Supplementary Environmental Report

Lei Lithium Project

Prepared for assessment under the *Environment Protection Act 2019*
NT EPA Assessment Number: EP2024/038

Lithium Plus Minerals Ltd
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PUBLICATION STATEMENT

This Supplementary Environment Report (SER) has been prepared by EcOz Environmental Consultants (EcOz) on behalf of Lithium Plus Minerals Ltd (LPM). A listing of the key consultants, their qualifications and experience in the environmental field are provided below.

Key consultant	Role	Qualifications	Experience
Emma Lewis	SER Reviewer Principal Consultant - Impact Assessment and Approvals	Bachelor of Science	15+ years
Britanny Crescentino	SER author Senior Environment Consultant - Impact Assessment and Approvals	Bachelor of Environmental Science	8 years
Paula Martinez	SER author Senior Environment Consultant - Impact Assessment and Approvals	Bachelor of Engineering (Environmental and Health) Master of Environmental Management	5 years
Glen Ewers	SER technical advisor GDE survey and monitoring report author Principal Consultant – Ecology	Bachelor of Science Bachelor of Law (Environment)	15+ years

A listing of the key technical consultants and inputs in the SER are provided below.

Company	Deliverables	Consultant & years of experience
EcOz	GDE Survey Report and Monitoring Plan	Glen Ewers – 15+ years David Loewensteiner – 20+ years
Environmental Geochemistry International (EGi)	Inland Water Environmental Quality – Assessment of Discharge and Seepage	Andrew Botfield – 20+ years
EcoLogical Australia (ELA) and CloudGMS	Groundwater Impact Assessment – which included groundwater desktop investigation, GDE investigation, groundwater modelling, and impact assessment.	Erica Holt – 15 years Garry Straughton – 18 years Caitlyn Scobie – 4 years Anthony Knapton – 30+ years
Collaboration between EcOz and ELA	Groundwater Dependant Ecosystems (GDE) Assessment	See EcOz and ELA above.
EMM Consulting Pty Ltd (EMM)	Community Stakeholder Engagement Strategy Stakeholder Engagement Outcomes Report based on the Stakeholder engagement undertaken prior to submission of the SER.	Melanie Rippon – 20+ years Samantha McCrea – 20+ years Caroline Wilkins – 20+ years Amelia Fox – 2 years
GHD	Traffic Impact Assessment	Farn-Ling Khung – 10 years
Lifecycles	Greenhouse Gas Assessment	Eliza Grant – 7 years Paul-Antoine Bontinck – 18 years

Company	Deliverables	Consultant & years of experience
Projectick	Revised surface infrastructure layouts. Fuel burn, explosives and fertiliser usage data for the Greenhouse Gas Emissions Assessment, Project traffic generation data for the Traffic Impact Assessment Concept Mine Closure Plan	Peter Habermann – 36+ years Rob McCahill – 27 years
Remote Heritage Services (RHS)	Site-specific archaeological survey and Cultural Heritage Assessment (CHA)	Ben Keys – 18 years Jenni Hillman – 15 years Andrew Coe – 4 years
WRM Water + Environment (WRM)	Site Water Balance Flood Modelling and Impact Assessment Surface Water Impact Assessment Water Management Plan (WMP)	Julian Orth – 20+ years Kah Ong – 7 years

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Appendix B **Traffic Impact Assessment (GHD 2026)**

Appendix C **GHG Emissions Assessment (Lifecycles 2026)**

Appendix D **Concept Mine Closure and Rehabilitation Plan (Projectick 2026)**

Appendix E **Community and Stakeholder Engagement Strategy (EMM Consulting 2026a)**

Appendix F **Community and Stakeholder Engagement Outcomes Report (EMM Consulting 2026b)**

Appendix G **Surface Water Assessment (WRM 2026a)**

Appendix H **Inland Water Environmental Quality – Assessment of Discharge and Seepage (EGi 2026)**

Appendix I **Groundwater Impact Assessment and Modelling Report (ELA 2026)**

Appendix J **Cultural Heritage Assessment Report (Remote Heritage Services 2026)**

Appendix K **Groundwater-Dependent Ecosystems Survey Report and Monitoring Plan (EcOz 2026)**

Acknowledgement

Lithium Plus Minerals Ltd (LPM) acknowledges the participation of Larrakia peoples who contributed to consultation and archaeological survey activities undertaken for the Lei Lithium Project. We also acknowledge the assistance of the Larrakia Nation Aboriginal Corporation (LNAC), Larrakia Development Corporation (LDC) and Northern Land Council (NLC) in facilitating engagement throughout the assessment process. Their participation and input contributed to the identification and understanding of cultural heritage values within the Project area. We further acknowledge the Northern Territory Heritage Branch for providing archaeological database records, heritage register information and spatial data that informed the desktop assessment, survey planning and cultural heritage investigations.

ACRONYMS

AAPA	Aboriginal Areas Protection Authority (Northern Territory)
AEP	Annual Exceedance Probability
AFANT	Amateur Fisherman's Association Northern Territory
AHD	Australian heigh datum
AIATSIS	Australian Institute of Aboriginal and Torres Strait Islander Studies
AMD	Acid metalliferous drainage
AMIRA	Australian Mineral Industries Research Association
ANFO	Ammonium Nitrate Fuel Oil
ANZECC	Australian and New Zealand Environment and Conservation Council
ANZG	Australian New Zealand guidelines for fresh and marine water quality
ARD	Acid Rock Drainage
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
ASD	Approach sight distance
ASS	Acid Sulfate Soils
ASX	Australian Securities Exchange
BAL	Basic Left-turn treatment
BAR	Basic Right-turn treatment
BCF	Burrell creek formation
BoM	Bureau of Meteorology
CCME	Canadian Council of Ministers of the Environment
CHA	Cultural Heritage Assessment
CO_2-e	Carbon dioxide equivalent
CPESC	Certified Professional in Erosion and Sediment Control
CSES	Community Stakeholder Engagement Strategy
Cth	Commonwealth
DCCEEW	Department of Climate Change, Energy, and the Environment and Water (Cth)
DEPWS	Department of Environment, Parks and Water Security (NT) – (now DLPE)
DFAT	Department of Foreign Affairs and Trade
DHWQO	Darwin Harbour Water Quality Objectives
DIPL	Department of Infrastructure, Planning and Logistics (now DLI)
DITT	Department of Industry, Tourism and Trade (now DME)
DLI	Department of Logistics and Infrastructure (formerly DIPL)
DLPE	Department of Lands, Planning and Environment (formerly DEPWS)
DME	Department of Mining and Energy (formerly DITT)
DMIRS	Department of Mines, Industry Regulation and Safety
DoH	Department of Health
DRARWCD	Darwin Rural Adelaide River Water Control District
DSO	Direct shipped ore
EC	Electrical conductivity (a measure of the total amount of dissolved salts in water)
ECNT	Environment Centre NT
EGi	Environmental Geochemistry International
EIA	Environmental Impact Assessment
EIA	Environmental Impact Statement
EL	Exploration Licence
ELA	Eco Logical Australia
EML	Environmental (Mining) Licence
EMM	EMM Consulting Pty Ltd
EP Act	Environment Protection Act 2019 (Northern Territory)

EPBC Act	Environment Protection and Biodiversity Conservation Act (1999) (Commonwealth)
ESCP	Erosion and Sediment Control Plan
FPIC	Free, prior and informed consent
FullCAM	Full Carbon Accounting Model
GARD Guide	Global Acid Rock Drainage Guide – best-practice guide to ARD prevention and management
GDA	Geocentric Datum of Australia
GDE	Groundwater-Dependent Ecosystems
GHG	Greenhouse Gas
GIS	Geographic information system
ha	Hectare
HSU	Hydrostratigraphic Units
HV	Heavy vehicle
IAP2	International Association for Public Participation
ICMM	International Council on Mining and Metals
IECA	International Erosion Control Association
INAP	International Network for Acid Prevention
LHOS	Long Hole Open Stoping
LNAC	Larrakia Nation Aboriginal Corporation
LOM	Total life of mine
LOSP	Level of Species Protection
LPM	Lithium Plus Minerals Ltd
LWD	Lei Waste Dump
mBGL	meters below ground level
MCP	Mine Closure Plan
ML	Mineral Lease
MNES	Matters of National Environmental Significance
Mt	Million tonnes
MTA	Mineral Titles Act
MWD	Mine water dam
NAFRPA	Northern Australian Fractured Rock Province Aquifer
NDMI	Normalised Difference Moisture Index
NGER	National Greenhouse and Energy Reporting
NHMRC	National Health and Medical Research Council
NLC	Northern Land Council
NMD	Neutral Metalliferous Drainage
NT	Northern Territory
NT EPA	Northern Territory Environment Protection Authority
NTG	Northern Territory Government
NVIS	National Vegetation Information System
PAF	Potential Acid Forming
PAF-LC	Potentially Acid Forming with Low Capacity
PASS	Potential Acid Sulfate Soils
PMP	Probable Maximum Precipitation
PWC	Power Water Corporation
RAR	Return Air Raise
RHS	Remote Heritage Services
RMA	Rehabilitation Management Area
ROM	Run of mine
RWD	Raw water dam
SD1	Sediment Dam 1
SER	Supplementary Environment Report

SISD	Safe Intersection Sight Distance
SSD	Stopping Site Distance
SSTV	Site-Specific Trigger Values
SWA	Surface Water Assessment
TARP	Trigger Action Response Plan
TIA	Traffic Impact Assessment
TMP	Traffic Management Plan
TMS	Traffic Management Strategy
TO	Traditional Owner
TPWC Act	Territory Parks and Wildlife Conservation Act 1976 (NT)
WDL	Waste Discharge Licence
WMP	Water Management Plan
WRD	Waste rock dump
WRM	WRM Water + Environment Pty Ltd
ZOI	Zone of influence

1. INTRODUCTION

This Supplementary Environment Report (SER), referred to hereafter as 'this document', has been prepared in accordance with the *Direction to Include Additional Information in the Supplementary Environmental Report* (the Direction) issued by the Northern Territory Environment Protection Authority (NT EPA) on 11 March 2025 following the referral of Lithium Plus Minerals (LPM)'s Lei Lithium Project (the Proposal) under the *Environment Protection Act 2019* (EP Act) (NT EPA reference EP2024/038). The referral was submitted in November 2024 and was on public exhibition for a period of 21 business days (excluding public holidays).

The Direction sought further detail on the Proposal, consultation and key environmental factors including:

- Hydrological processes
- Inland water environmental quality
- Terrestrial ecosystems
- Community and economy
- Culture and heritage

In response, LPM has undertaken technical investigations, refined impact assessments, and incorporated outcomes of stakeholder engagement. LPM received submissions during the public exhibition phase of the referral. The issues raised in those submissions have been considered and addressed in this document and have informed the refinement of the impact assessment and mitigation measures outlined in this document.

This document provides a response to each item raised in submissions in accordance with the requirements of the *Environmental Impact Assessment Guidance for Proponents: Preparing a Supplementary Environment Report* (NT EPA 2025). Responses cross-reference updated technical reports and appendices where relevant. The information provided is intended to comprehensively address the matters raised and support the ongoing assessment of the Proposal.

The purpose of this document is to:

- Provide the NT EPA with sufficient information to inform decision-making as part of the environmental impact assessment process under the EP Act including whether the Proposal should be approved and, if so, the conditions that should apply to any approval.
- Address and respond to the submissions received from the public and other stakeholders in relation to the referral made to the NT EPA in November 2024.

This document will be available for public comment on the NT EPA website for a period of 25 business days. In accordance with the Direction, LPM will publish a notice advising of the consultation period on the LPM website for the duration of the public exhibition period. Printed copies of this document and the related executive summary will also be made available at nominated locations identified in the Direction. On completion of the public comment period, the NT EPA will consider submissions and will determine whether the Proposal should be approved.

Table 1-1 summarises the additional information requirements in the Direction and identifies the section/s in this document where the information is provided. Where a detailed technical study or review was required, standalone reports prepared by suitably qualified technical experts are provided as Appendices. The responses to the submissions received are provided in Section 5.

Table 1-1. Additional information requirements for the Supplementary Environment Report

Topic	Referral ref.	Comment	Additional information required	SER section
The proposed action				
Proposed action description	Section 2	The referral identifies power for the proposed action as being the external power grid or on-site generation, requiring 605 kL/year of diesel. The proponent is intending to investigate the feasibility of a small solar farm to provide power to the administration office, lighting and water plants. The mining fleet is predicted to require 16,800 kL of diesel over the life of mine. It is unclear if this includes the volume of diesel to fuel the haulage fleet. No estimate of greenhouse gas emissions is provided and the basis for assuming low emissions and the proposal will not trigger obligations under the Commonwealth *National Greenhouse and Energy Reporting Act 2007* (NGER Act) Safeguard Mechanism is ambiguous.	1. Provide an estimate (and supporting information) of the proposal's annual and total scope 1 and scope 2 emissions over the life of the proposal including emissions from land clearing and diesel exhaust. 2. If projected scope 1 emissions exceed 100,000 tonnes per annum of CO2-e, explain the measures for avoiding, mitigating or offsetting greenhouse gas emissions over the project's lifetime.	Section 2
Closure and rehabilitation	Section 2.6.3	The referral identifies that a Mine Rehabilitation and Closure Plan will be developed consistent with the following mine rehabilitation and closure guidelines: • International Council for Mining and Metals (ICMM) Integrated Mine Closure, Good Practice guide (2nd Edition, 2019) • International Council for Mining and Metals (ICMM, 2020), Key Performance Indicators – Tool for Closure • Mine Closure and Mine Rehabilitation – Leading Practice Sustainable Development	3. Provide details for the proposed decommissioning, closure and rehabilitation of the proposal, with consideration of section 42 of the EP Act, in the form of a conceptual closure plan. The conceptual closure plan should detail proposed: • lifespan and planned closure timeframes • post development land use (after closure) including alternatives • timeframes of consultations to be undertaken with key stakeholders • strategies for managing unplanned or early closure • strategies for managing care and maintenance • options for progressive rehabilitation, decommissioning of infrastructure, removal and disposal of infrastructure prior to final closure • site or domain specific revegetation methodologies • rehabilitation objectives and outcomes	Section 2.5

Topic	Referral ref.	Comment	Additional information required	SER section
		Program for the Mining Industry (Commonwealth of Australia, 2016) • Mine Closure Plan Guidance - How to prepare in accordance with the Statutory Guidelines (DMIRS, 2020) Given the life of mine (seven years from construction to closure), the early stages of consultation on end land use objectives, and the high-level objective of returning the land "to its pre-mining land use", mine closure and rehabilitation must be appropriately planned and funded to ensure that there are no ongoing impacts from the operation. The stated mine life does not not account for periods of care and maintenance.	• rehabilitation and closure actions • performance indicators, constraints and reporting schedule. The conceptual closure plan must be consistent with the following guidelines: • Cooperative Research Centre – Transformations in Mining Economies (CRC-TiME) (2021) Integrated Mine Transitions Framework (IMTF) for mine closure planning • International Council for Mining and Metals (ICMM) Integrated Mine Closure, Good Practice guide (2nd Edition, 2019) • International Council for Mining and Metals (ICMM, 2020), Key Performance Indicators – Tool for Closure. • Mine Closure and Mine Rehabilitation - Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth of Australia, 2016). • Mine Closure Plan Guidance - How to prepare in accordance with the Statutory Guidelines (DMIRS, 2020).	
Consultation	Section 3	The referral does not demonstrate that consultation with stakeholders is adequate and has been undertaken in accordance with the NT EPA's *EIA guidance for proponents: Stakeholder Engagement and Consultation* and the General duty of proponents under section 43 (a) to (d) of the EP Act. Sufficient detail has not been provided to allow for the significance of any potential positive and/or negative impacts to be assessed. Stakeholder perspectives listed in the referral are limited and further consultation is required to ensure that communities and individuals likely to be affected understand the proposal and the potential impacts including cumulative impacts.	4. Demonstrate that affected communities and individuals have been adequately consulted on the potential benefits and negative impacts of the proposal. 5. Information on consulted stakeholders must include: • how stakeholders were identified • how and when consultation was undertaken • the role / relevancy of the stakeholder to the proposed action. 6. Describe how concerns and issues raised in submissions and during community and stakeholder consultation and engagement processes have been considered and resolved.	Section 4 and Table 12-1

Topic	Referral ref.	Comment	Additional information required	SER section
Water				
Hydrological processes	Section 5.3	**<u>Extent of groundwater drawdown</u>** The referral provides an indicative zone of influence (ZOI) of 2 km around the proposed action, based on groundwater modelling of the Core Lithium BP33 mine. The referral states that a site-specific groundwater model will be developed. The model is required to determine the potential for significant impacts from groundwater extraction. The BP33 underground mine is also < 3 km from the Lei Lithium Project, it is unclear what the cumulative ZOI is predicted to be in the event both mines operate concurrently.	7. Provide a groundwater model that includes, as a minimum: • descriptions of groundwater dependent ecosystems and understanding of their interconnectivity and water dependence • predictions based on the relevant site-specific characteristics such as: ○ groundwater drawdown levels, spatial extent and recovery time ○ alterations to recharge and subsequent effect on anticipated recovery time ○ impacts to declared beneficial uses of the water within the Fog Bay Area and Darwin Rural Adelaide River Water Control District • modelling using appropriate precautionary scenarios, and accounting for different proposal stages, such as initial conditions (baseline) and relevant intervals in construction, operation, care and maintenance, and closure phases (including post closure). Future predicted climatic conditions must also be considered. • assumptions and parameters used in the predictive model and justification for their use, including a description of how the predictions would change in the event critical assumptions (including transmissivity, hydraulic conductivity and porosity) were found to be incorrect. • overall water balance of the target groundwater system, including inputs and outputs, and feasibility assessment to demonstrate that groundwater abstraction to facilitate mining will not result in adverse impacts to the environment, and current and future groundwater users. 8. Identify, describe and assess potential direct and indirect impacts and risks of the predicted groundwater extraction, including likely effects to groundwater dependent ecosystems including springs, wetlands, vegetation, connected surface water systems, declared beneficial uses and other groundwater users. 9. Describe the avoidance and mitigation measures to manage the impacts and risks of groundwater extraction identified by item 8. 10. Describe any uncertainties and further work required to increase understanding of potential impacts, and the plan for completing further work. 11. Quantify the significance and extent of impacts at the project level and cumulatively. Quantify the significance of proposal impacts using: • the latest draft of the Northern Territory Water Allocation Planning Framework.	Section 7

Topic	Referral ref.	Comment	Additional information required	SER section
			• Relevant guideline thresholds.	
Inland water environmental quality	Section 5.4	**<u>Surface and groundwater quality</u>** The referral identifies: • elevated aluminium, arsenic and zinc in groundwater • enrichment of arsenic in waste rock and process residues • elevated arsenic in water extracts and peroxide extracts. Seepage and run off from waste rock and ore stockpiles, and discharge of groundwater through dewatering operations has the potential to, directly and cumulatively, significantly impact on: • surface water quality from the fate of metals, metalloids (particularly arsenic) and nutrients present in the groundwater and geology of the area, • groundwater quality from the fate of metals and metalloids present in waste rock and ore stockpiles • the ecological health of the Charlotte River from the migration of mine impacted water through the shallow alluvial aquifer.	12. Detail the chemical and physical characteristics of surface waters and groundwater within the predicted ZOI, through the collection of an appropriate baseline dataset. Identify any water quality standards and guidelines that would be used to describe the ecological values and health of surface water environments. 13. Identify the quantity, quality (including anions, cations, pH, EC, metals, arsenic and nutrients) and location of all potential discharges of water and wastewater by the proposal, to groundwater and surface water, whether as point sources (such as controlled discharges from regulated dams) or diffuse sources (such as seepage from waste rock dumps/ ore stockpiles or irrigation to land of wastewater). 14. Demonstrate how water would be managed and treated to achieve a quality that provides for the protection of aquatic ecosystems prior to discharge. Provide a tabulated comparison of the predicted water quality and the standards and guidelines identified in item 12. 15. Identify, describe and assess the potential impacts of any discharges on the quality and quantity of receiving waters taking into consideration cumulative impacts from other proposals and the practices and procedures that would be used to avoid or minimise impacts. 16. Describe the avoidance and mitigation measures to manage the impacts and risks of water discharges on the receiving environment identified by item 15. 17. Provide details of a monitoring program, including trigger thresholds and response (corrective) actions.	Section 8

Topic	Referral ref.	Comment	Additional information required	SER section
		<u>Groundwater drawdown</u> The referral identifies that groundwater extraction may result in saline intrusion in the freshwater reaches of the Charlotte River, and the oxidation of subsurface acid sulfate soils leading to potential significant impacts to surface and groundwater quality	18. Identify, describe and assess direct and indirect impacts of implementing the proposal, and cumulative impacts, on groundwater and surface water quality. This must include (at a minimum) consideration of impacts associated with: • disturbance / exposure of acid sulfate soils through groundwater extraction or removal of overburden. • changes to the saltwater – freshwater interface for all waterways within the ZOI, including the Charlotte River. • salinisation of groundwater aquifers from encroachment of seawater. 19. Describe the avoidance and mitigation measures to manage the impacts and risks of groundwater extraction identified by item 18.	Section 7
Land				
Terrestrial ecosystems	Section 5.2	The referral identifies that a large area of the disturbance footprint is mapped as having a moderate potential to be a terrestrial groundwater dependent ecosystem, similar to a "vast" area south and west of the proposal. Assessment and submissions on the referral indicate a key uncertainty is the potential impacts, including cumulative impacts, of groundwater extraction on seasonal surface water availability, groundwater dependent ecosystems, and significant or sensitive vegetation. Impacts to seasonal surface water availability may also result in threatened fauna attempting to access water dams and ponds on site during construction and operations during the dry season.	20. Refer to items 8 and 9 above. 21. Describe ongoing monitoring, inspection and reporting of impacts on terrestrial ecosystem values to ensure their protection.	Section 9

Topic	Referral ref.	Comment	Additional information required	SER section
People				
Community and economy	Section 5.6	The referral indicates that there will be an additional 30 heavy vehicle (quad road trains) movements per day between the mine site and the Port of Darwin. There is also an expected increase in traffic to and from the site associated with personnel. Noting that the increase in traffic will likely extend beyond the preferred haulage route with increases expected to be observed on Channel Island Road, Jenkins Road and Finn Road (i.e. the shortest route between Palmerston and the proposed mine site). There is a high likelihood that traffic increases will significantly impact nearby stakeholders including: • Berry Springs Primary School and the wider Berry Springs Community, • Communities at Dundee, Bynoe, Wagait and Belyuen, • mining operations, • tourism businesses, and • other road users.	22. Conduct an updated road and traffic assessment to identify, describe and assess potential direct and indirect impacts and risks of implementing the proposal, and cumulative impacts, on the community, including on: • Traffic, due to delays, and congestion including, but not limited to, during peak traffic periods (e.g. school drop off and pick up, morning and afternoon commute). • Residences, due to reduced amenity at sensitive receptors such as residences near the road/s and mine, due to increase in noise and/or dust especially from increased traffic and road trains. 23. Identify measures that will be implemented to avoid or mitigate these impacts. 24. Provide clarification on the role of other regulatory regimes (e.g. *Control of Roads Act 1953, Traffic Act 1987*) in avoiding or mitigating impacts from increased traffic associated with construction and operations (including cumulative impacts) on nearby stakeholders including: • Berry Springs Primary School and the wider Berry Springs Community, • communities at Dundee, Bynoe, Wagait and Belyuen, • mining operations, • tourism businesses, and • other road users. 25. Describe proposed processes for ongoing monitoring, inspection and reporting of impacts on the community and economy. 26. Provide further information that demonstrates awareness of the community of the potential social and economic impacts on: • local infrastructure such as the Fog Bay Road and the Cox Peninsula Road, • users of the Fog Bay Road and Cox Peninsula Road and the communities serviced by the preferred haulage route, • users of Channel Island Road, Jenkins Road and Finn Road including the residents of Finn Road, • individuals • tourism, hospitality and other businesses, • community cohesion and • recreational and cultural activities.	Section 10

Topic	Referral ref.	Comment	Additional information required	SER section
Culture and heritage	Section 5.7	The referral identifies that there are no registered or recorded sacred sites within ML(A) 33874. However, submissions on the referral indicate the assessment undertaken by the proponent has not been adequately informed by the Aboriginal Areas Protection Authority (AAPA). The proponent has indicated an intention for the project to be subject to a sacred site survey prior to commencement, and that the timing and area to be surveyed has not been determined. Dewatering operations may impact on groundwater dependent sacred sites, within the ZOI, or along the Charlotte River. It is unclear whether the ZOI will be subject to a sacred sites survey as the zone has not been delineated.	27. Describe the characteristics and current condition of sacred sites, cultural and heritage values within the proposal area, including the zone of influence, which could be impacted. This must include (at a minimum) descriptive and spatial information for the following: • Aboriginal and non-Aboriginal sites, places or objects of natural, historic or cultural heritage significance, current use and spiritual significance, • Heritage places or objects protected under the *Heritage Act 2011*, • traditional land use or industry within or in proximity to the proposal area and ZOI, • importance of amenity (i.e. visual, noise) to maintaining cultural values, • registered or recorded sacred sites under the *Northern Territory Aboriginal Sacred Sites Act 1989,* taking into account confidentiality requirements. 28. Information sources must include published archaeological and anthropological information, site surveys, respective registers, consultations and other research. 29. In the event that an Authority Certificate (from AAPA) is not provided: • Justify the suitability of the methodologies, surveys or processes used to provide information about sacred sites, culture and heritage. • Detail any information gaps or uncertainties in relation to sacred sites, culture and heritage, including any further studies or measures required to address these gaps. • Identify measures that will be implemented to avoid or mitigate these impacts. 30. Describe ongoing monitoring, inspection and reporting of impacts on the condition of sacred sites, cultural and heritage values within the ZOI.	Section 11

2. PROPOSAL DESCRIPTION

Section 2 of the Referral Report[1] outlined the description of activities and key components of the Proposal. Since submission, a suite of targeted technical studies have been completed to inform the development of the mine site detailed design and address Direction requirements.

These investigations have informed refinements to key aspects of the Proposal, including:

- mine site design
- construction and operational water management system
- greenhouse gas emissions
- geochemical characterisation analysis and discharge/seepage assessment
- conceptual mine closure and rehabilitation planning.

The following sections present the outcomes of these studies and describe the resulting updates to the Proposal description.

2.1 Changes to mine site design

Section 2.3 of the Referral Report described the Proposal's key physical components, including infrastructure and major equipment. Building on this, the design has been refined to optimise mine layout, improve constructability, and incorporate updated technical inputs.

Since submission, revisions have been made to the proposed surface infrastructure, including updates to the conceptual site layout and the design of the underground mine access.

The updated design has been informed by:

- an updated groundwater model (refining groundwater ingress predictions)
- supplementary groundwater and surface water management investigations
- constructability and logistical considerations.

These updates have resulted in the following key changes:

- Replacement of the proposed box cut and portal with a cut-and-cover tunnel, reducing the disturbance associated with mine access infrastructure and providing a preferred method for underground access.
- Refinement of the site layout and infrastructure configuration (refer to Table 2-1 and Table 2-2), including adjustments to the location, size and arrangement of key proposal infrastructure. This includes consolidation of waste rock storage areas, relocation of processing infrastructure and minor changes to access roads and supporting facilities.
- Revision of the water management system, including updated water storage locations, capacities and construction sequencing based on detailed water balance modelling. These refinements increase the total water storage capacity from approximately 300 ML to 775 ML and optimise management of mine-affected, sediment-laden and raw water.
- The overall site infrastructure footprint has increased from approximately 45.4 ha to 64.3 ha (an increase of 18.9 ha). The increase is primarily associated with the revised water management

[1] *Available on the NT EPA website at https://ntepa.nt.gov.au/your-business/public-registers/environmental-impact-assessments-register/assessments-in-progress-register/lei-lithium-project*

system and redistribution of infrastructure. The total proposed disturbance footprint remains within the clearing envelope assessed in the Referral Report (<100 ha).

- Identification and assessment of a preferred site access option to provide safe and efficient connectivity to the existing road network, which is being progressed in consultation with relevant NT Government departments (refer to Section 2.1.1).

Figure 2-1 provides regional context for the Proposal, showing its location within the Darwin region, and in relation to other lithium mining developments with environmental approvals.

Figure 2-2 shows the updated mine site layout, including the previously proposed 100 m wildlife corridor and 250 m Charlotte River buffer.

Table 2-1. Summary of changes to key proposal features

Aspect	Component	Referral details	Change details
Project area	Proposed disturbance footprint	Preliminary site design allows for disturbance footprint of less than 100 ha.	The boundary has been slightly modified. However, there is no impact on the wildlife corridor or Charlotte River buffer. The total disturbance area remains under 100 ha.
Schedule	Construction Phase	12 months.	**No change**
	Operations Phase	68 months.	
	Closure Phase	6 months of reinstatement works plus ongoing monitoring until requirements for relinquishment of lease are met.	
	Total Life of Mine (LOM)	86 months (~ 7 years).	
	Operating hours	24 hrs/day, 7 days/week.	
Resource	Target commodity	Spodumene.	**No change**
	Total Resource Recovery	3.10 million tonnes (Mt).	
Mining	Mining Depth	Approximately 700 m below surface.	**No change**
	Mining Methods	Underground; sublevel open stope with pillar or paste fill; drill and blast.	**Methodology confirmed.** Sublevel open stoping with pillar fill only; no paste-fill plant forms part of the Proposal. The mining method of underground with drill and blasting methods are still proposed.
	Ore production	Up to 600 kt/ore processed per annum. 3.10 Mt over LOM at 1.43% LiO_2.	**No change**
	Waste rock production	1.53 Mt over LOM	**No change**
Waste Rock Management	Geochemical characteristics	Low risk of Acid Metalliferous Drainage (AMD) and Neutral Metalliferous Drainage (NMD) from waste rock and ore.	**No change** An updated summary of geochemical characteristics is provided in Section 2.4.
	LWD1 (Lei waste dump)	LWD1 will temporarily store weathered waste rock material from box cut, prior to being used as backfill.	**Location change.**

Aspect	Component	Referral details	Change details
	LWD2 (Lei waste dump)	LWD2 will temporarily store transitional and fresh waste rock material from the underground mine, which will be backfilled on closure.	One consolidated temporary waste dump will be used.
Processing	Primary Ore	Direct shipped ore (DSO) product: crushed/screened and loaded straight to road trains for shipping to the Port facilities. No processing and tailings will occur on site.	**No change**
Water Management	Demand	Construction: ~300 ML across one dry season (currently targeted 2026). Operations: ~150 ML per annum for surface operations (crushing, dust suppression). Underground operations ~132 ML per annum.	**Scheduling change, a reduction in surface water usage,an increase in underground water usage and a minor increase in total operational water demand.** • Construction: ~300 ML across one dry season (now targeted 2027). • Operations: ~ 85 ML per annum for surface operations (crushing, dust suppression). • Underground operations ~ 221 ML per annum. This represents a minor increase in total operational water demand from approximately 282 ML/year reported in the Referral Report to approximately 306 ML/year in the updated design. The predictive site water balance is included in the WMP provided at Appendix A.
	Sources	Potable water will be trucked from nearby town water supply for human consumption. Clean surface water runoff and incidental rainfall will be captured in a Raw Water Dam (RWD) for operational use. Stormwater runoff and mine affected water will be captured and treated (as required) in two Mine Water Dams (MWD) and one Sediment Dam.	**No change to water sources.** However, storage dam sizes have changed. Revised sizes are set out below under the heading "Internal Water Storage Capacity".

Aspect	Component	Referral details	Change details
	Internal water storage capacity	Four water dams will be located across the site with the following preliminary capacity (WRM, 2024): A RWD (180 ML) to collect clean, localised stormwater runoff from the eastern portion of the Project area. MWD1 (100 ML) which collects mine affected runoff from the ROM pad, ore handling areas and the workshop area, and underground workings. MWD2 (10 ML) which collects mine affected runoff from the waste dump areas. SD1 (10 ML) which collects mine affected runoff from disturbed areas in the southwestern portion of the lease area.	Across the site, the total number of dams has reduced to three water dams to be constructed initially, with MWD2 potentially required from Year 4. While the number of water storages has reduced, revisions to the site water balance and updated groundwater inflow estimates have increased the total storage capacity from approximately 300 ML in the Referral Report to approximately 755 ML. The additional storage capacity provides greater flexibility for managing groundwater inflows, surplus mine water and operational water inventories throughout the LOM. **Raw Water Dam (RWD): initially, RWD will be designed to a capacity of 160 ML** to collect clean, localised stormwater runoff from the eastern portion of the Project area. If required, around year 4, the RWD dam will be split to allow for 80 ML of this capacity to hold mine affected water, the remaining 80 ML will be retained for raw water. **Mine Water Dam 1 (MWD1) has been increased to 250 ML**. It will collect runoff from the waste rock stockpile, ROM pad, ore handling and stockpile pad, and workshop pad, and store water pumped from the underground mine. **Mine Water Dam 2 (MWD2) has been revised to an increased capacity of 80 ML** Based on current water balance modelling assumptions, MWD2 will be required around year 4. However, the size, timing and need for MWD2 will be reassessed when actual data, such as groundwater inflows to the underground mine, are known. **Sediment Dam (SD1) increased in capacity to 265 ML,** split between a stilling basin of 60 ML and a main basin of 205 ML. Water will be transferred between the RWD and SD1 in accordance with the Water Management Plan (WMP).
	Controlled release (discharges)	Water balance modelling undertaken for median climatic conditions (WRM, 2024 – Appendix I of Referral Report) indicates that controlled release of excess water from Mine Water Dam 1 (MWD1) to the Charlotte River during the wet season, at 10 ML/d when the MWD1 volume exceeds its Maximum Operating Volume is 117 ML (based on no groundwater inflow scenario) and 142 ML (groundwater inflow scenario of 0.25 ML/d).	**Updated information** The water balance has been refined through updated groundwater inflow estimates and detailed operational water-balance modelling. This modelling predicts substantially higher groundwater inflows to the mine water management system, increasing from approximately 194 ML/year in Year 2 to 465 ML/year by Years 6 and 7. As a result, the predicted volume of controlled releases from MWD1 has increased from the 117–142 ML/year estimated in the Referral Report to approximately 298–472 ML/year during operations (WRM 2026b). Further details of the site water balance and predicted controlled releases are provided in the WMP at Appendix A).

Aspect	Component	Referral details	Change details
		Passive overflows of clean water from the RWD to the Charlotte River during the wet season, is 240 ML, and based on modelling undertaken for median climatic conditions (WRM, 2024). Subject to granting of a Waste Discharge Licence (WDL) under the *NT Water Act 1992* (noting that under the NT mining reforms the assessment of mine water management and proposed discharges is integrated into the Environmental (Mining) Licence (EML) framework and conditioned under the approved EML).	While these changes represent a refinement to the proposed water management approach, they do not alter the assessed impact pathways or the overall environmental outcomes of the Proposal. Potential impacts associated with water storage, surplus water management and controlled releases have been reassessed using updated water quality predictions and water quality modelling. The outcomes of these assessments are presented in the Hydrological Processes assessment (Section 7.5) and the Inland Water Environmental Quality assessment (Section 8.5). As a result of the above, additional mitigation and management measures have been incorporated in the site water management system; a summary of this is provided in Section 2.1.1.
	Options to supplement water demands in the dry season	Outcomes of the preliminary water balance (WRM, 2024 – Appendix I of Referral Report) indicate that the proposed water management infrastructure can supply the estimated site demands under median climatic conditions, based on collection of stormwater runoff from within the Project area. A small shortfall in meeting demands (27 ML) occurs under dry conditions (10 %ile) based on no groundwater inflow scenario. A 2 ML shortfall is modelled for dry conditions (10 %ile) based on 3 L/s (0.25 ML/d or 91 ML/yr) groundwater inflow scenario. Options to supplement water demands in the dry season will be considered in the final surface water assessment (if required), and may include: • surface water extraction from existing nearby water storages and/or waterways (subject to granting of a Surface Water Extraction Licence under the Water Act) • groundwater extraction and bores (subject to granting of a Groundwater Extraction Licence under the Water Act); and/or • yield additional water from catchment runoff from within the mine lease.	The water balance has been refined through updated groundwater inflow estimates and detailed operational water-balance modelling. This modelling predicts a substantial reduction in predicted water supply shortfalls during operations. Sufficient water is predicted to be available to meet operational demands from Year 2 onwards under median climatic conditions. Under very dry conditions, a minor operational shortfall of up to 6 ML is predicted in Year 2 only, with no operational shortfalls predicted for the remainder of the LOM. External water supply may be required primarily during construction, as a shortfall of 103 ML (median climatic conditions) to 146 ML (very dry climatic conditions) is predicted. LPM confirms that: • Operational water demands are proposed to be met through capture, storage and reuse of water generated within the site water management system. LPM will prioritise the construction of the RWD, SD1, and temporary construction dams (preferably before the wet season) to supply water during the construction phase. • Groundwater extraction from production bores is not proposed for operations, extraction may be considered required during the construction phase and subject to granting of a Groundwater Extraction Licence under the Water Act. • Surface water extraction from external storages, including Observation Hill Dam, is not proposed.

Aspect	Component	Referral details	Change details
Power Supply	Power supply to mining operations	Options to connect to the external power grid, on-site generation, and renewable energy are being investigated. The Power and Water Corporation (PWC) is currently assessing external network capacity to provide power to the site. Alternatively, on-site generation via diesel-powered units as either a primary source or emergency backup is being considered. An on-site solar / battery plant will provide low-voltage power requirements to administration, lighting, and water plants. It is anticipated that the fuel requirement for the diesel-powered generators will be 605 kL per year. In addition, the mining fleet is forecast to require approximately 16,800 kL over the life of the mine; the bulk of this (over 75%) will be required during the first 12 months. An energy options analysis will be undertaken during 2025 to inform further environmental assessment.	**Updated information.** Energy options were considered during the surface infrastructure concept design phase. The preferred method for supplying power to the site would be from an external supply. However, the existing network running past the Proposal area does not currently have sufficient capacity to service the Proposal Accordingly, the current power supply plan is for on-site diesel generation, with power lines distributing power across the mine, augmented by a solar farm supplying power to the administration offices. This plan may change if the external network's capacity is increased to meet the mine's power supply requirements. (Note: the Belyuen Community Council has expressed interest in developing a solar farm and battery storage facility to supply power to its community and to supply the mine.)
Emissions	Dust emissions	Air quality impacts from dust particles largely produced from land clearing, construction, mining, crushing and screening and haulage/traffic activities. Dust will be managed using water for dust suppression activities.	**No change**
	GHG emissions	Exhaust emissions will be produced from plant and equipment and diesel generators and pumps. Given the Project is relatively small-scale and limited duration, the emission levels are not anticipated to be a magnitude that would cause any measurable changes in air quality beyond the mine site. The energy options analysis will include an GHG emissions assessment and development of mitigation measures as required.	**No change**

Aspect	Component	Referral details	Change details
Waste	Non-mineral	There will be no landfill onsite. LPM is committed to avoid, reduce, reuse and recycle material where possible. All waste will be segregated into skip bins and removed from the Project area by a licenced waste management contractor to be recycled where possible (i.e., packaging, metals, wood, tyres, batteries etc.). Hazardous wastes that cannot be recycled will be segregated, appropriately stored and collected by a licenced waste contractor to be disposed of at a waste facility in Darwin regional area accordingly.	**No change**
Hazardous substances	Hydrocarbons	Maximum quantity fuel stored on site will be 220,000 L (2x 110,000 L above ground, self-bunded fuel storage tanks) and ~10,000 L (maximum) bunded storage facilities for greases, oils and lubricants.	**No change**
	Oxygen and Acetylene	~ 63 m^3 oxygen and ~ 63 m^3 Acetylene stored in accordance with manufacturers specifications.	
	Chemicals	Provision of ~500 L for miscellaneous chemicals for cleaning and maintenance that will be stored in accordance with manufacturers specifications.	
	Ammonium Nitrate	Magazine located on site for storage of explosives (Ammonium Nitrate Fuel Oil - ANFO) for blasting. Estimated storage onsite based on a weekly delivery: 35 - 40 t explosive 4000 - 5000 detonators.	
Roads and Traffic	Product Transport	Quad road trains will transport product from site to Darwin Port via Fog Bay Road, Cox Peninsula Road and Stuart Highway; 13-18 return trips/day during peak production.	**No change**
Workforce	Construction	~60 personnel.	**No change**
	Operations	~80 to 100 personnel.	

Aspect	Component	Referral details	Change details
Mine Closure	Infrastructure	Removed from site on completion of mining.	**No change**
	Backfilling	Waste rock material will be backfilled to box cut and underground voids.	**Scheduling and design change** Changing mine access from a box-cut and portal to a cut-and-cover tunnel will affect the bulk materials management plan. However, the approach to backfilling over the mine entry structure and placing mine waste underground remains unchanged.
	Plugging	Box cut portal and shaft vents plugged with concrete.	**Design change** The box-cut portal will now be the cut-and-cover tunnel entrance.
	Rehabilitation	Site stabilised and revegetated with native species.	**No change**

Table 2-2. Summary of changes to key proposal infrastructure

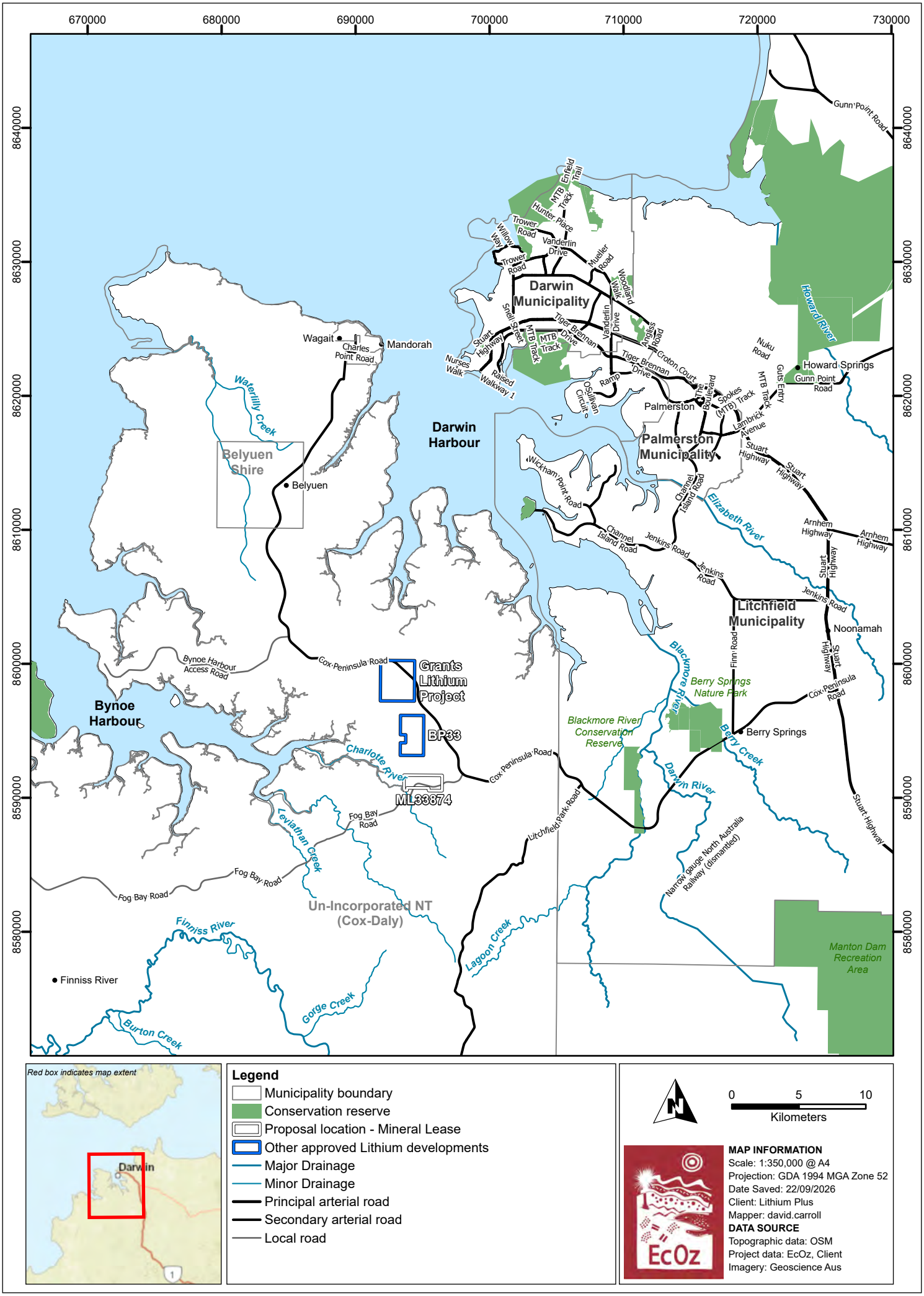
Component	Referral details	Referral approximate area / capacity	Change details	Change approximate area / capacity
Topsoil stockpiles	Topsoil will be stockpiled upon clearing. The top 100-200 mm will be scraped and stockpiled during clearing activities from the disturbance area. Topsoil stockpiles are proposed to be located adjacent to the waste dump, ROM pad and south of the box cut. Stockpiles are not proposed to be more than 2 m in height.	3.5 ha	**Location and size change**. 6 x topsoil stockpile locations have been placed around the mine site.	11 ha
Box cut	A surface box cut will be constructed to 50 m depth to gain access to geotechnical stable fresh material for construction of the portal and underground decline. A safety bund will be constructed around the perimeter of the box cut to prevent surface water from ingress into the box cut and restrict access. The bund will be constructed in accordance with relevant guidelines. Sump, pump and pipeline network will be constructed in the base of the box cut for dewatering of rainfall and groundwater inflows. The water intercepted will be retained on-site within the MWD1 for dust suppression use.	3.1 ha	**Design change** **A cut-and-cover tunnel** is preferred for accessing the underground decline. It requires a smaller disturbance area than a box cut and portal. A trench approximately 40 m deep will be excavated to install a reinforced concrete tunnel, then backfilled to the existing ground level. Subject to the bulk materials movement plan, excavated material will be reused as bulk fill for pads or roads and to backfill over the tunnel during construction. The disturbed area above the tunnel will be used as a planned rehabilitation trial area.	1.4 ha

Component	Referral details	Referral approximate area / capacity	Change details	Change approximate area / capacity
Portal and decline	A portal (underground entrance) will be constructed within the box cut and a spiralling decline developed between the two pegmatite bodies with long hole open stoping methods to access the ore. The total depth of the underground workings is 700 m. Preliminary designs include production levels, with each level having stope access, sump/drainage, ventilation network and a turning/stockpile bay. Water from the underground sumps will be pumped into the box cut sump to be dewatered to MWD1 for reuse.	N/A	**No change,** except there's no portal with a cut-and-cover tunnel. Entry to the underground mine is via the tunnel entry.	N/A
Underground services (including power station and backup generator	Ventilation and return air raise (RAR) will be developed to provide fresh air circulation throughout the underground. Mine air water, power station and backup generator will be located adjacent to the box cut.	1.3 ha	**Minor size change.**	1.5 ha
Run of mine pad (ROM)	A ROM pad will be constructed north of the box cut for the temporary stockpiling of ore prior to be crushed and screened. The ROM pad will have the capacity to stockpile 110,000 t of ore. The pad will be raised with oxide material from the construction of the box cut, requiring 220,000 t of material. Drainage will be directed to MWD1.	3 ha	**Location change and minor size change.** The ROM pad will be located east of the cut-and-cover tunnel, adjacent to the crushing and screening area to the north. The ROM pad will be raised 6 m above the crusher pad using material excavated for the cut-and-cover tunnel. This level difference will allow ore to be tipped directly from the ROM pad into the crusher. ROM pad capacity remains unchanged. Drainage will be directed to the revised, larger MWD1.	2.7 ha
Crushing, screening and road train loading area	Ore placed on the ROM pad will be crushed and screened in the area located adjacent to the ROM pad, prior to the crushed and screened ore being loaded into the haul trucks for transport to the Darwin Port. Drainage will be directed to MWD1.	5.7 ha	**Location change and size change.** The crushing, screening and road train loading area moved north of the ROM pad. Drainage will be directed to the now consolidated MWD.	11.2 ha

Component	Referral details	Referral approximate area / capacity	Change details	Change approximate area / capacity
Workshop and fuel bay	A workshop will be centrally located between the mining area and the administration area. Two fuel storage/refuelling areas are proposed, one for light vehicles and the other for heavy vehicles. Fuel storage and maintenance areas will be bunded with drainage directed to a sump for storage, and maintenance areas will be bunded with drainage directed to a sump for the removal of hydrocarbons.	2.3 ha	**No change, size incorporated into the Crushing, screening and road train loading area.**	
Road train assembly area	Area for assembly of road trains prior to loading of ore.	1.5 ha	**No change.**	1.5 ha
Waste dumps (WDs)	There will be two temporary waste dumps, one for the oxide waste rock from the surface box cut (LWD1) and the other for the fresh waste rock from the underground decline development (LWD2). The mine will be waste negative, and the material will be backfilled underground (fresh waste) and the box cut with the oxide waste on closure. The volume of waste rock for LWD1 is ~400 kt. The volume of waste rock for LWD2 is ~1,130 kt. The oxide waste from the box cut may also be used construction of surface works such as the box cut safety bund, raising of the ROM pad, RWD wall (the latter pending suitability from geotechnical assessment). The waste dumps are located north of the box cut.	4.3 ha	**Location change.** One consolidated temporary waste dump will be used. The waste rock from the excavation for the cut-and-cover tunnel (~400kt) will be used as bulk fill for pads, roads, and to backfill the tunnel once it's installed. The fresh waste rock from the underground decline and development will be stored at the waste rock dump until it's backfilled to the underground mine. The volume of fresh waste rock is ~1,130 kt. The mine will remain waste negative.	3.6 ha
Access roads and internal haul roads	There will be access roads for light vehicles (LV) and wider haul roads for heavy vehicles (HV). These roads will vary in width based on type of machinery that will primarily utilise the roadway. The haul road will be directly from the ROM pad to the internal Fog Bay access road. LV access roads will be 20 m wide and a network of approximately 1.61 km. HV access roads will be 30 m wide and approximately 1.70 km.	7 ha	**Minor footprint changes in the location of access roads.** A 25 m setback is generally provided between infrastructure and the boundary to allow, where required, for a fire track, a cleared-material windrow, and construction access. The sedimentation dam embankment is less than 25 m from the wildlife corridor; however, a fire track can still be provided, and construction access can be managed in this area.	5.2 ha

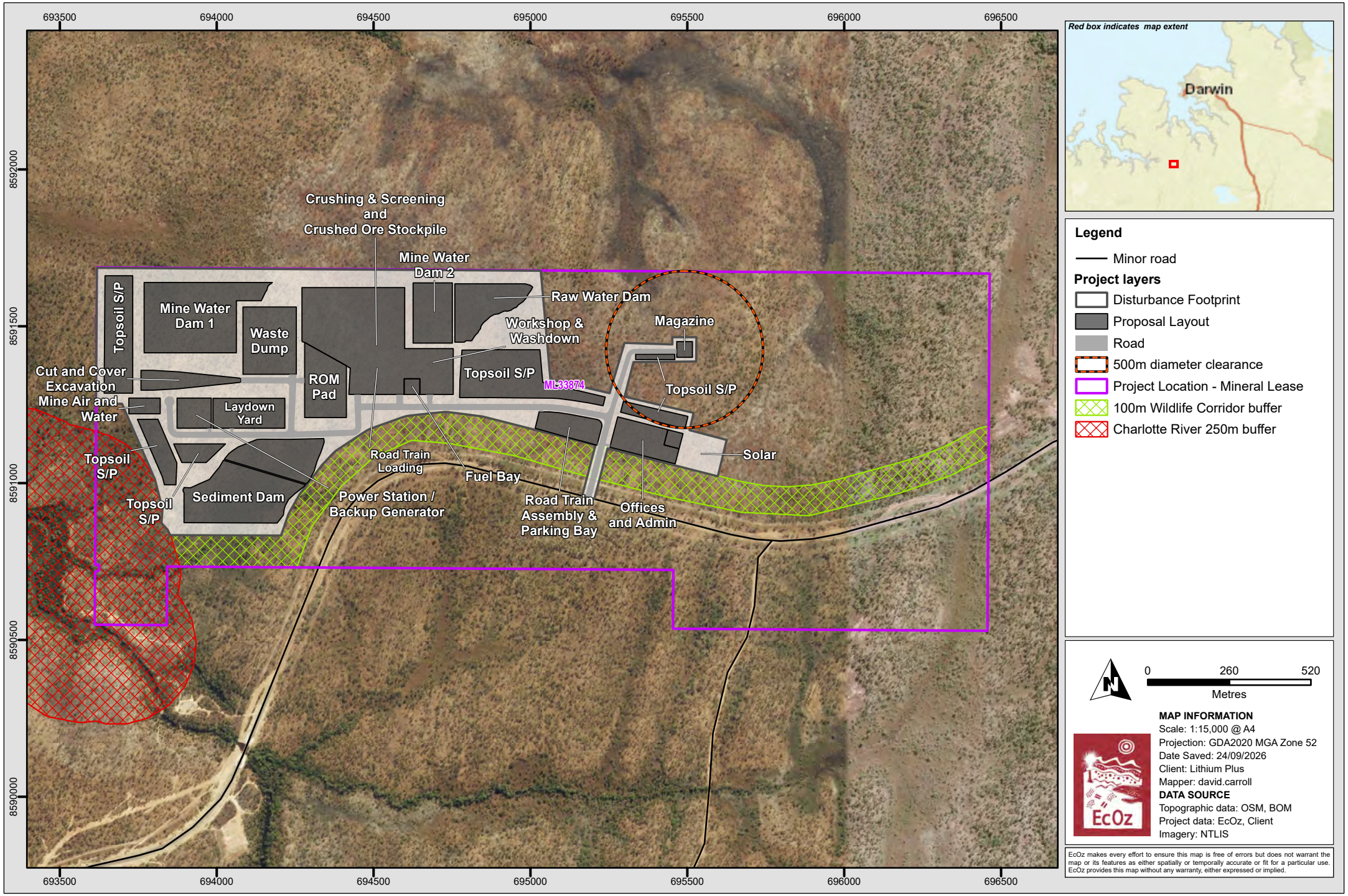
Component	Referral details	Referral approximate area / capacity	Change details	Change approximate area / capacity
Administration offices and employee facilities (inclusive of water storage)	Employee facilities will include office buildings, crib rooms, ablution/change rooms, gatehouse, located near the entrance of the mine adjacent to Fog Bay Road. Wastewater from ablutions will be directed to a septic system designed and constructed in accordance with the Code of Practice for Wastewater Management (Department of Health, 2020).	2 ha	**Minor size change.** The potable water storage will be managed within the administration office area.	2.2 ha
Solar plant	Located next to the administration facility to provide low-voltage power requirements to administration, lighting, and water plants.	1.4 ha	**Minor size change.**	1.0 ha
Laydown and storage areas	Storage for portable mine infrastructure and plant to go underground. A laydown and storage area will be located south of the box cut.	2 ha	**Location change and minor size change.** Minor location change with the laydown and storage area directly south of the cut-and-cover tunnel.	2.2 ha
Water management systems	The preliminary surface water assessment (WRM, 2024 Appendix I of the Referral Report) undertaken to inform the preliminary mine design provides the following water management system requirements: A RWD (3.6 ha) will be used as a mine water supply (with backup supply from MWD1). MWD1 (2 ha) will contain the mine water dewatered from the underground and box cut. The water, once settled, will be reused for surface water demands, including dust suppression activities. MWD2 (0.2 ha) and SD1 (2 ha) will be dewatered to MWD1 if MWD1 is below its maximum operating volume. A pump transfer rate of 4 ML/d for all pumped transfers, except transferring from MWD2 to MWD1 which is 10 ML/d was used in the preliminary water balance. A water storage tank for use in office region within a 0.25 ha area. Pending mine water quality, water treatment may be required to ensure water reuse or discharge to environment is in accordance with required Australian and New Zealand	8 ha Total 300 ML	**Location changes and refined sizing within the existing overall disturbance footprint.** Water storages have been revised, including updated locations, capacities and construction timing. Revisions are based on updated water balance modelling set out in the Surface Water Assessment in Appendix H. An updated mine design is provided at Figure 2-2, and the updated water management system is summarised in Section 2.2.	RWD 2.8 ha MWD1 7.1 ha MWD2 2.4 ha SD1 8.2 ha Total 20.5 ha Total 775 ML

Component	Referral details	Referral approximate area / capacity	Change details	Change approximate area / capacity
	Guidelines for Fresh and Marine Water Quality (ANZG, 2018) water quality guidelines. Drainage lines and sediment basins will be installed across the site to manage sedimentation and surface water runoff in disturbed areas. Final location, sizing and type of sediment basin will be determined through the preparation of an erosion and sediment control plan (ESCP), certified by a certified practitioner in erosion and sediment control (CPESC). The water balance and water management system will be refined following detailed mine design.			
Magazine (explosives storage)	The explosive magazine has been positioned to maintain a minimum separation distance of 500 m from the mine administration area and Fog Bay Road. The compound design will comply with Australian Standard AS2187 Explosives – Storage, transport and use.	0.3 ha	**No change**	0.3 ha
Site layout disturbance area		**45.4 ha**		**64.3 ha**
Total proposed disturbance footprint		**<100 ha**		



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Figure 2-1. Regional context of the Proposal



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Figure 2-2. Detailed mine design update

2.1.1 Site access assessment

The Referral Report identified Fog Bay Road as the proposed access route but did not include a detailed assessment of the site access arrangement. Since submission, GHD has completed a site access assessment as part of a Traffic Impact Assessment (TIA), which evaluated the suitability of a new intersection on Fog Bay Road to provide access to the Proposal.

The assessment was undertaken to identify a safe, efficient and compliant access arrangement for both light and heavy vehicles associated with the Proposal, including buses, service vehicles, semi-trailers and quad road trains. It considered existing road conditions and traffic volumes, the function of the surrounding road network, projected traffic associated with the Proposal, and the operational requirements of vehicles accessing the mine.

Consistent with relevant Austroads guidance, the assessment evaluated:

- safe intersection sight distance (SISD)
- stopping sight distance (SSD)
- approach sight distance (ASD)
- the suitability of the road geometry for light and heavy vehicle turning movements
- forecast traffic volumes and intersection performance
- the need for dedicated turning treatments at the proposed access.

The assessment found that the proposed access location on Fog Bay Road provides adequate sight distances for both light and heavy vehicles. Fog Bay Road is straight through the assessment area, generally flat, and free of significant sightline obstructions, making the location suitable for a new site access intersection. A preferred access location has therefore been identified (refer to Figure 2-3).

A turn lane warrant assessment was also undertaken to determine the appropriate intersection treatment. Based on forecast traffic volumes and turning movements associated with the Proposal, the TIA recommends a Basic Right-turn (BAR) treatment and a Basic Left-turn (BAL) treatment at the proposed Fog Bay Road/site access intersection to support safe and efficient operation of the road network.

Further details of the assessment are provided in Section 5.2 of Appendix B.

Detailed access design will be developed during subsequent project design phases in consultation with the Department of Logistics and Infrastructure (DLI). This will include confirmation of intersection geometry, sight distance requirements, turning treatments and any associated road upgrades, in accordance with Northern Territory Government requirements and approval processes.

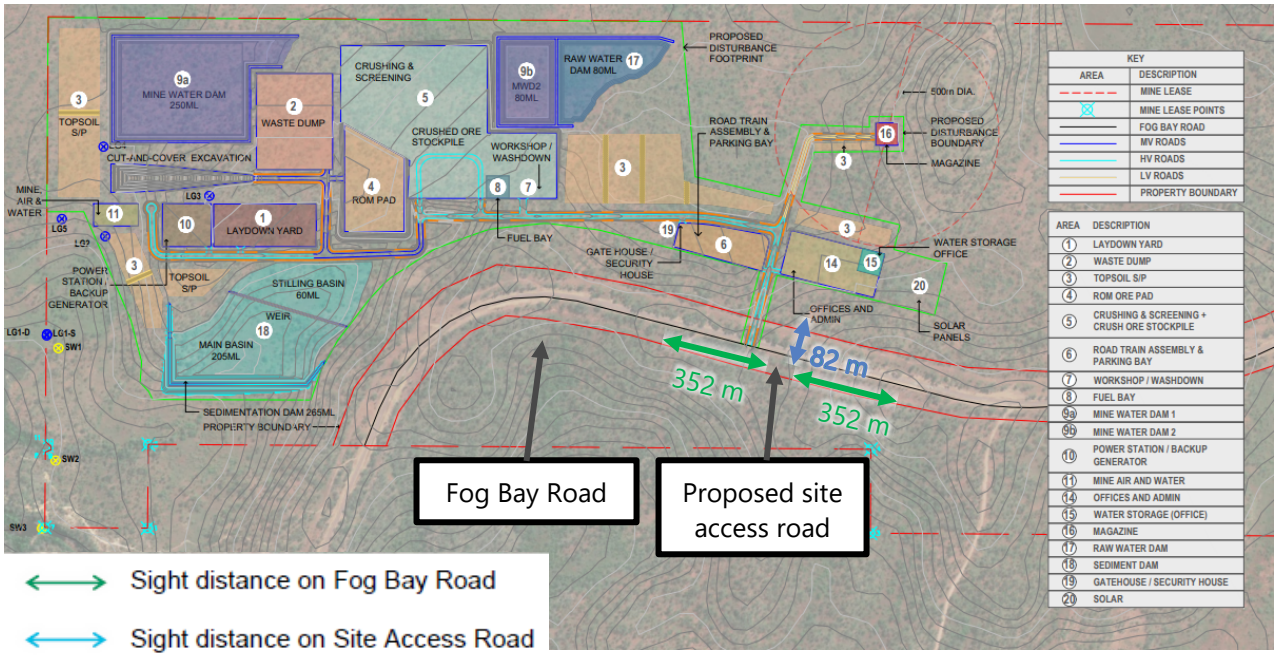


Figure 2-3. Proposed site access road and sight distance minimum requirements.

2.2 Site water management system

A comprehensive site water management system has been developed to support both construction and operations and has been informed by a suite of technical investigations including groundwater assessments, surface water assessments, baseline water quality monitoring and integrated water balance modelling. These investigations have been used to understand surface water processes, groundwater inflows, operational water demands, storage requirements and water movement through the site over the life of the Proposal. Further details of the water management system are provided in the WMP provided at Appendix A. A summary of the site water management system is provided below.

The Proposal adopts a risk-based water management system designed to segregate, capture, store, reuse and, where necessary, discharge water in a controlled manner. The general site water management principles include the following:

- Achieving the fullest separation of raw water, sediment water and mine-affected water runoff as far as reasonably practicable.
- Reducing the area of disturbance and therefore minimising the generation of sediment-laden and mine-affected runoff.
- Collecting and containing all potential mine-affected water within dedicated mine water storages.
- Managing runoff from disturbed areas through sediment control measures prior to release.
- Maximising reuse of site water to meet operational demands and minimise mine water inventories.
- Prioritising the use of lower quality water before higher quality water where practicable.
- Managing any mine water discharges in accordance with a with the EML, including compliance with approved discharge criteria, monitoring requirements and adaptive management measures.

The water management system is supported by diversion drains or bunds, sediment control infrastructure, underground dewatering systems, transfer pumps, monitoring programs and Trigger Action Response Plans

(TARPs). Groundwater inflows intercepted during underground mining would be collected and transferred to mine water storages for reuse and management.

In terms of the operational demand hierarchy, the Proposal would use the following water in order of priority:

1. Mine-affected water (first priority).
2. Sediment water.
3. Raw water.
4. External water sources, if required.

A schematic of the Lei Lithium water management system is provided at Figure 2-4, and details of the proposed water management systems operating rules are provided in Table 4-2 of the WMP (refer to Appendix A).

Relative to the Referral Report, the water management system has been refined through completion of groundwater investigations, surface water studies and integrated site water balance modelling. These investigations have informed revisions to water storage locations, capacities and operating arrangements, as well as the development of formal operating rules, monitoring requirements and water inventory management measures. The updated modelling incorporates revised groundwater inflow estimates and predicts higher controlled release volumes than previously assessed; however, no uncontrolled overflows from mine water storages are predicted over the LOM. This demonstrates that the revised water management approach can accommodate increased groundwater inflows while maintaining effective management of surplus water. Consistent with the refined design, three of the four proposed water storages are planned to be built during the construction phase, with Mine Water Dam 2 (MWD2) to be constructed around Year 4 to provide additional mine water storage capacity, subject to revised water balance modelling using known usage and groundwater inflow rates. Details of changes to the water management infrastructure since the referral are provided in Table 2-2.

2.2.1 Consideration of stakeholder feedback

During the referral consultation on the Proposal, the Environment Centre NT (ECNT) raised concerns regarding potential supplementary water sources, including groundwater extraction, surface water extraction and harvesting of additional catchment runoff, and noted that any future reliance on these sources would require appropriate assessment. The ECNT also noted that the Proposal's reliance on groundwater warranted a greater degree of assessment than projects that relied primarily on existing surface water storages. These matters were considered during development of the water management system and WMP through the completion of groundwater investigations, surface water assessments and integrated site water balance modelling. The outcomes of these investigations informed the design of a water management system focused on capturing, storing and reusing of water generated by site activities.

2.2.2 Knowledge gaps, uncertainties and approach to address

Consistent with the current stage of Proposal design, several aspects of the water management system remain subject to refinement as additional operational data becomes available. Section 9 of the WMP identifies these knowledge gaps and uncertainties and outlines the investigations, monitoring and adaptive management measures that will be used to address them (refer to Appendix A). Table 2-3 provides a summary of the key knowledge gaps and uncertainties associated with the WMS, the current design assumptions, the potential range or extent considered, and the proposed approach to resolving each uncertainty.

Consistent with the precautionary and adaptive management approach adopted for the Proposal, key uncertainties have been identified and incorporated into the design of the water management system and associated monitoring programs.

Table 2-3. Summary of knowledge gaps, uncertainties and approach to address – water management system

Aspect	Uncertainty / Knowledge Gap	Current Assumption / Design Basis	Potential Range or Maximum Extent Considered	Approach to address
Groundwater inflows	Actual groundwater inflows may differ from predictive groundwater modelling once underground mining commences.	Groundwater inflows are based on predictive groundwater modelling and incorporated into the site water balance.	Higher or lower groundwater inflows than forecast may occur during operations, affecting water inventories and storage requirements.	Ongoing monitoring of groundwater inflows, water inventories and water balance performance. Operational controls and adaptive management measures will be reviewed and updated based on observed inflows.
Mine water storage requirements	Additional storage capacity may be required if groundwater inflows exceed forecast volumes.	MWD1 is proposed as the primary mine water storage and MWD2 as a contingency storage.	MWD2 has a proposed capacity of 80 ML and represents the currently assessed contingency mine water storage.	Review actual groundwater inflows and storage inventories during operations and update water balance modelling as required.
Surplus water management	The volume of surplus mine water generated during operations is subject to uncertainty due to variability in groundwater inflows, rainfall and operational water demands.	Surplus water is proposed to be managed through reuse, storage within MWD1 and MWD2 and controlled release in accordance with the conditions of the EML, where required.	Contingency measures identified in the WMP include additional storage capacity, water treatment, evaporation technologies, optimisation of water reuse opportunities and controlled discharge in accordance with the conditions of the EML.	Ongoing review of groundwater inflows, operational water demands and water balance modelling to determine whether contingency measures are required.
Water supply requirements	Future operational water demands may differ from current assumptions.	The water management system prioritises use of mine-affected water, sediment water and raw water prior to consideration of external supplies.	External water supplies remain available as a contingency option if operational demands exceed available onsite water resources.	Ongoing water accounting, monitoring of site water inventories and review of operational water requirements.
Water quality management and discharge	Mine water quality may vary from predicted conditions and influence reuse or discharge requirements.	Mine water is proposed to be managed through storage, reuse and controlled release in accordance with the conditions of the EML.	Additional treatment systems, modified storage arrangements or alternative water management measures may be required if water quality objectives cannot be achieved.	Ongoing water quality monitoring, compliance assessment and adaptive management. Any future discharge arrangements would remain subject to regulatory approvals, including an EML.

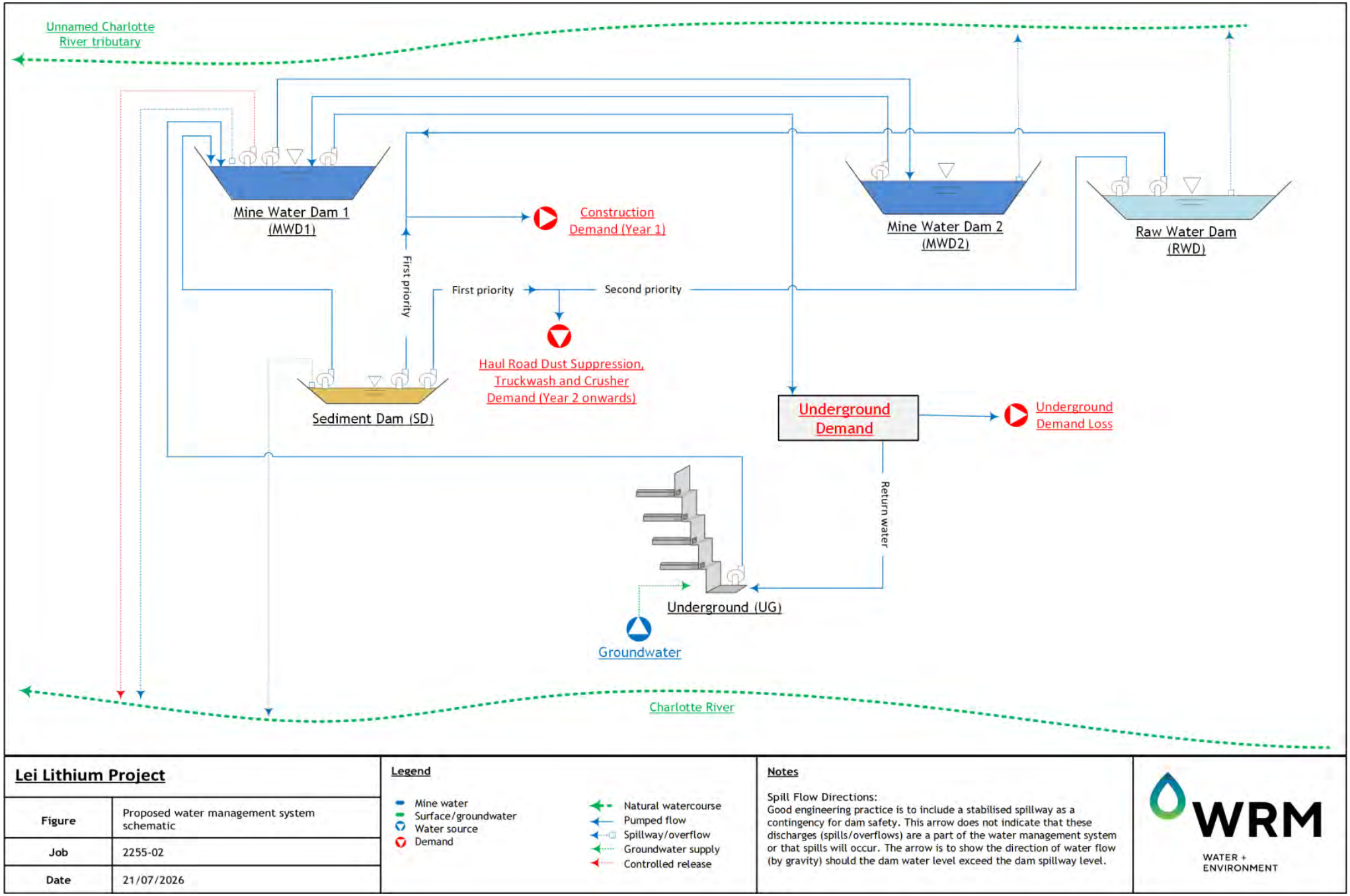


Figure 2-4 Proposed water management system schematic (WRM2026b)

2.3 Greenhouse gas assessment

The greenhouse gas (GHG) assessment, undertaken by Lifecycles, was prepared to support this document and respond to the Direction. The assessment quantified projected emissions and establishes the Proposal's GHG profile across its lifecycle. The assessment has been provided at Appendix C.

The assessment has been prepared in accordance with recognised frameworks, including the Greenhouse Gas Protocol and the National Greenhouse and Energy Reporting (NGER) Scheme, applying prescribed emission factors and calculation methodologies (refer to Appendix C.).

An operational control approach was adopted to define the assessment boundary, capturing all relevant Scope 1 emission sources, including:

- diesel combustion (mobile and stationary equipment)
- vegetation and soil clearing
- minor sources such as fertiliser application.

Scope 2 emissions were assessed but are not applicable, as the Proposal will not connect to the electricity grid at this time due to insufficient existing supply capacity. Emissions were estimated using:

- FullCAM for land clearing
- NGER Measurement Determination for fuel combustion.

The assessment covers all the Proposal phases—construction, operation and closure—providing a whole-of-life emissions profile.

The Proposal is estimated to generate approximately 101,878 tCO_2-e of Scope 1 emissions over its 8-year life (the 8th year is assumed for rehabilitation and closure in the assessment report), equating to an average annual emission of approximately 12,735 tCO_2-e. No Scope 2 emissions are expected due to reliance on on-site diesel power generation, which is accounted for in Scope 1 emissions.

Emissions are predominantly driven by diesel combustion, with land clearing contributing a one-off emission of approximately 13,911 tCO_2-e (around 14% of total emissions).

Annual Scope 1 emissions are not expected to exceed the 100,000 tCO_2-e threshold under the Safeguard Mechanism, and as such, mandatory offset requirements do not apply.

However, construction-phase emissions are predicted to exceed the 25,000 tCO_2-e NGER reporting threshold (estimated 46,781 tCO_2-e, excluding land clearing). LPM will monitor emissions and report under the NGER Scheme as required.

2.4 Geochemical characterisation

Geochemical characterisation of representative ore and waste rock materials undertaken by EGi (2024) identified that approximately 95% of samples had negligible sulphur contents and were classified as non-acid forming. One phyllite waste rock sample was classified as potentially acid forming (PAF) and two phyllite samples were classified as potentially acid forming with low acid-generating capacity (PAF-LC). Waste rock was also identified as being enriched in arsenic, beryllium, tin and tungsten relative to typical background soil concentrations.

During operations, any PAF and PAF-LC material encountered will be identified through geological and geochemical classification processes, segregated from non-acid-forming waste rock and managed in accordance with the mine waste management procedures. Any PAF and PAF-LC material encountered during

mining will be identified, segregated and preferentially returned underground as part of the backfilling program to minimise long-term oxidation and the potential for acid and metalliferous drainage generation.

2.5 Mine closure and rehabilitation

A Concept Mine Closure Plan (Concept MCP) has been prepared, having regard to the purpose of the environmental impact assessment process under section 42 of the *Environmental Protection Act 2019* (NT) and is generally consistent with the following guidelines:

- Cooperative Research Centre for Transformations in Mining Economies (CRC TiME) (2021), *Integrated Mine Transitions Framework*
- International Council on Mining and Metals (ICMM) (2019), *Integrated Mine Closure: Good Practice Guide* (2nd Edition)
- International Council on Mining and Metals (ICMM) (2020), *Key Performance Indicators Tool for Closure*
- Commonwealth of Australia (2016), *Mine Closure and Mine Rehabilitation: Leading Practice Sustainable Development Program for the Mining Industry*
- Department of Mines, Industry Regulation and Safety (DMIRS) (2020), *Mine Closure Plan Guidance: How to Prepare in Accordance with the Statutory Guidelines*.

The Concept MCP demonstrates that closure planning has been integrated into the design and assessment of the Proposal from an early stage and adopts a whole-of-life approach, whereby rehabilitation, monitoring, stakeholder engagement and closure planning will be progressively refined throughout the life of the mine.

The Proposal is a relatively small underground lithium mining operation with a disturbance footprint of less than 100 ha. Closure planning benefits from several design features that reduce long-term closure liabilities, including underground mining, the absence of a tailings storage facility, return of waste rock underground, and the absence of on-site chemical processing.

The closure objective is to achieve a safe, stable, non-polluting and self-sustaining post-mining landscape that supports agreed post-mining land uses and can ultimately be relinquished. The preferred post-mining land use is rehabilitation to a predominantly natural landscape that supports native vegetation, fauna habitat, cultural land-use activities, and conservation values consistent with the surrounding environment.

The conceptual closure strategy includes decommissioning and removal of infrastructure, closure of underground mine access points, rehabilitation and revegetation of disturbed land, management of residual mine water, and implementation of post-closure monitoring and adaptive management programs. Rehabilitation will be managed as a single rehabilitation domain, supported by targeted management of localised Rehabilitation Management Areas (RMAs) where required.

A conceptual final landform has been developed to achieve stable, free-draining and non-polluting conditions following closure. Preliminary completion criteria have been established for public safety, landform stability, water quality, groundwater recovery, revegetation success, infrastructure decommissioning and stakeholder outcomes, and will be progressively refined through operational experience, monitoring and stakeholder engagement.

Key closure risks include rehabilitation performance, landform stability and erosion, water quality, groundwater recovery, residual underground voids and climate change. These risks will be managed through progressive rehabilitation, implementation of the WMP, monitoring, adaptive management, ongoing stakeholder engagement and periodic review of closure objectives and completion criteria.

The Concept MCP provides a framework for closure implementation, care and maintenance, post-closure monitoring and financial provisioning, providing confidence that the Proposal can achieve.

The Concept Mine Closure Plan is provided in Appendix D.

3. ALTERNATIVES

3.1 Design Alternatives

Section 2.8 of the NT EPA Referral Report summarised the alternatives considered by LPM during concept design. Since then, the Proposal concept design has been developed, resulting in further evaluation of design alternatives, including their potential environmental benefits or impacts.

This section discusses:

- Design alternatives identified and evaluated by LPM since the referral submission
- Alternatives and design approaches raised by regulators and stakeholders during public exhibition and through the Direction.

3.1.1 Cut-and-cover tunnel

Since the submission of the Referral Report, access to the underground workings has been refined from an open box-cut and portal entry to a cut-and-cover tunnel. LPM assessed both access options to select an access arrangement that meets the Proposal's operational requirements while minimising environmental impacts.

The open box-cut and portal option would require significant excavation and stability management throughout the life-of-mine. It would also require substantial storage of groundwater and rainfall at the portal entry, with water pumped to a surface-water dam. By comparison, a cut-and-cover tunnel involves:

1. A significantly smaller excavation, with steeper sides, that only needs to remain stable during tunnel construction
2. Construction of a reinforced concrete tunnel from the surface level to the underground decline level.
3. Immediately backfilling above the tunnel to the natural surface level and rehabilitation of the disturbed area above the cut-and-cover tunnel.

The evaluation identified several environmental benefits associated with the cut-and-cover tunnel compared to the open box cut and portal option. By eliminating the permanent open excavation, the cut-and-cover tunnel reduces the surface water catchment area associated with the decline entry and limits the interaction between surface water and underground workings. This improves the separation of clean and mine-affected water and reduces the potential for water ingress into the underground mine.

The cut-and-cover tunnel also reduces the extent of permanent surface disturbance. After construction, the disturbed area above the tunnel can be shaped, topsoiled and used for rehabilitation trials, reducing the long-term disturbance footprint and supporting progressive rehabilitation.

Figure 3-1 is an overlay of the cut-and-cover tunnel and the box cut and portal entry designs. It illustrates the significantly larger excavation required for the box cut and portal option, which also requires a sump to store groundwater and rainfall runoff. However, the cut-and-cover tunnel requires the manufacture and installation of concrete segments to form the tunnel.

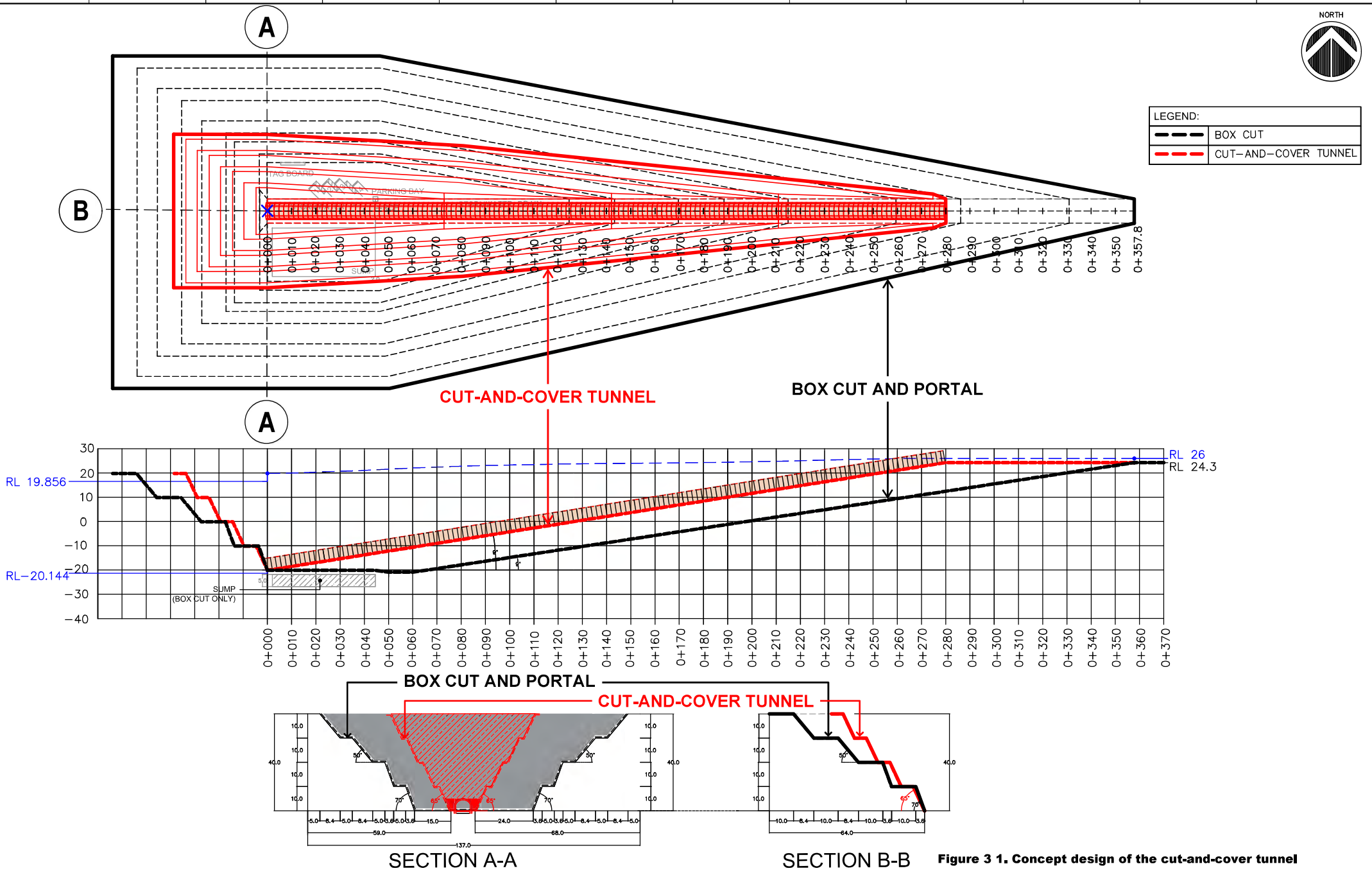


Figure 3 1. Concept design of the cut-and-cover tunnel

REVISION:	BY:	DATE:	DESCRIPTION:	APPROVED BY:
A	DVC	15/09/2026	INITIAL CONCEPT	PJH

projectick
creativity | rigour | confidence

THIS DRAWING IS FOR GENERAL INFORMATION AND GUIDANCE ONLY AND DOES NOT CONSTITUTE PROFESSIONAL ENGINEERING ADVICE.

Lithium PLUS MINERALS

PROJECT NAME:

LEI SURFACE INFRASTRUCTURE SCOPING STUDY

DRAWING TITLE: BOX CUT VS CUT-AND-COVER TUNNEL

SCALE: 1:2000	SHEET: A3	DRAWING NO. : J055.000.00.DWG.001	REVISION NO. : 0A

3.2 Consideration of alternatives raised

Submissions received during the public exhibition phase of the referral and in the Direction raised matters relating to the consideration of Proposal alternatives. These matters have been summarised and responded to in Table 3-1 below.

Table 3-1. Alternatives raised in submissions and Direction

Stakeholder	Alternatives raised	LPM's response and actions taken

Department of Lands Planning and Environment (DLPE) – Mining Division	The referral identified the use of Darwin Harbour Water Quality Objectives (DHWQO) priority water quality indicators, with baseline for nitrogen in groundwater underneath the site exceeding these values naturally. DLPE recommend waste discharge in accordance with DHWQO may not be achievable or not supported given the sensitive Charlotte River receptor and that alternative water management strategies or a combination of strategies need to be developed (e.g. irrigation to land and waste discharge) to demonstrate appropriate management of the water inventory.	The water management system has been refined since the Referral through completion of groundwater investigations, surface water assessments, water quality assessments and integrated site water balance modelling. These investigations informed development of the WMP (Appendix A), which adopts a hierarchical approach to water management based on capture, storage, reuse and controlled discharge.
		Water quality will be regularly monitored in accordance with the water quality monitoring programs in the WMP. This will provide early detection of any elevated contaminants from mining. TARPs will be implemented to identify any ongoing issues with regards to water quality on site and an investigation will be undertaken to identify the appropriate water treatment measure, if any elevated contaminants are identified.
		Alternative strategies may be required to be investigated, which include the following measures:
		• Water treatment measures to mitigate any high traces of toxicants in groundwater, which may include:
		  • Carbon filters for Iron;
		  • Phoslock for Total Phosphorus;
		  • Coagulating and Flocculating agents
		  • Reverse Osmosis treatment
		  • Resin filtration
		• Additional storage dams to manage excess water on site.
		• Evaporation fans to reduce the available water on site.
		A summary of the water management system is provided in Section 2.2 and further details are described in the WMP at Appendix A.

DLPE – Mining Division	The referral indicated the potential requirement for a paste-fill plant and ore sorting systems; however, it does not provide information for a tentative location. If a paste-plant is proposed, its location and the results of further geochemical testing is needed to inform assessment of the environmental risks of waste rock management and backfill activities.	LPM confirms that ore processing will not occur on site. Consequently, no tailings facility or paste-fill plant, form part of the current Proposal. No further assessment of these facilities has therefore been undertaken. Waste rock management has been assessed based on the currently proposed mining activities and available geochemical characterisation information. Should future Proposal design changes include processing infrastructure, further assessment and approvals would be required.

Stakeholder	Alternatives raised	LPM's response and actions taken
ECNT	The Referral Report identifies several potential supplementary water sources, including surface water extraction, groundwater extraction and additional runoff harvesting, but provides limited detail on their potential use. Should these options be pursued, their impacts would need to be assessed and supported by appropriate investigations. The Proposal's potential reliance on groundwater also warrants a greater level of assessment than mines that rely primarily on stored surface water.	LPM acknowledges that the Referral Report identified several potential options based on the information available at the time of referral. Subsequent design refinement and completion of groundwater investigations, water quality assessments and integrated site water balance have clarified the Proposal's water supply requirements and management approach. LPM confirms that: • Groundwater extraction from production bores is not proposed for operations, extraction may be considered required during the construction phase and subject to granting of a Groundwater Extraction Licence under the Water Act. • Surface water extraction from external storages, including Observation Hill Dam, is not proposed. • Operational water demands are proposed to be met through capture, storage and reuse of water generated within the site water management system. Rainfall runoff from the mine lease is collected in the RWD, SD1 and MWD1 and MWD2, while groundwater entering the underground mine is recovered through dewatering and stored in the mine water dams. These water sources are reused to supply operational requirements, including dust suppression, truck washdown and underground mining activities. The water balance assessment indicates that captured surface runoff and recovered mine water are generally sufficient to meet operational water demands throughout the mine life under average climatic conditions. Based on an average rainfall year the modelling predicts there will be a water supply shortfall of 103ML during the construction phase. To reduce this risk, construction the RWD and SD1 will be prioritized, using water captured in temporary dams on overland flow paths. These temporary dams will be removed once the permanent dams are built. Should future design changes include alternative water supply sources, additional investigations, assessment and regulatory approvals would be undertaken as required. A summary of the proposed water management system is provided in Section 2.2, further details in the WMP at Appendix A.

Stakeholder	Alternatives raised	LPM's response and actions taken
NT EPA	In a conceptual closure plan provide details on alternatives for post development land use (after closure).	A Concept MCP has been developed and describes the proposed post-closure outcomes and closure objectives for the Proposal. Closure planning has been developed with the objective of achieving a safe, stable and non-polluting landform, rehabilitating disturbed areas, protecting environmental values, and minimising ongoing maintenance requirements following closure. At this stage in design, no specific alternative post-mining land uses have been identified. However, future stakeholder consultation may identify opportunities for selective retention of infrastructure, including access tracks, water management infrastructure or transfer of selected infrastructure to Government, community or land management organisations, where consistent with closure objectives and stakeholder expectations. Any alternative post-mining land use outcome would be subject to stakeholder consultation, risk assessment and regulatory approval. The Concept MCP is summarised in Section 2.5 and a full version is provided at Appendix D.

4. CONSULTATION

Section 3 of the Referral Report outlined the early stakeholder engagement for the Proposal, including the identification of key stakeholders to be consulted. Since submission of the Referral Report, EMM Consulting Pty Ltd (EMM) has prepared a Community and Stakeholder Engagement Strategy (CSES), provided at Appendix E, and a Community and Stakeholder Engagement Outcomes Report, provided at Appendix F.

The purpose of this CSES is to be an evolving engagement document for the Proposal and outlines the framework, methods and commitments for engaging with affected communities, stakeholders and government agencies throughout the environmental assessment and ongoing construction and operations. It has been prepared to support this report and demonstrate compliance with Section 43 of the EP Act and relevant NT EPA guidance.

This section summarises the stakeholder identification process, consultation objectives, stakeholder mapping and engagement activities undertaken since submission of the Referral Report. It also describes the concerns and issues raised during consultation, how those matters have been considered during development of the Proposal and supporting assessments, and where relevant, the actions taken in response. It draws on the Community and Stakeholder Engagement Strategy (CSES), Community and Stakeholder Engagement Outcomes Report, key messages and fact sheet, and responds to the NT EPA Direction and the general duty in section 43(a)–(d) of the EP Act. Full details are provided in the reports prepared by EMM, which are in Appendices E and F.

4.1 Consultation objectives and approach

The objectives of the CSES were to:

- identify stakeholders that may be affected by, have an interest in, or influence the Proposal
- understand stakeholder interests, concerns and information needs
- provide timely, factual and accessible information regarding the Proposal
- identify potential environmental, social and economic issues associated with the Proposal
- collect and document stakeholder feedback
- explain how stakeholder feedback has been considered during development of the Proposal and supporting assessments
- satisfy stakeholder engagement requirements under the Environment Protection Act 2019 (NT) and relevant NT EPA guidance.

The engagement approach was informed by the NT EPA Stakeholder Engagement and Consultation Guidance (NT EPA 2021) and the International Association for Public Participation (IAP2) framework (IAP2 2024). Engagement activities were designed to provide opportunities for meaningful participation and two-way communication with stakeholders, while ensuring compliance with applicable legislative requirements.

Engagement focused on:

- identification and analysis of stakeholders based on their interest in, influence over, or potential exposure to Proposal impacts
- implementation of a range of engagement methods tailored to stakeholder needs
- establishment of systems for recording stakeholder interactions, feedback and commitments
- targeted consultation with government agencies, Traditional Owners, Aboriginal organisations, local government, community groups, local businesses and potentially affected communities

- provision of Proposal information through meetings, correspondence, community information sessions, direct mail, social media, the LPM website and consultation materials
- maintaining mechanisms for receiving, recording and responding to stakeholder feedback, enquiries and complaints.

The CSES also supports ongoing consultation throughout the environmental assessment process, including public exhibition of the SER, communication of consultation outcomes and continued engagement with stakeholders throughout subsequent phases of the Proposal.

4.2 Stakeholder identification and mapping

Stakeholder identification was undertaken to ensure individuals, communities, organisations and agencies that may be affected by, have an interest in, or influence the outcomes of the Proposal were provided an opportunity to participate in the engagement process. The identification methodology was in accordance with NT EPA Stakeholder Engagement and Consultation Guidance (NT EPA 2021) and included individuals, communities, organisations and government agencies that may be affected by, have an interest in, or influence the Proposal and its outcomes.

Stakeholder identification was informed by:

- consultation undertaken during preparation of the Referral Report
- submissions received during the referral process
- review of stakeholder engagement undertaken for nearby projects in the Bynoe region
- consultation with Government agencies and First Nations representative organisations
- assessment of communities, businesses, landholders and road users located within or adjacent to the Project area and haulage corridor.

The stakeholder identification considered each stakeholder's relationship to the Proposal, potential level of impact, degree of interest, and capacity to influence Proposal outcomes. Stakeholders were subsequently grouped into the following categories:

- First Nations stakeholders and representative organisations
- Government regulators and decision-makers
- Local government authorities
- Affected communities and residents
- Industry and business representatives
- Community and environmental interest groups
- Emergency service providers

Table 4-1 provides a summary of stakeholder identification, including the methods used and the stakeholder relevance to the Proposal. Further details of stakeholder identification and relevance is provided at Appendix E.

Table 4-1. Summary of stakeholder identification and relevance to the Proposal

Basis for Stakeholder engagement	Stakeholders	Identification method	Role / relevance to the Proposal
Proximity to the Proposal and Proposal activities	Communities located in Berry Springs, Belyuen, Dundee Beach, Wagait Beach and along Fog Bay Road and Cox Peninsula Road	Spatial analysis of the Proposal footprint and surrounding communities	Potentially affected communities whose views, local knowledge and concerns assist in understanding and managing social, environmental and amenity impacts.
Interaction with Proposal activities, particularly transport and haulage	Residents along haulage routes, businesses, Berry Springs Primary School and tourism operators. As well as local government councils, including Litchfield Shire Council and City of Palmerston Council.	Spatial analysis of haulage routes and sensitive receptors	Potentially affected stakeholders who may experience traffic, road safety, access and amenity impacts associated with Proposal activities.
Regulatory role or statutory responsibility	NT EPA, AAPA, DLPE, DLI, NT Health and relevant Ministers	Legislative and approvals pathway review	Regulators, decision-makers and technical advisors responsible for assessment, approvals, compliance and environmental management requirements.
Aboriginal interests and cultural heritage pathways	NLC, Larrakia Nation Aboriginal Corporation (LNAC), Ironbark Aboriginal Corporation, Traditional Owners, cultural custodians and Aboriginal representative organisations	Consultation with Aboriginal representative bodies and review of existing engagement pathways	Cultural knowledge holders, rights holders and representatives with interests in Country, cultural heritage, sacred sites, community wellbeing and potential economic participation.
Environmental, social and economic interests	ECNT, AFANT, tourism organisations, industry groups and business associations	Review of referral submissions and stakeholder mapping	Representative organisations that provide input on environmental, recreational, social and economic matters relevant to the assessment of the Proposal, through the public exhibition submission process.

4.3 Stakeholder consultation activities undertaken

The Proposal engagement chronology is summarised in Table 4-2.

Table 4-2. Engagement chronology

Time Period	Activity
Exploration and Referral Preparation	Early engagement informed the initial identification of stakeholders and issues.
November 2024 – January 2025	The Referral Report was submitted in November 2024 and publicly exhibited from 6 December 2024 to 8 January 2025.
March 2025	The NT EPA Direction established additional information requirements for the SER, including additional stakeholder engagement.
Following March 2025	LPM progressed an integrated SER work program encompassing Proposal refinement, investigations, technical studies, impact assessments and engagement planning.

Time Period	Activity
During the SER work program	Emerging findings informed the CSES and the preparation of collateral such as the Proposal factsheet, postcard, Facebook posts, website, maps and presentations.
From July 2026	Formal SER-focused engagement commenced using collateral informed by the SER work program and continued throughout preparation of the SER.

The most recent engagement activities were undertaken between July and September 2026 in accordance with the CSES and included consultation with the stakeholder groups identified in Section 4.2. A Community and Stakeholder Engagement Outcomes Report prepared by EMM Consulting Pty Ltd (Appendix F) documents the consultation activities undertaken, stakeholders engaged, feedback received and how issues have been considered. A summary of these engagement activities is provided below.

SER focused engagement using Proposal collateral based on the SER work program commenced in July 2026 and involved contact with regulatory agencies, local councils, Traditional Owners, Aboriginal organisations, community groups, neighbouring landholders, local businesses, service providers and residents across Berry Springs, Belyuen, Dundee Beach, Wagait Beach, Freds Pass, Palmerston and Darwin. Engagement activities included:

- introductory correspondence and briefing invitations to government agencies, regulators and environmental organisations - detailed records of stakeholder organisations contacted and the engagement and communication approaches are provided in Table 3.3 of Appendix F
- face-to-face and online stakeholder meetings and briefings
- targeted engagement with First Nations people and representatives, including engagement with the NLC and AAPA, cultural heritage engagement with Larrakia representatives, meetings with Belyuen Community Government Council, and yarning sessions with Kungarakan-Gurindji representatives
- direct distribution of Proposal information to communities along the proposed haulage route through letterbox drops and community information materials
- community pop-up information stalls at Berry Springs Shopping Village and Freds Pass Rural Markets
- direct engagement with local businesses, community organisations and service providers
- social media promotion of consultation activities and Proposal information
- distribution of Proposal fact sheets, postcards and other engagement materials
- recording and management of stakeholder interactions and feedback through a dedicated Stakeholder and Engagement Register.

Community engagement activities were supported by a targeted social media campaign undertaken during July and August 2026 to promote Proposal information and community information sessions. This included targeted advertising surrounding Berry Springs and Freds Pass to increase awareness of consultation opportunities and encourage participation. Further details of the engagement activities and the consultation methods are provided in Section 4 of Appendix F, as well as examples of the collateral materials used, which are provided in Appendix A of Appendix F. A high-level summary of the consultation activities undertaken is provided in Table 4-3.

Table 4-3. Summary of stakeholder engagement activities since submission of the Referral Report

Consultation activity	Timing	Stakeholders
Introductory correspondence and invitations to attend Proposal briefings.	July 2026	NT Government agencies and regulators, elected representatives, local councils, environmental organisations and other identified stakeholders.
Targeted briefings and meetings, conducted face-to-face and online.	July to August 2026	Government agencies, local government authorities, community organisations, First Nations organisations, local businesses and service providers, ECNT.
Direct distribution of Proposal information postcards to properties along Fog Bay Road (a delivery success rate of approximately 85% was achieved). Further details on the postcard distribution campaign and delivery statistics are provided in Section 4 of Appendix F).	July to August 2026	Residents, neighbouring landholders and properties along the proposed haulage route.
Face-to-face engagement and distribution of Proposal postcards and fact sheets within local communities.	July to August 2026	Local businesses, community groups, service providers and residents in Berry Springs, Belyuen, Dundee Beach and Wagait Beach.
Social media promotion of community consultation opportunities.	July to August 2026	Residents and other interested stakeholders within the targeted Berry Springs and Freds Pass areas.
Targeted Facebook promotion of the Freds Pass community event.	29 July to 7 August 2026	Residents and interested stakeholders within the targeted area surrounding Freds Pass.
Community pop-up information stall at Berry Springs Shopping Village.	4 August 2026	Berry Springs residents, local businesses, community members and other interested stakeholders.
Yarning session at Berry Springs Shopping Village.	4 August 2026	Traditional Owners.
Community pop-up information stall at Freds Pass Rural Markets, Coolalinga.	8 August 2026	Market attendees, local residents, businesses and other interested stakeholders.
Recording and management of stakeholder interactions, feedback and commitments through the Stakeholder and Engagement Register.	From July 2026 and ongoing	All stakeholders engaged through the consultation program.
Consultation to identify appropriate Traditional Owner representatives and engagement pathways for the Project.	July to August 2026	NLC
Engagement with Larrakia representative organisations regarding cultural heritage investigations and consultation processes.	August to September 2026	Larrakia representative organisations
Site-specific archaeological survey and Cultural Heritage Assessment (CHA), including participation in field surveys and discussions regarding cultural heritage values.	August 2026	Larrakia representatives and Aboriginal corporations

4.4 Summary of Key Issues Raised

Consultation undertaken between July and August 2026 identified several recurring themes relating to the potential environmental, social and economic impacts of the Proposal. While many stakeholders expressed support for the economic opportunities associated with lithium mining and recognised the importance of the critical minerals sector to the Northern Territory economy, a number of concerns and information needs were identified through the engagement process.

Overall, stakeholders demonstrated a generally positive understanding of the role of lithium in the transition to renewable energy technologies and recognised mining as an important contributor to the Northern Territory economy. Although some concerns were raised regarding potential environmental and social impacts, there was generally an acceptance of mining activity within the region. Engagement also indicated a perception among some stakeholders that approval of the Proposal was likely, highlighting the importance of clearly communicating the environmental assessment process and opportunities for community input. Stakeholders also identified a need for clearer information regarding the Proposal location and layout, particularly through the provision of more detailed mapping. The key issues raised during consultation are summarised in Table 4-4.

Engagement with First Nations people occurred through multiple concurrent streams. LPM engaged with the NLC regarding the Proposal, SER timeframes, cultural heritage process and future engagement arrangements with the Larrakia People. LPM also engaged with AAPA regarding Authority Certificate application. In parallel, RHS led cultural heritage engagement with Larrakia representatives, including an on-ground archaeological survey undertaken from 10 to 14 August 2026.Key issues raised during this consultation related to identification of the appropriate Traditional Owner representatives and stakeholders, cultural protocols for engagement, the need for meaningful consultation with the Larrakia, the identification and protection of cultural heritage values and sacred sites, and the development of an appropriate heritage management framework for the Project. Consultation also highlighted the importance of avoiding impacts to cultural heritage values through project design where practicable, undertaking appropriate archaeological investigations, and ensuring Traditional Owner knowledge and perspectives inform future heritage management measures.

The Heritage Branch provided input regarding the scope and methodology of heritage investigations, regulatory pathways for the management of Aboriginal archaeological places and objects, and the potential role of a Cultural Heritage Management Plan. The need for ongoing engagement with the Larrakia, presentation of survey findings, and continued consultation during development of future heritage management measures was also discussed.

Consultation outcomes informed the CHA and will continue to inform project planning, impact avoidance measures and future heritage management arrangements.

Table 4-4. Summary of key issues raised during consultation

Issue theme	Summary of issues raised
Road safety, road deterioration and traffic congestion	This was the most frequently raised issue during consultation, particularly by stakeholders in Berry Springs, Belyuen and Wagait Beach. Stakeholders expressed concerns regarding the contribution of Proposal traffic and haulage vehicles to road deterioration, increased traffic volumes, congestion and road safety risks along Fog Bay Road and Cox Peninsula Road. Concerns were also raised regarding existing road conditions, the effect of wet season conditions on road performance, and the cumulative effect of traffic associated with both the Proposal and other mining operations in the region. Particular concern was expressed in relation to sensitive receptors located along the haulage route, including Berry Springs Primary School, Berry Springs Child Care Centre, Out of School Hours Care, tourism destinations and recreational facilities. Stakeholders also raised concerns regarding heavy vehicle interactions, speeding, accident risk and road user safety.
Local employment and procurement opportunities	Stakeholders expressed strong interest in the employment, training and procurement opportunities associated with the Proposal. Local businesses sought information regarding potential contracting opportunities, while community members were interested in the timing and availability of employment opportunities and the extent to which economic benefits would be realised locally.

Issue theme	Summary of issues raised
First Nations employment, training and business opportunities	Traditional Owners, Aboriginal organisations and representatives of the Belyuen community expressed interest in opportunities for Aboriginal employment, training, business development and long-term community investment. Stakeholders highlighted the importance of meaningful participation in economic opportunities generated by the Proposal and partnerships that deliver enduring community benefits.
Environmental impacts	Stakeholders sought additional information regarding water management, groundwater protection, groundwater inflows, stormwater management and potential impacts to adjacent landholders. Additional concerns related to biodiversity, native vegetation clearing, threatened species, rehabilitation, land management practices and management of fire within the Proposal area.
Cumulative impacts	Stakeholders raised concerns regarding the cumulative impacts of existing and proposed developments within the region, including cumulative traffic, environmental and social impacts. Several stakeholders also sought clarification regarding the distinction between the Proposal and other mining activities within the Bynoe region and how cumulative impacts had been considered as part of the assessment.
Cultural heritage values and sacred sites	Stakeholders emphasised the importance of identifying, assessing and protecting cultural heritage values, sacred sites and other culturally significant places, and that significance determination rests with the Traditional Owners to determine and cannot be established on archaeological evidence alone. Concerns were also raised regarding the potential for undetected heritage values, including intangible cultural values.
Traditional Owner engagement and cultural protocols	Stakeholders highlighted the need for meaningful engagement with the Larrakia and Kenbi Danggalaba Association, appropriate cultural protocols, ongoing consultation, and involvement of Traditional Owners in heritage investigations and future management decisions.
Heritage assessment and management	Stakeholders supported the undertaking of archaeological surveys and cultural heritage investigations and emphasised the importance of developing an appropriate heritage management framework, including a Cultural Heritage Management Plan, monitoring arrangements and an Unexpected Finds Protocol.
Impact avoidance and protection measures	Stakeholders emphasised that impacts to cultural heritage values should be avoided where practicable through project design and that future ground-disturbing activities should be informed by Traditional Owner knowledge and consultation.

The issues raised through consultation have been considered during development of the Proposal and preparation of the SER. A summary of the key issues raised, and LPM's responses and actions taken is provided in Section 4.5

4.5 Consideration of Issues Raised and Actions Taken

The issues raised during consultation have been considered during the development of the Proposal and the preparation of the SER. Table 4-5 summarises how the key concerns raised by stakeholders have been addressed through, among other things, Proposal design, additional assessment, management measures and ongoing engagement activities.

Table 4-5. Summary of how key concerns addressed

Key issues and themes	Proposal design and response
Road safety, road deterioration and traffic congestion	LPM has completed a TIA and will prepare a Traffic Management Strategy for construction, operations and closure. Proposed measures include use of established road train routes to Darwin Port, construction of a new channelised mine access intersection on Fog Bay Road, road train blackout periods near Berry Springs Primary School during student drop-off and pick-up times, daylight-only haulage operations, workforce bus transport from Palmerston, driver fatigue and road safety management measures, baseline road condition audits, ongoing road condition monitoring, and continued engagement with local schools, businesses, residents, councils and relevant NT Government agencies.
Local employment and procurement opportunities	LPM intends to maximise local economic participation by encouraging contractors to recruit locally where practical, providing early visibility of upcoming work packages, creating opportunities for local businesses to participate in procurement processes, and seeking local supplier involvement in transport, accommodation, rehabilitation, fleet management, environmental management and other support services.
First Nations training, employment and business opportunities	LPM will continue working with Aboriginal communities, organisations and employment and training providers to identify practical employment, training and contracting opportunities during construction, operations and rehabilitation. This includes continuing discussions with Belyuen Community Government Council and other relevant organisations regarding business partnership, community investment and participation opportunities, and encouraging contractors to demonstrate genuine Aboriginal participation.
Environmental impacts	LPM has prepared technical assessments and management measures to address environmental concerns. Proposed measures include limiting clearing to areas required for mine infrastructure, retaining a wildlife corridor and riparian vegetation of the Charotte River buffer, implementing vegetation clearing procedures and pre-clearance fauna surveys, progressive rehabilitation, weed, bushfire, waste, dust and erosion and sediment controls, separation of clean water, sediment water and mine-affected water, dedicated water storage and reuse of mine water, surface water and groundwater monitoring, TARPs, controlled discharge only where regulatory approvals and water quality criteria are met, and ongoing monitoring of Charlotte River, groundwater systems and aquatic ecosystem values.
Cumulative impacts	LPM has considered cumulative impacts through the SER process, including traffic, water, biodiversity and community values. LPM will continue to communicate clearly with stakeholders to distinguish the Proposal from existing and proposed nearby developments, including existing Core Lithium operations, and will continue engagement with regulators, councils, communities and other stakeholders as assessment work progresses.
Cultural Heritage	LPM has undertaken a CHA with Larrakia participation and will continue consultation with the Larrakia through their nominated representative organisations and the NLC-facilitated process, where appropriate. LPM will obtain an AAPA Authority Certificate before ground disturbance commences, develop a Cultural Heritage Management Plan in consultation with Traditional Owners, implement cultural heritage inductions and an Unexpected Finds Protocol, offer opportunities for Larrakia cultural monitors during ground-disturbing works, avoid identified heritage places where practicable, and support additional work to document intangible cultural values and continue engagement with Larrakia and Kenbi interests.
Proposal awareness and ongoing engagement: • Larrakia People • Local Communities • Stakeholders	LPM will maintain transparent, accessible and ongoing communication with the Larrakia People, local communities, businesses, government agencies and community organisations throughout assessment and subsequent project phases. This will include meetings, briefings, community information sessions, fact sheets, direct correspondence, online channels, and the established feedback mechanism. LPM will close the loop with participants by responding to issues raised, providing requested information where practicable, preparing a plain-language 'What We Heard' summary, and continuing engagement on traffic, environmental management, employment opportunities, cultural heritage and mine closure planning.

4.6 Consultation outcomes

Key outcomes of consultation during preparation of this document included further assessment and clarification of traffic and road safety, water management, environmental protection measures, mine closure planning, cumulative impacts and opportunities for local and Aboriginal participation. The issues raised during consultation have been considered throughout the preparation of this document and are reflected in the Proposal design, assessment outcomes and proposed management measures. Ongoing consultation will continue throughout the environmental assessment process and subsequent phases of Proposal development.

4.7 Ongoing future engagement

LPM will continue engagement after submission of this document by closing the loop with stakeholders consulted during the SER engagement program, responding to specific information requests, presenting this document to interested agencies during the public exhibition period where requested, continuing engagement with the NLC and Larrakia representatives, progressing dialogue and partnership development with Belyuen Community Government Council, maintaining contact with interested residents and community representatives in Berry Springs, Wagait Beach and Dundee Beach, continuing respectful dialogue with Kungarakan-Gurindji representatives as nearby landholders, implementing the feedback mechanism, and incorporating outcomes of the AAPA Authority Certificate process and Cultural Heritage Management Plan into project planning and management measures.

5. RESPONSE TO SUBMISSIONS

This section addresses issues and recommendations identified in submissions received by the NT EPA from stakeholders during the Proposal Referral public exhibition phase. The Referral was available for public comment for a period of 21 business days (excluding public holidays) from 6 December 2024 to 8 January 2025. Eight submissions were received: one from the AAPA, four from NT Government agencies, one from the DCCEEW (Cth) one from ECNT and one from the NLC.

DCCEEW noted that the Proposal intersects with known occurrences of EPBC Act listed threatened and migratory species and advised that any action with the potential to significantly impact matters of national environmental significance requires referral under the EPBC Act. DCCEEW further noted that, in the absence of an EPBC Act referral, it was unable to comment on the potential impacts to these species or the adequacy of the assessment. As part of the Referral, significance impact assessments were undertaken for relevant listed threatened and migratory species in accordance with the EPBC Act *Significant Impact Guidelines 1.1*. These assessments concluded that impacts to the species assessed are unlikely to be significant. LPM acknowledges DCCEEW's submission. LPM has not referred the Proposal under the EPBC Act and has written to DCCEEW regarding its decision not to refer the proposed action.

LPM has reviewed all submissions and comments received during public exhibition in accordance with the NT EPA's Guidance for the Preparation of a SER (NT EPA 2025). General comments, references to standard regulatory requirements and management documents (such as Weed Management Plans and water extraction licensing requirements under the *Water Act 1992 (NT)*), and matters relating to acknowledged uncertainties in the Referral Report have been considered in the preparation of this SER. These matters are not individually reproduced in Table 5-1 below., which focuses on key issues raised and the actions undertaken by LPM in response.

Table 5-1. Summary of submissions and responses

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
Water				
Hydrological processes	Groundwater drawdown and impacts to groundwater dependent ecosystems and connection to Aboriginal Sacred Sites protection	Aboriginal Areas Protection Authority (AAPA)	There is potential for groundwater dependent tree species in the Proposal area. Such trees may be Aboriginal sacred sites; however, it is not known whether any such sites are present in the Proposal area. No site-specific groundwater model has been developed, therefore the absence of modelling of impacts to groundwater levels means that the assessment of the Hydrological Processes factor and consequently, the Culture and Heritage factor, is incomplete.	LPM acknowledges AAPA's submission. Since submission of the Referral, a site-specific groundwater model, groundwater impact assessment and groundwater dependent ecosystem (GDE) assessment have been completed and are reported in the SER. These assessments have been used to evaluate the extent of potential groundwater drawdown and the potential for impacts to groundwater-dependent receptors, including features that may possess Aboriginal cultural or sacred-site values. An AAPA Authority Certificate application has been submitted (28 September 2026), supported by the findings of the Lei Lithium Project – CHA, which was provided to AAPA as part of the application. The Authority Certificate process is being used to identify any sacred sites that may be present within the area potentially affected by the Proposal and to inform appropriate avoidance and management measures. Also refer to LPM's response to AAPA's submission regarding protection of Aboriginal Sacred Sites below.
	Extent of groundwater drawdown and dependency of the riparian community	DLPE – Flora and Fauna Division	DLPE acknowledges that groundwater modelling studies are ongoing. Should the modelling determine the change to be identified as potential moderate to low impact, a well-designed significant vegetation monitoring program with adequate triggers and responses should be able to manage the risk to biodiversity values.	Groundwater modelling indicates that, at maximum predicted drawdown (Years 6 to 7), no significant vegetation communities potentially reliant on groundwater occur within the modelled drawdown area of 2 m or greater. As a result, significant impacts to groundwater-dependent vegetation are not anticipated. Recognising the uncertainty in groundwater model predictions and vegetation responses, LPM will implement a GDE Monitoring Plan and WMP incorporating groundwater and vegetation monitoring to validate model predictions and support adaptive management. The monitoring program will utilise remote sensing and trigger-based management measures to identify and respond to any unexpected changes in vegetation condition within areas subject to drawdown, consistent with DLPE's recommendation for a monitoring program with appropriate triggers and management responses (refer Sections 7.4. and 9.4. for more information).

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
	Mine design – flood risk	DLPE – Mining Division	It is recommended the Proponent apply Probable Maximum Precipitation (PMP) and include an updated flood model assessment to provide an indication of "worst-case" scenario and the likely flood water management structures required, their size and location.	LPM engaged WRM to update the flood modelling in alignment with the DLPE request. Section 4 of the Surface Water Assessment provided at Appendix G extends the preliminary flood assessment to the 10% AEP, 1% AEP, 0.1% AEP and PMP flood events, including a future-climate 1% AEP scenario. Results indicate that flooding associated with the Charlotte River has minimal impact within the mine lease area, with inundation generally limited to shallow flooding in local low-lying areas. The proposed mine entry presents a low risk of inundation during events up to and including the 0.1% AEP event, while only shallow inundation depths of less than 0.1 m are predicted under the PMP scenario. Overall, flood risk is not considered a significant constraint to the Project layout.
Hydrological processes	Mine design – Boxcut	DLPE – Mining Division	The mine design is in the conceptual stage until geotechnical assessments are undertaken to determine the best approach and will impact the quantity of water requirements for construction and operations. Greater clarity is required to understand the Proposal water supply and demand, particularly during the first year of operation where dust and its management will be a key risk.	LPM engaged WRM to provide an updated site water balance for construction and operations. The water balance has been refined through updated groundwater inflow estimates and detailed operational water balance modelling. Mine water infrastructure (mine dams on site) has been sized to have a risk of uncontrolled overflow of less than a 1% AEP event. Predicted water supply risks are described in Section 6.5.5 of Appendix G. Water balance modelling indicates that a water supply shortfall of approximately 103 ML may occur during the construction phase under average rainfall conditions. To reduce this risk, construction of the RWD and SD1 will be prioritised, using water captured in temporary dams located on overland flow paths. These temporary dams will be removed once the permanent water infrastructure is operational. Additional water may also be sourced externally and/or from groundwater, subject to obtaining a Groundwater Extraction Licence under the Water Act, if deemed required for construction. During operations, sufficient water storage capacity is generally predicted to be available to meet site water demands under average climatic conditions.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
	Cumulative impacts	Environment Centre NT (ECNT)	ECNT raised concerns on the cumulative impact of groundwater drawdown cones and multiple pressures on the groundwater systems, in the event that the Proposal and the BP33 and Grants Projects operate concurrently.	A site-specific groundwater model incorporated the approved BP33 and Grants Projects and this Proposal to assess potential cumulative groundwater impacts of all Projects operating concurrently. The modelling indicates that localised drawdown cones may overlap with BP33 (Grants there is no potential for overlap), resulting in an additional drawdown of approximately 0.5 m in the area between the two mines during peak concurrent operations; however, this is not predicted to result in additional impacts to identified environmental values (refer Section 7.5.3). Uncertainty remains regarding future mine schedules, groundwater inflows and dewatering rates; therefore, groundwater monitoring and periodic model review will be undertaken to validate predictions and support adaptive management where required.
	Uncertainties of potential impacts	ECNT	The uncertainties that existing regarding the potential impact on hydrological processes, should be assessed as part of an EIS.	Potential impacts on hydrological processes, including the consideration of uncertainties, have been assessed through site-specific groundwater modelling, surface water investigations and water balance modelling undertaken in response to the Direction. The assessment is presented in Section 7 and supporting technical appendices.
	Groundwater dependant ecosystems	ECNT	The residual impacts of the Proposal are consistently under-acknowledged. If no site-specific groundwater model and impact assessment on groundwater dependent ecosystems (GDE) has been undertaken, the residual impact on the latter cannot be satisfactorily said to only be moderate. These studies need to be undertaken as a matter of priority and included as part of the public documentation provided at the next stage of assessment.	Site-specific groundwater modelling based on the conceptual underground mine design and site-specific groundwater levels has been developed by CloudGMS. A summary of the modelling is provided in Section 7.4.2. The interaction between groundwater drawdown and GDE's is discussed in Section 9.4.1. The impact is expected to be minor.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
	Surface water flows	ECNT	ECNT are concerned that all drainage lines from the Proposal area flow into the Charlotte River.	LPM acknowledges ECNT's concern that drainage lines within the Proposal area form part of the Charlotte River catchment. The Proposal has been designed to separate raw water, sediment water and mine-affected water, with runoff managed through a dedicated water management system. Mine-affected water, including groundwater dewatering and runoff from the waste rock dump, ROM pad, crushing and ore stockpile areas, will be captured and managed within mine water dams. Runoff from disturbed areas will be managed through erosion and sediment controls and directed to a sediment dam prior to release. Any release of mine-affected water to the receiving environment would only occur in accordance with the conditions of the EML and would be subject to water quality criteria and monitoring requirements. The WMP (Refer Appendix A) includes a comprehensive surface water and groundwater monitoring program for the Charlotte River catchment and downstream receiving environments. Site-specific trigger values have been established for receiving waters, and TARPs set out the investigation, mitigation, and management actions to be implemented if monitoring identifies exceedances of those trigger values or other water management performance criteria. Potential impacts to surface water and downstream environmental values, including the Charlotte River, have been assessed in Section 7.5.1, as part of the hydrological processes assessment undertaken in response to the Direction.
	Interconnectivity of groundwater aquifers	ECNT	The potential interconnectivity of the Burrel Creek Formation (BCF) Groundwater System with the Berry Springs Dolostone Aquifer should be examined, as the Proponent identifies without strong evidence base that the two are not connected. The aquifer and nearby water systems need to be more fully understood before meaningful impact assessments can be undertaken, and certainly before any conclusions can be made about the acceptability of conducting mining	Regional hydrogeological investigations indicate that the BCF beneath the Proposal area is not hydraulically connected to the Berry Springs Dolostone Aquifer (Verma, 1994; Verma, 2002). In addition, the groundwater impact assessment has been informed by site-specific groundwater level and water quality monitoring, GDE studies, and the development of a numerical groundwater model. The groundwater model was developed to assess the extent, magnitude and duration of groundwater drawdown associated with the Proposal and to evaluate potential impacts on identified environmental values and receptors. Model predictions indicate that drawdown impacts are localised to the vicinity of the Proposal. The impact assessment on

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
			operations so close to key sensitive ecosystems.	hydrological processes is presented in Section 7.5.2, with the full modelling report provided in Appendix A of Appendix I.
Hydrological processes	Supplementary water use options	ECNT	The Referral Report identifies several potential supplementary water sources, including surface water extraction, groundwater extraction and additional runoff harvesting, but provides limited detail on their potential use. Should these options be pursued, their impacts would need to be assessed and supported by appropriate investigations. The Proposal's potential reliance on groundwater also warrants a greater level of assessment than mines that rely primarily on stored surface water.	Refer to Table 3-1 for response.
	Preliminary flood assessment	ECNT	ECNT are concerned the preliminary flood assessment scenario of 1% annual exceedance probability is not adequate in comparison to the flood modelling prepared for the BP33 SER. Modelling for BP33 included 50%, 2%, 1%, 0.1% annual exceedance probability rates.	Updated flood assessment has been undertaken and Section 4 of Appendix G extends the preliminary flood assessment to the 10% AEP, 1% AEP, 0.1% AEP and the PMP. As set out above in LPM's response to a similar topic raised by DLPE – Mining Division, results indicate that flooding associated with the Charlotte River has minimal impact within the mine lease area, with inundation generally limited to shallow flooding in local low-lying areas. The proposed mine entry presents a low risk of inundation during events up to and including the 0.1% AEP event, while only shallow inundation depths of less than 0.1 m are predicted under the PMP scenario.
			It is also unclear if the modelling considers the context of climate change and sea level rise, including increased likelihood of extreme weather events.	Updated flood assessment has been undertaken and Section 4 of Appendix G describes the uplift applied the rainfall depths and the Charlotte River predicted discharges. A sensitivity has also been undertaken for a future climate change for the 1% AEP flood event to SSP2-4.5 2050.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
Inland water environmental quality	Mine design – WRD landforms (temporary) basal seepage	DLPE – Flora and Fauna Division	The information provided in the referral does not provide information specifically regarding the potential for basal seepage from potential contaminates and elevated arsenic (As) and aluminium (Al) that naturally occurs in the area from the temporary WRD into the shallow alluvial aquifer. DLPE are concerned with the drainage connection between the shallow alluvial aquifer and the surface water receptors such as the Charlotte River and its tributaries. Conceptual designs should be provided for the temporary WRDs and accompanied by an informed assessment of the key hydrogeological units potentially impacted by the proposal (particularly if water levels fluctuate seasonally with rainfall recharge). The conceptual designs must be of sufficient detail to enable risk assessment by the department to determine the adequacy of proposed key design elements (particularly basal low permeability layer and/or perimeter toe drains).	During drilling undertaken for installation of the six monitoring bores within the Proposal area, a shallow alluvial aquifer was not encountered, suggesting that any alluvial groundwater system is likely to be limited in extent and/or discontinuous within the Proposal area, particularly in locations further removed from the Charlotte River. To assess the potential for contaminants associated with waste rock and ore stockpiles to migrate via groundwater pathways, LPM engaged EGi to undertake a preliminary assessment of water quality impacts associated with seepage from these facilities. The assessment concluded that diffuse seepage is unlikely to adversely affect groundwater or surface water quality, with modelled seepage predicted to produce water quality comparable to existing conditions within the Charlotte River catchment. The assessment report is provided in Appendix H, with the outcomes of the impact assessment summarised in Section 8.5.2 LPM acknowledges that detailed waste rock dump design has not yet been completed and is therefore not available at the current stage of project development. Notwithstanding this, the available geochemical, hydrogeological and water quality information provides a sufficient basis to assess the potential impacts associated with seepage from waste rock and ore stockpiles.
	Surface water quality - Monitoring trigger levels	DLPE – Flora and Fauna Division	The Flora and Fauna Division notes that the Referral Report (Table 5-16) states that dilution factors will meet the trigger values, this is considered a low bar and dilution below the trigger values is preferred.	Water would be diluted to meet trigger values, which are based on the water quality objectives and the baseline water quality. The suggested site-specific trigger values (SSTVs), which are based on the baseline water quality, are based on the 80th percentile, which ensures that the dilution achieved is generally below the baseline values. In addition, water quality monitoring will continue to be monitored in the vicinity of the site to ensure the environment is not being impacted.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
Inland water environmental quality	Water management	DLPE – Mining Division	The referral identified the use of Darwin Harbour Water Quality Objectives (DHWQO) priority water quality indicators, with baseline for nitrogen in groundwater underneath the site exceeding these values naturally. DLPE recommend should waste discharge, in accordance with DHWQO not be achievable or not supported given the sensitive Charlotte River receptor, alternative water management strategies or a combination of strategies need to be developed (e.g. irrigation to land and waste discharge) to demonstrate appropriate management of water inventory.	Refer to Table 3-1 for response.
	Acid sulfate soils (ASS)	DLPE – Mining Division	Site-specific studies may be needed to better define ASS extent, including how dewatering activities may potentially impact on ASS, and if needed, an appropriate management plan be developed.	Potential impacts associated with ASS due to groundwater drawdown were assessed in Section 8.5.3 and determined that the likelihood of widespread ASS exposure is low. This conclusion is supported by site investigations, baseline monitoring results, and the limited overlap between predicted drawdown and mapped Potential ASS (PASS) areas. Residual uncertainty will be managed through a groundwater and surface water monitoring, TARPs (including an ASS investigation and Management Plan if triggered), and additional nested monitoring bores within mapped PASS areas. These findings are supported by investigations presented in Appendix I and Appendix H,.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
	ASS	ECNT	ECNT raise concerns relating to the release of contaminants from exposure of ASS within the Charlotte River, as well as saline intrusion into the underground workings. These potential risks are significant and require a full and public ASS assessment be undertaken.	Refer to response to the ASS topic above, and the sections and appendices there mentioned. The potential for saline intrusion associated with mine dewatering has been assessed in Section 8 and the supporting groundwater modelling presented in Appendix A of Appendix I. The assessment concluded that the reduction in groundwater head is insufficient to reverse the hydraulic gradient and induce groundwater flow away from the river towards the mine. Under a conservative modelling scenario (which is considered unlikely) and if saline groundwater is present at depth beneath the Charlotte River as opposed to just the shallow alluvial aquifer - saline groundwater may reach the underground workings during dewatering. Additional nested monitoring bores will be installed within tidally influenced areas of the Charlotte River to improve understanding of salinity stratification, and the WMP (Appendix A) includes groundwater monitoring, salinity-intrusion-specific TARPs, and adaptive management measures to verify model predictions and manage any unforeseen impacts.
	Mine design – underground geochemistry	DLPE – Mining Division	The referral indicated the potential requirement for a paste-fill plant and ore sorting systems however does not provide information for a tentative location. If a paste-plant is proposed, its location and the results of further geochemical testing is needed to inform assessment of the environmental risks of waste rock management and backfill activities.	Refer to Table 3-1 for response.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
	Cumulative impacts	ECNT	Water discharges in surrounding water systems, from a cumulative aspect needs to be fully understood before meaningful impact assessment can be undertaken.	A cumulative impact assessment has been undertaken, which considered potential discharges from the Proposal in the context of existing and approved mining activities in the area. The assessment incorporated baseline monitoring data, water quality modelling and consideration of cumulative groundwater and surface water pathways. The assessment concluded that cumulative impacts are expected to be minor. Refer to Section 8.5.5. Controlled discharges from the Proposal will be directed to the Charlotte River south of the Proposal area, which does not receive discharges from other mining operations. While passive overflows from the Raw Water Dam discharge to the Unnamed Northern Tributary, which ultimately joins a watercourse receiving discharges from the BP33 Project, water stored within such dam is sourced from undisturbed catchments and is expected to be comparable to baseline runoff conditions. As such, these overflows are not expected to materially contribute to cumulative surface water quality impacts.
	Water management plan	ECNT	The proponent identifies a number of management plans that be developed and implemented to detail mitigation measures to address the potential impacts to inland water environment quality. ECNT recommend the plans be fully developed and evaluated by the public and regulator as part of an EIS.	LPM has prepared and submitted a WMP (provided at Appendix A) and Conceptual MCP (provided at Appendix D) as part of this document. These plans provide the framework for managing potential impacts to inland water environmental quality, including monitoring, contingency measures, adaptive management, rehabilitation and closure planning, and are available for regulatory and public review.
	Contamination of Charlotte River	Northern Land Council (NLC)	The NLC is particularly concerned about the potential for acid metalliferous drainage, contamination of the Charlotte River from acid sulphate soil exposure, and the potential for saline intrusion. These risks require robust mitigation measures to avoid harm to the quality of surface and ground water, and ecosystems and sacred sites, connected to the Proposal area.	Potential impacts associated with acid metalliferous drainage, ASS exposure and saline intrusion have been assessed in Section 8.5, such assessment were based on site investigations conducted and presented in Appendix I and Appendix H. Mitigation and management measures, including monitoring programs, trigger values, TARPs (including an ASS investigation and Management Plan if triggered) and adaptive management measures, have been incorporated into the WMP for the Proposal (Appendix A).

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
	Development of site-specific guideline values	ECNT	ECNT mention the collection of baseline data to inform site-specific guideline values should be undertaken and included in the next stage of the environmental assessment process.	Baseline surface water and groundwater monitoring has been undertaken since the 2023/24 wet season. Section 3 of Appendix G includes a water quality analysis of existing surface water and groundwater monitoring locations. Site specific guideline values have been developed based on the baseline data and relevant water quality guidelines such as ANZG (2018), Darwin Harbour Water Quality Objectives and key toxicants found in groundwater monitoring that show elevated concentrations when compared to the surface water. These trigger values have been incorporated into the WMP monitoring framework and TARPs. Ongoing monitoring will be used to review and refine trigger values as additional data become available, consistent with the adaptive management approach adopted for the Proposal. Further details of the SSTVs are provided in Section 6.3.5 (surface water) and Section 6.4.4 (groundwater) of the WMP provided at Appendix A.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
Aquatic ecosystems	Controlled water release to Charlotte River	ECNT	Given the large volume of planned water release into Charlotte River, and the fact that no aquatic surveys have been undertaken by the Proponent in the surrounding waters, and furthermore the fact that key ecological sites such as mangrove woodlands and riparian vegetation occur directly downstream of the Proposal area, the potential for unacceptable and significant impacts to aquatic ecosystems is high.	Potential impacts to aquatic ecosystems values have been assessed through consideration of the relevant impact pathways, including changes to surface water quality, surface water hydrology and groundwater conditions. EGi's assessment (Appendix H), incorporated baseline surface water quality data, discharge water quality predictions and water quality modelling to evaluate potential impacts associated with controlled discharges and seepage from mine infrastructure. The assessment concluded that controlled releases from operational water storages are not expected to result in adverse water quality outcomes under expected, dry or wet climatic conditions. Predicted discharge water quality is generally comparable with existing receiving environment conditions, with modelling indicating that any changes in water quality are expected to be limited and manageable. As presented in the Hydrological Processes (Section 7.5) and Inland Water Environmental Quality (Section 8.5) assessments, residual impacts associated with changes to surface water quality and hydrology were assessed as minor following implementation of mitigation measures. In addition, no terrestrial GDEs were identified within the groundwater drawdown area. Accordingly, the assessment does not identify a pathway by which significant impacts to downstream aquatic ecosystem values would occur. The Proposal includes water management infrastructure, controlled discharge arrangements, water quality monitoring and adaptive management measures described in the WMP (Appendix A). Ongoing monitoring of both site water and receiving environment water quality will be undertaken to verify model predictions and support the early identification and management of any unforeseen impacts. In addition, mine water management and any proposed discharges are subject to assessment through the Environmental (Mining) Licence framework, including consideration of waste discharge information and management measures. This provides an additional layer of regulatory oversight to support the protection of downstream aquatic ecosystem values.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
Land				
Terrestrial ecosystems	Sensitive or significant vegetation – Woodland communities	DLPE – Flora and Fauna Division	The proponent does not provide detail on the above approaches. Parameters to consider include: • how tree hollows could be adequately checked prior to clearing, given the complexity of, and often, height at which such hollows occur, and the challenge of definitively determining use of such tree hollows. • what action would be taken if animals are found in tree hollows. • whether all individuals of all species would be targeted for 'relocation', or just particular species, particular taxonomic group(s) or threatened species. • where animals would be moved and how it would be ensured that the areas into which these 'relocated' animals are placed are suitable. • the action that would be taken for juvenile animals that are reliant on provisioning by parents. If pre-clearing relocation is to occur, it should have a realistic objective and target pre-determined taxonomic groups/species. It should also detail to where fauna would be relocated, how those locations are selected, what their existing faunal densities are, how relocated individuals will be monitored, and what thresholds are in place to intervene if animals are failing to survive post-relocation.	A Vegetation Clearing Procedure will be developed based on those used elsewhere in the Top End. It will address many of these considerations. However, it is noted that use of a fauna spotter-catcher is considered industry best practice and is employed in countless projects across Australia. It is not the place or role of LPM to present an analysis of the degree to which this practice benefits fauna. Moreover, whilst the use of fauna spotter-catcher has been proposed as a mitigation measure, the assessment of the Proposal as not likely to have a significant impact on threatened species is not contingent on it, and therefore this level of analysis is not required.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
	Threatened species	ECNT	The proponent has determined that the Black-footed Tree Rat and the Northern Brushtail Possum are present within the Proposal area and has assessed the potential impact of the Proposal on these species. Justifying that based on the sufficient habitat within the east of the Proposal area that will remain intact and undisturbed, the Proposal will not significantly impact the species. ECNT recommends an evidentiary basis for this statement be provided to justify the conclusion.	The conclusion that the Proposal will not have a significant impact on the Black-footed Tree Rat and the Northern Brushtail Possum is based on multiple lines of reasoning, including that the Proposal footprint is proportionally very small compared the surrounding landscape comprised almost entirely of remnant savanna habitat. Areas where the tree-rat were recorded are not only excluded from the Proposal footprint but kept connected to surrounding landscape through a wildlife corridor. In addition, the habitat of the mineral lease (ML) to the east will be actively managed to increase habitat value. On this basis, the Proposal is not expected to result in a long-term decrease in the size of an important population, significantly reduce the area of occupancy, fragment habitat, or adversely affect habitat critical to the survival of either species.
	Significant vegetation	ECNT	For the context of this Proposal, this includes riparian vegetation, mangroves, old growth trees and pockets of monsoon rainforest along Charlotte River. The Proponent should more closely examine the cumulative impacts of this Proposal in the context of increasing land clearing threats, including in nearby areas such as Middle Arm and the proposed solar farm nearby. Proponent in this instance has not considered how pressures on downstream riparian vegetation will act in conjunction with reduction of surface water flows from other sources.	The Proponent acknowledges concerns regarding cumulative land clearing within the Darwin region and has considered the Proposal in the context of existing and reasonably foreseeable future developments. Further information is provided in Section 9.5.2.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
Air				
Atmospheric processes (not triggered in referral)	Greenhouse gas emissions	ECNT	The Proponent asserts that there is no potential for impact to the Atmospheric Processes factor and as such has not undertaken an assessment of this factor. However, given the fact that the power generation for the Proposal has not yet been determined, it is not clear how the Proponent arrived at this conclusion. Whether a diesel generator or a solar farm is used will make a consequential difference to the atmospheric emissions of the Proposal. Without having undertaken an analysis of projected GHG emissions, the Proponent cannot be satisfied that GHG emissions will not trigger the large emitters threshold.	LPM acknowledges ECNT's concern regarding uncertainty in the Proposal's power supply. A detailed GHG Assessment has subsequently been completed using a conservative worst-case assumption that all power would be supplied by on-site diesel generation. The assessment estimates approximately 101,878 tCO_2-e of Scope 1 emissions over the eight-year mine life (including 1 year of closure and rehab) and confirms that annual operational emissions are expected to remain well below the Safeguard Mechanism threshold of 100,000 tCO_2-e per year. Consequently, the Proposal is not expected to trigger the large emitter threshold. Any future incorporation of lower-emission energy sources would further reduce emissions relative to those assessed. The assessment is summarised in Section 2.3 of this document, and the assessment report provided at Appendix C.
People				
Community and economy	Local procurement and workforce	Department of Chief Minister and Cabinet, Strategic Policy & Delivery Division (NT)	Recommendation: To promote best practice, the Referral could benefit from, for example, An assessment of local workforce capacity/skills and local business capability/opportunity ideally with a focus on Berry Springs and neighbouring areas and of opportunities for local Aboriginal workers and enterprises. Include more detail for key mitigations such as the proposed 'Local Employment Management Plan' and 'Local Supply Management Plan' and including these in the main Referral Report • considering the inclusion of targets and measurement	LPM notes the recommendation and will prepare a Local Employment Management Plan and Local Supply Management Plan. Detailed workforce assessments, local procurement initiatives, performance measures, and consideration of cumulative workforce and procurement impacts will be further developed during detailed project planning and incorporated into these management plans as appropriate.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
			criteria for social and socioeconomic mitigations. Further consideration of potential cumulative impacts (such as potential competition for skilled workers, local procurement requirements/opportunities across projects and cumulative traffic impacts) and their potential mitigations.	
Community and economy	Traffic Management	Department of Logistics and Infrastructure (DLI) (NT)	Traffic Impact Report in accordance with the Austroads Guide to Traffic Management Part 12: "Integrated Transport Assessments for Developments" is required for the proposed mining activities. Operational Traffic Management Plan be submitted to TCSD, DLI prior to commencement of all operations. The proposed application does not provide sufficient information to identify the formally approved access location to Section 2746 Hundred of Hughes, 2873 Cox Peninsula Road from a public road. DLI provided additional information relating to detailed design of the access road and general access and permitting requirements.	LPM acknowledges DLI's comments regarding traffic assessment, access arrangements and permitting requirements. A TIA has been completed to assess Proposal-related traffic impacts, road network capacity and site access arrangements, and to identify appropriate mitigation measures. A summary of the TIA is provided in Section 10.2, and the full report is included in Appendix B. The TIA concluded that the existing road network is capable of accommodating forecast Proposal traffic and identified a range of mitigation measures, including the preparation of a Traffic Management Strategy (TMS) and phase-specific Traffic Management Plans (TMPs) to be prepared prior to the relevant project phases in consultation with DLI. Access arrangements have been refined and presented in the TIA. Detailed access design will be developed in consultation with DLI and relevant NT Government agencies. Access, permitting and approval requirements will be addressed through detailed design and subsequent approval processes.
			Operational Traffic Management Plan be submitted to TCSD, DLI prior to commencement of all operations.	LPM acknowledges and commits to the requirement of submitting a Operational Traffic Management Plans to TCSD prior to commencement of operations.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
	Biting insects and creation of breeding habitats	NT Health – Medical Entomology	Medical Entomology recognised that the surrounding environment of the mine site location is likely to be a localised seasonal source of midges and salt marsh mosquitoes. Whilst no large waterbodies naturally occur in the Proposal area, the proposed activities have the potential to create new mosquito breeding sites. It is recommended a short and concise biting insect management plan be developed. The biting insect management plan is to be written in accordance with the mosquito breeding prevention guideline and include information on seasonality of biting insect populations. The submission provides a listing of design and mitigation measures to reduce potential creation of biting insect habitat. Refer to the submission here for further details.	LPM recognises engagement with Medical Entomology is available to assist with the development of the management plan. Because there will be no onsite accommodation facilities, the risk to mine workers from exposure to biting insects will be limited. Night shift workers will be at greater risk of exposure; however, exposure will be limited by all workers wearing long sleeved shirts and pants as part of their standard Personal Protective Equipment. The risk posed to the community by any biting insert populations around the mine site is limited due to the site being located more than 25 km from Berry Springs, the nearest town and at least 3km from any rural residence (direct line). LPM will develop Biting Insect Management Plans for Construction and Operations and will implement the relevant mitigation and monitoring measures outlined in the *Guidelines for Preventing Mosquito Breeding Sites Associated with Mining Sites* (DoH, 2005) and *Personal Protection from Mosquitoes & Biting Midges in the NT* (DoH, 2011). The Concept MCP incorporates final landform and closure design principles intended to achieve a stable, free-draining post-mining landscape and avoid the creation of persistent ponding areas that could provide breeding habitat for mosquitoes and other biting insects.
Culture and heritage	Protection of Aboriginal Sacred Sites	Aboriginal Areas Protection Authority (AAPA)	A search of AAPA records did not identify any recorded or registered Aboriginal sacred sites on MLA33874. The proponent has not applied for an Authority Certificate, and there are no previous Authority Certificates relevant to these works across the Proposal area. It is not known whether the Proposal area or surrounding Charlotte River contains Aboriginal sacred sites. Bynoe Harbour contains numerous Aboriginal sacred sites including beaches, islands, and reefs.	LPM acknowledges AAPA's submission. An application for an Authority Certificate was submitted on 28 September 2026. The proposed sacred sites survey area (subject land) as part of the AAPA application has been developed using a risk-based approach informed by groundwater modelling, potential GDEs, the hydrogeological characteristics of the Charlotte River corridor and the potential for groundwater-dependent sacred-site features. The subject land is not defined solely by groundwater drawdown contours but by consideration of where a credible pathway exists. Although GDEs were not identified within the Proposal area or surrounding area (Section 9.4.1), the proposed subject area recognises that sacred site values associated with the Charlotte River corridor may be linked to broader hydrological, estuarine or tidal processes and therefore warranted a precautionary survey extent.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
			Obtaining and adhering to an Authority Certificate is the appropriate mechanism to avoid and mitigate impacts to sacred sites. See summary of Aboriginal Scared Sites issues in connection to extent of groundwater drawdown in the Hydrological Processes section in this table.	LPM will comply with all requirements of the Authority Certificate and implement measures necessary to avoid impacts to identified sacred sites.
	Engagement with Heritage Branch	DLPE - Heritage Branch	The Heritage Branch provided a number of recommendations relating to engagement of: • the development and appropriateness of developing a Cultural Heritage Management Plan • the development of a suitable survey scope • data sharing results of cultural surveys.	RHS were engaged to conduct site-specific archaeological survey and related CHA, which is provided at Appendix J. During survey planning, RHS consulted with the Heritage Branch, including review of heritage register information, archaeological database records and input to survey design and methodology. In response to recommendations for further investigations, the assessment included desktop studies, predictive modelling, Traditional Owner consultation and field-based archaeological surveys. The resulting heritage management recommendations will inform development of a Cultural Heritage Management Plan prior to ground disturbance. Additional engagement with the Heritage Branch has included: • general overview of the Proposal, regulatory and approval timelines, CHA scope and methodology, Traditional Owner engagement processes (NLC, Larrakia and AAPA), archaeological survey requirements, development of a Cultural Heritage Management Plan, AAPA Authority Certificate requirements, regulatory approval pathways, and ongoing consultation and heritage management arrangements for the Proposal • opportunity to review the draft CHA prior to submission of this document. The above supports ongoing information sharing and regulatory engagement.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
	Mitigation measures for Aboriginal archaeological places and objects	DLPE - Heritage Branch	Suggest similar mitigation for Aboriginal archaeological places and objects as for Sacred Sites.	LPM acknowledges this recommendation and has considered applying a similar mitigation hierarchy to Aboriginal archaeological places and objects as proposed for sacred sites. Avoidance is the preferred management outcome and will be supported through design refinements and the establishment of appropriate exclusion buffers where practicable. Where avoidance is not practicable, management measures will be developed in consultation with relevant Traditional Owners, building on the relationships established through ongoing engagement and Larrakia participation in the site-specific archaeological survey. These measures will be documented through the development of a Cultural Heritage Management Plan and may include monitoring, workforce awareness training and unexpected finds procedures. Any disturbance of Aboriginal archaeological places or objects will be managed in accordance with the *Heritage Act 2011 (NT*), including obtaining any required permits and approvals.
	Impacts on Aboriginal culture and heritage	NLC	NLC are concerned based on the mine's high impact construction and operations that the proposed actions will cause inevitable destruction to Aboriginal culture and heritage. The NLC urges the NT EPA to take a robust approach to the EIA process by ensuring the participation of the Larrakia people in planning and design prevention and mitigation strategies.	LPM acknowledges the concerns raised by the NLC. Since submission of the Referral, LPM has continued to progress cultural heritage investigations to better understand, avoid and manage potential impacts on Aboriginal cultural values. A CHA has been undertaken by Remote Heritage Services with participation by Larrakia representatives, and the findings are being used to inform project planning and environmental assessment. The CHA findings will inform development of a Cultural Heritage Management Plan, which will establish measures for the identification, protection, management and monitoring of Aboriginal cultural heritage values associated with the Proposal. LPM has applied for an Authority Certificate and will comply with all requirements arising from that process. The outcomes of the CHA, Cultural Heritage Management Plan and Authority Certificate processes will inform final project design and management measures to avoid and minimise impacts to Aboriginal cultural heritage. Refer to Section 4.7 for ongoing consultation plans and Appendix E for further details.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
	Consultation with Traditional Owners	NLC	The NLC encourages the Proponent to meaningfully engage with Traditional Owners in relation to cultural protocols, identification and protection of sacred sites, and the protection of nearby rivers, sea/harbour, aquatic and land animals, trees, insects and traditional foods in the area. Concerns have been raised on extent and quality of early stakeholder engagement in preparation of the referral, as Larrakia Nation Aboriginal Corporation have not been contacted by the Proponent. Some Larrakia were not even aware of the proposed mine and the Proponents mineral lease application. Larrakia people are not included in the Proponent stakeholders list.	LPM acknowledges the NLC's comments regarding Traditional Owner engagement and participation. LPM recognises the importance of meaningful consultation with the Larrakia regarding cultural protocols, identification and protection of sacred sites, and culturally significant environmental values. LPM acknowledges that some Larrakia people and organisations may not have been aware of the Proposal during the early stages of project development. Since submission of the Referral, LPM has engaged with the NLC through ongoing correspondence and meetings regarding the Project, cultural heritage investigations and appropriate consultation pathways. LPM has also consulted with Larrakia representatives through the CHA process, including participation in the archaeological survey for the Proposal. Traditional Owner engagement is continuing through the CHA process and currently includes engagement with Larrakia representatives identified through consultation with the LDC and LNAC. LPM will continue to work with the NLC regarding appropriate consultation pathways and the identification of any additional Traditional Owner groups with interests relevant to the Proposal. LPM supports the consultation process being facilitated by the NLC and remains willing to work collaboratively with the NLC and the Larrakia to develop an engagement framework that is meaningful, practical and sustainable throughout the life of the Proposal. Feedback obtained through future consultation will continue to inform project planning and environmental management. Refer to Appendix E for further details.
	Sacred sites	NLC	As the Proposal area has not been extensively researched, consultation and information gathering through the Authority Certificate process is critical to the protection of Aboriginal cultural values. The environment impact assessment for the Proposal should not be concluded until an Authority Certificate has been obtained.	LPM submitted an application for an Authority Certificate on 28 September 2026. The application was supported by the findings of the Lei Lithium Project – CHA (Appendix J), a copy of which was provided to AAPA as part of the application. The application remains under assessment at the time of submission of this document.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
	Cultural Heritage Management Plan	NLC	The NLC urges the NT EPA to require proper cultural heritage due diligence as part of its environmental approval, including a heritage survey and CHA.	LPM supports the need for appropriate cultural heritage due diligence. A site-specific CHA, including desktop investigations, predictive modelling, stakeholder consultation and a field-based archaeological survey with Larrakia participation, has been undertaken to inform the SER. A summary of the survey is provided in Section 11.2.1.
General				
	Cumulative impacts – general statement	ECNT	The ECNT states that the Proponent has not adequately considered the Proposal in the context of nearby similar activities that will generate cumulative impacts in conjunction with the proposed Proposal if it proceeds. The ECNT are most concerned with cumulative impacts to the environment with the nearby BP33 and Grants Project which are also lithium mining projects. As the Proposal and above-mentioned Proposal area all lithium projects dependant on favourable market to commence operation, therefore potentially operating concurrently of each other.	LPM acknowledges ECNT's concern regarding the potential for cumulative impacts arising from concurrent operation of the Proposal and nearby mining developments, including the BP33 and Grants Projects. The environmental impact assessment has considered cumulative impacts for all relevant environmental factors, particularly the potential for cumulative groundwater impacts as a result of the nearby mining operations. The outcome of each cumulative impact assessment is presented within each factor section. Ongoing monitoring and adaptive management measures will be implemented to verify assessment outcomes and adapt responses as appropriate to minimise the potential for cumulative impacts.
	Level of NT Environmental Impact Assessment	ECNT	ECNT is concerned by the substantial uncertainties and information gaps in the Referral Report. In making their submission to public process informing the NT EPA's decision on whether the proposed action requires assessment and if so at what level, ECNT recommends that the Proposal be assessed at the level of Environmental Impact Assessment (EIS).	The NT EPA's Statement of Reasons, dated 5 February 2025, determined that the Proposal requires a standard environmental impact assessment in accordance with section 55 of the EP Act and regulation 57(2)(b)(i) of the Environmental Protection Regulations. The NT EPA further determined that the assessment would be undertaken by way of a SER in accordance with regulation 57(2)(b)(ii) of the Environmental Protection Regulations. Following consideration of the Referral Report and submissions received during the public exhibition period, the NT EPA issued a Direction to Provide Additional Information on 11 March 2025. This document has been prepared in response to that Direction.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
	Closure and Rehabilitation	ECNT	The Referral Report includes inadequate information regarding mine closure and rehabilitation, both planned and unplanned. Best practice is objectives and closure criteria be developed prior to the commencement of mining, with stakeholder involvement from the outset rather than post. Recommended based on uncertainty of market conditions of lithium, an unplanned closure plan should be prepared and submitted to the regulator as part of the environmental assessment.	LPM has prepared a concept MCP in accordance with the Direction, with a summary of the MCP provided in Section 2.5 and the Concept MCP provided at Appendix D. The Concept MCP adopts a whole-of-life closure planning approach and establishes a closure vision, post-mining land use objectives, preliminary closure objectives, performance indicators and completion criteria to guide rehabilitation and closure activities throughout the Proposal lifecycle. The Concept MCP incorporates ongoing stakeholder engagement and provides for the progressive refinement of closure planning as additional environmental, operational and stakeholder information becomes available. It also includes provisions for care and maintenance, temporary suspension of operations and unplanned closure, including measures for site stabilisation, environmental protection, rehabilitation, monitoring and stakeholder engagement, providing a framework for managing closure outcomes irrespective of the timing of mine cessation. The Proposal will also be subject to the mandatory financial security provisions of the EP Act, which requires financial security to cover rehabilitation liabilities prior to the commencement of authorised activities.
	Principle of intergenerational equity	ECNT	Given the uncertain future for similar kinds of activities in the nearby area, it remains to be seen whether the considerable amount of environmental impact and risk, including legacy issues and risks of unplanned closure, does not outweigh the alleged social and economic benefits that may or may not transpire, thus contravening the principle of intergenerational equity as referred to in the referral documents.	LPM acknowledges concerns regarding potential environmental risks, legacy impacts and closure outcomes raised by ECNT. The Proposal is a relatively small-footprint underground mining operation and does not include ore processing facilities, tailings storage facilities or a paste-fill plant which reduces the scale and complexity of potential long-term environmental liabilities. A Concept MCP has been prepared that addresses both planned and unplanned closure (refer to Appendix D). The Proposal will also be subject to the requirements of the EP Act (NT) including the provision of a mandatory financial security to cover full rehabilitation costs, payable prior to commencement of works. Together with progressive rehabilitation and ongoing regulatory oversight, these measures minimise the risk of residual legacy impacts and ensure that the environmental and economic costs of the Proposal are not transferred to future generations, consistent with the principle of intergenerational equity.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
	Closure and Rehabilitation	ECNT	The Referral Report includes inadequate information regarding mine closure and rehabilitation, both planned and unplanned. Best practice is objectives and closure criteria be developed prior to the commencement of mining, with stakeholder involvement from the outset rather than post. Recommended based on uncertainty of market conditions of lithium, an unplanned closure plan should be prepared and submitted to the regulator as part of the environmental assessment.	The Concept MCP has been prepared in accordance with the Direction that referenced contemporary mine closure guidance including the ICMM Integrated Mine Closure Good Practice Guide (2019), CRC TiME Integrated Mine Transitions Framework (2021) and DMIRS Mine Closure Plan Guidance (2020). The plan includes provision for planned closure, temporary care and maintenance, and unplanned or sudden closure scenarios, including environmental protection measures, site stabilisation, rehabilitation, monitoring and ongoing stakeholder engagement. A summary of the Concept MCP is provided in Section 2.5 and the provided at Appendix D.
Consultation				
	Stakeholder engagement – Traditional Owners	ECNT	Aside from vague references to future engagement with Traditional Owners, the Proponent has not engaged with the question of free, prior, and informed consent in their referral documents.	LPM acknowledges the Referral Report did not explicitly discuss FPIC principles. Since submission of the Referral, LPM has implemented an updated CSES (provided at Appendix E that incorporates Aboriginal engagement principles aligned with free, prior and informed participation. Consultation in since the Referral has included engagement with Larrakia representative organisations, direct Traditional Owner involvement in the preparation of the CHA and field surveys, and ongoing opportunities to inform Proposal planning, cultural heritage management and environmental assessment outcomes. A summary of the engagement activities undertaken are provided in Section 4.3 and the Outcomes Report is provided at Appendix F.
	Stakeholder engagement - ECNT	ECNT	It is unclear what stakeholder engagement that Proponent has undertaken to date. ECNT was identified as a key stakeholder, with various consultation actions identified to have occurred in 2024. ECNT have not been contacted by the Proponent.	LPM acknowledges the concern regarding stakeholder engagement. Since submission of the Referral, LPM has implemented an updated CSES (provided at Appendix E). Outcomes of engagement are summarised in Section 4.4 and concerns addressed in Section 4.5, with an Outcomes Report provided at Appendix F. ECNT was identified as a key stakeholder in the CSES. A presentation of the Proposal activities and opportunity to discuss ECNT concerns in person with LPM occurred on 6 August 2026 in Darwin.

Environmental Factor	Topic	Stakeholder	Summary of issues / recommendations raised in submission	LPM's response and actions taken
	Consultation and stakeholder engagement plan	ECNT	ECNT is not confident in the overall consultation plan. It is not acceptable to commence consultation once environmental approvals have been secured, or are on their way to being secured, because the substance of the mitigation and control measures included in the proposed plan needs to arise from consultation and stakeholder engagement. ECNT furthermore holds critical concerns about the suggested consultation material included by the Proponent in Appendix E. For example, the Plan instructs the Proponent to "Clearly state that the Proposal will not draw on any rural water tables/aquifers", but this is contradicted by the Proponent's own plans as outlined in the referral documents which indicates the possibility of groundwater extraction. The "Key Messages" are therefore factually wrong and fail to inform stakeholders about the true nature of the Proposal and potential impacts. Various areas of concern are said to be 'expected' to emerge from consultation, but once again it is unclear if this is based on conjecture or evidence (i.e. Traffic Management Plan should be developed by the proponent and published as part of a consultation process).	LPM acknowledges ECNT's concerns regarding the consultation approach and agrees that stakeholder engagement should meaningfully inform Proposal design, mitigation and management measures. Since submission of the Referral Report, LPM has implemented an updated CSES, prepared by EMM. This included review of the key messaging, to ensure alignment with Proposal activities and potential impacts. The strategy establishes engagement objectives, identified stakeholder groups, engagement methods and reporting processes, and specifically recognises the importance of ongoing engagement throughout the environmental assessment process. The CSES is provided at Appendix E.

6. ENVIRONMENTAL IMPACT ASSESSMENT

The NT EPA has identified that the Proposal has potential to significantly impact five environmental factors and associated values. The approach taken to assessing the significance of environmental impacts to each factor is summarised in the sections below, and the potential direct, indirect and cumulative impacts have been reassessed using the updated information collected in response to the Direction. The findings of these assessments are presented in Sections 7 to 11. A summary of the environmental factors and potential significant impacts assessed are provided in Table 6-1 below.

Table 6-1. Environmental factors identified in as having a potential significant impact

Theme	Factor	Potential for significant impact
Water	Hydrological processes	Groundwater extraction and mine dewatering have the potential to: • alter groundwater levels • groundwater flow dynamics • groundwater-surface water interactions. Potential impacts may occur to: • GDEs (discussed in Terrestrial ecosystems) • connected surface water systems • declared beneficial uses and other groundwater users. Cumulative impacts associated with nearby mining activities were also considered.
	Inland water environmental quality	Mine-affected water, seepage and runoff from waste rock, ore stockpiles and other mine infrastructure may result in changes to surface water and groundwater quality. Groundwater drawdown may also contribute to saline intrusion and oxidation of ASS. Potential impacts may occur to: • the Charlotte River and associated tributaries • groundwater resources and other receiving environments.
Land	Terrestrial ecosystems	Vegetation clearing and groundwater drawdown may result in changes to: • groundwater availability, seasonal surface water availability and habitat condition. Potential impacts may occur to: • GDEs • significant or sensitive vegetation.
People	Community and Economy	Construction and operation of the Proposal may increase: • traffic volumes • heavy vehicle movements along local and regional roads. Potential impacts may occur to: • road users • nearby communities, businesses, tourism operators, community amenity and local infrastructure.

Theme	Factor	Potential for significant impact
	Culture and heritage	Ground disturbance, infrastructure development and groundwater extraction may impact cultural and heritage values. Potential impacts may occur to the following associated with the Proposal area and zone of influence: • sacred sites • aboriginal archaeological places and objects • non-Aboriginal archaeological places and objects, • cultural landscape features and practices • intangible cultural values

6.1 Additional information and assessment undertaken

In response to the Direction and issues raised during public exhibition of the Referral, additional technical investigations, stakeholder engagement and impact assessment have been undertaken, over the past 19 months since the Direction was received. These activities have reduced uncertainty, refined impact predictions and informed the development of mitigation and management measures. The work undertaken is summarised in Table 6-2 and discussed further in the relevant environmental factor sections presented in Sections 7 to 11.

Table 6-2. Summary of additional studies undertaken since referral submission

Factor	Description of additional work	Relevant section
Hydrological processes	• Updated groundwater model and cumulative groundwater assessment. • Site-specific flood modelling. • Updated site water balance. • Baseline surface water and groundwater monitoring to January 2026.	Section 7
Inland water environmental quality	• Additional surface water and groundwater quality monitoring. • Refined site water balance and water management system design. • Assessment of discharge, seepage, saline intrusion and ASS risks.	Section 8
Terrestrial ecosystems	• GDE field survey and report. • Development of the GDE Monitoring Plan. • Review of groundwater drawdown effects on ecological values.	Section 9
Community and Economy	• Traffic impact assessment	Section 10
	• Stakeholder engagement scoping and planning • Consultation with community members, government agencies and other stakeholders.	Section 4
Culture and heritage	• CHA. • Site-specific archaeological survey. • Consultation with the AAPA, NLC, Larrakia and other Aboriginal stakeholders.	Section 11

6.2 Identifying the impacts

The additional information collected since submission of the Referral has been used to reassess the potential for significant environmental impacts of the Proposal. Potential direct, indirect and cumulative impacts[2] for each environmental factor were assessed using methodologies appropriate to the environmental values, receptors and impact pathways being considered. The methodologies applied for each factor are described in the relevant chapters of this document and supporting technical reports.

6.3 Impact avoidance, mitigation and monitoring

LPM has applied the environmental decision-making hierarchy to avoid and reduce potential impacts wherever practicable through Proposal design, infrastructure siting and operational planning. The environmental assessments undertaken for the Proposal have informed the development of target avoidance, mitigation measures for each environmental factor discussed in the relevant sections below. Where uncertainty remains, particularly in relation to matters requiring further investigations or ongoing consultation, adaptive management and monitoring frameworks have been incorporated into the WMP, GDE Monitoring Plan and Concept MCP to support informed decision-making and responsive management throughout the LOM. Monitoring programs have been designed to verify impact predictions and confirm the effectiveness of mitigation measures. Details of the proposed avoidance, mitigation, management and monitoring measures relevant to each environmental factor are discussed in the relevant sections below.

6.4 Assessing the significance of residual impacts

To provide a consistent basis for describing and comparing residual impacts across environmental factors, the outcomes of the factor-specific assessments were evaluated against the significance criteria provided in Table 6-3. These criteria consider the scale, magnitude and duration of impacts after implementation of relevant avoidance, mitigation and management measures.

[2] *Note that the SER focusses on assessing impacts that were not adequately assessed in the Referral (as per the direction given by the NT EPA). The NT EPA will refer to information presented in both the Referral and SER when making its decision on whether or not to approve the proposal.*

Table 6-3. Scale, magnitude and duration criteria

Scale: The spatial extent of the impact, considering both the impact footprint (direct disturbance) and/or area of influence, including (indirect disturbance).			
Widespread Impact affects a large proportion of the distribution, function or condition of the environmental value.	**Regional** Impact affects environmental values beyond the Proposal area and is detectable at a regional scale.	**Localised** Impact is largely confined to the local area surrounding the Proposal.	**Limited** Impact is restricted to the immediate disturbance area and affects only a small part of the environmental value.
Magnitude: The degree or amount of change from natural conditions.			
Major Impact results in a substantial adverse change to environmental values, ecological integrity, ecological function and/or the extent or condition of sensitive receptors. Relevant published or legislated thresholds or criteria for environmental protection are exceeded, where applicable.	**Moderate** Impact results in a measurable change to environmental values or sensitive receptors, but ecological integrity and function are largely maintained. Relevant published or legislated thresholds or criteria may be approached or marginally exceeded, where applicable.	**Minor** Impact is measurable but results in little change to environmental values, ecological integrity or sensitive receptors. Relevant published or legislated thresholds or criteria for environmental protection are met.	**Negligible** No discernible change to environmental values, ecological integrity, ecological function, sensitive receptors or existing environmental conditions.
Duration: The frequency of the impact and the time over which the impact persists.			
Permanent/irreversible Impact is enduring values are unlikely to recover.	**Long-term** Impact occurs over an extended period covering the construction and operational phases, values eventually recover.	**Medium-term** Impact occurs intermittently and/or only during the construction phases, after which values recover.	**Short-term** Impact occurs sporadically and/or lasts for a few days to weeks, after which values recover.

6.5 Residual impacts

Residual impacts were predicted for each environmental factor following the implementation of the proposed avoidance, mitigation and management measures. Residual impact significance was determined using the assessment framework described in Section 6.2, and the residual impact rating provided in Table 6-4.

Table 6-4. Residual impact ratings and criteria

Minor: A minor residual impact is unlikely to be significant	Moderate: A moderate residual impact has potential to be significant. The significance depends on the acceptability of the impacts and the effectiveness of mitigation measures	Major: A major residual impact is likely to be significant. The level of acceptability will depend on offsets or benefits compensating for the impact.
A minor impact generally has two or more of the following characteristics: **Scale**: limited/localised **Magnitude**: negligible/minor **Duration**: short-term/ medium-term/reversible.	A moderate impact generally has two or more of the following characteristics: **Scale**: localised/regional **Magnitude**: moderate **Duration**: medium-term/long-term.	A major impact generally has two or more of the following characteristics: **Scale**: regional/widespread **Magnitude**: moderate/major **Duration**: long-term/permanent.

A summary of the residual impact identified for each environmental factor is provided in Table 6-5.

Table 6-5. Summary of residual impacts

Factor	Key potential impact	Residual rating
Hydrological processes	• Groundwater drawdown. • Cumulative groundwater impacts associated with the concurrent operation of the Lei, Grants and BP33 Projects.	Moderate
Inland water environmental quality	• Surface water contamination from mine-affected water discharges • Surface water and groundwater contamination from mine seepage and runoff from waste rock and ore stockpiles • Exposure of ASS through groundwater drawdown • Exposure of ASS through removal of overburden • Saline intrusion and aquifer salinisation • Cumulative impacts	Minor
Terrestrial ecosystems	• Loss and degradation of GDEs from lowered groundwater levels	Minor
Community and Economy	• Increased traffic volumes and potential for congestion • Localised delays at intersections and along haulage routes due to heavy vehicles • Impacts to community amenity (noise, dust and vibration) along haul routes (e.g. Cox Peninsula Road, Fog Bay Road) • Impacts to sensitive receptors (e.g. Berry Springs Primary School and surrounding community) • Road safety risks associated with increased light and heavy vehicle movements • Deterioration of road condition due to heavy vehicle use • Uncertainty in traffic predictions and changing conditions over time • Potential cumulative impacts on road users, tourism and surrounding communities	Minor

Factor	Key potential impact	Residual rating
Culture and heritage	• Loss or damage to sacred sites • Direct loss or damage of Aboriginal archaeological sites • Direct loss or damage of non-aboriginal archaeological sites • Loss of or alteration of cultural landscape features, practices and amenity • Impacts on intangible cultural heritage values	Minor

Following implementation of the proposed avoidance, mitigation and management measures, no residual impacts were assessed as major and no environmental offsets are proposed. Detailed residual impact assessments are provided in Sections 7 to 11.

7. HYDROLOGICAL PROCESSES

7.1 Environmental objective

The NT EPA's objective for Hydrological Processes is to:

Protect the hydrological regimes of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.

7.2 Additional information required

The NT EPA requested additional information to determine the potential for significant impacts of the Proposal and the effectiveness of mitigation measures on Hydrological Processes. Refer to Table 1-1 Hydrological Processes topic for further information.

Since submission of the Referral, a site-specific groundwater model has been developed by CloudGMS to support assessment of potential groundwater impacts associated with the Proposal. The model was used to predict groundwater drawdown resulting from mine dewatering, including the magnitude, spatial extent, duration and recovery of drawdown, as well as potential cumulative impacts associated with nearby mining operations. Model outputs provide the quantitative basis for assessing potential impacts on key receptors including groundwater-dependent ecosystems and surface water systems, and for evaluating key uncertainties associated with the assessment. The groundwater model was initially developed based on a box cut mine design and was subsequently updated to reflect the revised cut-and-cover design (Appendix I).

A Surface Water Assessment, including preliminary flood modelling and a site water balance assessment, has been prepared by WRM (Appendix G). The assessment characterises the drainage network and baseline water quality in the Proposal area, establishes preliminary site-specific trigger values, assesses flood risk under a range of current and future climate scenarios, and evaluates the performance of the proposed water management system, including water supply, storage capacity and controlled releases.

A WMP (Appendix A) has been developed to describe the proposed water management system, including the separation, capture, storage, reuse and release of raw water, sediment water and mine-affected water. The WMP also establishes surface water and groundwater monitoring programs, assessment criteria, trigger action response plans and contingency measures to support adaptive management throughout the Proposal.

7.3 Policy and guidance

The key policy and guidance documents that have been applied to assessing and managing risks to surface water and groundwater hydrological processes are summarised in Table 7-1.

Table 7-1. Policy and guidelines – hydrological processes

Policy / Guidance	Key relevance	Application to the Proposal
Australian Groundwater Modelling Guidelines (Barnett et al., 2012)	Best-practice groundwater modelling.	Applied to development and assessment of the groundwater model, including drawdown, recovery, cumulative impacts and risk assessment.
Australian Rainfall and Runoff (Ball et al., 2019)	Standard approach for hydrological and flood assessment.	Used to inform surface water assessment, runoff estimation, drainage design and flood risk considerations.
Darwin Rural Adelaide River Water Control District Declaration (2024)	Identifies regulatory water management requirements.	Considered in assessing potential impacts to groundwater resources and beneficial uses within the Water Control District.
NT Water Allocation Planning Framework (2020)	Framework for sustainable water resource management.	Used to assess groundwater extraction impacts on environmental values, beneficial uses and cumulative water resource impacts.
Ready Reckoner for Flooding under Climate Change (2025)	Guidance for incorporating climate change into flood assessments.	Used to consider future climate influences on hydrology, flood risk and water management infrastructure performance.

7.4 Environmental values

7.4.1 Surface water

The Proposal area is located within the Charlotte River sub-catchment and an unnamed northern tributary of the Charlotte River sub-catchment (Figure 7-1). Consequently, surface water runoff from the Proposal area drains either directly to the Charlotte River or indirectly via unnamed tributaries. The Charlotte River represents the primary downstream surface water receptor for the Proposal.

Local surface water drainage is characterised by low ridges, broad gently sloping flats and shallow, poorly defined drainage pathways. The northern portion of the Proposal area is generally wide and flat and drains towards the unnamed northern tributary, while areas south of the central ridgeline and Fog Bay Road drain towards the Charlotte River (WRM, 2026b).

The Charlotte River drains a catchment of approximately 17,000 ha, with the Proposal footprint comprising around 1.7% of the catchment (CloudGMS, 2026a). Approximately 6,200 ha of the catchment contributes flow to the SW5 monitoring location downstream of the Proposal area.

The unnamed northern tributary drains a catchment of approximately 3,050 ha upstream of the New 1 monitoring location and receives runoff from local drainage lines located north of the Proposal area. The catchment also includes the BP33 mine located further north.

The lower reaches of both the Charlotte River and the unnamed northern tributary are influenced by tidal processes associated with Bynoe Harbour, while upstream reaches are predominantly freshwater.

Flood Model

A two-dimensional TUFLOW hydraulic model was developed by WRM (2026a) to characterise flood behaviour within the Proposal area and surrounding catchment. The model domain included the Proposal area, a reach of the Charlotte River and local overland flow paths. Flood conditions were simulated for the 10%, 1% and 0.1% Annual Exceedance Probability (AEP) events, the Probable Maximum Precipitation (PMP)

event, and a 1% AEP event incorporating future climate conditions. Further details of the model configuration, assumptions and model outputs are provided in Appendix G.

Model outputs indicate that flooding associated with the Charlotte River has limited influence across most of the Proposal area. Flooding is generally restricted to shallow inundation of low-lying areas, with the proposed box cut having a low likelihood of inundation during flood events up to and including the 0.1% AEP event under current climate conditions. During the PMP event, shallow inundation depths of less than 0.1 m may occur within the box cut area.

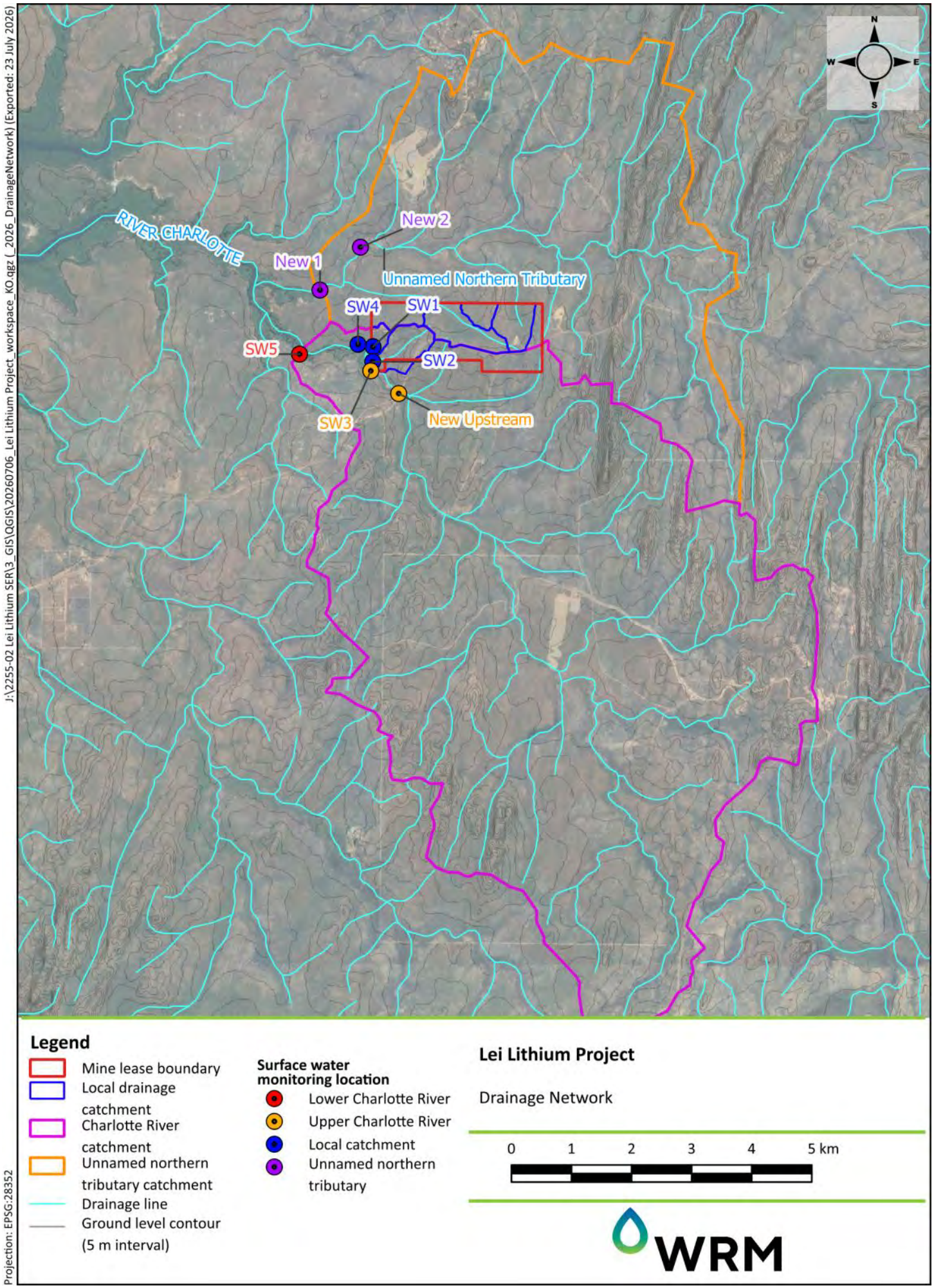


Figure 7-1. Local drainage network (WRM 2026b)

7.4.2 Groundwater

The Proposal area is underlain by the Burrell Creek Formation (BCF), which hosts a fractured rock aquifer that forms part of the broader Northern Australian Fractured Rock Province Aquifer (NAFRPA). The BCF is characterised by predominantly weakly fractured and weathered rocks, with groundwater occurrence controlled by secondary porosity associated with fracture and joint development. Shallow alluvial deposits are present in the broader area, particularly in proximity to the Charlotte River; however, no alluvial aquifer was intersected during drilling of the six monitoring bores within the Proposal area. Accordingly, groundwater at the site is inferred to occur predominantly within the BCF. The BCF is comprised of two hydrostratigraphic units (HSUs), the upper weathered BCF (4 to 40 mBGL) and the lower fresh BCF (40 to 75+ mBGL). The upper portion consists of weathered schists with clay lenses and iron oxide staining, forming a low-permeability, fractured rock aquifer with limited storage, consistent with the NAFRPA classification. At depth, the BCF transitions to slightly weathered to fresh phyllite and schist, where groundwater flow occurs primarily along fractures and quartz veining (Eco Logical Australia (ELA), 2026).

Aquifer hydraulic properties

The BCF has limited groundwater potential due to low primary porosity and generally limited open fracturing within the formation (CloudGMS, 2026a). Bore yields are typically less than 0.5 L/s, although higher yields may occur where fracture zones or quartz veining are intersected.

Slug testing undertaken in monitoring bores in the Proposal area reported hydraulic conductivity values of approximately 6.8 m/day in weathered, fractured rock, and 0.05 to 3.8 m/day in weathered rock where fractures were not observed (CDM Smith, 2024).

The influence of secondary porosity (fractures and joints) on BCF permeability is consistent with observations from nearby studies at BP33, where hydraulic conductivity ranged from 0.27 to 2.6 m/day in fractured rock, compared to significantly lower values of 0.0003 to 0.08 m/day in unfractured rock (CloudGMS, 2021; cited in CloudGMS 2026a).

Groundwater levels and flow

Groundwater levels within the six monitoring bores drilled within the Proposal area evidence relatively shallow levels (<16 m below ground level (mBGL)). The monitoring results evidence a rainfall seasonality effect on groundwater levels, with levels reaching their peak at the end of the wet season (March) and the lowest point towards the end of the dry season (September). The magnitude of groundwater level fluctuations varies spatially, with bores located in lower-lying areas exhibiting smaller annual changes (approximately 3 to 6 m) compared to those in more elevated areas (approximately 8 to 10 m). Groundwater levels also appear to be influenced by proximity to Charlotte River (CloudGMS, 2026a), suggesting groundwater flows towards the river.

One set of nested bores is located within the Proposal area (LG1-S and LG1-D), intercepting the upper and lower portions of the BCF. Groundwater levels recorded in these bores indicate an upward hydraulic gradient within the BCF, with the deeper bore showing a shallower groundwater level than the shallow bore. This vertical head difference likely reflects partial confinement of the deeper section of the formation by the overlying weathered unit (CloudGMS, 2026a).

Groundwater flow within the Proposal area is dominated by topography, moving from elevated areas toward Charlotte River, with no significant change driven by wet season recharge (CloudGMS, 2026a). The influence

of surface topography on groundwater flows was also observed during investigations conducted at BP33 and Grants (Groundwater Enterprises, 2023).

Groundwater recharge

Recharge of the BCF occurs predominantly through diffuse infiltration of rainfall during the wet season. Estimated recharge rates from nearby deposits, based on the water table fluctuation method, range from approximately 80 to 200 mm/year in elevated areas, and about 30 to 120 mm/year in the lower-lying areas (CloudGMS, 2026a). Recharge is strongly seasonal, with most occurring during the monsoonal wet season when rainfall exceeds evapotranspiration.

The rainfall seasonality effect observed in the groundwater levels within the Proposal area support that recharge of the BCF occurs primarily through diffuse infiltration of rainfall during the monsoonal wet season (CloudGMS, 2026a).

Recharge processes are influenced by factors such as soil permeability, vegetation-driven evapotranspiration, and fracture pathways within the weathered zone. In tropical environments, including the Cox Peninsula, rejected recharge may occur during high-intensity rainfall events when infiltration capacity is exceeded (ELA, 2026).

Groundwater discharge

Groundwater discharge within the Proposal Area occurs primarily through evapotranspiration and discharge to surface water features, including streams and creeks. Evapotranspiration is most significant where groundwater levels are shallow, allowing vegetation to access and utilise groundwater. Studies from comparable vegetation types and climatic conditions indicate that evapotranspiration may account for groundwater discharge rates of up to approximately 1,110 mm/year (Cook et al., 1998).

Groundwater discharge to surface water features is expected to be relatively limited due to the low hydraulic conductivity of the aquifer, which restricts groundwater flow rates. This is supported by observations of limited dry season flow in the upper reaches of the Charlotte River, indicating that while groundwater discharge to the river does occur, it is relatively minor and does not sustain flow throughout the year (ELA, 2026).

Declared Beneficial Uses

The Proposal is located within the Fog Bay Area and Darwin Rural Adelaide River Water Control District (DRARWCD). In the Fog Bay Area the designated beneficial use is aquatic ecosystem protection (Northern Territory Government (NTG), 1998), while in the DRARWCD, the beneficial uses of surface water and groundwater are the following:

- Aboriginal economic development
- Agriculture
- Aquaculture
- Cultural
- Environment
- Industry
- Mining activity
- Petroleum activity
- Public water supply
- Rural stock and domestic (NTG, 2024).

Groundwater users

Within a 2 km radius of the Proposal area, there are 13 groundwater bores mainly installed for the purpose of exploration and monitoring.

The nearest registered bore (RN041993), used for rural stock and domestic purposes, is located approximately 2.6 km south of the Proposal area. The nearest groundwater extraction licence (BCFUPC10197) is located more than 10 km from the Proposal area and permits the extraction of up to 340 ML/year for agricultural use from the BCF and Upper Pioneer Creek.

Further east, there are multiple groundwater extraction licences associated with the Berry Springs Groundwater System, which is managed under the Berry Springs Water Allocation Plan. However, the BCF aquifer underlying the Mine Lease area is not hydraulically connected to the Burrell Creek Groundwater System beneath the Berry Springs Dolostone aquifer (Verma, 1994; Verma, 2002).

7.5 Assessment of potential significant environmental impacts

The Proposal has the potential to affect hydrological processes through changes to surface water drainage patterns associated with land disturbance and operation of water management infrastructure, as well as groundwater extraction associated with mine dewatering. Potential impacts to surface water and groundwater hydrology, including cumulative impacts and key uncertainties, are assessed below. Proposed avoidance and mitigation measures, as well as the residual impact assessment, are presented in Table 7-2. Impact significance has been determined having regard to the extent, magnitude, duration and reversibility of predicted impacts, as well as the sensitivity of the affected environmental values, consistent with the assessment framework outlined in Section 6.

7.5.1 Alteration of surface water hydrology

Construction and operation of the Proposal will modify local surface water drainage patterns through vegetation clearing earthworks, excavation activities and the installation of water management infrastructure. These activities have the potential to alter local runoff pathways, increase runoff concentration in disturbed areas and reduce infiltration within portions of the Proposal footprint.

Potential impacts are expected to be localised and largely confined to disturbed areas. Although all drainage lines within the Proposal area ultimately discharge to the Charlotte River system, the disturbance footprint comprises less than 100 ha and represents a small proportion of the receiving catchment. Consequently, while some alteration to local drainage patterns is anticipated, the scale of disturbance is unlikely to result in significant changes to downstream flow regimes or catchment-scale hydrological processes. Controlled releases from MWD1 will only occur during periods of flow within the Charlotte River, minimising the potential for measurable changes to downstream hydrology. Similarly, passive overflows from the SD1 and RWD to the Charlotte River and the unnamed northern tributary are not expected to significantly alter receiving environment hydrological processes.

The Proposal incorporates a water management system designed to separate runoff from disturbed and undisturbed areas and manage water generated within the Proposal area (Section 2.2). Flood modelling indicates that flooding associated with the Charlotte River is expected to have limited influence across the Proposal area, with inundation generally restricted to low-lying areas during extreme events. The WMP (Appendix A), includes controlled discharge criteria and contingency measures for extreme rainfall events and potential failures of water management infrastructure. These measures are expected to minimise the

potential for adverse impacts on downstream hydrological processes under both normal operating conditions and extreme weather events.

Based on the assessment, impacts to surface water hydrology are expected to be limited to localised, with a negligible magnitude of impact due to the limited disturbance footprint relative to the broader catchment and the controlled nature of proposed discharges. The impact is expected to occur sporadically during construction and operations and is therefore considered short-term. Surface water monitoring, gauging within the receiving environment, and maintenance of discharge records will be undertaken in accordance with the WMP. Trigger Action Response Plans (TARPs) will also be implemented to identify and manage any unanticipated changes to receiving environment hydrology. Accordingly, the residual impact to surface water hydrological processes is considered minor.

7.5.2 Groundwater drawdown

Groundwater extraction associated with mine dewatering will have an impact on groundwater levels within and surrounding the Proposal area. The groundwater model was developed using a calibrated numerical groundwater flow model representing the Proposal. Model predictions were based on passive dewatering of groundwater inflows via underground sumps, with no production bore abstraction assumed. The model assessed a six-year life-of-mine period followed by a 14-year post-closure period and historic climatic inputs (1900 to 2000) to simulate recharge conditions. Initially, the model incorporated a box cut design but was later revised to incorporate the updated cut-and-cover tunnel design. The assumptions and parameters used in the model are presented in Appendix A1 and A2 of the Lei Lithium Groundwater Model and Impact Assessment report (Appendix G).

Groundwater inflows to the underground mine increase progressively throughout mining as development advances to depth. Combined inflows to the cut-and-cover tunnel, are predicted to increase from approximately 194 ML/year during Year 2 to a peak of approximately 465 ML/year during Year 6-7 (WRM, 2026a). The cut-and-cover tunnel contributes substantially lower inflows than the box cut design due to the reduced hydraulic connection provided by the tunnel liner (CloudGMS, 2026).

The forecast drawdown magnitude and extent at Year 6 (end of underground mining) are presented in Figure 7-2. As shown, the model predicts that the drawdown caused by dewatering activities will extend about 1 to 2 km beyond the mining lease boundary to the north, west and south, while approaching the lease boundary to the east. A maximum drawdown of approximately 10 m is predicted within the mining lease, decreasing to around 0.1 m at a distance of approximately 2 km from the Proposal. Drawdown is primarily driven by dewatering of the underground workings rather than the surface access configuration, resulting in negligible differences between the box cut and cut-and-cover tunnel scenarios.

Post-closure modelling predicts progressive groundwater recovery following cessation of dewatering activities. Drawdown is predicted to contract significantly within four years of mine closure (Year 10), extending only 1 km to the north, and west beyond the lease boundary (Figure 7-3 (a)). Drawdown is expected to be largely confined to the mining lease area after 9 years of recovery (Figure 7-3 (b)). Groundwater levels are predicted to progressively recover towards pre-mining conditions, with the groundwater system returning to near pre-mining conditions by Year 15 to 20. The modelling indicates that natural groundwater flow conditions are re-established following recovery of groundwater levels.

Although mining activities may result in minor changes to groundwater recharge, these changes are expected to be negligible relative to the scale of the broader catchment. Groundwater recovery is therefore expected to be driven predominantly by regional recharge processes rather than localised recharge conditions within the Proposal area (CloudGMS, 2026a).

Based on the model results, groundwater drawdown is predicted to be localised, with a moderate magnitude of impact within the Proposal area, decreasing to minor beyond the mining lease boundary. The impact is considered long-term, as it extends through the operational phase but then groundwater levels are expected to recover following closure. Groundwater monitoring will be undertaken in accordance with the WMP, which includes preliminary operational groundwater level ranges for monitoring drawdown within the existing monitoring network, as well as TARPs to facilitate a timely response should trigger levels be exceeded. Applying the precautionary principle to the uncertainties relating to the modelling and the use of adaptive management to manage groundwater drawdown impacts, the residual impact is considered moderate.

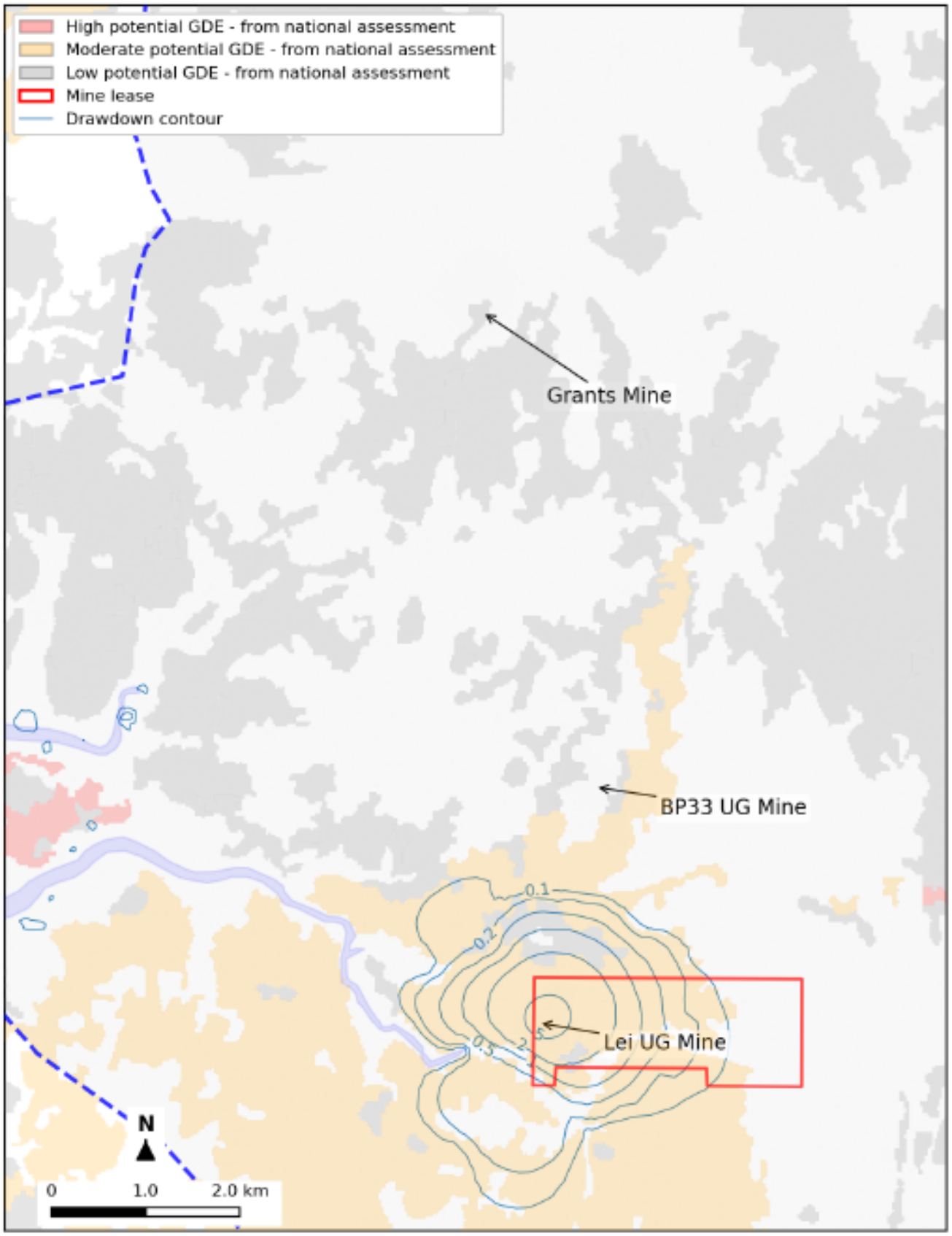


Figure 7-2. Forecast drawdown contours after 6 years of mining at the Proposal.

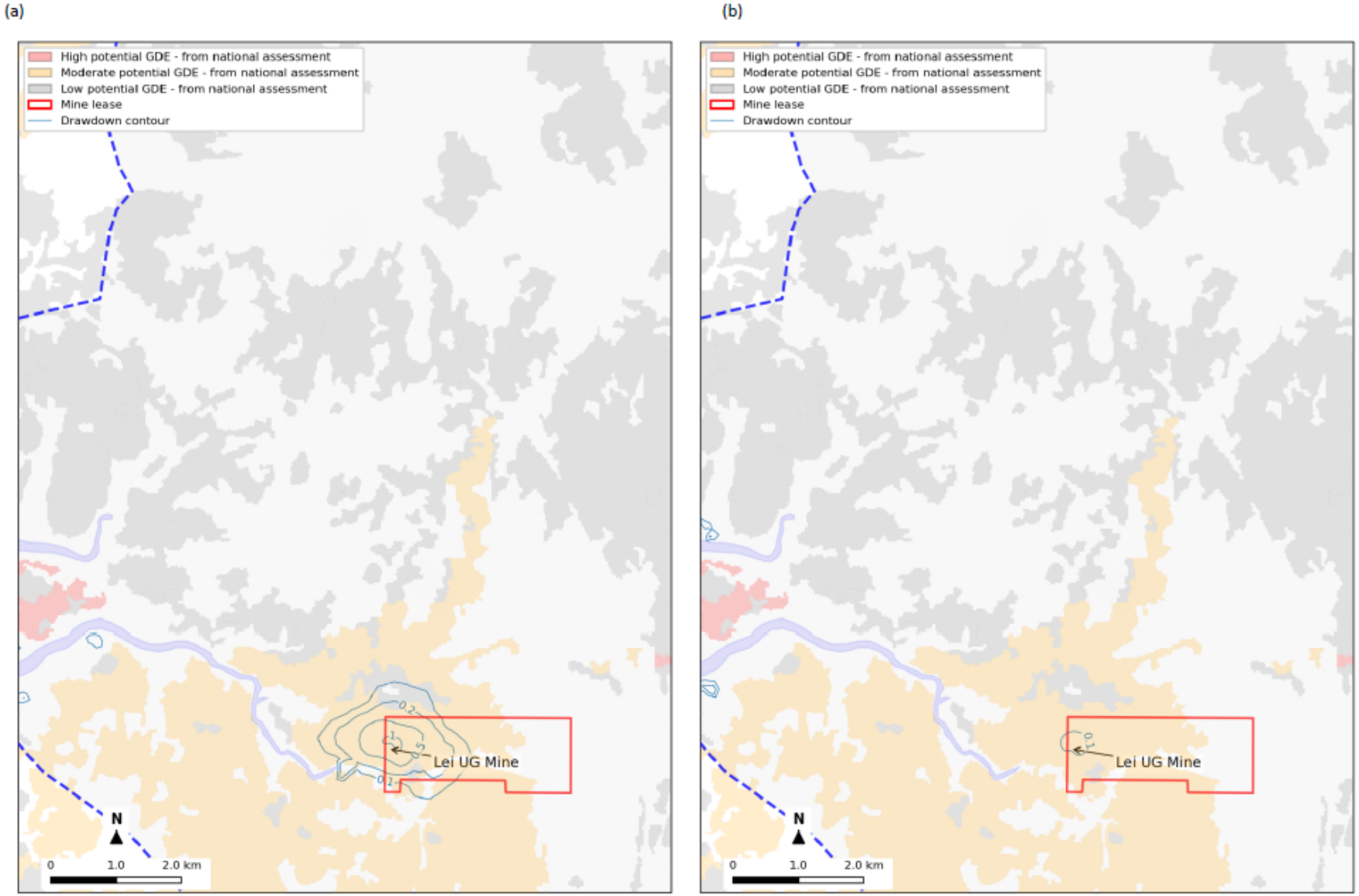


Figure 7-3. Forecast drawdown contours following (a) 4 years recovery, Year 10 from start of mining, and (b) 9 years of recovery, Year 15 from start of mining – Proposal.

Reduced groundwater availability for Groundwater Dependent Ecosystems

Groundwater modelling predicts that dewatering-induced drawdown will extend beneath areas identified as having moderate GDE potential and towards the Charlotte River. An assessment of the potential impacts of reduced groundwater levels and groundwater availability on GDEs is provided in Section 9.5.

Reduced groundwater availability for groundwater users and other environmental values.

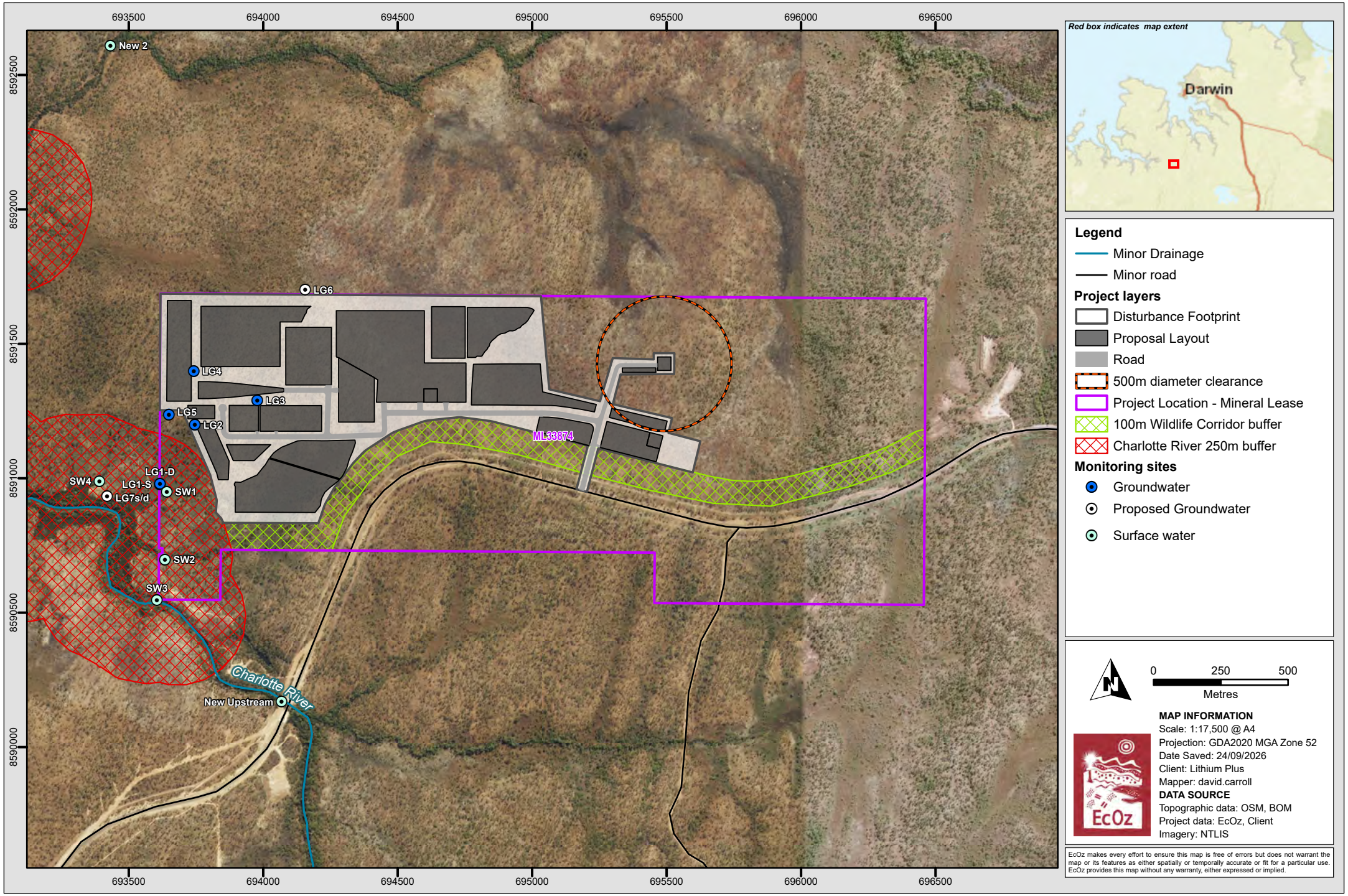
Groundwater modelling indicates that dewatering-related impacts are expected to be localised, with predicted drawdown largely confined to within approximately 2 km of the Proposal area. No impacts to existing groundwater users are predicted, as the nearest registered groundwater bore and groundwater extraction licence are located beyond the modelled zone of influence.

The predicted groundwater drawdown is largely confined to the vicinity of the Proposal and is not expected to affect existing groundwater users or groundwater-dependent environmental values. Drawdown is expected to be negligible at the scale of the Fog Bay Area and Darwin Rural Adelaide River Water Control District. Groundwater monitoring will be undertaken in accordance with the WMP, which includes TARPs to facilitate a prompt management response should monitoring results exceed established trigger values.

Alteration of groundwater flow and reduced groundwater contributions to Charlotte River

Dewatering associated with the proposed underground mine is predicted to lower groundwater levels in the surrounding aquifer, resulting in a localised cone of depression extending beyond the Proposal area. The reduction in groundwater levels is expected to alter natural groundwater flow patterns by creating a hydraulic gradient towards the underground workings. However, the predicted drawdown and associated changes to groundwater flow are expected to be localised, with groundwater levels recovering to near pre-mining conditions post-closure.

Groundwater contributions to surface water flows in the upper reaches of the Charlotte River are considered to be limited, with flows primarily driven by wet season rainfall and tidal influences in the lower reaches of the river. As such, changes to groundwater flow are expected to result in limited and negligible impacts to surface water flows within the Charlotte River. Monitoring of groundwater levels, river flows and surface water conditions, including the installation of additional monitoring bores adjacent to the Charlotte River, will support the assessment of potential impacts to the receiving environment and facilitate timely management responses should any unexpected impacts be identified (Figure 7-4).



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Figure 7-4. Water monitoring locations (existing and proposed)

Limitations and uncertainties

The groundwater modelling assessment provides a predictive representation of groundwater behaviour based on the information available at the time of model development. As with all numerical groundwater models, the results are dependent on the conceptual hydrogeological model, adopted boundary conditions, hydraulic parameters and the quantity and quality of available monitoring data. Consequently, model predictions should be interpreted as an indication of likely groundwater responses rather than exact forecasts. Some of the limitations and uncertainties outlined by CloudGMS (2026a) are summarised below with further details provided in Appendix A1 of Appendix G:

- The model was developed using existing hydrogeological investigations, monitoring data and groundwater level records available at the time of assessment. Additional data collected during future monitoring may improve understanding of aquifer characteristics, groundwater levels and groundwater-surface water interactions.
- The groundwater model is subject to uncertainties associated with hydrogeological properties, recharge rates, groundwater storage characteristics, and the timing and duration of mine dewatering activities. Sensitivity testing indicates that these factors may influence the predicted magnitude, extent and recovery of groundwater drawdown; however, the overall model predictions and impact assessment conclusions remain broadly consistent across a range of plausible conditions. The uncertainty analysis also indicates that predictions are likely conservative, as hydraulic conductivity and storage within the deeper BCF are expected to decrease with depth, whereas comparatively higher values were adopted in parts of the model. As a result, actual mine inflows and drawdown extents may be lower than predicted.
- Recent groundwater level and dewatering data from the adjacent Grants and BP33 operations provide additional information on groundwater behaviour that were not available during the groundwater model development. However, the period of active dewatering represented in the available datasets is relatively limited compared to the full life-of-mine conditions assessed for the Proposal. Consequently, some uncertainty remains regarding long-term predictions of groundwater inflows, drawdown and recovery.
- The Charlotte River was represented as a specified-head boundary within the model. While this approach provides a practical representation of groundwater-surface water interaction, it may influence the predicted extent of drawdown adjacent to the river and introduces uncertainty regarding the magnitude of potential impacts on river-aquifer connectivity.
- Climate variability, land clearing and mine infrastructure may influence groundwater recharge; however, these uncertainties have been incorporated into the assessment and are not expected to significantly alter predicted impacts due to the relatively short operational and recovery period.
- Predictions of post-closure recovery are dependent on assumptions relating to mine void characteristics, groundwater recharge, closure conditions and long-term climatic conditions. Actual recovery rates may vary depending on site conditions following mine closure.
- The cumulative impact assessment is based on the mine plans, schedules and assumptions available for the Proposal, BP33 and Grants Lithium Project at the time of modelling. Future changes to mine designs, dewatering requirements or project schedules may alter the magnitude and timing of cumulative groundwater impacts.

Additional proposal-level uncertainties associated with groundwater inflows, mine water storage requirements, water supply requirements and surplus water management are summarised in Table 2-3 and Section 2.2.2.

7.5.3 Cumulative impact

Alteration of surface water hydrology

Potential cumulative impacts to surface water hydrological processes were considered in the context of nearby mining activities. Passive overflows from the RWD discharge to the unnamed northern tributary, which then flows into a second unnamed tributary that also receives controlled discharges from the BP33 mine. As a result, there is potential for a cumulative increase in flow volumes within the downstream tributary during overflow and discharge events.

However, these discharges occur within existing drainage pathways and are expected to occur primarily during wet season conditions when natural runoff is already present. The Proposal is also expected to only influence drainage patterns within a relatively small area compared to the wider catchment. While localised increases in flow volumes may occur within the downstream tributary, significant changes to downstream flow regimes or catchment-scale hydrological processes are not expected. No other mining discharges occur to the southern arm of the Charlotte River that will receive controlled discharges from MWD1 and overflows from SD1. As such, cumulative impacts to surface water hydrological processes are expected to be localised and of negligible magnitude with changes limited to temporary increases in flow volumes within downstream receiving tributaries during discharge and overflow events.

Surface water monitoring, receiving environment gauging and discharge volume recording will be undertaken in accordance with the WMP to verify predicted hydrological responses, while TARPs will facilitate timely management responses should unexpected changes be identified. Accordingly, the residual cumulative impact to surface water hydrological processes is considered minor.

Groundwater drawdown

To assess cumulative impacts, Grants Pit and BP33 were represented within the numerical groundwater model. The conceptualisation, excavation schedule and closure assumptions for the two projects are presented in Appendix A1 within Appendix G.

The cumulative groundwater modelling predicts no hydraulic interaction between the drawdown associated with the Grants Lithium Project and the Lei or BP33 mines. On the contrary, the drawdown cones associated with the Lei and BP33 underground mines are predicted to overlap, with a maximum cumulative drawdown of approximately 0.5 m in the area between the two operations after the start of mining, prior to closure of BP33. The forecast drawdown impacts predicted after 4 years of the Proposal operation (at the end of the BP33 mining period), and after 6 years, at the end of the mining period are shown in Figure 7-5(a) and (b), respectively.

The post-closure modelling assumed cessation of dewatering, removal of mine-related seepage boundaries, progressive filling of mine voids, and pit lake development at the Grants Lithium Project. Due to the seasonal nature of recharge, a transient groundwater model was used to simulate recovery until groundwater levels stabilised and an approximate dynamic equilibrium was achieved. Drawdown recovery was assessed at four and nine years after closure to evaluate the rate and extent of groundwater system recovery. As shown in Figure 7-6, the cumulative post-closure drawdown pattern is broadly consistent with that predicted for the Proposal-only scenario (Figure 7-3), indicating limited long-term cumulative effects on groundwater recovery.

The cumulative impact associated with groundwater drawdown is therefore considered to be of minor magnitude, as the additional drawdown is small relative to the Proposal-only drawdown and is largely confined to the area between the two mining operations. The spatial extent of the impact is localised and reversible in duration.

The BCF is not managed under a declared Water Allocation Plan (WAP); however, for the purposes of this assessment, the Northern Territory Water Allocation Planning Framework has been adopted as a precautionary benchmark for groundwater resource management. The framework considers up to 20% of long-term average annual recharge to be available for consumptive use, with the remaining recharge retained to support GDEs, streamflow and other environmental values. As such, cumulative groundwater abstraction was compared with the calibrated average annual recharge to the model domain to provide a regional context for the proposed dewatering activities. This assessment found that the maximum concurrent groundwater extraction from the Lei, BP33 and Grants operations is approximately 4,141 ML/year, equivalent to around 14% of the modelled average annual recharge of 28,600 ML/year within the model domain. While recharge is spatially variable and cannot be directly compared with localised dewatering impacts, this comparison indicates that cumulative groundwater abstraction remains within the allowable consumptive use for the groundwater resource available within the assessed area.

Overall, the cumulative impact assessment indicates that the scale, magnitude and duration of groundwater impacts are largely consistent with those predicted for the Proposal-only scenario. Applying the precautionary principle due to the uncertainties in modelling, a moderate residual rating has been applied. Groundwater level monitoring will be undertaken throughout construction, operations and closure to validate model predictions and track groundwater responses over time to reduce the uncertainty. Additional monitoring bores will be installed to improve spatial coverage of the monitoring network, particularly in areas where cumulative drawdown is predicted to occur (Figure 7-4). SSTVs and TARPs have been developed within the WMP to provide an adaptive management framework for responding to variations in predicted drawdown and observed groundwater levels. In addition, the groundwater model will be reviewed periodically and refined, where necessary, as additional monitoring data, mine inflow records and mine discharge volumes become available during operations.

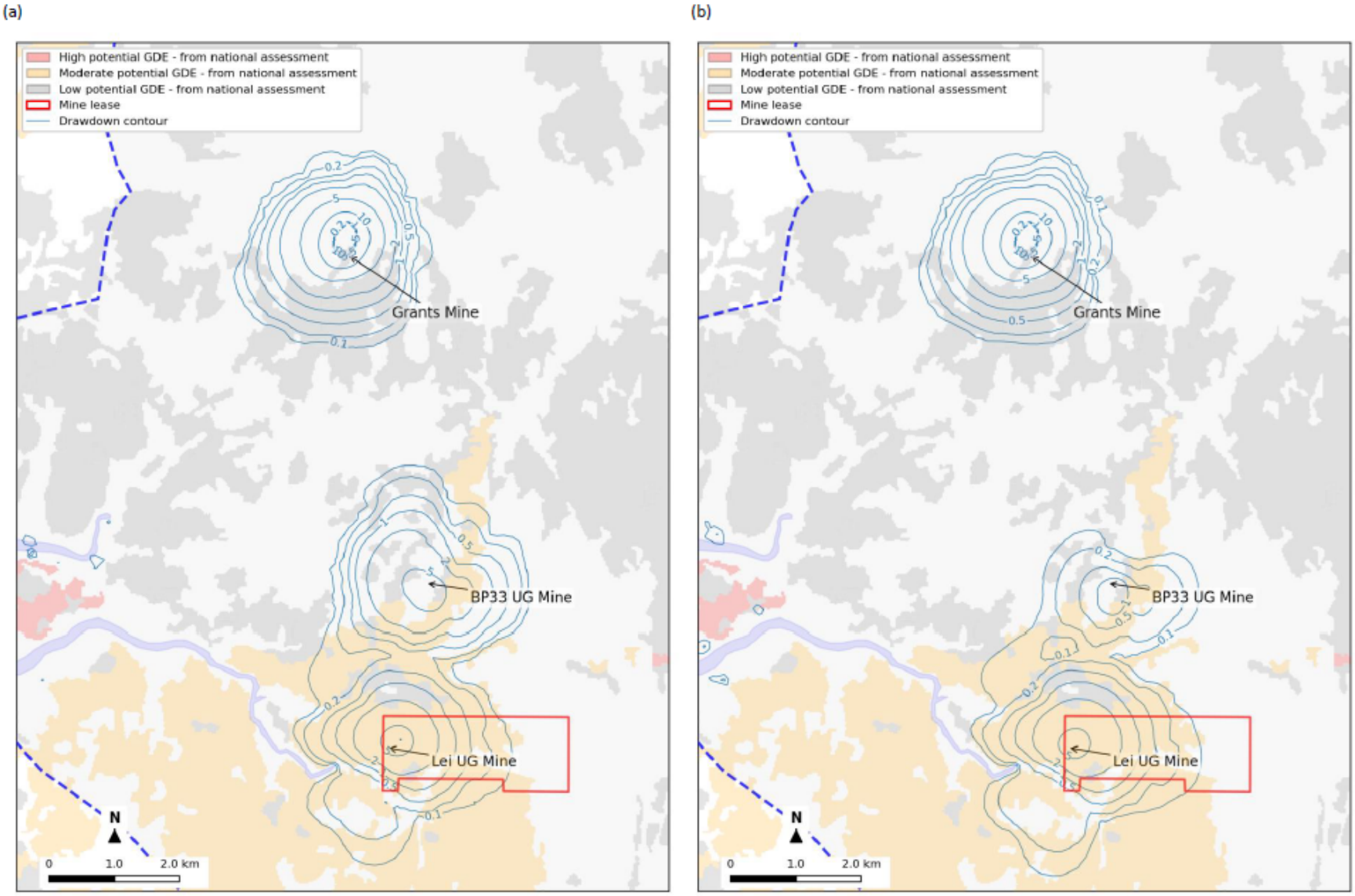


Figure 7-5. Forecast drawdown contours after (a) 4 years of mining and (b) 6 years of mining – Lei, BP33 and Grants Projects.

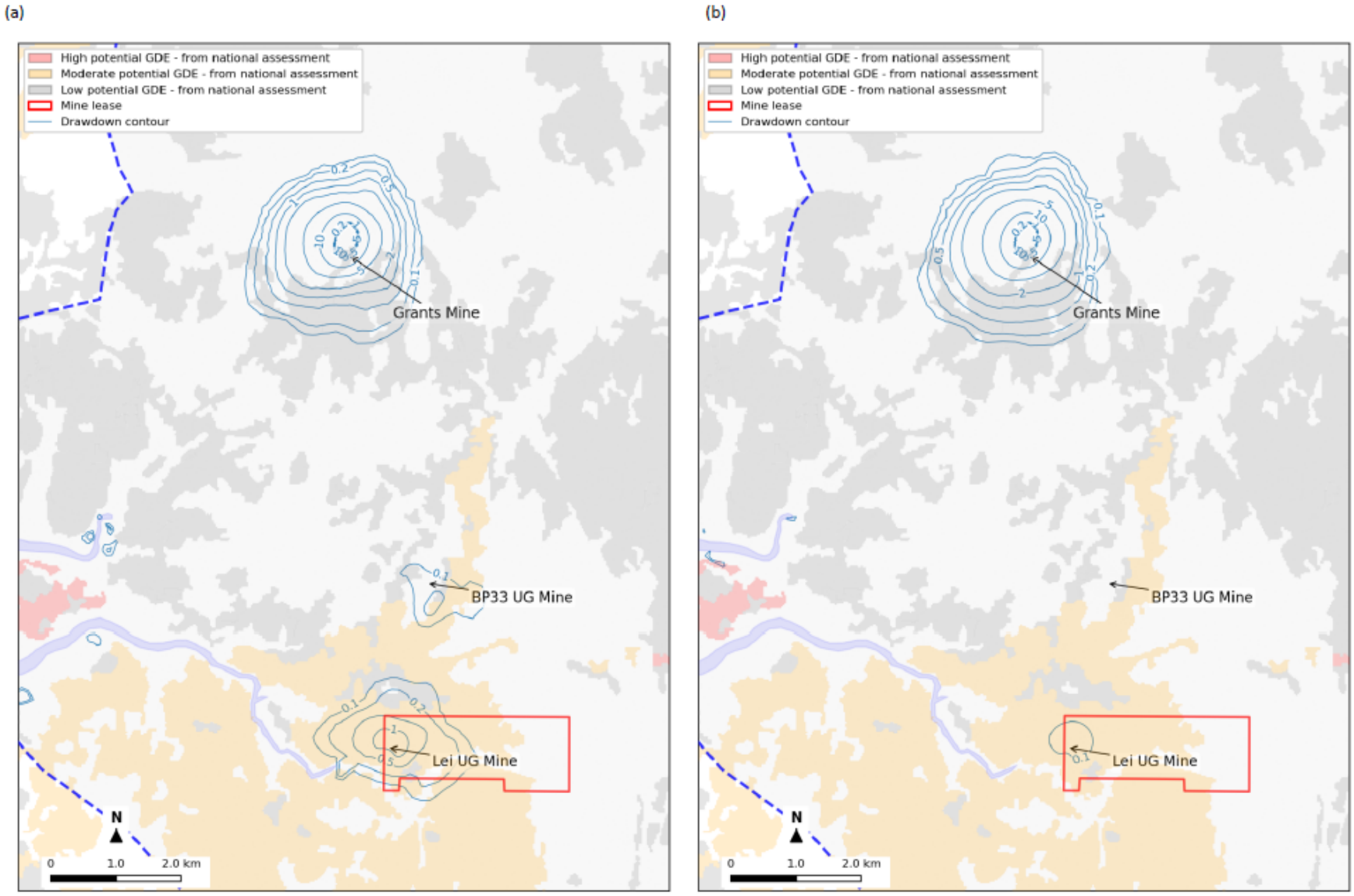


Figure 7-6. Forecast drawdown contours following (a) 4 years of recovery, Year 10 from the start of mining, and (b) 9 years of recovery, Year 15 from the start of mining – Lei, BP33 and Grants Projects.

7.5.4 Impact assessment summary

Table 7-2 below summarises the potential impacts on hydrological processes, the proposed avoidance and mitigation measures, and the corresponding residual impact ratings. Additional information on the avoidance and mitigation measures is also provided in this section.

Table 7-2. Impact assessment summary – hydrological processes

Potential impact	Avoidance and mitigation	Residual impact
Alteration of surface water hydrology	• Runoff and mine-affected water will be captured and managed within the site water management system to minimise uncontrolled releases to the receiving environment. • Controlled discharge criteria will be implemented in accordance with the WMP, with TARPs implemented where proposed mine water site storage inventory exceedance triggers are reached. • Surface water gauging within the Charlotte River catchment to validate flood assessments, engineering designs and waste discharge calculations. • Contingency measures will be implemented, in accordance with the WMP, for extreme rainfall events and potential failures of water management infrastructure.	**Minor** Localised, negligeable to minor, and short-term impacts to drainage pathways may occur within disturbed areas; however, impacts to downstream flow regimes and catchment-scale hydrological processes are not expected. Water management measures and contingency actions will minimise the potential for adverse impacts on receiving waterways.
Groundwater drawdown	• Tunnel liner will substantially reduce groundwater inflow to the underground working by limiting hydraulic connectivity between the surrounding groundwater system and the tunnel. Groundwater model sensitivity testing indicates that the tunnel liner could reduce inflows to the tunnel by approximately 50% compared to an unlined configuration. • Waste rock material will be backfilled to box cut and underground voids, which is expected to improve recovery times post-closure. The groundwater model assumed no backfilling and that voids would remain open. • Groundwater level monitoring will be undertaken in accordance with the WMP to verify model predictions and identify any unexpected groundwater responses. • Available abstraction volumes from the Proposal, BP33 and Grants will be compared against modelled-domain recharge. • Additional monitoring bores will be installed to improve spatial coverage of the monitoring network.	**Moderate** Groundwater drawdown is predicted to be localised, with moderate impacts confined largely to the Proposal area and minor impacts beyond the mining lease boundary. Groundwater levels will be impacted throughout the operational phase but are expected to recover following closure. Monitoring, trigger values and TARPs will support adaptive management during operations.
Alteration of groundwater flows and reduced groundwater contributions to Charlotte River		**Minor** Local groundwater flow patterns will be altered by mine dewatering, which will create a hydraulic gradient towards the underground workings. Groundwater contributions to surface water flows in the upper reaches of the Charlotte River are considered to be limited.

Potential impact	Avoidance and mitigation	Residual impact
Cumulative groundwater impacts associated with the concurrent operation of the Lei, Grants and BP33 Projects	• Groundwater level TARPs will be implemented to trigger management responses where observed groundwater drawdown exceeds the magnitude, extent or rate predicted by the groundwater model. • Groundwater model will be reviewed and recalibrated periodically as additional monitoring data become available, particularly during operations, and if the BP33 or Grants mine schedules, closure assumptions or dewatering rates materially change. Recharge distribution adopted in the model will also be reviewed once the final infrastructure layout and final water-management design are available. • Closure and rehabilitation measures will be implemented in accordance with the Conceptual Closure & Rehabilitation Plan for the Proposal (Appendix D).	**Moderate** The concurrent operation of the Lei, Grants and BP33 projects is not predicted to materially increase the impacts associated with the Proposal operating in isolation. Although some overlap of drawdown associated with the Lei and BP33 projects is predicted, the cumulative drawdown remains localised to the vicinity of the mining operations and is not expected to result in additional impacts to groundwater users or groundwater-dependent environmental values. However due to the long-term nature of the impact and the uncertainty in model predictions, the precautionary principle has been applied to the impact rating.

7.6 Predicted outcome

Implementation of the Proposal will result in localised groundwater drawdown associated with mine dewatering and minor alterations to surface water movement within the disturbed footprint. Groundwater modelling, surface water investigations and cumulative impact assessments indicate that predicted changes to hydrological processes are largely confined to the vicinity of the underground workings and are not expected to result in significant impacts to identified environmental values, including beneficial uses of groundwater, or connected surface water systems. Uncertainty associated with groundwater responses has been addressed through conservative modelling assumptions, contingency measures, groundwater monitoring programs, and an adaptive management framework. However with the application of the precautionary principle, residual impacts to hydrological processes have been assessed as moderate, but the adaptive management approach will ensure the Proposal remains consistent with the NT EPA environmental objective to maintain the hydrological regimes of groundwater and surface water so that environmental values are protected.

8. INLAND WATER ENVIRONMENTAL QUALITY

8.1 Environmental objective

The NT EPA's objective for Inland Environmental Quality is to:

Protect the quality of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.

8.2 Additional information required

The Direction requested additional information to improve the level of confidence in the prediction of potential significant impacts of the Proposal and the effectiveness of mitigation measures for Inland Water Environmental Quality. Refer to Table 1-1 Inland Water Environmental Quality topic for further information.

Since the referral was submitted in November 2024, additional baseline surface water and groundwater sampling was conducted (between December 2024 and December 2025) within the Proposal area to provide a better characterisation of the water quality within the area and surrounding streams, such as the Charlotte River. The information collected has informed the Groundwater Impact Assessment and Model Report developed for the site by ELA (2026). This report presents a characterisation of surface water and groundwater quality and assesses potential secondary impacts to GDEs associated with the exposure and oxidation of potential ASS within estuarine or alluvial sediments.

The WMP for the Proposal (Appendix A) has also been developed to include measures to manage potential impacts to surface water and groundwater quality, including mine-affected water management, controlled discharge criteria, monitoring programs, trigger values and TARPs to minimise risks to downstream environmental values.

Additional documents developed to support the assessment of potential significant impacts include an assessment of surface water and groundwater quality from potential wastewater discharge and seepage of waste rock material and ore by EGi (2026), which characterises baseline surface water and groundwater conditions, identifies and assesses potential water and wastewater discharge pathways from the Proposal, evaluates the potential impacts of controlled releases, seepage and runoff on receiving environments including the Charlotte River, and outlines avoidance, mitigation, monitoring and adaptive management measures to protect aquatic ecosystems and water quality. The assessment includes predictive water quality modelling, comparison against relevant water quality guidelines, and a TARP to inform ongoing water management and environmental protection

8.3 Policy and guidance

Water quality assessment standards and guidelines were used to define environmental values, establish assessment criteria and evaluate potential impacts to surface water and groundwater quality. These standards and guidelines are summarised in Table 8-1.

In addition, AMD guidance documents were separately used to assess the potential for waste rock and ore materials to act as a source of water quality impacts through the generation of acid, metalliferous or saline drainage. These documents inform the identification and development of appropriate management and mitigation measures. These standards and guidelines are summarised in Table 8-2.

Table 8-1. Policy and guidelines – inland water environmental quality – water quality

Policy / Guidance	Key relevance	Application to the Proposal
ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality	Water quality criteria.	Used to assess potential impacts to surface water and groundwater quality and aquatic ecosystem values.
ANZECC & ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality	Supplementary water quality criteria.	Used where relevant to support assessment of water quality values and indicators.
NHMRC (2022) Australian Drinking Water Guidelines	Drinking water quality criteria.	Used to assess potential impacts to groundwater beneficial uses.
British Columbia Approved Water Quality Guidelines (2021)	Alternative water quality criteria.	Used where relevant contaminant guideline values were unavailable under Australian guidelines to assess potential risks to aquatic ecosystems and water quality.
Canadian Environmental Quality Guidelines (CCME, 2024)		Used where Australian guideline values were unavailable to support assessment of metals and other water quality parameters relevant to the Proposal.

Table 8-2. Policy and guidelines – inland water environmental quality – acid and metalliferous drainage (AMD) assessment guidance

Policy / Guidance	Key relevance	Application to the Proposal
AMIRA ARD Test Handbook (2002)	AMD prediction.	Used to inform assessment of acid generation potential and mine drainage risks associated with waste rock, ore and other mine materials.
MEND Prediction Manual for Drainage Chemistry (2009)	Drainage chemistry prediction.	Used to evaluate the potential for acidification, salinity and metalliferous leachate generation from mine materials.
INAP Global Acid Rock Drainage Guide (2014)	AMD risk assessment and management.	Used to inform AMD characterisation, risk assessment, mitigation measures and monitoring requirements for mine wastes and disturbed materials.
DFAT Leading Practice Handbook: Preventing Acid and Metalliferous Drainage (2016)	Leading practice AMD management.	Used to guide the identification of avoidance, mitigation and management measures for AMD risks throughout the mine life cycle, including closure planning.
INAP & ICMM Tool for Acid Rock Drainage and Metal Leaching Prevention and Management (2025)	Contemporary AMD and metal leaching management framework.	Used to support assessment and management of acid rock drainage and metal leaching risks through Proposal design, operational controls, monitoring and closure planning.

8.4 Environmental values

8.4.1 Surface water quality

Baseline surface water quality conducted between January 2023 and December 2025 evidence water quality within Charlotte River and associated tributaries is strongly influenced by tidal fluctuations. Based on the data collected, four of the monitoring sites (New1, SW2, SW3 and SW5) have been classified as tidal and the

remaining four (New Upstream, SW1, SW4 and New2) are considered as indicative of freshwater conditions (Figure 8-1).

Freshwater quality

Baseline surface water monitoring indicates that freshwater environments occur within the upper reaches of the Charlotte River (New Upstream), local creeks (SW1 and SW4), and the upstream section of the unnamed northern tributary (New 2). These waterways are characterised by generally low salinity and electrical conductivity, and slightly acidic to neutral pH conditions typical of tropical freshwater systems.

Water quality within these freshwater environments is naturally variable and influenced by seasonal rainfall, runoff processes and local geochemical conditions. Monitoring identified naturally elevated concentrations of total nitrogen, total phosphorus, total suspended solids and some metals relative to the DHWQO (2010) trigger values for freshwater, and the Australian New Zealand guidelines for fresh and marine water quality (ANZG) (2018) and Australian and New Zealand Environment and Conservation Council (ANZECC) (2000) default guideline values (ELA, 2026).

Dissolved and total zinc concentrations varied across the freshwater monitoring locations, with some concentrations exceeding the ANZG (2018) trigger values for 95% level of species protection (LOSP).

Total aluminium concentrations also varied between monitoring locations, with the highest concentrations recorded at New Upstream and New 2, including occasional exceedances of guideline values. In contrast, concentrations at SW1 and SW4 generally remained below the ANZECC (2000) freshwater guideline values for 95% LOSP.

Total and dissolved arsenic concentrations were generally consistent across freshwater monitoring locations and remained below the ANZG (2018) trigger values for 95% LOSP (ELA, 2026).

Freshwater reaches generally exhibited limited tidal influence and maintained water quality characteristics consistent with freshwater systems. However, more variable results were observed at the New Upstream monitoring location compared to the other freshwater sites, potentially indicating occasional tidal influence (ELA, 2026).

The occurrence of naturally elevated concentrations and occasional exceedances of default guideline values under baseline conditions supports the development of site-specific trigger values (SSTVs) for the assessment of potential Proposal-related impacts.

Tidal influence

Tidally influenced monitoring sites exhibited a broader range of concentrations, reflecting the dynamic nature of these environments. pH values at tidal sites ranged from 5.69 to 9.92, indicating slightly alkaline conditions overall, while EC ranged from 17.90 to 62,360 µS/cm, which is typical for tidally influenced systems. Lower EC values were recorded at SW3, the most upstream site, which is subject to intermittent tidal flushing driven by cyclic variations rather than regular daily tidal patterns.

Zinc concentrations were generally below ANZG (2018) marine trigger values for 95% LOSP. However, elevated total zinc concentrations were recorded at SW2 (September 2024) and SW5 (February 2022). These results are likely associated with mixing of freshwater and marine waters, promoting sediment transport and zinc mobilisation, potentially linked to iron and manganese oxide cycling.

Aluminium at the tidal monitoring sites were mostly below the laboratory limit of reporting, noting that no applicable guideline value is available for this metal.

Total and dissolved arsenic concentrations were highly variable, likely influenced by tidal sediment resuspension and changes in salinity associated with tidal cycles, which influence arsenic portioning and mobility. Like aluminium, no applicable guideline value is available for this metalloid.

Overall, monitoring demonstrates that water quality within tidally influenced areas is naturally variable due to the interaction between freshwater runoff and marine waters. The observed variability supports the development of SSTVs to provide a locally relevant basis for water quality assessment.

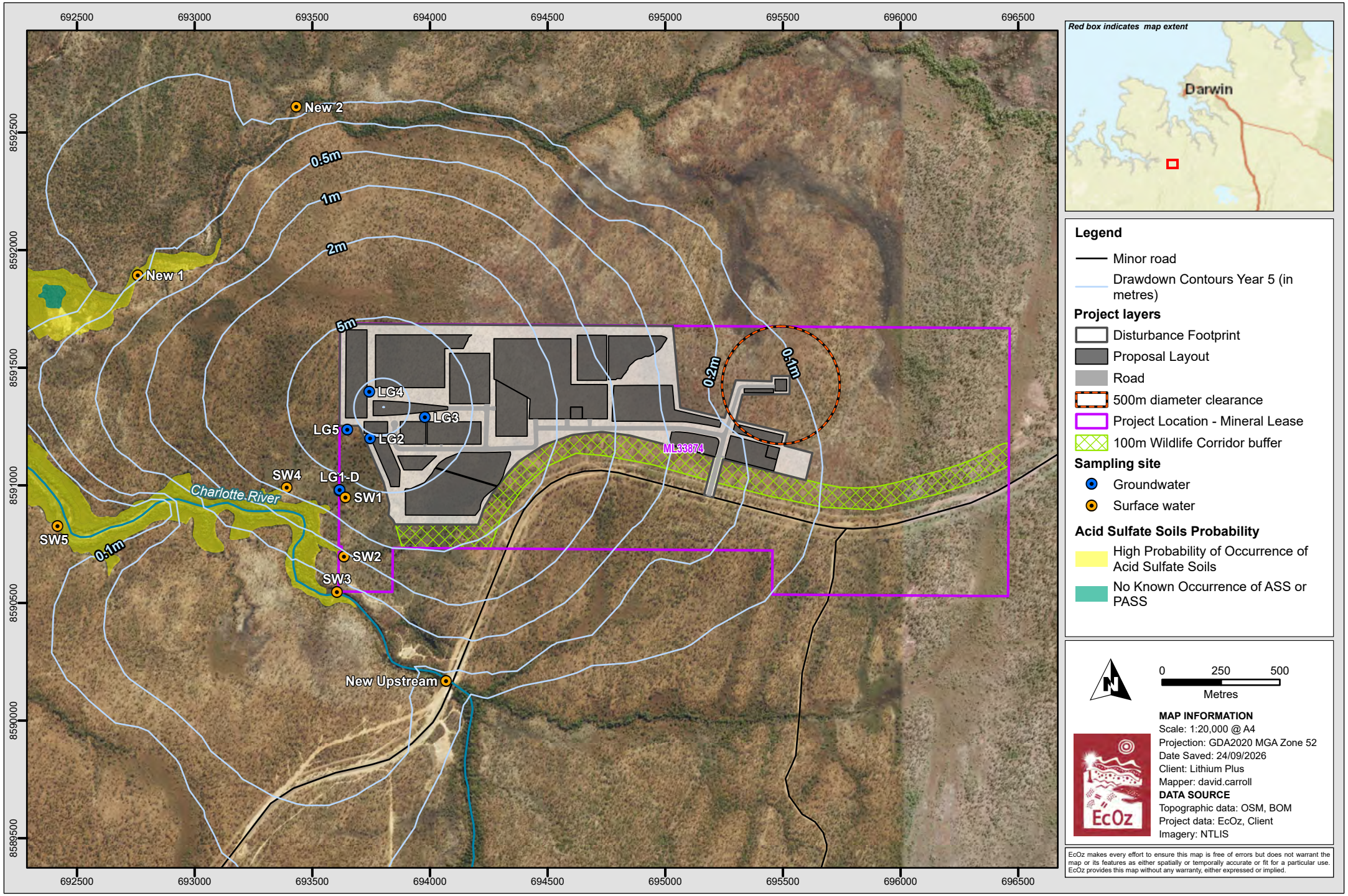
Acid sulfate soils

The Proposal disturbance footprint does not intersect mapped ASS or Potential ASS (PASS) (NTG, 2025) (Figure 8-1). However, PASS has been mapped within the Charlotte River alluvial corridor, including areas where these soils occur within the upper 1 m of the soil profile. Localised areas of known ASS are also present within the broader Charlotte River tidal reach, confined to low-lying alluvial and tidal sediments associated with the Charlotte River.

Based on the baseline surface water quality results, there is potential for ASS to contribute to elevated concentrations of aluminium, arsenic and zinc through mobilisation from suspended sediments within tidal zones and freshwater areas (ELA, 2026).

However, no clear correlation was observed between elevated metal concentrations and reduced pH in the baseline dataset (ELA, 2026). Similarly, elevated metal concentrations were not consistently associated with monitoring locations mapped as having a high risk of ASS occurrence. For example, New Upstream and New 2 exhibited some of the highest variability in total and dissolved aluminium, arsenic and zinc concentrations despite not being located within mapped PASS areas.

Therefore, while ASS may contribute to localised variability in surface water quality, the available baseline data indicate that ASS is unlikely to be the primary driver of the elevated metal concentrations recorded within the study area.



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Figure 8-1. ASS mapping, baseline surface water and groundwater monitoring locations, and groundwater drawdown contours

8.4.2 Groundwater quality

Groundwater was found to exhibit moderately acidic to alkaline pH conditions (ranging from 5.81 to 70.47), confirming that the BCF is predominantly fresh (ELA, 2026). This differs slightly from adjacent project areas, such as BP33, where groundwater is also fresh but exhibits a narrower range in EC and lower pH values (Groundwater Enterprises, 2023).

Groundwater quality for aluminium, arsenic and zinc has been assessed against relevant guideline values (ANZECC & ARMCANZ, 2000; ANZG, 2018), with the 95% LOSP trigger values adopted as an appropriate level of protection for a slightly to moderately disturbed system.

Aluminium concentrations show a clear distinction between dissolved and total fractions, with dissolved aluminium typically below detection limits while total aluminium is often elevated. Groundwater monitoring bores can be broadly grouped into three categories: some bores generally fall at or below guideline values, others are frequently elevated, and a subgroup show consistently higher concentrations. No clear seasonal trends or relationships with pH were observed. These patterns are consistent with natural geochemical processes, including mobilisation associated with ASS and local hydrogeological conditions.

Arsenic concentrations are generally elevated across the Proposal area, with total and dissolved concentrations closely aligned, indicating that arsenic occurs predominantly in dissolved form. This suggests that arsenic mobility is influenced by redox conditions rather than sediment transport. While concentrations frequently exceed guideline values, no consistent seasonal trends or correlation with pH were identified. The elevated concentrations are therefore considered to represent natural background conditions.

Zinc concentrations show moderate variability across the monitoring bores. Similar fluctuating trends were observed in the shallow monitoring bore (LG1s) and deeper bore LG3, which were not evident in the other bores, indicating variability across both shallow and deeper parts of the aquifer. Elevated zinc concentrations are likely associated with natural geochemical processes, including mineral weathering, redox cycling, and dissolution of iron and manganese oxides.

Overall, the results obtained during the monitoring conducted between December 2023 and December 2025 indicate that groundwater quality within the Proposal area is primarily controlled by natural hydrogeochemical processes, including variations in redox conditions, fracture connectivity and host rock composition.

Seawater-groundwater interaction

The sodium-to-chloride ratio is commonly used as an indicator of potential seawater or saline mixing in groundwater, as these ions occur in a consistent proportion in marine water and behave conservatively during mixing processes. An assessment of the sodium-to-chloride relationship indicates no significant evidence of seawater mixing within the groundwater, with chloride concentrations remaining low relative to sodium rather than approaching a 1:1 ratio, which is typically associated with seawater intrusion (ELA, 2026).

An assessment of major ions in groundwater evidence that groundwater is bicarbonate dominant with mixed dominant cations between sample locations. This chemistry indicates active flushing, low salinity and no seawater intrusion. Comparison of groundwater and surface water samples across wet and dry seasons indicates no distinct seasonal trend. While some surface water samples display a chemical composition similar to groundwater, this is considered to reflect fresher conditions at these sites due to their distance from estuarine influence, as well as the effects of rainfall and runoff, rather than direct groundwater–surface water mixing (ELA, 2026).

Oxidising conditions

Overall, the ratio of dissolved to total iron is close to 1:1 in groundwater, indicating that iron predominantly occurs in particulate or precipitated forms rather than in dissolved form, demonstrating that groundwater conditions are predominantly oxidising (ELA, 2026). These conditions promote the precipitation of iron and influence the mobility and partitioning of metals within the aquifer, representing an important control on groundwater quality and metal transport within the Proposal area.

8.5 Assessment of potential significant environmental impacts

The NT EPA identified that the Proposal has the potential to act as a contamination source and significantly impact on surface water and groundwater quality. The potential significance of these impacts and implications for the receiving waters and aquatic ecosystems is assessed in the sections below. Impact significance has been determined having regard to the extent, magnitude, duration and reversibility of predicted impacts, as well as the sensitivity of the affected environmental values, consistent with the assessment framework outlined in Section 6.

Table 8-3 provides a summary of the point and diffuse discharge sources associated with the Proposal that could significantly affect surface water and/or groundwater quality if not appropriately managed. Details of the water balance and respective water management plan for the proposal are presented in Appendix A.

Table 8-3. Sources of point and diffuse discharges of water and wastewater from the mine site.

Discharge source	Quality	Quantity
Point source		
SD1 passive discharges (overflow) into Charlotte River	Sediment basin discharges will target a 90th percentile turbidity ≤100 NTU and 50th percentile ≤60 NTU, consistent with IECA (2025).	Minimum of 14 ML in Year 1 and maximum of 56 ML in Year 7.
RWD passive discharges (overflow) and controlled discharges (Year 5 only) into unnamed northern tributary	RWD will receive surface runoff from areas where water quality is generally unaffected by mining operations and from rehabilitated areas. Water quality is expected to be similar to baseline surface water quality, considering this water will not be in contact with mine-affected areas.	Minimum of 293 ML in Year 1 and maximum of 491 ML in Year5. Discharge will occur mostly as overflows, except in Year 5, when water from RWD will be discharged to construct MWD2.

Discharge source	Quality	Quantity
Controlled releases from MWD1 into Charlotte River	Expected to contain groundwater inflows plus runoff/seepage from mining areas. Potential contaminants include arsenic, aluminium, iron, lithium, nutrients and suspended solids. Water quality prior to discharge is predicted to remain slightly acidic, with negligible to low concentrations of metals and metalloids and generally comparable to baseline water quality in the Charlotte River. Nitrate associated with blast residues may occur at slightly elevated concentrations. Water releases will be managed in accordance with the WMP and applicable requirements of waste discharge under an EML. Therefore, treatment options can be applied when concentrations exceed the adopted criteria. Water quality at MWD2 is expected to be similar to that at MWD1.	Minimum of 26 ML (Year 1) and maximum of 472 ML (Year 7). MWD2 will supply mine-affected water to MWD1; therefore, direct discharges from MWD2 to the Charlotte River are not proposed.
MWD1 and MWD2 passive discharges (overflow) into Charlotte River and Unnamed Northern Tributary, respectively	As above	None is expected under average climatic conditions (WRM, 2026a)
Diffuse		
SD1 and RWD used to supply water for dust suppression (crusher and mine and access roads) and truck washdown	Water used for dust suppression should meet irrigation water quality trigger values in ANZECC (2000a), including short-term trigger values for metals, nitrogen and phosphorus, and the assessment approaches for salinity and sodicity. Site-specific assessment requirements in Volume 3, Section 9.2.6 of the ANZECC (2000) also apply.	Approximately 85 ML/year are predicted to be required from Year 2 to Year 7 for crusher demands, truck washdown demands and dust suppression (WRM, 2026a).
Seepage from waste rock dump and ore stockpile areas	Diffuse seepage from waste rock and ore storage areas to shallow groundwater is predicted to produce water quality similar to that in the Charlotte River. Slightly elevated nitrate concentrations are expected.	Limited seepage expected, assuming infiltration rates are similar to those across the wider catchment.

8.5.1 Surface water contamination from mine-affected water discharges

Mine-affected water discharges have the potential to contaminate receiving surface waters. Preliminary modelling of Charlotte River water quality downstream of controlled releases from the MWD was undertaken using the PHREEQC geochemical equilibrium modelling program (Parkhurst & Appelo, 2013) was conducted by EGi, (2026; Appendix H). The assessment considered expected, dry and wet rainfall scenarios and conservatively assumed no removal of dissolved constituents through mineral precipitation, except where

iron oxide and hydroxide precipitation processes were specifically assessed. Input source term chemistries were based on the 75th percentile baseline groundwater quality, median baseline freshwater quality, and 1:2 de-ionised water extraction results from mine rock testing.

The modelling assessed the potential influence of controlled releases from MWD1, which accounted for groundwater extracted during dewatering activities, drainage from waste rock and ore storage areas, and MWD1 undisturbed catchment runoff. Model results indicate that controlled releases are unlikely to generate adverse drainage water under any rainfall scenario. Prior to mixing with the Charlotte River, discharge water is predicted to remain slightly acidic and contain negligible to low concentrations of metals and metalloids. Nitrate associated with blast residues was identified as the constituent most likely to occur at elevated concentrations; however, predicted concentrations remain of a similar order of magnitude to those already present within the Charlotte River (EGi, 2026).

Modelling indicates that dewatered groundwater represents the dominant life-of-mine source of arsenic, iron and zinc to MWD1. The influence of groundwater on mine water quality is predicted to increase over the LOM as dewatering volumes increase. The modelled discharge water quality, however, is predicted to remain comparable to baseline water quality within the non-tidal reaches of the Charlotte River (EGi, 2026).

Under expected rainfall conditions, the greatest effect of discharge on water quality in the Charlotte River is expected to occur during the last quarter of the year, at the start of the wet season, due to limited catchment runoff reducing the potential for mixing with groundwater before discharge to the Charlotte River. Under the dry rainfall scenario, controlled releases are limited to the wet season and are expected to have the greatest effect on river water quality during the 2033 wet season, when groundwater dewatering volumes are predicted to peak. However, even during these periods, modelling predicts discharge water quality would remain similar to baseline conditions. In addition, iron oxide and hydroxide precipitation resulting from oxidation of dissolved groundwater iron is predicted to effectively reduce dissolved concentrations of arsenic, beryllium, cadmium, chromium, lead, nickel, selenium and zinc prior to discharge.

Uncertainties remain regarding shallow groundwater chemistry, nitrate concentrations in water-rock and ore-contact water and background freshwater quality within the broader catchment. However, impacts to surface water quality are expected to be localised in scale and low to moderate in magnitude, primarily due to the potential for elevated nitrate concentrations in controlled discharges to the Charlotte River. Impacts associated with passive overflows to the unnamed northern tributary are expected to be limited in scale and negligible in magnitude, given these overflows comprise raw water and are not anticipated to result in material changes to receiving environment water quality. Potential impacts are expected to be short-term, occurring during discharge or overflow events. Surface water quality monitoring, discharge controls and TARPs will be implemented in accordance with the WMP to support the early identification and management of any unanticipated impacts. Accordingly, the residual impact to surface water quality from mine-affected discharges is considered minor.

8.5.2 Surface water and groundwater contamination from mine seepage and runoff from waste rock and ore stockpiles

Seepage and runoff from waste rock and ore stockpile areas have the potential to affect groundwater and surface water quality. Runoff from waste rock and ore storage areas are predicted to contain slightly elevated aluminium and arsenic concentrations. Runoff from these areas will be captured and managed as mine-affected water within the site water management system, with affected runoff directed to MWD1 and unaffected runoff diverted around disturbed areas. Preliminary water quality modelling undertaken indicates that water quality associated with controlled releases would remain similar to existing conditions within the

Charlotte River, with nitrate identified as the constituent most likely to occur at slightly elevated concentrations (EGi, 2026).

Seepage from waste rock and ore stockpiles areas has the potential to infiltrate into shallow groundwater and alter groundwater quality. To assess this risk, preliminary water quality modelling was undertaken using source term chemistries derived from mine rock testing and baseline water quality data. The assessment considered a mixing ratio based on the relative size of the waste rock and ore storage areas (13.23 ha) and the Charlotte River catchment (6,137 ha), equivalent to 0.0022:1, as well as a more conservative scenario (0.022:1) to account for reduced infiltration across the wider catchment (EGi, 2026).

The modelling predicts that diffuse seepage from waste rock and ore stockpiles areas to shallow groundwater would produce water quality similar to that currently present within the Charlotte River (EGi, 2026).

Random walk particle tracking was also undertaken to assess groundwater flow beneath the proposed waste rock dumps following mine closure using the same parameters applied during the operational phase of the Proposal (CloudGMS, 2026b). The results indicate that groundwater flow beneath the waste rock dumps will continue to migrate westward following closure. As groundwater levels recover within the box cut and underground workings, natural hydraulic gradients are re-established, directing groundwater towards the Charlotte River (Figure 8-2; CloudGMS, 2026b). While this assessment confirms a hydraulic pathway between the waste rock dumps and the Charlotte River following mine closure, water quality modelling predicts that seepage from waste rock and ore storage areas would remain similar to existing receiving water quality. As such, seepage from these areas is expected to result in minor, localised and reversible impacts to groundwater environmental values, with groundwater quality predicted to remain comparable to existing conditions and recover following mine closure.

The WMP includes groundwater and surface water monitoring during operations and post-closure to verify model predictions and identify any changes in water quality associated with seepage from waste rock and ore storage areas. Following implementation of the proposed monitoring and management measures, the residual impact is assessed as minor.

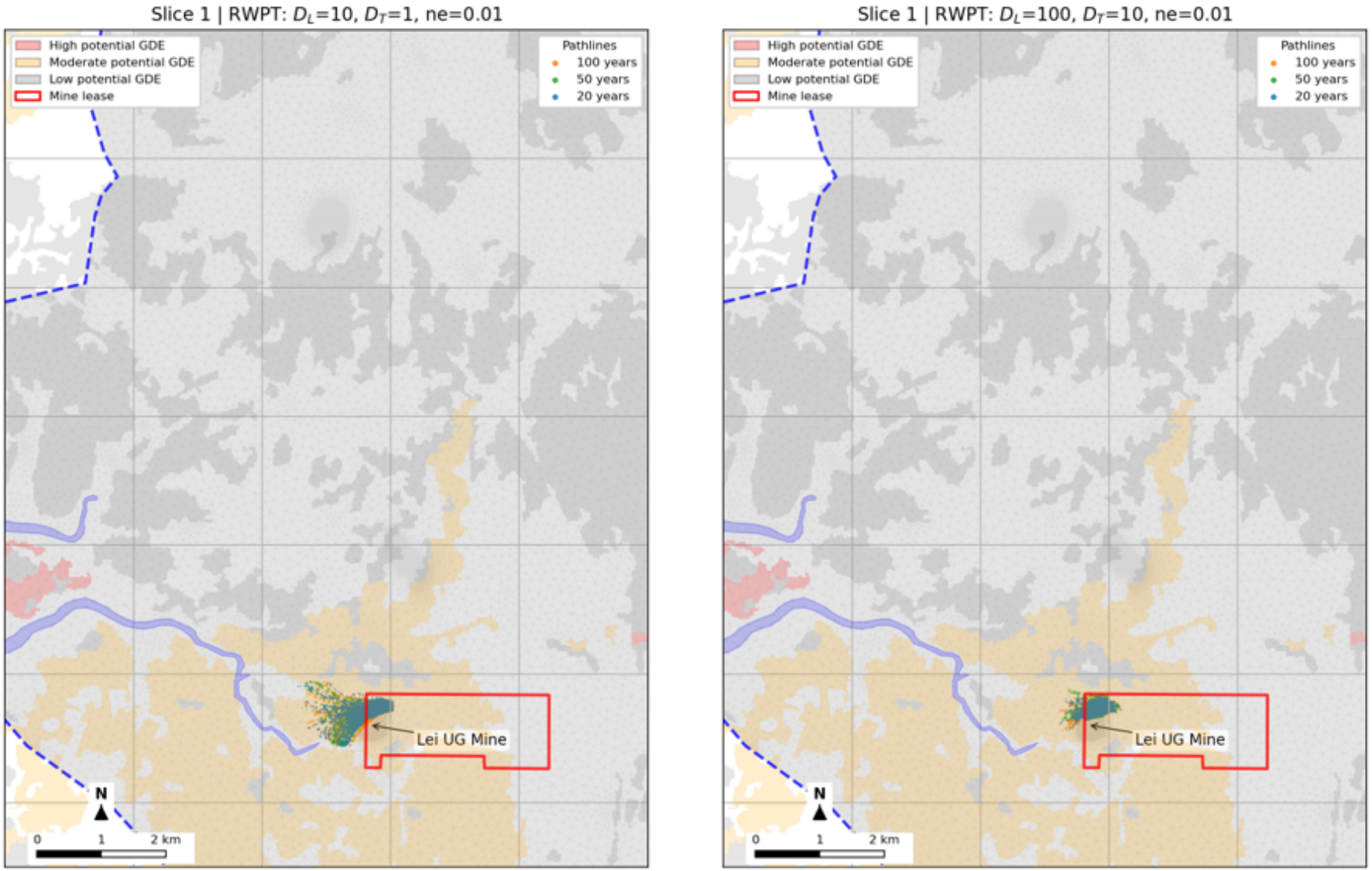


Figure 8-2. Random walk particle tracking post-closure (years 20, 50 and 100) under (a) best-case scenario: DL=10, DT=1 and ne=0.01, and (b) conservative-case scenario: DL=100, DT=100 and ne=0.001 (Source: CloudGMS, 2026b)

8.5.3 Exposure of ASS through groundwater drawdown or removal of overburden.

Groundwater drawdown associated with dewatering has the potential to lower groundwater levels within portions of the Charlotte River alluvial corridor where high probability PASS has been mapped. Mapping indicates that New 2 and SW5 are located outside the predicted cone of depression, while New 1 and New Upstream are expected to experience only minor groundwater level reductions of approximately 0.1 to 0.2 m. Predicted drawdown is approximately 0.5 m at SW3, around 1 m at SW2 and up to 2 m at SW4. The greatest groundwater drawdown is predicted at SW1, where reductions of up to 5 m are anticipated. However, SW1 is not located within a mapped PASS area. Areas mapped as having a high probability of PASS occurrence are generally associated with low-lying alluvial and tidal sediments along the Charlotte River corridor rather than the Proposal disturbance footprint itself (Figure 8-1).

Assessment of baseline surface water quality data does not indicate that oxidation of sulfide minerals is currently causing measurable impacts to water quality. No evidence of adverse water quality effects typically associated with ASS oxidation was identified at either freshwater monitoring locations (New Upstream, SW1, SW4 and New 2) or tidal monitoring locations (New 1, SW2, SW3 and SW5) (EGi, 2026). If widespread oxidation of sulfide minerals was occurring, substantially lower pH values and elevated dissolved metal concentrations would be expected. Instead, no clear relationship was observed between pH and metal concentrations (ELA, 2026).

Assessment of sulfate against aluminium and iron concentrations showed weak to moderate relationships (R^2 = 0.0045 to 0.6142 and 0.05 to 0.30, respectively; Figure 8-3 and Figure 8-4), indicating that increases in sulfate are not consistently associated with mobilisation of metals typically expected to result from ASS oxidation. A stronger relationship was observed between sulfate and arsenic concentrations (R^2 = 0.76 to 0.91); however, elevated sulfate concentrations also closely coincided with increases in chloride concentrations (R^2 > 0.95; Figure 8-3 and Figure 8-4), suggesting that sulfate variability is largely influenced by tidal or saline inputs. Furthermore, no clear relationship was identified between metal concentrations and pH, and no evidence of acidification was observed. Collectively, these findings do not indicate that ASS oxidation is a significant driver of surface water quality within the receiving environment.

Hydrological observations indicate that upstream tributaries of the Charlotte River within the Proposal area are generally ephemeral, with limited dry-season flow and permanent water largely restricted to the main Charlotte River channel further downstream (ELA, 2026). Monitoring records demonstrate that several sites regularly cease flowing, particularly SW1 and SW4, where dry conditions were reported during wet and dry season monitoring events. SW2, New 1 and New 2 also periodically ceased flowing during dry season conditions. These observations indicate that sediments and shallow groundwater systems within areas where groundwater drawdown is predicted to occur are already subject to natural fluctuations in water levels and periodic drying. ELA (2026) similarly notes that mapped PASS areas along the Charlotte River are already likely influenced by tidal processes and seasonal groundwater level fluctuations, indicating that natural wetting and drying cycles already occur within these environments.

Importantly, the locations where the greatest groundwater drawdown is predicted do not generally coincide with areas considered most susceptible to ASS exposure. SW1, where drawdown of approximately 5 m is predicted, is not located within a mapped PASS area. In contrast, monitoring locations situated within mapped PASS areas, including New 1 and SW5, are expected to experience either negligible drawdown (0.1 to 0.2 m) or no drawdown at all. While SW2, SW3 and SW4 are predicted to experience greater groundwater level reductions, the available surface water and groundwater monitoring data do not provide evidence of existing ASS-related water quality impacts, despite these areas already being subject to natural seasonal

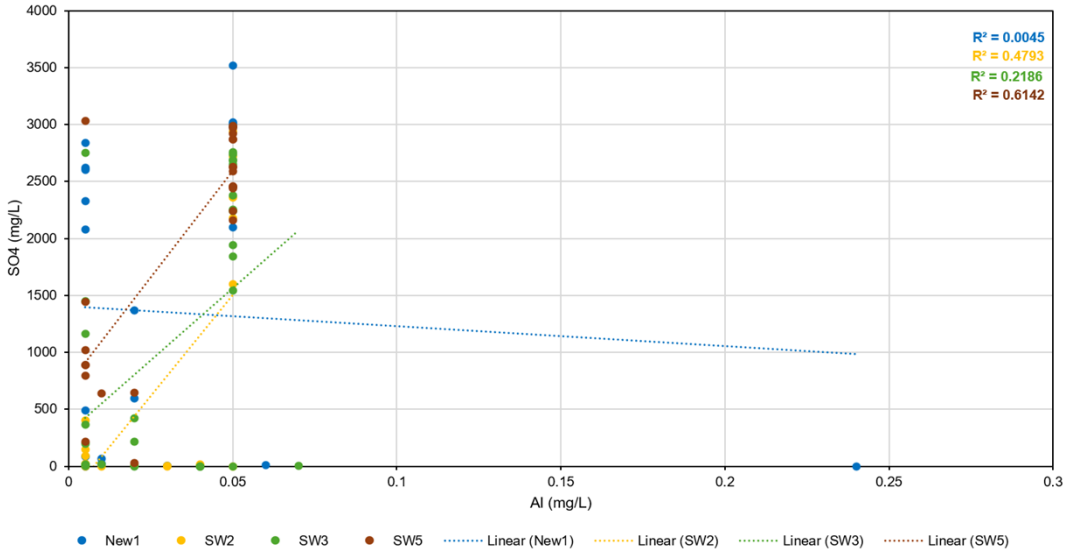
fluctuations in water levels. No ASS materials were encountered during drilling investigations and ongoing groundwater monitoring has not identified conditions indicative of acidification or metal mobilisation attributable to ASS processes.

Overall, while groundwater drawdown has the potential to alter groundwater levels within portions of the Charlotte River floodplain, the available evidence suggests the likelihood of widespread ASS exposure and subsequent deterioration of surface water, and groundwater, quality is low. This conclusion is supported by the absence of geochemical indicators typically associated with ASS oxidation, the naturally variable hydrological regime of the Charlotte River, and the limited overlap between areas of greatest predicted drawdown and mapped PASS.

While some uncertainty remains due to the absence of site-specific ASS investigations, the WMP (Appendix A) includes ASS-specific trigger values and TARPs to facilitate the early identification and management of potential ASS-related impacts. In addition, an ASS management plan will be implemented to guide the management of ASS should they be encountered. The proposed installation of an additional nested monitoring bores within areas mapped as having a high probability of PASS occurrence will also provide additional information on subsurface conditions and support the identification and assessment of potential ASS materials during drilling and ongoing monitoring (Figure 7-4). The groundwater model adopted conservative assumptions, as such, future recalibration may reduce uncertainty regarding the extent and magnitude of potential impacts. Following implementation of these measures, the residual impact is assessed as minor, reflecting the localised extent of potential impacts, the low likelihood of widespread ASS exposure, and the implementation of monitoring and adaptive management measures that will enable early detection and response should impacts occur.

Drilling for the groundwater bores undertaken within the proposed mining area predominantly encountered weathered phyllite, schist and pegmatite of the BCF. No estuarine or sulfidic sediments indicative of potential ASS were identified. Based on the available bore logs and groundwater chemistry, the likelihood of ASS within the proposed mining footprint is considered low. The proposed disturbance footprint is also situated on elevated terrain outside mapped ASS/PASS areas.

a)



b)

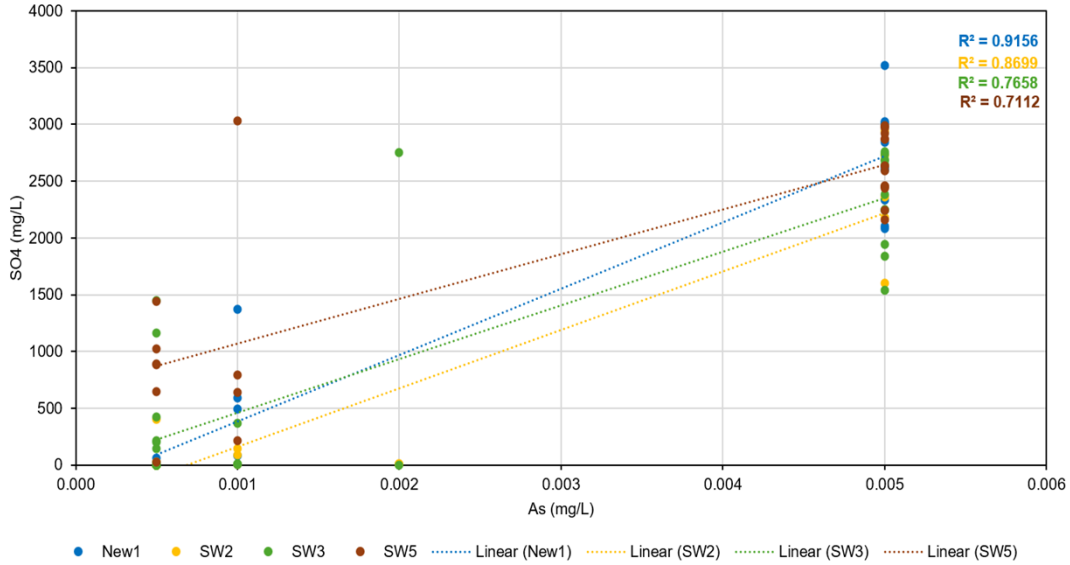
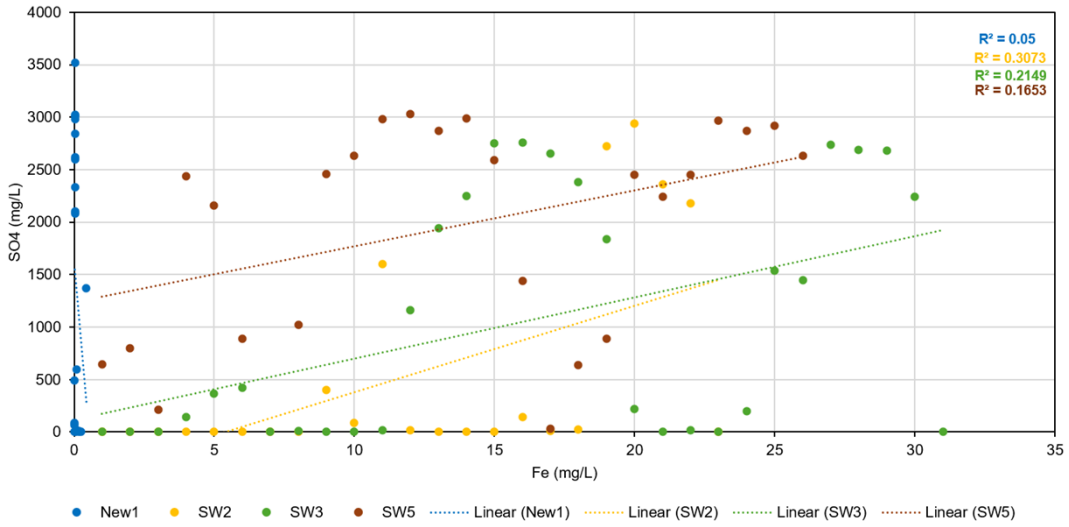


Figure 8-3. Relationship between a) aluminium and sulfate; b) arsenic and sulfate at tidal surface water monitoring locations

c)



d)

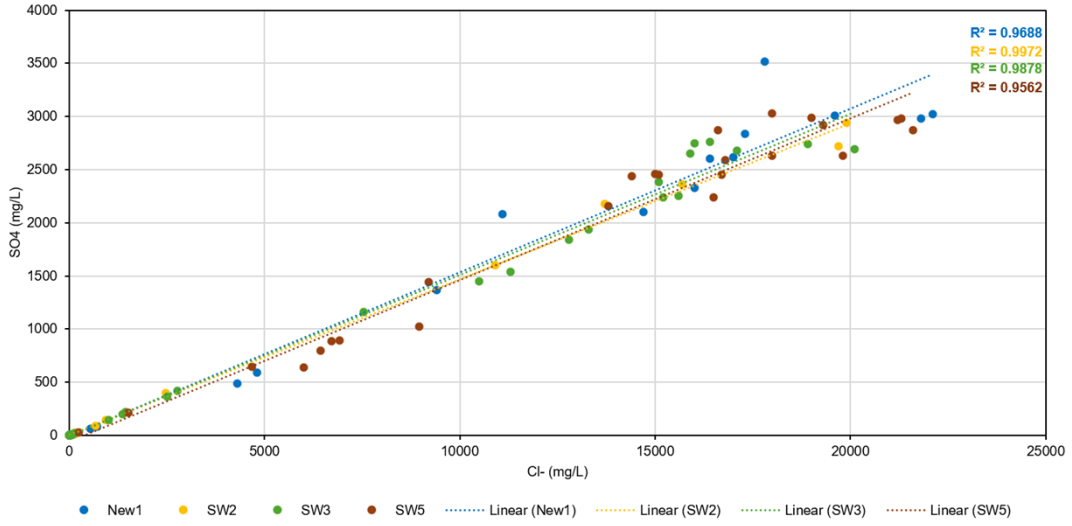


Figure 8-4. Relationship between c) iron and sulfate; d) chloride and sulfate concentrations at tidal surface water monitoring locations

8.5.4 Saline intrusion and aquifer salinisation

Given the proximity of the tidal reach of the Charlotte River, there is a potential pathway for saline water to migrate inland where groundwater levels are lowered as a result of mine dewatering. To assess this risk, CloudGMS (2026b) undertook random walk particle tracking to simulate groundwater flow paths and evaluate whether saline water could migrate from the tidal reach of the Charlotte River toward the receiving environment and mine workings. Two scenarios were modelled, the first assuming that saline water only occurs within the Charlotte River (Figure 8-5) and the second being that the fresh BFC HSU (40 – 75+ mBGL) beneath the Charlotte River is also saline (Figure 8-6). Within each scenario, two parameter sets were assessed, comprising a best-case scenario, where particle migration was assumed to be limited, and a conservative scenario, where particles were assumed to travel further. Particle migration was modelled after 6, 10, 14 and 20 years from the commencement of mining.

A similar particle-tracking distribution was found between the no-mining and mining modelling scenarios, indicating that saline-water migration (as modelled) is associated with seasonal groundwater-level variation and the dispersive random-walk component of the particle-tracking method. Although some particle tracks intersect the predicted drawdown cone, the reduction in groundwater head is insufficient to reverse the hydraulic gradient and induce groundwater flow away from the river towards the mine (CloudGMS, 2026b)..

Particle tracking through the top of the fresh BCF showed that saline water could migrate towards the underground mine workings in the conservative case scenario (Figure 8-6(b)). However, this modelling scenario assumes relatively rapid particle movement through the groundwater system. This is a conservative assumption and is less likely given the low permeability of the BCF and the fact that groundwater flow occurs mainly through localised fractures and quartz veins and so, groundwater movement is expected to be less rapid (CloudGMS, 2026b).

The modelling therefore indicates that dewatering of the pit is unlikely to cause saline intrusion from the Charlotte River. However if the conservative modelling of the BCF is found to be true (i.e. it is saline and particle-tracking is more widespread) there is potential for saline groundwater to be captured by the underground mine and influence dewatering water quality. While this may present an operational consideration for mine water management, the particle tracking assessment does not predict salinisation of surface water. Furthermore, hydrological observations indicate that the freshwater reaches of the Charlotte River located closer to the mine are primarily rainfall-driven and experience limited groundwater baseflow, with several monitoring locations drying periodically during the dry season and occasionally in the wet season. Consequently, even if saline groundwater were drawn towards the underground mine under the conservative modelling scenario, salinisation of freshwater reaches around SW1, SW4 and New Upstream, is considered unlikely. This conclusion is further supported by the particle tracking results, which indicate groundwater originating from the tidal reach is unlikely to migrate sufficiently far inland to affect upstream freshwater reaches.

There remains uncertainty associated with the particle tracking analysis, particularly regarding the hydraulic and transport parameters used within the model and the extent to which saline groundwater occurs at depth beneath the Charlotte River. CloudGMS (2026b) notes that additional site-specific data and further refinement of groundwater transport parameters could reduce uncertainty and improve confidence in the assessment of saline intrusion risk. To address this uncertainty, the WMP includes installation of additional nested groundwater monitoring bores closer to the Charlotte River to better characterise salinity stratification within the groundwater system and verify the assumptions adopted by the groundwater model (Figure 7-4).

The WMP also include TARPs that establish investigation and management responses should monitoring identify increasing salinity trends or evidence of saline intrusion.

Modelling of saline intrusion demonstrates that the reduction in groundwater head is insufficient to reverse the hydraulic gradient and induce groundwater flow away from the river towards the mine. Saline groundwater is only predicted to reach the underground mine under the conservative modelling scenario if saline groundwater is present at depth beneath the Charlotte River (CloudGMS, 2026b). Accordingly, the magnitude of impact is expected to be low, with no substantial deterioration in groundwater quality predicted beyond the immediate area of influence. The potential impact would persist only for the duration of dewatering activities and is expected to reduce over time as groundwater levels recover following mine closure. Considering the localised scale, low magnitude and reversibility of the potential impact, together with the implementation of groundwater monitoring, salinity intrusion TARPs, and installation of additional monitoring bores (Figure 7-4), as outlined in the WMP (Appendix A), the residual impact is assessed as minor.

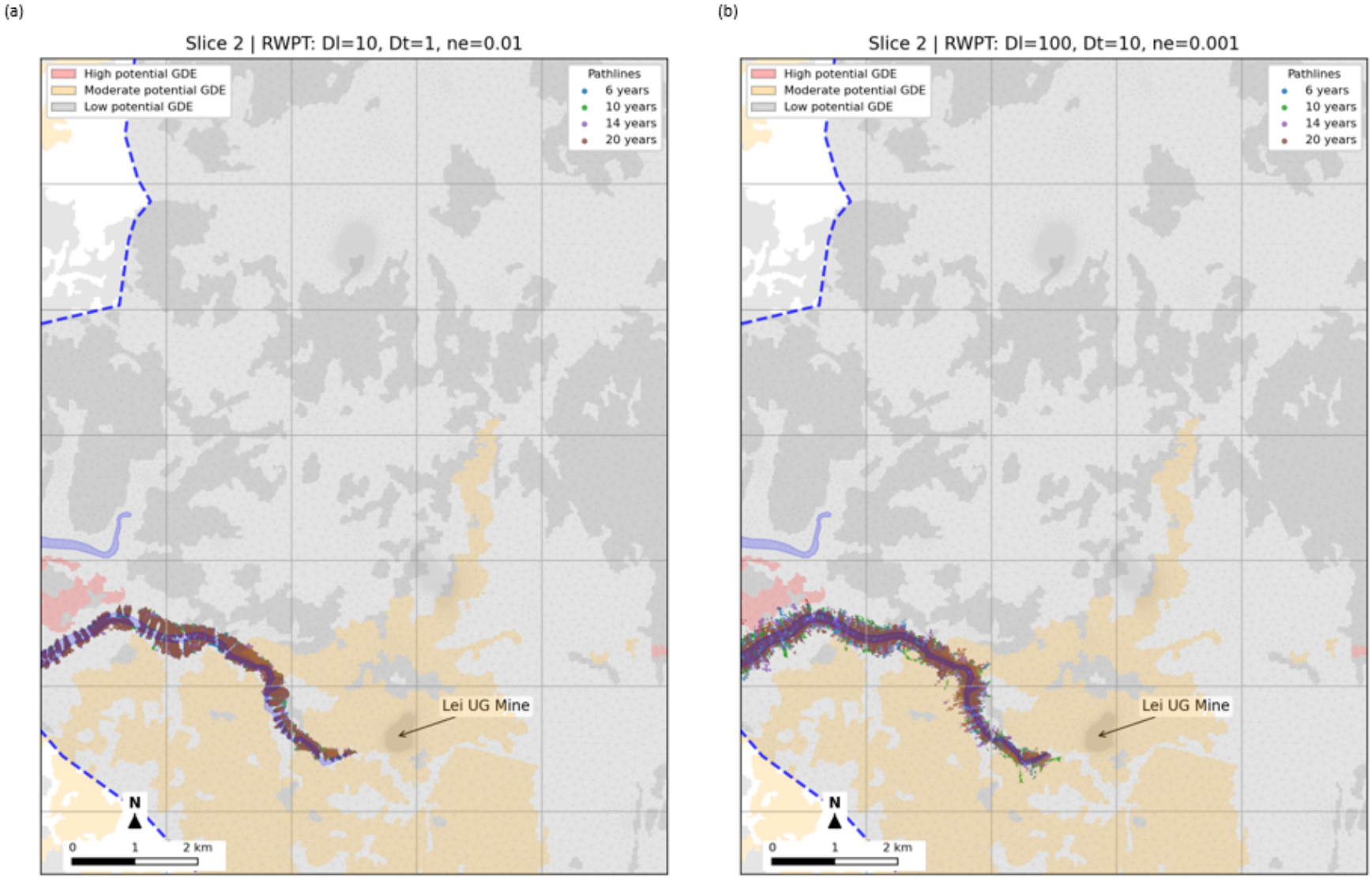


Figure 8-5. Random walk particle tracking under (a) best-case scenario and (b) conservative-case scenario where surface water: groundwater interaction occurs in the shallow alluvial aquifer (Source: CloudGMS, 2026b).

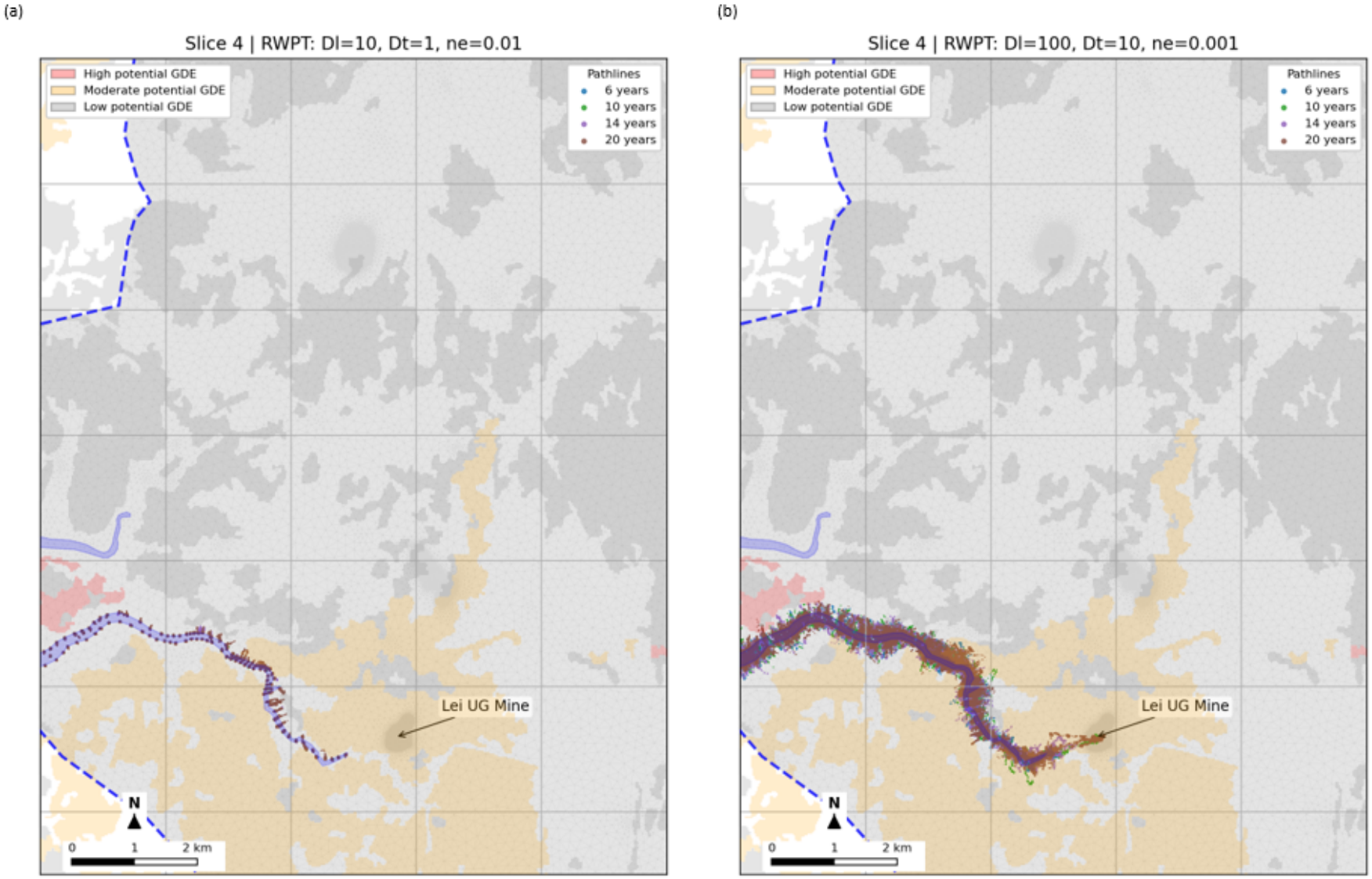


Figure 8-6. Random walk particle tracking for years under (a) best-case scenario and (b) conservative-case scenario where surface water: groundwater interaction occurs in the deeper BCF aquifer (Source: CloudGMS, 2026b).

8.5.5 Cumulative impacts

Surface water

Passive overflows from the RWD will discharge to the unnamed northern tributary, which then joins a downstream tributary that also receives controlled discharges from the BP33 mine (WRM, 2024). While this creates a potential pathway for cumulative effects on surface water quality, water stored within the RWD is expected to be comparable to baseline surface water conditions and is therefore unlikely to contribute materially to cumulative changes in downstream water quality.

MWD2, which also overflows to the unnamed northern tributary, may contain groundwater inflows and runoff from mining areas. However, water quality modelling indicates that water quality is generally expected to remain comparable to baseline conditions, with only slightly elevated nitrate concentrations potentially occurring (EGi, 2026). In addition, no overflows from MWD2 are predicted under average climatic conditions, and any releases would be managed in accordance with the WMP and applicable discharge criteria.

Any cumulative impact on surface water quality is expected to be localised in scale, confined to the unnamed northern tributary and its downstream receiving waters. The magnitude of impact is expected to be minor, as modelled water quality remains broadly comparable to baseline conditions. The duration of impact would be short-term, occurring only during overflow. The WMP includes surface water monitoring, trigger values and TARPs to facilitate the early identification and management of any unanticipated water quality changes. Accordingly, the residual impact is assessed as minor.

Groundwater

The groundwater model does not predict a substantial increase in groundwater drawdown under the cumulative scenario compared to the Proposal-only scenario (refer to Section 7.5.1). As such, potential drawdown-related impacts on groundwater quality, including the oxidation of ASS and inland migration of saline groundwater from the Charlotte River, are not expected to be greater under cumulative operating conditions. Ongoing groundwater monitoring in accordance with the WMP will be undertaken to verify model predictions and identify any changes in groundwater quality over time.

8.5.6 Impact assessment summary

Table 8-4 below summarises the potential impacts on inland water environmental quality, the proposed avoidance and mitigation measures, and the corresponding residual impact ratings. Additional information on the avoidance and mitigation measures is also provided in this section.

Table 8-4. Inland water environmental quality processes avoidance, mitigation and monitoring measures

Potential impact	Avoidance and mitigation	Residual impact
Surface water contamination from mine-affected water discharges	• Mine-affected water will be captured and contained, with unaffected runoff diverted around disturbed areas. • Release of mine-affected water will be done through controlled discharges via MWD1, in accordance with the conditions of the EML to be obtained for the site and will only take place when the Charlotte River is flowing. No release will occur where water quality does not meet the applicable release criteria. • Water stored in MWD1 will be reused for underground water demands. • Additional storage in MWD2 from Year 5 will guarantee that sufficient storage capacity for mine-affected water is maintained. • In accordance with the WMP, discharges will only occur when flows are sufficient to achieve a dilution factor for arsenic and aluminium. Where the adopted trigger values are not met, water treatment will be conducted. • Where discharges are not feasible, additional mine-water storage, evaporation fans, irrigation or reuse may be considered, subject to relevant water-quality criteria. • Surface water monitoring, as well as monitoring within the water management system on site will support the assessment of water quality against trigger values and prevent the release of water that could affect the receiving environment. • TARPs have been established in the WMP to identify and respond to deteriorating conditions within the water management system and at surface water monitoring locations. Measures include reviewing and modifying dewatering rates and sequencing where monitoring indicates that groundwater inflows or drawdown exceed model predictions. • Dewatering rates and site water storage will be managed in accordance with the WMP to minimise uncontrolled releases.	**Minor** Water quality modelling predicts localised and short-term impacts to surface water quality associated with controlled discharges to the Charlotte River and passive overflows to the unnamed northern tributary. Potential impacts are primarily related to elevated nitrate concentrations in mine-affected water; however, monitoring, discharge controls and TARPs will minimise risks to receiving environments.

Potential impact	Avoidance and mitigation	Residual impact
Surface water and groundwater contamination from mine seepage and runoff from waste rock and ore stockpiles	• Mine-affected water runoff from the waste rock dump, crusher and ore stockpile areas will be captured and directed to MWD1, rather than discharged directly. • The area of surface disturbance will be minimised to reduce the volume of mine-affected runoff generated. • Surface water monitoring will be undertaken upstream and downstream of the Proposal to detect contaminants associated with waste rock dump seepage, stockpile runoff and mine-water discharges. • Groundwater quality monitoring will be undertaken to identify changes associated with potential seepage from the waste rock dump, ore stockpiles and water storages. • Groundwater, surface water and AMD TARPs will be implemented to trigger source investigations, increased monitoring, water treatment, containment and corrective action where changes from baseline conditions or trigger exceedances are identified. • Visual indicators of AMD, including acidic seepage, oxidation and iron or aluminium staining, will trigger further sampling, investigation, isolation of affected areas and active treatment where required. • The closure strategies outlined in the Concept Mine Closure Plan (Appendix D) will be implemented, including returning waste rock underground where practicable to reduce the volume of mine-affected material remaining at surface. Disturbed areas will be reshaped to establish stable, free-draining landforms, with drainage controls, surface preparation and revegetation implemented to minimise erosion, runoff and contaminant mobilisation. Surface water and groundwater monitoring will continue post-closure to verify environmental performance and identify any unexpected impacts.	**Minor** Water quality modelling indicates that seepage from waste rock and ore storage areas is expected to produce water quality comparable to existing conditions within the Charlotte River catchment. Runoff from waste rock and ore stockpile areas will be managed as mine-affected water collected. Given the limited predicted change in groundwater and surface water quality, and the minor contribution of groundwater to flows within the Charlotte River, the potential impact is expected to be minor in magnitude and localised in extent.

Potential impact	Avoidance and mitigation	Residual impact
Exposure of ASS through groundwater drawdown	• Tunnel liner to be used will reduce the volume of groundwater inflows. • Groundwater levels will be monitored against modelled drawdown predictions, with dewatering rates and sequencing reviewed and modified where monitoring indicates greater-than-predicted drawdown. • ASS-specific trigger values and TARPs will be implemented to facilitate the early identification and management of potential ASS-related impacts associated with groundwater drawdown. • Surface water and groundwater monitoring will be undertaken throughout operations and post-closure to identify declining pH, increasing sulfate concentrations and metal mobilisation associated with potential ASS exposure. • Where monitoring indicates a plausible ASS exposure pathway, targeted investigations and adaptive management measures, including modification of dewatering practices and water-level management, will be implemented.	**Minor** The predicted drawdown is generally limited in areas mapped as having a high probability of ASS occurrence, and no evidence of existing ASS-related acidification or metal mobilisation has been identified through the baseline sampling in groundwater or surface water. Sediments and shallow groundwater systems within areas of the Charlotte River are already subject to natural seasonal groundwater fluctuations and periodic drying.
Exposure of ASS through removal of overburden	• An ASS management plan will be developed and implemented for the Proposal to guide the identification, assessment and management of ASS/PASS materials,	**Minor** The Proposal is not located within areas mapped as PASS. No estuarine or sulfidic sediments indicative of potential ASS were identified during drilling of groundwater bores in the Proposal area.

Potential impact	Avoidance and mitigation	Residual impact
Saline intrusion and aquifer salinisation	• Tunnel liner to be used will reduce the volume of inflows. • Groundwater levels will be monitored against predicted drawdown responses to verify that drawdown remains within modelled limits and identify any departures from expected conditions. • Additional nested monitoring bores (LG7-s and LG7-d) will be installed near the Charlotte River to characterise salinity stratification and improve understanding of groundwater conditions adjacent to tidally influenced areas. • Groundwater level TARPs, included in the WMP, require review of dewatering rates, groundwater model assumptions and, where necessary, modification of dewatering rates or sequencing if drawdown exceeds predictions. • Groundwater quality monitoring includes indicators relevant to saline intrusion, including electrical conductivity, salinity, chloride and major ions. • A specific saline intrusion TARP has been developed for increasing EC and chloride concentrations relative to baseline groundwater conditions. • The groundwater model will be refined and recalibrated using data collected from the additional nested monitoring bores installed within the tidally influenced reaches of the Charlotte River to improve understanding of salinity stratification and reduce uncertainty regarding the risk of saline intrusion. • Surface water monitoring will be conducted in compliance with the WMP and will include monitoring of the locations included during the baseline sampling.	**Minor** Groundwater modelling indicates saline intrusion into the underground mine and freshwater reaches of the Charlotte River is unlikely. Saline intrusion is only predicted under a conservative modelling scenario and if saline groundwater is present at depth beneath the Charlotte River. Should saline intrusion occur, impacts are expected to be confined to areas already subject to tidal influence within the Charlotte River corridor. Impacts to freshwater reaches of the Charlotte River are considered unlikely, as these systems are predominantly rainfall-driven and exhibit limited evidence of sustained groundwater baseflow.
Cumulative impacts	• As per proposal-only avoidance and mitigation measures. • The groundwater monitoring program includes the installation of a new monitoring bore north of the Proposal to monitor groundwater levels and verify predicted drawdown. The bore will also assist in determining whether groundwater levels in the area are being influenced by the BP33 drawdown cone, supporting the assessment of potential cumulative groundwater impacts.	**Minor** Cumulative impacts are expected to be localised, low in magnitude and short-term. Surface water quality impacts are limited to downstream overflow pathways and are not predicted to differ substantially from baseline conditions. Groundwater modelling indicates negligible additional drawdown under cumulative operating conditions, with no material increase in the risk of ASS oxidation or saline intrusion.

8.6 Predicted outcome

Potential impacts to inland water environmental quality are primarily associated with groundwater inflows, contact water management, temporary waste rock storage, and controlled discharge of surplus mine water. The Proposal incorporates a comprehensive water management system based on the segregation, containment, reuse, monitoring and controlled release of water, supported by water quality trigger values, operational controls, contingency measures and regulatory approvals. Assessment of surface water and groundwater quality indicates that, with implementation of the proposed mitigation measures and a WMP, the risk of adverse impacts to receiving environments, including the Charlotte River catchment, is low. Ongoing monitoring and adaptive management will provide early identification of any unexpected changes in water quality and enable timely corrective action. Residual impacts are therefore expected to be low and consistent with the NT EPA environmental objective to maintain the quality of groundwater and surface water so that environmental values are protected.

9. TERRESTRIAL ECOSYSTEMS

9.1 Environmental objective

The NT EPA's objective for terrestrial ecosystems is to:

Protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.

9.2 Additional information required

The Direction identified uncertainty regarding the potential impacts of groundwater extraction and the associated groundwater drawdown on GDEs, sensitive and significant vegetation, and seasonal surface water availability. The relevant additional information requirements identified in the Direction are requirements 20 and 21 (refer to Table 1-1) which directly relate to requirements 8 and 9 of the hydrological processes factor.

The following studies as listed in Table 6-2, were undertaken to address the requirements of the Direction:

- *Groundwater Dependent Ecosystem Survey Report and Monitoring Plan* (EcOz 2026) provided at Appendix K. This report identifies and characterises potential terrestrial GDEs within the modelled drawdown extent using desktop analyses, remote-sensing and field investigations, and presents a monitoring framework to detect and assess any vegetation responses to groundwater drawdown during project operations.
- *Groundwater Impact Assessment and Modelling Report* (ELA 2026) described in detail in Section 7 and provided at Appendix I, provides an assessment of potential drawdown resulting from the Proposal, including potential based on and including modelling by CloudGMS.

Additionally, public submissions received raised concerns regarding cumulative land clearing within the Darwin region. This is addressed in Section 9.5.2.

Impacts on other values of terrestrial ecosystems resulting from other pathways of impact were assessed where relevant in the Referral. Additional information and assessment of impacts to groundwater resources, declared beneficial uses and other groundwater users from groundwater drawdown activities is provided in Section 7.

9.3 Policy and guidance

Key policy and guidance documents that informed the GDE survey, monitoring plan and the assessment of terrestrial ecosystems are summarised in Table 9-2.

Table 9-1. Policy and guidelines – terrestrial ecosystems

Policy / Guidance	Key relevance	Application to the Proposal
Guidelines for assessment of impacts on terrestrial biodiversity (NT EPA 2025)	Provides the NT EPA's framework for identifying terrestrial biodiversity values, undertaking ecological surveys, assessing direct, indirect and cumulative impacts, evaluating significance, and applying the mitigation hierarchy to protect terrestrial ecosystems.	Informed the identification and assessment of terrestrial ecosystem values associated with the Proposal.

Policy / Guidance	Key relevance	Application to the Proposal
Environmental factor guidance: Terrestrial ecosystems (NT EPA 2026)	Establishes environmental values, objectives and assessment expectations for terrestrial ecosystems.	Informed the identification of ecological values, assessment of potential impacts to vegetation communities and consideration of avoidance, mitigation and monitoring measures.
Bureau of Meteorology Groundwater Dependent Ecosystems Atlas (2019)	National dataset identifying areas with potential groundwater dependence.	Used as a desktop information source to identify mapped potential aquatic and terrestrial GDEs within and surrounding the Proposal area.
Australian Groundwater-Dependent Ecosystems Toolbox (Richardson et al. 2011)	Provides a nationally recognised framework for identifying and assessing groundwater-dependent ecosystems.	Informed the conceptual framework used to assess the likelihood of groundwater dependence and potential ecological responses to groundwater drawdown.
Functional Methodology for Determining the Groundwater Regime Needed to Maintain the Health of Groundwater-Dependent Vegetation (Eamus et al. 2006)	Provides classification and assessment principles for groundwater-dependent vegetation.	Informed the interpretation of groundwater dependence and assessment of whether vegetation communities were likely to rely on groundwater.
Land Clearing Guidelines (DLPE 2026)	Provides recommendation of buffer requirements for sensitive and significant vegetation types, ground disturbance and clearing of vegetation.	Used to inform recommendation of buffer requirements for sensitive and significant vegetation types associated with the Charlotte River, wildlife corridor incorporated into detailed design.
Northern Territory Guidelines and Field Methodology for Vegetation Survey and Mapping (Brocklehurst et al. 2007)	Standard methodology for vegetation survey and mapping in the Northern Territory.	Field verification surveys were completed in accordance with these guidelines to characterise vegetation communities and assess evidence of groundwater dependence.
National Vegetation Information System (NVIS) Framework	National standard for classification and description of vegetation communities.	Vegetation assessments were undertaken to NVIS Level 5 to ensure consistent classification and description of vegetation communities.

9.4 Environmental values

One terrestrial ecosystem value is relevant to the assessment in this chapter: GDEs – and is discussed below.

It should be noted the Direction mentioned the potential impacts on fauna accessing mine water sources due to potential impacts on seasonal surface water availability during the Dry season. Mapping of surface water permanence shows that the higher reaches of the drainages are generally not permanent water sources, indicating little to no base flow to the rivers from the groundwater during dry periods (ELA 2026). Additionally, there was no surface water present in the survey locations targeted by EcOz (2026) for GDEs in the Dry season, suggesting seasonal surface water features within the area are not groundwater-dependent. Based on this, this potential impact is not assessed further. Other potential groundwater and surface water related hydrological impacts are discussed in Section 7.5.

9.4.1 Groundwater Dependent Ecosystems

GDEs comprise vegetation communities, wetlands and other ecological features that rely wholly or partially on groundwater to maintain ecological function. Multiple information sources were reviewed to characterise GDE values within the potential drawdown extent, including the Bureau of Meteorology (BoM) Groundwater Dependent Ecosystems Atlas, baseline ecological surveys undertaken by EcOz between 2023 and 2024, groundwater investigations - Appendix I - and a targeted GDE assessment undertaken by EcOz in 2026 - Appendix K.

No seepage, springs, permanent surface water, saturated soils or vegetation communities strongly indicative of groundwater dependence were recorded by EcOz (2026) within the Proposal area or the predicted groundwater drawdown extent. While some vegetation communities may opportunistically access groundwater during dry periods, there was no evidence that groundwater makes a material contribution to maintaining vegetation composition, structure or ecological function.

Vegetation communities within the Proposal area are dominated by Eucalypt woodland and open woodland, with smaller areas of open forest, drainage-associated vegetation and grassland. The assessment by EcOz (2026) identified approximately 15 ha of potential GDEs within the modelled drawdown extent but outside the proposed mine footprint. Detailed assessment by EcOz (2026) of areas exhibiting elevated late dry-season vegetation moisture identified several localised vegetation patches associated with drainage depressions and lower landscape positions. These areas retained moisture later into the dry season than the surrounding landscape; however, field verification determined that the elevated vegetation moisture was attributable to localised surface-water accumulation and prolonged soil moisture retention rather than groundwater dependence (refer to Section 3.2 of Appendix K).

There is a high level of confidence in these findings. Some uncertainty remains regarding the extent to which individual plants (for example, large trees) may opportunistically access groundwater during periods of low soil-moisture availability; however, the available evidence does not indicate that this represents groundwater dependence at the vegetation-community or ecosystem level.

9.5 Assessment of potential significant environmental impacts

The Direction identified that groundwater extraction associated with mine dewatering may impact GDEs through reduction in groundwater availability and changes to connected surface water systems.

The section below provides an assessment of this potential impact. The significance of this impact has been assessed considering the extent, magnitude, duration and reversibility of predicted changes, together with the sensitivity of affected environmental values, in alignment with Table 6-3 and Table 6-4 accounting for uncertainty where relevant.

9.5.1 Loss and degradation of GDEs from lowered groundwater levels

As described in Section 7.5.2, dewatering of the underground mining operation is predicted to result in localised groundwater drawdown surrounding the mine. Groundwater levels are predicted to recover following cessation of dewatering activities, with groundwater conditions progressively returning towards pre-mining conditions between Year 15 to 20 (9 to 14 years after underground mining ceases).

GDE surveys (EcOz 2026) did not identify any vegetation communities or ecosystems within the drawdown area reliant on groundwater. The vegetation communities within the area are considered to be sustained primarily by seasonal rainfall and retained soil moisture rather than groundwater. Any impacts on vegetation quality and extent is expected to be limited to some individual plants who may opportunistically access groundwater during dry periods, therefore the magnitude of potential impacts on terrestrial vegetation from drawdown across the predicted drawdown period is expected to be of minor magnitude. The impact is also predicted to be limited in extent, with the potential for individual plants that may use groundwater across approximately 15 ha within the maximum predicted drawdown extent.

Should individual plants in the drawdown area present signs of impacts due to groundwater drawdown, a GDE monitoring program has been developed as a precautionary measure to detect any unanticipated vegetation responses to groundwater drawdown. The program incorporates annual Normalised Difference Moisture Index (NDMI) monitoring using a Before-After-Control-Impact design, supported by landscape-scale surveillance of the drawdown extent. Monitoring results will be used to evaluate whether vegetation moisture within the drawdown extent changes relative to baseline conditions and reference sites, and to inform further investigation where potential drawdown-related responses are identified. Further details are provided in Section 4 of Appendix K. Implementation of this adaptive management approach would enable identification of potential impacts as they occur and adjust Proposal activities to ensure impacts on vegetation would occur in the short to medium term.

Consistent with the predicted drawdown characteristics, the likely absence of terrestrial GDEs and therefore limited extent and magnitude of the impacts, and the implementation of adaptive management to reduce the duration of potential impacts, the residual impact on vegetation within the groundwater drawdown extent due to lowered groundwater levels is assessed as minor.

Table 9-2. Impact assessment summary – terrestrial ecosystems

Potential impact	Environmental management measures	Residual impact
Loss and degradation of GDEs from lowered groundwater levels	• Tunnel liner will substantially reduce groundwater inflow to the underground working by limiting hydraulic connectivity between the surrounding groundwater system and the tunnel. Groundwater model sensitivity testing indicates that the tunnel liner could reduce inflows to the tunnel by approximately 50% compared to an unlined configuration, minimising the amount of water requiring dewatering. • Continuous groundwater level monitoring will be undertaken using data loggers installed at monitoring bores to track groundwater responses to dewatering activities and verify model predictions. • Groundwater levels will be assessed against the adopted trigger values, with actions and management responses implemented in accordance with the TARPs presented in the WMP (Appendix A). • GDEs will be monitored in accordance with the GDE Monitoring Plan to detect potential changes in ecosystem condition and groundwater dependence over time.	**Minor** Impacts to vegetation communities are predicted to be of minor magnitude, limited extent and short to medium term duration, with no significant impacts predicted.

9.5.2 Consideration of cumulative impacts

Groundwater drawdown

As part of the groundwater modelling, a cumulative impact assessment of groundwater drawdown was undertaken for the Proposal, BP33 and the Grants Lithium Project (refer Section 7.5.3 for further details). The assessment predicted no hydraulic interaction between the drawdown associated with the Grants Lithium Project and the Proposal. Limited overlap between the drawdown cones associated with the Proposal and BP33 was predicted, resulting in a maximum cumulative drawdown of approximately 0.5 m in the area between the two operations.

Cumulative impacts on terrestrial ecosystem values could occur where overlapping drawdown influences groundwater availability to vegetation communities or connected surface water systems. However, the additional cumulative drawdown is predicted to be minor relative to the Proposal-only scenario, localised in extent and medium-term in duration. The cumulative groundwater modelling assessment also indicates that groundwater recovery is broadly consistent with the Proposal-only scenario (refer Section 7.5.3).

Ecological investigations undertaken for the Proposal did not identify any terrestrial GDEs within the Proposal area or predicted drawdown extent (EcOz 2026). While limited overlap between the Proposal and BP33 drawdown cones is predicted, GDEs are generally associated with shallow groundwater systems, whereas the cumulative drawdown effects are associated with dewatering of the deeper groundwater aquifer. Given the low hydraulic connectivity between shallow, intermediate and deep groundwater zones, cumulative effects on vegetation communities, GDEs or connected surface water systems are not expected.

Groundwater level, groundwater quality and vegetation monitoring programs will be implemented throughout operations to verify model predictions and identify any unforeseen cumulative ecological responses. Accordingly, the residual cumulative impact to terrestrial ecosystem values is considered to be minor, because of the localised extent of cumulative drawdown, the limited overlap between the Proposal and BP33 drawdown cones, the absence of identified GDEs within the area of overlap, and the predicted recovery of groundwater levels following mine closure.

Regional land clearing

Through the public submissions received, concerns were raised regarding cumulative land clearing within the Greater Darwin region. To provide regional context, publicly available information on existing disturbance and reasonably foreseeable future developments, together with published regional assessments relevant to the Greater Darwin region, were reviewed. This included consideration of the Middle Arm Precinct and Darwin H2 Project Wak Wak Solar Farm both currently under assessment under the EP Act.

The Darwin Coastal Bioregion covers approximately 2,843,199 ha, of which approximately 125,101 ha (4.4%) has been cleared or disturbed to date. The Proposal has a total disturbance footprint of approximately 100 ha (of which 64.3ha is to be disturbed for mine site surface infrastructure), equivalent to approximately 0.0035% of the Darwin Coastal Bioregion. By comparison, the Middle Arm Precinct and Wak Wak Solar Farm are expected to disturb approximately 1,500 ha (0.053%) and 2,500 ha (0.088%) respectively.

Published regional assessments identify that vegetation and habitat within the Greater Darwin region continue to be subject to clearing pressures associated with urban expansion, industrial development, renewable energy projects and supporting infrastructure. These assessments also recognise that substantial areas of native vegetation remain within the region and highlight opportunities for strategic biodiversity conservation planning, including the identification and protection of conservation areas and other high-value habitats. A coordinated regional approach to biodiversity conservation planning has been identified as an important mechanism for managing cumulative land clearing pressures while providing greater certainty for future development and decision-making.

In the context of the Proposal, the contribution to regional vegetation clearing is limited relative to the extent of existing disturbance and the broader extent of native vegetation remaining within the Darwin Coastal Bioregion. The Proposal is also not expected to result in significant impacts on downstream riparian vegetation, mangroves or monsoon rainforest communities through alteration of surface water flows. These matters are assessed separately in hydrological processes Section 7.

9.6 Predicted outcome

Ground-truthing and ecological investigations found no evidence of GDEs, wetlands or springs within the Proposal area or predicted groundwater drawdown extent (EcOz 2026). Groundwater modelling predicts that drawdown associated with the Proposal will remain localised and is unlikely to result in significant reductions in groundwater availability to vegetation communities or connected surface water systems.

Consequently, potential impacts to vegetation communities and connected surface water systems are expected to be localised, of low magnitude and groundwater conditions are expected to recover following cessation of the mining operation.

Implementation of groundwater extraction controls, groundwater level and groundwater quality monitoring programs, vegetation monitoring, groundwater model refinement, and adaptive management measures will further reduce risk and provide early detection of any unanticipated impacts.

Regional cumulative land clearing is recognised as an important consideration within the Greater Darwin region; however, the Proposal's disturbance footprint is small relative to the extent of native vegetation remaining within the Darwin Coastal Bioregion and is not expected to materially contribute to significant cumulative impacts on riparian vegetation, mangroves, or downstream hydrological processes. Consequently, residual impacts to terrestrial ecosystem values associated with groundwater extraction and land clearing, including cumulative impacts, are predicted to be minor.

10. COMMUNITY AND ECONOMY

10.1 Environmental objective

The NT EPA's objective for Community and Economy is to:

Enhance communities and the economy for the welfare, amenity and benefit of current and future generations of Territorians.

10.2 Additional information required

The Direction requested an updated road and traffic assessment, which includes assessment of direct, indirect and cumulative impacts associated with increased traffic during construction and operations, particularly in relation to congestion, delays, road safety, residential amenity, and noise and dust at sensitive receptors. The request also seeks clarification of the mitigation and management measures proposed, the role of relevant road and traffic regulatory frameworks, and the processes for ongoing monitoring, inspection and reporting. Refer to Table 1-1 for further information.

In addition, the Direction requested further information demonstrating awareness of the community of the potential social and economic impacts, this information is provided as part of stakeholder consultation in Section 4. Refer to Table 1-1 and Direction no. 26 for further information.

A Traffic Impact Assessment (TIA) was undertaken by GHD (2026) and is provided at Appendix B. The assessment provides a high-level evaluation of the existing transport environment and the proposed development in the context of the surrounding road network. The TIA outlines the Proposal characteristics, identifies key access arrangements and reviews baseline traffic conditions, including road hierarchy, traffic volumes and relevant transport infrastructure. It also describes the methodology and assumptions adopted to estimate future traffic demand and inform the analysis of transport interactions associated with the Proposal.

10.3 Policy and guidance

The TIA has been prepared in accordance with relevant Northern Territory and nationally recognised guidance, recognised traffic engineering and road design guidance. These guidelines inform the application of assessment thresholds, traffic modelling assumptions, and the design of mitigation measures such as intersection treatments and sight distance requirements. While the assessment is primarily guided by these standards, implementation of the Proposal will also be undertaken in accordance with relevant Northern Territory legislative frameworks governing road use and traffic management.

Key guidance documents that informed the TIA are summarised in Table 10-1.

Table 10-1. Policy and guidelines – traffic impact assessment

Policy / Guidance	Key relevance	Application to the Proposal
Development Guidelines for NT Government Controlled Roads (NTG 2026)	Road access, road design, intersection requirements, road authority approvals and safety.	Provides the primary Northern Territory framework for assessing access arrangements to the Proposal, road upgrades, intersection treatments, sight distance requirements and compliance with Department of Logistics and Infrastructure expectations.
Guide to Traffic Management Part 3: Traffic Studies and Analysis (Austroads 2020a)	Traffic surveys, traffic forecasting and traffic impact assessment methodologies.	Informed assessment of existing traffic conditions, traffic generation estimates, traffic growth assumptions and evaluation of Proposal-related traffic impacts on the surrounding road network.
Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings (Austroads 2020b)	Intersection performance, capacity and safety.	Guided assessment of existing and future intersection performance and informed recommendations regarding intersection upgrades and treatments where required.
Guide to Traffic Management Part 12: Traffic Impacts of Development (Austroads 2020c)	Development-generated traffic and transport impact assessment.	Provided the framework for assessing vehicle movements associated with construction, operations and workforce activities, and evaluating the effect of Proposal traffic on the surrounding transport network.
Guide to Road Design Part 3: Geometric Design (Austroads 2021a)	Road geometry, vehicle movements and design standards.	Informed assessment of road geometry requirements, vehicle manoeuvrability, turning movements and suitability of road infrastructure for proposed traffic volumes and vehicle types.
Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (Austroads 2021b)	Intersection design and traffic safety.	Guided the assessment of existing intersection layouts and informed design recommendations to maintain safe and efficient operation of the road network.

10.4 Environmental values

Sensitive receptors

Key environmental values and sensitive receptors in relation to traffic and transport include the Berry Springs Primary School and surrounding community, rural residential receptors along Cox Peninsula Road and Fog Bay Road, and general road users including school bus services and tourists accessing the region. These receptors are sensitive to increased traffic volumes, particularly heavy vehicle movements, due to potential impacts on safety, amenity (including noise and dust), and travel conditions.

Additional sensitive receptors include local communities and businesses reliant on the haulage corridor, as well as existing mining operations that share the road network and contribute to cumulative traffic impacts. Road infrastructure itself is also identified as a key value due to its susceptibility to increased wear and degradation associated with heavy vehicle use. The sensitive receptors included in the traffic impact assessment are summarised in Table 10-2.

Table 10-2. Summary of sensitive receptors relevant to the haulage route.

Receptor	Sensitive to
Berry Springs Primary School (including pre-school)	Traffic safety risks, heavy vehicle interactions, noise, dust, and increased traffic during school drop-off and pick-up periods
Berry Springs community and recreational users	Changes in traffic conditions, increased heavy vehicle movements, amenity impacts (noise, dust), and potential delays or congestion
Rural residential properties (Cox Peninsula Road and Fog Bay Road)	Noise, dust, vibration and reduced amenity from increased heavy vehicle (including road trains) traffic
General road users (including private vehicles and tourists)	Increased interaction with heavy vehicles, road safety risks (particularly at intersections and access points), and changes to travel times or traffic conditions
School bus services (routes 429, 433, 435)	Interaction with heavy vehicles during peak school transport periods and increased safety risk along Cox Peninsula Road
Regional communities along haul routes (e.g. Berry Springs, access routes to Dundee, Bynoe, Wagait, Belyuen)	Changes in accessibility, increased traffic volumes, delays, and reduced amenity from increased haulage activity
Tourism businesses and visitors (e.g. Litchfield National Park, Dundee Beach access)	Traffic delays, safety concerns, and amenity impacts (dust, noise) affecting visitor experience
Other mining operations (e.g. BP33 and nearby projects)	Increased cumulative traffic volumes, heavy vehicle interactions, and shared haul route constraints
Road infrastructure (roads, bridges, culverts, intersections)	Increased wear, degradation, and maintenance requirements from heavy vehicle loading

Assumptions and input information

The TIA incorporates site-specific operational assumptions to characterise traffic generation and movement patterns associated with the Proposal. At peak operations (2030 to 2032), the Proposal is estimated to generate approximately 68 two-way vehicle movements per day, including around 20 heavy vehicle movements associated with DSO haulage and site deliveries, equivalent to approximately 23,789 two-way vehicle movements annually. Traffic is expected to be distributed throughout the day, with limited concentration during peak commuter or school periods (refer to Appendix B Table 5).

Proposal traffic was assigned to the haulage route via Fog Bay Road and Cox Peninsula Road before dispersing towards Berry Springs, the Stuart Highway and Darwin Port. Heavy vehicles are assumed to utilise the designated haulage route, while light vehicles are expected to travel between the mine site and Palmerston via Fog Bay Road, Cox Peninsula Road, Finn Road, Jenkins Road and Channel Island Road.

Baseline traffic data were derived from available traffic counts and may not fully capture seasonal variation, tourism peaks or short-term fluctuations. Future traffic scenarios were modelled with and without the Proposal, incorporating background traffic growth and cumulative development assumptions. Predicted changes in traffic volumes for the peak operational year (2032) are presented in Table 9 of Appendix B.

10.5 Assessment of potential significant environmental impacts

The NT EPA identified a high likelihood that traffic increases from the Proposal would significantly impact nearby stakeholders and road users. The direct and indirect impacts and significance of increased traffic on these receptors are assessed in the subsections below and summarised with proposed avoidance and mitigation measures and residual impact ratings in Table 10-3.

. Impact significance has been determined having regard to the extent, magnitude, duration and reversibility of predicted impacts, as well as the sensitivity of the affected environmental values, consistent with the assessment framework outlined in Section 6.

The assessment area in the TIA, considers the broader road network that may be used by, or affected by, Proposal-related traffic, extending beyond the mine access road to include the haulage route and associated transport corridors. The road network assessed includes Fog Bay Road, Cox Peninsula Road, Finn Road, Jenkins Road, Channel Island Road, Stuart Highway, Tiger Brennan Drive and Berrimah Road. This network was used to evaluate existing traffic conditions, road safety, network performance and potential traffic-related effects associated with the Proposal.

10.5.1 Traffic delays and congestion

The TIA indicates that the Proposal will result in a modest increase in traffic volumes across the regional road network, including Fog Bay Road, Cox Peninsula Road, Jenkins Road, Channel Island Road and Finn Road. While increases on some road sections exceed a 5% threshold relative to modelled baseline conditions, the overall traffic volumes remain well below the theoretical capacity of the existing road network. Section 5.2 of the *Austroads Guide to Traffic Management Part 3: Transport Study and Analysis Methods* (2020a) indicate that the theoretical capacity of a two-lane, two-way rural road is approximately 3,200 vehicles per hour for both directions combined, and none of the roads modelled exceed this theoretical capacity. It is anticipated that the total daily traffic generation from the Proposal is 68 two-way vehicle movements, consisting of 48 light vehicle movements and 20 heavy vehicle movements at the peak (expected 2032).

As such, the Proposal is not expected to result in material increases in congestion or sustained delays, including during peak traffic periods such as commuting and school drop-off and pick-up times. Minor, localised delays may occur at intersections and along haulage routes due to increased heavy vehicle movements; however, these impacts are anticipated to be short-term and intermittent and manageable within the existing road network capacity. Therefore, the residual impact is assessed as minor.

10.5.2 Impacts to residences and community amenity

Increased traffic associated with the Proposal, particularly heavy vehicles, including road trains, has the potential to reduce amenity for nearby residents and sensitive receptors along the haul route. Potential impacts include increased noise, dust and vibration, particularly along Cox Peninsula Road and Fog Bay Road where rural residential uses are present. These impacts are expected to be localised to the Cox Peninsula Road and Fog Bay Road and of minor magnitude, noting that heavy vehicles, including road trains, already operate along these corridors. Sensitive receptors, including Berry Springs Primary School and the surrounding community, may experience minor increases in exposure; however, mitigation measures designed to reduce the likelihood of road train convoying, distribute traffic throughout the day, and avoid peak school periods are expected to limit the significance of these impacts, and the residual impact is minor.

10.5.3 Road safety risks

Analysis of five years of crash data identified no discernible crash patterns or existing road safety issues within the overall assessment area. It is acknowledged that the Proposal will increase light and heavy vehicle movements on roads, including Fog Bay Road, Cox Peninsula Road, Jenkins Road, Channel Island Road and Finn Road. While there will be additional interactions between background and Proposal traffic, including with heavy vehicles, particularly at intersections and along the haulage route, forecast traffic volumes are

expected to remain well below the theoretical capacity of the road network and are not anticipated to materially alter existing operating conditions.

However, to further minimise road safety risks, the Proposal will implement a Traffic Management Strategy supported by phase-specific Traffic Management Plans, prepared in consultation with relevant NT Government departments. These plans will include measures to, among other things:

- Reduce the likelihood of road train convoying to improve opportunities for safer overtaking by other road users
- Avoidance of road train movements past Berry Springs Primary School during school drop-off and pick-up periods
- Speed management measures
- Traffic controls where required
- Driver fatigue and alcohol management procedures.

These measures are expected to minimise the likelihood of traffic-related incidents and maintain the safe operation of the road network. Consequently, residual road safety impacts are assessed as minor and manageable within the existing road environment.

10.5.4 Deterioration of road use conditions

Increased heavy vehicle movements associated with the Proposal have the potential to contribute to deterioration of road conditions, including pavement wear and surface degradation, particularly along sections of the haulage route utilised by road trains transporting DSO to Darwin Port.

The TIA recognises that heavy vehicle traffic can contribute to road wear over time; however, impacts are expected to be localised to sections of road subject to concentrated heavy vehicle use, primarily Cox Peninsula Road. To manage these potential impacts, a pre-construction road condition audit will be undertaken prior to construction for all roads expected to carry Proposal-related road train traffic, including associated infrastructure such as culverts, bridges and other critical assets., Ongoing inspections, traffic monitoring, maintenance and consultation with relevant NT Government agencies will also be undertaken throughout the life of the Proposal.

Residual impacts on road conditions are expected to be minor and manageable through implementation of monitoring, maintenance and adaptive management measures, ensuring the continued safe and efficient operation of the road network.

Table 10-3 Impact assessment summary – community and economy

Potential impact	Avoidance and mitigation	Residual impact
Increased traffic volumes and potential for congestion	• Implementation of Traffic Management Strategy • Avoid peak school pick up and drop off periods by scheduling vehicle movements outside these times • Minimising the likelihood of the Proposal's road trains convoying through coordination of haulage activities.	**Minor** Traffic volumes remain well below theoretical road capacity and are not expected to result in sustained congestion or delays.
Localised delays at intersections and along haulage routes due to heavy vehicles	• Traffic control measures (signage, traffic controllers where required) • speed management • Minimising the likelihood of the Proposal's road trains convoying through coordination of haulage activities.	**Minor** Minor, intermittent delays may occur but are manageable within existing network capacity.
Impacts to community amenity (noise, dust and vibration) primarily along the haul route (e.g. Cox Peninsula Road, Fog Bay Road)	• Development and implementation of dust, noise and vibration management plan • Maintenance of vehicle standards	**Minor** Localised and temporary impacts managed through mitigation measures.
Impacts to sensitive receptors (e.g. Berry Springs Primary School and the surrounding community)	• Avoidance of haulage during school drop-off and pick-up periods • Ongoing stakeholder engagement and communication with the Berry Springs community	**Minor** Exposure reduced through timing controls and communication.
Road safety risks associated with increased light and heavy vehicle movements	• Speed management • Traffic control measures • Driver fatigue and alcohol management plans • Compliance with relevant NT road transport legislation	**Minor** Risks reduced through standard operational and regulatory controls.
Deterioration of road condition due to heavy vehicle use	• Pre-construction road condition audits • Ongoing inspection and maintenance of road infrastructure • Coordination with NT Government (DLI) • Facilitating repairs or reinstatement where required	**Minor** Deterioration managed through monitoring, facilitating maintenance and regulatory oversight.
Uncertainty in traffic predictions and changing conditions over time	• Ongoing monitoring (traffic counts) • Inspection of road conditions • Incident and complaint reporting systems • Adaptive management and reporting to NT Government agencies	**Minor** Impacts managed through monitoring and responsive management.

In addition to the avoidance and mitigation measures identified through the TIA and summarised in Table 10-3, the Direction requested further information on the role of relevant regulatory regimes (no. 24), and the

processes for ongoing monitoring, inspection and reporting (no. 25) associated with traffic and transport impacts. The following sections summarise the information to address these requirements.

10.5.5 Role of regulatory regimes

The Proposal will be implemented within the framework of relevant NT regulatory regimes, including requirements under the *Control of Roads Act 1953* and *Traffic Act 1987*. These frameworks provide mechanisms to manage road safety, vehicle operations and impacts on public roads, including permitting, enforcement of vehicle standards, and traffic control measures. LPM will work in consultation with the NT Government (including DLI) to ensure compliance with applicable legislation, coordinate haulage activities, and implement appropriate mitigation measures. This will support the safe and efficient operation of the road network and minimise impacts on nearby communities, including Berry Springs, Dundee, Bynoe, Wagait and Belyuen, as well as other road users, tourism operators and existing mining activities.

10.5.6 Monitoring, inspection and reporting

Ongoing monitoring, inspection and reporting processes will be implemented to manage potential impacts to the community and road network. These will include periodic traffic counts to verify traffic volumes, compliance monitoring of operational controls, and regular inspections of road conditions to identify wear or damage associated with Proposal traffic. Incident and complaint reporting systems will be established to capture community feedback, with mechanisms for timely response and corrective action. Outcomes of monitoring and inspections will be reported to relevant NT Government agencies as required, and adaptive management measures will be implemented where necessary to ensure impacts remain acceptable throughout the LOM.

10.6 Cumulative impact

Cumulative traffic impacts have been assessed in the context of overlapping activities associated with the Core Lithium BP33 Project, including operation of the Grants processing facility where ore from BP33 is processed prior to export through Darwin Port. The same haulage route will be utilised by both Core Lithium and LPM, with both projects relying on Cox Peninsula Road as the primary connection to the Stuart Highway and Darwin Port export facilities (GHD 2024).

The BP33 Project (proposed variation currently in assessment under the EP Act, with an operational timeline of 2027 to 2039) was incorporated within baseline traffic conditions in the TIA. Concurrent operation of the projects will result in a cumulative increase in heavy vehicle movements, particularly along Cox Peninsula Road and key arterial routes to Darwin. Impacts are expected to occur throughout the operation life of the Proposal, with the greatest impacts occurring between 2030 and 2032, when the Proposal is hauling the most ore, and both projects are operating concurrently and utilising the same regional haulage corridors. Assessment of the peak 2032 scenario indicates that, although cumulative heavy vehicle movements will increase along shared transport routes, forecast traffic volumes remain within the capacity of the regional road network.

The combined effect of these developments will result in increased interaction between heavy vehicles and general traffic, incremental increases in congestion, extended travel times and accelerated road wear, particularly during periods of overlapping haulage activity. While haulage is generally distributed throughout the day and not concentrated during peak periods, there remains potential for cumulative impacts on road

users and local communities, including increased exposure to noise, dust and traffic safety risks along shared transport corridors.

Notwithstanding these cumulative effects, forecast cumulative traffic volumes remain well within the capacity of the affected road network and impacts are expected to be manageable through implementation of a site specific Traffic Management Plan. Identification of any additional mitigation measures required will be identified through ongoing review and consultation with the community and road authority.

While cumulative traffic impacts are expected to occur throughout the operational life of the Proposal, forecast traffic volumes remain within the capacity of the road network and impacts are expected to be manageable through implementation of a Traffic Management Plan and associated regulatory controls. The Proposal is expected to cease operations in 2033, while the BP33 Project has submitted a variation application under the EP Act to extend operations to approximately 2039 (from four years to up to 12 years), which is currently under assessment by the NT EPA. Accordingly, cumulative traffic impacts are assessed as occurring at a localised scale, with a minor magnitude and long-term duration. Consistent with the broader traffic impact assessment, residual cumulative traffic impacts are expected to be minor. A summary of the cumulative impact assessment is provided in Table 10-4.

Table 10-4. Cumulative impact assessment summary – community and economy

Impact	Avoidance and mitigation	Residual impact
Potential cumulative impacts on road users, tourism and surrounding communities	• Consultation and coordination with NT Government and relevant stakeholders • Adherence to Control of Roads Act 1953 and Traffic Act 1987 requirements	**Minor –** Cumulative traffic impacts are expected due to shared use of localised haulage routes of Cox Peninsula Road; however, impacts are not expected to exceed overall road network capacity and will be managed through implementation of traffic management measures, monitoring and regulatory requirements.

10.7 Predicted outcome

The TIA demonstrates that the Proposal is not expected to result in significant impacts on community wellbeing, access, connectivity or infrastructure capacity. While the Proposal will generate traffic movements across the regional road network of the preferred haulage route, the potential impacts are expected to be concentrated along specific road corridors and nearby communities where traffic volumes will increase, including Fog Bay Road, Cox Peninsula Road, Finn Road, Jenkins Road and Channel Island Road. Therefore, traffic is considered a localised impact. In addition, the predicted traffic volumes remain within the theoretical capacity of the existing road network, and impacts to road users, residents, businesses, tourists and community infrastructure are expected to be localised and manageable through implementation of the proposed mitigation measures and applicable regulatory controls.

Cumulative traffic impacts associated with overlapping haulage activities from the Proposal and the BP33 Project are expected to occur throughout the operational life of the Proposal. As traffic associated with the BP33 Project has been incorporated into the baseline traffic assessment, cumulative impacts have been considered in the assessment of future traffic conditions. The assessment indicates that cumulative impacts are not expected to result in a material reduction in road network performance, community access or economic activity, and are expected to remain manageable through implementation of the proposed mitigation and management measures.

11. CULTURE AND HERITAGE

11.1 Environmental objective

The NT EPA's objective for Culture and Heritage is to:

Protect culture and heritage.

11.2 Additional information required

The NT EPA requested additional information to improve confidence in the identification, assessment and management of potential impacts on sacred sites, cultural heritage and cultural values within the Proposal area and zone of influence. Refer to Table 1-1 for further information.

The Direction also required information on consultation with Traditional Owners and relevant stakeholders was undertaken as part of the assessment process. Traditional Owner participation was incorporated into field investigations, and consultation outcomes informed the assessment of cultural significance and recommendations for ongoing engagement and heritage management. A summary of consultation activities is provided in Section 4.3, with proposed ongoing future engagement described in Section 4.7.

11.2.1 Archaeological survey and cultural heritage assessment

An archaeological survey and CHA was undertaken by Remote Heritage Services (RHS) and is provided at Appendix J. The assessment considered cultural heritage values with the Proposal area through a combination of desktop investigations (Appendix J, Section 2.2, 3 and 4), consultation with Larrakia representatives (Appendix J, Section 1.3) and an on-ground archaeological survey (Appendix J, Section 5 and 6) undertaken with Larrakia participation. The assessment was undertaken to identify and assess cultural heritage values within the Proposal area and to inform consideration of potential impacts and management measures. The assessment also contributes to understanding potential impacts on both tangible and intangible cultural heritage values within the Proposal area and surrounding cultural landscape. The environmental values identified through the CHA are summarised in Section 11.4 below.

Justification of methodology

Field investigations comprised a systematic archaeological survey undertaken with participation from Larrakia representatives. Survey methods included pedestrian transects, inspection of landforms and areas of archaeological potential, recording of identified heritage places and objects, spatial data collection and photographic documentation. The survey methodology was informed by the results of desktop investigations and recognised archaeological survey and heritage assessment practices. For further information the survey methodology is detailed in Section 5 of Appendix J.

The assessment methodology comprising desktop review and on-ground survey with Larrakia representatives was considered appropriate for identifying archaeological places and objects, informing understanding of cultural heritage values and supporting environmental assessment requirements.

Further to the survey a cultural heritage significance assessment was undertaken. The purpose of this cultural heritage significance assessment was to evaluate the archaeological and cultural significance of the heritage values identified during the survey. The assessment considered the scientific and archaeological significance of the recorded sites based on their research potential, rarity, representativeness and integrity, while recognising that cultural significance, including intangible, spiritual and restricted values, which can only be

determined by the Larrakia Traditional Owners. Further information on this is provided in Section 8 of Appendix J.

Survey limitation, data gaps and uncertainties

Several limitations were identified during the assessment, which limited what could be detected and assessed. These included:

- Variable ground visibility associated with vegetation cover and surface conditions of quart geology
- Disturbance from feral pig activity
- Inherent limitations of archaeological survey methods in identifying intangible cultural values, sacred sites and restricted cultural information.
- Absence of an AAPA certificate and sacred sites records.

The assessment acknowledges that cultural heritage values may exist beyond those identified during field investigations. Further information relating to limitations is detailed in Section 6.3 of Appendix J.

11.3 Policy and guidance

The CHA and related survey was informed by a range of NT and Commonwealth environmental assessment guidance, Indigenous cultural heritage frameworks and heritage management principles. Collectively, these documents guided the identification of cultural heritage values, consultation with Larrakia representatives, assessment of cultural significance, consideration of cultural landscape values and the development of avoidance, mitigation and management measures. The guidance also informed the assessment of both tangible and intangible cultural heritage values and ensured that the assessment was undertaken in accordance with contemporary cultural heritage management and environmental impact assessment practices.

Key guidance documents that informed the CHA are summarised in Table 11-1.

Table 11-1. Policy and guidelines – culture and heritage

Policy / Guidance	Key relevance	Application to the Proposal
Environmental Factor Guidance: Culture and Heritage (Draft) (NT EPA 2022)	Identification and assessment of sacred sites, cultural heritage values, Aboriginal archaeological places and objects, cultural landscapes and intangible values.	Guided the identification and assessment of cultural heritage values within the Proposal area, including recorded archaeological sites, cultural landscape values and intangible cultural values. Also informed the assessment of potential impacts and development of mitigation measures.
Environmental Impact Assessment Guidance (NT EPA 2020)	Environmental value identification, impact assessment and management.	Informed the overall environmental assessment framework used to identify heritage values, assess impacts and develop avoidance, mitigation and management measures.
Stakeholder Engagement and Consultation Guidance (NT EPA 2021)	Community and Traditional Owner consultation.	Guided consultation activities undertaken with Larrakia representatives during the CHA and informed the integration of Traditional Owner perspectives into the environmental assessment process.

Policy / Guidance	Key relevance	Application to the Proposal
Interim Engaging with First Nations People and Communities on Assessments and Approvals under the EPBC Act 1999 (DCCEEW, 2023)	First Nations engagement and CHA.	Informed engagement with Larrakia representatives and consideration of Traditional Owner knowledge during the identification and assessment of cultural heritage values.
Burra Charter (Australia ICOMOS, 2013a) Practice Notes (Australia ICOMOS, 2013b)	Assessment of cultural significance and heritage values.	Provided the framework for assessing archaeological, social, spiritual and cultural significance of heritage places and cultural landscape values identified within the Proposal area.
Ask First: A Guide to Respecting Indigenous Heritage Places and Values (Australian Heritage Commission 2002)	Indigenous heritage assessment and consultation.	Informed the approach to recognising Traditional Owners as the primary source of information regarding cultural significance and Indigenous heritage values.
Dhawura Ngilan: A Vision for Aboriginal and Torres Strait Islander Heritage in Australia (AIATSIS 2020)	Aboriginal cultural heritage and cultural landscapes.	Informed the consideration of the Proposal area as part of a broader living cultural landscape and reinforced the importance of Traditional Owner-led determination of cultural significance.

11.4 Environmental values

As a result of the CHA, the understanding of cultural heritage values within the Proposal area and the ZOI has been significantly refined since the submission of the Referral. In addition to the desktop-identified values presented in the Referral Report, the assessment identified Aboriginal archaeological places and objects that link to traditional resource use and movement through Country and culturally modified tree identified by Larrakia participants as having ceremonial significance and culturally significant landscape features. The assessment further concluded that the cultural significance of the area extends beyond the recorded archaeological evidence and includes intangible cultural values that are yet to be formally documented through ongoing engagement with the Larrakia People

11.4.1 Sacred sites

A commitment in the Referral Report was for LPM to undertake consultation with AAPA, obtain an Authority Certificate and comply with all conditions of the certificate. Since submission of the Referral Report, LPM has undertaken consultation with AAPA regarding the Proposal. On 10 July 2026, LPM contacted AAPA to discuss matters raised in AAPA's submission on the Referral and to invite AAPA representatives to discuss the Proposal and the preparation of this document. Following correspondence to arrange a suitable meeting date, a Proposal presentation was conducted with AAPA on 7 August 2026.

An AAPA Authority Certificate application, supported by the findings of the RHS archaeological survey CHA Report, was submitted on 28 September 2026 and remains under assessment at the time of submission of this document. Consequently, the presence or absence of registered sacred sites within the Proposal area could not be confirmed for the purposes of this assessment. Any identified sacred site requirements and associated management measures will be addressed through the Authority Certificate process, and LPM will comply with all conditions of the issued certificate.

11.4.2 Aboriginal archaeological places or objects

The survey recorded nine Aboriginal cultural heritage places, including five isolated quartz artefacts (IA_001 to IA_005), one quartz artefact scatter (AS_001), one resource place (RS_001) marked by Telescopium shell transported inland, one culturally modified tree (CMT_001) with a coolamon scar, and one possible stone arrangement (SA_001) that was assessed as likely natural but recorded as a precaution. The recorded places provide evidence of Aboriginal occupation, resource use, movement across Country and the manufacture of material culture associated with the East Charlotte River landscape.

Searches of the NT Archaeological Site Database identified six previously recorded Aboriginal archaeological places within approximately 320 m to 4.6 km of the Proposal area, comprising a stone arrangement, stone artefact scatters, isolated stone artefacts and a stone artefact scatter/quarry complex.

The significance assessment identified the creek-corner artefact assemblage and associated resource place as being of moderate archaeological significance, reflecting their contribution to understanding Aboriginal occupation and resource use within the local landscape. The scarred ironwood tree (CMT_001) was assessed as being of high archaeological significance due to its rarity, integrity and evidence of cultural modification. The possible stone arrangement (SA_001) was not assigned a significance rating and remains subject to further consideration by the Larrakia, a recommendation from the survey. A summary of the significance assessment is provided in Table 11-2.

Table 11-2. Summary of archaeological significance of the recorded places (RHS 2026)

Place/group	Archaeological significance	Basis
South-western creek-corner assemblage (IA_001–IA_005, AS_001)	Moderate at the landscape scale	Expedient quartz technology associated with the watercourse; contributes to a regional understanding of Holocene stone use.
Resource place, Telescopium (RS_001)	Moderate	Estuarine resource transported well inland of its natural range; a rare occurrence evidencing subsistence range and connection to the tidal country.
Scarred tree (CMT_001)	High	Rare, intact culturally modified tree; coolamon/shield scar evidencing material-culture manufacture; identified by Larrakia rangers as an active smoking-ceremony tree.
Possible stone arrangement (SA_001)	Not rated; most likely natural	Recorded as a precaution at Larrakia direction; remains open to Larrakia consideration.
Intangible and restricted values	For Larrakia determination	Beyond the scope of surface survey; to be recorded with senior Larrakia people.

11.4.3 Non-aboriginal archaeological places or objects

No non-Aboriginal heritage places or objects were identified within the Proposal area during database searches or field surveys. The assessment identified historical mining activity in the wider Bynoe district, including Kelly's, Bell's and Rocky Bar historic workings within approximately 1 km of the Proposal area. Broader historical values associated with pastoral occupation, regional mining history, Chinese mining activity and World War II activities were also identified within the wider locality. However, no non-Aboriginal heritage places or objects were recorded within the surveyed Proposal area.

As no non-Aboriginal heritage places or objects were identified within the Proposal area, significant impacts to known non-Aboriginal heritage values are not expected. The possibility of previously unidentified heritage

material occurring within the Proposal area cannot be completely excluded. Any previously unidentified non-Aboriginal heritage places or objects encountered during construction or operation will be managed through the Cultural Heritage Management Plan and Unexpected Finds Procedure described in Section 11.5.2.

11.4.4 Cultural landscape features and practices and importance of amenity

The report identifies the broader landscape of the Proposal area and associated ZOI as Larrakia Country and describes a connected cultural landscape rather than isolated sites. Key values include:

- Seasonal resource gathering
- Hunting, fishing and shellfish collection
- Movement through country
- Use of plants for food, medicine, tools, canoes and ceremony
- Water sources and waterways as culturally important places
- Spiritual places and dreaming associations
- Ceremonial practices
- Ongoing connection to country
- Transport of estuarine resources inland
- Use of ironwood trees in smoking ceremonies.

The East Charlotte River and tributaries are identified as organising features of the cultural landscape, with recorded sites concentrated along these watercourses. Intangible cultural knowledge, stories, restricted values and spiritual associations are acknowledged as important but largely unrecorded. The assessment also recognised that the experience of Country, including access to culturally important places, landscape character, and visual and acoustic amenity, may contribute to the maintenance of cultural values, cultural practices and ongoing connection to Country.

11.5 Assessment of potential significant environmental impacts

The Direction identified the potential for the Proposal to impact sacred sites, Aboriginal archaeological places and objects, cultural landscape values, intangible cultural heritage and associated cultural practices within the Proposal area and ZOI. This assessment considers impacts arising from vegetation clearing, ground disturbance, construction and operational activities, changes to access and amenity, and indirect impacts associated with groundwater drawdown and changes to environmental conditions within the ZOI. Proposed avoidance and mitigation measures and residual impact ratings are summarised in Table 11-3. Impact significance has been determined having regard to the extent, magnitude, duration and reversibility of predicted impacts, as well as the sensitivity of the affected environmental values, consistent with the assessment framework outlined in Section 6.

11.5.1 Loss or damage to sacred sites

Sacred sites were not assessed through the site-specific archaeological survey and remain subject to the ongoing AAPA Authority Certificate process. Accordingly, assessment of potential impacts to sacred sites is precautionary and considers both direct disturbance and potential indirect pathways associated with the predicted Proposal-related groundwater drawdown.

LPM has commenced the process of obtaining an AAPA Authority Certificate, with an application submitted on 28 September 2026 and currently under assessment. The AAPA assessment area was not defined solely by a prescribed groundwater drawdown contour. Rather, the survey envelope was developed using a risk-based approach informed by predicted groundwater drawdown, the distribution and nature of potential GDEs, the hydrogeological and tidal characteristics of the Charlotte River, and the potential presence of groundwater-

dependent sacred sites. This approach recognises that groundwater drawdown alone does not establish an impact to a sacred site.

Following implementation of the avoidance and mitigation of sacred sites in accordance with the requirements of an approved Authority Certificate under the *Northern Territory Aboriginal Sacred Sites Act 1989* compliance with all certificate conditions, implementation of the Cultural Heritage Management Plan and Unexpected Finds Procedure, the likelihood of impacts to sacred sites is expected to be minor. Any impacts that do occur are expected to be localised in extent and minor in magnitude. Accordingly, the residual impact to sacred sites is assessed as minor.

11.5.2 Direct loss or damage of Aboriginal archaeological places and objects

Construction and operation of the Proposal has the potential to directly impact Aboriginal archaeological places and objects through vegetation clearing, earthworks, excavation, infrastructure construction, vehicle movements and other ground-disturbing activities. Potential impacts include disturbance, damage or loss of known archaeological places and objects, as well as any previously unidentified archaeological material that may be present within areas where survey coverage was constrained by vegetation, ground visibility or other survey limitations.

To minimise impacts to archaeological places and objects, LPM will:

- Avoid recorded archaeological places where practicable through detailed Proposal design
- Implement a Cultural Heritage Management Plan developed in consultation with Traditional Owners/Larrakia representatives
- Progress ground-disturbance activities in consultation with Larrakia
- Establish exclusion areas and site protection measures where required
- Undertake cultural heritage inductions for personnel and contractors
- Undertake ongoing consultation with Larrakia representatives throughout Proposal development
- Implement an unexpected finds procedure to manage any previously unidentified archaeological places or objects encountered during construction or operation.

Following implementation of these measures, the scale of any impact is expected to be localised and the magnitude of impact minor. Known archaeological places will be avoided or managed through the Cultural Heritage Management Plan, while the Unexpected Finds Procedure provides a mechanism for identifying and managing previously unidentified archaeological material. Accordingly, the residual impact to Aboriginal archaeological places and objects is assessed as minor.

11.5.3 Loss or alteration of cultural landscape features, practices and amenity

The Proposal has the potential to alter aspects of the broader cultural landscape through changes in landscape character, visual amenity, noise, access and human activity. These changes may influence how the area is used and experienced by the Larrakia People, including areas associated with connection to Country, movement through Country and use of waterways. While the CHA did not identify specific amenity values requiring protection, visual and acoustic changes associated with the Proposal may contribute to broader changes in cultural landscape values and experience of place.

Potential impacts will be reduced through implementation of the Cultural Heritage Management Plan, ongoing consultation with Larrakia representatives, retention of access where practicable, and management measures relating to noise, lighting and visual impacts. Following implementation of these measures, any

changes to cultural amenity are expected to be localised in extent and minor in magnitude. Accordingly, the residual impact is assessed as minor.

11.5.4 Impacts on intangible cultural heritage values

These values were not fully documented during the archaeological survey, however potential impacts to intangible cultural heritage values may arise through disturbance or alteration of culturally important places, changes to landscape character, changes to access and use of Country, and indirect changes to cultural connections associated with the broader cultural landscape. To minimise potential impacts, LPM will continue consultation with the Larrakia People throughout project planning and development, implement a Cultural Heritage Management Plan, comply with all conditions of the AAPA Authority Certificate and support further cultural heritage investigations where required. These measures will assist in identifying, managing and protecting intangible cultural heritage values as additional information becomes available.

Given the uncertainty surrounding the location, extent and significance of intangible cultural heritage values, impacts cannot be fully quantified at this stage. However, through ongoing consultation and implementation of the Cultural Heritage Management Plan, the scale of potential impacts is expected to be localised and the magnitude minor. Accordingly, the residual impact to intangible cultural heritage values is assessed as minor.

The monitoring measures adopted in the Cultural Heritage Management Plan are intended to address residual uncertainties, support adaptive management and ensure the ongoing protection of cultural heritage values throughout construction, operation, rehabilitation and closure of the Proposal. Further detail is provided in Sections 9.2, 9.3 and 9.7 of Appendix J.

Table 11-3. Impact assessment summary – culture and heritage

Potential impact	Avoidance and mitigation	Residual impact
Loss or damage to sacred sites	• Obtain an AAPA Authority Certificate, which will provide conditions to avoid and mitigate impacts to sacred sites in accordance with the requirements of the certificate under the *Northern Territory Aboriginal Sacred Sites Act 1989*. • Implementation of a Cultural Heritage Management Plan that incorporates the conditions of the Authority Certificate, an unexpected finds procedure and developed in consultation with Traditional Owners.	Minor
Direct loss or damage of Aboriginal archaeological sites	• Implementation of a Cultural Heritage Management Plan, that has been developed in accordance with relevant Acts and regulations and consolation with the Heritage Branch and Larrakia. The management plan will also align with the conditions of the Authority Certificate and will include provisions for the protection of sacred sites. • Ground-disturbance activities proceed in consultation with Larrakia • Unexpected Finds Procedure • Avoid recorded archaeological places where practicable through detailed Proposal design • Establish exclusion areas and site protection measures where required • Undertake cultural heritage inductions for personnel and contractors • Ongoing consultation	Minor
Direct loss or damage of non-aboriginal archaeological sites		Minor
Loss of or alteration of cultural landscape features, practices and amenity	• Implementation of a Cultural Heritage Management Plan negotiated with the Larrakia • Ongoing consultation • Management measures relating to noise, lighting and visual impacts.	Minor

Potential impact	Avoidance and mitigation	Residual impact
Impacts on intangible cultural heritage values	• Recording of intangible values with senior Larrakia knowledge-holders.	Minor

11.6 Predicted outcome

Desktop investigations, consultation with Larrakia representatives and the archaeological survey identified a range of Aboriginal cultural heritage values within the Proposal area, including archaeological places and objects, culturally significant landscape features and broader cultural landscape values associated with the East Charlotte River and surrounding Country. The assessment also recognised that intangible cultural values, spiritual associations and sacred site information continue to be refined through ongoing consultation with Larrakia Traditional Owners and the AAPA Authority Certificate process.

Potential impacts to culture and heritage are primarily associated with disturbance to archaeological places and objects, changes to cultural landscape values, impacts to intangible cultural heritage and potential impacts to sacred sites. Through detailed Proposal design, implementation of a Cultural Heritage Management Plan, obtaining and complying with an AAPA Authority Certificate, ongoing consultation with Larrakia representatives, protection of identified heritage places and implementation of an Unexpected Finds Procedure, the likelihood and consequence of these impacts will be substantially reduced.

While some uncertainty remains regarding the location and significance of intangible cultural values and any sacred site requirements that may arise through the Authority Certificate process, ongoing consultation, monitoring, inspection and reporting measures provide an adaptive management framework to identify and manage any unforeseen cultural heritage issues during construction, operation, rehabilitation and closure.

Consequently, residual impacts to culture and heritage values are expected to be localised and of minor magnitude. With implementation of the proposed avoidance, mitigation and management measures, residual impacts to sacred sites, Aboriginal archaeological places and objects, cultural landscape values and intangible cultural heritage are assessed as minor,

12. ENVIRONMENTAL PROTECTION AND MANAGEMENT REQUIREMENTS OF THE EP ACT

The Proposal has applied the principles of environmental protection and management under Part 2 of the Environment Protection Act 2019 (EP Act), the environmental decision-making hierarchy (section 26), the waste management hierarchy (section 27), and the general duty on proponents under section 43. Details of the key principles and requirements are provided in Table 12-1.

Table 12-1. Application of the environmental protection and management requirements of the EP Act

Principle	Application of the principle
Principles of Ecological Sustainable Development	
Decision-making principle Principle of Proportionality	LPM has undertaken additional technical investigations, consultation and design refinement in response to issues raised during public exhibition and in the Direction. The assessment integrates environmental, social, cultural and economic considerations through a whole-of-environment assessment (Section 12). Community involvement has occurred through implementation of the Community and Stakeholder Engagement Strategy and associated consultation sessions, including engagement with affected communities, Aboriginal organisations, government agencies and stakeholders (Section 4). Management measures and monitoring programs have been developed proportionate to the nature and magnitude of identified risks, including groundwater modelling, water quality monitoring, vegetation monitoring, traffic management and cultural heritage management measures – refer to each factor section for further information.
Precautionary principle	The Proposal has applied the precautionary principle where uncertainty remains regarding groundwater drawdown, saline intrusion, cultural heritage values and vegetation responses. Conservative groundwater modelling scenarios, cumulative impact assessments, monitoring programs, TARPs, adaptive management measures and continued consultation have been adopted to avoid or minimise potential environmental harm. The assessment acknowledges uncertainties and incorporates monitoring and model refinement to validate predictions and inform management responses throughout the life of the Proposal.
Principle of evidence-based decision-making	The environmental impact assessment has been informed by the best available scientific, technical and cultural information, including groundwater modelling, surface water investigations, water quality monitoring, GDE surveys, TIA, cultural heritage investigations and stakeholder consultation. Specialist studies undertaken by suitably qualified experts have been incorporated into this document to inform assessment and decision-making.
Principle of intergenerational equity	Management measures and monitoring programs have been developed proportionate to the nature and magnitude of identified risks to protect environmental values for the present and future generations. The Proposal incorporates rehabilitation, closure planning and financial security mechanisms to minimise the risk of transferring environmental liabilities to future generations. A Concept MCP has been developed to achieve a safe, stable, non-polluting and self-sustaining post-mining landform supported by rehabilitation, monitoring, stakeholder engagement and financial provisioning of mining security requirements.

Principle	Application of the principle
Principle of sustainable use	The Proposal seeks to use natural resources in a sustainable and efficient manner through capture, storage and reuse of water within the site water management system, minimisation of external water supply requirements, implementation of groundwater monitoring and adaptive management, and progressive rehabilitation of disturbed areas. Water use has been informed by detailed water balance modelling and incorporated into the site WMP (Appendix A). Environmental, social and economic considerations have been integrated into project design, assessment and decision-making, including design refinements such as the cut-and-cover tunnel and closure planning.
Principle of conservation of biological diversity and ecological integrity	The Proposal incorporates measures to avoid and minimise impacts on biodiversity values, including retention of a wildlife corridor, maintenance of a Charlotte River buffer, minimisation of clearing, progressive rehabilitation, groundwater monitoring, GDE monitoring and protection of significant vegetation and cultural values. Assessment outcomes indicate impacts are expected to be localised and manageable through implementation of proposed mitigation measures and monitoring programs – refer to Terrestrial Ecosystems Section 9 for further information.
Principle of improved valuation, pricing and incentive mechanisms	LPM has incorporated environmental management, monitoring, rehabilitation and closure requirements into project planning and will be responsible for implementing mitigation, monitoring, rehabilitation and closure obligations associated with the Proposal (refer to Section 2.5 for a summary of the Concept MCP and Appendix D for the plan). The Proposal will also be subject to financial security requirements and regulatory approvals, ensuring environmental costs and liabilities are managed by LPM.

Other section 43 considerations	
Have communities that may be affected by the proposed action been provided with information and opportunities for consultation?	LPM engaged EMM to prepare and implement a Community and Stakeholder Engagement Strategy (Appendix E) and associated engagement sessions. Consultation included government agencies, Aboriginal organisations, local councils, community groups, local businesses, neighbouring landholders and communities potentially affected by the Proposal. Engagement methods included meetings, briefings, information sessions, community pop-up stalls, direct correspondence, fact sheets, targeted social media notifications of pop-up stalls and stakeholder feedback mechanisms. Consultation outcomes have informed the development of the Proposal and preparation of this document.
Has consultation with affected communities, including Aboriginal communities' been undertaken in a culturally appropriate manner?	Consultation included engagement with the NLC, AAPA, Larrakia representative organisations, Traditional Owners and Aboriginal corporations. Cultural heritage investigations were undertaken with participation of Larrakia representatives and engagement pathways were informed through consultation with Aboriginal representative organisations. Ongoing consultation and cultural heritage management processes continue to be progressed by LPM.
Has community knowledge and understanding (including scientific and traditional knowledge and understanding) of the natural and cultural values of areas that may be impacted by the proposed action been sought and documented?	The assessment has incorporated community feedback, stakeholder concerns, scientific investigations and Traditional Owner participation. Traditional Owner knowledge informed the CHA and archaeological survey, while stakeholder feedback informed consideration of environmental, social, economic and cultural values and development of mitigation and management measures.

Other section 43 considerations	
Have Aboriginal values and the rights and interests of Aboriginal communities' been addressed in relation to areas that may be impacted by the proposed action?	LPM has commenced consultation with the NLC, AAPA and Larrakia representative organisations and other Aboriginal stakeholders as part of the Community and Stakeholder Engagement Strategy (Appendix E). An AAPA Authority Certificate application was submitted on 28 September 2026 and is being progressed under the *Northern Territory Aboriginal Sacred Sites Act 1989*, while cultural heritage investigations and review of relevant heritage registers and archaeological records have been undertaken to inform assessment under the *Heritage Act 2011*. Consultation with Aboriginal stakeholders and the NLC has also informed consideration of Aboriginal rights and interests relevant to the *Native Title Act 1993*. These processes support the identification and consideration of Aboriginal values that may be affected by the Proposal.

Other Principles of Environmental Protection and Management	
Environmental decision-making hierarchy	The Proposal has applied the environmental decision-making hierarchy through avoidance and minimisation of impacts during Proposal design, followed by mitigation, monitoring and adaptive management. Examples include refinement of infrastructure layouts, retention of environmental buffers and a wildlife corridor, cut-and-cover tunnel design to reduce disturbance and groundwater inflows, site water management systems, cultural heritage management measures and progressive rehabilitation. No residual impacts have been assessed as major and environmental offsets are not proposed.
Waste management hierarchy	The Proposal seeks to avoid and minimise waste generation through efficient mine design, reuse of water within the site water management system, backfilling of waste rock into underground voids, reuse of excavated materials for construction, segregation and recycling of non-mineral wastes where practicable, and environmentally appropriate disposal of wastes that cannot be reused or recycled.

13. WHOLE OF ENVRIONMENT CONSIDERATIONS

The Lei Lithium Project has been assessed as a whole-of-environment proposal, recognising that environmental factors do not operate in isolation and that impacts may interact across environmental, social and cultural values. The Proposal is a relatively small-scale underground mining operation with a disturbance footprint of less than 100 ha and a planned life of approximately seven years, plus closure and rehabilitation. Key proposal features include underground mining, ore crushing and screening, temporary waste rock storage, site water management infrastructure, road transport of product, and progressive rehabilitation and closure.

The environmental impact assessment has considered the interrelationship between hydrological processes, inland water environmental quality, terrestrial ecosystems, community and economy, and culture and heritage. The assessment recognises that changes to one environmental factor may influence others. In particular, groundwater extraction and mine dewatering have the potential to influence groundwater levels, GDEs, surface water systems, water quality, cultural values associated with water resources, and community perceptions regarding environmental management. The assessment therefore adopts an integrated approach to impact identification, management and monitoring.

Hydrological processes underpin many of the environmental values associated with the Proposal area. Groundwater modelling, surface water investigations, water balance modelling and GDEs assessments have been undertaken to understand the relationship between groundwater abstraction, GDEs, surface water resources and downstream environmental values. These assessments indicate that potential impacts are localised and can be managed through the proposed water management system, monitoring programs and adaptive management framework. Importantly, cumulative groundwater scenarios have been assessed in consideration of nearby mining developments to understand the potential for overlapping groundwater drawdown and associated environmental consequences.

The assessment of community and economy recognises the interaction between environmental values and social outcomes. The Proposal has the potential to contribute positively through employment, procurement and economic activity while also generating pressures associated with traffic, amenity and community perceptions of environmental risk. These matters have been addressed through consultation, traffic assessment, mitigation measures and ongoing stakeholder engagement. The consideration of cumulative impacts has included both environmental and social effects associated with other existing and proposed developments in the Bynoe region.

Culture and heritage values are closely connected to the natural environment, particularly groundwater, surface water systems, vegetation communities and the broader landscape. Consultation undertaken to date has identified the importance of ongoing engagement with the Larrakia people and relevant representative organisations to ensure cultural values continue to inform project planning and environmental management. Cultural heritage investigations, the Authority Certificate process, future consultation and management planning will provide mechanisms to avoid, minimise and manage potential impacts on cultural values and heritage places.

Overall, the assessment concludes that residual impacts are expected to be localised, largely reversible following mine closure and rehabilitation, and capable of being managed through the proposed mitigation measures, monitoring programs and adaptive management framework.

Accordingly, when considered as a whole, the Proposal is not expected to result in significant adverse impacts to the environment provided the proposed mitigation measures, monitoring programs, adaptive management framework and closure commitments are implemented and maintained throughout the life of the Proposal.

14. REFERENCES

AMIRA (EGi & IWRI) (2002). *ARD Test Handbook: Prediction and Kinetic Control of Acid Mine Drainage*. AMIRA International Limited.

ANZECC & ARMCANZ (2000a) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

ANZG (2018). Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at: http://www.waterquality.gov.au/anz-guidelines.

Australia ICOMOS (2013a), *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance*. Published by Australia ICOMOS Incorporated, Melbourne, Victoria. [online] Available at: https://australia.icomos.org/publications/burra-charter-practice-notes/.

Australia ICOMOS (2013b), *Practice Notes for the Burra Charter*. Published by Australia ICOMOS Incorporated, Melbourne, Victoria. [online] Available at: https://australia.icomos.org/publications/burra-charter-practice-notes/.

Australian Heritage Commission (2002), *Ask First: A Guide to Respecting Indigenous Heritage Places and Values*. Published by the Australian Heritage Commission, Canberra, ACT. [online] Available at: https://www.wipo.int/export/sites/www/tk/en/databases/creative_heritage/docs/ask_first.pdf.

Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) (2020), Dhawura Ngilan: A Vision for Aboriginal and Torres Strait Islander Heritage in Australia and the Best Practice Standards in Indigenous Cultural Heritage Management and Legislation. Published by the Australian Institute of Aboriginal and Torres Strait Islander Studies, Canberra, ACT. [online] Available at: https://www.dcceew.gov.au/parks-heritage/heritage/publications/dhawura-ngilan-vision-atsi-heritage.

Austroads (2020a), Guide to Traffic Management Part 3: Traffic Studies and Analysis. Published by Austroads Ltd, Sydney, New South Wales. [online] Available from: austroads.com.au/network-operations/traffic-management.

Austroads (2020b), Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings. Published by Austroads Ltd, Sydney, New South Wales. [online] Available from: https://austroads.gov.au/network-operations/traffic-management.

Austroads (2020c), Guide to Traffic Management Part 12: Traffic Impacts of Development. Published by Austroads Ltd, Sydney, New South Wales. [online] Available from: https://austroads.gov.au/network-operations/traffic-management.

Austroads (2021a), Guide to Road Design Part 3: Geometric Design. Published by Austroads Ltd, Sydney, New South Wales. [online] Available from: https://austroads.gov.au/safety-and-design/road-design.

Austroads (2021b), Guide to Road Design Part 4A: Unsignalised and Signalised Intersections. Published by Austroads Ltd, Sydney, New South Wales. [online] Available from: https://austroads.gov.au/safety-and-design/road-design.

British Columbia Ministry of Environment and Climate Change Strategy (BC WQG) (2021). British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife and Agriculture. Available at: https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines.

Brocklehurst, P.S., Lewis, D., Lynch, D., Napier, D. and Northern Territory Department of Natural Resources, Environment and the Arts (2007). Northern Territory Guidelines and Field Methodology for Vegetation Survey and Mapping. Northern Territory Government, Palmerston.[online] Avaliable at: https://hdl.handle.net/10070/635994.[Accessed June 2026].

Bureau of Meteorology (BoM) (2019). Groundwater Dependent Ecosystems Atlas. Australian Government, Canberra. [online] Available at: https://www.bom.gov.au/water/groundwater/gde/ [accessed June 2026]..

Canadian Council of Ministers of the Environment (CCME) (2024). Canadian Environmental Quality Guidelines. Available at: https://ccme.ca/en/current-activities/canadian-environmental-quality-guidelines

CDM Smith (2024) Drilling Report Lei Lithium Groundwater Bore Drilling Report. Prepared for Lithium Plus, July 2024 [unpublished]

CloudGMS (2026a) Lei Lithium Project Groundwater Model Report, Draft Version 0.4. Prepared for Lithium Plus Minerals Ltd [unpublished]

CloudGMS (2026b) Lei Lithium Project Groundwater Model Addendum Report, Final Version 1.0. Prepared for Lithium Plus Minerals Ltd [unpublished]

Cook P.G., Halton, T.J., Eamus, D., Hutley, L. and Pidsley, D. (1998) Hydrological Investigation at Howard East. Technical Report 25/97 [online] Available at: https://www.greeningaustralia.org.au/wp-content/uploads/2017/11/Howard-Sands-Hydrological-Investigation-at_Howard-East.pdf [Accessed on 30 May 2026]

Core Lithium (2026) Finniss Lithium Project – Proposed Variations [online] Available at: https://ntepa.nt.gov.au/__data/assets/pdf_file/0020/1612460/referral-report-bp33-expansion-project.pdf [Accessed on 15 July 2026]

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023), Interim Engaging with First Nations People and Communities on Assessments and Approvals under the Environment Protection and Biodiversity Conservation Act 1999. Published by the Australian Government Department of Climate Change, Energy, the Environment and Water, Canberra, ACT. [online] Available at: https://www.dcceew.gov.au/environment/epbc/publications/engage-early.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023). National Vegetation Information System (NVIS). Australian Government, Canberra.

Department of Foreign Affairs and Trade (2016). *Preventing Acid and Metalliferous Drainage, Leading Practice Sustainable Development Program for the Mining Industry*. Australian Government.

Department of Health (DoH) (2005) Guidelines for Preventing Mosquito Breeding Sites Associated with Mining Sites, Medical Entomology Centre for Disease Control. [online] Available at: https://digitallibrary.health.nt.gov.au/prodjspui/bitstream/10137/2683/1/Guidelines%20Mine%20Site.pdf. [Accessed 01 July 2026].

Department of Health (DoH) (2011) Personal protection from mosquitoes & biting midges in the NT, Medical Entomology Centre for Disease Control. [online] Available at: https://digitallibrary.health.nt.gov.au/prodjspui/bitstream/10137/2683/1/Guidelines%20Mine%20Site.pdf. [Accessed 01 July 2026].

Department of Lands, Planning and Environment (2026) *Land Clearing Guidelines Northern Territory Planning Scheme*, Northern Territory Government. Darwin, NT.

Eamus, D., Froend, R., Loomes, R., Hose, G. and Murray, B. (2006). A functional methodology for determining the groundwater regime needed to maintain the health of groundwater-dependent vegetation. Australian Journal of Botany, 54, 97-114.

Eco Logical Australia (ELA) (2026) Lei Lithium Groundwater Impact Assessment and Model Report, Version 4. Prepared for EcOz Environmental Consultants, April 2026 [unpublished]

EcOz (2026) Groundwater-dependant Ecosystems Survey Report and Monitoring Plan Lei Lithium Project. Report Prepared for Lithium Plus Minerals Ltd. 11 September 2026 [unpublished].

EcOz Environmental Consultants (EcOz) (2024) Ecological Assessment of EL31091. Report prepared for Lithium Plus Minerals Ltd, August 2024 [online] Available at: https://ntepa.nt.gov.au/_resources/documents/eia/lithium-plus-minerals-ltd/referral/appendix-b-lithium-plus-ecological-assessment.PDF [Accessed 2 June 2026]

EMM Consulting Pty Ltd (EMM) (2026a), Community and Stakeholder Engagement Strategy, Lei Lithium Project. Prepared for Lithium Plus Minerals Ltd. August 2026.

EMM Consulting Pty Ltd (EMM) (2026b), Community and Stakeholder Engagement Outcomes Report, Lei Lithium Project. Prepared for Lithium Plus Minerals Ltd. August 2026

Envrionmental Geochemistry International (EGi) (2026) NT EPA – Inland Water Environmental Quality (assessment of discharge and seepage). Lei Lithium Project. Report No. J000966 / R1827. Rev 1. Prepared for Lithium Plus Minerals Ltd. 3 September 2026 [unpublished].

GHD (2024), Lei Deposit Haulage Route Assessment. Prepared for Lithium Plus Minerals Ltd. 09 September 2024.

GHD (2026), Lei Deposit Traffic Impact Assessment. Prepared for Lithium Plus Minerals Ltd. 11 September 2026.

Groundwater Enterprises (2023) Lei Lithium Project, Preliminary Groundwater Assessment. Prepared for Lithium Plus Minerals Pty Ltd. September 2023 [unpublished]

INAP & ICMM (2025). *Tool for Acid Rock Drainage and Metal Leaching Prevention and Management*. International Network for Acid Prevention and International Council on Mining and Metals.

INAP (2014). *Global Acid Rock Drainage Guide (GARD Guide)*. International Network for Acid Prevention. Available at: Global Acid Rock Drainage Guide.

International Association for Public Participation (IAP2) 2024, IAP2 Spectrum of Public Participation, IAP2, [online] Avaliable at: https://cdn.ymaws.com/www.iap2.org/resource/resmgr/pillars/iap2_spectrum_2024.pdf [Accessed July 2026].

Lifecycles Strategies Pty Ltd (Lifecycles) (2026) Greenhouse Gas Assessemtn for Lithium Lei Project, Prepared for Lithium Plus Minerals Ltd.19 May 2026 [unpublished].

MEND (2009). *Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials*. Mining Environment Neutral Drainage (MEND) Program, Natural Resources Canada.

NHMRC (2022). Australian Drinking Water Guidelines 6 (Version 3.8). National Health and Medical Research Council, Australian Government. Available at: https://www.nhmrc.gov.au/about-us/publications/australian-drinking-water-guidelines.

NT EPA 2025, *Preparing a Supplementary Environmental Report (SER): Guidance for Proponents*, NT EPA, Darwin [online] Avaliable at: https://ntepa.nt.gov.au/_resources/documents/eia/epa-2019-guidance-for-proponents/documents/draft-guidance-documents/guide-for-preparing-an-ser.pdf.

NT EPA (2020), *Environmental Impact Assessment and Environmental Approval in the Northern Territory: Environmental Impact Assessment Guidance*. Published by the Northern Territory Environment Protection Authority, Darwin, Northern Territory. [online] Available at: https://environment.nt.gov.au/media/docs/environment/documents/environmental-impact-assessment-and-approval-in-the-nt.pdf

NT EPA (2021), *Stakeholder Engagement and Consultation: Environmental Impact Assessment Guidance for Proponents*. Published by the Northern Territory Environment Protection Authority, Darwin, Northern Territory. [online] Available at: https://ntepa.nt.gov.au/publications-and-advice?external-uuid=a82c5d79-027c-487c-ac12-ee1a9222e7a9

NT EPA (2022), *Environmental Factor Guidance: Culture and Heritage (Draft)*. Published by the Northern Territory Environment Protection Authority, Darwin, Northern Territory. [online] Available at: https://ntepa.nt.gov.au/_resources/documents/eia/draft-guidance-for-environmental-factor-culture-and-heritage/current-documents/draft-environmental-factor-guidance-culture-and-heritage.pdf.

NT EPA (2023). Environmental Factor Guideline: Terrestrial Ecosystems. Northern Territory Environment Protection Authority, Darwin. [online] Avaliable at: https://ntepa.nt.gov.au/__data/assets/pdf_file/0003/1615836/terrestrial-ecosystems-factor-guidance.pdf [accessed May 2026].

NTG (1998). Northern Territory Government gazette : no. G9. Available at: https://hdl.handle.net/10070/684392 [accessed 1 June 2026]

NTG (2015), Development Guidelines for Northern Territory Government Controlled Roads. Published by the Northern Territory Government Department of Logistics and Infrastructure, Darwin, Northern Territory. [online] Available from: https://nt.gov.au/_media/docs/driving,-transport-and-marine/registration_and_number_plates2/development-guidelines-for-ntg-controlled-roads.pdf

NTG (2024). Northern Territory Government gazette : no. S61. Available at: https://nt.gov.au/_media/docs/gazettes/2024/june/s61.pdf [accessed 1 June 2026]

NTG (2025). Natural Resources Maps. [Online] Available at: https://nrmaps.nt.gov.au/nrmaps.html [accessed 3 June 2026]

NTG. 2016. Development Guidelines for Northern Territory Government Controlled Roads. Department of Transport, Darwin, NT. [online] Available at: Development Guidelines for Northern Territory Government Controlled Roads [Accessed May 2026].

Projectick Pty Ltd (Projectick) (2026), Lei Lithium Mine Concept Mine Closure Plan. Prepared for LPM by Projectick 22 September 2026 [unpublished]

Remote Heritage Services (RHS) (2026), Lei Lithium Project Cultural Heritage Assessment Report. Prepared for EcOz Environmental Consultants on behalf of Lithium Plus Minerals by Remote Heritage Services, 2026 [unpublished].

Richardson, S., Irvine, E., Froend, R., Boon, P., Barber, S. and Bonneville, B. (2011). Australian Groundwater-Dependent Ecosystem Toolbox Part 1: Assessment Framework. Waterlines Report Series No. 69, National Water Commission, Canberra.

Verma, M (2002) Hydrogeology of Darwin – Explanatory Notes 1:250,000 Scale Map [online] Available at: https://frackinginquiry.nt.gov.au/submission-library?a=433205

Verma, M. (1994) Report on Hydrogeology of the Berry Springs – Noonamah Area WRD62/1994, Darwin: Northern Territory Government.

WRM (2026b), Lei Lithium Project –Water mangement Plan. Prepared for Lithium Plus Minerals by WRM Water + Environment, September 2026 [unpublished].

WRM Water + Environment (WRM) (2024), Lei Lithium Project – Preliminary Surface Water Assessment. Prepared for EcOz Environmental Consultants on behalf of Lithium Plus Minerals by WRM Water + Environment, October 2024 [unpublished].

Xu, L., Wang, M., Xin, C., Liu, C. and Wang, W. (2019). Mangrove distribution in relation to seasonal water salinity and ion compartmentation: a field study along a freshwater-dominated river. Hydrobiologia, 843, 107-123.

Appendix A Water Management Plan (WRM 2026b)

Appendix B Traffic Impact Assessment (GHD 2026)

Appendix C GHG Emissions Assessment (Lifecycles 2026)

Appendix D Concept Mine Closure and Rehabilitation Plan (Projectick 2026)

Appendix E Community and Stakeholder Engagement Strategy (EMM Consulting 2026a)

Appendix F Community and Stakeholder Engagement Outcomes Report (EMM Consulting 2026b)

Appendix G Surface Water Assessment (WRM 2026a)

Appendix H Inland Water Environmental Quality – Assessment of Discharge and Seepage (EGi 2026)

Appendix I Groundwater Impact Assessment and Modelling Report (ELA 2026)

Appendix J Cultural Heritage Assessment Report (Remote Heritage Services 2026)

Appendix K Groundwater-Dependent Ecosystems Survey Report and Monitoring Plan (EcOz 2026)