Preliminary Documentation

Portland Energy Park

Madeira Packet Road, Portland

For Pacific Green Energy Park Portland Pty Ltd (Pacific Green)

18 August 2025

cogency
Planning | Engagement | Strategy

Nature Advisory
Formerly Brett Lane & Associates

JBS&G

Pacific Green

Document Details

Portland Energy Park

Report Name:	Preliminary Documentation
Revision:	4
Date:	18 August 2025
Client:	Pacific Green Energy Park Portland Pty Ltd (Pacific Green)
Prepared by:	**Nature Advisory:** Chris Armstrong, Emma Basile, Elinor Ebsworth **Cogency:** Billy Greenham **JBS&G:** Cameron Miller **Pacific Green:** James Segundo

This document has been prepared for, and for the exclusive use of, the client listed above, and is subject to the fee proposal and terms of conditions between Cogency and the client. Cogency accepts no liability for any use of, or reliance upon, this document by any party other than the client.

Cogency acknowledges the shared authorship of this document, prepared in collaboration with Nature Advisory, JBS&G and Pacific Green.

Cogency Australia Pty Ltd
cogencyaustralia.com.au
office@cogencyaustralia.com.au

Document history

Version	Date	Description	Author	Approved
1	06/03/25	Initial draft	CA, EB, EE, CM, BG	CA
2	14/05/25	Final draft	CA, EB, EE, CM, BG, JS	CA, CM, BG
3	27/05/2025	Final	CA, EB, EE, CM, BG, JS	CA, CM, BG, JS
4	17/07/25	Final (addressing RFI)	CT, BG, CM	BG, CM, JS
5	18/08/2025	Final (version control)	BG	BG, CM

We celebrate the physical and spiritual connections between Indigenous people and place expressed through the Birrarung Wilam (Common Ground) art project on the banks of Melbourne's Yarra River.

Acknowledgement of Country

Cogency acknowledges the Traditional Owners and Custodians of the land on which we meet, work and write, the Wurundjeri Woi-wurrung peoples of the Kulin nation, and their connections to land, sea, and community. We pay our respect to their Elders past and present.

Cogency also extends that respect and acknowledges the Traditional Custodians of Portland, the Gunditjmara. We recognise and respect their cultural heritage, beliefs and continuing connection with the land and waterways. We also recognise the resilience, strength, and pride of the Gunditjmara and First Nations communities and acknowledge that Sovereignty was never ceded.

Executive Summary

The Action

Pacific Green Energy Park Portland Pty Ltd (Pacific Green, the Person proposing to undertake the Action) have proposed the use and development of the Portland Energy Park (the Action), located in Portland, Victoria. The Portland Energy Park is a 1GW / 2.5GWh battery energy storage system (BESS) (in 4 x 250MW 'battery parks') and is a critical piece of electricity grid infrastructure. It is one of the largest BESS proposals in Australia.

This Preliminary Documentation submission supports referral '2024/09947' under the EPBC Act. The Action was referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) on 26 September 2024, and on 25 October 2024 was determined to be a Controlled Action subject to Preliminary Documentation assessment. The basis of the referral decision was the potential to have a significant impact upon four listed threatened species:

- Blue-winged Parrot (*Neophema chrysostoma*) – Vulnerable
- Southern Bent-wing Bat (*Miniopterus orianae bassanii*) – Critically endangered
- Southern Brown Bandicoot (*Isoodon obesulus obesulus*) – Endangered
- Swamp Antechinus (*Antechinus minimus maritimus*) – Vulnerable.

This submission provides an overview of the Action, the Project area and existing environment, the potential impacts to Matters of national Environmental Significance (MNES), the design features and evolution supporting avoidance and minimisation of potential impacts, and an assessment of potential impacts for each relevant species.

The Project area is located across multiple parcels of land either side of Madeira Packet Road, within the Portland 'Smelter Precinct' – a State-significant industrially-zoned area in South Portland. Pacific Green has secured purchase and lease rights over the involved private freehold land.

The Action will require development of approximately 25-34 hectares of the 113-hectare Project area (described in three parts as 'North Site, 'East Site', and 'West Site' for ease). The Action requires ancillary infrastructure (33kV collector stations, new 500kV terminal station and transmission connection to existing Heywood–Portland 500kV transmission network), and ancillary infrastructure and works, such as new access points and internal tracks, native vegetation removal, security fencing, drainage, earthworks and landscaping.

The Project area is ideally suited to a BESS and associated infrastructure development, as it has direct access to existing transmission infrastructure, is within an industrial precinct with a highly modified landscape, energy intensive users, and has low bushfire risk and sufficient distance from residential land. The Action represents a significant investment in Portland, with social and economic benefits.

Pacific Green is committed to community and stakeholder involvement and has undertaken comprehensive community and stakeholder engagement, including an early round of consultation as a high-level introduction to the Project, and a second round that provided further design detail once the concept plan had progressed. The project team have regularly engaged with the Gunditj Mirring Traditional Owners Aboriginal Corporation (GMTOAC), Glenelg Shire Council (Planning, Engineering, Executive and Councillor teams) and other key stakeholders.

The Action will provide critical electricity grid services, a new terminal station that can service future energy projects, significant regional economic benefit, and a major contribution to Victoria's energy storage targets.

The design of the Action has iteratively evolved since early due diligence through to the current indicative layout, with intentional efforts to achieve strong avoidance and minimisation of impacts to site values. Native vegetation removal has primarily been avoided and impacts to natural values minimised, with additional vegetation planting and wetland rehabilitation proposed. Areas of elevated cultural heritage significance have been avoided and disturbance minimised.

Mitigations

In addition to the steps taken to avoid and minimise impacts, additional steps to mitigate the direct and indirect impacts during the construction and operation phases have been developed. The balance land will continue to be used for agricultural purposes and notably, managed via the proposed (draft) Land Management & Rehabilitation Plan (LMRP) (Appendix E) that seeks to provide an overall increase in biodiversity values. Furthermore, a draft Environmental Management Plan (EMP) for the Action (Appendix F) has been prepared, the purpose is to "*ensure that the proposed construction and operation works on site are managed to acceptable standards and appropriate controls are put in place to manage human and environmental risks*". For both construction and operation, the draft EMP includes measures related to air quality, noise and vibration, lighting, traffic management, erosion and sediment control, waste management, soil and contamination, surface water and groundwater, ecology, flora and fauna, weed and pest management, public safety, fire and environmental emergency response, with consideration of specific measures required for MNES.

The LMRP has been developed to address the strategic environmental management of the Project area. Specifically, the plan has been prepared to inform construction and rehabilitation activities, including four key land-management treatments (LMT) (plantings and management totalling 21.89 ha), with associated performance requirements:

1. Roadside (0.25 ha of plantings)
2. Perimeter (0.2.62 ha of plantings)
3. Blue-winged Parrot terrestrial and wetland enhancement (0.50 and 7.33 ha of plantings, respectively)
4. Pest animal and grazing management (11.19 ha of managed area)

The LMRP over-arching goal is "to improve the overall ecological conditions of the site through time such that the project mitigates its environmental impacts and ultimately results in a nature positive outcome".

Site specific investigations

This Preliminary Documentation primarily relies upon the ecological assessments conducted by Nature Advisory. These include flora and fauna assessment, targeted survey assessments, and detailed Blue-winged Parrot assessment:

- Portland Battery Energy Storage System (BESS) - Flora and Fauna Assessment, Report No. 23146.03 (120) (Nature Advisory 2024a). (Appendix B)
- Portland Battery Energy Storage System (BESS) - Targeted Flora Survey, Report No. 23146.02 (1.1) (Nature Advisory 2024b). (Appendix C)
- Portland Battery Energy Storage System (BESS) - Detailed Assessment for Blue-winged Parrot, Report No. 23146 (7.2) (Nature Advisory 2024c). (Appendix D)

Existing environment

The Project area is a flat to gently undulating landscape 30-40 metres above sea level, supporting grazing paddocks of introduced grasses with numerous ephemeral wetlands. The history of cattle grazing throughout the paddocks has resulted in the ground being heavily pugged.

In general, the vegetation throughout the Project area is highly modified from its original condition due to the historical land clearing and evidently intense grazing pressure on the land. The condition of the vegetation is poor due to the absence of canopy trees, loss of native species diversity and a very high cover of pasture grasses and commonly associated weeds. Terrestrial native vegetation within the Project area consists predominantly of Heathy Woodland that had been significantly modified, and is essentially restricted to the adjacent road reserves. Sparse areas of native rush occurred in the south-eastern portion of the Project

area, providing foraging habitat for Blue-winged Parrot, observed in small groups, opportunistically foraging on this vegetation while it was in seed.

There are no defined waterways that run through or near the Project area, with the topography creating low-lying wetland areas. Historically, informal drainage channels have been dug, and several depressions fill during rainfall events. These areas are highly modified and are accessed by Cattle under the existing agricultural use. These modified wetlands vary in size and depth, including constructed drainage lines, seasonally-flooded pastures, and shallow wetlands with open water. Native aquatic vegetation (Aquatic Herbland EVC) is present within low-lying areas of pasture and constructed drainage channels.

Both terrestrial and aquatic fauna habitat is present within the Project area. Aquatic habitat occurs in the form of ephemeral wetlands and drainage lines which provide breeding and foraging habitat for common frogs and waterbirds, both of which were observed to be utilising aquatic habitat present. However, the limited structural diversity within and surrounding these wetlands, in conjunction with their ephemeral nature limited the overall value of this habitat for fauna species. Wetland areas fringed by native rush (*Juncus* spp.) also provided terrestrial foraging habitat for Blue-winged Parrot.

Key listed threatened species and ecological communities

The Action will impact 10.827 hectares of foraging habitat (low-quality, primarily exotic species) for the Blue-winged Parrot, and 0.072 hectares of native vegetation that is assumed habitat for Southern Brown Bandicoot and Swamp Antechinus.

Regarding the four relevant MNES, this Preliminary Documentation finds that:

Blue-winged Parrot (*Neophema chrysostoma*) – Vulnerable

While the Action will impact 10.827 hectares of foraging habitat for the Blue-winged Parrot, it is considered that the Action will not have a significant impact on the species. The foraging habitat to be impacted is low quality, predominantly exotic pasture grasses, and there is a significant amount of similar foraging habitat in the site surrounds and region. Notably, the commitment to increase habitat availability and quality through the implementation of a LMRP, and management of traffic, fire, noise and vibration through an EMP, is considered to mitigate impacts and indeed will see enhancement of terrestrial and aquatic habitat on site.

Southern Bent-wing Bat (*Miniopterus orianae bassanii*) – Critically endangered

Southern Bent-wing Bat are likely to use the surrounding landscape to commute and forage, given the Project area is situated within 20 km of two known roosting caves and a maternity cave. While SBWB may occasionally fly over the Project area and opportunistically forage and drink from the wetlands (when inundated), there is limited treed habitat within the Project area except for along roadsides and the Project area is considered sub-optimal compared to treed waterbodies in the surrounding landscape.

The Action has taken a precautionary approach and will follow the National Light Pollution Guidelines for Wildlife (DCCEEW 2023) to aid in mitigating cumulative impacts of light pollution across the landscape. Furthermore, the proposed measures to expand and enhance the quality of the wetland habitat in the Project area will be of benefit to Southern Bent-wing Bat, and are considered adequate to maintain (assuming presence) species persistence and habitat usage at the Project area. Indeed, these commitments will likely increase usage of the wetland area by Southern Bent-wing Bat, resulting in a net gain for the species.

Southern Brown Bandicoot (*Isoodon obesulus obesulus*) – Endangered

While the Action will impact 0.072 hectares of native vegetation that is assumed habitat for Southern Brown Bandicoot, the Action is not considered to have a significant impact on this species. The habitat to be impacted is considered relatively low quality, given the existing degree of fragmentation, with availability of large areas of high-quality habitat adjacent to the Project area.

Swamp Antechinus (*Antechinus minimus maritimus*) – Vulnerable

While the Action will impact 0.072 hectares of native vegetation that is assumed habitat for Swamp Antechinus, the Action is not considered to have a significant impact on this species. The habitat to be impacted is considered relatively low quality, given the existing degree of fragmentation, with availability of large areas of high-quality habitat adjacent to the Project area.

Conclusion

Based on the outcomes of assessments and proposed management plans supporting this Preliminary Documentation, as well as consideration of the mitigation hierarchy, it is anticipated that the Action will not result in any significant residual impacts to the four relevant MNES listed above. The Action therefore is not expected to trigger offset requirements.

Table of Contents

Executive Summary **4**
Glossary **10**
1. Introduction **12**
1.1 Introduction 12
1.2 The Action 14
1.3 Table of replies 16
1.4 Site context 20
1.5 The Person proposing to take the Action 22
1.6 Traditional Owners 22
1.7 Background and studies 23
2. Description of the Action **24**
2.1 Project area overview 24
2.2 The Action 24
2.3 Other approvals 28
2.4 Future third-party expansion 30
3. Description of the environment **31**
3.1 Landscape and land use 31
3.2 Terrestrial environment 32
3.3 Aquatic environment 33
3.4 Matters of National Environmental Significance (MNES) 33
4. Impact pathways **37**
5. Avoidance and mitigation steps **39**
5.1 Avoidance and minimisation 39
5.2 Mitigation 48
6. Listed MNES **55**
6.1 Blue-winged Parrot 55
6.2 Southern Brown Bandicoot 69
6.3 Swamp Antechinus 77
6.4 Southern Bent-wing Bat 85
7. Social, economic and engagement considerations **94**
7.1 Economic and social impacts 94
7.2 Community engagement 95
7.3 First Nations engagement 96
8. Ecologically sustainable development **97**
8.1 Meeting Australia's National and international obligations 98
9. Conclusion **99**
10. Information sources **101**

Appendix A **Design pack**
Appendix B **Portland Battery Energy Storage System (BESS) - Flora and Fauna Assessment**
Appendix C **Portland Battery Energy Storage System (BESS) - Targeted Flora Survey**
Appendix D **Portland Battery Energy Storage System (BESS) - Detailed Assessment for Blue-winged Parrot**
Appendix E **Land Management & Rehabilitation Plan**
Appendix F **Environmental Management Plan**
Appendix G **Flood Impact and Water Quality Assessment**
Appendix H **Socioeconomic Impact Assessment**
Appendix I **Consultation Summary Report**
Appendix J **EPBC Act listed flora likelihood of occurrence**
Appendix K **EPBC Act listed fauna likelihood of occurrence**

Table of Figures

Figure 1 - Project area overview 13
Figure 2 – The Action: functional layout and project terms 14
Figure 3 – Site context 21
Figure 4 – Detail and staging layout 25
Figure 5 – Artist impression of the Portland Energy Park 26
Figure 6 - Proposed layout of Action in comparison to the potential future expansion for AEMO 30
Figure 7 – Existing ecological values 31
Figure 8 – Impacts to MNES 37
Figure 9 – Early planting establishment 49
Figure 10 - Extract from (Engel et al., 2024), showing noise impacts to Psittaciformes (Ps) – parrots 51
Figure 11 - VBA, eBird and Nature Advisory records for BWP in the search region (20km buffer) 56
Figure 12 – Habitat overview of MNES 58
Figure 13 – Blue-winged parrot habitat distribution model 59
Figure 14 - VBA records for SBB in the search region (10km buffer) 70
Figure 15 - ALA records for SBB in the search region (10km buffer) 71
Figure 16 - NatureKit Habitat Distribution Modelling (HDM) for SBB within the Project area and surrounds 71
Figure 17 – SBB habitat distribution model (2km) (NatureKit) 72
Figure 18 – VBA records for SA in the search region (10km buffer) 78
Figure 19 - ALA records for SA in the search region (10km buffer) 78
Figure 20 - NatureKit Habitat Distribution Modelling (HDM) for SA within the Project area and surrounds 79
Figure 21 – SBB habitat distribution model (2km) (NatureKit) 80
Figure 22 - VBA records for SBWB in the search region (20km buffer) 86
Figure 23 - ALA records for SBWB in the search region (20km buffer) 87

List of Tables

Table 1 – Action definitions 12
Table 2 – Project area land parcels 12
Table 3 - Table of replies 16
Table 4 – The Person proposing to take the Action 22
Table 5 - Summary of treatments and their areas 28
Table 6 - EPBC Act-listed ecological communities and likelihood of occurrence in the Project area 34
Table 7 - Site influences on design 40
Table 8 - Design Iterations 43
Table 9 - Significant Impact Assessment – Blue-winged Parrot (EPBC: Vulnerable) 66
Table 10 - Significant Impact Assessment – Southern Brown Bandicoot (EPBC: Endangered) 75
Table 11 - Significant Impact Assessment – Swamp Antechinus (EPBC: Vulnerable) 83
Table 12 - Impacts on Southern Bent-wing Bats in relation to MNES impact criteria for critically endangered species 91

Glossary

Abbreviation	Meaning
ABS	Australian Bureau of Statistics
AEMO	Australian Energy Market Operator
AHD	Australian Height Datum
ALA	Atlas of Living Australia
BESS	Battery energy storage system
BWP	Blue-winged Parrot
CEC	Clean Energy Council
CFA	Country Fire Authority
CHMP	Cultural Heritage Management Plan
dB(ENL)	Decibel (effective noise level)
DEECA	Department of Energy, Environment and Climate Action
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Cth)
DTP	Department of Transport and Planning (Vic)
EMP	Environmental Management Plan
EPA	Environmental Protection Authority (Vic)
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ERA	Environmental Risk Assessment
ESD	Ecologically Sustainable Development
EVC	Ecological Vegetation Class
FFG Act	Flora and Fauna Guarantee Act 1988
FTE	Full time equivalent
GHCMA	Glenelg Hopkins Catchment Management Authority
GMTOAC	Gunditj Mirring Traditional Owners Aboriginal Corporation (the RAP)
HDM	NatureKit Habitat Distribution Modelling
HV	High voltage
HVAC	HV Alternating Current
IAP2	International Association for Public Participation
LED	Light-emitting diodes
LGA	Local Government Area
LMRP	Lands Management and Rehabilitation Plan
LMT	Land Management Treatment
kV	kilovolt
MER	Monitoring, Evaluation and Reporting
MNES	Matters of national environmental significance
MW	Megawatt
MWh	Megawatt-hour
MV	Medium voltage
NEM	National Energy Market (NEM)
O&M	Operations and Maintenance
PAS	Portland Aluminium smelter
PBFD	Psittacine Beak and Feather Disease

RAP	Registered Aboriginal Party
REZ	Renewable Energy Zone
RNTBC	Registered Native Title Body Corporate
SA	Swamp Antechinus
SBB	Southern Brown Bandicoot
SBWB	Southern Bent-wing Bat
SPRAT	Species Profile and Threats
TNSP	Transmission Network Service Provider
VBA	Victorian Biodiversity Atlas

1. Introduction

1.1 Introduction

This Preliminary Documentation submission supports a referral under the EPBC Act for the Portland Energy Park (the Action). The Action is a proposed large-scale BESS at Madeira Packet Road, Portland, in Southwest Victoria.

The Action was referred to the Commonwealth DCCEEW on 26 September 2024, and determined to be a Controlled Action subject to Preliminary Documentation assessment on 25 October 2024.

This submission provides an overview of the Action, the Project area and existing environment, the potential impacts to MNES, and an assessment of potential impacts for each relevant species.

Pacific Green have engaged Cogency Australia Pty Ltd (Cogency – a planning and engagement consultancy), Nature Advisory (ecological consultancy) and JBS&G (a multi-disciplinary consultancy) to prepare the enclosed Preliminary Documentation package. This consultant team have been supporting Pacific Green on the Portland Energy Park since early feasibility assessments commenced two years ago.

The relevant definitions for the Action are shown in Table 1 and Figure 1.

Table 1 – Action definitions

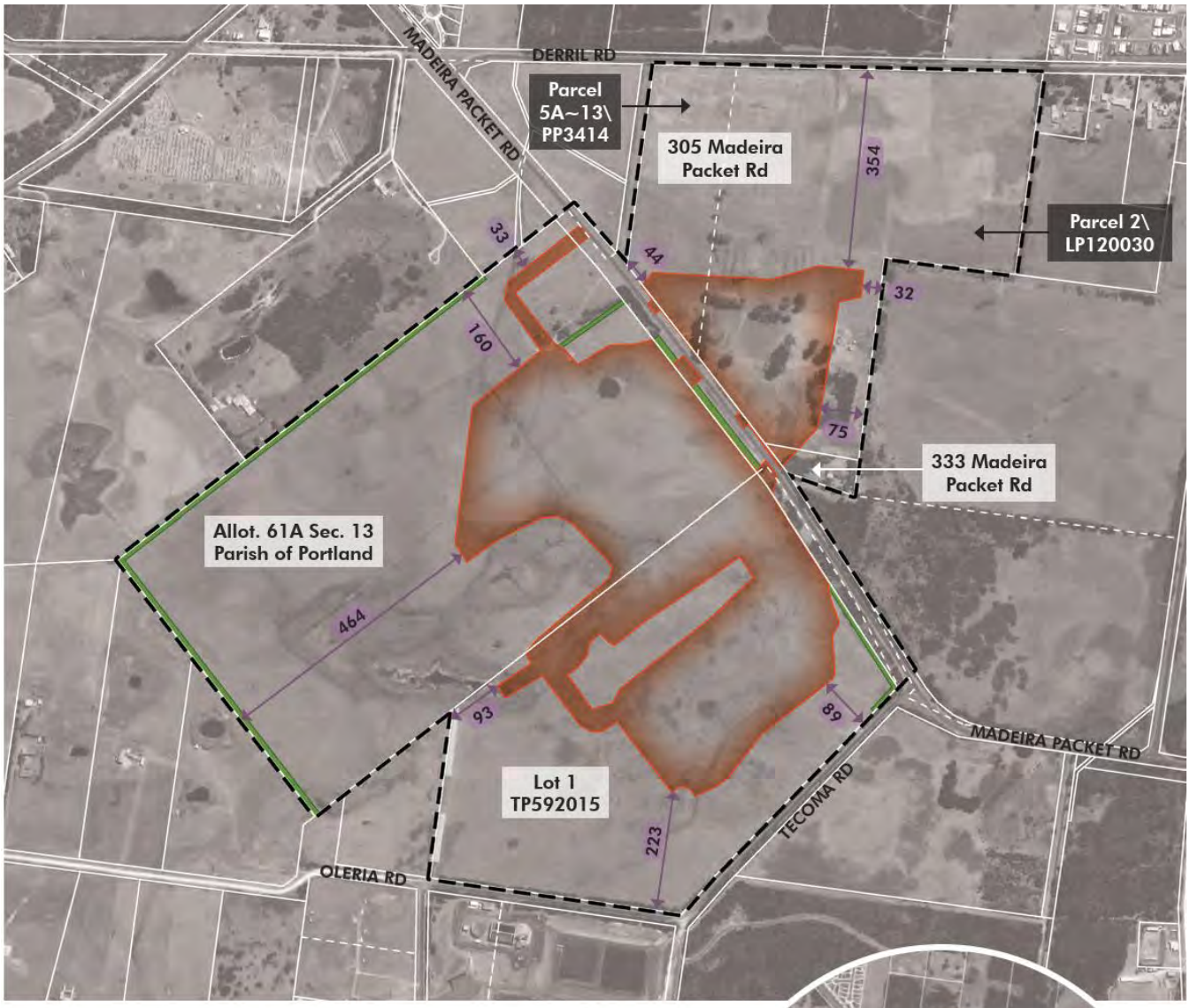
Term used	Definition	Notes
Project area	The area of land where the Action is proposed to take place.	The Project area comprises 5 freehold parcels of land (Table 1) and the adjacent areas of Madeira Packet Road reserve (Crown Land). The Project area is approximately 120 ha. The Project area spans land either side of Madeira Packet Road and has defined areas 'Portland East', 'Portland West', and 'Portland North' (Figure 1). Referred to as 'the Site' in Victorian planning permit application documentation
Disturbance footprint	The maximum physical extent of works associated with the Action that create a temporary change in environmental conditions on the natural environment of the site.	The maximum extent of works is shown in Figure 1, comprising approximately 34 ha. Notably, this area may not be fully disturbed, subject to construction management and detailed design. Referred to as the 'Development area' in Victorian planning permit application documentation

Areas of mapped habitat and proposed rehabilitation activities are shown in Appendix E.

The land parcels comprising the Project area are shown in Table 2, noting that not all parcels include street address numbers. Pacific Green have option agreements in place for all involved private land, for purchase or long-term lease.

Table 2 – Project area land parcels

Street address	Title details	Project reference
Madeira Packet Road	Lot 1 TP592015	'East Site'
Madeira Packet Road	Allotment 61A Section 13 Parish of Portland	'West Site'
333 Maderia Packet Road	1\LP120030	'North Site'
305 Maderia Packet Road	2\LP120030 and 5A~13\PP3414	



PROJECT BOUNDARIES AND AREAS

0 100 200 300 400 M
1:10,000 @ A4
PROJECTION: GDA2020/MGA ZONE 54

LEGEND:

- PROPERTY BOUNDARIES
- PARCEL BOUNDARIES WITHIN PROPERTIES
- PROJECT SITE AREA (SUBJECT PROPERTIES WITH ADJACENT ROAD RESERVE)
- DISTURBANCE FOOTPRINT (MAXIMUM EXTENT OF DEVELOPMENT AND ASSOCIATED DISTURBANCES)
- ADDITIONAL LANDSCAPING AREA (MAY BE USED IN ADDITION TO THE DISTURBANCE FOOTPRINT FOR PLANTING, AS PART OF PROJECT DELIVERY)
- # SETBACK DISTANCE IN METRES

Figure 1 - Project area overview

1.2 The Action

Pacific Green Energy Park Portland Pty Ltd (Pacific Green) proposes the construction, operation and decommissioning of the Portland Energy Park, a utility-scale battery energy storage system (BESS) (the Action). The proposed BESS will have a capacity of 1GW / 2.5GWh, making it one of the largest battery storage projects in Australia. The Project area covers approximately 34 ha and includes four 250 MW battery 'parks', electricity switchyard infrastructure, transmission line connection into the existing high-voltage network, and associated infrastructure and works such as access tracks, benching, drainage and landscaping.

The Action will involve the construction of the BESS and electricity infrastructure (including 33/500 kV collectors, a 500 kV terminal station, and grid connection to the existing 500 kV transmission line), with associated infrastructure and works including access tracks, security fencing and earthworks (Figure 2).

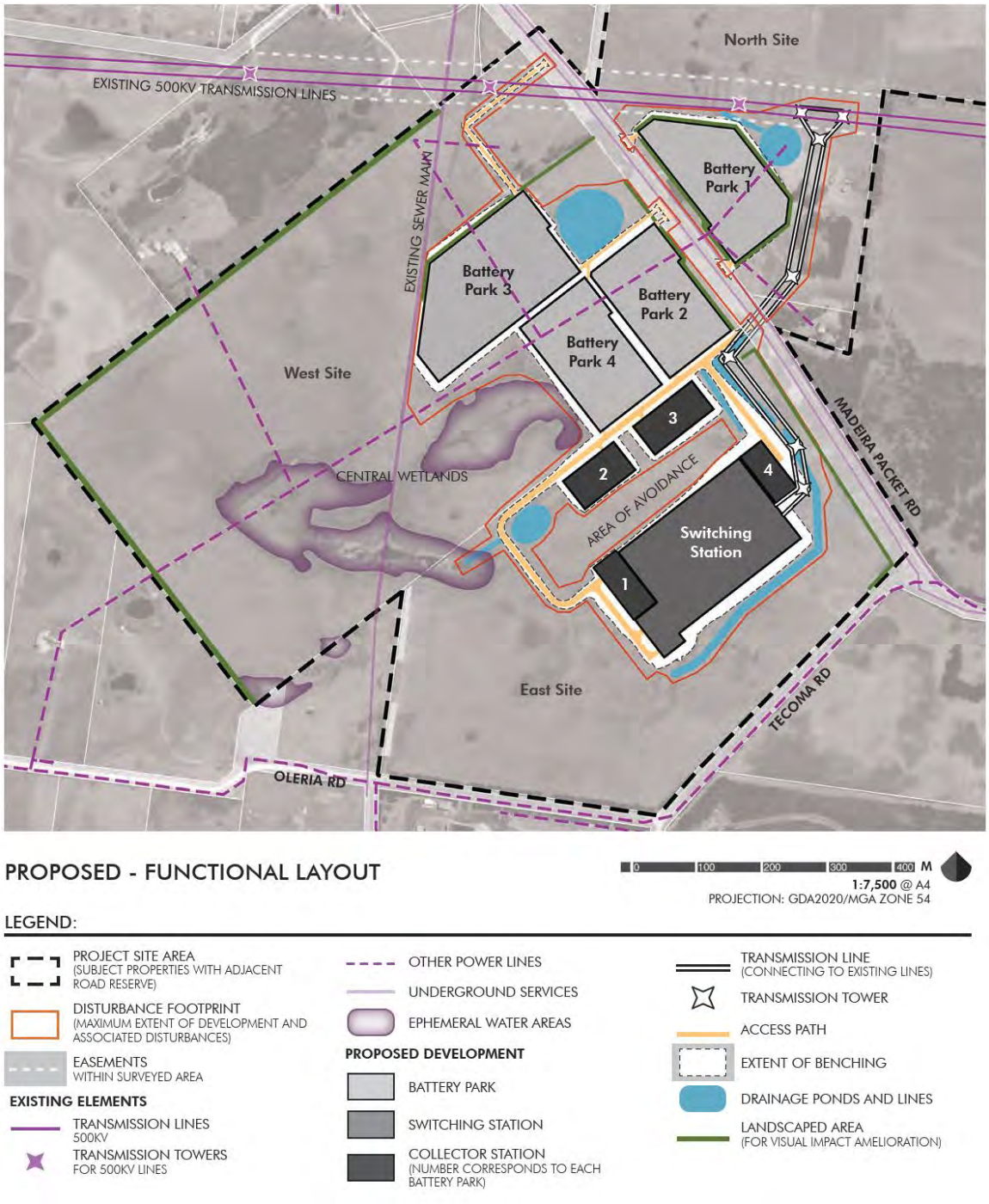


Figure 2 – The Action: functional layout and project terms

The Action is taking place on land currently used for agricultural grazing. The Action also proposes landscape revegetation and active management to increase the biodiversity value on parts of the balance land of the Project area, that are currently denuded through historical grazing activities. These landscape rehabilitation areas include biodiversity planting belts on some boundaries of the West and East Sites, and ephemeral water areas central within the Project area (Figure 2, and Figure 3 of Appendix E).

Once operational, the Portland Energy Park will provide critical energy storage and stability for the National Electricity Market (NEM) grid. By helping to store and manage energy generated from renewable energy sources, the Action will support existing and proposed renewable energy projects within Victoria's South West Renewable Energy Zone (SWREZ), while helping to strengthen energy supply and price stability for households across Victoria and support Victoria's energy transition. The 500kV component will become a significant regional public asset.

The following factors support the use and development of a BESS and associated infrastructure within the Project area:

- Large landholding and appropriate zoning as Industrial 2 Zone (IN2Z – heavy industry)
- Seamless integration with the surrounding electrical infrastructure, particularly the 500 kV high-voltage transmission lines crossing through the north of the Project area.
- Proximity to energy-intensive users such as the existing Portland Water Treatment Plant and Portland Aluminium smelter (responsible for approximately 10% of Victoria's energy consumption), and access to main roads (Madeira Packet Road is part of the Victorian Principal Freight Network, with direct access to the deepwater Port of Portland).
- Located within the Southwest Renewable Energy Zone (as designated by the Australian Energy Market Operator and the Victorian Government), providing support for existing and proposed renewable energy projects.
- Conducive to Portland's transition to renewable energy, with onshore windfarms in operation and proposed, as well as the recently declared Southern Ocean Offshore Wind Area.

Section 1.6 gives an overview of the studies undertaken to inform the Action's design, and this referral.

A planning permit application was lodged with the Victorian Minister for Planning in August 2024 with the assessment process nearing completion. While this Preliminary Documentation submission is focused upon EPBC Act matters, it is noted that the Action has been informed and supported by a suite of technical assessments over a two-year period. The following technical reports were lodged with the planning permit application:

- Planning Report
- Design Plans
- Consultation Summary Report
- Noise Assessment
- Flora and Fauna Assessment
- Preliminary Hazard Assessment
- Flood Impact and Water Quality Assessment
- Landscape and Visual Impact Assessment
- Traffic and Transport Impact Assessment
- Letter from Head, Transport for Victoria providing consent to lodge this application under the provisions of the Transport Zone 2.

Section 5 provides a summary of the design iteration – particularly avoidance and minimisation steps – that have evolved as the proposal was progressed from early feasibility to concept design, to planning.

1.3 Table of replies

Table 3 provides direction to responses to address each item contained within DCCEEW's *Request for Additional Information – Assessment* by Preliminary Documentation (25 October 2024).

Table 3 - Table of replies

Information required		Response
Description of the Action		
1.1	The location, boundaries and size (in hectares) of the disturbance footprint and of any adjoining areas which may be indirectly impacted by the proposal, including nearby vegetation. Include mapping and coordinates.	Section 2.2
1.2	An indicative layout plan for the proposed action area, including the location and type of land use, key infrastructure, and the number and location of buildings. Include mapping and coordinates for each of the above.	Section 2.2
1.3	A description of any changes to the project design since the referral documentation was submitted.	Section 2.2.3
1.4	The anticipated timing and duration (including start and completion dates) for all activities and for each phase of the project, which must include, but is not limited to, construction, operation and decommissioning.	Section 2.2.2
1.5	A description, including timing and duration, of any ongoing operational requirements including any anticipated maintenance works.	Section 2.2.2
Description of the environment		
2	This section must provide a description of the environment, which includes but is not limited to: ▪ a detailed description of the terrestrial and aquatic environments affected (in the short and the long term) by the proposed action. ▪ a detailed description of the land use within and adjacent to the proposed action area.	Section 3
Habitat assessment		
3.1.1	A description of any potential MNES that occur, or have the potential to occur, within or adjacent to the proposed action area.	Section 3.3
3.1.2	Information regarding known records of the MNES within or adjacent to the proposed action area, utilising relevant information sources such as Atlas of Living Australia (ALA) and NatureKIT.	Sections 3.3 & 6
3.1.3	A detailed assessment of habitat values present for MNES. This assessment must include the location, size, type, and value of MNES habitat both within and adjacent to the proposed action area.	Sections 3.2, 3.3 & 6
3.1.4	Recent targeted surveys to confirm the presence, status, and extent of relevant listed threatened species within the proposed action area. If it is believed that targeted surveys are not necessary, a well-substantiated explanation of why targeted surveys are not considered necessary.	Sections 1.5, 3.3 & 6
3.1.5	All targeted surveys for MNES must be consistent with the department's survey guidelines or the available significant impact guidelines for these species, available from the department's Species Profile and Threats (SPRAT) database at http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl.	Sections 1.5, 3.3 & 6
3.1.6	An assessment of the adequacy of any surveys undertaken. This must include survey effort, timing, and consistency with the department's relevant scientific and policy guidance.	Sections 1.5, 3.3 & 6
Impact assessment		
4.1.1	An assessment of any light, noise, vibration and/or visual impacts to listed species' breeding or foraging activities within or adjacent to the proposed action area as a result of construction, operation and ongoing maintenance associated with the proposed action.	Section 6
4.1.2	An assessment of the likely impacts as a result of the direct and indirect loss and/or disturbance of MNES individuals and habitat as a result of the proposed action. This must include:	Section 6

	i. description of the type (nesting/foraging etc) of habitat and quality/value of habitat for that species. ii. quantification of the area (in hectares) of habitat, and/or number of hollows to be impacted (including through loss and/or disturbance). iii. a detailed assessment of the impact of the loss of any suitable habitat area/features on the species/community population. This must consider the type and quality of the habitat impacted. This must include consideration of suitable habitat and species' movement patterns in adjacent and surrounding areas.	
4.1.3	An assessment of the impacts of habitat fragmentation in the proposed action area and surrounding areas, including consideration of species' movement patterns and habitat requirements to support breeding and foraging activities.	Section 6
4.1.4	An assessment of loss and/or changes to water quality, hydrology, and flow regime of waterways in or near the Action area as a result of construction and/or operation associated with the proposed action.	Section 6, Appendix G
4.1.5	An assessment of the potential impacts to listed species within or near the proposed action area as a result of increased traffic during construction and operation of the proposed action.	Section 6
4.1.6	An assessment of the likely duration of all potential impacts as a result of the proposed action, including an assessment of whether impacts are likely to be repeated (for example as part of ongoing or future maintenance).	Section 6
4.1.7	A discussion of whether any impacts are likely to be unknown, unpredictable, or irreversible.	Section 4
4.1.8	An assessment of any cumulative and/or facilitated impacts to listed species and communities as a result of, or relating to, actions referred by Pacific Green Energy Park Portland Pty Ltd.	Section 6.1.8, 6.2.8, 6.3.8, 6.4.7
4.1.9	Justification, with supporting evidence, of how the proposed action will not be inconsistent with: ▪ Australia's obligations under the Biodiversity Convention, the Convention of Nature in the South Pacific (Apia Convention), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); and ▪ the recovery of listed threatened species or ecological communities, through the context of the relevant Recovery Plans for those listed threatened species or ecological communities.	Section 8.1
4.1.10	An assessment of any risk to MNES in or around the proposed action area resulting from fire occurring as a result of construction or operation of the proposed action.	Section 6
Avoidance and mitigation measures		
5.1	A detailed summary of measures proposed to be undertaken by the proponent to avoid, mitigate and manage relevant impacts of the proposed action on relevant MNES, and to maintain connectivity through the site and the surrounding area.	Section 5
5.2	An analysis of whether mitigation measures are suitable and adequate to maintain species persistence and habitat usage in the remainder of the habitat patch, or whether offsets for that habitat area is required.	Section 6
5.3	The proposed measures must be based on best available practices, appropriate standards, evidence of success for other similar actions and supported by published scientific evidence.	References throughout, Section 11
5.4	All proposed measures for MNES must be drafted to meet the 'S.M.A.R.T' principle: ▪ S – Specific (what and how) ▪ M - measurable (baseline information, number/value, auditable) ▪ A – achievable (timeframe, money, personnel) ▪ R – relevant (conservation advices, recovery plans, threat abatement plans) ▪ T – Time-bound (specific timeframe to complete)	Section 5 & the LMRP (Appendix E)
5.5	Details of specific and measurable environmental outcomes to be achieved for relevant MNES. All commitments must be drafted using committal language (e.g. 'will, 'must') when describing the proposed measures.	Section 5 & the LMRP (Appendix E)
5.6	Details of the proposed measures to be undertaken to avoid, mitigate and manage the relevant impacts of the proposed action, including those required through other Commonwealth, state and local government approvals.	Section 5 & the LMRP (Appendix E)

5.7	Information on the timing, frequency and duration of the proposed avoidance, mitigation, management and monitoring measures, and corrective actions to be implemented.	Section 5
5.8	An assessment of the expected or predicted effectiveness of the proposed measures.	Section 6 & the LMRP (Appendix E)
5.9	Any statutory or policy basis for the proposed measures, including reference to the SPRAT database and relevant approved conservation advice, recovery plan or threat abatement plan, and a discussion on how the proposed measures are not inconsistent with relevant plans.	Section 6
5.10	Details of ongoing management, including monitoring programs to support an adaptive management approach, that validate the effectiveness of the proposed measures and overall demonstrate that environmental outcomes will be achieved.	Section 5 & the LMRP (Appendix E)
5.11	Details of tangible, on-ground corrective actions that will be implemented in the event the monitoring programs indicate that the environmental outcomes have not or will not be achieved.	LMRP (Appendix E)
5.12	Details of any measures proposed to be undertaken by Victoria and local governments, including the name of the agency responsible for approving each measure.	N/A
Offsets		
6.1	An assessment of the likelihood of residual impacts occurring on relevant MNES, after avoidance, mitigation and management measures have been applied. This assessment must be in accordance with the department's Significant Impact Guidelines 1.1.	Section 6
6.2	If residual impacts to MNES are likely, include a draft OAMP as an appendix to the PD. The draft OAMP will incorporate an Offset Management Strategy and an Offset Management Plan. The draft OAMP must: ▪ be prepared by a suitably qualified ecologist, ▪ meet the information requirements set out in Appendix B, and ▪ must be developed in accordance with the department's Environmental Management Plan Guidelines (2024), available at Environmental Management Plan Guidelines - DCCEEW.	N/A
6.3	A summary of the proposed environmental offset and key commitments to achieve a conservation gain for each protected matter.	N/A
Social and economic		
7.1	An analysis of the economic and social impacts of the action, both positive and negative.	Section 7.1
7.2	Details of any public consultation activities undertaken and their outcomes.	Section 7.2
7.3	Details of any consultation with any indigenous stakeholders. **Indigenous Engagement** Identify existing or potential native title rights and interests, including any areas and objects that are of particular significance to Indigenous peoples and communities, possibly impacted by the proposed action and the potential for managing those impacts. Describe any Indigenous consultation that has been undertaken, or will be undertaken, in relation to the proposed action and their outcomes. The department considers that best practice consultation, in accordance with the Guidance for proponents on best practice Indigenous engagement for environmental assessments under the EPBC Act (2016) includes: ▪ identifying and acknowledging all relevant affected Indigenous peoples and communities; ▪ committing to early engagement; ▪ building trust through early and ongoing communication for the duration of the project, including approvals, implementation and future management; ▪ setting appropriate timeframes for consultation; and ▪ demonstrating cultural awareness. Describe any state requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply to the proposed action with regards to Indigenous peoples and communities.	Section 7.3

7.4	Projected economic costs and benefits of the project, including the basis for their estimate through cost/benefit analysis or similar studies.	Section 7.1
Other approvals and conditions		
8.1	a description of any approval obtained or required to be obtained from a state or Commonwealth agency or authority (other than an approval under the EPBC Act).	Section 2.3.1
8.2	any conditions that apply, or are proposed to apply, to the proposed action.	Section 2.3.2
8.3	a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the proposed action.	Section 2.3.2 & 6
Environmental record of the Person proposing to take the Action		
9	Please provide the following information, including details of any proceedings under a Commonwealth, state, or territory law for the protection of the environment or the conservation and sustainable use of natural resources against: a) the person proposing to take the action. b) for an action for which a person has applied for a permit, the person making the application. If the person proposing to take the action is a corporation, details of the corporation's environmental policy and planning framework should be described.	Section 1.5
Ecologically sustainable development		
10.1	the long-term and short-term economic, environmental, social and equitable considerations.	Section 8
10.2	the precautionary principle which states that a lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation where there are threats of serious or irreversible environmental damage.	Section 8
10.3	the principle of inter-generational equity which states that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.	Section 8
10.4	the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making.	Section 8
10.5	improved valuation, pricing and incentive mechanisms should be promoted.	Section 8
Conclusion		
11	The preliminary documentation must provide an overall conclusion as to the environmental acceptability of the proposal, including discussion on compliance with the principles of Ecologically Sustainable Development (ESD) and the objects and requirements of the EPBC Act. You may wish to include a statement as to whether or not the controlled action should be approved and may recommend conditions pertaining to an approval. This should include justification for undertaking the proposed action in the manner proposed. The measures proposed or required by way of offset for any unavoidable impacts on MNES and the relative degree of compensation, should be restated here.	Section 9
Information sources		
12	The preliminary documentation must state for the information provided, the following: a) the source and currency (date) of the information. b) how the reliability of the information was tested. c) the uncertainties (if any) in the information. d) any guidelines, plans and/or policies considered.	Section 10

1.4 Site context

The Project area is located within the *Smelter Industrial Precinct* as identified in the Portland Industrial Land Strategy, in the town of Portland, Southwest Victoria (Glenelg Shire LGA). The Project area lies within the Glenelg Plain bioregion, within the Glenelg Hopkins catchment management area and on the Traditional Lands of the Gunditjmara People.

Portland is a regional centre, 360 kilometres west-southwest of Melbourne with a population of 10,016 (ABS, 2021). It serves as the seat of the Glenelg Shire Council (LGA population of 20,152 (ABS, 2021)). The city's economy is driven by its deepwater port, industry (such as the Portland Aluminium smelter), skilled workforce, fishing, agricultural and forestry hinterland, and burgeoning renewable energy industry. The city provides local and regional education, health, sporting and emergency services.

The industrial precinct is characterised by the Portland Aluminium smelter, Wannon Water wastewater treatment plant, Bald Hill water supply facility, Portland Wind Farm, and vacant land used for agricultural purposes (see Figure 3). The industrial precinct is surrounded by the Portland township (residential area) to the north, coastal reserve to the south and east, and a strip of rural residential development to the west.

The immediate vicinity of the Project area is characterised by a mix of industrial, recreational, and rural residential uses. Nearby, the Portland area features several parks and forests, including Cape Nelson State Park (6.8 km southwest), Mount Chaucer Heath (4.3 km west), Portland H47 Bushland Reserve (2.2 km west), Yellow Rock Coastal Park (1.2 km southwest), Nelson Park (0.64 km north), and Yarraman Park (0.8 km northwest).

The land selected for the Action is within an Industrial 2 Zone under the Glenelg Planning Scheme and is currently used for agricultural grazing. The surrounding land is also zoned Industrial 2 Zone. The high voltage 500 kV Heywood Terminal to Portland Aluminium transmission line dissects the north of the Project area. The surrounding area includes operational wind farms. The Project area is bordered by the Wannon Water Portland Water Reclamation Centre and the Bald Hill Reservoir to the south, an access road and agricultural land to the east, and additional agricultural land to the northwest and west. The Project area is also located in proximity to the existing Portland Aluminium smelter.

Access to the Project area is via Madeira Packet Road, with some of land parcels on the northern and southern sides. This two-lane sealed road connects southern Portland to the major road network (A1, A200) and Port of Portland. Secondary access is available via Tecoma Road and Oleria Road. These secondary roads are also used for accessing nearby residential dwellings, the Wannon Water facility and agricultural land.

The Project area is currently used for agricultural grazing. Consistent with the clearing for the historic and ongoing use of the Project area for grazing, there is minimal remnant native vegetation. There are no notable natural features within the Project area. Due to historical and current agricultural use, the majority of the Project area has been cleared and is dominated by introduced pasture grasses and commonly associated weed species, with native vegetation generally restricted to drainage lines, wet depressions, and roadsides.

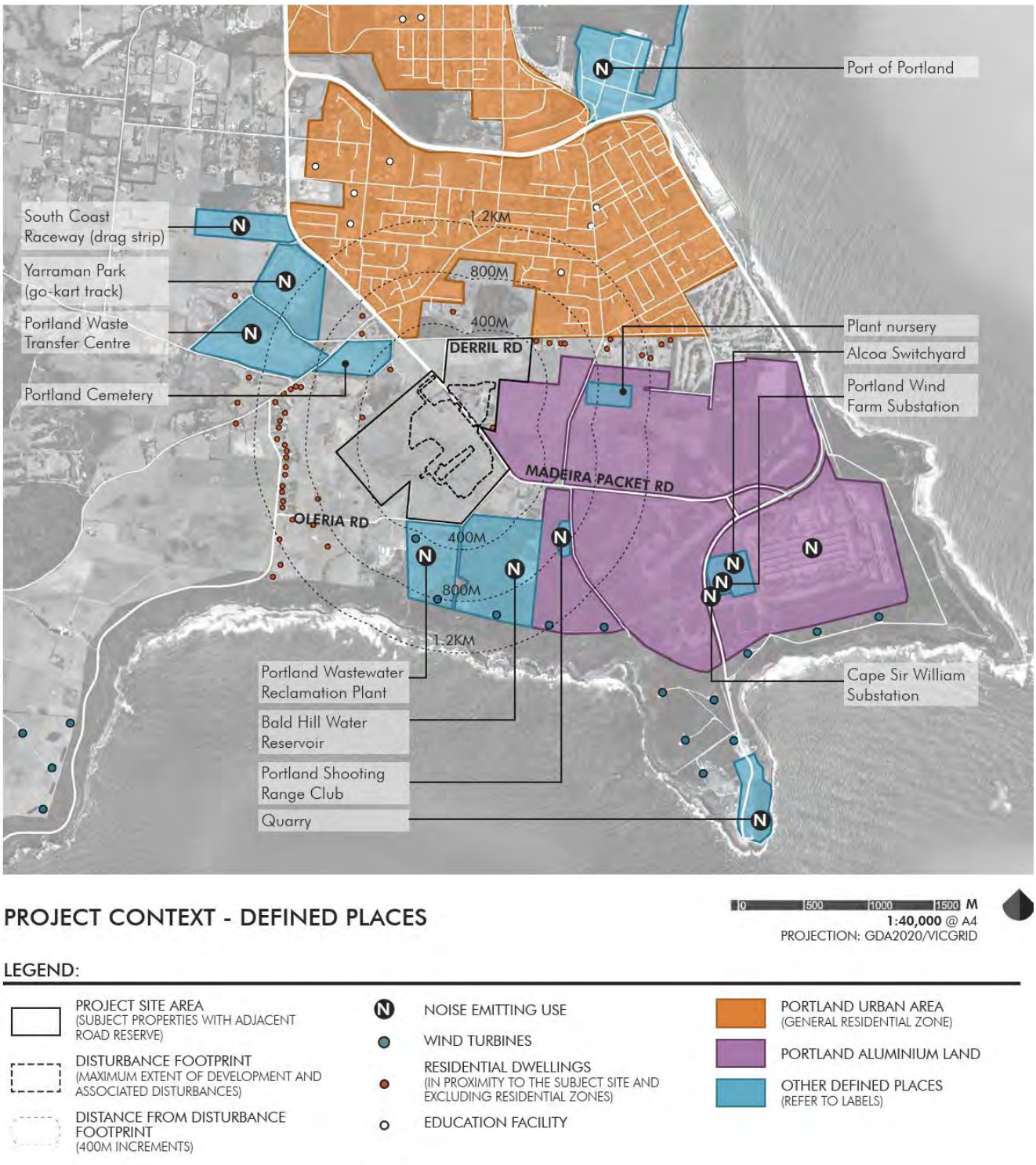


Figure 3 – Site context

Nearby significant natural features include the Nelson Bay Coastal Reserve, Discovery Bay Coastal Park, and Narrawong Coastal Reserve. These reserves are characterized by heathy woodland and coastal scrub, common natural features in the area. A large patch of this habitat type is located adjacent to the southeastern boundary of the study area. Native vegetation within the study area is connected to this habitat through dense coastal scrub along the roadsides, creating a contiguous corridor with the local reserves. Roadside vegetation in the study area serves as an important link between smaller habitat areas to the northwest, within an otherwise largely modified landscape.

1.5 The Person proposing to take the Action

Pacific Green Energy Park Portland Pty Ltd (the Person proposing to take the Action) is a wholly owned subsidiary of Pacific Green Technologies Inc (Pacific Green). Pacific Green has a satisfactory record of responsible environmental management record and has had no proceedings under Commonwealth or State law regarding the protection of the environment.

Table 4 – The Person proposing to take the Action

The Person proposing to take the Action	Pacific Green Energy Park Portland Pty Ltd
ABN	73667082911
Registered Address	3121 VIC

Pacific Green is a global leader in grid-scale battery development with over 1 GWh of energy storage capacity delivered globally. By developing and maximising return from renewable energy, energy storage systems and emission control technologies, Pacific Green is helping to address the world's demand for cleaner and more sustainable energy. The organisation is committed to open and transparent engagement with the communities in which it operates and is dedicated to creating a cleaner environment for our communities. It does this by delivering innovative energy storage solutions that enable Australia's net-zero transition and partnering with communities where it delivers projects to develop wider social value beyond its core business.

Pacific Green is dedicated to creating a cleaner environment for our communities, by delivering innovative energy storage solutions that enable Australia's net-zero transition. Pacific Green is committed to responsible development. In addition to first-class technical engineering that's designed to meet International Electrotechnical Commission (IEC) and Australian standards, all Pacific Green energy storage projects undergo rigorous safety and security testing to minimise safety risks.

Pacific Green is committed to providing a positive environmental development for the Portland Energy Park. The primary mitigation tool is to avoid impacts through intelligent design, then minimise and offset any impacts as required. The project will include planting local species vegetation and rehabilitation of wetland areas, to improve biodiversity values. Already, Pacific Green has fenced exclusion areas and planted native species, with significant additional planting to come.

1.6 Traditional Owners

Pacific Green acknowledges that this project is located on the lands of the Gunditjmara. We recognise and respect their cultural heritage, beliefs and continuing connection with the land and waterways.

The activity area is located on *Nyamat Mirring* (Sea Country), between the fresh water and the coast. The Project area includes coastal dune systems near wetlands – an area of high activity throughout human history due to its abundance of resources. Gunditjmara Mirring (Country) is a complex, connected landscape incorporating four Mirring, with Nyamat Mirring (Sea Country) continuous along the coastline between South Australia and towards Warrnambool.

The Gunditjmara Traditional Owners Community established the Gunditj Mirring Traditional Owners Aboriginal Corporation RNTBC (GMTOAC) in 2005. GMTOAC is a Registered Native Title Body Corporate under the *Native Title Act 1993* (Cth) and a Registered Aboriginal Party under the *Aboriginal Heritage Act 2006* (Vic).

The Project area is located at the southern (coastal) extent of the area represented by GMTOAC, that extends approximately 30 km east, 60 km west, and 130 km north of the Project area.

The Gunditjmara have a deep, strong and ongoing connection to Nyamat Mirring. The Gunditjmara note that Nyamat Mirring is the site of white settler arrival, the first recorded massacre of their people, and the basis for legal battles for cultural heritage recognition and protection. The Gunditjmara's deep knowledge of Country has influenced the siting and design of this Project, including identification of culturally significant sand dune rises within the Site, that have since been avoided through redesign.

1.7 Background and studies

1.7.1 Flora and Fauna assessment

Nature Advisory undertook flora and fauna assessments of the Project area on 17 and 18 July 2023 (Allotment 61A Section 13 Parish of Portland and Lot 1 TP592015 Madeira Packet Road), 9 and 10 January 2024 (305 Madeira Packet Road) and 7 March 2024 (333 Madeira Packet Road). The adjacent roadsides of each property were assessed at the same time as the corresponding property. During the assessments, the Project area was surveyed on foot.

Areas in the Project area found to support native vegetation or with potential to support listed matters were mapped through a combination of aerial photograph interpretation and ground-truthing using ArcGIS Field Maps® (Esri) on a hand-held device (accurate to approximately 5 metres).

The findings of Nature Advisory's flora and fauna assessments are documented in:

- Portland Battery Energy Storage System (BESS) - Flora and Fauna Assessment, Report No. 23146.03 (120) (Nature Advisory 2024a). (Appendix B)

1.7.2 Targeted flora survey

Nature Advisory undertook targeted flora surveys within Allotment 61A Section 13 Parish of Portland, Lot 1 TP592015 Madeira Packet Road and the adjacent roadsides on 31 October 2023 and 1 November 2023 for the following species:

- River Swamp Wallaby Grass (*Amphibromus fluitans*) (Vulnerable)
- Swamp Fireweed (*Senecio psilocarpus*) (Vulnerable)
- Swamp Everlasting (*Xerochrysum palustre*) (Vulnerable)

All targeted surveys were undertaken within areas of identified suitable habitat in accordance with the survey guidelines for similarly cryptic species (DoE 2013b) as there are no survey guidelines for the abovementioned species. Extensive portions of the Project area were deemed unlikely to support threatened species, owing to the modified nature of the vegetation, lack of suitable habitat and the dominance of weedy species.

The detailed methodology and findings of the targeted survey assessments are documented in:

- Portland Battery Energy Storage System (BESS) - Targeted Flora Survey, Report No. 23146.02 (1.1) (Nature Advisory 2024b). (Appendix C)

No EPBC listed flora values were observed during this assessment.

1.7.3 Further Assessment of Blue-winged Parrot

Due to the Blue-winged Parrot (*Neophema chrysostoma)* (BWP) being recorded during the Flora and Fauna Assessment, further assessment of the species was undertaken to gain a clearer understanding of habitat use within the Project area and the likelihood of impacts associated with the Action. A desktop assessment of an area with 20-kilometre radius from the boundary of the Project area, was undertaken by Nature Advisory to investigate the extent of suitable habitat for BWP in the broader landscape.

Additionally, a survey involving ground truthing and a roaming survey of the region was undertaken on 10th and 11th January 2024. This included surveys of forest and woodland habitat that could contain hollow-bearing trees as well as wetlands where BWPs are known to forage and roost, in additional to other agricultural lands, such as what is observed within the Project area. The detailed methodology and findings of the desktop assessment and the ground truthing and roaming survey are documented in:

- Portland Battery Energy Storage System (BESS) - Detailed Assessment for Blue-winged Parrot, Report No. 23146 (7.2) (Nature Advisory 2024c). (Appendix D)

2. Description of the Action

2.1 Project area overview

The Action spans multiple parcels of land, either side of Madeira Packet Road, Portland. Refer to Table 2 and Figure 1 for an overview of the land comprising the Action. The Project area covers five parcels of freehold land known under multiple addresses, as well as the adjacent road reserve (Crown Land).

The Project area is predominantly flat, with some low-points and small dune rises. The majority of the Project area is between 36-37 m AHD, with a full range between 35-45 m AHD (Appendix A, pg. 4). The Project area is characterised by pasture land, small sand dune rises (with elevated cultural heritage sensitivity), and low points with ephemeral waterbodies (highly modified). The concept layout has been designed to avoid low swamp areas and the higher elevations with cultural sensitivity.

The Project area is typically open grazing land of introduced grasses. The vegetation throughout the Project area is highly modified from its original condition due to the historical land clearing and intense grazing pressure. The condition of the vegetation is poor due to the absence of canopy trees, loss of native species diversity and a very high cover of noxious weeds including grassy, herbaceous and woody weeds.

Fauna habitat within the Project area comprised planted trees, grazing paddocks, aquatic habitat in the form of drainage lines, ephemeral wetlands and seasonally inundated depressions, and dense roadside vegetation mainly comprising Coast Wattle scrub. Nearby significant fauna habitat occurred as a large patch of heathy woodland/coastal scrub adjacent to the south-eastern boundary of the Project area in the Bald Hill Reserve. Native vegetation in the Project area is connected to this habitat by dense coastal scrub along roadsides. This habitat is contiguous with similar habitat of Nelson Bay Coastal Reserve, Discovery Bay Coastal Park, and Narrawong Coastal Reserve.

Roadside vegetation in the Project area provides an important link/corridor between smaller habitat areas to the north-west, within a largely modified landscape.

The Project area lies within the Glenelg Plain bioregion, within the Glenelg Hopkins catchment management area and on Traditional Lands of the Gunditjmara People. A detailed description of the existing environment is provided in Section 3.

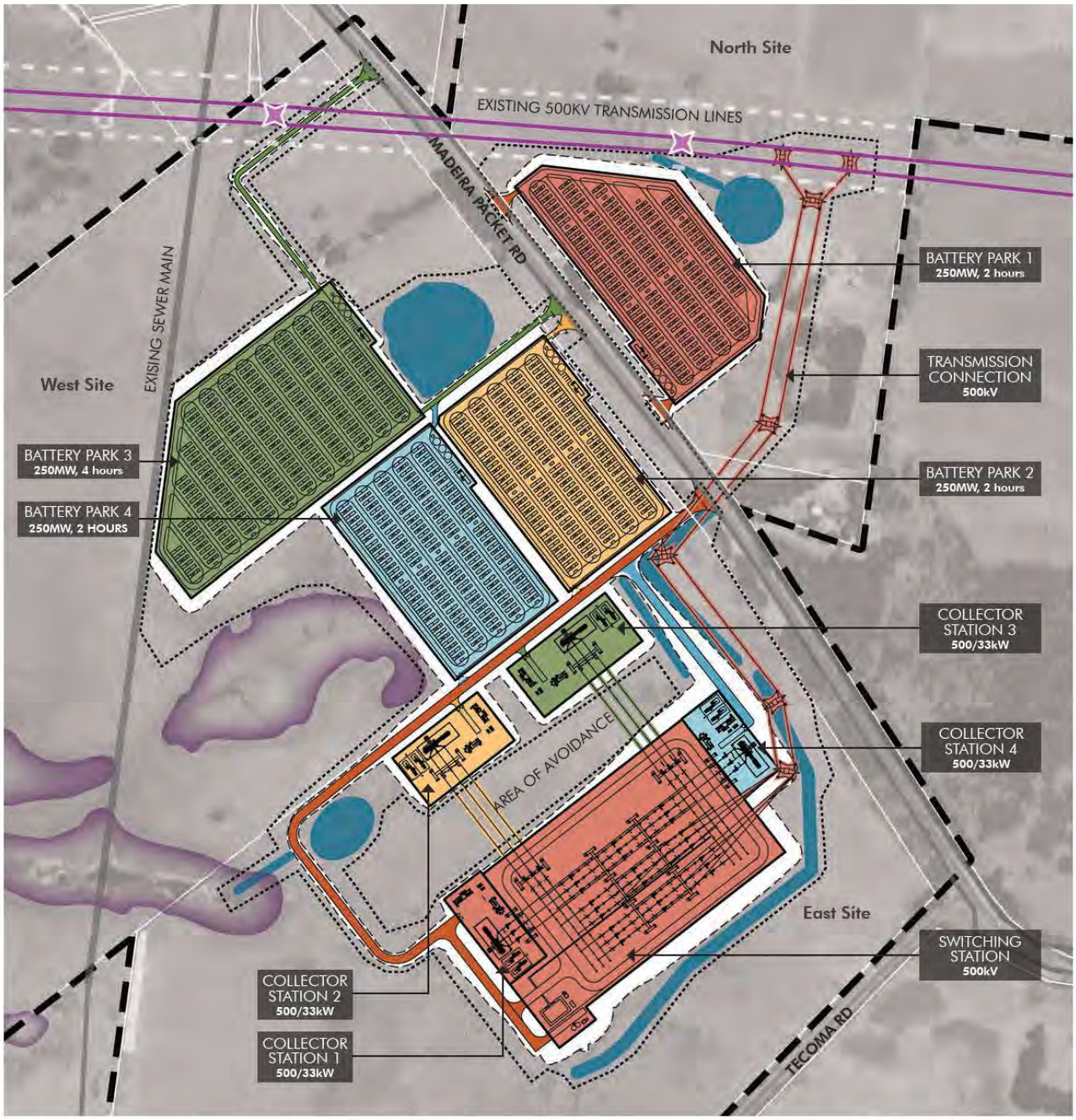
2.2 The Action

2.2.1 Disturbance footprint

The project will involve the construction of a utility-scale BESS and associated infrastructure. The associated infrastructure includes electricity switchyard, transmission line connection to the existing high-voltage network, access tracks, security fencing, landscaping, drainage and earthworks.

The Disturbance footprint totals approximately 34 hectares and is considered to be the *maximum* extent of necessary works. The indicative layout plan (Figure 4) shows the Disturbance footprint allows for some buffer to components of the indicative layout. This conservative approach ensures flexibility to address detailed design, and supports additional minimisation of impacts through detailed design and construction management.

The detailed project plans are provided as Appendix A. Figure 5 is an artist's impression of the Action.



PROPOSED - DETAIL & STAGING LAYOUT

0 50 100 150 200 M
1:5,000 @ A4
PROJECTION: GDA2020/MGA ZONE 54

LEGEND:

- PROJECT SITE AREA (SUBJECT PROPERTIES WITH ADJACENT ROAD RESERVE)
- DISTURBANCE FOOTPRINT (MAXIMUM EXTENT OF DEVELOPMENT AND ASSOCIATED DISTURBANCES)

EXISTING ELEMENTS

- TRANSMISSION LINES 500KV
- TRANSMISSION TOWERS FOR 500KV LINES
- UNDERGROUND SERVICES
- EPHEMERAL WATER AREAS

PROPOSED DEVELOPMENT

- STAGE 1 FACILITIES
- STAGE 1 ROADS
- STAGE 2 FACILITIES
- STAGE 2 ROADS
- STAGE 3 FACILITIES
- STAGE 3 ROADS
- STAGE 4 FACILITIES
- STAGE 4 ROADS
- TRANSMISSION LINE (CONNECTING TO EXISTING LINES)
- TRANSMISSION TOWER
- EXTENT OF BENCHING
- DRAINAGE PONDS AND LINES

Figure 4 – Detail and staging layout

Figure 5 – Artist impression of the Portland Energy Park

2.2.2 Key activities and phases

The Action includes the following key installations and works:

- A 1GW/2.5GWh, utility scale BESS using lithium-ion battery technology comprised of 4 x 250MW battery 'parks',
- 33/500kV collector stations (one for each battery park),
- 500kV terminal station and grid connection to the existing 500kV line,
- Internal access tracks, external access points and road upgrades, including the primary access points for construction and operation vehicles, as well as emergency access points,
- Earthworks, including benching (with imported fill) for the battery parks and drainage construction,
- Fencing and vegetation planting.

The Action will have a Disturbance footprint of less than half of the Project area, with key constraints (including ecological values and cultural heritage sensitivity) primarily avoided. Section 5.1.1 provides a detailed summary of the concept design evolution and avoidance and minimisation steps taken to reduce potential impacts on ecology and cultural heritage.

The western extent of the activity area contains a wetland which increases and decreases substantially in size depending on rainfall. The wetland and the Wannon Water sewer pipeline (running north-south through the Project area) creates a construction boundary with no infrastructure to be built in this western area.

Vegetation will be planted inside some of the boundaries and within Madeira Packet Road reserve to increase biodiversity and act as visual screening, as well as replanting of the central ephemeral wetland. Vegetation planting will not involve any significant ground disturbance.

Construction

The works will be undertaken in stages as presented within Figure 3 and within the Environmental Management Plan (EMP)(Appendix F). Works will be completed in a continuous construction period of

approximately 12-18 months, and laydown areas for equipment will be constrained to the activity footprint as shown in the EMP.

Construction planning and early works are proposed for early 2026 with full construction likely to start mid-2026. Based on an 18-month construction period, it is likely the works will be completed by the end of 2027 /early 2028.

Individual battery units (similar to a shipping container) will be located on individual concrete slabs. Each BESS park will connect to a 500/33kV Collector Station which have been redesigned around the large dune landform in the centre of the activity area, that then connects to the primary 500kV switching station via overhead distribution lines. The Collector Stations will be constructed on shallow, wide footings designed to avoid impacting the natural ground surface.

A total of five or six new transmission towers will be constructed to connect the switching station to existing transmission lines in the northern extent of the Project area.

The majority of cabling for utilities will occur within the fill layer. Another two ponds will be constructed in the north and south of the activity area for water runoff.

A small dam in the north of the activity area will be expanded to catch run off from the benching areas (for water filtering), and a series of subsurface pipes for drainage will be installed to direct water away from the infrastructure.

Operation

Within the operation phase, there is minimal day-to-day activity relative to construction. It is expected that there will be 21 ongoing jobs (FTE) (4 direct and 17 indirect) related to maintenance, inspections and management. Pasture grasses and vegetation on the balance land will be managed to address fire risk.

Decommissioning

The Action is expected to last 40 years, and specific processes for decommissioning will therefore be highly subject to future conditions, including the availability of materials reuse and recycling, evolving environmental and material standards, economic circumstances and market forces, surrounding land uses, environmental constraints, and community expectations. As such, a specific decommissioning plan will be developed at a more appropriate time prior to decommissioning.

2.2.3 Changes since initial referral

There have been no material changes to the design of the Action since the initial referral in late 2024.

Since the decision that the Action is a Controlled Action, the project team have further developed and formalised the rehabilitation activities via a Land Management and Rehabilitation Plan (LMRP, Appendix E). The proposed rehabilitation activities are detailed in Section 2.2.4.

2.2.4 Rehabilitation activities

A LMRP has been developed for the Action, provided at Appendix E.

The LMRP has been developed to address the strategic environmental management of the Project area. Specifically, the plan has been prepared to inform construction and rehabilitation activities.

The over-arching of goal of the LMRP is:

'to improve the overall ecological conditions of the site through time such that the project mitigates its environmental impacts and ultimately results in a nature positive outcome'.

The LMRP documents the following information:

- A description of the ecological values of the Project area as determined by field visits;

- General management prescriptions for the Project area;
- Land management prescriptions;
- Post construction rehabilitation activities; and
- Maintenance and monitoring activities.

Pacific Green are committed to implementing four (4) different Land Management Treatments (LMT) to meet the goals and objectives of the LMRP. These treatments include:

5. LMT01: Roadside treatment (Madeira Packet Road);
6. LMT02: Perimeter screening;
7. LMT03: Blue-winged Parrot enhancement planting (LMT03a & LMT0b); and
8. LMT04: Pest animal and grazing management.

The treatments and associated areas are presented in Table 5 and mapped in Figure 3 of Appendix E.

Table 5 - Summary of treatments and their areas

Treatment	Area (ha)
LMT01: Roadside treatment	0.25
LMT02: Perimeter screening	2.62
LMT03a: Blue-winged Parrot terrestrial enhancement planting (existing & proposed)	0.50
LMT03b: Blue-winged Parrot wetland enhancement planting	7.33
LMT04: Pest animal and grazing management	11.19
Total:	**21.89**

2.3 Other approvals

2.3.1 Key approvals

The Action requires multiple primary approvals under relevant State and Commonwealth legislation. Excluding EPBC Act considerations, the three primary approvals are:

- Planning Permit
- Cultural Heritage Management Plan (CHMP)
- Grid Connection.

Planning Permit

In Victoria, planning approvals are administered through the *Planning and Environment Act 1987* (P&E Act). The Action is located within the Glenelg Shire LGA and falls under the Glenelg Planning Scheme. According to the planning scheme, the Action's land use term (development of a BESS and associated infrastructure) is classified as 'Utility Installation' and will require planning permission. The Minister for Planning will be the Planning Authority for the application.

The Portland Energy Park aligns with the purposes of the relevant zones and overlays, as well as key State, Regional, and Local policies within the Glenelg Planning Scheme. It supports various Federal and Victorian policy objectives related to grid infrastructure, renewable energy and emissions reduction. A planning permit application is currently being assessed under delegation by the Victorian Department of Transport and Planning (DTP).

The Action does not meet the thresholds to trigger assessment under the *Environment Effects Act 1978*.

Cultural Heritage Management Plan (CHMP)

Places of Aboriginal Cultural Heritage are protected under the *Aboriginal Heritage Act 2006* (AH Act). The primary purposes of the AH Act are to protect Aboriginal cultural and intangible heritage in Victoria and to empower Traditional Owners to act as guardians of their cultural heritage on behalf of Aboriginal people and the broader community.

In 2023, a desktop assessment was conducted to understand the local Indigenous history of the Project area and identify any First Nations heritage values relevant to the Project area. The assessment revealed three previously recorded Aboriginal places within the Project area. To ensure the Action does not unduly impact these known locations of First Nations cultural heritage, a CHMP is being prepared. Currently, the CHMP is fully drafted and awaiting assessment by GMTOAC.

Grid Connection Approval

In Victoria, transmission network connections are managed through the AEMO Victorian Connections process, as Victoria operates a declared transmission system under the National Electricity (Victoria) Act 2005. Unlike other states where the local Transmission Network Service Provider (TNSP) (e.g., ElectraNet or Powerlink) manages connections, AEMO acts as the TNSP for shared transmission services in Victoria.

The proposed Battery Energy Storage System (BESS) project is currently in the Pre-Application Stage of the AEMO VIC Connections process. At this stage, proponents engage with AEMO to define connection requirements, clarify modelling expectations, and identify technical studies required to progress toward a Connection Agreement.

The connection process follows the requirements of Chapter 5 of the National Electricity Rules, and includes milestones such as:

- Registration of Intention to Connect (R0)
- Preliminary Impact Assessment
- Generator Performance Standards negotiations
- Completion of Power System Studies
- Execution of the Connection Agreement

Engagement with AEMO is being undertaken in parallel with the design development, modelling studies, and procurement planning to ensure alignment with network requirements. The project is progressing toward formal lodgement of a connection application following refinement of system modelling inputs and interface with the DNSP and AEMO.

2.3.2 Conditions, secondary consents and monitoring

Both the planning permit and CHMP will contain additional State-imposed conditions. These conditions will likely include requirements to be addressed prior to commencing any works associated with the Action, as well as preparation of additional management plans, construction works supervision, and operational requirements. As such, it is anticipated that there will be conditions, secondary consents and monitoring expectations from both DCCEEW and Victorian DTP.

Recognising that these primary approvals have inter-relationships in requirements, and that detailed design will be undertaken post-planning approval, two management plans have been prepared for endorsement to support this EPBC Act Referral (the EMP [Appendix F] and LMRP [Appendix E]). While it is expected that both may have updates post-EPBC Act Referral decision, the details and intent of both will be carried through, with updates expected to be 'in addition'.

While the CHMP and Victorian planning permit have not yet been approved, it is anticipated that secondary consents and condition requirements will include:

- Additional plans to be prepared / requirements to be fulfilled:
  - Final detailed design plans and updated predictive noise assessment
  - Risk Management Plan and Fire Management Plan / Fire Safety Study
  - Emergency Management Plan
  - Stormwater Management Plan (or equivalent eg Drainage & Stormwater Management Plan)
  - Traffic Management Plan
  - Complaints register
  - Securing of State-level native vegetation offsets.
- Construction and operational requirements:
  - Protocols relating to cultural heritage, including inductions, observation, soil management, salvage, stop works, contingency plans and other requirements
  - Compliance with permit conditions, including noise limit protocols.
- Other approvals / consents:
  - Asset connection and protection permits (Council: drainage, Wannon Water: water and sewer, DTP: works in road reserve)

2.4 Future third-party expansion

The Action is to be constructed and operated by Pacific Green. During early development discussions, the Australian Energy Market Operator (AEMO) identified the opportunity to cater for future electricity demand (demand from external parties not related to Pacific Green) through the design of additional switching bays, a substation and additional transmission lines. AEMO identified the land owned by Pacific Green for such future use and development. If required in future, AEMO or a third party would construct and operate these facilities and be responsible for obtaining any required approvals. These designs are not required in any way to support Pacific Green's batteries and the Action is not reliant on those additional expansion works. As such, Pacific Green's Action does not include the expansion/upgrades.

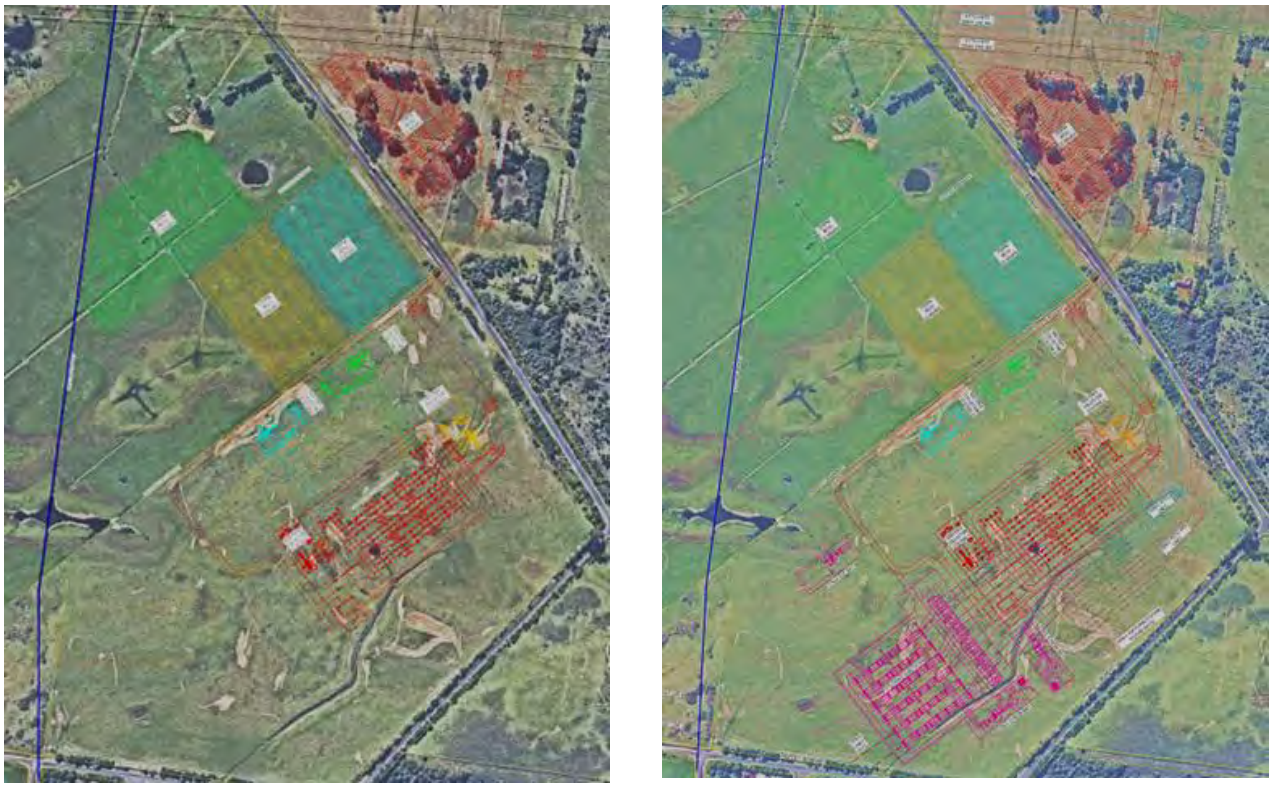


Figure 6 - Proposed layout of Action in comparison to the potential future expansion for AEMO

Notes: Left image is the proposed Action. In the right image, in pink and grey (expanding south) is the potential future expansion (by others).

3. Description of the environment

This Section describes the existing Landscape and land use, Terrestrial environment, Aquatic environment and Matters of National Environmental Significance (MNES). The summary of relevant ecological values is shown in Figure 7 (for a full size version, see Appendix B (Figure 1, pg.30)).

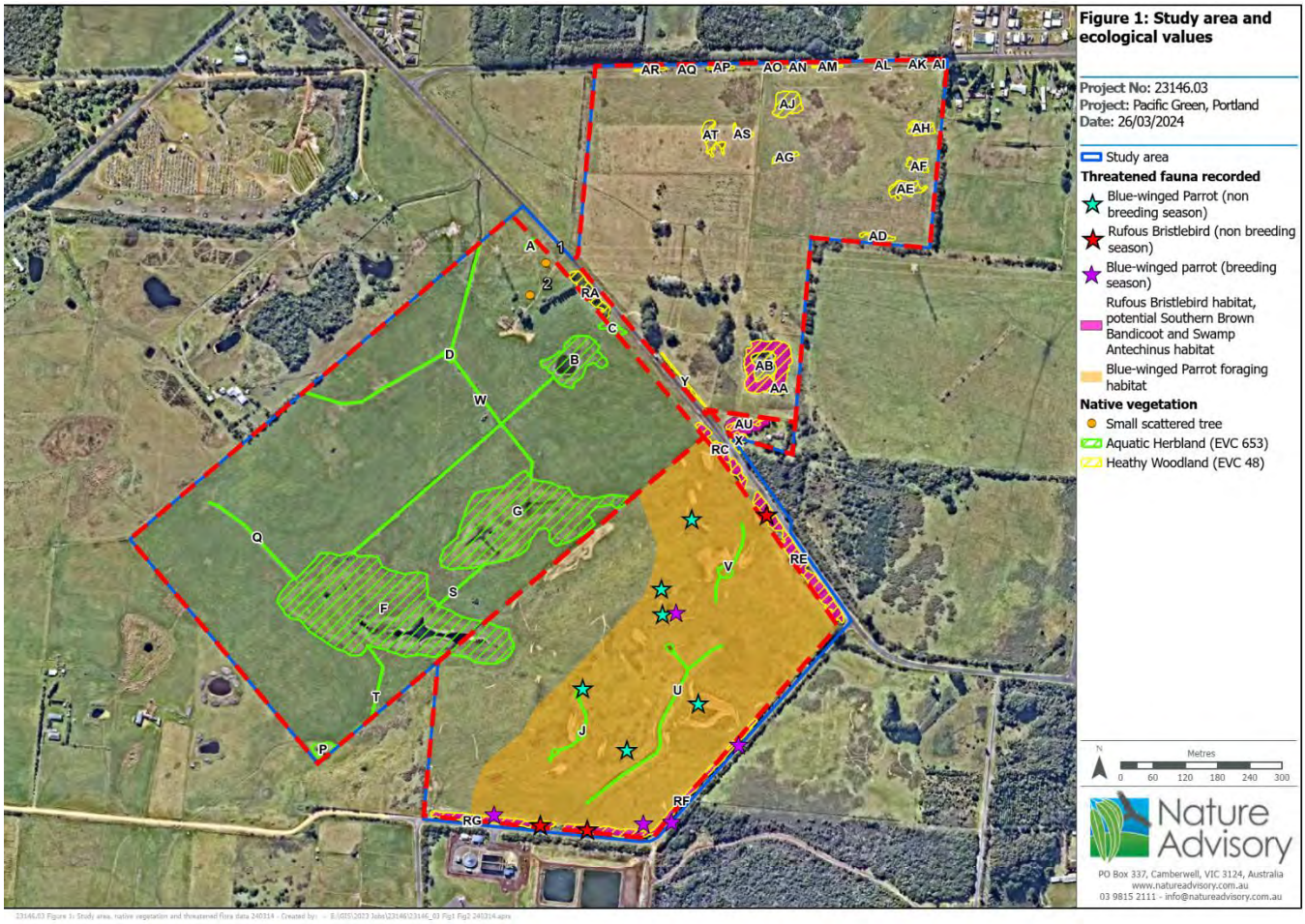


Figure 7 – Existing ecological values

3.1 Landscape and land use

The Project area is a flat to gently undulating landscape 30-40 metres above sea level, supporting grazing paddocks of introduced grasses with numerous wetlands. The history of cattle grazing throughout the paddocks has resulted in the ground being heavily pugged. In general, the vegetation throughout the Project area is highly modified from its original condition due to the historical land clearing and evidently intense grazing pressure on the land. The condition of the vegetation is poor due to the absence of canopy trees, loss of native species diversity and a very high cover of pasture grasses and commonly associated weeds.

The Project area contained relatively uniform introduced pasture, the most common species including Kikuyu (*Cenchrus clandestinus*), White Clover *(Trifolium repens),* Capeweed *(Arctotheca calendula)* and Flatweed (*Hypochaeris radicata*). Occasional woody weeds included African Boxthorn (*Lycium ferocissimum*), Blackberry (*Rubus fruticosus* spp. agg.) and Gorse (*Ulex europaeus*).

Nearby significant habitat occurred as a large patch of heathy woodland/coastal scrub adjacent to the south-eastern boundary of the Project area. Native vegetation in the Project area was connected to this habitat by dense coastal scrub along roadsides. This habitat is contiguous with similar habitat of Nelson Bay Coastal Reserve, Discovery Bay Coastal Park, and Narrawong Coastal Reserve.

Roadside vegetation along Tecoma Road provides an important link between the abovementioned significant habitat and smaller habitat areas on private property to the north-east (606 Madeira Packet Road). These remaining fragments of habitat exist within a largely modified landscape, dominated by agricultural and industrial use.

The Project area lies within the Glenelg Plain bioregion, within the Glenelg Hopkins catchment management area and within the Glenelg Shire local government area.

3.2 Terrestrial environment

3.2.1 Vegetation

Terrestrial native vegetation within the Project area consisted predominantly of Heathy Woodland that had been significantly modified, primarily restricted to the adjacent road reserves. This vegetation comprised a shrub layer of Coast Wattle (*Acacia longifolia* var. *sophorae*) with some Coastal Beard-heath (*Leucopogon parviflorus*) over a densely weedy ground layer, mainly Kikuyu and Cocksfoot (*Dactylus glomerata*), with scattered Austral Bracken. Native graminoids included Coast Sword-sedge (*Lepidosperma gladiatum*), Thatch Saw-sedge (*Gahnia radula*) and Spear-grass (*Austrostipa* spp.).

The Project area also contained scattered Austral Bracken (*Pteridium esculentum*) and native Rush (*Juncus* spp.) at varying covers amongst pasture grasses. Native tree cover in the Project area was limited, with two isolated Swamp Gum (*Eucalyptus ovata*) in very poor health and planted trees occurring in Allotment 61A Section 13 Parish of Portland, as well as a number of eucalypts in 333 Madeira Packet Road.

3.2.2 Fauna habitat

3.2.2.1 Wooded habitat

This habitat type was represented by a row of planted non-indigenous trees and dense coastal scrub along roadsides adjacent to and within the Project area. No hollow-bearing trees were observed during the field assessment; however, trees planted as windbreaks provide breeding and foraging habitat for common native bird species, mammals and potentially roosting habitat for bats. Brown Falcon (*Falco berigora*) and Brown Goshawk (*Accipiter fasciatus*) were likely utilising the windbreak on 305 Madeira Packet Road as both species were observed feeding fledglings perched in the pines. Yellow-tailed Black Cockatoos (*Zanda funerea*) were observed foraging on the pinecones on each day of the summer survey and two Koala were observed resting in the planted windbreak of eucalypts adjacent to the eastern boundary of 305 Madeira Packet Road. Coastal scrub vegetation occurred along the boundary of the Project area, around a small dam on 305 Madeira Packet Road and within the property of 333 Madeira Packet Road. This vegetation varied in quality and floristic composition. Dominant native species included Coast Wattle, Coast Beard-heath, and Coast Tea-tree (*Gaudium laevigatum*). Native graminoids including Coast Sword-sedge, Thatch Saw-sedge and Spear-grass occurred sparsely. Weed cover was generally high with Sweet Pittosporum (*Pittosporum undulatum*), Mirror Bush (Coprosma repens), Kikuyu and Blackberry being common. Weediness aside, this habitat provided an important foraging and nesting resource for threatened species including Rufous Bristlebird and potentially Southern Brown Bandicoot (*Isoodon obesulus obesulus*) (SBB) and Swamp Antechinus (*Antechinus minimus maritimus*) (SA). Additionally, the habitat along Tecoma Road provides an important link between the coastal vegetation south of the Project area and isolated habitat areas on private property to the north-east (606 Madeira Packet Road).

3.2.2.2 Grassland habitat

This was the dominant habitat type within the Project area and mostly comprised introduced pasture grasses. Generally, the condition of this habitat was considered to be poor due to the absence of native species diversity and high cover of noxious weeds. Sparse areas of native rush occurred in the south-eastern portion of the Project area, providing foraging habitat for BWP, which were frequently observed in small groups, opportunistically foraging on this vegetation while it was in seed.

3.3 Aquatic environment

There are no defined waterways that run through or near the Project area, with the topography creating low-lying wetland areas. Historically, informal drainage channels have been dug, and several depressions fill during rainfall events. These areas are highly modified and are accessed by Cattle under the existing agricultural use. These modified wetlands vary in size and depth, including constructed drainage lines, seasonally-flooded pastures, and shallow wetlands with open water. The project design layout has been informed by pre and post-development hydrology modelling. The design achieves no net-negative offsite flood impacts.

3.3.1 Vegetation

Native aquatic vegetation (Aquatic Herbland EVC) is present within low-lying areas of pasture and constructed drainage channels. At the time of the field assessment of Allotment 61A Section 13 Parish of Portland and Lot 1 TP592015 Madeira Packet Road, all the wetlands had relatively large open water zones and shallow submergent zones. They lacked fringing emergent vegetation such as rushes and sedges, native grasses and riparian woody vegetation. Introduced pasture grass often remained dominant except in the deepest areas, with herbaceous weeds in all wetlands including White Clover, Buck Horn's Plantain (*Plantago coronopus*), Water-buttons (*Cotula coronopifolia)* and Hairy Hawkbit (*Leontodon saxatilis*). Native aquatic species in the deeper drainage lines and shallow wetlands included River Buttercup (*Ranunculus inundatus*), Swamp Crassula (*Crassula helmsii*), Pennywort (*Hydrocotyle* spp.) and Southern Water-ribbons (*Cycnogeton alcockiae*). The native wetland plants were likely the result of natural colonisation rather than from a remnant wetland community in the Project area.

3.3.2 Fauna habitat

Both terrestrial and aquatic fauna habitat are present within the Project area. Aquatic habitat occurs in the form of ephemeral wetlands and drainage lines. These areas provide breeding and foraging habitat for common frogs and waterbirds, both of which were observed to be utilising aquatic habitat present. However, the limited structural diversity both within and surrounding these wetlands, in conjunction with their ephemeral nature limited the overall value of this habitat for fauna species. Wetland areas fringed by native rush (*Juncus* spp.) also provided terrestrial foraging habitat for BWP. Further information on the terrestrial habitat is provided in Section 6.

3.4 Matters of National Environmental Significance (MNES)

Sections 3.4.1 – Section 3.4.3 present the outcomes of a likelihood of occurrence of MNES within the Project area. The location and extent of MNES within the Project area is shown in Figure 7. The potential impacts to MNES are shown in Figure 8 and discussed within the following Section.

3.4.1 Listed ecological communities

The EPBC Protected Matters Search Tool (DCCEEW 2025) indicated that five ecological communities listed under the EPBC Act had the potential to occur in the search region (Table 6). In addition, given the presence of wetland vegetation in the Project area, *Seasonal Herbaceous Wetlands of the Temperate Lowland Plain* was also considered for its potential to occur in the Project area although it was not included in the results from the EPBC Protected Matters Search Tool (DCCEEW 2025).

Table 6 - EPBC Act-listed ecological communities and likelihood of occurrence in the Project area

Ecological Community	EPBC Status	Likelihood of occurrence in the Project area
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	**Does not occur within the Project area**. No suitable treed vegetation recorded in the Project area.
Giant Kelp Marine Forests of South East Australia	Endangered	**Does not occur within the Project area**. This is a marine community, whilst the Project area is terrestrial.
Karst springs and associated alkaline fens of the Naracoorte Coastal Plain Bioregion	Endangered	**Does not occur within the Project area.** Outside this community's range. This groundwater dependant ecological community is limited to the Gambier Limestone formation (Gambier Karst Province) within the Bridgewater (NCP01) subregion of the Naracoorte Coastal Plain IBRA6 bioregion – this subregion is located west of the Project area (DAWE 2020).
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	**Does not occur within the Project area**. No native grassland recorded in the Project area.
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	**Does not occur within the Project area**. No coastal saltmarsh recorded in the Project area.
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	**Does not occur within the Project area**. No suitable wetland vegetation meeting the diagnostic criteria for this community in the Project area, particularly given the lack of graminoid vegetation component in all of the wetlands in the Project area.

Notes: EPBC Status = status under the EPBC Act.

3.4.2 Listed flora species

The EPBC Protected Matters Search Tool (DCCEEW 2025) and VBA (DEECA 2025) indicated that within the search region there were records of, or there occurred potential suitable habitat for, 19 flora species listed under the Commonwealth EPBC Act.

The likelihood of occurrence in the Project area of species listed under the EPBC Act is addressed in Appendix I. Species considered 'likely to occur' are those that have a very high chance of being in the Project area based on numerous records in the search region and suitable habitat in the Project area. Species considered to have the 'potential to occur' are those for which suitable habitat exists, but recent records are scarce.

This analysis indicates that three listed flora species are considered to potentially occur:

- River Swamp Wallaby Grass (Vulnerable)
- Swamp Fireweed (Vulnerable)
- Swamp Everlasting (Vulnerable)

Subsequently, targeted surveys were undertaken for these species in October and November 2023 (Appendix B). Allotment 61A Section 13 Parish of Portland, Lot 1 TP592015 Madeira Packet Road and the adjacent roadsides were surveyed for the abovementioned species, in accordance with the relevant guidelines for similarly cryptic species (DoE 2013b). No individuals were recorded. Therefore, these species are now considered unlikely to occur.

Additionally, no suitable habitat for threatened species was identified in the remaining areas of the Project area, owing to the modified nature of the vegetation, lack of suitable habitat and the dominance of weedy species.

No other listed flora species are considered to have the potential to occur within the Project area.

3.4.3 Listed fauna species

The EPBC Protected Matters Search Tool (DCCEEW 2025) and VBA (DEECA 2025) indicated that within the search region there were records of, or there occurred potential suitable habitat for 43 threatened fauna species and an additional 5 migratory species listed under the EPBC Act.

Nature Advisory undertook an assessment of the likelihood of occurrence of the listed Fauna Species as detailed in Appendix K.

This analysis of potential occurrence of listed fauna species excludes:

- Marine fauna given the Project area is inland; and
- Oceanic bird species (such as albatrosses and petrels) given the Project area is inland.

Species considered 'likely to occur' are those that have a very high chance of being in the Project area given the existence of numerous records in the search region and suitable habitat in the Project area. Using the precautionary approach, species considered to have the 'potential to occur' are those where suitable habitat exists, but recent records are scarce.

A total of seven species are known to occur, or were found to be 'likely to occur' or have the 'potential to occur':

- Blue-winged Parrot (BWP) (Vulnerable)
- Fork-tailed Swift (*Apus pacificus*) (Migratory)
- Latham's Snipe (*Gallinago hardwickii*) (Vulnerable & Migratory)
- White-throated Needletail (*Hirundapus caudacutus*)(Vulnerable & Migratory)
- Southern Brown Bandicoot (SBB) (Endangered)
- Swamp Antechinus (SA) (Vulnerable)
- Southern Bent-wing Bat (SBWB) (*Miniopterus orianae bassanii*) (Critically Endangered)

3.4.3.1 Blue-winged Parrot

During the field assessment, in July 2023 and again in January 2024, small groups (5-15 birds) of BWPs were observed foraging throughout the south-eastern portion of the Project area (Lot 1 TP592015 Madeira Packet Road) in areas that contained native rushes and common weed species. The observation of this foraging habitat is consistent with known foraging habitat of this species (Higgins 1999). Birds remained present in the Project area throughout the field assessment and, when flushed, would move to nearby areas of suitable foraging habitat or fly south to the wooded habitat within the Sir William Grant Wind Farm.

The observation of BWPs in winter and summer and the presence of immature birds within the flocks in summer suggests that it is regularly used as foraging habitat for the local population of this species. Refer to Section 6.1 for a detailed impact assessment.

3.4.3.2 Fork-tailed Swift

This species is a migrant from north-east Asia, occurring in Australia from October to April. It is likely to occur in the Project area in summer and early autumn when conditions are suitable. It is almost exclusively aerial, foraging up to hundreds of metres above the ground but also above the canopy of forests and over open plains (Menkhorst et al. 2019).

Given its aerial habits and occasional occurrence, it is unlikely that Fork-tailed Swift would be directly impacted by development of the Project area and is therefore not discussed further.

3.4.3.3 Latham's Snipe

This species may occur in the Project area seasonally (late August to March) following rain events resulting in more extensive inundation of low-lying areas of existing wetlands, particularly where soft substrates (e.g. mud) results in suitable feeding habitat. However, the habitat is considered sub-optimal given the lack of low, dense vegetation. More extensive suitable areas nearby (i.e. Fawthrop Lagoon) contain high quality wetlands that likely provide habitat for Latham's snipe in spring and summer and some birds may visit the Project area intermittently.

Given the limited extent and marginal quality of habitat, the Project area is unlikely to support a consistent population of Latham's Snipe and therefore the risk to the species' population arising from development of the Project area is low and is therefore not discussed further.

3.4.3.4 White-throated Needletail

This species is a trans-equatorial migrant breeding in north-east Asia and spending its non-breeding season in Australia from September to April (Higgins 1999). It is likely to occur regularly in summer and early autumn when conditions are suitable. It forages aerially for insects and is rarely if ever seen perching in Australia.

Given its aerial habits and occasional occurrence, it is unlikely that White-throated Needletail would be directly impacted by development of the Project area and is therefore not discussed further.

3.4.3.5 Southern Brown Bandicoot

This species likely occurs within the Project area due to numerous nearby records. The species is assumed to occur within coastal scrub around the farm dam (Habitat Zone AA) and along the boundary of the Project area (Habitat Zone's X, AU, RC, RE, RF and RG). This vegetation is considered continuous with larger areas of habitat within the surrounding landscape where individuals have been recorded as recently as 2017. If SBB is present, the species may be impacted by development in the Project area due to the potential loss of suitable nesting and foraging habitat, and movement corridors. Refer to Section 6.26.1.6 for a detailed impact assessment.

3.4.3.6 Swamp Antechinus

This species likely occurs within the Project area due to numerous nearby records. The species is assumed to occur within coastal scrub around the farm dam (Habitat Zone AA) and along the boundary of the Project area (Habitat Zone's X, AU, RC, RE, RF and RG). This vegetation is considered continuous with larger areas of habitat within the surrounding landscape. If Swamp Antechinus is present, the species may be impacted by development in the Project area due to the potential loss of suitable nesting and foraging habitat, and movement corridors. Refer to Section 6.3 for a detailed impact assessment.

3.4.3.7 Southern Bent-wing Bat

This species had been recorded in the search region and is known to forage widely. SBWB is an open-space adapted species that may occasionally fly over the Project area and may also opportunistically forage and drink from the wetlands on site. Refer to Section 6.4 for a detailed impact assessment.

4. Impact pathways

The identified construction phase impact pathways for susceptible MNES are:

- Direct habitat removal or fragmentation from clearance, earthworks and physical disturbance (Figure 8).
- Direct injury, death or displacement of terrestrial fauna from vegetation clearing and earthworks or entrapments in trenches.
- Direct injury, death or displacement of terrestrial fauna from increased risk of fire associated with construction.
- Direct injury, death or displacement of terrestrial fauna from collision or avoidance of an increased number of vehicles.
- Temporary disturbance to fauna caused by factors such as noise, light and vibration.
- Habitat degradation from introduction or spread of invasive species or pathogens.
- Habitat degradation from surface hydrological changes and/or reduced water quality.
- Habitat degradation rom increased risk of fire associated with construction.

Figure 8 presents the potential direct physical impacts to MNES.

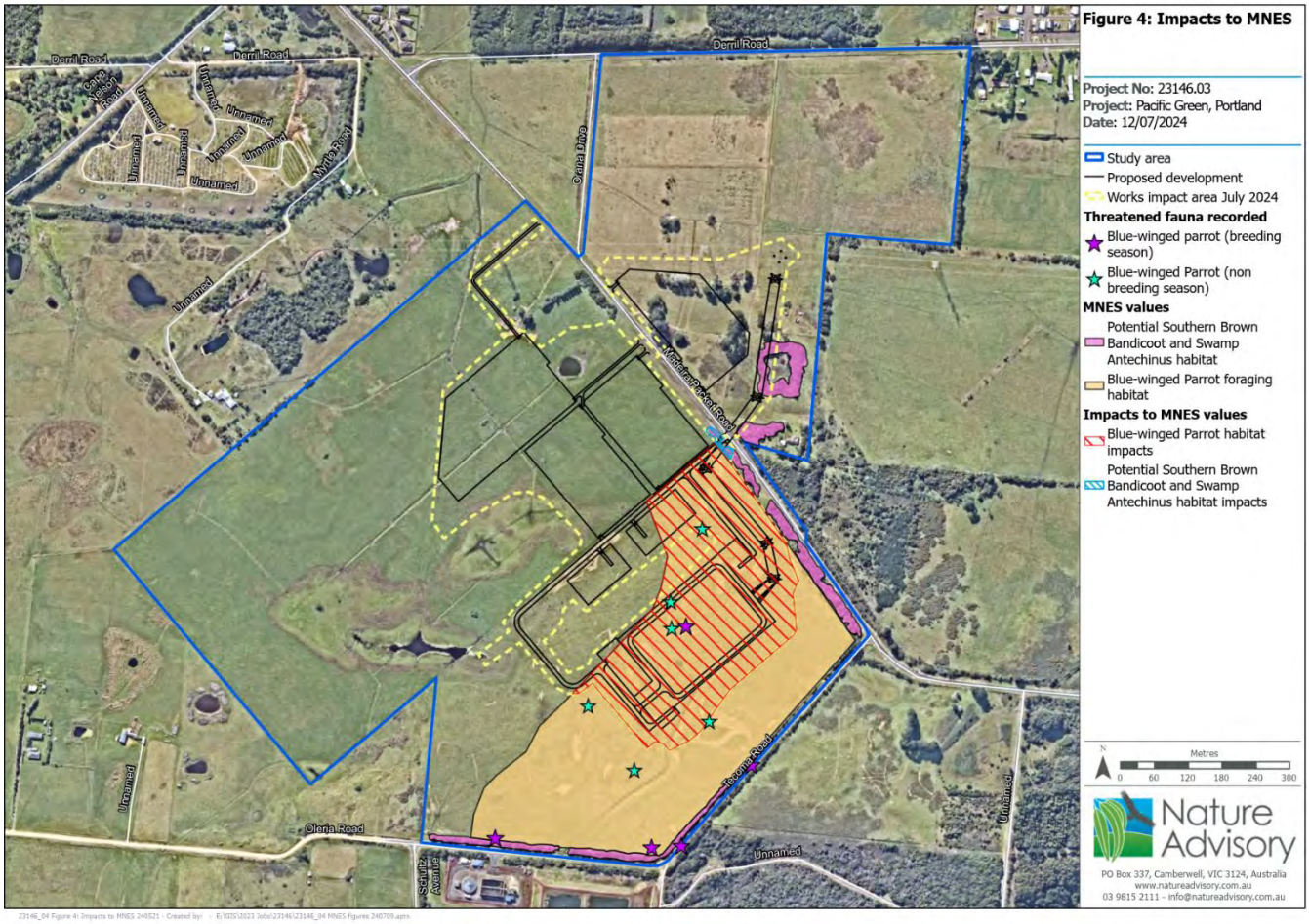


Figure 8 – Impacts to MNES

The identified operational phase impact pathways for MNES are:

- Physical disturbance to habitats during the operational phase for maintenance, replacement or repair of infrastructure.
- Direct injury, death or displacement of terrestrial fauna from increased risk of fire associated with operation.
- Direct injury, death or displacement of terrestrial fauna from collision or avoidance of an increased number of vehicles.
- Long-term disturbance to fauna caused by factors such as noise, light and vibration.
- Habitat degradation from introduction or spread of invasive species or pathogens.
- Habitat degradation from surface hydrological changes and/or reduced water quality.

An Environmental Risk Assessment (ERA) has been completed for the project as part of the Environmental Management Plan (EMP) that documents the perceived risks, impacts and mitigations (Appendix A of Appendix F). The Risk assessment considers 36 risks, their likelihood and consequence. Despite being a relatively large project, the construction is relatively straight-forward - using 'tried and tested' methods. Similarly, operating a battery park is not novel with numerous BESS facilities operating across Australia and internationally. For these reasons the project team believes that it has considered environmental risks and there are no unknown or unpredictable risks (impacts), particularly as they relate to MNES. Furthermore, the project team does not believe there are irreversible or major risks (for example, polluting groundwater, removing old growth trees, removing a last-remaining breeding habitat). This is currently a highly modified environment with largely exotic pasture and small areas of native vegetation. The modifications, removal and land-management treatments will not result in irreversible negative impacts.

5. Avoidance and mitigation steps

This Section provides an overview of avoidance and mitigation steps taken for the Action. These steps typically benefit all relevant MNES and have been developed to provide a holistic approach to design and site management. Section 6 nonetheless provides details of avoidance and mitigation for each particular MNES.

The avoid, minimise and mitigate hierarchy has guided technical investigations and design response.

The Action has been designed to largely avoid impacts to native vegetation and fauna through an iterative process between Pacific Green's design team and Nature Advisory's ecology team. The infrastructure is proposed to be developed primarily in areas of exotic pasture grasses and will only impact constructed drainage lines of poor quality, partially impact poor quality Heathy Woodland roadside vegetation and portions of poor-quality Aquatic Herbland. Although the Action is largely proposed to be developed in areas of exotic pasture and areas of low-quality native vegetation, there is an unavoidable overlap with mapped BWP foraging habitat within Lot 1 TP592015 Madeira Packet Road, given the prevalence of this habitat type within the Project area and the other site constraints including cultural heritage, as outlined in the design evolution summary in Section 5.1.1.

5.1 Avoidance and minimisation

5.1.1 Concept design evolution

There has been significant evolution from the original concept design to the current design layout. The current design has evolved over two years of early feasibility and concept work, through to technical assessments and planning permit application preparation.

The primary factors influencing design from a commercial and engineering perspective include:

- Providing sufficient layout space for 4 stages of battery parks, including Battery Park 3 as a 4-hour system
- Responding to AEMO / AusNet requirements for the high-voltage Terminal Station design – including provision for 'future expansion' of the substation (if required, to support future energy projects – by other parties – see Section 2.3)
- Due to land tenure requirements, the Terminal Station could only be developed on the East Site, required by the authorities, because that property is secured for purchase. The West Site is only secured for lease, and the authorities will not accept development of substation infrastructure on leasehold land
- Avoiding crossing the trunk sewer line running north-south through the Project area
- Managing electrical engineering safety and design standards, as well as fire risk mitigation measures including separation spacing of units and fire-fighting infrastructure.

To accommodate the various process components and facilities, an ideal site would be approximately 25 hectares, although AEMO have required additional space for future expansion.

The electrical infrastructure components have distinct engineering relationship requirements, such as 'bays' being parallel to each other, cable connections at 90 degrees, etc, that restrict flexibility in design.

The primary site values (identified via technical investigations) that have influenced design iterations include:

- Placing key infrastructure as far away from the nearest dwellings as practical, to minimise noise and visual impacts. Notably, on the North Site, all infrastructure has been placed at the southern extent of the property, away from the general residential zoned land
- Designating 'areas of avoidance' on sensitive dune rises, following extensive consultation with GMTOAC and cultural heritage site investigations. These areas of cultural heritage sensitivity have been protected from all development and works

- Avoiding the southern extent of the Project area as minimizing disturbance in that area as much as practical, to minimise impacts upon foraging habitat for the Blue-winged Parrot
- Avoiding other ecological values within the Project area as much as possible, including native vegetation within roadsides and small areas within the Project area
- Addressing the complex hydrology and drainage of the Project area (with no legal point of discharge available for Site East and Site West), requiring areas of benching (fill) to direct runoff, development of multiple 'drainage ponds', and ensuring off-site impacts on drainage and inundation are addressed. This has been in consultation with Wannon Water, Glenelg Shire Council and Glenelg Hopkins CMA. This has required a balancing of sufficient runoff capture and storage while avoiding/minimising earthworks to low-lying swamp areas
- Designing a landscape concept plan that achieves vegetation screening (to better screen views over the Disturbance footprint as well as improve the visual amenity of the Project and adjacent streetscape) and enhancing biodiversity and habitat creation (particularly the linking of existing roadside vegetation)
- Acoustics improvements via equipment selection and layout have been incorporated to minimise noise impacts on surrounding sensitive receptors.

These primary site considerations are presented in a series of plans within Table 7, with detailed design iterations presented in Table 8. The design evolution has sought to balance considerations of those technical matters and site values. The proposed Terminal Station will become a significant regional public asset.

Overall, Pacific Green have sought to avoid and minimise environmental, social and physical impacts through a site-responsive design. By designing to avoid disturbance of most ephemeral water areas and creating replanting areas, the design can provide a strong positive biodiversity benefit.

Table 7 - Site influences on design

Design consideration

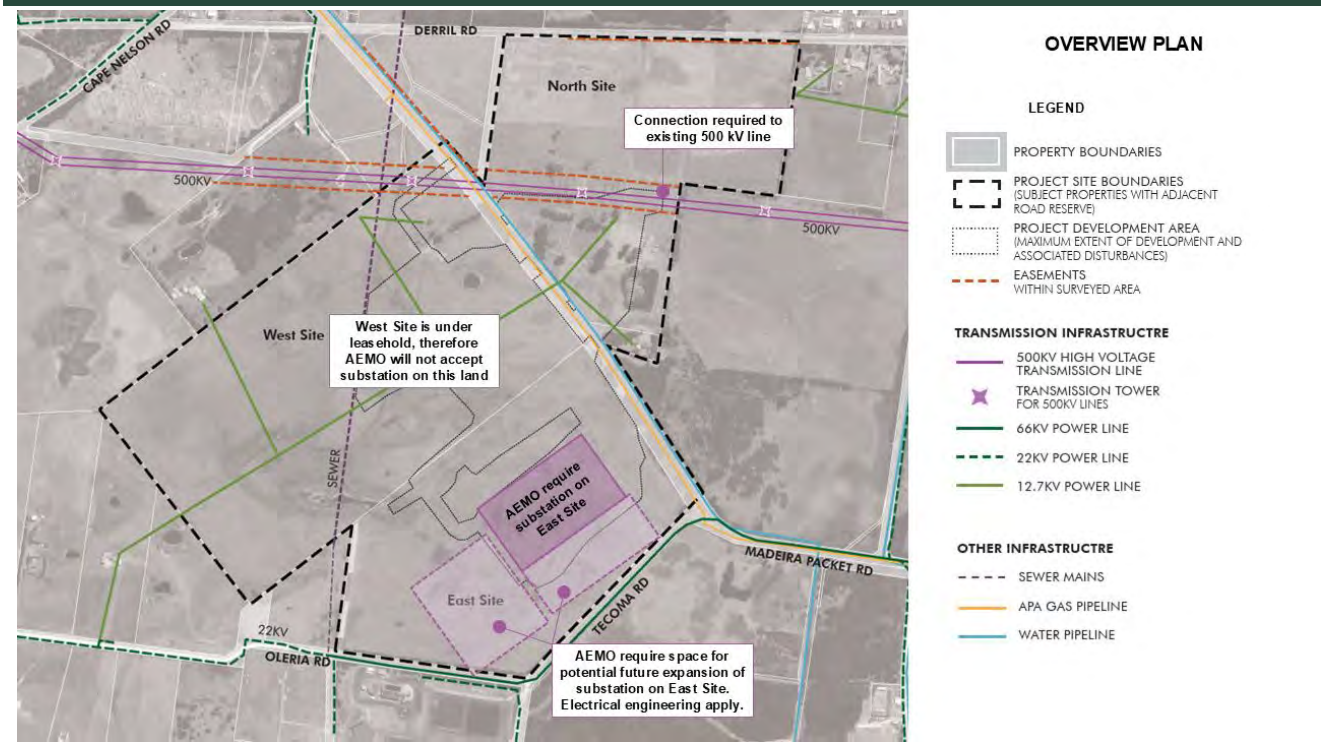


Plate A: AEMO/AusNet requirements on land tenure and engineering design for potential future Terminal Station expansion mean the substation can only be developed on the East Site.

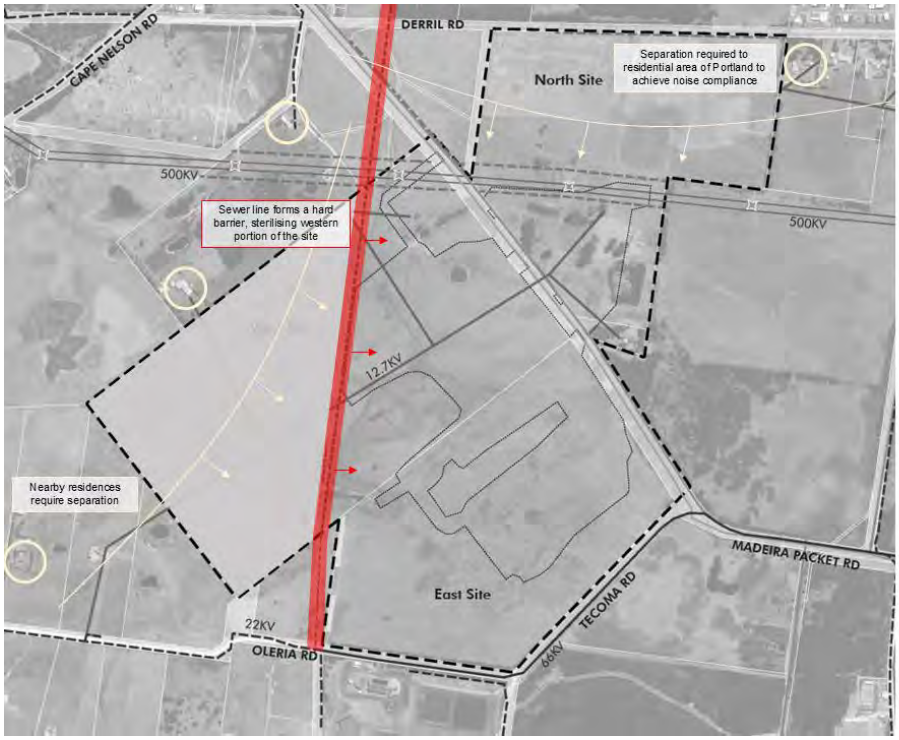


Plate B: A trunk sewer line running north-south through presents a construction barrier. Residences to the north and west create a need for separation of development for noise protocol adherence.

Plate C: Avoidance of elevated cultural heritage sensitivity within dune rises.

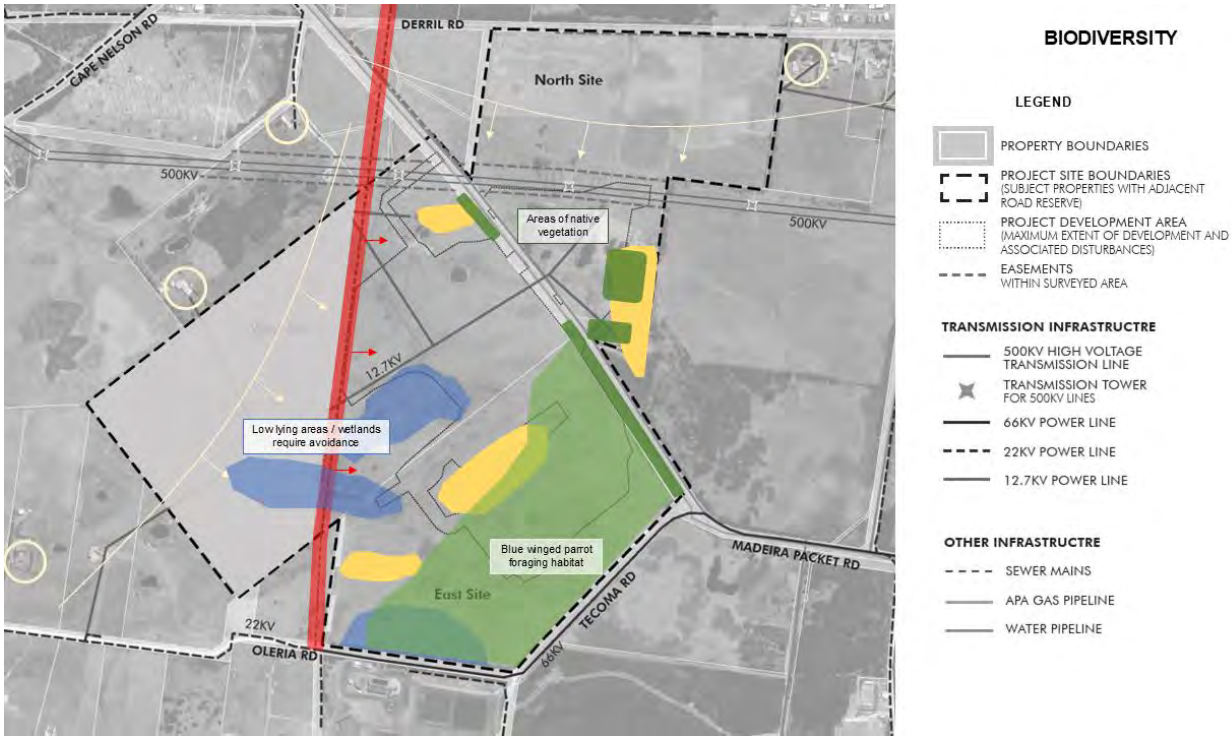


Plate D: Low lying ephemeral water areas, native vegetation, and Blue-winged Parrot foraging areas identified.

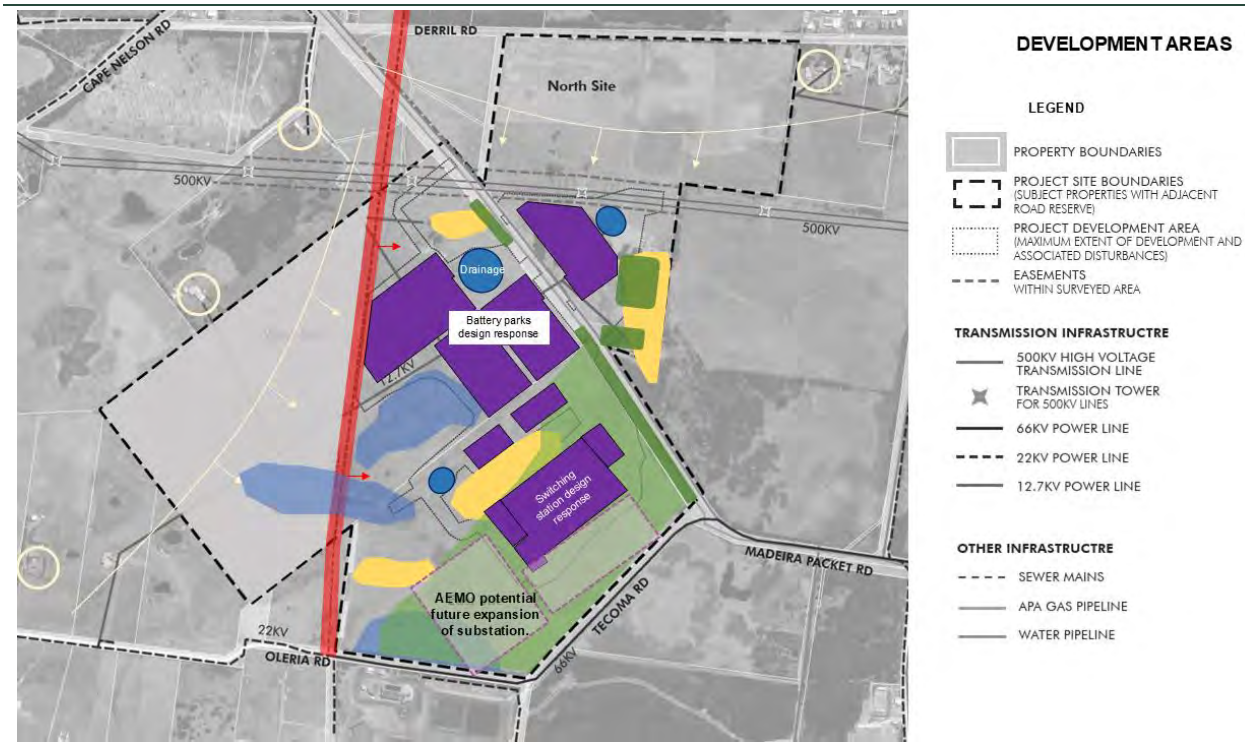


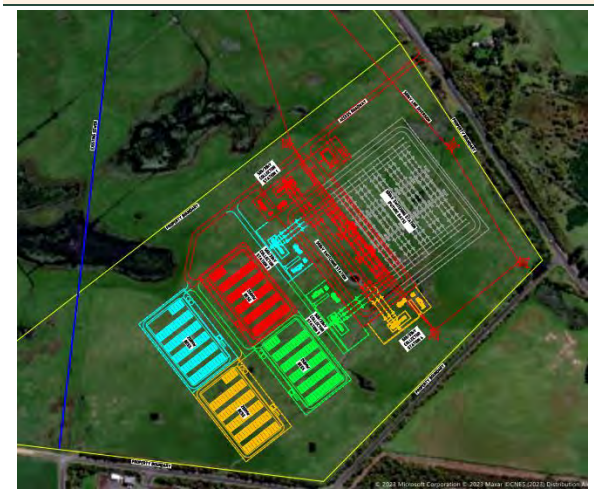
Plate E: Project design response balancing avoidance, minimisation and mitigation of the various site values and constraints.

The initial site selection and concept design has changed significantly in response to the factors described above.

The initial concept layouts were contained solely within the East Site, with early iterations then expanded to include the West Site once site values were identified. The inclusion of the North Site provided additional space to account for constraints on the other the other site parcels – primarily hydrology, foraging habitat for

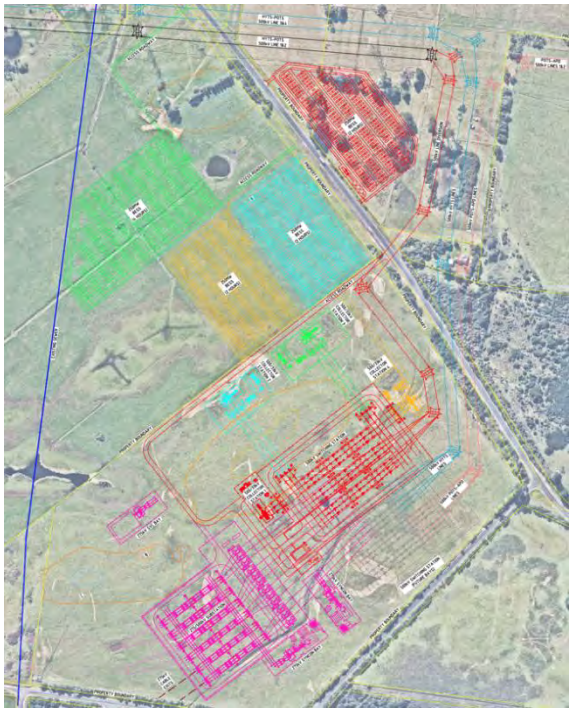
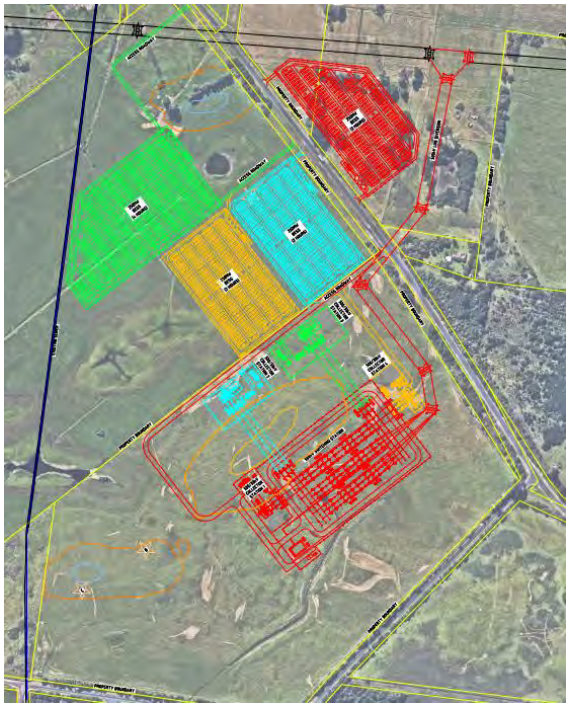
the Blue-winged Parrot, cultural heritage sensitivity, the trunk sewer line running north-south in the Project area and AEMO requirements for the substation.

Table 8 - Design Iterations

Design version (drawing name and date)	Primary changes/notes	Engagement influences
EHV-PREH2-EL-DR-0001 **RevD**	**17 April 2023**	
 	Initial concept design located all components on the 'Site East' property (secured for purchase), with transmission connection crossing 'Site West' to existing 500kV lines.	*AEMO requested provision for future bays on 500kV switching station*
EHV-PREH2-EL-DR-0001_OPTION4 **Rev B**	**16 August 2023**	
	Battery parks moved to 'Site West' to accommodate AEMO requirements for future substation expansion (275kV bays – shown in magenta).	AEMO stipulate that future expansion of substation must be allowed for. Only Site East can host substation due to tenure (purchase as opposed to lease)

EHV-PREH2-EL-DR-0001_HRTG **Rev B**	**22 October 2023**	
	Substation design moved (separated from 33kV Collector Stations) to avoid dune rises. Additional properties secured (Site North) to accommodate revised design layouts. Pacific Green propose a 'Gas Insulated System' for future 275kV substation – as it is more space efficient than standard equipment (magenta). Additionally, Pacific Green reduce allowance for future 500kV bays (in grey), to reduce width of 500kV substation, to accommodate dune avoidance.	Standard Site Assessment (walkover) completed *17 October 2023*, with GMTOAC, identifies dune rises as likely to contain significant cultural heritage. *(Draft Desktop Assessment completed September 2023)* AEMO push back on redesign. GMTOAC sign letter to AEMO (11 December 2023) stating support for redesign to avoid dune rises, noting zero harm.
EHV-PREH2-EL-DR-0001_AEMOULT **Rev D**	**25 January 2024**	
	AEMO / AusNet refuse 'GIS' system, meaning future area (magenta) has larger footprint.	AEMO refuse GIS system, but agree to reducing future allowance of 500kV bays (in grey) to allow avoidance of dune rises (February 2024).

EHV-PREH2-EL-DR-0001_AEMOULT **Rev G**	**14 February 2024**	
	Green battery park becomes a 'four-hour' system (instead of two hour), to allow longer duration storage in alignment with Vic Gov policy. Transmission line connection (red line) is altered to avoid impacting roadside vegetation (habitat for listed fauna).	This version is formally endorsed by AEMO.
EHV-PREH2-EL-DR-0001_AEMOULT **Rev N**	**13 March 2024**	
	Fire engineering risk management requires BESS units to have increased spacing in-between, necessitating expanded footprint of battery parks. Increased footprints for benched areas increases hydrology / surface water management pressure. Functional drainage concept design commences to respond.	Complex testing methodology is reviewed to account for footprint changes.

EHV-PREH2-EL-DR-0001_AEMOULT **Rev O**	**20 March 2024**	
	Battery Park layouts are rationalised from previous version for efficiency, and to provide better setback to northern dune rise. Benching concept design is undertaken, with focus on avoiding cut (i.e., bringing in fill) to avoid/minimise natural ground disturbance and potential impacts to cultural heritage.	Complex testing continues.
EHV-PREH2-EL-DR-0001_AEMOULT **Rev Q**	**12 July 2024**	
	Only fractional differences to RevO: Slight changes (increases) in setback to trunk sewer line (now that we have received the Sewer authority's GPS-located sewer data), and to Madeira Packet Road (gas pipeline and to allow for vegetation planting). Surface water management / functional drainage ponds and lines, as well as benching, designed and factored in.	Wannon Water provide geo-located data of trunk sewer line. Complex testing is complete, with artefact locations / patterns now known. Future expansions not shown as these are not Pacific Green projects. Planning permit application lodged with this version.

In consideration of the above, the concept design layout achieves a highly responsive site design that has avoided significant site values as much as practical.

5.1.2 Detailed design minimisation

Beyond the design concept layout opportunities for avoidance of key site values, Pacific Green are seeking to further minimise impacts. While it is too early to undertake detailed design, in order to demonstrate reduced impacts of construction upon cultural heritage sensitivity, some early commitments in detailed design have been established.

As discussed in the previous section, Pacific Green have undertaken significant design revisions to accommodate AEMO requirements while seeking to avoid the most sensitive areas of the Project area. Additional land has been secured to allow the layout to expand over multiple properties to achieve avoidance of dune rises as much as possible.

Subsequent to the 'Rev Q' plan (12 July 2024), to support the CHMP process and illustrate works penetrating deeper below natural ground level, a 'footings plan' was prepared and provided to GMTOAC. In a meeting on 18 September 2024 with GMTOAC, the RAP voiced concerns with the footings plan and deep penetration impacting cultural heritage. To address these concerns, a review of detailed design/construction methodology was undertaken.

All battery parks and substation infrastructure must be constructed on engineered benches. Pacific Green have designed these benches to fully avoid cutting into the site, necessitating significant engineered fill (to be imported into site). All effort will be undertaken to align cabling to access tracks/roads and minimise disturbance outside of existing works areas. Access roadways are to be constructed throughout the Project area, primarily raised on imported fill.

While AEMO have not supported attempted layout changes to the substation and infrastructure, Pacific Green have been able to review detailed design / construction methodology for the four 'Collection Stations', to be constructed on shallow concrete pads as opposed to the original deep piling design. This avoids deep ground impacts at all four Collector Stations. The nature of the tall gantry / substation infrastructure for the 500kV substation means that deep footings will still be required and are unavoidable. Notably, the 500kV substation footings are located on lower elevations and avoid areas where testing located significant (in hundreds) numbers of artefacts.

In summary, the works considered unavoidable in terms of penetrating below natural ground level are:

- Scraping of topsoil to prepare benching areas. This is expected to 150mm but conservatively estimated to 200mm maximum.
- Deep-ground penetration for footings in 500kV substation area (typically up to 8m or hitting bedrock). These direct piles can be as wide as 800mm.
- Deep-ground penetration for footings for transmission towers.
- Excavation of drainage ponds (exact footprint subject to detailed design, but functional layout completed).
- Drainage line realignment, subject to detailed design (indicative only at moment).

Sub-surface cabling is required between BESS units and Collection Stations however, it is anticipated that these will primarily be within engineered fill depths. The detailed construction methodology changes on the Collector Station footings have been viewed very positively by GMTOAC.

5.2 Mitigation

In addition to the steps taken to avoid and minimise impacts, steps for mitigation of direct and indirect impacts during the construction and operation phases have been developed. The following sub-sections provide an overview of 'best-practice' mitigation commitments that will be implemented during construction and operation:

- Land Management & Rehabilitation Plan (LMRP)
- Environmental Management Plan (EMP)
- Water quality
- Noise
- Lighting
- Fire
- Traffic

The LMRP and EMP in particular, are two documents prepared by Pacific Green to ameliorate impacts to ecological values within the Project area.

As no significant residual impact on MNES is anticipated, no Offset Management Strategy or environmental offsets are required.

5.2.1 Land Management & Rehabilitation Plan (LMRP)

In recognition of the important ecological values present within and adjacent to the Project area, Pacific Green engaged JBS&G Australia Pty Ltd (JBS&G) to prepare a LMRP for the Project area (Appendix E). The overarching goal of the LMRP is to *improve the overall ecological conditions of the site through time such that the Action mitigates its environmental impacts and ultimately results in a nature positive outcome,* with the following specific objectives:

- **Objective 1:** Provide guidance on proposed visual screening that will improve visual amenity for local residents whilst providing opportunities for biodiversity enhancement;
- **Objective 2:** Articulate areas proposed for terrestrial and aquatic enhancement and revegetation for the purposes of improving biodiversity and stormwater outcomes for flora and fauna including Commonwealth listed species;
- **Objective 3:** Improve the connection between isolated vegetation patches to promote native wildlife movement including increasing foraging and roosting habitat for MNES, specifically the Blue-winged Parrot, Southern Brown Bandicoot and Swamp Antechinus;
- **Objective 4:** Provide guidance on appropriate species selection for the different land management treatments that will ultimately increase the abundance of indigenous flora species; and
- **Objective 5:** Improve land management practices within parts of the Project area through the reduction in grazing pressure and impacts associated with pest animals and weeds that will improve the ecological condition and habitat within treated areas.

These will be achieved through four land management treatments, described in the following sub-sections, as well as general prescriptions including hygiene controls, avoidance of off-target herbicide damage and soil disturbance, protection of existing indigenous vegetation, woody debris and mulch management and removal of temporary fencing. Table 4-1 of Appendix E provides a summary of treatments and their areas.

5.2.1.1 Roadside treatment

This treatment type will be applied along Madeira Packet road and addresses Objectives 1 and 3. Revegetation of the roadside will occur in a 0.25 ha area to the south of Madeira Packet Road. This treatment focusses on infill planting of Heathy Woodland (EVC 48) vegetation between existing patches, both for visual

amenity and to improve the connectivity and increase the availability of habitat for SBB and SA. These plantings will also (once established) increase the availability of roosting habitat for BWP.

5.2.1.2 Perimeter screening

This treatment type will be applied along the Project area's three south-western boundaries and addresses Objectives 1 and 3. Perimeter screening will be an 8 m wide and 1,600 m long planting strip, totalling approximately 2.62 ha. This treatment focusses on planting of canopy species and shrubs from a variety of local EVCs, both for visual amenity and to improve the connectivity and increase the availability of habitat for SBB and SA. These plantings will also (once established) increase the availability of roosting habitat for BWP.

5.2.1.3 Blue-winged Parrot Enhancement Planting

The LMRP proposes to improve the quality and area of habitat for the Blue-winged Parrot in two ways:

- The provision of additional terrestrial foraging habitat (0.50 ha), and
- The provision of additional wetland (semi-aquatic) foraging habitat (7.33 ha).

BWP enhancement planting addresses objectives 2, 3, 4 and 5 of the LMRP.

Pacific Green have undertaken the revegetation of a terrestrial trial plot of 0.18 ha area along the project boundary opposite Schultz Ave in 2023 (Figure 9), with a variety of species successfully established (including *Juncus* spp.). An additional 2 m wide area running adjacent to the inside of the LMT02: Perimeter Screening area is to be revegetated, totalling 0.50 ha. The revegetation of these areas aims to increase the area of high-quality foraging habitat available for BWPs. The proposed enhancement planting aims to mitigate the loss of poor-quality foraging habitat through the provision of high-quality foraging habitat.

The provision of additional wetland foraging habitat will focus on non-native areas adjacent to existing areas of Aquatic Herbland (EVC 653) that are present throughout the Project area, which are currently in poor condition. As the BWP was recorded foraging on native rushes fringing the wetlands, revegetating these areas will significantly increase the foraging habitat and food resources available for this species. In addition, as the wetlands are ephemeral, improving their condition will improve the stormwater management of the Project area.

The wetland revegetation will focus on two patches of Aquatic Herbland (EVC 653) in the southern portion of the Project area, totalling 7.34 ha. The terrestrial area adjacent to wetlands provides important habitat for species. This area will be revegetated with native grassland species in a fringe surrounding the Aquatic Herbland areas.

Figure 9 – Early planting establishment

5.2.1.4 Pest and grazing management

This treatment type will be applied to 11.19 hectares of existing non-native pasture, with the view of improving this area as BWP foraging habitat. Quality improvements will be achieved through reduced stocking rates, weed management and pest animal management. This treatment type addresses Objective 5 of the LMRP.

5.2.2 Environmental Management Plan (EMP)

Pacific Green engaged JBS&G Australia Pty Ltd (JBS&G) to prepare a draft Environmental Management Plan (EMP) for the Action (Appendix F). The purpose of the EMP is to "*ensure that the proposed construction and operation works on site are managed to acceptable standards and appropriate controls are put in place to manage human and environmental risks".* For both construction and operation, the draft EMP includes measures related to Air quality, Noise and vibration, Lighting, Traffic, Erosion and sediment control, Waste management, Soil and contamination, Surface water and groundwater, Ecology, flora and fauna, Weed and pest management, Public safety, Fire and Environmental emergency response, with consideration of specific measures required for MNES.

In addition, further information is provided in Sections 5.2.3-5.2.7 on some specific environmental matters.

5.2.3 Water quality

The proposal for the wetland rehabilitation includes the construction of holding points to capture and treat any stormwater from the Disturbance footprint before discharge into the central wetland. Rehabilitation of the wetland in the centre of the Project area will include habitat enhancement via plantings and restricted stock access, which will result in an improvement in water quality and filtration. Therefore, the proposed wetland rehabilitation will increase water quality of the wetland area. Additionally, the two holding ponds will create habitat that fauna, and insects, may use.

5.2.4 Noise

5.2.4.1 Understanding the impacts of noise on fauna

Although there is an extensive literature concerning the impacts of noise on humans, marine mammals and birds, there is relatively little information concerning the impacts of noise associated with BESS's and associated electricity infrastructure. Most of the studies relating to noise and terrestrial fauna have been conducted in the United States of America and Europe and relate to noise from military operations, aircraft, highway operational noise and other vehicles or equipment (e.g. boats, snow mobiles, gas compressors) most of which focus on impacts to avian fauna.

Available information suggests that mammals as a whole, hear in a frequency bandwidth from below 10 Hertz (Hz) to over 15 000 Hz, birds between 100 Hz and 10,000 Hz, reptiles between 50 and 2000 Hz and amphibians between 100 and 2000 Hz. Key noise levels when assessing potential impacts to fauna are presented below. All levels are expressed in dB(A). The 'A' weighting adjusts the frequency spectrum to better reflect the subjective loudness of each frequency as perceived by the human ear.

- -20 dB(A) is the sound just audible to a nocturnal carnivore
- 0 dB(A) is the sound just audible to humans
- 20 dB(A) characterizes a quiet desert
- 40 dB(A) describes night time noise in the average home
- 60 dB(A) characterises normal human speech.
- 80 dB(A) is the safe human limit for continuous noise[1]. An air compressor at 15m will typically generate 80db(A) or above
- 100 dB(A) is where the startle reflex stops habituating, for example, pile driving.
- 120 dB(A) is the threshold of auditory pain in humans.

The potential effects of noise on terrestrial fauna has been previously described as including physiological stress responses, physical damage to hearing organs, increased energy expenditure or physical injury while responding to noise, interference with normal animal activities, and impaired communication (Forman et al., 2003). Manci et al. (1988) presents a summary of some of the key findings of international studies on the effects of noise on terrestrial fauna and found that a range of bird species respond to loud noise, blasting, drilling and other noises. Most studies examining noise levels of 80–110 dB found that response of birds to noise varies from startling and flight to reduced clutch size or nest abandonment. Certain terrestrial fauna such as owls have very sensitive hearing; to perceive and locate many important sounds (such as prey, nestlings and other adult owls) owls need to discern them from background noise. A general increase in background noise levels may impact on the behaviour of birds of prey including hunting success, breeding success and ultimately may impact population viability.

More recently, a key piece of analytical research by Engel et al. (2024) examined the impacts of anthropogenic noise on avian species. Whilst it is difficult to summarise such a comprehensive piece of work, we have taken some of the key determinations form this article as they relate to Psittaciformes, the order of birds that contain parrots. In summary:

- Budgerigars can experience permanent damage from impulse blasts at 140dB(a) and temporary damage from multiple impulse blasts (jackhammer, pile drivers) at 50-60 dB(A).
- Budgerigars can experience temporary damage from continuous construction and highway noise above 93dB(A).
- Budgerigars can experience physiological and behavioural response to continuous noise at 50-60 dB(A).
- Rainbow lorikeet's and Budgerigars have expressed behavioural response and decreased density in response to traffic noise (unknown dB).

Engel et al. (2024) also presents a figure that quantifies anthropogenic noise impacts on avian orders as presented in (Figure 10), showing that Psittaciformes (Ps) – parrots are relatively robust to a range of noise impacts.

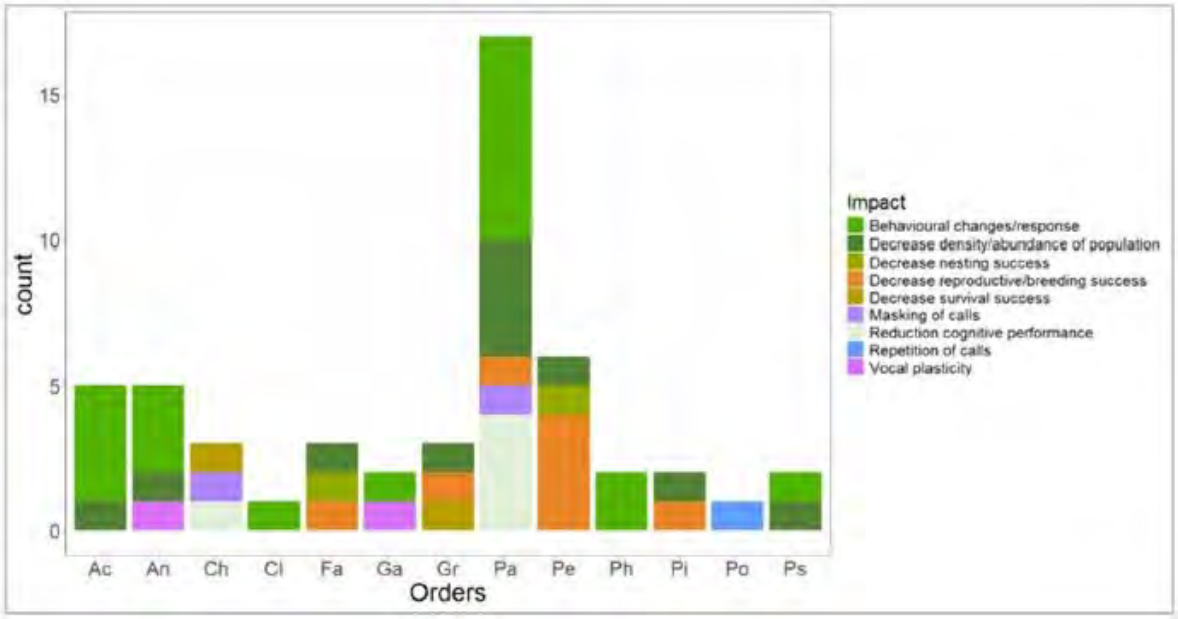


Figure 10 - Extract from (Engel et al., 2024), showing noise impacts to Psittaciformes (Ps) – parrots

Additional Studies investigating the impacts of traffic disturbance in the Netherlands found that of 43 species of woodland birds, 60% showed reduced densities near highways with regression modelling indicating that noise was the key variable (Forman et al., 2003). Grassland birds species were observed to reduce in density at an average of 48 dB(A) and 42 dB(A) for woodland species. Research conducted in 1973 and 1980 provides a

disturbance effect range for traffic noise in grassland habitat of between 500-600 m for rural road and 1600-1800 m for busy highways. Forman et al., (2003) also found a correlation between noise and levels of stress induced hormones for the Spotted Owls (*Strix occidentalis caurina)* nesting in forests within 400 m of logging roads receiving a traffic volume of between 5 and 50 vehicles a day. Male owls within the impact zone showed notably higher hormone levels than background levels (Forman et al., 2003) with no seasonal change. Intersex differences were suggested to reflect the predominantly male role in territorial defence, compared to the predominantly female role in parental care.

Several studies also investigated disturbance response in birds such as those that trigger flight response and other behavioural characteristics. For instance, military jet fly overs producing noise at levels above 80 dB(A) were responsible for eliciting alert behaviour in Harlequin Ducks (*Histrionichus histrionicus)* with residual effects such as reduced courtship behaviour, antagonism lasting up to two hours. Another example was the use of call playback to simulate the effect helicopter flyovers on Crested Terns (*Sterna bergii)* in the Great Barrier Reef with flight induced at 85 dB(A) while other bird species were observed to illicit a response at as little as 65 dB(A) (Jones, 2004).

In Australia there is some data relating to the effects of noise from mining operations on fauna. Biosis Research conducted a study on the response of birds (mainly waterbirds) to quarry blasting at a site on Port Phillip Bay, Victoria. The study found that response to quarry blasting varied, with most birds (including waterfowl, migratory waders and *Neophema* [parrots]) located more than 2 km away from the blast site not taking flight. However, certain birds (mainly waders and waterbirds) located up to 1 km from the blast site did respond to blasting with flight or altered behaviours, particularly when there was ground vibration associated with the blast. International studies are often show consistent results which indicates not only is the noise level important in influencing bird behaviour but also the characteristics of the noise. Noise characteristics that are sharp and rapid (e.g. blasts) will elicit a greater response in birds than those that are slow and ramp up in noise level.

With regards to birds, Marshall Day Acoustics note that *'in some respects, birds show that they are more adaptable to noise than humans. As an example, most bird scaring guns need to operate at random time intervals to avoid having birds perching on them between blasts. This is supported by a study by Pater et al (1999) on the response of woodpeckers to military training noise events such as artillery, small arms, helicopters and manoeuvre noise. The woodpeckers were observed to successfully adjust to these events' (Marshall Day Acoustics, 2014). Furthermore, they noted 'in 1995 and 1997, Marshall Day Associates studied the impact of noise on birds for the Avalon Air Shows at Avalon Airport near Geelong, Victoria. These studies found that the impact of noise on birds consisted primarily with the startle response following the initial transient signal, but a habituation to noise developed after continuous exposure to steady levels of noise'*.

5.2.4.2 Assessing the impacts of the Project on Terrestrial Fauna

Marshal Day Acoustics provides a detailed assessment of noise and noise impacts associated with the project. A summary of the potential sources of noise from the project operations include the following:

- Inverter noise
- Battery units, and
- MV/HV transformers (Marshall Day Acoustics, 2024).

Whilst this was primarily focused on human impacts of noise, data contained within can be used to predict potential impacts on fauna. When assessing the noise impacts on fauna associated with the Action, key threatened species considered are those with records within the Project area or considered highly likely to utilise the Project area including:

- Blue-winged Parrot;
- Southern Brown Bandicoot;
- Swamp Antechinus; and
- Southern Bent-wing Bat.

The existing noise environment around the Project area was 'typically characterised by wildlife such as birds and insects, varying levels of surf noise from the ocean, trees rustling in wind and intermittent road traffic. The level of noise from each of these sources varied depending on the measurement location and meteorological conditions' (Marshall Day Acoustics, 2024) . For example, a continuous logger located within the Project area (L1) recorded noise over 40 hours and found noise ranged from approximately 35db-45db for most periods but with some spikes up to approximately 58 dB (likely vehicle). A full night recording shows elevated noise due primarily to surf with an unusual spike in $L_{Aeq,15min}$ most likely due to a truck or machinery for a very short period. Significant commercial, industrial and trade premises noise was noted, in particular that emanating from the PAS. Marshall Day Acoustics note that during the attended survey, noise from the PAS was observed to be an audible feature of the noise environment at most measurement positions (Marshall Day Acoustics, 2024). For example, the measuring site in proximity to the PAS (S1) shows a constant overnight noise ~53db (Marshall Day Acoustics, 2024). Therefore, overall, there's a clear indication that the area has some elevated noise, and the nature of the noise context includes wind turbines, surf, infrastructure and the smelter.

The noise report explores a number of different scenarios on human receptors located between 400m-1.5 km from the Project area. The determinations of that report are summarised below:

- Unmitigated Cumulative noise levels for the project and the PAS combined range between 37-49 dB(ENL);
- Mitigated cumulative noise levels for the project and the PAS combined range between 35-45 dB(ENL); and
- With additional equipment mitigation (equipment selections and operational controls [fan speeds]), cumulative noise levels for the project and the PAS combined range between 31-44 dB(ENL) (Marshall Day Acoustics, 2024).

Very little empirical data exists for terrestrial mammal (other than humans) responses to noise. However, it is considered likely that there will be some response of SBB , SA and SBWB to the altered noise regime. It should be noted that if ground-dwelling mammals are present within the Project area, then it is highly likely they are utilising roadside corridors to access the Project area which would indicate they tolerate significant transport noise including that generated by large trucks along Maderia-Packet Road. Little is known about the impacts of noise on bats.

JBS&G consider that some form of behavioural responses in fauna is possible between 31–49 dB(A). However, such impacts need to be considered in relative terms with noise of 49–59 dB(A) the equivalent of noise levels between night time levels in the average home and normal human speech. Natural noises in the environment such as that produced by a flock of Cockatoos would be expected to exceed such a noise level. It is likely that noise levels ranging between 31 – 49 dB(ENL) are unlikely likely to illicit a significant response, and within a relatively short space of time, most animals will adapt to the changing noise environment. This determination is made in light of the literature reviewed and considering species present are likely to have some natural noise tolerance to ambient noise conditions which already have anthropogenic impacts, particularly from the PAS, nearby wind turbines, and Wannon Water's Wastewater Treatment Plant. For example, Australia's only mainland colony of the Australasian Gannet (*Morus serrator)* occurs at Point Danger, Portland within a fenced are of the coast strip directly abutting the PAS. This significant colony of birds occurs less the 1 km from wind turbines and the PAS which produces significantly more noise than the proposed battery park.

With regards to bats, given that they are nocturnal and the majority (90%) of operations will be during that day and that the maximum discharge duration is 4 hours for one of the batteries and 2 hours for the remaining three, impacts are also likely to be minor and non-significant. The Project will not generate erratic blast noises, as cooling fans and electronic vibration will typically slowly ramp up or down, with a relatively continuous noise. Ie, it would be fair to expect that this does not create a 'scare factor'. Extending that, the noise of the PAS is: 1) in absolute terms, louder, 2) while there is an element of constant hum, there are also louder erratic noises (machinery etc) within the existing environment.

5.2.5 Lighting

The project will take a precautionary approach and lighting design will follow the National Light Pollution Guidelines for Wildlife (DCCEEW 2023).

The following lighting principles will be taken to avoid any impact of lighting to MNES:

- Start with natural darkness – The design phase of the Project will consider the existing lighting levels across the Project area, and only add lighting where necessary. Additionally, there will be no lighting directly illuminating the wetland area or retained habitat for SBB and SA.
- Use adaptive controls – Where possible on site, design will implement smart-controlled lights which only switch on when personnel are present.
- Light only the intended object or area - Lighting will be directional and fully shielded. This will decrease the amount of light spill into areas that are not intended to be light, and contribute less to skyglow. Lighting closest to the wetland will be directed away from the wetland area. Lighting closest to dense vegetation, which may provide habitat for SBB and SA, will be directed away from this vegetation.
- Use appropriate lighting – The minimum number and intensity of lights will be used to provide safe and secure illumination for the Project area. The minimum amount of light needed to illuminate an object or the Project area will be assessed during the early design stages and only that amount of light installed.
- Use non-reflective, dark-colour surfaces – Colour of surfaces will be considered during the design phase. Where possible, dark coloured surfaces will be used for infrastructure.
- Use lights with reduced or filtered-out blue, violet and ultraviolet wavelengths – Light globes used across the entire Project area will be chosen from the list of lighting least impactful to bats and terrestrial mammals (DCCEEW 2023). These include:
    - Low pressure sodium vapour
    - Filtered LED
    - Filtered metal halide
    - Filtered white LED
    - Amber LED
    - PC amber.

5.2.6 Fire

Whilst the Action conceptually could represent an increased likelihood of ignition, the additional fire detection and suppression measures that have been designed into the Project mean that fire is highly unlikely to ignite within the development or to run through the landscape. The battery parks are on constructed hardstand with no vegetation. Additionally, the design includes static water supplies, hydrants, and active management of surrounding balance land.

A Preliminary Hazard Assessment has been undertaken for the Action. This determined that the Action achieves an acceptable level of safety, with risks considered low to medium. Fire management measures are included in the EMP, and a Fire Management Plan will be developed for the Action.

5.2.7 Traffic

During construction, approximately 12-18 months, there will be periods of elevated numbers of workers and deliveries driving to the site. However, these will occur during construction hours only (7 am to 6 pm Monday to Friday, 9 am to 3 pm on Saturdays, and 9 am to 3 pm on Sundays and Public Holidays when required) and managed via a Traffic Management Plan (part of Construction Management Plan) with temporarily reduced speed limits. Due to this management, traffic collision risk is considered negligible, and indeed less than the current risk considering the 80-100kmh speed limits surrounding the Project area.

During operation there is negligible traffic associated with the Action, with only limited site maintenance visits.

6. Listed MNES

6.1 Blue-winged Parrot

6.1.1 Description and distribution

The BWP is a slender parrot that is up to 24 centimetres in length with a weight of less than 50 grams. It has an olive-green head and upper body, grading to light green on the fore-neck (Higgins 1999). The upper tail is green-blue, with yellow sides. The underparts are yellow, and there may be orange in the centre of the belly. A yellow facial patch extends back to the eye (Higgins 1999). A narrow, dark blue band runs from eye to eye across the forehead. The BWP gets its name from the large, dark blue patch on the wings. The female is similar to the male, but with slightly duller colours (Higgins 1999).

BWPs breed on mainland Australia south of the Great Dividing Range in southern Victoria from Port Albert in Gippsland west to Nelson, and sometimes in the far south-east of South Australia, and the north-western, central and eastern parts of Tasmania (Emison et al. 1987; Higgins 1999).

A partial migrant, variable numbers of birds migrate across Bass Strait in winter, apparently making the flight non-stop based on the scarcity of records from the Bass Strait islands. During the non-breeding period, from autumn to early spring, birds are recorded from northern Victoria, eastern South Australia, south-western Queensland and western New South Wales, with some birds reaching south-eastern New South Wales and eastern Victoria, particularly on the southern migration (Higgins 1999).

There is a paucity of information about the movements of BWPs, especially regarding their wintering migration routes, however the species has historically been recorded in the search region year-round (DEECA 2023; eBird 2023; Nature Advisory survey data 2023/24 [un-published]).

6.1.2 Habitat

BWPs are a highly mobile species and utilise a range of habitats. They tend to favour grasslands and grassy woodlands and are often found near wetlands. They are also observed in altered environments such as airfields, golf-courses and paddocks as well as agricultural land (DCCEEW 2023).

BWPs breed in Tasmania, southern Victoria and in the far south-east of South Australia, predominantly in Eucalypt forests and woodlands (Emison et al. 1987; Higgins 1999; Holdsworth et al. 2021). During the breeding season (spring/summer) they nest in tree hollows of live or dead trees. In Victoria, birds are known to breed mainly in heathy forests and woodlands and in wetter forests soon after fire or logging (Emison et al. 1987; Higgins 1999).

6.1.3 Ecology

BWPs are known to forage on seeds of a wide range of native and introduced grasses, herbs and shrubs (Higgins 1999). The species likely traditionally favoured a variety of foraging habitats including saltmarsh, heathland/sedgeland, grassy woodland, sparse grassland, and chenopod shrubland. BWP appears to have adapted to forage more widely in modified environments and is known to forage in areas of cleared agricultural land dominated by exotic pasture grasses. The extent to which the species relies on these altered landscapes is unknown.

6.1.4 Occurrence & surveys

6.1.4.1 Database searches

Records of BWP in the search region from the last 25 years were obtained from the VBA (DEECA 2025b) and the last five years from e-bird (e-bird 2025). As of 6th February 2025, there are 142 existing VBA records for BWP within 20km of the Project area, the most recent of which is from October 2022. While there were no

previous records from the Project area (likely reflecting a lack of survey effort on private land), Nature Advisory recorded the species numerous times within and south of the Project area.

The distribution of current VBA records, eBird and Nature Advisory records for BWP within 20km are shown in Figure 11.

Figure 11 - VBA, eBird and Nature Advisory records for BWP in the search region (20km buffer)

6.1.4.2 Desktop assessment

A desktop assessment of an area with a 20km radius from the boundary of the Project area was undertaken to investigate the extent of suitable habitat for BWP in the broader landscape. This information was used to gain clearer understanding of the likelihood of impacts associated with the Action. A combination of satellite imagery, areas of mapped native vegetation, habitat distribution models (DEECA 2025a) and BWP observation records (DEECA 2025b, eBird 2025) were used to indicate areas of suitable habitat.

The majority of historical BWP observations are from remnant native vegetation along the coast (such as along Nelson and Bridgewater Bays), coastal wetlands (south of Princes Highway), largely cleared agricultural land or inland forests including Cobboboonee National Park and Mt Clay State Forest. Historical records from these two tracts of remnant woodland likely indicate that these areas support suitable breeding habitat for BWPs.

The vast number of records throughout the landscape suggests that the species utilises a broad range of habitat types in the region. Notably, the species has been recorded by Nature Advisory as well as in eBird and the VBA throughout Point Danger, surrounding the Portland Aluminium Smelter, a large, industrial facility as well as close to the township of Portland (refer to map insert in Figure 11). The presence of the BWP in these localities suggests that the species can tolerate anthropogenic disturbances including noise, light and vibration.

Additional desktop assessment – 2km radius focus – July 2025

In response to the request for further information (RFI) from DCCEEW in June 2025, an additional desktop assessment of the amount and type of habitat near the project area has been completed, relevant to BWP, SBB and SA.

Desktop Review Method

The investigation area is defined here as the area within 2km of the proposed development boundary (Figure 12). Information was drawn from several standard sources and previous project reports:

- EPBC Protected Matters Search Tool (DCCEEW 2025)
- NatureKit (DEECA 2025a)
- Victorian Biodiversity Atlas (DEECA 2025b)
- eBird database (eBird 2021)
- Nature Advisory reports referenced within this Preliminary Documentation.

As presented in Figure 12, visible areas of woody vegetation and open grassy fields have been broadly mapped by Nature Advisory based on large-scale aerial imagery within 2km of the proposed development boundary. These two types of areas potentially provide habitat for SBB, SA and BWP. Note that this broad mapping:

- Includes approximately 528 hectares of open grassy fields and approximately 458 hectares of woody vegetation
- Aims to highlight larger areas of woody vegetation and open grassy fields, particularly on the southern side of the 2km investigation area which includes/is closer to the large tracts of remnant native vegetation situated along the coast, rather than the northern side which is mostly urban area (though we noted that there have been previous records of Southern Brown Bandicoot, Swamp Antechinus and Blue-winged Parrot on the northern side as well)
- Is indicative and provides general outlines or locations only, and is not intended to represent precise boundaries
- Has not been ground-truthed through field surveys, which we recognise is a significant limitation on this broad mapping's guidance about fauna habitat, for example:
    - Some areas of woody vegetation may not be a suitable vegetation community for SBB and SA
    - Some areas of woody vegetation may not have a suitably dense understorey for SBB and SA
    - There may be some areas of suitable habitat that were not identified at this level of broad mapping, e.g. sedgeland habitat for SA
    - Some areas of open grassy fields may not be suitable for BWP, depending on the mix of understorey species providing foraging opportunities
    - Varying levels of human disturbance will occur at the site-specific scale that will ultimately impact habitat availability
    - Even if these broadly mapped areas provide suitable habitat, field surveys were not conducted to confirm presence in suitable habitat – fauna do not necessarily utilise all suitable habitat in the region and there could be a variety of reasons for this (e.g. if there are barriers to dispersal between suitable habitats for the ground-dwelling SBB and SA).
- Did not include sports ovals and golf courses.

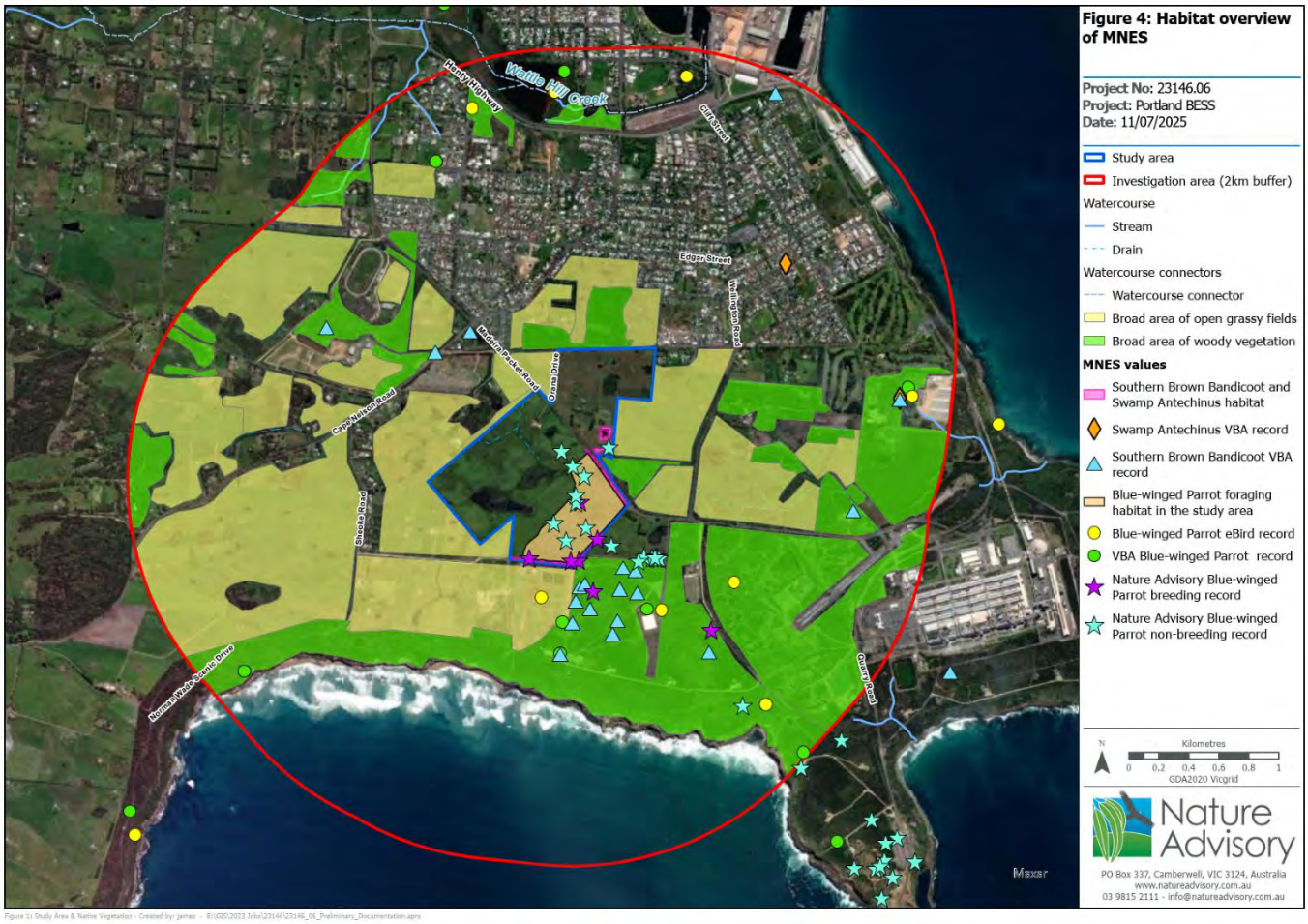


Figure 12 – Habitat overview of MNES

BWP additional desktop review discussion

The BWP is a highly mobile species, ranging from Tasmania to South Australia and Queensland. BWP are a partial migrant with some remaining in the southernmost parts of mainland Australia year-round, while others cross the Bass Strait into Tasmania each year to breed.

The species has experienced declines of 30-50% over recent years (Holdsworth et al. 2021). The proposed development is within the general range for the species and in an area where they are known to occur in both breeding and non-breeding season (DCCEEW 2025).

Habitat for the BWP can be described as foraging, breeding, roosting, and staging habitats (DCCEEW 2023). Foraging habitats typically are diverse natural habitats for foraging, including salt marsh, heathland, sedgeland, grassy woodland, sparse grassland, and chenopod shrubland (Higgins 1999). The Blue-winged Parrot appears to have adapted to more modified landscapes and is now frequently observed foraging in cleared agricultural areas dominated by exotic pasture grasses (Nature Advisory 2024b; DCCEEW 2023). Staging habitats are the foraging areas near the coast, where birds congregate before migrating across the Bass Strait (DCCEEW 2023). Breeding and roosting habitat typically consists of Eucalypt woodlands or heathlands with hollow-bearing trees, with nearby foraging habitats (Emison et al. 1987; Higgins 1999). During breeding season, birds typically make frequent movements between breeding/roosting areas and nearby foraging habitats.

Habitat modelling produced by DEECA maps the site to be free of BWP habitat (Figure 13). However, direct field observations confirmed there was some high-quality foraging habitat in the area, as discussed in 6.1.4.3. BWP were observed feeding on exotic pasture species and common weeds including Yorkshire Fog (*Holcus*

lanatus), Sweet Vernal-grass (*Anthoxanthum odoratum*), Sheep Sorrel (*Acetosella vulgaris*) and Cats Ear (*Hypochaeris radicata*).

Figure 13 – Blue-winged parrot habitat distribution model

Note: Figure 13 displays the Action's Site within the broader 2km investigation area. Data sourced from NatureKit (DEECA 2025).

The Site itself does not support any breeding habitat as it lacks hollow-bearing trees required for nesting. The nearest potential breeding and roosting habitat is in the adjacent remnant woodland to the southeast of the site and is also present throughout the broader region, primarily within designated conservation areas (Figure 12). As such, the records of BWP during breeding season (spring/summer) were likely to be nesting nearby and utilising the project site solely for foraging. At the same time, the birds congregating in the area during autumn may have been using the area as a staging ground for their migration.

Based on the species' most recent conservation advice, habitat critical to survival includes "foraging and staging habitats found from coastal, sub-coastal and inland areas, right through to semi-arid zones including: grasslands, grassy woodlands and semi-arid chenopod shrubland with native and introduced grasses, herbs and shrubs" (p. 4, DCCEEW 2023). On that basis, the project area qualifies as a critical foraging habitat which will be impacted by the proposed action. However, the forage that birds were observed favouring were all common exotic species, which are available widely in paddocks, road edges, lawns, and most other open areas. Given the availability and proximity of similar quality foraging habitat to both the east, west and north of the site, the onsite habitat is not considered unique or limited in the surrounding area. On the contrary, exotic pasture is widely available in this largely agricultural landscape.

The project area contains 22.697 ha of foraging habitat for BWP which was mapped from field assessments for the project, of which 10.827 ha will be impacted by the project. The broader investigation area contains approximately 528 ha of broadly mapped open grassy fields, which represents potential suitable BWP foraging habitat. Therefore, there is a total of approximately 551 ha of foraging habitat in the project area and broader investigation area combined. The 22.697 ha of suitable foraging habitat in the study area represents 4.119% of the suitable foraging habitat in the broader investigation area, while the 10.827 ha of impacted habitat represents 1.965%.

We note that the broadly mapped woody vegetation to the south of the study area (295 ha) likely contains potential breeding and roosting habitats for the species. No such breeding habitat occurs within the project area.

Based on observations of what plants are preferentially foraged (widespread exotic species), the abundance of similar quality habitat nearby, and the lack of breeding habitat onsite, it is considered unlikely that the proposed development will significantly affect habitat critical to the survival of the Blue-winged Parrot. Importantly, the project avoids impacts to any nesting or roosting habitat, and the foraging habitat within the site, though utilised, is not unique or limited. This desktop review has considered that this type of foraging resource, dominated by exotic grasses, is abundant across the surrounding landscape.

The above supports the conclusions of this section's assessment that the proposed development is unlikely to result in a significant impact for the Blue-winged Parrot.

6.1.4.3 Site-based assessments

6.1.4.3.1 Flora and Fauna survey

During the field assessment conducted by Nature Advisory ecologists in July 2023, BWPs were recorded within the Project area at Allotment 61A Madeira Packet Road in small groups (5-15 birds). The species was observed associating with areas almost entirely dominated by introduced pasture, with a sparse cover of native Rush. Small flocks of BWPs flushed while walking the Project area on foot would either fly a short distance and continue foraging or circle briefly and return to similar vegetation within the Project area. An estimated total of 30-40 birds were recorded within the Project area during the field survey – a conservative estimate given the possibility of double-counting flushed birds that returned to forage in other parts of the Project area.

The determination and subsequent delineation of BWP foraging habitat within the Project area encompassed areas supporting the highest cover of native Rush where the species was observed foraging. Notably, similar habitat was observed throughout the surrounding landscape and no particular feature of the Project area was identified as supporting high-quality foraging habitat for the BWP. Had the species not been observed continuously foraging within the Project area during the initial field assessment, the presence of marginal foraging habitat (areas supporting native Rush) would have been noted but would have unlikely warranted further investigation given the wide availability of comparable foraging habitat throughout the broader landscape.

6.1.4.3.2 Roaming survey and ground-truthing of BWP habitat in the region

A field assessment conducted on 11 and 12 January 2024 included a roaming survey for BWPs and ground-truthing areas of suitable habitat identified from a desktop analysis. During the roaming surveys an experienced observer travelled as a passenger along roadsides in a slow-moving vehicle with the windows down, listening and scanning for BWPs. If BWPs were observed, the location, number of individuals and flight height was recorded. Ground truthing took place at random sites in agricultural areas and in areas indicated in the desktop assessment as important BWP habitat. This included forest and woodland that could contain hollow bearing trees and wetlands where BWPs are known to forage and roost.

A roaming survey was considered appropriate for this purpose given:

- There are no published survey guidelines for the BWP (the species was listed after the publication of the Survey guidelines for Australia's threatened birds (DEWHA 2010));
- The BWP was already known from the Project area (i.e. these surveys were not seeking to determine presence or absence);
- The objectives of the survey were to establish habitat use within the broader region; and
- The Survey guidelines for Australia's threatened birds (DEWHA 2010) identify slow-moving vehicle transects as being effective in expansive areas for Swift Parrot, another gregarious, migratory parrot species.

In January 2024, BWPs were observed foraging in the Project area of the original (July 2023) observation. Additional observations were recorded of flying and perched BWPs within 1.2 kilometres of the Project area.

At least twenty BWPs, including juveniles, were observed within or nearby the Project area during the January 2024 survey.

BWPs were observed foraging on exotic pasture species and common weeds including Yorkshire Fog , Sweet Vernal-grass, Sheep Sorrel and Cats Ear.

Ground-truthing indicated that the agricultural land throughout the region contained a cover of exotic pasture grasses and native Rush similar to that of Project area. Additionally, it was found that areas which have high numbers of BWP records were predominantly wooded areas or pasture adjacent to wooded areas.

During field assessments conducted by Nature Advisory in March 2024, BWPs were observed within the Project area and throughout the surrounding region in a range of habitat types including both remnant native vegetation and highly disturbed areas.

The species was observed foraging and roosting in remnant coastal headland scrub and heathland/heathy woodland areas, in the coastal reserve south of the Project area. Small flocks were observed foraging in exotic pasture, and other disturbed areas such as along quarry road and throughout the still-active quarry site, near the Portland Aluminium Smelter, feeding on seeds of both native and introduced species demonstrating their adaptiveness to a wide variety of foraging habitats as well as their tolerance to anthropogenic disturbances including noise, light and vibration.

BWPs were also regularly observed flying throughout the Portland area, but no meaningful patterns of movement could be ascertained. On two separate occasions, once in the late afternoon and once in the early morning, birds were observed flying in and perching in old eucalypts near the Project area. Small groups and individuals would later disperse in different directions, providing no indication of any regular roosting or foraging areas. A small number of these birds flew towards the Project area and later two small flocks in flight were observed descending on the Project area to forage.

BWP foraging habitat within the Project area was considered marginal in quality and not in short supply throughout the region, much of which has been heavily modified through agricultural use.

The Project area has previously been cleared and has historically been subject to intensive grazing pressure. As such, native flora has largely been replaced with introduced species including common pasture grasses and associated agricultural weeds, which occur throughout the majority of agricultural land across the region. Some native Rush occurred sparsely in the south-eastern portion.

The Project area falls within the core breeding range of the BWP but does not itself support any breeding habitat for the species. Suitable breeding habitat was observed within adjacent remnant woodland to the south-east and throughout the surrounding region. This habitat predominantly occurs within the nearby coastal reserve and is absent from the Project area and adjacent roadside vegetation. As such, the species does not rely on the Project area for breeding or roosting but is likely used by as foraging habitat by fledglings and breeding pairs.

6.1.5 Impact pathways

6.1.5.1 Habitat loss

Population decline of BWP has likely been caused by habitat loss and deterioration in habitat quality (Holdsworth et al. 2021). Habitat critical to the survival or important habitat for BWP includes (but is not limited to) areas that are necessary for foraging and staging habitats found from coastal, sub-coastal and inland areas, and wetlands near the coast (DCCEEW 2023). Any removal of such habitat is considered a threatening process for this species.

The observations of BWPs in January and March 2024, and the presence of juveniles amongst the flocks observed during this period, indicates the species utilises habitat within the Project area to forage during the breeding season. Repeat observations of BWPs within the Project area during the winter and breeding seasons suggests the local population may exhibit some site fidelity; however, the reason for this is unclear

given the highly disturbed nature of site and the availability of extensive areas of very similar habitat and broad utilisation of modified landscapes throughout the region.

The proposed development footprint is expected to impact upon BWP foraging habitat given that this species was recorded during both the summer and winter. A total of 10.827 ha of habitat for BWP will be impacted, occurring within Lot 1 TP592015 Madeira Packet Road, which includes Habitat Zones J, U and V as well as extensive areas of exotic pasture grass.

BWP foraging habitat within the Project area is almost entirely devoid of traditional food sources such as native grasses, herbs and shrubs. These have been largely replaced with introduced pasture grasses and associated agricultural weeds – the ground layer across the Project area has been highly modified through a history of grazing pressure. The BWP's utilisation of the Project area was initially thought to be correlated with the occurrence (although sparse) of native Rush. However, further investigations found that the species was more commonly feeding on the seeds of exotic pasture grasses and common weeds. The BWP's ability to survive in altered landscapes is a current research gap and understanding its foraging ecology is a research priority for this species, as noted in the relevant conservation advice (DCCEEW 2023).

Considering the current knowledge gaps regarding the BWP's population decline and foraging ecology, and the absence of a recovery plan for the species, the information and observations outlined above have been used to inform the significant impact assessment in the following section.

The Action has been referred under the EPBC Act based on the definition of habitat critical to survival in the most recent conservation advice for BWP, which includes 'foraging habitats found from coastal, sub-coastal and inland areas' (DCCEEW 2023). Habitat meeting this description occurs within the Project area and will be impacted by the Action. Given what is known of the species' foraging ecology, it has been understood the above definition implies that areas of pasture dominated by exotic species known to be utilised by BWPs as a foraging resource, can constitute habitat critical to the survival of the species.

6.1.5.2 Water quality

Given the scale of construction and earth works, there the potential to degrade waterways and the existing central ephemeral wetland. The proposal for the wetland protection and rehabilitation includes the construction of holding ponds to capture and treat any stormwater from the Disturbance footprint before discharging into the central wetland. This will reduce nutrient flows, settle sediments and reduce intense flows reaching the ephemeral wetlands.

Rehabilitation of the central wetland is documented in the LMRP (refer to Appendix E) and will include habitat enhancement via plantings of native species (including preferred foraging species, specifically native rush, *Juncus* spp.) Management controls also include restricted stock access, which will result in an improvement in water quality and filtration. Additionally, the two holding ponds will create additional habitat that flora, macrofauna, and insects, will likely inhabit and use. Therefore, the proposed wetland rehabilitation will increase water quality of the wetland area.

Protocols to prevent contamination of the wetland areas during construction are outlined in the EMP (Appendix F, pg.33 & 53).

6.1.5.3 Lighting

As BWP is a diurnal species and the Project area supports only the foraging habitat for this species (i.e. they are not likely to be roosting within the Project area), it is not anticipated that lighting associated with the Action would impact this species. Nonetheless, lighting will be designed in accordance with the *National Light Pollution Guidelines for Wildlife*, as documented in Section 5.2.5. and within the EMP.

6.1.5.4 Noise and vibration

Noise and vibration have the potential to impact BWP through deterring them from using usual foraging habitat.

Noise would be generated by a range of equipment used during construction, including earth-moving equipment for civil works, diesel generators, trucks, and cranes. These would have similar noise outputs to farm machinery such as tractors, however, the duration of output is likely to be significantly longer. The majority of noise and vibration generating construction activities will be undertaken during the daytime, with all construction activities restricted to 7 am to 6 pm Monday to Friday, 9 am to 3 pm on Saturdays, and 9 am to 3 pm on Sundays and Public Holidays (when work on these days is required).

A noise impact assessment for the Action (Marshall Day Acoustics, 2024) determined that the Action can be designed and operated in compliance with the EP Regulations, Noise Protocol, and other applicable legislation (Marshall Day Acoustics, 2024). Section 5.2.4 provides a more detailed noise impact review as it relates to all flora and fauna and should be considered in assessing the impacts of noise on BWPs. However, a short-form response for operation and construction is also provided below.

Construction noise is likely to elicit some behavioural responses in BWP, where they flee the site for a short time. However, parrots in general are highly adaptable birds and their presence indicates they can tolerate noise from the Portland Aluminium Smelter, neighbouring windfarms, wastewater treatment plants and traffic volumes. Under this scenario, it is likely they will return to large parts of the site when construction noise is absent, low or the birds have adapted to the low-level disturbance.

Operational noise from the battery park will not be the prominent noise in the broader landscape, particularly from the Portland township and the operational of the PAS. Noise mitigation measures are documented in the EMP and include treatments such as noise attenuators and anti-noise, anti-vibration systems on fixed operational equipment (as inverters, transformers, and HVAC units).

The ecological assessment confirmed that the species is utilising habitat in proximity to Project (i.e. across the local environment) demonstrating their adaptiveness to a wide variety of foraging habitats as well as their tolerance to anthropogenic disturbances including noise and vibration. Therefore, it is unlikely that noise pollution from the Project will impact on BWP.

Given that noise and vibration are likely to deter BWP only from foraging habitat and only during the day and given the significant availability of similar exotic pasture in the landscape, it is anticipated that the impacts from noise and vibration are likely to be minimal and temporary.

6.1.5.5 Traffic

During construction, approximately 12-18 months, there will be periods of elevated numbers of workers and deliveries driving to the site. However, these will occur during construction hours only (7 am to 6 pm Monday to Friday, 9 am to 3 pm on Saturdays, and 9 am to 3 pm on Sundays and Public Holidays when required) and managed via a Traffic Management Plan (part of Construction Management Plan) with temporarily reduced speed limits. As part of the planning permit application, a Traffic Impact Assessment was prepared, noting that existing vehicle movements per day on Madeira Packet Road within the Project area are over 900 (with speed limits currently 80 and 100 km/h within the Project area). During peak construction, it is predicted that the Action will increase vehicles per day by approximately 545 however, due to traffic management of reduced speeds, traffic collision risk is considered negligible; indeed, it is likely less than the current risk considering the current 80-100kmh speed limits within the Project area.

During operation there is negligible traffic associated with the Action, with only limited site maintenance visits and deliveries. The Action will require permanent staff on site.

6.1.5.6 Fire

While the Action inherently introduces a non-zero increase in ignition risk due to the nature of BESS', the implementation of fire breaks and clearances, comprehensive fire prevention, detection, and suppression systems—including early fault monitoring, remote shutdown capabilities, non-combustible surfaces, and containerised metal enclosures—substantially reduces the likelihood of a fire igniting and escalating. As a result, any fire that does occur is expected to be containable and of limited severity.

Pacific Green engaged Fire Risk Consultants to undertake a Preliminary Hazard Assessment of the Action to inform and support the planning permit application. This determined that the Action achieves an acceptable level of safety, with risks considered low to medium. Fire management measures are included in the EMP (Appendix F, pg.43 & 59). A Fire Management Plan will be developed as a condition of planning permit.

As a highly mobile species that likely to only use the Project area occasionally, the mortality risk to BWP from fire is minimal; however, fire could decrease the habitat quality. Given that any fire is likely to quickly be controlled, and the availability of habitat in the landscape, as well as the provision of new foraging habitat through the landscape plan, it is considered unlikely that fire would impact BWP.

6.1.6 Avoidance & mitigation

General avoidance and mitigation steps for the Action are detailed in Section 5. Those specifically relating to BWP are detailed below.

The LMRP has been prepared for the Action to particularly mitigate ecological impacts, including impacts to MNES. The LMRP proposes the planting of 0.5 ha of terrestrial foraging habitat, improvement of 7.33 ha of aquatic foraging habitat, management of 11.19 ha of grazing pastures (the habitat type in which BWP have been observed) and planting of 2.87 ha of native vegetation that will provide additional roosting habitat within the medium term (+20 years).

Plantings will utilise a diverse mix of locally appropriate native species to enhance feeding habitat for the BWP. This will result in an overall improvement in the quality and extent of habitat for the species.

Revegetation works using indigenous species have already been initiated, including along a 10 metre-wide buffer (total area approximately 0.18 ha) along the Project area's south-western boundary, to establish foraging habitat for BWP. The revegetation works aimed to establish a tall, dense shrub community similar to Damp Heathland (EVC 710) that is interspersed with clusters of rushes and sedges; these clusters were specifically incorporated to provide foraging locations for BWP. The LMRP includes a number of additional land management treatments (particularly LMT01-04) that will benefit the BWP through the provision of additional or improved foraging habitat.

6.1.7 Significant Impact assessment

The impacts of the proposed Project on BWP are considered in Table 9 against the EPBC Act Significant Impact Guidelines for Vulnerable species (DoE 2013a).

Significant impact criteria

An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of an important population of a species
- reduce the area of occupancy of an important population
- fragment an existing important population into two or more populations
- adversely affect habitat critical to the survival of a species
- disrupt the breeding cycle of an important population
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
- introduce disease that may cause the species to decline, or
- interfere substantially with the recovery of the species.

Habitat critical to survival

'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- for activities such as foraging, breeding, roosting, or dispersal
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- to maintain genetic diversity and long-term evolutionary development, or
- for the reintroduction of populations or recovery of the species or ecological community.

Such habitat may be, but is not limited to, habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.

The following species-specific definitions of critical habitat are taken from the most recent conservation advice for BWP (DCCEEW 2023):

- Foraging and staging habitats found from coastal, sub-coastal and inland areas, right through to semi-arid zones including grasslands, grassy woodlands, and semi-arid chenopod shrubland with native and introduced grasses, herbs and shrubs.
- Wetlands both near the coast and in semi-arid zones used for foraging and staging.
- Eucalypt forests and woodlands within the breeding range in Tasmania, coastal southeastern South Australia and southern Victoria.
- Live and dead trees and stumps with suitable hollows within the breeding range.

The conservation advice also states that habitat critical to the survival should not be cleared, fragmented or degraded. Any known or likely habitat should be considered as habitat critical to the survival of the species. It is essential that the highest level of protection is provided to these areas and that enhancement and protection measures target these productive sites. Additional conservation advice is more ambiguous, stating that any known or likely habitat (within the modelled distribution of BWP) should be considered as habitat critical to the survival of the species. It is unclear what this encompasses for a species that utilises a wide range of habitat types, including highly disturbed areas such as pasture and cropland.

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

In accordance with Significant Impact Guidelines for Vulnerable Species (DoE 2013a), an important population of a species is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

The Conservation advice for BWP (DCCEEW 2023) does not identify any important populations, nor does Portland occur near the limit of the species range; however, given that the species has been observed using the Project area across several seasons, and the mobility of the species (i.e. those individuals recorded on-site are likely to be interacting with many other BWPs across the range, and the Project area occurs in close proximity to high-quality habitat), this can be considered an important population, as it is likely to be necessary for a species' long-term survival and recovery.

Impacts to Blue-winged Parrot

The land proposed for development has previously been cleared and has historically been subject to intense grazing pressure. BWPs were observed within the Project area during winter and summer surveys by Nature

Advisory ecologists, suggesting that this area is regularly utilised by the local population of the species. A population of at least 20 BWPs including juveniles was observed on two occasions within the Project area.

The impacts of the Action on BWP have been considered against the Significant Impact Guidelines for **Vulnerable** Species (DoE 2013a) as presented in Table 9. Based on a site-based assessment and the known ecology of the species, the impact of the Action is unlikely to have a significant impact on the BWP. Critically, the Action avoids impacts to roosting and nesting habitat of the species, with disturbance restricted to foraging habitat, a resource that is locally abundant throughout the region. Refer to Appendix D for a more detailed assessment of the BWP.

Table 9 - Significant Impact Assessment – Blue-winged Parrot (EPBC: Vulnerable)

Significant impact criterion	Assessment	Significant impact likelihood
Lead to a long-term decrease in the size of an important population of a species.	A population of at least 20 BWPs including juveniles was observed during the non-breeding and breeding season within the Project area. BWPs tend to favour grasslands and grassy woodlands, are often found near wetlands and are often observed in altered environments such as airfields, golf-courses and paddocks (DCCEEW 2023c). During surveys, BWPs were observed in the same area during winter and summer surveys. The habitat they were utilising is observed extensively throughout the Portland region (agricultural land), although the local population clearly favour utilising the habitat within the Project area. The proposed project footprint will occupy a significant proportion of the area that the BWPs were observed foraging in within the Project area (10.827 ha of 22.698 ha of mapped foraging habitat, or 48%, will be lost). Decreasing the area of foraging habitat that is utilised year-round by this population of BWPs could disrupt the behaviours of the current population. However, it is highly likely that the existing population will be able to locate alternate food sources within the broader Project area and in similar agricultural properties throughout the broader region. Notably, the implementation of the LMRP will increase and improved the availability of habitat within balance land of the Project area.	Unlikely with appropriate mitigation measures
Reduce the area of occupancy of an important population.	The proposed project footprint will occupy most of an area where birds were observed foraging. This will reduce the area of foraging of a potentially important population, however in the context of the extensive areas of similar agricultural land within the broader landscape, this is not considered significant. Additionally, the Action does not impact/reduce the area of occupancy on roosting and nesting habitat for the species found in nearby coastal shrubland. Furthermore, the implementation of the LMRP will increase and improve the availability of habitat directly adjacent to the development footprint (within the Project area).	Unlikely with appropriate mitigation measures
Fragment an existing important population into two or more populations.	BWPs are a highly mobile species and utilise a range of habitats (DCCEEW 2023c). This suggests that the Action is not anticipated to fragment the important population of BWPs into two or more populations.	Unlikely
Adversely affect habitat critical to the survival of a species.	Foraging and breeding habitat is considered critical to the survival of a species. The proposed project footprint will occupy 48% of the BWP habitat mapped within the Project area. Although the proposed development is proposing to adversely impact foraging habitat, it is not considered to be critical to the survival of BWPs. BWPs are highly mobile	Unlikely

	species and have adapted to modified landscapes and opportunistically feed on a range of food sources including extensively available pasture grasses and other common weeds. This is clearly articulated by their numerous records across the region in both native and non-native (pasture) habitat. Given this, the loss of foraging habitat is not considered as critical to the survival of the species, in comparison to suitable roosting and nesting habitat.	
Disrupt the breeding cycle of a population.	The proposed project footprint will occupy 48% of BWPs habitat within the Project area. The loss of this foraging resource during the breeding season could potentially disrupt the breeding cycle of this local population of BWP, if this food source is impacted. However, BWPs are highly mobile species and have adapted to modified landscapes and opportunistically feed on a range of food sources including extensively available pasture grasses and other common weeds. Furthermore, the implementation of the LMRP will increase and improve the availability of habitat directly adjacent to the development footprint (within the Project area).	Unlikely with appropriate mitigation measures
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	The project is only proposing to remove foraging habitat – not breeding habitat. This has the potential to impact the local population, however, because of the wide distribution of this species, it is unlikely to lead to a decline in the species. The foraging habitat within the Disturbance footprint is considered to be marginal and similar habitat occurs extensively in the surrounding region, including within the balance land of the Project area (not subject to disturbance). Furthermore, the implementation of the LMRP will increase and improve the availability of habitat in the Project area.	Unlikely
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.	A draft EMP has been created and will be implemented to manage the environmental impacts of the construction-phase of this project, including weed and pest control. Construction mitigation measures will be put in place to ensure project does not facilitate the spread of invasive species, including implementation of pest plant and animal monitoring and control. Given this, the Action is unlikely to result in the introduction of invasive species that are harmful to BWP.	Unlikely
Introduce disease that may cause the species to decline.	A draft Environmental Management Plan (EMP) has been created and will be implemented to manage the environmental impacts of the construction-phase of this project. Provided construction mitigation measures are put in place to ensure project does not facilitate the spread or introduction of disease, including strict cleaning procedures and protocol during construction, the Action is unlikely to introduce disease that may cause the species to decline. The Conservation advice (DCCEEW 2023) cites Psittacine Beak and Feather Disease (PBFD) as a risk to BWP; however, PBFD is transferred bird-to-bird, so risks arise from reduced nest availability and increased competition (DCCEEW 2023). As no nesting habitat is proposed to be removed, it is unlikely that the Action will result in increases in this disease.	Unlikely
Interfere substantially with the recovery of the species.	The project is unlikely to substantially interfere with the recovery of this species as a comparatively small area of foraging habitat, in comparison to the landscape is to be	Unlikely

	impacted. Additionally, no breeding or roosting habitat is proposed to be impacted.	

It is considered unlikely that the Action will adversely affect habitat critical to the survival of the BWP based on site observations as well as the known ecology of the species. Critically, the Action avoids impacts to roosting and nesting habitat of the species, with disturbance restricted to foraging habitat, a resource that is locally abundant throughout the region. Furthermore, the implementation of the LMRP will increase and improve the availability of habitat directly adjacent to the Project area. The LMRP also including monitoring, reporting and corrective actions should the performance targets for the BWP not be met.

6.1.8 Assessment of cumulative and/or facilitated impacts

For the purposes of this assessment, we have defined cumulative impacts as:

Cumulative impacts are a result of incremental, sustained and combined effects of human action and natural variations over time and can be both positive and negative. They can be caused by the compounding effects of a single project or multiple projects in an area, and by the accumulation of effects from past, current and future activities as they arise. (source: DPE, 2022).

Facultative impacts are considered impacts that are significantly brought about by a project or proposed action.

In the case of BWP, given their relative abundance within the local landscape and region, the fact that the Action is not impacting breeding habitat and a number of landscape treatments are proposed to mitigate the loss of foraging habitat combined with the fact that the current zoning is industrial and the broader area is already cleared for agricultural or industrial purposes, cumulative and facultative impacts are considered unlikely.

6.1.9 Blue-winged Parrot conclusion

The Project area occurs close to known high-quality habitat for the BWP, and sightings throughout the year of the species foraging in grazing land within the Project area and its surrounds indicate that the Project area supports foraging habitat for BWP. The Action could impact BWP through collisions with increased traffic, by direct loss of foraging habitat, by habitat degradation arising from fire and reduced water quality, and by a deterrent effect from noise and vibration. Given the availability of similar foraging habitat in the region, the commitment to increase habitat availability and quality through the implementation of a LMRP, and management of traffic, fire, noise and vibration through an EMP, it is considered that the Action will not have a significant impact on Blue-winged Parrot.

6.2 Southern Brown Bandicoot

6.2.1 Description and distribution

The Southern Brown Bandicoot (SBB) is a medium-sized ground-dwelling marsupial. They have a long, pointed snout, bare nose, small eyes, rounded ears, compact body and a short tail (approximately half the body length; TSSC 2016a). The dorsal fur is bristly and brown, while the softer underbelly is creamy white (TSSC 2016a). The SBB is largely solitary and nocturnal.

The range of the SBB extends from the southern side of the Hawkesbury River (NSW) through Victoria and across to Kangaroo Island (SA; TSSC 2016a). In Victoria, there are five main populations in the regions of 1) Portland–Mt Gambier, 2) the Grampians National Park, 3) the Otway Ranges, 4) south-central Victoria (Port Phillip–Western Port–Wilsons Promontory) and 5) East Gippsland. Apart from in the Grampians region, the species is typically found no further than 100 km from the coast.

The home range of the SBB varies according to habitat type and quality, food availability and seasonal conditions. The home range of the SBB varies depending on habitat type and quality, food availability, seasonal conditions and sex of the animal. Home ranges are typically between 0.6ha-9.8ha, with males holding larger home ranges (Wilson 2004).

6.2.2 Ecology

SBB are omnivorous and forage for food mainly by digging in the leaf litter and soil to find insects, fungi, plant root nodules and bulbs. It also eats fruit, seeds and other plant material found above ground (TSSC 2016a). Nests are built under plants on the ground; they do not create their own burrow, but occasionally use the burrows of other species (Paull 2008). SBB breed throughout the year with a peak in spring. Longevity in the wild is three to four years (Paull 2008). Based on capture rate data in Victoria and South Australia, all populations (except those in fenced reserves) appear to occur at low to very low densities throughout most of the species' range (Coates & Wright 2003; TSSC 2016a). Home ranges are typically between 0.5 ha and 5 ha (i.e. densities of 20–200 individuals/km2), assuming no overlap in home range (Paull 2008), but are strongly influenced by seasonal conditions (TSSC 2016a).

6.2.3 Habitat

The SBB inhabits areas of dense vegetation, including heath, shrubland, heathy forest and woodland, usually associated with well-drained soils and dry heath communities (Bruce et al. 2008). It is known to utilise both native bushland and areas with exotic shrubby species such as Blackberry (*Rubus fruticosus* spp. agg.) (Packer 2013). In recent decades, SBBs have been displaced by intensive agriculture and urban development.

6.2.4 Occurrence & surveys

6.2.4.1 Database searches

SBB is known to occur in the region. Although not recorded during Nature Advisory surveys, there are numerous historical VBA records in all directions from the Project area. There are 37 existing VBA records for SBB within the search region (10km buffer), the most recent is from June 2017 (As of 6 February 2025).

There are several VBA records for SBB within one kilometre from the Project area boundary. The majority are south-east of the Project area and associated with native vegetation remnants on public land at Bald Hill, most from 2017. Three more records occur north-west of the Project area, from small remnant of native vegetation adjacent to the Portland Cemetery, Yarraman Park and roadsides dated 2003, 2005 and 2012.

The habitat distribution model (DEECA 2025a; Figure 16) does not identify the Project area as suitable habitat; however, adjacent land is identified as having high to moderate suitability, suggesting that the species may utilise any suitable habitat within the Project area. The distribution of current VBA records, Atlas of Living Australia (ALA) records and NatureKit Habitat Distribution Modelling (HDM) for SBB within 10km are provided below, in Figure 14, Figure 15 and Figure 16.

Victorian Biodiversity Atlas, Geographic Distribution Map

Taxon Id	Scientific Name	Common Name	Discipline	Level
61092	Isoodon obesulus obesulus	Southern Brown Bandicoot	Terrestrial fauna	Species

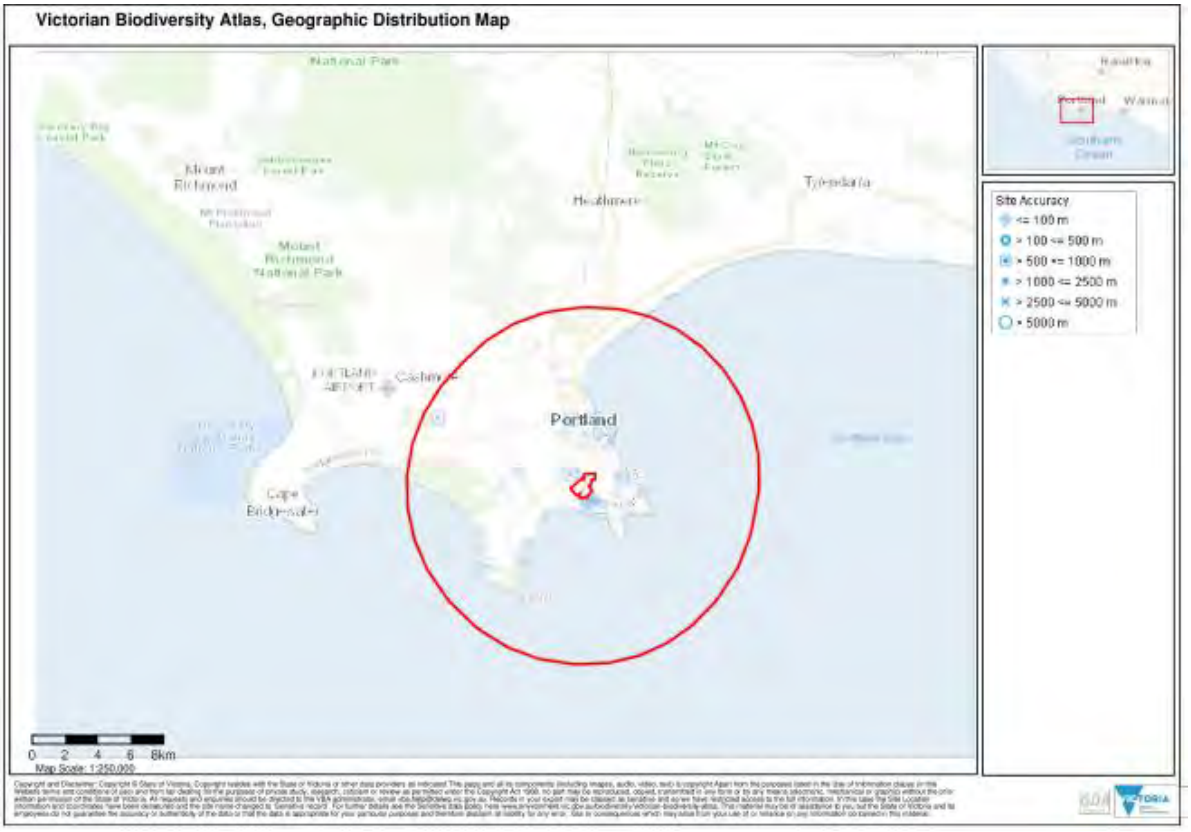


Figure 14 - VBA records for SBB in the search region (10km buffer)

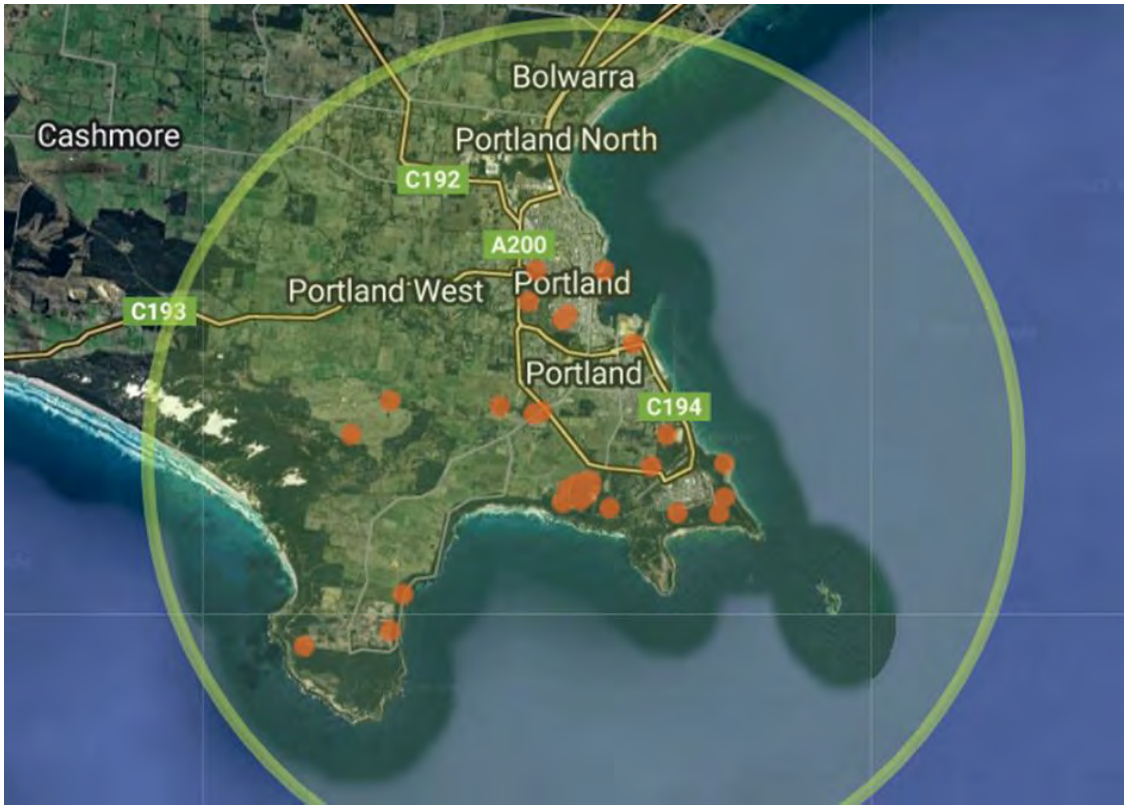


Figure 15 - ALA records for SBB in the search region (10km buffer)

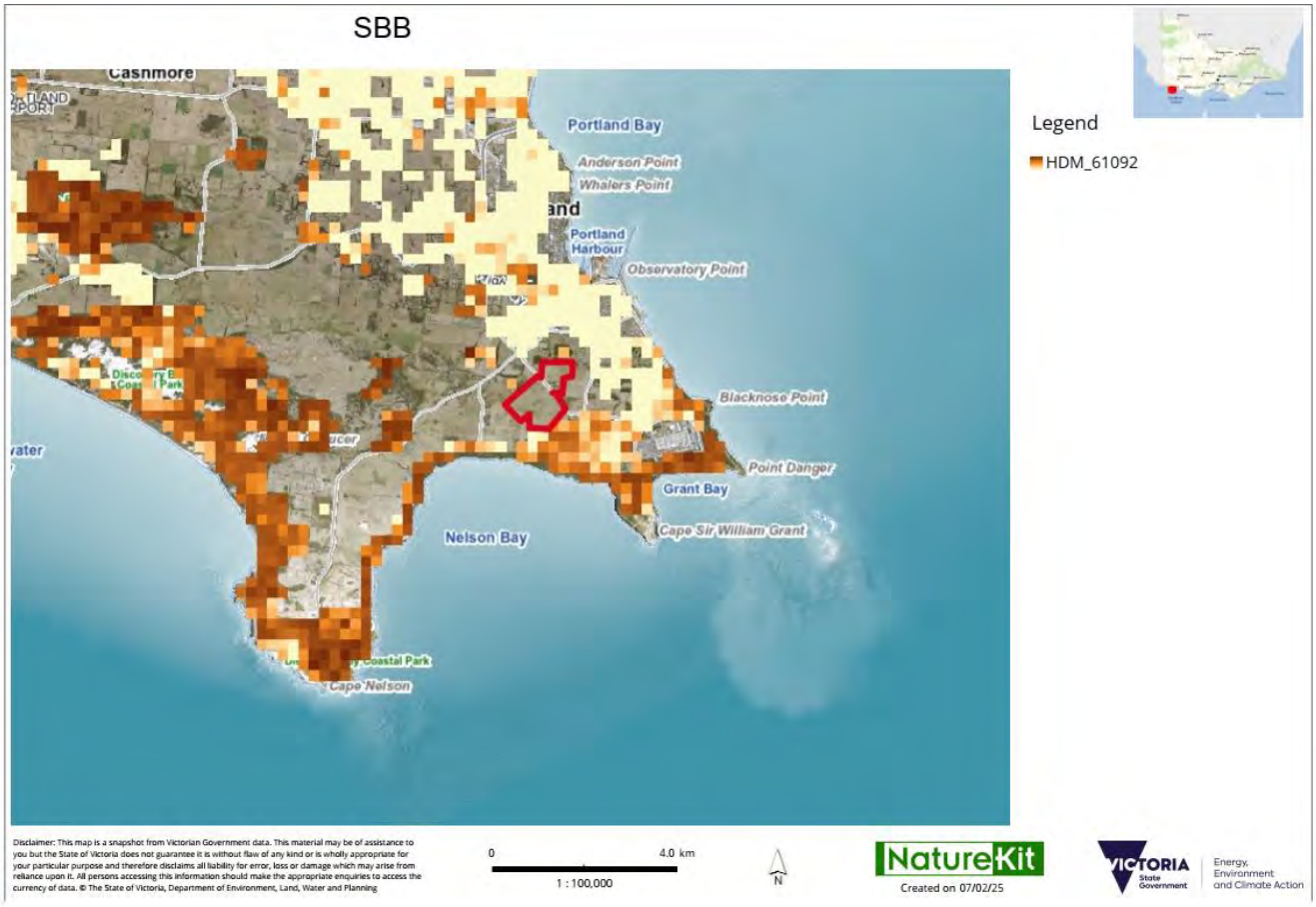


Figure 16 - NatureKit Habitat Distribution Modelling (HDM) for SBB within the Project area and surrounds

Additional desktop assessment – 2km radius focus – July 2025

As discussed In 6.1.4.2, in response to the RFI from DCCEEW in June 2025, an additional desktop assessment of the amount and type of habitat near the project area has been completed, relevant to BWP, SBB and SA.

The SBB has a broad range across southern South Australia, Victoria and New South Wales. Severe range contracts and population declines have resulted in a highly fragmented and discontinuous population (TSSC 2016a). The proposed development is within the general range for the species and in an area where they are known to occur (DSEWPaC 2011).

The species inhabits areas of dense ground cover of greater than 50% average foliage density within the 0.2-1.0 m height range, including wetland fringes and heathland (DSEWPaC 2011). Small patches of potentially suitable habitat exist within the study area along the edge of Oleria Road, Tecoma Road, and Madeira Packet Roads and surrounding the dam to the north (**Figure 12**). These areas are likely of low to poor quality due to the relatively open nature of the understory (Nature Advisory 2024a, 2024c). The total amount of habitat mapped in the area of the proposed development for SBB was 2.195 hectares.

In the broader 2km, several high-quality large patches of likely suitable habitat exist (**Figure 12**), including a large (295 ha) patch of heathland abutting the south that contains numerous SBB records.

In total, the broader investigation area contained approximately 458 ha of broadly mapped woody vegetation, which represents potential suitable habitat for SBB. Within the project area, 2.195 ha of suitable SBB habitat was mapped as part of the field assessment for the project. Therefore, there is approximately 460 ha of potentially suitable SBB habitat within the project area and broader investigation area combined. The 2.195 ha of suitable SBB habitat in the project area represents 0.477% of the total broadly mapped suitable

habitat in the 2km investigation area, while the amount of habitat impacted by the proposed development (0.072 ha) represents 0.016%.

The Draft EPBC Guidelines for the SBB state significant impacts occur when 5% of suitable habitat is removed from patches above 100 ha (DSEWPaC 2011). Consequently, there is not considered to be a risk of a significant loss or long-term modification of SBB habitat by the Action.

While the suitable habitat onsite connects to the large southern patch, it does not appear to provide any additional connections due to existing agricultural land to the north, east, and west that extends well beyond the 50m that is suggested to significantly reduce connectivity (DSEWPaC 2011; Figure 17). This supports the conclusion of previous assessments that the proposed development is unlikely to significantly reduce connectivity or fragmentation of suitable habitat.

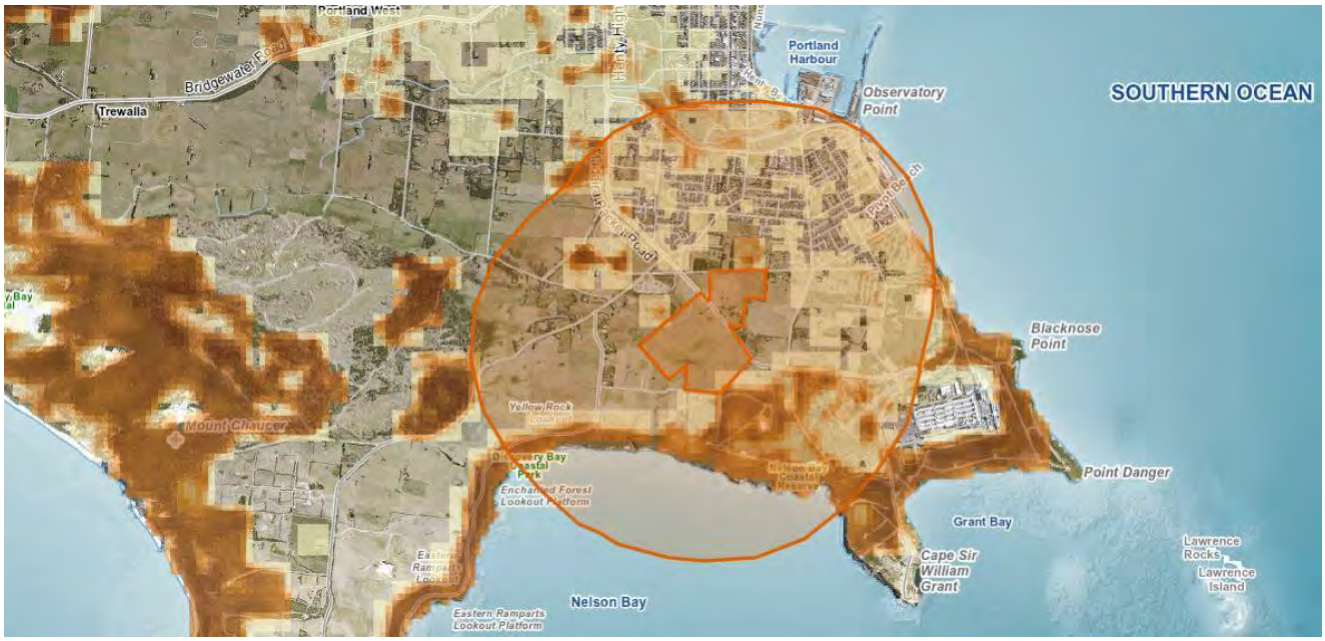


Figure 17 – SBB habitat distribution model (2km) (NatureKit)

6.2.4.2 Habitat recorded on-site

This species likely occurs within the Project area due to numerous nearby records and the presence of suitable habitat. The species is assumed to occur within coastal scrub around the farm dam (Habitat Zone AA) and along the boundary of the Project area (Habitat Zone's X, AU, RC, RE, RF and RG). This vegetation is considered continuous with larger areas of habitat within the surrounding landscape where individuals have been recorded as recently as 2017. If SBB is present, the species may be impacted by development in the Project area due to the potential loss of suitable nesting and foraging habitat, and movement corridors.

No targeted surveys have been undertaken for SBB, given the high likelihood of occurrence, relatively small area of suitable habitat to be impacted, and provision of the establishment of higher quality habitat in the incorporated land management plan.

6.2.5 Impact pathways

6.2.5.1 Habitat loss

Presence of SBB within coastal scrub around the farm dam (Habitat Zone AA) and along the boundary of the Project area (Habitat Zone's X, AU, RC, RE, RF and RG) is assumed. Any removal or fragmentation of suitable habitat is regarded as a threatening process for this species which relies on dense cover for breeding, foraging and movement. A total of 0.072 ha of potential habitat for SBB will be impacted, to allow for the construction of an access point into the Project area. This comprises a portion of Habitat Zone RC.

6.2.5.2 Lighting

Artificial light at night may disrupt the behaviour and physiology of SBB through reduced time spent foraging, increased predation and altered timing of reproduction (DCCEEW 2023). Lighting design for the Action will be in accordance with the *National Light Pollution Guidelines for Wildlife* (DCCEEW 2023) as detailed in Section 5.2.5. The full list of proposed lighting restrictions for construction and operation is presented in the EMP (Appendix F, pg.25 & 49).

6.2.5.3 Noise and vibration

A noise impact assessment for the Action (Marshall Day Acoustics, 2024) determined that the Action can be designed and operated in compliance with the EP Regulations, Noise Protocol, and other applicable legislation (Marshall Day Acoustics, 2024). Section 5.2.4 provides a more detailed noise impact review as it relates to all flora and fauna and should be considered in assessing the impacts of noise on SBBs. However, a short-form response for operation and construction is also provided below.

Construction and traffic noise is regularly tolerated by SBBs, particularly as they are known to regularly occur in roadsides and in high-noise environments. However, should construction occur during the night this would have the potential to disrupt bandicoots. This is an unlikely event and will only occur if instructed by the regulators. A number of operational controls will be put in place to reduce noise and vibration. Operational noise is predicted to not be the primary noise source in the landscape, particularly considering proximity to the Portland township, the operational Portland Aluminium Smelter and wastewater treatment plant, wind turbines and surf conditions.

Therefore, it is unlikely that noise pollution from the Project will impact on SBB.

6.2.5.4 Traffic

Mortalities associated with road traffic are identified as a threat to SBB in the Conservation Advice for the species (TSSC 2016a). The Action will include a traffic management plan, that will include reduced speed limits, speed control measures (such as speed humps), and appropriate signage to protect SBB, in accordance with the Conservation Advice for the species (TSSC 2016a).

6.2.5.5 Fire

Too frequent and extensive burning is identified as a threat to SBB in the Conservation Advice for the species (TSSC 2016a). While the Action inherently introduces a non-zero increase in ignition risk due to the nature of BESS', the implementation of fire breaks and clearances, comprehensive fire prevention, detection, and suppression systems—including early fault monitoring, remote shutdown capabilities, non-combustible surfaces, and containerised metal enclosures—substantially reduces the likelihood of a fire igniting and escalating. As a result, any fire that does occur is expected to be containable and of limited severity.

Pacific Green engaged Fire Risk Consultants to undertake a Preliminary Hazard Assessment of the Action to inform and support the planning permit application. This determined that the Action achieves an acceptable level of safety, with risks considered low to medium. Fire management measures are included in the EMP (Appendix F). A Fire Management Plan will be developed as a condition of planning permit.

6.2.6 Avoidance & mitigation

General avoidance and mitigation steps for the Action are included in Section 5. Those specifically relating to SBB are detailed below.

A LMRP has been prepared for the Action. This includes 0.25 ha of roadside planting on Madeira Packet Road and 2.62 ha of perimeter screening that will improve the connection between isolated vegetation patches to promote native wildlife movement including increasing foraging and dispersal habitat for SBB. The LMRP also includes pest animal (rabbit) control measures that will decrease competition and with SBB for food resources.

A draft Environmental Management Plan (EMP) for the Action has been prepared (Appendix F), which manages the risks to SBB arising from noise, lighting, fire and traffic associated with the Action, as documented in Section 5.2.2.

6.2.7 Significant Impact assessment

The impacts of the proposed Project on SBB are considered in Table 10 against the EPBC Act Significant Impact Guidelines for Endangered species (DoE 2013a).

Significant impact criteria

An action is likely to have a significant impact on an **Endangered** species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of a population
- reduce the area of occupancy of the species
- fragment an existing population into two or more populations
- adversely affect habitat critical to the survival of a species
- disrupt the breeding cycle of a population
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat
- introduce disease that may cause the species to decline, or
- interfere with the recovery of the species.

Habitat critical to survival

'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- for activities such as foraging, breeding, roosting, or dispersal
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- to maintain genetic diversity and long-term evolutionary development, or
- for the reintroduction of populations or recovery of the species or ecological community.

Such habitat may be, but is not limited to, habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.

The following species-specific definitions of habitat are taken from the most recent referral guidelines for SBB (DSEWPaC 2011a):

- Suitable habitat: Any patches of native or exotic vegetation, within the distribution of the southern brown bandicoot (Maps 1 to 6), which contains understorey vegetation structure with 50-80% average foliage density in the 0.2-1 m height range.
- Important exotic habitat: Any patches of exotic vegetation which may provide habitat or connectivity for southern brown bandicoots. Important exotic vegetation should be assessed on a case-by-case basis for use by Southern Brown Bandicoots (Section 4) and typically has, but is not limited to, the following characteristics:
    - an area covering greater than 25 m2
    - occurs within 50 m proximity of suitable vegetation, which may be native or exotic

- contains understorey vegetation structure with 50-80% average foliage density in the 0.2-1 m height range.

The advice goes on to state that habitat critical to the survival should not be cleared, fragmented or degraded. Any known or likely habitat should be considered as habitat critical to the survival of the species. It is essential that the highest level of protection is provided to these areas and that enhancement and protection measures target these productive sites.

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

Impacts to Southern Brown Bandicoot

The land proposed for development has previously been cleared and has historically been subject to intense grazing pressure. SBB inhabit areas of dense vegetation, in both native bushland and areas with exotic shrubby species such as Blackberry (TSSC 2016a). Whilst no SBB were observed within the Project area during the field assessments and no targeted surveys have been conducted, this species is assumed to occur in suitable habitat within the Project area. The impacts of the Action on SBB have been considered against the Significant Impact Guidelines for Endangered Species (DoE 2013a). Based on the relevant conservation advice and significant impact criteria the impact of the proposed development is unlikely to have a significant impact on the SBB. This is because only a small area of foraging and dispersal habitat is being removed, which is unlikely to lead to a long-term decrease in the size of a population of the species and will not reduce the area of occupancy of a population by adversely affecting habitat critical to the survival of the species.

Table 10 - Significant Impact Assessment – Southern Brown Bandicoot (EPBC: Endangered)

Significant impact criterion	Assessment	Significant impact likelihood
Lead to a long-term decrease in the size of a population.	Although the Action will impact 0.072 ha of assumed SBB habitat, this habitat is unlikely to be used for breeding given it is dispersal habitat (less than 15m wide) along Madeira Packet Road. Given the provision of higher-quality core area habitat occurs beyond the Project area (within the coastal reserve), habitat loss is unlikely to lead to a long-term decrease in the size of the local SBB population. Other potential impact pathways include direct impacts from traffic, behavioural disruptions from increased light, noise and vibration, and increased predation as a result of lighting. These risks will be managed through the EMP, and it is therefore not anticipated that these would lead to a long-term decrease in the size of the local SBB population.	Unlikely
Reduce the area of occupancy of the species.	The proposed project footprint will impact 0.072 ha of potential SBB habitat. This is highly unlikely to reduce the area of occupancy of the local SBB population, as any population in the region would not be reliant on this small area of roadside vegetation. Although the powerline easements intersect with this identified habitat, it will only be maintained to 4 metres. This maintenance will not affect the habitat for which the species utilises and has therefore not been considered as impacted habitat.	Unlikely
Fragment an existing population into two or more populations.	This project is not anticipated to fragment a population of SBB into two or more populations given that the impacted habitat is already largely fragmented. There is no contiguous habitat further to the north-west along Madera Packet Road, which a population would use for dispersal to connect an existing population.	Unlikely
Adversely affect habitat critical to the survival of a species.	Foraging and breeding habitat is considered critical to the survival of a species. The proposed project footprint will impact 0.072 ha of assumed SBB habitat. This small amount of impact is highly unlikely to adversely affect habitat critical to the survival of SBB, given the provision of higher quality habitat in the region.	Unlikely
Disrupt the breeding cycle of a population.	The proposed project footprint will impact 0.072 ha of assumed SBB habitat. The small amount of loss of this resource is highly	Unlikely

	unlikely to disrupt the breeding cycle of SBB, given that this habitat is likely to only be used for foraging and dispersal.	
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	The proposed project footprint will impact 0.072 ha of assumed SBB habitat. This is unlikely going to impact a local population that could lead to a decline in the species, given the foraging habitat within the Project area is considered to be marginal and more suitable habitat occurs extensively in the surrounding region.	Unlikely
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat.	A draft Environmental Management Plan (EMP) has been created and will be implemented to manage the environmental impacts of the construction-phase of this project. Provided construction mitigation measures are put in place to ensure project does not facilitate the spread of invasive species, including implementation of pest plant and animal monitoring and control, the Action is unlikely to result in the introduction of invasive species that are harmful to SBB.	Unlikely
Introduce disease that may cause the species to decline.	A draft Environmental Management Plan (EMP) has been created and will be implemented to manage the environmental impacts of the construction-phase of this project. Provided construction mitigation measures are put in place to ensure project does not facilitate the spread or introduction of disease, including strict cleaning procedures and protocol during construction, the Action is unlikely to introduce disease that may cause the species to decline.	Unlikely
Interfere with the recovery of the species.	The project is unlikely to substantially interfere with the recovery of this species due to the extensive areas of more suitable habitat in the nearby coastal reserves.	Unlikely

6.2.8 Assessment of cumulative and/or facilitated impacts

In the case of SBB, given their assumed abundance within the local landscape, within roadside corridors and the coastal vegetation and the fact that the Action is having a very minor impact on this habitat coupled with the proposed habitat improvements, cumulative and facultative impacts are considered unlikely. Pacific Green are not aware of any other projects in the short-term within the local environment proposing to impact SBB habitat. We assume any projects with the potential to impact SBB would go through Sate and Commonwealth approvals and be subject to avoid, minimise and offset requirements.

6.2.9 Southern Brown Bandicoot conclusion

The Project area is likely to be utilised by SBB for foraging and dispersal, given the provision of high-quality habitat to the south-east and large number of records in surrounding areas. Nonetheless, the SBB habitat to be impacted is considered relatively low quality, given the existing degree of fragmentation. The Action could impact SBB through collisions with increased traffic, by direct loss of foraging and dispersal habitat, by direct impacts and habitat degradation arising from fire, by increased predation arising from lighting, and by a deterrent effect from noise and vibration. Given the availability of large areas of high-quality habitat adjacent to the Project area, the commitment to increase habitat availability and quality through the implementation of a Land Rehabilitation and Management Plan (LRMP), and management of traffic, lighting, fire, noise and vibration through an Environmental Management Plan (EMP), it is considered that the Action will not have a significant impact on SBB.

6.3 Swamp Antechinus

6.3.1 Description and distribution

The Swamp Antechinus (SA) is a small, ground-dwelling, carnivorous marsupial that inhabits dense and damp coastal areas (Wilson et al. 2017). It weighs 28–100 g, has a body length of 95–140 mm, and a tail that is approximately 70% of the body length (TSSC 2016b; Menkhorst & Knight 2011). It has long brown fur that typically fades to a yellowish-brown colour towards the hindquarters and flanks, and pale eye rings and long claws (Menkhorst & Knight 2011).

The mainland SA distribution in coastal areas is highly fragmented and ranges from Robe (eastern South Australia) to Wilsons Promontory (Victoria). Habitat suitability modelling indicates that only a small proportion (10–15 percent) of the distributional extent provides high quality habitat for the subspecies (Wilson et al. 2001; Gibson et al. 2004; Magnusdottir et al. 2008).

6.3.2 Habitat

The mainland SA occurs in dense and damp habitat, particularly at sites with dense vegetation at about 1–2 m above ground level. Its habitat includes dense woodlands, tussock grasslands, heathlands, sedgelands and gullies (TSSC 2016b), often in landscape settings with little exposure to the sun (Magnusdottir et al. 2008; Wilson et al. 2001). The species is predominantly found in coastal areas but may also occur inland. Habitat is highly fragmented, and it is estimated that only 10–15% of the species' range contains favourable habitat (Wilson et al. 2017). It appears to be more of a habitat specialist than the more common species it is frequently found to co-occupy habitat with (TSSC 2016b).

6.3.3 Ecology

The species breeds annually, with young born from June to August. Males undergo an obligate die-off, dying from physiological stress after the breeding season. In contrast, females may live for 2–3 breeding seasons (Magnusdottir et al 2008; TSSC 2016b).

SA are at least partly active during the day (diurnal). They shelter in shallow burrows under organic debris or topsoil or beneath thick leaf litter (Menkhorst 1995; Sale & Arnould 2009; TSSC 2016b). It is social, with individuals exhibiting a high degree of spatial overlap and sharing of den sites (Sale & Arnould 2009). Its diet includes a wide range of invertebrates, particularly moth larvae and beetles, and some small vertebrates and seeds (Sale et al. 2006).

6.3.4 Occurrence & surveys

6.3.4.1 Database searches

SA is known to occur in the region. Although not recorded during Nature Advisory surveys, there are a few historical VBA records in all directions from the Project area. As of 6 February 2025, there are 9 existing VBA records for SA within the search region (10km buffer), the most recent of which is from December 1983.

There are no VBA records for SA within one kilometre from the Project area boundary. The closest three records are east of the Project area in Portland township, although these are older records (1979) and the location accuracy is low (>1 km). The paucity of records correlates with the habitat specialisation of the species, and limited suitable habitat identified within the species' range (TSSC 2016b).

The habitat distribution model (DEECA 2025a; Figure 20) identifies the Project area as moderately suitable habitat, whilst adjacent land towards the coast is identified as having high suitability, suggesting that the species may utilise any suitable habitat within the Project area.

The distribution of current VBA records, Atlas of Living Australia (ALA) records and NatureKit Habitat Distribution Modelling (HDM) for SA within 10km are provided below, in Figure 18, Figure 19 and Figure 20.

Victorian Biodiversity Atlas, Geographic Distribution Map

Taxon Id	Scientific Name	Common Name	Discipline	Level
11034	Antechinus minimus maritimus	Swamp Antechinus	Terrestrial fauna	Species

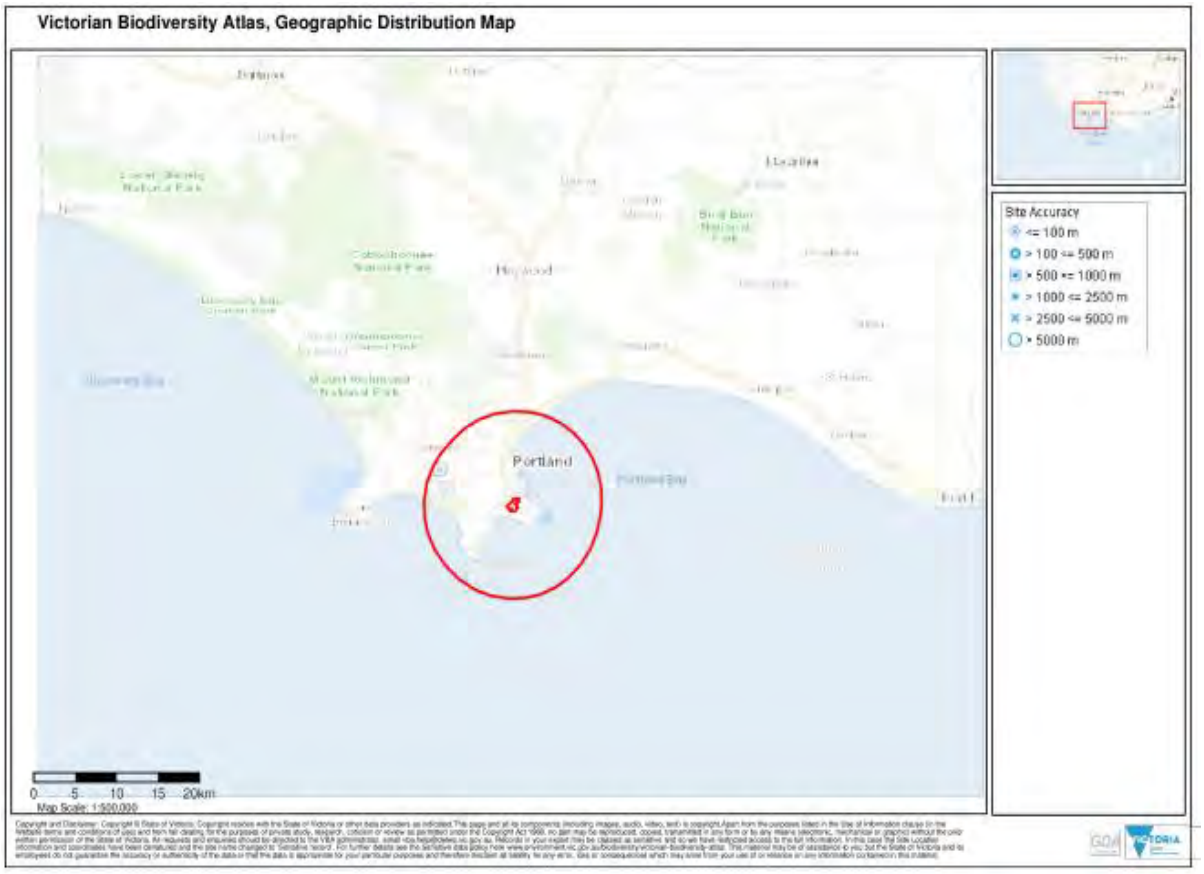


Figure 18 – VBA records for SA in the search region (10km buffer)

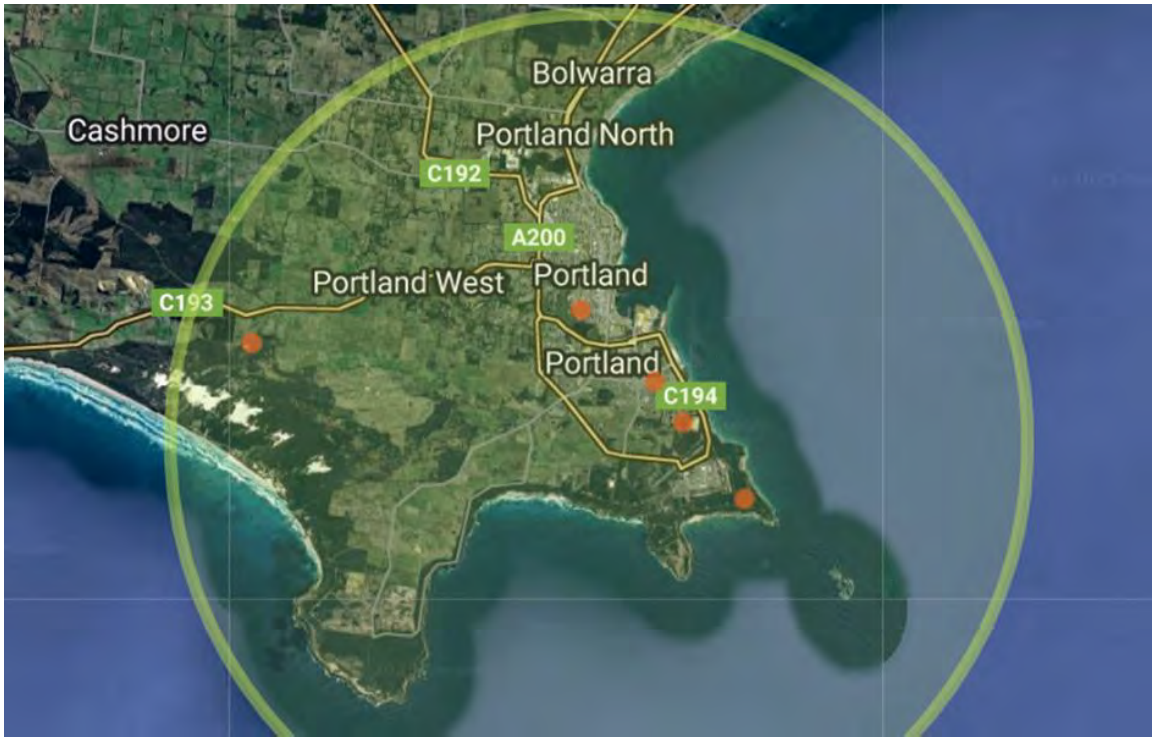


Figure 19 - ALA records for SA in the search region (10km buffer)

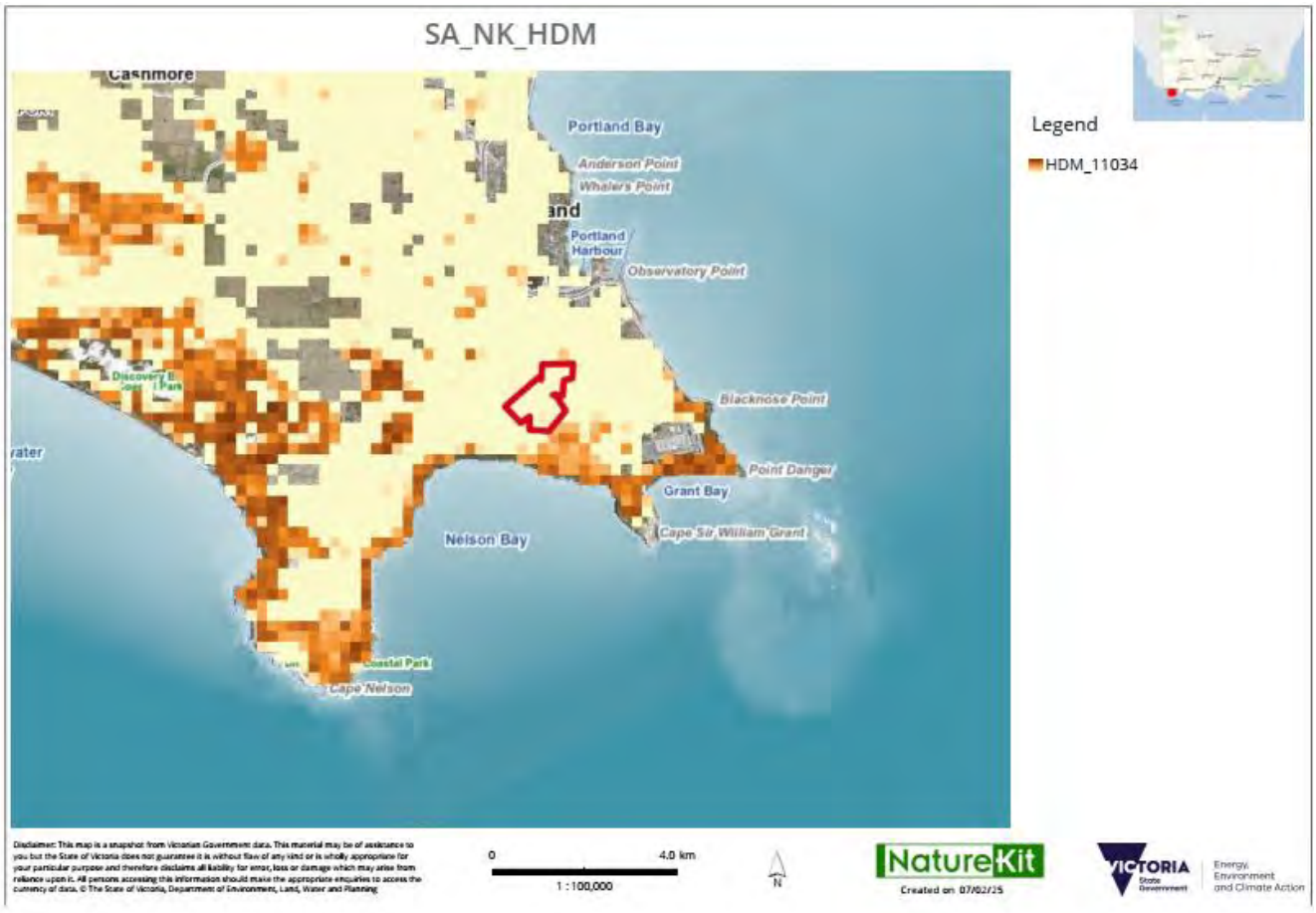


Figure 20 - NatureKit Habitat Distribution Modelling (HDM) for SA within the Project area and surrounds

Additional desktop assessment – 2km radius focus – July 2025

As discussed In 6.1.4.2, in response to the RFI from DCCEEW in June 2025, an additional desktop assessment of the amount and type of habitat near the project area has been completed, relevant to BWP, SBB and SA.

The SA is restricted to southern Australia, with a highly fragmented distribution between Robe in South Australia and Wilson's Promontory in eastern Victoria. Their extent of occurrence and area of occupancy have declined substantially due to habitat loss, degradation and fragmentation (TSSC 2016b). Habitat suitability modelling has indicated that only 10-15 % of the species extent contains high-quality habitat (Wilson et al. 2001; Gibson et al. 2004; Magnusdottir et al. 2008). The proposed development falls within the general range for the species and within proximity to known records, albeit all from the 1960s to 1980s (**Figure 12**).

The species inhabits damp areas with dense vegetation at 1-2 m above the ground, but with a relatively open understory (Menkhorst 1995). They tend to prefer settings with little sun exposure, such as damp gullies, wet heathland, sedgelands, swamps, and shrubby woodland (Menkhorst 1995; Wilson et al. 2001). There is some heathland that provides potentially suitable habitat near the dam north of Madeira Pack Road, with a lesser degree of the roadside vegetation along Oleria Road, Tecoma Road, and the southern end of Madeira Packet Road (**Figure 12**). The vegetation surrounding the dam consisted of denser vegetation with sparse understory and may be considered moderate habitat quality, while the roadsides are likely to be of low to very low quality as vegetation is less dense and there is much intrusion of sunlight. The total amount of habitat mapped in the project area for SA was 2.195 hectares.

The broader investigation area contained approximately 458 ha of broadly mapped woody vegetation, which represents potential suitable habitat for SA. Therefore, the broader investigation area and project area contain approximately 460 ha of suitable habitat combined. Similar to SBB, the 2.195 ha of suitable SA habitat in the project area represents 0.477% of the total broadly mapped suitable habitat in the broader investigation area, while the amount of habitat impacted in the project area (0.072 ha) represents 0.016%.

Habitat distribution models show the quality of habitat in the broader investigation area is likely higher to the immediate south, south-east and further west – where there exists both dense vegetation and shaded gullies (Figure 21). These areas represent large patches of potentially suitable habitat, including the tract of heathland abutting the south (>260 ha). This tract has vegetated connections to other, larger tracts to the west and south-east (where the species was last recorded). There is some potential that Swamp Antechinus may move from the high-quality areas into the habitat onsite. However, the species' dispersal tends to be small (1.7 – 2.7 ha; Sale and Arnould 2009), and the suitable habitat onsite that is being impacted (0.072 ha) represents a discontinuous patch, fragmented to the north, east, and west. As such, the proposed development is unlikely to significantly reduce connectivity or fragmentation of suitable habitat.

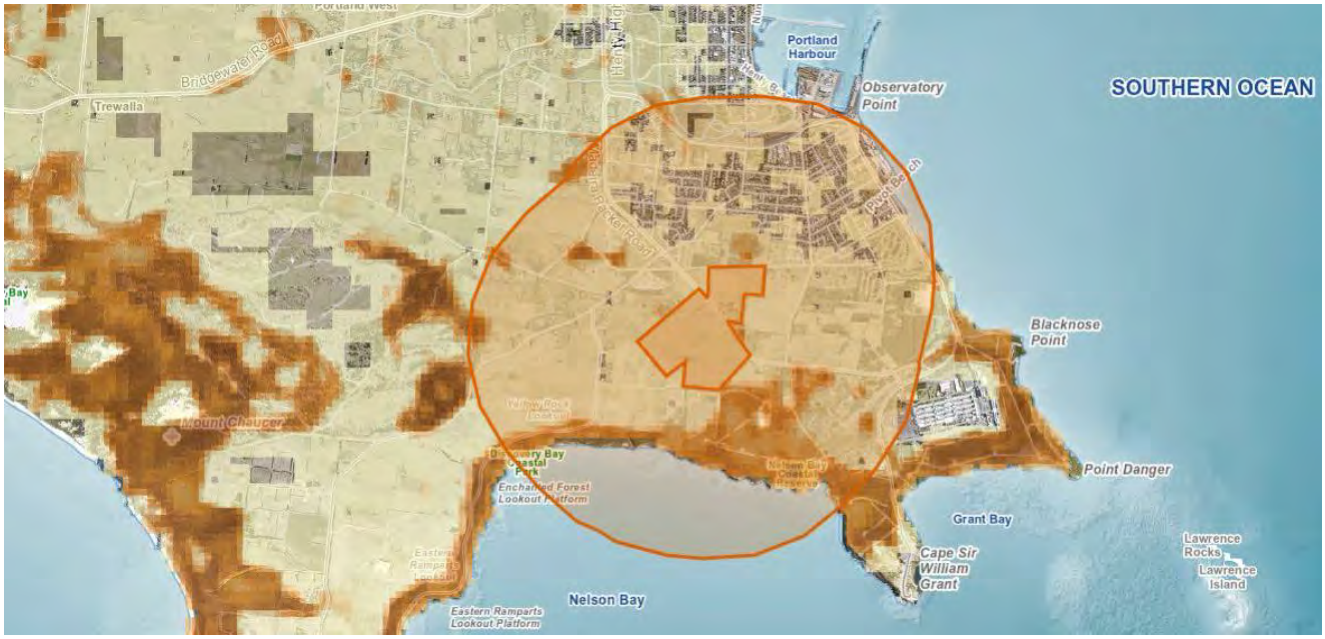


Figure 21 – SBB habitat distribution model (2km) (NatureKit)

The above supports the conclusion of previous assessments that the proposed development is unlikely to result in a significant impact to the Swamp Antechinus.

6.3.4.2 Habitat recorded on-site

This species potentially occurs within the Project area due to numerous nearby records, although habitat is likely to be sub-optimal. The species is assumed to occur within coastal scrub around the farm dam (Habitat Zone AA) and along the boundary of the Project area (Habitat Zone's X, AU, RC, RE, RF and RG). This vegetation is considered continuous with larger areas of habitat within the surrounding landscape. If SA is present, the species may be impacted by development in the Project area due to the potential loss of suitable nesting and foraging habitat and movement corridors.

No targeted surveys have been undertaken for SA, given the relatively small area of suitable habitat to be impacted and provision of higher quality habitat in the land management plan.

6.3.5 Impact pathways

6.3.5.1 Habitat loss

Presence of SA within coastal scrub around the farm dam (Habitat Zone AA) and along the boundary of the Project area (Habitat Zone's X, AU, RC, RE, RF and RG) is assumed. Any removal or fragmentation of suitable habitat is regarded as a threatening process for this species which relies on dense cover for breeding, foraging and movement. A total of 0.072 ha of potential habitat for SA will be impacted, to allow for the construction of an access point into the Project area. This comprises a portion of Habitat Zone RC.

6.3.5.2 Lighting

Artificial light at night may disrupt the behaviour and physiology of SA through reduced time spent foraging, increased predation and altered timing of reproduction (DCCEEW 2023). Lighting design for the Action will be in accordance with the National Light Pollution Guidelines for Wildlife (DCCEEW 2023) as detailed in Section 5.2.5.

6.3.5.3 Noise and vibration

Operational noise will be less than the current background noise in the landscape, particularly from the Portland township and the operational Alcoa Smelter. Therefore, it is unlikely that noise pollution from the Project will impact on SA.

6.3.5.4 Traffic

The project will include a traffic management plan, that will include reduced speed limits, speed control measures (such as speed humps), and appropriate signage to protect ground-dwelling fauna including SA.

6.3.5.5 Fire

Too frequent burning is identified as a threat to SA in the Conservation Advice for the species (TSSC 2016b). While the Action inherently introduces a non-zero increase in ignition risk due to the nature of BESS', the implementation of fire breaks and clearances, comprehensive fire prevention, detection, and suppression systems—including early fault monitoring, remote shutdown capabilities, non-combustible surfaces, and containerised metal enclosures—substantially reduces the likelihood of a fire igniting and escalating. As a result, any fire that does occur is expected to be containable and of limited severity.

Pacific Green engaged Fire Risk Consultants to undertake a Preliminary Hazard Assessment of the Action to inform and support the planning permit application. This determined that the Action achieves an acceptable level of safety, with risks considered low to medium. Fire management measures are included in the EMP (Appendix F). A Fire Management Plan will be developed as a condition of planning permit.

6.3.6 Avoidance & mitigation

General avoidance and mitigation steps for the Action are included in Section 5. Those specifically relating to SA are detailed below.

A LMRP has been prepared for the Action. This includes 0.25 ha of roadside planting on Madeira Packet Road and 2.62 ha of perimeter screening that will improve the connection between isolated vegetation patches to promote native wildlife movement including increasing foraging and dispersal habitat for SA. The LMRP also includes pest animal (rabbit) control measures that will decrease competition and predation on SA.

A draft Environmental Management Plan (EMP) for the Action has been prepared (Appendix F), which manages the risks to SA arising from noise, lighting, fire and traffic associated with the Action, as documented in Section 5.2.2.

6.3.7 Significant Impact assessment

The impacts of the proposed Project on SA are considered in Table 11 against the EPBC Act Significant Impact Guidelines for Vulnerable species (DoE 2013a).

Significant impact criteria

An action is likely to have a significant impact on a **Vulnerable** species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of an important population of a species
- reduce the area of occupancy of an important population

- fragment an existing important population into two or more populations
- adversely affect habitat critical to the survival of a species
- disrupt the breeding cycle of an important population
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
- introduce disease that may cause the species to decline, or
- interfere substantially with the recovery of the species.

Habitat critical to survival

'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- for activities such as foraging, breeding, roosting, or dispersal
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- to maintain genetic diversity and long-term evolutionary development, or
- for the reintroduction of populations or recovery of the species or ecological community.

Such habitat may be, but is not limited to, habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.

The following species-specific definitions of critical habitat are taken from the most recent conservation advice for SA (TSSC 2016b):

- Occurs primarily in damp areas, mainly at sites with dense vegetation at about 1–2 m above ground level.
- Suitable habitat includes dense wet heathlands, tussock grasslands, sedgelands, damp gullies, swamps and some shrubby woodlands.
- Dense leaf litter or suitable topsoil to shelter in short burrows.

The advice goes on to state that habitat critical to the survival should not be cleared, fragmented or degraded. Any known or likely habitat should be considered as habitat critical to the survival of the species. It is essential that the highest level of protection is provided to these areas and that enhancement and protection measures target these productive sites.

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

Impacts to Swamp Antechinus

The land proposed for development has previously been cleared and has historically been subject to intense grazing pressure. SA inhabit areas of dense vegetation, in wetter areas of heathlands, tussock grasslands, sedgelands, damp gullies, swamps and shrubby woodlands (TSSC 2016b). Whilst no SA were observed within the Project area during the field assessments and no targeted surveys have been conducted, this species is assumed to occur in suitable habitat within the Project area. The impacts of the Action on SA have been considered against the Significant Impact Guidelines for Vulnerable Species (DoE 2013a). Based on the relevant conservation advice and significant impact criteria the impact of the proposed development is unlikely to have a significant impact on the SA. This is because only a small area of foraging and dispersal habitat is being removed, which is unlikely to lead to a long-term decrease in the size of an important

population of the species and will not reduce the area of occupancy of an important population by adversely affecting habitat critical to the survival of the species.

Table 11 - Significant Impact Assessment – Swamp Antechinus (EPBC: Vulnerable)

Significant impact criterion	Assessment	Significant impact likelihood
Lead to a long-term decrease in the size of an important population of a species.	Although the Action will impact 0.072 ha of assumed SA habitat, this habitat is unlikely to be used for breeding given it is dispersal habitat (less than 15m wide) along Madeira Packet Road. Given the provision of higher-quality core area habitat occurs beyond the Project area (within the coastal reserve), habitat loss is unlikely to lead to a long-term decrease in the size of the local SA population. Other potential impact pathways include direct impacts from traffic, behavioural disruptions from increased light, noise and vibration, and increased predation as a result of lighting. These risks will be managed through the EMP, and it is therefore not anticipated that these would lead to a long-term decrease in the size of the local SA population.	Unlikely
Reduce the area of occupancy of an important population.	The proposed project footprint will impact 0.072 ha of potential SA habitat. This is highly unlikely to reduce the area of occupancy of a potentially important population, as any important population in the region would not be reliant on this small area of roadside vegetation. Although the powerline easements intersect with this identified habitat, it will only be maintained at 4 metres. This maintenance will not affect the habitat for which the species utilises and has therefore not been considered as impacted habitat.	Unlikely
Fragment an existing important population into two or more populations.	This project is not anticipated to fragment a population of SA into two or more populations given that the impacted habitat is already largely fragmented. There is no contiguous habitat further to the north-west along Madera Packet Road, which a population would use for dispersal to connect an existing population.	Unlikely
Adversely affect habitat critical to the survival of a species.	Foraging and breeding habitat is considered critical to the survival of a species. The proposed project footprint will impact 0.072 ha of potential SA habitat. This small amount of impact is highly unlikely to adversely affect habitat critical to the survival of the species	Unlikely
Disrupt the breeding cycle of a population.	The proposed project footprint will impact 0.072 ha of potential SA habitat. The small amount of loss of this resource during the breeding season is highly unlikely to disrupt the breeding cycle of a population of the species	Unlikely
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	The proposed project footprint will impact 0.072 ha of potential SA habitat. This is unlikely going to impact a local population that could lead to a decline in the species. However, the foraging habitat within the Project area is considered to be marginal and more suitable habitat occurs extensively in the surrounding region.	Unlikely
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.	A draft Environmental Management Plan (EMP) has been created and will be implemented to manage the environmental impacts of the construction-phase of this project. Provided construction mitigation measures are put in place to ensure project does not facilitate the spread of invasive species, including implementation of pest plant and animal monitoring and control, the Action is unlikely to result in the introduction of invasive species that are harmful to SA.	Unlikely
Introduce disease that may cause the species to decline.	A draft Environmental Management Plan (EMP) has been created and will be implemented to manage the environmental impacts of the construction-phase of this project. Provided construction mitigation measures are put in place to ensure project does not facilitate the spread or introduction of disease, including strict cleaning procedures and protocol during construction, the Action is unlikely to introduce disease that may cause the species to decline.	Unlikely
Interfere substantially with the recovery of the species.	The project is unlikely to substantially interfere with the recovery of this species due to the extensive areas of more suitable habitat in the nearby coastal reserves.	Unlikely

6.3.8 Assessment of cumulative and/or facilitated impacts

Much like the response for SBB, SA utilises the same habitat including the roadside corridors and the coastal vegetation. As the Action is having a very minor impact on this habitat coupled with the proposed habitat improvements, cumulative and facultative impacts are considered unlikely. Pacific Green are not aware of any other projects in the short-term within the local environment proposing to impact SA and SBB habitat.

6.3.9 Swamp Antechinus conclusion

The Project area is likely to be utilised by SA for foraging and dispersal, given the provision of high-quality habitat to the south-east and records in surrounding areas. Nonetheless, SA habitat is considered relatively low quality, given the existing degree of fragmentation. The Action could impact SA through collisions with increased traffic, by direct loss of foraging and dispersal habitat, by direct impacts and habitat degradation arising from fire, by increased predation arising from lighting, and by a deterrent effect from noise and vibration. Given the availability of large areas of high-quality habitat adjacent to the Project area, the commitment to increase habitat availability and quality through the implementation of a Land Rehabilitation and Management Plan (LRMP), and management of traffic, lighting, fire, noise and vibration through an Environmental Management Plan (EMP), it is considered that the Action will not have a significant impact on SA.

6.4 Southern Bent-wing Bat

6.4.1 Description and distribution

The Southern Bent-wing Bat (SBWB) is an insectivorous bat weighing an average of 15 g (Churchill 2007). It is an obligate cave-roosting species with a restricted distribution (19,452 km2) in south-eastern Australia that spans an area from Robe, Naracoorte and Port MacDonnell in south-east South Australia, extending eastwards to Lorne and Pomborneit in south-west Victoria (Churchill 2008; TSSC 2021). The SBWB has undergone serious population decline since the 1960s (DELWP 2020). Consequently, in 2007 the SBWB was listed as Critically Endangered under the EPBC Act. In Victoria, the species is listed as Critically Endangered under the FFG Act. A draft national recovery plan for the SBWB was issued in 2015 (Lumsden & Jemison 2015), and a revised plan was formally adopted under the EPBC Act in 2020 (DELWP 2020).

Recent population modelling predicted an 84% to 97% reduction in population size from 2020-2056 (van Harten et al. 2022). Continued population decline is suspected to be primarily driven by historical and ongoing loss of foraging habitat via the conversion of wetlands and native vegetation for agricultural purposes. Drought and the introduction of White-nose Syndrome to Australia both pose significant threats to SBWB (Holz et al. 2019; Southern Bent-wing Bat National Recovery Team 2022).

6.4.2 Ecology and habitat

SBWB is a nocturnal, aerial hawking insectivorous species with a fast, direct flight pattern (Dwyer 1965). Where there are trees, SBWBs typically forage in open spaces above the canopy, but can fly closer to the ground in more open areas (Churchill 2008; TSSC 2021). Limited radio-tracking studies have shown that SBWBs hunt in a range of habitat types: forested areas, native remnant vegetation, and over cleared agricultural and grazing land (Grant 2004; Stratman 2005; TSSC 2021), and preliminary analysis of radiotracking data has revealed that SBWB locations were closer to trees than would be expected from random movement alone (Bush 2022). SBWB also show a preference for seasonally inundated wetlands (Stratman 2005). DELWP (2020) state that wetlands with terrestrial vegetation occurring around the fringes and aquatic vegetation within the swamp itself are used extensively, with individuals recorded flying considerable distances from roost caves to reach these foraging areas.

SBWB are a cave roosting species. Throughout the year, the use a mix of maternity and non-maternity caves throughout the landscape and move often between the cave roosts. Only three maternity caves are known: Naracoorte cave in South Australia, and Warrnambool cave and Portland cave in Victoria (DELWP 2020). The two closest non-maternity caves are located within 20 km of the Project area (location of maternity cave not disclosed by DEECA). SBWB give birth annually to one pup and congregate in large numbers to creche these pups within a maternity cave.

Dietary studies examining stomach contents of Bent-wing bat (Vestjens & Hall 1977) and guano of SBWB (Kuhne et al. 2022) found moths (Lepidoptera) were the main prey item. Of the 67 moth species identified, many are associated with agricultural landscapes, such as Pasture Webworm (*Hednota pedionoma*) and Armyworm (*Persectania dyscrita*) (Kuhne et al. 2022). These findings suggest SBWB may provide important ecosystem services by contributing to the control of populations of moth species considered to be agricultural pests (Kuhne et al. 2022).

Being an insectivorous bat, SBWBs have a high surface area to volume ratio and large, naked flight membranes, which in combination result in high rates of evaporative water loss (Webb et al. 1995). Consequently, they require access to surface water and drink on-the-wing from open waterbodies such as creeks and rivers, wetlands and farm dams (TSSC 2021). SBWBs are also known to access drinking water by licking droplets from drips in roost caves (Bourne and Hamilton-Smith 2007; Codd et al. 1999).

6.4.3 Occurrence & surveys

6.4.3.1 Desktop assessment

SBWB is known to occur throughout the landscape due to the proximity of the Project area to the known maternity and non-maternity roosting caves, and collisions with nearby operating turbines (Bennett et al. 2022; TSSC 2021). Due to the difficult nature of surveying for microbats, there are few recent records within the surrounding landscape on the VBA and Atlas of Living Australia.

However, the Project area is situated within 20 km of two known roosting caves and a maternity cave for SBWB (location of maternity cave not disclosed by DEECA). The species has been known to fly 70 km between roosting caves within a couple of hours and forage up to 85 km for their roost site. Therefore, the species will use the surrounding landscape to commute and forage.

A desktop assessment of an area within a 20km radius of the Project area was undertaken to investigate the extent of suitable habitat for SBWB in the broader landscape. This information was used to gain clearer understanding of the likelihood of impacts associated with the Action. A combination of satellite imagery, areas of mapped native vegetation, and SBWB observation records (DEECA 2023a; ALA 2025) were used to indicate areas of suitable habitat.

The distribution of current VBA and Atlas of Living Australia (ALA) records within 20km are provided below, in Figure 22 and Figure 23.

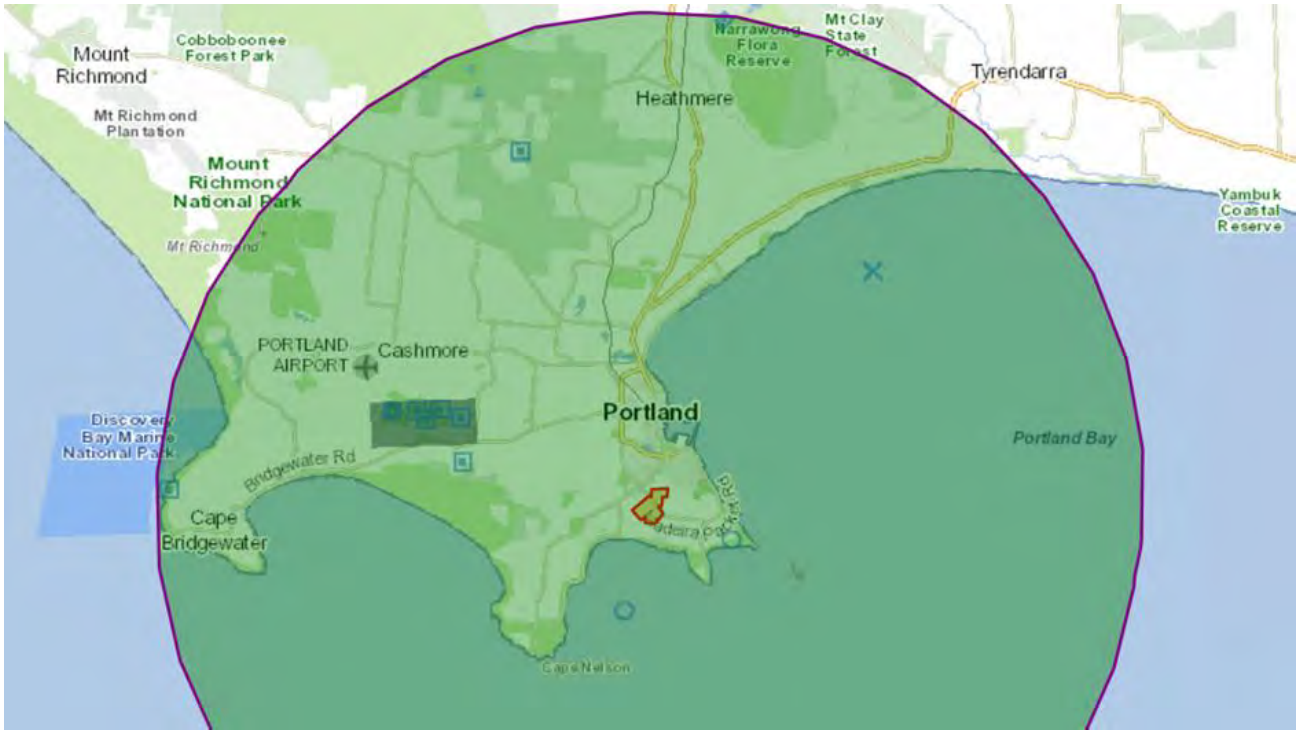


Figure 22 - VBA records for SBWB in the search region (20km buffer)

Figure 23 - ALA records for SBWB in the search region (20km buffer)

6.4.3.2 Site assessment

SBWB is known to occur throughout the landscape due to the proximity of the Project area to the known roosting caves, and collisions with nearby operating turbines (Bennett et al. 2022, TSSC 2021). Therefore, as this species' presence has been confirmed within the greater landscape, targeted acoustic surveys will not add extra information than what is already known. Additional information provided from targeted acoustic surveys would include areas of the Project area that are used most frequently, and seasonal and temporal activity patterns. However, this additional movement and activity patterns would not aid in the analysis of avoidance and mitigation recommendations for the Action, as the primary potential impacts to SBWB will be indirect and be from noise and light pollution. Furthermore, bat detector surveys cannot provide a representation of numbers of individuals in an area, therefore SBWB abundance cannot be calculated from acoustic surveys. Calls collected by acoustic surveys can only provide information on the relative activity of SBWB within the Project area.

6.4.3.3 Habitat in the Project area

As SBWB are an aerial species, the habitat for SBWB within the Project area includes the following areas:

- Open airspace;
- Linear roadside vegetation strips;
- Wetland areas; and
- Coastal vegetation adjacent to the property.

SBWB may occasionally fly over the Project area and may also opportunistically forage and drink from the wetlands on site (when inundated). Although SBWB may use open spaces to forage, given there is limited treed habitat within the Project area except for along roadsides, the Project area is likely used less often than treed waterbodies in the landscape. Coastal wooded vegetation to the south and south-east of the Project area is likely to be used more extensively than the open areas within the Project area.

The aquatic habitat comprised areas of ephemeral wetland throughout the Project area, including low-lying areas of pasture and constructed drainage channels. All the wetlands in the Project area are ephemeral and therefore do not provide a consistent water source for SBWB throughout the year; however, they were

saturated at the time of the assessment. The wetlands contained limited structural diversity both within and surrounding these wetlands. The temporal nature and limited habitat features reduce the overall value of this habitat for SBWB.

6.4.4 Impact pathways

Continued population decline of SBWB is suspected to be driven primarily by historical and ongoing loss of foraging habitat via the conversion of wetlands and native vegetation for agricultural purposes. Drought and the introduction of White-nose Syndrome to Australia both pose significant threats to SBWB (Holz et al. 2019; SBWB National Recovery Team 2022). Habitat critical to the survival of the SBWB includes the three maternity caves, non-maternity caves that are used by a significant proportion of the population or at key times during the yearly cycle, and key foraging areas (yet to be defined; DELWP 2020). Due to the severe decline in numbers in recent decades, all populations are considered important.

Any impacts of the Action on SBWB are likely to be temporary during construction. On completion of wetland rehabilitation proposed in the LMRP, there is predicted to be a net gain for the species due to enhanced foraging habitat. Therefore, there are not predicted to be any irreversible impacts to SBWB. A summary of the potential impacts to SBWB are assessed below, and a significant impact assessment outlined in Table 12.

6.4.4.1 Habitat loss

Collisions with turbines on the adjacent wind farm (Bennett et al. 2022), and the proximity of the Project area to known maternity and non-maternity caves (TSSC 2021), indicates the species may use the Project area to forage. The proposed development footprint is expected to impact on wetland habitat that may be intermittently used by SBWB when flooded. However, the wetland habitat within the Project area is considered low-quality for SBWB, due to its ephemeral nature, limited emergent and fringing vegetation, and lack of treed areas across the Project area. It is considered likely that the SBWB will more often utilise the treed vegetation to the south and south-east of the Project area, and other more vegetation waterbodies in the landscape.

Preliminary analysis of SBWB radiotracking data has revealed that SBWB locations were closer to trees than would be expected from random movement alone (Bush 2022), therefore it is highly likely that primary SBWB habitat constitutes the coastal vegetated areas to the south and south-east, and roadside vegetation as corridors between those vegetated areas and the wetland habitat on site when inundated. Habitat enhancement at the remaining wetland will provide a permanent foraging source for SBWB, and connectivity to these wetland areas from the adjacent foraging habitat in the coastal vegetation.

Given the predicted use of SBWB in the Project area and the greater landscape, and the proposed wetland enhancement on site, habitat fragmentation is not considered an impact on SBWB and a net gain is likely to occur for the species.

6.4.4.2 Water quality

The existing wetland habitat on site is ephemeral, therefore the Project area is not a permanent foraging resource for SBWB. The water is fed by untreated rainwater only and is dynamic in response to temporal conditions.

The proposal for the wetland rehabilitation includes the construction of holding points to capture and treat any stormwater from the Disturbance footprint before discharge into the central wetland. Rehabilitation of the central wetland will include habitat enhancement via plantings and restricted stock access, which will result in an improvement in water quality and filtration. Additionally, the two holding ponds will create habitat that fauna, and insects, may use. Therefore, the proposed wetland rehabilitation will increase water quality of the wetland area.

Protocols to prevent contamination of the wetland areas during construction have been outlined in the draft Environmental Management Plan (EMP) (Appendix F).

6.4.4.3 Light pollution

Artificial light at night can affect bats at roost sites, along commuting corridors or when foraging. Impacts are species-specific, but can include attraction to artificial lights, changes in prey availability, habitat degradation and avoidance of artificial light (DCCEEW 2023).

Artificial light in commuting areas, particularly for light-avoidant bats, can fragment habitat, which may cause longer flight times and increase energy expenditure (Stone et al. 2015). Insectivores are likely to be affected by artificial light in multiple ways, as their primary food source, insects, may also be susceptible to impacts from artificial light, which can lead to changes in prey availability (Owens & Lewis 2018; Rowse et al. 2016). There have been no studies conducted on the impacts of artificial light at night on SBWB, however light in and around roosting caves is likely to have the greatest impact (TSSC 2021). It is unknown what the impacts are on SBWB foraging activity and commuting across the landscape.

The Project will not entail any construction works at night unless instructed by a regulator. Given this, there is no proposed construction lighting. There may be some minimal lighting to ensure site safety and security, however, this will be minimal and will follow the requirements of the EMP. There will be some operational lighting, however, again this will be minimal and will be sufficient to ensure the safe operating of the site and to meet security requirements. Operational lighting will follow the controls as stipulated in the EMP.

As the impacts of light pollution on SBWB foraging are unknown, the Action will take a precautionary approach and follow the National Light Pollution Guidelines for Wildlife when designing lighting across the Project area, particularly near the upgraded wetland area (DCCEEW 2023).

6.4.4.4 Noise, vibration, visual impacts, traffic, fire

The Project will not entail any construction works at night, or construction of any new public roads through the Project area. Therefore, increased noise, vibration visual impacts or traffic at night when SBWB would be foraging is not a predicted outcome of the Action.

The study of noise impacts on bats is in its relative infancy, and the circumstances in which noise mitigation might be needed remain uncertain (Reason & Wray 2023). There are currently no noise pollution guidelines for bats in Australia. Operational noise will be less than the current background noise in the landscape, particularly from the Portland township and the operational Portland Aluminium Smelter. Therefore, it is unlikely that noise pollution from the Project will impact on SBWB foraging activity.

SBWB is a cave roosting species, and there are no caves within the Project area. Therefore, fire as a result of construction poses no risk to SBWB.

6.4.5 Avoidance & mitigation

There are no predicted impacts of the Action to SBWB, however avoidance and mitigation measures for Blue-winged Parrot will have additional benefits to SBWB. The quality of existing foraging habitat within the Project area is considered low for SBWB, therefore usage level of Project area is predicted to increase for SBWB with the avoidance and mitigation measures in place. Avoidance and mitigation measures are consistent with guidance provided in the SBWB conservation advice (TSSC 2021) and recovery plan (DELWP 2020).

The Project area was partially selected for the proposed development given the land has previously been cleared and has historically been subject to intense grazing pressure, therefore less likely to support a diverse array of biodiversity. Through early design iterations based upon initial flora and fauna survey work, the southern area of the Project area mapped as BWP foraging habitat has been largely avoided, with impacts minimised as much as practicable. Avoidance of this habitat will benefit SBWB as it provides a habitat corridor for SBWB to the wetland area from the coastal reserve (where they're most likely to forage).

Although significant impacts of lighting to SBWB are not expected due to the low-quality habitat within the Project area, the Action will take a precautionary approach and lighting design will follow the National Light Pollution Guidelines for Wildlife (DCCEEW).

The following lighting principles will be taken to avoid any impact of lighting to SBWB:

- Start with natural darkness – The design phase of the Action will consider the existing lighting levels across the Project area, and only add lighting where necessary. Additionally, there will be no direct lighting into wetland areas of the Project area.
- Use adaptive controls – Where possible on site, design will implement smart-controlled lights which only switch on when personnel are present.
- Light only the intended object or area - Lighting will be directional and fully shielded. This will decrease the amount of light spill into areas that are not intended to be light, and contribute less to skyglow. Lighting closest to the wetland will be directed away from the wetland area.
- Use appropriate lighting – The minimum number and intensity of lights will be used to provide safe and secure illumination for the Project area. The minimum amount of light needed to illuminate an object or the Project area will be assessed during the early design stages and only that amount of light installed.
- Use non-reflective, dark-colour surfaces – Colour of surfaces will be considered during the design phase. Where possible, dark coloured surfaces will be used for infrastructure.
- Use lights with reduced or filtered-out blue, violet and ultraviolet wavelengths – Light globes used across the entire Project area will be chosen from the list of lighting least impactful to bats (DCCEEW 2023). These include:
    - Low pressure sodium vapour
    - Filtered LED
    - Filtered metal halide
    - Filtered white LED
    - Amber LED
    - PC amber.

Lighting mitigations will be implemented from the beginning of construction, and will continue through operation as detailed in the EMP (Appendix F)

Furthermore, SBWB will benefit from the habitat enhancement, particularly the 'wetland enhancement planting' (LMT03b) as described in the LMRP (Appendix E). Enhancement of the remaining wetland habitat in the Project area will include revegetation with emergent and fringing vegetation, destocking, and weed and pest management (outlined in Appendix E). The Action will include the preparation of a stormwater management plan providing an opportunity to undertake revegetation of the Project area using a diverse mix of locally appropriate native species to enhance feeding habitat for the BWP, which is predicted to enhance water quality in the wetland area. Furthermore, revegetation of the roadside vegetation for BWPs will enhance connectivity for SBWB to the wetland area, as SBWB are recorded closer to treed habitat than not (Bush 2022). These measures will likely increase usage of the wetland area by SBWB, resulting in a net gain for the species.

Ongoing management of the wetland habitat, including destocking, weed and pest management, outlined in the LMP, will ensure continued enhancement of the wetland area, and will have benefits to SBWB by increasing foraging habitat options in the landscape.

No monitoring for SBWB will occur, as there are no predicted impacts of the Action on SBWB. Measuring environmental outcomes for the wetland habitat is outlined in the LMRP (Appendix E).

6.4.6 Significant Impact assessment

The impacts of the Action on SBWB are considered in Table 12 against the EPBC Act Significant Impact Guidelines for Critically Endangered species (DoE 2013a).

Table 12 - Impacts on Southern Bent-wing Bats in relation to MNES impact criteria for critically endangered species

Significant impact criterion	Assessment	Significant impact likelihood
Lead to a long-term decrease in the size of a population.	The primary foreseeable impacts of the Action on SBWB include removal of low-quality wetland habitat, light pollution and noise pollution during construction. The proposed project footprint will impact some marginal SBWB foraging habitat, in the form of ephemeral wetlands. There will be no roosting habitat impacted. Due to the proximity of the Project area to two known SBWB roosting caves and the Portland maternity cave, it is possible that SBWB will forage over the wetlands in the Project area when inundated. However, there is almost no emergent vegetation in the wetland and treed habitat within the Project area, therefore the wetlands are likely to be favoured less over other waterbodies in the landscape. Furthermore, the remaining wetland habitat and roadside vegetation within the Project area will be revegetated, increasing the quality of habitat for SBWB. Evidence has suggested that SBWB show a preference for seasonally inundated wetlands (Stratman, 2005), and wetlands with terrestrial vegetation occurring around the fringes and aquatic vegetation within the wetland itself are used extensively (DELWP 2020). It is therefore unlikely that the Action will results in a long-term decrease in the size of the SBWB population.	Unlikely
Reduce the area of occupancy of the species.	The Action will impact a proportion of potential SBWB foraging habitat. There will be no roosting habitat impacted. The habitat is considered of low quality to SBWB for the following reasons: No treed habitat around the wetland area or within the Project area except for roadsides. The wetland habitat contains limited emergent vegetation and no terrestrial fringing vegetation. Therefore, the Action is unlikely to reduce the area of occupancy of the species, as the Project area provides low quality habitat for the species.	Unlikely
Fragment an existing population into two or more populations.	The Action is not anticipated to fragment an important population of SBWB into two or more populations given that the species is aerial and highly mobile. The Action may increase usability of the Project area due to revegetation of the roadsides and wetland area.	Unlikely
Adversely affect habitat critical to the survival of a species.	Habitat critical to the survival of the species includes the three known breeding caves in South Australia, Warrnambool and Portland (DELWP 2020, TSSC 2021). The closest of these is within the Portland area, but the exact location is not publicly available information. Non-breeding caves are also critical habitat for the SBWB (DELWP 2020, TSSC 2021), the closest of these are Bat's Ridge, (approximately 10 km from the Project area), Mt Eccles (~45 km away), and Lower Glenelg (~65 km away). No known maternity or non-maternity caves would be directly impacted by the construction or operation of the BESS. Foraging habitat in proximity to the above-mentioned caves is also critical habitat to SBWB (DELWP 2020, TSSC 2021). There is no woodland habitat within the Project area, and the wetland habitat within the Project area is considered to be of low quality, as there are other, more vegetated waterbodies in the surrounding	Unlikely

	landscape. Of this wetland habitat, a proportion will be removed during construction, and the remaining wetland area and roadside vegetation leading to the wetland will be revegetated, increasing the quality of the habitat within the Project area. It is therefore considered unlikely that the Action will adversely affect habitat critical to the survival of the species.	
Disrupt the breeding cycle of a population.	There is a SBWB maternity cave within the Portland area, however the location of which is no disclosed to the public. However, this cave is not within the Project area. The construction and operation of the Action would not have any direct impact on maternity caves, or on the bats roosting in the caves during the breeding season. The Action is not predicted to disrupt the breeding cycle of the SBWB population.	Unlikely
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	The Project area does not support any SBWB roosting habitat, and there is very limited treed habitat along roadsides within the Project area. The permanent and semi-permanent wetlands do not contain any emergent or fringing vegetation and therefore are expected to be low quality habitat for SBWB. The Action will impact a proportion of wetland habitat. Foraging habitat within the Project area is considered to be marginal and more suitable habitat occurs extensively in the surrounding region. Therefore, the Action is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. Additionally, the Action proposes to upgrade the wetland area to include ephemeral and fringing vegetation, which is likely to increase the habitat quality in this area. Furthermore, revegetation along the roadsides for BWP will also increase the quality of habitat corridors for SBWB to move through to access the wetland area.	Unlikely
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat.	A draft Environmental Management Plan (EMP) has been created and will be implemented to manage the environmental impacts of the construction-phase of this Action. Provided construction mitigation measures are put in place to ensure Action does not facilitate the spread of invasive species, including implementation of pest plant and animal monitoring and control, the Action is unlikely to result in the introduction of invasive species or disease that are harmful to SBWB.	Unlikely
Introduce disease that may cause the species to decline.	As above.	Unlikely
Interfere with the recovery of the species.	The Action is unlikely to substantially interfere with the recovery of this species due to the upgrade works to the remaining wetland habitat, and the extensive areas of more suitable habitat in the landscape.	Unlikely

6.4.7 Assessment of cumulative and/or facilitated impacts

A threat to SBWB in the local area is collisions with wind energy facilities. Collisions have been recorded at the adjacent Cape Nelson North wind farm (Bennett et al. 2022) and are likely to have occurred at other wind farms in the Portland landscape due to the proximity to roosting caves. The Project will consist of a fixed structure and adjoining powerlines, rather than large moving infrastructure seen at wind farm facilities. Therefore, risk of collision is low.

Removal of habitat in the landscape is another threat to SBWB (TSSC 2021). SBWB rely on caves for roosting, waterbodies for drinking, and treed areas for commuting and foraging. The Project area contains ephemeral

wetland and roadside habitat that may be used on occasion when the area is inundated, however it is considered to be of low quality to SBWB. In addition, the remaining wetland area will be rehabilitated, providing higher quality habitat for SBWB. Removal of a portion of this wetland habitat is not likely to add to any cumulative habitat loss across the landscape.

It is therefore unlikely that any cumulative or facilitated impacts will occur to SBWB.

6.4.8 Southern Bent-wing Bat conclusion

SBWB are likely to use the surrounding landscape to commute and forage, given the Project area is situated within 20 km of two known roosting caves and a maternity cave. SBWB may occasionally fly over the Project area and may opportunistically forage and drink from the wetlands within the Project area (when inundated). Although SBWB may use open spaces to forage when necessary, given there is limited treed habitat within the Project area except for along roadsides, the Project area is considered sub-optimal compared to treed waterbodies in the landscape.

The Action could impact SBWB through foraging habitat loss, decreased water quality and light pollution. The Action has taken a precautionary approach and will follow the National Light Pollution Guidelines for Wildlife (DCCEEW 2023) to aid in mitigating cumulative impacts of light pollution across the landscape. Furthermore, the proposed measures to expand and enhance wetland habitat in the Project area will be of benefit to SBWB, and are considered adequate to maintain species persistence and habitat usage at the Project area. The existing habitat in the Project area is considered to be of low quality to SBWB, due to levels of stock usage and lack of emergent and terrestrial fringing vegetation. The Action plans to enhance the quality of the wetland area by destocking the area and revegetating the emergent and fringing vegetation, which will increase water quality in the wetland area. Furthermore, revegetation of the roadside vegetation for BWPs will enhance connectivity for SBWB to the wetland area, as SBWB have been recorded closer to treed habitat than not (Bush 2022). These measures will likely increase usage of the wetland area by SBWB, resulting in a net gain for the species. Residual impacts to SBWB as a result of the Action are not considered to be significant given the low-quality habitat present on site, and the avoidance and mitigation measures implemented.

7. Social, economic and engagement considerations

Pacific Green are committed to delivering an Action that supports the local environment, community and economy. This $1.5 billion project will deliver significant economic benefit to Portland, the Glenelg Shire Council, broader community and region. This includes direct economic benefits, via local employment and procurement, a community benefit fund and workforce expenditure, as well as broader wholesale energy market reductions and indirect economic benefits.

Pacific Green has utilised community information sessions, letters to neighbours, direct meetings and engagement with neighbours to ensure opportunities for stakeholder and local community engagement feedback on appropriate approaches to address impacts.

7.1 Economic and social impacts

The Portland Energy Park will generate economic and employment opportunities for the local and wider communities, with benefits including:

- Direct investment of approximately $1.5 billion, and local economic benefit of $1.2 million annually;
- Creation of 300 construction jobs and 21 ongoing operational jobs;
- Contributing to Victoria's future energy storage targets (at least 2.6GW by 2030 and 6.3GW by 2035) and supporting its Net-Zero transition.
- Increased energy stability and reduced wholesale electricity costs. When the electricity grid is producing an excess of renewable energy, some of that excess will be captured by the battery and stored. Then, at times of increased demand, the battery can discharge that stored energy back into the grid to relieve demand pressure and minimise the occurrence of high price events.
- Supporting the development of the Portland 'Smelter Precinct' industrial area and renewable energy generation projects in the region via direct infrastructure development, enabling new grid connection opportunities, and potentially assisting new and proposed energy-intensive users in the vicinity.
- Prioritisation of local employment opportunities for construction, operation and maintenance, as well as supporting training and development of an emerging energy industry in Victoria's South West REZ.
- A Community Benefit Fund.
- Contributing to global efforts to mitigate climate change, via decarbonisation of the energy grid.

The Action will provide critical electricity grid services, a new terminal station that can service future energy projects, significant regional economic benefit, and a major contribution to Victoria's energy storage targets.

A Socioeconomic Impact Assessment has been prepared for the Action (Appendix H).

The suite of technical impact investigations prepared to support the planning permit application included: noise, hazard risk (including fire), hydrology and stormwater, flora and fauna, transport and landscape and visual. Over a roughly twelve-month period, from early concept design through to detailed layout development, the technical impact assessments have contributed to an iterative design approach that has sought to avoid potential impacts as much as possible, and minimise or mitigate any remaining impacts. The layout design has changed significantly to address those.

Those reports demonstrate that Pacific Green have been dedicated to identifying and addressing potential impacts. Key influences on the design development have included amenity considerations for neighbours, ensuring minimal flora and fauna impacts, water quality and wetland rehabilitation, and appropriate fire risk design. Overall, Pacific Green is confident that the Project has successfully avoided, minimised and mitigated potential negative impacts, while providing significant economic and social benefits.

7.2 Community engagement

During all stages to date, Pacific Green has been committed to informing, consulting, and involving the appropriate stakeholders through an effective engagement process based on the objectives and principles of community engagement best practices and guidelines. A Consultation Summary Report (Appendix I) has been prepared and provides further details of engagement to date.

Pacific Green has undertaken a comprehensive community and stakeholder engagement program, appropriately informing nearby residents and the wider Portland community of the Project. Consistent and clear information has been provided to stakeholders and community outlining the details of the Project and any potential impacts.

Since the early stages of project development Pacific Green has focused on building strong relationships and local connections through meaningful two-way engagement. Pacific Green has prioritised engaging with landholders and all four direct neighbours to the Project area, in addition to nearby neighbours. Other key stakeholders with an interest in the project include those in the business and supplier community who are keen to learn of future work opportunities.

Our engagement approach was tailored to suit differing ways in which individuals prefer to receive information. This included direct mailouts that introduced the Project, one-on-one meetings and Community Information Drop-in Sessions that were promoted and advertised to attract wider audiences. Future engagement will include supplier information sessions to directly engage potential suppliers interested in civil, electrical or other work opportunities.

For the entirety of the Project's lifecycle, First Nations engagement has and will continue to form an integral part of Pacific Green's ongoing activity in Portland. Early engagement with Traditional Owners provided the project team with important information regarding the cultural heritage values of the Project area. Those lessons informed redesign of the Action to avoid impacts to the most sensitive areas of cultural heritage value.

Broadly, feedback on the Project has been positive, as received from the local community, government authorities and service providers, trade unions and Members of Parliament. The feedback has included positive comments on the engagement process, particularly early engagement and opportunities for genuine feedback, the economic opportunities for Portland – particularly as a small city with strong manufacturing, logistics, engineering and fabrication services – and efforts to ameliorate the Project area.

The first Community Information Drop-in Session held in the early feasibility stage, February 2024, attracted nearly 60 attendees, with a high level of interest in the proposal. As the first utility-scale BESS proposed in the Portland area, there was significant interest in the technology, with questions on the potential risks, amenity impacts, siting, design, procurement opportunities, construction timeframes, and electricity market benefits. The project team was able to answer most questions on the day, with some requiring direct follow-up via email or phone. Some neighbours had questions about potential noise and fire risks. As the Project progressed technical studies in the pre-application phase, an additional mailout was sent as an update, linking to the Project 'factsheets' on the website, in advance of the second information day. The attendance of 6 people, with positive attitudes towards the Project (including local businesses and trade unions), has demonstrated an effective engagement program with a high level of community acceptance.

As a result of the consultation and engagement activities completed to date, several changes have been made to the concept design in direct response to issues or concerns raised. Key changes and alterations to the concept plan include:

- The southern area of the Project area has been avoided to protect the habitat for the Blue-winged Parrot.
- Key infrastructure has been placed, where possible, away from the nearest dwellings to minimise noise and visual impacts. Most notably, on the North Site, all infrastructure has been placed at the southern extent of the property, away from the general residential zoned land.

- The siting and design of the Project, including adequate benching and drainage ponds, has addressed drainage issues raised by Wannon Water and Glenelg Shire Council.
- Following extensive consultation with GMTOAC and site investigations, an 'area of avoidance' was identified, comprising the culturally sensitive dune rises. This area of Aboriginal cultural heritage sensitivity has been protected from development.
- A landscape concept plan, entailing vegetation screening, has been developed to minimise views over the Disturbance footprint as well as improve the visual amenity of the Action and adjacent streetscape.
- Acoustics measures such as equipment selection and layout have been incorporated into the Project to minimise noise impacts on surrounding sensitive receptors.

Based on the consultation to date, the Project team has also refined its local supplier content provisions for construction and operation to ensure that Portland businesses will be positioned to work on the Project. A supplier portal will be launched on the Portland Energy Park website to facilitate this opportunity.

7.3 First Nations engagement

As noted in Section 1.6, the Project area is located on Gunditjmara Country, specifically *Nyamatt Mirring* (Sea Country).

Beyond the statutory obligation to prepare a CHMP, Pacific Green has sought to proactively engage with GMTOAC, as the representative of the Traditional Owners of the Project area, to build a positive relationship. This engagement will continue throughout the project's lifecycle. Pacific Green believes that the Portland Energy Park can respect Nyamat Mirring and cultural heritage, as well as provide economic and social benefits to Traditional Owners.

For the duration of the CHMP process, engagement activities have necessarily been driven by that statutory process. Notwithstanding, Pacific Green has used that same period of time to continue to build relationships and knowledge and use those lessons to shape future engagement and key project inputs beyond the CHMP assessment. Traditional Owners were invited to the Community Drop-in Sessions and the Project Team ensured they were available at any time should a request be made to meet and discuss the Project.

A detailed list of meetings with GMTOAC as part of the CHMP process is included in Appendix I. Outside of the CHMP process, Pacific Green has actively sought to discuss opportunities to work with, support and collaborate with GMTOAC. Notably, GMTOAC and the project's heritage consultancy asked Pacific Green to co-present at the Victorian Archaeology Colloquium in February 2025. The presentation highlighted the project team's CHMP work in Portland with GMTOAC as a best-practice case study in successfully working with RAP groups to balance protection of cultural heritage with development and changes in land use.

Overall, the open and two-way communication has allowed layout changes to avoid and minimise impacts to culturally sensitive areas of the Project area. This engagement has been viewed positively by GMTOAC and improved project outcomes. Pacific Green is committed to further collaborative engagement with GMTOAC, beyond the CHMP statutory process, to ensure that the Project can deliver positive economic and social benefits to the Traditional Owners.

8. Ecologically sustainable development

The National Strategy for Ecologically Sustainable Development defines the goal of ecologically sustainable development (ESD) as:

Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.

The Core Objectives are:

- to enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations
- to provide for equity within and between generations
- to protect biological diversity and maintain essential ecological processes and life-support systems

The Principles of ecologically sustainable development (as specified in s.3A of the EPBC Act) are:

a. decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;

b. if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;

c. the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;

d. the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making;

e. improved valuation, pricing and incentive mechanisms should be promoted.

Pacific Green has considered the long-term and short-term economic, environmental, social and equitable impacts of the Action. Overall, the Action presents strong opportunities and benefits in the energy transition, local economic and social development, and the environment.

The project team have considered the precautionary principle, that states that a lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation where there are threats of serious or irreversible environmental damage. The project team has also ensured that conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making. The Action includes tangible land management and rehabilitation activities to provide an overall benefit to biodiversity.

The Action supports positive inter-generational equity through its social, economic, energy and environmental benefits.

Pacific Green are implementing procurement practices that support improved valuation, pricing and incentive mechanisms.

The Action aligns with Australia's obligations under the Biodiversity Convention, the Convention of Nature in the South Pacific (Apia Convention), does not contradict the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), does not impact ecological communities, and indeed through restoration of habitat on-site, supports the recovery of the four relevant listed threatened species (BWP, SBB, SA, SBWB).

8.1 Meeting Australia's National and international obligations

The project has assessed whether it meets or contravenes any obligations under Biodiversity Convention, the Convention of Nature in the South Pacific (Apia Convention), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The technical team has determined that the Action will not contravene any of the above-mentioned conventions.

Throughout the assessment process, the project team has considered the Action, impacts and mitigations in the context of the relevant recovery plans for the listed species and communities (Blue-winged Parrot, Southern Brown Bandicoot, Swamp Antechinus and Southern Bent-wing Bat). Where a recovery plan does not exist, we have considered the relevant conservation advice. It is not the intent to paraphrase each of these documents, however, they all broadly discuss:

- Critical or important habitat such as cave sites, roost sites or hollow bearing trees
- Loss of important native vegetation habitat and large-scale habitat clearing
- Predation by exotic species or habitat change dues to weed infestation, and
- Collisions with infrastructure (wind turbines) or road transport.

The project team has considered each of these impacts and more across the whole project cycle as presented in the environmental risk assessment (Appendix E) and within the impact sections of this report (Chapters 4, 5 & 6). The Action is not considered to be inconsistent with any of the relevant recovery plans.

9. Conclusion

This Preliminary Documentation provides a detailed overview of: the Action, the current environment, the iterative evolution of the proposal's design – achieving strong alignment with an avoidance, minimisation, and mitigation hierarchy – the relevant MNES, impact pathways and detailed assessment of the four key species (BWP, SBB, SA and SBWB), as well as social, economic, engagement and ESD considerations.

Pacific Green are committed to ensuring the Portland Energy Park provides a positive impact for the national electricity grid, as well as local environment, economy and community.

Existing environment

The Disturbance footprint consumes less than one third of the Project area, located in predominantly cleared, agricultural grazing paddocks with low-quality vegetation. Existing ephemeral wetlands are accessed by grazing stock and severely degraded.

The Project area is within the Portland 'Smelter Precinct' – a State-significant industrially-zoned area in South Portland. This industrial precinct is characterised by the Portland Aluminium smelter, Wannon Water wastewater treatment plant, Bald Hill water supply facility, Portland Wind Farm, and vacant land used for agricultural purposes. The industrial precinct is directly south of the Portland township (residential area), with coastal reserve to the south and east, and a strip of rural residential development to the west.

The immediate vicinity of the Project area is characterised by a mix of industrial, recreational, and rural residential uses. This existing industrial environment includes significant noise and light emissions.

Biodiversity improvements

The Action includes commitments to increase habitat availability and quality through the implementation of the Land Rehabilitation and Management Plan (LRMP), and management of traffic, lighting, fire, noise and vibration through an Environmental Management Plan (EMP). The LMRP treatments will see stock exclusion and planting of terrestrial and aquatic / wetland vegetation of 3.37 and 7.33 hectares respectively, as well as 11.19 hectares of active management of existing grazed pasture paddocks to improve biodiversity (totalling 21.89 hectares of rehabilitation).

Blue-winged Parrot

While the Action will impact 10.827 hectares of foraging habitat for the BWP, it is considered that the Action will not have a significant impact on the species. The foraging habitat to be impacted is low quality, predominantly exotic pasture grasses, and there is significant, similar foraging habitat in the site surrounds and region. Notably, the commitment to increase habitat availability and quality through the implementation of a LMRP , and management of traffic, fire, noise and vibration through an EMP, mitigate impacts and indeed will see enhancement of terrestrial and aquatic habitat on site.

Southern Brown Bandicoot and Swamp Antechinus

While the Action will impact 0.072 hectares of native vegetation that is assumed habitat for SBB and SA, the Action is not considered to have a significant impact on those species. The habitat to be impacted is considered relatively low quality, given the existing degree of fragmentation, with availability of large areas of high-quality habitat adjacent to the Project area.

Southern Bent-wing Bat

SBWB are likely to use the surrounding landscape to commute and forage, given the Project area is situated within 20 km of two known roosting caves and a maternity cave. While SBWB *may* occasionally fly over the Project area and opportunistically forage and drink from the wetlands (when inundated), there is limited treed habitat within the Project area except for along roadsides and the Project area is considered sub-optimal compared to treed waterbodies in the surrounding landscape.

The Action has taken a precautionary approach and will follow the National Light Pollution Guidelines for Wildlife (DCCEEW 2023) to aid in mitigating cumulative impacts of light pollution across the landscape. Furthermore, the proposed measures to expand and enhance the quality of the wetland habitat in the Project area will be of benefit to SBWB, and are considered adequate to maintain (assuming presence) species persistence and habitat usage at the Project area. Indeed, these commitments will likely increase usage of the wetland area by SBWB, resulting in a net gain for the species.

Conclusion

Based on the outcomes of this assessments and proposed management plans supporting this Preliminary Documentation, as well as consideration of the mitigation hierarchy, it is anticipated that the Action will not result in any significant residual impacts to the four key MNES discussed within. Pacif Green, therefore contends that he controlled action should be approved and that the Action does not require offsetting of any residual impacts to MNES.

The approval can include requirements to finalise the EMP and the LMRP to the satisfaction of DCCEEW, with the Action to be undertaken in accordance with those finalised documents. Other key approvals, notably the (Victorian) planning permit, as well as completing detailed design, will influence the final wording of the EMP and LMRP.

The Action aligns with the objects of the EPBC Act:

- (a) to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance; and
- (b) to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources; and
- (c) to promote the conservation of biodiversity; and
- (ca) to provide for the protection and conservation of heritage; and
- (d) to promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and indigenous peoples; and
- (e) to assist in the co-operative implementation of Australia's international environmental responsibilities; and
- (f) to recognise the role of indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity; and
- (g) to promote the use of indigenous peoples' knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.

10. Information sources

Atlas of Living Australia 2025, Website at http://www.ala.org.au. Accessed 7th February 2025.

Bennett EM, Florent SN, Venosta M, Gibson M, Jackson A, and Stark E 2022, *Curtailment as a successful method for reducing bat mortality at a southern Australian wind farm.* Austral Ecology, 47(6): 1329-1339.

Bourne, S., Hamilton-Smith, E., 2007. Miniopterus schreibersii bassanii and climate change. The Australasian Bat Society Newsletter 28, 67–69.

Bruce J, Bryant DB, Kohout M, Macak PV, Batpurev K &Sinclair SJ 2008, 'Southern brown bandicoots, Isoodon obesulus obesulus, occupy the margins of artificial waterways, in preference to bushland remnants or roadside vegetation', *Wildlife Research* **50**: 68-75.

Bush, A. 2022. GPS tracking reveals long distance foraging flights of Southern Bent-wing Bats in an agricultural landscape [conference abstract}, Australasian Bat Society Conference 2022, Brisbane, Australia.

Churchill, S. 2008. Australia Bats. Jacana Books, New South Wales.

Coates TD & Wright CJ 2003, 'Predation of Southern Brown Bandicoots Isoodon obesulus by the European Red Fox Vulpes vulpes in south-east Victoria', *Australian Mammalogy,* **25**:107-110.

Codd, J., Clark, B., Sanderson, K., 1999. Drinking by the common bent-wing bat Miniopterus schreibersii and calcium in cave water. Bat Research News 40, 9–10.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2023, National Light Pollution Guidelines for Wildlife, Department of Climate Change, Energy, the Environment and Water, Canberra, May. CC BY 4.0.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2025, *EPBC Act Protected Matters Search Tool*, Department of Climate Change, Energy, the Environment and Water, Canberra, viewed 6th February 2025, https://www.environment.gov.au/epbc/pmst/index.html.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2023, *Conservation Advice for Neophema chrysostoma (Blue-winged Parrot)*, Department of Climate Change, Energy, the Environment and Water, Canberra.

Department of Energy, Environment and Climate Action (DEECA) 2025a, *NatureKit*, Department of Energy, Environment and Climate Action, Melbourne, Victoria, viewed 7th February 2025, https://www.environment.vic.gov.au/biodiversity/naturekit.

Department of Energy, Environment and Climate Action (DEECA) 2025b, *Victorian Biodiversity Atlas 3.2.8*, Department of Energy, Environment and Climate Action, Melbourne, Victoria, viewed 6th February 2025, https://vba.dse.vic.gov.au.

Department of Environment, Land, Energy, Water and Planning (DELWP 2020). National Recovery Plan for the Southern Bent-wing Bat Miniopterus orianae bassanii. Department of Environment, Land, Water and Planning, Victorian Government, Melbourne.

Department of the Environment (DoE) 2013a, *Matters of National Environmental Significance - Significant impact guidelines 1.1,* Department of Climate Change, Energy, the Environment and Water, Canberra.

Department of the Environment (DoE) 2013b, *Survey Guidelines for Australia's Threatened Orchids: Guidelines for Detecting Orchids Listed as 'Threatened' Under the Environment Protection and Biodiversity Conservation Act 1999*, Department of Climate Change, Energy, the Environment and Water, Canberra.

Department of the Environment, Water, Heritage and the Arts (DEWHA) 2010, *Survey guidelines for Australia's threatened birds,* Department of Climate Change, Energy, the Environment and Water, Canberra.

Department of Planning and Environment (DPE), 2022, Cumulative Impact Assessment Guidelines for State Significant Projects. New South Wales Department of Planning and Environment.

Emison, WB, Beardsell, CM, Norman, FI, Loyn, RH & Bennett SC 1987, *Atlas of Victorian Birds*, Department of Conservation, Forests and Lands and the Royal Australasian Ornithologists Union, Melbourne.

Engel, M. S., Young, R. J., Davies, W. J., Waddington, D., & Wood, M. D., 2024, *A Systematic Review of Anthropogenic Noise Impact on Avian Species*, Current Pollution Reports, **10:** 684–709, https://doi.org/10.1007/s40726-024-00329-3.

Forman, R. T. T., Dale, V. H., Cutshall, C. D., & Bissonette, D. S. J., 2003, *Road ecology : science and solutions,* Island Press.

Gibson L A, Wilson BA, Cahill DM & Hill J 2004, 'Modelling habitat suitability of the swamp antechinus (Antechinus minimus maritimus) in the coastal heathlands of southern Victoria, Australia', *Biological Conservation,* **117:** 143-150.

Grant, C., 2004. Radiotracking of Miniopterus schreibersii at Naracoorte, South Australia. Department of Environment and Heritage (South Australia), Mt Gambier.

Higgins PJ 1999, *Handbook of Australian, New Zealand and Antarctic Birds, Volume 4: Parrots to Dollarbird*, Oxford University Press, Melbourne.

Holdsworth M, Newman M, Menkhorst P, Morley C, Cooper R, Green B, Starks J, Baker GB, Garnett ST 2021, 'Blue-winged Parrot Neophema chrysostoma', in Garnett ST & Baker GB (eds), *The Action Plan for Australian Birds 2020*, pp.447 450, CSIRO Publishing, Melbourne.

Holz, P., Hufschmid, J., Boardman, W.S.J., Cassey, P., Firestone, S., Lumsden, L.F., Prowse, T.A.A., Reardon, T., Stevenson, M., 2019. Does the fungus causing white-nose syndrome pose a significant risk to Australian bats? Wildlife Research 46, 657–668. https://doi.org/10.1071/WR18194

Jones, I., 2004, *Dose-response relationships of harlequin duck behaviour to noise from low-level military jet over-flights in central Labrador,* Environmental Conservation, 31, 289–298, https://doi.org/10.1017/S0376892904001651

Kuhne, J.G., Austin, J.J., Reardon, T.B., Prowse, T.A.A., 2022. Diverse moth prey identified in the diet of the critically endangered southern bent-wing bat (Miniopterus orianae bassanii) using DNA metabarcoding of scats. Wildlife Research 49, 571–582. https://doi.org/10.1071/WR21052

Lumsden, L.F., Jemison, M.L., 2015. National recovery plan for the southern bent-wing bat Miniopterus schreibersii bassani. Arthur Rylah Institute for Environmental Research, Department of Environment, Land, Water and Planning, Heidelberg Victoria.

Magnusdottir R, Wilson BA & Hersteinsson P 2008, 'Dispersal and the influence of rainfall on a population of the carnivorous marsupial swamp antechinus (Antechinus minimus maritimus)', *Wildlife Research* **35**: 446-454.

Manci, K. M., Gladwin, D. N., Villella, R., & Cavendish, M. G., 1988, *Effects of aircraft noise and sonic booms on domestic animals and wildlife: a literature synthesis*, U.S. Fish and Wildlife Service, National Ecology Research Center, 88(29), 88–98.

Marshall Day Acoustics, 2014, *Noise Effects on Animals - a literature review*, Marshall Day Acoustics Pty Ltd, Ultimo.

Marshall Day Acoustics, 2024, *Portland Energy Park Noise Assessment* - Report No. Rp 001 20230391, Marshall Day Acoustics Pty Ltd, Ultimo, consultant report prepared for Pacific Green Energy Park Portland Pty Ltd.

Menkhorst P & Knight F 2011, *A Field Guide to the Mammals of Australia*, 3rd edition, Oxford University Press, Melbourne.

Nature Advisory 2024a, Portland Battery Energy Storage System (BESS) - Targeted Flora Survey - Report No. 23146.02 (1.1), Nature Advisory Pty Ltd, Hawthorn East, consultant report prepared for Pacific Green Technologies Australia Pty Ltd.

Nature Advisory 2024b, Portland Battery Energy Storage System (BESS) - Flora and Fauna Assessment - Report No. 23146.03 (2.0), Nature Advisory Pty Ltd, Hawthorn East, consultant report prepared for Pacific Green Technologies Australia Pty Ltd.

Nature Advisory 2024c, Portland Energy Park - Detailed Assessment for the Blue-winged Parrot - Report No. 23146 (7.2), Nature Advisory Pty Ltd, Hawthorn East, consultant report prepared for Pacific Green Portland Energy Park Pty Ltd.

Owens, ACS, Cochard, P, Durrant, J, Farnworth, B, Perkin, EK & Seymoure, B 2020, Light pollution is a driver of insect declines, Biological Conservation, vol. 241, 108259, DOI: 10.1016/j.biocon.2019.108259.

Paull DJ 2008, 'Southern brown bandicoot Isoodon obesulus', in Van Dyck S & Strahan R (eds), *The Mammals of Australia, Third edition,* pp. 180-182. Reed New Holland, Sydney.

Reason, P.F. and Wray, S. 2023. UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats. Version 1.1. Chartered Institute of Ecology and Environmental Management, Ampfield.

Rowse, EG, Lewanzik, D, Stone, EL, Harris, S & Jones, G 2016, Dark matters: the effects of artificial lighting on bats, in CC Voigt & T Kingston (eds) Bats in the anthropocene: conservation of bats in a changing world, Springer International Publishing, Cham.

Southern Bent-wing Bat National Recovery Team, 2022. Southern Bent-wing Bat National Recovery Team Annual Progress Report 2022

Stone, EL, Harris, S & Jones, G 2015, Impacts of artificial lighting on bats: a review of challenges and solutions, Mammalian Biology, vol. 80, pp. 213–219, DOI: 10.1016/j.mambio.2015.02.004.

Stratman, BR. 2005. Comparison of pine plantations and native remnant vegetation as habitat for insectivorous bats in south-eastern South Australia: School of Ecology and Environment, Deakin University.

Threatened Species Scientific Committee (TSSC) 2016a, *Conservation Advice - Isoodon obesulus obesulus, Southern Brown Bandicoot Eastern*, Department of Climate Change, Energy, the Environment and Water, Canberra.

Threatened Species Scientific Committee (TSSC) 2016b, *Conservation Advice - Antechinus minimus maritimus, swamp antechinus (coastal Victoria and far south-eastern South Australia),* Department of Climate Change, Energy, the Environment and Water, Canberra.

Threatened Species Scientific Committee (TSSC) 2021, *Approved Conservation Advice for Miniopterus orianae bassanii Southern Bent-wing Bat*, Department of Climate Change, Energy, the Environment and Water, Canberra.

Sale MG & Arnould JPY 2009, 'Spatial and temporal organization in the Swamp Antechinus: comparison between island and mainland populations', *Journal of Mammalogy,* **90**: 347–355.

van Harten E., Lawrence R., Lumsden L.F., Reardon T., Bennett A.F., & Prowse T.A.A. 2022. Seasonal population dynamics and movement patterns of a critically endangered, cave-dwelling bat, Miniopterus orianae bassanii. Wildlife Research, 49(7), 646–658.

Vestjens, W., Hall, L., 1977. Stomach contents of forty-two species of bats from the Australasian region. Wildlife Research 4, 25–35

Webb, P.I., Speakman, J.R., Racey, P.A., 1995. Evaporative water loss in two sympatric species of vespertilionid bat, Plecotus auritus and Myotis daubentoni: relation to foraging mode and implications for roost site selection. Journal of Zoology 235, 269–278. https://doi.org/10.1111/j.1469-7998.1995.tb05143.x

Wilson BA, Zhuang-Griffin L & Garkaklis MJ 2017, 'Decline of the dasyurid marsupial Antechinus minimus maritimus in south-east Australia: implications for recovery and management under a drying climate', *Australian Journal of Zoology,* **65**: 203-216.

Appendices

Appendix A	Design pack
Appendix B	Portland Battery Energy Storage System (BESS) - Flora and Fauna Assessment
Appendix C	Portland Battery Energy Storage System (BESS) - Targeted Flora Survey
Appendix D	Portland Battery Energy Storage System (BESS) - Detailed Assessment for Blue-winged Parrot
Appendix E	Land Management & Rehabilitation Plan
Appendix F	Environmental Management Plan
Appendix G	Flood Impact and Water Quality Assessment
Appendix H	Socioeconomic Impact Assessment
Appendix I	Consultation Summary Report
Appendix J	EPBC Act listed flora likelihood of occurrence
Appendix K	EPBC Act listed fauna likelihood of occurrence

Appendix A Design pack

Appendix B Portland Battery Energy Storage System (BESS) - Flora and Fauna Assessment

Appendix C Portland Battery Energy Storage System (BESS) - Targeted Flora Survey

Appendix D Portland Battery Energy Storage System (BESS) - Detailed Assessment for Blue-winged Parrot

Appendix E Land Management & Rehabilitation Plan

Appendix F Environmental Management Plan

Appendix G Flood Impact and Water Quality Assessment

Appendix H Socioeconomic Impact Assessment

Appendix I Consultation Summary Report

Appendix J EPBC Act listed flora likelihood of occurrence

Appendix K EPBC Act listed fauna likelihood of occurrence

cogency

Planning | Engagement | Strategy

Cogency provides planning, environmental assessment and stakeholder engagement services for the renewable energy, property, clean tech and circular economy sectors.

Our collaborative teams bring a uniquely nuanced understanding of planning processes and the technical aspects of renewable energy property, infrastructure and circular economy projects, which helps to build a strong rapport and trust with local community members and stakeholders.

Unlike many in-house engagement and planning teams that are managed separately, our planners work in collaboration with our engagement practitioners to ensure that stakeholder and community consultation is at the heart of the planning process and a critical tool for delivering positive outcomes for our clients.

www.cogencyaustralia.com.au

PROJECT BOUNDARIES AND AREAS

0 100 200 300 400 M

1:10,000 @ A4

PROJECTION: GDA2020/MGA ZONE 54

LEGEND:

- PROPERTY BOUNDARIES
- PARCEL BOUNDARIES WITHIN PROPERTIES
- PROJECT SITE AREA (SUBJECT PROPERTIES WITH ADJACENT ROAD RESERVE)
- DISTURBANCE FOOTPRINT (MAXIMUM EXTENT OF DEVELOPMENT AND ASSOCIATED DISTURBANCES)
- ADDITIONAL LANDSCAPING AREA (MAY BE USED IN ADDITION TO THE DISTURBANCE FOOTPRINT FOR PLANTING, AS PART OF PROJECT DELIVERY)
- # SETBACK DISTANCE IN METRES

PROJECT SITE - EXISTING INFRASTRUCTURE & EASEMENTS

0 100 200 300 400 M
1:10,000 @ A4
PROJECTION: GDA2020/MGA ZONE 54

LEGEND:

- PROPERTY BOUNDARIES
- PROJECT SITE AREA (SUBJECT PROPERTIES WITH ADJACENT ROAD RESERVE)
- DISTURBANCE FOOTPRINT (MAXIMUM EXTENT OF DEVELOPMENT AND ASSOCIATED DISTURBANCES)
- EASEMENTS WITHIN SURVEYED AREA

TRANSMISSION INFRASTRUCTRE

- 500KV HIGH VOLTAGE TRANSMISSION LINE
- TRANSMISSION TOWER FOR 500KV LINES
- 66KV POWER LINE
- 22KV POWER LINE
- 12.7KV POWER LINE

OTHER INFRASTRUCTRE

- SEWER MAINS
- APA GAS PIPELINE
- WATER PIPELINE

PROJECT SITE - VEGETATION RETENTION AND REMOVAL

0 100 200 300 400 M
1:10,000 @ A4
PROJECTION: GDA2020/MGA ZONE 54

LEGEND:

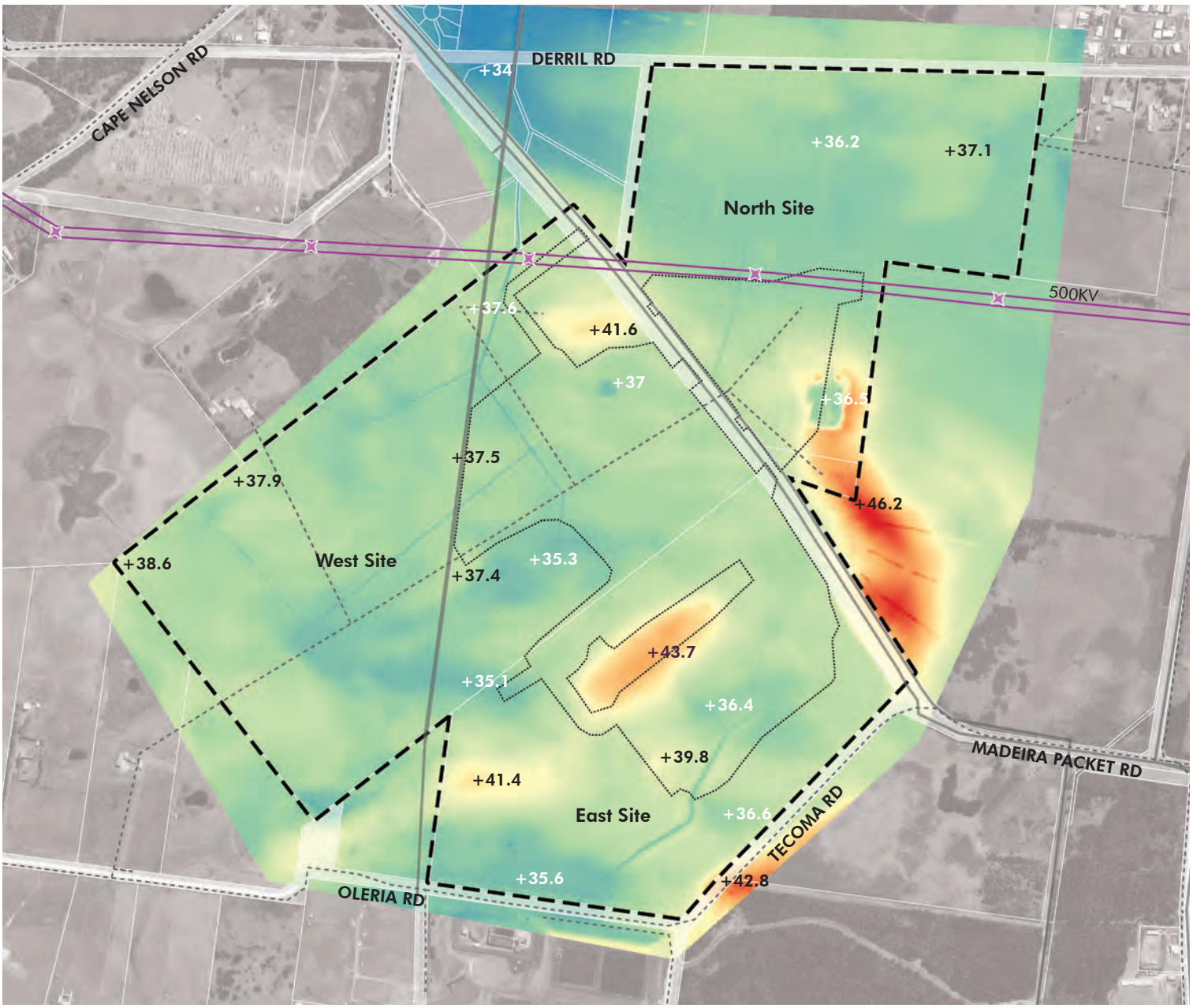
- PROJECT SITE AREA (SUBJECT PROPERTIES WITH ADJACENT ROAD RESERVE)
- DISTURBANCE FOOTPRINT (MAXIMUM EXTENT OF DEVELOPMENT AND ASSOCIATED DISTURBANCES)
- EASEMENTS WITHIN SURVEYED AREA

INFRASTRUCTURE

- 500KV HIGH VOLTAGE TRANSMISSION LINE
- TRANSMISSION TOWER FOR 500KV LINES
- OTHER POWER LINES
- UNDERGROUND SERVICES

VEGETATION

- SMALL SCATTERED TREE
- AQUATIC HERBLAND (EVC 653)
- HEATHY WOODLAND (EVC 48)
- NATIVE VEGETATION TO BE REMOVED



PROJECT SITE - EXISTING TOPOGRAPHY

0 100 200 300 400 M

1:10,000 @ A4

PROJECTION: GDA2020/MGA ZONE 54

LEGEND:

PROJECT SITE AREA
(SUBJECT PROPERTIES WITH ADJACENT ROAD RESERVE)

DISTURBANCE FOOTPRINT
(MAXIMUM EXTENT OF DEVELOPMENT AND ASSOCIATED DISTURBANCES)

EASEMENTS
WITHIN SURVEYED AREA

INFRASTRUCTURE

500KV HIGH VOLTAGE TRANSMISSION LINE

TRANSMISSION TOWER
FOR 500KV LINES

OTHER POWER LINES

UNDERGROUND SERVICES

TOPOGRAPHY

+46.3M
+33.5M

TOPOGRAPHICAL ELEVATION ABOVE SEA LEVEL
(FOR AREA SURVEYED)

PROJECT SITE - CULTURAL HERITAGE

0 100 200 300 400 M
1:10,000 @ A4
PROJECTION: GDA2020/MGA ZONE 54

LEGEND:

PROJECT SITE AREA
(SUBJECT PROPERTIES WITH ADJACENT ROAD RESERVE)

DISTURBANCE FOOTPRINT
(MAXIMUM EXTENT OF DEVELOPMENT AND ASSOCIATED DISTURBANCES)

EASEMENTS
WITHIN SURVEYED AREA

INFRASTRUCTURE

500KV HIGH VOLTAGE TRANSMISSION LINE

TRANSMISSION TOWER
FOR 500KV LINES

OTHER POWER LINES

UNDERGROUND SERVICES

CULTURAL HERITAGE

AREAS OF CULTURAL HERITAGE SENSITIVITY

PROJECT SITE - WATER AND DRAINAGE

0 100 200 300 400 M
1:10,000 @ A4
PROJECTION: GDA2020/MGA ZONE 54

LEGEND:

PROJECT SITE AREA
(SUBJECT PROPERTIES WITH ADJACENT ROAD RESERVE)

DISTURBANCE FOOTPRINT
(MAXIMUM EXTENT OF DEVELOPMENT AND ASSOCIATED DISTURBANCES)

EASEMENTS
WITHIN SURVEYED AREA

INFRASTRUCTURE

500KV HIGH VOLTAGE TRANSMISSION LINE

TRANSMISSION TOWER
FOR 500KV LINES

OTHER POWER LINES

UNDERGROUND SERVICES

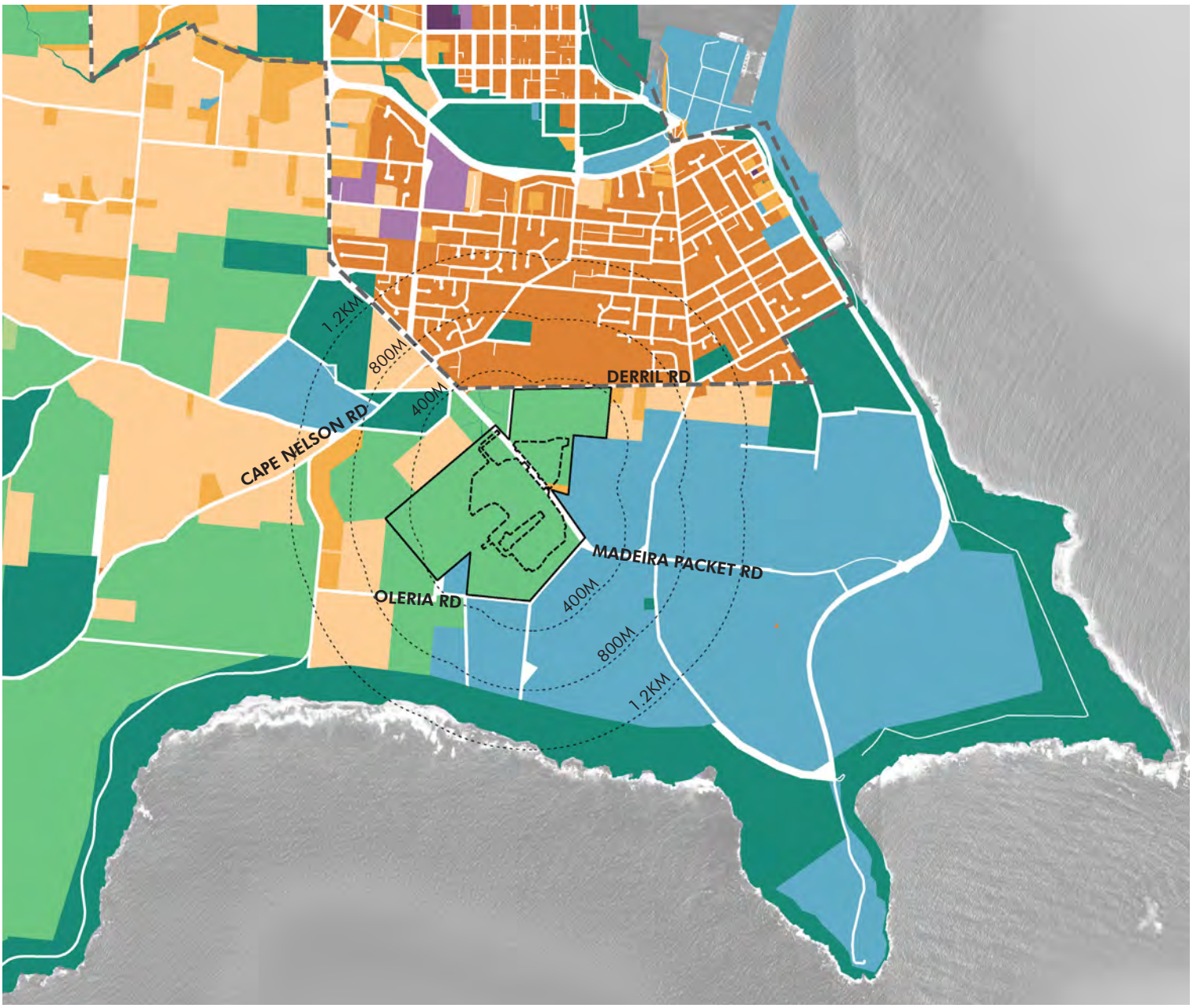
WATER AND DRAINAGE

1M CONTOURS
WITHIN SURVEYED AREA

EPHEMERAL WATER AREAS

DRAINAGE LINES

FARM DAM

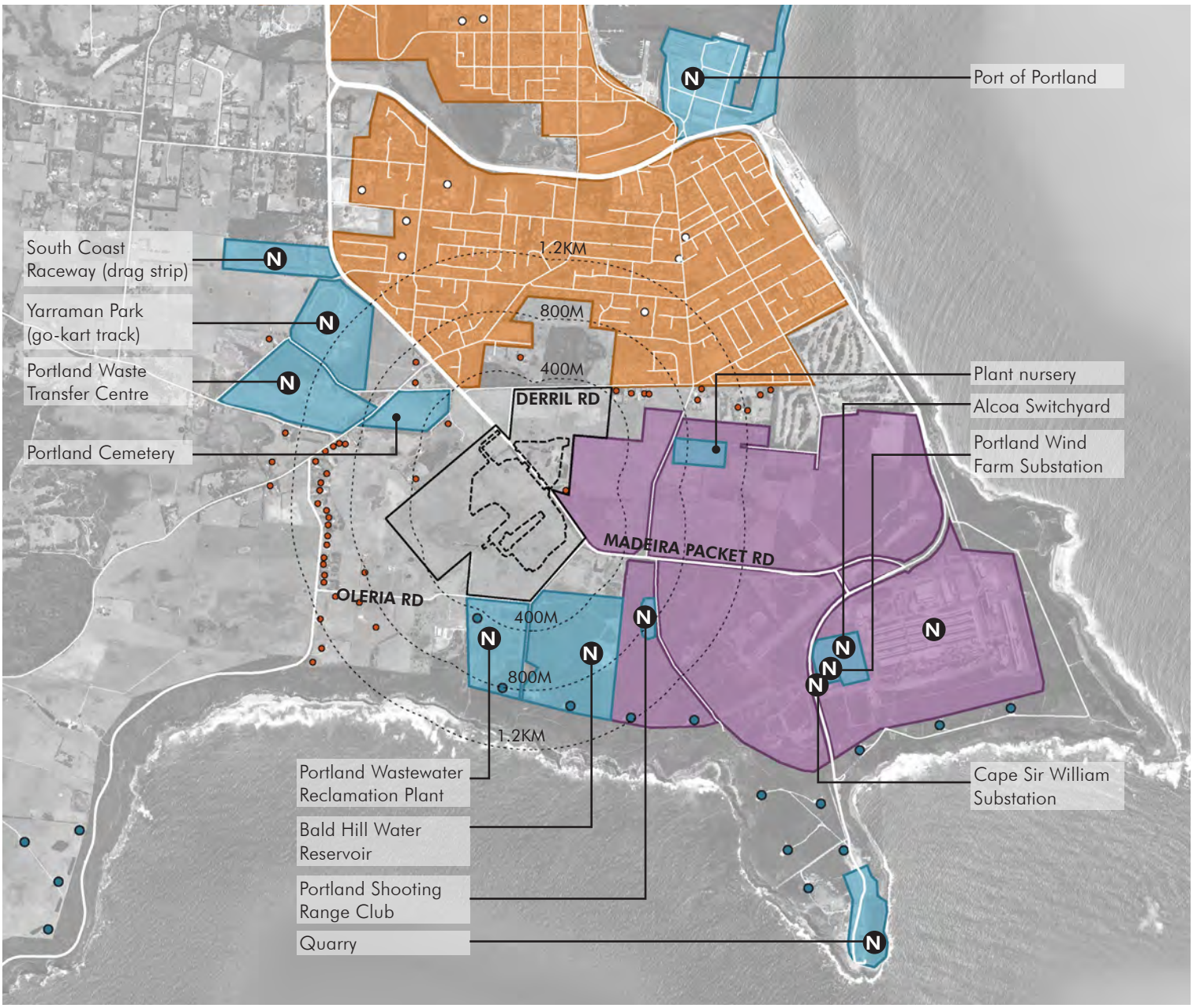


PROJECT CONTEXT - LAND USES

0 500 1000 1500 M
1:40,000 @ A4
PROJECTION: GDA2020/VICGRID

LEGEND:

- PROJECT SITE AREA
  (SUBJECT PROPERTIES WITH ADJACENT ROAD RESERVE)
- DISTURBANCE FOOTPRINT
  (MAXIMUM EXTENT OF DEVELOPMENT AND ASSOCIATED DISTURBANCES)
- DISTANCE FROM DISTURBANCE FOOTPRINT
  (400M INCREMENTS)
- PORTLAND FRAMEWORK BOUNDARY
- URBAN RESIDENTIAL
- RURAL RESIDENTIAL
  WITHOUT AGRICULTURE
- RURAL RESIDENTIAL
  WITH AGRICULTURE
- FARMING
  INCL. GRAZING PASTURES & CROPPING
- RESERVES, RECREATION & CULTURE
  INCL. CONSERVED AREAS & PROTECTED LANDSCAPES
- UTILITIES & INDUSTRIAL
  INCL. QUARRIES, SEWERAGE, RAILWAYS & PORT
- PUBLIC SERVICES
- COMMERCIAL SERVICES

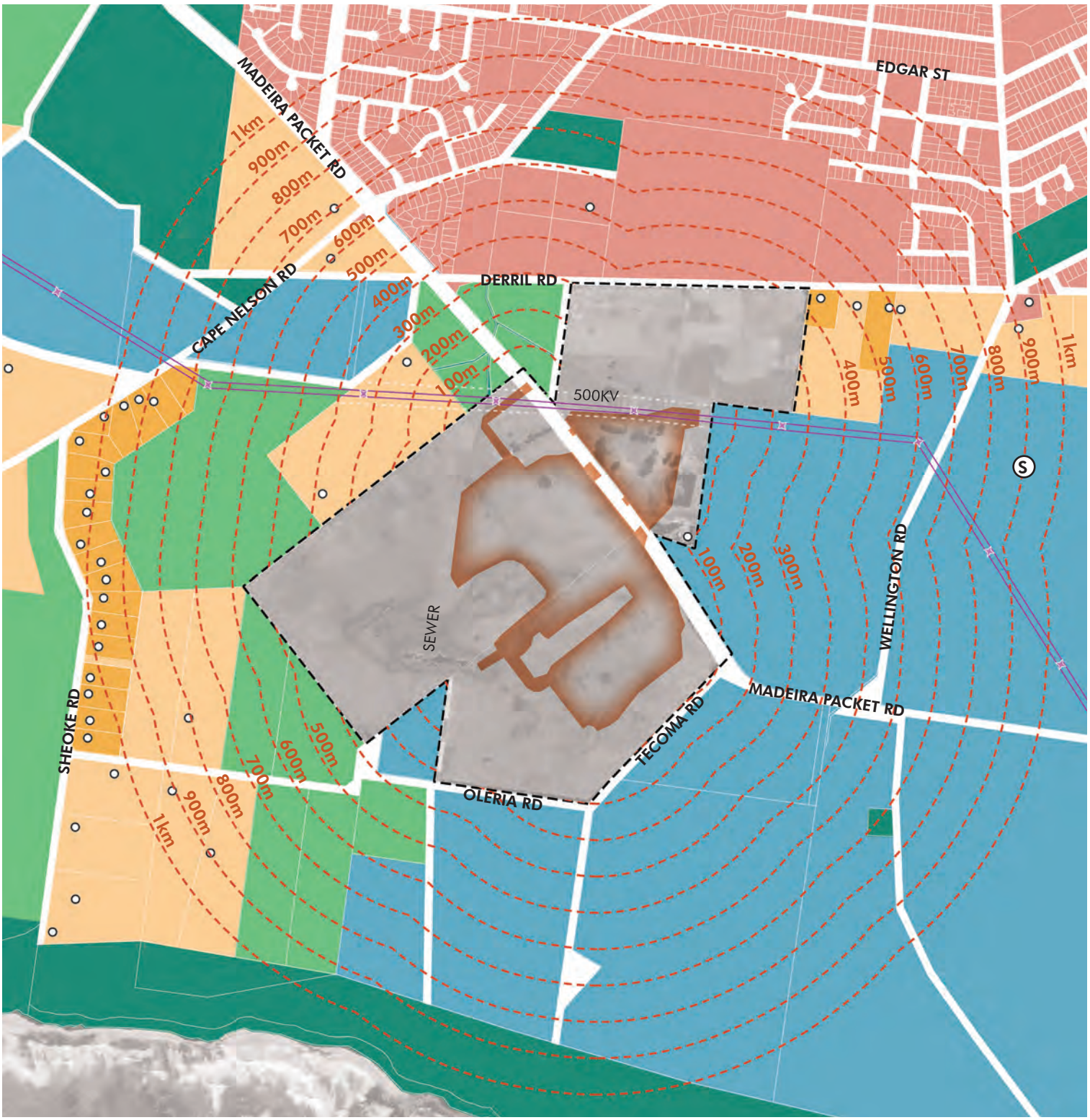


PROJECT CONTEXT - DEFINED PLACES

0 500 1000 1500 M
1:40,000 @ A4
PROJECTION: GDA2020/VICGRID

LEGEND:

- PROJECT SITE AREA (SUBJECT PROPERTIES WITH ADJACENT ROAD RESERVE)
- DISTURBANCE FOOTPRINT (MAXIMUM EXTENT OF DEVELOPMENT AND ASSOCIATED DISTURBANCES)
- DISTANCE FROM DISTURBANCE FOOTPRINT (400M INCREMENTS)
- NOISE EMITTING USE
- WIND TURBINES
- RESIDENTIAL DWELLINGS (IN PROXIMITY TO THE SUBJECT SITE AND EXCLUDING RESIDENTIAL ZONES)
- EDUCATION FACILITY
- PORTLAND URBAN AREA (GENERAL RESIDENTIAL ZONE)
- PORTLAND ALUMINIUM LAND
- OTHER DEFINED PLACES (REFER TO LABELS)



PROJECT CONTEXT - SENSITIVE USE SETBACKS

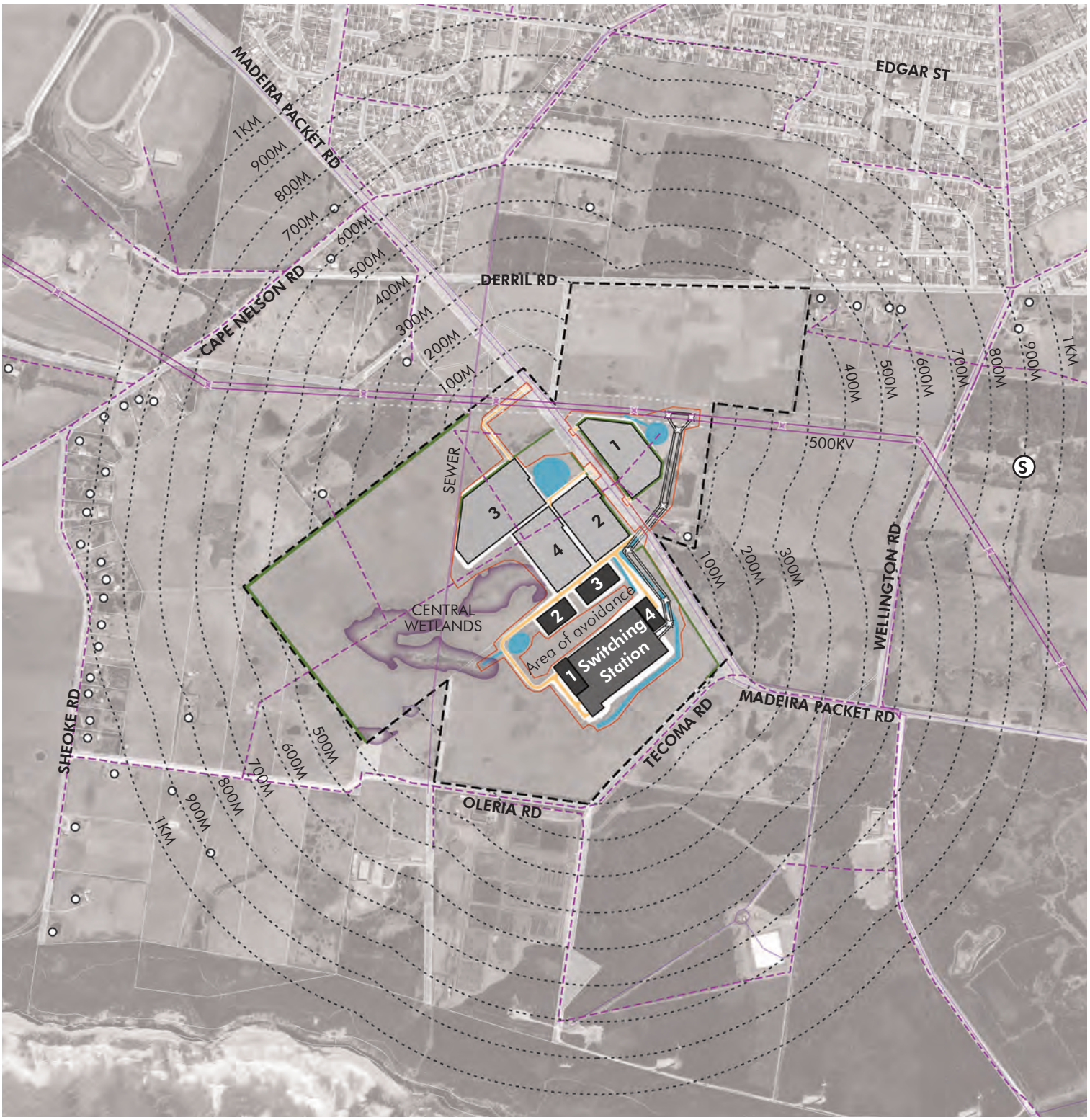
0 200 400 600 M

1:15,000 @ A4

PROJECTION: GDA2020/MGA ZONE 54

LEGEND:

- PROJECT SITE AREA (SUBJECT PROPERTIES WITH ADJACENT ROAD RESERVE)
- DISTURBANCE FOOTPRINT (MAXIMUM EXTENT OF DEVELOPMENT AND ASSOCIATED DISTURBANCES)
- DISTANCE FROM DISTURBANCE FOOTPRINT (100M INCREMENTS)
- 500KV HIGH VOLTAGE TRANSMISSION LINES
- TRANSMISSION TOWERS FOR 500KV LINES
- RESIDENTIAL DWELLINGS (IN PROXIMITY TO THE SUBJECT SITE AND EXCLUDING RESIDENTIAL ZONES)
- (S) SEAWINDS NURSERY
- URBAN RESIDENTIAL
- RURAL RESIDENTIAL WITHOUT AGRICULTURE
- RURAL RESIDENTIAL WITH AGRICULTURE
- FARMING INCL. GRAZING PASTURES & CROPPING
- RESERVES, RECREATION & CULTURE INCL. CONSERVED AREAS & PROTECTED LANDSCAPES
- UTILITIES & INDUSTRIAL INCL. QUARRIES, SEWERAGE & RAILWAYS
- PUBLIC SERVICES
- COMMERCIAL SERVICES



PROPOSED - FUNCTIONAL LAYOUT WITH SENSITIVE USES

0 200 400 600 M

1:15,000 @ A4

PROJECTION: GDA2020/MGA ZONE 54

LEGEND:

- PROJECT SITE AREA (SUBJECT PROPERTIES WITH ADJACENT ROAD RESERVE)
- DISTURBANCE FOOTPRINT (MAXIMUM EXTENT OF DEVELOPMENT AND ASSOCIATED DISTURBANCES)
- DISTANCE FROM DISTURBANCE FOOTPRINT (100M INCREMENTS)
- EASEMENTS WITHIN SURVEYED AREA

EXISTING ELEMENTS

- RESIDENTIAL DWELLINGS (IN PROXIMITY TO THE SUBJECT SITE AND EXCLUDING RESIDENTIAL ZONES)
- SEAWINDS NURSERY
- RETAINED EPHEMERAL WATER AREAS
- TRANSMISSION LINES 500KV
- TRANSMISSION TOWERS FOR 500KV LINES
- OTHER POWER LINES
- UNDERGROUND SERVICES

PROPOSED DEVELOPMENT

- BATTERY PARK
- SWITCHING STATION
- COLLECTOR STATION (NUMBER CORRESPONDS TO EACH BATTERY PARK)
- TRANSMISSION LINE (CONNECTING TO EXISTING LINES)
- TRANSMISSION TOWER
- ACCESS PATH
- DRAINAGE PONDS AND LINES
- LANDSCAPED AREA (FOR VISUAL IMPACT AMELIORATION)

PROPOSED - FUNCTIONAL LAYOUT

0 100 200 300 400 M

1:7,500 @ A4

PROJECTION: GDA2020/MGA ZONE 54

LEGEND:

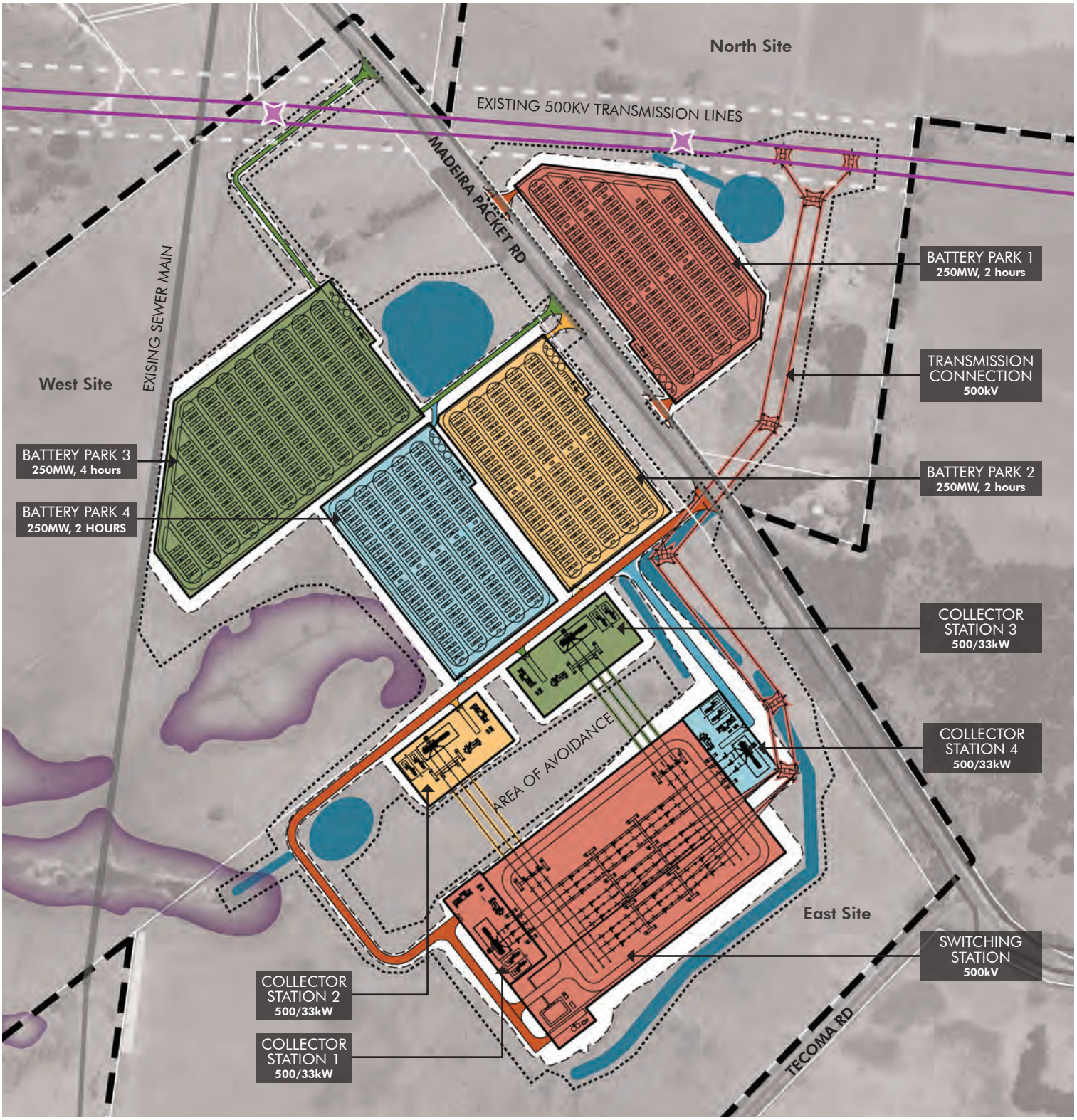
- PROJECT SITE AREA (SUBJECT PROPERTIES WITH ADJACENT ROAD RESERVE)
- DISTURBANCE FOOTPRINT (MAXIMUM EXTENT OF DEVELOPMENT AND ASSOCIATED DISTURBANCES)
- EASEMENTS WITHIN SURVEYED AREA

EXISTING ELEMENTS

- TRANSMISSION LINES 500KV
- TRANSMISSION TOWERS FOR 500KV LINES
- OTHER POWER LINES
- UNDERGROUND SERVICES
- EPHEMERAL WATER AREAS

PROPOSED DEVELOPMENT

- BATTERY PARK
- SWITCHING STATION
- COLLECTOR STATION (NUMBER CORRESPONDS TO EACH BATTERY PARK)
- TRANSMISSION LINE (CONNECTING TO EXISTING LINES)
- TRANSMISSION TOWER
- ACCESS PATH
- EXTENT OF BENCHING
- DRAINAGE PONDS AND LINES
- LANDSCAPED AREA (FOR VISUAL IMPACT AMELIORATION)



PROPOSED - DETAIL & STAGING LAYOUT

0 50 100 150 200 M

1:5,000 @ A4

PROJECTION: GDA2020/MGA ZONE 54

LEGEND:

PROJECT SITE AREA
(SUBJECT PROPERTIES WITH ADJACENT ROAD RESERVE)

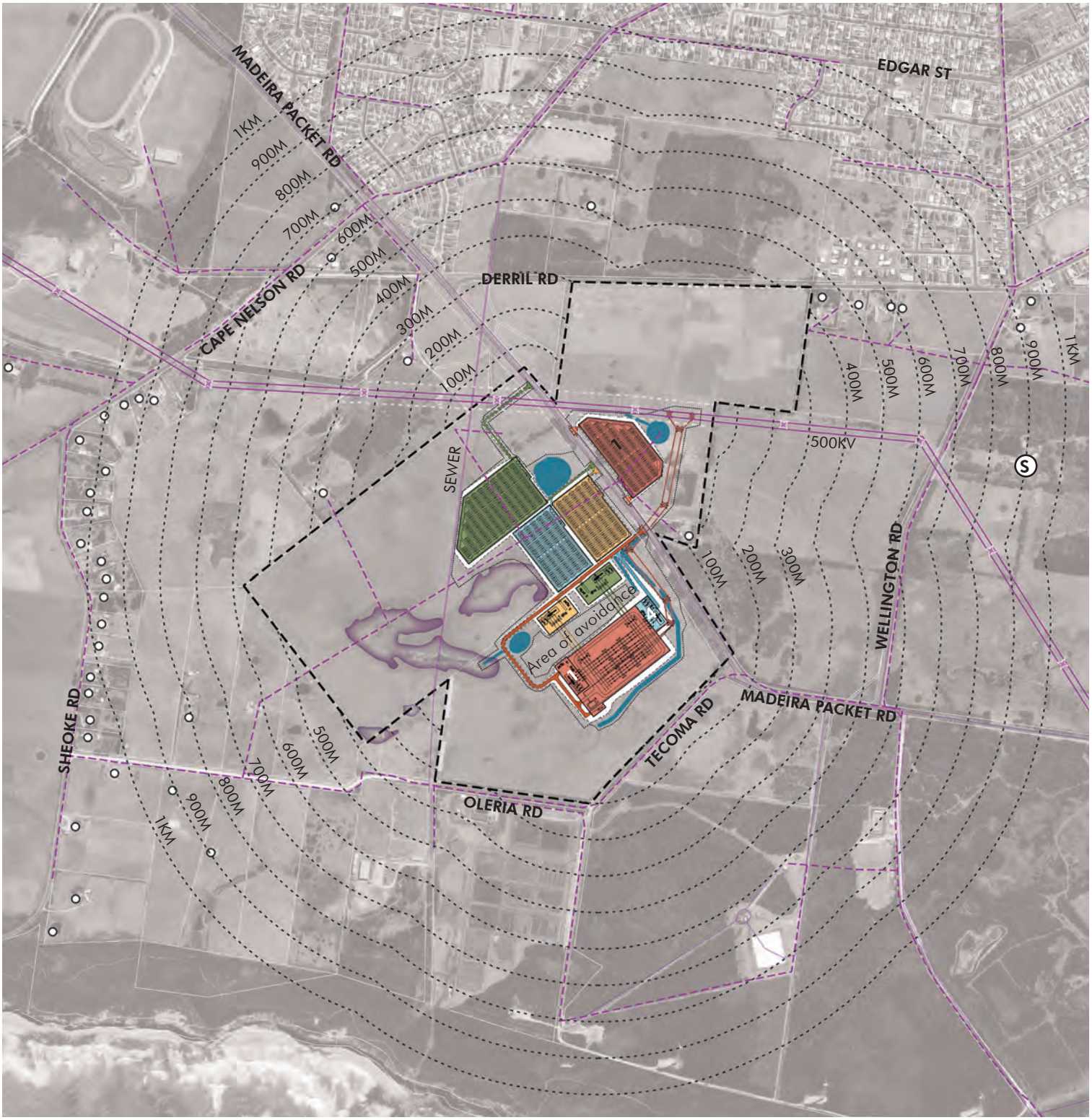
DISTURBANCE FOOTPRINT
(MAXIMUM EXTENT OF DEVELOPMENT AND ASSOCIATED DISTURBANCES)

EXISTING ELEMENTS

- TRANSMISSION LINES 500KV
- TRANSMISSION TOWERS FOR 500KV LINES
- UNDERGROUND SERVICES
- EPHEMERAL WATER AREAS

PROPOSED DEVELOPMENT

- STAGE 1 FACILITIES
- STAGE 1 ROADS
- STAGE 2 FACILITIES
- STAGE 2 ROADS
- STAGE 3 FACILITIES
- STAGE 3 ROADS
- STAGE 4 FACILITIES
- STAGE 4 ROADS
- TRANSMISSION LINE (CONNECTING TO EXISTING LINES)
- TRANSMISSION TOWER
- EXTENT OF BENCHING
- DRAINAGE PONDS AND LINES



PROPOSED - DETAIL & STAGING LAYOUT WITH CONTEXT

0 200 400 600 M

1:15,000 @ A4

PROJECTION: GDA2020/MGA ZONE 54

LEGEND:

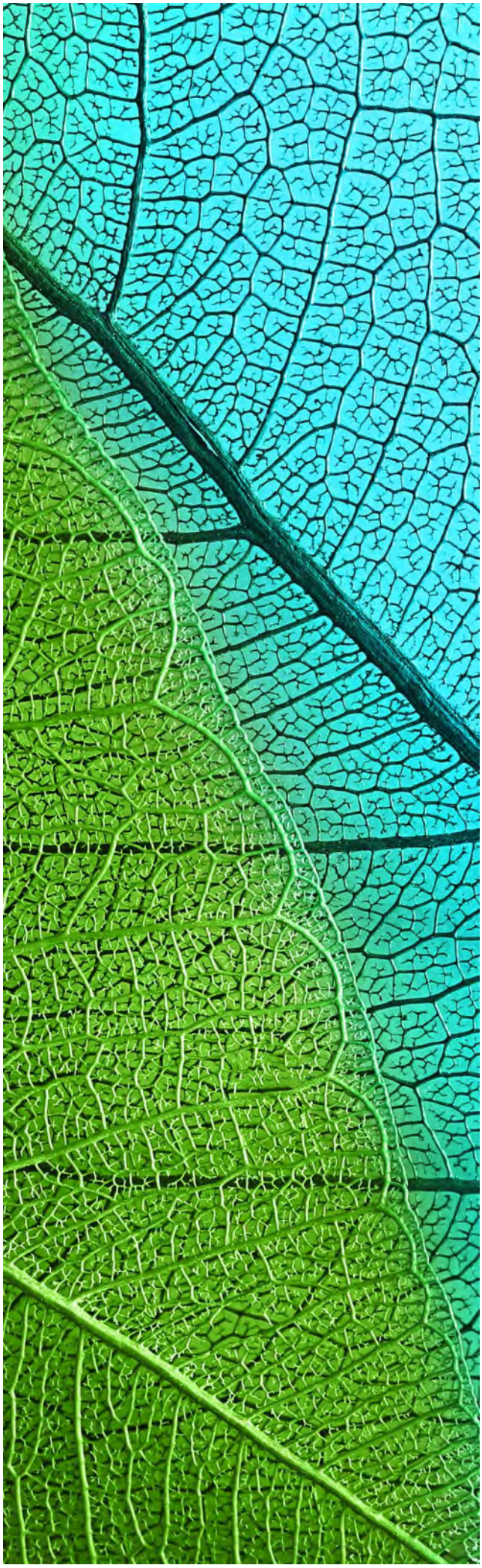
- PROJECT SITE AREA (SUBJECT PROPERTIES WITH ADJACENT ROAD RESERVE)
- DISTURBANCE FOOTPRINT (MAXIMUM EXTENT OF DEVELOPMENT AND ASSOCIATED DISTURBANCES)

EXISTING ELEMENTS

- RESIDENTIAL DWELLINGS (IN PROXIMITY TO THE SUBJECT SITE AND EXCLUDING RESIDENTIAL ZONES)
- SEAWINDS NURSERY
- TRANSMISSION LINES 500KV
- TRANSMISSION TOWERS FOR 500KV LINES
- OTHER POWER LINES
- UNDERGROUND SERVICES
- EPHEMERAL WATER AREAS

PROPOSED DEVELOPMENT

- STAGE 1 FACILITIES
- STAGE 1 ROADS
- STAGE 2 FACILITIES
- STAGE 2 ROADS
- STAGE 3 FACILITIES
- STAGE 3 ROADS
- STAGE 4 FACILITIES
- STAGE 4 ROADS
- TRANSMISSION LINE (CONNECTING TO EXISTING LINES)
- TRANSMISSION TOWER
- EXTENT OF BENCHING
- DRAINAGE PONDS AND LINES



Portland Battery Energy Storage System (BESS)

Flora and Fauna Assessment

Prepared for Pacific Green Technologies Australia Pty Ltd

July 2024
Report No. 23146.03 (2.0)

Nature Advisory
(Formerly Brett Lane & Associates Pty Ltd)
5/61-63 Camberwell Road
Hawthorn East, VIC 3123
PO Box 337, Camberwell VIC 3124
(03) 9815 2111
www.natureadvisory.com.au

Contents

1. Executive summary 5
2. Introduction 11
3. Planning and legislative considerations 12
3.1. Local planning provisions 12
3.1.1. Planning Policy Framework 12
3.1.2. Zoning 14
3.1.3. Overlays 14
3.1.4. Particular provisions – Native Vegetation (Clause 52.17) 14
3.2. EPBC Act 15
3.3. FFG Act 15
3.4. EE Act 16
3.5. CaLP Act 17
4. Existing information and methods 18
4.1. Existing information 18
4.1.1. Existing reporting and documentation 18
4.2. Desktop methods 18
4.2.1. Native vegetation 18
4.2.2. Threatened species and communities 18
4.3. Field methods 19
4.3.1. Native vegetation 19
4.3.2. EVC determination 20
4.3.3. Flora species and habitats 20
4.3.4. Fauna species and habitats 20
4.3.5. Threatened ecological communities 21
4.3.6. Limitations 21
5. Assessment results 22
5.1. Site description 22
5.2. Native vegetation 23
5.2.1. Patches of native vegetation 23
5.2.2. Scattered trees 29
5.3. Flora species 31
5.3.1. Species recorded 31
5.3.2. Listed species 31

5.4. Fauna habitats 32
5.5. Fauna species 34
5.5.1. Species recorded 34
5.5.2. Listed species 34
5.6. Listed ecological communities 35
6. Impact assessment 37
6.1. Proposed development 37
6.1.1. Impacts to native vegetation 37
6.1.2. Impacts to listed flora 37
6.1.3. Impacts to listed fauna 38
6.1.4. Impacts to listed communities 43
7. Implications under legislation and policy 44
7.1. Implications under Clause 52.17 44
7.1.1. Exemptions to Clause 52.17 44
7.1.2. Impacts to native vegetation 46
7.1.3. Avoid and minimise statement 46
7.1.4. Modelled species important habitat 46
7.1.5. Assessment pathway 46
7.1.6. Offset requirements 47
7.1.7. Offset statement 47
7.2. Implications under other planning provisions 49
7.2.1. Clause 12.01 49
7.2.2. Clause 12.03 49
7.2.3. Zoning 49
7.3. Implications under the EPBC Act 49
7.4. Implications under the FFG Act 49
7.5. Implications under the EE Act 50
7.6. CaLP Act 50
8. Design and construction mitigation recommendations 51
9. References 52

Tables

Table 1: Description of habitat zones in the study area 24
Table 2: Summary of habitat hectare assessment results 27
Table 3: Detailed scattered tree results 29

Table 4: EPBC Act-listed ecological communities and likelihood of occurrence in the study area 35
Table 5: Additional EPBC Act-listed ecological communities and likelihood of occurrence in the study area 36
Table 6: FFG Act-listed ecological communities and likelihood of occurrence in the study area 36
Table 7: Susceptibility of listed fauna species 39
Table 8: Assessment pathway matrix 47

Figures

Figure 1: Study area and native vegetation 30
Figure 2: Impacts of the proposed development 48

Appendices

Appendix 1: Detailed habitat hectare assessment results 55
Appendix 2: Flora species recorded in the study area 58
Appendix 3: Likelihood of occurrence of listed flora 63
Appendix 4: Fauna species recorded in the study area 71
Appendix 5: Likelihood of occurrence of listed fauna 73
Appendix 6: Photographs of native vegetation proposed for removal 85
Appendix 7: Native Vegetation Removal (NVR) report 101
Appendix 8: Evidence that native vegetation offset requirement is available 102

1. Executive summary

Nature Advisory Pty Ltd undertook flora and fauna assessments of 122-hectares of privately held land located at Portland. The specific area investigated, referred to herein as the 'study area' (Figure 1), comprised the properties at:

- Allotment 61A Section 13 Parish of Portland;
- Lot 1 TP592015 Madeira Packet Road;
- 305 Madeira Packet Road; and
- 333 Madeira Packet Road

The study area also includes the adjacent roadsides of Madeira Packet Road, Tecoma Road, Oleria Road and Derril Road that abutted the study area.

This assessment is required to identify ecological impacts associated with the proposed development of a utility scale Battery Energy Storage System (BESS).

Summary of findings

The vegetation throughout the study area was highly modified from its original condition due to historical land clearing and cattle grazing. All native vegetation present in the study area was of poor to moderate quality. Large portions of the study area supported introduced pasture. The pasture in Lot 1 TP592015 Madeira Packet Road also contained a low level of native regeneration in the form of scattered Austral Bracken and native Rush. These pastoral lands further contained a number of highly degraded wetlands and constructed drainage lines, some containing native vegetation in the form of aquatic herbs. The roadside native vegetation was defined primarily by a shrub layer of Coast Wattle (native species occurring beyond its natural distribution) over a densely weedy understorey, mainly Kikuyu and Cocksfoot.

A total of 13.17 hectares of native vegetation comprising 41 patches and two small scattered trees were mapped in the study area. Habitat Zones recorded within the study area comprised wetlands which resembled degraded Aquatic Herbland (EVC 653) and woody vegetation recorded as Heathy Woodland (EVC 48).

Fauna habitat within the study area comprised wooded vegetation, grassland and aquatic areas. The highest quality fauna habitat occurred as woody vegetation along adjacent roadsides, which supported the threatened Rufous Bristlebird (Coorong subspecies) and is also likely to support Southern Brown Bandicoot and Swamp Antechinus. Furthermore, an area of introduced pasture grasses and weeds with scattered native Rush in Lot 1 TP592015 Madeira Packet Road supported foraging habitat for the threatened Blue-winged Parrot during summer and winter. Areas of aquatic habitat comprised semi-permanent to permanent wetlands that provided habitat for some common native waterbirds and frogs owing to the degraded nature of this habitat.

Impact assessment

The proponent proposes to remove 2.163 hectares of native vegetation requiring a permit to remove under Clause 52.17.

The proposed development will impact on habitat for the following listed values presented below:

- Blue-winged Parrot (EPBC: Vulnerable)
- Rufous Bristlebird (Coorong subspecies) (FFG: Endangered)
- Southern Brown Bandicoot (EPBC: Endangered; FFG: Endangered)
- Swamp Antechinus (EPBC: Vulnerable; FFG: Vulnerable)

Approximately 10.827 hectares of known foraging habitat for the Blue-winged Parrot is proposed to be removed for the proposed development, namely within Lot 1 TP592015 Madeira Packet Road.

Approximately 0.072 hectares of suitable habitat for the Rufous Bristlebird, Southern Brown Bandicoot and Swamp Antechinus is proposed to be removed for the construction of crossovers into the site as well as the construction of a transmission line tower (see recommendations for avoidance). Although there is additional habitat for these species proposed to be removed within the powerline easement, it is understood that this will only involve the removal of any vegetation above 4 metres in height. The maintenance of vegetation at this height will not impact on the habitat for the above mentioned species which are reliant on dense understory vegetation. As such, this was considered an impact to this native vegetation but was not considered as impacts to habitat which would be retained.

Targeted flora survey results

A targeted survey of Allotment 61A Section 13 Parish of Portland, Lot 1 TP592015 Madeira Packet Road and the adjacent roadsides for five flora species was conducted by two botanists across two days on 31 October 2023 and 1 November 2023. The survey was conducted during a seasonally appropriate time to detect the species listed in Section 6.1.2 (Nature Advisory 2023).

As targeted surveys were conducted and no individuals of the five listed flora species were observed, listed flora species are considered unlikely to occur within the study area. The unsurveyed areas of the study area were deemed unlikely to support threatened flora species due to the degraded nature of the landscape, dominance of weedy species and lack of suitable habitat.

Implications under legislation and policy

A permit is required under Clause 52.17 for the proposed removal of native vegetation. The proposal must be assessed under the **Detailed** assessment pathway. This **would** trigger a referral to the Department of Energy, Environment and Climate Action (DEECA).

A *Native Vegetation Removal* (NVR) report for this proposal is provided in Appendix 7.

Offsets required to compensate for the proposed removal of native vegetation from the study area are:

- 0.599 general habitat units, with following offset attribute requirements:
    - A minimum strategic biodiversity value (SBV) of 0.453
    - Located within the Glenelg Hopkins CMA boundary or the Glenelg Shire municipal district.
    - Include protection of at least 0 large trees.

Under the Guidelines all offsets must be secured prior to the removal of native vegetation. The offset target for the current proposal will be achieved via a third-party offset. An online search of the Native Vegetation Credit Register (NVCR) has shown that the required offset is currently available for purchase from a native vegetation credit owner. Evidence that the required offset is available is provided in Appendix 8. The required offset would be secured following approval of the application to remove native vegetation.

EPBC Act

Based on the relevant guidelines, the proposed development has the potential to impact on the EPBC Act-listed values presented below:

- Blue-winged Parrot (EPBC: Vulnerable)
- Southern Brown Bandicoot (EPBC: Endangered; FFG: Endangered)
- Swamp Antechinus (EPBC: Vulnerable; FFG: Vulnerable)

Although the total area of impact to BWP foraging is substantial, it is a relatively abundant habitat type in the surrounding landscape (agricultural land) and it is not suitable breeding habitat. Therefore, it is considered unlikely that the proposal will lead to a significant impact to the BWP.

Given the relatively small area of impact to potential Southern Brown Bandicoot and Swamp Antechinus habitat in comparison to the amount of habitat in the surrounding landscape, it is considered unlikely that the proposal will lead to a significant impact to any of the above mentioned species

However, it is still recommended that a referral under the EPBC Act is undertaken for potential impacts to habitat for the above threatened fauna. The minister has 20 days from lodgement of the referral to make a decision on the proposal.

FFG Act Threatened species

Habitat for the following FFG Act values listed as threatened are anticipated to be impacted from the proposed development:

- Rufous Bristlebird (Coorong subspecies) (FFG: Endangered)
- Southern Brown Bandicoot (EPBC: Endangered; FFG: Endangered)
- Swamp Antechinus (EPBC: Vulnerable; FFG: Vulnerable)

Given the relatively small area of habitat removal in comparison to the amount of habitat in the surrounding landscape, it is considered unlikely that the proposal will lead to a significant impact to any of the above-mentioned species.

However, any application for a planning permit may be assessed by the responsible or referral authority for potential impacts to FFG threatened values as part of broader considerations of impacts to biodiversity.

FFG Act Protected flora

The following FFG Act values listed as protected are anticipated to be impacted from the proposed development on public land:

- Coast Wattle
- Coastal Beard-heath

Coast Wattle was the dominant species present in most native vegetation patches on public land (road reserves). Similarly, Coastal Beard-heath was observed in many native vegetation patches on public land (road reserves). An exact count of individuals of these species was not undertaken during the field assessment. Additionally, Coast Wattle has been considered as an environmental weed as it is occurring beyond its natural distribution (within coastal dune systems within ~200 metres of the coastline).

A Protected Flora Permit would be required from DEECA to remove the plant taxa comprising the abovementioned protected flora species. Protected Flora Permits can only be lodged after a planning permit is obtained.

A site survey to count the number of individual plants that will be impacted would be required to support the permit application.

EE Act

Based on the relevant criteria, a Referral to the state Minister for Planning will not be required under the EE Act for the aspects covered by the current investigation.

Implications under Clause 12.01

This application responds to the objectives of Clause 12.01 by siting the development primarily in areas of non-native vegetation and poor-quality native vegetation. Additionally, the majority of the Rufous Bristlebird habitat, and potential Southern Brown Bandicoot and Swamp Antechinus habitat within the study area will be retained and large portions of the wetlands within the study area will be avoided. Furthermore, there is scope to create and enhance habitat and increase connectivity between habitat zones in areas that will not be developed.

Implications under Clause 12.03

This application largely responds to these objectives as the development minimises impacts to existing wetlands and drainage lines within the study area. It is understood that a stormwater management plan will be prepared to sensitively manage runoff on the site and ensure it is adequately filtered before being discharged into the existing wetlands. There is scope to design wetlands proposed to be constructed for ecological benefit as well as enhance existing wetlands that are to be retained on site.

Design recommendations

- Investigate the potential to reposition a transmission line tower which is currently proposed to be constructed within native vegetation identified as suitable habitat for the Rufous Bristlebird, Southern Brown Bandicoot and Swamp Antechinus (Habitat Zone AU).
- Consider opportunities to rehabilitate habitat for threatened flora and fauna – it is recommended that a Land Management Plan is prepared to demonstrate how the project will protect, enhance and create habitat for significant values that are known to or have the potential to occur in the study area. Particular areas that are strongly recommended to be retained as conservation areas include the following:
    - Any areas not within the construction footprint to be rehabilitated into high quality Blue-Winged Parrot habitat to compensate for impacts to the modified habitat that they have been identified using in Lot 1 TP592015 Madeira Packet Road. This will also create potential habitat for other native wildlife. It is noted that some revegetation has already been undertaken in the form of a 10 metre wide corridor along the western boundary. This revegetation has been undertaken in consideration of the Blue-Winged Parrot habitat requirements.
    - Coast Wattle-dominated vegetation in the adjacent roadsides – investigate the feasibility in collaborating with VicRoads/council to undertake gradual weed removal and enhance native understorey for Rufous Bristlebird, Southern Brown Bandicoot and Swamp Antechinus habitat. Would also be highly beneficial to connect the native vegetation patches along Madeira Packet Road and Tecoma Road with native shrubs and understorey plants. Alternatively, any screen plantings within the property boundary should consider establishing suitable habitat for the above listed species, as well as the Blue-Winged Parrot.
    - The existing wetlands in the study area currently provide limited habitat for common wetland species. These areas should be enhanced to encourage utilisation by a broader array of

species, including those which are threatened. There is an opportunity to ensure any construct wetlands to manage stormwater on the site are designed in consideration of providing fauna habitat. Any proposed revegetation should attempt to link existing habitats to areas proposed for enhancement.

Response to application requirements of the Guidelines

The tables below summarise the compliance of the information in this report with the application requirements of the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017).

	Application requirement	Response
1.	Information about the native vegetation to be removed.	See Section 5.2
2.	Topographic and land information relating to the native vegetation to be removed.	See Section 5.1
3.	Recent, dated photographs of the native vegetation to be removed.	See Appendix 6
4.	Details of any other native vegetation approved to be removed, or that was removed without the required approvals, on the same property or contiguous land in the same ownership as the applicant, in the five-year period before the application for a permit is lodged.	N/A
5.	An avoid and minimise statement.	See Section 7.1.3
6.	A copy of any Property Vegetation Plan contained within an agreement made pursuant to section 69 of the *Conservation, Forests and Lands Act 1987* that applies to the native vegetation to be removed.	N/A
7.	Where the removal of native vegetation is to create defendable space, a written statement explaining why the removal of native vegetation is necessary. This statement is not required when the creation of defendable space is in conjunction with an application under the Bushfire Management Overlay.	N/A
8.	If the application is under Clause 52.16, a statement that explains how the proposal responds to the Native Vegetation Precinct Plan considerations (at decision guideline 8).	N/A
9.	An offset statement providing evidence that an offset that meets the offset requirements for the native vegetation to be removed has been identified and can be secured in accordance with the Guidelines.	See Section 7.1.7 and Appendix 8

Additional requirements for applications in the Detailed assessment pathway		
	Application requirement	**Response**
10.	A site assessment report of the native vegetation to be removed, including the following: ▪ A habitat hectare assessment of any patches of native vegetation, including the condition, extent (in hectares), Ecological Vegetation Class and bioregional conservation status. ▪ The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any large trees within patches. ▪ The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any scattered trees, and whether each tree is small or large.	See Section 5.2.1 and Appendix 1
11.	Information about impacts on rare or threatened species habitat, including the following: The relevant section of the Habitat importance map for each rare or threatened species requiring a species offset. For each rare or threatened species that the native vegetation to be removed is habitat for, according to the Habitat importance maps: ▪ the species' conservation status; ▪ the proportional impact of the removal of native vegetation on the total habitat for that species; and ▪ whether the habitats are highly localised habitats, dispersed habitats, or important areas of habitat within a dispersed species habitat.	See Section 6.1 and Appendix 7

2. Introduction

Nature Advisory Pty Ltd undertook a flora and fauna assessment of a 122-hectare area of freehold land located at Portland. The specific area investigated, referred to herein as the 'study area' (Figure 1), comprised the properties at:

- Allotment 61A Section 13 Parish of Portland;
- Lot 1 TP592015 Madeira Packet Road;
- 305 Madeira Packet Road; and
- 333 Madeira Packet Road

The study area also included the adjacent roadsides of Madeira Packet Road, Tecoma Road, Oleria Road and Derril Road that abutted the study area.

This assessment is required to identify ecological impacts associated with the proposed development of a utility scale Battery Energy Storage System (BESS).

This investigation was commissioned to provide information on the extent and condition of native vegetation in the study area according to Victoria's *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017), and any potential impacts on flora and fauna matters listed under the state *Flora and Fauna Guarantee Act 1988* (FFG Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This report outlines any implications under relevant national, state and local legislation and policy frameworks.

Specifically, the scope of the investigation included the following:

- Review of existing information regarding the flora, fauna and native vegetation of the study area and surrounds, including the following:
    - *Victorian Biodiversity Atlas* administered by the Department of Energy, Environment and Climate Action (DEECA);
    - The *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) *Protected Matters Search Tool*; and
    - DEECA's *Native Vegetation Information Management system* (NVIM).
- Field assessment involving the following:
    - Characterisation and mapping of native vegetation on the site, as defined in Victoria's *Guidelines for the removal, destruction or lopping of native vegetation* (the 'Guidelines');
    - Assessment of native vegetation in accordance with the Guidelines, including habitat hectare assessment and/or scattered tree assessment;
    - Compilation of a flora and fauna species lists for the site;
    - Assessment of the nature and quality of native fauna habitat; and
    - Assessment of the likelihood of occurrence of EPBC Act- and *Flora and Fauna Guarantee Act 1988* (FFG Act)-listed flora, fauna and communities on the site.

This investigation was undertaken by a team from Nature Advisory comprising Cody Hajnal (Botanist), Caroline Tan (Senior Botanist & Project Manager), Adam Dzunko (Ecologist), Clint Schipper (Zoologist) and Chris Armstrong (Senior Botanist & Project Manager).

3. Planning and legislative considerations

This investigation and report address the proposal on the site against relevant legislation and planning policies that protect biodiversity. Local, state and Commonwealth controls are summarised below.

3.1. Local planning provisions

The study area is located within the Glenelg local government area. The area proposed for development is currently zoned as Industrial 2 Zone (IN2Z) in the Glenelg Planning Scheme.

Planning provisions are established under the *Victorian Planning and Environment Act 1987* and are incorporated into all Victorian Planning Schemes. Relevant overlays, zoning and planning provisions are discussed below.

3.1.1. Planning Policy Framework

Clause 12.01 - Biodiversity

Clause 12.01 of all Victorian planning schemes provides an overarching framework to protect and enhance Victoria's biodiversity. The responsible authority is obligated to refer to Clause 12.01-1S – *Protection of biodiversity*, Cl. 12.01-2S – *Native vegetation management* and Cl. 12.01-1L – *Protection of biodiversity*. The objectives and strategies relating to the current proposal for each of these relevant Clauses are outlined below.

Clause 12.01-1S – *Protection of biodiversity*

The objective of this Clause is to protect and enhance Victoria's biodiversity through the following strategies:

- Use biodiversity information to identify important areas of biodiversity, including key habitat for rare or threatened species and communities, and strategically valuable biodiversity sites.
- Strategically plan for the protection and conservation of Victoria's important areas of biodiversity.
- Ensure that decision making takes into account the impacts of land use and development on Victoria's biodiversity, including consideration of:
    - Cumulative impacts.
    - Fragmentation of habitat.
    - The spread of pest plants, animals and pathogens into natural ecosystems.
- Avoid impacts of land use and development on important areas of biodiversity.
- Consider impacts of any change in land use or development that may affect the biodiversity value of national parks and conservation reserves or nationally and internationally significant sites; including wetlands and wetland wildlife habitat designated under the Convention on Wetlands of International Importance (the Ramsar Convention) and sites utilised by species listed under the Japan-Australia Migratory Birds Agreement (JAMBA), the China-Australia Migratory Birds Agreement (CAMBA), or the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).
- Assist in the identification, protection and management of important areas of biodiversity.
- Assist in the establishment, protection and re-establishment of links between important areas of biodiversity, including through a network of green spaces and large-scale native vegetation corridor projects.

- Support land use and development that contributes to protecting and enhancing habitat for indigenous plants and animals in urban areas.

Clause 12.01-2S – *Native vegetation management*

The objective of this Clause is to ensure there is no net loss to biodiversity as a result of removal, destruction or lopping of native vegetation through the following strategies:

- Ensure decisions that involve, or will lead to, the removal, destruction or lopping of native vegetation, apply the three-step approach in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment, Land, Water and Planning, 2017):
    - Avoid the removal, destruction or lopping of native vegetation.
    - Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided.
    - Provide an offset to compensate for the biodiversity impact from the removal, destruction or lopping of native vegetation.

Clause 12.01-1L - *Protection of biodiversity*

The objective of this Clause is to protect and biodiversity within Glenelg Shire through the following strategies:

- Encourage revegetation on private land to be undertaken with locally indigenous species.
- Retain eucalypt trees, in particular Red Gum, Brown Stringybark, and Desert Stringybark, as a significant environmental and landscape asset which contributes to the survival of the endangered red-tailed black cockatoo.

A response of how this application addresses the relevant Clauses is provided in Section 7.2.1.

Clause 12.03– Water bodies and wetlands

Clause 12.03 of all Victorian planning schemes provides an overarching framework to protect and enhance waterway systems. The responsible authority is obligated to refer to Clause 12.03-1S - *river and riparian corridors, waterways, lakes, wetlands and billabongs.*

Clause 12.03-1S – River and riparian corridors, waterways, lakes, wetlands and billabongs

The objective of this Clause is to protect and enhance waterway systems including river and riparian corridors, waterways, lakes, wetlands and billabongs through the following strategies relevant to this investigation:

- Sensitively design and site development to maintain and enhance the waterway system and the surrounding landscape setting, environmental assets, and ecological and hydrological systems.
- Protect geomorphology, bank stability and flood management capacity to strengthen the environmental value and health of waterway systems by:
    - Retaining, enhancing and re-establishing indigenous riparian vegetation along waterway systems, ensuring it responds to the bushfire risk of a location.
    - Enhancing and re-establishing both terrestrial and aquatic habitats and their linkages along and surrounding waterway systems.
    - Limiting earthworks in proximity to waterway systems to minimise alterations to geomorphology, natural drainage, natural flows and water quality.

- Facilitating the restoration of waterway systems through the removal of weeds, invasive species and pests.

3.1.2. Zoning

The area proposed for development is currently zoned as Industrial 2 Zone (IN2Z) in the Glenelg Planning Scheme

Additionally, the northern half of the property at 305 Madeira Packet Road is zoned as Farming Zone – Schedule 1 (FZ1) and Madeira Packet Road is zoned as Transport Zone 2 (TRZ2) in the Glenelg Planning Scheme. Neither the objectives of IN2Z, FZ1 nor TRZ2 are considered relevant to this investigation.

3.1.3. Overlays

No overlays relevant to this investigation cover the study area.

Moreover, the study area is also located within a Bushfire-prone Area (BPA). Implications under the BPA are outside the scope of this investigation and is not discussed further in this report.

3.1.4. Particular provisions – Native Vegetation (Clause 52.17)

This report addresses the requirements under Clause 52.17 – *Native Vegetation*.

The purpose of Clause 52.17 is to ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. This is achieved by applying the following three step approach in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017), herein referred to as 'the Guidelines'.

1. Avoid the removal, destruction or lopping of native vegetation.
2. Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided.
3. Provide an offset to compensate for the biodiversity impact if a permit is granted to remove, destroy or lop native vegetation.

This provision states that a permit is required to remove, destroy or lop native vegetation, including dead native vegetation. This does not apply to the following:

- If an exemption in Table 52.17-7 specifically states that a permit is not required.
- If a native vegetation precinct plan corresponding to the land is incorporated into the planning scheme and listed in the schedule to Clause 52.16.
- The native vegetation is specified in a schedule to Clause 52.17.

Application requirements

Any application to remove, destroy or lop native vegetation must comply with the application requirements specified in the Guidelines (DELWP 2017).

Referral to DEECA

Clause 66.02-2 of the planning scheme determines the role of the Department of Energy, Environment and Climate Action (DEECA) in the assessment of native vegetation removal permit applications. If an application is referred, DEECA may make certain recommendations to the responsible authority in relation to the permit application.

Any application to remove, destroy or lop native vegetation must be referred to DEECA if any of the following apply:

- The impacts to native vegetation fall within the Detailed Assessment Pathway;
- A property vegetation plan applies to the site; or
- The native vegetation is on Crown land that is occupied or managed by the responsible authority.

Implications under this particular provision are discussed in Section 7.1.

3.2. EPBC Act

The Australian *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) protects a number of threatened species and ecological communities that are considered to be of national conservation significance. Any significant impacts to these species require the approval of the Australian Minister for the Environment.

If there is a possibility of a significant impact on nationally threatened species, communities or listed migratory species, a Referral under the EPBC Act should be considered. The Minister will decide whether the project will be a 'controlled action' under the EPBC Act after 20 business days, in which case the project can only be undertaken with the approval of the Minister. This approval depends on a further assessment and approval process (lasting between three and nine months, depending on the level of assessment).

Implications under the EPBC Act for the current proposal are discussed in Section 7.3.

3.3. FFG Act

The Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) includes:

- a *Threatened List* (DEECA 2023a); and
- a *Protected Flora List* (DELWP 2019).

This Act generally only has implications for impacts to FFG Act-listed values where they occur on public land.

Threatened List

The FFG Threatened List represents Victoria's single operational list of threatened flora, fauna and communities. Each species is assigned a threatened status which aligns with the listing categories and criteria for the International Union for the Conservation of Nature (IUCN) Red List.

Although there are no legislative implications for impacts to these species on private land under the FFG Act, these values should be avoided wherever possible, in recognition of their threatened status at a state level.

Any application for a planning permit may also be assessed by the responsible or referral authority for potential impacts to FFG Act threatened values as part of broader considerations of impacts to biodiversity.

Protected Flora List

The Protected Flora List includes plants from three sources:

- Plant taxa (species, subspecies or varieties) listed as threatened under the FFG Act,
- Plant taxa belonging to communities listed as threatened under the FFG Act, and
- Plant taxa which are not threatened but require protection for other reasons. For example, some species which are attractive or highly sought after, such as orchids, daisies, and grass trees, are protected so that the removal of these species from the wild can be controlled (DELWP 2019).

Under the Act, any removal of protected flora from public land requires a Protected Flora Permit, which must be obtained from the relevant regional DEECA officer. This can only be obtained after the removal of this flora is approved as part of a planning permit.

Implications under the FFG Act for the current proposal are discussed in Section 7.4.

3.4. EE Act

One or a combination of several criteria may trigger a requirement for a Referral to the Victorian Minister for Planning who will determine whether an Environmental Effects Statement (EES) will be required according to the *Ministerial Guidelines for Assessment of Environmental Effects under the* Environment Effects Act 1978 (DSE 2006).

The criteria related to flora, fauna and native vegetation that trigger a Referral are listed below.

One or more of the following would trigger a Referral:

- Potential clearing of 10 or more hectares of native vegetation from an area that meets the following criteria:
    - Is of an Ecological Vegetation Class identified as endangered by the Department of Sustainability and Environment (in accordance with Appendix 2 of Victoria's Native Vegetation Management Framework); or
    - Is, or is likely to be, of very high conservation significance (as defined in accordance with Appendix 3 of Victoria's Native Vegetation Management Framework); and
    - Is not authorised under an approved Forest Management Plan or Fire Protection Plan;
- Potential long-term loss of a significant proportion (e.g. 1 to 5 percent depending on the conservation status of the species) of known remaining habitat or population of a threatened species within Victoria;
- Potential long-term change to the ecological character of a wetland listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'; or
- Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term.

Two or more of the following would also trigger a Referral:

- Potential clearing of 10 or more hectares of native vegetation, unless authorised under an approved Forest Management Plan or Fire Protection Plan;
- Matters listed under the Flora and Fauna Guarantee Act 1988, including the following:
    - Potential loss of a significant area of a listed ecological community; or
    - Potential loss of a genetically important population of an endangered or threatened species (listed or nominated for listing), including as a result of loss or fragmentation of habitats; or
    - Potential loss of critical habitat; or
    - Potentially significant effects on habitat values of a wetland supporting migratory bird species.

Implications under the *Environment Effects Act 1978* (EE Act) for the current proposal are discussed in Section 7.5.

3.5. CaLP Act

The *Catchment and Land Protection Act 1994* (CaLP Act) requires that landowners (or a third party to whom responsibilities have been legally transferred) must eradicate regionally prohibited weeds and prevent the growth and spread of regionally controlled weeds.

Weed species listed under the CaLP Act that have been recorded in the study area are discussed in Section 7.6.

4. Existing information and methods

4.1. Existing information

Existing information used for this investigation is described below.

4.1.1. Existing reporting and documentation

The existing documentation below, relating to the study area, was reviewed.

- Glenelg Planning Scheme (DTP 2024);
- Development Plan (Drawing number: EHV-PREH2-EL-DR-0001_AEMOULT, Revision: 0) dated 20/03/2024;
- *Portland Battery Energy Storage System (BESS) - Targeted Flora Survey* (Nature Advisory 2023).

4.2. Desktop methods

4.2.1. Native vegetation

Pre-1750 (pre-European settlement) vegetation mapping administered by DEECA was reviewed to determine the type of native vegetation likely to occur in the study area and surrounds. Information on Ecological Vegetation Classes (EVCs) was obtained from published EVC benchmarks. These sources included the following:

- Relevant EVC benchmarks for the Glenelg Plain bioregion[1] (DSE 2004a); and
- *NatureKit* (DEECA 2023b).

4.2.2. Threatened species and communities

Existing flora and fauna species records and information regarding the potential occurrence of listed matters were obtained from an area termed the 'search region', defined here as an area with a radius of 10 kilometres from the boundaries of the study area.

A list of the flora and fauna species recorded in the search region was obtained from the *Victorian Biodiversity Atlas* (VBA), a database administered by DEECA. Any species where the last observation predates 1980 has been excluded from this list.

A likelihood of occurrence analysis was undertaken using these flora and fauna records. Species considered 'likely to occur' have very high potential of occurring in the study area based on numerous records in the search region and suitable habitat in the study area. Species considered to have the 'potential to occur' are those for which suitable habitat exists, but recent records are scarce.

The online EPBC Act *Protected Matters Search Tool* (DCCEEW 2023a) was consulted to determine whether nationally listed species or communities potentially occurred in the search region based on habitat modelling.

[1] A bioregion is defined as "a geographic region that captures the patterns of ecological characteristics in the landscape, providing a natural framework for recognising and responding to biodiversity values". In general, bioregions reflect underlying environmental features of the landscape (DNRE 1997).

4.3. Field methods

Flora and Fauna Assessments

The field assessment of Allotment 61A Section 13 Parish of Portland and Lot 1 TP592015 Madeira Packet Road was conducted on 17 and 18 July 2023, whilst 305 Madeira Packet Road was assessed on 9 and 10 January 2024 and 333 Madeira Packet Road was assessed on 7 March 2024. During these assessments, the study area was surveyed on foot.

Sites in the study area found to support native vegetation or with potential to support listed matters were mapped through a combination of aerial photograph interpretation and ground-truthing using ArcGIS Field Maps® (Esri) on a hand-held device. Species and ecological communities listed as threatened under the EPBC Act or protected/threatened under FFG Act (where these occurred on public land) were also mapped using the same method.

Targeted Flora surveys

A targeted survey for the five below-mentioned flora species was conducted by two botanists across two days on 31 October 2023 and 1 November 2023 within Lot 1 Madeira Packet Road, Allotment 61A Madeira Packet Road and adjacent roadsides (Nature Advisory 2023). The survey coincided with the flowering period for all species, listed in brackets below:

- River Swamp Wallaby-grass (flowers November to March);
- Swamp Fireweed (flowers November to March);
- Swamp Everlasting (flowers November to March);
- Curly Sedge (flowers September to November); and
- Swamp Diuris (flowers August to October).

The survey area was traversed on foot using the following method:

- A random meander was used to visually inspect the site and determine where targeted surveys would be required. This method involved walking across the site to get a relatively even coverage of the study area. Areas of native vegetation and drainage lines mapped in the previous report (Nature Advisory 2023) informed where survey efforts should be focussed, and these areas were prioritised. Coverage of the site was tracked using ArcGIS Field Maps® (ESRI). Where areas of habitat for threatened species were identified, transects were traversed as described below.
- Parallel transects were spaced five metres apart as this was considered adequate on-site for detecting target species given the low height and clear visibility of the vegetation. Transects were traversed and visually inspected for the target species within areas of habitat (defined below). Transects were tracked using ArcGIS Field Maps® (ESRI).
- Habitat for most of the target species was considered as swampy depressions or drainage lines where native vegetation was present and disturbance from cattle was comparatively low.

The additional areas of the study area (305 and 333 Madeira Packet Road, Portland), were deemed not to contain suitable habitat for the any listed species, as such no targeted surveys were undertaken within these properties.

4.3.1. Native vegetation

Native vegetation is currently defined in Clause 73.01 of all Victorian planning schemes as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'. The Guidelines (DELWP 2017) further classify native vegetation as belonging to two categories:

- Patch; or
- Scattered tree.

4.3.2. EVC determination

Determination of EVCs in the field was based on DEECA's pre-European modelled native vegetation (DEECA 2003b) within or nearby to the study area.

Although some vegetation types more closely resembled EVCs not modelled in the study area, this was due to historical modification of the landscape. Where this is the case, EVC has been assigned based on the modelled vegetation type in that locality.

4.3.3. Flora species and habitats

Records of flora species were made in conjunction with sampling methods used to undertake habitat hectare assessments of the native vegetation described above. Specimens requiring more detailed identification were collected and identified with additional resources.

Species protected under the FFG Act were determined by crosschecking species recorded against the FFG Act *Protected Flora List* (DELWP 2019).

The potential for habitats to support listed flora species was assessed based on the following criteria:

- The presence of suitable habitat for flora species such as soil type, floristic associations and landscape context; and
- The level of disturbance of suitable habitats by anthropogenic disturbances and invasions by pest plants and animals.

Wherever appropriate, a precautionary approach was adopted in determining the likelihood of occurrence or flora listed under the EPBC Act and/or FFG Act. That is, where insufficient evidence was available regarding the potential occurrence of a listed species, the assumption was made that this could be in an area of suitable habitat.

4.3.4. Fauna species and habitats

The techniques below were used to detect fauna species utilising the study area.

- Incidental searches for mammal scats, tracks and signs (e.g. diggings, signs of feeding and nests/burrows)
- Turning over logs/rocks and other ground debris for reptiles, frogs and mammals
- Daytime bird observations
- General searches for reptiles and frogs, including identification of frog calls in seasonally wet areas
- General searches for bat habitat including waterbodies and potential roosting sites such as caves, trees with hollows and underneath the bark of trees.

Fauna habitats are described using habitat components that include old-growth trees, fallen timber, leaf litter, seasonally inundated areas, and remnant native vegetation.

Habitat connectivity of the study area (i.e. degree of isolation/fragmentation), including linkages to other habitats in the region, was determined using field observations, recent aerial photography and *NatureKit* (DEECA 2023b).

Wherever appropriate, a precautionary approach was adopted in determining the likelihood of occurrence or fauna listed under the EPBC Act and FFG Act. That is, where insufficient evidence was available

regarding the potential occurrence of a listed species, the assumption was made that this could be in an area of suitable habitat.

4.3.5. Threatened ecological communities

EPBC Listed communities

The likelihood of EPBC listed threatened ecological communities occurring in the study area was determined by the following process:

- Review of the communities modelled to potentially occur in the study area from the EPBC Act *Protected Matters Search Tool* (DCCEEW 2023a), and
- Checking general field observations of mapped native vegetation against published descriptions of these communities and assessment against the identification criteria and condition thresholds from the relevant listing advice.

FFG Listed communities

The likelihood of FFG listed threatened ecological communities occurring in the study area was determined by the following process:

- Review of the communities modelled to potentially occur within 5 kilometres of the study area (DELWP 2018b),
- Review of any communities without modelled distribution habitat mapping, and
- Checking general field observations against published descriptions of the identified communities (SAC 2015).

4.3.6. Limitations

The short duration and seasonal timing of field assessments can result in some species not being detected when these may occur at other times. Additionally, some flora species and lifeforms may be undetectable at the time of survey or unidentifiable due to a lack of flowers or fruit.

The site assessment of Allotment 61A Section 13 Parish of Portland and Lot 1 TP592015 Madeira Packet Road was conducted during winter, immediately after a substantial rainfall event; as such low-lying areas were in the study area were saturated. As there was no clear demarcation of the wetland edges by native flora species, a precautionary approach was adopted whereby patch extent was defined by the water level rather than the persistence of native elements above 25% cover. Therefore, the on-ground mapping of the wetland boundaries will be inherently subjective depending on the timing of the survey and the natural fluctuation in the extent of native vegetation cover. The site assessment of 305 Madeira Packet Road was conducted in summer and 333 Madeira Packet Road was conducted in autumn.

Timing of the surveys and condition of vegetation were otherwise considered suitable to ascertain the extent and condition of native vegetation and fauna habitats.

These limitations were not considered to compromise the validity of the investigation as the habitat hectares scoring method has been intentionally designed to account for seasonal and temporal variation within patches of native vegetation, to enable site assessments to occur year-round. This reduces the subjectivity and variability between assessors and minimises the time taken during the assessment process. In most cases, habitat zones will be placed comfortably within a habitat component category that would unlikely change even if additional data was collected during alternative survey times (DSE 2004b).

Therefore, this investigation accurately addresses the relevant policies and decision guidelines.

5. Assessment results

5.1. Site description

The study area comprised a generally flat to gently undulating landscape at 30-40 metres above sea level, supporting open grazing land of introduced grasses with numerous highly modified wetlands. The history of cattle grazing throughout the paddocks has resulted in the ground layer being heavily pugged. In summary, the vegetation throughout the study area is highly modified from its original condition due to the historical land clearing and evident intensive grazing pressure on the land. The condition of the vegetation is poor due to the absence of canopy trees, loss of native species diversity and a very high cover of noxious weeds including grassy, herbaceous and woody weeds.

The study area contained generally homogenous cover of introduced pasture, the most common species including Kikuyu, White Clover, Capeweed and Flatweed. Occasional woody weeds were present including African Boxthorn, Blackberry and Gorse. It is important to note that some parts of the study area contained scattered Austral Bracken and native Rush at low covers – including some patchy areas with up to 20% cover of Bracken and up to 15% cover of native Rushes. However, these areas did not qualify as patches of native vegetation under the Guidelines and were subsequently not mapped.

The wetlands in the study area were of varying size and depth, ranging from constructed drainage lines to seasonally flooded pasture to shallow wetlands with open water. The most extensive and deepest wetlands were habitat zones F and G in the centre of the study area. None of the wetlands were included in the DEECA current wetland mapping. These wetlands are not dependent on flooding from rivers or creeks, and they are linked by constructed drainage lines and are reliant on fed by direct rainfall on the site. All of the wetlands are seasonal and accessible by cattle, having modified hydrology from grazing land use and simplified floristics.

At the time of the field assessment of Allotment 61A Section 13 Parish of Portland and Lot 1 TP592015 Madeira Packet Road, all the wetlands had relatively large open water zones and shallow submergent zones. They lacked fringing emergent vegetation such as rushes and sedges, native grasses and woody vegetation. Introduced pasture grass often remained dominant except in the deepest areas, with herbaceous weeds in all of the wetlands including White Clover, Buck Horn's Plantain, Water-buttons and Hairy Hawkbit. Evidence of native aquatic species occurred in the deeper drainage lines and shallow wetlands included River Buttercup, Swamp Crassula, *Hydrocotyle* spp. and Southern Water-ribbons. The native wetland plants were likely the result of natural colonisation rather than from a remnant wetland community inside the study area.

Native tree cover in the study area was limited. A total of two isolated Swamp Gum in very poor health (<25% crown foliage remaining) and planted trees occurred within Allotment 61A Section 13 Parish of Portland.

Planted trees within the study area comprised Cypress-pine, Monterey Cypress and Radiata Pine as windbreaks or as small clusters. Scattered River She-oak was also observed within Allotment 61A Section 13 Parish of Portland and Lot 1 TP592015 Madeira Packet Road. River She-oak is commonly grown as a garden or roadside tree, and sometimes spreads from these areas. All planted River She-oak occurred over a weedy understorey dominated by Kikuyu and included Stinging Nettle and Small-flowered Mallow. Additionally, the property at 333 Madeira Packet Road contained various shrubs and eucalypts that were recorded as planted.

The roadside native vegetation was defined by a shrub layer of Coast Wattle (native species growing outside of its natural distribution) with some Coastal Beard-heath over a densely weedy understorey, mainly Kikuyu and Cocksfoot, with scattered Austral Bracken. Native graminoids including Coast Sword-sedge, Thatch Saw-sedge and Spear-grass were sparsely observed (particularly along Olearia Road in habitat zones RF and RG).

Fauna habitat within the study area comprised planted trees, grazing paddocks, aquatic habitat in the form of drainage lines, ephemeral wetlands and seasonally inundated depressions, and dense roadside vegetation mainly comprising Coast Wattle scrub.

The following key fauna habitat areas occurred within the region:

- Nearby significant habitat occurred as a large patch of heathy woodland/coastal scrub adjacent to the south-eastern boundary of the study area. Native vegetation in the study area was connected to this habitat by dense coastal scrub along roadsides. This habitat is contiguous with similar habitat of Nelson Bay Coastal Reserve, Discovery Bay Coastal Park, and Narrawong Coastal Reserve.

Roadside vegetation in the study area provides an important link/corridor between smaller habitat areas to the north-west, within a largely modified landscape.

The study area lies within the Glenelg Plain bioregion, within the Glenelg Hopkins catchment management area and on Traditional Lands of the Gunditjmara People.

5.2. Native vegetation

5.2.1. Patches of native vegetation

Pre–European EVC mapping (DEECA 2023b) indicated that the study area and surrounds would have supported a Heathy Woodland/Damp Heathy Woodland/Damp Heathland Mosaic (EVC 650) prior to European settlement, based on modelling of factors including rainfall, aspect, soils and remaining vegetation.

However, evidence on site including floristic composition and soil characteristics suggested that native vegetation more closely resembled Aquatic Herbland (EVC 653) within the wet depressions in the paddocks and Heathy Woodland (EVC 48) in both paddocks and the adjacent roadsides (Figure 1).

A total of 41 habitat zones comprising the abovementioned EVCs, were identified in the study area (Table 1). This totalled an area of 13.17 hectares of native vegetation in patches, with no large trees in patches. Photographs of native vegetation in the study area are provided in Appendix 6.

Determination of EVCs considers vegetation types that would have naturally occurred in the landscape prior to European impacts. Significant past alteration of the study area's landform, hydrology and soil composition, and past vegetation clearance has resulted in the emergence of an artificial site ecosystem and the reestablishment of vegetation that is likely to be notably different from that which would have naturally occurred in the study area.

In this case, the study area's topography, land features and floristic composition no longer resembled the original native vegetation communities. Nonetheless, patches of native vegetation were assessed against the EVC benchmarks for the appropriate EVC, consistent with the Vegetation Quality Assessment (VQA) methodology and the Guidelines regarding anthropogenically modified native vegetation.

Table 1: Description of habitat zones in the study area

Habitat Zone	EVC	Description
RA, RC and RE	Heathy Woodland (EVC 48) *Poor quality*	Located in the road reserve of Madeira Packet Road. These habitat zones comprised a closed shrub layer of Coast Wattle over dense weed understorey, mainly Kikuyu and Cocksfoot, with scattered Coastal Beard-Heath and Seaberry Saltbush in Habitat Zones RC and RE. Habitat zone RE also contained significant Bower Spinach and Austral Bracken in the more open areas. Other significant grassy weeds included Couch, Rat-tail Grass, Paspalum, Cocksfoot and Buffalo Grass. Significant herbaceous weeds included White Clover, Soursob, Flatweed, Ox-tongue and Spear Thistle. Woody weeds were extensive in habitat zones RC and RE, including Mirror Bush, Sweet Pittosporum, Boneseed, Italian Buckthorn and Radiata Pine.
RF, RG, and Y	Heathy Woodland (EVC 48) *Poor quality*	Located in the road reserves of Tecoma Road and Oleria Road. These habitat zones also comprised a closed shrub layer of Coast Wattle and scattered Coastal Beard-Heath over dense weed understorey, mainly Kikuyu and Cocksfoot, similar to RA, RC and RE. New weeds also included Cape Ivy, Fleabane and Wild Radish. However, there were also more native vegetation elements in the understorey of these habitat zones (albeit at very low cover), particularly near the drainage line along Oleria Road, including Coast Sword Sedge, Thatch Saw-sedge and Spear Grass.
A, B, C, D and P	Aquatic Herbland (EVC 653) *Poor quality*	Smaller wetlands located in Allotment 61A Section 13 Parish of Portland. These habitat zones comprised wetlands in saturated, low-lying areas where native aquatic (or semi-aquatic) herbs were considered to meet 25% of the perennial vegetation cover. The main native plants were *Hydrocotyle* spp., River Buttercup and Southern Water-ribbons. These habitat zones were dominated by introduced pasture grass and herbaceous weeds like Buckhorn's Plantain and White Clover. There was a lack of native grasses and sedges, and lack of fringing vegetation. These habitat zones had significant proportions of open water where the introduced pasture grasses and aquatic herbs were submerged. These habitat zones were otherwise surrounded by the open introduced pasture, which graded into the wetlands themselves. Pugging by cattle evident.

Habitat Zone	EVC	Description
F and G	Aquatic Herbland (EVC 653) *Poor quality*	Two large wetlands located in Allotment 61A Section 13 Parish of Portland, with some of habitat zone F extending into Lot 1 TP592015 Madeira Packet Road – the rural fencing between the two lot parcels continued inside habitat zone F, showing the shallow depth and semi-permanence of the wetland. Similar to habitat zones A, B, C, D and P – but much larger in area, mostly open water with gentle shallow gradient from the surrounding introduced pasture which continued into the wetland. The main native plants were *Hydrocotyle* spp. and River Buttercup. Some mostly submerged Slender Dock was present. Lack of native grasses and sedges, and lack of fringing vegetation.
J, Q, S, T, U and W	Aquatic Herbland (EVC 653) in drainage lines *Poor quality*	Constructed drainage lines located in Allotment 61A Section 13 Parish of Portland (HZ's Q, S T and W) and Lot 1 TP592015 Madeira Packet Road (HZ's J and U). Often dominated by introduced pasture. The main native plants were River Buttercup, Swamp Crassula, Southern Water-ribbons and floating plants such as *Callitriche spp*. and *Lemna spp.* There was a lack of native grasses and sedges, and lack of fringing vegetation. Pugging by cattle evident.
V	Aquatic Herbland (EVC 653) in drainage line *Poor quality*	Constructed drainage line located in Lot 1 TP592015 Madeira Packet Road. This habitat zone was more deeply and steeply cut into the ground with significant erosion in some areas. The main native plants were River Buttercup, Swamp Crassula, Southern Water-ribbons and floating plants such as *Callitriche spp*. and *Lemna spp.* There was a lack of native grasses and sedges, and minimal fringing vegetation in the form of scattered native Rush and woody weeds including Blackberry and Gorse. Pugging by cattle evident.
X and AU	Heathy Woodland (EVC 48) *Poor quality*	Located within 333 Madeira Packet Road, with a portion of Habitat Zone X occurring in the road reserve of Madeira Packet Road. These habitat zones lacked a canopy. Comprised a midstorey of a closed shrub layer of Coast Wattle, Coast Beard-heath and Moonah. Both habitat zones had a dense weedy understorey comprised of mainly Kikuyu and Cocksfoot. HZAU was dominated by Bower Spinach whilst HZX had scattered occurrences of Knobby Club-sedge, Bidgee-widgee, and Austral Bracken. Other significant grassy weeds included Sweet Vernal-grass, Rat-tail Grass and Cocksfoot. Woody and high threat weeds included Sweet Pittosporum, Sweet-scented Hakea, Boneseed, Italian Buckthorn, Giant Honey-myrtle, Mirror Bush and Radiata Pine.

Habitat Zone	EVC	Description
AA	Heathy Woodland (EVC 48) *Poor quality*	This Habitat Zone comprised a closed shrub layer of Coast Wattle and Coast Beard-heath over a weedy understorey surrounding an empty farm dam. Native understorey elements included Angled Lobelia Swamp Crassula, Bidgee-widgee, Kidney Weed with scattered Knobby Club-sedge, Spike Sedge and Bulrush. Significant weeds included Kikuyu, Sweet Vernal-grass, Flatweed, Yorkshire Fog, Rat-tail Grass and Soft Brome. High threat weeds included Blackberry, Boneseed and Jointed Rush.
AB	Heathy Woodland (EVC 48) *Poor quality*	Constructed empty farm dam dominated by herbs and graminoids. Indigenous species comprised of Water-milfoil, Bulrush, Angled Lobelia Swamp Crassula, River Buttercup, Bidgee-widgee, Spike Sedge, Rush and Streaked Arrowgrass. Fringing shrubby vegetation contained Coast Wattle and Coast Beard-heath. The dominant weed was the high threat Jointed Rush. Other weeds present included Flatweed, Dandelion, Kikuyu, Sweet Vernal-grass, Buckhorn's Plantain and White Clover.
AD, AE, AF, AS and AT	Heathy Woodland (EVC 48) *Poor quality*	These habitat zones comprised primarily of Rush with enough cover to form a patch. These patches lacked a diversity of native herbs and grasses as the primary component of the ground layer was introduced pasture grasses and exotic herbs. Indigenous species present included Slender Dock and Club-rush. Weeds within these habitat zones included Curled Dock, Mediterranean Loosestrife, kikuyu, Flatweed, Sweet Vernal-grass, Ribwort and Trefoil. The high threat Jointed Rush was also recorded. Due to anthropogenic modification, these habitat zones were heavily degraded as the canopy and midstorey vegetation was absent. They were therefore assigned the most appropriate modelled EVC, Heathy Woodland (EVC 48). Pugging by cattle was evident.
AH, AG and AJ	Heathy Woodland (EVC 48) *Poor quality*	These habitat zones consisted of derived grasslands dominated by Common Blown-grass. Other indigenous components within the understorey included Rush, Spike Sedge, Swamp Crassula, Small Loosestrife, River Buttercup and Lobelia. These habitat zones were dominated by Flatweed. Additionally, Yorkshire Fog, Trefoil, Dandelion, Mediterranean Loosestrife, Curled Dock, Rye-grass, Kikuyu, Fat Hen and Annual Beard-grass. The high threat Jointed Rush was also recorded. Due to anthropogenic modification, these habitat zones were heavily degraded as the canopy and midstorey vegetation was absent. They were therefore assigned the most appropriate modelled EVC, Heathy Woodland (EVC 48). Pugging by cattle was evident.

Habitat Zone	EVC	Description
AI, AP and AR	Heathy Woodland (EVC 48) *Poor quality*	Located in the road reserve of Derril Road. These habitat zones comprised primarily of a closed shrub layer of Coast Wattle over a weedy understorey, mainly Kikuyu, Buffalo Grass and Yorkshire Fog. Silver Banksia and Sea-box were present in Habitat Zones AP and AR. Habitat zone AI also contained Austral Bracken in the understorey. Weeds within these Habitat Zones included Large Quaking Grass, Cocksfoot, Sweet Vernal-grass, Flatweed, Trefoil, Sow Thistle, Drain Flat-sedge, Mediterranean Loosestrife and Annual Beard-grass.
AK, AL, AM, AN, AO and AQ	Heathy Woodland (EVC 48) *Poor quality*	Located in the road reserve of Derril Road. These habitat zones comprised primarily of Austral Bracken with scattered Rush, Knobby Club-sedge and occasional Coast Wattle. The ground layer was dominated by the weeds Kikuyu, Buffalo Grass with Flatweed and Sweet Vernal-grass also present. Habitat Zone AL was dominated by the high threat weed Blackberry. Due to anthropogenic modification, these habitat zones were heavily degraded as the canopy and midstorey vegetation was effectively absent. They were therefore assigned the most appropriate modelled EVC, Heathy Woodland (EVC 48).

The habitat hectare assessment results for these habitat zones are provided in Table 2. More detailed habitat scoring results are presented in Appendix 1.

Table 2: Summary of habitat hectare assessment results

Habitat Zone	EVC	Area (ha)	Condition score (out of 100)	No. of large trees in HZ
RA	Heathy Woodland (EVC 48)	0.193	17	0
RC	Heathy Woodland (EVC 48)	0.185	15	0
RE	Heathy Woodland (EVC 48)	0.518	13	0
RF	Heathy Woodland (EVC 48)	0.447	24	0
RG	Heathy Woodland (EVC 48)	0.265	24	0
A	Aquatic Herbland (EVC 653)	0.023	25	N/A
B	Aquatic Herbland (EVC 653)	0.629	25	N/A
C	Aquatic Herbland (EVC 653)	0.063	25	N/A
D	Aquatic Herbland (EVC 653)	0.044	19	N/A

Habitat Zone	EVC	Area (ha)	Condition score (out of 100)	No. of large trees in HZ
F	Aquatic Herbland (EVC 653)	5.193	22	N/A
G	Aquatic Herbland (EVC 653)	3.082	20	N/A
J	Aquatic Herbland (EVC 653)	0.068	19	N/A
P	Aquatic Herbland (EVC 653)	0.081	19	N/A
Q	Aquatic Herbland (EVC 653)	0.044	19	N/A
S	Aquatic Herbland (EVC 653)	0.023	19	N/A
T	Aquatic Herbland (EVC 653)	0.047	19	N/A
U	Aquatic Herbland (EVC 653)	0.107	27	N/A
V	Aquatic Herbland (EVC 653)	0.075	19	N/A
W	Aquatic Herbland (EVC 653)	0.260	19	N/A
X	Heathy Woodland (EVC 48)	0.060	26	0
Y	Heathy Woodland (EVC 48)	0.041	27	0
AA	Heathy Woodland (EVC 48)	0.561	36	0
AB	Heathy Woodland (EVC 48)	0.190	35	0
AD	Heathy Woodland (EVC 48)	0.048	18	0
AE	Heathy Woodland (EVC 48)	0.146	18	0
AF	Heathy Woodland (EVC 48)	0.064	18	0
AG	Heathy Woodland (EVC 48)	0.044	14	0
AH	Heathy Woodland (EVC 48)	0.102	14	0
AI	Heathy Woodland (EVC 48)	0.007	19	0
AJ	Heathy Woodland (EVC 48)	0.199	14	0
AK	Heathy Woodland (EVC 48)	0.006	20	0
AL	Heathy Woodland (EVC 48)	0.004	18	0
AM	Heathy Woodland (EVC 48)	0.019	20	0
AN	Heathy Woodland (EVC 48)	0.013	20	0

Habitat Zone	EVC	Area (ha)	Condition score (out of 100)	No. of large trees in HZ
AO	Heathy Woodland (EVC 48)	0.007	20	0
AP	Heathy Woodland (EVC 48)	0.032	23	0
AQ	Heathy Woodland (EVC 48)	0.011	20	0
AR	Heathy Woodland (EVC 48)	0.029	23	0
AS	Heathy Woodland (EVC 48)	0.031	18	0
AT	Heathy Woodland (EVC 48)	0.133	18	0
AU	Heathy Woodland (EVC 48)	0.072	21	0
Total		**13.168**		**0**

5.2.2. Scattered trees

Two scattered trees recorded in the study area would once have comprised the canopy component of Damp Heathy Woodland (EVC 793), of which a character species in the canopy layer is Swamp Gum.

Two small scattered trees occurred in the study area (Figure 1), being Swamp Gum in very poor health with less than 25% of the crown foliage remaining.

Table 3: Detailed scattered tree results

Tree No.	Common Name	Scientific Name	DBH (cm)	Category	Radius of TPZ (m)	Removed/ Retained	Notes
1	Swamp Gum	*Eucalyptus ovata*	36	Small scattered tree	4.3	Retained	Poor health
2	Swamp Gum	*Eucalyptus ovata*	50	Small scattered tree	6.0	Retained	Has a dead trunk and poor health

Notes: DBH = Diameter at breast height (130 cm from the ground); **TPZ** = Tree Protection Zone.

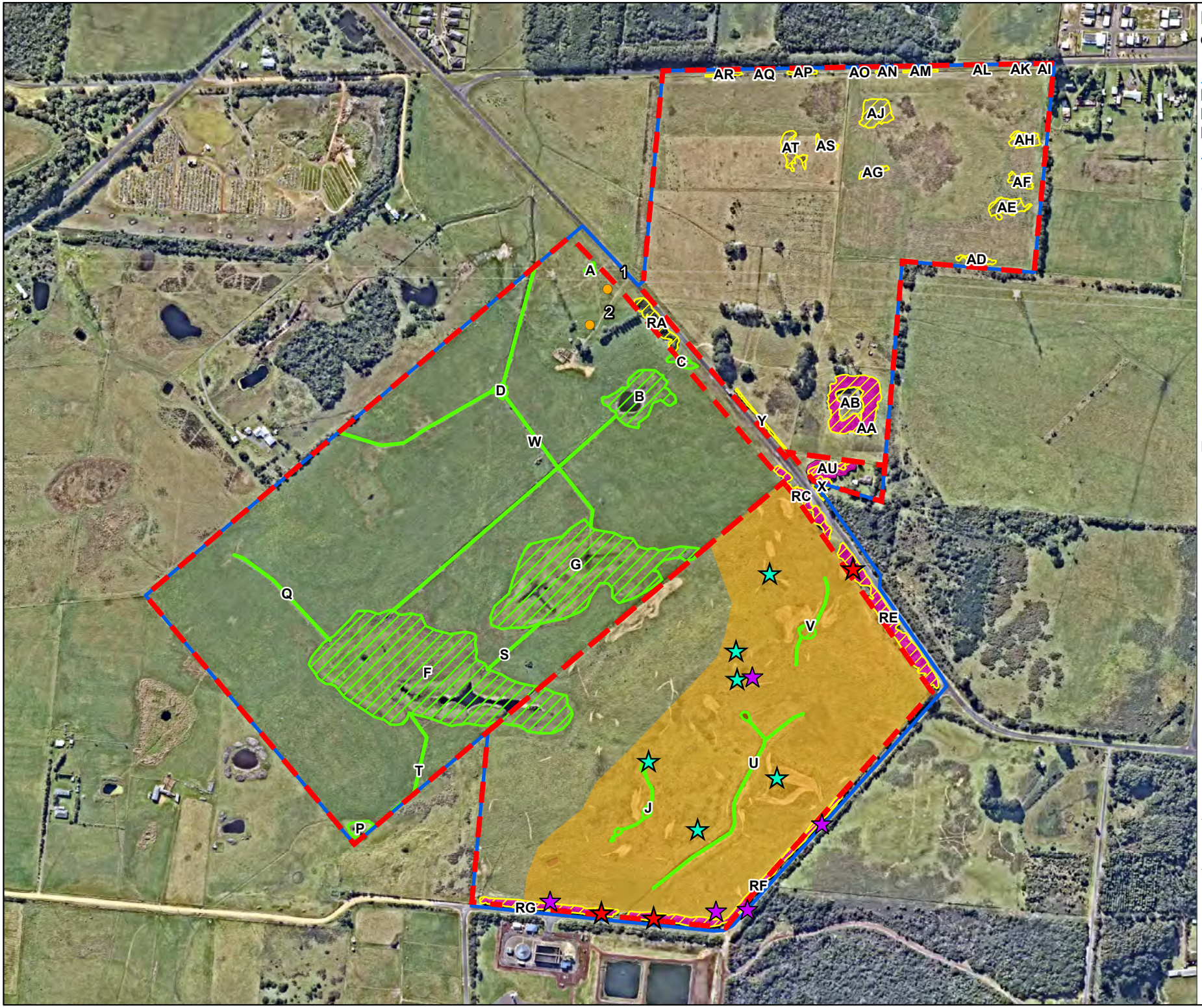


Figure 1: Study area and ecological values

Project No: 23146.03
Project: Pacific Green, Portland
Date: 26/03/2024

Study area

Threatened fauna recorded

- Blue-winged Parrot (non breeding season)
- Rufous Bristlebird (non breeding season)
- Blue-winged parrot (breeding season)
- Rufous Bristlebird habitat, potential Southern Brown Bandicoot and Swamp Antechinus habitat
- Blue-winged Parrot foraging habitat

Native vegetation

- Small scattered tree
- Aquatic Herbland (EVC 653)
- Heathy Woodland (EVC 48)

N

Metres

0 60 120 180 240 300

Nature Advisory
PO Box 337, Camberwell, VIC 3124, Australia
www.natureadvisory.com.au
03 9815 2111 - info@natureadvisory.com.au

5.3. Flora species

5.3.1. Species recorded

During the field assessment, a total of 112 plant species were recorded, of which 33 (29%) were indigenous and 79 (71%) were introduced or non-indigenous native in origin (Appendix 2).

5.3.2. Listed species

Records from the VBA (DEECA 2023c) and Commonwealth EPBC Protected Matters Search Tool (DCCEEW 2023a) indicated that within the search region there were records of, or potential suitable habitat occurred for 16 species listed under the Commonwealth EPBC Act and 41 listed under the state FFG Act, including 12 listed under both Acts.

No listed flora species were recorded during the field survey.

The likelihood of occurrence of species listed under the EPBC Act and FFG Act in the study area is addressed in Appendix 2.

The likelihood analysis indicated that the following five listed flora species have the potential to occur in suitable habitat within the native vegetation mapped in Lot 1 TP592015 Madeira Packet Road and along Oleria Road:

- River Swamp Wallaby Grass (EPBC: Vulnerable)
- Swamp Fireweed (EPBC: Vulnerable)
- Swamp Everlasting (EPBC: Vulnerable)
- Curly Sedge (FFG: Endangered)
- Swamp Diuris (FFG: Endangered)

Subsequently, targeted surveys were undertaken for the above-mentioned species in accordance with the methodology described below (Nature Advisory 2023).

Additionally, no suitable habitat for threatened species was identified in the remaining areas of the study area, owing to the modified nature of the vegetation, lack of suitable habitat and the dominance of weedy species.

Targeted survey results

A targeted survey of Allotment 61A Section 13 Parish of Portland, Lot 1 TP592015 Madeira Packet Road and the adjacent roadsides for five flora species was conducted by two botanists across two days on 31 October 2023 and 1 November 2023 (Nature Advisory 2023b). The survey coincided with the flowering period for all species, listed in brackets below:

- River Swamp Wallaby-grass (flowers November to March);
- Swamp Fireweed (flowers November to March);
- Swamp Everlasting (flowers November to March);
- Curly Sedge (flowers September to November); and
- Swamp Diuris (flowers August to October).

The survey area was traversed on foot using the following method:

- A random meander was used to visually inspect the site and determine where targeted surveys would be required. This method involved walking across the site to get a relatively even coverage of the study

area. Areas of mapped native vegetation and drainage lines informed where survey efforts should be focussed, and these areas were prioritised. Coverage of the site was tracked using ArcGIS Field Maps® (ESRI). Where areas of habitat for threatened species were identified, transects were traversed as described below.

- Parallel transects were spaced five metres apart as this was considered adequate on-site for detecting target species given the low height and clear visibility of the vegetation. Transects were traversed and visually inspected for the target species within areas of habitat (defined below). Transects were tracked using ArcGIS Field Maps® (ESRI).
- Habitat for most of the target species was considered as swampy depressions or drainage lines where native vegetation was present and disturbance from cattle was comparatively low.

None of the five abovementioned species were recorded during the targeted survey. These species are no longer considered likely to or have the potential to occur in the study area based on these findings.

5.4. Fauna habitats

The study area supported the following three fauna habitat types:

- Wooded habitat;
- Grassland habitat; and
- Aquatic habitat

Wooded habitat

This habitat type was represented by a row of panted non-indigenous trees and dense coastal scrub along roadsides adjacent to and within the study area. No hollow-bearing trees were observed during the field assessment, however, trees planted as windbreaks provide breeding and foraging habitat for common native bird species, mammals and potentially roosting habitat for bats. Brown Falcon and Brown Goshawk were likely utilizing the windbreak on 305 Madeira Packet Road, both species were observed feeding fledglings perched in the pines. Yellow-tailed Black Cockatoos were observed foraging on the pinecones on each day of the summer survey and two Koala were observed resting in the planted windbreak of eucalypts adjacent to the eastern boundary of 305 Madeira Packet Road. Coastal scrub vegetation occurred along the boundary of the study area, around a small dam on 305 Madeira Packet Road and within the property of 333 Madeira Packet Road and varied in quality and floristic composition. Dominant native species included Coastal Wattle, Coastal Beard-heath, and Coastal Tea-tree. Native graminoids including Coast Sword-sedge, Thatch Saw-sedge and Spear-grass occurred sparsely. Weed cover was generally high with Sweet Pittosporum, Mirror Bush, Kikuyu and Blackberry being common. Weediness aside, this habitat provided an important foraging and nesting resource for threatened species including Rufous Bristlebird and potentially Southern Brown Bandicoot and Swamp Antechinus. Additionally, this habitat provided a movement corridor for these species as well as other, more common native fauna.

Photograph 1: Wooded habitat in the form of dense coastal scrub

Photograph 2: Wooded habitat in the form of a planted windbreak of pines.

Grassland habitat

This was the dominant habitat type within the study area and mostly comprised introduced pasture grasses. Generally, the condition of this habitat was considered to be poor due to the absence of native species diversity and high cover of noxious weeds. Sparse areas of native rush (*Juncus* sp.) occurred in the south-eastern portion of the study area providing foraging habitat for Blue-winged Parrot, which were frequently observed in small groups almost exclusively associated with this vegetation.

Photograph 3: Grassland habitat with native rush (Blue-winged Parrot foraging habitat)

Aquatic habitat

Areas of wetland occurred throughout the study area, including low-lying areas of pasture and constructed drainage channels. Most of the wetlands in the study area were semi-permanent or permanent and were saturated at the time of the assessment. These areas provided breeding and foraging habitat for common frogs and waterbirds, both of which were observed to be utilising aquatic habitat present. However, the limited structural diversity both within and surrounding these wetlands limited the overall value of this habitat for fauna species. Wetland areas fringed by native rush (*Juncus* sp.) also provided foraging habitat for Blue-winged Parrot.

Photograph 4: Aquatic habitat featuring low-lying wetland and connecting drainage channel beyond

Photograph 5: Aquatic habitat as a vegetated farm dam surrounded by Coastal Scrub vegetation.

5.5. Fauna species

5.5.1. Species recorded

During the field assessment 63 fauna species were recorded. This included 55 bird species (four introduced), two mammal species, one reptile species and five frog species (Appendix 4).

5.5.2. Listed species

The review of existing information [including VBA records (DEECA 2023c) and the results of the EPBC Protected Matters Search Tool (DCCEEW 2023a) indicated that within the search region there were records of, or potential suitable habitat occurred for, 59 species listed under the Commonwealth EPBC Act and 65 listed under the State FFG Act, including 43 listed under both Acts.

The following four listed fauna species were recorded during the field assessment:

- Blue-winged Parrot (EPBC: Vulnerable)
- Grey Goshawk (FFG: Endangered) (1.3 km from site)
- Rufous Bristlebird (Coorong subspecies) (FFG: Endangered)
- White-bellied Sea-Eagle (FFG: Endangered)

The likelihood of occurrence of species listed under the EPBC Act and FFG Act in the study area is addressed in Appendix 5. This analysis of potential occurrence of listed fauna species excludes the following:

- Marine fauna given that the study area is inland; and

- Oceanic bird species (such as albatrosses and petrels) given that the study area is inland.

This analysis indicates that the following 17 listed fauna species are likely to occur or have the potential to occur within the study area:

- Blue-winged Parrot (EPBC: Vulnerable)
- Brolga (FFG: Endangered)
- Eastern Great Egret (FFG: Vulnerable)
- Fork-tailed Swift (EPBC: Migratory)
- Grey Goshawk (FFG: Endangered)
- Latham's Snipe (EPBC: Vulnerable, Migratory)
- Little Eagle (FFG: Vulnerable)
- Little Egret (FFG: Endangered)
- Plumed Egret (FFG: Critically Endangered)
- Rufous Bristlebird (Coorong subspecies) (FFG: Endangered)
- Rufous Fantail (EPBC: Migratory)
- Satin Flycatcher (EPBC: Migratory)
- White-bellied Sea-Eagle (FFG: Endangered)
- White-throated Needletail (EPBC: Vulnerable, Migratory; FFG: Vulnerable)
- Southern Brown Bandicoot (EPBC: Endangered; FFG: Endangered)
- Swamp Antechinus (EPBC: Vulnerable; FFG: Vulnerable)
- Southern Bent-wing Bat (EPBC: Critically Endangered; FFG: Critically Endangered)

5.6. Listed ecological communities

EPBC Listed communities

The EPBC *Protected Matters Search Tool* (DCCEEW 2023a) indicated that five ecological communities listed under the EPBC Act had the potential to occur in the search region (Table 4). Occurrence of these communities in the study area was determined based on an assessment of the native vegetation present against published descriptions and condition thresholds for these communities.

Table 4: EPBC Act-listed ecological communities and likelihood of occurrence in the study area

Ecological Community	EPBC Status	Occurrence in the study area
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	Critically Endangered	**Does not occur within the study area.** No suitable treed vegetation recorded in the study area.
Giant Kelp Marine Forests of South East Australia	Endangered	**Does not occur within the study area.** This is a marine community.

Ecological Community	EPBC Status	Occurrence in the study area
Karst springs and associated alkaline fens of the Naracoorte Coastal Plain Bioregion	Endangered	**Does not occur within the study area.** Outside this community's range. This groundwater dependant ecological community is limited to the Gambier Limestone formation (Gambier Karst Province) within the Bridgewater (NCP01) subregion of the Naracoorte Coastal Plain IBRA6 bioregion – this subregion is located west of the study area.
Natural Temperate Grassland of the Victorian Volcanic Plain	Critically Endangered	**Does not occur within the study area**. No native grassland recorded in the study area.
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	**Does not occur within the study area**. No coastal saltmarsh recorded in the study area.

Notes: EPBC = status under the EPBC Act.

In addition, the following community was also considered for its potential to occur in the study area although it was not included in the results from the EPBC *Protected Matters Search Tool* (DCCEEW 2023a).

Table 5: Additional EPBC Act-listed ecological communities and likelihood of occurrence in the study area

Ecological Community	EPBC Status	Occurrence in the study area
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Critically Endangered	**Does not occur within the study area**. No wetland vegetation meeting the diagnostic criteria for this community in the study area, particularly given the lack of graminoid vegetation component in all of the wetlands in the study area.

No EPBC Act listed ecological communities were recorded in the study area.

FFG Listed communities

A review of the communities modelled to potentially occur within 5 kilometres of the study area (DELWP 2018b), as well as reviewing any communities without modelled distribution habitat mapping, indicated that one ecological community listed under the FFG Act had the potential to occur in the search region (Table 6). Occurrence of this community in the study area was determined based on an assessment of the fauna assemblage or native vegetation present against published descriptions of this community (SAC 2015).

Table 6: FFG Act-listed ecological communities and likelihood of occurrence in the study area

Ecological Community	Occurrence in the study area
Coastal Moonah (*Melaleuca lanceolata* subsp. *lanceolata*) Woodland	**Does not occur within the study area**. No suitable treed vegetation recorded in the study area.

No FFG Act listed ecological communities were recorded in the study area.

6. Impact assessment

6.1. Proposed development

The proposal involves the construction of a utility scale Battery Energy Storage System (BESS).

6.1.1. Impacts to native vegetation

The proposed development will result in the following impacts to 2.163 hectares of native vegetation. Refer to Section 7.1.2 for a summary of impacts and implications.

To determine impacts to native vegetation, the proposed development plan was overlaid with the native vegetation mapped as part of this investigation. Where mapped native vegetation intersects with the development layout, this was considered to be impacted. Trees are deemed impacted when the development footprint encroaches on the Tree Protection Zone (TPZ)[2]. In addition to this, the following instances of consequential removal were accounted for:

- Native vegetation occurring with a 2-metre construction buffer from the outermost extent of earthworks for the construction of access roadways.
- Native vegetation occurring with a 20-metre construction buffer from the outermost extent of earthworks for the construction of the BESS to account for bushfire management.
- Native vegetation within a works extents layout provided by the client, including laydown areas during construction and areas for drainage infrastructure for stormwater management.

6.1.2. Impacts to listed flora

The original likelihood of occurrence analysis of species listed under the EPBC Act and FFG Act (Nature Advisory 2023a) indicated that the following five listed flora species are likely to occur or have the potential to occur:

- River Swamp Wallaby Grass (EPBC: Vulnerable)
- Swamp Fireweed (EPBC: Vulnerable)
- Swamp Everlasting (EPBC: Vulnerable)
- Curly Sedge (FFG: Endangered)
- Swamp Diuris (FFG: Endangered)

All of the above listed species were previously considered to have potential to occur in suitable habitat within the native vegetation mapped in Lot 1 TP592015 Madeira Packet Road and along Oleria Road. Subsequently, targeted surveys were undertaken to establish whether the proposed development would impact the above-mentioned listed flora species as outlined in the section below. Additionally, no suitable habitat for threatened species was identified in the remaining areas of the study area, owing to the modified nature of the vegetation, lack of suitable habitat and the dominance of weedy species.

[2] In accordance with the *Assessor's Handbook* (DELWP 2018a), a tree is deemed lost when earthworks encroach on more than 10% of the Tree Protection Zone (TPZ), unless deemed otherwise by an arborist. However, trees which form part of a 'patch' of native vegetation are not required to be individually mapped in accordance with the habitat hectare assessment method, unless they meet the minimum DBH of a large tree under the relevant EVC Benchmark.

Targeted survey results

A targeted survey of Allotment 61A Section 13 Parish of Portland, Lot 1 TP592015 Madeira Packet Road and the adjacent roadsides for five flora species was conducted by two botanists across two days on 31 October 2023 and 1 November 2023 (Nature Advisory 2023). None of the above listed species were recorded during these surveys, as such no listed flora species are considered to have the potential to be impacted from the proposal.

6.1.3. Impacts to listed fauna

The following listed fauna species were recorded during the site assessment:

- Blue-winged Parrot (EPBC: Vulnerable)
- Grey Goshawk (FFG: Endangered) (1.3 km from site)
- Rufous Bristlebird (Coorong subspecies) (FFG: Endangered)
- White-bellied Sea-Eagle (FFG: Endangered)

In addition to the above listed values, the likelihood of occurrence analysis indicated that 17 listed fauna species are likely to occur or have the potential to occur. For each of these species, a susceptibility and impact assessment was undertaken, which is summarised in Table 7 below. This analysis considered the mobility of each species and the availability of other suitable habitat in the region. This informs the degree to which each species may rely on habitat in the study area and its susceptibility to the proposed development.

Table 7: Susceptibility of listed fauna species

Name	Conservation Status		Susceptibility analysis	Implications
	EPBC	FFG		
Birds (non-migratory)				
Blue-winged Parrot	V		10.827 hectares of BWP foraging habitat is proposed to be impacted by the proposal. During the field assessment, in July 2023 and again in January 2024, small groups (5-15 birds) of Blue-winged Parrots were observed foraging throughout the south-eastern portion of the study area (Lot 1 TP592015 Madeira Packet Road) in areas that contained native rushes (*Juncus* sp.) and common weed species. Birds remained present in the study area throughout the field assessment and, when flushed, would move to nearby areas of suitable foraging habitat or fly south to the wooded habitat within the Sir William Grant Wind Farm. The observation of Blue-winged Parrots in winter and summer and the presence of immature birds within the flocks in summer suggests that the local population of this species regularly utilises the study area. However, given the extensive areas of similar habitat throughout the broader landscape, it is unlikely that the species is reliant on habitat within the study area. Additionally, no roosting or nesting habitat is proposed to be impacted by the project.	Population decline of Blue-winged Parrot has likely been caused by habitat loss and deterioration in habitat quality (Holdsworth et al. 2021). Habitat critical to the survival or important habitat for Blue-winged Parrot includes (but is not limited to) areas that are necessary for foraging and staging habitats found from coastal, sub-coastal and inland areas, and wetlands near the coast (DCCEEW 2023c). Any removal of such habitat is considered a threatening process for this species, as such it is recommended that the proposal is referred under the EPBC Act.
Brolga		E	There are recent records of Brolga from the search region (DEECA 2023). While suitable habitat occurs within the study area, it is marginal in quality and extent, as such, this species is unlikely to be dependent on habitat within the study area for breeding or foraging.	Development of the study area is unlikely to have a significant impact on these species. However, enhancement of the existing habitat through the implementation of a LMP could establish more suitable habitat for these species.
Eastern Great Egret		V	Known to utilise open shallow water and flooded grasslands. Marginal habitat occurs within study area. Requires trees for breeding and roosting. This species is unlikely to be dependent on habitat within the study area.	

Name	Conservation Status		Susceptibility analysis	Implications
	EPBC	FFG		
Grey Goshawk		E	Grey Goshawk was recorded 1.3 km from the study area. It mostly occurs where forest or woodland provide cover for hunting from perches. While this species was observed close to the study area, there is an absence of suitable foraging and breeding habitat within the boundaries of the study area.	Development of the study area is unlikely to have a significant impact on this species.
Little Eagle		V	Little Eagle is widespread but prefers open woodland habitats. While this species may occasionally visit the study area, there is an absence of suitable foraging and breeding habitat.	Development of the study area is unlikely to have a significant impact on this species.
Little Egret		E	Little Egret may occasionally visit the study area but is unlikely to be reliant on the marginal wetland habitat present.	Development of the study area is unlikely to have a significant impact on these species. However, enhancement of the existing habitat through the implementation of a LMP could establish more suitable habitat for these species.
Plumed Egret		CE	Plumed Egret may occasionally visit the study area but is unlikely to be reliant on the marginal wetland habitat present.	
Rufous Bristlebird (Coorong)		E	0.072 hectares of suitable habitat is proposed to be impacted by the proposal. Eastern Bristlebird was recorded in roadside coastal scrub along the northern, eastern and southern boundaries of the study area. Bristlebirds are ground-dwelling, weak flyers and most likely have poor dispersal capabilities. Any removal or fragmentation of suitable habitat is regarded as a threatening process for this species, which relies on dense cover for breeding, foraging and dispersal.	Given that the project is only proposing to remove a relatively small area of habitat in comparison to the extensive areas of suitable habitat in the surrounding landscape, impacts are unlikely to be significant to the species. Additionally, enhancement of the existing habitat or planting of additional vegetation through the implementation of a LMP could establish more suitable habitat for these species.
White-bellied Sea-Eagle		E	White-bellied Sea-Eagle was recorded flying over the study area but it is unlikely to be reliant on the planted wind break of pines or the marginal wetland habitat present.	Development of the study area is unlikely to have a significant impact on this species.

Name	Conservation Status		Susceptibility analysis	Implications
	EPBC	FFG		
Migratory Birds				
Fork-tailed Swift	M		This species is a migrant from north-east Asia, occurring in Australia from October to April. It is likely to occur in the study area in summer and early autumn when conditions are suitable. It is almost exclusively aerial, foraging up to hundreds of metres above the ground but also above the canopy of forests and over open plains (Menkhorst et al. 2019).	Given its aerial habits and occasional occurrence, it is unlikely that Fork-tailed Swift would be directly impacted by development of the study area.
Latham's Snipe	V, M		This species may occur in the study area seasonally (late August to March) following rain events resulting in more extensive inundation of low-lying areas of existing wetlands, particularly where soft substrates (e.g. mud) results in suitable feeding habitat. However, the habitat is considered sub-optimal given the lack of low, dense vegetation. More extensive suitable areas nearby (i.e. Fawthrop Lagoon) contain high quality wetlands that likely provide habitat for Latham's snipe in spring and summer and some birds may visit the study area intermittently.	Given the limited extent and marginal quality of habitat, the study area is unlikely to support a consistent population of Latham's Snipe and therefore the risk to the species' population arising from development of the study area is low. However, enhancement of the existing habitat through the implementation of a LMP could establish more suitable habitat for these species.
Rufous Fantail	M		This species breeds in densely forested habitats along the coast and Great Dividing Range of eastern Australia. It migrates north as far as southern New Guinea to spend winter (Higgins et al. 2006). This species may occasionally pass through the study area utilising roadside vegetations where treed habitat is close to continuous. It was observed in the extensive habitat that lies not far to the north in Cobboboonee NP and Narrawong FR during the summer survey.	Since the areas of potential habitat are not extensive and suboptimal for breeding, development of the study area is unlikely to have a significant impact on this species.
Satin Flycatcher	M		This species breeds in densely forested habitats along the coast and Great Dividing Range of eastern Australia. It migrates north as far as southern New Guinea to spend winter (Higgins et al. 2006). This species may occasionally pass through the study area utilising roadside vegetations where treed habitat is close to continuous. Extensive habitat lies not far to the north in Cobboboonee NP and Narrawong FR.	Since the areas of potential habitat are not extensive and suboptimal for breeding, development of the study area is unlikely to have a significant impact on this species.

Name	Conservation Status		Susceptibility analysis	Implications
	EPBC	FFG		
White-throated Needletail	V, M	V	This species is a trans-equatorial migrant breeding in north-east Asia and spending its non-breeding season in Australia from September to April (Higgins 1999). It is likely to occur regularly in summer and early autumn when conditions are suitable. It forages aerially for insects and is rarely if ever seen perching in Australia.	Given its aerial habits and occasional occurrence, it is unlikely that White-throated Needletail would be directly impacted by development of the study area.
Mammals				
Southern Brown Bandicoot	E	E	0.072 hectares of suitable habitat is proposed to be impacted by the proposal. This species likely occurs within the study area due to numerous nearby records and the presence of suitable habitat (dense coastal scrub) along the boundary. This vegetation is considered continuous with larger areas of habitat within the surrounding landscape where individuals have been recorded as recently as 2017. If Southern Brown Bandicoot is present, the species may be impacted by development in the study area due to the potential loss of suitable nesting and foraging habitat, and movement corridors.	Given that the project is only proposing to remove a relatively small area of habitat in comparison to the extensive areas of suitable habitat in the surrounding landscape, impacts are unlikely to be significant to the species. However, given that an EPBC referral has been recommended for impacts to the BWP, these impacts should be considered as part of the application. Additionally, enhancement of the existing habitat or planting of additional vegetation through the implementation of a LMP could establish more suitable habitat for these species.
Swamp Antechinus	V	V	0.072 hectares of suitable habitat is proposed to be impacted by the proposal. This species has potential to occur within the study area due to the presence of suitable habitat (dense coastal scrub) along the boundary of the study area. This vegetation is considered continuous with larger areas of suitable habitat within the surrounding landscape. If Swamp Antechinus is present, the species may be impacted by development in the study area due to the potential loss of suitable nesting and foraging habitat, and movement corridors	
Southern Bent-wing Bat	CE	CE	This species had been recorded in the search region and is known to forage widely. Southern Bent-wing Bat is an open-space adapted species that may occasionally fly over the study area.	Development of the study area is unlikely to have a significant impact on this species.

Notes: Grey shading indicates species considered to be susceptible to impacts; CE =Critically Endangered; E = Endangered; V = Vulnerable; M = Migratory.

The susceptibility analysis indicated that the following four listed fauna species have the potential to be impacted by the proposed development:

- Blue-winged Parrot (EPBC: Vulnerable) –10.827 hectares of suitable foraging habitat proposed to be impacted
- Rufous Bristlebird (FFG: Endangered) – 0.072 hectares of suitable habitat proposed to be impacted
- Southern Brown Bandicoot (EPBC: Endangered; FFG: Endangered) – 0.072 hectares of suitable habitat proposed to be impacted
- Swamp Antechinus (EPBC: Vulnerable; FFG: Vulnerable) – 0.072 hectares of suitable habitat proposed to be impacted

Suitable habitats for these four listed fauna species in the study area are mapped in Figure 1. Although habitat is proposed to be removed by the proposal, none of the above listed species are considered to be significantly impacted for the reasons detailed in the above table.

The Blue-winged Parrot was observed utilising suitable habitat in Lot 1 TP592015 Madeira Packet Road and the Rufous Bristlebird (Coorong subspecies) was recorded using suitable habitat within the roadside vegetation and 333 Madeira Packet Road. Both the Southern Brown Bandicoot and Swamp Antechinus are assumed to occupy similar habitat to that of the Rufous Bristlebird. This is based on recent nearby historic records (DEECA 2023) and the suitability of this habitat.

Recommendations are provided in Section 8 to assist in the avoidance and mitigation of impacts to the above listed species.

Implications under the EPBC Act are discussed in Section 7.3, while implications under the FFG Act are detailed in Section 7.4.

Species which were deemed not to be susceptible to the proposed development (Table 7) are not discussed further.

6.1.4. Impacts to listed communities

The likelihood of occurrence analysis indicated that the study area is unlikely to support any EPBC or FFG listed communities (see Section 5.6).

Therefore, there are no anticipated impacts to listed communities from the proposal.

7. Implications under legislation and policy

7.1. Implications under Clause 52.17

A permit for the proposed removal of native vegetation is required under Cl. 52.17 of the Glenelg Planning Scheme.

Furthermore, a permit is also required under Clause 52.17 for the removal of incidental occurrences of native vegetation that do not constitute a patch or scattered tree under the Guidelines. Though, no offsets obligations are generated from such removal.

7.1.1. Exemptions to Clause 52.17

Exemptions listed in Cl. 52.17-7 relevant to the study area are discussed below.

Planted vegetation

- *Planted vegetation:* Native vegetation that is to be removed, destroyed or lopped that was either planted or grown as a result of direct seeding. This exemption does not apply to native vegetation planted or managed with public funding for the purpose of land protection or enhancing biodiversity.

Three Cypress-pine trees, a windbreak of a younger cohort of Cypress-pine and some planted River She-oak were present within the north-eastern section of Allotment 61A Section 13 Parish of Portland. Additionally, various shrubs and eucalypts were recorded as planted within the property at 333 Madeira Packet Road. These trees were recognised as planted due to the location of the study area in the context of these species' natural distribution, as well as the windbreak and River She-oaks having a linear orientation, generally even spacing and similar age class.

Regrowth

- *Regrowth:* Native vegetation that is to be removed, destroyed or lopped that has naturally established or regenerated on land lawfully cleared of naturally established native vegetation, and may be classified as one of the following:
    - Less than 10 years old; or
    - Austral Bracken (*Pteridium esculentum*); or
    - Within the boundary of a timber production plantation, as indicated on a Plantation Development Notice or other documented record and has established after the plantation; or
    - Less than ten years old at the time of a property vegetation plan being signed by the Secretary to DEECA (as constituted under Part 2 of the *Conservation, Forests and Lands Act 1987*) and is shown on that plan as being 'certified regrowth'; and on land that is to be used or maintained for cultivation or pasture during the term of that plan.

  This exemption does not apply to land where native vegetation has been destroyed or otherwise damaged as a result of flood, fire or other natural disaster.

Native vegetation comprising regrowth of Austral Bracken was identified in the study area, notably in Lot 1 TP592015 Madeira Packet Road, 305 Madeira Packet Road and on public land (adjacent roadsides). Austral Bracken had established amongst exotic grasses after land clearing and modification for the sowing of introduced pasture and the construction of the road.

7.1.2. Impacts to native vegetation

Given the above exemptions, the proposed development will result in the loss of a total extent of 2.151 hectares of native vegetation under the Guidelines as represented in Figure 2 and documented in the *Native Vegetation Removal* (NVR) report provided by DEECA (Appendix 7).

This comprised the following:

- 2.163 hectares of native vegetation in patches (including no large trees in patches).
- No scattered trees
- No DEECA mapped wetlands

The native vegetation to be removed is in an area mapped as an endangered Ecological Vegetation Class.

Additionally, it has been advised that no native vegetation has been removed on the property within the last five years.

7.1.3. Avoid and minimise statement

In accordance with the Guidelines, all applications to remove native vegetation must provide an avoid and minimise statement that describes any efforts undertaken to avoid the removal of, and minimise the impacts to biodiversity and other values of native vegetation, and how these efforts were focused on areas of native vegetation with the highest value. Efforts to avoid and minimise impacts to native vegetation in the current application are presented as follows:

- Site level planning – The proposed development has been designed to largely avoid impacts to native vegetation through an ongoing consultation process with the proponents and the ecological consultant. The infrastructure is proposed to be developed primarily in areas of exotic pasture grasses and will only impact constructed drainage lines of poor quality (HZ's U, V and W), partially impact poor quality Heathy Woodland roadside vegetation (HZ's X, Y, AU and RC), portions of poor quality Aquatic Herbland (HZ's B & G) and exempt native vegetation. Although the proposed development is largely to be developed primarily in areas of exotic pasture and areas of low-quality native vegetation, it overlaps significantly with mapped Blue-winged Parrot habitat within the property located at Lot 1 TP592015 Madeira Packet Road.

Design and construction recommendations to further avoid and minimise impacts to native vegetation are provided in Section 8.

7.1.4. Modelled species important habitat

The current proposal footprint will not have a significant impact on modelled habitat for any rare or threatened species as determined in the NVR Report (Appendix 7).

7.1.5. Assessment pathway

The assessment pathway is determined by the location category and extent of native vegetation as detailed for the study area as follows:

- **Location Category:** Location 1
- **Extent of native vegetation:** A total of 2.163 hectares of native vegetation (including no large trees).

Based on the extent of native vegetation removal being ≥ 0.5 hectares, the Guidelines stipulate that the proposal is to be assessed under the **Detailed** assessment pathway, as determined by the following matrix:

Table 8: Assessment pathway matrix

Extent of native vegetation	Location Category		
	Location 1	Location 2	Location 3
< 0.5 hectares and not including any large trees	Basic	Intermediate	Detailed
< 0.5 hectares and including one or more large trees	Intermediate	Intermediate	Detailed
≥ 0.5 hectares	**Detailed**	Detailed	Detailed

7.1.6. Offset requirements

Offsets required to compensate for the proposed removal of native vegetation from the study area are as follows:

- 0.599 general habitat units and must include the following offset attribute requirements:
  - Minimum strategic biodiversity value (SBV) of 0.463.
  - Occur within the Glenelg Hopkins CMA boundary or the Glenelg Shire municipal district.
  - Include protection of at least 0 large trees.

Under the Guidelines all offsets must be secured prior to the removal of native vegetation.

7.1.7. Offset statement

The offset target for the current proposal will be achieved via a third-party offset.

An online search of the Native Vegetation Credit Register (NVCR) has shown that the required offset is currently available for purchase from a native vegetation credit owner (DEECA 2023d).

Evidence that the required offset is available is provided in Appendix 8. The required offset would be secured following approval of the application to remove native vegetation.

Figure 2: Native vegetation to be removed

Project number: 23146.03
Project: Pacific Green, Portland
Date: 22/07/2024

- Study area
- Property boundary
- Works impact area July 2024
- Proposed development layout

Native vegetation

- Small scattered tree
- Aquatic Herbland (EVC 653)
- Heathy Woodland (EVC 48)
- Native vegetaion to be removed

N

Metres
0 90

Nature Advisory
PO Box 337, Camberwell, VIC 3124, Australia
www.natureadvisory.com.au
03 9815 2111 - info@natureadvisory.com.au

7.2. Implications under other planning provisions

7.2.1. Clause 12.01

The objectives and strategies of Clause 12.01 (outlined in Section 3.1.1) are in general, achieved by the 'Guidelines' and the avoid, minimise and offset obligations as detailed within this report. However, this clause is also relevant to the application by considering the protection and enhancement of habitat for indigenous plants and animals in urban areas and avoiding fragmentation of habitat.

This application responds to these objectives by siting the development primarily in areas of non-native vegetation and poor-quality native vegetation. Additionally, the majority of the Rufous Bristlebird habitat, and potential Southern Brown Bandicoot and Swamp Antechinus habitat within the study area will be retained and large portions of the wetlands within the study area will be avoided. Furthermore, there is scope to create and enhance habitat and increase connectivity between habitat zones in areas that will not be developed (see Section 8).

7.2.2. Clause 12.03

The objectives and strategies of Clause 12.03 (outlined in Section 3.1.1) are in general, achieved by the 'Guidelines' and the avoid, minimise and offset obligations as detailed within this report.

This application largely responds to these objectives as the development minimises impacts to existing wetlands and drainage lines within the study area. It is understood that a stormwater management plan will be prepared to sensitively manage runoff on the site and ensure it is adequately filtered before being discharged into the existing wetlands. There is scope to design wetlands proposed to be constructed for ecological benefit as well as enhance existing wetlands that are to be retained on site (see Section 8)

7.2.3. Zoning

The application requirements and decision guidelines for the applicable zones are not considered relevant to this investigation.

7.3. Implications under the EPBC Act

The EPBC Act protects a number of threatened species and ecological communities that are considered to be of national conservation significance. Any significant impacts on these species require the approval of the Australian Minister for the Environment.

Based on the relevant guidelines, the proposed development is unlikely to result in a significant impact on the EPBC Act-listed values presented below:

- Blue-winged Parrot (EPBC: Vulnerable)
- Southern Brown Bandicoot (EPBC: Endangered; FFG: Endangered)
- Swamp Antechinus (EPBC: Vulnerable; FFG: Vulnerable)

However, it is recommended that a Referral under the EPBC Act is undertaken for the impacts to habitat for the above threatened fauna.

7.4. Implications under the FFG Act

Impacts to FFG Act-listed values generally only has implications for where they occur on public land.

Threatened species

Habitat for the following FFG Act values listed as threatened are anticipated to be impacted from the proposed development:

- Rufous Bristlebird (Coorong subspecies) (FFG: Endangered)

- Southern Brown Bandicoot (EPBC: Endangered; FFG: Endangered)
- Swamp Antechinus (EPBC: Vulnerable; FFG: Vulnerable)

Any application for a planning permit may be assessed by the responsible or referral authority for potential impacts to FFG threatened values as part of broader considerations of impacts to biodiversity.

Protected Flora

The following FFG Act values listed as protected are anticipated to be impacted from the proposed development on public land:

- Coast Wattle
- Coastal Beard-heath

Coast Wattle was the dominant species present in most native vegetation patches on public land (road reserves). Similarly, Coastal Beard-heath was observed in many native vegetation patches on public land (road reserves). An exact count of individuals of these species was not undertaken during the field assessment. Additionally, Coast Wattle has been considered as an environmental weed as it is occurring beyond its natural distribution (within coastal dune systems within ~200 metres of the coastline).

A Protected Flora Permit would be required from DEECA to remove the plant taxa comprising the abovementioned listed threatened flora species. Protected Flora Permits can only be lodged after a planning permit is obtained.

A site survey to count the number of individual plants that will be impacted would be required to support the protected flora permit application.

7.5. Implications under the EE Act

The *Ministerial Guidelines for Assessment of Environmental Effects under the* Environment Effects Act 1978 (DSE 2006) identifies criteria that trigger a Referral to the State Minister for Planning.

Based on the relevant criteria, a Referral to the state Minister for Planning will not be required under the EE Act for the aspects covered by the current investigation.

7.6. CaLP Act

The *Catchment and Land Protection Act 1994* (CaLP Act) requires that landowners (or a third party to whom responsibilities have been legally transferred) must eradicate regionally prohibited weeds and prevent the growth and spread of regionally controlled weeds.

Property owners who do not eradicate regionally prohibited weeds or prevent the growth and spread of regionally controlled weeds for which they are responsible, may be issued with a Land Management Notice or Directions Notice that requires specific control work to be undertaken.

In accordance with the *Catchment and Land Protection Act 1994*, the noxious weed species listed below, that were recorded in the study area, must be controlled:

- African Box-thorn
- Blackberry
- Boneseed
- Gorse

Precision control methods that minimise off-target kills (e.g. spot spraying) should be used in environmentally sensitive areas (e.g. within or near native vegetation, waterways, etc.).

8. Design and construction mitigation recommendations

The following design recommendations are provided to avoid/minimise impacts to protected biodiversity values in the study area, including native vegetation and threatened flora and fauna:

- Investigate the potential to reposition a transmission line tower which is currently proposed to be constructed within native vegetation identified as suitable habitat for the Rufous Bristlebird, Southern Brown Bandicoot and Swamp Antechinus (Habitat Zone AU).
- Consider opportunities to rehabilitate habitat for threatened flora and fauna – it is recommended that a Land Management Plan is prepared to demonstrate how the project will protect, enhance and create habitat for significant values that are known to or have the potential to occur in the study area. Particular areas that are strongly recommended to be retained as conservation areas include the following:
    - Any areas not within the construction footprint to be rehabilitated into high quality Blue-Winged Parrot habitat to compensate for impacts to the modified habitat they have been identified using in Lot 1 TP592015 Madeira Packet Road. This will also create potential habitat for other species. It is noted that some revegetation has already been undertaken in the form of a 10 metre wide corridor along the western boundary. This revegetation has been undertaken in consideration of the BWP habitat requirements.
    - Coast Wattle-dominated vegetation in the adjacent roadsides – investigate the feasibility in collaborating with VicRoads/council to undertake gradual weed removal and enhance native understorey for Rufous Bristlebird, Southern Brown Bandicoot and Swamp Antechinus habitat. Would also be highly beneficial to connect the native vegetation patches along Madeira Packet Road and Tecoma Road with native shrubs and understorey plants. Alternatively, any screen plantings within the property boundary should consider establishing suitable habitat for the above listed species, as well as the BWP.
    - The existing wetlands in the study area currently provide limited habitat for common wetland species. These areas should be enhanced to encourage utilisation by a broader array of species, including those which are threatened. There is an opportunity to ensure any construct wetlands to manage stormwater on the site are designed in consideration of providing fauna habitat. Any proposed revegetation should attempt to link existing habitats to areas proposed for enhancement.

Recommendations to mitigate impacts to retained native vegetation during the construction phase are provided below:

- Establish appropriate vegetation protection zones around areas of native vegetation to be retained prior to works.
- Establish appropriate TPZs around native trees to be retained prior to works.
- Ensure all construction personnel are appropriately briefed prior to works, and that no construction personnel, machinery or equipment are placed inside vegetation zones/TPZs.
- A suitably qualified zoologist should undertake a pre-clearance survey of planted trees to be removed during the week prior to removal to identify the presence of any nests or hollows.
- If considered necessary based on the results of the pre-clearance survey, a suitably qualified zoologist should be on site during any tree removal works to capture and relocate any misplaced fauna that may be present.

9. References

Allen, GR, Midgley, SH & Allen, M 2002, Field Guide to the Freshwater Fishes of Australia, Western Australian Museum, Perth.

Cadwallader, PL & Backhouse, GN 1983, A Guide to the Freshwater Fish of Victoria, Fisheries and Wildlife, Melbourne.

Carter, N, Cooke R, White, JG, Whisson, DA, Isaac, B & Bradsworth, N 2019, 'Joining the dots: How does an apex predator move through an urbanzing landscape?', Global Ecology and Conservation, vol. 16, pp. 1-12.

Clemann N & Gillespie GR 2004, 'Recovery Plan for *Litoria raniformis* 2004 – 2008', Department of Environment and Heritage, now Department of the Environment, Canberra.

Cogger HG 2000, Reptiles and Amphibians of Australia, Reed New Holland, Sydney; State Wide Integrated Flora and Fauna Teams (SWIFFT) 2020, Species profile database - Southern Toadlet, SWIFFT, accessed 201X.

Commonwealth of Australia 2016, National Recovery Plan for the Plains-wanderer (*Pedionomus torquatus*), Commonwealth of Australia, Canberra.

DCCEEW 2023a, *EPBC Act Protected Matters Search Tool*, Department of the Environment and Energy, Canberra, viewed July 2023 , https://www.environment.gov.au/epbc/pmst/index.html.

DCCEEW 2023b, *Species Profile and Threats Database*, Department of Climate Change, Energy, the Environment and Water, Canberra, https://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl.

DCCEEW 2023c, Conservation Advice for *Neophema chrysostoma* (blue-winged parrot), Department of Climate Change, Energy, the Environment and Water, Canberra.

DCCEEW 2023d, Conservation Advice for *Lissolepis coventryi* (swamp skink), Department of Climate Change, Energy, the Environment and Water, Canberra.

DEE 2016, 'Conservation advice - *Antechinus minimus maritimus*', Department of the Environment and Energy, Canberra, <http://www.environment.gov.au/sprat>

DEECA 2023a, *Flora and Fauna Guarantee Act 1988 – Threatened List, June 2023*, Department of Energy, Environment and Climate Action (DEECA), Melbourne.

DEECA 2023b, *NatureKit*, Department of Energy, Environment and Climate Action, Melbourne, Victoria, viewed July 2023, https://www.environment.vic.gov.au/biodiversity/naturekit.

DEECA 2023c, *Victorian Biodiversity Atlas 3.2.8*, Department of Energy, Environment and Climate Action, Melbourne, Victoria, viewed July 2023, https://vba.dse.vic.gov.au.

DEECA 2023e, *MapShareVic*, Department of Energy, Environment and Climate Action, Melbourne, Victoria, viewed July 2023, https://www2.delwp.vic.gov.au/maps/maps-and-services/interactive-maps.

DEECA 2023f, *Native Vegetation Information Management system*, Department of Energy, Environment and Climate Action, Melbourne, Victoria, viewed July 2023, https://nvim.delwp.vic.gov.au/.

DELWP 2017, *Guidelines for the removal, destruction or lopping of native vegetation*-, Department of Environment, Land, Water and Planning, now Department of Energy, Environment and Climate Action (DEECA), Melbourne.

DELWP 2018a, *Assessor's Handbook – Applications to remove, destroy or lop native vegetation* (Version 1.1, dated October 2018), Department of Environment, Land, Water and Planning, now Department of Energy, Environment and Climate Action (DEECA), Melbourne.

DELWP 2018b, *Native Vegetation – Flora and Fauna Guarantee Act Listed Communities* (Resource Name: NV2005_FFG_COMM, dated 1 February 2018), Department of Environment, Land, Water and Planning, now Department of Energy, Environment and Climate Action (DEECA), Melbourne.

DELWP 2019, *Flora and Fauna Guarantee Act 1988 - Protected Flora List, November 2019*, Department of Environment, Land, Water and Planning, now Department of Energy, Environment and Climate Action (DEECA), Melbourne.

DNRE 1997, *Victoria's Biodiversity – Directions in Management*, Department of Natural Resources and Environment (DNRE), now Department of Energy, Environment and Climate Action (DEECA), Melbourne.

DSE 2003, Flora and Fauna Guarantee Action Statement #49: Rufous Bristlebird (*Dasyornis broadbenti*), Department of Sustainability and Environment, Victoria.

DSE 2004a, *Ecological Vegetation Class (EVC) Benchmarks by Bioregion*, Department of Sustainability and Environment (DSE), now Department of Energy, Environment and Climate Action (DEECA), Melbourne.

DSE 2004b, *Native Vegetation: sustaining a living landscape, Vegetation Quality Assessment Manual – guidelines for applying the Habitat Hectare scoring method (Version 1.3)*, Department of Sustainability and Environment (DSE), now Department of Energy, Environment and Climate Action (DEECA), Melbourne.

DSE 2006, *Ministerial Guidelines for Assessment of Environmental Effects under the* Environmental Effects Act 1978, Department of Sustainability and Environment (DSE), now Department of Energy, Environment and Climate Action (DEECA), Melbourne.

DTP 2024, *Glenelg Planning Scheme,* Department of Transport and Planning, Melbourne.

Emison, WB, Beardsell, CM, Norman, FI, Loyn, RH & Bennett SC 1987, Atlas of Victorian Birds, Department of Conservation, Forests and Lands and the Royal Australasian Ornithologists Union, Melbourne.

Higgins PJ & Peter JM 2002, Handbook of Australian, New Zealand and Antarctic Birds, Volume 6: Pardalotes to Shrike-thrushes, Oxford University Press, Melbourne.

Higgins PJ 1999, Handbook of Australian, New Zealand and Antarctic Birds, Volume 4: Parrots to Dollarbird, Oxford University Press, Melbourne.

Higgins, PJ & Davies, SJJF 1996, Handbook of Australian, New Zealand and Antarctic Birds, Volume 3: Snipe to Pigeons, Oxford University Press, Melbourne.

Higgins, PJ & Peter, JM 2002, Handbook of Australian, New Zealand and Antarctic Birds, Volume 6: Pardalotes to Shrike-thrushes, Oxford University Press, Melbourne.

Higgins, PJ, Peter, JM & Cowling, SJ 2006, Handbook of Australian, New Zealand and Antarctic Birds, Volume 7: Boatbills to Starlings, Oxford University Press, Melbourne.

Higgins, PJ, Peter, JM & Steele, WK 2001, Handbook of Australian, New Zealand and Antarctic Birds, Volume 5: Tyrant-flycatchers to Chats, Oxford University Press, Melbourne.

Holdsworth M, Newman M, Menkhorst P, Morley C, Cooper R, Green B, Starks J, Baker GB, Garnett ST (2021) Blue-winged Parrot *Neophema chrysostoma*, in *The Action Plan for Australian Birds 2020*. (Eds ST Garnett and GB Baker, CSIRO Publishing, Melbourne.

Johnstone RE & Storr GM 1998, Handbook of Western Australian Birds, Volume 1: Non-passerines (Emu to Dollarbird), West Australian Museum, Perth, Western Australia.

Kennedy SJ & Tzaros CL 2005, 'Foraging ecology of the Swift Parrot *Lathamus discolor* in the box-ironbark forests and woodlands of Victoria', Pacific Conservation Biology 11: 158--173.

Marchant S & Higgins PJ 1990, Handbook of Australian, New Zealand and Antarctic birds, Volume 1: Ratites to Ducks, Oxford University Press, Melbourne.

Marchant, S & Higgins, PJ 1993, Handbook of Australian, New Zealand and Antarctic birds, Volume 2: Raptors to Lapwings, Oxford University Press, Melbourne.

Menkhorst P, Rogers D, Clarke R, Davies J, Marsack P & Franklin, K 2019, The Australian Bird Guide, CSIRO, Australia.

Menkhorst, P 1995, Mammals of Victoria, Oxford University Press, Melbourne.

Morgan, GJ 1986, 'Freshwater crayfish of the genus *Euastacus* Clark (Decapoda: Parastacidae) from Victoria' Memoirs of the Museum of Victoria, 47:1-57.

Naarding JA 1983, Latham's Snipe in Southern Australia, Wildlife Division Technical Report 83/1, Tasmania National Parks and Wildlife Service, Tasmania.

Nature Advisory 2023, *Portland Battery Energy Storage System (BESS) - Targeted Flora Survey* - Report No. 23146.02 (1.0), Nature Advisory Pty Ltd, Hawthorn East, consultant report prepared for Pacific Green Technologies Pty Ltd.

Parkes D, Newell G & Cheal D 2003, Assessing the Quality of Native Vegetation: The 'habitat hectares' approach', *Ecological Management and Restoration* 4:29 – 38.

Read, JL 1994, 'The diet of three species of Firetail Finches in temperate South Australia', Emu – Austral Ornithology, vol. 94, pp. 1-8.

Saddlier S, Jackson J & Hammer, M 2010, 'National recovery plan for the Dwarf Galaxias (*Galaxiella pusilla*)', Department of Environment, Land, Water & Planning (DELWP), Melbourne.

Scientific Advisory Committee (SAC) 2015, *Flora and Fauna Guarantee Act 1988 – Threatened List: Characteristics of Threatened Communities*, Department of Energy, Environment and Climate Action, Melbourne.

Saunders, DL & Tzaros, CL 2011, 'National recovery plan for Swift Parrot *Lathamus discolor*', Birds Australia, Melbourne.

Tzaros, C 2005, Wildlife of the Box-Ironbark Country, CSIRO Publishing, Collingwood.

Wilson, S & Swan, G 2003, A Complete Guide to the Reptiles of Australia, Reed New Holland, Sydney.

Appendix 1: Detailed habitat hectare assessment results

Habitat Zone			RA	RC	RE	RF	RG	A	B	C	D	F	G	J	P	Q	S
Bioregion			GlePP	GlePP	GlePP	GlePP	GlePP	GlePP	GlePP	GlePP	GlePP	GlePP	GlePP	GlePP	GlePP	GlePP	GlePP
EVC Number			48	48	48	48	48	653	653	653	653	653	653	653	653	653	653
Total area of Habitat Zone (ha)			0.193	0.185	0.518	0.447	0.265	0.023	0.629	0.063	0.044	5.193	3.082	0.068	0.081	0.044	0.023
Site Condition	Large Old Trees	/10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tree Canopy Cover	/5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lack of Weeds	/15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Understorey	/25	5	5	5	10	10	15	15	15	10	10	10	10	10	10	10
	Recruitment	/10	5	5	3	3	3	0	0	0	0	0	0	0	0	0	0
	Organic Matter	/5	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0
	Logs	/5	2	0	0	2	2	0	0	0	0	0	0	0	0	0	0
	Site condition standardising multiplier*		1.00	1.00	1.00	1.00	1.00	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36
	Site Condition subtotal		*12*	*10*	*8*	*18*	*18*	*20*	*20*	*20*	*14*	*14*	*14*	*14*	*14*	*14*	*14*
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	1	1	4	2	1	1	1	1
	Neighbourhood	/10	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
	Distance to Core	/5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Total Condition Score		**/100**	**17**	**15**	**13**	**24**	**24**	**25**	**25**	**25**	**19**	**22**	**20**	**19**	**19**	**19**	**19**

* Modified approach to habitat scoring - refer to Table 14 of DEECA's Vegetation Quality Assessment Manual (DSE, 2004).

Habitat Zone			T	U	V	W	X	Y	AA	AB	AD	AE	AF	AG	AH
Bioregion			GIeP	GIeP	GIeP	GIeP	GIeP	GIeP	GIeP	GIeP	GIeP	GIeP	GIeP	GIeP	GIeP
EVC Number			653	653	653	653	48	48	48	48	48	48	48	48	48
Total area of Habitat Zone (ha)			0.047	0.107	0.075	0.260	0.060	0.041	0.561	0.190	0.048	0.146	0.064	0.044	0.102
Site Condition	Large Old Trees	/10	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tree Canopy Cover	/5	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lack of Weeds	/15	0	0	0	0	6	9	9	13	2	2	2	2	2
	Understorey	/25	10	10	10	10	5	5	10	5	5	5	5	5	5
	Recruitment	/10	0	6	0	0	5	5	5	5	5	5	5	5	5
	Organic Matter	/5	0	0	0	0	4	3	5	5	4	4	4	0	0
	Logs	/5	0	0	0	0	0	0	0	0	0	0	0	0	0
	Site condition standardising multiplier*		1.36	1.36	1.36	1.36	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Site Condition subtotal		*14*	*22*	*14*	*14*	*20*	*22*	*29*	*28*	*16*	*16*	*16*	*12*	*12*
Landscape Context	Patch Size	/10	1	1	1	1	2	1	2	2	1	1	1	1	1
	Neighbourhood	/10	0	0	0	0	1	1	2	2	0	0	0	0	0
	Distance to Core	/5	4	4	4	4	3	3	3	3	1	1	1	1	1
Total Condition Score		**/100**	**19**	**27**	**19**	**19**	**26**	**27**	**36**	**35**	**18**	**18**	**18**	**14**	**14**

* Modified approach to habitat scoring - refer to Table 14 of DEECA's Vegetation Quality Assessment Manual (DSE, 2004).

Habitat Zone			AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU
Bioregion			GIeP	GIeP	GIeP	GIeP	GIeP	GIeP	GIeP	GIeP	GIeP	GIeP	GIeP	GIeP	GIeP
EVC Number			48	48	48	48	48	48	48	48	48	48	48	48	48
Total area of Habitat Zone (ha)			0.007	0.199	0.006	0.004	0.019	0.013	0.007	0.032	0.011	0.029	0.031	0.133	0.072
Site Condition	Large Old Trees	/10	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tree Canopy Cover	/5	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lack of Weeds	/15	4	2	4	2	4	4	4	7	4	7	2	2	0
	Understorey	/25	5	5	5	5	5	5	5	5	5	5	5	5	5
	Recruitment	/10	5	5	5	5	5	5	5	5	5	5	5	5	3
	Organic Matter	/5	3	0	3	3	3	3	3	3	3	3	4	4	5
	Logs	/5	0	0	0	0	0	0	0	0	0	0	0	0	4
	Site condition standardising multiplier*		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Site Condition subtotal		*17*	*12*	*17*	*15*	*17*	*17*	*17*	*20*	*17*	*20*	*16*	*16*	*17*
Landscape Context	Patch Size	/10	1	1	1	1	1	1	1	1	1	1	1	1	1
	Neighbourhood	/10	0	0	1	1	1	1	1	1	1	1	0	0	0
	Distance to Core	/5	1	1	1	1	1	1	1	1	1	1	1	1	3
Total Condition Score		**/100**	**19**	**14**	**20**	**18**	**20**	**20**	**20**	**23**	**20**	**23**	**18**	**18**	**21**

* Modified approach to habitat scoring - refer to Table 14 of DEECA's Vegetation Quality Assessment Manual (DSE, 2004).

Appendix 2: Flora species recorded in the study area

Origin	Common name	Scientific name	EPBC	FFG-T	FFG-P	CaLP
#	Coast Wattle	*Acacia longifolia subsp. sophorae*			P	
	Bidgee-widgee	*Acaena novae-zelandiae*				
*	Sheep Sorrel	*Acetosella vulgaris*				
*	Woolly Bush	*Adenanthos sericeus*				
*	Bromeliad	*Aechmea spp.*				
*	Golden Aeonium	*Aeonium arboreum*				
*	Agapanthus	*Agapanthus praecox subsp. orientalis*				
*	Fox Tail Agave	*Agave attenuata*				
*	Willow Myrtle	*Agonis flexuosa*				
*	Angled Onion	*Allium triquetrum*				R
*	Yellow Alstroemeria	*Alstroemeria aurea*				
*	Belladonna Lily	*Amaryllis belladonna*				
*	Smooth-barked Apple	*Angophora costata subsp. costata*				
*	Sweet Vernal-grass	*Anthoxanthum odoratum*				
*	Cape Weed	*Arctotheca calendula*				
	Spear Grass	*Austrostipa spp.*				
	Azolla	*Azolla spp.*				
†	Coast Banksia	*Banksia integrifolia subsp. integrifolia*				
*	English Daisy	*Bellis perennis*				
*	Silver Birch	*Betula pendula*				
†	Daisy	*Brachyscome spp.*			P	
*	Twiggy Turnip	*Brassica fruticulosa*				
*	Large Quaking-grass	*Briza maxima*				
*	Lesser Quaking-grass	*Briza minor*				
*	Great Brome	*Bromus diandrus*				
*	Common box	*Buxus sempervirens*				
*†	Crimson Bottlebrush	*Callistemon citrinus*				
	Water Starwort	*Callitriche spp.*				
*†	Cypress-pine	*Callitris spp.*				
*	Indian Shot	*Canna indica*				
*†	River Oak	*Casuarina cunninghamiana subsp. cunninghamiana*				
*	Kikuyu	*Cenchrus clandestinus*				
*	Fat Hen	*Chenopodium album*				
*	Boneseed	*Chrysanthemoides monilifera*				C
*	Spear Thistle	*Cirsium vulgare*				R
*	Clivia	*Clivia spp.*				
*	Pink Diosma	*Coleonema pulchellum*				

Origin	Common name	Scientific name	EPBC	FFG-T	FFG-P	CaLP
*	Mirror Bush	*Coprosma repens*				
*	New Zealand Cabbage-tree	*Cordyline australis*				
*	Flowering Gum	*Corymbia ficifolia*				
*	Water Buttons	*Cotula coronopifolia*				
*	Pig's Ear	*Cotyledon orbiculata*				
	Swamp Crassula	*Crassula helmsii*				
*	Jade Plant	*Crassula ovata*				
*	Crocosmia	*Crocosmia spp.*				
*	Cypress	*Cupressus spp.*				
	Southern Water-ribbons	*Cycnogeton alcockiae*				
*	Couch	*Cynodon dactylon var. dactylon*				
*	Dense Flat-sedge	*Cyperus congestus*				
*	Drain Flat-sedge	*Cyperus eragrostis*				
*	Cocksfoot	*Dactylis glomerata*				
*	Carrot	*Daucus carota*				
*	Cape Ivy	*Delairea (monotypic)*				
	Flax Lily	*Dianella spp.*				
	Kidney-weed	*Dichondra repens*				
*	Peacock Iris	*Dietes spp.*				
*	Trailing African Daisy	*Dimorphotheca fruticosa*				
*	Panic Veldt-grass	*Ehrharta erecta*				
	Spike Sedge	*Eleocharis spp.*				
*	Fleabane	*Erigeron spp.*				
#	Southern Mahogany	*Eucalyptus botryoides*				
#†	Large-fruit Yellow-gum	*Eucalyptus leucoxylon subsp. megalocarpa*		Critically Endangered		
	Swamp Gum	*Eucalyptus ovata*				
*	Tall Fescue	*Festuca arundinacea*				
	Knobby Club-sedge	*Ficinia nodosa*				
*	Desert Ash	*Fraxinus angustifolia*				
	Thatch Saw-sedge	*Gahnia radula*				
	Saw Sedge	*Gahnia spp.*				
*	Montpellier Broom	*Genista monspessulana*				R
*	Dove's Foot	*Geranium molle*				
	Crane's Bill	*Geranium spp.*				
*†	Grevillea (cultivated)	*Grevillea spp./cv.*				
*	Blood Lily	*Haemanthus coccineus*				
*	Sweet Hakea	*Hakea drupacea*				
*	English Ivy	*Hedera helix s.l.*				

Origin	Common name	Scientific name	EPBC	FFG-T	FFG-P	CaLP
*	Ox-tongue	*Helminthotheca echioides*				
*	Monterey Cypress	*Hesperocyparis macrocarpa*				
*	Yorkshire Fog	*Holcus lanatus*				
*	Sea Barley-grass	*Hordeum marinum*				
	Pennywort	*Hydrocotyle spp.*				
*	Smooth Cat's-ear	*Hypochaeris glabra*				
*	Flatweed	*Hypochaeris radicata*				
*	Cat's Ear	*Hypochaeris spp.*				
*	Jointed Rush	*Juncus articulatus subsp. articulatus*				
	Rush	*Juncus spp.*				
*	Pyramid Tree	*Lagunaria patersonia*				
*	Hare's-tail Grass	*Lagurus ovatus*				
*	Lavender	*Lavandula spp.*				
	Duckweed	*Lemna spp.*				
*	Lion's Ear	*Leonotis leonurus*				
*	Hairy Hawkbit	*Leontodon saxatilis subsp. saxatilis*				
	Coast Sword-sedge	*Lepidosperma gladiatum*				
#	Coast Tea-tree	*Leptospermum laevigatum*				
	Heath Tea-tree	*Leptospermum myrsinoides*				
	Coast Beard-heath	*Leucopogon parviflorus*			P	
	Angled Lobelia	*Lobelia anceps*				
	Lobelia	*Lobelia spp.*				
*	Rye Grass	*Lolium spp.*				
*	African Box-thorn	*Lycium ferocissimum*				C
	Small Loosestrife	*Lythrum hyssopifolia*				
*	Mediterranean Loosestrife	*Lythrum junceum*				
*	Small-flower Mallow	*Malva parviflora*				
*	Burr Medic	*Medicago polymorpha*				
#†	Giant Honey-myrtle	*Melaleuca armillaris subsp. armillaris*		Endangered		
†	Kangaroo Fern	*Microsorum pustulatum subsp. pustulatum*				
*	Oleander	*Nerium oleander*				
†	Tobacco	*Nicotiana spp.*				
	Grassland Wood-sorrel	*Oxalis perennans*				
*	Soursob	*Oxalis pes-caprae*				R
*	Large-flower Wood-sorrel	*Oxalis purpurea*				
*	Paspalum	*Paspalum dasypleurum*				
*	Regal Pelargonium	*Pelargonium X domesticum*				

Origin	Common name	Scientific name	EPBC	FFG-T	FFG-P	CaLP
*	Toowoomba Canary-grass	*Phalaris aquatica*				
*	Canary Island Date-palm	*Phoenix canariensis*				
*	New Zealand Flax	*Phormium tenax*				
*	Radiata Pine	*Pinus radiata*				
*	Karo	*Pittosporum crassifolium*				
*	Kohuhu	*Pittosporum tenuifolium*				
#	Sweet Pittosporum	*Pittosporum undulatum*				
*	Buck's-horn Plantain	*Plantago coronopus*				
*	Ribwort	*Plantago lanceolata*				
*	Elkhorn Fern	*Platycerium bifurcatum*				
*	Cape Leadwort	*Plumbago auriculata*				
*	Annual Beard-grass	*Polypogon monspeliensis*				
*	Blue Psoralea	*Psoralea pinnata*				
	Austral Bracken	*Pteridium esculentum subsp. esculentum*				
	River Buttercup	*Ranunculus inundatus*				
*	Wild Radish	*Raphanus raphanistrum*				
	Seaberry Saltbush	*Rhagodia candolleana subsp. candolleana*				
*	Italian Buckthorn	*Rhamnus alaternus*				
*	Rose	*Rosa spp.*				
*	Blackberry	*Rubus fruticosus spp. agg.*				C
	Slender Dock	*Rumex brownii*				
*	Curled Dock	*Rumex crispus*				
	Dock	*Rumex spp.*				
†	Sage	*Salvia spp.*				
#	Kangaroo Apple	*Solanum aviculare*				
†	Large Kangaroo Apple	*Solanum laciniatum*				
*	Black Nightshade	*Solanum nigrum s.l.*				
*	Rough Sow-thistle	*Sonchus asper s.l.*				
*	Rat-tail Grass	*Sporobolus africanus*				
*	Chickweed	*Stellaria media*				
*	Buffalo Grass	*Stenotaphrum secundatum*				
	Cranberry Heath	*Styphelia humifusa*			P	
*	Garden Dandelion	*Taraxacum officinale spp. agg.*				
	Bower Spinach	*Tetragonia implexicoma*				
*	White Clover	*Trifolium repens var. repens*				
*	Clover	*Trifolium spp.*				
	Streaked Arrowgrass	*Triglochin striata*				

Origin	Common name	Scientific name	EPBC	FFG-T	FFG-P	CaLP
	Bulrush	*Typha spp.*				
*	Gorse	*Ulex europaeus*				C
*	Giant Nettle	*Urtica dioica*				
*	Small Nettle	*Urtica urens*				
*	Napuka	*Veronica speciosa*				
*	Common Vetch	*Vicia sativa*				
*	Bulbil Watsonia	*Watsonia meriana var. bulbillifera*				R
*	Coast Rosemary	*Westringia fruticosa*				
*	Palm Lily	*Yucca gloriosa var. recurvifolia*				
*	White Arum-lily	*Zantedeschia aethiopica*				

Notes: EPBC = Threatened species status under the EPBC Act; **FFG-T** = Threatened species status under the FFG Act; **FFG-P =** Listed as protected (P) under the FFG Act; **CaLP Act**: Declared noxious weeds under the CaLP Act (S = State Prohibited Weeds – any infestations must be reported to DEECA that is responsible for control of these; P = Regionally Prohibited Weeds – landowners must eradicate these; C = Regionally Controlled Weeds – landowners must prevent the growth and spread of these; R = Restricted Weeds – trade in these weeds and propagules, either as plants, seeds or contaminants in other materials is prohibited).

* = introduced to Victoria

= Victorian native taxa occurring outside the natural range

† = planted

Appendix 3: Likelihood of occurrence of listed flora

Common Name	Scientific name	EPBC	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Coast Ground-berry	*Acrotriche cordata*		Endangered	SA, Tas and WA. Victoria, restricted to very few sites in south-west, growing on limestone-derived soils, often near coastal or riparian cliffs in coastal scrub, mallee or woodland (VicFlora 2022).	VBA	10	14/12/2010	No suitable habitat. Records within the search area limited to coastal headland at Cape Nelson and Bats Ridge Wildlife Reserve. **Unlikely to occur.**
River Swamp Wallaby-grass	*Amphibromus fluitans*	Vulnerable		River Swamp Wallaby-grass grows mostly in permanent swamps and also lagoons, billabongs, dams and roadside ditches. The species requires moderately fertile soils with some bare ground; conditions that are caused by seasonally-fluctuating water levels (DCCEEW 2023).	PMST	No previous records	N/A	Wetlands in the study area severely disturbed from cattle and within introduced pasture grasses lacking native grasses and sedges, but some marginally suitable habitat within wetlands in the southern lot parcel and drainage line along Oleria Road (albeit highly degraded). No previous records within search area – nearest records are at Cobboboonee National Park, more than 17km away. **No individuals were recorded during targeted surveys. Unlikely to occur**
Hairy Boronia	*Boronia pilosa subsp. torquata*		Endangered	Occurs in heathlands and heathy woodlands of the far south-west (e.g. Casterton and Portland areas), usually on sandy soils.	VBA	7	7/08/2017	No suitable habitat. Original heathy habitat in the study area prior to agricultural land uses has been cleared and not present. **Unlikely to occur.**
Lizard Orchid	*Burnettia cuneata*		Endangered	Favours wet heathy habitat, primarily in near-coastal regions. Distributed from Portland to Mallacoota, with a single inland occurrence noted in the Grampians. Flowers September to November, though primarily following summer fires (RBGV 2023).	VBA	3	1/10/1936	No suitable habitat. Original heathy habitat in the study area prior to agricultural land uses has been cleared and not present. Additionally, there have been no local records in >80 years. **Unlikely to occur.**
Limestone Spider-orchid	*Caladenia calcicola*	Vulnerable	Critically Endangered	Well-drained limey sands in heathy forest on limestone ridges (Jones 2006).	PMST & VBA	110	1/10/2005	No suitable habitat. Original heathy habitat in the study area prior to agricultural land uses has been cleared and not present. **Unlikely to occur.**
Christmas Spider-orchid	*Caladenia flavovirens*		Critically Endangered	Grows in habitats ranging from heathy woodland to moist foothill-forest when inland, and scrubland in coastal and near-coastal settings. Distributed around Portland, the Dandenong Ranges and north-east Victoria. Flowers December to January (Jeanes & Backhouse 2006; RBGV 2023).	VBA	1	12/12/1942	No suitable habitat. Original heathy habitat in the study area prior to agricultural land uses has been cleared and not present. Additionally, there have been no local records in >80 years. **Unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Scented Spider-orchid	*Caladenia fragrantissima*		Critically Endangered	Moist to well-drained sandy loam soils in dense heathland and heathy forest (Jones 2006).	VBA	17	5/11/2009	No suitable habitat. Original heathy habitat in the study area prior to agricultural land uses has been cleared and not present. **Unlikely to occur.**
Mellblom's Spider-orchid	*Caladenia hastata*	Endangered	Critically Endangered	One known population at Point Danger, south of portland. Occurs on well-drained sands in dense coastal heathland and heathy forest (Todd 2000).	PMST & VBA	66	9/10/2017	No suitable habitat. Original heathy habitat in the study area prior to agricultural land uses has been cleared and not present. **Unlikely to occur.**
Ornate Pink-fingers	*Caladenia ornata*	Vulnerable	Endangered	Heathy forest and among shrubs on seasonally moist sandy loams (Jones 2006).	PMST	No previous records	N/A	No suitable habitat. Original heathy and shrubby habitat in the study area prior to agricultural land uses has been cleared and not present. **Unlikely to occur.**
Robust Spider-orchid	*Caladenia valida*		Critically Endangered	Well-drained sands in coastal heathy forest and scrub (Jones 2006).	VBA	3	1/10/1940	No suitable habitat. Original heathy habitat in the study area prior to agricultural land uses has been cleared and not present. Additionally, there have been no local records in >80 years. **Unlikely to occur.**
Large White Spider-orchid	*Caladenia venusta*		Endangered	Grows in woodland and heathy woodland habitat, on well-drained to moist soils. Usually found in coastal and sub-coastal areas, though the species is also known from the Grampians. Flowers September to November (RBGV 2023).	VBA	4	1/10/1936	No suitable habitat. Original heathy habitat in the study area prior to agricultural land uses has been cleared and not present. Additionally, there have been no local records in >80 years. **Unlikely to occur.**
Curly Sedge	*Carex tasmanica*		Endangered	Occurs in seasonally wet, fertile, heavy basalt clay soils, usually around the margins of slightly saline drainage lines or freshwater swamps. The dominant vegetation type varies, but is often grassy/sedgy and generally lacks trees (Carter 2010). Known occurences are localised around Heywood, Portland, Port Fairy, Karish (Lake Weeranganuk), Craigieburn, Kalkallo and Wollert (Victorian Biodiversity Atlas 2015).	VBA	8	12/11/2015	Wetlands in the study area severely disturbed from cattle and within introduced pasture grasses lacking native grasses and sedges. But some marginally suitable habitat within wetlands in the southern lot parcel and drainage line along Oleria Road (albeit highly degraded).. Nearest records are from 2002 and associated with Wattle Hill Creek 1.8km to the north. **No individuals were recorded during targeted surveys. Unlikely to occur.**
Coast Colobanth	*Colobanthus apetalus var. apetalus*		Endangered	An uncommon species that grows in coastal dune habitat, in sheltered settings and in swales. Distributed along the coastline of Victoria, from the far west to the far east of the state. Flowers July to March (RBGV 2023).	VBA	2	1/01/1980	No suitable coastal dune habitat within the study area. Additionally, there have been no local records in >40 years. **Unlikely to occur.**
Velvet White Correa	*Correa alba var. pannosa*		Endangered	Occurring in coastal areas from the lower Glenelg River to Port Phillip Bay, usually on calcareous substrates.	VBA	8	7/08/2017	No suitable habitat. Original coastal habitat in the study area prior to agricultural land uses has been cleared and not present. **Unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Tiny Midge-orchid	*Corunastylis nuda*		Endangered	Disjunct distribution in the far east and far west of Victoria. Occurs in a variety of moist grassy areas of open forest and in subalpine grassy woodland (RBGV 2023).	VBA	2	1/01/1980	No suitable open forest habitat within the study area. Study area has been highly modified for agricultural land uses. Additionally, there have been no local records in >40 years **Unlikely to occur.**
Coast Helmet-orchid	*Corybas despectans*		Endangered	The species is often found in colonies amongst dense Bracken habitat, on sandy soils. Known from Portland in the far west of the state, and Cape Schanck on the Mornington Peninsula. Flowers July to August (RBGV 2023).	VBA	2	1/01/1980	Study area contains suitable habitat. However, there have been no local records in >40 years **Unlikely to occur.**
Swamp Diuris	*Diuris palustris*		Endangered	Scattered distribution throughout western Victoria. Usually in swampy depressions in grassland or open woodland (Entwisle 1994).	VBA	13	28/09/2006	Wetlands in the study area severely disturbed from cattle and within introduced pasture grasses lacking native grasses and sedges. But some marginally suitable habitat within wetlands in the southern lot parcel and drainage line along Oleria Road (albeit highly degraded). Nearest records are more than 8km away at Bats Ridge Wildlife Reserve. **No individuals were recorded during targeted surveys. Unlikely to occur.**
Coast Gum	*Eucalyptus diversifolia subsp. megacarpa*		Vulnerable	Restricted to Cape Nelson south of Portland, in far west Victoria. It grows on thin sandy soils over limestone in dense coastal shrubland (Nicolle 2006).	VBA	42	3/01/2020	No suitable habitat. Original shrubland habitat in the study area prior to agricultural land uses has been cleared and not present. Conspicuous species not recorded during field assessment. **Unlikely to occur.**
Western Peppermint	*Eucalyptus falciformis*		Vulnerable	Occurs on sandy soils in near-coastal heathy woodland from Anglesea area west to the SA border, sometimes adjacent to wetter vegetation. Also locally common in broadly similar vegetation in the Grampians.	VBA	8	7/08/2017	No suitable habitat. Original heathy woodland habitat in the study area prior to agricultural land uses has been cleared and not present. Conspicuous species not recorded during field assessment. **Unlikely to occur.**
Bog Gum	*Eucalyptus kitsoniana*		Critically Endangered	Occurring on coastal lowlands from Yarram west to Cape Otway, and Mt Richmond near Portland. It also occurs on top of Mt Oberon (Wilsons Promontory) and on nearby Snake Is. An inland collection from near Woohlpooer (west of the Grampians) requires verification.	VBA	4	14/08/2014	No suitable habitat. Original coastal woodland habitat in the study area prior to agricultural land uses has been cleared and not present. Conspicuous species not recorded during field assessment. **Unlikely to occur.**
Large-fruit Yellow-gum	*Eucalyptus leucoxylon subsp. megalocarpa*		Critically Endangered	Undulating low hills of thin loam over limestone in coastal shrubland. Naturally restricted to far south-western Victoria, near the Glenelg River estuary south of Nelson, and south-eastern South Australia. Other occurences comprise planted individuals (Nicolle 2006).	VBA	1	13/04/2012	No suitable habitat. Original coastal shrubland habitat in the study area prior to agricultural land uses has been cleared and not present. Conspicuous species not recorded during field assessment. **Unlikely to occur.**
Coast Ballart	*Exocarpos syrticola*		Endangered	Confined to coastal dunes and cliffs on and west of Wilsons Promontory, but locally common (Jeanes 1999).	VBA	15	17/05/2011	No suitable habitat. Also, a conspicuous species not recorded during field assessment. **Unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Clover Glycine	*Glycine latrobeana*	Vulnerable	Vulnerable	Found across south-eastern Australia in native grasslands, dry sclerophyll forests, woodlands and low open woodlands with a grassy ground layer. In Victoria, populations occur in lowland grasslands, grassy woodlands and sometimes in grassy heath (DCCEEW 2023).	PMST	No previous records	N/A	No suitable habitat. Grasslands (seasonally wet/inundated pastures) in the study area contained introduced grasses and pugging from cattle. No previous records in search area - nearest record at Mt Richmond National Park over 17km away. **Unlikely to occur.**
Western Golden-tip	*Goodia medicaginea*		Endangered	Sporadically placed, however prefers dry sites.	VBA	1	29/03/2021	No suitable habitat. Only 1 previous record at Nuns Beach in Portland city (possible planted or misidentification), otherwise records more than 30km north within national parks. **Unlikely to occur.**
Pale Guinea-flower	*Hibbertia pallidiflora*		Endangered	Occurs in coastal heath and mallee vegetation in south-western Victoria.	VBA	38	2/02/2021	No suitable habitat. Original heathy and woodland habitat in the study area prior to agricultural land uses has been cleared and not present. **Unlikely to occur.**
Coast Ixodia	*Ixodia achillaeoides subsp. arenicola*	Vulnerable		Confined to coastal vegetation in the Cape Bridgewater-Portland area (Short 1999).	PMST & VBA	4	27/08/2008	No suitable habitat. Original coastal heath and woodland habitat in the study area prior to agricultural land uses has been cleared and not present. **Unlikely to occur.**
Rough Blown-grass	*Lachnagrostis rudis subsp. rudis*		Endangered	A primarily coastal species that grows in moist forest and swampy habitat. Distributed from the South Australian border to Lake Tyers. Flowers during spring (RBGV 2023).	VBA	1	1/01/1980	Wetlands in the study area severely disturbed from cattle and within introduced pasture grasses lacking native grasses and sedges. But some marginally suitable habitat within wetlands in the southern lot parcel and drainage line along Oleria Road (albeit highly degraded). However, there have been no local records in >40 years **Unlikely to occur.**
Drooping Velvet-bush	*Lasiopetalum schulzenii*		Critically Endangered	In Victoria confined to clifftop and dune woodland and heathland near Port Campbell and Portland, favouring sandy soils derived from limestone.	VBA	7	8/01/2016	No suitable habitat. Original coastal heath and woodland habitat in the study area prior to agricultural land uses has been cleared and not present. **Unlikely to occur.**
Spiny Peppercress	*Lepidium aschersonii*	Vulnerable	Endangered	The Spiny Peppercress occurs in periodically wet sites such as gilgai depressions and the margins of freshwater and saline marshes and shallow lakes, usually on heavy clay soil. Almost all sites receive some degree of soil waterlogging or seasonal flooding.	PMST	No previous records	N/A	Study area outside the known distribution of the species – all previous records northeast of this region, inland between Warrnambool and Geelong and towards Horsham. **Unlikely to occur.**
Basalt Peppercress	*Lepidium hyssopifolium s.s.*	Endangered	Endangered	Known to establish on open, bare ground with limited competition from other plants. Previously recorded from Eucalypt woodland with a grassy ground cover, low open *Casuarina* woodland with a grassy ground cover and tussock grassland. Now generally found amongst exotic pasture grasses and beneath exotic trees (DCCEEW 2023).	PMST	No previous records	N/A	No suitable habitat in the study area. Also study area generally outside the known distribution of the species – almost all previous records northeast of this region, inland between Warrnambool and Macedon, plus one record from 1983 near the Nelson estuary more than 60km west (possible mis-identification). **Unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Hoary Rapier-sedge	*Lepidosperma canescens*		Endangered	Scattered in sandy heath-land and woodland, chiefly near the coast, mostly west of Port Phillip Bay, with easterly occurrences on the Mornington Peninsula and Wilsons Promontory.	VBA	20	17/10/2018	No suitable habitat. Original coastal heath and woodland habitat in the study area prior to agricultural land uses has been cleared and not present. Post-1990 records are in vegetated coastal parks/reserves. Other plants of this genus recorded during the field assessment, but this species was not recorded. **Unlikely to occur.**
Shiny Tea-tree	*Leptospermum turbinatum*		Endangered	Confined to the Grampians and nearby Mts Langi Ghiran, Buangor and Ben Nevis. Locally common on sandstone and granitic outcrops.	VBA	1	17/05/2011	Study area outside the known distribution of the species – one record from 2011 near Point Danger, likely mis-identification. Conspicuous species not recorded during field assessment. **Unlikely to occur.**
Oval-leaf Logania	*Logania ovata*		Endangered	Mainly on the south-western coasts near Portland, Port Fairy and near Peterborough in Victoria, where occasional on sandy soils usually derived from limestone.	VBA	12	30/06/2006	No suitable habitat. Conspicuous species not recorded during field assessment. **Unlikely to occur.**
Lax Twig-sedge	*Machaerina laxa*		Endangered	Wet, sandy areas in heathlands and heathy swamps (Wilson 1994).	VBA	4	1/01/1980	No suitable habitat. Original heathy habitat in the study area prior to agricultural land uses has been cleared and not present. Additionally, there have been no local records in >40 years **Unlikely to occur.**
Giant Honey-myrtle	*Melaleuca armillaris subsp. armillaris*		Endangered	Mainly confined to near-coastal sandy heaths, scrubs slightly raised above saltmarsh, riparian scrubs, rocky coastlines and foothill outcrops eastwards from about Marlo. Occurrences to the west are naturalized from cultivated stock.	VBA	4	10/08/2021	No suitable habitat and outside known natural distribution (otherwise widely planted and also considered an environmental weed). Conspicuous species not recorded during field assessment. **Unlikely to occur.**
Salt Paperbark	*Melaleuca halmaturorum*		Endangered	Mostly fringing salt lakes or on saline soils near the coast (Spencer 1996).	VBA	1	13/04/2012	No suitable habitat. Conspicuous species not recorded during field assessment. **Unlikely to occur.**
Rough Daisy-bush	*Olearia asterotricha*		Endangered	Three subspecies known to occur, which are found in heathy woodland in the Grampians (subsp. asterotricha), moist forest and heathland around Portland and east of Melbourne (subsp. lobata) and damp woodland below the summit of Mount Langhi Ghiran (subsp. rotundifolia). Flowers November to December (subsp. asterotricha), October to December (subsp. lobata) and December (subsp. rotundifolia) (RBGV 2023).	VBA	2	1/10/1944	No suitable habitat. Original heathy habitat in the study area prior to agricultural land uses has been cleared and not present. Additionally, there have been no local records in >80 years **Unlikely to occur.**
Morning Flag	*Orthrosanthus multiflorus*		Endangered	Very rare in Victoria where known only from heathland communities near Cape Nelson and Port Campbell.	VBA	10	10/02/2014	No suitable habitat. Original coastal heath habitat in the study area prior to agricultural land uses has been cleared and not present. 1 previous records in the study area but from 1976. Nearest other records in Discovery Bay Coastal Park and Cape Nelson. Conspicuous species not recorded during field assessment. **Unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Coast Fescue	*Poa billardierei*		Endangered	Of scattered occurrence on coastal sand dunes from near the NSW border to Nelson in the far south-west, but infrequently collected in recent times and possibly receding as the similar, introduced Marram-grass (*Ammophila arenaria*) advances (Walsh 1994).	VBA	4	10/03/2001	No suitable coastal sand dune habitat. Widely recorded around the state but nearest record is at Wattle Hill Creek in 2001, other records from 1980 and 1952. **Unlikely to occur.**
Dwarf Coast Poa	*Poa halmaturina*		Endangered	Occurs along coasts from the SA border to at least Phillip Island, mostly on calcareous sands overlying dune limestone or sometimes on basaltic substrates.	VBA	1	6/01/2016	No suitable sandy habitat. One previous record in search area is on dunes at Nuns Beach. **Unlikely to occur.**
Gorae Leek-orchid	*Prasophyllum diversiflorum*	Endangered	Critically Endangered	Wet grasslands or inundated swamps among tussocks (Jones 2006).	VBA	No records since pre-1990	N/A	No suitable habitat. Wetlands in the study area severely disturbed from cattle and within introduced pasture grasses lacking native grass tussocks and sedges. No records since 1990 in search area, nearest record was in 1949 at Nuns Beach 3.5km north. Next nearest records are from 1933, 1942 and 1948 in Cobboboonee National Park more than 16km northwest. **Unlikely to occur.**
Maroon Leek-orchid	*Prasophyllum frenchii*	Endangered	Endangered	Grows mainly in open sedge swampland or in wet grassland and wet heathland generally bordering swampy regions. Sites are generally low altitude, flat and moist. Soils are generally moderately rich damp sandy or black clay loams. Climate is mild, with an annual rainfall of 600–1100 mm, occurring predominantly in winter and spring (DCCEEW 2023).	VBA	No records since pre-1990	N/A	No suitable habitat. Wetlands in the study area severely disturbed from cattle and within introduced pasture grasses lacking native grasses and sedges. No records since 1990 in search area, nearest record was in 1947 at Nuns Beach 3.5km north. Next nearest record is from 1945 near Cobboboonee National Park more than 16km northwest. **Unlikely to occur.**
Coastal Leek-orchid	*Prasophyllum litorale*		Critically Endangered	Coastal scrub and heath on stabilised dunes and swales (Jones 2006).	PMST & VBA	7	14/12/2010	No suitable habitat. Original coastal scrub and heath habitat in the study area prior to agricultural land uses has been cleared and not present – degraded scrub in the roadside densely infested with introduced grass and other weeds. No previous records in search area since 1990. Nearest recent records are in Discovery Bay Coastal Park. **Unlikely to occur.**
Dense Leek-orchid	*Prasophyllum spicatum*	Vulnerable	Critically Endangered	Occurs in coastal and near-coastal heathland and heathy woodland. Soils are generally sandy, with some sites seasonally waterlogged (Duncan 2010).	PMST & VBA	No records since pre-1990	N/A	No suitable habitat. Original coastal heath and woodland habitat in the study area prior to agricultural land uses has been cleared and not present – degraded scrub in the roadside densely infested with introduced grass and other weeds. No previous records in search area since 1990, two old records from 1980's are on developed land. Nearest recent record is at Cobboboonee National Park. **Unlikely to occur.**
Green-striped Greenhood	*Pterostylis chlorogramma*	Vulnerable	Endangered	Occurs in mixed Box-Stringybark forest with a shrubby understorey, often with *Pteridium esculentum* as a major component on sandy or clay loam soils (Duncan et al. 2009).	PMST	No previous records	N/A	No suitable habitat. Modelled pre-settlement vegetation is heathland and heathy woodland, not Box-Strongybark Forest. Vegetation prior to agricultural land uses has been cleared and not present – degraded scrub in the roadside has some Austral Bracken but also densely infested with introduced grass and other weeds. No previous records in search area. Nearest records at Mount Clay more than 17km northeast. **Unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Leafy Greenhood	*Pterostylis cucullata*	Vulnerable		Tea-tree scrubs on tall sandy and calcareous dunes, in moist, open or even deep shaded locations (Jones 1994).	PMST	No previous records	N/A	No suitable habitat. Original coastal heath and woodland habitat in the study area prior to agricultural land uses has been cleared and not present – degraded scrub in the roadside densely infested with introduced grass and other weeds. No previous records in search area. Nearest recent records limited to Budj Bim National Park more than 40km northwest. **Unlikely to occur.**
Long-tongue Shell-orchid	*Pterostylis dolichochila*		Critically Endangered	Apart from an isolated occurrence near Portland, apparently confined to the Little Desert and Big Desert areas of western Victoria, often growing under mallee-scrub or *Callitris gracilis* (Slender Cypress-pine)/*Eucalyptus leucoxylon* (Yellow Gum) woodland, on well-drained sandy soil.	VBA	3	1/07/2006	No suitable habitat and outside known natural distribution. Two isolated records at Cape Nelson may have been mis-identification – these records are in coastal vegetation in parks/reserves. **Unlikely to occur.**
Coast Bush-pea	*Pultenaea canaliculata*		Endangered	Scattered and uncommon on coastal dunes and limestone cliffs from the South Australian border to Wilsons Promontory (e.g. Portland, Warrnambool, Cape Otway, Sorrento) (Corrick 1996).	VBA	10	6/01/1999	No suitable coastal dune habitat. Most records around Portland and Cape Nelson are prior to 1990, nearest recent record is from 1999 and in coastal vegetation at Cape Nelson State Park. Conspicuous species not recorded during field assessment. **Unlikely to occur.**
Otway Bush-pea	*Pultenaea prolifera*		Endangered	Confined to a few scattered, near-coastal localities in the west, including Portland area, Chapple Vale and Angahook state Park, usually in the heathy understorey of Eucalyptus baxteri or E. obliqua open-forest.	VBA	19	14/12/2010	No suitable coastal dune habitat. Most records around Portland and Cape Nelson are prior to 1990, nearest recent records from coastal vegetation at Cape Nelson State Park and Point Danger Reserve. Conspicuous species not recorded during field assessment. **Unlikely to occur.**
Dune Fan-flower	*Scaevola calendulacea*		Endangered	Scattered and rather uncommon in Victoria, on coastal dunes between the mouth of the Glenelg River and Gabo Island, often forming low hummocks through acretion of windblown sand (Jeanes 1999).	VBA	2	29/03/2021	No suitable coastal dune habitat. Records within search area are from Nuns Beach and Cape Nelson State Park. **Unlikely to occur.**
Swamp Fireweed	*Senecio psilocarpus*	Vulnerable		Herb-rich winter-wet swamps on volcanic clays or peaty soils (Walsh 1999). Known from approximately 10 sites between Wallan, about 45 km north of Melbourne, and Honans Scrub in south-eastern South Australia (TSSC 2008).	PMST	No previous records	N/A	Wetlands and roadside drainage lines in the study area severely disturbed and within introduced pasture grasses lacking native grasses and sedges. But some marginally suitable habitat within wetlands in the southern lot parcel and drainage line along Oleria Road (albeit highly degraded). No records in search area, nearest few records are in Cobboboonee Forest Park more than 13km northwest. **No individuals were recorded during targeted surveys. Unlikely to occur.**
Winter Sun-orchid	*Thelymitra hiemalis*		Critically Endangered	Swamps and heaths on sandy soils near coast to low woodlands on skeletal soils inland, mostly in moist and poorly drained areas (Weber & Entwisle 1994). South-west Victoria near Portland and immediately east of Melbourne at Blackburn on Glenelg Plain and Gippsland Plain (DSEWPC 2011)	VBA	2	30/06/2010	No suitable habitat. Original coastal heath and woodland habitat in the study area prior to agricultural land uses has been cleared and not present – degraded scrub in the roadside densely infested with introduced grass and other weeds. Nearest record from 1934 in Portland/developed land, next nearest record in Bats Ridge Wildlife Reserve 9km northwest, other records in the region are from mount Richmond National Park more than 16km away. **Unlikely to occur.**
Slender Plum-orchid	*Thelymitra orientalis*	Critically Endangered	Critically Endangered	Occurs in heath and heathy woodland, usually in damp/seepage areas along watercourses and around swamp margins, on either in peaty white sands or heavy black often peaty soils (DEECA 2023; RBGV 2023).	PMST	No VBA records	N/A	No suitable habitat. Original coastal heath and woodland habitat in the study area prior to agricultural land uses has been cleared and not present – degraded scrub in the roadside densely infested with introduced grass and other weeds. Additionally, there are no records in search area. **Unlikely to occur.**

Common Name	Scientific name	EPBC	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Tiny Violet	*Viola sieberiana s.s.*		Endangered	Localised in Victoria but locally common in heath and heathy woodland, usually on sandy soils south and west from the Grampians. Mostly at low altitude but to c. 900 m on the Mt William Range.	VBA	18	17/10/2018	No suitable habitat. Original coastal heath and woodland habitat in the study area prior to agricultural land uses has been cleared and not present – degraded scrub in the roadside densely infested with introduced grass and other weeds. Nearest records limited to coastal vegetation along Grant Bay and Nelson Bay. **Unlikely to occur.**
One-flower Early Nancy	*Wurmbea uniflora*		Vulnerable	An uncommon species, mostly from moist, heathy lowland sites (e.g Portland, Halls Gap, Bairnsdale, Wangarabell near Genoa), with an isolated upland record from Mt Hedrick, north of Maffra.	VBA	1	30/06/2001	No suitable habitat. Original coastal heath habitat in the study area prior to agricultural land uses has been cleared and not present – degraded scrub in the roadside densely infested with introduced grass and other weeds. 1 previous record in search area, located in a bushland reserve more than 9km north. **Unlikely to occur.**
Swamp Everlasting	*Xerochrysum palustre*	Vulnerable	Critically Endangered	Grows in wetlands including sedge-swamps and shallow freshwater marshes, often on heavy black clay soils. Commonly associated genera include *Amphibromus, Baumea, Carex, Chorizandra, Craspedia, Eleocharis, Isolepis, Lachnagrostis, Lepidosperma, Myriophyllum, Phragmites australis, Themeda triandra* and *Villarsia* (DCCEEW 2023).	PMST	No previous records	N/A	Wetlands and roadside drainage lines in the study area severely disturbed and within introduced pasture grasses lacking native grasses and sedges. But some marginally suitable habitat within wetlands in the southern lot parcel and drainage line along Oleria Road (albeit highly degraded). No previous records in search area, nearest few records are in Cobboboonee Forest Park more than 18km northwest and Bessiebelle State Forest more than 27km northeast. **No individuals were recorded during targeted surveys. Unlikely to occur.**

Notes: grey shading indicates species that are likely or have the potential to occur in the study area; **EPBC-T** = threatened species status under EPBC Act; **FFG** = threatened species status under the FFG Act.

Appendix 4: Fauna species recorded in the study area

Origin	Common name	Scientific name	EPBC-T	EPBC-M	FFG
	Australian Magpie	*Gymnorhina tibicen*			
	Australian Pipit	*Anthus australis*			
	Australian Shelduck	*Tadorna tadornoides*			
	Australian White Ibis	*Threskiornis molucca*			
	Australian Wood Duck	*Chenonetta jubata*			
	Black Swan	*Cygnus atratus*			
	Blue-winged Parrot	*Neophema chrysostoma*	Vulnerable		
	Brown Falcon	*Falco berigora*			
	Brown Quail	*Synoicus ypsilophorus*			
	Brown Thornbill	*Acanthiza pusilla*			
	Common Eastern Froglet	*Crinea signifera*			
*	Common Starling	*Sturnus vulgaris*			
	Crimson Rosella	*Platycercus elegans*			
	Eastern Sign-bearing Frog	*Crinea parasignifera*			
	Eastern Yellow Robin	*Eopsaltria australis*			
*	Eurasian Skylark	*Alauda arvensis*			
*	European Goldfinch	*Carduelis carduelis*			
	Galah	*Eolophus roseicapilla*			
	Grey Fantail	*Rhipidura albiscapa*			
	Grey Shrike-thrush	*Colluricincla harmonica*			
	Hoary-headed Grebe	*Poliocephalus poliocephalus*			
*	House Sparrow	*Passer domesticus*			
	Little Pied Cormorant	*Microcarbo melanoleucos*			
	Little Wattlebird	*Anthochaera chrysoptera*			
	Magpie-lark	*Grallina cyanoleuca*			
	Masked Lapwing	*Vanellus miles*			
	New Holland Honeyeater	*Phylidonyris novaehollandiae*			
	Pacific Black Duck	*Anas superciliosa*			
	Raven sp.	*Corvus sp.*			
	Red Wattlebird	*Anthochaera carunculata*			
	Rufous Bristlebird (Coorong)	*Dasyornis broadbenti broadbenti*			Endangered
	Southern Brown Tree Frog	*Litoria ewingii*			
	Spotted Marsh Frog	*Limnodynastes tasmaniensis*			
	Straw-necked Ibis	*Threskiornis spinicollis*			
	Striated Fieldwren	*Calamanthus fuliginosus*			
	Striated Thornbill	*Acanthiza lineata*			
	Superb Fairy-wren	*Malurus cyaneus*			

Origin	Common name	Scientific name	EPBC-T	EPBC-M	FFG
	Swamp Harrier	*Circus approximans*			
	Wedge-tailed Eagle	*Aquila audax*			
	Welcome Swallow	*Hirundo neoxena*			
	Whistling Kite	*Haliastur sphenurus*			
	White-browed Scrubwren	*Sericornis frontalis*			
	White-faced Heron	*Egretta novaehollandiae*			
	Willie Wagtail	*Rhipidura leucophrys*			

Notes: EPBC-T = Threatened species status under EPBC Act; **EPBC-M**: Migratory status under the EPBC Act (M = listed migratory taxa; Bonn Convention (A2H) – Convention on the Conservation of Migratory Species of Wild Animals – listed as a member of a family; Bonn Convention (A2S) – Convention on the Conservation of Migratory Species of Wild Animals – species listed explicitly; CAMBA – China-Australia Migratory Birds Agreement; JAMBA – Japan-Australia Migratory Birds Agreement; ROKAMBA – Republic of Korea Australia Migratory Birds Agreement); **FFG:** = Threatened species status under the FFG Act.

* = introduced to Victoria

Appendix 5: Likelihood of occurrence of listed fauna

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Australasian Bittern	*Botaurus poiciloptilus*	Endangered		Critically Endangered	Terrestrial wetlands, including a range of wetland types but prefers permanent water bodies with tall dense vegetation, particularly those dominated by sedges, rush, reeds or cutting grass (Marchant & Higgins 1990).	PMST & VBA	59	8/08/2021	No suitable habitat - **Unlikely to occur.**
Australasian Shoveler	*Spatula rhynchotis*			Vulnerable	Large and deep permanent bodies of water and aquatic flora abundant. Also occurs on billabongs, watercourses and flood waters on alluvial plains, freshwater meadows, shallow swamps, reed swamps, wooded lakes, sewage farms and farm dams (Marchant & Higgins 1990).	VBA	27	2/06/2019	No suitable habitat - **Unlikely to occur.**
Australian Painted-snipe	*Rostratula australis*	Endangered	CAMBA	Critically Endangered	Generally inhabits shallow terrestrial freshwater wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of *Lignum muehlenbeckia* or canegrass or sometimes tea-tree (*Melaleuca*). Sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber (DCCEEW 2023).	PMST & VBA	No records since pre-1990	N/A	No suitable habitat or historic records - **Unlikely to occur.**
Bar-tailed Godwit	*Limosa lapponica*	Vulnerable	BONN A2H, ROKAMBA, JAMBA, CAMBA	Vulnerable	Mainly coastal species, usually in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats (Higgins & Davies 1996).	PMST & VBA	8	11/04/2003	No suitable habitat - **Unlikely to occur.**
Black-faced Monarch	*Monarcha melanopsis*		BONN A2H		Rainforests, eucalypt woodlands, coastal scrub and damp gullies (Higgins et al. 2006)	PMST	No previous records	N/A	Outside of known distribution - **Unlikely to occur.**
Blue-billed Duck	*Oxyura australis*			Vulnerable	Terrestrial wetlands and prefers deep permanent, well vegetated water bodies (Marchant & Higgins 1990).	VBA	6	13/02/2017	No suitable habitat - **Unlikely to occur.**
Blue-winged Parrot	*Neophema chrysostoma*	Vulnerable			Occupies coastal, subcoastal and inland habitats ranging into semi-arid zones. Throughout much of range inhabits grasslands and grassy woodlands and forest (Higgins 1999).	PMST & VBA	79	6/12/2019	**Recorded in study area during field assessment.**
Brolga	*Antigone rubicunda*			Endangered	Wetlands that include permanent open water and deep freshwater marsh. Between 500 and 700 Brolgas are known to occur in southwestern Victoria (Marchant & Higgins 1993).	VBA	15	1/04/2020	Suitable habitat occurs within study area and recent records from search region - **Potential to occur.**
Caspian Tern	*Hydroprogne caspia*		CAMBA, JAMBA	Vulnerable	Sheltered coastal embayment, including harbours, lagoons, inlets, estuaries and river deltas, usually with sandy or muddy margins (Higgins & Davies 1996).	VBA	19	31/01/2019	No suitable habitat - **Unlikely to occur.**
Chestnut-rumped Heathwren	*Calamanthus pyrrhopygius*			Vulnerable	Dense heathland and dense understorey or ground-layer in sclerophyll forests and woodlands; also in Box-ironbark forests. Widespread but sparsely distributed (Higgins & Peter 2002; Tzaros 2005).	VBA	3	11/10/2008	Scarcity of records from search region - **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Common Greenshank	*Tringa nebularia*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Endangered	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands (Higgins & Davies 1996).	PMST & VBA	2	1/09/1999	No suitable habitat - **Unlikely to occur.**
Common Sandpiper	*Actitis hypoleucos*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Vulnerable	Inhabits a wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands. In Victoria, mostly found Westernport and Port Phillip Bay (Higgins & Davies 1996).	PMST & VBA	24	4/11/2000	No suitable habitat - **Unlikely to occur.**
Curlew Sandpiper	*Calidris ferruginea*	Critically Endangered	BONN A2H, ROKAMBA, JAMBA, CAMBA	Critically Endangered	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands (Higgins & Davies 1996).	PMST & VBA	6	2/10/2018	No suitable habitat - **Unlikely to occur.**
Diamond Firetail	*Stagonopleura guttata*	Vulnerable		Vulnerable	Commonly found in box-ironbark forests and woodlands and also occurs along watercourses and in farmland areas. Widespread but scattered. Forages on a wide range of seeds, which in some cases a large portion can be derived from weed species (Read 1994). Populations have declined in Victoria since the 1950s (Emison et al. 1987; Tzaros 2005).	PMST & VBA	No records since pre-1990	N/A	Scarcity of records from search region - **Unlikely to occur.**
Double-banded Plover	*Charadrius bicinctus*		BONN A2H		Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands (Marchant & Higgins 1993).	VBA	No records since pre-1990	N/A	No suitable habitat - **Unlikely to occur.**
Eastern Curlew	*Numenius madagascariensis*	Critically Endangered	BONN A1, ROKAMBA, JAMBA, CAMBA	Critically Endangered	Inhabits sheltered coasts, especially estuaries, embayment, harbours, inlets and coastal lagoons with large intertidal mudflats or sandflats, often with beds of sea grass (Higgins & Davies 1996).	PMST & VBA	4	3/12/2004	No suitable habitat - **Unlikely to occur.**
Eastern Great Egret	*Ardea alba modesta*			Vulnerable	Occurs in a variety of wetlands including: permanent water bodies on flood plains; shallows of deep permanent lakes, either open or vegetated with shrubs or trees; semi-permanent swamps with tall emergent vegetation (e.g. bulrush) and herb dominated seasonal swamps with abundant aquatic flora (Marchant & Higgins 1990).	VBA	30	21/07/2019	Suitable habitat occurs within study area and recent records from search region - **Potential to occur.**
Eastern Osprey	*Pandion cristatus*		BONN A2S		Rare vagrant to Victoria (Marchant & Higgins 1993). Littoral and coastal habitats and terrestrial wetlands. They are mostly found in coastal areas but occasionally travel inland along major rivers (Johnstone & Storr 1998; Marchant & Higgins 1993; Olsen 1995). They require extensive areas of open fresh, brackish or saline water for foraging (Marchant & Higgins 1993).	VBA	No records since pre-1990	N/A	Scarcity of records from search region - **Unlikely to occur.**
Fairy Tern	*Sternula nereis*	Vulnerable		Critically Endangered	Generally restricted to sheltered coasts both on the mainland, and inshore and offshore islands. Occurs in embayment, such as harbours, inlets, bays, estuaries, lagoons, and ocean beaches. Also found on lakes and salt ponds (Higgins & Davies 1996).	PMST & VBA	No records since pre-1990	N/A	No suitable habitat - **Unlikely to occur.**
Fork-tailed Swift	*Apus pacificus*		CAMBA, ROKAMBA, JAMBA		The species can occur in wet sclerophyll forest but mainly prefers open forest or plains. It is almost exclusively aerial and feeds up to hundreds on metres above the	PMST & VBA	10	31/01/2020	May occasionally forage over study area - **Potential to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
					ground, but can feed among open forest canopy. The species breeds internationally and seldom roosts in trees (Higgins 1999).				
Freckled Duck	*Stictonetta naevosa*			Endangered	Terrestrial wetlands; prefer fresh, densely vegetated waters, particularly floodwater swamps and creeks vegetated with lignum or cane grass. During dry seasons or droughts, move off ephemeral breeding swamps and occupy large permanent waters (Marchant & Higgins 1990).	VBA	3	20/09/2017	No suitable habitat - **Unlikely to occur.**
Gang-gang Cockatoo	*Callocephalon fimbriatum*	Endangered			In summer generally in tall mountain forests and woodlands, particularly in heavily timbered, mature wet sclerophyll forests and woodlands. Prefer *Eucalyptus* dominated assemblages. Also occurs in subalpine snow gum woodlands and occasionally in temperate rainforests and regenerating forests. In winter occur at lower altitudes in drier, more open *Eucalyptus* woodland (Higgins 1999).	PMST & VBA	48	24/02/2021	No suitable habitat - **Unlikely to occur.**
Great Knot	*Calidris tenuirostris*	Critically Endangered	BONN A2H, ROKAMBA, JAMBA, CAMBA	Critically Endangered	In Australasia, the species typically prefers sheltered coastal habitats, with large intertidal mudflats or sandflats. This includes inlets, bays, harbours, estuaries and lagoons. They are occasionally found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, saltlakes and non-tidal lagoons. The Great Knot rarely occurs on inland lakes and swamps (DCCEEW 2023).	VBA	1	17/02/1992	No suitable habitat - **Unlikely to occur.**
Greater Sand Plover	*Charadrius leschenaultii*	Vulnerable	BONN A2H, ROKAMBA, JAMBA, CAMBA	Vulnerable	Entirely coastal; mainly on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks. In Vic. Mostly in Corner inlet, Westernport and Port Phillip Bay (Marchant & Higgins 1993).	PMST	No previous records	N/A	No suitable habitat - **Unlikely to occur.**
Grey Falcon	*Falco hypoleucos*	Vulnerable		Vulnerable	Inhabits arid and semi-arid zones; mainly on sandy and stony plains of inland drainage systems, lightly timbered with acacia. Hunt far into open areas, over spinifex, tussock grasslands and low shrublands. In Victoria, few records mostly in north and northwestern regions (Marchant & Higgins 1993).	PMST	No previous records	N/A	Outside of known distribution - **Unlikely to occur.**
Grey Goshawk	*Accipiter novaehollandiae*			Endangered	Inhabit rainforests, open forests, swamp forests, woodlands and plantations; most abundant where forest or woodland provide cover for hunting from perches. In Victoria, it is most common in the Otway ranges (Marchant & Higgins 1993).	VBA	14	16/06/2021	May occasionally forage over study area - **Potential to occur.**
Grey Plover	*Pluvialis squatarola*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Vulnerable	Entirely coastal, but occasionally inland. Mainly on marine shores, inlets, estuaries and lagoons where there are nearby large tidal mudflats for feeding and sandy beaches for roosting (Marchant & Higgins 1993).	VBA	3	3/01/2000	No suitable habitat - **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Hardhead	*Aythya australis*			Vulnerable	Inhabits large, deep waters where vegetation is abundant; particularly deep swamps and lakes, pools and creeks. Also occur on freshwater meadows, seasonal swamps with abundant aquatic flora, reed swamps, wooded lakes and swamps, rice fields, and sewage ponds (Marchant & Higgins 1990).	VBA	17	6/12/2019	No suitable habitat - **Unlikely to occur.**
Hooded Plover	*Thinornis cucullatus*	Vulnerable		Vulnerable	Inhabits sandy ocean beaches, especially those that are broad and flat, with a wide wave-wash zone for feeding. Widespread and scattered across coastal Victoria. Numbers reduced due to disturbance by recreational activities on beaches (Marchant & Higgins 1993).	PMST & VBA	30	11/07/2021	No suitable habitat - **Unlikely to occur.**
Hooded Robin	*Melanodryas cucullata*	Endangered		Vulnerable	Occur mostly in open Grey Box, White Box, Yellow Box, Yellow Gum and Ironbark woodlands with pockets of saplings or taller shrubs, an open shrubby understorey, sparse grasses and patches of bare ground and leaf-litter, with scattered fallen timber. The population has declined throughout range, especially since the early 1980s. This species typically occurs north of the great divide in shrubland or woodland dominated by acacias (Higgins & Peter 2002; Tzaros 2005).	VBA	20	2/07/1991	Outside of known distribution - **Unlikely to occur.**
Latham's Snipe	*Gallinago hardwickii*	Vulnerable	BONN A2H, ROKAMBA, JAMBA, CAMBA		Occurs in wide variety of permanent and ephemeral wetlands; it prefers open freshwater wetlands with dense cover nearby, such as the edges of rivers and creeks, bogs, swamps, waterholes. The species is widespread in southeast Australia and most of its population occurs in Victoria, except in the northwest of the state (Naarding 1983; Higgins & Davies 1996).	PMST & VBA	31	29/01/2021	Suitable habitat occurs within study area and recent records from search region - **Potential to occur.**
Lewin's Rail	*Lewinia pectoralis*			Vulnerable	Occurs in a variety of densely vegetated wetland habitats, fresh or saline, and usually with areas of standing water. Requires shallow water areas for foraging (Marchant & Higgins 1993).	VBA	45	26/09/2020	No suitable habitat - **Unlikely to occur.**
Little Eagle	*Hieraaetus morphnoides*			Vulnerable	Over wooded and forested lands and open country of Aust. Range extending into arid zone. Most abundant in open forest and woodland (Marchant & Higgins 1993).	VBA	14	16/02/2008	May occasionally forage over study area - **Potential to occur.**
Little Egret	*Egretta garzetta*			Endangered	It occurs in a range of coastal and terrestrial wetlands, including freshwater wetlands with vegetation such as bulrush and requires trees for roosting and nesting (Marchant & Higgins 1990).	VBA	13	27/07/2019	Suitable habitat occurs within study area and recent records from search region - **Potential to occur.**
Little Tern	*Sternula albifrons*		BONN A2S, ROKAMBA, JAMBA, CAMBA	Critically Endangered	Sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets, especially those with exposed sandbanks or sand spits. In Victoria, they are found mainly on the east coast between Mallacoota and Corner Inlet, rare elsewhere (Higgins & Davies 1996).	PMST & VBA	No records since pre-1990	N/A	No suitable habitat - **Unlikely to occur.**
Magpie Goose	*Anseranas semipalmata*			Vulnerable	Terrestrial and aquatic habitats, but activities cantered on wetlands, mainly those	VBA	4	12/02/2011	Lack of suitable habitat and recent records - **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
					on floodplains of rivers (Marchant & Higgins 1990).				
Malleefowl	*Leipoa ocellata*	Vulnerable		Vulnerable	Mainly in semi-arid zones (200–450 mm rainfall), but in higher rainfall area of heath and mallee-heath. Rarely occurs in arid zones. Associated with mallee, particularly floristically rich tall dense mallee of higher rainfall areas (Marchant & Higgins 1993). Notably in Victoria, a small, isolated population does occur in Wychitella Flora and Fauna Reserve near Wedderburn (DSE 2003).	VBA	1	1/12/1990	No suitable habitat - **Unlikely to occur.**
Marsh Sandpiper	*Tringa stagnatilis*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Endangered	Inhabits sandy, muddy or rocky shores, usually coastal, rarely far inland. Often on beaches and mudflats, sandflats and occasionally rock shelves (Higgins & Davies 1996).	VBA	No records since pre-1990	N/A	No suitable habitat - **Unlikely to occur.**
Musk Duck	*Biziura lobata*			Vulnerable	It inhabits terrestrial wetlands, estuarine habitats and sheltered inland waters. Almost entirely aquatic; preferring deep water of large swamps, lakes and estuaries, where conditions are stable and aquatic flora abundant (Marchant & Higgins 1990).	VBA	71	21/07/2019	No suitable habitat - **Unlikely to occur.**
Orange-bellied Parrot	*Neophema chrysogaster*	Critically Endangered		Critically Endangered	The Orange-bellied Parrot is endemic to south-eastern Australia. Its current non-breeding mainland distribution is from the mouth of the Murray River in South Australia, along the coast, to the east of Jack Smith Lake in South Gippsland, Victoria, covering approximately 1000 km of coastline. The most used sites in Victoria are around Port Phillip Bay and Bellarine Peninsula. In South Australia, Carpenter Rocks is the main site. During winter on the mainland, found mostly within 3 km of the coast. In Victoria, they mostly occur in sheltered coastal habitats, such as bays, lagoons and estuaries, or, rarely, saltworks. They are also found in low samphire herbland dominated by Beaded Glasswort *Sarcocornia quinqueflora*, Sea Heath *Frankenia pauciflora* or Sea-blite *Suaeda australis*, and in taller shrubland dominated by Shrubby Glasswort *Sclerostegia arbuscula*. They are sometimes found in low samphire dominated by Grey Glasswort *Halosarcia halocnemoides* or in *Chenopodium* herbfields. Breeds at Melaleuca in Tasmania during spring/summer months (DCCEEW 2023).	PMST	No previous records	N/A	Lack of suitable habitat and no historic records - **Unlikely to occur.**
Painted Honeyeater	*Grantiella picta*	Vulnerable		Vulnerable	Inhabits box-ironbark forests and woodlands and mainly feeds on the fruits of mistletoe. Strongly associated with mistletoe around the margins of open forests and woodlands. Can also be found in farmland containing remnant treed vegetation. Occurs at few localities. Uncommon breeding migrant from further north, arriving in October and leaving	PMST	No previous records	N/A	Lack of suitable habitat and no historic records - **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
					in February (Higgins et al. 2001; Tzaros 2005).				
Pectoral Sandpiper	*Calidris melanotos*		BONN A2H, ROKAMBA, JAMBA		Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation (Higgins & Davies 1996).	PMST & VBA	1	2/03/2006	No suitable habitat - **Unlikely to occur.**
Plains-wanderer	*Pedionomus torquatus*	Critically Endangered		Critically Endangered	This species is highly sensitive to changes in grassland cover and density. Typically inhabits treeless native grasslands with sparse cover, with a preference for grasslands composed of wallaby grass and spear grass (Marchant & Higgins 1993). Habitat becomes unsuitable when grassland becomes dense (CA 2016). Evidence suggests it avoids areas of tree cover, with no records of the species within 300m of trees (>10m high) in their strongholds in New South Wales or Victoria (CA 2016).	PMST	No previous records	N/A	Lack of suitable habitat and no historic records - **Unlikely to occur.**
Plumed Egret	*Ardea intermedia plumifera*			Critically Endangered	It mainly inhabits terrestrial wetlands; only occasionally visit coastal wetlands and forages amongst aquatic vegetation in shallow water and requires trees for roosting and nesting. It often occurs in wetlands that contain vegetation, including bulrush (Marchant & Higgins 1990).	VBA	8	12/04/2007	Suitable habitat occurs within study area - **Potential to occur.**
Powerful Owl	*Ninox strenua*			Vulnerable	Found in open and tall wet sclerophyll forests with sheltered gullies and old growth forest with dense understorey. They are also found in dry forests with box and ironbark eucalypts and River Red Gum. Large old trees with hollows are required by this species for nesting. In Victoria, the Powerful Owl is widespread, having been recorded from most of the state. However, throughout its range it is uncommon and occurs in low densities (Higgins 1999). Also occurs in highly urbanised areas, such as metropolitan Melbourne, where they are heavily reliant upon various forms of movement corridors (riparian strips, roadside vegetation and recreational reserves) to both hunt within and navigate throughout the landscape (Carter et al. 2019).	VBA	4	4/11/2003	No suitable habitat - **Unlikely to occur.**
Red Knot	*Calidris canutus*	Endangered	BONN A2H, ROKAMBA, JAMBA, CAMBA	Endangered	In Australasia, the Red Knot mainly inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes,	PMST	No previous records	N/A	No suitable habitat - **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
					lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps (DCCEEW 2023).				
Red-necked Stint	*Calidris ruficollis*		BONN A2H, ROKAMBA, JAMBA, CAMBA		Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation (Higgins & Davies 1996).	VBA	4	1/11/1999	No suitable habitat - **Unlikely to occur.**
Red-tailed Black-Cockatoo (south-eastern)	*Calyptorhynchus banksii graptogyne*	Endangered		Endangered	Prefer eucalypt forests and woodlands but often in adjacent acacia or *Casuarina* woodlands. In Victoria, subsp. graptogyne inhabits mostly in or at edge of patches of Brown Stringybark woodlands in pasture or in remnant copses of River Red-gum (Higgins 1999).	PMST & VBA	1	7/01/2013	No suitable habitat - **Unlikely to occur.**
Ruddy Turnstone	*Arenaria interpres*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Endangered	Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation (Higgins & Davies 1996).	VBA	No records since pre-1990	N/A	No suitable habitat - **Unlikely to occur.**
Rufous Bristlebird (Coorong)	*Dasyornis broadbenti broadbenti*			Endangered	Inhabits low dense shrublands and heathlands on coastal dunes and cliffs, but extends inland along valleys in Otway Ranges where it inhabits dense undergrowth in forest. It occurs in isolated coastal populations in western Victoria. It is abundant in the Port Campbell National Park and in the Bay of Islands Coastal Park near Peterborough (Higgins & Peter 2002).	VBA	76	22/11/2006	**Recorded in study area during field assessment.**
Rufous Fantail	*Rhipidura rufifrons*		BONN A2H		In east and south-east Australia, mainly inhabits tall wet sclerophyll forests, often in gullies. When on passage in warmer months, they are sometimes recorded in drier sclerophyll forests and woodlands, as well as parks and gardens (Higgins et al. 2006). Virtually absent from south-eastern Australia during winter (Higgins et al. 2006).	PMST & VBA	11	17/10/2004	Lack of suitable habitat but may occasionally visit study area when on passage during warmer months - **Potential to occur.**
Sanderling	*Calidris alba*		BONN A2H, ROKAMBA, JAMBA, CAMBA		Inhabits open sandy beaches exposed to sea-swells; also on exposed sandbars and spits (Higgins & Davies 1996).	VBA	No records since pre-1990	N/A	No suitable habitat - **Unlikely to occur.**
Satin Flycatcher	*Myiagra cyanoleuca*		BONN A2H		Mostly found in eucalypt forest, particularly tall wet forests and woodland within gullies (Higgins et al. 2006). Also inhabits eucalypt woodland comprising an open understorey and a grassy ground layer (Higgins et al. 2006). Generally absent from rainforest (Higgins et al. 2006).	PMST & VBA	7	18/12/2010	Lack of suitable habitat but may occasionally visit study area when on passage during warmer months - **Potential to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Sharp-tailed Sandpiper	*Calidris acuminata*		BONN A2H, ROKAMBA, JAMBA, CAMBA		Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation (Higgins & Davies 1996).	PMST & VBA	15	27/10/2018	No suitable habitat - **Unlikely to occur.**
Swift Parrot	*Lathamus discolor*	Critically Endangered		Critically Endangered	Prefers a select range of eucalypts in Victoria, including Yellow Gum, Grey Box, White Box, Red Ironbark and Yellow Box, as well as River Red-gum when this species supports abundant 'lerp' (Saunders & Tzaros 2011). The species is also known to forage within planted stands of Spotted Gum and Sugar Gum (Nature Advisory; unpublished data). Breeds in Tasmania and migrates to the mainland of Australia for the autumn, winter and early spring months. It lives mostly north of the Great Dividing Range, passing through two areas of Victoria on migration: the Port Phillip district and Gippsland (Emison et al. 1987; Higgins 1999; Kennedy & Tzaros 2005). Though it is also not uncommonly sighted in urban areas (Nature Advisory; unpublished data). Occurrence of this species on the mainland can substantially change from year to year depending on food availability, giving potential for this species to occur almost anywhere throughout its range (Emison et al. 1987).	PMST	No previous records	N/A	Lack of suitable habitat and no historic records - **Unlikely to occur.**
Terek Sandpiper	*Xenus cinereus*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Endangered	Inhabits saline intertidal mudflats in sheltered estuaries, harbours and lagoons; on islets, mudbanks, sandbanks or spits. In Victoria, they occur in Corner Inlet, Westernport Bay and Port Phillip Bay (Higgins & Davies 1996).	VBA	No records since pre-1990	N/A	No suitable habitat - **Unlikely to occur.**
White-bellied Sea-Eagle	*Haliaeetus leucogaster*			Endangered	Maritime habitats, terrestrial large wetlands and coastal lands of tropical and temperate Australia and offshore islands, ranging far inland only over large rivers and wetlands. The eagles usually breed on coast and offshore islands and inland beside large lakes or rivers, usually in tall trees in or near water, also in cliffs, rock pinnacles and escarpments (Marchant & Higgins 1993).	VBA	43	24/07/2019	May occasionally forage over study area - **Potential to occur.**
White-throated Needletail	*Hirundapus caudacutus*	Vulnerable	CAMBA, ROKAMBA, JAMBA	Vulnerable	Aerial, over all habitats, but probably more over wooded areas, including open forest and rainforest. Often over heathland and less often above treeless areas such as grassland and swamps or farmland (Higgins 1999).	PMST & VBA	No records since pre-1990	N/A	May occasionally forage over study area - **Potential to occur.**
Wood Sandpiper	*Tringa glareola*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Endangered	Inhabits well vegetated, shallow, freshwater wetlands, such as swamps, lakes, pools, and waterholes; typically with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reed. In Victoria, they are mostly from Port Phillip bay and in mid-Murray valley (Higgins & Davies 1996).	VBA	5	2/03/2006	Lack of suitable habitat and scarcity of recent historic records - **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Yellow Wagtail	*Motacilla flava*		CAMBA, JAMBA, ROKAMBA		Common migrant from Asia. Inhabits moist, grassy or muddy areas, sewage treatment plants, sports fields, tracks or bare ground, occasionally on beaches (Menkhorst et al. 2019).	PMST	No previous records	N/A	Suitable habitat occurs but no historic records - **Unlikely to occur.**
Mammals									
Heath Mouse	*Pseudomys shortridgei*	Endangered		Endangered	In eastern Australia, Heath Mouse prefers recently burnt (preferably 7–10 years post fire), floral species-rich, treeless, dry heathlands in an area with 600 mm annual rainfall. The optimum situation for the species appears to be a mosaic of habitats of differing maturity, subject to the disturbance by fire. Typical habitats include dry heath, and forest and woodland with a heathy understorey (Menkhorst 1995). In Victoria, the species is restricted to the wannon region in the far west of the state.	PMST & VBA	16	7/02/1994	Scarcity of records from search region and lack of suitable habitat - **Unlikely to occur.**
Long-nosed Potoroo	*Potorous tridactylus trisulcatus*	Vulnerable		Vulnerable	In Victoria, the species occupies a wide variety of wet forest and wet scrub, usually occuring on sandy loam soils where rainfall exceeds 750mm annually (Menkhorst 1995); In Tasmania, moist forest with dense shrub layer; in the north edge of rainforest (Menkhorst 1995). Dense understorey vegetation is an essential component for the species persistence, which can consist of grass trees, sedges, ferns, heath, tea-tree or melaleucas (Menkhorst 1995).	PMST & VBA	No records since pre-1990	N/A	Scarcity of records from search region and lack of suitable habitat - **Unlikely to occur.**
New Holland Mouse	*Pseudomys novaehollandiae*	Vulnerable		Endangered	Suitable habitat includes coastal heath and scrub, heathy woodland, open forest and vegeatated sand-dunes, with dry heath regenrating post-fire appearing to be optimal for the species (Menkhorst 1995). Victorian records are largely restricted to the localities of Anglesea, Westernport and Gippsland lakes.	PMST	No previous records	N/A	Scarcity of records from search region and lack of suitable habitat - **Unlikely to occur.**
Smoky Mouse	*Pseudomys fumeus*	Endangered		Endangered	Smoky Mouse occurs in a wide variety of habitats, from heath to dry sclerophyll forest, especially along ridgetops with a heath understorey, and occasionally adjacent wetter habitats such as fern gullies (Menkhorst 1995). A characteristic of many localities, except those in wet gullies, is a floristically diverse shrub layer with members of the plant families *Epacridaceae, Fabaceae* and *Mimosaceae* well represented (DCCEEW 2023). Shrub seeds and berries are important food sources for the species, with fire frequency and intensity highly influential in the occurrence of such habitat, and ultimately the species (Menkhorst 1995).	PMST	No previous records	N/A	Scarcity of records from search region and lack of suitable habitat - **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Southern Brown Bandicoot	*Isoodon obesulus obesulus*	Endangered		Endangered	Suitable habitat for Southern Brown Bandicoots (eastern) is defined to be any patches of native or exotic vegetation, within their distribution, which contains understorey vegetation structure with 50–80% average foliage density in the 0.2–1 m height range. In areas where native habitats have been degraded or diminished, exotic vegetation, such as Blackberry (*Rubus* spp.), can and often does, provide important habitat (DCCEEW 2023).	PMST & VBA	37	23/06/2017	Recent nearby records and suitable habitat present in the form of roadside vegetation - **Likely to occur.**
Spot-tailed Quoll	*Dasyurus maculatus maculatus*	Endangered		Endangered	Rainforest, wet and dry forest, coastal heath and scrub and River Red-gum woodlands along inland rivers (Menkhorst 1995).	PMST & VBA	No records since pre-1990	N/A	No recent records from search region and lack of suitable habitat - **Unlikely to occur.**
Swamp Antechinus	*Antechinus minimus maritimus*	Vulnerable		Vulnerable	Dense wet heath, tussock grassland, sedgeland heathy woodland and coastal heath and scrub (Menkhorst 1995). Requires mature, dense vegetation with thick ground cover (DCCEEW 2023). Shelters in short burrows or underneath dense leaf litter. Rarely occurs more than 200m above sea level. Though this species has also previously been detected at sites which had experienced some structural disturbance in the South Gippsland region (Nature Advisory; unpublished data).	PMST & VBA	No records since pre-1990	N/A	No recent records from search region, however, there is suitable habitat within and adjacent to the study area - **Potential to occur.**
Yellow-bellied Glider	*Petaurus australis*	Vulnerable			Forests with a predominance of smooth-barked eucalypts, as well as a mixture of eucalypt species. Uncommon in wet forests dominated by single tree species; a mixture of tree species is preferred (Menkhorst 1995). Inhabits a range of forest types, depending on the location in Victoria - western populations use dry woodland and forest, whereas southern, eastern and northeastern populations use a variety of wet forest types (Menkhorst 1995). Require large hollows in large, old trees. In Mountain Ash forest dependent on extensive stands of old-growth forest - rare in young forest even when scattered old trees are available (Menkhorst 1995). Will persist in corridors as narrow as 200 m (Menkhorst 1995).	PMST	No previous records	N/A	No suitable habitat - **Unlikely to occur.**
Bats									
Grey-headed Flying-fox	*Pteropus poliocephalus*	Vulnerable		Vulnerable	Brisbane, Newcastle, Sydney and Melbourne are occupied continuously. Elsewhere, during spring, they are uncommon south of Nowra and widespread in other areas of their range. Roosts in aggregations of various sizes on exposed branches. Roost sites are typically located near water, such as lakes, rivers or the coast. Roost vegetation includes rainforest patches, stands of *Melaleuca*, mangroves and riparian vegetation, but colonies also use highly modified vegetation in urban and suburban areas (DCCEEW 2023).	PMST & VBA	2	19/07/2013	No suitable habitat - **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Southern Bent-winged Bat (southern ssp.)	*Miniopterus orianae bassanii*	Critically Endangered		Critically Endangered	Roosts in caves during the day, dispersing over a range of habitats at night. Its feeding areas tend to be associated with major drainage systems (Menkhorst 1995).	PMST & VBA	35	9/09/2016	May occasionally forage over study area - **Potential to occur.**
Reptiles									
Striped Worm-Lizard	*Aprasia striolata*			Endangered	Sand plains and rocky outcrops including limestone in south west Victoria (Wilson & Swan 2003).	VBA	3	15/01/1994	No suitable habitat - **Unlikely to occur.**
Swamp Skink	*Lissolepis coventryi*	Endangered		Endangered	Wetlands including swamp margins, lakes, rivers, creeks and even tidal salt marshes, often associated with tea-tree thickets (Wilson & Swan 2003).	PMST & VBA	1	20/02/2006	Nearby historical record but wetland habitat marginal and highly degraded through history of grazing - **Unlikely to occur.**
Fish									
Australian Grayling	*Prototroctes maraena*	Vulnerable		Endangered	Large and small coastal streams and rivers with cool, clear waters with a gravel substrate and altering pools and riffles (Cadwallader & Backhouse 1983).	PMST	No previous records	N/A	No suitable habitat - **Unlikely to occur.**
Dwarf Galaxias	*Galaxiella pusilla*	Vulnerable		Endangered	Ranges from the far west of the state through to the Mitchell River basin in central Gippsland. Vegetated margins of still water, ditches, swamps and backwaters of creeks, both ephemeral and permanent (Allen et al. 2002). Some wetlands where it occurs may partially or completely dry up during summer, with such wetlands reliant on seasonal flooding plus linkages to other sites where the species occurs, for habitat and population replenishment (Saddlier, Jackson & Hammer 2010). Dwarf Galaxias is also often found in association with burrowing freshwater crayfish (*Engaeus* spp.), with the crayfish burrows reportedly providing refuge from predators and dry conditions for the species (Saddlier, Jackson & Hammer 2010).	PMST	No previous records	N/A	No suitable habitat - **Unlikely to occur.**
Yarra Pygmy Perch	*Nannoperca obscura*	Vulnerable		Vulnerable	Streams and small lakes, prefers flowing water with abundant aquatic vegetation (Allen et al. 2002).	PMST	No previous records	N/A	No suitable habitat - **Unlikely to occur.**
Amphibians									
Growling Grass Frog	*Litoria raniformis*	Vulnerable		Vulnerable	Permanent, still or slow flowing water with fringing and emergent vegetation in streams, swamps, lagoons and artificial wetlands such as farm dams and abandoned quarries (Clemann & Gillespie 2004).	PMST & VBA	No records since pre-1990	N/A	No recent records from search region and lack of suitable permanent habitat - **Unlikely to occur.**
Southern Toadlet	*Pseudophryne semimarmorata*			Endangered	Damp areas in forests and woodlands (Cogger 2000). In Victoria, the Southern Toadlet is mainly found on and south of the Great Dividing Range although there are records as far north as the Little Desert (SWIFFT 2020).	VBA	2	19/05/2011	No suitable habitat - **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	FFG	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Mussels, decapod crustacea									
Glenelg Spiny Crayfish	*Euastacus bispinosus*	Endangered		Endangered	Glenelg Spiny Freshwater Crayfish is considered a specialist species with typically low tolerance to environmental conditions (namely dissolved oxygen concentrations), ensuring that species requires specific habitat requirements. As with other Euastacus species, Glenelg Spiny Freshwater Crayfish have a preference for permanently-flowing, cool (and shaded) and well-oxygenated water (Morgan 1986; Morgan 1997). Other habitat requirements vary across Victorian and South Australian populations.	PMST	No previous records	N/A	No recent records from search region and lack of suitable habitat - **Unlikely to occur.**
Hairy Burrowing Crayfish	*Engaeus sericatus*			Vulnerable	Data deficient. Known to burrow in damp habitats such as flood-plains, creeks, swamps, and in drainage channels. Burrows are connected to the water table and excavated during wetter periods to create 'chimney-like' structures that can be visible in suitable habitat.	VBA	2	1/01/2008	Records from search region. Suitable habitat present, but highly degraded. No burrows observed during field assessment despite conditions being optimal - **Unlikely to occur.**
Portland Burrowing Crayfish	*Engaeus strictifrons*			Endangered	Data deficient. Known to burrow in damp habitats such as flood-plains, creeks, swamps, and in drainage channels. Burrows are connected to the water table and excavated during wetter periods to create 'chimney-like' structures that can be visible in suitable habitat.	VBA	1	15/04/2010	Records from search region. Suitable habitat present, but highly degraded. No burrows observed during field assessment despite conditions being optimal - **Unlikely to occur.**

Notes: grey shading indicates species that are likely to or have the potential to occur in the study area; **EPBC-T** = threatened species status under EPBC Act; **EPBC-M =** migratory status under the EPBC Act (M = listed migratory taxa; Bonn Convention (A2H) - Convention on the Conservation of Migratory Species of Wild Animals – listed as a member of a family; Bonn Convention (A2S) - Convention on the Conservation of Migratory Species of Wild Animals - species listed explicitly; CAMBA - China-Australia Migratory Birds Agreement; JAMBA - Japan-Australia Migratory Birds Agreement; ROKAMBA - Republic of Korea Australia Migratory Birds Agreement); **FFG** = threatened species status under the FFG Act.

Appendix 6: Photographs of native vegetation proposed for removal

All photographs were taken on 17 and 18 July 2023 and 9 and 10 January 2024.

Photo 1: Habitat Zone RA, along Maderia Packet Road – Heathy Woodland (EVC 48) that now more closely resembles Coastal Alkaline Scrub (EVC 858) with canopy absent. Coast Wattle over weed understorey.

Photo 2: Habitat Zone RC, along Maderia Packet Road – Heathy Woodland (EVC 48) that now more closely resembles Coastal Alkaline Scrub (EVC 858) with canopy absent. Coast Wattle over weed understorey.

Photo 3: Habitat Zone RD, along Maderia Packet Road – Heathy Woodland (EVC 48) that now more closely resembles Coastal Alkaline Scrub (EVC 858) with canopy absent. Coast Wattle over weed understorey.

Photo 4: Habitat Zone RE, along Maderia Packet Road – Heathy Woodland (EVC 48) that now more closely resembles Coastal Alkaline Scrub (EVC 858) with canopy absent. Coast Wattle over weed understorey.

Photo 5: Habitat Zone RF, along Tecoma Road and Oleria Road – Heathy Woodland (EVC 48) that now more closely resembles Coastal Alkaline Scrub (EVC 858) with canopy absent. Coast Wattle over weed understorey.

Photo 6: Habitat Zone RG, along Oleria Road – Heathy Woodland (EVC 48) that now more closely resembles Coastal Alkaline Scrub (EVC 858) with canopy absent. Coast Wattle over weed understorey.

Photo 7: Drainage line along Habitat Zone RG, at Oleria Road.

Photo 8: Habitat Zone A – degraded wetland in low-lying area of introduced pasture – Aquatic Herbland (EVC 653).

Photo 9: Habitat Zone B – degraded wetland in low-lying area of introduced pasture – Aquatic Herbland (EVC 653).

Photo 10: Habitat Zone C – degraded wetland in low-lying area of introduced pasture – Aquatic Herbland (EVC 653).

Photo 11: Habitat Zone D – degraded wetland in low-lying area of introduced pasture – Aquatic Herbland (EVC 653).

Photo 12: Habitat Zone F – large wetland in low-lying area of introduced pasture, open water – Aquatic Herbland (EVC 653).

Photo 13: Habitat Zone G – large wetland in low-lying area of introduced pasture, open water – Aquatic Herbland (EVC 653).

Photo 14: Habitat Zone J – degraded connected wetlands in low-lying area of introduced pasture – Aquatic Herbland (EVC 653).

Photo 15: Habitat Zone P – degraded wetland in low-lying area of introduced pasture – Aquatic Herbland (EVC 653).

Photo 16: Habitat Zone Q – drainage line in Allotment 61A Section 13 Parish of Portland – Aquatic Herbland (EVC 653).

Photo 17: Habitat Zone S – drainage line in Allotment 61A Section 13 Parish of Portland – Aquatic Herbland (EVC 653).

Photo 18: Habitat Zone T – drainage line in Allotment 61A Section 13 Parish of Portland – Aquatic Herbland (EVC 653).

Photo 19: Habitat Zone W – drainage line in Allotment 61A Section 13 Parish of Portland – Aquatic Herbland (EVC 653).

Photo 20: Habitat Zone U – drainage line in Lot 1 TP592015 Madeira Packet Road– Aquatic Herbland (EVC 653).

Photo 21: Habitat Zone V – drainage line in Lot 1 TP592015 Madeira Packet Road– Aquatic Herbland (EVC 653).

Photo 22: General photo of the vegetation in Allotment 61A Section 13 Parish of Portland – open introduced pasture on generally flat land.

Photo 23: General photo of the vegetation in Lot 1 TP592015 Madeira Packet Road – open introduced pasture on undulating landscape. Scattered Austral Bracken and sparse native Rush.

Photo 24: Small scattered trees no. 1 and 2 within Allotment 61A Section 13 Parish of Portland.

Photo 25: Planted Cypress-pines on either side of the driveway in Allotment 61A Section 13 Parish of Portland.

Photo 26: Cypress-pine windbreak and planted River She-oaks in Allotment 61A Section 13 Parish of Portland.

Photo 27: Habitat Zone X, along Maderia Packet Road – Heathy Woodland (EVC 48) that now more closely resembles Coastal Alkaline Scrub (EVC 858) with canopy absent. Primarily Coast Wattle and Coast Beard-heath over weed understorey

Photo 28: Habitat Zone Y, along Maderia Packet Road – Heathy Woodland (EVC 48) that now more closely resembles Coastal Alkaline Scrub (EVC 858) with canopy absent. Primarily Coast Wattle and Coast Beard-heath over weed understorey.

Photo 29: Exempt Austral Bracken regrowth in 305 Madeira Packet Road – Heavily modified Heathy Woodland (EVC 48).

Photo 30: Habitat Zone AA – Heathy Woodland (EVC 48) that now more closely resembles Coastal Alkaline Scrub (EVC 858) with canopy absent. Primarily Coast Wattle and Coast Beard-heath over weed understorey.

Photo 31: Habitat Zone AU – Heathy Woodland (EVC 48) that now more closely resembles Coastal Alkaline Scrub (EVC 858) with canopy absent. Primarily Bower Spinach under a planted shrub layer.

Appendix 7: Native Vegetation Removal (NVR) report

Native vegetation removal report

This report provides information to support an application to remove, destroy or lop native vegetation in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation*. The report **is not an assessment by DELWP** of the proposed native vegetation removal. Native vegetation information and offset requirements have been determined using spatial data provided by the applicant or their consultant.

Date of issue: **16/07/2024**
Time of issue: **1:13 pm**

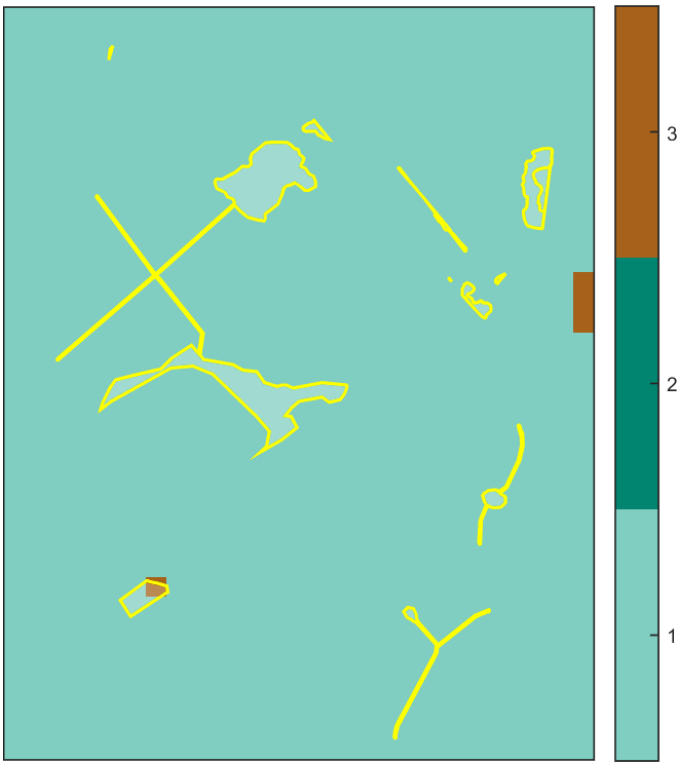
Report ID: NAA_2024_104

Project ID	23146_03_Portland_Green_rem_240716

Assessment pathway

Assessment pathway	**Detailed Assessment Pathway**
Extent including past and proposed	2.163 ha
Extent of past removal	0.000 ha
Extent of proposed removal	2.163 ha
No. Large trees proposed to be removed	0
Location category of proposed removal	Location 3 The native vegetation is in an area where the removal of less than 0.5 hectares could have a significant impact on habitat for one or more rare or threatened species.

1. Location map



OFFICIAL

Offset requirements if a permit is granted

Any approval granted will include a condition to obtain an offset that meets the following requirements:

General offset amount[1]	0.599 general habitat units
Vicinity	Glenelg Hopkins Catchment Management Authority (CMA) or Glenelg Shire Council
Minimum strategic biodiversity value score[2]	0.463
Large trees	0 large trees

NB: values within tables in this document may not add to the totals shown above due to rounding

Appendix 1 includes information about the native vegetation to be removed

Appendix 2 includes information about the rare or threatened species mapped at the site.

Appendix 3 includes maps showing native vegetation to be removed and extracts of relevant species habitat importance maps

1 The general offset amount required is the sum of all general habitat units in Appendix 1.

2 Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required

Next steps

Any proposal to remove native vegetation must meet the application requirements of the Detailed Assessment Pathway and it will be assessed under the Detailed Assessment Pathway.

If you wish to remove the mapped native vegetation you are required to apply for a permit from your local council. Council will refer your application to DELWP for assessment, as required. **This report is not a referral assessment by DELWP.**

This *Native vegetation removal report* must be submitted with your application for a permit to remove, destroy or lop native vegetation.

Refer to the *Guidelines for the removal, destruction or lopping of native* vegetation (the Guidelines) for a full list of application requirements This report provides information that meets the following application requirements:

- The assessment pathway and reason for the assessment pathway
- A description of the native vegetation to be removed (partly met)
- Maps showing the native vegetation and property (partly met)
- Information about the impacts on rare or threatened species.
- The offset requirements determined in accordance with section 5 of the Guidelines that apply if approval is granted to remove native vegetation.

Additional application requirements must be met including:

- Topographical and land information
- Recent dated photographs
- Details of past native vegetation removal
- An avoid and minimise statement
- A copy of any Property Vegetation Plan that applies
- A defendable space statement as applicable
- A statement about the Native Vegetation Precinct Plan as applicable
- A site assessment report including a habitat hectare assessment of any patches of native vegetation and details of trees
- An offset statement that explains that an offset has been identified and how it will be secured.

© The State of Victoria Department of Environment, Land, Water and Planning Melbourne 2024

This work is licensed under a Creative Commons Attribution 4.0 International licence. You are free to re-use the work under that licence, on the condition that you credit the State of Victoria as author. The licence does not apply to any images, photographs or branding, including the Victorian Coat of Arms, the Victorian Government logo and the Department of Environment, Land, Water and Planning logo. To view a copy of this licence, visit http://creativecommons.org/licenses/by/34.0/au/deed.en

Authorised by the Victorian Government, 8 Nicholson Street, East Melbourne.

For more information contact the DELWP Customer Service Centre 136 186

www.delwp.vic.gov.au

Disclaimer
This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

Obtaining this publication does not guarantee that an application will meet the requirements of Clauses 52.16 or 52.17 of the Victoria Planning Provisions and Victorian planning schemes or that a permit to remove native vegetation will be granted.

Notwithstanding anything else contained in this publication, you must ensure that you comply with all relevant laws, legislation, awards or orders and that you obtain and comply with all permits, approvals and the like that affect, are applicable or are necessary to undertake any action to remove, lop or destroy or otherwise deal with any native vegetation or that apply to matters within the scope of Clauses 52.16 or 52.17 of the Victoria Planning Provisions and Victorian planning schemes.

Appendix 1: Description of native vegetation to be removed

The species-general offset test was applied to your proposal. This test determines if the proposed removal of native vegetation has a proportional impact on any rare or threatened species habitats above the species offset threshold. The threshold is set at 0.005 per cent of the mapped habitat value for a species. When the proportional impact is above the species offset threshold a species offset is required. This test is done for all species mapped at the site. Multiple species offsets will be required if the species offset threshold is exceeded for multiple species.

Where a zone requires species offset(s), the species habitat units for each species in that zone is calculated by the following equation in accordance with the Guidelines:

Species habitat units = extent x condition x species landscape factor x 2, where the species landscape factor = 0.5 + (habitat importance score/2)

The species offset amount(s) required is the sum of all species habitat units per zone

Where a zone does not require a species offset, the general habitat units in that zone is calculated by the following equation in accordance with the Guidelines:

General habitat units = extent x condition x general landscape factor x 1.5, where the general landscape factor = 0.5 + (strategic biodiversity value score/2)

The general offset amount required is the sum of all general habitat units per zone.

Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
1-B	Patch	glep0653	Endangered	0	no	0.250	0.629	0.629	0.593		0.188	General
1-C	Patch	glep0653	Endangered	0	no	0.250	0.027	0.027	0.600		0.008	General
1-F	Patch	glep0653	Endangered	0	no	0.220	0.128	0.128	0.780		0.037	General
1-G	Patch	glep0653	Endangered	0	no	0.200	0.805	0.805	0.569		0.189	General
1-U	Patch	glep0653	Endangered	0	no	0.270	0.067	0.067	0.800		0.024	General
1-V	Patch	glep0653	Endangered	0	no	0.200	0.075	0.075	0.790		0.020	General
1-AB	Patch	glep0048	Least Concern	0	no	0.350	0.060	0.060	0.263		0.020	General
1-AA	Patch	glep0048	Least Concern	0	no	0.360	0.190	0.190	0.399		0.072	General
1-AU	Patch	glep0048	Least Concern	0	no	0.260	0.005	0.005	0.810		0.002	General
1-RC1	Patch	glep0048	Least Concern	0	no	0.150	0.052	0.052	0.810		0.011	General

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	**Type**	**BioEVC**	**BioEVC conservation status**	**Large tree(s)**	**Partial removal**	**Condition score**	**Polygon Extent**	**Extent without overlap**	**SBV score**	**HI score**	**Habitat units**	**Offset type**
1-RC2	Patch	glep0048	Least Concern	0	no	0.150	0.000	0.000	0.810		0.000	General
1-W1	Patch	glep0653	Endangered	0	no	0.190	0.106	0.106	0.382		0.021	General
1-W2	Patch	glep0653	Endangered	0	no	0.190	0.001	0.001	0.430		0.000	General
1-Y1	Patch	glep0048	Least Concern	0	no	0.270	0.017	0.017	0.780		0.006	General
1-Y2	Patch	glep0048	Least Concern	0	no	0.270	0.002	0.002	0.260		0.001	General

Appendix 2: Information about impacts to rare or threatened species' habitats on site

This table lists all rare or threatened species' habitats mapped at the site.

Species common name	Species scientific name	Species number	Conservation status	Group	Habitat impacted	% habitat value affected
Drooping Velvet-bush	*Lasiopetalum schulzenii*	501875	Rare	Dispersed	Habitat importance map	0.0011
Oval-leaf Logania	*Logania ovata*	502032	Rare	Dispersed	Habitat importance map	0.0005
Coast Ballart	*Exocarpos syrticola*	501354	Rare	Dispersed	Habitat importance map	0.0003
Coast Helmet-orchid	*Corybas despectans*	500836	Vulnerable	Dispersed	Habitat importance map	0.0002
Scented Spider-orchid	*Caladenia fragrantissima*	504351	Endangered	Dispersed	Habitat importance map	0.0002
Coast Bitter-bush	*Adriana quadripartita*	504755	Vulnerable	Dispersed	Habitat importance map	0.0002
Coast Ground-berry	*Acrotriche cordata*	500119	Rare	Dispersed	Habitat importance map	0.0002
Lacey River Buttercup	*Ranunculus amplus*	505019	Rare	Dispersed	Habitat importance map	0.0002
Gull-billed Tern	*Gelochelidon nilotica macrotarsa*	10111	Endangered	Dispersed	Habitat importance map	0.0001
Swamp Greenhood	*Pterostylis tenuissima*	502819	Vulnerable	Dispersed	Habitat importance map	0.0001
Lax Twig-sedge	*Baumea laxa*	500378	Rare	Dispersed	Habitat importance map	0.0001
Robust Spider-orchid	*Caladenia valida*	501022	Endangered	Dispersed	Habitat importance map	0.0001
Leafy Greenhood	*Pterostylis cucullata subsp. cucullata*	505911	Endangered	Dispersed	Habitat importance map	0.0001
Wiry Bog-sedge	*Schoenus carsei*	503043	Rare	Dispersed	Habitat importance map	0.0001
Lime Fern	*Pneumatopteris pennigera*	502578	Endangered	Dispersed	Habitat importance map	0.0001
Swamp Diuris	*Diuris palustris*	501082	Vulnerable	Dispersed	Habitat importance map	0.0001
Dense Leek-orchid	*Prasophyllum spicatum*	504506	Endangered	Dispersed	Habitat importance map	0.0001
Winter Sun-orchid	*Thelymitra hiemalis*	505006	Endangered	Dispersed	Habitat importance map	0.0001
Forked Rice-flower	*Pimelea hewardiana*	502522	Rare	Dispersed	Habitat importance map	0.0001

Southern Xanthosia	*Xanthosia tasmanica*	504088	Rare	Dispersed	Habitat importance map	0.0001
Showy Lobelia	*Lobelia beaugleholei*	502733	Rare	Dispersed	Habitat importance map	0.0000
Hoary Rapier-sedge	*Lepidosperma canescens*	501915	Rare	Dispersed	Habitat importance map	0.0000
Small Sickle Greenhood	*Pterostylis lustra*	504876	Endangered	Dispersed	Habitat importance map	0.0000
Slender Stylewort	*Levenhookia sonderi*	501998	Rare	Dispersed	Habitat importance map	0.0000
Mauve-tuft Sun-orchid	*Thelymitra malvina*	503374	Vulnerable	Dispersed	Habitat importance map	0.0000
Slender Pink-fingers	*Caladenia vulgaris*	504449	Rare	Dispersed	Habitat importance map	0.0000
Rough Daisy-bush	*Olearia asterotricha*	502300	Rare	Dispersed	Habitat importance map	0.0000
Swamp Skink	*Lissolepis coventryi*	12407	Vulnerable	Dispersed	Habitat importance map	0.0000
Maroon Leek-orchid	*Prasophyllum frenchii*	502709	Endangered	Dispersed	Habitat importance map	0.0000
Southern Bent-wing Bat	*Miniopterus schreibersii bassanii*	61343	Critically endangered	Dispersed	Habitat importance map	0.0000
Wavy Swamp Wallaby-grass	*Amphibromus sinuatus*	503625	Vulnerable	Dispersed	Habitat importance map	0.0000
Plains Yam-daisy	*Microseris scapigera s.s.*	504657	Vulnerable	Dispersed	Habitat importance map	0.0000
Bog Gum	*Eucalyptus kitsoniana*	501290	Rare	Dispersed	Habitat importance map	0.0000
Blotched Sun-orchid	*Thelymitra benthamiana*	503369	Vulnerable	Dispersed	Habitat importance map	0.0000
Mellblom's Spider-orchid	*Caladenia hastata*	504348	Endangered	Dispersed	Habitat importance map	0.0000
Swamp Flax-lily	*Dianella callicarpa*	505086	Rare	Dispersed	Habitat importance map	0.0000
Leafy Twig-sedge	*Cladium procerum*	500786	Rare	Dispersed	Habitat importance map	0.0000
Swamp Fireweed	*Senecio psilocarpus*	504659	Vulnerable	Dispersed	Habitat importance map	0.0000
Parsley Xanthosia	*Xanthosia leiophylla*	504562	Rare	Dispersed	Habitat importance map	0.0000
Western Peppermint	*Eucalyptus falciformis*	505358	Rare	Dispersed	Habitat importance map	0.0000
Purple Blown-grass	*Lachnagrostis punicea subsp. filifolia*	504222	Rare	Dispersed	Habitat importance map	0.0000
Delicate Crane's-bill	*Geranium sp. 6*	505347	Vulnerable	Dispersed	Habitat importance map	0.0000

Tufted Grass-tree	*Xanthorrhoea caespitosa*	505088	Rare	Dispersed	Habitat importance map	0.0000
Australasian Bittern	*Botaurus poiciloptilus*	10197	Endangered	Dispersed	Habitat importance map	0.0000
Neat Spear-grass	*Austrostipa mundula*	503281	Rare	Dispersed	Habitat importance map	0.0000
Rough Blown-grass	*Lachnagrostis rudis subsp. rudis*	500159	Endangered	Dispersed	Habitat importance map	0.0000
One-flower Early Nancy	*Wurmbea uniflora*	503583	Rare	Dispersed	Habitat importance map	0.0000
Dwarf Brooklime	*Gratiola pumilo*	503753	Rare	Dispersed	Habitat importance map	0.0000
Pale Swamp Everlasting	*Coronidium gunnianum*	504655	Vulnerable	Dispersed	Habitat importance map	0.0000
Baillon's Crake	*Porzana pusilla palustris*	10050	Vulnerable	Dispersed	Habitat importance map	0.0000
Clover Glycine	*Glycine latrobeana*	501456	Vulnerable	Dispersed	Habitat importance map	0.0000
Swamp Everlasting	*Xerochrysum palustre*	503763	Vulnerable	Dispersed	Habitat importance map	0.0000
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*	10220	Vulnerable	Dispersed	Habitat importance map	0.0000
Masked Owl	*Tyto novaehollandiae novaehollandiae*	10250	Endangered	Dispersed	Habitat importance map	0.0000
Lewin's Rail	*Lewinia pectoralis pectoralis*	10045	Vulnerable	Dispersed	Habitat importance map	0.0000

Habitat group

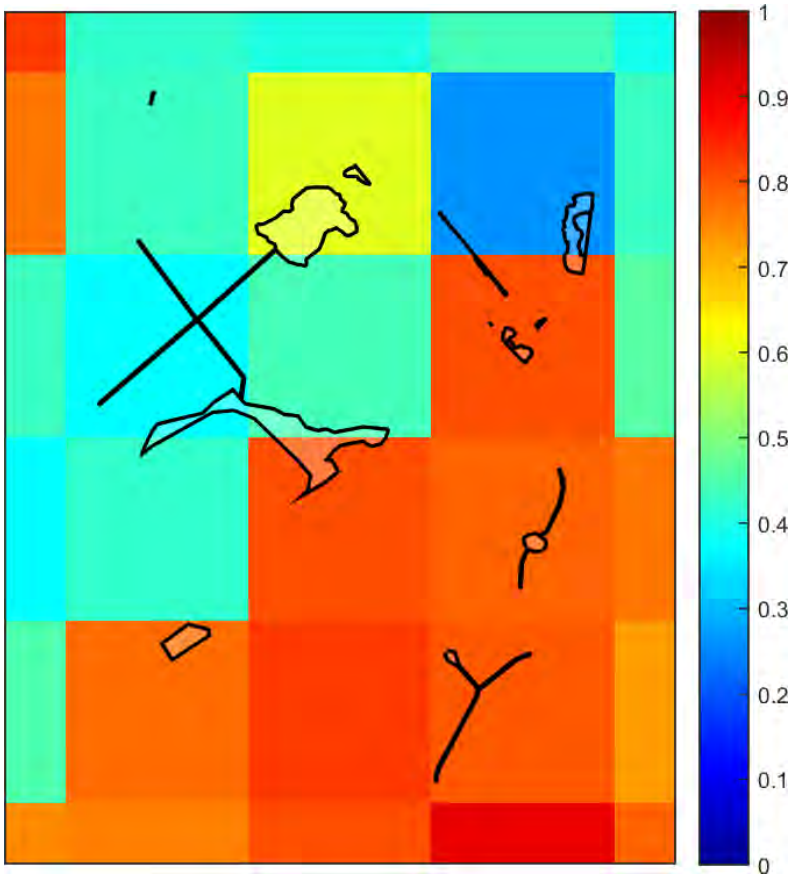
- Highly localised habitat means there is 2000 hectares or less mapped habitat for the species
- Dispersed habitat means there is more than 2000 hectares of mapped habitat for the species

Habitat impacted

- Habitat importance maps are the maps defined in the Guidelines that include all the mapped habitat for a rare or threatened species
- Top ranking maps are the maps defined in the Guidelines that depict the important areas of a dispersed species habitat, developed from the highest habitat importance scores in dispersed species habitat maps and selected VBA records
- Selected VBA record is an area in Victoria that represents a large population, roosting or breeding site etc.

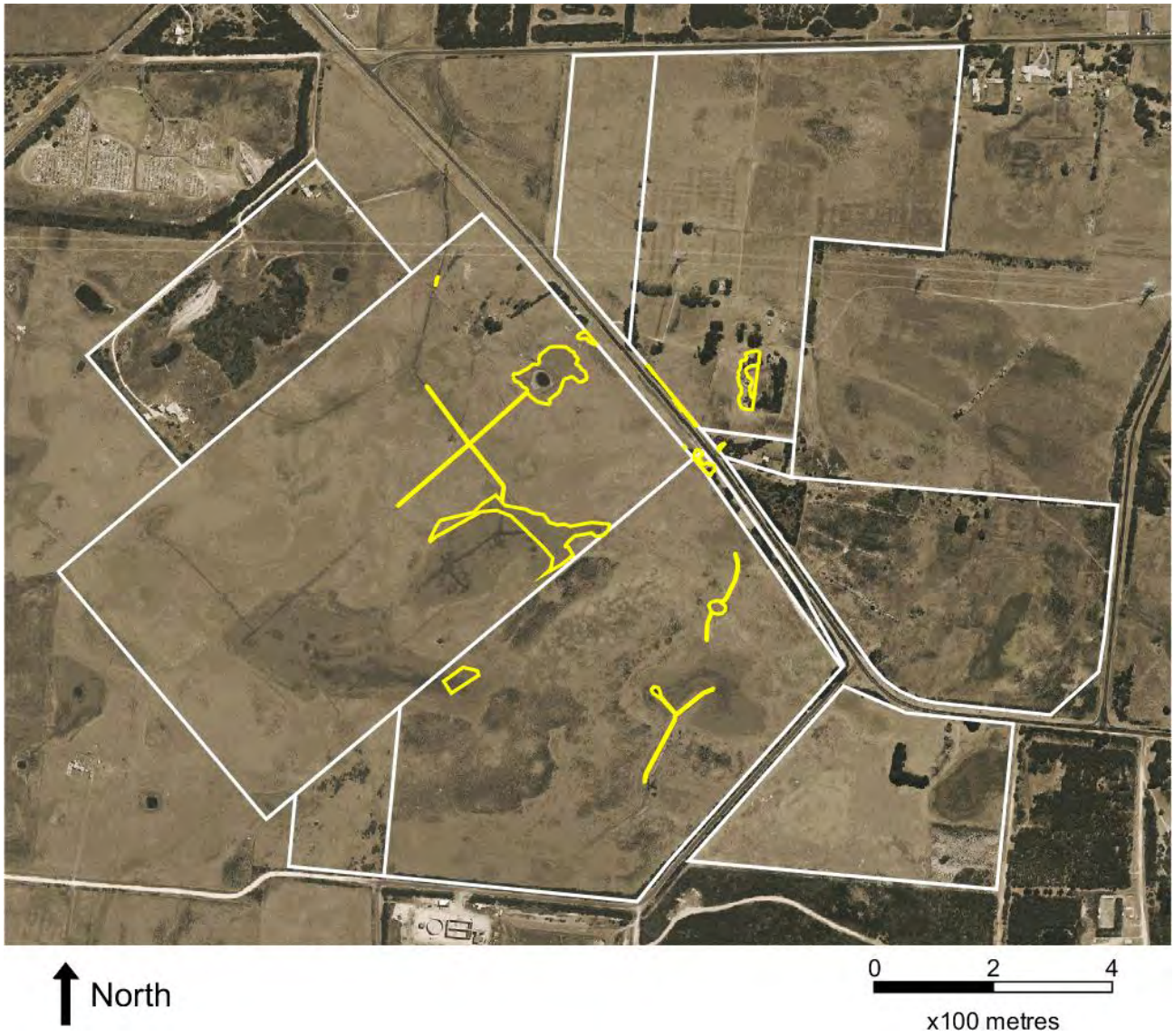
Appendix 3 – Images of mapped native vegetation

2. Strategic biodiversity values map



3. Aerial photograph showing mapped native vegetation

4. Map of the property in context



Yellow boundaries denote areas of proposed native vegetation removal.

Appendix 8: Evidence that native vegetation offset requirement is available

Report of available native vegetation credits

This report lists native vegetation credits available to purchase through the Native Vegetation Credit Register.

This report is **not evidence** that an offset has been secured. An offset is only secured when the units have been purchased and allocated to a permit or other approval and an allocated credit extract is provided by the Native Vegetation Credit Register.

Date and time: 18/07/2024 04:44 **Report ID: 25410**

What was searched for?

General offset

General habitat units	Strategic biodiversity value	Large trees	Vicinity (Catchment Management Authority or Municipal district)	
0.599	0.463	0	CMA	Glenelg Hopkins
			or LGA	Glenelg Shire

Details of available native vegetation credits on 18 July 2024 04:44

These sites meet your requirements for general offsets.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
BBA-0639	4.618	0	Glenelg Hopkins	Moyne Shire	Yes	Yes	No	Bio Offsets
BBA-0667	1.567	0	Glenelg Hopkins	Southern Grampians Shire	Yes	Yes	No	Contact NVOR
BBA-1139_05	1.141	0	Glenelg Hopkins	Moyne Shire	No	Yes	No	VegLink
BBA-3027	1.231	267	Glenelg Hopkins	Pyrenees Shire	Yes	Yes	No	VegLink
TFN-C0228	4.637	0	Glenelg Hopkins	Glenelg Shire	No	Yes	No	Bio Offsets
VC_CFL-3693_01	2.194	600	Glenelg Hopkins	Ararat Rural City	Yes	Yes	No	VegLink
VC_CFL-3727_01	12.327	24	Glenelg Hopkins	Ararat Rural City	Yes	Yes	No	VegLink
VC_CFL-3756_01	25.909	0	Glenelg Hopkins	Ararat Rural City	Yes	Yes	No	VegLink
VC_CFL-3763_01	3.246	266	Glenelg Hopkins	Glenelg Shire	Yes	Yes	No	VegLink
VC_TFN-C2046_01	7.575	1446	Glenelg Hopkins	Southern Grampians Shire	Yes	Yes	No	Ecocentric, Ethos, VegLink

These sites meet your requirements using alternative arrangements for general offsets.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)

There are no sites listed in the Native Vegetation Credit Register that meet your offset requirements when applying the alternative arrangements as listed in section 11.2 of the Guidelines for the removal, destruction or lopping of native vegetation.

These potential sites are not yet available, land owners may finalise them once a buyer is confirmed.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)

There are no potential sites listed in the Native Vegetation Credit Register that meet your offset requirements.

LT - Large Trees *CMA - Catchment Management Authority* *LGA - Municipal District or Local Government Authority*

Next steps

If applying for approval to remove native vegetation
Attach this report to an application to remove native vegetation as evidence that your offset requirement is currently available.

If you have approval to remove native vegetation
Below are the contact details for all brokers. Contact the broker(s) listed for the credit site(s) that meet your offset requirements. These are shown in the above tables. If more than one broker or site is listed, you should get more than one quote before deciding which offset to secure.

Broker contact details

Broker Abbreviation	Broker Name	Phone	Email	Website
Abezco	Abzeco Pty. Ltd.	(03) 9431 5444	offsets@abzeco.com.au	www.abzeco.com.au
Baw Baw SC	Baw Baw Shire Council	(03) 5624 2411	bawbaw@bawbawshire.vic.gov.au	www.bawbawshire.vic.gov.au
Bio Offsets	Biodiversity Offsets Victoria	0452 161 013	info@offsetsvictoria.com.au	www.offsetsvictoria.com.au
Contact NVOR	Native Vegetation Offset Register	136 186	nativevegetation.offsetregister@delwp.vic.gov.au	www.environment.vic.gov.au/native-vegetation
Ecocentric	Ecocentric Environmental Consulting	0410 564 139	ecocentric@me.com	Not avaliable
Ethos	Ethos NRM Pty Ltd	(03) 5153 0037	offsets@ethosnrm.com.au	www.ethosnrm.com.au
Nillumbik SC	Nillumbik Shire Council	(03) 9433 3316	offsets@nillumbik.vic.gov.au	www.nillumbik.vic.gov.au
TFN	Trust for Nature	8631 5888	offsets@tfn.org.au	www.trustfornature.org.au
VegLink	Vegetation Link Pty Ltd	(03) 8578 4250 or 1300 834 546	offsets@vegetationlink.com.au	www.vegetationlink.com.au
Yarra Ranges SC	Yarra Ranges Shire Council	1300 368 333	biodiversityoffsets@yarraranges.vic.gov.au	www.yarraranges.vic.gov.au

© The State of Victoria Department of Energy, Environment and Climate Action 2024

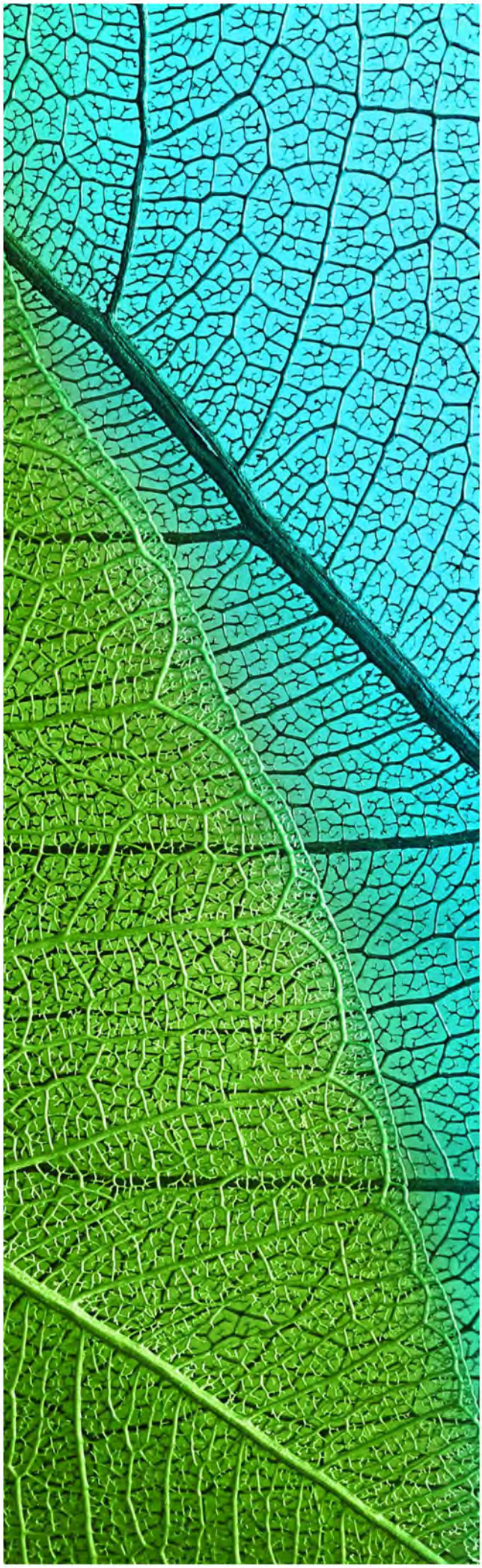
This work is licensed under a Creative Commons Attribution 4.0 International licence. You are free to re-use the work under that licence, on the condition that you credit the State of Victoria as author. The licence does not apply to any images, photographs or branding, including the Victorian Coat of Arms, the Victorian Government logo and the Department of Energy, Environment and Climate Action (DEECA) logo. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/

For more information contact the DEECA Customer Service Centre 136 186 or the Native Vegetation Credit Register at nativevegetation.offsetregister@delwp.vic.gov.au

Disclaimer
This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

Obtaining this publication does not guarantee that the credits shown will be available in the Native Vegetation Credit Register either now or at a later time when a purchase of native vegetation credits is planned.

Notwithstanding anything else contained in this publication, you must ensure that you comply with all relevant laws, legislation, awards or orders and that you obtain and comply with all permits, approvals and the like that affect, are applicable or are necessary to undertake any action to remove, lop or destroy or otherwise deal with any native vegetation or that apply to matters within the scope of Clauses 52.16 or 52.17 of the Victoria Planning Provisions and Victorian planning schemes



Portland Battery Energy Storage System (BESS)

Targeted Flora Survey

Prepared for Pacific Green Technologies Pty Ltd

April 2024
Report No. 23146.02 (1.1)

Nature Advisory
(Formerly Brett Lane & Associates Pty Ltd)
5/61-63 Camberwell Road
Hawthorn East, VIC 3123
PO Box 337, Camberwell VIC 3124
(03) 9815 2111
www.natureadvisory.com.au

Contents

1. Executive summary 3
2. Introduction 1
3. Species biology 2
3.1. River Swamp Wallaby-grass 2
Description 2
3.1.1. 2
3.1.2. Habitat 2
3.1.3. Distribution 2
3.1.4. Threats 2
3.1.5. Legislative protection 3
3.2. Swamp Fireweed 3
3.2.1. Description 3
3.2.2. Habitat 3
3.2.3. Distribution 3
3.2.4. Threats 4
3.2.5. Legislative protection 4
3.3. Swamp Everlasting 4
3.3.1. Description 4
3.3.2. Habitat 4
3.3.3. Distribution 5
3.3.4. Threats 5
3.3.5. Legislative protection 5
3.4. Curly Sedge 5
3.4.1. Description 5
3.4.2. Habitat 6
3.4.3. Distribution 6
3.4.4. Threats 6
3.4.5. Legislative protection 7
3.5. Swamp Diuris 7
3.5.1. Description 7
3.5.2. Habitat 7
3.5.3. Distribution 7

3.5.4. Threats 8
3.5.5. Legislative protection 8
4. Methods 9
4.1. Existing information 9
4.2. Habitat assessment 9
4.3. Field methodology 9
4.4. Limitations of field assessment 10
5. Results 14
5.1. Existing information 14
5.2. Habitat assessment 14
5.3. Survey results 18
6. Regulatory implications 20
6.1. EPBC Act 20
6.2. FFG Act 20
6.3. EE Act 20
7. Conclusions 21
8. References 22

Figures

Figure 1: Historical VBA records of target flora species within 10 kilometres of the study area. 13
Figure 2: Targeted flora survey 19

1. Executive summary

Pacific Green Technologies Pty Ltd engaged Nature Advisory Pty Ltd to undertake targeted surveys for five threatened flora species at a 122-hectare area of privately owned land and the adjacent roadsides in Portland. A utility scale Battery Energy Storage System (BESS) is proposed for the site. The study area comprised four parcels of land at Lot 1 TP592015 Madeira Packet Road, Allotment 61A Section 13 Parish of Portland, 305 Madeira Packet Road and 333 Madeira Packet Road. The study area also included the roadsides of Madeira Packet Road, Tecoma Road, Derril Road and Oleria Road. The following flora species listed as threatened under the Commonwealth EPBC Act and/or State FFG Act were surveyed for during this investigation:

- River Swamp Wallaby-grass (**EPBC Act: Vulnerable**);
- Swamp Fireweed (**EPBC Act: Vulnerable**);
- Swamp Everlasting (**EPBC Act: Vulnerable; FFG Act: Critically Endangered**);
- Curly Sedge (**FFG Act: Endangered**); and
- Swamp Diuris (**FFG Act: Endangered**).

No individuals of the above-mentioned threatened flora species were recorded in the study area during targeted surveys. As such, these species are unlikely to occur in the proposed development footprint and thus there are no regulatory implications regarding these species.

2. Introduction

Pacific Green Technologies Pty Ltd engaged Nature Advisory Pty Ltd to undertake targeted surveys for five threatened flora species at a 122-hectare area of privately owned land and the adjacent roadsides in Portland. A utility scale Battery Energy Storage System (BESS) is proposed for the site. The study area comprised four parcels of land at Lot 1 TP592015 Madeira Packet Road, Allotment 61A Section 13 Parish of Portland, 305 Madeira Packet Road and 333 Madeira Packet Road. The study area also included the roadsides of Madeira Packet Road, Tecoma Road, Derril Road and Oleria Road. The following flora species listed as threatened under the Commonwealth EPBC Act and/or State FFG Act were surveyed for during this investigation:

- River Swamp Wallaby-grass (EPBC Act: Vulnerable);
- Swamp Fireweed (EPBC Act: Vulnerable);
- Swamp Everlasting (EPBC Act: Vulnerable; FFG Act: Critically Endangered);
- Curly Sedge (FFG Act: Endangered); and
- Swamp Diuris (FFG Act: Endangered).

This investigation was commissioned to provide information regarding the presence or otherwise of threatened flora species in the study area and outline any implications under various national, state and local legislation and policy.

This report presents the findings of the assessment, identifies relevant issues and provides recommendations and mitigation options, and is divided into the sections described below:

Section 3 presents the sources of information and biology of the five target flora species.

Section 4 presents the methods of the surveys.

Section 5 presents the results of the assessments.

Section 6 presents the regulatory implications.

Section 7 presents the conclusions and recommendations.

This investigation was undertaken by a team from Nature Advisory, comprising Tessa Doherty (Botanist), Suzie Moss (Botanist), and Chris Armstrong (Ecologist & Project Manager).

3. Species biology

3.1. River Swamp Wallaby-grass

3.1.1. Description

River Swamp Wallaby-grass (*Amphibromus fluitans*) is a rhizomatous and stoloniferous aquatic or semi-aquatic perennial grass. It grows to 80cm tall and has flat, glabrous and scabrous leaf blades up to 25cm long. The flowering stems are arching and can grow to over a metre, with roughly half the stem submerged in water (DEWHA 2008a). River Swamp Wallaby-grass flowers from November to March (RBGV 2023).

Photo: Neville Walsh (image cropped), CC BY-NC-SA 4.0 © Royal Botanic Gardens Board.
Source: VicFlora.

3.1.2. Habitat

River Swamp Wallaby-grass is found in natural water bodies such as swamps, lagoons and billabongs as well as constructed dams (DEWHA 2008a).

3.1.3. Distribution

River Swamp Wallaby-grass occurs in NSW, Victoria, South Australia and Tasmania. In Victoria, it occurs mostly along the Murray River and its tributaries between Kerang and Tallangatta. Rarer in the south, wit is known from several areas in south Gippsland, as well as in the Melbourne, Ballarat and Portland-Casterton areas (DEWHA 2008a).

3.1.4. Threats

The historical drainage and modification of lowland swamps and conversion of these areas to agricultural land has resulted in the loss of habitat for River Swamp Wallaby-grass across its range (DEWHA 2008a).

Major threats to River Swamp Wallaby-grass include:

- Loss of habitat through changed hydrology (largely in agricultural areas).

- Grazing and trampling by livestock, especially late in the season as water levels recede and swamps become accessible to livestock.
- Invasion of habitat (competition with exotic grasses and other weeds).

3.1.5. Legislative protection

River Swamp Wallaby-grass is currently listed as **Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**.

3.2. Swamp Fireweed

3.2.1. Description

Swamp Fireweed (*Senecio psilocarpus*) is a rhizomatous herb with above-ground parts arising annually from a perennial rootstock. It grows to 80 centimetres in height, having an erect form that is rarely branched below the inflorescence (RBGV 2023). Its leaves are simple, sessile, auriculate and alternate, and are mostly glabrous with margins occasionally hispid. The inflorescence consists of 2 to 20 capitula, with distinctive long internodes of up to 20 centimetres at the base of the inflorescence (DEWHA 2008b).

Photo: Marc Freestone (image cropped), CC BY-NC-SA 4.0 © Royal Botanic Gardens Board. Source: VicFlora.

3.2.2. Habitat

Swamp Fireweed is known from wetlands and swamps on plains supporting a range of soil types, including volcanic clays, grey/black silty clays and peaty soils. These wetlands often exhibit strong fluctuations of water levels, being fully inundated in winter and nearly drying out in summer. Associated vegetation is often rich in diversity of grasses, sedges and aquatic herbs, and is often lacking a canopy or includes an open canopy of River Red Gum (*Eucalyptus camaldulensis*) (DEWHA 2008b).

3.2.3. Distribution

Swamp Fireweed occurs in South Australia, Tasmania and Victoria. In Victoria, the species is largely distributed in the southern half of the state from the Melbourne region west to the border, with scattered records east to Sale (RBGV 2023).

3.2.4. Threats

Widespread historical land clearing and alteration has led to the modification of the majority of wetland habitat across Victoria. The current threats to Swamp Fireweed are not well understood (DEWHA 2008b), however the following are thought to be ongoing threatening processes:

- Grazing pressure from stock and overabundant native fauna.
- Weed invasion leading to degradation of habitat and displacement.
- Habitat loss, disturbance and modification, particularly through changes to hydrology.

3.2.5. Legislative protection

Swamp Fireweed is currently listed as **Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).**

3.3. Swamp Everlasting

3.3.1. Description

The Swamp Everlasting (*Xerochrysum palustre*) is a perennial rhizomatous herb. It grows to 30-100 centimetres in height, having an erect form with minimal branching of stems. Its leaves are narrow, alternating and largely glabrous; with the exception of cobweb-like hairs running along the leaf margins (RBGV 2023). The Swamp Everlasting exhibits striking golden-yellow flowers, which bloom from November to March. The flowers are composed of numerous florets arranged in a button-like configuration, and surrounded by a series of overlapping, papery bracts (DAWE 2021).

Photo: Marc Freestone (image cropped), CC BY-NC-SA 4.0 © Royal Botanic Gardens Board. Source: VicFlora.

3.3.2. Habitat

The Swamp Everlasting is a relatively large daisy found in either permanent or seasonal wetlands (Carter & Walsh 2011). It favours lowland swamps and shallow freshwater marshes, which are sedge-rich in composition and overlaid on heavy black cracking clays. The species is also known to grow in ephemeral wetland habitats, such as seasonally wet native grasslands and heathlands. In some instances, the species has even been detected in water up to 1-metre in depth. Companion species are primarily derived from a range of common wetland genera. These include Common Reed (*Phragmites australis*), Twig-sedge (*Machaerina spp.*), Native Sedge (*Carex spp.*), Spike-sedge (*Eleocharis spp.*), Club-sedge (*Isolepis spp.*), Sword-sedge (*Lepidosperma spp.*), Bristle-rush (*Chorizandra spp.*), Swamp Wallaby-grass (*Amphibromus spp.*), Watermilfoil (*Myriophyllum spp.*) and Marsh-flower (*Ornduffia spp.*). Some grassland species that are also commonly associated with Swamp Everlasting include Kangaroo Grass (*Themeda triandra*), Blown-grass (*Lachnagrostis spp.*) and Billy-button (*Craspedia spp.*) (DAWE 2021; Carter & Walsh 2011).

3.3.3. Distribution

The Swamp Everlasting occurs in Victoria, New South Wales and Tasmania. The distribution of the species within Victoria is patchy and extends from the South Australian border to near Bairnsdale, typically found below an altitude of 500 metres (DAWE 2021).

3.3.4. Threats

Prior to European settlement, the Swamp Everlasting was likely widespread across wetland habitats. However, due to activities such as the draining of wetlands for agriculture and modifications of waterways, the species has experienced a large depletion of available habitat and extensive fragmentation of populations. These activities remain a continuing threat to the species, particularly on private land in Victoria (DAWE 2021).

Major threats to the Swamp Everlasting include:

- Climate change (increased frequency and severity of fires and drought).
- Habitat loss, disturbance and modification through land clearing and changed hydrology.
- Invasive species (grazing and disturbance form feral herbivores and competition with weeds).
- Grazing from overabundant native fauna.
- Genetic threats from small and fragmented populations.

3.3.5. Legislative protection

Swamp Everlasting is currently listed as:

- **Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**; and
- **Critically Endangered under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act).**

A national recovery plan for the species has been developed (Carter & Walsh 2011).

3.4. Curly Sedge

3.4.1. Description

Curly Sedge (*Carex tasmanica*) is a rhizomatous, densely tufted perennial sedge. Culms typically grow to a height of between 20-70 centimetres, but may sometimes reach as high as 170 centimetres, and bear a narrow inflorescence of two to four solitary spikes at the nodes. Flowers develop in Spring (RBGV 2023). Leaves are typically leathery, flat and blunt at the apex, which is distinctively curled when dry. Blades

typically grow to around 40 centimetres, and sheath close to the base of flowering stems (Threatened Species Scientific Committee 2016).

Photo: Andre Messina (image cropped), CC BY-NC-SA 4.0 © Royal Botanic Gardens Board. Source: VicFlora.

3.4.2. Habitat

Curly Sedge typically occurs in seasonally wet heavy fertile clays often derived from basalt, such as drainage lines, moist depressions and on the verges of swamps. Hydrology can be freshwater or slightly saline (Threatened Species Scientific Committee 2016).

3.4.3. Distribution

Curly Sedge occurs in Tasmania and Victoria. In Victoria, the species is known to occur at Cranbourne as well as in the west, from the region surrounding Heywood and Portland east to Lake Weeranganuk (RBGV 2023).

3.4.4. Threats

Historical modification of lowland swamps, drainage lines and other damp areas on the clay soils of western Victoria for agriculture has resulted in the loss of much of Curly Sedge's preferred habitat (Threatened Species Scientific Committee 2016).

Major current threats to Curly Sedge include:

- Loss of habitat through changed hydrology and loss of seasonal inundation, particularly relating to the permanent flooding or drying of creeks.
- Intensive grazing and trampling by livestock, especially from cattle and high densities of sheep.
- Land use changes which alter inundation regimes, alter beneficial regimes of light grazing or clear land for cropping.
- Roadworks which clear suitable habitat along roadside drainage lines.
- Weed invasion of habitat.

3.4.5. Legislative protection

Curly Sedge is currently listed as **Endangered under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act).**

Curly sedge was previously listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act),but was found to be no longer eligible for listing and subsequently removed from listing in 2016 (Threatened Species Scientific Committee 2016).

3.5. Swamp Diuris

3.5.1. Description

Swamp Diuris (*Diuris palustris*) is a terrestrial orchid arising from a subterranean tuber, with above-ground parts dying back after flowering. The flowering stem grows to 15 centimetres tall and bears one to four yellow flowers which are blotched with brown. Leaves are narrow, channelled and often twisted. They grow to eight centimetres, forming a loose tussock of up to 15 leaves at the base of the plant. Swamp Diuris flowers from August to October (RBGV 2023).

Photo: Jeff Jeanes (image cropped), CC BY-NC-SA 4.0 © Royal Botanic Gardens Board. Source: VicFlora.

3.5.2. Habitat

Swamp Diuris is known from a range of habitats including grassland, heath, woodland and box-ironbark communities, with the majority of records in drier inland box-ironbark communities (DELWP 2021). In these habitats, Swamp Diuris often occurs in localised swampy depressions (RBGV 2023).

3.5.3. Distribution

Swamp Diuris occurs in Victoria, Tasmania and South Australia. In Victoria, the species occurs west of Melbourne to the state border, distributed from the southern Wimmera to the coast. Swamp Diuris was

previously recorded in the Melbourne region, but has no recent records and is now thought extinct in this area (RBGV 2023).

3.5.4. Threats

The majority of the habitat of Swamp Diruis in the Melbourne region has been removed by urban development, and the species is now thought extinct in this area. The remainder of the species' habitat in the west has been heavily encroached by clearing for agriculture, as well as for recreation activity in coastal areas (DELWP 2021).

Major current threats to Swamp Diuris include:

- Ongoing clearance of habitat in coastal regions for residential and industrial development as well as recreational activity.
- Habitat loss, disturbance and modification through land clearing and changed hydrology, particularly for agriculture.

3.5.5. Legislative protection

Swamp Diuris is currently listed as **Endangered under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act).**

4. Methods

4.1. Existing information

The following previous report on the study area was reviewed prior to the current site inspection:

- *Portland Battery Energy Storage System (BESS) - Flora and Fauna Assessment* (Nature Advisory 2023).

Records and listing status under state legislation were obtained from the Victorian Biodiversity Atlas (VBA), a public database held by the Department of Energy, Environment, and Climate Action (DEECA). These records were obtained from a wider area, named the 'search region' defined for this assessment as an area with a radius of 10 kilometres from the approximate outline of the study area.

The likelihood of suitable habitat in the study area for nationally threatened flora species was ascertained through a search of the online *Protected Matters Search Tool* (DCCEEW 2023) using the same search region.

Threatened flora species requiring targeted surveys were determined in the previous report (Nature Advisory 2023) based on a likelihood of occurrence analysis. This found that the study area had the potential to support the following five threatened flora species:

- River Swamp Wallaby-grass (**EPBC Act: Vulnerable**);
- Swamp Fireweed (**EPBC Act: Vulnerable**);
- Swamp Everlasting (**EPBC Act: Vulnerable; FFG Act: Critically Endangered**);
- Curly Sedge (**FFG Act: Endangered**); and
- Swamp Diuris (**FFG Act: Endangered**).

4.2. Habitat assessment

At each survey site, the habitat components considered important in influencing the distribution of the target species were assessed. These components included vegetation type, dominant species, vegetation structure, weed cover, hydrology and disturbance. These components were examined across the site during the field assessment and used to determine whether targeted surveys were required.

A habitat assessment for the properties at 305 Madeira Packet Road and 333 Madeira Packet Road was undertaken in conjunction with the native vegetation assessments at those properties (Nature Advisory 2024). These properties were deemed unlikely to support the target flora species and therefore targeted surveys were not undertaken. A justification for this conclusion is detailed in Section 5.2, where the observed vegetation is described.

4.3. Field methodology

A targeted survey for the five above-mentioned flora species was conducted by two botanists across two days on 31 October 2023 and 1 November 2023. The survey coincided with the flowering period for all species, listed in brackets below:

- River Swamp Wallaby-grass (flowers November to March);
- Swamp Fireweed (flowers November to March);
- Swamp Everlasting (flowers November to March);
- Curly Sedge (flowers September to November); and

- Swamp Diuris (flowers August to October).

The survey area was traversed on foot using the following method:

- A random meander was used to visually inspect the site and determine where targeted surveys would be required. This method involved walking across the site to get a relatively even coverage of the study area (refer to Figure 2 for area covered). Areas of native vegetation and drainage lines mapped in the previous report (Nature Advisory 2023) informed where survey efforts should be focussed, and these areas were prioritised. Coverage of the site was tracked using ArcGIS Field Maps® (ESRI). Where areas of habitat for threatened species were identified, transects were traversed as described below.
- Parallel transects were spaced five metres apart as this was considered adequate on-site for detecting target species given the low height and clear visibility of the vegetation. Transects were traversed and visually inspected for the target species within areas of habitat (defined below). Transects were tracked using ArcGIS Field Maps® (ESRI).
- Habitat for most of the target species was considered as swampy depressions or drainage lines where native vegetation was present and disturbance from cattle was comparatively low. See result in Section 5.2 for a detailed description of vegetation condition encountered in the study area.

4.4. Limitations of field assessment

Although some areas were inundated and inaccessible at the time of survey, these areas were easily visible from the edge of the water. The edges of these wet areas were traversed, and the ground inspected closely. Inaccessible areas contained the same vegetation as the areas that were traversed. These areas contained either no vegetation (i.e., open water), non-native vegetation (a mixture of Divided Sedge and Water Buttons) or Spike-sedge, Azolla and Swamp Crassula (Photo 1). Target species able to grow in standing water (River Swamp Wallaby-grass, Swamp Everlasting, Swamp fireweed and Curly Sedge) are all conspicuous species and would have been observable from the edge of the water, if present. See Photo 1 below for an example of an area not surveyed by transects as it was covered by water during the time of survey.

Photo 1: Standing water in the centre of Habitat Zone F.

Disturbance from cattle in the form of pugging and intensive grazing has significantly altered the state of the vegetation in the study area. All vegetation was grazed, meaning that some species may be unidentifiable if present. However, it is considered highly unlikely that the target species would be able to persist in the area under such grazing intensity, and if they were, they would have been observable during the targeted survey. See Photo 2 for an example of heavily grazed and pugged vegetation.

Photo 2: Unsurveyed heavily grazed ground with pugging from cattle.

The timing of the targeted surveys, duration and weather conditions under which surveying was undertaken were considered suitable for detecting the target species. Additionally, the overall survey effort was considered sufficient to detect the species in the study area.

Figure 1 Historical records of target flora species within 10 kilometres of the study area

Project No: 23146.02
Project: Pacific Green, Portland
Date: 9/04/2024

Study area
10km buffer of the study area
VBA_broad_listedfloraFF_Clipped
VBA listed flora record
Curly Sedge
Swamp Diuris

N

Metres
0 2,000

Nature Advisory
PO Box 337, Camberwell, VIC 3124, Australia
www.natureadvisory.com.au
03 9815 2111 - info@natureadvisory.com.au

5. Results

5.1. Existing information

The VBA contains records of Swamp Diuris and Curly Sedge within 10 kilometres of the study area. shows the locations of these records in the surrounding area. There were no VBA records of Swamp Everlasting, River Swamp Wallaby-grass and Swamp Fireweed within a 10-kilometre radius at the time the search was conducted.

5.2. Habitat assessment

Meandering surveys for areas of habitat found that vegetation in the study area was largely unsuitable to support any of the target species. This was due mostly to the vegetation type which was predominantly non-native pasture in paddocks. Some areas within the pasture supported native Rush (*Juncus sp.*) and Bracken Fern (*Pteridium esculentum),* however weed cover was very high in these areas and were therefore not considered habitat for the target species. See Photo 3, Photo 4 and Photo 5 below for examples of non-native pasture where targeted surveys were not undertaken. Additionally, areas of Heathy Woodland (EVC 48) understorey regrowth along roadsides were considered too dense and weedy to support the target species. While Swamp Diuris requires heath or woodland as habitat, there were no areas identified as suitable for this species due to the very high weed cover and lack of swampy depressions within the patches of Heathy Woodland. See Photo 6 below for an example of highly modified roadside vegetation where targeted surveys were not undertaken. Additionally, the intensive grazing and pugging observed across the properties was considered likely to exclude these areas as being habitat for threatened species.

Although some aquatic habitat was present in Habitat Zone AB (Photo 7), this habitat zone was an artificial dam that lacked continuity to larger wetlands. This area was dominated by a mix of native and non-native herbs and graminoids and deemed to be of relatively low quality due to pugging by cattle.

Although the study area in general was considered unlikely to support target species, a precautionary approach was taken, and targeted surveys were conducted in some of the more suitable habitat areas which included damp depressions and drainage lines despite there still being evidence of impacts from cattle. Targeted surveys were conducted in habitat zones J, U and V (insets in Figure 2). See Photo 8 below for an example of the habitat observed in these areas. Targeted surveys were also conducted in damp depressions within and adjacent to habitat zones D, V and W (insets in Figure 2). See Photo 9 below for an example of habitat observed in these areas.

Photo 3: Drainage line and non-native pasture present across most the study area where targeted surveys were not required

Photo 4: Area of Bracken Fern with dense cover of pasture grasses underneath, where targeted surveys were not required

Photo 5: Area of native Rush with pasture underneath, where targeted surveys were not required

Photo 6: Roadside Heathy Woodland (EVC 48) where targeted surveys were not undertaken due to high weed cover

Photo 7: Habitat Zone AB where targeted surveys were not conducted due to relatively high pugging and higher weed cover

Photo 8: Example of drainage line (Habitat Zone U) where targeted surveys were conducted due to relatively less pugging and higher cover of native species

Photo 9: Example of drainage line in Habitat Zone D where targeted surveys were conducted due to presence of native aquatic species

5.3. Survey results

No individuals of the target flora species were recorded within the study area during the current investigation. As such, these species are unlikely to occur within the study area. Refer to Figure 2 for the area surveyed, including insets where targeted surveys were conducted.

Figure 2 Targeted flora surveys

Project No: 23146.02
Project: Pacific Green, Portland
Date: 9/04/2024

Study area

Transect Lines

1 November 2023

31 October 2023

Native vegetation

Aquatic Herbland (EVC 653)

Heathy Woodland (EVC 48)

N

Metres

0 130

Nature Advisory
PO Box 337, Camberwell, VIC 3124, Australia
www.natureadvisory.com.au
03 9815 2111 - info@natureadvisory.com.au

6. Regulatory implications

6.1. EPBC Act

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) lists threatened species and ecological communities of national conservation significance. Any impacts to these species considered significant require the approval of the Australian Minister for the Environment. If a significant impact on nationally threatened species or communities, or listed migratory species may be possible, a Referral under the EPBC Act should be considered. After 20 business days, the Minister will decide whether the project will be a 'controlled action' under the EPBC Act, in which case the project cannot be undertaken without the approval of the Minister. This approval depends on a further assessment and approval process (lasting between three and nine months, depending on the level of assessment).

No flora species listed as threatened under the EPBC Act were observed during the current investigation.

The proposed BESS is therefore unlikely to impact any EPBC Act-listed flora species within the study area. As there is unlikely to be a significant impact (DEWHA 2009) to threatened flora species, a Referral under the EPBC Act is not recommended.

6.2. FFG Act

The Victorian *Flora and Fauna Guarantee Act 1988* lists threatened flora and fauna species to provide for protection and management. The removal of threatened species or communities, or protected flora under the FFG Act from public land requires a licence under the Act. This licence may be obtained from DEECA. However, the FFG Act has only limited application to private land.

No species listed as threatened under the FFG Act were observed during the current investigation. Therefore, the responsible authority does not need to consider these species under the provisions of this legislation.

6.3. EE Act

Under the *Environment Effects Act 1978*, proponents are required to prepare a Referral to the state minister for Planning that will determine whether an Environment Effects Statement (EES) will be required for the project. Criteria related to flora include the following:

- Potential long-term loss of a significant proportion (1 to 5% depending upon conservation status of species concerned) of known remaining habitat or population of a threatened species in Victoria;
- Potential long-term change to the ecological character of a wetland, where that wetland is Ramsar-listed, or listed in 'A Directory of Important Wetlands in Australia';
- Potential major effects on the biodiversity of aquatic ecosystems over the long term; and
- Potential significant effects on matters listed under the *Flora and Fauna Guarantee Act 1988*.

One or a combination of these criteria may trigger a requirement for a Referral to the Victorian Minister for Planning who will determine whether an EES will be required.

The proposed works do not meet any of these criteria and a Referral to the state Minister for Planning is therefore not warranted.

7. Conclusions

The following five target flora species were not recorded within the study area during the targeted flora surveys:

- River Swamp Wallaby-grass (**EPBC Act: Vulnerable**);
- Swamp Fireweed (**EPBC Act: Vulnerable**);
- Swamp Everlasting (**EPBC Act: Vulnerable; FFG Act: Critically Endangered**);
- Curly Sedge (**FFG Act: Endangered**); and
- Swamp Diuris (**FFG Act: Endangered**).

Therefore, it is unlikely there are any impacts to the above-mentioned listed flora species as part of this proposal and as such, there are no associated legislative implications.

8. References

Carter, O & Walsh, N 2011, *National Recovery Plan for the Swamp Everlasting* Xerochrysum palustre, Victorian Government Department of Sustainability and Environment (DSE), East Melbourne.

Department of Agriculture, Water and the Environment (DAWE) 2021, *Conservation Advice for* Xerochrysum palustre *(Swamp Everlasting),* Department of Agriculture, Water and Environment, Canberra.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2023, *EPBC Act Protected Matters Search Tool*, Department of Climate Change, Energy, the Environment and Water, Canberra, viewed 31 July 2023 , https://www.environment.gov.au/epbc/pmst/index.html.

Department of Energy, Environment, and Climate Action (DEECA) 2023, *Victorian Biodiversity Atlas 3.2.8*, Department of Energy, Environment and Climate Action, Melbourne, Victoria, viewed 31 July 2023, https://vba.dse.vic.gov.au.

Department of Environment, Land, Water and Planning (DELWP) 2021, *Threatened Species Assessment for* Diuris Palustris *Swamp Diuris*, Department of Environment, Land, Water and Planning, Melbourne, Victoria.

Department of the Environment, Water, Heritage and the Arts (DEWHA) 2008a, *Approved Conservation Advice for* Amphibromus fluitans *(River Swamp Wallaby-grass),* Department of the Environment, Water, Heritage and the Arts, Canberra.

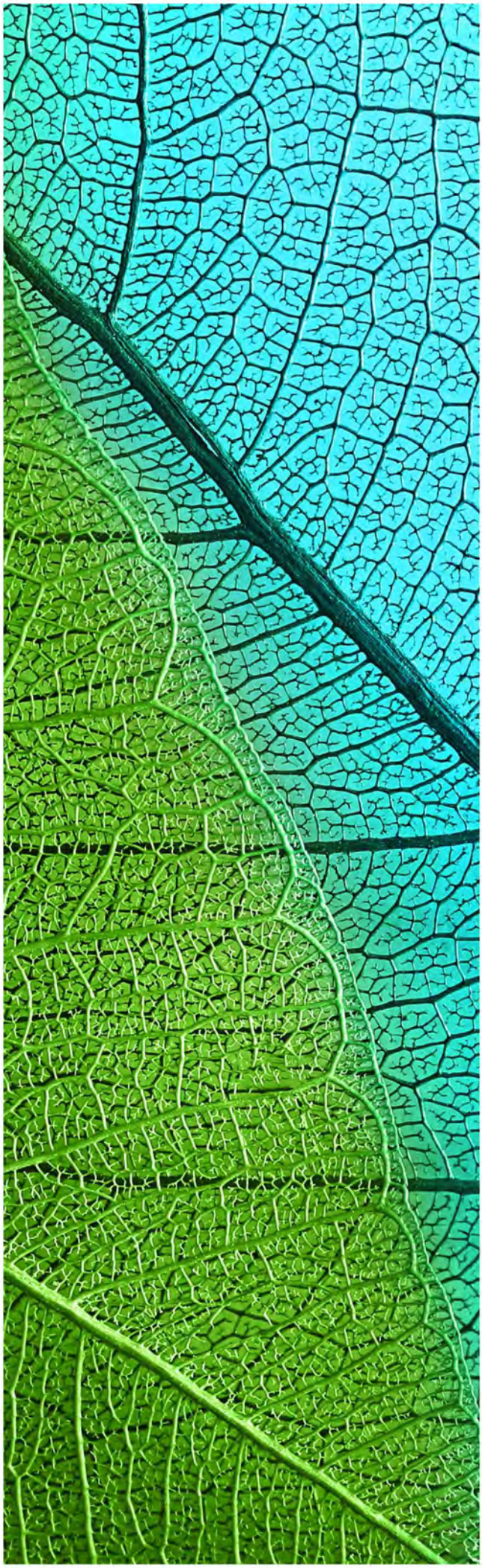
Department of the Environment, Water, Heritage and the Arts (DEWHA) 2008b, *Approved Conservation Advice for* Senecio Psilocarpus *(Swamp Fireweed),* Department of the Environment, Water, Heritage and the Arts, Canberra.

Nature Advisory 2023, *Portland Battery Energy Storage System (BESS) - Flora and Fauna Assessment* - Report No. 23146.01 (1.0), Nature Advisory Pty Ltd, Hawthorn East, consultant report prepared for Pacific Green Technologies Pty Ltd.

Nature Advisory 2024, *Portland Battery Energy Storage System (BESS) - Flora and Fauna Assessment* - Report No. 23146.03 (1.0), Nature Advisory Pty Ltd, Hawthorn East, consultant report prepared for Pacific Green Technologies Pty Ltd.

Royal Botanic Gardens Victoria (RBGV) 2023, *VicFlora*, viewed 13 November 2023, https://vicflora.rbg.vic.gov.au/.

Threatened Species Scientific Committee 2016, *Commonwealth Listing Advice on* Carex tasmanica *(Curly sedge),* Department of the Environment, Canberra.



Portland Energy Park

Detailed Assessment for the Blue-winged Parrot

Prepared for Pacific Green Portland Energy Park Pty Ltd

July 2024
Report No. 23146 (7.2)

Nature Advisory
(Formerly Brett Lane & Associates Pty Ltd)
5/61-63 Camberwell Road
Hawthorn East, VIC 3123
PO Box 337, Camberwell VIC 3124
(03) 9815 2111
www.natureadvisory.com.au

Contents

1. Introduction 2
2. Existing information and methods 3
2.1. Sources of information 3
2.2. Relevant ecology of the Blue-winged Parrot 3
2.3. Threats and conservation actions 3
2.4. Desktop assessment of Blue-winged Parrot habitat in the region 4
2.5. Flora and fauna assessments 4
2.6. Roaming survey and ground-truthing of Blue-winged Parrot habitat in the region 4
3. Results 6
3.1. Habitat assessment 6
3.2. Blue-winged Parrot observations from initial field surveys 6
3.3. Desktop assessment of Blue-winged Parrot habitat in the region 6
3.4. Subsequent roaming survey and ground-truthing of habitat in the region 7
3.5. Additional Blue-winged Parrot observations during field assessments 7
4. Discussion 8
4.1. Summary 9
5. References 10

1. Introduction

Pacific Green Portland Energy Park Pty Ltd engaged Nature Advisory to undertake a flora and fauna assessment of a 122-hectare area of freehold land located at Portland and Portland East. The specific area investigated, referred to herein as the 'study area comprised the property at Lot 1 Madiera Packet Road ('Portland West'), 305 and 303 Madeira Packet Road and Allotment 61A Madiera Packet Road ('Portland East'), Portland. This assessment is required to support applications for authority approvals for a utility scale Battery Energy Storage System (BESS).

During a field assessment in July 2023, Blue-winged Parrots (*Neophema chrysostoma*) were recorded at Allotment 61A Madiera Packet Road (Portland East) in small groups (5-15 birds) foraging in areas of introduced pasture and native rush (*Juncus* sp.). In January 2024, Blue-winged Parrot was again recorded foraging in the same area of 61 A Madiera Packet Road, Portland. The observation of this foraging habitat is consistent with known foraging habitat of this species (Higgins 1999).

The most recent published literature suggests that the Blue-winged Parrot has undergone a significant population decline in recent decades (Holdsworth et al. 2021). This was the basis of the species' recent listing as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 31st March 2023. There is currently no recovery plan to guide conservation efforts for the Blue-winged Parrot, nor is Nature Advisory aware of any referral process involving potential impacts to this species. It is understood that the most notable threats facing this species are habitat loss, degradation, fragmentation, and removal, and climate change.

The EPBC Act protects listed threatened species, ecological communities and migratory species that are defined as Matters of National Environmental Significance (MNES). Any impacts on these matters considered significant require the approval of the Australian Minister for the Environment. If there is a possibility of a significant impact on a MNES, a Referral under the EPBC Act should be considered.

The purpose of this report is to provide advice as to whether the current proposal is likely to constitute a significant impact on a MNES (Blue-winged Parrot) under the EPBC Act.

2. Existing information and methods

2.1. Sources of information

In addition to the Flora and Fauna Assessments (Nature Advisory 2023a), relevant information has been obtained from the following:

- Conservation advice for *Neophema chrysostoma* (Blue-winged Parrot) under the EPBC Act (DCCEEW 2023b)
- eBird (eBird 2021)
- *NatureKit* (DEECA 2023a)
- The Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) *Protected Matters Search Tool* (DCCEEW 2023a)
- Victorian Biodiversity Atlas administered by the Department of Energy, Environment and Climate Action (DEECA 2023b)

2.2. Relevant ecology of the Blue-winged Parrot

Blue-winged Parrots are a small parrot indigenous to south-eastern Australia (Emison et al. 1987; Higgins 1999; Holdsworth et al. 2021). They are a highly mobile species and utilise a range of habitats. They tend to favour grasslands and grassy woodlands and are often found near wetlands. They are also observed in altered environments such as airfields, golf-courses and paddocks as well as agricultural land (DCCEEW 2023a).

Blue-winged Parrots are known to forage on seeds of a wide range of native and introduced grasses, herbs and shrubs (Higgins 1999). The species likely traditionally favoured a variety of foraging habitats including saltmarsh, heathland/sedgeland, grassy woodland, sparse grassland, and chenopod shrubland. Blue-winged Parrot appears to have adapted to forage more widely in modified environments and is known to forage in areas of cleared agricultural land dominated by exotic pasture grasses. The extent to which the species relies on these altered landscapes is unknown.

Blue-winged Parrots are partial migrants, with variable numbers of birds migrating across Bass Strait. There is a paucity of information about the movements of Blue-winged Parrots, especially regarding their wintering migration routes, however the species has historically been recorded in the search region year-round (DEECA 2023b; eBird 2023; Nature Advisory survey data 2023/24).

Blue-winged Parrots breed in Tasmania, southern Victoria and in the far south-east of South Australia, predominantly in Eucalypt forests and woodlands (Emison et al. 1987; Higgins 1999; Holdsworth et al. 2021). During the breeding season (spring/summer) they nest in tree hollows of live or dead trees. In Victoria, birds are known to breed mainly in heathy forests and woodlands and in wetter forests soon after fire or logging (Emison et al. 1987; Higgins 1999).

2.3. Threats and conservation actions

The most recent literature regarding the Blue-winged Parrot, summarised in *The Action Plan for Australian Birds 2020*, suggests that there is no obvious explanation for the species' decline. Habitat loss, degradation and fragmentation is considered to be a significant threat to the Blue-winged Parrot, in particular the loss of breeding habitat caused by clearing for large-scale agriculture in Tasmania (DCCEEW 2023a; Holdsworth et al, 2021). Most breeding and some non-breeding habitats on the mainland are protected within conservation areas (Holdsworth et al. 2021). Recommended

management actions include the protection of suitable breeding habitat and ecological management of other remnant habitat on private and public land (Holdsworth et al. 2021).

2.4. Desktop assessment of Blue-winged Parrot habitat in the region

A desktop assessment of the 'search region', defined here as an area with 20 kilometre radius from the boundary of the study area was undertaken to investigate the extent of suitable habitat for Blue-winged Parrot in the broader landscape. This information was used to gain clearer understanding of the likelihood of impacts associated with the proposal. A combination of satellite imagery, areas of mapped native vegetation, habitat distribution models (DEECA 2023a) and Blue-winged Parrot observation records (DEECA 2023b, eBird 2021) were used to indicate areas of suitable habitat.

2.5. Flora and fauna assessments

A field assessment of Allotment 61A Section 13 Parish of Portland and Lot 1 TP592015 Madiera Packet Road was conducted on 17 and 18 July 2023. Additionally, 305 Madeira Packet Road was assessed on 9 and 10 January 2024 and 333 Madeira Packet Road was assessed on 7 March 2024. During these field assessments, the study area was surveyed on foot. Sites in the study area found to support native vegetation or with potential to support listed matters were mapped through a combination of aerial photograph interpretation and ground-truthing using ArcGIS Field Maps® (Esri) on a hand-held device. Species and ecological communities listed as threatened under the EPBC Act or protected/threatened under FFG Act (where these occurred on public land) were also mapped using the same method.

2.6. Roaming survey and ground-truthing of Blue-winged Parrot habitat in the region

A field assessment conducted on 11 and 12 January 2024 included a roaming survey for Blue-winged Parrots and ground-truthing areas of suitable habitat identified from a desktop analysis. During the roaming surveys an experienced observer travelled as a passenger along roadsides in a slow-moving vehicle with the windows down, listening and scanning for Blue-winged Parrots. If Blue-winged Parrots were observed the location, number of individuals and flight height was recorded. Ground truthing took place at random sites in agricultural areas and in areas indicated in the desktop assessment as important Blue-winged Parrot habitat. This included forest and woodland that could contain hollow bearing trees and wetlands where Blue-winged Parrots are known to forage and roost.

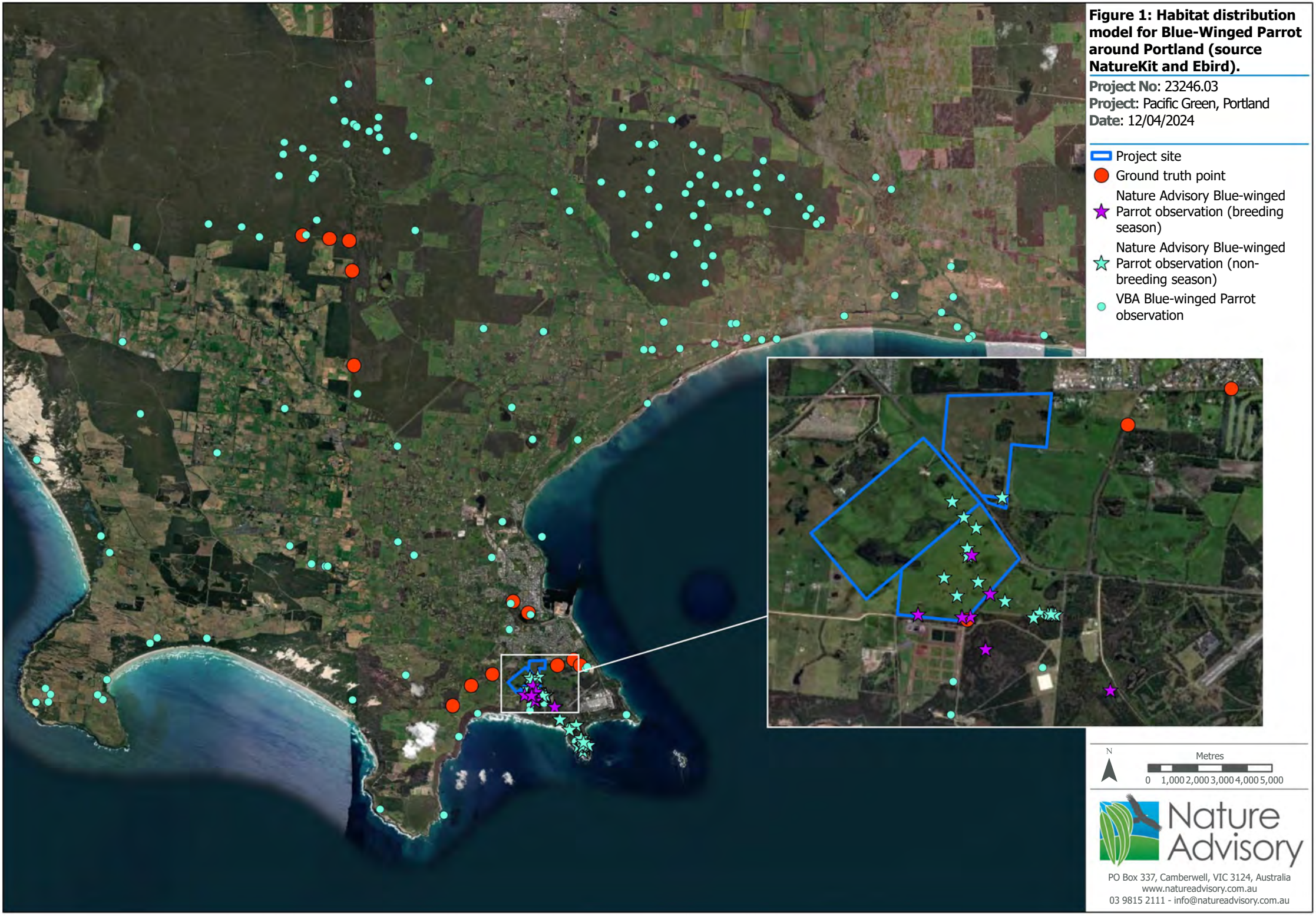


Figure 1: Habitat distribution model for Blue-Winged Parrot around Portland (source NatureKit and Ebird).

Project No: 23246.03
Project: Pacific Green, Portland
Date: 12/04/2024

Nature Advisory
PO Box 337, Camberwell, VIC 3124, Australia
www.natureadvisory.com.au
03 9815 2111 - info@natureadvisory.com.au

3. Results

3.1. Habitat assessment

Blue-winged Parrot foraging habitat within the project area was considered marginal in quality and not in short supply throughout the region, much of which has been heavily modified through agricultural use. Records from the VBA and eBird (DEECA 2023b; eBird 2023) suggest that most Blue-winged Parrot observations within the region occur from remnant vegetation. This high-quality habitat was identified throughout the region (mostly occurring on public land) during field observations.

The project area has previously been cleared and has historically been subject to intensive grazing pressure. As such, native flora has largely been replaced with introduced species including common pasture grasses and associated agricultural weeds, which occur throughout the majority of agricultural land across the region. Some native rush (*Juncus* sp.) occurred sparsely in the south-eastern portion.

The project area falls within the core breeding range of the Blue-winged Parrot but does not itself support any breeding habitat for the species. Suitable breeding habitat was observed within adjacent remnant woodland to the south-east and throughout the surrounding region. This habitat predominantly occurs within conservation areas and is absent from the study area and adjacent roadside vegetation. As such, the species does not rely on the project area for breeding or roosting but is likely used by as foraging habitat by fledglings and breeding pairs.

3.2. Blue-winged Parrot observations from initial field surveys

During a field assessment conducted by Nature Advisory ecologists in July 2023, Blue-winged Parrots were recorded within the project area at Allotment 61A Madiera Packet Road in small groups (5-15 birds). The species was observed associating with areas almost entirely dominated by introduced pasture with a sparse cover of native rush. Small flocks of Blue-winged Parrots flushed while walking the study area on foot would either fly a short distance and continue foraging or circle briefly and return to similar vegetation within the project area. An estimated total of 30-40 birds were recorded within the project area during the field survey – a conservative estimate given the possibility of double-counting flushed birds that returned to forage in other parts of the project area.

The determination and subsequent delineation of Blue-winged Parrot foraging habitat within the project area encompassed areas supporting the highest cover of native rush where the species was observed foraging. Notably, similar habitat was observed throughout the surrounding landscape and no particular feature of the project area was identified as supporting high-quality foraging habitat for the Blue-winged Parrot. Had the species not been observed continuously foraging within the study area during the initial field assessment, the presence of marginal foraging habitat (areas supporting native rush) would have been noted but would have unlikely warranted further investigation given the wide availability of comparable foraging habitat throughout the broader landscape.

3.3. Desktop assessment of Blue-winged Parrot habitat in the region

Records of Blue-winged Parrot in the search region from the last 25 years were obtained from the VBA (DEECA 2024b) and the last five years from e-bird (e-bird 2024). While there were no previous records from the project area (likely reflecting a lack of survey effort on private land), there are numerous historical records from within 10 kilometres, mostly from areas supporting remnant vegetation on public land.

The majority of historical Blue-winged Parrot observations are from remnant native vegetation along the coast (such as along Nelson and Bridgewater Bays), coastal wetlands (south of Princes Highway), or inland forests including Cobboboonee National Park and Mt Clay State Forest. Interestingly, despite the

high number of VBA records from the region, the model does not show Cobboboonee National Park and Mt Clay State Forest as suitable habitat for the species. Historical records from these two tracts of remnant woodland likely indicate that these areas support suitable breeding habitat for Blue-winged Parrots.

The habitat distribution model (DEECA 2024a) identifies the project area (as well as much of the agricultural land around Portland) as having a medium habitat suitability value for the Blue-winged Parrot. The relatively high number of coastal observations are in accordance with the habitat distribution model for this species, predicting high habitat suitability values for areas of intact coastal vegetation and wetlands.

3.4. Subsequent roaming survey and ground-truthing of habitat in the region

In January 2024, Blue-winged Parrots were observed foraging at the site of the original (July 2023) observation. Additional observations were recorded of flying and perched Blue-winged Parrots within 1.2 kilometres of the project area. At least twenty Blue-winged Parrots, including juveniles, were observed within or nearby the study area during the January 2024 survey.

Blue-winged Parrots were observed foraging on exotic pasture species and common weeds including Yorkshire Fog (*Holcus lanatus*) and Sweet Vernal-grass (*Anthoxanthum odoratum*), Sheep Sorrel (*Acetosella vulgaris*) and Cats Ear (*Hypochaeris radicata*).

Ground-truthing indicated that the agricultural land throughout the region contained a cover of exotic pasture grasses and native rush similar to that of project area, and those areas supporting high numbers of Blue-winged Parrot records were predominantly wooded areas or pasture adjacent to wooded areas.

3.5. Additional Blue-winged Parrot observations during field assessments

During field assessments conducted by Nature Advisory in March 2024, Blue-winged Parrots were observed within the project area and throughout the surrounding region in a range of habitat types including both remnant native vegetation and highly disturbed areas.

The species was observed foraging and roosting in remnant coastal headland scrub and heathland/heathy woodland areas. Small flocks were observed foraging in exotic pasture, and other disturbed areas such as along quarry road and throughout the old Hanson quarry site, feeding on seeds of both native and introduced species demonstrating their adaptiveness to a wide variety of foraging habitats.

Blue-winged Parrots were also regularly observed flying throughout the Portland area, but no meaningful patterns of movement could be ascertained. On two separate occasions, once in the late afternoon and once in the early morning, birds were observed flying in and perching in old Eucalypts near the project area. Small groups and individuals would later disperse in different directions, providing no indication of any regular roosting or foraging areas. A small number of these birds flew towards the project area and later two small flocks in flight were observed descending on the project area to forage.

4. Discussion

The observations of Blue-winged Parrots in January and March 2024, and the presence of juveniles amongst the flocks observed during this period, indicates the species utilises habitat within the project area to forage during the breeding season. Repeat observations of Blue-winged Parrots within the project area during the winter and breeding seasons suggests the local population may exhibit some site fidelity, however, the reason for this is unclear given the highly disturbed nature of site and the availability of extensive areas of very similar habitat and broad utilisation of modified landscapes throughout the region.

Blue-winged Parrot foraging habitat within the project area is almost entirely devoid of traditional food sources such as native grasses, herbs and shrubs. These have been largely replaced with introduced pasture grasses and associated agricultural weeds – the ground layer across the site has been highly modified through a history of grazing pressure. The Blue-winged Parrot's utilisation of the project area was initially thought to be correlated with the sparse occurrence of native rush. However, further investigations found that the species was more commonly feeding on the seeds of exotic pasture grasses and common weeds. The Blue-winged Parrot's ability to survive in altered landscapes is a current research gap and understanding its foraging ecology is a research priority for this species, as noted in the relevant conservation advice (DCCEEW 2023a).

Considering the current knowledge gaps regarding the Blue-winged Parrot's population decline and foraging ecology, and the absence of a recovery plan for the species, the information and observations outlined above have been used to inform the significant impact assessment in the following section.

Impacts to Blue-winged Parrot from the project

The proposed action is being referred under the EPBC Act based on the definition of habitat critical to survival in the most recent conservation advice for Blue-winged Parrot, which includes 'foraging habitats found from coastal, sub-coastal and inland areas' (DCCEEW 2023a). Habitat meeting this description occurs within the project area and will be impacted by the proposed action. Given what is known of the species' foraging ecology, it has been understood the above definition implies that areas of pasture dominated by exotic species known to be utilised by Blue-winged Parrots as a foraging resource, may potentially constitute habitat critical to the survival of the species.

The land proposed for development has previously been cleared and has historically been subject to intense grazing pressure. Blue-winged Parrots were observed within the project area during winter and summer surveys by Nature Advisory ecologists, suggesting that this area is regularly utilised by the local population of the species. A population of at least 20 Blue-winged Parrots including juveniles was observed on two occasions within the study area.

The impacts of the proposed action on Blue-winged Parrot have been considered against the Significant Impact Guidelines for Vulnerable Species (DoE 2013b) in a separate MNES Report (Nature Advisory 2024).

It is considered unlikely that the proposed action will adversely affect habitat critical to the survival of the Blue-winged Parrot based on site observations as well as the known ecology of the species. Critically, the proposal avoids impacts to roosting and nesting habitat of the species, with disturbance restricted to foraging habitat, a resource that is locally abundant throughout the region.

Additionally, the proposed action will include the preparation of a stormwater management plan providing an opportunity to undertake revegetation of the project area using a diverse mix of locally appropriate native species to enhance feeding habitat for the Blue-winged Parrot. If new habitat

patches are established within the study area, as per the relevant conservation and recovery actions (DCCEEW 2023a), this will result in an overall improvement in the quality and extent of habitat for the species.

Revegetation works using indigenous species have already been undertaken along a 10 metre-wide buffer along the site's south-western boundary, to establish foraging habitat for Blue-winged Parrot with the added benefit of extending the current habitat around the site's perimeter for Rufous Bristlebird and Southern Brown bandicoot. The revegetation works aimed to establish a tall, dense shrub community similar to Damp Heathland (EVC 710) that is interspersed with clusters of rushes and sedges; these clusters were specifically incorporated to provide foraging locations for Blue-winged Parrot.

4.1. Summary

Assessment against the EPBC Act Significant Impact Guidelines found that the project is **unlikely** to have a significant impact on the Blue-winged Parrot (Nature Advisory 2024).

The information provided in this assessment is intended to inform the regulator for their decision-making process as to whether any impacts to the species are deemed significant and whether the project should be considered a controlled action or otherwise.

5. References

DAWE 2022, Consultation Document for *Neophema chrysostoma* (Blue-winged Parrot), Department of Agriculture, Water and the Environment, Canberra.

DCCEEW 2023a, Conservation Advice for *Neophema chrysostoma* (Blue-winged Parrot), Department of Climate Change, Energy, the Environment and Water, Canberra.

DCCEEW 2023b, EPBC Act Protected Matters Search Tool, Department of Climate Change, Energy, the Environment and Water, Canberra, viewed November 2023, https://www.environment.gov.au/epbc/pmst/index.html.

DCCEEW 2023c, Species Profile and Threats Database, Department of Climate Change, Energy, the Environment and Water, Canberra, https://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl.

DEECA 2023a, *NatureKit*, Department of Energy, Environment and Climate Action, Melbourne, Victoria, viewed 8 April 2024, https://www.environment.vic.gov.au/biodiversity/naturekit.

DEECA 2023b, Victorian Biodiversity Atlas 3.2.8, Department of Energy, Environment and Climate Action, Melbourne, Victoria, viewed 7 September 2023, https://vba.dse.vic.gov.au.

Department of Environment 2013, Matters of National Environmental Significance - Significant impact guidelines 1.1, Department of the Environment and Energy, Canberra

eBird 2024, eBird: An online database of bird distribution and abundance [web application]. eBird, Cornell Lab of Ornithology, Ithaca, New York, viewed 8 April 2024, http://www.ebird.org.

Emison, WB, Beardsell, CM, Norman, FI, Loyn, RH & Bennett SC 1987, Atlas of Victorian Birds, Department of Conservation, Forests and Lands and the Royal Australasian Ornithologists Union, Melbourne.

Higgins PJ 1999, Handbook of Australian, New Zealand and Antarctic Birds, Volume 4: Parrots to Dollarbird, Oxford University Press, Melbourne.

Holdsworth M, Newman M, Menkhorst P, Morley C, Cooper R, Green B, Starks J, Baker GB, Garnett ST 2021, Blue-winged Parrot *Neophema chrysostoma*.In *The Action Plan for Australian Birds 2020*. (Eds ST Garnett and GB Baker), pp.447 450. CSIRO Publishing, Melbourne.

Menkhorst P, Rogers D, Clarke R, Davies J, Marsack P & Franklin, K 2019, The Australian Bird Guide, CSIRO, Australia.

Portland Energy Park

Pacific Green Portland Energy Park Pty Ltd

Land Management and Rehabilitation Plan

JBS&G 66207 | 163,702 (Rev 3)

18 August 2025

We acknowledge the Traditional Custodians of Country throughout Australia and their connections to land, sea and community.

We pay respect to Elders past and present and in the spirit of reconciliation, we commit to working together for our shared future.

Caring for Country The Journey of JBS&G
Artist: Patrick Caruso, Eastern Arrernte

Project Details

Project Title	Portland Energy Park
EPBC Number	2024/09947
Proponent	Pacific Green Energy Park Portland Pty Ltd
ACN /ABN	667 082 911 / 73 667 082 911
Location of the Action	Portland, Victoria

Document control table

Version	Date	Description	Author	Approved
1	22/05/2025	Draft	LH, CM, CA, BG	CM
2	08/07/2025	Final (addressed department comments)	LH, CM, CA, BG	CM
3	18/08/2025	Final (added document control table)	LH, BG	CM

Declaration of accuracy

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations* 2000 (Commonwealth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed:	
Full name (please print):	Michael Maranta
Organisation (please print):	Pacific Green Technologies (Australia) Pty Ltd
Date:	18/08/2025

Table of Contents

Project Details ii

Declaration of accuracy ii

Abbreviations vi

Key Terms vii

1. Introduction 1

1.1 Purpose of this report 1

1.2 LMRP goal and objectives 1

1.3 Area description 2

1.4 Project description 2

Construction Phase 2

Operational Phase 3

Decommissioning Phase 3

2. Existing conditions 6

2.1 Overview 6

2.2 Native vegetation and conservation significant species or communities 6

2.3 Exotic species 10

3. General management requirements 15

3.1 Roles and responsibilities 15

3.2 General provisions 16

3.2.1 Limit the area of impact 16

3.2.2 Hygiene controls 16

3.2.3 Wash-down requirements 16

3.2.4 Use of chemicals and managing overspray 16

3.2.5 Avoiding soil compaction and rutting 17

3.2.6 Protecting existing indigenous vegetation 17

3.2.7 Woody debris & mulch management 18

3.2.8 Temporary fence removal 18

3.2.9 Seed collection and sourcing stock 18

4. Land Management Treatments 19

4.1 Summary of treatment areas 19

LMT01: Roadside treatment (Madeira Packet Road) 21

Species selection 22

Planting densities and abundance 23

Site preparation and planting 24

Standards of establishment planting and site handover 24
LMT02: Perimeter screening 26
Species selection 26
Planting densities and abundance 27
Site preparation and planting 28
Standards of establishment planting 28
LMT03: Blue-winged Parrot enhancement planting 30
Terrestrial enhancement planting (LMT03a) 30
Species selection 31
Planting densities and abundance 31
Site preparation and planting 32
Standards of establishing planting 32
Wetland enhancement planting (LMT03b) 33
Species selection 33
Planting densities and abundance 34
Site preparation and planting 34
Standards of establishment planting 35
LMT04: Pest and grazing management 36
Destocking 36
Weed Management 36
Pest Animal Management 36
5. Fencing prescriptions for revegetated areas 37
5.1 Minimum fencing specifications: 37
5.2 Removal of fencing 38
6. Maintenance and monitoring activities 39
6.1 Management and maintenance periods 39
6.2 Performance indicators 39
6.3 Monitoring and reporting 40
6.4 Audit and review 44
7. Risk management 45
8. References 59
Appendix A General weed provisions 60
Appendix B Department of Transport and Planning Correspondence 64

List of Tables

Table 1-1: Predicted project schedule 4
Table 2-1: Exotic species identified within the project area 10
Table 3-1: Roles and responsibilities for the project 15
Table 3-2: Potential damage to vegetation by construction activity 17
Table 4-1: Summary of treatments and their areas (colours relate to the treatment colours on Figure 3). 19
Table 4-2: Species typical of Heathy Woodland EVC at the site 22
Table 4-3: Recommended planting densities for life forms in Heathy Woodland for the roadside screening. 23
Table 4-4: Species guide for the perimeter screening (source: Peter Haack Consulting 2024) 27
Table 4-5: Recommended planting densities and distribution for the perimeter screening 28
Table 4-6: Species guide for the Blue-winged Parrot enhancement planting 31
Table 4-7: Planting densities used in 2023 for the Blue-winged Parrot terrestrial enhancement planting 31
Table 4-8: Proposed planting densities for the proposed Blue-winged Parrot terrestrial enhancement planting 31
Table 4-9: Species typical of Aquatic Herbland at the site 33
Table 4-10: Recommended planting densities for different zones of the wetlands 34
Table 6-1: Monitoring program 42
Table 6-2: Reporting requirements 43
Table 7-1: Likelihood of occurrence 45
Table 7-2: Potential consequence 45
Table 7-3: Risk evaluation matrix 45
Table 7-4: Environmental risk register 46

List of Figures

Figure 1: Site location 5
Figure 2: Ecological values within the project area (source: Nature Advisory 2024a) 14
Figure 3: Portland Energy Park Footprint and Ecological Land Management Treatments. 20
Figure 4: Raw (initial) risks ratings and residual risk rating after mitigation 58

List of Plates

Plate 2-1: Heathy Woodland along Maderia Packet Road (source: Nature Advisory 2024a) 8
Plate 2-2: Heathy Woodland along Tecoma Road and Oleria Road (source: Nature Advisory 2024a) 8
Plate 2-3: Aquatic Herbland EVC – large wetland in low-lying area of introduced pasture (source: Nature Advisory 2024a) 8
Plate 2-4: Aquatic Herbland EVC – degraded wetland in low-lying area of introduced pasture (source: Nature Advisory 2024a) 8
Plate 4-1: Current image of Maderia Packet Road (source: Peter Haack Consulting 2024b) 21
Plate 4-2: Perimeter screening typology (Type 2) (source: Peter Haack Consulting 2024) 27
Plate 4-3: Jute matting (pre-planting) 32
Plate 4-4: Planting through the jute matting 32
Plate 4-5: Rabbit-proof mesh applied to fencing 32
Plate 4-6: Enhancement planting, May 2024 32
Plate 5-1: Diagram of a recommended fencing (modified from: Peter Haack Consulting 2024) 37
Plate 5-2: Diagram of a fence to provide rabbit and stock control (source: (DEECA 2024)) 38

Abbreviations

Acronym / Term	Explanation
BESS	Battery Energy Storage System
CaLP Act	*Catchment and Land Protection Act 1994*
CEMP	Construction Environment Management Plan
CHMP	Cultural Heritage Management Plan
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEECA	Department of Energy, Environment and Climate Action
DSWMP	Drainage and Surface Water Management Plan
DTP	Department of Transport and Planning
EP Act	*Environment Protection Act 1993*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EVC	Ecological Vegetation Class
FFG Act	*Flora and Fauna Guarantee Act 1988*
FMP	Fire Management Plan
GW	Gigawatt
GWh	Gigawatt hour
ha	Hectare
JBS&G	JBS&G Australia Pty Ltd
km	Kilometre
kV	Kilovolt
LMRP	Land Management and Rehabilitation Plan
m	Metre
MNES	Matters of National Environmental Significance
mm	Millimetre
OEMP	Operational Environment Management Plan
Pacific Green	Pacific Green Energy Park Portland Pty Ltd
The project	The proposed Portland Energy Park in Portland, Victoria
TMP	Traffic Management Plan
VPZ	Vegetation Protection Zone(s)
WoNS	Weeds of National Significance

Key Terms

Term	Definition
Biodiversity	The variety of all life-forms, the different plants, animals and micro-organisms, the genes they contain, and the ecosystems of which they form a part.
Bioregion	A landscape-based approach to classifying the land surface using a range of environmental attributes such as climate, geomorphology, lithology, and vegetation.
Ecological Vegetation Class (EVC)	A type of native vegetation classification that is described through a combination of its floristics, life form and ecological characteristics, and through an inferred fidelity to particular environment attributes. Each EVC includes a collection of floristic communities that occurs across a biogeographic range, and although differing in species, have similar habitat and ecological processes operating.
Exotic Vegetation	Any vegetation that is not native to Australia or its States and Territories. This can sometimes include non-indigenous vegetation.
Indigenous Vegetation	Refers to vegetation that is native to Australia as well as occurring naturally in the local geographical region.
Local provenance	Local provenance is a term used to describe native plant populations that naturally occur in a given 'local' area. That is they are genetically adapted to the local area.
Native Vegetation	Refers to a plant which occurs naturally in a country but does not occur locally occur. However, when referring to native vegetation recognised under Clause 52.16 or 52.17 of the Victorian Planning Scheme, 'native vegetation' is defined as indigenous to the area.
Non-native Vegetation (exotic)	Vegetation that is not native to Australia.
Patch	A patch of native vegetation is: • an area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native, or • any area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy, or • any mapped wetland included in the Current wetlands map, available in the Department of Environment, Land, Water and Planning (DELWP) systems and tools.
The disturbance footprint	The disturbance footprint totals approximately 34 hectares and is considered to be the *maximum* extent of necessary works
The project	The project comprises of four utility-scale Battery Energy Storage System (BESS) compounds (total capacity of 1-gigawatt (GW)/2.5-gigawatt hour (GWh)), and associated infrastructure including a 33 kilovolt (kV) substation and 500 kV switchyard and grid transmission connection. The project includes associated works, such as earthworks, security fencing, access tracks, drainage and landscape vegetation planting.
The project area	The project area is approximately 120 hectares and encompasses the following addresses: • Allotment 61A Section 13 Parish of Portland • Lot 1 TP592015 Madeira Packet Road • 305 Madeira Packet Road • 333 Madeira Packet Road
Scattered Tree	A scattered tree is a native canopy tree that does not form part of a patch.

1. Introduction

JBS&G Australia Pty Ltd (JBS&G) have been engaged by Pacific Green Energy Park Portland Pty Ltd (Pacific Green, the Proponent) to complete a Land Management and Rehabilitation Plan (LMRP) associated with the proposed Portland Energy Park in Portland, Victoria (hereafter referred to as the project). The project comprises of four utility-scale Battery Energy Storage System (BESS) compounds (total capacity of 1-gigawatt (GW)/2.5-gigawatt hour (GWh)), and associated infrastructure including a 33 kilovolt (kV) substation and 500 kV switchyard and grid transmission connection. The project includes associated works, such as earthworks, security fencing, access tracks, drainage and landscape vegetation planting. This LMRP is to provide Pacific Green with guidelines to protect and enhance the natural values of the project area.

1.2 Purpose of this report

This LMRP has been developed to address the strategic environmental management of the project area. Specifically, this plan has been prepared to inform construction and rehabilitation activities. The LMRP documents the following information:

- A description of the ecological values of the project area as determined by field visits;
- General management prescriptions for the project area;
- Land management prescriptions;
- Post-construction rehabilitation activities; and
- Maintenance and monitoring activities.

1.3 LMRP goal and objectives

The over-arching goal of the LMRP is:

> ***'to improve the overall ecological conditions of the site through time such that the project mitigates its environmental impacts and ultimately results in a nature positive outcome'.***

The project will reach this goal by meeting the five LMRP objectives to:

Objective 1: Guide proposed perimeter screening that will improve visual amenity for local residents whilst providing opportunities for biodiversity enhancement;

Objective 2: Articulate areas proposed for terrestrial and aquatic enhancement and revegetation to improve biodiversity and stormwater outcomes for flora and fauna, including Commonwealth listed species;

Objective 3: Improve the connection between isolated vegetation patches to promote native wildlife movement, including increasing foraging and roosting habitat for matters of national environmental significance (MNES), specifically the Blue-winged Parrot *Neophema chrysostom*, Southern Brown Bandicoot *Isoodon obesulus obesulus* and Swamp Antechinus *Antechinus minimus maritimus*.

Objective 4: Provide guidance on appropriate species selection for the different land management treatments, which will ultimately increase the abundance of indigenous flora species; and

Objective 5: Improve land management practices within parts of the site through the reduction in grazing pressure and impacts associated with pest animals and weeds that will improve the ecological condition and habitat within treated areas.

1.4 Area description

The project is located at Portland's southern extent and 300 kilometres (km) southwest of Melbourne (refer to **Figure 1**). The land upon which the project is proposed to be developed (hereafter referred to as the project area) is situated to the north and south of Madeira Packet Road, west of the Portland Aluminium Smelter, and north of the Portland Wind Farm. The project area is approximately 120 hectares and encompasses the following addresses:

- Allotment 61A Section 13 Parish of Portland;
- Lot 1 TP592015 Madeira Packet Road;
- 305 Madeira Packet Road; and
- 333 Madeira Packet Road.

The project area is currently used for agricultural grazing. This is consistent with the surrounding land, primarily used for agriculture.

Within the project area, a portion of the site will be developed, referred to as the disturbance footprint. The disturbance footprint totals approximately 34 hectares and is considered to be the *maximum* extent of necessary works.

1.5 Project description

The project is broken up into three (3) phases:

- Phase 1: Construction
- Phase 2: Operation
- Phase 3: Decommissioning

The activities that will be undertaken as part of each relevant project phase is discussed further below with the anticipated schedule of each phase shown in **Table 1-1**.

Construction Phase

The works will be undertaken in stages (four stages). Works will be completed in a continuous construction period of approximately 12-18 months, and laydown areas for equipment will be constrained to the disturbance footprint.

Construction planning and early works are proposed for early 2026 with full construction likely to start mid-2026. Based on an 18-month construction period, it is likely the works will be completed by the end of 2027 /early 2028.

Individual battery units (similar to a shipping container) will be located on individual concrete slabs. Each BESS park will connect to a 500/33kV Collector Station which have been redesigned around the large dune landform in the centre of the activity area, that then connects to the primary 500kV switching station via overhead distribution lines. The Collector Stations will be constructed on shallow, wide footings designed to avoid impacting the natural ground surface.

A total of five or six new transmission towers will be constructed to connect the switching station to existing transmission lines in the northern extent of the project area.

The majority of cabling for utilities will occur within the fill layer. Another two ponds will be constructed in the north and south of the activity area for water runoff.

A small dam in the north of the activity area will be expanded to catch run off from the benching areas (for water filtering), and a series of subsurface pipes for drainage will be installed to direct water away from the infrastructure.

Operational Phase

Within the operation phase, there is minimal day-to-day activity relative to construction. It is expected that there will be 21 ongoing jobs (full time equivalent) (4 direct and 17 indirect) related to maintenance, inspections and management. Pasture grasses and vegetation on the balance land will be managed to address fire risk.

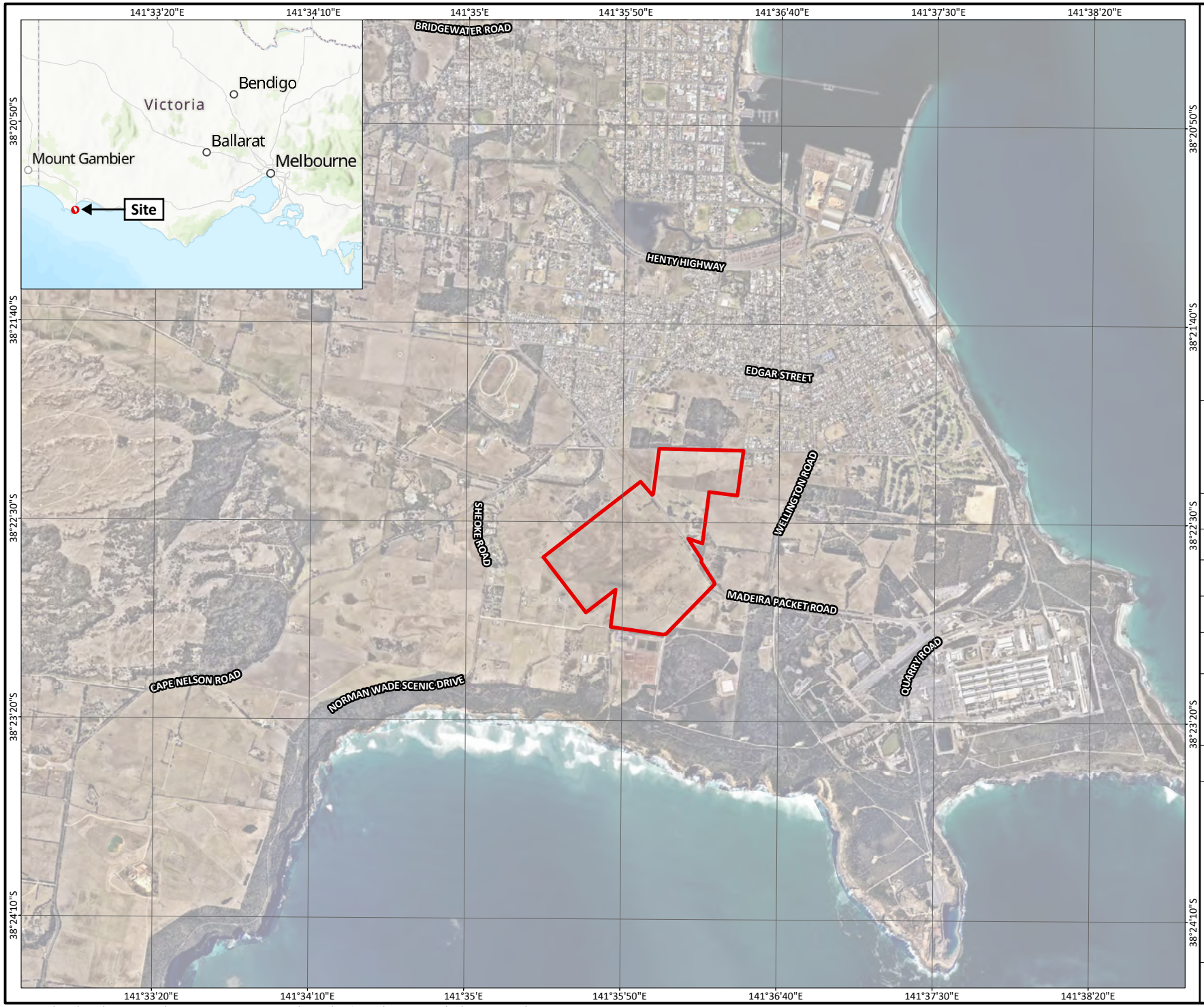
Decommissioning Phase

The project is expected to last 40 years, and specific processes for decommissioning will therefore be highly subject to future conditions, including the availability of materials reuse and recycling, evolving environmental and material standards, economic circumstances and market forces, surrounding land uses, environmental constraints, and community expectations. As such, a specific decommissioning plan will be developed at a more appropriate time prior to decommissioning.

Table 1-1: Predicted project schedule

Phase		Year														
		2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038 – 2066*	2067*	2068*
		Year 1	Year 2	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11 – year 40	Year 1	Year 2
Construction																
Operation	LMRP establishment															
	LMRP maintenance and monitoring															
	Ongoing maintenance															
Decommissioning																

*Predicted



Legend

Project Area

JBS&G

Job No: 66207	
Client: Pacific Green	
Version: final	Date: 18-Jun-2025
Drawn By: AL	Checked By: LH

Scale: 1:40,000 at A4

0 800 1,600

metres

Coord. Sys. GDA2020 MGA Zone 54

Portland Energy Park,
Portland Victoria

EPBC No.: 2024/09947

FIGURE 1 - SITE LOCATION

File Name: C:\Users\aliddy\JBS&G Australia\JBS&G - DCS - Internal - Documents\Projects\Pacific Green\66207_Portland\GIS\02_MapProjects\66207_Portland_RMP_FigureUpdates.aprx; Name:66207_01_SiteLoc
Reference: ESRI Topographic Basemap - Accessed Imagery: 18/06/2025 | Aerial Imagery Suplied by Nearmap (March, 2025)

2. Existing conditions

The following section describes the existing conditions within the project area and the broader surrounding area.

2.1 Overview

Portland falls within the Glenelg Planning Scheme. Under this scheme, the majority of the project area is zoned as Industrial 2 Zone. The northern most part of the project area is zoned as Farming Zone – Schedule 1 and Madeira Packet Road is zoned as Transport Zone 2.

The project area has historically been used for agricultural grazing. As a result of grazing and historical land clearing, the vegetation is highly modified from its original condition (Nature Advisory 2024b). The lack of canopy trees, high presence of noxious weeds, and the loss of native species diversity has resulted in a poor condition of the remaining vegetation (Nature Advisory 2024b). The existing vegetation in the roadside adjacent the project area provides an important link and corridor between the small patches of native vegetation within a largely modified landscape (Nature Advisory 2024b).

2.2 Native vegetation and conservation significant species or communities

An ecological assessment of the project area and the adjacent roadsides was undertaken by Nature Advisory in 2024. This assessment provided information on native vegetation and impacts to flora and fauna matters listed under the state *Flora and Fauna Guarantee Act 1988* (FFG Act) and the Commonwealth EPBC Act. The ecological assessment derived conclusions from desktop assessment findings and multiple field assessments. The field assessments included:

- General site visits to map native vegetation and listed species and ecological communities on the 17 and 18 July 2023, 9 and 10 January 2024, and 7 March 2024.
- A five flora species targeted survey on 31 October 2023 and 1 November 2023.

The project area is within the Glenelg Plain bioregion and the Glenelg Hopkins catchment management area (Nature Advisory 2024a). The project area contained the following Ecological Vegetation Classes (EVC) from the Glenelg Plain bioregion:

- Heathy Woodland (EVC 48). This EVC is generally associated with nutrient-poor soils including deep uniform sands (aeolian or outwash) and Tertiary sand/clay which has been altered to form quartzite gravel (DSE 2004). It is typically dominated by Eucalypts, forming a low to 10 metre (m) tall woodland. It lacks a secondary tree layer and generally supports a diverse array of narrow or ericoid-leaved shrubs except where frequent fire has reduced this to a dense cover of bracken (DSE 2004). Geophytes and annuals can be common, but the ground cover is normally fairly sparse (DSE 2004). Nature Advisory (2024b) identified this EVC in patches along the project area's eastern and northern boundary, in the roadside adjacent Madeira Packet Road, and in the land parcel north of Madeira Packet Road (as seen in **Figure 2**). Blue-winged Parrots were observed foraging and roosting in the project area's remnant Heathy Woodland areas (Nature Advisory 2024b). However, the Heathy Woodland understorey regrowth along the roadsides was considered too dense and weedy to support the targeted threatened fauna species (Nature Advisory 2024b). Native flora species identified within this EVC in the project area include, but are not limited to, Coast Wattle *Acacia longifolia subsp. Sophorae,* Coastal Beard-Heath *Leucopogon parviflorus,* Seaberry Saltbush *Rhagodia candolleana subsp. Candolleana,* Coast Sword Sedge *Lepidosperma gladiatum,* Thatch Saw-sedge *Gahnia radula*, Spear Grass *Austrostipa spp.,* Bulrush *Typha spp.,* Knobby Club-sedge *Ficinia nodosa,* and native rushes. Whilst species mid-storey species such as Coast Wattle, Coast Beard-Heath and Seaberry

Saltbush are not documented in the EVC benchmark, within the context of the disturbed landform and surrounding native vegetation, these species are still considered consistent with this EVC.

- Exotic species identified within the areas of Heathy Woodland EVC in the project area include, but are not limited to, Kikuyu *Cenchrus clandestinus*, Cocksfoot *Dactylis glomerata*, Bower Spinach *Tetragonia implexicoma*, Sweet Vernal-grass *Anthoxanthum odoratum*, White Clover *Trifolium repens var. repens,* Soursob *Oxalis pes-caprae,* Flatweed *Hypochaeris radicata,* Spear Thistle *Cirsium vulgare,* and Boneseed *Chrysanthemoides monilifera.*
- Aquatic Herbland (EVC 653). This EVC is generally found on fertile paludal soils, typically with heavy clays beneath organic accumulations (DSE 2004). These herblands are permanent to semi-permanent wetlands that are typically dominated by sedges (especially on shallower verges) and/or aquatic herbs (DSE 2004). Nature Advisory (2024b) identified areas of wetland throughout the project area, including low-lying areas of pasture and constructed drainage channels (as seen in **Figure 2**). Most were semi-permanent or permanent and provided breeding and foraging habitat for common frogs and waterbirds. The wetlands that were fringed by native rush (*Juncus sp.*) provided foraging habitat for the Blue-winged Parrot. However, Nature Advisory (2024b) determined that the limited structural diversity both within and surrounding these wetlands limited the overall value of this habitat for fauna species. Native flora species identified within this EVC in the project area include, but are not limited to, Pennywort *Hydrocotyle spp.*, River Buttercup *Ranunculus inundatus*, Southern Water-ribbons *Cycnogeton alcockiae*, Slender Dock *Rumex brownii*, Swamp Crassula *Crassula helmsii*, Water Starwort *Callitriche spp.,* Duckweed *Lemna spp.*, and native rushes. Exotic species identified within this EVC in the project area include, but are not limited to, Buckhorn's Plantain *Plantago lanceolata*, White Clover *Trifolium repens var. repens*, *Blackberry Rubus fruticosus spp. agg.*, and Gorse *Ulex europaeus*.

Plate 2-1 to **Plate 2-4** present general vegetation conditions of both EVCs within the project area.

Plate 2-1: Heathy Woodland along Maderia Packet Road (source: Nature Advisory 2024a)

Plate 2-2: Heathy Woodland along Tecoma Road and Oleria Road (source: Nature Advisory 2024a)

Plate 2-3: Aquatic Herbland EVC – large wetland in low-lying area of introduced pasture (source: Nature Advisory 2024a)

Plate 2-4: Aquatic Herbland EVC – degraded wetland in low-lying area of introduced pasture (source: Nature Advisory 2024a)

The field survey recorded two (2) small, scattered trees, as seen in **Figure 2**. Both were Swamp Gums *Eucalyptus ovata*, identified to be in very poor health (Nature Advisory 2024a). No listed flora species were recorded during the field survey, despite targeted surveys being undertaken for the five listed flora species that had the potential to occur within the project area.

The project area contained three fauna habitat types: wooded habitat, grassland habitat, and aquatic habitat.

Wooded habitat was found along roadsides adjacent to and within the project area and contained planted non-indigenous trees and dense coastal scrub (Nature Advisory 2024a). Despite the presence of weeds, these patches provided an important foraging and nesting resource for threatened species, including Rufous Bristlebird and potentially Southern Brown Bandicoot and Swamp Antechinus. It also provided a movement corridor for these species as well as other, more common native fauna (Nature Advisory 2024a).

The grassland habitat was the most prevalent in the project area. Comprising of introduced pasture grasses and noxious weeds, the condition of this habitat was poor (Nature Advisory 2024a). In the southeastern portion of the project area, this habitat contained sparse areas of native rush, which provided foraging habitat for the Blue-winged Parrot.

The aquatic habitat was present in areas throughout the project area. These areas provided breeding and foraging habitat for common frogs and waterbirds, and in cases where wetlands were fringed by native rush, they provided foraging habitat for Blue-winged Parrot *Neophema chrysostoma* (Nature Advisory 2024a).

Four (4) listed threatened fauna species were recorded within the project area during the field survey, including:

- Blue-winged Parrot (EPBC Act: Vulnerable)
- White-bellied Sea-Eagle *Haliaeetus leucogaster* (FFG Act: Endangered)
- Rufous Bristlebird (Coorong subspecies) *Dasyornis broadbenti broadbenti* (FFG Act: Endangered)
- Grey Goshawk *Accipiter novaehollandiae* (FFG Act: Endangered) (1.3 km from site)

The likelihood of occurrence of threatened fauna species undertaken by Nature Advisory (2024a) identified 17 species that are likely to occur or have the potential to occur within the project area:

- Blue-winged Parrot (EPBC Act: Vulnerable)
- Brolga *Antigone rubicunda* (FFG Act: Endangered)
- Eastern Great Egret *Ardea alba modesta* (FFG Act: Vulnerable)
- Fork-tailed Swift *Apus pacificus* (EPBC Act: Migratory)
- Grey Goshawk *Accipiter novaehollandiae* (FFG Act: Endangered)
- Latham's Snipe *Gallinago hardwickii* (EPBC Act: Vulnerable, Migratory)
- Little Eagle *Hieraaetus morphnoides* (FFG Act: Vulnerable)
- Little Egret *Egretta garzetta* (FFG Act: Endangered)
- Plumed Egret *Ardea intermedia plumifera* (FFG Act: Critically Endangered)
- Rufous Bristlebird *Dasyornis broadbenti broadbenti* (Coorong subspecies) (FFG Act: Endangered)
- Rufous Fantail *Rhipidura rufifrons* (EPBC Act: Migratory)
- Satin Flycatcher *Myiagra cyanoleuca* (EPBC Act: Migratory)
- White-bellied Sea-Eagle *Haliaeetus leucogaster* (FFG Act: Endangered)
- White-throated Needletail *Hirundapus caudacutus* (EPBC Act: Vulnerable, Migratory; FFG Act: Vulnerable)
- Southern Brown Bandicoot (EPBC Act: Endangered; FFG Act: Endangered)
- Swamp Antechinus (EPBC Act: Vulnerable; FFG Act: Vulnerable)
- Southern Bent-wing Bat *Miniopterus schreibersii bassanii* (EPBC Act: Critically Endangered; FFG Act: Critically Endangered)

2.3 Exotic species

The site survey identified 119 weed species within the project area. These species are listed in **Table 2-1,** noting those listed as Weeds of National Significance (WoNS) or listed under the *Catchment and Land Protection Act 1994* (CaLP Act).

Table 2-1: Exotic species identified within the project area

Common name	Scientific name	WoNS	CaLP listing
African Box-thorn	*Lycium ferocissimum*	✓	*Regionally Controlled Weeds*
Agapanthus	*Agapanthus praecox* subsp. *orientalis*		
Angled Onion	*Allium triquetrum*		*Restricted Weeds*
Annual Beard-grass	*Polypogon monspeliensis*		
Belladonna Lily	*Amaryllis belladonna*		
Black Nightshade	*Solanum nigrum* s.l.		
Blackberry	*Rubus fruticosus* spp. agg.	✓	*Regionally Controlled Weeds*
Blood Lily	*Haemanthus coccineus*		
Blue Psoralea	*Psoralea pinnata*		
Boneseed	*Chrysanthemoides monilifera*	✓	*Regionally Controlled Weeds*
Bromeliad	*Aechmea* spp.		
Buck's-horn Plantain	*Plantago coronopus*		
Buffalo Grass	*Bouteloua dactyloides*		
Bulbil Watsonia	*Watsonia meriana* var. *bulbillifera*		*Restricted Weeds*
Burr Medic	*Medicago polymorpha*		
Canary Island Date- palm	*Phoenix canariensis*		
Cape Ivy	*Delairea (monotypic)*		
Cape Leadwort	*Plumbago auriculata*		
Cape Weed	*Arctotheca calendula*		
Carrot	*Daucus carota*		
Cat's Ear	*Hypochoeris radicata*		
Chickweed	*Stellaria media*		
Clivia	*Clivia* spp.		
Clover	*Trifolium* spp.		
Coast Rosemary	*Westringia fruticosa*		
Cocksfoot	*Dactylis glomerata*		
Common box	*Buxus sempervirens*		
Common Vetch	*Vicia sativa*		
Couch	*Cynodon dactylon var. dactylon*		
Couch Grass	*Elymus repens*		
Crimson Bottlebrush	*Callistemon citrinus*		
Crocosmia	*Crocosmia* spp.		
Crowngrass	*Paspalum dilatatum*		
Curled Dock	*Rumex crispus*		
Cypress	*Cupressus* spp.		

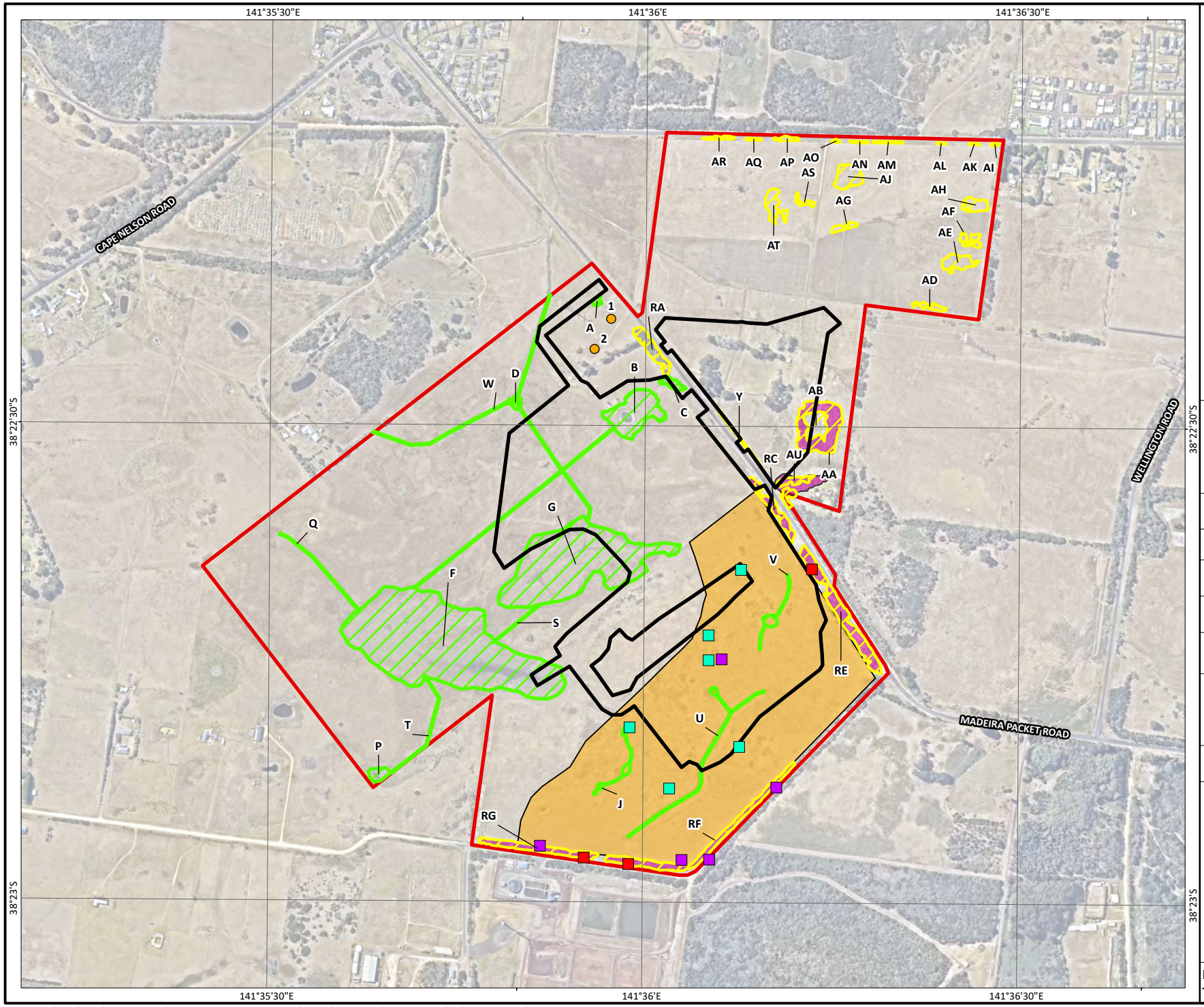
Common name	Scientific name	WoNS	CaLP listing
Cypress-pine	*Callitris* spp.		
Dense Flat-sedge	*Cyperus congestus*		
Desert Ash	*Fraxinus angustifolia*		
Dove's Foot	*Geranium molle*		
Drain Flat-sedge	*Cyperus eragrostis*		
Elkhorn Fern	*Platycerium bifurcatum*		
English Daisy	*Bellis perennis*		
English Ivy	*Hedera helix* s.l.		
Fat Hen	*Chenopodium album*		
Flatweed	*Hypochaeris radicata*		
Fleabane	*Erigeron* spp.		
Flowering Gum	*Corymbia ficifolia*		
Fox Tail Agave	*Agave attenuata*		
Garden Dandelion	*Taraxacum officinale* spp. agg.		
Giant Honey-myrtle*	*Melaleuca armillaris subsp. armillaris*		
Giant Nettle	*Urtica dioica*		
Golden Aeonium	*Aeonium arboreum*		
Gorse	*Ulex europaeus*	✓	*Regionally Controlled Weeds*
Great Brome	*Bromus diandrus*		
Grevillea (cultivated)	*Grevillea* spp./cv.		
Hairy Hawkbit	*Leontodon saxatilis subsp. saxatilis*		
Hare's-tail Grass	*Lagurus ovatus*		
Indian Shot	*Canna indica*		
Italian Buckthorn	*Rhamnus alaternus*		
Jade Plant	*Crassula ovata*		
Jointed Rush	*Juncus articulatus subsp. articulatus*		
Karo	*Pittosporum crassifolium*		
Kikuyu	*Cenchrus clandestinus*		
Kohuhu	*Pittosporum tenuifolium*		
Large Quaking-grass	*Briza maxima*		
Large-flower Wood- sorrel	*Oxalis purpurea*		
Lavender	*Lavandula* spp.		
Lesser Quaking- grass	*Briza minor*		
Lion's Ear	*Leonotis leonurus*		
Mediterranean Loosestrife	*Lythrum junceum*		
Mirror Bush	*Coprosma repens*		
Monterey Cypress	*Hesperocyparis macrocarpa*		
Montpellier Broom	*Genista monspessulana*	✓	*Restricted Weeds*
Napuka	*Veronica speciosa*		
New Zealand Cabbage-tree	*Cordyline australis*		

Common name	Scientific name	WoNS	CaLP listing
New Zealand Flax	*Phormium tenax*		
Oleander	*Nerium oleander*		
Ox-tongue	*Helminthotheca echioides*		
Palm Lily	*Yucca gloriosa var. recurvifolia*		
Panic Veldt-grass	*Ehrharta erecta*		
Paspalum	*Paspalum dasypleurum*		
Peacock Iris	*Dietes* spp.		
Pig's Ear	*Cotyledon orbiculata*		
Pink Diosma	*Coleonema pulchellum*		
Pyramid Tree	*Lagunaria patersonia*		
Radiata Pine	*Pinus radiata*		
Rat-tail Grass	*Sporobolus fertilis*		
Regal Pelargonium	*Pelargonium X domesticum*		
Ribwort	*Plantago lanceolata*		
River Oak	*Casuarina cunninghamiana subsp. cunninghamiana*		
Rose	*Rosa* spp.		
Rough Sow-thistle	*Sonchus asper* s.l.		
Rye Grass	*Lolium* spp.		
Sea Barley-grass	*Hordeum marinum*		
Sheep Sorrel	*Acetosella vulgaris*		
Silver Birch	*Betula pendula*		
Small Nettle	*Urtica urens*		
Small-flower Mallow	*Malva parviflora*		
Smooth Cat's-ear	*Hypochaeris glabra*		
Smooth-barked Apple	*Angophora costata subsp. costata*		
Soursob	*Oxalis pes-caprae*		*Restricted weed*
Spear Thistle	*Cirsium vulgare*		*Restricted weed*
Sweet Hakea	*Hakea drupacea*		
Sweet Pittosporum	*Pittosporum undulatum*		
Sweet Vernal-grass	*Anthoxanthum odoratum*		
Sweet-scented Hakea	*Hakea drupacea*		
Tall Fescue	*Festuca arundinacea*		
Toowoomba Canary- grass	*Phalaris aquatica*		
Trailing African Daisy	*Dimorphotheca fruticosa*		
Twiggy Turnip	*Brassica fruticulosa*		
Water Buttons	*Cotula coronopifolia*		
Water Starwort	*Callitriche* spp.		
White Arum-lily	*Zantedeschia aethiopica*		
White Clover	*Trifolium repens* var. *repens*		

Common name	Scientific name	WoNS	CaLP listing
Wild Radish	*Raphanus raphanistrum*		
Willow Myrtle	*Agonis flexuosa*		
Woolly Bush	*Adenanthos sericeus*		
Yellow Alstroemeria	*Alstroemeria aurea*		
Yorkshire Fog	*Holcus lanatus*		

**Note: Giant Honey-myrtle is considered an environmental weed for the project area as it is occurring beyond its natural distribution, despite being native to Australia.*

In some parts of Victoria, Coast Wattle is considered a weed. This is not the case for the project area as it is close to the coastline. Regardless, the abundance and spread of this species will be monitored as it is known to dominate disturbed coastal landscapes.



Legend

- Project Area
- Project Development Area

Threatened Fauna Recorded (Nature Advisory, 2024)

- Blue-winged Parrot (Breeding Season)
- Blue-winged Parrot (Non Breeding Season)
- Rufous Bristlebird (Non Breeding Season)
- Blue-winged Parrot Foraging Habitat
- Rufous Bristlebird habitat, potential Southern Brown Bandicoot and Swamp Antechinus habitat

Native Vegetation (Nature Advisory, 2024)

- Aquatic Herbland (EVC 653)
- Heathy Woodland (EVC 48)
- Small Scattered Tree

JBS&G

Job No: 66207

Client: Pacific Green

Version: Final	Date: 24-Jun-2025
Drawn By: AL	Checked By: LH

Scale: 1:10,000 at A4

0 200 400
metres

Coord. Sys. GDA2020 MGA Zone 54

Portland Energy Park, Portland Victoria

EPBC No.: 2024/09947

FIGURE 2 - ECOLOGICAL VALUES WITHIN THE PROJECT AREA

File Name: C:\Users\aliddy\JBS&G Australia\JBS&G - DCS - Internal - Documents\Projects\Pacific Green\66207_Portland\GIS\02_MapProjects\66207_Portland_RMP_FigureUpdates.aprx; Name:66207_02_ExistingVeg 02
Reference: ESRI Topographic Basemap - Accessed Imagery: 24/06/2025 | Aerial Imagery Suplied by Nearmap (March, 2025)

3. General management requirements

The following section outlines general management measures which will be implemented to ensure the protection of the area's biodiversity and environmental values and ensure the greatest likelihood of planting success.

3.1 Roles and responsibilities

The roles and responsibilities of key personnel for the project are outlined below in **Table 3-1**. All personnel involved in the project are required to work in accordance with the LMRP.

Table 3-1: Roles and responsibilities for the project

Role	Responsibility
Pacific Green Executive Management	• Overarching responsibility for the project • Licence holders and therefore hold overall responsibility for the environmental management of the project
Pacific Green Project Manager	• Directly responsible for the environmental management of the project • Reports directly to Executive Management • Managing the environmental approval process • Directly responsible for overseeing and fulfilling the commitments contained in the LMRP • Coordinating management reviews, external and internal audits and reporting progress against environmental targets and objectives • Conducting environmental incident investigations and performing environmental risk assessments • Providing general environmental support • Works closely with the Site Manager during the construction phase
Site Manager	• Oversees LMRP implementation • During construction, monitors the activities of contractors and assesses compliance with the LMRP and Environment Management Plan (EMP) • Coordinates the monitoring and audit program • Undertakes a weekly inspection of the site as outlined in **Table 6-1**, or delegates to a suitably qualified person • Represents the project on environmental matters with stakeholders • Reports to the Project Manager during the construction phase
Rehabilitation Manager	• Oversees the implementation of the on-ground management treatments (LMT01-04) • Can be the same person as the Site Manager, other staff or a contractor if a suitably qualified. • 'Suitably qualified' refers to appropriate skills in science, natural resource management or land management practices. • Is responsible for implementing the land management treatments (either directly or through procurement). • The Rehabilitation Manager is required to ensure that on-ground staff have the appropriate training and licences with regards to chemical us and pest animal methods and welfare.
Subcontractors and other site workers	• Implement environmental controls as directed • Report any environmental issues • Report to the Site Manager

Role	Responsibility
	• Adhere to any site-specific management requirements identified in this plan, the EMP or other relevant sub-plans.
Monitoring Manager	• The Monitoring Manager must be an ecologist with suitable qualifications in indigenous flora identification and ecological monitoring. The Monitoring Manager is responsible for: - the delivery of the annual monitoring report (Section 6.3); - the Blue-winged Parrot Monitoring report. - Engagement of an ISO accredited auditor (independent of the Pacific Green project team) to verify the monitoring reports.

3.2 General provisions

3.2.1 Limit the area of impact

The first principle is to limit the area of disturbance and appropriately plan any disturbance footprints and laydown areas using the avoid, minimise hierarchy. Disturbance (removal) of native vegetation shall only occur within the approved removal areas as presented in **Figure 3**.

3.2.2 Hygiene controls

Soil disturbance, sedimentation, and transportation associated with construction activities have the potential to encourage weed species to spread or establish where not formerly present. This is particularly relevant for high threat nationally listed weeds or CaLP-listed species identified throughout the project area during the field survey (refer to **Table 2-1**). The spread of weeds may reduce the diversity and quality of retained native vegetation and can over time, affect the quality of soil, waterways, and fauna habitats. In addition, machinery movement can cause the translocation of soil-borne pathogens. Given this, the following mitigation measures are proposed.

3.2.3 Wash-down requirements

Wash down requirements outlined below apply to all works and machinery working within (with approval of the site manager) or in the vicinity of the project area.

Prior to the commencement of the project, all machinery and vehicles should be free of weed propagules and/or material carrying potential diseases. Soil and vegetative matter carrying weed seeds and soil-borne pathogens are easily trapped in earthmoving equipment tracks and tyres.

Washdown requirements are to ensure weeds and diseases are not brought onto work sites, or existing weeds and diseases are not spread further throughout the work site. It is mandatory for construction vehicles to be cleaned before entering the work site each day.

If equipment and machinery will not be moving off-site each day of construction, daily washdown is not required. However, washdown is required for machinery and equipment coming from other construction sites. This is essential for the prevention of introducing new soil stored weed seeds into the site.

3.2.4 Use of chemicals and managing overspray

The use of weed control chemicals, such as herbicides, can be optimized to minimize overspray and mitigate negative impacts on biodiversity by implementing targeted application techniques and adopting integrated weed management strategies. Employing appropriately trained staff and reputable contractors is important to ensure chemical management follows the manufacturers prescriptions.

In addition, precision application methods, such as spot spraying or using advanced equipment like GPS-guided sprayers, allows for precise targeting of weeds while reducing the likelihood of damage to non-target plants and organisms.

3.2.5 Avoiding soil compaction and rutting

Minimising soil rutting within the site is essential for maintaining healthy soil structure and promoting plant health. Recommended strategies to minimise rutting include:

1. Use Proper Equipment: Select lightweight machinery and equipment specifically designed for landscaping to reduce compaction and rutting. Avoid using heavy vehicles, particularly on wet soil.
2. Timing: Avoid land management activities during wet periods when the soil is saturated, as this is when it is most susceptible to rutting.
3. Establish Designated Pathways: Create defined pathways for foot and vehicle traffic to limit soil disturbance and rut formation in other areas.
4. Implement Erosion Control Measures: Utilise erosion control blankets, mulch, or ground cover plants such as sterile rye or corn to protect bare soil from being compacted and rutted.
5. Regular Maintenance: Routinely inspect and repair any ruts that do form, as prompt attention can prevent further damage and promote recovery.

3.2.6 Protecting existing indigenous vegetation

The indigenous vegetation within the project area, both currently present and that planted as per this LMRP, must be adequately protected during the construction of the project. Indigenous vegetation may be directly impacted by a range of construction activities, including but not limited to, earthworks, vehicle movement and parking, equipment storage, and stockpiling of soils.

Construction activities have the potential to impact vegetation in several ways, including those identified in **Table 3-2**.

Table 3-2: Potential damage to vegetation by construction activity

Damage	Causes	Effects
Physical damage	• Poor pruning cuts (e.g. lopping, flush cuts, lion-tailing). • Impacts from machinery, material storage. • Attaching signs/fencing to trees.	• Facilitating pathogens. • Initiating decay. • Promoting epicormic shoots (prone to failure).
Root severance	• Excavation. • Trenching for underground services. • Grade changes for footings/landscaping. • Preparation for the installation of piling, roads, paths, and crossovers.	• Tree decline (leaf drop, loss of vitality, branch dieback). • Limb failure. • Total tree failure.
Soil environment degeneration	• Compaction from machinery for footings or paving. • Lack of moisture penetration from sealed surfacing. • Lack of gas exchange from sealed surfacing/increased soil level. • pH changes. • Erosion and sedimentation. • Alteration to the existing levels of the site through excavation and fill.	• Root damage. • Root decline/death. • Vegetation decline/death.
Chemical injury	• Fuel/paint/solvent dumping/spills. • Herbicide uptake (e.g. via root grafting between trees, or wind drift).	• Vegetation decline/death. • Tree canopy dieback.
Alteration to drainage	• Excavation. • Trenching for underground services.	• Vegetation decline/death. • Tree canopy dieback

Damage	Causes	Effects
	• Grade changes for footings/landscaping. • Preparation for installation of piling, roads, paths, and crossovers.	

3.2.7 Woody debris & mulch management

Where indigenous trees are required to be lopped, lopped material should be maintained at the sites. Rather than mulching all material, it is proposed that larger branches and logs are distributed within heathy vegetation proposed to be protected throughout the project area.

Where non-indigenous trees are removed, it is proposed that they are mulched in line with AS 4454—2003 'Composts, soil conditioners and mulches' (Standards Australia 2003). Mulch is to be distributed around the planted vegetation except for in the wetland vegetation areas, as outlined in **Section 4.2**.

3.2.8 Temporary fence removal

Temporary fencing utilised to protect areas of vegetation or to control machinery will be taken down at the completion of the works.

3.2.9 Seed collection and sourcing stock

When selected species and a plant stock supplier, the following guidelines are provided, consistent with (DEECA 2024):

1. Wherever possible, local provenance plants are to be supplied, preferably contract-grown specifically for the project from locally sourced seeds/propagules.
2. Source seeds and plants well in advance (up to a year).
3. Keep records of plant stock and supplies.
4. Any trees supplied should meet the Australian Standard (AS 2303:2018): Tree Stock for landscape use.

4. Land Management Treatments

Pacific Green are committed to implementing four (4) different Land Management Treatments (LMT) to meet the goals and objectives of the LMRP. These treatments include:

1. LMT01: Roadside treatment (Madeira Packet Road);
2. LMT02: Perimeter screening;
3. LMT03: Blue-winged Parrot enhancement planting (LMT03a & LMT0b); and
4. LMT04: Pest animal and grazing management.

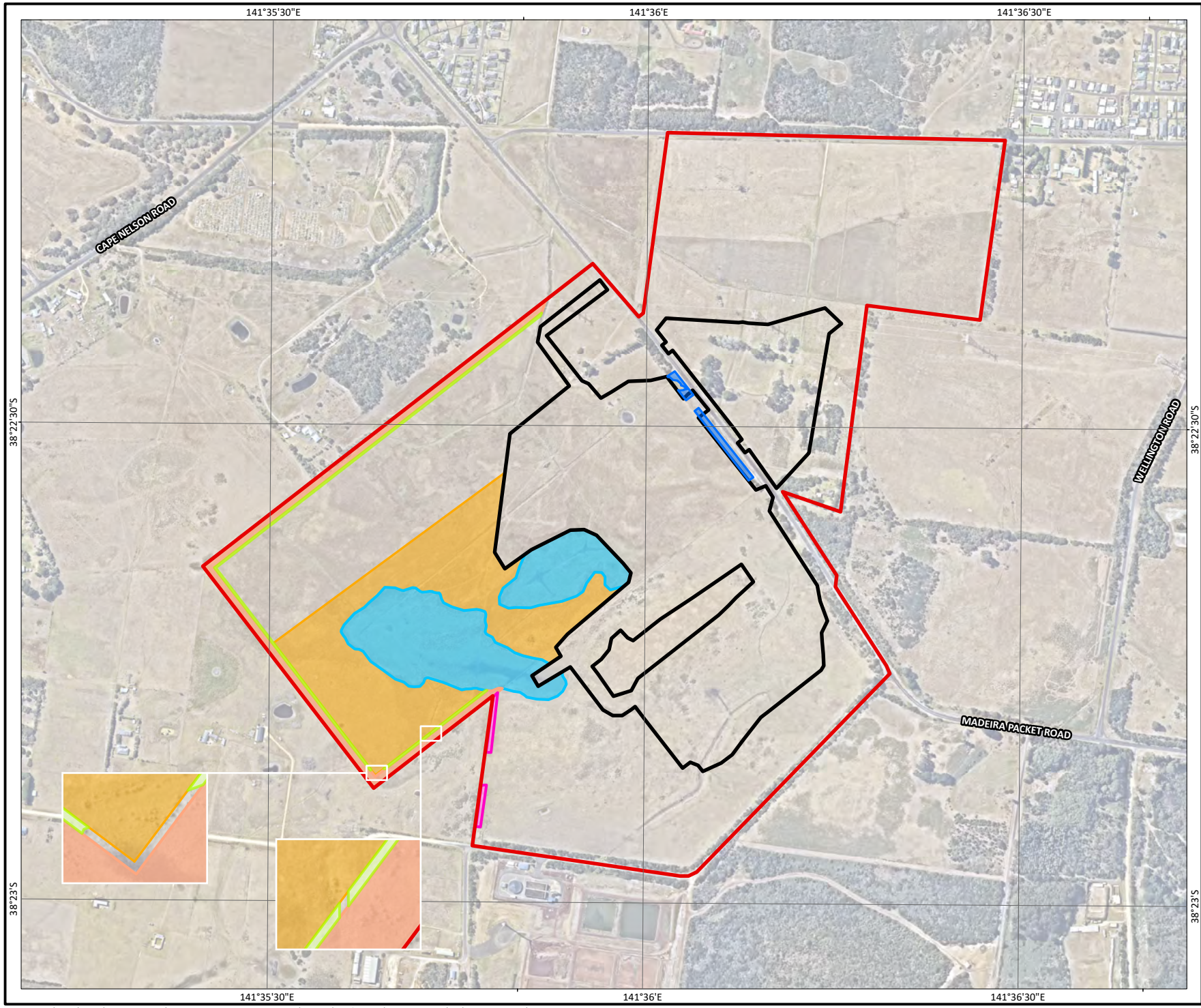
The areas proposed for the four treatments (LMT01-04) are presented in **Figure 3**. Further information on each of the treatments is provided in the subsequent sections.

4.1 Summary of treatment areas

To mitigate the loss of 10.83 hectares of Blue-winged Parrot foraging habitat and 0.35 hectares of Heathy Woodland, Pacific Green are proposing to manage 21.89 hectares of land within their Site. The treatments and associated areas are presented in **Table 4-1**.

Table 4-1: Summary of treatments and their areas (colours relate to the treatment colours on Figure 3).

Treatment	Area (ha)
LMT01: Roadside treatment	0.25
LMT02: Perimeter screening	2.62
LMT03a: Blue-winged Parrot terrestrial enhancement planting (existing & proposed)	0.50
LMT03b: Blue-winged Parrot wetland enhancement planting	7.33
LMT04: Pest animal and grazing management	11.19
Total:	**21.89**



Legend

- Project Area
- Project Development Area
- LMT01: Roadside Treatment
- LMT02: Perimeter Screening Area
- Existing Blue-winged Parrot Enhancement Planting
- LMT03a: Terrestrial Enhancement Planting
- LMT03b: Wetland Enhancement Planting
- LMT04: Pest Animal and Grazing Management

JBS&G

Job No: 66207	
Client: Pacific Green	
Version: Final	Date: 24-Jun-2025
Drawn By: AL	Checked By: LH
Scale: 1:10,000 at A4	

0 200 400
metres

Coord. Sys. GDA2020 MGA Zone 54

Portland Energy Park, Portland Victoria

EPBC No.: 2024/09947

FIGURE 3 - LAND MANAGEMENT TREATMENTS

File Name: C:\Users\aliddy\JBS&G Australia\JBS&G - DCS - Internal - Documents\Projects\Pacific Green\66207_Portland\GIS\02_MapProjects\66207_Portland_RMP_FigureUpdates.aprx; Name:66207_03_Screening 02
Reference: ESRI Topographic Basemap - Accessed Imagery: 24/06/2025 | Aerial Imagery Suplied by Nearmap (March, 2025)

LMT01: Roadside treatment (Madeira Packet Road)	
Relevant LMRP objective	**Objective 1:** To provide guidance on proposed perimeter screening that will improve visual amenity for local residents whilst providing for opportunities for biodiversity enhancement. **Objective 3:** Improve the connection between isolated vegetation patches to promote native wildlife movement including increasing foraging and roosting habitat for MNES, specifically the Blue-winged Parrot *Neophema chrysostom*, Southern Brown Bandicoot *Isoodon obesulus obesulus* and Swamp Antechinus *Antechinus minimus maritimus*.
Target MNES	• Blue-winged Parrot • Southern Brown Bandicoot • Swamp Antechinus
Timing	Spring 2025 – Autumn 2026
Treatment area	0.25 hectares

Madeira Packet Road was observed by nature Advisory to contain numerous patches of Heathy Woodland as presented in **Figure 3**. However, sections parallel to the proposed development were noted to contain only exotic grasses, with large breaks between the higher quality native vegetation as shown in **Plate 4-1**. This severs habitat connection between patches for species such as Southern Brown Bandicoot and Swamp Antechinus.

Plate 4-1: Current image of Maderia Packet Road (source: Peter Haack Consulting 2024b)

Given that this is a public road, Pacific Green have sought endorsement from the Department of Transport and Planning (DTP) to revegetate this area as described within. DTP provided written in-principal support for the proposal as presented in **Appendix B.**

Revegetation of this area will provide visual screening of the project from the road and reduce the project's visual impact. The Landscape Concept Plan undertaken for the project outlined the most effective way to reduce the project's visual prominence was to add screen planting around the perimeter where there is a lack in vegetation (Peter Haack Consulting 2024b).

This roadside screening presents a significant opportunity to improve the roadsides current vegetation condition, increasing indigenous vegetation and biodiversity condition in the landscape. The improvement of potential habitat for Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) listed species will partially mitigate the loss expected from the clearance of Heathy Woodland EVC.

Heathy Woodland was noted to provide roosting habitat for the Blue-winged Parrot (EPBC Act: vulnerable). In addition, ground-dwelling mammals, including the Southern Brown Bandicoot (EPBC Act: Endangered) and Swamp Antechinus (EPBC Act: Vulnerable) will benefit from the provision of greater continuous foraging and dispersal habitat. In particular, a dense medium and small shrub and ground flora layer that provides screening and protection from pest animal predations.

Revegetation of the roadside will occur in a 0.25 ha area to the south of Madeira Packet Road, as seen in **Figure 3**. This will link up with the existing patches of Heathy Woodland in the roadside, improving the vegetation and habitat connectivity.

The roadside planting is expected to be undertaken over a relatively short period (6 months including site preparation, planting and fencing) with a maintenance period up to a three (3) year period post planting. After this time, the maintenance of the vegetated roadside will fall to the DTP to manage. It is envisioned that revegetating this area with indigenous species will lead to reduced roadside maintenance costs as the proposed vegetation requires less maintenance than slashing exotic pasture grass.

Species selection

While the roadside screening will use species consistent with the Heathy Woodland EVC, it is not proposed to be revegetated to the EVC benchmark standard. Rather, the intent of the species selection is to use species consistent with the existing vegetation, commercially available plants in the region and locally indigenous species consistent with the EVC. However, both the species selected and the quantities (target density) has considered Appendix 1 '*Minimum standard for revegetation and supplementary planting*' (DELWP 2017b). Based on this, a species list appropriate for selection in the roadside rehabilitation is presented in **Table 4-2**.

Table 4-2: Species typical of Heathy Woodland EVC at the site

Species common name	Scientific name	Life form
Brown Stringybark	*Eucalyptus baxteri* s.l.	Canopy tree
Moonah	*Melaleuca lanceolata*	Canopy Tree
Jimmy's Shining Peppermint	*Eucalyptus willisii*	Canopy tree
Coastal Beard-Heath	*Leucopogon parviflorus*	Medium Shrub
Common Correa	*Correa reflexa*	Medium Shrub
Common Heath	*Epacris impressa*	Medium Shrub
Heath Tea-tree	*Leptospermum myrsinoides*	Medium Shrub
Silver Banksia	*Banksia marginata*	Medium Shrub
Seaberry Saltbush	*Chenopodium candolleanum*	Medium Shrub
Bundled Guinea-flower	*Hibbertia fasciculata* var. *prostrata*	Small Shrub

Species common name	Scientific name	Life form
Flame Heath	*Astroloma conostephioides*	Small Shrub
Horny Cone-bush	*Isopogon ceratophyllus*	Small Shrub
Pink-bells	*Tetratheca ciliata*	Small Shrub
Cranberry Heath	*Astroloma humifusum*	Prostrate Shrub
Dwarf Wedge-pea	*Gompholobium ecostatum*	Prostrate Shrub
Golden Heath	*Styphelia adscendens*	Prostrate Shrub
Honey-pots	*Acrotriche serrulata*	Prostrate Shrub
Bent Goodenia	*Goodenia geniculata*	Medium Herb
Common Raspwort	*Gonocarpus tetragynus*	Medium Herb
Woolly Everlasting	*Argentipallium blandowskianum*	Medium Herb
Running Postman	*Kennedia prostrata*	Small or Prostrate Herb
Austral Bracken	*Pteridium esculentum*	Ground Fern
Bower Spinach	*Tetragonia implexicoma*	Scrambler or Climber

Planting densities and abundance

This section provides general guidance on target planting densities to establish target survival numbers relevant to the EVC after 10 years as outlined in *Revegetation Planting Standards – Guidelines for establishing native vegetation for net gain accounting* (DSE 2006) and the *Native Vegetation Gain Scoring Manual* (v2) (DELWP 2017b). Densities are based on the benchmark requirements of the Heathy Woodland EVC (DSE 2004) (further outlined in **Section 2.2**). In addition to the proposed densities, for ease, we have converted the densities to actual numbers of plants based on the revegetation area (0.25 ha) and a 3-year program of works allowing for individual death and attrition.

Table 4-3: Recommended planting densities for life forms in Heathy Woodland for the roadside screening

Life form	Density (at year 1)	Approximate numbers for the revegetation area based on a 3-year program
Canopy trees	50 plants/ha	10 – 12
Understorey tree or large shrub	Not proposing to plant understorey trees or large shrubs given the high cover of canopy trees and medium/small shrubs proposed	-
Medium shrubs	1,400 plants/ha	115
Small shrubs (or prostrate shrub)	2,000 plants/ha	165
Graminoids (including large tufted, large non-tufted, medium to small tufted, and medium to tiny non-tufted)	Not proposing to plant graminoids given the high cover of shrubs proposed	-
All herbs, scramblers or climbers, and bryophytes/lichens	At the discretion of the planting contractor targeting 1% cover	1% cover

For the densities that are 'at the discretion of the planting contractor targeting 1% cover', there are no requirements listed in the EVC benchmarks or the Revegetation Planting Standards for these life forms (DSE 2006). As there are no specified planting densities, it is up to the contractor to determine the proposed density for these lifeforms is consistent with the EVC. A target of 1% cover is recommended.

The Landscape Concept Plan outlined that the area of the roadside to be revegetated should utilise the screening typology 2: trees and shrubs (Peter Haack Consulting 2024b). This typology is comprised of:

- Small Trees – centrally located along the 5 m to 8 m wide buffer in random small groups. Can be located as close as 3 m apart.
- Large Shrubs – roughly located in a meandering line centrally along the 5 m to 8 m buffer at 2 m centres.
- Medium Shrubs – roughly located in a meandering line on either side of the large shrubs at 1.2 m centres.

Site preparation and planting

Measures to be undertaken when preparing and planting the roadside screening area should, as a minimum, include the following:

- Ensure there is a random placement of different species within the designated planting area to create a more natural establishment.
- Prior to soil cultivation, spray the entire extent to be mulched and planted with a systemic herbicide such as Glyphosate. Ensure the application follows the protocols identified in (DEECA 2024). Weed ground cover must be treated at least twice before planting.
- Prior to cultivation, remove any dead exotic rhizomous material, such as Kikuyu or other material with seed heads.
- Excavate a hole at least twice the size of the pot of the plant to be planted. Roughen the sides of the hole.
- Backfill the hole with site topsoil mixed with slow-release fertiliser mixed at the manufacturers recommended rate to prevent fertiliser directly touching tree roots.
- Use a tree proof guard, such as the 'Sure Grow Tree Max' Sleeve Tree Guard. Fix it in place using a 3 x 600 mm bamboo stakes[1].
- Add a mulch layer 75 mm deep around the plants, ensuring there is not direct contact with plant and fertiliser (Source Peter Haack Consulting 2024).
- Where fencing is deemed necessary, it should be placed around the revegetated area, at least 1200 mm high, and lined with a rabbit control function. This may be a standard rabbit netting at least 900 mm above ground and buried 150 mm in the ground (Hay 1999)and (DELWP 2017b).

Standards of establishment planting and site handover

When the following criteria are met, the plant establishment period will be deemed complete for the roadside:

- Plant species are located at the specified densities and configurations.
- The vegetation has not restricted essential sight lines at vehicle entry points and signage.
- The trunks of non-frangible species are located at distances as specified by the DTP for the designed speed of the roadway.

[1] Unless rabbit-proof fencing is erected.

- Vegetation is established with healthy root systems that prevent the plant from being lifted out of its planting hole.
- The ground around the planted species is covered with mulch to the required depth.
- There is minimal evidence of pests, disease, or nutrient deficiencies or toxicities.
- Listed noxious weeds are eradicated in the site in line with the CaLP Act requirements.
- An overall groundcover of weeds is <10%.
- All non-conformance reports and defects notifications have been closed out.

Once the roadside plant establishment period has been deemed complete, the maintenance of the roadside will then fall to the DTP.

LMT02: Perimeter screening	
Relevant LMRP objective	**Objective 1:** To provide guidance on proposed perimeter screening that will improve visual amenity for local residents whilst providing for opportunities for biodiversity enhancement. **Objective 3:** Improve the connection between isolated vegetation patches to promote native wildlife movement including increasing foraging and roosting habitat for MNES, specifically the Blue-winged Parrot *Neophema chrysostom*, Southern Brown Bandicoot *Isoodon obesulus obesulus* and Swamp Antechinus *Antechinus minimus maritimus*.
Target MNES	• Blue-winged Parrot • Southern Brown Bandicoot • Swamp Antechinus • Southern Bent-wing Bat
Timing	Early works in Autumn 2025. Follow-up works within Spring 2025
Treatment area	2.62 hectares

The Landscape Concept Plan undertaken for the project outlined that the most effective way to reduce the project's visual prominence was to add screen planting around the perimeter where there is a lack of vegetation (Peter Haack Consulting 2024b). As the project has exposed boundaries to residential uses to the west, revegetating this boundary will ameliorate the visual impact that residents experience (Peter Haack Consulting 2024a).

Perimeter screening will be an 8 m wide and 1,600 m long planting strip on the three southwestern boundaries as seen in **Figure 3**. This area will total approximately 2.62ha.

In addition to visual screening, the perimeter screening provides a significant opportunity for habitat provision and general ecological improvement. Given the species selected (refer **Table 4-4**), once established, the perimeter screening will provide roosting habitat for the blue-winged parrot and micro-bats and provide an additional wildlife corridor for ground-dwelling mammals such as Southern Brown Bandicoot and Swamp Antechinus and foraging and roosting habitat for other common bird species.

Species selection

The perimeter screening will use locally indigenous species as recommended in the Landscape Concept Plan (Peter Haack Consulting 2024b). Peter Haack Consulting drew the plant species from the following Bioregions and EVCs:

- Bridgewater & Glenelg Plain Bioregion:
  - EVC 3: Damp Sands Herb-rich Woodland
  - EVC 53: Swamp Scrub
  - EVC 160: Coastal Dune Scrub
  - EVC 161: Coastal Headland Scrub.
- Glenelg Plain Bioregion only:
  - EVC 6: Sand Heathland
  - EVC 8: Wet Heathland.

The species list appropriate for selection in perimeter screening is presented in **Table 4-4**. However, note that due to the increase in width of the screening (from 5m to 8m) there is the opportunity to plant some larger canopy species (Eucalypts) that will provide additional habitat and in time potentially hollows.

Table 4-4: Species guide for the perimeter screening (source: Peter Haack Consulting 2024)

Species common name	Scientific name	Installation size	Size at maturity (height x width)	Spacing (metre centres)
Canopy trees*				
Brown Stringybark	*Eucalyptus baxteri s.l.*	Tubestock	20 x 10	50 plants/ha
Jimmy's Shining Peppermint	*Eucalyptus willisii*	Tubestock	10 x10	
Small trees				
Blackwood	*Acacia melanoxylon*	Tubestock	10 x 6	Refer to Table 4-5
Black Wattle	*Acacia mearnsii*	Tubestock	8 x 8	Refer to Table 4-5
Shrubs				
Sea Box	*Alyxia buxifolia*	Tubestock	2.5 x 2.5	1 per 2m
Silver Banksia	*Banksia marginata*	Tubestock	3 x 3	1 per 2m
Prickly Tea-tree	*Leptospermum continentale*	Tubestock	2 x 2	1 per 2m
Woolly Tea-tree	*Leptospermum lanigerum*	Tubestock	3 x 3	1 per 2m
Heath Tea-tree	*Leptospermum myrsinoides*	Tubestock	2.5 x 2.5	1 per 2m
Coast Beard-heath	*Leucopogon parviflorus*	Tubestock	3 x 3	1 per 2m
Scented Paperbark	*Melaleuca squarrosa*	Tubestock	4 x 4	1 per 2m
Tree Everlasting	*Ozothamnus ferrugineus*	Tubestock	2.5 x 2.5	1 per 2m

**Canopy species added to provide additional roosting habitat for birds and bats*

Planting densities and abundance

This section provides guidance on target planting densities and distribution to establish target screening based on the recommendations in the Landscape Concept Plan (Peter Haack Consulting 2024b). The Landscape Concept Plan outlined that the perimeter screening should utilise the screening typology 2: trees and shrubs (Peter Haack Consulting 2024b).

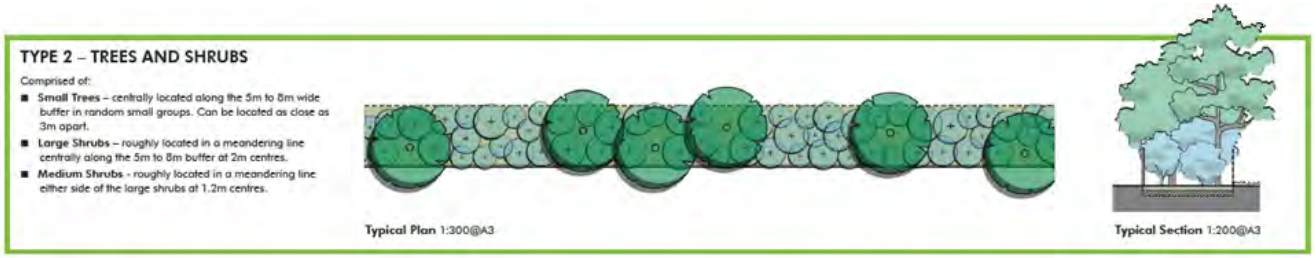


Plate 4-2: Perimeter screening typology (Type 2) (source: Peter Haack Consulting 2024)

As presented in **Plate 4-2**, this typology is comprised of:

- Small Trees – centrally located along the 8 m wide buffer in random small groups. Can be located as close as 3 m apart.

- Large Shrubs – roughly located in a meandering line centrally along the 5 m to 8 m buffer at 2 m centres. Given the additional 3m in width provided by the 8m strip, two meandering rows of large shrubs are to be included in this area.
- Medium Shrubs – roughly located in a meandering line either side of the large shrubs at 1.2 m centres.

Note, in the case of LMT02, to add further structural diversity, larger canopy species have been added to the planting mix.

In addition to the proposed densities, for ease, we have converted the densities to approximate numbers of plants based on the revegetation area (2.62 ha) and a 3-year program of works allowing for individual death and attrition (refer to **Table 4-5**).

Table 4-5: Recommended planting densities and distribution for the perimeter screening

Life form	Density	Approximate numbers of plants based on a 3-year program*
Canopy trees	Randomly placed along the inside boarder (away from the boundary)	100-120
Small trees	Centrally located along the buffer in random small groups, 3 m to 5m between centres.	240
Large shrubs	Two meandering lines, all 2 m between centres.	1,600
Medium shrubs	Meandering lines either side of the large shrubs at 1.2 m centres.	2,660

**All individual plants, planted in year 1 with assumed losses of 20% per year. Plants maintained in year 2 and 3.*

Site preparation and planting

Measures to be undertaken when preparing and planting the perimeter screening area should, as a minimum, include the following:

- Ensure there is a random placement of different species within the designated planting area to create a more natural establishment.
- At least 2weeks prior to soil cultivation, spray the entire extent to be mulched and planted with a systemic herbicide such as Glyphosate.
- Prior to cultivation, remove any dead rhizomous material, such as Kikuyu or other material with seed heads.
- Rip the subsoil to a depth of 450 mm with rip lines situated 0.5 m apart. Ripping should cover at minimum 25 m^3 per tree prior to planting.
- Excavate a hole at least twice the size of the pot of the plant to be planted. Roughen the sides of the hole.
- Backfill the hole with site topsoil mixed with slow-release fertiliser to prevent fertiliser directly touching tree roots.
- Add a mulch layer 75 mm deep around the plants, ensuring there is no direct contact with plant and fertiliser (Source Peter Haack Consulting 2024).

Standards of establishment planting

When the following criteria are met, the plant establishment period will be deemed complete for the perimeter screening:

- Plant species are located at the specified densities and configurations.
- Vegetation is established with healthy root systems that prevent the plant from being lifted out of its planting hole.
- The ground around the planted species is covered with mulch to the required depth.
- There is minimal evidence of pests, disease, or nutrient deficiencies or toxicities.
- Listed noxious weeds are eradicated in the site in line with the CaLP Act requirements.
- All non-conformance reports and defects notifications have been closed out.

LMT03: Blue-winged Parrot enhancement planting	
Relevant LMRP objective	**Objective 2:** Articulate areas proposed for terrestrial and aquatic enhancement and revegetation to improve biodiversity and stormwater outcomes for flora and fauna including Commonwealth listed species. **Objective 3:** Improve the connection between isolated vegetation patches to promote native wildlife movement including increasing foraging and roosting habitat for MNES, specifically the Blue-winged Parrot *Neophema chrysostom*, Southern Brown Bandicoot *Isoodon obesulus obesulus* and Swamp Antechinus *Antechinus minimus maritimus*. **Objective 4:** Provide guidance on appropriate species selection for the different land management treatments, which will ultimately increase the abundance of indigenous flora species. **Objective 5:** Improve land management practices within parts of the site through the reduction in grazing pressure and impacts associated with pest animals and weeds that will improve the ecological condition and habitat within treated areas.
Target MNES	• Blue-winged Parrot • Southern Brown Bandicoot • Swamp Antechinus • Southern Bent-wing Bat
Timing	• Stage 1 initiated December 2023 (terrestrial planting) • Remaining program implemented in 2025-26 • Terrestrial planting proposed for Autumn- Spring (March-October) • Aquatic planting to avoid planting between April- September
Treatment area	7.83 hectares

The approach to improving the quality and area of habitat for the Blue-winged Parrot is two-fold:

- The provision of additional terrestrial foraging habitat, and
- The provision of additional wetland (semi-aquatic) foraging habitat.

Further information on these components is provided within.

Terrestrial enhancement planting (LMT03a)

Pacific Green began the revegetating of a terrestrial trial plot of 0.18 ha area along the project boundary opposite Schultz Ave in 2023. It is proposed that an additional 2 m wide area running adjacent to the inside of the LMT02: Perimeter Screening area is to be revegetated, totalling 0.50 ha. Both areas can be seen in **Figure 3**.

The revegetation of these areas aims increase the area of high-quality foraging habitat available for Blue-winged Parrots. As discussed in **Section 2.2**, the existing foraging habitat available for this species in the project area is of poor quality and does not meet the definition of native vegetation. The proposed enhancement planting aims to mitigate the loss of poor quality foraging habitat through the provision of high-quality foraging habitat.

Species selection

The enhancement planting undertaken in 2023 used locally indigenous species chosen for their ability to provide foraging habitat for the Blue-winged Parrot. It is recommended that the proposed additional area of enhancement planting utilise these same species. The species list is presented in **Table 4-6**.

Table 4-6: Species guide for the Blue-winged Parrot enhancement planting

Species common name	Scientific name	Life form
Drooping Sheoak	*Allocasuarina verticillata*	Understory tree
Prickly Tea-tree	*Leptospermum continentale*	Medium Shrub
Silver Banksia	*Banksia marginata*	Medium Shrub
Bristly Wallaby-grass	*Rytidosperma setaceum*	Large Tufted Graminoid
Pale Rush	*Juncus pallidus*	Large Tufted Graminoid
Silvertop Wallaby-grass	*Joycea Pallida*	Large Tufted Graminoid
Coast Tussock-grass	*Poa poiformis var. poiformis*	Medium to Small Tufted Graminoid
Common Tussock-grass	*Poa labillardierei*	Medium to Small Tufted Graminoid

Planting densities and abundance

This section provides guidance on target planting densities and distribution to establish target enhancement planting. For ease, we have converted the densities to actual numbers of plants based on the revegetation areas, and a 3-year program of works allowing for individual death and attrition.

The exact numbers of each species that was used to revegetate the existing enhancement planting area in 2023 is reflected in **Table 4-7**.

Table 4-7: Planting densities used in 2023 for the Blue-winged Parrot terrestrial enhancement planting

Species common name	Numbers chosen for the existing enhancement planting area (0.17 ha)
Drooping Sheoak	100
Prickly Tea-tree	500
Silver Banksia	80
Bristly Wallaby-grass	100
Pale Rush	300
Silvertop Wallaby-grass	100
Coast Tussock-grass	150
Common Tussock-grass	100

Considering the current state of the existing area and noting weed encroachment, increased stocking rates are proposed to provide greater canopy closure and competition with weeds for nutrients and light. Reflective of this, a recommendation has been provided for the proposed enhancement planting area. The proposed planting densities are presented in **Table 4-8**.

Table 4-8: Proposed planting densities for the proposed Blue-winged Parrot terrestrial enhancement planting

Life form	Approximate numbers for the proposed enhancement planting area (0.50 ha) based on a 3-year program
Graminoids (including large tufted, large non-tufted, medium to small tufted, and medium to tiny non-tufted)	10,000-12,000

Site preparation and planting

For the trial plot planting that occurred in 2023, jute matting was initially placed down to kill off weeds (**Plate 4-3**). Planting was then undertaken (**Plate 4-4**) and the area was fenced off to keep out stock and rabbits (**Plate 4-5** and **Plate 4-6**).

It is recommended that the similar methods listed above be undertaken for the proposed enhancement planting area, however, it is ultimately up to the landscape contractor. In addition, the following measures are recommended:

- Rip the subsoil to a depth of 450 mm with rip lines situated 0.5 m apart. Ripping should cover at minimum 25 m^3 per tree prior to planting.
- Excavate a hole at least twice the size of the pot of the plant to be planted. Roughen the sides of the hole.
- Backfill the hole with site topsoil mixed with slow-release fertiliser to prevent fertiliser directly touching tree roots.
- Use a tree proof guard, such as the 'Sure Grow Tree Max' Sleeve Tree Guard. Fix it in place using a 3 x 600 mm bamboo stakes.
- Add a mulch layer 75 mm deep around the plants, ensuring there is not direct contact with plant and fertiliser (Source Peter Haack Consulting 2024).

Plate 4-3: Jute matting (pre-planting)

Plate 4-4: Planting through the jute matting

Plate 4-5: Rabbit-proof mesh applied to fencing

Plate 4-6: Enhancement planting, May 2024

Standards of establishing planting

When the following criteria are met, the plant establishment period will be deemed complete for the enhancement planting:

- Plant species are located at the specified densities and configurations.

- Vegetation is established with healthy root systems that prevent the plant from being lifted out of its planting hole.
- The ground around the planted species is covered with mulch to the required depth.
- There is minimal evidence of pests, disease, or nutrient deficiencies or toxicities.
- Listed noxious weeds are eradicated in the site in line with the CaLP Act requirements.
- An overall groundcover of weeds is <25%.
- All non-conformance reports and defect notifications have been closed out.

Wetland enhancement planting (LMT03b)

Areas of Aquatic Herbland (EVC 653) are present throughout the project area, however, they are in poor condition. The rehabilitation of these areas would increase the biodiversity of indigenous species, creating habitat available for MNES species, particularly birds and bats. As the Blue-winged Parrot was recorded foraging on native rushes fringing the wetlands, revegetating these areas will significantly increase the foraging habitat available for this species. In addition, as the wetlands are ephemeral, improving their condition will improve the stormwater management of the project area.

The wetland revegetation will focus on two patches of Aquatic Herbland (EVC 653) in the southern portion of the project area, totalling 7.34 ha. The terrestrial area adjacent to wetlands provides important habitat for species (DELWP 2017a). As such, it is recommended that revegetation with native grassland species is undertaken in the fringe surrounding the EVC areas.

Species selection

Based on this EVC, a species list appropriate for selection in the wetland rehabilitation is presented in **Table 4-9**.

Table 4-9: Species typical of Aquatic Herbland at the site

Species common name	Scientific name	Life form
Amphibious Water-milfoil	*Myriophyllum simulans*	Medium Herb
Floating Pondweed	*Potamogeton tricarinatus* s.l.	Medium Herb
Water-milfoil	*Myriophyllum* spp.	Medium Herb
Yellow Bladderwort	*Utricularia australis*	Medium Herb
Common Rush	*Juncus usitatus*	Large Tufted Graminoid
Pale Rush	*Juncus pallidus*	Large Tufted Graminoid
Jointed Twig-sedge	*Baumea articulata*	Large Tufted Graminoid
River Club-Rush	*Schoenoplectus tabernaemontani*	Large Tufted Graminoid
Common Blown-grass	*Lachnagrostis filiformis*	Medium to Small Tufted Graminoid
Floating Club-sedge	*Isolepis fluitans*	Medium to Small Tufted Graminoid
Loose-flower Rush	*Juncus pauciflorus*	Medium to Small Tufted Graminoid
Tall Spike-sedge	*Eleocharis sphacelata*	Medium to Small Tufted Graminoid
Water Ribbons	*Triglochin procerum* s.l.	Medium to Small Tufted Graminoid
Wetland Blown-grass	*Lachnagrostis filiformis* (perennial variety)	Medium to Small Tufted Graminoid
Wavy Swamp Wallaby-grass	*Amphibromus sinuatus*	Medium to Tiny Non-tufted Graminoid

Planting densities and abundance

This section provides general guidance on target planting densities to establish target survival numbers based on the Constructed Wetlands Design Manual (Melbourne Water 2020). The central two-thirds of the wetlands will be planted to the recommended shallow marsh densities, with the outer third planted with an increasing density to the recommendations of ephemeral batters (Melbourne Water 2020). An assumption of the existing cover of native vegetation in the wetlands has been determined based on the habitat hectare assessment results (Nature Advisory 2024a). As the understory vegetation comprises≥50-90% of Life Forms present, with ≥50% of those substantially modified, it is assumed that the wetland areas to be revegetated currently contain a 60% cover of native vegetation. As such, the area to be revegetated is defined as 2.94 ha.

In addition to the proposed densities, for ease, we have converted the densities to actual numbers of plants based on the revegetation area (2.94 ha) and a 3-year program of works allowing for individual death and attrition. The proposed numbers are to be confirmed through consulting the nursery contractor and reviewing the existing conditions. It is also noted that the wetlands are ephemeral in nature.

Table 4-10: Recommended planting densities for different zones of the wetlands

Life form	Density	Approximate numbers for the revegetation area based on a 3-year program
Shallow marsh zone	2 plants/m^2	39,100
Ephemeral batters	6 plants/m^2	58,700

The Landscape Concept Plan does not outline a screening typology to be used for wetland revegetation (Peter Haack Consulting 2024b). The arrangement of plants will be at the discretion of the planting contractor. It is recommended that the wetland batters be planted with a fringe of terrestrial vegetation, followed by species that thrive in the ephemeral zone, with aquatic plants closest to the waterline in the macrophyte zone (Melbourne Water 2020). This macrophyte zone should be densely planted with species arranged according to the likely depth of water, ranging from shallow to completely submerged (Melbourne Water 2020). In the terrestrial fringe, it is recommended that the arrangement follows typical low-form herbland/grassland communities. A patchy arrangement of denser plantings of tussock-forming species is encouraged to maintain potential terrestrial shelter sites for fauna species (DELWP 2017a).

Site preparation and planting

Measures to be undertaken when preparing and planting the wetland areas:

- Undertake wetland planting during the spring-summer months (September to March) to ensure a higher success rate of plant survival and establishment (Melbourne Water 2020).
- Prior to planting, ensure the macrophyte planting stock are healthy and well developed, including their root system (Melbourne Water 2020).
- Ensure there is a random placement of different species within the designated planting area to create a more natural establishment.
- Mulch must not be used within 50 m of a wetland (DELWP 2017a). If required, jute matting could be used to suppress weeds.
- Place a fence around the wetland areas to be revegetated to prevent entry from stock and rabbits. As the wetlands are adjacent to each other, it is recommended that they be fenced off together, with any terrestrial revegetation fringe included in the fenced-off area. The fence should be at least 1200 mm high and lined with a rabbit control function. This may be a standard rabbit netting at least 900 mm above ground and buried 150 mm in the ground (Hay 1999).
- Some macrophytes species (such as Water Ribbons) can be netted to avoid damage by birds during establishment (Melbourne Water 2020).

Standards of establishment planting

When the following criteria are met, the plant establishment period will be deemed complete for the wetlands:

- Plant species are located at the specified densities and configurations.
- Vegetation is established with healthy root systems that prevent the plant from being lifted out of its planting hole.
- A rabbit and stock-proof fence has been erected around the wetland areas to be revegetated.
- There is minimal evidence of pests, disease, or nutrient deficiencies or toxicities.
- Listed noxious weeds are eradicated in the site in line with the CaLP Act requirements.
- An overall groundcover of weeds is <25% and CaLP or WONS species <5%.
- All non-conformance reports and defect notifications have been closed out.

LMT04: Pest and grazing management	
Relevant LMRP objective	**Objective 5**. Improve land management practices within parts of the site through the reduction in grazing pressure and impacts associated with pest animals.
Target MNES	• Blue-winged Parrot • Southern Brown Bandicoot • Swamp Antechinus • Southern Bent-wing Bat
Timing	2026
Treatment area	11.19 hectares

Given the proposed loss of 10.83 hectares of poor-quality Blue-winged Parrot foraging habitat associated with the project, Pacific Green is proposing to improve a commensurate area of existing pasture for the benefit of the species. Quality improvements will be achieved through the measures outlined below.

Destocking

A level of destocking will be undertaken to improve the overall quality of the treatment area. The reduction in livestock numbers in the treatment area will lead to land and soil improvements through the reduction in soil pugging. This will improve the water quality of the wetlands and likely lead to a reduction in weed incursion and establishment (which thrive in disturbed landscapes).

Destocking implementation will be achieved by:

1. Reducing the number of cattle within the treatment area to minimal numbers, and /or
2. Excluding stock at certain times of the year, particularly during wetter periods, and/or
3. Changing the stock from cattle to sheep[2], and/or
4. Pulse grazing for certain periods to minimise impacts on susceptible native plants.

Weed Management

Weed management procedures will be implemented within the treatment area to reduce the cover and abundance of weeds. The program is proposed to focus on WoNS and CaLP-listed species as presented in **Table 2-1**. Other weeds presented in **Table 2-1** are proposed to be 'managed' by the land management contractor. Minimum weed targets are high-threat weeds (CaLP listed and/or WONS) must be reduced to <5% cover as soon as practicable.

Appendix A provides a general description of the identified weeds, outlines how they are controlled, and preferred timing of control for maximum management success.

Pest Animal Management

Landowners have an obligation under the CaLP Act to control established pests on their land. Pest animals have the potential to degrade an area by altering the prevailing ecological processes, impacting vegetation through grazing pressure, and predating on native fauna species.

Within the treatment area, rabbits are considered the most significant pest animal risk to ecological processes and indigenous flora diversity and cover. Given this, rabbits are proposed to be controlled within the treatment area with the intent of eradication.

[2] Which are recognised to reduce the level of impact compared with cattle

5. Fencing prescriptions for revegetated areas

Development activities have the potential to impact vegetation in several ways, affecting the health, condition, and lifespan of vegetation and the amenity it provides to the surrounding environment. In addition to construction activities and access by humans, stock and pests such as rabbits pose a threat to native vegetation within the project area. As such, all revegetated areas (LMT01-04) are proposed to be fenced. The following section provides commentary on the minimum fencing standards to be met. However, it should be noted that ultimately the fencing contractor may vary the fencing approach to meet local conditions or to provide a cost-effective solution. For example, in the Portland environment, concrete footings may be deemed inappropriate in favour of a more traditional farming approach to strainer post installation.

5.1 Minimum fencing specifications:

- 5-6 inch thick, 1.8 m tall pine posts. Placed every 10 m, 600 mm in the ground, for a fence height of 1.2 m.
- Two black iron posts placed in between the pine posts.
- Where required, the fence will be lined with a rabbit control function. This may be a standard rabbit netting at least 900 mm above ground and buried 150 mm in the ground (Hay 1999).
- 1 strand of electric wiring and a single wooden railing in some locations to prevent cows from jumping the fence.
- Gates for access into the area at a suitable location.
- Fencing should be erected before the commencement of revegetation.

A diagram of an example fence recommended by the Landscape Concept Plan (Peter Haack Consulting 2024b) is presented in **Plate 5-1**.

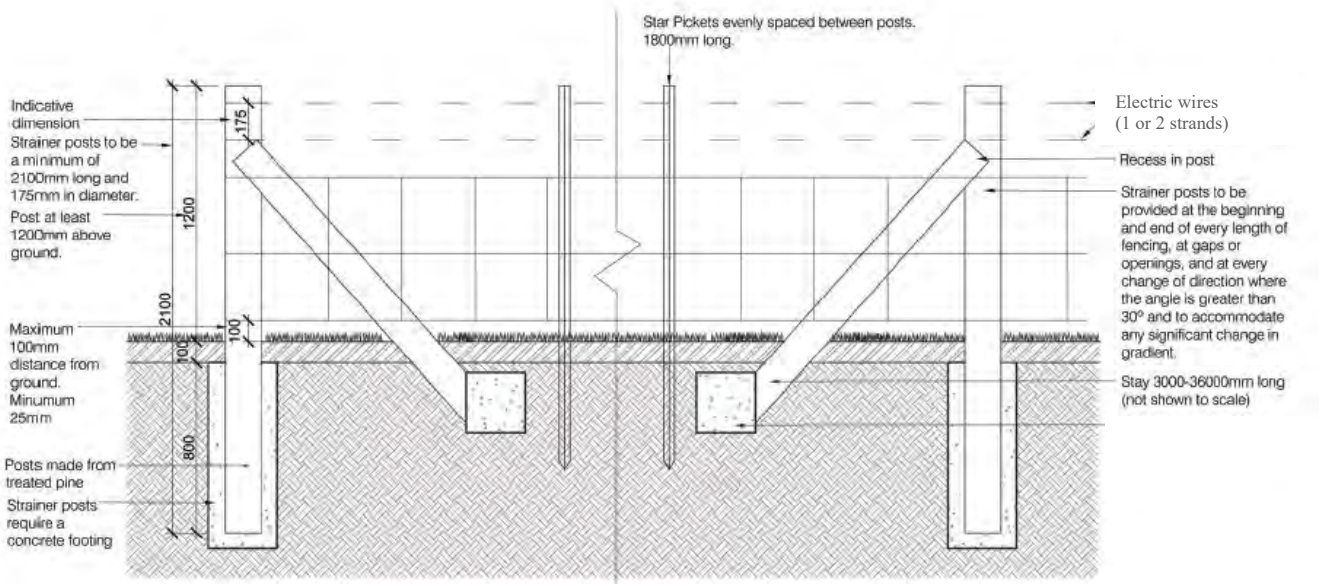


Plate 5-1: Diagram of a recommended fencing (modified from: Peter Haack Consulting 2024)

Plate 5-1 does not include rabbit-proof netting, which will be required for some of the treatments. **Plate 5-2** provides an example of a fence to keep out rabbits and stock (Hay 1999). **Plate 4-5** and **Plate 4-6** provide examples of what this looks like *in situ*.

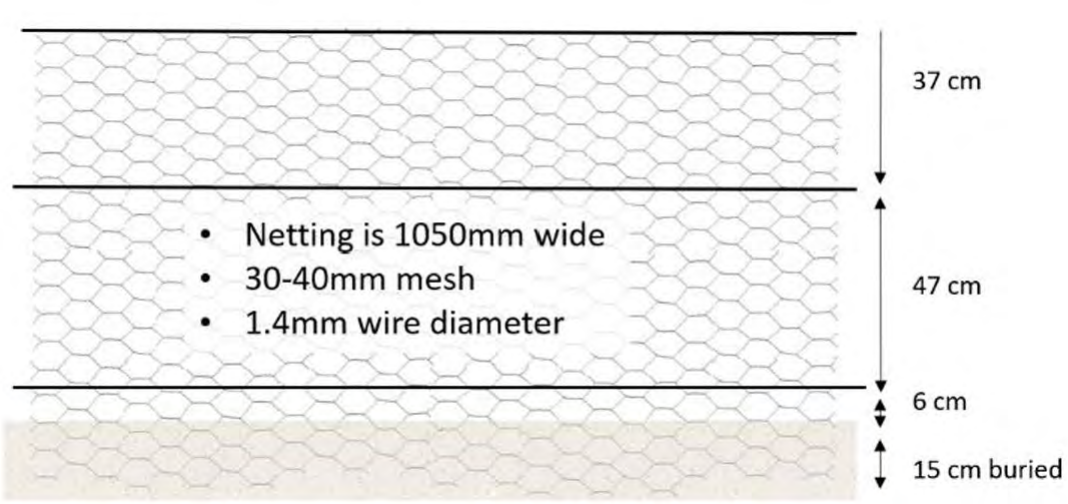


Plate 5-2: Diagram of a fence to provide rabbit and stock control (source: (DEECA 2024))

5.2 Removal of fencing

Whilst stock exclusion around landscape treatments for a minimum ten (10) years, rabbit-proof fencing can be removed within a shorter timeframe once plants are established. The removal of rabbit-proof fencing will be beneficial for a range of ground-dwelling fauna as it will allow for unrestricted dispersal and utilisation of the improved habitat. In particular, the Southern Brown Bandicoot and Swamp Antechinus will be able to access significant additional habitat resources that are currently not provided within the local environment.

It is proposed that rabbit-proof fencing is removed between years 3-5, with a preference for year three. However, in the event that plant growth is not at sufficient levels or rabbit numbers are in very high densities, there is the potential to delay removal for up to 2 years.

6. Maintenance and monitoring activities

6.1 Management and maintenance periods

Variable management and maintenance periods are proposed as described below:

- LMT01 (roadside treatment) will be actively managed for a three-year (3) period post planting. The intent of this is to ensure weeds are controlled (thus reducing competition) and that plants are established. At the end of the 3-year period, the ongoing maintenance will be handed back to DPT for incorporation into their regular roadside maintenance program. All fencing around LMT01 will be removed.
- Treatments LMT02-03a&b are proposed to be actively managed for a three-year (3) period post planting. The intent of this is to ensure weeds are controlled (thus reducing competition) and that plants are established. After this period, fast-growing ground covers and shrubs will be established and will generally out-compete weeds. As such, it is likely that the management requirements will decrease and 'maintenance' will occur. Maintenance requirements between years 4-10 within LMT02-03a&b.
- At the end of year 3, all fencing should be checked and repaired where necessary for LMT02-04. In addition, as discussed in **Section 5.2** it is proposed that all rabbit fencing be removed from these treatments.
- Within LMT04, cattle are proposed to be actively managed for the full ten-year (10) period as this area overlaps with the wetland enhancement planting (LMT03) that is more susceptible to the impacts from grazing, pugging and weeds.

6.2 Performance indicators

The following key performance indicators (PI) are proposed to be met at the end of the third (3) year and maintained for years 4-10[3]:

PI1. Eradicate and control listed noxious weeds in line with the CaLP Act requirements within LMT01-04.

PI2. Control herbaceous and grassy weed species within LMT01, LMT02 and LMT03a to reduce cover to a <25%. Any high-threat weeds (CaLP listed and/or WONS – refer to **Table 2-1**) must be reduced to <5% cover as soon as practicable.

PI3. Within LMT04, high-threat weeds (CaLP listed and/or WONS) must be reduced to <5% cover as soon as practicable.

PI4. Ensure target densities and configurations of indigenous plants are achieved to within 10% of the target density/cover. Where this is not achieved, supplementary planting is required to achieve the required density.

PI5. Within three (3) years of operation of the Portland Energy Park, Blue-winged Parrots are to be shown to be accessing and utilising the resources within the project area for foraging purposes[4].

[3] Note for LMT01: Roadside treatment the treatment period is three (3) years.

[4] Unless extenuating circumstances occur such as long-extended drought, fire or wildfire or other conditions that render the project area temporarily unsuitable habitat for Blue-winged Parrot

6.3 Monitoring and reporting

It is proposed that an annual monitoring report be completed and submitted to the Department of Climate Change, Energy and the Environment (DCCEEW) on an annual basis for 10 years. The report essentially serves as an environmental audit of activities implemented and outcomes under this LMRP. The monitoring report will be shared with DTP for the first three years of the program prior to handing over the management of the roadside planting (LMT01) at the completion of the three-year maintenance period.

The report will meet the following minimum requirements:

1. Generally be consistent with DELWP Output Data Standard: Core Standard for Natural Resource Management Reporting (DELWP 2021)
2. Include a Project ID
3. Describe the on-ground activities completed within each Land Management Treatment Type across the annual program (financial year)
4. Present figures and maps that describe the treatment areas
5. Name the on-ground contractors and nurseries involved in the planting and maintenance activities
6. Provides details on the numbers (+/- 5%) of plants supplied for each treatment area and any supplementary planting undertaken
7. Describes and quantifies the pest plant and pest animal treatments using measures such as:
    a. number of baits laid;
    b. Any trapping and trap success;
    c. herbicide treatment area (m^2), or
    d. volume of herbicide used per annum, or
    e. days of treatment per annum.
8. Quantification and measures of success against performance indicators PI01-04 for each treatment area. For each performance target, provide an indication of planned management outcome direction (increase, maintain, reduce) in line with (DELWP 2021).
9. Description of the physical treatment area and activities, including:
    a. Sign of erosion;
    b. Sign of pugging;
    c. Sign of stock entry (where excluded); and
    d. Fence condition, maintenance activities implemented and (where appropriate) removal or changes to fencing.
10. Within 12 months of the operation of the Portland Energy Park, a Blue-winged Parrot monitoring program will be established to monitor the presence and (if present) quantify the number of parrots accessing the site. The program will:
    a. Run annually over a three (3) year period;
    b. Survey Blue-winged Parrot within the Project Area during the breeding and non-breeding season of the Parrots;
    c. Be implemented by a suitably qualified ecologist(s); and
    d. Document the findings with the annual monitoring report.

11. At the end of the three-year monitoring period, if Performance Indicator 5 (PI5) has not been achieved, a specific report will be written and submitted to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) that:
    a. Documents the survey effort to date;
    b. Provides context in terms of Blue-winged Parrot population(s) regionally and any broad commentary on regional conditions impacting or affecting the Blue-winged Parrot;
    c. Examines corrective actions proposed either within the Project area or an alternative site to support foraging habitat for the Blue-winged Parrot; and
    d. Requires sign-off from DCCEEW of the proposed corrective actions.
12. Document the overall outcome success of the program at that point in time as it relates to objectives 1-5. Commentary should be provided on whether the overall program is meeting the objectives.
13. Any other relevant information or remedial actions.
14. The program of works, on-ground activities, performance goals and monitoring program is all subject to review, corrective actions and adaptive management. The monitoring report must propose corrective actions and amendments to meet the performance targets.

The monitoring program for the key management themes discussed in this LMRP is summarised in **Table 6-1**. This program outlines how to determine the efficacy of measures and corrective actions, detect if targets are attained or failed in a timely manner, and identify whether a trigger threshold is met in a timely manner.

Table 6-1: Monitoring program

Aspect	How	When	Where	Trigger value	Corrective action	Party responsible
Fence condition	In person inspection of the fences to assess their effectiveness. Locate any areas that require maintenance.	Annually for 10 years[1]	All revegetated areas (LMT01-04) while the fences are required in that area.	Any damage to the fences great enough for a rabbit to enter the area, or, once the rabbit fence is removed, damaged enough for stock to enter the area.	Repair the fence where required. If fencing is ineffective, review and implement corrective actions, including: • Review fence design and structure • Repair/modify fence as required • Review monitoring frequency.	Site Manager to manage the condition assessment. Corrective actions undertaken by the fencing contractor.
Animal management	Field assessment to identify signs of rabbits or stock within the revegetated area (LMT01-03)	Annually for 10 years[1] for stock and 3 years for rabbits. Incidental stock sightings throughout the year.	All revegetated areas (LMT01-04) (LMT01 only for 3-years after revegetation is undertaken).	Signs of rabbits or stock within the revegetated areas, including animal sightings, warrens, pugging, heavy grazing, or faeces that threatens success of the treatment.	• Determine how access was obtained. • Repair the fence where required. • If fencing is ineffective, review the fencing design and implement corrective measures as required. • Remove stock from the area. • Implement rabbit eradication measures if deemed necessary. • Record the findings in the annual monitoring report.	Rehabilitation Manager
Weed control	Field assessment to quantify and measure the success of weed management against the performance indicators PI1-PI3 (see **Section 6.2**). Methodology to be confirmed by ecologist in the field, but likely to include habitat hectare assessments and photopoint monitoring.	Annually for 10 years[1].	All revegetated areas (LMT01-04) (LMT01 only for 3-years after revegetation is undertaken).	If the ecologist determines the conditions are not on track to meet the performance indicators PI1-PI3 (see **Section 6.2**) at 3 years post implementation, or do not meet the indicators throughout year 4-10 post implementation.	Determine if management should be increased, maintained, or decreased, and implement such actions. Record the findings of the monitoring in the annual monitoring report.	Rehabilitation Manager
Revegetation success	Field assessment to quantify and measure the success of revegetation measures against the performance indicator PI4 (see **Section 6.2**). Methodology to be confirmed by ecologist in the field, but likely to include habitat hectare assessments and photopoint monitoring.	Annually for 10 years[1].	All revegetated areas (LMT01-04) (LMT01 only for 3-years after revegetation is undertaken).	If target densities and configurations of indigenous plants are not within 10% of the expected target density/cover outlined in **Section 4** at 3 years post implementation and maintained for 4-10 years.	Where target density/cover is not achieved, undertake supplementary planting within the target life form (e.g. understory, ground cover, canopy species establishment). Record the findings of the monitoring in the annual monitoring report.	Monitoring Manager
Evidence of Blue-winged Parrot foraging	Field assessment to quantify and measure the success of the performance indicator PI5 (see **Section 6.2**).	Annually for 3 years[1], starting within 12 months of the Practical Completion of the project.	Across the Project Area	Within 3 years of operation, Blue-winged Parrots are to be shown to be accessing and utilising the resources within the project area for foraging purposes (unless extenuating circumstances occur that render the project area temporarily unsuitable for Blue-winged Parrot).	Determine the potential cause (i.e. lack of foraging habitat) and implement measures to rectify it where possible. This may include supplementary planting of indigenous species or further pest management. Write and submit to DCCEEW the Blue-winged Parrot monitoring report.	Monitoring Manager

Table Notes
1: Monitoring to commence first spring after Practical Completion of Construction phase of the project.

A summary of the reporting requirements is provided in **Table 6-2**.

Table 6-2: Reporting requirements

Report type	Internal/ external	Description	Trigger for preparation	Report audience
Annual monitoring report	External	An assessment of activities implemented and outcomes under this LMRP. This will include: • A Project ID. • On-ground activities completed across the year. • Figures and maps that describe the treatment areas. • Name the on-ground contractors and nurseries. • Numbers (+/-5%) of plants supplied for each treatment area and any supplementary planting undertaken. • Pest plant and pest animal treatments. • Measures of success against PI1-PI4 for each treatment area and indicate planned management outcome direction (increase, maintain, reduce). • Describes the physical treatment area and activities. • Document the findings of the Blue-winged Parrot monitoring program. • Document the overall outcome of the program at that point in time as it relates to objectives 1-5 • Propose corrective actions and amendments to meet the performance targets.	To be completed annually for 10 years.	DCCEEW for 10 years, and DTP for the first 3 years (until LMT01 is handed over).
Blue-winged Parrot Monitoring report	External	A report that will summarise the findings of the Blue-winged Parrot monitoring program. It will include: • The Blue-winged Parrot survey effort. • The regional conditions that may impact the species. • Corrective actions to support foraging habitat.	To be written if at the end of the three-year monitoring period, PI5 has not been achieved.	DCCEEW (it requires sign-off from DCCEEW of the proposed corrective actions).

6.4 Audit and review

An ISO accredited auditor[5], independent of the project team, will conduct an annual audit for a period of 10 years.

The 'auditor' can be on the same team as the monitoring manager but will independently assess the:

- Annual monitoring report,
- The Blue-winged Parrot Monitoring Report, and

The Pacific Green Project Manager, with support from the Site Manager (refer to **Table 3-1**), is responsible for conducting the audit process. Audit outcomes will be documented in the Annual Monitoring Report, which will be submitted to:

- The Department of Climate Change, Energy, the Environment and Water (DCCEEW) for the duration of the 10-year audit period; and
- The Department of Transport and Planning (DTP) for the first 3 years.

If audit findings indicate that the objectives of the LMRP are not being met, appropriate corrective actions will be implemented and documented.

Prior to undertaking any activity that deviates from the approved management plan (as specified in the conditions of approval), a revised management plan must be submitted to DCCEEW and relevant state regulatory agencies. The proposed variation must not proceed until written approval is received from the Minister. Approval is only likely where the revised plan is demonstrated to result in an equivalent or improved environmental outcome over time.

[5] An ISO auditor must at least be part of the audit team and sign-off on the annual audit reports.

7. Risk management

This section sets out the qualitative risk assessment methodology that has been used to assess project risks.

A list of risks associated with the construction and operation of the project was collated and each risk assessed against its likelihood of occurrence (**Table 7-1**) and its potential consequence on the environment (**Table 7-2**). This resulted in a risk rating for each risk based on the risk evaluation matrix (**Table 7-3**).

Management controls were identified for each risk to reduce its potential consequence. The risks were re-assessed in the risk evaluation matrix taking into consideration the reduced impact. The residual risk rating, along with the initial risks and control measures, is provided in **Table 7-4**. This risk register demonstrates how the management of identified risks will achieve environmental management objectives.

Table 7-1: Likelihood of occurrence

LIKELIHOOD	LIKELIHOOD DESCRIPTION
Almost certain	>75% probability of occurrence, and/or has occurred recently with a high degree of confidence it will occur again.
Likely	51 – 74 % probability of occurrence, and/or has a history of consistent occurrence and is reasonable to expect it will occur again.
Possible	16-50% probability of occurrence.
Unlikely	3 – 15 % probability of occurrence, and/or minimal or sporadic historical instances of occurrence.
Very unlikely	<3% probability of occurrence, a rare event

Table 7-2: Potential consequence

CONSEQUENCE	PROJECT CONSEQUENCE DESCRIPTION
No threat	No impact to the environment.
Low threat	Negligible impact on the environment: Possible minor behavioural responses in fauna or loss of some common native flora species.
Moderate threat	Minor impact on the environment: Limited impact on native vegetation or common fauna species, including minor loss.
Significant threat	Short-term impact on environment: Moderate direct loss of native vegetation, which can be offset. Moderate direct loss of fauna that is important at a local scale.
Major threat	Serious medium-term impact on environment: Substantial impact on native vegetation that can only be partially offset or substantial impact on individuals of a population of animals that are listed as threatened at a State or Commonwealth level.
Critical threat	Significant long-term impact on environment: Native vegetation loss has no offsets available, loss of a critical Threatened Ecological Community or significant loss of an important population of fauna that is listed as threatened at a State or Commonwealth level.

Table 7-3: Risk evaluation matrix

LIKELIHOOD	CONSEQUENCE				
	Low threat	Moderate threat	Significant threat	Major threat	Critical threat
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	Extreme	Extreme
Possible	Low	Medium	Medium	High	High
Unlikely	Low	Low	Low	Medium	High

Events that are very unlikely to occur or have a consequence of no threat have not been considered in the risk evaluation matrix due to the very low level of risk they result in.

Table 7-4: Environmental risk register

Initial risk					Residual risk				
#	Risk Description	Consequence	Likelihood	INITIAL RISK	Controls (Treatment)	Relevant Plan or EPR	Consequence	Likelihood	RESIDUAL RISK
1	Illegal removal of native vegetation potentially resulting in fines, authority proceedings, and stop work orders.	Significant Threat	Possible	MEDIUM	Obtain approval/permits for native vegetation removal where necessary. Restrict vegetation clearance to the area approved for clearance. Project designed to avoid vegetation clearance as far as practical. Revegetate areas of the project area to improve the biodiversity of the project area. Suitable demarcation or fencing is to be present to prevent entry by contactors into areas of vegetation to that are to be protected. Induction program to cover environmental management prior to construction. EMP to outline native vegetation to be protected.	LMRP	Significant Threat	Unlikely	LOW
2	Recklessly injuring protected native fauna potentially resulting in fines, proceedings, and community backlash.	Significant Threat	Possible	MEDIUM	EMP to set out measures to manage all fauna in the project area. Induction program to cover environmental management prior to construction. Protocols for native fauna identification, monitoring, protection, salvage and relocation to be implemented during construction (in particular during removal of native vegetation).	EMP – Construction Environment Management Plan (CEMP)	Significant Threat	Unlikely	LOW
3	Damage (physical or chemical) to native vegetation to be protected (i.e. not proposed to be removed).	Significant Threat	Possible	MEDIUM	All work (including driving, site access and storage) to be restricted to areas with approval for vegetation clearance. Suitable demarcation or fencing is to be present to prevent entry by contactors into areas of vegetation to be protected. Induction program to cover environmental management prior to construction. EMP to outline native vegetation to be protected.	EMP - CEMP	Significant Threat	Unlikely	LOW
4	The potential loss of habitat connectivity of heathy woodland utilised by bandicoots, antechinus and other	Significant Threat	Possible	MEDIUM	Areas are proposed to be revegetation to promote vegetation connectivity, increase the amount of available habitat, and improve the quality of vegetation. Suitable demarcation or fencing is to be present to prevent entry by contactors into areas of vegetation to be protected.	LMRP	Significant Threat	Unlikely	LOW

Initial risk					Residual risk				
#	Risk Description	Consequence	Likelihood	INITIAL RISK	Controls (Treatment)	Relevant Plan or EPR	Consequence	Likelihood	RESIDUAL RISK
	ground dwelling fauna and birds.								
5	Significant impacts to Matters of National Environmental Significance (MNES) through unmitigated habitat removal, fragmentation from clearance, earthworks, and physical disturbance	Significant Threat	Possible	MEDIUM	A Land Management and Rehabilitation Plan (LMRP) has been developed. Areas are proposed to be revegetation to promote vegetation connectivity and increase the amount of available habitat. In addition, measures are proposed to improve the quality of vegetation and land management conditions. Mapped MNES habitat has largely been avoided by the project footprint. Suitable demarcation or fencing is to be present to prevent entry by contactors into areas of vegetation to that are to be protected. Induction program to cover environmental management prior to construction. EMP to outline native vegetation to be protected.	LMRP	Significant Threat	Unlikely	LOW
6	Direct injury, death, or displacement of fauna from the approved clearance of vegetation (habitat) and earthworks or entrapments in trenches.	Significant Threat	Possible	MEDIUM	Protocols for native fauna identification, monitoring, protection, salvage and relocation to be implemented during construction (in particular during removal of native vegetation). The majority of fauna at risk are highly mobile and/or nocturnal that reduces the risk. Appropriately qualified and experienced fauna spotter will be on site when removing/felling trees and vegetation. Any native fauna salvage, handling or relocation to be conducted by a licenced native fauna handler. EMP and LMRP include measures to avoid fauna and keep fauna out of the works area through the use of temporary fencing.	EMP - CEMP	Significant Threat	Unlikely	LOW
7	Physical disturbance to habitats during the operational phase for maintenance, replacement or repair of infrastructure.	Moderate Threat	Possible	MEDIUM	All work (including driving, site access and storage) is restricted to the project footprint (approved vegetation clearance). Clearly identify and minimise the vegetation to be removed to reduce the unnecessary loss of vegetation. Rehabilitate areas of temporary disturbance where appropriate. Manage habitat degradation through the operational EMP.	EMP – Operational Environment Management Plan (OEMP)	Moderate Threat	Unlikely	LOW

Initial risk					Residual risk				
#	Risk Description	Consequence	Likelihood	INITIAL RISK	Controls (Treatment)	Relevant Plan or EPR	Consequence	Likelihood	RESIDUAL RISK
8	The potential exists for the creation of dust through construction activities.	Low Threat	Likely	MEDIUM	Construction activities likely to result in high levels of dust mobilisation will be avoided during high wind conditions. Where dust is visible during the construction phase, dust control measures, including the use of water trucks and implementation of vehicle speed limits, will be implemented where required. Where possible, utilise stabilising techniques and/or environmentally acceptable dust treatments (e.g. temporary vegetation) in lieu of wetting controls. Maintain suitable surfacing (e.g. gravel) of high traffic areas within the project area. Implement EMP.	EMP - CEMP	Low Threat	Possible	LOW
9	Construction and decommissioning activities can potentially result in impacts to soil, including erosion and sedimentation, soil compaction, soil inversion and soil contamination.	Moderate Threat	Possible	MEDIUM	An EMP will be created in accordance with all relevant guidelines and codes of practice to be implemented during construction and decommissioning, as will a Soil Erosion and Drainage Management Plan. Induction program to cover erosion management prior to construction.	EMP - CEMP	Moderate Threat	Unlikely	LOW
10	The placement of stockpiles, storage of construction materials, parking, and vehicle movement throughout the project area can damage protected vegetation.	Significant Threat	Likely	HIGH	Design project area layout (including stockpiles and internal roads) to avoid areas of protected vegetation. All work (including driving, site access and storage) to be restricted to areas with approval for vegetation clearance. Locate areas of temporary disturbance within the final/permanent disturbance footprint where possible. Suitable demarcation and temporary fencing is to be installed to prevent entry by contactors into areas of protected vegetation. Induction program to cover environmental management prior to construction. EMP to outline native vegetation to be protected.	EMP - CEMP	Significant Threat	Unlikely	LOW

Initial risk					Residual risk				
#	Risk Description	Consequence	Likelihood	INITIAL RISK	Controls (Treatment)	Relevant Plan or EPR	Consequence	Likelihood	RESIDUAL RISK
11	The potential for mass release of proposed fill (clean soil and rock) smothering existing vegetation and habitat for the Blue-winged Parrot.	Significant Threat	Possible	MEDIUM	Benching to be designed to minimise the chance of mass release, including appropriate grading of slopes. Construction of benching to be undertaken in staging to ensure fill is not left uncapped with concrete for extended periods of time. The LMRP has been designed to manage landscape and visual impacts including appropriate grades and treatments of batters.	EMP - CEMP	Significant Threat	Unlikely	LOW
12	Temporary disturbance to fauna caused by factors such as noise and vibration during construction.	Significant Threat	Possible	MEDIUM	Induct staff prior to construction on potential noise issues and mitigation measures. Restrict the operating hours of construction activities to comply with the EPA guidelines and ensure no work is undertaken during the night. Shut down equipment that is not in use.	EMP - CEMP	Significant Threat	Unlikely	LOW
13	The potential for long-term disturbance to fauna caused by factors such as noise and vibration during operation.	Moderate Threat	Possible	MEDIUM	EMP to include noise mitigation measures. Attenuators will be put on battery units to reduce the sound produced. Monitoring will be undertaken to assess background noise levels. Pacific Green to comply with the EPA guidelines. All permanent equipment will have vibration dampeners to minimise vibration.	EMP - OEMP	Moderate Threat	Unlikely	LOW

Initial risk					Residual risk				
#	Risk Description	Consequence	Likelihood	INITIAL RISK	Controls (Treatment)	Relevant Plan or EPR	Consequence	Likelihood	RESIDUAL RISK
14	The potential for artificial lighting during construction causing impacts to nocturnal fauna, particular bats and ground-dwelling mammals like the MNES Southern Bent-wing Bat, Southern Brown Bandicoot, and Swamp Antechinus.	Moderate Threat	Possible	MEDIUM	No works will be undertaken at night wherever possible. Lighting to be designed to avoid direct light spill and unnecessary sky glow. Lighting will avoid directing artificial light on habitat patches. The minimum number and intensity of lights needed will be used. Light globes used across the entire project area will be chosen from the list of lighting to be least impactful to bats. Where possible on site, design will implement smart-controlled lights which only switch on when personnel are present. Lighting design for the project, particularly near the upgraded wetland area, will be in accordance with the National Light Pollution Guidelines for Wildlife.	EMP - CEMP	Moderate Threat	Unlikely	LOW
15	The potential for artificial operational lighting causing impacts to nocturnal fauna, particular bats and ground-dwelling mammals like the MNES Southern Bent-wing Bat, Southern Brown Bandicoot, and Swamp Antechinus.	Moderate Threat	Possible	MEDIUM	Lighting designed to avoid direct light spill and unnecessary sky glow. Avoid directing artificial light on habitat patches. The minimum number and intensity of lights needed will be used. Where possible on site, design will implement smart-controlled lights which only switch on when personnel are present. Light globes used across the entire project area will be chosen from the list of lighting least impactful to bats. Lighting design for the project, particularly near the upgraded wetland area, will be in accordance with the National Light Pollution Guidelines for Wildlife. Where possible, non-reflective dark coloured surfaces will be used for infrastructure.	EMP - OEMP	Moderate Threat	Very unlikely	LOW
16	Alteration to surface water flows and erosion in the flow paths causing water quality impacts.	Moderate Threat	Likely	MEDIUM	The management of surface water will include the installation of drainage controls, and the careful placement and management of soil stockpiles out of potential flow paths. Design and construct all project components and stormwater management systems with regard to the 1834.1: Civil construction, building and demolition guide. A Drainage and Surface Water Management Plan (DSWMP) will be completed during detailed design and will consider additional corrective actions manage and mitigate the potential of this risk occurring.	DSWMP	Moderate Threat	Possible	MEDIUM

Initial risk					Residual risk				
#	Risk Description	Consequence	Likelihood	INITIAL RISK	Controls (Treatment)	Relevant Plan or EPR	Consequence	Likelihood	RESIDUAL RISK
17	Habitat degradation from surface hydrological changes and/or reduced water quality during construction, including the wetland foraging habitat for the Southern Bent-wing Bat.	Moderate Threat	Possible	MEDIUM	The proposed wetland rehabilitation will increase water quality of the wetland area. Suitable demarcation or fencing is to be present around areas of vegetation to that are to be protected. Design and construct all project components and stormwater management systems with regard to the 1834.1: Civil construction, building and demolition guide. The management of surface water will include the installation of drainage controls, and the careful placement and management of soil stockpiles out of potential flow paths. Creation of a DSWMP will establish proposed flow and erosion controls.	DSWMP	Moderate Threat	Unlikely	LOW
18	Habitat degradation from surface hydrological changes and/or reduced water quality during operation, including the wetland foraging habitat for the Southern Bent-wing Bat.	Moderate Threat	Possible	MEDIUM	The proposed wetland rehabilitation will increase water quality of the wetland area. Suitable demarcation or fencing is to be present around areas of vegetation to that are to be protected. Design and construct all project components and stormwater management systems with regard to the 1834.1: Civil construction, building and demolition guide. Implement measures to protect the quality of surface water, as listed in the EMP, DSWMP and Soil Erosion and Drainage Management Plan.	EMP - OEMP	Moderate Threat	Unlikely	LOW
19	Contamination of surface water and groundwater during construction, including the wetland foraging habitat for the Southern Bent-wing Bat.	Major Threat	Possible	HIGH	No significant volumes of potential contaminants will be stored on site. All potential contaminants to be stored in bunded areas. The main transformers in the BESS substation will be bunded in case of an oil spill. The EMP includes measures to prevent, manage and contain spills, however, prior to construction the Site Manager will review procedures to ensure they reflect site conditions and contaminants present (or likely to be present) within the project area.	EMP - CEMP	Major Threat	Unlikely	MEDIUM

Initial risk					Residual risk				
#	Risk Description	Consequence	Likelihood	INITIAL RISK	Controls (Treatment)	Relevant Plan or EPR	Consequence	Likelihood	RESIDUAL RISK
20	Contamination of surface water and groundwater during operation, including the wetland foraging habitat for the Southern Bent-wing Bat.	Major Threat	Unlikely	MEDIUM	No significant volumes of potential contaminants will be stored on site. All potential contaminants to be stored in bunded areas. The main transformers in the BESS substation will be bunded in case of an oil spill. An EMP and contain spills.	EMP - OEMP	Major Threat	Very unlikely	LOW
21	Chemical spills during construction can result in localised soil contamination and could cause off-site contamination if spills are not appropriately managed.	Major Threat	Possible	HIGH	No significant volumes of potential contaminants will be stored on site. All potential contaminants to be stored in bunded areas. The storing and handling fuel of chemicals in accordance with the relevant standards and guidelines. Chemicals will be stored in sealed drums and containers in a bunded area before removal from the site by an EPA licensed contractor for recycling or disposal to a licensed facility. Procedures to contain and clean up spills. Transport and handling of batteries will take place in accordance with the manufacturer's requirements. This EMP includes measures to prevent, manage and contain spills, however, prior to construction the Site Operations Manager will review procedures to ensure they reflect site conditions and contaminants present (or likely to be present) within the project area.	EMP - CEMP	Major Threat	Unlikely	MEDIUM
22	Soil contamination could potentially occur as a result of a spill of fuel or chemicals (e.g. lubricants or herbicides) during the operational phase.	Major Threat	Possible	HIGH	No significant volumes of potential contaminants will be stored on site. All potential contaminants to be stored in bunded areas. Storage and handling of fuel and chemicals in accordance with relevant standards and guidelines. Measures to contain and clean up spills. Operational activities that may result in soil contamination will have management measures included in the EMP, such as the installation of permanent soil erosion and drainage management measures.	EMP - OEMP	Major Threat	Unlikely	MEDIUM

Initial risk					Residual risk				
#	Risk Description	Consequence	Likelihood	INITIAL RISK	Controls (Treatment)	Relevant Plan or EPR	Consequence	Likelihood	RESIDUAL RISK
23	Impact on Aboriginal Heritage, including damage to Aboriginal places or objects.	Moderate Threat	Possible	MEDIUM	All construction staff will receive a heritage induction which will include procedures to follow should any Aboriginal or non-Aboriginal sites, places, or objects be uncovered during excavation works. Pacific Green will comply with all laws, regulations, and commitments in relation to Aboriginal heritage. A Cultural Heritage Management Plan (CHMP) has been developed and addresses all cultural heritage management measures.	CHMP	Moderate Threat	Unlikely	LOW
24	The expected increase in traffic movements on local roads during the construction phase has the potential to increase traffic interactions with fauna, particularly ground-dwelling fauna like the MNES Southern Brown Bandicoot, or displacement due to avoidance of the increased number of vehicles.	Significant Threat	Almost Certain	HIGH	This risk will be mitigated through this EMP and through the development of a Traffic Management Plan (TMP) during detailed design. Speed limits on Madeira Packet Road will be reduced during construction. Implement procedures to monitor traffic impacts and adapt controls (where required) to reduce impacts. No works will be undertaken at night, when fauna is typically more active. Should any native mammal deaths be observed or reported (by the community or project team) either within the project area or on the abutting roads, then consultation with a suitably qualified ecologist will be initiated to explore the root cause and recommend corrective actions.	TMP	Significant Threat	Possible	MEDIUM
25	Direct injury, death or displacement of terrestrial fauna like the MNES Southern Brown Bandicoot from collision or avoidance of an increased number of vehicles during operation.	Significant Threat	Likely	HIGH	This risk will be mitigated through this EMP and through the development of a TMP during detailed design. A permanent reduction in the Madeira Packet Road speed limit to 80 kph. Implement procedures to monitor traffic impacts and adapt controls (where required) to reduce impacts. Signage may be erected to warn travellers of fauna, such as the Southern Brown Bandicoot. Should any native mammal deaths be observed or reported (by the community or project team) either within the project area or on the abutting roads, then consultation with a suitably qualified ecologist will be initiated to explore the root cause and recommend corrective actions.	TMP	Significant Threat	Possible	MEDIUM

Initial risk					Residual risk				
#	Risk Description	Consequence	Likelihood	INITIAL RISK	Controls (Treatment)	Relevant Plan or EPR	Consequence	Likelihood	RESIDUAL RISK
26	The risk that a natural phenomenon (flood, fire or drought) will cause death and loss of restored ecological habitat.	Major Threat	Possible	HIGH	There is always the potential for natural phenomena to impact the ecology of a site. When establishing new vegetation and ecological processes, the potential damage caused increases. This can only be mitigated by attempting to increase the resilience of the system as early as possible by managing threats and threatening processes, purchasing good quality plant stock and intensively managing the system in the establishment years, particularly years 1-3. Where the ecological outcomes (success) of restoration works are impacted by natural phenomenon, the LMRP will be reviewed and re-issued with updated timelines and targets.	Emergency MP	Major Threat	Unlikely	MEDIUM
27	Construction activities have the potential to increase the risk of bushfire.	Major Threat	Possible	HIGH	A Fire Management Plan (FMP) will be developed in conjunction with the Fire Rescue Victoria (FRV) to outline how fire risks will be managed. Measures for fire prevention, firefighting, site access and emergency response procedures will be developed in consultation with the FRV and incorporated into the EMP. Activities with a risk of fire ignition will be strictly controlled, particularly during the fire danger season, and any permits required (e.g. for hot work on days of total fire ban) would be obtained where necessary. Fuel reduction of grasses <100 mm in height during the declared Fire Danger Period. The FMP should also consider corrective actions to manage fire and the risk of escape.	FMP	Major Threat	Unlikely	MEDIUM
28	Habitat degradation from increased risk of fire associated with construction.	Significant Threat	Possible	MEDIUM	Implement FMP. Implement procedures for control of activities with a risk of fire ignition. Develop measures for fire prevention, firefighting, site access and emergency response in consultation with the CFA. Undertake fuel reduction yet avoid the areas of vegetation to be protected where possible. The FMP should also consider corrective actions to manage fire and the risk of escape.	FMP	Significant Threat	Unlikely	LOW
29	Direct injury, death or displacement of terrestrial fauna from increased risk of fire	Major Threat	Possible	HIGH	Implement FMP. Implement procedures for control of activities with a risk of fire ignition. Develop measures for fire prevention, firefighting, site access	FMP	Major Threat	Unlikely	MEDIUM

Initial risk					Residual risk				
#	Risk Description	Consequence	Likelihood	INITIAL RISK	Controls (Treatment)	Relevant Plan or EPR	Consequence	Likelihood	RESIDUAL RISK
	associated with construction, such as the MNES Southern Brown Bandicoot or Swamp Antechinus.				and emergency response in consultation with the CFA. The FMP should also consider corrective actions to manage fire and the risk of escape.				
30	Direct injury, death or displacement of terrestrial fauna from increased risk of fire associated with operation, such as the MNES Southern Brown Bandicoot or Swamp Antechinus.	Major Threat	Possible	HIGH	Implement FMP. Implement procedures for control of activities with a risk of fire ignition. Develop measures for fire prevention, firefighting, site access and emergency response in consultation with the CFA. The FMP should also consider corrective actions to manage fire and the risk of escape during operation.	FMP	Major Threat	Unlikely	MEDIUM
31	The potential for a fire during operations to cause water-quality damage and uncontrolled release of contaminated water into the natural environment.	Significant Threat	Possible	MEDIUM	No significant volumes of potential contaminants will be stored on site. All potential contaminants to be stored in bunded areas in sealed drums and containers. A FMP will be developed in conjunction with the CFA to outline how fire risks will be managed. Measures for fire prevention, firefighting, site access and emergency response procedures will also be developed in consultation with the CFA and incorporated into the EMP. The FMP will also consider corrective actions to manage fire and the risk of escape during operation.	FMP	Significant Threat	Unlikely	LOW
32	The risk that cattle breach fencing and destroy revegetation efforts to rehabilitate wetlands.	Significant Threat	Likely	HIGH	A level of destocking will be undertaken in the project area. Areas of wetland rehabilitation to be fenced off, including measures to prevent cattle jumping the fence, such as a strand of electric wiring and a single wooden railing. The LMRP outlines fencing requirements. Corrective actions are not expected to be required as farming and fencing practices are well understood. However, there could be a failure in a component (e.g. electric wire battery) that leads to a failure. Should a fence breach occur, this needs	LMRP	Significant Threat	Unlikely	LOW

Initial risk					Residual risk				
#	Risk Description	Consequence	Likelihood	INITIAL RISK	Controls (Treatment)	Relevant Plan or EPR	Consequence	Likelihood	RESIDUAL RISK
					the logged as a non-compliance and corrective actions considered and implemented.				
33	Overgrazing by stock causing land degradation in Blue-winged Parrot habitat.	Significant Threat	Likely	HIGH	A level of destocking will be undertaken in the project area. Areas to be rehabilitated to be fenced off, including measures to prevent cattle jumping the fence, such as a strand of electric wiring and a single wooden railing. The LMRP outlines fencing requirements. The Site Manager in conjunction with the rehabilitation contractor need to review the success of native species regeneration and achievement of the relevant LMRP objective. Where the objective is not being met or success looks unlikely, corrective actions need to be put in place to increase the likelihood of success.	LMRP	Significant Threat	Unlikely	LOW
34	Habitat degradation from introduction or spread of invasive species or pathogens during the construction phase.	Significant Threat	Almost Certain	HIGH	The EMP stipulates standard construction management techniques to be deployed within the development footprint. Beyond this, weed and pathogen controls will be put in place to control the movement of vehicles and people in areas earmarked for protection and rehabilitation. Vehicle hygiene measures to be implemented. Weed management prescriptions are outlined in the LMRP and performance targets set. Should the rehabilitation contractor observe invasions of new weeds or pathogens, then the on-ground control program must be modified to consider and treat these weeds (or pathogens).	EMP - CEMP	Significant Threat	Possible	MEDIUM
35	Habitat degradation from introduction or spread of invasive species or pathogens during the operation phase.	Significant Threat	Almost Certain	HIGH	Undertake ongoing weed management in line with the LMRP. To mitigate the impacts of key pest animals (rabbits and cattle), areas proposed for revegetation will be fenced off and measure targets monitored. Monitoring reports including a description of pest plant and pest animal treatments and success to be submitted to DCCEEW annually for 10 years. Should the rehabilitation contractor (landscape contractor) observe invasions of new weeds or pathogens, then the on-ground control program must be modified to consider and treat these weeds (or pathogens).	EMP - OEMP	Significant Threat	Possible	MEDIUM

Initial risk					Residual risk				
#	Risk Description	Consequence	Likelihood	INITIAL RISK	Controls (Treatment)	Relevant Plan or EPR	Consequence	Likelihood	RESIDUAL RISK
36	Uncontrolled pest animals (including cattle) outcompeting, predating or impacting on native species.	Significant Threat	Almost Certain	HIGH	The LMRP has some measures to control pest herbivores such as rabbits including fencing of revegetated areas to include rabbit proof function to protect the areas from rabbit grazing. Furthermore, measures will be put in place to limit cattle grazing in some areas to improve soil conditions, reduce weed spread and improve conditions for native flora. No specific measures are proposed to control pest carnivores. If native mammal or native bird deaths are observed within the project area to be caused by exotic predators, then the landscape contractor will adapt the program to consider targeted pest animal control.	LMRP	Significant Threat	Possible	MEDIUM

Figure 4 presents a summary of raw risks (15 High and 21 Medium) versus the residual risk ratings (13 Medium and 23 Low) as determined if the proposed mitigations are implemented.

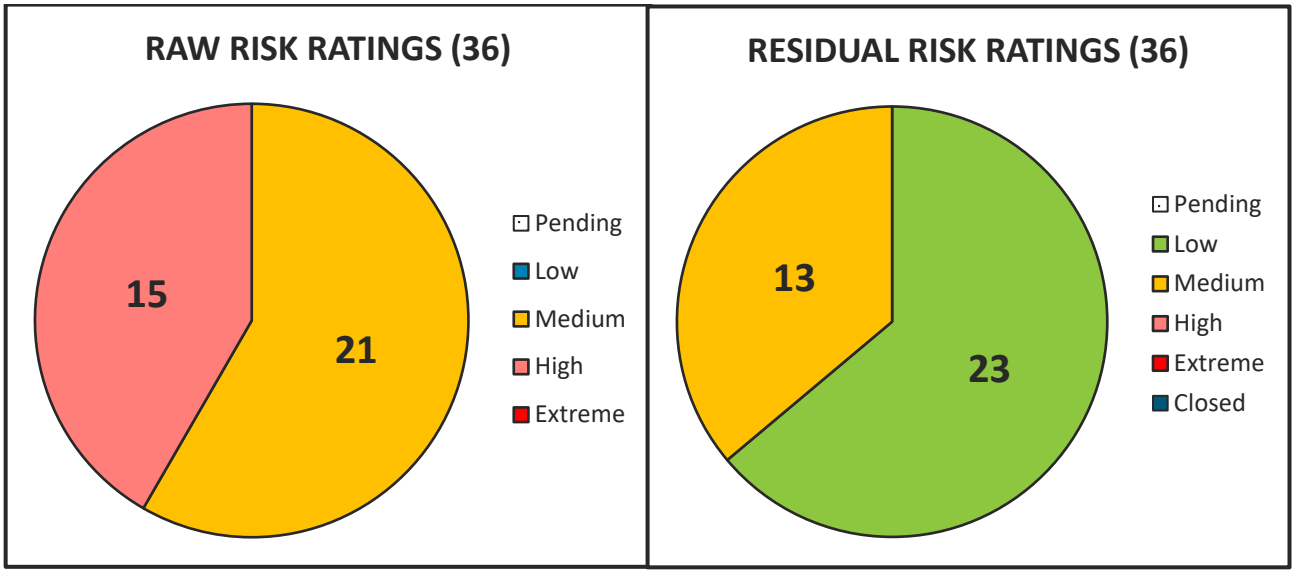


Figure 4: Raw (initial) risks ratings and residual risk rating after mitigation

8. References

Agriculture Australia (2023) Gorse. https://agriculture.vic.gov.au/biosecurity/weeds/weeds-information/gorse (accessed 3 June 2024)

Agriculture Victoria (2020) Boneseed. https://agriculture.vic.gov.au/biosecurity/weeds/weeds-information/boneseed (accessed 2 September 2024)

Blood K (2001) *Environmental Weeds: A Field Guide for SE Australia*. C.H. Jerram and Associates.

CRC Australian Weed Management (2000) *Best practice management guide: Blackberry, Rubus fruticosus aggregate*. Retrieved from www.weeds.org.au

CRC Australian Weed Management (2007) *Weed Management Guide: African boxthorn (Lycium ferocissimum)*.

DEECA (2024) *Management standards for native vegetation offset sites*. http://creativecommons.org/licenses/by/4.0/ISBN978-1-76077-546-9

DELWP (2017a) *Growling grass frog habitat design standards: Melbourne strategic assessment*. Victorian Government Library Service.

DELWP (2017b) *Native vegetation gain scoring manual*, V2 edn. Victorian Government Department of Environment, Land, Water and Planning.

DELWP (2021) *DELWP Output Data Standard*. Department of Environment, Land, Water and Planning, Victorian Government. (accessed 18 March 2025)

DNRE (2002a) *Landcare Notes: Cape broom / Montpellier broom*.

DNRE (2002b) *Victorian Pest Management: A Framework for Action. Weed Management Strategy*.

DPIPWE (2002) *Service Sheet: Broom*. Tasmania.

DSE (2004) EVC/Bioregion Benchmark for Vegetation Quality Assessment: Glenelg Plain bioregion. https://www.environment.vic.gov.au/__data/assets/pdf_file/0035/48698/GleP_EVCs_combined.pdf (accessed 2 September 2024)

DSE (2006) *Revegetation Planting Standards-Guidelines for establishing native vegetation for net gain accounting*. Retrieved from www.dse.vic.gov.au

Hay P (1999) *Landcare Notes: Rabbit-proof fencing*. Government of Victoria, Department of Natural Resources and Environment.

Lamp C and Collet F (1989) *Field guide to weeds in Australia*, 3rd ed. Melbourne: Inkata Press.

Melbourne Water (2020) *Constructed Wetlands Design Manual*.

Muyt A (2001) *Bush invaders of South-East Australia : a guide to the identification and control of environmental weeds found in South-East Australia*. R.G. and F.J Richardson Publishers.

Nature Advisory (2024a) *Portland Battery Energy Storage System (BESS): Flora and Fauna Assessment*.

Nature Advisory (2024b) *Portland Energy Park Matters of National Environmental Significance (MNES) Self-Assessment*.

Parsons W and Cuthbertson E (2001) *Noxious weeds of Australia*, 2nd ed. CSIRO Publishing.

Peter Haack Consulting (2024a) *Landscape Concept Plan Portland Renewable Energy Hub*.

Peter Haack Consulting (2024b) *Landscape Concept Plan Portland Renewable Energy Hub*.

Robertson M (1994) *Stop Bushland Weeds: A Guide to Successful Weeding in South Australia's Bushland*. Nature Conservation Society of South Australia.

Standards Australia (2003) *Australian Standard (AS4454—2003) Composts, soil conditioners and mulches*.

Weeds Australia (2024a) Gorse, Furze. https://weeds.org.au/profiles/gorse-furze/ (accessed 3 June 2024)

Weeds Australia (2024b) Spear Thistle, Black Thistle, Scotch Thistle. https://weeds.org.au/profiles/spear-thistle-black/#prosection1 (accessed 3 September 2024)

Weeds Australia (2024c) Three-corned Garlic, Angled Onion, Three-Cornered Leek, Triquetrous Garlic, Triquetrous Leek.

Appendix A General weed provisions

Weed Species	General Description	Weed Control Approach	Ideal Timing of Control
African Boxthorn *Lycium ferocissimum*	African boxthorn is a perennial shrub, commonly 2-3 m tall, with long thorns occurring along the branches It often grows to impenetrable thickets. The leaves are bright green, smooth, oval, often growing 10–40 mm long and 4–10 mm wide, occurring in clusters. Flowers are white to mauve with a tubular base, and fruit is a smooth round berry, green ripening to orange/red. African boxthorn most often flowers in spring and summer, but flowers may be present any time of year. Its seeds are often spread by birds and foxes. Plants can be manually removed, either by hand pulling seedlings or using mechanical equipment such as a 'Boxthorn Plucker' on individual plants in extensive infestations in pastures when plants are not in fruit. Removal must be followed up over several years to treat regrowth from root fragments left behind (CRC Australian Weed Management 2007). Herbicide treatments for boxthorn are foliage spray, cut-stump, stem injection and basal bark application. All of these methods are only effective if the plants are actively growing at the time of application (CRC Australian Weed Management 2007).	Manual removal through hand pulling seedlings or mechanically removing infestations. Herbicides are applied via spraying, cut-stump, stem injection, and basal bark application.	Year round for manual removal. Autumn/winter for herbicide spraying.
Angled Onion *Allium triquetrum*	Angled Onion is a perennial herb with bright green, fleshy pointed leaves and small white, bell - shaped flowers. It has a strong onion smell when crushed (Weeds Australia 2024c). Angled Onion reproduces by seeds and bulbs and is dispersed via water, soil and during removal (Weeds Australia 2024c). Angled Onion grows between March and May and flowers between June and August. Small plants can be hand-pulled or dug out whilst soils are moist, ensuring that the bulb is removed (Muyt 2001). Angled Onion is a persistent weed that may take several years to eradicate (Weeds Australia 2024c). Larger infestations can be covered with dense mulch matting (after active growth) or black plastic (prior to September), or treated with a selective herbicide in late winter/early spring. Repeat application of herbicide over two to four years is usually required (Muyt 2001).	Hand pull or dig out small plants when soils are moist. Cover larger infestations with dense mulch matting or black plastic, or treat with selective herbicide. Repeat over 2-4 years.	Cover larger infestations with dense mulch matting after active growth, or black plastic prior to September, or use herbicide in late winter/early spring.
Blackberry *Rubus fruticosus species aggregate*	Blackberry is a perennial, semi deciduous shrub with prickly stems. It often forms thickets up to several metres high. Blackberry leaves are usually dark green with a lighter green underside. Blackberry is spread by seed. Dispersal mechanisms include birds, mammals (especially foxes) and water (CRC Australian Weed Management 2000). Slashing can help open up dense stands for follow-up control by other methods. High volume spraying is recommended in areas of dense infestation. However, this method is not suitable for use near susceptible native species given the high potential for off-target damage. The 'cut and paint' method	Slashing and herbicides. Cut and paint with herbicides near susceptible native species. High volume spraying for dense infestations not near	Year round. Sept – April for young seedlings.

Weed Species	General Description	Weed Control Approach	Ideal Timing of Control
	is recommended for areas located near susceptible native species. Herbicides are most effective between September and April and are most effective on young seedlings (CRC Australian Weed Management 2000).	susceptible native species.	
Boneseed *Chrysanthemoides monilifera*	Boneseed is a woody, erect shrub growing to a height of 2 to 3m and 2 to 6m wide. Stems are brown and hard. Leaves are oval-shaped with a tapering base and irregularly toothed margins. Flowers are bright yellow and daisy-like, forming in late winter and spring, from August to October. Boneseed fruits from spring through to autumn. They are globular and dry to a light brown (Agriculture Victoria 2020). Boneseed is spread by seed only. Germination is promoted by fire, soil disturbance, weathering and ingestion of seeds by animals. Most seeds are dispersed by animals such as foxes and birds, through water, or vehicle movements. The seedbank for boneseed can remain viable for at least 10 years (Agriculture Victoria 2020). Boneseed is a Regionally Controlled weed under the CaLP Act and a WoNS. Plants can be removed physically or sprayed with a registered herbicide in July through to October (Agriculture Victoria 2020).	Removed physically or sprayed with a registered herbicide.	Spray July – October.
Bulbil Watsonia *Watsonia meriana var. bulbillifera*	Bulbil Watsonia is a long-lived, erect perennial herb that grows to 2 m tall, with light green sword-shaped leaves and orange – red flowers (Lamp and Collet 1989). It is a highly invasive species that can form dense stands. Bulbil Watsonia reproduces vegetatively and by seed and is spread by water, soil and machinery (Blood 2001). Isolated plants can be dug out whilst soils are moist. Plants can also be treated using the 'cut and paint' method or larger infestations can be sprayed with a selective herbicide in September/ October (Muyt 2001).	Dig out isolated plants whilst soils are moist. Plants can also be treated using the 'cut and paint' herbicide method or larger infestations can be sprayed with a selective herbicide.	September/ October for herbicides.
Gorse *Ulex europaeus*	Gorse is a shrub that grows up to 4 m tall and can form dense thickets. The woody branches are hairy and covered in spines, with a green spine up to 5 cm long at the end of each branch. The dark green leaves have a sharp spine at the tip and are arranged in clusters along the branch. Flowers are bright yellow, 15-25 mm in length, with a coconut-like fragrance. The fruit are oblong pods 10-20 mm long and 6 mm wide, covered in hairs, and turn from green to dark brown with maturity. Gorse reproduces via seed once the seed coats have been damaged or scared such as by fire, passing through an animal stomach, or soil disturbance (Agriculture Australia 2023). Management works best when incorporating a range of measures that focus on reducing seed production (Weeds Australia 2024a). Herbicides can be directly applied to leaves or by cut-and-paint, ideally not while the plant is in full flower. Seedlings can be hand-pulled. Bulldozers or tractors can	Integrated weed management: herbicides, manual removal, fire, and grazing.	Year round.

Weed Species	General Description	Weed Control Approach	Ideal Timing of Control
	clear more mature infestations. Fire can be used to remove dense thickets, followed sheep grazing on seedlings before spines are formed. Once plants are removed, follow up is critical to remove the seedlings that will germinate (Weeds Australia 2024a).		
Montpellier Broom *Genista monspessulana*	Montpellier Broom is an upright evergreen shrub up to 3 m high, which reproduces by seed. Montpellier Broom is capable of forming dense thickets which exclude the growth of native vegetation. Dense infestations of broom provide habitat for pest animal species (such as foxes and rabbits) and increase fire fuel loads in areas of native vegetation (DNRE 2002a). Fire stimulates seed germination by breaking the dormancy of the soil-stored seed, resulting in dense infestations of seedlings (DNRE 2002a). Seeds are dispersed when the pod opens. They may also be dispersed locally by ants. Longer range methods of seed dispersal include earth-moving equipment, slashing, water, machinery, vehicles and movement by people and animals through infested areas (DNRE 2002b). Small, isolated plants can be hand pulled or grubbed in spring. The 'cut and paint' method is effective for larger plants. This should be carried out in spring/early summer. Larger infestations of Montpellier Broom can be slashed and regrowth sprayed with herbicide (DNRE 2002a). It should be noted that new infestations should be treated prior to plants reaching the flowering stage as control becomes more difficult once plants begin seeding. The persistent soil seed bank usually leads to rapid regeneration after initial weed control measures (DPIPWE 2002).	Hand pull or grub small, isolated plants. 'Cut and paint' pesticides on larger plants. Larger infestations can be slashed and regrowth sprayed with herbicide.	Hand pull and grub in spring. 'Cut and paint' herbicides in spring/early summer. Treat new infestations prior to plants reaching flowering stage.
Soursob *Oxalis pes-caprae*	Soursob is a small erect perennial that grows up to 30 cm and reproduces from bulbs (Parsons and Cuthbertson 2001). It has bright yellow flowers. Dispersal is almost completely by bulbs and bulbils, with most Australian infestations not producing seeds. Cultivation and propagation are common means of spread of this species (Parsons and Cuthbertson 2001). Plants should be grubbed just before flowering (Robertson 1994). Spot spraying is also an effective means of controlling Soursob when applied in July or August as this is when new bulbs are being formed (Parsons and Cuthbertson 2001). Soursob can also be spot sprayed when flowering (Robertson 1994).	Manual removal. Spot spraying herbicides.	Manual removal prior to flowering. Spraying in July and August or when flowering.
Spear Thistle *Cirsium vulgare*	Spear Thistle (also known as Scotch Thistle) is a deep-rooted annual or biennial herb. It has erect, spiny and normally very leafy stems covered with fine hairs. The upper surface of the leaves is covered with scattered prickles. Spear Thistle has purple or reddish flowers which usually appear in December to February (Weeds Australia 2024b). There are two main germination times, late summer to autumn and late winter to spring. Seeds are dispersed by wind.	Manual removal of plant and greater root system or spot spray larger infestations with herbicide.	Sept - November

Weed Species	General Description	Weed Control Approach	Ideal Timing of Control
	Isolated plants and small patches of Spear Thistle can be removed by hand, but for effective control the greater part of the root system must be removed (Weeds Australia 2024b). Slashing or mowing is not considered to be a highly effective method for larger infestations. In particular, viable seeds may already have been produced if flowers are present when cutting occurs (Weeds Australia 2024b). However, larger infestations can be spot-sprayed with herbicide.		

Appendix B Department of Transport and Planning Correspondence

Department of Transport and Planning

GPO Box 2392
Melbourne, VIC 3001 Australia
www.transport.vic.gov.au

Cameron Miller
Principal, Team Leader
Assessments & Approvals, Victoria
JBS&G

Dear Cameron

THE USE OF THE MADERIA PACKET ROAD RESERVE FOR THE PURPOSE OF VEGETATION AND PLANTING

Thank you for the documentation received by the Department of Transport and Planning (Head, Transport for Victoria).

Following a review of the proposed vegetation and planting proposal, DTP is pleased to inform you that permission is granted to utilise and maintain the Madeira Packet Road reservation in the manner described in your submission.

Accompanying Note:
Separate consent for works within the road reserve and the specifications of these works is required under the *Road Management Act 2004*. Further information regarding consent to work within the road reserve can be found on the VicRoads Website**:** www.vicroads.vic.gov.au/business-and-industry/design-and-management/working-within-the-road-reserve.

Should you have any enquiries regarding this matter, please contact Dave Fary on 0408 317 254 or dave.fary@transport.vic.gov.au.

Yours sincerely

DAVE FARY
Acting Team Leader, Statutory Planning
Barwon South West and Northen Region
Regional Transport
DEPARTMENT OF TRANSPORT AND PLANNING
Under delegation from the Head, Transport for Victoria
27/11/2024
Cc Applicant

VICTORIA State Government

© JBS&G
This document is and shall remain the property of JBS&G. The document may only be used for the purposes for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited

Document Distribution

Rev No.	Copies	Recipient	Date
1	1 x electronic copy	Joel Alexander (Pacific Green)	22/05/2025
2	1 x electronic copy	Joel Alexander (Pacific Green)	08/07/2025
3	1 x electronic copy	Joel Alexander (Pacific Green)	18/08/2025

Document Status

Rev No.	Author	Reviewer	Approved for Issue		
		Name	Name	Signature	Date
3	Lucy Harrison	Cameron Miller	Cameron Miller		18/08/2025

www.jbsg.com.au

JBS&G

Adelaide
Kaurna Country | 100 Hutt St,
Adelaide, SA 5000
T: 08 8431 7113

Brisbane
Turrbal/Yuggera Country | Level 37, 123
Eagle Street, Brisbane, QLD 4000
T: 07 3211 5350

Bunbury
Wardandi Noongar Country | 177
Spencer Street Bunbury, WA 6230
T: 08 9792 4797

Canberra
Ngunnawal Country | Level 1, The Realm
18 National Circuit Barton, ACT 2600
T: 02 6198 3278

Darwin
Larrakia Country | Suite G1, Level 1
48-50 Smith Street, Darwin NT 0800
T: 08 8943 0600

Hobart
Muwununa/Nuenon Country | Level 6,
111 Macquarie Street Hobart, TAS 7000
T: 03 6108 9054

Melbourne
Kulin Country | Level 5, 10 Queen
Street, Melbourne, VIC 3000
T: 03 9642 0599

Newcastle
Awabakal/Worimi Country | 61 / 63
Parry Street Newcastle West, NSW 2302
T: 02 8245 0300

Perth
Whadjuk Nyoongar Country | Allendale Square,
Level 9, 77 St Georges Terrace, WA 6000
T: 08 9380 3100

Sydney
Gadigal Country | Level 1, 50
Margaret Street, Sydney, NSW 2000
T: 02 8245 0300

Wollongong
Dharawal Country | Suite 1A, 280 - 286
Keira Street, Wollongong, NSW 2500
T: 02 4225 2647

Portland Energy Park

Pacific Green Pty Ltd

Environment Management Plan

66207 | 164,357 (Rev2)

18 August 2025

Exceptional Outcomes

Project Details

Project Title	Portland Energy Park
EPBC Number	2024/09947
Proponent	Pacific Green Energy Park Portland Pty Ltd
ACN /ABN	667 082 911 / 73 667 082 911
Location of the Action	Portland, Victoria

Document control table

Version	Date	Description	Author	Approved
1	08/07/2025	Final (addressed department comments)	LH, CM, CA, BG	CM
2	18/08/2025	Final (added document control table)	LH, BG	CM

Declaration of accuracy

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations* 2000 (Commonwealth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed:	
Full name (please print):	Michael Maranta
Organisation (please print):	Pacific Green Technologies (Australia) Pty Ltd
Date:	18/08/2025

©JBS&G Australia Pty Ltd

Table of Contents

1. Introduction 1

1.1 Project description 2

1.1.1 Construction 2

1.1.2 Operation 2

1.1.3 Decommissioning 2

1.2 Purpose 2

1.3 Responsibilities 3

1.4 Structure of the EMP and approach to environmental management procedures 3

1.5 Objectives 4

2. Summary of site condition 5

2.1 Site details 5

2.2 Site condition 5

3. Application, enforcement and regulatory requirements 11

3.1 Application of EMP 11

3.2 Enforcement of EMP 11

3.3 Regulatory requirements 11

4. General site management 13

4.1 Roles and responsibilities 13

4.2 Hours of operation 13

4.3 Induction and training 14

4.3.1 Training and competencies 14

4.3.2 Site specific inductions 14

4.4 Environmental inspections and monitoring 15

4.4.1 Construction requirements 15

4.4.2 Operational requirements 16

4.5 Compliance 16

4.6 Incident reporting 17

4.7 Record keeping 17

4.8 Review of the EMP 18

4.9 Communications, Emergency Contacts and Responses 18

4.9.1 Site communications 18

4.9.2 Community engagement 19

4.9.3 Complaints and feedback protocol 19

5. Environmental risk management 21

©JBS&G Australia Pty Ltd

5.1 Risk determinations 22
6. Environmental management 25
6.1 Construction environmental management 25
C-EPR01 Air quality 26
C-EPR02 Noise and vibration 27
C-EPR03 Lighting 29
C-EPR04 Traffic 31
C-EPR05 Erosion and sediment control 33
C-EPR06 Waste management 35
C-EPR07 Soil and contamination 37
C-EPR08 Surface water and groundwater 39
C-EPR09 Ecology, flora and fauna 41
C-EPR10 Weed and pest management 44
C-EPR11 Public safety 46
C-EPR12 Fire 47
C-EPR13 Environmental emergency response 49
6.2 Operation environmental management 51
O-EPR01 Noise and vibration 52
O-EPR02 Lighting 53
O-EPR03 Traffic 55
O-EPR04 Waste management 56
O-EPR05 Soil and contamination 57
O-EPR06 Surface water and groundwater 58
O-EPR07 Ecology, flora and fauna 59
O-EPR08 Weed and pest management 61
O-EPR09 Public safety 62
O-EPR10 Fire 63
O-EPR11 Environmental emergency response 65
7. Management and monitoring 67
8. References 78
Appendix A: Environmental Risk Assessment

©JBS&G Australia Pty Ltd

List of Tables

Table 1-1: Activity and identified environmental procedures....3
Table 2-1: Site details summary....5
Table 4-1: Roles and responsibilities for the project....13
Table 4-2: Emergency contacts....19
Table 5-1: Likelihood of occurrence....21
Table 5-2: Potential consequence....21
Table 5-3: Risk evaluation matrix....21
Table 5-4: Environmental risks and risk descriptions applied for the Project....22
Table 6-1: Estimated generated traffic during the construction of the project (source: ESR Transport Planning, 2024)....31
Table 7-1: EPR monitoring program....67

List of Figures

Figure 1: Site location....7
Figure 2: Functional layout....8
Figure 3: Project area construction features....9
Figure 4: Sensitive Environmental Matters....10
Figure 5: Raw (initial) risks ratings and residual risk rating after mitigation....24

List of Plates

Plate 2-1: General photo of the vegetation in project area – open introduced pasture on generally flat land (source: Nature Advisory, 2024a)....6
Plate 2-2: General photo of the vegetation in project area – open introduced pasture on undulating landscape (source: Nature Advisory, 2024a)....6
Plate 2-3: Aquatic Herbland – large wetland in low-lying area of introduced pasture (source: Nature Advisory, 2024a)....6
Plate 2-4: Aquatic Herbland – degraded wetland in low-lying area of introduced pasture (source: Nature Advisory 2024a)....6
Plate 2-5: Heathy Woodland along Maderia Packet Road (source: Nature Advisory, 2024a)....6
Plate 2-6: Small scattered trees in the project area (source: Nature Advisory, 2024a)....6
Plate 6-1: Waste management hierarchy (Source: EPA South Australia, 2022)....35
Plate 6-2: Waste management hierarchy (Source: EPA South Australia, 2022)....56

©JBS&G Australia Pty Ltd

Abbreviations

Term	Definition
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AS	Australian Standard
BESS	Battery Energy Storage System
CaLP Act	*Catchment and Land Protection Act 1994*
C-EPR	Construction Environmental Performance Requirement
CFA	Country Fire Authority
CHMP	Cultural Heritage Management Plan
CNVMP	Construction Noise and Vibration Management Plan
DCCEEW	Department of Climate Change, Energy and the Environment
DEECA	Department of Energy, Environment and Climate Action
DTP	Department of Transport and Planning
EE Act	*Environment Effects Act 1978*
EMP	Environmental Management Plan
EP Act	*Environment Protection Act 2017*
EP Regulations	Environment Protection Regulations 2021
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPRs	Environmental Performance Requirements
ERMP	Emergency Response Management Plan
FFG Act	*Flora and Fauna Guarantee Act 1988*
FMP	Fire Management Plan
FRV	Fire Rescue Victoria
GW	Gigawatt
GWh	Gigawatt hour
ha	Hectare
JBS&G	JBS&G Australia Pty Ltd
km	Kilometre
kph	Kilometres per hour
kV	Kilovolt
LGA	Local Government Area
LMRP	Landscape Management and Rehabilitation Plan
m	Metre
mm	Millimetre
MNES	Matters of National Environmental Significance
NVR	Native Vegetation Removal
O-EPR	Operation Environmental Performance Requirement
OHS Act	*Occupational Health and Safety Act 2004*

Term	Definition
OHS Regulations	Occupational Health and Safety Regulations 2017
P&E Act	*Planning and Environment Act 1987*
SEDMP	Soil Erosion and Drainage Management Plan
TIAR	Transport Impact Assessment Report
TMP	Traffic Management Plan
TPZ	Tree Protection Zone
vpd	Vehicles Per Day
WoNS	Weed(s) of National Significance

Key Terms

Term	Definition
Bioregion	A landscape-based approach to classifying the land surface using a range of environmental attributes such as climate, geomorphology, lithology, and vegetation.
Ecological Vegetation Class (EVC)	A type of native vegetation classification that is described through a combination of its floristics, life form and ecological characteristics, and through an inferred fidelity to particular environment attributes. Each EVC includes a collection of floristic communities that occurs across a biogeographic range, and although differing in species, have similar habitat and ecological processes operating.
Exotic Vegetation	Any vegetation that is not native to Australia or its States and Territories. This can sometimes include non-indigenous vegetation.
Indigenous Vegetation	Refers to vegetation that is native to Australia as well as occurring naturally in the local geographical region.
Native Vegetation	Refers to a plant which occurs naturally in a country but does not occur locally occur. However, when referring to native vegetation recognised under Clause 52.16 or 52.17 of the Victorian Planning Scheme, 'native vegetation' is defined as indigenous to the area.
The disturbance footprint	The disturbance footprint totals approximately 34 hectares and is considered to be the *maximum* extent of necessary works
The Project	The project comprises of four utility-scale Battery Energy Storage System (BESS) compounds (total capacity of 1-gigawatt (GW)/2.5-gigawatt hour (GWh)), and associated infrastructure including a 33 kilovolt (kV) substation and 500 kV switchyard and grid transmission connection. The project includes associated works, such as earthworks, security fencing, access tracks, drainage and landscape vegetation planting.
The project area	The project area is approximately 120 hectares and encompasses the following addresses: • Allotment 61A Section 13 Parish of Portland • Lot 1 TP592015 Madeira Packet Road • 305 Madeira Packet Road • 333 Madeira Packet Road

©JBS&G Australia Pty Ltd

2. Introduction

JBS&G Australia Pty Ltd (JBS&G) have been engaged by Pacific Green Energy Park Portland Pty Ltd (Pacific Green) to prepare an Environmental Management Plan (EMP) for the proposed Portland Energy Park in Portland, Victoria (hereafter referred to as the project). The land upon which the project is proposed to be developed (hereafter referred to as the project area) is located at:

- Allotment 61A Section 13 Parish of Portland
- Lot 1 TP592015 Madeira Packet Road
- 305 Madeira Packet Road
- 333 Madeira Packet Road.

The project area lies within the Glenelg Shire Local Government Area (LGA) at Portland's southern extent and 300 kilometres (km) southwest of Melbourne (refer to **Figure 1**). It has an area of approximately 120 hectares (ha). Within the project area, a portion of the site will be developed, referred to as the disturbance footprint. The disturbance footprint totals approximately 34 hectares and is considered to be the *maximum* extent of necessary works

The project is awaiting approval for a planning permit from the Minister of Planning. The project comprises of the following components:

- Four utility-scale Battery Energy Storage System (BESS) compounds (total capacity of 1-gigawatt (GW)/2.5-gigawatt hour (GWh)).
- Switching station, 33 kilovolt (kV) switching equipment and associated electrical infrastructure.
- Transmission connection infrastructure (poles and wires) to the existing 500 kV and 250 kV lines.
- Auxiliary power supplies.
- Protection and control equipment.
- Operations and maintenance building.
- Access points and internal tracks.
- Water storage systems and fire-fighting infrastructure.
- Security fencing and monitoring systems.
- Earthworks/benching of the site.
- Stormwater detention.
- Landscaping/screening.

This EMP applies to the construction of the project components within the project area.

©JBS&G Australia Pty Ltd

2.1 Project description

The activities that will be undertaken as part of each relevant project phase, as well as the anticipated schedule of each phase, is discussed below.

2.1.1 Construction

The works will be undertaken in stages as presented within **Figure 3**. Works will be completed in a continuous construction period of approximately 12-18 months, and laydown areas for equipment will be constrained to the disturbance footprint.

Construction planning and early works are proposed for early 2026 with full construction likely to start mid-2026. Based on an 18-month construction period, it is likely the works will be completed by the end of 2027 /early 2028.

Individual battery units (similar to a shipping container) will be located on individual concrete slabs. Each BESS park will connect to a 500/33kV Collector Station which have been redesigned around the large dune landform in the centre of the activity area, that then connects to the primary 500kV switching station via overhead distribution lines. The Collector Stations will be constructed on shallow, wide footings designed to avoid impacting the natural ground surface.

A total of five or six new transmission towers will be constructed to connect the switching station to existing transmission lines in the northern extent of the project area.

The majority of cabling for utilities will occur within the fill layer. Another two ponds will be constructed in the north and south of the activity area for water runoff.

A small dam in the north of the activity area will be expanded to catch run off from the benching areas (for water filtering), and a series of subsurface pipes for drainage will be installed to direct water away from the infrastructure.

2.1.2 Operation

Within the operation phase, there is minimal day-to-day activity relative to construction. It is expected that there will be 21 ongoing jobs (full time equivalent) (4 direct and 17 indirect) related to maintenance, inspections and management. Pasture grasses and vegetation on the balance land will be managed to address fire risk.

2.1.3 Decommissioning

The project is expected to last 40 years, and specific processes for decommissioning will therefore be highly subject to future conditions, including the availability of materials reuse and recycling, evolving environmental and material standards, economic circumstances and market forces, surrounding land uses, environmental constraints, and community expectations. As such, a specific decommissioning plan will be developed at a more appropriate time prior to decommissioning.

2.2 Purpose

This EMP has been designed to ensure that the proposed construction and operation works on site are managed to acceptable standards and appropriate controls are put in place to manage human and environmental risks.

This EMP is not intended to replace or supersede other Landscape Management Plans and / or Health and Safety Plans provided for the site. Instead, the EMP is to be considered as a supplement to these documents and particularly targeted to deal with environmental issues unique to the construction and operation works.

©JBS&G Australia Pty Ltd

2.3 Responsibilities

The development of the site will be undertaken under the direction of the site owners (Pacific Green) and the appointed Principal Contractor.

The Principal Contractor will be responsible for the implementation of most procedures provided in the EMP relating to construction. It is noted that where the specific procedures are technical or complex in nature then the Principal Contractor may appoint appropriately qualified agents (i.e. environmental consultants) to fulfil the requirements of the procedure or advise on the appropriate implementation of the procedure. Pacific Green, or their delegate, will be responsible for the implementation of procedures relating to the operation of the project provided in the EMP.

A formal list of procedures is provided to the EMP based on an assessment of potential environmental emissions from anticipated site works required for the construction and operation works. Specific responsibilities are nominated for the implementation of these procedures.

2.4 Structure of the EMP and approach to environmental management procedures

This EMP includes procedures, or Environmental Performance Requirements (EPRs) to manage environmental aspects and mitigate potential impacts (detailed in **Section 6**), as presented in **Table 1-1**. EPRS are broken up into Construction Environmental Performance Requirements (C-EPR) and Operation Environmental Performance Requirements (O-EPR).

Table 1-1: Activity and identified environmental procedures

Activity	Environmental considerations	Management procedure
Construction activities (i.e. building of batteries, staff facilities, internal roads etc.)	Dust generation Noise and vibration generation Light pollution Traffic impacts to the local road network and fauna Soil disturbance Waste accumulation and management Soil and water contamination Surface water and groundwater management Ecology, flora, and fauna Pest plants and animals Local community public safety Fire hazards Environmental emergency scenarios	C-EPR01 Air quality C-EPR02 Noise and vibration C-EPR03 Lighting C-EPR04 Traffic C-EPR05 Erosion and sediment control C-EPR06 Waste management C-EPR07 Soil and contamination C-EPR08 Surface water and groundwater C-EPR09 Ecology, flora and fauna C-EPR10 Weed and pest management C-EPR11 Public safety C-EPR12 Fire C-EPR13 Environmental emergency response
Operation activities (i.e. staff accessing the site, maintenance activities etc.)	Noise and vibration generation Light pollution Traffic impacts to the local road network and fauna Waste accumulation and management Soil and water contamination Surface water and groundwater management Ecology, flora, and fauna (including pest plants and animals) Local community public safety Fire hazards Environmental emergency scenarios	O-EPR01 Noise and vibration O-EPR02 Lighting O-EPR03 Traffic O-EPR04 Waste management O-EPR05 Soil and contamination O-EPR06 Surface water and groundwater O-EPR07 Ecology, flora and fauna O-EPR08 Weed and pest management O-EPR09 Public safety O-EPR10 Fire O-EPR11 Environmental emergency response

2.5 Objectives

The objective of this EMP is to ensure that:

1. environmental risks during construction and operation are considered, realistic and are assessed using endorsed approaches;
2. environmental risks are tailored to the project, the location and the activities that will be performed during construction and operation;
3. roles and responsibilities are clearly defined such that there is limited ambiguity about responsibilities;
4. potential impacts associated with the Project (as listed in **Table 1-1** and **Section 6**) are minimised and managed; and
5. Appropriate monitoring and review processes are embedded in the EMP such that adaptive management and continual improvement can occur where required.

3. Summary of site condition

The following section describes the existing conditions within the project area and the broader surrounding area.

3.1 Site details

The site is located to the north and south of Madeira Packet Road in Portland, Victoria, as shown in **Figure 1.** The proposed site layout shown in **Figure 2** and the construction features are shown in **Figure 3**. The site details are summarised in **Table 2-1** and described further in **Section 2.2**.

Table 2-1: Site details summary

Lot/DP (at time of writing)	
Address	• Allotment 61A Section 13 Parish of Portland • Lot 1 TP592015 Madeira Packet Road • 305 Madeira Packet Road • 333 Madeira Packet Road
LGA	Glenelg Shire LGA
Site zoning	The majority of the project area is zoned as Industrial 2 Zone. The northern most part of the project area is zoned as Farming Zone – Schedule 1 and Madeira Packet Road is zoned as Transport Zone 2.
Previous use	Agriculture and livestock grazing
Proposed use	Utilities
Project area size	Approximately 120 ha

3.2 Site condition

The topography across the project area is undulating, with heights ranging approximately from 45 metres (m) Australian Height Datum (AHD) to 35 m AHD. The portion of the project area north of Madeira Packet Road comprises mostly of Molineaux Sand (Pleistocene to Holocene (sand deposition-dunefield and intra-continental basin)) geology, with the portion to the south of Madeira Packet Road comprising of this Molineaux Sand at the western and eastern edges, with an area of Bridgewater Formation (Pleistocene to Pleistocene (aeolian) calcarenite) in the centre and north (CeRDI, 2024).

The project area is within the Glenelg Plain bioregion and the Glenelg Hopkins Catchment Management Area (CMA) (Nature Advisory, 2024a). Wetlands were present in the project area and of varying size and depth, ranging from constructed drainage lines to seasonally flooded pasture to shallow wetlands with open water (Nature Advisory, 2024a).

Nature Advisory undertook an ecological field assessment of the project area. They identified much of the project area to be used for livestock (cattle) grazing (Nature Advisory, 2024a). The vegetation in the site is highly modified from its original condition due to grazing and historical land clearing (**Plate 2-1** and **Plate 2-2**) (Nature Advisory, 2024b). The lack of canopy trees, high presence of noxious weeds, and the loss of native species diversity has resulted in a poor condition of the remaining vegetation (Nature Advisory, 2024a). The major native vegetation groups within the project area are Aquatic Herbland (**Plate 2-3** and **Plate 2-4**) and Heathy Woodland (**Plate 2-5**) (Nature Advisory, 2024a). Two small, scattered trees in very poor health remained in the project area (**Plate 2-6** and **Figure 4**) (Nature Advisory, 2024a). Further detail on the site conditions and rehabilitation measures are addressed in the Landscape Management and Rehabilitation Plan (LMRP).

Plate 2-1: General photo of the vegetation in project area – open introduced pasture on generally flat land (source: Nature Advisory, 2024a)

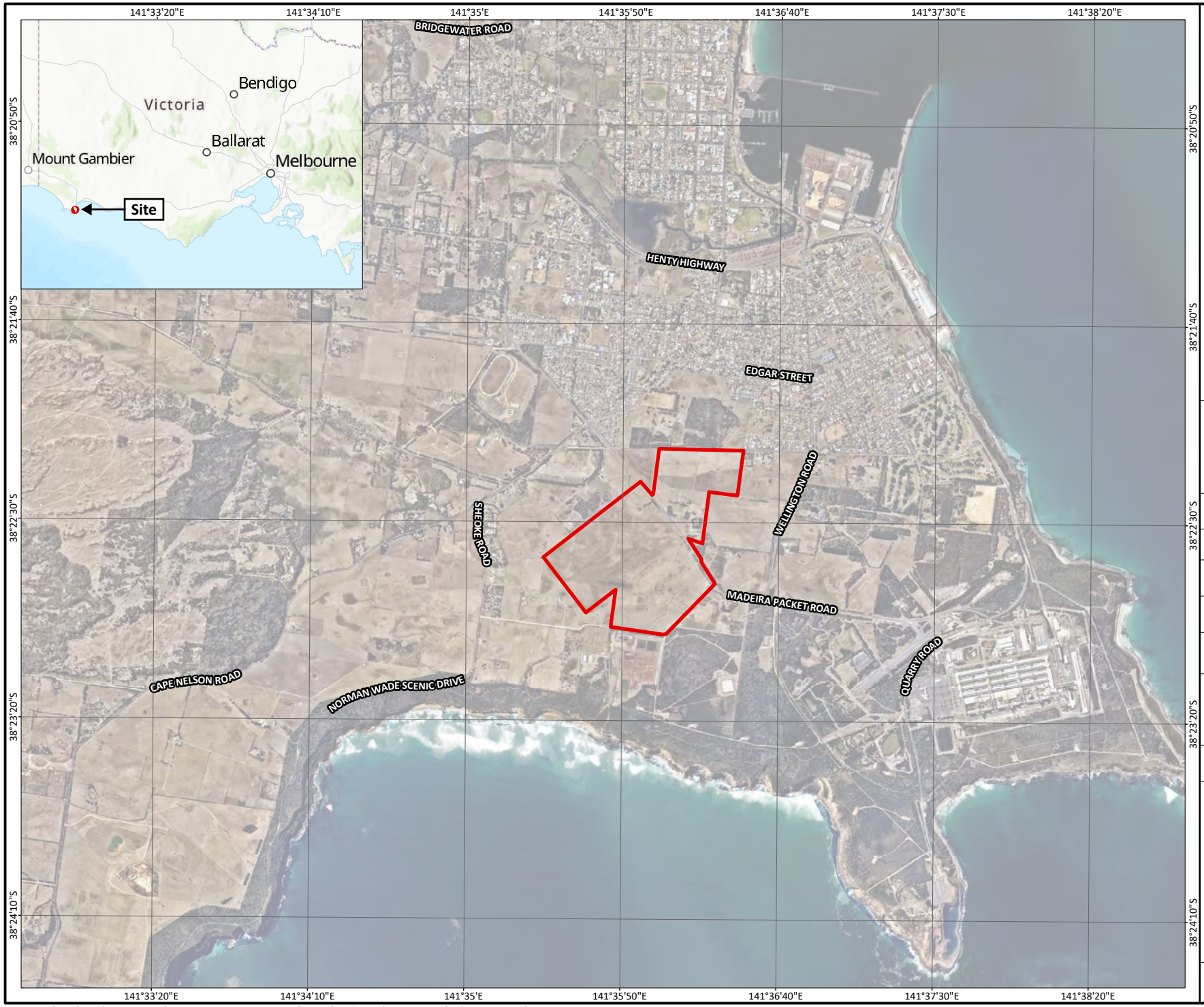
Plate 2-2: General photo of the vegetation in project area – open introduced pasture on undulating landscape (source: Nature Advisory, 2024a)

Plate 2-3: Aquatic Herbland – large wetland in low-lying area of introduced pasture (source: Nature Advisory, 2024a)

Plate 2-4: Aquatic Herbland – degraded wetland in low-lying area of introduced pasture (source: Nature Advisory 2024a)

Plate 2-5: Heathy Woodland along Maderia Packet Road (source: Nature Advisory, 2024a)

Plate 2-6: Small scattered trees in the project area (source: Nature Advisory, 2024a)



Legend

Project Area

JBS&G

Job No: 66207	
Client: Pacific Green	
Version: Final	Date: 18-Jun-2025
Drawn By: AL	Checked By: LH

Scale: 1:40,000 at A4

0 800 1,600

metres

Coord. Sys. GDA2020 MGA Zone 54

Portland Energy Park,
Portland Victoria

EPBC No.: 2024/09947

FIGURE 1 - SITE LOCATION

File Name: C:\Users\aliddy\JBS&G Australia\JBS&G - DCS - Internal - Documents\Projects\Pacific Green\66207_Portland\GIS\02_MapProjects\66207_Portland_RMP_FigureUpdates.aprx; Name:66207_01_SiteLoc
Reference: ESRI Topographic Basemap - Accessed Imagery: 18/06/2025 | Aerial Imagery Suplied by Nearmap (March, 2025)

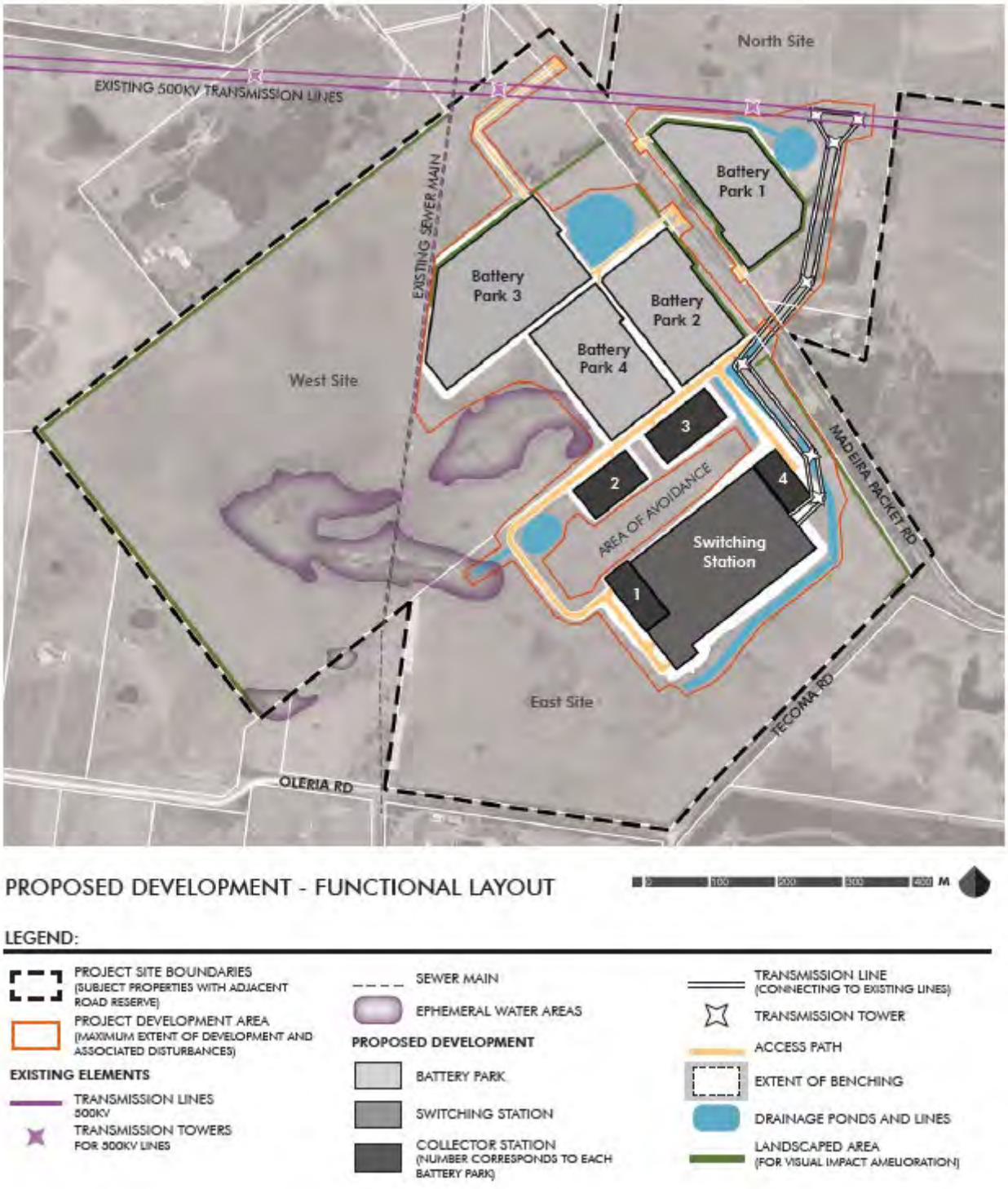
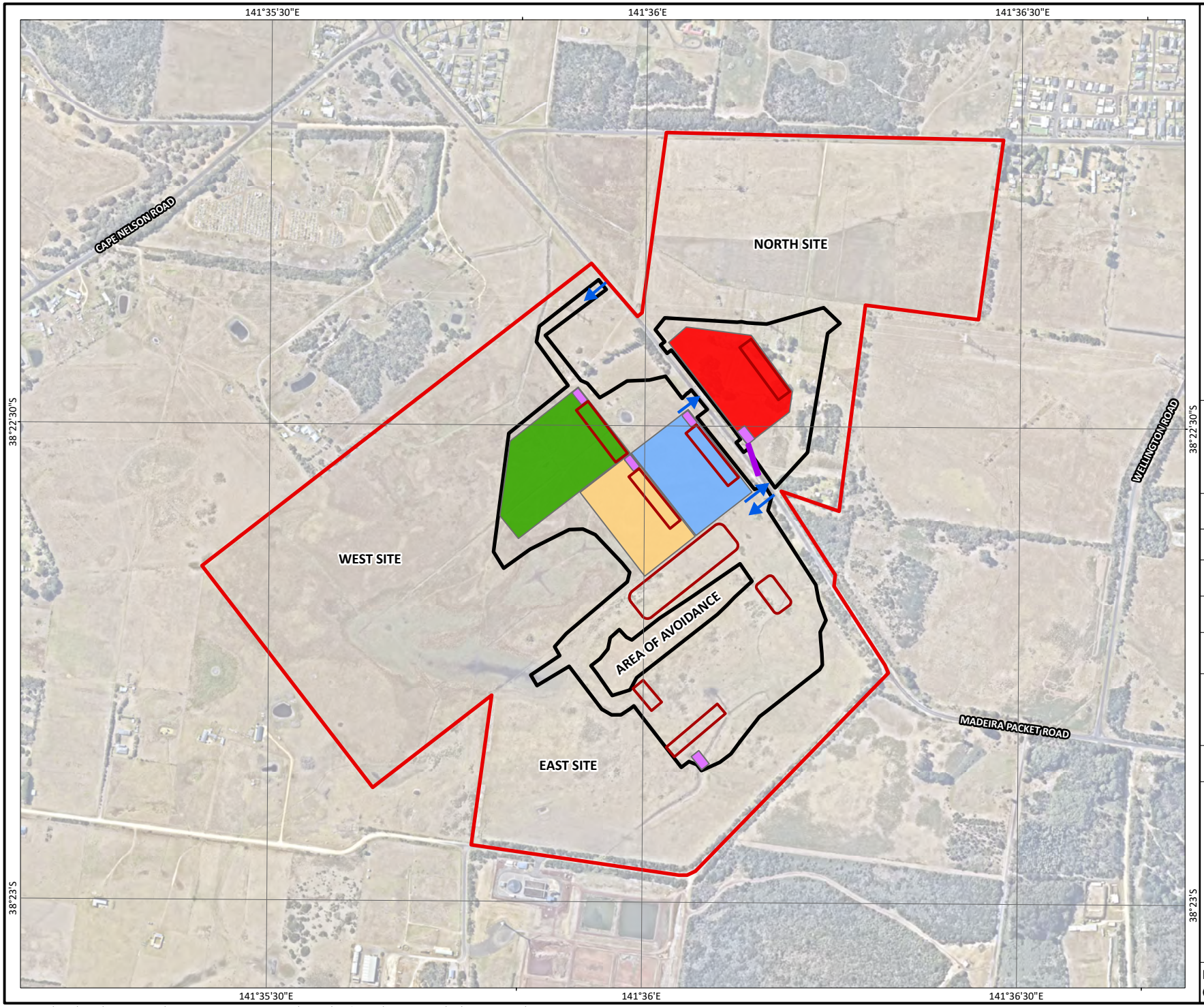


Figure 2: Functional layout



Legend

- Project Area
- Project Development Area

Construction Features

- Stage 1
- Stage 2
- Stage 3
- Stage 4
- Fire Fighting Water Storage
- Indicative Water and Sewer Connection
- Storage, Laydown, Parking, Site Amenities
- Access Egress

JBS&G

Job No: 66207

Client: Pacific Green

Version: Final	Date: 02-Jul-2025
Drawn By: AL	Checked By: LH

Scale: 1:10,000 at A4

0 200 400

metres

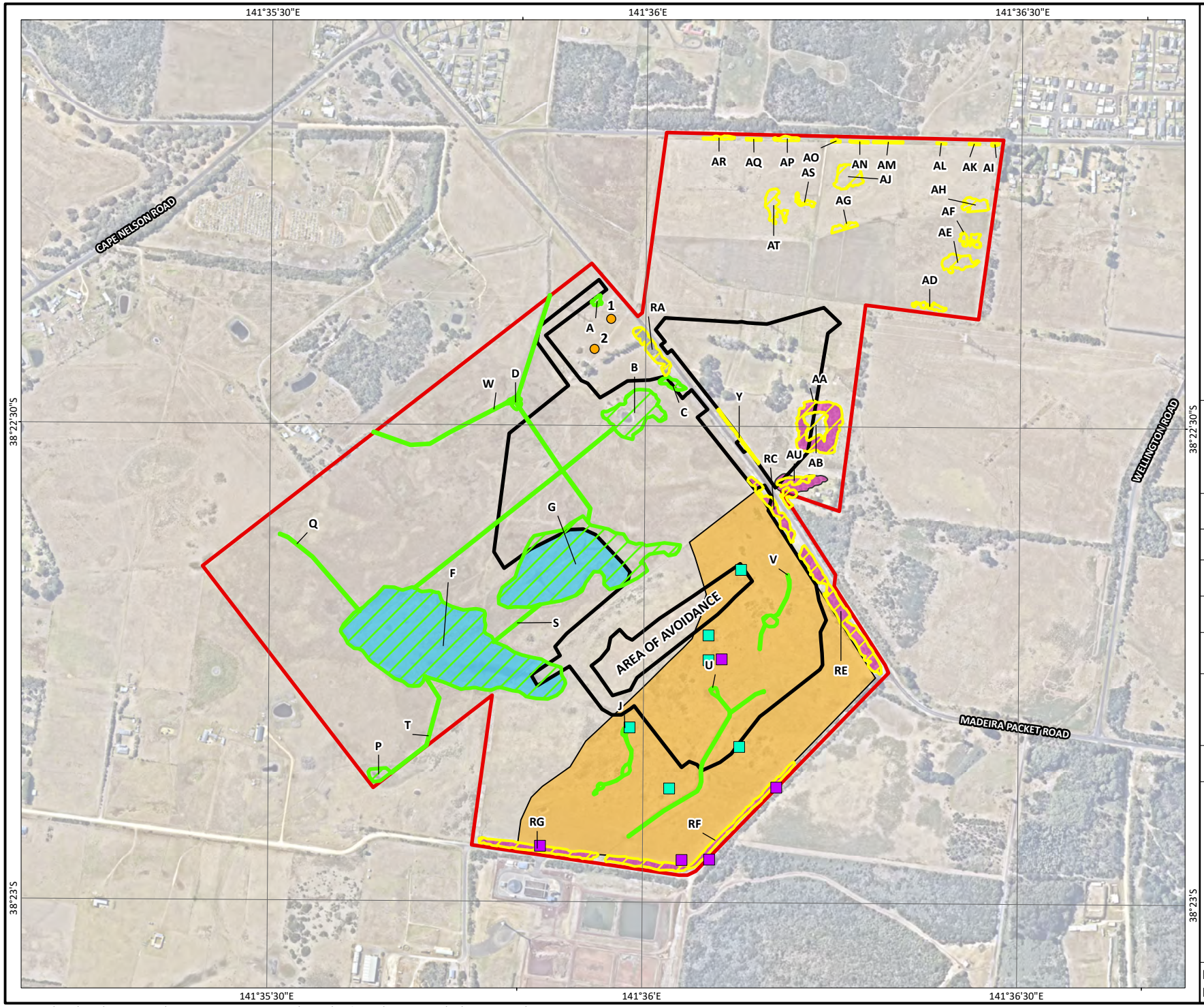
Coord. Sys. GDA2020 MGA Zone 54

Portland Energy Park,
Portland Victoria

EPBC No.: 2024/09947

FIGURE 3 - PROJECT AREA CONSTRUCTION FEATURES

File Name: C:\Users\aliddy\JBS&G Australia\JBS&G - DCS - Internal - Documents\Projects\Pacific Green\66207_Portland\GIS\02_MapProjects\66207_Portland_RMP_FigureUpdates.aprx; Name:66207_04_ConstructionFeatures 02
Reference: ESRI Topographic Basemap - Accessed Imagery: 02/07/2025 | Aerial Imagery Suplied by Nearmap (March, 2025)



Legend

- Project Area
- Project Development Area
- Wetlands

Threatened Fauna Recorded (Nature Advisory, 2024)

- Blue-winged Parrot (Breeding Season)
- Blue-winged Parrot (Non Breeding Season)
- Blue-winged Parrot Foraging Habitat
- Potential Southern Brown Bandicoot and Swamp Antechinus habitat

Native Vegetation (Nature Advisory, 2024)

- Aquatic Herbland (EVC 653)
- Heathy Woodland (EVC 48)
- Small Scattered Tree

JBS&G

Job No: 66207

Client: Pacific Green

Version: Final	Date: 02-Jul-2025
Drawn By: AL	Checked By: LH

Scale: 1:10,000 at A4

0 200 400

metres

Coord. Sys. GDA2020 MGA Zone 54

Portland Energy Park, Portland Victoria

EPBC No.: 2024/09947

FIGURE 4 - SENSITIVE ENVIRONMENTAL MATTERS

File Name: C:\Users\aliddy\JBS&G Australia\JBS&G - DCS - Internal - Documents\Projects\Pacific Green\66207_Portland\GIS\02_MapProjects\66207_Portland_RMP_FigureUpdates.aprx; Name:66207_05_Sensitive Environmental Matters
Reference: ESRI Topographic Basemap - Accessed Imagery: 02/07/2025 | Aerial Imagery Suplied by Nearmap (March, 2025)

4. Application, enforcement and regulatory requirements

4.1 Application of EMP

This EMP applies to the construction and operational works relating to the project. The requirements of the EMP are intended to apply to activities within the project area which require/involve:

- Earthmoving works.
- Construction of the project and ancillary infrastructure.
- Transport of construction materials, wastes, etc. to and from the site.
- The operation of the project.
- Maintenance throughout the operation phase.

For the purposes of this EMP, the activities during the construction phase will be referred to as construction, while the activities during the operation phase will be referred to as operation.

4.2 Enforcement of EMP

The EMP will be enforced and implemented by the Principal Contractor for the construction of the project, including work by subcontractors. During operation, Pacific Green will enforce and implement the EMP.

4.3 Regulatory requirements

Activities on site will be required to be completed in accordance with several sections of environmental and occupational health and safety legislation and associated regulations. The primary Acts, Regulations and Guidelines are listed below with a summary of their applicability. Please note that this list is not intended to be a comprehensive listing of acts and regulations. The site owner and contractors are required to satisfy themselves that all applicable legislation is adhered to, relevant permits and licences have been obtained, and their conditions satisfied.

Regulations that are to be considered as part of this EMP include the following:

- *Occupational Health and Safety Act 2004* (OHS Act). Victoria's primary legislation for ensuring workplace health and safety and outlining employer responsibilities.
- *Occupational Health and Safety Regulations 2017* (OHS Regulations). Support the OHS Act by providing detailed rules and requirements for specific workplace hazards and activities.
- *Environment Protection Act 2017* (EP Act). An Act to provide for the protection of the environment and to enhance the power and responsibilities of the Environment Protection Authority (EPA).
- *Environment Protection Regulations 2021* (EP Regulations). Supplements the EP Act by providing detailed rules, requirements, and guidance for managing environmental risks in Victoria. They help duty holders comply with their responsibilities under the EP Act.
- Environment Reference Standard published 25 May 2021. It is a framework under Victoria's EP Act that sets benchmarks for environmental quality across air, water, land, and noise to guide environmental protection and improvement efforts.
- EPA Publication 1826.4 Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues published May 2021. It provides guidelines under Victoria's EP Act for assessing and managing noise to protect community amenity while supporting sustainable business operations.

- *Aboriginal Heritage Act 2006*. An Act to provide for the protection and preservation of the Aboriginal cultural heritage in Victoria.
- *Catchment and Land Protection Act 1994* (CaLP Act). An Act to provide the framework for managing land, water, and biodiversity resources in Victoria sustainably and collaboratively, including the regulation of pest plants and animals.
- *Flora and Fauna Guarantee Act 1988* (FFG Act). A Victorian Act to protect threatened species and ecological communities in Victoria.
- *Planning and Environment Act 1987* (P&E Act). Victoria's primary planning legislation. It also contains clauses relevant to the protection of native vegetation.
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Australia's primary environmental legislation that provides a legal framework to protect and manage nationally and internationally significant flora, fauna, ecological communities, and heritage places.

5. General site management

Key general site management requirements that underpin the implementation of this plan are detailed in the following sections.

5.1 Roles and responsibilities

Effective management of environmental issues and promoting environmental awareness during construction and operation of the project is key to responsible project management. The roles and responsibilities of key personnel for the project are outlined below in **Table 4-1**.

All personnel involved in the project are required to work in accordance with the EMP.

Table 4-1: Roles and responsibilities for the project

Role	Responsibility
Pacific Green Executive Management	• Overarching responsibility for the project • Licence holders and therefore hold overall responsibility for the environmental management of the project
Pacific Green Project Manager	• Directly responsible for the environmental management of the project • Reports directly to Executive Management • Managing the environmental approval process • Directly responsible for overseeing and fulfilling the commitments contained in the EMP • Coordinating management reviews, external and internal audits and reporting progress against environmental targets and objectives • Conducting environmental incident investigations and performing environmental risk assessments • Providing general environmental support • Works closely with the Site Manager during the construction phase
Site Manager	• Oversees EMP implementation • During construction, monitors the activities of contractors and assesses compliance with the EMP • Coordinates the monitoring and audit program including coordinating data collection for the monthly assessments and implementing the weekly inspections (see below) • Undertakes a weekly visual inspection of the site as per the requirements in **Table 7-1**, or delegates to a suitably qualified person • Represents the project on environmental matters with stakeholders • Reports to the Project Manager during the construction phase
Operational Manager	• Responsible for delivery, monitoring and reporting of the EMP during operations. • Completes inspections as required to ensure environmental compliance. • Conducts corrective actions-based complaints and incidents. • Reports to the Pacific Green Project Manager or delegated party.
Subcontractors and other site workers	• Implement environmental controls as directed • Report any environmental issues • Reports to the Site Manager

5.2 Hours of operation

All construction will be carried out between the following times:

- 7 am and 6 pm Monday to Friday
- 9 am to 3 pm on Saturdays
- 9 am to 3 pm on Sundays or Public Holidays (when required).

Note: There may be minor site activities outside these hours. Types of activities could include site inductions, daily start-ups and other low impact administrative tasks.

Furthermore, the Department of Transport and Planning (DTP) or other authorities may request certain deliveries such as over-size, over-mass vehicles occur at specific times such as at night. Where required, Pacific Green will comply with these requests.

- Operational hours will be 24/7, for 30-50 years. It should be noted that the batteries have 2h and 4 hr discharge rates at full discharge. Therefore, whilst in 'operation' there will be significant periods with little or no discharge.

5.3 Induction and training

Training and induction are only relevant for the construction phase of the project. Details are provided below.

5.3.1 Training and competencies

Pacific Green and the Contractor will develop, implement, monitor and review a documented process that controls and governs all aspects of the management of training and competency in accordance with all Laws and Good Industry Practice.

The process must apply to all contractors and sub-contractors engaged to work on the project to ensure all workers are qualified, trained, certified, adequately experienced and appropriately licenced to undertake all tasks for their individual roles. The training and competencies component will address as a minimum:

- The operation of vehicles and mobile plant.
- The operation of equipment and plant.
- All activities that require Australian High-Risk Licences.
- All specialist certifications (e.g. working at heights, rescue activities, work in confined spaces or any other applicable activity).
- Maintenance of the project throughout operation.

Job-specific training relevant to roles will also be undertaken and records maintained of induction and attendees.

Any personnel engaged in the implementation of nominated tasks within the EMP will be provided with adequate training to manage environmental aspects during construction. This will include inductions and other task specific training as required.

The Contractor shall maintain records of personnel engaged in the nominated tasks and their relevant training/qualifications for the period of three years.

5.3.2 Site specific inductions

For construction, all personnel and contractors will complete a site induction upon arrival at the site, and prior to the commencement of any work tasks. The site induction will be facilitated by the Site Manager or delegate and include details of:

- General site and project orientation.
- Work tasks to be performed by the inductees and any special requirements or approvals.

- Key environmental risks and worker health and safety risks associated with the work tasks.
- Worker obligations and reporting requirements for with environmental incidents or near-misses.
- Approval conditions and an overview of the EMP requirements.
- Specific requirements and responsibilities under the planning permit conditions of approval.
- Legislative requirements of the company and individuals.
- Driver code of conduct to minimise vehicular traffic and noise impacts.
- Key personnel and roles.
- Emergency response procedures including fire season education and associated risks and restrictions.
- Community issues related to the project and relevant management plans and procedures.
- Penalties for non-compliance with required plans and procedures.
- Cultural Heritage induction and stop work procedure.
- Any other site-specific issues.

The induction will ensure that the principles of the EMP will be considered by all site personnel. Records of attendees will be maintained. A less detailed induction may be completed by site visitors who will not be undertaking work tasks.

Other communication methods will also be used to ensure personnel remain informed of environmental requirements including:

- Sub-contractor's kick-off meetings.
- Contractor and client site kick-off meetings.
- Risk workshops and project meetings.
- Daily pre-start meetings and / or toolbox meetings.
- Incident bulletins.

5.4 Environmental inspections and monitoring

A compliance monitoring inspection program must be implemented to monitor compliance with the conditions of consent for the project.

5.4.1 Construction requirements

The effectiveness of environmental protection measures described in this EMP and sub plans will be assessed monthly ('the monthly assessment') during construction by the Site Manager. During which, the following activities will be undertaken:

- Provide a surveillance tool to ensure that safeguards are being implemented.
- Identify where problems might be occurring.
- Identify where sound environmental practices are not being implemented.
- Facilitate the identification and early resolution of problems.

Weekly environmental visual inspections will monitor aspects including:

- Review of relevant works approvals and permits.
- Erosion and sediment controls and review of associated plans.

- Drainage/groundwater protection.
- Air quality, odours, dust emissions and mitigating controls.
- Noise and vibration management including approved working hours and required respites and safe working distances.
- Hazardous substances and dangerous goods (including fuels and chemicals) and recording any spills.
- Waste management, recycling and recovery.

The weekly environmental inspections will be undertaken by the Site Manager, or a delegated suitably qualified person, who will fill out a weekly environmental inspection checklist to ensure all relevant aspects are assessed. The relevant aspects, their trigger values, and corrective actions, is provided in **Table 7-1**

Any non-conformances identified will be highlighted discussed at regular project meetings by the Site Manager where rectification actions are discussed with all site teams.

The checklist will remain 'open' until:

- The issue has been resolved.
- A new or revised procedure has been established and implemented.
- Training has been provided to relevant personnel/ sub-contractors.

Regular inspections to assess environmental management will be undertaken and documented as appropriate.

5.4.2 Operational requirements

During operation the following monitoring will be undertaken:

- Compliance monitoring and reporting as described in the LMRP.
- Regular site inspections to ensure environmental compliance, site hygiene and minimisation of complaints
- Operational noise monitoring.
- Complaints monitoring.
- Incident monitoring and reporting.

5.5 Compliance

Ongoing monitoring and auditing will be undertaken by both Pacific Green and the Principal Contractor to determine whether environmental protection measures are being implemented and performing effectively, as discussed in **Section 4.4**.

A non-compliance is defined as an occurrence, set of circumstances or development that is a breach of the intent and procedures of the project EMP. Non-compliances may occur during the implementation of the EMP and may include events such as failure to maintain sediment and erosion controls, accidental spills from machinery etc.

Where a non-compliance is identified, the Site Manager and Project Manager shall be informed and the non-conformity rectified as soon as possible, as per the requirements of the relevant procedure(s). The non-compliance shall be recorded and detailed as per the requirements of **Section 4.6** to inform relevant follow up / review actions.

Detail of the action taken to rectify the non-compliance shall be provided to those affected in writing. Where a non-compliance cannot be rectified, the EMP will be updated as per the requirements of **Section 4.8**.

5.6 Incident reporting

During **construction**, contractors will report all significant environmental and safety events to the Principal Contractor and Pacific Green within one hour of the incident occurring, or if not reasonably practicable, as soon as possible. The Principal Contractor will report to relevant government agencies as required by approval conditions and legislation within any statutory reporting timeframes. The Principal Contractor shall facilitate the completion of environmental incident forms for any environmental incident that occurs on the site. The Site Manager shall review all incident forms.

During **operation**, staff will report all environmental and safety events to Pacific Green or the Operational Manager within one hour of the incident occurring, or if not reasonably practicable, as soon as possible. Pacific Green will report to relevant government agencies as required by approval conditions and legislation within any statutory reporting timeframes. The Operational Manager shall facilitate the completion of environmental incident forms for any environmental incident that occurs on the site. Pacific Green, or their delegate, shall review all incident forms.

The environmental incident forms will be collated and reported on in the annual monitoring report. This report essentially serves as an environmental audit of activities implemented and outcomes under the LMRP. It will be submitted to the Department of Climate Change, Energy and the Environment (DCCEEW) on an annual basis for 10 years and shared with DTP for the first 3 years. If the EMP requires modification, these modifications will be presented in this annual monitoring report, along with an updated compliance of the EMP.

Relevant authorities will be contacted if necessary, depending on the type of incident:

- Requiring emergency response within 24 hours of that incident.
- Within 7 days after the non-compliance is identified.

5.7 Record keeping

During all phases of the project, an appropriate and auditable record system will be maintained. Environmental records will include:

- Training and induction attendance.
- Non-conformance reports.
- Remedial actions taken following incident reports.
- Inspection reports and monitoring results.
- Consultation records and complaints register.
- Audit reports.

During construction, the Site Manager (or person nominated by the Site Manager) shall be responsible for the maintenance of all documents relating to the implementation of the EMP. During operation, Pacific Green (or a person nominated by Pacific Green) shall be responsible. The documents include any additional assessment undertaken, registers for the maintenance of the EMP (site inspection forms, works approval checklists, revised plans, etc.).

All records shall be retained by the Principal Contractor throughout the time of implementation of the EMP. In the event that the role of operator or Principal Contractor is transferred from one organisation to another, control of all relevant (historical and current) documents will be transferred for safekeeping to the current Responsible Person.

©JBS&G Australia Pty Ltd

5.8 Review of the EMP

The EMP is a working document that will be reviewed and updated as required during the construction and operation to ensure that it reflects current best practice environmental management. Review of the EMP will include a process of adaptive management, whereby the effectiveness and performance of current controls and mitigation measures are assessed and improved to ensure robust environmental performance.

A review of the EMP shall be undertaken in response to a non-compliance with the EMP, or at a minimum of once per year by an appropriately qualified contractor/consultant in conjunction with the Site Manager, Pacific Green Project Manager and/or the Operational Manager.

The review process will examine at a minimum:

- Practicalities and efficiencies of management measures and whether there are more effective ways to improve environmental compliance.
- Incident reporting and procedures for preventative actions.
- Any non-compliances with the EMP that have been unable to be resolved.
- Complaints handling procedures.
- Emergency response procedures for environmental incidents.
- Any changes in state or national environmental protection legislation or guidelines that impact any part of the EMP.
- Any proposed changes in land-use of the site or adjoining sites which may impact upon exposure pathways.

If there are substantial changes to work activities on site (outside to those described in this EMP) then a complete review of the EMP document and compliance measures will be necessary to identify suitable replacement EMP compliance mechanisms.

In addition, where a review identifies items which are required to be modified, or added to the EMP, then a revision of the EMP shall be prepared by a suitably qualified person.

Note: Prior to undertaking any activities other than in accordance with the approved management plan specified in the approval conditions, revised management plans must be submitted to DCCEEW and the relevant state government departments. The varied activity should not commence until the relevant Minister has approved the varied management plan in writing, which is only likely if the management plan would result in an equivalent or improved environmental outcome over time.

5.9 Communications, Emergency Contacts and Responses

5.9.1 Site communications

Communication during site works is critical to the safety and effectiveness of the work program. Pathways of communication include:

- Communication between site personnel, including Pacific Green and subcontractors.
- Communication between the Site Manager and all site personnel via daily prestart and toolbox meetings. This communication will establish the operational and environmental conditions for the day and for the following planned day ahead (at relevant prestart and toolbox meetings). These meetings will discuss the environmental controls and restrictions on work tasks to mitigate environmental impacts and will be documented in the daily field notes for the project.

- The Site Manager will report to the Project Manager information that encompasses all parameters required for the continued compliance to the EMP. Communication will be via telephone or email, as the circumstances require.
- The Site Manager with the assistance of the Project Engineer will report results and data collected over the course of site work to the Project Manager. This will be communicated via telephone/email daily summaries.

Table 4-2 contains a list of emergency response personnel, key persons, and relevant stakeholders and their relevant contact information. In the event that a significant issue develops at the site, including, but not limited to, a chemical spill, or uncontrolled release to land, water or atmosphere; health and safety incident; or a significant change in project scope, authorised persons can consult the EMP for contact information.

Table 4-2: Emergency contacts

Emergency contact	Contact details
Glenelg Shire Council	1300 002 642
Emergency services (police, fire, hazmat, ambulance)	000/112
Portland District Health – emergency department (141-151 Bentinck St, Portland 3305)	03 5521 0333
SES	132 500
Work Safe Victoria (24 hours)	132 360
Victoria EPA Pollution (24 hours)	1300 372 842
Pacific Green Project Manager	[name] [number] TBC
Principal Contractor Project Manager	[name] [number] TBC

All contact information will be verified and updated as necessary during the works.

5.9.2 Community engagement

During all stages of the project, Pacific Green has committed to informing, consulting, and involving appropriate stakeholders through an effective engagement process based on the objectives and principles of community engagement best practices and guidelines.

Pacific Green has a website for the project as part of their community engagement strategy (https://www.pacificgreen.com/aus/projects/portland/). This website includes contact details for enquiries and complaints.

During construction, the contact telephone number and email address of the Site Manager will be displayed on the gates and hoarding of the site.

5.9.3 Complaints and feedback protocol

A complaints register shall be maintained by Pacific Green or their representative.

An interaction will be recorded as a complaint if the stakeholder expresses a dissatisfaction in relation to the project or the proponent, consistent with the definition of a complaint as described in the Australian and New Zealand Guidelines for Complaint Management (ISO 10002:2018, NEQ).

If a complaint or feedback is received via the contact telephone number or email address, the Site Manager will investigate and resolve the complaint directly with the complainant.

If a complaint is received face-to-face on/near the project site by a project team member to their supervisor is to be advised who will then notify the Site Manager. The Site Manager may be notified initially by telephone or verbally, and a follow-up written notification shall be provided via email. The Site Manager/Operational Manager is to then add this to the complaints register and contact the complainant.

Recording and responding to (if required) complaints are to be actioned immediately and closed out within five business days, unless escalation is required.

6. Environmental risk management

This section sets out the qualitative risk assessment methodology that has been used to assess project risks.

A list of risks associated with the construction and operation of the project was collated and each risk assessed against its likelihood of occurrence (**Table 5-1**) and its potential consequence on the environment (**Table 5-2**). This resulted in a risk rating for each risk based on the risk evaluation matrix (**Table 5-3**).

Management controls were identified for each risk to reduce its potential consequence. The risks were re-assessed in the risk evaluation matrix taking into consideration the reduced impact. The residual risk rating, along with the initial risks and control measures, is provided in **Appendix A**. This risk register provided the foundation for the management prescriptions outlined in this EMP, specifically the controls in **Section 6**.

Table 5-1: Likelihood of occurrence

LIKELIHOOD	LIKELIHOOD DESCRIPTION
Almost certain	>75% probability of occurrence, and/or has occurred recently with a high degree of confidence it will occur again.
Likely	51 – 74 % probability of occurrence, and/or has a history of consistent occurrence and is reasonable to expect it will occur again.
Possible	16-50% probability of occurrence.
Unlikely	3 – 15 % probability of occurrence, and/or minimal or sporadic historical instances of occurrence.
Very unlikely	<3% probability of occurrence, a rare event

Table 5-2: Potential consequence

CONSEQUENCE	PROJECT CONSEQUENCE DESCRIPTION
No threat	No impact to the environment.
Low threat	Negligible impact on the environment: Possible minor behavioural responses in fauna or loss of some common native flora species.
Moderate threat	Minor impact on the environment: Limited impact on native vegetation or common fauna species, including minor loss.
Significant threat	Short-term impact on environment: Moderate direct loss of native vegetation, which can be offset. Moderate direct loss of fauna that is important at a local scale.
Major threat	Serious medium-term impact on environment: Substantial impact on native vegetation that can only be partially offset or substantial impact on individuals of a population of animals that are listed as threatened at a State or Commonwealth level.
Critical threat	Significant long-term impact on environment: Native vegetation loss has no offsets available, loss of a critical Threatened Ecological Community or significant loss of an important population of fauna that is listed as threatened at a State or Commonwealth level.

Table 5-3: Risk evaluation matrix

LIKELIHOOD	CONSEQUENCE				
	Low threat	Moderate threat	Significant threat	Major threat	Critical threat
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	Extreme	Extreme
Possible	Low	Medium	Medium	High	High
Unlikely	Low	Low	Low	Medium	High

Events that are very unlikely to occur or have a consequence of no threat have not been considered in the risk evaluation matrix due to the very low level of risk they result in.

6.1 Risk determinations

Thirsty six (36) risks were identified as presented in **Table 5-4**.

Table 5-4: Environmental risks and risk descriptions applied for the Project

Risk No.	Risk Description
Env.Risk1	Illegal removal of native vegetation potentially resulting in fines, authority proceedings, and stop work orders.
Env.Risk2	Recklessly injuring protected native fauna, potentially resulting in fines, proceedings, and community backlash.
Env.Risk3	Damage (physical or chemical) to native vegetation to be protected (i.e. not proposed to be removed).
Env.Risk4	The potential loss of habitat connectivity of heathy woodland utilised by bandicoots, antechinus and other ground-dwelling fauna and birds.
Env.Risk5	Significant impacts to Matters of National Environmental Significance (MNES) through unmitigated habitat removal, fragmentation from clearance, earthworks, and physical disturbance
Env.Risk6	Direct injury, death, or displacement of fauna from the approved clearance of vegetation (habitat) and earthworks or entrapment in trenches.
Env.Risk7	Physical disturbance to habitats during the operational phase for maintenance, replacement or repair of infrastructure.
Env.Risk8	The potential exists for the creation of dust through construction activities.
Env.Risk9	Construction and decommissioning activities can potentially result in impacts to soil, including erosion and sedimentation, soil compaction, soil inversion and soil contamination.
Env.Risk10	The placement of stockpiles, storage of construction materials, parking, and vehicle movement throughout the project area can damage protected vegetation.
Env.Risk11	The potential for mass release of proposed fill (clean soil and rock) smothering existing vegetation and habitat for the Blue-winged Parrot.
Env.Risk12	Temporary disturbance to fauna caused by factors such as noise and vibration during construction.
Env.Risk13	The potential for long-term disturbance to fauna caused by factors such as noise and vibration during operation.
Env.Risk14	The potential for artificial lighting during construction causing impacts to nocturnal fauna, particular bats and ground-dwelling mammals like the MNES Southern Bent-wing Bat, Southern Brown Bandicoot, and Swamp Antechinus.
Env.Risk15	The potential for artificial operational lighting causing impacts to nocturnal fauna, particular bats and ground-dwelling mammals like the MNES Southern Bent-wing Bat, Southern Brown Bandicoot, and Swamp Antechinus.
Env.Risk16	Alteration to surface water flows and erosion in the flow paths causing water quality impacts.
Env.Risk17	Habitat degradation from surface hydrological changes and/or reduced water quality during construction, including the wetland foraging habitat for the Southern Bent-wing Bat.
Env.Risk18	Habitat degradation from surface hydrological changes and/or reduced water quality during operation, including the wetland foraging habitat for the Southern Bent-wing Bat.
Env.Risk19	Contamination of surface water and groundwater during construction, including the wetland foraging habitat for the Southern Bent-wing Bat.
Env.Risk20	Contamination of surface water and groundwater during operation, including the wetland foraging habitat for the Southern Bent-wing Bat.
Env.Risk21	Chemical spills during construction can result in localised soil contamination and could cause off-site contamination if spills are not appropriately managed.
Env.Risk22	Soil contamination could potentially occur as a result of a spill of fuel or chemicals (e.g. lubricants or herbicides) during the operational phase.

Risk No.	Risk Description
Env.Risk23	Impact on Aboriginal Heritage, including damage to Aboriginal places or objects.
Env.Risk24	The expected increase in traffic movements on local roads during the construction phase has the potential to increase traffic interactions with fauna, particularly ground-dwelling fauna like the MNES Southern Brown Bandicoot, or displacement due to avoidance of the increased number of vehicles.
Env.Risk25	Direct injury, death or displacement of terrestrial fauna like the MNES Southern Brown Bandicoot from collision or avoidance of an increased number of vehicles during operation.
Env.Risk26	The risk that a natural phenomenon (flood, fire or drought) will cause death and loss of restored ecological habitat.
Env.Risk27	Construction activities have the potential to increase the risk of bushfire.
Env.Risk28	Habitat degradation from the increased risk of fire associated with construction.
Env.Risk29	Direct injury, death or displacement of terrestrial fauna from increased risk of fire associated with construction, such as the MNES Southern Brown Bandicoot or Swamp Antechinus.
Env.Risk30	Direct injury, death or displacement of terrestrial fauna from increased risk of fire associated with operation, such as the MNES Southern Brown Bandicoot or Swamp Antechinus.
Env.Risk31	The potential for a fire during operations to cause water-quality damage and uncontrolled release of contaminated water into the natural environment.
Env.Risk32	The risk that cattle breach fencing and destroy revegetation efforts to rehabilitate wetlands.
Env.Risk33	Overgrazing by stock causing land degradation in Blue-winged Parrot habitat.
Env.Risk34	Habitat degradation from the introduction or spread of invasive species or pathogens during the construction phase.
Env.Risk35	Habitat degradation from the introduction or spread of invasive species or pathogens during the operation phase.
Env.Risk36	Uncontrolled pest animals (including cattle) outcompeting, predating or impacting native species.

The management measures for each risk, are detailed in **Appendix A**.

Figure 5 presents a summary of raw risks (15 High and 21 Medium) versus the residual risk ratings (13 Medium and 23 Low) as determined if the proposed mitigations are implemented (as seen in **Appendix A**).

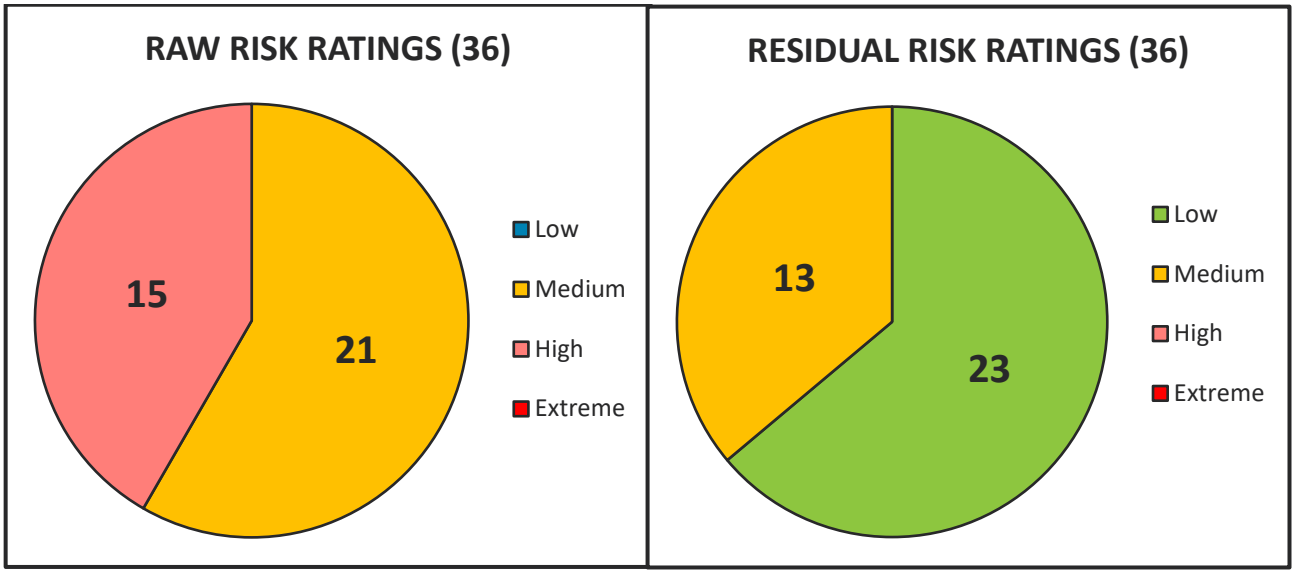


Figure 5: Raw (initial) risks ratings and residual risk rating after mitigation

Given that no 'high risk' residual risks occur, additional controls have not been put in place to manage contingency or provide a margin of safety to detect, avoid or mitigate a risk that does not behave in the way planned within this document. However, it should be noted that the whole EMP is an 'adaptive plan' and will be regularly monitored and reviewed as described in Section 4.4 - Section4.8. This provides a mechanism to respond to changing risks, new risks or conditions. However, for each 'medium residual risk' presented in **Appendix A** additional corrective actions have been considered or will be developed within the appropriate sub-plan.

7. Environmental management

This section outlines environmental objectives and mitigation and management controls for the project. These have been developed based on the risk and management measures identified in the risk register, provided in **Table 5-4**.

The EPRs and their management strategies have been split up based on whether they are to be undertaken during the construction or operational phase of the project (C-EPRs and O-EPRs).

Key legislative considerations and measures to be implemented to avoid and / or minimise environmental impacts are highlighted for each matter. The mitigation and management controls represent the minimum requirements that will be adopted, noting that changes may be required based on the final methodology proposed by the chosen contractor and operator.

In addition, specific management plans will be prepared for the following matters:

- Construction Noise and Vibration Management Plan (CNVMP)
- Traffic Management Plan (TMP)
- Soil Erosion and Drainage Management Plan (SEDMP)
- Fire Management Plan (FMP)
- Cultural Heritage Management Plan (CHMP)
- Emergency Response Management Plan (ERMP)

They will form part of the overarching EMP, but until they are prepared, specific requirements from these management plans cannot be summarised within the relevant EPRs.

It is noted that no EPRs relating to cultural heritage management are included in this EMP. All cultural heritage management measures are to be addressed in a CHMP.

7.1 Construction environmental management

Management strategies to be undertaken during the construction phase of the project for the following matters are addressed in this EMP:

- C-EPR01 Air quality
- C-EPR02 Noise and vibration
- C-EPR03 Lighting
- C-EPR04 Traffic
- C-EPR05 Erosion and sediment control
- C-EPR06 Waste management
- C-EPR07 Soil and contamination
- C-EPR08 Surface water and groundwater
- C-EPR09 Ecology, flora and fauna
- C-EPR10 Weed and pest management
- C-EPR11 Public safety
- C-EPR12 Fire
- C-EPR13 Environmental emergency response

C-EPR01 Air quality

Air quality		C-EPR01
Responsibility:	Principal Contractor	
Frequency:	Continuous	
Objective:	To minimise dust emissions from construction activities	

Background

Key potential sources of dust have been from the following sources:

- Construction activities including vegetation clearance of native pasture, earthworks and excavation, concrete slab foundations, and trenching for cabling.
- Vehicles accessing the site and the movement of vehicles along unpaved roads and access tracks.

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- EP Act

Mitigations and control measures

The following mitigation measures will be implemented for all works:

- Where dust is visible during the construction phase, dust control measures, including the use of water trucks and vehicle speed limits (e.g. < 40 km/hr on dirt roads) will be implemented.
- Where possible, utilise stabilising techniques and/or environmentally acceptable dust treatments (e.g. temporary vegetation) in lieu of wetting controls.
- Avoid undertaking earthworks during high wind conditions (wind speed over 35 km/h or 9 m/s or 19 knots).
- Limit stockpiling of soil and stabilise, if required.
- Undertake progressive rehabilitation of disturbed areas during the construction phase. Rehabilitation includes activities such as reseeding to promote vegetation regrowth.
- Any material tipping occurring onsite will be done at the lowest possible height.
- Trucks used for transport of soil will be fully enclosed and covered to prevent loss of materials during transport.
- Maintain suitable surfacing (e.g. gravel) of high traffic areas within the project area.
- Visually monitor dust control measures regularly for effectiveness.
- Develop a procedure to promptly identify and respond to issues generating complaints. If complaints are received regarding dust, the frequency of water spraying or dry removal will be increased and recorded in the site register.

©JBS&G Australia Pty Ltd

C-EPR02 Noise and vibration

Noise and vibration	C-EPR02
Responsibility:	Principal Contractor
Frequency:	Where activities are undertaken that may potentially cause noise or vibration Continuous
Objective:	To mitigate impacts of noise and vibration on adjoining land and fauna species

Background

Noise and vibration have the potential to impact surrounding neighbours and the public, as well as causing temporary disturbance to fauna species.

Noise would be generated by a range of equipment used during construction, including earth-moving equipment for civil works, diesel generators, trucks, and cranes. These would have similar noise outputs to farm machinery such as tractors; however, the duration of output is likely to be significantly longer. The majority of noise and vibration generating construction activities will be undertaken during the daytime, with key activities including:

- Vegetation clearance.
- Earthworks including benching.
- Road traffic associated with the delivery of construction materials.
- Road traffic associated with the delivery of electrical infrastructure such as batteries, transmission connection infrastructure, switching stations etc.
- Construction activities such as for the battery foundations and the operations and maintenance building.

All construction activities will be restricted to 7 am to 6 pm Monday to Friday, 9 am to 3 pm on Saturdays, and 9 am to 3 pm on Sundays and Public Holidays when required.

A noise impact assessment was undertaken for the project (Marshall Day Acoustics, 2024). It determined that the project can be designed and operated in compliance with the EP Regulations, Noise Protocol, and other applicable legislation (Marshall Day Acoustics, 2024).

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- EP Act
- EP Regulations
- Environment Reference Standard
- EPA Publication 1826.4 Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues

Mitigations and control measures

All reasonable and practicable mitigation measures will be implemented to minimise construction noise including:

- Being aware of transport related noise and avoiding the transportation of materials, equipment and plant outside the operating hours. All deliveries to and from the site must be made during the scheduled work hours (7 am to 6 pm Monday to Friday or 9 am to 3 pm on Saturdays (and Sundays and Public Holidays when required)).
- Schedule noisier activities where this could impact receptors to coincide with business hours wherever possible. For example, between the hours of 9.00 am – 5.00 pm.
- Ensuring that noise reduction devices such as attenuators on the battery units are fitted and operating effectively.
- Shutting or throttling equipment down when not in active use.
- Ensuring that equipment is not operated if maintenance or repairs would eliminate or significantly reduce a characteristic of noise resulting from its operation that is audible by noise-sensitive receptors.
- Operating equipment and handling materials to minimise impact noise.
- Using off-site or other alternative processes that eliminate or lessen resulting noise.
- Creation of a CNVMP.

Additionally:

- Ensure that plant and equipment are properly maintained.

©JBS&G Australia Pty Ltd

Noise and vibration	C-EPR02
• Avoid unnecessary noise when carrying out manual operations and when operating plant. • Review equipment specifications and locations during detailed design to ensure that operational noise requirements continue to be met. • Undertake ongoing consultation with the community to identify any construction noise issues and where possible identify measures to minimise disruption.	

C-EPR03 Lighting

Lighting	C-EPR03
Responsibility:	Principal Contractor
Frequency:	On going
Objective:	To ensure appropriate management of light pollution

Background

The use of artificial lighting has the potential to impact surrounding neighbours and fauna species, in particular bats and ground-dwelling mammals. This is especially a risk for three listed threatened fauna species that are likely to occur or have the potential to occur within the project area, including the Southern Bent-wing Bat *Miniopterus orianae bassanii*, Southern Brown Bandicoot *Isoodon obesulus*, and Swamp Antechinus *Antechinus minimus*.

Bats

The use of artificial light at night can impact bats at roost sites, commuting corridors, and foraging areas. Impacts are species-specific, but can include attraction to artificial lights, changes in prey availability, habitat degradation, and avoidance of artificial light (DCCEEW, 2023).

Artificial light in commuting areas can cause habitat fragmentation, particularly for light-avoidant bats, potentially resulting in longer flight times and increased energy expenditure (Stone et al., 2015). Insectivores are likely to be affected by artificial light in multiple ways, including changes in prey availability, as their primary food source, insects, may also be susceptible to impacts from artificial light (Owens et al., 2020)(Rowse et al., 2016).

Ground-dwelling fauna

The use of artificial light can impact fauna by disrupting normal activity patterns, increasing predation risk, and altering the breeding and physiology of terrestrial fauna (DCCEEW, 2023). Artificial light at fauna refuge sites, foraging areas, and commuting routes can result in habitat fragmentation, consequently limiting access to foraging sites and dispersal of individuals (Gaston & Bennie, 2014). These impacts vary case-by-case, but for threatened species the impacts may reduce the capacity of a species to persist or recover (DCCEEW, 2023).

As lighting is required in the project area during construction, management measures will be implemented to ensure impacts to fauna species and surrounding neighbours are reduced.

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- National Light Pollution Guidelines for Wildlife
- Reducing the Effect of Light Pollution on Wildlife
- OHS Act
- OHS Regulations
- FFG Act
- EPBC Act

Mitigations and control measures

The following mitigation measures will be implemented for all works:

- Lighting design for the project, particularly near the upgraded wetland area, will be in accordance with the National Light Pollution Guidelines for Wildlife.
- No construction works will be undertaken at night unless instructed to by a regulatory authority.
- Lighting will be directional and fully shielded. This will decrease the amount of light spill into areas not intended to be lit and contribute less to skyglow.
- Lighting closest to the wetland will be directed away from the wetland area and light spill into roadside patches will be minimized.
- The number and intensity of lights needed will be minimised to only that which is required.
- Light globes used across the project area will be chosen from the list of lighting least impactful to bats, including:
  - low-pressure sodium vapour,
  - filtered Light Emitting Diode (LED),
  - filtered metal halide, filtered white LED or amber LED or Phosphor Converted (PC) amber LED

Lighting	C-EPR03
• Where possible, design will implement smart-controlled lights which only switch on when personnel are present. • Lighting design for the project, particularly near the upgraded wetland area, will be in accordance with the National Light Pollution Guidelines for Wildlife. • Maintaining suitable vegetation cover, including canopy cover for arboreal species and ensuring artificial light does not spill into the habitat, can reduce the impacts of artificial light on activity and behaviour of terrestrial mammals (DCCEEW, 2023).	

C-EPR04 Traffic

Traffic	C-EPR04
Responsibility:	Principal Contractor
Frequency:	Heavy vehicle movements as generated by site works
Objective:	To minimise impacts on local road network and reduce traffic interactions with fauna, particularly ground-dwelling fauna

Background

The expected increase in traffic movements on local roads during the construction phase has the potential to disrupt local traffic networks and normal community activities. It also has the potential to impact fauna in the area, especially ground-dwelling species, through increased traffic interactions or fauna displacement due to avoidance of the increased number of vehicles.

A Transport Impact Assessment Report (TIAR) was undertaken for the site (ESR Transport Planning, 2024). Construction of the project is expected to occur over approximately 18 months. The construction phase will include delivery of construction materials, civil works equipment, and workers transportation.

Table 6-1 summarises the estimated number of Vehicles Per Day (vpd) that are expected to be generated from each phase of the project construction.

Table 6-1: Estimated generated traffic during the construction of the project (source: ESR Transport Planning, 2024)

	Construction phase			
	Site preparation	**Battery installation**	**Electrical**	**Commissioning**
Duration of phase	~ 6 months	~ 6 months	~ 3 months	~ 3 months
Assumed light vehicle volume per day[1]	500 vpd (morning peak 165 arriving, afternoon peak 165 departing)	500 vpd (morning peak 165 arriving, afternoon peak 165 departing)	500 vpd (morning peak 165 arriving, afternoon peak 165 departing)	75 vpd (morning peak 25 arriving, afternoon peak 25 departing)
Assumed heavy vehicle volume per day	120 vpd (single entry and exit every 10 minutes for 10 hours)	32 vpd (12 containers x 2 movements, +35% ancillary)	60 vpd (single entry and exit every 20 minutes for 10 hours)	None

Intensive construction activities will see volumes of traffic in the order of 500-620 vehicle movements daily. Access to the project will strictly be from Madeira Packet Road, which currently accommodates approximately 900 vpd (ESR Transport Planning, 2024). This road has a capacity in the order of tens of thousands of vehicle movements, meaning it has ample spare capacity to accommodate well above anticipated construction traffic whilst maintaining favourable operating performance (ESR Transport Planning, 2024). The other nearby streets that are likely to accommodate a share of staff vehicle movements per day, Cape Nelson Road and Wellington Road, are expected to accommodate the traffic increase with no impact to efficient operating conditions or residential amenity (ESR Transport Planning, 2024).

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- Glenelg Planning Scheme
- AUSTROADS Guide to Road Design
- AUSTROADS Guide to Traffic Management
- Australian Standard (AS) AS2890: Australian Standard for Parking Facilities

[1] Light vehicle assumptions: 100% staff arrive within motor vehicle, 1.2 average vehicle occupancy, 2.5 average vehicle movements per day, +20% for others (e.g. deliveries).

Mitigations and control measures

A TMP will be prepared during the detailed design phase. Pacific Green will work in close contact with DTP and the Glenelg Shire Council in the preparation of the TMP and development of mitigation and management measures.

The TMP will consider the following aspects:

- Routes to be used by project construction traffic.
- Assessment of road conditions prior to construction.
- Review access requirements and upgrade road formation as required.
- Traffic controls (e.g. speed limits and signage) where appropriate.
- Procedures to monitor traffic impacts and adapt controls (where required) to reduce impacts.
- Community consultation regarding traffic impacts for nearby residents.
- Maintenance of road pavement conditions during construction.

Additionally:

- No construction works will be undertaken at night, when many faunal groups such as ground-dwelling mammals and bats are active.
- Temporary traffic management measures (e.g. trucks entering signage, other signage, construction zone speed limits, etc.) at key locations where significant volumes of construction traffic will be entering and exiting.
- Ensuring any vegetation close to roadway carriageways near access intersections is trimmed if necessary to afford vehicles giving way an unobstructed sight line to through traffic in accordance with design minimum standards.
- Upgrades to critical road pavements/surfaces to ensure the increased construction traffic activity does not lead to significant deterioration that would become hazardous.
- Where access tracks intersect with Madeira Packet Road, ensuring a formed carriageway width accommodates simultaneous traffic in both directions with return radii that accommodate swept paths of the largest regular access vehicle, considered to be a semi-trailer.
- Any area where arriving vehicles are likely to stop, such as a weighbridge or car parking area, be setback sufficient distance to avoid queues extending back to the site access intersection.
- A range of measures to ensure safe operation of vehicles along access tracks (such as staff induction / training, maximum operating speeds, speed zone signage, communication protocols, etc.).
- Dust suppression activities and ensuring mud from works areas or access tracks is not deposited onto sealed roadways (such as with gravel surfacing of access tracks.
- A permanent reduction in the Madeira Packet Road speed limit to 80 kilometres per hour (kph) and a localised temporary speed limit as part of construction traffic management, e.g. 40 kph.
- Signage may be erected to warn travellers of fauna, such as the Southern Brown Bandicoot.
- Given the sight distance restrictions of the Tecoma Road intersection, the provision of a site access from Tecoma Road is discouraged, particularly for heavy vehicle traffic, unless the Madeira Packet Road speed zone is 80 kph or less.
- Design and development of on-site parking requirements and provisions for a 180-space temporary carpark during construction in accordance with Planning Scheme Clause 52.06-9 Design Standard 2.
- Modify site access intersection layouts to accommodate swept paths of the largest regular access vehicle, considered to be a semi-trailer, passing in either direction.
- Review the need and ability for semi-trailers to deliver battery containers to each row of the battery parks, noting that the layouts currently do not accommodate this size vehicle around all curves and corners.
- Access track intersections with Madeira Packet Road be minimised, with an opportunity to consolidate 2 adjacent connections located approximately midway along the West Site boundary.
- Car parking and access tracks will be located outside of the area of native vegetation to be retained and any associated Tree Protection Zones (TPZ).

©JBS&G Australia Pty Ltd

C-EPR05 Erosion and sediment control

Erosion and sediment control	C-EPR05
Responsibility:	Principal Contractor
Frequency:	Disturbance of soils or storage of exposed soils
Objective:	To minimise potential of sediment generation and migration

Background

Considering the undulating nature of the project area, earthworks will be required to create benching and achieve a level platform(s) upon which the project will be constructed. Excavation and earthworks will be required for the construction of the new access points at Madeira Packet Road, internal access tracks, and parking areas. The disturbance of soil during construction has the potential to cause erosion and sediment impacts on the surrounding area, including:

- The potential for a mass release of proposed fill (clean soil and rock) due to benching failure smothering native vegetation that is to be retained, including habitat for listed threatened species.
- Soil erosion resulting in the sedimentation of surface water.

Considering the scale of earthworks proposed for the site, a SEDMP will include soil and erosion control best practice as detailed in the International Erosion Control Association (2008) document 'Best Practice Erosion and Sediment Control'. The SEDMP will also be prepared in accordance with the EPA Victoria Publication 275: Construction Techniques for Sediment Pollution Control (EPA Victoria, 1991), EPA Victoria Publication 1834.1: Civil Construction, Building, and Demolition Guide (EPA Victoria, 2023), and any other relevant guidelines. The SEDMP will be produced for the construction works and provide designs and procedures of sediment control devices.

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- EP Act
- International Erosion Control Association: Best Practice Erosion and Sediment Control
- EPA Victoria Publication 275: Construction Techniques for Sediment Pollution Control
- EPA Victoria Publication 1834.1: Civil Construction, Building, and Demolition Guide

Mitigations and control measures

- Induction program for all staff working on the project to cover erosion management prior to construction commencing.
- Minimise disturbance to soil surface and retain ground cover as much as possible, prior to and during construction, to minimise areas exposed to erosion.
- Locate stockpiles and the works area outside of areas of native vegetation to be retained.
- Locate areas of temporary disturbance within the final/permanent disturbance footprint where possible as presented in **Figure 3**.
- Restrict activities causing excessive rutting or soil compaction in wet or boggy conditions, particularly around wetlands/ ephemeral wetlands.
- Construction activities likely to result in high levels of dust mobilisation will be avoided during high wind conditions. Where dust is visible during the construction phase, dust control measures, including the use of water trucks and implementation of vehicle speed limits, will be implemented where required.
- Benching to be designed to minimise the chance of mass release, including appropriate grading of slopes. Construction of benching to be undertaken in staging to ensure fill is not left uncapped with concrete for extended periods of time.
- Berms or drainage controls, stockpile management, and sediment fencing will be implemented for the proposed excavation works to minimise and manage erosion and sedimentation across the project area during construction.
- Stockpile topsoil separately from subsoil, particularly in areas where the natural surface will be reinstated.
- Limit the height and size of stockpiles to a maximum 2:1 height to width ratio as recommended in Melbourne Water *The Site EMP Kit - Guidance Notes* (Melbourne Water, 2017), and preferably no higher than 5 m (based on

available guidance from EPA South Australia, 2020). Stockpile management uses the Victorian guidelines where practicable, and the EPA South Australian for height limits as this is deemed best practice.

- If heavy rain is forecast, sediment control fences/ filters or similar will be constructed around stockpiles to prevent sediment runoff.
- Hay bales or similar will be placed around stockpiles so water is diverted around stockpiles.
- Site personnel and equipment de-contamination occur in designated areas as required when handling excavated soil. All plant will be de-contaminated (within allocated de-contamination/washdown areas) prior to being taken off-site.
- Vehicle and plant wash down area(s) will have appropriate sediment controls around it and be large enough to hold all wastewater generated. The washdown area will be clearly signposted to alert subcontractors and staff of their responsibilities.
- Change in surface water drainage pathways causing erosion to be mitigated during construction.
- Design to consider surface water drainage and possible erosion and install appropriate soil erosion and drainage management measures, such as:
  - Diversion of uncontaminated runoff around site works as practicable, i.e. a diversion bund up gradient of the proposed works area with sandbags to divert the water around the work to a potential nearby open drain.
  - Alternatively, the diverted water can be fed into a constructed sump or settling tank. After a sufficient period of time where the sediment has settled, the water can be pumped out (being filtered if necessary) to the local stormwater drainage or reused on-site for dust suppression (provided no impact is noted). This may require additional testing prior to disposal.
  - Install temporary sediment trap(s) (e.g. gravel sausages/sandbags/haybales) around drains.
  - Stockpiles are to be placed in designated areas which can be appropriately bunded using appropriate sediment fences, gravel sausages/sandbags or straw bales.
- Backfill and compact trenches to a level consistent with surrounding soils or in line with final facility design to minimise the potential for subsidence and erosion.
- Rip or scarify areas of temporary disturbance (e.g. temporary construction compound) where appropriate to promote revegetation.
- Rehabilitate areas of disturbed soil promptly and progressively during construction.

©JBS&G Australia Pty Ltd

C-EPR06 Waste management

Waste management		C-EPR06
Responsibility:	Principal Contractor	
Frequency:	Continuous	
Objective:	To minimise the amount of waste generated during construction	

Background

A range of waste products will be generated during the construction phase of the project. These will include wooden pallets, plastic wrapping, drums, metal offcuts and contractor litter, food and drink waste products.

Waste will be managed in accordance with the waste management hierarchy shown in **Plate 6-1** and the requirements of the EP Act.

Plate 6-1: Waste management hierarchy (Source: EPA South Australia, 2022)

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- EP Act
- EP Regulations

Mitigations and control measures

The following general practices will be used to reduce waste:

- Dedicated waste storage and handling areas and facilities will be provided during construction.
- Construction waste generated during the construction phase will be stored in skips (located in the temporary construction compound) with windshields and lids.
- Waste will be separated into different streams to facilitate recycling with waste removed from the site by a licensed contractor as appropriate.
- Collection and disposal of construction waste is expected to be conducted at the rate at which waste is generated to minimise the volume of construction waste on-site.
- Liquid waste (including hydrocarbons, paints, and solvents) will be stored in sealed drums and containers in a bunded area before removal from the site by an EPA licensed contractor for recycling, where possible, or disposal to a licensed facility.
- Areas for activities including loading and unloading and storage of waste refuse bins will be designed to prevent all wastewater from polluting stormwater.

Waste management	C-EPR06

- Waste will be managed in accordance with the waste management hierarchy (see **Plate 6-1**) (EPA South Australia, 2024).
- Any waste material to be disposed off-site will be analysed and classified by an appropriately qualified and experienced Environmental Consultant in accordance with relevant EPA guidelines prior to off-site disposal.

C-EPR07 Soil and contamination

Soil and contamination	C-EPR07
Responsibility:	Principal Contractor
Frequency:	On the identification of unanticipated site conditions
Objective:	To ensure appropriate prevention and management of contaminated soil and water

Background

Given the existing land-use, historical contamination is deemed to be a low likelihood. During construction there is the potential to introduce new contaminants into the environment, such as chemical spills. This could cause contamination of soil onsite and potentially spread offsite if not appropriately managed. There is also the potential for surface water and groundwater to become contaminated during construction. Measures will be implemented to reduce the likelihood of contamination occurring, with plans in place to ensure if it does occur then it is appropriately managed.

Soil compaction and inversion

Compaction of soil in areas of temporary disturbance (such as, fill areas, equipment and machinery laydown areas or areas of heavy vehicle traffic) can change local drainage patterns and prevent effective plant growth following completion of construction.

The mixing of different soil layers during excavation (soil inversion) can adversely affect plant growth after backfilling of the excavation. In locations where the natural surface cover will be reinstated following excavation (e.g. trenches for cables), topsoil will be stockpiled separately for use in reinstatement to minimise this impact.

Measures to manage negative impacts resulting from soil compaction and inversion will be included in the SEDMP.

Contamination

The storage and use of chemicals on site has the potential to result in localised soil and water contamination if spills occur and could cause off-site contamination if spills are not appropriately managed. However, no significant volumes of potential contaminants will be stored on site.

Contaminated soils can potentially be encountered during excavation activities. Although relatively unlikely at this site, measures to respond to this situation would be in accordance with EPA Victoria Publication 1698: Liquid storage and handling guidelines (EPA Victoria, 2018) and EPA Victoria Publication 1834: Civil Construction, Building, and Demolition Guide (EPA Victoria, 2023).

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- EP Act
- EPA Victoria Publication 1834: Civil Construction, Building, and Demolition Guide
- EPA Victoria Publication 1698: Liquid storage and handling guidelines

Mitigations and control measures

The following general practices will be used to reduce the likelihood of contamination, compaction and inversion, and manage chemical spills:

- All project components will be designed and constructed in accordance with the EPA Victoria Publication 1834: Civil Construction, Building, and Demolition Guide.
- Soil compaction impacts will generally be limited to defined areas.
- Areas of native vegetation that are to be protected will be marked out to prohibit access from construction works.
- Heavy vehicle traffic will be restricted to constructed access tracks and hardstand areas on the site.
- Activities causing excessive rutting or soil compaction will be restricted in wet or boggy conditions.
- All areas of temporary disturbance (e.g. temporary construction compound and temporary construction carpark) will be ripped or scarified where appropriate to alleviate compaction.
- All areas of temporary disturbance will be contained within the project area.
- No significant volumes of potential contaminants will be stored on site.
- Undertake storage and handling of fuel and chemicals in accordance with relevant standards and guidelines (e.g. EPA Liquid storage and handling guidelines).

- All potential contaminants to be stored in bunded areas to contain potential leaks and spills before removal from the site by an EPA licensed contractor for recycling (where possible) or disposal to a licensed facility.
- The main transformers in the BESS substation will be bunded in case of an oil spill.
- Undertake refuelling and maintenance of plant and machinery with appropriate spill containment measures in place (e.g. use of drip trays or in lined, bunded areas).
- Transport and handling of batteries during the construction phase will take place in accordance with the manufacturer's requirements. Batteries will be delivered in purpose-built packaging as required for transport and shipment.
- Regularly inspect machinery for leaks and maintain in good working order.
- Vehicle and plant washdown area(s) will have appropriate sediment controls around it and be large enough to hold all waste water generated. The washdown area will be clearly signposted to alert subcontractors and staff of their responsibilities.
- Procedures to contain and clean up spills, should they occur, will be implemented to minimise contamination risk.
- Develop protocol for dealing with potential contaminants (e.g. pesticide containers) if discovered during construction.
- Where soils are required to be disposed offsite, soils are to be assessed accordance with EPA Publication 702.2 (EPA Victoria, 2021) (or any new EPA guidelines that are enforced by the EP Act).
- Contaminated soil is to be managed to ensure it is appropriately disposed of and areas not cross contaminated.

Unexpected contamination finds

There remains the possibility that additional hazards including contaminated soil may be identified during soil movement works. Potential contamination may be identified by (but not limited to):

- A change in the colour or texture of the soil.
- The inclusion of construction/building material
- Odour change.

If potential contamination is identified, work in the immediate vicinity will stop immediately and report to supervisor who will advise the Project Manager. Work will not recommence in the vicinity until directed by the Project Manager.

©JBS&G Australia Pty Ltd

C-EPR08 Surface water and groundwater

Surface water and groundwater	C-EPR08
Responsibility:	Principal Contractor
Frequency:	On identification of unanticipated site conditions
Objective:	To ensure appropriate management of surface water and groundwater

Background

Potential risks associated with surface water and groundwater in the project area include:

- Alteration to surface water flows and erosion in the flow paths causing water quality impacts.
- Habitat degradation from surface hydrological changes and/or reduced water quality, including the wetland foraging habitat for the Southern Bent-wing Bat.
- Contamination of surface water and groundwater during construction, including the wetland foraging habitat for the Southern Bent-wing Bat.

A Flood Impact and Water Quality Assessment was completed for the project area (Water Technology, 2024). The project area is slightly undulating with no steep flow paths or defined waterways other than constructed drainage lines. Flooding of the site is primarily driven by trapped low points, localised depressions and inefficient drainage (Water Technology, 2024).

The project's current water quality management strategy, which consists of three storage ponds, and revegetation of part of the central wetland as a treatment wetland, will achieve Best Practice Environmental Management targets (Water Technology, 2024).

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- EP Act
- EPA Publication 1834.1: Civil construction, building and demolition guide

Mitigations and control measures

The following general practices will be used to manage surface water and groundwater:

- The management of surface water will include the installation of drainage controls, and the careful placement and management of soil stockpiles out of potential flow paths.
- Design and construct all project components and stormwater management systems with regard to the 1834.1: Civil construction, building and demolition guide (EPA Victoria, 2023).
- Implement a SEDMP that includes soil and erosion control in accordance with all other relevant guidelines.
- Implement measures to minimise erosion and sedimentation.
- The modelling iterations have proposed a design which aims to lower the benches as far as possible while maintaining 300-millimetre (mm) freeboard over the critical 1% Annual Exceedance Probability (AEP) flood event.
- Tracks and track crossings will be constructed in accordance with the Guide to Road Design (Austroads, 2021).
- No significant volumes of potential contaminants will be stored on site.
- All potential contaminants to be stored in bunded areas.
- Regular maintenance and inspection of fuel bund, oil bund, and battery storage units.
- The main transformers in the BESS substation will be bunded in case of an oil spill.
- Firefighting equipment will be bunded, where possible. If discharged divert to a designated storage system.
- Both the Battery Pond and North Pond must be capable of storing water runoff used for firefighting purposes. This will require the installation of a penstock gate at the outflow structure, with the procedure for firefighting to include closure of the penstock which will enable all water using during fire suppression to be stored in the ponds. The ponds have been sized with this in mind.
- Development of site management plans detail responses to leaks such as spill kits, removal and appropriate testing and disposal of impacted soils and options for installing groundwater monitoring bores in the case of a significant fire or unexpected leak.
- Pipes to be designed to ensure they do not block over time, however, a potential need remains to inspect the pipes regularly and clean them out if required.

Surface water and groundwater	C-EPR08

- Potential need to regularly dewater the battery pond and clean out the bench pipes as required.
- Design to consider the large size of the battery pond and the entrance pipes being vertically lower than the exit.
- The proposed wetland rehabilitation will increase water quality of the wetland area. Suitable demarcation or fencing is to be present around areas of vegetation to that are to be protected, including the wetland.

C-EPR09 Ecology, flora and fauna

Ecology, flora and fauna	C-EPR09
Responsibility:	Principal Contractor
Frequency:	Continuous and on identification
Objective:	To ensure appropriate management of ecology, flora and fauna

Background

A flora and fauna assessment, Matters of National Environmental Significance (MNES) Self-Assessment, and Native Vegetation Removal (NVR) report have been completed by Nature Advisory (2024). Four listed fauna species were observed to be present on site during the field survey. No listed flora species or threatened ecological communities were observed during the field survey. Two scattered trees were identified in the north-west corner of the project area.

Potential risks to the ecological features of the area include:

- Illegal removal of native vegetation.
- Damage (physical or chemical) to native vegetation to be protected.
- Recklessly injuring protected native fauna.
- Direct injury, death, or displacement of fauna from the approved clearance of vegetation (habitat) and earthworks or entrapments in trenches.
- Direct MNES habitat removal or fragmentation from clearance, earthworks, and physical disturbance.
- The potential loss of habitat connectivity of heathy woodland that is utilised by MNES species.
- The risk that a natural phenomenon (flood, fire or drought) will cause death and loss of restored ecological habitat.

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- EPBC Act
- FFG Act
- EE Act
- CaLP Act

Mitigations and control measures

The following mitigation measures will be implemented for all works:

- Design the project to avoid vegetation clearance as far as practical (complete).
- Restrict vegetation clearance to the area approved for clearance (as documented in the NVR report provided by the Department of Energy, Environment and Climate Action (DEECA)).
- Vegetation clearance is only to occur as directed by Project Manager and in accordance with the NVR report. Additional mitigations within this EMP.
- All work (including driving, site access and storage) to be restricted to areas with approval for vegetation clearance.
- Locate areas of temporary disturbance within the final/permanent disturbance footprint, where possible, as presented in **Figure 3**.
- All earthmoving/construction equipment is to be cleaned of soil and vegetation prior to entering the site and before moving off-site.
- Avoid importing weed-affected soil, mulch, fill or other material to the site.
- Dust suppression to minimise dust settling on adjacent vegetation.
- Rehabilitate areas of temporary disturbance (e.g., temporary construction compound) where appropriate.
- Undertake ongoing weed management in consultation with the landowner and the relevant governing bodies where required (refer to C-EPR10 Weed and pest management).
- There is always the potential for natural phenomena to impact the ecology of a site. When establishing new vegetation and ecological processes the potential damage caused increases. This can only be mitigated by attempting to increase the resilience of the system as early as possible by managing threats and threatening

processes, purchasing good quality plant stock and intensively managing the system in the establishment years, particularly years 1-3.

Management of impacts to the threatened fauna species

The project will impact on the habitat of the following listed threatened fauna species:

- Blue-winged Parrot (EPBC: Vulnerable)
- Rufous Bristlebird (Coorong subspecies) (FFG: Endangered)
- Southern Brown Bandicoot (EPBC: Endangered; FFG: Endangered)
- Swamp Antechinus (EPBC: Vulnerable; FFG: Vulnerable)

Given the potential interaction of the project and these species, the following management measures are proposed:

- Mapped MNES habitat has largely been avoided by the project footprint.
- Induction program to cover environmental management prior to construction.
- Protocols for native fauna identification, monitoring, protection, salvage and relocation to be implemented during construction (in particular during removal of native vegetation). This will include an appropriately qualified and experienced fauna spotter being on site when removing/felling large trees.
- Any native fauna salvage, handling or relocation to be conducted by a licensed native fauna handler.
- Areas are proposed to be revegetated to promote vegetation connectivity, increase the amount of available habitat, and improve the quality of vegetation.
- Suitable demarcation or fencing is to be present to prevent entry by contractors into areas of vegetation to be protected.

Listed below are rescue organisations for fauna in Victoria that will be contacted immediately upon finding an injured or orphaned animal.

- Wildlife Victoria: (03) 8400 7300 (24-hour).
- Wildlife Rescue Australia: 1300 596 457 (24-hour).

Vegetation Clearance

- A permit is required to remove the proposed native vegetation under Clause 52.17 of the Glenelg Planning Scheme. Vegetation clearance must be approved by the Project Manager and must be in accordance with the approved permit, once obtained.
- Prior to clearance commencing, the area and trees approved for clearance must be defined with markings, barriers, pegs, flags or temporary fencing. The markings, barriers, pegs, flags or temporary fencing must remain in place, in good condition and clearly visible, for the period in which clearance is occurring.
- Machinery, vehicle movement and material laydown areas must be restricted to the approved clearance area or existing tracks (see **Figure 3**).
- For clearance near trees:
  - Clearly identify and minimise the vegetation to be removed to reduce the unnecessary loss of vegetation.
  - Establish a TPZ around trees to be preserved and ensure they are fenced or cordoned off.
  - Trees to be retained shall be managed and fenced off from the project.
  - Should excavation be proposed within the TPZ of trees (to be protected), a suitably qualified arborist should be engaged to avoid damage to tree roots. Where roots within the TPZ are exposed by excavation, temporary root protection will be installed to prevent them drying out.
  - Where it is unavoidable and necessary to remove additional native vegetation and trees, council permission must be sought and granted and appropriate offset implemented prior to removal.

Prohibited activities

Within areas earmarked for 'vegetation protection' the following activities re prohibited:

a) Vehicular or pedestrian access;

b) Trenching or soil excavation;

c) Storage or dumping of any soils, materials, equipment, vehicles, machinery or waste products;
d) Entry and exit pits for the provision of underground services;
e) Any other actions or activities that may result in adverse impacts to retained native vegetation.

C-EPR10 Weed and pest management

Weed and pest management	C-EPR10
Responsibility:	Principal Contractor
Frequency:	Continuous and on identification
Objective:	To ensure appropriate management of weed and pests

Background

The introduction or spread of invasive species or pathogens has the potential to cause habitat degradation. The LMRP provides further detail on and management measures for invasive species.

Pest plants

The CaLP Act requires that landowners (or a third party to whom responsibilities have been legally transferred) must eradicate regionally prohibited weeds and prevent the growth and spread of regionally controlled weeds.

Weed(s) of National Significance (WoNS) is an Australian government initiative aimed at managing and controlling invasive weed species that pose significant threats to Australia's natural environment, agriculture, and economy.

A total of 119 weed species were recorded during the field survey. Of these, 9 are listed under the CaLP Act and 5 are WoNS (listed in the LMRP).

Pest animals

Pest animals present an ongoing management threat to all-natural areas, where they impact native fauna through predation or competition, and impact native vegetation. For the project area, rabbits are considered the most significant pest animal risk to ecological processes and indigenous flora diversity and cover. Cattle are present in the project area and pose a risk to vegetation, including the risk that cattle breaching fences and destroying revegetation efforts to rehabilitate wetlands or overgrazing causing land degradation in Blue-winged Parrot habitat.

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- EPBC Act
- CaLP Act

Mitigations and control measures

The following mitigation measures will be implemented for all works.

Pest plants

- Clean earthmoving/construction equipment of soil and vegetation prior to entering the site and before moving off-site.
- Avoid importing weed affected soil, mulch, fill or other material to the site.
- Undertake ongoing weed management in line with the LMRP.
- Weed control of priority species will occur during ‘early works’ construction activities. For example, whilst staff facilities are being established, lay-down area establishment etc. Prior to the main construction activities commencing.
- Weed control of low threat species will be ongoing as required in response to any observations from weed monitoring (as detailed below).
- Weed management will be undertaken (as directed by the Site Manager) for a 3-year period post planting for most of the planting treatment areas, with treatment areas LMT02-03a&b proposed to have decreased ‘maintenance’ requirements between years 4-10 post planting (further detail provided in LMRP).
- Weeds to be managed in accordance with the LMRP.

Pest animals

- The key mitigation measure to control rabbits and cattle in the project area will be the fencing of areas to be revegetated. The LMRP provides further detail on fencing options, however, the fencing contractor may vary the fencing approach to meet local conditions or to provide a cost-effective solution. Ultimately, they will include measures to prevent cattle from breaking the fence, such as a strand of electric wiring and a single wooden railing, and keep rabbits out, such as rabbit-proof netting.
- A level of destocking will be undertaken in the project area.
- Rabbits are proposed to be controlled within the treatment area with the intent of eradication.

Weed and pest management	C-EPR10

Reporting

- It is proposed that an annual monitoring report be completed and submitted to DCCEEW on an annual basis for 10 years. The report will be shared with DTP for the first three years of the program prior to handing over the management of the roadside planting at the completion of the 3-year maintenance period. This report must include a description of pest plant and pest animal treatments and the quantification and measures of success against key weed performance indicators.

©JBS&G Australia Pty Ltd

C-EPR11 Public safety

Public safety		C-EPR11
Responsibility:	Principal Contractor	
Frequency:	On going	
Objective:	To ensure appropriate management of unauthorised access	

Background

Risks to public safety include:

- Unauthorised access.

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- OHS Regulations

Mitigations and control measures

- The project will have signage, including no-entry signs.
- Fencing as per the Fencing Plan.

C-EPR12 Fire

Fire	C-EPR12
Responsibility:	Principal Contractor
Frequency:	As required
Objective:	To ensure appropriate management of fire hazards

Background

The project is in the South West Fire District where the fire danger season generally occurs between 25 October and 1 May each year (CFA, 2024). MapshareVic indicates that the closest recorded bushfire to the project area was the 2019 Far South West 22 – Portland – Blacknose Point fire, located approximately 3 km east (DECCA, 2024). This is the most recent recorded bushfire within 30 km of the project area.

A review of VicPlan identified that the Bushfire Management Overlay applies to the very northern and eastern portions of the project area, however, this is outside of the project footprint (DTP, 2024). The Overlay seeks to ensure that the development of land prioritises the protection of human life and strengthens community resilience to bushfire, especially in areas where the bushfire hazard warrants bushfire protection measures to be implemented. It ensures development is only permitted where the risk to life and property from bushfire can be reduced to an acceptable level.

Fire Risk Consultants were engaged to undertake a Preliminary Hazard Assessment of the project. They determined that the project achieves an acceptable level of safety, with risks considered low to medium. The low to medium risk is driven by compliance with the Country Fire Authority (CFA) Guidelines and the numerous standards, guidelines, and legislative requirements during the design phase of the project. All the model requirements outlined within the CFA Guideline can be achieved with this development, along with other mitigation measures that will further reduce the risk.

Regardless, the following risks associated with fire remain:

- Construction activities have the potential to increase the risk of bushfire.
- Habitat degradation from the increased risk of fire.
- Direct injury, death or displacement of terrestrial fauna from increased risk of fire, such as the MNES Southern Brown Bandicoot or Swamp Antechinus.

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- CFA - Design Guidelines and Model Requirements Renewable Energy Facilities v4 (2023)

Mitigations and control measures

- Implement FMP[2] (to be developed during detailed design in conjunction with the Fire Rescue Victoria [FRV]).
- Implement procedures for control of activities with a risk of fire ignition, particularly during the fire danger season.
- Develop measures for fire prevention, firefighting, site access and emergency response in consultation with the CFA / FRV.
- Obtain any permits required (e.g., for hot work on days of total fire ban) where necessary.
- On declared Catastrophic Fire Danger Days there will be a policy of “no work” or “essential work only”.
- Diesel powered heavy machinery only to be used on-site, not petrol.
- The layout of the project has considered the location and types of surrounding vegetation, including existing roadside vegetation and proposed landscape planting.
- Undertake fuel reduction (vegetation) around the site boundary or in other areas where necessary. Fuel reduction of grasses <100 mm in height during the declared Fire Danger Period. Avoid areas of vegetation to be protected where possible.
- Provision of an above-ground water tank holding dedicated firefighting water supply.
- Firefighting equipment will be bunded, where possible. If discharged divert to a designated storage system.

[2] Or other document as specified by the relevant Fire Authority

Fire	C-EPR12

- Both the Battery Pond and North Pond must be capable of storing water runoff used for firefighting purposes. This will require the installation of a penstock gate at the outflow structure, with the procedure for firefighting to include closure of the penstock, which will enable all water used during fire suppression to be stored in the ponds. The ponds have been sized with this in mind.
- The project will incorporate appropriate levels of fire protection, including:
  - Establishment of asset protection zones and firebreaks.
  - Appropriate design and construction of buildings to reduce the impact of relevant criteria listed under the Bushfire Management Overlay, the Building Code of Australia, and relevant AS.
  - Provision of a water tank and fire hydrants within the project area for firefighting on-site. Fire hydrants will be designed, installed, and commissioned in accordance with AS 2419.1-2005.
  - Provision of appropriate fire suppression systems and fire-fighting equipment.
  - Regular inspection and maintenance of onsite firefighting equipment to ensure continued readiness for use and adequate staff training.
- Pacific Green will liaise with the FRV to ensure that fire hazards, fire-fighting resources, and fire response plans are clearly understood by both parties.
- The community can contact Pacific Green via the website with fire risk concerns, questions, or issues.

©JBS&G Australia Pty Ltd

C-EPR13 Environmental emergency response

Environmental emergency response	C-EPR13
Responsibility:	Principal Contractor
Frequency:	As required
Objective:	To ensure appropriate management of environmental emergencies during construction

Background

Potential environmental incidents on the site which would require emergency response relate to a spill of hazardous liquid or material on soils on the site, or in proximity of stormwater discharge point, or relating to a release of potential asbestos-affected materials.

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- EP Act
- EP Regulations
- OHS Act
- OHS Regulations

Mitigations and control measures

Emergency response plans (ERPs) will be developed for each phase of the project (i.e. construction, operation, and decommissioning) to guide actions to be taken to minimise the impacts of accidents and incidents. ERPs will be reviewed and updated on a regular basis to incorporate new information arising from any incidents, near misses and hazards and emergency response simulation training sessions. These plans will also include the facilitation of fire danger season restrictions and requirements. The ERPs will address all potential risks associated with the project and will outline:

- Identification of appropriate emergency services.
- Measures to undertake consultation with local emergency services.
- Protocol for notification of appropriate authorities.
- Detailed incident and emergency procedures.

Emergency response drills will also be undertaken at regular intervals to ensure that personnel are familiar with the plans and the types of emergencies to which it applies, and that there will be a rapid and effective response in the event of a real emergency occurring.

Response actions to environmental incidents will depend on the type and location of the incident:

- For spills on **land**, the following shall be undertaken:
  - Identify the source of the spill and stop when / if safe to do so.
  - Identify the area of the spill and clear the area of all personnel.
  - Notify the relevant government agency (as required) (within 24 hours), and the environmental manager of spill.
  - Construct earthen bunding using earthmoving equipment available on site to contain the spill.
  - Environmental manager to coordinate the pumping of liquid waste out of the containment structure and disposal to a licensed waste facility.
  - If solid waste:
    - Environmental consultant coordinates the excavation and removal of the hazardous material to a secure area.
    - Assess soils in the vicinity of the incident for contamination and conduct remediation works where contamination has occurred.
- For spills **in proximity of stormwater outlets** from the site, the following shall be undertaken:
  - Identify the source of the spill and stop when / if safe to do so.
  - Identify area of spill and clear the area of all personnel.
  - Notify the relevant government agency (as required) (within 24 hours), and the environmental manager.

- Environmental consultant instructs containment of area of spill in water by placement of temporary absorbent beams (available on site) to create a 'coffer dam' around the stormwater outlet to prevent discharge of spilt material.
- Environmental manager to coordinate a liquid waste tanker to be brought onto the site and pump directly from water contained within the impacted area until visual evidence that the spill has been removed.
- Conduct chemical testing of water in the stormwater system as potentially affected by the spill to validate removal of contamination.
- Subject to validation results, remove coffer dam.

All emergency responses will be followed up with incident reporting (see **Section 4.6**) and review of the EMP (see **Section 4.8**).

7.2 Operation environmental management

Management strategies to be undertaken during the operational phase of the project for the following matters are addressed in this EMP:

- O-EPR01 Noise and vibration
- O-EPR02 Lighting
- O-EPR03 Traffic
- O-EPR04 Waste management
- O-EPR05 Soil and contamination
- O-EPR06 Surface water and groundwater
- C-EPR09 Ecology, flora and fauna
- O-EPR08 Weed and pest management
- O-EPR09 Public safety
- O-EPR10 Fire
- O-EPR11 Environmental emergency response

Whilst risks to air quality and surface water through erosion and sediment control are expected during construction activities, there is a minimal risk anticipated during the operational phase. As such, an O-EPR has not been included.

O-EPR01 Noise and vibration

Noise and vibration	O-EPR01
Responsibility:	Pacific Green or their delegate
Frequency:	Where activities are undertaken that may potentially cause noise or vibration Sporadic during operation over a 24-hr period
Objective:	To mitigate the impacts of noise and vibration on adjoining land and fauna species

Background

Noise and vibration have the potential to impact surrounding neighbours and the public, as well as causing long-term disturbance to fauna species.

Noise would be generated by the operation of the project, typically from the fans in the BESS. The faster these fans run, the greater the noise produced. Periods of 100% fan speed are only likely to occur during periods of elevated ambient temperatures and full rate charge and discharge conditions (Marshall Day Acoustics, 2024). Peak discharge periods are expected in early evening when electricity demand spikes.

A noise impact assessment was undertaken for the project (Marshall Day Acoustics, 2024). It determined that the project can be operated in compliance with the EP Regulations, Noise Protocol, and other applicable legislation (Marshall Day Acoustics, 2024).

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- EP Act
- EP Regulations
- Environment Reference Standard
- EPA Publication 1826.4 Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues

Mitigations and control measures

All reasonable and practicable mitigation measures will be taken to minimise operational noise including:

- Ensuring that noise reduction devices such as attenuators on the battery units are fitted and operating effectively.
- Anti-noise and anti-vibration systems will be utilised for fixed and operational equipment such as inverters, transformers, and HVAC units to reduce ongoing acoustic disturbance. Typically these include vibration-dampening mounts, to minimise impacts on fauna and humans.
- Being aware of transport-related noise and avoid transportation from entering the site outside business hours wherever possible. For example, between the hours of 9.00 am – 5.00 pm.
- Schedule noisy maintenance activities where this could impact receptors to coincide with business hours wherever possible. For example, between the hours of 9.00 am – 5.00 pm.
- Ensuring that equipment is not operated if maintenance or repairs would eliminate or significantly reduce a characteristic of noise resulting from its operation that is audible by noise-sensitive receptors.
- Operating equipment and handling materials to minimise impact noise.

Additionally:

- Ensure that plant and equipment are properly maintained.
- Avoid unnecessary noise when operating plant.
- Switch off any equipment not in use for extended periods.
- Operational noise monitoring will be undertaken.

O-EPR02 Lighting

Lighting	O-EPR02
Responsibility:	Pacific Green or their delegate
Frequency:	On going
Objective:	To ensure appropriate management of light pollution

Background

The use of artificial lighting has the potential to impact surrounding neighbours and fauna species, in particular bats and ground-dwelling mammals. This is especially a risk for three listed threatened fauna species that are likely to occur or have the potential to occur within the project area, including the Southern Bent-wing Bat, Southern Brown Bandicoot, and Swamp Antechinus.

Bats

The use of artificial light at night can impact bats at roost sites, commuting corridors, and foraging areas. Impacts are species-specific, but can include attraction to artificial lights, changes in prey availability, habitat degradation, and avoidance of artificial light (DCCEEW, 2023).

Artificial light in commuting areas can cause habitat fragmentation, particularly for light-avoidant bats, potentially resulting in longer flight times and increased energy expenditure (Stone et al., 2015). Insectivores are likely to be affected by artificial light in multiple ways, including changes in prey availability, as their primary food source, insects, may also be susceptible to impacts from artificial light (Owens et al., 2020)(Rowse et al., 2016).

Ground-dwelling fauna

The use of artificial light can impact fauna by disrupting normal activity patterns, increasing predation risk, and altering the breeding and physiology of terrestrial fauna (DCCEEW, 2023). Artificial light at fauna refuge sites, foraging areas, and commuting routes can result in habitat fragmentation, consequently limiting access to foraging sites and dispersal of individuals (Gaston & Bennie, 2014). These impacts vary case-by-case, but for threatened species, the impacts may reduce the capacity of a species to persist or recover (DCCEEW, 2023).

Lighting is required in the project area during the operation phase, however, at night this is expected to be limited to security lighting. As such, the risk to fauna and surrounding neighbours is expected to be low. Nonetheless, management measures will be implemented to ensure these impacts are minimised as far as practicable.

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

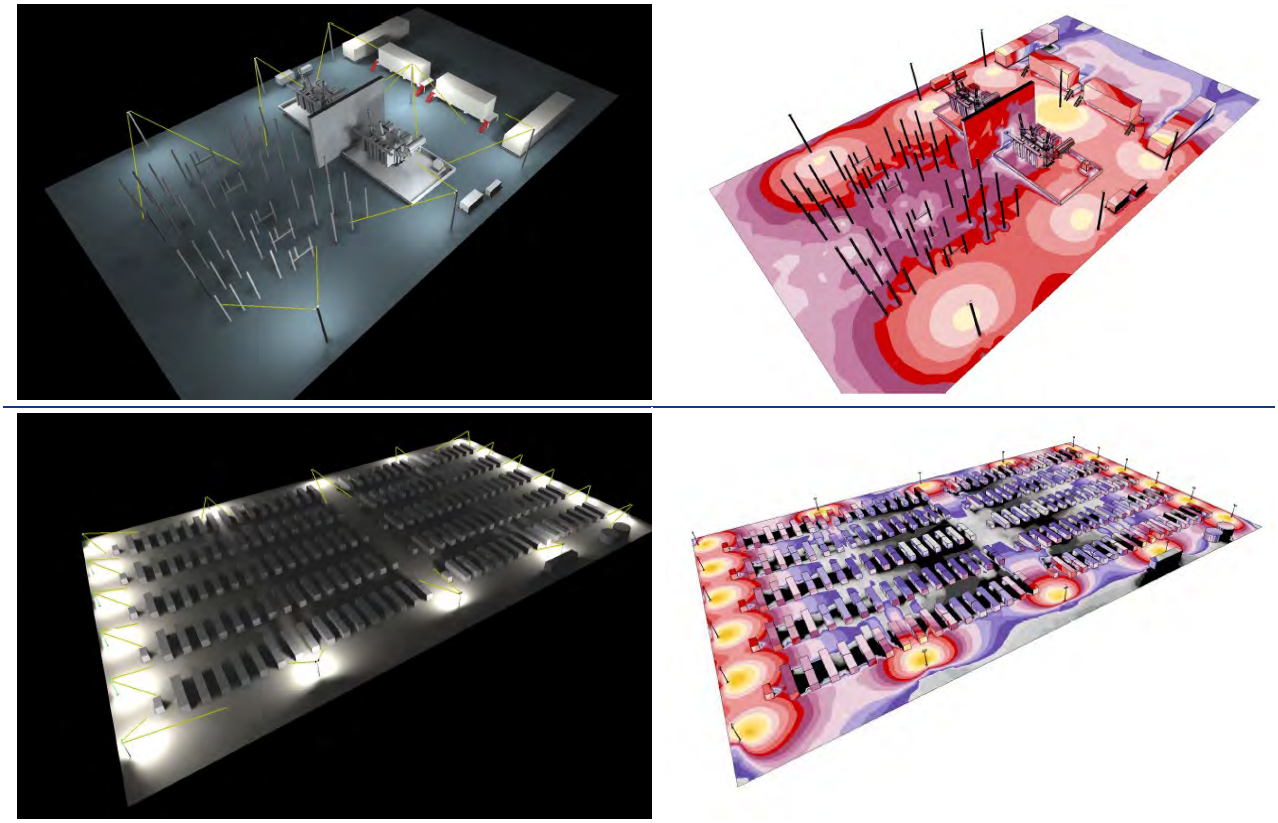
- National Light Pollution Guidelines for Wildlife
- Reducing the Effect of Light Pollution on Wildlife
- OHS Act
- OHS Regulations
- FFG Act
- EPBC Act

Mitigations and control measures

The following mitigation measures will be implemented for all works:

- Lighting design for the project, particularly near the upgraded wetland area, will be in accordance with the National Light Pollution Guidelines for Wildlife.
- Where possible, non-reflective dark coloured surfaces will be used for infrastructure.
- Lighting will be directional and fully shielded. This will decrease the amount of light spill into areas that are not intended to be lit and contribute less to skyglow.
- Typical illuminance (Lux) and direction for the substation (top) and the battery park (equivalent of one stage) (bottom) are presented below:

Lighting	O-EPR02



- Lighting will be directed and avoid directly shedding artificial light on habitat patches.
- Lighting closest to the low-lying wetland (south of the development) will be directed away from the wetland area.
- The minimum number and intensity of lights needed, will be used.
- Light globes used across the project area will be chosen from the list of lighting least impactful to bats, including:
  - low-pressure sodium vapour,
  - filtered Light Emitting Diode (LED),
  - filtered metal halide,
  - filtered white LED or amber LED or Phosphor Converted (PC) amber LED
- Where possible, design will implement smart-controlled lights which only switch on when personnel are present.
- Lighting design for the project, particularly near the upgraded wetland area, will be in accordance with the National Light Pollution Guidelines for Wildlife.
- Maintaining suitable vegetation cover, including canopy cover for arboreal species and ensuring artificial light does not spill into the habitat, can reduce the impacts of artificial light on the activity and behaviour of terrestrial mammals (DCCEEW, 2023). This will be achieved through implementing the LMRP.

©JBS&G Australia Pty Ltd

O-EPR03 Traffic

Traffic	O-EPR03
Responsibility:	Pacific Green or their delegate
Frequency:	No to very low vehicle movements expected to be generated during project operation
Objective:	To minimise impacts on local road network and reduce traffic interactions with fauna, particularly ground-dwelling fauna

Background

During operation, the project will not be permanently staffed, and most vehicular activity to/from the site will consist of vehicles associated with site maintenance (ESR Transport Planning, 2024). Additionally, there may be infrequent traffic such as delivery of components and consumables and equipment maintenance (ESR Transport Planning, 2024). It is expected that during the operational phase the project will generate zero traffic some days and very low traffic volumes (e.g. less than 10 vehicle movements) other days. The TIAR concluded that such low traffic activity could be expected to be absorbed onto the local road network without a significant impact on efficient operating conditions (ESR Transport Planning, 2024).

Regardless, traffic generated from the operation of the project may result in direct injury, death, or displacement of terrestrial fauna like the MNES Southern Brown Bandicoot. As such, traffic impacts will be mitigated as much as practicable.

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- Glenelg Planning Scheme
- AUSTROADS Guide to Road Design
- AUSTROADS Guide to Traffic Management
- AS AS2890: Australian Standard for Parking Facilities.

Mitigations and control measures

A TMP will be prepared during the detailed design phase. Pacific Green will work in close contact with the DTP and the Glenelg Shire Council in the preparation of the TMP and development of mitigation and management measures.

The TMP will consider the following aspects:

- Traffic controls (e.g. speed limits and signage) where appropriate.
- Procedures to monitor traffic impacts and adapt controls (where required) to reduce impacts.
- Community consultation regarding traffic impacts for nearby residents.

Additionally:

- Ensuring any vegetation close to roadway carriageways near access intersections are trimmed if necessary to afford vehicles giving way an unobstructed sight line to through traffic in accordance with design minimum standards.
- A permanent reduction in the Madeira Packet Road speed limit to 80 kph.
- Signage may be erected to warn travellers of fauna, such as the Southern Brown Bandicoot.
- Implement procedures to monitor traffic impacts and adapt controls (where required) to reduce impacts.
- Design and development of on-site parking requirements and provisions for a permanent small car parking area (e.g. 4 spaces) in accordance with Planning Scheme Clause 52.06-9 Design Standard 2. This will be located outside of the area of native vegetation to be retained, ideally located conveniently to any site office and amenities area.

O-EPR04 Waste management

Waste management	O-EPR04
Responsibility:	Pacific Green or their delegate
Frequency:	Continuous
Objective:	To minimise the amount of waste generated during operation

Background

Given the small number of employees likely to be on site during operation, operational waste is expected to be relatively low compared to the construction phase of the project. These will include food and drink waste products, and any waste generated from maintenance activities.

Waste will be managed in accordance with the waste management hierarchy shown in **Plate 6-2** and the requirements of the EP Act.

Plate 6-2: Waste management hierarchy (Source: EPA South Australia, 2022)

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- EP Act
- EP Regulations

Mitigations and control measures

The following general practices will be used to reduce waste:

- Dedicated waste storage and handling areas and facilities will be provided during operations.
- Waste will be separated into different streams to facilitate recycling with waste removed from the site by a licensed contractor as appropriate.
- Operational waste facilities, such as bins within the control building, will be serviced as required and the waste disposed by an appropriately licenced waste contractor.
- Waste will be managed in accordance with the waste management hierarchy (see **Plate 6-2**) (EPA South Australia, 2024).
- Areas for activities including loading and unloading and storage of waste refuse bins will be designed to prevent all wastewater from polluting stormwater.

O-EPR05 Soil and contamination

Soil and contamination	O-EPR05
Responsibility:	Pacific Green or their delegate
Frequency:	On the identification of unanticipated site conditions
Objective:	To ensure appropriate prevention and management of contaminated soil and water

Background

During operation, there is the potential to introduce new contaminants into the environment, such as chemical spills. This could cause contamination of soil onsite and potentially spread offsite if not appropriately managed. There is also the potential for surface water and groundwater to become contaminated during construction. Measures will be implemented to reduce the likelihood of contamination occurring, with plans in place to ensure that if it does occur then it is appropriately managed.

Contamination

The storage and use of chemicals on site has the potential to result in localised soil and water contamination if spills occur and could cause off-site contamination if spills are not appropriately managed. However, no significant volumes of potential contaminants will be stored on site.

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- EP Act
- EPA Victoria Publication 1698: Liquid storage and handling guidelines
- EPA Victoria Publication 1834: Civil Construction, Building, and Demolition Guide

Mitigations and control measures

The following general practices will be used to reduce the likelihood of contamination and manage chemical spills:

- No significant volumes of potential contaminants will be stored on site.
- Undertake storage and handling of fuel and chemicals in accordance with relevant standards and guidelines (e.g. EPA Liquid storage and handling guidelines).
- All potential contaminants to be stored in bunded areas to contain potential leaks and spills before removal from the site by an EPA licensed contractor for recycling (where possible) or disposal to a licensed facility.
- The main transformers in the BESS substation will be bunded in case of an oil spill.
- Undertake refuelling and maintenance of plant and machinery with appropriate spill containment measures in place (e.g. use of drip trays or in lined, bunded areas).
- Regularly inspect machinery for leaks and maintain in good working order.
- Vehicle and plant washdown area(s) will have appropriate sediment controls around it and be large enough to hold all waste water generated. The washdown area will be clearly signposted to alert subcontractors and staff of their responsibilities.
- Procedures to contain and clean up spills, should they occur, will be implemented to minimise contamination risk.
- Contaminated soil is to be managed to ensure it is appropriately disposed of and areas not cross contaminated.

O-EPR06 Surface water and groundwater

Surface water and groundwater	O-EPR06
Responsibility:	Pacific Green or their delegate
Frequency:	On identification of unanticipated site conditions
Objective:	To ensure appropriate management of surface water and groundwater

Background

Potential risks associated with surface water and groundwater in the project area include:

- Alteration to surface water flows and pollution in the flow paths causing water quality impacts.
- Habitat degradation from surface hydrological changes and/or reduced water quality, including the wetland foraging habitat for the Southern Bent-wing Bat.
- Contamination of surface water and groundwater during operation, including the wetland foraging habitat for the Southern Bent-wing Bat.

A Flood Impact and Water Quality Assessment was completed for the project area (Water Technology, 2024). The project area is slightly undulating with no steep flow paths or defined waterways other than constructed drainage lines. Flooding of the site is primarily driven by trapped low points, localised depressions and inefficient drainage (Water Technology, 2024).

The project's current water quality management strategy, which consists of three storage ponds, and revegetation of part of the central wetland as a treatment wetland, will achieve Best Practice Environmental Management targets (Water Technology, 2024).

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- EP Act

Mitigations and control measures

The following general practices will be used to manage surface water and groundwater:

- No significant volumes of potential contaminants will be stored on site.
- All potential contaminants to be stored in bunded areas.
- Regular maintenance and inspection of fuel bund, oil bund, and battery storage units.
- The main transformers in the BESS substation will be bunded in case of an oil spill.
- Firefighting equipment will be bunded, where possible. If discharged divert to a designated storage system.
- Both the Battery Pond and North Pond must be capable of storing water runoff used for firefighting purposes. This will require the procedure for firefighting to include closure of the penstock at the outflow structure which will enable all water using during fire suppression to be stored in the ponds.
- Regular maintenance and inspection of fuel bund, oil bund, and battery storage units.
- Development of site management plans detail responses to leaks such as spill kits, removal and appropriate testing and disposal of impacted soils and options for installing groundwater monitoring bores in the case of a significant fire or unexpected leak.
- Pipes to be designed to ensure they do not block over time, however, a potential need remains to inspect the pipes regularly and clean them out if required.
- Potential need to regularly dewater the battery pond and clean out the bench pipes as required.
- The proposed wetland rehabilitation will increase water quality of the wetland area. Suitable demarcation or fencing is to be present around areas of vegetation to that are to be protected, including the wetland.

O-EPR07 Ecology, flora and fauna

Ecology, flora and fauna	O-EPR07
Responsibility:	Pacific Green or their delegate
Frequency:	Continuous and on identification
Objective:	To ensure appropriate management of ecology, flora and fauna

Background

A flora and fauna assessment, MNES Self-Assessment, and NVR report have been completed by Nature Advisory (2024). Four fauna listed species were observed during the field survey. No listed flora species or threatened ecological communities were observed during the field survey. Two scattered trees were identified in the north-west corner of the project area.

Potential risks to the ecological features of the area include:

- Physical disturbance to habitats during the operational phase for maintenance, replacement or repair of infrastructure.
- Illegal removal of native vegetation.
- Damage (physical or chemical) to native vegetation to be protected.
- Recklessly injuring protected native fauna.
- The risk that a natural phenomenon (flood, fire or drought) will cause death and loss of restored ecological habitat.

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- EPBC Act
- FFG Act
- EE Act
- CaLP Act

Mitigations and control measures

The following mitigation measures will be implemented for all works:

- Vegetation clearance is only to occur as directed by Operations Manager and in accordance with the NVR report, additional information is below in this EMP.
- Rehabilitate areas of temporary disturbance (e.g., temporary construction compound) where appropriate.
- Undertake revegetation maintenance and monitoring in line with the LMRP.
- Undertake ongoing weed management in line with the LMRP (refer to **O-EPR08 Weed and pest management**).
- There is always the potential for natural phenomena to impact the ecology of a site. When establishing new vegetation and ecological processes the potential damage caused increases. This can only be mitigated by attempting to increase the resilience of the system as early as possible by managing threats and threatening processes, purchasing good quality plant stock and intensively managing the system in the establishment years, particularly years 1-3.

Management of impacts to the threatened fauna species

The project will impact on habitat for the following listed threatened fauna species:

- Blue-winged Parrot (EPBC: Vulnerable)
- Rufous Bristlebird (Coorong subspecies) (FFG: Endangered)
- Southern Brown Bandicoot (EPBC: Endangered; FFG: Endangered)
- Swamp Antechinus (EPBC: Vulnerable; FFG: Vulnerable)

Given the potential interaction of the project and these species, the management measures listed under **O-EPR01 Noise and vibration** and **O-EPR02 Lighting** are proposed.

Ecology, flora and fauna	O-EPR07

Listed below are rescue organisations for fauna in Victoria that will be contacted immediately upon finding an injured or orphaned animal.

- Wildlife Victoria: (03) 8400 7300 (24 hour).
- Wildlife Rescue Australia: 1300 596 457 (24 hour).

Vegetation clearance

- A permit is required to remove the proposed native vegetation under Clause 52.17 of the Glenelg Planning Scheme. Vegetation clearance must be approved by the Operations Manager and must be in accordance with the approved permit, once obtained.
- Where it is unavoidable and necessary to remove existing tree, council permission must be sought and granted and appropriate offset implemented.

©JBS&G Australia Pty Ltd

O-EPR08 Weed and pest management

Weed and pest management	O-EPR08
Responsibility:	Pacific Green or their delegate
Frequency:	Continuous and on identification
Objective:	To ensure appropriate management of weed and pests

Background

The introduction or spread of invasive species or pathogens has the potential to cause habitat degradation. The LMRP provides further detail on and management measures for invasive species.

Pest plants

The CaLP Act requires that landowners (or a third party to whom responsibilities have been legally transferred) must eradicate regionally prohibited weeds and prevent the growth and spread of regionally controlled weeds.

WoNS is an Australian government initiative aimed at managing and controlling invasive weed species that pose significant threats to Australia's natural environment, agriculture, and economy.

A total of 119 weed species were recorded during the field survey. Of these, 9 are listed under the CaLP Act and 5 are WoNS (listed in the LMRP).

Pest animals

Pest animals present an ongoing management threat to all-natural areas, where they impact native fauna through predation or competition, and impact on native vegetation. For the project area rabbits are considered the most significant pest animal risk to ecological processes and indigenous flora diversity and cover. Cattle are present in the project area and pose a risk to vegetation, including the risk of cattle breaching fences and destroying revegetation efforts to rehabilitate wetlands or overgrazing, causing land degradation in Blue-winged Parrot habitat.

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- EPBC Act
- CaLP Act

Mitigations and control measures

The following mitigation measures will be implemented for all works.

Pest plants

- Undertake ongoing weed management in line with the LMRP.
- Weed control of low threat species will be ongoing as required in response to any observations from weed monitoring (as detailed below).
- Weed management will be undertaken (as directed by the Site Manager) for a 3-year period post planting for most of the planting treatment areas, with treatment area LMT02-03a&b proposed to have decreased 'maintenance' requirements between years 4-10 post planting (further detail provided in LMRP).
- The LMRP outlines control methods for all declared weeds and WoNS recorded within the project area.

Pest animals

- The key mitigation measure to control rabbits and cattle in the project area will be the fencing of areas to be revegetated. The LMRP provides further detail on fencing options, however, the fencing contractor may vary the fencing approach to meet local conditions or to provide a cost-effective solution. Ultimately, they will include measures to prevent cattle jumping the fence, such as a strand of electric wiring and a single wooden railing, and keep rabbits out, such as rabbit-proof netting.
- A level of destocking will be undertaken in Land Management Treatment area 03b (refer to the LMRP).
- Rabbits are proposed to be controlled within the treatment area with the intent of eradication.

Reporting

- It is proposed that an annual monitoring report be completed and submitted to DCCEEW on an annual basis for 10 years. The report will be shared with DTP for the first three years of the program prior to handing over the management of the roadside planting at the completion of the 3-year maintenance period. This report must include a description of pest plant and pest animal treatments and the quantification and measures of success against key weed performance indicators.

O-EPR09 Public safety

Public safety		O-EPR09
Responsibility:	Pacific Green or their delegate	
Frequency:	On going	
Objective:	To ensure appropriate management of unauthorised access	

Background

Risks to public safety include:

- Unauthorised access.

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- OHS Regulations

Mitigations and control measures

- The project will have signage, including no entry signs.
- Fencing as per the Fencing Plan.

O-EPR10 Fire

Fire	O-EPR10
Responsibility:	Pacific Green or their delegate
Frequency:	As required
Objective:	To ensure appropriate management of fire hazards

Background

The project is in the South West Fire District where the fire danger season generally occurs between 25 October and 1 May each year (CFA, 2024). MapshareVic indicates that the closest recorded bushfire to the project area was the 2019 Far South West 22 – Portland – Blacknose Point fire, located approximately 3 km east (DECCA, 2024). This is the most recent recorded bushfire within 30 km of the project area.

Fire Risk Consultants were engaged to undertake a Preliminary Hazard Assessment of the project. They determined that the project achieves an acceptable level of safety, with risks considered low to medium. The low to medium risk is driven by compliance with the CFA Guidelines and the numerous standards, guidelines, and legislative requirements during the design phase of the project. All the model requirements outlined within the CFA Guideline can be achieved with this development along with other mitigation measures that will further reduce the risk.

Regardless, the following risks associated with fire remain:

- Direct injury, death or displacement of terrestrial fauna from increased risk of fire associated with operation, such as the MNES Southern Brown Bandicoot or Swamp Antechinus.
- The potential for a fire during operations to cause water-quality damage and uncontrolled release of contaminated water into the natural environment.

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- CFA - Design Guidelines and Model Requirements Renewable Energy Facilities v4 (2023)

Mitigations and control measures

- Implement FMP[3] (to be developed in conjunction with the FRV).
- Implement procedures for control of operations with a risk of fire ignition, particularly during the fire danger season.
- Develop measures for fire prevention, firefighting, site access and emergency response in consultation with the CFA/FRV.
- Undertake fuel reduction (vegetation) around the site boundary or in other areas where necessary. Fuel reduction of grasses <100 mm in height during the declared Fire Danger Period. Avoid areas of vegetation to be protected where possible.
- Provision of an above-ground water tank holding dedicated firefighting water supply.
- Firefighting equipment will be bunded, where possible. If discharged, divert to a designated storage system.
- Both the Battery Pond and North Pond must be capable of storing water runoff used for firefighting purposes. This will require the installation of a penstock gate at the outflow structure, with the procedure for firefighting to include closure of the penstock, which will enable all water using during fire suppression to be stored in the ponds. The ponds have been sized with this in mind.
- No significant volumes of potential contaminants will be stored on site. All potential contaminants to be stored in bunded areas in sealed drums and containers.
- The project will incorporate appropriate levels of fire protection including:
  - Establishment of asset protection zones and firebreaks.
  - Provision of a water tank and fire hydrants within the project area for firefighting on-site. Fire hydrants will be designed, installed, and commissioned in accordance with AS 2419.1-2005.
  - Provision of appropriate fire suppression systems and fire-fighting equipment.

[3] Or other document as specified by the relevant Fire Authority

  - The BESS units contain complex operation management, hardware and software systems to reduce any risk of fire.
  - Regular inspection and maintenance of onsite firefighting equipment to ensure continued readiness for use and adequate staff training.
- Pacific Green will liaise with the CFA to ensure that fire hazards, fire-fighting resources, and fire response plans are clearly understood by both parties.
- The community can contact Pacific Green via the website with fire risk concerns, questions, or issues.

O-EPR11 Environmental emergency response

Environmental emergency response	O-EPR11
Responsibility:	Principal Contractor or their delegate
Frequency:	As required
Objective:	To ensure appropriate management of environmental emergencies during construction

Background

Potential environmental incidents on the site which would require emergency response would relate to a spill of hazardous liquid or material on soils on the site, or in proximity of stormwater discharge point, or relating to a release of potential asbestos-affected materials.

Statutory requirements and guidance documents

The EMP considered relevant legislation and guidelines, including:

- EP Act
- EP Regulations
- OHS Act
- OHS Regulations

Mitigations and control measures

ERPs will be developed for each phase of the project (i.e. construction, operation, and decommissioning) to guide actions to be taken to minimise the impacts of accidents and incidents. ERPs will be reviewed and updated on a regular basis to incorporate new information arising from any incidents, near misses and hazards and emergency response simulation training sessions. These plans will also include the facilitation of fire danger season restrictions and requirements.

The ERPs will address all potential risks associated with the project and will outline:

- Identification of appropriate emergency services.
- Measures to undertake consultation with local emergency services.
- Protocol for notification of appropriate authorities.
- Detailed incident and emergency procedures.

Emergency response drills will also be undertaken at regular intervals to ensure that personnel are familiar with the plans and the types of emergencies to which it applies, and that there will be a rapid and effective response in the event of a real emergency occurring.

Response actions to environmental incidents will depend on the type and location of the incident:

- For spills on **land**, the following shall be undertaken:
  - Identify source of spill and stop when / if safe to do so.
  - Identify area of spill and clear area of all personnel.
  - Notify relevant government agency (as required) (within 24hrs), and environmental manager of spill.
  - Environmental manager to coordinate the pumping of liquid waste out of the containment structure and disposal to a licensed waste facility.
  - If solid waste:
    - Environmental consultant coordinates the excavation and removal of the hazardous material to a secure area.
    - Assess soils in vicinity of environmental incident for contamination and conduct remediation works where contamination has occurred.
- For spills **in proximity of the stormwater outlets** from the site, the following shall be undertaken:
  - Identify source of spill and stop when / if safe to do so.
  - Identify area of spill and clear area of all personnel (where onshore area present).
  - Notify relevant government agency (as required) (within 24hrs), and environmental manager of spill.
  - Environmental consultant instructs containment of area of spill in water by placement of temporary absorbent beams (available on site) to create ‘coffer dam’ around stormwater outlet to prevent discharge of spilt material.

- Environmental manager to coordinate a liquid waste tanker to be brought onto site and pump directly from water contained within the impacted area until visual evidence that the spill has been removed.
- Conduct chemical testing of water in the stormwater system as potentially affected by the spill to validate removal of contamination.
- Subject to validation results, remove coffer dam.

All emergency responses will be followed up with incident reporting (see **Section 4.6**) and review of the EMP (see **Section 4.8**).

8. Management and monitoring

Monitoring requirements for each EPR are presented in **Table 7-1**. The table outlines how to determine the efficacy of mitigation measures and corrective actions, detect if performance targets are attained or not, and, where relevant, identify whether a trigger threshold is met and within what timeframe.

Table 7-1: EPR monitoring program

EPR	Performance target	Monitoring program	Trigger value	Corrective actions	Environmental schedules
C-EPR01 Air quality	• Minimise dust pollution. • Limited complaints received from the community.	• Weekly environmental inspections. • All staff on site to report sightings of the trigger value/s to the Site Manager. • Complaints register maintained by Pacific Green or their representative.	• Dust pollution visible. • 4 or more dust complaints received from the community in an 8 week period	• Record and respond to (if required) complaints within five business days, unless escalation is required. • Remediate any dust pollution. • Raise incident report. • Investigate cause and apply targeted management measure, if possible. • Ensure all management measures are being implemented effectively. • If they are and impacts persist, increase the frequency of the measures or identify additional mitigations to implement. • Record change in management measures or their frequency in the site register.	• Weekly inspections and monthly assessments conducted by the Site Manager (or delegate). • Complaints monitored throughout the life of the project.
C-EPR02 Noise and vibration	• Noise generated is compliant with the EP Regulations, Noise Protocol. • Limited complaints received from the community.	• Weekly environmental inspections. • Undertake ongoing consultation with the community to identify any construction noise issues. • Complaints register maintained by Pacific Green or their representative.	• Noises created that are not compliant with the EP Regulations, Noise Protocol. • 4 or more noise or vibration complaints received from the community in an 8 week period.	• Record and respond to (if required) complaints within five business days, unless escalation is required. • Raise incident report. • Investigate cause and apply targeted management measure, if possible. • Ensure all management measures are being implemented effectively. • If they are and impacts persist, increase the frequency of the measures or identify additional measures to implement.	• Weekly inspections, with any additional observations reported as soon as possible to the Site Manager. • Complaints monitored throughout the

EPR	Performance target	Monitoring program	Trigger value	Corrective actions	Environmental schedules
		• Ecological Monitoring as per the LMRP.		• Record change in management measures or their frequency in the site register.	life of the project.
C-EPR03 Lighting	• Limited complaints received from the community. • minimise lighting disturbance to fauna identified.	• Weekly environmental inspections. • Undertake ongoing consultation with the community to identify any construction lighting issues. • Complaints register maintained by Pacific Green or their representative. • Ecological Monitoring as per the LMRP.	• 4 or more complaints received from the community in an 8 week period. • Fauna showing signs of disturbance i.e. altered activity or fleeing the area.	• Record and respond to (if required) complaints within five business days, unless escalation is required. • Raise incident report. • Investigate cause and apply targeted management measure, if possible. • Ensure all management measures are being implemented effectively. • If they are and impacts persist, increase the frequency of the measures or identify additional measures to implement. • Record change in management measures or their frequency in the site register.	• Weekly inspections, with any additional observations reported as soon as possible to the Site Manager. • Annual ecological monitoring for 10 years. • Complaints monitored throughout the life of the project.
C-EPR04 Traffic	• No car accidents in the area, including fauna collisions, as a direct result of the project. • Limited complaints received from the community.	• All staff to report car accidents, fauna collisions, or vehicle safety concerns to the Operational Manager. • Site Manager to identify any days where project traffic is expected to be greater than the assumed daily traffic in the TIAR.	• Any vehicle accidents including fauna collisions caused by Pacific green staff, sub-contractors or deliveries recorded.	• Record and respond to (if required) complaints within five business days, unless escalation is required. • Raise incident report. • Investigate cause and apply targeted management measure, if possible. • Ensure all management measures are being implemented effectively. • If the accident is likely to be a result of the project, review the TMP to determine the effectiveness of control measures. • If required, increase the frequency of the measures or identify additional measures to implement.	• Periodically as accidents occur. • Complaints monitored throughout the life of the project.

EPR	Performance target	Monitoring program	Trigger value	Corrective actions	Environmental schedules
		• Complaints register maintained by Pacific Green or their representative.		• Record change in management measures or their frequency in the site register.	
C-EPR05 Erosion and sediment control	• Minimise sediment pollution on the environment. • Limited complaints received from the community.	• Weekly environmental inspections • All staff on site to report sightings of the trigger value/s to the Site Manager. • Complaints register maintained by Pacific Green or their representative.	• Mass release of proposed fill. • Sedimentation in the wetlands. • 5 or more complaints received from the community.	• Remediate any sedimentation or mass release. • Record and respond to (if required) complaints within five business days, unless escalation is required. • Raise incident report. • Investigate cause and apply targeted management measure, if possible. • Ensure all management measures are being implemented effectively. • If they are and impacts persist, review the soil erosion and drainage management measures, altering if required for adequate management. • Record change in management measures or their frequency in the site register.	• Weekly inspections, with any additional observations reported as soon as possible to the Site Manager. • Complaints monitored throughout the life of the project.
C-EPR06 Waste management	• No waste pollution to the environment.	• Weekly environmental inspections. • Site staff and contractors to report sightings of the trigger value/s to the Site Manager.	• Waste present in the site outside of the waste storage areas. • Waste generated on site observed outside the property boundary.	• Raise incident report, if required. • Investigate cause and apply targeted management measure, if possible. • Ensure all management measures are being implemented effectively. • If they are and impacts persist, increase the frequency of the measures or identify additional measures to implement. • Record change in management measures or their frequency in the site register. • Remove waste and remediate pollution where required.	• Weekly inspections, with any additional observations reported as soon as possible to the Site Manager.
C-EPR07 Soil and contamination	• No long term contamination of the	• Weekly environmental inspections	• Chemical spill observed.	• Stop work until advice is obtained from the Project Manager. • Investigate cause.	• Weekly inspections, with any

EPR	Performance target	Monitoring program	Trigger value	Corrective actions	Environmental schedules
	environment caused by the project.	undertaken by a suitably qualified person during an in-person site visit. • In addition, site staff and contractors to report sightings of the trigger value/s to the Site Manager.	• Contamination identified. • Vegetation die-off in an area.	• Follow procedures to clean up spill and remediate any contamination. • Notify appropriate authorities as required in the ERP. • Revegetate any areas of die-off. • Raise incident report. • Ensure all management measures are being implemented effectively. • If they are and impacts persist, increase the frequency of the measures or identify additional measures to implement. • Record change in management measures or their frequency in the site register.	additional observations reported as soon as possible to the Site Manager.
C-EPR08 Surface water and groundwater	• No impact to water quality leaving the site as a result of the project.	• Weekly environmental inspections. • In addition, site staff and contractors to report sightings of the trigger value/s to the Site Manager.	• Contamination identified. • Habitat degradation of wetlands. • Persistent negative change in water quality.	• Raise incident report. • Investigate cause and apply targeted management measure, if possible. • Ensure all management measures are being implemented effectively. • If they are and impacts persist, increase the frequency of the measures or identify additional measures to implement. • Record change in management measures or their frequency in the site register. • Remediate any impacts to water quality.	• Weekly inspections, with any additional observations reported as soon as possible to the Site Manager.
C-EPR09 Ecology, flora and fauna	• Overall increase in the amount and quality of indigenous vegetation on site, with a focus on habitat available to threatened fauna species.	• Weekly environmental inspections. • Ecological Monitoring as per the LMRP. • In addition, site staff and contractors to report sightings of	• Habitat degradation or clearing of native vegetation other than what has been approved. • Failure of revegetation efforts to establish.	• Raise incident report. • Investigate cause and apply targeted management measure, if possible. • Ensure all management measures are being implemented effectively. • If they are and impacts persist, increase the frequency of the measures or identify additional measures to implement.	• Annually, with any additional observations reported as soon as possible to the Site Manager.

EPR	Performance target	Monitoring program	Trigger value	Corrective actions	Environmental schedules
	• No negative impacts on native fauna species as a result of the project.	the trigger value/s to the Site Manager.	• Altered fauna activity or negative impacts to fauna. • Native fauna trapped in fenced areas.	• Record change in management measures or their frequency in the site register. • Report any incidents of unapproved native vegetation removal to DEECA. An offset may be required. • A licensed native fauna handler to remove any native fauna trapped in fenced areas. • A suitably qualified person to remediate any areas of degradation.	
C-EPR10 Weed and pest management	• Eradicate and control listed noxious weeds and pest animals in line with the CaLP Act requirements.	• Ecological Monitoring as per the LMRP. • In addition, site staff and contractors to report sightings of the trigger value/s to the Site Manager.	• High presence of pest fauna and flora species. • Stock observed within the fenced off revegetation areas.	• If stock are observed in the fenced off revegetation areas, determine how they gained access. Rectify this issue, potentially through fixing the fences, and remove the stock from the area. • Record the findings of the monitoring in the annual monitoring report. • Ensure all management measures are being implemented effectively. • If they are and impacts persist, increase the frequency of the measures or identify additional measures to implement. • Record change in management measures or their frequency in the site register.	• Annually for 10 years as per the LMRP
C-EPR11 Public safety	• No unauthorised access within the project area.	• Weekly environmental inspections. • In addition, site staff and contractors to report sightings of the trigger value/s to the Site Manager.	• Unauthorised access within the project area. • Damage to the fencing that could facilitate in unauthorised access.	• Ensure the person/s are removed from site. If required, contact the relevant authorities for assistance. • Investigate how access was obtained. If there is damage to the fence or the fencing is ineffective, rectify this issue. • Raise incident report.	• Weekly inspections and monthly reporting.
C-EPR12 Fire	• No fires caused as a result of the project.	• Weekly environmental inspections.	• A fire in the project area. • A fire risk that is not appropriately	• Raise incident report. • Investigate cause and apply targeted management measure, if possible.	• Weekly inspections and monthly reporting.

EPR	Performance target	Monitoring program	Trigger value	Corrective actions	Environmental schedules
		• In addition, site staff and contractors to report sightings of the trigger value/s to the Site Manager. • Inspections of onsite firefighting equipment to ensure continued readiness for use.	being managed, including work on Catastrophic Fire Danger Days or grasses >100 mm in height during the declared Fire Danger Period.	• Ensure all management measures are being implemented effectively. • If they are and impacts persist, increase the frequency of the measures or identify additional measures to implement. • If required, review the FMP (or other document as specified by the relevant Fire Authority) and consult the CFA and/or FRV. • Record change in management measures or their frequency in the site register.	
C-EPR13 Environmental emergency response	• The timely and adequate response to any environmental emergency to ensure there is no permanent impact to the environment. • Limited complaints received from the community.	• Weekly environmental inspections. • In addition, site staff and contractors to report sightings of the trigger value/s to the Site Manager • Complaints register maintained by Pacific Green or their representative.	• Identification of a spill of hazardous liquid or material or the release of potential asbestos-affected materials. • 5 or more complaints received from the community.	• Upon the identification of the triggers, follow the ERP protocols. • Raise incident report and review the EMP. • Following any incidents or near misses, review and update the ERP. • Record and respond to (if required) complaints within five business days, unless escalation is required.	• Weekly inspections and monthly reporting. • Complaints monitored throughout the life of the project.
O-EPR01 Noise and vibration	• No noise created that is not compliant with the EP Regulations, Noise Protocol. • Limited complaints received from the community.	• Operational noise monitoring by a suitably qualified person. • Site visit for fauna monitoring by a suitably qualified ecologist. • In addition, all staff on site to report sightings of the trigger value/s to the	• Noises created that are not compliant with the EP Regulations, Noise Protocol. • 4 or more noise or vibration complaints received from the community in an 8 week period.	• Record and respond to (if required) complaints within five business days, unless escalation is required. • Raise incident report. • Investigate cause and apply targeted management measure, if possible. • Ensure all management measures are being implemented effectively. • If they are and impacts persist, increase the frequency of the measures or identify additional measures to implement.	• Annually, with ecological monitoring only for 10 years. • Any additional observations reported as soon as possible to the Operational Manager.

EPR	Performance target	Monitoring program	Trigger value	Corrective actions	Environmental schedules
		Operational Manager. • Complaints register maintained by Pacific Green or their representative.		• Record change in management measures or their frequency in the site register.	• Complaints monitored throughout the life of the project.
O-EPR02 Lighting	• Limited complaints from the community. • No lighting disturbance to fauna identified.	• Undertake ongoing consultation with the community to identify any operational lighting issues. • Complaints register maintained by Pacific Green or their representative. • Ecological Monitoring as per the LMRP.	• 4 or more complaints received from the community within an 8 week period. • Fauna showing signs of disturbance i.e. altered activity or fleeing the area.	• Record and respond to (if required) complaints within five business days, unless escalation is required. • Raise incident report. • Investigate cause and apply targeted management measure, if possible. • Ensure all management measures are being implemented effectively. • If they are and impacts persist, increase the frequency of the measures or identify additional measures to implement. • Record change in management measures or their frequency in the site register.	• Annual ecological monitoring for 10 years. • Complaints monitored throughout the life of the project.
O-EPR03 Traffic	• Minimise car accidents in the area, including fauna collisions, as a direct result of the project. • Limited complaints received from the community.	• All staff to report car accidents, fauna collisions, or vehicle safety concerns to the Operational Manager. • Complaints register maintained by Pacific Green or their representative.	• Any vehicle accidents including fauna collisions caused by Pacific green staff, sub-contractors	• Record and respond to (if required) complaints within five business days, unless escalation is required. • Raise incident report. • Investigate cause and apply targeted management measure, if possible. • Ensure all management measures are being implemented effectively. • If the accident is likely to be a result of the project, review the TMP to determine the effectiveness of control measures. • If required, increase the frequency of the measures or identify additional measures to implement.	• Periodically as accidents occur. • Complaints monitored throughout the life of the project.

©JBS&G Australia Pty Ltd

EPR	Performance target	Monitoring program	Trigger value	Corrective actions	Environmental schedules
				• Record change in management measures or their frequency in the site register.	
O-EPR04 Waste management	• No waste pollution to the environment.	• Inspections conducted by the Operations Manager. • In addition, all staff on site to report sightings of the trigger value/s to the Operational Manager.	• Waste present in the site outside of the waste storage areas.	• Raise incident report, if required. • Investigate cause and apply targeted management measure, if possible. • Ensure all management measures are being implemented effectively. • If they are and impacts persist, increase the frequency of the measures or identify additional measures to implement. • Record change in management measures or their frequency in the site register. • Remove waste and remediate pollution where required.	• Ad hoc inspections by the Operations Manager. • Annually, within operational reporting.
O-EPR05 Soil and contamination	• No long term contamination of the environment caused by the project.	• Annual environmental inspections undertaken by a suitably qualified person during an in-person site visit. • In addition, all staff on site to report sightings of the trigger value/s to the Operational Manager.	• Chemical spill observed. • Contamination identified. • Vegetation die-off in an area.	• Investigate cause. • Follow procedures to clean up spill and remediate any contamination. • Notify appropriate authorities as required in the ERP. • Revegetate any areas of die-off. • Raise incident report. • Ensure all management measures are being implemented effectively. • If they are and impacts persist, increase the frequency of the measures or identify additional measures to implement. • Record change in management measures or their frequency in the site register.	• Ad hoc inspections by the Operations Manager. • Annually, within operational reporting.
O-EPR06 Surface water and groundwater	• No impact to the water quality on site or in the surrounding	• Annual environmental inspections undertaken by a suitably qualified	• Contamination identified. • Habitat degradation of wetlands.	• Raise incident report. • Investigate cause and apply targeted management measure, if possible. • Ensure all management measures are being implemented effectively.	• Ad hoc inspections by the Operations Manager.

©JBS&G Australia Pty Ltd

EPR	Performance target	Monitoring program	Trigger value	Corrective actions	Environmental schedules
	area as a result of the project.	person during an in-person site visit. • In addition, all staff on site to report sightings of the trigger value/s to the Operational Manager.	• Persistent negative change in water quality	• If they are and impacts persist, increase the frequency of the measures or identify additional measures to implement. • Record change in management measures or their frequency in the site register. • Remediate any impacts to water quality.	• Annually, within operational reporting.
O-EPR07 Ecology, flora and fauna	• Overall increase in the amount and quality of indigenous vegetation on site, with a focus on habitat available to threatened fauna species. • No negative impacts on native fauna species as a result of the project.	• Site visit for ecological monitoring by a suitably qualified ecologist, with indigenous flora identification skills and experience in handling/trapping animals and the humane control of them. • In addition, all staff on site to report sightings of the trigger value/s to the Operational Manager.	• Habitat degradation or clearing of native vegetation other than what has been approved. • Failure of revegetation efforts to establish. • Altered fauna activity or negative impacts to fauna. • Native fauna trapped in fenced areas.	• Raise incident report. • Investigate cause and apply targeted management measure, if possible. • Ensure all management measures are being implemented effectively. • If they are and impacts persist, increase the frequency of the measures or identify additional measures to implement. • Record change in management measures or their frequency in the site register. • Report any incidents of unapproved native vegetation removal to DEECA. An offset may be required. • A licensed native fauna handler to remove any native fauna trapped in fenced areas. • A suitably qualified person to remediate any areas of degradation.	• Annually for 10 years as per the LMRP. • Ad hoc inspections by the Operations Manager.
O-EPR08 Weed and pest management	• Eradicate and control listed noxious weeds and pest animals in line with the CaLP Act requirements.	• Site visit for ecological monitoring by a suitably qualified ecologist, with flora identification skills and experience in handling/trapping animals and the humane control of	• High presence of pest fauna and flora species. • Stock observed within the fenced off revegetation areas.	• If stock are observed in the fenced off revegetation areas, determine how they gained access. Rectify this issue, potentially through fixing the fences, and remove the stock from the area. • Record the findings of the monitoring in the annual monitoring report. • Ensure all management measures are being implemented effectively.	• Annually for 10 years as per the LMRP. • Ad hoc inspections by the Operations Manager.

EPR	Performance target	Monitoring program	Trigger value	Corrective actions	Environmental schedules
		them. The site visit will quantify and measure success of weed and pest management against key performance indicators.		• If they are and impacts persist, increase the frequency of the measures or identify additional measures to implement. • Record change in management measures or their frequency in the site register.	
O-EPR09 Public safety	• No unauthorised access within the project area.	• All staff on site to report sightings of the trigger value/s to the Operational Manager.	• Unauthorised access within the project area.	• Ensure the person/s are removed from site. If required, contact the relevant authorities for assistance. • Investigate how access was obtained. If there is damage to the fence or the fencing is ineffective, rectify this issue. • Raise incident report.	• Observations reported as soon as possible to the Operational Manager.
O-EPR10 Fire	• No fires caused as a result of the project.	• During the declared Fire Danger Period, undertake in person site visits to ensure the fire risks are being appropriately managed.	• A fire in the project area. • A fire risk that is not appropriately being managed, including grasses >100 mm in height during the declared Fire Danger Period, identified by staff.	• Raise incident report. • Investigate cause and apply targeted management measure, if possible. • Ensure all management measures are being implemented effectively. • If they are and impacts persist, increase the frequency of the measures or identify additional measures to implement. • If required, review the FMP (or other document as specified by the relevant Fire Authority) and consult the CFA or FRV. • Record change in management measures or their frequency in the site register.	• Once a month during the Fire Danger Period.
O-EPR11 Environmental emergency response	• The timely and adequate response to any environmental emergency to ensure there is no permanent	• Annual environmental inspections undertaken by a suitably qualified person during an in-person site visit.	• Identification of a spill of hazardous liquid or material or the release of potential asbestos-affected materials.	• Upon the identification of the triggers, follow the ERP protocols. • Raise incident report and review the EMP. • Following any incidents or near misses, review and update the ERP.	• Annually, with any additional observations reported as soon as possible to the

EPR	Performance target	Monitoring program	Trigger value	Corrective actions	Environmental schedules
	impact to the environment. • Limited complaints received from the community.	• In addition, all staff on site to report sightings of the trigger value/s to the Operational Manager. • Complaints register maintained by Pacific Green or their representative.	• 5 or more complaints received from the community.	• Record and respond to (if required) complaints within five business days, unless escalation is required.	Operational Manager. • Complaints monitored throughout the life of the project.

9. References

Austroads. (2021). *Guide to Road Design*.

CeRDI. (2024). *Visualising Victorias Groundwater*. https://www.vvg.org.au/vvg_map.php?agreement=Agree+and+Continue

CFA. (2024). *Fire Restriction Dates*. https://www.cfa.vic.gov.au/warnings-restrictions/fire-danger-period/fire-restriction-dates

DCCEEW. (2023). *National Light Pollution Guidelines for Wildlife*. Department of Climate Change, Energy, the Environment and Water. Commonwealth Government of Australia.

DECCA. (2024). *MapshareVic*. https://mapshare.vic.gov.au/MapShareVic/index.html?viewer=MapShareVic.PublicSite&locale=en-AU

DTP. (2024). *VicPlan*. https://mapshare.vic.gov.au/vicplan/

EPA South Australia. (2020). *Guideline for stockpile management*.

EPA South Australia. (2024). *Waste & Recycling*. https://www.epa.sa.gov.au/environmental_info/waste_recycling

EPA Victoria. (1991). *Construction Techniques for Sediment Pollution Control*.

EPA Victoria. (2018). *Liquid storage and handling guidelines: Publication 1698*.

EPA Victoria. (2021). *Soil sampling for waste soils: Publication 702.2*.

EPA Victoria. (2023). *Civil construction, building and demolition guide*.

ESR Transport Planning. (2024). *Proposed Battery Energy Storage System Madeira Packet Road, Portland: Transport Impact Assessment Report*. www.esrtp.com.au

Gaston, K., & Bennie, J. (2014). Demographic effects of artificial nighttime lighting on animal populations. *Environmental Reviews*, *22*, 323–330.

Marshall Day Acoustics. (2024). *Portland Energy Park Noise Assessment*. www.marshallday.com

Melbourne Water. (2017). *The Site EMP Kit - Guidance Notes*.

Nature Advisory. (2024a). *Portland Battery Energy Storage System (BESS): Flora and Fauna Assessment*.

Nature Advisory. (2024b). *Portland Energy Park Matters of National Environmental Significance (MNES) Self-Assessment*.

Owens, A., Cochard, P., Durrant, J., Farnworth, B., Perkin, E., & Seymoure, B. (2020). Light pollution is a driver of insect declines. *Biological Conservation*, *241*.

Rowse, E., Lewanzik, D., Stone, E., Harris, S., & Jones, G. (2016). Dark Matters: The Effects of Artificial Lighting on Bats. In C. Voigt & T. Kingston (Eds.), *Bats in the Anthropocene: Conservation of Bats in a Changing World*.

Stone, E. L., Harris, S., & Jones, G. (2015). Impacts of artificial lighting on bats: a review of challenges and solutions. *Mammalian Biology*, *80*(3).

Water Technology. (2024). *Flood Impact and Water Quality Assessment - Pacific Green Energy Park Portland*.

Appendix A Environmental Risk Assessment

©JBS&G Australia Pty Ltd

© JBS&G
This document is and shall remain the property of JBS&G. The document may only be used for the purposes for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited

Document Distribution

Rev No.	Copies	Recipient	Date
1	1 x electronic copy	Joel Alexander (Pacific Green)	08/07/2025
2	1 x electronic copy	Joel Alexander (Pacific Green)	18/08/2025

Document Status

Rev No.	Author	Reviewer	Approved for Issue		
		Name	Name	Signature	Date
2	Lucy Harrison	Cameron Miller	Cameron Miller		18/08/2025

www.jbsg.com.au

JBS&G

Adelaide
Kaurna Country | 100 Hutt St,
Adelaide, SA 5000
T: 08 8431 7113

Brisbane
Turrbal/Yuggera Country | Level 37,
123 Eagle Street, Brisbane, QLD 4000
T: 07 3211 5350

Bunbury
Wardandi Country | 177 Spencer
Street Bunbury, WA 6230
T: 08 9792 4797

Canberra
Ngunnawal Country | Level 1, The Realm
18 National Circuit Barton, ACT 2600
T: 02 6198 3278

Darwin
Larrakia Country | Suite G1, Level 1,
48-50 Smith Street, Darwin NT 0800
T: 08 8943 0600

Hobart
Muwununa/Nuenon Country | L2, 137
Liverpool Street, Hobart TAS 7000
T: 03 6208 3700

Melbourne
Wurundjeri Country | Level 19,
31 Queen Street, Melbourne VIC 3000
T: 03 9642 0599

Newcastle
Awabakal/Worimi Country | 61 / 63
Parry Street Newcastle West, NSW 2302
T: 02 8245 0300

Perth
Whadjuk Country | Allendale Square,
Level 9, 77 St Georges Terrace, WA 6000
T: 08 9380 3100

Sydney
Gadigal Country | Level 1,
50 Margaret Street, Sydney, NSW 2000
T: 02 8245 0300

Wollongong
Dharawal Country | Suite 1A, 280 - 286
Keira Street, Wollongong, NSW 2500
T: 02 4225 2647

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Report

Flood Impact and Water Quality Assessment

Pacific Green Energy Park Portland

31 July 2024

Document Status

Version	Doc type	Reviewed by	Approved by	Date issued
01	Draft	B Hughes	B Hughes	28/09/2023
02	Report	J Theilemann	J Theilemann	18/07/2024
03	Report	J Theilemann	J Theilemann	31/07/2024

Project Details

Project Name	Flood Impact and Water Quality Assessment
Client	Pacific Green Energy Park Portland
Client Project Manager	Michael Maranta
Water Technology Project Manager	Michael Clarke
Water Technology Project Director	Ben Hughes
Authors	Michael Clarke, Stefan Kitanovic
Document Number	23010492_R01_V01_Portland_BESS_FIA

Cover Image: Roadside drainage, Madeira Packet Road Portland (Water Technology)

COPYRIGHT

Water Technology Pty Ltd has produced this document in accordance with instructions from Pacific Green Energy Park Portland for their use only. The concepts and information contained in this document are the copyright of Water Technology Pty Ltd. Use or copying of this document in whole or in part without written permission of Water Technology Pty Ltd constitutes an infringement of copyright.

Water Technology Pty Ltd does not warrant this document is definitive nor free from error and does not accept liability for any loss caused, or arising from, reliance upon the information provided herein.

15 Business Park Drive
Notting Hill VIC 3168
Telephone (03) 8526 0800
Fax (03) 9558 9365
ACN 093 377 283
ABN 60 093 377 283

ACKNOWLEDGEMENT OF COUNTRY

The Board and employees of Water Technology acknowledge and respect the Aboriginal and Torres Strait Islander Peoples as the Traditional Custodians of Country throughout Australia. We specifically acknowledge the Traditional Custodians of the land on which our offices reside and where we undertake our work.

We respect the knowledge, skills and lived experiences of Aboriginal and Torres Strait Islander Peoples, who we continue to learn from and collaborate with. We also extend our respect to all First Nations Peoples, their cultures and to their Elders, past and present.

Artwork by Maurice Goolagong 2023. This piece was commissioned by Water Technology and visualises the important connections we have to water, and the cultural significance of journeys taken by traditional custodians of our land to meeting places, where communities connect with each other around waterways.

The symbolism in the artwork includes:

- *Seven circles representing each of the States and Territories in Australia where we do our work*
- *Blue dots between each circle representing the waterways that connect us*
- *The animals that rely on healthy waterways for their home*
- *Black and white dots representing all the different communities that we visit in our work*
- *Hands that are for the people we help on our journey*

CONTENTS

1 INTRODUCTION 5

2 METHODOLOGY 6
2.1 Overview 6
2.2 Topographic Data 6
2.3 Culvert Data 7
2.4 Hydraulic (Manning's) Roughness 8
2.5 Initial Water Levels 9
2.6 Hydrologic Inputs 10
2.6.1 Losses 11
2.7 Boundary Conditions 11

3 MODEL RESULTS 12
3.1 Critical Event Selection 12
3.2 Existing Conditions Flood Behaviour 13

4 DEVELOPED CONDITIONS 18
4.1 Concept and Key Design Features 18
4.2 Modelling Updates 21
4.3 Results 23
4.4 Flood Impact 27

5 WATER QUALITY 29
5.1 MUSIC Modelling 31
5.1.1 Meteorological Template 31
5.1.2 Catchments 31
5.1.3 Asset Summary 33
5.1.4 Pollutant Load Reduction 34

6 SUMMARY AND KEY CONSIDERATIONS 36
6.1 Summary 36
6.2 Key Considerations 36

APPENDICES

Appendix A MUSIC Modelling Parameters

LIST OF FIGURES

Figure 1-1 Site Locality 5
Figure 2-1 Model Extent and Topography 7
Figure 2-2 Model 1D Network 8
Figure 2-3 Land Use 9
Figure 2-4 Initial Water Level Areas 10
Figure 3-1 Critical Durations – Existing Conditions (1% AEP Event) 12
Figure 3-2 Median Temporal Pattern, 12-hour Duration (Existing Conditions) 13

Figure 3-3 Maximum Flood Depth – Existing Conditions (1% AEP RCP8.5 2090 Event) 14
Figure 3-4 Maximum Flood Depth (Site) – Existing Conditions (1% AEP RCP8.5 2090 Event) 14
Figure 3-5 Maximum Flood Velocity – Existing Conditions (1% AEP RCP8.5 2090 Event) 15
Figure 3-6 Maximum Flood Velocity (Site) – Existing Conditions (1% AEP RCP8.5 2090 Event) 15
Figure 3-7 Flood Hazard Vulnerability Curves 16
Figure 3-8 Maximum Flood Hazard – Existing Conditions (1% AEP RCP8.5 2090 Event) 17
Figure 3-9 Maximum Flood Hazard (Site) – Existing Conditions (1% AEP RCP8.5 2090 Event) 17
Figure 4-1 Portland Energy Park Functional Layout 18
Figure 4-2 Drainage Concept 20
Figure 4-3 Topographic, pipe network and rainfall updates to TUFLOW model for Developed Conditions 22
Figure 4-4 Maximum Flood Depth – Developed Conditions (1% AEP RCP8.5 2090 Event) 24
Figure 4-5 Maximum Flood Depth (Site) – Developed Conditions (1% AEP RCP8.5 2090 Event) 24
Figure 4-6 Maximum Flood Velocity – Developed Conditions (1% AEP RCP8.5 2090 Event) 25
Figure 4-7 Maximum Flood Velocity (Site) – Developed Conditions (1% AEP RCP8.5 2090 Event) 25
Figure 4-8 Maximum Flood Hazard – Developed Conditions (1% AEP RCP8.5 2090 Event) 26
Figure 4-9 Maximum Flood Hazard (Site) – Developed Conditions (1% AEP RCP8.5 2090 Event) 26
Figure 4-10 Flood Level Difference, Developed vs Existing, 1% AEP RCP8.5 Event 28
Figure 5-1 Stormwater Quality Management Asset Layout 30
Figure 5-2 MUSIC Model Schematic 32

Figure A-1 Nearby Pluviograph Stations (Source: eWater)
Figure A-2 Monthly Rainfall Comparison
Figure A-3 SILO Data Extraction Point
Figure A-4 MUSIC Monthly Average PET

LIST OF TABLES

Table 2-1 Manning's ‘n’ Roughness Coefficients 9
Table 2-2 Land Use Fraction Impervious & Losses 11
Table 4-1 Key Pipe Details 23
Table 5-1 Catchment Area 32
Table 5-2 Sediment Pond Parameter Summary 33
Table 5-3 Wetland Parameter Summary Option 1 34
Table 5-4 Bioretention Parameter Summary Option 2 34
Table 5-5 Wetland Parameter Summary Option 2 34
Table 5-6 Pollutant Load Reduction Performance Option 1 35
Table 5-7 Pollutant Load Reduction Performance Option 2 35

1 INTRODUCTION

Water Technology was engaged by Pacific Green Energy Park Portland Pty Ltd (Pacific Green) to undertake a Flood Impact Assessment (FIA) for the proposed Portland Energy Park: a utility-scale Battery Energy Storage System (BESS). The site is located at the corner of Madeira Packet Road and Tecoma Road in Portland, Victoria. Four lots have been earmarked for the development as shown in Figure 1-1 below.

The Site Area is made up of the East Site (south-east of Madeira Packet Road), West Site (south-west of Madeira Packet Road) and North Site (the two lots north of Madeira Packet Road). The four lots are collectively referred to as the project site or sites ("Sites" in all figures in this report). The area of the four lots totals approximately 116 hectares. The lots are located within an Industrial Zone 2 and Farming Zone areas of Portland. There are no defined waterways that run through or near to the site, however there are small channels that intersect the lots, as well as a number of depressions that are filled during rainfall events. Analysis of such occurrences forms part of the FIA, which will inform the proposed development design and layout.

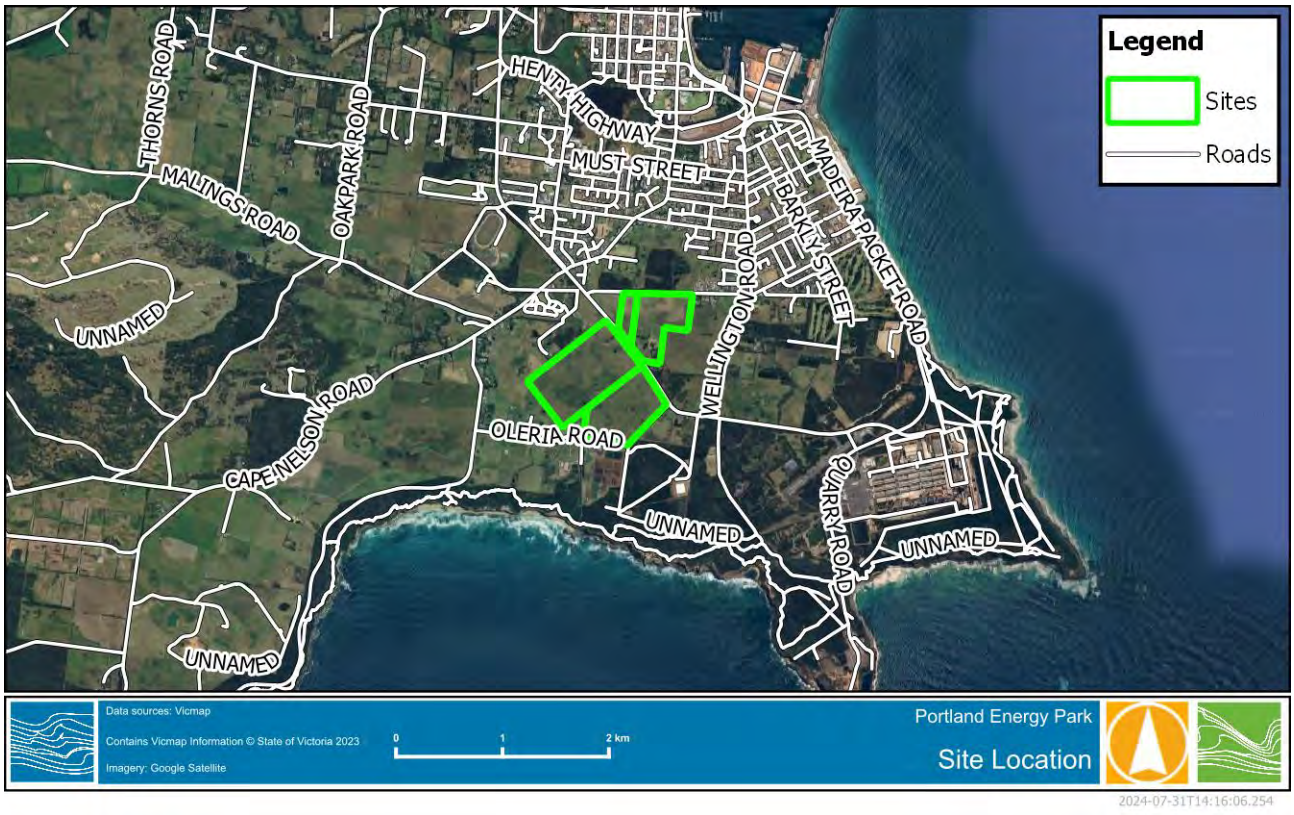


Figure 1-1 Site Locality

The following assessment has modelled the existing flood extent, depth, velocity and flood hazard for the 1% Annual Exceedance Probability (AEP) flood event under projected increases in rainfall intensity associated with Representative Concentration Pathway RCP8.5 to 2090 in line with Australian Rainfall and Runoff (ARR) 2019 guidelines.

2 METHODOLOGY

2.1 Overview

A TUFLOW Rain-on-Grid (RoG) hydraulic model was used to demonstrate the existing site inundation conditions for the 1% AEP flood event.

TUFLOW is one of the most widely used hydraulic modelling software packages in Australia and an appropriate choice of modelling tool for flood mapping of the site. RoG modelling allows the simulation of runoff generated from local rainfall on a two-dimensional grid that is representative of the catchment topography and surface roughness. Runoff moves across the grid according to the topography and roughness of the site, as it would in a real storm event. Depressions on site fill and drain in the model dictated by the topography.

2.2 Topographic Data

The main component of the 2D hydraulic model is the Digital Elevation Model (DEM), which is a representation of the natural and built topography. For the existing conditions modelling two sources of topographic data were available:

- Light Distance And Ranging (LiDAR) data of the site and surrounds developed in 2016 and provided as a 1 metre resolution DEM; and
- Feature survey of the site and a small downstream area captured in July 2023 for the purposes of the development, provided as a 3D surface.

The 1-metre resolution grided LiDAR DEM was utilised in a 2-metre resolution TUFLOW domain covering the entire local catchment. A 2-metre TUFLOW domain samples the provided DEM every 1-metre thus the full resolution of the available topographic data was used. It was deemed that a 2-metre domain grid would provide suitable detail to represent the catchment and site of interest in a 2D modelling environment. Feature survey provided was used to verify the accuracy of the LiDAR DEM in key locations such as drain inverts; however, the point density of feature survey was low and the high resolution LiDAR data was adopted as the most accurate representation of the topography given the two datasets were in close agreement at key locations. The model boundary and topographic datasets are shown in Figure 2-1 below.

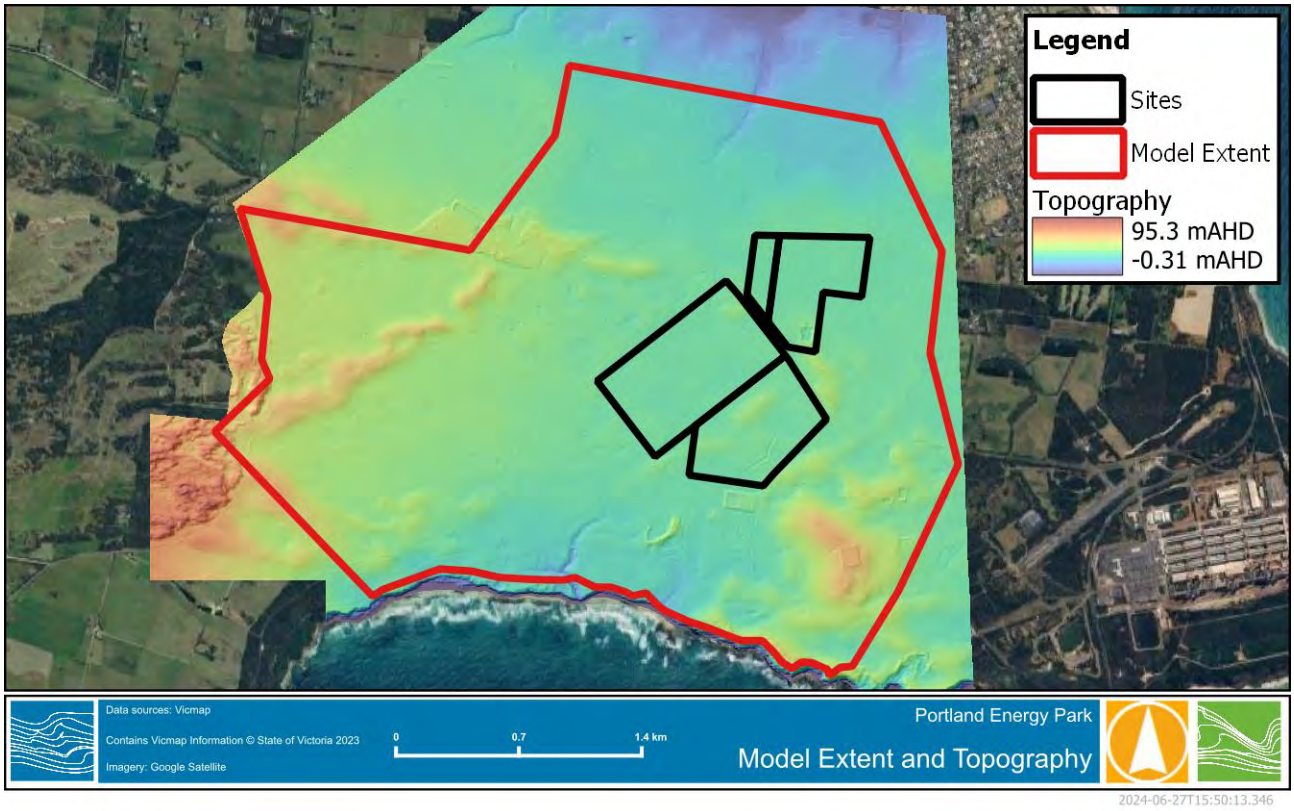


Figure 2-1 Model Extent and Topography

2.3 Culvert Data

Critical culvert information within the model extent was obtained from the feature survey and a site visit by Water Technology staff on August 9th, 2023. The feature survey provided the invert levels and dimensions of the culverts adjacent to the site, with the site visit being used to record the dimensions of the remaining accessible culverts (for those that were inaccessible, dimensions were assumed based on the size of the respective drainage line). Invert levels for the culverts not formally surveyed were derived from the LiDAR DEM.

The culverts included within the modelling extent are shown in Figure 2-2.

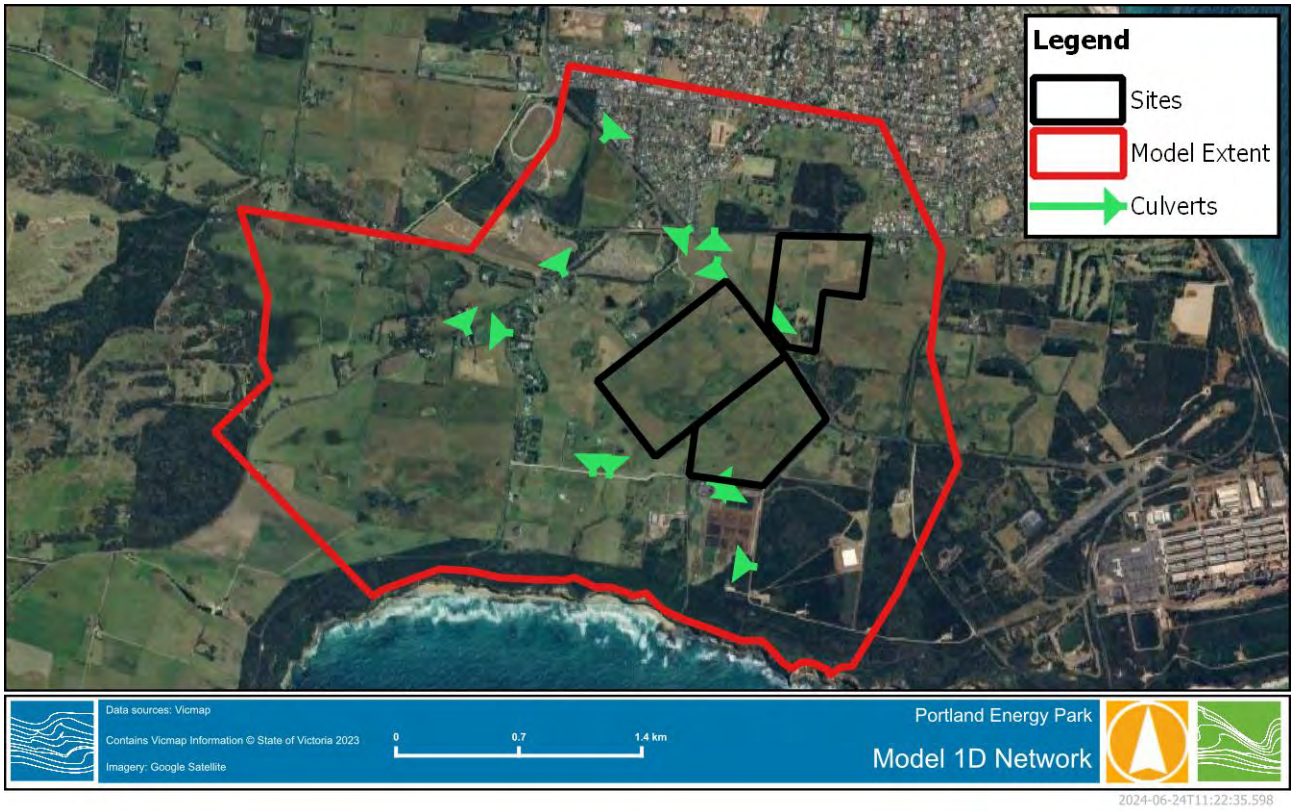


Figure 2-2 Model 1D Network

2.4 Hydraulic (Manning's) Roughness

Manning's roughness values were applied based on identifying common land uses areas within the model extent using a combination of aerial imagery and VicMap spatial data. The majority the area has been taken as open space with a Manning's 'n' roughness coefficient of 0.04. The values of the Manning's roughness coefficients were adopted from industry-standard figures.

A plot of the assigned land uses is provided in Figure 2-3. The adopted roughness coefficient for each land use is provided in Table 2-1.

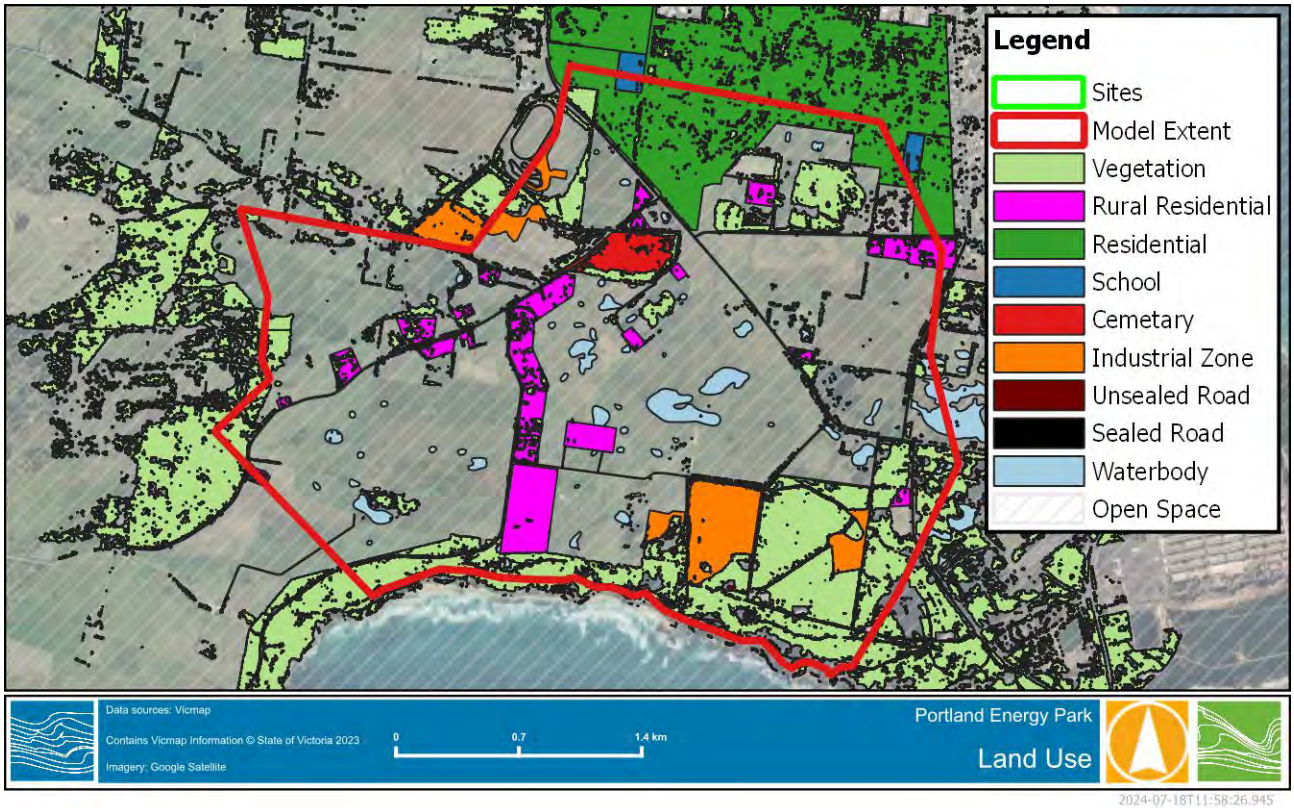


Figure 2-3 Land Use

Table 2-1 Manning's 'n' Roughness Coefficients

Land Use	Manning's 'n' Roughness Coefficient
Open Space	0.04
Vegetation	0.08
Rural Residential Zone	0.1
Residential Zone	0.35
School	0.5
Cemetery	0.5
Industrial Zone	0.5
Unsealed Road	0.03
Sealed Road	0.02
Waterbody	0.02

2.5 Initial Water Levels

The site is characterised by a series of depressions joined by man-made drains. At the time of survey and site aerial photography, it was noted that the depressions on site were full of water which was not draining. This was confirmed by several timeseries images of aerial photography.

To ensure the modelling properly considered standing water on the site at the beginning of an event, an initial water level was applied to waterbody areas near the site. The initial water level adopted was calculated from the ground levels within the water area with comparison against initial model run results. Critical areas on site

adopted the levels from initial model runs of a 1% AEP event which caused the depressions to fill fully. This is likely to be a conservative approach however without detailed water level data a conservative approach was deemed appropriate given the potential impact flooding may have on the facility.

The areas which had an initial water level applied to them are shown in Figure 2-4 below.

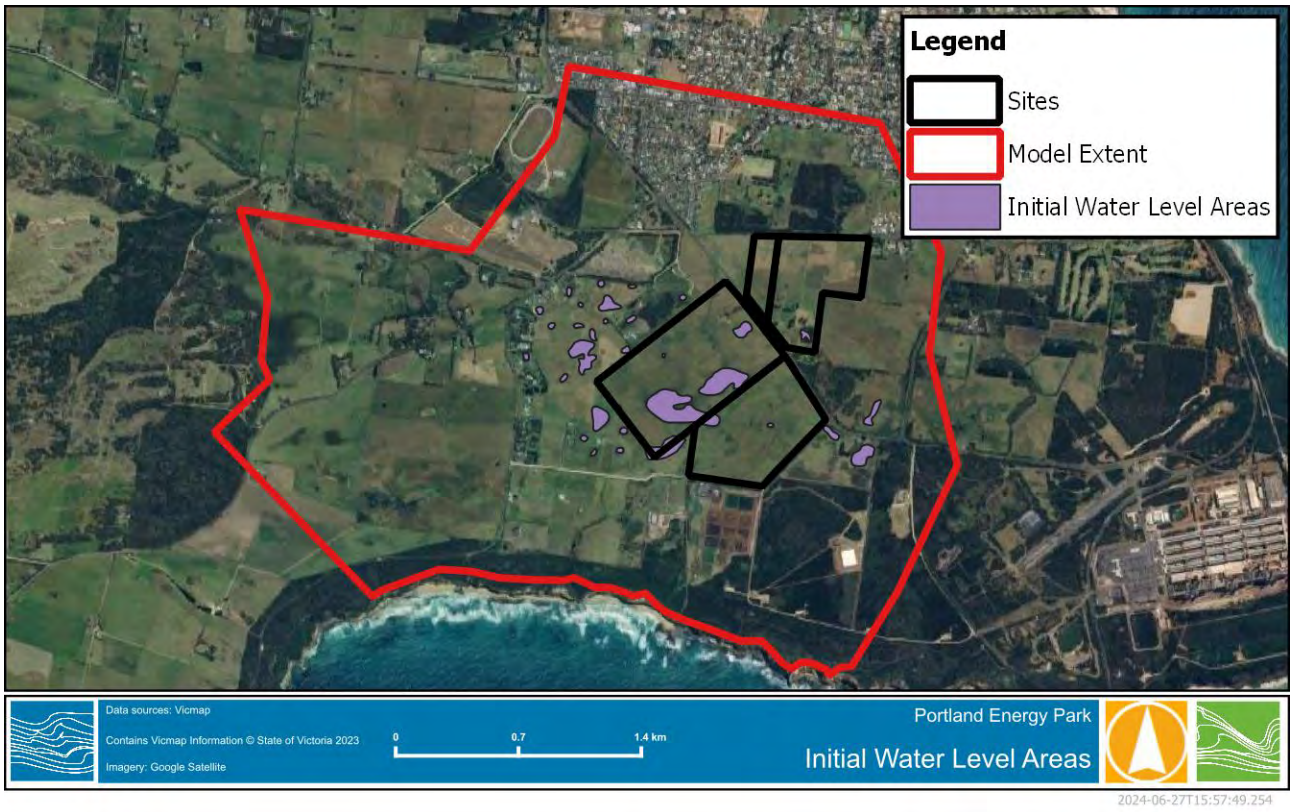


Figure 2-4 Initial Water Level Areas

2.6 Hydrologic Inputs

RoG modelling requires hydrologic inputs of rainfall and losses to be applied to the hydraulic model. The TUFLOW QGIS plugin was used to extract design rainfalls and associated data from the ARR 2019 and Bureau of Meteorology (BoM) databases for the catchment of interest. Rainfalls were scaled by the interim climate change factors from the ARR datahub to 2090 under RCP8.5.

Note: At the time of writing, Book 1 Chapter 6 (Climate Change Considerations) of ARR2019 was in the process of being updated with a draft chapter released. As the project commenced before this draft chapter was released and was finalised before the final chapter was adopted into ARR2019, the updated advice was not included in the modelling contained herein.

With the model extent being larger than the discrete watershed that the site is located within, a conservative approach was taken with no areal reduction factors being applied to the design rainfall.

Temporal patterns were selected from the Southern Slopes (Vic/NSW) zone. Three temporal patterns were modelled for each storm duration, consisting of front loaded, mid-loaded and rear loaded storms.

2.6.1 Losses

Rainfall losses were accounted for using the initial loss / continuing loss method and were assigned to each land use type based on expected fraction imperviousness. Land use types were based on those identified as part of applying the Manning's roughness coefficients.

Losses were applied to the model in the hydraulic roughness database, alongside the roughness values.

Starting values of 15 mm for pervious initial loss and 2.5 mm/h for pervious continuing loss were taken from the Portland Flood Study[1] that was completed in 2010. It is noted that the Portland Flood Study loss values are significantly lower than those provided by the ARR datahub; however, given the Portland Flood Study was focussed on the local catchment and is more conservative than the datahub, this is deemed acceptable for this investigation. The starting pervious initial loss was then lowered to 10 mm to account for the RoG modelling approach, i.e. rainfall that fills local depressions which is accounted for in the modelling rather than in the loss value. The initial loss and continuing loss values were then factored based on the fraction imperviousness of each land use.

The fraction impervious and loss values per land use type are shown in Table 2-2 (note that the waterbody land use type was taken as being fully impervious).

Table 2-2 Land Use Fraction Impervious & Losses

Land Use	Fraction Imperviousness	Initial Loss (mm)	Continuing Loss (mm/h)
Open Space	0	10	2.5
Vegetation	0	10	2.5
Rural Residential Zone	0.2	8	2
Residential Zone	0.6	4	1
School	0.7	3	0.75
Cemetery	0.7	3	0.75
Industrial Zone	0.7	3	0.75
Unsealed Road	0.7	3	0.75
Sealed Road	0.9	1	0.25
Waterbody	1	0	0

2.7 Boundary Conditions

In RoG modelling, inflows are applied as rainfall. Rainfall was applied over the entire model grid utilising the BoM intensity-frequency-duration (IFD) rainfall.

Water flows out from the model via two mechanisms: one 2D height-flow boundary condition encompassing almost the entire model, and another 2D height-flow boundary condition at outlet of the catchment. A slope of 1% was adopted for the boundary condition around the extent of the model, while the slope of the boundary condition at the catchment outlet was set to the gradient of the respective drainage line. Both boundary conditions were located far enough away from the area of interest so as not to influence the results of the analysis.

[1] Portland Flood Study (Cardno, 2011)

3 MODEL RESULTS

3.1 Critical Event Selection

The 1% AEP events with climate change were modelled with identified back-loaded, mid-loaded and front-loaded temporal patterns for the standard durations between 30 minutes and 12 hours. Early modelling included the 18-hour event which demonstrated that this event was not critical, thus it was not included in the final run schedule.

The critical duration varied across the site as expected, tending towards shorter durations where shallow sheet flow was present, to longer durations for channels and larger depressions. Critical duration results are shown in Figure 3-1 below. The results indicate the 12-hour duration was generally critical along the site's major flow paths for the 1% AEP event, which is a reflection of the undulating nature of the site where depressions must fill before flowing downstream, something which doesn't occur in the low volume short durations.

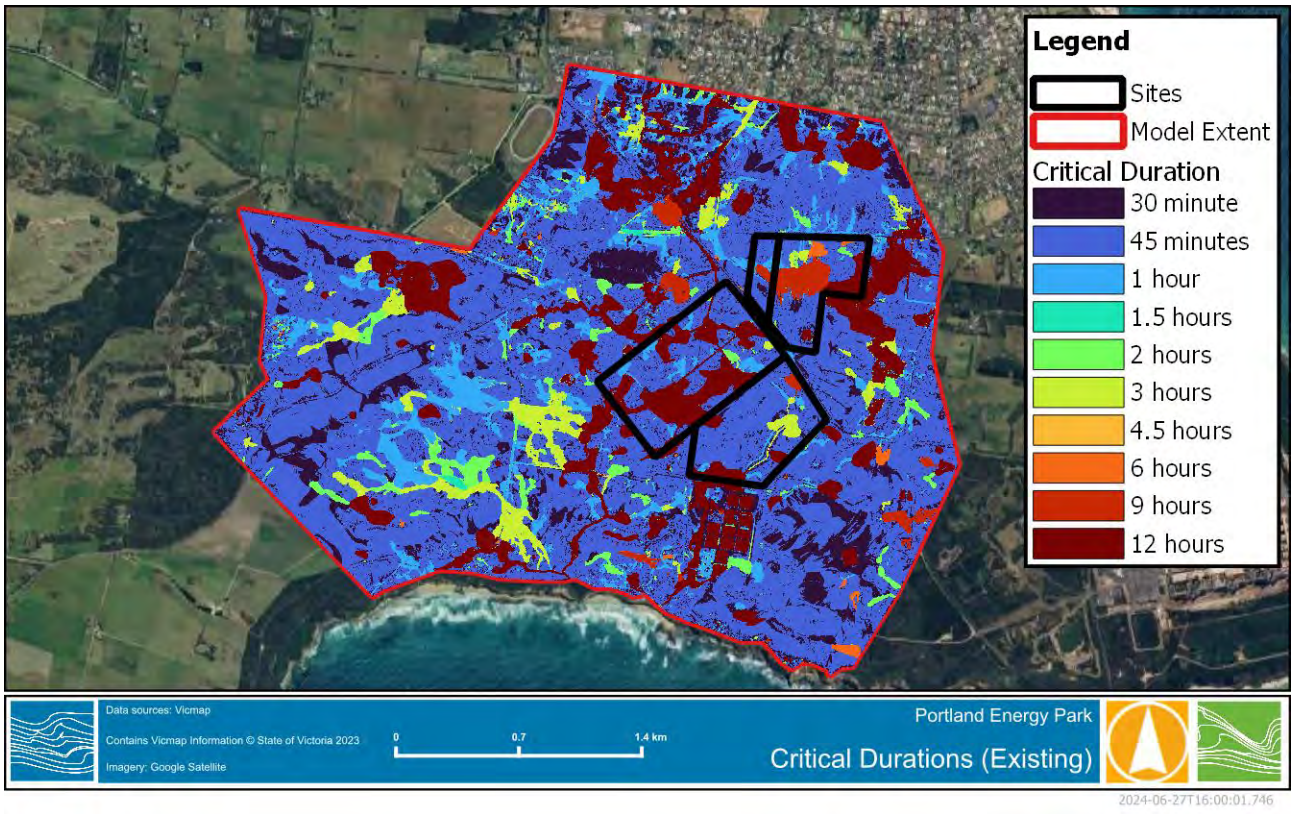


Figure 3-1 Critical Durations – Existing Conditions (1% AEP Event)

All durations were run with three different representative temporal patterns as part of the critical event selection process. For the critical 12-hour duration, temporal pattern 8 produced the median flood level in the overwhelming majority of the model extent as shown in Figure 3-2 below.

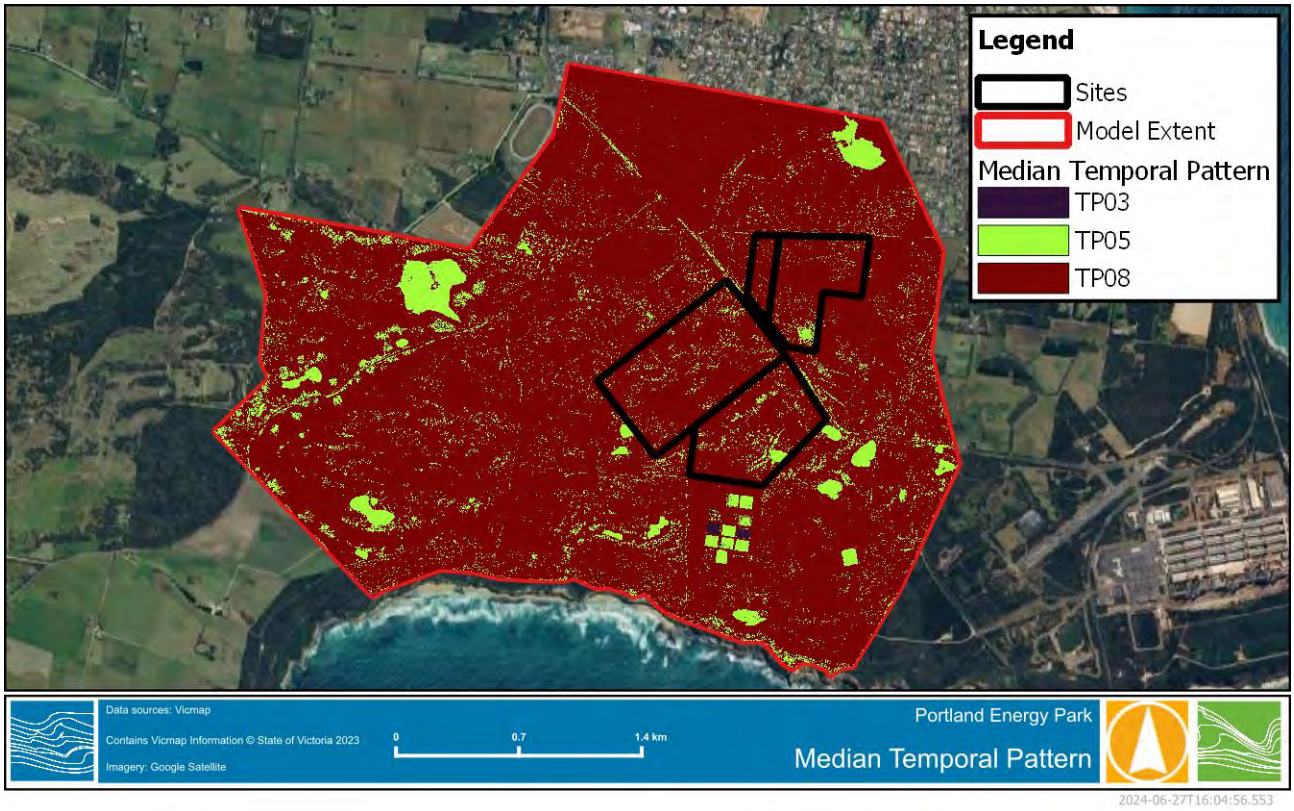


Figure 3-2 Median Temporal Pattern, 12-hour Duration (Existing Conditions)

3.2 Existing Conditions Flood Behaviour

A map of critical flood depth for each magnitude of event across the model extent was produced in the following manner:

1. The median depth at each grid cell was calculated for each duration across the three modelled temporal patterns.
2. The depth at each grid cell was calculated for the area by taking the maximum of the medians produced in step one.
3. The process was repeated for other mapping outputs such as flood level, velocity and hazard.

The resultant flood depth map for the 1% AEP event with climate change is shown in Figure 3-3 and Figure 3-4.

Flood depths of less than 0.02 m were filtered from the flood depth mapping, along with remaining puddles less than 100m^2. The results indicate that flood depths vary across the sites, reaching 1.5 metres on the western parcel for the 1% AEP event. The extent of flooding on site is a result of the localised inundation of its channels and depressions, with no well-defined external flow path serving to contribute to the flooding of the four lots in question.

Modelled velocities are shown to be low, being less than 0.5 m/s for almost the entirety of the site (see Figure 3-5), consistent with the observed flat grade of drainage channels across the sites.

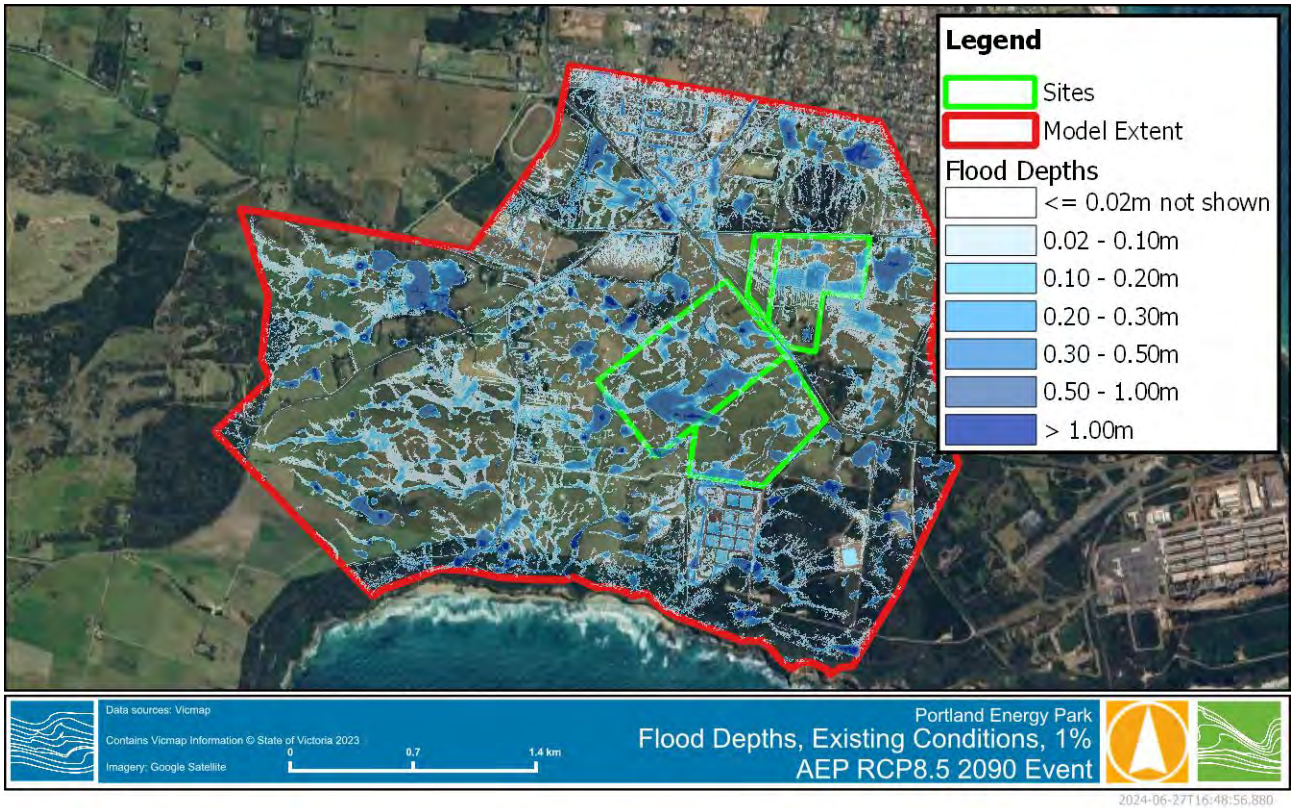


Figure 3-3 Maximum Flood Depth – Existing Conditions (1% AEP RCP8.5 2090 Event)

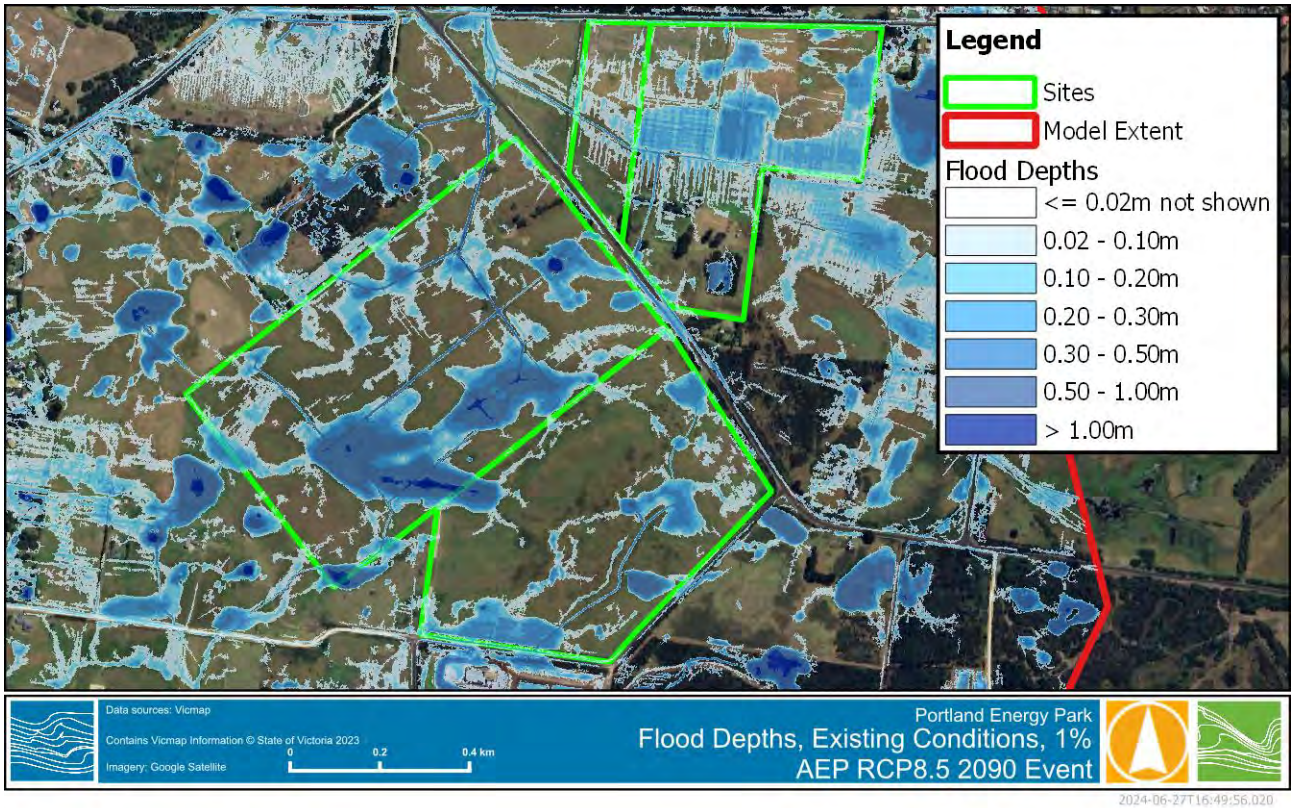


Figure 3-4 Maximum Flood Depth (Site) – Existing Conditions (1% AEP RCP8.5 2090 Event)

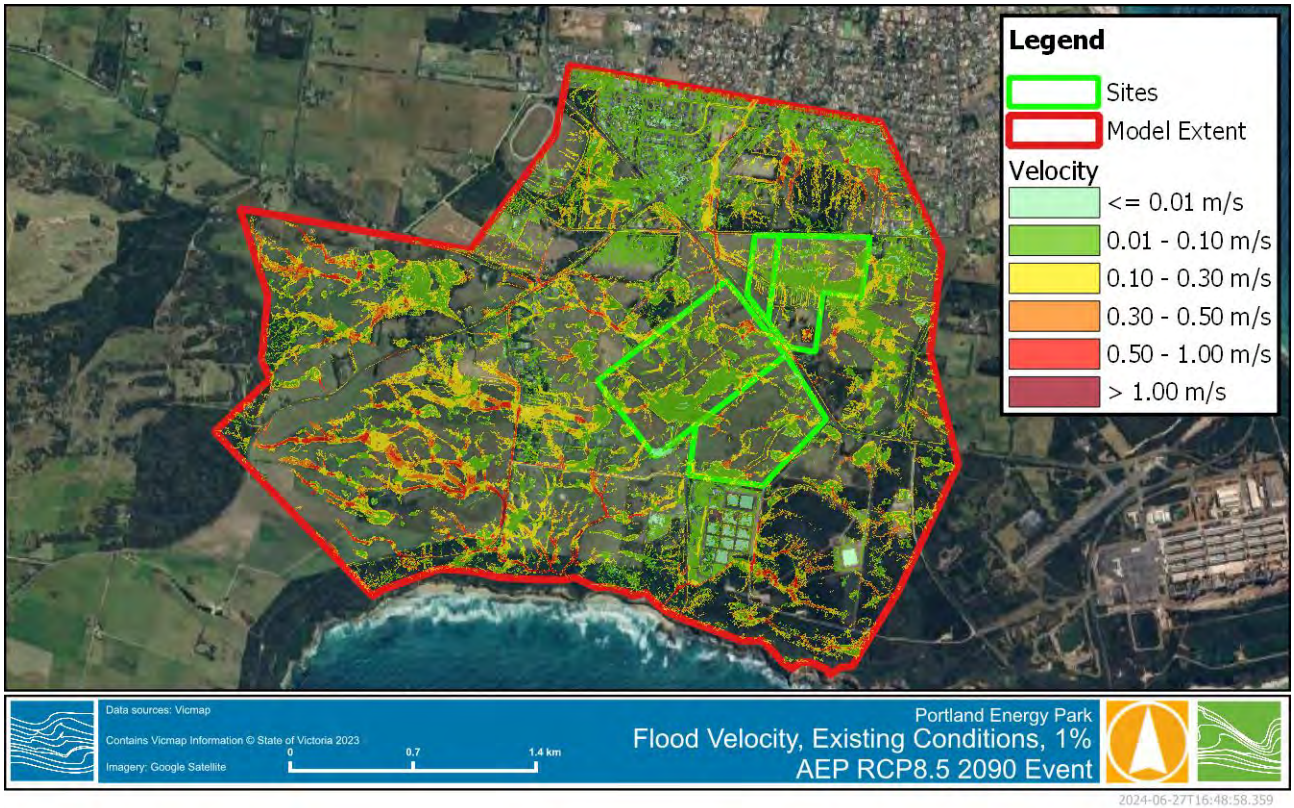


Figure 3-5 Maximum Flood Velocity – Existing Conditions (1% AEP RCP8.5 2090 Event)

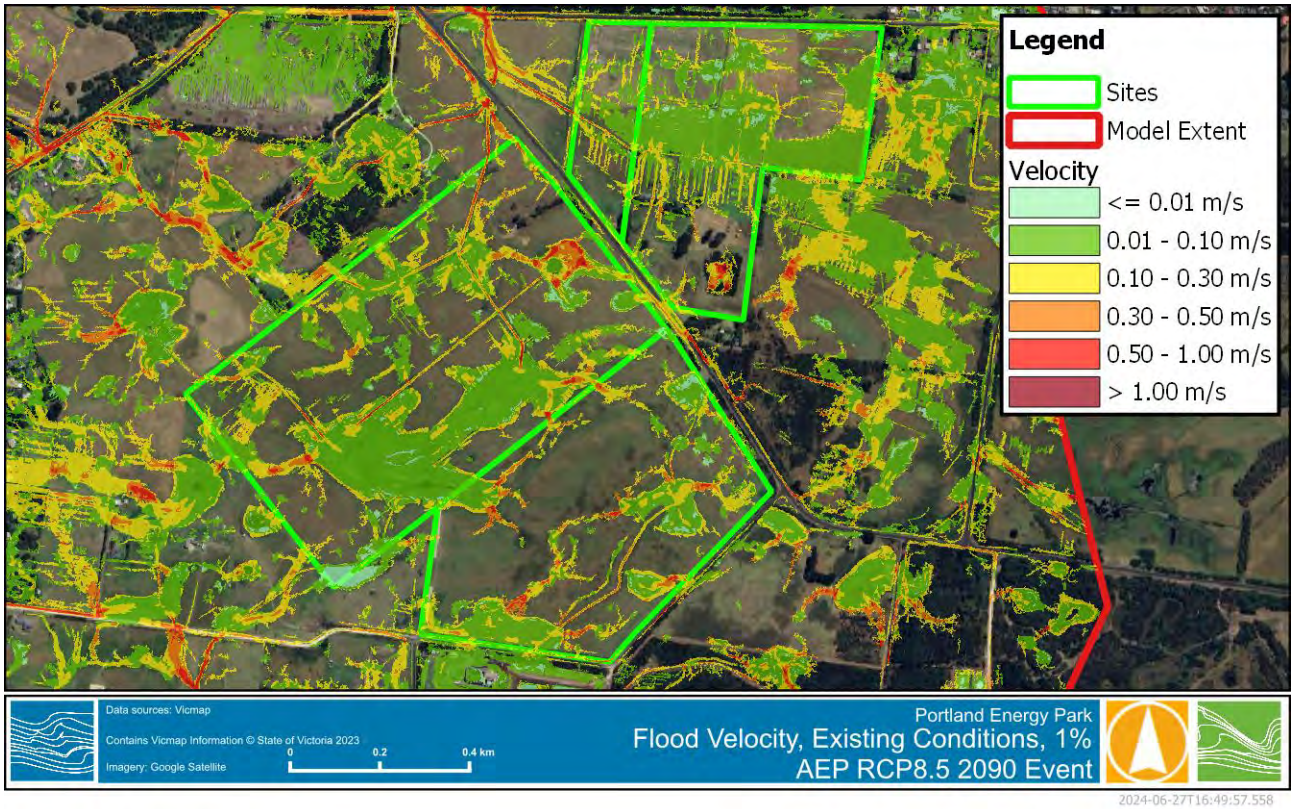


Figure 3-6 Maximum Flood Velocity (Site) – Existing Conditions (1% AEP RCP8.5 2090 Event)

Flood hazard results for the existing conditions modelling has been provided for the proposed development site (Figure 3-8 to Figure 3-9). Flood hazard mapping is used to determine flood safety for vehicles and pedestrians within the area of interest. The flood hazard mapping presented has followed ARR 2019 recommendations, adopting flood hazard categories as outlined in the Australian Disaster Resilience Guideline 7-3 – Flood Hazard. The depth-velocity-hazard relationship is shown in Figure 3-7 below.

Results from the flood modelling indicate that the flood hazard is within the H1 category for almost all of the site during the 1% AEP events, with limited areas within the channels and depressions coming under the H2, H3 and H4 categories.

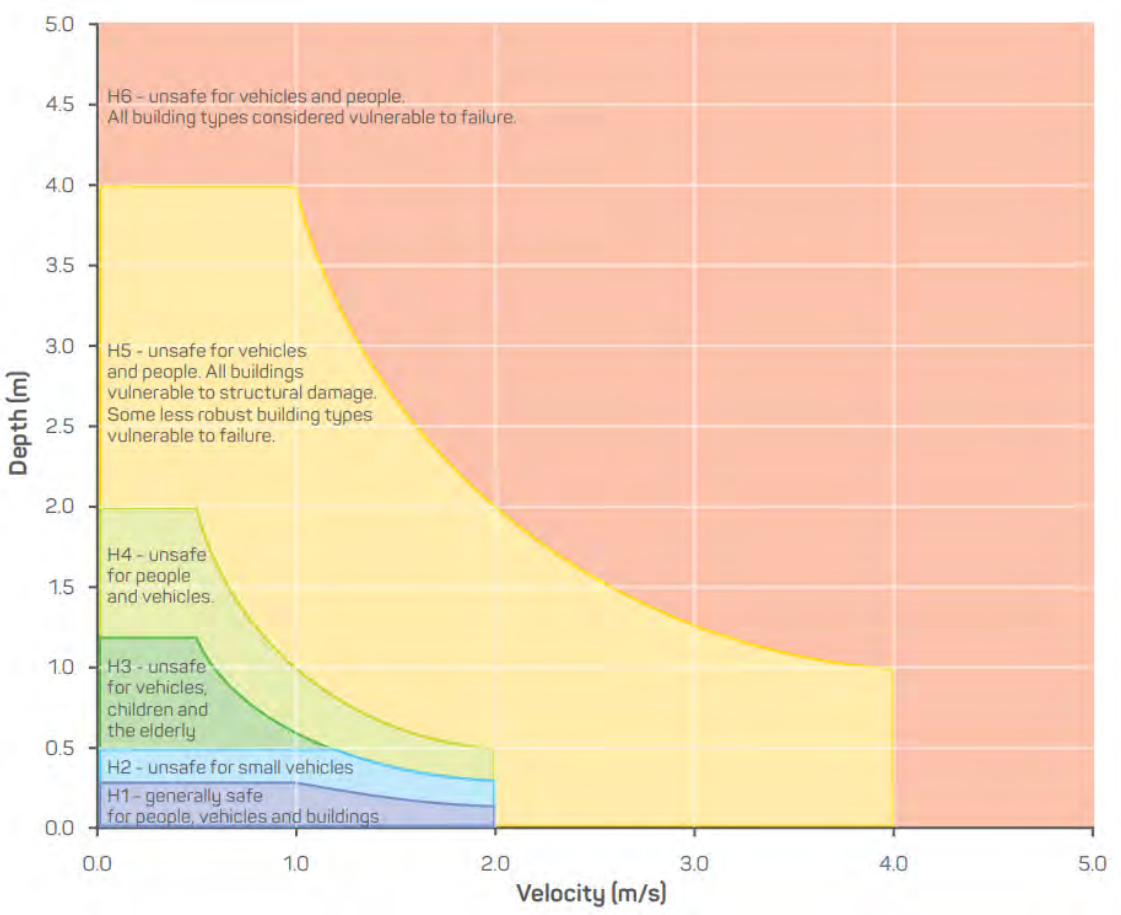


Figure 3-7 Flood Hazard Vulnerability Curves

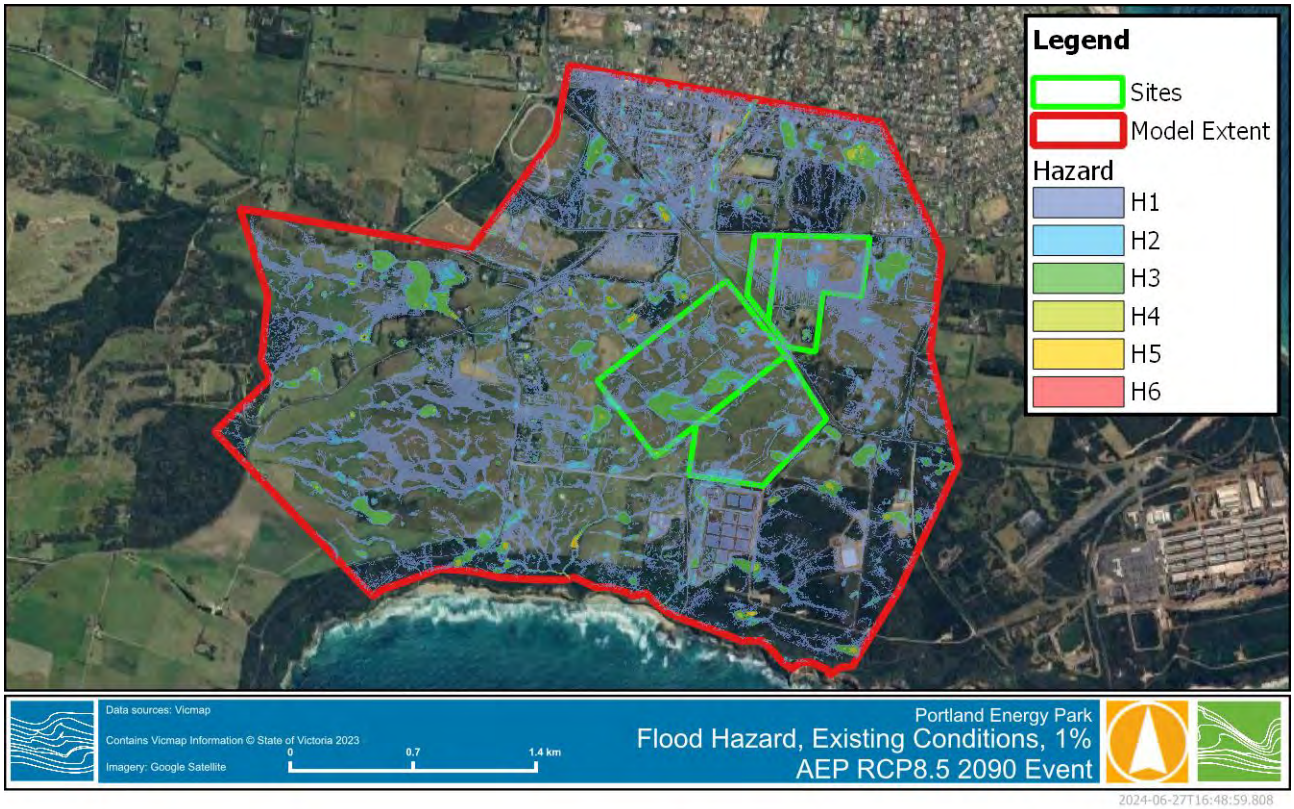


Figure 3-8 Maximum Flood Hazard – Existing Conditions (1% AEP RCP8.5 2090 Event)

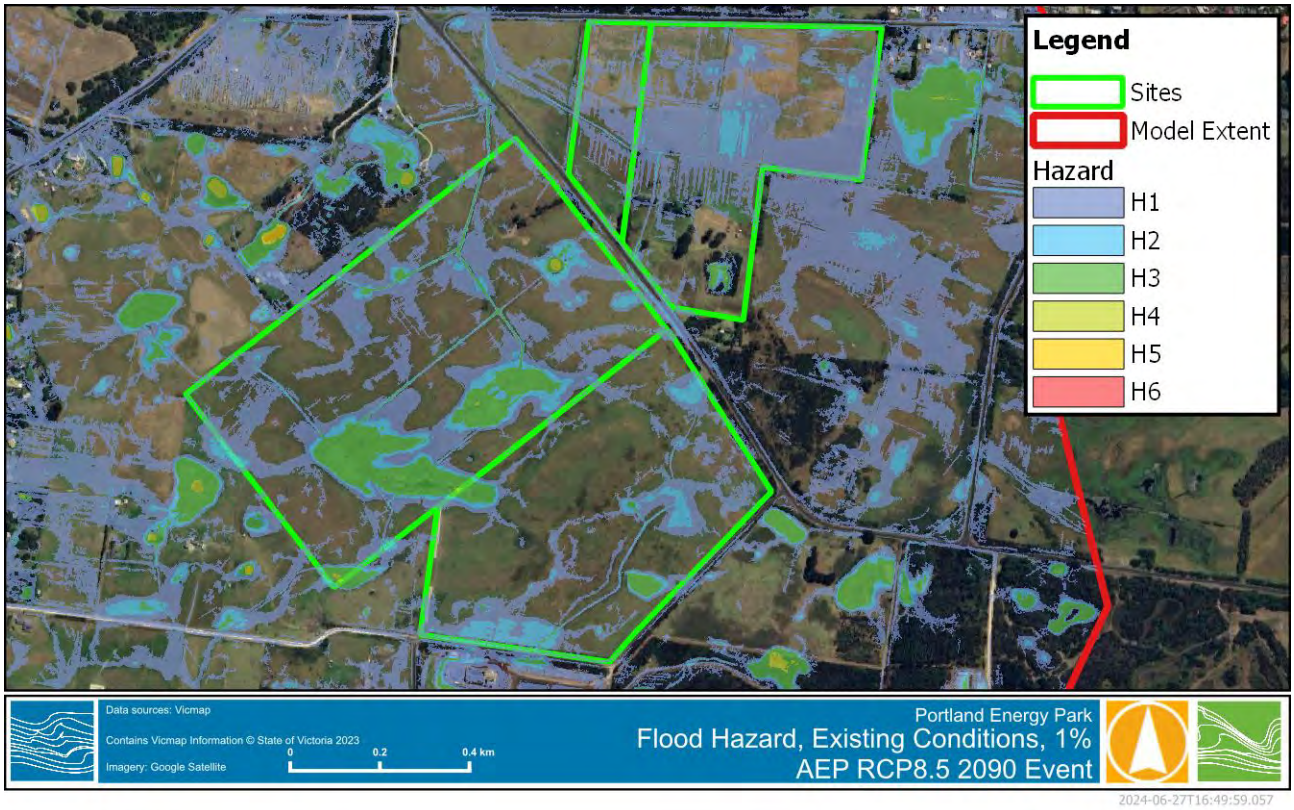


Figure 3-9 Maximum Flood Hazard (Site) – Existing Conditions (1% AEP RCP8.5 2090 Event)

4 DEVELOPED CONDITIONS

4.1 Concept and Key Design Features

Water Technology were provided with a functional layout of the development in April 2023, with subsequent amendments and updates provided as the project progressed. After an iterative design process with input from multiple disciplines including this assessment, the final functional layout as shown in Figure 4-1 below was supplied on 24/07/2024.

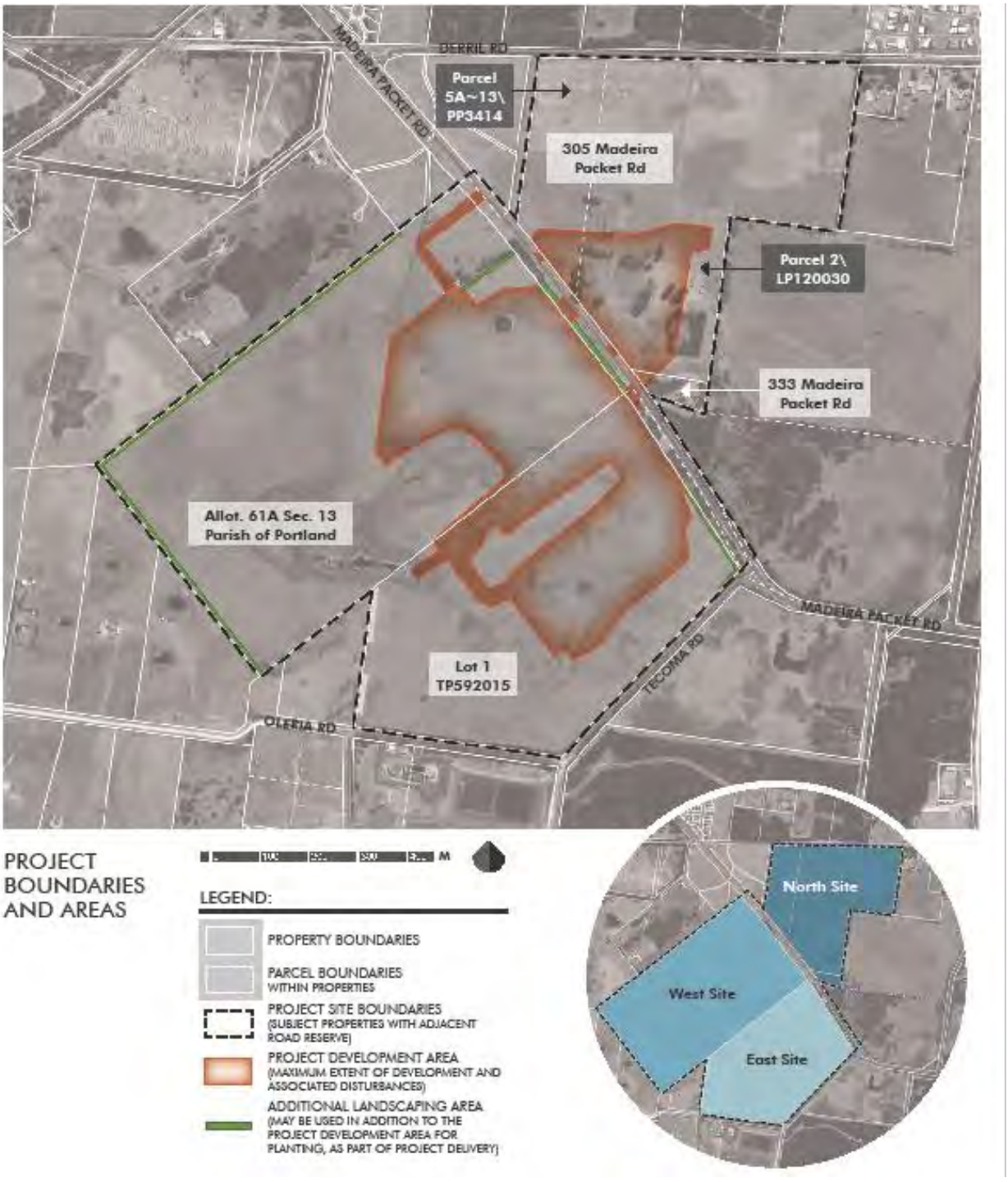


Figure 4-1 Portland Energy Park Functional Layout

The development consists of 3 benches to site four battery energy storage systems (BESS). A 3D surface was provided to Water Technology with the proposed elevations of the benches.

Drainage and runoff treatment concepts went through several iterations and model tests before the final concept was settled on. The concept is summarised as follows:

- Drainage from the northern BESS bench area is directed to a small sediment pond, with treatment provided in that pond.
- Drainage from the remaining BESS benches are diverted to what is referred to as the Battery Pond, where sediment removal can take place.
- Drainage from the switching benches and transformer station are diverted to the “West Pond” with sediment removal taking place there.
- The Battery Pond and West Pond drain to the central wetland, which will be enhanced and utilised for habitat and water quality treatment as part of this development.
- Swales have been added to the design to drain Materia Packet Road around the eastern bench.

The concept acts to divert more catchment area to the south, which was flowing towards the township in existing conditions. This has the effect of lowering flood levels on residential properties to the north of the sites. The concept is shown in Figure 4-2 below.

A key design consideration for the site was freeboard at the battery pond and within the pits draining to the battery pond. Given a significant amount of attenuation occurs with the natural slope of the land, and with cognisance of the need to keep peak flood levels as low as possible in the battery pond, flow detention was not proposed at the pond. Instead, elevated flood levels have been kept within the sites by the construction of small weirs within the outlet drains, with 100mm orifices (e.g. PVC pipe) in the weirs to provide flow retardation.

All ponds have been assumed to have an extended detention depth (EDD) of 200mm over the normal top water level (NTWL) and have been modelled with the high flow outlet only, i.e. low flow outlets have not been added to the model. High flow outlets are conceptualised and modelled as weir entrances to headwalls with the weir level set 200mm above the outlet pipe invert. Low flow pipes or notches in the weirs are anticipated to provide low flow to EDD, however the final arrangement is a matter for further design stages.

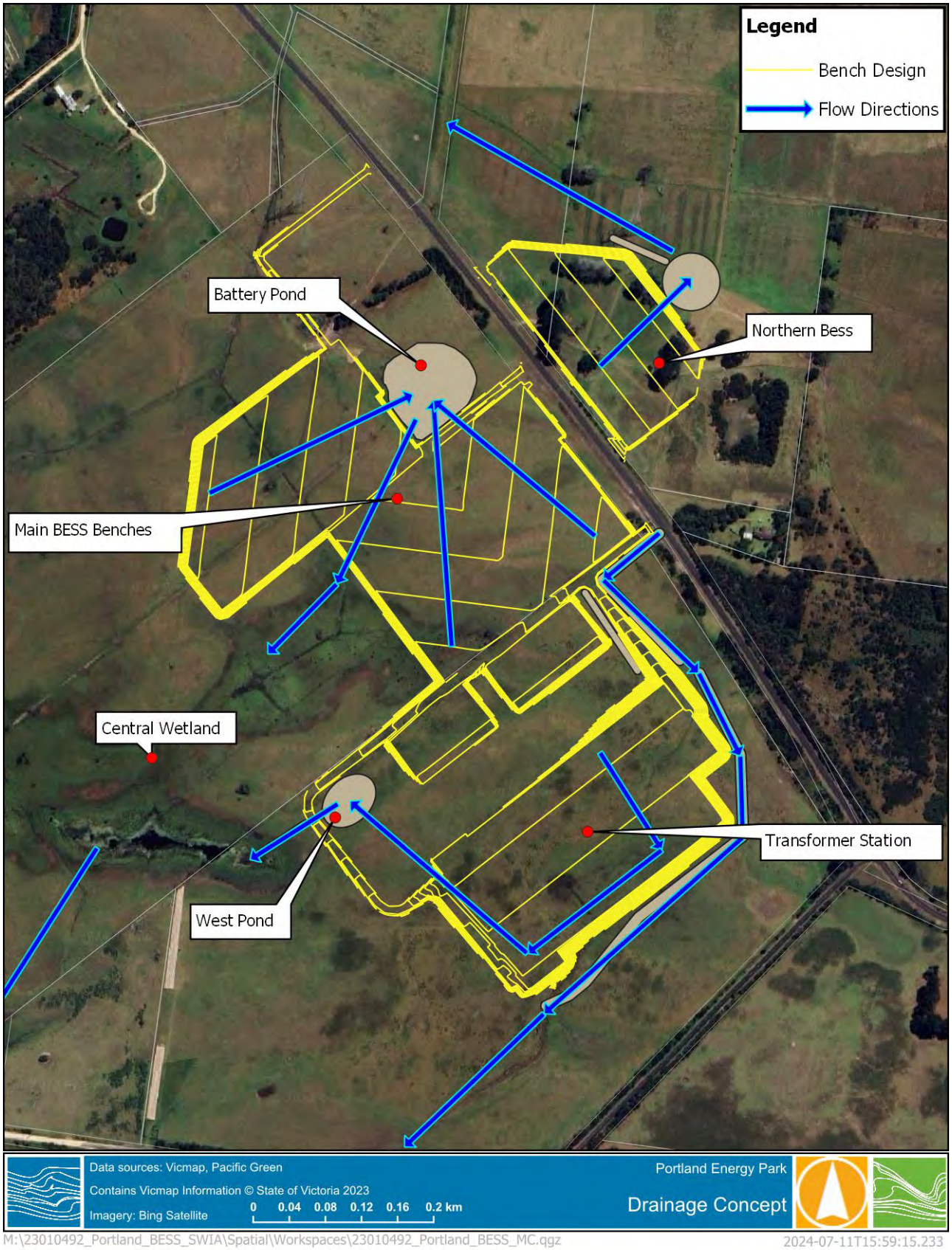


Figure 4-2 Drainage Concept

4.2 Modelling Updates

The TUFLOW model for the developed conditions onsite was altered as follows:

- Topographic updates provided by Pacific Green (i.e. the Bench design) were added to the model to represent filling of the proposed benches.
- Rainfall was not applied to the benches as internal drainage is beyond the scope of this assessment.
  - For the three battery benches south of Maderia Packet Road, rainfall was applied to the indicative 1D network (i.e. the flows were added directly to pits) and allowed to flow through the system.
  - For the remaining benches, runoff was applied directly to the relevant basin/pond.
  - This is likely to be a conservative approach as the additional attenuation provided by overland flows to the pits and pipe flow to the basins is not accounted for.
- Topographic modifications were included to represent the basins, open drains and outlet control weirs.
- Additional pipes were included, most notably a large culvert underneath the western bench to drain the battery pond.

Model updates are shown in Figure 4-3 below.

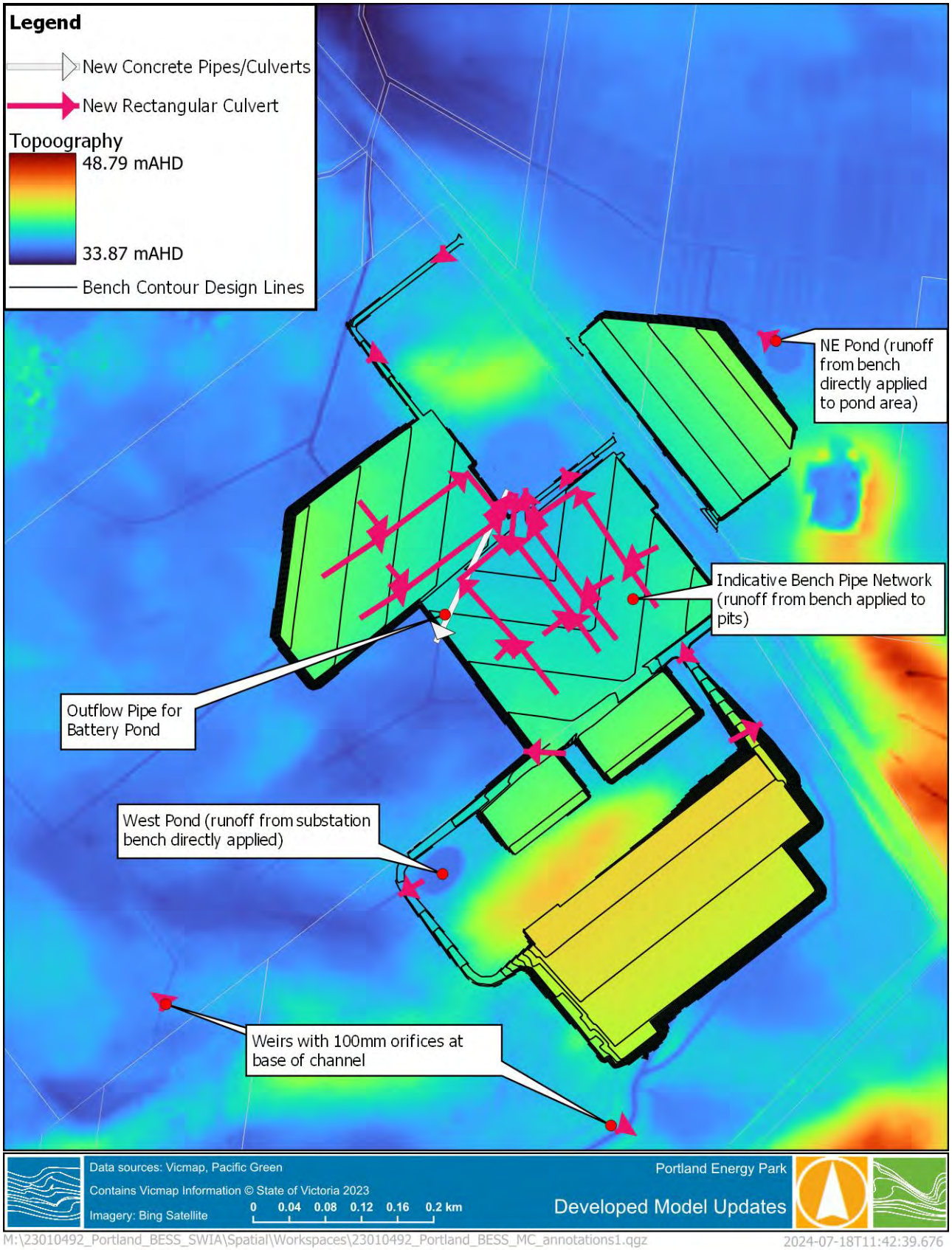


Figure 4-3 Topographic, pipe network and rainfall updates to TUFLOW model for Developed Conditions

4.3 Results

The model was simulated for the same events as existing conditions, with critical events selected according to the methodology described in section 3.1.

Generally, the results are similar to the existing conditions, however the bench areas are now flood free, basin areas are inundated and the central wetland on the site is subject to deeper flooding. The flood model results are presented in Figure 4-4 to Figure 4-9 below, with the change from existing conditions discussed in detail in section 4.4 below.

Some pipes included in the model, such as the basin outlets, are critical to the performance of the site from a flooding perspective. The outlet from the Battery Pond is particularly crucial as the flood level in this pond directly impacts the available freeboard and potentially the height of the three main benches south of Maderia Packet Road. Key pipe details are included in Table 4-1 below for the purpose of guiding detailed design at a future stage of the development.

Note that the north pond outlet did not flow in the model, due to there being enough storage between the low flow outlet and 20cm above the low flow outlet (within the extended detention area) to store the entire 1% AEP volume. The basin is significantly oversized and could be potentially reduced, noting however that there is a requirement for the basin to hold 570 m³ of runoff from fire suppression should it be required (see section 6.2 for more details).

Table 4-1 Key Pipe Details

Pipe	Size* (mm) and Type	US Invert (mAHD)	DS Invert (mAHD)	Critical Flow (m³/s)	Peak US Water Level (mAHD)	Peak DS Water Level (mAHD)
Battery Pond Outlet	2x1200x450 RCBC	36.6	35.9	0.649	36.91	36.55
West Pond Outlet	750 RCP	36.0	35.74	0.996	37.09	36.55
North Pond Outlet	600 RCP	36.2	36.0	-	-	-
Internal Bench Outfalls	1050 RCP	35.5	Various (1% slope)	0.226 (west bench)	36.93	36.91

* Note the pipe size is quoted as was included in the model. Iterative modelling to refine and minimise pipe sizes has not been undertaken, however it is recommended that detailed design balance the pipe size against required freeboard and basin sizes.

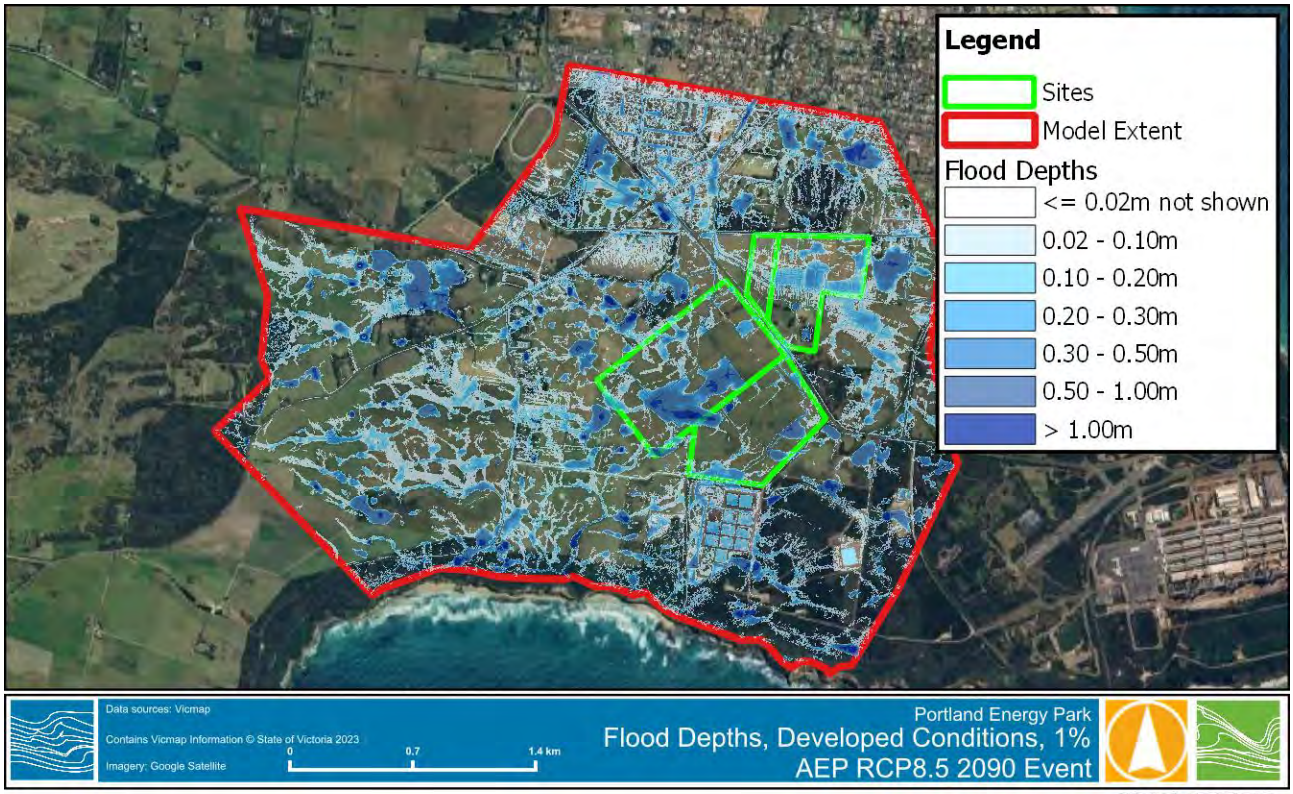


Figure 4-4 Maximum Flood Depth – Developed Conditions (1% AEP RCP8.5 2090 Event)

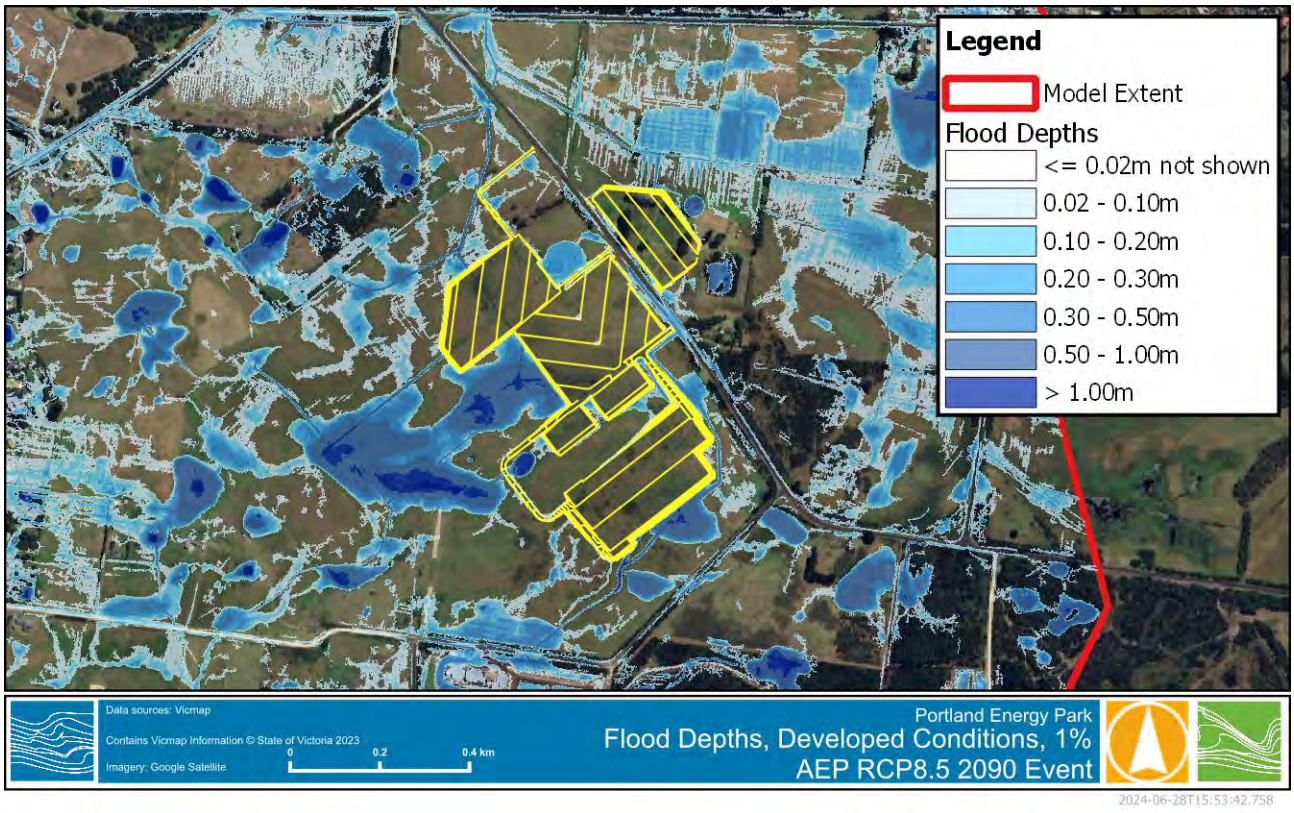


Figure 4-5 Maximum Flood Depth (Site) – Developed Conditions (1% AEP RCP8.5 2090 Event)

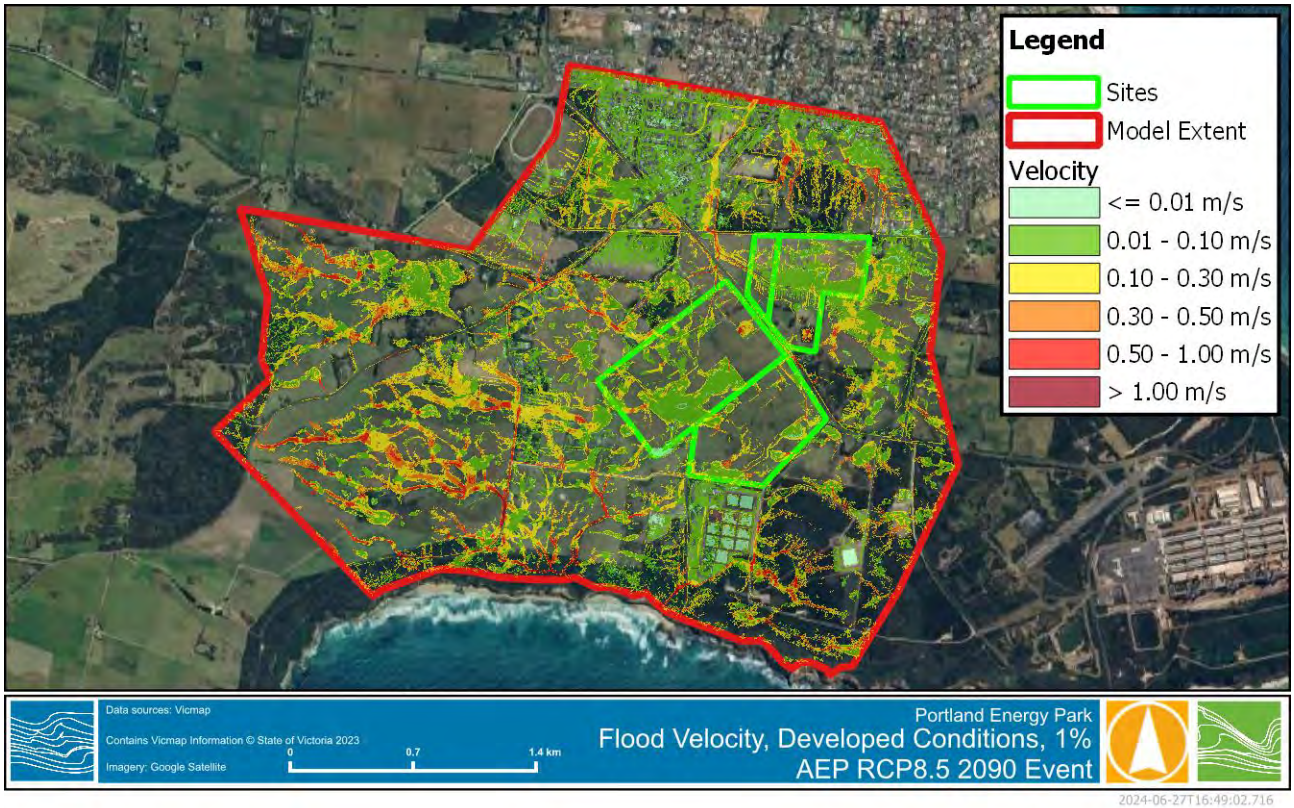


Figure 4-6 Maximum Flood Velocity – Developed Conditions (1% AEP RCP8.5 2090 Event)

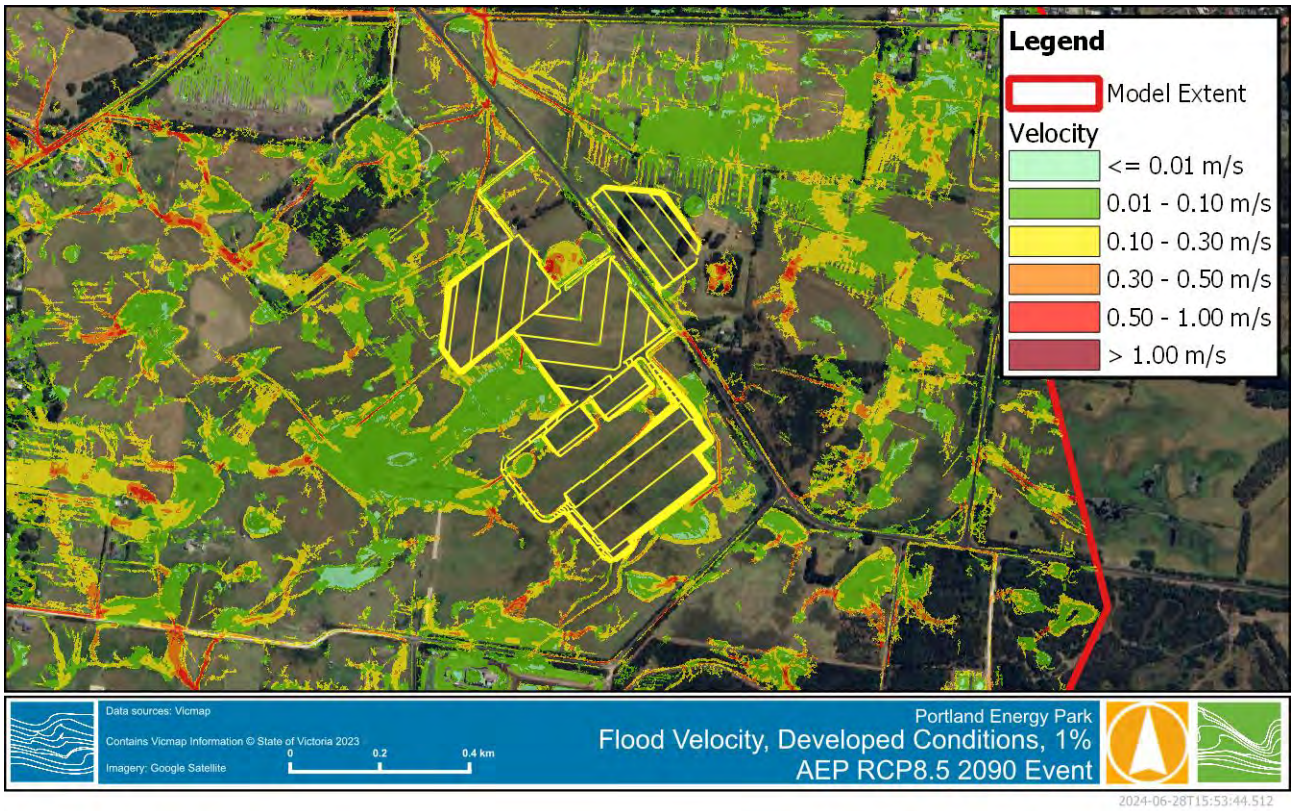


Figure 4-7 Maximum Flood Velocity (Site) – Developed Conditions (1% AEP RCP8.5 2090 Event)

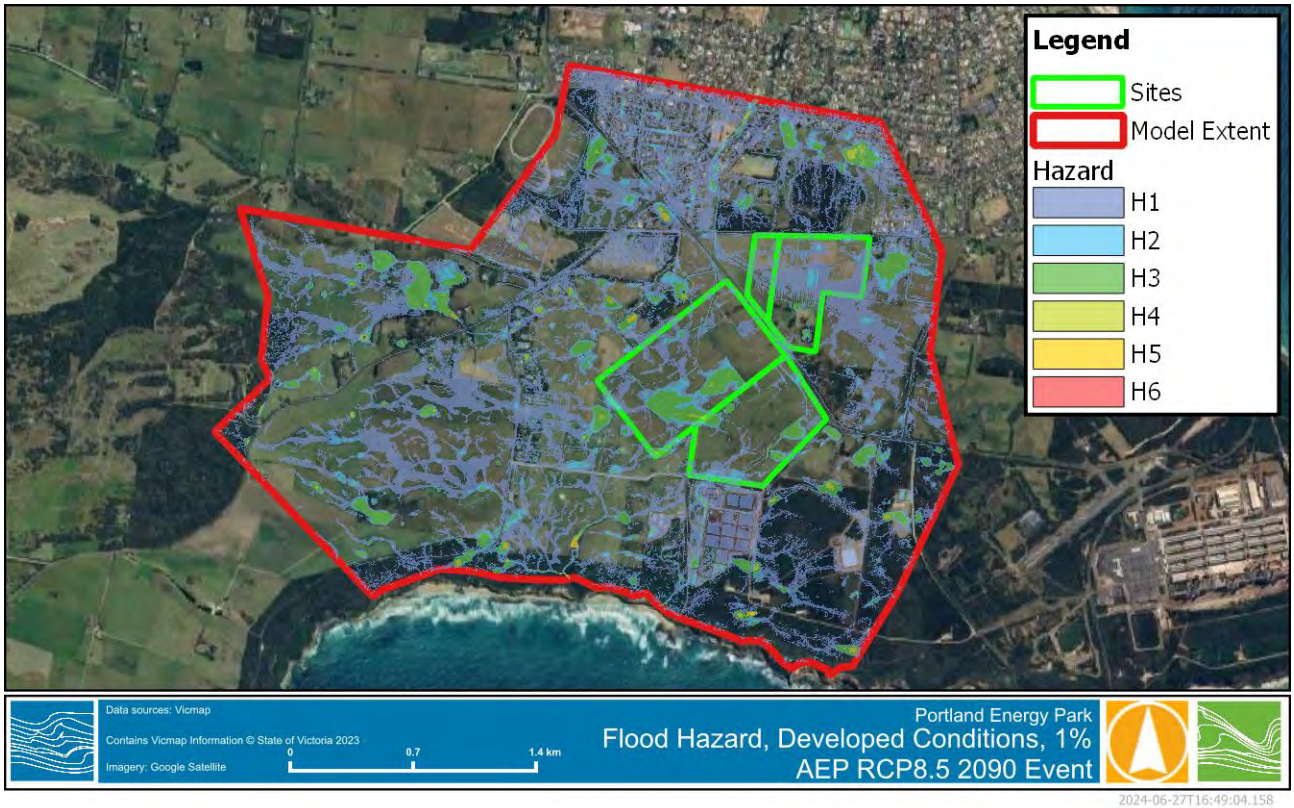


Figure 4-8 Maximum Flood Hazard – Developed Conditions (1% AEP RCP8.5 2090 Event)

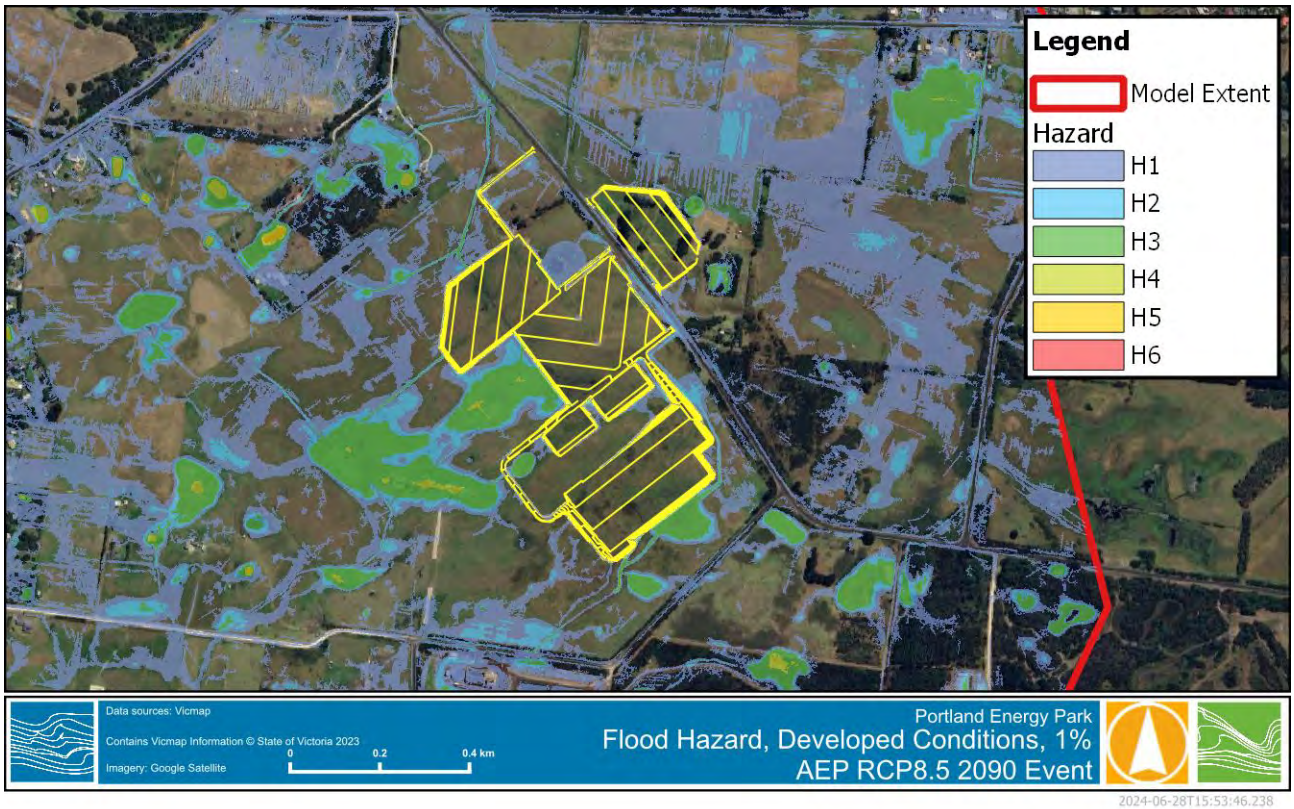


Figure 4-9 Maximum Flood Hazard (Site) – Developed Conditions (1% AEP RCP8.5 2090 Event)

4.4 Flood Impact

The impact of the development on flooding, expressed as the change in flood level between developed and existing conditions, is shown in Figure 4-10 below. The surface water strategy of diverting flow from the 3 main battery benches, along with flow that is now blocked by the western bench, to the south has the effect of reducing flood levels by up to 5cm in residential areas to the north near Cape Nelson Road. It should be noted that the model was not developed to define flooding in the residential area, with the council drainage network not included in the model away from the BESS site. Because of this, the model results may not be an accurate reflection of flooding of the residential area, however, the reduction in flow reaching the area will translate to some benefit for those residents in the event of a major flood.

Flows to the south of the site have been managed by the proposed weirs, with no change to flood levels (within 1cm) along the south west flow path and decreases in flood level of up to 9cm along the south east flow path (i.e. through the Wannon Water site).

The modelling shows that the development will not cause worsened flooding off site for the modelled 1% AEP, RCP8.5 2090 event.

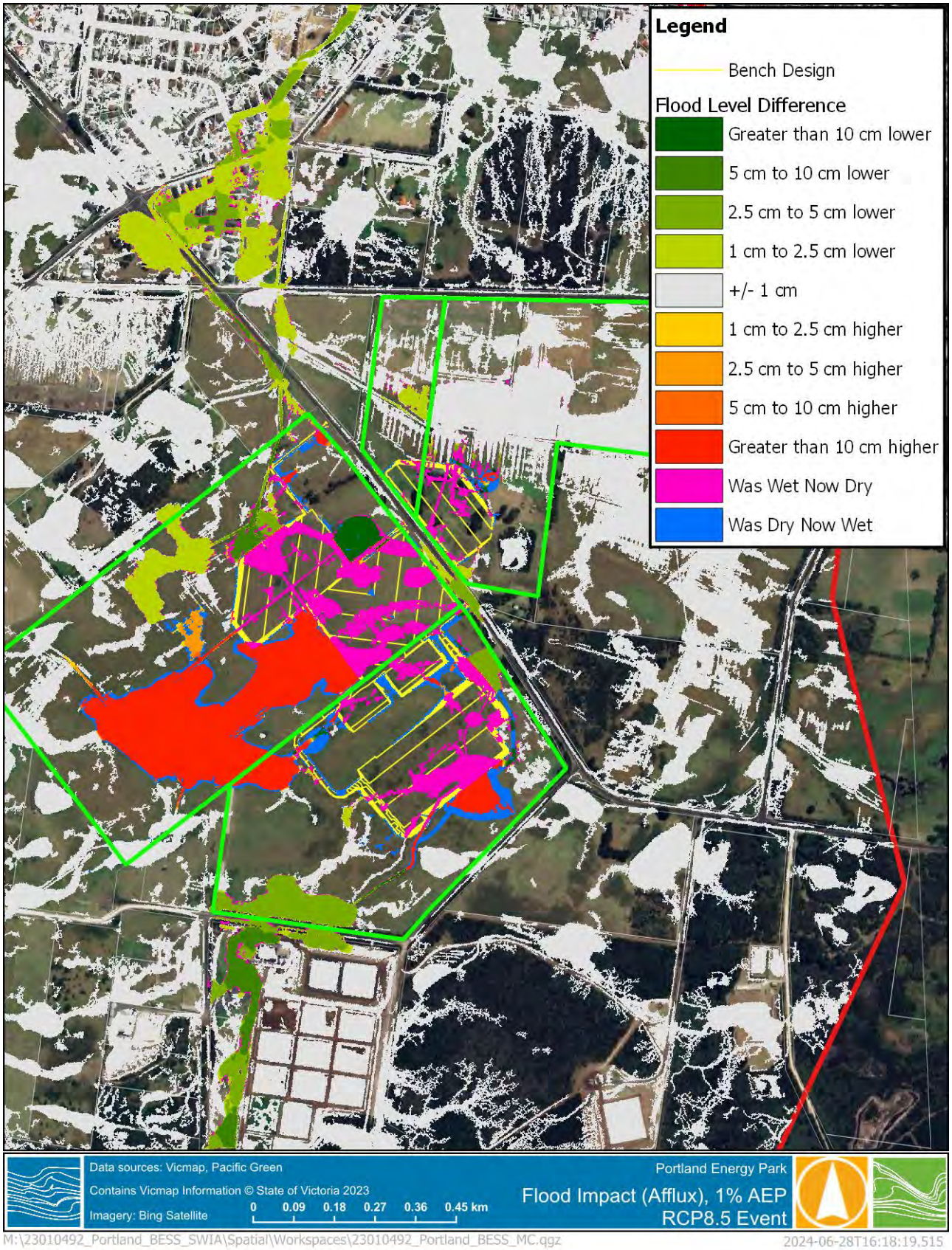


Figure 4-10 Flood Level Difference, Developed vs Existing, 1% AEP RCP8.5 Event

5 WATER QUALITY

This section details the proposed treatment for the site's stormwater runoff and the characteristics of any stormwater treatment assets to be installed as part of the proposed development. The overall stormwater quality management objectives are to meet the Best Practice Environmental Management (BPEM) water quality targets:

- 80% removal of the post-development Total Suspended Solids (TSS);
- 45% removal of the post-development Total Phosphorus (TP);
- 45% removal of the post-development Total Nitrogen (TN); and
- 70% removal of the post-development Total Gross Pollutant Load (Litter).

The three ponds described in Section 4.1 for flood mitigation are assumed to provide a secondary function of sedimentation. Since the sedimentation alone cannot typically achieve the nutrient reduction targets (particularly TN), a portion of the revegetated central wetland was assumed to provide additional stormwater treatment.

The proposed treatment strategy is shown in Figure 5-1. The current strategy aims to achieve the BPEM water quality targets as a whole for development. It is noted that the proposed treatment strategy for the northern outfall (North Pond Outfall) only comprised primary treatment via sedimentation. Therefore, this outfall currently does not meet the BPEM target. However, additional wetland treatment is provided at the southern outfall to compensate for the lack of nutrient removal at the northern outfall.

An alternative strategy for meeting BPEM water quality targets for both north and south outfalls is also presented. This option introduces a small bioretention system to the north outfall to provide additional nutrient removal.

Figure 5-1 Stormwater Quality Management Asset Layout

5.1 MUSIC Modelling

MUSIC modelling was used to determine the treatment performance of the proposed three storage ponds and the additional treatment wetland footprint needed to meet the BPEM water quality targets for the whole development. A summary of MUSIC model parameters and results are provided below.

5.1.1 Meteorological Template

In the absence of an existing MUSIC meteorological template in the region, a new template was built using rainfall information from Wartook Reservoir pluviograph station[2] (Gauge ID: 079046). The evapotranspiration data was incorporated into the model template as monthly values obtained from SILO point database[3]. Further details of MUSIC meteorological template are provided in Appendix A.

The MUSIC model was run with six-minute rainfall time series data over the 10-year period from 1/01/1982 to 31/12/1991 (inclusive). The resultant annual average rainfall was estimated to be 851 mm, compared to the long-term mean annual rainfall of 834 mm recorded at Portland BoM rainfall gauges (Gauge ID: 090070). The modelled average potential evapotranspiration was 1040 mm/year.

5.1.2 Catchments

A schematic of the MUSIC model developed for the Subject Site is shown in Figure 5-2 and summary of catchment area is presented in Table 5-1. Each catchment was assumed to be 70% impervious. The catchment surface type was set to “unsealed road” instead of typically used “mixed” surface type for urban developments. The unsealed surface was selected as the development pads will consist of loose gravel or crushed rock. These surfaces will generate higher sediment load compared to typical impervious surfaces.

The soil storage capacity was also set at 120 mm, and field capacity was set to 50 mm.

[2] Extracted via eWater pluviograph data tool.
[3] https://www.longpaddock.qld.gov.au/silo/point-data/

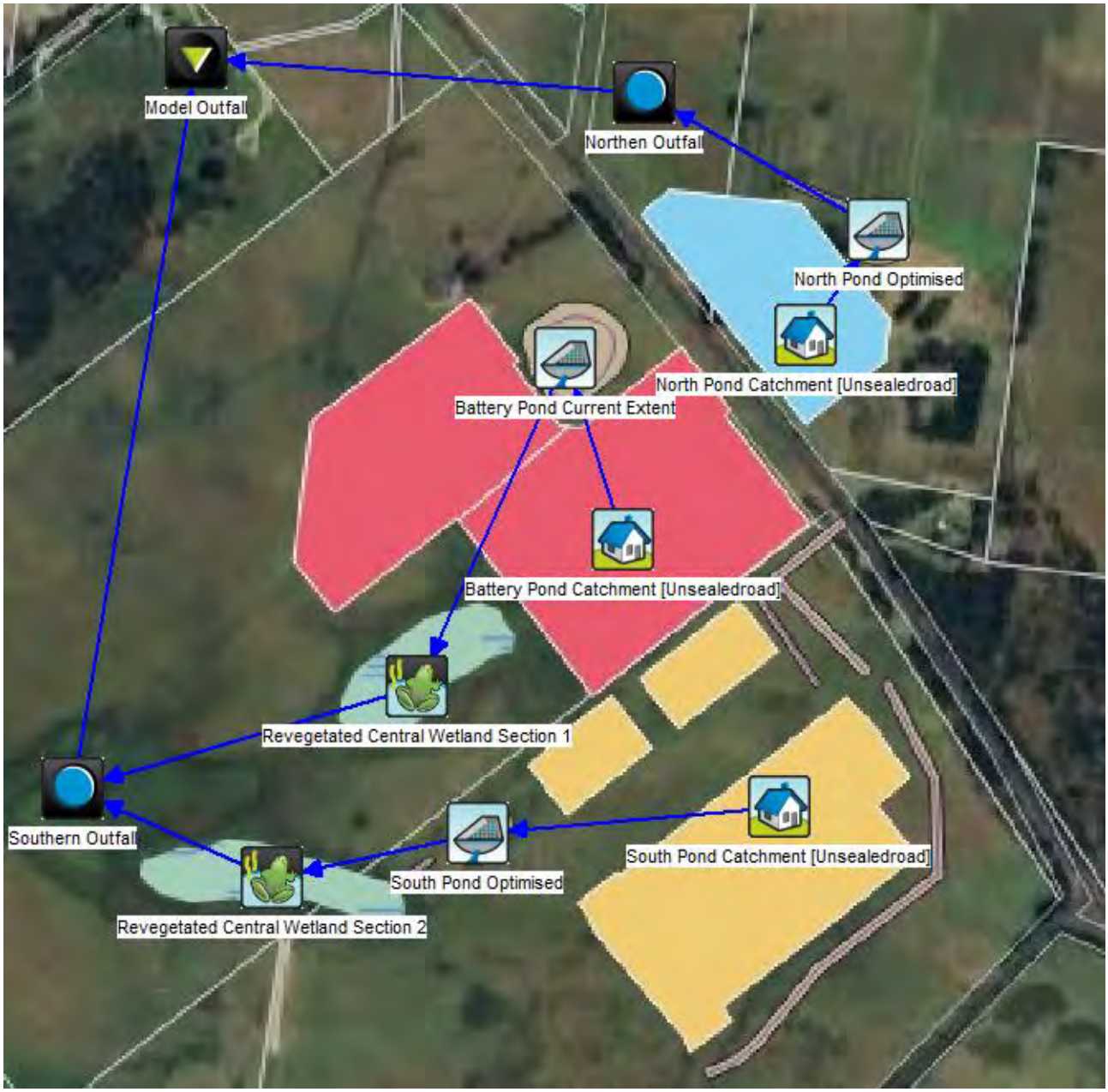


Figure 5-2 MUSIC Model Schematic

Table 5-1 Catchment Area

Catchment	Area (ha)
North pond catchment	2.765
Battery pond catchment	9.655
South pond catchment	6.462

5.1.3 Asset Summary

Stormwater Quality Management Strategy Option 1

A summary of sediment pond parameters is presented in Table 5-2. North and South pond sizing was optimised to meet the typical design criteria of removing at least 95% of the particles ≥ 125 µm in a 1EY event and achieving a clean-out frequency of 1 in every 5 years. However, the Battery pond was not optimised for treatment as its sizing is currently governed by the freeboard requirements (Section 4). Therefore, this sediment pond is currently oversized for treatment purposes.

Table 5-2 Sediment Pond Parameter Summary

Design Parameter	North Pond[d]	Battery Pond[e]	South Pond[d]
High flow bypass rate (1 EY flow) (m^3/s)[a]	0.16	0.39	0.31
Extended detention depth (m)	0.2	0.2	0.2
Permanent pool depth (m)	1.0[f]	1.5	1.5
Surface area at NWL (m^2)	575	4362	750
Permanent pool volume (m^3)	368	3656	468
Removal of particles ≥ 125 µm (%)[b]	98.2	99.6	98.1
Clean out frequency (1 in x years)[c]	5.1	35.1	5.2
Sediment dewatering area for 1 in 5 year clean out frequency[c]	133	464	310

Notes:

a) Based on Rational Method
b) Using Fair and Geyer Equation (Equation 10.3 WSUD Stormwater Technical Manual (2005))
c) Using an assumed sediment loading rate of 9.6 m^3/ha/year. The typical urban sediment loading rate is 1.6 m^3/ha/year (Willing and Partners 1992). A sensitivity analysis of the MUSIC model indicated that an “unsealed road” surface generates six times higher sediment loading rate than a “mixed” surface. Therefore, typical urban loading was multiplied by six times to establish the loading rate of crushed rock pads.
d) Sediment pond sized to meet design criteria (at least 95% of the particles ≥ 125 µm in a 1EY event and achieving a clean-out frequency of 1 in every 5 years)
e) Sediment pond size governed by freeboard requirements. Asset size not optimised for treatment.
f) Indicative depth based on proposed bunding to capture firewater

Additional wetland treatment needed for Battery Pond outfall and South Pond outfall to achieve the BPEM targets is summarised in Table 5-3. It should be noted that the extent of the central wetland is significantly larger than the required additional wetland footprint to meet the BPEM targets. Therefore, if a larger extent of the central wetland is revegetated to develop a formalised treatment wetland, there is potential to exceed the BPEM targets.

Table 5-3 Wetland Parameter Summary Option 1

Design Parameter	Battery Pond Outfall	South Pond Outfall
Surface area at NWL (m^2)	2100	2600
Extended detention depth (m)	0.35	0.35
Permanent pool volume (m^3)	630	780
Notional detention time (hr)	70	71

Alternative Stormwater Quality Management Strategy (Option 2)

As the above strategy will not achieve BPEM targets for TN removal at the northern outfall, an alternative strategy was tested by adding a small bioretention downstream of the North Pond outfall. A summary of bioretention parameters is provided in Table 5-4. Since the northern outfall is achieving the BPEM targets, a reduced wetland footprint is possible for the southern outfall (Table 5-5).

Table 5-4 Bioretention Parameter Summary Option 2

Design Parameter	North Pond Outfall
Extended detention depth (m)	0.2
Surface area (m^2)	40
Filter media depth (m)	0.3
Saturated hydraulic conductivity (mm/hr)	100
Is base lined?	Yes
Underdrain present?	Yes
Submerged zone with carbon present	No

Table 5-5 Wetland Parameter Summary Option 2

Design Parameter	Battery Pond Outfall	South Pond Outfall
Surface area at NWL (m^2)	1700	2100
Extended detention depth (m)	0.35	0.35
Permanent pool volume (m^3)	510	630
Notional detention time (hr)	71	70

5.1.4 Pollutant Load Reduction

A summary of pollutant load reduction performance at the combined outlet is shown in Table 5-6 and Table 5-7 for water quality management strategy Option 1 and 2. Both strategies meet the BPEM targets, with Option 1 achieving the target at the combined outfall only, while Option 2 achieves the BPEM targets at individual outfalls as well as the combined site outfall.

Table 5-6 Pollutant Load Reduction Performance Option 1

Pollutant	Inflow Load (kg/year)	Residual Load (kg/year)	Load Reduction (%)
TSS	123000	3800	96.9
TP	58.4	10.4	82.1
TN	250	137	45.1
GP	3880	3.95	99.9

Table 5-7 Pollutant Load Reduction Performance Option 2

Pollutant	Inflow Load (kg/year)	Residual Load (kg/year)	Load Reduction (%)
TSS	122000	3840	96.9
TP	58.4	10.9	81.3
TN	250	135	45.8
GP	3880	0	100

6 SUMMARY AND KEY CONSIDERATIONS

6.1 Summary

Flood modelling has been undertaken to assess the impact on flood behaviour of a proposed Battery Energy Storage System (BESS) in Portland, Victoria. The existing site is slightly undulating with no steep flow paths or defined waterways other than constructed drainage lines. Flooding of the site is primarily driven by trapped low points, localised depressions and inefficient drainage.

The modelling has adopted a conservative approach as follows:

- The 1% AEP with consideration of increased rainfall intensity to 2090 under RCP8.5 has been adopted for the design case.
- Low depressions in the area have been started as at or near their full level in the model.

The modelling iterations have proposed a design which aims to lower the benches as far as possible while maintaining 300mm freeboard over the critical 1% AEP, RCP8.5 2090 flood level. A key consideration is the slope of the large culvert between the Battery Pond and central wetland, as blockage of this pipe before or during a large rainfall event could result in decreased pipe capacity and may cause flooding of the benches. It is recommended that self-cleaning capability of this pipe be a key design consideration in future design phases.

The strategy prevents increased flood levels off site by significantly reducing the flow capacity of the drains leaving the site via the construction of weirs with low flow pipes. This results in increased water levels within the drains and wetlands on site however the normal top water level of the central wetland will be unaffected if the low flow pipe is set to the existing invert of the drain.

The current water quality management strategy, which consists of three storage ponds, and revegetation of part of the central wetland as a treatment wetland with or without a small bioretention system at the north outfall, will achieve the BPEM targets. Inclusion of the bioretention system is required if the northern outfall water quality is to be considered in isolation.

6.2 Key Considerations

The concept design has responded to the site constraints and considered the available land and fall across the sites. These constraints have resulted in some non-standard design characteristics which require consideration in future design phases. The following matters should be explicitly considered and addressed in future design:

- Pipe slope and self cleaning velocities to ensure pipes do not block over time
  - Potential need to inspect regularly and clean out pipes if required (maintenance)
- Bench pipes into battery pond are significantly below the normal top water level of the pond, which presents a heightened blockage risk.
  - Potential need to regularly dewater the pond and clean out pipes as required (maintenance)
- Blockage risk of small throttle pipes in the weirs.
  - Can be monitored by monitoring the wetland levels and via manual inspection of the pipes.
- The entrance (i.e. drainage outflow from benches) and exit (i.e. the large culvert between the pond and wetland) of the battery pond are adjacent to each other. This is not ideal for settling of material as the travel distance through the pond is short. The pond is significantly oversized and the entrance pipes are vertically lower than the exit, so this may not be a signifiicant issue. Requires consideration in design.
- Both the Battery Pond and North Pond must be capable of storing water runoff used for firefighting purposes. This will require the installation of a penstock gate at the outflow structure, with the procedure

for fire fighting to include closure of the penstock which will enable all water using during fire suppression to be stored in the ponds. The ponds have been sized with this in mind as follows:

- Fire safety consultants have advised that 570 m^3 of water will require storage (maximum).
- The Battery Pond is ~4000 m^2 at the NTWL, resulting in a depth of <15cm over NTWL with all fire runoff captured. This leaves sufficient freeboard to the benches.
- The North Pond is ~1000 m^2, resulting in a depth of ~57cm over the NTWL with all fire runoff captured. There is sufficient space for the bund of the north pond to be 1 metre above NTWL, leaving 330mm freeboard to the bund in the event all fire runoff requires capturing.

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

APPENDIX A
MUSIC MODELLING PARAMETERS

A-1 Meteorological Template Development

The nearby pluviograph station data were reviewed to select a suitable pluviography station for developing a MUSIC metereological template that simulate long-term climate condition of Portland. For instance, Camperdown Donalds Hill (Gauge ID: 090153) was the nearest gauge to the coastline. However, the maximum mean annual rainfall for ten consecutive years was 721 mm, which was significantly lower than the Portland mean annual rainfall of 834 mm. Therefore, 6 min rainfall from 1982 to 1991 from the Wartook Reservoir pluviography station[4] (Gauge ID: 079046) (Figure A-1) was chosen for the current assessment because this selected period has:

- a similar mean annual rainfall to the long-term average of Portland (BoM ID: 090070; 834 mm/year);
- a similar mean monthly rainfall to that of the long-term average of Portland (Figure A-2); and
- minimal missing data.

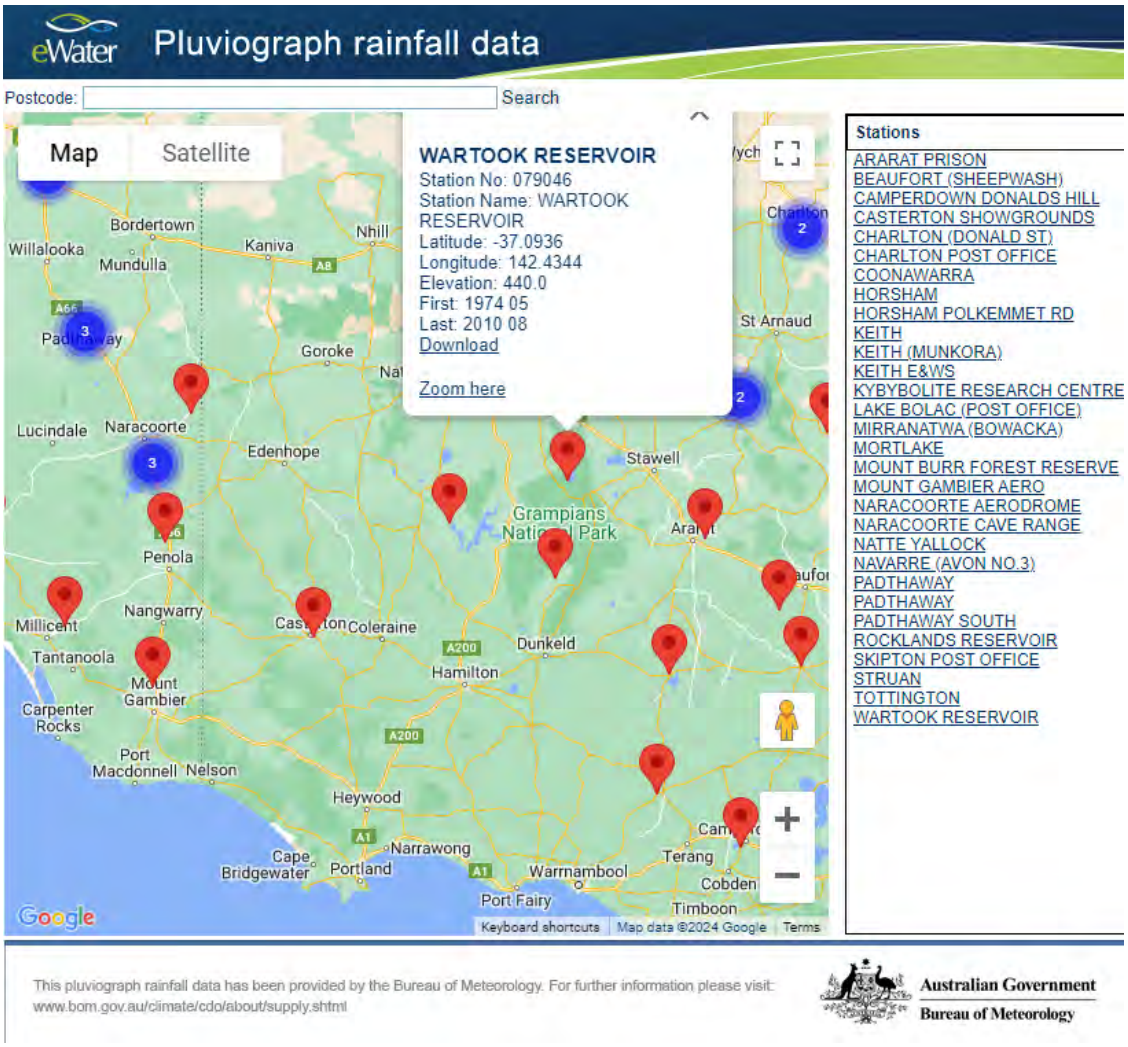


Figure A-1 Nearby Pluviograph Stations (Source: eWater)

[4] Extracted via eWater pluviograph data tool.

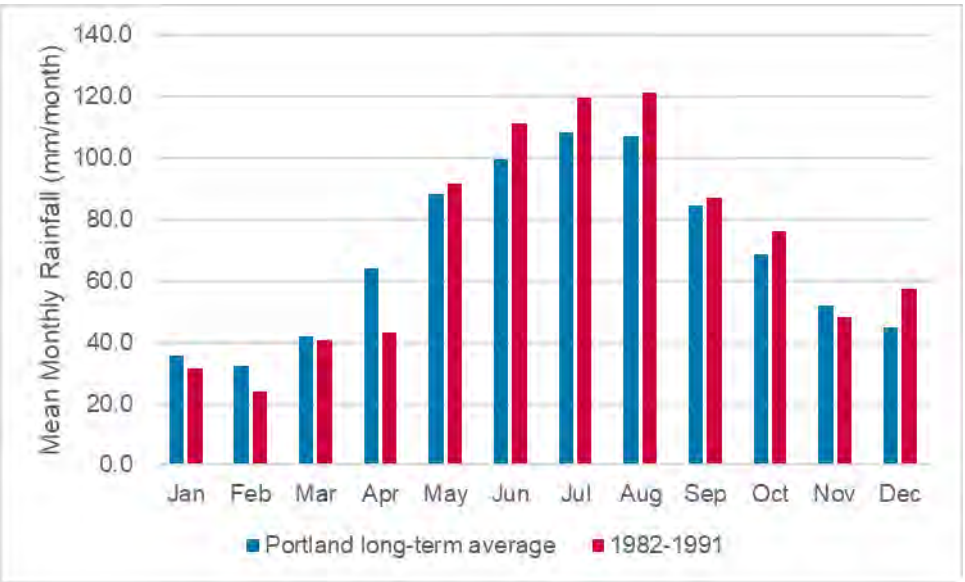


Figure A-2 Monthly Rainfall Comparison

Average monthly potential evapotranspiration (PET) data was extracted for the SILO grid point adjacent to the subject site (latitude -38.35, longitude 141.60) (Figure A-3). SILO Point data consists of a continuous daily time series of data at either recording stations or grid points across Australia. Data at station locations consists of observational records, which have been supplemented by interpolated estimates when observed data are missing. Data at grid points consists entirely of interpolated estimates. The data are taken from the gridded datasets and are available at any pixel on a 0.05° × 0.05° grid over the land area of Australia.

Morton's wet-environment areal evapotranspiration over land were downloaded for the 50-year period starting from 1/01/1974 to 31/12/2023. The corresponding monthly PET values adopted for MUSIC template is shown in Figure A-4.

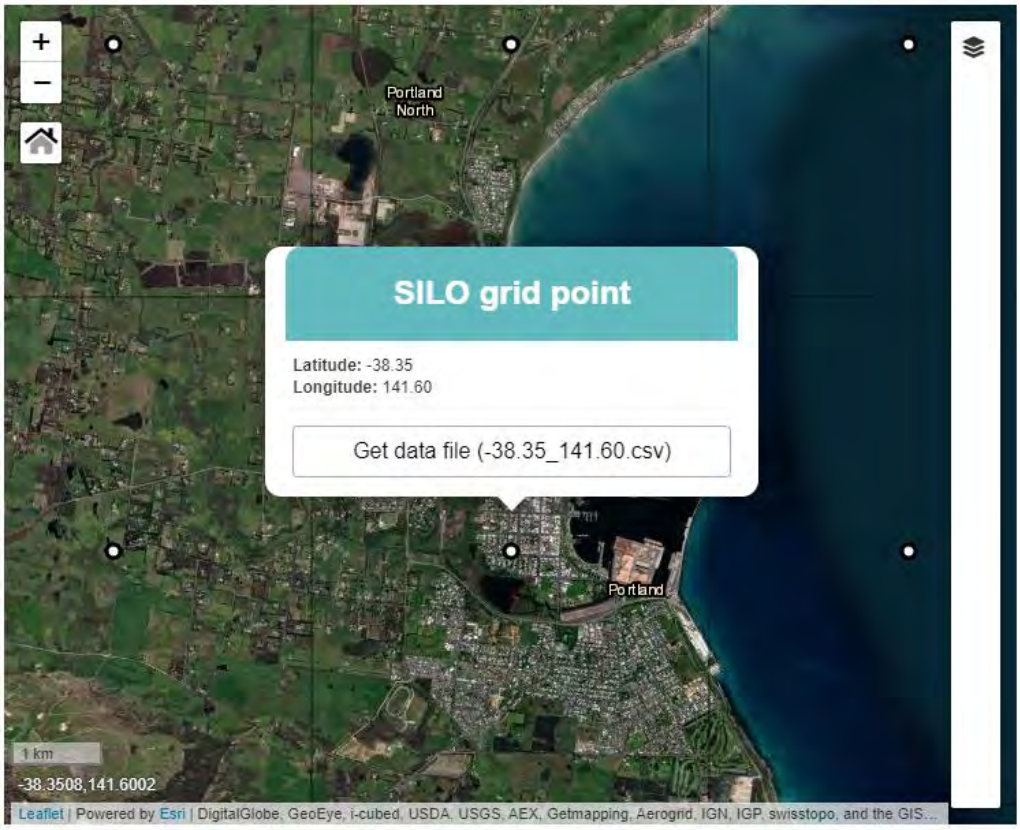


Figure A-3 SILO Data Extraction Point

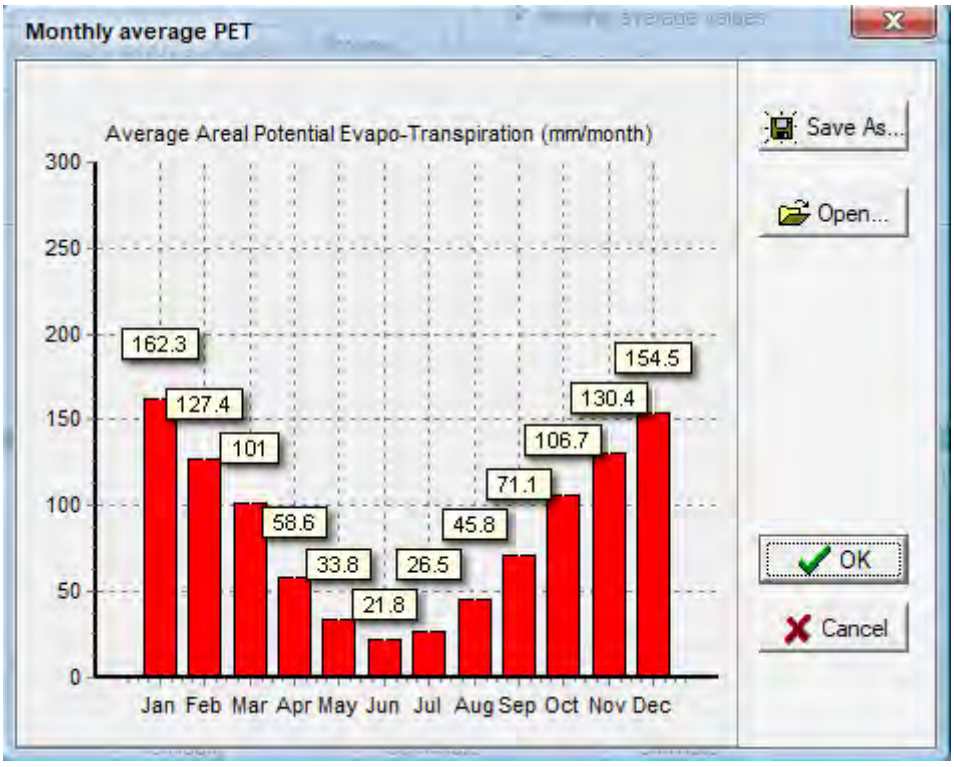


Figure A-4 MUSIC Monthly Average PET

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Melbourne

15 Business Park Drive
Notting Hill VIC 3168
Telephone (03) 8526 0800

Sydney

Suite 3, Level 1, 20 Wentworth Street
Parramatta NSW 2150
Telephone (02) 9354 0300

Brisbane

Level 5, 43 Peel Street
South Brisbane QLD 4101
Telephone (07) 3105 1460

Adelaide

1/198 Greenhill Road
Eastwood SA 5063
Telephone (08) 8378 8000

Perth

Ground Floor, 430 Roberts Road
Subiaco WA 6008
Telephone (08) 6555 0105

New Zealand

7/3 Empire Street
Cambridge New Zealand 3434
Telephone +64 27 777 0989

Wangaratta

First Floor, 40 Rowan Street
Wangaratta VIC 3677
Telephone (03) 5721 2650

Geelong

51 Little Fyans Street
Geelong VIC 3220
Telephone (03) 8526 0800

Wimmera

597 Joel South Road
Stawell VIC 3380
Telephone 0438 510 240

Gold Coast

Suite 37, Level 4, 194 Varsity Parade
Varsity Lakes QLD 4227
Telephone (07) 5676 7602

watertech.com.au

urban enterprise planning economics+tourism

PORTLAND ENERGY PARK

SOCIOECONOMIC IMPACT ASSESSMENT

PACIFIC GREEN ENERGY PARK PORTLAND PTY LTD | SEPTEMBER 2024

www.urbanenterprise.com.au

AUTHORS

Kurt Ainsaar, Director

Tayler Neale, Senior Consultant

Ned Barry, Consultant

DISCLAIMER

Neither Urban Enterprise Pty. Ltd. nor any member or employee of Urban Enterprise Pty. Ltd. takes responsibility in any way whatsoever to any person or organisation (other than that for which this report has been prepared) in respect of the information set out in this report, including any errors or omissions therein. In the course of our preparation of this report, projections have been prepared on the basis of assumptions and methodology which have been described in the report. It is possible that some of the assumptions underlying the projections may change. Nevertheless, the professional judgement of the members and employees of Urban Enterprise Pty. Ltd. have been applied in making these assumptions, such that they constitute an understandable basis for estimates and projections. Beyond this, to the extent that the assumptions do not materialise, the estimates and projections of achievable results may vary.

COPYRIGHT

© Copyright, Urban Enterprise Pty Ltd, 2024

This work is copyright. Apart from any uses permitted under Copyright Act 1963, no part may be reproduced without written permission of Urban Enterprise Pty Ltd.

ACKNOWLEDGEMENT OF COUNTRY

Urban Enterprise is located on Wurundjeri Woi-Wurrung Country. We pay our respects to elders past, present and emerging and also acknowledge all Traditional Owners of Country on which we work.

L1 302-304 Barkly St, Brunswick VIC 3056

+61 3 9482 3888 urbanenterprise.com.au

EXECUTIVE SUMMARY 1
1. INTRODUCTION 5
1.1. BACKGROUND 5
1.2. ENGAGEMENT & SCOPE 5
1.3. SCOPE 5
1.4. INFORMATION SOURCES 5
1.5. PROPOSAL: PORTLAND ENERGY PARK 6
2. STRATEGIC, POLICY & INDUSTRY CONTEXT 10
2.1. INTRODUCTION 10
2.2. POLICY CONTEXT 10
2.3. STATE OF THE INDUSTRY: BATTERY STORAGE 12
3. SOCIOECONOMIC PROFILE 14
3.1. INTRODUCTION 14
3.2. IMPACT AREAS 14
3.3. BATTERY ENERGY STORAGE SYSTEMS: SUPPLY-CHAIN NEEDS 15
3.4. SOCIOECONOMIC SNAPSHOT 16
3.5. EMPLOYMENT & BUSINESS MIX 17
3.6. KEY POINTS 19
4. SOCIOECONOMIC IMPACT ASSESSMENT 20
4.1. INTRODUCTION 20
4.2. POTENTIAL SOCIOECONOMIC IMPACTS OF BATTERY ENERGY STORAGE SYSTEMS 20
4.3. IMPACT FRAMEWORK 23
4.4. SOCIOECONOMIC IMPACTS 24
4.5. SUMMARY OF SOCIOECONOMIC IMPACTS 34
4.6. IMPACT EVALUATION 36
APPENDICES 38
APPENDIX A CASE STUDY ANALYSIS, BATTERY STORAGE PROJECTS 38
APPENDIX B CONSTRUCTION & OPERATIONAL ECONOMIC IMPACT ASSUMPTIONS 39
APPENDIX C COMMERCIAL ACCOMMODATION ASSUMPTIONS & METHODOLOGY 40

FIGURES

F1. SUBJECT AREA 7
F2. PROPOSED LAYOUT 8
F3. REGIONAL CONTEXT 9
F4. VICTORIA'S RENEWABLE ENERGY ZONES 10
F5. BATTERY STORAGE TECHNOLOGY MATURITY OVERVIEW 12
F6. IMPACT AREAS 14
F7. LOCATION QUOTIENT, REGIONAL CATCHMENT 2021 18
F8. OCCUPATIONS, LOCAL REGIONAL & REGIONAL VICTORIA, 2021 18
F9. UNEMPLOYMENT RATE, REGION LGA & REGIONAL VICTORIA, JUNE 2017 - 2023 19
F10. SOUTH WEST VICTORIA RENEWABLE ENERGY PROJECTS 26
F11. RENTAL VACANCY RATE, REGIONAL VICTORIA, 2018-2023 29

F12. RENTAL LISTINGS – POSTCODE 3305 (PORTLAND TOWNSHIP AND SURROUNDING AREA) 30

TABLES

T1. INDICATIVE PROJECT PHASING 8
T2. STRATEGIC & POLICY SUMMARY & ALIGNMENT 11
T3. SUPPLY-CHAIN OPPORTUNITIES, RENEWABLE ENERGY 15
T4. LOCAL & REGIONAL CATCHMENT AT A GLANCE 16
T5. EMPLOYMENT & BUSINESS MIX, LOCAL & REGIONAL CATCHMENT, 2021 17
T6. KEY SOCIOECONOMIC IMPACTS, BATTERY ENERGY STORAGE SYSTEMS 21
T7. KEY SOCIOECONOMIC IMPACTS, BATTERY ENERGY STORAGE SYSTEMS 22
T8. ECONOMIC AND COMMUNITY BENEFIT FRAMEWORK 23
T9. ECONOMIC IMPACTS, CONSTRUCTION PHASE 25
T10. SOUTH WEST VICTORIA RENEWABLE ENERGY PROJECTS 26
T11. VICTORIAN BATTERY ENERGY STORAGE PROJECTS 27
T12. EXISTING COMMERCIAL ACCOMMODATION ROOM SUPPLY & DEMAND 2022 28
T13. ACCOMMODATION IMPACT ASSESSMENT – IMPORTED LABOUR DURING CONSTRUCTION PHASE 29
T14. RENTAL DATA – ACTIVE LISTINGS, JUNE 2023 30
T15. ECONOMIC IMPACTS, OPERATIONAL PHASE (ANNUAL) 31
T16. EXISTING AGRICULTURE OPERATIONS 31
T17. AGRICULTURE IMPACT ASSESSMENT 32
T18. SOCIOECONOMIC IMPACT SUMMARY 34
T19. CONSTRUCTION PHASE IMPACT EVALUATION & MANAGEMENT MEASURES 36
T20. OPERATIONAL PHASE IMPACT EVALUATION & MANAGEMENT MEASURES 37
T21. ACCOMMODATION SUPPLY & DEMAND, LOCAL CATCHMENT 40
T22. ACCOMMODATION SUPPLY & DEMAND, REGIONAL CATCHMENT 40

GLOSSARY OF TERMS

Direct Impacts	Direct output or value of development or construction activity.
Employment	Employment data represents the number of people employed by businesses/organisations in each of the industry sectors in a defined region. Employment data presented in this report is destination of work data. That is, no inference is made as to where people in a defined region reside. This employment represents full-time equivalent jobs, based on a 38-hour work week.
Indirect Impacts	Supply-Chain effects – The increased output generated by servicing industry sectors in response to the direct change in output and demand; and Consumption effects – As output increases, so too does employment and wages and salaries paid to local employees. Part of this additional income to households is used for consumption in the local economy which leads to further increases in demand and output
Output	Represents the gross revenue generated by businesses / organisations in each of the industry sectors in a defined region. Gross revenue is also referred to as total sales or total income.
Gross Regional Product	The total value of final goods and services produced in the region over the period of one year.
Regional Exports	Represents the value of goods and services exported outside of the defined region that have been generated by businesses / organisations in each of the industry sectors within the region.

EXECUTIVE SUMMARY

Portland Energy Park (the proposal) is a proposed utility-scale Battery Energy Storage System (BESS) in Portland, south-west Victoria. The proposal comprises a 1GW/2.5GWh utility-scale BESS using Lithium battery technology, and associated infrastructure including switching station and grid transmission connection.

The proposal is located across multiple parcels of land either side of Madeira Packet Road, within the Portland 'Smelter Precinct' – a State-significant industrially-zoned area in South Portland. The Proponent has secured purchase and lease rights over the involved private freehold land. The Proposal will require development of approximately 25-30 hectares of the 113-hectare Site (described in three parts as 'North Site, 'East Site', and 'West Site' for ease). The proposed transmission connection is approximately 600 metres long and will oversail Madeira Packet Road.

The proposed BESS requires ancillary infrastructure (33kV collector stations, new 500kV terminal station and transmission connection to existing Heywood–Portland 500kV transmission network), and ancillary infrastructure and works, such as new access points and internal tracks, native vegetation removal, security fencing, drainage, earthworks and landscaping.

Pacific Green Energy Park Portland Pty Ltd (Pacific Green) engaged Urban Enterprise to prepare a socioeconomic impact assessment (SEIA) for the proposal. The purpose is to identify and assess the suite of socioeconomic impacts that could be generated by the proposal.

POLICY CONTEXT

- The proposal aligns and satisfies key environmental, economic and social objectives at a local, regional, state and national level.
- Federal and state policy is accelerating the need to transition to renewables, including more ambitious targets for renewable energy generation and reduction in greenhouse emissions, as well as energy storage.
- Regional research has identified that despite best-in-class wind energy production, the Great South Coast region remains without storage solutions or grid reliability and stability pathways.
- State Government policy highlights the critical role that will be performed by large-scale energy storage facilities in improving grid reliability by storing low-cost electricity (such as renewable energy), when there is an oversupply or during periods of low demand so that it is available when demand is higher.

STRATEGIC & ECONOMIC CONTEXT

- Southwest Victoria has abundant renewable energy resources, particularly wind. The proposal is situated within the Southwest Victoria Renewable Energy Zone (REZ), ensuring there will be substantial future renewable energy generation in proximity to Portland Energy Park.
- BESS projects will be critical in enabling renewable energy projects, as they allow the integration of intermittent renewables into the grid more effectively.
- The proposal will draw on a regional, state and national supply chain during the planning/design, construction and operational phases of the proposal.
- For the construction and operational phases, the proposal will present opportunities for local and regional businesses operating in general construction and civil works, electrical and engineering, parts manufacturing, transport, machinery operating and servicing.
- There is a relatively low level of unemployment in the regional catchment, indicating that there is limited capacity for new job creation within the existing workforce. This provides further evidence that a proportion of construction phase workers will be sourced from outside of the catchment.

SOCIOECONOMIC IMPACT SUMMARY

No.	Impact	Economic Impact	Main stakeholders/ and industries affected
CONSTRUCTION PHASE (SHORT TERM)			
1	**Economic stimulus construction phase**	The estimated construction investment of $1.5 billion is estimated to generate a total economic output in the order of $3.9 billion (direct & indirect) and support 814 (FTE) jobs during the construction phase, including 275 direct jobs.	Regional and state construction industry: civil trades, labourers, machinery operators, technicians.
2	**Amenity disruptions from construction activities**	Amenity impacts such as noise and traffic may arise from associated construction activities. However, technical studies prepared as part of the development application suggest these impacts will be minimal, and will be appropriately managed.	Local residents (proximate).
3	**Competition for labour force**	There are several renewable energy projects planned in proximity to the development area and the broader region. Some of the jobs and skills required to deliver these projects, and anticipated timing of construction may overlap with the Portland Energy Park. The overlap has the potential to increase competition for local labour, and could lead to tensions and delays across projects.	Major projects planned in-region.
4	**Cumulative demand for housing and accommodation**	Some of the 275 construction workers will be sourced from outside of the region, and workers will require a mix of short and long term rental housing, and commercial accommodation. The regional catchment has adequate rental property and commercial room capacity to meet accommodation demand generated by the proposal's construction phase. However, if all renewable projects are delivered across the region (as planned), accommodating the cumulative housing needs could place temporary upward pressure on rents and commercial room rates.	Local businesses and local residents (housing only)
OPERATIONAL PHASE (LONG TERM & ONGOING)			
1	**Economic stimulus: Operational phase**	The ongoing operation of the BESS is estimated to generate $60 million in total economic output and support 21 (FTE) jobs per annum, which includes 4 direct jobs (FTE).	Local and regional economy
2	**Agricultural value of grazing**	There is expected to be a reduction in the value of agricultural operations at the subject area in the order of $10,000. This suggests the economic impact associated with a loss of agricultural production value is expected to be negligible.	Local and regional agriculture industry
3	**Amenity impacts**	Once built and operational, the physical infrastructure of the proposal may create long term amenity impacts such as visual, ecology and traffic. Technical studies prepared found that ongoing impacts will be minimal.	Local residents (proximate), passing travellers.
4	**Energy market impacts**	The proposal will reduce wholesale energy costs for Victorian residents by an estimated $6.67 billion between 2026 and 2046. There is also expected to be a reduction in overall carbon emission levels valued at $42.7 million over the first 20 years of operation.	Victorian residents and businesses

5		**Grid reliability & energy access**	The proposal will enhance the reliability of the local energy grid, and is expected to reduce the frequency and duration of power outages. This will provide benefits association with minimising disruptions of power outages to residents and businesses.	Local residents and businesses
6		**Community funds**	The proponent will establish a community fund associated with the operational phase of the facility. This will be used to support local projects and programs that achieve positive community outcomes.	Local community
7		**Municipal Revenue**	Council will receive revenue in the form of an annual charge associated with the new use and capital improved value of the subject area. The exact annual charge is unknown at this point, but the funds will be redirected for community benefit.	Glenelg Shire Council. Local economy and community

Source: Urban Enterprise, 2024

IMPACT EVALUATION

The significance of impacts are evaluated by considering the expected magnitude (low, moderate and high) and the likelihood of the impact occurring during the lifecycle of the proposal.

Planned and recommended management measures have been included (where relevant) to optimise benefits and minimise negative impacts.

Construction Phase Impact Evaluation & Management Measures

No.	Impact	Magnitude of Impact	Likelihood	Management measure(s)	Recommendations
1	**Economic stimulus construction phase**	Moderate	Likely	None identified.	Advocate for use of local suppliers (where possible).
2	**Amenity disruptions from construction activities**	Low	Likely	Provide regular updates and notifications about the proposal and potential disruptions to nearby landowners. Public community consultation sessions held in-region.	Refer to other technical studies for planned and recommended management measures relating to amenity impacts during the construction phase.
3	**Competition for labour force**	Moderate	Possible	None Identified.	Liaise with other renewable energy project proponents to discuss synergies with jobs and skills and potential for resource sharing (if required).
4	**Cumulative demand for housing and accommodation**	Low	Possible	None identified.	Engage with regional catchment LGAs, and relevant Chamber of Commerce/Business Associations to notify of impending accommodation requirements during the construction period.

Source: Urban Enterprise, 2024

Operational Phase Impact Evaluation & Management Measures

No.	Impact	Magnitude of Impact	Likelihood	Management measure(s)	Recommendations
1	**Economic stimulus: Operational phase**	Low	Highly likely	None identified.	Advocate for use of local suppliers (where possible) using platforms such as the Industry Capability Network.
2	**Agricultural value of grazing**	Low	Highly likely	The land with the lowest agricultural and environmental value has been selected (and the development appropriately	None.

				sited) to minimise disruptions to agricultural activities. A large portion of balance land will continue to be used for grazing.	
3	**Amenity impacts**	Low	likely	Technical studies prepared to assess potential amenity impacts and recommend management measures. Public community consultation sessions held in-region	Refer to other technical studies for planned and recommended management measures relating to ongoing amenity impacts.
4	**Energy market impacts**	High	Highly likely	None identified	None.
5	**Grid reliability & energy access**	Moderate	Highly Likely	None identified.	None.
6	**Community funds**	Low	Likely	The proponent proposes to establish a community fund to support local projects and programs that deliver community benefits.	None.
7	**Municipal revenue**	Low	Highly Likely	N/A	None.

Source: Urban Enterprise, 2024

1. INTRODUCTION

1.1. BACKGROUND

Portland Energy Park (the proposal) is a proposed utility-scale Battery Energy Storage System (BESS) in Portland, south-west Victoria. The proposal comprises a 1GW/2.5GWh BESS and associated infrastructure including switching station and grid transmission connection.

1.2. ENGAGEMENT & SCOPE

Pacific Green Energy Park Portland Pty Ltd (Pacific Green) engaged Urban Enterprise to prepare a socioeconomic impact assessment (SEIA) for the proposal. The purpose is to identify and assess the suite of socioeconomic impacts that could be generated by the proposal.

Economic impacts relate to the direct and indirect economic activities that are generated through the construction and operational phase of the proposal.

Social impacts relate to changes (both positive and negative) that may occur to the way people live and the environment during the proposal's lifecycle.

1.3. SCOPE

The scope of this report includes the following:

- **Project Overview** - Provide an overview of the proposal, including location, description of key project phases, construction investment, development timeline and supply-chain needs.
- **Impact Area –** Define a local and regional impact area to understand the socioeconomic capability and capacity, and also establish catchments in which impacts associated with the proposal are likely to flow.
- **Strategic and Policy Drivers** - Assess the strategic and policy drivers that underpin the need for the proposal.
- **Baseline Socioeconomic Conditions –** profile the socioeconomic characteristics and employment capabilities in the impact areas to understand the potential for local supply-chain integration, and determine the extent to which the local and regional economy can support and benefit from the proposal**.**
- **Literature Review** - Complete a literature review, case study analysis and review other relevant technical studies to identify potential socioeconomic impacts generated by battery and other renewable energy projects.
- **Socioeconomic Impact Framework** - Prepare an impact framework that identifies and describes the expected socioeconomic impacts that may arise during the construction and operational phase of the proposal.
- **Economic Impact Assessment** - Estimate the economic impact of benefits (where possible) using the input-output (I-O) method of analysis.
- **Management Measures** - Assess the magnitude and likelihood of impacts, and recommend management measures (where relevant) to optimise benefits and minimise negative impacts.

1.4. INFORMATION SOURCES

The following sources of information have been used to inform this project:

- Project information, including layout, capacity, capital expenditure, operational expenditure and project phasing and timing, Pacific Green;
- Census of Population & Housing and Place of Work, ABS, 2021;
- Census of Place of Work, ABS, 2021;

- Unemployment rate, National Skills Commission, 2023;
- Bespoke Price And Energy Cost Savings Forecasts Pacific Green, Cornwall Insight Australia, November 2023;
- Portland Energy Park Traffic Impact Assessment, ESR Transport Planning, 2024;
- Portland Energy Park Flora and Fauna Assessment, Nature Advisory, 2024;
- Portland Energy Park Flood Impact and Water Quality Assessment, Water Technology, 2024;
- Portland Energy Park Landscape and Visual Impact Assessment, Peter Haack Consulting, 2024;
- Portland Energy Park Noise Assessment, Marshall Day Acoustics, 2024; and
- Portland Energy Park Cultural Heritage Assessment, GML Heritage, 2024.

1.5. PROPOSAL: PORTLAND ENERGY PARK

OVERVIEW

Pacific Green Energy Park Portland Pty Ltd (Pacific Green, the Proponent) proposes to develop the Portland Energy Park: a utility-scale Battery Energy Storage System (BESS) in Portland, Victoria. The proposal comprises a 1GW/2.5GWh utility-scale BESS using Lithium battery technology, and associated infrastructure including switching station and grid transmission connection.

The proposed BESS requires ancillary infrastructure (33kV collector stations, new 500kV terminal station and transmission connection to existing Heywood–Portland 500kV transmission network), and ancillary infrastructure and works, such as new access points and internal tracks, native vegetation removal, security fencing, drainage, earthworks and landscaping.

BESS's provide an opportunity to store energy generated from another source. An example of this is coupling batteries with renewable energy generation allowing energy to be stored during times of low demand and released at times of peak demand. The proposal will use lithium iron phosphate battery technology to store electricity until it is ready to be distributed into the network.

SUBJECT AREA

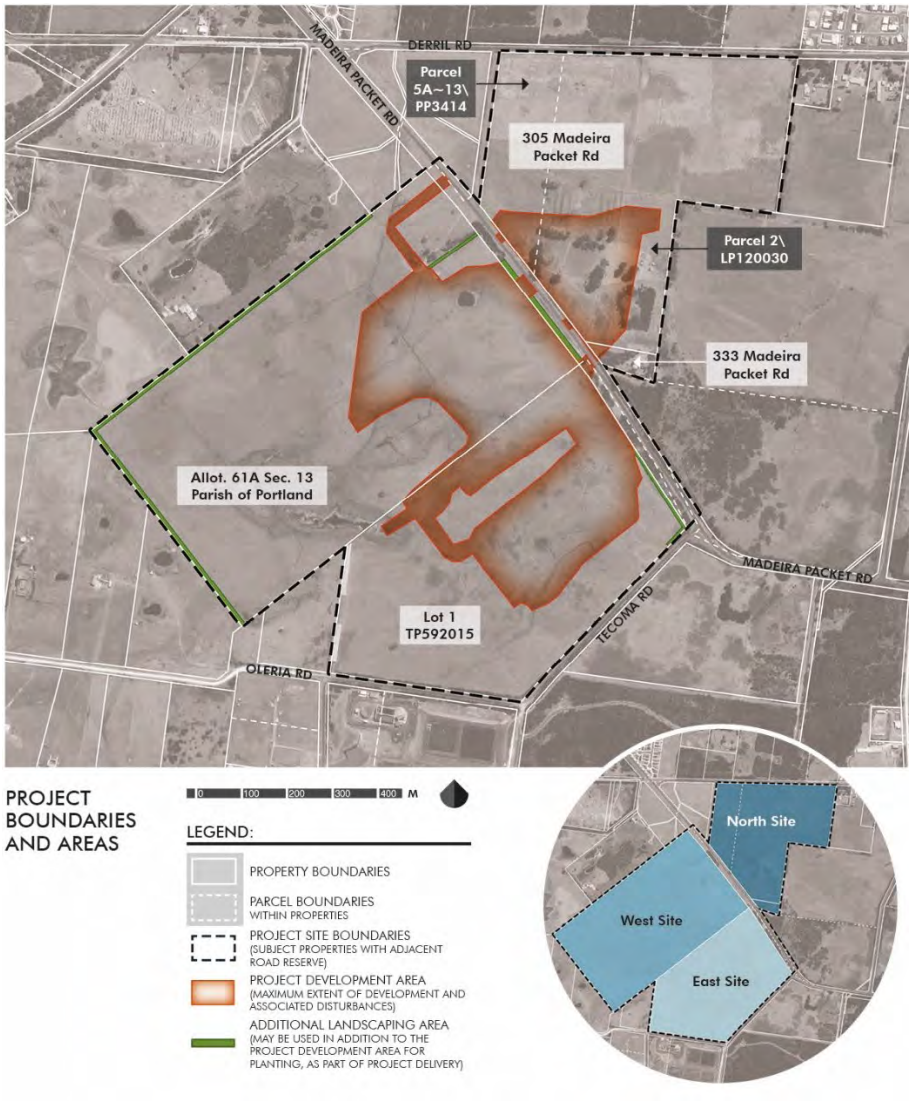
The subject area is located at Madeira Packet Road, Portland. The 116 hectare area is primarily zoned Industrial 2 (IN2Z). The subject area comprises four properties (with a total of five parcels), defined in three areas 'Site North, Site West, and Site East. The subject area is located approximately 3 kms south of the centre of Portland and 2.5 kms west of the Portland Aluminium smelter.

The parcels are relatively flat, with some undulating and low-lying areas. They are currently used for agricultural grazing and contain agricultural dams and stockyards. All parcels are mostly cleared of remnant vegetation, however, some drainage lines, and low-lying areas contain heavily modified native vegetation.

The 500 kV transmission line runs through the northern corner of the West Site and across the North Site. The trunk APA gasline runs within the Madeira Packet Road frontage. A sewer main runs north-south through the centre of the Portland West parcel.

There are unconstructed crossovers and farm gate to Madeira Packet Road and Oleria Road. In general, there is ample opportunity for site access to Madeira Packet Road, a Declared Road. The land is located within a large precinct of Industrial 2 Zoned (IN2Z) land, partly serving as an unofficial buffer between the Portland Aluminium smelter and Portland township. The site and surrounding land are generally used for broadacre grazing, are somewhat low-lying, and feature drainage lines and some swampland.

F1. SUBJECT AREA

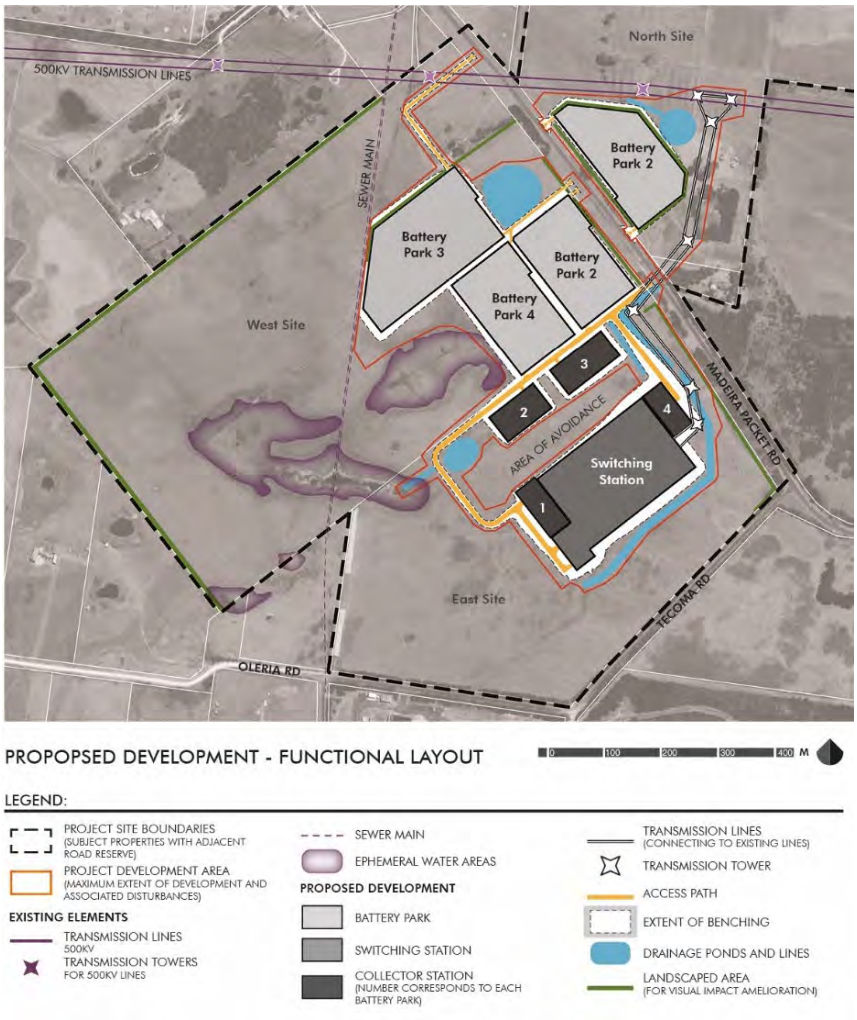


Source: Pacific Green/Cogency, 2024

PROJECT LAYOUT AND PHASING

The proposed layout is presented in Figure 2, and an overview of the key phases of the proposal's lifecycle are presented in Table 1.

F2. PROPOSED LAYOUT



Source: Pacific Green/Cogency, 2024

T1. INDICATIVE PROJECT PHASING

Phase	Overview	Indicative Cost (approx.)	Timeframe
1.DESIGN & PLANNING	Feasibility analysis, site investigations and concept design.	$20 million	2 years (expected completion early 2025)
2. CONSTRUCTION	Engineering, procurement, construction and installation.	$1.5 billion	2 years (expected commencement in 2025/26)
3. OPERATIONAL	Operation, maintenance and servicing.	$25 million p.a.	40 years (expected operational commencement in 2027)

Source: Pacific Green/Urban Enterprise, 2023

RENEWABLE ENERGY INFRASTRUCTURE & AREAS OF INTEREST

The subject site is strategically located within Victoria's South West Renewable Energy Zone (REZ), and adjacent to the Southern Ocean offshore wind area. Importantly, an existing 500 kV transmission line traverses the north west part of the site, allowing a straightforward connection to the grid.

There are several operational onshore wind farms proximate to the proposal. The proposal will have capacity to serve existing and future renewable energy projects within the REZ.

Currently, Portland Energy Park is the only proposed BESS that is planned to connect to the 500 kV Moorabool to Portland transmission line.

F3. REGIONAL CONTEXT

Source: Urban Enterprise, 2023

2. STRATEGIC, POLICY & INDUSTRY CONTEXT

2.1. INTRODUCTION

This section summarises the federal and state policy that is relevant to the proposal, the current state of the of battery industry, and the strategic rationale for Portland Energy Park.

2.2. POLICY CONTEXT

Government policy is accelerating the transition to renewables, including more ambitious targets for renewable energy generation and storage, as well as greenhouse gas emissions reduction. BESS projects are seen as key to the transition as they help increase utilisation of renewable energy by enabling absorption of excess energy from renewable generation during periods of negative demand.

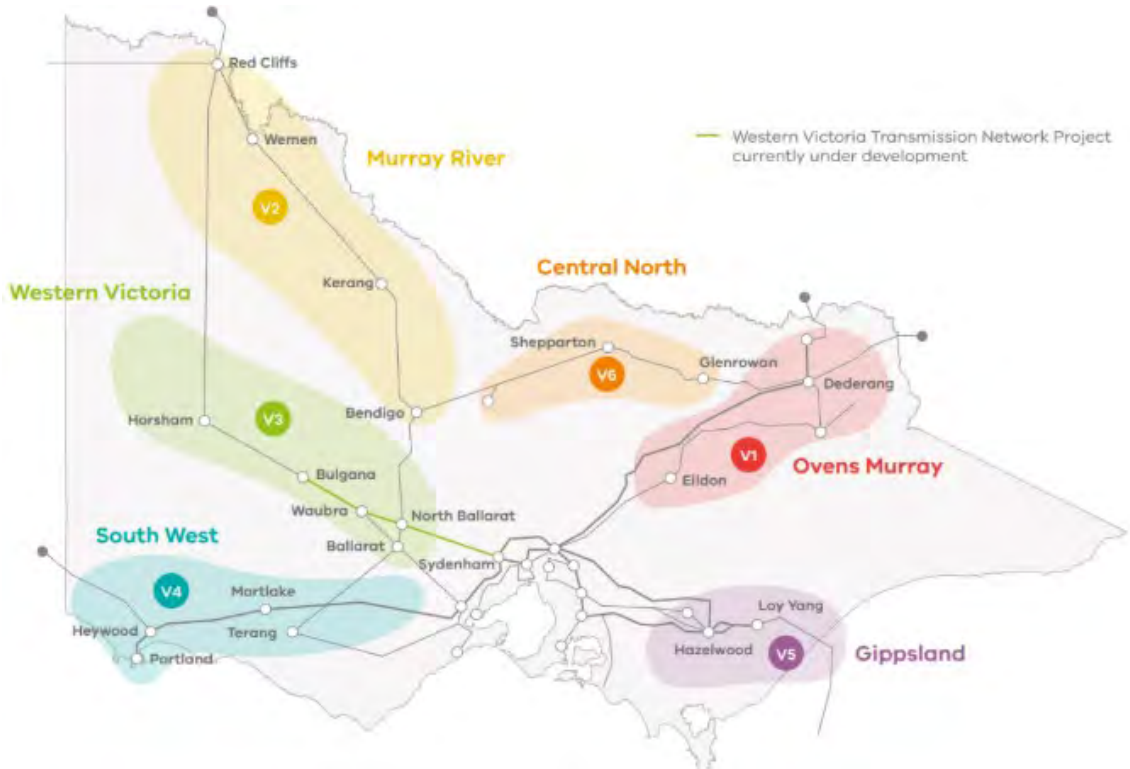
The State Government is determined to expedite the clean energy transition, recently committing to reach 95 percent renewable electricity in the state by 2035, and net zero emissions by 2045. The state government also plans to legislate the following energy storage targets for Victoria:

- at least 2.6 GW of energy storage capacity by 2030
- at least 6.3 GW by 2035.

As such, the proposal will make a substantial contribution to achieving these energy storage targets.

Renewable Energy Zones (REZ) were introduced by the Australian Energy Market Operator (AEMO) to help identify regions that are highly suited to renewable energy development. Portland Energy Park is situated within the South West Victoria REZ, which will leverage and benefit from existing energy resources and grid infrastructure.

F4. VICTORIA'S RENEWABLE ENERGY ZONES



Source: Victorian Renewable Energy Zones Development Plan, DELWP 2021

Table 2 outlines the state, regional and local policies and strategies that support the proposal, including alignment with environmental, economic, social and community objectives:

- The proposal aligns and satisfies key environmental, economic and social objectives at a local, regional, state and national level.
- Federal and state policy is accelerating the need to transition to renewables, including more ambitious targets for renewable energy generation and reduction in greenhouse emissions, as well as energy storage.
- Regional research has identified that despite best-in-class wind energy production, the Great South Coast region remains without storage solutions or grid reliability and stability pathways.
- State Government policy highlights the critical role that will be performed by large-scale energy storage facilities in improving grid reliability by storing low-cost electricity (such as renewable energy), when there is an oversupply or during periods of low demand so that it is available when demand is higher.

T2. STRATEGIC & POLICY SUMMARY & ALIGNMENT

	Relevant objectives and actions	Project alignment
Federal		
Renewable Energy Storage Roadmap, CSIRO (2023)	Continue to deploy commercial short-duration electricity storage technologies and medium-to-long intraday-duration technologies to create a diverse set of options for major grids and industry applications.	The proposal will provide additional short-medium duration storage capacity in the region to support future renewable energy uptake and improve grid reliability.
Climate Change Act (2022)	• Reducing Australia's net greenhouse gas emissions by 43% on 2005 levels by 2030 • Reducing Australia's net greenhouse gas emissions to zero by 2050	The proposal will support the uptake of new renewable energy capacity to assist in achieving the federal government's emissions reductions targets
State		
Victoria's Climate Change Act (2017)	Aim to achieve net zero greenhouse gas emissions by 2050 and a climate-resilient community and economy.	The proposal will assist the state in achieving its emissions target through the provision of additional energy storage capacity, thus allowing proximate renewable energy projects to achieve their energy generation potential.
Victorian Renewable Energy Zones Development Plan Directions Paper (2021)	Facilitate scale efficient and anticipatory investment in preparation for more renewables in the electricity system in the medium-term.	The proposal is located within the South West Victoria REZ and will facilitate further expansion of renewable energy into the energy market through the provision of additional storage capacity.
Victoria's Climate Change Strategy (2021)	Accelerate Victoria's transition to a clean and efficient energy future.	The proposal will assist the clean energy transition by improving grid reliability for energy by storing low-cost electricity (such as renewable energy) when there is an oversupply or during periods of low demand.
Victorian Renewable Energy Action Plan	Supporting energy storage that integrates with renewable generation.	The proposal will provide additional storage capacity for clean energy and assist to integrate renewable energy generation into the network.
Infrastructure Victoria Strategy 2021-2051	Contribute toward strategic power supply infrastructure upgrades in Great South Coast.	The proposal would assist in improving the region's power supply infrastructure.
Regional		
Great South Coast Regional Economic Development Strategy (2022)	• Maximise the potential of the region's energy resources. • Grow and equip the workforce needed to enable future economic opportunities.	The proposal will provide additional storage capacity for clean energy as well as substantial employment benefits during the construction and operational phases of the proposal.
Great South Coast Regional Strategic Plan	• Significantly increase the capacity of the region's power distribution network. • Identify and address the barriers to incorporating intermittent power generation (i.e. renewable energy) into the state's power grid.	The proposal will increase renewable energy storage capacity within the region's network and improve grid reliability.
Great South Coast Economic Futures (2020)	A key challenge identified in the report was the lack of energy storage solutions planned for the region's renewable energy potential capacity.	The proposal will increase renewable energy storage capacity within the region's network.

Local		
Glenelg Council Plan 2021-2025	Creating opportunities for business connection and growth.	The proposal is expected to create opportunities for local business involvement, particularly during the construction phase.

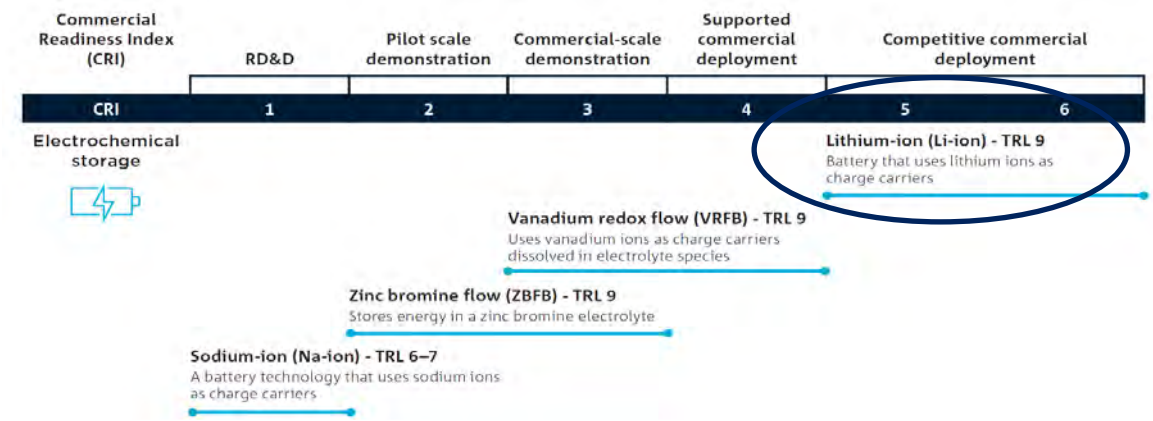
Source: Urban Enterprise, 2023

2.3. STATE OF THE INDUSTRY: BATTERY STORAGE

A summary of the key trends in the battery storage sector in Australia and internationally are summarised below:

- Lithium-ion batteries have reached competitive commercial deployment overall (as shown in Figure 5), with approximately 37-GW of global BESS capacity installed (to the end of 2022).[1]
- Global investment in battery energy storage exceeded $20 billion (USD) in 2022, predominantly in grid-scale deployment, which represented more than 65% of total spending in 2022. After solid growth in 2022, battery energy storage investment is expected to hit another record high and exceed $35 billion in 2023 (USD), based on the existing pipeline of projects and new capacity targets set by governments.[2]
- Australia's investment in the development of big batteries continued to gain momentum in 2022, with the announcement of several significant battery projects (including NSW's Waratah Super Battery) and $176 million of conditional funding from ARENA.
- Australia's largest battery project, Melbourne Renewable Energy Hub (in Melton), recently received federal government environmental approval. Equis is planning a 1.2GW facility (2.4GWh) situated 25km from Melbourne.
- From a market perspective, revenue opportunities for batteries continue to grow and diversify, including as a result of government-led initiatives such as revenue underwriting schemes and a proposed congestion relief market.
- The demand for batteries and international supply chain constraints have placed significant pressure on the availability and affordability of critical minerals required in the battery manufacturing process. The federal government is seeking to capitalise on Australia's large reserves of critical mineral resources for the battery industry through strategies such as the National Critical Mineral Strategy and the Australian Made Battery Plan.
- New policies and proposed reforms will likely continue to play a part in shaping the trajectory of big batteries in the market, including the Australian government's Capacity Investment Scheme and proposed transmission access reforms.

F5. BATTERY STORAGE TECHNOLOGY MATURITY OVERVIEW



Source: Renewable Energy Storage Roadmap, CSIRO, 2023

[1] Rystad Energy, 2023

[2] Schoenfisch M, Dasgupta A (2023) Grid-scale storage: Tracking report. IEA.

WHAT IS THE STRATEGIC RATIONALE FOR THE PROPOSAL?

No.	Item		Rationale
1		**Renewable energy generation**	South West Victoria has abundant renewable energy resources, particularly wind and solar. The declared offshore wind area in the Southern Ocean between Warrnambool and Port Fairy covers more than 1,000 sq km and is planned for major offshore wind projects in the future. BESS projects will be critical in enabling renewable energy projects, as they allow the integration of intermittent renewables into the grid more effectively. This project will play a key role in achieving the region's renewable energy potential.
2		**Grid stability & reliability**	BESS projects can provide grid stability by smoothing out fluctuations in energy supply and demand. In regional areas, a BESS can help maintain voltage and frequency levels, reducing the risk of blackouts and ensuring a reliable electricity supply for residents and businesses. A BESS can also serve as a backup power source, providing critical electricity to emergency services, hospitals, and communities during such events, enhancing energy reliability and resilience.
3		**Market signal**	With a capacity of 1GW/2.5GWh, Portland Energy Park represents one of the largest BESS proposals in Australia The successful development of this project can demonstrate the market potential of energy storage projects in the region, and has the potential to catalyse further new energy investment in the region.
4		**Strategic location**	The proposal is situated within the South West Victoria REZ, ensuring there will be substantial future renewable energy generation in proximity to the Portland Energy Park. The proposal is also strategically located in proximity to the coastline, allowing for connection to the grid for future offshore wind projects in the region. Further to this, the project is the only BESS that is planned for connection to the 500 kV Moorabool to Portland transmission line. The development of the 500kV terminal station as part of this project will be a key enabler of future energy generation and energy-intensive industries in Portland.
5		**Policy support**	The proposal has strong policy support across all levels of government. The proposal will make an important contribution to achieving the state government's energy storage targets, whilst BESS projects are seen as critical to the clean energy transition by government due to their ability to increase utilisation of renewable energy.

Source: Urban Enterprise, 2023

3. SOCIOECONOMIC PROFILE

3.1. INTRODUCTION

This section provides an overview of the socioeconomic characteristics and employment capabilities in the local and regional impact areas to understand the potential for supply-chain integration, and determine the extent to which the local and regional economy can support and benefit from the proposal.

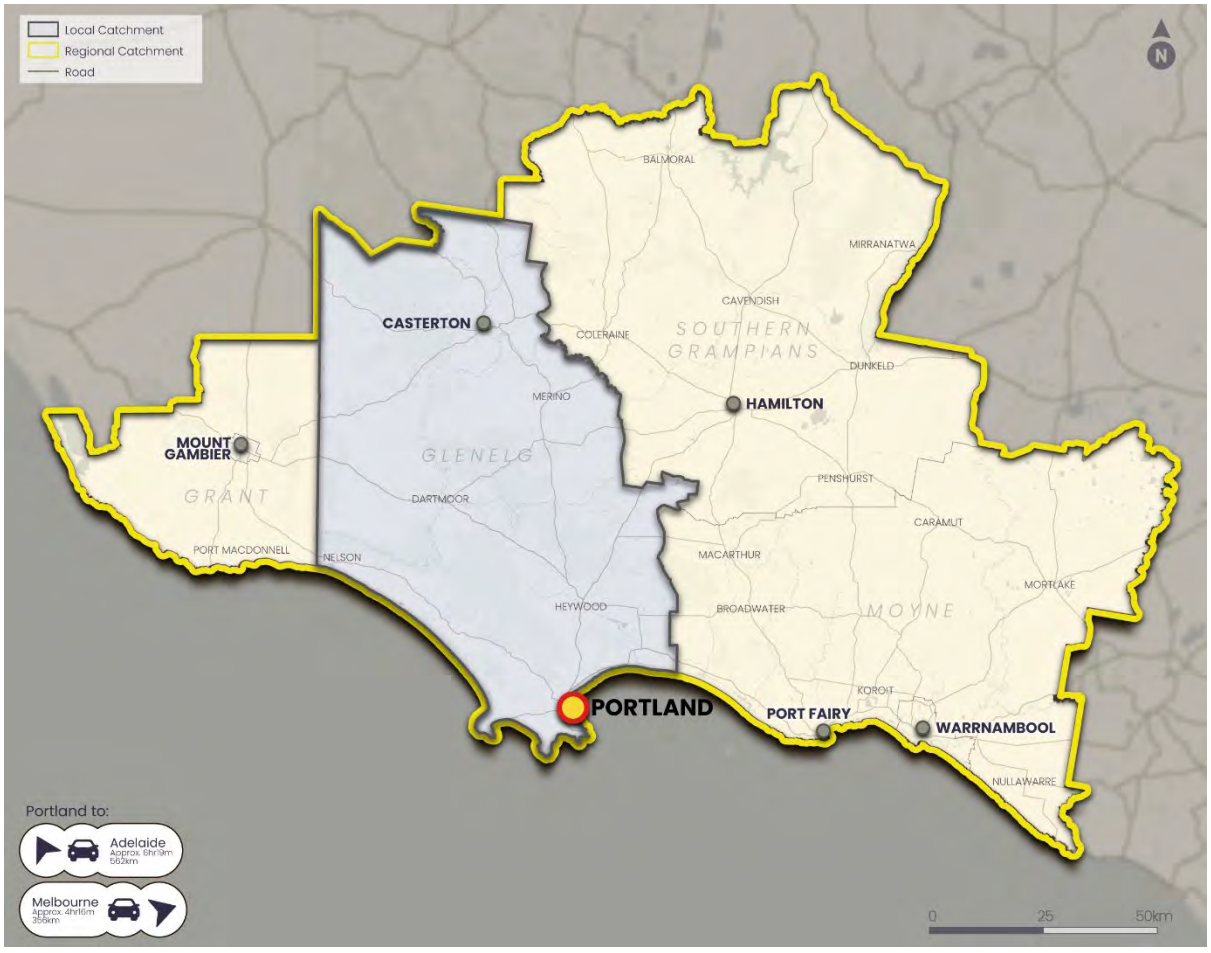
3.2. IMPACT AREAS

A local and regional impact area has been defined to understand the socioeconomic capability and capacity within the region, and the extent to which supply-chain participation and integration is possible. The impact areas also provide a regional catchment in which impacts associated with the proposal are likely to flow.

The local catchment includes the Glenelg LGA, while the regional catchment includes the local governments of Glenelg, Warrnambool, Moyne, Southern Grampians, Mt Gambier and Grant.

The impact areas have regard to the spatial proximity to, and accessibility of the proposal, location attributes, the population and employment base, and economic capabilities.

F6. IMPACT AREAS



Source: Urban Enterprise, 2023

3.3. BATTERY ENERGY STORAGE SYSTEMS: SUPPLY-CHAIN NEEDS

The Portland Energy Park will draw on a direct and indirect supply chain during the planning/design, construction and operation phases of the proposal. Supply chain opportunities will present for local businesses in activities that support key phases of the proposal's lifecycle.

Ideally the proposal will primarily draw on a regional and state catchment to support construction and operations. However, given the specialised nature of particular activities associated with large-scale battery storage projects and the relative supply-chain immaturity, the proposal is expected to also draw from a national catchment.

A summary of direct project supply-chain opportunities associated with a generic battery storage project is outlined in Table 3.

There will also be indirect economic opportunities for population service industries such as accommodation, retail and hospitality on the back of worker demand for retail, hospitality and accommodation.

T3. SUPPLY-CHAIN OPPORTUNITIES, RENEWABLE ENERGY

Phase	Industry Sector	Activity & Jobs
Planning/Design	**Professional and technical services**	▪ Engineering and surveying ▪ Planning, legal and financial services ▪ Environmental services ▪ Project management and administration
Construction	**Construction and trades**	▪ Electricians and technicians (including transmission and substation specialists) ▪ Engineering (electrical, civil, structural) ▪ Metal workers, welders and fitters ▪ Battery system installers ▪ Labourers ▪ Machinery operators ▪ Site preparatory and civil construction
	Manufacturing and wholesale trade	▪ Parts and materials ▪ Equipment ▪ Machinery
	Transport and logistics	▪ Truck drivers ▪ Machinery operators ▪ Machine and equipment servicing
Operation	**Construction and trades**	▪ Landscaping and maintenance ▪ Operators ▪ Technicians ▪ Facilities management

Source: Urban Enterprise, 2023

3.4. SOCIOECONOMIC SNAPSHOT

This section summarises the socioeconomic profile and employment capability in the local and regional catchments to identify gaps and opportunities to serve different stages of the project supply-chain and project lifecycle.

The following observations are relevant:

- The regional catchment is home to approximately 125,000 residents and 58,000 jobs. The regional population is largely concentrated to regional centres and larger towns such as Warrnambool, Mt Gambier, Portland, Hamilton.
- The local catchment has a population of 20,000, with approximately half of municipal residents living in Portland.
- The regional unemployment rate (average of 2.5%) is lower compared with Victoria (3.7%), indicating that the regional economy has limited capacity within the labour market.
- The local and regional catchments are relatively disadvantaged when compared to the state average.
- The key industries are similar across the region with healthcare, agriculture, retail, manufacturing and construction featuring in the top 5 of both catchments.

Higher socioeconomic disadvantage, low unemployment and below average participation rate in the local catchment suggests that the proposal may have challenges in sourcing workers from the local area. The proposal is likely to draw from both the regional and state workforce to support planning/design and construction.

The local economy can benefit in other ways, particularly through demand generated by the transient workforce during the planning/design and construction phases for goods and services such as retail, hospitality, accommodation etc.

T4. LOCAL & REGIONAL CATCHMENT AT A GLANCE

Population (2021)		Unemployment (June 2023)		SEIFA (2021)	
Local	20,152	Local	3.1%	Local	952
Regional	125,034	Regional (average)	2.5%	Regional (average)	987
		Victoria	3.7%	Victoria	1010
Businesses (2022)		**Jobs (2021)**		**Participation (2021)**	
Local	1,941	Local	8,829	Local	61%
Regional	12,653	Regional	58,863	Regional (average)	65.8%
Top 5 Employing Industries (2021)					
Local		Regional		Victoria	
1. Health	15.2%	1. Health	16.4%	1. Health	16%
2. Agriculture	14.1%	2. Agriculture	12.2%	2. Professional & technical services	10%
3. Manufacturing	11.2%	3. Retail Trade	10.1%	3. Retail Trade	9.9%
4. Retail Trade	7.9%	4. Manufacturing	8.2%	4. Construction	9.2%
5. Construction	7.2%	5. Construction	8.2%	5. Manufacturing	8.3%

Source: Census of Population & Housing, ABS, 2021, Business Counts, ABS, 2022, Jobs and Skills Australia Small Area Labour Markets June 2023.

3.5. EMPLOYMENT & BUSINESS MIX

The local and regional catchment employment mix is relatively well-matched to some of the general construction, manufacturing and transport activities required to deliver and maintain battery projects.

There are approximately 4,800 manufacturing jobs and 4,800 construction jobs within the regional catchment. This includes nearly 1,000 manufacturing and 600 construction jobs in the local catchment. A proportion of these jobs with transferable skills present opportunities to service the construction phase of the Portland Energy Park.

From a transport and logistics perspective, the regional catchment includes more than 2,000 transport, postal and warehousing jobs, suggesting there may be scope for local employment opportunities in this sector during the construction phase of the proposal.

Currently, battery and inverter manufacturing capabilities do not exist in the region and will likely have to be sourced from overseas. Similarly, employment in the electricity, gas, water and waste services industry is significantly less prominent within the region (1.1%) and may need to be imported.

There are more than 12,600 businesses operating in the region. There are around 3,100 businesses operating in industries aligned to renewable energy supply chains throughout the regional impact area.

There are potential advantages in the construction, transport, postal and warehousing and manufacturing sectors, accounting for approximately 25% of the region's business base.

T5. EMPLOYMENT & BUSINESS MIX, LOCAL & REGIONAL CATCHMENT, 2021

Industry		Employment				Businesses	
		Local		Regional		Local	Regional
	Health Care and Social Assistance	1,338	15%	9,638	16%	45	596
	Agriculture, Forestry and Fishing	1,244	14%	7,174	12%	824	4,092
	Retail Trade	700	8%	5,947	10%	108	729
⚡	**Manufacturing**	990	11%	4,837	8%	62	434
⚡	**Construction**	632	7%	4,826	8%	216	1,794
	Education and Training	615	7%	4,785	8%	5	104
	Accommodation and Food Services	508	6%	4,030	7%	101	626
	Public Administration and Safety	506	6%	3,071	5%	0	22
⚡	**Transport, Postal and Warehousing**	538	6%	2,232	4%	112	590
	Other Services	313	4%	2,149	4%	100	633
⚡	**Professional, Scientific and Technical Services**	203	2%	1,890	3%	93	666
	Administrative and Support Services	212	2%	1,486	3%	47	316
⚡	**Wholesale Trade**	231	3%	1,454	2%	39	297
	Financial and Insurance Services	71	1%	767	1%	20	259
	Arts and Recreation Services	107	1%	634	1%	16	164
	Electricity, Gas, Water and Waste Services	107	1%	624	1%	7	38
	Rental, Hiring and Real Estate Services	81	1%	527	1%	138	1,215
	Information Media and Telecommunications	32	0%	362	1%	5	32
	Mining	27	0%	276	0%	3	29
	Total	**8,829**	**100%**	**58,863**	**100%**	**1,941**	**12,653**

Source: Census of Employment, Place of Work, ABS, 2021 ABS Business Counts 2022 | ⚡ key renewable energy supply-chain sectors.

3.5.1. EMPLOYMENT SPECIALISATIONS

Employment specialisations in the region are evident through the Location Quotient (LQ) technique which measures the proportion of employment compared with Regional Victoria as a benchmark.

An industry value of less than 1 indicates a low proportion of employment within that industry compared with Regional Victoria. A value greater than 1 represents a higher proportion of employment and indicates a competitive advantage in that industry sector compared with Regional Victoria.

The LQ analysis highlights employment specialisations in wholesale trade, transport, postal and warehousing, and manufacturing – all of which are relevant to supply-chain needs during the construction phase. This presents opportunities for the regional catchment to participate in projects needs during the construction phase.

F7. LOCATION QUOTIENT, REGIONAL CATCHMENT 2021

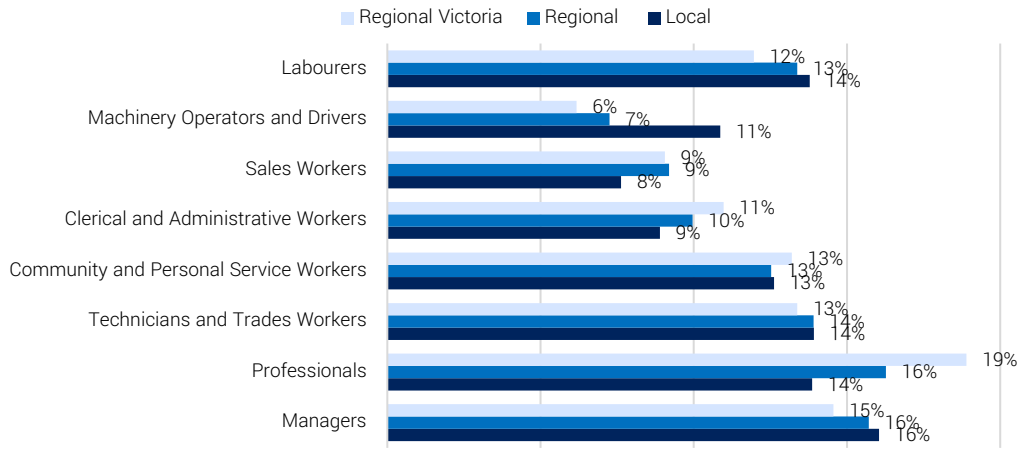
Source: Census of Employment, Place of Work, ABS, 2021

3.5.2. OCCUPATIONS

Analysis of occupations held by employed residents in the local and regional catchments indicates an alignment of jobs and skills with some supply chain needs of the proposal, particularly during the construction phase. Examples include a high proportion of machinery operators and drivers, labourers, managers, technicians and trade workers.

White collar occupations (administrative and professional workers) are underrepresented when compared with Regional Victoria, indicating that these roles are more likely to be sourced from outside of the catchments.

F8. OCCUPATIONS, LOCAL REGIONAL & REGIONAL VICTORIA, 2021

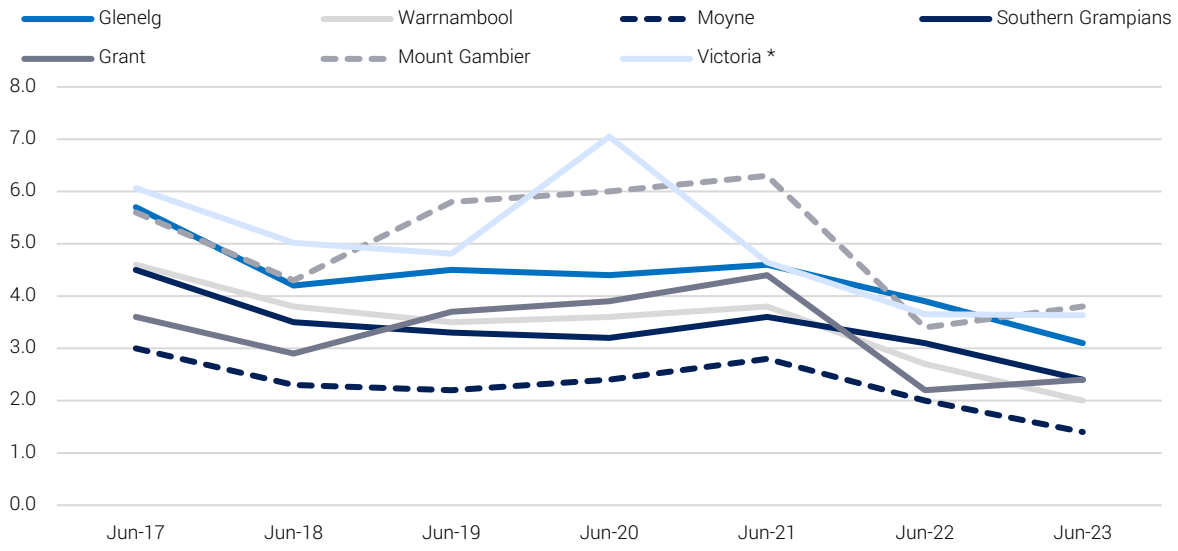


Source: Census of Population & Housing, ABS, 2021

3.5.3. UNEMPLOYMENT

As at June 2023, the majority of the LGAs which encompass the regional catchment had a lower rate of unemployment compared with Victoria (3.7%). As it stands, there is limited capacity within the regional labour force pool for new job creation. This suggests that job requirements to support the proposal will be drawn from the existing labour force and business base, and supplemented with workers imported from outside of the regional catchment.

F9. UNEMPLOYMENT RATE, REGION LGA & REGIONAL VICTORIA, JUNE 2017 - 2023



Source: Small Area Labour Markets, National Skills Commission, 2023, Labour Force Survey, ABS, 2023.
*Note time series for Labour Force Survey data and Small Area Labour Markets do not exactly align

3.6. KEY POINTS

- **The Portland Energy Park will draw on a regional, state and national supply chain during the planning/design, construction and operational phases of the proposal.**
- **The local catchment has a limited population base to draw on. Regional centres and large townships in the broader catchment are likely to perform a supply-chain role, particularly with respect to servicing demand from a transient workforce (i.e. housing, accommodation, retail, hospitality etc.).**
- **For the construction and operational phases, the proposal will present opportunities for local and regional businesses in general construction and civil works, electrical and engineering, parts manufacturing, transport, machinery operating and servicing.**
- **There is partial alignment with the skills of local workers and the skills required during the construction and operational phase of the proposal. This includes a relatively high share of machinery operators and drivers, labourers, managers, and technicians and trade workers.**
- **Battery manufacturing and specialised technician (design, engineering) capabilities will be imported from outside of the catchment. Battery manufacturing will be supplied from overseas and can be imported via the Port of Portland.**
- **There is a relatively low level of unemployment in the catchment, suggesting that there is limited capacity for new job creation within the existing workforce. This provides further evidence that a proportion of construction phase workers will be sourced from outside of the catchment.**

4. SOCIOECONOMIC IMPACT ASSESSMENT

4.1. INTRODUCTION

This section identifies and assesses the potential socioeconomic impacts that could arise during the construction and operational phase of the Portland Energy Park project.

4.2. POTENTIAL SOCIOECONOMIC IMPACTS OF BATTERY ENERGY STORAGE SYSTEMS

To identify the potential impacts associated with the proposal, the following approach has been adopted:

- Review existing literature and case study socioeconomic impact assessments for comparable BESS and renewable energy projects across Australia (see Appendix A for detailed list of BESS case studies); and
- Review relevant technical studies prepared for the Portland Energy Park to identify potential socioeconomic impacts such as visual amenity, ecology, biodiversity, traffic, etc.

4.2.1. LITERATURE REVIEW

The literature review included analysis of 10 BESS projects, as well as 14 solar farms and wind projects from across Australia. The findings from the literature review and case study analysis are as follows:

- The most substantial economic impacts such as direct and indirect job creation and business supply-chain generally occur during the short-term construction phase.
- For projects that are proximate to township with a primarily transient workforce (during the planning/design and construction phase), local traders can benefit from an uplift in demand for retail, hospitality, accommodation,
- Economic impacts during the operational phase are modest due to lesser demand for on-site employment to service and maintain the infrastructure.
- Energy storage projects typically create substantial benefits for local residents and businesses due to improvements to the reliability of the energy grid.
- The state-wide benefits primarily relate to energy cost savings for consumers associated with improved efficiency usage of energy sources (particularly renewable) of generation and environmental benefits of renewable energy production.
- Isolated local and private beneficiaries include landowners who provide the right to use their land, and an increase in municipal rate revenue collected by Council, which is ultimately re-directed for community benefit.
- In many cases, renewable energy developers and proponents provide funds to support local community programs and initiatives.
- Social impacts typically relate to:
    - Amenity impacts such as noise, visual and traffic during construction;
    - Community concerns around property rights and potential impacts to the natural environment, health and wellbeing; and
    - Increased pressure on local infrastructure and services due to cumulative demand from seasonal labour and major projects undertaken concurrently. This mostly includes demand for housing, accommodation and workers.

T6. KEY SOCIOECONOMIC IMPACTS, BATTERY ENERGY STORAGE SYSTEMS

Impact category	Description
Construction phase impacts	Output and jobs associated with the construction phase of a project. These are typically substantial and there is scope for local benefits if there is alignment with the local business and employment profile. Other impacts associated with the construction phase include: ▪ Amenity disruptions from construction activities (noise, traffic etc). ▪ Cumulative uplift in demand for worker housing, accommodation, retail and services. ▪ Competition for skills and labour between other major projects.
Operational phase impacts	Output and jobs during the life of the proposal. These are often substantially lower than the construction phase impacts, albeit over a much longer period. The change of land use following development of a BESS project, and subsequent loss of agricultural land, has been identified as a potential impact in some instances.
Energy costs	If a BESS project is integrated into the local energy grid, it can help stabilise energy prices and potentially lead to cost savings for residents and businesses in the region. A BESS can store excess electricity during periods of low demand and low prices and discharge it during peak demand hours when electricity prices are higher. BESS projects also increase competition in energy markets which has the potential to place downward pressure on energy prices, thus benefiting residents and businesses.
Grid reliability & energy access	BESS projects can enhance the reliability of the local energy grid, reducing the frequency and duration of power outages. This can have significant socioeconomic benefits by preventing disruptions to businesses, healthcare facilities, and the broader community. In regions with unreliable or limited energy access, BESS projects can help ensure a more consistent power supply, benefiting households, schools, healthcare facilities, and local businesses.
Government revenue	Once complete and operational, the Project will generate additional municipal rate revenue for Council as it relates to the new use and capital improved value at the subject area.
Community fund	BESS projects often offer to provide a community fund associated with the operational phase of a facility. This typically takes the form of an annual payment that can be used to support local projects and programs.
Property values*	To date, there is limited research measuring the impact that proximity to major renewable energy projects has on surrounding property values. This includes the effect that visual amenity impacts caused by project has on surrounding residential property prices.[3]
Social impacts	Social impacts typically include the following:[4] ▪ Amenity impacts such as noise, visual and traffic; ▪ Community concerns around property rights and potential impacts to the natural environment, health and wellbeing. ▪ Increased pressure on local infrastructure and services due to cumulative demand from seasonal labour and major projects undertaken concurrently.

Source: Refer to footnotes. *Given the lack of research that is available, an assessment of this impact has been excluded.

[3] Analysis provided by Cogency, 2022

[4] Findings from case study analysis, Urban Enterprise, 2023

4.2.2. REVIEW OF TECHNICAL STUDIES

Several technical studies have been prepared for the Portland Energy Park that are relevant to the SEIA. Table 7 provides a summary of relevant findings relating to impacts during the project's lifecycle.

T7. KEY SOCIOECONOMIC IMPACTS, BATTERY ENERGY STORAGE SYSTEMS

Technical Study	Purpose	Findings

Bespoke Price And Energy Cost Savings Forecasts Pacific Green, Cornwall Insight Australia, November 2023	To model some of the energy market benefits that could occur if the Portland Energy Park is developed.	• The primary benefits to the energy market resulting from the proposal include:
		  o Lower wholesale prices to consumers, as the project acts to reduce wholesale energy costs in the market – discharging during peak pricing intervals by offering capacity at a lower cost than existing fossil fuel-based generators – specifically gas and liquid peaking plants
		  o Reducing overall carbon emissions levels, by displacing emissions-intensive fossil fuel-based generation capacity required to supply the grid during high-demand periods
		• Market modelling indicates reductions in wholesale energy costs of $6.67 billion between 2026-46 due to the installation of the Portland Energy Park, equal to a 3.8% reduction in total wholesale energy costs for the state.
		• The estimated value of the carbon emissions reduction for the project between 2026-20246 is $42.7 million.

Flora and Fauna Assessment, Nature Advisory, 2024	Investigate the existing native vegetation within and surrounding the subject site, and assess potential impacts from the proposal.	• The proposed development will result in the loss of a total extent of 2.163 hectares of native vegetation. • The current footprint will not have a significant impact on modelled habitat for any rare or threatened species. • Offsets (0.599 general habitat units) are required to compensate for the proposed removal of native vegetation from the study area.
Transport Impact Assessment, esr Transport Planning, 2024	Outlines the existing traffic conditions, and assesses the proposal's potential traffic generation and impact on the road network.	• Once operational, the site is expected to generate very low traffic activity that can be absorbed onto the local road network without significant impact to efficient operating conditions. • Based on anticipated numbers of construction staff, working hours, component delivery schedules and duration of construction activities over a 15-month period, 500-620 vehicle movements per day are expected at peak. • Construction traffic, or higher than anticipated additional traffic, can be absorbed by the local road network without significant impact to efficient traffic flow.
Flood Impact & Water Quality Assessment, Water Technology, 2024	Models and assesses the impact of the proposal on flood behaviour.	• The results indicate that the flood hazard for the proposal falls within the lowest vulnerability category during a 1% AEP event, making it generally safe for people, vehicles, and buildings. • Flood Impact Modelling found that the development of the Portland Energy Park would not cause worsened flooding off site.
Landscape and Visual Impact Assessment, Peter Haack Consulting, 2024	Provides a qualitative assessment of the landscape values of the site and its surrounding areas and evaluate the potential landscape and visual impact of the project on these existing values.	• The overall landscape impacts, or changes to the landscape, will align with what is permitted under the zoning regulations. • The visibility of the project is expected to be minimal due to the relatively low visual profile of many above-ground components. • The residual visual impacts on all sensitive viewpoints will gradually diminish to low or very low levels over time.
Noise Assessment, Marshall Day Acoustics, 2024	The Noise Assessment evaluates the risk of potential non-compliance, considering both operational noise from the project and cumulative noise from nearby commercial, industrial, and trade premises.	• The project is capable of being designed and operated such that Project related, and cumulative noise levels, are below the Noise Protocol noise limits. • Additional assessment for the project will be required to include construction noise and vibration, once a main contractor is appointed and specific equipment and work processes are known.
Cultural Heritage Management Plan, GML Heritage, 2024	Assesses the existing culturally significant and sensitive land within and surrounding the	• Some areas of elevated cultural heritage significance have been identified, which has generated concept design layout changes that avoid and minimise impacts to culturally sensitive areas of the Site.

	subject site and assess potential impacts from the proposal.	• The Cultural Heritage Management Plan (CMHP) must be approved prior to a decision being made on the planning permit application. The CHMP will include management conditions for cultural heritage.
Preliminary Hazard Assessment, Fire Risk Consultants, 2024	Analyses the fire safety risks associated with the project, to demonstrate that the fire risks have been assessed and can be managed throughout the project.	• The Preliminary Hazard Analysis of the project identified a low to moderate fire risk and confirmed that the project achieves an acceptable level of safety.

4.3. IMPACT FRAMEWORK

A socioeconomic impact framework has been prepared to outline and justify the suite of expected impacts that could arise from the proposal. For each impact, the main stakeholder groups and industries affected are identified.

For short term impacts, the economic benefits are expected over a finite period, and will not endure beyond the 2 year construction phase of the proposal.

For ongoing impacts, the economic benefits are expected to be delivered once the proposal is delivered and operational, and will incur either on an ongoing basis or over a long term horizon.

T8. ECONOMIC AND COMMUNITY BENEFIT FRAMEWORK

No.	Benefit/Impact	Rationale	Main stakeholders/ and industries affected
SHORT TERM			
1	**Economic stimulus: construction phase**	The direct investment to construct the BESS and associated infrastructure will stimulate the construction industry through additional output and jobs created during the construction phase.	Regional, state and national construction industry: civil trades, labourers, machinery operators, technicians.
2	**Amenity disruptions from construction activities**	Amenity impacts such as noise and traffic may arise from associated construction activities.	Local residents (proximate), passing travellers.
3	**Competition for labour force**	If major projects with high employment needs are delivered concurrent with Portland Energy Park, competition for labour force may increase and create tensions between major projects. Conversely, if there is adequate capacity, the local labour force will benefit from an increase in participation.	Local and regional labour force, major projects.
4	**Cumulative demand for housing, accommodation and services**	The importation of workers during the construction phase will create additional demand for local infrastructure and services such as commercial accommodation, rental housing, retail and hospitality. Increased retail and hospitality spending is recognised as a benefit to regional businesses. An insufficient availability of housing and accommodation may increase competition between residents, visitors and other temporary workers. Conversely, if there is adequate availability, local businesses will benefit from the short term uplift in demand.	Local businesses and local residents (housing only)
LONG TERM & ONGOING			
1	**Economic stimulus: Operational phase**	The operation and maintenance of the proposal will require direct expenditure and jobs, which will create flow-on indirect benefits to the economy.	Local and regional economy
2	**Agricultural value of grazing**	Currently, the subject site comprises minor cattle grazing activities. Under the proposal there is expected to be a reduction in the agricultural operations on-site. Due to the scale of the existing operations, the impact to regional production is likely to be insignificant.	Local and regional agriculture industry

3	**Amenity impacts**	Once built and operational, the physical infrastructure of the BESS has potential to create long term amenity impacts such as visual, noise and traffic. The scale of the impact typically depends on the significance of the environment affected, the potential to enact permanent change, and the extent of stakeholder groups that are impacted.	Local residents (proximate), passing travellers.
4	**Energy market impacts**	The proposal will reduce wholesale energy costs by offering capacity at a lower cost than existing fossil fuel-based generators during peak periods. There is also expected to be a reduction in overall carbon emission levels due to the displacement of emissions intensive fossil fuel based generation capacity.	Victorian residents and businesses
5	**Grid reliability & energy access**	The proposal will enhance the reliability of the local energy grid, reducing the frequency and duration of power outages. This will have significant socioeconomic benefits by preventing disruptions to residents, businesses, healthcare facilities, and the broader community.	Local residents and businesses
6	**Community funds**	The proponent will establish a community fund associated the operational phase of the facility. This will take the form of an annual payment that can be used to support local projects and programs that achieve positive community outcomes.	Local community

Source: Urban Enterprise, 2023

4.4. SOCIOECONOMIC IMPACTS

This section assesses and quantifies (where possible) economic impacts expected to be created by the Portland Energy Park. Impacts are assessed for the short term construction phase, and the ongoing phase (i.e. once the proposal is complete and operational).

This assessment adopts the input-output method of analysis (I-O). The I-O method is based on the interdependencies and relationship between industry sectors and is widely used across the public and private sector to estimate the direct and flow on economic impacts of a project or activity to an economy.

The Productivity Commission of Australia states that *"input-output tables can be used to compute output, employment and income multipliers. These multipliers take account of one form of interdependence between industries – that relating to the supply and use of products. The numbers add up the direct and indirect impacts of a change in final output of a designated industry on economic activity and employment across all industries in an economy."*

Definitions of economic terms can be found in the glossary of terms.

4.4.1. CONSTRUCTION PHASE (SHORT TERM)

During the construction phase, the following socioeconomic impacts are expected:

1. **Economic stimulus generated from construction investment.**
2. **Amenity disruptions from construction activities.**
3. **Competition for labour force.**
4. **Cumulative demand for housing and accommodation.**

1. ECONOMIC STIMULUS GENERATED FROM CONSTRUCTION INVESTMENT

The scale of economic impacts (jobs and investment) estimated during the construction phase of the proposal has been informed by:

- Construction investment and employment estimates provided by Pacific Green;
- Case study analysis of large-scale BESS projects across Australia (Appendix A); and

- Urban Enterprise's experience with similar scale renewable energy projects.

Based on these information sources, the proposal is estimated to generate:

- $3.9 billion in total economic output, including:
  - $1.50 billion in direct output; and
  - $2.4 billion in indirect output.
- 814 jobs (FTE), including:
  - 275 direct jobs; and
  - 539 indirect jobs.

These economic impacts are expected to endure over the 18-month construction period. Indirect impacts also account for flow-on expenditure from wage stimulus associated with labour imported from outside of Glenelg.

Not all of the direct jobs generated by the proposal will occur in Glenelg (and the broader region). A proportion of jobs from outside of the local and regional area will be required, given the specialised nature of skills (e.g. battery technicians).

The greatest opportunity for Glenelg businesses and workers to support the construction phase is through more general construction activities such as civil construction and site works, trade workers and labourers, machinery operators, transport and logistics.

T9. ECONOMIC IMPACTS, CONSTRUCTION PHASE

	Direct	Indirect	Total
Output ($M)	1,500	2,402	3,903
Jobs (FTE)	275	539	814

Source: Urban Enterprise, 2023

In addition to the above, Pacific Green estimate total planning/design phase expenditure in the order of $2.5 million across a 12 month period. This is made up of $2m for sub-station design and $0.5m across professional and technical services.

Pacific Green indicated that approximately 90% of spend will be incurred in Victoria. Further, an estimated $40,000 to $50,000 will be incurred within the township of Portland for goods and services such as surveying, fencing, planting, retail, hospitality and accommodation – a direct benefit to Portland's economy.

2. AMENITY DISRUPTIONS FROM CONSTRUCTION ACTIVITIES

Amenity impacts such as noise and traffic may arise from associated construction activities. The findings from the technical studies indicate the following:

- Construction traffic, or higher than anticipated additional traffic, can be absorbed by the local road network without significant impact to efficient traffic flow.
- The proposal is capable of being designed and operated such that project related, and cumulative noise levels, are below the Noise Protocol noise limits.
- Additional assessment for the proposal will be required to include construction noise and vibration, once a main contractor is appointed and specific equipment and work processes are known.

3. COMPETITION FOR CONSTRUCTION LABOUR FORCE

There is a strong base of local construction workers to draw from in the region. The construction industry is the fifth highest employing sector in the regional catchment, with close to 5,000 jobs (~8% of employed persons).

There are several renewable energy projects planned in the regional catchment. Projects in the region that may overlap with the construction phase of the Portland Energy Park are summarised in Table 10.

There is a level of uncertainty surrounding the timing of construction for these projects. Even if all projects were to be delivered as planned and overlap with the construction phase of the Portland Energy Park, the risk of labour force competition is low to moderate, given the smaller scale capacity of projects, and shorter construction timeframes.

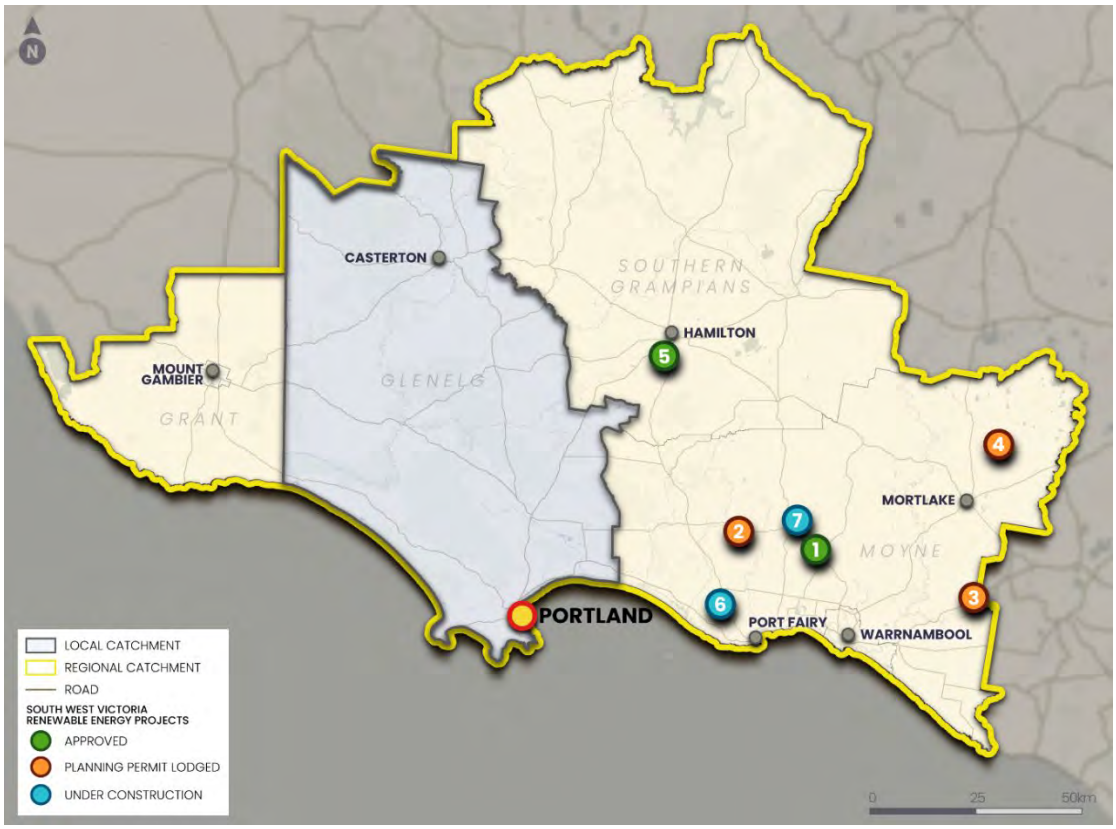
It should also be noted that offshore wind projects are slated to be developed in the Southern Ocean offshore wind area, off the coast of Portland. The State Government is targeting 3GW of capacity for this area by 2030. Construction for these projects is expected close to 2030 and will not compete with Portland Energy Park.

T10. SOUTH WEST VICTORIA RENEWABLE ENERGY PROJECTS

ID	Project name	Capacity (MW)*	Indicative location	Type	Status	Indicative Timeline
1	Woolsthorpe Wind Farm	72	Woolsthorpe	Wind	Approved	Construction approx. 10-12 months
2	Willatook Wind Farm	354	Willatook	Wind	Planning permit under consideration	N/A
3	Swansons Lane Wind Farm	39	Garvoc	Wind	Planning permit under consideration	Construction approx. 12 months
4	Mt Fyans Wind Farm	400	Mortlake	Wind	Planning permit under consideration	Fully operational by end of 2026.
5	Hamilton Solar Farm	5	Hamilton	Solar	Approved	N/A
6	Ryan Corner Wind Farm	218	Hamilton	Wind	Under Construction	Completion date estimated Feb 2024
7	Hawkesdale Wind Farm	96.6	Hawkesdale	Wind	Under Construction	Construction commenced Jan 2023

Source: Renewable Energy Projects Victoria (Department of Transport & Planning) compiled by Urban Enterprise, September 2023
*This represents the maximum capacity for the project, however, there is no guarantee this will be achieved

F10. SOUTH WEST VICTORIA RENEWABLE ENERGY PROJECTS



Source: Urban Enterprise, 2023

Victorian Battery Projects

Another labour force risk for the proposal is the potential overlap in construction periods for other large scale battery projects in Victoria. Given the specialised nature of some of the skills required for a BESS (e.g. battery installation technicians), any overlap with other major battery projects has the potential to increase competition for labour and could impact construction timeframes.

An audit of planned BESS projects in Victoria is summarised in Table 11. The analysis shows there are 17 battery projects planned across the state over the next five years. Seven projects have a maximum capacity of more than 250MW and thus are likely to be of a scale that could compete with the specialised workforce needs for the Portland Energy Park if there are conflicting timeframes.

This poses a potential risk to sourcing appropriate labour during the construction phase if there are timing conflicts with some of the larger projects.

T11. VICTORIAN BATTERY ENERGY STORAGE PROJECTS

Project name	Location	Max Capacity (MW)*	Status	Indicative Timeline
Melbourne Renewable Energy Hub (BESS)	Melton	1,200	Approved	Expected construction commencement in 2023, operational in 2024
Victorian Big Battery 2	Geelong	600	Approved	Construction will take 10 months
Wooreen BESS	Hazelwood North	350	Approved	Estimated to be operational by late 2026
Thomastown BESS	Thomastown	300	Approved	Project will commence in 2024 and be operational in 2026.
Gnarwarre BESS	Gnarwarre	250	Approved	Construction starts mid 2023
Pine Lodge BESS	Shepparton	250	Approved	Construction & Commissioning estimated by 2024
Glenbrae BESS	Glenbrae	250	Planning permit under consideration	N/A
Tyabb BESS	Tyabb	240	Approved	Construction will take 12 months, scheduled completion in 2025
Latrobe Valley BESS	Hazelwood North	200	Approved	N/A
Loy Yang A BESS	Traralgon	200	Approved	N/A
Rangebank BESS	Cranbourne	200	Approved	Operational in 2024/25
Elaine BESS	Mount Doran	200	Planning permit under consideration	N/A
Dalvui BESS	Terang	196	Approved	N/A
Terang BESS	Terang	100	Approved	Estimated Construction start in late 2023, works to take approximately 14 months
Bennetts Creek BESS	Hazelwood North	100	Planning permit under consideration	Construction to begin early 2024 and operational by late 2024
Longwarry BESS	Longwarry	5	Approved	N/A
Red Cliffs Terminal Station	Red Cliffs	0	Approved	N/A

Source: Renewable Energy Projects Victoria (Department of Transport & Planning) compiled by Urban Enterprise, September 2023
*This represents the maximum capacity for the project, however, there is uncertainty of ultimate capacity.

4. CUMULATIVE DEMAND FOR HOUSING, ACCOMMODATION AND SERVICES

The proposal is estimated to create demand for 275 direct jobs during the construction phase. A proportion of jobs from outside of the local and regional catchment will be required, given the specialised nature of skills.

The importation of workers during the construction phase will create additional demand for local infrastructure and services such as commercial accommodation, short term rental housing, retail and hospitality.

An uplift in demand alongside an insufficient availability of short term rental housing and commercial accommodation could increase competition in the market between residents, visitors and other temporary workers. Conversely, if there is adequate availability, the accommodation and housing market will benefit from the temporary uplift in demand.

The following housing and accommodation assessment confirms a highly competitive rental market across the regional impact area, with moderate capacity to serve rental tenure demand in the region.

Comparatively, the commercial accommodation sector shows an existing level of capacity, indicating that a temporary uplift in demand during the construction phase could benefit the accommodation sector.

Commercial Accommodation

To determine whether there is adequate commercial accommodation room capacity to serve worker demand, an audit and assessment of room supply relative to average room demand has been undertaken for the local and regional catchment areas (as specified in the socioeconomic profile).[5]

Analysis shows that the current occupancy rate for commercial accommodation in the local catchment is estimated at 62%, and 55% for the regional catchment. This suggests there is capacity to support additional overnight visitation within the region's commercial accommodation stock.

T12. EXISTING COMMERCIAL ACCOMMODATION ROOM SUPPLY & DEMAND 2022

	Description	Local	Regional
Total room demand	Total commercial accommodation room nights required to accommodate existing visitors	130,000	837,000
Total room supply	Total commercial accommodation room nights available.	210,000	1,520,000
Occupancy rate	Existing commercial accommodation occupancy rate.	62%	55%
Vacancy rate	Existing commercial accommodation vacancy rate.	38%	45%
Current available capacity	Additional commercial accommodation room nights available	40,000	341,000

Source: Urban Enterprise (refer to Appendix C for detailed sources and assumptions), 2023

The number of workers originating from the regional, state and national catchment is uncertain at this stage. Three scenarios for the proportion of imported labour during the construction phase of the proposal have been assessed to understand the impact on accommodation demand, and include:

- 20% of workers sourced from outside of the regional impact area;
- 30% of workers sourced from outside of the regional impact area; or
- 40% of workers sourced from outside of the regional impact area.

The results show that the proposal would generate demand for a substantial share (mid-point of 54%) of the local catchment's available accommodation room supply if all workers were based in Portland (and the surrounding area). However, if the regional catchment's commercial accommodation stock is added, the impact would be negligible (mid-point of 6%). This analysis suggests that the local commercial accommodation stock will be insufficient in accommodating workers during the construction phase, however, the broader regional catchment has the capacity to meet overflow demand, particularly in major regional centres such as Warrnambool and Mt Gambier.

[5] See Appendix C for further detail on catchment areas.

It should also be noted that this assessment does not consider the fluctuation in construction workers that are likely to be spread across the construction period.

Given the region's relatively low occupancy rate, the accommodation demand generated by workers is more likely to be an economic benefit to the region. This is particularly the case given that workers will generate weekday demand, which is typically an off-peak period.

T13. ACCOMMODATION IMPACT ASSESSMENT – IMPORTED LABOUR DURING CONSTRUCTION PHASE

	Local			Regional		
Total construction workers (Portland Energy park)	275					
Scenario	**Low**	**Base**	**High**	**Low**	**Base**	**High**
Proportion of workers imported from outside impact area	20% (55)	30% (83)	40% (110)	20% (55)	30% (83)	40% (110)
Worker accommodation demand (i.e. room nights)	14,300	21,450	28,600	14,300	21,450	28,600
Current available capacity (i.e. room nights)	39,694			340,891		
Proportion of available capacity	**36%**	**54%**	**72%**	**4%**	**6%**	**8%**

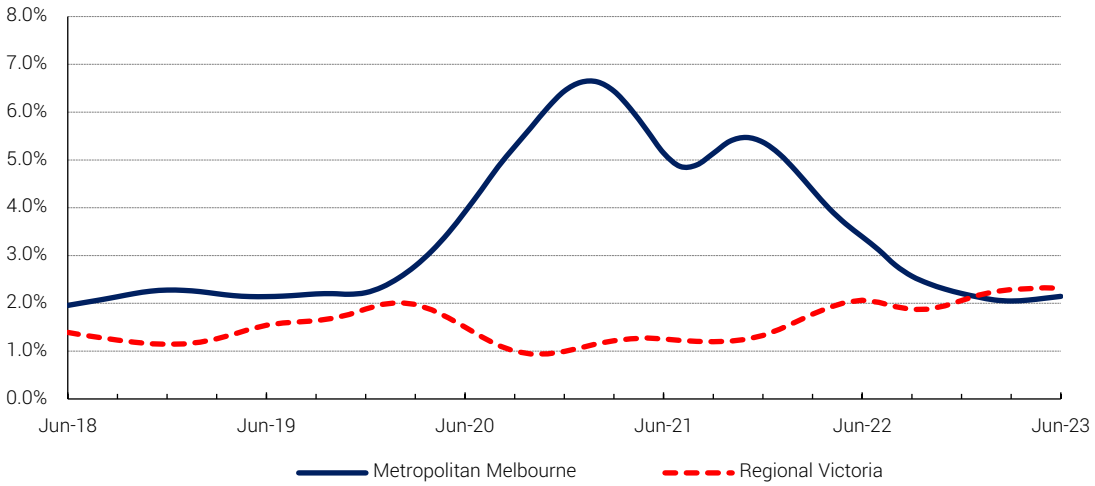
Source: Urban Enterprise (refer to Appendix C for detailed sources and assumptions), 2023

Rental Market

The overall rental market in regional Victoria is experiencing capacity issues, with vacancy rates at record low levels and in many places, a decline in the number of rental properties available.

Figure 11 shows the trend vacancy rate for rental properties in regional Victoria and metropolitan Melbourne over the past five years. The vacancy rate in regional Victoria in June 2023 was 2.3%, and has remained between 1% and 2.3% over the past five years.

F11. RENTAL VACANCY RATE, REGIONAL VICTORIA, 2018-2023



Source: Homes Victoria Rental Report, Department of Families, Fairness and Housing June 2023

The capacity of the rental market in the regional catchment is declining, with a lower number of rental properties available (compared with 1 and 5 years ago). This has placed upward pressure on rents.

Active bonds for each of the Victorian LGAs in the regional catchment as at June 2023 is shown in Table 14.[6]. Glenelg has over 1,000 active listings, more than Moyne and Southern Grampians, while over half of all listings are located in Warrnambool (3,017). Further analysis of post code level rental listings data (shown in Figure 11) indicates that permanent rental housing is scarce, with approximately 25 rental listings in the Portland area in October 2023.[7]

This analysis suggests that it will be challenging for workers to find a permanent rental property close to the project location– if seeking this type of tenure.

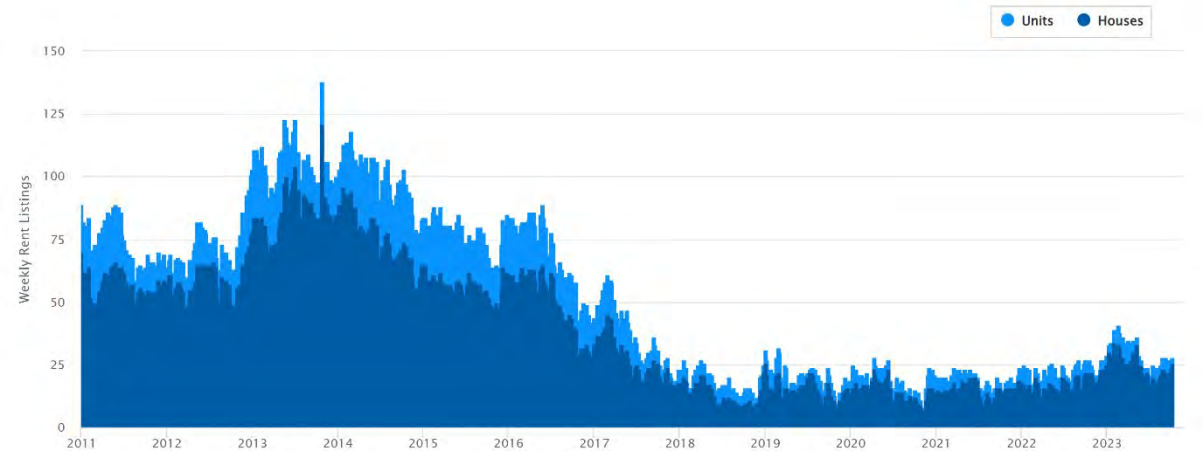
As previously mentioned, there are several renewable energy projects proposed across the region. If all projects were to be delivered as planned, the cumulative demand for housing and accommodation could present challenges for the region to service demand for both rental housing and commercial accommodation.

T14. RENTAL DATA – ACTIVE LISTINGS, JUNE 2023

LGA	Active Listings	Change (%)	
		1 year	5 years
Glenelg	1,056	-0.7%	-11.3%
Moyne	620	1.1%	-8.0%
Southern Grampians	830	-2.7%	-18.9%
Warrnambool	3,017	-1.1%	-10.8%
Total	**5,523**	NA	NA

Source: Homes Victoria Rental Report, June 2023

F12. RENTAL LISTINGS – POSTCODE 3305 (PORTLAND TOWNSHIP AND SURROUNDING AREA)



Source: SQM Research, 2023

[6] The number of active bonds provides an indicator of the total stock of rental housing, based on the total number of bonds held by the RTBA at a given point in time.

[7] Postcode area 3305

4.4.2. OPERATIONAL PHASE (ONGOING)

Once the proposal is complete and operational, the project could result in the following socioeconomic impacts.

1. **Ongoing economic impacts generated during the operational phase.**
2. **Loss of agricultural production value.**
3. **Permanent amenity impacts.**
4. **Energy market impacts.**
5. **Grid reliability and energy access.**
6. **Community funds.**

1. ONGOING ECONOMIC IMPACTS GENERATED DURING THE OPERATIONAL PHASE

Pacific Green estimates that operational expenditure will average in the order of $25 million per annum throughout the operational life of the proposal.

This level of investment is estimated to generate the following economic impacts:

- $60.4 million in total economic output per annum, including:
  - $25 million in direct output; and
  - $35.4 million in indirect output.
- 21 ongoing jobs (FTE), including:
  - 4 direct; and
  - 17 indirect.

T15. ECONOMIC IMPACTS, OPERATIONAL PHASE (ANNUAL)

	Direct	Indirect	Total
Output ($M)	$25.0	$35.4	$60.4
Jobs (FTE)	4	17	21

Source: Urban Enterprise, 2023

2. LOSS OF AGRICULTURAL PRODUCTION VALUE

The subject site is currently used for cattle grazing purposes, with current livestock numbers estimated between 50-75 head of cattle. Adopting industry standard value ratios, it is estimated that the current agricultural operations generate approximately $35,000 economic value per annum.

T16. EXISTING AGRICULTURE OPERATIONS

	Value
Current operations	50-75 head of cattle
Estimated value	$34,570

Source: Pacific Green/Urban Enterprise, 2023

Information provided by Pacific Green suggests that once operational, agricultural operations on-site will reduce by between 20-40%. This level of reduction translates to a reduction of $10,000 per annum, which is a marginal impact.

T17. AGRICULTURE IMPACT ASSESSMENT

	Impact (% reduction)	Impact Estimate
Scenario 1	20	-$6,914
Scenario 2	40	-$13,828
Baseline Scenario (mid-point)	30	-$10,371

Source: Urban Enterprise, 2023

3. AMENITY IMPACTS

Once built and operational, the physical infrastructure of the proposal may create long term amenity impacts such as visual, ecology and traffic.

The key findings from the technical studies are summarised below.

- The overall landscape impacts, or changes to the landscape, will align with what is permitted under the zoning regulations.
- The visibility of the proposal is expected to be minimal due to the relatively low visual profile of many above-ground components and the ability to screen the infrastructural using trees and vegetation.
- The residual visual impacts on all sensitive viewpoints will gradually diminish to low or very low levels over time.
- The current footprint will not have a significant impact on modelled or known habitat for any rare or threatened species.
- Once operational, the site is expected to generate very low traffic activity that can be absorbed onto the local road network without significant impact to efficient operating conditions.

Please refer to technical studies for detailed analysis and findings.

4. ENERGY MARKET IMPACTS

The proposal is expected reduce wholesale energy costs by offering capacity at a lower cost than existing fossil fuel-based generators during peak periods. Modelling undertaken for the proposal by Cornwall Insight Australia indicates reductions in wholesale energy costs of $6.67 billion between 2026-2046 due to the installation of the Portland Energy Park. This equates to a 3.8% reduction in total wholesale energy costs for the state of Victoria.

There is also expected to be a reduction in overall carbon emission levels due to the displacement of emissions intensive fossil fuel based generation capacity. Cornwall Insight has estimated the value of the emissions reduction for the project between 2026-20246 at $42.7 million.

Cornwall Insight's analysis suggests that the Portland Energy Park has the potential to generate substantial positive energy market impacts for Victorian residents and businesses.

5. GRID RELIABILITY & ENERGY ACCESS

The proposal will enhance the reliability of the local energy grid and the broader NEM through peak demand management and frequency regulation.

BESS projects can store excess electricity during periods of low demand and discharge it during peak demand periods. This helps to stabilise the grid by reducing strain during high-demand periods, preventing blackouts, and reducing the need for costly peaker plants. BESS projects can also respond rapidly to disturbances, helping to stabilise the grid after events like sudden load changes, equipment failures, or even natural disasters.

Grid frequency needs to be maintained within a narrow range for the system to operate reliably. BESS projects can respond quickly to frequency fluctuations, injecting or absorbing power to help keep the frequency stable. This ultimately reduces the frequency and duration of power outages.

6. COMMUNITY FUNDS

The proponent proposes to establish a community fund to support local projects and programs that deliver community benefits. The benefit amount paid to a community fund is typically based on the project's size (i.e. MW capacity) and the community's needs. The proponent will engage with community stakeholders in the future to determine the nature of the fund.

4.5. SUMMARY OF SOCIOECONOMIC IMPACTS

The socioeconomic impacts of the proposal during the construction and operational phase are summarised in Table 18.

T18. SOCIOECONOMIC IMPACT SUMMARY

No.	Impact	Economic Impact	Main stakeholders/ and industries affected
CONSTRUCTION PHASE (SHORT TERM)			
1	**Economic stimulus construction phase**	The estimated construction investment of $1.5 billion is estimated to generate a total economic output in the order of $3.9 billion (direct & indirect) and support 814 (FTE) jobs during the construction phase, including 275 direct jobs.	Regional and state construction industry: civil trades, labourers, machinery operators, technicians.
2	**Amenity disruptions from construction activities**	Amenity impacts such as noise and traffic may arise from associated construction activities. However, technical studies prepared as part of the development application suggest these impacts will be minimal, and will be appropriately managed.	Local residents (proximate).
3	**Competition for labour force**	There are several renewable energy projects planned in proximity to the development area and the broader region. Some of the jobs and skills required to deliver these projects, and anticipated timing of construction may overlap with the Portland Energy Park. The overlap has the potential to increase competition for local labour, and could lead to tensions and delays across projects.	Major projects planned in-region.
4	**Cumulative demand for housing and accommodation**	Some of the 275 construction workers will be sourced from outside of the region, and workers will require a mix of short and long term rental housing, and commercial accommodation. The regional catchment has adequate rental property and commercial room capacity to meet accommodation demand generated by the proposal's construction phase. However, if all renewable projects are delivered across the region (as planned), accommodating the cumulative housing needs could place temporary upward pressure on rents and commercial room rates.	Local businesses and local residents (housing only)
OPERATIONAL PHASE (LONG TERM & ONGOING)			
1	**Economic stimulus: Operational phase**	The ongoing operation of the BESS is estimated to generate $60 million in total economic output and support 21 (FTE) jobs per annum, which includes 4 direct jobs (FTE).	Local and regional economy
2	**Agricultural value of grazing**	There is expected to be a reduction in the value of agricultural operations at the subject area in the order of $10,000. This suggests the economic impact associated with a loss of agricultural production value is expected to be negligible.	Local and regional agriculture industry
3	**Amenity impacts**	Once built and operational, the physical infrastructure of the proposal may create long term amenity impacts such as visual, ecology and traffic. Technical studies prepared found that ongoing impacts will be minimal.	Local residents (proximate), passing travellers.

4		**Energy market impacts**	The proposal will reduce wholesale energy costs for Victorian residents by an estimated $6.67 billion between 2026 and 2046. There is also expected to be a reduction in overall carbon emission levels valued at $42.7 million over the first 20 years of operation.	Victorian residents and businesses
5		**Grid reliability & energy access**	The proposal will enhance the reliability of the local energy grid, and is expected to reduce the frequency and duration of power outages. This will provide benefits association with minimising disruptions of power outages to residents and businesses.	Local residents and businesses
6		**Community funds**	The proponent will establish a community fund associated with the operational phase of the facility. This will be used to support local projects and programs that achieve positive community outcomes.	Local community
7		**Municipal Revenue**	Council will receive revenue in the form of an annual charge associated with the new use and capital improved value of the subject area. The exact annual charge is unknown at this point, but the funds will be redirected for community benefit.	Glenelg Shire Council. Local economy and community

Source: Urban Enterprise, 2023

4.6. IMPACT EVALUATION

The significance of impacts are evaluated by considering the expected magnitude (low, moderate and high) and the likelihood of the impact occurring during the lifecycle of the proposal.

The following criteria has been used to assess the magnitude of impacts:

- Duration – The timeframe over which the impact occurs or the frequency of potential impacts.
- Extent – The geographical area or the range and number of stakeholders affected.
- Magnitude – Scale or degree of change from the existing condition as a result of the impact.
- Sensitivity – The extent to which people or an environment can adapt to or mitigate the impact.

The following categories have been used to assess the likelihood of impacts taking place:

- Highly Unlikely – High improbability that the impact will occur.
- Unlikely – An improbability that the impact will occur.
- Possible – moderate probability that the impact will occur.
- Likely – A good probability that the impact will occur.
- Highly Likely – A very high probability that the impact will occur.

Planned and recommended management measures have been included (where relevant) to optimise benefits and minimise negative impacts.

T19. CONSTRUCTION PHASE IMPACT EVALUATION & MANAGEMENT MEASURES

No.	Impact	Magnitude of Impact	Likelihood	Management measure(s)	Recommendations
1	**Economic stimulus construction phase**	Moderate	Likely	None identified.	Advocate for use of local suppliers (where possible).
2	**Amenity disruptions from construction activities**	Low	Likely	Provide regular updates and notifications about the project and potential disruptions to nearby landowners. Public community consultation sessions held in-region.	Refer to other technical studies for planned and recommended management measures relating to amenity impacts during the construction phase.
3	**Competition for labour force**	Moderate	Possible	None Identified.	Liaise with other renewable energy project proponents to discuss synergies with jobs and skills and potential for resource sharing (if required).
4	**Cumulative demand for housing and accommodation**	Low to moderate	Possible	None identified.	Engage with regional catchment LGAs, and relevant Chamber of Commerce/Business Associations to notify of impending accommodation requirements during the construction period.

Source: Urban Enterprise/Cogency, 2023

T20. OPERATIONAL PHASE IMPACT EVALUATION & MANAGEMENT MEASURES

No.	Impact	Magnitude of Impact	Likelihood	Management measure(s)	Recommendations
1	**Economic stimulus: Operational phase**	Low	Highly likely	None identified.	Advocate for use of local suppliers (where possible) using platforms such as the Industry Capability Network.
2	**Agricultural value of grazing**	Low	Highly likely	The land with the lowest agricultural and environmental value has been selected (and the development appropriately sited) to minimise disruptions to agricultural activities.	None.
3	**Amenity impacts**	Low	likely	Technical studies prepared to assess potential amenity impacts and recommend management measures. Public community consultation sessions held in-region	Refer to other technical studies for planned and recommended management measures relating to ongoing amenity impacts.
4	**Energy market impacts**	High	Highly likely	None identified	None.
5	**Grid reliability & energy access**	Moderate	Highly Likely	None identified.	None.
6	**Community funds**	Low	Likely	The proponent proposes to establish a community fund to support local projects and programs that deliver community benefits.	None.
7	**Municipal revenue**	Low	Highly Likely	N/A	None.

Source: Urban Enterprise/Cogency, 2023

APPENDICES

APPENDIX A CASE STUDY ANALYSIS, BATTERY STORAGE PROJECTS

Project	Location	Energy Capacity	Status	Construction impacts	Ongoing impacts
Hornsdale Power Reserve	Hornsdale, SA	100MW/129MWh & 50MW/64.5MWh expansion	Operational (retrospective)	$307.7m output total, including $71.1m in direct spend and $236.5m indirect spend (in SA, 50% of above in Yorke and Mid North Region)	$24.6m annually, including $6.6m direct spend and $18m indirect spend (90% in Yorke and Mid North region)
				1,056 total jobs, including 158 direct and 898 indirect jobs FTE	65 jobs total FTE, including 6 direct and 59 indirect
Victorian Big Battery 1 (Geelong)	Geelong	300MWh/450MWh	Operational	80 jobs	6 full time permanent jobs
Latrobe Valley BESS	Morwell, VIC	203MW/812MWh	Yet to be approved	$243m investment	7 direct and 20 indirect FTE jobs during operation
				150 direct and 240 indirect jobs FTE	*
Eraring Battery	Eraring, NSW	700MW/2800MWh	Approved 2022	Capital Investment $798.8m	Up to 10 operational jobs FTE
				Up to 128 construction jobs FTE	*
Greater Western Battery	Wallerawang, NSW	500MW/1000MWh	Yet to be approved	$400m project investment	5 to 6 ongoing jobs FTE
				Up to 250 construction jobs FTE	*
Wallerawang 9 Battery	Wallerawang, NSW	500MW/1000MWh	Approved 2022	$400m project investment	*
				100 construction FTE	Up to 5 jobs
Orana BESS	Wellington, NSW	400MW/1600MWh	Not yet approved	Capital Investment $800m	*
				100-150 FTE	1 FTE
Calala BESS	Calala, NSW	300MWh/450MWh	Yet to be approved	$400m project investment	10 FTE during operations
				150 FTE	
Templars BESS	Templars, SA	200MW/200MWh	Yet to be approved	181 FTE construction jobs	4 FTE ongoing
Daluvi BESS	Terang, VIC	196MW/392MWh	Approved	$243m investment	7 direct and 20 indirect FTE jobs during operation
				150 direct and 240 indirect jobs FTE	*

Source: various online sources | * information unavailable.

APPENDIX B CONSTRUCTION & OPERATIONAL ECONOMIC IMPACT ASSUMPTIONS

	Impact Assumption*	Source
Construction	275 direct construction jobs (adopt the mid-point of 250-300 job estimate provided)	Pacific Green, 2023
	$1.5 billion direct capital expenditure	Pacific Green, 2023
Operational	4 direct operational jobs (adopt the mid-point of 3-5 job estimate provided)	Pacific Green, 2023
	$25 million ongoing operational expenditure	Pacific Green, 2023

*It should be noted that impact estimates provided by Pacific Green generally align with the case study analysis and thus were adopted for the purposes of the impact assessment.

APPENDIX C COMMERCIAL ACCOMMODATION ASSUMPTIONS & METHODOLOGY

T21. ACCOMMODATION SUPPLY & DEMAND, LOCAL CATCHMENT

					Source
Demand					
Commercial accommodation visitors (2022): 95,728 Commercial accommodation visitor nights (2022): 260,244					National Visitor Survey, Tourism Research Australia
Average travel party size: 2					Urban Enterprise, 2023
Existing visitor market demand for commercial accommodation (i.e. number of room nights demanded in a year): 130,122					Urban Enterprise, 2023
Supply*					
	Units	Available Room Nights	Average visitors per unit	Capacity	Urban Enterprise, 2023
Rooms	287	104,755	2	209,510	

*Note the supply assessment was focused on the Portland township and surrounding areas thus some accommodation establishments outside the township may not be included in the analysis

T22. ACCOMMODATION SUPPLY & DEMAND, REGIONAL CATCHMENT

					Source
Demand					
Commercial accommodation visitors (2022): 670,342 Commercial accommodation visitor nights (2022): 1,673,237					National Visitor Survey, Tourism Research Australia
Average travel party size: 2					Urban Enterprise, 2023
Existing visitor market demand for commercial accommodation (i.e. number of room nights demanded in a year): 836,619					Urban Enterprise, 2023
Supply*					
	Units	Available Room Nights	Average visitors per unit	Capacity	Urban Enterprise, 2023
Rooms	2,080	759,200	2	1,518,400	

*Note the supply assessment was focused on the major townships within the region (Portland, Hamilton, Warrnambool, Port Fairy, Mount Gambier) thus some accommodation establishments may not be included in the analysis

www.urbanenterprise.com.au

Consultation Summary Report

Portland Energy Park

Madeira Packet Road

For Pacific Green Energy Park Portland Pty Ltd

18 December 2024

Pacific Green

cogency

Planning | Engagement | Strategy

Document Details

Portland Energy Park

Project No:	2234
Report Name:	Consultation Summary Report
Revision:	1
Date:	18 December 2024
Client:	Pacific Green Energy Park Portland Pty Ltd

This document has been prepared for, and for the exclusive use of, the client listed above and is subject to the terms of conditions between Cogency and the client. Cogency accepts no liability for any use of, or reliance upon, this document by any party other than the client.

Cogency Australia Pty Ltd
cogencyaustralia.com.au
office@cogencyaustralia.com.au

Document history

Revision	Date	Description	Author	Approved
1	19/08/2024	Draft Consultation Summary Report	AP	CH + RW
2	29/08/24	Final Consultation Summary Report	AP	CH + BG
3	16/12/2024	Updated Consultation Summary Report	CH	CH + BG

We celebrate the physical and spiritual connections between Indigenous people and place expressed through the Birrarung Wilam (Common Ground) art Project on the banks of Melbourne's Yarra River.

Acknowledgement of Country

Cogency acknowledges the Traditional Owners and Custodians of the land on which we meet, work and write, the Wurundjeri Woi-wurrung peoples of the Kulin nation, and their connections to land, sea, and community. We pay our respect to their Elders past and present and emerging.

Cogency also extends that respect and acknowledges the Traditional Custodians of Portland, the Gunditjmara. We recognise and respect their cultural heritage, beliefs and continuing connection with the land and waterways. We also recognise the resilience, strength, and pride of the Gunditjmara and First Nations communities and acknowledge that Sovereignty was never ceded.

Executive Summary

Pacific Green Energy Park Portland Pty Ltd (Pacific Green) (the Proponent) appointed Cogency Australia (Cogency) to prepare a Communications, Community and Stakeholder Engagement Plan and lead the engagement activities for the proposed development of the Portland Energy Park - a utility-scale Battery Energy Storage System (BESS) in Portland, Victoria, referred to as the 'Project.'

Pacific Green is committed to ensuring the community and stakeholders are proactively and meaningfully informed, consulted and involved in the planning and development of the Project, and that the benefits are genuinely felt by local people and businesses.

This Consultation Summary Report provides details of the engagement undertaken for the Portland Energy Park, from 2022 to 2024. This Report should be read in conjunction with the Project's Communications, Community and Stakeholder Engagement Plan (May 2023) and First Nations Engagement & Communications Plan (May 2023).

The three main phases of engagement throughout the lifecycle of the Project include:

- **Phase 1:** Early Feasibility and Design (completed)
- **Phase 2**: Pre-Application (completed)
- **Phase 3:** Post Application (completed).

The planning permit application is currently in its final stages of assessment by the Department of Transport and Planning. As such, all key engagement activities in Phase 3 have been completed. Overall, the engagement program to date has contributed to a generally positive community sentiment, with no objections to the planning permit application being received.

During all phases of the Project, the appropriate stakeholders were effectively informed, consulted and involved in the process based on the objectives and principles of community engagement best practices and guidelines.

By actively listening to stakeholders and addressing their concerns, the Proponent has aimed to enhance the benefits derived from the Portland Energy Park and minimise the impacts on neighbours, the community, and the local environment.

Consultation with stakeholders and the Portland community has enabled the Project team to make adjustments to various elements of the Project and conduct additional technical studies to identify and resolve any issues raised. A summary of the influence on the Project design has been provided in Chapter 7.

The Engagement Action Plan continues to be periodically updated to reflect the progress of the Project, incorporate community input, and address any emerging needs and issues.

Table of Contents

1. Project Overview **7**
1.1 Introduction 7
1.2 The Project 7
1.3 Engagement Objectives 7
2. Consultation Phases **8**
3. Communication Tools **9**
4. Consultation Activities **10**
4.1 Phase 1: Early Feasibility and Design Engagement 10
4.2 Phase 2: Pre-Application Engagement 13
4.3 Phase 3: Post-Lodgement Engagement 16
5. First Nations Engagement **17**
6. Next steps **18**
7. Influence on Project Design **19**
8. Conclusion **20**

Appendix A **Portland Energy Park website**
Appendix B **Project Flyer #1 (January 2024)**
Appendix C **Letter to Neighbour (11 January 2024)**
Appendix D **Community drop-in session advertisement**
Appendix E **Photos of community drop-in session (7 February 2024)**
Appendix F **Letter to Neighbour (3 July 2024)**
Appendix G **Project Flyer #2 and Factsheets (July 2024)**
Appendix H **Outline of key consultation dates with GMTOAC**
Appendix I **Letter to Neighbour (November 2024)**
Appendix J **Community drop-in session advertisement**
Appendix K **Photos of community drop-in session (7 November 2024)**
Appendix L **Project media and event coverage**

Table of Figures

Figure 1 – Pacific Green Managing Director & CEO, presenting at #UnionTown Conference 15

List of Tables

Table 1 – Early Feasibility Engagement Overview 10
Table 2 – Design Phase Engagement Overview 11
Table 3 – Pre-application Engagement Overview 14
Table 4 – Neighbour Interaction Summary 15
Table 5 – Post Lodgement Engagement Overview 16

Glossary

Abbreviation	Meaning
ABS	Australian Bureau of Statistics
AEMO	Australian Energy Market Operator
AMWU	Australian Manufacturing Workers' Union
BESS	Battery Energy Storage System
CEC	Clean Energy Council
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEECA	Department of Energy, Environment and Climate Action
DTP	Department of Transport and Planning
EPA	Environmental Protection Authority
ETU	Electrical Trade Union
EPBC	Environment Protection and Biodiversity Conservation
GMTOAC	Gunditj Mirring Traditional Owners Aboriginal Corporation
IAP2	International Association for Public Participation
LGA	Local Government Area
kV	kilovolt
MER	Monitoring, Evaluation and Reporting
MW	Megawatt
NEM	National Energy Market
O&M	Operations and Management
REZ	Renewable Energy Zone

1. Project Overview

1.1 Introduction

Cogency Australia Pty Ltd (Cogency), on behalf of Pacific Green Energy Park Portland Pty Ltd (Pacific Green), has prepared this Consultation Summary Report in relation to the proposed development of the Portland Energy Park – a utility-scale Battery Energy Storage System (BESS) in Portland, Victoria, hereby referred to as the 'Project'.

Community and stakeholder engagement is fundamental to delivering positive and effective outcomes for both renewable energy Projects and the local community. Evidence from across Australia and internationally has shown that effective engagement increases the likelihood of establishing and maintaining renewable energy facilities that bring the most mutual benefit to all stakeholders. Proactive, meaningful, inclusive, and robust engagement practices can therefore be seen as an investment in two outcomes: the future success of the renewable energy industry and strong communities.

This Report aims to provide an overview of the stakeholder and community consultation that has occurred and will continue to occur in the planning and development of the Project. To date, Pacific Green with the support of Cogency Australia has sought to ensure that the community and stakeholders are **proactively and meaningfully informed, consulted and involved** throughout the Project's lifecycle.

1.2 The Project

The Portland Energy Park is a significant new grid-scale BESS Project to be developed in Portland, in regional Victoria. It will deliver a major increase in energy storage capacity in the region, strengthening energy and price stability for households in Victoria, and supporting the state's net-zero transition.

The Project comprises a BESS with a capacity of 1GW / 2.5GWh, making it one of the largest battery storage Projects in Australia. The Project area covers approximately 38 hectares (ha) and includes four 250 MW battery 'parks', electricity switchyard infrastructure, transmission line connection into the existing high-voltage network, and associated infrastructure and works such as access tracks, benching, drainage and landscaping.

Once operational, the Portland Energy Park will provide critical energy storage and stability for the National Electricity Market (NEM) grid. By helping to store and manage energy generated from renewable energy sources, the proposed Project will support existing and proposed renewable energy Projects within Victoria's South West Renewable Energy Zone (SWREZ), while helping to strengthen energy supply and price stability for households across Victoria and support Victoria's energy transition.

1.3 Engagement Objectives

Pacific Green acknowledges that active and early engagement with the community and other relevant stakeholders is a crucial part of the planning process. It helps to foster greater understanding of and support for the Project, and to improve the design and development outcomes through the exchange of knowledge and information.

The Proponent is committed to delivering best practice engagement, with the overarching objective of ensuring that the identified community and stakeholder groups are proactively and meaningfully informed, consulted and involved and that the benefits of the Project are genuinely felt by the local community.

The communication and stakeholder engagement objectives are set out in the Communications, Community and Stakeholder Engagement Plan and have been met through the implementation of the Engagement Action Plan, guided by the Project's engagement principles.

2. Consultation Phases

An Engagement Action Plan for the Portland Energy Park engagement process was developed to encompass the entire Project lifecycle. The action plan was specifically tailored to the local and regional context of Portland, ensuring relevance and effectiveness. Each engagement phase was designed to facilitate information sharing and provide opportunities for diverse stakeholder participation to influence the design of the concept plan.

Three engagement phases were identified, with the primary objective being **to ensure early, proactive, and meaningful engagement** with key stakeholders and the local community. The Engagement Action Plan was structured to give ample time for interested parties to be informed and involved before the Planning Application is lodged.

2.1.1 Early Feasibility and Design

This phase comprised engaging with key process stakeholders to help with preliminary investigations and to garner support for and input to the Project at local, regional, and state levels. A Communications, Community and Stakeholder Engagement Plan was developed at this stage to help establish key engagement and approval objectives for the initial stages of the Project. Following this document, the Engagement Action Plan was established, outlining the key phases and activities for the Project.

This phase comprised of additional engagement with a wider range of local stakeholders as part of the early design and planning for the Planning Application. This phase was also used to introduce the Project to nearby neighbours and landowners to assist them in understanding the Project.

2.1.2 Pre-Application

This phase aimed to introduce the Project to the broader local community, assist them in understanding the issues, listen to their concerns and address those through design iterations.

Specialist consultants prepared technical assessments for the Project and the Planning Application package was finalised, ready for lodgement.

Periodic updates in relation to the Project were provided to the key stakeholders.

2.1.3 Post Lodgement

This phase aims to keep all stakeholders informed of the Project after it is lodged with the Responsible Authority for assessment.

The Project team will continue to involve the community and stakeholders in the planning and decision-making process, and further consultation will be conducted to ensure the Project is widely understood by the community and stakeholders.

Feedback on the Planning Application has been sought via:

- Verbally at a community drop-in session, meeting or telephone
- Written feedback via email, letter or formal submission
- Project update newsletter
- Feedback forms (hard copies received at the community sessions or e-forms online).

2.1.4 Ongoing Communication

To ensure that members of the public can access information about the Project and contact the Proponent if needed, the Pacific Green Australia website will remain open through construction and operation phases: https://www.pacificgreen.com/aus/contact/. The 'Contact Us' page on the website, as well as footers on all public collateral, includes the dedicated email address portland@pacificgreen.com to enable community members / stakeholders to contact Pacific Green throughout the project lifecycle, if desired.

3. Communication Tools

A wide range of communication tools ensured that the Portland community and stakeholders were effectively informed, consulted and involved in the Project, to reduce to the extent possible:

- The risk of conflict between community, stakeholders, and Pacific Green.
- Any intrusion and disruption to land uses.
- Potential impacts of energy infrastructure development.

Communication materials for the Portland Energy Park sought to be **objective, balanced and free from technical jargon**.

Given that there is a heightened level of community interest in new energy infrastructure and its relationship to renewable energy, the Project team sought to undertake an engagement approach that was personal and focused on consultation with referral authorities, surrounding businesses, landowners, neighbours and the local community potentially impacted.

This approach enabled a deeper level of stakeholder and community knowledge regarding the Project and greater awareness of the processes to which Pacific Green is committed to mitigate or manage potential impacts. Through this process, trust has been developed between the community and the Project team.

The focus of communications during Early Feasibility and Design and Pre-Application has been to seek input from the community about the Project and to adequately respond to and address enquiries and concerns in a timely manner.

Feedback was recorded through the Stakeholder Database and was used to inform the concept design and planning for the Project.

The communication tools that were used to implement the Engagement Action Plan are listed below:

- Stakeholder presentation and briefing pack
- Face-to-face and online meetings
- Contact phone and email address
- Project website and regular updates
- Technical fact sheets
- Letters of introduction
- Site visits
- Media releases and news articles
- Local media advertisement
- Community drop-in session
- Closing the loop communications

To date, these tools and activities have been used to provide timely and informative progress updates on the Project, as well as opportunities for the community and stakeholders to participate in the planning and design process.

4. Consultation Activities

An Engagement Action Plan was developed to cover the entire Project lifecycle. The implementation of the Engagement Action Plan has provided channels of information sharing and opportunities for a wide range of stakeholders to influence the development of the concept plan as reflected in Chapter 7.

The three main phases of engagement throughout the lifecycle of the Project include:

- **Phase 1:** Early Feasibility and Design (completed: November 2022 – May 2024)
- **Phase 2**: Pre-Application (completed: June 2024 – August 2024)
- **Phase 3:** Post Application (completed: September 2024 – December 2024).

The following sub-sections detail the activities undertaken in each phase. Chapter 5 specifically discusses engagement with Gunditj Mirring Traditional Owners Aboriginal Corporation (GMTOAC), as the Registered Aboriginal Party (RAP) representing the Gunditjmara.

4.1 Phase 1: Early Feasibility and Design Engagement

Engagement during early Feasibility and Design was undertaken from late 2022 until early 2024. This phase of engagement was critical to garnering support in the early stages of the Project, to identifying potential opportunities and constraints and receiving initial feedback.

4.1.1 Early feasibility

Engagement with key process stakeholders took place from late 2022 to the end of 2023. The key objectives of this phase were to engage with local and State authorities to obtain support in the Project's early stages and to seek initial feedback. During this phase, Cogency prepared a Communications, Community and Stakeholder Engagement Plan tailored to Portland's local and regional context. The local stakeholders and community groups were identified, along with the appropriate engagement activities to be undertaken as part of the Engagement Action Plan.

Table 1 – Early Feasibility Engagement Overview

Stakeholders Engaged	Communication and consultation undertaken
▪ Department of Transport and Planning (Planning Unit) ▪ Glenelg Shire Council (Planning and Engineering Units) ▪ Wannon Water (Development Services) ▪ Glenelg Hopkins Catchment Management Authority ▪ Australian Energy Market Operator (AEMO) ▪ Gunditj Mirring Traditional Owners Aboriginal Corporation (via GML Heritage)	▪ Face-to-face meetings ▪ Online meetings ▪ Formal briefings/presentations
Summary	
The initial briefings with key state and local stakeholders sought to provide an overview of the Project and discuss potential opportunities and constraints at a high level. The meetings provided insights into the requirements and approval process of an application for a large-scale battery.	

4.1.2 Design

Over the course of four weeks in January-February 2024, the Project was publicly announced. The announcement was supported by targeted stakeholder and community engagement and the team sought to monitor and respond to interest in the Project from local stakeholders.

4.1.3 Stakeholder Briefings

Preliminary design Project briefings consisting of face-to-face and online meetings were held with key process stakeholders including with local MPs, Glenelg Shire Council, the Mayor, Wannon Water, Committee of Portland and local unions ETU and AMWU. These Project briefings sought to introduce the Project and the Proponent to the key stakeholders and provide opportunities for initial feedback and input.

The initial meetings and discussions found stakeholders to be supportive of the Project and they generously provided insights from past energy Projects. These initial meetings provided insights that helped to understand the key opportunities and issues that could arise for the Project and how to manage these considerately. These meetings were also the first discussion in relation to opportunities and initiatives for a local Community Benefit Fund.

Table 2 – Design Phase Engagement Overview

Stakeholders engaged	Activities undertaken
▪ Local members ▪ Glenelg Shire Council (Executive team) ▪ Wannon Water ▪ Mayor of Portland ▪ Committee for Portland ▪ Local unions (AMWU, ETU, AWU) ▪ Nearby-neighbours ▪ Gunditj Mirring Traditional Owners Aboriginal Corporation (via GML Heritage)	▪ Face-to-face meetings ▪ Online meetings ▪ Formal briefings/presentations ▪ Letter of introduction ▪ Phone calls ▪ Community drop-in session

Summary of Design Engagement Activities			
Date	**Stakeholder**	**Activity**	**Consultation notes**
January 2024	**Roma Britnell Member for South West Coast (State)**	Online Briefing	▪ Project, context and Proponent overview ▪ Victorian storage needs, and economic development ▪ Management of noise impacts and fire risks ▪ Cultural heritage and other potential impacts ▪ Near-neighbour and local concerns.
January 2024	**Mayor of Glenelg Shire**	Face-to-face meeting	▪ Project, context and Proponent overview ▪ Community benefits for the whole shire ▪ Electricity price benefits ▪ Third parties that can support community fund ▪ Other local Projects ▪ Number of jobs (construction & ongoing) ▪ Project impacts including cultural heritage.
January 2024	**Glenelg Shire Council (Executive Team)**	Face-to-face meeting	▪ Project, context and Proponent overview ▪ Benefits and impacts Project could have for the smelter ▪ The importance of a good community engagement ▪ Potential Project impacts including sensitive receptors, noise, amenity and fire risks ▪ Industrial zoning support Project use ▪ Council assets including drainage and roads ▪ Experiences of other local Projects ▪ Local workforce.

January 2024	**Local Unions (AMWU and ETU)**	Face-to-face meeting	▪ Project, context and Proponent overview ▪ Alcoa operations ▪ Union support of renewable energy Projects ▪ Use of local businesses and contractors.
February 2024	**Committee for Portland**	Face-to-face meeting	▪ Project, context and Proponent overview ▪ Potential benefits of the Project ▪ SW TAFE skills/labour requirements ▪ Noise and fire risk considerations of the Project ▪ Past experiences with other major infrastructure Projects ▪ Ongoing dialogue related to local content provisions ▪ Number of jobs (construction & ongoing).
February 2024	**Dan Tehan, Member for Wannon (Federal)**	Online Briefing	▪ Project, context and Proponent overview ▪ Battery capacity relationship and potential impacts and benefits to smelter ▪ Insights from past community engagement ▪ Project impacts ▪ Community sentiment ▪ Number of jobs (construction & ongoing).
February 2024	**Wannon Water**	Face-to-face meeting	▪ Project, context and Proponent overview ▪ Overview of neighbouring assets ▪ Domestic water supply and sewer services ▪ Potential areas of interaction with Wannon Water ▪ Construction phase impacts ▪ Insights from past community engagement ▪ Noise and cumulative impacts ▪ Potential for landscape planning and revegetation.

4.1.4 Local Unions

Meetings with the Electrical Trade Union (ETU) and the Australian Manufacturing Workers' Union (AMWU) were held in January 2024. Key discussions were focussed on understanding the nature of the Alcoa smelter's operations and the potential relationship between the battery Project and the smelter.

Potential impacts and the key benefits of the Project on the smelter were highlighted. The union representatives expressed support for energy Projects in the region, expressing general support for the Project.

Opportunities for job creation and job safety, possibilities of local procurement of components for the battery energy storage system and community benefit-sharing options were discussed. The input provided by the unions assisted in further informing the Community Benefit Fund and options for job creation.

4.1.5 Neighbours

In January 2024, a letter was sent to surrounding and adjacent neighbours introducing them to the Project team and informing them of the Project. The letter included an invitation to arrange a one-on-one meeting and/or attend the forthcoming community drop-in session.

Of the 38 letters posted, only two neighbours contacted the Project team requesting further information about the Project. Several neighbours attended the information session seeking further details about the Project scale and impact on their properties.

In addition, Pacific Green was welcomed into the home of an immediate neighbour to discuss the Project in further detail. Following this meeting, preliminary designs were also shared with this neighbour to enable open and transparent dialogue on an ongoing basis.

4.1.6 Community Drop-In Session

A community drop-in session was held on Wednesday 7 February 2024 from 2:00pm to 7:00pm at the Portland Golf Club. This event was designed to provide the wider Portland community with an opportunity to meet the Project team, learn about the Project and to listen to their concerns.

During the four-hour session, 55 people attended, with the majority visiting in the first half of the event.

Overall, the feedback received from attendees was positive about the Project with a desire to understand more about the technical assessments. There was considerable curiosity about what an energy park was, how BESS technology works and where it would be in relation to other local infrastructure.

A few attendees were initially not supportive of the Project, relaying concerns about amenity impacts, property prices, broader energy issues, and anti-renewable energy sentiment. However, most attendees left the session informed and interested in understanding more about how the Project will manage acoustics, visual screening, and fire risks.

Around 20% of attendees either worked for or previously worked at the smelter. Local electricians and mechanic businesses were interested in understanding if there would be work opportunities related to the Project, throughout construction and operation.

Fire management, transmission line placement, acoustic impacts and decommissioning were raised by multiple people and the Project team assured them that there would be further communication about these aspects once technical assessments were completed.

The Project team sent a ‘closing the loop’ email and text message to the session attendees thanking them for their time and reassuring them that there would be information provided as the technical investigation and design progresses.

4.2 Phase 2: Pre-Application Engagement

The pre-application engagement commenced in June 2024 and was completed in August 2024. This phase aimed at reintroducing the Project with more technical information, providing periodic updates to the key process stakeholders previously engaged and continuing discussions with neighbouring properties.

Where needed, the Project was introduced to new stakeholders and any other interested parties. This stage was designed to ensure that any questions or concerns regarding the refined design of the Project could be considered with ample time before the lodgement of the Planning Application.

4.2.1 Project Update Briefings

Pre-application meetings were held with Wannon Water, Glenelg Shire Council, the Committee for Portland and the Local MPs to provide timely updates on the Project’s progress since February 2024. These included updates regarding:

- Project design updates.
- Technical matters including noise, grid and water connection, cumulative impacts
- Potential economic impacts including local procurement
- Community benefit sharing options
- Development and construction timeframes

The Project briefings with key stakeholders illustrated the positive reception and general support of the Project. They also highlighted stakeholders' eagerness to collaborate on various technical aspects of the Project and to develop a robust and impactful community benefit fund.

Table 3 – Pre-application Engagement Overview

Stakeholders engaged	Activities undertaken
▪ Glenelg Shire Council (Planning and Engineering Units) ▪ Wannon Water (Development Services) ▪ Local members ▪ Committee of Portland ▪ Near neighbours ▪ Gunditj Mirring Traditional Owners Aboriginal Corporation (via GML Heritage)	▪ Face-to-face meetings ▪ Online meetings ▪ Briefings/presentations ▪ Second Project letter ▪ Phone calls ▪ Website updates including fact sheets and supplier portal created

Summary of Pre-application Engagement Activities

Date	Stakeholder	Activity	Key Details
July 2024	**Wannon Water**	Face-to-face meeting	▪ Provided updates on Project design refinement ▪ Water and sewage connection accessibility ▪ Construction requirements and potential impacts ▪ Community benefit schemes that also contribute to a regional pool to support major Projects ▪ Noise protocols
July 2024	**Glenelg Shire Council, Mayor, Councillors, Vic Gov Monitor**	Face-to-face meeting	▪ Provided updates on Project design refinement ▪ Technical matters including drainage impacts, noise generation and limits, and the function of the battery ▪ Economic benefits of the Project for Portland and the wider region ▪ Community benefit-sharing options and input into Community Benefit Fund structure
July 2024	**Roma Britnell Member for South West Coast (State)**	Online	▪ Provided updates on Project design refinement ▪ Amenity impacts of BESS ▪ Other Pacific Green UK Projects ▪ Engagement approach
July 2024	**Committee for Portland**	Face-to-face meeting	▪ Provided updates on Project design refinement ▪ Construction timeframes and requirements ▪ Community engagement approach ▪ Local content and contracts ▪ Community Benefit Fund
July 2024	**Dan Tehan, Member for Wannon (Federal)**	Online	▪ Provided updates on Project design refinement ▪ Commercial aspects of the Project

4.2.2 Neighbours

In early July 2024, a second letter was sent to neighbours, reintroducing the Project and informing them that the Project team wished to share the updated concept design in greater detail. The correspondence included an invitation to arrange a one-on-one meeting, either in person or online.

Out of the 38 letters sent, only three neighbours reached out for more information. Consequently, further meetings were proposed with these neighbours to discuss the Project in greater detail post-lodgement.

Table 4 – Neighbour Interaction Summary

Summary of Pre-application Engagement Activities			
Date	Stakeholder	Activity	Key Details
July 2024	**Neighbour**	Phone calls Fact sheets posted	Neighbour called and left a message. Project team called him back to understand his concerns related to the location and technology. This neighbour said they didn't have access to the internet, so the project team sent them a printed set of project factsheets for further information and confirmed receipt of the registered post. No further correspondence has been exchanged.
July 2024	**Neighbour**	Phone call / Emails	Initial phone call received detailing concerns regarding the audio impact the project may have on surrounding properties. Phone call follow up from project team to discuss concerns further. Follow up email sent including Fact sheets and flyer. Within email and phone call the offer of a face-to-face meeting with Managing Director was detailed. No response received so another follow up email was sent.
July 2024	**Neighbour**	Face-to-face meeting	Pacific Green's Managing Director & CEO met the same neighbour from Phase 1 again in Portland, to provide an update to the Project, including key considerations such as noise and visual impact. These updates were positively received and appreciated. Communication with this neighbour will continue on an ongoing and frequent basis.
July 2024	**Neighbour**		Email of support from a member of the community thanking the project team for the amount of project information provided to date and for being so considerate. The project team replied, detailing our appreciation for this feedback and encouraged the community member to get in touch with the team once again should they have any further feedback, questions or queries.

4.2.3 Union Conference

The South-West Trades and Labour Council invited Pacific Green to join the #Uniontown Conference 2024, bringing together union members from across Victoria, New South Wales and South Australia.

Pacific Green's Managing Director & CEO attended in person and presented the Project to the Union Town 2024 Conference (22 and 23 August 2024) to build trust and connection with the local workforce. He spoke about the Project's planned supplier networking event later in 2024 and overall timelines with construction planned to commence in 2025. He encouraged all attendees and their relevant members to register their interest within the supplier portal for the supplier networking event. He communicated Pacific Green's ambition to be transparent in its approach to developing the procurement framework and sought feedback for union involvement on an ongoing basis. The Limestone Coast Project was also discussed to build confidence in Pacific Green.

Figure 1 – Pacific Green Managing Director & CEO, presenting at #UnionTown Conference

Subsequent to the event, Assistant Secretary South-West Trades and Labour Council sent the following: "Thank you for your participation in the #Uniontown conference in Portland. The update on the project was very well received by attendees. When you need contact details for groundworks, maritime and then construction, please contact me and I can forward this information if you haven't already got this. Keep

sending us updates on progress and we can help with lining up work crews and companies as the project moves towards its start date."

4.3 Phase 3: Post-Lodgement Engagement

This phase of engagement commenced from lodgement of the planning permit application in September 2024. While the Project was undergoing assessment for statutory approval, the Proponent and the Project team continued to engage with the local community, neighbouring residents and other key stakeholders.

The Proponent, with the support of Cogency, **remains committed to proactive, and meaningful engagement** with the local community and stakeholders, which has started from the preliminary concept design phase.

4.3.1 Neighbours

In November 2024, a letter was sent to surrounding and adjacent neighbours (the same catchment as the first-phase mailout) to inform them of the planning permit application lodgement and invite them to arrange a one-on-one meeting and/or attend the forthcoming community drop-in session.

Of the 38 letters posted, no neighbours contacted the team requesting further information about the Project. Only one neighbour attended the information session seeking further details about vegetation screens, visual amenity and options for land acquisition.

4.3.2 Community Drop-In Session

A community drop-in session was held on Thursday 7 November 2024 from 2:00pm to 6:00pm at the Portland Golf Club. This event was designed to provide the wider Portland community with an opportunity to update and inform stakeholders and the community regarding the Planning Application and associated technical assessments.

The session was advertised in the Portland Observer over two weeks in the lead up to the event and stakeholders were invited by email to attend.

During the four-hour session, six people attended the session, including representatives for the Australian Manufacturing Workers Union and South West Trades & Labour Council, a local journalist, a nearby neighbour of the project and two local construction businesses seeking to understand the procurement process, should the project received planning approval.

Overall, the feedback received from attendees was positive about the Project with a desire to understand the timing and procurement process, should the project receive planning approval. There were also requests for early planting around the site to establish vegetation as early as possible. Some attendees asked questions about the fire management plan, construction timelines, local procurement opportunities, Limestone Coast Energy Park program details and liability issues.

Table 5 – Post Lodgement Engagement Overview

Stakeholders engaged	Activities undertaken
▪ Portland community ▪ Wannon Water ▪ Glenelg Shire Council ▪ Gunditj Mirring Traditional Owners Aboriginal Corporation ▪ Committee of Portland ▪ Local Members of Parliament ▪ Department of Climate Change, Energy, the Environment and Water (DCCEEW) ▪ Department of Transport and Planning (Planning Unit)	▪ Letter to neighbours notifying them of the planning permit application lodgement ▪ Newspaper advertisements promoting community drop-in session (four editions in weeks prior) ▪ A second community drop-in session ▪ Provision of updated factsheets ▪ Website updates ▪ Provision of updated concept plans ▪ Meetings as requested to inform, consult, or involve the interested or concerned local community and stakeholder groups.

5. First Nations Engagement

Pacific Green has sought to proactively engage with GMTOAC, as the representative of the Traditional Owners of the area of the Project, to build a positive relationship. Engagement will continue throughout the project's lifecycle. Pacific Green believe that the Project can respect Nyamat Mirring (Sea Country) and cultural heritage, as well as provide economic and social benefits to Traditional Owners.

For the duration of the CHMP process engagement activities have necessarily been driven by that statutory process. Heritage consultancy GML Heritage has been the primary liaison point between the Project team and GMTOAC throughout all engagement phases, from July 2023 to December 2024. GML Heritage has held over 20 meetings/points of contact in relation to the Cultural Heritage Management Plan (CHMP) Assessment and Conditions on site, in face-to-face meetings and online. A full summary of consultation dates with GMTOAC is shown in Appendix H. Pacific Green and other Project Team members have often been directly involved in these meetings.

Engagement with GMTOAC is delivering upon the legislative requirements of the *Aboriginal Heritage Act 2006*, requiring a Cultural Heritage Management Plan (CHMP) to be prepared, in order to understand and manage cultural heritage. However, outside this statutory engagement process, Pacific Green are actively seeking other opportunities to support and collaborate with GMTOAC.

Key steps in the CHMP and GMTOAC engagement process include:

- September 2023: the CHMP 'Inception meeting', introducing all parties and discussing the Project. The preliminary designs were shared and the potential ground disturbances discussed. Initial feedback was provided regarding potentially sensitive areas on the Site.
- 17 October 2023: GMTOAC staff accompanied the consultant team for a site walkover survey (standard assessment). This discussed the sensitive dune rises and prompted complex site assessments.
- *Redesign of project layout to avoid elevated areas of the sensitive dune rises.*
- 14 December 2023: GMTOAC wrote a letter of support to the Australian Energy Market Operator (AEMO), outlining and supporting Pacific Green's intent to avoid dune rises of significance (that necessitated design changes to substation assets).
- February-May 2024: Complex site testing excavations.
- February 2024: Design plan updates and testing methodology changes.
- June 2024: Ground disturbance mapping and discussions on subsurface impacts, including discussions on Complex testing results. This has affirmed the design layout approach.
- August 2024: 'Footings plan' provided and discussed, to illustrate works that would penetrate deeper below natural ground level.
- *Detailed construction methodology review to minimise deep earth disturbance. Changes in collector station design from deep footings to shallow slabs significantly reduces impacts.*
- November 2024: Updated design and construction documentation discussed, with positive feedback from GMTOAC.
- December 2024: CHMP to be submitted to GMTOAC for decision once Artefact Registration is complete.

Overall, the open and two-way communication has allowed layout changes to avoid and minimise impacts to culturally sensitive areas of the Site. This engagement has been viewed positively by GMTOAC and improved project outcomes. Pacific Green is committed to further collaborative engagement with GMTOAC, beyond the CHMP statutory process.

6. Next steps

As the application continues to undergo state and commonwealth planning and environmental approvals, the project team will continue to refine the Pacific Green Portland Community Benefit Fund application process and timeframes.

In addition, Pacific Green will host a Supplier Information Session in 2025 to update local businesses and community members about employment opportunities prior to the construction phase. In preparation for this session, a supplier portal has been developed on the Pacific Green website to enable local businesses to register their interest for this session and to lodge their business details as part of the BoP engagement process.

Notably, GMTOAC and GML have asked Pacific Green to co-present at the Victorian Archaeology Colloquium in February 2025. The proposed presentation will highlight the project team's CHMP work in Portland with GMTOAC as a best-practice case study in successfully working with RAP groups to balance protection of cultural heritage with development and changes in land use. Separately, Pacific Green will continue to build its relationship with GMTOAC through ongoing, proactive and respectful engagement, including on broader support and collaboration opportunities.

7. Influence on Project Design

As a result of the consultation and engagement activities completed to date, several changes have been made to the concept design in direct response to issues or concerns raised.

Key changes and alterations to the concept plan include:

- The southern area of the site has been avoided to protect the habitat for the Blue Winged Parrot.
- Key infrastructure has been placed, where possible, away from the nearest dwellings to minimise noise and visual impacts. Most notably, on the North Site, all infrastructure has been placed at the southern extent of the property, away from the general residential zoned land.
- The siting and design of the Project, including adequate benching and drainage ponds, has addressed drainage issues raised by Wannon Water and Glenelg Shire Council.
- Following extensive consultation with GMTOAC and site investigations, an 'area of avoidance' was identified, comprising the culturally sensitive dune rises. These areas of Aboriginal cultural heritage sensitivity have been protected from development.
- A landscape concept plan, entailing vegetation screening, has been developed to minimise views over the site as well as improve the visual amenity of the Project and adjacent streetscape.
- Acoustics measures such as equipment selection and layout have been incorporated into the Project to minimise noise impacts on surrounding sensitive receptors.

Based on the consultation to date, the Project team has also refined its local content provisions for construction and operation to ensure that Portland businesses will be positioned to work on the Project. A supplier portal is to be launched on the Portland Energy Park website to facilitate this opportunity.

8. Conclusion

The Portland Energy Park presents an opportunity to increase energy storage capacity in Victoria, thereby strengthening grid and price stability for Victorian households and supporting the state's net-zero transition.

From the outset of planning and development, the Proponent, Pacific Green, has been dedicated to fostering and sustaining respectful relationships with the local community, businesses, all levels of government, Traditional Owners of the land, and other stakeholders. This has been made evident through the Proponent's commitment to preliminary and ongoing engagement with key stakeholders (such as nearby neighbours, Wannon Water, Glenelg Shire Council, Gunditj Mirring Traditional Owners Aboriginal Corporation and local unions).

As demonstrated within this report, the Proponent has remained committed to proactive and meaningful engagement at every critical stage of the Project. This approach has helped facilitate open and honest dialogue with key stakeholders and the broader community. Key considerations in the design process included the Project's proximity to sensitive receptors, visual amenity and noise impacts of the Project, drainage issues, along with considerations of Aboriginal cultural heritage sensitivity, biodiversity values and fire risks.

By actively listening to stakeholders and addressing their concerns, the Proponent has successfully incorporated feedback into the Project's design, aiming to further minimise any potential impacts on landowners, the community, cultural heritage and the local environment. Importantly, due to the early and meaningful engagement with GMTOAC (including cultural heritage investigation process), the concept layout was able to be significantly reworked during the feasibility phase to avoid areas of cultural heritage significance on the Site.

While aiming to minimise the potential impacts of the Project, the Proponent has also strived to maximise the benefits for the local community. Through the comprehensive engagement process, the Proponent has developed a deep understanding of the key opportunities and challenges associated with the Project, and how to manage these thoughtfully. These insights have also helped to identify initiatives related to the creation of a Community Benefit Fund which will continue to evolve as the Project progresses through its approval stages.

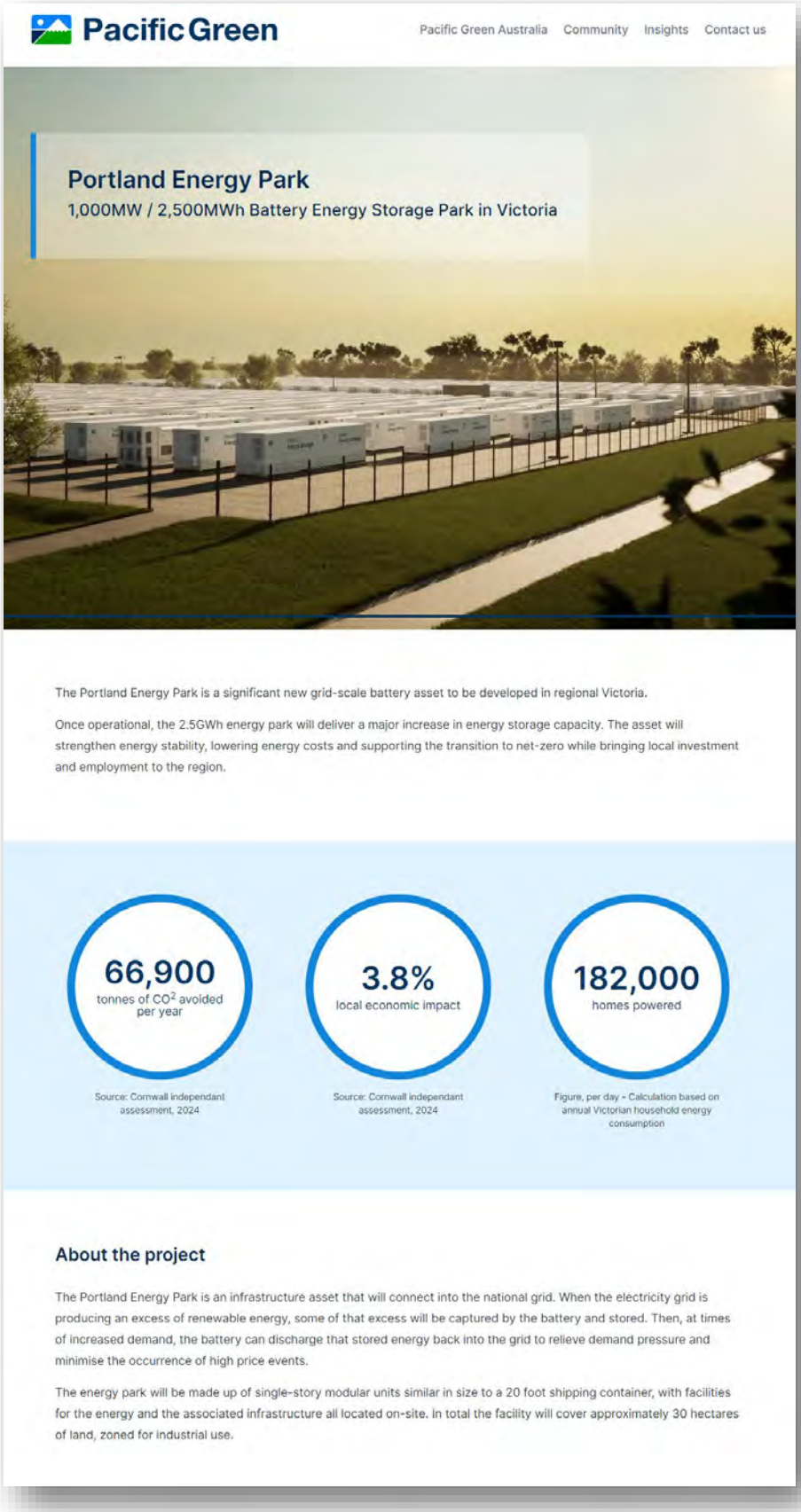
Looking ahead, Pacific Green, with the support of Cogency, remains committed to fostering strong relationships with key stakeholders and the local Portland community. The Proponent plans to maintain open lines of communication by actively engaging with the Portland community members through a Supplier Information Session in 2025 and the ongoing development of the Pacific Green Portland Community Benefit Fund.

This continued engagement highlights the Proponent's dedication to maintaining respectful and ongoing relationships, ensuring that the community's voices are heard, and their needs are addressed throughout the Project's lifecycle and beyond.

Appendices

Appendix A	Portland Energy Park website
Appendix B	Project Flyer #1 (January 2024)
Appendix C	Letter to Neighbour (11 January 2024)
Appendix D	Community drop-in session advertisement
Appendix E	Photos of community drop-in session (7 February 2024)
Appendix F	Letter to Neighbour (3 July 2024)
Appendix G	Project Flyer #2 and Factsheets (July 2024)
Appendix H	Outline of key consultation dates with GMTOAC
Appendix I	Letter to Neighbour (November 2024)
Appendix J	Community drop-in session advertisement
Appendix K	Photos of community drop-in session (7 November 2024)
Appendix L	Project media and event coverage

Appendix A Portland Energy Park website



Pacific Green

Pacific Green Australia Community Insights Contact us

Portland Energy Park

1,000MW / 2,500MWh Battery Energy Storage Park in Victoria

The Portland Energy Park is a significant new grid-scale battery asset to be developed in regional Victoria.

Once operational, the 2.5GWh energy park will deliver a major increase in energy storage capacity. The asset will strengthen energy stability, lowering energy costs and supporting the transition to net-zero while bringing local investment and employment to the region.

66,900
tonnes of CO^2 avoided per year

Source: Cornwall independant assessment, 2024

3.8%
local economic impact

Source: Cornwall independant assessment, 2024

182,000
homes powered

Figure, per day - Calculation based on annual Victorian household energy consumption

About the project

The Portland Energy Park is an infrastructure asset that will connect into the national grid. When the electricity grid is producing an excess of renewable energy, some of that excess will be captured by the battery and stored. Then, at times of increased demand, the battery can discharge that stored energy back into the grid to relieve demand pressure and minimise the occurrence of high price events.

The energy park will be made up of single-story modular units similar in size to a 20 foot shipping container, with facilities for the energy and the associated infrastructure all located on-site. In total the facility will cover approximately 30 hectares of land, zoned for industrial use.

(preview continued overpage. See https://www.pacificgreen.com/aus/Projects/portland/)

Location

Strategically positioned within the industrial zoned area on Madeira Packet Road, the Portland Energy Park is in close proximity to the Portland Aluminium Smelter and the Portland Water Treatment Plant, enabling the asset to seamlessly co-exist with the existing electrical infrastructure positioned nearby.

The asset location also provides direct access to the State's principle road network and can integrate directly into the existing transmission infrastructure positioned within the northern extent of the site.

Timeline

The Portland Energy Park is currently going through its regulatory approval process. As part of this process, we are seeking to finalise the concept design, informed by preliminary research and technical studies. Pacific Green has completed a range of assessments and studies to ensure the project minimises any impacts during construction and operation. Our next steps include compiling this into a planning permit application.

For further information on the project and to keep up to date with its progress, please click here to sign up for our community updates.

Technical assessments

Large-scale battery energy storage system projects require a planning permit approval from the Minister for Planning. A planning approval determines the appropriateness of the proposed land use and development to its location, considering its context, physical environment and ability to meet other technical criteria.

To support this process, a large range of technical, environmental, and operational assessments have been undertaken. This will ensure the project minimises and manages any potential impacts and meets or exceeds all statutory requirements.

- Project Approvals
- Cultural Heritage
- Landscape & Visual Impact
- Noise
- Hydrology
- Design & Engineering
- Boidiversity
- Traffic Impact
- Fire & Safety Management

In addition to the assessments above, Pacific Green has a close working relationship with Gunditj Mirring Traditional Owners Aboriginal Corporation (GMTOAC) to ensure successful management of Cultural Heritage elements. Through this relationship we have gathered valuable advice that has shaped the proposal design of the Portland Energy Park. We value this relationship and look forward to our ongoing discussions.

Appendix B Project Flyer #1 (January 2024)

Pacific Green

The Portland Energy Park

The Portland Energy Park is a major new grid-scale battery project to be developed in Victoria.

Once operational, the 2.5GWh energy park will provide critical support for existing and proposed renewable energy projects within the Southwest Renewable Energy Zone, and large electricity users and energy generation facilities in the area.

The Portland Energy Park is located within the industrial zone of Madeira Packet Road, close to the Portland Aluminium smelter and Wannon Water facilities.

Our community commitment

Pacific Green is dedicated to creating a cleaner environment for our communities. We do this by delivering innovative energy storage solutions that enable Australia's net-zero transition. We also partner with communities where we deliver projects to develop wider social value beyond our core business.

Scan the QR code to visit the project website: **portland.energypark.au**

About the project

The Portland Energy Park will deliver a major increase in energy storage capacity in Victoria, strengthening the region's energy stability and supporting its net-zero transition.

The park is not linked to any current or planned renewable energy projects but will connect into the national grid. When the electricity grid is producing an excess of renewable energy, some of that excess will be captured by the battery and stored. Then, at times of increased demand, the battery can discharge that stored energy back into the grid to relieve demand pressure and minimise the occurrence of high price events.

Location

Strategically positioned within the industrial zoned area on Madeira Packet Road, the Portland Energy Park is in close proximity to the Portland Aluminium smelter and the Portland Water Treatment Plant. The Energy Park will seamlessly integrate with the existing electrical infrastructure, which is currently positioned across the proposed project location.

Timeline

The Portland Energy Park is currently going through its regulatory approval process. As part of this, the company is completing a range of plans and studies to ensure the project minimises any impacts, these include biodiversity, hydrogeological, noise, landscape and visual impact assessments; and the development of risk assessment and management plans linked to safety and fire. A cultural heritage management plan is also being developed. The energy park is scheduled to be constructed in the first half of 2025.

During the construction phase several employment and contracting opportunities will be available and we will aim to engage local contractors, suppliers and businesses where possible.

For further information on the project and to keep up to date with its progress, please visit portland.energypark.au where you can also register for our community updates.

Pacific Green

enquiries@energypark.au

About Pacific Green

At Pacific Green we specialise in delivering grid-scale smart energy storage solutions from greenfield to operation and we are proud of our record in delivering safe, cutting edge energy storage solutions which are benefitting people and the planet.

Appendix C Letter to Neighbour (11 January 2024)

The name of the residents has been removed from the letter provided below.

Pacific Green

11 January 2024

Address

Portland VIC 3309

Dear Resident

Pacific Green Technologies Inc. ("Pacific Green") is in the early design and planning stages of a proposal for a large-scale battery in Portland. We are writing to inform you about the project, offer an in-person meeting to discuss it further and invite you to our upcoming Community Drop-in Session.

The Portland Energy Park would deliver a major increase in energy storage capacity for Victoria, strengthening the region's grid stability, which will help keep energy costs manageable for households across the state.

The proposed development has been designed to avoid sensitive areas of the site and will connect into the existing high-voltage transmission line. In total, the facility will cover approximately 25 hectares of land, including four stages of battery parks and a switchyard.

Pacific Green is committed to open and transparent engagement with the communities in which we operate. We have engaged Cogency - a planning and engagement consultancy specialising in renewable energy projects - to facilitate community engagement on this project.

We will be visiting Portland on Wednesday 31 January and Thursday 1 February and would be happy to arrange an in-person meeting at a convenient local location. We can also speak to you on the phone or schedule an online meeting.

If you would like to arrange a meeting, please contact Camilla Hamilton by phone on 0452 593 428 or consultation@cogencyaustralia.com.au.

The following week we will be hosting a Community Drop-in Session to provide interested parties with an opportunity to view the preliminary plans and technical reports and ask questions of the project team.

COMMUNITY DROP-IN SESSION

Date: Wednesday 7 February 2024

Time 2:00pm to 7:00pm

Location: Portland Golf Club, 755 Madeira Packet Road, Portland

Thank you for your time and consideration. We hope to see you soon.

Sincerely,

Michael Maranta

Project Director – Pacific Green Technologies (Australia) Pty Ltd
Michael.maranta@pacificgreen.com

Pacific Green is a specialised company focused on addressing the worlds need for cleaner and more sustainable energy. Our head-office is in London and our Australian business is based in Melbourne. We aspire to become one of the largest battery park operators in the Southern hemisphere.

Pacific Green Technologies Australia • 4/459 Church Street, Richmond VIC 3121 • www.pacificgreen.com/au

Appendix D Community drop-in session advertisement

Portland Battery
Community Information Session

Pacific Green, a leading developer of grid-scale energy storage solutions, is proposing to develop a new battery energy storage system in the Portland region.

Once operational, the 2.5GWh battery park will help to stabilise energy supply and keep energy costs manageable for Victorian customers.

This project is currently going through a regulatory approval process and is scheduled to be constructed in 2025.

Join us at a community information session to talk to the project team, learn more, and provide your feedback.

When
Drop-in at any time
between 2 pm and 7 pm,
Wednesday 7 February

Where
Portland Golf Club,
755 Madeira Packet Rd, Portland

Learn more and register for updates:
portland.energypark.au

Appendix E Photos of community drop-in session (7 February 2024)

Appendix F Letter to Neighbour (3 July 2024)

The name of the residents has been removed from the letter provided below.

PacificGreen

3 July 2024

Resident

Address

Dear XXX,

In January, Pacific Green wrote to inform you of its proposal for a large-scale battery in Portland – the Portland Energy Park. At that point the proposal was in an early design stage.

The Portland Energy Park can deliver a major increase in energy storage capacity for Victoria, strengthening the region's grid stability and helping to keep energy costs manageable for households across the state.

After months of progressing a suite of technical and environmental assessments, we would like to share with you our upoated concept design in greater detail.

The concept plan has evolved to respond to technical and environmental considerations including cultural heritage, biodiversity, acoustics, hydrology, and visual amenity. It continues to avoid sensitive areas of the site and will connect into the existing high-voltage transmission line, minimising the footprint of the project.

As a neighbour, we would like to offer you an in-person meeting once again to review the concept plan in detail and provide feedback before preparing the planning permit application lodgement.

If you would like to arrange a meeting either in person, online or over the phone, please contact Camilla Hamilton on 0452 593 428 or portland@pacificgreen.com . We will be visiting Portland on 18th July if you would like to meet on that date.

Thank you for your time and consideration. We hope to see you soon.

Sincerely,

Joel Alexander

Managing Director & CEO – Pacific Green Australia

Appendix G Project Flyer #2 and Factsheets (July 2024)

Pacific Green

Artist's impression of Pacific Green's Energy Park

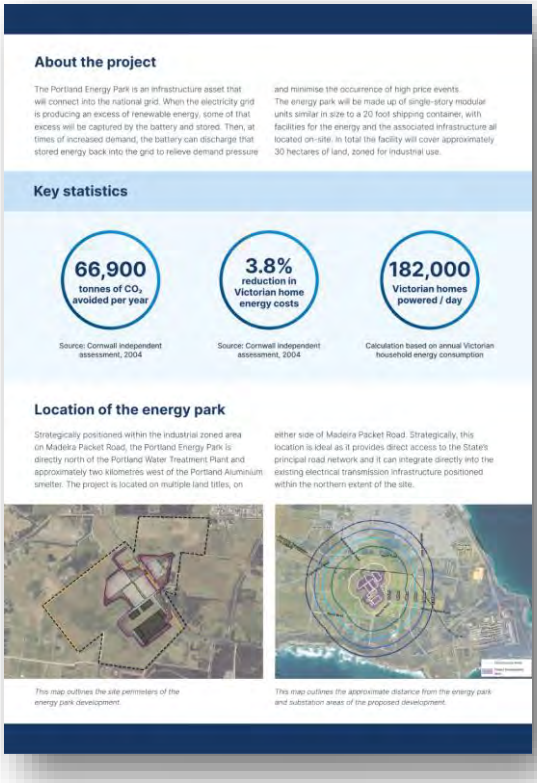
The Portland Energy Park

The Portland Energy Park is a major new grid-scale battery project to be developed in Victoria.

Once operational, the 2.5GWh energy park will deliver a major increase in energy storage capacity in Victoria, strengthening the region's energy stability, lowering energy costs for households and supporting the transition to net-zero.

The Portland Energy Park is an infrastructure project that will connect into the national grid – it is not linked to any current or planned renewable energy projects. When the electricity grid is producing an excess of renewable energy, some of that excess will be captured by the battery and stored. Then, at times of increased demand, the battery can discharge that stored energy back into the grid to relieve demand pressure and minimise the occurrence of high price events.

Scan the QR code to visit the project website: **www.pacificgreen.com/aus/projects/portland**



About the project

The Portland Energy Park is an infrastructure asset that will connect into the national grid. When the electricity grid is producing an excess of renewable energy, some of that excess will be captured by the battery and stored. Then, at times of increased demand, the battery can discharge that stored energy back into the grid to relieve demand pressure and minimise the occurrence of high price events.

The energy park will be made up of single-story modular units similar in size to a 20 foot shipping container, with facilities for the energy and the associated infrastructure all located on-site. In total this facility will cover approximately 30 hectares of land, zoned for industrial use.

Key statistics

66,900 tonnes of CO_2 avoided per year

Source: Cornwall Independent assessment, 2004

3.8% reduction in Victorian home energy costs

Source: Cornwall Independent assessment, 2004

182,000 Victorian homes powered / day

Calculation based on annual Victorian household energy consumption

Location of the energy park

Strategically positioned within the industrial zoned area on Madeira Packet Road, the Portland Energy Park is directly north of the Portland Water Treatment Plant and approximately two kilometres west of the Portland Aluminium smelter. The project is located on multiple land titles, on either side of Madeira Packet Road. Strategically, this location is ideal as it provides direct access to the State's principal road network and it can integrate directly into the existing electrical transmission infrastructure positioned within the northern extent of the site.

This map outlines the site perimeters of the energy park development.

This map outlines the approximate distance from the energy park and substation areas of the proposed development.

Supporting technical assessments

Since our first Community Information Session in February 2024, Pacific Green have been working to finalise a suite of technical, operational and environmental assessments, in addition to an updated concept design.

The concept plan has also evolved to respond to technical and environmental considerations, including cultural heritage, biodiversity, acoustics, hydrology, and visual amenity. It continues to avoid sensitive areas of the site and will connect into the existing high-voltage transmission line, minimising the footprint of the development.

Our suite of assessment summaries, listed below, are available to view via our website **www.pacificgreen/aus/projects/portland**

- Project Approvals
- Noise
- Biodiversity
- Cultural Heritage
- Hydrology
- Traffic Impact
- Landscape and Visual Impact
- Design and Engineering
- Fire and Safety Management

Timeframe of the energy park

The Portland Energy Park is currently going through its regulatory approval process. As part of this process, we are seeking to finalise the concept design, informed by preliminary research and technical studies. Our next steps include compiling this into a planning permit application.

Planning and design

Planning application lodgement

2023 | 2024 | 2025 | 2026 | 2027

- Community and stakeholder engagement phase 1
- Site identification and feasibility
- Technical and environmental assessments completed
- Community and stakeholder engagement phase 2
- Grid studies and connection agreement
- Construction commencement
- Operations commencement

Our community commitment

Pacific Green is dedicated to creating a cleaner environment for our communities. We do this by delivering innovative energy storage solutions that enable Australia's net-zero transition. We also partner with communities where we deliver projects to develop wider social value beyond our core business.

Pacific Green's Community Benefit Fund

Pacific Green takes pride in becoming an integral part of communities in which we operate. Our energy parks provide measurable benefits for community, businesses and households through the provision of energy storage, stability of the electricity grid and by playing an important role in enabling retailers to pass on reductions in electricity prices.

The Community Benefit Fund (CBF) established by Pacific Green aims to enhance and enrich the social, economic, and environmental well-being of communities in which we operate.

Finer details of the Portland Community Benefit Fund will be released shortly. **To read about Pacific Green's commitment to community, please visit: www.pacificgreen.com.au/community.**

Community safety commitments

The safety of our employees and the communities in which we operate takes precedence in all we do. In addition to first-class technical engineering that's designed to meet International Electrotechnical Commission (IEC) and Australian standards, all Pacific Green energy storage projects undergo rigorous safety and security testing to minimise safety risks.

Local employment opportunities

Pacific Green has nominated a principle contractor for the development. The scope of our (non) scope includes the installation of the battery and inverter systems as well as the supply, construction, testing and commissioning of all other plant and equipment required to support the facility.

During the construction phase, employment and contracting opportunities will be available. Pacific Green will engage local contractors, suppliers and businesses from within the local community to support regional economic development and growth.

The (pre-)principle contractor will seek to engage local suppliers and service providers to support the site works (predominantly civil and electrical) as well as offsite manufacturing (structures, transportable buildings).

To register your business, please visit: www.pacificgreen.com/aus/supplier

Pacific Green

At Pacific Green we specialise in delivering grid-scale smart energy storage solutions from greenfield to operation. We are proud of our record in delivering safe, cutting-edge energy storage solutions, which are benefiting people and the planet.

Scan the QR code to visit the project website:

portland@pacificgreen.com

The series of technical factsheets (select thumbnails shown below) are available on the website: https://www.pacificgreen.com/aus/Projects/portland/

Pacific Green Portland Energy Park

Biodiversity

Ensuring ecological net benefit

Independent ecologists have undertaken site surveys to comprehensively assess environmental values and inform the project design.

Pacific Green is committed to providing a positive environmental development. Our primary mitigation tool is to avoid impacts through intelligent design, then minimise and offset any impacts as required. The project will include planting local species vegetation and rehabilitation of wetland areas, to improve biodiversity values. Already, Pacific Green has fenced exclusion areas and planted native species, with significant additional planting to come.

Due to the site's use for cattle grazing, it has been broadly cleared of trees and there is minimal native vegetation within the site boundaries. The most sensitive areas of the site are roadside vegetation, providing habitat for a range of fauna species.

Any impacts to native vegetation or nationally-significant flora and fauna must meet Victoria's legislation and relevant guidelines, as well as the Federal Environment Protection & Biodiversity Conservation Act (EPBC Act).

To ensure the project meets all requirements, the following assessments and approvals have been completed:

- Site and landscape surveys
- Targeted species surveys
- Avoid, minimise and offset statement

Biodiversity assessments will accompany the planning permit application and EPBC Act Referral.

Pacific Green Portland Energy Park

Cultural heritage

The project requires a Cultural Heritage Management Plan (CHMP) to be approved by Gunditj Mirring Traditional Owners Aboriginal Corporation (GMTOAC).

The following steps have been undertaken in preparing the Draft CHMP:

- Desktop assessment
- Site walkover
- Complex testing assessment
- Registration of artefacts

Respecting and managing cultural heritage

Pacific Green acknowledges that this project is located on the lands of the Gunditjmara. We recognise and respect their cultural heritage, beliefs and continuing connection with the land and waterways.

The activity area is located on *Nyamat Mirring* (Sea Country), between the fresh water and the coast. The site includes coastal dune systems near wetlands – an area of high activity throughout human history due to its abundance of resources.

Pacific Green has sought to proactively engage with Gunditj Mirring Traditional Owners Aboriginal Corporation (GMTOAC), the Registered Aboriginal Party for this area. Our engagement will continue throughout the project's lifecycle.

Early cultural heritage investigations progressed from a desktop assessment to a survey of the site, to inform the concept layout and a complex archaeological testing methodology. From the survey, areas of heightened sensitivity to contain Aboriginal cultural heritage material were identified, and Pacific Green committed to redesigning some components to avoid those areas. Furthermore, detailed design and choice of construction methods have sought to avoid impacts on Aboriginal cultural heritage.

Over multiple months, archaeological subsurface testing has been conducted to better understand the site's cultural heritage. These results have revealed how the site had been utilised in the past, and have further informed the project layout. These results have been documented within a draft Cultural Heritage Management Plan (CHMP). The CHMP will ensure compliance with relevant legislation, manage and mitigate harm to Aboriginal cultural heritage and requires approval by GMTOAC.

This project provides an opportunity for further recognition of cultural heritage, as well as localised environmental restoration to support Country, in accordance with *Gunditjmara Nyamat Mirring Plan (2023-2033).*

About Pacific Green

At Pacific Green we specialise in delivering grid-scale smart energy storage solutions from greenfield to operation. We are proud of our record in delivering safe, cutting-edge energy storage solutions, which are benefiting people and the planet.

To learn more about the Portland Energy Park via our project website, scan this QR code: www.pacificgreen.com/aus/projects/portland or contact us at portland@pacificgreen.com

Pacific Green Portland Energy Park

Traffic

Managing road transport

A Traffic Impact Assessment (TIA) has been prepared to ensure that project design meets relevant State and Council road and traffic requirements.

The site's location on Madeira Packet Road is ideal, as it provides direct access to the State's principal road network. No new roads will be necessary, with only new access points to Madeira Packet Road required. Olerla Road will not be used for construction access. Internal tracks will allow servicing of the site.

Once operational vehicles will only need to enter the site for maintenance purposes. During the construction period vehicle movements will be required however all heavy vehicles will access the site via the Ring Road, past the Port and the smelter. This will avoid residential areas north of the site.

The Victorian Department of Transport (DPT) must consent to the application and approve new access points to Madeira Packet Road. A Traffic Impact Assessment (TIA) and Traffic Management Plan (TMP) must be endorsed by Council and DTP.

To ensure the project meets road safety requirements, the following assessments have been undertaken:

- Safe Intersection Sight Distance and swept path analysis
- Traffic generation calculations and SIDRA modelling
- Road capacity assessment

The TIA will accompany the planning permit application.

About Pacific Green

At Pacific Green we specialise in delivering grid-scale smart energy storage solutions from greenfield to operation. We are proud of our record in delivering safe, cutting-edge energy storage solutions, which are benefiting people and the planet.

To learn more about the Portland Energy Park via our project website, scan this QR code: www.pacificgreen.com/aus/projects/portland or contact us at portland@pacificgreen.com

Pacific Green Portland Energy Park

Fire and safety management

Fire risk and management plans must be approved by Fire Rescue Victoria (FRV) and Energy Safe Victoria (ESV). Both entities have already been engaged in discussions about the project.

To ensure the project meets all fire safety requirements, the following assessments have been undertaken:

- Landscape fire risk assessment
- Equipment selection comparisons
- Design standards assessment (including sufficient separations)
- Concept fire-fighting provision (static water supply and hydrants).

A Bushfire Management Plan will accompany the planning permit application. Further Risk and Safety Management protocols will be prepared and submitted to FRV for endorsement.

Safety first

The safety of our employees, contractors, environment and communities in which we operate takes precedence in all we do.

The current concept layout design and equipment selection implements high-level safety management, with future detailed design to address micro-level safety management. Furthermore, a suite of operational risk management processes will be prepared and must be approved by the relevant authorities, including Fire Rescue Victoria and Energy Safe Victoria.

In addition to first-class technical engineering designed to meet International Electrotechnical Commission (IEC) and Australian standards, all Pacific Green energy storage projects undergo rigorous safety and security testing to minimise safety risks.

The Portland Energy Park will come equipped with the latest Lithium battery technology incorporating several integrated fire safety measures. This will include both external monitoring and heat sensors as well as individual units within each battery container that are sealed and monitored with their own fire suppression systems. This means that if a single cell fails, this section of the battery is isolated and contained, thus protecting the rest of the container unit.

A Bushfire Management Plan (BMP) has also been specifically designed to over-see the Portland Energy Park operations. The site does not contain areas of significant vegetation and therefore has a low bushfire risk profile. The concept design addresses fire management requirements set out in the relevant CFA Guidelines. These design measures include sufficient spacing between containers, static water supply and hydrant provision and multiple emergency access points. Furthermore, civil earthworks and drainage concept design ensures that any run-off from the battery park earth benches will be captured in isolated ponds, that will filter sediment and control runoff.

About Pacific Green

At Pacific Green we specialise in delivering grid-scale smart energy storage solutions from greenfield to operation. We are proud of our record in delivering safe, cutting-edge energy storage solutions, which are benefiting people and the planet.

To learn more about the Portland Energy Park via our project website, scan this QR code: www.pacificgreen.com/aus/projects/portland or contact us at portland@pacificgreen.com

Pacific Green Portland Energy Park

Hydrology

Water management and quality

Hydrological modelling (water movement and flooding) has been undertaken to inform site design and surface water management.

The project has been designed to ensure there are no negative off-site flood impacts, and that electrical infrastructure is sufficiently clear of on-site floodwater.

A Flood Impact Assessment will accompany the planning permit application. Separately, approval will be required from the Glenelg Hopkins Catchment Management Authority (GHCMA).

The hydrology process began with existing conditions modelling, that found large low-lying areas of the site are subject to inundation. These results informed concept design layout updates, to avoid these areas as much as possible.

Flood modelling progressed iteratively with design layouts, to ensure that runoff is appropriately directed to on-site drainage infrastructure. Holding ponds will capture runoff, allowing sedimentation settling and filtering prior to water flowing into the site's central wetlands.

The project must meet Glenelg Shire Council's engineering and drainage standards, including no net-negative impact off-site.

Works approval is required from the Glenelg Hopkins Catchment Management Authority (CMA) and address water quality requirements.

To ensure the project addresses surface water management requirements, the following steps have been undertaken:

- **Existing conditions modelling**
- **Post-development flood modelling**
- **Water quality assessment**
- **Functional drainage concept design**

A Flood Impact Assessment will accompany the planning permit application.

The central wetlands will be fenced to exclude stock and replanted with appropriate vegetation, seeking to improve overall ecology and hydrology.

We have engaged with Glenelg Shire Council's engineering unit to ensure that drainage infrastructure and run-off control is appropriate.

Pacific Green Portland Energy Park

Landscape and visual amenity

Indicative render (artist's impression) shows site boundary planting to screen the energy park from view.

Responsive landscape design to minimise design impact

A draft Landscape and Visual Impact Assessment (LVIA) has been prepared to assess the site's context, the design's relationship to the landscape, and propose mitigation such as vegetation screening planting..

Visual renders have also been prepared from various viewpoints, to illustrate what the project will look like.

The site is near the coast within a precinct of industrially zoned land, that includes Portland Aluminium, Wannon Water facilities and high-voltage transmission line. There are rural-residential dwellings to the west and north, with residential land further north.

The LVIA has assessed the site's setting as highly modified. The proposed switchyard infrastructure has been sited as far south as possible, to maximise the distance between its taller infrastructure and nearby dwellings (minimum 600m away).

The planning permit application must provide a Landscape Plan for endorsement, with management conditions to plant and manage screening vegetation.

To support the planning permit application, the following steps have been undertaken:

- **Character assessment of landscape**
- **Topography and vegetation mapping and modelling**
- **Preliminary visual impact assessment and sensitive viewpoint consideration**
- **Landscape concept plan (including perimeter planting design with locally appropriate species)**
- **3D visual modelling**

Pacific Green Portland Energy Park

Noise

Addressing EPA noise protocols

An acoustic assessment has been undertaken to ensure that the project will not exceed the Environment Protection Authority (EPA) noise limits.

The report will assess noise limits for residences and model noise generated by the project to demonstrate compliance. Pacific Green is committed to ensuring noise generation is minimised and compliant.

The key to making the project as quiet as possible is selecting equipment with lower noise output. Our batteries will be using cutting edge liquid cooling thermal management systems to keep the batteries at optimal temperature, rather than relying upon noisier fan forced cooling. Other key equipment selections include inverters and transformers.

The EPA have strict noise limits for both construction and operation of the project, underpinned by their legislation. At the planning application stage of the project, we will be required to demonstrate that the project is capable of not exceeding those noise limits at any time of day.

The Energy Park must comply with EPA Victoria's 'Noise limit and assessment protocol for the control of noise from industrial premises'.

To ensure the project complies with the EPA's requirements, the following technical work has been undertaken:

- **Background noise monitoring**
- **Defining noise limits**
- **Equipment data comparisons**
- **Acoustic modelling**

A Noise Impact Assessment will accompany the planning permit application.

The independent acoustic consultants have undertaken background noise monitoring at locations around the site to inform their assessment and ensure a high level of accuracy.

The Energy Park will generate very minor ambient noise when operational. The Portland Energy Park site was selected largely due to its industrial zoning and distance from the residential areas of Portland, minimising the risk of noise disturbances for the local community.

About Pacific Green

At Pacific Green we specialise in delivering grid-scale smart energy storage solutions from greenfield to operation. We are proud of our record in delivering safe, cutting edge energy storage solutions, which are benefiting people and the planet.

To learn more about the Portland Energy Park via our project website, scan this QR code: **www.pacificgreen.com/aus/projects/portland** or contact us at **portland@pacificgreen.com**

Pacific Green Portland Energy Park

Project approval process

Indicative render (artist's impression)

Addressing planning and environmental requirements

Large-scale battery energy storage system projects require a planning permit approval from the Minister for Planning. A planning approval determines the appropriateness of the proposed land use and development to its location, considering its context, physical environment and ability to meet other technical criteria.

To support this process, specialist studies into a range of impact areas including biodiversity, cultural heritage, and noise have been undertaken. This will ensure the project minimises and manages any potential impacts and meets or exceeds all statutory requirements.

Separately, there are potential environmental approvals including under the federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The project also requires grid connection approval from the Australian Energy Market Operator (AEMO), to ensure stability of the electricity grid.

The project must comply with Victorian planning legislation, State and Federal environmental laws, and grid connection approvals.

To ensure the project meets those requirements, the following applications will be made:

- **Planning permit application to Victorian Minister for Planning**
- **EPBC Act Referral to Federal Minister for Environment**
- **Grid connection approval to AEMO**

Appendix H Outline of key consultation dates with GMTOAC

See following page for consultation summary provided by GML Heritage.

1 Documentation of Consultation

1.1 Consultation in relation to the assessment

Table 1.1 Consultation in relation to the assessment

Date	Name and Title	Organisation	Nature of Consultation
14 July 2023	[redacted]	GML	Submission of Notice of Intent
	Secretary	DPC	
14 July 2023	Registrar	DPC	Assigns CHMP number 19677
	[redacted]	GML	
	[redacted]	Pacific Green	
27 July 2023	[redacted]	GMTOAC	GMTOAC elected to evaluate the CHMP
	[redacted]	GML	
	[redacted]	GML	
15 August 2023	[redacted]	GML	Inception meeting
	[redacted]	GML	
	[redacted]	GMTOAC	
	[redacted]	Pacific Green	
	[redacted]	Pacific Green	
	[redacted]	Cogency	
	[redacted]	Cogency	
11 October 2023	[redacted]	GML	Standard assessment results meeting
	[redacted]	GML	
	[redacted]	GMTOAC	
	[redacted]	GMTOAC	
	[redacted]	Pacific Green	
	[redacted]	Cogency	
22 March 2024	[redacted]	GML	Design change meeting, complex assessment methodology meeting
	[redacted]	GMTOAC	
	[redacted]	GMTOAC	
	[redacted]	GMTOAC	
	[redacted]	Pacific Green	
	[redacted]	Pacific Green	
	[redacted]	Cogency	

Date	Name and Title	Organisation	Nature of Consultation
	[redacted]	JBS&G	
18 June 2024	[redacted]	GML	Complex assessment results meeting
	[redacted]	GML	
	[redacted]	GMTOAC	
	[redacted]	GMTOAC	
	[redacted]	GMTOAC	
	[redacted]	Pacific Green	
	[redacted]	Pacific Green	
	[redacted]	Cogency	
	[redacted]	JBS&G	

1.2 Participation in the conduct of the assessment

Table 1.2 Participation in the conduct of the assessment

Date	Name and Title	Organisation	Nature of Consultation
11 October 2023	[redacted]	GML	Standard assessment
		GML	
		GMTOAC	
		GMTOAC	
		GMTOAC	
6 to 9 February 2024		GML	Complex Assessment
		GML	
		GMTOAC	
		GMTOAC	
13 to 16 February 2024		GML	Complex assessment
		GML	
		GMTOAC	
		GMTOAC	
20 to 23 February 2024		GML	Complex assessment
		GML	
		GMTOAC	
		GMTOAC	

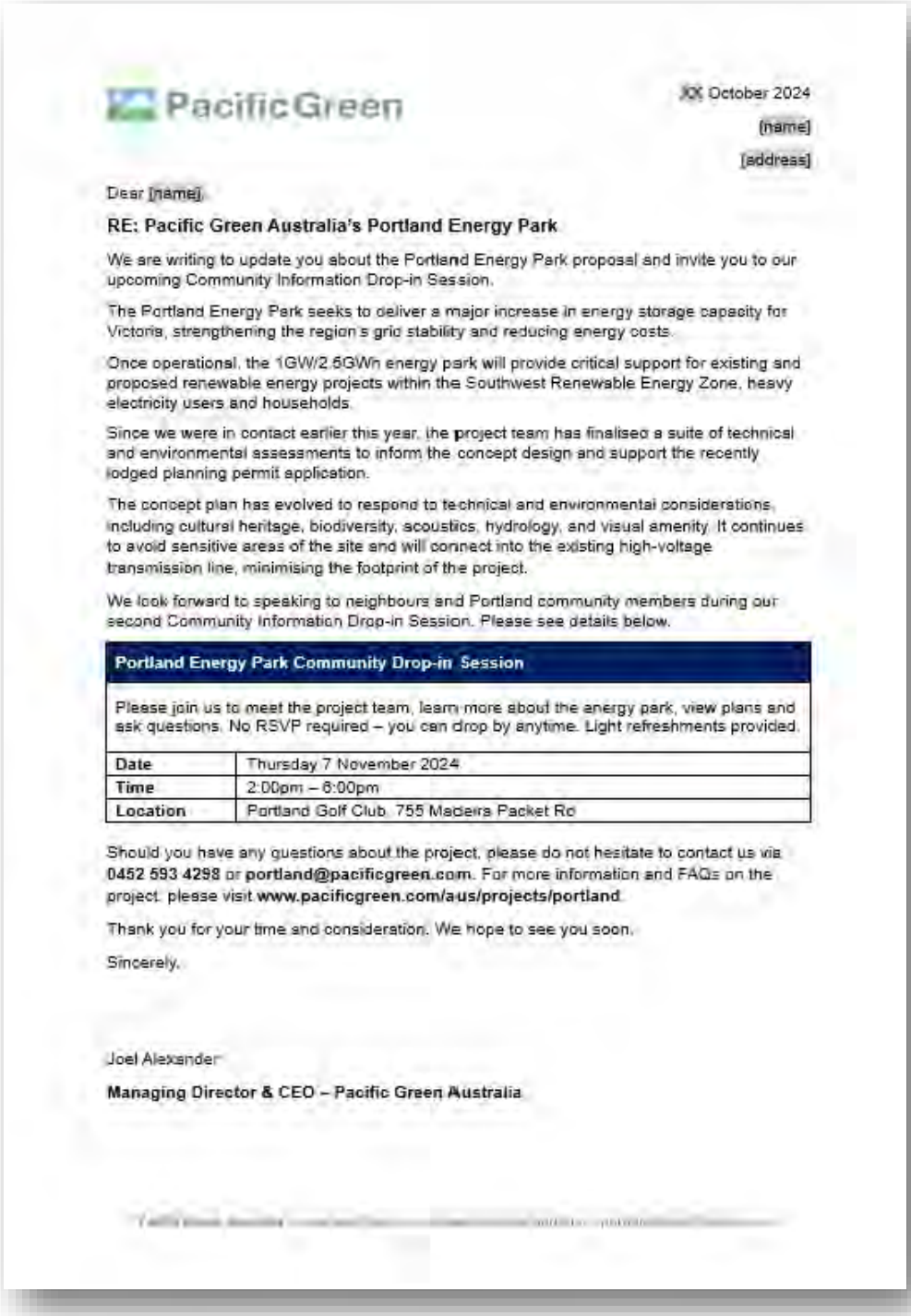
Date	Name and Title	Organisation	Nature of Consultation
27 February to 1 March 2024	[redacted]	GML	Complex assessment
		GML	
		GMTOAC	
		GMTOAC	
5 to 8 March 2024		GML	Complex assessment
		GML	
		GMTOAC	
		GMTOAC	
13 to 15 March 2024		GML	Complex assessment
		GML	
		GMTOAC	
		GMTOAC	
26 to 29 March		GML	Complex assessment
		GML	
		GMTOAC	
		GMTOAC	
3 to 5 April 2024		GML	Complex assessment
		GML	
		GMTOAC	
		GMTOAC	
9 to 12 April 2024		GML	Complex assessment
		GML	
		GMTOAC	
		GMTOAC	
6 to 9 May 2024		GML	Complex assessment
		GML	
		GMTOAC	
		GMTOAC	
14 to 17 May 2024		GML	Complex assessment
		GML	
		GMTOAC	
		GMTOAC	

1.3 Consultation in relation to the conditions

Table 1.3 Consultation in relation to the conditions

Date(s)	Name and Title	Organisation	Nature of Consultation
18 June 2024	[redacted]	GML	Complex assessment results and activity impacts meeting
		GMTOAC	
		GMTOAC	
		GMTOAC	
		Pacific Green	
		Cogency	
		JBS&G	
18 September 2024		GML	Activity impacts meeting
		GMTOAC	
		GMTOAC	
		GMTOAC	
		Pacific Green	
		Cogency	
		JBS&G	
26 November 2024		GML	Management conditions meeting
		GMTOAC	
		GMTOAC	
		GMTOAC	
		Pacific Green	
		Cogency	

Appendix I Letter to Neighbour (November 2024)



PacificGreen

XX October 2024

[name]

[address]

Dear [name],

RE: Pacific Green Australia's Portland Energy Park

We are writing to update you about the Portland Energy Park proposal and invite you to our upcoming Community Information Drop-in Session.

The Portland Energy Park seeks to deliver a major increase in energy storage capacity for Victoria, strengthening the region's grid stability and reducing energy costs.

Once operational, the 1GW/2.6GWh energy park will provide critical support for existing and proposed renewable energy projects within the Southwest Renewable Energy Zone, heavy electricity users and households.

Since we were in contact earlier this year, the project team has finalised a suite of technical and environmental assessments to inform the concept design and support the recently lodged planning permit application.

The concept plan has evolved to respond to technical and environmental considerations, including cultural heritage, biodiversity, acoustics, hydrology, and visual amenity. It continues to avoid sensitive areas of the site and will connect into the existing high-voltage transmission line, minimising the footprint of the project.

We look forward to speaking to neighbours and Portland community members during our second Community Information Drop-in Session. Please see details below.

Portland Energy Park Community Drop-in Session	
Please join us to meet the project team, learn more about the energy park, view plans and ask questions. No RSVP required – you can drop by anytime. Light refreshments provided.	
Date	Thursday 7 November 2024
Time	2:00pm – 6:00pm
Location	Portland Golf Club, 755 Madeira Packet Rd

Should you have any questions about the project, please do not hesitate to contact us via **0452 593 4298** or **portland@pacificgreen.com**. For more information and FAQs on the project, please visit **www.pacificgreen.com/aus/projects/portland**.

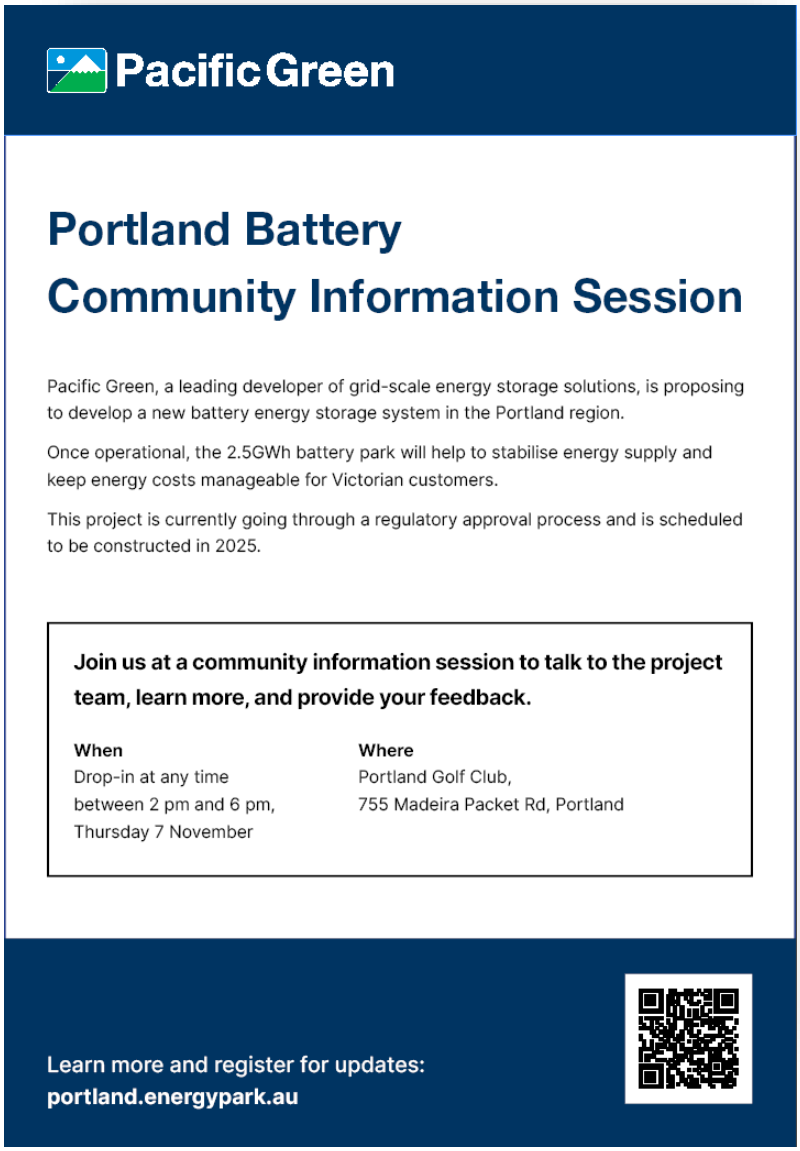
Thank you for your time and consideration. We hope to see you soon.

Sincerely,

Joel Alexander

Managing Director & CEO – Pacific Green Australia

Appendix J Community drop-in session advertisement



Pacific Green

Portland Battery
Community Information Session

Pacific Green, a leading developer of grid-scale energy storage solutions, is proposing to develop a new battery energy storage system in the Portland region.

Once operational, the 2.5GWh battery park will help to stabilise energy supply and keep energy costs manageable for Victorian customers.

This project is currently going through a regulatory approval process and is scheduled to be constructed in 2025.

Join us at a community information session to talk to the project team, learn more, and provide your feedback.

When
Drop-in at any time
between 2 pm and 6 pm,
Thursday 7 November

Where
Portland Golf Club,
755 Madeira Packet Rd, Portland

Learn more and register for updates:
portland.energypark.au

Appendix K Photos of community drop-in session (7 November 2024)

Appendix L Project media and event coverage

Media coverage			
Outlet	**Media**	**Date/Time**	**Topic/link to media**
ABC Radio	Live radio interview	5 February 2024 at 7.10am	Discussed Portland Energy Park and Community Information Session details
3HA Radio	Live radio interview	7 February 2024	Discussed Portland Energy Park and Community Information Session details
Portland Observer	Article with interview	2 February 2024 (interview) 6 February 2024 (in print)	Discussed Portland Energy Park and Community Information Session details
Renew Economy	Discussion with Sophie Vorrath and Article	5 February 2024	Portland Energy Park https://reneweconomy.com.au/victoria-to-get-huge-new-battery-as-uk-developer-advances-multi-gigawatt-australia-plans/
Financial Times	Interview with Australian correspondent	13 February 2024	Portland Energy Park
Eco Generation	Article		Portland Energy Park https://www.ecogeneration.com.au/taking-australia-into-a-greener-future/
The Observer	Article	23 August 2024 (in print)	Portland Energy Park
The Observer	Article	12 November 2024 (in print)	Pacific Green battery park one step closer
Event Coverage			
Outlet	**Location**	**Date/Time**	**Topic/Link to Media**
Solar & Storage Live Australia 2024	Brisbane Convention & Exhibition Centre QLD	2 May 2024	Portland Energy Park
Australian British Energy Transition and Investment Summit 2024,	The Fullerton Hotel VIC	7 May 2024	Portland Energy Park
South Australia Energy Developments Conference 2024	Adelaide Convention Centre, SA	18 June 2024	Portland Energy Park
#Uniontown Conference 2024	Portland, VIC	24 August 2024	Portland Energy Park
All Energy Conference 2024	Melbourne, VIC	October 2024	Portland Energy Park The main sponsor for Day 1

Getting show ready P. 4

portland observer

Phone (03) 5522 3000 AND GUARDIAN

OBSERVER SPORT Grand final next

www.spec.com.au TUESDAY, FEBRUARY 6, 2024 $2.60 inc GST

Garden delights

THE Portland Community Garden celebrated its 10th birthday on Saturday with the public enjoying tours and guest speakers. Community Garden president Wayne Barrett said they had a terrific response to the day. Garden volunteers and South West TAFE horticultural students (pictured here) sold produce on the day. Inset: Max Oberlander explains the use of the front-end loader and other equipment. Read more on PAGE 2.

Billion-dollar battery plan for Portland

OSCAR PERRI

ANOTHER major energy infrastructure project is in the works for Portland with a battery park that would be the largest in Australia, with 700 containers across a 30-hectare site, connecting in to the power grid.

With a site secured near the Portland Aluminium Smelter, the company behind the 2.5 gigawatt hour battery, Pacific Green, is planning to be operational in 2026.

Currently in the planning stages, Joel Alexander, Pacific Green's managing director Australia, said he and his team will be in Portland tomorrow for a public information event at the Portland Golf Club from 2pm to 7pm.

The proposal is currently going through a development application with the Victorian Government with plans to submit the application in March and, if successful, start construction next year.

"Once it's fully constructed, (the cost) would be north of $1 billion," Mr Alexander said.

Much of that cost will cover building new infrastructure, including four 250MW battery energy parks, a 500/33kV collector, and a 500kV terminal station and grid connection to the existing 500kV transmission line.

Mr Alexander said building batteries like this is a "critical" step to decarbonising Victoria.

"Fundamentally, it's a standalone lithium-ion battery, which is connected to the grid and it will pull energy from the grid when there's an excess of renewable energy, and it will put energy back onto the grid when the grid needs it most," he said.

"It'll do that every day, 365 days for the year."

The battery park will cover a 30-hectare precinct, connected to the power grid through a traditional substation.

"Think of 20-foot containers arranged as a precinct side by side with spacing between them, and by last count, it's roughly 700 containers," Mr Alexander said.

The upshot of the battery, according to Pacific Blue's modelling, is a wholesale power prices in Victoria reducing by nearly 4% as well as less pressure on the state's power grid.

"The grid is under pressure to be able to deliver energy to households when it's needed, when people use their air cons and turn on their lights," Mr Alexander said.

"What batteries do is they provide a tool to store energy when there's an excess of energy on the grid, and then push it back on when there's volatility on the grid.

"We're transitioning to a future of net zero, and traditional coal and gas has been replaced by solar and wind.

"As you could probably appreciate when the sun isn't shining, or the wind isn't blowing, the energy generators just isn't there for people to use. So that's exactly what batteries do, it steps in at those times and can provide that energy."

Once operational, the battery park will have 15 full time equivalent staff, most based in Portland.

Along with the jobs, Pacific Blue is keen to contribute to the community in other ways.

Continued PAGE 2

PORTLAND OBSERVER Tuesday February 6 2024 3

Billion-dollar battery plan for Portland

From PAGE 1

"We're particularly interested in discussing what meaningful grants or investments into projects we can do and how we set up a community fund that's both ongoing and sustainable, Mr Alexander said.

"That's a commitment that we want to make to the community, to Portland, and of course, the broader Glenelg Shire community.

"We're very keen to understand what that might look like and some partnerships that we can form over time, and we're also interested in identifying local labour and suppliers and, and hospitality that can be part of the project and how we can make sure that they have an opportunity to participate in the project."

Mr Alexander said he has been meeting with local construction and engineering companies, and has been impressed by what they can do for the project.

"We really want to use local content wherever we can, as part of our development of the project, we're coming up with our local content requirements and will have some more information on that later," he said.

A biodiversity impact assessment for the project is currently underway.

"Our primary mitigation tool is to avoid impacts, and minimise and offset where required," Mr Alexander said.

"We're committed to providing a positive environmental development, and that actually includes rehabilitation of areas of undeveloped land to improve the local biodiversity value of the land."

Rather than its proximity to major renewable proposals, Portland was chosen for the battery due to the existing infrastructure, 500kv transmission line and industrial land zoning, he said.

Although there is much of what is needed for the project that is already there, Mr Alexander said Pacific Blue will build a new power sub station on site to suit their needs.

Pacific Green will oversee the construction and stabilise the operation of the energy park, and will organise long term trading contracts of around 10 to 15 years with retailers, who take the energy from the park.

As for how it turns a profit once up and running, Mr Alexander said there are a few ways the battery park can make money.

"There's a few avenues, one of them is simply charging the battery when prices are low and de-charging when prices are high, that's called wholesale price spread," he said.

"Then there's another market that the batteries can play in which is on behalf of the network, and that's to maintain the voltage of the network. So as there's more renewables coming into the network, the voltage of the network can fluctuate and the important role to actually bring the network back into stability, so the lights don't turn off."

Meanwhile, Origin Energy has recently approved construction of a smaller battery at its Mortlake Power Station, with a capacity of 300MW, but Mr Alexander said this will not affect the Portland project or its viability.

"Victoria has some fantastic targets for net zero, and also some fantastic energy storage targets and collectively, we want to make sure that we're achieving those targets through battery storage. So in this case, competition is a great thing," he said.

A PLAN of the proposed Portland battery park.

False start for interim hospital CEO

OSCAR PERRI

COLAC Area Health CEO Fiona Brew was meant to have her first day yesterday as Portland District Health's interim CEO, but instead will remain on leave because Colac Area Health is under investigation, accused of having "fake patients".

Allegations recently surfaced that during a visit from Victorian Health Minister Mary-Anne Thomas last August, around 10 Colac Area Health staff and family members posed as patients, including one who arrived by ambulance.

The Colac Herald last week reported that complaints had been made, and the Health Department has now said an independent investigator will be engaged to look into them.

As a result, Karena Prevett will now remain as the PDH acting CEO while the hospital board looks for a permanent replacement for the role.

"This investigation is being prioritised and we are providing ongoing support to the health service which is continuing to deliver high-quality care to the local community," a Department of Health spokesperson said.

"We support a decision by CEO Fiona Brew to remain on leave and at Colac Area Health in the interim, and this does not pre-empt the outcome of the ongoing investigation.

"We encourage anyone with information about the allegations to come forward and make contact via publicinterestdisclosure@health.vic.gov.au".

The PDH board, led by Chair Peter Matthews, is currently in the formal recruitment process to hire a new CEO and is currently selecting a recruitment agency to find candidates.

"Our recruitment for a CEO is ongoing and Karena Prevett, who has been Acting CEO since November last year, will remain in the role in the interim," Mr Matthews said.

"Ms Prevett and our entire team at Portland District Health have a wealth of experience and a deep understanding of the local area and we remain focused on providing high quality health care services to our community."

Unions supporting renewable projects

OSCAR PERRI

LOCAL union groups are hosting a renewable energy public information session this week, to counter an "extremely negative" community response to some proposed projects nearby.

The event will include updates on the projects planned for the region, and speakers including Cam Walker from Friends of the Earth, and representatives from SpinifexOffshore Wind and the Victorian Trades Hall Council.

Southwest Trades and Labour Council's Carl Millard is organising the event and said all are welcome to attend, to hear from some of the experts about the offshore windfarms and other projects, and ask questions.

"We're trying to give a bit of confidence about renewables because there's been quite a bit of negative stuff, there's a part of the community here that doesn't want them at all, and they've had plenty to say," he said.

"It has been extremely negative, and and that's why people aren't really talking about renewables too much, and particularly the wind farms."

Mr Millard said he feared that could cost Portland workers and industry.

"Because of how the town has treated the companies involved in it, and being extremely negative, they can build it (wind farm) here and all the work would come from Tasmania, at Bell Bay," he said.

"We're trying to get some positivity, Portland could be the renewable zone for Victoria, which if it really gets going there'll be a fair bit of construction, which will mean that we'll get better infrastructure.

"Lots of people don't get to have the discussion with the experts, or a lot of times those discussions are happening behind doors with councils and big manufacturers and unions and that type of stuff, but this is a chance that they can come and ask a question about how it all works."

The event, run by the Southwest Trades and Labour Council, will be at the Portland Golf Club on Thursday from 4.30pm to 6pm and is one of many rallies and community events across the country this week under the banner "Yes to Renewables".

Pacific Green

Portland Battery Community Information Session

Pacific Green, a leading developer of grid-scale energy storage solutions, is proposing to develop a new battery energy storage system at the Portland region.

Once operational, the 2.5GWh battery park will help to stabilise energy supply and keep energy costs manageable for Victorian customers.

This project is currently going through a regulatory approval process and is scheduled to be constructed in 2025.

Join us at a community information session to talk to the project team, learn more, and provide your feedback.

When
Drop-in at any time
between 2 pm and 7 pm;
Wednesday 7 February

Where
Portland Golf Club,
755 Madeira Packet Rd, Portland

Learn more and register for updates:
portland.energypark.au

Trinasolar

N-type module Small in Size. Bigger on Power

RENEW ECONOMY

CLEAN ENERGY NEWS AND ANALYSIS

Donate Subscribe

Thursday, August 29, 2024

Home Wind Solar Storage Electrification Commentary Podcasts Maps All SwitchedOn The Driven One Step Off The Grid

Victoria to get huge big battery park as UK developer advances "multi-gigawatt" Australian plans

AI Energy Solutions to enhance savings, revenues and sustainability

GET UP TO 3 QUOTES FROM PRE-VETTED SOLAR (AND BATTERY) INSTALLERS

GET QUOTES

SOLARQUOTES

DATA. ALL IN ONE PLATFORM.

Sophie Vorrath Feb 5, 2024

UK energy storage developer Pacific Green has proposed its second grid-scale energy storage project in Australia in a matter of months, unveiling plans for a massive 1GW, 2.5GWh big battery project in Portland in Victoria's south-west – the state's biggest such precinct.

Pacific Green says the Portland Energy Park, which is in the early stages of planning and approvals process, will combine four 250MW batteries of varying storage duration capacities, a 500/33kV collector, and a 500kV terminal station and grid connection to the existing 500kV transmission line.

The company says the energy park will be developed as four stand-alone projects, each with their own connection point. Three of the batteries will be have two hours of energy storage duration (250MW/500MWh each) and one energy park will be four hours (250MW/1,000MWh).

P. 5

Off to the wild west

portland observer

Phone (03) 5522 3000 AND GUARDIAN

Great ride remembers stalwart

OBSERVER SPORT

www.spec.com.au FRIDAY, AUGUST 23, 2024 $3.00 inc GST

Daffodil Day dip

SWIMMERS Shirley Dunn, Jenny Duffin and Lynne Peters were doing their 'dip' for the Cancer Council's Daffodil Day at Nuns Beach yesterday. More stories on Daffodil Day will be featured in next Tuesday's *Observer*.

Picture: MORAG PITTIS

Billion dollar batteries - one step closer

JO REID

THE Pacific Green Portland battery park, slated for Madeira Packet Road, is progressing well, according to Pacific Green's managing director Joel Alexander.

The energy park will be made up of single-story modular units similar in size to a 20-foot shipping container, which will house lithium-ion battery cells. In total the facility will cover approximately 30 hectares of land, zoned for industrial use.

Once completed , the project will have cost "north of one billion dollars," according to Mr Alexander.

When the electricity grid is producing excess energy, some of that excess will be captured by the battery park and stored. Then, at times of increased demand, the battery can discharge that stored energy back into the grid to be used by consumers.

"It's basically the same battery technology as your phone. We will be utilising lithium-ion battery technology and it will be a 1 gigawatt park," Mr Alexander said.

The project was announced in February this year, and now after completing all of the prerequisite planning and testing, such as noise studies, biodiversity studies and community engagement, the company is ready to put their planning approval to the State Government to get the final tick of approval before building commences next year.

The energy park, located within the industrial-zoned area on Madeira Packet Road, is in close proximity to the Portland Aluminium Smelter and the Portland Water Treatment Plant.

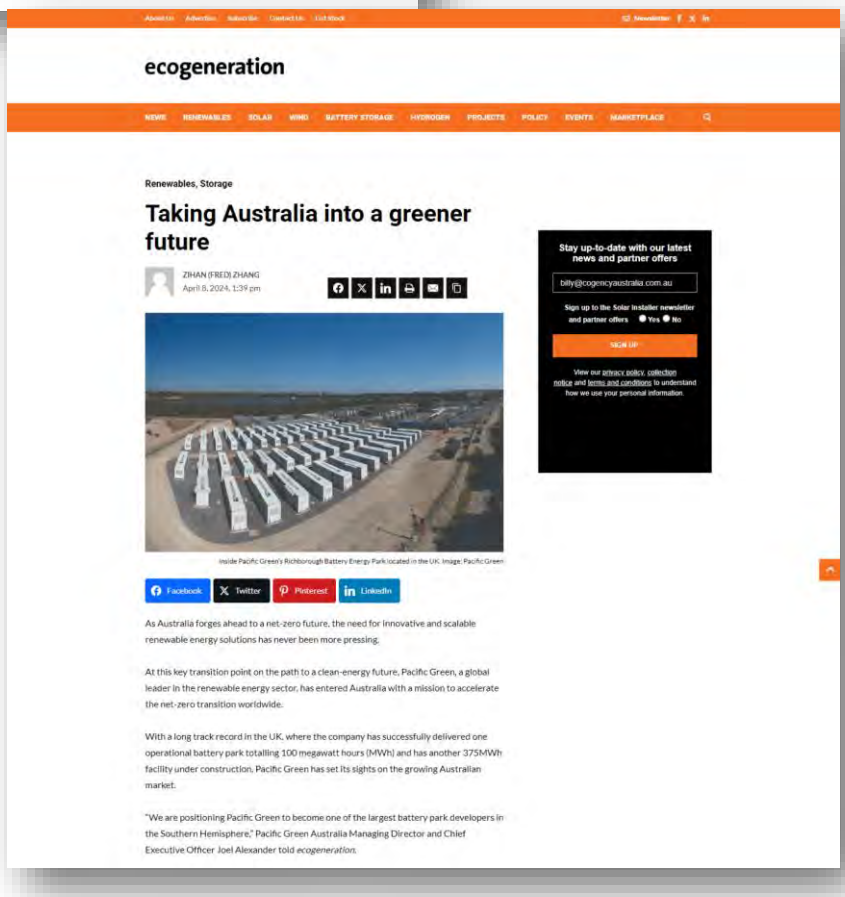
"We are definitely still on track with our timeline," he said.

The company will also have to gain "grid approval" from the current energy operator, AEMO, to connect into the power network.

Once all the approvals have been completed, Pacific Green hopes to start construction on the Portland site next year, with upwards of 200 people employed at any given point during this phase.

Continued PAGE 4

AN artist's impression of the battery park slated for Portland.



ecogeneration

NEWS RENEWABLES SOLAR WIND BATTERY STORAGE HYDROGEN PROJECTS POLICY EVENTS MARKETPLACE

Renewables, Storage

Taking Australia into a greener future

ZIHAN (FRED) ZHANG
April 8, 2024, 1:39 pm

Stay up-to-date with our latest news and partner offers

billy@cogencyaustralia.com.au

Sign up to the Solar Installer newsletter and partner offers Yes No

SIGN UP

View our privacy policy, collection notice and terms and conditions to understand how we use your personal information.

Inside Pacific Green's Richborough Battery Energy Park located in the UK. Image: Pacific Green

Facebook Twitter Pinterest LinkedIn

As Australia forges ahead to a net-zero future, the need for innovative and scalable renewable energy solutions has never been more pressing.

At this key transition point on the path to a clean-energy future, Pacific Green, a global leader in the renewable energy sector, has entered Australia with a mission to accelerate the net-zero transition worldwide.

With a long track record in the UK, where the company has successfully delivered one operational battery park totalling 100 megawatt hours (MWh) and has another 375MWh facility under construction, Pacific Green has set its sights on the growing Australian market.

"We are positioning Pacific Green to become one of the largest battery park developers in the Southern Hemisphere," Pacific Green Australia Managing Director and Chief Executive Officer Joel Alexander told *ecogeneration*.

cogency

Planning | Engagement | Strategy

Cogency provides planning, environmental assessment and stakeholder engagement services for the renewable energy, property, clean tech and circular economy sectors.

Our collaborative teams bring a uniquely nuanced understanding of planning processes and the technical aspects of renewable energy property, infrastructure and circular economy projects, which helps to build a strong rapport and trust with local community members and stakeholders.

Unlike many in-house engagement and planning teams that are managed separately, our planners work in collaboration with our engagement practitioners to ensure that stakeholder and community consultation is at the heart of the planning process and a critical tool for delivering positive outcomes for our clients.

www.cogencyaustralia.com.au

Likelihood of occurrence of listed flora species

Common Name	Scientific name	EPBC	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
River Swamp Wallaby-grass	*Amphibromus fluitans*	Vulnerable	River Swamp Wallaby-grass grows mostly in permanent swamps and also lagoons, billabongs, dams and roadside ditches. The species requires moderately fertile soils with some bare ground; conditions that are caused by seasonally-fluctuating water levels (DCCEEW 2023).	PMST	No previous records	N/A	Wetlands in the study area severely disturbed from cattle and within introduced pasture grasses lacking native grasses and sedges, but some marginally suitable habitat within wetlands in the southern lot parcel and drainage line along Oleria Road (albeit highly degraded). Usually conspicuous but the study area has been short-grazed by cattle. No previous records within search area – nearest records are at Cobboboonee National Park, more than 17km away. **No individuals were recorded during targeted surveys. Unlikely to occur**
Limestone Spider-orchid	*Caladenia calcicola*	Vulnerable	Well-drained limey sands in heathy forest on limestone ridges (Jones 2006).	PMST & VBA	110	1/10/2005	No suitable habitat. Original heathy habitat in the study area prior to agricultural land uses has been cleared and not present. **Unlikely to occur.**
Mellblom's Spider-orchid	*Caladenia hastata*	Endangered	One known population at Point Danger, south of portland. Occurs on well-drained sands in dense coastal heathland and heathy forest (Todd 2000).	PMST & VBA	66	9/10/2017	No suitable habitat. Original heathy habitat in the study area prior to agricultural land uses has been cleared and not present. **Unlikely to occur.**
Ornate Pink-fingers	*Caladenia ornata*	Vulnerable	Heathy forest and among shrubs on seasonally moist sandy loams (Jones 2006).	PMST	No previous records	N/A	No suitable habitat. Original heathy and shrubby habitat in the study area prior to agricultural land uses has been cleared and not present. **Unlikely to occur.**
Clover Glycine	*Glycine latrobeana*	Vulnerable	Found across south-eastern Australia in native grasslands, dry sclerophyll forests, woodlands and low open woodlands with a grassy ground layer. In Victoria, populations occur in lowland grasslands, grassy woodlands and sometimes in grassy heath (DCCEEW 2023).	PMST	No previous records	N/A	No suitable habitat. Grasslands (seasonally wet/inundated pastures) in the study area contained introduced grasses and pugging from cattle. No previous records in search area - nearest record at Mt Richmond National Park over 17km away. **Unlikely to occur.**
Coast Ixodia	*Ixodia achillaeoides subsp. arenicola*	Vulnerable	Confined to coastal vegetation in the Cape Bridgewater-Portland area (Short 1999).	PMST & VBA	4	27/08/2008	No suitable habitat. Original coastal heath and woodland habitat in the study area prior to agricultural land uses has been cleared and not present. **Unlikely to occur.**
Spiny Peppercress	*Lepidium aschersonii*	Vulnerable	The Spiny Peppercress occurs in periodically wet sites such as gilgai depressions and the margins of freshwater and saline marshes and shallow lakes, usually on heavy clay soil. Almost all sites receive some degree of soil waterlogging or seasonal flooding.	PMST	No previous records	N/A	Study area outside the known distribution of the species – all previous records northeast of this region, inland between Warrnambool and Geelong and towards Horsham. **Unlikely to occur.**
Basalt Peppercress	*Lepidium hyssopifolium s.s.*	Endangered	Known to establish on open, bare ground with limited competition from other plants. Previously recorded from Eucalypt woodland with a grassy ground cover, low open *Casuarina* woodland with a grassy ground cover and tussock grassland. Now generally found amongst exotic pasture grasses and beneath exotic trees (DCCEEW 2023).	PMST	No previous records	N/A	No suitable habitat in the study area. Also study area generally outside the known distribution of the species – almost all previous records northeast of this region, inland between Warrnambool and Macedon, plus one record from 1983 near the Nelson estuary more than 60km west (possible mis-identification). **Unlikely to occur.**
Gorae Leek-orchid	*Prasophyllum diversiflorum*	Endangered	Wet grasslands or inundated swamps among tussocks (Jones 2006).	VBA	No records since pre-1990	N/A	No suitable habitat. Wetlands in the study area severely disturbed from cattle and within introduced pasture grasses lacking native grass tussocks and sedges. No records since 1990 in search area, nearest record was in 1949 at Nuns Beach 3.5km north. Next nearest records are from 1933, 1942 and 1948 in Cobboboonee National Park more than 16km northwest. **Unlikely to occur.**

Common Name	Scientific name	EPBC	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Maroon Leek-orchid	*Prasophyllum frenchii*	Endangered	Grows mainly in open sedge swampland or in wet grassland and wet heathland generally bordering swampy regions. Sites are generally low altitude, flat and moist. Soils are generally moderately rich damp sandy or black clay loams. Climate is mild, with an annual rainfall of 600–1100 mm, occurring predominantly in winter and spring (DCCEEW 2023).	VBA	No records since pre-1990	N/A	No suitable habitat. Wetlands in the study area severely disturbed from cattle and within introduced pasture grasses lacking native grasses and sedges. No records since 1990 in search area, nearest record was in 1947 at Nuns Beach 3.5km north. Next nearest record is from 1945 near Cobboboonee National Park more than 16km northwest. **Unlikely to occur.**
Dense Leek-orchid	*Prasophyllum spicatum*	Vulnerable	Occurs in coastal and near-coastal heathland and heathy woodland. Soils are generally sandy, with some sites seasonally waterlogged (Duncan 2010).	PMST & VBA	No records since pre-1990	N/A	No suitable habitat. Original coastal heath and woodland habitat in the study area prior to agricultural land uses has been cleared and not present – degraded scrub in the roadside densely infested with introduced grass and other weeds. No previous records in search area since 1990, two old records from 1980's are on developed land. Nearest recent record is at Cobboboonee National Park. **Unlikely to occur.**
Green-striped Greenhood	*Pterostylis chlorogramma*	Vulnerable	Occurs in mixed Box-Stringybark forest with a shrubby understorey, often with *Pteridium esculentum* as a major component on sandy or clay loam soils (Duncan et al. 2009).	PMST	No previous records	N/A	No suitable habitat. Modelled pre-settlement vegetation is heathland and heathy woodland, not Box-Strongybark Forest. Vegetation prior to agricultural land uses has been cleared and not present – degraded scrub in the roadside has some Austral Bracken but also densely infested with introduced grass and other weeds. No previous records in search area. Nearest records at Mount Clay more than 17km northeast. **Unlikely to occur.**
Leafy Greenhood	*Pterostylis cucullata*	Vulnerable	Tea-tree scrubs on tall sandy and calcareous dunes, in moist, open or even deep shaded locations (Jones 1994).	PMST	No previous records	N/A	No suitable habitat. Original coastal heath and woodland habitat in the study area prior to agricultural land uses has been cleared and not present – degraded scrub in the roadside densely infested with introduced grass and other weeds. No previous records in search area. Nearest recent records limited to Budj Bim National Park more than 40km northwest. **Unlikely to occur.**
Swamp Fireweed	*Senecio psilocarpus*	Vulnerable	Herb-rich winter-wet swamps on volcanic clays or peaty soils (Walsh 1999). Known from approximately 10 sites between Wallan, about 45 km north of Melbourne, and Honans Scrub in south-eastern South Australia (TSSC 2008).	PMST	No previous records	N/A	Wetlands and roadside drainage lines in the study area severely disturbed and within introduced pasture grasses lacking native grasses and sedges. But some marginally suitable habitat within wetlands in the southern lot parcel and drainage line along Oleria Road (albeit highly degraded). No records in search area, nearest few records are in Cobboboonee Forest Park more than 13km northwest. **No individuals were recorded during targeted surveys. Unlikely to occur.**
Slender Plum-orchid	*Thelymitra orientalis*	Critically Endangered	Occurs in heath and heathy woodland, usually in damp/seepage areas along watercourses and around swamp margins, on either in peaty white sands or heavy black often peaty soils (DEECA 2023; RBGV 2023).	PMST	No VBA records	N/A	No suitable habitat. Original coastal heath and woodland habitat in the study area prior to agricultural land uses has been cleared and not present – degraded scrub in the roadside densely infested with introduced grass and other weeds. Additionally, there are no records in search area. **Unlikely to occur.**
Swamp Everlasting	*Xerochrysum palustre*	Vulnerable	Grows in wetlands including sedge-swamps and shallow freshwater marshes, often on heavy black clay soils. Commonly associated genera include *Amphibromus, Baumea, Carex, Chorizandra, Craspedia, Eleocharis, Isolepis, Lachnagrostis, Lepidosperma, Myriophyllum, Phragmites australis, Themeda triandra* and *Villarsia* (DCCEEW 2023).	PMST	No previous records	N/A	Wetlands and roadside drainage lines in the study area severely disturbed and within introduced pasture grasses lacking native grasses and sedges. But some marginally suitable habitat within wetlands in the southern lot parcel and drainage line along Oleria Road (albeit highly degraded). No previous records in search area, nearest few records are in Cobboboonee Forest Park more than 18km northwest and Bessiebelle State Forest more than 27km northeast. **No individuals were recorded during targeted surveys. Unlikely to occur.**

Likelihood of occurrence of listed fauna species

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Birds								
Australasian Bittern	*Botaurus poiciloptilus*	Endangered		Terrestrial wetlands, including a range of wetland types but prefers permanent water bodies with tall dense vegetation, particularly those dominated by sedges, rush, reeds or cutting grass (Marchant & Higgins 1990).	PMST & VBA	59	8/08/2021	No suitable habitat - **Unlikely to occur.**
Australian Painted-snipe	*Rostratula australis*	Endangered	CAMBA	Generally, inhabits shallow terrestrial freshwater wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of *Lignum muehlenbeckia* or canegrass or sometimes tea-tree (*Melaleuca*). Sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber (DCCEEW 2023).	PMST & VBA	No records since pre-1990	N/A	No suitable habitat or historic records - **Unlikely to occur.**
Bar-tailed Godwit	*Limosa lapponica*	Vulnerable	BONN A2H, ROKAMBA, JAMBA, CAMBA	Mainly coastal species, usually in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats (Higgins & Davies 1996).	PMST & VBA	8	11/04/2003	No suitable habitat - **Unlikely to occur.**
Black-faced Monarch	*Monarcha melanopsis*		BONN A2H	Rainforests, eucalypt woodlands, coastal scrub and damp gullies (Higgins et al. 2006)	PMST	No previous records	N/A	Outside of known distribution - **Unlikely to occur.**
Blue-winged Parrot	*Neophema chrysostoma*	Vulnerable		Occupies coastal, subcoastal and inland habitats ranging into semi-arid zones. Throughout much of range inhabits grasslands and grassy woodlands and forest (Higgins 1999).	PMST & VBA	79	6/12/2019	Recorded in study area during field assessment.
Caspian Tern	*Hydroprogne caspia*		CAMBA, JAMBA	Sheltered coastal embayment, including harbours, lagoons, inlets, estuaries and river deltas, usually with sandy or muddy margins (Higgins & Davies 1996).	VBA	19	31/01/2019	No suitable habitat - **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Common Greenshank	*Tringa nebularia*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands (Higgins & Davies 1996).	PMST & VBA	2	1/09/1999	No suitable habitat - **Unlikely to occur.**
Common Sandpiper	*Actitis hypoleucos*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Inhabits a wide range of coastal or inland wetlands with varying levels of salinity, mainly muddy margins or rocky shores of wetlands. In Victoria, mostly found Westernport and Port Phillip Bay (Higgins & Davies 1996).	PMST & VBA	24	4/11/2000	No suitable habitat - **Unlikely to occur.**
Curlew Sandpiper	*Calidris ferruginea*	Critically Endangered	BONN A2H, ROKAMBA, JAMBA, CAMBA	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands (Higgins & Davies 1996).	PMST & VBA	6	2/10/2018	No suitable habitat - **Unlikely to occur.**
Diamond Firetail	*Stagonopleura guttata*	Vulnerable		Commonly found in box-ironbark forests and woodlands and also occurs along watercourses and in farmland areas. Widespread but scattered. Forages on a wide range of seeds, which in some cases a large portion can be derived from weed species (Read 1994). Populations have declined in Victoria since the 1950s (Emison et al. 1987; Tzaros 2005).	PMST & VBA	No records since pre-1990	N/A	Scarcity of records from search region - **Unlikely to occur.**
Double-banded Plover	*Charadrius bicinctus*		BONN A2H	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands (Marchant & Higgins 1993).	VBA	No records since pre-1990	N/A	No suitable habitat - **Unlikely to occur.**
Eastern Curlew	*Numenius madagascariensis*	Critically Endangered	BONN A1, ROKAMBA, JAMBA, CAMBA	Inhabits sheltered coasts, especially estuaries, embayment, harbours, inlets and coastal lagoons with large intertidal mudflats or sandflats, often with beds of sea grass (Higgins & Davies 1996).	PMST & VBA	4	3/12/2004	No suitable habitat - **Unlikely to occur.**
Eastern Osprey	*Pandion cristatus*		BONN A2S	Rare vagrant to Victoria (Marchant & Higgins 1993). Littoral and coastal habitats and terrestrial wetlands. They are mostly found in coastal areas but occasionally travel inland along major rivers (Johnstone & Storr 1998; Marchant & Higgins 1993; Olsen 1995). They require extensive areas of open fresh, brackish or saline water for foraging (Marchant & Higgins 1993).	VBA	No records since pre-1990	N/A	Scarcity of records from search region - **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Fairy Tern	*Sternula nereis*	Vulnerable		Generally restricted to sheltered coasts both on the mainland, and inshore and offshore islands. Occurs in embayment, such as harbours, inlets, bays, estuaries, lagoons, and ocean beaches. Also found on lakes and salt ponds (Higgins & Davies 1996).	PMST & VBA	No records since pre-1990	N/A	No suitable habitat - **Unlikely to occur.**
Fork-tailed Swift	*Apus pacificus*		CAMBA, ROKAMBA, JAMBA	The species can occur in wet sclerophyll forest but mainly prefers open forest or plains. It is almost exclusively aerial and feeds up to hundreds on metres above the ground, but can feed among open forest canopy. The species breeds internationally and seldom roosts in trees (Higgins 1999).	PMST & VBA	10	31/01/2020	May occasionally forage over study area - **Potential to occur.**
Gang-gang Cockatoo	*Callocephalon fimbriatum*	Endangered		In summer generally in tall mountain forests and woodlands, particularly in heavily timbered, mature wet sclerophyll forests and woodlands. Prefer *Eucalyptus* dominated assemblages. Also occurs in subalpine snow gum woodlands and occasionally in temperate rainforests and regenerating forests. In winter occur at lower altitudes in drier, more open *Eucalyptus* woodland (Higgins 1999).	PMST & VBA	48	24/02/2021	No suitable habitat - **Unlikely to occur.**
Great Knot	*Calidris tenuirostris*	Critically Endangered	BONN A2H, ROKAMBA, JAMBA, CAMBA	In Australasia, the species typically prefers sheltered coastal habitats, with large intertidal mudflats or sandflats. This includes inlets, bays, harbours, estuaries and lagoons. They are occasionally found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, saltlakes and non-tidal lagoons. The Great Knot rarely occurs on inland lakes and swamps (DCCEEW 2023).	VBA	1	17/02/1992	No suitable habitat - **Unlikely to occur.**
Greater Sand Plover	*Charadrius leschenaultii*	Vulnerable	BONN A2H, ROKAMBA, JAMBA, CAMBA	Entirely coastal; mainly on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks. In Vic. Mostly in Corner inlet, Westernport and Port Phillip Bay (Marchant & Higgins 1993).	PMST	No previous records	N/A	No suitable habitat - **Unlikely to occur.**
Grey Falcon	*Falco hypoleucos*	Vulnerable		Inhabits arid and semi-arid zones; mainly on sandy and stony plains of inland drainage systems, lightly timbered with acacia. Hunt far into open areas, over spinifex, tussock grasslands and low shrublands. In Victoria, few records mostly in north and northwestern regions (Marchant & Higgins 1993).	PMST	No previous records	N/A	Outside of known distribution - **Unlikely to occur.**
Grey Plover	*Pluvialis squatarola*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Entirely coastal, but occasionally inland. Mainly on marine shores, inlets, estuaries and lagoons where there are nearby large tidal mudflats for feeding and sandy beaches for roosting (Marchant & Higgins 1993).	VBA	3	3/01/2000	No suitable habitat - **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Hooded Plover	*Thinornis cucullatus*	Vulnerable		Inhabits sandy ocean beaches, especially those that are broad and flat, with a wide wave-wash zone for feeding. Widespread and scattered across coastal Victoria. Numbers reduced due to disturbance by recreational activities on beaches (Marchant & Higgins 1993).	PMST & VBA	30	11/07/2021	No suitable habitat - **Unlikely to occur.**
Hooded Robin	*Melanodryas cucullata*	Endangered		Occur mostly in open Grey Box, White Box, Yellow Box, Yellow Gum and Ironbark woodlands with pockets of saplings or taller shrubs, an open shrubby understorey, sparse grasses and patches of bare ground and leaf-litter, with scattered fallen timber. The population has declined throughout range, especially since the early 1980s. This species typically occurs north of the great divide in shrubland or woodland dominated by acacias (Higgins & Peter 2002; Tzaros 2005).	VBA	20	2/07/1991	Outside of known distribution - **Unlikely to occur.**
Latham's Snipe	*Gallinago hardwickii*	Vulnerable	BONN A2H, ROKAMBA, JAMBA, CAMBA	Occurs in wide variety of permanent and ephemeral wetlands; it prefers open freshwater wetlands with dense cover nearby, such as the edges of rivers and creeks, bogs, swamps, waterholes. The species is widespread in southeast Australia and most of its population occurs in Victoria, except in the northwest of the state (Naarding 1983; Higgins & Davies 1996).	PMST & VBA	31	29/01/2021	Suitable habitat occurs within study area and recent records from search region - **Potential to occur.**
Little Tern	*Sternula albifrons*		BONN A2S, ROKAMBA, JAMBA, CAMBA	Sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets, especially those with exposed sandbanks or sand spits. In Victoria, they are found mainly on the east coast between Mallacoota and Corner Inlet, rare elsewhere (Higgins & Davies 1996).	PMST & VBA	No records since pre-1990	N/A	No suitable habitat - **Unlikely to occur.**
Malleefowl	*Leipoa ocellata*	Vulnerable		Mainly in semi-arid zones (200–450 mm rainfall), but in higher rainfall area of heath and mallee-heath. Rarely occurs in arid zones. Associated with mallee, particularly floristically rich tall dense mallee of higher rainfall areas (Marchant & Higgins 1993). Notably in Victoria, a small, isolated population does occur in Wychitella Flora and Fauna Reserve near Wedderburn (DSE 2003).	VBA	1	1/12/1990	No suitable habitat - **Unlikely to occur.**
Marsh Sandpiper	*Tringa stagnatilis*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Inhabits sandy, muddy or rocky shores, usually coastal, rarely far inland. Often on beaches and mudflats, sandflats and occasionally rock shelves (Higgins & Davies 1996).	VBA	No records since pre-1990	N/A	No suitable habitat - **Unlikely to occur.**
Orange-bellied Parrot	*Neophema chrysogaster*	Critically Endangered		The Orange-bellied Parrot is endemic to south-eastern Australia. Its current non-breeding mainland distribution is from the mouth of the Murray River in South Australia, along the coast, to the east of Jack Smith Lake in South Gippsland, Victoria, covering approximately 1000 km of coastline. The most used sites in Victoria are around Port Phillip Bay and Bellarine Peninsula. In South Australia, Carpenter Rocks is the main site. During winter on the mainland, found mostly within 3 km of the coast. In Victoria, they mostly occur in sheltered coastal habitats, such as bays, lagoons and estuaries, or, rarely, saltworks. They are also found in low samphire herbland dominated by Beaded Glasswort *Sarcocornia quinqueflora*, Sea Heath *Frankenia pauciflora* or Sea-blite *Suaeda australis*, and in taller shrubland dominated by Shrubby Glasswort *Sclerostegia arbuscula*. They are sometimes found in low samphire dominated by Grey Glasswort *Halosarcia halocnemoides* or in	PMST	No previous records	N/A	Lack of suitable habitat and no historic records - **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
				Chenopodium herbfields. Breeds at Melaleuca in Tasmania during spring/summer months (DCCEEW 2023).				
Painted Honeyeater	*Grantiella picta*	Vulnerable		Inhabits box-ironbark forests and woodlands and mainly feeds on the fruits of mistletoe. Strongly associated with mistletoe around the margins of open forests and woodlands. Can also be found in farmland containing remnant treed vegetation. Occurs at few localities. Uncommon breeding migrant from further north, arriving in October and leaving in February (Higgins et al. 2001; Tzaros 2005).	PMST	No previous records	N/A	Lack of suitable habitat and no historic records - **Unlikely to occur.**
Pectoral Sandpiper	*Calidris melanotos*		BONN A2H, ROKAMBA, JAMBA	Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation (Higgins & Davies 1996).	PMST & VBA	1	2/03/2006	No suitable habitat - **Unlikely to occur.**
Plains-wanderer	*Pedionomus torquatus*	Critically Endangered		This species is highly sensitive to changes in grassland cover and density. Typically inhabits treeless native grasslands with sparse cover, with a preference for grasslands composed of wallaby grass and spear grass (Marchant & Higgins 1993). Habitat becomes unsuitable when grassland becomes dense (CA 2016). Evidence suggests it avoids areas of tree cover, with no records of the species within 300m of trees (>10m high) in their strongholds in New South Wales or Victoria (CA 2016).	PMST	No previous records	N/A	Lack of suitable habitat and no historic records - **Unlikely to occur.**
Red Knot	*Calidris canutus*	Endangered	BONN A2H, ROKAMBA, JAMBA, CAMBA	In Australasia, the Red Knot mainly inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps (DCCEEW 2023).	PMST	No previous records	N/A	No suitable habitat - **Unlikely to occur.**
Red-necked Stint	*Calidris ruficollis*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation (Higgins & Davies 1996).	VBA	4	1/11/1999	No suitable habitat - **Unlikely to occur.**
Red-tailed Black-Cockatoo (south-eastern)	*Calyptorhynchus banksii graptogyne*	Endangered		Prefer eucalypt forests and woodlands but often in adjacent acacia or *Casuarina* woodlands. In Victoria, subsp. graptogyne inhabits mostly in or at edge of patches of Brown Stringybark woodlands in pasture or in remnant copses of River Red-gum (Higgins 1999).	PMST & VBA	1	7/01/2013	No suitable habitat - **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Ruddy Turnstone	*Arenaria interpres*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation (Higgins & Davies 1996).	VBA	No records since pre-1990	N/A	No suitable habitat - **Unlikely to occur.**
Rufous Fantail	*Rhipidura rufifrons*		BONN A2H	In east and south-east Australia, mainly inhabits tall wet sclerophyll forests, often in gullies. When on passage in warmer months, they are sometimes recorded in drier sclerophyll forests and woodlands, as well as parks and gardens (Higgins et al. 2006). Virtually absent from south-eastern Australia during winter (Higgins et al. 2006).	PMST & VBA	11	17/10/2004	Lack of suitable habitat but may occasionally visit study area when on passage during warmer months - **Potential to occur.**
Sanderling	*Calidris alba*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Inhabits open sandy beaches exposed to sea-swells; also, on exposed sandbars and spits (Higgins & Davies 1996).	VBA	No records since pre-1990	N/A	No suitable habitat - **Unlikely to occur.**
Satin Flycatcher	*Myiagra cyanoleuca*		BONN A2H	Mostly found in eucalypt forest, particularly tall wet forests and woodland within gullies (Higgins et al. 2006). Also inhabits eucalypt woodland comprising an open understorey and a grassy ground layer (Higgins et al. 2006). Generally absent from rainforest (Higgins et al. 2006).	PMST & VBA	7	18/12/2010	Lack of suitable habitat but may occasionally visit study area when on passage during warmer months - **Potential to occur.**
Sharp-tailed Sandpiper	*Calidris acuminata*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation (Higgins & Davies 1996).	PMST & VBA	15	27/10/2018	No suitable habitat - **Unlikely to occur.**
Swift Parrot	*Lathamus discolor*	Critically Endangered		Prefers a select range of eucalypts in Victoria, including Yellow Gum, Grey Box, White Box, Red Ironbark and Yellow Box, as well as River Red-gum when this species supports abundant 'lerp' (Saunders & Tzaros 2011). The species is also known to forage within planted stands of Spotted Gum and Sugar Gum (Nature Advisory; unpublished data). Breeds in Tasmania and migrates to the mainland of Australia for the autumn, winter and early spring months. It lives mostly north of the Great Dividing Range, passing through two areas of Victoria on migration: the Port Phillip district and Gippsland (Emison et al. 1987; Higgins 1999; Kennedy & Tzaros 2005). Though it is also not uncommonly sighted in urban areas (Nature Advisory; unpublished data). Occurrence of this species on the mainland can substantially change from year to year depending on food availability, giving potential for this species to occur almost anywhere throughout its range (Emison et al. 1987).	PMST	No previous records	N/A	Lack of suitable habitat and no historic records - **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Terek Sandpiper	*Xenus cinereus*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Inhabits saline intertidal mudflats in sheltered estuaries, harbours and lagoons; on islets, mudbanks, sandbanks or spits. In Victoria, they occur in Corner Inlet, Westernport Bay and Port Phillip Bay (Higgins & Davies 1996).	VBA	No records since pre-1990	N/A	No suitable habitat - **Unlikely to occur.**
White-throated Needletail	*Hirundapus caudacutus*	Vulnerable	CAMBA, ROKAMBA, JAMBA	Aerial, over all habitats, but probably more over wooded areas, including open forest and rainforest. Often over heathland and less often above treeless areas such as grassland and swamps or farmland (Higgins 1999).	PMST & VBA	No records since pre-1990	N/A	May occasionally forage over study area - **Potential to occur.**
Wood Sandpiper	*Tringa glareola*		BONN A2H, ROKAMBA, JAMBA, CAMBA	Inhabits well vegetated, shallow, freshwater wetlands, such as swamps, lakes, pools, and waterholes; typically, with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reed. In Victoria, they are mostly from Port Phillip Bay and in mid-Murray valley (Higgins & Davies 1996).	VBA	5	2/03/2006	Lack of suitable habitat and scarcity of recent historic records - **Unlikely to occur.**
Yellow Wagtail	*Motacilla flava*		CAMBA, JAMBA, ROKAMBA	Common migrant from Asia. Inhabits moist, grassy or muddy areas, sewage treatment plants, sports fields, tracks or bare ground, occasionally on beaches (Menkhorst et al. 2019).	PMST	No previous records	N/A	Suitable habitat occurs but no historic records - **Unlikely to occur.**
Mammals								
Heath Mouse	*Pseudomys shortridgei*	Endangered		In eastern Australia, Heath Mouse prefers recently burnt (preferably 7–10 years post fire), floral species-rich, treeless, dry heathlands in an area with 600 mm annual rainfall. The optimum situation for the species appears to be a mosaic of habitats of differing maturity, subject to the disturbance by fire. Typical habitats include dry heath, and forest and woodland with a heathy understorey (Menkhorst 1995). In Victoria, the species is restricted to the wannon region in the far west of the state.	PMST & VBA	16	7/02/1994	Scarcity of records from search region and lack of suitable habitat - **Unlikely to occur.**
Long-nosed Potoroo	*Potorous tridactylus trisulcatus*	Vulnerable		In Victoria, the species occupies a wide variety of wet forest and wet scrub, usually occuring on sandy loam soils where rainfall exceeds 750mm annually (Menkhorst 1995); In Tasmania, moist forest with dense shrub layer; in the north edge of rainforest (Menkhorst 1995). Dense understorey vegetation is an essential component for the species persistence, which can consist of grass trees, sedges, ferns, heath, tea-tree or melaleucas (Menkhorst 1995).	PMST & VBA	No records since pre-1990	N/A	Scarcity of records from search region and lack of suitable habitat - **Unlikely to occur.**
New Holland Mouse	*Pseudomys novaehollandiae*	Vulnerable		Suitable habitat includes coastal heath and scrub, heathy woodland, open forest and vegeatated sand-dunes, with dry heath regenrating post-fire appearing to be optimal for the species (Menkhorst 1995). Victorian records are largely restricted to the localities of Anglesea, Westernport and Gippsland lakes.	PMST	No previous records	N/A	Scarcity of records from search region and lack of suitable habitat - **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Smoky Mouse	*Pseudomys fumeus*	Endangered		Smoky Mouse occurs in a wide variety of habitats, from heath to dry sclerophyll forest, especially along ridgetops with a heath understorey, and occasionally adjacent wetter habitats such as fern gullies (Menkhorst 1995). A characteristic of many localities, except those in wet gullies, is a floristically diverse shrub layer with members of the plant families *Epacridaceae, Fabaceae* and *Mimosaceae* well represented (DCCEEW 2023). Shrub seeds and berries are important food sources for the species, with fire frequency and intensity highly influential in the occurrence of such habitat, and ultimately the species (Menkhorst 1995).	PMST	No previous records	N/A	Scarcity of records from search region and lack of suitable habitat - **Unlikely to occur.**
Southern Brown Bandicoot	*Isoodon obesulus obesulus*	Endangered		Suitable habitat for Southern Brown Bandicoots (eastern) is defined to be any patches of native or exotic vegetation, within their distribution, which contains understorey vegetation structure with 50–80% average foliage density in the 0.2–1 m height range. In areas where native habitats have been degraded or diminished, exotic vegetation, such as Blackberry (*Rubus* spp.), can and often does, provide important habitat (DCCEEW 2023).	PMST & VBA	37	23/06/2017	Recent nearby records and suitable habitat present in the form of roadside vegetation - **Likely to occur.**
Spot-tailed Quoll	*Dasyurus maculatus maculatus*	Endangered		Rainforest, wet and dry forest, coastal heath and scrub and River Red-gum woodlands along inland rivers (Menkhorst 1995).	PMST & VBA	No records since pre-1990	N/A	No recent records from search region and lack of suitable habitat - **Unlikely to occur.**
Swamp Antechinus	*Antechinus minimus maritimus*	Vulnerable		Dense wet heath, tussock grassland, sedgeland heathy woodland and coastal heath and scrub (Menkhorst 1995). Requires mature, dense vegetation with thick ground cover (DCCEEW 2023). Shelters in short burrows or underneath dense leaf litter. Rarely occurs more than 200m above sea level. Though this species has also previously been detected at sites which had experienced some structural disturbance in the South Gippsland region (Nature Advisory; unpublished data).	PMST & VBA	No records since pre-1990	N/A	No recent records from search region, however, there is suitable habitat within and adjacent to the study area - **Potential to occur.**
Yellow-bellied Glider	*Petaurus australis*	Vulnerable		Forests with a predominance of smooth-barked eucalypts, as well as a mixture of eucalypt species. Uncommon in wet forests dominated by single tree species; a mixture of tree species is preferred (Menkhorst 1995). Inhabits a range of forest types, depending on the location in Victoria - western populations use dry woodland and forest, whereas southern, eastern and northeastern populations use a variety of wet forest types (Menkhorst 1995). Require large hollows in large, old trees. In Mountain Ash forest dependent on extensive stands of old-growth forest - rare in young forest even when scattered old trees are available (Menkhorst 1995). Will persist in corridors as narrow as 200 m (Menkhorst 1995).	PMST	No previous records	N/A	No suitable habitat - **Unlikely to occur.**
Bats								
Grey-headed Flying-fox	*Pteropus poliocephalus*	Vulnerable		Brisbane, Newcastle, Sydney and Melbourne are occupied continuously. Elsewhere, during spring, they are uncommon south of Nowra and widespread in other areas of their range. Roosts in aggregations of various sizes on exposed branches. Roost sites are typically located near water, such as lakes, rivers or the coast. Roost vegetation includes rainforest patches, stands of *Melaleuca*, mangroves and riparian vegetation, but colonies also use highly modified vegetation in urban and suburban areas (DCCEEW 2023).	PMST & VBA	2	19/07/2013	No suitable habitat - **Unlikely to occur.**
Southern Bent-winged Bat (southern ssp.)	*Miniopterus orianae bassanii*	Critically Endangered		Roosts in caves during the day, dispersing over a range of habitats at night. Its feeding areas tend to be associated with major drainage systems (Menkhorst 1995).	PMST & VBA	35	9/09/2016	May occasionally forage over study area - **Potential to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Source	Number of records	Date of last record	Likelihood of occurrence
Reptiles								
Swamp Skink	*Lissolepis coventryi*	Endangered		Wetlands including swamp margins, lakes, rivers, creeks and even tidal salt marshes, often associated with tea-tree thickets (Wilson & Swan 2003).	PMST & VBA	1	20/02/2006	Nearby historical record but wetland habitat marginal and highly degraded through history of grazing - **Unlikely to occur.**
Fish								
Australian Grayling	*Prototroctes maraena*	Vulnerable		Large and small coastal streams and rivers with cool, clear waters with a gravel substrate and altering pools and riffles (Cadwallader & Backhouse 1983).	PMST	No previous records	N/A	No suitable habitat - **Unlikely to occur.**
Dwarf Galaxias	*Galaxiella pusilla*	Vulnerable		Ranges from the far west of the state through to the Mitchell River basin in central Gippsland. Vegetated margins of still water, ditches, swamps and backwaters of creeks, both ephemeral and permanent (Allen et al. 2002). Some wetlands where it occurs may partially or completely dry up during summer, with such wetlands reliant on seasonal flooding plus linkages to other sites where the species occurs, for habitat and population replenishment (Saddlier, Jackson & Hammer 2010). Dwarf Galaxias is also often found in association with burrowing freshwater crayfish (*Engaeus* spp.), with the crayfish burrows reportedly providing refuge from predators and dry conditions for the species (Saddlier, Jackson & Hammer 2010).	PMST	No previous records	N/A	No suitable habitat - **Unlikely to occur.**
Yarra Pygmy Perch	*Nannoperca obscura*	Vulnerable		Streams and small lakes, prefers flowing water with abundant aquatic vegetation (Allen et al. 2002).	PMST	No previous records	N/A	No suitable habitat - **Unlikely to occur.**
Amphibians								
Growling Grass Frog	*Litoria raniformis*	Vulnerable		Permanent, still or slow flowing water with fringing and emergent vegetation in streams, swamps, lagoons and artificial wetlands such as farm dams and abandoned quarries (Clemann & Gillespie 2004).	PMST & VBA	No records since pre-1990	N/A	No recent records from search region and lack of suitable permanent habitat - **Unlikely to occur.**
Mussels, decapod crustacea								
Glenelg Spiny Crayfish	*Euastacus bispinosus*	Endangered		Glenelg Spiny Freshwater Crayfish is considered a specialist species with typically low tolerance to environmental conditions (namely dissolved oxygen concentrations), ensuring that species requires specific habitat requirements. As with other Euastacus species, Glenelg Spiny Freshwater Crayfish have a preference for permanently flowing, cool (and shaded) and well-oxygenated water (Morgan 1986; Morgan 1997). Other habitat requirements vary across Victorian and South Australian populations.	PMST	No previous records	N/A	No recent records from search region and lack of suitable habitat - **Unlikely to occur.**