

Mackay Sulphate of Potash Project – Terrestrial Fauna Environmental Management Plan

PREPARED FOR AGRIMIN October 2024

We design with community in mind

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1 October 2024

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STATUS Final | Project No 304500994



Revision Schedule

Rev No	Date	Description	Signature of Typed Name (documentation on file)			
			Prepared by	Checked by	Reviewed by	Approved by
V1.0	21/7/2023	TFEMP	S. Puglisi	P. Bolton	F. Taukulis	F. Taukulis
V2.0	11/4/2024	TFEMP incorporating feedback from EPA (DWER) and DCCEEW.	S. Puglisi C. Roberts	P. Bolton	F. Taukulis I. Kenwery	F. Taukulis I. Kenwery
V3.0	19/4/2024	TFEMP incorporating comments by Dr Rachel Paltridge on behalf of the Tjamu Tjamu (Aboriginal Corporation) RNTBC, and Desert Support Services (Kate Crossing) on behalf of both the Kiwirrkurra and Ngururrpa Ranger programs	S. Puglisi C. Roberts	P. Bolton	R. Paltridge K. Crossing	F. Taukulis I. Kenwery
V4.0	28/08/2024	TFEMP incorporating feedback from EPA (DWER) and DCCEEW.	P. Bolton	S. Puglisi	F. Taukulis	I. Kenwery
V5.0	01/10/2024	TFEMP incorporating feedback from EPA (DWER) and DCCEEW.	S. Puglisi	J. Puglisi	F. Taukulis	F. Taukulis



Abbreviations

Enter Abbreviation	Enter Full Name
ACAR	Annual Compliance Assessment Report
AERs	Annual Environmental Reports
Agrimin	Agrimin Limited
BC Act	<i>Biodiversity Conservation Act 2016</i>
BMUs	Brine Mine Units
CCWA	Conservation Council of Western Australia
CEMP	Construction Environmental Management Plan
DAWE	Department of Agriculture, Water and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DJTSI	Department of Jobs, Tourism, Science and Innovation
DMIRS	Department of Mines, Industry Regulation and Safety
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
EP Act	Environmental Protection Act 1986
EPA	Environmental Protection Authority
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
ERD	Environmental Review Document
ESD	Environmental Scoping Document
GDS	Great Desert Skink
ha	hectare
IF	Indicative Footprint
IUCN	International Union for the Conservation of Nature
km	kilometre
m	meters
MNES	Matter of National Environmental Significance
NIDE	Northern Infrastructure Development Envelope
NP	Night Parrot
NP Monitoring Program	Night Parrot Monitoring Program
NPMP	Night Parrot Management Plan
NT	Northern Territory
Off-LDE	Off Lake Development Envelope
On-LDE	On Lake Development Envelope
PER	Public Environmental Review
SIDE	Southern Infrastructure Development Envelope
SMEs	Subject Matter Experts
SOP	Standard Operating Procedure
TF	Terrestrial Fauna



Enter Abbreviation	Enter Full Name
TFEMP	Terrestrial Fauna Environmental Management Plan
TOs	Traditional Owners
WA	Western Australian



Executive Summary

Table ES 1 summarises the purpose of the Terrestrial Fauna Environmental Management Plan (TFEMP) and Monitoring Program within the context of the Western Australia Environmental Protection Authority (EPA) objectives for the key environmental factor of Terrestrial Fauna (EPA 2016). The TFEMP and Monitoring Program also aligns with the Environmental Management Plan Instructions and Guidelines (Commonwealth of Australia 2014; EPA 2024). The TFEMP and Monitoring Program has been prepared for the Agrimin Proposal for Lake Mackay. A stand-alone Night Parrot Management Plan (NPMP) and monitoring program have been prepared, in recognition of the importance of this species and limited knowledge on biology and ecology.

This EMP specifically addresses the Terrestrial Fauna environmental factors associated with the Proposal.

Summary **Table ES 1** below presents the environmental outcomes and objectives for the environmental factor to be met through implementation of this TFEMP, as well as the environmental criteria and management targets to measure achievement of the associated environmental outcomes and objectives.

Table ES 1: Summary and Purpose of the Terrestrial Fauna Environmental Management Plan (TFEMP).

Item	Description
Proposal Title	Agrimin Lake Mackay Potash Project (the Proposal)
Proponent Name	Agrimin Limited (Agrimin)
Ministerial Statement number	N/A- Under Assessment
Purpose of the TFEMP	The purpose of the TFEMP is to address the requirements of the Agrimin Environmental Scoping Document (ESD) and present a robust and implementable environmental management framework to protect the environmental values of the Project Area and demonstrate that the EPA's objectives are met during the operational stage of the Project.
Key Environmental Factor and Objectives	Terrestrial Fauna: The Environmental Protection Authority (EPA) Objective for Terrestrial Fauna is <i>'to protect terrestrial fauna so that biological diversity and ecological integrity are maintained'</i> (EPA 2016). The proponent shall manage the operations of the Proposal to meet the following Outcome-based and Objective-based management provisions.
Purpose of TFEMP	Development of a framework to ensure potential impacts on terrestrial fauna (including significant fauna) from Proposal are avoided to the maximum extent practicable by: - Identifying the risks and potential impacts from the Proposal on significant terrestrial fauna within the Development Envelope. - Outline management provisions of significant fauna, to avoid and minimise potential impacts to populations within the Development Envelope. - Provide Monitoring Plans for significant fauna. - Propose corrective actions if triggers and thresholds are exceeded to avoid impact on populations attributed to the Proposal. A stand-alone Night Parrot Management Plan (NPMP) and monitoring program have been prepared, in recognition of the importance of this species and limited knowledge on biology and ecology.
Outcome-based Management Provisions	TF1: - No unauthorised clearing within avoidance buffers applied to significant fauna (GDS) within the Development Envelope - Total clearing is not to exceed the approved clearing footprint. TF2: - No project-related increase in feral predators from baseline levels during the life of the Proposal. - No adverse impacts to significant fauna (Bilby, Mulgara, Princess Parrot, Spotted Ctenotus and GDS) as a result of project-related increase in feral animal abundance relative to suitable reference sites TF3: No significant increase in Silver Gull (<i>Larus novaehollandiae</i>) abundance attributed to the Project.



Item	Description
	• TF4: No adverse impacts to significant fauna (waterbirds) from bird strike from wind turbine operations. • TF5: No long term decrease in Banded Stilt breeding success as a result of project based activities. TF6: No statistically significant decrease in the abundance of conservation significant species (GDS, Bilby) as a result of project-related activities.
Objective-based Management Provisions	• MO1: Minimise project-related direct interactions per year (e.g., vehicle strike, wind turbine strike) to significant fauna (including waterbird species) resulting in injury or mortality. - Implement speed limits within proximity to critical habitat for significant fauna (NP). - No project related incidents of vehicles being used off designated roads (unless in the case of unplanned events) that result in direct impacts to critical habitat for significant fauna (NP, GDS, Bilby). - No adverse project related impact to significant fauna (waterbird) species from wind turbine interactions. - No operational use (non-haulage activities) of haul road at night, unless for unplanned events (e.g. emergency response). • MO2: Minimise loss of significant fauna habitat and fragmentation as a result of project-related land clearing: - All vegetation clearing will be carried out during daylight hours. Trenching will be undertaken on the lake over a 24hr period for the first 2 years of operations only. Trenching will then move to daytime only. - Disturbance within on-lake Development Envelope (On-LDE) will not exceed: On-lake development of trenches, extraction of up to 100 GL/a of brine, and solar evaporation and harvesting ponds for potash salts, including ground disturbance of approximately 15,000 ha with the 217,261 ha On-LDE. - Clearing not to exceed 1,500 ha of flora and vegetation (the combined total of 200 ha of native vegetation within the 688 ha Off-LDE, and 300 ha of native vegetation within the 11,799 ha SIDE and 1,000 ha of native vegetation within the 33,928 ha NIDE). - No adverse project related impact to significant fauna species (Bilby, GDS, Marsupial Mole, Mulgara and Spotted Ctenotus) as a result of vegetation clearing. - Installation of culverts to reduce the impact of habitat fragmentation and facilitate the movement and dispersal of significant fauna species (Bilby). - Significant fauna avoidance buffer zones (GDS) are in place following completion of pre-clearance surveys, where applicable. - Access to the significant fauna avoidance buffer zones (GDS) is restricted to authorised personnel and there are no incidents of unauthorised access. • MO3: No project-related adverse impacts to terrestrial fauna (including significant fauna) or habitat within proximity of the Proposal area from project- related unplanned fire events: - Provision and maintenance of firefighting equipment in accordance with the relevant fire safety standards. - Firefighting emergency response plan and procedures are in place. • MO4: No adverse impacts to significant fauna as a result of project-related increase in feral animal abundance: - No incidents of feeding feral animals by operational staff and contractors. - Minimise attraction of introduced predators by ensuring: ▪ waste management plan and procedures are in place. ▪ measures to deter feral predators from artificial water sources are in place. ▪ road infrastructure design and road verge management avoids roadside artificial water sources.

Item	Description
	- Feral predator monitoring and control program is in place to minimise feral predator numbers within and adjacent to the Development Envelope, within critical habitat for the GDS, Greater Bilby and Mulgara, for the life of the Proposal. • MO5: Minimise project related changes to surface hydrology: - No access permitted to inundated portions of Lake Mackay when more than 20 % of the lake is inundated. - Detailed hydrological modelling of surface water flows, simulation 1:100-year events in place. - Staged development of trenches via BMUs and engineering design (1 km spacing, install crossovers) in place to maintain natural hydrological processes. - No adverse project-related impacts to surface hydrology (off-lake operations) and water flows resulting in significant disturbance and decline of critical habitat for significant fauna (Bilby, GDS, Mulgara). - No project-related adverse impacts to significant fauna (waterbirds) from attraction of waterbirds to artificial water bodies. - Minimise injury or loss of fauna (including significant fauna) from entrapment in ponds/trenches. • MO6: Provide ongoing opportunities for involvement of Traditional Owners in the implementation of conservation actions and improve understanding of local populations (abundance and dynamics) of significant fauna (Bilby, GDS) and facilitate TO knowledge-sharing for these species: - Access agreements and Native Title Agreements (NTA) in place for the Parna Ngururrpa and Tjamu Tjamu Peoples' and the Tjurabalan Peoples. - Ongoing opportunities provided for TO ranger group involvement in monitoring programs and management activities for significant fauna. - Successful two- way knowledge sharing of significant fauna species. • MO7: No adverse project-related impacts to significant fauna or critical habitat from project related introduction or proliferation of weed species: - Weed management programs should be designed in accordance with relevant EPBC Act weed threat abatement plans. - Weed management procedures informed by best practice management of the weed species identified during weed baseline surveys. - No proliferation or introduction of new weed species rated as high or very high management priority by DBCA in the Proposal Area as a result of the Proposal. • MO8: No adverse project-related impacts to significant fauna or critical habitat from dust, noise, and vibration: - Dust suppression measures in place. - Implement speed limits on unsealed tracks. - Machinery and equipment will be fitted with noise attenuation measures. • MO9: No adverse project-related impacts to significant fauna or critical habitat from hydrocarbon or chemical spill: - Hazardous Substances Management Plan (HSMP) and Procedure implemented. - Spill response training for all personnel and contractors. - Spill response equipment provided for all site vehicles (including on all Haul Trucks). • MO10: No adverse project-related impacts to significant fauna or critical habitat from project related artificial light spill: - Directional lighting measures implemented in operational areas. - No artificial light spill from on-lake development into surrounding lake margin complex habitat (NP foraging habitat and critical Greater Bilby habitat).
Condition Clauses	N/A - Under Assessment



Item	Description
Key Components of the TFEMP	Key provisions are detailed in Section 3 .
Proposed Construction Date	TBA
TFEMP required pre-construction?	Yes



Corporate endorsement

I hereby certify that to the best of my knowledge, the provisions within this Agrimin Sulphate of Potash Project Terrestrial Fauna Environmental Management Plan are true and correct.

Name:

Ingrid Kenwery

Signed:



Designation: Environment Manager:

Date: 01 October 2024



Contents

1	Context Scope and Rationale	1
1.1	Proposal Background	1
1.2	Key Environmental Factors	2
1.3	Purpose and Framework	4
1.4	Rationale and Approach	4
1.5	Documentation	4
1.5.1	Legislation, Policy and Guidance	4
1.5.2	Plans and Strategies	5
1.6	Indigenous Protected Areas	5
2	Terrestrial Fauna	6
2.1	Previous Surveys	6
2.2	Fauna Habitat	10
2.3	Fauna Assemblages	16
2.4	Introduced Fauna	19
2.5	Significant Fauna	19
3	Management Approach	33
3.1	Provisions Background	33
3.2	Key Assumptions and Uncertainties	33
3.3	Potential Proposal Impacts	34
3.4	Application of Mitigation Hierarchy	34
4	Management Provisions	36
4.1	Overview	36
4.2	Outcome-Based Provisions	36
4.3	Objective-Based Provisions	36
4.4	Environmental Criteria, Targets and Justification	38
4.5	Traditional Owner Engagement	40
4.6	Rehabilitation	59
4.6.1	Rehabilitation Methods	59
4.6.2	Rehabilitation methods for Significant Fauna Habitat	59
5	Monitoring and Evaluation	62
6	Pre-clearance Surveys Significant Fauna	63
6.1	Overarching Approach and Administrative Requirements	63
6.2	Clearing Approach: Night Parrot Critical Habitat	63
6.3	Clearing Approach: Greater Bilby, Great Desert Skink, and Mulgara Critical Habitat and suitable habitat for Spotted Ctenotus	63
6.3.1	Greater Bilby	63
6.3.2	Great Desert Skink	66



6.3.3	Brush-tailed Mulgara.....	67
6.3.4	Spotted Ctenotus	68
6.4	Injured Fauna Management.....	68
6.4.1	Injured fauna management for Significant Fauna.....	68
6.5	Significant Fauna Monitoring	69
7	Reporting Provisions.....	69
7.1	Annual Reporting	69
7.2	Exceedance Reporting	69
7.3	Incident Reporting.....	70
8	Roles and Responsibilities.....	71
9	Adaptive Management and Review	71
10	Changes to an EMP.....	72
11	Stakeholder Consultation.....	74
12	References	89

List of Tables

Table 2-1:	Summary of terrestrial vertebrate fauna surveys conducted for the Proposal.....	7
Table 2-2:	Summary of regional vertebrate fauna surveys that intersect, occur within or lie adjacent to the Proposal Area.....	9
Table 2-3:	Fauna habitat types, description, and extent within the Study Area, Proposal Area, and Indicative Footprint.	11
Table 2-4:	Representative photographs of each fauna habitat.....	14
Table 2-5:	Summary of waterbird recorded during waterbird surveys of Lake Mackay.	16
Table 2-6:	Banded Stilt breeding evidence at Lake Mackay.....	17
Table 2-7:	Significant fauna confirmed or likely to occur within the Study Area.....	21
Table 2-8:	Significant fauna species - summary table of key threats, proposal impacts, and key survey findings.....	22
Table 4-1:	Terrestrial fauna outcome-based management provisions.....	42
Table 4-2:	Terrestrial fauna objective-based management provisions.	50
Table 4-3:	Supporting environmental management plans, procedures and documents.....	57
Table 4-4:	Rehabilitation procedures for high value significant fauna habitat.....	60
Table 8-1:	Roles and responsibilities for implementation of the TFEMP.	71
Table 10-1:	Changes to TFEMP	73
Table 11-1:	A summary of stakeholder consultation associated with the TFEMP.	75

List of Figures

Figure 1-1:	The Proposal's Development Envelopes and Study Area.....	3
Figure 2-1:	Frequency of Lake Mackay inundation events with limits for potentially supporting waterbird foraging (green) and Banded Stilt Breeding (red). Estimations of event duration are based on analysis of aerial imagery (Stantec 2021a). Banded Stilt breeding duration represents the minimum time required to raise chicks to fledge based on literature, while waterbird foraging suitability is based on the smallest observed event supporting significant foraging behaviour (Appendix G.1A of the ERD).....	18
Figure 2-2:	Terrestrial fauna habitats and records of fauna – Greater Bilby.....	28
Figure 2-3:	Terrestrial fauna habitats and records of fauna – Brush-tailed Mulgara.....	29
Figure 2-4:	Terrestrial fauna habitats and records of fauna – Great Desert Skink.....	30
Figure 2-5:	Terrestrial fauna habitats and records of fauna – Spotted Ctenotus	31
Figure 2-6:	Habitats and records of listed threatened and migratory waterbirds.	32

Figure 6-1: Representative photographs of a Greater Bilby burrow and a Great Greater Bilby.....	66
Figure 6-2: Representative photograph of a Great Desert Skink burrow.....	67
Figure 6-3: Representative photograph of Brush-tailed Mulgara burrows.	67

List of Appendices

Appendix A	Night Parrot Monitoring Program
Appendix B	Waterbird Monitoring Program
Appendix C	Great Desert Skink Monitoring Program
Appendix D	Greater Bilby Monitoring Program
Appendix E	Feral Predator Monitoring and Control Program
Appendix F	Greater Bilby Risk Assessment
Appendix G	Great Desert Skink Risk Assessment

1 Context Scope and Rationale

1.1 Proposal Background

Agrimin Limited (Agrimin) proposes to develop and operate a greenfields potash fertiliser operation, the Mackay Sulphate of Potash Project (the Proposal), approximately 450 kilometres (km) south of Halls Creek, adjacent to the Western Australian (WA) and Northern Territory (NT) borders (**Figure 1-1**). The Proposal involves the extraction of brine from a network of shallow trenches established on the surface of Lake Mackay. The brine will be transferred into evaporation ponds for the precipitation of salt which will be harvested and then processed to produce a potash fertiliser product.

Disturbance of the lake's surface and clearing of native vegetation are required for Proposal development. The Proposal is remote and extensive (263,675 ha) and comprises four Development Envelopes shown in **Figure 1-1**. The following areas and applicable terms relevant to the Proposal and this Terrestrial Fauna Environmental Management Plan (TFEMP) are outlined below:

- **Study Area** – refers to the boundary within which all investigations and field surveys were undertaken (443,985 ha), extending beyond the Proposal Area.
- **Proposal Area** – The combined area in which the four Development Envelopes are contained.
- **Development Envelopes** – the boundary within which the elements of the Proposal are situated. The Development Envelopes occur entirely within the Study Area and comprise four components that make up the Proposal. The Proposal includes disturbance of up to 15,000 hectares (ha) of the lake's surface and clearing of approximately 1,500 ha of native vegetation. The proposed extent of the physical and operational elements includes four development envelopes (**Figure 1-1**) as follows:
 - **On-lake Development Envelope (On-LDE):** On-lake development of trenches, extraction of up to 100 GL/a of brine, and solar evaporation and harvesting ponds for potash salts, including ground disturbance of approximately 15,000 ha with the 217,261 ha On-LDE.
 - **Off-Lake Development Envelopes (Off-LDE):** Off-lake development of a processing plant and associated site infrastructure, including access roads, accommodation camp, airstrip, and solar farm, including clearing of approximately 200 ha of native vegetation within the 688 ha Off-LDE.
 - **Southern Infrastructure Development Envelope (SIDE):** Development of borefield, water pipeline and access tracks for abstracting up to 3.5 GL/a of processing water and off-lake access to Lake Mackay including clearing of approximately 300 ha of native vegetation within the 11,799 ha SIDE.
 - **Northern Infrastructure Development Envelope (NIDE):** Haul road for trucking potash product to Wyndham Port, including clearing of approximately 1,000 ha of native vegetation within the 33,928 ha NIDE.
- **Indicative Footprint (IF)** – the area that is proposed to be directly disturbed by the Proposal. The layout of the IF may change; however, the total disturbance will not exceed the maximum disturbance for each Development Envelope. Proponent-led avoidance and mitigation measures have been implemented where possible to minimise potential impacts to areas of high ecological or heritage value through the detailed design of the IF.

1.2 Key Environmental Factors

The Proposal was referred to the Western Australian (WA) Environmental Protection Authority (EPA) on 02/01/2019 and the EPA determined the Proposal required a Public Environmental Review (PER) level of assessment on 30/01/2019. The EPA approved an Environmental Scoping Document (ESD) on 10/09/2020 identifying key environmental factors, including Terrestrial Fauna.

The Environmental Review Document (ERD) submitted to the EPA on 11/04/2022 was followed by a public review period that closed on 30/05/2022. The Proposal is currently being assessed under an accredited process by the State Government (EPA Assessment Number 2173) and the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW). As the Proposal is still under assessment, a Ministerial Statement has not yet been issued.

The EPA objective for Terrestrial Fauna is '*to protect terrestrial fauna so that biological diversity and ecological integrity are maintained*' (EPA 2016). Comprehensive surveying identified 21 significant species as occurring within the Study Area. Several of the fauna species are Matters of National Environmental Significance (MNES), listed at the Commonwealth and/or State level. Of the significant fauna recorded in the Study Area, the following are of note due to their conservation status, relative abundance and/or potential to be impacted by the Proposal:

- Night Parrot (*Pezoporus occidentalis*) listed as Endangered under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) and Critically Endangered under the Biodiversity Conservation Act 2016 (BC Act).
- Greater Bilby (*Macrotis lagotis*) listed as Vulnerable (Vu) under the EPBC Act and BC Act.
- Brush-tailed Mulgara (*Dasymercus blythi*), listed as Priority 4 (P4) under the BC Act.
- Great Desert Skink (*Liopholis kintorei*), listed as Vu under the EPBC Act and BC Act.
- Marsupial mole (*Notoryctes* sp.), listed as Priority 4 (P4) under the BC Act.
- Princess Parrot (*Polytelis alexandrae*), listed as Vu under the EPBC Act and Priority 4 (P4) under the BC Act.
- Spotted Ctenotus (*Ctenotus uber johnstonei*), listed as P2 under the BC Act; and
- Several threatened and migratory listed waterbirds, comprising 13 internationally and nationally important species, listed under the EPBC Act (Section 2.5).

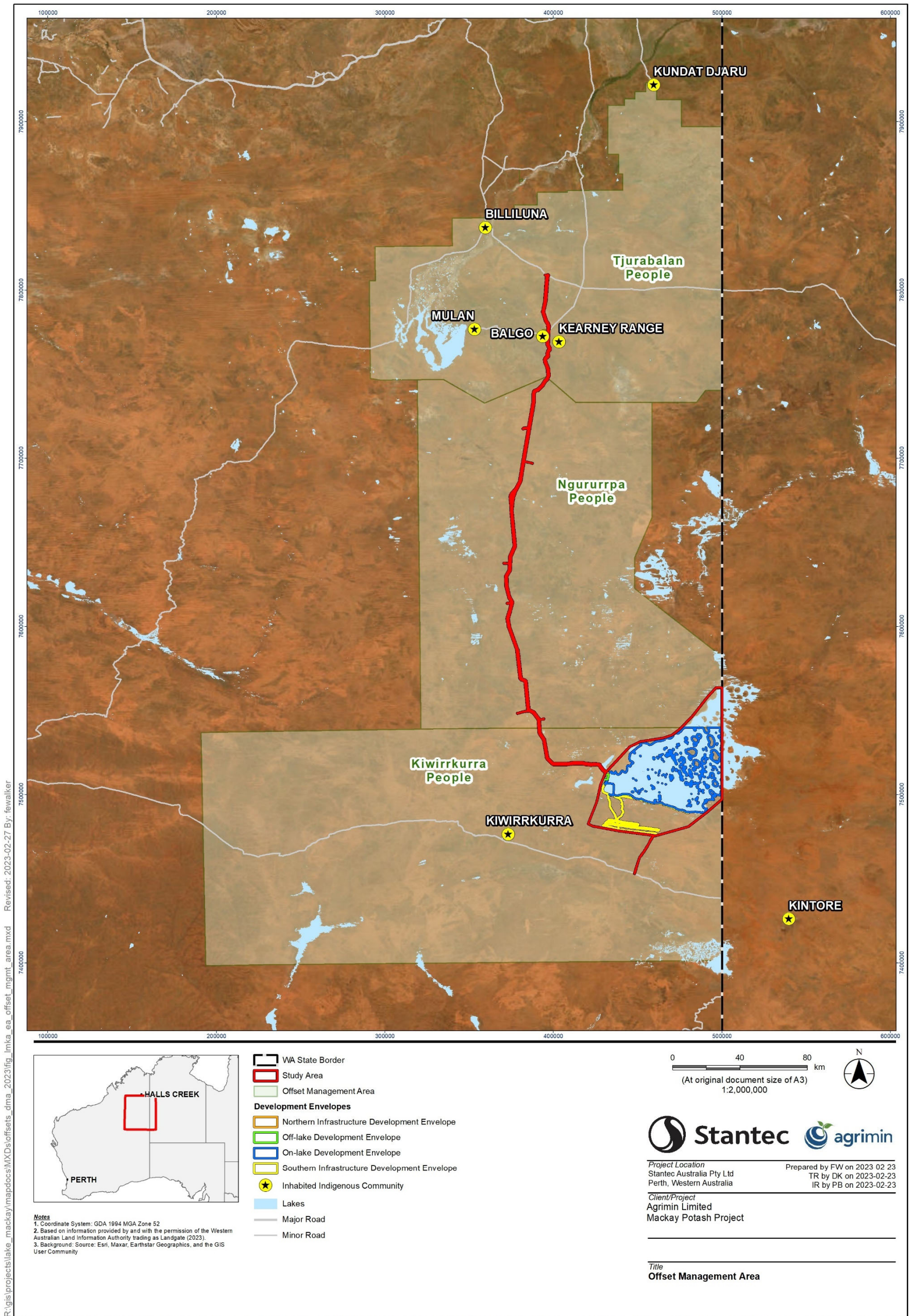


Figure 1-1: The Proposal's Development Envelopes and Study Area.

The EPA's mitigation hierarchy (avoid, minimise, and rehabilitate), was applied where possible to reduce impacts to the terrestrial fauna from the Proposal, including listed species. This TFEMP includes associated monitoring programs for these species, presented in **Appendix A-E**, which comprise part of the mitigation measures to avoid impacts. A stand-alone Night Parrot Management Plan (NPMP) and monitoring program have been prepared, in recognition of the importance of this species and limited knowledge on biology and ecology. These monitoring programs will be used to evaluate the effectiveness of the management provisions outlined in the TFEMP and NPMP and will inform adaptive management where required over the life of the Proposal (20 years).

1.3 Purpose and Framework

The purpose of the TFEMP and monitoring programs (**Appendix A-E**) is to:

- Ensure that the Proposal is carried out in a manner that minimises the direct and indirect impacts to terrestrial fauna;
- Ensure there is no direct or indirect adverse impacts to terrestrial fauna within the Proposal Area and immediate surrounds; and
- To actively engage with Traditional Owner (TO) groups, building capacity for Indigenous Ranger involvement, where possible.
- This will be addressed by ensuring potential impacts to terrestrial fauna from the Proposal are avoided to the maximum extent practicable by:
- Identifying the risks and potential impacts from the Proposal on terrestrial fauna.
- Outlining management provisions for terrestrial fauna, to avoid and minimise potential impacts to significant fauna populations.
- Preparing and implementing monitoring programs for populations recorded within the Development Envelope and regional reference locations; and
- Proposing corrective and response actions if triggers and thresholds are exceeded to avoid impact to significant fauna populations.

1.4 Rationale and Approach

Agrimin is committed to avoiding and minimising potential impacts caused by the operations of the Proposal to fauna species of significance and their associated habitats to ensure the biodiversity and ecological integrity and function of terrestrial fauna are maintained. The Proposal has been designed to avoid impacts to key environmental factors located within the Proposal Area.

The TFEMP focuses on outcome-based management provisions including monitoring and evaluating success of management actions with respect to significant fauna populations within the Proposal Area, driven by triggers and thresholds. Assessment of the pathways over which impacts may occur provides the rationale for choice of provisions and choice of appropriate indicators to measure against the environmental outcome and/or objective.

This TFEMP is subject to approval by the EPA and Department of Climate Change, Energy, the Environment and Water (DCCEEW) and will subsequently be implemented.

Any reporting for the TFEMP will be undertaken in accordance with the DCCEEW Departmental Policy – (DoE 2016b) Sensitive Ecological Data – Access and Management Policy.

1.5 Documentation

1.5.1 Legislation, Policy and Guidance

- This TFEMP has been written in accordance with Western Australian (WA) and Commonwealth policies and guidance, including:
- Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016; (EPA 2021a);
- Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans; (EPA 2024);
- Environmental Impact Assessment (Divisions 1 and 2) Procedures Manual (EPA 2021b);
- Environmental Management Plan Guidelines (Commonwealth of Australia 2014);
- Outcomes-based conditions policy (DoE 2016a);
- Outcomes-based conditions guidance (DoE 2016c);
- Environmental Factor Guideline – Terrestrial Fauna (EPA 2016);

- Biosecurity and Agriculture Management Act 2007 (WA);
- Biodiversity Conservation Act 2016 (WA);
- Rights in Water and Irrigation Act 1914 (WA); and
- Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth).

1.5.2 Plans and Strategies

The following management plans and strategies are also relevant to the TFEMP, specific to the Proposal and include:

- Construction Environmental Management Plan (CEMP)(Stantec 2024a);
- Night Parrot Management Plan (NPMP) (Stantec 2024c);
- Flora and Vegetation Environmental Management Plan (FVEMP) (Stantec 2024b); and
- Mackay Sulphate of Potash Project Revised Offsets Strategy (Stantec 2024d).

State and Commonwealth plans and management prescriptions that are relevant to the terrestrial fauna include:

- Matters of National Environmental Significance. Significant impact guidelines 1.1 - Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2013).
- State and Commonwealth plans/management prescriptions applicable to the Night Parrot (Blyth 1996; TSSC 2016b), listed in the separate Night Parrot Management Plan (NPMP);
- The Action Plan for Australian Mammals 2012 (Woinarski *et al.* 2014);
- Conservation Advice for the Great Desert Skink (TSSC 2016c);
- Recovery Plan for Great Desert Skink (McAlpin 2001);
- National Recovery Plan for the Great Desert Skink (*Liopholis kintorei*) 2023-2033 (Indigenous Desert Alliance 2022);
- Conservation Advice for Bilby (TSSC 2016a);
- Recovery Plan for the Greater Bilby (*Macrotis lagotis*) (DCCEEW 2023c);
- Survey Guidelines for Australia's Threatened Birds (DEWHA 2010);
- Draft referral guideline for 14 migratory birds listed under the EPBC Act (DoE 2015b);
- Approved Conservation Advice for *Polytelis alexandrae* Princess Parrot (TSSC 2018);
- Recovery plan for Marsupial Moles *Notoryctes typhlops* and *N. caurinus*, 2005-2010 (Benshemesh 2004);
- Threat Abatement Plan for Competition and Land Degradation by Feral Goats (DEWHA 2008b);
- Threat Abatement Plan for Competition and Land Degradation by Feral Rabbits (DEE 2016);
- Threat Abatement Plan for Predation by Feral Cats (DEWHA 2008c); and
- Threat Abatement Plan for Predation by the European Red Fox (DEWHA 2008d).

1.6 Indigenous Protected Areas

The Proposal traverses two Indigenous Protected Areas (IPAs) comprising the Ngururrpa and Kiwirrkurra IPAs (**Figure 1-1**). IPAs are voluntarily dedicated by indigenous groups on indigenous owned or managed land or sea country, in accordance with Traditional Owner objectives. They are recognised by the Australian Government as an important part of the National Reserve System, protecting the nation's biodiversity for the benefit of all Australians.

The Ngururrpa IPA is managed by Traditional Owners through their prescribed body corporate, the Parna Ngururrpa Aboriginal Corporation and includes most of the haul road and the Proposal's NIDE. It is bounded by the Kiwirrkurra IPA (Tjumu Tjumu Aboriginal Corporation) to the south, which comprises part of Lake Mackay (On-LDE). The two IPAs contribute to a contiguous network of protected areas throughout the region.

The IPAs are managed to protect biodiversity and cultural resources, based on indigenous perspectives of connecting and looking after country, complemented by western knowledge and management principles (Tjumu Tjumu Aboriginal Corporation 2014). They are supported by a number of strategies including the Ngururrpa IPA – Plan for Country 2020-2025 (Parna Ngururrpa 2019) and Kiwirrkurra IPA – Plan for Country (Tjumu Tjumu Aboriginal Corporation 2014). These plans outline management actions to protect natural and cultural values, and provide a range of economic, educational, health and wellbeing benefits for communities. There is also a focus on Traditional Owners working collaboratively with scientists to undertake fauna surveys and monitoring, increase conservation experience, and protect habitat and manage feral animals.

Agrimin also have a Native Title Agreements (NTA) in place for the Parna Ngururpa, Tjamu Tjamu and Tjurabalan Peoples'. Commitments in these NTAs focus on consultation and reasonable endeavours, to avoid adverse impacts to the environment or areas of cultural concern from the Proposal. In addition, Agrimin will provide opportunities for engagement in environmental surveys and monitoring, and the management of feral animals and fire. These measures align with the management provisions applied in this TFEMP.

All three IPA determinations are of relevance to the TFEMP, and specifically the haul road of the Proposal's NIDE.

2 Terrestrial Fauna

2.1 Previous Surveys

The Study Area, which totalled 443,985 ha, encompassed the entire Proposal Area (263,675 ha) and was a consolidation of the previous survey areas for the Proposal. The Proposal Area and local surrounds (the Study Area) has been the subject of 17 terrestrial vertebrate fauna surveys and an additional two GIS fauna desktop studies commissioned by Agrimin for the Proposal. Additionally, there have been six terrestrial SRE invertebrate fauna surveys commissioned by Agrimin for the Proposal. This large body of work included level 1 and level 2 terrestrial fauna surveys, as well as targeted Night Parrot, Great Desert Skink, and waterbird surveys between 2016 and 2021 (**Table 2-1**). In addition, from 2001 to 2018, six regional surveys have been conducted that overlap the Study Area and provide additional local and regional context (**Table 2-2**). The consolidation of all previous work (habitat mapping, survey effort and survey findings) is detailed within the ERD and summarised below.

Systematic sampling totalled 11,735 trap-nights for vertebrate fauna, comprising 8,736 trap nights during the Stantec Survey (Phase 1: 5,824 trap nights and 2,912 trap nights), 1,669 trap nights during the 360 Environmental (2018a) survey, 997 trap nights during the Strategen (2018) survey and 333 trap nights during the Cowan et al. (2015) survey. Additionally, systematic sampling within the Study Area accounted for 71 avifauna census hours, 24 systematic searching hours, 24 spotlighting hours, 358 motion-sensor cameras sampling nights and 54 bat echolocation recording nights.

Baseline targeted survey effort involved the use of survey methods specific to each species of significance where suitable habitats were encountered within the Study Area (**Table 2-1**). Motion cameras were deployed at 157 locations primarily to detect the presence/activity of the Greater Bilby and the Great Desert Skink, as well as species of marsupial mole and the Brush-tailed Mulgara. The majority of these deployments were within spinifex sandplain (42 locations), dunefield (30 locations) and gravel spinifex plain (28 locations) habitats. The majority of this effort was conducted during the Stantec survey with 128 targeted deployments totalling 2,782 recording nights.

The '2 ha plot' survey method was used primarily to detect the presence/activity of the Greater Bilby and the Great Desert Skink, but also species of marsupial mole and the Brush-tailed Mulgara. In total, 142 '2 ha plots' were conducted within the Study Area, with most undertaken in spinifex sandplain habitat (74 locations). Subsequently, a targeted survey for the Great Desert Skink was undertaken to better define the extent of a population which informed the design of the haulage corridor.

Baseline targeted survey effort for the Night Parrot was undertaken by deploying autonomous SM4 acoustic bird recorders and by conducting dusk census combined with call playback. In total, acoustic recorders have been deployed at 110 locations within the Study Area. Most of these deployments were within spinifex sandplain and dunefield habitats. The majority of these deployments were undertaken during the Stantec Survey (68 locations) totalling 829 recording nights, followed by the Strategen (2018) survey (29 locations). Subsequent to the baseline surveys, an additional 89 units (604 recording nights) were deployed (Stage 1-4) to better understand Night Parrot occurrence at two locations that coincide with the Study Area.

Targeted waterbird surveys were undertaken of Lake Mackay and peripheral wetlands when the lake was inundated in both 2021 and 2017.

No significant bat species were anticipated to occur within the Study Area; however, targeted deployment of echolocation recorders was undertaken at habitats where bat species were more likely to be recorded (water sources and caves) to increase the knowledge of what bat species utilise the Study Area. In total, 20 bat echolocation recorders were deployed within the Study Area. The majority of these were deployed within rocky ridge and gorge habitat (six locations). Most of these deployments were undertaken during the Stantec Survey (18 locations) totalling 188 recording nights.

Table 2-1: Summary of terrestrial vertebrate fauna surveys conducted for the Proposal.

Project (Reference)	Study Type / Dates	Proximity to Proposal Area	Survey Effort	Key Findings	
				Fauna Assemblage	Significant Fauna
<u>Reference:</u> ecologia Environment (2017) <u>Title:</u> Agrimin Mackay Project: Level 1 Fauna and Single Phase Level 2 Flora Assessment.	<u>Study type:</u> Level 1 fauna <u>Dates:</u> 6-13 September 2016	<u>Location:</u> Study Area <u>Survey Area:</u> 400,138 ha	- Targeted searches (time spent not stated) - Habitat mapping - Nocturnal searches (time spent not stated) 20 motion camera locations (for four nights each, totaling 80 nights) 30-minute avifauna census (total not stated) 3 echolocation recorders (seven nights)	57 taxa including: 11 mammals 35 birds 11 reptiles	- Northern Marsupial Mole (P4) - Rainbow Bee-eater (no longer listed)
<u>Reference:</u> 360 Environmental (2017a) <u>Title:</u> Waterbird Survey at Lake Mackay	<u>Study type:</u> Targeted waterbird survey <u>Dates:</u> 14-17 April 2017 <u>Senior Ornithologist:</u> Dr Colin Trainor	<u>Location:</u> Study Area <u>Survey Area:</u> 256,000 ha	17 ground avifauna census sites, totaling 20 hrs and 47 minutes 45 aerial avifauna census sites (hours not stated)	52 taxa including: 25 waterbirds 27 birds	- Australian Painted Snipe (EN, En) - Sharp-tailed Sandpiper (IA, Mi,) - Common Greenshank (IA, Mi) - Red-necked Stint (IA, Mi)
<u>Reference:</u> 360 Environmental (2018b) <u>Title:</u> Lake Mackay Sulphate of Potash Project: Single Phase Level 2 Fauna Survey at Lake Mackay	<u>Study type:</u> Level 2 fauna survey <u>Dates:</u> 10 – 19 May 2017	<u>Location:</u> Study Area <u>Survey Area:</u> 5,547.3 ha	- Six trapping sites over seven nights (1059 trap nights) - Six SM2 Echolocation and acoustic recorder locations (minimum 6-night total) 90-minute avifauna census (540 person minutes) 120 minutes of spotlighting - Six motion camera locations (minimum of 6 nights total) 22 habitat assessments - Opportunistic records	76 taxa including: 11 mammals 39 birds 24 reptiles 2 amphibians	Fork-tailed Swift (IA, Mi)
<u>Reference:</u> Strategen (2018) <u>Title:</u> Lake Mackay Sulphate of Potash Project: Level 2 Vertebrate and Targeted Fauna Survey.	<u>Study type:</u> Level 2 fauna and targeted fauna survey <u>Dates:</u> 10-21 November 2017	<u>Location:</u> Study Area <u>Survey Area:</u> 2,419.5 ha	- Detailed Survey involving Indigenous Rangers and Desert Support Services. - Four trapping sites (7 nights) 35 habitat assessments 90-minute avifauna census at the four trapping sites 240 minutes of spotlighting - Eight motion cameras (minimum of 5 nights) 2 ha plots (quantity not stated) 29 acoustic recorder locations (recording nights not stated) - Opportunistic records	117 taxa including: 12 mammals (4 introduced) 65 birds 31 reptiles 2 amphibians	None
<u>Reference:</u> ecologia Environment (2019) <u>Title:</u> Night Parrot Monitoring Lake Mackay	<u>Study type:</u> Targeted automated acoustic surveys for Night Parrot <u>Dates:</u> 21 April and 22 May 2018	<u>Location:</u> Off-LDE & surrounds <u>Survey Area:</u> N/A	Seven acoustic recorder locations for a total of 91 recording nights	N/A	- None - One call was detected that was similar pitch and length to some Night Parrot calls. However, based on the analysis of the call itself and the time it was detected, it was considered unlikely this call was a Night Parrot; however, the possibility could not be ruled out.
<u>Reference:</u> Stantec (2020b) <u>Title:</u> Lake Mackay Potash Project: Detailed and Targeted Vertebrate Fauna Survey and Consolidation	<u>Study type:</u> Preliminary survey <u>Dates:</u> 25 February to 4 March 2019	<u>Location:</u> NIDE <u>Survey Area:</u> 34,491 ha	Planning/logistics survey to inform the subsequent detailed and targeted survey. Selection of indicative survey sites for plan detailed survey	N/A	N/A
	<u>Study type:</u> Consolidation survey <u>Dates:</u> 2 to 6 October 2019	<u>Location:</u> Study Area <u>Survey Area:</u> 443,627.69 ha	- Consolidated habitat mapping of the Study Area as a whole. - Consolidating previous habitat type mapping by aligning scale, descriptions and defining characteristics. - Survey work involved ground-truthing key areas of interest via 4WD vehicle and helicopter.	Consolidated mapping of Study Area	N/A
	<u>Study type:</u> Detailed and targeted surveys <u>Dates:</u>	<u>Location:</u> NIDE <u>Survey Area:</u> 34,491 ha	Detailed systematic and targeted surveys of the NIDE involving Stantec, Indigenous Rangers and Desert Support Services.	193 taxa including: 22 mammals	- Greater Bilby - Brush-tailed Mulgara

Project (Reference)	Study Type / Dates	Proximity to Proposal Area	Survey Effort	Key Findings	
				Fauna Assemblage	Significant Fauna
	- Phase 1: 7 to 20 October 2019, and 29 October to 10 November 2019 - Phase 2: 7 to 22 March 2020		- Systematic effort: 16 trapping sites (8736 trap nights) 3360 minutes of avifauna census at the 24 sites 1440 minutes of systematic searches 1440 minutes if nocturnal searches 336 motion camera nights (48 locations) 48 bat recording nights (24 locations) - Targeted effort: 2,782 motion camera nights (128 locations) 142 '2 ha plots' for Greater Bilby and Great Desert Skink 829 recording nights (53 locations) for the Night Parrot 188 recording nights (18 locations) for bats 101 habitat assessments	6 non-native mammals 92 birds 70 reptiles 3 amphibians	- Northern Marsupial Mole - Southern Marsupial Mole - Night Parrot - Grey Falcon - Oriental Plover - Sharp-tailed Sandpiper - Striated Grasswren - Great Desert Skink - Broad-eyed Slider - Spotted Ctenotus
	<u>Study type:</u> Night Parrot Targeted Surveys <u>Dates:</u> - Stage 1: August 2020 - Stage 2: August – October 2020 - Stage 3: October – November 2020 - Stage 4: October 2020	<u>Location:</u> NIDE & surrounds <u>Survey Area:</u> N/A	- Targeted deployment of acoustic units around foraging records - Subsequent targeted survey to understand roost proximity - Units were deployed inside and outside the NIDE and were collected and redeployed in stages	Foraging and roosting individuals recorded	Night Parrot
	<u>Study type:</u> Night Parrot Fine Scale Habitat Mapping <u>Dates:</u> October 2020	<u>Location:</u> Study Area <u>Survey Area:</u> 443,985 ha	Fine scale digitisation of potentially suitable habitat for Night Parrots using satellite imagery	11,522 ha of potential Night Parrot habitat	N/A
	<u>Study type:</u> Great Desert Skink Targeted Survey <u>Dates:</u> 19 October – 1 November 2020	<u>Location:</u> NIDE & surrounds <u>Survey Area:</u> N/A	- Targeted survey to determine population extent - Transects 2 ha plots	Population size expanded to a total of 64 burrows	Great Desert Skink
	<u>Study type:</u> Night Parrot Baseline Survey around Lake Mackay <u>Dates:</u> March - April 2021	<u>Location:</u> SIDE & OFF-LDE <u>Survey Area:</u> N/A	- Baseline survey to address limitations identified in previous surveys 15 acoustic recording units deployed in areas of suitable Night Parrot habitat with potential to be impacted by the Proposal, around Lake Mackay	No Night Parrots detected	None
	<u>Study Type:</u> Waterbird Survey of Lake Mackay and Peripheral Wetlands <u>Dates:</u> 30 March – 2 April 2021 <u>Zoologist:</u> Samantha Lostrom	<u>Location:</u> Study Area <u>Survey Area:</u> N/A	17 ground avifauna censuses sites totalling 11 hours and 38 minutes 22 opportunistic observations (largely from helicopter)	28 taxa comprising; 12 confirmed waterbirds to species level 1 waterbird to genus level 15 birds	- Sharp-tailed Sandpiper (IA, Mi) - Marsh Sandpiper (IA, Mi) - Princess Parrot (Vu, P4) - Gull-billed Tern (IA, Mi) - White-winged Black Tern (IA, Mi) - Stint sp. (IA, Mi) (unable to identify to species in aerial observation)
	<u>Night Parrot regional modelling</u>	<u>Location:</u> Study Area and within 75 km of the Study Area	GIS modelling of prospective regional Night Parrot habitat. The modelling used Sentinel imagery trained to identify image signatures for the two areas (58 unit locations) where Night Parrots have been recorded by Stantec.	N/A	N/A

Table 2-2: Summary of regional vertebrate fauna surveys that intersect, occur within or lie adjacent to the Proposal Area

Project (Reference)	Study Type/ Dates	Study Details	Proximity to Proposal Area	Survey / study effort	Key Findings	
					Fauna Assemblages	Significant Fauna
<u>Reference:</u> Paltridge (2012) <u>Title:</u> <i>Kiwirrkura Threatened Species Survey 2012</i>	<u>Location:</u> Kiwirrkura, Nyinmi and Maruwa management zones (including western edge of Lake Mackay) <u>Survey date:</u> 12-18 May 2012	Tracking survey	Maruwa management area encompasses the western edge of Lake Mackay and a southern portion of the Stantec Survey Area.	29 x 2 ha tracking plots	N/A	- Greater Bilby (Vu, Vu) - Brush-tailed Mulgara (P4) - Princess Parrot (Vu, P4)
<u>Reference:</u> Outback Ecology (2012a) <u>Title:</u> <i>Level 1 Terrestrial Fauna Assessment</i>	<u>Location:</u> Lake Mackay <u>Survey Date:</u> 7-14 June 2012	Level 1 fauna survey	Within the Study Area	24 systematic searching sites, for 60 minutes each totalling 24 hours) 12 hours of nocturnal searching - Two motion camera locations (total of six nights) - Opportunistic records - One echolocation recorder location (four recording nights) - Habitat assessments	52 taxa including: 15 mammals (5 introduced) 14 reptiles 23 birds	- Northern Marsupial Mole (P4) - Brush-tailed Mulgara (P4)
<u>Reference:</u> Paltridge (2015) <u>Title:</u> <i>Looking for animals on Ngururpa Country</i>	<u>Location:</u> road between Yagga Yagga and Bibarrd Aboriginal Outstations <u>Survey Date:</u> 28 July – 1 August 2015	Tracking Survey	Overlaps the Study Area. Predominantly the Stantec Survey Area	32 2 ha plots	N/A	- Greater Bilby (Vu, Vu) - Brush-tailed Mulgara (P4) - Grey Falcon (VU)
<u>Reference:</u> Cowan <i>et al.</i> (2015) also presented in BushBlitz (2015) <u>Title:</u> <i>Kiwirrkura Indigenous Protected Area BushBlitz Survey</i>	<u>Location:</u> Area around Kiwirrkura and Nyinmi (100 km west of Kiwirrkura) and Lake Mackay <u>Survey Date:</u> 5-19 September 2015	Bush Blitz	Intersects the Study Area in the vicinity of Lake Mackay	14 trapping sites (4 within the Study Area) (333 trap nights) 3 echolocation recorder locations for at least one night each - Active foraging (time not stated) - Targeted motion cameras (nights deployed not stated)	71 vertebrate taxa including: 23 mammals (5 introduced) 48 reptiles 1 amphibian	- Greater Bilby (Vu, Vu) - Evidence of Northern Marsupial Mole (P4) - Great Desert Skink (VU, Vu)
<u>Reference:</u> Desert Support Services (2018) <u>Title:</u> <i>Bilby Blitz Survey on the proposed Ngururpa Indigenous Protected Area, Alice Springs.</i>	<u>Location:</u> Ngururpa IPA <u>Survey Date:</u> 18-22 October 2018	Targeted Greater Bilby survey	Overlaps the Study Area. Predominantly the Stantec Survey Area.	27 x 2 ha plots - Opportunistic records	N/A	- Greater Bilby (Vu, Vu) - Great Desert Skink (VU, Vu)
<u>Reference:</u> Duguid <i>et al.</i> (2005) <u>Title:</u> <i>Wetlands in the Arid Northern Territory</i>	<u>Location:</u> Northern Territory (including Lake Mackay) <u>Aerial Survey Date:</u> 5-6 September 2001 <u>Experienced Ornithologist:</u> Ray Chatto <u>Ground Survey:</u> 3-10 Oct 2001 <u>Zoologists:</u> Peter Latz and Rachel Paltridge	Wetland survey (with shorebird/ waterbird survey at Lake Mackay)	Lake Mackay. Aerial survey of the perimeter of the Lake in the WA side and ground-truthed sites on the Northern Territory side of the lake.	Aerial avifauna census (time not stated)	20 waterbird species (confirmed Id) (42,473 individuals)	- Gull-billed Tern (Mi, IA) - Common Greenshank (Mi, IA) - Glossy Ibis (Mi, IA)
<u>Reference:</u> Pedler <i>et al.</i> (2018) <u>Title:</u> <i>Long-distance flights and high-risk breeding by nomadic waterbirds on desert salt lakes</i>	<u>Location:</u> Lake Mackay <u>Survey Date:</u> 6 March 2014	One-off flight to conduct Banded Stilt survey	Lake Mackay. Aerial survey of the lake.	Once-off aerial Banded Stilt census	N/A	6,500 clutches of Banded Stilt eggs

2.2 Fauna Habitat

Habitat mapping undertaken over several fauna surveys was consolidated for the wider Study Area (which encompassed the Proposal Area) (*Stantec 2021a*). This work resulted in the delineation of 12 broad fauna habitats. These habitats were delineated on the basis of location, landform, substrate, vegetation type and their importance to different faunal groups, in particular their importance to fauna of significance. Descriptions of each habitat type and the extent within the study area, proposal area, and indicative footprint are provided in **Table 2-3**. Representative photographs of each habitat type are shown in **Table 2-4**. The most extensive habitats in the Study Area were the salt lake playa (54.8%), spinifex sandplain (23.3%) and dunefield (9.3%). The remaining nine habitats comprised proportions that were individually less than 5% of the Study Area.

Habitats considered of high value to significant fauna as they supported threatened and priority species including the Brush Tailed Mulgara, Spotted Ctenotus, Bilby, Great Desert Skink and Night Parrot, Northern/southern Marsupial Mole and Princess Parrot (**Table 2-8**) include:

- Gravel Spinifex plain
- Spinifex sandplain
- Dune-field
- Dune
- Claypans and Claypan mosaic (and adjacent areas with old growth *Triodia*); and
- Salt lake playa, associated islands and surrounding claypans and claypan mosaic and saline flats and depressions when Lake Mackay is in flood.

In addition to these broad habitat features, fresh water sources are a limiting factor in arid environments and are an important feature of the arid interior, albeit typically temporarily during and following rainfall events. Specifically, birds and mammals will use these areas for drinking, amphibians will use these areas to breed, and many vertebrate fauna species will benefit from increased aquatic invertebrate fauna abundance for food. A total of 13 temporary water sources were identified in the Study Area. Most were pools in exposed bedrock, associated with rocky substrates in rocky ridge and gorge (5), minor drainage line (3), and outcropping and stony rise (2) habitats. Three were identified in claypans and claypan mosaic habitat; these comprised large claypans and a soak. The location of one permanent water source supplied by Tjurabalan representatives is approximately ~250 m west and downstream of the NIDE.

Table 2-3: Fauna habitat types, description, and extent within the Study Area, Proposal Area, and Indicative Footprint.

Habitat	Description	Extent within - ha (proportion %)		
		Study Area	Proposal Area	Indicative Footprint
Salt lake playa	The salt lake playa is a vast flat salt crust playa which is devoid of vegetation. Larger islands on the playa support varying proportions of the broad habitats found elsewhere within the Study Area. While the lake infrequently floods, water can persist for relatively long time frames (over 6 months) (Duguid <i>et al.</i> 2005). For further information on the ecology and hydrology of Lake Mackay, please see Stantec (2020c). Disturbance was limited to exploration tracks and test ponds/trenches for the Proposal (Stantec 2021a).	243,271	216,333 (88.93%)	13,363 (5.49%)
Lake margin	The lake margin habitat fringes the salt lake playa of Lake Mackay with vegetation that is typically represented by a low open chenopod shrubland of <i>Frankenia cordata</i> , <i>Tecticornia</i> spp. and <i>Maireana luehmanni</i> . The vegetation in this habitat typically lacks an upper or mid storey. Occasional groves of <i>Melaleuca glomerata</i> may form mosaics with the chenopod shrubland in some areas. Substrates comprise clayey sand with occasional minor calcrete outcropping. Disturbance was limited to minor exploration tracks (Stantec 2021a).	14,884	1,341 (9.01%)	22.4 (0.15%)
Claypan and claypan mosaics	Typically, the claypans and claypan mosaic habitat comprises a mosaic of claypans interspersed by low lying chenopod shrublands, <i>Triodia</i> hummock grasslands and tussock grasslands. Often this habitat features chains of claypans in the swales between dune habitat, particularly in the vicinity of Lake Mackay. The claypans in this habitat would hold freshwater or less saline water compared to the saline flats and depressions habitat when inundated. Upper storey vegetation typically comprises <i>Eucalyptus vitrix</i> and <i>Acacia aneura</i> isolated trees to low open woodlands. The presence of these taller trees tends to be uncommon in the broader landscape. The midstory varies from dense groves of <i>Melaleuca glomerata</i> and/or <i>Acacia</i> spp. through to scattered low shrublands of <i>Eremophila</i> , <i>Senna artemoides</i> subsp. <i>oligophylla</i> , <i>Melaleuca</i> and <i>Acacia</i> . Disturbance was limited to minor exploration tracks (Stantec 2021a). Broadly, this habitat includes the following natural variation/features: • Large isolated freshwater claypans which may be surrounded by a relatively high cover of tall <i>Eucalyptus</i> spp. or <i>Acacia aneura</i>, or a relatively sparse upper stratum with a medium cover of tussock and hummock grasses; • Tussock dominated depressions and/or gilgai; and • Occasional areas of <i>Triodia</i> spp. dominated open plains with isolated or no shrubs and bare depressions.	15,960	1,547 (9.13%)	42.2 (0.26%)
Saline flats and depressions	Typically, the saline flats and depressions are flat low-lying saline areas in the landscape interspersed with depressions that have the potential to hold water after rain. This habitat is restricted to the immediate surrounds of Lake Mackay. Typically, this habitat features chains of depressions or complex saline drainage areas. These features are interspersed with a mosaic of chenopods (<i>Tecticornia</i> spp., <i>Frankenia cordata</i>) <i>Triodia</i> spp hummock grasslands and tussock grasslands. Occasionally, this habitat includes a sparse shrubland of <i>Melaleuca glomerata</i> and / or <i>Acacia</i> spp. Substrate typically comprises sand or clayey sands. Disturbance was limited to minor exploration tracks (Stantec 2021a). This broad habitat also includes the following natural variation/features: • Relatively large pans with a salt crust, surrounded by chenopods such as <i>Frankenia cordata</i>, <i>Tecticornia</i> spp., <i>tussocks</i> and <i>Triodia</i> spp.; and • Occasional <i>Triodia</i> dominated open plains with isolated or no shrubs and bare saline depressions.	8,069	151 (1.87%)	3.4 (0.04%)

Habitat	Description	Extent within - ha (proportion %)		
		Study Area	Proposal Area	Indicative Footprint
Dune-field	Typically, the dune-field habitat comprises small closely-spaced dunes interspersed by swales and relatively narrow flats. Upper and mid storey vegetation is typically sparse, ranging from isolated to 30% shrub cover and occasional thickets. These shrubs range from 1.5 – 3m tall and include <i>Acacia</i> spp., <i>Corymbia</i> sp., <i>Melaleuca</i> sp. and <i>Grevillea</i> spp. The lower story is typically an open <i>Triodia</i> spp. hummock grassland which ranges in cover from 10 – 30%, with occasionally cover of up to 70%. This broad habitat also includes the following natural variation/features: • Stands of <i>Allocasuarina decaisneana</i>, with mature trees reaching 5 – 6 m and shrubs ~2 m in height; and • <i>Corymbia</i> woodlands ranging from an open cover of <i>Corymbia chippendalei</i> to relatively dense stands of tall (~8 m) <i>Corymbia opaca</i> with minimal mid-storey.	41,418	5,431.74 (13.11%)	281.82 (0.68%)
Dune	Typically, the dune habitat comprises relatively large sand dunes which are separated by sandplains and/or large swales. Vegetation typically comprises scattered tall <i>Corymbia chippendalei</i> (3 – 5 m) (a distinct feature of larger dunes) over a mixed <i>Eucalyptus mallee</i>, <i>Grevillea</i>, <i>Hakea</i> and <i>Acacia</i> open shrubland over an open <i>Triodia</i> spp. hummock grassland. Substrate is exposed (75%) and comprises a deep orange red sand. Dunes occasionally support stands of <i>Allocasuarina decaisneana</i>, however this is more common in the dune-fields habitat. Dune habitat occurs throughout the Study Area. Disturbance included evidence of broadscale fires and minor exploration/local access tracks (Stantec 2021a).	6,521	1,477 (22.65%)	19.27 (0.30%)
Spinifex sandplain	Typically, the spinifex sandplains are large expanses of relatively flat <i>Triodia</i> hummock grasslands with sparse shrubs and trees. Where present, trees comprise <i>Corymbia deserticola</i>, <i>C. candida</i> and <i>Eucalyptus victrix</i> over an open shrubland with occasional thickets of <i>Eucalyptus mallee</i> and varied <i>Acacia</i>, <i>Grevillea</i> and <i>Hakea</i> species. The <i>Triodia</i> spp. hummock grassland tends to be open to relatively closed. Substrates range from sandy to sandy clay and tended to lack coarse fragments. This broad habitat also includes the following natural variation/features: • Relatively dense shrubland, particularly near the salt lake margin where <i>Melaleuca glomerata</i>, <i>Acacia ligulata</i>, <i>A. trachycarpa</i> and <i>Grevillea stenobotrya</i> occur. • Isolated stands of <i>Eucalyptus</i> trees and mallee.	103,435	28,189 (27.25%)	754 (0.73%)
Gravel spinifex plain	Typically, the gravel spinifex plains are elevated in the landscape with substrates made up of fine to medium gravel fragments, usually laterite, over sandy clays. Vegetation typically comprises a low open to very open shrubland of <i>Acacia hilliana</i> (<1 m tall) over an open <i>Triodia</i> hummock grassland. The upper storey is represented by occasional <i>Corymbia</i> trees, <i>Hakea</i> and/or <i>Eucalyptus mallee</i>, however these are broadly uncommon. The shrubland also comprises <i>Acacia</i> spp., <i>Hakea</i> sp. and <i>Grevillea wickami</i>. The gravel substrate tends to give way to more densely packed larger stones in proximity to outcropping, stony rises and ridges, usually associated with vegetation type (Eb)AacTi (Stantec 2021a).	9,646	8,614 (89.3%)	248 (2.57 %)

Habitat	Description	Extent within - ha (proportion %)		
		Study Area	Proposal Area	Indicative Footprint
Rocky ridge and gorge	Typically, the rocky ridge and gorge habitat comprises large sandstone ridgelines with exposed outcropping greater than 5m high and large boulders which form substantial crevices, alcoves and shallow caves. Exposed bedrock forms collection points for semi-permanent water, which is relatively common in this habitat compared to most others. Typically, the upper storey ranges from a closed to open woodland of <i>Corymbia candida</i> and/or <i>C. aspera</i> with trees being substantially taller (averaging 4 – 8 m) than trees in other habitats. The habitat also supports <i>Ficus brachypoda</i> with large mature trees occasionally forming dense groves. The mid-storey is typically a sparse open low shrubland (<i>Dodonaea polyzyga</i>, <i>Corymbia</i> spp. and <i>Acacia monticola</i>), over a very open to scattered <i>Triodia</i> hummock and / or tussock grassland. The substrate ranges from exposed bedrock through to areas with a high cover of rocks, usually between 6 – 20cm in diameter, over sandy clays. Disturbance was limited in this habitat (Stantec 2021a).	38.59	28.59 (100 %)	0.09 (0.24 %)
Outcropping and stony rise	Typically, the outcropping and stony rise habitat comprises outcropping rock-faces (less than 5 m tall), exposed bedrock and/or extensive stony substrates. The rocky features within this habitat are less prominent than within the rocky ridge and gorge habitat, but more pronounced than other habitats in the broader landscape. Vegetation comprises <i>Corymbia</i> spp. scattered low trees with occasional <i>Ficus brachypoda</i> over <i>Acacia</i> spp. scattered low shrubs over an open <i>Triodia</i> spp. hummock grassland. Substrate tends to be made up of sandy clays, with a high proportion of coarse rocky fragments. In places where water collected, the bedrock supports occasional semi-permanent water sources. Some islands on Lake Mackay, have outcropping of gypsum which forming larger crevices not present elsewhere within this habitat. Disturbance was limited to broadscale fire in some areas (Stantec 2021a).	491.08	415.75 (84.66 %)	5.36 (1.09 %)
Ridge slope	Typically, the ridge slopes include the sloped rocky habitat between the ridge-faces and stony plains. Vegetation comprises scattered trees and shrubs of <i>Corymbia candida</i> and <i>Acacia</i> spp. over an open <i>Triodia</i> spp. hummock grassland. Substrate is dominated by a dense cover of coarse rocky fragments on sandy clays. Disturbance was limited to broadscale fire in some areas (Stantec 2021a).	94.24	94.24 (100 %)	0 (0 %)
Drainage line	Typically, the drainage lines are channels which temporarily carried water after rainfall events. Substrates ranges from sandy to rocky outcropping, with the latter occasionally supporting semi-permanent water sources after recent rains. Vegetation is variable, but typically included mixed <i>Grevillea wickhamii</i>, <i>Acacia</i> sp. and <i>Hakea</i> sp. shrublands over a <i>Triodia</i> spp. open hummock grasslands or open tussock grassland or herbland. A relatively high cover of herbs and tussocks grasses is present in areas with low proportions of exposed bedrock, particularly after recent rainfall. Rocky drainage lines tend to support <i>Corymbia candida</i>, scattered trees and occasional <i>Ficus brachypoda</i>. Disturbance was limited within this habitat (Stantec 2021a).	40.98	39.43 (96.21 %)	0.55 (1.34 %)

Table 2-4: Representative photographs of each fauna habitat

Fauna Habitat - Representative Photographs	
Salt lake playa 	Lake margin 
Claypan and claypan mosaics 	Saline flats and depressions 
Dune-field 	Dune 

Fauna Habitat - Representative Photographs

Spinifex sandplain



Gravel spinifex plain



Rocky ridge and gorge



Outcropping and stony rise



Ridge slope



Drainage line



2.3 Fauna Assemblages

The desktop assessment (database searches and the literature review) identified a total of 421 species of vertebrate fauna which have previously been recorded and/or have the potential to occur within the Study Area and therefore the Proposal Area. In total, across all previous surveys that intersect the Study Area, a total of 245 vertebrate fauna species have been recorded, comprising 22 native mammals, 9 introduced mammals, 129 birds, 1 introduced bird, 80 reptiles and 6 amphibians.

Overall, during dry season surveys, the spinifex sandplain habitat had the highest species richness (n=52), followed by dunefield (n=43) and gravel spinifex plain (n=41). In comparison, during wet season surveys, dunefield habitat had the highest species richness (n=68), followed by gravel spinifex plain (n=46) and claypans and claypan mosaic (n=45).

For mammals, the most diverse habitat types were the dunefield (53 captures of 6 species), claypans and claypan mosaics (44 captures of 4 species) and spinifex sandplains (32 captures of 3 species). The most commonly recorded mammal was the Desert Mouse (*Pseudomys desertor*) which was captured on 48 occasions, most of which occurred in the dunefield habitat.

For birds, the most diverse habitat types were the dunefield (1245 records of 24 species), claypans and claypan mosaic (746 records of 28 species) and spinifex sandplain (706 records of 22 species). The most commonly recorded bird species from systematic sites was the Masked Woodswallow (*Artamus personatus*), (366 records), followed by the Budgerigar (*Melopsittacus undulatus*) (239 records) and Zebra Finch (*Taeniopygia guttata*) (138 records). These species are considered common and widespread throughout the region (Menkhorst *et al.* 2017).

For reptiles, the most diverse habitat types were the dunefield (1,273 records of 46 species), spinifex sandplain habitat (750 records of 40 species) and gravel spinifex plain (619 records of 35 species). These habitats offered a range of microhabitats for reptiles, often with a high proportion of *Triodia* cover and sandy or sandy clay substrates that are suitable for burrowing. The most commonly recorded reptile from systematic sites was the Leopard Ctenotus (*Ctenotus pantherinus*) (147 records), followed by the North-western Sandslider (*Lerista bipes*) (316 records) and the Bynoe's Gecko (*Heteronotia bynoei*) (109 records). All of these species are considered common and/or widespread throughout the region (Wilson and Swan 2017).

During major flood events, Lake Mackay supports a range of waterbird species including shorebirds, terns and ducks. The larger islands serve as waterbird breeding habitat while the lake playa and surrounding claypans/ saline depressions support foraging. Migratory and threatened bird species were recorded following large inundation events in 2001 and 2016 and during a smaller inundation event in 2021 (Table 2-5).

Table 2-5: Summary of waterbird recorded during waterbird surveys of Lake Mackay.

Waterbird Survey	Waterbird Species (Confirmed ID)*	Listed Species	Waterbird Abundance	Inundation Duration (> 20 %)
2001 Survey (Duguid <i>et al.</i> 2005)	20	3	42,473	398 days
2017 Survey (360 Environmental 2017a)	25	5	3,273	89 days
2021 Survey (Stantec 2021c)	12	4	42,194	24 days
Total	34	8	-	-

*Note: * indicates that non-waterbird species and waterbird species that could not be confirmed to species level have been excluded (e.g. Tern Whiskered or White-winged).*

The waterbird survey during the 2001 flood event recorded 42,473 individuals from 20 waterbird species (with six additional unconfirmed waterbird species). These records included more than 1% of the estimated population for three shorebirds: 12,000 Banded Stilts; 3,262 Black-winged Stilts; and 1,295 Red-necked Avocets. Additionally, 4,400 immature Banded Stilts were recorded which demonstrated a breeding event. The 2017 survey recorded a nationally significant count (3,273 individuals) of the Red-necked Stint (Mi, Mi). Note, both surveys occurred in sub-optimal timing several months after the rainfall events, and as such are likely to underestimate waterbird abundance, diversity and breeding activity. The 2021 survey detected large congregations of waterbirds foraging on a localised area of the Lake Mackay playa, ranging from 9,301 to 35,038 individuals. These congregations included from 4.4% to 11.8% of the estimated population of Sharp-tailed Sandpipers. An additional four migratory waterbirds are considered likely to occur based on regional records.

Based on the analysis of available historical satellite imagery, Lake Mackay had 58 inundation events (with over 20 % inundation) over the last 33 years of available imagery (Figure 2-1). Typically, the duration of these events lasted less than a month. Of the 58 events, 21 were equivalent or greater in duration to the event observed during the 2021 waterbird survey (24 days) while only two were greater in duration than the event observed during the 2017 waterbird survey (more than 400 mm of rainfall; 89 days duration). These large inundation events (greater than 89 days) were 139 days in 2000 and the event observed during the 2001 waterbird survey estimated to be 398 days in duration. This event in 2000/2001 was the longest inundation event on available records and was nearly 30 times the average inundation duration. Lake

levels were predicted to have reached approximately 4 m in the south-east of the lake, initially spilling into the surrounding riparian vegetation zone.

Inundation events in excess of 65 days duration meets the minimum time required for successful breeding of Banded Stilts. Based on the 33 years of available satellite imagery, six inundation events exceeded this minimum duration of inundation, with three of those events being marginal (estimates of 66, 69 and 72 days) (**Table 2-6, Figure 2-1**). However, the 2001 inundation event likely resulted in several reproductive events over the duration of the inundation. In summary, when inundated, Lake Mackay provides an important resource for foraging and breeding of waterbirds; however, large inundation events are rare and infrequent with the majority lasting less than one month.

Table 2-6: Banded Stilt breeding evidence at Lake Mackay.

Days of inundation	Breeding evidence observation	Date recorded	Likely success	Reference
398	12,070 adults, 4,400 juveniles	2001	Successful	(Duguid <i>et al.</i> 2005)
69	~6,000 adult pairs, 6,500 clutches, >650 chicks (~2-4 weeks old)	2014	Potentially successful	Pedler (2017a); Pedler <i>et al.</i> (2014)
66	257 adults, <10 fledged juveniles	14 to 17 April 2017	Successful	(360 Environmental 2017a)
24	4,200 adults observed nesting No juveniles observed during the survey.	30 March to 2 April 2021	Unlikely successful due to rate of water recession	(Stantec 2021c)

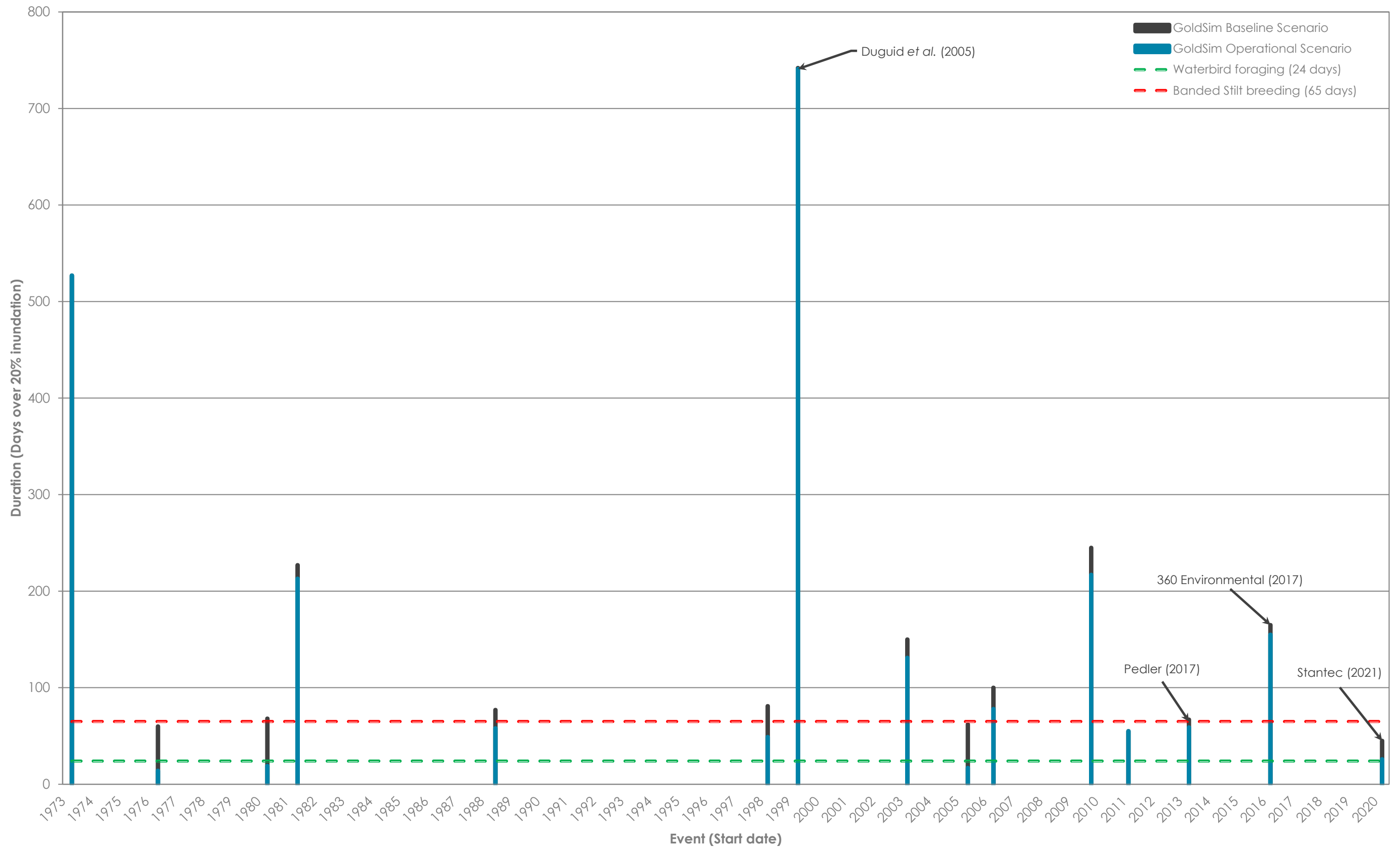


Figure 2-1: Frequency of Lake Mackay inundation events with limits for potentially supporting waterbird foraging (green) and Banded Stilt Breeding (red). Estimations of event duration are based on analysis of aerial imagery (Stantec 2021a). Banded Stilt breeding duration represents the minimum time required to raise chicks to fledge based on literature, while waterbird foraging suitability is based on the smallest observed event supporting significant foraging behaviour (Appendix G.1A of the ERD).

2.4 Introduced Fauna

A total of eight introduced fauna species have been recorded from within the Study Area, and have the potential to occur in the Proposal Area, including:

- European Cattle (*Bos taurus*), the Camel (*Camelus dromedarius*),
- Feral Cat (*Felis catus*),
- Feral Dog (*Canis lupus*),
- Horse (*Equus caballus*),
- Red Fox (*Vulpes vulpes*),
- House Mouse (*Mus musculus*), and
- Rabbit (*Oryctolagus cuniculus*).

One additional species, the Silver Gull (*Chroicocephalus novaehollandiae*) is known to occur and breed at Lake Mackay during inundation events. While not feral, Silver Gulls are known to predate on Banded Stilt chicks during breeding events and have considerable influence on breeding success (Pedler 2017b). As for feral predators, Silver Gull populations have the potential to increase above natural levels in response increased foraging resources. Increased foraging resources have the potential to occur during operations, particularly in associating with the landfill and accommodation village.

2.5 Significant Fauna

Based on all previous surveys, 21 significant species have been confirmed in the Study Area (**Table 2-7**). This includes one species, the Broad-eyed Slider (*Lerista aff. robusta*) (P1) that was not identified in the desktop assessment. These species included three mammals, 14 birds (9 migratory) and three reptiles. Of these, the following are of note due to their conservation status, relative abundance and/or potential to be impacted by the Proposal:

- Greater Bilby (*Macrotis lagotis*) (Vu, Vu);
- Brush-tailed Mulgara (*Dasyurus blythi*) (P4);
- Night Parrot (*Pezoporus occidentalis*) (En, Cr);
- Great Desert Skink (*Liopholis kintorei*) (Vu, Vu);
- Spotted Ctenopus (*Ctenopus uber. Johnstonei*) (P2); and
- Migratory or threatened waterbirds and shorebirds (confirmed or considered likely to occur) including:
 - Red-necked Stint (*Calidris ruficollis*) (Mi: migratory shorebird);
 - Sharp-tailed Sandpiper (*Calidris acuminata*) (Mi: migratory shorebird);
 - Marsh Sandpiper (*Tringa nebularia*) (Mi: migratory shorebird);
 - Oriental Plover (*Charadrius veredus*) (Mi: migratory shorebird);
 - Common Greenshank (*Tringa nebularia*) (Mi: migratory shorebird);
 - Glossy Ibis (*Plegadis falcinellus*) (Mi);
 - Gull-billed Tern (*Sterna nilotica*) (Mi);
 - White-winged Black Tern (*Sterna leucopterus*) (Mi); and
 - Fork-tailed Swift (*Apus pacificus*) (Mi).

Significant species assessed as having a low potential to be impacted by the Proposal included the following species (Stantec 2022):

- Northern Marsupial Mole (P4);
- Southern Marsupial Mole (P4);
- Spectacled Hare-wallaby (P3);
- Princess Parrot (Vu, P4);
- Grey Falcon (Vu, Vu);
- Striated Grasswren (P4);
- Fork-tailed Swift (Mi); and

- Broad-eyed Slider (P1).

Each of these species were assessed during the environmental impact assessment as having low potential to be impacted by the Proposal as they were recorded in low numbers and / or had an ecology which meant they were unlikely to be directly or indirectly impacted.

The significant species of note due to their conservation status, relative abundance and/or potential to be impacted by the Proposal are described in more detail in **Table 2-8** with recorded locations shown in **Figure 2-2 - Figure 2-6**. For these species, a summary is presented of the species ecology, habitat requirements, key threats, potential Proposal related impacts.

A standalone Night Parrot Management Plan (NPMP) has been developed for the Proposal, which aligns with the TFEMP. The NPMP outlines the ecology, key threats, potential impacts and survey findings, and separate management provisions and contingency actions, due to the importance of this species.

Table 2-7: Significant fauna confirmed or likely to occur within the Study Area

Scientific Name	Common Name	Likelihood Occurrence	EPBC Act	BC Act
Mammalia				
<i>Macrotis lagotis</i>	Greater Bilby	Confirmed	Vu	Vu
<i>Dasycercus blythi</i>	Brush-tailed Mulgara	Confirmed	-	P4
<i>Notoryctes caurinus</i> / <i>Notoryctes typhlops</i> *	Northern / Southern Marsupial Mole	Confirmed	-	P4
<i>Lagorchestes conspicillatus leichardti</i>	Spectacled Hare-wallaby	Likely	-	P3
Reptilia				
<i>Liopholis kintorei</i>	Great Desert Skink	Confirmed	Vu	Vu
<i>Lerista aff. robusta</i>	Broad-eyed Slider	Confirmed	-	P1
<i>Ctenotus uber johnstonei</i>	Spotted Ctenotus	Confirmed	-	P2
Aves				
<i>Pezoporus occidentalis</i>	Night Parrot	Confirmed	En	Cr
<i>Rostratula australis</i>	Australian Painted Snipe	Confirmed	En	En
<i>Polytelis alexandrae</i>	Princess Parrot	Confirmed	Vu	P4
<i>Falco hypoleucos</i>	Grey Falcon	Confirmed	-	Vu
<i>Amytornis striatus striatus</i>	Striated Grasswren	Confirmed	-	P4
<i>Apus pacificus</i>	Fork-tailed Swift	Confirmed	Mi	IA
<i>Charadrius veredus</i>	Oriental Plover	Confirmed	Mi	IA
<i>Plegadis falcinellus</i> [^]	Glossy Ibis	Confirmed	Mi	IA
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Confirmed	Mi	IA
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Confirmed	Mi	IA
<i>Sterna nilotica</i>	Gull-billed Tern	Confirmed	Mi	IA
<i>Sterna leucopterus</i>	White-winged Black Tern	Confirmed	Mi	IA
<i>Calidris ruficollis</i>	Red-necked Stint	Confirmed	Mi	IA
<i>Tringa nebularia</i>	Common Greenshank	Confirmed	Mi	IA
<i>Tringa nebularia</i>	Common Sandpiper	Likely	Mi	IA
<i>Calidris melanotos</i>	Pectoral Sandpiper	Likely	Mi	IA
<i>Glareola maldivorum</i>	Oriental Pratincole	Likely	Mi	IA
<i>Tringa glareola</i>	Wood Sandpiper	Likely	Mi	IA

* Both species have been recorded in the Study Area and have an overlapping range. As they cannot be differentiated based on tracks and signs and have the same conservation listing, they are discussed collectively.

Table 2-8: Significant fauna species - summary table of key threats, proposal impacts, and key survey findings

Species habitat requirements and representation of habitat within the in Proposal Area	Ecology and Distribution	Key Threats	Potential Proposal Related Impacts	Key Findings
Greater Bilby (<i>Macrotis lagotis</i>): Vu - EPBC Act / Vu - BC Act				
Critical Habitat: - Burrowing habitats (Cramer <i>et al.</i> 2017; DCCEEW 2023c). - Plain habitat with isolated dunes and dune fields that support soils from coarse sand to light medium clay, which has the following vegetation types: - Woodlands of low trees (<10m) with Eucalyptus and Acacia spp. - Shrub-steppe communities over Triodia hummock grasslands. - Pindan woodland with hummock and tussock grasses. - Rises, breakaways, plateaus, granitic hills and rises that support sandy soils, sandy loams and red earths often with lateritic, small gravel, stony matrix, featuring vegetation types of low shrub cover of Acacia spp. including mulga (<i>A. aneura</i>) over hummock and tussock grasses. - Creeklines and palaeodrainage systems that support sandy and sandy loam soils, alluvial and calcareous areas, and salt channels and lakes, featuring vegetation types of Spinifex grasslands (mainly Triodia basedowii, T. pungens and T. schinzii) with low shrub cover of Acacia spp. and Melaleuca spp. - Key Habitat: - General foraging and dispersal habitats (DCCEEW 2023d; Southgate <i>et al.</i> 2007; TSSC 2016c) - Open tussock grasslands on uplands and hills. - Mulga (<i>Acacia aneura</i>) woodland/shrubland (both pure mulga and mixed stands of mulga/witchetty bush) growing on ridges and rises. - Hummock grassland growing on sand plains and dunes, drainage systems, salt-lake	Description The Greater Bilby is a solitary, nocturnal marsupial with long ears. Distribution They have a disjointed distribution throughout desert habitat between the Pilbara and south-west Queensland, with large shifting home ranges that change in response to food resources (van Dyck and Strahan 2008). Ecology The Greater Bilby shelters in deep burrows. Burrow use is relatively dynamic, with individuals maintaining several burrows at once and abandoning, re-using, or excavating new burrows continually. Gravel spinifex plain is likely to be an important foraging habitat for the species due to the presence of <i>Acacia hilliana</i> which is a host species for root larvae known to be an important food resource for the Greater Bilby.	Threatening processes: - Habitat Loss: - Direct impacts to habitat will lead to the loss of breeding and foraging habitat and will likely cause the degradation of surrounding habitat, increase fragmentation risks, and possibly lead to an increase of predation by feral animals (DCCEEW 2023b) - Increase predation by introduced predators (feral cats and foxes and to a lesser extent by dingoes/wild dogs). Additional infrastructure and settlements may result in elevated predator densities resulting from increases in food and water resources (Bradley <i>et al.</i> 2015); - Feral herbivores: - Feral herbivores can overgraze ground cover, cause soil compaction and erosion, and degradation of Bilby habitat (Bradley <i>et al.</i> 2015). - Cane Toads - The extent of the threat to the Greater Bilby in the GSD is currently unquantified. - Altered fire regimes: - Large hot fires are likely to reduce the availability of food sources and can increase predation risks by removing vegetation cover (Southgate and Carthew 2006; Southgate <i>et al.</i> 2007). - Habitat loss, degradation and fragmentation (Woinarski <i>et al.</i> 2014). - Clearing for linear infrastructure such as roads may result in indirect impacts from habitat fragmentation and increase the threat of mortality or injury from vehicle strike. - Barriers to dispersal such as large infrastructure projects may restrict the ability to establish new populations and inhibit the roving of male Bilbies (DCCEEW 2023b). Populations which become genetically isolated are more susceptible to extinction and less resilient to natural fluctuation, there are reduced opportunities for evolutionary adaptation to changes in the environment with restricted genetic exchange across the populations (DCCEEW 2023b). - Introduced weeds such as Buffel grass (<i>Cenchrus ciliaris</i>) and couch grass (<i>Cynodon dactylon</i>) have a preference for sandy soils associated with Bilby habitat. Degradation of habitat as a result of weeds presents a threat to affected habitat by changing fire intensity and regimes, altering vegetation composition and	Direct impacts: - Direct loss (mortality or injury) from clearing, operations or vehicle interaction or infrastructure and - loss of individuals (should individuals are present in burrows during clearing); and - Loss of key habitat during clearing. - Indirect impacts: - Habitat fragmentation - Increased fugitive dust emissions from clearing of native vegetation and haulage, resulting in degradation of habitat. - Degradation of habitat and individual mortality through unplanned project-related fire events. - Increased predation by introduced and feral predators (feral cats and foxes); - Creation of artificial watering points may contribute to the expansion of feral predators - Increased noise and vibration, or light exposure resulting in disruption of fauna behaviour; and - Potential proposal impacts compounding the effects of climate change to Greater Bilby populations who are less resilient to other threats, for example feral predators as a result.	- Records in Proposal Area - Recorded at 130 locations (77 burrows) in the Study Area via tracks, digs, burrows, scats and camera trap photos (Figure 2-2). All of these records are from within the NIDE. - Additionally, the species has been recorded at 165 locations in the surrounding region (within 150 km of the Study Area), of which 66 occur near the Study Area (within 25 km).

Species habitat requirements and representation of habitat within the in Proposal Area	Ecology and Distribution	Key Threats	Potential Proposal Related Impacts	Key Findings
systems, and other alluvial areas. - Laterite and rock feature substrates that support <i>Acacia kempeana</i>, <i>Acacia hilliana</i> and <i>Acacia rhodophylla</i> shrub species and spinifex hummocks with open runways between the hummocks for easy movements. Habitat within the Proposal Area: - Critical Habitat: - Gravel spinifex plain (recorded at 92 locations) - Spinifex sandplain (recorded at 33 locations). - Claypan and claypan mosaics (3 locations) - Dune-field (1 location) - Dune (1 location). The extent of habitat with potential to be disturbed by the Proposal is described in Table 2-3. Representative photographs of each habitat are shown in Table 2-4.		demography (Clarke <i>et al.</i> 2005) and by competing with Bilby food plants (PWCNT 1998). - Changes to hydrology: - Creation of artificial watering points may contribute to the expansion of feral predators (James <i>et al.</i> 1999) (Davies <i>et al.</i> 2010). - Changes to surface water and groundwater may flood denning and foraging habitats. - Climate change: - The Recovery Plan for the Greater Bilby (DCCEEW 2023c) identifies climate change as a threat that potentially makes Greater Bilby populations less resilient to other threats, for example introduced predators.		
Brush-tailed Mulgara (<i>Dasyercus blythi</i>): Priority 4 - BC Act				
Habitat within the Proposal Area: - Primary habitat: - Spinifex sandplain (19 locations) - Secondary habitat: - Gravel spinifex plain (1 location) - Dune-field (2 locations) - Dune (1 location) - Saline flats and depressions (1 location) - Lake margin (1 location). The extent of habitat with potential to be disturbed by the Proposal is described in Table 2-3. Representative photographs of each habitat are shown in Table 2-4.	Description The Brush-tailed Mulgara is solitary, nocturnal marsupial with short round ears and short tapering tails. Distribution The Brush-tailed Mulgara has a wide distribution across central and inland Australia, with a population that fluctuates in response to seasonal conditions. Ecology The Brush-tailed Mulgara typically inhabits spinifex grasslands with medium to dense cover in the arid zone. They shelter in burrows systems which they dig in the flats between low sand dunes (van Dyck <i>et al.</i> 2013; van Dyck and Strahan 2008). Their diet consists of a broad range of invertebrate and small vertebrates (Woinarski <i>et al.</i> 2014).	Threatening processes: - Predation by, and competition with, feral cats and red foxes; - Altered fire regimes; - Habitat degradation, including change and loss due to livestock and weeds; - Clearing and development; and - Climate changing causing prolonged and server drought conditions (Woinarski <i>et al.</i> 2014).	Direct impacts: - Loss of individuals during clearing and operations, and - Loss of habitat during clearing. Indirect impacts: - Habitat fragmentation - Degradation of habitat and individual mortality through altered fire regimes; - Increased predation by introduced and feral predators (feral cats and foxes); and - Loss (mortality or injury) of individuals from vehicle interaction.	Records in Proposal Area Recorded at 25 locations within the Study Area (Figure 2-3). This included 15 locations within the NIDE, two within the SIDE and eight within the Study Area but outside the Proposal Area. Additionally, the Brush-tailed Mulgara has been recorded at 31 locations from 2012 – 2016 in the surrounding region (150 km), of which two locations were near the Study Area (25 km) (DBCA 2020; Outback Ecology 2012a; Paltridge 2015).
Northern / Southern Marsupial Mole (<i>Notoryctes caurinus</i> / <i>Notoryctes typhlops</i>*): Priority 4 - BC Act				

Species habitat requirements and representation of habitat within the in Proposal Area	Ecology and Distribution	Key Threats	Potential Proposal Related Impacts	Key Findings
Primary habitat: - Dune fields, - Sand dunes (particularly the crests and slopes) and - River flats. Preferred habitat within the Proposal Area: The habitats of primary importance to Marsupial Moles in the Study Area were dune (6 locations) and dune-field (3 locations). These are consistent with the species known described habitats, showing preference for dune fields and sand dune habitat suitable for burrowing. The species was also recorded from spinifex sandplains (1 record).	Description Little is known about the Marsupial Mole. Marsupial moles have a head and body length of up to 140 mm and weigh from 30 g to 60 g. They show the typical characteristics of fossorial mammals including a tubular body form, an absence of ear pinnae, heavily keratinised skin on the snout, a reduced tail, and short dense fur. Distribution They are sparsely distributed across much of arid central Australia, in sandy desert country, including dune fields, sand dunes (particularly the crests and slopes) and river flats. They mostly live underground and are known from the Great Sandy Desert (Menkhorst and Knight 2011; van Dyck <i>et al.</i> 2013; van Dyck and Strahan 2008). There is no ongoing monitoring program in place for Marsupial Moles and their abundance is unknown (Woinarski <i>et al.</i> 2014). As the two species are difficult to tell apart, overlap in range, have a paucity of information, and have the same conservation listing, they are discussed collectively.	Threatening processes: There is very little information on the conservation ecology of marsupial moles, and factors that may threaten the species are largely unknown. Threatening processes that may threaten marsupial moles on a landscape scale include: - Changed fire regimes, and trampling - Degradation of habitat caused by introduced cattle and burgeoning camel populations. - Changes to fire and grazing regimes have the potential to greatly modify the vegetation of habitats, and thus the availability of invertebrate prey for marsupial moles. - Larger roads, railways and pipeline trenches may affect the dispersal patterns of marsupial moles and might genetically isolate populations that were previously continuous, potentially leading to deleterious effects for small, localised populations in the long term. - Little is known about the climatic responses of marsupial moles. Moreover, little can be inferred about climatic constraints from distribution as available records suggest that marsupial moles occupy most of the available sandy habitats and do not appear to be constrained by climate change as much as by substrate.	Direct impacts: - Loss of individuals during clearing and operations, and - Loss of habitat during clearing. Indirect impacts: - Habitat fragmentation - Degradation of habitat and individual mortality through altered fire regimes - Increased predation by introduced and feral predators (feral cats and foxes)	Marsupial Moles have been recorded in the Study Area on 10 occasions: - Six locations were from Phase 1 of the Stantec Survey, via motion camera, tracks (mainly burrows identified during pitfall trap establishment) and a deceased individual. - The remaining records are from surveys in and overlapping the Study Area (Cowan <i>et al.</i> 2015; DBCA 2020; ecologia 2017b; Outback Ecology 2012a). - No Marsupial Moles were captured during the systematic trapping surveys and the identity of moles captured on camera or identified via tracks could not be confirmed to species level. Additionally the Northern Marsupial Mole was recorded in the surrounding region (150 km) at nine locations, of which five occur near (25 km) the Study Area (DBCA 2019). The Southern Marsupial Mole was only recorded once in the surrounding region (150 km), 5 km east of the haul road corridor, north of Yagga Yagga Airport in 1979 (DBCA 2019).
Great Desert Skink (<i>Liopholis kintorei</i>): Vu - EPBC Act / Vu - BC Act				
Critical Habitat: There is no formal definition of critical habitat for this species, however the draft <i>Pilbara Bioregion: EPBC Act Policy Statement</i> (DCCEEW 2023a) defines critical habitat for the species as: - Active burrowing habitats (Dennison <i>et al.</i> 2015) (Indigenous Desert Alliance 2022; McAlpin <i>et al.</i> 2011). - Sandplain habitat vegetated by spinifex (usually <i>Triodia basedowii</i>, but also <i>Triodia pungens</i> and <i>Triodia schinzii</i>) with the hummocks scattered shrubs and occasional trees from the genera <i>Acacia</i>, <i>Eremophila</i>, <i>Grevillea</i>, <i>Hakea</i>, <i>Eucalyptus</i>, and often the sub-shrub <i>Androcalva loxophylla</i>. - Swales of dunefields adjacent to sandplains. - Palaeodrainage areas featuring slightly saline depressions or chains of dry salt lakes, with soft spinifex (<i>T. pungens</i>), tea tree (<i>Melaleuca</i> spp.) shrubs and the salt tolerant sub-shrub <i>Pluchea ferdinandi-muelleri</i>	Description The Great Desert Skink is a burrowing lizard that can grow up to 44 cm long and potentially live up to 20 years. Distribution The species has undergone a widespread decline, with many historical populations no longer occurring. Knowledge of the species current fine-scale distribution is unclear due to the remote and inaccessible nature of sites. Eight key populations are known to occur across Western Australia, the Northern Territory, and South Australia (TSSC 2016c), with population estimates listed where available (McAlpin 2001): - WA (population=~3,000, may exceed) - NT (Tanami Desert population=<2,250) - SA (population=<50) Ecology The Great Desert Skink is known to occupy sandplains and sand ridges vegetated with hummock grassland (<i>Triodia</i> sp.), sparse shrubs and trees. Paleo-drainage lines and open mulga woodlands are also potential habitat (DCCEEW 2023d). The species lives communally in multi-generational family groups, with up to 10 individuals occupying a burrow system, using a shared latrine, and maintaining the burrow. Individuals are relatively sedentary, only moving up to 150 m from the burrow while foraging at night; however, juveniles may move up to 10 km to colonise new areas (DAWE 2020). The species hibernates from the end of May through to September or October. During the breeding season,	Threatening processes: - Altered fire regimes: - fire poses a significant threat to the Great Desert Skink as it removes groundcover making the species more vulnerable to predation from feral predators resulting in burrows within burnt areas becoming inactive (Moore <i>et al.</i> 2015), and a major increase in size and frequency of fires can drive subpopulations to extinction (Cadenhead <i>et al.</i> 2016). - fire has the potential to impact the availability of Great Desert Skink's food sources (small vertebrates and invertebrate prey) that live in vegetation. - Predation by feral cats and introduced foxes (McAlpin 2001; Pavey 2006): - predation events coinciding with a fire event could be particularly detrimental for the species (Indigenous Desert Alliance 2022; Moore <i>et al.</i> 2018). - Isolation: - The species is slow to recolonise (low dispersal capacity), and that genetic 'erosion' is possible with the loss of multiple colonies within an area (Dennison <i>et al.</i> 2015). - Habitat fragmentation:	Direct impacts: - Loss of individuals during clearing and operations, and - Loss of habitat during clearing. Indirect impacts: - Habitat fragmentation - Degradation of habitat and individual mortality through altered fire regimes; - Increased predation by introduced and feral predators (feral cats and foxes); and - Loss (mortality or injury) of individuals from vehicle interaction.	- Records in Proposal Area: - The Great Desert Skink has been recorded from three areas within the Study Area (Figure 2-4): - Yagga Yagga population which overlaps they Study Area for the NIDE: 64 active burrows recorded approximately 22 km south of Yagga Yagga. After the population was better defined through additional targeted survey work, the NIDE was realigned so that all active burrows associated with the population were avoided with a buffer of 300 m. - Murrawa population within the NIDE: two locations recorded in 2000. Subsequent targeted survey work has established that this population is no longer present. - Lake Mackay population within the Study Area outside the Proposal Area: one location 10 km south of Lake Mackay from 2018. Subsequent targeted survey work has established that this population is no longer present. - Additionally, the species has been recorded at 138 locations in the surrounding region (150 km). Almost all are in a 30 km stretch of

Species habitat requirements and representation of habitat within the in Proposal Area	Ecology and Distribution	Key Threats	Potential Proposal Related Impacts	Key Findings
(Tanami Desert and parts of the Great Sandy Desert). - Rira areas of gently undulating gravelly downs (buckshot plain), which have soil surface characterised by a layer of small laterite pebbles and vegetated with hard spinifex (<i>T. basedowii</i>) (Gibson Desert). - Open woodlands of Mulga (<i>Acacia aneura</i>) and Minyura (<i>Acacia minyura</i>) over woollybutt grass (<i>Eragrostis eriopoda</i>) and spinifex (Northern South Australia). - Foraging habitat termite mounds near active burrowing. Critical habitat within the Proposal Area: - Spinifex sandplain The extent of habitat with potential to be disturbed by the Proposal is described in Table 2-3. A representative photograph of the habitat is shown in Table 2-4.	males will mate with multiple females at multiple nearby burrows (DAWE 2020).	- resulting from linear infrastructure including roads or pipelines intersecting the burrow systems or inhibiting the species to move into other suitable habitats within the development envelope. - Habitat destruction and degradation: - by introduced rabbits (McAlpin 2001; Pavey 2006). - Camels and livestock could potentially crush burrows through trampling, causing the Great Desert Skink to abandon the burrows (Paltridge 2008). - Spread of weeds (eg. buffel grass) has the potential to cause more frequent fire events, increasing predation pressure for the Great Desert Skink and limiting food availability (Indigenous Desert Alliance 2022). - Vehicle strike is identified as a key threat to the species in the Recovery Plan for the Great Desert Skink (Indigenous Desert Alliance 2022). - Climate change: - Climate change impacts are considered to cause more extreme fire-weather events which may reduce the species' resilience to other threatening processes listed above.		the Kiwirrkurra road ~20 km southeast of the Kiwirrkurra community (the Kiwirrkurra population) (DBCA 2020). Recently, an additional population has been discovered by TO Rangers to the north-east of Lake Mackay outside the Development Envelope for the Proposal (Kate Crossing pers. comm. 18 March 2024).
Spotted Ctenotus (<i>Ctenotus uber</i> subsp. <i>johnstonei</i>): Priority 2 - BC Act				
Habitat within the Proposal Area: - Primary habitat: - Gravel spinifex plain (6 locations) - Secondary habitat: - Outcropping and stony rise (1 location) - Ridge slope (1 location) The extent of habitat with potential to be disturbed by the Proposal is described in Table 2-3. Representative photographs of each habitat are shown in Table 2-4.	Description The Spotted Ctenotus was previously only known from the holotype collected at Balgo (21 km west of the Study Area) in 1979 and a record approximately 105 km northwest of the Study Area in 2012 (DBCA 2020). The Spotted Ctenotus long-tailed skink with patterns of stripes and spots including a laterodorsal series of pale spots (Wilson and Swan 2021). Distribution The subspecies <i>C. u. johnstonei</i> is known only from a highly restricted area of chenopod shrubland in the interior of WA, and possibly extends further (Wilson and Swan 2021). Ecology The general ecology and habitat preferences of the subspecies <i>C. u. johnstonei</i> is poorly understood, however the <i>Ctenotus uber</i> group is known to prefer hard, reddish soils of semi-arid and arid landscapes (Wilson and Swan 2013).	Threatening processes: The population of the species is poorly understood, and potential threats are unknown.	Direct impacts: - loss of individuals during clearing and operations, and - loss of habitat during clearing. Indirect impacts: - Habitat fragmentation - Degradation of habitat and individual mortality through altered fire regimes; - Increased predation by introduced and feral predators (feral cats and foxes); and - Loss (mortality or injury) of individuals from vehicle interaction.	Records in Proposal Area: The Spotted Ctenotus has been recorded from eight locations within the Study Area represented by 55 records (Figure 2-5). The species was commonly encountered during the survey. The species limited distribution is likely a reflection of limited survey effort. Species distribution is likely to occur in association with gravel spinifex plain habitat in the vicinity of Balgo and possibly more widely.
Princess Parrot (<i>Polytelis alexandrae</i>): Vu - EPBC Act / P4 - BC Act				
Critical Habitat: - Breeding trees (Pavey <i>et al.</i> 2014; TSSC 2018). - Medium to large stands of tall trees, which may include:	Description The Princess Parrot is a medium-sized slender parrot growing to 40–45 cm long. It has mostly dull olive green plumage, paler on the underparts, with a blue-grey cap, yellow-green shoulder patches, blue back and rump, pale blue-green uppertail and pink chin, throat and foreneck.	Threatening processes: - Habitat Loss and Fragmentation. - Altered fire regimes: - Large-scale fires cause mortality to breeding trees and reduced food availability for the Princess Parrot (Pavey <i>et al.</i> 2014; TSSC 2018)	Direct impacts: Loss of habitat during clearing. Indirect impacts:	Records within the Proposal Area: Princess Parrots were recorded twice in the Study Area; (sighting of a flock of 12 to 30 parrots near Lake Mackay (2012) and sightings of a flock of 11 parrots flying over an island on Lake Mackay (2021).

Species habitat requirements and representation of habitat within the in Proposal Area	Ecology and Distribution	Key Threats	Potential Proposal Related Impacts	Key Findings
- River Red Gum (<i>Eucalyptus camaldulensis</i>) - Marble Gum (<i>Eucalyptus gongylocarpa</i>), and/or - Desert Oak (<i>Allocasuarina decaisneana</i>) Foraging habitat (Pavey <i>et al.</i> 2014; TSSC 2018): - Shrubland in swales between sand dunes, with occupied sites typically having a variety of shrubs (including <i>Grevillea</i>, <i>Hakea</i>, <i>Cassia</i> and <i>Eremophila</i> species) among scattered emergent trees, with a groundcover of spinifex <i>Triodia</i> species. - Marble Gum woodlands of (<i>Eucalyptus gongylocarpa</i>) and/or Desert Oak (<i>Allocasuarina decaisneana</i>) woodlands on undulating sandplain with sandy loam soil. - Dune slopes, swales and crests with Desert Oak and eucalypts. - Vegetated riverine and major drainage areas. - Vegetated littoral areas. - Permanent, semi-permanent, and ephemeral water holes. Habitat within the Proposal Area: - Dunefield- (sighting of a flock of 12 to 30 parrots near Lake Mackay (2012) and sightings of a flock of 11 parrots flying over an island on Lake Mackay (2021).	Distribution Rare and highly nomadic, the Princess Parrot is confined to arid regions of Western Australia, the Northern Territory, and South Australia (DEWHA 2008a). It is sparsely distributed from near Oodnadatta in South Australia, west to near Coolgardie and the east Murchison River in Western Australia, and north to near the Fitzroy River in Western Australia and to Howell Ponds in the Northern Territory (Baxter and Henderson 2000). Their core distribution is in the Great Sandy Desert, but can also be found in the Gibson, Tanami and Great Victoria Deserts.. Ecology Princess Parrots inhabit sand dune country with scattered trees and a covering of shrubs and <i>Triodia</i> (DotE 2020). They are considered an irregular visitor to most sites in its range and their movements are largely unknown (DotE 2020). They nest in tree hollows and have been recorded to forage on flowers, seeds and other plant material on the ground and in the foliage, including <i>Acacia</i>, <i>Grevillea</i>, <i>Leptosema</i>, <i>Hakea</i>, <i>Eremophila</i> and <i>Ptilotus</i> and grasses (<i>Digitaria ammophila</i>, <i>Eragrostis eriopoda</i>) (Pavey <i>et al.</i> 2014). They can inhabit stands of mulga, <i>Casuarina</i>, desert-oaks, desert poplars and hakeas and were recorded in areas containing parakeelia and other succulents around salt lakes (Menkhorst <i>et al.</i> 2017; Pizzey and Knight 2007).	- Weeds: - An increase in weed densities has the potential to increase the intensity and frequency of fire events (Pavey <i>et al.</i> 2014; TSSC 2018) - Buffel grass has been identified occurring in the distribution range for the Princess Parrot and has the potential to invade preferred foraging habitats by outcompeting native grasses (TSSC 2018). - Feral herbivores: - Rabbits, camels and livestock cause habitat degradation by reducing the quality and availability of suitable breeding and foraging habitat for the Princess Parrot (Garnett <i>et al.</i> 2011; International 2023). - Infection with Psittacine Beak and Feather Disease - Feral predators: - Cats and foxes are a key threat to the Princess Parrot due to the ground feeding behaviour of the species (International 2023). - Illegal collection: - Princess Parrots are known to be illegally collected to be used as pets or may be trafficked (Garnett <i>et al.</i> 2011); TSSC 2018).	- Degradation of habitat and individual mortality through altered fire regimes; - Increased predation by introduced and feral predators (feral cats and foxes); and - Loss (mortality or injury) of individuals from vehicle interaction.	
Migratory and Threatened Waterbirds: Listed as Migratory and Threatened under EPBC Act				
Habitat within the Proposal Area: Primary habitat: - Saline flats and depressions - Lake margin - Claypan and claypan mosaics following inundation - Salt lake playa. The extent of habitat with potential to be disturbed by the Proposal is described in Table 2-3. Representative photographs of each habitat are shown in Table 2-4.	Description Threatened and migratory species as well as other important species are considered likely to occur in the Survey Area include: Australian Painted Snipe (<i>Rostratula benghalensis</i>): En - EPBC Act / En - BC Act Red-necked Stint (<i>Calidris ruficollis</i>): Mi - EPBC Act / IA - BC Act Sharp-tailed Sandpiper (<i>Calidris acuminata</i>): Mi - EPBC Act / IA - BC Act Marsh Sandpiper (<i>Tringa stagnatilis</i>): Mi - EPBC Act / IA - BC Act Oriental Plover (<i>Charadrius veredus</i>): Mi - EPBC Act / IA - BC Act Common Greenshank (<i>Tringa nebularia</i>): Mi - EPBC Act / IA - BC Act	Threatening processes (DoE 2015b): - Degradation or modification of habitats through fragmentation, altered fire regimes or alteration to nutrient or hydrological cycles. - Destruction or isolation of areas of important habitat for migratory species - Disruption of lifecycle (i.e., breeding, feeding, migration or resting) of an ecologically significant proportion of each species' population - Direct habit loss or individual mortality; and - Disturbance to Offshore Islands that act as gathering points or stop-over points during migration.	Direct impacts: - Loss of waterbird breeding habitat from the construction of trenches and infrastructure on lake during operations; - Loss of primary waterbird foraging habitat through construction activities; - Loss of water bird individuals due to wind turbine strike; and - Loss off waterbirds from attraction of waterbirds to artificial water bodies. Indirect impacts:	Records in Proposal Area - A total of at least 34 confirmed waterbird species were recorded at Lake Mackay (Figure 2-6) including 12 threatened and priority waterbird species (360 <i>Environmental 2017a</i>)(Duguid <i>et al.</i> 2005; Stantec 2021a). 4,200 Banded Stilts (<i>Cladorhynchus leucocephalus</i>) displaying breeding behaviour on a lake island (Stantec 2021a) - Banded Stilts with juveniles were observed on the lake from three other surveys including in internationally important numbers

Species habitat requirements and representation of habitat within the in Proposal Area	Ecology and Distribution	Key Threats	Potential Proposal Related Impacts	Key Findings
	• Gull-billed Tern (<i>Sterna nilotica</i>): Mi - EPBC Act / IA - BC Act • White-winged Black Tern (<i>Sterna leucoptera</i>): Mi - EPBC Act / IA - BC Act • Glossy Ibis (<i>Plegadis falcinellus</i>): Mi - EPBC Act / IA - BC Act • Banded Stilt (<i>Cladorhynchus leucocephalus</i>): not listed but Lake Mackay is recognised as an important breeding site. Distribution Waterbirds have sparse distributions in inland Australia, however, may congregate in large numbers to forage and breed following inundation of inland lakes and waterways. Ecology During flood events, salt lakes provide an abundance of food resources for waterbirds. Specifically, these waterbodies may support high densities of aquatic invertebrates and macrophyte beds, than freshwater lakes (Kingsford and Porter 1994). Notably, the central southwest area of Lake Mackay supported large congregations of foraging waterbirds in 2021 (up to 35,058 individuals in one observation). The southeast corner was one of the only playa areas where waterbirds were observed during a survey in 2017.		• Changes to the areas of inundation through the construction of on lake infrastructure; and • Changes to the depth and duration of inundation events through groundwater drawdown.	in 2001 (360 Environmental 2017b; Duguid <i>et al.</i> 2005; Pedler 2017b). • In addition, several significant species were recorded from the lake and its peripheral wetlands, including: – Internationally important numbers of Sharp-tailed Sandpipers (<i>Calidris acuminata</i>) – Nationally important numbers of Red-necked Stints (<i>Calidris ruficollis</i>) – The Australian Painted Snipe (<i>Rostratula australis</i>) (360 Environmental 2017b; Stantec 2021a).

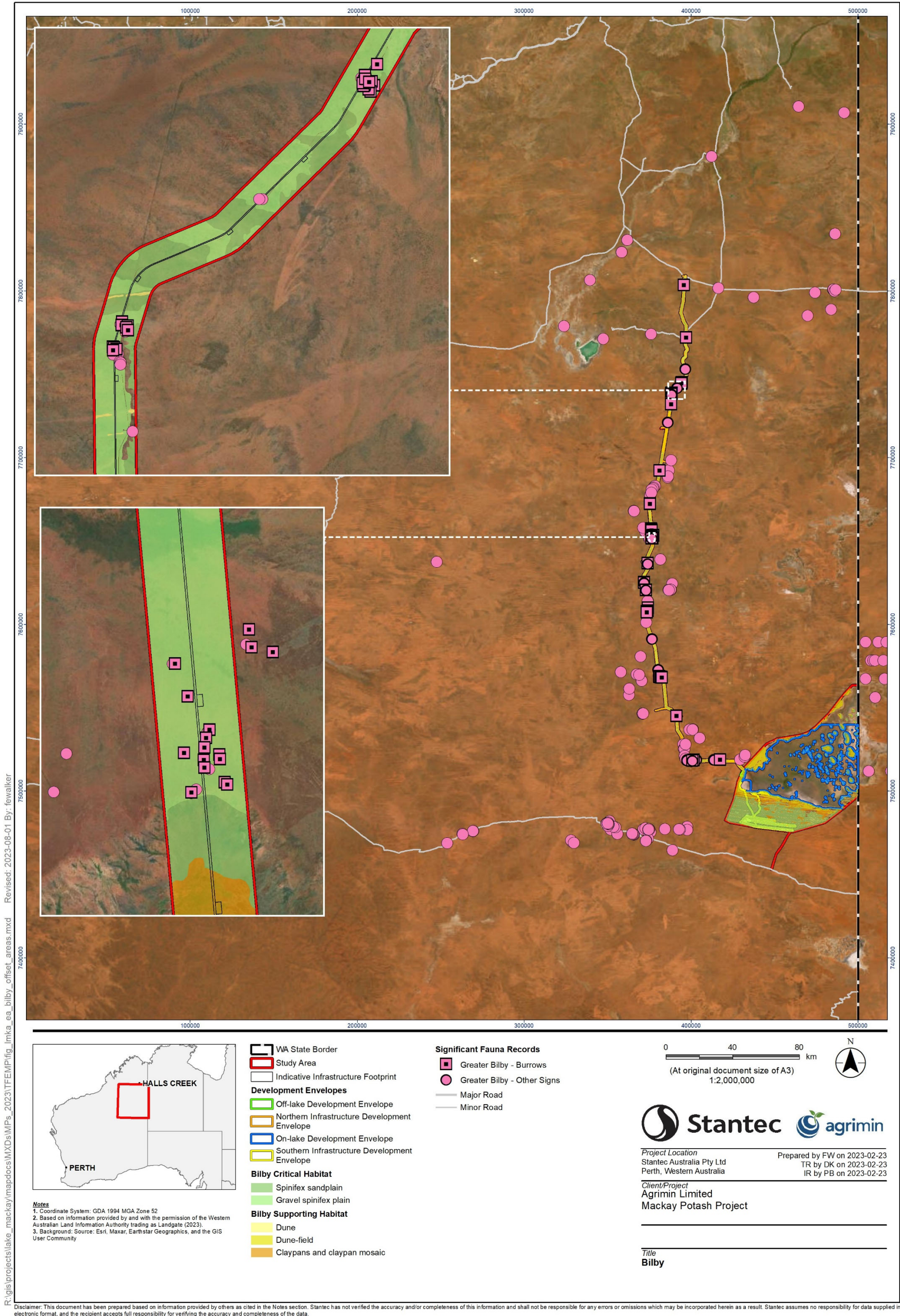


Figure 2-2: Terrestrial fauna habitats and records of fauna – Greater Bilby



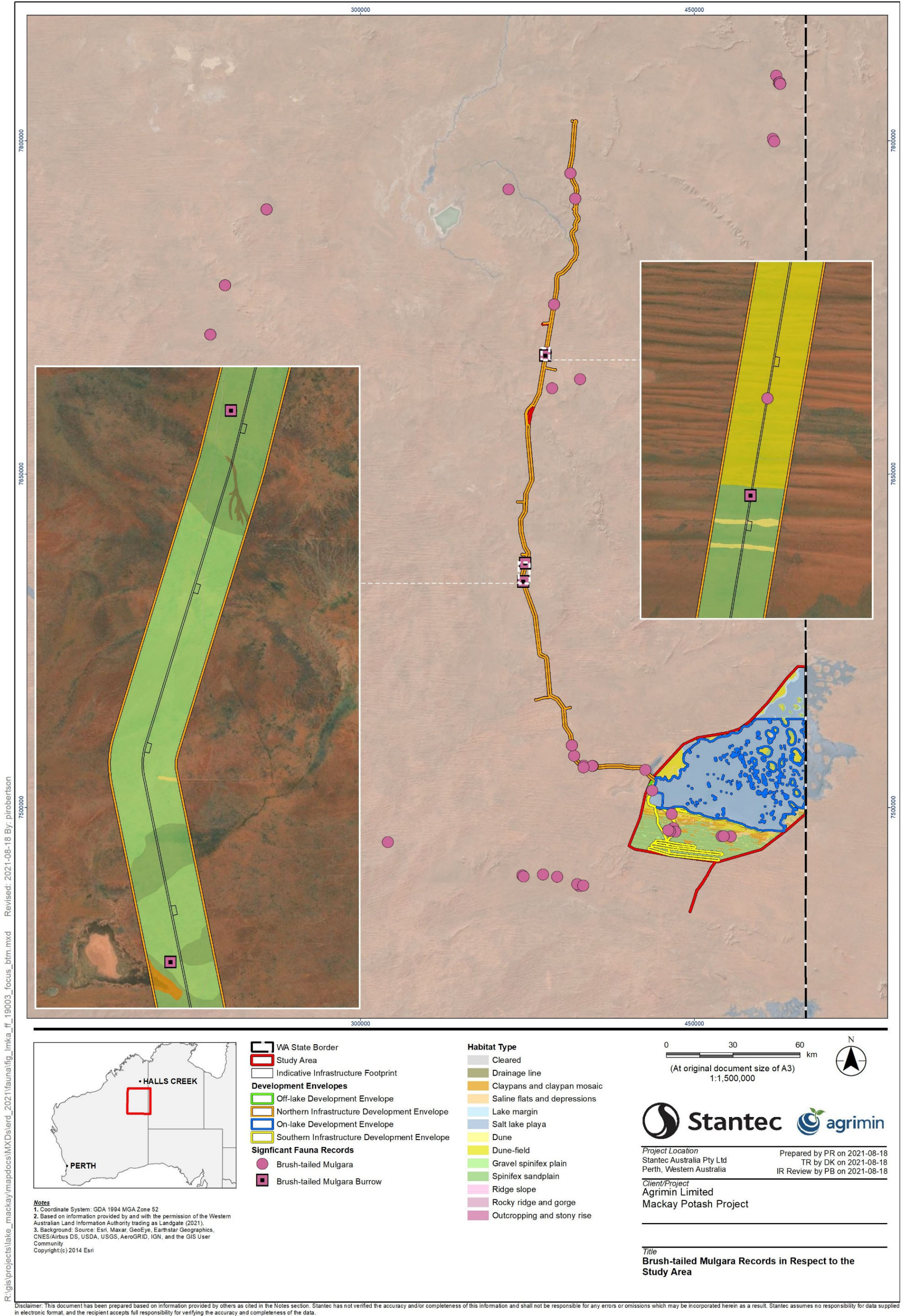


Figure 2-3: Terrestrial fauna habitats and records of fauna – Brush-tailed Mulgara

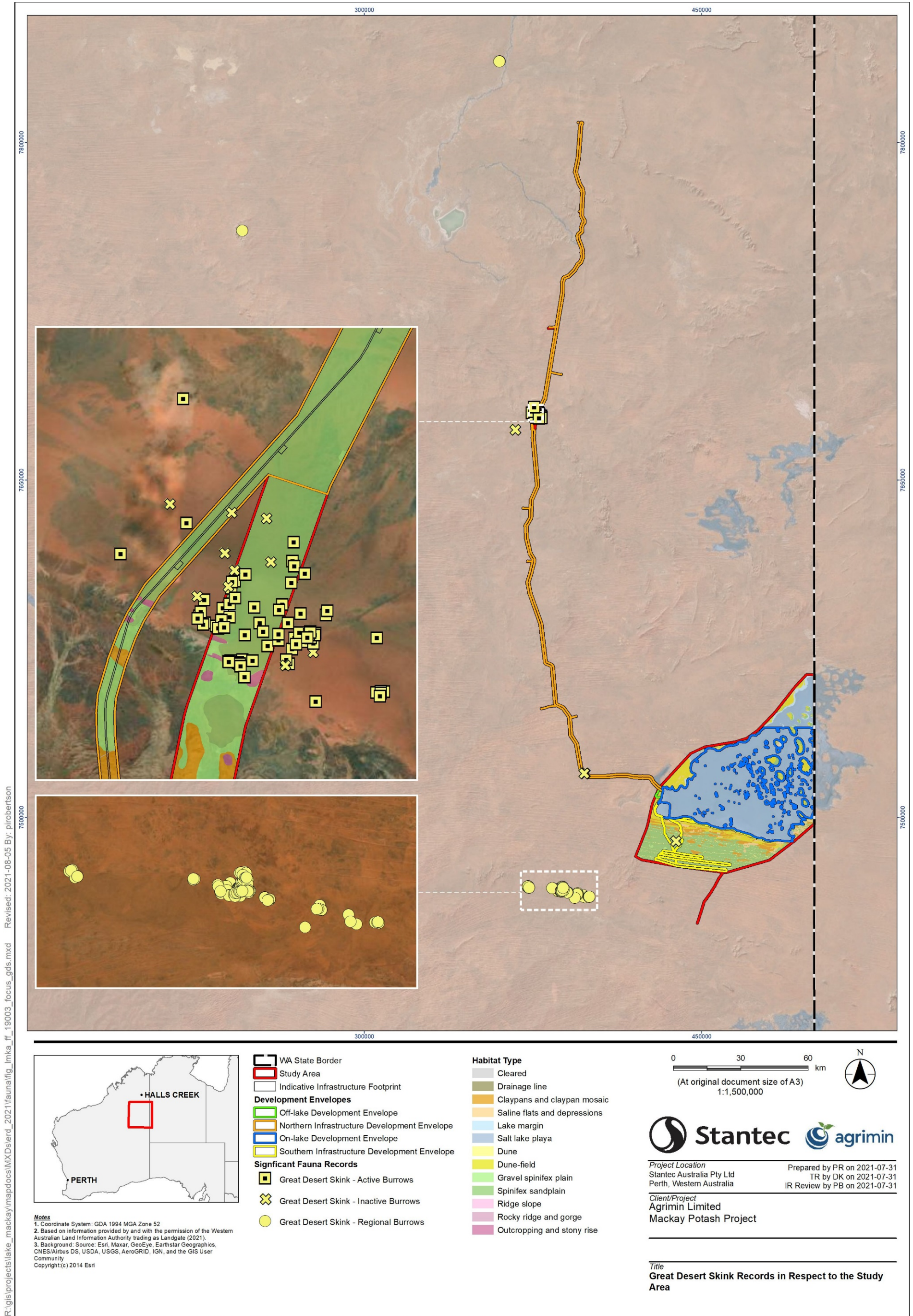


Figure 2-4: Terrestrial fauna habitats and records of fauna – Great Desert Skink



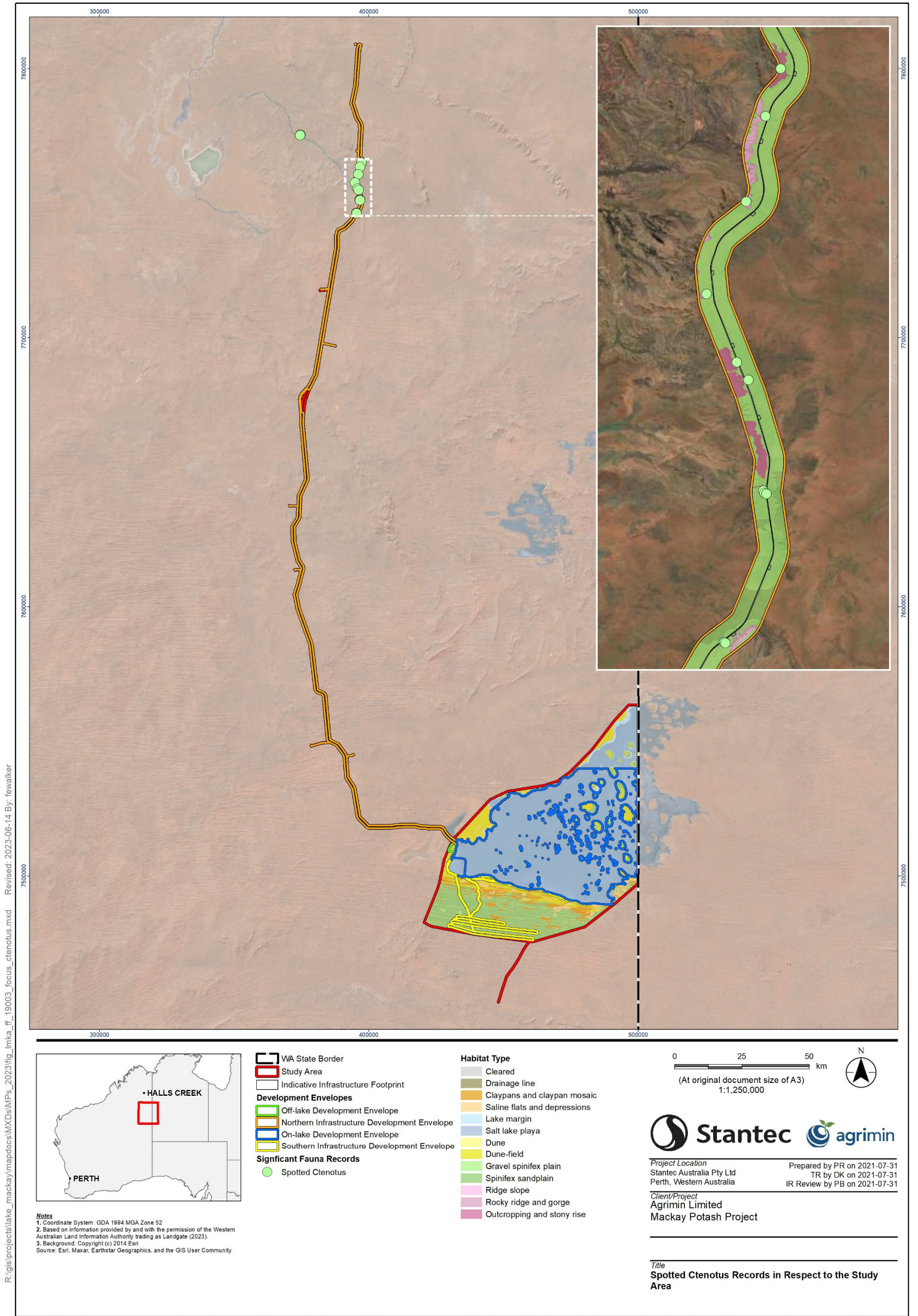


Figure 2-5: Terrestrial fauna habitats and records of fauna – Spotted Ctenotus

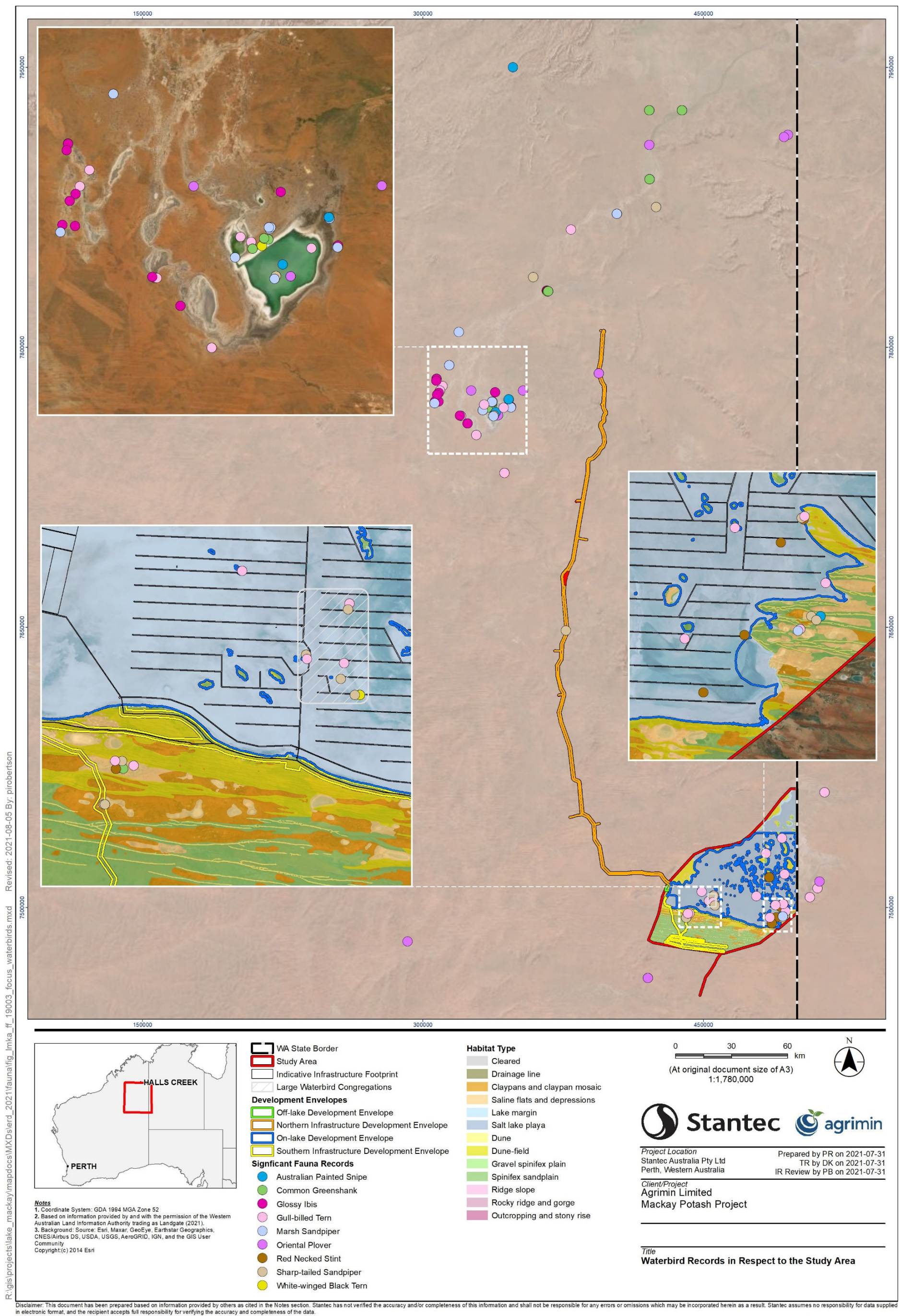


Figure 2-6: Habitats and records of listed threatened and migratory waterbirds.

3 Management Approach

3.1 Provisions Background

This section (**Section 3.1**) outlines the management approach of this TFEMP. The approach comprises outcome-based and objective-based management provisions, with appropriate indicators developed for environmental objectives and criteria, which are robust and measurable, where possible.

Outcome-based management provisions are applied where a sufficient level of information exists to measurable criteria (EPA 2020a), defined to assess performance against the environmental outcome. These include:

- **Trigger Criteria** – Measures set at a conservative level (trigger criteria), to forewarn the approach of threshold criteria and ensure trigger level response actions are implemented well in advance of an environmental outcome being compromised.
- **Threshold Criteria** – Framed to represent the limit of acceptable impact beyond which there is likely to be a significant effect on the environment. This indicates there is risk that the environmental outcome will not be met.

Objective-based management provisions are applied where a level of uncertainty exists or where performance cannot be measured against trigger or threshold criteria. In this case, management targets are established to measure the success of management actions in achieving the environmental objective.

Complementary provisions (including both outcome and objective-based) have also been applied to address values where a high level of management is required (determined based on the outcome of the risk assessment for Bilby (**Appendix F**) and Great Desert Skink (**Appendix G**), and/or where a degree of uncertainty and complexity exists.

3.2 Key Assumptions and Uncertainties

Agrimin is committed to supporting the conservation of terrestrial fauna within the vicinity of the Proposal. Survey work for the Proposal (**Section 7.3** of the ERD) has contributed substantially to the occurrence and ecology of significant fauna in the region. However, it is acknowledged that there are remaining knowledge gaps, which may better inform the management of potential impacts through the implementation of this TFEMP. The key assumptions and uncertainties that apply to terrestrial fauna are summarised as follows:

- The majority of significant fauna species identified are highly mobile with notably large home ranges, such that point location records for individuals represent the usage of available foraging/breeding habitat (rather than fixed permanent locations of individuals); and
- Based upon local and regional records of the significant fauna species identified, the extent of potentially suitable breeding/foraging habitat is expected to extend beyond the fixed area of the field surveys.
- Agrimin acknowledge the uncertainty and complexity involved of Night Parrot management, ongoing discussion with regulatory departments and subject matter experts is required (see separate NPMP).
- Areas identified as important for significant fauna during the surveys may change over time ie breeding / foraging habitat for Night Parrot may change in response to foraging resources, the Bilby is known to move throughout the landscape abandoning and re-establishing new burrows constantly, Banded Stilts are known to use different islands during each breeding event at Lake Mackay.
- Records of significant fauna (i.e., burrow, roost / nest locations) within or outside the Study Area at the time of surveys in 2020 may not be an accurate reflection of their occurrence at the time of clearing:
 - Species recorded in the area are known to be highly mobile. For example, during inundation, water birds use different areas of the lake, islands and claypans depending on the stage of the hydroperiod. Bilbies which are known to occupy large home ranges and utilise numerous burrows. The Bilby may establish burrows at different locations during the life of the Proposal, and this may include between the pre-clearance survey and clearing activities.
 - The quality of habitat may naturally change over time due to environmental factors unrelated to the Proposal e.g., the Bilby is known to preferentially seek out recently burned areas for foraging, whereas the Night Parrot is known to occupy areas of long unburnt spinifex and would be negatively affected by fire.
 - The impact of fires (unrelated to the Proposal) on fauna habitat quality and significant fauna populations is likely to affect the occurrence/distribution of significant fauna change over time.
 - The extent to which climatic factors outside of the proponent's control will impact on the health and extent of populations of significant fauna within the Proposal Area is also an unknown.

3.3 Potential Proposal Impacts

Considering the key assumptions and uncertainties, the potential impacts of the Proposal on terrestrial fauna include the following:

- Potential direct impacts:
 - Direct loss (mortality or injury) from clearing, operations or vehicle interaction or infrastructure such as wind turbines or trenches, and
 - The direct loss of foraging or breeding habitat through clearing of native vegetation or disturbance to the playa.
- Potential indirect impacts:
 - Habitat fragmentation.
 - Increased predation by feral and native predators (Cats, Foxes and Silver Gulls).
 - Degradation of habitat from unplanned project-related fire, changing surface hydrology, spread of weeds, increase in feral rabbit numbers or contamination.
 - Fauna entrapment in the trench network on the lake.
 - Increased noise and vibration, or light exposure resulting in disruption of fauna behaviour; and
 - Increased fugitive dust emissions from clearing of native vegetation and haulage, resulting in degradation of habitats.
 - Potential proposal impacts compounding the effects of climate change to significant fauna (Night Parrot, Greater Bilby, Brush-tailed Mulgara, Spotted Ctenotus and Great Desert Skink) populations who are less resilient to other threats, for example feral predators as a result.

The EPA mitigation hierarchy has been applied to avoid and minimise potential project-related impacts to terrestrial fauna within the Proposal Area, through the development of appropriate objectives and targets for management provisions (**Section 4**). This approach has been informed by best practice and experience on similar potash infrastructure projects in Western Australia.

3.4 Application of Mitigation Hierarchy

Mitigation measures for potential impacts of the Proposal on terrestrial fauna are detailed within **Section 7** of the ERD and have been updated and consolidated within this TFEMP. Mitigation measures have focused on significant fauna, where relevant, aligning with the management provisions.

The Proposal will **avoid** impacts to terrestrial fauna via the following:

- Specific avoidance measures for the Night Parrot are outlined in **Section 3.4** of the NPMP.
- Preclearance surveys for Greater Bilby, Brush-tailed Mulgara, Great Desert Skink and Spotted Ctenotus in accordance with Section 6 of this plan, to avoid adverse impacts occurring to significant fauna as a result of project-related clearing.
- 30% of the haul road will be constructed on the existing cleared track reducing total clearing.
- Clearing will only occur in approved ground disturbance areas.
- Limit disturbance within the On-LDE (4.55%; <15,000 ha).
- NT portion of the lake will remain undisturbed (56,506 ha).
- Exclusion zone on WA side of the lake that will remain undisturbed (32,261 ha).
- The On-LDE has been designed to incorporate exclusion buffers around islands to avoid direct and potential secondary impacts (total of 20,119 ha of islands excluded from On-LDE):
 - Landform islands (3 islands in total) – buffer size will be 500 m.
 - Intermediate and Large islands (52 islands in total) – buffer size will be 250 m.
 - Small islands (216 islands in total) – buffer size will be 100 m.
- The location and layout of the On-LDE infrastructure has been designed to avoid impacts to the lake margin habitat that fringes the lake.
- Avoid or limit clearing of primary habitat for significant fauna species, where possible.
- Proposal will avoid impacts to GDS burrows through the implementation of a 150 m buffer around active burrows recorded during preclearance surveys and a 300m buffer around known GDS population active burrows.

- Avoid clearing of suitable breeding trees for the Grey Falcon (tall trees with raptor nests) and Princess Parrot (large stands of trees with hollows or potential to form hollows (e.g., stands of *Allocasuarina* sp. and *Corymbia* sp)), where possible.
- The location of the wind turbines has been offset from the lake where possible to avoid migratory bird pathways.
- Location of the wind turbines was selected to be on the western edge of the lake, which is away from the deeper eastern parts of the lake which are more likely to flood during inundation events and hence attracting water birds.
- Haulage will only be undertaken during daytime hours and travel will be avoided from dusk to dawn when the majority of significant fauna in the area are more active.

The Proposal will **minimise** impacts to terrestrial fauna via the following:

- Specific minimisations measures for the Night Parrot are outlined in **Section 3.4** of the NPMP.
- Retain adequate suitable habitat and foraging resources (equivalent to the home range for the Bilby of 1.5km in area) for the Bilby within proximity to an active Bilby burrow in the DE (outside of the IF).
- Installation of culverts to facilitate the movement of fauna.
- Implement strict clearing mitigation that avoids clearing as a priority, and clearly demarcate and monitor clearing boundaries.
- All vegetation clearing will be carried out during daylight hours. Trenching will be undertaken on the lake over a 24hr period for the first 2 years of operations only. Where possible minimise clearing/disturbance to primary habitats for significant species.
- Implement pre-clearance surveys for significant fauna in accordance with **Section 6** of this plan,
- Implement and enforce speed limits for all traffic, particularly at dawn/dusk and night-time in habitats and areas of importance to significant species.
- During road construction within drainage features, maintain ecosystem function i.e., surface hydrology (within and outside the Development Envelope).
- Restrict road haulage operations and operational use of the haul road to daylight hours.
- Staged development of infiltration trenches via Brine Mine Units (BMUs) and engineering design (1 km spacing, install crossovers) to allow natural surface water flows and flooding in natural depressions of the lake.
- Implement bird deterrents around artificial water bodies on the lake, if required. To be informed from the monitoring program.
- Natural trench fill-in and breaking of pond bunds at closure to allow flow of water.
- Approximately 1.5 m high bunding adjacent to trenches.
- Fauna egress will be provided for temporary ponds such as Turkeys nests along the haul road.
- Fencing will be installed around the perimeter of artificial water sources to deter feral predators such as permanent freshwater storage dam/s. Requirements for fencing in proximity to Night Parrot habitat to deter Night Parrots from getting caught in fencing is outlined in the Night Parrot Management Plan.
- Implement speed limits for all traffic at dawn/dusk and night-time in habitats and areas of importance to significant species.
- Develop training and awareness packages and inductions in relation to significant fauna.

The Proposal has the potential to result in significant residual impact to the EPBC Act listed Night Parrot, Greater Bilby and Great Desert Skink. Agrimin proposes to **offset** loss of critical and supporting habitat for MNES from the Proposal in accordance with the Mackay Sulphate of Potash Revised Offset Strategy.

In addition, several significant fauna species monitoring programs will be implemented including, a Night Parrot Monitoring Program (in accordance with **Appendix A** of the NPMP), Waterbird monitoring (**Appendix B**), GDS monitoring (**Appendix C**), Bilby monitoring (**Appendix D**) and feral predator monitoring and control (**Appendix E**) (in accordance with **Section 4** and **Section 6.5** of the TFEMP) has been developed to evaluate the performance of mitigation and management.

This management approach aims to ensure that significant fauna populations in proximity to the Proposal persist with no adverse impacts. The monitoring programs aims to evaluate the success of the mitigation measures and allow corrective actions to be implemented if required (**Section 7**).

4 Management Provisions

4.1 Overview

The TFEMP outlines the requirements to avoid, minimise, manage, monitor, and rehabilitate direct and indirect impacts to terrestrial fauna from the Proposal, aligning with the EPA's mitigation hierarchy. The subsequent sections identify the management provisions that will be implemented by Agrimin for the Proposal to ensure that the environmental objectives, criteria, targets, and outcomes are met for terrestrial fauna. Where unacceptable environmental outcomes remain post the implementation of control measures, such as permanent loss of significant species habitat, offset strategies will be proposed (Stantec 2024d). The TFEMP will be reviewed and updated as required, following an adaptive management approach (**Section 9**).

4.2 Outcome-Based Provisions

This TFEMP focuses on outcome-based provisions, which are performance-based and can be audited. The management provisions developed are measurable, and the success of management actions can be monitored and reported. They comprise triggers and thresholds (environmental criteria) for direct impacts that are quantifiable and specifically relate to project-related impacts that may affect terrestrial fauna (**Table 4-1**). Six outcome-based provisions have been developed for this TFEMP, with associated triggers and thresholds (**Table 4-1**). Where required, suitable response and corrective actions are also recommended for environmental criteria.

The following outcomes-based provisions have been established (beginning with the prefix TF and shown in (**Table 4-1**):

- **TF1:**
 - No unauthorised clearing within avoidance buffers applied to significant fauna (GDS) within the Development Envelope.
 - Total clearing is not to exceed the approved clearing footprint.
- **TF2:**
 - No project-related increase in feral predators from baseline levels during the life of the Proposal.
 - No adverse impacts to significant fauna (Bilby, Mulgara, Princess Parrot, Spotted Ctenotus and GDS) as a result of project-related increase in feral animal abundance relative to suitable reference sites.
- **TF3:** No significant increase in Silver Gull (*Larus novaehollandiae*) abundance attributed to the Project.
- **TF4:** No adverse impacts to significant fauna (waterbirds) from bird strike from wind turbine operations.
- **TF5:** No long term decrease in Banded Stilt breeding success as a result of project based activities.
- **TF6:** No statistically significant decrease in the abundance of conservation significant species (GDS, Bilby) as a result of project-related activities.

4.3 Objective-Based Provisions

Objective-based provisions relate to environmental management actions that are not specifically measurable. They specify management actions according to management targets, particularly for indirect impacts that are not quantifiable. For terrestrial fauna, as ongoing monitoring is undertaken and additional population data is gathered, these management targets will be reviewed, and quantifiable outcome-based provision(s) will be established as required. Ten objective-based management provisions have been outlined in **Table 4-2**, to prevent project-related adverse impacts to terrestrial fauna (including significant fauna species) within proximity to the Proposal with appropriate management actions and monitoring actions.

The following objectives-based provisions (referred to as MO1, MO2 etc.) each with specific measurable targets have been established:

- **MO1:** Minimise project-related direct interactions per year (e.g., vehicle strike, wind turbine strike) to significant fauna (including waterbird species) resulting in injury or mortality.
 - Implement speed limits within proximity to critical habitat for significant fauna (NP).
 - No project related incidents of vehicles being used off designated roads (unless in the case of unplanned events) that result in direct impacts to critical habitat for significant fauna (NP, GDS, Bilby).
 - No adverse project related impact to significant fauna (waterbird) species from wind turbine interactions.
 - No operational use (non-haulage activities) of haul road at night, unless for unplanned events (e.g. emergency response).
- **MO2:** Minimise loss of significant fauna habitat and fragmentation as a result of project-related land clearing:

- All vegetation clearing will be carried out during daylight hours. Trenching will be undertaken on the lake over a 24hr period for the first 2 years of operations only. Trenching will then move to daytime only.
 - Disturbance within on-lake Development Envelope (On-LDE) will not exceed: On-lake development of trenches, extraction of up to 100 GL/a of brine, and solar evaporation and harvesting ponds for potash salts, including ground disturbance of approximately 15,000 ha with the 217,261 ha On-LDE.
 - Clearing not to exceed 1,500 ha of flora and vegetation (the combined total of 200 ha of native vegetation within the 688 ha Off-LDE, and 300 ha of native vegetation within the 11,799 ha SIDE and 1,000 ha of native vegetation within the 33,928 ha NIDE).
 - No adverse project related impact to significant fauna species (Bilby, GDS, Marsupial Mole, Mulgara and Spotted Ctenotus) as a result of vegetation clearing.
 - Installation of culverts to reduce the impact of habitat fragmentation and facilitate the movement and dispersal of significant fauna species (Bilby).
 - Significant fauna avoidance buffer zones (GDS) are in place following completion of pre-clearance surveys, where applicable.
 - Access to the significant fauna avoidance buffer zones (GDS) is restricted to authorised personnel and there are no incidents of unauthorised access.
- **MO3:** No project-related adverse impacts to terrestrial fauna (including significant fauna) or habitat within proximity of the Proposal area from project- related unplanned fire events:
 - Provision and maintenance of firefighting equipment in accordance with the relevant fire safety standards.
 - Firefighting emergency response plan and procedures are in place.
- **MO4:** No adverse impacts to significant fauna as a result of project-related increase in feral animal abundance:
 - No incidents of feeding feral animals by operational staff and contractors.
 - Minimise attraction of introduced predators by ensuring:
 - waste management plan and procedures are in place.
 - measures to deter feral predators from artificial water sources are in place.
 - road infrastructure design and road verge management avoids roadside artificial water sources.
 - Feral predator monitoring and control program is in place to minimise feral predator numbers within and adjacent to the Development Envelope, within critical habitat for the GDS, Greater Bilby and Mulgara, for the life of the Proposal.
- **MO5:** Minimise project related changes to surface hydrology:
 - No access permitted to inundated portions of Lake Mackay when more than 20 % of the lake is inundated.
 - Detailed hydrological modelling of surface water flows, simulation 1:100-year events in place.
 - Staged development of trenches via BMUs and engineering design (1 km spacing, install crossovers) in place to maintain natural hydrological processes.
 - No adverse project-related impacts to surface hydrology (off-lake operations) and water flows resulting in significant disturbance and decline of critical habitat for significant fauna (Bilby, GDS, Mulgara).
 - No project-related adverse impacts to significant fauna (waterbirds) from attraction of waterbirds to artificial water bodies.
 - No project-related adverse impacts to SRE salt lake specialist invertebrate fauna as a result of changes in hydrology.
 - Minimise injury or loss of fauna (including significant fauna) from entrapment in ponds/trenches.
- **MO6:** Provide ongoing opportunities for involvement of Traditional Owners in the implementation of conservation actions and improve understanding of local populations (abundance and dynamics) of significant fauna (Bilby, GDS) and facilitate TO knowledge-sharing for these species:
 - Access agreements and Native Title Agreements (NTA) in place for the Parna Ngururpa and Tjamu Tjamu Peoples' and the Tjurabalan Peoples.
 - Ongoing opportunities provided for TO ranger group involvement in monitoring programs and management activities for significant fauna.
 - Successful two- way knowledge sharing of significant fauna species.
- **MO7:** No adverse project-related impacts to significant fauna or critical habitat from project related introduction or proliferation of weed species:
 - Weed management programs should be designed in accordance with relevant EPBC Act weed threat abatement plans.

- Weed management procedures informed by best practice management of the weed species identified during weed baseline surveys.
- No proliferation or introduction of new weed species rated as high or very high management priority by DBCA in the Proposal Area as a result of the Proposal.
- **MO8:** No adverse project-related impacts to significant fauna or critical habitat from dust, noise, and vibration:
 - Dust suppression measures in place.
 - Implement speed limits on unsealed tracks.
 - Machinery and equipment will be fitted with noise attenuation measures.
- **MO9:** No adverse project-related impacts to significant fauna or critical habitat from hydrocarbon or chemical spill:
 - Hazardous Substances Management Plan (HSMP) and Procedure implemented.
 - Spill response training for all personnel and contractors.
 - Spill response equipment provided for all site vehicles (including on all Haul Trucks).
- **MO10:** No adverse project-related impacts to significant fauna or critical habitat from project related artificial light spill:
 - Directional lighting measures implemented in operational areas.
 - No artificial light spill from on-lake development into surrounding lake margin complex habitat (NP foraging habitat and critical Greater Bilby habitat).

Several subsidiary plans, procedures and registers are required to be developed and implemented which include commitments to minimise the risk of impact to terrestrial fauna (including significant fauna) and associated habitat. A summary of these supporting documents and the commitments relating to the management of terrestrial fauna is provided in **Table 4-3**.

4.4 Environmental Criteria, Targets and Justification

The development of environmental objectives and criteria for outcome-based provisions within the TFEMP are based on available data and information and align with the purpose of the TFEMP (**Table 4-1**). Outcome-based provisions utilise monitoring and reporting to assess against the measurable environmental criteria. The triggers and thresholds in some instances are considered preliminary and will be revised as, as appropriate as further data becomes available from the Monitoring Programs (**Appendix A, Appendix B, Appendix C and Appendix D**). In addition, typically where data or information is considered limited, objective-based provisions have been applied, with management targets to address knowledge gaps, with corresponding monitoring and reporting requirements.

During monitoring, where threshold criteria (outcome-based) or management targets (objective-based) are exceeded, and are project-related, response and corrective actions are provided, and should be implemented, where deemed appropriate. Monitoring will inform adaptive management, with the revision of environmental criteria, and response or corrective actions, as required. A risk assessment of the potential impacts and risks from the proposal associated with Greater Bilby (**Appendix F**) and Great Desert Skink (**Appendix G**) has informed the level of management applied within this TFEMP.

Triggers and thresholds criteria are conservative to allow for early identification and management response to avoid a potential adverse impact on conservation significant values. Justification for the management provisions and triggers and thresholds outlined in the TFEMP are:

- Clearing of critical habitat for significant species (Bilby, NP, Mulgara and GDS, Brush-tailed Mulgara and Spotted Ctenotus) has the potential to result in direct impacts to individuals and indirect impacts through habitat loss. Triggers and thresholds set for significant fauna aim to detect unauthorised clearing and to implement triggers to notify when the approved clearing limit for the Proposal reaches 95% to ensure that an exceedance of the proposed clearing does not occur. Significant avoidance buffer zones have been implemented to protect GDS populations and clearing within the Proposal Area will be minimised as far as practicable and will be undertaken in accordance with the clearing approach within **Section 6.3**. The clearing approach has been developed based on DBCA guidelines for pre-clearance surveys for the Bilby and adapted for the Spotted Ctenotus (P2), Mulgara (P4) and Great Desert Skink (Vu, Vu) and which also inhabit the spinifex sandplain and gravel spinifex plain habitats.
- The impact assessment concluded that although confirmed records occurred, the following species had a low potential to be impacted by the Proposal and therefore no specific management measures in relation to clearing are included within this TFEMP, however general management measures (eg. fire management, predator control) may be beneficial to the following species (Stantec 2022):
 - Northern Marsupial Mole (P4);
 - Southern Marsupial Mole (P4);
 - Spectacled Hare-wallaby (P3);
 - Princess Parrot (Vu, P4);

- Grey Falcon (Vu, Vu);
 - Striated Grasswren (P4);
 - Fork-tailed Swift (Mi).
- Feral predators are an existing key threat to significant species recorded within the Study Area (Bilby, NP, Mulgara, GDS, Brush-tailed Mulgara, Spotted Ctenotus, Northern / Southern Marsupial Mole and Princess Parrot) in the vicinity of the Proposal. Of note is the recent recorded loss of two Great Desert Skinks populations within the Proposal Area recorded during baseline surveys which has been attributed to existing predation in the area by feral cats. A Feral Predator Monitoring and Control Program has been proposed within **Appendix E**. This feral predator monitoring and control program aims to reduce predation pressure on significant fauna, for populations that are potentially impacted by the Proposal identified above, for the Night Parrot (refer to the NPMP), for the life of the Proposal.
 - Triggers are conservative and have been set at the scale to detect any significant increase or the presence of an individual feral predator in proximity to the Greater Bilby or GDS populations. This approach differs from a percentage increase of the baseline population, which in turn improves the proponent's ability to protect the Greater Bilby and Great Desert Skink populations from feral predator interactions.
 - Triggers and thresholds (**Table 4-1**) are based upon current available survey data which does not provide definitive baseline population data. Baseline monitoring is proposed to be undertaken for 2 years to provide more definitive estimate for baseline population data, the triggers and thresholds set out within **Table 4-1** will be reviewed upon the completion of baseline data and refined accordingly.
 - The density of feral predator species is difficult to quantify from the existing surveys undertaken. It is uncertain how many records of feral predator observations are of the same or different individuals moving across the landscape on the same or different days. Therefore, it is difficult to predict the actual population size without unique individual markings/identification (or tracking of individuals through a capture and release program). During baseline survey work, foxes were recorded at four locations (12 occasions) and feral cats at 37 locations (85 occasions) within the NIDE (Stantec 2021a). Previous other surveys around the lake recorded lower numbers of feral predators, likely due to lower survey intensity:
 - 360 Environmental (2018a): Foxes: 2 locations; feral cat: not recorded;
 - Strategen (2018): Foxes: not recorded; feral cat: recorded (numbers not provided);
 - ecologia (2017a): Foxes and feral cat: recorded (numbers not provided);
 - Cowan et al. (2015): Foxes and feral cat: recorded (numbers not provided); and
 - Outback Ecology (2012b): Foxes and feral cat: not recorded;

It is anticipated that monitoring feral predators will demonstrate a decrease in feral predator numbers below that of baseline levels over the duration of the control program.

- Ongoing feral predator control is undertaken by TOs/ranger groups within proximity to the Proposal area and in the wider region. This provides opportunity for knowledge sharing to help with understanding of feral baseline population and effective control methods.
- Silver Gulls are a native predator of waterbird chicks, however populations can increase rapidly where human resources are abundant i.e. landfill. Monitoring and where required, control options have been developed to reduce unnatural predation pressure, if required, for waterbirds (in particular Banded Stilt chicks). Populations of Silver Gulls have the potential to increase in the Project Area either as a result of Proposal activities or from areas outside of the Projects control such as through attraction to large landfill facilities within regional areas. Triggers and thresholds have been set for an increase in numbers recorded at landfill sites which are known to attract the Silver Gull to detect any population increase.
- Waterbirds, in particular Banded Stilts, require lakes to retain water for a sufficient duration to allow them to breed (mating, eggs, chicks, fledglings). Drawdown of the water table in the lake sediments has the potential to reduce the duration of inundation events and therefore the success of breeding events. Monitoring will be undertaken to measure the success of Banded Stilt breeding when the species is present and conditions are suitable. Additionally, monitoring will be undertaken as a component of the IWEMP to ensure that drawdown of water levels within the lake sediments remains within modeled limits. Triggers and thresholds in relation to potential impacts from the Proposal as a result of drawdown or changes in the lake ecology and therefore food resources as a result of the Proposal are presented within the IWEMP.
- Establishing statistically robust triggers and thresholds for an outcome-based management provision for waterbirds based on abundance is problematic with respect to the Proposal. The abundance of waterbirds fluctuates naturally based on duration and scale of inundation events, seasonality and resource availability. This is evident where, the abundance and diversity of waterbirds has fluctuated widely across previous surveys of Lake Mackay from 3,271 individuals to over 24,000 individuals, and from 12 species to 25 species (360 Environmental 2017b; Duguid *et al.* 2005; Stantec 2021c). Additionally, there are no suitable reference sites in proximity to Lake Mackay which are able

to be accessed (given heritage considerations) to compare changes in waterbird diversity and abundance over time. The natural fluctuation in abundance and diversity of waterbirds between inundation events combined with the lack of suitable available reference site(s) means that it is difficult to establish statistically robust triggers and thresholds for an outcome-based management provision for waterbirds. Given this, an objective-based management approach has been established to minimise potential impacts to waterbirds from changes to surface hydrology and water flows and manage potential impacts to waterbird habitat and foraging behaviour from the implementation of the Proposal to within an acceptable level. In light of the above, trigger and threshold criterion in relation to banded stilt breeding success are included, given that Banded Stilts are a suitable indicator for ecosystem health.

- Wind turbines are known to result in bird and bat strike and the Proposal includes provision for five turbines. There is potential for these turbines to result in bird and bat strike (including significant fauna eg. Waterbirds), particularly during periods when the lake is inundated which results in waterbird congregations on the lake. Triggers and thresholds and corrective management measures set for threatened waterbirds as a result of wind turbine strike are in accordance with the *Post-construction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities in Emerging Market Countries- Good Practice Handbook and Decision Support Tool* where appropriate (IFC 2023). The triggers and thresholds set consider the substantial variation in significant fauna (water bird) numbers at Lake Mackay in response to inundation events, baseline levels of mortality are assumed to be zero, the risk associated with installation of a low number of proposed wind turbines (five) and their proximity to the lake.
- Wind turbine strike is considered a low risk to Night Parrots as there is evidence that the species tends to fly close to the ground. This includes a number of anecdotal reports of low flight heights (Leseberg *et al.* 2021), capture of the species in mist nets located 1.2 m and 0.6 m above ground (Murphy *et al.* 2017), and reports of Night Parrots colliding with fences (Cupitt and Cupitt 2008). Based on the hub height (130 m) and sweep diameter of 155 m of the turbines, this equals a rotor-sweep height of between 52.5 m and 207.5 m above ground level. No significant bats species were recorded within the Study Area and the risk to bat species as a result of wind turbine strike was determined to be low. Non-threatened bird and bat species mortality as a result of wind turbine strike will be recorded and reported in the annual monitoring reporting. Where population numbers of a species are known, the definition of an unacceptable impact on non-threatened species is any impact that is likely to reduce the viability of the population of the affected species in the bioregion. The proposal is unlikely to result in significant impacts through bird strike to non-threatened bird and bat species and therefore triggers and thresholds focus on potential wind turbine strike for significant fauna (waterbirds).
- Wind turbine significant fauna (waterbirds) fatality monitoring and water bird monitoring (**Appendix B**) will be undertaken to inform the need for corrective actions, measure the effectiveness of mitigation measures and inform adaptive management.
- The Proposal has the potential to negatively impact upon the occurrence of significant species (Bilby, NP and GDS) through direct and indirect impacts. The aim of triggers set for the Bilby and Great Desert Skink is to detect any loss of individuals (vehicle strike, feral predator predation) as quickly as possible before further mortality occurs. Monitoring programs have been developed for each of these species (**Appendix A, Appendix C and Appendix D**) to detect for potential decreases in abundance/activity in comparison to baseline levels and relative to reference sites, to detect trigger or threshold exceedances inform adaptive management where required.
- The overall management strategy with respect to significant fauna habitat is to maintain the ecological function and viability of the habitat through implementation of monitoring and mitigation measures to minimise impacts. Habitat degradation through contamination or the introduction of weeds could negatively impact upon critical habitat for significant species. In particular, the proliferation of weeds such as Buffel grass could increase the risk of fire. Weed introduction and spread will be managed and monitored as part of the FVEMP and appropriate management and mitigation measures have been implemented for Buffel grass and weed management to reduce the spread of weeds in proximity to significant fauna habitats (**Table 4-2**).
- The known Night Parrot populations in the vicinity of the Proposal all occur in low lying areas associated with claypans. Although the haul road will be constructed to avoid changes to hydrological flows, there is the potential that the alignment could affect surface hydrology and therefore habitat (old growth spinifex) upstream and downstream of the alignment. Monitoring has been proposed within the FVEMP to evaluate the effectiveness of mitigation measures and inform adaptive management where required.

4.5 Traditional Owner Engagement

A key outcome of this TFEMP is to provide ongoing opportunities for involvement of Traditional Owners in the implementation of conservation actions and improve understanding of local populations (abundance and dynamics) of significant fauna (Bilby, GDS, migratory birds) and facilitate TO knowledge-sharing for these species. Agrimin will actively seek opportunities to engage Traditional Owners from both the Ngururpa and Kiwirrkurra IPAs and the Tjurabalan Peoples, considered important local stakeholders of the Proposal, to participate in management and monitoring, where possible. Agrimin also acknowledges that management actions are already undertaken by Rangers as part of the Plans for Country (Parna Ngururpa 2019; Tjamaru Tjamaru Aboriginal Corporation 2014), and will seek to align with existing programs, where possible.

Indigenous Ranger groups in desert country play an integral role in the conservation of the significant fauna throughout the area and are actively involved with supporting initiatives. The Rangers are skilled in the methods of detection of significant fauna, having undertaken numerous surveys in the region. Rangers have also participated in workshops facilitated through the Threatened Species Recovery Hub, with two-way ecological and knowledge exchange contributing to the understanding of the species in the area. This provides an invaluable opportunity to involve Rangers in the monitoring and management of significant fauna.

This TFEMP has incorporated comments by Dr Rachel Paltridge on behalf of the Tjamu Tjamu (Aboriginal Corporation) RNTBC, and Desert Support Services (Kate Crossing) on behalf of both the Kiwirrkurra and Ngururpa Ranger programs. These comments represent their local knowledge and experience from existing programs undertaken by ranger groups.. A key component of the TFEMP is to consult, actively engage with, and build the capacity of Traditional Owners to implement management actions on IPAs. Opportunities for potential engagement are presented in **Table 4-1** and **Table 4-2** and include the following:

- Installation of signage which will include local indigenous language,
- Education programs for haul road users,
- Engagement to understand local fire regimes and involvement in fire management practices, and
- Two-way knowledge sharing and ongoing engagement with Indigenous Rangers to manage feral predators.

Note that these measures are considered indicative only and are to be determined following further consultation with Traditional Owners. Agrimin are committed to ongoing discussions with both groups, which will involve spending time on country and engaging in two-way knowledge sharing. Through these ongoing discussions, there may be refinement in the locations of some of the reference sites within monitoring programs for the TFEMP, based on any recent additions to knowledge about significant fauna in the area. It is also acknowledged that monitoring methods may change over time, through adaptive management, in line with most recent scientific practices. Any refinements made to the program will be aligned with the requirements of the TFEMP. Agrimin recognises and respects that the Traditional Owners and Ranger Groups have well-defined threatened species protection strategies, and extensive experience and skills in a range of monitoring, protection and management activities which are integral to ongoing discussions as part of stakeholder engagement for the life of the Proposal.

Table 4-1: Terrestrial fauna outcome-based management provisions

EPA Factor and Objective		Terrestrial Fauna: to protect terrestrial fauna so that biological diversity and ecological integrity are maintained.						
TFEMP Purpose		To avoid adverse project-related impacts to terrestrial vertebrate fauna including significant fauna and associated habitat.						
Key Impacts and Risks		Potential loss or degradation of significant fauna habitat and the potential for loss of species from the proposal area, as a result of implementation of the Proposal.						
Indicators		Breach of significant fauna avoidance buffer(s), Population change (decrease in abundance of significant fauna species), breach of approved clearing extents impacting significant fauna habitat.						
Outcome-based Management Objectives		Trigger and Threshold Criteria		Trigger and Threshold Response Actions		Monitoring	Timing / Frequency of Monitoring	Reporting
		Trigger Criteria	Threshold criteria	Trigger Level Actions	Threshold Level Corrective Actions			
	Management Measures specific to the Night Parrot are provided separately in the NPMP.	1. Refer to the species-specific Night Parrot Management Plan (NPMP), The Mackay Sulphate of Potash NPMP contains: 2. Triggers and thresholds relating to the Night Parrot are provided in the NPMP. 3. Night Parrot trigger and threshold criteria and response actions are addressed in the separate NPMP. 4. Monitoring and reporting requirements specific to the Night Parrot are outlined in the separate NPMP.						
TF1	1. No unauthorised clearing within avoidance buffers applied to significant fauna (GDS) within the Development Envelope 2. Total clearing is not to exceed the approved clearing footprint. * Night Parrot is addressed separately in the NPMP.	Early response indicator: Authorised clearing within 300m of significant fauna avoidance buffer zone(s). Trigger Criteria: Unauthorised clearing (without a GDP) occurs within the Development Envelope, but outside significant fauna avoidance buffer zone(s). Or Total clearing (ha of direct disturbance to vegetation) reaches 95% (1,425 ha) of the total of the approved clearing footprint (1,500 ha).	Threshold Criteria: Any clearing occurs within significant fauna avoidance buffer zone(s). Or Total clearing (ha of direct disturbance to vegetation) exceeds the total approved clearing footprint (1,500 ha*). * existing and approved disturbance according to activities described in the ERD.	Early response Action: - Daily meeting (toolbox) to check of ground disturbance spatial database to ensure clearing contractors are aware of proximity of clearing to significant fauna avoidance buffer zone(s) . Trigger Actions: - Report internally as an incident in accordance with internal procedures. - Investigate potential cause of exceedance: - Undertake in field inspection and record the nature and extent of direct disturbance that has occurred and record within the internal clearing register. - Determine if clearing is authorised. - Notify the clearing contractor that they are approaching a significant fauna avoidance buffer zone(s), ie during toolbox meeting. - Review management strategies and implement changes where required including: - Audit and review of training and staff inductions (increase staff training for staff undertaking clearing activities and awareness to include information on location of significant fauna buffer zones, legislative requirements, ground disturbance procedure and appropriate clearing protocols). - Inspect existing signage, fencing and/or clearing demarcations are in place. - Ensure the required preclearance survey procedures are in place (Section 6).	Threshold Action - Implement the following threshold contingency actions within 24 hours of threshold exceedance: - Temporarily cease clearing activities. - Undertake in field inspection and record the nature and extent of direct disturbance that has occurred and record within the internal clearing register. - Report any significant fauna mortality/ injury and adhere to injured fauna management procedure (Section 6.4) - The following threshold contingency actions are to be undertaken within 7 days of the threshold exceedance occurring: - Review of the potential impact(s) of unauthorised clearing and report any non-compliance to Department of Water and Environmental Regulation (DWER) and DCCEEW (for matters relating to MNES) within 7 days of identification. - Environmental Manger (or suitably qualified delegate) to undertake a review to determine if impact of clearing can be minimised. - Inspect any damage to existing signage, fencing and/or clearing demarcations (where in place). - Suitably qualified zoologist to undertake an assessment of degree of potential impact(s) resulting from the unauthorised clearing incident to significant fauna population and habitat which may include: - Type and extent of fauna habitat cleared; and - Monitor significant fauna population, as appropriate. - Audit and review of training and staff/contractor inductions	1. Pre- clearance surveys 2. Monitoring of clearing register for compliance to approvals. Land clearing reconciliation (against GIS exclusion and disturbance layers) to ensure the significant fauna buffer(s) are not impacted or entered without authorisation. 3. Aerial image capture (satellite or remotely piloted aircraft (RPA)). 4. Internal audit and inspection of areas of clearing. Monitor significant species populations as appropriate (Appendix A - Appendix D).	1. Pre-clearance surveys will be undertaken in accordance with significant fauna pre-clearance surveys (Section 6). 2. Monitoring of clearing register- Monthly. 3. Aerial image capture- Annual. 4. Internal audit and inspection- Regular compliance inspections during clearing. 5. When required in accordance (Appendix A - Appendix D).	- Clearing Register. - Internal clearing permits. - Survey data. - Monitoring Program reporting (Appendix A - Appendix D). - Reporting requirements described in Section 7 apply: - Annual Environmental Reporting (Section 7.1). - Threshold exceedance reporting in accordance with Section 7.2. - Incident reporting in accordance with Section 7.3.

EPA Factor and Objective		Terrestrial Fauna: to protect terrestrial fauna so that biological diversity and ecological integrity are maintained.						
TFEMP Purpose		To avoid adverse project-related impacts to terrestrial vertebrate fauna including significant fauna and associated habitat.						
Key Impacts and Risks		Potential loss or degradation of significant fauna habitat and the potential for loss of species from the proposal area, as a result of implementation of the Proposal.						
Indicators		Breach of significant fauna avoidance buffer(s), Population change (decrease in abundance of significant fauna species), breach of approved clearing extents impacting significant fauna habitat.						
Outcome-based Management Objectives		Trigger and Threshold Criteria		Trigger and Threshold Response Actions		Monitoring	Timing / Frequency of Monitoring	Reporting
		Trigger Criteria	Threshold criteria	Trigger Level Actions	Threshold Level Corrective Actions			
					(increase staff/contractor training and awareness to include information on significant fauna avoidance buffers, legislative requirements, and appropriate clearing procedures). – Review and revise preclearance survey procedures and ground disturbance procedure with the aim to prevent further occurrences in the future. – Install signage notifying unauthorised clearing has occurred, where appropriate. – Undertake rehabilitation of unauthorised clearing as required, in accordance with rehabilitation procedures, with the aim to reinstate habitat for significant fauna as described in Section 4.6.2 . – Installation of non-descriptive markers as appropriate, to indicate significant fauna habitat occurs in proximity. Communicate these markers to private haul road users and site personnel/ contractors as appropriate. – Monitor threshold contingency actions to validate success of mitigation strategy. Investigation report to be submitted to DWER and DCCEW with remediation actions proposed within 28 days of incident report.			
TF2	1. No project-related increase in feral predators from baseline levels during the life of the Proposal.	Total remote camera records of feral predator (fox, cat) is ≥10 * at a single feral predator monitoring location (impact sites) during a single monitoring event**.	A statistically significant increase* in the occurrence of feral predator numbers recorded at impact sites comparative to baseline levels and relative to reference sites over two consecutive monitoring events** (Appendix E).	- Report internally as an incident in accordance with internal procedures. - Identify potential causes for increased feral animal population, for example: - Poor waste management, - Attraction of feral predators to artificial water sources. - Check operational status of grooming traps (Felixers) to ensure in working order (1080 bait cartridges present, solar panels working). Confirm feral predator fencing from artificial water sources is in working order. - Cross reference with Incident Reporting Procedure records for sightings of feral predators - If increase in presence of feral predators is attributed to project-related activities, undertake a	- Report as incident. - Should significant fauna mortality occur report it on the fauna mortality register. - Report non-compliance to DWER and DCCEEW (for matters relating to MNES) within seven (7) days of identification in accordance with exceedance reporting requirements Section 7.2. - Identify potential causes for increased feral animal population, for example: - poor waste management, - attraction of feral predators to artificial water sources. - Check operational status of felixers to ensure in working order (1080 bait cartridges	1. Monitor feral predators in accordance with the Feral Predator Monitoring and Control Program (Appendix E). 2. Record observations of feral predator in accordance with Feral Predator Monitoring and Control Program(Appendix E). 3. Monitoring of Internal incident reporting for number of incidents relating to feral predators.	1. Feral predator Monitoring with Camera traps in sensitive Areas (in proximity to significant fauna populations quarterly and in proximity to Accommodation and landfill: (Monthly) in accordance with Appendix E). 2. Record observations of feral predator as triggered. 3. Monitoring of Internal incident reporting annual or as triggered	- Reporting requirements described in Section 7 apply: - Annual Environmental Reporting (Section 7.1) - Threshold exceedance reporting in accordance with Section 7.2. - Incident reporting in accordance with Section 7.3.
	2. No adverse impacts to significant fauna (Bilby, Mulgara, <i>Notoryctes</i> sp. (marsupial mole), Princess Parrot, spotted Ctenotus and GDS) as a result of project-related increase	* Trigger to be reviewed and revised as appropriate (a percentage) of total baseline records following the collation of baseline data (2 years). ** following implementation of feral	Or Observation or evidence of single predation event (feral predator) on significant fauna (Bilby, Mulgara, Princess Parrot and GDS) at an impact site.					

EPA Factor and Objective		Terrestrial Fauna: to protect terrestrial fauna so that biological diversity and ecological integrity are maintained.						
TFEMP Purpose		To avoid adverse project-related impacts to terrestrial vertebrate fauna including significant fauna and associated habitat.						
Key Impacts and Risks		Potential loss or degradation of significant fauna habitat and the potential for loss of species from the proposal area, as a result of implementation of the Proposal.						
Indicators		Breach of significant fauna avoidance buffer(s), Population change (decrease in abundance of significant fauna species), breach of approved clearing extents impacting significant fauna habitat.						
Outcome-based Management Objectives		Trigger and Threshold Criteria		Trigger and Threshold Response Actions		Monitoring	Timing / Frequency of Monitoring	Reporting
		Trigger Criteria	Threshold criteria	Trigger Level Actions	Threshold Level Corrective Actions			
	in feral animal abundance relative to suitable reference sites. * Night Parrot is addressed separately in the NPMP.	<i>predator control commencing during clearing (CEMP). Note: feral cats are likely to continually move into the areas of control. The objective is to maintain feral cat numbers at low densities (not eradication).</i> <i>During surveys of the NIDE, foxes were recorded at four locations (12 occasions) and feral cats at 37 locations (85 occasions) (Stantec 2021a).</i>	* Trigger to be reviewed and revised following the collation of baseline data (2 years) ** following implementation of feral predator control commencing during clearing (CEMP).	review of procedures to determine if impact can be minimised, develop corrective actions with consideration of the following: – Ensure grooming traps (Felixers) are in place and in working order in working order (1080 bait cartridges present, solar panels working). – Incident Reporting Procedure to record sightings of feral predators; and – Educate staff on the importance of not feeding feral animals and correct waste disposal as well as reporting all sightings of feral predators. • Conduct a review of waste management practices and improve practices accordingly. • Audit and review of training and staff/contractor inductions (increase staff/contractor training and awareness around feral animal control).	present, solar panels working). Confirm feral predator fencing from artificial water sources is in working order. – Cross reference with Incident Reporting Procedure records for sightings of feral predators • If the threshold exceedance for observation or evidence of single predation event on significant fauna (Bilby, Mulgara, Princess Parrot and GDS) at an impact site occurs: – Compare rate of predation on Bilby and GDS to the number of baseline events to determine if feral predator control is being effective in reducing predation on these species. – Review and compare results of increase in feral predator numbers with the results of monitoring for significant fauna species (Appendix A, Appendix B, Appendix C, Appendix D). – Review potential impact of feral predators (fox or cat) to the significant fauna populations, in consultation with suitably qualified zoologist. • Corrective management actions to be considered include: – Increase frequency and intensity of feral predator control actions, if required, as per Feral Predator Monitoring and Control Program (Appendix E). – Investigate alternative control measures to control feral predator populations according to industry best practice. For example, undertaking targeted baiting in response to the significant increase in feral predator numbers (only following consultation with TO groups) or consider undertaking targeted feral predator trapping/ culling event where appropriate as per Feral Predator Monitoring and Control Program (Appendix E).		• Annual Compliance Assessment Report (ACAR). • Inspection Forms - Monthly detection to be included within ACAR.	

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Key Impacts and Risks		Potential loss or degradation of significant fauna habitat and the potential for loss of species from the proposal area, as a result of implementation of the Proposal.						
Indicators		Breach of significant fauna avoidance buffer(s), Population change (decrease in abundance of significant fauna species), breach of approved clearing extents impacting significant fauna habitat.						
Outcome-based Management Objectives		Trigger and Threshold Criteria		Trigger and Threshold Response Actions		Monitoring	Timing / Frequency of Monitoring	Reporting
		Trigger Criteria	Threshold criteria	Trigger Level Actions	Threshold Level Corrective Actions			
					- Should GDS predation (feral predator) occur, consider feral predator fencing options around impacted populations of GDS as a preventative measure in consultation with DBCA. - Audit and review of training and staff inductions (increase staff training and awareness around feral animal control). - Ensure Felixers are in place and in working order in working order (1080 bait cartridges present, solar panels working). - Incident Reporting Procedure to record sightings of feral predators; and - Educate staff/contractors on the importance of not feeding feral animals and correct waste disposal as well as reporting all sightings of feral predators.			
TF3	No significant increase in Silver Gull (<i>Larus novaehollandiae</i>) abundance attributed to the Project.	10- 50 Silver Gull (<i>Larus novaehollandiae</i>) recorded at waste landfill.	≥100 Silver Gulls * (<i>Larus novaehollandiae</i>) recorded at waste landfill for a period of more than a week.	- Report internally as an incident in accordance with internal procedures. - Identify and investigate key causes for increased Silver Gull abundance , for example: - Poor waste management. - Artificial ponding of water that attracts fauna. - Causes outside of Project control may be attributed to a population increase (for example attraction to large landfill areas in the surrounding region). - Implement appropriate management measures following investigation. Corrective management measures to be considered include: - Revise waste management procedures, as appropriate, - Increase staff/contractor awareness and training in relation to waste management, - In field inspection of artificial water sources to determine if Silver Gull are attracted to artificial water sources within the Development Envelope. - Investigate the use of bird deterrents at the waste landfill as a potential measure to deter Silver Gulls	- Undertake threshold exceedance reporting requirements in accordance with incident reporting (Section 7). - Identify and investigate key causes for increased Silver Gull abundance, for example: - Poor waste management. - Causes outside of Project control may be attributed to a population increase (for example attraction to large landfill areas in the surrounding region). - Investigate the use of bird deterrent measures for silver gulls in proximity to waste landfill. - Implement management measures to prevent future threshold occurrences: - Engage specialist contractor within 10 days to cull Silver Gulls at the waste landfill (in accordance with the Feral Predator Monitoring and Control Program in consultation with DBCA (Appendix E).	- Monitor feral predators in accordance with the Feral Predator Monitoring and Control Program (Appendix E). - Record presence of Silver Gull at artificial water sources and landfill areas in the Development Envelope opportunistically.	- As triggered. - In accordance with Waterbird Monitoring Program (Appendix B).	- Incident reports. - Culling contractor reports. - Annual Compliance Assessment Report (ACAR). - Reporting requirements described in Section 7 apply: - Annual Environmental Reporting (Section 7.1). - Threshold exceedance reporting in accordance with Section 7.2. - Incident reporting in accordance with Section 7.3.
		<i>*The Silver Gull is a predator of waterbird fledglings including Banded Stilts. Numbers naturally fluctuate with previous surveys: 2001 survey: 129 individuals (Duguid et al. 2005), 2017 survey: 485 individuals (360 Environmental 2017a), and 2021 survey: 7 individuals (Stantec 2021a).</i>	<i>The Silver Gull is a predator of waterbird fledglings including Banded Stilts. Numbers naturally fluctuate with previous surveys: 2001 survey: 129 individuals (Duguid et al. 2005), 2017 survey: 485 individuals (360 Environmental 2017a), and 2021 survey: 7 individuals (Stantec 2021a).</i>					

EPA Factor and Objective		Terrestrial Fauna: to protect terrestrial fauna so that biological diversity and ecological integrity are maintained.						
TFEMP Purpose		To avoid adverse project-related impacts to terrestrial vertebrate fauna including significant fauna and associated habitat.						
Key Impacts and Risks		Potential loss or degradation of significant fauna habitat and the potential for loss of species from the proposal area, as a result of implementation of the Proposal.						
Indicators		Breach of significant fauna avoidance buffer(s), Population change (decrease in abundance of significant fauna species), breach of approved clearing extents impacting significant fauna habitat.						
Outcome-based Management Objectives		Trigger and Threshold Criteria		Trigger and Threshold Response Actions		Monitoring	Timing / Frequency of Monitoring	Reporting
		Trigger Criteria	Threshold criteria	Trigger Level Actions	Threshold Level Corrective Actions			
TF4	No adverse impacts to impacts to significant fauna (waterbirds) from bird strike from wind turbine operations.	Occurrence of a flood event at Lake Mackay (where greater than 20% of the lake is inundated).	Occurrence of wind turbine strike for 3 or more individuals of an EPBC Act listed threatened or EPBC Act listed migratory bird species during a single monitoring period.	- There is the potential for an increase in significant fauna (waterbirds) to be present at Lake Mackay and the following management measures apply to ensure that potential impacts from wind turbine strike occurring to significant fauna (waterbirds) are minimised: - Increase increments for wind turbine (carcass monitoring events), as required from 2 monthly (outside periods of inundation) to weekly for the duration of the flood event (when greater than 20% of the lake is inundated). - Check the wind turbines are operating as intended (eg. rotor speeds). - Educate staff as to the inundation event and that any events/near misses of wind turbine strike are to be reported to the Environmental Manager. - Undertake monitoring for waterbirds in accordance with Waterbird Monitoring Program (Appendix B).	- Report any significant fauna mortality/ injury and adhere to injured fauna management procedure (Section 6.4.1). - Report findings of the impact assessment to DWER and DCCEEW in accordance with reporting requirements (Section 7). - Following a threshold exceedance, increase increments for wind turbine (carcass monitoring events), from weekly to daily as per the Waterbird Monitoring Program (Appendix B) for the remainder of the flood event (when greater than 20% of the lake is inundated). - Investigate the potential cause for increase in wind turbine strike, for example, an inundation event at Lake Mackay, increase in numbers of waterbirds present at Lake Mackay, installation of new landfill facility or potentially attraction of waterbirds to artificial waterbodies in the Development Envelope. - Implement appropriate management measures following investigation. Corrective management measures to be considered include: - In situations where the threshold is reached for water birds, investigate options for wind turbine curtailment during periods of low wind speed and high waterbird activity occurs in proximity to the wind turbines. - Investigate installation of measures such as video surveillance or radar monitoring to detect incoming bird life and detect the presence of large numbers of water birds within the vicinity of wind turbines. - Investigate additional management measures such as painting wind turbines blades to make them more visible to birdlife. Increasing the visibility of rotor blades by painting one blade black may reduce turbine collisions for some bird species (Hodos 2003). Blade painting as an effective collision mitigation measure is currently based on a single field study (May et al. 2020), and further research is	1. Fauna mortality register 2. Induction records. 3. In accordance with Waterbird Monitoring Program (Appendix B).	1. As triggered. 2. Following induction 3. As applicable (during flood events on the lake).	- Monitoring reports. - Annual Compliance Assessment Report (ACAR). - Internal incident reporting and investigation reporting. - Reporting requirements described in Section 7 apply: - Annual Environmental Reporting (Section 7.1). - Threshold exceedance reporting in accordance with Section 7.2. - Incident reporting in accordance with Section 7.3.

EPA Factor and Objective		Terrestrial Fauna: to protect terrestrial fauna so that biological diversity and ecological integrity are maintained.						
TFEMP Purpose		To avoid adverse project-related impacts to terrestrial vertebrate fauna including significant fauna and associated habitat.						
Key Impacts and Risks		Potential loss or degradation of significant fauna habitat and the potential for loss of species from the proposal area, as a result of implementation of the Proposal.						
Indicators		Breach of significant fauna avoidance buffer(s), Population change (decrease in abundance of significant fauna species), breach of approved clearing extents impacting significant fauna habitat.						
Outcome-based Management Objectives		Trigger and Threshold Criteria		Trigger and Threshold Response Actions		Monitoring	Timing / Frequency of Monitoring	Reporting
		Trigger Criteria	Threshold criteria	Trigger Level Actions	Threshold Level Corrective Actions			
					needed to evaluate its efficacy more comprehensively. - Investigate installation of medium intensity steady (red obstacle lighting) on turbines. - Continue to implement contingency management actions until the CEO of DWER has confirmed by notice in writing that is has been demonstrated that the threshold criteria are being met - Monitor threshold contingency actions to validate success of mitigation strategy.			
TF5	No long term decrease in Banded Stilt breeding success as a result of project based activities	Banded Stilts* fail to successfully breed on Lake Mackay when the species is present and conditions are suitable for breeding (greater than 20% inundation of the lake for a minimum of 65 days, based on available literature) <i>*Banded stilts are a suitable indicator of ecosystem health</i>	Banded stilts* fail to successfully breed on Lake Mackay when the species is present and conditions are suitable for breeding (greater than 20% inundation of the lake for a minimum of 65 days, based on available literature) over two consecutive inundation events. <i>*Banded stilts are a suitable indicator of ecosystem health</i>	- Report internally as an incident in accordance with internal procedures. - Investigate the reason for species’ failing to breed successfully during a suitable monitoring, for example: potential changes due to groundwater drawdown for the project (outside predicted extent), - Potential wind turbine effects or mortality, or natural population fluctuation due to environmental changes (duration of flood event, climate change). - Re-examine monitoring parameters and predictions within the IWEMP, specifically whether groundwater levels in the lake sediments are within modelled predictions and whether flood events (scale and duration) are consistent with modelled predictions. - Re-examine monitoring parameters (Waterbird Monitoring Program Appendix B).	- Report any non-compliance to DWER and DCCEEW within 7 days of identification (Section 7.2). Re-examine monitoring parameters and predictions within the IWEMP, specifically whether groundwater levels in the lake sediments are within modelled predictions and whether flood events (scale and duration) are consistent with modelled predictions. - Re-examine monitoring parameters (Waterbird Monitoring Program Appendix B). - Cross reference Banded Stilt breeding success with the most recent environmental monitoring data for example, surface water/ groundwater/ feral animals/ meteorological etc. or regional bushfire data and wind turbine carcass monitoring to determine whether the potential cause for the decrease in breeding success can be identified. - Compare observed decrease in success of breeding events against: - The local aquatic invertebrate and water monitoring (Inland Waters Environmental Management Plan), - Wind turbine strike monitoring results. - Continue the management and monitoring program in accordance with the Waterbird Monitoring Program (Appendix B).	1. Record and monitor Banded Stilt breeding events to determine the effectiveness of management actions. 2. Internal incident reporting and investigation process.	1. As applicable (during flood events on the lake). 2. As triggered following an incident.	- Monitoring reports. - Annual Compliance Assessment Report (ACAR). - Internal incident reporting and investigation reporting. - Reporting requirements described in Section 7 apply: - Annual Environmental Reporting (Section 7.1). - Threshold exceedance reporting in accordance with Section 7.2. - Incident reporting in accordance with Section 7.3.

EPA Factor and Objective		Terrestrial Fauna: to protect terrestrial fauna so that biological diversity and ecological integrity are maintained.						
TFEMP Purpose		To avoid adverse project-related impacts to terrestrial vertebrate fauna including significant fauna and associated habitat.						
Key Impacts and Risks		Potential loss or degradation of significant fauna habitat and the potential for loss of species from the proposal area, as a result of implementation of the Proposal.						
Indicators		Breach of significant fauna avoidance buffer(s), Population change (decrease in abundance of significant fauna species), breach of approved clearing extents impacting significant fauna habitat.						
Outcome-based Management Objectives		Trigger and Threshold Criteria		Trigger and Threshold Response Actions		Monitoring	Timing / Frequency of Monitoring	Reporting
		Trigger Criteria	Threshold criteria	Trigger Level Actions	Threshold Level Corrective Actions			
TF6	No statistically significant decrease in the abundance of conservation significant species (GDS, Bilby) as a result of project-related activities.	The burrow status of a previously active* GDS burrow is recorded as inactive in a single monitoring event*	Statistically significant decrease in GDS* activity at the impact monitoring site over two consecutive monitoring events, compared to baseline levels.	- Report internally as an incident. - Review feral predator monitoring data to determine if change in burrow activity may be as a result of an increase in feral predators. - Cross reference decrease in GDS or Bilby activity with fauna mortality records for recent records of GDS mortality, feral predator monitoring results. - Review potential environmental factors that could attribute to the change in burrow activity such as fire events, drought, and climatic factors. - Undertake site inspection to look for to look for evidence of potential project-related indirect impacts such as dust deposition, vibration, light spill, proliferation of weeds in proximity to GDS burrows. Implement corrective management actions in proximity to GDS population as soon as possible.	- Report any non-compliance to DWER and DCCEEW within 7 days of identification Section 7.2.. - Determine whether the changes observed in the impact sites are comparable to the observations in the GDS or Bilby monitoring reference sites (Appendix C, Appendix D). - Cross reference significant fauna results with the most recent environmental monitoring data for example, surface water/ groundwater/ vegetation/ weeds/ feral animal monitoring and control / meteorological etc. or regional bushfire data to determine whether the potential cause for the decrease can be identified.	1. Monitor the populations of Great Desert Skink and (Appendix C) Bilby (Appendix D) to determine the effectiveness of management actions. 2. Internal incident reporting and investigation process	1. As triggered. 2. According to: - Great Desert Skink Monitoring Program (Appendix C), - Bilby Monitoring Program (Appendix D)	- Monitoring reports - Annual Compliance Assessment Report (ACAR) - Internal incident reporting and investigation process - Reporting requirements described in Section 7 apply: - Annual Environmental Reporting (Section 7.1). - Threshold exceedance reporting in accordance with Section 7.2. - Incident reporting in accordance with Section 7.3.
	* Night Parrot is addressed separately in the NPMP. Or Statistically significant decrease in Bilby occupancy at impact monitoring sites in a single monitoring event, compared to baseline levels and relative to reference sites. * Active status defined by evidence of latrine present outside of burrow; or activity of a GDS record on remote camera placed at burrow entrance.	Or Statistically significant decrease in Bilby occupancy at impact monitoring sites over two consecutive monitoring events, compared to baseline levels and relative to reference sites. Or If evidence of predation event (feral predator) of GDS or Bilby occurs (refer to TF2 feral predator threshold for contingency actions). * Active status defined by evidence of latrine present outside of burrow; or activity of a GDS record on remote camera placed at burrow entrance.	- Revise monitoring schedule in the GDS or Bilby Monitoring Program (Appendix C, Appendix D) in consultation with a qualified zoologist, increasing intensity or monitoring frequency as appropriate. - Undertake further communication and training to raise awareness with staff of the impact and the management measures (including new management measures identified) to reduce the potential impact on the species. Undertake a site inspection to determine if the population has moved to another area in response to changes in environmental conditions e.g. in response to fire or food resources.	- Undertake site inspection to look for evidence of potential project-related indirect impacts such as dust deposition, vibration, light spill, proliferation of weeds in proximity to GDS burrows. Implement corrective management actions in proximity to GDS population as soon as possible. - Following investigation into the potential cause of decrease, additional contingency actions as appropriate, for example: - Dust deposition – review dust mitigation measures and adapt the Dust Management Plan accordingly - Light spill- seek alternative options for				

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Key Impacts and Risks		Potential loss or degradation of significant fauna habitat and the potential for loss of species from the proposal area, as a result of implementation of the Proposal.						
Indicators		Breach of significant fauna avoidance buffer(s), Population change (decrease in abundance of significant fauna species), breach of approved clearing extents impacting significant fauna habitat.						
Outcome-based Management Objectives		Trigger and Threshold Criteria		Trigger and Threshold Response Actions		Monitoring	Timing / Frequency of Monitoring	Reporting
		Trigger Criteria	Threshold criteria	Trigger Level Actions	Threshold Level Corrective Actions			
					lighting, directional lighting in accordance with National Light Pollution Guidelines for Wildlife (DCCEEW 2023b) ○ Proliferation of weeds – undertake additional weed management as required, in accordance with the Weed Management Plan ○ Surface water and groundwater - review mitigation measures and adapt accordingly. ○ Feral predators- increase frequency of feral animal control in accordance with the Feral Predator Monitoring and Control Program, ○ Bushfire- review the Fire Management Plan, increase monitoring frequency, accordingly. • Cross reference results with the fauna mortality register and should the decrease in activity potentially caused by vehicle interaction consider the following: – Revise monitoring schedule in the GDS or Bilby Monitoring Program (Appendix C, Appendix D) in consultation with a qualified zoologist, increasing intensity or monitoring frequency as appropriate. – Undertake further communication and training to raise awareness with staff of the impact and the management measures (including new management measures identified) to reduce the potential impact on the species. • Continue to implement contingency management actions until the CEO of DWER has confirmed by notice in writing that is has been demonstrated that the threshold criteria are being met. • Monitor threshold contingency actions to validate success of mitigation strategy.			

Table 4-2: Terrestrial fauna objective-based management provisions.

EPA Factor and Objective	Terrestrial Fauna: to protect terrestrial fauna so that biological diversity and ecological integrity are maintained.				
TFEMP Purpose and Objectives	To avoid adverse project-related impacts to terrestrial vertebrate fauna including significant fauna and associated habitat.				
Key Impacts and Risks	Potential loss or degradation of significant fauna habitat and the potential for loss of species from the proposal area, as a result of implementation of the Proposal. Refer to detailed Risk assessment (Appendix F, Appendix G).				
Indicators	Breach of significant fauna avoidance buffer(s), Population change (decrease in abundance of significant fauna species), breach of approved clearing extents impacting significant fauna habitat.				
Objective Based Management Provisions					
Management Target	Management Actions	Monitoring	Timing	Responsible	Reporting
High Management Level					
MO1: Minimise project-related direct interactions per year (e.g., vehicle strike, wind turbine strike) to significant fauna (including waterbird species) resulting in injury or mortality.					
1. Implement speed limits within proximity to Night Parrot critical habitat*. 2. No project related incidents of vehicles being used off designated roads outside operational areas (unless in the case of unplanned events), that result in significant direct impacts to critical habitat for significant fauna (Bilby, GDS, Mulgara). 3. There will be no operational use (non-haulage activities) of haul road at night, unless for unplanned events (e.g. emergency response). 4. No adverse project related impact to significant fauna (waterbird) species from wind turbine interactions. <i>*Night Parrot management targets and actions are addressed in separate NPMP.</i>	• Develop and implement a Traffic Management Plan in accordance with (Table 4-3). The following management measures for significant fauna are to be included within the Traffic MP: – Monitoring and enforcement of speed limits through placement of interactive traffic management signs advising acceptable road use (daylight hours and private designation) and road user of compliance against speed limits (encouraging driver lead compliance). – GPS installation to monitoring Agrimin haul trucks and Agrimin vehicles to ensure compliance with speed limits. – Installation of traffic counting measures such as Pneumatic Tubes monitored quarterly to measure vehicle speed and road usage during non-daylight hours. • The northern haul road corridor will be designated a private road with appropriate signage to restrict vehicular traffic to only Agrimin workforce (employees and contract partners), and Traditional Owners. • Develop and implement awareness and education programs for all haul road users (including Agrimin workforce and Traditional Owners) relating to safety and governed use of the road designed to protect fauna. Engagement will specifically occur with Rangers to support this communication. • Engage and educate other (non Agrimin) haul road users of the importance in restricting driving to daytime hours where possible and following speed restrictions. Engagement will specifically occur with Rangers to support this communication. • Install signage to clearly demarcate existing authorised vehicle tracks and existing access tracks. • Implement and enforce the following speed limits on the Haul Road: – 40km along the haul road during night-time in the vicinity of NP populations (noting that NP are not active in the day and haulage will only be undertaken during daylight hours); and – 80 km/hr speed limit to apply to the remaining NIDE. Key avoidance measures implemented whereby no haulage or operational use of haul road is to be undertaken during night-time (noting that significant fauna such as the Bilby/ Mulgara and GDS are not active during the day-time). – 60 km/ hour speed limit implemented for unsealed access roads. • Signage will be installed along access roads to advise of speed reduction (40km/ hour at night-time along the haul road in proximity to Night Parrot critical habitat): – Signs will not specifically mention the Night Parrot (due to the risk of poaching occurring), however, will advise of speed reduction to speed limit reduction to 40km in these areas. The signage approach within proximity to Night Parrot critical habitat will be determined following consultation with DBCA prior to installation. – A component of the signage will include local indigenous language (following adequate consultation with Traditional Owners) who utilise the road. • Implementation of key avoidance and mitigation measures such as: – All haulage to be undertaken during daytime hours only when significant fauna species (NP, Bilby, Mulgara and GDS) are not active. – Operational driving (non-haulage) will be restricted to daylight hours, unless for an unplanned event (for example emergency response).	1. Inspection of inductions, training, and awareness material. 2. Record mortality events: establish a baseline to determine future mitigation effectiveness and potential 'hot spots' or periods of increased risk (e.g., mating dispersal) requiring particular focus. 3. Maintain a fauna mortality register to identify at risk species. 4. Comply with: – CEMP – NPMP and Monitoring Program. 5. Undertake road signage inspections. 6. Monitoring in accordance with the Traffic Management Plan (Table 4-3). 7. Monitoring in accordance with Waterbird Monitoring Program (Appendix B).	1. When required as inductions, training is completed. 2. As triggered. 3. Ongoing 4. In accordance with schedule in the: – CEMP – NPMP and Monitoring Program. 5. Quarterly signage inspections. 6. In accordance with schedule outlined in the Traffic Management Plan 7. In accordance with schedule outlined in the Waterbird Monitoring Program (Appendix B).	• Construction. • Operations. • Environment Team.	• Annual Compliance Assessment Report (ACAR). • Report mortalities to DBCA. • Internal incident reporting. • Annual Monitoring reports.

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TFEMP Purpose and Objectives	To avoid adverse project-related impacts to terrestrial vertebrate fauna including significant fauna and associated habitat.				
Key Impacts and Risks	Potential loss or degradation of significant fauna habitat and the potential for loss of species from the proposal area, as a result of implementation of the Proposal. Refer to detailed Risk assessment (Appendix F, Appendix G).				
Indicators	Breach of significant fauna avoidance buffer(s), Population change (decrease in abundance of significant fauna species), breach of approved clearing extents impacting significant fauna habitat.				
Objective Based Management Provisions					
Management Target	Management Actions	Monitoring	Timing	Responsible	Reporting
	- Provisions to be included within the Traffic Management Plan (TMP) to implement additional speed reduction areas to 40km/ hour at night-time should a new location of a Night Parrot population be confirmed in addition to current known populations, within proximity to the haul road (signage will not allude to the fact that Night Parrot habitat occurs in proximity to the haul road, due to risk of poaching). - Should nighttime road traffic levels be found to significantly increase following monitoring as per the TMP, additional engagement will be undertaken to educate other (non Agrimin) haul road users of the importance in restricting driving to daytime hours where possible and following speed restrictions. - Design haul road and manage road verges to minimise roadside water sources and foraging opportunities for fauna and maximise visibility of road edges for drivers. - Monitor for potential wind turbine interactions (carcass monitoring,) in accordance with the Waterbird Monitoring Program (Appendix B). - Near miss and incidents of wind turbine interactions will be reported to the Environmental Manager and included in Annual Environmental Reporting.				
MO2: Minimise loss of significant fauna habitat and fragmentation as a result of project-related land clearing					
1. All vegetation clearing will be carried out during daylight hours. Trenching will be undertaken on the lake over a 24hr period for the first 2 years of operations only. Trenching will then move to daytime only. 2. Clearing not to exceed 1,500 ha of flora and vegetation (the combined total of 200 ha of native vegetation within the 688 ha Off-LDE, and 300 ha of native vegetation within the 11,799 ha SIDE and 1,000 ha of native vegetation within the 33,928 ha NIDE). 3. Significant fauna avoidance buffer zones are in place following completion of pre-clearance surveys. 4. Access to the significant fauna avoidance buffer zones (is restricted to authorised personnel only and there are no incidents of unauthorised access). 5. No unauthorised clearing within significant fauna avoidance buffer zones applied within the Proposal area.	- All vegetation clearing will be carried out during daylight hours. Trenching will be undertaken on the lake over a 24hr period for the first 2 years of operations only. - Avoid clearing of suitable breeding trees for the Grey Falcon (tall trees with raptor nests) and Princess Parrot (large stands of trees with hollows or potential to form hollows (e.g., stands of <i>Allocasuarina</i> sp. and <i>Corymbia</i> sp.), where possible. - Clearly demarcate clearing boundaries. Delineate clearing boundary areas by qualified surveyors in the field and confirmed cleared areas via survey after clearing. - Coordinates for clearing extents will be provided to the Construction Contractor. - All Ground Disturbance Permits (GDP's) issued within each financial year will be recorded and reported to internal personnel on an annual basis. Installation of culverts in drainage line habitat to facilitate the movement of significant fauna (Creese (2012)). - Proposal will avoid impacts to GDS burrows through the implementation of a 150 m buffer around active burrows recorded during preclearance surveys and a 300m buffer around known GDS population active burrows. - Retain adequate suitable habitat and foraging resources (equivalent to the home range for the Bilby 1.5km in area) following preclearance surveys for the Bilby within proximity to an active Bilby burrow(s) in the DE (outside of the IF). - Progressively rehabilitate areas as opportunities become available in accordance with rehabilitation procedures outlined in the MCP. Rehabilitation procedures specific to reinstating high value significant fauna habitat will be undertaken in accordance with Table 4-4. - Pre-clearance acoustic surveys are to be completed 4 weeks prior to clearing in accordance with Section 6 of this plan or as outlined in the CEMP. - Register significant fauna avoidance buffer zones (GDS) on internal database, as required following completion of pre-clearance surveys. - No direct disturbance is to occur within significant fauna avoidance buffer zones. - Inductions of all site personnel to include information on the location of significant fauna, on management targets, measures and expectations. - Pre-clearance surveys to be undertaken in accordance with pre-clearance survey methods presented in the following: - Night Parrot (refer to Section 5 of the NPMP). - Bilby (Section 6.3 of the TFEMP).	- Monitoring and annual reconciliation of clearing for compliance to approvals. - Analysis of clearing undertaken via annual aerial imagery survey to assess whether any unauthorised clearing has occurred. - Internal incident reporting and investigation process. - Comply with: - CEMP - NPMP and Monitoring Program. - Fauna spotter to record observations of significant fauna and burrows during project-related land disturbance, including written records and photographs, during pre-clearance surveys. - Opportunistic identification of fauna mortalities. - Monitoring for significant species as required.	- During construction, pre-clearing clearing and post-clearing activities. - Annual aerial imagery capture and analysis to monitor clearing extent. - As triggered. - In accordance with: - CEMP - NPMP and Monitoring Program. - During Pre-clearance surveys. - As triggered. - In accordance with schedule in the: - Waterbird Monitoring Program (Appendix B). - GDS Monitoring Program (Appendix C). - Bilby Monitoring Program (Appendix D).	- Construction. - Operations. - Environment Team.	- Pre-clearance survey records including significant fauna observations and fauna mortality records. - GIS records of pre-clearance survey records, fauna exclusion zones and locations of significant fauna recorded by fauna spotter. - Annual Compliance Assessment Report (ACAR). - Report mortalities to DBCA. - Incident reporting.

EPA Factor and Objective		Terrestrial Fauna: to protect terrestrial fauna so that biological diversity and ecological integrity are maintained.				
TFEMP Purpose and Objectives		To avoid adverse project-related impacts to terrestrial vertebrate fauna including significant fauna and associated habitat.				
Key Impacts and Risks		Potential loss or degradation of significant fauna habitat and the potential for loss of species from the proposal area, as a result of implementation of the Proposal. Refer to detailed Risk assessment (Appendix F, Appendix G).				
Indicators		Breach of significant fauna avoidance buffer(s), Population change (decrease in abundance of significant fauna species), breach of approved clearing extents impacting significant fauna habitat.				
Objective Based Management Provisions						
Management Target		Management Actions	Monitoring	Timing	Responsible	Reporting
6. No adverse project related impact to significant fauna species (Bilby, GDS, Marsupial Mole, Mulgara and Spotted Ctenotus) as a result of vegetation clearing and habitat fragmentation. <i>*Night Parrot management targets and actions are addressed in separate NPMMP.</i>		- Great Desert Sink (Section 6.3.2 of the TFEMP). - Mulgara (Section 6.3.3 of the TFEMP). - Spotted Ctenotus (Section 6.3.4 of the TFEMP). - Demarcate fauna buffer zones (digital GPS) and on site to deter accidental clearing being undertaken within these areas. For significant fauna avoidance buffer zones protecting high value MNES species (such as GDS) an inconspicuous marking will be used and communicated to relevant staff and contractors. - Restrict access to fauna buffer zones to authorised personnel only and TO’s where applicable.				
MO3: No project-related adverse impacts to terrestrial fauna (including significant fauna) or habitat within proximity of the Proposal area from project- related unplanned fire events.						
1. Provision and maintenance of firefighting equipment in accordance with the relevant fire safety standards. 2. Firefighting emergency response plan and procedures are in place. <i>*Night Parrot management targets and actions are addressed in separate NPMMP.</i>		- Avoid hot works in fire sensitive habitats (i.e. areas of long unburnt spinifex) and along the haul road. - Liaise with Traditional Owners about the management of local fire regimes and fire management practices. - Establish Emergency Response Plan and Emergency Response Team (ERT). - Require all personnel to complete a site induction that will include information on prevention of project-related fires, including designated smoking areas, no fires permitted in workplace, use of extinguishers, hot works procedures, appropriate waste management. - All fuel stored on site to be in a secure bund. - Implement a hot works permit system for high ignition risk work activities. - If hot works adjacent to vegetation can’t be avoided, the area immediately surrounding ‘hot work’ to be dampened with water if vegetated and vegetation is not already naturally damp. - Fire response equipment maintained at site and in vehicles, machinery and Haul Trucks. - Water trucks to have fire management capabilities (pumps/hoses). - Consider ‘no fires’ or ‘fires prohibited’ signage in areas of fire sensitive habitat i.e. Night Parrot habitat.	- Internal incident reporting and investigation process. - Daily wind conditions will be taken into consideration when clearing activities are proposed. - Monitor and record occurrence of fires within the proposal area through internal reporting system. - Comply with: - FVEMP - CEMP - NPMP and Monitoring Program.	- As triggered - Daily during construction. - On-going, as triggered. - Comply with schedule in the : - FVEMP - CEMP - NPMP and Monitoring Program. –	- Construction. - Operations. - Environment Team.	- Incident reporting. - Annual Compliance Assessment Report (ACAR).
MO4: No adverse impacts to significant fauna as a result of project-related increase in feral animal abundance						
1. No incidents of feeding feral animals 2. Minimise attraction of introduced predators by ensuring: Waste management plan and procedures are in place. Measures to deter feral predators from artificial water sources are in place. Road infrastructure design and road verge management avoids artificial water sources.		- Record observations of feral predator animals opportunistically (foxes, wild dogs, feral cats) within operational areas, and record numbers removed in control programs in accordance with schedule of Feral Predator Monitoring and Control Program (Appendix E). - Record observations of feral rabbits in accordance with provision within the Feral Predator Monitoring and Control Program (Appendix E). - Fence off artificial water sources to deter predator access, following best practice exclusion fencing guidelines to allow ongoing dispersal of fauna species. - Introduced predators identified will be reported to Environmental personnel and recorded to monitor occurrences. - Avoid attraction of introduced predators by implementing domestic waste management procedures (e.g. fencing of landfills, regularly covering putrescible waste, secure lids on bins): - Putrescible waste to be stored and disposed of in a way that cannot be accessed by fauna. - Landfill wastes will be covered promptly, and active waste disposal cells will be fenced to exclude large fauna. - Introduced predator control will be undertaken on site in cooperation with regional control programs in response to an increase in sightings, as required.	- Record and monitor the presence of feral predators including an assessment of abundance compared to baseline levels and to determine the effectiveness of control program. - Record and monitoring the presence of feral rabbits at impact and reference sites for the feral predator control program to identify potential changes as a result of the feral predator control program. - Internal incident reporting and investigation process - Comply with: - CEMP - Feral Predator Control Program in this TFEMP (Appendix E).	- According to the Feral Predator Control Program in this TFEMP (Appendix E). - As triggered. - In accordance with schedule of: - CEMP - Feral Predator Monitoring Program in this TFEMP (Appendix E).	- Construction. - Operations. - Environment Team.	- Introduced predator control reports. - Incident reports. - Annual Environmental Reporting. - Report mortalities to DBCA.

EPA Factor and Objective	Terrestrial Fauna: to protect terrestrial fauna so that biological diversity and ecological integrity are maintained.				
TFEMP Purpose and Objectives	To avoid adverse project-related impacts to terrestrial vertebrate fauna including significant fauna and associated habitat.				
Key Impacts and Risks	Potential loss or degradation of significant fauna habitat and the potential for loss of species from the proposal area, as a result of implementation of the Proposal. Refer to detailed Risk assessment (Appendix F, Appendix G).				
Indicators	Breach of significant fauna avoidance buffer(s), Population change (decrease in abundance of significant fauna species), breach of approved clearing extents impacting significant fauna habitat.				
Objective Based Management Provisions					
Management Target	Management Actions	Monitoring	Timing	Responsible	Reporting
	- Implement a Feral Predator Control Program to manage any potential increase in the prevalence of feral predators as a result of the Proposal. - Liaise with traditional owners and investigate opportunities to build the capacity and engage Indigenous Rangers to manage feral predators, particularly in habitat important to significant species and/or locations where significant species have been recorded within IPAs. - Induct personnel on waste management and introduced predator control measures.				
Medium Management Level					
MO5: Minimise project-related changes to surface hydrology					
1. No access permitted to inundated portions of Lake Mackay when more than 20 % of the lake is inundated. 2. Verification of detailed hydrological modelling of surface water flows, including simulation 1:100-year rainfall events (as per the IWEMP) 3. Staged development of trenches via BMUs and engineering design (1 km spacing, install crossovers) to maintain natural hydrological processes.	- Verify hydrological modelling of surface water flows, including simulation 1:100-year events and investigate potential impacts that vary from predicted and if required review network design and configuration, and if required, modify abstraction schedule. - Mitigation of indirect impacts to waterbird foraging habitat on the playa through the installation of crossovers designed to maintain the hydrological regime, inundating the deepest parts of the basin to ensure favourable conditions for primary producers (such as algae and macrophytes) and aquatic invertebrates, to provide foraging resources for waterbirds. - To avoid disturbance to foraging waterbirds, no access will be permitted to inundated portions of Lake Mackay when more than 20 % of the lake is inundated. Similarly, no access will be permitted to inundated claypans or salt pans with the exception of inspections and evaporation ponds and areas intersected by the Indicative Footprint. - Staged development of trenches via BMUs and engineering design (1 km spacing, install crossovers) to maintain natural hydrological processes. The staged approach will allow for adaptive management to be implemented. - Implement Water Bird Monitoring Program prior to construction / operations (Appendix B), where possible. - Where sufficient data is available through repeated flood events, review and potentially develop trigger and threshold criteria for waterbirds, if appropriate. - Implement management measures as per the IWEMP.	1. Conduct opportunistic waterbird surveys in response to suitable conditions, if they occur, prior to and during construction/operation of the Proposal. 2. Document utilisation of the lake by waterbirds (diversity and abundance) in suitable flood events compared to areas of proposed disturbance and use findings to inform management actions, if required. Utilisation of the lake may be influenced by abundance of aquatic invertebrates, surface hydrology, turbidity etc. 3. Monitoring in accordance with the Water Bird Monitoring Program (Appendix B). 4. Comply with: - FVEMP - CEMP - MCP - IWEMP.	1. Prior to and during construction/operation. 2. Following inundation events of the lake as per the Water Bird Monitoring Program (Appendix B). 3. In accordance with: - FVEMP - CEMP - MCP - IWEMP.	- Construction. - Operations. - Environment Team.	- Waterbird monitoring report. - Incident reports.
4. No adverse project-related impacts to surface hydrology (excluding on-lake operations) and water flows resulting in disturbance and decline of fauna habitats, including significant fauna habitats.	- Design of haul road and infrastructure to minimise changes to natural hydrological flow. For example, haul road crossing occurs in drainage features known to support Night Parrot the haul road will follow natural contours so that natural hydrology is maintained downstream of the crossing. - The haul road level will be lowered as much as practicable to avoid banking of water against the road and creating washouts. - The haul road will be designed to facilitate sheet flow crossing the road during flood events. - Implement vegetation health monitoring in accordance with the FVEMP.	1. Monitor vegetation health in the areas in the vicinity of the Night Parrot populations in accordance with the NPMP and Appendix B of the FVEMP 2. Comply with: - FVEMP - CEMP.	1. During construction and operations 2. In accordance with: - FVEMP - CEMP	- Construction. - Operations. - Environment Team.	- Annual Compliance Assessment Report (ACAR). - Internal incident reporting and investigation process. - Vegetation Health monitoring reporting in accordance with the FVEMP.
5. No project-related adverse impacts to significant fauna (waterbirds) from attraction of waterbirds to artificial water bodies.	- Investigation of usage of bird deterrents such as reflectors, sound deterrents, netting as deemed appropriate, if required at artificial waterbodies (requirement to be informed from the results of the Water Bird Monitoring Program (Appendix B)). - Natural trench fill-in (within approximately 10 years) and breaking of pond bunds at closure to allow flow of water. Maintain records and report on fauna mortality rates to determine fauna at risk and potential locations of interest.	1. Implement a monitoring program from inception of the Proposal in accordance with Waterbird Monitoring Program (Appendix B) with corrective actions to be implemented if required. 2. Internal incident reporting and investigation process. 3. Comply with: CEMP	1. During construction / operation. 2. In accordance with schedule in the Waterbird Monitoring Program (Appendix B). 3. In accordance with: - CEMP - MCP.	- Construction. - Operations. - Environment Team.	- Waterbird monitoring report. - Incident reports.

EPA Factor and Objective	Terrestrial Fauna: to protect terrestrial fauna so that biological diversity and ecological integrity are maintained.				
TFEMP Purpose and Objectives	To avoid adverse project-related impacts to terrestrial vertebrate fauna including significant fauna and associated habitat.				
Key Impacts and Risks	Potential loss or degradation of significant fauna habitat and the potential for loss of species from the proposal area, as a result of implementation of the Proposal. Refer to detailed Risk assessment (Appendix F, Appendix G).				
Indicators	Breach of significant fauna avoidance buffer(s), Population change (decrease in abundance of significant fauna species), breach of approved clearing extents impacting significant fauna habitat.				
Objective Based Management Provisions					
Management Target	Management Actions	Monitoring	Timing	Responsible	Reporting
		– MCP.			
6. No project-related adverse impacts to SRE salt lake specialist invertebrate fauna as a result of changes in hydrology.	- Verify hydrological modelling of surface water flows, including simulation 1:100-year events and investigate potential impacts that vary from predicted and if required review network design and configuration, and if required, modify abstraction schedule. - Staged development of trenches via BMUs and engineering design (1 km spacing, install crossovers) to maintain natural hydrological processes. The staged approach will allow for adaptive management to be implemented. - Undertake monitoring for SRE salt lake specialist invertebrate fauna in accordance with Appendix B of the IWEMP. - Implement management measures as per the IWEMP.	Conduct SRE salt lake specialist invertebrate fauna monitoring during dry conditions in accordance with the IWEMP	In accordance with the Aquatic Ecology Monitoring Program (Appendix B of the IWEMP)	- Construction. - Operations. - Environment Team.	- Annual Compliance Assessment Report (ACAR). - SRE Monitoring as a component of the Aquatic Ecology Monitoring Report.
7. Minimise injury or loss of individuals including significant fauna from entrapment in ponds/trenches.	- Construct approximately 1.5 m high bunding adjacent to trenches. - Fauna egress will be provided for temporary ponds such Turkeys nests along the haul road. - Fencing will be installed around the perimeter of permanent freshwater storage dam/s. - Natural trench fill-in and breaking of pond bunds at closure to allow flow of water with trenches to naturally salt over to form a cohesive hard surface. - Trench network and BMUs will be strategically breached on the completion of brine abstraction to allow natural flow paths to return to the lake.	- Inspect trenches. - Implement a monitoring program from inception of the Proposal in accordance with Waterbird Monitoring Program (Appendix B) with corrective actions to be implemented if required. - Maintain records and report on fauna mortality rates to determine fauna at risk and potential locations of interest. - Baseline information to determine effectiveness and focus of further mitigation and adaptive management if necessary. - Comply with: - CEMP - MCP - Internal incident reporting and investigation process.	- Once a week for main feed canal and evaporation ponds, once every 6 months for infiltration trenches. - In accordance with schedule in the Waterbird Monitoring Program (Appendix B). - Ongoing, as triggered - Following baseline survey - In accordance with: - CEMP - MCP. - As triggered.	- Construction. - Operations. - Environment Team.	- Annual Compliance Assessment Report (ACAR). - Internal incident reporting and investigation process. - Report mortalities to DBCA - Monitoring reports.
MO6: Provide ongoing opportunities for involvement of Traditional Owners in the implementation of conservation actions and improve understanding of local populations (abundance and dynamics) of significant fauna (Bilby, GDS) and facilitate TO knowledge-sharing for these species.					
- Access agreements and Native Title Agreements (NTA) in place for the Parna Ngururrpa, Tjamu Tjamu and the Tjurabalan Peoples. - Ongoing opportunities provided for TO ranger group involvement in monitoring programs and management activities for significant fauna. - Successful two-way knowledge sharing for significant fauna species.	- Utilise skills and experience of Indigenous Ranger groups and provide opportunities for engagement in environmental surveys and monitoring, and the management in particular of feral animals and fire. - Ongoing consultation with TO Groups. - Provide training for TO rangers in the methods and data capture processes to undertake significant fauna monitoring programs and management measures, where required. - Actively facilitate the two-way knowledge sharing of significant fauna species during the design and implementation of significant fauna monitoring programs and management measures, where possible.	- Stakeholder consultation records - TO involvement in - NPMP and Monitoring Program (Appendix A of the NPMP). - GDS Monitoring Program (Appendix C). - Bilby Monitoring Program (Appendix D).	- Following stakeholder consultation (regular and ongoing) - In accordance with monitoring schedule: - NPMP and Monitoring Program (Appendix A of the NPMP). - GDS Monitoring Program (Appendix C). - Bilby Monitoring Program (Appendix D).	- Construction - Operations - Environment and heritage team	- Annual Compliance Assessment Report (ACAR). - Stakeholder consultation records.
MO7: No adverse project-related impacts to significant fauna or critical habitat from project related introduction or proliferation of weed species.					
1. Weed management programs should be designed in accordance with relevant EPBC Act	Weeds management to be undertaken in accordance with the Weed Management Plan and Monitoring Program (outlined within the FVEMP), including:	Weeds management to be undertaken in accordance with the Weed Management Plan and Monitoring Program	- In accordance with: - FVEMP	- Construction - Operations - Environment Team	- Annual Compliance Assessment Report (ACAR). - Internal incident reporting and investigation process.

EPA Factor and Objective	Terrestrial Fauna: to protect terrestrial fauna so that biological diversity and ecological integrity are maintained.				
TFEMP Purpose and Objectives	To avoid adverse project-related impacts to terrestrial vertebrate fauna including significant fauna and associated habitat.				
Key Impacts and Risks	Potential loss or degradation of significant fauna habitat and the potential for loss of species from the proposal area, as a result of implementation of the Proposal. Refer to detailed Risk assessment (Appendix F, Appendix G).				
Indicators	Breach of significant fauna avoidance buffer(s), Population change (decrease in abundance of significant fauna species), breach of approved clearing extents impacting significant fauna habitat.				
Objective Based Management Provisions					
Management Target	Management Actions	Monitoring	Timing	Responsible	Reporting
weed threat abatement plans. 2. Weed management procedures informed by best practice management of the weed species identified during weed baseline surveys. 3. No proliferation or introduction of new weed species rated as high or very high management priority by DBCA in the Proposal Area as a result of the Proposal. 4. No significant increase in weed cover of buffel grass in significant fauna avoidance buffer areas attributable to the Proposal.	– Weed management programs will be undertaken in accordance with relevant EPBC Act threat abatement plans and be informed by best practice management of the weed species identified during baseline surveys and in accordance with: ▪ The Threat Abatement Plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses (DSEWPaC 2012). ▪ Buffel grass management for Central Australia (Department of Environment and Natural Resources 2018), as well as ▪ Integrated weed management (Weeds Australia 2021a). – Minimising the risk of invasion of buffel grass in significant fauna avoidance buffer areas will be a key priority. – – Maintain weed hygiene obligations in clearing contractor contracts. – Timely response for management of any declared weed occurrences. – Limit vehicle and personnel movements outside of approved access and disturbance envelopes. – Train personnel to identify weed species and process for reporting weed locations. – Incident reporting of new weed species and new locations. – Implement weed hygiene procedures for clearing and construction equipment coming into the Proposal Area, and equipment moving between Development Envelopes in the proposal area. – Establish weed hygiene zones if conducting earthworks near known weed locations. – Weed mitigation to be undertaken prior to the wet season to minimise weed infestation. – Undertake weed baseline survey and weed mapping. – Monitor and report weed occurrence within the proposal area in accordance with the Weed Management Plan and Monitoring Program.	2. Annual inspections of cleared and rehabilitated areas to detect presence of new weed species and to determine success of weed mitigation measures. 3. Inspection of inductions, training, and awareness material 4. Internal incident reporting and investigation process.	– Weed Management Plan: and – Weed Monitoring Program 2. Annual inspection 3. As triggered.		• Weed Monitoring reports.
Low Management Level					
MO8: No adverse project-related impacts to significant fauna or critical habitat from dust, noise, and vibration.					
1. Dust management plan in place. 2. Dust suppression measures in place. 3. Implement speed limits on unsealed tracks. 4. Machinery and equipment will be fitted with noise attenuation measures. *Night Parrot management targets and actions are addressed in separate NPMP and Monitoring Program.	• Access roads to be appropriately engineered, with compaction, appropriate bunding and drainage implemented to prevent erosion and sedimentation. • Access roads will be subject to speed restrictions and dust suppression to minimise impacts on fauna. • Dust suppression measures will include good house-keeping practices for vehicles, cleared areas, and active stockpiles. • Use of dust suppression (water carts) during clearing activities and operations. • Machinery and equipment will be fitted with noise attenuation measures to meet personnel safety requirements. • Implement and enforce speed limits (40 km / hour at night-time) for all traffic in areas that critical Night Parrot habitat intersects the haul road. • Haul road speed limit to be 80 km per hour during daylight hours. The haul road will initially be unsealed; however, Agrimin plan to bituminise the haul road and this will subsequently reduce noise dust and vibration. • Speed limit of 60/km per hour on unsealed access tracks.	1. Internal incident reporting and investigation process. 2. If required, monitoring vegetation health in affected areas and adjacent areas. Vegetation health monitoring (with particular attention to areas where Priority flora species have been identified and in critical significant fauna habitat) for dust deposition. 3. Monitor activity of Great Desert Skink burrows within close proximity of haul road to determine success of speed limits in mitigating noise and vibration impacts. 4. Daily wind conditions (for elevated risk of dust as a result of clearing) will be taken into consideration when clearing activities are proposed. 5. Internal incident reporting and investigation process. 6. Complaints Procedure and Register.	1. As triggered 2. Following dust deposition event, as required. 3. As required – GDS Monitoring Program (Appendix C). – Bilby Monitoring Program (Appendix D). 4. Daily wind monitoring. 5. As triggered 6. Following receipt of a complaint (excessive dust levels, speeding)	• Construction. • Operations. • Environment Team.	• Monitoring data. • Annual Compliance Assessment Report (ACAR). • Internal incident reporting and investigation process

EPA Factor and Objective	Terrestrial Fauna: to protect terrestrial fauna so that biological diversity and ecological integrity are maintained.				
TFEMP Purpose and Objectives	To avoid adverse project-related impacts to terrestrial vertebrate fauna including significant fauna and associated habitat.				
Key Impacts and Risks	Potential loss or degradation of significant fauna habitat and the potential for loss of species from the proposal area, as a result of implementation of the Proposal. Refer to detailed Risk assessment (Appendix F, Appendix G).				
Indicators	Breach of significant fauna avoidance buffer(s), Population change (decrease in abundance of significant fauna species), breach of approved clearing extents impacting significant fauna habitat.				
Objective Based Management Provisions					
Management Target	Management Actions	Monitoring	Timing	Responsible	Reporting
MO9: No adverse project-related impacts to significant fauna or critical habitat from hydrocarbon or chemical spill.					
1. Hazardous Substances Management Plan (HSMP) and Procedure implemented. 2. Spill response training for all personnel and contractors. 3. Spill response equipment provided for all site vehicles (including on all Haul Trucks).	- Hydrocarbon and/or chemical leaks and spills (expected to be rare) will be managed using bunding techniques, leak detection mechanisms and spill kits to restrict impacts. - Spill response equipment available (including on all Haul Trucks). - Spill response training for all personnel and contractors. - Dedicated workshop for maintenance. - Maintain high standard of housekeeping around processing plant. - Bioremediation facility for the treatment of contaminated fill, soils, or sediment. - Management of sites as per the Contaminated Site Act 2003 (WA). - Develop and implement a Hazardous Substances Management Plan (HSMP) and Procedure.	- Internal incident reporting and investigation process for spills. - If required, sampling of soils to ensure all contaminated material has been removed and in situ soils sediment have been remediated. - If required, monitoring vegetation health in affected areas and adjacent areas.	- As triggered. - As required following a spill event. - As required in accordance with the schedule in the Vegetation Health Monitoring Program (FVEMP).	- Construction. - Operations. - Environment Team.	- Annual Compliance Assessment Report (ACAR). - Internal incident reporting and investigation process.
MO10: No adverse project-related impacts to significant fauna or critical habitat from project related artificial light spill.					
1. Directional lighting measures implemented in operational areas. 2. No artificial light spill from on-lake development into surrounding lake margin complex habitat (NP foraging habitat).	- Installation of lighting that direct lights toward operational areas to minimise light spill into adjacent vegetated areas. - Investigate light management options specific to terrestrial mammals with consideration of National Light Pollution Guidelines for Wildlife (DCCEEW 2023b) in proximity to Critical Bilby habitat: - Keep artificial light intensity as low as possible near terrestrial mammal refuge sites and known foraging areas and commuting routes. - Consider avoiding specific wavelengths that are problematic for the species present. In general, this includes avoiding the use of artificial lights rich in blue wavelengths, which are easily perceived by terrestrial mammals. Terrestrial mammals also show a strong physiological response to blue-wavelength light, where blue light may be preferable in proximity to significant bird species. Longer wavelength artificial light (such as red light) may have less impact on terrestrial mammal species, though this may not be the case for all species. Where this option is progressed, careful post-installation monitoring should be undertaken to assess the success of mitigation. - Consideration of the <i>National Light Pollution Guidelines for Wildlife</i> (DCCEEW 2023b) light management options specific to reptiles in proximity to Critical GDS habitat and known GDS populations: - For nocturnal reptiles such as GDS, artificial light may alter their movement in the landscape in a similar way to other wildlife and may result in disorientation and the increased risk of predation by nocturnal feral predators.	Undertake regular inspections for light spill	Monthly during construction and operations	- Construction. - Operations. - Environment Team.	- Monitoring data. - Annual Compliance Assessment Report (ACAR). - Internal incident reporting and investigation process.

Table 4-3: Supporting environmental management plans, procedures and documents

Environmental Management Aspect	Document Type	Document Title	Required Action/ Status	Commitments relating to terrestrial fauna (MNES)
Significant fauna - Night Parrot	Management Plan	Night Parrot Management Plan	Mackay Sulphate of Potash Night Parrot Management Plan and Monitoring Program has been completed and submitted to DWER and DCCEEW for approval.	
Site Wide - Incident Management	Procedure	Incident Reporting Procedure	Develop and Implement Procedure	Incident reporting for significant fauna in accordance with reporting requirements in the TFEMP and NPMP.
Site Wide - Emergency Response	Operational Plan	Emergency Response Plan	Develop and Implement Plan	Minimise risk of unplanned fire events and hazardous spills to critical significant fauna habitat.
Clearing	Procedure	Ground Disturbance Permit (GDP) System and Procedure	Develop and Implement Procedure	- All GDPs issued within each financial year will be recorded and reported to internal personnel on an annual basis. The following electronic spatial data will be included in the GDP report in support of this TFEMP: - Areas assessed as suitable critical significant fauna habitat. - Areas assessed as not suitable for critical significant fauna habitat. - Boundaries of any fires that have occurred. - The location of any confirmed significant fauna records. - Measures to trigger preclearance survey requirements for significant fauna prior to undertaking ground disturbance.
Fire	Procedure	Fire Management Procedure	Develop and Implement Procedure	- Fire management procedure to include appropriate measures for the management of fire and fuel loads in proximity to key significant fauna habitat and populations: - Fire management techniques should be implemented in concert with feral animal control and habitat restoration measures. - Avoid hot works in fire sensitive habitats (i.e. areas of long unburnt spinifex) and along the haul road. - Fire management planning and techniques implemented under the Offset Strategy will be co-designed and implemented with Traditional Owner involvement to incorporate two-way science and knowledge and to maintain healthy country. Proposal-related fire management programs will facilitate the traditional burning practices being undertaken in the region by traditional owners, encourage two-way knowledge sharing and the consideration of contemporary knowledge of significant fauna species and appropriate fire management practices including but not limited to the following: - Implement suitable burning practices to improve food resource availability for the Bilby within the region - Design and implement fire management practices around known Great Desert Skink burrow areas that maximise the coverage of spinifex and native groundcovers around burrows. - Species-appropriate fire management: prioritise small winter (or early dry season) burns to provide a mosaic of habitat ages and densities and to reduce the intensity and area size of fires (Cadenhead <i>et al.</i> 2016; Moore <i>et al.</i> 2015). - Burning activities around GDS burrows and key habitats should not be undertaken during the breeding season (September to October) (Dennison <i>et al.</i> 2015). - Establish Emergency Response Plan and Emergency Response Team (ERT).
	Permit	Hot Works Permit System.	Develop and Implement Permit System	- Reduce risk of fire occurring within proximity proposal area (minimises risk to significant terrestrial fauna and habitat) - No specific management commitments to threatened or specially protected terrestrial fauna species required.
Vehicle Interaction	Environmental Management Plan	Traffic Management Plan	Develop and Implement Plan	- The following management measures for significant fauna are to be included within the Traffic MP: - Monitoring and enforcement of speed limits through placement of interactive traffic management signs advising acceptable road use (daylight hours and private designation) and road user of compliance against speed limits (encouraging driver lead compliance). - GPS installation to monitoring Agrimin haul trucks and Agrimin vehicles to ensure compliance with speed limits. - Installation of traffic counting measures such as Pneumatic Tubes monitored quarterly to measure vehicle speed and road usage during non-daylight hours. - The haul road corridor will be designated a private road with appropriate signage to restrict vehicular traffic to only Agrimin workforce (employees and contract partners), and Traditional Owners. - Develop and implement awareness and education programs for all haul road users (including Agrimin workforce and Traditional Owners) relating to safety and governed use of the road designed to protect fauna. Engagement will specifically occur with Rangers to support this communication. - Engage and educate other (non Agrimin) haul road users of the importance in restricting driving to daytime hours where possible and following speed restrictions. Engagement will specifically occur with Rangers to support this communication. - Install signage to clearly demarcate existing authorised vehicle tracks and existing access tracks. - Implement and enforce the following speed limits on the Haul Road: 40km along the haul road during night-time in the vicinity of NP populations (noting that NP are not active in the day and haulage will only be undertaken during daylight hours);

Environmental Management Aspect	Document Type	Document Title	Required Action/ Status	Commitments relating to terrestrial fauna (MNES)
				– 80 km/hr speed limit to apply to the remaining NIDE. Key avoidance measures implemented whereby no haulage or operational use of haul road is to be undertaken during night-time (noting that significant fauna such as the Night Parrot, Bilby,/ Mulgara and GDS are not active during the day-time). – 60 km/ hour speed limit implemented for unsealed access roads. • Signage will be installed along access roads to advise of speed reduction (40km/ hour at night-time along the haul road in proximity to Night Parrot critical habitat): – Signs will not specifically mention the Night Parrot (due to the risk of poaching occurring), however, will advise of speed limit reduction to 40km in these areas. The signage approach within proximity to Night Parrot critical habitat will be determined following consultation with DBCA prior to installation. – A component of the signage will include local indigenous language (following adequate consultation with Traditional Owners) who utilise the road. • Implementation of key avoidance and mitigation measures such as: – All haulage to be undertaken during daytime hours only when significant fauna species (NP, Bilby, Mulgara and GDS) are not active. – Operational driving (non-haulage) will be restricted to daylight hours, unless for an unplanned event (for example emergency response). • Implement additional speed reduction areas to 40km/ hour at night-time should a new location of a Night Parrot population be confirmed in addition to current known populations, within proximity to the haul road (signage will not allude to the fact that Night Parrot habitat occurs in proximity to the haul road, due to risk of poaching). • Should nighttime road traffic levels be found to significantly increase following monitoring as per the TMP, additional engagement will be undertaken to educate other (non Agrimin) haul road users of the importance in restricting driving to daytime hours where possible and following speed restrictions.
Vehicle Interaction Feral Predators	Educational Material	Educational Packages - Terrestrial Fauna	Develop and implement education programs for haul road users (including Traditional Owners), site personnel including contractors.	• A staff induction will: – explain the importance of stopping and eradicating feral and pest species becoming established; – advise staff of the TFEMP, and in particular the triggers requiring action, so that they inform management when appropriate action is required; – indicate to all staff that feral and native fauna must not be fed on-site nor will containers for water be provided for feral and pest species to access; – require that any physical or near miss interactions / incidents between feral and pest species and staff and visitors is recorded in the internal record management system.
Feral Predators	Management Plan	Waste Management Plan	Develop and Implement Plan	• There are no Western Australian guidelines that pertain to the management of vertebrate fauna in waste management facilities, although there are more general guidelines on landfill and waste management facility operations (e.g. (Wright Corporate Strategy Pty Ltd 2003), but none provide guidance on managing vertebrate fauna. • The waste management procedure will include the following management measures to avoid attraction of feral predators: – Avoid attraction of introduced predators by implementing domestic waste management procedures (e.g. fencing of landfills, regularly covering putrescible waste, secure lids on bins): – Putrescible waste to be stored and disposed of in a way that cannot be accessed by fauna. – Landfill wastes will be covered promptly, and active waste disposal cells will be fenced to exclude large fauna. – Fence off artificial water sources to deter predator access, following best practice exclusion fencing guidelines to allow ongoing dispersal of fauna species. Specific fencing requirements in proximity to critical night parrot habitat and NP populations are outlined in the NPMP.
Hydrocarbons	Procedure	Refueling Procedures of on-lake vehicles, plant, and equipment.	Develop and Implement Procedure.	• To consider potential implications from refueling on significant fauna habitat.
Hydrocarbons	Plan	Spill Response Plan	Develop and Implement Plan.	• Elevated spill response within areas attributed to critical significant fauna habitat
	Procedure	Controlled Waste Management Procedure	Develop and Implement Procedure.	• To consider management measures to avoid attraction of feral predators.
	Register	Contaminated Sites Register	Develop and Implement Register.	• Elevated management response within areas attributed to critical significant fauna habitat
Rehabilitation	Procedure	Topsoil Management Procedure	Develop and Implement Procedure.	• Priorities retaining topsoil from areas in critical fauna habitat.
Weeds	Procedure	Weed Management Procedure	• Plan has been completed and included in the CEMP and submitted to DWER and DCCEEW for approval in the FVEMP.	
Dust Management Plan	Management Plan	Dust Management Plan	• Plan has been completed and included in the CEMP and submitted to DWER and DCCEEW for approval.	

4.6 Rehabilitation

Opportunities for progressive rehabilitation within the Proposal area are limited. The most significant disturbance in terms of land clearance is a combined total of 1,500 ha for the Off-LDE, the haul road in the NIDE and the borefield, water pipelines and access tracks in the SIDE. Areas proposed for the Project and development of the operations are likely to all be used until closure and the clearing of significant fauna habitat within these areas is proposed to be offset as described in the Revised Offset Strategy.

As the operations progress, some opportunities for progressive rehabilitation of small areas of fauna habitat (e.g. exploration, bores, other cleared areas such as borrow pits) will be identified and added to the Schedule of Works in the revised iteration of the Mine Closure Plan (MCP).

4.6.1 Rehabilitation Methods

The Schedule of Works will be updated within the revised iteration of the MCP. The following general rehabilitation methodologies apply to the following disturbance types (tracks, roads, facilities and borrow pits) for the proposal:

- **Rehabilitation objective:** disturbed areas are rehabilitated to a stable condition that is compatible with the natural ecosystem composition and processes of analogous areas with equivalent landform and soil characteristics.
- **Timing:** to be undertaken in accordance with the schedule of works within the revised iteration of the MCP.
- **Roads or tracks** not required for long-term reserve management purposes will be rehabilitated.
- **Vegetation clearing:** to be completed in accordance with the Ground Disturbance Procedure and in accordance with **Section 6** of this TFEMP.
- **Topsoil:** where available, topsoil will be sourced from analogous soil-landscape types and will be used on the surface after recontouring earthworks have been undertaken, the surface will be ripped, and designated areas will be seeded with a local provenance native seed mix suitable for the desired post-mining land use.
- **Ripping, scarification, or subsoiling:** can be used to break up compacted, or naturally impermeable subsoils in areas undergoing rehabilitation. Tines are set 300 mm apart and used to rip to a maximum depth of 300 mm. Scarifying aims to reduce surface compaction with the use of a toothed bucket on an excavator. The soil surface (<100 mm) is "scratched" to alleviate residual surface compaction.
- **Weed Control:** Disturbed areas are conducive to weed proliferation, therefore rehabilitation areas will undergo annual weed monitoring or after significant rainfall events to capture opportunistic weed establishment.
- **Access:** restrict access to rehabilitated areas with signs on completion of rehabilitation works.
- **Inspection:** Upon completion of all rehabilitation tasks at a site, suitably qualified environmental staff as directed by the Environment Manager will inspect the site and confirm rehabilitation works have been completed satisfactorily. The site and associated rehabilitation tasks completed will then be added to the completed rehabilitation sites checklist.

4.6.2 Rehabilitation methods for Significant Fauna Habitat

In addition to the methods mentioned in **Section 4.6.1**, the specific rehabilitation requirements for rehabilitation of habitats considered of high value to significant fauna species are shown in **Table 4-4**. These techniques will be included in the rehabilitation methods in the revised MCP for the proposal.

Table 4-4 Rehabilitation procedures for high value significant fauna habitat.

High Value Significant Fauna Habitat	Significant Fauna	Rehabilitation Process
Gravel Spinifex plain	- Bilby (Vu,Vu)- recorded at 92 locations* - Brush-tailed Mulgara (P4)¹ - Spotted Ctenotus (P2)- recorded at 6 locations¹	- Undertake rehabilitation as described in Section 4.6.1. - The construction of the haul road will follow the natural contours of the landscape, allowing the marsupial mole to persist within habitat in more elevated areas in the landscape following construction.
Spinifex sandplain	- Bilby -33 locations* - Great Desert Skink (Vu,Vu) * A representative photograph of the habitat is shown in Table 2-4.	
- Claypans and Claypan mosaic (and adjacent areas with old growth Triodia) - Saline flats and depressions	- Bilby-3 locations* - Night Parrot*	- Rehabilitation specific to Night Parrot critical habitat (Claypans and Claypan mosaic (and adjacent areas with old growth Triodia) and saline flats and depressions are outlined within the stand alone NPMP. - Old growth Triodia will take many years to provide habitat compatible with the natural ecosystem composition and processes of analogous areas. The following rehabilitation techniques (in addition to those listed in Section 4.6.1) apply to areas with old growth Triodia: - Undertake progressive rehabilitation where possible. Within the Claypans and Claypan mosaic, opportunities for progressive rehabilitation within old growth Triodia will be limited given that the total proposed clearing within this habitat comprises 42.2 ha (0.26%) of the Development Envelope, which is proposed to be offset. Opportunities for progressive rehabilitation area limited to exploration, bores, other minor cleared areas, such as borrow pits. - The placement of borrow pits, minor tracks will be avoided within areas containing old growth Triodia, where practicable. Should the removal of old growth Triodia be unavoidable for operational requirements then the following procedures will be implemented: - Identify available topsoil within the habitat type. - Do not bring in additional topsoil from other areas. - Lightly scarify the area to loosen the soil substrate. - Spread topsoil thinly over a proportion of the rehabilitated area. - Consider installation of temporary fencing in rehabilitated areas to allow for colonisation of spinifex over time. - Undertake weed control in accordance with the WMP. - Maintain hydrological flows.
	Following Periods of inundation- Threatened and Migratory Bird Species¹	

High Value Significant Fauna Habitat	Significant Fauna	Rehabilitation Process
		– Seed collection with native providence is to be undertaken prior to clearing. • Investigate and trial treatments to adapt spinifex seeds for optimum growth rate success. Consider innovative techniques in consultation with SME's (Kings Park Botanic Gardens) such as trialling seed-coating (adding chemicals to seed coats for example germination promoting agents or anti-stress agents or water holding gels) that may promote a higher seedling growth rate success. • Consider installation of temporary fencing (suitable style to minimise injury or mortality of Night Parrots) of rehabilitated areas.
• Riparian vegetation: – Salt lake playa, associated islands and surrounding claypans and claypan mosaic and saline flats and depressions when Lake Mackay is in flood. – Lake Margin Complex.	• Threatened and Migratory Bird Species¹	Riparian vegetation: • Seed collection with native providence is to be undertaken prior to clearing. • Retain cleared vegetation following appropriate hygiene protocols and respread as soon as practicable in increase rehabilitation success. • Consider installation of temporary fencing of rehabilitated areas.
• Dune-field	• Bilby -1 location*	Sand dune habitats are naturally prone to wind erosion. Erosion is therefore a key factor for consideration for rehabilitation within this fauna habitat type: • If ripping is being conducted to produce contours for erosion resistance, use of winged tines should be considered. However, scarifying is preferred as it is considered to be less intrusive than ripping and is suited to areas naturally influenced by erosion. • Additional erosion control methods will be applied to rehabilitated areas, as appropriate.
• Dune	• Bilby -1 location*	

* Habitat critical to the survival of the species

¹ Primary habitat for the species within the Study Area.



5 Monitoring and Evaluation

Monitoring Programs have been developed to align with the TFEMP and are presented in **Appendix B, Appendix C and Appendix D and Appendix E**. The survey design, frequency and components have been considered and informed by previous findings, and where possible aligned with the baseline survey (Stantec 2021a), for consistency and to allow for comparison over time to assess the effectiveness of the management measures outlined in this TFEMP (**Section 4**). The performance targets have been aligned with the outcomes-based objectives and associated environmental criteria, with associated measurement parameters, monitoring frequencies and responsibilities.

The Monitoring Program has been developed to achieve the following objectives:

- monitor the success of mitigation and management and detect potential impacts (**Section 3.3**) to terrestrial fauna and habitat;
- evaluate potential impacts against trigger, threshold, and target criteria (management provisions) (**Table 4-1**);
- report exceedances against environmental criteria and implement corrective actions where required (**Section 7**); and
- assess the effectiveness of the environmental criteria to inform adaptive management and revision where required (**Section 9**).

Where environmental threshold criteria are exceeded, potential corrective actions have been identified for terrestrial fauna (**Table 4-1**).

6 Pre-clearance Surveys Significant Fauna

6.1 Overarching Approach and Administrative Requirements

Pre-clearance surveys will be undertaken within the indicative footprint 4 weeks prior to clearing being undertaken. General methodology for these surveys is outlined below:

- Pre-clearance surveys are to be undertaken by a qualified zoologist.
- Pre-clearance walk throughs within the indicative footprint will be undertaken to identify and displace fauna prior to clearing.
- Pre-clearance walk throughs will be undertaken the morning before clearing / disturbance to displace individuals and will include searching and checking refugia sites.
- Suitably qualified fauna personnel will be present during clearing activities, in the unlikely event that significant fauna are injured during clearing.
- Prior to undertaking a pre-clearance survey a DBCA Regulation 27 license and a Section 40 Authorisation to Take or Disturb Threatened Species is required.
- Injured fauna euthanised according to the animal ethics application or taken to a care facility that can be used to rehabilitate injured fauna, where appropriate.
- An appropriate procedure for the care of injured fauna will be developed in consultation with Department of Biodiversity, Conservation and Attractions (DBCA) and **Section 6.4.1**.

Separate requirements for the Night Parrot, Greater Bilby and Great Desert Skink, Brush-tailed Mulgara and Spotted Ctenotus during pre-clearance surveys are outlined below. Although the specific timeframes for clearing will be dependent upon availability of resources and environmental conditions, the broad approach will follow the steps below and undertaken over approximately two to three years. The approach for vegetation clearing is described in Subsequent sections.

6.2 Clearing Approach: Night Parrot Critical Habitat

Critical habitat for the Night Parrot in the Proposal Area has been defined as:

- Claypans and claypan mosaic; and
- Saline flats and depressions.

Night Parrot Critical habitat is recorded within the Ground Disturbance Permit procedure database. The clearing approach for the Night Parrot is to adhere to the pre-clearance survey protocol outlined in the NPMP for both within critical habitat (**Section 5.2.1** of the NPMP) and outside of Night Parrot critical habitat (**Section 5.2.2** of the NPMP).

6.3 Clearing Approach: Greater Bilby, Great Desert Skink, and Mulgara Critical Habitat and suitable habitat for Spotted Ctenotus.

Critical habitat within the Proposal area for the Bilby has been identified as gravel spinifex plain, spinifex sandplain, claypan and claypan mosaics, dune-field and dune. Critical habitat for the Great Desert Skink and Mulgara within the Proposal area has been identified as Spinifex Sandplain habitat. Suitable habitat for the Spotted Ctenotus within the Proposal area has been identified as gravel spinifex plain habitat and is only known to occur within the Paruku IPA of the Tjurabalan People.

The clearing approach for these species applies to any clearing of critical habitat for these species which includes the clearing for the trace line and clearing for the wider footprint for the construction of the haul road and other Proposal related infrastructure.

6.3.1 Greater Bilby

The methods to be aligned with the "Guidelines for pre-clearing searches to locate resident bilbies" and the "Guidelines for relocation of bilbies prior to vegetation clearing". These documents are located within "The conservation and management of the bilby (*Macrotis lagotis*) in the Pilbara" (DBCA 2018a). In accordance with these guidelines, the approach will be undertaken in two stages.

- **Stage 1:** Pre-clearing searches to locate resident bilbies in critical habitat for the species.
- **Stage 2:** Relocation of bilbies prior to vegetation clearing.

Critical habitat for the Bilby has been identified as Gravel Spinifex Plain and Spinifex Sandplain Habitat.

6.3.1.1 Stage 1: Clearing Approach: Pre-clearing searches to locate resident bilbies

The objective of this step is to identify burrows and assess their occupancy before relocation options are considered. Representative photographs of Greater Bilby burrows are shown in **Figure 6-1**. Searches to be undertaken at most, no longer than 2 weeks prior to the commencement of clearing. This approach accounts for the species moving into an area within a short timeframe. The steps for pre-clearance searches are summarised below and detailed within DBCA (2018b).

- **Transects:** Initially traverse the proposed clearing area to detect areas of Bilby activity/signs. Spacing of transects to be close enough together to ensure that bilby signs between transects will not be missed. This spacing is to be adjusted during the survey depending on visibility within the area being searched.
- **Intensive searches:** If evidence of bilbies is found during these initial transects, undertake more intensive searches where transects spacing ensures visibility of all ground between adjacent transects. Exact distances between transects depend on vegetation and terrain but are in the order of 20m spacing. The aim is to locate recent foraging sign, fresh tracks and scats. Should little to no evidence be recorded, more intensive searches will be undertaken to locate all occupied burrows.
- **Records:** Once a burrow is located, clearly mark and record the location.
- **Determine activity:** All burrows to be assessed for recent occupation (fresh tracks or recent excavation). Use of motion cameras is recommended. If there is any evidence that a burrow is potentially occupied, a precautionary approach should be adopted and the protocols for 'Occupied burrow' should be adopted.
 - **Unoccupied burrow:** See description within DBCA (2018b). In these circumstance, no further monitoring is required. Actions as detailed within DBCA (2018b) involve exposing the burrow for at least one night and then filling in the burrow to prevent fauna moving into the burrow before, during or after clearing activities.
 - **Potentially occupied burrow:** See description within DBCA (2018b). Monitoring via motion camera is required for a minimum of three nights and records kept and included in reporting. The cameras used will be Reconyx (or better quality). Recommended setting includes the following (but may require adaption depending on the model of camera and the conditions of the survey): Number of pictures: 3 (or more); Time between pictures: RapidFire; Quiet period: No Delay; and sensitivity: High-Very High. The camera will be positioned so that it faces into the burrow but at a sufficient distance so that it has sufficient 'field of view' that it captures fauna entering and leaving the burrow. The camera will be mounted on a stake to provide elevation and increase the field of view. Consideration should also be given to focal distance of the camera model. Effort should also be made to avoid situations where vegetation may contribute to a high number of false triggers. Ideally two cameras will be used to increase confidence of determining burrow occupancy or vacancy. If there is no evidence of fauna activity for at least three nights, then the burrow can be classed as "Unoccupied" and actions described for an unoccupied burrow above will be undertaken immediately. If the burrow is identified as "Occupied", the steps outlined in **Section 6.3.1.2** will be undertaken as per "Guidelines for relocation of bilbies prior to vegetation clearing" (DBCA 2018b), summarised below.

6.3.1.2 Clearing Approach: Relocation of bilbies prior to vegetation clearing

This step is required where active burrows have been identified within the planned clearing area. The objective of this step is to displace or relocate the individual to prevent injury or mortality. A minimum of a week (3 nights for displacement, 4 nights for trapping) should be devoted to relocation if potentially occupied burrows are identified.

The preferred approach should always be displacement where the animal is encouraged to move out of the proposed clearing area on its own accord. The displacement approach is preferred as it minimises direct trapping and handling of bilbies and reflects the behaviour of bilbies to use multiple burrows within their home range and their ability to rapidly excavate new burrows. Trapping and physical relocation should be only undertaken under circumstances where displacement has not been successful before clearing occurs, or if adjacent habitat is inviable.

Steps included in this section for relocation of Bilbies are summarised below and detailed within DBCA (2018b).

- Fauna relocation, including the following:
 - Displacement to encourage fauna to abandon burrows; and
 - Capture and release.
- Conduct vegetation clearing with a fauna spotter present; and
- Monitor displaced or relocated fauna activity after disturbance and mitigate threats.

Displacement: Steps are summarised below and detailed within DBCA (2018b).

1. Remote cameras previously installed to determine occupancy or potential occupancy should remain in-situ to continue monitoring fauna activity and confirm that fauna have left the burrow.
2. Some disturbance (i.e. partial excavation) of all burrow entrances within the development footprint may help make the burrows unattractive to the fauna and they may vacate the burrow and leave the impact area.
3. Time and date stamped images of fauna exiting a burrow and not returning, together with a lack of fresh sign (tracks on a sand-pad at the entrance), must be gathered to confirm successful displacement has occurred. Two cameras are recommended.
4. Once fauna displacement from a burrow has been confirmed, the burrow must be filled in immediately to prevent fauna moving in before, during or after vegetation clearing.
5. Following displacement it is possible that new burrows will be created within the proposed clearing area. Surveillance within the surrounding proposed clearing area is to be undertaken.
6. An animal may persist in using even a partly excavated or collapsed burrow or try to re-excavate a burrow. Burrows should continue to be monitored until clearing has been undertaken.
7. If there is no confirmation that fauna have left an occupied or potentially occupied burrow, monitoring should continue for at least three nights until displacement is certain or capture and release is used.

Capture and Release: Steps are summarised below and detailed within DBCA (2018b):

Capture and release may be appropriate where displacement has been unsuccessful in timeframes before clearing is scheduled to commence. Displacement is the preferred method as Bilbies can be difficult to trap and trapping can cause stress to the individual. It is important that capture and release is undertaken in accordance with relevant DBCA standard operating procedures (SOPs) presented within DBCA (2018b) such as:

- Transport and temporary holding of wildlife SOP No: SC22-11 (DBCA 2023b).
- Cage traps for live capture of terrestrial vertebrates SOP No: SC22-07 (DBCA 2023a).
- Animal handling and restraint using soft containment SOP No: SC22-12 (DBCA 2023c).
- Hand capture of wildlife SOP No: SC22-12 (DBCA 2022).
- Hand restraint of wildlife (DBCA 2017d); and
- Care of evicted pouch young SOP No. SC22-16 (DBCA 2023d).
- An appropriate DBCA fauna licence is required prior to undertaking capture and release of individuals.

The following trapping methods, trapping periods and handling protocols are to be undertaken in accordance with the methods presented within DBCA (2018b):

- **Burrow traps:** Cage traps with internal-opening doors, with top and side covered by hessian. The entrance to the burrow must be carefully dug to ensure the trap fits snugly. Bait is unnecessary.
- **Yard traps:** A card built around a burrow using 900mm tall, 3000-4000mm long panels of 25x25mm or finer square mesh with a hinged 300-400mm footing. The footing must face inwards towards the burrow entrance. Cage traps with internal-opening doors should be set inside the yard, with top and side covered by hessian.
- **Trapping period:** Traps will be checked at sunrise each morning. A burrow trap that has been sprung by a Bilby or another but captured will be removed and replaced with a yard trap around the burrow. After no more than three consecutive nights of trapping, a burrow should be carefully excavated to ensure all animals have been captured, then collapsed to prevent re-excavation. Collapsed burrows will continue to be inspected to ensure recolonization does not occur prior to clearing.
- **Handling:** Follow DBCA SOPs. Always check there are no ejected pouch young in or around the trap. Re-insert any ejected pouch young, tape and release. If a lactating female is captured, hold the mother until burrow excavation is completed to attempt to retrieve the young and reunite. All individuals captured should receive a general health check and be sexed.
- **Transport and release:** Release captured Bilbies as soon as possible (hold for no more than 14 hours) at a pre-selected release site. If release cannot be undertaken immediately, store held Bilbies in dark, well ventilated, quiet and cool areas (less than 20°C) in soft containment bags within petpacks. If possible, release the Bilby at a dis-used Bilby burrow at the release site. If no suitable burrow is found, construct an artificial burrow by digging a 30 degree slope to 1m depth with a half-cut 35-45mm PVC pipe lining the roof. If releasing early morning, a yard trap can be constructed around the intended release burrow (dis-used or artificial) prior to release in the event the Bilby finds the burrow unsuitable and decides to reemerge during daylight.
- **Monitoring:** Monitor relocated Bilbies with motion cameras facing burrows for at least four days.

During Vegetation Clearing: Steps are summarised below and detailed within DBCA (2018b):

- Within two days of any planned clearing, a fauna specialist will be engaged to undertake a walkthrough of the proposed clearing area to inspect any previously filled burrows to ensure that the Bilby has not recolonised the filled burrows and to ensure that no new burrows have been constructed.
- Clearing should commence at a maximum distance from any retained burrow and progressively move towards it, allowing fauna to move out of the impact area into non-cleared vegetation. All Clearing activities must be undertaken during daylight hours with a fauna spotter present.
- If any Bilbies are found to have relocated within the proposed clearing area, Agrimin will immediately stop the planned clearing activities and follow the steps above in accordance with the guidelines for relocation of bilbies prior to vegetation clearing (DBCA 2018).

After Vegetation Clearing: Steps are summarised below and detailed within DBCA (2018b):

- Retain any motion cameras installed at burrows, to detect any animals that use abandoned burrows as refuge sites. Record any activity.
- Record any secondary signs of Bilby using the area surrounding the development footprint, based on opportunistic sightings.
- Periodically inspect the cleared area to determine if Bilby recolonisation has occurred, as excavated/loose soil is preferred for burrowing. Minimise areas of loose soil.
- If a period of two weeks or longer elapses between fauna displacement and clearing, conduct additional pre-clearing searches (and relocation if required), as recolonisation may occur.

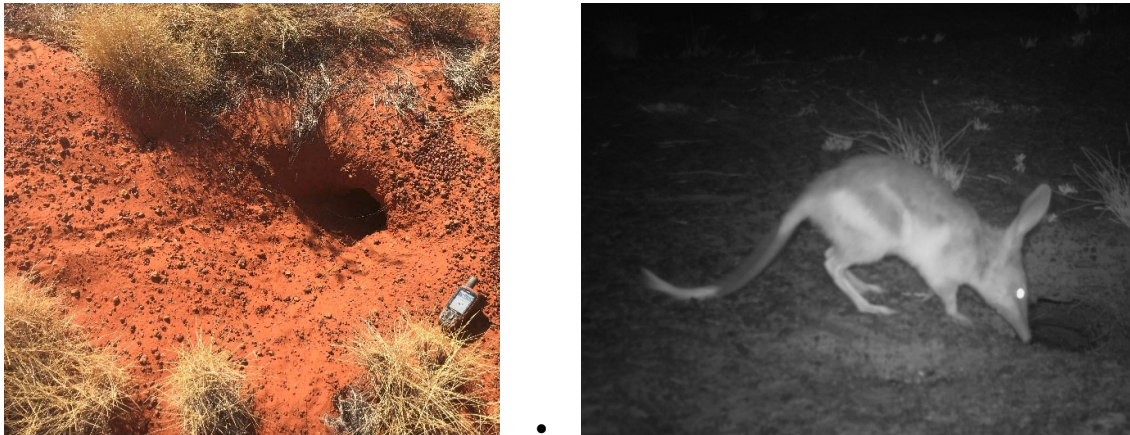


Figure 6-1: Representative photographs of a Greater Bilby burrow and a Great Greater Bilby.

6.3.2 Great Desert Skink

Critical habitat for the Great Desert Skink within the Study Area has been identified as spinifex sandplain habitat. In total, 64 active burrows of the Great Desert Skink were recorded during surveys for the Proposal with all records within a single population (the Yagga Yagga population). None of these burrows occur within the Indicative Footprint or within the Development Envelope for the Proposal. All records of the species within the vicinity of the Proposal occur within Spinifex Sandplain habitat. This habitat coincides with habitat that is also identified as critical habitat for the Bilby (Spinifex Sandplain and Gravel Spinifex plain). Consequently, the pre-clearance survey approach for Bilby (**Section 6.3**) which includes transects and intensive searches, will also apply when conducting pre-clearance surveys for the Great Desert Skink.

If burrows are encountered during pre-clearance surveys, the area of proposed clearing will be amended where possible, to avoid active burrows and a 150m buffer implemented. This buffer accounts for foraging behavior for the species with the aim reduce the potential for secondary impacts e.g. road strike, habitat fragmentation and habitat degradation occurring. Should a buffer zone be implemented for active Great Desert Skink burrows, the area is to be delineated with flagging tape, signage or similar to be installed to alert all personnel of their location and importance. A representative photograph of a Great Desert Skink burrow is shown in **Figure 6-2**.



Figure 6-2: Representative photograph of a Great Desert Skink burrow.

6.3.3 Brush-tailed Mulgara

The Mulgara has been recorded primarily from Spinifex Sandplain habitat. Although this species is not listed as threatened under state or commonwealth legislation, there exists opportunity to relocate individuals of this species during pre-clearance surveys for the Bilby and Great Desert Skink as all three species inhabit the Spinifex Sandplains. Consequently, the pre-clearance survey approach for Bilby (**Section 6.3**) which includes transects and intensive searches, will also apply when conducting pre-clearance surveys for the Mulgara.

If burrows are identified during pre-clearance surveys, any individuals are to be relocated to similar habitat in the area by a qualified fauna expert. A representative photograph of Mulgara burrows is shown in **Figure 6-3**. The relevant fauna expert will require a fauna license approved from DBCA to undertake any relocations and the work undertaken in accordance with DBCA SOPs, including:

- Transport and temporary holding of wildlife SOP No: SC22-11 (DBCA 2023b);
- Animal handling and restraint using soft containment SOP No SC22-12 (DBCA 2023c);
- Hand capture of wildlife SOP No SC22-12 (DBCA 2022);
- Hand restraint of wildlife (DBCA 2017d); and
- Care of evicted pouch young SOP No. SC22-16 (DBCA 2023d).

The proposed relocation area should be in similar suitable habitat in the surrounds outside the immediate vicinity of operations.



Figure 6-3: Representative photograph of Brush-tailed Mulgara burrows.

6.3.4 Spotted Ctenotus

The Spotted Ctenotus (P2) has been recorded, primarily from gravel spinifex plain habitat and is only known to occur within the Paruku IPA of the Tjurabalan People (**Figure 2-5**). Within this area it was commonly encountered during baseline surveys (8 locations, 55 records). Although this species is not listed as threatened under state or commonwealth legislation, there exists opportunity to relocate individuals of this species prior to clearing. This will most effectively be achieved through undertaking pre-clearance walk throughs on the morning before clearing / disturbance to displace individuals (**Section 6.1**). Additionally, the species is fast moving and is likely to actively displace from approaching machinery.

A photograph of the Spotted Ctenotus is shown in **Figure 6-3**. The relevant fauna expert will require a fauna license approved from DBCA to undertake any relocations and the work undertaken in accordance with DBCA SOPs, including:

- Transport and temporary holding of wildlife SOP No: SC22-11 (DBCA 2023b);
- Animal handling and restraint using soft containment SOP No SC22-12 (DBCA 2023c);
- Hand capture of wildlife SOP No SC22-12 (DBCA 2022); and
- Hand restraint of wildlife (DBCA 2017d).

The proposed relocation area should be in similar suitable habitat in the surrounds outside the immediate vicinity of operations.



Plate 6-1: Spotted Ctenotus (*Ctenotus uber johnstonei*) captured during Phase 1 of the Stantec Survey (Photo: Ray Lloyd).

6.4 Injured Fauna Management

In the event that injured Night Parrot is found, the injured fauna management procedure outlined in the NPMP should be followed.

6.4.1 Injured fauna management for Significant Fauna

In unlikely event that an injured significant fauna individual is found, the following management actions should be undertaken in accordance with the Injured Terrestrial Fauna Management Procedure. The following management actions for injured fauna management should be undertaken by a fauna handler:

- An assessment if the fauna approach is safe and capture is necessary:
- Capture of the injured animal will be undertaken by a suitably qualified fauna handler.
- If handling is the preferred method, safely confine (wrap the animal in towel and place in cardboard box) ensuring the animal can breathe.
- Keep box closed but not sealed to allow for ventilation and place box in a dry, warm, dark and quiet place.
- The DBCA (2023b) - SOP Transport and Temporary Holding of Wildlife procedure should be adhered to if the injured animal is to be transported:
 - Where transportation of the injured animal is to occur on foot or vehicle.
 - Individuals shall be kept within a box with ventilation for secure transport; and
 - Temperature of vehicle will not exceed 25 degrees Celsius during transportation.
- First response wound management will be undertaken in accordance with DBCA (2017c) - SOP First aid for animals:
- Due to the remote location of the Proposal any medical attention required to the animal is to be assessed on a case by case basis in consultation with the fauna handler, a veterinarian and the Environment Manager; and
- In the event the animal is injured (or is dependent young) and is not able to be re-released (based on veterinarian advice), the DBCA shall be consulted for rehabilitation options.
- No relocation of nests or rehabilitated fauna individuals is to occur (unless in extenuating circumstances where prior consultation has occurred with EPA, DCCEEW and DBCA and approval and a permit to handle and move significant fauna has been granted).
- Euthanasia of an animal will only be undertaken under the instruction of a veterinarian, however, DBCA (2018c) - SOP Human Killing of Animals under Field Conditions should be considered, where appropriate.

6.5 Significant Fauna Monitoring

Monitoring of significant fauna will be undertaken in accordance with the relevant Monitoring Programs outlined in **Appendix A, Appendix B, Appendix C and Appendix D** of this TFEMP.

7 Reporting Provisions

All the analysis and subsequent reporting provisions relating to the performance of this TFEMP will be submitted to the relevant regulatory authorities by the Manager Environment, as follows:

- DBCA: where plans relate to matters listed under the Biodiversity Conservation Act 2016 (BC Act)
- DWER: where plans relate to matters regulated under the Environmental protection Act 1986 (EP Act).
- DCCEEW: where plans relate to matters listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) or is a matter of national environmental significance (MNES).
- EPA: where required under the Environmental Protection Act 1986 (EP Act).

Requirements for annual reporting, exceedance and incident reporting are discussed in subsequent sections.

7.1 Annual Reporting

Agrimis will prepare an Annual Environmental Reports (AER) for submission to the DWER and DBCA (where applicable). An Annual Compliance Assessment Report (ACAR) will be prepared for submission to:

- DWER/ EPA
- DCCEEW annually for MNES related values (ACAR annual compliance assessment report).

The format and contents of these reports will align with the conditions and requirements stipulated by the individual authorities and demonstrate compliance. Reporting specific to the management of terrestrial fauna will be summarised in the AER and ACAR to address the relevant conditions, with technical reports appended.

7.2 Exceedance Reporting

In the event that a threshold within this plan is exceeded, the DWER, EPA and DBCA will be notified, as required within 7 days of identification of the exceedance in accordance with **Section 4 (Table 4-1)**.

For matters regulated under the Environmental protection Act 1986 (EP Act):



- The Proponent will report a non-compliance to DWER within 7 days of identification.
- The Proponent will provide an investigation report to be submitted to DWER with remediation actions proposed within 28 days of incident report.

For matters relating to MNES:

- Proponent will report to DCCEEW in the event that monitoring, tests, surveys or investigations indicate exceedance of threshold criteria, the exceedance will be reported in writing to the DCCEEW within seven (7) business days of the exceedance being identified.
- The Proponent will provide a report to the CEO within twenty-one (21) days and to the DCCEEW within twenty-one (21) business days of the exceedance being reported.

7.3 Incident Reporting

Should evidence of, or an occurrence of an incident of Illegal collection of Significant fauna (Great Desert Skink) occur:

- Notify the Environmental Manager who will notify the local police as appropriate, to report the incident.
- The incident must be reported to DCCEEW and DWER within seven (7) days.
- An internal investigation into the incident should be undertaken by the Environmental Manager prior to the end of shift the following day with a written incident report including any supportive evidence such as GPS location, photographs, statements from witnesses should be included and reported to DCCEEW and DWER.
- The Proponent will provide an investigation report to be submitted to DWER and DCCEEW with remediation actions proposed within 28 days of incident report.

All environmental incidents, regardless of the scale and nature of the incident, will be reported in accordance with the internal incident reporting procedure to the Agrimin Manager Environment and, Heritage as soon as practicable. The following procedure will be adhered to:

- All environmental near misses and incidents will be recorded within an incident management system. Incidents will be recorded internally by the person/s who cause or identify the event, within 24 hours of the incident occurring.
- The area supervisor or Superintendent will determine the need for corrective actions and level of investigation required dependent on severity of the incident. Investigations will be conducted in accordance with the Investigation and Action Management Procedure and recorded within the incident reporting system within two weeks of the incident occurring, or as instructed by the Registered Mine Manager.
- Where applicable, environmental incidents will be reported to the relevant regulatory authorities by the Manager Environment.
- In the event of a non-compliance, the cause of the non-compliance will be investigated and reported as an incident. Corrective actions will be developed and recorded, and outcomes monitored, as required. Non-compliance and incident reports will be closed out by the Manager Environment and/or the Registered Mine Manager.

8 Roles and Responsibilities

The key personnel involved in implementation of the TFEMP and their roles and responsibilities are listed in **Table 8-1**.

Table 8-1: Roles and responsibilities for implementation of the TFEMP.

Role	Responsibility
Agrimin	• Agrimin have the overall responsibility for implementation of the TFEMP. • Audit and compliance. • Engagement with Traditional Owners
Manager Environment (may delegate all or part responsibility to an appropriately qualified person)	• Obtain relevant approvals from regulatory agencies for disturbance as required. • Undertake monitoring for significant fauna as detailed in Section 4.6 of this Plan. • Monitor and report incidents. • Maintain clearing register to ensure compliance with approvals. • Undertake internal audits and inspections of clearing areas and compliance with TFEMP. • Implement and maintain the TFEMP, review its effectiveness and review the implementation as required. • Undertake training and inductions of personnel in accordance with the TFEMP. • Implement terrestrial fauna monitoring programs as specified in Appendix A, Appendix B, Appendix C, Appendix D and Appendix E of this TFEMP. • Liaise with stakeholders and technical experts for advice and resolution of management aspects/objectives as required. • Engagement with Traditional Owners • Report as required to regulating authorities.
All personnel (including contractors)	• Complete induction prior to commencement of work on site. • Toolbox • Training • Comply with requirements in TFEMP. • Report any incidents through the Agrimin incident management system within 24 hours.
Third Party Contractor (specialist consultant)	• Specialist consultant to undertake monitoring according to terrestrial fauna monitoring programs as specified in Appendix A, Appendix B, Appendix C, Appendix D and Appendix E of this TFFMP.

9 Adaptive Management and Review

It is recognised that there are some knowledge gaps relating to a number of significant fauna for the key factor of Terrestrial Fauna, such as the abundance and distribution of some cryptic species. Therefore, this TFEMP has been designed to be adaptive, and should be updated over the life of the Proposal. It is expected that additional information from fauna monitoring will be used to revise environmental criteria and response actions, as required.

- Other changes that may prompt the revision of the TFEMP include:
- addressing items identified during incident investigations.
- audits or inspections; and
- additional information or data becomes available.

The TFEMP will be reviewed and revised every three years throughout the life of the Proposal, or as deemed necessary. Any revisions by Agrimin will be undertaken in consultation with DWER, DCCEEW and or DBCA (where appropriate). The review process for will include:

- **Periodic review and evaluation of monitoring data or methodology** – to determine whether monitoring results indicate that management provisions and environmental objectives are suitable and management targets can be achieved.
- **Increased understanding of this factor and habitat requirements of biota** – as additional information is received, which may be used to better inform environmental criteria, management or response actions.
- **Proposal changes (such as design and processing, or technical advances and innovation)** – consider the relevance and effectiveness of management provisions will be considered following any significant changes to the Proposal.

10 Changes to an EMP

This TFEMP (v1) is the original version submitted to the EPA and DCCEEW for review prior to assessment.

All changes to the TFEMP post-assessment must be provided separate to compliance reports and submitted to DWER and DCCEEW (for matters relating to MNES) for approval with changes summarised in **Table 10-1**.

Table 10-1: Changes to TFEMP

Complexity of Changes		Minor Revisions ☐	Moderate Revisions ☐	Major Revisions ☐
Number of Key Environmental Factors		One ☐	Two – Three ☐	> Three ☐
Date Revision submitted to EPA: DD/MM/YYYY				
Proponent's Operational Requirement Timeframe for approval of revision				
Reason for Timeframe:				
Item No.	EMP Section No.	EMP Page No.	Summary of Change	Reason for Change

11 Stakeholder Consultation

Several key stakeholder groups have been identified for the Lake Mackay Potash Proposal. Whilst engagement continues, some of the key stakeholders with respect to the Proposal include:

- State Government agencies, including the EPA, DWER, DBCA, Department of Mines, Industry Regulation and Safety (DMIRS), Department of Planning, Lands and Heritage (DPLH), and the Department of Jobs, Tourism, Science and Innovation (DJTSI);
- The Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW);
- Local Government agencies including the Shires of Shire of East Pilbara; Shire of Halls Creek; and Shire of Wyndham-East Kimberley;
- Native Title Bodies including: Central Desert Native Title Services; and Kimberley Land Council;
- Traditional Owners and Heritage representative groups, including the Tjamu Aboriginal Corporation and Kiwirrkurra People; Parna Ngururpa Aboriginal Corporation and Ngururpa People; and Tjurabalan Native Title Land Aboriginal Corporation.
- Environmental groups including the Conservation Council of Western Australia (CCWA) and Night Parrot Recovery Team, and
- Community representatives.

Agrimin maintains a Stakeholder Engagement Register that includes specific consultation with stakeholders and a detailed response to issues is provided. Stakeholder engagement will continue through the construction and operation of the Proposal and reported through revisions of Environmental Management Plans. Stakeholder consultation will continue to be monitored and reported following revision of the TFEMP as the document is finalised and implemented. A summary of stakeholder consultation specific to the TFEMP is summarised in **Table 11-1**.

Table 11-1: A summary of stakeholder consultation associated with the TFEMP.

Stakeholder	Date of Communication	Type of consultation	Attendees	Summary of communication	Outcome of consultation
Between 2014-2017, consultations with relevant regulatory agencies, government departments and indigenous groups are summarised as follows: - Regular meetings with representatives of the Kiwirrkurra People and CDNTS to discuss country, arrangements for an exploration agreement an negotiation protocol and discussions on heritage surveys - Meetings with the DMP (now DMIRS) to discuss environmental assessments and management plans and discuss options given the limitations associated with applying the Mining Act to brine mineral resources. Subsequent discussions took place with the DSD and Minister for State Development's office regarding this issue. - A meeting with the DoW to discuss implications to ground-water dependent ecosystems in relation to the Project. - A meeting with DPaW to discuss arrangements for flora and vegetation, terrestrial fauna and subterranean fauna in relation to the Project.					
DPAW	16-Feb-17	Meeting at DPAW office to provide project briefing	Agrimin: Tom Lyons DPAW: Sandra Thomas, Murray Baker, Michelle Corbellini	Flora & Vegetation - The Department of Parks & Wildlife ("DPAW") understand full environmental impact of Project on and off footprint. Agrimin should focus on conservation significant species. - Salt lakes are ecological islands. Note fringing vegetation, restricted species, new species, range extensions. - Correct ID of plants – confirmed by WA Herbarium – specimens to be properly vouchered. - Target genera and species of conservation significance, eg Tecticornia spp and samphires. - Transect surveys preferred over individual quadrats. - Gypsum islands have potential to host unique species – need thorough, targeted investigation. - Increase general survey area to capture more area outside of impact footprint. Vertebrate Fauna - Migratory birds after significant rainfall need to be investigated and	- Future studies to incorporate advice from government agencies. - Future bore hole drilling to incorporate calcretes on- and off-footprint. - Agrimin will make use of existing bores as far as practicable for subterranean fauna assessments.

Stakeholder	Date of Communication	Type of consultation	Attendees	Summary of communication	Outcome of consultation
				the potential for large bird numbers and associated aquatic invertebrates. - Target conservation significant species, especially Greater Bilby, Great Desert Skink and Brush-tailed Mulgara. - Map Bilby, Mulgara, Skink locations so that preferred living/foraging habitat is avoided as far as practicable. - Target endemic fauna, particularly reptiles. - Current fauna work needs to be more extensive, albeit Level 1 survey to date. Subterranean Fauna - Need to understand calcrete locations which are related to subterranean fauna distributions. - Need to assess subterranean fauna off-footprint as well as within disturbance envelope.	
OEPA	21-Feb-17	Meeting at OEPA office to provide project briefing	Agrimin: Tom Lyons EPA: Chris Stanley	- Ensure guidance document recommendations are incorporated into environmental assessments. - Provide technical environmental reports to the Office of the EPA ("OEPA") Technical Team for review and feedback. - Ensure early consultation on project with the Commonwealth Government.	- Provided technical reports on flora, vegetation and vertebrate fauna for review. - Initiated contact with Commonwealth's Department of Environment & Energy ("DEE") regarding project briefing.
DMP	17-Apr-17	Meeting at DMP office to provide project briefing	Agrimin: Tom Lyons DMP: Demelza Dravnieks	Impacts to surface water hydrology from trenching (bund wall influence on surface flows) should be assessed.	Trench configuration constructed to minimise interference with surface water flow

Stakeholder	Date of Communication	Type of consultation	Attendees	Summary of communication	Outcome of consultation
				• Use of piping constructed through bunds to direct surface flow over trenches. • Strategies should be considered to allow fauna egress from trenches if required. • Groundwater drawdown, including depth and extent, and impacts to flora and subterranean fauna needs to be considered. • Closure planning.	• Piping strategy successful elsewhere under similar conditions. • Appropriate and practical egress measures to be considered for trenches. • Further hydrological modelling required to quantify drawdown impacts. • Closure planning to be addressed as part of project's development studies.
Kiwirrkurra People & IPA Rangers	15-Sep-17	Flora & fauna survey briefing	Agrimin: Tom Lyons DSS: Kate Crossing	• IPA Ranger involvement in environmental baseline studies, particularly with respect to conservation significant flora and fauna.	• Cultural leaders & IPA Rangers enthusiastic about opportunity to work collaboratively with Agrimin and expert consultants.
IPA Rangers Program	24-Oct-17	Flora & fauna survey briefing	Agrimin: Tom Lyons DSS: Kate Crossing	• Discussed logistical requirements and targeted survey activities including scheduling for the November 2017 field survey.	• Improved understanding of involvement in the survey work and deliverables. • Agreed on dates for the survey period involving IPA Rangers.
IPA Rangers Program	31-Oct-17	Flora & fauna survey briefing	Agrimin: Tom Lyons DSS: Kate Crossing	• Coordination of field survey activities to be held in November 2017 at Lake Mackay involving IPA Rangers and zoology/botany consultants.	• Very positive response with regard to the duration of involvement with the survey and the activities planned. • IPA Rangers to engage as planned in field activities relating to conservation significant species.
IPA Rangers Program	10-Nov-17	Environmental baseline surveys	Agrimin: Tom Lyons DSS: Kate Crossing	• IPA Rangers keen to be involved in environmental surveys within their conservation area, particularly regarding conservation significant species, and engage in two-way	• Welcome involvement of IPA Rangers in survey work. Traditional ecological knowledge coupled with tracking skills used to great effect in locating habitat and



Stakeholder	Date of Communication	Type of consultation	Attendees	Summary of communication	Outcome of consultation
				learning process with scientists from mining consulting team.	species of conservation significance. - Four IPA Rangers committed to 4-day baseline studies field programme at Lake Mackay. - Close collaboration between mining consultants and IPA Rangers on a range of survey opportunities with positive engagement and feedback from all involved.
DEE	21-Dec-17	Pre-referral meeting on teleconference	Agrimin: Tom Lyons DEE: Matt Whitting, Mallory Owen	- The Commonwealth Department of the Environment and Energy ("DEE") requires an understanding of the Project's hydrogeological modelling - need to adequately understand groundwater drawdown in relation to depth and lateral extent, and connectivity between shallow and deep aquifers (existence and rate of connectivity). - Hydrological modelling is also required regarding any increase in infiltration from the shallow aquifer, and corresponding reduction in surface water availability. This may include: - The impacts of drawdown relating to the proposed project life (period) and area of extraction (spatial); - The likelihood of depressurization of the overlying units occurring; and - The approximate period of time to maximum impact extent and rate of recovery	- Preliminary groundwater and surface water modelling on-lake completed. Off-lake water modelling targeting potential impacts related to proposed borefield yet to commence. - Uranium and thorium concentrations in soils and sediments impacted by Project related activities to be assessed. - Re-visiting flora survey work to check for presence of <i>E. papillosa</i> and whether or not this species would have been visible, if present, during surveys. Also, look for other similar flora spp which may be impacted by changed hydrology (lowering of water table) and consider related impacts to dependent fauna. - DEE's comments should currently be considered a guide at best in lieu of more



Stakeholder	Date of Communication	Type of consultation	Attendees	Summary of communication	Outcome of consultation
				of the groundwater level in each aquifer. - Determine uranium (U) and thorium (Th) concentrations in sediments/soils (assay results) in Project impact area as this has been an issue raised in relation to similar projects by Ministers. If U and Th concentrations are elevated then ultimate test will be whether or not the action meets the test set out in Division 2.1 of the EPBC Regulations, particularly Regulation 2.02). - Investigate potential changed hydrology (water drawdown) impacts on the Dwarf Desert Spike-rush <i>Eleocharis papillosa</i> – DEE search radius of 120km around Lake Mackay identified its occurrence to NE of the lake (Northern Territory). Also, any other plant spp which may be similarly impacted and potential impacts to fauna such as Bilby that may be dependent on these species. - If Project assigned as 'Controlled Action' then assessment can occur via an 'Accredited Process'.	detailed information becoming available.
OEPA (EPA Services Directorate, DWER)	3-May-18	Feedback regarding draft referral supporting documentation	Agrimin: Tom Lyons EPA: Chris Stanley	- Advised that the overall referral document appears comprehensive, however, need to address the following: - Description for each activity in Key Characteristics table needs trimming to what is environmentally relevant and presented more concisely; - Development envelope needs to be reduced in size	- Agrimin will address each of the comments and amend the referral document, as appropriate. - Technical reports were not provided with the supporting document which may have facilitated an understanding of the issues commented on.

Stakeholder	Date of Communication	Type of consultation	Attendees	Summary of communication	Outcome of consultation
				so that it is, at most, double the amount of disturbance; – Check that most recent EPA guidance is followed – see reference to 2004 (updated in 2016); – Potential impacts to potentially 5 new Tecticornia species needs to be more fully addressed; – Waste salt stockpiles – height and location may be an issue. – Greenhouse gas emissions – include truck haulage of product; – Remove or clarify reference to ‘EPA scoping guideline’; – Remove reference to ASX code, and – MNES – complex with regard to what may be assessed under the EPBC Act.	
DEE	9-May-18	Feedback regarding draft referral supporting documentation	Agrimin: Tom Lyons DEE: Thomas Schindl	• Department requires enough detail to consider whether or not the Proposal constitutes a nuclear action in accordance with Section 22 of the EPBC Act, Regulations 2.01 – 2.03 of the EPBC Regulations 2000 and the Australian Radiation Protection and Nuclear Safety Regulations 1999; • Need adequate description and quantification of the quality and extent of vegetation type and habitat to be affected. • Night Parrot surveys to be conducted in accordance with the WA DPaW (now DBCA) Interim	• Agrimin will address each of the comments and amend the referral document, as appropriate. • Technical reports were not provided with the supporting document which may have facilitated an understanding of the issues commented on.



Stakeholder	Date of Communication	Type of consultation	Attendees	Summary of communication	Outcome of consultation
				guideline for preliminary surveys of Night Parrot in WA.	
Desert Support Services	27-Nov-18	Meeting to discuss opportunities for TO involvement on surveys	Agrimin: Tom Lyons Stantec: Paul Bolton DSS: Kate Crossing	Meeting to discuss planned environmental surveys in 2019 and where there are opportunities for the Kiwirrkurra IPA Rangers to be involved (i.e., flora and fauna surveys on the islands and along the haul road). And run through the expected dates for the surveys.	Excited about the opportunity to work together on future surveys
Desert Support Services	27-Feb-19	Meeting to discuss approach and survey design for Phase 1 flora and fauna surveys with TOs	Agrimin: Tom Lyons Stantec: Paul Bolton DSS: Kate Crossing, Rachel Paltridge	Phase 1: Meeting to discuss details of how TO will be involved during the upcoming fauna surveys, particularly targeted surveys work for the Bilby and Great Desert Skink amongst other spp.	Excited to be conducted the surveys together.
DWER - EPAS	6-Mar-19	EPAs Aquatic and Terrestrial Ecology Discussion	Agrimin: Tom Lyons (General Manger) EPA: Chris Stanley, Helena Mills (Flora and Vegetation), Claire Stevenson (Fauna and Aquatic) Stantec: Sarah Osborne (Approvals), Kate Stanbury (Approvals), Fiona Taukulis (Aquatic Ecology), Paul Bolton (Fauna), Alice Bott (Flora and Vegetation)	Key Topics - Haul road corridor flora, vegetation and fauna survey - Consolidation of previous survey work within the on-lake and off-lake development envelopes - SRE surveys within the haul road corridor and in the vicinity of the lake - Aquatic ecology survey during flooding (or rewetting trials as an alternative)	Preliminary feedback provided on approaches for surveys
Desert Support Services	19-Sep-19	Meeting to discuss approach and survey design for Phase 2 flora and fauna surveys with Tos	Agrimin: Tom Lyons Stantec: Paul Bolton DSS: Kate Crossing, Rachel Paltridge	Phase 2: Meeting to discuss details of how TO will be involved during the upcoming fauna surveys, particularly targeted surveys work for the Bilby and Great Desert Skink amongst other spp.	Excited to be conducted the surveys together.



Stakeholder	Date of Communication	Type of consultation	Attendees	Summary of communication	Outcome of consultation
EPAS	25-Feb-20	Meeting at EPAS Office to provide project update and advise of changes	Agrimin: Tom Lyons Stantec: Sarah Osborne EPA: Peter Tapsell	- Peter Tapsell (PT) advised that TEB branch have reviewed the flora and fauna memos provided. Peter relayed the message that the TEB had reviewed these and said that they looked ok and based on what was proposed in those memos there was no requirement for TEB branch to meet with Agrimin/Stantec. - PT – the Section 43a looks good in terms of the proposed changes and significance to tick the box and he sees no issues in proceeding with the current approval's pathway (i.e., section 43a and ESD submitted concurrently, and ERD will reflect the proposed changes).	Agrimin to proceed with lodging S43a change notice
Central Deserts and Desert Support Services	7-Aug-20	Meeting to discuss survey results and future survey plans	Agrimin: Tom Lyons Stantec: Paul Bolton DSS: Kate Crossing, Angie Reid	Planning for upcoming targeted Great Desert Skink surveys and Night Parrot surveys with TOs	
EPA	20-Aug-20	Meeting at EPAs Office to provide project presentation to EPA Board members	EPA Board	Agrimin's presentation was well received.	No specific comments or issues were raised.
EPAS and DWER	30-Sep-20	Meeting at EPAS office to provide project update and major findings	Agrimin: Tom Lyons Stantec: Sarah Osborne, Paul Bolton EPA: Liesl Rohl, Vanessa Robinson, Helena Mills, Claire Stevenson	Agrimin presented key findings of field surveys to DWER-EPAS and TEB branch including Night Parrot and Great Desert Skink. Discussions around findings and next steps for further survey and impact assessment work for inclusion within the ERD was discussed.	- It was recommended to another discussion including DBCA around significant fauna species be undertaken. - EPAS/TEB branch recommended to focus the attention of the ERD around: changes to surface water hydrology, sediments drying, impacts to Tecticornia (sediment loading / distribution / germination / change to large scale



Stakeholder	Date of Communication	Type of consultation	Attendees	Summary of communication	Outcome of consultation
					flooding events / indirect impacts on islands) and maintaining hydrological flows to maintain priority Tecticornia species and supporting vegetation communities.
DBCA	8-Oct-20	Meeting at DBCA office to provide project update and major findings	Agrimin: Michael Hartley, Tom Lyons DBCA: Charlotte Patrick, Juanita Renwick, Amy Mutton, David Chemello, Ben Corey, David Pickles, Alicia Whittington, Allan Burbidge (Night Parrot and waterbirds SME), Bruce Greatwich (Night Parrot SME), Mark Cowan (Great Desert Skink SME) Stantec: Matt Spence, Paul Bolton, Fiona Taukulis	Meeting with Environmental Management Branch (DBCA) to provide a project update, including recent survey findings from night parrot and great desert skink investigative works, including preliminary management approaches.	N/A
Desert Support Services	12-Oct-20	Meeting to discuss survey findings, and planning involving Tos	Agrimin: Tom Lyon Stantec: Paul Bolton DSS: Kate Crossing, Angie Reid	Summary of recent results and planning of surveys involving Tos	Survey planned
DAWE	5-Nov-20	Teleconference to provide update on Environment Review Document timeline	Agrimin: Tom Lyons, Mark Savich, Michael Hartley DAWE: Cassandra Elliott, Dylan Stinton Stantec: Sarah Osborne, Peter De San Miguel, Matthew Spence, Paul Bolton	Provided DAWE assessment officers a project update, including recent survey findings from night parrot and great desert skink investigative works, including preliminary management approaches.	N/A
DAWE	31-Mar-21	Meeting	Stantec: Paul Bolton, Matthew Spence	Meeting to workshop approach to addressing the Commonwealth's	N/A

Stakeholder	Date of Communication	Type of consultation	Attendees	Summary of communication	Outcome of consultation
			DAWE: Dylan Stinton, Cassandra Elliott	comments raised in the DMA consultation process. Also, to present a number of avoidance measures that are being proposed to re-align the haul road to avoid key MNES in the project area.	
WA TEB	18-May-21	Meeting with the WA TEB	Stantec: Paul Bolton, Matthew Spence DWER: Clare Stevenson, Kym Abrams, Gareth Watkins	- Presented recent proposed proponent-led avoidance measures for the Great Desert Skink (GDS) – realignment of the road around the key population. - Presented night parrot survey results (discussed appending Night Parrot memo). Although still travelling through Night Parrot habitat, measures implemented to avoid impact include only travelling in daytime, speed limit, signage, sealing road to reduce dust. (No fencing).	Agrimin to provide preliminary Night Parrot Memo (provided on 26 May 2021)
NT EPA Board Meeting (Formal Agenda Item at Board Meeting)	1-Jun-21	Meeting	Agrimin: Tom Lyons Stantec: Sarah Osborne NT EPA Board: meeting (formal agenda item at the meeting) including Paul Vogel	- Agrimin provided a detailed briefing note to inform the Northern Territory (NT) Environmental Protection Authority (EPA) of the Proposal by Agrimin Limited (Agrimin) to construct and operate the Lake Mackay Potash Project (the Proposal). - Agrimin detailed their consideration for WA EPA's mitigation hierarchy at each stage of the assessment process across all environmental factors, providing for the implementation of a number of proponent-led avoidance measures.	These were well received by the NT EPA Board.
EPAS, DWER	11-Oct-21	Site Visit over two days 11&12 October 2021.	Agrimin: Mark Savich, Tom Lyons DWER: Troy Sinclair, Liesl Rohl, Cristina Angel	Opportunity to show EPA/DWER the proposal area and discuss on site potential impacts and mitigation to Flora and vegetation, waterbirds,	N/A



Stakeholder	Date of Communication	Type of consultation	Attendees	Summary of communication	Outcome of consultation
			EPA: Lee McIntosh, Jenny Pope Stantec: Peter Tapsell, Fiona Taukulis, Paul Bolton	SREs, Night Parrot, Subterranean fauna and inland waters.	
DWER	9-Nov-21	Meeting	Agrimin: Tom Lyons, Michael Hartley, Mark Savich DWER: Liesl Rohl, Troy Sinclair Stantec: Matthew Spence, Peter Tapsell, Fiona Taukulis, Paul Bolton.	Meeting to allow for Agrimin/Stantec to seek EPA-S guidance and advice, as well as clarification, on a number of actions raised regarding the second draft of the Lack Mackay Potash Project's ERD (as per matters raised by Liesl Rohl, Manager EIA North, letter dated 29 October 2021).	N/A
DCCEEW, DWER	17-Jan-22	Meeting	Agrimin: Tom Lyons, Michael Hartley, Mark Savich DCCEEW: Dylan Stinton, Laura Dennis DWER: Liesl Rohl, Troy Sinclair Stantec: Matthew Spence, Peter Tapsell, Fiona Taukulis, Paul Bolton.	Discussion on potential impacts to significant fauna and expectations round potential offset requirements	N/A
DCCEEW, DWER	8-Mar-22	Meeting	DWER: Troy Sinclair, Liesl Rohl DCCEEW: Cassandra Elliott, Julie Kennett, Dylan Stinton Industry: Lin Cheng	Discussion on environmental offsets for the Lake Mackay Potash Project	N/A
DBCA	20-Apr-22	Meeting	Agrimin: Michael Hartley, Tom Lyons, Mark Savich DBCA: Charlotte Patrick, Murray Baker, Allan Burbidge (Night Parrot and waterbirds)	Meeting to update DBCA on the latest results on targeted surveys and proposed mitigation to be presented in the ERD. Key topics included: Great Desert Skink, Night Parrot, Greater Bilby and water birds.	General consensus that the additional targeted surveys had contributed to a much better understanding of the species at the site and subsequently informed



Stakeholder	Date of Communication	Type of consultation	Attendees	Summary of communication	Outcome of consultation
			SME), Harley Taylor, Brooke Halkyard, Cho Lamb, Teagan Johnson, William Oversby. Stantec: Paul Bolton, Fiona Taukulis, Peter Tapsell		potential impacts and options for mitigation.
DCCEEW, DWER, DBCA	3-Jun-22	Meeting (round table)	Agrimin: Michael Hartley, Tom Lyons, Mark Savich DBCA: Charlotte Patrick, Murray Baker, William Oversby, Allan Burbidge (Night Parrot SME), Martin Dziminski (Bilby SME) DCCEEW: Julie Kennett, Stephen Bolton, Dylan Stinton, Tim McGrath DWER: Troy Sinclair, Claire Stevenson, Tania Liaghati Stantec: Paul Bolton, Fiona Taukulis, Peter Tapsell	The meeting focused on potential impacts and options for mitigation and environmental offsets with a focus on the following three listed species: Great Desert Skink, Night Parrot and Greater Bilby.	Specific advice provided by SMEs on options to further mitigate impacts and on how offsets could best be used to result in net gains to these threatened species.
DBCA	15-Jun-22	Meeting (round table)	Stantec: Fiona Taukulis, Paul Bolton DBCA: Mark Cowan (Great Desert Skink SME) Charlotte Patrick William Oversby Harley Taylor	Continuation on previous meeting. The meeting focused on potential impacts and options for mitigation and environmental offsets with a focus on the following three listed species: Great Desert Skink, Night Parrot and Greater Bilby.	Specific advice provided by SMEs on options to further mitigate impacts and on how offsets could best be used to result in net gains to these threatened species.
DCCEEW	23-Jun-22	Meeting	DCCEEW: Julie Kennett, Dylan Stinton, Cassandra Elliott	Discussion on offsets. Given lack of comparable land for acquisition, options were put forward for management offsets (feral predator control and fire management)	Agreement that comparable land was not available and that management could be applied provided the objectives were to

Stakeholder	Date of Communication	Type of consultation	Attendees	Summary of communication	Outcome of consultation
					maintained or improved populations of threatened fauna.
DCCEEW, DWER	26-Jul-22	Meeting (round table)	DCCEEW: Julie Kennett, Dylan Stinton, Cassandra Elliott DWER: Troy Sinclair Stantec: Paul Bolton, Fiona Taukulis, Peter Tapsell	Meeting to discuss the previous round table communications with DBCA and to seek consensus in approach for offsets with DWER/EPA and DCCEEW	DWER and DCCEEW would organise a separate meeting to develop consensus on Offsets for the Proposal.
DWER/EPA	19-Jan-23	Meeting	Agrimin: Michael Hartley, Tom Lyons, Mark Savich DWER: Tania Liaghati, Beck Capri, Sandra Dowding EPA: Lee McIntosh, Stantec: Paul Bolton, Fiona Taukulis, Peter Tapsell	Meeting to brief the Deputy Chair on the progress of the Lake Mackay Sulphate of Potash proposal and to show how they have further addressed impacts on significant fauna species and progressed with their negotiations with the various Traditional Owners.	Additional request for information was to be provided in the next DMA comments.
DSS	25-Jun-23	Teams Meeting	Agrimin: Michael Hartley Stantec: Fiona Taukulis, Paul Bolton DSS: Kate Crossing and Stuart Bradfield	Discussion on management plans, input from Ranger groups, recognition of work completed on IPAs to date, permissions and discussions required for land access.	DSS to review and provide feedback on the Night Parrot Management Plan. Agrimin to continue to engage with DSS to discuss land access, involve Ranger groups in surveys and provide feedback on the Offset Strategy when available.
DWER	20-Feb-24	Teams Meeting	Agrimin: Michael Hartley, Ingrid Kenwery Stantec: Fiona Taukulis, Mike Jorgensen, Cameron Love DWER: Casey Webb, Capri Beck, Gary	Meeting to provide DWER an overview of recent work by Agrimin and Stantec on H3 Hydrogeological Assessment and associated environmental impacts and mitigations arising from EPAS/DWER regulatory feedback to Agrimin's Response to Submissions document.	DWER clarified key points of their regulatory feedback to Agrimin.

Stakeholder	Date of Communication	Type of consultation	Attendees	Summary of communication	Outcome of consultation
			Humphreys, Mariana DeMoraes, Rory Hunter		
DSS	7-Mar-24	Teams Meeting	Agrimin: Debbie Morrow, Ingrid Kenwery Stantec: Fiona Taukulis, Paul Bolton DSS: Kate Crossing PNAC: Lucy Muir	Agrimin Offsets Strategy discussion with DSS and Parna Ngururpa Aboriginal Corporation (PNAC).	Agrimin will send through updated Offset Strategy and the Greater Bilby, Night Parrot and Great Desert Skink Offset Plans when ready for review and discussion.
DSS	18-Mar-24	Meeting	Agrimin: Debbie Morrow, Ingrid Kenwery Stantec: Fiona Taukulis, Paul Bolton DSS: Kate Crossing, Jarrah Dale, Luke Parker TTAC: Julian Santamaria	Feedback on monitoring programs review by DSS.	DSS provided feedback to Agrimin and Stantec from their review of the monitoring programs. Useful feedback provided on reference site selection, monitoring methodology and Indigenous ranger groups' involvement in future surveys and programs.
DBCA	25-Mar-24	Teams Meeting	Stantec: Paul Bolton, Caitlin Roberts DBCA: Harry Moore	Meeting with SME to discuss design of the Bilby Monitoring Program and appropriate feral predator control at known Bilby populations.	SME provided advice on design of the Bilby Monitoring Program and appropriate feral predator control methods. Stantec to incorporate this advice into monitoring programs

12 References

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Appendices

Appendix A Night Parrot Monitoring Program

Refer to **Appendix A** of the Night Parrot Management Plan for the Night Parrot Monitoring Program.

Appendix B Waterbird Monitoring Program

B.1 Background

Lake Mackay is subject to infrequent major inundation, during which water can remain pooled for extended periods (>6 months) (Duguid *et al.* 2005; Northern Territory Government 2009). Based on 40 years of Landsat imagery, Lake Mackay fills to an average maximum depth of 2 m once every 5-10 years (Stantec 2020a). When inundated, Lake Mackay is known to be an important resource for foraging waterbirds (360 Environmental 2017a; Duguid *et al.* 2005; Pedler *et al.* 2018; Stantec 2021b)(**Table B 1**), including listed migratory species such as migratory shorebirds (protected by the EPBC Act under migratory bird agreements), and the Banded Stilt (*Cladorhynchus leucocephalus*), an endemic species that breeds at inland salt lakes (Pedler *et al.* 2018). While Banded Stilts are not a threatened or priority species in WA, their unpredictable and irregular breeding ecology means successful breeding events are important and, as such, so is the preservation of known breeding lakes (Duguid *et al.* 2005). The Proposal has implemented measures to avoid impacts to waterbird species, where possible and minimise residual direct and indirect impacts through implementation of the Terrestrial Fauna Environmental Management Plan, TFEMP. The Waterbird Monitoring Program will measure the effectiveness of management measures and whether the objectives of the TFEMP for waterbirds are met.

According to *EPBC Act Policy Statement 3.21 Industry guidelines for avoiding, assessing, and mitigating impacts on EPBC Act listed migratory shorebird species (DEE 2017)*, wetland habitat for migratory shorebirds can be considered internationally important or nationally important according to the following criteria:

- **Internationally important** habitat regularly supports:
 - 1% of the individuals in a population of one species or subspecies of waterbird; or
 - A total abundance of at least 20,000 waterbirds.
- **Nationally important** habitat regularly supports:
 - 0.1% of the flyway population of a single species of migratory shorebird; or
 - 2,000 migratory shorebirds; or
 - 15 migratory shorebird species.

Based on previous surveys, Lake Mackay fulfils the criteria of an internationally important habitat for migratory shorebirds. During the Stantec (2021b) survey, four observations of 3,758 to 10,000 Sharp-tailed Sandpipers (*Calidris acuminata*; Mi) were recorded foraging on the playa, equating to 4.4% to 11.8% of the flyway population (Hansen *et al.* 2016), well over the 1% threshold for international importance. In 2017 Red-necked Stilts (*Calidris ruficollis*; Mi) on the playa and peripheral wetlands (502 individuals) exceeded the 0.1% of the flyway population considered for national significance (0.1 % threshold = 475 individuals) (Hansen *et al.* 2016). Additionally, the Oriental Plover (*Charadrius veredus*; Mi) is considered likely to trigger the criteria for nationally important habitat at Lake Mackay as it was recorded in numbers that are internationally significant at Lake Gregory (265 km from Lake Mackay).

Table B 1: Summary of waterbirds recorded during waterbird surveys of Lake Mackay.

Waterbird Survey	Waterbird Species (Confirmed ID)*	Listed Species	Waterbird Abundance	Inundation Duration (> 20 %)
Duguid <i>et al.</i> (2005)	20	3	42,473	398 days
360 Environmental (2017a)	25	5	3,273	89 days
Stantec (2021b)	12	4	42,194	24 days
Total	34	8	-	-

*Note: * indicates that non-waterbird species and waterbird species that could not be confirmed to species level have been excluded (e.g. Tern Whiskered or White-winged).*

Based on available literature, Banded Stilts require inland salt lakes to be inundated for a minimum of 65 days for the species to successfully complete their breeding cycle and fledge their chicks Stantec (2021b). Based on the 33 years of available satellite imagery, six inundation events at Lake Mackay exceeded this minimum duration of inundation, however, three of those events were marginal (2007: 66 days, 2014: 69 days and 2015: 72 days) (**Figure B 1**). Based on these inundation durations, the attempted breeding event in 2014 was potentially successful, while the event in 2021 was likely unsuccessful (**Table B 2**). In summary, when inundated for a sufficient duration, Lake Mackay provides an important resource for foraging and breeding of waterbirds. These larger events are important as they are relatively rare and infrequent with the majority of inundation events lasting less than one month.

Table B 2: Banded Stilt breeding evidence at Lake Mackay

Days of inundation	Breeding evidence observation	Date recorded	Likely success	Reference
398	12,070 adults, 4,400 juveniles	2001	Successful	Duguid <i>et al.</i> (2005)
69	~6,000 adult pairs, 6,500 clutches, >650 chicks (~2-4 weeks old)	2014	Potentially successful	Pedler (2017a); Pedler <i>et al.</i> (2014)
66	257 adults, <10 fledged juveniles	14 to 17 April 2017	Successful	360 Environmental (2017a)
24	4,200 adults observed nesting No juveniles observed during the survey.	30 March to 2 April 2021	Unlikely successful due to rate of water recession	Stantec (2021b)

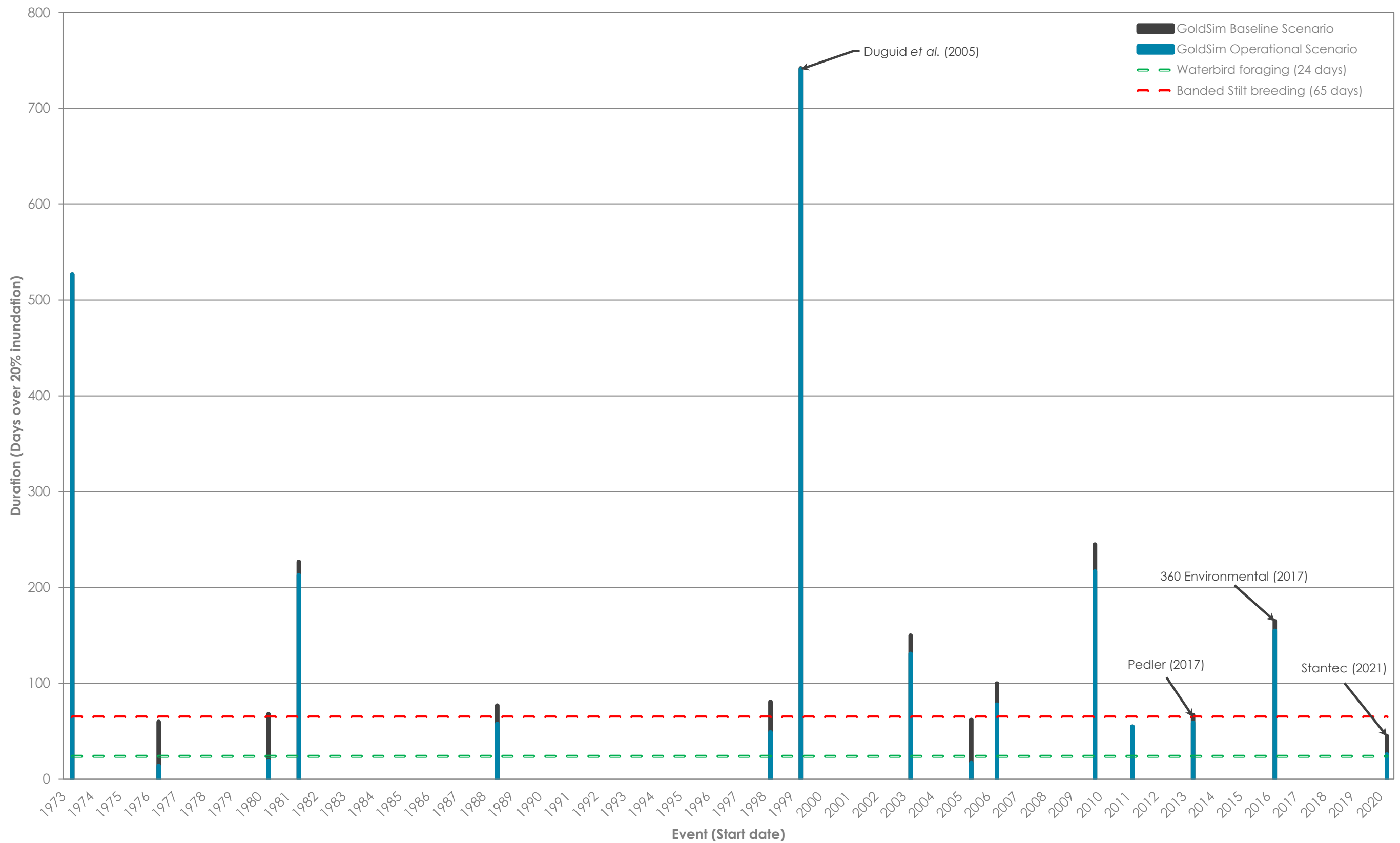


Figure B 1: Frequency of Lake Mackay inundation events with limits for potentially supporting waterbird foraging (green) and Banded Stilt Breeding (red). Estimations of event duration are based on analysis of aerial imagery (Stantec 2021a). Banded Stilt breeding duration represents the minimum time required to raise chicks to fledge based on literature, while waterbird foraging suitability is based on the smallest observed event supporting significant foraging behaviour (Stantec 2022).

B.2 Objectives and Duration of Monitoring

The objective of the Waterbird Monitoring Program is to monitor and measure the success of management provisions (outcome-and objective-based) outlined in the TFEMP. To address this objective the following will be undertaken:

- Monitor waterbird abundance, diversity and foraging on the lake during inundation events to demonstrate their continued utilisation of Lake Mackay over time in comparison to environmental factors or potential impacts from the Proposal (waterbird utilisation monitoring);
- Monitor Banded Stilt breeding success when conditions are suitable (i.e. inundation event of greater than 20% for approximately 65 days);
- Assess the direct and indirect effects of climate change on waterbird species and their associated ecology, where possible;
- Evaluate the results of the monitoring against trigger and threshold criteria, and management measures outlined in the TFEMP, to demonstrate waterbird populations are maintained during the life of the Proposal; and
- Provide opportunities for direct engagement of TO Ranger groups, allowing opportunities for knowledge sharing and connection to country.

The Waterbird Monitoring Program is proposed to be completed over a 20-year timeframe to align with the estimated life of the Proposal.

B.3 Traditional Owner Engagement

The Waterbird Monitoring Program presents an opportunity to engage with and work alongside TO Ranger groups from the Kiwirrkurra IPA, a key objective of the Waterbird Monitoring Program. This monitoring program has been reviewed by Desert Support Services (Kate Crossing) and Dr Rachel Paltridge on behalf of the Kiwirrkurra and Ngururrpa people and the advice they have shared represents local knowledge and experience from existing programs undertaken by ranger groups.

Opportunities to involve TO Rangers in monitoring may include:

- Undertaking waterbird monitoring surveys; and
- Knowledge sharing to increase understanding of waterbird species utilisation of the area.

B.4 Monitoring

B.4.1 Overview and Timing

The approach for the Waterbird Monitoring Program is presented in **Table B 3**, which also shows the relevant trigger and threshold criteria (outcome-based) and objective-based management provisions. The Waterbird Monitoring Program has three components, Banded Stilt breeding monitoring, waterbird utilisation monitoring and carcass monitoring. Waterbird utilisation monitoring and Banded Stilt breeding monitoring will be conducted opportunistically following flood events.

Banded Stilt breeding monitoring and waterbird utilisation monitoring will occur following considerable rainfall events that result in the inundation of Lake Mackay. These events do not occur on a regular basis and there may be several years between inundation events which means annual monitoring is not possible. Additionally, given the irregularity of inundation events, Agrimin is unable to commit to undertaking two years of baseline monitoring prior to construction commencing for the Proposal. However, if suitable rainfall occurs within the two-year pre-construction period, then baseline waterbird monitoring will be undertaken. Contextual data is also available from the previous surveys at Lake Mackay (**Table B 1**).

Waterbird surveys at inland salt lakes need to take into consideration the timing of the survey with respect to the hydroperiod (inundation period) and season. The hydroperiod of the lake post-rainfall drives the productivity (emergence of algae and aquatic invertebrates) of the system which supports foraging waterbird species. Timing of the survey with respect to the annual migration is also important for the detection of migratory shorebirds, with the non-breeding period extending from November to March and the northern migration occurring from March to May (Hansen *et al.* 2016). Banded Stilt breeding monitoring and waterbird utilisation monitoring will be undertaken following significant rainfall events which result in an inundation event of greater than 20% for over approximately 65 days. Monitoring will be conducted by an experienced ornithologist and supported by TO Ranger groups, as agreed.

Carcass monitoring will be undertaken according to the approach detailed in IFC (2023). Carcass monitoring will be conducted at each of the five wind turbines to be constructed for the Proposal. When Lake Mackay is not inundated, carcass monitoring will be conducted bimonthly, and when inundated, frequency of monitoring will increase to weekly. This increase in monitoring frequency is to account for the arrival of waterbirds to Lake Mackay and a potentially increased risk of collision.

The methods (**Section B.4.4**) follow standard survey techniques recommended for waterbird surveys. This includes methods presented in *EPBC Act Policy Statement 3.21 Industry guidelines for avoiding, assessing, and mitigating impacts on EPBC Act listed migratory shorebird species* (DEE 2017) and *Survey guidelines for Australia's threatened birds*

(DEWHA 2010). Monitoring methods are aligned with those used during previous waterbird surveys of Lake Mackay (360 Environmental 2017a; Stantec 2021b) and will be conducted in accordance with relevant guidance for terrestrial fauna surveys (EPA 2016; 2020).

Table B 3: Waterbird Monitoring Program Summary.

Component	Personnel	Timing	Number of Monitoring Sites	Survey Effort	Monitoring Parameters	Outcome-based Management Objectives	Trigger Criteria	Threshold Criteria	Objective-based Management Provisions
Waterbird utilisation and Banded Stilt breeding success	Experienced Ornithologist	Following significant rainfall events which result in an inundation event of greater than 20% for over approximately 65 days	15 avifauna monitoring sites - Aerial survey	20-minute point surveys will be undertaken at each of the 15 avifauna census sites - Aerial survey to detect evidence of Banded Stilt breeding	- Continued waterbird utilisation of Lake Mackay - Breeding success of Banded Stilts	No long term decrease in Banded Stilt breeding success as a result of project based activities	Banded Stilts fail to successfully breed on Lake Mackay when the species is present and conditions are suitable for breeding (greater than 20% inundation of the lake for a minimum of 65 days, based on available literature).	Banded Stilts fail to successfully breed on Lake Mackay when the species is present and conditions are suitable for breeding (greater than 20% inundation of the lake for a minimum of 65 days, based on available literature) over two consecutive inundation events.	Minimize changes to surface hydrology
Carcass Monitoring	Trained site personnel	- Bimonthly (outside periods of inundation) - Weekly (when greater than 20% of the lake is inundated)	Five carcass search areas (i.e. one at each wind turbine)	Within each 3 ha circular search area, transects spaced 20 m apart will be walked	Count of bird mortalities	No adverse impacts to significant fauna (waterbirds) from bird strike from wind turbine operations.	Occurrence of a flood event at Lake Mackay (where greater than 20% of the lake is inundated).	Occurrence of wind turbine strike for 3 or more individuals of an EPBC Act listed threatened or EPBC Act listed migratory bird species during a single monitoring period.	

B.4.2 Logistical Considerations

Several logistical factors were taken into consideration for the design and safe implementation of the Waterbird Monitoring Program:

- The Proposal is located in a remote area of Western Australia and mobilisation to site from Perth currently takes a minimum of 1.5 days.
- A helicopter will be required to access avifauna census sites on Lake Mackay.
- Consultation has been undertaken with TO Ranger groups during the development of this monitoring program. Monitoring is intended to be undertaken with involvement of TO Ranger groups.

B.4.3 Monitoring Sites

B.4.3.1 Utilisation Monitoring and Banded Stilt Monitoring

Waterbird utilisation monitoring and Banded Stilt breeding monitoring will be conducted on Lake Mackay and located within the On-Lake Development Envelope (On-LDE) for the Proposal. Waterbird utilisation monitoring will be undertaken at 15 avifauna census sites distributed across the lake (**Figure B 2**). These sites align with those sampled during Stantec (2021b) and correspond to areas of the lake which remain inundated longer and are therefore more likely to support foraging waterbirds. Banded Stilt breeding monitoring will consist of flyovers of suitable islands to survey for evidence of breeding (colonies of birds nesting). Based on previous surveys, Banded Stilts have used different islands for breeding during different inundation events (Stantec 2022).

B.4.3.2 Carcass Monitoring

Carcass monitoring will be undertaken at the five wind turbines to be constructed within the Off Lake Development Envelope (Off-LDE; **Figure B 3**). The carcass search area under each turbine will encompass a 3 ha circle. This area was selected in accordance with *Post-construction bird and bat fatality monitoring for onshore wind energy facilities in emerging market countries* (IFC 2023), which states the carcass search area should have a radius equivalent to half of the maximum turbine blade height. It is suggested that an area of this size has the potential to detect most bird and bat mortalities occurring at a turbine.

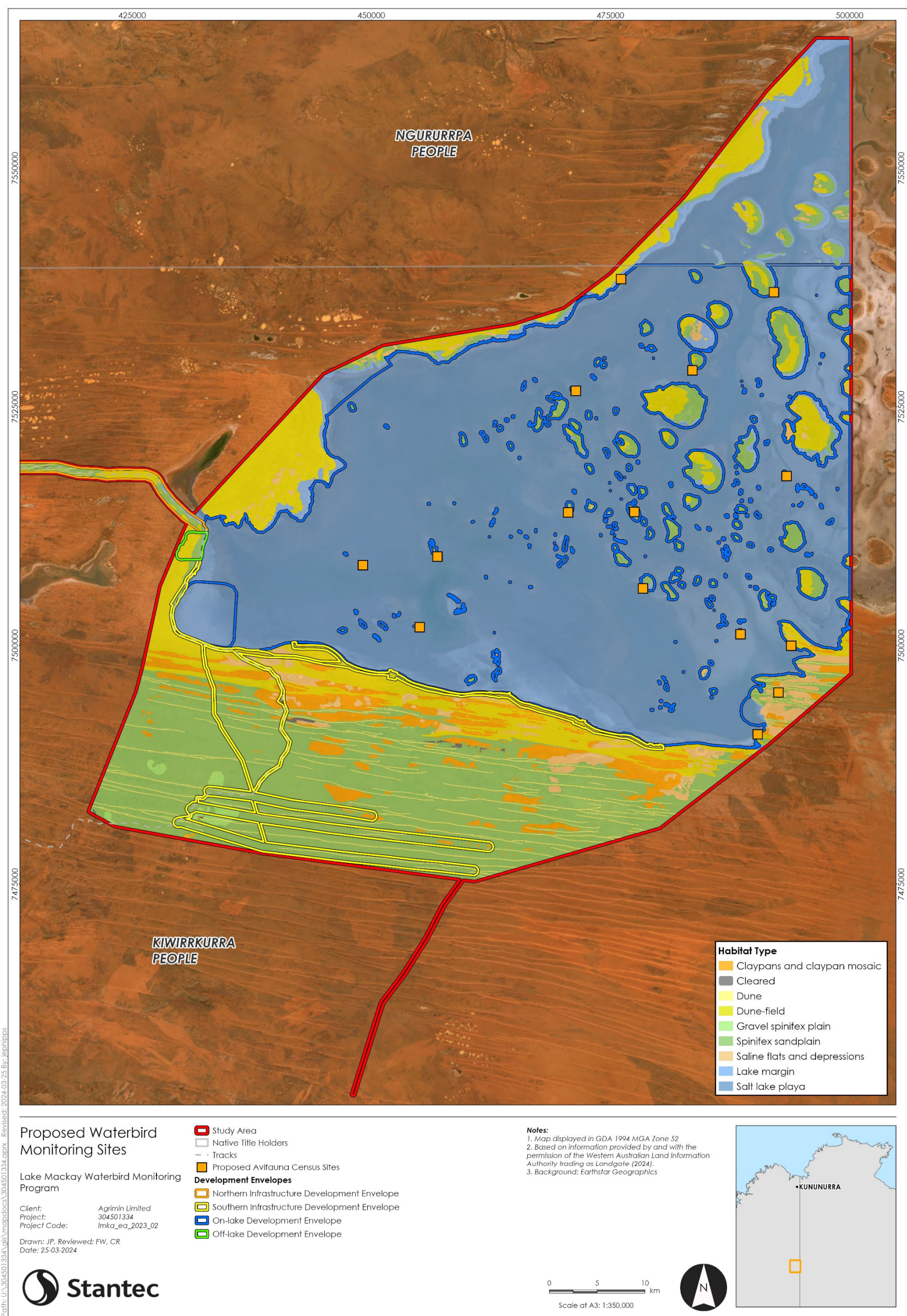


Figure B 2: Proposed waterbird population monitoring sites.

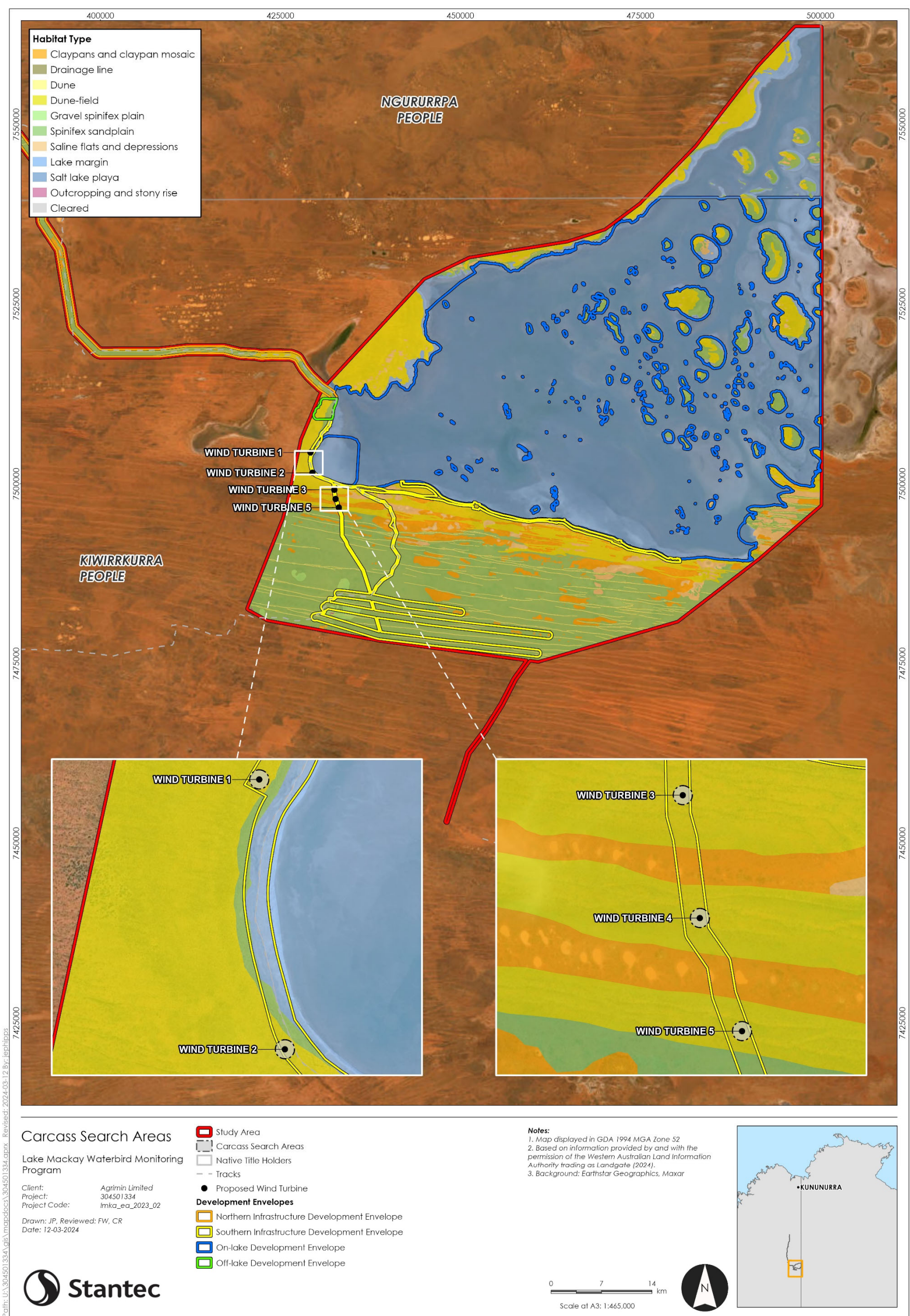


Figure B 3: Proposed carcass monitoring sites.

B.4.4 Methods

B.4.4.1 Utilisation Monitoring and Banded Stilt Breeding Monitoring

Waterbird utilisation monitoring will be undertaken to assess whether waterbirds continue to utilise/forage on Lake Mackay following commencement of construction for the Proposal. Monitoring will comprise on-ground point surveys at 15 avifauna census sites to measure waterbird diversity, abundance and behaviour during inundation events. Opportunistic census sites may be identified while undertaking monitoring, for example, where there are observations of large congregations of waterbirds. This will ensure that large congregations of waterbirds are not missed during monitoring.

At each avifauna census site, a team consisting of at least one experienced ornithologist will conduct a census using binoculars and a spotting scope. Censuses will be conducted for a minimum of 20 minutes, however duration may be extended if additional time is required to adequately assess avifauna assemblages. During each census, the following information will be recorded:

- Unique site ID and GPS location;
- Habitat;
- Water presence;
- Start and end time; and
- Avifauna species identified including:
 - Abundance;
 - Breeding plumage;
 - Age (e.g. chick, juvenile, adult); and
 - Behaviour (e.g. breeding, nesting, foraging).

Banded Stilt breeding monitoring will comprise flyovers of suitable island habitat to locate evidence of breeding (colonies of nesting birds). While previous nesting sites may be visited, Banded Stilts are known to use different islands for breeding during different inundation events (Stantec 2022). Where breeding colonies are located, the following information will be recorded:

- Unique site ID and GPS location;
- Number of individuals (breeding pairs / nesting individuals).
- Presence of:
 - Eggs;
 - Chicks; or
 - Fledglings (creche).
- Proximity of the breeding colony to water; and
- Any evidence of predation (feral predators or Silver Gulls).

B.4.4.2 Carcass Monitoring

At each of the five carcass monitoring sites, site personnel will conduct searches for bird and bat carcasses which have collided with a wind turbine. Carcass searches will be conducted using transects as recommended by IFC (2023). A transect spacing of 4 to 20 m is suggested depending on the landscape and vegetation. Given that wind turbines are proposed to be constructed in relatively sparsely vegetated dune-field and claypan and claypan mosaic habitat, a wider transect spacing (20 m) is considered suitable. All carcasses will be collected, labelled and stored in a freezer until a qualified zoologist can identify each specimen. Specimens will be identified to the species level where possible, dependent on the condition of the specimen and logged in the fauna mortality register. Mortalities of significant fauna will be reported in accordance with **Section 7.2** of the TFEMP.

B.4.5 Survey Personnel and Licensing Requirements

The Waterbird Monitoring Program will be undertaken by an experienced ornithologist trained in the methods described in **Section B.4.4** and preferably accompanied by TO Ranger groups. The participation of TO ranger groups will provide an opportunity for meaningful engagement and contribute to two-way knowledge sharing for the species. There are currently no licence requirements for undertaking observational avifauna censuses.

B.4.6 Data and Statistical Analysis

Data analysis will be undertaken to explore changes in waterbird abundance, diversity and activity observed over time and relative to baseline data (if available). Statistical tests will be used to interrogate the data collected from monitoring as

appropriate, for example unpaired t-tests, ANOVAs or general linear models. The application of statistical analyses will depend on the quality of the data collected, and where possible, will incorporate supporting data, such as level of inundation and regional migratory shorebird population data.

If conditions are suitable to support Banded Stilt breeding (greater than 65 days of more than 20% inundation), then breeding success will be evaluated based on the number of fledged juveniles recorded during the Monitoring Program. These metrics will inform whether trigger or threshold criteria are being exceeded and assess the effectiveness of management actions outlined in the TFEMP.

B.5 Reporting

A standalone technical report will be submitted to Agrimin and the Indigenous landholders at the conclusion of each monitoring period, presenting the key findings of the Waterbird Monitoring Program. The report will include an assessment against relevant management provisions, including outcome- and objective-based criteria, and specifically trigger and threshold criteria presented in **Table 4-1** of the TFEMP. In the event that trigger or threshold criteria are exceeded, these will be reported in accordance with **Section 7.2** of the TFEMP and contingency actions will be provided for consideration. The technical report will be summarised within or appended to the Annual Environmental Report (AER) and the Annual Compliance Assessment Report (ACAR), to be submitted to the DWER, DCCEEW, and EPA, respectively, aligning with **Section 7.1** of the TFEMP.

B.5.1 Reporting Considerations

There are several considerations associated with this Waterbird Monitoring Program, which will be considered when interrogating the data recorded and for interpretation and reporting:

- It can be difficult to compare waterbird monitoring data across inundation events as previous waterbird surveys of Lake Mackay (360 Environmental 2017a; Duguid *et al.* 2005; Stantec 2021b) have demonstrated that species diversity and abundance can be highly variable. This is due to the duration of the flood event (longer events being more productive) and the timing of the survey (some surveys conducted for the Proposal were at peak activity while others were at the end of the hydroperiod when waterbird productivity was declining). These factors must be taken into account when comparing waterbird utilisation across different inundation events.
- Migratory shorebird populations are declining globally, and shorebirds using the East Asian – Australasian flyway are under threat due to widespread habitat destruction, particularly at staging areas in East Asia (Hansen *et al.* 2016). Given that migratory shorebirds may be impacted by threatening processes across the flyway it can be difficult to isolate whether population changes can be attributed to local factors (the Proposal) or external factors. If available, regional waterbird population data will be reviewed to determine whether changes in waterbird utilisation at Lake Mackay can be attributed to the Proposal or to external factors.
- Given the irregularity of inundation events, collection of baseline monitoring data may not be feasible. However, data from previous waterbird surveys undertaken at Lake Mackay may be reviewed to help contextualise monitoring data in the absence of adequate baseline data.

B.6 Adaptive Management and Review

Results obtained from this Waterbird Monitoring Program may inform adaptive management measures for the TFEMP and guide management actions for the species in the broader region. The review of data and information gathered during monitoring may increase understanding of the species or the environment in a regional context. This may inform management and mitigation measures such as:

- Refinement of the Feral Predator Monitoring and Control Program for the Proposal, focusing on Silver Gull predation of Banded Stilt chicks; and
- Review and refinement of the Waterbird Monitoring Program for compliance and against regulatory conditions.

A review of this Waterbird Monitoring Program will be undertaken every five years, in response to adaptive management, as new technology becomes available, or as required by to achieve the environmental outcomes associated with the TFEMP. Any revisions of the Waterbird Monitoring Program will be submitted to the relevant State (DWER, DBCA) and Commonwealth Government (DCCEEW) for approval, or in accordance with relevant regulatory conditions or requirements.

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- Stantec. (2021a). Lake Mackay Potash Project: Detailed and Targeted Vertebrate Fauna Survey and Consolidation. Unpublished report prepared for Agrimin Ltd.
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Appendix C Great Desert Skink Monitoring Program

C.1 Background

The Great Desert Skink (*Liopholis kintorei*) is a large orange/brown burrowing skink that is listed as Vulnerable under the EPBC 1999 and BC Act 2016. The Great Desert Skink constructs large burrow systems to a depth of over 1 m and up to 10 m in diameter (McAlpin *et al.* 2011). Burrow systems can be easily identified from the surface due to presence of at least one large external latrine. Individuals are relatively sedentary, known to move up to 150m from the burrow while foraging, however may move up to 10 km to colonise new areas (DoE 2020). The Proposal has implemented measures to avoid impacts to the species where possible and minimise residual direct and indirect impacts through implementation of the Terrestrial Fauna Environmental Management Plan, TFEMP. The Great Desert Skink Monitoring Program will measure the effectiveness of management measures and whether the objectives of the TFEMP for the Great Desert Skink are met.

Great Desert Skinks occupy a variety of habitat types within the western deserts region (Indigenous Desert Alliance 2023a) with the species showing a preference for habitat comprising at least 50% bare ground, and inhabits areas of varying post-fire regeneration age, ranging from 3–15 years (Ridley *et al.* 2018). The species is often associated with spinifex sandplains and swales with hummock grasses and scattered shrubs (Pavey 2006). There is no formal definition for habitat critical for the survival of the Great Desert Skink, however in the Study Area, the primary habitat for the species is spinifex sandplain (Stantec 2021a). The Great Desert Skink has been recorded from three areas within the Study Area within this habitat (**Figure C 1**):

- Yagga Yagga population which overlaps with the NIDE: 64 active burrows recorded approximately 22 km south of Yagga Yagga. After the population was better defined through additional targeted survey work, the NIDE was realigned so that all active burrows associated with the population were avoided with a buffer of 300 m.
- Murrawa population within the NIDE: two locations recorded in 2000. Subsequent targeted survey work has established that this population is no longer present.
- Lake Mackay southern population within the Study Area but outside the Proposal area: one location 10 km south of Lake Mackay from 2018. Subsequent targeted survey work has established that this population is no longer present.
- Lake Mackay northern population: Recently, an additional population has been discovered by TO Rangers to the north-east of Lake Mackay outside the Development Envelope for the Proposal (Kate Crossing pers. comm. 18 March 2024).

Additionally, the species has been recorded at 138 locations in the surrounding region (150 km). Almost all are in a 30 km stretch of the Kiwirrkurra road ~20 km southeast of the Kiwirrkurra community (the Kiwirrkurra population).

C.2 Objectives and Duration of Monitoring

The objective of the Great Desert Skink Monitoring Program is to monitor and measure the success of management provisions (outcome-and objective-based) outlined in the TFEMP. To address this objective the following will be undertaken:

- Monitor changes in population activity over time in comparison to environmental factors or potential impacts from the Proposal;
- Monitor the movement of individuals in the landscape in response to resources, environmental factors or potential impacts from the Proposal;
- Assess the direct and indirect effects of climate change on the Great Desert Skink and its associated ecology, where possible;
- Evaluate the results of the monitoring against trigger and threshold criteria, and management measures outlined in the TFEMP, to demonstrate Great Desert Skink populations are maintained during the life of the Proposal; and
- Provide opportunities for direct engagement of TO Ranger groups, allowing opportunities for knowledge sharing and connection to country.

The Great Desert Skink Monitoring Program is proposed to be completed over a 20-year timeframe to align with the estimated life of the Proposal.

C.3 Traditional Owner Engagement

The Great Desert Skink Monitoring Program presents an opportunity to engage with and work alongside TO Ranger groups from the Ngururpa and Kiwirrkurra IPAs and Tjurabalan People, a key objective of the Great Desert Skink Monitoring Program and the National Recovery Plan (Indigenous Desert Alliance 2023a). During the baseline surveys for the Proposal, TO Rangers provided integral local knowledge of the area and conducted independent targeted surveys for significant fauna, including the Great Desert Skink. The TO Ranger Groups all have well-defined threatened species protection strategies, and extensive experience and skills in a range of monitoring, protection and management activities.

This monitoring program has incorporated comments by Dr Rachel Paltridge on behalf of the Tjumu Tjumu (Aboriginal Corporation) RNTBC, and Desert Support Services (Kate Crossing) on behalf of both the Kiwirrkurra and Ngururpa Ranger programs. These comments represent their local knowledge and experience from existing programs undertaken by ranger groups.

Opportunities to involve TO Rangers in this monitoring may include:

- Consulting on survey design;
- Assisting with site selection within impact and reference sites;
- Undertaking Great Desert Skink monitoring surveys; and
- Knowledge sharing to improve detection of the Great Desert Skink and increase understanding of species utilisation of the area.

Agrimin are committed to ongoing discussions with both groups, which will involve spending time on country and engaging in two-way knowledge sharing. Through these ongoing discussions, there may be refinement in the locations of some of the reference sites, based on any recent additions to knowledge about significant fauna in the area. It is also acknowledged that monitoring methods may change over time, through adaptive management, in line with most recent scientific practices. Any refinements made to the program will be aligned with the requirements of the TFEMP. Agrimin recognises and respects that the Traditional Owners and Ranger Groups have well-defined threatened species protection strategies, and extensive experience and skills in a range of monitoring, protection and management activities which are integral to ongoing discussions as part of stakeholder engagement for the life of the Proposal.

C.4 Monitoring

C.4.1 Overview and Timing

The approach for the Great Desert Skink Monitoring Program is summarized in **Table C 1**, which also shows the relevant trigger and threshold criteria (outcome-based) and objective-based management provisions. Survey design (**Section C.4.3**) follows a before-after-control-impact (BACI) design. The BACI design is considered optimal to isolate potential effects of the Proposal on the Great Desert Skink from effects which may be attributed to natural variability. Prior to clearing being undertaken for the Proposal, adequate baseline monitoring data on the Great Desert Skink (prior to potential impacts), will be collected for a two-year period. The Great Desert Skink Monitoring Program will be undertaken annually between October to March. Ideally, monitoring would occur in March to evaluate breeding success (females give birth between December and February), and coincide with “Mulyamidji March” national Great Desert Skink monitoring program. Monitoring will be undertaken by suitably qualified zoologists and supported by TO Ranger groups, as agreed.

The methods outlined (**Section C.4.4**) follow standard survey techniques recommended for detection of the species. This includes methods used within existing Great Desert Skink monitoring programs such as, *Ecological Health Monitoring at Newhaven Wildlife Sanctuary* (Skinner *et al.* 2021) and the “Mulyamidji March” (Indigenous Desert Alliance 2023b; K. Crossing pers. comm.). Two additional third-party Fauna Management Plans have been reviewed and considered in the development of the Great Desert Skink Monitoring Program, including *Lake Wells Potash Project Fauna Management Plan* (OZ Minerals 2021) and *West Musgrave Copper and Nickel Project Terrestrial Fauna Management Plan* (MBS Environmental 2020). Monitoring will also be conducted in accordance with relevant guidance for terrestrial fauna surveys (DSEWPac 2011b; EPA 2016; 2020). The methodology aligns with those presented in *the National Recovery Plan for the Great Desert Skink* (Indigenous Desert Alliance 2023a).

Table C 1: Great Desert Skink Monitoring Program summary.

Personnel	Timing	Number of Monitoring Sites	Survey Effort	Monitoring Parameters	Outcome-based Management Objectives	Trigger Criteria	Threshold Criteria
- Qualified zoologists - Skilled Indigenous Rangers	- Annually when the Great Desert Skink is active (October to March) - Ideally during March to coincide with the "Mulyamidji March" national Great Desert Skink monitoring program	- One impact site - One reference site	- Four 10 ha plots per site (total survey effort of 8 x 10 ha plots) - One hour of searching at each 10 ha plot (dependent upon number of people searching) - Two motion cameras per 10 ha plot positioned on active Great Desert Skink burrows where present	- Great Desert Skink activity (via presence of active burrows) - Habitat characteristics - Evidence of disturbance. - Evidence of feral predators	No statistically significant decrease in the abundance of conservation significant species (GDS, Bilby) as a result of project-related activities.	- The burrow status of a previously active* GDS burrow is recorded as inactive in a single monitoring event* * Active status defined by evidence of latrine present outside of burrow; or activity of a GDS record on remote camera placed at burrow entrance.	- Statistically significant decrease in GDS* activity at the impact monitoring site over two consecutive monitoring events, compared to baseline levels; OR - If evidence of predation event (feral predator) of GDS occurs

C.4.2 Logistical Considerations

Several logistical factors were taken into consideration for the design and safe implementation of the Great Desert Skink Monitoring Program:

- The Proposal is located in a remote area of Western Australia and mobilisation to site from Perth currently takes a minimum of 1.5 days. TO Rangers are located in communities near to the proposed locations.
- Proposed Great Desert Skink monitoring sites are located ~200 km apart. The Yagga Yagga Population is located along the Balgo track, a rugged 4WD track, which currently has no communities, accommodation, or amenities (e.g., water and fuel) located along it. Management of safety and fatigue is imperative for field survey personnel undertaking the monitoring program.
- Consultation has been undertaken with TO Ranger groups during the development of this monitoring program. Monitoring is intended to be undertaken with involvement of TO Ranger groups.

C.4.3 Monitoring Sites

Within the Great Desert Skink Monitoring Program, the impact site and reference site are defined in accordance with *How to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans: Instructions* (EPA 2024), as follows:

- Impact Site (Yagga Yagga Population): Site where Great Desert Skink have been previously recorded and where suitable habitat is known to occur, but adjacent to the Development Area of the Proposal and therefore where the Great Desert Skink may be subjected to direct and secondary impacts.
- Reference Site (Lake Mackay Northern Population): Site where Great Desert Skink have been previously recorded and where suitable habitat is known/likely to occur, but at locations that are likely to experience similar natural environmental conditions as the impact sites which are being managed for potential impacts of the Proposal. These reference sites are in areas largely un-impacted by human influences. The newly discovered population north-east of Lake Mackay will provide a more suitable reference site given the lack of human impacts (the Kiwirrkurra population is bisected by the Kiwirrkurra road) and the opportunity to initiate monitoring at a new population (the Kiwirrkurra population is already being monitored by Kiwirrkurra Rangers (Indigenous Desert Alliance 2023a)) (Kate Crossing pers comm 18 March 2024).

Following on from this, one impact site (the Yagga Yagga population) and one reference site (the Lake Mackay Northern population) have been selected based on the following:

- Known occurrence of Great Desert Skink populations within the Study Area and surrounding region;
- Distances from the proposed impact areas;
- Accessibility of sites; and
- Presence of suitable habitat (i.e. spinifex sandplain).

The impact site is in proximity to Development Envelope for the Proposal which is accessible by vehicle and traversable on foot. This site has been selected in proximity to the proposed haul road realignment (the NIDE realignment) as the Yagga Yagga population occurs in this area. The reference site occurs in an area that is not subject to direct or indirect impacts by the Proposal. The reference site occurs at the Lake Mackay Northern Population located to the north-east of Lake Mackay outside the Development Envelope of the Proposal. Proposed locations of impact and reference sites for the Great Desert Skink Monitoring Program are presented in **Figure C 1**. Final selection of monitoring sites may deviate from those presented in **Figure C 1** based on the distribution of active Great Desert Skink burrows, accessibility during baseline monitoring, and consultation with TO Ranger Groups. Sampling sites for the Great Desert Skink, will occur via 10 ha plots, with methods detailed in the subsequent sections.

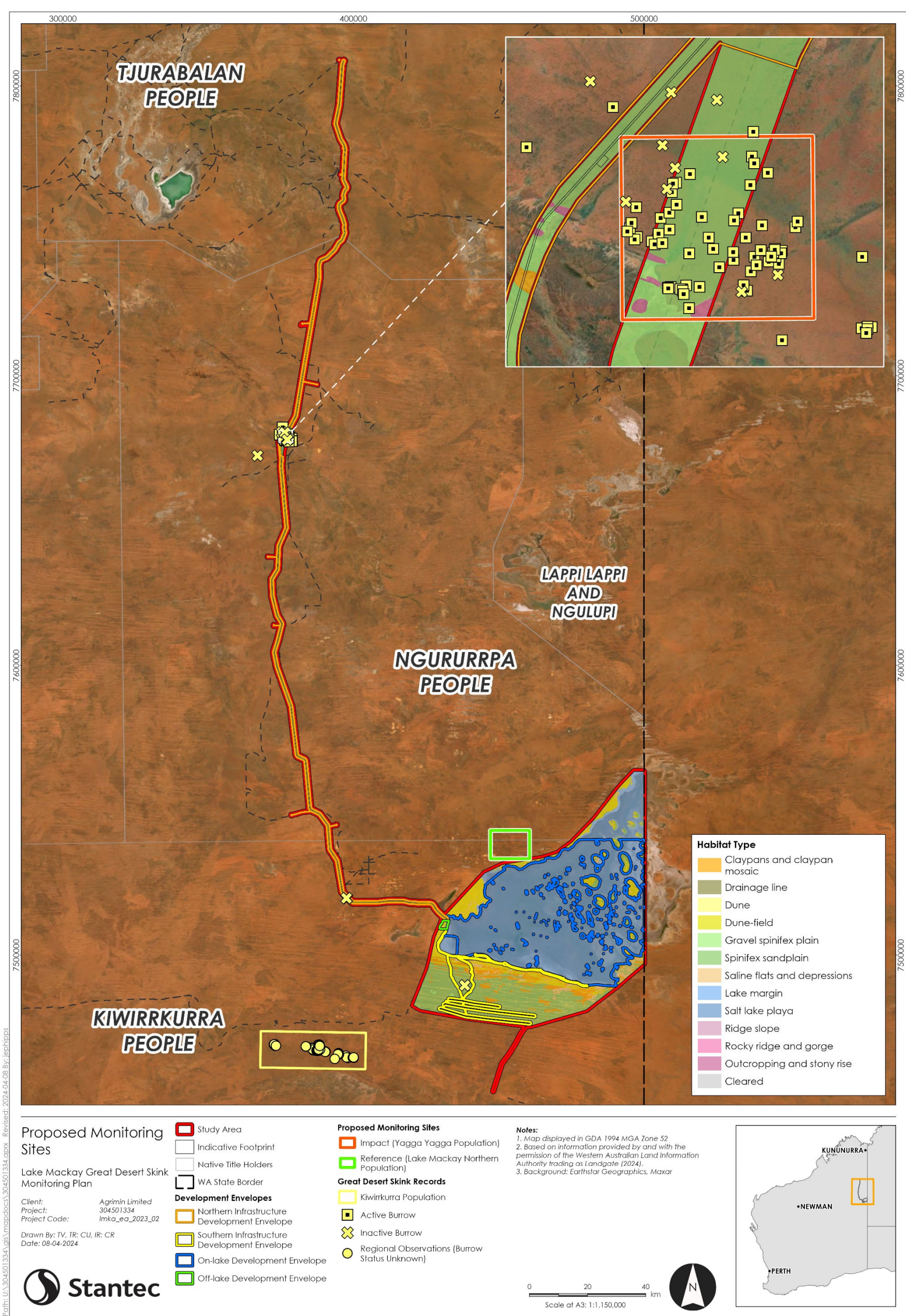


Figure C 1: Proposed Great Desert Skink monitoring sites (location of Reference site indicative and pending further discussions with TO groups).

C.4.4 Methods

The Great Desert Skink Monitoring Program will utilise a plot search technique to quantify the number of active burrows at each site. This method is recommended in the *National Recovery Plan for the Great Desert Skink* (Indigenous Desert Alliance 2023a) as a non-invasive and rapid method of monitoring the species, which builds upon the tracking skills of TO Rangers. Four 10 ha plots will be monitored at both the impact site and the reference site. Indicative 10 ha plot locations have been selected (**Figure C 1**), however these sites may be refined during baseline monitoring based on the distribution of active Great Desert Skink burrows and consultation with TO Rangers.

At each 10ha plot, qualified zoologists and TO ranger groups will search for one hour and record the following:

- Presence of Great Desert Skink burrows;
 - GPS coordinates;
 - Burrow status (active or inactive);
 - Number of latrines present;
 - Presence and count of adult, sub-adult, and juvenile scats in a latrine;
- Signs of feral predator presence (i.e., tracks and scats) and age of signs (fresh, recent, old);
- Evidence of disturbance (i.e., fire); and
- Fauna habitat type present (i.e. spinifex sandplain).

The 10 ha plot search method will allow for the detection of new burrows established through recruitment or movement of individuals within the population. All active burrows recorded during monitoring will be revisited during subsequent annual monitoring events to assess their continued occupancy and allow for assessment against the trigger and threshold criteria presented in within **Table 4-1** of the TFEMP.

In addition, at each 10 ha plot (both impact and reference) a representative subset of known active burrows will be monitored using motion cameras. Two motion cameras will be deployed within each 10 ha plot (where present), totalling 16 cameras for the Monitoring Program. Motion cameras will provide supplementary evidence of ongoing Great Desert Skink presence (**Figure C 2**) and may provide evidence of feral predator presence (indicating predation pressure) at burrows, triggering contingency measures to be implemented under the Feral Predator Monitoring and Control Program.

Motion cameras powered with long lasting lithium batteries will be mounted on stakes at entrances to burrows and visited quarterly to collect SD cards and exchange batteries. Data will be analysed by appropriately trained zoologist(s) to confirm continued species presence at reference and impact sites and to provide context if a burrow becomes inactive (i.e. cameras may capture a predation event).

C.4.5 Personnel and Licensing Requirements

The Great Desert Skink Monitoring Program will be undertaken by suitably qualified zoologists trained in the methods described in **Section C.4.4**, and/or knowledgeable and experienced Indigenous Rangers with existing skills in the methods described in **Section C.4.4**. TO Ranger groups have invaluable knowledge of the local area and previous experience, expertise and skills in conducting targeted surveys and data collection for Great Desert Skink. The participation of TO ranger groups will provide an opportunity for meaningful engagement and contribute to two-way knowledge sharing for the species.

Current licence requirements comprise a DBCA Fauna taking (scientific or other purposes) licence to take or disturb native fauna and a Section 40 Authorisation, to take or disturb threatened species. These licenses will be obtained prior to commencement of monitoring.



Figure C 2: Great Desert Skink captured on motion camera during Phase 1 of the Stantec Survey

C.4.6 Data and Statistical Analyses

Statistical tests will be used to interrogate the data collected from monitoring as appropriate, for example unpaired t-tests, ANOVA or linear models. Data analysis will be undertaken to detect any significant changes in Great Desert Skink activity (e.g. changes in the number of active burrows) observed at impact sites over time, relative to baseline data and reference sites. This information will inform whether trigger or threshold criteria are being exceeded and the effectiveness of management actions outlined within the TFEMP.

The application of statistical analyses will depend on the quality of the data collected, and where possible, will incorporate supporting data, such as presence of feral predators. If trigger or threshold criteria for Great Desert Skink in the TFEMP are exceeded, this supporting data will assist in assessing if changes in Great Desert Skink activity may be attributed to the Proposal or alternatively environmental factors.

C.5 Reporting

A standalone technical report will be submitted to Agrimin and the Indigenous landholders at the conclusion of each monitoring period, presenting the key findings of the Great Desert Skink Monitoring Program. The report will include assessment against relevant management provisions, including outcome- and objective-based criteria, and specifically trigger and threshold criteria presented in **Table 4-1** of the TFEMP. In the event that trigger or threshold criteria are exceeded, these will be reported in accordance with **Section 7.2** of the TFEMP and contingency actions will be provided for consideration. The technical report will be summarized within or appended to the Annual Environmental Report (AER) and the Annual Compliance Assessment Report (ACAR), to be submitted to the DWER, DCCEEW, and EPA, respectively, aligning with **Section 7.1** of the TFEMP.

C.5.1 Reporting Considerations

There are several considerations associated with this Great Desert Skink Monitoring Program, which will be considered when interrogating the data recorded and for interpretation and reporting:

- The Great Desert Skink is already threatened by feral predators occurring in the vicinity of the impact and reference sites. This may result in Great Desert Skink populations declining over the baseline monitoring period until feral predator control is implemented as per the Feral Predator Monitoring and Control Program and the Revised Offsets Strategy.
- *The National Recovery Plan for the Great Desert Skink* (Indigenous Desert Alliance 2023a) identifies climate change as a threat that has the potential to impact Great Desert Skink populations indirectly, by making the population less resilient to other threats, for example introduced predators. Consideration will be given to Climate Change effects when reporting and analysing data associated with the Monitoring Program.
- The quality of habitat may naturally change over time due to environmental factors unrelated to the Proposal e.g., when fire removes vegetation cover, most Great Desert Skink burrows become inactive within 12 months (Moore *et al.* 2015). The impact of fires (unrelated to the Proposal) on fauna habitat quality and significant fauna populations is likely to affect the occurrence/distribution of significant fauna over time.

C.6 Adaptive Management and Review

Results obtained from this Great Desert Skink Monitoring Program may inform adaptive management measures for the TFEMP and guide management actions for the species in the broader region. The review of data and information gathered during monitoring may increase understanding of the species or the environment in a regional context. This may inform management and mitigation measures such as:

- Fire management practices in relation to the Proposal and burning practices to benefit the Great Desert Skink in the broader region;
- Feral animal control undertaken in the broader region and refinement of the Feral Predator Monitoring and Control Program for the Proposal, focusing on known Great Desert Skink populations in the region; and
- Review and refinement of the Great Desert Skink Monitoring Program for compliance and against regulatory conditions.

A review of this Great Desert Skink Monitoring Program will be undertaken every five years, in response to adaptive management, as new technology becomes available, or as required by to achieve the environmental outcomes associated with the TFEMP. Any revisions of the Great Desert Skink Monitoring Program will be submitted to the relevant State (DWER, DBCA) and Commonwealth Government (DCCEEW) for approval, or in accordance with relevant regulatory conditions or requirements.

C.7 References

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Appendix D Greater Bilby Monitoring Program

D.1 Background

The Greater Bilby (*Macrotis lagotis*) (Bilby) is a solitary, nocturnal marsupial with long ears. The Bilby is listed as Vulnerable under the EPBC 1999 and BC Act 2016. The Bilby shelters in deep burrows. Burrow use is relatively dynamic, with individuals maintaining several burrows at once and abandoning, re-using, or excavating new burrows continually. The Proposal has implemented measures to avoid impacts to the species, where possible and minimise residual direct and indirect impacts through implementation of the Terrestrial Fauna Environmental Management Plan, TFEMP. The Bilby Monitoring Program will measure the effectiveness of management measures and whether the objectives of the TFEMP for the Bilby are met.

The Recovery Plan for the Greater Bilby (DCCEEW 2023c) states that habitat critical to the survival of the Bilby includes:

- Any area where the species is known or likely to occur as shown on the distribution map on the Greater Bilby SPRAT profile.
- Any location outside the known or likely distribution where Bilbies are found.
- Any area, between the areas noted above, that may be periodically occupied by Bilbies.
- Any area which Bilbies may naturally colonise or may feasibly be reintroduced.

Within the Study Area for the Proposal, the Bilby was recorded at 130 locations with the majority of records occurring within gravel spinifex plain (92 locations) and spinifex sandplain (33 locations) habitat (Stantec 2021a). Additionally, the species was also recorded in the surrounding region (150 km) at 165 locations, of which 66 occur near (within 25 km) of the Study Area (DBCA 2020) (**Figure D 1**).

Based on records from surveys completed within the Study Area, (Stantec 2021a), the preferred habitat for the Bilby within the Study Area comprises gravel spinifex plain and spinifex sandplain. Gravel spinifex plain is likely to be an important foraging habitat for the species due to the presence of *Acacia hilliana*, which is a host species for root larvae known to be an important food resource for the Bilby. According to the definition of critical habitat for the Bilby within the *Recovery Plan for the Greater Bilby* (DCCEEW 2023c) and consideration of known records of the Bilby in proximity to the Study Area, the following broad fauna habitats within the Study Area are considered critical to the survival of the Bilby (totals 1,345.63 ha):

- Gravel spinifex plain (248.12 ha; Bilby recorded at 92 locations);
- Spinifex sandplain (754.20 ha; 33 locations);
- Claypan and claypan mosaics (42.22 ha; 3 locations);
- Dune-field (281.82 ha; 1 location); and
- Dune (19.27 ha; 1 location).

D.2 Objectives and Duration of Monitoring

The objective of the Bilby Monitoring Program is to monitor and measure the success of management provisions (outcome- and objective-based) outlined in the TFEMP. To address this objective the following will be undertaken:

- Monitor changes in population abundance over time in comparison to environmental factors or potential impacts from the Proposal;
- Monitor the movement of individuals in the landscape in response to resources, environmental factors or potential impacts from the Proposal;
- Assess the direct and indirect effects of climate change on the Bilby and its associated ecology, where possible;
- Evaluate the results of the monitoring against trigger and threshold criteria, and management measures outlined in the TFEMP, to demonstrate Bilby populations are maintained during the life of the Proposal; and
- Provide opportunities for direct engagement of TO Ranger groups, allowing opportunities for knowledge sharing and connection to country.

The Bilby Monitoring Program is proposed to be completed over a 20-year timeframe to align with the estimated life of the Proposal.

D.3 Traditional Owner Engagement

The Bilby Monitoring Program presents an opportunity to engage with and work alongside TO Ranger groups from the Ngururpa and Kiwirrkurra IPAs and Tjurabalan People, a key objective of the Bilby Monitoring Program and Recovery Plan (DCCEEW 2023c). During the baseline surveys for the Proposal, TO Rangers provided integral local knowledge of the area and conducted independent targeted surveys for significant fauna, including the Bilby. The TO Ranger Groups all have well-defined threatened species protection strategies, and extensive experience and skills in a range of monitoring, protection and management activities.

This monitoring program has incorporated comments by Dr Rachel Paltridge on behalf of the Tjumu Tjumu (Aboriginal Corporation) RNTBC, and Desert Support Services (Kate Crossing) on behalf of both the Kiwirrkurra and Ngururpa Ranger programs. These comments represent their local knowledge and experience from existing programs undertaken by ranger groups.

Opportunities to involve TO Rangers in this monitoring may include:

- Consulting on survey design
- Assisting with site selection within impact and reference sites;
- Undertaking Bilby monitoring surveys; and
- Knowledge sharing to improve detection of the Bilby and increase understanding of species utilisation of the area.

Agrimin are committed to ongoing discussions with both groups, which will involve spending time on country and engaging in two-way knowledge sharing. Through these ongoing discussions, there may be refinement in the locations of some of the reference sites, based on any recent additions to knowledge about significant fauna in the area. It is also acknowledged that monitoring methods may change over time, through adaptive management, in line with most recent scientific practices. Any refinements made to the program will be aligned with the requirements of the TFEMP. Agrimin recognizes and respects that the Traditional Owners and Ranger Groups have well-defined threatened species protection strategies, and extensive experience and skills in a range of monitoring, protection and management activities which are integral to ongoing discussions as part of stakeholder engagement for the life of the Proposal.

D.4 Monitoring

D.4.1 Overview and Timing

The approach for the Bilby Monitoring Program is summarised in **Table D 1**, which also shows the relevant trigger and threshold criteria (outcome-based) and objective-based management provisions. Survey design (**Section D.4.3**) follows a before-after-control-impact (BACI) design. The BACI design is considered optimal to isolate potential effects of the Proposal on the Bilby, from effects which may be attributed to natural variability. Prior to clearing being undertaken for the Proposal, adequate baseline monitoring data on the Bilby (prior to potential impacts), will be collected for a two-year period. The Bilby Monitoring Program will be undertaken annually during the dry season by suitably qualified zoologists and supported by TO Ranger groups, as agreed. Comparable habitats will be selected for both impact and references sites with site selection randomised within areas of known Bilby occurrence and potentially informed by a species distribution model if appropriate.

The methods (**Section D.4.4**) follow standard survey techniques recommended for detection of the species. This includes methods used within existing Bilby monitoring programs such as the *Fitzroy River Catchment Bilby Project* (DBCA 2021). Monitoring will also be conducted in accordance with relevant guidance for terrestrial fauna surveys (DSEWPac 2011a; EPA 2016; 2020). This aligns with the Department of Biodiversity, Conservation and Attraction's (DBCA) *Guidelines for Surveys to Detect the Presence of Bilbies, and Assess the Importance of Habitat in Western Australia* (DBCA 2017b). Additionally, consultation with Subject Matter Expert Dr. Harry Moore (DBCA) has been undertaken to confirm suitability of monitoring methods (H. Moore pers. com. 26 March 2024).

Table D 1: Bilby Monitoring Program summary.

Personnel	Timing	Number of Monitoring Sites	Survey Effort	Monitoring Parameters	Outcome-based Management Objectives	Trigger Criteria	Threshold Criteria
• Qualified zoologists • Skilled Indigenous Rangers	• Annually during the dry season (June to October)	• Four impact sites • Four reference sites	• Minimum of five 2 ha plots per site spaced 4-5 km apart (minimum total survey effort of 40 x 2 ha plots) • 20 minutes of searching at each 2 ha plot • 2 motion cameras per site positioned on active Bilby burrows where present	• Bilby occupancy (via presence of tracks, diggings, scats, burrows, and motion camera images) • Habitat characteristics • Availability of food sources • Evidence of disturbance • Evidence of feral predators	• No statistically significant decrease in the abundance of conservation significant species (GDS, Bilby) as a result of project-related activities.	• Statistically significant decrease in Bilby occupancy at impact monitoring sites in a single monitoring event, compared to baseline levels and relative to reference sites.	• Statistically significant decrease in Bilby occupancy at impact monitoring sites over two consecutive monitoring events, compared to baseline levels and relative to reference sites. - OR • If evidence of predation event (feral predator) of Bilby occurs.

D.4.2 Logistical Considerations

Several logistical factors were taken into consideration for the design and safe implementation of the Bilby Monitoring Program:

- The Proposal is located in a remote area of Western Australia and mobilisation to site from Perth currently takes a minimum of 1.5 days. TO Rangers are located in communities near to the proposed locations.
- Proposed Bilby monitoring sites are located along ~250 km of the Balgo Track, a rugged 4WD track, which takes up to 1.5 days to drive in entirety. There are currently no communities, accommodation, or amenities (e.g., water and fuel) located along the track. Management of safety and fatigue is imperative for field survey personnel undertaking the monitoring program.
- Consultation has been undertaken with TO Ranger groups during the development of this monitoring program. Monitoring is intended to be undertaken with involvement of TO Ranger groups.

D.4.3 Monitoring Sites

Within the Bilby Monitoring Program, impact sites and reference sites are defined in accordance with *How to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans: Instructions* (EPA 2024), as follows:

- **Impact Sites:** Sites where Bilbies have been previously recorded and where suitable habitat is known to occur, but within the Development Area of the Proposal and therefore where the Bilby may be subjected to direct and secondary impacts.
- **Reference Sites:** Sites where Bilbies have been previously recorded and where suitable habitat is known/likely to occur, but at locations that are likely to experience similar natural environmental conditions as the impact sites which are being managed for potential impacts of the Proposal. These reference sites are in areas largely un-impacted by human influences.

Following on from this, four proposed impact and four proposed reference sites (**Figure D 1**) have been selected for the Bilby Monitoring Program based on the following:

- Known occurrence of Bilby populations within the Study Area and surrounding region;
- Distances from the proposed impact areas;
- Accessibility of sites; and
- Presence of suitable habitat (i.e. gravel spinifex sandplain and spinifex sandplain).

Impact sites are located within the Development Envelope for the Proposal (accessible by vehicle and traversable by foot). These sites have been selected along the proposed haul road alignment (Northern Infrastructure Development Envelope; NIDE), correlating with higher numbers of Bilby records and the prevalence of suitable habitat (**Figure D 1**).

The proposed reference sites occur in areas that are not subject to direct or indirect impacts by the Proposal. The location of reference sites occurs along the Balgo Track (where it deviates outside the NIDE). The exact location of reference sites, in line with the above criteria, will be determined through more detailed consultation with the Indigenous landholders and Ranger Groups, incorporating their knowledge of Bilby populations, site accessibility (including cultural considerations) and presence of suitable habitat.

Each monitoring site encompasses a 20 km x 7 km area either overlapping the Development Envelope (impact) or outside of the NIDE (reference). Impact and reference sites will be situated at least 5 km apart (**Figure D 1**). Monitoring sites selected may deviate slightly from those presented in **Figure D 1**, based on habitat suitability and accessibility during baseline monitoring. Sampling within sites for the Bilby, will occur via 2 ha plots, with methods detailed in the subsequent section.

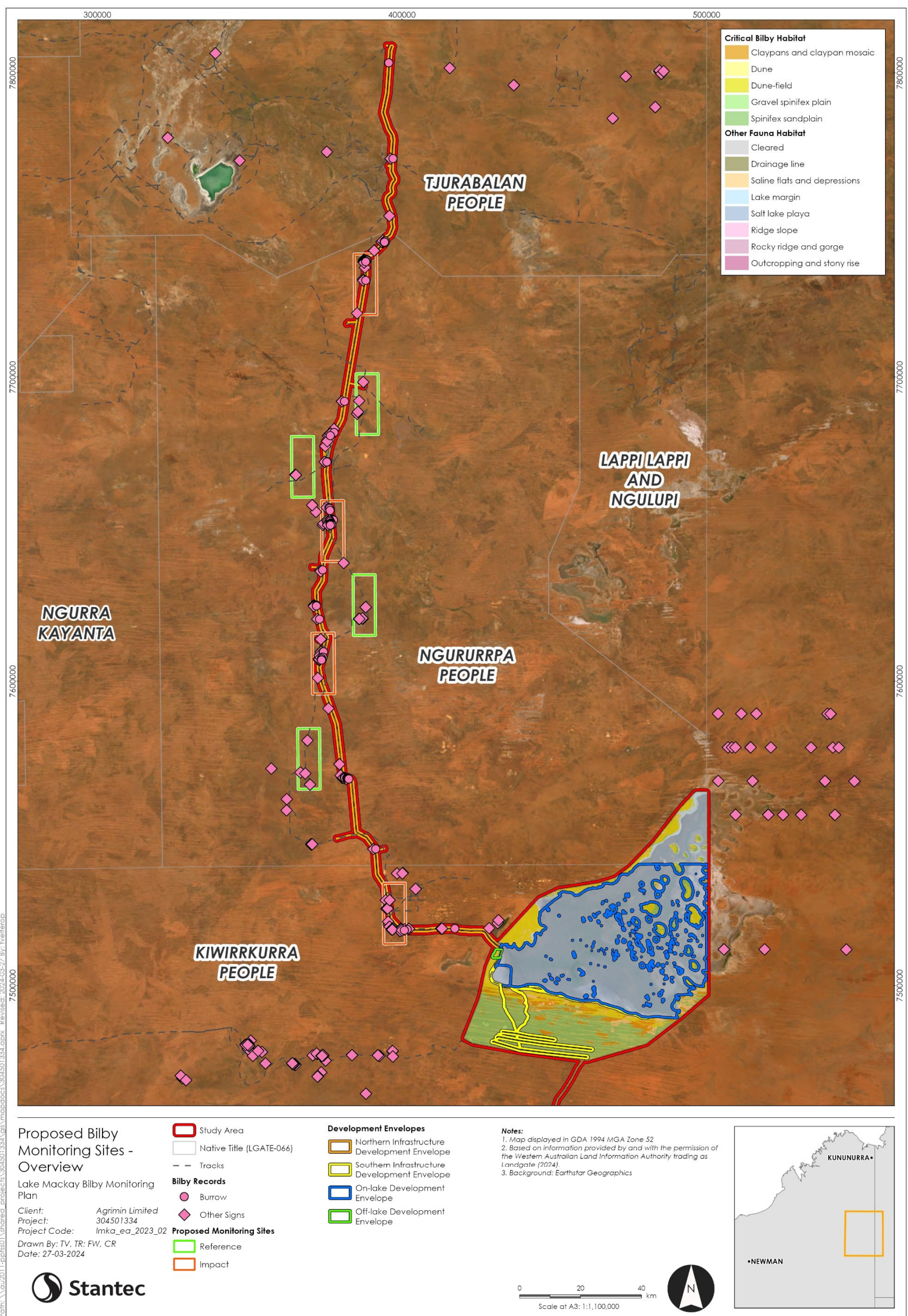


Figure D 1: Proposed Bilby monitoring site locations (note supporting figures of proposed monitoring site locations are presented as Attachments).

D.4.4 Methods

The Bilby Monitoring Program will utilise the 2 ha plot technique, which aligns with DBCA (2017b) guidance and current literature (Southgate *et al.* 2018). This method is considered suitable over large areas and where directly comparable and systematically quantified data is required. The 2 ha plot method was developed over many years by Indigenous Ranger Groups and partner scientists across the arid zone where “trackability” is high. At each impact site, 2 ha plots will be established within the Development Envelope. At each reference site, 2 ha plots will be established within an equivalent area along the Balgo Track.

A minimum of five 2 ha plots will be selected within each impact and reference monitoring site spaced approximately 4 to 5 km apart, resulting in a minimum total of 40 x 2 ha plots. The 2 ha plot locations will be stratified according to habitat type and then randomly selected. Random selection of 2 ha plots will allow for a more robust statistical analysis of Bilby occupancy (MacKenzie *et al.* 2002).

At each 2 ha plot, qualified zoologists and TO ranger groups will search for 20 minutes and record the following:

- Signs of Bilby presence including tracks, burrows, scats, and diggings (particularly at the base of plants where foraging for larvae) and age of signs (fresh, recent, old);
- Signs of feral predator presence (i.e., tracks and scats) and age of signs (fresh, recent, old);
- Evidence of disturbance (i.e., fire);
- Availability of Bilby food sources (i.e., *Acacia* shrub species which support root-dwelling larvae); and
- Fauna habitat type present (i.e., gravel spinifex sandplain, spinifex sandplain etc.).

At each 2 ha plot qualified zoologists and skilled TO Rangers will also opportunistically collect Bilby scats for DNA analysis to gather additional information about the populations. This method relies on the viability of DNA extracted and must be conducted after a two-week period of no rain, as rain degrades Bilby scat (DBCA 2018b).

If Bilbies are absent from all 2 ha plots within a monitoring site location, additional transects will be traversed. Observations will be recorded to determine if the population is present within the surrounding area to ascertain the persistence or movement patterns of Bilby in the surrounding region.

In addition, two motion cameras will be deployed at each monitoring site outside of active Bilby burrows (where present), totalling 16 cameras for the Monitoring Program. Motion cameras will be powered with long lasting lithium batteries and SD cards and batteries will be exchanged quarterly. Motion cameras will detect Bilbies, providing an indication of the condition of individuals. However, they are unlikely to be suitable for establishing a quantitative estimate of the mobile population. A subset of motion camera data will be analysed quarterly by a suitably qualified zoologist to detect and provide supplementary evidence of ongoing Bilby presence and condition over time (**Figure D 2**).



Figure D 2: Foraging Bilby detected on motion camera during targeted surveys.

D.4.5 Personnel and Licensing Requirements

The Bilby Monitoring Program will be undertaken by suitably qualified zoologists trained in the methods described in **Section D.4.4**, and/or knowledgeable and experienced Indigenous Rangers with existing skills in the methods described in **Section D.4.4**. TO Ranger groups have invaluable knowledge of the local area and previous experience, expertise and skills in conducting targeted surveys and data collection for Bilbies. The participation of TO ranger groups in will provide an opportunity for meaningful engagement and contribute to two-way knowledge sharing for the species.

Current licence requirements comprise a DBCA Fauna taking (scientific or other purposes) licence to take or disturb native fauna and a Section 40 Authorisation, to take or disturb threatened species. These licenses will be obtained prior to commencement of monitoring.

D.4.6 Data and Statistical Analyses

Statistical tests will be used to interrogate the data collected from monitoring as appropriate, for example unpaired t-tests, ANOVAs or general linear models. Bilby occupancy will be estimated using the approach detailed in MacKenzie *et al.* (2002).

Statistical analysis will be undertaken to detect any significant changes in Bilby occupancy at impact monitoring sites over time, relative to baseline data and reference sites. This will inform whether trigger or threshold criteria are being exceeded and assess the effectiveness of management actions outlined in the TFEMP.

The application of statistical analyses will depend on the quality of the data collected, and where possible, will incorporate supporting data, such as availability of food sources and habitat types. If trigger or threshold criteria for Bilby in the TFEMP are exceeded, the supporting data will assist in assessing changes in abundance that may be attributed to the Proposal or alternatively environmental factors.

D.5 Reporting

A standalone technical report will be submitted to Agrimin and the Indigenous landholders at the conclusion of each monitoring period, presenting the key findings of the Bilby Monitoring Program. The report will include assessment against relevant management provisions, including outcome- and objective-based criteria, and specifically trigger and threshold criteria presented in **Table 4-1** of the TFEMP. In the event that trigger or threshold criteria are exceeded, these will be reported in accordance with **Section 7.2** of the TFEMP and contingency actions will be provided for consideration. The technical report will be summarised within or appended to the Annual Environmental Report (AER) and the Annual Compliance Assessment Report (ACAR), to be submitted to the DWER, DCCEEW, and EPA, respectively, aligning with **Section 7.1** of the TFEMP.

D.5.1 Reporting Considerations

There are several considerations associated with this Bilby Monitoring Program, which will be considered when interrogating the data recorded and for interpretation and reporting:

- Monitoring populations of Bilbies can pose challenges as the species is highly mobile in response to food availability and has a relatively large home range. The mean male home range is 3.16 km² and the mean female home range is 0.18 km² (Moseby and O'Donnell 2003). This has the following implications:
 - Monitoring may record the presence of the Bilby in one year, with a subsequent absence the next year, which may trigger a false conclusion in relation to potential Proposal impacts. Given this, additional explanatory variables will be recorded during monitoring, including evidence of fire, presence of suitable food sources, and feral predator tracks and scats, to contextualise the data collected and assist in interpretation of results.
- *The Recovery Plan for the Greater Bilby* (DCCEEW 2023) identifies climate change as a threat with the potential to impact populations indirectly. For example, changing climate conditions may mean the population is less resilient to other threats, such as introduced predators. Consideration will be given to climate change when reporting and analysing data associated with this Bilby Monitoring Program.
- The quality of critical habitat may naturally change over time due to environmental factors unrelated to the Proposal. For example, the Bilby is known to preferentially seek out recently burned areas for foraging. The impact of fires (unrelated to the Proposal) on habitat quality and populations is likely to affect the occurrence/distribution of significant fauna change over time.

D.6 Adaptive Management and Review

Results obtained from this Bilby Monitoring Program may inform adaptive management measures for the TFEMP and guide management actions for the species in the broader region. The review of data and information gathered during monitoring may increase understanding of the species or the environment in a regional context. This may inform management and mitigation measures such as:

- Fire management practices in relation to the Proposal and burning practices to benefit the Bilby in the broader region;
- Feral animal control undertaken in the broader region and refinement of the Feral Predator Monitoring and Control Program for the Proposal, focusing on known Bilby populations in the region; and
- Review and refinement of the Bilby Monitoring Program for compliance and against regulatory conditions.

A review of this Bilby Monitoring Program will be undertaken every five years, in response to adaptive management, as new technology becomes available, or as required by to achieve the environmental outcomes associated with the TFEMP. Any revisions of the Bilby Monitoring Program will be submitted to the relevant State (DWER, DBCA) and Commonwealth Government (DCCEEW) for approval, or in accordance with relevant regulatory conditions or requirements.

D.7 References

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Attachments

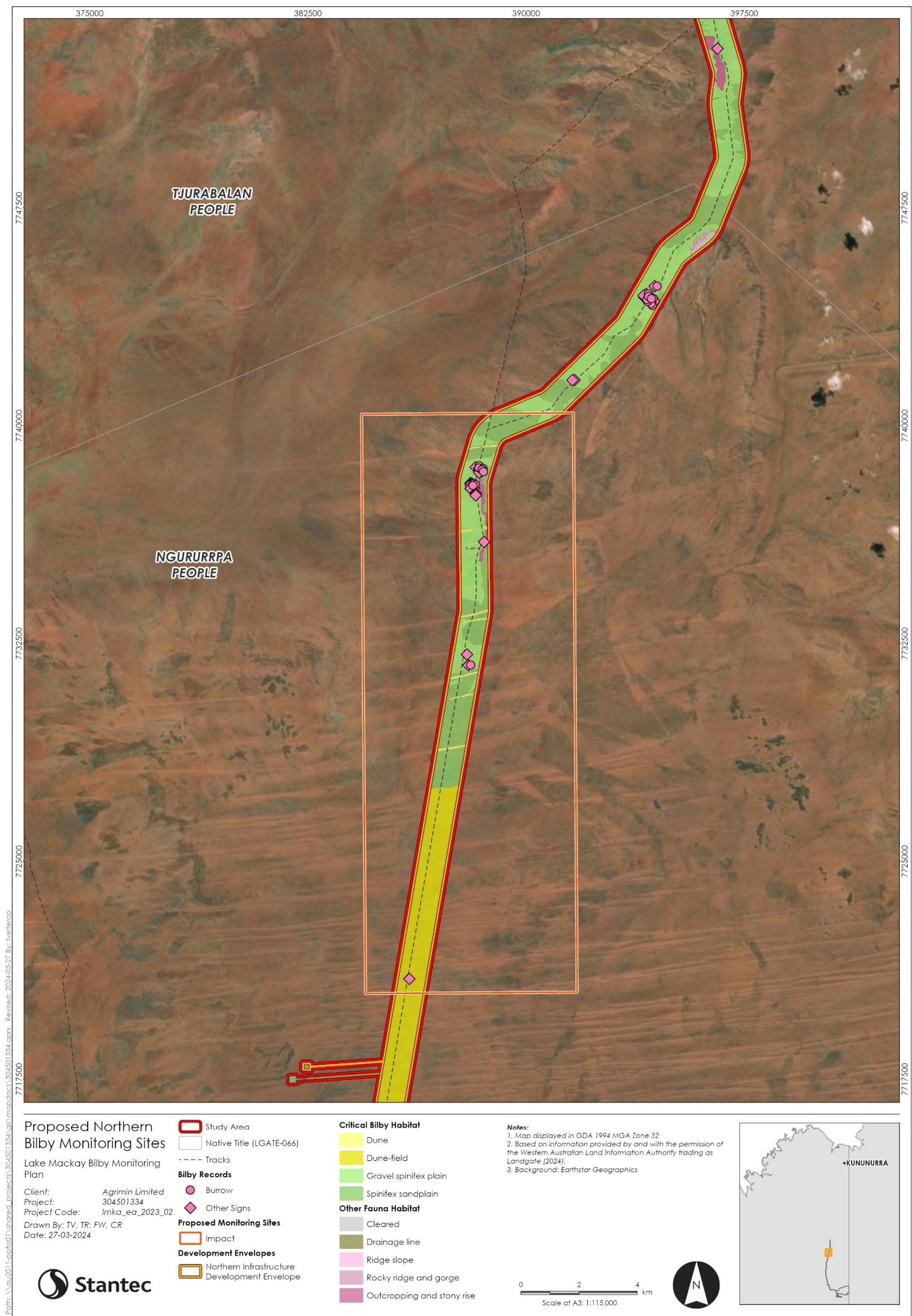


Figure D 3: Proposed northern Bilby monitoring sites.



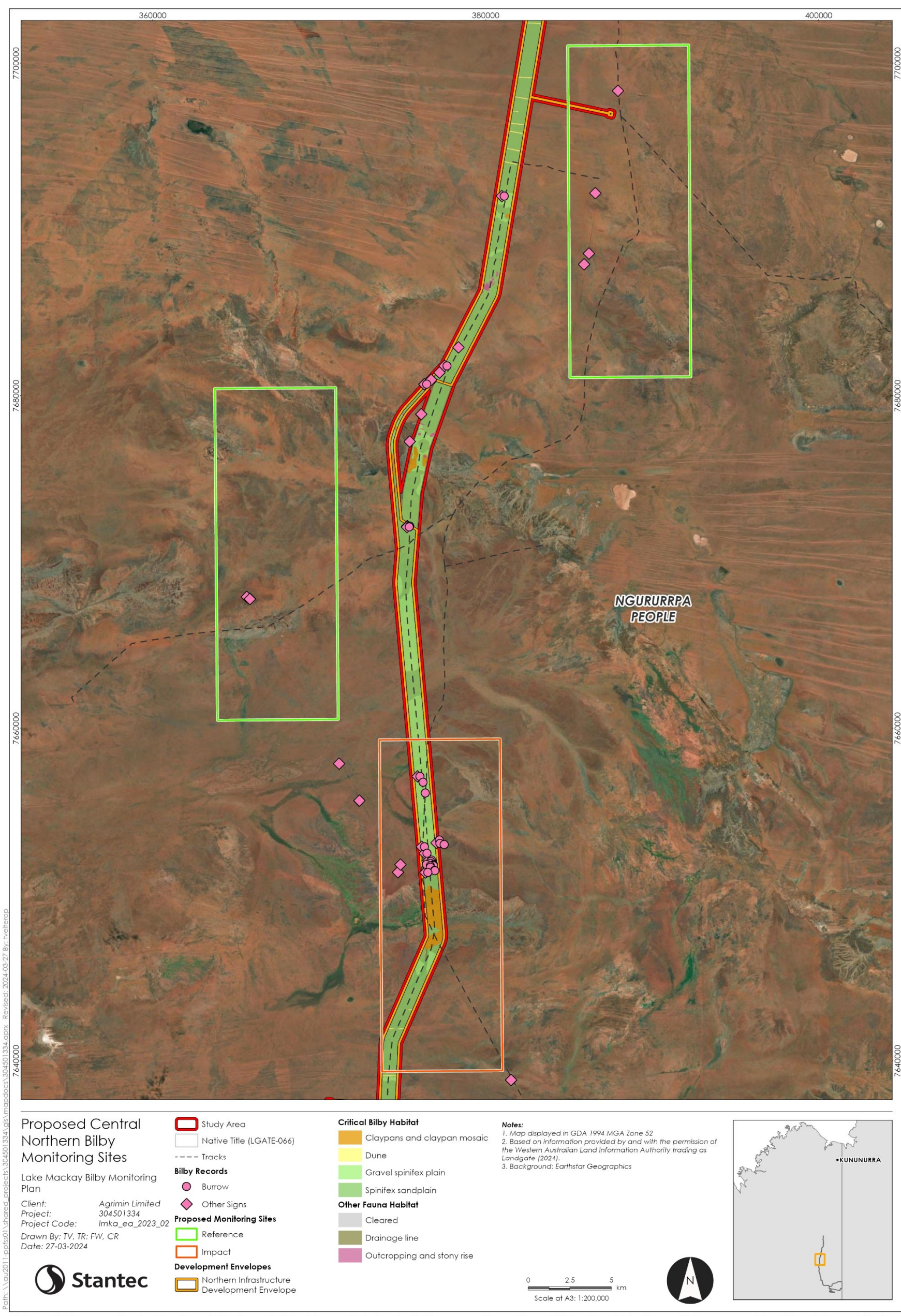


Figure D 4: Proposed central northern Bilby monitoring sites.

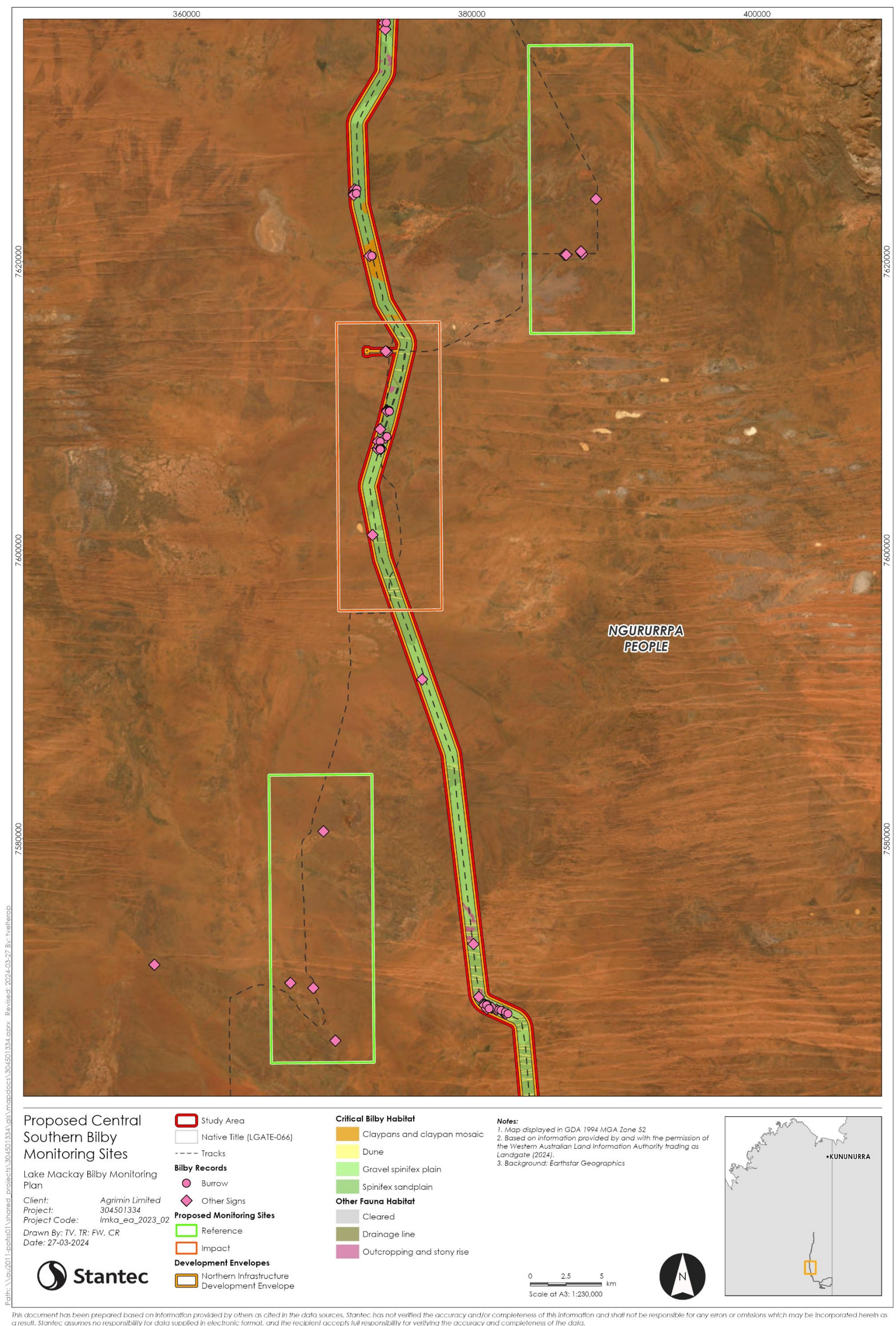


Figure D 5: Proposed central southern Bilby monitoring sites.





This document has been prepared based on information provided by others as cited in the data sources. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

Figure D 6: Proposed southern Bilby monitoring sites.

Appendix E Feral Predator Monitoring and Control Program

E.1 Background

Feral and pest fauna, specifically feral cats and foxes have been implicated in the significant decline of multiple species of vertebrate fauna in Australia (DEWHA 2008c; d). Feral predators have direct negative impacts on native fauna through predation as well as indirect effects on native predators through competition for dietary resources. Predation by feral predators is listed as a key threatening process for several significant species that have been recorded in the vicinity of the Proposal including:

- Night Parrot *Pezoporus occidentalis*; En, Cr)
- Greater Bilby (*Macrotis lagotis*; Vu, Vu)
- Great Desert Skink (*Liopholis kintorei*; Vu, Vu)
- Brush-tailed Mulgara (*Dasyercus blythi*; P4)
- Princess Parrot (*Polytelis alexandrae*; Vu, P4)
- Marsupial mole (*Notoryctes* sp; P4)

Feral predators, particularly feral cats are already known to occur within the vicinity of the Proposal and are currently exerting pressure on populations of threatened fauna (e.g. feral cats have been observed predating on Great Desert Skinks at the Yagga Yagga population during the Great Desert Skink Targeted Survey (Stantec 2021a)). However, the operation of the Proposal could attract and lead to an increased abundance of feral predators in the vicinity of the Proposal through an increase of available foraging resources and increased access to these resources via roads (Raiter *et al.* 2018). Foraging resources may include access to putrescible wastes and landfill, artificial freshwater sources, and access to carcasses from road strike. The TFEMP provisions appropriate management and mitigation measures to reduce the potential for any increase in feral predator numbers as a result of the Proposal e.g. fencing of the landfill. However, given that cats and foxes may utilise linear corridors such as the haul road for dispersal, and the sensitivity of the area for significant fauna, Agrimin has taken the conservative approach of implementing feral predator control to further reduce the risk of feral predators to significant species.

Although feral predators are a known threat to significant fauna in the vicinity of the Proposal, it is also important to acknowledge that there may be an existing predator/prey balance between the Dingo and feral predators. Dingoes, an apex predator, are also known to occur in the vicinity of the Proposal. There is evidence that Dingoes may suppress the behaviour and/or abundance of feral predator populations and their removal may result in an increase in feral predator abundance (mesopredator release)(Letnic and Dworjanyan 2011; Moseby *et al.* 2012; Ritchie and Johnson 2009). Evidence of Dingoes predating feral cats has been recorded in proximity to the Proposal suggesting they play an important role in limiting feral predator populations in the area (K. Crossing pers. com. 19 March 2024). However, Dingoes are known to be killed by baits containing the poison 1080 (sodium fluoroacetate) and this includes Eradicat® (Johnston 2020) with canids including dingoes being extremely sensitive to the toxin (Thylation Operations Pty. Ltd. 2020). Implementation of any feral predator control measures should aim to avoid disrupting the current equilibrium between Dingoes and feral predators which exists in the vicinity of the Proposal on the Indigenous Protection Areas (IPAs).

The Ngurrpa and Kiwirrkurra rangers are currently trialling different methods of feral predator control on their IPAs (K. Crossing pers. com. 19 March 2024). The Ngurrpa rangers are trialling the deployment of Felixers (two units): a targeted approach in the vicinity of a Night Parrot population. The Kiwirrkurra rangers are trialling a small scale baiting program: a control approach at a Bilby population where Dingoes occur in low densities. Agrimin acknowledges the importance of incremental knowledge gain and adaptive management. Based on the information available at the time of developing this program, Agrimin has adopted a targeted approach to feral predator control (Felixers) and will evaluate the option for a targeted approach for baiting on the haul road once more information is available from the current trial by Kiwirrkurra rangers. At the request of the Traditional Owners, Agrimin has not adopted an approach involving broadscale baiting, which has the potential for unintended consequences. Through adaptive management and incremental knowledge gain, baiting options will be re-evaluated as a method of feral predator control once the trial program by the Kiwirrkurra rangers is complete. Any potential baiting program would involve an evaluation of effectiveness and implications through comparisons with baseline data and unbaited reference sites.

Additionally, when inundated, the islands on Lake Mackay provide suitable breeding habitat for waterbirds such as the Banded Stilt (*Cladorhynchus leucocephalus*) (Stantec 2021a). While not feral, Silver Gulls are known to predate Banded Stilt chicks during breeding events and have considerable influence on breeding success (Pedler 2017b). Silver Gulls are known to occur at Lake Mackay (360 Environmental 2017a; Duguid *et al.* 2005; Stantec 2021b), however populations have the potential to increase in response to the same foraging resources as feral predators.

E.2 Objectives and Duration of Monitoring and Control

The Feral Predator Monitoring and Control Program is comprised of the Feral Predator Monitoring Program and the Feral Predator Control Program. These programs have separate but related objectives. The objective of the Feral Predator Monitoring Program is to monitor and measure the success of management provisions (outcome- and objective-based) outlined in the TFEMP. To address this objective the following will be undertaken:

- Monitor changes in detection of feral predators over time in comparison to environmental factors or potential impacts from the Proposal;
- Monitor the movement of individuals in the landscape in response to resources, environmental factors or potential impacts from the Proposal;
- Evaluate the results of the monitoring against trigger and threshold criteria, and management measures outlined in the TFEMP and Feral Predator Control Program (**Section E.5**), to demonstrate that feral predator populations are not increasing because of the Proposal during the life of the Proposal; and
- Provide opportunities for direct engagement of TO Ranger groups, allowing opportunities for knowledge sharing and connection to country.

The objective of the Feral Predator Control Program is to ensure there is no increase in feral predator numbers attributed to the Proposal with the aim to reduce the number of feral predators in proximity to key significant species populations in the vicinity of the Proposal. To address this objective the following will be undertaken:

- Feral Predator Control Program is to commence when clearing is undertaken.
- Ongoing annual monitoring and control of feral predators and Silver Gulls (when environmental criteria for control is triggered as per the TFEMP), in the vicinity of the Proposal;
- Targeted approach for feral predator control in proximity to known significant fauna populations and key infrastructure areas known to attract feral predators (e.g. waste landfill, camps).
- Provide opportunities for direct engagement of TO Ranger groups, allowing opportunities for knowledge sharing and connection to country.
- Implement feral predator control in conjunction with fire management where required as per the NPMP and TFEMP (e.g. prescribed burning).

The Feral Predator Monitoring and Control Program is proposed to be completed over a 20-year timeframe to align with the estimated life of the Proposal.

E.3 Traditional Owner Engagement

The Feral Predator Monitoring and Control Program presents an opportunity to engage with and work alongside TO Ranger groups from the Ngururpa and Kiwirrkurra IPAs and Tjurabalan People, a key objective of the Feral Predator Monitoring and Control Program. The TO Ranger Groups all have well-defined predator monitoring and management strategies, and extensive experience in a range of monitoring and control activities.

This monitoring program has incorporated comments by Dr Rachel Paltridge on behalf of the Tjamu Tjamu (Aboriginal Corporation) RNTBC, and Desert Support Services (Kate Crossing) on behalf of both the Kiwirrkurra and Ngururpa Ranger programs. These comments represent their local knowledge and experience from existing programs undertaken by ranger groups. Opportunities to involve TO Rangers in this monitoring may include:

- Consulting on monitoring survey design;
- Consulting on feral predator control methods;
- Involvement in feral predator monitoring surveys;
- Undertaking feral predator control (e.g. being trained to load cartridges into Felixers and collect SD cards); and
- Traditional Knowledge sharing to improve detection and monitoring of feral predators.

Agrimin are committed to ongoing discussions with both groups, which will involve spending time on country and engaging in two-way knowledge sharing. Through these ongoing discussions, there may be refinement in the locations of some of the reference sites, based on any recent additions to knowledge about significant fauna in the area. It is also acknowledged that monitoring methods may change over time, through adaptive management, in line with most recent scientific practices. Any refinements made to the program will be aligned with the requirements of the TFEMP. Agrimin recognizes and respects that the Traditional Owners and Ranger Groups have well-defined threatened species protection strategies, and extensive experience and skills in a range of monitoring, protection and management activities which are integral to ongoing discussions as part of stakeholder engagement for the life of the Proposal.

E.4 Feral Predator Monitoring Program

E.4.1 Overview and Timing

The approach for the Feral Predator Monitoring Program is summarised in **Table E 1** which also shows the relevant trigger and threshold criteria (outcome-based) and objective-based management provisions. Survey design (**Section E.4.3**) follows a before-after-control-impact (BACI) design. The BACI design is considered optimal to isolate potential effects of the Proposal on feral predator activity before and after construction for the Proposal and feral predator control has commenced. Prior to clearing being undertaken for the Proposal, adequate baseline monitoring data on feral predators (prior to potential impacts), will be collected for a two-year period. The Feral Predator Monitoring Program will be undertaken quarterly by suitably qualified zoologists and supported by TO Ranger groups, as agreed.

The methods outlined (**Section E.4.4**) follow standard survey techniques recommended for detection of feral cats and feral foxes including those presented in *Pest animal monitoring techniques* (PestSmart 2021) and *A guide to surveying red foxes and feral cats in Australia* (Hradsky *et al.* 2021). Monitoring will be conducted in accordance with relevant guidance for terrestrial fauna surveys (EPA 2016;2020).

Table E 1: Feral Predator Monitoring Program summary

Personnel	Timing	Number of Monitoring Sites	Survey Effort	Monitoring Parameters	Outcome-based Management Objectives	Trigger Criteria	Threshold Criteria
- Qualified zoologists (establishment of the program) - Site personnel (collection of SD cards and record presence of Silver Gull at waste landfill) - Skilled Indigenous Rangers as appropriate	- Cameras to be visited quarterly - Record presence of Silver Gull at artificial water sources and landfill areas in the Development Envelope opportunistically/ weekly when silver gulls are present.	- Seven impact sites - Two Night Parrot population impact sites - One Great Desert Skink population impact site - Four Bilby population impact sites - Eight reference sites - Three Night Parrot population reference sites - One Great Desert Skink population impact sites - Four Bilby population impact sites - Key infrastructure areas (waste landfill, camp)	5 to 10 motion cameras per impact/reference site spaced approximately 1 km apart. 5 motion cameras at key infrastructure areas - Visual monitoring of Silver Gulls present at the waste landfill.	- Detection rate of feral predators - Count of Silver Gulls present at the waste landfill.	- No project- related increase in feral predators from baseline levels during the life of the Proposal. - No adverse impacts to significant fauna (Bilby, Mulgara, Princess Parrot and GDS) as a result of project-related increase in feral animal abundance relative to suitable reference sites.	Total remote camera records of feral predator (fox, cat) is >10 * at a single feral predator monitoring location (impact sites) during a single monitoring event**. <i>* Trigger to be reviewed and revised as appropriate (a percentage) of total baseline records following the collation of baseline data (2 years).</i> <i>** following implementation of feral predator control commencing during clearing (CEMP).</i>	- A statistically significant increase* in the occurrence of feral predator numbers recorded at impact sites comparative to baseline levels and relative to reference sites over two consecutive monitoring events**; - OR - Observation or evidence of single predation event (feral predator) on significant fauna (Bilby, Mulgara, Princess Parrot and GDS) at an impact site. <i>* Trigger to be reviewed and revised following the collation of baseline data (2 years)</i> <i>** following implementation of feral predator control commencing during clearing (CEMP).</i>
					No significant increase in Silver Gull (<i>Larus novaehollandiae</i>) abundance attributed to the Project.	10- 50 Silver Gull (<i>Larus novaehollandiae</i>) recorded at waste landfill. <i>*The Silver Gull is a predator of waterbird fledglings including Banded Stilts. Numbers naturally fluctuate with previous surveys: 2001 survey: 129 individuals (Duguid et al. 2005), 2017 survey: 485 individuals (360 Environmental 2017a), and 2021 survey: 7 individuals (Stantec 2021a).</i>	≥100 Silver Gulls * (<i>Larus novaehollandiae</i>) recorded at waste landfill for a period of more than a week. <i>*The Silver Gull is a predator of waterbird fledglings including Banded Stilts. Numbers naturally fluctuate with previous surveys: 2001 survey: 129 individuals (Duguid et al. 2005), 2017 survey: 485 individuals (360 Environmental 2017a), and 2021 survey: 7 individuals (Stantec 2021a).</i>

E.4.2 Logistical Considerations

Several logistical factors were taken into consideration for the design and safe implementation of the Feral Predator Monitoring Program:

- The Proposal is located in a remote area of Western Australia and mobilisation to site from Perth currently takes a minimum of 1.5 days. TO Rangers are located in communities near to the proposed locations.
- Additionally, proposed feral predator monitoring sites are located along ~250 km of the Balgo Track, a rugged 4WD track, which takes 1-1.5 days to drive in entirety. There are currently no communities, accommodation, or amenities (e.g., water and fuel) located along the track. Management of safety and fatigue is imperative for field survey personnel undertaking the monitoring program.
- Consultation has been undertaken with TO Ranger groups during the development of this monitoring program. Monitoring is intended to be undertaken with involvement of TO Ranger groups.

E.4.3 Monitoring Sites

Within the Feral Predator Monitoring Program, impact sites and reference sites are defined in accordance with *How to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans: Instructions* (EPA 2024), as follows:

- **Impact Sites:** Sites where significant species (Night Parrot, Bilby, Great Desert Skink) have been previously recorded and where suitable habitat is known to occur but intersected by the Development Area of the Proposal and therefore where significant species may be subjected to increased predation pressure as a result of the Proposal.
- **Reference Sites:** Sites where significant species (Night Parrot, Bilby, Great Desert Skink) have been previously recorded and where suitable habitat is known/likely to occur, but at locations that are likely to experience similar natural environmental conditions as the impact sites which are being managed for potential impacts of the Proposal. These reference sites are in areas largely un-impacted by human influences.

Feral predator monitoring will be undertaken at seven impact sites, eight reference sites, and key infrastructure areas (**Figure E 1 – Figure E 3**), focusing on areas known to support significant species that are particularly vulnerable to predation. In addition, monitoring for Silver Gulls will be undertaken by site personnel weekly when silver gulls are present at the waste landfill. Feral predator monitoring sites will coincide with significant fauna monitoring locations, including:

- Impact Sites
 - Two Night Parrot feral predator monitoring sites (located at the Night Parrot impact monitoring locations, refer to NPEMP **Appendix A**);
 - One Great Desert Skink feral predator monitoring site (located at the Yagga Yagga Population; **Appendix C**); and
 - Four Bilby feral predator monitoring sites (located at the Bilby impact monitoring locations; **Appendix D**).
- Reference Sites
 - Three Night Parrot feral predator monitoring sites (located at the Night Parrot reference monitoring locations, refer to NPEMP **Appendix A**);
 - One Great Desert Skink feral predator monitoring site (located at the Lake Mackay Northern Population; **Appendix C**); and
 - Four Bilby feral predator monitoring sites (located at the Bilby reference monitoring locations; **Appendix D**).

E.4.4 Methods

The Feral Predator Monitoring Program will use motion cameras to detect presence of feral predators at impact sites, reference sites, and key infrastructure areas. This method is suitable for monitoring long-term population trends through calculation of an average detection rate (the number of feral predators detected on each camera each quarter divided by the total camera trap nights) (Moseby *et al.* 2021). At each impact and reference site, 5 to 10 motion cameras will be deployed approximately every one km on star pickets at permanent locations. Additionally, 5 motion cameras will be deployed across key infrastructure areas such as the waste landfill and camp to assess the effectiveness of feral predator mitigation and exclusion measures. Motion cameras will be powered with long lasting lithium batteries and visited quarterly to exchange SD cards and batteries. Motion camera data will be analysed quarterly by a suitably qualified zoologist to measure changes in the feral predator detection rate over time. Additionally, analysis will include monitoring for changes in feral rabbit detections over time to detect any potential changes as a result of the feral predator control program.

In addition, any secondary signs of feral predators (e.g. scats, tracks) observed during quarterly visits to download data from remote cameras will be recorded. Any opportunistic visual observations of feral predators by site personnel or contractors will be recorded including date, time, location, and species in accordance with the TFEMP. Secondary evidence and opportunistic sightings of feral predators (e.g. scats, tracks) will be reviewed in context of the feral Predator Monitoring Program and to inform the Feral Predator Control Program.

Silver Gulls will be visually monitored at the waste landfill by site personnel. Counts of Silver Gulls will be undertaken weekly when silver gulls are present to assess whether trigger or threshold criteria are being exceeded and determine if additional management actions are required.

E.4.5 Survey Personnel and Licensing Requirements

The Feral Predator Monitoring Program will be undertaken by suitably qualified zoologists trained in the methods described in **Section E.4.4**, site personnel, and/or knowledgeable and experienced Indigenous Rangers with existing skills in the methods described in **Section E.4.4**. The participation of TO ranger groups in the Monitoring Program will provide an opportunity for meaningful engagement and contribute to two-way knowledge sharing for feral predator detection. There are currently no licence requirements for deploying unbaited cameras for feral predator monitoring.

E.4.6 Data and Statistical Analyses

Statistical tests will be used to interrogate the data collected from feral predator monitoring as appropriate, for example unpaired t-tests, ANOVA or linear models. Final selection of statistical tests will depend on the qualities of the data collected. Data analysis will be undertaken to measure any significant changes in the feral predator detection rate (e.g. number of independent detections/ number of camera trap nights) observed at the impact sites over time, relative to baseline data and reference sites. This will inform whether trigger or threshold criteria are being exceeded and the effectiveness of management actions outlined within the TFEMP.

E.4.7 Reporting

A standalone technical report will be submitted to Agrimin and the Indigenous landholders at the conclusion of each annual monitoring period, presenting the key findings of the Feral Predator Monitoring Program. The report will include assessment against relevant management provisions, including outcome- and objective-based criteria, and specifically trigger and threshold criteria presented in **Table 4-1** of the TFEMP. In the event that trigger or threshold criteria are exceeded, these will be reported in accordance with **Section 7.2** of the TFEMP and contingency actions will be provided for consideration. The technical report will be summarised within or appended to the Annual Environmental Report (AER) and the Annual Compliance Assessment Report (ACAR), to be submitted to the DWER, DCCEEW, and EPA, respectively, aligning with **Section 7.1** of the TFEMP.

E.4.7.1 Reporting Considerations

There are several considerations associated with this Feral Predator Monitoring Program, which will be considered when interrogating the data recorded and for interpretation and reporting:

- The quality of habitat may naturally change over time due to environmental factors unrelated to the Proposal e.g., feral predators are attracted to recently burnt areas due to improved foraging opportunities (McGregor *et al.* 2016). The impact of fires (unrelated to the Proposal) is likely to affect the occurrence/distribution of feral predator change over time.
- The feral predator detection rate is likely to decrease following baseline monitoring once feral predator control is undertaken as per the Feral Predator Control Program.

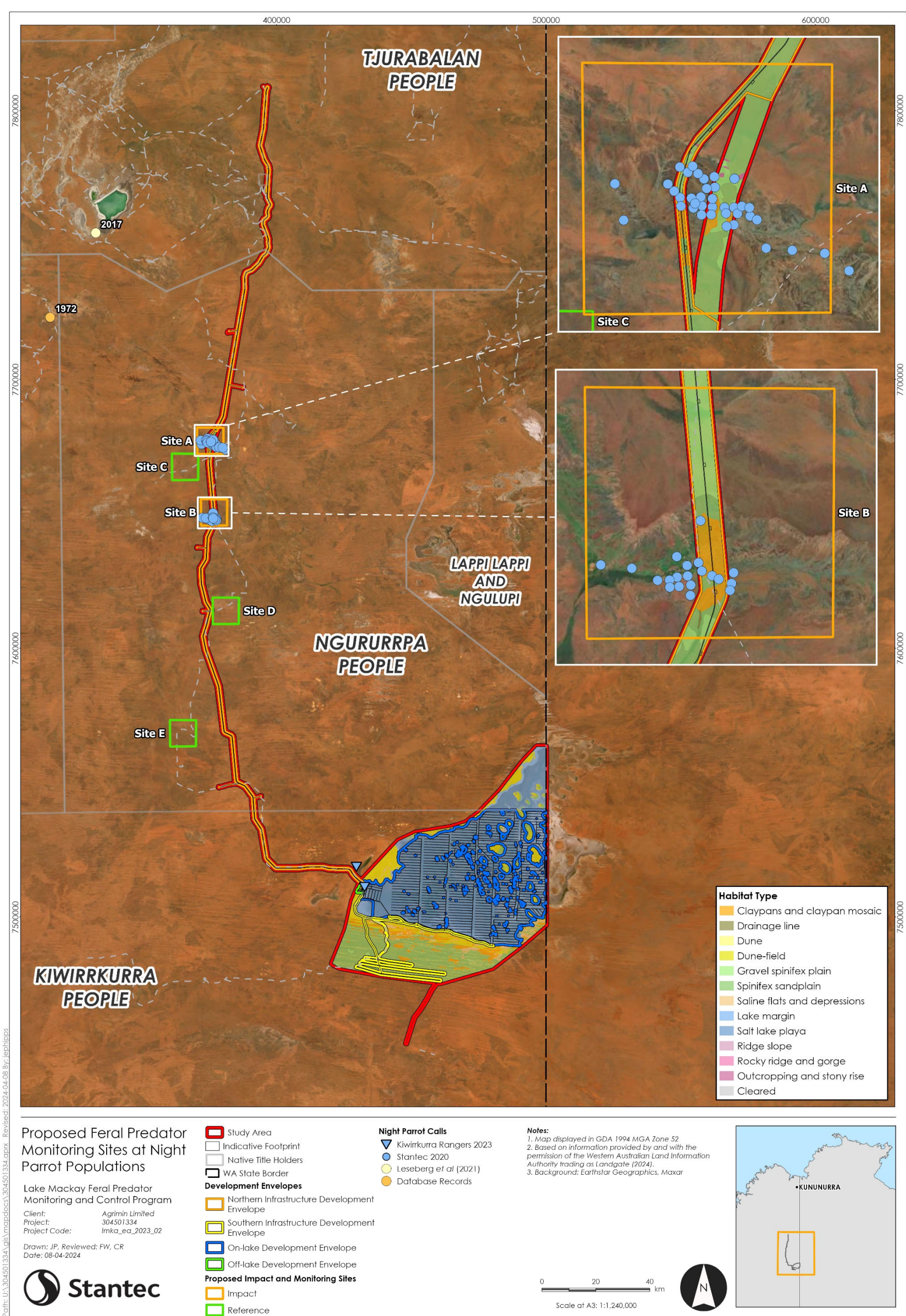


Figure E 1: Proposed feral predator monitoring sites: Night Parrot.

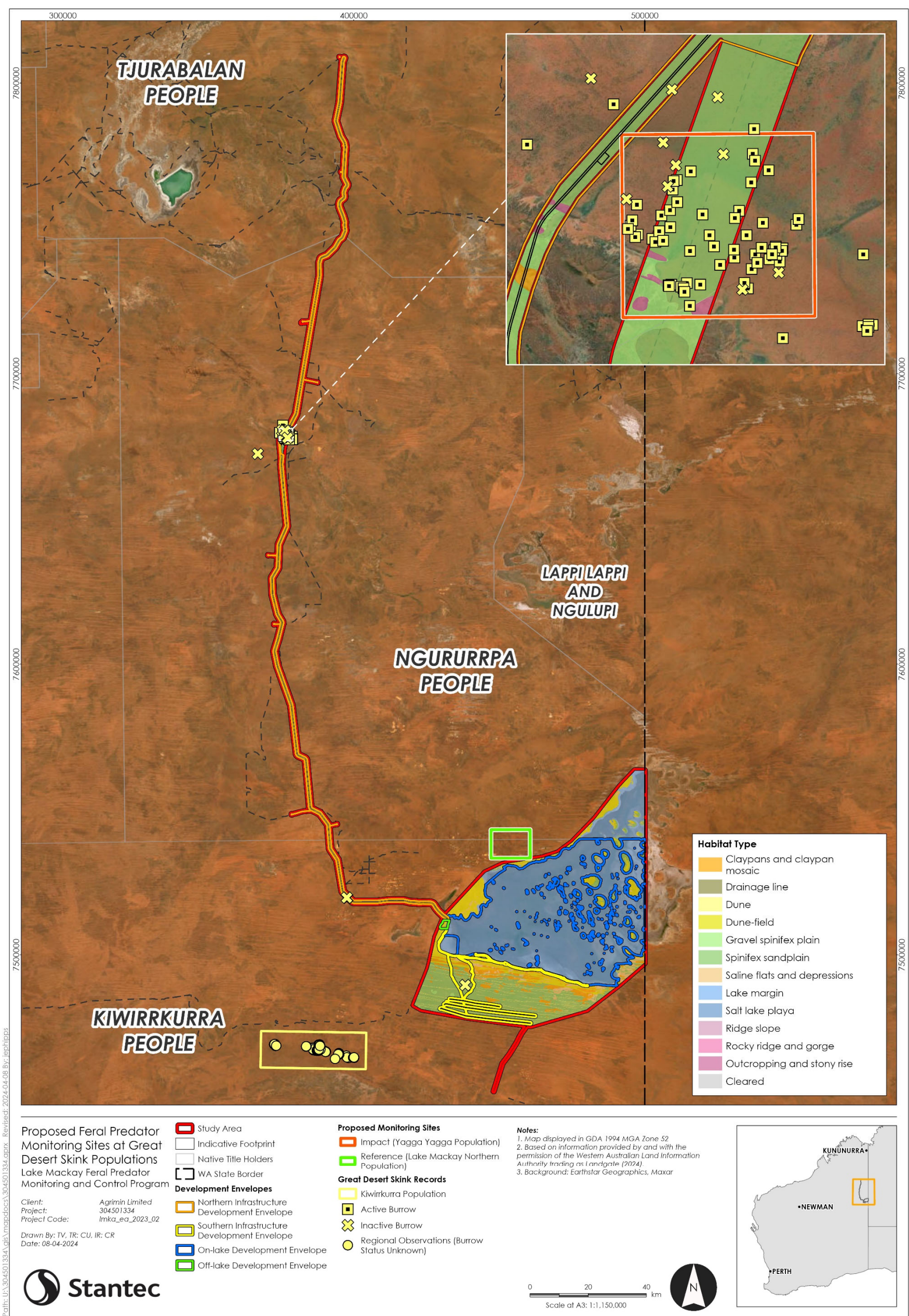


Figure E 2: Proposed feral predator monitoring sites: Great Desert Skink (location of Reference site indicative and pending further discussions with TO groups).

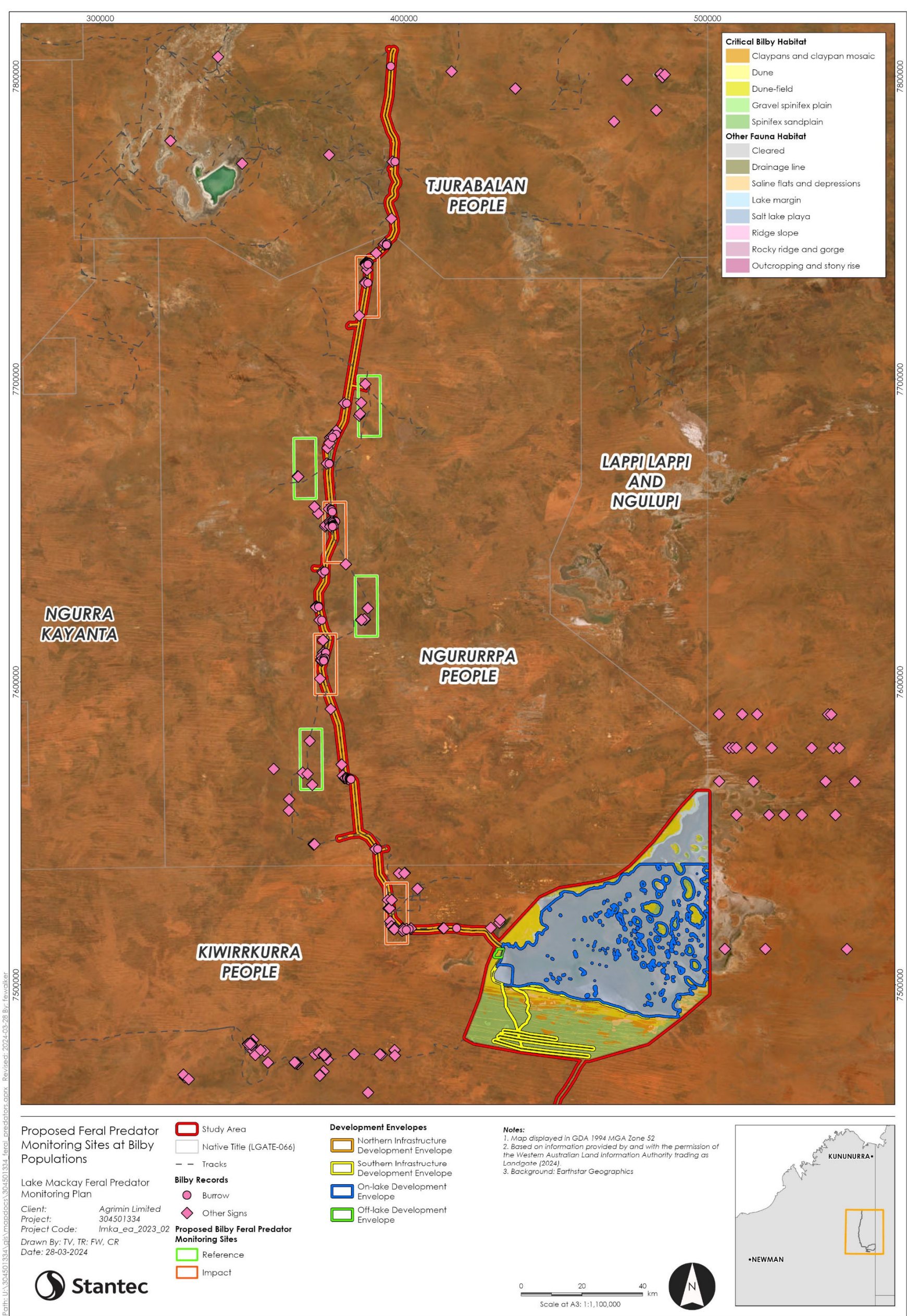


Figure E 3: Proposed feral predator monitoring sites: Bilby.

E.5 Feral Predator Control Program

E.5.1 Overview and Timing

The Feral Predator Control Program will be informed by the findings of the Feral Predator Monitoring Program and the existing programs being undertaken by TO rangers, and undertaken in accordance with the *Threat abatement plan for predation by feral cats (DoE 2015a)* and the *Threat abatement plan for predation by the European Red Fox (DEWHA 2008d)*. Specific control methods and control sites will be selected following collection of two years of baseline monitoring data, however proposed control sites and methods are presented in **Sections E.5.2 and E.5.3**.

Feral predator control will be undertaken according to the following:

- Upon commencement of clearing for the Proposal as per the CEMP;
- Annually as part of the annual Feral Predator Control Program;
- In response to a trigger or threshold exceedance as per the TFEMP and NPMP, where required;
- In conjunction with fire management practices (eg. Controlled burns) as per the TFEMP and NPMP.

E.5.2 Control Sites

The feral predator control will be undertaken within areas potentially impacted by the Proposal (**Figure E 4**) with a focus on:

- Areas where significant fauna (Night Parrot, Great Desert Skink, Bilby) have been recorded in proximity to the Proposal Area;
- Along the proposed haul road alignment (Northern Infrastructure Development Envelope; NIDE) as feral predators are known to utilise linear corridors (Raiter *et al.* 2018);
- The camp and key infrastructure areas (eg, waste landfills); and
- Areas where Silver Gulls and feral predators trigger the criteria for control to be undertaken as per the TFEMP.

E.5.3 Methods

Appropriate feral predator control methods will be selected based on predator density, control site characteristics and following detailed consultation with TO Rangers. TO Ranger groups are undertaking feral predator control in the surrounding region using a variety of techniques and have considerable expertise to contribute to the Feral Predator Control Program. Appropriateness of various control methods as per McLeod and Harris (2020), Johnston and Algar (2020), DEWNR (2014), and DBCA (2017a), and how they may be utilised in the Feral Predator Control Program are presented in **Table E 2**.

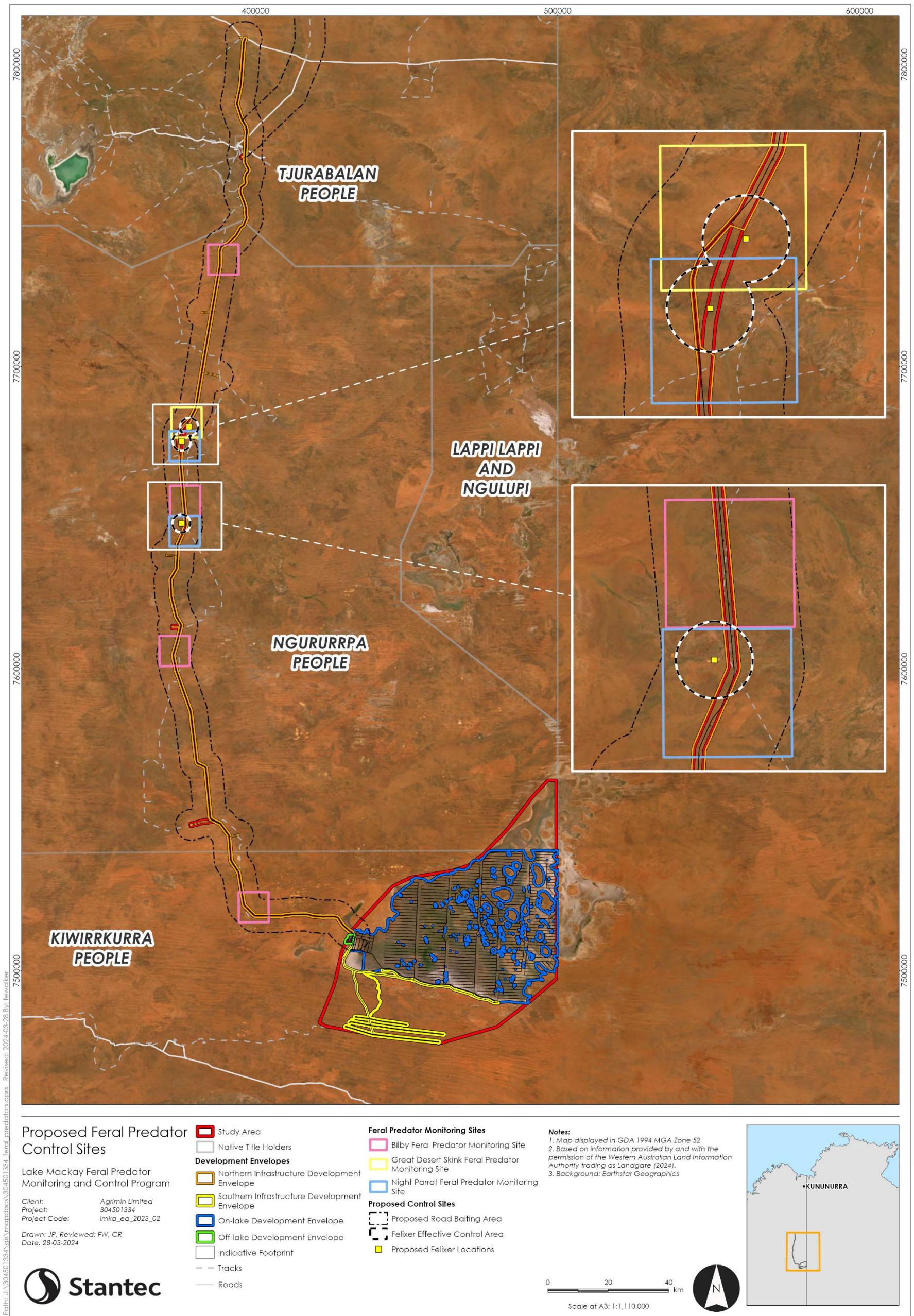


Figure E 4: Proposed feral predator control sites (Options for baiting pending findings of current programs and ongoing discussions with TO groups)



Table E 2: Summary of advantages, disadvantages, and potential uses of feral control methods.

Control Method	Advantages	Disadvantages	Potential Uses with Respect to the Feral Predator Control Program
Grooming traps (Felixers)	• Selective and target specific. • Sentinel control tool capable of removing multiple feral cats. • Opportunity to engage and train TO Rangers to manage the grooming traps.	• Must be secured to ensure the poison (1080 cartridges) is inaccessible. • Higher cost per unit. • Limited feral predator population reduction across broadscale areas.	• Felixers are currently being trialled by Ngururrpa Rangers to control feral predators near known Night Parrot roosts. Learnings from this control program will be used to determine the most effective way to incorporate Felixers into the Feral Predator Control Program. • Felixers are an appropriate control method to be deployed at areas where significant fauna (i.e. Night Parrot and Great Desert Skink) have been recorded in proximity to the Proposal and at areas known to attract feral predators such as key infrastructure areas (e.g. waste landfills). • Deployment of Felixers will create a 'sink' for feral cats in the vicinity of the Proposal and reduce overall predation pressure on native fauna in the surrounding area, including the Bilby. • Given the low density of feral cats expected at control areas, the potential control area is approximately one trap per 40km² of Night Parrot or Great Desert Skink habitat at the known populations. This is considered a conservative approach, given the ratio of traps to cats per unit area (1:5, assuming similar density in non-drought conditions to the Gibson Desert) is double the ratio used in the successful study (1:10) by Humphrey (Unpublished). • DBCA requires Felixers to be deployed for a 6-week non-toxic trial period before they can become operational. Once operational Felixers must be visited quarterly to load 1080 cartridges and download SD cards.
1080 Baiting (e.g. Eradicat)	• Can be applied on a broadscale by aircraft. • Can be applied via a targeted approach along linear corridors by vehicle. • Low-cost relative to the area to be treated.	• Can be hazardous to domestic animals and some native wildlife species. • Can have reduced efficacy when alternative prey resources are abundant. • Broadscale baiting can disrupt existing predator/prey balance where Dingoes predate on cats by removing Dingoes from an area allowing cat numbers to increase. • Health and safety considerations: Native fauna (e.g. varanids) are known to consume baits. Varanids are a potential traditional food source for indigenous peoples and adequate consultation with respective TO groups is required to understand the potential implications of a baiting program within the region.	• Broadscale baiting is not recommended as it may disrupt the Dingo – feral predator equilibrium, resulting in an increased abundance of feral predators. • Targeted baiting along the haul road may be appropriate in specific impact areas, however further consultation with TO Ranger groups is required prior to implementation. Targeted baiting is currently being trialled at the Marruwa Bilby population, which does not have a large Dingo population. It is the preference of the TO groups that additional baiting is not undertaken on Indigenous lands until the effectiveness of the Marruwa baiting program is assessed. Any potential baiting program would involve an evaluation of effectiveness and implications through comparisons with baseline data and unbaited reference sites. • Should a baiting program be implemented appropriate measures such as signage and ongoing communication and consultation with TO groups regarding the timing, location and extent of the baiting program being undertaken is required.

Control Method	Advantages	Disadvantages	Potential Uses with Respect to the Feral Predator Control Program
			•
Trapping	- Can be used in areas where baiting is not appropriate. - Can be targeted and will confirm removal of specific individual feral predators.	- A proportion of feral animals will not enter traps. - Difficult and increased cost to implement over a larger area. - Ethical considerations for non-target fauna species.	Trapping may be an appropriate method in proximity to infrastructure areas (e.g. waste landfill).
Baiting (Alpha-chloralose)	Humane method of population control.	- Hazardous to native animals and humans. - All deceased animals and unused bait must be collected and disposed of correctly to prevent secondary poisoning. - Very toxic to aquatic organisms.	Targeted baiting for Silver Gulls at the waste landfill, if required.
Shooting	Selective and target specific.	- High level technical ability required. - Time consuming - Health and safety considerations relating to use of firearms.	May be used for targeted control for Silver Gulls at the waste landfill, if required.
Deterrents	- Targeted to certain areas. - Low cost.	Method may become less effective over time as animals become habituated to deterrents.	May be used to prevent attraction of Silver Gulls to the waste landfill, if required.

E.5.4 Survey Personnel and Licencing Requirements

Feral predator control will be undertaken by specialist contractors and preferably accompanied by TO Ranger groups. Depending on the method of feral predator control, different licenses and permits will be required. This may include, but is not limited to:

- Department of Health 1080 landholder application and permit.
- DPIRD Wildlife Animal Ethics Committee animal ethics permit.
- DBCA Fauna License approval.
- DBCA 1080 risk assessment and non-toxic trial (Grooming traps).

Separately, Silver Gulls are a native species and therefore population controls will require a permit under Section 65(1) of the *National Parks and Wildlife Act 1972*. Specific permits for substances used to control animal populations are also likely to be required depending on the substance being used for control.

E.5.5 Measurable outcomes

The success of the Feral Predator Control Program will be measured by changes (decrease) in feral predator presence recorded over time as per the Feral Predator Monitoring Program. It is anticipated that the Feral Predator Control Program will reduce predation pressure of foxes and feral cats within proximity to the Proposal and it is expected to see an increase in the abundance of significant vertebrate fauna species over time (Night Parrot, Great Desert Skink, Bilby).

E.5.6 Reporting

The specialist contractors undertaking feral and pest animal reduction will submit a technical report to Agrimin and the Indigenous landholders at the conclusion of each control period. This report will quantify the outcomes of feral predator control undertaken. The technical report will be summarised within or appended to the Annual Environmental Report (AER) and the Annual Compliance Assessment Report (ACAR), to be submitted to the DWER, DCCEEW, and EPA, respectively, aligning with **Section 7.1** of the TFEMP.

E.6 Adaptive Management and Review

Results obtained from the Feral Predator Monitoring Program may inform adaptive management measures for the TFEMP and guide the Feral Predator Control Program. The review of data and information gathered during monitoring may increase understanding of the species or the environment in a regional context. This may inform management and mitigation measures such as:

- Fire management practices in relation to the Proposal and burning practices to manage feral predators in the broader region; and
- Review and refinement of the Feral Predator Monitoring and Control Program for compliance and against regulatory conditions.

A review of this Feral Predator Monitoring and Control Program will be undertaken every five years, in response to adaptive management, as new technology becomes available, or as required by to achieve the environmental outcomes associated with the TFEMP. Any revisions of the Feral Predator Monitoring and Control Program will be submitted to the relevant State (DWER, DBCA) and Commonwealth Government (DCCEEW) for approval, or in accordance with relevant regulatory conditions or requirements.

E.7 References

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Appendix F Greater Bilby Risk Assessment

A qualitative risk assessment was conducted in accordance with the Environmental Management Plan Guidelines (Commonwealth of Australia 2014) to assess the risks of the proposal and is shown in **Table F-1**. Each environmental risk identified has been provided a likelihood and consequence rating using the criteria in **Table F-2** to generate a risk rating of low, medium, high or severe.

Table F-1: Risk assessment criteria	Consequence				
	Likelihood	Minor	Moderate	High	Major
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
Likelihood					
The following criteria has been used to determine the likelihood of the risk occurring					
Highly likely	The risk event is expected to occur in most circumstances				
Likely	The risk event will probably occur during the life of the project				
Possible	The risk event might occur during the life of the project				
Unlikely	The risk event could occur but considered unlikely or doubtful				
Rare	The risk event may only occur in exceptional circumstances				
Consequence					
The following criteria has been used to determine the consequences of a risk occurring					
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				
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage				



Table F-2: Greater Bilby Risk Assessment

Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Greater Bilby mortality or injury from project- related vehicle strike	Highly Likely	High	High	The proposed haul road is a large linear infrastructure which has the potential to increase vehicle strike of Greater Bilby. The following management measures will be implemented in the TFEMP: • Vehicles to remain on designated roads. Restricting haulage operations to daylight hours. • There will be no operational use (non-haulage activities) of haul road at night, unless for unplanned events (for example emergency response). The Greater Bilby is nocturnal and through the implementation of these avoidance measures, the risk of vehicle strike will be greatly reduced. • Prepare and implement a Traffic Management Plan. • Education for road users. • Monitoring for vehicle interactions with fauna. • Pre-clearance surveys to be undertaken for Bilby in accordance with methods outlined in the TFEMP. The is inherent risk event is considered High and level of management within the TFEMP is proportionate to the risk reducing the residual risk to Medium considering proposed management measures.	Likely	Moderate	Medium



Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Project- related clearing of native vegetation resulting in loss of critical Greater Bilby habitat.	Likely	High	High	Loss of significant fauna habitat has the potential to significant environmental damage resulting in impacts through habitat fragmentation, loss of breeding and foraging habitat to Greater Bilby. The following management measures will be implemented in the TFEMP: • Triggers and thresholds in Table 4-1 for unauthorised clearing protecting critical bilby habitat within the DE. • Preclearance surveys will be undertaken to minimise potential impacts through clearing to Greater Bilby. • Clearing not to exceed 1,500 ha of flora and vegetation (the combined total of 200 ha of native vegetation within the 688 ha Off-LDE, and 300 ha of native vegetation within the 11,799 ha SIDE and 1,000 ha of native vegetation within the 33,928 ha NIDE). • Clearing methodology is outlined and rehabilitation specific to greater Bilby habitat is proposed. • Loss of critical Greater Bilby habitat is proposed to be offset as described within the Revised Offset Strategy. The is inherent risk event is considered High and level of management within the TFEMP is proportionate to the risk reducing the residual risk to Medium considering proposed management measures.	Possible	Moderate	Medium



Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Clearing and infrastructure for the proposal resulting in fragmentation of Greater Bilby habitat.	Likely	High	High	Fragmentation of habitat for significant fauna through long linear infrastructure such as the proposed haul road has the potential to increase feral predator abundance, increase edge effects through introduced weeds and could result in an increased risk of vehicle interaction for Greater Bilby. The following management measures will be implemented in the TFEMP: - Progressive rehabilitation will be undertaken. - Specific rehabilitation procedures for rehabilitation of critical Bilby habitat. - Feral animal monitoring and control will be undertaken. - Monitoring of the Bilby in accordance with the Bilby Monitoring Program. - Installation of culverts to facilitate the movement of fauna across the haul road. - Weed control in accordance with the Weed Management Plan. The is inherent risk is High and residual risk event is considered Medium. The level of management within the TFEMP is proportionate to the risk.	Possible	Moderate	Medium



Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Increase in the prevalence of feral predators resulting in an increase in predator prey interaction for Greater Bilby.	Likely	High	High	Predation from feral animals have the potential to cause substantial environmental harm to significant fauna populations that would require intensive management efforts to reverse. Potential impacts include significant fauna mortality as a result of a potential increase in the prevalence of introduced species and feral predators, linear infrastructure providing increased movement of feral predators within the landscape and the potential to provide additional food resources for feral predators through artificial water sources and putrescible waste. The following management measures will be implemented in the TFEMP: • Monitoring of the Bilby in accordance with the Greater Bilby Monitoring Program (Appendix D) • Monitoring of feral predators in accordance with the Feral Predator Monitoring Program (Appendix E). • Triggers and thresholds set for feral predators and control actions if required. • Fence off artificial water sources to deter predator access, following best practice exclusion fencing guidelines to allow ongoing dispersal of fauna species. • Introduced predators identified will be reported to Environmental personnel and recorded to monitor occurrences. • Avoid attraction of introduced predators by implementing domestic waste management procedures (e.g. fencing of landfills, regularly covering putrescible waste, secure lids on bins): – Putrescible waste to be stored and disposed of in a way that cannot be accessed by fauna. – Landfill wastes will be covered promptly, and active waste disposal cells will be fenced to exclude large fauna. – Prohibit personnel and contractors from feeding feral animals. • Introduced predator control will be undertaken on site in cooperation with regional control programs in response to an increase in sightings, as required. • Implement a Feral Predator Control Program to manage any potential increase in the prevalence of feral predators as a result of the Proposal. The inherent risk is High and with consideration of management and mitigation measures identified within the TFEMP the residual risk event is considered Medium and the level of management within the TFEMP is proportionate to the risk.	Possible	Moderate	Medium



Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Occurrence of project-related fire as a result of project-related activities resulting in the degradation, loss of habitat and loss of individuals and/ or populations of Greater Bilby	Likely	Major	High	The following management measures will be implemented in the TFEMP: • Liaise with Traditional Owners about the management of local fire regimes and fire management practices. • Establish Emergency Response Plan and Emergency Response Team (ERT). • Require all personnel to complete a site induction that will include information on prevention of fires, including designated smoking areas, no fires permitted in workplace, use of extinguishers, hot works procedures, appropriate waste management. • All fuel stored on site to be in a secure bund. • Implement a hot works permit system for high ignition risk work activities. • If hot works adjacent to vegetation can't be avoided, the area immediately surrounding 'hot work' to be dampened with water if vegetated and vegetation is not already naturally damp. • Fire response equipment maintained at site and in vehicles and machinery and Haul Trucks. • Water trucks to have fire management capabilities (pumps/hoses). The inherent risk is High and with consideration of management and mitigation measures identified within the TFEMP the residual risk event is considered Medium and the level of management within the TFEMP is proportionate to the risk.	Possible	High	Medium
Potential decline or change in the health/composition of fauna habitat arising from hydrological regime changes: Changes to surface hydrology and water flows (off-lake operations).	Likely	Moderate	Medium	The following management measures will be implemented in the TFEMP: • Design of haul road and infrastructure to minimize changes to natural hydrological flow. • Undertake detailed hydrological modelling of surface water flows, simulation 1:100-year events to determine impacts. • Installation of culverts in major drainage line habitat to facilitate the movement of fauna across the haul road.	Possible	Minor	Low



Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Dust generated as part of construction and operation activities has the potential to degrade Greater Bilby habitat and potentially limit availability of food resources Noise and vibration disrupting of natural foraging and breeding behaviours.	Likely	Minor	Low	Dust, noise, and vibration management: The following management measures will be implemented in the TFEMP: - Access roads to be appropriately engineered, with compaction, appropriate bunding and drainage implemented to prevent erosion and sedimentation. - Access roads will be subject to speed restrictions and dust suppression to minimise impacts on fauna. - Dust suppression measures that include good house-keeping practices for vehicles, cleared areas, and active stockpiles. - Use of dust suppression (water carts) during clearing and construction activities and operations. - Machinery and equipment will be fitted with noise attenuation measures to meet personnel safety requirements. Implement and enforce speed limits: - Reduction of the speed limit to: 40km along the haul road during night-time in the vicinity of NP populations and critical habitat (noting that NP are not active in the day and haulage will only be undertaken during daylight hours); and 80km/hr speed limit to apply to the remaining NIDE along the haul road. 60km/ hr speed limit along unsealed access tracks - The haul road will initially be unsealed; however, Agrimin plan to seal the haul road and this will subsequently reduce noise dust and vibration.	Possible	Slight	Low



Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Artificial light can potentially disturb species behaviour, cause barriers to movement, cause abandoning of burrows, and expose Greater Bilby to nocturnal predators.	Likely	Minor	Low	The following management measures will be implemented in the TFEMP: • Installation of lighting that direct lights toward operational areas to minimize light spill into adjacent vegetated areas. • Consideration of the <i>National Light Pollution Guidelines for Wildlife</i> (DCCEEW 2023b) light management options specific to terrestrial mammals in proximity to Critical Bilby habitat: – Keep artificial light intensity as low as possible near terrestrial mammal refuge sites and known foraging areas and commuting routes. – Consider avoiding specific wavelengths that are problematic for the significant species present. – Any potential disruption to species behaviour from artificial light are expected to be managed through suitable design and mitigation measures, with negligible impacts for Greater Bilby and therefore this risk event is considered Low.	Possible	Minor	Low



Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Introduction and/or spread of weed species leading to reduced flora species and system diversity.	Possible	Moderate	Medium	Weeds management to be undertaken in accordance with the Weed Management Plan (outlined within the FVEMP), including: – Weed management programs will be undertaken in accordance with relevant EPBC Act threat abatement plans and be informed by best practice management of the weed species identified during baseline surveys and in accordance with: ▪ the Threat Abatement Plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses (DSEWPac 2012). ▪ Buffel grass management for Central Australia (Department of Environment and Natural Resources 2018), as well as ▪ Integrated weed management (Weeds Australia 2021a). – Minimising the risk of invasion of buffel grass in significant fauna avoidance buffer areas. – Maintain weed hygiene obligations in clearing contractor contracts. – Timely response for management of any declared weed occurrences. – Limit vehicle and personnel movements outside of approved access and disturbance envelopes. – Training for personnel to identify weed species and process for reporting weed locations. – Incident reporting of new weed species and new locations. – Implement weed hygiene procedures for clearing and construction equipment coming into the Proposal Area, and equipment moving between Development Envelopes. – Establish weed hygiene zones if conducting earthworks near known weed locations. – Weed mitigation to be undertaken prior to the wet season to minimise weed infestation. – Undertake weed baseline survey and weed mapping. – Monitor and report weed occurrence within the development envelope in accordance with the Weed Management Plan. Inherent risk is considered Medium and any potential decline or change in the health/composition of fauna habitat arising from the introduction and/or spread of weeds are expected to be managed through suitable avoidance and mitigation measures, therefore this risk event is considered LOW.	Possible	Minor	Low



Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Inadequate transport, handling and storage of hydrocarbons and chemicals leading to contamination of the environment.	Likely	Minor	Low	- Hydrocarbon and/or chemical leaks and spills (expected to be rare) will be managed using bunding techniques, leak detection mechanisms and spill kits to restrict impacts. - Spill response equipment available (including on all Haul Trucks). - Spill response training for all personnel and contractors. - Dedicated workshop for maintenance. - Maintain high standard of housekeeping around processing plant. - Bioremediation facility for the treatment of contaminated fill, soils, or sediment. - Management of sites as per the Contaminated Site Act 2003 (WA). - Develop and implement a Hazardous Substances Management Plan (HSMP) and Procedure. Any potential contamination of Greater Bilby habitat arising from the hydrocarbon or chemical spills are expected to be managed through suitable mitigation measures, with negligible impacts therefore risk event is considered Low.	Possible	Minor	Low



Appendix G Great Desert Skink Risk Assessment

A qualitative risk assessment was conducted in accordance with the Environmental Management Plan Guidelines (Commonwealth of Australia 2014) to assess the risks of the proposal and is shown in **Table G-1**. Each environmental risk identified has been provided a likelihood and consequence rating using the criteria in **Table G-2** below to generate a risk rating of low, medium, high or severe.

Table G-1: Risk assessment criteria

Likelihood	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
Likelihood					
The following criteria has been used to determine the likelihood of the risk occurring					
Highly likely	The risk event is expected to occur in most circumstances				
Likely	The risk event will probably occur during the life of the project				
Possible	The risk event might occur during the life of the project				
Unlikely	The risk event could occur but considered unlikely or doubtful				
Rare	The risk event may only occur in exceptional circumstances				
Consequence					
The following criteria has been used to determine the consequences of a risk occurring					
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				
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage				



Table G-2: Great Desert Skink Risk Assessment

Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Great Desert Skink mortality or injury from vehicle strike	Highly Likely	High	High	The proposed haul road is a large linear infrastructure which has the potential to increase vehicle strike of GDS. The following management measures will be implemented in the TFEMP: • Vehicles to remain on designated roads. • Restricting haulage operations to daylight hours. • There will be no operational use (non-haulage activities) of haul road at night, unless for unplanned events (e.g. emergency response). GDS is nocturnal and through these avoidance measures the risk of vehicle strike will be greatly reduced. • Prepare and implement a Traffic Management Plan. • Education for road users, • Monitoring for vehicle interactions with fauna • Implementation of 150 m avoidance buffer zones for GDS active burrows recorded during preclearance surveys and 300m avoidance buffer around active burrows at known populations of GDS, with the buffer applying to the outermost burrow recorded where multiple burrows occur. • Pre Clearance surveys to be undertaken for GDS in accordance with methods outlined in the TFEMP. The is inherent risk event is considered High and level of management within the TFEMP is proportionate to the risk reducing the residual risk to Medium considering proposed management measures.	Likely	moderate	Medium



Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Clearing of native vegetation for the proposal resulting in loss of critical Great Desert Skink habitat or GDS population or individuals.	Likely	High	High	The following management measures will be implemented in the TFEMP: - Triggers and thresholds in Table 4-1 for unauthorised clearing protecting GDS critical habitat within the Development Envelope. - Loss of significant fauna habitat has the potential for significant environmental damage resulting in impacts through habitat fragmentation, loss of breeding and foraging habitat to GDS. - Preclearance surveys will be undertaken to minimise potential impacts through clearing to GDS. - Clearing not to exceed 1,500 ha of flora and vegetation (the combined total of 200 ha of native vegetation within the 688 ha Off-LDE, and 300 ha of native vegetation within the 11,799 ha SIDE and 1,000 ha of native vegetation within the 33,928 ha NIDE). - Clearing methodology is outlined and rehabilitation specific to GDS is proposed. - Loss of critical GDS habitat is proposed to be offset as described within the Revised Offset Strategy. The inherent risk event is considered High and level of management within the TFEMP is proportionate to the risk reducing the residual risk to Medium considering proposed management measures.	Possible	Moderate	Medium



Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Clearing and infrastructure for the proposal resulting in fragmentation of GDS habitat	Likely	High	High	Fragmentation of habitat for significant fauna through long linear infrastructure such as the proposed haul road has the potential to increase feral predator abundance, increase edge effects through introduced weeds and could result in an increased risk of vehicle interaction for GDS The following management measures will be implemented in the TFEMP: - Progressive rehabilitation will be undertaken. - Specific rehabilitation procedures for rehabilitation of critical GDS habitat and avoidance of old growth spinifex habitat. - Feral animal monitoring and control will be undertaken. - Monitoring of the GDS in accordance with the GDS Monitoring Program. - Implementation of avoidance buffer zones for GDS active burrows, with the buffer applying to the outermost burrow recorded where multiple burrows occur. - Weed control in accordance with the Weed Management Plan. The is inherent risk is High and residual risk event is considered Medium. The level of management within the TFEMP is proportionate to the risk.	Possible	Moderate	Medium



Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Project-related increase in the prevalence of feral predators resulting in an increase in predator prey interaction for GDS	Highly Likely	Major	Severe	Predation from feral animals have the potential to cause substantial environmental harm to significant fauna populations that would require intensive management efforts to reverse. Potential impacts include significant fauna mortality as a result of a potential increase in the prevalence of introduced species and feral predators, linear infrastructure providing increased movement of feral predators within the landscape and the potential to provide additional food resources for feral predators through artificial water sources and protrusible waste. The following management measures will be implemented in the TFEMP: • implementation of the Feral Predator Monitoring Program (Appendix E). • Monitoring of the GDS in accordance with the GDS Monitoring Program. • Specific triggers and thresholds set for feral predators and control actions if required. • Fence off artificial water sources to deter predator access, following best practice exclusion fencing guidelines to allow ongoing dispersal of fauna species. • Introduced predators identified will be reported to Environmental personnel and recorded to monitor occurrences. • Avoid attraction of introduced predators by implementing domestic waste management procedures (e.g. fencing of landfills, regularly covering putrescible waste, secure lids on bins): – Putrescible waste to be stored and disposed of in a way that cannot be accessed by fauna. – Landfill wastes will be covered promptly, and active waste disposal cells will be fenced to exclude large fauna. – Prohibit personnel from feeding feral animals. • Introduced predator control will be undertaken on site in cooperation with regional control programs in response to an increase in sightings, as required. • Implement a Feral Predator Control Program to manage any potential increase in the prevalence of feral predators as a result of the Proposal. The inherent risk is Severe and with consideration of management and mitigation measures identified within the TFEMP the residual risk event is considered Medium and the level of management within the TFEMP is proportionate to the risk.	Likely	Moderate	Medium



Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Altered fire regimes as a result of project related activities resulting in the degradation, loss of habitat and loss of individuals and/ or populations of GDS	Likely	Critical	Severe	The following management measures will be implemented in the TFEMP: • Liaise with Traditional Owners about the management of local fire regimes and fire management practices. • Establish Emergency Response Plan and Emergency Response Team (ERT). • Require all personnel to complete a site induction that will include information on prevention of fires, including designated smoking areas, no fires permitted in workplace, use of extinguishers, hot works procedures. • All fuel stored on site to be in a secure bund. • Implement a hot works permit system for high ignition risk work activities. • If hot works adjacent to vegetation can't be avoided, the area immediately surrounding 'hot work' to be dampened with water if vegetated and vegetation is not already naturally damp. • Fire response equipment maintained at site and in vehicles and machinery and Haul Trucks. • Water trucks to have fire management capabilities (pumps/hoses). The inherent risk is Severe and with consideration of management and mitigation measures identified within the TFEMP the residual risk event is considered Medium and the level of management within the TFEMP is proportionate to the risk.	Possible	High	Medium
Potential decline or change in the health/composition of fauna habitat arising from hydrological regime changes: Changes to surface hydrology and water flows (excluding on-lake operations).	Likely	Moderate	Medium	The following management measures will be implemented in the TFEMP: • Design of haul road and infrastructure to minimise changes to natural hydrological flow. • Undertake detailed hydrological modelling of surface water flows, simulation 1:100-year events to determine impacts.	Possible	Minor	Low



Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Dust generated as part of construction and operation activities has the potential to degrade GDS habitat and potentially limit availability of food resources. Noise and vibration disrupting of natural foraging and breeding behaviours.	Likely	Minor	Low	Dust, noise, and vibration management: The following management measures will be implemented in the TFEMP: - Access roads to be appropriately engineered, with compaction, appropriate bunding and drainage implemented to prevent erosion and sedimentation. - Access roads will be subject to speed restrictions and dust suppression to minimise impacts on fauna. - Dust suppression measures that include good house-keeping practices for vehicles, cleared areas, and active stockpiles. - Use of dust suppression (water carts) during clearing activities and construction and operations. - Machinery and equipment will be fitted with noise attenuation measures to meet personnel safety requirements. - Implement and enforce speed limits: 40 km/ hr along the haul road during night-time in the vicinity of NP populations (noting that NP are not active in the day and haulage will only be undertaken during daylight hours); and 80 km/hr speed limit to apply to the remaining NIDE. 60 km/hr speed limit along unsealed access tracks. - The haul road will initially be unsealed; however, Agrimin plan to bituminise the haul road and this will subsequently reduce noise dust and vibration.	Possible	Slight	Low



Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Artificial light can potentially disturb species behaviour, cause barriers to movement, cause abandoning of burrows, and expose GDS to nocturnal predators.	Likely	Minor	Low	The following management measures will be implemented in the TFEMP: • Installation of lighting that direct lights toward operational areas to minimise light spill in proximity to GDS populations and adjacent vegetated areas. • Consideration of the <i>National Light Pollution Guidelines for Wildlife</i> (DCCEEW 2023b) light management options specific to reptiles in proximity to Critical GDS habitat and known GDS populations : – For nocturnal reptiles such as GDS, artificial light may alter their movement in the landscape in a similar way to other wildlife and may result in disorientation and the increased risk of predation by nocturnal feral predators. Any potential disruption to species behaviour from artificial light are expected to be managed through suitable design and mitigation measures, with negligible impacts for GDS, this risk event is considered Low.	Possible	Minor	Low



Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
Introduction and/or spread of weed species leading to reduced flora species and system diversity.	Possible	Moderate	Medium	The following management measures will be implemented in the TFEMP: • Weeds management to be undertaken in accordance with the Weed Management Plan (outlined within the FVEMP), including: – Weed management programs will be undertaken in accordance with relevant EPBC Act threat abatement plans and be informed by best practice management of the weed species identified during baseline surveys and in accordance with: ▪ the Threat Abatement Plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses (DSEWPaC 2012). ▪ Buffel grass management for Central Australia (Department of Environment and Natural Resources 2018), as well as ▪ Integrated weed management (Weeds Australia 2021a). – Minimising the risk of invasion of buffel grass in significant fauna avoidance buffer areas. – Maintain weed hygiene obligations in clearing contractor contracts. – Timely response for management of any declared weed occurrences. – Limit vehicle and personnel movements outside of approved access and disturbance envelopes. – Training for personnel to identify weed species and process for reporting weed locations. – Incident reporting of new weed species and new locations. – Implement weed hygiene procedures for clearing and construction equipment coming into the Proposal Area, and equipment moving between Development Envelopes. – Establish weed hygiene zones if conducting earthworks near known weed locations. – Weed mitigation to be undertaken prior to the wet season to minimise weed infestation.	Possible	Minor	Low



Impact Pathway	Inherent Risk (before Management)			Management Measures	Residual Risk (after Management)		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Ranking
				- Undertake weed baseline survey and weed mapping. - Monitor and report weed occurrence within the development envelope in accordance with the Weed Management Plan. Inherent risk is considered Medium and any potential decline or change in the health/composition of fauna habitat arising from the introduction and/or spread of weeds are expected to be managed through suitable avoidance and mitigation measures, therefore this risk event is considered LOW.			
Inadequate transport, handling and storage of hydrocarbons and chemicals leading to contamination of the environment.	Likely	Minor	Low	The following management measures will be implemented in the TFEMP: - Hydrocarbon and/or chemical leaks and spills (expected to be rare) will be managed using bunding techniques, leak detection mechanisms and spill kits to restrict impacts. - Spill response equipment available (including on all Haul Trucks). - Spill response training for all personnel and contractors. - Dedicated workshop for maintenance. - Maintain high standard of housekeeping around processing plant. - Bioremediation facility for the treatment of contaminated fill, soils, or sediment. - Management of sites as per the Contaminated Site Act 2003. - Develop and implement a Hazardous Substances Management Plan (HSMP) and Procedure. Any potential contamination of GDS habitat arising from the hydrocarbon or chemical spills are expected to be managed through suitable mitigation measures, with negligible impacts therefore risk event is considered Low.	Possible	Minor	Low



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