Hydrogen Jobs Plan PM CEMP Final

Protected Matters Construction Environmental Management Plan

Final

August 2025

Hydrogen Jobs Plan PM CEMP Final

Protected Matters Construction Environmental Management Plan

Final

Prepared by
EBS Ecology (now Umwelt (Australia) Pty Ltd)

On behalf of
Office of Hydrogen Power South Australia (now Department for Energy and Mining)

Project Director:	Travis How
Project Manager:	Marina Louter
Report Author:	Marina Louter
Report No.:	R01 V6
Date:	August 2025

112 Hayward Avenue, Torrensville, SA 5031

This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Acknowledgement of Country

Disclaimer

This document has been prepared for the sole use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that for which it was supplied by Umwelt (Australia) Pty Ltd (Umwelt). No other party should rely on this document without the prior written consent of Umwelt.

Umwelt undertakes no duty, nor accepts any responsibility, to any third party who may rely upon or use this document. Umwelt assumes no liability to a third party for any inaccuracies in or omissions to that information. Where this document indicates that information has been provided by third parties, Umwelt has made no independent verification of this information except as expressly stated.

Document Status

Rev No.	Reviewer Name	Date	Approved for Issue Name	Date
V1	Dr M. Louter	16/10/2024	-	-
V2	Dr M. Louter	31/10/2024	Lathwida and OHPSA	31/10/2024
V3	Dr M. Louter	19/11/2024	Lathwida and OHPSA	19/11/2024
V4	Dr M. Louter	02/12/2024	Lathwida and OHPSA	02/12/2024
V5	D. Bryson	02/07/2025	DEM	02/07/2025
V6	Dr M. Louter	19/08/2025	DEM	19/08/2025

Distribution of Copies

Revision No.	Date issued	Media	Issued to
1	16/10/2024	Electronic	S. Milne and A. Mayo, JBS&G
2	31/10/2024	Electronic	S. Milne and A. Mayo, JBS&G
3	19/11/2024	Electronic	N. Bull, Lathwida
4	02/12/2024	Electronic	N. Bull, Lathwida
5	02/07/2025	Electronic	K Turner, DEM
6	19/08/2025	Electronic	K Turner, DEM

Declarations

Declaration of Accuracy

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (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 Regulation 2000* (Cth). 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 decision.

Signed	Martin Reid
Full name (please print)	Martin Reid
Organisation (please print)	Office of Hydrogen Power South Australia (now part of Department for Energy and Mining)
Role (please print)	Director
Date	20/08/25
Proponent /approval holder and ACN or ABN	Department for Energy and Mining ABN: 83768683934
EPBC Referral Number:	2023/09759
Project Name:	South Australian Government Renewable Hydrogen Power Station, Electrolysers and Storage Facility (referred to below as the Hydrogen Jobs Plan).
Document name	Hydrogen Jobs Plan Hydrogen Jobs Plan Protected Matters Construction Environmental Management Plan
Location of the action	The proposed Project is located at Lincoln Highway, Whyalla Barson in South Australia. The proposed HJP location is on the urban fringes of Whyalla near the Whyalla industrial precinct.

Abbreviations

Abbreviation	Description
AAR	Aboriginal Affairs and Reconciliation (division of Attorney-General's Department)
AEP	Annual Exceedance Probability
AOO	Area of Occupancy: area within a species' extent of occurrence which is occupied by a species, excluding cases of vagrancy
BDAC	Barngarla Determination Aboriginal Corporation
BDBSA	Biological Databases of South Australia
CAZ	Construction Activity Zones
CEMP	Construction Environmental Management Plan
CFA	Country Fire Authority
CFS	South Australian Country Fire Service
cm	Centimetres
CP	Conservation Park
DA	Development Approval
DBOM	Designed, built, operated and maintained
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEM	Department for Energy and Mining (South Australia)
DEW	Department for Environment and Water (South Australia)
Disturbance Footprint	The indicative Disturbance Footprint (consisting of the Primary Facility Footprint, the Northern Infrastructure Footprint and Southern Infrastructure Footprint) as shown in **Figure 5.1**
DotE	Department of the Environment (Commonwealth)
EBS	Environmental and Biodiversity Services Pty Ltd, trading as EBS Ecology
EMP	Environmental Management Plan
EOO	Extent of Occurrence: The area contained within the shortest continuous imaginary boundary that can be drawn to encompass all the known sites of present occurrence of a species, excluding cases of vagrancy
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ERP	Emergency Response Procedure
ESME	Environment and Safety Management System
FTE	Full-time equivalent
g	Grams
ha	Hectare(s)
HJP	Hydrogen Jobs Plan

Abbreviation	Description
HSEMS	Health, Safety and Environment Management System
IUCN	International Union for Conservation of Nature
km	Kilometre(s)
kV	Kilovolt
LDP	Land Disturbance Permit
MERI	Monitoring, Evaluation, Reporting and Improvement
MFS	Metropolitan Fire Service
MNES	Matter(s) of National Environmental Significance, as defined under the EPBC Act
NEM	National Electricity Market
OEMP	Operational Environmental Management Plan
OHPSA	Office of Hydrogen Power South Australia (now a part of DEM)
PMCEMP/the Plan	Hydrogen Jobs Plan Protected Matters Construction Environmental Management Plan
Project	The planning and development of a green hydrogen power station, electrolyser and storage facility, also referred to as the Hydrogen Jobs Plan
RAI	Request for Additional Information
SA	South Australia/South Australian
SAPN	SA Power Networks
sp.	Species (singular)
spp.	Species (plural)
SPRAT	Species Profile and Threats Database
ssp.	Subspecies
Study Area	The outer boundary of the area proposed containing the HJP site and indicative transmission line alignments (that were current at the time of the targeted bird surveys undertaken for the Project). The area defined by the red line on all maps in this report
the Proposed Action	South Australian Government Renewable Hydrogen Power Station, Electrolysers and Storage Facility (referred to below as the Hydrogen Jobs Plan or Project)
Umwelt	Umwelt Australia Pty Ltd (formerly EBS Ecology)
V	Vulnerable
WEC	Wildlife Ethics Committee
WoNS	Weeds of National Significance

Contents

Figures

Tables

1.0 Introduction

The Office of Hydrogen Power South Australia (OHPSA), an attached office to the Department for Energy and Mining (DEM), was tasked with delivering the Hydrogen Jobs Plan (HJP/the Project), a South Australian government project to establish a hydrogen production facility with associated storage capacity and hydrogen fuel-based power generation near Whyalla. On 20 February 2025, the South Australian Government announced that the HJP would be deferred. On 1 May 2025, the SA government gazette announced the abolishment of OHPSA and transfer of responsibilities for HJP to DEM. Any references to OHPSA throughout this document will hereby be considered references to DEM.

Several ecological constraints associated with the HJP were identified during surveys conducted in support of the Project, including potential impacts to the Western Grasswren (*Amytornis textilis myall*) and Southern Whiteface (*Aphelocephala leucopsis*), which are both listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Both species have historical and recent observations and suitable habitat within and surrounding the Project area.

OHPSA (on behalf of the Department for Energy and Mining) lodged a referral under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for the Proposed Action (EPBC Ref: 2023/09759) to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) as outlined in **Table 1.1**.

Table 1.1 EPBC Referral for the Hydrogen Jobs Plan Project

Proposed Action	Legal Entity	Referral Reference	Referral Decision	Assessment Process
South Australian Government Renewable Hydrogen Power Station, Electrolysers and Storage Facility	Department for Energy and Mining, South Australia	2023/09759	Controlled Action	A decision made under section 87 of the EPBC Act that it will be assessed by preliminary documentation.

On 5 April 2024, the Environment Minister's delegate determined that the Proposed Action was a Controlled Action and that it would be assessed on Preliminary Documentation. On 5 April 2024, the delegate provided a Request for Additional Information (RAI) setting out the information required to assess the relevant impacts of the Proposed Action.

Following assessment through the preliminary documentation pathway, OHPSA received notification from DCCEEW on 24 October 2024 that the proposed Action was approved (EPBC 2023/09759), subject to a number of conditions, including development of a Protected Matters Construction Environmental Management Plan.

1.1 Scope of this Document

This Hydrogen Jobs Plan Protected Matters Construction Environmental Management Plan (PMCEMP, the Plan) has been prepared for the HJP in response to the conditions of the EPBC approval. The PMCEMP outlines measures which will be implemented during pre-construction and construction to

avoid, minimise and/or mitigate potential impacts of the Action on Western Grasswren (*Amytornis textilis myall*) and Southern Whiteface (*Aphelocephala leucopsis*).

EPBC approval conditions 4 to 7 outline the requirement for a PMCEMP and the content of that document.

On 20 February 2025, the State Government announced that the HJP would be deferred. As a result, the construction period has been split into two phases:

- Phase 1 - Construction of electrical infrastructure.
- Phase 2- Construction of full project.

This PMCEMP will apply to both phases of construction. Should there be a time lapse between construction of electrical infrastructure (phase 1) and construction of the full project (phase 2) the mitigation measures and monitoring will be deferred at the end of phase 1 and until phase 2 commences, as operation of electrical infrastructure presents a low risk to threatened species.

1.1.1 Objectives

The purpose of this Plan is to outline the mitigation and preservation measures that will be undertaken throughout the pre-construction and construction phase of the Project. The objectives of this PMCEMP are to:

- Provide background information on the HJP.
- Provide species profile information on the Western Grasswren and Southern Whiteface.
- Provide information on the location of Western Grasswren and Southern Whiteface within the Project Area.
- Provide a summary of the likely direct and potential indirect impacts to the Western Grasswren and Southern Whiteface during pre-construction and construction phase of the HJP.
- Provide a risk assessment and management strategies to minimise impacts to Western Grasswren and Southern Whiteface individuals and their habitat during pre-construction and construction of the Project.

Implementation of this management plan will minimise the potential impact to Western Grasswren and Southern Whiteface and should be considered in conjunction with the documents listed in Section **3.0** of this Plan.

2.0 Compliance

2.1 Legislation, Policies and Guidelines

This Plan has been prepared by EBS Ecology (now Umwelt Australia Pty Ltd (Umwelt)) in accordance with the following relevant pieces of legislation, policies and guidelines:

- Commonwealth
  - Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).
  - Environmental Management Plan Guidelines (DCCEEW, 2024).
  - Relevant Conservation Advice, Recovery Plans and Threat abatement Plans, including:
    - Conservation Advice for Western Grasswren (*Amytornis textilis myall*) (DCCEEW, 2023a).
- Conservation Advice for Southern Whiteface (*Aphelocephala leucopsis*) (DCCEEW, 2023b)
  - Survey guidelines for Australia's threatened birds. Guidelines for detecting birds listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*.
  - National Light Pollution Guidelines for Wildlife (DCCEEW, 2023c).
- State
  - Planning, Development and Infrastructure Act 2016 (PDI Act).
  - National Parks and Wildlife Act 1972 (NPW Act).
  - Animal Welfare Act 1985.
- Local
  - There are no relevant local policies, legislation, guidelines and approval conditions as of June 2024.

2.2 Relevant Approval Conditions

OHPSA has obtained EPBC approval for the HJP that are relevant to the Western Grasswren and Southern Whiteface on 24 October 2024 (EPBC 2023/09759).

This document addresses the EPBC approval conditions (conditions 4 to 7) that outline the requirement for a PMCEMP. **Table 2.1** shows compliance with those conditions.

Table 2.1 Conditions of EPBC Act Approval Reference Table

Condition No.	Condition	References	How the PMCEMP addresses the condition
4	The approval holder must submit a Protected Matters Construction Environmental Management Plan (PMCEMP) to the department for the Minister's approval to protect, mitigate and repair harm to protected matters. In preparing	Whole document	This document is the PMCEMP.

Condition No.	Condition	References	How the PMCEMP addresses the condition
	the PMCEMP the approval holder must consider the **following documents**:		
a	Survey guidelines for Australia's threatened birds	Section **2.1**	Summarises relevant pieces of legislation, policies and guidelines considered in the preparation of this PMCEMP.
b	Relevant Conservation Advice, Recovery Plans and Threat abatement Plans	Section **2.1**	Summarises relevant pieces of legislation, policies and guidelines considered in the preparation of this PMCEMP.
c	National Light Pollution Guidelines for Wildlife	Section **2.1**	Summarises relevant pieces of legislation, policies and guidelines considered in the preparation of this PMCEMP.
5	The approval holder must not commence the Action unless the Minister has approved the PMCEMP in writing. The approval holder must commence implementing the approved PMCEMP no later than the commencement of the Action and continue to implement it until the **completion of all construction**.	Whole document	For noting
6	By implementing the PMCEMP, the approval holder must achieve the following environmental **outcomes**:		
a	prevent any avoidable harm to protected matters and mitigate and remediate unavoidable **and accidental harm to protected matters**.	Section **9.0**	Provides details of the mitigation measures, and specific management measures to mitigate and remediate unavoidable and accidental harm to protected matters.
7	The PMCEMP must be prepared by a suitably qualified ecologist. All commitments, including environmental outcomes, management measures, corrective measures, trigger values, limits and performance indicators in the PMCEMP must be SMART and based on referenced or	Whole document	For noting

Condition No.	Condition	References	How the PMCEMP addresses the condition
	included evidence of effectiveness. The PMCEMP must be consistent with the **Environmental Management Plan Guidelines, and must include:**		
a	details of the relevant protected matters and a reference to EPBC Act approval conditions to **which the plan refers**	Section **7.0** This table (**Table 2.1**)	Section **7.0** provides details of the relevant protected matters. This table (**Table 2.1**) provides a reference to EPBC Act approval conditions to which the PMCEMP refers.
b	a table of commitments made in the plan to achieve the environmental outcomes, and a reference to exactly where these commitments are detailed in the plan,	Section **9.0** Tables in Section **9.2.1 – 9.2.8**	Section **9.0** provides details of mitigation measures, a risk assessment and management measures. Section **9.2.1 – 9.2.8** tables provide management measures and commitments made in the PMCEMP.
c	an assessment of risks relating to achieving the environmental outcomes and risk management strategies and/or mitigation measures that will be applied to address identified risks,	Section **8.0** Section **9.0** Tables in Section **9.2.1 – 9.2.8**	Section **8.0** provides a summary of the risks and potential impacts to MNES. Section **9.0** provides details of mitigation measures, a risk assessment and management measures. Section **9.2.1 – 9.2.8** tables provide management measures and commitments made in the PMCEMP to address identified risks.
d	impact avoidance, mitigation and/or repair measures, and the timing of those measures,	Tables in Section **9.2.1 – 9.2.8**	Section **9.0** provides details of mitigation measures, a risk assessment and management measures. Section **9.2.1 – 9.2.8** tables detail the repair measures, and the timing of those measures.
e	a monitoring, evaluation and reporting framework that includes:	Section **9.3** Section **9.4** Section **9.5** Section **10.0** Section **11.0**	Section **9.3** provides details on the procedures for managing environmental emergencies. Section **9.4** provides details on response measures and corrective actions.

Condition No.	Condition	References	How the PMCEMP addresses the condition
			Section **9.5** provides an overview of risks associated with this Plan. Section **10.0** provides details of the monitoring program. Section **11.0** provides detail on the audit and review, which includes evaluation and reporting.
i)	performance indicators,	Section **11.0**	Provides detail on the audit and review, which includes evaluation and reporting.
ii)	trigger values for corrective measures,	Section **9.4** Section **9.5**	Provides details on response measures and corrective actions and an assessment of risks to achieving the Protected Matters CEMP's environmental objectives and associated risk management strategies that will be applied.
iii)	the timing and frequency of monitoring, ensuring monitoring is capable of detecting trigger values and changes in the performance indicators,	Section **10.0** Section **11.0**	Section **10.0** provides details of the monitoring program. Section **11.0** provides detail on the audit and review, which includes evaluation and reporting.
iv)	monitoring and analysis on the effectiveness of mitigation and corrective measures,	Section **10.0** Section **11.0**	Section **10.0** provides details of the monitoring program. Section **11.0** provides detail on the audit and review, which includes evaluation and reporting.
v)	any other specific monitoring measures to ensure that the environmental outcomes are being achieved.	Section **10.0** Section **11.0**	Section **10.0** provides details of the monitoring program. Section **11.0** provides detail on the audit and review, which includes evaluation and reporting.
f	references to other relevant plans or conditions of approval (including state approval conditions).	Section **3.0**	Provides details of the environmental management and sub-plans.

3.0 Environmental Management

OHPSA is committed to conducting its operations and activities to minimise disturbance to the environment in which it operates by using environmental standards consistent with development in technology, industry codes of practice and relevant statutory requirements. OHPSA has a Health, Safety and Environment Management System (HSEMS) that establishes a framework under which environmental management of OHPSA's activities takes place. It also ensures the identification of environmental impacts and that measures are in place to mitigate, measure and review impacts as well as environmental performance.

This Plan forms part of the suite of environmental management procedures established within the HSEMS and is part of the suite of documents which comprise the overarching Construction Environmental Management Plan. OHPSA will incorporate the relevant management actions into procedures and plans for contractors to comply with its contents.

The Construction Environmental Management Plan (CEMP)[1] is the document that describes the actions taken to minimise impacts prior to and during construction. This will include management, mitigation measures and monitoring procedure for the following aspects:

- Environmental Management Plan
- Rehabilitation Management Plan
- Weed, Pest and Disease Management Plan
- Sedimentation, Erosion and Drainage Management Plan
- Landholder Liaison
- Cultural Heritage Management
- Bushfire Management Plan
- Waste Management Plan.

Once construction is finished an Operational Environmental Management Plan (OEMP) will describe the actions DEM will take to minimise impacts during operation. For electrical infrastructure ElectraNet's overarching Environmental Management Plan will be applicable. DEM will prepare an OEMP for hydrogen infrastructure prior to commissioning.

[1] Phase 1 CEMP was prepared by ElectraNet and has been approved. Phase 2 – Hydrogen Production CEMP will be prepared by DEM prior to commencement of this phase.

4.0 Environmental Management Roles and Responsibilities

DEM has overarching responsibility for management of pre-construction and construction activities in the Project Area. All employees and contractors are responsible for conforming to applicable Australian and South Australian laws and regulations and conducting work in accordance with permit and approval conditions, OHPSA's HSEMS, CEMP, OEMP (and sub-plans) and this Plan.

An overview of the roles and responsibilities of OHPSA personnel and the Principal Contractors are summarised in **Table 4.1**. During Phase 1 ElectraNet will be the Principal Contractor with responsibility for construction of electrical infrastructure. During Phase 2 a separate Principal Contractor will be engaged to construct the remainder of plant onsite. Detailed descriptions of roles and responsibilities are provided in the Principal Contractor's Construction Environmental Management Plan and sub-plans.

Table 4.1 Roles and Responsibilities During the Project Planning, Construction and Operations Phase

Role	Responsibilities
Superintendent (or Representative)	• Responsible for ensuring the Contractor complies with the specification, requirements of this plan and satisfying reporting requirements of the EPBC Approval Notice 2023/09759.
DCCEEW	• Responsible for administering *Environment Protection and Biodiversity Conservation Act 1999* matters.
OHPSA	• Obtain statutory approvals in accordance with the Contracts. • Comply with conditions of statutory approvals. • Maintain documentation and a compliance system to ensure compliance with the EPBC Act approval conditions, the Contract, and the CEMP. • Ensure all contractors operate in accordance with the Contract. • Complete environmental audits. • Ensure all personnel are competent to perform their assigned duties. • Ensure all personnel have received appropriate training and inductions. • Overall responsibility for environmental compliance, including monitoring, data collection and reporting.
ElectraNet (Phase 1) Principal Contractor (Phase 2)	• Preparation and implementation of the Construction Environmental Management Plan (CEMP), Operational Environmental Management Plan (OEMP) and sub-plans. • Inclusion of the management measures outlined in this Plan into the CEMP/OEMP and sub-plans. • Ensure resources are available to manage environmental obligations and implement management actions.

Role	Responsibilities
	• Identify and address risks associated with Contractor's activities prior to commencing works. • Ensure all contractor personnel are competent to perform their assigned duties. • Ensure all contractor personnel have received appropriate training and inductions. • Ensure that personnel are adequately supervised. • Ensure that all activities are carried out in accordance with the CEMP/OEMP and sub-plans. • Implement the management actions identified in the CEMP/OEMP and sub-plans. • Immediately notify Superintendent (or Representative) of any incidents and non-compliances with the CEMP/OEMP or statutory approvals conditions. • Undertake project auditing and monitoring.
Suitably qualified environmental professional	• Responsible for providing expert advice to the Superintendent and/or Contractor including: ○ Implementation of the avifauna monitoring program (and tasks that are part of this responsibility) as specified in Sections **9.0** and **10.0**.
Environmental contractor (including Project Manager and Personnel)	• Responsible for the implementation of this plan (including maintaining no-go zones and implementing the Sub-Plans, as specified in Section **9.0**).
Suitably qualified environmental professionals	• Responsible for undertaking environmental monitoring requirements as outlined within Section **9.0**, including: ○ Inspection of vegetation clearing and report. ○ Pre-construction[2] vegetation clearance report and post-construction audit and report. ○ Pre-clearance surveys. ○ Implementing threatened species no-go zones. ○ Protected matters monitoring by suitably qualified environmental professional during clearing operations. ○ 3 monthly surface water management audits by suitably qualified environmental professional during Phase 2 construction. ○ Quarterly noise monitoring during the Phase 2 construction period. ○ Noise monitoring within 30 days of commissioning of gas turbines to confirm compliance under all operating conditions.

[2] All references to construction in this document (including both pre-construction and post-construction) refer to both Phase 1 and Phase 2 construction, excluding the period between phase 1 and phase 2.

Role	Responsibilities
	○ Dust inspection following incidents during the construction phase. ○ Weed survey undertaken every 3 months during construction. ○ Check of records confirms all fill brought to site has the appropriate certification (only applicable if fill was brought to site during that month). ○ 3 monthly pest animal inspection during construction. ○ One-off lighting inspection following installation of any new lighting. ○ In the case of a fire, investigation completed within 30 days of any incident.

5.0 Project Description

5.1 Project Details

The HJP incorporates a multi-faceted approach to renewable energy development, integrating the following components:

- 250 MWe electrolysers
- Hydrogen storage facility
- 200 MW hydrogen-fuelled power station.

The HJP integrates these components to establish a sustainable approach to renewable energy development, leveraging South Australia's abundant renewable resources for hydrogen production and power generation and to realise the state government's goal – to fast-track South Australia's transition towards 100% net renewable energy generation, as outlined in the state's (). This target has recently been brought forward from 2030 to 2027.

The South Australian government has committed A$593M investment for the completion of the Project with a view to becoming a global leader in renewable hydrogen. Hydrogen industry development presents a significant economic growth opportunity for South Australia. The Upper Spencer Gulf has a unique combination of coincidental wind and sun, as well as existing mature industries and local infrastructure, and a pre-existing capable workforce. The rapid expansion of a hydrogen industry will help to unlock the development of gigawatt scale renewable energy projects in South Australia.

The HJP will deliver dispatchable power generation into the energy grid, providing 'firming services' that will assist in balancing the renewable load and move South Australia closer to a fully renewable energy system. The stored hydrogen will fuel the power station and also provide a source of hydrogen that will support local industry to decarbonise their operations.

5.2 The Proponent

The Proponent for the Proposed Action is the Department for Energy and Mining. In May 2022, the South Australian Government established the Office of Hydrogen Power South Australia (OHPSA) – an attached office to the Department for Energy and Mining (DEM) – to oversee the design and delivery of the HJP. On 1 May 2025, the SA Government Gazette announced the abolishment of OHPSA and transfer of responsibilities for HJP to the Department for Energy and Mining (DEM). Any references to OHPSA throughout this document will hereby be considered references to DEM. The proponent details are provided in **Table 5.1**.

Table 5.1 Proponent Details

Proponent	Department for Energy and Mining / South Australian Government
Registered ABN	83 768 683 934
Registered Address	Level 4, 11 Waymouth Street, Adelaide SA 5000
Nominated Contact	Martin Reid (Director)
Phone	(08) 7085 1750
Email	wsitu.enquiries@sa.gov.au
Website	www.energymining.sa.gov.au

5.3 Project Location

The proposed Project is located at Lincoln Highway, Whyalla Barson in South Australia. The proposed HJP location is on the urban fringes of Whyalla near the Whyalla industrial precinct (**Figure 5.1**).

5.4 Project Design

The proposed HJP encompasses key components such as hydrogen power station, electrolysers, storage tanks, and distribution infrastructure, designed to produce, store, and distribute hydrogen efficiently and sustainably, details of which can be found in the Planning Report (Ekistics Planning and Design, 2024) and Development Application (JBS&G, 2024). The Development Envelope, and the indicative Disturbance Footprint (consisting of the Primary Facility Footprint, the Northern Infrastructure Footprint and Southern Infrastructure Footprint) is shown in **Figure 5.1**.

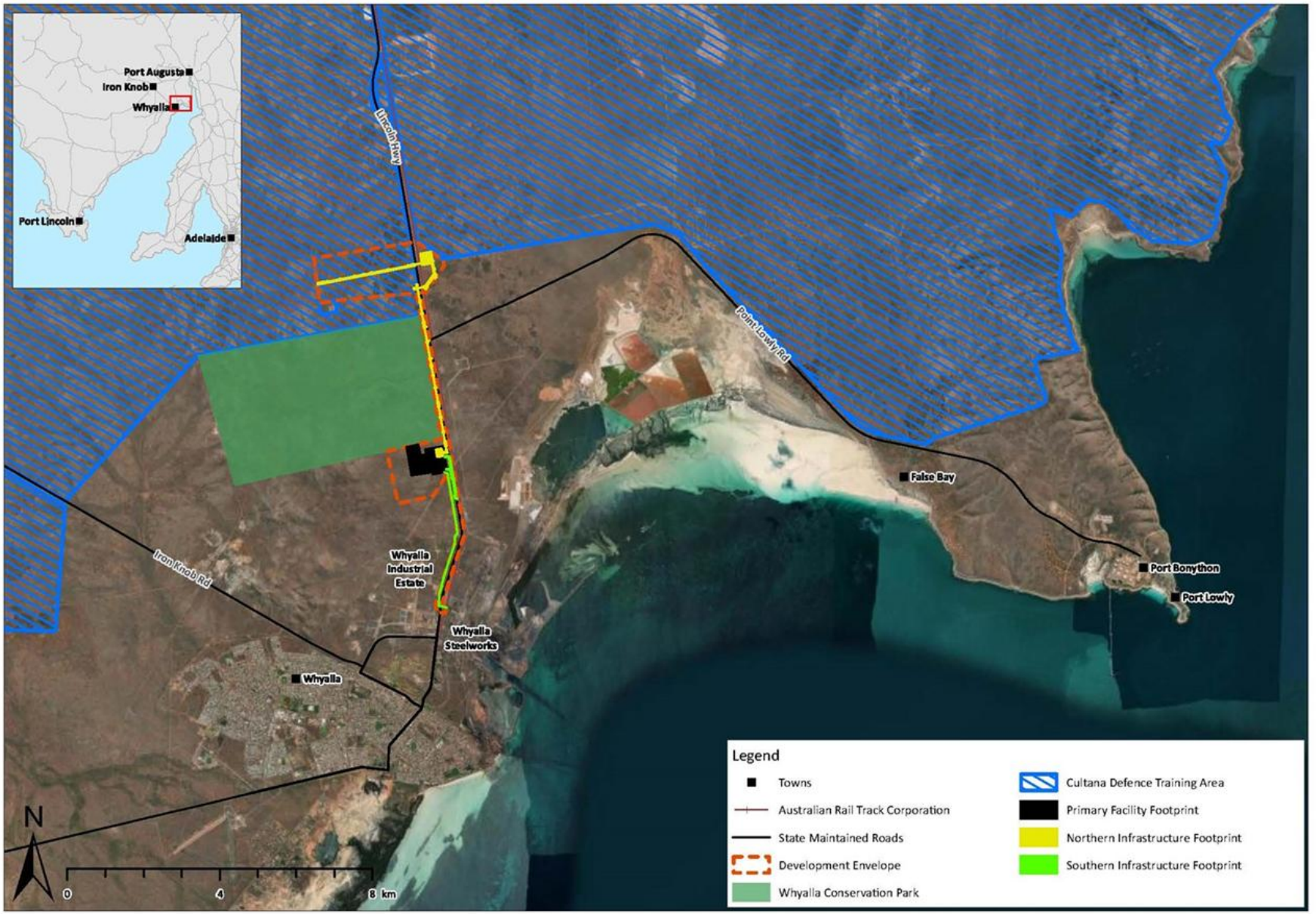

Figure 5.1 Project Location and Development Envelope (Map Source: (OHPSA, 2024))

6.0 Staging of Construction and Operations

Whilst this PMCEMP relates to the pre-construction and construction phase of the HJP, the below sections describe some of the general timing of activities of the staging of construction and operation of the HJP.

6.1 Project Timing

Phase 1 construction of the Project is planned to commence in late-2024 and forecast for completion in late 2025/early 2026. Phase 2 construction is currently deferred. Activities of the proposed actions are as per the Development Approval (DA) (JBS&G, 2024) and the EPBC Act Preliminary Documentation (OHPSA, 2024) and are summarized in the sections below.

6.1.1 Schedules

Project Phase 1 Schedule	Timing
Planning/Pre-construction Activities	From Q4/24
Construction	From Q1/25
Operation/Maintenance	From Q1/26

6.2 Planning/Pre-construction Activities

The first phase of works on site is the enabling civil works phase. This phase will include enabling activities such as:

- Initial mobilisation and site establishment
- Vegetation clearing and mulching
- Stripping and stockpiling of topsoil for re-use and rehabilitation works
- Bulk earthworks (balanced cut and fill to form a bench)
- Perimeter security fencing
- Stormwater infrastructure
- Earth grids (electrical connection to the ground in order to safely discharge electricity in case of faults)
- Internal roads and hardstands
- Concrete foundations
- Worker and security facilities.

A summary of key activities and approach to managing environmental impacts during the pre-construction phase is provided below. Detailed mitigation and management activities to be implemented during the pre-construction and planning phase of the HJP are outlined in Section **9.0**.

6.2.1 Vegetation Clearance and Mulching

Clearing of native vegetation will be deliberately controlled and constrained to the minimum footprint required to support construction and built form. Specific areas of high-value vegetation that are not within the direct infrastructure footprint will be isolated and protected during the construction process where practicable. Site clearing will be undertaken by dozer, generally by 'pushing' over the vegetation. It is not expected that trees will require felling using chainsaws, although it may be required in isolated cases. The uprooted vegetation will be managed into piles for mulching, or for re-distribution over areas designated for rehabilitation. The stockpiled vegetation will be designated to areas within or adjacent to the site for later use.

6.2.2 Stripping and Stockpiling of Topsoil

Following clearing, topsoil to approximately 100 millimetre (mm) depth (or as otherwise specified in the CEMP) will be stripped using dozer and front-end loader equipment. This topsoil will contain organic matter and seed. It will be stockpiled in designated areas within or adjacent to the site and protected from wind and rain in accordance with the CEMP. The topsoil will be utilised within the Project site for areas that are designated for rehabilitation.

6.2.3 Cut and Fill

On completion of the topsoil stripping, bulk earthworks will commence. The objective of the bulk earthworks is to create a level (or essentially level with a slight fall) bench across the site upon which access tracks, hardstands and foundations can be built. In accordance with Australian Standards and planning codes the level for key infrastructure will be 300 mm above the 1% Annual Exceedance Probability (AEP) flood level. Where placement of fill is required, it will be placed in layers and compacted in accordance with the civil works specification.

While the site has relatively limited topographic relief, and it is anticipated that the bulk earthworks will achieve a cut and fill balance, there is potential that there will be some level of surplus or shortfall of material. If surplus material is encountered, it could be utilised in the areas designated for remediation or disposed of at a licenced facility. If a shortfall is encountered, suitable clean material will be imported. The basecourse material used to construct the roads and hardstands is expected to be imported quarry rubble to achieve the required engineering properties.

6.2.4 Security Fencing

To secure the site at the earliest opportunity, the installation of the permanent perimeter security fence is expected to be part of the initial enabling civil works. This will include controlled entry and exit points to the site. On completion of the enabling civil works described above, subcontractors and suppliers can mobilise to site and begin the construction phase.

6.3 Construction Advice

On completion of bulk earthworks, in-ground infrastructure will be installed including power and stormwater infrastructure, oily water separator and earth grids. These elements will require excavation and/or trenching using backhoes or trenching machinery, prior to installation and backfilling. A summary of key activities and approach to managing environmental impacts during the construction phase is provided below. Detailed mitigation and management activities to be implemented during the construction phase are outlined in Section **9.0**.

6.3.1 Internal Roads

Internal roads/tracks will be developed to meet the requirements of the construction phase. The tracks will generally be left unsealed until just prior to the operations phase, allowing the transition of tracks within the footprint of the facilities to be built form, or any tracks no longer required to be rehabilitated (as described in CEMP). Water carts will be used for dust suppression.

6.3.2 Foundations

Pad footings are expected to be the suitable foundation type for the majority of applications. Initial onsite geotechnical investigations have been completed; subsequent round(s) will determine any requirement for any steel or reinforced piling for equipment with very high static and dynamic loads. Excavation for the footings will be created using backhoe. The base of each foundation will be compacted before side forms and reinforcement is placed. If driven piles are specified, a pile driving machine will be utilised to drive steel 'H' piles to the required depth. If bored piers are specified, an auger will excavate a shaft to the appropriate depth before installing a reinforcement cage and concrete.

6.3.3 Earth Grids

Earth grids will be required at the electrical substations. Earth grids are a series of cables laid underground whereby excess electricity (during a fault or outage) can be discharged into the ground without impacting people or infrastructure. The earth grid requires a grid of parallel trenches in which conductors are laid before backfilling. These trenches are typically created with trenching machines or back hoes, depending on the ground conditions.

6.3.4 Electrical Cabling

Intra site electrical cabling will generally be laid in trenches approximately 1,200 mm deep. The trenches will be excavated using either trenching machines or backhoe. Cables are typically laid in a layer of compacted sand and the excavated material used to backfill the remainder of the trench.

6.3.5 Power Supply

Maximum demand for construction power is expected to be in the order of 0.6 MW. There are currently two options being investigated for construction power. If it is feasible and cost effective, the Project will utilise the SAPN 33 kilovolt (kV) power line running to the south of the site. This would utilise power from the National Electricity Market (NEM), which in South Australia is comprised of nearly 80%

renewables. The alternative solution is the use of temporary, mobile generators (gensets). Investigation into fuel options indicates that biodiesel is unlikely to provide a viable solution, and if gensets are required, fuel supply is likely to be diesel.

6.3.6 Concrete Batching

Concrete will be supplied from existing facilities within Whyalla and Port Augusta or a mobile concrete batching plant onsite or at a suitable local industrial area. Deliveries of aggregate, sand, water and cement would be required for the batching plant. Should a temporary batching plant be selected, the contractor will require an approved Environment Protection Licence prior to mobilisation. Supporting documentation for an Environment Protection Licence, if required, will comply with Environmental Protection Authority (EPA) Guideline 427/16 Concrete Batching, updated March 2016 (EPA, 2016). Concrete trucks will deliver concrete to various parts of the site.

6.4 Operational/Maintenance Requirements

Whilst this plan covers the pre-construction and construction phases of the HJP, a summary of the key activities and approaches to managing environmental impacts during the pre-operational and operational phase is provided below.

6.4.1 Workforce and Hours

The construction workforce is expected to involve up to 1,000 full-time equivalent (FTE) workers. The operational workforce is expected to reduce to approximately 30 FTE workers in Whyalla and an additional 65 FTE workers that can work remotely, likely based in Adelaide.

Hours of operation for construction are expected to be Monday to Saturday 6 am to 6 pm. To meet project schedule requirements, flexibility will be retained to operate alternative timeframes, with the deliberate isolation of the site from Whyalla residents treating the risk of noise impacts. This includes the potential for earlier starts during summer months to allow work to occur before the heat of the day, and the potential for overnight works during specific tasks (e.g. pressure testing, installation of heavy modules, pre-commissioning and commissioning).

Project facilities will operate 24 hours a day 7 days per week but will switch between Standby Mode, Hydrogen Production Mode and Power Generation Mode depending on market conditions.

6.4.2 Maintenance Activities

Key maintenance activities required throughout the life of the Proposed Activity operation include:

- Replacement of electrolyser stacks ~ every 5 – 10 years. Stacks are returned to the manufacturer for refurbishment so they can be reinstalled at the next replacement.
- Replacement of the lye used in the electrolysers will occur every 1 to 5 years with 35 m^3 of lye being replaced each time. Spent lye will be removed via tanker. The base case is disposal of lye by a waste contractor, with alternative options for reuse of lye in another industry and onsite regeneration of lye being investigated.

- Inspection of storage modules will be required with an external inspection every 2 years and internal inspection every 10 years. Inspections may involve use of a phased array ultrasonic testing.
- Gas turbines will require routine maintenance (including oil replacement) every 3 years with a major overhaul every 10 years. Management of waste oil from maintenance is described in in the EPBC Act Preliminary Documentation (OHPSA, 2024).
- Compressors require head valve replacement annually with maintenance every 2 years. Management of waste oil from maintenance is described in the EPBC Act Preliminary Documentation (OHPSA, 2024).
- Deoxygenation catalyst requires replacement of approximately 10 m^3 every 5 years and will be returned to the vendor to recover precious metals. Dryer absorbent requires replacement of approximately 100 m^3 every 3 years and will be disposed of via a waste contractor.

6.4.3 Weed and Pest Management

A weed and pest management plan will be developed, focusing on prevention, monitoring and early identification and management of concerns. Specific actions include:

- Implementing appropriate hygiene practices when equipment is brought on site.
- Ensuring construction compounds are kept neat and tidy at all times to prevent pest animals from inhabiting the area, and food waste is placed in enclosed / covered bins to prevent access by pest animals.
- Implementing weed surveillance and control programs targeting Weeds of National Significance (WoNS) and Declared Weed species in accordance with the Weed Control Handbook for declared plants in South Australia. The weed management plan will include specific measures for WoNS Buffel Grass (*Cenchrus ciliaris*), due to its prevalence in this area.
- Ensuring all fill materials (e.g. sand, aggregate) imported to site are sourced from weed and pathogen free sites.

6.4.4 Waste Management

Waste management at the Primary Facility will follow the waste management hierarchy in alignment with the South Australia's waste strategy 2020-2025 (Green Industries SA, 2020). Production of waste will be avoided as much as reasonably practicable. When the production of waste is not avoidable, options will be implemented to reduce, reuse and recycle. Waste management procedure for each waste stream is described in detail in OHPSA (2024).

6.5 Disturbance Footprint

For the purpose of determining the impact for the Project without a detailed design, an indicative maximum potential disturbance footprint was assumed that reflects a "worst-case" scenario for the required vegetation clearance. It is expected the area of impact will be refined during detailed design, with a design emphasis on the minimisation of vegetation clearance.

The worst-case scenario disturbance footprint for each Project component based on the Significant Impact Assessment (JBS&G, 2024) and Jacobs (2024) is presented in **Table 6.1**.

Table 6.1 Worse-case Scenario Disturbance Footprint for Each Project Component

Project element	Project Area (ha)	Disturbance footprint (ha)			Percentage to be revegetated	Operational footprint (ha)
		Total	Phase 1	Phase 2		
Primary facility (including electrolysis plant, power generation plant and ancillary infrastructure, includes opportunity for construction laydown)	205.0	63.2	3.4	59.8	0%	63.2
Southern infrastructure	69.0	5.3	0	5.3	40%	3.1
Northern Infrastructure Total	435.0	20.9	16.5	4.4	50%	10.9
Transmission line	-	12.2	-	-	80%	2.2
Substation	-	8.7	-	-	0%	8.7
TOTAL	**709.0**	**89.4**	**19.9**	**69.5**	**~15%**	**~ 77.2**

6.6 Revegetation and Rehabilitation Activities

Rehabilitation strategies are set out in the Rehabilitation Management Plan (*in preparation*). Temporary construction areas will be rehabilitated as soon as possible following completion of works. Temporary construction areas from phase 1 that are also required for phase 2 (approximately 1.5 ha) will be allowed to naturally regenerate to prevent dust, weed and pest and erosion issues until phase 2 commences. Some open area surrounding the main facility will be required for fire safety. Preparing for rehabilitation starts at vegetation clearance where any cleared vegetation is retained for mulching or re-distribution. This will be stockpiled within or adjacent to the site in addition to the topsoil and subsoil stockpiles. Stockpiles will be protected from wind and water erosion.

When an area becomes available for rehabilitation all hard stand areas will be ripped, subsoil and topsoil respread in layers to recreate a soil profile and retained and/or mulched vegetation respread over the area to stabilise the soil, provide organic matter and seed bank to encourage revegetation, in accordance with Rehabilitation Management Plan.

7.0 Threatened Species of Relevance

7.1 Western Grasswren (Gawler Ranges) (*Amytornis textilis myall*)

7.1.1 Taxonomy

Species

The Western Grasswren (*Amytornis textilis myall*) is a passerine of the family Maluridae (Christidis & Boles, 1994). The Western Grasswren was formerly considered as conspecific with the Thick-billed Grasswren (*Amytornis modestus*) until split as a separate species in 2010 (Black, *et al.*, 2010).

Subspecies

Analysis of plumage, morphology and genetic findings amongst populations identified five subspecies of Western Grasswrens in the *A. textilis* family (Austin, *et al.*, 2013) (Black, 2011) (Black & Gower, 2017) (Garnett & Baker, (Eds) 2021), of which three are presumed extinct: Dirk Hartog Island subspecies *A. t. carteri*; East Murchison subspecies *A. t. giganturus* and Large-tailed Grasswren (*A. t. macrourus*). Two subspecies are extant: the Shark Bay subspecies *A. textilis textilis* in Western Australian and the Eyre Peninsula subspecies *A. t. myall* in South Australia.

The subspecies of relevance to this Project is *A. t. myall* (Western Grasswren (Gawler Ranges)).

7.1.2 Conservation Listing

Commonwealth classification

The Gawler Ranges subspecies of Western Grasswren (*A. t. myall*) is listed as 'Vulnerable' under the EPBC Act (Date effective 06-Nov-2014).

State Classification

A. t. myall is also listed as 'Vulnerable' in South Australia under the *National Parks and Wildlife Act 1971*.

IUCN Red List Classification

A. textilis has been assessed by *International Union for Conservation of Nature (IUCN) Red List of Threatened Species* in 2016 where it is listed as 'Least Concern'.

A. textilis myall has not been assigned a conservation classification on IUCN Red List. However, *The Action Plan for Australian Birds 2020* (Black, *et al.*, 2021) categorises *A. textilis myall* as 'Least Concern'.

7.1.3 Biology

Like most other grasswren species there is limited understanding of the Western Grasswrens' ecology. The below sections summarize what information is currently available for the species, but there is a paucity of empirical data and robust scientific evidence to underpin knowledge of the species biology and general ecology.

Species Description

A. textilis myall Western Grasswren (Gawler Ranges) (referred to as Western Grasswren from hereon) are a small (15-20 centimetre (cm), pale to dark brown songbird with erect, elongated tail feathers. The breast of the Western Grasswren is light brown and colours fade to off-white on their belly. Plumage darkens on the wings and back of the species, which are brown. Distinctive white streaks from the beak extend to the base of the tail and to the lower breast. Sexes can be distinguished from the chestnut flanks that are present in females and absent in males (Pizzey & Knight, 2014). Western Grasswrens are usually seen in pairs or small groups but sometimes occur singly (Black & Gower, 2017).

All grasswren species, including the Western Grasswren, are birds that utilize vegetation close to ground level. They have short-rounded wings and are unable to undertake long flights across large open spaces or at height. Rather, they tend to hop or run between shrubs and grass tussocks. Amytornis are notorious for their secretive behaviour and, as a result, baseline ecological data for most species are still lacking.

Breeding

Western Grasswren breeding behaviour is poorly known, but the subspecies is thought to be socially monogamous. Breeding probably occurs from late June to September. It is deemed possible that Western Grasswren can engage in cooperative breeding with additional adults assisting in the raising of young (Higgins, *et al.*, 2001) (Black & Gower, 2017), though there is no empirical data to confirm this. Similarly, there is no data on territory size for breeding pairs or groups, but in Western Australia for *A. textilis textilis* the territory is thought to be around 1.2 to 2.0 ha in good seasons (Brooker, 1998a) (Brooker, 1998b).

Nests vary from open cups, to partly or fully dome-shaped structures solidly constructed from dry grass, saltbush twigs and narrow strips of bark and lined with downy plant material, or occasionally fur and feathers (Brooker, 1998a) (Higgins, *et al.*, 2001). Nests are usually located close to the ground in clumps of canegrass or in the centre of low shrubs such as saltbush and blackbush (Brooker, 1998a) (Higgins, *et al.*, 2001) (Prizzey, 1991).

Breeding pairs generally produce two to three eggs which are tapered ovals with colouration varying from white to pink and markings ranging from heavy red-brown or purplish-grey spots or blotches to fine red-brown specks (Black & Longmore , 2009) (Higgins, *et al.*, 2001) (Prizzey, 1991). The generation time is estimated to be 3.3 years (minimum 2.5, maximum 4.1) (Garnett & Baker, (Eds) 2021).

Recent advice from DCCEEW (DCCEEW *pers. comms.* 15 May 2024) states that the species is likely to be sedentary and demonstrate strong site fidelity, particularly during the breeding-season, rather than being often transient in the landscape. However, it was noted that this is only suspected and not fully known given the limited, and at times, conflicting information of the species' and/or similar species' ecology.

Distribution

Western Grasswren occur only in the eastern Gawler Ranges/north-eastern Eyre Peninsula of South Australia (**Figure 7.1**). Two historic records (1909) of Western Grasswren are reported from the Yellabinna region in South Australia, 400 km to the west of the current known distribution (Black, 2004) (Black, *et al.*, 2009). These records provide an indication that the species was once more widespread (Black & Gower, 2017).

Black *et al.* (2009) described the distribution limits of the species which are summarised in **Table 7.1**. Major concentrations of Western Grasswrens are present within the south of their distribution, especially along large drainage systems in Myall and Pine Creeks (Black, *et al.*, 2009). Drainage lines would provide increased availability of water and a source of disturbance in times of flood that facilitate the tall and dense growth of spiny shrubs, which comprise suitable habitat for Western Grasswren.

Table 7.1 Location of Disturbance Limits for the Western Grasswren (Gawler Ranges) (Black *et al.* 2009)

Distribution limit	Location of distribution extent
Southern	Northern edge of Munyaroo Conservation Park (CP) and Ash Hall near Sinclair Gap.
Eastern	Murninnie Beach; Eight Mile Creek, south of Whyalla; Myall Creek near the crossing of Port Augusta – Whyalla Road; and Port Augusta – Iron Knob road.
Northern	Gunter's Dam, Carieweloo Station; Scrubby Outstation, Nonning Station.
Western	Mount Ive Homestead.
South-western	Wilcherry (approx. 30 km north of Kimba); north-eastern extremity of Lake Giles CP; 15 km south-west of Iron Knob; and Iron Knob-Iron Baron road.

It is thought that about 20% of the Western Grasswren population occurs within the Cultana Training Area near Whyalla (TSSC, 2014). As the Project area shares its northern boundary with the Cultana Training Area, it is likely that any Western Grasswrens in the Project area are an extension of that population.

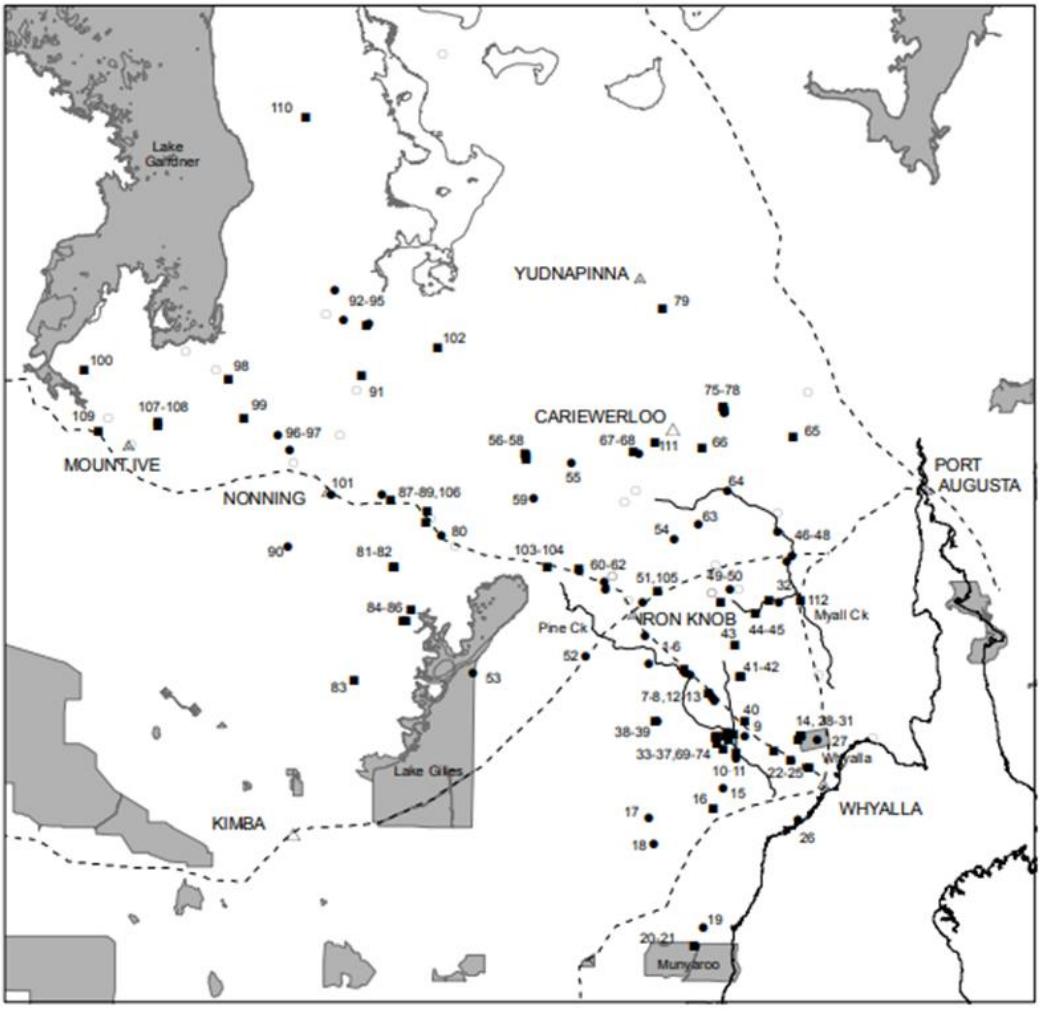

Figure 7.1 Records of Western Grasswrens (Gawler Ranges) (*Amytornis textilis myall*) showing verified previous reports (black circle), previous reports unconfirmed (hollow circle) and new localities identified in the field study by Black *et al.* (2009). Note that records from the Yellabinna in 1909 (Black, 2004) are not shown, being located about 600 km WNW of Port Augusta (2009)

Habitat

Suitable habitat for the Western Grasswren (Gawler Ranges) was described by Black *et al.* (2009) as "*low-lying areas of Blackbush and spiny shrubs, particularly Australian Boxthorn, either as a shrubland or as an understorey of Western Myall low open woodland*". Furthermore, the "*presence of (western) grasswrens could largely be predicted by the total cover of Blackbush, Australian Boxthorn, spiny shrubs, Ruby Saltbush and taller shrubs (over 0.75 m)*".

Areas of suitable habitat for Western Grasswrens are largely restricted to small areas, especially drainage lines (Black, *et al.*, 2009). Surveys of Western Grasswren habitat by Black *et al.* (2009) found that 64% of sites where Western Grasswrens were recorded were associated with low shrublands, where *Maireana pyramidata* (Blackbush) and *Lycium australe* (Australian Boxthorn) were the dominant shrub species. A further 28% of sites were associated with low woodlands, typically with an *Acacia papyrocarpa* (Western Myall) overstorey.

The structure of habitat is particularly important in determining whether habitat is suitable for Western Grasswrens. Black *et al.* (2009) compared the structure of habitats where Western Grasswrens were detected versus not detected and found that sites where Western Grasswrens were observed had

greater total shrub cover; particularly from large shrubs with a dense structure extending to the ground.

7.1.4 Threats

Threats to the Western Grasswren include:

- *Over-grazing*: Grasswren populations are impacted on by habitat loss, fragmentation and degradation due to overgrazing by sheep, feral goats (*Carpa hircus*) and Western Grey Kangaroos (*Macropus fuliginosus*) (Garnett & Baker, (Eds) 2021), which can cause a reduction in the cover and density of many chenopod plant species, which comprise the species' main habitat *(Black, et al.*, 2009).
- *Unprotected land*: A total of 0.63% (8247 ha) of the land within the Extent of Occurrence (EOO) of the Western Grasswren is located within protected lands, such as Conservation Parks and Heritage Agreements. Furthermore, about 20% of the Western Grasswren population is thought to occur within the Cultana Training Area ((Black, *et al.*, 2009) in (DotE, 2014), which is used for military purposes, including tank training, and therefore may directly damage habitat (DotE, 2014). In addition to this, the area is exempt from the South Australian *Native Vegetation Act 1991* and vegetation clearance is permitted if carried out by the Department of Defence or the Australian Defence Force (DotE, 2014). However, if MNES are significantly impacted, an environment assessment and subsequent approval is required under EPBC Act.
- *Introduced predators*: Introduced predators, such as cats (*Felis catus*) and foxes (*Vulpes vulpes*) may also threaten Western Grasswrens, as they are known to impact on other grasswren species. Thick-billed Grasswren (*A. modestus*) has been recorded within the stomach contents of a cat (Woinarski, *et al.*, 2018). It has been suggested that fox control programs could be a reason for increased numbers of Thick-billed Grasswrens in the north Olary Plains region and Short-tailed Grasswrens (*A. merrotsyi*) in the Flinders Rangers (G. Carpenter *pers. comm. in* (Pedler, *et al.*, 2007).
- *Mining*: Mining causes direct habitat loss and subsequent degradation of adjacent habitats. In the 1970s, Western Grasswrens were relatively common on the coast south of Whyalla prior to sandmining. However, they are now scarce due to habitat loss associated with mining activity and subsequent damage by off-road vehicles (Black, *et al.*, 2009).
- *Road development*: The combination of increased run off from the road surface and a lack of stock grazing along the Whyalla – Iron Knob Road has led to the growth of dense stands of M. pyramidata, which is known to be suitable habitat of Western Grasswren. Clearance of these areas adjacent to roads for road-widening or water pipeline construction activities can threatened important habitat for the Western Grasswren (Black, *et al.*, 2009).
- *Incorrect removal* of *Lycium australe* (Australian Boxthorn): The removal of *L. australe* due to its incorrect identification as *Lycium ferocissiumum* (African Boxthorn), a Weed of National Significance, has been listed as a potential threat (Black, *et al.*, 2009).

7.1.5 Population Estimates and Trajectory

There is only one subpopulation of Western Grasswrens, as all birds occur in a small area with no apparent biogeographic barriers. The two historic records (1909) of Western Grasswren from the

Yellabinna region in South Australia, suggests that the species was once more widespread (Black, 2004) (Black, *et al*., 2010) (Black & Gower, 2017).

The population of the Western Grasswren was estimated by Black *et al.* (2009) to be unlikely to exceed a few thousand individuals in 2006, based upon the availability of suitable habitat current at time of estimate and territory sizes for pairs of four to five ha based on (Schodde, 1982). As per Black *et al.* (2021) no subsequent or recent monitoring of known Western Grasswren sites has been undertaken since the 2006 assessment by Black *et al.* (2009).

In 2006, Western Grasswren was present at more than 75% of 62 sites where they were previously recorded (Black, *et al*., 2009). Based on these surveys results it was deemed that Western Grasswren have a relatively stable population. It was deemed that the relative stability of the Area of Occupancy (AOO) of the Western Grasswren is likely due to plant species, such as *M. pyramidata* (Blackbush) and other spiny shrubs, that are important habitat features, being favoured by light to moderate grazing (Black, *et al*., 2009). The absence of Western Grasswrens from approximately 25% of their previous identified localities could be due to several factors, including drought and grazing by stock, mainly sheep and cattle, and rabbits (Black, *et al*., 2009).

The identification of causal mechanisms underlying grasswren population declines continues to be a difficult task, especially when the knowledge of the behavioural ecology of most grasswrens species, including Western Grasswrens, is very limited.

Garnett *et al*. (2011) estimated the Western Grasswren population to be between 4,800-12,000 individuals based upon the species AOO and population density. The mid-point of 8,400 individuals (Garnett, *et al*., 2011) is used in the approved Conservation Advice for the species (DotE, 2014), which is still the only and thus current conservation advice for the species.

Current Estimate

As reported more recently in Black *et al.* (2021) population densities determined from other taxa suggest the Western Grasswren population is larger than previously realised and the evidence for continual decline is equivocal. Black *et al.* (2021) estimate that the Western Grasswren population is 12,000 mature individuals (with a minimum of 8,000 and a maximum of 16,000 mature individuals), but this estimate has a low reliability. The population trend of Western Grasswren is considered stable (Black, *et al*., 2021), but there is a paucity of empirical data to support this.

7.1.6 Extent of Occurrence and Area of Occupancy

The EOO and AOO of Western Grasswrens has been estimated based on the *Guidelines for assessing the conservation status of native species according to the EPBC Act 1999 and EPBC Regulations 2000* (TSSC, 2000).

The EOO and AOO of the Western Grasswren has been calculated as per shown in **Table 7.2**. Both areas are shown on the map in **Figure 7.2**.

Table 7.2 The Extent of Occurrence (EOO) and Area of Occupancy (AOO) of Western Grasswren

EOO (km^2)	EOO (ha)	AOO (km^2)	AOO (ha)
15,040.86	1,504,086.00	2,550.00	255,000.00

7.1.7 Occurrence of Western Grasswrens in the Study Area

Western Grasswren was recorded at 11 of the 24 survey sites within the Study Area. A minimum of 23 individuals were recorded over the 3-day survey period (**Table 7.3**). It should be noted that this is a conservative number, as in some instances additional Western Grasswren individual(s) may have been present but could not be confirmed by sight (**Table 7.3**).

Based on the numbers of Western Grasswren observed (groups size of up to 4 birds present at two sites) and behavioural observations in the field (i.e. rodent run[3] observed at site 24), it is assumed that breeding was and/or had been occurring at the site, at the time of the targeted bird survey.

Table 7.3 Observations of Western Grasswrens Within the Study Area in October 2023

Survey site	Date	Time (AM/PM)	GPS location	No of individuals	Comments/ observations
1	3/10/2023	PM	E 738691 N 6345675	3-4	Two individuals observed multiple times in different locations. Likely 4 individuals present.
2	3/10/2023	PM	E 739260 N 6346105	1	One individual (presumed male) observed. No vocalizations heard.
3	3/10/2023	PM	E 739600 N 6347211	2	Male and female observed.
4	3/10/2023	PM	E739853 N 6347587	3-4	Heard 3-4 individuals vocalizing, one individual was flushed from a shrub, possibly 4 individuals present.
5	3/10/2023	PM	E 740205 N 6348297	1-2	One individual observed, other heard. Possibly 2 individuals present.
6	4/10/2023	AM	E 739824 N 6348987	2	Male seen + other individual heard vocalizing.
10	4/10/2023	AM	E 740546 N 6349108	2	Two individuals observed.
14	4/10/2023	PM	E 740387 N 6354304	2	Two individuals observed.
20	5/10/2023	AM	E 741184 N 6349712	3	Heard individuals vocalising before playback, 3 individuals seen.
22	5/10/2023	AM	E 740348 N 6354082	2	Male and female observed.
24	5/10/2023	PM	E 739777 N 6348009	2	Male and female observed. Strong response to playback Rodent-run observed in response to playback.

[3] Rodent-run: A type of passive distraction display behaviour which closely resembles the run of a small mammal is characteristic of some Australian passerines, including grasswrens. This distraction display is also known as a 'rodent-run'. Grasswrens are known to display 'rodent-run' to draw attention away from potential nests and/or young (Rowley & Russell, 1997).

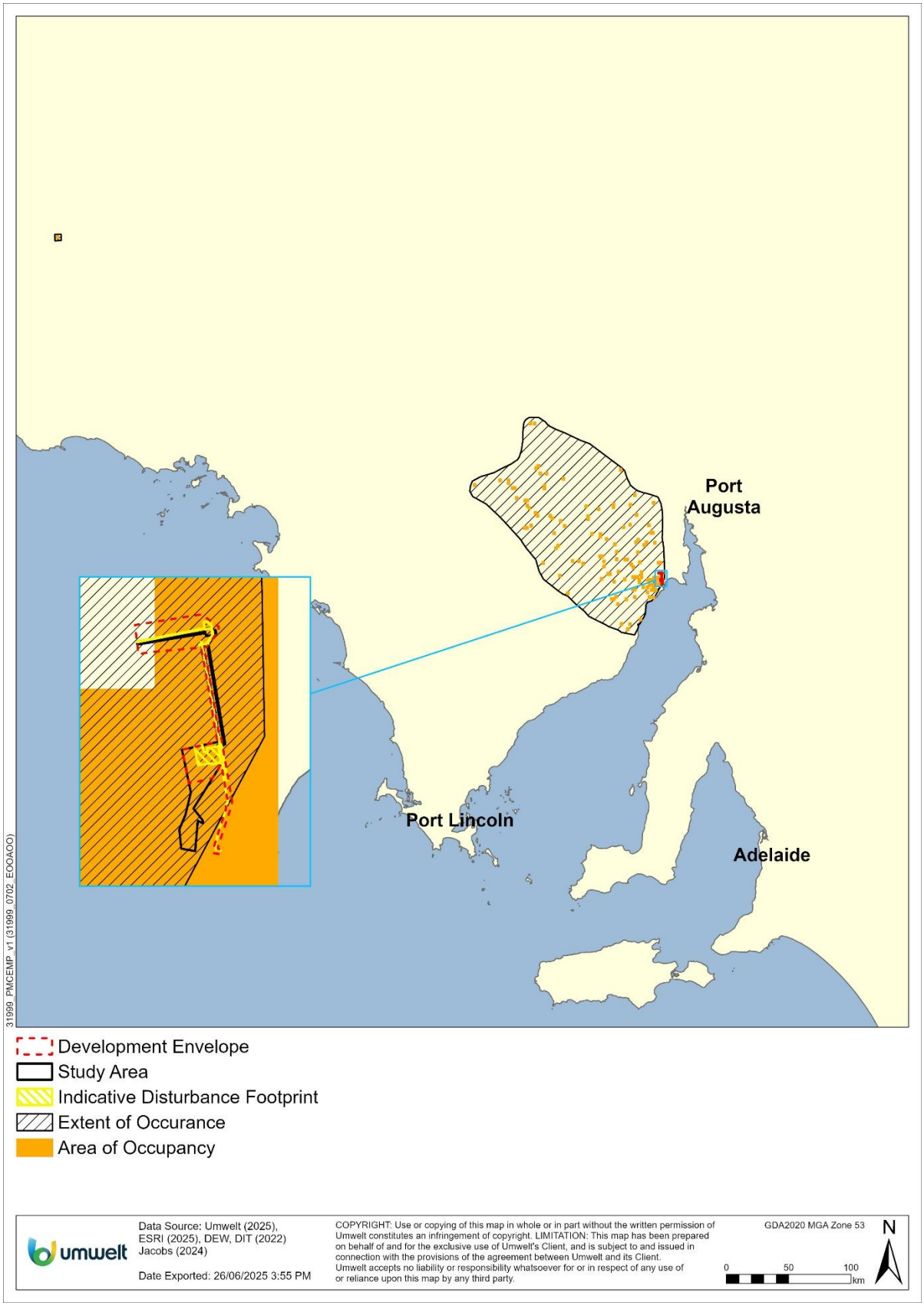

Figure 7.2 Extent of Occurrence (EOO) and Area of Occupancy (AOO) of the Western Grasswren. The AOO has been calculated using historical records and observations collected by Jacobs and EBS Ecology in 2022 and 2023. All historical records were source from the Biological Database of South Australia

7.1.8 Suitable Habitat in the Project Area

Vegetation and habitat assessments were outside the scope of works for this report. Vegetation assessments and habitat mapping was undertaken by Jacobs (2023), and data was provided to EBS Ecology to include in mapping in this report. The vegetation associations as per Jacobs (2023) and notes on their suitability for Western Grasswren are presented in **Table 7.4**.

Table 7.4 Vegetation Associations of the Study Area and Surrounds (as per Jacobs (2023)) and Their Suitability of Western Grasswren Habitat

Vegetation Association	Western Grasswrens Observed	Suitable Habitat
Chenopod open shrublands +/- emergent trees	Yes, Bird sites 5, 10, 20	Yes
Inland tall shrublands on calcrete	No	Yes
Low open woodlands of Sugarwood with a Chenopod shrub understorey	Yes, Bird Site 1	Yes
Low open woodlands of Western Myall with a Chenopod shrub understorey	Yes, Bird Site 2, 3, 4, 24	Yes
Low open woodlands with Western Myall and Blackoak over chenopod shrub understorey	Yes, Bird Site 6, 14, 22	Yes

Western Grasswren were observed by EBS Ecology in 3 out of the 4 broad vegetation associations present within the Study Area (Figure 7.3 and Table 7.1). Bird Site 1 was located in *Low open woodlands of Sugarwood with a Chenopod shrub understorey*, in a vegetation association that occurred just outside the Study Area.

All vegetation within the Study Area is deemed suitable for Western Grasswren, with the exception of one small more degraded area of low open woodland of Western Myall with a Chenopod shrub understorey located in the southeastern corner of the Study Area (i.e., the area around Bird Site 11 and 12). This area is relatively degraded due to anthropogenic impacts such as existing trails and tracks (walking / motorbike) and historic earth works. There are many existing dirt tracks in this area with highly disturbed soil, and a borrow pit is present. This area is mapped in more detail by Jacobs **(2023)** as *Scaevola spinescens* low open shrubland with emergent *Acacia papyrocarpa* / *Myoporum platycarpum* on borrow pit (degraded), and described as:

"Within BAM21 in the southern section of the project area there is a section that is highly disturbed / impacted (looks like old quarries) that offers limited/low habitat value for Western Grasswren."

"Within BAM22, there is an area on the eastern section of the project area that is highly degraded, containing existing trails and tracks (walking / motorbike) and is therefore considered to have limited / low value for *threatened fauna including Western Grasswren."*

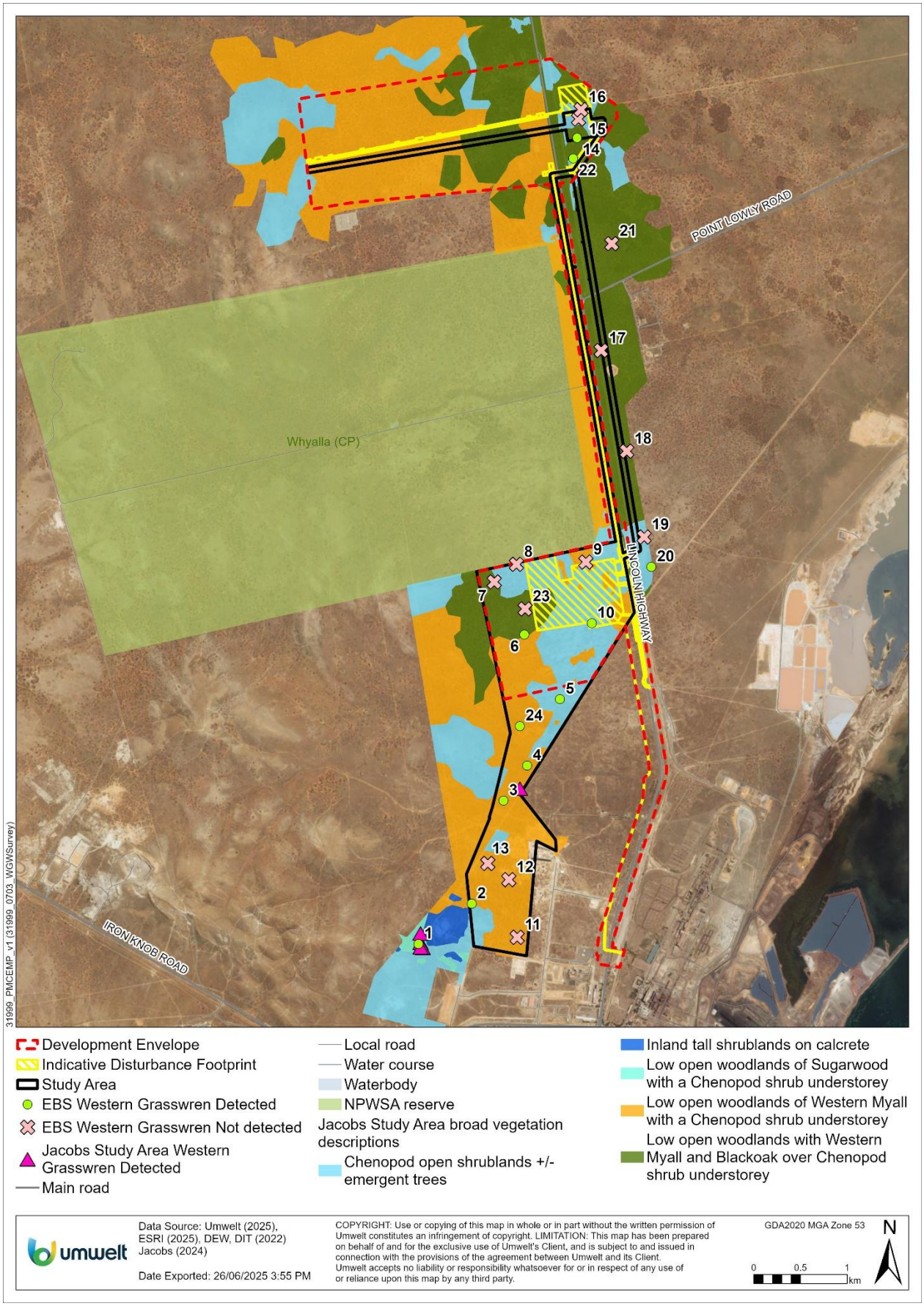

Figure 7.3 The Location of Bird Survey Sites and Western Grasswren Observations in the Study Area Collected by EBS Ecology in 2023 in Relation to Broad Habitat Mapping as per Jacobs (2023)

7.2 Southern Whiteface (*Aphelocephala leucopsis*)

7.2.1 Conservation Listing

Commonwealth Classification

The Southern Whiteface (*Aphelocephala leucopsis*) was listed as Vulnerable under the EPBC Act on 31 March 2023 (DCCEEW, 2023b).

State Classification

Southern Whiteface has not been assigned a conservation classification in South Australia under the *National Parks and Wildlife Act 1971*.

IUCN Red List Classification

Aphelocephala leucopsis has been assessed by *International Union for Conservation of Nature (IUCN) Red List of Threatened Species* in 2016 where it is listed as 'Vulnerable.

The Action Plan for Australian Birds 2020 categorises *Aphelocephala leucopsis* as 'Vulnerable'.

7.2.2 Biology

There is a paucity of empirical data and robust scientific evidence to underpin knowledge of the Southern Whiteface biology and general ecology. The below sections summarize what information is available for the species.

Species Description

The Southern Whiteface is a small stocky thornbill-like bird with a brown dorsum, white belly, dark brown wings and a black tail with narrow white tip. A grey wash on the belly is sometimes present, along with a grey or rufous tinge to the flanks. The species displays the characteristic facial markings of the genus: a white band across the forehead, with a darker streak along the top edge. Adult birds are approximately 11.5 cm in length with a cream-coloured eye, grey legs and a stubby dark grey bill of finch-like appearance (DCCEEW, 2023b).

Breeding

Breeding takes place from July to October throughout most of the species' range, however, the timing of breeding can be affected by rainfall in arid regions (Higgins & Peter, 2002) (Smith & Smith, 2023a). Birds may breed outside of their usual season following sufficient rainfall or may not breed at all during drought. Birds build large bulky domed nest of grass, bark and roots, usually in a hollow or crevice, although sometimes in low bushes (Higgins & Peter, 2002). Hollows are re-used by Southern Whiteface, as evident in the study by Smith and Smith (2023b) that found that Southern Whiteface used the same hollow in spring 1990, winter and spring 1992, spring 1993.

Little is known about the species' social organisation. Nesting is often observed to involve pairs, but there have also been multiple occurrences of co-operative breeding recorded, with up to four adults participating in chick rearing (Sandbrink & Robinson, 1994) (Higgins & Peter, 2002). A clutch size of 3–4 eggs is typical. The length of the incubation period is unknown, but young fledge between 14–19 days after hatching (Higgins & Peter, 2002). The Southern Whiteface may be more vocal during breeding season (in spring), with the species occurring in pairs with established territories.

Distribution

The geographic distribution of the Southern Whiteface is widespread. The Southern Whiteface occurs across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range. There is a broad hybrid zone between the two subspecies extending north from the western edge of the Nullarbor Plain. The northern boundary extends to about Carnarvon in the west, to the southern Northern Territory in central Australia, but is slightly further south in Queensland where the species is largely confined to the south-west of the Mitchell Grass Downs and along the southern state border (DCCEEW, 2023b).

The movements, home range and social structure of Southern Whiteface are poorly understood. Recent advice from DCCEEW (*pers. comms. 15 May 2024*) states that Southern Whiteface are considered sedentary; however, records indicate that birds will move locally to new areas particularly in drought years. Smith and Smit (2023a) refer to Southern Whiteface as 'residents', in their paper on breeding patterns in an Australian arid-zone landbird community. It is suspected that the movement ecology of the Southern Whiteface is likely influenced by rainfall and associated productivity, yet the species typically forages over a likely relatively small home range on a day-to-day basis, probably no more than 1 km (and home ranges can be overlapping) (*DCCEEW pers. comms. 15 May 2024*). They often visit the same areas daily, have active foraging periods and a distinct call.

Recent advice from DCCEEW (*pers. comms. 15 May 2024*). states that data passed on (in March 2024) by the Australian Bird and Bat Banding Scheme show many 0 km Southern Whiteface recaptures over 10+ year periods. Indicating that the species continuously breeds in the same location, demonstrating strong site fidelity specifically in the breeding season. This suggests that the species may be sensitive to local clearing of habitat.

Habitat

The Southern Whiteface occurs in open woodland and shrubland habitat with an understorey of grasses and / or low shrubs. Suitable habitat is usually dominated by *Acacia* spp. or *Eucalyptus* spp. on ranges, foothills, lowlands and plains. The birds forage almost exclusively on the ground, favouring habitats with low tree densities and an herbaceous understorey. Critical habitat for the Southern Whiteface includes areas of (DCCEEW, 2023b):

- Relatively undisturbed open woodlands and shrublands with an understorey of grasses or shrubs or both.
- Habitat with low tree densities and an herbaceous understorey litter cover which provides essential foraging habitat.
- Living and dead trees with hollows and crevices which are essential for roosting and nesting.

The Southern Whiteface is sedentary, although it is thought there may be some movements outside of their normal range during dry periods. There is limited evidence as to what drives occupancy.

Southern Whiteface habitat in South Australia is varied across the intensive Agricultural zone, characterised by extensive vegetation clearance, and pastoral rangelands, characterised by stock grazing of native vegetation. The availability of habitat within the Agricultural zone has been significantly reduced since European settlement through land clearing activities to accommodate cropping and other intensive agricultural activities. The habitat that remains within this area is often highly fragmented and degraded. The availability of habitat across the pastoral rangelands zone is considered similar to pre-European settlement as the majority of this area has been used for stock (sheep and cattle) grazing and has not been subject to land clearing. This has resulted in the habitat

being essentially contiguous throughout the region with only small areas of clearance across the region. Therefore, it is considered that extensive suitable contiguous habitat is available for Southern Whiteface across the pastoral rangelands region of SA.

7.2.3 Threats

Threats to the Southern Whiteface include:

- *Habitat loss and fragmentation*: Habitat loss caused by clearing for agriculture is likely the cause of the species decline, especially in the parts of the species' range where there has been complete removal of habitat for intensive agriculture (Ehmke, *et al*., 2021).
- *Habitat degradation*: Habitat degradation caused by domestic livestock grazing impacts on native tree and shrub seedlings and grassy woodland groundcover species, as well as changes in soil structure and damage to native plants by trampling. Livestock grazing can exacerbate the spread of weeds through seed dispersal, soil and vegetation disturbance, and nutrient enrichment.
- *Increased frequency or length of droughts*: Droughts impact food resources (e.g., native grasses, nectar and arthropods) for a range of woodland birds in Australia, which, in turn, decreases bird abundance. Reporting rates for southern whiteface declined during the millennium drought; however, longer monitoring is needed to determine if these declines are short-term responses due to drought conditions or are responses to other long-term impacts (e.g., environmental deterioration) (Ellis & Taylor, 2014). It is not known how the increased frequency or length of droughts affect Southern Whiteface survival and reproduction and its habitat. Further studies are needed to better understand the impact of drought on the species.
- *Increased likelihood of extreme events (i.e., wildfire, drought and heatwaves)*: It is not known how wildfire, drought and heatwaves weather events, or the cumulative effect of these weather events, affect Southern Whiteface survival and reproduction and its habitat. Further studies are needed to better understand the impact increased likelihood of extreme events on the species.

Climate change may be affecting Southern Whiteface *Aphelocephala leucopsis* and *Aphelocephala leucopsis castaneiventris* (Ehmke, *et al*., 2021) but how that is mediated is unknown (Lilleyman, *et al*., 2024).

7.2.4 Population Estimates and Trajectory

There are currently estimated to be 477,000 (range 236,000–954,000) mature individuals in the wild (DCCEEW, 2023b).

South-east Southern Whitefaces are one of a suite of taxa often considered to be declining at a local level, including around western New South Wales (Reid, 1999) (Olsen, *et al*., 2005) and they disappeared after the millennium drought in central New South Wales (Ellis & Taylor, 2014).

Trends in range-wide reporting rates for both subspecies since 2000 have been strongly and significantly negative (Ehmke, et al., 2021). For South-west Southern Whitefaces, reporting rates in 2 ha 20 minute counts and 500 m radius area searches from 2000–2020 declined by 86% and 46%, respectively (2000–2009: -35% and -35%; 2010–2019: -49%, +3% (Ehmke, *et al*., 2021)). For south-east southern whitefaces, the equivalent figures were declines of 64% and 72% from 2000–2020 (2000–2009: -49% and -20%; 2010–2019: -57% and -65% (Ehmke, *et al*., 2021)). This is based on the most recent analysis of Ehmke *et al*. (2021) over earlier and localised studies (Lindenmayer, 2018) (Barrett, *et al*., 2002) (Barrett, *et al*., 2007).

As per Ehmke *et al*. (2021) overall, declines across the range of both subspecies are 30–50% every ten years (one generation 2.9 years) since 1999, with no suggestion that the declines are slowing.

As per the Southern Whiteface conservation advice the survey and monitoring priorities for the species are to monitor long term trends and the status of the species, with research priorities being to understand demography, breeding success and movement ecology with respect to climate variables, with the aim to determine reasons for population declines (DCCEEW, 2023b). Without this information it is not possible to develop appropriate management interventions for each subspecies.

7.2.5 Extent of Occurrence and Area of Occupancy

The EOO and AOO of the Southern Whiteface are presented in **Table 7.5**. The estimated modelled distribution is presented in **Figure 7.4**.

Table 7.5 The Extent of Occurrence and Area of Occupancy of the Southern Whiteface (DCCEEW, 2023b)

EOO (km^2)	EOO (ha)	AOO (km^2)	AOO (ha)
4,910,000.00	491,000,000.00	70,000.00	7,000,000.00

7.2.6 Occurrence of Western Grasswren in the Study Area

Southern Whiteface was recorded at 7 of the 24 survey sites within the Study Area. A total of 16 individuals were recorded over the 3-day survey period (Table 7.6).

Table 7.6 Observations of Southern Whiteface within the Study Area in October 2023

Survey site	Date	Time (AM/PM)	GPS location		No of individuals	Comments/ Observations/Activity
			Easting	Northing		
2	3/10/2023	PM	739260	6346105	4	ROT, 4 individuals observed.
7	4/10/2023	AM	739500	6349551	3	ROS, 3 individuals observed.
9	4/10/2023	AM	740482	6349764	2	ROT, 2 individuals observed.
14	4/10/2023	PM	740387	6354304	2	ROT, 2 individuals observed.
19	5/10/2023	AM	741106	6350032	1	ROS, 1 individual observed.
20	5/10/2023	AM	741184	6349712	2	ROS, 2 individuals observed.
24	5/10/2023	PM	739777	6348009	2	ROS, 2 individuals observed.

Activity: ROT = resting on tree. ROS = resting on shrub.

Targeted behavioural studies to determine breeding status of Southern Whiteface were not undertaken as part of the October 2023 survey. There was no indication of Southern Whiteface breeding activity at the site, at the time of the survey. Southern Whiteface were observed resting in trees and on shrubs, and typical breeding behaviour such as carrying food/nesting material and or

guarding a nest site were not observed. Detailed behavioural observations were not part of the scope of works, and therefore breeding at the site cannot be ruled out.

7.2.7 Suitable Habitat in the Project Area

Vegetation and habitat assessments were outside the scope of works for this report. Vegetation assessments and habitat mapping were undertaken by Jacobs (2023) and data was provided to EBS Ecology to include in mapping in this report. The vegetation associations as per Jacobs (2023) is presented in **Table 7.7**.

Table 7.7 Vegetation Associations of the Study Area and Surrounds (as per Jacobs (2023)) and Their Suitability as Southern Whiteface Habitat

Vegetation Association	Southern Whiteface Observed	Suitable Habitat
Chenopod open shrublands +/- emergent trees	Yes, Bird sites 19, 20	Yes
Inland tall shrublands on calcrete	No	Yes
Low open woodlands of Sugarwood with a Chenopod shrub understorey	No	Yes
Low open woodlands of Western Myall with a Chenopod shrub understorey	Yes, Bird Site 2, 9, 24	Yes
Low open woodlands with Western Myall and Blackoak over chenopod shrub understorey	Yes, Bird Site 7, 14	Yes

Southern Whiteface were observed by EBS Ecology in 3 out of the 4 broad vegetation associations present within the Study Area (Figure 7.5, Table 7.7). However, as per the precautionary principle, all vegetation within the Study Area is deemed suitable habitat for Southern Whiteface.

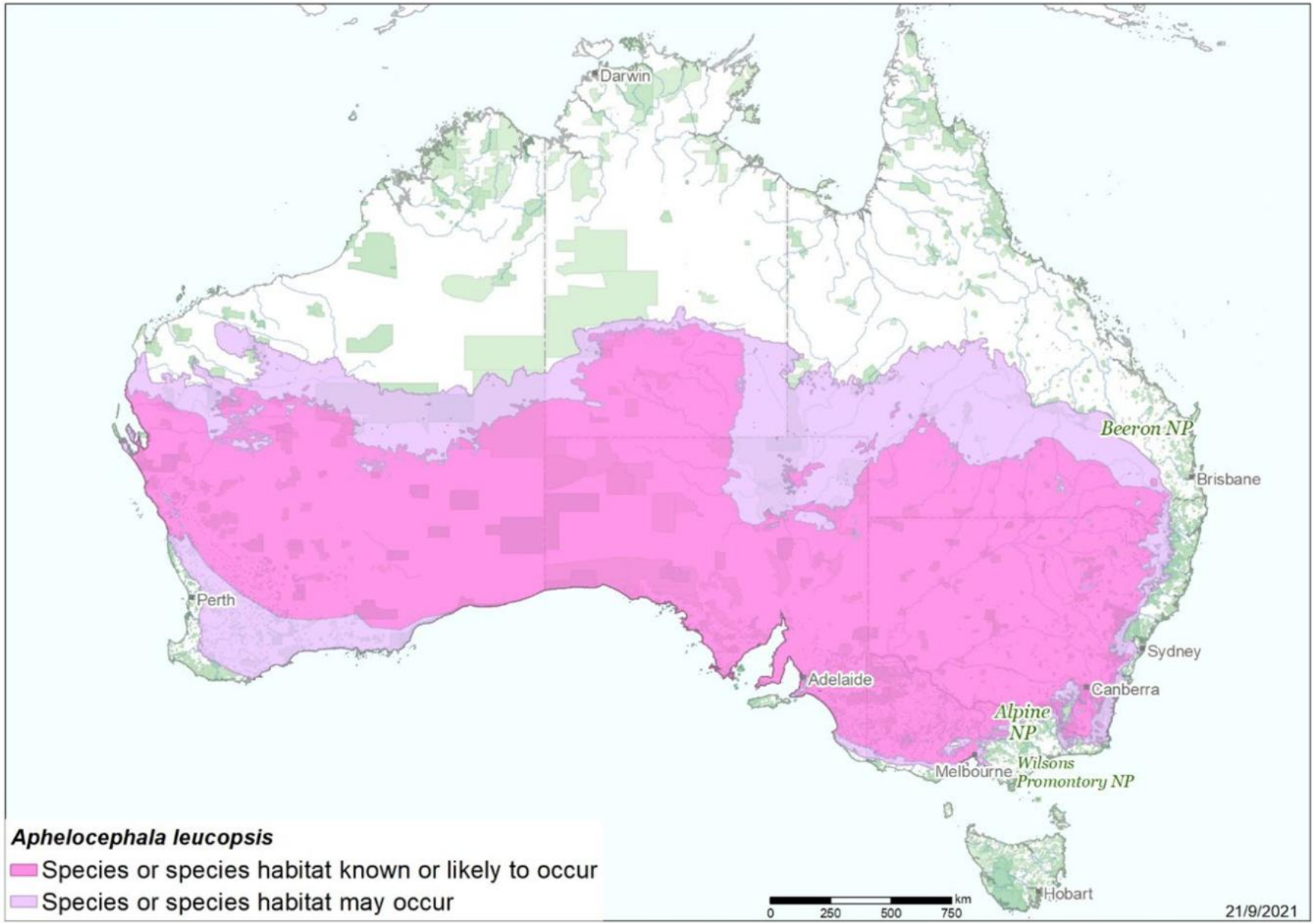

Figure 7.4 Modelled Distribution of Southern Whiteface (Source: (DCCEEW, 2023b)).

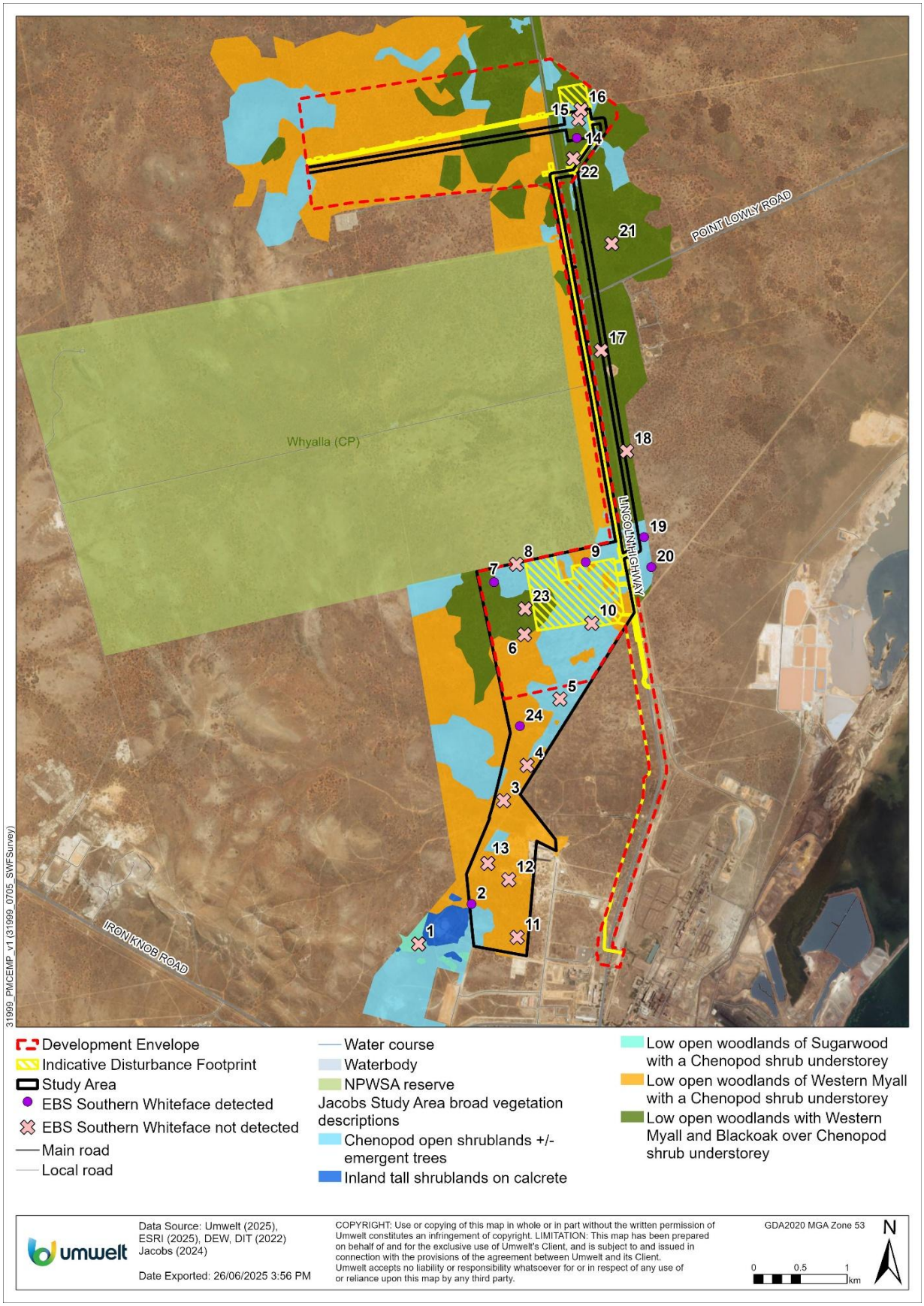

Figure 7.5 The Location of Bird Survey Sites and Southern Whiteface Observations Within the Study Area Collected by EBS Ecology in 2023 in Relation to Broad Habitat Mapping as per Jacobs (2023)

8.0 Summary of Potential Risks and Impacts to Threatened Species

An assessment of relevant impact and risk assessments has been undertaken for the proposed Project, which is reported in OHPSA (2024). The below **Table 8.1** briefly summaries the potential risks and impacts to MNES as a result from the pre-construction and construction phase of the Project. For more information, refer to OHPSA (2024).

Table 8.1 Summary of the Potential Risks and Impacts to MNES as a Result from the Project

Action	Summary description	Direct/ indirect impact to MNES
1. Clearance of Native Vegetation	Clearing of native vegetation is required to enable construction of HJP facility and associated infrastructure. The clearance of native vegetation will remove 89.4 ha of suitable habitat for the EPBC-listed Vulnerable Western Grasswren and Southern Whiteface (includes 77.2 ha permanently and 12.2 ha temporary clearance, revegetated following construction).	Direct
2. Surface Water Management	Changes to surface water flows in the proposed action area from pre-construction and construction activities which may impact on habitat of listed threatened species.	Indirect
3. Human and Vehicles Disturbance	Increased human and vehicles disturbance within the proposed action area from pre-construction and construction activities, which may impact on threatened species.	Indirect
4. Noise	Noise will be generated from pre-construction and construction of the HJP facility.	Indirect
5. Dust	Increased dust in the proposed action area from pre-construction and construction activities which may impact on habitat of listed threatened species.	Indirect
6. Weeds	Increased weeds in the proposed action area from pre-construction and construction activities which may impact on listed threatened species.	Indirect
7. Pest Animals	Increased pest animals in the proposed action area from pre-construction and construction activities which may impact on listed threatened species.	Indirect
8. Lighting	Lighting at the primary facility for safety and security purposes during night-time may impact on habitat and listed threatened species.	Indirect
9. Fire	Sparks from some pre-construction and construction could cause a fire with resultant impact on habitat for listed threatened species.	Indirect

9.0 Mitigation Measures

9.1 Risk Assessment Methodology

Methodology for the risk assessment was based on DCCEEW *Environmental Management Plan Guidelines* **(DCCEEW, 2024)**. The consequence of each impact was rated using the consequence criteria in Table 9.1. The likelihood of an impact to occur ranges from rare to highly likely and was determined using the likelihood criteria in Table 9.2. Likelihood and consequence where then used to assess the risk of impacts using the risk rating matrix in Table 9.3.

Table 9.1 Consequence Criteria

Qualitative measure of consequences	What will be the consequence/result if this issue does occur rating
Minor	Minor incident of environmental damage that can be reversed.
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts.
High	Substantial instances of environmental damage that could be reversed with intensive efforts.
Major	Major loss of environmental amenity and real danger of continuing impact(s).
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage.

Table 9.2 Likelihood Criteria

Qualitative measure of likelihood	How likely is it that this event/issue will occur after control strategies have been put in place
Highly likely	Is expected to occur in most circumstances.
Likely	Will probably occur during the life of the project.
Possible	Might occur during the life of the project.
Unlikely	Could occur but considered unlikely or doubtful.
Rare	May occur in exceptional circumstances.

Table 9.3 Risk Rating

	Consequence				
	Minor	**Moderate**	**High**	**Major**	**Critical**
Highly Likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possible	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High

9.2 Risk Assessment and Management Plan

A risk assessment of each of the potential risks identify in Section **8.0** is presented in the sections below along with management measures to mitigate the risks. The risks of not achieving the environmental outcomes outlined in this Section and measures to mitigate these risks are presented in Section **9.5** below.

The level of uncertainty associated with the management measures proposed, the risk ratings applied, and the measurement criteria/monitoring and corrective actions presented is low. OHPSA has a robust understanding of the ecological environment in which the HJP Project is proposed, developed through multiple studies undertaken by suitably qualified, and very experienced South Australian ecologists. As such, the stated outcomes and risks are considered achievable and realistic.

Management measures applied are standard best practice construction activities, considered to be 'tried and true' rather than novel approaches to unique risk events. As such, there is a low level of uncertainty associated with the risk ratings applied (consequence, likelihood and resultant residual risk arising from the risk matrix presented in Section **9.1**). The risk matrix applied to the risk assessment is based on DCCEEW *Environmental Management Plan Guidelines* (DCCEEW, 2024), and as such, is considered to represent an acceptable approach which does not introduce uncertainty.

Sufficient conservatism has been applied to the risk ratings and corrective actions, and this along with the reporting requirements proposed enable transparency to DCCEEW regarding achievement of the environment outcomes, along with options for involvement in development of acceptable corrective measures if outcomes are not achieved.

9.2.1 Vegetation Clearing / Habitat Loss / Fragmentation / Infrastructure Development / Loss of Hollow-bearing Trees

Outcome	Risk event	Management measures	Project phase	Risk			Outcome measurement criteria	Monitoring	Corrective action
				Consequence	Likelihood	Residual risk			
Construction of the HJP does not result in clearance of more than 89.4 ha of Western Grasswren and Southern Whiteface habitat.	Construction equipment or vehicles intrude into no-go areas.	• Geospatial data and mapping used to identify approved clearance area. • Prior to vegetation clearance, the approved disturbance footprint will be delineated using fencing or flagging to ensure that no disturbance occurs outside of the approved area. • All vehicle and machinery parking, laydown areas and stockpiles will be restricted to designated areas within the Disturbance Footprint. • All personnel will be inducted as to the locations of sensitive vegetation and threatened flora species. • Construction contractor to operate strictly under an OHPSA approved CEMP, that includes clearing procedures.	Pre-construction Construction	High	Unlikely	Medium	Geospatial data and mapping confirm that no more than 89.4 ha of habitat has been cleared.	Environmental contractor to undertake inspection of vegetation clearing at the completion of Phase 1 and Phase 2 construction.	Over-clearing is reported to OHPSA and rehabilitation measures developed in consultation with DEW and DCCEEW.
Loss of habitat for Western Grasswren and Southern Whiteface is minimised to the extent reasonably practicable for pre-construction	Inappropriate siting of HJP components results in greater vegetation loss than is reasonably practicable.	• Prior to finalisation of design, micro-siting surveys to be undertaken by suitably qualified environmental professional to position transmission line towers and other project components as far as reasonably practicable in areas which minimise	Pre-construction	Moderate	Unlikely	Low	Report by suitably qualified environmental professional confirms micro-siting has reduced impacts on	Pre-construction report and post-construction audit Report by suitably qualified environmental	Further siting investigations undertaken if report does not confirm impacts have been minimised.

Outcome	Risk event	Management measures	Project phase	Risk			Outcome measurement criteria	Monitoring	Corrective action
				Consequence	Likelihood	Residual risk			
and construction phase of the HJP		impacts to high value vegetation which may provide suitable habitat for Western Grasswren or Southern Whiteface.					habitat as far as reasonably practicable. Post-construction audit confirms all project components constructed as planned.	professional at the completion of Phase 1 construction.	
	Vehicle access tracks are poorly planned.	• New vehicle access tracks will be planned to minimise their number, width and total length.	Pre-construction	Moderate	Unlikely	Low	Track locations reviewed by suitably qualified consultant to confirm impacts cannot be further reduced while meeting function and safety requirements.	Post-construction audit Report by suitably qualified environmental professional at the completion of phase 2 construction.	Unnecessary tracks rehabilitated.
	Vegetation clearance results in loss of hollows that could be used by Southern Whiteface.	• Areas of vegetation being removed will be surveyed for hollow bearing trees prior to clearing. Hollow-bearing trees will be mapped and clearly marked in the field. Where the removal of a hollow-bearing tree is required, the hollows will be retained on site or shifted to nearby locations outside of the disturbance area to provide ongoing available nesting habitat for	Pre-construction Construction	Moderate	Possible	Medium	Survey report completed. Suitably qualified consultant confirms all hollows have been retained on site, or shifted to adjacent areas where they can persist. Nesting boxes established for	Post-clearance audit Report by suitably qualified environmental professional at the completion of phase 2 construction if tree hollows identified during construction.	Corrective actions as agreed by DEW and DCCEEW, which could include provision of more nesting boxes.

Outcome	Risk event	Management measures	Project phase	Risk			Outcome measurement criteria	Monitoring	Corrective action
				Consequence	Likelihood	Residual risk			
		Southern Whiteface (and other fauna). • OHPSA to implement a hollow replacement program through the provision of appropriately sized and orientated nesting boxes for Southern Whiteface in adjacent areas for all hollow bearing trees which are inadvertently destroyed during site clearance.					any hollows lost.		
	Revegetation fails on areas that are planned for rehabilitation following construction.	• Topsoil and vegetative material stockpiled for use in revegetation. • Areas designated for rehabilitation have topsoil spread and ground scarified to retain surface moisture and organic materials. • Vegetative materials placed over ground designated for rehabilitation to expediate natural regeneration and provide organic materials to soils.	Construction	Moderate	Possible	Medium	Construction contractor to have a Rehabilitation Management Plan approved by OHPSA including rehabilitation targets and recommendations for different vegetation types.	As specified in the Rehabilitation Management Plan.	Corrective action to be developed by suitably qualified environmental professional and could include seeding with locally indigenous species.
Vegetation clearance during construction does not cause death or injury to Western Grasswren or Southern Whiteface	Vegetation clearance causes death or injury to Western Grasswren and Southern Whiteface.	• Progressive clearing of all areas to allow fauna time to disperse into surrounding habitat following disturbance. • Avoid clearing within breeding season (July to September).	Construction	Moderate	Unlikely	Low	No injuries or deaths to fauna detected.	Monitoring by suitably qualified environmental professional during clearing operations.	Any injuries or deaths reported to DEW and DCCEEW. Fauna expert to advise if any changes are needed to the staging of clearance.

9.2.2 Surface Water Management

Outcome	Risk events	Management measures	Project phase	Risk			Outcome measurement criteria	Monitoring	Corrective action
				Consequence	Likelihood	Residual risk			
	Civil works cause a change in surface water flows.	• Stormwater system has been designed to retain existing surface water flow regime	Pre-construction Construction	Moderate	Unlikely	Low	Audit by suitably qualified environmental professional confirms all works meet the design specifications.	Post-construction audit by suitably qualified environmental professional at the completion of phase 2 construction.	Remedial action as recommended by a suitably qualified environmental professional.
No adverse impact on habitat for Western Grasswren and Southern Whiteface outside the Disturbance Footprint due to changes in surface water flows or quality during pre-construction and construction phase of the HJP.	Soil disturbance during construction results in erosion and sedimentation.	• Stormwater system has been designed to retain existing surface water flow regime, as far as reasonably practicable. • Stormwater system has been designed to ensure any stormwater flow off site complies with water quality standards outlined in *Environment Protection* (Water Quality) *Policy 2015*. • Clean stormwater diverted around disturbance areas. • Construction contractor to have a Sedimentation, Erosion and Drainage Management Plan approved by OHPSA. • Induct all site personnel to provide an understanding of the issues associated with surface water and the management zones and strategies in place.	Pre-construction Construction	Moderate	Possible	Low	Audits every 3 months during phase 2 construction confirm compliance with the approved Sedimentation, Erosion and Drainage Management Plan.	3 monthly audits by suitably qualified environmental professional during phase 2 construction.	Corrective actions to be identified by a suitably qualified environmental professional, if needed, by the audit.

Outcome	Risk events	Management measures	Project phase	Risk			Outcome measurement criteria	Monitoring	Corrective action
				Consequence	Likelihood	Residual risk			
		• Soil to be stockpiled at least 50 m away from drainage pathways. • Storage of construction materials and hazardous waste at least 40 m from drainage lines or watercourses. • Control the entry and exit of stormwater runoff from work areas including to divert clean stormwater away from and around materials storage areas.							
	Unexpected find of contaminated soils resulting in mobilisation of polluted soils/water.	• Stop work in the event of encountering potentially contaminated soil and reassess site drainage to ensure sediments from potentially contaminated soils are contained.	Construction	Moderate	Unlikely	Low	Audit by a suitably qualified environmental professional confirms contaminated soils have been appropriately managed to present a low risk to fauna habitat.	If contaminated soils are found, the need for any monitoring to be determined by a suitably qualified environmental professional.	If required, to be determined by a suitably qualified environmental professional.

9.2.3 Human and Vehicle Disturbance

Outcome	Risk events	Management measures	Project phase	Risk			Outcome measurement criteria	Monitoring	Corrective action
				Consequence	Likelihood	Residual risk			
No measurable adverse impact on Western Grasswren and Southern Whiteface outside the Disturbance Footprint due to vehicle movement or presence of humans during pre-construction and construction phase of the HJP.	Unauthorised access to site causes disturbance to Western Grasswren and/or Southern Whiteface.	• Where access points and tracks intersect public roads, they will be fenced with access restricted by locked gates where possible and only with landholder agreement.	Pre-construction Construction	Moderate	Possible	Medium	An investigation by a suitably qualified environmental professional confirms that the unauthorised access to the site could not have been reasonably prevented.	Incident investigation by suitably qualified environmental professional.	Incident investigation to confirm if any additional measures are needed to prevent unauthorised access.
	Vehicles accidents cause death or injury to Western Grasswren or Southern Whiteface.	• Speed limits will be imposed on all access roads and within the Project Area. • Maintain log of incidents involving fauna injury/death resulting from construction activities.	Construction	Moderate	Unlikely	Low	An investigation by a suitably qualified environmental professional confirms that the vehicle accident could not have been reasonably prevented.	Incident investigation by suitably qualified environmental professional.	Incident investigation to confirm if any additional measures are needed to prevent unauthorised access.

9.2.4 Noise

Outcome	Risk events	Management measures	Project phase	Risk			Outcome measurement criteria	Monitoring	Corrective action
				Consequence	Likelihood	Residual risk			
No measurable adverse impact on Western Grasswren and Southern Whiteface outside the Disturbance Footprint	Construction equipment does not operate within	• Low noise equipment selected where practicable. • All vehicles and equipment will be appropriately serviced and maintained.	Pre-construction Construction	Moderate	Unlikely	Low	Noise measured by a suitably qualified environmental professional at	Quarterly monitoring by a suitably qualified environmental professional	CEMP reviewed to identify any additional measures that could be

Outcome	Risk events	Management measures	Project phase	Risk			Outcome measurement criteria	Monitoring	Corrective action
				Consequence	Likelihood	Residual risk			
due to noise from pre-construction and construction phase of the HJP.	specifications.	• Avoid clearing within breeding season of Western Grasswren and Southern Whiteface. • Construction contractor to operate strictly under an OHPSA approved CEMP, that includes construction procedures.					the boundary of the Whyalla Conservation Park is less than 50 dB(A) for at least 90% of the time.	during the phase 2 construction period.	reasonably applied.
	On-site monitoring identifies that noise emissions are greater than expected.	• Noise impacts will be controlled in accordance with the limits of the relevant regulations including *Local Nuisance and Litter Control Act 2016*, *Environment Protection Act 1993*, *Environment Protection* (Commercial and Industrial Noise) *Policy 2023* and *Planning, Development Infrastructure Act 2016* which govern construction noise in South Australia. • Implement proactive noise control strategies if required, such as shielding for compressors, power generators and other fixed plant; and temporary acoustic barriers or enclosures. • Induct site personnel to provide an understanding of the issues associated with noise management and the mitigating strategies in place.	Pre-construction Construction	Moderate	Possible	Medium	Noise measured by a suitably qualified environmental professional at the boundary of the Whyalla Conservation Park is less than 50 dB(A).	Monitoring undertaken by a suitably qualified environmental professional within 30 days of commissioning gas turbines to confirm compliance under all operating conditions.	Any non-compliance investigated. If it cannot be reasonably rectified and implemented, the impact on Western Grasswren and Southern Whiteface will be investigated and an additional offset provided if required.

9.2.5 Dust

Outcome	Risk events	Management measures	Project phase	Risk			Outcome measurement criteria	Monitoring	Corrective action
				Consequence	Likelihood	Residual risk			
No decline in habitat quality for the Western Grasswren or Southern Whiteface outside the Disturbance Footprint due to smothering of vegetation in dust from construction of the HJP.	Poor dust management during construction cause vegetation smothering.	• Cover or wet-down soil and construction material stockpiles to minimise dust mobilisation. • Stop work in areas where construction activities are generating unacceptable levels of dust. • Minimise use of on-site cutting and grinding. Where used, employ equipment and techniques such as dust extractors and surface wetting to minimise dust. Consider use of specific plant such as wet cutting saws, vacuum extraction or block/slab splitters. • Regularly water exposed surfaces, including exposed stockpiles and unsealed roadways, or seal high use access tracks to suppress dust generation. • Induct site personnel to provide an understanding of the issues associated with air quality management and the mitigating strategies in place. • Construction contractor to operate strictly under an OHPSA approved CEMP, that includes construction procedures.	Construction	Minor	Possible	Low	Inspection of vegetation adjoining Disturbance Footprint following a dust incident[4] by a suitably qualified environmental professional identified no evidence of dust smothering.	Inspection following incident by a suitably qualified environmental professional.	Additional dust mitigation measures applied as necessary. This could include an increase in the frequency of watering exposed areas with a water cart.

[4] Dust incident is defined as dust visibly leaving site or receipt of a dust complaint.

9.2.6 Weeds, Pathogens and Pest Animals

Outcome	Risk events	Management measures	Project phase	Risk			Outcome measurement criteria	Monitoring	Corrective action
				Consequence	Likelihood	Residual risk			
No introduction of new weeds, pathogens or pest animals, nor sustained increase in abundance of existing weeds, pathogens or pest animals, in areas adjoining the Disturbance Footprint due to pre-construction and construction phase of the HJP.	Introduction of weeds, pathogens or pest animals on construction equipment and vehicles.	• Construction contractor to have a Weed, Pest and Disease Management Plan (including Phytophthora) approved by OHPSA. The plan will be developed based on known Whyalla and Upper Spencer Gulf weeds. • Factsheets of weed and pest species will be made available to contractors. • Induct all site personnel to provide an understanding of the declared plants present onsite and requirements of the *Landscape South Australia Act 2019*. • Limit entry/exit points to the Project Area to the minimum number possible. Clearly delineate designated entry and exit points to avoid traffic movements outside of these locations. • Designate/establish vehicle and machinery washdown and inspection sites. • Ensure that any construction machinery is clean and free from soil pathogens such as Phytophthora and any plant materials before entering the area. This includes performing appropriate hygiene before entering and leaving the project	Pre-construction Construction	Moderate	Unlikely	Low	A survey by a suitably qualified environmental professional confirms there has been no introduction of new weeds, pathogens or pest animals, nor sustained increase in abundance of existing weeds, pathogens or pest animals, in areas adjoining the Disturbance Footprint.	Survey undertaken every 3 months by a suitably qualified environmental professional during phase 1 and phase 2 construction but excluding the time between construction phases.	Weed, pathogen or pest animal controls to be developed and implemented by a suitably qualified environmental professional as needed.

Outcome	Risk events	Management measures	Project phase	Risk			Outcome measurement criteria	Monitoring	Corrective action
				Consequence	Likelihood	Residual risk			
		area to avoid potential spread. Heavy vehicles/machinery must be certified weed and soil free by the responsible officer prior to entering the Project Area.							
	Fill material brought onto site contains weeds or pathogens.	• All fill materials required for construction (e.g. sand, soil, gravel) will be sourced from certified weed and phytophthora free sites. • Where fill is required, only clean fill which meets EPA 'Waste Fill' criteria shall be used. If there is a proposal to use sand, gravel, stone, shell, shale or clay from an adjacent landholder (and not a licenced quarry), the Contractor shall ensure that the extraction has approval pursuant to the *Mining Act 1971* (where required) by the Department for Energy and Mining.	Construction	Moderate	Unlikely	Low	All fill material is appropriately certified as weed and pathogen free.	Check of records by a suitably qualified environmental professional confirms all fill brought to site has the appropriate certification.	If fill is not appropriately certified, Control measures to be implemented as advised by the suitably qualified environmental professional.
	Pest animals attracted by putrescible waste on site.	• Work areas to be maintained in a neat and orderly manner. • Waste will be appropriately stored to discourage pest animals. This includes covering putrescible and organic storages associated with crib rooms and offices. • Waste will be disposed of regularly by the persons/organisation undertaking the activities, with appropriate signage and separation of hard organic	Construction	Minor	Possible	Low	Site inspection confirms all waste is managed in accordance with the Waste Management Plan.	3 monthly inspections by a suitably qualified environmental professional during construction.	Inspection to identify and rectification measures if needed.

Outcome	Risk events	Management measures	Project phase	Risk			Outcome measurement criteria	Monitoring	Corrective action
				Consequence	Likelihood	Residual risk			
		material from putrescible organic material. • Off-site waste disposal will be in accordance with SA EPA and Zero Waste SA guidelines/requirements. • Construction contractor will have a Waste Management Plan approved by OHPSA.							

9.2.7 Lighting

Outcome	Risk events	Management measures	Project phase	Risk			Outcome measurement criteria	Monitoring	Corrective action
				Consequence	Likelihood	Residual risk			
No measurable adverse impacts on Western Grasswren or Southern Whiteface due to lighting at the HJP during pre-construction and construction phase.	Lighting is not installed or operated in accordance with required specifications.	• Main facility sited 800 m away from preferred Western Grasswren habitat in BAM 22 vegetation group and a 50 m buffer between the facility boundary and the Conservation Park is maintained. • Lighting designed to be shielded and directional. • Designed for access for vehicles and personnel, and for security. • All lighting will be designed to Australian Standards (AS/NZS 1158 & AS/NZS1680) and applicable laws and regulations, consistent with DCCEEW's National Light Pollution Guidelines for Wildlife 2023.	Construction	Moderate	Unlikely	Low	An inspection by a suitably qualified contractor confirms lighting is in accordance with the required specifications.	One-off inspection by a suitably qualified contractor following installation of any new lighting.	As advised by the suitably qualified contractor.

9.2.8 Fire

Outcome	Risk events	Management measures	Project phase	Risk			Outcome measurement criteria	Monitoring	Corrective action
				Consequence	Likelihood	Residual risk			
No adverse impacts on habitat for Western Grasswren or Southern Whiteface due to fires caused by pre-construction or construction phase of the HJP that could have been reasonably prevented.	Construction activities cause fire ignition.	• Construction contractor to have a Bushfire Management Plan consistent with OHPSA's approved plan. • All vehicles accessing Project Area will be fitted with fire extinguishers or other suitable firefighting equipment such as water carts that are inspected regularly. • Hot works will only occur on days of total fire ban under appropriate permit, in compliance with the documented plan and regulations. Restrictions will be in place on catastrophic rating days. • Contractors' work safety documentation will include emergency response procedures for the event of fire. • Personnel will be informed of daily South Australian Country Fire Service (CFS) Fire Danger Rating at daily toolbox meetings. The Fire Danger Rating will form part of the daily risk analysis at these meetings. • At all times during the declared Bushfire Danger Season, or on days of Total Fire Ban outside the declared season, light vehicles will carry fire-fighting backpacks for each personnel in	Construction	Major	Rare	Medium	An investigation by a suitably qualified contractor confirms that the fire could not have been reasonably prevented.	Investigation by a suitably qualified contractor completed within 30 days of any incident.	Additional fire prevention measures implemented if recommended by the investigation by a suitably qualified contractor.

Outcome	Risk events	Management measures	Project phase	Risk			Outcome measurement criteria	Monitoring	Corrective action
				Consequence	Likelihood	Residual risk			
		vehicle. From spring to autumn, all light vehicles will carry one fire fighting backpack and shovel as a minimum regardless of the fire danger rating. • Any incidents of unplanned ignition will be immediately (or as soon as practicable) reported to the CFS and OHPSA. • Procedures relating to fire management in the Project Area, including contact details of relevant authorities (e.g. CFS) and information sources, will be clearly communicated to all personnel during inductions.							

9.3 Procedures for Managing Environmental Emergencies

OHPSA, or their contractors, will develop an emergency response system as part of the overarching Environment and Safety Management System (ESMS), with processes and plans for responding to potential or actual emergency situations, including potential environmental emergencies, documented in an Emergency Response Procedure (ERP) which is regularly reviewed and updated.

Environmental emergencies relevant to the pre-construction and construction phase of the HJP include:

- Unauthorised habitat clearance.
- Injury or death of listed fauna.
- Offsite sediment discharge causing damage to habitat.
- Hydrocarbon spill causing damage to habitat.
- Fire.

A Fire and Emergency Management Plan will be further developed in accordance with Metropolitan Fire Service (MFS) and Country Fire Authority (CFA) guidance (CFA, 2019) (the site is located within the MFS operational area) and Guide for Major Hazard Facilities – Emergency Plans (Safe Work Australia, 2012). Copies will be available at both the site and the Whyalla MFS and CFS/CFA stations. This will include:

- Firefighting systems designed to relevant Codes, Standards and Regulations.
- Fire water storage system with the maximum required fire water volume so no reliance on mains water during a fire. This will be connected to pump station and ring main systems.

9.4 Response Measures and Corrective Actions

If an outcome measurement differs from what is indicated in Section **9.2**, this will be reported as an environmental incident and an environmental incident investigation will be undertaken to determine the extent and cause and to prevent it from occurring again.

If clearing of habitat occurs outside the Disturbance Footprint, remediation and/or rehabilitation should be undertaken, provided that it does not cause any further adverse impact (such as undesirable soil disturbance).

If injured or dead protected matters are found, the appropriately qualified ecologist will be notified immediately to investigate and determine the best course of action. The ecologist will be responsible for contacting the Department for Environment and Water (South Australian Government) (DEW) and providing notification of the incident (refer to **Table 12.2** for contact details).

If live Western Grasswren and Southern Whiteface or populations are discovered in areas of impact (in areas not previously identified as Western Grasswren and Southern Whiteface habitat), the following actions are to be taken:

- All works will cease in the immediate vicinity until a suitably qualified ecologist provides advice.
- The area is designated as Western Grasswren and Southern Whiteface habitat and the management measures outlined in this Plan are to be implemented.

- DEW and consultation group is to be notified (refer to **Table 12.2** for contact details).

9.5 Risks to Implementation of this Plan

There are a number of potential risks to achieving this Plan's environmental objectives, including the following:

- Indifference and/or lack of understanding of requirement for this Plan (EPBC Act approval conditions) leading to poor implementation of this Plan;
- Change of facility owner and/or operator (potentially leading to poor implementation of this Plan);
- Change of staff responsible for implementation of this Plan (i.e., Construction Project Manager /Asset Manager (OHPSA)) and lack of understanding of requirements within this Plan; and
- Change of Ecological Consultancy assisting OHPSA to implement this Plan and a subsequent lack of understanding of requirements within this Plan.

These risks are outlined in **Table 9.4** below, along with further commentary on each risk, the likelihood rating of each risk occurring, the consequence rating of each risk, the overall risk rating, risk management strategies and/or proposed contingency measures, along with who will be responsible for managing the risk. A qualitative risk assessment methodology was used to undertake the risk assessment, with the likelihood and consequence rating criteria, and the corresponding risk rating matrix, provided in **Table 9.3** (on page 38).

Table 9.4 Assessment of Risks to Achieving the Protected Matters CEMP's Environmental Objectives and Associated Risk Management Strategies That Will Be Applied

Potential Risk	Comment on Risk	Likelihood of Risk Occurring	Consequence Rating	Risk Rating	Risk Management Strategies / Proposed Contingency Measures	Responsibility
Indifference and/or lack of understanding of Construction requirement for this Plan.	Poor implementation of this Plan is likely to result in potential non-compliance with the EPBC Act approval conditions, which is not the intent of OHPSA.	Unlikely - Possible	Minor - Moderate	Medium	Ensure this Plan addresses all EPBC Act approval conditions outlined in **Table 2.1**. EPBC Act Approvals Annual Compliance Reports to be published to the Project's website on an annual basis and available until the approval expires. OHPSA to ensure they maintain accurate records and files, including this PMCEMP, any subsequent revisions to the plan, and all associated reporting.	Construction Project Manager / Asset Manager (OHPSA) (with assistance from appointed Ecological Consultant).
Change of asset owner and/or operator potentially leading to poor implementation of this PMCEMP.	OHPSA intend to own and operate the HJP Project, and this is unlikely to change during the construction phase.	Unlikely - Possible	Minor - Moderate	Medium	EPBC Act approval and conditions to be adhered to and pass on to any future owner with appropriate hand-over and learnings. OHPSA to ensure they maintain accurate records and files, including this PMCEMP, any subsequent revisions to the plan, and all associated reporting.	Construction Project Manager / Asset Manager (OHPSA) (with assistance from appointed Ecological Consultant).

Potential Risk	Comment on Risk	Likelihood of Risk Occurring	Consequence Rating	Risk Rating	Risk Management Strategies / Proposed Contingency Measures	Responsibility
Change of staff responsible for implementation of this PMCEMP (i.e. Construction Project Manager / Asset Manager (OHPSA) and lack of understanding of the requirements of this Plan.	Given the relatively short duration of the HJP Project construction phase (approx. 2 years), it is considered unlikely, but possible that the Construction Project Manager / Asset Manager will change during that time.	Unlikely - Possible	Minor - Moderate	Medium	Construction Project Manager / Asset Manager to be inducted into this PMCEMP. Construction Project Manager / Asset Manager to be involved in review of the reporting requirements associated with this PMCEMP. Ecological Consultant engaged to implement aspects of this PMCEMP to ensure the Construction Project Manager / Asset Manager are invited to review all reporting required associated with this PMCEMP, and that they understand the requirements. OHPSA to ensure they maintain accurate records and files, including this PMCEMP, any subsequent revisions to the plan, and all associated reporting.	Construction Project Manager / Asset Manager (OHPSA) (with assistance from appointed Ecological Consultant).
Change of Ecological Consultancy assisting OHPSA with the implementation of this PMCEMP, and	Given the relatively short duration of the HJP Project construction phase (approx. 2 years), it is considered unlikely, but	Unlikely - Possible	Minor - Moderate	Medium	OHPSA to ensure that they engage a suitably qualified Ecological Consultant to implement the relevant requirements of this PMCEMP. OHPSA to ensure they maintain accurate records	Construction Project Manager / Asset Manager (OHPSA).

Potential Risk	Comment on Risk	Likelihood of Risk Occurring	Consequence Rating	Risk Rating	Risk Management Strategies / Proposed Contingency Measures	Responsibility
a subsequent lack of understanding of the Plan by newly appointed consultants.	possible that the Ecological Consultant will change during that time.				and files, including this PMCEMP, any subsequent revisions to the plan, and all associated reporting.	

10.0 Avifauna Monitoring

In addition to the monitoring summarised in Section **9.0**, a specific avifauna monitoring program will be implemented for Western Grasswren and Southern Whiteface during the pre-construction and construction phase of the HJP.

Whilst this PMCEMP relates to the pre-construction and construction phase of the HJP only, the below sections include some general avifauna monitoring activities related to the operation of the HJP as well.

10.1 Monitoring Objectives

Monitoring requirements outlined in Section **9.0** above largely focus on monitoring and reporting to demonstrate that management and mitigation measures have been achieved, rather than providing a dedicated focus on the end-target of those mitigation strategies; the Western Grasswren and Southern Whiteface. The avifauna monitoring program compliments the compliance monitoring outlined in Section **9.2** and provides a focus on the target species themselves, to allow a mechanism to measure their actual response to the Project and the management measures which are applied. Due to expected variations in seasonal abundance/detectability of Western Grasswren and Southern Whiteface, the avifauna monitoring is not appropriate for measuring compliance. It will however inform the need for adaptive management if required.

The objective of the avifauna monitoring program is:

- to inform whether the outcomes established for Western Grasswren and Southern Whiteface are reflected in the occupancy and behaviour of the species in habitat surrounding the Project area.

The outcomes for the species (identified in Section **9.2** above) which the avifauna monitoring program relate to include:

- No adverse impact on habitat for Western Grasswren and Southern Whiteface outside the Disturbance Footprint due to changes in surface water flows or quality during the pre-construction or construction phase of the HJP.
- No measurable adverse impact on Western Grasswren and Southern Whiteface and their habitat outside the Disturbance Footprint due to vehicle movement or presence of humans during pre-construction or construction phase of the HJP.
- No measurable adverse impact on Western Grasswren and Southern Whiteface and their habitat outside the Disturbance Footprint due to noise from the pre-construction or construction phase of the HJP.
- No measurable adverse impacts on Western Grasswren or Southern Whiteface and their habitat due to lighting at the HJP during the pre-construction or construction phase of the HJP.

10.2 Broad Approach

A total of 26 bird monitoring sites were established during the October 2023 survey (EBS Ecology, 2023) and up to 22 bird monitoring sites were surveyed during the Jacobs surveys (2023) (2024). These

survey sites provide data which can be considered to reflect a 'baseline' condition prior to the Project commencing, taking into account the climate cycle of that time period.

To assess potential impacts of the pre-construction and construction phase of the Project to Western Grasswren or Southern Whiteface, the established survey sites will be categorized into 3 groups, based on the location and distance of survey sites in relation to the Project Footprint, as follows:

- "Impact" sites within the direct vicinity (0 - 500 metres away from Project Footprint)
- "Intermediate" sites within the direct vicinity (500 – 1,000 metres away from Project Footprint)
- "Control" sites (> 1,000 metres away from Project Footprint).

A small number of the survey locations established during the previous surveys are located within the Disturbance Footprint, but the majority of the remaining sites are outside of the Disturbance Footprint (and ultimately the Project Disturbance Footprint) and provide a 'baseline' data set against which future comparisons can be made. Additional sites may need to be established to ensure a balanced survey design.

Occupancy of Western Grasswren and Southern Whiteface at the existing survey locations allow for the determination of Southern Whiteface and Western Grasswren presence in relation to distance to the Disturbance Footprint (and ultimately from the Project) prior to the commencement of construction.

Repeated surveys during similar climatic conditions and seasons during at the same survey locations (and any others added to establish a balanced survey design) during the pre-construction and construction phase of the Project would enable an opportunity to compare the pre-and during construction occupancy of sites (at varying distances from the disturbance). If there is no notable and persistent change in the occupancy of the target species at all distances from the Disturbance Footprint boundary once construction commences (or once the Project moves into operation) it will provide evidence across climate cycles that there are no measurable adverse impacts on Western Grasswren and Southern Whiteface outside of the Disturbance Footprint during the pre-construction or construction phase of the HJP. Conversely, a reduction in occupancy at sites closest to the Disturbance Footprint boundary may be indicative of indirect impacts as a result of the Project.

Additional observations regarding evidence of particular behaviours or age classes (e.g. juveniles) which provide evidence for breeding behaviours at the sites, as well as in the areas surrounding the Project will also be noted and discussed in monitoring reports.

10.3 Timing, Frequency and Duration

The avifauna monitoring program will be conducted annually and be undertaken between July and October, the preferred survey window when bird activity is most intense as described in Section **7.0**.

The avifauna monitoring program will be undertaken annually during the preferred survey window during construction activities. No monitoring is required during the period between phase 1 and phase 2 construction due to the low level of risk posed by the operating substation. The key operational risks of noise from gas turbines, weed introduction from vehicle movements and making habitat for suitable to pests due to inappropriate waste management will not apply to the unattended substation and as such the construction monitoring is not required and any operational monitoring undertaken will not capture the key impacts of gas turbine noise impacting avifauna behaviour.

During operation, the monitoring program will be undertaken during the preferred survey window annually from year 1 to years 5.

At the completion of the year 5 operational survey, the results from all previous rounds of monitoring will be collated, analysed and presented to DCCEEW and DEW in the form of a scientific peer reviewed paper in conjunction with the Offset Management Plan Monitoring, Evaluation, Reporting and Improvement (MERI) framework.

10.4 Monitoring Methods

Each round of avifauna monitoring will include the following:

- Monitoring will be conducted by suitably qualified independent ecologists.
- The same monitoring method as described in EBS (2023) will be utilised for each monitoring event unless a valid scientific reason can be demonstrated to justify a change in methodology.
- All correct permits, licenses and approvals will be in place prior to commencing works (see Section **10.6** below).
- All monitoring data will be provided to DEW as required by the Scientific Research Permit.
- Site access permission will be in place prior to commencing and will be the responsibility of OHPSA and/or the site operator.

Monitoring methods will include:

- Systematic 2 ha, 20 min active bird survey (as outlined by Birdlife Australia (2024) and as per EPBC survey guidelines) at defined bird survey site, i.e. those sites (or a selection of those sites) previously surveyed by EBS and/or Jacobs.
- Playback experiments for target species as per EPBC survey guidelines.
- Data recorded to include:
    - Presence or absence of Western Grasswren and Southern Whiteface at each survey site.
    - The number of individuals recorded.
    - If observed/heard, record of any behaviours noted, including nest building, nesting, roosting, foraging.
    - If observed, any evidence of particular age classes present (e.g. juvenile birds which provide evidence of local breeding).

10.5 Data Analysis and Reporting

Data from each monitoring event will be collated for analysis and reporting. Data presentation and analysis will include, but not be limited to:

- For the first monitoring reporting event, a summary of the ‘baseline condition’ which provides the locations of previous records Western Grasswren and Southern Whiteface and occupancy at sites in relation to distance from the Disturbance Footprint.
- For all subsequent monitoring events, a summary of records of Western Grasswren and Southern Whiteface from the survey event, noting which survey locations birds were observed at in relation to the distance of the survey locations from the Disturbance Footprint.

- Figures noting the locations of records of Western Grasswren and Southern.
- A comparison of records with previous monitoring events, highlighting any notable changes against previous monitoring, or apparent seasonal variations.
- Figures indicating comparison of locations of records of Western Grasswren and Southern Whiteface against previous monitoring events and baseline data.
- Statistical comparison of the occupancy of sites in relation to the distance of the survey locations from the Disturbance Footprint observed during the monitoring event, compared with the baseline data, along with relevant comparisons with other monitoring events.
- Observations of target species made whilst moving around the survey site, and their proximity to the Disturbance Footprint.
- Observations of behaviours or age class which may be reflective of breeding behaviour in proximity to the Disturbance Footprint (e.g. nest building, nesting, mating displays, juvenile birds).

Reports for each monitoring event to include the following:

- Presentation of data, figures and analysis as described above.
- Details of results for both Western Grasswren and Southern Whiteface from each avifauna monitoring event to be provided to DCCEEW and DEW.
- Consideration of ongoing appropriateness of the survey methodology to meet the monitoring objective, and recommendations for future monitoring
- Statement of whether survey event data provides any evidence that Western Grasswren and/or Southern Whiteface are being adversely impacted in areas surrounding the Disturbance Footprint.
- Statement regarding whether the data collected supports the need to adjust any of the Western Grasswren and/or Southern Whiteface management or mitigation strategies that are being employed by the Project.

10.6 Permits, Licences and Approvals

The following permits, licences and approvals are relevant to the avifauna monitoring program and will need to be held or obtained by the suitably qualified ecologists who are undertaking the monitoring:

- Scientific research permit to monitor Western Grasswren and Southern Whiteface (Sections 53(1)(a) and 53(1)b) of NPW Act) (DEW Research Permits).
- Licence for teaching, research or experimentation involving animals, required under the Animal Welfare Act 1985, (DEW Animal Welfare).
- Relevant South Australian Wildlife Ethics Committee (WEC) approvals must be obtained for the purposes of teaching, research or experimentation (required under the licence for teaching, research or experimentation involving animals).

It is noted for the purposes of monitoring planning that a minimum of 4 weeks should be allowed for processing applications for permits from DEW. For WEC approvals, allow for a 2-week submission deadline prior to WEC meetings which are held every 2 months, as well as 2 weeks for processing of applications.

11.0 Audit and Review

Whilst this PMCEMP relates to the pre-construction and construction phase of the HJP only, the below sections include some general audit and review activities of the construction and operation of the HJP.

11.1 Reporting

11.1.1 Internal

The Project will be designed, built, operated and maintained (DBOM) by a contractor. The contractor will be responsible for reporting compliance with all environmental management plans to OHPSA on a regular basis:

- Monitoring requirements will be in accordance with those set out in Sections **9.0** and **10.0** of this document.
- Reports will include, at a minimum:
  - Work undertaken in the last reporting period.
  - Work proposed in the next reporting period.
  - Monitoring undertaken in the last reporting period (including results).
  - Compliance with monitoring and outcomes, set out in Sections **9.0** and **10.0**.
  - Any incidents that occurred during the last reporting period.
  - Corrective actions, if required, for any incidents or non-compliances.
- Reports will be provided every 3 months during construction with a final report submitted once construction has been completed[5]. During operations reporting frequency will decrease to every 3 years to align with the reduced impact during this phase.
- Reports will be verified by the DBOM contractor and reviewed by OHPSA. Reports and monitoring data will be provided in native file format and kept for standard document management timeframes in line with organisational policy.

11.1.2 External

External reporting will occur following major or reportable incidents and in accordance with any reporting requirements specified as conditions of approval (refer to Section **2.0**). Reports will be prepared by the DBOM contractor and endorsed by OHPSA prior to issue to relevant agencies.

11.2 Environmental Auditing

Environmental auditing will be conducted in accordance with ISO14001 certification requirements with audits occurring at least once during construction (phase 2), following completion of all construction and 5 yearly during operations (this will be detailed in a separate Protected Matters

[5] For clarity reports are only required during Phase 1 construction and phase 2 construction and exclude the period between construction phases due to the low risk profile.

Operational Environmental Management Plan). Additional audits may be requested following a major environmental incident.

11.3 Environmental Management Plan Review

The Environmental Management Plans (EMPs), including this Plan will require regular reviews to ensure they reflects up to date species knowledge and best practice mitigation measures. Reviews will be undertaken by the DBOM contractor and require endorsement by OHPSA. Reviews will be undertaken:

- Prior to construction of phase 2, to ensure risks and mitigation are still accurate and relevant.
- At the completion of construction period (to reflect change in risk profile and transition to from CEMP to OEMP).
- Following a non-compliance with environmental outcomes or a major environmental incident.
- Every 5 years during operations, following an environmental audit to incorporate any recommendations from the audit.
- Following a significant change in the construction or operation methodology.

External approval of updated EMPs will be required following significant variations in the approved activity as a result of a review by the Federal Environmental Minister or delegate.

12.0 Contacts

12.1 Emergency Contacts

The key emergency contacts responsible for managing environmental emergencies associated with the project and their contact details are presented in **Table 12.1**.

Table 12.1 Emergency Contacts

Contact	Email	Phone
TBD	TBD	TBD

12.2 Other Important Contacts

Other important contacts are presented in **Table 12.2**.

Table 12.2 Important Contacts

Contact	Email	Phone
DEW (Fauna Permits Unit)	dewfaunapermitsunit@sa.gov.au	(08) 8124 4972
DEW (Scientific Research Permits)	DEWResearchPermis@sa.gov.au	(08) 8124 4856
DEW (Animal Welfare - Licence for teaching, research or experimentation involving animals)	DEWAnimalWelfare@sa.gov.au	(08) 8207 7731
DCCEEW	TBD	TBD
Wildlife Ethics Committee	DEW.WildlifeEthicsCommittee@sa.gov.au	(08) 8463 6851

13.0 References

Austin, J., Joesph, L., Pedler, L. & Black, A., 2013. Uncovering cryptic evolutionary diversity in extant and extinct populations of the southern Australian arid zone Western and Thick-billed Grasswrens (Passeriformes: Maluridae: Amytornis). *Conservation Genetics,* Volume 14, pp. 1173-1184.

Barrett, G. *et al*., 2002. *The new atlas of Australian birds,* Melbourne: Birds Australia (Royal Australasian Ornithologists Union).

Barrett, G. *et al*., 2007. Comparison of atlas data to determine the conservation status of bird species in New South Wales, with an emphasis on woodland-dependent species. *Australian Zoologist,* Volume 34, pp. 37-77.

Birdlife Australia, 2024. *Survey Techniques - 2-ha, 20 min Search*. [Online]
Available at: https://birdata.birdlife.org.au/help/survey-techniques

Black, A. B., 2004. The 'Immarna' grasswrens of RC Chandler: locality, habitat, identity and taxonomic implications. *South Australian Ornithologist,* Volume 34, pp. 199-211.

Black, A. B., 2011. Western Australia, home of the Grass-Wren (*Amytornis textilis*). *Western Australian Journal of Ornithology,* Volume 3, pp. 1-12.

Black, A. B., Joseph, L. & Pedler, L. P., 2010. A taxonomic framework for interpreting evolution within the *Amytornis textilis*–modestus complex of grasswrens. *Emu – Austral Ornithology,* 110(4), pp. 358-363.

Black, A. B. & Longmore , N. W., 2009. Notes on grasswren eggs in Len Harvey's collection, Museum Victoria. *Australian Field Ornithology,* Volume 26, pp. 132-141.

Black, A., Carpenter, G. & Pedler, L., 2009. Distribution and habitats of the Thick-billed Grasswren *Amytornis textilis* subspecies myall. *South Australian Ornithologist,* Volume 35, pp. 161-177.

Black, A., Copley, P. & Garnett, S., 2021. Eyre Peninsula Western Grasswren *Amytornis textilis myall*. In: *The Action Plan for Australian Birds 2020*. Melbourne: CSIRO Publishing, pp. 565-568.

Black, A. & Gower, P., 2017. *Grasswrens, Australian Outback Identities*. Stepney, South Australia: AXIOM Publishers and Distributors.

Black, A., Joseph, L., Pedler, L. & Carpenter, G., 2010. A taxonomic framework for interpreting evolution within the *Amytornis textilis–modestus* complex of grasswrens. *Emu - Austral Ornithology,* Volume 110, pp. 358-363.

Brooker, B., 1998a. *A comparison of the ecology of an assemblage of ground-dwelling birds in an arid environment,* Perth, Australia: Dissertation. Murdoch University.

Brooker, B., 1998b. Evidence of long laying intervals by the Thick-billed Grasswren *Amytornis textilis*. *Emu - Austral Ornithology,* Volume 98, pp. 82-83.

CFA, 2019. *CFA Guideline for the Provision of Emergency Information,* Melbourne: Country Fire Authority.

Christidis, L. & Boles, W., 1994. *The taxonomy and species of birds of Australia and its territories*. Melbourne: Royal Australasian Ornithologists Union Monograph 2.

DCCEEW, 2023a. *Amytornis textilis myall in Species Profile and Threats Database,* Canberra: Department of Climate Change, Energy, the Environment and Water.

DCCEEW, 2023b. *Conservation Advice for Aphelocephala leucopsis (Southern Whiteface),* Canberra: Department of Climate Change, Energy, the Environment and Water.

DCCEEW, 2023c. *National Light Pollution Guidelines for Wildlife,* Canberra, May. CC BY 4.0: s.n.

DCCEEW, 2024. *Environmental Management Plan Guidelines,* Canberra, March. CC By 4.0: s.n.

DEW, 2020. *South Australian Government Climate Change Action Plan 2021-2025,* Adelaide: s.n.

DotE, 2014. *Conservation Advice Amytornis textilis myall western grasswren (Gawler Ranges).,* Canberra: Department of the Environment.

EBS Ecology, 2023. *Hydrogen Jobs Plan Targeted Bird Survey,* Adelaide: EBS Ecology.

Ehmke, G. *et al*., 2021. *South-west Southern Whiteface Aphelocephala leucopsis castaneiventris and South-east Southern Whiteface A. l. leucopsis,* Melbourne, Australia: CSIRO Publishing.

Ekistics Planning and Design, 2024. *Planning Assessment Hydrogen Jobs Plan (HJP) Whyalla 27 March 2024 REF# 01632_003_F,* s.l.: Planning Assessment Report (Final).

Ellis, M. & Taylor, J., 2014. *After the 2010 rains: Changes in reporting rates of birds in remnant woodland vegetation in the central wheatbelt of New South Wales, Australia, from drought to post-drought,* Sydney: Australian Zoologist.

EPA, 2016. *Air & Water Quality Guideline Updated March 2016,* s.l.: Environment Protection Authority.

Garnett, S. & Baker, G., (Eds) 2021. *The Action Plan for Australian Birds 2020.* Melbourne: CSIRO Publishing.

Garnett, S., Szabo, J. & Dutson, G., 2011. *The action plan for Australian birds 2010,* Collingwood, Victoria: CSIRO Publishing.

Green Industries SA, 2020. *Supporting the circular economy South Australia's waste strategy 2020-2025,* Adelaide: Green Industries SA.

Higgins, P. & Peter, J., 2002. *Handbook of Australian, New Zealand and Antarctic Birds'. Vol. 6. Pardalotes to Spangled Drongo.* Melbourne: Oxford University Press.

Higgins, P., Peter, J. & Steele, W., 2001. *Handbook of Australian, New Zealand and Antarctic Birds. Volume 5: Tyrant- Flycatchers to Chats.* Melbourne: Oxford University Press.

Jacobs, 2023. *Hydrogen Jobs Plan – Site 1 Terrestrial Ecological Assessment,* Adelaide: Jacobs Group (Australia) Pty Ltd.

Jacobs, 2024. *Native Vegetation Clearance Data Report South Australian Government Renewable Hydrogen Power Station, Electrolysers and Storage Facility Native Vegetation Clearance Data Report,* Adelaide: Jacobs Group (Australia) Pty Ltd.

JBS&G, 2024. *Crown Development Application – Hydrogen Jobs Plan,* s.l.: Office of Hydrogen Power South Australia.

Lilleyman, A. *et al*., 2024. Imperilled birds and First Peoples' land and sea Country in Australia. *Emu - Austral Ornithology,* Volume 124 (1), pp. 108-122.

Lindenmayer, D., 2018. Integrating forest biodiversity conservation and restoration ecology principles to recover natural forest ecosystems. *New Forest,* 50(2), pp. 169-181.

OHPSA, 2024. *EPBC Act Preliminary Documentation Hydrogen Jobs Plan – South Australian Government Renewable Hydrogen Power Station, Electrolysers and Storage Facility,* s.l.: Prepared by JBS&G as advisors to the Office of Hydrogen Power South Australia.

Olsen, P., Weston, M., Tzaros, C. & Silcocks, A., 2005. The state of Australia's birds 2005. Woodlands and birds. *Supplement to Wingspan,* Volume 15, p. 1–32.

Pedler, L., Watson, M., Langdon, P. & Pedler, R., 2007. *Rare bird surveys, Mt Lyndhurst Station,* s.l.: Report prepared for South Australian Arid Lands Natural Resources Management Board.

Pizzey, G. & Knight, F., 2014. *Birds of Australia.* Melbourne: Gibbon Multimedia Pty Ltd.

Prizzey, G., 1991. *A Field Guide to the Birds of Australia.* Sydney: Collins.

Reid, J., 1999. *Threatened and declining birds in the New South Wales sheep-wheat belt: II. Landscape relationships – modelling bird atlas data against vegetation cover,* Canberra: CSIRO Wildlife and Ecology.

Reid, J. & Fleming, M., 1992. The conservation status of birds in arid Australia. *Rangeland Journal,* Volume 14, pp. 65-91.

Rowley, I. & Russell, E., 1997. *Fairy-wrens and Grasswrens,* Oxford: Oxford University Press.

Safe Work Australia, 2012. *Guide For Major Hazard Facilities Emergency Plans. March 2012,* s.l.: ISBN 978-0-642-33376-6.

Sandbrink, J. & Robinson, D., 1994. An observation of communal breeding by southern whiteface.. *Corella,* 18(3), p. 88.

Schodde, R., 1982. *The Fairy-Wrens.* Melbourne: Lansdowne Editions.

Smith, J. & Smith, P., 2023a. Breeding patterns in an Australian arid-zone landbird community. *Australian Field Ornithology,* Volume 40, p. 77–87.

Smith, J. & Smith, P., 2023b. Use of nesting resources in an Australian arid-zone landbird community. *Australian Field Ornithology,* Volume 40, p. 88–98.

TSSC, 2000. *Guidelines for assessing the conservation status of native species according to the Environment Protection and Biodiversity Conservation Act 1999 and Environment Protection and Biodiversity Conservation Regulations 2000,* Canberra: Threatened Species Scientific Committee.

TSSC, 2014. *Conservation Advice for Amytornis modestus obscurior thick-billed grasswren (north-west New South Wales),* Canberra, Australia: Threatened Species Scientific Committee.

Woinarski, J. *et al*., 2018. The diet of the feral cat (*Felis catus*), red fox (*Vulpes vulpes*) and dog (*Canis familiaris*) over a three-year period at Witchelina Reserve, in arid South Australia. *Australian Mammalogy,* Volume 40, pp. 204-213.

umwelt

P 1300 793 267 E info@umwelt.com.au W umwelt.com.au

NSW | ACT | WA | QLD | VIC | SA ABN 18 059 519 041