MACKAY SULPHATE OF POTASH PROJECT - ENVIRONMENTAL SCOPING DOCUMENT

PREPARED FOR **AGRIMIN LIMITED BY STANTEC AUSTRALIA PTY LTD**

Version 2

August 2020

Stantec

QUALITY STATEMENT

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Stantec have been granted of authority to act on behalf of Agrimin's CEO.

Authority to act on behalf of Agrimin APPROVED BY		
Mark Savich - Chief Executive Officer	.....	12/08/2020

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REVISION SCHEDULE

Rev No.	Date	Description	Signature or Typed Name (documentation on file)			
			Prepared by	Checked by	Reviewed by	Approved by
0.1	10/04/2019	Internal Draft for Review	SO	FT	MC	PDSM
0.2	12/08/2019	Draft for Client Comment	SO	MC	PDSM	PDSM
2	29/08/2019	Revised draft for Client Comment	SO	MC	PDSM	PDSM
3	09/09/2019	Final Draft for Internal Review	SO	MC	PDSM	PDSM
4	10/09/2019	Final Draft for Client Comment	SO	MC	PDSM	PDSM
5	21/02/2020	Final Draft for TO review	SO	MC	PDSM	PDSM
Final	02/04/2020	Final Draft for submission to EPAS	SO	MC	PDSM	PDSM
V1	05/05/2020	Revised Final post submission to EPAS	SO	MC	PDSM	PDSM
V2	12/08/2020	Revised Final addressing DMAs comments for submission to EPA	SO	MC	PDSM	PDSM

DRAFT Environmental Scoping Document

Proposal name:	Mackay Sulphate of Potash (SOP) Project
Proponent:	Agrimin Limited
Assessment number:	2193
Location:	The Proposal is located in the East Pilbara region of Western Australia, 785 km south of Wyndham and 510 km west of Alice Springs.
Local Government Area:	Shire of East Pilbara Local Government Area
Public review period:	Environmental Review Document – 4 weeks
EPBC reference no:	2018/8834

1. Introduction

The Environmental Protection Authority (EPA) has determined that the Mackay Sulphate of Potash Project (the Proposal) is to be assessed under Part IV of the *Environmental Protection Act 1986* (EP Act).

The purpose of the Environmental Scoping Document (ESD) is to define the form, content, timing and procedure of the environmental review, required by Section 40(3) of the EP Act.

Agrimin Limited (the Proponent) has prepared this Draft ESD according to the procedures in the EPA's *Procedures Manual (EPA 2016c;2018b)*.

Form

The EPA requires that the form of the report on the environmental review required under s.40 of the EP Act is according to the Environmental Review Document (ERD) template (EPA 2018e).

Content

The EPA requires that the ERD includes the content outlined in **Sections 2** to **Section 6**.

Timing

Table 1-1 sets out the timeline for the assessment of the Proposal agreed between the EPA and the proponent.

Table 1-1: Assessment Timeline

Key Assessment Milestones	Completion Date
EPA Approves ESD	30 August 2020
Proponent submits first draft ERD	31 October 2020
EPA provides comment on first draft ERD (6 weeks from receipt of ERD)	11 December 2020
Proponent submits revised draft ERD	15 January 2021
EPA authorises release of ERD for public review (*2 weeks from EPA approval of ERD*)	29 January 2021
Proponent releases ERD for public review for 4 weeks	5 February 2021
Close of public review period	5 March 2021
EPA provides summary of ERD Submission (*3 weeks from close of public review period*)	26 March 2021
Proponent provides Response to ERD Submissions	9 April 2021
EPA reviews the Response to ERD Submissions (*4 weeks from receipt of Response to Submissions*)	7 May 2021
EPA prepares draft Assessment Report and completes assessment (6 weeks from acceptance of Environmental Review Document)	18 June 2021
EPA finalises assessment report (including two weeks consultation on draft conditions) and gives report to Minister (6 weeks from completion of assessment)	31 July 2021

Procedure

The EPA requires the proponent to undertake the environmental review according to the procedures in the *Administrative Procedures* and the *Procedures Manual* (EPA 2018b).

Assessment under the Bilateral Agreement (or accredited assessment)

The Proposal has been referred and determined to be a controlled action under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and is being assessed under the Bilateral Agreement between the Commonwealth of Australia and the State of Western Australian made under s.45 of that Act. The relevant matters of national environmental significance (MNES) for this Proposal are:

- List the relevant MNES as per the Commonwealth's controlled action determined e.g. Listed threatened species and communities (s.18 and 18A); and
- List the relevant MNES as per the Commonwealth's controlled action determined e.g. Listed migratory species (s.20 and 20A).

This draft ESD includes work required to be carried out and reported on in the ERD in relation to MNES. The ERD will also address the matters in Schedule 4 of the *Environmental Protection and Biodiversity Conservation Regulations 2000*.

- MNES that may be impacted by the Proposal have be identified (**Appendix A**) and the potential impacts on these matters addressed within each relevant preliminary environmental factors identified in Table 3-1, **Table 3-2** and **Table 3-4**. Proposed offsets to address significant residual impacts on MNES will also be discussed in the ERD.

2. The Proposal

The subject of this ESD is the Proponent's Mackay SOP Project, which involves the development of a greenfield potash fertiliser operation. The potash operation will involve 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. The Proposal includes a processing plant and other associated site infrastructure, a haul road for transporting potash to Wyndham Port, as well as a water pipeline from a fresh borefield located to the south of Lake Mackay.

The Proposal has a project life of beyond 20 years with construction targeted to commence in 2021 and potash production to commence through late 2022.

The Proposal is in the East Pilbara region of Western Australia (WA), adjacent to the WA and Northern Territory (NT) border, approximately 785 km south of Wyndham. The regional location of the Proposal is shown in **Figure 2-1**.

The Proposal covers a large area and therefore four development envelopes have been proposed; these are described in **Table 2-2** and delineated in **Figure 2-3** (On-lake Development Envelope, Off-lake Development Envelope and Southern Infrastructure Development Envelope) and **Figure 2-4** (Northern Infrastructure Development Envelope).

The key characteristics of the Proposal are set out in **Table 2-1** and **Table 2-2**. Minor changes to key Proposal characteristics may result from the findings of studies and investigations conducted as well as the application of the mitigation hierarchy by the proponent.

Agrimin currently holds Exploration Licences and Miscellaneous Licences associated with the Proposal area. Relevant mining tenure will be obtained under the *Mining Act 1978* to support mining and processing activities.

The Proposal lies within three Native Title Determination Areas under the *Native Title Act 1993* (NT Act) (**Figure 2-2**):

- Kiwirrkurra Determination Area (Determination Number: WCD2001/002) – On-lake Development Envelope, Off-lake Development Envelope, Southern Infrastructure Development Envelope and Northern Infrastructure Development Envelope;
- Ngururrpa Determination Area (Determination Number: WCD2007/004) – Northern Infrastructure Development Envelope; and
- Tjurabalan Determination Area (Determination Number: WCD2001/001) – Northern Infrastructure Development Envelope.

The On-lake, Off-lake, Southern Infrastructure and Northern Infrastructure Development Envelopes are located within Ngaanyatjarra Central Australia Aboriginal Reserve 24923 (**Figure 2-2**)**.** The Kiwirrkurra Native Title holders have exclusive rights to occupy, use and benefit from this Reserve. Agrimin has signed a Native Title Agreement (WAD6019/1998) with the Tjamu Tjamu (Aboriginal Corporation) RNTBC for the Kiwirrkurra People. The Northern Infrastructure Development Envelope also falls within Aboriginal Kearney Aboriginal Reserve 26399 (**Figure 2-2**).

Agrimin has undertaken an extensive set of ecological studies with the aim of developing a comprehensive, holistic understanding of the ecohydrology of Lake Mackay, the Lake's local and regional significance, and the interactions and potential impacts associated with the Proposal.

Table 2-1: Summary of Proposal

Proposal title	Mackay SOP Project
Proponent name	Agrimin Limited
Short description	The Proposal involves the development of a greenfields potash fertiliser operation which is currently designed to operate for life beyond 20 years. The Proposal includes the on-lake development of trenches and solar evaporation ponds for brine extraction and harvesting of potash salts. The Proposal also includes the off-lake development of a processing plant, associated site infrastructure, a fresh water borefield and a haul road for trucking potash production to Wyndham Port.

Table 2-2: Mackay Proposal Location and Proposed Extent of Physical and Operational Elements

Element	Location	Proposed extent
Physical elements		
On-lake Development Envelope: Brine extraction trenches and evaporation ponds.	**Figure 2-3**	Disturbance of no more than 15,000 ha within the 218,400 ha On-lake Development Envelope (less than 5 % of the lake's surface).
Off-lake Development Envelope: Processing infrastructure, access roads, associated infrastructure (camp, airstrip) and solar farm.	**Figure 2-3**	Clearing of no more than 200 ha of native vegetation within the 680 ha Off-lake Development Envelope.
Northern Infrastructure Development Envelope: Haul road.	**Figure 2-4**	Clearing of no more than 1,000 ha of native vegetation within the 34,486 ha Northern Infrastructure Development Envelope.
Southern Infrastructure Development Envelope: Borefield, water pipeline and access tracks.	**Figure 2-4**	Clearing of no more than 300 ha of native vegetation within the 11,829 ha Southern Infrastructure Development Envelope.
Operational elements		
Brine Abstraction	**Figure 2-3**	Abstraction of up to 100 GL per annum (GL/a) of hypersaline brine.
Water Abstraction	**Figure 2-3**	Abstraction of up to 3.5 GL/a of groundwater for processing.
Water Treatment	**Figure 2-3**	Treatment of no more than 3.5 GL/a of water through a reverse osmosis plant.
Waste Salt	**Figure 2-3**	Disposal of no more than 18 million tonnes per annum of waste salt to be retained on the lake surface.

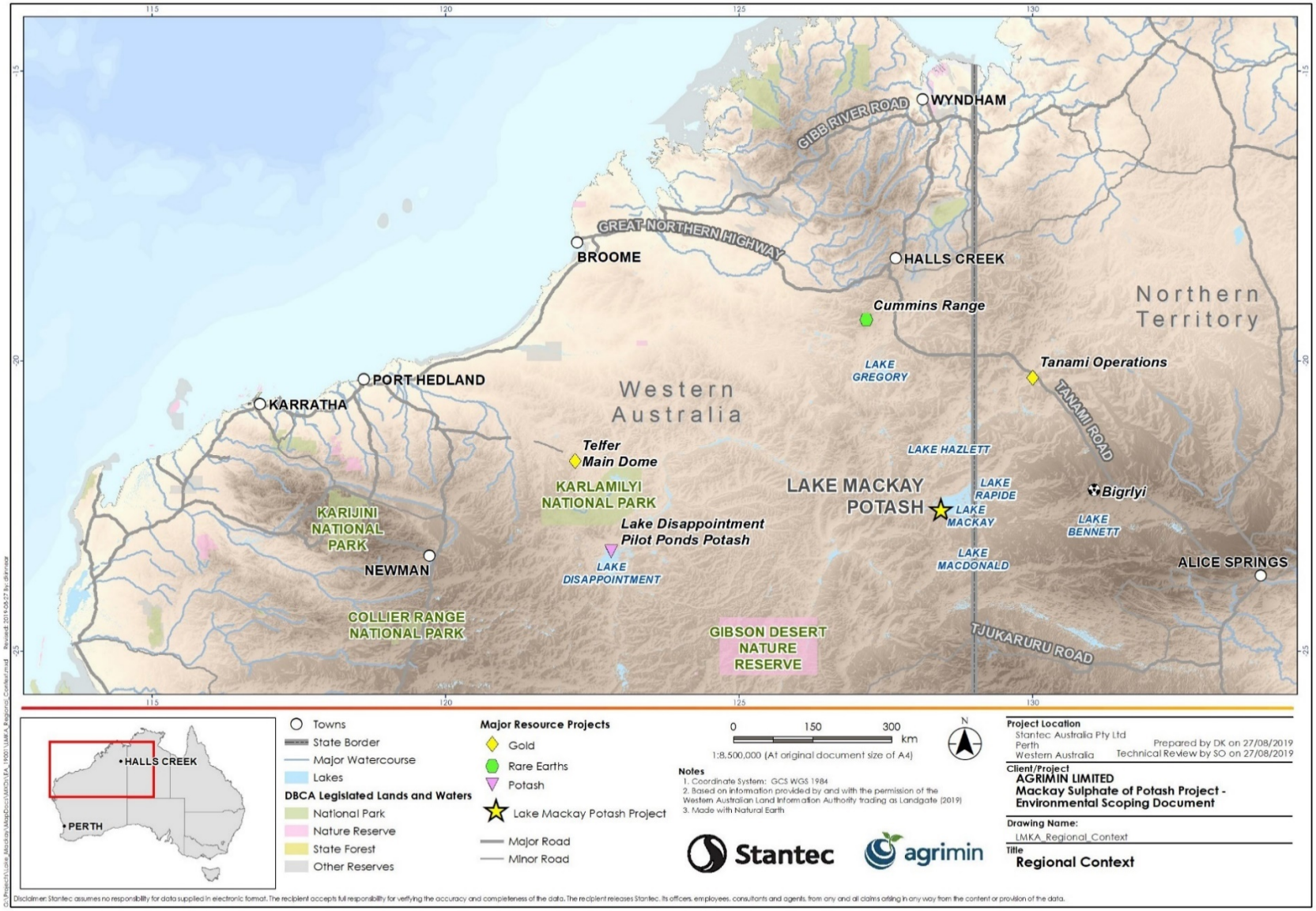

Figure 2-1: Proposal Local and Regional Context

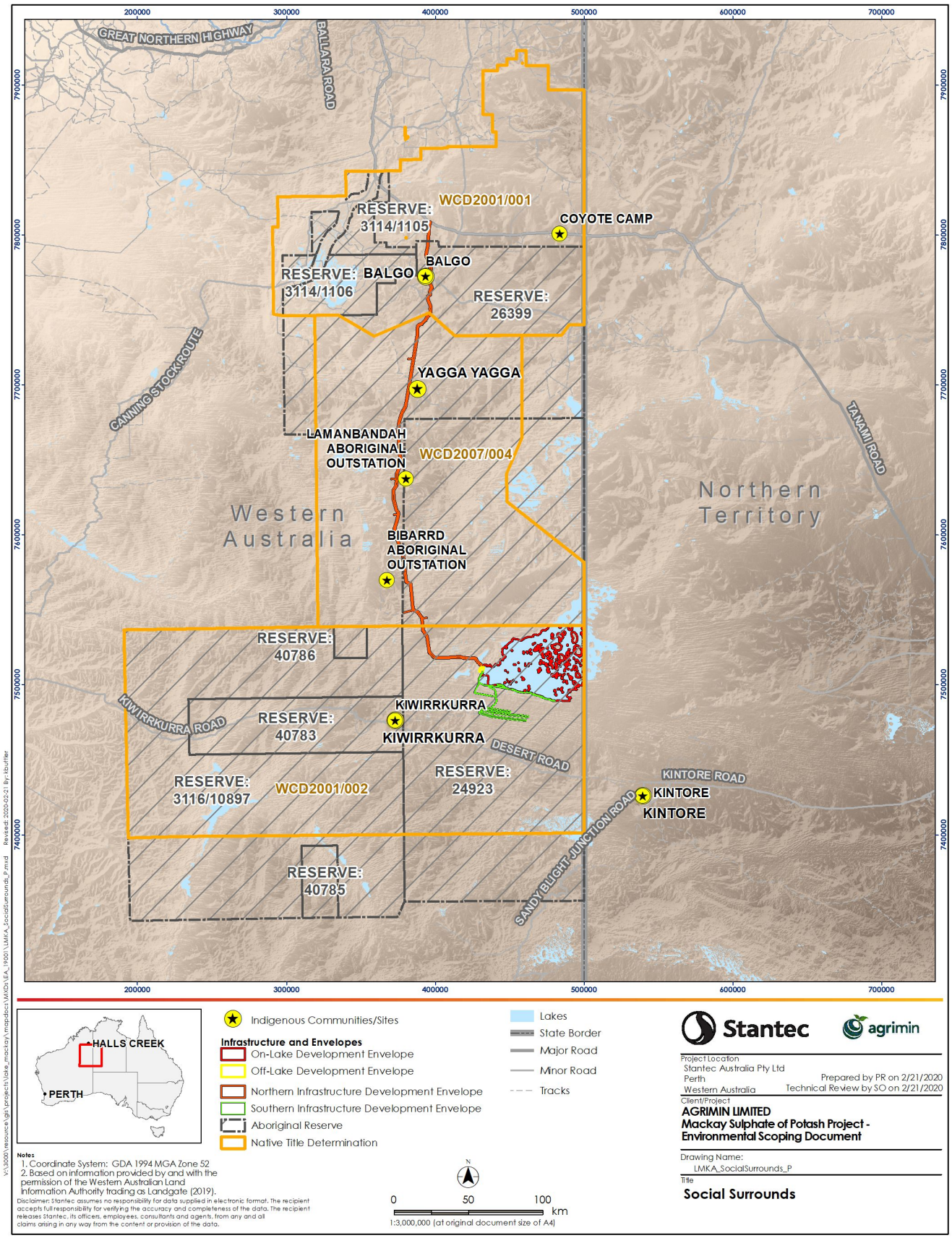

Figure 2-2: Proposal Social Surrounds

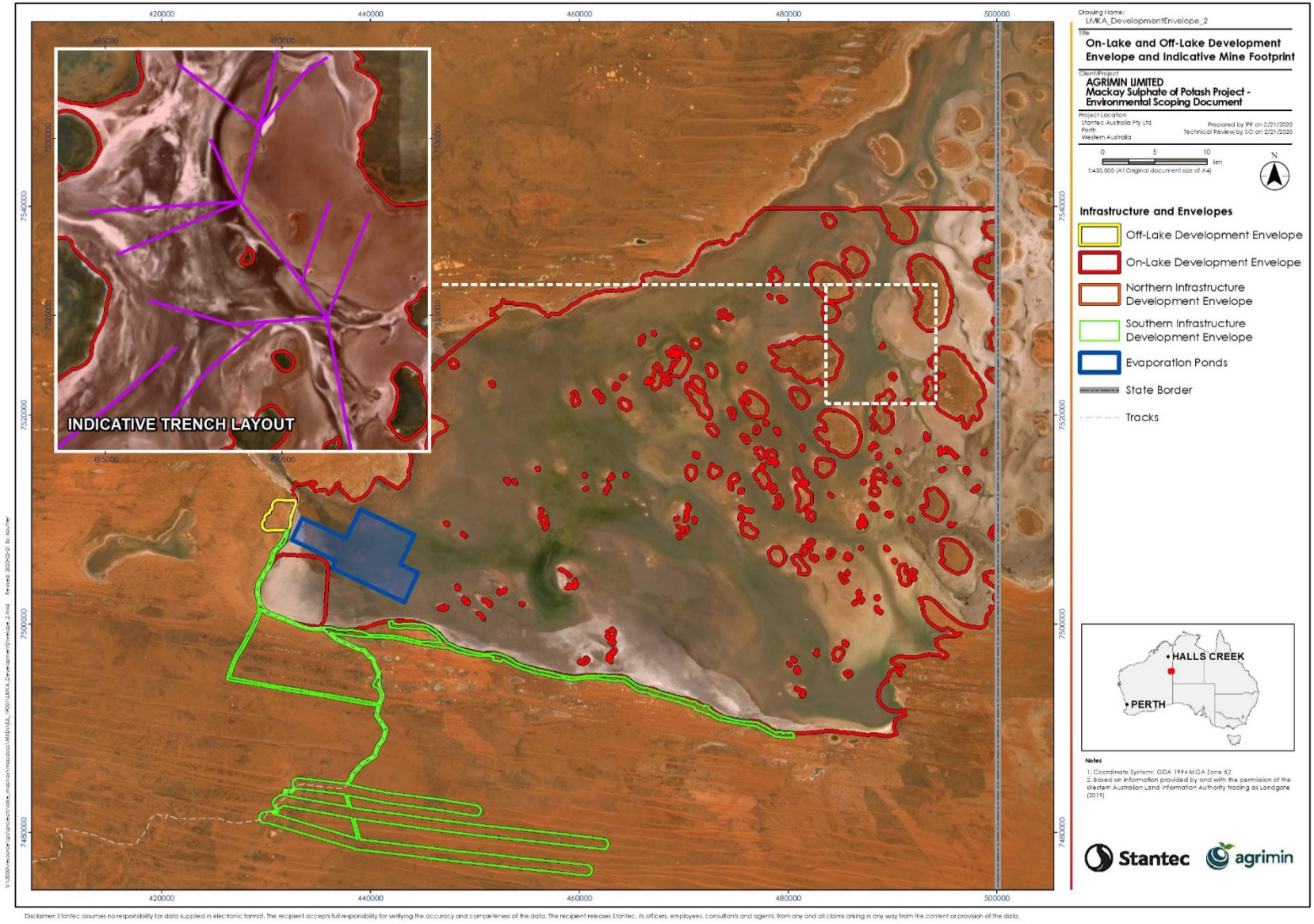

Figure 2-3: On-lake and Off-lake Development Envelopes and Indicative Mine Footprint and Trench Layout

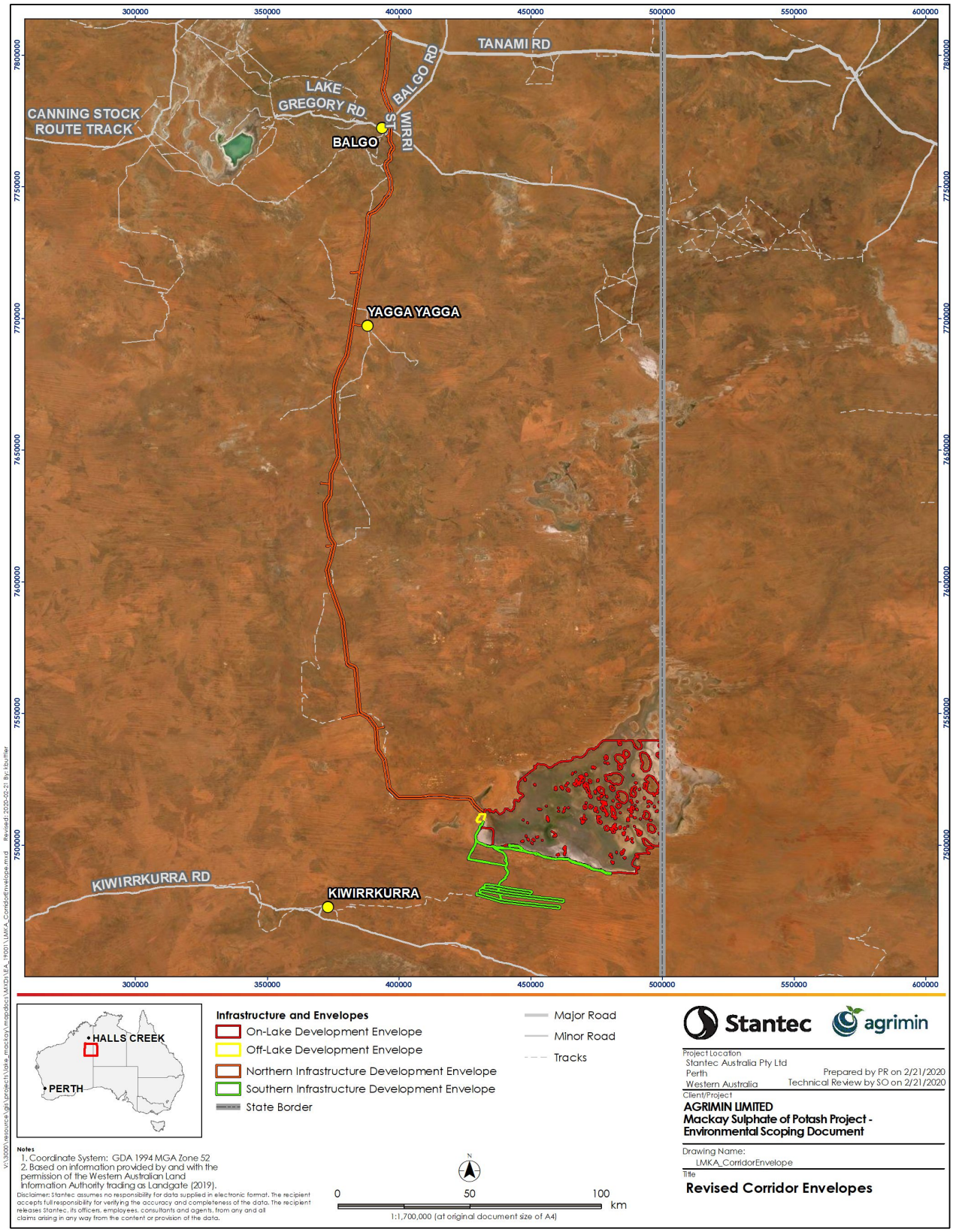

Figure 2-4: Northern Infrastructure, Southern Infrastructure, On-lake and Off-lake Development Envelopes

3. Preliminary Key Environmental Factors and Required Work

The preliminary key environmental factors for the environmental review as defined by the EPA are:

1. Flora and vegetation;
2. Terrestrial fauna;
3. Subterranean fauna;
4. Inlands waters; and
5. Social surroundings.

Table 3-1 to **Table 3-5** outline any work remaining for each preliminary key environmental factor. The following elements are detailed for each factor:

- **EPA factor** and **EPA objective** for that factor.
- **Relevant activities** – the Proposal activities that may have significant impact on that factor.
- **Potential impacts and risks** to that factor.
- **Required work** for that factor.
- **Relevant policy** and **guidance** – EPA (and other) guidance and policy relevant to the assessment.

All Key and Other Environmental Factors will consider the following EPA policy and guidance where relevant:

- Statement of Environmental Principles, Factors and Objectives 2016 (EPA 2016e);
- Environmental Impact Assessment (EIA) (Part IV Divisions 1 and 2) Administrative Procedures 2016;
- EIA (Part IV Divisions 1 and 2) Procedures Manual 2016 (EPA 2018b);
- Instructions on how to prepare EP Act Part IV Environmental Management Plans (EPA 2018f);
- Statutory Guidelines for Mine Closure Plans (DMIRS 2020b); and
- Mine Closure Plan Guidance - How to prepare in accordance with Part 1 of the Statutory *Guidelines for Mine Closure Plans* (DMIRS 2020a).

Table 3-1: EPA Factor – Flora and Vegetation

EPA Factor – Flora and Vegetation	
EPA objective	*To protect flora and vegetation so that biological diversity and ecological integrity are maintained.*
Relevant activities	• Disturbance of up to 15,000 ha within a 218,400 ha On-lake Development Envelope (<5% of the total lake surface), including trenching, bunding and evaporation ponds. • Clearing of up to 200 ha (<15%) of flora and vegetation within a 680 ha Off-lake Development Envelope. • Clearing of up to 1,000 ha of flora and vegetation for a haul road within a 34,486 ha Northern Infrastructure Development Envelope. • Clearing of up to 300 ha of flora and vegetation for borefield, water pipelines and access tracks within a 11,829 ha Southern Infrastructure Development Envelope. • Abstraction of up to 100 GL/a of brine from trenches over 20-year period and up to 3.5 GL/a of groundwater from bores for process and potable water. • Storage of waste salts in the evaporation ponds and salt piles with gradual release to the lake over time.

EPA Factor – Flora and Vegetation	
	• Use of light and heavy vehicles and equipment for construction and operations including fuel storage and the transport of potash production to the port and the transport of gas to the process plant. • Fugitive dust emissions from vehicles and equipment during construction and operation.
Potential impacts and risks	Potential Direct Impacts: • Clearing; and • Hydrocarbon or chemical leaks and spills that may negatively affect flora and vegetation. Potential Indirect Impacts: • Flora and vegetation habitat fragmentation; • Groundwater drawdown impacting flora and vegetation; • Changes in hydraulic connectivity and groundwater quality negatively affecting flora and vegetation; • Potential formation of acid-generating material impacting peripheral flora and vegetation; • Erosion and sedimentation negatively affecting flora and vegetation; • Increases in surface water and groundwater salinity; • Introduction or spread of introduced flora and/or pathogens; • Fugitive dust emissions that may negatively affect flora and vegetation; and • Potential for altered fire regimes from Proposal development and activities.
Required work	Desktop Review 1. Undertake a desktop review, including database searches, a comprehensive literature review and a likelihood of occurrence assessment for identified significant flora taxa and vegetation communities. On-lake, Off-lake, Southern and Northern Infrastructure Development Envelopes Survey 2. Undertake a dual-phased Detailed Flora and Vegetation Survey of the Development Envelopes in accordance with EPA's Technical Guidance: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016j), comprising: a) Describe and delineate the vegetation types within the Development Envelopes based on data collected from representative sample sites (quadrats and relevés); b) Assess and map the vegetation condition within the Development Envelopes; c) Record the vascular flora species observed within the Development Envelopes; d) Conduct targeted searches for flora and vegetation of significance, recording the type, condition, population size and locations; and e) Identify and map the presence and abundance of weed species within the Development envelopes. 3. Undertake Riparian Flora and Vegetation Survey (as part of the aquatic ecology investigation see Table 3-4) in accordance with Technical Guidance: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016l). This will include the revisiting established transects (length to be determined in the field), comprising 3 m x 3 m quadrats within the riparian zone, and assessment of diversity, abundance, cover and health. 4. Seek clarification from relevant taxonomic experts for any flora taxa which cannot be / have not been readily identified to species level, such as existing tentative identifications of *Tecticornia* specimens (samphire's) where clarification will be sought from K. Shepherd from the Western Australian Herbarium (WAH). Submit any

EPA Factor – Flora and Vegetation	
	new specimens of *Tecticornia* species collected during field surveys to the WAH for identification and vouchering. Data Consolidation 5. Undertake a data consolidation of flora and vegetation surveys and vegetation mapping for the Development Envelopes, including a review and reconciliation of vegetation type and vegetation condition mapping across the Development Envelopes to develop one consolidated GIS layer for the Proposal. 6. Provide a figure depicting survey effort applied in relation to the study area and development envelope, identifying the direct and indirect impact areas. Reporting, Impact Assessment and Management 7. Demonstrate how surveys are relevant, representative and demonstrate consistency with current EPA policy and guidance. Ensure database searches and taxonomic identifications are up-to-date. If multiple surveys have been undertaken to support the assessment, a consolidated report should be provided including the integrated results of the surveys. All surveys should be appended to the environmental review documentation. 8. Provision of relevant IBSA data package in accordance with the Instructions and Form: IBSA Data Packages for all flora and vegetation surveys (EPA 2018d). 9. Identify and characterise the flora and vegetation of areas that may be directly or indirectly impacted by the proposal in accordance with Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment. Surveys should be designed to inform local and regional context. 10. Determine whether any flora species recorded are significant and provide an analysis of local and regional context (refer to Environmental Factor Guideline – Flora and Vegetation for definition of significant flora). 11. Determine whether any vegetation identified is significant including groundwater dependence of riparian vegetation, and provide an analysis of local and regional context, (refer to *Environmental Factor Guideline – Flora and Vegetation* for definition of significant vegetation). 12. Provide figures depicting the recorded locations of flora and vegetation in relation to the development envelope in accordance with *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment*. 13. Assess the potential direct and indirect impacts of the construction and operational elements of the Proposal on the flora and vegetation environmental values. within the development envelopes. Describe and assess the extent of cumulative impacts as appropriate. 14. Provide a quantitative assessment of impact: a) For significant flora, this includes; I. number of individuals and populations in a local and regional context; II. numbers and proportions of individuals and populations directly or potentially indirectly impacted; and III. numbers/proportions/populations currently protected within the conservation estate (where known). b) For all vegetation units (noting threatened and priority ecological communities and significant vegetation) this includes; I. area (in hectares) and proportions directly or potentially indirectly impacted; and II. proportions/hectares of the vegetation unit currently protected within conservation estate (where known).

EPA Factor – Flora and Vegetation	
	15. Provide figures of the proposed clearing and predicted direct and indirect impacts to flora, vegetation and significance flora and vegetation taxa. 16. Describe elements of the Proposal which affect the environment (e.g. temporary construction versus operation, impacts/pressures from the Proposal etc.) for use in the flora and vegetation risk and impact assessments. 17. Develop a flora and vegetation risk assessment to assist in predicting inherent and residual impacts from the Proposal's activities before and after applying the mitigation hierarchy (avoid, minimise, manage, monitor, rehabilitate). 18. Discuss and quantify the potential indirect impacts to flora and vegetation (in particular *Tecticornia* species) from the mobilisation of waste salts and dust emissions from clearing, construction and operational activities. 19. Describe the application of the mitigation hierarchy in the proposal design, construction, operation and closure. Detail actions undertaken to avoid, minimise and mitigate proposal impacts. Include management and/or monitoring plans to be implemented pre- and post-construction to demonstrate that residual impacts are not greater than predicted. Management and/or monitoring plans are to be presented in accordance with EPA Guidance Instructions on how to prepare *Environmental Protection Act 1986* Part IV Environmental Management Plans and EPA instructions. 20. Identify any limitations associated with the flora and vegetation survey data or existing knowledge and discuss their implications for the impact assessment. 21. Determine and quantify any significant residual impacts to flora and vegetation by applying the Residual Impact Significance Model (page 11) and WA Offset Template in the WA Environmental Offsets Guidelines (Government of Western Australia 2014) and *Biodiversity Conservation Act 1999 Environmental Offsets Policy* (SEWPaC 2012). 22. If significant residual impacts to flora and vegetation remain after applying the mitigation hierarchy an appropriate offset strategy developed, in consultation with the Tjamu Tjamu (Aboriginal Corporation) RNTBC and other relevant stakeholders for the Proposal. The offset package will be developed in accordance with the WA Environmental Offsets Policy (Government of Western Australia 2011), and the EPBC Act Environmental Offsets Policy (SEWPaC 2012) and include reference to the Commonwealth Offsets Assessment Guide for any MNES. Spatial data defining the area of significant residual impacts for each environmental value should also be provided (e.g. vegetation type, vegetation condition, specific fauna species habitat) 23. If an offset strategy is required, Agrimin will use its best endeavours to ensure that any offsets are directed towards matters that are relevant to and benefit the Kiwirrkurra People, particularly through support for the Kiwirrkurra Indigenous Protected Area program and its land management activities. 24. Prepare a Mine Closure Plan (MCP) including site specific rehabilitation requirements consistent with the Department of Mines, and Petroleum (DMIRS) Mine Closure Plan Guidance (DMIRS 2020a). 25. Within the ERD demonstrate how Proponent considers the EPA's objectives for this factor have been addressed.
Relevant policy and guidance	**EPA Policy and Guidance** • Statement of Environmental Principles, Factors and Objectives (EPA 2016e); • Instructions on how to prepare an Environmental Review Document (EPA 2018e); • Environmental Factor Guideline: Flora and Vegetation (EPA 2016a); • Technical Guidance: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016j);

EPA Factor – Flora and Vegetation	
	• Environmental Protection of Native Vegetation in WA: Clearing of Native Vegetation with Particular Reference to Agricultural Areas. Position Statement No. 2 (EPA 2000); • Environmental Protection (Clearing of Native Vegetation) Regulations 2004; • Guidance Statement No. 6 – Rehabilitation of Terrestrial Ecosystems (EPA 2006); • WA Environmental Offsets Policy (Government of Western Australia 2011); • WA Environmental Offsets Guidelines (Government of Western Australia 2014) and WA Offsets Template; • Instructions and Form: IBSA Data Packages (EPA 2018f); and • Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans (EPA 2018c). **Other Policy and Guidance** • *Environment Protection and Biodiversity Conservation Act 1999;* • *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy (SEWPaC 2012) – including the Offset Assessment guide; • A guide to the assessment of applications to clear native vegetation under the *Environmental Protection Act 1986* (DER 2014); • A Directory of Important Wetlands in Australia (Australia 2001); • Biosecurity and Agriculture Management Act 2007; • Weeds of National Significance (WoNS) identified by the Commonwealth Government; • Matters of National Environmental Significance. Significant impact guidelines 1.1 - Environment Protection and Biodiversity Conservation Act 1999 (DEWHA 2013); • Environmental Management Plan Guidelines (DoE 2014); • *Environment Protection and Biodiversity Conservation Act 1999* Condition Setting Policy (DoE 2016a); • *Environment Protection and Biodiversity Conservation Act 1999* Outcomes-based conditions policy and guidance (DoE 2016c), (DoE 2016b); • Relevant EPBC listed species survey guidelines and protocols- refer **Appendix A**; and • Relevant EPBC listed species Recovery plans, Threat Abatement Plans, for conservation significant species that are known to occur, or are likely to occur in the vicinity of the proposal area– refer **Appendix A**.

Table 3-2: EPA Factor – Terrestrial Fauna

EPA Factor – Terrestrial Fauna	
EPA objective	*To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.*
Relevant activities	• Disturbance of up to 15,000 ha within a 218,400 ha On-lake Development Envelope (<5% of the total lake surface), including trenching, bunding and evaporation ponds. • Clearing of up to 200 ha (<15%) of potential fauna habitat within a 680 ha Off-lake Development Envelope. • Clearing of up to 1,000 ha of potential fauna habitat for a haul road within a 34,486 ha Northern Infrastructure Development Envelope. • Clearing of up to 300 ha of potential fauna habitat for borefield, water pipelines and access tracks within a 11,829 ha Southern Infrastructure Development Envelope. • Use of light and heavy vehicles and equipment for construction and operations including fuel storage and the transport of potash production to the port and the transport of gas to the process plant. • Abstraction of up to 100 GL/a of brine from trenches over 20-year period and up to 3.5 GL/a of groundwater from bores for process and potable water affecting fauna habitats.

EPA Factor – Terrestrial Fauna	
	• Storage of waste salts in the evaporation ponds and gradual release to the lake over time.
Potential impacts and risks	Potential Direct Impacts: • Clearing of fauna habitat; and • Increased risk of injury or death from vehicle or equipment collision. Excluding clearing, vehicle collision will have potential to impact species and populations along the haulage road. Potential Indirect Impacts: • Fauna habitat fragmentation or edge effects; • Altered surface hydrology, partially on-lake hydrology which may affect Migratory Wading bird species (i.e. impact upon water conditions during flood events which could negatively affect food sources for migratory wading bird species, or the presence of surface water outside of flood events could attract migratory wading bird species when conditions are not suitable); • Hydrocarbon or chemical leaks and spills that may negatively affect fauna habitat; • Increased resources that may attract and increase numbers of introduced fauna; • Spread of introduced flora and/or pathogens impacting fauna (including SREs, macroinvertebrates and waterbirds); • Changes in hydraulic connectivity and groundwater quality impacting fauna habitats; • Increases in salinity that may negatively affect fauna habitats; • Groundwater drawdown impacting fauna habitats; • Erosion and sedimentation negatively affecting fauna habitats; • Potential exposure of acid-generating material impacting lake and peripheral wetlands habitat and fauna; • Fugitive dust emissions that may negatively affect fauna habitats; • Potential for altered fire regimes from Proposal development and activities; • Noise and Vibration; and • Artificial light.
Required work	Desktop Review, On-lake, Off-lake, Southern and Northern Infrastructure Development Envelopes Survey 26. In accordance with the requirements of EPA Guidance conduct a desktop study to identify and characterise the fauna and fauna habitats to inform local and regional context; and based on the results of the desktop study: a) conduct a Basic (Level 1) survey and fauna habitat assessment; and/or b) conduct a Detailed (Level 2) survey; and/or c) conduct targeted surveys for significant fauna that may be directly or indirectly impacted. Note: *The desktop study, surveys and ERD should consider vertebrates and short-range endemic, and/or other significant, invertebrates. Survey design should ensure that adequate local and regional contextual data are collected and should consider cumulative impacts. Surveys should include sites in both impact and non-impact (reference) areas.* 27. Migratory waterbird survey of Lake Mackay and periphery wetlands and claypans (to be undertaken as part of the aquatic ecology investigation (see **Table 3-4**) by a relevant technical specialist). 28. Fauna, fauna habitat and SRE survey of lake islands in accordance with EPAs Technical Guidance: Sampling of Short Range Endemic Invertebrate Fauna (EPA 2016g) (if required, based on results of hydrogeological investigation and internal risk assessment). Data Consolidation

EPA Factor – Terrestrial Fauna	
	29. Undertake a data consolidation of fauna records and fauna habitat mapping for the Development Envelopes, including a review and reconciliation of fauna records and fauna habitat mapping across the Development Envelopes to develop one consolidated GIS layer for the Proposal. 30. Demonstrate how surveys are relevant, representative, and consistent with current EPA policy and guidance and this Environmental Scoping Document. 31. Provide a map of the survey effort applied in relation to the fauna habitats, the study area, Development Envelope, identifying the direct and indirect impact areas. Reporting, Impact Assessment and Management 32. Identify and describe the fauna assemblages present and likely to be present within the development envelope that may be impacted by the proposal. 33. Identify and describe the characteristics of the fauna habitats identified by the desktop study and surveys, including a map their extents in relation to the study area, the Development Envelope, and direct and indirect impact areas. Describe significant habitats, including but is not limited to: refugia, breeding areas, key foraging habitat, movement corridors and linkages. 34. Identify significant fauna and describe in detail their known ecology, likelihood of occurrence, habitats and known threats. Map the locations of significant fauna records in relation to the fauna habitats, the study area, the Development Envelope, and direct and indirect impact areas. 35. Assess the potential direct and indirect impacts associated with the Proposal on the fauna and fauna habitats within the development envelopes. Where appropriate, this will be a quantitative assessment that addresses numbers and proportions of individuals, populations and associations in the local and regional context; especially those species and communities of significance as defined in EPA's Factor Guideline, Environmental Factor Guideline: Terrestrial Fauna (EPA 2016d). Note: *Reports for vertebrate fauna and short-range endemic (and/or other significant) invertebrate fauna should be provided separately. Survey reports should be accompanied by IBSA Data Packages prepared following EPA Guidance.* *Survey reports should be prepared following EPA Guidance and appended to the ERD. If multiple surveys of the same type are undertaken a consolidated report should be provided.* 36. Provide figures of the proposed clearing and predicted direct and indirect impacts to fauna, fauna habitats and significant fauna species including, but not limited to Threatened and / or Priority Ecological Communities, Threatened and Priority fauna and new species of fauna. 37. Describe elements of the Proposal which affect the environment (e.g. temporary construction versus operation, impacts/pressures from the Proposal etc.) for use in the fauna habitat risk and impact assessments. 38. Outline and justify the proposed avoidance and mitigation measures to reduce the potential impacts of the proposal. Include proposed management and/or monitoring plans that will be implemented pre- and post-construction to demonstrate and ensure residual impacts are not greater than predicted. Management and/or monitoring plans are to be presented in accordance with the EPAs Instructions. 39. Identify any limitations associated with the terrestrial fauna survey data or existing knowledge and discuss their implications for the impact assessment. 40. Develop environmental management plans and / or proposed monitoring and management where required (i.e. conversation significant taxa and / or feral animals) in consultation with State and Commonwealth regulators and Tjamu Tjamu (Aboriginal Corporation) RNTBC, in accordance with EPA Guidance Instructions on how to prepare *Environmental Protection Act 1986* Part IV Environmental

EPA Factor – Terrestrial Fauna	
	Management Plans (EPA 2018f) and Environmental Management Plan Guidelines (DoE 2014). 41. Identify, describe, and quantify the potential residual impacts (direct, indirect and cumulative) to fauna assemblages, habitats, significant species, that may occur following implementation of the proposal after considering and applying avoidance and minimisation measures, in a local and regional context. Provide a table of the proportional extents of each habitat within the study area and Development Envelope, and the predicted amount to be directly and indirectly impacted. 42. Discuss how the proposed action is consistent with the relevant EPBC Act statutory recovery plans and threat abatement plans and has had regard to approved conservation advices. 43. Determine and quantify any significant residual impacts to flora and vegetation by applying the Residual Impact Significance Model (page 11) and WA Offset Template in the WA Environmental Offsets Guidelines (Government of Western Australia 2014) and *Biodiversity Conservation Act 1999 Environmental Offsets Policy* (SEWPaC 2012). 44. If significant residual impacts to terrestrial fauna remain after applying the mitigation hierarchy an appropriate offset strategy will developed, in consultation with the Tjamu Tjamu (Aboriginal Corporation) RNTBC and other relevant stakeholders for the Proposal. The offset strategy will be developed in accordance with the WA Environmental Offsets Policy (Government of Western Australia 2011), and the EPBC Act Environmental Offsets Policy (SEWPaC 2012) and include reference to the Commonwealth Offsets Assessment Guide for any MNES. If required, spatial data defining the area of significant residual impacts will also be provided. 45. Where significant residual impacts remain, propose an appropriate offsets package that is consistent with the *WA Environmental Offsets Policy* (Government of Western Australia 2011) and *WA Environmental Offsets Guidelines(Government of Western Australia 2014* and, where impacts relate to EPBC Act-listed taxa, the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* (SEWPaC 2012). Spatial data defining the area of significant residual impacts should be provided. 46. If an offset strategy is required, Agrimin will use its best endeavours to ensure that any offsets are directed towards matters that are relevant to and benefit the Kiwirrkurra People, particularly through support for the Kiwirrkurra Indigenous Protected Area program and its land management activities. 47. Prepare a Mine Closure Plan (MCP) consistent with the Department of Mines, and Petroleum (DMIRS) Mine Closure Plan Guidance (DMIRS 2020a) that addresses the development of completion criteria to protect and conserve significant terrestrial fauna species and their habitat that environmental values are maintained post closure. 48. Within the ERD demonstrate how the Proponent considers the EPA's objectives for this factor have been addressed.
Relevant policy and guidance	**EPA Policy and Guidance** • Statement of Environmental Principles, Factors and Objectives (EPA 2016e); • Instructions on how to prepare an Environmental Review Document (EPA 2018e); • Environmental Factor Guideline: Terrestrial Fauna (EPA 2018b); • Technical Guidance: Terrestrial Fauna Surveys (EPA 2016i); • Technical Guidance Sampling Methods for Terrestrial Vertebrate Fauna (EPA 2016e); • Technical Guidance: Sampling of short-range endemic invertebrate fauna (EPA 2016g); • Environmental Protection of Native Vegetation in WA: Clearing of Native Vegetation with Particular Reference to Agricultural Areas. Position Statement No. 2 (EPA 2000);

EPA Factor – Terrestrial Fauna	
	• Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (Clearing Regulations); • Guidance Statement No. 6 – Rehabilitation of Terrestrial Ecosystems (EPA 2006); • WA Environmental Offsets Policy (Government of Western Australia 2011); and • WA Environmental Offsets Guidelines (Government of Western Australia 2014) and WA Offsets Template; • Instructions and Form: IBSA Data Packages (EPA 2018d) ; and • Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans (EPA 2018f). **Other Policy and Guidance** • *Environment Protection and Biodiversity Conservation Act 1999;* • *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy (SEWPaC 2012) – including the Offset Assessment guide; • Matters of National Environmental Significance. Significant impact guidelines 1.1 - Environment Protection and Biodiversity Conservation Act 1999 (DEWHA 2013); • A guide to the assessment of applications to clear native vegetation under the *Environmental Protection Act 1986* (DER 2014); • A Directory of Important Wetlands in Australia (Australia 2001); • *Biosecurity and Agriculture Management Act 2007;* • Survey Guidelines for Australia's Threatened Bats (DEWHA 2010a); • Survey Guidelines for Australia's Threatened Birds(DEWHA 2010b); • Survey Guidelines for Australia's Threatened Reptiles (DEWHA 2010d); • Survey Guidelines for Australia's Threatened Mammals (DEWHA 2010c); • Interim guideline Interim guideline Interim guideline for preliminary surveys of night parrot (*Pezoporus occidentalis*) in Western Australia (DBCA 2017); • Approved Conservation Advice for *Pezoporus occidentalis* (night parrot) (TSSC 2016c); • Approved Conservation Advice for *Macrotis lagotis* (greater bilby) (TSSC 2016b); • Approved Conservation Advice for *Liopholis kintore* (great desert skink) (TSSC 2016a); • A recovery plan for the Great Desert Skink (*Egernia kintorei*) 2001-2011 (McAlpin 2001); • National Recovery Plan for the Greater Bilby *Macrotis lagotis* (Pavey 2006); • *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy (SEWPaC 2012) – including the Offset Assessment guide; • National Light Pollution Guidelines for Wildlife including Marine Turtles, Seabirds and Migratory Shorebirds {DoEE, 2020 #119); • Environmental Management Plan Guidelines (DoE 2014); • *Environment Protection and Biodiversity Conservation Act 1999* Condition Setting Policy (DoE 2016a); • *Environment Protection and Biodiversity Conservation Act 1999* Outcomes-based conditions policy and guidance (DoE 2016c), (DoE 2016b); • Relevant EPBC listed species survey guidelines and protocols- refer **Appendix A**; and • Relevant EPBC listed species Recovery plans, Threat Abatement Plans, for conservation significant species that are known to occur, or are likely to occur in the vicinity of the proposal area.– refer **Appendix A**.

Table 3-3: EPA Factor – Subterranean Fauna

EPA Factor – Subterranean Fauna	
EPA objective	*To protect subterranean fauna so that biological diversity and ecological integrity are maintained.*
Relevant activities	• Disturbance of up to 15,000 ha within a 218,400 ha On-lake Development Envelope (< 5% of the total lake surface), including trenching, bunding and evaporation ponds. • Abstraction of up to 100 GL/a of brine from trenches over 20-year period and up to 3.5 GL/a of groundwater from bores for process and potable water. • Storage of waste salts in the evaporation ponds and gradual release to the lake over time.
Potential impacts and risks	Potential Direct Impacts: • Groundwater drawdown impacting the islands and peripheral habitat supporting subterranean fauna within the On-lake Development. • Groundwater drawdown impacting the habitat supporting subterranean fauna within the borefield area in the Southern Infrastructure Development Envelope. Potential Indirect Impacts: • Hydrocarbon or chemical leaks and spills. • Changes in hydraulic connectivity and groundwater quality. • Increases in groundwater salinity.
Required work	Subterranean fauna surveys (if required), based on results of hydrogeological investigation and internal risk assessment 49. In accordance with EPA guidance: a) conduct a Level 1 (basic) subterranean fauna survey, including a pilot and desktop study that incorporates existing regional subterranean fauna surveys and databases where habitat is not prospective with suitable justification. b) potentially undertake multi-phased Level 2 (detailed) surveys in prospective areas (calcareous) of impact, to identify and characterise subterranean fauna and subterranean fauna habitat, at a local and regional scale, that may be impacted directly and indirectly by the implementation of the proposal. This should include sampling inside and outside the impact areas and consider cumulative impacts where possible with suitable justification. Reporting, Impact Assessment and Management (if required), based on results of hydrogeological investigation and internal risk assessment 50. Describe the characteristics of subterranean fauna habitat that may be impacted directly and indirectly by implementation of the proposal during both construction and operations, and describe the significance of these values in a local and regional context. Include relevant geological and hydrological information to determine habitat suitability and connectivity, including inside and outside the impact areas. 51. Where appropriate, provide figure(s) and maps showing the extent of subterranean fauna habitat in relation to the proposal and species distributions. 52. Where appropriate, describe and assess the extent of direct, indirect and cumulative impacts as a result of implementation of the proposal during both construction and operations to subterranean fauna, taking into consideration the significance of fauna and fauna habitat. 53. Where appropriate, quantify the extent of direct, indirect and cumulative impacts, including percentages, of habitat types to be disturbed or otherwise impacted. 54. Develop a subterranean fauna risk assessment to assist in predicting inherent and residual impacts from the Proposal's activities (before and after applying the mitigation hierarchy (avoid, minimise, manage, monitor, rehabilitate) in accordance with EPA's Environmental Factor Guideline: Subterranean Fauna (EPA 2016c), where possible. For species that are likely to be impacted provide information on habitat

EPA Factor – Subterranean Fauna	
	prospectively and including figures and discussion to demonstrate any habitat connectivity beyond the impacted area. 55. Outline the proposed management, monitoring and mitigation methods to be implemented to ensure residual impacts (direct and indirect) are not greater than predicted. 56. Identify any limitations associated with the subterranean fauna survey data or existing knowledge and discuss their implications for the impact assessment. Note: *Survey reports provided should be accompanied by IBSA Data Packages prepared following EPA Guidance*. 57. Develop environmental management plans for proposed monitoring and management where required for subterranean fauna if required, in accordance with EPA Guidance Instructions on how to prepare *Environmental Protection Act 1986* Part IV Environmental Management Plans (EPA 2018f). 58. Determine and quantify any significant residual impacts by applying the Residual Impact Significance Model (page 11 of the WA Environmental Offsets Guideline) or all direct and indirect impacts, including an explanation of how the information and values within the model have been determined, the WA Offset Template in the WA Environmental Offsets Guidelines (Government of Western Australia 2014) the *Biodiversity Conservation Act 1999 Environmental Offsets Policy* (SEWPaC 2012), and or all direct and indirect impacts, including an explanation of how the information and values within the model have been determined. 59. Where signigicant residual impacts remain, propose an appropriate offsets package with supporting incofmraion to demonstrate consistency with the WA Environmental Offsets Policy (Government of Western Australia 2011) and Guidelines (Government of Western Australia 2014) and where residual impacts relate to EPCA Act-listed threatened and/or migratroy species the *Environmental Protection and Biodiversity Convservation Act 1999* Environmental Offsets Policy. Spatial data defining the area of significant residual impacts for each environmental value should also be provided (e.g. vegetation type, vegetation condition, specific fauna species habitat). 60. If an offset strategy is required, Agrimin will use its best endeavours to ensure that any offsets are directed towards matters that are relevant to and benefit the Kiwirrkurra People, particularly through support for the Kiwirrkurra Indigenous Protected Area program and its land management activities. 61. Within the ERD demonstrate how the Proponent considers the EPA's objectives for this factor have been addressed.
Relevant policy and guidance	**EPA Policy and Guidance** • Statement of Environmental Principles, Factors and Objectives (EPA 2016e); • Instructions on how to prepare an Environmental Review Document (EPA 2018e); • Environmental Factor Guideline: Subterranean Fauna (EPA 2016c); • Technical Guidance: Subterranean Fauna Survey (EPA 2016h); • Technical Guidance: Sampling Methods for Subterranean Fauna (EPA 2016f); and • Instructions and Form: IBSA Data Packages (EPA 2018d). **Other Policy and Guidance** • *Environment Protection and Biodiversity Conservation Act 1999;* • DWER Policies for the take and use of water; • DWER (Water) Policies for better understanding water resources and planning for their use; • DWER Policies for protecting public drinking water supplies and the natural environment; • DWER - Western Australian Water in Mining Guidelines, May 2013 (DoW 2013); • Australian Rainfall and Runoff Guidelines (Geoscience Australia 2016);

EPA Factor – Subterranean Fauna	
	• Australian Groundwater Modelling Guidelines (Australian Government National Water Commission 2012); • Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000); • WA Environmental Offsets Policy (Government of Western Australia 2011); and • WA Environmental Offsets Guidelines (Government of Western Australia 2014) including the WA Offsets Template; and • *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy (SEWPaC 2012) – including the Offset Assessment guide; and • Relevant EPBC listed species Recovery plans, Threat Abatement Plans, for conservation significant species that are known to occur, or are likely to occur in the vicinity of the proposal area – refer **Appendix A**.

Table 3-4: EPA Factor – Inland Waters

EPA Factor – Inland Waters	
EPA objective	*To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.*
Relevant activities	• Disturbance of up to 15,000 ha within a 218,400 ha On-lake Development Envelope (<5% of the total lake surface), including trenching, bunding and evaporation ponds. • Clearing of up to 200 ha (<15%) of flora and vegetation within a 680 ha Off-lake Development Envelope. • Abstraction of up to 100G L/a of brine from trenches over 20-year period and up to 3.5 GL/a of groundwater from bores for process and potable water. • Storage of waste salts in the evaporation ponds and gradual release to the lake over time.
Potential impacts and risks	Potential Direct Impacts: • On ground disturbance; • Habitat reduction; and • Hydrocarbon or chemical leaks and spills. Potential Indirect Impacts: • Habitat fragmentation or edge effects; • Altered surface hydrology, which may impact aquatic biota and or waterbirds. • Changes in hydraulic connectivity and groundwater quality; • Increases in salinity; • Potential exposure of acid-generating material impacting lake and peripheral habitat and fauna; • Groundwater drawdown impacting the islands and peripheral habitat; • Erosion and sedimentation; • Increased resources that may attract and increase numbers of introduced fauna; • Spread of introduced flora and/or pathogen; and • Fugitive dust emissions that may negatively affect riparian flora and vegetation and / or fauna habitats.
Required work	Surface Hydrology 62. Undertake a desktop hydrology assessment to: a) To identity and delineate surface water catchment areas and key drainage paths; b) Describe Lake Mackay on-lake flow paths / drainage network; c) Summarise climate data; and d) Develop design rainfall intensity-frequency-duration (IFD) curves in accordance with Australian Rainfall and Runoff (ARR) 2016 to support future hydrologic and hydraulic modelling efforts.

EPA Factor – Inland Waters	
	63. Undertake surface hydrology modelling and flood mitigation assessment to develop an understanding of Lake Mackay hydrology and response to rainfall events under current (pre-development) scenarios. As the Proposal involves both on-lake and land-based operations two different hydrology and hydraulic modelling approaches will be used for the respective land-based and on-lake operations. The focus of the land-based assessment will be on the project area hydrology, surface runoff, potential flooding regimes and characterisation of risk to development and infrastructure. The focus of the on-lake assessment will be to develop an understanding of the baseline (pre-disturbance) surface hydrology of Lake Mackay and the surrounding catchment, lake hydro-period, flooding extents and regimes in relation to environmental values and potential environmental impacts. The project (developed) scenario will include assessment of potential impact of the bunded trench system on the lake surface water flows. Potential climate change impacts will be qualitatively assessed. 64. Key modelling tasks include: a) Develop design rainfall and storm profiles in accordance with ARR (2016); b) Configure rainfall-runoff models for the external catchment intersecting proposed operational areas using appropriate methods based upon catchment areas (i.e. Rational Method for catchment areas less than 25 km²) or the Rainfall-Runoff Model (RORB) for larger catchments; c) For the external catchments simulate design peaks for a range of AEP events, up to the 1% AEP; d) Develop a two-dimensional (2D) hydraulic model (TUFLOW) to model the external catchments draining to Lake MacKay and to simulate inflows to Lake Mackay under the 1% AEP design rainfall event, inflows from the external model as source point inputs to the lake-based model; e) TUFLOW will be used to assess water levels, flow velocities and identify potential areas at risk of flooding that may require flood protection / flood mitigation; f) The TUFLOW model will be validated using available data from local site rainfall (if available) and historical lake flooding extents. BoM and SILO daily rainfall data will also be considered, along with satellite images of historical inundation extents; and g) Undertake a surface water salt balance study that will include analysis of sediment, with ionic composition, which can be compared to the composition of waste salts. 65. Analyse, discuss and assess surface water impacts including: a) Impacts of different flooding scenarios during operations and post-closure on brine abstraction areas, infrastructure and final landforms, including changes in surface water inundation patterns on fringing areas of Lake Mackay and peripheral wetlands; b) The nature, extent and duration of impacts including the relationship between rainfall events and flood inundation; the impact of trenches and bunds on surface water movement on the lake and used to inform potential impact assessment on associated ecosystems; and the influence of lake inundation on sediment generation, turbidity and potential erodibility of these landforms; and c) Impacts on the environmental values of significant receptors. 66. Demonstrate consideration of design scheduling of the trenching plan to avoid, minimise or manage impacts to inland waters. Hydrogeology 67. Undertake Preliminary Groundwater Modelling Study to provide an assessment of the existing groundwater system and initial predictions of the potential for groundwater extraction. 68. Undertake an assessment of groundwater pumping tests of the trenches to understand actual drawdown extents. 69. Determine the most acceptable distances of trenches from islands. 70. Determine if there is connectivity between clay pans and groundwater resources. 71. Undertake detailed lake infiltration and recharge testing.

EPA Factor – Inland Waters	
	72. Undertake salt-water balance modelling to understand the changes and possible migration of salt back into the lake. 73. Develop a conceptual and numerical hydrogeological model (to meet requirements of H3 level hydrogeological assessment) to predict the development of the drawdown cone, determine the optimum distance between trenches, and impacts associated with a changed regime. The numerical model will be developed using the MODFLOW-SURFACT code within the Groundwater Vistas interface. 74. Groundwater investigation to identify a suitable groundwater resource to establish a groundwater supply borefield options for Proposal's processing requirements. The investigation will include the development of both conceptual and numerical groundwater models (to meet requirements of H3 level hydrogeological assessment). The numerical model will be developed using the FEFLOW software package. The investigation will consider groundwater resource potential, drawdown extends and likely impacts on ecosystems. 75. Characterise the baseline hydrogeological regimes and water quality, both in a local and regional context, including, but not limited to water levels, quantity and quality. 76. Provide a detailed description of the design and location of the Proposal aspects that have the potential to impact hydrogeological processes. 77. Analyse, discuss and assess hydrogeological impacts including: a) The impacts from groundwater drawdown from trenching activities impacting islands and peripheral habitat; b) The impacts from groundwater drawdown from borefield impacting the ecosystems; c) The nature, extent and duration of impacts to Lake Mackay, islands, freshwater claypans and subterranean fauna habitat; and d) Impacts on the environmental values of significant receptors. Environmental Values 78. Undertake an aquatic ecology investigation of Lake Mackay of 20 sites including a range of habitats, comprising up to 14 sites on the playa (across the western and eastern portions of the lake) and six sites on the peripheral wetlands (to provide regional context). The following values will be investigated: a) Habitat Characteristics: Key physical, geological and hydrological attributes will be recorded, including measurements of salt crust thickness on the lake bed; b) Water and Sediment Quality: Collection of surface water and sediment samples and submission to a NATA-accredited laboratory; c) Baseline aquatic ecology study including benthic/planktonic algae, diatoms, macrophytes, microinvertebrates and macroinvertebrates; including sorting and identification to lowest possible level in the laboratory. d) Resting Stages: Scraping of surface sediment to collect dormant propagules of algae and aquatic invertebrates. Processing and identification to genus level in the laboratory; e) Waterbirds: Migratory waterbird survey of Lake Mackay and periphery wetlands, including an approximation of abundance, with identification to species level; and f) Riparian Flora and Vegetation Survey: Undertaken in accordance with Technical Guidance: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016l). This will include the establishment of transects (length to be determined in the field), comprising 3 m x 3 m quadrats within the riparian zone, and assessment of diversity, abundance, cover and health. *Tecticornia* specimens will be identified, vouchered and lodged with the taxonomic expert (K. Shepherd) from the Western Australian Herbarium (WAH). 79. Identify and characterise the aquatic ecology values and riparian vegetation values (and potential groundwater dependence) and any environmental receptors of Lake Mackay and the peripheral wetlands, both in a local and regional context.

EPA Factor – Inland Waters	
	80. Characterise the ecological values of the island habitats (including freshwater clay pans and riparian vegetation and potential groundwater dependent ecosystems) of Lake Mackay in relation to potential indirect impacts from Proposal activities. 81. Discuss how the proposed action is consistent with the relevant EPBC Act statutory recovery plans and threat abatement plans and has had regard to approved conservation advices. 82. Undertake additional characterisation of waste salts on the lake from solar evaporation activities and conduct a comparison of waste salt characterisation and baseline lake sediment conditions from the aquatic ecology investigation. 83. Provision of relevant IBSA data package in accordance with the Instructions and Form: IBSA Data Packages for all flora and vegetation surveys. Reporting, Impact Assessment and Management 84. Develop an inland waters risk assessment to assist in predicting inherent and residual impacts from the Proposal's activities (before and after applying the mitigation hierarchy. 85. Identify potential direct, indirect, and cumulative impacts on conservation values of inland waters (e.g. surface water or groundwater flows, islands, wind movement, hydrology and ecology studies) and consider these within the impact assessment. 86. Identify any limitations associated with the aquatic ecology investigation data or existing knowledge and discuss their implications for the impact assessment. 87. Discuss the proposed management, monitoring (including on adjacent tenure) and mitigation measures (in terms of the mitigation hierarchy) to prevent impacts to inland waters, and potential flow-on effects on the surrounding environment as a result of implementing the Proposal, at local, catchment and regional scale. 88. If management plans are required to be developed to address specific impacts, they will be prepared in accordance with EPA Guidance Instructions on how to prepare *Environmental Protection Act 1986* Part IV Environmental Management Plans (EPA 2018f) and Environmental Management Plan Guidelines (DoE 2014). 89. Determine and quantify any significant residual impacts to flora and vegetation by applying the Residual Impact Significance Model (page 11) and WA Offset Template in the WA Environmental Offsets Guidelines (Government of Western Australia 2014) and *Biodiversity Conservation Act 1999 Environmental Offsets Policy* (SEWPaC 2012) 90. If significant residual impacts to inland waters remain after applying the mitigation hierarchy an appropriate offset strategy will be developed, in consultation with the Tjamu Tjamu (Aboriginal Corporation) RNTBC and other relevant stakeholders for the Proposal in accordance with the WA Environmental Offsets Policy (Government of Western Australia 2011) and the EPBC Act Environmental Offsets Policy (SEWPaC 2012). If required, spatial data defining the area of significant residual impacts will also be provided. 91. If an offset strategy is required, Agrimin will use its best endeavours to ensure that any offsets required for inland waters are directed towards matters that are relevant to and benefit the Kiwirrkurra People, particularly through support for the Kiwirrkurra Indigenous Protected Area program and its land management activities. 92. Prepare a Mine Closure Plan (MCP) consistent with the Department of Mines, and Petroleum (DMIRS) Mine Closure Plan Guidance (DMIRS 2020a), that addresses the development of completion criteria to maintain the quality of surface water and groundwater so that environmental values are maintained post closure. 93. Within the ERD demonstrate how the Proponent considers the EPA's objectives for this factor has been addressed.
Relevant policy and guidance	**EPA Policy and Guidance** • Statement of Environmental Principles, Factors and Objectives (EPA 2016e); • Instructions on how to prepare an Environmental Review Document (EPA 2018e); • Environmental Factor Guideline: Inland Water Environmental Quality (EPA 2018a). • Refer to guidance outlined for flora and vegetation (**Table 3-1**) and terrestrial fauna (**Table 3-2**).

EPA Factor – Inland Waters	
	Other Policy and Guidance • DWER Policies for the take and use of water; • DWER (Water) Policies for better understanding water resources and planning for their use; • DWER Policies for protecting public drinking water supplies and the natural environment; • DWER - Western Australian Water in Mining Guidelines, May 2013 (DoW 2013); • National Light Pollution Guidelines for Wildlife including Marine Turtles, Seabirds and Migratory Shorebirds (DoEE 2020); • Australian Rainfall and Runoff Guidelines (Geoscience Australia 2016); • Australian Groundwater Modelling Guidelines (Australian Government National Water Commission 2012); and • Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000); and • Refer to guidance outlined for flora and vegetation (**Table 3-1**) and terrestrial fauna (**Table 3-2**).

Table 3-5: EPA Factor – Social Surroundings

EPA Factor – Social Surroundings	
EPA objective	*To protect social surroundings from significant harm.*
Relevant activities	• Clearing of up to 200 ha (<15%) of flora and vegetation within a 680 ha Off-lake Development Envelope. • Clearing of up to 1,000 ha of flora and vegetation for haul road within a34,486 ha Northern Infrastructure Development Envelope. • Clearing of up to 300 ha of flora and vegetation for borefield, water pipelines and access tracks within a 11,8297 ha Southern Infrastructure Development Envelope. • Abstraction of up to 100 GL/a of brine from trenches over 20-year period and up to 3.5 GL/a of groundwater from bores for process and potable water. • Storage of waste salts in the evaporation ponds and gradual release to the lake over time and subsequent salt stockpiles (up to 20 m in height at closure). • Use of light and heavy vehicles and equipment for construction and operations including fuel storage, transport of potash production to the port and the transport of gas to the process plant. • Fugitive dust emissions from the transport of potash production.
Potential impacts and risks	Potential Direct Impacts • Impacts to Aboriginal Sites or other places of heritage significance; • Restrictions or prevention of traditional practices by Traditional Owners; • Changes to aesthetic values; and • Fugitive dust emissions impacting Aboriginal Sites or other places of heritage significance.
Required work	Aboriginal Heritage and Culture 94. Characterise the cultural heritage values and identity any sites of significance within the Proposals development envelopes, their relevance within a wider regional context and any other areas that may be indirectly impacted from Proposal activities. 95. Conduct Aboriginal heritage surveys of the Development Envelopes, with the appropriate Aboriginal people who have knowledge of the heritage places within the area and who have appropriate cultural standing to be able to speak for this area, to identify any Aboriginal sites of significance and identify concerns in regards to impacts from proposed Proposal activities. 96. Provide a description of the heritage values within the all development envelopes. Air Emissions (Dust)

EPA Factor – Social Surroundings	
	97. Characterise the emission sources, and deposited dust sources from the Proposal in from on-lake, off-lake and the northern haul road activities to ensure compliance with NEPM standards. Reporting, Impact Assessment and Management 98. Assess the impacts on heritage sites and cultural values in accordance with the Environmental Factor Guideline - Social Surroundings (EPA 2016b) and EPA Guidance Statement No. 41: Assessment of Aboriginal Heritage (EPA 2004). 99. Assess the impacts on amenity and predict the residual impacts after considering the mitigation hierarchy. 100. Assess the potential direct and indirect impacts associated with the Proposal from air quality emissions within the development envelopes. 101. Predict the residual impacts on social surrounds for direct, indirect and cumulative impacts after considering mitigation hierarchy. 102. Identification and discussion of proposed management, monitoring and mitigation measures (in terms of the mitigation hierarchy) to achieve predicted outcomes/objectives for social surrounds. 103. Identify any limitations associated with the heritage survey data or existing knowledge and discuss their implications for the impact assessment. 104. Develop an Aboriginal Cultural Heritage Management Plan (ACHMP) for proposed monitoring and management where required, in accordance with EPA Guidance Instructions on how to prepare *Environmental Protection Act 1986* Part IV Environmental Management Plans (EPA 2018f) and the Guidelines for the development of an Aboriginal Cultural Heritage Management Plan for the Aboriginal Heritage Act 1972 (DIA 2009). 105. Prepare a Mine Closure Plan (MCP) consistent with the Department of Mines, and Petroleum (DMIRS) Mine Closure Plan Guidance (DMIRS 2020a). Provide detail on any consultation undertaken with Traditional Owners in undertaking surveys, assessment of significance and in preparing the ACHMP and MCP. 106. Within the ERD demonstrate how the Proponent considers the EPA's objectives for this factor have been addressed.
Relevant policy and guidance	**EPA Policy and Guidance** • Statement of Environmental Principles, Factors and Objectives (EPA 2016e). • Instructions on how to prepare an Environmental Review Document (EPA 2018e). • Environmental Factor Guideline: Social Surroundings (EPA 2016b). • EPA Guidance Statement No. 41: Assessment of Aboriginal Heritage (EPA 2004). **Other Policy and Guidance** • Aboriginal Heritage Due Diligence Guidelines (DAA 2013). • Guidelines for Preparing Aboriginal Heritage Survey Reports (DAA 2018). • DPLH Guidelines for the Development of an Aboriginal Cultural Heritage Management Plan for the *Aboriginal Heritage Act 1972* (DIA 2009). • World Health Organisation (WHO) Air Quality Guidelines and Criteria.

4. Other Environmental Factors Matters

The EPA has identified the following Other Environmental Factors: Landforms; Terrestrial Environmental Quality and Air Quality must be addressed during the environmental review and discussed in the ERD. The following provides a summary of the work that is required to support the development of the ERD:

107. **Landforms** – the ERD will include the following required work:

- Include a description of the Proposal in the context of local and regional scale impact to the variety, integrity, ecological functions and environmental values of the landforms;
- Provide an analysis of the significance of the landforms to be impacted, in terms of intactness, uniqueness and / or local, regional or national level of representation, ecological function and from a visual landscape perspective;
- Identify landforms and their environmental values likely to be impacted. Identify and describe areas that will be altered, both temporarily and permanently, and for those that will remain, outline the structural or visual impact on the landform;
- Identify and describe the extent to which the Proposal's activities may fragment the landform, analyse the spatial extent of the landform likely to be impacted and the impacts to the integrity of the landform;
- Analyse the environmental values supported by the landform, including how the Proposal will affect the role of the landform in maintaining these values (e.g. surface water or groundwater flows, wind movement, precipitation, temperature, landscape connectivity, and soil composition/chemistry);
- Identification of and discussion of proposed management, monitoring and mitigation measures (in terms of the mitigation hierarchy) to achieve predicted outcomes/objectives;
- Prepare a Mine Closure Plan (MCP) consistent with the Department of Mines, and Petroleum (DMIRS) Mine Closure Plan Guidance (DMIRS 2020a); and
- Within the ERD demonstrate how the Proponent considers the EPA's objectives for this factor have been addressed.

108. **Terrestrial Environmental Quality** – the ERD will include the following required work:

- Present a baseline soil quality assessment (including acid sulphate soils investigation) for the development envelopes;
- Include in the ERD figures of mapped soil units for the development envelopes;
- Undertake an investigation to determine if uranium, thorium and major & trace metals are present within the Proposal area.
- Undertake sediment analysis of lake and peripheral wetlands (as part of the aquatic ecology investigation of the lake and peripheral wetlands during flooding);
- Undertake additional characterisation of waste salts on the lake from the Proposal's activities and conduct a comparison of waste salt characterisation and baseline lake sediment conditions;
- Determine the rate of dissolution of salts from the waste stockpile into the lake, and effect on the lake's salt balance;
- Quantify the potential seepage of hypersaline water or salts that may occur through the clay liner underlying the proposed evaporation cells;
- Undertake a risk assessment of the Proposal impacts to the Terrestrial Environment factor including an assessment of how spills or accidental dispersal of the potash product will affect terrestrial environmental quality;
- Assess the potential direct and indirect impacts associated with the Proposal on the Terrestrial Environment factor within the development envelopes;

- Identification and discussion of proposed management, monitoring and mitigation measures (in terms of the mitigation hierarchy) to achieve predicted outcomes/objectives;
- Prepare a Mine Closure Plan (MCP) consistent with the Department of Mines, and Petroleum (DMIRS) Mine Closure Plan Guidance (DMIRS 2020a); and
- Within the ERD demonstrate how Proponent considers the EPA's objectives for this factor have been addressed.

109. **Air Quality** - the ERD will include the following required work:

- Characterise the emission sources and deposited dust sources from the Proposal from activities undertaken within all the development envelopes to ensure compliance with NEPM standards;
- Characterise the greenhouse gas emission key sources by source inclusive of stationary energy, fugitives, transport, and emissions associated with changes to land use for the Proposal;
- Estimate the expected Scope 1 (direct) and Scope 2 (energy indirect) greenhouse gas emissions for the Proposal;
- Analyse the greenhouse gas intensity (i.e. quantity of CO2-e generated per tonne of product produced) for the Proposal;
- Assess the potential direct and indirect impacts associated with the Proposal from greenhouse gas and air quality (dust) emissions within the development envelopes;
- Identification of and discussion of proposed management, monitoring, mitigation and offset measures (in terms of the mitigation hierarchy) to achieve predicted outcomes/objectives for air quality; and
- Within the ERD demonstrate how Proponent considers the EPA's objectives for this factor have been addressed.

5. Stakeholder Consultation

The proponent must consult with stakeholders who are affected by or are interested in the Proposal.

This includes the decision-making authorities (see **Section 6**), other relevant state (and Commonwealth) government agencies and local government authorities, the local community and environmental non-government organisations:

- Department of Agriculture, Water and the Environment;
- Shire of East Pilbara;
- Shire of Halls Creek;
- Shire of Wyndham-East Kimberley;
- Central Desert Native Title Services;
- Kimberley Land Council;
- Tjamu Tjamu (Aboriginal Corporation) RNTBC and Kiwirrkurra People;
- Parna Ngururrpa (Aboriginal Corporation) RNTBC and Ngururrpa People;
- Tjurabalan Native Title Land Aboriginal Corporation and Tjurabalan People;
- Conservation Council of Western Australia (CCWA);
- Wildflower Society of Western Australia;
- Birdlife Australia; and
- Waterbird Conservation Group.

The proponent must document the following in the ERD:

- Identified stakeholders;
- The stakeholder consultation undertaken and the outcomes, including decision-making authorities' specific regulatory approvals and any adjustments to the Proposal as a result of consultation; and
- Any future plans for consultation.

6. Decision-Making Authorities

At this stage, the EPA has identified the following decision-making authorities for the Proposal (**Table 6-1**). Additional decision-making authorities (DMAs) may be identified during the assessment.

Table 6-1: Decision-Making Authorities

Decision-making authority	Relevant legislation
Minister for Environment – Western Australia	*Environmental Protection 1986* *Biodiversity Conservation Act 2016*
Department of Agriculture Water and the Environment (Commonwealth)	*Environment Protection and Biodiversity Conservation Act 1999*
Minister for Water – Western Australia	*Rights in Water and Irrigation Act 1914*
Minister for Mines and Petroleum – Western Australia	*Mining Act 1978* *Dangerous Goods and Safety Act 2004* *Mines Safety and Inspection Act 1994*
Minister for Aboriginal Affairs	*Aboriginal Heritage Act 1972*
Chief Executive Officer – Department of Biodiversity Conservation and Attractions	*Biodiversity Conservation Act 2016*
Chief Executive Officer – Department of Water and Environmental Regulation	*Environmental Protection 1986* *Rights in Water and Irrigation Act 1914*
A/Executive Director – Resource and Environmental Compliance Division, Department of Mines, Industry, Regulation and Safety	*Mining Act 1978* *Mines Safety and Inspection Act 1994*
Chief Dangerous Goods Officer – Department of Mines, Industry, Regulation and Safety	*Dangerous Goods and Safety Act 2004*
State Mining Engineer – Department of Mines, Industry, Regulation and Safety	*Mining Act 1978* *Mines Safety and Inspection Act 1994*
Chief Health Officer – Department of Health	*Health Act 2016*
Chief Executive Officer – Shire of East Pilbara	*Local Government Act 1995* *Planning and Development Act 2006*

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Appendix A EPBC Act Matters Potentially Impacted by the Action

Appendix A: EPBC Act Matters Potentially Impacted by the Action

The following information has been developed from the information available in the referral, the proposed action may have, or is likely to have a significant impact on the following matters of national environmental significance (mNES). The following tables outline the information that must be considered in surveying and assessing impacts to these mNES.

The list of species in **Table A-1** below should be assessed as a minimum however, it is not considered to be exhaustive. Equivalent survey and assessment considerations should be applied to any additional EPBC Act listed threatened species, ecological communities or migratory species recorded or likely to occur within the Proposal area.

Table A-1: Listed threated species and communites (section 18 & 18A)

Listed threated species and communities (sections 18 & 18A)	Recovery Plan [1]	Threat Abatement Plan [1]	Approved Conservation Advice (ACA) [1, 3]	Listing Advice [3]	Bioregional Plan [2]	Survey Guidelines [2]	Other References [2]
Greater Bilby *(Macrotis lagotis)* – Vulnerable	(Pavey 2006)	Cats, fox, Rabbits	(TSSC 2016b)	Within ACA	None	(DEWHA 2010c)	20 mammals by 2020
Night Parrot *(Pezoporus occidentalis)* – Endangered	None	Cats, fox, rabbits	(TSSC 2016c)	Within ACA	None	(DEWHA 2010b)	20 birds by 2020
Princess Parrot (*Polytelis alexandrae*) – Vulnerable	None	None	(TSSC 2018)	Within ACA	None	(DEWHA 2010b) (DoEE 2016)	20 birds by 2020 (Garnett 2011) (DEH 2005)
Great Desert Skink *(Liopholis kintorel)* – Vulnerable	(McAlpin 2001)	Fire, cats, traditional food source, tourism, groundwater extraction	(TSSC 2016a)	Within ACA	None	(DEWHA 2010d)	-
Australian Painted Snipe *(Rostratula australis)* – Endangered	None	None	(TSSC 2013)	Within ACA	None	(DEWHA 2010b)	20 birds by 2020 (Garnett 2011) (DEH 2005)
Dwarf Desert Spike-rush *(Eleocharis papillosa)* – Vulnerable	None	None	(DEWHA 2008)	(TSSC 2010)	None	-	-

Notes:

1 The availability, currency and status of Recovery Plants, Threatened Abatement Plans and Approved Conservation Advice was current at the time of writing but should be reviewed up to the point of submitting assessment documentation as changes do occur.

2 Listed reference should be relied upon as complete of exhaustive.

3 Reference in this column are not included in the reference list at **Section 7.**

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