

Jervois Base Metal Project

SUPPLEMENT TO THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

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Quality Information

Jervois Base Metal Project
Supplement to the Draft
Environmental Impact Statement

Prepared for
KGL Resources Pty Ltd

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Prepared by:
Nitro Solutions Pty Ltd
ABN 21 607 079 998
The Bower, 433 Logan Rd
Greenslopes. QLD 4120

Mobile | +61 7 3394 8460
Email | admin@nitrosolutions.com.au
Web | www.nitrosolutions.com.au

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Abbreviations

Abbreviation	Description
AA	Access Authority
AAPA	Aboriginal Areas Protection Authority
AASA	Aboriginal Sacred Sites Act 1989
AADT	Annual Average Daily Traffic
ABS	Australian Bureau of Statistics
ALEC	Arid Lands Environment Centre
ALRA	Aboriginal Land Rights (Northern Territory) Act 1976
AMD	Acid and Metalliferous Drainage
ANZECC	Australian and New Zealand Environment and Conservation Council guidelines for fresh and marine water quality 2000
ARD	Acid Rock Drainage
ARI	Average Recurrence Interval
ASC	Australian Soil Classification
AS/NZS	Australia and New Zealand Standards
AusRivAs	Australian Rivers Assessment System
BFMP	Bushfire Management Plan
bHDPE	Biobased High-Density Polyethylene
BMP	Biodiversity Management Plan
BIBO	Bus in Bus Out
CDRC	Central Desert Regional Council
CHMP	Cultural Heritage Management Plan
CLC	Central Land Council
CLPSI	Contaminated Land Preliminary Site Investigation
cm	Centimetre
CO ₂	Carbon Dioxide
COD	Chemical Oxygen Demand
COPC	Chemicals of Potential Concern
CSM	Conceptual Site Model
DEE	Commonwealth Department of Environment and Energy
DENR	NT Department of Environment and Natural Resources
DFS	Definitive Feasibility Study
DIDO	Drive in Drive Out
DHCS	Department of Health and Community Services

Abbreviation	Description
DHEM	Down Hole Electromagnetic (Exploration Surveying)
DLPE	Department of Lands Planning and Environment
DME	Department of Mines and Energy
DO	Dissolved Oxygen
DSEWPC	Department of Sustainability, Environment, Water, Population and Communities
EA Act	Environmental Assessment Act 1982
EAAP	Environmental Assessment Administrative Procedures 1984
EAU	Environmental Assessment Unit
EIA	Environmental Impact Assessment
ECEC	Effective Cation Exchange Capacity
ESIA	Economic and Social Impact Assessment
EIS	Environmental Impact Statement
EL	Exploration Licence
ELDO	European Launcher Development Organisation
ELR	Exploration Licence in Retention
EMEL	Extractive Mineral Exploration Licence
EML	Extractive Mineral Lease
EMP	Environmental Management Plan
EMP	Extractive Mineral Permit
EOP	Environmental Offset Policy
EPA	Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPBC Regulation	Environmental Protection and Biodiversity Conservation Regulations 2000
ERA	Environmental Risk Assessment
ESCP	Erosion and Sediment Control Plan
ESP	Exchangeable Sodium Percentage
ESD	Ecologically Sustainable Development
EVs	Environmental Values
FIFO	Fly-in Fly-out
FTE	Full Time Equivalent
GDE	Groundwater Dependent Ecosystems
GHG	Greenhouse Gas
GIS	Geographic Information System
GL	Gigalitres

Abbreviation	Description
GWP	Global Warming Potential
ha	Hectares
HLD	Tenure
IAP2	International Association for Public Participation
IBRA	Interim Biogeographical Regionalisation for Australia
ICMM	International Council on Mining and Metals
ICN	Industry Capability Network
IECA	International Erosion Control Association
ILUA	Indigenous Land Use Agreement
ISO	International Organization for Standardization
JBMP	Jervois Base Metal Project
JORC	Joint Ore Reserves Committee
KCl	Potassium Chloride
kL	Kilolitres
km	Kilometre
Km ₂	Square Kilometres
Km/h	Kilometres Per Hour
ktpa	Kilo Tonnes Per Annum
L	Litre
LGA	Local Government Area
LOM	Life of Mine
LoS	Level of Service
m	Metres
MA	Mineral Authority
MC	Mineral Claim
MIA	Mine Infrastructure Area
mg	Milligram
ML	Mineral Lease
MLA	Mineral Lease Application
MM Act	Mining Management Act 2001
MMP	Mining Management Plan
MM Regs	Mining Management Regulations
MNES	Matters of National Environmental Significance
MOU	Memorandum of Understanding

Abbreviation	Description
MRCP	Project Mine Rehabilitation and Closure Plan
MSDS	Material Safety Data Sheet
MT Act	Mineral Titles Act
Mtpa	Million Tonnes Per Annum
MT Regs	Mineral Titles Regulations
MWh	Megawatt Hour
NAF	Non-Acid Forming
NGGERA	National Greenhouse Gas and Energy Reporting Act 2007
NAG	Net Acid Generation (test)
NAGpH	pH of NAG solution before titration
NAG _(pH4.5)	NAG acidity titrated to pH 4.5 in kg H ₂ SO ₄ /t
NAG _(pH7.0)	NAG acidity titrated to pH 7.0 in kg H ₂ SO ₄ /t
NGO	Non-Government Organisation
NOI	Notice of Intent
NAFI	North Australia Fire Information
NARP	Northern Australia Roads Program
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure for Ambient Air Quality
NGA	The National Greenhouse Accounts
NGER	National Greenhouse and Energy Reporting Act 2007
NPI	National Pollution Inventory
NTCA	Northern Territory Cattlemen's Association
NT EPA	Northern Territory Environment Protection Authority
NTDIPL	NT Department of Infrastructure, Planning and Logistics
NTFRES	Northern Territory Fire and Rescue Emergency Services
NTG	Northern Territory Government
NTPFES	Northern Territory Police Fire and Emergency Services
PAF	Potentially Acid Forming
PAM	Polyachrylamide
PCB	Polychlorinated Biphenyls
PER	Public Environmental Report
PFS	Pre-Feasibility Study
PFS	Project Facilitation Agreement (major project status)
PM ₁₀	Particulate Matter 10 Micrometres or Less in Diameter

Abbreviation	Description
PM _{2.5}	Particles Matter Less Than 2.5 µm (0.0025 mm) in Diameter
PSI	Preliminary Site Investigation
EPBC PMST	EPBC Protected Matters Search Tool
PWC	Power and Water Corporation
REDC	Regional Economic Development Committee
ROM	Run of Mine
S	Sulphur
SO ₄	Sulphate
SAG	Semi-Autogenous Grinding
SES	State Emergency Services
SEWPAC	Department of Sustainability, Environment, Water, Population and Communities
SIA	Social Impact Assessment
SIMP	Social Impact Management Plan
SOBS	Sites of Botanical Significance
SoCs	Sites of Conservation Significance
SVOC	Semivolatile Organic Compounds
TDS	Total Dissolved Solids
TECs	Threatened Ecological Communities
ToR	Terms of Reference
TPWC Act	Territory Parks and Wildlife Conservation Act 2000
TPWC Regs	Territory Parks and Wildlife Conservation Regulations
TSSC	Threatened Species Scientific Committee
TSF	Tailings Storage Facility
UNFCCC	United Nations Framework Convention on Climate Change
VOC	Volatile Organic Compound
WHS Act	Work Health and Safety (National Uniform Legislation) Act
WHS Regulations	Work Health and Safety (National Uniform Legislation) Regulations
WM Act	Weeds Management Act 2001
WM Regs	Weeds Management Regulations
WMPCA	Waste Management and Pollution Control Act
WoNS	Weeds of National Significance
WRD	Waste Rock Dump

Units of Measurement

Unit	Description
%	Percentage
MW	Mega watt
°C	Degrees Celsius
dS	Deci Siemen
µm	Micrometre
mm	Millimetre
m	Metre
mg	Milligram
g	Gram
kg	Kilogram
t	Tonne
L	Litre
ml	Millilitre
kL	kilolitre (10 ³ litres)
km	Kilometre
km ²	Square Kilometre
L/s	Litres Per Second
m ² /d	Metres Squared Per Day
m ³	Cubic Metre
m ³ /d	Cubic Metres Per Day
m ³ /s	Cubic Metres Per Second
ML	Megalitre (10 ⁶ Litres)
ML/a	Megalitre Per Year
mAHD	Metres Above Australian Height Datum
mBGL	Metres Below Ground Level
mm	Millimetre
mm/d	Millimetre Per Day
pF	Log Scale For Representing Soil Matric Potential
RMS	Root Mean Square
SRMS	Scaled Root Mean Square
SRTM	Shuttle Radar Topographic Mission
T	Transmissivity (Metres Squared Per Day)

Glossary

Term	Description
Acidity	Latent acidity is a hidden stock of potential or future acid generation, based on a range of factors including local environmental geochemical conditions.
AMD	A result of the exposure of some sulfide minerals to oxygen and water, resulting in drainage waters that can be acidic and/or have high concentrations of dissolved metals. The drainage produced from the oxidation process may be acidic or neutral, with or without dissolved heavy metals, but always contains sulfate.
Acid Base Accounting	The balance between the acid-production and acid-consumption properties of a mine waste material. Minerals in waste material (mostly sulphides and pyrites) react with water and oxygen to produce sulphuric acid.
Actions	Proposed measures to limit adverse impacts and maximise opportunities, including environmental protection outcomes.
ANGOLD Guidelines	“Australian National Committee on Large Dams” guidelines.
Anthropogenic	Produced by humans or human-related activity.
Aquifer	A subsurface feature containing permeable water-bearing material which will yield a usable volume of groundwater. If yields are unsustainable or the water quality is not suitable for its desired use then it would be referred to as a water bearing zone.
Bund	An embankment that is constructed around an area and/or structure that is designed to prevent inflow or outflow of various liquid types. Can also be referred to as “a bund wall” or “bundling”.
Catchment	A structure or topographic land feature which collects water.
Capping	To cover waste rock/overburden with a sealant (low permeable) material such as clay in order to prohibit (or reduce) the ingress of water and/or air.
Corrective Action	Management strategies that are to be implemented in the event that targets and objectives are not being achieved.
Curtilage	The area of land occupied by a dwelling and its yard and outbuildings, is enclosed or considered as enclosed.
dB(A)	Frequency weighting filter used to measure ‘A-weighted’ sound pressure levels, which conforms approximately to the human ear response, as our hearing is less sensitive at very low and very high frequencies.
Decibel	The unit used for expressing the sound pressure level (SPL) or power level (SWL) in acoustics.
Endorheic basin	Closed drainage basin retains water and allows no outflow.
Emissions	The release of material into the environment (dust or gas).
Equivalent sound pressure level	The steady sound level that, over a specified period, would produce the same energy equivalence as the fluctuating sound level occurring.
Embankment	A ridge constructed of earth, fill, rocks or gravel and used most commonly to retain water. The length of an embankment exceeds both its width and its height.
Ephemeral	Watercourse flows that are short-lived and often reliant upon direct precipitation input.
Evapotranspiration	The movement of water to the air from sources such as soil, plants and water bodies.

Term	Description
Exploration	The task of identifying areas that may contain viable mineral resources. This can include such activities as surface mapping, remote sensing, exploratory drilling, geophysical testing, geochemical testing and other activities.
Decommissioning	The process of shutting a mine after cessation of mining activities. This involves the removal of buildings, equipment and other redundant infrastructure. Upon completion of decommissioning activities, the site will then be rehabilitated (refer separate definition).
Freeboard	The vertical distance between the surface level of the water in a storage facility and the upper surface of the storage facility. In the case of this Project, such facilities include dams or other related facilities such as the tailings storage facility.
Greenhouse Gases	Gases that accumulated within the Earth's atmosphere which contribute to global climatic change/global warming.
Geochemistry	The science which uses the tools and principles of chemistry to explain the mechanisms behind major geological systems.
Hazardous Substance	A chemical, substance or material used in the workplace, which has the potential to cause injury or have an adverse effect on a person's health. Hazardous substances are listed in the code of practice for managing risks of Hazardous Chemicals in the workplace and classified only based on immediate or long-term health effects.
Hierarchy of controls	A defined order which is based on the effectiveness for implementing controls to mitigate risk (e.g. elimination, substitution, isolation, engineering, administration and personal protective equipment).
Hydraulic conductivity	The rate (or ability) which water can move through pore spaces or fractures. Such rate depends on the intrinsic permeability of the material and on the degree of saturation.
Impermeable Layer	An impermeable layer of rock, sediment, soil or manmade material that does not allow water to pass through it. Also referred to as an aquiclude.
Indigenous land use agreement.	A formal agreement under the Native Title Act that contemplates access to land for the purposes of mining, mineral processing, and the placement of associated infrastructure.
JORC Code	Guidelines for public reporting of Exploration Results, Mineral Resources and Ore Reserves.
Long term stockpile	Stockpiled ore scheduled for processing during life of mine.
Mine Site	Area comprising the Mineral Lease Application.
Mineral Resources	Defined under the JORC Code as concentration of solid material of economic interest in such form, quality and quantity that there are reasonable prospects of economic extraction.
Mineral Titles Act	Legislation that regulates mineral exploration and mining titles in the Northern Territory.
Monitoring Programs	Programs implemented to allow early detection of adverse environmental impacts (includes analysing, assessing, examining, inspecting, measuring, modelling and/or reporting).
Net acid producing potential	Indicates if a material has the potential to generate acid rock drainage. It represents the balance between the capacity of a sample to generate acid (TAPP) and its capacity to neutralise acid (ANC). The NAPP is also expressed in units of kg of H ₂ SO ₄ per tonne of ore and is calculated as follows: NAPP = TAPP-ANC.

Term	Description
Non – Acid forming	A description for material not expected to produce acid.
Jervois Project or the project	Comprises the development of the proposed Jervois site.
Jervois site	The collective term refers to the project site including all components - mine site, processing site, borefield area, accommodation village, access roads, utilities corridors (potable water pipeline, water supply pipeline, power lines).
Ore	Ore used in the context of this document is a generic term for mineralisation, or metal-bearing mineral or rock.
Ore Reserves	Defined under the JORC Code as the economically mineable part of Measured and/or Indicated Mineral Resources.
Ore Processing	Crushing and separating ore into valuable substances or waste by any of a variety of techniques.
Overburden	Non-ore bearing material overlying and surrounding the ore.
Oxidation	A chemical reaction in which substances combine with oxygen.
Peak Flow	The maximum instantaneous discharge of a stream or other form of water course at a specific location.
Performance Indicators	Measures by which all anticipated and potential impacts can be measured.
Permeability	A measure of how well a material can transmit water. Materials such as gravel, that transmit water quickly, have high permeability values. Permeability is primarily determined by the size of the pore spaces and their degree of interconnection.

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1 INTRODUCTION

1.1 Overview

The Jervois Base Metal Project draft Environmental Impact Statement (EIS) was submitted to the Northern Territory Environment Protection Authority (NT EPA) on the 12th of October 2018 and made available for public comment until the 14th of December 2018. Copies of the draft EIS were made available for public viewing on the NT EPA and KGL websites and in various physical locations in Alice Springs and Darwin. The complete EIS process timeline is provided in Table 1.1-1 below.

Table 1.1-1: EIS Process Timeline

Date	Action
20 November 2013	Notice of Intent submitted
25 February 2014	NT EPA direction to prepare an EIS
10 May 2014	Draft ToR released for public comment
28 May 2014	Final ToR issued to KGL
25 January 2017	Section 14A variation to the 2013 NOI submitted to the NT EPA
1 March 2017	NT EPA determined that the altered project will continue to be assessed at the level of an EIS
14 July 2017	Draft ToR released for public comment
11 August 2017	Revised ToR issued to KGL
12 October 2018	Draft EIS submitted to NT EPA
	Draft EIS released for public comment 19th October - 14 December 2018 (8 weeks)
21 December 2018	NT EPA provided direction to prepare EIS Supplement
26 July 2019	EIS Supplement submitted to NT EPA

In accordance with clause 12 of the Environmental Assessment Administrative Procedures (EAAP), the NT EPA directed KGL Resources to provide a Supplement to the draft EIS. This Supplement has been prepared to address public comments made by various government and non-government organisations (Table 1.1-2) on the draft EIS and to provide additional technical information in support of the proposed action. This report has been submitted to the NT EPA for consideration in preparing their Assessment Report to assist the responsible Minister in making a decision on authorisation of the Project.

Table 1.1-2: Stakeholder Submissions Received

Government Departments
Northern Territory Environment Protection Authority
Department of Tourism and Culture
Department of Health
Department of the Chief Minister
Department of Primary Industries and Resources
Department of Environment and Natural Resources
Department of Infrastructure, Planning and Logistics
Northern Territory Police and Fire Emergency Services
Statutory Authorities
Aboriginal Areas Protection Authority
Central Land Council
Non-Government Organisations
Arid Lands Environment Centre
Tourism Central Australia

No public submissions were received.

The purpose of this report is to:

- Supplement the information provided in the draft EIS;
- Provide a summary of the submissions received as a result of the public exhibition of the draft EIS;
- Address all issues raised in these submissions;
- Provide a summary of additional work which has been undertaken following the draft EIS exhibition period in response to submissions;
- Detail additional commitments in response to submissions; and
- Present supporting technical information.

This Supplement should be read in conjunction with the draft EIS and as such, where possible the sections have been structured in line with the layout used in the draft EIS to facilitate ease of use and cross referencing. Comments which require considerable additional technical information have been addressed in Section 4 of this report. For reader convenience, a cross reference table is provided in Appendix E for guidance on where individual comments are addressed throughout this report.

1.2 Report Structure

This report has been structured as follows:

Section 1 – Introduction to the scope and content of the Supplement;

Section 2 – Clarification of the proposed action and additional information on the Project Description;

Section 3 – Responses to public submissions which are cross referenced to the relevant supporting technical information in Section 4;

Section 4 – Additional supporting technical information;

Section 5 – List of Supplement Report commitments;

Section 6 – References; and

Appendices – Supporting technical studies, independent peer reviews, updated management plans*, cross references and personnel qualifications and experience.

*Only those management plans which have been altered significantly as a result of suggestions and feedback in the submissions and those that were not included as part of the draft EIS have been included in this Supplement.

2 PROJECT DESCRIPTION

This section provides additional information and updates to the draft EIS Project Description and the Proposed Action in response to stakeholder comments on the information presented in Section 2 of the draft EIS. To facilitate ease of use and cross referencing to the draft EIS, this section has been structured in line with the layout used in the Project Description section of the draft EIS.

Stakeholder comments in relation to the Project Description and the Proposed Action which require clarification and additional information are provided in the following Table. Where detailed technical clarification or information is not required, responses are provided in Section 3 of this Supplement Report as indicated in this Table.

Table 1.2-1: Summary of Stakeholder Feedback on Project Description

Stakeholder	Draft EIS Feedback
NT EPA	EIS Section 2.1 Project Description
	Clarify what the proposed action is, and therefore the scope of the Proposal to be assessed e.g. does the borefield and water pipeline form part of this proposed action, if so additional information is required (see below).
	Addressed within this Section of the Supplement Report.
	In line with the requirements of the Terms of Reference (TOR), provide maps (at a suitable scale and resolution) clearly showing: - location of all Proposal components, including mine infrastructure, water supply pipeline, borefield boundary, extraction bores and the access road to each bore - location of all areas to be cleared - location of all existing infrastructure with an identification of which components will be used, removed and left in situ. - location of infrastructure that will remain on site post-closure Provide updated shapefiles of the Proposal components, areas to be cleared, infrastructure and mining activities.
	Addressed within this Section of the Supplement Report.
	EIS Section 2.2.7 Transport
	Include Lucy Creek Access Road 194 on maps e.g. Figure 2-1 (only provided in additional regional features map and in Traffic and Transport Impact Assessment).
	Addressed within this Section of the Supplement Report.
	Identify if borrow pits for access road construction materials will be located within the proposed disturbance footprint/clearing area and assess the potential environmental impact. This should include a map of their location, information about extent of clearing required and rehabilitation.
	Addressed within this Section of the Supplement Report.

	EIS Section 2.2 Borefield and Water Supply Pipeline An indicative wider area (approx. 6km long) of the borefield was identified on maps provided by KLG Resources 19/11/18. Provide a precise location of the borefield including approximate extent of borefield, access road and clearing requirements. If available, provide location of extraction bores and access roads to the extraction bores. Describe and map land clearing and trenching requirements. Addressed within this Section of the Supplement Report. EIS Section 2.2.2 Mining Operations In response to a clarification request, the Proponent provided a new map of the proposed infrastructure and mining areas that differed to the one provided in the Draft EIS (Figure 2-1). In order to identify the scope of the assessment: a) clarify omission of Proposal components from Draft EIS including: • red area labelled as Bellbird North U/G Pit • 2 pink areas, one located south of plant location and the other labelled 'Future Waste rock' • brown area east of 'Marshal Reward Waste Rock' • area labelled as Rock Face Pit (open pit?) b) confirm all components of the Proposal, including: • Is 'UG Infrastructure' the 'Rock Face Pit' as identified in previous version? • Are areas labelled as 'Waste Stockpile' actually 'Waste Rock Dumps' (as indicated in previous version) or are the Waste Rock Dumps now proposed to be temporary and the waste stockpiles will be relocated elsewhere? Refer to the response to comment No. 6 in Section 3 for a detailed explanation. Ensure maps are consistent in presentation of all Proposal components. Identify if the omissions in Figure 2-1 constitute an alteration to the Proposal. If yes, identify if the environmental significance of the proposed action has changed (clause 14A Environmental Assessment Administrative Procedures). Refer to the response to comment No. 7 in Section 3. EIS Section 2.2.3 Ore Processing Specify which flocculant (Table 2-8) will be used. Assess environmental impact of all chemicals added during water treatment and processing, including an assessment of their behaviour and breakdown products in tailings and tailings decant/seepage and potential to contaminate the environment. Polyacrylamide flocculants with more than 0.05% of the neuro-toxin acrylamide monomer should not be used. Refer to the response to comment No. 8 in Section 3. EIS Section 2.2.5 Waste Rock Characterisation App C-1, pp 10: Specialised testing indicated the presence of iron carbonate....but leach column testing would be required to confirm these preliminary findings. Refer to Section 2.2.4 of this report. AppC-1, pp 11: .. but understanding the lag times, overall leaching characteristics and final water quality will require additional work. Refer to Section 2.2.4 of this report.
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	AppC-1, pp 12 & 71: recommendations include: • kinetic leach column and batch water extraction testing • initial S distribution model with additional S testing to infill gaps • geochemical assessment of Bellbird and other key deposits Demonstrate why kinetic leach testing and an S distribution model are not required. Refer to Section 2.2.4 of this report.
	Demonstrate why geochemical assessment of the proposed Bellbird open pit is not required. Refer to Section 2.2.4 of this report.
	Provide an assessment of metalliferous and saline drainage against relevant guidelines. Refer to Section 2.2.4 of this report.
	EIS Section 2.2 Project Components
	The Draft EIS refers to a 970 ha project footprint (section 2.2) and a 389.45 ha area to be cleared (section 4.2.4.1). In response to a clarification request the Proponent provided a map (19/11/18) titled 'disturbance footprint'. Confirm and update if necessary, the area and total hectares to be cleared and explain the differences, if any, between the project footprint and clearing area. This should include detailed map(s) showing the project footprint, the area to be cleared and the proposed infrastructure including water supply pipeline and borefield. Addressed within this Section of the Supplement Report.
	EIS Section 4.2.4.1 Clearing Vegetation
	Should all of the areas identified as 'disturbance footprint' in the new map provided 19/11/18 be cleared, justify the requirement for the clearing of large areas not used for infrastructure e.g. between TSF and Jervois dam. Addressed within this Section of the Supplement Report.
	EIS Section 2.2.11 Workforce and Accommodation
	Confirm full time equivalent workforce numbers directly employed by the proposal, excluding jobs indirectly created by the Proposal (e.g. servicing industry) during construction and operation. Refer to the response to comment No. 14 in Section 3.
	EIS Section 2.2.11 Workforce and Accommodation
Department of Health, Environmental Health Branch	In regards to the accommodation village, catering facilities, provision of potable water and wastewater management systems the proponent must comply with the Department of Health's requirements for mining and construction camps as detailed at https://nt.gov.au/property/building-and-development/health-requirementsmining-construction-projects. Refer to the response to comment No. 72 in Section 3.

Department of Primary Industries and Resources	EIS Section 2.2.5 Waste Rock Characterisation
	The draft EIS has not adequately demonstrated that the waste classification system is sufficiently definitive to accurately determine the relative volumes of the various classes of waste that will be generated. Therefore, the viability of the management methods proposed for waste rock, tailings, surface water and groundwater cannot be verified. Refer to Section 2.2.4 of this report.
	Given the interdependencies of the classification system and management methods, the failure of one component may result in the failure of others. For example, if a more detailed waste characterisation indicates a significantly greater volume of potentially acid-forming (PAF) waste and therefore a lesser volume of non-acid-forming (NAF) waste this would have important implications as to whether the nonbenign waste will fit back into underground mining voids and whether PAF can be stored under a water cover. This would also apply to the availability of suitable cover material for the tailings storage facilities or waste rock dumps. The proponent does not necessarily need to acquire more characterisation data but rather undertake a more detailed analysis of the data. Refer to Section 2.2.4 of this report.
	EIS Section 2.2.4 Tailings Storage Facility
	Evidence that sufficient material with the appropriate geotechnical and geochemical suitability for construction of a stable and non-polluting tailings storage facility (TSF) should be included in the Supplement to the draft EIS. Refer to Section 2.2.4 of this report.
	EIS Section 2.2.1 Mine Construction
	A conceptual waste rock dump (WRD) design with 25-degree slope angles may make the retention of top soil, and the closure criteria of a safe, stable and non-polluting landform, extremely difficult to achieve. Only the best conditions and stable materials would justify slopes approaching 20 degrees. Given the propensity of soils in the area to slake (the soil study indicates a medium erosion risk in the area), and the steep slopes proposed, the proponent should demonstrate how this WRD design is likely to remain stable. Refer to the response to comment No. 96 in Section 3.

2.1 Project Description

As described in the 2013 Notice of Intent and the 2017 Section 14A Variation to the NOI, the proposed action/project development is the construction and development of a base metal mine and associated infrastructure which will include:

- Open pit and underground mining;
- Processing plant for on-site processing of ore;
- Waste rock landforms;
- ROM pads;
- Fuel storage areas;
- Workshops;
- Concentrate load out facility;
- Power generation and supply facilities;
- Haul roads;
- Tailings storage facilities;
- Administrative, accommodation and maintenance facilities;
- A borefield; and
- Transport of ore off site.

The borefield of up to six (6) production bores is located south of the Lucy Creek homestead as indicated in Figure 2.1-1. Access to the borefield area is via the Lucy Creek Access Road 194 and existing pastoral tracks. The proposed pipeline to supply water from the borefield will be approximately 50 km long and will connect the individual production bores and follow a route back to the Project area along the existing road easement. The borefield is located on Lucy Creek Station whilst the pipeline is located partly within Jervois Station, Lucy Creek Station and Road 194. Approximately half of the pipeline route is within the road reserve.

The following Figures are provided to clearly show the location of all Project components, areas to be cleared, historic infrastructure areas and those that will be used, removed or left in situ and the infrastructure that is to remain on site post-closure. The Lucy Creek Access Road 194 and proposed location of the borrow pits are also provided on these Figures. The Project footprint, including the existing/historic and Project development disturbance areas is explained in detail in the following section. A summary of the infrastructure that will remain on site post closure is also provided within this section.

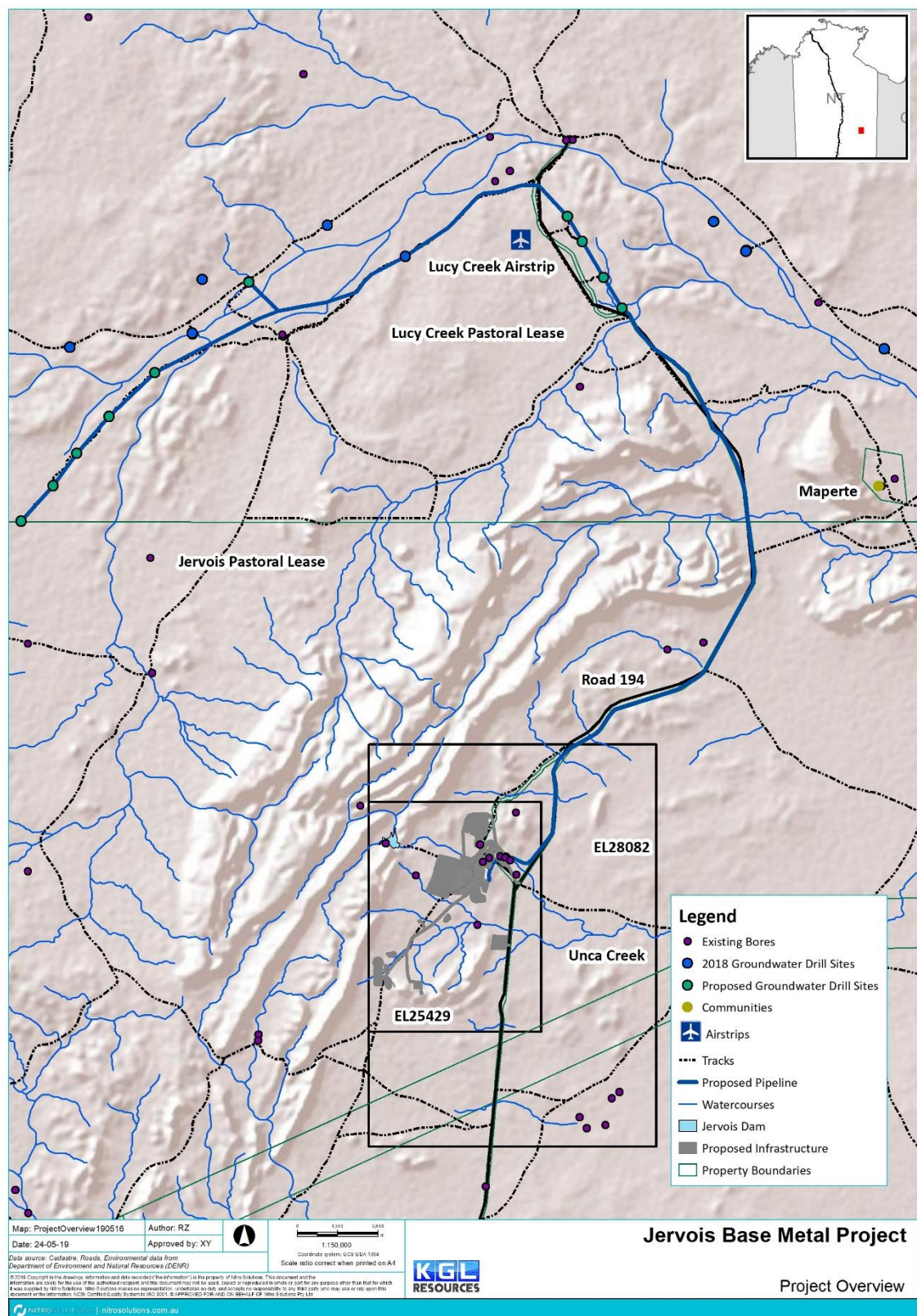


Figure 2.1-1: Project Overview

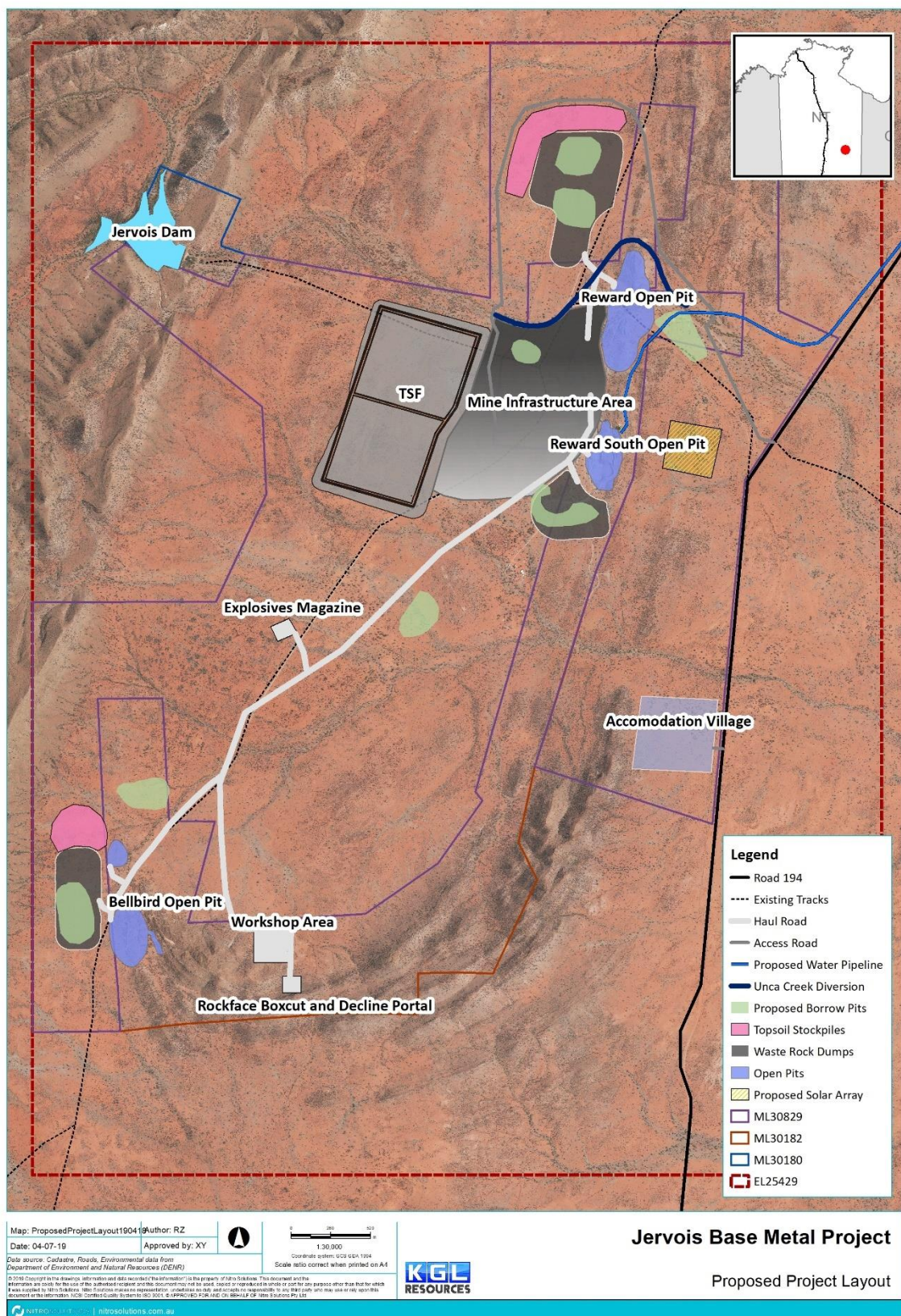


Figure 2.1-2: Proposed Project Layout

Further Project planning has identified potential borrow pits located within the MLs (Figure 2.1-2). These pits have been located within historic and proposed disturbance areas wherever possible to reduce the overall Project disturbance (Figure 2.1-4). As a result, the potential environmental impacts of these areas on flora and fauna, surface water, groundwater and cultural heritage indicate a negligible effect on the impact assessment and mitigation measures provided in the draft EIS.

The Project water supply in the proposed borefield area has been investigated in detail since the preparation of the draft EIS. The exploration and investigation works have been conducted under the permission of the pastoralists and the appropriate AAPA clearances. This area will be subject to a separate tenure and the appropriate water licenses once the detailed design has been completed. Other than disturbance for trenching requirements for the pipeline, this area will undergo minimal additional disturbance from clearing activities. Figure 2.1-1 shows the precise location of the borefield, its extent and accesses.

Detailed trenching requirements for the pipeline are provided in Section 2.2.1 below.

2.1.1 Project Footprint

The 970 ha footprint referred to in the draft EIS is a generic footprint area only which encompasses the general outline of the specific disturbance areas including the underground areas, the majority of which are not surface disturbance areas. The proposed Project footprint area of 970 hectares used in the draft EIS will not all be cleared for the development of the Project infrastructure and mine workings as detailed in the following information.

The draft EIS originally estimated the historic mining disturbance across the Project area at 163.15 ha. This has been refined through additional desktop investigations and ground truthing and is now estimated to be 174 ha as indicated in Figure 2.1-3 and Table 2.1-2.

Table 2.1-3 provides a summary of the proposed disturbance area for the Project which will occur within the historic disturbance areas and indicates that approximately 136 ha of the proposed mining disturbance will be located within historic disturbance areas. The updated total Project area is approximately 382 ha which has been reduced from the total area of 389.45 ha estimated in the draft EIS. Clearing areas required to accommodate the Project development has been estimated at approximately 246 ha which is slightly more than the 236.26 ha proposed in the draft EIS. Figure 2.1-4 illustrates the proposed disturbance in comparison to the historic disturbance within the Project area. Wherever possible, the Project components have been located within this historic disturbance area to reduce the area of additional clearing required.

The proposed borefield and pipeline will require minimal additional clearing as the infrastructure will be located within the existing road easement, existing tracks and previously disturbed areas.

Table 2.1-1: EL Historic Disturbance Areas

Description	Historic Disturbance Area (Ha)
Mine Infrastructure Area (including the Tailings dam, processing plant and equipment, and other dams and reservoirs, etc)	92
Stockpiles and Waste Rock Dumps	3
Mine Pits (including the surface Extraction Areas)	27
ROM	5
Jervois Dam	7
Plenty River Mining Camp	10
Existing Airstrip	10
Exploration Disturbances including roads and tracks	20
Total Disturbance	174

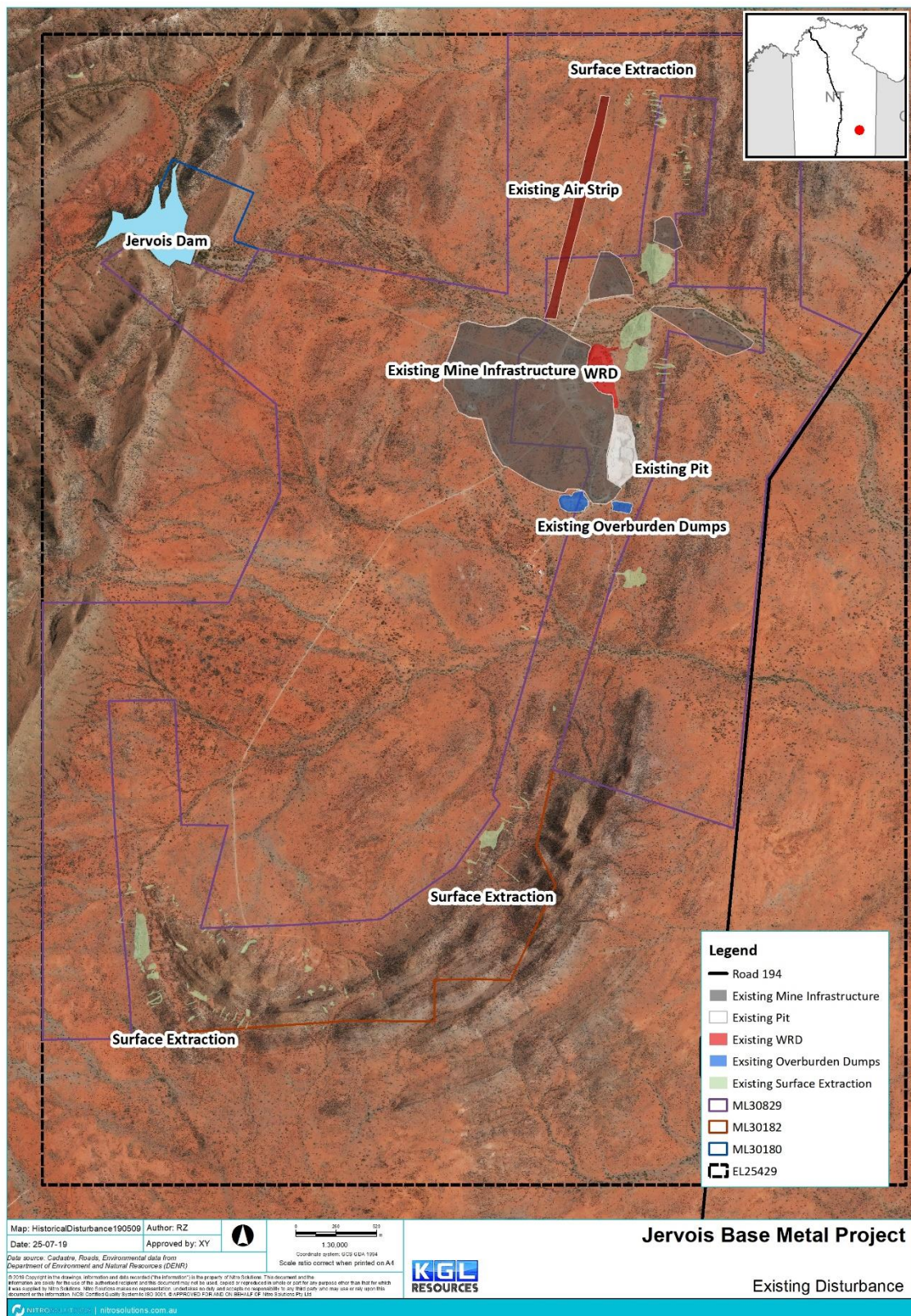


Figure 2.1-3: EL Historic Disturbance Area

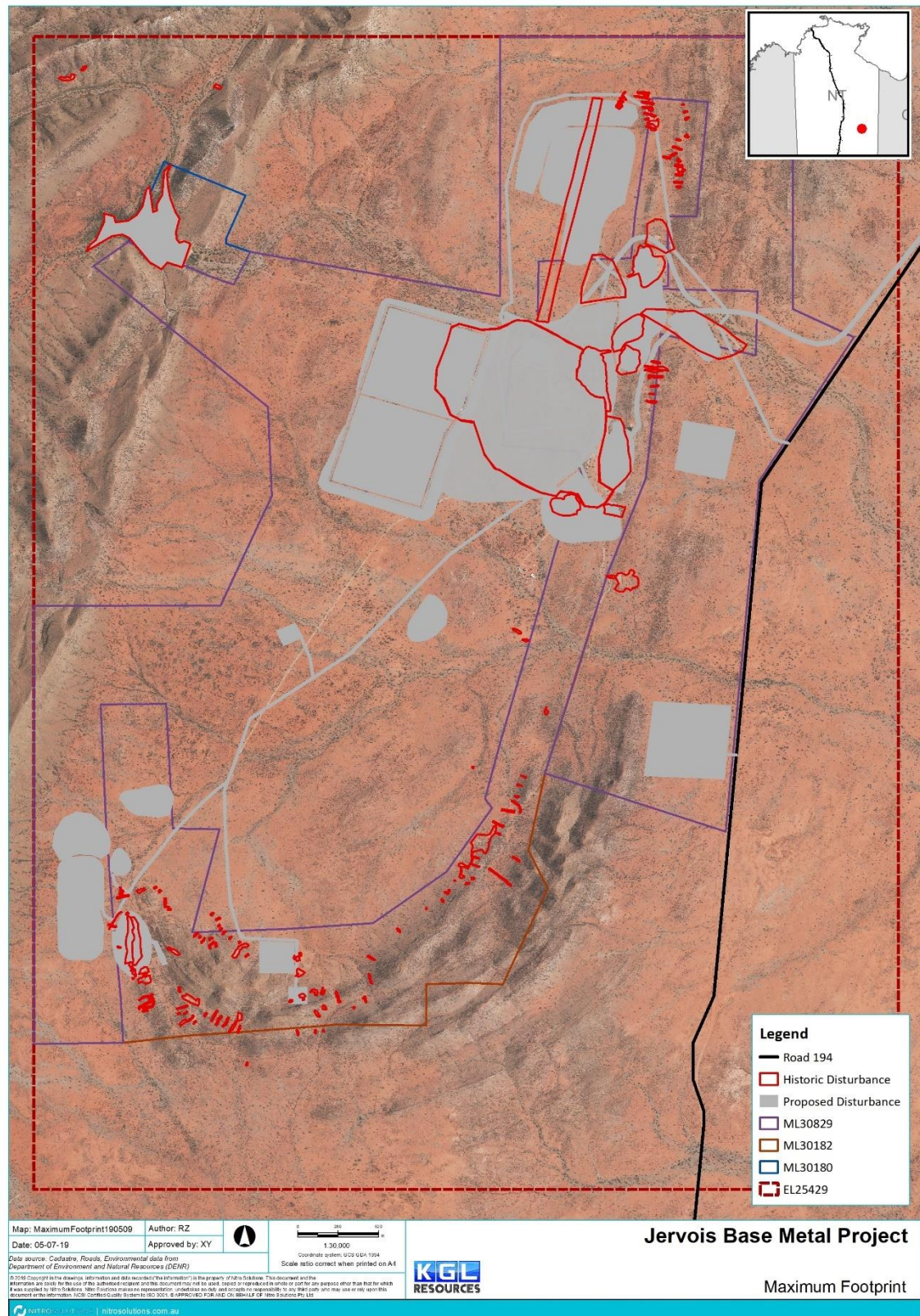


Figure 2.1-4: EL Proposed Disturbance Area in Comparison to Historic Disturbance Areas

The following Table nominates the historic disturbance areas within the EL that will be impacted by the development of the Project. The balance of 38 ha of the historic disturbance will not be impacted by future development for the Project.

Table 2.1-2: EL Disturbance Area Summary

Proposed Action	Historic Disturbance Area (Ha)	Additional Clearing Area Required (Ha)	Total Footprint (Ha)
Accommodation Village	0	23	23
Mine Infrastructure Area	65	26	91
Proposed Solar Array	0	10	10
Open Pits	17	16	33
Jervois Dam	7	0	7
Surface Water Infrastructure (excluding the MIA area and the Jervois Dam)	0	1	1
Tailings Storage Facility	14	71	85
Borrow Pits (excluding the overlapping areas)	5	12	17
Underground Decline Portal and Workshop	1	5	6
Explosives Magazine	0	2	2
Topsoil Stockpiles and Waste Rock Dumps	11	78	89
Borefield and Pipeline	14	1	15
Roads and Tracks	2	1	3
Total	136	246	382

Tables 2.1-4 and 2.1-5 below detail the historic disturbance, the proposal for the development of these disturbance areas within the proposed Project disturbance areas, the development plans for each of the areas including the post closure objectives and the infrastructure that will be left in situ.

Table 2.1-3: Proposed Development of Historic Mine Disturbance Areas

Historic Disturbance	Disturbance Area (Ha)	Development Plan	Closure
Mine Infrastructure Area (including the Tailings dam, processing plant and equipment, and other dams and reservoirs, etc)	92	The area will be redeveloped as part of the proposed MIA and TSF.	The area will be rehabilitated according to the requirements of the MRCP.
Stockpiles and Waste Rock Dumps	3	The historic WRDs will form part of the proposed Reward South WRD.	The area will be rehabilitated according to the requirements of the MRCP.

Historic Disturbance	Disturbance Area (Ha)	Development Plan	Closure
Mine Pits (including the surface Extraction Areas)	27	The historic pit will be re-mined as part of the Reward South open pit operation. Other surface extraction areas that lie within the proposed Project area will be redeveloped. Historic disturbance areas outside of the proposed Project area will be secured and will remain untouched.	The pit void and the area to be redeveloped will be rehabilitated according to the requirements of the MRCP.
ROM	5	The area will form part of the proposed ROM stockpile.	The area will be rehabilitated according to the requirements of the MRCP.
Jervois Dam	7	The Jervois Dam embankment and spillway will be repaired and upgraded to improve storage and safety.	The Jervois Dam will be left for use as part of the final landform.
Plenty River Mining Camp	10	The area within the proposed borrow pit will be cleaned up and redeveloped as required. The area outside the proposed Project area will remain untouched.	The area to be developed will be rehabilitated according to the MRCP.
Existing Airstrip	10	The northern portion of the airstrip will be used to form part of the proposed Reward WRD and topsoil stockpile. The southern portion of the area will remain untouched.	The area developed will be rehabilitated according to the MRCP.
Exploration Disturbances including roads and tracks	20	The areas within the proposed Project area will be redeveloped. The area outside the proposed Project area will remain untouched.	The area developed will be rehabilitated according to the MRCP.
Total Disturbance	174		

Table 2.1-4: Closure Plan Overview

Project Disturbance	Closure
Site Infrastructure	The borefield, sediment dams, roads and tracks will be left for use by landowners or Traditional Owners if requested. All other site infrastructure will be rehabilitated to meet the completion criteria outlined in the MRCP.
Open Pits	Open pits will be backfilled where possible. Open pits which remain open will achieve the completion criteria outlined in the MRCP.
Underground Workings	Portals and shafts will be secured to achieve the completion criteria outlined in the MRCP.

Project Disturbance	Closure
Extractive Workings	Borrow pits will be reshaped to gentle slopes, ripped and rehabilitated to be made safe to fauna and livestock to achieve the completion criteria outlined in the MRCP.
Water Dams and other Surface Water Structure	Unca Creek diversion will remain after closure. Sediment dams and other surface water infrastructure will be left for use by landowners or Traditional Owners if requested. Surface water structure that is not required to remain will be rehabilitated according to the requirements of the MRCP.
Waste Rock Dumps and Tailings Dam Facility	WRDs and the TSF will be rehabilitated to comply with the completion criteria outlined in the MRCP.
Exploration	Ongoing rehabilitation of exploration disturbance will be carried out according to the MRCP and the MMP.
Access Roads	Haul roads, access roads and other site roads will be rehabilitated unless required for use by Traditional Owners and/or landowners.

2.2 Project Components

Life of Mine Schedule

The Project will broadly be carried out in the following key phases following EIS approval and authorisation of an associated MMP:

- 2019 – 2020: Detailed Planning;
- 2020 – 2021: Construction;
- 2021 – 2030: Operation and Progressive Rehabilitation; and
- 2031 – 2032: Closure.

Mine Infrastructure Area

Further refinement of the processing plant and associated infrastructure layout, including the ROM stockpile, workshop, mine water dam, underground dewatering dam and other infrastructure has been completed. The infrastructure east of the TSF and west of the Reward Operation has been combined into a Mine Infrastructure Area (MIA) to represent the overall possible disturbance area (Figure 2.1-2). As the overall footprint of the proposed MIA is similar to that proposed in the draft EIS the environmental impact reflects those presented in the draft EIS with no significant increase in impact anticipated. The proposed total Project disturbance area has been reduced from 389.45 ha to 382 ha.

Explosives Magazine

The explosives magazine has been relocated to a location which is removed from the MIA for safety purposes and is also more accessible to the Bellbird and Rockface mining areas.

Proposed Solar Array

Since the draft EIS was prepared, and in response to feedback from stakeholders, KGL have investigated alternative power supply options. As a secure and continuous power supply is of the utmost importance to ensure the safety of personnel, particularly those working at considerable depths underground, KGL are proposing to use the latest diesel power generation process coupled with low penetration solar with or without battery support. This is a well tested system which is considered the best solution for this Project in terms of safety and the environment. It is also the preferred option in relation to the remote location of the Project and potential unreliability of service and supply logistics to the area. The proposed location of the solar array associated with the new power generation system covers an area of approximately 10 ha as indicated in Figure 2.1-2.

Discussions are also underway with providers for a solar power system for the site telecommunications systems to further reduce the reliance on diesel power.

2.2.1 Construction

Pipeline

Pipeline construction methods will include:

- Clearing of vegetation where required;
- Stockpiling of topsoil for use in rehabilitation;
- Stockpiling of trench spoil separate to topsoil;
- Trenching, pipe placement, connection and trench backfilling; and
- Rehabilitation with stockpiled topsoil and seeding if necessary.

Additional measures to be undertaken to minimise impacts on local flora and fauna will include:

- Restriction of access track widths to only that required for safe vehicle movements;
- Minimising the length of open trench;
- The inclusion of breaks in the open trench to facilitate stock and wildlife crossings and agricultural vehicle movements; and
- Sizing of trench breaks to enable trenching, pipe placement, pipe connection and trench refilling to be completed in one day.

It is expected that up to 2 km of pipeline will be installed per day so the construction period for the pipeline will be approximately one month taking into consideration workforce rosters, equipment availability and reliability. Daily pipeline construction will vary due to factors such as terrain type and weather conditions.

2.2.2 Mining Operations

Mining from the Reward open pit will commence in 2021 to provide ore supply for the processing plant commissioning. This will be followed by ore production from the Rockface underground, Bellbird open pit, the Reward underground, Reward South open pit and then the Bellbird underground. The proposed mining sequence is outlined below in Table 2.2-1.

Table 2.2-1: Proposed Mining Sequence

Activities	Estimated Timeframe
Commence mining ore from the Reward open pit Process plant commissioning Commence ore production from Rockface underground mine	2021
Commence mining ore from the Bellbird open pit	2023
Commence mining ore from Reward underground mine	2025
Commence Rockface underground mine closure and rehabilitation Commence Stage 1 closure of Reward open pit Commence mining ore from Reward South open pit	2026
Commence mining ore from Bellbird underground mine Commence Stage 1 closure of Bellbird open pit	2027
Commence Reward South open pit closure and rehabilitation	2028
Ore production ceases	2030

Reward

The refined mine plan for the Reward mining area incorporates the Reward open pit, Reward South open pit, Reward underground, two waste rock dumps and one topsoil stockpile. Reward underground will be developed using a single decline, commencing from a portal within the Reward open pit. The satellite pits north of the Reward open pit that were proposed in the draft EIS have now been omitted. The proposed Reward waste rock dump and topsoil stockpile have also been realigned and reduced in size. The Reward South open pit and associated waste rock dump are located within the historic disturbance footprint.

A brief description on the environmental impacts related to the Reward operation updates are outlined below in Table 2.2-2.

Table 2.2-2: Reward Mining Area Impact Assessment Summary

Project Aspect	Significance of Update	Impact Assessment Comment
Reward Open Pit	Negligible	Omission of satellite pits and the changes to the Reward open pit footprint is minimal. The updated plan does not pose additional overall risks or impacts to those presented in the draft EIS.
Reward South Open Pit	Negligible	The Reward South open pit is located within the historic pit footprint. The pit does not pose additional overall risks or impacts to those presented in the draft EIS.
Waste Rock Dumps	Negligible	The proposed Reward WRD disturbance area has been reduced due to the omission of the satellite pits. The proposed Reward South WRD is within the historic WRD area. There will be a negligible effect on the impact assessment and mitigation measures provided in the draft EIS.

Project Aspect	Significance of Update	Impact Assessment Comment
Topsoil Stockpile	Negligible	The proposed topsoil stockpile footprint size has been reduced and will have no effect on the impact assessment and mitigation measures provided in the draft EIS.
Reward underground	Negligible	Refinement of the Reward underground development poses similar risks to those presented in the draft EIS.

Rockface

Rockface underground operation includes a decline portal from the surface. A small workshop area is proposed to service the Rockface underground area. The Rockface WRD proposed in the draft EIS has been omitted which will result in less surface disturbance area.

A brief description of the environmental impacts related to the Rockface operation is outlined in Table 2.2-3.

Table 2.2-3: Rockface Mining Area Impact Assessment Summary

Project Aspect	Significance of Update	Impact Assessment Comment
Rockface Underground	Negligible	Further refinement of the underground mine plan will have a negligible effect on the impact assessment and mitigation measures provided in the draft EIS.
Rockface Open Pit	Negligible	Removal of the potential Rockface open pit and subsequent WRD reduces the disturbance footprint and will have no effect on the impact assessment provided in the draft EIS.
Workshop	Negligible	The potential environmental impacts on flora and fauna, surface water, groundwater and cultural heritage on the workshop area have been assessed and indicate a negligible effect on the impact assessment and mitigation measures provided in the draft EIS.

Bellbird

The Bellbird operation consists of Bellbird open pits, Bellbird underground, a WRD and a topsoil stockpile. Bellbird underground will be developed using a single decline, commencing from a portal within the main Bellbird open pit.

A brief description of the environmental impacts related to the Bellbird operation update is outlined in Table 2.2-4.

Table 2.2-4: Bellbird Mining Area Impact Assessment Summary

Project Aspect	Significance of Update	Impact Assessment Comment
Bellbird Open Pits	Negligible	Further refinement of the open pit planning, WRD and topsoil stockpile poses similar risks and opportunities to those presented in the draft EIS.

Project Aspect	Significance of Update	Impact Assessment Comment
Waste Rock Dump	Negligible	Minor modifications of the WRD footprint poses negligible change on the overall environmental Impact.
Topsoil Stockpile	Negligible	Minor modification of the topsoil stockpile poses negligible change on the overall environmental impact.
Bellbird underground	Negligible	Refinement of the Bellbird underground development poses similar risks to those presented in the draft EIS.

2.2.3 Tailings

Availability of Suitable TSF Construction Material

Environmental Geochemistry International Pty Ltd (EGI) have completed an investigation into the availability of suitable materials to enable the construction of a stable and non-polluting tailings storage facility (TSF). This assessment included a field visit where preliminary geotechnical and geochemical sampling occurred. A conceptual cover design for the surface placed TSF was able to be designed using abundantly available materials onsite.

Additionally, the TSF design will include a suitable compacted composite liner with a drain at the base and seepage will be managed by the diversion of contaminated water and storage in the process water dam.

KGL will continue to develop its geochemical water model, which includes the TSF, to ensure that ongoing monitoring and management of the facility occurs.

2.2.4 Waste Rock Characterisation

In response to the recommendations and findings within the draft EIS further investigations have included:

- Surface Water Impact Assessment Supplement (Appendix A-3);
- Groundwater Impact Assessment Supplement Report (Appendix A-4); and
- Geochemical Assessment (Appendix A-5).

These studies and associated models have been updated to incorporate recent site surveys and available monitoring data. A summary of these study updates is provided within Sections 4.5 Hydrological Processes and Section 4.6 Inland Waters Environmental Quality. The following additional information is provided in response to key stakeholder comments.

Demonstrate why kinetic leach testing and S distribution model are not required

As per the draft EIS Appendix C-1, Section 9.0 of the Acid Mine Drainage Report recommendations, kinetic leach column testing will be required to provide further information on leaching rates for inclusion in the geochemical water model. In addition, the S distribution model was completed in

early 2019 by H&SC. A summary of the S Block modelling is provided within Section 4.6.2 and Appendix A-5.

Demonstrate why geochemical assessment of the proposed Bellbird open pit is not required

Geochemical assessment of the proposed Bellbird open pit is required and the S distribution model incorporates the Bellbird open pit. Further detailed technical information is provided within Section 4.6 and Appendix A-5.

Provide an assessment of metalliferous and saline drainage against relevant guidelines

An assessment of metalliferous and saline drainage against relevant guidelines has been included within Appendix A-5, Sections 4.2 and 4.3. Outcomes from current modelling indicate that ANZECC 2000 guidelines are the most appropriate to allow for early detection of potential water quality impacts arising from metalliferous and saline drainage.

Waste classification system

The waste classification system is guided by the S distribution model and the detailed mine plan completed by H&S Consultants (H&SC) and Australian Mine Design & Development (AMDAD) respectively. The S distribution model enables better definition of the proportions of acid rock drainage rock types for the project deposits which has enabled mine planning schedules to accurately determine the movement of the relative volumes of the various classes of waste that will be generated during the mine life.

Further detailed technical information provided in Section 4.6 and Appendix A-5.

Detailed analysis of waste characterisation

Further analysis of the available data has been undertaken with the establishment of the S distribution model as well as the development of conceptual cover design options and the conceptual geochemical water modelling. Through this process the potentially acid-forming (PAF) material has been reduced which is still based upon a conservative assessment approach. EGI further established upon review of the S distribution model and mine plan, prepared by H&SC and AMDAD respectively, that the total volume of PAF estimated was less than 5 % which they consider indicative of considerable flexibility in waste rock management. The S distribution model will be continually developed as the Project progresses. Further detailed technical information is provided in Section 4.6 and Appendix A-5.

3 RESPONSES TO SUBMISSIONS

This section provides details of all stakeholder submissions on the draft EIS received during the exhibition period and responses from KGL to address these comments. Where they do not provide context for the comments provided, the introductions and background information provided by stakeholders have not been included in this section.

These comments are provided in the order as provided by the NT EPA to assist in facilitating the cross checking that all submissions have been addressed. Comments are numbered for ease of reference to other comments and sections of this Supplement Report. In addition, they are laid out in a manner which enables the reader to easily locate comments from stakeholders through the Table of Contents or the document navigation pane.

3.1 Northern Territory Environment Protection Authority

3.1.1 Project Description

Comment No. 1 - EIS Section 2 Proposed Action

Clarify what the proposed action is, and therefore the scope of the Proposal to be assessed e.g. does the borefield and water pipeline form part of this proposed action, if so additional information is required (see below).

As described in the 2013 Notice of Intent and the 2017 Section 14A Variation to the NOI, the proposed action/project development is the construction and development of a base metal mine and associated infrastructure which will include:

- Open pit and underground mining;
- Processing plant for on-site processing of ore;
- Waste rock landforms;
- ROM pads;
- Fuel storage areas;
- Workshops;
- Concentrate load out facility;
- Power generation and supply facilities;
- Haul roads;
- Tailings storage facilities;
- Administrative, accommodation and maintenance facilities;
- A borefield; and
- Transport of ore off site.

The additional information on the borefield and pipeline associated with the Project is provided in Section 2.1 and in the supporting technical information provided in Section 4 of this Supplement Report.

Comment No. 2 - EIS Section 2 Proposed Action

In line with the requirements of the Terms of Reference (TOR), provide maps (at a suitable scale and resolution) clearly showing:

- *location of all Proposal components, including mine infrastructure, water supply pipeline, borefield boundary, extraction bores and the access road to each bore*
- *location of all areas to be cleared*
- *location of all existing infrastructure with an identification of which components will be used, removed and left in situ.*
- *location of infrastructure that will remain on site post-closure*

Provide updated shapefiles of the Proposal components, areas to be cleared, infrastructure and mining activities.

Please refer to the Figures provided in Section 2.1 which show the location of all proposal components.

Comment No. 3 - EIS Section 2.2.7 Transport

Include Lucy Creek Access Road 194 on maps e.g. Figure 2-1 (only provided in additional regional features map and in Traffic and Transport Impact Assessment).

Please refer to the Figures provided in Section 2.1 which show the location of the Lucy Creek Access Road.

Comment No. 4 - EIS Section 2.2.7 Transport

Identify if borrow pits for access road construction materials will be located within the proposed disturbance footprint/clearing area and assess the potential environmental impact. This should include a map of their location, information about extent of clearing required and rehabilitation.

As detailed in Section 2.1, further Project planning has identified potential borrow pits located within the MLs (Figure 2.1-2). These pits have been located within historic and proposed disturbance areas wherever possible to reduce the overall Project disturbance. The disturbance associated with these areas has been considered within the Supplement Report impact assessment updates which include guidance for rehabilitation and management of land disturbances.

Comment No.5 - EIS Section 2.2 Borefield and Water Supply Pipeline

An indicative wider area (approx. 6km long) of the borefield was identified on maps provided by KLG Resources 19/11/18. Provide a precise location of the borefield including approximate extent of borefield, access road and clearing requirements. If available, provide location of extraction bores and access roads to the extraction bores. Describe and map land clearing and trenching requirements.

Please refer to the Figures and detailed technical information provided in Sections 2.1 and 4.4 which provides detailed information on the location and activities associated with the borefield.

Comment No. 6 - EIS Section 2.2.2 Mining Operations

In response to a clarification request, the Proponent provided a new map of the proposed infrastructure and mining areas that differed to the one provided in the Draft EIS (Figure 2-1). In order to identify the scope of the assessment:

a clarify omission of Proposal components from Draft EIS including:

- red area labelled as Bellbird North U/G Pit*
- 2 pink areas, one located south of plant location and the other labelled 'Future Waste rock'*
- brown area east of 'Marshal Reward Waste Rock'*
- area labelled as Rock Face Pit (open pit?)*

b confirm all components of the Proposal, including:

- Is 'UG Infrastructure' the 'Rock Face Pit' as identified in previous version?*
- Are areas labelled as 'Waste Stockpile' actually 'Waste Rock Dumps' (as indicated in previous version) or are the Waste Rock Dumps now proposed to be temporary and the waste stockpiles will be relocated elsewhere?*

Ensure maps are consistent in presentation of all Proposal components.

The original map of the proposed infrastructure contained some mapping anomalies. Further refinement of the Proposed Project Layout figure clarifies these as follows and is provided in Section 2.1 of this report:

- The red area labelled as Bellbird North U/G Pit was incorrectly shaded and labelled. The updated figure correctly removes this shading and the reference;
- The pink area located south of the plant is an error in the mapping as there are no disturbance activities proposed for this location. The pink shaded area west of the Reward waste stockpile was incorrectly labelled and is now labelled as the proposed topsoil stockpile area on the revised figure. The Pink shaded area north of the Rockface Pit has been removed from the updated figure as the Rockface open pit is not part of the current mine plan;
- The brown area east of 'Marshal Reward Waste Rock' has been removed as it is an error in the original figure;
- The area labelled as Rock Face Pit (open pit?) has been removed from the revised figure as there is no plan for a Rockface open pit;
- The Rockface area will only be an underground mine, so the revised figure correctly labels this area as the Rockface Boxcut and Decline Portal along with a Workshop Area;
- Areas labelled as 'Waste Stockpile' have been correctly labelled as 'Waste Rock Dumps' on the revised figure. These dumps will remain and be rehabilitated in their current proposed locations.

Comment No. 7- EIS Section 2.2.2 Mining Operations

Identify if the omissions in Figure 2-1 constitute an alteration to the Proposal. If yes, identify if the environmental significance of the proposed action has changed (clause 14A Environmental Assessment Administrative Procedures).

The omissions in Figure 2-1 do not constitute an alteration to the proposal. These are errors in the original mapping as explained in the responses to comments 1 and 6 above, and in the proposed mining sequence in the draft EIS and Section 2.2.2 of this Supplement Report.

Comment No. 8 - EIS Section 2.2.3 Ore Processing

Specify which flocculant (Table 2-8) will be used. Assess environmental impact of all chemicals added during water treatment and processing, including an assessment of their behaviour and breakdown products in tailings and tailings decant/seepage and potential to contaminate the environment. Polyacrylamide flocculants with more than 0.05% of the neuro-toxin acrylamide monomer should not be used.

As there are several types of polyacrylamide (PAM) flocculants that have less than 0.05% acrylamide monomer available (e.g. ALKEN® SOLUTIONS A3040L), KGL will investigate the use of these. Once chosen, the Material Safety Data Sheet (MSDS) will be used to determine the chemical makeup of the flocculant and investigations will be made into their potential environmental impact. This will include assessing their behaviour and breakdown in tailings and tailings seepage.

The risk associated with any flocculant use associated with ore processing or production of potable water will be minimised or avoided through the confinement of these substances within the mine water management system and recycling through the process water dam. No process water that has been in contact with flocculants will be released to the environment.

Comment No. 9 - EIS Section 2.2.5 Waste Rock Characterisation

App C-1, pp 10: Specialised testing indicated the presence of iron carbonate....but leach column testing would be required to confirm these preliminary findings.

AppC-1, pp 11: .. but understanding the lag times, overall leaching characteristics and final water quality will require additional work.

AppC-1, pp 12 and 71: recommendations include:

- *kinetic leach column and batch water extraction testing*
- *initial S distribution model with additional S testing to infill gaps*
- *geochemical assessment of Bellbird and other key deposits*

Demonstrate why kinetic leach testing and an S distribution model are not required.

As per the draft EIS Appendix C-1, Section 9.0 of the Acid Mine Drainage Report recommendations kinetic leach column testing will be required to provide further information on leaching rates for inclusion in the geochemical water model. In addition, the S distribution model was completed in early 2019 by H&SC. A summary of the S Block modelling is provided within Section 4.6 and Appendix A-5.

Comment No. 10 - EIS Section 2.2.5 Waste Rock Characterisation

Demonstrate why geochemical assessment of the proposed Bellbird open pit is not required.

As previously discussed in Section 2.2.4 geochemical assessment of the proposed Bellbird open pit is required and the S distribution model incorporates the Bellbird open pit. Further detailed technical information is provided within Section 4.6 and Appendix A-5.

Comment No. 11 - EIS Section 2.2.5 Waste Rock Characterisation

Provide an assessment of metalliferous and saline drainage against relevant guidelines.

An assessment of metalliferous and saline drainage against relevant guidelines has been included in Appendix A-5, Sections 4.2 and 4.3. Outcomes from current modelling indicate that ANZECC 2000 guidelines are the most appropriate to allow for early detection of potential water quality impacts arising from metalliferous and saline drainage.

Comment No. 12 - EIS Section 2.2 Project Components

The Draft EIS refers to a 970 ha project footprint (section 2.2) and a 389.45 ha area to be cleared (section 4.2.4.1). In response to a clarification request the Proponent provided a map (19/11/18) titled 'disturbance footprint'. Confirm and update if necessary, the area and total hectares to be cleared and explain the differences, if any, between the project footprint and clearing area. This should include detailed map(s) showing the project footprint, the area to be cleared and the proposed infrastructure including water supply pipeline and borefield.

The 970 ha footprint referred to in the draft EIS is a generic footprint area only which encompasses the general outline of the specific disturbance areas including the underground areas, the majority of which are not surface disturbance areas. The proposed Project footprint area of 970 hectares used in the draft EIS will not all be cleared for the development of the Project infrastructure and mine workings as detailed in the following information.

The draft EIS originally estimated the historic mining disturbance across the Project area at 163.15 ha. This has been refined through additional desktop investigations and ground truthing and is now estimated to be 174 ha as indicated in Figure 2.1-3 and Table 2.1-3.

Please refer to the detailed information provided in Section 2.1.

Comment No. 13 - EIS Section 4.2.4.1 Clearing Vegetation

Should all of the areas identified as 'disturbance footprint' in the new map provided 19/11/18 be cleared, justify the requirement for the clearing of large areas not used for infrastructure e.g. between TSF and Jervois dam.

This area and the other areas within the 'disturbance footprint' which are not required for Project infrastructure and mine workings will not be cleared. Please refer to our previous response above.

Please refer to the Figures and detailed information provided in Section 2.1.

Comment No. 14 - EIS Section 2.2.11 Workforce

Confirm full time equivalent workforce numbers directly employed by the proposal, excluding jobs indirectly created by the Proposal (e.g. servicing industry) during construction and operation.

For the operational phase of the Project, current estimates indicate 80 full time positions directly employed by KGL with a further 220 positions directly employed as contractors for the operations of the Project. During the Construction phase of the Project the total number of positions required is estimated to be 360. Within the 360 positions it is expected that 30 positions will be directly employed by KGL Resources with the remaining 330 positions employed at the project by the major construction and mining contractors.

3.1.2 Physical Environment

Comment No. 15 - EIS Section 3.1.4.2 Land contamination

Potential sources of land contamination include the TSF, ROMs, processing plant and the possible milled ore at the processing plant, pits, underground shafts, prospecting trenches and old plenty river mining camp.

Identify the contamination status of the Proposal area, including identification of all contamination sources, contaminants, quantities, concentrations, extent, pathways and the significance and risks of potential impacts to the environment.

WMV Environmental Pty Ltd were engaged to complete a Contaminated Land Preliminary Site Investigation (CLPSI) in accordance with the National Environment Protection (Assessment of Site Contamination) Measure (ASC NEPM). This included a detailed site history investigation and an extensive site inspection to document and photograph all of the visible historic mine disturbance areas. The findings of this investigation can be found in Section 4.1 of this report.

Table 4.2-1 of the draft EIS has been updated to include potential pollutant sources from historic mining, TSF leachates/spills, waste rock dump and ROM runoff and is provided in Section 4.3.1.

Comment No. 16 - EIS Section 3.1.5.5 Surface Water Quality

Provide Figure 3.1-16 with readable labels.

High resolution images have been included with the report where necessary. Please refer to Figure 4.5-9 provided in Section 4.5.

Comment No. 17 - EIS Section 3.1.5.5 Surface Water Quality

Contaminant concentrations in Group A are significantly higher than Group B, particularly TSS and metals. The Group A monitoring sites are located in the mineralised zone within the Project area, which likely contributes to the high concentrations of metals at these monitoring sites.

It is possible that runoff from existing mining disturbance in the catchment of Unca Creek and its tributary may have also contributed to the elevated contaminant concentrations observed here.

Provide additional information about how the relative contribution of natural and historic mine-related contributions to water contaminant levels will be determined, and how water quality monitoring will robustly demonstrate that there is no additional, unacceptable impact on water quality from proposed activities.

There is no historic mining disturbance of significance in the catchments of either Group A or Group B. These were selected as being representative of runoff from undisturbed catchments as all historic mining disturbance is located downstream of these monitoring sites.

Historic mining disturbance at the Project site within the proposed operational footprint will be removed as part of the construction of new mine infrastructure, and therefore the potential for ongoing impact due to historic mining disturbance is low.

The proposed surface water monitoring program will allow the extent and severity of any water quality impacts from the Project to be quantified and any sources of contaminants identified.

Refer to the detailed information provided in Sections 4.1.1 and 4.5 and Appendix A-3 of this report.

Comment No. 18 - EIS Section 3.1.6 Groundwater

Provide local maps of the Proposal area, including mine site and borefield.

Based on further detailed mine planning works, local maps of the proposal area which include the borefield in addition to the mine site have been included within this Report. Please refer to the Figures provided in Section 2.1.

Comment No. 19 - EIS Section 3.1.6 Groundwater (Figures 3.1-18 to 20)

Identify which aquifer the Maperte community utilises and potential impacts from the Proposal on the aquifer and water availability.

The Maperte outstation bores are located in the Georgina Basin Carbonate aquifer and are about 18 km to the southeast of the process water supply. Potential impacts to the outstation water supply have been considered as part of the groundwater studies and has been found to be minimal over the life of mine. Further detailed technical information is provided in Section 4.5 and Appendix A-4.

3.1.3 Biological Environment

Comment No. 20 - EIS Section 3.2.2.2 Flora Species

Identify, describe and map the vegetation communities of the areas to be disturbed for the borefield and water supply pipeline.

Low Ecological were engaged to identify, describe and map the vegetation communities of the borefield and pipeline area. Please refer to the additional technical information provided in Section 4.2 of this report and the Landscape, Flora and Fauna Assessment Report provided in Appendix A-1.

Comment No. 21 - EIS Section 3.2.2.2 Flora Species

Further information about threatened flora species assessment of the borefield and water supply pipeline is required (see 4.1 below).

Please refer to the additional technical information provided in Section 4.2 of this report and the Landscape, Flora and Fauna Assessment Report provided in Appendix A-1.

Comment No. 22 - EIS Section 3.2.2.3 Fauna Habitat

Figure 3.2-4 is essentially the same as Figure 3.2-2. It would be beneficial to provide a map showing the six broad fauna habitat types rather than vegetation communities with habitat type numbers.

Please refer to the updated Figure provided in Section 4.4 which has been updated to show the six broad habitat types.

Comment No. 23 - EIS Section 3.2.2.4 Fauna

Further information about threatened fauna species assessment of the borefield and water supply pipeline is required (see 4.3 below).

Please refer to the additional technical information provided in Section 4.4 of this report and the Landscape, Flora and Fauna Assessment Report provided in Appendix A-1.

Comment No. 24 - EIS Section 3.2.2.6 Groundwater Systems

Provide a description of the hydrogeology of the mine site and borefield based on local rather than regional bore data.

A localised groundwater investigation has been completed for the mine site and borefield. These further works included field studies, groundwater motoring bore establishment, water quality sampling and further testing and sensitivity analysis of the groundwater model. Please refer to the additional technical information provided in Section 4.5 of this report and the Groundwater Impact Assessment Supplement Report provided in Appendix A-4.

3.1.4 Cultural and Historic Environment

Comment No. 25 - EIS Section 3.3.4 Cultural and Historic Features

Archaeological values: borefield and water supply pipeline were not part of the surveys (see 4.1 below).

Earthsea were engaged to assess the archaeological values of the borefield and pipeline area. Please refer to the additional technical information provided in Section 4.8 of this report and the Supplementary Archaeological Report provided in Appendix A-8.

3.1.5 Terrestrial Flora and Vegetation

Comment No. 26 - EIS Section 4.1.4 Flora Characteristics of the Project Area (Vegetation Surveys)

Demonstrate that vegetation description sites (survey sites) are adequately representative of habitat types, in particular of riparian habitats. Figure 4.3-1 shows only 1 vegetation description site in riparian vegetation, which is located in the upper reaches of the southern tributary of Unca Creek. There seem to be no vegetation description sites in ephemeral riparian vegetation further downstream.

Previous survey sites and their associated vegetation communities are listed in Tables 1 and 14 of the draft EIS 2018 Jervois Base Metal Project Landscape Flora and Fauna Report. Refined vegetation communities were identified during the on-ground survey and mapped over the Project area. The vegetation communities present in each land unit and the dominant plant species present within each of these vegetation communities are provided in the 2018 report. A minimum of two survey sites were located in each of five vegetation communities (1,2,3,4,5,7) and recorded dominant species in each land unit as described during the on-ground surveys.

Vegetation Communities 6 and 8 both occupied smaller areas and were not surveyed. Sites J03, J03b and J11 were located in riparian vegetation, described as Vegetation Community 7: *Eucalyptus camaldulensis* tall woodland over sparse grasses in drainage channels and rocky creek beds. Site J09 was located on the northern side of the dam which is permanently wet.

The Flora and Fauna Division of the Department of Environment and Natural Resources commented on the flora and fauna surveys and stated “Fieldwork was conducted by suitably-qualified ecologists and the survey methods employed were appropriate and in line with NT EPA guidelines. Sampling adequately covered the spatial extent of the proposal area and was repeated over multiple years and across seasons (wet versus dry). Targeted searches were carried out for an appropriate suite of potentially-occurring threatened species.”

Comment No. 27 - EIS Section 4.1.3.1 Vegetation Communities and 4.1.3.2 Flora Species

Table 3.2-3 only identifies “trees containing large trees with hollows suitable for fauna” as a significant vegetation community. Include riparian vegetation communities, defined in the NT Land Clearing Guidelines as a significant vegetation community, in Table 4.1-3 and Table 3.2-3.

Please refer to the updated table provided in Section 4.2 of this report which identifies 122 ha of riparian vegetation within the Project EL area.

Comment No. 28 - EIS Section 4.1.5 Potential Impacts and Risks

The water pipeline and borefield were not part of the flora surveys and not part of the overall assessment in the Draft EIS. As a minimum and as per the TOR, undertake a desktop likelihood analysis of the area to be impacted by the borefield and pipeline for potential occurrences of threatened species. If the analysis indicates likely occurrences of threatened, undertake targeted

surveys to confirm the occurrence and extent of these values. Assess the significance and risks of the potential impact according to the requirements outlined in the TOR.

Low Ecological were engaged to complete a flora survey and assessment of the borefield and pipeline area. Please refer to the additional technical information provided in Section 4.2 of this report and the Landscape, Flora and Fauna Assessment Report provided in Appendix A-1.

Comment No. 29 - EIS Appendix Flora and Fauna Study

Identify the additional land clearing requirements on maps requested in '2. Description of the Project'.

It has been estimated that approximately 136 ha of the proposed mining disturbance will be located within historic disturbance areas. The updated total Project area is approximately 382 ha which has been reduced from the total area of 389.45 ha estimated in the draft EIS. Clearing areas required to accommodate the Project development has been estimated at approximately 246 ha which is slightly more than the 236.26 ha proposed in the draft EIS.

Refer to the figures and detailed information provided in Section 2.1 of this report.

Comment No. 30 - EIS Appendix Flora and Fauna Study

As per the TOR and defined in the NT Land Clearing Guidelines 2010, identify, map and describe all significant and sensitive vegetation types, wetlands and drainage areas impacted by the Proposal. The analysis should include all areas directly and indirectly impacted by the Proposal, including areas to be disturbed for water supply, to be flooded by the upgraded Jervois dam, to be impacted by drawdown, to be impacted by the diversion of Unca Creek and to be impacted downstream by modification of hydrological regimes.

Low Ecological were engaged to map suitable habitats for threatened flora. CloudGMS and WRM Water and Environment were engaged to investigate impacts from potential drawdown and other potential surface water impacts. Refer to the additional technical information provided in Sections 4.2 and 4.5 of this report.

Comment No. 31 - EIS Appendix Flora and Fauna Study

As per the TOR, identify and map suitable habitats for threatened flora with known, possible and likely occurrence and identify potential direct and indirect impacts of the Proposal.

Each map should be provided at an appropriate scale to clearly demonstrate the local potential impact. Losses due to potential direct and indirect impacts should be provided in hectares and their significance assessed at a local and regional scale.

The likelihood of occurrence has been mapped for threatened and near-threatened species based on parameters such as land systems, soil units, proximity to watercourses and vegetation units. From this, the potential losses of these possible habitats within a five kilometre buffer of the Project EL, borefield and pipeline areas have been estimated as provided Section 4.2 for the detailed information on these areas and the potential impacts.

Comment No. 32 - EIS Appendix Flora and Fauna Study

Provide a fire history map of the site in relation to the proposed infrastructure and clearing area.

Please refer to the Figure provided in Section 4.2.

3.1.6 Terrestrial Environmental Quality

Comment No. 33 - EIS Section 4.2.4.1 Clearing Vegetation

Vegetation clearing as per above. (Identify the additional land clearing requirements on maps requested in '2. Description of the project').

It has been estimated that approximately 136 ha of the proposed mining disturbance will be located within historic disturbance areas. The updated total Project area is approximately 382 ha which has been reduced from the total area of 389.45 ha estimated in the draft EIS. Clearing areas required to accommodate the Project development has been estimated at approximately 246 ha which is slightly more than the 236.26 ha proposed in the draft EIS.

Refer to the figures and detailed information provided in Section 2.1 of this report.

Comment No. 34 - EIS Section 4.2.4.3 Potential Pollutant Sources and 3.1.4.2 Land Contamination

As outlined above, identify through field investigations the contamination status of the Proposal area.

WMV Environmental Pty Ltd were engaged to complete a Contaminated Land Preliminary Site Investigation (CLPSI) in accordance with the National Environment Protection (Assessment of Site Contamination) Measure (ASC NEPM). This included a detailed site history investigation and an extensive site inspection to document and photograph all of the visible historic mine disturbance areas. The findings of this investigation can be found in Section 4.1.1 of this report.

Comment No. 35 - EIS Section 4.2.4.3 Potential Pollutant Sources and 3.1.4.2 Land Contamination

Amend Table 4.2-1 with potential pollutant sources from historic mining, TSF leachates/spills, WRD and ROM runoff, and hazardous material spills.

Table 4.2-1 of the draft EIS has been updated to include potential pollutant sources from historic mining, TSF leachates/spills, waste rock dump and ROM runoff and is provided in Section 4.3.1.

Comment No. 36 - EIS Section 4.2.5.10 Site Closure, Decommissioning and Rehabilitation Strategies

Post-mining, the site will have improved opportunity for alternate uses as the Project proposes to progressively rehabilitate areas disturbed through mining practices and associated activities, therefore much of the legacy of historic mining will be improved. The Jervois Base Metal Project closure and rehabilitation objectives include:

- *Establishment of safe and stable post-mining land surfaces to support long-term vegetation growth*
- *Returning land to pre-disturbance land use levels (as reasonably practical); and*
- *Preparing site suitability to future leaseholders.*

Further demonstrate how the legacy of historic mining will be improved. This should include identification of the terrestrial environmental quality (e.g. contamination and erosion status) before commencement of the Proposal and to be achieved after closure based on proposed rehabilitation and closure criteria.

WMV Environmental Pty Ltd were engaged to complete a Contaminated Land Preliminary Site Investigation (CLPSI) to determine the existing contamination status of the Project EL area.

The objective of mine closure and rehabilitation is to return the land to as close as is reasonably possible to its pre-disturbance condition i.e. stable, resilient, self-sustaining native vegetation of local provenance suitable for use by Traditional Owners and as habitat for flora and fauna.

As a significant portion (136 ha) of the historic mining disturbance area (174 ha) will be subject to disturbance as a result of the Project activities, these areas will be rehabilitated in accordance with the rehabilitation strategies and objectives outlined in the MRCP. In particular, the construction of a new TSF and processing plant will result in the removal of the more significant historic mining disturbance and source of contamination. Consequently, the legacy of historic mining in the Project EL area will be improved as a result of the Project activities with only a portion of this airstrip and some minor surface extraction sites to remain untouched.

Refer to the detailed information provided in Section 4.3.2 of this report.

Comment No. 37 - EIS Section 4.2.5.10 Site Closure, Decommissioning and Rehabilitation Strategies

As per the TOR, identify contingency measures to be implemented in the event that monitoring demonstrates that rehabilitation closure objectives are not met.

Contingency measures provided in Section 4.3.1 of this report include:

- Review of rehabilitation completion criteria to take into consideration additional information obtained about environmental and other constraints;
- Changes in mine planning;
- Consideration of feedback from future stakeholder consultations;
- Regular review of the risk assessment throughout the life of the Project; and
- Review of management strategies to ensure the early identification of issues.

3.1.7 Terrestrial Fauna

Comment No. 38 - EIS Section 4.3.3 Existing Environment (Fauna Surveys)

Demonstrate that trapping sites are adequately representative of habitat types, in particular of riparian habitats. Figure 4.3-1 shows only 1 trapping site in riparian vegetation below Jervois Dam

(J03), which is a permanently wet site. There seem to be no trapping sites in ephemeral riparian vegetation, which is potential habitat for threatened species.

Previous survey sites and their associated vegetation communities are listed in Tables 1 and 14 of the 2018 Jervois Base Metal Project Landscape Flora and Fauna Report. Refined vegetation communities were identified during the on-ground survey and mapped over the Project area. The vegetation communities present in each land unit and the dominant plant species present within each of these vegetation communities are provided in the 2018 report. Trapping locations were chosen to represent the major land systems and vegetation types occurring within the area. Vegetation Communities 6 and 8 both occupied smaller areas and were not surveyed. Sites J03, J03b and J11 were located in riparian vegetation, described as Vegetation Community 7: *Eucalyptus camaldulensis* tall woodland over sparse grasses in drainage channels and rocky creek beds. Site J09 was located on the northern side of the dam which is permanently wet.

The Flora and Fauna Division of the Department of Environment and Natural Resources commented on the flora and fauna surveys and stated “Fieldwork was conducted by suitably-qualified ecologists and the survey methods employed were appropriate and in line with NT EPA guidelines. Sampling adequately covered the spatial extent of the proposal area and was repeated over multiple years and across seasons (wet versus dry). Targeted searches were carried out for an appropriate suite of potentially-occurring threatened species.”

Comment No. 39 - EIS Figure 4.3-2 Habitat Types

Figure 4.3-2 is essentially the same as Figure 3.2-2. It would be beneficial to provide a map of the six broad habitat types.

Please refer to the updated Figure provided in Section 4.4.

Comment No. 40 - EIS Figure 4.3-1 Habitat Types

Table 4.3-1 would benefit from a numbering of the broad habitat types as these numbers are referenced later in the text.

Please refer to the updated Table provided in Section 4.4.

Comment No. 41 - EIS Section 4.3.4.4 Conservation Significant Fauna Species

*Assess potential impacts and risks to the Grey Falcon (*Falco hypoleucos*) (Vulnerable, TPWC Act), and describe mitigation measures if appropriate.*

Refer to the additional information provided in Section 4.4 of this report. Mitigation measures to retain mature trees or habitat trees are provided in the updated Biodiversity Management Plan provided in Appendix C-1.

Comment No. 42 - EIS Section 4.3.5.2 Change in Habitat Quality

Hydrology: Area of riparian / GDE habitat lost due to groundwater drawdown not identified.

Even though there is little information on their groundwater dependencies in Central Australia, the 2019 Low Ecological Landscape, Flora and Fauna Assessment identified *Eucalyptus camaldulensis*

(River Red Gum) and some *Corymbia* species to be dependent on groundwater. River Red Gums are reported to be dependent on shallow groundwater (up to 10 m) while *Corymbia* species tend to be deeper rooted from 8 – 20 m. In addition to these species which are found in the Project EL area, *Corymbia Apperrinja* (Ghost Gum) and *Vigna lanceolate* (Bean Trees) were observed throughout the borefield and pipeline area. These two species are deep rooted species which tap into ground water and would be considered facultative GDE species.

CloudGMS were engaged in 2018 and again in 2019 to investigate potential groundwater drawdown and the effects this may have on GDEs in the Project area and in the borefield area. These investigations found that the depth to groundwater in the borefield area is greater than 10 metres and the closest sites that recorded water levels within 15 metres are to the west of the Lucy Creek homestead approximately 10 kilometres east of the borefield area. CloudGMS reported that whilst riparian vegetation in this area may be accessing regional groundwater, it is more likely it is reliant on water stored in alluvial sediments associated with the larger creeks. As a result, riparian health is more dependent on surface water flows within the creek systems. CloudGMS also reported that the borefield water supply will extract two gigalitres per annum and result in a drawdown of about two metres over an area of less than 110 km².

CloudGMS found that while two sites drilled within the Project EL area in 1972 reported groundwater levels less than five metres below ground level, these have been interpreted to be associated with alluvium associated with Unca Creek. As both of these bores were completed to less than 15 metres and given the low permeability of the underlying rocks, it suggests that this feature may be perched and possibly disconnected from the regional groundwater systems. Generally groundwater levels in the Project EL area are greater than 20 metres below ground level as all but one of the groundwater levels in the 2018 investigation were greater than 14 – 15 metres. As a result, drawdown in the fractured rock aquifer is expected to have limited effect on groundwater availability to riparian vegetation as the long-term health of the trees is related to the maintenance of the surface water flow regime in the creeks.

The literature review completed as part of the 2018 Groundwater Impact Assessment submitted as part of the draft EIS determined that stygofauna are not likely to be an environmental factor within the EL area as the habitat suitability is poor as the lithology of metamorphosed rocks is fine grained and will not provide the pore spaces required to support stygofauna (CloudGMS, 2018). As a result, the potential impact to stygofauna from groundwater drawdown within the Project EL area is considered low (CloudGMS, 2018).

The 2019 frc environmental Stygofauna Pilot Study further investigated the presence of stygofauna in the borefield area of the Project. This study found that the geology and hydrology of the borefield area was considered suitable for providing habitat for stygofauna whilst the water quality was assessed as potentially suitable. Of the ten bores sampled, only one contained stygofauna: a single copepod. Overall the stygofauna community of the borefield area was assessed as having low environmental value based on the limited occurrence of a single taxon and the groundwater quality being only potentially suitable on the basis of total dissolved solids (frc environmental, 2019).

Potential impacts to stygofauna in the borefield area may include the drawdown of water tables and subsequent reduction in groundwater pressure and compaction of aquifers due to traffic on access roads. Vegetation clearing may also reduce habitat quality of shallow groundwater ecosystems where the water table intersects the root zone of vegetation and provides habitat for stygofauna. The risk assessment conducted as part of the pilot study rated these risks as low for the borefield area. The 2019 CloudGMS Groundwater Impact Assessment Supplement report found that “the proposed extraction regime in the borefield area is within the capacity of the aquifer and removes a very small fraction of the immense volume in storage”.

Comment No. 43 - EIS Section 4.3.5.2 Change in Habitat Quality

Identify if the diverted Unca Creek will be rehabilitated (not in Mine Rehabilitation and Closure Plan). If not rehabilitated, identify how this may impact habitat quality and connectivity.

Section 4.3.5.2 of the draft EIS recognises that habitat fragmentation will occur as a result of the Project activities, particularly the redirection of Unca Creek due to the expansion of the Reward Pit. The diversion of Unca Creek aims to maintain the seasonal flow of water through the Project area. As the diversion will be permanent, it has been designed to remain as part of the final landform in its diverted alignment. It has been recognised that in the short term this will result in the severance of the wildlife corridor provided by Unca Creek. It has also been identified that in the long term there will be a reconnection of this habitat to provide a functional vegetative linkage due to the proposed rehabilitation of the riparian vegetation. Recovery of vegetation in the locality is limited by site conditions, which are dry and harsh, and so there will be a medium-term impact on riparian connectivity during the time when the rehabilitated vegetation is developing.

In acknowledgement of the short to medium term impact on the Unca Creek environment caused by the Project, a Voluntary Offset Strategy has been outlined in the Terrestrial Flora and Vegetation chapter of the draft EIS (Section 4.1.8 and Table 4.1-7). The offset proposed for the diversion of Unca Creek (removal of vegetation in waterway buffer areas) is to protect other riparian habitats within the Project area at a ratio of 3:1 (three times the impact area).

In the meantime, the Mine Rehabilitation and Closure Plan will ensure that there is more intense management of the diversion to support the growth and recruitment of native groundcovers, minimise the mortality of planted juvenile shrubs and canopy trees and manage exotic weeds. These actions will at least provide some vegetative cover along the diversion in the short-term and conserve the connectivity value of Unca Creek for more mobile or common species. It is anticipated that in the long-term, appropriate management of the diverted section of Unca Creek will provide adequate habitat and connectivity values to avoid significant impacts on local flora and fauna.

As the life of the Project is expected to be at least 15 years, it is considered that there is little to no ecological benefit in reinstating the original alignment of Unca Creek through the section that will be affected by the Reward Pit (approx. 1.5 km) for the following reasons:

- The landform of the area affected by the pit will be different and potentially not supportive of a drainage channel;

- Overland drainage would have been engineered to flow away from the original location of the waterway for at least 15 years;
- Changes in landform and drainage may have started to affect the geology of the site – particularly in terms of the transport of alluvial deposits and presence of mesic areas;
- The nature of the mine pit and mining activities are such that the geology of the area affected by the pit will be different post-mining and will no longer display stratification or typical alluvial characteristics (that would support a riparian vegetation community);
- By the time mine closure occurs (after 15 years of operation), the condition of the riparian vegetation along the diversion is likely to be nearing a functional ecosystem that is self-managing and provides significant connectivity values. If the water channel is then diverted back to its original alignment, the rehabilitated area will die back within a short timeframe (about 1 – 2 years) – however, it will take another 15 years (minimum) of management within the original alignment to recover the riparian vegetation to the same condition as the diversion (if it is possible given the level of disturbance within Reward Pit). This essentially means 30-40 years where there is a sub-optimal riparian corridor, instead of 15-20 years, and with a higher level of risk to achieve the same outcome.

The MRCP closure objectives for flora and fauna are:

- Vegetation is resilient, self-sustaining and comparable to the surrounding areas and pre-existing ecosystem; and
- Rehabilitated areas will provide appropriate habitat for fauna – abundance and diversity will be appropriate.

Section 1.5.1 of the MRCP allocates a rehabilitation strategy domain to “water dams and ponds, including surface water management structures, such as sediment dams and diversion drains”. This domain includes the Unca Creek diversion. The MRCP will be updated to include more detailed information on outcomes and completion criteria for the Unca Creek diversion and specifically address habitat quality and connectivity. This will include management of the diversion to support the growth and recruitment of native groundcovers, minimise the mortality of planted juvenile shrubs and canopy trees and manage exotic weeds. These actions will at least provide some vegetative cover along the diversion in the short-term and conserve the connectivity value of Unca Creek for more mobile or common species.

Comment No. 44 - EIS Section 4.3.5.3 Impacts to Threatened Fauna and Appendix C-7 Flora and Fauna Study

The water pipeline and borefield were not part of the fauna surveys and not part of the overall assessment in the Draft EIS. As a minimum and as per the TOR, undertake a desktop likelihood analysis of the area to be impacted by the borefield and pipeline for potential occurrences of threatened species. If the analysis indicates likely occurrences of threatened, undertake targeted surveys to confirm the occurrence and extent of these values. Assess the significance and risks of the potential impact according to the requirements outlined in the TOR. Identify and provide details of trenching requirements.

Low Ecological were engaged to undertake a fauna survey of the borefield and pipeline area. Please refer to the additional technical information provided in Sections 2.2 and 4.4 of this report and the Landscape, Flora and Fauna Assessment Report provided in Appendix A-1.

3.1.8 Hydrological Processes

Comment No. 45 - EIS Section 4.4.4 Potential Impacts and Risks, Groundwater

Verify the Georgina Basin groundwater model with local bore data. Based on the verified model, identify if water demand and water abstraction volumes can be met, and predict local and regional drawdown (including Maperte) and other impacts to groundwater hydrology. Provide uncertainties and level of confidence of the model.

Further groundwater investigations have been completed which have included the establishment of groundwater bores within the proposed borefield area. Subsequently, an assessment of the ability to achieve the water demand and water abstraction volumes, assessment of potential impacts and supporting sensitivity analysis was completed. The findings of this detailed technical study are provided in Section 4.5 and Appendix A-4.

Comment No. 46 - EIS Section 4.4.4 Potential Impacts and Risks, Groundwater

Provide location and depth of bores used for groundwater modelling at the mine site and borefield area.

Detailed information in relation to the location and depth of bores used for groundwater modelling at the mine site and borefield area is provided in Appendix A-4 Groundwater Impact Assessment Supplement, Section 3.6 Drilling Investigations.

Comment No. 47 - EIS Section 4.4.4 Potential Impacts and Risks, Groundwater

Provide an independent peer review to assess adequacy of modelling, extent of drawdown and risks to local groundwater resources from groundwater leaking into pits and underground workings.

Please refer to the independent peer review provided in Appendix B-1.

Comment No. 48 - EIS Section 4.4.4 Potential Impacts and Risks, Groundwater

Provide a peer reviewed monitoring program capable of monitoring direct and indirect impacts of the Proposal on groundwater hydrology at the mine site, the water extraction site and regional groundwater users during operation and after closure. The monitoring programs should be based on robust pre-mining baseline data and monitoring data should be used to improve model predictions and levels of confidence.

Please refer to the independent peer review provided in Appendix B-1.

Comment No. 49 - EIS Section 4.4.4 Potential Impacts and Risks, Surface Water

Demonstrate structural integrity and functionality of the diversion during operation and after closure, including details of the diversion design, scour protection measures and catch drains.

The flood modelling conducted by WRM (Appendix A-3) provides details of the diversion drain concept design. Further design of scour protection measures and catch drains will be undertaken by an appropriately qualified technical specialist during the detailed design of the diversion.

The functionality of the diversion for operational conditions has been assessed for events up to and including the 0.1 % (1 in 1,000) annual exceedance probability (AEP).

In order to ensure that the diversion can protect the final void from floodwater in the post-closure scenario, it is proposed to construct the Eastern and Western flood protection bunds along the right bank of Unca Creek and the Unca Creek Diversion to protect the final void and the TSF from flooding up to the probable maximum flood event. The bunds will be incorporated into the rehabilitated final landform to form a self-sustaining structure that does not require long term maintenance.

Further detailed technical information is provided in Section 4.5 and Appendix A-3.

Comment No. 50 - EIS Section 4.4.4 Potential Impacts and Risks, Surface Water

Provide a risk assessment and worst-case scenario of failure of the diversion and of Jervois Dam during operations and after closure.

A risk assessment for the failure of Jervois Dam and the Unca Creek diversion for both operation and post-closure scenarios has been undertaken (Appendix A-3). The risk assessment identified the following:

- Failure of the Jervois Dam would result in a flood wave downstream of the dam in Unca Creek;
- Failure of the diversion drain would result in floodwater draining into the Reward Pit;
- During the operational phase, the population at risk (PAR) during a failure of either the dam or diversion would consist of mine personnel only. There are no settlements or population centres downstream of the site that would potentially be affected by the resulting flood wave in Unca Creek. Regardless, any flood wave from a dam failure is expected to dissipate rapidly downstream of the dam due to the flat terrain and wide floodplains to the east of the Project;
- The risk to mine personnel would be managed by site specific risk assessments, dam monitoring and regular inspections; and
- During post-closure there is no population at risk for a failure in the Jervois Dam.

Further detailed technical information is provided in Section 4.5 and Appendix A-3.

Comment No. 51 - EIS Section 4.4.4 Potential Impacts and Risks, Surface Water

Provide modelled predictions for flood levels, velocities and increases in peak flood levels for 1 in 100 flood events for closure conditions.

Closure conditions have been considered in the surface water technical studies. 1 % (1 in 100) flood levels and velocities for post-closure conditions will be unchanged from operational conditions. The Unca Creek diversion channel, open cut pits and waste rock dumps will remain in the post-closure case.

Further information is provided in Section 4.5 and Appendix A-3.

3.1.9 Inland Waters Environmental Quality

Comment No. 52 - EIS Section 4.5 Potential Impacts and Risks, Groundwater

Provide a peer reviewed monitoring program capable of monitoring direct and indirect impacts of the Proposal on groundwater quality at the mine site, the water extraction site and regional groundwater users during operation and after closure. The monitoring program should be based on robust pre-mining baseline data.

The proposed groundwater monitoring program has been peer reviewed, and found to be well researched, structured and composed.

The recommendations of the peer review have been incorporated into the monitoring program provided in this Supplement Report.

Please refer to the independent peer reviewed groundwater monitoring program provided in Appendix B-1.

Comment No. 53 - EIS Section 4.5 Potential Impacts and Risks, Surface Water

Provide a peer reviewed monitoring program capable of monitoring direct and indirect impacts of the Proposal on surface water quality at the mine site during operation and after closure. Pre-mining baseline data should establish impacts from historic mining and natural background conditions (see 3.1.5.5).

Please refer to the independent peer reviewed surface water monitoring program provided in Appendix B-2.

Comment No. 54 - EIS Section 4.5 Potential Impacts and Risks, Surface Water

Identify the expected water quality of process water and requirements for lining of the process water dam (mine water dam on updated Figure 2-1).

The water stored in the process water dam will consist of dewatered groundwater, tailings return water and runoff from pits and mine affected catchments (including the ROM pad). This water is likely to contain elevated levels of salinity (EC), metals and sulphates compared to baseline surface water quality.

KGL will commit to lining of the process water dam. A risk assessment will be undertaken during detailed design to determine an appropriate lining. The lining of the process water dam would likely be consistent with any liner recommended for the TSF cells due to the proximity to Unca Creek.

Comment No. 55 - EIS Section 4.5 Potential Impacts and Risks, Surface Water

Identify the expected water quality of runoff from waste rock dumps, ROM pads etc. and the requirement for lining of the associated sediment dams.

The waste rock dump (WRD) sediment dams will contain both runoff and seepage from waste rock dumps. Due to the proposed capping of the dumps with NAF material, runoff is likely to be of relatively similar quality to baseline surface water quality. Seepage from the dumps is likely to be of

poorer quality (EGI, 2019). Water collected in the WRD sediment dams will be predominantly runoff, with limited amounts of seepage. Therefore, water quality in the WRD sediment dams is not expected to be poor enough to require lining of the dams. Further, seepage and runoff from the waste rock dump sediment dams will be pumped back to the process water dam, and therefore the residence time in the unlined sediment dams will be low.

Run off and seepage from the ROM pad will drain to the process water dam and not to an unlined sediment dam.

Further detailed technical information is provided in Section 4.6 and Appendix A-5.

3.1.10 Air, Greenhouse Gases and Noise

Comment No. 56 - EIS Section 4.6.1 Introduction

Demonstrate suitability of the locations of the two air monitoring gauge sites and why monitoring of dust emissions of the southern mining activities is not required.

Air Noise Environment (ANE) who are scientific and engineering consultants specialising in air quality and acoustics were engaged to assess the suitability of the two dust monitoring locations (Appendix A-7 Supplementary Air and Noise Assessment Report). In the view of ANE, 'The sampling locations are noted to be on the western and eastern side of the mine and would provide an indication of dust levels for mining operations near the mine camp facilities (east position, D1) and near the processing plant and Tailings Storage Facility (TSF) (west position, D2).'

Whilst these two monitoring locations were considered adequate for the level of activity that has occurred on site during the monitoring period (being exploration drilling only). As recommended by ANE, additional monitoring locations will be added during the construction and operational phases will include locations in the south adjacent to the proposed Bellbird waste rock stockpile and in the north adjacent to the Reward waste rock and topsoil stockpiles.

These additional dust monitoring locations will only serve to provide information for on-site dust levels as the impact assessment has been predicted that dust is not expected to adversely impact off-site sensitive receptors due to their distance from the Project.

Comment No. 57 - EIS Section 4.6.4 Potential Impacts

Include quantification of greenhouse gas emissions from land clearing.

Greenhouse gas emissions from land clearing have now been calculated and are estimated to be 3,954 tonnes CO₂-e. Details on these calculations are provided in Section 4.7.1 of this report and Section 6 of the Supplementary Air and Noise Assessment Report provided in Appendix A-7.

Comment No. 58 - EIS Section 4.6.4 Potential Impacts

The Proponent is encouraged to reduce greenhouse gas emissions from energy production, for example through the use of renewable energy sources.

As the Project will be operating at considerable depths underground, a secure and continuous power supply is of the utmost importance to ensure the safety of personnel. KGL have further investigated power supply options and are now proposing to use the latest diesel power generation process coupled with low penetration solar with or without battery support which is well tested and considered to be the best solution in terms of safety and the environment.

Whilst this will supply the majority of the energy requirements of the Project, KGL are continuing to investigate alternative sources of energy supply. Discussions are currently underway with providers for a solar power system for the site telecommunications systems. The details on this solar system will be subject to detailed design and engineering once the preferred provider has been chosen.

The proposed power supply options are currently the most practical due to: the remote location of the Project where service and supply logistics can be unreliable; the need for an uninterrupted power supply; maintaining the economic feasibility of the Project and the practicality of other power supply options. Complete reliance on solar energy is not feasible for several reasons including the need for an uninterrupted power supply and the peak load requirements for start-up of the processing plant.

Throughout the life of the Project KGL will introduce initiatives to improve energy efficiency which will reduce greenhouse gas emissions and subsequently contribute to managing operational costs. The draft Environmental Management Plan and sections 2.2.9 and 4.6 of the draft EIS provide details on the greenhouse gas mitigation options are under consideration including fuel efficiency practices, the investigation of renewable sources and energy conservation practices.

3.1.11 Social, Economic and Cultural Surrounds

Comment No. 59 - EIS Appendix C-8 Archaeological Impact Assessment

The water pipeline and borefield were not part of the archaeological surveys and not part of the overall assessment in the Draft EIS. As a minimum and as per the TOR, undertake a desktop likelihood analysis of the area to be impacted by the borefield and pipeline for potential occurrences of archaeological values. If the analysis indicates likely occurrences, undertake targeted surveys. Assess the significance and risks of the potential impact according to the requirements outlined in the TOR.

As the Project water supply in the proposed borefield area has been investigated in detail since the preparation of the draft EIS, Earthsea were engaged to assess the archaeological values of the borefield and pipeline area. Please refer to the additional technical information provided in Section 4.8 of this report and the Supplementary Archaeological Report provided in Appendix A-8.

Comment No. 60 - EIS Section 4.7.1 Introduction

Demonstrate that all relevant stakeholders have been and will be adequately consulted during all stages of the Proposal.

KGL engaged the services of True North Strategic Communications (True North) to undertake a thorough Social Impact Assessment (SIA) for the Project. True North are a strategic communication consultancy based in the NT who specialise in strategic communication and community and

stakeholder engagement. As part of the SIA process, True North developed an Engagement Strategy which aimed to guide KGL on providing timely, relevant and appropriate information to stakeholders. This Strategy listed key stakeholder groups as identified by True North, KGL and other stakeholders. It also provided the approach for the most appropriate methods of informing each stakeholder which were followed through by True North and KGL. Communication and engagement methods used included a Project fact sheet, emails and phone calls to stakeholders, briefings and meetings, SIA interviews, updates to the KGL website, ASX announcements and PowerPoint presentations.

In preparing the Social Impact Assessment Report and the Engagement Strategy, True North were guided by the International Association of Impact Assessment Principles for a Social Impact Assessment, the International Association for Public Participation Core Values and the NT EPA's Guidelines for the Preparation of an Economic and Social Impact Assessment.

Both the draft Environmental Management Plan (EM Plan) and the Social Impact Management Plan (SIMP) provide formalised engagement activities proposed by KGL in order to ensure stakeholders are informed on the progress of the Project, including key milestones such as the granting of Project approvals and commencement timeframes.

KGL is committed to maintaining the strong link to the community during the life of the Project through regular consultation. As recommended by True North, KGL have every intention to continue with ongoing engagement with stakeholders to address any emerging issues and to provide continued input to decision making by those stakeholders that may be impacted by the Project.

Comment No. 61 - EIS Section 4.7.1 Introduction

Provide issues raised and outcomes of stakeholder consultations to date.

KGL have maintained regular communications with numerous stakeholders over several years, and in particular the NT Government, the Bonya community and the local pastoralists. In 2018 the following activities formed part of the regular communications with the NT, Alice Springs and local stakeholders:

- A presentation at the Central Australian Regional Mining Seminar in Alice Springs in March 2018;
- Formal briefings of numerous local stakeholders by KGL in March and October 2018;
- Regular Project site visits by the Executive Chairman which includes visits to the Bonya community and the local pastoralists;
- Regular consultation by the site based Project Director with the local pastoralists and the Bonya community; and
- Numerous meetings with the NT Government departments in Darwin and Alice Springs.

Issues raised by stakeholders to date, and particularly during the SIA are provided in detail in the Social Impact Assessment and the SIMP with a summary provided in Section 4.7 of the draft EIS. The issues raised were both positive and negative and included:

- Employment and training opportunities;
- Procurement of local goods and services;
- Potential upgrades of infrastructure;

- Increased heavy vehicle traffic on unsealed roads;
- Impacts to water resources;
- Reduced community cohesion;
- Reduction in tourist traffic;
- Reduced productivity of other sectors;
- Workplace deaths or injuries; and
- Cumulative impacts of the five major mining Projects.

The outcomes of the stakeholder consultations to date includes clear progress towards fulfilling the following consultation and communication objectives set as part of the SIA process:

- Listen to and understand the perspectives of stakeholder groups;
- Manage stakeholder expectations;
- Early identification of local knowledge that may be beneficial and assist in avoiding negative impacts;
- Support the delivery of a project that is environmentally, economically, culturally and socially acceptable (earn and maintain a social licence to operate);
- Provide regulators with confidence that positive and negative impacts are understood and managed;
- Provide guidance to KGL's long term social performance;
- Build and maintain awareness of the Project;
- Provide a tailored approach to stakeholder engagement; and
- Build an understanding, trust and relationships with individuals or groups who have the potential to be positively or negatively impacted by the Project.

Overall, True North reported that feedback on the Project from stakeholders indicated that "The majority of stakeholders are supportive of the project and are positive about the potential benefits and opportunities for the region."

Comment No. 62 - EIS Section 4.7.1 Introduction

Demonstrate how an agreement on a post-mining land use and landform will be developed.

As indicated in Appendix 5.H of the draft EIS, the post-mining land use and landforms will be developed from the currently specified Preliminary End Land Use and Closure Outcomes as part of the outcomes determined through the Communication and Engagement Strategy, which will be developed during the operational phase of the Project. In particular, the proposed progressive rehabilitation activities will provide early discussions and determination of some specific land use of areas and final landforms. A specific closure consultation will be undertaken two years prior to mine closure, which is expected to include close consultation with the current pastoralists and Traditional Owners to provide preferred specifications for post-mining land use and landforms which can then be considered by the wider group of stakeholders listed in the draft EIS Appendix 5.H (Section 1.4).

Comment No. 63 - EIS Section 4.7.1 Introduction

Provide commitments about how KGL will inform the public and relevant stakeholders about the mine's ongoing environmental management performance.

The purpose of the SIMP which was submitted as part of the draft EIS, is to guide KGL's social performance for the life of the Project. This SIMP contains management plans and commitments to guide KGL in meeting their obligations to the community. Social impact management for the Project will focus on community liaison, stakeholder engagement and proactive and open communications to provide updates, reduce community fears due to lack of knowledge and manage stakeholder expectations.

The SIMP contains a Commitments Register which includes annual reporting to stakeholders and the KGL Board, the establishment of a community liaison committee, the development of specialised management plans and preparation of annual SIMP reports. Specifically, commitment 12 of the SIMP states that KGL will maintain good communication and engagement with stakeholders through numerous measures such as:

- Providing Project updates to key stakeholders through various means including emails and community noticeboards;
- Posting regular updates and community reports on the KGL website;
- Ongoing liaison with pastoralists and the Bonya community;
- Annual satisfaction surveys;
- The maintenance of easily accessible public enquiry methods; and
- Communication with the Gemtree Caravan Park and other tourism bodies during peak tourist season.

The SIMP also commits to providing an annual report to the community liaison committee. This annual report will include the measurement of environmental indicators against baseline data.

As KGL is a publicly listed company on the ASX, they are obliged to prepare an Annual Report for shareholders. A summary of the company's social and environmental performance will be included as part of this report which will be made available to the general public through several avenues including the KGL website.

KGL is committed to implementing the above measures to keep the public and relevant stakeholders updated on the Projects environmental performance. Please refer to the list of commitments provided in Section 5 of this report.

Comment No. 64 - EIS Section 4.7 Cultural Impacts

Provide commitments to allow Traditional Owners reasonable access to all cultural and significant sites on the mineral leases and borefield.

The draft EM Plan recognises that cultural aspects are an environmental value associated with the Project and as such are subject to management and mitigation measures detailed in the Cultural Heritage Management Plan in Section 5.5.6.12.

Both the SIMP and the draft EM Plan outline commitments which aim to ensure Traditional Owners are provided with reasonable access to culturally significant sites on the Project. Commitment 13 in the commitments register in the SIMP states that KGL will ensure traditional owners are provided reasonable access to all cultural or significant sites on the Mineral Leases. This will be expanded to include the provision of reasonable access to all sites on the borefield area.

In addition, KGL has successfully conducted negotiations with the Traditional Owners and an Indigenous Land Use Agreement (ILUA) is in place for the Project. Whilst the specific content of the ILUA is confidential, an ILUA is a legally binding document which deals with matters such as protection of significant sites and culture and how the rights of native title holders can be exercised.

Comment No. 65 - EIS Section 4.7 Legacy Mine Risk

Demonstrate how the timely development of premature closure plans will be achieved, especially if the mine will close at short notice.

The Project risk assessment identified premature closure as a potential risk and site rehabilitation or maintenance not being completed as a result. Methods identified to control this risk include the inclusion of Premature Closure Plans in the MRCP which is based on operational conditions.

One of the objectives of the MRCP is compliance and this includes meeting NTG closure requirements and legally binding conditions and commitments relevant to rehabilitation and closure.

Section 1.9.3 of the MRCP addresses premature closure of the Project and provides closure plans which have been developed for each domain of disturbance for short-term, long-term and potential care and maintenance closures. The MRCP includes conceptual care and maintenance commitments including commitments on what measures will be implemented to maintain the Projects environmental obligations should it unexpectedly close.

As detailed in the MRCP, rehabilitation of mine disturbance areas will be undertaken progressively as infrastructure and other disturbed areas become redundant and are decommissioned. Progressive rehabilitation will also be incorporated into the mine schedule during the detailed planning stage and modified as necessary during operations. Wherever practicable, disturbed areas and/or areas no longer required for mining will be rehabilitated during operations.

The MRCP will be a dynamic document that will undergo regular reviews to ensure it remains relevant to the activities being undertaken and activities that are planned to be undertaken. This will include updates to address premature closure.

In addition, the MMP will address the possibility of unplanned or premature mine closure as required by the Mining Management Plan Structure Guide for Mining Operations. The MMP will include specific monitoring and maintenance plans relevant to premature or unplanned closure of the Project.

Comment No. 66 - EIS Section 4.7 Legacy Mine Risk

Identify the Proponent's requirements for rehabilitation of historic mining infrastructure and contamination.

Section 2.1 of this report outlines that approximately 136 ha of the 174 ha of historic disturbance areas will be rehabilitated as they are located within the proposed Project disturbance area.

As detailed in Section 4.1.1 of this report, WMV Environmental Pty Ltd were engaged to complete a Contaminated Land Preliminary Site Investigation (CLPSI) in accordance with the National Environment Protection (Assessment of Site Contamination) Measure (ASC NEPM). The purpose of this investigation was to identify the characteristics of the site, investigate the site history and determine whether historic contamination poses a risk to human health and/or the environment. The conceptual site model (CSM) prepared as part of the PSI indicates that “the potential risks associated with contaminated land will be limited to those of new or modified infrastructure involving excavation” and these will be associated with the disturbance of potentially contaminated soil and contamination of land through spills or leaks. This indicates that the potential land contamination within historic disturbance areas does not pose a significant risk to human health or the environment if left undisturbed and the exposure pathways remain limited. This report also states that the proposed mitigation and management measures provided in the EM Plan are “appropriate and adequate to manage land contamination hazards/risk for the Project”.

3.2 Department of Tourism and Culture

Comment No. 67

The Traffic Management Plan and the Draft EIS do not provide information on the cumulative safety risks to travellers on the Plenty Highway from the interaction between the increased traffic on the Plenty Highway due to large mining vehicles and the proposed road works to upgrade the Highway.

A key impact identified during the Social Impact Assessment (SIA) for the Project was the increased traffic on unsealed roads which has safety implications for other road users. Section 4.7 of the draft EIS specifically addresses the potential traffic impacts and includes mitigation and monitoring methods proposed to manage these impacts. A Road Safety Audit, road condition assessment and risk assessment were also undertaken as part of the 2019 Traffic Supplement Report prepared by Consone Consulting Pty Ltd.

A detailed Traffic Management Plan is provided in the 2019 Traffic Supplement Report and includes recommendations for best practice road safety. This detailed plan expands on the management actions nominated in the draft EIS and addresses issues such as speed limits, stakeholder liaison, road safety initiatives, restrictions on the use of private vehicles and journey management planning.

As there are no clear timeframes on when proposed works to upgrade each section of the Plenty Highway will commence or the duration of these works, KGL will continue to monitor the situation, liaise with stakeholders and amend their Traffic and Journey Management Plans as appropriate to accommodate changes in road conditions due to road works.

Comment No. 68

The impact of increased numbers of trucks on the overall road condition and other road users is also of interest, as well as impacts of increased dust from mine traffic on tourist locations such as Gemtree Caravan Park.

The impact of increased vehicle numbers on the overall condition of the Plenty Highway and on other road users is addressed in a number of sections of the draft EIS including Section 4.7 Social, Economic and Cultural Surrounds, the Social Impact Management Plan and the draft EM Plan in Section 5, the Traffic Impact Assessment in Appendix C-2, the Air and Noise Assessment in Appendix C-3 and the Social Impact Assessment in Appendix C-9. The Social Impact Assessment specifically addresses issues including the implications of increased traffic on road conditions, dust levels at sensitive receivers, other road users and on the pastoral and tourism industries.

A Road Safety Audit was also undertaken as part of the 2019 Traffic Supplement Report. Strategies proposed for mitigating impacts from additional heavy vehicles on the Plenty Highway include:

- The development of a Traffic Management Plan;
- Road safety initiatives;
- Community liaison and stakeholder engagement;
- Occupational health and safety plans;
- Workforce Codes of Conduct and guidelines for driver behaviour;
- The restriction of workers driving to site through FIFO and BIBO;
- Good communications and engagement with key tourism stakeholders;
- A public relations strategy regarding road traffic and road safety awareness;
- Journey Management Plans which include speed restrictions in areas of concern;
- Staging of heavy vehicle movements;
- Traffic control devices (line marking, signage and guide posts); and
- Road treatments.

The Air and Noise Assessment Report in Appendix C-3 of the draft EIS highlights that the Gemtree Caravan Park is a sensitive receiver which may be impacted by Project transport activities. As the Plenty Highway is sealed along the section that passes the Gemtree Caravan Park, dust is not likely to be a risk at this location.

As the Project has implications for the tourism industry KGL are committed to ongoing communication and engagement with the Gemtree Caravan Park and other key tourism stakeholders.

3.2.1 Parks, Wildlife and Heritage Division

Comment No. 69

The proposed development has no direct impact on any of the parks and reserves managed by the Department of Tourism and Culture, and therefore we have no comment.

No response required.

3.2.2 Heritage Branch

Comment No. 70

Heritage Branch can confirm that all heritage and archaeological issues have been adequately addressed for the project. An archaeological assessment and survey have been conducted and a Heritage Management Plan developed, which indicates that there are no highly significant heritage or archaeological sites within the project area. Heritage Branch considers that there are no further heritage or archaeological issues associated with this EIS.

No response required.

3.3 Aboriginal Areas Protection Authority

Comment No. 71

The Aboriginal Areas Protection Authority advised that Authority Certificate C2016/115 was issued to Kentor Minerals (NT) Pty Ltd, a subsidiary of KGL Resources Pty Ltd. The company has to comply with all conditions on the Authority Certificate.

KGL understand that archaeological places or objects exist within the subject land for which their Certificates were issued and that these are protected under the *Northern Territory Heritage Act*. KGL is committed to complying with all conditions in their AAPA Certificates for their proposed works. This includes ensuring all agents, employees, contractors and sub-contractors are made aware of the conditions and their obligations under the *Northern Territory Aboriginal Sacred Sites Act 1989*.

3.4 Department of Health

3.4.1 Environmental Health Branch

Comment No. 72

In regards to the accommodation village, catering facilities, provision of potable water and wastewater management systems the proponent must comply with the Department of Health's requirements for mining and construction camps as detailed at:

<https://nt.gov.au/property/building-and-development/health-requirementsmining-construction-projects>

KGL and the Project contractors and subcontractors will comply with the Department of Health's requirements for the accommodation village facilities including the requirements to register the village kitchen as a food business with the Environmental Health Branch. The kitchen facilities will also be designed, constructed, managed and maintained in accordance with the national food safety requirements such as the Australia New Zealand Food Standards Codes.

The potable and wastewater management systems will be compliant with the relevant codes and guidelines. The potable water supply system will be designed to ensure water supplied for drinking and cooking complies with the Australian Drinking Water Guidelines to prevent the possibility of microbial or chemical contamination. Regular bacteriological and chemical testing of the potable water supply will be undertaken to ensure it meets health guidelines.

The wastewater management system will be designed to ensure the safe disposal and reuse of wastewater to protect the health of the workforce, public and the environment. The appropriate planning and assessments will be also be completed in the design of the Project wastewater systems.

3.4.2 Medical Entomology

Comment No. 73 - EIS Section 4.8 Human Health, Table 4.8-3 Potential Human Health and Safety Impacts and Controls (Serious Animal Bites)

There is the potential for potential disease carrying mosquitoes to affect mine personnel, particularly after major flooding events/above average rainfall. The NT Department of Health-Medical Entomology unit will usually issue a media release for Central Australia when there is a likelihood of elevated mosquito borne disease risk. The media alerts would also apply to the mine site, if residual surface ponding (i.e. > 5 days) is evident within a few kilometres of the mine after heavy rainfall.

Following heavy rainfall events, the Project Health and Safety Manager will be responsible for regularly checking the NT Department of Health – Medical Entomology website for media releases regarding issues such as when there is a likelihood of an elevated mosquito borne disease risk. This process will be incorporated into the Projects Occupational Health and Safety Procedures to ensure it becomes a regular part of their role.

Comment No. 74

There is also the potential for the mine site to create mosquito breeding sites in areas of residual shallow ponding not affected by copper water. The Medical Entomology guideline 'Guidelines for preventing mosquito breeding sites associated with mining sites' provides information on minimising the potential to create new mosquito breeding sites.

The Environmental Management Plan will be updated to address mosquito monitoring and control in accordance with the Department of Health Guidelines for Preventing Mosquito Breeding Sites Associated with Mining Sites. The updated Plan will include:

- Monitoring of adult mosquitoes;
- Regular visual inspections of the Project water storage facilities;
- Ongoing control of larvae, including the use of an approved larvicide;
- Locating the accommodation village as far as possible from mine water storage dams;
- Installation of screens throughout the accommodation village;
- Appropriate design of water storage and drainage facilities, sediment traps, borrow pits and waste dumps;

- Management of pit dewatering activities;
- Appropriate design of wastewater disposal facilities;
- Emptying of containers that collect rainwater following significant rainfall events;
- Operational plans for the management of the refuse dump;
- Consideration of potential mosquito breeding sites in the Mine Rehabilitation and Closure Plan; and
- Providing readily accessible insect repellents for the workforce.

The Medical Entomology Branch will be contacted regarding the most appropriate methods of control and insecticides to use.

3.5 Power and Water Corporation

No comment.

No response required.

3.6 Department of the Chief Minister

3.6.1 Social Impact

Comment No. 75

The SIMP states it is intended to be a standalone document, however in its current state (as part of the Environmental Management Plan – a 356 page document), it is not easily accessible to community and stakeholders. It is recommended the proponent consider having the SIMP in a community-friendly format, particularly for it to be communicated to the local community of Bonya.

As provided in Volume 3 Environmental Management, Section 5 of the draft EIS, the full version of the SIMP can be made a stand-alone document as can the various other management plans in this Section. These single element management plans are designed to provide greater detail and specific management actions. The overarching draft EM Plan is designed to bring together the various aspects of the environment and detail a summary of the various impact management compliance measures to enable a coordinated approach to the environmental management of the Project.

Having management plans specific to the various environmental values associated with the Project allows for more detailed management measures which can be implemented in an operationally functional manner by the various personnel responsible for Project compliance.

As suggested, KGL will ensure the SIMP is stand-alone document which is communicated in a community-friendly format.

Comment No. 76

On pp.5-6 it states 'the SIMP assumes' four dot points that highlight aspects important to the success of implementing the SIMP such as ongoing community input, monitoring and evaluation, reporting and management being held accountable for the social performance. It is recommended this be 'committed to' by the proponent, rather than 'assumed'.

Ongoing community input, monitoring and evaluation, reporting and management accountability for social performance is addressed in the Commitments Register in Section 5 of the SIMP. These are specifically addressed through a number of commitments including:

- Establishing a community liaison committee to discuss social risks and opportunities, indicators and reporting methods;
- Reporting to the community liaison committee on an annual basis;
- Making worker policies public documents which provides an avenue for constructive feedback;
- Maintaining good communication and engagement with the community through ongoing liaison;
- Conducting annual satisfaction surveys; and
- Maintaining a public enquiry line and email address.

The overarching draft EM Plan provides a framework and commitments which further aim to address environmental values which require protection, including the social environment. The environmental protection objective for the management of social impacts is to establish social sustainability through compliance with the SIMP and the implementation of additional management actions.

As recommended, KGL is committed through the Project SIMP to ongoing community input, monitoring and evaluation, reporting and management being held accountable for KGL's social performance. These commitments have been included in the list provided in Section 5 of this report.

Comment No. 77

DCM acknowledges the initiative by the proponent to ban alcohol on site (p.11 SIMP) as a result of community consultation and its MoU with the Bonya community. This comment is stand alone in the SIMP.

No response required, feedback noted.

Comment No. 78

Alcohol and its consumption is mentioned later in the SIMP. It is suggested to have all alcohol related matters linked to the worker code of conduct (committed to on p.20 regarding alcohol consumption on site). This would more comprehensively tie together the ban of alcohol being not only consumed on site, but consumed at the nearest point of sale (Gemtree) and risks of drink driving or bringing alcohol into the community (outside of the site's restricted zone).

It is the intention that the worker Code of Conduct and the drug and alcohol policies will include the banning of alcohol consumption on site and the Project being 100% alcohol-free translates to bans

on bringing alcohol on to site. KGL will have a zero tolerance to any breaches of these codes which will apply to all staff, contractors and sub-contractors.

The workforce will be alcohol tested before the commencement of every shift prior to leaving the accommodation village and drug testing will be conducted on a random basis. KGL is also having discussions with the Harts Range Police regarding their involvement in the on-site drug and alcohol testing on an ad hoc basis. The aim of this is to have a regular police presence on site in the hope of further deterring the workforce from bringing drugs or alcohol to site. The consequences of drug and drink driving will be also be highlighted during the regular site safety meetings and in the Project safety induction.

As the majority of the workforce will be transported to site by bus or light plane, there is no opportunity for them to purchase alcohol or drink drive on their way to the Project. Drinking on buses and flights to site will also be banned.

The transport of workers to site and the housing of them in the accommodation village means that access to vehicles to travel off site will be very limited so the workforce will not be able to drink alcohol or take drugs in off-site locations.

KGL will have no authority over worker behaviour off site and the enforcement of any policy that would restrict the purchase or consumption of alcohol in off-site locations will be difficult and potentially unlawful. It is expected that the on-site drug and alcohol testing process and the worker Code of Conduct will encourage the workforce to think about their off-site behaviour when they are not on shift.

Comment No. 79

Number #22 of the risk and opportunity register – it is suggested the proponent connect with DTBI regarding aligning the IPP and Territory Benefits Policy for local content and employment opportunities.

The mitigation and enhancement strategy proposed to address the risk of not meeting local content targets due to a lack of capacity or skills includes working with the ICN NT and the NT Government. As suggested, KGL will liaise with, and take advice from the Department of Trade, Business and Innovation in relation to aligning the Industry Participation Plan and the Territory Benefits Policy.

Comment No. 80

Number #29 – DCM notes “Mental health issues for workers” is rated low. DCM suggest the indicator of selfharm incidence and mitigation of good FIFO rosters could be further examined by proponent. The incidence of mental health issues with FIFO staff is typically and relatively high and it would be suggested the proponent look into other management and mitigation measures to ensure this indicator is maintained as low by ensuring staff wellbeing through measures such as access to communication (phone/internet/connection to family) and counselling services.

Mitigation measures proposed to manage the impacts on workers mental health and impacts on their families include the design of good human resources practices, staff mentoring and support, utilising

lifestyle FIFO rosters, the construction of a gymnasium and recreational facilities on site and the introduction of fitness programs.

As suggested, KGL will further investigate the indicator of self-harm incidence and mitigation of good FIFO rosters along with additional measures such as awareness campaigns, communications systems, support programs and counselling services to ensure the wellbeing of the workforce.

Comment No. 81

Number #30 – ‘Reduce interaction of FIFO workers with locals (straight to bus or plane) may not be conducive to social cohesion and building social connections/employment and education profile in the community. It is suggested this mitigation method be revisited so that the proponent work with the community, rather than isolating its workforce from it. Number 30 could also be seen to contradict #37 ‘reduced enjoyment of human rights through racism, inequitable work practices...’ etc.

Since acquiring the Jervois Project in 2011, KGL have formed and maintained a good working relationship with the Bonya community through regular and open communication. KGL worked closely with the Bonya community to successfully negotiate an MOU which focusses on a cooperative approach to identifying mutual opportunities that may arise, including employment and training opportunities. As a result of this MOU, several Bonya residents are employed and continue to be trained to work on site. The MOU also requires regular meetings of the parties to discuss matters such as any issues which may be of concern. Through this MOU KGL will continue to work with the community to provide more training and employment opportunities. KGL have also been working together with the Bonya Enterprise Development Program to assist them in capturing business opportunities.

KGL engaged the services of True North Strategic Communications (True North) to undertake a thorough Social Impact Assessment (SIA) for the Project. True North are a strategic communication consultancy based in the NT who specialise in strategic communication and community and stakeholder engagement. As part of the SIA, True North provided advice on how best to manage interactions between predominantly male, non-local FIFO workers and the local Aboriginal communities to avoid potential anti-social behaviour, health and social impacts. This advice included managing the direct interaction of the FIFO workforce with the local community and the implementation of a worker Code of Conduct. Given there is the potential that the FIFO workforce may not be educated on the cultural and spiritual aspects of an Aboriginal community in the Northern Territory or be skilled in culturally appropriate communication, KGL feel it is best that these off-site interactions are managed appropriately.

As workers will be housed in the accommodation village on site, there is the potential for social connections to be formed within this environment. Furthermore, it is expected that a number of local Bonya residents will be employed on site by both KGL and the contractors so there is an avenue for onsite interactions between local community members and the FIFO workforce. Whilst on-site during their shifts, such interactions can be monitored and controlled should any issues or misunderstandings arise.

Based on the advice received to date, KGL are of the view that it is preferable to have some control over the FIFO workforce in order to maintain social cohesion between the residents within communities such as Bonya. As outlined in the SIMP, all Project employees will undergo cross cultural training as part of their induction in order to provide a level of cultural awareness and maintain social cohesion. KGL will stay in constant communication with the Bonya community to monitor any social issues that may arise over time.

KGL feel that it is their responsibility to build an employment and education profile in the local community, and not the responsibility of the FIFO workers. KGL will directly employ a small number of site-based workers for administration, management and some technical roles and it will be the responsibility of some of these staff, particularly management to build and maintain the Projects employment and education profile within the community. KGL have every intention of continuing to work closely with the community as they have done to date and would prefer not to rely on the FIFO workforce to build a reputable profile for the Project.

Whilst risk #37 relates to the reduced enjoyment of human rights through racism, inequitable work practices, breaches of labour laws, native title holders not providing free, prior and informed consent, it is not the intention of KGL to deny workers of their human rights and they will not be forced to remain on site should they decide they wish to visit and interact with the Bonya community. However, Company transport available to do so will require authorisation for any travel off the Mining Leases as this is a safety requirement for all personnel working in such a remote location.

The SIMP will be updated to include aspects of the MOU such as cooperating and working together with the Bonya community throughout the life of the Project. The SIMP will also be updated to include training and awareness in relation to Free Prior and Informed Consent.

Comment No. 82

Numbers #38 and #39 – Cumulative impacts of five other projects in the region – an additional enhancement measure for this is for the proponent to work with the Regional Economic Development Committee (REDC), mentioned previously in the SIMP, to ensure best outcomes for their cumulative impacts in the region.

As suggested, KGL will work with the REDC to address and manage the cumulative impacts that may arise from having five mines in the region.

Comment No. 83

On pp.25-26 of the SIMP a commitments register is noted for the proponent. It is recommended the entire SIMP be a commitment register (some items are lost from this shorter register such as some SIMP measures that are mentioned as part of the MoU, Code of Conduct, cross cultural training etc.).

The purpose of the SIMP is that it forms a part of the environmental management strategy for the Project and as such KGL have an obligation to comply with and implement the management and mitigation strategies provided for each aspect of the SIMP. The entire Environmental Management Plan has been developed to ensure that Project operations comply with legislation, including any

authorities issued in accordance with NT legislation. The purpose of the Commitments Register is to provide a quick reference to, and a brief snapshot of the commitments nominated throughout the SIMP.

KGL is committed to implementing all aspects of the SIMP as this is integral to KGL's social licence to operate and the ultimate success of the Project. This commitment has been included in the list provided in Section 5 of this report.

3.6.2 Economic Impact

Comment No. 84

The EIS notes that the project has the potential to offer employment and training to currently unemployed local residents and local suppliers and services in the area. However, Section 5.4.8.2 of the Environment Management Plan (EMP) notes there is community concern that the proponent may not be able to meet the expectations of local Indigenous job creation and employment requirements due to lack of required/work-ready skills.

Whilst the Project does have the ability to offer employment and training opportunities to unemployed local residents, and to engage the services of local suppliers, realistically with new Projects there is always a risk that they will not live up to the expectations of some community members. Such situations may arise because the community expectations are not realistic or proponents do not put enough effort into managing these expectations and suppressing misinformation and rumours. In an effort to minimise unrealistic expectations, several training agencies, the Central Land Council and the Arramwelke Corporation have been involved in discussions at a meeting co-ordinated by the Central Australia Region, Indigenous Affairs Network, Department of the Prime Minister and Cabinet, where the achievable engagement of local individuals and service providers has been outlined by KGL Resources.

As part of the strategy to manage community expectations, KGL are committed to ongoing community consultation to keep stakeholders informed. In addition, the SIMP strategies for maximising local employment and business development include:

- Developing a Local Industry Participation Plan;
- Working with local employment and training providers to develop a local employment and training plan;
- Development of an indigenous employment and training plan;
- Workforce planning to reduce structural and cultural barriers to work; and
- Working with the Bonya Enterprise Development Program to assist them in capturing business opportunities.

KGL is also committed to working with the ICN NT, the local Chamber of Commerce, Regional Economic Development Corporations and the NT Government (including DTBI) to obtain advice on packaging works in a manner which suits local companies and can assist with enterprise development and provide business upskilling opportunities. KGL will also work with these organisations to ensure procurement standards and expectations are met through good communication practices.

Comment No. 85

The proponent plans to develop and implement training and employment plans that are culturally appropriate and include realistic expectations for potential employees in partnership with relevant agencies, which DCM agrees must be delivered.

No response required, feedback noted.

Comment No. 86

The EIS raises a concern about the loss of local staff to the project and difficulty in replacing staff from local existing businesses. DCM acknowledges that the proponent plans to mitigate this risk through joint training initiatives and again agrees that these must be delivered.

No response required, feedback noted.

Comment No. 87

An increase in mine-related traffic and increased road safety risks are expected to have a negative impact on tourism, the pastoral industry and other road users. There is also concern for potential cumulative impacts from the 5 major projects in the region.

The SIA identified that a key negative impact was the increase in traffic on unsealed roads which has implications for the tourism industry, the pastoral industry and other road users. The SIMP mitigation strategies to manage these impacts include:

- The development of a Traffic Management Plan;
- Road safety initiatives;
- Community liaison and stakeholder engagement;
- Occupational health and safety plans;
- The restriction of workers driving to site where possible;
- Guidelines and Codes of Conduct for Project bus driver behaviour;
- Good communications and engagement with key tourism stakeholders; and
- A public relations strategy regarding road traffic and road safety.

KGL is also committed to lobbying the NT Government for the early sealing of the remainder of the Plenty Highway between the Lucy Creek Access Road and the Stuart Highway.

Based on the location of the other four mines nominated as part of the Five Mines Project, the only common road transport route with the Jervois Project is the 70 kilometres from Alice Springs north to the Plenty Highway turnoff. Even though it was anticipated that these projects would commence in the coming two to five years, there is some uncertainty around this timeframe and the possibility that all five projects will go ahead. As such, the timing of cumulative traffic related impacts of these projects remains uncertain.

Comment No. 88

DCM acknowledges that the proponent plans to mitigate road safety risks through the Traffic Management Plan, procedures and bus driver guidelines to minimise negative impact and would like to see this committed to by the proponent.

KGL's obligations and commitment to the SIMP and the EM Plan are provided in the response to comment number 83 above. In particular, KGL is committed to implementing a Traffic Management Plan, procedures and bus driver guidelines to minimise negative traffic impacts.

Additional mitigation strategies to manage the impacts from traffic detailed in the SIMP which will be implemented include:

- Road safety initiatives;
- Community liaison and stakeholder engagement;
- Occupational health and safety plans;
- The restriction of workers driving to site where possible;
- Good communications and engagement with key tourism stakeholders; and
- A public relations strategy regarding road traffic and road safety.

As requested, plans to mitigate road safety risks through the Traffic Management Plan (Appendix C-3), procedures and bus driver guidelines have been included in the commitments list provided in Section 5.

3.6.3 Environmental Impact

Comment No. 89

The Environment Management Plan notes that impact to water resources is of high concern.

DCM suggests that the proponent ensure that these risks are mitigated and negative impacts are minimised.

KGL is committed to ensuring that the impacts to water resources are mitigated and that negative impacts are minimised, particularly as this was a high-risk matter of concern in the community. The Water and Groundwater Management Plans set objectives for the protection of water resources, monitoring strategies and performance indicators which will be used to monitor the effectiveness of the management strategies.

Management strategies for surface water resources include:

- The establishment of a water monitoring program;
- Selective use of water;
- Preferential use of water to reduce demand on natural sources;
- Appropriate design of water management structures; and
- Annual review of the water balance model.

Groundwater management strategies include:

- Implementation of a monitoring network;

- Annual monitoring model validation; and
- Establishment of groundwater drawdown trigger levels.

Comment No. 90

DCM acknowledges that the proponent is considering the possibility of using solar PV in combination with diesel fuel for its power supply, and suggests that where greenhouse gas emissions reduction is not possible, options for carbon offsets be considered.

As the Project will be operating at considerable depths underground, a secure and continuous power supply is of the utmost importance to ensure the safety of personnel. KGL have further investigated power supply options and are now proposing to use the latest diesel power generation process coupled with low penetration solar and battery support which is well tested and considered to be the best solution in terms of safety and the environment.

Whilst this will supply the majority of the energy requirements of the Project, KGL are continuing to investigate alternative sources of energy supply. Solar power is being considered for the site telecommunications systems.

The proposed power supply option is currently the most practical due to the remote location of the Project where service and supply logistics can be unreliable, the need for an uninterrupted power supply, maintaining the economic feasibility of the Project and the practicality of other power supply options. Complete reliance on solar energy is not feasible for several reasons including the need for an uninterrupted power supply and the peak load requirements for start-up of the processing plant.

Throughout the life of the Project KGL will introduce initiatives to improve energy efficiency and reduce greenhouse gas emissions. The draft Environmental Management Plan and sections 2.2.9 and 4.6 of the draft EIS provide details on the greenhouse gas mitigation options which will be investigated including fuel efficiency practices, the investigation of renewable sources and energy conservation practices.

Where greenhouse gas emissions reduction is not possible, KGL will consider options for carbon offsets.

3.7 Department of Primary Industries and Resources

Mines Division has reviewed the KGL Resources Jervois Base Metal Project draft Environmental Impact Statement (EIS) and has identified a number of issues to be addressed in the Supplement to the draft EIS as the information presented does not adequately address the matters in the Terms of Reference relevant to the Mines Division.

The following information is intended to provide guidance to the Department of Environment and Natural Resources (DENR) as to where potential knowledge gaps remain within the environmental management proposal for the Jervois Base Metal Project. Mines Division concerns relate primarily to

conflicts between and within consultant reports and the lack of evidence demonstrating that the multiple management methods discussed are viable.

3.7.1 Demonstration of Project Viability

Comment No. 91

The draft EIS has not adequately demonstrated that the waste classification system is sufficiently definitive to accurately determine the relative volumes of the various classes of waste that will be generated. Therefore, the viability of the management methods proposed for waste rock, tailings, surface water and groundwater cannot be verified.

The waste classification system is guided by the S distribution model and the detailed mine plan completed by H&S Consultants (H&SC) and Australian Mine Design & Development (AMDAD) respectively. The S distribution model enables better definition of the proportions of acid rock drainage rock types for the project deposits which has enabled mine planning schedules to accurately determine the movement of the relative volumes of the various classes of waste that will generate during mine life.

Further detailed technical information provided in Section 4.6 and Appendix A-5.

Comment No. 92

Given the interdependencies of the classification system and management methods, the failure of one component may result in the failure of others. For example, if a more detailed waste characterisation indicates a significantly greater volume of potentially acid-forming (PAF) waste and therefore a lesser volume of non-acid-forming (NAF) waste this would have important implications as to whether the nonbenign waste will fit back into underground mining voids and whether PAF can be stored under a water cover. This would also apply to the availability of suitable cover material for the tailings storage facilities or waste rock dumps.

The proponent does not necessarily need to acquire more characterisation data but rather undertake a more detailed analysis of the data.

Further analysis of the available data has been undertaken with the establishment of the S distribution model as well as the development of conceptual cover design options and the conceptual geochemical water modelling. Through this process the potentially acid-forming (PAF) material has been reduced which is still based upon a conservative assessment approach. EGI further established upon review of the S distribution model and mine plan, prepared by H&SC and AMDAD respectively, that the total volume of PAF estimated was less than 5 % which they consider indicative of considerable flexibility in waste rock management. The S distribution model will be continually developed as the Project progresses. Further detailed technical information is provided in Sections 2.2 and 4.6.

3.7.2 Tailings Storage Facility Construction Material

Comment No. 93

Evidence that sufficient material with the appropriate geotechnical and geochemical suitability for construction of a stable and non-polluting tailings storage facility (TSF) should be included in the Supplement to the draft EIS.

As detailed in Section 2.2, EGI have completed an investigation into the availability of suitable materials to enable the construction of a stable and non-polluting tailings storage facility and a conceptual cover design for the surface placed TSF was able to be designed using abundantly available materials onsite. The TSF design will also include a suitable compacted composite liner with a drain at the base and seepage will be managed by the diversion of contaminated water and storage in the process water dam.

Further information is provided in Section 4.6 and Appendix A-5.

3.7.3 Groundwater Modelling and Future Resource Assessment

Comment No. 94

The information provided in the groundwater section forecasts 200 years into the future and it is unclear if drawdown impacts are expected to continue beyond this timeframe. The groundwater section of the draft EIS indicates the pits will act as sinks beyond this period and drawdown could reach existing local communities. This matter should be referred to DENR Water Resources to determine if additional assessment is required to determine impacts on local groundwater supplies.

As part of the draft EIS assessment process, DENR provided assessment advice to the NT EPA regarding water related issues. The changes to the Water Act mean that the DENR will be involved in the approvals process for the groundwater extraction licence for the Project water supply and requirements from DENR will be included in the mine approval conditions.

3.7.4 Water Management

Comment No. 95

The water management schematic shows the Process Water Dam (PWD) as the source of dust suppression water. Multiple sections of the draft EIS refer to the PWD as potentially receiving contaminated runoff from temporary PAF storages or contaminated groundwater.

The quality of any water used for dust suppression on areas that drain away from the project area should meet appropriate site-specific trigger values that are either adopted or derived.

The water stored in the process water dam will consist of dewatered groundwater, tailings return water, run off from pits and mine affected catchments (including ROM pad). This water is likely to

contain elevated levels of salinity (EC), metals and sulphates compared to the baseline surface water quality (WRM, 2019).

It is expected that the water in process water dam would exceed the proposed trigger limits (Section 4.5.3, Table 4.5-3). Therefore, the water management system has been adjusted to restrict the use of water from the process water dam to the following:

- Process plant use; and
- Dust suppression on catchments that drain back to the mine water management system (i.e. plant areas, waste rock dumps, pits and haul and access roads within the catchment of the site dams and pits).

This approach will reduce the risk of contaminated water being applied to areas which drain externally to the site.

Water used for dust suppression in areas that drain externally to the Project will be sourced from the Jervois Dam or the external borefield which is expected to meet the trigger limits identified (Appendix A-4, Table 4.5-3).

Ongoing monitoring of the water quality in the process water dam will be undertaken during the Project, and if the water quality permits (i.e. is similar to baseline surface water quality) this water may be used for dust suppression on externally draining areas.

3.7.5 Erosion and Sediment Control

Comment No. 96

A conceptual waste rock dump (WRD) design with 25-degree slope angles may make the retention of top soil, and the closure criteria of a safe, stable and non-polluting landform, extremely difficult to achieve.

Only the best conditions and stable materials would justify slopes approaching 20 degrees. Given the propensity of soils in the area to slake (the soil study indicates a medium erosion risk in the area), and the steep slopes proposed, the proponent should demonstrate how this WRD design is likely to remain stable.

In response to this feedback, the 25-degree slope angle design has been revisited. In order to satisfy the Projects rehabilitation requirements, the slope angles have been reduced to 18 degrees and benches and batters will be incorporated into the waste rock dump rehabilitation surface to allow for the retention of top dressing material and the establishment of vegetation.

All waste rock dumps will be finished (top dressed, ripped and seeded) to ensure the final structures are safe, stable and not prone to significant erosion. The rehabilitated dumps will also have appropriate drainage control measures to avoid significant erosion.

This reduced slope angle will also ensure the rehabilitated waste rock dumps are integrated with the surrounding landscape.

Comment No. 97

When developing the final Erosion and Sediment Control (ESC) Plan the proponent should ensure that erosion and sediment management approaches, and planned control structures, are appropriately designed for an arid zone climate and physical environmental conditions.

Feedback acknowledged, the final ESCP will ensure that erosion and sediment control measures are appropriate for an arid zone climate.

3.8 Department of Environment and Natural Resources

3.8.1 Environmental Authorisations

Comment No. 98

Based upon the information provided in the draft EIS and under current legislation, the Project does not appear to trigger a requirement for an Environment Protection Licence (EPL) or an Environment Protection Approval (EPA) under the Waste Management and Pollution Control Act (WMPC Act), or a Waste Discharge Licence (WDL) under the Water Act. The Project will be authorised under the Mine Management Act, whereby the WMPC Act and Water Act do not apply (within the lease boundary).

Should the proponent, however, commence the Project post implementation of the environmental reforms phase 2, our advice is that the proponent should revisit the authorisation requirements of the activity. It is likely that there will be requirements under the new Environment Protection Act pertaining to environmental impacts on a mine site. This may extend to regulating impacts on water and the surrounding environment.

At this stage it is not clear how the Act will apply as initial consultation is currently underway to inform the new Bill.

Should the Project commence post implementation of the environmental reforms phase 2 and KGL are advised to do so by the NTG, the authorisation requirements of the activity will be revisited to address requirements under the new Environment Protection Act.

3.8.2 Flora and Fauna Division

Comment No. 99 - Biological values

*The proponent employed standard techniques – database and literature searches and field survey – to identify high conservation-value species with a high likelihood of occurrence in the proposal area. Field survey confirmed the presence of two Near Threatened (TPWC Act) plant species, *Eremophila cordatisepala* and *Sauropus rigens* and two Near Threatened (TPWC Act) fauna species – *Emu (Dromaius novaehollandiae)* and *Long-haired rat (Rattus villosissimus)* within the proposal*

*area. The proponent accurately reported that no threatened flora species are known from the proposal area, and their assertion that *Bolboschoenus caldwellii* (Endangered, TPWC Act) is unlikely to occur there is justifiable. The proponent accurately reported the recent occurrence of the Endangered (EPBC Act) nomadic shorebird, Australian painted snipe (*Rostratula australis*) and the Near Threatened (TPWC Act) Squaretailed Kite (*Lophoictinia isura*) in the proposal area. Three additional conservation significant fauna species were appropriately assessed as likely to occur within the proposal area:*

- *Australian bustard (*Ardeotis australis*) – Near threatened (TPWC Act)*
- *Red-tailed black cockatoo (*Calyptorhynchus banksii samueli*) – Near threatened (TPWC Act)*
- *Grey honeyeater (*Conopophila whitei*) – Data deficient (TPWC Act).*

*Notably, an additional species, Grey Falcon (*Falco hypoleucos*) (Vulnerable, TPWC Act) has recently been recorded from within 10 km of EL25429, and it should therefore also be included in the EIS, given that it is moderately likely to occur in the area.*

Information on the presence of the Grey Falcon in the Project EL area and the borefield and pipeline has now been investigated by Low Ecological. Refer to the additional information provided in Section 4.4 of this report and the 2019 Landscape, Flora and Fauna Assessment in Appendix A-1. Mitigation measures to retain mature trees or habitat trees are provided in the updated Biodiversity Management Plan provided in Appendix C-1.

Comment No. 100 - Impact and Risk Assessment

There is uncertainty regarding the potential impacts and risks to fauna from the construction of a pipeline and borefield for water supply. No details have been provided for the borefield and pipeline and therefore the potential impacts and risks of these components cannot be assessed. Further information is required on the pipeline construction methods, duration and length of pipeline trench that would be open if it is to be buried, habitats through which the pipeline would traverse, as well as the proponent's assessment of impacts and risks to fauna due to pipeline construction and establishment of the borefield.

The Landscape Flora and Fauna Supplement Report completed in 2019 includes an assessment of the potential impacts and risks to fauna due to pipeline construction and the establishment of the borefield.

Pipeline construction methods detailed in Section 2.2.1 include vegetation clearing, stockpiling of topsoil and trench spoil, pipe placement and connection followed by backfilling and rehabilitation. The measures proposed in this section to minimise impacts to fauna include the restriction of operational areas, minimising open trenches, the inclusion of trench breaks and restriction of open trench times to one day or less.

Fauna mortality is addressed in Section 7.5 of the BMP (Appendix and 'measures to minimise fauna entrapment in trenches or pits' appears as a mitigation measure in Table 26. The process for this generally includes:

- Planning the pipeline to avoid traverses through large areas of intact fauna habitat, where possible;
- Avoid construction during and just after the wet season;
- Construct the pipeline in shorter sections (i.e. excavate, install and back-fill one section at a time), to avoid a long open trench on the ground for any lengthy duration;
- Placement of fauna refuges (e.g. hessian bags, small logs) in the trench;
- Placement of escape ramps or fauna furniture to allow fauna to escape; and
- Daily monitoring of trenches prior to construction recommencing every morning.

Refer to the additional technical information provided in Section 4.4 of this report.

Comment No. 101 - Mitigation and Management

The proponent devised a suite of management measures that, if fully implemented, should avoid or mitigate most of the identified environmental impacts and risks. Generally, the Flora and Fauna Division considers that the proposed management objectives, indicators and targets, and mitigation measures and corrective actions are clear and specific, though further clarification is needed in some areas, including:

- *the basis for demarcation of exclusion zones and measures that will be taken to retain mature trees during vegetation clearing*
- *the specific measures for 'habitat enhancement elsewhere on the property' as a corrective action for unintentional clearing*
- *the target proposed for exotic flora, that 'There are no infestations of exotic flora in the Project area', which is most likely unachievable and therefore should be revised*
- *the target for change in habitat quality for fauna – 'Fauna survey along Unca Creek detects native species moving through the area', which needs more detail (e.g. appropriate indicator species; rates of fauna use relative to intact sites, etc.)*
- *pipeline trench fauna management procedures.*

Refer to the response to recommendations in Comments 103 to 110 below.

Comment No. 102 - Monitoring and Reporting

The draft EIS proposes monitoring of four potential impacts on vegetation health. For dust and erosion, regular (monthly) visual inspection for dieback of significant species and vegetation communities located in high risk areas is proposed. For changed hydrology and contamination along Unca Creek, seasonal monitoring is proposed. While, in general terms, the focus of the proposed monitoring program is appropriate, the information provided in the draft EIS is insufficient to assess the likely effectiveness of monitoring for measuring performance against vegetation targets. This also applies to the monitoring of rehabilitation success. Similarly, insufficient detail is provided to determine the likely effectiveness of monitoring for exotic fauna trends. Further, there is no contingency for the management and monitoring of unforeseen impacts

(e.g. noise, contamination, etc.) on the Australian Painted Snipe, should this threatened species colonise the site during the lifespan of mine operations.

Monitoring programs have now been added to each sub-plan in the Biodiversity Management Plan to address the need to assess the performance of the mitigation measures against the targets outlined.

Vegetation health and exotic fauna have been addressed in Sections 6.2, 6.4, 6.5, 6.6, 6.7 and 7.4 of the BMP respectively. The detailed monitoring program for rehabilitation is outlined in the Mine Rehabilitation and Closure Plan.

Refer to the responses to comment numbers 107 and 108 and the updated BMP (Appendix C-1) for further detail.

Comment No. 103 – Summary and Recommendations

The proposed increase in size of the mine footprint from 675 to 970 ha is noted, however, the additional disturbance does not significantly increase the risk to threatened species or other biodiversity values not already accounted for in the original draft Terms of Reference for the EIS. Appropriate mitigation methods are included, though some clarification is required.

It is recommended that information is provided on:

The basis for demarcation of exclusion zones and measures that will be taken to retain mature trees during vegetation clearing.

In relation to the proposed footprint, refer to the Figures and detailed information provided in Section 2.1.

Section 6.1 Vegetation clearing for pits and infrastructure, Table 2 of the BMP (Appendix C-1) lists mitigation measures to reduce the impact of clearing on biodiversity. This includes the ‘demarcation of exclusion zones to protect areas of vegetation to be retained prior to clearing’. The process for this generally includes:

- Defining areas of vegetation for clearing at the planning stage by producing site plans that clearly indicate where clearing will occur in the Project area. These site plans are to be in line with relevant Project approvals;
- Clearing will only occur within the areas identified for clearing on the site plan and will be staged with construction;
- Prior to clearing occurring exclusion markers will be placed or temporary fencing installed at the perimeter of the clearing zone;
- Exclusion fencing will consist of fauna friendly temporary fencing (generally post and orange safety fence for large areas with a 30cm gap underneath for fauna escape);
- There is to be no access to plant or stockpiling of materials and machinery within the exclusion zone (areas of vegetation to be retained); and
- Pre-start meetings will include discussion of the exclusion fencing.

Another mitigation measure in Table 2 of the BMP requires ‘measures to retain mature trees or habitat trees where possible’. The process for this generally includes:

- Pre-clearing inspection of clearing area to identify mature/habitat trees and record their location on the site plan;
- Assess the ability to retain these trees within the plan (for example mature/habitat trees located adjacent to planned buildings or tracks where there is limited earthworks may be able to be retained or slight adjustments made to the plans to enable retention);
- Trees identified for retention will be flagged on site and protected by exclusion fencing around the trunk (offset by at least 1m);
- These trees will not be cleared during construction works; and
- Mature/habitat trees that need to be removed will be reported to the Environmental Officer who will implement the corrective action.

Please refer to the updated BMP provided in Appendix C-1.

Comment No. 104 - Recommendations

The specific measures for 'habitat enhancement elsewhere on the property' as a voluntary corrective action for unintentional clearing.

Section 6.1 Vegetation clearing for pits and infrastructure, Table 2 of the BMP (Appendix C-1) identifies a corrective action for removal of habitat trees as "Report removal of habitat trees to Environmental Officer, who will implement offsets including habitat enhancement elsewhere on the Project area". The process for this generally includes:

- Environmental Officer is alerted by Construction Site Manager that a mature/habitat tree has been identified for removal on site;
- Environmental Officer inspects tree and arranges management of tree removal (including removal of nesting/denning fauna);
- Environmental Officer will guide tree removal including salvage of hollows or hollow limbs (which can be cut out of the tree) for transportation to adjacent areas of vegetation that will be retained); and
- Large boulders may also be relocated to adjacent areas of vegetation that will be retained.

Please refer to the updated BMP provided in Appendix C-1.

Comment No. 105 - Recommendations

An alternative to the target proposed for exotic flora, that 'there are no infestations of exotic flora in the Project area', which is most likely unachievable.

Section 6.3 Introduction of exotic flora, Table 5 of the BMP lists the target for weed management as 'There are no infestations of exotic flora in the Project area', which is most likely unachievable. This has been amended to 'Existing infestations of exotic flora within the Project area are reduced in area by 85%'.

Comment No. 106 - Recommendations

The target for change in habitat quality for fauna, that 'Fauna survey along Unca Creek detects native species moving through the area', which needs more detail (e.g. appropriate indicator species; rates of fauna use relative to intact sites, etc.).

Section 7.2 Change in habitat quality, Table 19 of the BMP (Appendix C-1) lists the target for maintaining riparian habitat along Unca Creek as 'Fauna survey along Unca Creek detects native species moving through the area'. This will be supported by a monitoring program focused on recording fauna within Unca Creek. The monitoring program will include:

- Contracting local ecologists to conduct seasonal fauna surveys along Unca Creek (wet and dry season);
- Set up of two permanent monitoring sites – one in the undisturbed portion of Unca Creek and one in the diverted portion of Unca Creek;
- Seasonal surveys to include a number of survey methods (deemed appropriate by ecologists), including: spot-lighting, trapping, call-playback, active searches etc.;
- Surveys to include targeted methods for key indicator species, which are likely to include the long-haired rat (*Rattus villosissimus*); and
- Results of surveys within undisturbed and disturbed portions of Unca Creek will be reported and compared in an annual report submitted to the Environmental Officer.

It is expected that the monitoring program will highlight differences in the faunal assemblage between disturbed and undisturbed sites, particularly in the first five years. However, as the rehabilitation program progresses it is anticipated that the differences between the faunal assemblages will become less.

The contracted ecologists will have local knowledge and be able to refine the monitoring program according to environmental conditions.

Refer to the updated BMP provided in Appendix C-1.

Comment No. 107 - Recommendations

Monitoring programs to enable assessment of the likely effectiveness of monitoring to measure performance against targets for vegetation dieback, rehabilitation success, and exotic fauna trends.

Monitoring programs have now been added to each sub-plan within the Biodiversity Management Plan (BMP) to address the need to assess the performance of the mitigation measures against the targets outlined.

Vegetation health, including vegetation dieback is addressed in Sections 6.4, 6.5, 6.6 and 6.7 of the BMP whilst exotic fauna is addressed in Section 7.4. Control methods for rehabilitation success are included in the MRCP and include operational and post rehabilitation monitoring to ensure objectives are achieved. Proposed monitoring and compliance criteria (targets) are provided in Section 1.10 of the MRCP with rehabilitation monitoring to include:

- Vegetation establishment, growth, diversity and cover;

- Evidence and type of erosion;
- Water quality including groundwater and surface water;
- Air quality;
- Landform stability including cover system performance;
- Soil quality; and
- Fauna.

Please refer to the updated BMP provided in Appendix C-1.

Comment No. 108 - Recommendations

Contingencies for the management and monitoring of potential impacts on the Australian Painted Snipe (e.g. noise, contamination, etc.).

One single female Australian Painted Snipe was observed on Jervois Dam in March 2012 (separate to the ecological assessments conducted by Low Ecological for the Project). The ecological assessment indicated that, due to past records and the presence of appropriate habitat (Jervois Dam), the species is likely to occur within the Project area (Low Ecological 2018).

The Project is unlikely to impact on populations of the Australian Painted Snipe directly particularly due to the nomadic nature of the snipe. Their presence at the Jervois dam is irregular and they are unlikely to be present along the Pipeline area due to a lack of suitable habitat (Low Ecological Services, 2019).

Potential impacts on the Australian painted snipe have been assessed in Chapter 4.3 Terrestrial fauna, Section 4.3.5.3 as low because the species is associated with potential habitat at Jervois Dam that will not be removed or significantly altered during the life of the Project and activities creating noise and contamination are somewhat removed from this area. For this reason, no specific measures to address the Australian Painted Snipe have been included in the BMP. However, there are several mitigation measures across various sub-plans within the BMP that address the importance of Jervois Dam as potential habitat for the Australian Painted Snipe as well as other migratory species. For example, Section 6.6 Changes in hydrology, and Section 7.3 Impacts to threatened fauna which specifically addresses potential impacts and mitigation measures for threatened species such as the Australian Painted Snipe. Monitoring for the Australian Painted Snipe (to detect colonisation of the Jervois Dam during the lifespan of the mine) has been added to Section 7.3.

Refer to the updated BMP provided in Appendix C-1.

Comment No. 109 - Recommendations

The potential impacts and risks to fauna from the construction of a proposed water supply pipeline and, specifically, pipeline construction methods, duration and length of pipeline trench that would remain open, habitats through which the pipeline would traverse, and the proponent's assessment of impacts and risks to fauna due to pipeline construction.

Pipeline construction methods detailed in Section 2.2.1 include vegetation clearing, stockpiling of topsoil and trench spoil, pipe placement and connection followed by backfilling and rehabilitation.

The measures proposed in this section to minimise impacts to fauna include the restriction of operational areas, minimising open trenches, the inclusion of trench breaks and restriction of open trench times to one day or less.

Fauna mortality is addressed in Section 7.5 of the BMP and 'measures to minimise fauna entrapment in trenches or pits' appears as a mitigation measure in Table 26. The process for this generally includes:

- Planning the pipeline to avoid traverses through large areas of intact fauna habitat, where possible;
- Avoid construction during and just after the wet season;
- Construct the pipeline in shorter sections (i.e. excavate, install and back-fill one section at a time), to avoid a long open trench on the ground for any lengthy duration;
- Placement of fauna refuges (e.g. hessian bags, small logs) in the trench;
- Placement of escape ramps or fauna furniture to allow fauna to escape; and
- Daily monitoring of trenches prior to construction recommencing every morning.

Refer to the additional technical information provided in Section 4.4 of this report.

Comment No. 110 - Recommendations

The impacts and risks to the biological values of the proposed borefield site.

Low Ecological were engaged to evaluate the risks and impacts to the biological values of the borefield and pipeline area. Please refer to the additional technical information provided in Sections 4.1 and 4.2 of this report and the Landscape, Flora and Fauna Assessment Report provided in Appendix A-1.

3.8.3 Water Resources Division

Comment No. 111 - Groundwater

Groundwater considerations extend to two main areas: dewatering activities in the Arunta complex; and extraction of source water from the aquifers of the Georgina Basin sediments.

With regard to dewatering activities, the proposed mine will be in the hard rock environment of the Arunta complex and the pits and underground workings will eventually extend to below the water table. As reported in the draft EIS, the impact of pit dewatering and predicted effects will be of local scale and limited to the area of the mine site. Monitoring activities, as proposed by the proponent, will assist to measure the extent of any impacts associated with dewatering activities.

The draft EIS reports the project will need 2 GL per annum of process water for the 10 year life of the mine sourced from aquifers in Georgina Basin sediments, approximately 8 km north of the mine site. To assess the impact of the proposed extraction from this area of the basin the proponent developed a groundwater model based on the hydrogeological conditions of other parts of the basins which are known to host significant aquifers. The reliability and confidence in the model outputs would be improved by undertaking local monitoring to verify the model.

Subsequent to the submission of the draft EIS, CloudGMS completed Phase 1 of the groundwater supply investigation on Lucy Creek station, which utilised local scale data. The data collected in this phase have been consistent with the 2018 investigation drilling results, therefore reinforcing the reliability and confidence in the original model provided in the draft EIS.

Please refer to the detailed technical information provided in Section 4.5 and Appendix A-4.

Comment No. 112 - Groundwater

Further, a groundwater monitoring program (i.e. purpose drilled monitoring holes) or a regional monitoring program should be considered to monitor the impacts (or not) on other groundwater users (e.g. Maperte community) in the region, along with a communication program to update regional groundwater users on the status of groundwater resources as a result of mining activities. The draft EIS should also consider other measures to verify the negligible impacts reported in the draft EIS, for example a schedule for updating the model with new information, detailed monitoring program, contingency planning for unexpected results, and establishment of baseline groundwater data.

Since the draft EIS was prepared, a detailed baseline field study has been undertaken and the groundwater model for the Project EL area and borefield area has been updated to determine water drawdown impacts to the nearest sensitive receptors as a result of the Project activities.

Subsequently a Groundwater Management Program was developed to include ongoing monitoring of groundwater impacts to third party users. In addition, this Groundwater Management Program was peer reviewed and found to adequately address these considerations. The peer review findings associated the Groundwater Monitoring Program are provided in Appendix B-1 of this report.

The Groundwater Model revision and re-calibration will be undertaken annually. Drawdown predictions will be repeated for the life of mine and post closure period using the re-calibrated model.

Prediction of drawdown using the calibrated groundwater flow model will be a leading indicator of impact and monitoring of water level at the receptors will be used to confirm impacts. If impacts are greater than predicted, the following contingency measures will be implemented

1. Impact assessment – the revised magnitude of the impact will be assessed for the full Project duration from mining to mine closure and aquifer recovery.
2. Make-good measures will be assessed and implemented if required, for instance deepening of existing users bores to ensure ongoing water availability.
3. Additional water recycling methods will be explored, for example enhanced water recovery from tailings.
4. Alternative water sources will be explored, for instance extending / relocating the borefield further from receptors into deeper parts of the Georgina Basin might be considered – though this is likely to be cost prohibitive.

As per provisions of the draft EIS Social Impact Management Plan, the results of monitoring will be communicated with relevant third party users.

Comment No. 113 - Groundwater

The depth to groundwater in the region of the mine apparently exceeds 15 m, therefore the modelling predicts no impact to terrestrial groundwater dependent ecosystems. However, there is a possibility of stygofauna in the Georgina Basin aquifers. The effect of the extraction regime on stygofauna is unknown.

In accordance with the Western Australia and Queensland assessment guidelines for subterranean aquatic fauna, a staged approach to the determination of the likelihood of stygofauna within the EL area was adopted. A literature review was completed as part of the 2018 Groundwater Impact Assessment submitted as part of the draft EIS. This desktop study determined that stygofauna are not likely to be an environmental factor within the EL area as the habitat suitability is poor as the lithology of metamorphosed rocks is fine grained and will not provide the pore spaces required to support stygofauna (CloudGMS, 2018). As a result, the potential impact to stygofauna as a result of groundwater drawdown within the EL area is considered low (CloudGMS, 2018).

The 2019 frc environmental Stygofauna Pilot Study further investigated the presence of stygofauna in the borefield area of the Project. This study found that the geology and hydrology of the borefield area was considered suitable for providing habitat for stygofauna whilst the water quality was assessed as potentially suitable. Of the ten bores sampled, only one contained stygofauna: a single copepod. Overall the stygofauna community of the borefield area was assessed as having low environmental value based on the limited occurrence of a single taxon and the groundwater quality being only potentially suitable on the basis of total dissolved solids (frc environmental, 2019).

Potential impacts to stygofauna in the borefield area may include the drawdown of water tables and subsequent reduction in groundwater pressure. The risk assessment conducted as part of the pilot study rated this risk as low for the borefield area.

Please refer to the detailed technical information provided in Sections 4.2 and 4.4.

Comment No. 114 - Surface Water

Natural surface waters in the area are believed to be relatively short lasting following rain events. There are no permanent or long-term aquatic environments in the proposal area. The longest lasting surface waterbody is most likely the old Jervois Dam. Other short and medium term waterholes (e.g. rockholes) are likely to occur in tributaries of Unca Creek, in the Jervois Range. These are upstream of the proposed mining activities and are likely to have less amenity or biodiversity values than would permanent surface waters. No springs or similar surface expression of groundwater are recorded for the area. No persistent waterholes have been mapped in or downstream of the mining area, so it is likely that surface water bodies in those areas out from the Jervois Range would be very shortlasting following creek flows (days or weeks).

The draft EIS correctly identifies low risk of impact on surface water quality and associated native biota.

Unca Creek is part of the Hay River catchment (in the Arthur Creek sub-catchment). However, the channel of Unca Creek does not reach Arthur Creek because it dissipates (floods out) on the

sandplain. Surface water connection of Unca Creek to Arthur Creek is believed to only occur under extreme flooding conditions, with a likely recurrence interval of several decades. Under these circumstances the Hay River may flow into the Great Artesian Basin Water Control District, directly recharging the J Aquifer of the Great Artesian Basin in the Northern Territory.

The risk of pollution, that might arise at the proposed mine, reaching Arthur Creek and Hay River via surface water flows, is considered to be very low. However if this does occur, it could pose a significant risk to nationally significant ground waters of the Great Artesian Basin. All efforts should be made by the proponent to mitigate any possibility of contaminated surface water flows entering the Hay River system through appropriately designed containment infrastructure capable of withholding potentially contaminated waters during extreme weather events.

WRM has conducted water balance modelling which indicates that there are no predicted or uncontrolled or controlled releases of contaminated water from the process water dam (WRM, 2019).

It has been predicted that there is approximately a 17 % chance in any year of an uncontrolled spill occurring from the WRD sediment dams. These uncontrolled spills may occur during extremely wet periods when runoff from the WRD is expected to be of good quality (similar to baseline surface water quality) (WRM, 2019). Additionally, the spill volumes would be minor in relation to the volume of runoff that will occur in the receiving watercourses.

Therefore, the risk of water released from the mine site resulting in any impact to the downstream surface or groundwaters is very small (WRM, 2019).

Further information in relation to mitigation and management measures is available in Section 4.5 and Appendix A-3.

Comment No. 115 - Licensing and Regulation

In preparation for future application of the Water Act mining operators should ensure:

- *measures are in place to quantify, record and report monthly the volume of water extracted from surface water or groundwater resources*
- *groundwater bores are constructed and maintained in accordance with the National Uniform Drillers Committee, Minimum Construction Requirements for Water Bores in Australia*
- *all groundwater bores are registered with DENR and clearly and permanently labelled with a registered bore number*
- *water meters comply with DENR's Non-Urban water metering policy and Non-Urban water metering code of practice for water extraction licenses*
- *a plan is prepared that demonstrates how and when water will be used over the life of the project. The plan should include elements addressing detailed construction or development schedules relating to water infrastructure requirements (e.g. bores, water supply, distribution or irrigation systems; projected water use (monthly for 10 years); water drainage and wastewater management; a description of the surrounding environment and facilities and the potential impact water extractions and drainage associated with the*

activity may have on the areas available water resource and other persons entitled to that resource including the environment.

- *Groundwater and surface water use does not impact on water dependent ecosystems and there are measures in place to monitor for potential impacts.*

Activities are conducted in a manner that minimises interference with bed and banks of a waterway.

These actions are being implemented in relation to the application of the Water Act.

3.8.4 Rangelands Division, Land Management Unit

Comment No. 116

This submission has not been assessed by the Land Management Unit. With regard to erosion and sediment control, for all proposals involving earth-disturbing activities, DENR provides the following advice.

To prevent soil loss from the site and deposition offsite, minimisation of associated risks to water quality and air quality, and to ensure satisfactory stabilisation of the site at completion of works, preparation and implementation of an Erosion and Sediment Control Plan (ESCP) is recommended. The ESCP should:

- *Be prepared by a suitably qualified and experienced professional in erosion and sediment control planning; and be reviewed and approved by a Certified Professional in Erosion and Sediment Control (CPESC).*
- *Be prepared in accordance with the IECA Best Practice Erosion and Sediment Control Guidelines 2008 (or higher standard).*
- *Be the final environmental management plan to be prepared (as it relies on completion of final design) and be a stand-alone document which contains all necessary information to facilitate its implementation without requiring the user to reference other documents.*
- *Be cross-referenced with other relevant environmental management plans to ensure consistency (e.g. plans relating to Water Management, Stormwater Management, Site Rehabilitation, etc.).*
- *Include details of both temporary and permanent erosion and sediment control methods and treatments to be implemented for all stages of the project (pre, during and post works).*
- *Comprise an over-arching strategic document outlining the principles, practices and methods to be implemented, as well as site-specific dimensioned plans identifying the location of works and prescribed controls; and be accompanied by relevant Standard Drawings and Construction Notes.*
- *Include information regarding proposed timing and staging of works, site manager contact details, maintenance and monitoring requirements, and reporting procedures.*

The draft EM Plan which was submitted as part of the draft EIS included an ESCP which provided strategies to manage sediment laden and undisturbed runoff from the Project. The ESCP examines

and addresses issues relating to the generation, management and mitigation of erosion and sediment transport; provides guidance on issues related to erosion and sediment issues and management techniques; and determined the requirements for sediment and erosion control and management.

In preparing the ESCP, the IECA Best Practice and Sediment Control Guidelines (2008) were heavily referenced in order to adopt industry best practice. The fundamentals of IECA Best Practice Erosion and Sediment Control Guidelines 2008 were taken into consideration with the three cornerstones of ESC (drainage, erosion and sediment control) adopted in its development.

In accordance with this advice, the final ESCP which will be submitted as part of the Mining Management Plan will be prepared by a suitably qualified and experienced professional and will be approved by a Certified Professional in Erosion and Sediment Control. As suggested, implementation of the ESCP will be regularly monitored by a suitably qualified third-party auditor to the satisfaction of the Consent Authority.

This commitment has been included on the list provided in Section 5 of this report.

Comment No. 117

Implementation of the CPESC-approved ESCP should be regularly monitored by a suitably qualified third party auditor, to the satisfaction of the Consent Authority.

As suggested, implementation of the ESCP will be regularly monitored by a suitably qualified third-party auditor to the satisfaction of the Consent Authority.

This commitment has been included in the list provided in Section 5 of this report.

Comment No. 118

Information regarding best practice management can be obtained from the following sources:

International Erosion Control Association (IECA) Australasia: www.austieca.com.au

Department of Environment and Natural Resources (DENR): <https://nt.gov.au/environment/soil-land-vegetation>

Department of Infrastructure Planning and Logistics (DIPL):

<https://transport.nt.gov.au/infrastructure/technicalstandards-guidelines-and-specifications/technical-specifications/environmental-management>

Leading Practice Sustainable Development Program for the Mining Industry (Department of Industry, Innovation and Science):

<http://www.industry.gov.au/resource/Programs/LPSD/Pages/LPSDhandbooks.aspx>

Society for Ecological Restoration: <http://www.ser.org/page/SERDocuments>

Information sources acknowledged; these references will be investigated in the preparation of the final ESCP.

3.8.5 Rangelands Division, Weed Management Branch

Comment No. 119

Previous comments provided by the Weed Management Branch on the Notice of Intent (Ref: NR2070) and in response to notification of an alteration to the project (Ref: DENR2017/0055) remain relevant and should be referred to.

KGL have been advised that as these comments were provided to the NT EPA on the original Notice of Intent (NOI) document in 2013 and the 2017 NOI variation was circulated by the NT EPA for comment, these would have been incorporated into the original and the revised Terms of Reference (ToR). As a result, weed management has been addressed in the draft EIS in accordance with the ToR requirements which were to:

- Describe, quantify and map, where relevant the presence, or likely occurrence, of introduced and invasive species (both flora and fauna) including weed species declared under the Weed Management Act;
- Include the results of a comprehensive baseline fauna and flora survey which is to be undertaken by a suitably qualified and experienced person;
- Outline how potential impacts to flora and vegetation will be minimised, monitored and managed including the potential introduction and/or spread of plants declared under the Weed Management Act; and
- Outline how potential impacts on terrestrial fauna will be avoided, minimised or mitigated, monitored and managed including the impacts and risks from plants declared under the Weed Management Act.

Both the draft Environmental Management Plan (EM Plan) and the Biodiversity Management Plan (BMP) which formed part of the draft EIS address weed management and recognise the importance of controlling weeds such as Athel Pine. The management objectives detailed in these plans include eradication of existing weed infestations, prevention of the spread of weeds and management of new infestations. The BMP mitigation measures include:

- Having qualified environment personnel on site;
- Inclusion of weed management responsibilities in the site induction;
- Vegetation clearing restrictions;
- Conducting surveys prior to construction;
- Reference to the NT Weed Management Handbook;
- Appropriate weed disposal; and
- Equipment hygiene procedures.

KGL are aware that there is a statutory Weed Management Plan for Athel Pine. As the Jervois Project lies within the Eradication Zone for Athel Pine, the legal requirements of this Plan will be complied with to ensure that Athel Pine infestations are managed and potential damage to environmental, cultural and agricultural values is mitigated. The focus for Athel Pine will be to implement best

management practices to eradicate it in order to prevent larger infestations and to restrict it from being spread or introduced into other areas of the NT.

3.8.6 Bushfires NT

Comment No. 120

Bushfires NT has reviewed and assessed the information provided in the draft EIS and make the following comments:

- *the land to which the project relates to falls within the Alice Springs Fire Management Zone*
- *during periods of a declared fire danger period, no fire shall be lit, with exception of a small fire for cooking or boiling water without a permit to burn issued by a Fire Warden or Fire Control Officer*

further fire management information or applications for permits to burn can be made to Bushfires NT in Alice Springs by calling (08) 8952 3066.

The Bushfire Management Plan in the Environmental Management section of the draft EIS details how KGL intend to manage fire risks and how fire safety measures will be implemented on the Project. The fire management activities to reduce the risk of fire include mechanical controls, maintenance activities, strategic installation of fire suppression equipment and procedural controls for activities that have the potential to ignite fires. All personnel, contractors and visitors to the Project will be educated on the Bushfire Management Plan during the site induction process and at staff meetings. This will include the requirement that during periods of a declared fire danger period, no fire shall be lit, with exception of a small fire for cooking or boiling water without a permit to burn issued by a Fire Warden or Fire Control Officer. The Project workforce will also be required to comply with Bushfires NT fire ban days and advice.

Permits to burn will be obtained if necessary or as directed by Bushfires NT. Bushfires NT are listed as a key contact in the Bushfire Management Plan for the Project.

3.9 Department of Infrastructure, Planning and Logistics

3.9.1 Transport Civil Services

Comment No. 121

The Traffic Impact Assessment (TIA) in its current form, does not adequately address the impacts of the project on traffic and infrastructure. There does not appear to be a Traffic Management Plan for construction or operation. This hampers and limits this Departments ability to adequately assess the risks.

Consone Consulting Pty Ltd were engaged to undertake an additional Traffic Impact Assessment for the Project. This included a review of the information provided in the draft EIS, the inclusion of additional and updated traffic data, extensive consultation with stakeholders, a detailed risk assessment, road safety audit and road condition assessment, a review of the proposed DIPL road upgrade and maintenance program and the development of a Traffic Management Plan.

Please refer to the 2019 Traffic Supplement Report provided in Appendix A-9 and the Traffic Management Plan in Appendix C-3.

Comment No. 122

The proponent is required to submit its Traffic Impact Assessment (TIA) and a Traffic Management Plan (TMP) in its EIS, in accordance with Part 12 AUSTROADS, Guide to Traffic Management. This is mandatory to ensure the road authority can measure the proponent's acknowledgement of the risks associated with project impacts on NTG Roads, infrastructure and road safety. The TIA is to include details on access, vehicle types, volumes of existing vehicles and increased traffic and other relevant matters, including a risk assessment to reflect how all roads and infrastructure will be affected. This includes impacts on commercial enterprises and tourist attractions and infrastructure with assumptions reflective of existing Department Policy and Guidelines and Australian Standards.

Consone Consulting were engaged to undertake an independent assessment of the draft EIS documentation, liaise with the relevant government departments and prepare a Traffic Management Plan and Risk Assessment in accordance with the Austroads guideline.

Please refer to the 2019 Traffic Supplement Report provided in Appendix A-9 and the Traffic Management Plan in Appendix C-3.

Comment No. 123

The concerns with the underlying assumptions that have been applied throughout the TIA include, but are not limited to:

Both Plenty Highway/ Lucy Creek Access & Lucy Creek Access/Mine site Access intersection swept paths for triple road trains has been done with the "Due to very low traffic volumes at the intersection, it is expected that road trains would use the full width of the Plenty Highway & Lucy Creek Access when turning.". This proposal is not safe due to the high speed environment.

This intersection has been identified as requiring an upgrade to a standard T type intersection. Refer to the swept paths and updated intersection assessment regarding these intersections provided in Sections 3.2.5 and 6.5.2 to 6.5.4 of the Traffic Supplement Report.

Comment No. 124

Swept Path diagrams at the Stuart Highway/ Plenty Highway intersection for Triple road train need to be provided.

Refer to the swept paths and updated intersection assessment regarding this intersection provided in Sections 3.2.5 and 6.5.1 of the Traffic Supplement Report.

Comment No. 125

Two accesses proposed to the site from Lucy Creek Access Road. Road Agency Approval process applies for access and road construction. Location of access will need to be assessed for safety and design criteria.

Refer to the assessments and proposed access road upgrades provided in Sections 3.2.5, 6.5.3 and 6.5.4 of the Traffic Supplement Report.

Comment No. 126

Requirement of acceleration lane to the Stuart Highway (road trains turning from Plenty Highway) is not discussed in the report. This needs detailed consideration and discussion between the proponent and the Department.

This acceleration lane intersection has been addressed, refer to the information provided in Sections 3.2.5 and 6.5.1 of the Traffic Supplement Report.

Comment No. 127

Risks to increased tourist and local traffic in the dry season for recreational activities are not identified, nor adequately addressed.

Consone completed a detailed Risk Assessment which was undertaken in conjunction with KGL, the preferred ore transport company and Balance Advisory. The identified risks and associated risk mitigation measures were developed as part of this assessment. The Journey Management Plan developed as a result of this process will be used for the ore transport company and a generic version will be adopted by KGL for all staff and contractors. These plans will include:

- Details of the proposed route;
- Pre-start checklist for drivers;
- Areas of concern for road safety;
- Speed restriction zones;
- Areas of concern with pavement wearing coarse (particularly in wet weather);
- Emergency procedures;
- Emergency Contact Details;
- Procedures for dealing with oncoming traffic; and
- Location of all intersections and relevant points on the proposed route.

The draft Traffic Management Plan prepared as part of the 2019 Traffic Supplement Report includes a generic Journey Management Plan and further detailed information on:

- Safety Concerns within the transport route;
- Risk Mitigation;
- Plant and vehicle requirements;
- Specific operational requirements;
- Policies and procedures;
- Proposed contractual requirements;
- Operational restrictions;
- Roles and Responsibilities; and

- Auditing and reporting.

Please refer to the 2019 Traffic Supplement Report provided in Appendix A-9 and the Traffic Management Plan in Appendix C-3.

Comment No. 128

The proponent will need to contact Transport Civil Services to discuss its project proposal in detail to ensure the road authority's concerns are adequately addressed and to clarify the approvals and permit processes that apply to NTG roads. This includes the Stuart Highway, Plenty Highway and Lucy Creek Access Road. The programming of upgrades of sections of the Plenty Highway also needs to be discussed and considered.

Transport Civil Services, Corridor Access can be contacted by email: DevRoads.nt@nt.gov.au or telephone Director Corridor Access on (08) 8924 7252.

As requested, contact was made with Transport Civil Services throughout the preparation of the 2019 Traffic Supplement Report.

3.10 Northern Territory Police and Fire Emergency Services

Comment No. 129

The remote location of the operations (outside of our ERA) means that neither the Northern Territory (NT) Emergency Service or NT Fire and Rescue Service have an ability to respond to an emergency in a timely manner.

Please refer to the following response.

Comment No. 130

Jervois Base Metal will need to develop a detailed emergency management plan based on a recognised risk assessment methodology.

A detailed Emergency Management Plan will be further developed following the risk assessment will that will be undertaken by KGL prior to the commencement of construction. This will be managed by appropriately qualified health and safety representatives in the development of the project Health and Safety Management System and the policies and plans associated with this.

The Health and Safety Management System, which will include and Emergency Management Plan, will be based on AS/NZS 4801:2001 Occupational Health and Safety Management Systems and will adopt the relevant NT Worksafe Codes of Practice. As requested by the NT Police, KGL is liaising with the Harts Range Police Remote Sargent regarding Project safety initiatives, including Emergency Response Plans. KGL will also enter discussions with the local State Emergency Service (SES) regarding traffic incidents and emergencies.

Comment No. 131

With regards to road crash/response, the NT Fire, Rescue and Emergency Service (NTFRES) crews will respond as required within existing capacity as with any other crash. If the timeliness of that response does not adequately mitigate the risk for Jervois Base Metal then self-funded measures should be implemented.

The availability of medical services within the local area was highlighted during the Social Impact Assessment process and KGL understand that the Project will place additional strain on the existing capacity of the local NTFRES. This matter was further investigated with Regional Management of NTFRES and the local command at Harts Range during the 2019 Traffic Impact Assessment completed by Consone Consulting Pty Ltd. As a result of these discussions, an informal agreement has been made for KGL to supplement regional emergency services.

KGL will be employing paramedics/nurses with the view of meeting the needs of potential health issues specifically related to mining and the potential circumstances arising in the mining environment. These paramedics/nurses will be made available to work with the emergency services at Harts Range to provide assistance in responding to road crashes in the local area. Equipment, personnel and facilities such as the ambulance, traffic control vehicles, firefighting equipment, the mines rescue team and the mine clinic may also be made available as required.

As detailed in Section 10.3.1 of the Traffic Supplement Report provided in Appendix A-9, KGL are preparing an Emergency Response Plan, Policies and Procedures which will include providing regional assistance to the NTFRES in responding to road traffic incidents.

Comment No. 132

The NTFRES is happy to advise Jervois Base Metal on current capabilities in the vicinity of their operation to inform their risk assessment.

The NT Police Force (NTPF) have met with representatives of the project on a number of occasions to highlight the safety risks as identified by and within the remit of the NTPF. These conversations have been constructive and informative.

As a result of these meetings and on reviewing all documents the proposed is supported in principle.

This offer of assistance is welcomed and has been accepted as detailed in the previous responses.

Comment No. 133

In relation to the residual impacts on Southern Command, public safety, emergency management and infrastructure, it is noted at page 22 of the Executive Summary that there is information provided on cumulative impacts and projected 'Benefits' including to local economy and region from this and four other major (mining) projects proposed for the Alice Springs and Barkly Region over the next two years.

These benefits are accepted however, further advice is required on the scope of these four projects to allow for a full NT police and community cumulative impact assessment to be undertaken to

consider, suitability of existing policing footprint, emergency management response capability/needs and broader risks/mitigations.

Whilst KGL do not have the full details to provide information on the final scope of these four projects, it is anticipated that the NTG will provide further advice on these projects when they become available to enable a full cumulative impact assessment.

Comment No. 134

The impact assessment is acknowledged – risk levels and residual impact rating applicable to:

- 1. Worker Code of Behaviour;*
- 2. Road safety initiatives;*
- 3. Road safety public awareness campaign;*
- 4. Traffic Management Plan (TMP);*
- 5. Provision of alternative transport arrangements to and from site; and*
- 6. Workplace health and safety procedures.*

Further information is requested in relation to 2, 3 and 4 to assess the suitability of same. It is noted the existence of Traffic and Transport Impact Assessment study, actual TMP would be beneficial to determine suitability of mitigations and operationalisation of plans/activities arising from findings in study.

The 2019 Traffic Impact Assessment for the Project included a review of the information provided in the draft EIS, a detailed risk assessment, road safety audit and road condition assessment and the preparation of a draft Traffic Management Plan. The additional road safety initiatives provided in the Traffic Supplement Report include:

- Operational procedures and vehicle safety equipment;
- Safety policies and procedures to form part of contractors' obligations;
- Signs on ore transport trucks to enable travellers to make radio contact with drivers;
- Journey Management Plans which include speed restrictions in areas of concern;
- Staging of heavy vehicle movements;
- Road safety public awareness campaigns;
- Emergency response procedures; and
- Driver inductions and education training.

Detailed information on these initiatives can be found in the Traffic Supplement Report provided in Appendix A-9.

In developing the Traffic Supplement Report, Consone and KGL liaised with the NTPFES to ensure the mitigation measures, operational activities and recommendations were practical. Direct consultation with the NTPFES on these matters will continue to ensure they remain suitable and relevant.

Comment No. 135

In relation to issues of stress on existing road network it is noted in the Traffic and Transport Impact Assessment C-2 at page 13 that the proposed development is expected to generate 22 trips per day during construction and 33 trips per day during operation. Road trains are expected to account for up to eight double road train trips during construction and 20 trips during operation. Haulage is expected to be 150,000 tonnes of material per annum.

This traffic flow is of concern particularly in relation to the attributing impacts on road conditions/surface in inclement weather and the resulting serviceability and safety of the road which will still serve as a significant local and tourist arterial road from the NT to Queensland. The recommendation that the proposed development contribute towards the cost of maintenance on the Stuart and Plenty Highway based on increase Equivalent Standard Axles loading associated with the proposed mine is noted. As we are unable to locate any specifics on this commitment, it is difficult to determine the suitability of same and whether this recommendation will sufficiently address the concern noted.

Further information in relation to this matter is requested, in particular scope and schedule of works for upgrades to assess compounding impacts for area. Ongoing communication with the NTPF around upgrades to ensure priority is given to areas considered high risk areas.

The 2019 Traffic Impact Assessment (Appendix A-9) for the Project included a review of the information provided in the draft EIS and as a result, revised transport figures have been developed as provided in Section 6 of the Traffic Supplement Report. The road safety audit and road condition assessment completed as part of this report includes recommendations for the prioritisation of re-sheeting, maintenance and future upgrades for further discussion with DIPL. KGL will continue discussions with various Government Departments regarding the acceleration of works to the Plenty Highway, although final scheduling is the responsibility of the DIPL. KGL will also have further discussions with DIPL on road upgrade and maintenance contributions, highlighting the priorities listed in the Traffic Supplement Report.

Comment No. 136

Operational activities noted in risk to human health of the workforce and to the Public Appendix C-11, in particular:

- *Underground and open cut mine activities;*
- *Blasting activities;*
- *Limitations of medical facilities; and*
- *Transportation and handling of dangerous goods.*

Advice on practical application of, mitigations and response plans around same is required.

The risk assessment undertaken as part of the draft EIS was the second risk assessment completed for the Project. The basis of the risk assessments are to develop practical management, treatment, prevention and control strategies to manage to potential impacts to human health and safety, the environment, communities and KGL. Another risk assessment will be undertaken by KGL and

appropriately qualified health and safety representatives in the development of the project Health and Safety Management System and the policies and plans associated with this. The Health and Safety Management System will be based on AS/NZS 4801:2001 Occupational Health and Safety Management Systems and will adopt the relevant NT Worksafe Codes of Practice. It will also be based on recognised, practical and accepted practices and mitigation measures from other remote mine sites across the NT, Qld and WA.

As the risks will evolve over the life of the Project, ongoing monitoring and periodic reviews of the Health and Safety Management System will be conducted, along with additional risk assessments. This will ensure that the system remains current and the mitigation measures and response plans are regularly updated.

As some impacts will directly affect Northern Territory Police and Fire Emergency Services, consultation will form a part of the development of relevant aspects of the Health and Safety Management System to ensure they are practical and the mitigation measures are suitable.

Comment No. 137

It is noted reference to fly-in-fly-out (FIFO) service – FIFO service typically impact on policing services, similar FIFO models throughout the NT place significant stress on policing services policing the night time entertainment precincts i.e. Darwin during down time while FIFO are in transit from Darwin to their respective residential jurisdictions. Advice regarding application of same is necessity to inform consideration as to the suitability of existing policing footprint in Alice Springs to police the resulting night time pressures particularly in licensed establishments. Note compounding effect of four other unidentified projects occurring in the region at the same time.

KGL current has a process for managing FIFO activities via Alice Springs. The current process for employee and contractor FIFO personnel is that employees arrive at Alice Springs airport on commercial flights between 0900h and 1330h on the day before their first rostered day at work. On the same day those arrivals will transfer to the charter air service which will leave Alice Springs after 1330h arriving at the Project the same afternoon. Those personnel finishing their work rosters will then be flown from the Project to Alice Springs by 0900h the following day, transferring to their commercial flights and leaving Alice Springs airport that same morning. It is not envisaged that FIFO personnel will overnight in Alice Springs.

It is not possible for KGL to comment on any compounding effect from other unidentified projects occurring in the region.

3.11 Central Land Council

Recommendations:

- *All information relating to sacred sites and location of archaeological findings should remain confidential.*

- *Native title holders shall be consulted regarding the best way to preserve the Aboriginal artefacts identified in the Project area before a permit to disturb those Aboriginal Archaeological sites is applied for.*
- *Further detail should be provided in the EIS in relation to the management of open pit water and risk mitigation.*
- *The surface water assessment should cover the full term of the mine life. This means an additional five years should be added to the current ten year modelling.*
- *Further consideration should be given to ensure that metals/metalloids are not spread to the natural environment if using recycled pit water for dust suppression.*
- *Further consideration around the risk mitigation strategy should be conducted regarding road safety to address the increased traffic and dire weather conditions from December through to February.*
- *Sealing the Plenty Highway between Harts Range and the Lucy Creek Intersection should be prioritised on the basis of benefit for the Project economics, the safety of workers, and the neighbouring communities.*
- *Constructive discussions between KGL Resources, Government and preferably local Aboriginal contractors should be held to guarantee regular and targeted maintenance of the Plenty Highway.*
- *Adjust the footprint of the evaporation pond to exclude the mature bloodwood and ironwood habitat (Appendix C-7).*
- *Avoid works in the vicinity of the mature Mulga patch habitat (Appendix C-7) and establish a monitoring program.*
- *Accounting for the loss of ecological value including the riparian habitat trees proposed to be cleared for the Project should be included for planning environmental offset measures.*
- *Undertake protection works to ensure that the threatened species habitat north of Bellbird is not disturbed by development, vehicles, works, or erosion, or polluted at all by dust, toxic water or chemical spills, and establish a monitoring program.*
- *Arrange annual monitoring of threatened species and their habitats, including the long haired rat (*Rattus villosissimus*) in areas identified by Low Ecological Services.*
- *The CLC recommends that consultations be held with ranger groups or ecologists to determine the best location for the compensatory 3:1 offset.*
- *That KGL Resources should clarify where and how the identified Potentially Acid Forming (PAF) material will be stored during the period prior to rehabilitation to enable ongoing management and possibly ongoing mitigation.*
- *The CLC is concerned that if rehabilitation is left until the end of operation, there is a risk that the site could be subject to abandonment. Progressive rehabilitation should be considered if possible. An appropriate financial security should be set aside for rehabilitation and closure.*

- *The south cell of the evaporation pond should be moved so that modelled particle tracking intercepts the pit lakes 'at the end of life of mine year 10' (C-6.7.3.2 and related figure 7-25).*
- *CLC recommends that it has an active role in the development of policy to identify and implement KGL's prioritisation of Aboriginal training and employment. In particular, the CLC wishes to ensure this is formulated in the best interests of the native title holders.*
- *The Project could provide significant employment opportunities to native title holders and local Aboriginal people and is likely to encourage a 'return to country' by some people. The CLC urges KGL Resources to have a target of at least 20% Aboriginal employment with flexible training and employment arrangements.*
- *KGL Resources should consider scoping options to employ a small crew from one of the nearby communities to do regular maintenance of the unsealed part of the Plenty Highway, the intersection and Lucy Creek Road.*
- *Bonya community members do not have reasonable access to a health facility, nurse or first aid. Residents seek to access whatever services the mine establishes with respect to health and first aid.*

Please refer to the responses below.

Specific Comments:

Comment No. 138 - Sacred Site Protection and Heritage Protection

Authority Certificate(s) for this area have been issued by the Aboriginal Areas Protection Authority (AAPA). The CLC acknowledge that KGL Resources has treated 'exclusion zones' protecting sacred sites as sensitive and confidential information. The CLC requests that sacred site protection information remain confidential.

KGL is aware of the sensitivity surrounding sacred sites and their need for protection. Information regarding sacred sites is kept strictly confidential and this will continue into the future.

Comment No. 139 - Sacred Site Protection and Heritage Protection

Heritage information in relation to the location of any Aboriginal archaeological findings should also remain confidential.

As with sacred sites, KGL will keep heritage information on the location of Aboriginal archaeological finds strictly confidential.

Comment No. 140 - Archaeological Material

Archaeological sites and artefacts have been identified in relation to the Project area. This material is of cultural interest to the native title holders who wish to be consulted about and to participate in the management of this material. The CLC requests that this is done before a permit is issued to disturb those Aboriginal Archaeological sites identified in the EIS.

KGL are aware of the sensitivities surrounding archaeological sites and artefacts and their value to native title holders. As recommended, KGL will consult with native title holders regarding the management of this material prior to permits being issued to disturb these sites.

3.11.1 Groundwater

Comment No. 141

The EIS (C-7 Groundwater assessment) predicts that the water sourced from dewatering open pits will ultimately be acidic. Clarification is sought as to whether the dewatered groundwater, if acidic, will be neutralised before being used as raw water. The EIS report does not make reference to the type of treatment or the need for gypsum or other sludge disposal management. If left untreated the acidic water cannot be recycled. At the same time treatment may create additional waste that requires disposal. The CLC recommends further detail be included for the management of open pit water and risk mitigation.

The Surface Water Impact Assessment Supplement report (Appendix A-3) indicates as the part of the surface water management strategy that “mine affected water” and “plant standard raw water” are both unlikely to be suitable for release to the environment. Groundwater dewatered from mining operations is classified as plant standard raw water. Due to the predicted water quality neither class of water will be released to the environment. The open pit water has been determined as being suitable for process plant requirements without treatment.

Comment No. 142

The EIS modelling for particle tracking shows that there is a risk for particles seeded beneath the south cell of the Tailing Storage Facility to not be captured by the cone of groundwater level depression developed at the end of mining. If the groundwater gradient is not towards the pit-lake (C-6.7.3.2 and figure 7-25 Random walk particle and drawdown contours at the end of LOM year (3650d)) it would travel to the southeast. The recommendation is to move the south cell so that possible seepage does get captured.

The Groundwater Impact Assessment Supplement (2019) which is based on updated modelling demonstrates random walk particle tracking from end of life of mine (LOM) through to 190 years post mining. This predicts that the potential drawdown is to the north-east, which indicates particles seeded beneath the Reward, Reward South waste rock dumps and the TSF terminate at the Reward pit-lake. Therefore, relocation of the south cell is no longer required to capture seepage.

Please refer to Section 4.6 and Appendix A-4 (Section 7.3.2 (Figures 7-29 to 7-31)) for further information.

3.11.2 Surface Water

Comment No. 143

The EIS surface water assessment (Appendix C-5-3) uses models based on 10 years of mine operation. The CLC recognises that the life of the mine is expected to run for up to 15 years. It is recommended that the water assessment cover the full mine life expectancy for an additional 5 years.

Whilst the life of the mine has been estimated at 12 to 15 years, the expected period of mining (ore extraction and production) covers a 10 year period. The site water balance model has been simulated for this 10 year period only. Periods of construction or post-mining have not been modelled in the water balance model. This is not considered necessary due to the fact that the water management system will not be operating during the construction or post-mining periods.

Should the period of mining extend beyond 10 years, the water assessment will be updated to identify any changes to previously identified potential impacts.

Further information is available in Section 4.5 Appendix A-3.

Comment No. 144

The EIS 6.4 Contaminant Source Study states that groundwater seepage to underground operations (raw water, plant water) will not be suitable for release to the environment. However, section C-5-6.6.2 Underground mine dewatering states that groundwater that seeps into the underground mining operations is expected to be of good quality suitable for supply of raw water demands. These statements seem to contradict each other. The CLC request clarification on this point. Further, the CLC queries whether this water is suitable for dust suppression as listed under 4.3 Underground Dewatering Dam in table C-5-Table B-5. Use of this water for dust suppression may cause spread of metals/metalloids into the natural environment.

As discussed in response to comment 141, the underground water is suitable for “plant standard raw water” which will not be released to the environment via dust suppression draining to uncontained areas. These waters will be used for the process plant facility as outlined in Section 4.5 and the Surface Water Impact Assessment Supplement report (Appendix A-3).

3.11.3 Transport

Comment No. 145

During both construction and operation phases of the Project the company intends to use the Plenty Highway and Lucy Creek Road for access to the Project Area. The unsealed part of the Highway is the only route between Harts Range and Bonya. This section is also used for travel to communities across the Queensland border. Native title holders are concerned about traffic safety given the increase of heavy vehicles and the current condition of the road. The EIS (C-12 table 5.1) identifies that traffic volumes are slightly larger in the months December through to February than for the

rest of the year. There may be increased traffic to communities to see family and participate in important cultural activities during the same time period. Due to the dire temperatures of this season the CLC recommends the risk mitigation strategy for the peak period be reviewed.

A key impact identified during the Social Impact Assessment (SIA) for the Project was the increased traffic on unsealed roads which has safety implications for other road users, particularly during the busy tourist season. The Social Impact Assessment and Section 4.7 of the draft EIS state that the increase in traffic on local roads is likely to be confined to the cooler winter months when cattle truck and tourist traffic is at its highest. The 2019 Traffic Supplement Report provided in Appendix A-9 includes NTG traffic count data for 2017 and 2018 which indicates that November to February experience significantly less traffic volumes than other times of the year.

There is expected to be an increase in localised traffic travelling to and from the communities of Bonya and Harts Range, together with some of the other local outstations, as a result of family members seeking employment opportunities either within those communities or resulting from the Project. It is expected that this traffic is likely to be similar for both the warmer and cooler months. KGL also recognise that an increase in local community travel may occur through December to February when community members travel between centres for family and community activities.

Section 4.7 of the draft EIS specifically addresses the potential traffic impacts and includes mitigation and monitoring methods proposed to manage these impacts. A Road Safety Audit was also undertaken as part of the 2019 Traffic Supplement Report prepared by Consone Consulting Pty Ltd. Strategies proposed for mitigating impacts from additional heavy vehicles on the Plenty Highway include:

- The development of a Traffic Management Plan;
- Road safety initiatives;
- Community liaison and stakeholder engagement;
- Occupational health and safety plans;
- Workforce Codes of Conduct and guidelines for driver behaviour;
- The restriction of workers driving to site through FIFO and BBO;
- Good communications and engagement with key tourism stakeholders;
- A public relations strategy regarding road traffic and road safety awareness;
- Journey Management Plans which include speed restrictions in areas of concern;
- Staging of heavy vehicle movements;
- Traffic control devices (line marking, signage and guide posts); and
- Road treatments.

The preferred transport company engaged to haul the ore to Alice Springs apply world's best practice in journey management planning which will be adopted as the generic plan for the overall Project. Typical procedures and equipment utilised by the company include internal systems and procedures for driver fatigue, GPS tracking of vehicles, on board cameras and driver safety workshops. The transport company will also be subject to regular contract reviews which will include an investigation into their safety performance.

The Site Safety Management System and the Traffic Management Plan will expand on the management actions nominated in Section 4.7 of the draft EIS and in the draft Environmental Management Plan (EM Plan) and include:

- Restrictions on the use of private vehicles;
- Installation of road signs to increase driver engagement;
- Regular liaison with the Harts Range Police Station;
- Implementation of a risk management plan for workers, truck and bus drivers driving to site; and
- Fatigue management.

KGL will continue to consult with the NT Government and relevant stakeholders regarding road safety strategies. As requested by the NT Police, KGL is liaising with the Harts Range Police regarding Project safety initiatives, including Emergency Response Plans. KGL will also enter discussions with the local State Emergency Service (SES) regarding traffic incidents and emergencies. Should the need for additional risk mitigation strategies for the peak period be identified by stakeholders, additional strategies will be investigated.

Comment No. 146

KGL Resources has not suggested any upgrades of the Lucy Creek / Plenty Highway access intersection. The company plans for triple and quad road trains to be used for transport and expect that these will use the full width of the Plenty Highway on left-in and right-out turning. The CLC recommends the company provide clarification on the sight conditions at the intersection and any measures that are proposed to alert approaching drivers.

All intersections along the proposed transport route along the Plenty Highway and Lucy Creek access roads have been assessed through a Road Safety Audit conducted as part of the 2019 Traffic Supplement Report. Concept layouts have been prepared and swept path analyses completed for the major intersections at the Lucy Creek mine access, Lucy Creek/Plenty Highway and the Plenty Highway and Stuart Highway intersections. The swept path analysis demonstrates that triple road trains will have a very minor crossover at the Lucy Creek/Plenty Highway intersection. It is no longer proposed to use quad road trains.

Safe Intersection Sight Distance, Approach Sight Distance and Minimum Gap Sight Distance calculations of this intersection were also completed as part of the 2019 assessment. As the sight distance to the west is approximately 280 m, improvements to this intersection have been recommended.

KGL have advised that the intersection will be upgraded and likely sealed. These upgrades may include the creation of a standard T type intersection including the sealing of 200 m of all legs and moving the intersection 25 m to the east. As part of the Journey Management Plan, speed restrictions will be applied to all heavy vehicles at this intersection. Additional safety measures will include the installation of traffic control devices such as line marking and signage.

Comment No. 147

The EIS states that mine operations will be scheduled for 47 weeks per year. KGL Resources should clarify when the Project will be operating so that local Aboriginal people can have better understanding of the operation.

The draft EIS states that transport operations will be for an average of 47 weeks per year. This figure was used to allow for a buffer of five weeks per annum where access to the Project is restricted or cut off due to wet weather events and possible closure of the Plenty Highway to minimise damage to this road. These events are expected to occur in the warmer summer months normally between December and February. Due to the unpredictable nature of weather events, KGL will not be able to schedule or predict when this will occur but are confident that those in the local area will be aware of when the Plenty Highway is impassable due to flooding. Regardless, whenever possible, KGL will endeavour to keep the local Aboriginal people informed of when transport operations are postponed due to weather events.

Comment No. 148

The EIS (C-3) states that traffic for the Plenty Highway – unsealed section west of Huckitta station is expected to increase by 30% and traffic for the part of the Plenty Highway – between Huckitta Station and Lucy Creek Access will be close to double. Both of these sections were identified to have Crash Scores significantly higher than average. The CLC recommends that KGL Resources raise with the Northern Territory Government that the upgrade of the Plenty Highway needs to be kept high priority beyond the current planning up to year 2021. It is understood that KGL Resources wishes to commence construction of the mine before completion of the current schedule. The CLC recommends that the benefits of sealing the Plenty Highway between Harts Range and the Lucy Creek Intersection are viewed from the Project economics and the safety for workers in general including those from neighbouring communities.

A Road Safety Audit, road condition assessment and risk assessment has now been undertaken along these sections of the Plenty Highway and a prioritisation of future works based on condition and road safety has been included in the Traffic Supplement Report provided in Appendix A-9. Recommendations from the audit and the Traffic Management Plan is for KGL to work with the NT Government to investigate several options for the acceleration of works to the Plenty Highway, including intersection upgrades, widening of single seal sections and edge treatments. Options will also be investigated with all levels of Government to discuss the acceleration of the list of works priorities under the Outback Way program.

Consone noted that they will be working with government to highlight deficiencies in the network including safety concerns raised with the NT Government regarding single lane seal sections. As it is recognised that budgetary restrictions exist, it has been recommended that a focus should be made on upgrading the sections that will provide the most benefit.

Comment No. 149

Native title holders are worried that the increased use of heavy traffic will deteriorate the road quality. The CLC recommends that constructive discussions between KGL Resources, Government and local Aboriginal contractors should be held to guarantee regular and targeted maintenance of the Plenty Highway.

One of the key negative impacts of the Project is the increase in heavy vehicle traffic on unsealed roads and the deterioration of road surfaces. KGL will be having discussions with the NT Government regarding the maintenance of these unsealed roads as regular maintenance is in the best interests of the Project and all other road users. As the maintenance of public roads is the responsibility of the NT Government, KGL are not able to guarantee that these discussions will result in regular or targeted maintenance of the Plenty Highway.

Whilst KGL fully supports the concept of employing Aboriginal contractors to undertake this work, it is ultimately the responsibility of the NT Government to award contracts for the maintenance of public roads. KGL will continue to support the development of a road maintenance team from the local community to undertake this work.

3.11.4 Flora and Fauna

Comment No. 150

Appendix C-7 identifies a mature bloodwood and ironwood habitat as providing important landscape structure and habitat features for local fauna such as tree hollows, food and protection. The Project proposes to remove this stand of trees completely to create an evaporation pond. The CLC recommend KGL Resources adjust the footprint of the evaporation pond to exclude the mature bloodwood and ironwood habitat.

The positioning of the proposed Tailings Storage Facility (TSF) was evaluated in respect to avoiding interference with the creek systems to the north and south of the facility. Avoiding these systems is important in avoiding potential impacts to surface water, riparian vegetation, habitat trees and groundwater dependent ecosystems.

The final design of the TSF will investigate the possibility of minimising the overall disturbance footprint, including potential impacts on the 2.56 ha of mature bloodwood and ironwood woodland, although initial reviews indicate that this will be problematic to the surrounding creek systems. Should the further review of the design indicate that the footprint cannot be changed to significantly reduce the impact on the area, this will be addressed through the Voluntary Offset Strategy and the associated Offset Management Plan.

Comment No. 151

In the hills in the south-east there is an unusual community of unburnt Mulga composed of trees around 150 year old. Appendix C-7 recommends that these are retained and protected from impact by mining operations. The CLC support this recommendation and further recommends that work is avoided in the vicinity of the Mulga patch and establish a monitoring program.

As there is no intention to have any workings, infrastructure or other disturbances in the area where the community of Mulga is located, this area will not be impacted by proposed mining operations. This area will be physically demarcated as an exclusion zone.

Monitoring of the Mulga community will be integrated into the regular monitoring program outlined in the Environmental Management Plan which will be included in the Mining Management Plan for the Project.

Comment No. 152

*The creation of the Reward Pit has a number of concerns. There will be loss of the ecological value of the riparian habitat trees, especially as the long haired rat (*Rattus villosissimus*), which is listed as Near-Threatened in the TPWC, was found in the vicinity. Further, diverting the water course will impact hydrology and flora in the area. KGL Resources should account for these losses in natural habitats in the planning of an offset.*

Secondary signs (scats and an abandoned nest) of the Near Threatened (TPWC) long-haired rat were recorded during the 2012 survey, likely remnants left from the 2010-11 population irruption in southern parts of the Northern Territory resulting from high rainfall (Low Ecological 2018). This species occurs in central and northern Australia in mesic cracking clay areas during dry periods, but across a much broader habitat range during population irruptions following high rainfall (Woinarski & Aplin 2017, Predavec & Watts 2008). During good times individuals can produce 12 young every 3 weeks (one of the highest reproductive capacities of any Australian rodent), allowing them to quickly exploit resources (Predavec & Watts 2008). The long-haired rat nests in complex burrow systems underground and is nocturnally active (OEH 2019). Low Ecological (2018) reports that it is likely that during the 2010-2011 population irruption, the species immigrated to the Project area from known base populations to the west and naturally retreated when conditions became less favourable. It is possible that some individuals remained in the Project area and the Unca Creek riparian corridor may be utilised by the species as refuge habitat during drought periods. Section 4.3.5.3 Impacts to threatened fauna of the draft EIS has assessed the risk of impact to this species as low because of the very broad habitat requirements of the species and its ability to utilise any of the habitat types located in the Project area during favourable conditions. Further, due to its incredibly high reproductive capacity, it is likely to recover well from any temporary disturbances and once again immigrate into the Project area from known populations to the west during the next population explosion.

The Project proposes to divert Unca Creek around the Rewards Pit, which would involve the removal of existing riparian vegetation (including any habitat trees) as well as relocation of the channel. Given the habitat requirements of the long-haired rat, it is more the access to mesic environments and associated grass/herb resources in drought periods that is important for the persistence of the species rather than the presence of habitat trees. The diversion of Unca Creek aims to maintain the seasonal flow of water through the Project area and rehabilitation of the diverted creek will recreate the mesic environment and vegetative food resources that the long-haired rat requires. The Terrestrial Fauna chapter of the draft EIS (Section 4.3.5.2 Connectivity and Table 4.3-6) outlines that the Unca Creek diversion is revegetated and will recover slowly (approximately 20 years) to provide

a functional vegetative linkage. However, the grasses and herbs (that support the long-haired rat) will be some of the first flora species to establish. It is anticipated that in the long-term appropriate management of the diverted section of Unca Creek will provide adequate habitat and connectivity values to avoid significant impacts on local flora and fauna.

In acknowledgement of the short to medium term impact on the Unca Creek environment caused by the Project, a Voluntary Offset Strategy has been outlined in the Terrestrial Flora and Vegetation chapter of the draft EIS (Section 4.1.8 and Table 4.1-7). The offset proposed for the diversion of Unca Creek (removal of vegetation in waterway buffer areas) is to protect other riparian habitats within the Project area at a ratio of 3:1 (three times the impact area). These areas would undergo conservation management to improve habitat quality and condition.

Comment No. 153

Appendix C-7 identifies a number of records of Eremophila cordatisepala which is a listed on as a Threatened Species and contributes to the classification of the Jervois area as a Site of Botanical Significance. The EIS notes a particularly important community of this species in the west of the project area, important due to the greater likelihood of successful natural propagation. Rattus villosissimus was also found in this area. The CLC recommends that KGL Resources should undertake protection works to ensure that the area North of Bellbird is not disturbed by development, vehicles, works, or erosion, or polluted at all by dust, toxic water or chemical spills, and establish a monitoring program.

As there is no intention to have any workings, infrastructure or other disturbances in the area where the community of *E. cordatisepala* is located, this area will not be impacted by proposed mining operations. This area will be physically demarcated as an exclusion zone.

Monitoring of the *E. cordatisepala* community will be integrated into the regular monitoring program outlined in the Environmental Management Plan which will be included in the Mining Management Plan for the Project.

Note : This species is listed as near threatened under the TPWC Act.

Comment No. 154

Sauropus rigens, listed as Near Threatened, is found in the rocky slopes around the dam. The Project proposes to undertake works on the dam wall and to expand the size of the dam. These specimens are likely to be lost in this process. KGL may consider including collecting genetic material from these plants before commencing works to be used in rehabilitation works.

As recommended, KGL will collect genetic material from the *S. rigens* species which are located approximately 90 metres east of the Jervois Mine Dam prior to conducting any repair works on the dam wall. This material will then be used in rehabilitation works in areas which provide a suitable habitat for this species to ensure it is self-sustaining. As a precautionary measure to ensure this is completed, procedures have been incorporated into the threatened flora mitigation measures section of the Biodiversity Management Plan.

Comment No. 155

The EIS proposes that there will be a compensatory offset at a ratio of 3:1 plus nesting boxes. KGL should clarify on the necessary steps on choosing a location and the timing of creating the offset. The CLC recommends that biodiversity consultations are held with CLC ranger groups or ecologists to determine the best location for these offset areas.

The process for offset delivery will involve the following steps:

1. Quantification of final impacts to the Unca Creek environment and the mature bloodwood/ironwood community – once the mine design is finalised, a GIS application will be used to calculate the areas of impact of the Project on the values to be offset;
2. Calculation of offset requirements (based on 3:1 ratio) – once the area of impact is known, the offset requirement can be calculated;
3. Identification of potential offset areas – as part of the draft EIS, the vegetation communities within the Project area were surveyed and mapped (Figure 4.1-3). The vegetation communities for offset have been identified as:
 - Unca Creek – *Eucalyptus camaldulensis* tall woodland over sparse grasses in drainage channels and rocky creek beds (vegetation community 7); and
 - Mature bloodwood/ironwood community – part of the tall open woodland with *Corymbia* and *Acacia siberica* over short grasses and forbs, on floodplains and at the base of ranges (vegetation community 5) that is distributed over much of the Project site.

The draft EIS (Table 4.1-5) indicates that there is 123.2 ha of vegetation community 7 available within the Project area that will remain outside of the impact area, specifically on Unca Creek and the tributary to the south. It is likely an appropriate area for offset (requiring management to improve habitat condition) will be identified along these waterways. Similarly, there is 1,843 ha of vegetation community 5 available within the Project area that will remain outside of the impact area. Further ecological surveys will be undertaken to locate appropriate offset areas. The criteria for offsets will be further developed with relevant stakeholders (including CLC ranger groups or ecologists) to ensure that there is a net ecological gain provided by the offsets. Several opportunities for offset may be identified.

4. Selection of offset area – from the information provided in point 3 above, an appropriate offset area for the Unca Creek diversion and mature bloodwood/ironwood forest will be selected.
5. Offset Strategy to be submitted and reviewed by relevant government departments – an Offset Strategy will be drafted to identify the final impacts for the Unca Creek diversion and mature bloodwood/ironwood forest and detail the location and baseline condition of the proposed offset areas, including an assessment against the criteria outlined above. The Offset Strategy will include some basic management recommendations to be applied to the offset areas. Further detail will be included in the final Offset Management Plan (provided after statutory approvals have been issued and the location of the offset accepted).
6. Offset Management Plan – an Offset Management Plan will be developed to address on ground conservation management mechanisms for each of the offset areas. The management plan will

be based on the baseline ecological assessments conducted in point 3 above. Management measures recommended may include:

- Protection of existing native remnant vegetation;
- Grazing regimes that support improvement in ecological condition of the prescribed environmental matter;
- Weed control, including control of non-endemic native plant species;
- Fire management to avoid high intensity fires (catastrophic to habitat trees);
- Recommendations for nest box density and location;
- Erosion control and management of areas at risk of future erosion; and
- Control of feral and problem animals such as pigs, foxes and cats.

The Offset Management Plan will include goals, objectives, measurable targets and a monitoring program with corrective actions to ensure goals are being achieved.

Comment No. 156

KGL Resources proposed a 1.2 km radius from the Project area for any further surveys on disturbance predicted in the Noise Impact Assessment (C-3). The CLC queries what the assessment impact and measures are for fauna and on possible migration away from the project area itself.

The potential impacts of noise disturbance on fauna is outlined in Section 4.3.5.2 of the Terrestrial Fauna chapter of the draft EIS. This section provides information on the impacts of noise on fauna based on a literature review and includes the example of the effects of noise and light from urban development. The study states that “the distance at which various bird species are affected by man-made noise is generally restricted to < 1 km from the noise source, except on a study of a major road that indicated bird presence and breeding was reduced for a distance of 1.2 km” (Newport, Shorthouse & Manning 2014). The Noise Assessment (ANE 2018) (Section 5.4) presented in the appendices of the draft EIS has utilised this information to delineate a buffer zone of 1.2 km around the impact area where noise disturbance could have an impact on fauna species. ANE (2018) recommends that should fauna species of conservation significance be identified within 1.2 km of the impact area during future monitoring programs, they should be observed to assess whether the mine activity is impacting feeding or breeding and that if an impact is identified noise related emissions management measures should be developed.

The assessment in Section 4.3.5.2 of the Terrestrial Fauna chapter of the draft EIS indicates that there is a very low to low risk of a significant impact to fauna given the noise modelling presented in the technical report (ANE 2018). In any case, mitigation measures related to noise abatement in the presence of native fauna are outlined in Section 7.2 of the Biodiversity Management Plan. These measures include:

- Ensure there is an appropriately qualified Environmental Officer on site;
- Blasting to be undertaken in the middle of the day when fauna activity is at its lowest;
- Utilise the quietest plant available and maintain plant or utilise noise suppression equipment to ensure noise emissions are limited as far as possible;

- Monitoring noise emissions from the Project to ensure compliance with the Mining Management Plan; and
- Monitoring of fauna species within the Project area, particularly threatened species.

3.11.5 Operational Matters

Comment No. 157

The EIS sets out that a smaller part of the potentially acid forming (PAF) material will be selectively handled and isolated in pit or underground at closure. KGL Resources should clarify on where and how the identified PAF will be stored during the period prior to rehabilitation to enable an ongoing management and possibly ongoing mitigation.

Identified PAF materials will preferentially be placed in final locations as per the preliminary geochemical assessment follow up report (Appendix A-5, Section 3) which details the cover design requirements. Should PAF materials require mining prior to final placement they will be stored within existing waste dump PAF areas.

3.11.6 Rehabilitation

Comment No. 158

The CLC notes that KGL plan to use open pit and underground voids for backfilling of PAF waste. KGL also state that it would be preferable if tailings are also backfilled into the underground voids on closure. KGL should clarify their plans to secure funding for rehabilitation works after the operation ceases and the NTG should ensure sufficient funds are set aside as a security for this purpose because of the potentially toxic nature of some of the waste. KGL should explain more fully how this material will be managed. The CLC is concerned about possible future abandonment of this material. The CLC recommends that staged rehabilitation be considered prior to closure when possible.

KGL is using inert materials (NAF) in their cement mix and wherever possible PAF waste will go into the underground voids. However, this is being carefully managed as part of the AMD and mine scheduling processes. This is a complex environmental management issue which needs to consider the requirement to carefully manage the small amount of PAF present on the site. Further information is provided in Appendix A-5.

Section 5 of this report outlines KGLs commitment to progressive rehabilitation in accordance with the practices outlined in the draft EIS Mine Closure and Rehabilitation Plan.

Funding for the Mine Closure and Rehabilitation Plan will be included in the overall Jervois Project Development fund raising. The rehabilitation and closure costs estimate has been calculated based upon the Mining Operations Securities Calculation Spreadsheet from the NTG which requires Departmental approval.

3.11.7 Employment and Community

Comment No. 159

The CLC encourages KGL Resources to continue targeting training for 30-40 potential Aboriginal employees from Bonya and 50-80 from the wider Plenty area and the training be linked to direct employment. The CLC recommends that it has an active role in the development of policy to identify and implement KGL's prioritisation of Aboriginal training and employment. In particular, the CLC wishes to ensure this is formulated for the best interests of the native title holder.

As there are high levels of unemployment in the local communities, in part due to a lack of work readiness, KGL are committed to providing training opportunities for the local Aboriginal community which will equip them with the skills necessary to gain employment. Training programs will be tailored to the individual's interests, skills and capabilities with the aim of getting them job ready. Training will also focus on vocations which offer realistic job opportunities.

These opportunities will be managed and enhanced through measures such as the MOU between KGL and Bonya, the development of an indigenous employment and training plan, workforce planning to reduce structural and cultural barriers, the development of a Local Industry Participation Plan and working closely with the NT Government, ICN NT, the Chamber of Commerce and Regional Economic Development Corporations.

During consultations to date with the Department of the Prime Minister, CLC, Arramwelke Corporation, and Local Registered Training Providers, KGL has initially outlined 29 "Entry Level" employment positions, which KGL expect to be available to local community members during the construction and early production phases of the Project. KGL view the training and employment for these positions as a pilot program to facilitate consultation with all the relevant stakeholders, including CLC, to determine the optimal training and recruitment processes for further long term, permanent employment positions.

KGL expect the success of this pilot program will lead to further employment positions.

However, KGL is aware from comments from local stakeholders, that training of large numbers of community members without specific, targeted positions in the workforce, would be detrimental to community expectations during the early development of the Project.

Comment No. 160

The CLC wishes to question the statement (e.g. C-3) that the Maperte Community has been unoccupied for a number of years. These houses may look empty but that does not mean they are not used from time-to-time. It may also be that native title holders choose to reside more permanently in Maperte in the future. The draft EIS states that Bonya Community has 20 people residing and yet is accommodating up 80 people. This should be seen as representative of the fluctuating population in these remote communities. Former or periodical residents may return to Bonya permanently if there were new opportunities arising locally. This highlights that the scope for local employment may be larger than expected.

Whilst the third-party Air and Noise Assessment in Appendix C-3 of the draft EIS uses the terminology that the Maperte Community has been unoccupied for a number of years, the body of the draft EIS, including Section 3.3 Cultural and Historic Environment and Section 3.4 Socio-Economic Environment, uses the term “mostly unoccupied”.

The Project Risk Assessment and the Social Impact Assessment identified that the return of residents to Bonya is a key activity that may create change in the community and therefore pose both social impacts and opportunities in the community. As the Project has the potential to offer good local job opportunities, KGL is eager to provide local people with training and work. Expectations surrounding employment will be managed through the development of a local employment and training plan, and liaison with employment and training providers to support workers and accommodate cultural and family obligations. Furthermore, economic opportunities will be enhanced through numerous measures, including the MOU between KGL and Bonya, the development of an indigenous employment and training plan, workforce planning to reduce structural and cultural barriers, the development of a Local Industry Participation Plan and working closely with the NT Government, ICN NT, the Chamber of Commerce and Regional Economic Development Corporations.

KGL appreciate the feedback that the scope for local employment may be larger than expected and if there is an ability to employ more residents from local communities than originally estimated, this will be pursued.

Comment No. 161

The EIS states that the Project should look for local contracting employment opportunities. As part of KGL Resources reaching these employment goals the company should consider scoping to employ a small crew from one of the local Aboriginal communities to do regular maintenance of the unsealed part of the Plenty Highway, the intersection and Lucy Creek Road.

KGL are committed to supporting business opportunities within the local communities, including small mining services contracting opportunities. Whilst KGL supports the concept of employing a small crew from one of the local Aboriginal communities to do regular maintenance on the unsealed portion of the Plenty Highway and at the intersection with the Lucy Creek Road, these are public roads which are not within the jurisdiction of KGL. Repair and maintenance of public roads is the responsibility of the NT Government. However, KGL will provide support should the NT Government indicate that there was an opportunity for the local community to be contracted to undertake regular maintenance on these roads.

Comment No. 162

The CLC highlights the fact that medical services are highly sought after in communities. The Bonya clinic is currently visited fortnightly by the nurse from Harts Range. Sharing the necessary 24hr medical services of the mine would be a welcome benefit for the community members. Native title holders also request that KGL seek options to train and employ an Aboriginal nurse or health worker at the proposed shared clinic in the community or at site.

The availability of medical services within the local communities was highlighted during the Social Impact Assessment process and KGL can understand that there is a need for improved medical services, particularly in the local Aboriginal communities. KGL are also aware that the Project has the potential to place additional demand on the Bonya clinic with the possibility of a return of residents to the community due to the creation of local job opportunities.

As KGL will be employing paramedics/nurses with the view of meeting the needs of potential health issues specifically related to mining and the potential circumstances arising in the mining environment, “sharing” of this resource will be difficult as they must be available for site requirements for the majority of the time and this will be their priority. However, KGL are investigating options for the sharing of the medical demands of the Bonya community with the Harts Range Health Clinic nurse who visits Bonya. As there will not be a continuous demand for the services of the paramedic/nurse who will be employed for the Project, there will be scope for them to visit Bonya on a routine basis to assist the community with their basic health services which would in turn relieve the burden on the Harts Range Health Clinic.

The added benefit of the medical resources at Jervois is the capability to assist in the case of critical accidents in the local area, working with the emergency services at Harts Range.

KGL can appreciate the benefits of having a more accessible nurse or health worker in the local community and are happy to work with the relevant NT Government authorities to investigate options to address this. The employment of an exclusively Aboriginal nurse or health worker by KGL to service communities such as Bonya would not be possible as such a placement is the responsibility of the NT Department of Health.

3.12 Arid Lands Environment Centre

3.12.1 Water

Comment No. 163

While the EIS notes that there are limited risks through groundwater drawdown, more information is needed to clarify the potential impact on groundwater dependent ecosystems (GDE). The information on GDEs in arid NT is still developing and is an issue of significant public interest.

Even though there is little information on their groundwater dependencies in Central Australia, the 2019 Low Ecological Landscape, Flora and Fauna Assessment (Appendix A-1) identified *Eucalyptus camaldulensis* (River Red Gum) and some *Corymbia* species to be dependent on groundwater. River Red Gums are reported to be dependent on shallow groundwater (up to 10 m) while *Corymbia* species tend to be deeper rooted from 8 – 20 m. In addition to these species which are found in the Project EL area, *Corymbia Apperrinja* (Ghost Gum) and *Vigna lanceolate* (Bean Trees) were observed throughout the borefield and pipeline area. These two species are deep rooted species which tap into ground water and would be considered facultative GDE species.

Potential impacts on these species may include dieback as a result of changes in hydrology. This may include adaptive responses and floristic changes as a result of groundwater drawdown. Secondary impacts may include weed proliferation around the base of tree species which inhibit germination of seeds.

CloudGMS were engaged in 2018 and again in 2019 to investigate potential groundwater drawdown and the effects this may have on GDEs in the Project area and in the borefield area. These investigations found that the depth to groundwater in the borefield area is greater than 10 metres and the closest sites that recorded water levels within 15 metres are to the west of the Lucy Creek homestead approximately 10 kilometres east of the borefield area. CloudGMS reported that whilst riparian vegetation in this area may be accessing regional groundwater, it is more likely it is reliant on water stored in alluvial sediments associated with the larger creeks. As a result, riparian health is more dependent on surface water flows within the creek systems. CloudGMS also reported that the borefield water supply will extract two gigalitres per annum and result in a drawdown of about two metres over an area of less than 110 km².

CloudGMS found that while two sites drilled within the Project EL area in 1972 reported groundwater levels less than five metres below ground level, these have been interpreted to be associated with alluvium associated with Unca Creek. As both of these bores were completed to less than 15 metres and given the low permeability of the underlying rocks, it suggests that this feature may be perched and possibly disconnected from the regional groundwater systems. Generally groundwater levels in the Project EL area are greater than 20 metres below ground level as all but one of the groundwater levels in the 2018 investigation were greater than 14 – 15 metres. As a result, drawdown in the fractured rock aquifer is expected to have limited effect on groundwater availability to riparian vegetation as the long-term health of the trees is related to the maintenance of the surface water flow regime in the creeks.

The literature review completed as part of the 2018 Groundwater Impact Assessment submitted as part of the draft EIS determined that stygofauna are not likely to be an environmental factor within the EL area as the habitat suitability is poor as the lithology of metamorphosed rocks is fine grained and will not provide the pore spaces required to support stygofauna (CloudGMS, 2018). As a result, the potential impact to stygofauna from groundwater drawdown within the Project EL area is considered low (CloudGMS, 2018).

The 2019 frc environmental Stygofauna Pilot Study (Appendix A-2) further investigated the presence of stygofauna in the borefield area of the Project. This study found that the geology and hydrology of the borefield area was considered suitable for providing habitat for stygofauna whilst the water quality was assessed as potentially suitable. Of the ten bores sampled, only one contained stygofauna: a single copepod, a stygoxene. Stygoxenes facultatively use groundwater ecosystems, but are not dependent on groundwater to complete their lifecycle. Overall the stygofauna community of the borefield area was assessed as having low environmental value based on the limited occurrence of a single taxon and the groundwater quality being only potentially suitable on the basis of total dissolved solids (frc environmental, 2019).

Potential impacts to stygofauna in the borefield area may include the drawdown of water tables and subsequent reduction in groundwater pressure and compaction of aquifers due to traffic on access roads. Vegetation clearing may also reduce habitat quality of shallow groundwater ecosystems where the water table intersects the root zone of vegetation and provides habitat for stygofauna. The risk assessment conducted as part of the pilot study rated these risks as low for the borefield area. The 2019 CloudGMS Groundwater Impact Assessment Supplement report found that “the proposed extraction regime in the borefield area is within the capacity of the aquifer and removes a very small fraction of the immense volume in storage”.

Refer to the detailed technical information provided in Sections 4.2 and 4.4.

Comment No. 164

The EIS notes that groundwater dependent ecosystems exist along the Unca creek and that some tributaries may be sensitive to large drawdown. More information is needed to reduce the risk to GDEs:

Is large draw down expected to occur in the groundwater resources of Unca creek and associated tributaries? How will this be monitored?

Refer to the response to comment 163 above regarding the groundwater resources in the vicinity of Unca Creek.

The BMP has been updated to include monitoring of the health of vegetation communities as a result of changes in hydrology such as the presence of dieback, leaf wilting and introduced species invasions.

Drawdown in the groundwater resources of the Project area will also be monitored in accordance with the Groundwater Management Plan. This will include monthly monitoring of pumped volumes and water level drawdown at observation bores.

Comment No. 165

What is the anticipated drawdown of groundwater levels in the vicinity of the River Red Gum community identified to be at risk?

While River Red Gums are reported to be dependent on shallow groundwater (up to 10 m) and the groundwater levels in the Project EL area are reported to be greater than 20 metres below ground level, drawdown in this area is expected to have a limited effect on this community. The long-term health of this community has been found to be dependent on surface water flow regimes in the area.

Refer to the response to comment 163 above regarding the groundwater resources in the vicinity of Unca Creek.

Comment No. 166

What are the contingency plans to modify pumping regimes if the River Red Gum community is found to be adversely affected by draw down?

Whilst it is not expected, the health of the River Red Gum community will be monitored in accordance with the Biodiversity Management Plan to determine if they are being adversely affected by

drawdown. This will include monitoring the health of the community including the presence of dieback, leaf wilting and introduced species invasions.

The Groundwater Management Plan (Appendix C-2) includes trigger values and mitigation measures for potential impacts as a result of water table drawdown. The trigger value is measured drawdown at observation bores which exceed the range of drawdown predicted by modelling. Mitigation measures are staged and include:

- The development of a Class 2 Groundwater flow model to be undertaken in accordance with the Australian Groundwater Modelling Guidelines;
- Increased process water efficiency investigations; and
- Modified pumping regimes.

Adaptive management strategies will also be investigated should improvements to these mitigation strategies be required to prevent adverse impacts to this River Red Gum community.

Comment No. 167

Are their future groundwater dependent ecosystem monitoring strategies proposed to improve the certainty of this risk factor?

In addition to the groundwater management plan mitigation measures outlined above in comment 166, specific monitoring strategies for impacts to GDEs have been included in the updated Biodiversity Management Plan provided in Appendix C-1.

These monitoring strategies include:

- Inspection of vegetation communities in high risk areas (e.g. Unca Creek) on a seasonal basis to ascertain status and condition;
- Monitoring the health of vegetation communities including:
 - Extent of the community;
 - Presence of die back, leaf wilting, leaf and branch dieback;
 - New species invasion;
 - Declining condition of trees (e.g. defoliation); and
 - Presence of regeneration.
- Initiation of corrective actions for vegetation communities which appear to be declining in extent or condition.

3.12.2 Acid Mine and Metalliferous Drainage

Comment No. 168

Acid and metalliferous mine drainage is an ongoing environmental challenge for many legacy and operating mine sites in the NT. Public trust in mining projects has been undermined by contamination at Redbank, McArthur River and other ongoing rehabilitation projects and is an ongoing drain on public finances. It is therefore important that all necessary precautions are taken to prevent AMD issues from occurring on the Jervois site.

KGL are committed to delivering a Project that is environmentally, economically, culturally and socially acceptable which includes a responsibility for completing progressive and sustainable closure and rehabilitation of the Project. Operating in an ecologically sustainable manner is integral to KGL earning and maintaining their social licence to operate and the ultimate success of the Project. To ensure that this approach is facilitated, KGL has ensured that a conservative approach to all technical impact assessments has occurred with particular reference to the Acid Mine Drainage studies completed to date.

Comment No. 169

While appendix C-1 suggests there is generally a minimal risk of AMD, it does demonstrate results that suggest possible AMD and problematic leachate. It also includes necessary precautionary measures to prevent contamination. AMD can therefore not be completed discounted as a risk. The contingency measures and precautions should be included as enforceable conditions in the event the project is approved.

Further works have been undertaken as part of the Supplement Report which provide further assessment of potential AMD and associated leachate. These technical works have determined appropriate management practices and monitoring regimes which KGL has committed to (Section 5 of this report).

As KGL is not responsible for determining NT mining approvals conditions and the legislation regulating this, they will rely on instruction from the NTG on whether it is approved and what conditions are applied to the Project.

Comment No. 170

Testing at Bellbird has confirmed potential acid forming ore from historic mine materials. The primary Cu ore is also a long-term concern that will require ongoing management. As acid forming ores were identified, especially at Bell Bird, AMD potential should not be discounted entirely and should remain a key monitoring issue.

KGL acknowledge that primary copper from historic mining has influenced the landscape. The handling and management of ore bodies from all mining areas is outlined in Section 4.6 and the Geochemical Assessment Supplement (Appendix A-5). Any affects arising from both historic or future mining activities will be detected through the proposed environmental management programs relating the surface water and groundwater monitoring and the geochemical assessment model.

Comment No. 171

We acknowledge that KGL are confident that owing to the low sulfur content of the ore, there is a minimal chance of AMD but consider that further testing and stringent monitoring plans must be developed. This will be necessary for public confidence and certainty that there will be no long-term significant impacts from AMD.

Subsequent to the draft EIS, further geochemical assessment works have been completed as detailed in Appendix A-5. Specifically, Section 4.3 of this Appendix details the management and monitoring in

relation to AMD. This has included the generation of a Sulphur Block Model that will be used to update and refine prediction of the small quantities of PAF material. This will allow the timely scheduling of suitable treatment of any PAF materials.

In addition, Appendix A-5 outlines recommended programs to monitor water quality around the TSF, Waste Rock Dumps and Open Pit areas, which will be undertaken quarterly.

Groundwater Monitoring is included to measure the impact of possible WRDs seepage. Two bores are currently located down-gradient of the WRDs for this purpose. Groundwater Monitoring to measure any impact of tailings seepage is also included in this program, with one bore located upgradient of the TSF, two bores located down-gradient and adjacent to the TSF. A further three monitoring bores are located to the east between the TSF and Reward pit.

Monitoring bores are also installed to the east of the Reward and Bellbird open pits and the Rockface underground operations.

3.12.3 Key Concerns

Comment No. 172

How will the proponent isolate the historic mine materials from the environment as recommended in appendix C1?

KGL has identified all areas previously disturbed by mining and exploration activities. Where materials from previous activities are identified as potentially acid forming (PAF), they will be removed from their current location and treated as PAF waste in the same manner as any PAF waste mined during the proposed Project. For materials identified as Non-Acid Forming (NAF), they will be incorporated within proposed waste stockpile areas.

Section 4.6 of this report and Appendix A-5 provides further detail in relation to the cover design and treatment of PAF materials.

Comment No. 173

Final pit voids are likely acid forming and will require ongoing monitoring of water quality. How long has the proponent considered is appropriate to continue monitoring and management of voids following closure?

Further geochemical modelling predicts that the water quality of the final pit voids (lakes) will stabilise in the longer term to a near neutral pH at 7 – 8, as the input of acidity from PAF ore rock diminishes with time as sulphide mineralisation becomes depleted by oxidation processes.

The proposal for management and monitoring recommends monitoring for at least 10 years post mining. During this time the results will be statistically reviewed, and further monitoring needs will be adjusted depending upon the findings of the analysis.

Further information is available in Section 4.5 and Appendix A-5.

Comment No. 174

The potential impacts on groundwater systems from underground water will need to be assessed, what are the details of this monitoring and who will assess the adequacy of the strategy during operation and post closure?

The potential impacts upon groundwater systems from activities associated with operations has been assessed at a local scale in the Groundwater Impact Assessment Supplement prepared by CloudGMS (Appendix A-4). As part of this process, a groundwater monitoring program was developed (Appendix B-1) which was peer reviewed by HydroGeoLogic (Appendix B-1) and found to be well designed.

The ongoing review of groundwater data and modelling will be assessed by an independent technical specialist during operations and post-closure.

Comment No. 175

What are the long-term monitoring programs to ensure groundwater quality will not be adversely affected by leachate from the TSF?

Appendix A-4 outlines recommended programs to monitor water quality around the TSF, which will be undertaken quarterly. The results of this recommended monitoring program will be used as input to the Groundwater Management Plan (Appendix C-2).

The Groundwater Monitoring Program, found within the Groundwater Management Plan, specifically targets measurement of any impact of tailings seepage, with one bore located upgradient of the TSF, two bores located down-gradient and adjacent to the TSF. A further three monitoring bores are located to the east between the TSF and Reward pit.

The Groundwater Monitoring Program is proposed to be continued for a period of 10 years post mining, with review during that 10 year period to determine the necessity of any further extension of monitoring program.

Comment No. 176

What are the contingency plans in the event groundwater quality is found to be adversely impacted by TSF leachate?

The risks associated with the potential for TSF leachate to have impacts on groundwater quality have been considered with the Groundwater Impact Assessment Supplement prepared by CloudGMS (Appendix A-4). Utilising data localised to the mine site the current modelling predicts a low likelihood of groundwater impacts off site. The localised impact of TSF seepage is shown to be restricted to capture within the Reward open pit pit-lake.

Should unacceptable impacts be measured, specific contingency options will be undertaken, such as pumping and treating seepage from beneath the TSF using interception bores for subsequent re-use in the process plant.

The Groundwater Management Plan (Appendix C-2) has been developed which provides a process for the identification and management of potential impacts. Suitable remediation measures will be

developed should adverse impacts be identified dependent upon site based data and technical investigations.

3.12.4 Regulation, Monitoring and Management

Comment No. 177

Assessment and potential approval of the Jervois project is occurring at a critical juncture of environmental and mining regulatory reform. The framework for monitoring and managing the environmental impacts of mining in the NT is being entirely reviewed and the Environment Protection Bill has just completed initial consultation. In addition to new requirements for water licencing under the Water Act, there are a whole host of reforms that would apply to this project. However, there is no clarity on how this will be done, especially concerning the transitional arrangements, of which the EIS is silent.

KGL is aware of the regulatory reform process currently underway and will take advice from the NTG on the transitional arrangements which may apply to this Project.

As suggested by DENR in their comments on the draft EIS, KGL will implement actions to conform with the application of the Water Act as recommended in their comments.

Comment No. 178

While we acknowledge the proponent is not able to comment on that process, it is important that this EIS is responsive to responsibilities that are foreseeable within the subsequent regulatory framework. This may mean developing data sets and monitoring strategies that provide the level of information necessary to ensure compliance with the future framework.

KGL will take advice and guidance from the DENR on their responsibilities in relation to future changes in legislation and abide by any statutory requirements in order to remain in compliance. This will include the development of data sets and monitoring strategies as required.

Comment No. 179

Is there an approximate time period by which the proponent anticipates the project will be regulated under the Environment Protection Act 2019?

As KGL is not aware of the timeframe for finalising the new legislative regime, it is not possible to place a definite timeframe on when it is expected that the Project will be regulated under the Environment Protection Act.

Comment No. 180

Has the proponent undertaken the investigations and studies necessary to apply for water licences as required by the amended Water Act?

At the suggestion of DENR Water Resources Division in their comments on the draft EIS, the following actions are being implemented in accordance with the application of the Water Act:

- Measures are in place to quantify, record and report monthly the volume of water extracted from surface water or groundwater resources;
- Groundwater bores are constructed and maintained in accordance with the National Uniform Drillers Committee, Minimum Construction Requirements for Water Bores in Australia;
- All groundwater bores are registered with DENR and clearly and permanently labelled with a registered bore number;
- Water meters comply with DENR's Non-Urban water metering policy and Non-Urban water metering code of practice for water extraction licenses;
- A plan is prepared in accordance with DENR guidance that demonstrates how and when water will be used over the life of the project;
- Groundwater and surface water use does not impact on water dependent ecosystems and there are measures in place to monitor for potential impacts; and
- Activities are conducted in a manner that minimises interference with bed and banks of a waterway.

Please refer to the Groundwater Impact Assessment Supplement (Appendix A-4) and associated Groundwater Management Plan (Appendix C-2).

Comment No. 181

Will reform of the framework for regulating the environmental impacts of mining have any bearing on the development of monitoring and management strategies for the project?

The draft Environmental Management Plan (EM Plan) provided in Section 5 of the draft EIS nominates management actions, performance indicators and monitoring strategies for the protection objectives of each environmental value of the Project. In developing the EM Plan, guidance was sought from the Queensland environmental regulatory system along with relevant Australian Standards. The use of these information sources has placed the Project in a good position for transition towards the new regulatory framework.

Monitoring and management strategies will continue to be updated in accordance with best practice strategies in order to comply with regulatory requirements.

3.12.5 Closure and Rehabilitation

Comment No. 182

Appropriate closure and rehabilitation will be the most important indicator of the sustainable legacy of the Jervois project. Considering the ongoing failure of mine rehabilitation in the NT, it is paramount that KLG demonstrates complete responsibility to the integrated, progressive and sustainable closure and rehabilitation of all mining activities on their tenements. While the EIS states that the proponent is fully committed to all their legal obligations, this provides limited assurance considering Mining Management Plans remain confidential, there are no legally enforceable NT standards of mine rehabilitation and the regulatory framework is being entirely reformed.

KGL are committed to delivering a project that is environmentally, economically, culturally and socially acceptable which includes a responsibility for completing progressive and sustainable closure and rehabilitation of the Project. Operating in an ecologically sustainable manner is integral to KGL earning and maintaining their social licence to operate and the ultimate success of the Project.

Should the standards of mine rehabilitation be reformed as part of the new regulatory framework, KGL will take advice and guidance from the DENR on their responsibilities and incorporate new standards into their closure and rehabilitation obligations.

Comment No. 183

As there are no NT Specific closure guidelines, what guidelines are informing the design of the progressive rehabilitation of the project?

The guidelines and handbooks referenced in the MRCP which informed the design of the progressive rehabilitation program for the Project include:

- The Guidelines for Preparing Mine Closure Plans 2015 (Western Australia Department of Mines and Petroleum);
- Mine Closure and Completion - Leading Practice Sustainable Development Program for the Mining Industry 2006 (Australian government Department of Industry Tourism and Resources);
- Mine Rehabilitation - Leading Practice Sustainable Development Program for the Mining Industry 2006 (Australian government Department of Industry Tourism and Resources); and
- Strategic Framework for Mine Closure 2000 (Australian and New Zealand Minerals and Energy Council and the Minerals Council of Australia).

In addition to these, a full analysis of completed and accepted closure and rehabilitation plans within several other NT EIS's was undertaken which determined that the adopted standard is currently acceptable to the NTG in the absence of NT guidelines.

Comment No. 184

How does the proponent intend to demonstrate ongoing compliance with closure commitments?

Outcomes and draft completion criteria have been developed to achieve closure objectives with completion criteria developed for each domain of disturbance. The completion criteria have been developed to be as clear and measurable as practical and will form the basis for Project closure conditions. During the detailed planning stage and throughout the life of Project, these criteria will be reviewed and updated. These updates will take into consideration additional information about environmental and other constraints, changes in mine planning and feedback from stakeholder consultations.

The proposed monitoring criteria for closure are outlined in Table 5-H-15 of the MRCP. Reports on monitoring results and progress towards mine closure criteria will be issued to relevant stakeholders annually.

The Mining Management Plans which will be submitted annually to the Department of Primary Industries and Resources will also contain a summary of the disturbed areas and the progressive rehabilitation status based on the MRCP completion criteria. In accordance with the MMP guideline, the MMP will also address closure planning.

The *Mining Management Act* requires operators of mining sites to apply to the Minister for a certificate of closure when rehabilitation has been completed to the satisfaction of the Minister. In accordance with the Act, the Minister will only issue a certificate of closure when the operator has met the closure criteria for the site. These closure criteria will form part of the standard provided in the MMP.

Comment No. 185

Does the proponent intend to include closure and rehabilitation reporting within the stakeholder engagement and communication plans?

As detailed in the MRCP, it is the intention that the annual report to be provided to the Community Liaison Committee will include mine closure monitoring results and progress towards mine closure criteria.

Comment No. 186

Considering the risk of commodity fluctuations, and the ongoing issue of perpetual care and maintenance for fledgling projects in the NT, how does the proponent intend to demonstrate the stability of the project as compared to the previous activities on the site?

Since owning the Project in 2011, KGL has implemented more modern, cost efficient exploration methods to improve the knowledge of the mineral resource and increase the average resource copper grade. KGL have also modified the exploration program with an aim to improving the quality of the resource and focussing on the drilling necessary to allow it to proceed. The board of KGL has also changed somewhat during this time and the new board has been focused on additional exploration to gain more confidence in the Project to ensure its long-term success.

Whilst the history has been chequered by sporadic exploration and mining activity since 1929, the common feature is that of a rich deposit that offers new discoveries. KGL has built upon these findings to establish a project which takes advantage of the full diversity of the deposit whilst focusing on delivering a copper product demanded by global markets. This focused approach on copper as the main product paired with technological advancement in mining and processing methods has enabled KGL to create an economically feasible project.

The stability of this Project is supported in several ways including:

- The use of copper in the digital age including its use in electric cars, solar panels, mobile phones and charging infrastructure;
- Wind and solar generation installations require multiple times the amount of copper used to generate the same amounts of electricity in coal and gas-fired power plants;

- Increases in copper demand are expected to be driven by the major emerging economies of China and India which are experiencing rapid growth in electricity distribution and household consumption;
- Whilst the worldwide copper demand is increasing, some reports state there is a copper supply deficit looming with existing mines at full capacity, declining grades and a shortage of new projects coming into production. Many markets have predicted deficit forecasts as early as 2019; and
- The global copper market outlook is favourable for KGL as the Jervois Base Metal Project is located in a country that is politically and economically stable compared to other copper producing countries such as Africa.

A recent article (January 2019) in the Financial Review provided an opinion of the OZ Minerals Chief Executive Officer which was that “any downturn in global economic growth won’t automatically spill over to the copper price because of the red metal’s increasing importance as a vital material for the digital age, along with the dearth of big copper discoveries being made around the world.”

Comment No. 187

How will the proponent complete the project and rehabilitate the site to a greater standard than previous operators?

The most recent mining activity on the Jervois Project was conducted by the Plenty River Mining Company in the early 1980’s. Since then, records indicate that only exploration, surveys, studies and test holes occurred on the site. It would appear environmental regulation legislation, and in particular the Environmental Assessment Administrative Procedures, in the NT dates back to 1995 which is some time after the last known mining activity on the site. As a result, rehabilitation standards in the 1980’s and beyond were no doubt significantly lacking, and possibly non-existent in the eyes of some mining and exploration companies.

As KGL Resources is bound by the current and more rigorous Environmental Assessment Administrative Procedures, they have an obligation to rehabilitate the activities proposed for this Project to a standard aligned with NTG principles. This includes the demonstration that ecologically sustainable mine closure can be achieved, rehabilitation of the disturbance areas associated with this Projects’ activities are consistent with agreed post-mining outcomes and land uses, and are without unacceptable liability to the NT. Prior to 2005, there was no requirement for operators to lodge a rehabilitation security bond which provides assurance to stakeholders that provisions are made for suitable rehabilitation and mine closure.

The Terms of Reference for the Project required the development of a Mine Rehabilitation and Closure Plan (MRCP) which outlines concepts for mine closure. In the development of this MRCP consideration was given to the results of materials characterisation, data on the local environmental and climatic conditions and potential impacts through contaminant pathways and environmental receptors.

Comment No. 188

What guarantees has the proponent made to the affected communities that this operation is distinct from the previous projects?

KGL has avoided making guarantees to stakeholders that this operation is distinct from the previous operations. KGL has been factual in their discussions and presentations to affected communities and stakeholders regarding the distinction between the proposed operations and previous activities which occurred prior to KGL taking ownership of the Project in 2011. Presentations to affected communities have concentrated on the history of the Project, the status of the copper market, the benefits and uses of copper, KGL's commitment to the Project, the economic benefits and the robust impact assessment process which is required to address the economic, social, cultural and physical environment.

KGL has explained that they altered the exploration program with an aim to improving the quality of the resource and focussing on the drilling necessary to allow it to proceed. KGL has also highlighted to stakeholders that their goal is to create a robust, low cost producer that can sustain its viability during times of fluctuating international base metal markets.

Comment No. 189

Will the closure and rehabilitation strategy include addressing the historical mine materials and activities?

Section 2.1 of this Supplement Report identifies approximately 136 ha of the 174 ha of historic disturbance areas will be located within the proposed Project disturbance area. As a result, this 136 ha will be rehabilitated in accordance with the rehabilitation strategies outlined in the MRCP.

Comment No. 190

We do not consider that the closure guidelines noted by the proponent are enough to guarantee sustainable mine closure and rehabilitation. We recommend that the proponent consider and integrate The International Council on Mining and Metals (ICMM) Planning for Integrated Mine Closure guidelines as they are considered international best practice.

The Australian guidelines used to prepare the MRCP (listed above in response to comment 183) are based on the ICMM guidelines and are considered best practice for Australia. Whilst the ICMM guidelines provide high level guidance for mine closure planning, the guidelines used for Australian mining projects more accurately reflect the practicalities of mining in this country. Our guidelines have been tailored to reflect the Australian climate, environment, governance framework and our national socio-economic status.

Closure has been considered from the outset of the mine design phase to ensure that operations are effectively managed. By progressively managing our rehabilitation, KGL are able to ensure that their practices will be sustainable and cognisant of the environment in which we operate.

Unless the NTG deem the Australian guidelines to be insufficient and specify that the ICMM guidelines are to be used, the Australian guidelines will be used for the finalisation of the MRCP and the mine closure and rehabilitation targets.

Comment No. 191

Further, we submit that the proponent should strive to backfill all voids, as required by best practice mine rehabilitation. Appropriate backfilling and rehabilitation should not be determined according to the financial capacity of the proponent, but rather as a precondition of any approval and necessary for the sustainable operation of the mine.

KGL will strive to backfill the Bellbird North Open Pit, where waste from the Bellbird South Open Pit is available at the time this pit void is available to fill. Filling of this pit will not interfere with the required underground mine access and ventilation infrastructure at Bellbird.

Backfilling of the voids at the Reward and Southern Bellbird open pits will result in the underground access at each resource being removed. As the underground mining continues well beyond the open pit mining, waste will not be mined from the open pits at the time that surface voids are available to fill. Hence the requirement for the planned waste rock dumps outlined in the draft EIS.

The option to later remove the waste rock dumps back to the open pit voids at completion of the underground projects could potentially sterilise future resources. Consequently, this will not be incorporated into the mine rehabilitation targets unless there are statutory requirements to do so.

KGL is using inert materials (NAF) in their cement mix and wherever possible (PAF) waste will go into the underground voids. However, this is being carefully managed as part of the AMD and mine scheduling processes. To remain consistent with guidelines for AMD, complete backfilling is not actually best practice (i.e. it may force further disturbance of encapsulated wastes). This is a complex environmental management issue which needs to consider the requirement to carefully manage the small amount of PAF present on the site.

As KGL is not responsible for determining NT mining approvals conditions and the legislation regulating this, they will rely on instruction from the NTG on whether it is approved and what conditions are applied to the Project.

3.12.6 Consultation and Engagement

Comment No. 192

ALEC is grateful for the time that KGL has taken to inform us on the design of the project and operational plans on several occasions. Proactive engagement with a broad range of stakeholder is necessary to acquiring any social licence to operate. This EIS submission, however, is but one event in ongoing community engagement and education.

The proponent should continue to maintain open lines of communication as the project progresses.

As demonstrated to date, KGL is committed to regular and open communication with stakeholders in order to keep them informed as the Project progresses. The purpose of the Social Impact

Management Plan (SIMP) which was submitted as part of the draft EIS, is to guide KGL's social performance for the life of the Project. Social impact management for the Project will focus on community liaison, stakeholder engagement and proactive and open communications to provide updates, reduce community fears due to lack of knowledge and manage expectations in relation to jobs and services procurement.

KGL is committed to maintaining their strong link to the community into the future. Management actions will include the development of a Communication Strategy which will be specific and include methods for proactive and open communications with relevant and affected stakeholders.

Comment No. 193

Consider plans to formalise on-going public engagement in the event approvals are granted and the project commences.

The SIMP contains a Commitments Register which includes annual reporting to the community, the establishment of a community liaison committee and the development of specialised management plans. Specifically, commitment 12 of the SIMP states that KGL will maintain good communication and engagement with the community through numerous measures such as providing project updates to the community through various means, ongoing liaison with pastoralists and the Bonya community and the maintenance of easily accessible public enquiry methods.

As KGL are committed to ongoing stakeholder engagement, a Socio-Economic Management Plan will form part of the MMP's for the Project.

Comment No. 194

Commitment to informing relevant stakeholders in the event modifications are made to the project prior to an assessment decision being made.

Whilst it is not the intention to make any significant modifications to the Project prior to an assessment decision being made, KGL will keep relevant stakeholders informed of any Project updates during this time.

This commitment has been included in the list provided in Section 5 of this report.

Comment No. 195

More information on how the proponent intends to maintain regular communication and engagement for relevant and affected stakeholders.

As detailed above in responses, KGL has every intention of maintaining regular communication and engagement with relevant stakeholders through the formalised engagement strategies provided in the SIMP and draft EM Plan.

Comment No. 196

Note that the EIS process is not necessarily the most effective tool for broad engagement and consultation. An EIS is not the most effective tool for communicating complex scientific risk. Consider providing briefings and summaries to improve access to information and engagement.

In accordance with the SIMP, KGL is committed to ongoing stakeholder engagement through numerous measures including the provision of Project updates to key stakeholders. As suggested, KGL will provide technical briefings and Project summaries to those stakeholders who may be interested in the more complex scientific aspects of the Project.

Refer to the responses to comments 192 and 193.

3.12.7 Energy Use

Comment No. 197

Despite the Jervois project on its own, potentially producing little greenhouse emissions, cumulatively these operations contribute a significant amount to total electricity emissions of the NT. It is therefore concerning that the proponent has not anticipated the use of solar energy, instead relying on diesel.

The underground operations will be operating at considerable depths so safety to personnel is of utmost priority which means having a secure power supply system. KGL are proposing to use the latest power generation processes taking into account the need for a secure continuous supply of power in an area where service and supply logistics can be unreliable. This diesel power generation process coupled with low penetration solar with or without battery support is now well tested and is considered to be the best solution from both a safety and environmental perspective.

Whilst this will supply the majority of the energy requirements of the Project, KGL are continuing to investigate alternative sources of energy supply. Discussions are currently underway with providers for a solar power system for the site telecommunications systems. The details on this solar system will be subject to detailed design and engineering once the preferred provider has been chosen.

The proposed power supply options are currently the most practical due to the remote location of the Project, the need for an uninterrupted power supply, maintaining the economic feasibility of the Project and the practicality of other power supply options. Complete reliance on solar energy is not feasible for several reasons including the need for an uninterrupted power supply and the peak load requirements for start-up of the processing plant.

Throughout the life of the Project KGL will introduce initiatives to improve energy efficiency which will reduce greenhouse gas emissions and subsequently contribute to managing operational costs. The draft Environmental Management Plan and sections 2.2.9 and 4.6 of the draft EIS provide details on the greenhouse gas mitigation options which will be investigated including fuel efficiency practices, the investigation of renewable sources and energy conservation practices.

Comment No. 198

The recent announcement of a fully integrated hybrid solar/diesel power plant at the Nova Mine in WA demonstrates that the technological capacity and commercial imperative exists to provide significant solar energy for remote mining operations. We therefore suggest that the proponent investigate the potential use of solar power for total energy demand which will help deliver on their

obligations to minimise greenhouse gas emissions and generally improve sustainability of the operations.

KGL have considered industry options for the proportion of total energy that can be generated with the hybrid solar systems which are currently available. The findings indicate that this varies as follows:

- Using solar + diesel generation only (i.e. solar only being available during daylight hours) - approximately 20 to 30% of the total power can be generated from the solar system; and
- Using solar + diesel + solar battery storage - approximately 30 to 50% of the total power can be generated from a solar installation.

KGL are aware of the long-term cost saving benefits of a hybrid scheme, not to mention the benefits of renewable energy sources and their obligations to reduce their carbon footprint. As previously stated (responses to comments 58, 90 and 197), KGL is now proposing to use diesel power generation coupled with low penetration solar with or without battery support. Solar power alternatives are also being investigated for the site telecommunications systems.

3.12.8 Conclusion

Comment No. 199

The Jervois project can provide economic opportunity to arid NT and isolated communities. However, the equitable and sustainable operation of this mine is only possible provided that the proponent commits to undertaking operations that are properly consistent with ecologically sustainable development. This includes anticipating the need to develop operational plans and ongoing monitoring that will be consistent with updated responsibilities and obligations under a modernised framework of mining and environmental regulation.

KGL is committed to developing a robust Project that can sustain its viability and this includes a commitment to operating in an ecologically sustainable manner in line with Territory and Federal guidelines and regulations. Project decision-making and planning addressed the principles of ESD by integrating the findings of the project risk assessment, economic and financial modelling outputs, the findings of supporting environmental assessments and outcomes of key stakeholder engagement. These points were also considered in the Project alternatives assessment.

The Terms of Reference (ToR) for the draft EIS were prepared in accordance with the *Environment Protection Authority Act* which aims to protect the environment and promote ecologically sustainable development. The draft EIS was prepared to address the requirements of the ToR and hence provide objectives and strategies for an ecologically sustainable Project.

The environmental impact assessment process is precautionary in nature as it assesses and evaluates uncertainty about the environmental consequences of a development prior to a project proceeding. To satisfy ESD principles, emphasis was placed on the anticipation and prevention of environmental harm (i.e. being proactive rather than reactive). The Project Risk Assessment identified the hazards and risks associated with the preferred alternatives and proposed appropriate controls and mitigation measures where required.

In line with the ecologically sustainable principles of the draft EIS, Mining Management Plans (MMPs) will be prepared for the Project and updated annually. These MMPs will include operational plans and ongoing monitoring strategies in accordance with the draft Environmental Management Plan which was prepared as part of the draft EIS. The MMP will be updated as necessary in order to anticipate and maintain compliance with revised mining and environmental regulatory regimes.

KGL will continue to keep abreast of reform processes to determine any changes in responsibilities or obligations under any new regulatory frameworks which may be introduced throughout the life of the Project.

3.13 Tourism Central Australia

3.13.1 Environment

Comment No. 200

The Northern Territory prides itself on the importance of National Parks and the extensive biological factors that are critical to the varying ecosystems. The project will be based within the Jervois Range Site of Bioregional Significance, an eastern outlier of the Dulcie Ranges and located 20km north of Jervois Station Homestead. It covers the following bioregions: Channel Country (CHC 95.3%); Burt Plain (BRT 3.4%) and Simpson-Strezlecki Dunefields (SSD 1.3%).

The environmental consequences of mining operations have both acute and chronic impacts on vegetation, water, and biological life in surrounding areas. A major concern is Acid Mine Drainage (AMD), caused when metal sulphides are exposed to natural elements. During oxidation sulfuric acid and free heavy metals can contaminate surrounding areas. This has a huge negative impact on the environment, resulting in the inability to sustain vegetation and biological life.

During the operational period of the project does KGL commit to continuously improving environmental standards and will KGL provide media releases regarding any positive or negative environmental impacts that arises due to mining operations?

The draft Environmental Management Plan (EM Plan) submitted as part of the draft EIS was developed to avoid, minimise or mitigate potential environmental impacts from the Project. One of the intentions of the EM Plan is to incorporate revised or improved measures to manage environmental impacts. The goal of the environmental management strategies is to maintain or exceed the environmental compliance criteria for the Project. In addition, the adoption of an Environmental Management System (EMS) will guide compliance and the continuous improvement of the EM Plan throughout the life of the Project.

KGL engaged the services of True North Strategic Communications (True North) to undertake a thorough Social Impact Assessment (SIA) for the Project and prepare a Social Impact Management Plan (SIMP). Both the EM Plan and the SIMP provide formalised engagement activities proposed by KGL in order to ensure stakeholders are informed on the progress of the Project, including key milestones such as the granting of Project approvals and commencement timeframes. The SIMP

states that KGL will maintain good communication and engagement with stakeholders through numerous measures such as:

- Providing Project updates to key stakeholders through various means including emails and community noticeboards;
- Posting regular updates and community reports on the KGL website;
- Ongoing liaison with pastoralists and the Bonya community;
- Annual satisfaction surveys;
- The maintenance of easily accessible public enquiry methods; and
- Communication with the Gemtree Caravan Park and other tourism bodies during peak tourist season.

The SIMP also commits to the creation of a liaison committee and annual liaison committee reporting. This annual environmental report will include measurement of indicators against baseline data provided in the SIA.

As KGL is a publicly listed company on the ASX, they are obliged to prepare an Annual Report for shareholders. A summary of the company's social and environmental performance will be included as part of this report which will be made available to the general public through several means including the KGL website.

KGL is committed to maintaining the strong link to the community during the life of the Project through regular consultation. As recommended by True North, KGL have every intention to continue with ongoing engagement with stakeholders to address any emerging issues. Please refer to the commitments provided in Section 5.

Please also refer to the detailed technical information on inland waters environmental quality provided in Section 4.6 of this report.

Commitments to continuously improving environmental standards and providing media releases regarding Project environmental impacts resulting from mining operations have been included in the commitments list provided in Section 5.

Comment No. 201

Due to the publicly perceived negative benefits of the mining industry it is refreshing to know that progressive rehabilitation will be commencing onsite between 2027-2030. To further improve your social standing it would be beneficial to implement a carbon sequestration and/or vegetation rehabilitation program in the Alice Springs region. Can you please note if KGL will be undertaking any additional programs in an effort to support the local environment, and the justification?

Whilst a carbon sequestration and/or vegetation rehabilitation program in the Alice Springs region has not specifically been investigated, KGL have committed to considering options for carbon offsets where greenhouse gas emissions reduction is not possible. Please refer to the commitments provided in Section 5 of this report.

As part of their commitment to supporting the environment and investing in the local community, KGL will be happy to investigate local rehabilitation programs which may become available.

3.13.2 Transport and Tourism

Comment No. 202

The Plenty Highway is frequented by tourists and freight vehicles and already places stress on the current infrastructure. Additional heavy weight vehicles will lead to faster degradation of the road and will result in unsafe conditions. Does KGL have any intentions of sealing the Plenty Highway to the Northern Territory border, or maintaining the formed earth road?

The Social Impact Assessment identified that a key negative impact was the increase in traffic on unsealed roads which has implications for the tourism industry, the pastoral industry and other road users. Whilst KGL supports the concept of sealing the remainder of the Plenty Highway, these are public roads which the NT Government is responsible for repairing, maintaining and sealing. The Traffic Supplement Report in Appendix A-9 provides recommendations for the prioritisation of maintenance works and upgrades to the Plenty Highway which KGL will pursue with the various Government Departments.

Due to the benefits it would provide to several sectors in Central Australia, KGL is committed to lobbying the NT Government for the early sealing of the Plenty Highway.

Comment No. 203

The proposal of a rail corridor from the Jervois Base Metal Project site to the Ghan Railway Line will improve transportation efficiency and provide many economic benefits. It is understandable if you do not wish to share the rail infrastructure with tourists or freight rail carriages, so TCA is proposing the development of a cycle path alongside the Plenty Highway to the Gemtree Caravan Park. This will provide an alternative transportation route for a range of persons working in a variety of industries. Will KGL fund and construct the multiple use cycle path from Stuarts Highway to Gemtree Caravan Park during the two year construction phase of the project site?

KGL is not proposing a rail corridor from the Jervois Project to the Ghan Railway Line. Section 4.7 of the draft EIS states that KGL will pursue the option of constructing a rail siding on the existing Ghan Railway Line where it crosses the Plenty Highway north of Alice Springs. Should this happen, concentrate from the Project would still be transported by road from the Project along the Plenty Highway to this proposed siding. From there it would be railed to its destination for export instead of being transported by road along the Stuart Highway into the freight terminal in Alice Springs.

KGL are not able to fund or construct public infrastructure such as the proposed cycle path. KGL is a publicly listed company and it would not be in the best interests of the shareholders to agree to such an activity.

4 SUPPORTING TECHNICAL INFORMATION

This section provides new and updated environmental impact assessment information since the draft EIS was prepared. This technical information has been provided to address specific stakeholder comments which required further technical clarification. Comments which could be addressed through a simple explanation are provided in Section 3 of this Supplement. Reference can be made to the Supplement Report Cross Reference table provided in Appendix E for guidance on where individual comments are addressed throughout this report.

Information specific to EL 25429 and the borefield and pipeline area are referenced as such. Where information relates to the Project as a whole (EL 25429 and the borefield and pipeline area), reference is made to the proposed action or the Project area.

4.1 Existing Environment

4.1.1 Physical Environment

Comments on the Physical Environment section of the draft EIS relate to the following matters:

- Contamination status of the Project; and
- Natural and historic mine-related contributions to water contaminant levels determination and water quality monitoring to demonstrate that there is no additional, unacceptable impact on water quality.

Land Contamination

In response to feedback on the draft EIS, WMV Environmental Pty Ltd were engaged to complete a Contaminated Land Preliminary Site Investigation (CLPSI) in accordance with the National Environment Protection (Assessment of Site Contamination) Measure (ASC NEPM). This included a detailed site history investigation and an extensive site inspection to document and photograph all of the visible historic mine disturbance areas.

The CLPSI identified potentially affected media as shallow soil, groundwater and sediments and surface water in Unca Creek. Potential sources of contamination from historic mining activities that could be identified include mine infrastructure areas, a processing plant and associated stockpiles and facilities, the airstrip, possible explosives store and magazine/warehouse. Chemicals of potential concern associated with these areas could include acids, alkalis, explosives, metals, PCBs, hydrocarbons, solvents, SVOCs and VOCs. A complete representation of the historic contamination sources and COPCs are provided in Table 5.1 of the CLPSI in Appendix A-6.

As reported in the CLPSI, maps, records and data availability for the historic mining activities is not comprehensive with some limited information obtained from historic photographs and geological reports and the 2018 archaeological assessment which was commissioned by KGL. As a result of the

lack of available data, the extent of disturbance or contamination from historic mining activities cannot be comprehensively confirmed, it can only be assumed based on the information available.

Potential pathways/transport mechanisms and the potential for these to impact human health and the environment are detailed in Table 4.1-1 below.

Table 4.1-1: Potential Pathways/Transport Mechanisms

Pathway/Transport Mechanism	Construction	Operations	Post-closure
Human			
Wind erosion and atmospheric dispersion of upper layers of surface soil	Occasionally	Occasionally	Rarely
Ingestion of contaminated soil via handling	Unlikely	Unlikely	Rarely
Dermal absorption from soils via handling	Unlikely	Unlikely	Rarely
Ingestion or dermal contact with impacted groundwater	Unlikely	Unlikely	Rarely
Ingestion or dermal contact with impacted surface water	Unlikely	Unlikely	Rarely
Environmental			
Migration of potential contaminants in Groundwater	Unlikely	Unlikely	Rarely
Migration of potential contaminants in surface water runoff	Unlikely	Unlikely	Rarely
Ingestion or dermal contact with impacted Groundwater	Unlikely	Unlikely	Rarely
Ingestion or dermal contact with impacted surface water	Unlikely	Unlikely	Rarely
Ingestion or dermal contact with impacted soil	Unlikely	Unlikely	Rarely

Source: WMV Environmental, 2019

Potential environmental impacts from areas of historic contamination identified by the CLPSI may include those to groundwater, aquatic ecosystems and terrestrial ecosystems. Receptors that have the potential to be exposed to chemicals of potential concern include agricultural workers, site workers, aquatic ecosystems, terrestrial ecosystems and water users. The conceptual site model and exposure pathway assessment is provided in Figure 4.1-1 below.

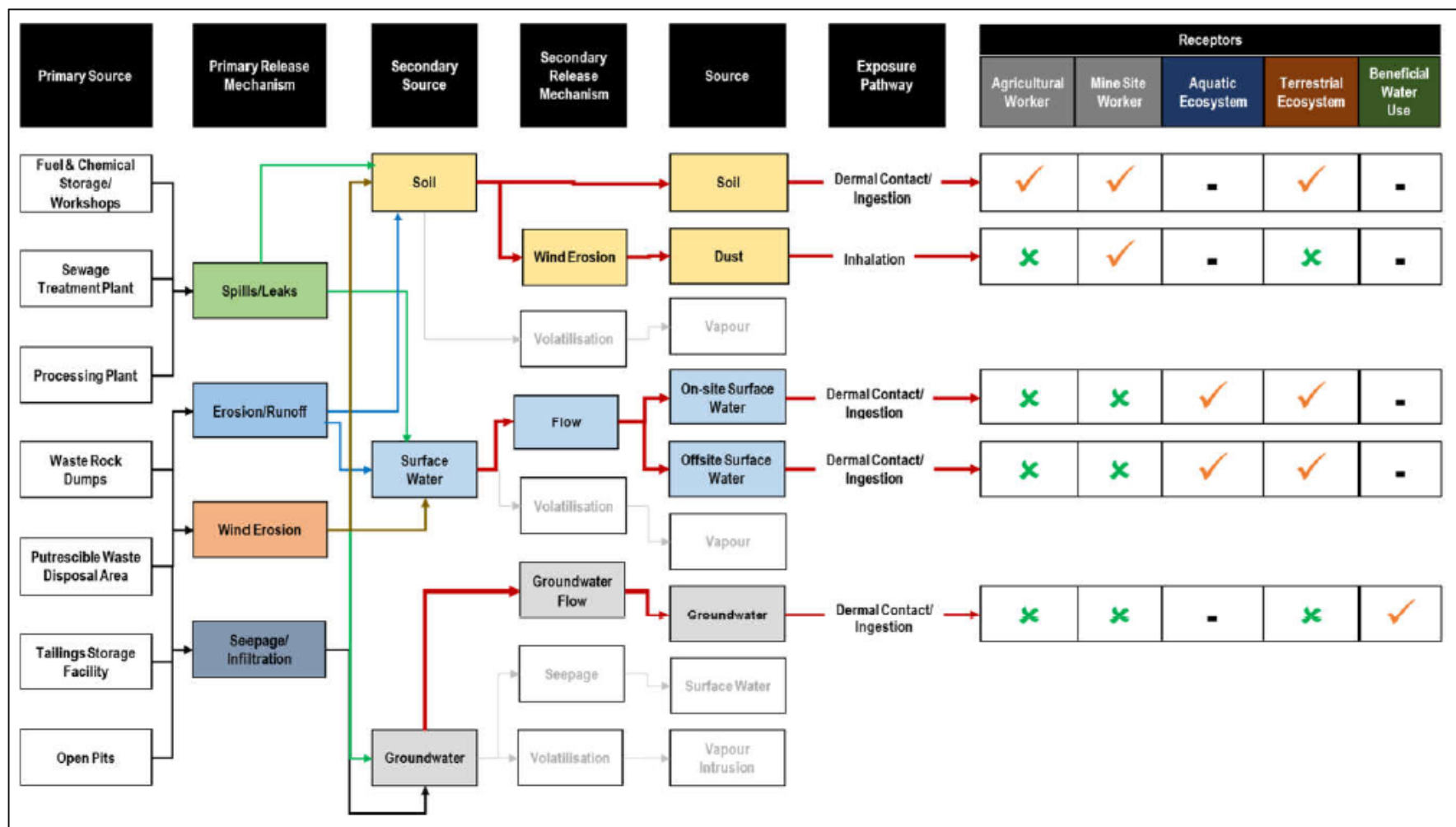


Figure 4.1-1: Conceptual Site Model and Exposure Pathway Assessment
Source: WMV Environmental, 2019 Contaminated Land Preliminary Site Investigation (Appendix A-6)

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Potential risks from historic contamination during the construction and operational phases of the Project may include the excavation or disturbance of historically contaminated soil and subsequent wind and water erosion from these areas. The exposure pathway assessment found that there are few potentially complete pathways linking human health or environmental receptors to potential contamination sources. The likelihood of human exposure to dispersed soil was assessed as being occasional during the construction and operational phases of the Project. Ingestion and absorption of historically contaminated soil or water by humans during the construction and operational phases of the Project has been assessed as unlikely. Likewise, the potential for the migration of historic contaminants to waters and for environmental receptors to ingest or have dermal contact with this water has been assessed as unlikely and rare.

Whilst there is potential that the historic mining activities have resulted in contamination, a significant portion of this historic disturbance area will be rehabilitated as part of the Project. As provided in Section 2.1, approximately 136 ha of the proposed mining disturbance will be located within the 174 ha of historic disturbance areas. Historic mining disturbances that will not be impacted by the proposed mining disturbance and will remain untouched include part of the airstrip and some minor surface extraction sites (Refer to Figure 2.1-4 in Section 2.1 of the Project Description). The conceptual site model prepared as part of the CLPSI identified potential sources of contamination resulting from the open pits may include acids and metals whilst the airstrip may also include hydrocarbons, solvents, SVOCs and VOCs. As a result of the limited complete exposure pathways, it is not expected that the contamination in these areas will pose a significant risk to human health or the environment.

The CLPSI report findings indicate that the proposed mitigation measures will be adequate to manage potential risks from historic contamination. Measures which will be implemented to mitigate the risk of historic contamination impacting the environment or human health will include:

- Implementation of the Environmental Management Plan including the Erosion and Sediment Control Plan;
- Implementation of the Health and Safety Management Plan;
- Management and prevention of dust emissions; and
- Workplace health and safety inspections and audits.

4.1.2 Biological Environment

Comments on the Biological Environment section of the draft EIS related to the identification of vegetation communities and threatened species of the borefield and water supply pipeline. The majority of other comments received on this section of the draft EIS have been incorporated into the Terrestrial Flora and Vegetation and the Terrestrial Fauna Sections

Fauna Habitat

As requested, Table 3.2-5 from the draft EIS is updated as follows to include the six broad habitat typed used in the draft EIS (as commented on in Section 4.4 of this report).

Table 4.1-2: Broad Habitat Types in the EL Area

No.	Broad Habitat Type	Vegetation Community	Refined Vegetation Communities	Amount in EL area (ha)
1	Hummock grassland	1	Hummock (<i>Triodia basedowii</i> , <i>Triodia pungens</i>) grassland with sparse shrubs and low trees (VC1).	345.7
2	Low <i>Acacia</i> sp. shrubland	2, 6, 8	Sparse, low <i>Acacia siberica</i> shrubland over short grasses and forbs (VC2). Sparse low <i>Acacia</i> woodland over hummock grasses (VC6). <i>Acacia georginae</i> (Gidgee) dominated woodland. Sparse grass and forb understorey (VC8).	1,332.6
3	Tall <i>Acacia</i> sp. woodland	3, 4	<i>Acacia estrophiolata</i> tall, open woodland over short grasses with sparse shrubs (VC3). Tall <i>Acacia aneura</i> woodland over short grasses in fire protected valleys and upper reaches of drainage lines (VC4).	151.3
4	Tall <i>Corymbia</i> sp. and <i>Acacia</i> sp. woodland	5	Tall, open woodland with <i>Corymbia</i> and <i>Acacia siberica</i> over short grasses and forbs; on floodplains and at the base of ranges (VC5).	1,843
5	Tall <i>Eucalyptus</i> sp. woodland on drainage lines	7	<i>Eucalyptus camaldulensis</i> tall woodland over sparse grasses in drainage channels and rocky creek beds (VC7).	116.5
6	Jervois Dam	7	A large artificial lake on Unca Creek	6.7

Figure 3.2-4 from the draft EIS is updated as follows:



Figure 4.1-2 Broad Habitat Types

4.2 Terrestrial Flora and Vegetation

This Section provides the additional technical information required to address the feedback from stakeholders in relation to assessing the terrestrial flora and vegetation values of the Project area, including the borefield and water pipeline. Feedback on the draft EIS in relation to terrestrial flora and vegetation which required further technical clarification is summarised as follows:

- Evaluate the flora characteristics and assess the potential impacts of the borefield and pipeline area, including threatened flora habitats;
- Identify, map and describe significant and sensitive vegetation types, wetlands and drainage areas impacted by the Project; and
- Project fire history.

Numerous flora surveys of the Project area have been completed by Low Ecological Services Pty Ltd between 1985 and 2018. The surveys in 2017 and 2018 were undertaken for the draft EIS to address the dry season and the post-wet season characteristics of the Project EL area. In response to feedback on the flora and fauna aspects of the draft EIS, Low Ecological were engaged again in April 2019 to undertake additional investigations into the potential flora and fauna impacts of the proposed borefield and pipeline area. The 2019 Landscape, Flora and Fauna Supplement Report can be found in Appendix A-1.

Significant Vegetation Communities

Tables 3.2-3 and 4.1-3 from the draft EIS are updated as requested to include riparian vegetation as defined in the NT Land Clearing Guidelines:

Table 4.2-1- Significant Vegetation Communities Located in the Project EL Area

Significant Value	Description	Present in EL Area	Area (ha)
Sensitive vegetation	Trees containing large trees with hollows suitable for fauna	Central area of the Project area near the southern end of the proposed tailings dam.	2.56 ha
Riparian vegetation	Riparian woodland dominated by <i>Eucalyptus cameldulensis</i>	Vegetation community #7	122 ha
Bioregional Conservation Significance	Within the Jervois Range – site of botanical significance (SoBS)	The majority of the Project area (88%) is mapped within this area.	3,350 ha
Essential habitat (TPWC Act)	n/a	No	0 ha
TEC (EPBC Act)	n/a	No	0 ha
Identified as significant in previous government assessment	n/a	No	0 ha

Suitable Habitats for Threatened Flora

Targeted field surveys of the Project EL area did not identify any threatened species under the TPWC Act. *Bolboschoenus caldwellii*, which is listed as endangered under the TPWC Act, has a low-moderate likelihood of occurring in the Project area as only record of it is 3.4 km west of the Project area as recorded in 1985. Two flora species listed as near threatened under the TPWC Act *Eremophila cordatisepala* and *Sauropus rigens*, were recorded during on-ground surveys. Whilst not encountered during field surveys, *Sida intricata* has a high likelihood of occurring within the EL area even though the closest record of this species is approximately 13 km north-east of the Project area in 1957.

As the Project water supply investigations have included drilling activities in proposed production bore locations, other than trenching activities for the pipeline, this area will undergo minimal clearing as the infrastructure will be located within the existing road easement, existing tracks and previously disturbed areas.

The likelihood of occurrence has been mapped for threatened and near-threatened species based on parameters such as land systems, soil units, proximity to watercourses and vegetation units (Appendix A-1 Low Ecological Services Landscape, Flora and Fauna Supplement Report Figures 7 to 10). From this, the potential losses of these possible habitats within a five kilometre buffer of the Project EL, borefield and pipeline areas have been estimated as provided in Table 4.2-2.

Table 4.2-2 Potential Losses of Threatened Flora within 5 km of the Project

Species	TPWC Act Status	Likelihood of Occurrence	Suitable Habitat Area (ha)	Potential Loss of Habitat (ha)	% Loss of Habitat
<i>Bolboschoenus caldwellii</i>	EN	Low	59,955	143	0.2%
		Moderate	14,415	1.5	0.01%
		High	557	0.1	0.02%
<i>Sida intricata</i>	NT	Low	63,363	144	0.2%
		Moderate	11,565	0	0%
		High	0	0	0%
<i>Sauropus rigens</i>	NT	Low	8,551	0	0%
		Moderate	48,440	136.1	0.3%
		High	17,937	8.3	0.05%
<i>Eremophila cordatisepala</i>	NT	Low	28,842	0	0%
		Moderate	28,190	4.9	0.02%
		High	17,895	139.5	0.8%

Due to the location of the only record of *B. caldwellii* 3.4 km west of the Project EL, losses due to the potential direct and indirect impacts from the Project are not expected. *S. intricata* has not been recorded during field surveys of the Project EL area and due to its habitat requirements, is unlikely to occur in the area. On ground surveys recorded *S. rigens* and *E. cordatisepala* within the Project EL

area but these lie outside of the proposed disturbance areas and will not be impacted (Note the location of *S. rigens* on Figure 4.1-4 of the draft EIS and Site J04 on Figure 4 of the 2018 Landscape, Flora and Fauna Assessment Report is incorrect as this species was only found in the Jervois Mine Dam area where suitable habitat exists). *E. cordatisepala* was recorded during on-ground surveys at sites J02, J04, J06 and J14. The record at site J02 is the only location which may be impacted by a proposed borrow pit but the footprint of this can be altered to avoid this area.

Fire History

Records indicate that the majority of the Project area, including the EL and borefield and pipeline, was burnt in 2002 and a small isolated fire occurred near the Jervois Mine Dam in 2011. Whilst the northern boundary has not been burnt since 1997, a large section of the proposed borefield and pipeline in the north east has long been unburnt.

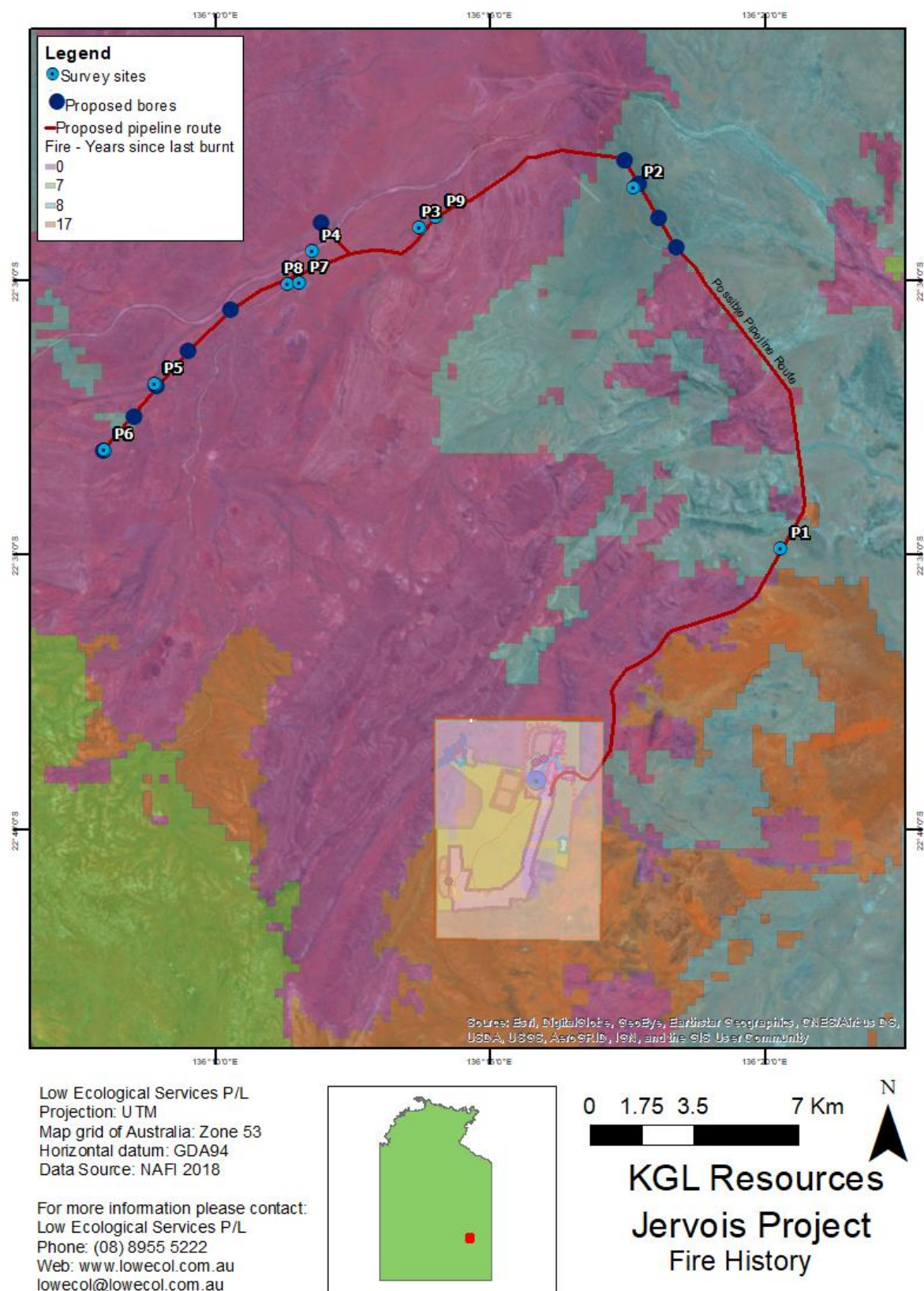


Figure 4.2-1 Project Area Fire History 1997 to 2018

Source: Low Ecological Services, 2019 Landscape Flora and Fauna Supplement Report (Appendix A-1)

4.2.1 Flora Characteristics of the Borefield and Pipeline Area

Methods and sources of information for the desktop assessment of the borefield and pipeline area followed the process used for the 2017 and 2018 Landscape, Flora and Fauna Assessments completed by Low Ecological Services with the search area including a 20 km buffer around the area. Field surveys of the borefield and pipeline area were completed over four days and three nights between 29th April and 2nd May 2019 with the methodology following that used in the draft EIS.

Vegetation Communities

Seven broad land systems (Bond Springs, Ilgulla, Lucy, Sandover, Singleton, Sonder and Woodduck) occur across the area as described in Table 3 and shown on Figure 2 of the Landscape, Flora and Fauna Supplement Report. Vegetation types in the area were mapped at a scale of 1: 1,000,000 in the Vegetation Survey of the Northern Territory (Wilson, et al., 1990). Four broad vegetation types dominate the area as defined in Table 4.2-3 and Figure 4.2-2.

Table 4.2-3 Vegetation Types within the Borefield and Pipeline Area

Vegetation Unit	Broad Vegetation Classification	Structural Formation	Fine Vegetation Description
63	Acacia with grass understorey	<i>Acacia georginae</i> (Gidyea) Low open-woodlands	<i>Acacia georginae</i> (Gidyea) low open-woodland with open-grassland understorey.
71	Acacia with grass understory	Sparse shrubland	<i>Acacia aneura</i> (Mulga) tall sparse shrubland with grassland understory.
74	Acacia with grass understory	Sparse shrubland	<i>Acacia stowardii</i> (now <i>sibirica</i>) (Bastard Mulga), <i>Cassia</i> , <i>Eremophila</i> (Fuschsia) sparse shrubland.
95	Hummock grassland	Grassland	Mixed species sparse-grassland or herbland.

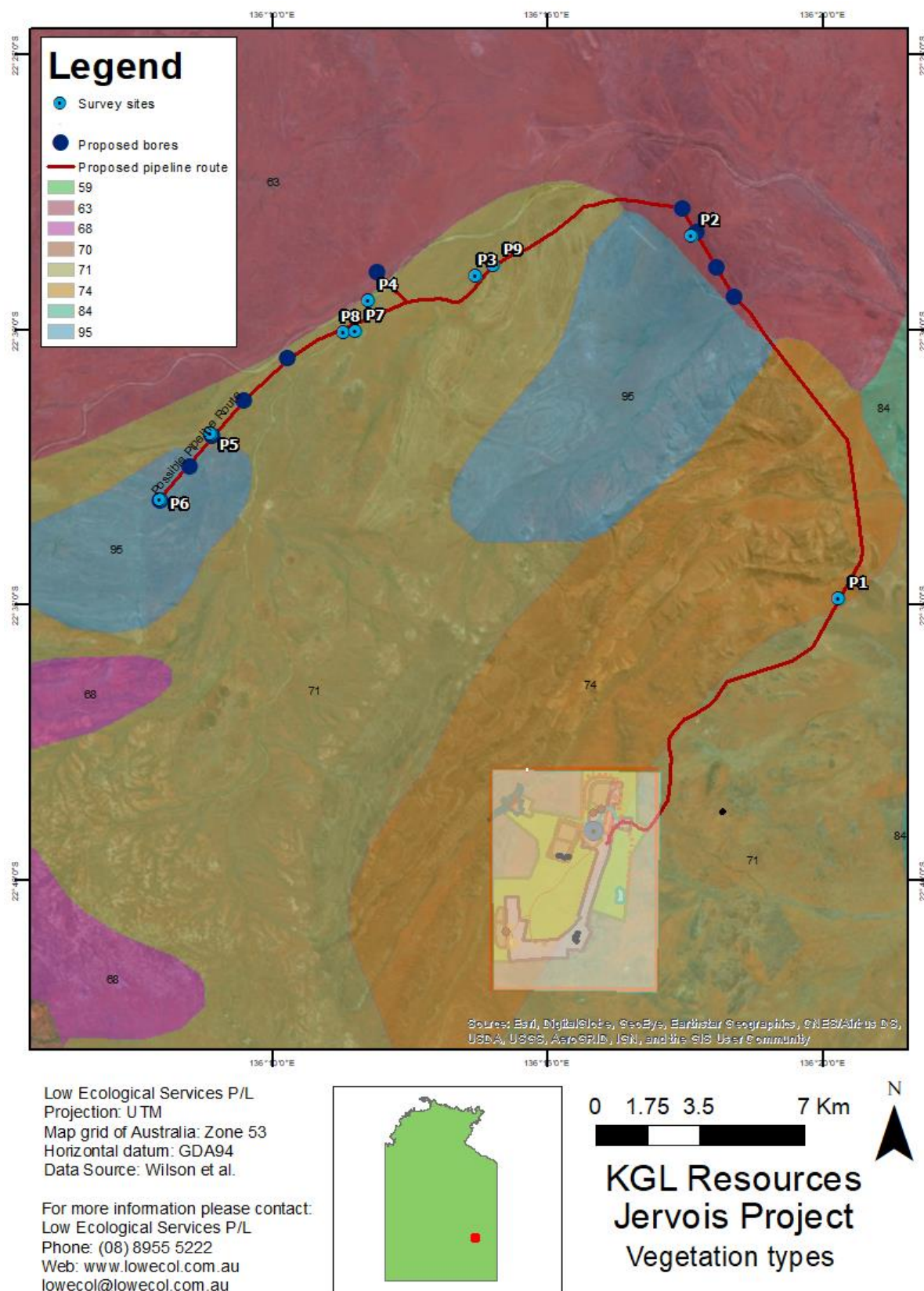


Figure 4.2-2 Vegetation Types within the Borefield and Pipeline Area
 Source: Low Ecological Services, 2019 Landscape Flora and Fauna Supplement Report (Appendix A-1)

Ground truthing identified eight broad vegetation categories along the borefield and pipeline route as detailed in Table 4.2-4 and Figure 4.2-3. It should be noted that the entire pipeline route is within an existing cleared station track.

Table 4.2-4 Vegetation Communities in the Borefield and Pipeline Area

Vegetation type	Description
Gidgee woodland	<i>Acacia georginae</i> dominant low woodland.
Grassland	Grassland with forbs and annual grasses with scattered <i>Corymbia apparrerinja</i> , <i>Corymbia opaca</i> and <i>Eucalyptus intertexta</i> . Intermittent patches of <i>Acacia stowardii</i> .
Low open shrubland	<i>Acacia stowardii</i> dominated low open shrubland. Ground layer of annual grasses. Undulating plain.
Low open woodland	Low open woodland. <i>Acacia Georginae</i> , <i>Acacia estrophiolata</i> , <i>Corymbia opaca</i> , <i>Atalya hemiglauca</i> trees. Shrubs and <i>Triodia pungens</i> .
Open woodland	Tall open woodland with <i>Corymbia apparrerinja</i> , <i>Eucalyptus intertexta</i> , <i>Acacia estrophiolata</i> and a mixed mid-storey of <i>senna</i> and <i>eremophila</i> species.
Tall Mallee shrubland	Mallee shrubland with <i>Eucalyptus pachyphylla</i> and <i>Eucalyptus gamophylla</i> with <i>Triodia pungens</i> .
Tall open shrubland	Tall open shrubland with <i>senna</i> and <i>Eremophila</i> species. Emergent trees include <i>Acacia estrophiolata</i> and <i>Erythrina vespertilio</i> .
Riparian area	Riparian woodland dominated by <i>Eucalyptus cameldulensis</i> .

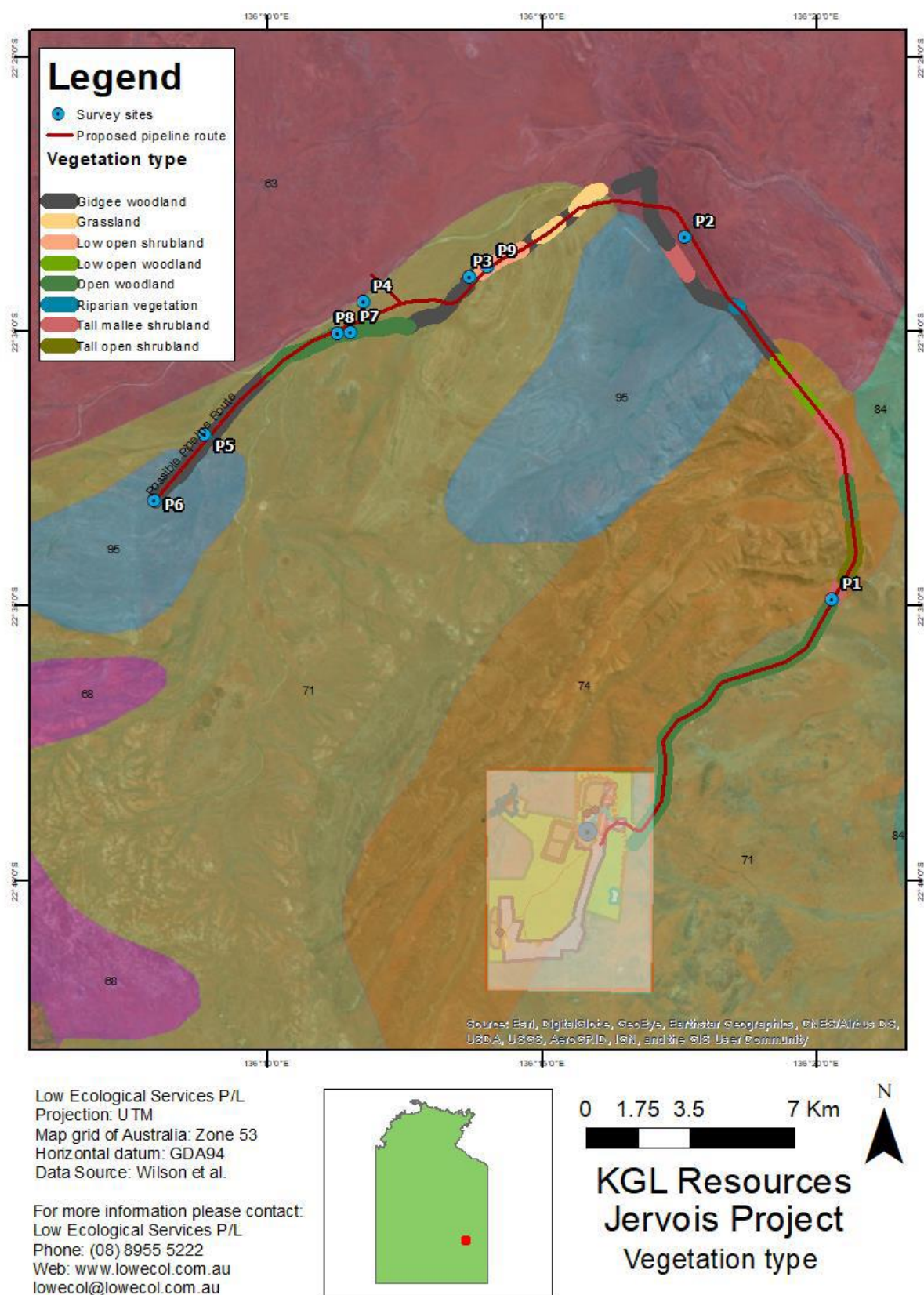


Figure 4.2-3 Vegetation Communities in the Borefield and Pipeline Area
Source: Low Ecological Services, 2019 Landscape Flora and Fauna Supplement Report (Appendix A-1)

Conservation Significant Vegetation Communities

Areas of riparian vegetation occur along the proposed pipeline route. The pipeline will traverse a number of riparian vegetation communities associated with Arthur Creek in the north and Unca Creek within EL 25429. A summary of the significant vegetation communities within the borefield and pipeline area is presented in Table 4.2-5.

Table 4.2-5 Significant Vegetation Communities Located in the Borefield and Pipeline Area

Significant value	Description	Present in the Area	Area (ha) using a 50 m Buffer
Sensitive vegetation	Trees containing large trees with hollows suitable for fauna	Areas that could contain large, hollow-bearing trees include grassland, open woodland, riparian vegetation	201
Riparian vegetation	<i>Eucalyptus camaldulensis</i> dominated riparian woodland with <i>Corymbia Opaca</i> or <i>Corymbia apperrinja</i>	In the north of the area on Arthur Creek, includes 100 m buffer	78
Bioregional Conservation Significance	Within the Jervois Range – site of botanical significance (SoBS)	Approximately 16.7 km of the proposed pipeline	181
Essential habitat (TPWC Act)	n/a	No	0 ha
TEC (EPBC Act)	n/a	No	0 ha
Identified as significant in previous government assessment	n/a	No	0 ha

Threatened Ecological Communities (TECs)

No listed threatened ecological communities were identified by the desktop study or field surveys within the area.

Other vegetation (Groundwater Dependent Ecosystems(GDEs))

In addition to *Eucalyptus camaldulensis* and *Corymbia opaca*, *Corymbia Apperrinja*, Ghost Gum, and *Vigna lanceolate*, Bean Trees were observed throughout the area. These two species are deep rooted species which tap into ground water and would be considered facultative GDE species, although there is a lack of information regarding their groundwater dependencies in Central Australia. *Eucalyptus camaldulensis* and *Corymbia opaca* were abundant along riparian areas, particularly Arthur Creek whilst *Vigna lanceolate* was observed in the southern section of the pipeline area. *E. camaldulensis* is dependent on shallow ground water, up to 10 m below ground level (Horner, et al., 2009), while *Corymbia* species tend to be deeper rooted, from 8-20 m.

Flora Species

Vegetation surveys and site descriptions identified 79 flora species in the borefield and pipeline area as listed in Appendix 2 of the Landscape, Flora and Fauna Supplement Report.

The desktop assessment identified seven flora species of conservation significance within a 20 km radius of the area as detailed in Table 4.2-6.

Table 4.2-6 Flora Species of Conservation Significance Potentially Occurring within 20 km

Family	Scientific name	TPWC Act Status	EPBC Act Status	Likelihood of occurrence
CONVOLVULACEAE	<i>Evolvulus alsinoides</i> var. <i>alsinoides</i>	DD	Not listed	Low
CYPERACEAE	<i>Bolboschoenus caldwellii</i>	EN	Not listed	Low
CYPERACEAE	<i>Fimbristylis velata</i>	DD	Not listed	Moderate
MALVACEAE	<i>Sida intricata</i>	NT	Not listed	Moderate
MALVACEAE	<i>Sida</i> sp. Hale River (P.K.Latz 12036)	DD	Not listed	Low
PHYLLANTHACEAE	<i>Sauropus rigens</i>	NT	Not listed	High
SCROPHULARIACEAE	<i>Eremophila cordatisepala</i>	NT	Not listed	High

DD: data deficient; EN: endangered; NT: near threatened

Whilst *Fimbristylis velata* was identified as potentially occurring within the area, it was not recorded during field surveys and there is a low likelihood that it occurs.

Sida intricata was also not recorded during field surveys and there is moderate likelihood that it occurs in the area.

Sauropus rigens was not observed in any of the survey sites but was observed incidentally on a rocky rise which will not be directly impacted by any development and has a high likelihood of occurring in the area but is unlikely to be impacted.

The field survey located a patch of *Eremophila cordatisepala* at Site P05 which was found to be abundant within a 1 km² area and potentially extended beyond this as shown in Figure 4.2-4. Two isolated plants were also found at Site P03.

Despite targeted surveys, no other species of conservation significance listed under the EPBC Act or the TPWC Act were recorded during field surveys.

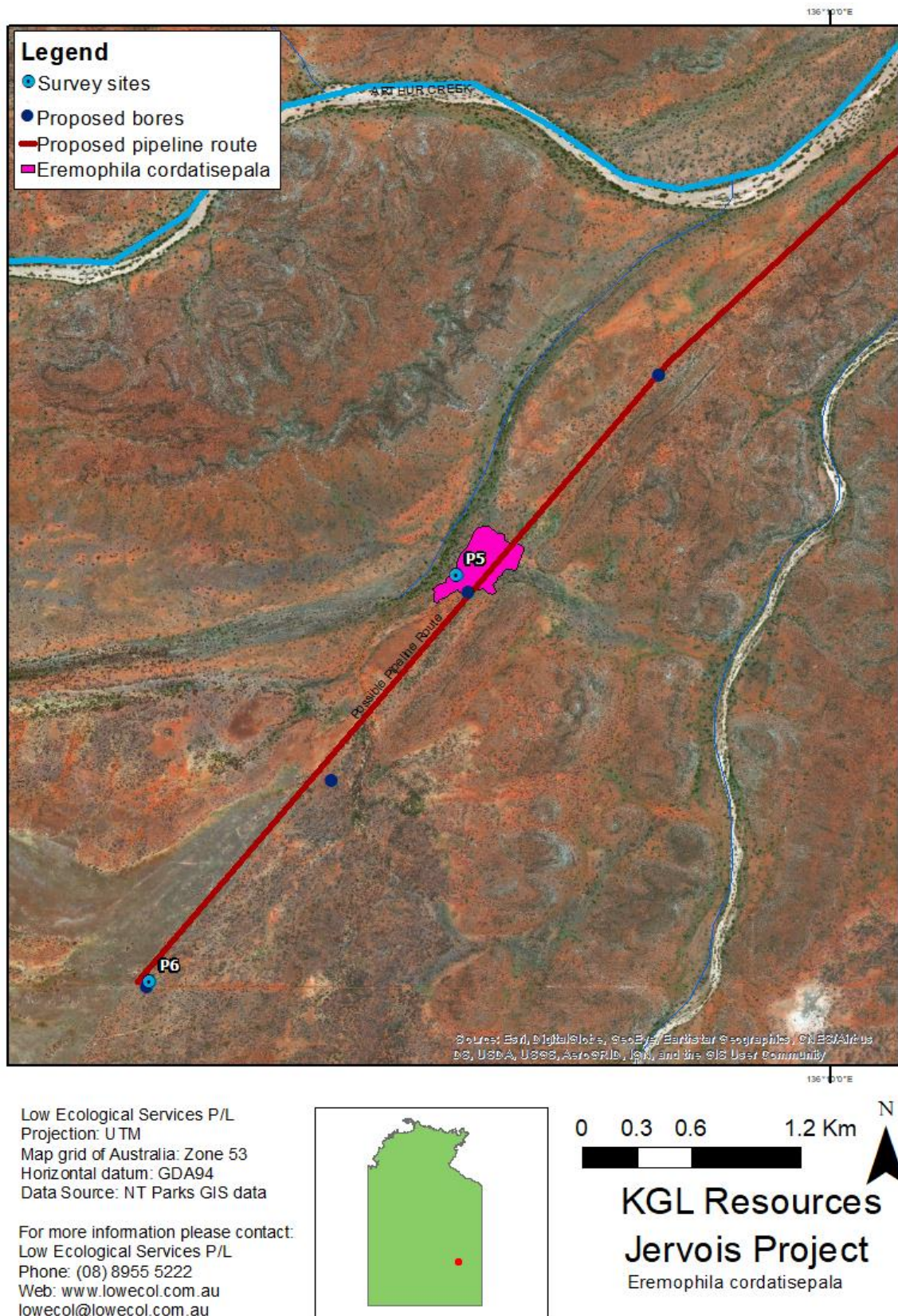


Figure 4.2-4 Location of *Eremophila cordatisepala* at Site P05

Source: Low Ecological Services, 2019 Landscape Flora and Fauna Supplement Report (Appendix A-1)

Sites of Conservation and Botanical Significance (SoCS and SoBS)

The Landscape, Flora and Fauna assessment of the borefield and pipeline area did not identify any SoCS within 20 km of the area.

The Jervois Range SoBs is traversed by the southern section of the proposed pipeline (Figure 4.2-5). The SoBs contains five taxa of NT Significance; *Bolboschoenus caldwellii*, *Eremophila cordatisepala*, *Fimbristylis velata* and, *Sauropus rigens*.

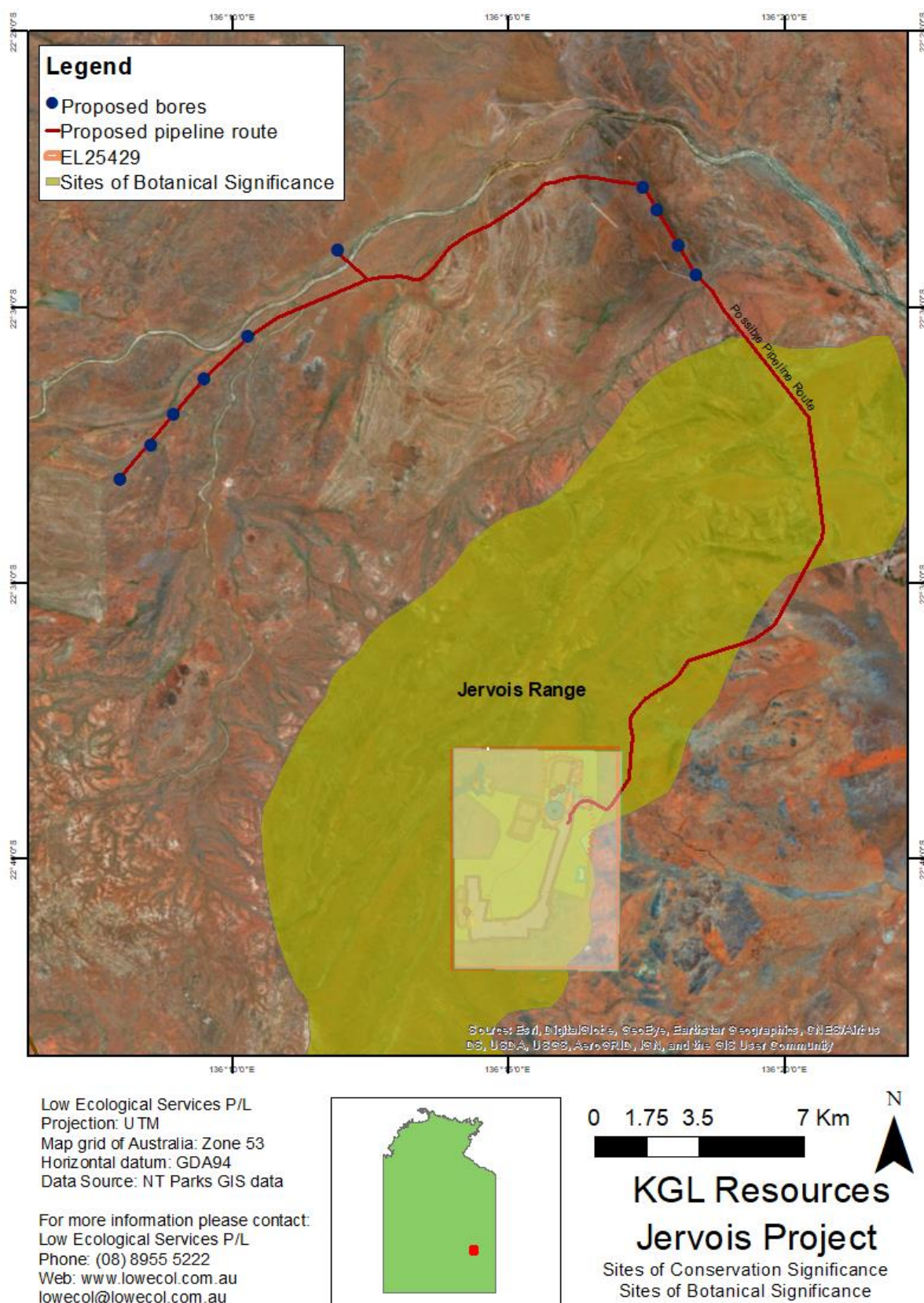


Figure 4.2-5 Sites of Botanical Significance

Source: Low Ecological Services, 2019 Landscape Flora and Fauna Supplement Report (Appendix A-1)

Introduced flora

The desktop assessment identified fourteen introduced flora species identified as potentially occurring within 20 km of the area.

Table 4.2-7 Introduced Flora Species Potentially Occurring within 20 km of the Borefield and Pipeline

Scientific name	Common name	EPBC PMST	NT database	WoNS	NT Class	Found in surveys
<i>Cenchrus ciliaris</i>	Buffel grass	X				X
<i>Chloris virgata</i>	Feather top Rhodes grass		X			
<i>Citrullus colocynthis</i>	Paddy melon		X			X
<i>Cylindropuntia fulgida</i>	Coral cactus, Jumping Cholla		X	X	A,C	X
<i>Cynodon dactylon</i>	Couch grass		X			X
<i>Datura ferox</i>	Thornapple - Longspine		X		A,C	
<i>Malvastrum americanum</i>	Spiked malvastrum		X			X
<i>Parkinsonia aculeate</i>	Parkinsonia	X		X	B,C	
<i>Ricinus communis</i>	Castor oil plant		X			
<i>Sida cordifolia</i>	Flannel weed		X		B,C	
<i>Tamarix aphylla</i>	Athel pine	x	X	X	A,B	x
<i>Tribulus terrestris</i>	Caltrop		X		B,C	
<i>Vachellia farnesiana</i>	Mimosa bush		X			x
<i>Xanthium strumarium</i>	Burr - Noogoora		X		B,C	

Source: Low Ecological Services, 2019

The field survey found Buffel grass to be predominant throughout the area. Thornapple was observed in a riparian habitat at Site P08 whilst Mimosa bush was observed in drainage and floodplain areas, and in particular near Bore 1. Caltrop was located at several sites including P03, P04, P05, P06, P07 and P09.

4.2.2 Borefield and Pipeline Potential Impacts and Risks

Potential impacts and risks for terrestrial flora and vegetation in the borefield and pipeline area are similar to those identified in the draft EIS, albeit on a much smaller scale, and may include:

- Impacts to threatened flora;
- Introduction of exotic flora;
- Dust pollution;
- Erosion and sedimentation;
- Changes in hydrology;

- Release of contaminants; and
- Bushfire.

As the Project water supply investigations have included drilling activities in proposed production bore locations, other than trenching activities for the pipeline, this area will undergo minimal clearing as the infrastructure will be located within the existing road easement, existing tracks and previously disturbed areas.

Of the 79 flora species recorded during the field surveys of the borefield and pipeline area, none are listed as threatened under the TPWC Act or the EPBC Act. Only one flora species listed as near threatened under the TPWC Act, *Eremophila cordatisepala*, was recorded during on-ground surveys in this area. The patch located at Site P05 has been impacted by an existing cleared station track and bore access and additional specimens may be further impacted by indirect impacts from dust deposition.

The field survey recorded the presence of Buffel grass, Thornapple, Mimosa bush and Caltrop across the area. As identified in the draft EIS, introduced species can threaten native flora and fauna and the spread of these exotic species can be facilitated by ground disturbance and vehicle movements.

Even though there is little information on their groundwater dependencies in Central Australia and some species would be considered facultative GDE species, the 2019 Low Ecological Landscape, Flora and Fauna Assessment identifies potential impacts on GDEs such as *Eucalyptus camaldulensis* (River Red Gum), *Corymbia opaca* (Bloodwood), *Corymbia Apperrinja* (Ghost Gum) and *Vigna lanceolata* (Bean Trees) to include dieback as a result of changes in hydrology. This may include adaptive responses and floristic changes as a result of groundwater drawdown. Secondary impacts may include weed proliferation around the base of tree species which inhibit germination of seeds.

CloudGMS were engaged in 2018 and again in 2019 to investigate potential groundwater drawdown and the effects this may have on GDEs in the Project area and in the borefield area. These investigations found that the depth to groundwater in the borefield area is greater than 10 metres and the closest sites that recorded water levels within 15 metres are to the west of the Lucy Creek homestead approximately 10 kilometres east of the borefield area. CloudGMS reported that whilst riparian vegetation in this area may be accessing regional groundwater, it is more likely it is reliant on water stored in alluvial sediments associated with the larger creeks. As a result, riparian health is more dependent on surface water flows within the creek systems. CloudGMS also reported that the borefield water supply will extract two gigalitres per annum and result in a drawdown of about two metres over an area of less than 110 km².

The potential impacts from the remainder of sources in the above list for the borefield and pipeline area are comparable to those listed in Section 4.1.5 of the draft EIS but on a much smaller scale due to the simplicity of the proposed activities for this area compared to the EL area.

4.2.3 Borefield and Pipeline Mitigation and Monitoring

The mitigation and monitoring strategies proposed in the draft EIS will be applied to the borefield and pipeline area where relevant to the activities being conducted here. The Environmental Management Plan and associated sub-plans such as the Biodiversity Management Plan will also apply to this area. Section 6 of the BMP specifically contains mitigation measures and monitoring programs for potential impacts to terrestrial flora and vegetation.

As recommended by Low Ecological Services, the patch of *E. cordatisepala* at Site P05 will be further investigated and the area will be demarcated to avoid further disturbance.

Groundwater dependent species such as *E. camaldulensis* and some *Corymbia* species in close proximity to production bores will be monitored for adverse effects as a result of drawdown. This will include the quantification of impacts throughout the duration of the Project until water extraction from the borefield ceases. The BMP has been updated to include a program to monitor the health of vegetation communities such as those which may be impacted by groundwater drawdown.

4.3 Terrestrial Environmental Quality

A summary of the feedback on the draft EIS in relation to terrestrial environmental quality which required further technical clarification included:

- Contamination status and potential pollutant sources of the Project;
- Improvements to the legacy of historic mining activities; and
- Contingency measures if rehabilitation closure objectives are not met.

4.3.1 Potential Pollutant Sources

The contamination status of the Project has been investigated further and is provided in Section 4.1.1. As requested, Table 4.2-1 from the draft EIS has been updated to include potential pollutant sources from historic mining, TSF leachates/spills, waste rock dump and ROM runoff as provided below.

Table 4.3-1 Potential Pollutant Sources

Disturbance category	Potential contaminant	Potential impacts
Waste rock dumps	Unconsolidated material with varying quantities of saline and sediment pre-disposition. Acid mine drainage (AMD).	Erosion of potentially alkaline/acidic/saline deposits leading to soil contamination. Sediments causing impacts to receiving waters through reduction in water quality and degradation of in-stream habitats. Leachates entering groundwater.
Topsoil stripping areas and stockpiles	Unconsolidated materials and sediment.	Erosion leading to sedimentation of waterways and loss of valuable rehabilitation material. Sediments causing impacts to receiving waters through reduction in water quality and degradation of in-stream habitats.

Disturbance category	Potential contaminant	Potential impacts
Exploration and access tracks	Unconsolidated materials and sediment.	Sediments causing impacts to receiving waters through reduction in water quality and degradation of in-stream habitats.
Haul roads	Unconsolidated materials and sediment.	Sediments causing impacts to receiving waters through reduction in water quality and degradation of in-stream habitats.
Industrial areas	Hazardous materials including hydrocarbons, chemicals and reagents.	Contaminated runoff causing impacts to receiving waters through reduction in water quality and degradation of in-stream habitats. Contamination of soil. Leachates entering groundwater.
Hazardous material spills	Hazardous materials including hydrocarbons, chemicals and reagents.	Contaminated runoff causing impacts to receiving waters through reduction in water quality and degradation of in-stream habitats. Contamination of soil. Leachates entering groundwater.
Tailings storage facility	Acid mine drainage (AMD).	Uncontrolled release of tailings causing impacts to receiving waters through reduction in water quality and degradation of in-stream habitats. Contamination of soil. Leachates entering groundwater.
ROM & product stockpiles	Unconsolidated material with varying quantities of metals, saline and sediment pre-disposition. Acid mine drainage (AMD).	Sediment and contaminated runoff causing impacts to receiving waters through reduction in water quality and degradation of in-stream habitats. Contamination of soil. Leachates entering groundwater.
Hardstand areas.	Unconsolidated materials and sediment. Hazardous materials including hydrocarbons, chemicals and reagents.	Sediment and contaminated runoff causing impacts to receiving waters through reduction in water quality and degradation of in-stream habitats. Contamination of soil. Leachates entering groundwater.
Exploration activity	Unconsolidated materials and sediment.	Sediment causing impacts to receiving waters through reduction in water quality and degradation of in-stream habitats.
Land clearing	Unconsolidated materials and sediment.	Sediment causing impacts to receiving waters through reduction in water quality and degradation of in-stream habitats.
Drainage channels and stream diversions/levees	Unconsolidated materials and sediment.	Sediment causing impacts to receiving waters through reduction in water quality and degradation of in-stream habitats.
Historic mining activities	Unconsolidated materials and sediment. Unconsolidated material with varying quantities of metals,	Sediment and contaminated runoff causing impacts to receiving waters through reduction in water quality and degradation of in-stream habitats. Contamination of soil.

Disturbance category	Potential contaminant	Potential impacts
	saline and sediment pre-disposition. Acid mine drainage (AMD). Hazardous materials including hydrocarbons, chemicals and reagents.	Leachates entering groundwater.

4.3.2 Site Closure, Decommissioning and Rehabilitation

Demonstrate how the legacy of historic mining will be improved:

As detailed in Section 4.1.1 of this report, WMV Environmental Pty Ltd were engaged to complete a Contaminated Land Preliminary Site Investigation (CLPSI) to determine the existing contamination status of the Project EL area. A Soil Landscape Assessment was also completed in the preparation of the draft EIS which included a pre-mining soil survey. This survey found that the dispersibility of the soils across the Project EL is low which is reflected in the low erosion status of the area. Erosion risk is elevated in areas disturbed by historic mining and grazing activities, although the erosion gullies were reported to be narrow and shallow and often vegetated. Overall, the survey found the erosion risk associated with soil disturbance was moderate due to the nature of the surface and subsoils to slake when wet.

The objective of mine closure and rehabilitation is to return the land to as close as is reasonably possible to its pre-disturbance condition i.e. stable, resilient, self-sustaining native vegetation of local provenance suitable for use by Traditional Owners and as habitat for flora and fauna. Closure objectives and completion criteria are provided in detail in Sections 1.5.2 and 1.6 of the MRCP which was submitted with the draft EIS. These include landform objectives for erosion and land contamination and specific completion criteria for each land disturbance category/domain.

As a significant portion (136 ha) of the historic mining disturbance area (174 ha) will be subject to disturbance as a result of the Project activities, these areas will be rehabilitated in accordance with the rehabilitation strategies and objectives outlined in the MRCP. Consequently, the legacy of historic mining in the Project EL area will be improved as a result of the Project activities with only a portion of this airstrip and some minor surface extraction sites to remain untouched.

Contingency measures if rehabilitation closure objectives are not met:

The MRCP states that throughout the life of the Project, the draft rehabilitation completion criteria will be reviewed and revised to take into consideration additional information obtained about environmental and other constraints, changes in mine planning and feedback from future stakeholder consultations. In addition, the risk assessment will be regularly reviewed throughout the life of the Project and the management strategies reviewed to ensure the early identification of issues such as not meeting the rehabilitation closure objectives and ensure risks are adequately controlled.

Should the ongoing rehabilitation monitoring and reviews indicate that rehabilitation closure objectives may not be met, rehabilitation methods and designs will be refined and revised to evaluate their suitability, completion criteria will be reviewed in consultation with the relevant stakeholders and the rehabilitation program will be adapted accordingly. Trials have also been proposed to evaluate the most effective rehabilitation techniques for the Project which will guide the rehabilitation process toward achieving success.

As detailed in Section 5.5 of the EM Plan, the Project Environmental Management System (EMS) will guide compliance and continuous improvement. The aim of this EMS includes providing guidance for the timely incorporation of improved environmental management measures into operational requirements. The non-conformance and corrective and preventative actions processes within the EMS will ensure that rehabilitation closure objectives are regularly evaluated and the appropriate corrective actions implemented.

4.4 Terrestrial and Aquatic Fauna

This Section provides the additional technical information required to address the feedback from stakeholders in relation to assessing the terrestrial fauna values of the Project area, including the borefield and water pipeline. Feedback on the draft EIS in relation to terrestrial fauna which requires further technical clarification is summarised as follows:

- Potential impacts and risks to the Grey Falcon;
- Impacts on riparian/GDE habitat due to groundwater drawdown;
- Evaluate the fauna characteristics and assess the potential impacts of the borefield and pipeline area, including threatened fauna; and
- Pipeline construction methods, duration and potential impacts.

Numerous fauna surveys of the Project area have been completed by Low Ecological Services Pty Ltd between 1985 and 2018. The surveys in 2017 and 2018 were undertaken for the draft EIS to address the dry season and the post-wet season characteristics of the Project area. In response to feedback on the flora and fauna aspects of the draft EIS, Low Ecological were engaged again in April 2019 to undertake additional investigations into the potential flora and fauna impacts of the proposed borefield and pipeline area. The 2019 Landscape, Flora and Fauna Supplement Report can be found in Appendix A-1.

Broad Habitat Types

As requested, Table 4.3-1 from the draft EIS is updated as follows to include the numbering of the broad habitat types used in the draft EIS.

Table 4.4-1 Broad Habitat Types in the Project EL Area

No.	Broad Habitat Type	Vegetation Community	Refined Vegetation Communities	Amount in Project EL area (ha)
1	Hummock grassland	1	Hummock (<i>Triodia basedowii</i> , <i>Triodia pungens</i>) grassland with sparse shrubs and low trees (VC1).	345.7
2	Low <i>Acacia sp.</i> shrubland	2, 6, 8	Sparse, low <i>Acacia siberica</i> shrubland over short grasses and forbs (VC2). Sparse low <i>Acacia</i> woodland over hummock grasses (VC6). <i>Acacia georginae</i> (Gidgee) dominated woodland. Sparse grass and forb understorey (VC8).	1,332.6
3	Tall <i>Acacia sp.</i> woodland	3, 4	<i>Acacia estrophiolata</i> tall, open woodland over short grasses with sparse shrubs (VC3). Tall <i>Acacia aneura</i> woodland over short grasses in fire protected valleys and upper reaches of drainage lines (VC4).	151.3
4	Tall <i>Corymbia sp.</i> and <i>Acacia sp.</i> woodland	5	Tall, open woodland with <i>Corymbia</i> and <i>Acacia siberica</i> over short grasses and forbs; on floodplains and at the base of ranges (VC5).	1,843
5	Tall <i>Eucalyptus sp.</i> woodland on drainage lines	7	<i>Eucalyptus camaldulensis</i> tall woodland over sparse grasses in drainage channels and rocky creek beds (VC7).	116.5
6	Jervois Dam	7	A large artificial lake on Unca Creek.	6.7

Figures 3.2-2 and 4.3-2- from the draft EIS are also updated with a new Figure as follows:



Figure 4.4-1 Broad Habitat Types

Conservation Significant Species – Grey Falcon

Falco hypoleucos (Grey Falcon), which is listed as vulnerable under the TPWC Act has been included in the Species of Conservation Significance Table in the Landscape, Flora and Fauna Supplement Report, 2019 provided in Appendix A-1.

The desktop assessment for the Landscape, Flora and Fauna Supplement Report for Grey Falcon indicates it was recorded within a 20 km buffer of the Project area and has a high likelihood of occurring in the pipeline and borefield area and a moderate likelihood of occurring in the Project EL area.

The Grey Falcon is found in low densities throughout arid and semi-arid areas of Australia and has been recorded in all mainland states and territories. It favours habitats of lightly timbered lowland plains, typically associated with inland drainage systems with average annual rainfall less than 500 mm (Ward, 2012). Suitable habitat for this species was identified along Arthur Creek and in grassland in the vicinity of Site P09. Within the Project EL area, sites along Unca Creek provide potentially suitable habitat but of a lesser quality. Whilst habitats for the Grey Falcon occur throughout the Project area, field surveys did not locate this species.

Potential impacts to this species may include the clearing of suitable nesting trees and the disturbance of ground roosting sites. Indirect impacts from the Project activities are considered to be low and will be managed through avoiding the clearing of large trees and the inspection of nests prior to planned clearing as outlined in the Biodiversity Management Plan provided in Appendix C-1.

4.4.1 Fauna Characteristics of the Borefield and Pipeline

Methods and sources of information for the desktop assessment of the borefield and pipeline area followed the process used for the 2017 and 2018 Landscape, Flora and Fauna Assessments completed by Low Ecological Services with the search area including a 20 km buffer around the area. Field surveys of the borefield and pipeline area were completed over four days and three nights between 29th April and 2nd May 2019 with the methodology following that used in the draft EIS.

Fauna Species

The 2019 field survey recorded a total of 43 fauna species; 34 birds, 6 mammals, 2 reptiles and 1 amphibian. The full list of fauna species recorded during this survey can be found in Appendix 3 of the Landscape, Flora and Fauna Supplement Report. Of the bird species, four had not been previously recorded in the area. This included *Ardeotis australis* (Australian Bustard), *Calyptorhynchus banksia* (Red-tailed Black Cockatoo), *Corvus bennetti* (Little Crow) and *Haliastur sphenurus* (Whistling Kite). Only two native mammals, were trapped during the field survey - *Pseudomys hermannsburgensis* (Sandy Inland Mouse) and *Sminthopsis macroura* (Stripe-faced Dunnart). Dingo tracks were observed at one location (J09) and Red Kangaroos were observed incidentally during the field surveys. The reptiles recorded were *Ctenotus leonhardii* (Leonhardi's ctenotus) and *Varanus sp.* (Goanna). The only amphibian recorded was *Litoria rubella* (Desert tree frog). Bats were observed around the mine camp

area but were not recorded due to technical issues with the Anabat recording device. No threatened bat species were identified through the desktop survey and are not likely to be in the area. Invertebrates including wolf spiders, scorpions, centipedes and caterpillars were not recorded in a systematic way during the surveys and have not been included in the report.

Species of Conservation Significance

The desktop assessment identified 19 species of conservation significance identified by the EPBC PMST and NT Fauna Atlas as potentially occurring within 20 km of the borefield and pipeline area (Table 4.4-2).

Table 4.4-2 Species of Conservation Significance within a 20km Radius of the Borefield and Pipeline

Group	Species Name	Common Name	Status		Search Tool		Likelihood of Occurrence
			EPBC Act	TPWC Act	EPBC PMST	NT Atlas	
Birds	<i>Ardeotis australis</i>	Australian bustard	Not listed	NT	-	X	High
	<i>Calidris ferruginea</i>	Curlew sandpiper	CE	VU	X	-	Moderate
	<i>Conopophila whitei</i>	Grey honeyeater	Not listed	DD	-	X	High
	<i>Dromaius novaehollandiae</i>	Emu	Not listed	NT	-	X	High
	<i>Erythrorchis radiatus</i>	Red goshawk	VU	VU	X	-	Low
	<i>Falco hypoleucos</i>	Grey falcon	Not listed	VU	-	X	High
	<i>Merops ornatus</i>	Rainbow Bee-eater	Not listed	VU	-	-	High
	<i>Lophoictinia isura</i>	Square-tailed kite	Not listed	NT	-	X	Moderate
	<i>Pedionomus torquatus</i>	Plains wanderer	CE	DD	X	-	Low
	<i>Pezoporus occidentalis</i>	Night parrot	EN	CE	X	-	Low
	<i>Phaps histrionica</i>	Flock Bronzewing	Not listed	NT	-	X	Moderate
	<i>Rostratula australis</i>	Australian painted snipe	EN	VU	X	X	High
	<i>Stictonetta naevosa</i>	Freckled duck	Not listed	NT	-	X	Moderate
Mammals	<i>Isoodon auratus</i>	Golden bandicoot	VU	EN	-	X	Low (locally extinct)

Group	Species Name	Common Name	Status		Search Tool		Likelihood of Occurrence
			EPBC Act	TPWC Act	EPBC PMST	NT Atlas	
	<i>Macrotis lagotis</i>	Greater Bilby	VU	VU	X	X	Low (Last record 1969)
	<i>Rattus villosissimus</i>	Long-haired Rat	Not listed	NT	-	X	High
	<i>Petrogale lateralis</i> <i>MacDonnell</i> <i>Ranges race</i>	Black-footed rock wallaby	VU	NT	X	-	Low – Mod
	<i>Trichosurus vulpecula</i>	Common brushtail possum	Not listed	EN	-	X	Low (Last record 1969)
	<i>Lagorchestes conspicillatus</i>	Spectacled hare wallaby	Not listed	NT	-	X	Low – no recent records

CE: Critically endangered, EN: endangered, VU: vulnerable, NT: near threatened, DD: Data deficient, NE: Not evaluated
Source: Low Ecological Services, 2019

Despite targeted surveys, no fauna species of conservation significance were recorded within the area. The Near-Threatened Red-tailed Black-cockatoo and Australian Bustard (TPWC Act) were recorded within the area. Red-tailed Black-cockatoos were recorded at sites P02, P03 and P07 whilst the Australian Bustard was recorded at site P03. Neither of these species had been recorded in previous surveys of the Project area.

Due to a lack of suitable habitat within the pipeline and borefield area, the Curlew Sandpiper has a low likelihood of occurring in the area and a low risk of being impacted.

The nomadic Grey Honeyeater can be found in mulga woodland and acacia scrubland which is habitat occurring within the borefield and pipeline area. It is therefore highly likely that this species will be present in the area.

As the emu and the long-haired rat have previously been recorded in the Project area through tracks and burrows, there is a high likelihood that these species occur within the borefield and pipeline area. Given that the area of occupancy of *Rattus villosissimus* varies greatly throughout time in response to rainfall, and suitable habitat exists in the Pipeline and Borefield area, the species is highly likely to occur in the area.

As habitats for the Grey Falcon occur throughout the Project area, there is a high likelihood that this species occurs in the area even though field surveys did not locate this species.

Although the Rainbow bee-eater was not observed in the pipeline and borefield area, there remains a high likelihood that this species could occur it is a widespread summer migratory species that inhabits a range of habitats.

There is a low likelihood that the Plains wanderer is present in the area due to the large distance to the current known range of this species, the absence of suitable habitat and the lack of records in the NT.

There is also a low likelihood of the Night parrot occurring in the area as it was not recorded during field surveys and there is a lack of habitat for this species in the area.

One record of the Flock bronzewing exists within a 20 km radius of the area and this highly nomadic bird has a patchy distribution in the NT. As a result, there is a moderate likelihood that it occurs in the area.

A single female Australian Painted snipe was recorded in March 2012 at the Jervois Dam as it provides a suitable habitat for this species (shallow inland wetlands, either fresh or brackish, which may be temporarily or ephemerally filled). Therefore, there is a high likelihood that this species may occur within the Project area when there is water in the Jervois Dam.

Similarly, the Square Tailed Kite inhabits heathland, woodland and forest habitats, hills and gorges which are present in the area so there is a moderate likelihood that this highly mobile, sparsely distributed and partly migratory species will occur in the area.

The Freckled duck is found mainly in south-east and south-west Australia in areas which provide dense cover and permanent water. Due to the lack of permanent water apart from the Jervois Mine Dam, it is unlikely this species would occur in the borefield and pipeline area.

The availability of suitable habitat within the Jervois Range and the lack of habitat in the immediate vicinity of the borefield and pipeline area indicates that there is a low likelihood of the Black-footed Rock Wallaby occurring in the area.

There is also a low likelihood that the Common Brushtail Possum occurs in the borefield and pipeline area as this species is restricted to riverine habitats close to rocky outcrops and moist gullies with ranges or rocky slopes.

Even though suitable habitat exists in the area, the contraction of its range and patchy distribution of the Spectacled Hare Wallaby indicates that there is a low likelihood this species occurs in the area.

The Greater Bilby and Golden Bandicoot are considered regionally extinct in the area.

Migratory and Marine Species

The desktop assessment identified 17 migratory and marine species as occurring or potentially occurring within 20km of the borefield and pipeline area with no additional species from those listed in the 2018 Landscape, Flora and Fauna Assessment Report.

Aquatic Fauna

The desktop assessment did not identify any records of aquatic fauna such as fish, and freshwater invertebrates as occurring or potentially occurring within 20 km of the borefield and pipeline area. As aquatic systems are not well studied in arid Australia, it is likely that fish and aquatic invertebrates occur in the watercourses of the area following good rainfall. Burrows of freshwater land crabs (*Holothuiana transversa*) have previously been found in Arthur Creek. Whilst the area did experience good rainfall (170 mm) prior to the field survey, no aquatic fauna were found.

The 2019 frc environmental Stygofauna Pilot Study further investigated the presence of stygofauna in the borefield area of the Project. This study found that the geology and hydrology of the borefield area was considered suitable for providing habitat for stygofauna whilst the water quality was assessed as potentially suitable. Of the ten bores sampled, only one contained stygofauna: a single copepod, a stygoxene. Stygoxenes facultatively use groundwater ecosystems, but are not dependent on groundwater to complete their lifecycle. Overall the stygofauna community of the borefield area was assessed as having low environmental value based on the limited occurrence of a single taxon and the groundwater quality being only potentially suitable on the basis of total dissolved solids (frc environmental, 2019).

Introduced Fauna

The same ten introduced fauna species as identified in the 2018 assessment were identified by the desktop assessment for those species occurring or potentially occurring within 20km of the borefield and pipeline area.

Three introduced fauna species, *Bos taurus* (domestic cattle), *Mus musculus* (house mouse), and *Felis catus* (feral cat) were recorded or observed during the field surveys. Domestic cattle were widespread across the area while one single house mouse was recorded at site P05

4.4.2 Borefield and Pipeline Potential Impacts and Risks

Terrestrial Fauna

Potential impacts and risks for terrestrial flora and vegetation in the borefield and pipeline area are similar to those identified in the draft EIS, albeit on a much smaller scale, and may include:

- Change in habitat quality;
- Impacts to threatened fauna;
- Impacts to migratory fauna;
- Introduction of exotic fauna;
- Fauna mortality; and
- Hazardous materials.

As there will be no additional clearing for the borefield and pipeline area outside of the EL area, it is not anticipated that impacts such as habitat removal will be an impact associated with this area. Potential impacts on habitat quality may include dust deposition from trenching and vehicle movements, erosion and sedimentation along drainage lines and creeks, noise from vehicle movements and trenching activities and hydrological changes such as groundwater drawdown.

Impacts on small burrowing mammals and the near-threatened Long-haired rat may occur in the area as a result of trenching activities damaging burrows and fauna becoming trapped in open trenches. It is not expected that these species will be impacted on a regional scale.

As reported by Low Ecological Services, it is unlikely that there will be any direct impacts on the Red-tailed Black-cockatoo or the Australian Bustard due to the local habitat availability for these species.

Similarly, it is not expected that there will be any impacts on migratory fauna due to the lack of available permanent habitat and the minimal disturbance associated with the borefield and pipeline activities.

The potential impacts from the remainder of sources in the above list for the borefield and pipeline area are comparable to those listed in Section 4.3.5 of the draft EIS but on a much smaller scale due to the simplicity of the proposed activities and lack of clearing for this area compared to the EL.

Aquatic Fauna

Potential impacts to stygofauna in the borefield area may include the drawdown of water tables and subsequent reduction in groundwater pressure and compaction of aquifers due to traffic on access roads. Vegetation clearing may also reduce habitat quality of shallow groundwater ecosystems where the water table intersects the root zone of vegetation and provides habitat for stygofauna. The risk assessment conducted as part of the pilot study rated these risks as low for the borefield area due to the low environmental value of the borefield in relation to stygofauna due to the limited occurrence of a single taxon and the water quality of the aquifer. The 2019 CloudGMS Groundwater Impact Assessment Supplement report found that “the proposed extraction regime in the borefield area is within the capacity of the aquifer and removes a very small fraction of the immense volume in storage”.

4.4.3 Borefield and Pipeline Mitigation and Monitoring

The mitigation and monitoring strategies for terrestrial fauna proposed in the draft EIS will be applied to the borefield and pipeline area where relevant to the activities being conducted here. The Environmental Management Plan and associated sub-plans such as the Biodiversity Management Plan will also apply to this area. Section 7 of the BMP specifically contains mitigation measures and monitoring programs for potential impacts to terrestrial fauna.

During trenching activities, measures to be undertaken to minimise impacts on fauna will include:

- Restriction of access track widths to only that required for safe vehicle movements;
- Minimising the length of open trench;
- The inclusion of breaks in the open trench to facilitate stock and wildlife crossings and agricultural vehicle movements; and
- Sizing of trench breaks to enable trenching, pipe placement, pipe connection and trench refilling to be completed in one day.

Potential impacts to stygofauna such as physical disturbance of groundwater ecosystems will be monitored through the water level monitoring to be conducted as part of the Groundwater Management Plan, the development of suitable water level triggers and the restriction of access tracks.

4.5 Hydrological Processes

CloudGMS and WRM Water & Environment Pty Ltd were employed to undertake groundwater and surface water assessments of the Project in 2018. In response to feedback on the hydrological processes section of the draft EIS, CloudGMS and WRM were engaged in 2019 to undertake additional investigations into the hydrological processes associated with the proposed action. Feedback on the draft EIS in relation to this section was received from several stakeholders and is summarised below:

- Identification of the Maperte aquifer and potential impacts;
- Describe the hydrogeology of the mine site and borefield based on local rather than regional bore data;
- As defined in the NT Land Clearing Guidelines 2010 identify, map and describe all significant wetlands and drainage areas to be impacted including:
 - areas to be disturbed for water supply;
 - areas flooded by the upgraded Jervois dam;
 - areas impacted by drawdown;
 - areas impacted by the diversion of Unca Creek; and
 - downstream due to modification of hydrological regimes.
- Verify the Georgina Basin groundwater model, identify if water demand and abstraction volumes can be met, predict local and regional hydrological impacts including drawdown;
- Provide bore location and depths used for groundwater modelling;
- Provide independent peer reviews of monitoring programs, modelling, drawdown and risks from groundwater leaking into pits and underground workings;
- Demonstrate the structural integrity and functionality of the diversion throughout the life of the Project;
- Provide modelled predictions for flood levels, velocities and increases in peak flood levels for 1 in 100 flood events for closure conditions;
- Refer groundwater impact forecasts to DENR Water Resources to determine if additional assessment is required to determine impacts on local groundwater;
- Undertake local monitoring to verify the groundwater model;
- Consider a regional groundwater monitoring program to evaluate impacts on other groundwater users, a schedule for updating the model and contingency plans; and
- Monitoring of drawdown in the Unca Creek area.

In response to feedback on the hydrological processes section of the draft EIS, further updates on the hydrological and groundwater assessments have been completed, including:

- Completion of Phase 1 groundwater supply study on Lucy Creek station (Figure 2.1-1) to demonstrate borefield yields suitable for the Jervois Mine processing supply. The study used information for the drilling program comprising nine (9) groundwater bores completed by Tomlin Drilling over a three-week period from 23rd July to 11th August 2018.

Completion of the Jervois proposed mine site groundwater drilling program including sixteen (16) groundwater bores (

- Figure 4.5-1).
- Jervois proposed mine site and the associated borefield groundwater model update to incorporate data from the 2018 drilling programs.
- Update on impact assessment of groundwater extraction from mining activities, abstraction from the borefield during mine operation and closure.
- Update on water balance model and surface water management strategy to ensure flood impacts and impacts to the receiving environment are appropriately managed.

This Section provides the information required to address the feedback from stakeholders in relation to assessing the hydrological processes of the proposed action. The 2019 Surface Water and Groundwater Impact Assessment Reports can be found in Appendix A-3 and A-4.

4.5.1 Existing Environment

As per the overview provided with the draft EIS Section 3.1.6 the hydrologic description of the mine site and borefield was provided based on regional bore data. Subsequently, groundwater drilling and testing programs were completed within the mine site and the borefield areas which has increased the confidence on understanding of the hydrogeology at a localised and regional scale. Further information with regards to the mine site and borefield hydrogeology is provided below.

Hydrogeology of the Mine Site

A groundwater investigation program within the Project EL was completed between September to October 2018 (

Figure 4.5-1). The aim of the program was to provide good spatial coverage around the Reward, Bellbird and Rockface deposits and to establish groundwater monitoring bores. The program (Table 4.5-1) included the construction of fourteen (14) groundwater monitoring bores and two (2) test production bores. Deeper bores (150 m) J11 and J7 were drilled in the centre of the proposed Bellbird and Reward open pit to investigate groundwater conditions throughout the pit sequence. All other bores targeted the water table aquifer and were drilled to an average depth of 55 m.

All investigation bores were constructed in the Bonya Metamorphics which typically comprised of light to dark grey uniform schist with zones of Hematite alteration and occasional calcite, quartz and pegmatite veins. The upper sequence of the schist is weathered and is typically softer with extensive iron staining, within an average thickness of around 20 m. At most locations the weathered zone was unsaturated and consequently is not considered to form a significant aquifer across the EL area.

The findings suggest that the overall conceptual hydrogeological model for the mine site is that of a series of steeply dipping variably connected aquifers of limited lateral extent. The rock matrix has a very low hydraulic conductivity (<0.001 m/day), with fracture conductivity within the central and southern portion of the mine site in the order of 0.01-0.1 m/day from slug tests. The pumping tests indicate that the aquifer development is laterally constrained, with widths in the order of 1-100 m. There is limited connection between adjacent aquifers.

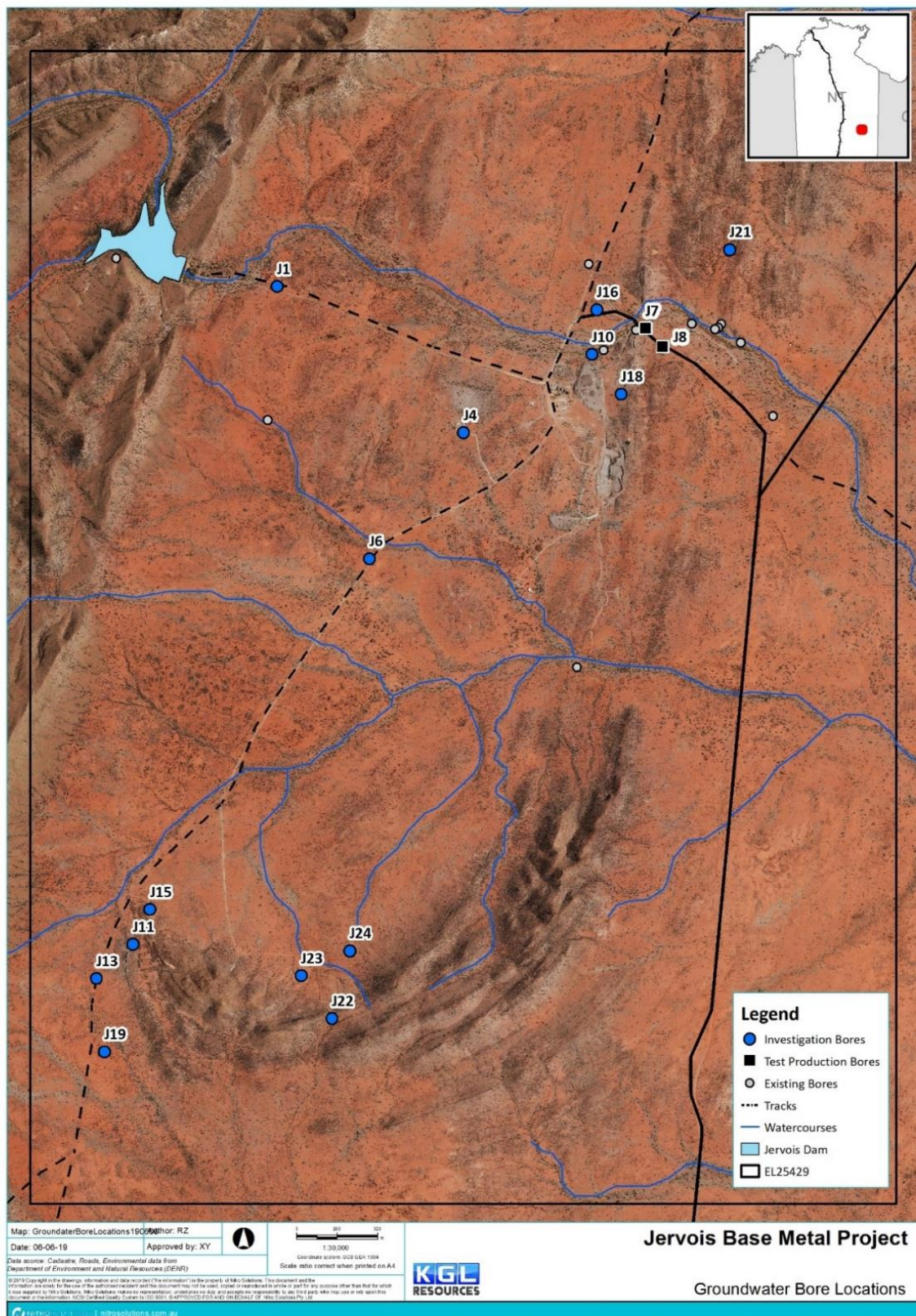


Figure 4.5-1: Project EL Groundwater Investigation Drilling

Table 4.5-1: Summary of Jervois Mine Site Groundwater Drilling Results

Site ID	Bore Type	Aquifer Type	Drilled Depth (mBGL)	Cased Depth (mBGL)	Airlift Yield (L/s)	Standing Water Level (mBGL)	Electrical Conductivity (µS/cm)
J1	Monitoring	Fresh schist	66	53	0.05	18.42	2110
J4	Monitoring	Fresh schist	54	54	<0.01	12.19	2040
J6	Monitoring	Fresh schist	72	72	-	14.66	-
J7	Test Production	Fractured schist with quartz veins	150	70	5	15.86	1660
J8	Test Production	Fractured schist	48	48	3.6	16.74	2810
J11	Investigation	Fresh schist	150	108	0.02	28.15	2950
J13	Monitoring	Fresh schist	54	54	0.01	30.34	2260
J15	Monitoring	Fresh schist	78	78	-	22.98	-
J16	Monitoring	Fresh schist	75	73.45	0.1	14.73	1850
J18	Monitoring	Fractured schist	60	60	0.75	22.05	1600
J19	Monitoring	Discrete fracture in schist	48.6	48.6	0.1	31.08	2570
J21	Monitoring	Fractured schist	54	54	0.6	25.1	3450
J22	Investigation	Fresh schist	84	84	-	Dry	-
J23	Monitoring	Fresh schist	72	72	-	27.27	-
J24	Monitoring	Discrete fracture in schist	60	60	0.4	28.73	2330

Hydrogeology of the Georgina Basin

Groundwater resources capable of meeting the water demand for the process water supply of up to 63 L/s have been located within the southern Georgina Basin in the regionally extensive fractured and karstic rocks of the Arrinthrunga Formation and Arthur Creek Formation. The Georgina Basin Carbonate Aquifer is part of the regionally extensive Georgina Basin and underlies approximately one quarter of the Northern Territory and extends beneath the northwest of Queensland.

The Georgina Basin represents a large regional scale groundwater resource of ~ 1,320,000 GL, assuming a specific yield of 0.04, a saturated accessible thickness of 100m and an area of ~330,000 km².

Drilling for the process water supply investigation was completed by Tomlin Drilling over a three week period from end July to mid August 2018. The Phase 1 investigation bores were drilled at nine (9) sites, including the construction of two (2) test production bore and seven (7) monitoring bores. Further drilling targets were identified to secure sufficient water supply for the Project.

Additional drilling to install process water supply production bores was completed in June 2019 and the results from this drilling were consistent with the 2018 investigation drilling results. Sufficient groundwater resources for the Project have now been identified. The bores have typically yielded ~ 10 L/s.

The pumping test results conducted during the process water supply investigations in 2018 are summarised in Table 4.5-2.

Table 4.5-2: Summary of Drilling Results From 2018 Lucy Creek Investigation Drilling

Bore ID	Bore Type	Drilled Depth (mBGL)	Cased Depth (mBGL)	Airlift Yield (L/s)	Standing Water Level (mBGL)	Electrical Conductivity (µS/cm)
RN019782	Test Production	60	58	14+	14.21	680
RN019774	Monitoring	90	90	< 0.05	11.82	3300
RN019776	Monitoring	78	28.5	8 - 10^ (4.5)	11.31	710
RN019775	Monitoring	117	117	2.5	20.3	650
RN019793	Monitoring	101.5	101.5	7	14.46	720
RN019781	Monitoring	53.4	53.4	0.8	21.27	1500
RN019777	Abandoned	66	-	-	-	-
RN019794	Test Production	69	65	5+	12.04	2800
RN019778	Monitoring	168	168	3	9.58	3750
RN019779	Monitoring	150	150	8		2760
RN019780	Monitoring	150	148.3	4.5	12.34	1540

^ Yield estimated during drilling, final constructed airlift does not represent yield across the full drilled sequence.

4.5.2 Relevant Activities

The proposed infrastructure for the Project area is detailed in Section 2 – Project Description.

The surface water management structures including the following:

- A 203 ML process water dam to be constructed between the proposed process plant and the Reward open cut pit as proposed in the draft EIS, with a slightly increased capacity;
- A 10 ML underground dewatering dam adjacent to the process plant as proposed in the draft EIS;
- Sediment dams to capture and manage runoff from waste rock dumps as proposed in the draft EIS; and
- Repairs and upgrades to the exiting Jervois dam embankment and spillway as proposed in the draft EIS.

With the proposed water management infrastructure and measures in place, the proposed water management system (WMS) will be robust and will have adequate storage capacity to manage

surface water runoff and groundwater generated within the Project for a wide range of possible climatic conditions, including extended wet and dry periods.

Groundwater affecting activities remain similar to those described in the draft EIS. A detailed process water supply investigation was carried following the draft EIS and a borefield of up to six (6) production bores is located south of the Lucy Creek homestead (Figure 2.1-1). The bores typically yield ~ 10 L/s.

4.5.3 Potential Impacts and Risks

Site Water Demands

For surface water management purposes, the surface water that is generated and/or managed at the Project is divided into five classes based on water quality:

- Undisturbed runoff: runoff from catchments unaffected by mining;
- Raw water (potable standard): raw water suitable for use in supplying potable water for the treatment plant. Raw water (potable) standard will not have been in contact with any areas disturbed by mining, or any ore bodies. Raw water (potable standard) is typically sourced from Jervois Dam or the external borefield prior to treatment by the potable water treatment plant.
- Raw water (plant standard): water suitable for use in the raw water streams of the process plant. Raw water (plant standard) will have suitably low levels of TSS to prevent clogging of machinery nozzles but may have elevated levels of metalloids, salinity (EC), and sulphates. Raw water (plant standard) is typically sourced from groundwater dewatered from the underground mining operations. Unlikely to be suitable for release to the environment.
- Sediment laden water: sediment laden runoff from waste rock dumps. Sediment laden water is suitable for use as make-up process water in the plant, and for dust suppression. May be suitable for release to the environment dependant on long term water quality monitoring results.
- Mine affected water: runoff from areas where chemicals, contaminants or oxidised ore may be present. Includes runoff that collects from the process plant, ROM and product stockpiling areas, open cut mining pits and tailings storage facilities. Suitable for use as make up process water in the plant and for dust suppression on parts of the project where runoff is captured by the mine water management system. Unlikely to be suitable for release to the environment.

Potable Water Demand

Based on the water mass balance process flow diagram for the Project (Sedgman, 2018) the predicted water demand rate to the Potable Water Treatment Plant is 3.8 T/h (0.1 ML/d or 36.5 ML/year). Based on a plant yield of 50%, 1.9 T/h (0.05 ML/d) of treated water from the Potable Water Treatment Plant will be used to supply potable water for use in the mine camp and the administration area. The remaining 1.9 T/h (0.05 ML/d) waste stream from the potable water treatment plant will be pumped to the process plant to supply non-potable uses.

Processing Plant Demand

The Sedgman (2018) water mass balance shows the Process Plant is projected to require a constant water demand rate of 86.1 T/h (2.05 ML/d) over the life of the Project, which includes:

- 55 T/h (1.3 ML/d or 475 ML/year) of raw water (plant standard); and
- 31 T/h (0.75 ML/d or 274 ML/year) of process water (mine affected water or sediment laden water).

The above water demand rate has accounted for all internal recycling of processed water within the process plant and tailing storage facility. If insufficient mine affected or sediment laden water is available to supply the process water demand to the plant, raw water will be used to supply the plant demand.

Dust Suppression

Dust suppression demand rates were calculated based on the predicted surface area (waste rock dump, open cut pits, haul roads and access roads) to be wetted, and the average daily evaporation rate for during dry days. The following methodology was adopted:

- For mining pit and waste rock dumps, dust suppression demand was calculated assuming that 50% of the total area require dust suppression. Dust suppression is not required when the open cut pit or waste rock dump is no longer in operation.
- For haul roads and access roads, dust suppression demand was calculated based on a total road length of 13.9 km and road width of 30 m as per the proposed haul road layout supplied by KGL. The total road surface area requiring dust suppression will remain the same over the life of the Project.
- Based on the 130 year Patch Point data, there is an average of 354 dry days per year, and an average daily evaporation rate of 5.6 mm during these dry days. The daily dust suppression rate for each mine stage was calculated by multiplying the average daily evaporation rate (5.6 mm) and the surface area requiring dust suppression.

Dust suppression demand will be supplied by both raw water (potable standard) from Jervois Dam and the borefields, as well as sources of lower water quality (via the Process Water Dam), such as harvested surface runoff and groundwater dewatered from the underground mine.

To minimise the potential for impacts to surface water quality in receiving watercourses, it is proposed to only use harvested water (with lower quality) for dust suppression on areas that are captured by the water management system. These areas include the waste rock dumps, open cut pits, mine infrastructure area and some haul roads.

Dust suppression for areas that drain off-site (not captured by the water management system) will only be supplied from raw water (potable standard) sources (i.e. Jervois Dam and the borefields). These areas represent most of the haul roads proposed for the Project. It should be noted that should ongoing monitoring indicate that the quality of water stored in the Process Water Dam complies with the adopted WQOs in Table 4.5-3, then this water could be used for dust suppression on areas of the project that are not captured by the water management system.

Table 4.5-3: Adopted Surface Water Quality Objectives (WQOs) for the Project

Parameter	Abbreviation	Units	Adopted WQO value ^a	Group A observed water quality
Non-metallic indicators				
pH	pH	pH units	6.0 - 8.5 ^b	6.9
Electrical conductivity	EC	µS/cm	5,970 ^c	39
Total dissolved solids	TDS	mg/L	4,000 ^c	30
Total suspended solids	TSS	mg/L	380 ^k	3,610
Turbidity	Turbidity	NTU	50 ^d	1,112
Dissolved oxygen	DO	% saturation	90 ^e	n/a
Sulphate	SO ₄	mg/L	1,000 ^f	1.0
Nitrate	NO ₃	mg/L	0.7	1.5
Metals and metalloids (filtered, unless otherwise stated)				
Aluminium	Al	µg/L	55	54,500 (total) ^j
Arsenic	As	µg/L	24	3.0 (total) ^j
Cadmium	Cd	µg/L	0.2	0.2 (total) ^j
Copper	Cu	µg/L	1.4	172 (total) ^j
Iron	Fe	µg/L	300 ^g	55,500 (total) ^j
Lead	Pb	µg/L	3.4	44 (total) ^j
Magnesium	Mg	mg/L	2,000 ^h	0.9
Manganese	Mn	µg/L	1,900	1,748 (total) ^j
Mercury	Hg	µg/L	0.6	0.2 (total) ^j
Nickel	Ni	µg/L	11	46 (total) ^j
Zinc	Zn	µg/L	8	202 (total) ^j

^a – Obtained from Table 3.4.1 in ANZECC & ARMCANZ (2000) based on 95% species level of protection, unless otherwise stated.

^b – Section 4.2.10.1 in ANZECC & ARMCANZ (2000) for general water uses.

^c – Table 4.3.1 in ANZECC & ARMCANZ (2000), adopted the lower limit for beef cattle and horses.

^d – Table 3.3.9 in ANZECC & ARMCANZ (2000) for upland & lowland rivers.

^e – Table 3.3.8 in ANZECC & ARMCANZ (2000) for lowland rivers and freshwater lakes and reservoirs.

^f – Section 4.3.3.4 in ANZECC & ARMCANZ (2000) for livestock drinking water.

^g – Table 5.2.3 in ANZECC & ARMCANZ (2000) for recreational purposes.

^h – Section 4.3.3.2 in ANZECC & ARMCANZ (2000) for livestock drinking water.

ⁱ – Group A sites are representative of undisturbed areas within the mineralised zone of Project area.

^j – Testing on filtered samples was not undertaken.

^k – No WQO values for TSS available, maximum sample TSS concentration from Sample group B nominated

Table 4.5-4 summarises the predicted dust suppression demand for the areas captured in the WMS as well as for areas that drain off-site over the various stages of the project.

Table 4.5-4: Dust Suppression Demand

Project year	Total area requiring dust suppression (ha)			Total area captured in WMS (ha)	Total area draining off-site (ha)	Dust suppression demand			
	Mining Pit	Waste Rock dump	Haul Roads			For areas captured in WMS		For areas draining off-site	
						(kL/d)	(ML/yr)	(kL/d)	(ML/yr)
EOY0 to EOY3	16.6	36.7	46.9	35.0	38.5	1,902	694	2,094	764
EOY3 to EOY4	26.8	55.3	46.9	49.4	38.5	2,685	980	2,094	764
EOY4 to EOY5	26.8	55.3	46.9	49.4	38.5	2,685	980	2,094	764
EOY5 to EOY6	33.9	61.3	46.9	56.0	38.5	3,041	1,110	2,094	764
EOY6 to EOY7	33.9	45.9	46.9	48.3	38.5	2,624	958	2,094	764
EOY7 to EOY10	33.9	23.0	46.9	36.8	38.5	2,000	730	2,094	764

Underground Mining Equipment Demand

A maximum nominal underground mining demand rate of 100 kL/d was adopted when all three underground mines (Rockface, Bellbird and Reward) are operating. That is, the adopted underground mine demand is 33.3 kL/d for each operating underground mine. Table 4.5-5 shows the adopted underground mine demand rates over the Project life. It is assumed that underground mining equipment demands can be supplied from raw water (plant standard), mine affected water and sediment laden water if necessary. If insufficient water is available from the above sources, raw water (potable standard) will be used.

Table 4.5-5: Underground Mining Demand

Project year	Reward operations	Bellbird Operations	Rockface operations	Underground mine demand (kL/d)	Underground mine demand (ML/yr)
EOY0 to EOY3	Open cut only	None	Underground only	33.3	12.2
EOY3 to EOY4	Open cut only	Open cut only	Underground only	33.3	12.2
EOY4 to EOY5	Open cut + underground	Open cut only	Underground only	66.7	24.3
EOY5 to EOY6	Open cut + underground	Open cut only	None	33.3	12.2
EOY6 to EOY7	Open cut + underground	Underground only	None	66.7	24.3
EOY7 to EOY10	Underground only	Underground only	None	66.7	24.3

Water Balance Model Update

The water balance model has been updated by WRM in July 2019. A summary of the updated long-term average annual inflows and outflows based on the model is provided in Table 4.5-6. Key outcomes are:

- There is no accumulation of water predicted during the first three years of mining (Year 1 to EOY3) as the total water supply is equal to or exceeded by the total site demand. As groundwater inflows into the underground mines increase, water accumulation is predicted to begin to occur in year 4 and increasing to year 5.
- Total groundwater inflows into the underground mines increase from EOY3 to EOY5, exceeding the total site demand. This results in accumulation of water from EOY3 to EOY5.
- Total groundwater inflows decrease after EOY5 and then increases again from EOY6 to EOY7. As a result, water accumulation occurs from EOY6 to EOY7. From EOY8, groundwater inflows gradually decrease towards the end of the Project in EOY10.
- The average external water supply requirements vary over the life of the Project. The following is of note:
 - External water supply requirement is largest at the start of the Project (EOY0), reducing significantly towards EOY3 in conjunction with the increasing availability of groundwater from the underground mines to meet site demands. External water supply remains relatively steady after EOY3 until the end of the Project.
 - The average annual raw water supply requirements from Jervois Dam is about 81 ML/yr to 86 ML/yr over the life of the Project.
 - The average annual external raw water supply requirements from the groundwater bore fields varies between 714 and 1,441 ML/yr over the life of the Project.

- There were no modelled uncontrolled releases (spillway overflows) from the Process Water Dam over the life of the Project.
- There are minor uncontrolled releases (spillway overflows) from the sediment dams (between 6.5 ML/yr and 11 ML/yr) over the life of the Project. The water balance model does not account for the potential controlled release of water from the waste rock sediment dams.

Table 4.5-6: Annual Site Water Balance (average annual volumes)

Component	Process	Volume (ML/yr)					
		Year 1 to EOY3	EOY3 to EOY4	EOY4 to EOY5	EOY5 to EOY6	EOY6 to EOY7	EOY7 to EOY10
Inflows	Rainfall runoff (exclude Jervois Dam)	84	85	84	88	96	61
	Groundwater inflows	1,037	1,299	1,841	1,350	1,776	1,036
	Supply from Jervois Dam	86	83	83	83	84	81
	Supply from bore fields	1,441	1,178	1,040	1,107	714	1,157
	Total	2,649	2,645	3,049	2,629	2,670	2,336
Outflows	Evaporation (exclude Jervois Dam)	68	69	64	68	122	67
	Process Plant demand	767	755	755	755	755	755
	Dust suppression	1,772	1,746	1,888	1,747	1,520	1,459
	Underground mine demand	12	24	12	24	24	12
	Potable water demand	34	33	33	33	33	33
	Offsite discharge - Sediment Dams	9.4	10.0	9.5	10.3	11.0	6.5
	Offsite discharge - PWD	0.0	0.0	0.0	0.0	0.0	0.0
	Total	2,663	2,636	2,761	2,638	2,465	2,333
Change in Site Water Inventory		-15	8	288	-9	206	2

Surface Water Impacts

Impacts on Changes to Streamflow in Unca Creek

The potential impacts of the upgraded dam on Unca Creek streamflow are insignificant. The proposed upgrade to Jervois Dam will potentially result in changes to the existing conditions streamflow regime in Unca Creek. The upgraded dam will require a greater volume of catchment runoff to fill the dam before the spillway is activated and flow leaves the dam. Further, the dam will be relied upon as a source of raw water, particularly during the first four years of operations (before groundwater inflows to the underground increase). Therefore, the volume of water stored in the dam will be drawn down after a runoff event more rapidly than under existing conditions.

Overall, the proposed upgrade to the dam will potentially reduce the magnitude and number of overflows from the dam, particularly in the first four years of mine life.

The water balance model was used to assess the change in flows in Unca Creek immediately downstream of the dam following the upgrade. Figure 4.5-2 shows the existing conditions and predicted post-upgrade (for year 1 of project life and post-mine closure) flow duration curves for Unca Creek immediately downstream of the dam for the first four years of Project life.

- Under existing conditions, Jervois Dam is predicted to overflow via the spillway on approximately 0.8% of all days. That is, there is no flow over the spillway 99.2 % of the time;
- Under year 1 conditions (upgraded dam and site demands sourced from the dam), the dam is predicted to overflow only 0.1% of the time. That is, there would be no flow over the spillway for 99.9 % of the time.
- Under the post mine closure scenario (upgraded dam and no site demands), the dam is predicted to overflow about 0.15 % of the time. That is, there would be no flow over the spillway for 99.85 % of the time.
- The maximum predicted daily flow over the spillway is increased by about 500 ML/day for both of the upgraded dam cases due to the more efficient and larger spillway proposed as part of the upgrade.

It should be noted that the existing dam has already altered the streamflow regime of Unca Creek significantly. Further, the dam is situated in an arid catchment, where it would not be unusual for the dam not to overflow for several years. Water balance modelling indicates that the existing dam on average only overflows in every fourth year. The upgraded dam is predicted to overflow on average every 11 years under the year 1 scenario, and every 9 years under the post-mine closure scenario.

Therefore, the proposed dam upgrades will alter the streamflow regime in Unca Creek downstream of the dam, with reduced frequency of spill events, but increased maximum spill rates. The change in streamflow regime will have a significant affect along the reach of Unca Creek within the Project, up until the Unca Creek tributary confluence which doubles the Unca Creek catchment. The impacts downstream of this point will be insignificant.

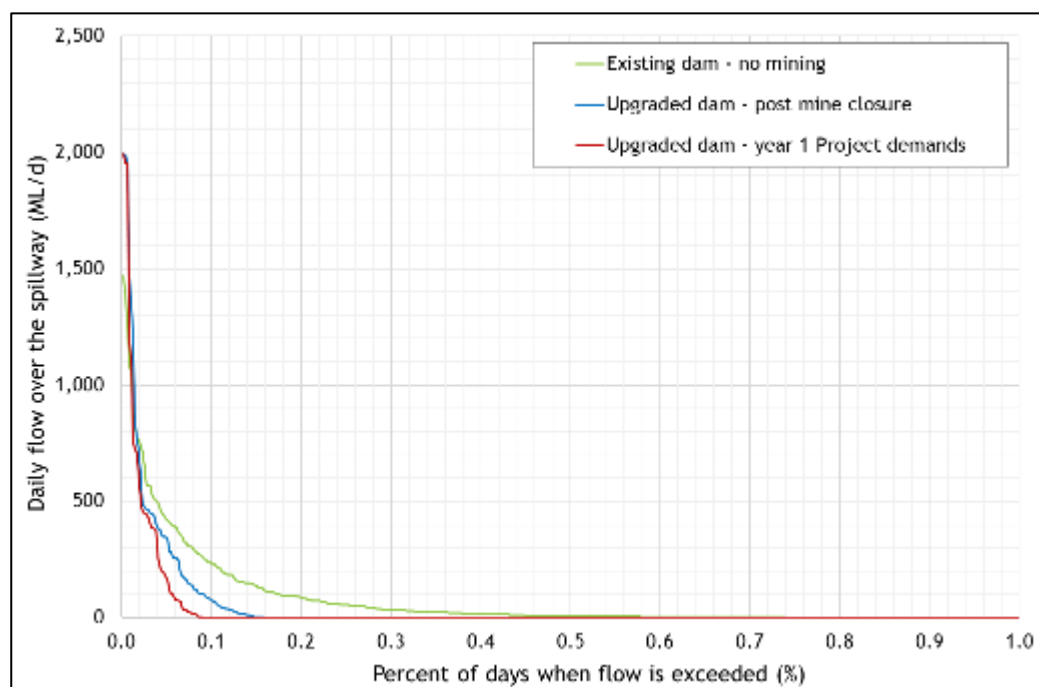


Figure 4.5-2: Impact of upgraded Jervois Dam on Unca Creek Flows

Flooding

The project will not have any significant impact on flooding. The predicted impacts on flooding are summarised below:

- There are no predicted increases in peak flood levels and velocities along the watercourses traversing the Project area, except in Unca Creek.
- The Jervois Dam spillway will be raised and widened under operational conditions. This has the effect of increasing the peak outflow discharge from the spillway by about 10 %. In turn, the increased discharges from the dam spillway results in minor increases in peak flood levels and velocities along Unca Creek downstream of Jervois Dam.
- There are minor predicted increases in peak flood levels of up to 0.1 m in Unca Creek downstream of Jervois Dam for the 10 % AEP and 1 % AEP events. The average increase in flood levels along Unca Creek is about 0.05 m for the 10 % AEP event and about 0.08 m for the 1 % AEP event. These minor increases in peak flood levels are not expected to have any material impact on existing land uses downstream of the Project area.
- There are minor predicted increases in peak velocities of up to 0.2 m/s in Unca Creek downstream of Jervois Dam for the 10 % AEP and 1 % AEP events. The average increase in peak velocities along Unca Creek is about 0.07 m/s for the 10 % AEP event and about 0.11 m/s for the 1 % AEP event. Given that the average peak flood velocities along Unca Creek under existing conditions are about 0.9 m/s for the 10 % AEP event and 1.3 m/s for the 1 % AEP event, the minor predicted increases in peak velocities due to the Project are not considered significant.

The relatively minor increases in peak flood levels and velocities in Unca Creek due to the upgrade to Jervois Dam are not considered significant. The increased flood levels and velocities are typically confined to the Unca Creek channel and do not affect any existing structures or property. The peak flood levels, discharges and velocities in Unca Creek with the upgraded dam in place will also be below the 'pre- dam' scenario.

Failure of the repaired Jervois Dam or the Unca Creek diversion would potentially result in a flood wave downstream of the project, or floodwater entering the Reward Pit. The only population at risk from such a failure would be mine personnel. There are no downstream dwellings or population centres at risk of flooding from a failure in either structure.

Impact of Final Voids

CloudGMS (2019) has assessed the long-term behaviour of the final voids at the Project (post mine closure). The CloudGMS (2019) study indicates that approximately 190 years after mining has ceased, shallow pit lakes will have developed in the Bellbird and Reward final voids. The water surface level in the pit lakes is predicted to be some 20 m to 50 m below ground levels surrounding the voids.

The final landform hydraulic modelling in this report has demonstrated that the final voids will be protected from flooding from Unca Creek and its tributaries for all events up to and including the Probable Maximum Flood (PMF).

Therefore, the only water that collects in the final voids will be surface water runoff from the pit catchments and groundwater seepage. The final voids will therefore neither capture nor release surface water and will have no significant impact on surface water.

Impacts on Water Quality

The Project has the potential to impact on water quality in Unca Creek and its tributaries due to controlled and uncontrolled releases of water.

The water balance model has been used to investigate the predicted frequency and volume of uncontrolled releases (spills) of water from the process water dam and waste rock dump sediment dams.

The results of the water balance model show that no uncontrolled releases are predicted from the process water dam in any of the water balance model simulations. Therefore, the Project will not release any mine affected water or dewatered groundwater to the environment.

The water balance model indicates that there is approximately a 10 % chance of uncontrolled releases of water from the waste rock sediment dams in the first four years of Project life.

Due to the proposed capping of the waste rock dumps with NAF material, runoff from the dumps is likely to be of relatively similar quality to baseline surface water quality at the project site, however seepage from the dumps is likely to be of poorer quality (EGI, 2019). It is anticipated that runoff from the waste rock dumps may be suitable for release to the environment (following a period of monitoring).

Therefore, it is considered that the predicted uncontrolled releases from the waste rock sediment dam are unlikely to have any impact of significance on water quality in Unca Creek, as they will occur when there is likely to be some flow in the receiving watercourses, and the uncontrolled releases are likely to be of similar quality to background water quality.

Increase in Jervois Dam Lake Extent

The proposed repairs and upgrade to Jervois Dam (increased spillway level) will result in an increase in the area inundated by the lake behind the dam wall. The water balance model was used to investigate the impact of the dam upgrade on lake water levels. Figure 4.5-3 shows the extent of inundation from the lake at full supply level under both existing conditions and post-mining conditions. The area of inundation at full supply will increase from about 16 ha under existing conditions to about 36 ha under the upgraded dam case. The increased inundation extent does not affect any existing structures or sensitive environmental or cultural heritage areas.

Figure 4.5-4 shows the water level duration curves for the lake under existing conditions and post mine closure (when lake levels will be highest). The proposed dam upgrade will result in an increase to the frequency of inundation. The water balance model predicts that water levels in the upgraded dam will exceed the existing full supply level approximately 27 % of the time (and conversely will be below the existing full supply level 63 % of time).

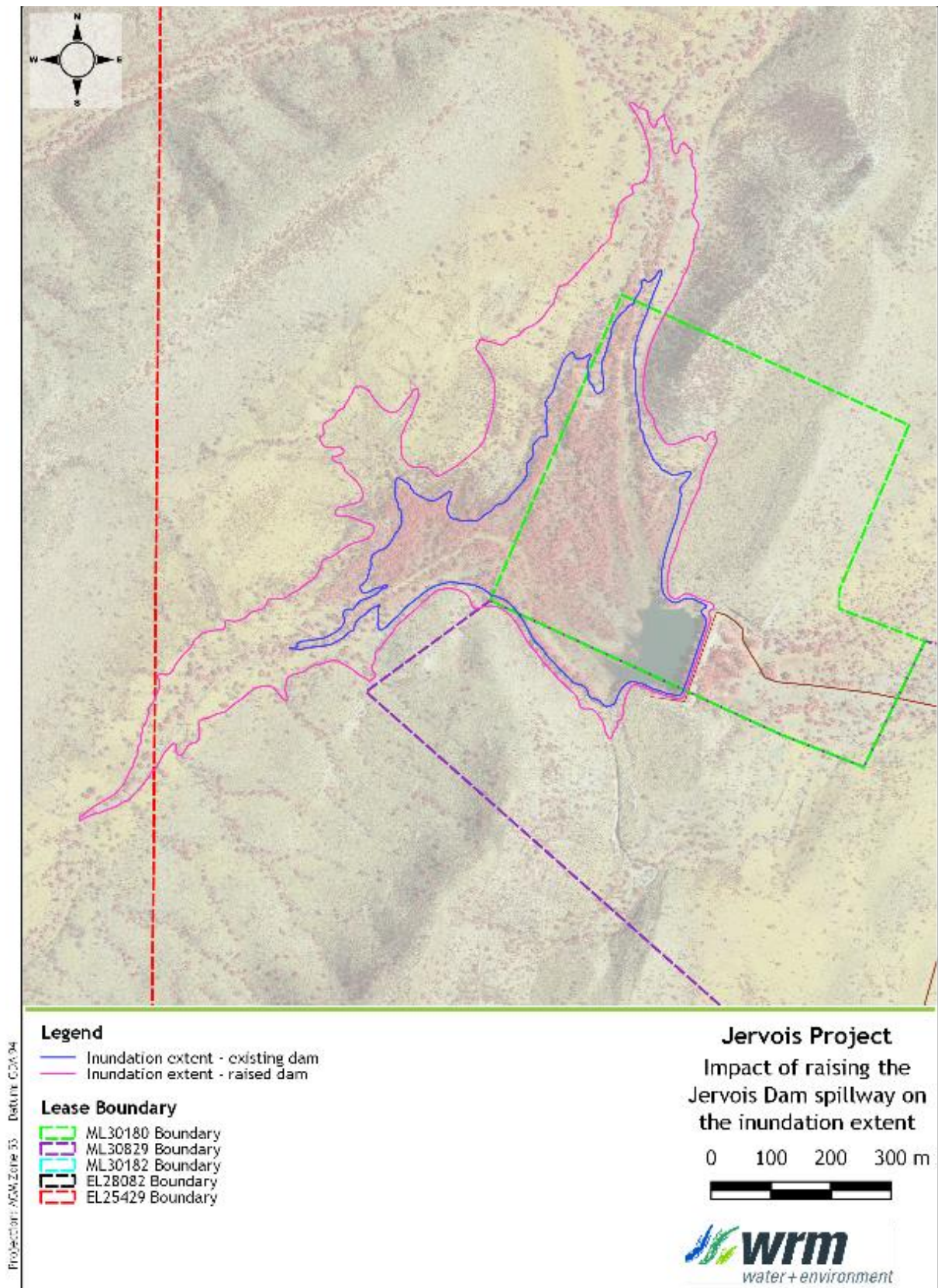


Figure 4.5-3: Impact of Raising Jervois Dam Spillway on the Inundation Extent

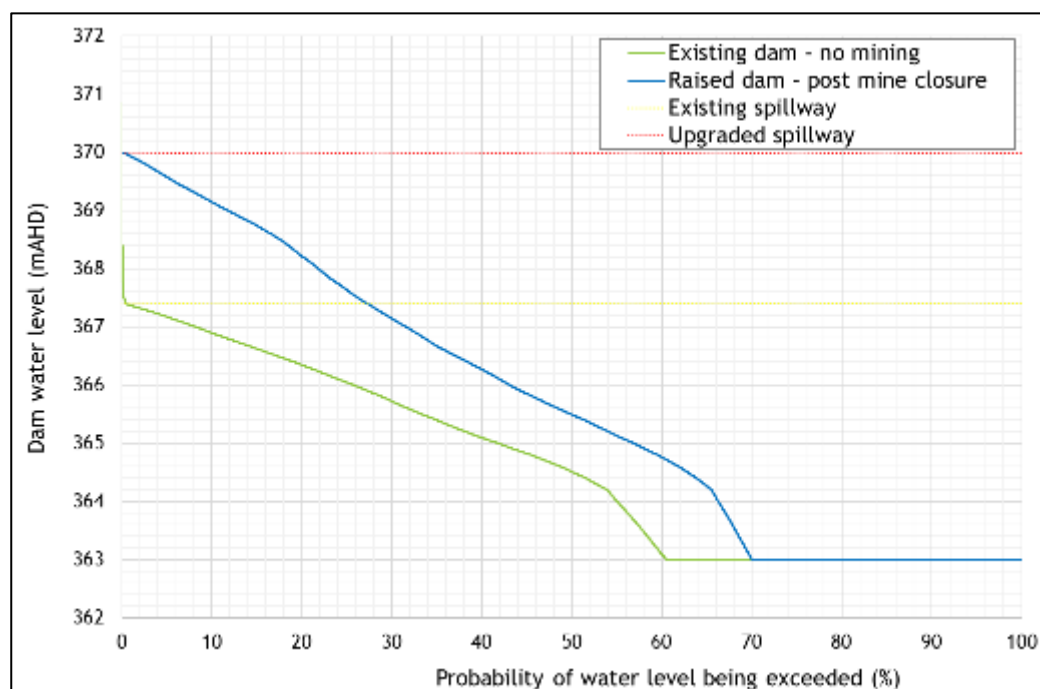


Figure 4.5-4: Water Level Duration Curves under Existing Conditions and Post Mine Closure

Groundwater Impacts

As part of the supplement report to the draft EIS, the groundwater model was updated with the most up to date mine plan, recently acquired local bore data, and the inclusion of anisotropy. The likely impacts of groundwater abstraction for the mine process water supply and dewatering of mine excavations on exiting users are presented below.

Drawdown at Receptors

Groundwater drawdown after 10 years of pumping at the process water supply borefield are detailed in the Jervois Base Metals Mine Groundwater Impact Assessment Supplement (CloudGMS, 2018).

The drawdown at the closest stock bores to the borefield is expected to be about 1-2 metres at the end of LOM. Drawdown at the domestic bores close to the Lucy Creek homestead is expected to be around 1 metre at the end of LOM.

Groundwater levels at the production bores are expected to decline by approximately 9 metres.

The modelled extraction does not cause the maximum depth to water table to exceed 15 metres below ground level, hence GDEs (the riparian vegetation adjacent to the river channels) will not be impacted by the proposed borefield.

Groundwater drawdown to existing users are predicted to be as follows:

- Maperte outstation water supply: much less than 1 metre over the 10 year LOM period;
- Orrtipa Thurra water supply: less than 1 metre over the 10 year LOM period;
- Lucy Creek Station: subtle declining trends of 1-2 metres over the LOM period

Life of Mine Inflows

Predicted inflows to the pits during the life of mine are presented in Table 4.5-7. Inflows increase from commencement of mining and reach a peak during year 4 at about 0.42 ML/d (4.9 L/s). The lack of inflows to the Bellbird and Reward South pits is due to the dewatering impacts of the underground mines along strike from these features.

Table 4.5-7: Annual Estimated Inflows to the Pits

Year	Bellbird Pit	Reward Pit	Reward South Pit
		[L/s]	
1	0.0	0.0	0.0
2	0.0	1.8	0.0
3	0.0	4.0	0.0
4	0.0	4.9	0.0
5	0.0	0.4	0.0
6	0.0	0.0	0.0
7	0.0	0.0	0.0
8	0.0	0.0	0.0
9	0.0	0.0	0.0
10	0.0	0.0	0.0

Predicted inflows to the underground mines during the life of mine are presented in Table 4.5-8. Inflows increase from commencement of mining and reach a peak during year 8 at about 65 L/s.

Table 4.5-8: Forecast Annual Life of Underground Mine Workings Inflows

Year	All ug	Bellbird ug	Reward ug	Rockface ug
	[L/s]	[L/s]	[L/s]	[L/s]
1	17.3	0.0	0.0	17.3
2	44.8	0.0	0.0	44.8
3	36.5	0.0	0.0	36.5
4	32.7	0.0	0.0	32.7
5	41.2	0.0	10.7	30.5
6	49.3	0.0	49.3	0.0
7	42.7	0.0	42.7	0.0
8	64.6	29.1	35.5	0.0
9	53.7	21.2	32.5	0.0
10	50.6	19.8	30.9	0.0

Post-closure Pit Lake Formation

After 200 years since the start of mining (ie 190 years recovery) the water level in the Bellbird pit-lake is 275 – 285 mAHD, Reward pit-lake is 245 – 255 mAHD and Reward South is 250 – 260 mAHD and all are fairly stable. The drawdown contours at year 200 (ie after 190 years of recovery) are presented below in Figure 4.5-5.

After 1,000 years since the start of mining (i.e. 990 years recovery) the water levels in the pit-lakes are very much the same as listed above. The drawdown contours at year 1000 (ie after 990 years of recovery) are presented below in Figure 4.5-6, indicating that regional drawdown effects have expanded significantly, with the 2 m drawdown contour at about 15 km from the mine site in the north, east and south directions, but only about 4 km in the west direction.

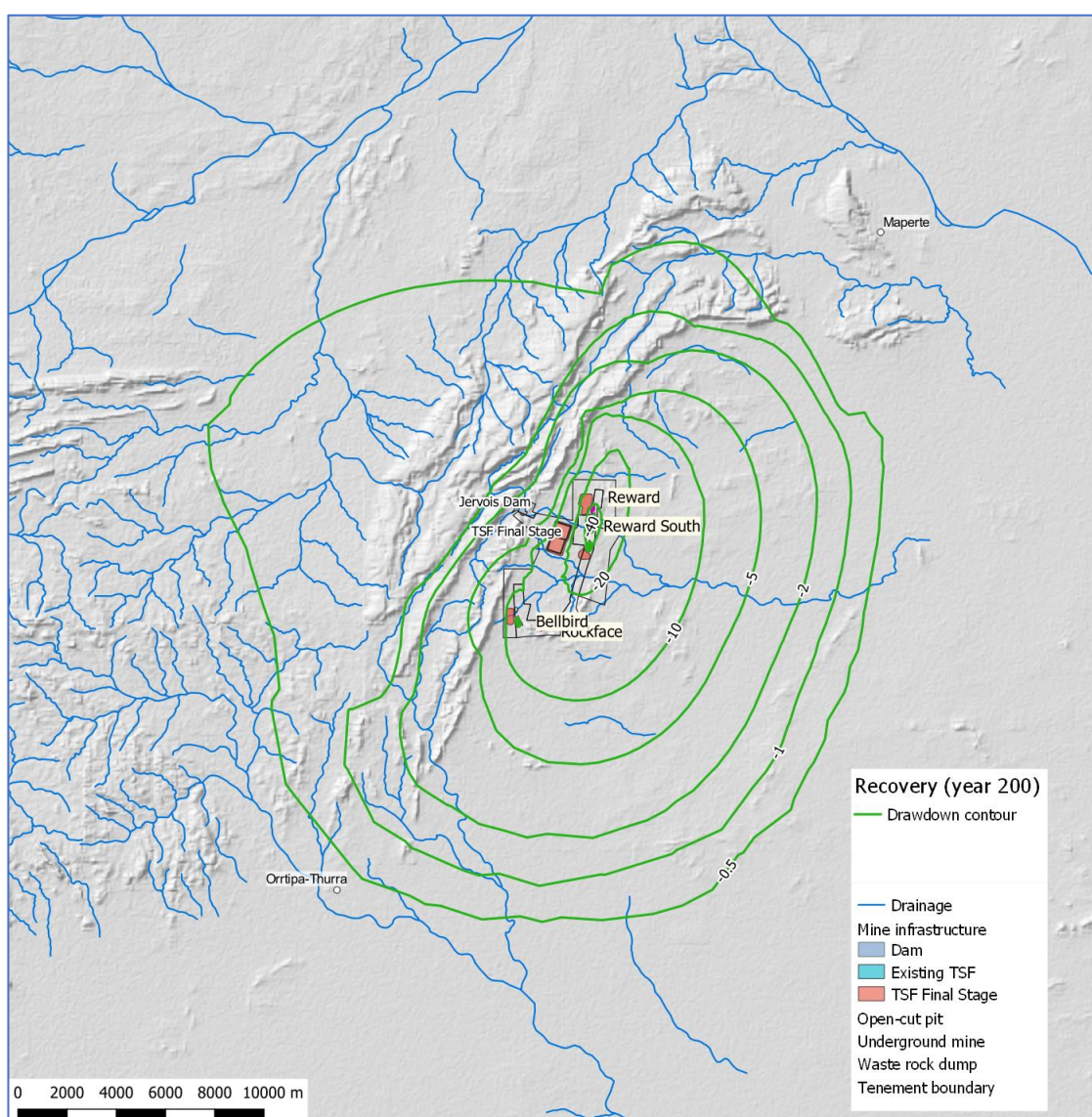


Figure 4.5-5: Post-closure Final Drawdown Contours after 190 Years of Recovery (200 Years from Start of Mining)

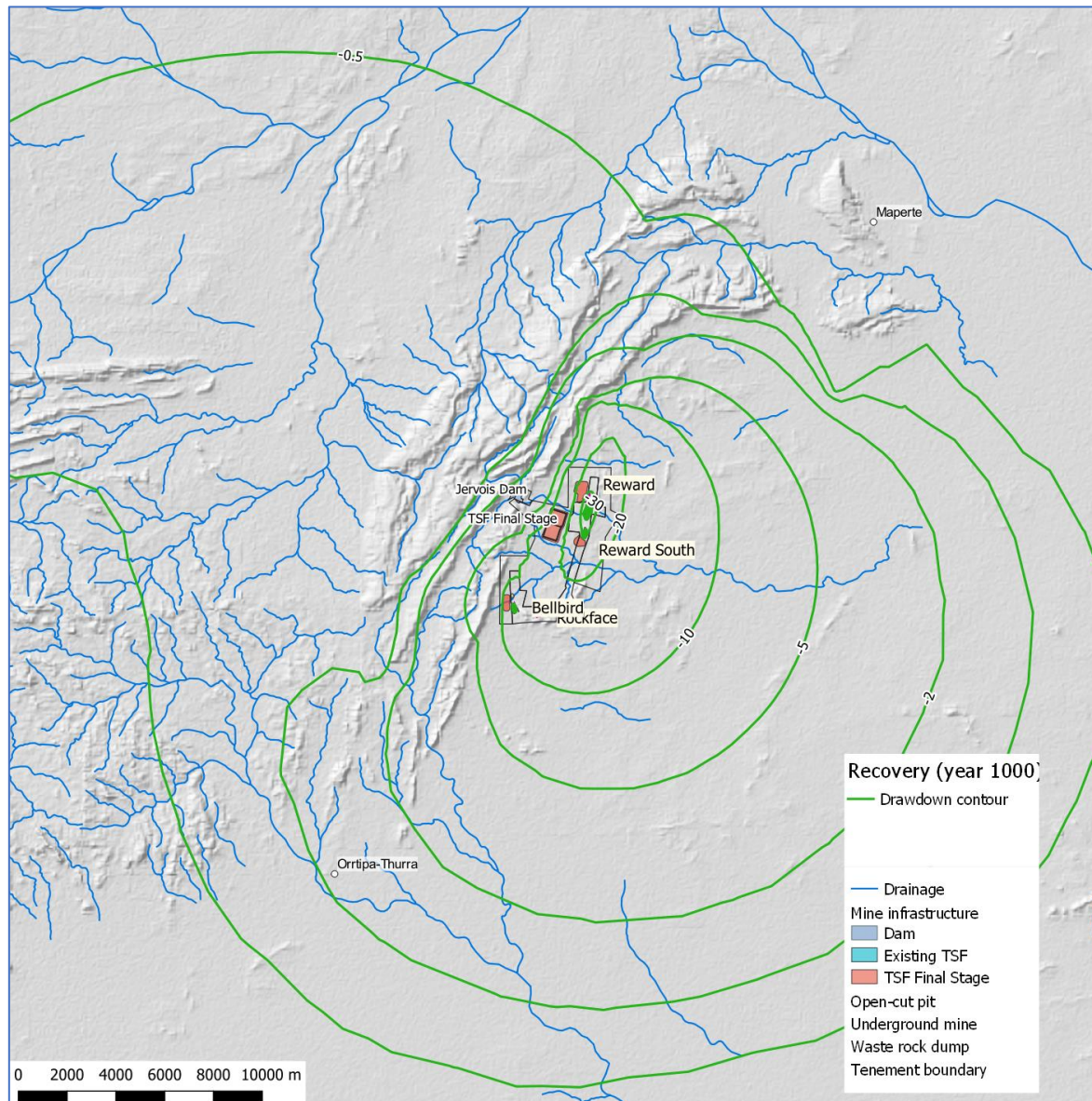


Figure 4.5-6: Post-closure Final Drawdown Contours after 990 Years of Recovery
(1000 years from Start of Mining)

Contamination from TSF

The updated groundwater model indicates that all flow from the TSF will migrate towards the Reward Underground. As groundwater levels recover, the flow will ultimately report to the Reward pit (Figure 4.5-7). All potential seepage from the TSF will terminate at the Reward pit lake. Further information is provided in Appendix A-4 Groundwater Assessment Supplement Report.

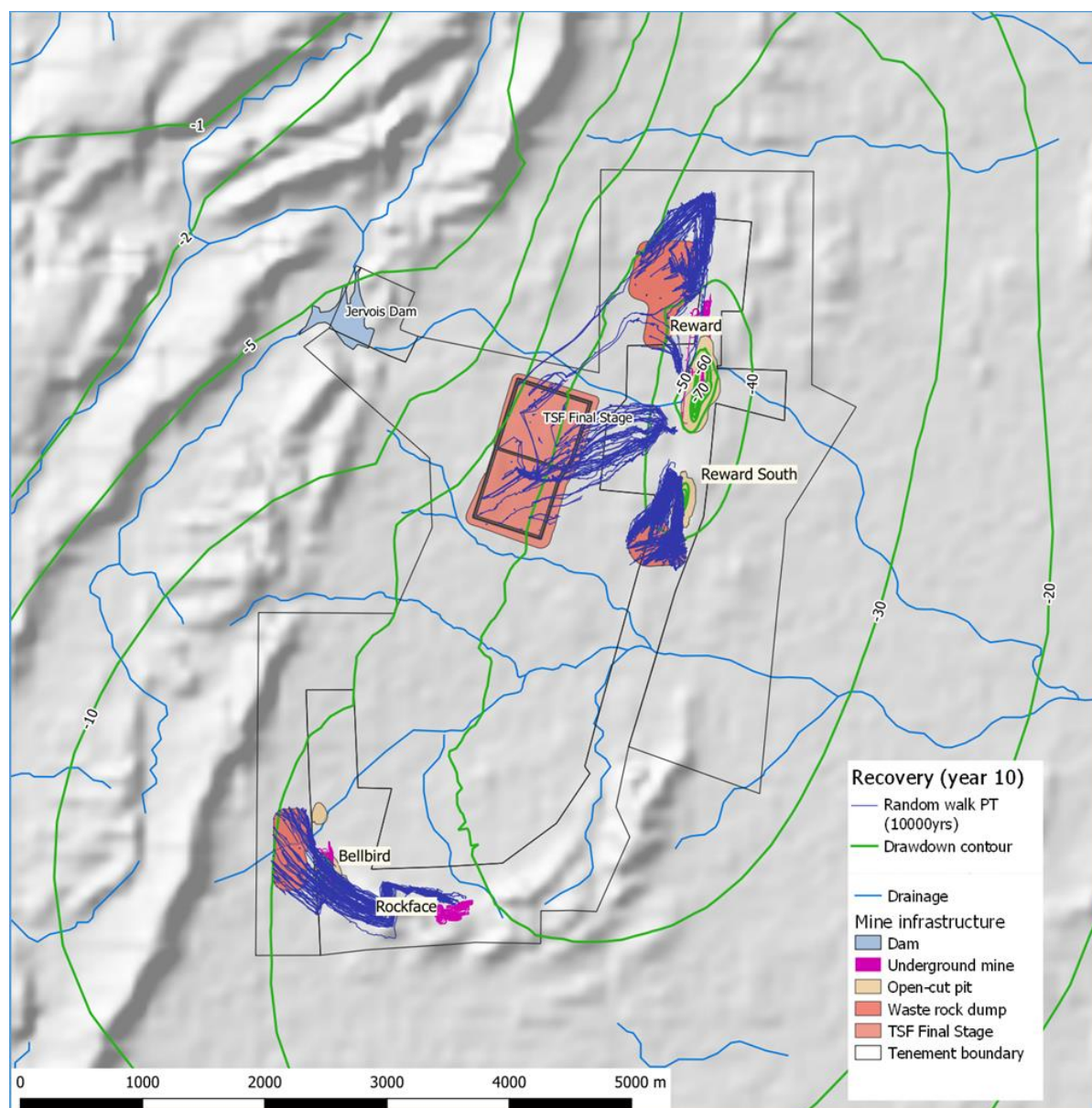


Figure 4.5-7: Random Walk Particle Tracking and Drawdown Contours from the End of LOM Year 10

Groundwater Dependent Ecosystems

There are no identified groundwater dependant ecosystems (GDEs) within at least 40 kilometres of the process water supply borefield and the depth to groundwater (>15 metres) generally precludes ecosystem use. However, Low (2019) identified the possibility of the presence of deep rooted species along Arthur Creek which may be considered facultative GDE species.

The drawdown from the process water supply is expected to be about 2 metres which will result in impacts that are less than the criteria adopted by DENR:

- Modelled extraction does not cause the maximum depth to water table to exceed 15 metres below ground level in areas where groundwater is less than 15 metres;
- Modelled extraction does not result in the maximum depth to water table declining by more than 50 % below the levels that would be expected under a natural baseline scenario (no pumping scenario); and
- Modelled extraction does not result in a rate of groundwater drawdown that exceeds 0.2 metres/year.

Groundwater levels in the mine site are generally greater than 20 m below ground level. Two (2) sites have historically shown groundwater levels less than 5 m below ground level and are associated with Unca Creek. However, all but one of the groundwater levels obtained during the 2018 groundwater investigation (Table 4.5-1) were greater than 14 – 15 m below ground level, which in addition to the very low permeability of the underlying rocks, suggests that the 2 shallow groundwater levels associated with Unca Creek may be disconnected from the regional groundwater system. Therefore, groundwater drawdown in the fractured rock aquifer is expected to have limited effect on groundwater availability to riparian vegetation.

The impact on potential stygofauna for this project is dewatering of the aquifer habitat in proximity to the process water supply borefield. Stygofauna surveying was completed at the project site in 2019 and a single commonly found species was encountered. The level of expected reduction in habitat, in the context of the size of the possible habitat, is considered insignificant. The impact to stygofauna from groundwater drawdown is considered low.

4.5.4 Mitigation and Monitoring

This section provides information pertaining to the mitigation measures to be implemented to safeguard surface and groundwater resources and their environmental values. All mitigation measures remain consistent with those proposed within the draft EIS.

Water Management

The proposed Jervois surface water management strategy will use a number of surface water management measures that will be implemented during construction, operational and post-closure periods.

The key objectives of the Project's water management system (Figure 4.5-8, Figure 4.5-9, Figure 4.5-10) are:

- To protect environmental values of the receiving waters downstream of the Project during the operational period and post-closure; and
- To ensure that the Project has sufficient water available for operations during dry times.
- The above objectives will be achieved by:
- Maintaining existing surface water drainage patterns where practical to do so;
- Managing water from different sources separately:
 - Undisturbed runoff will be diverted around disturbed areas where practical;
 - Mine affected water collected in-open cut pits, and in the process water dam will be managed using temporary in-pit sumps and re-used within the water management system;
 - Sediment-laden runoff from the proposed waste rock dumps will be captured in dedicated sediment dams and re-used within the water management system;
 - Raw water (plant standard) dewatered from the open cut pits and underground mines will be reused within the water management system.
- Using water collected on site as part of mining operations preferentially in order to reduce demand on external water sources. Water for mine operating purposes (excluding raw water demands) will be sourced preferentially as follows:
 - Mine affected water;
 - Raw water (plant standard), dewatered from the underground mines;
 - Sediment laden water;
 - Raw water (potable standard), sourced from Jervois Dam; and
 - Raw water (potable standard) sourced from the external borefield.

The above water management objectives, when implemented through appropriate management plans, will mitigate the effects of the Project on natural surface water quantity and quality and flooding downstream of the mine site during operations and post-closure.

Monitoring

Monitoring of surface water and groundwater quality will be ongoing as part of the Project. This will comprise monitoring of the: background water quality locations; surface water storages proposed as part of the Project; borefield and onsite monitoring bores; and within receiving environments situated downstream of the Project area.

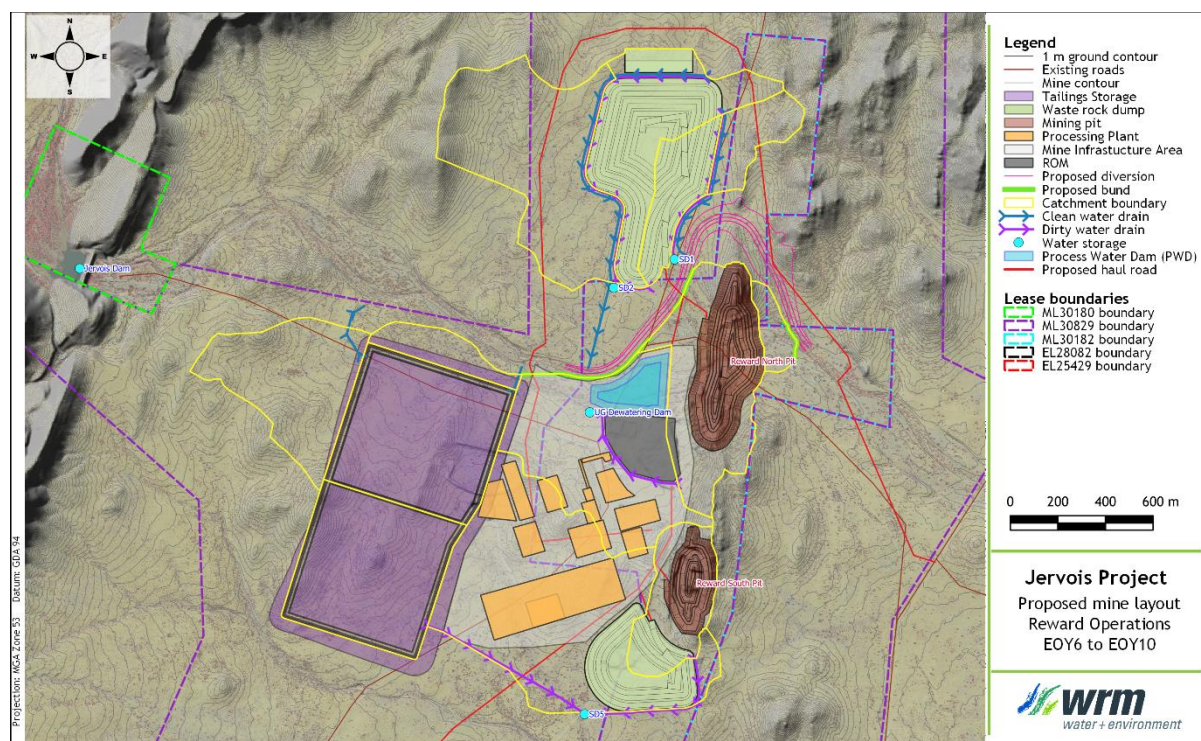


Figure 4.5-8: Proposed Water Management System for Reward Operation

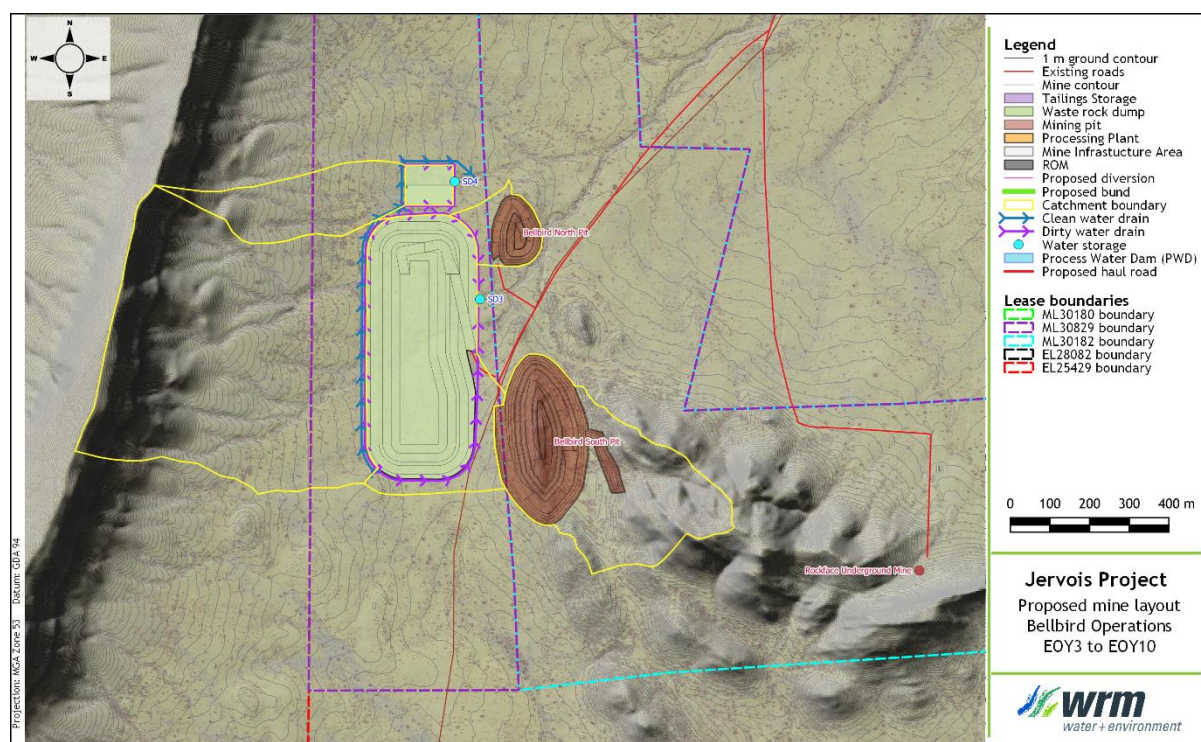


Figure 4.5-9: Proposed Water Management System for Bellbird and Rockface Operation

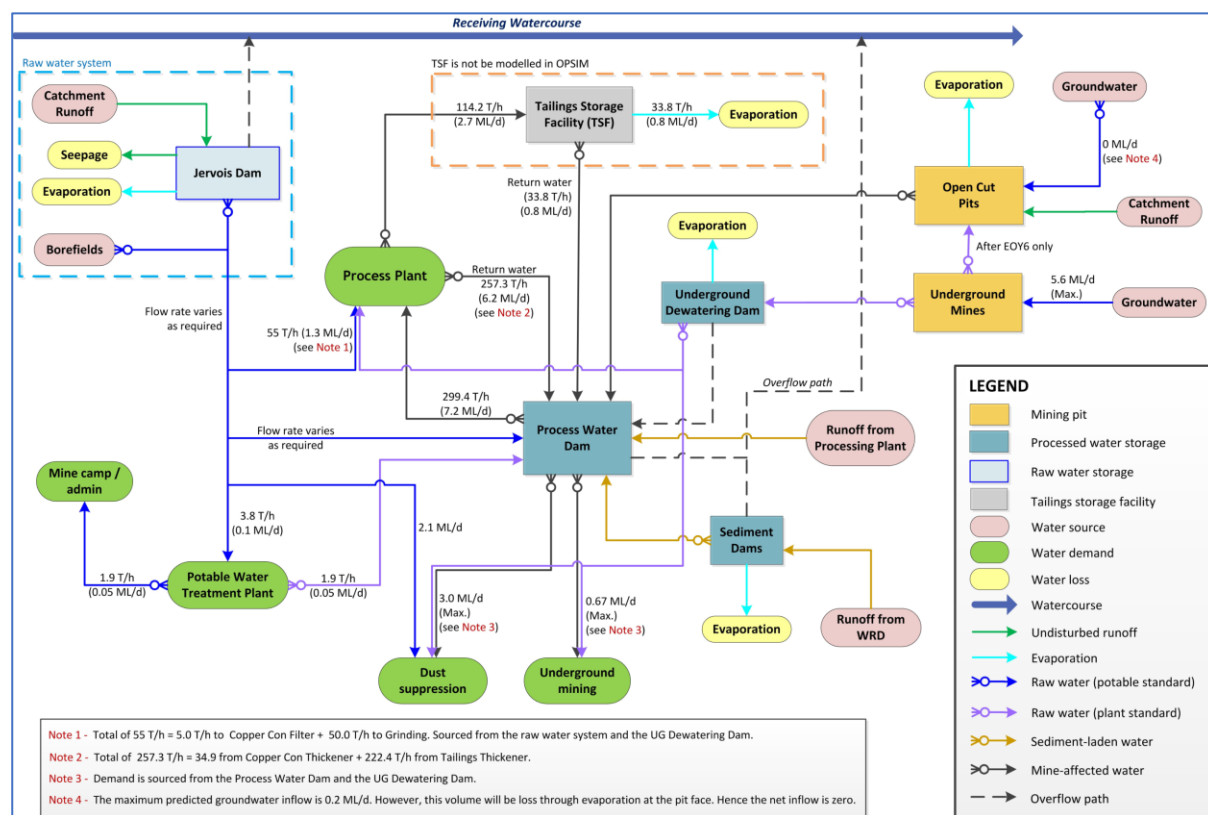


Figure 4.5-10: Water Management System Schematic

Surface Water Monitoring Program

With regard to the surface water monitoring program this is designed to collect:

- Background surface water (undisturbed) quality data along natural streams upstream and downstream of the mine site, and through the mine site;
- Surface water storage (storage) quantity and quality data in the water storages at the mine site; and
- Receiving environment surface water (receiving) quality data along streams downstream of disturbance areas at the mine site.

Figure 4.5-11 shows the locations of the proposed water quality monitoring points. Data from the water monitoring stations will be used to inform mine site water use and water inventories, validate hydrologic, hydraulic and water balance modelling, in addition to assessing the impact of mining activities on water quality in the receiving waters and demonstrating compliance.

Background and receiving water monitoring will continue to take place following runoff events at the existing monitoring locations specified in Table 4.5-9. The background and receiving water monitoring parameters are detailed in Table 4.5-10.

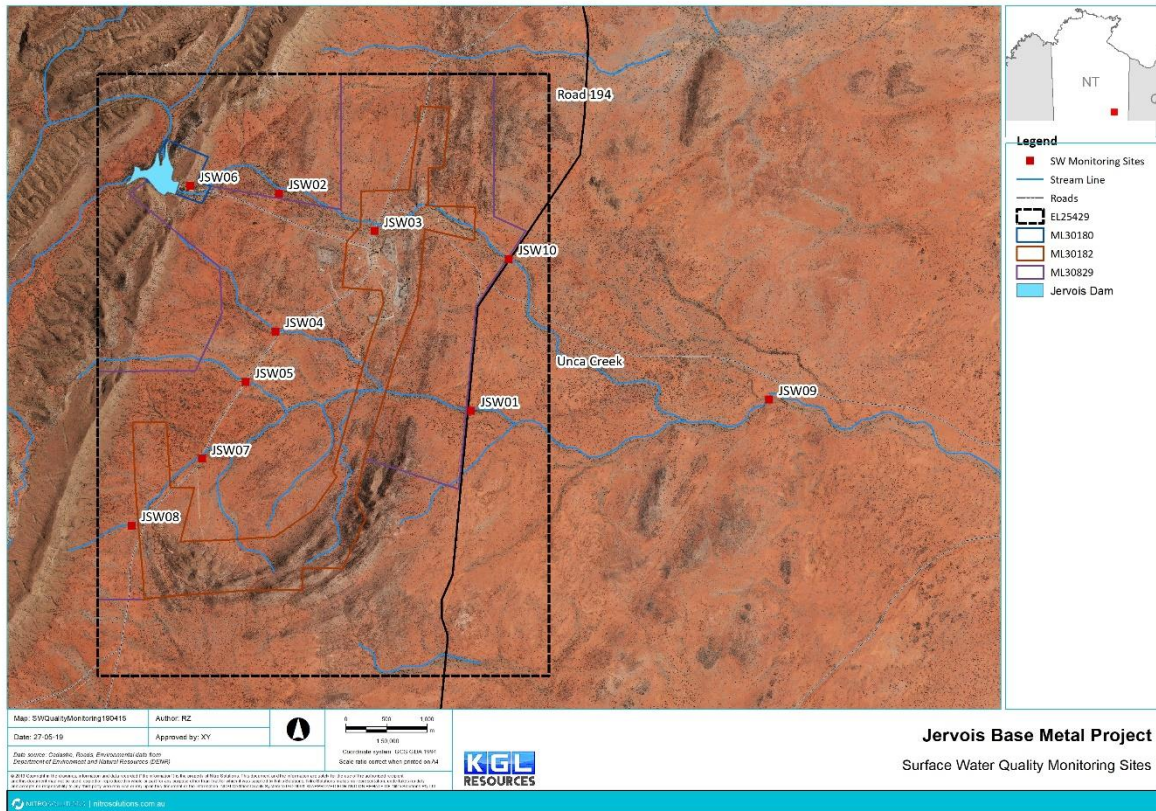


Figure 4.5-11: Surface Water Monitoring Sites

Table 4.5-9: Background and Receiving Water Monitoring Locations

Location	Background / receiving water	Comments
JSW01	Receiving water	Downstream boundary of Project on Unca Creek tributary. Includes Bellbird and Rockface mining disturbance area.
JSW02	Background	Unca Creek upstream of diversion. No mining disturbance in catchment.
JSW04	Background	Drainage feature in catchment of Unca Creek tributary. No mining disturbance in catchment.
JSW05	Background	Drainage feature in catchment of Unca Creek tributary. No mining disturbance in catchment.
JSW06	Background	Unca Creek downstream of Jervois Dam. No mining disturbance in catchment.
JSW07	Receiving water	Drainage feature in catchment of Unca Creek tributary. Includes Bellbird mining disturbance area.
JSW09	Receiving water	Downstream of Project at confluence of Unca Creek and Unca Creek tributary. Includes all mining disturbance area.
JSW10	Receiving water	Downstream boundary of Project on Unca Creek. Includes Reward mining disturbance area.

No controlled releases of mine affected water are proposed as part of the mine water management system, and therefore the monitoring samples will not be relied upon to determine if the quality of water held in site storages is suitable for release.

The proposed storages at the Project including the process water dam, Jervois Dam, underground dewatering dam and waste rock sediment dams will be monitored at least quarterly (and daily during or following significant runoff events). The proposed suite of monitoring parameters and recommended monitoring frequency is provided in Table 4.5-10. A significant runoff event is one where the water level in any dam rises by greater than 0.3 m.

Table 4.5-10: Surface Water Monitoring Parameters and Frequencies

Parameter	Frequency
Water level / storage volume	Daily
Non-metallic indicators	
pH	Quarterly / daily during significant runoff events
Electrical conductivity	Quarterly / daily during significant runoff events
Total dissolved solids	Quarterly / daily during significant runoff events
Total hardness	Quarterly / daily during significant runoff events
Total Petroleum Hydrocarbons (TPH C6-C9, C10-C36)	Quarterly / daily during significant runoff events
Turbidity	Quarterly / daily during significant runoff events
Dissolved oxygen	Quarterly / daily during significant runoff events
Sulphate	Quarterly / daily during significant runoff events
Nitrate	Quarterly / daily during significant runoff events
Metals and metalloids (total and filtered)	
Aluminium	Quarterly / daily during significant runoff events
Arsenic	Quarterly / daily during significant runoff events
Boron	
Cadmium	Quarterly / daily during significant runoff events
Chromium	Quarterly / daily during significant runoff events
Cobalt	Quarterly / daily during significant runoff events
Copper	Quarterly / daily during significant runoff events
Iron	Quarterly / daily during significant runoff events
Lead	Quarterly / daily during significant runoff events
Magnesium	Quarterly / daily during significant runoff events
Manganese	Quarterly / daily during significant runoff events
Mercury	Quarterly / daily during significant runoff events

Parameter	Frequency
Molybdenum	Quarterly / daily during significant runoff events
Nickel	Quarterly / daily during significant runoff events
Selenium	Quarterly / daily during significant runoff events
Silver	Quarterly / daily during significant runoff events
Uranium	Quarterly / daily during significant runoff events
Vanadium	Quarterly / daily during significant runoff events
Zinc	Quarterly / daily during significant runoff events

Groundwater Management and Monitoring

The updated Groundwater Management Plan (Appendix C-2) details the groundwater management, trigger levels, monitoring and mitigation measures to address the impacts to groundwater.

Groundwater monitoring program will comprise:

1. Monitoring of drawdown in proximity to the process water supply borefield;
2. Monitoring of drawdown between the process water supply borefield and third-party bores;
3. Monitoring of drawdown in proximity to the mine excavations (pits and underground workings);
4. Monitoring of drawdown between the mine excavations (pits and underground workings) and third party bores;
5. Monitoring of dewatering volumes from the pits and underground excavations;
6. Monitoring at third-party bores; and
7. Monitoring adjacent to the TSF to assess mounding and groundwater quality changes due to any seepage.

Proposed monitoring locations around the Project mine site are presented in

Figure 4.5-1 and Table 4.5-11. Groundwater monitoring bores in the borefield including third party pastoral bores are detailed in Figure 4.5-12, Table 4.5-12 and Table 4.5-13

Water levels at all bores will be measured monthly. Water quality will be monitored annually at all observation bores, and quarterly at pumping bores, WRD and TSF seepage monitoring bores. A full suite of analytes per Table 4.5 14 will be analyses at all bores.

The monitoring suite and frequency will be reviewed and optimised following two years data collection and every two years thereafter. If the stated purpose of the monitoring is not met then additional bores will be installed.

A separate Water Abstraction Management Plan will be developed in the detailed planning stage to address issues associated with the management of groundwater abstraction from the borefield.

Table 4.5-11: Mine Site Groundwater Monitoring Locations

Site name	Easting	Northing	Purpose	Water Level Measurement	Monitoring Water Quality Analysis	Volume Pumped
Groundwater levels / quality						
J1	628190	7495025	Tailings mounding and seepage assessment	Monthly	Quarterly	N/A
J4	629290	7494080	Tailings mounding and seepage assessment	Monthly	Quarterly	N/A
J6	628725	7493277	Tailings mounding and seepage assessment	Monthly	Quarterly	N/A
J7	630375	7494741	Reward pit and underground mine excavation dewatering drawdown	Monthly	None	N/A
J8	630474	7494620	Reward pit and underground mine excavation dewatering drawdown	Monthly	None	N/A
J10	630056	7494574	Reward pit and underground mine excavation dewatering drawdown	Monthly	None	N/A
J11	627300	7490821	Bellbird pit and underground mine excavation dewatering drawdown	Monthly	None	N/A
J13	627082	7490602	Bellbird pit and underground mine excavation dewatering drawdown	Monthly	None	N/A
J15	627403	7491043	Bellbird pit and underground mine excavation dewatering drawdown	Monthly	None	N/A
J16	630086	7494860	Reward pit and underground mine excavation dewatering drawdown	Monthly	None	N/A
J18	630228	7494318	Reward pit and underground mine excavation dewatering drawdown	Monthly	None	N/A
J19	627124	7490133	Bellbird pit and underground mine excavation dewatering drawdown	Monthly	None	N/A

Table 4.5-11: Mine Site Groundwater Monitoring Locations

Site name	Easting	Northing	Purpose	Water Level Measurement	Monitoring Water Quality Analysis	Volume Pumped
J21	630879	7495238	Reward pit and underground mine excavation dewatering drawdown	Monthly	None	N/A
J22	628478	7490335	Rockface underground mine excavation dewatering drawdown	Monthly	None	N/A
J23	628297	7490610	Rockface underground mine excavation dewatering drawdown	Monthly	None	N/A
J24	628586	7490768	Rockface underground mine excavation dewatering drawdown	Monthly	None	N/A
RN006910	630803	7494755	Reward pit and underground mine dewatering drawdown Unca Ck	Monthly	Quarterly	N/A
Groundwater volumes						
Bellbird pit			Bellbird pit and underground mine excavation dewatering drawdown	N/A	Quarterly	Weekly
Bellbird underground			Bellbird pit and underground mine excavation dewatering drawdown	N/A	Quarterly	Weekly
Reward pit			Reward pit and underground mine excavation dewatering drawdown	N/A	Quarterly	Weekly
Reward underground			Reward pit and underground mine excavation dewatering drawdown	N/A	Quarterly	Weekly
Reward South pit			Reward South pit and underground mine excavation dewatering drawdown	N/A	Quarterly	Weekly
Rockface underground			Rockface underground mine excavation dewatering drawdown	N/A	Quarterly	Weekly

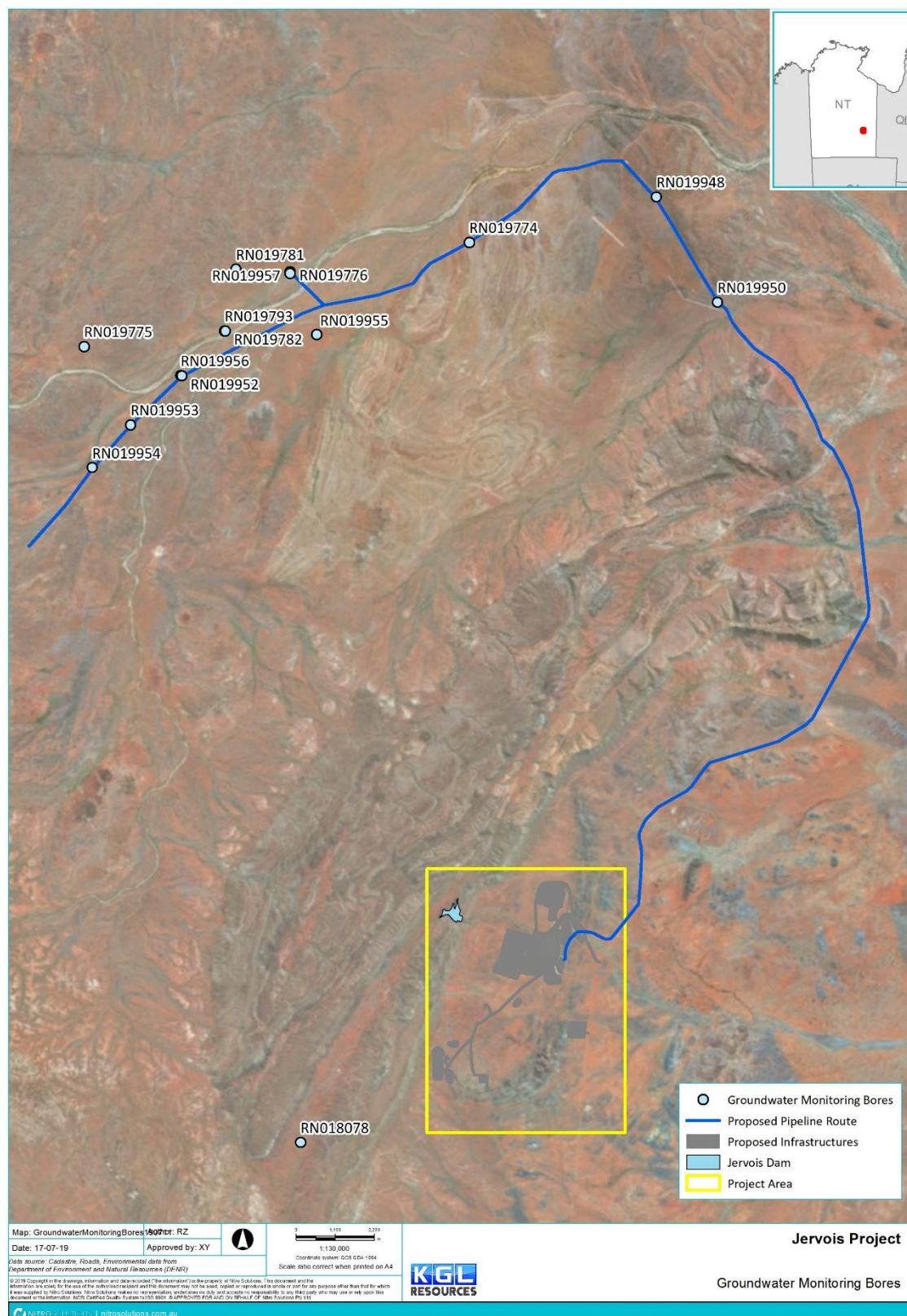


Figure 4.5-12: Borefield Groundwater Monitoring Bores (Including Third Party Monitoring Bores)

Table 4.5-12: Process Water Supply Groundwater Monitoring Locations

Site name	Easting	Northing	Purpose	Water Level Measurement	Monitoring Water Quality Analysis	Volume Pumped
Groundwater levels / quality						
RN019776 (Mon)	623311	7513279	Borefield Performance	Monthly	None	N/A
RN019793 (Mon)	621599	7511640	Borefield Performance	Monthly	None	N/A
RN019956 (Mon)	620453	7510399	Borefield Performance	Monthly	None	N/A
Production Bores Volumes						
RN019782 (Prod)	621622	7511636	Borefield Performance	Monthly	Quarterly	Weekly
RN019950 (Standby)	634423	7512336	Borefield Performance	Monthly	Quarterly	Weekly
RN019952 (Prod)	620478	7510390	Borefield Performance	Monthly	Quarterly	Weekly
RN019953 (Prod)	619135	7509029	Borefield Performance	Monthly	Quarterly	Weekly
RN019954 (Prod)	618131	7507838	Borefield Performance	Monthly	Quarterly	Weekly
RN019957 (Prod)	623308	7513239	Borefield Performance	Monthly	Quarterly	Weekly

Table 4.5-13: Third Party Groundwater Monitoring Locations

Site name	Easting	Northing	Purpose	Water Level Measurement	Monitoring Water Quality Analysis	Volume Pumped
RN019774	627979	7514063	Third Party Process Water Supply Impact Assessment	Monthly	None	N/A
RN019775	617946	7511234	Third Party Process Water Supply Impact Assessment	Monthly	None	N/A
RN019781	621907	7513363	Third Party Process Water Supply Impact Assessment	Monthly	None	N/A
RN019948	632857	7515290	Third Party Process Water Supply Impact Assessment	Monthly	None	N/A

Site name	Easting	Northing	Purpose	Water Level Measurement	Monitoring Water Quality Analysis	Volume Pumped
RN019955	623994	7511520	Third Party Process Water Supply Impact Assessment	Monthly	None	N/A
RN018078 (200m offset)	623390	7488922	Third Party Mine Dewatering Impact Assessment	Monthly	None	N/A

Table 4.5-14: Groundwater Monitoring Analytical Suite

pH Value	Aluminium	Manganese
Electrical Conductivity	Antimony	Molybdenum
Total Dissolved Solids	Arsenic	Selenium
Total Alkalinity as CaCO ₃	Beryllium	Silver
Sulfate as SO ₄ -	Barium	Vanadium
Chloride	Cadmium	Tin
Calcium	Chromium	Uranium
Magnesium	Cobalt	Boron
Sodium	Copper	Iron
Potassium	Nickel	
Silicate	Lead	
Fluoride	Zinc	
Nitrate as N	Mercury	

4.6 Inland Waters Environmental Quality

Environmental Geochemistry International (EGI) were employed to undertake geochemical investigations and assessment of the Project in 2018. In response to feedback on the geochemical information provided in the draft EIS, EGI were also engaged again in 2019 to undertake additional investigations into the geochemical aspects of the proposed action.

Feedback on the draft EIS in relation to the inland waters environmental quality section of the draft EIS, including those in relation to potential for acid drainage was received from numerous stakeholders as summarised below:

- Identify the expected water quality of process water and requirements for lining of the process water dam;
- Identify the expected water quality of runoff from waste rock dumps, ROM pads etc. and the requirement for lining of the associated sediment dams;

- Clarify where and how the identified PAF will be stored during the period prior to rehabilitation to enable an ongoing management and possibly ongoing mitigation;
- How the PAF waste material will be managed after closure;
- AMD potential should remain a key monitoring issue, further testing and stringent monitoring plans must be developed;
- How will the proponent isolate the historic mine material from the environment; and
- How long has the proponent considered is appropriate to continue monitoring and management of voids following closure.

4.6.1 Relevant Activities

The activities that have the potential to impact upon inland water environmental qualities remain the same as those presented in the draft EIS.

4.6.2 Potential Impacts and Risks

Further to the risks and potential contamination sources provided in the draft EIS, additional investigations related to ARD were carried out to address stakeholder comments, including:

- Development of an initial Sulphur block model to better define proportions of Acid Rock Drainage (ARD) rock types for Rockface, Reward and Bellbird deposits;
- Development of conceptual cover design options and opportunities for surface placement of PAF materials; and
- Conceptual geochemical water quality modelling to assist in the assessment of different management options for mine materials.

Development of an Initial Sulphur Block Model

The initial Sulphur (S) block model was developed based on the following principals:

- Where S data was available at a suitable density, a simplified S cut off of 0.4% was applied to define NAF ($\leq 0.4\%$) and PAF materials ($> 0.4\%$);
- S assay coverage is sparse away from the ore zone, some reasonable assumptions were made based on geological observation, for example, oxidised materials were assumed to be NAF; and
- A degree of conservatism was applied.

Based on the initial S block model, the predicted total quantities of Potentially Acid Forming (PAF) waste rock to be generated from the Project has been reduced to less than 5%. This sees a refinement in the PAF predictions within the draft EIS and indicates considerable flexibility in waste rock management.

Conceptual Cover Design

A team of specialist geochemists, soil modellers and geotechnical engineers carried out a site visit on the Project between 15th and 18th April 2019, to identify potential cover materials for the Project.

Geotechnical and geochemical samples were collected during the site visit. A conceptual cover design for waste rock dumps and tailings storage facilities was subsequently developed. The purpose of the cover system is to control ARD effects upon receiving surface and groundwater which may potentially arise from surface placed waste rocks and tailings on the receiving surface water and groundwater.

Based on the field investigation availability of capping materials and climate, a preliminary conceptual cover design (Figure 4.6-1) is proposed by EGi, comprising of:

- Coarse rock such as pegmatite or similar non mineralised material on the top;
- Silty barrier layer;
- NAF coarse waste material at the base; and
- PAF waste rock placed in short lifts (typically less than 5m) with traffic compaction rather than high end-tipped lifts to prevent development of rubble and chimney zones (tailings placed as usual).

Such design would aim to ensure that:

- Vegetation growth is promoted, and erosion minimised by placing the pegmatite coarse rock on the surface, protecting the cover system;
- Infiltration is limited due to the silty layer that would form the capillary barrier;
- Upward migration of salts from PAF materials into the cover system is limited due to the isolation of PAF materials from the cover system with the lower coarse waste rock layer; and
- Development of convective cells and rapid sulphide oxidation and high ARD loads is prevented during operations through placement of PAF waste rock in short and compacted lifts.

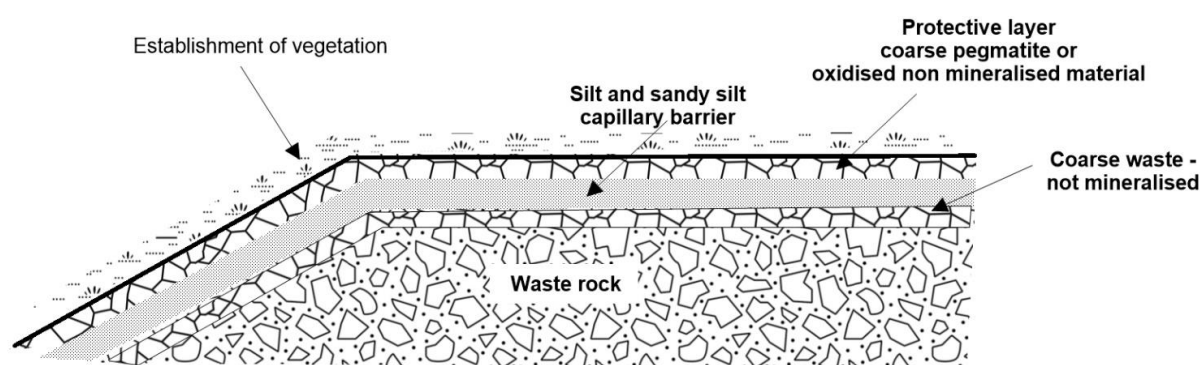


Figure 4.6-1: Conceptual Waste Rock Cover Design

A detailed capping design will be completed in the detail planning stage, after receiving the results from the geotechnical and geochemical testing, and completion of a soil oxygen flux model.

Geochemical Water Quality Modelling

Geochemical water quality modelling enables prediction on mine drainage quality from pits, underground workings, waste rock dumps, stockpiles and TSF. Conceptual models during operations and post-closure were developed as part of this Supplement report based on the following:

- Characteristics of key rock/material types;
- Initial estimate of the distribution of key rock/material types;
- Water balance; and
- Groundwater quality and flows.

The conceptual models further support the impact assessment and mitigation measured proposed in the draft EIS.

During operation (Figure 4.6-2), the Reward and Bellbird open pits will intercept groundwater as they are developed. Any water that enters the open pit area will be collected in the sumps at the base and will be pumped to the Process Water Dam. No interaction is predicted between the contaminated water in the pit and the natural environment. Underground operations will also intercept groundwater as they are developed, and this water will be discharged to the underground dewatering dam.

The runoff from the waste rock dumps during operation will be collected in sediment dams and diverted to process water dam. Runoff from the TSF will be captured in the Process Water Dam.

No impact to the receptors' (Orrtipa Thurra, Maperte water supply and Lucy Creek station) groundwater quality are predicted from mining activities.

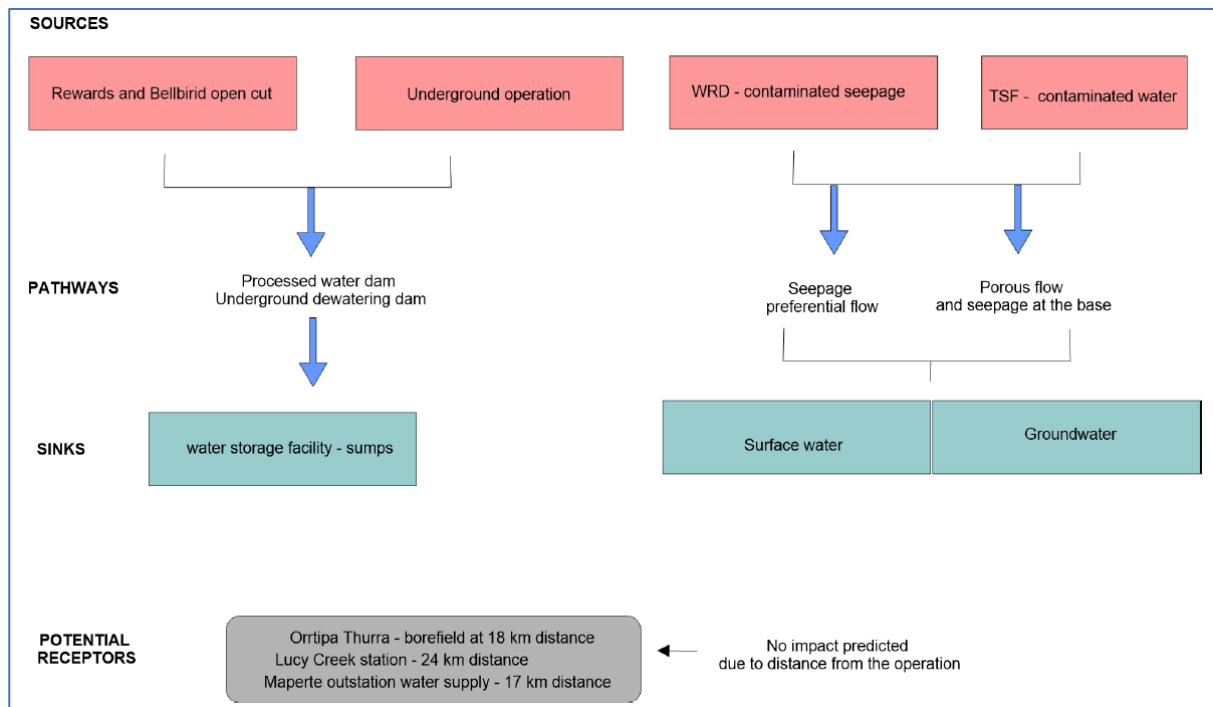


Figure 4.6-2: Conceptual Operational Model

Post closure (Figure 4.6-3), the model predicts that the pit lake will develop to a depth of around 20m, at which the inputs via rainfall and groundwater will be approximately balanced by evaporation. The chemistry of the pit lake is predicted to fluctuate widely during the first year following closure, with pH fluctuating between about pH 4 to 7.5 depending on the relative contributions of the initially

acidic runoff and the alkaline groundwater. However, in the longer term the pH of the pit lake is predicted to stabilise at near neutral pH (between 7 to 8) as the input of acidity from PAF wall rock diminishes with time, as the sulphide mineralisation becomes depleted by oxidation processes.

Sulphate is predicted to increase over time, reaching around 2500 mg/L after 30 years. Calcium concentration initially trends higher with time before stabilising at between 40-60 mg/L in the longer term. Zinc concentration is also predicted to steadily rise with time, to around 10-15 mg/L in the longer term. Copper concentrations are predicted to fluctuate up to around 10 mg/L during the first year under the acidic conditions, but in the longer term is less than 0.1 mg/L due to solubility constraints.

Groundwater in the underground mining areas is predicted to recover in the post closure to between 20-50 m from surface. The recovered water will come into contact with oxidised sulphidic material exposed on the underground walls of stopes and drives, resulting in dissolution of salts. It is predicted that when the system has come to an equilibrium, this process will cease. The recovered water will mix with regional groundwater and be diluted along the regional flow path toward the east. The closest potential receptor is 24 km away from the mine site. The impact to groundwater quality is negligible.

Post closure, the Bellbird and Reward waste rock dumps will be covered to limit ARD and mobilisation of salts and metals. However, any contaminated water that seeps from the WRD and reaches groundwater via preferential flow will be captured by the cone of depression resulting from Bellbird and Reward open pits and underground operations, and will report to each of the pit lakes respectively.

Post closure, the TSF will be covered to limit any further exposure to weather conditions. Any potential seepage is predicted be captured by the Reward pit lake (Figure 4.5-7).

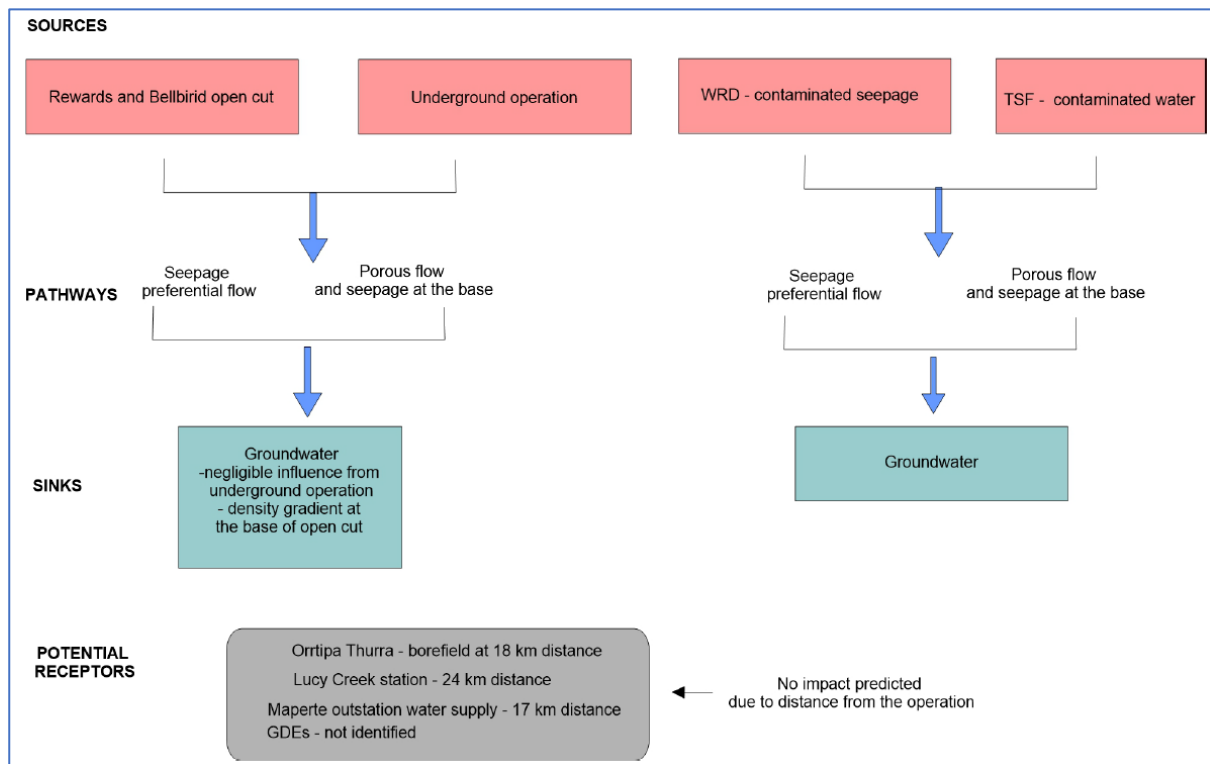


Figure 4.6-3: Conceptual Post-Closure Model

4.6.3 Mitigation and Monitoring

This sections summaries updates on mitigation and monitoring measures to those presented in the draft EIS.

Approach to Mine Water Management

The proposed Water Management Plan has been updated based on the water balance model and surface water impact assessment updates. Mitigation and monitoring measures regarding mine water management is presented in Section 4.5.4

Erosion and Sediment Control

The proposed Erosion and Sediment Control Plan has been updated to prevent unacceptable levels of sediments and contaminants from leaving the lease and entering the receiving waters. The slope batter angles for the Waste Rock Dump construction have been changed from 25 degree to 18 degree to allow topsoil and vegetation establishment.

Groundwater Monitoring

The proposed Groundwater Management Plan has been updated which detailed the Groundwater Monitoring Program. Groundwater monitoring is presented in section 4.5.4.

A separate Water Abstraction Management Plan will be developed in the detailed planning stage to address issues associated with the management of groundwater abstraction from the borefield.

Groundwater Trigger Levels and Mitigation Measures

Water Table Drawdown from Borefield Pumping and Mine Dewatering

Water table drawdown from the process water supply borefield pumping and mine dewatering will be measured at observation bores as described in Section 4.5.4. The groundwater model will be run annually to estimate drawdown at each of these observation bores using the groundwater pumping data recorded at the process water supply borefield and mine dewatering.

If the measured drawdown at observation bores exceeds the range of drawdown predicted by modelling (trigger value), mitigation measures will be implemented sequentially as follows:

Stage 1: Development of a Class 2 Groundwater flow model will be undertaken in accordance with the Australian Groundwater Modelling Guidelines (Barnett et al., 2012). Volumes pumped from the Project process water supply borefield and mine dewatering rates will be used to define hydraulic stress for the model. Water level drawdown measured at the monitoring bores will be used to provide a calibration data set. Aquifer parameters applied in the model will be adjusted such that the model drawdown matches the measured drawdown. The recalibrated model will be run to predict drawdown impacts on other users. If these impacts will reduce water availability to other users, then subsequent mitigation will be implemented. The model set-up may require modification to better meet the model objective which is to predict the aquifer response to Project process water supply borefield pumping and borefield closure and mine dewatering. Possible changes include: redefinition of parameter zones to simulate varied geology within current zonation and modification of boundary conditions.

Future models will be assessed as part of ongoing authorisation under the MM Act. A recalibrated model will be delivered within one year of the trigger value being exceeded.

Stage 2: Make-good measures at other users to ensure water availability. For example, deepening bores and upgrading pumps.

Stage 3: Increased process water efficiency to be studied and implemented if practicable.

Stage 4: Modified pumping regimes to be implemented if significant impacts associated with groundwater drawdown are identified.

Waste Rock Dump Leachate Seepage

Waste rock dump seepages may occur during significant rainfall events. It is unlikely that these events will result in groundwater level rises, although deterioration of water quality may occur. Groundwater quality will be monitored at the monitoring bores to detect any impacts to groundwater from the seepages.

Trigger levels comprise:

- Water level rise beyond seasonal variation.
- Water quality deteriorating from baseline.

Mitigation measures will be implemented sequentially as follows:

Stage 1: Assess the impact of water table rise. Water level rise can impact the environment if water levels rise to the root zones of plants, nominally higher than 15m below ground surface. Or if water tables rise to ground surface and cause soil waterlogging and/or salinisation.

Assess the impact of water quality decline. The current beneficial use of groundwater beneath the mine is pastoral use. The impact of tailings leachate seepage if detected should be assessed to determine if the beneficial use category of groundwater will change.

Stage 2: If seepage from the WRDs causes unacceptable impacts (change in beneficial use) then design and implement seepage management measures. Such as, pump and treat seepage from beneath the WRDs using interception bores for subsequent re-use in the process plant.

Tailings Storage Facility Leachate Seepage

Groundwater levels and water quality downgradient of the TSF will be monitored at the monitoring bores to detect for the impacts of seepage if it occurs.

Trigger levels comprise:

- Water level rise beyond seasonal variation; and,
- Water quality deteriorating from baseline.

Mitigation measures will be implemented sequentially as follows:

Stage 1: Assess the impact of water table rise. Water level rise beyond the TSF footprint can impact the environment if water levels rise to the root zones of plants, nominally higher than 15m below ground surface. Or if water tables rise to ground surface and cause soil waterlogging and/or salinization.

Assess the impact of water quality decline. The current beneficial use of groundwater beneath the mine is pastoral use. The impact of tailings leachate seepage if detected should be assessed to determine if the beneficial use category of groundwater will change.

Stage 2 If tailing seepage causes unacceptable impacts (Water table rise to near surface beyond the TSF footprint or change in beneficial use) then design and implement seepage management measures. Such as, pump and treat seepage from beneath the TSFs using interception bores for subsequent re-use in the process plant.

Contingency Measures

It is possible that groundwater impacts (water level drawdown and reduced groundwater availability to other users) exceeds the magnitude predicted in the impact assessment.

Prediction of drawdown using the calibrated groundwater flow model will be a leading indicator of impact and monitoring of water level at the receptors will be used to confirm impacts. If impacts are greater than predicted, the following contingency measures will be implemented:

1. Impact assessment – the revised magnitude of the impact will be assessed for the full project duration from mining to mine closure and aquifer recovery;

2. Make-good measures will be assessed and implemented if required, for instance deepening of existing users bores to ensure ongoing water availability;
3. Additional water recycling methods will be explored, for example enhanced water recovery from tailings; and
4. Alternative water sources will be explored, for instance extending/relocating the borefield further from receptors into deeper parts of the Georgina Basin might be considered – though this is likely to be cost prohibitive.

Acid Rock Drainage Management

A Waste Rock and Spoil Disposal Plan will be developed to manage ARD issues associated with the Project development. The plan will incorporate the continuous update of the S Distribution Model, mine waste schedule, ongoing management and monitoring criteria specific to ARD.

Potential areas of contamination will be managed as follows:

- Contaminated water generated in the underground will be managed by disposal in the underground dewatering dam;
- Runoffs from the waste rock dumps during operation will be collected and diverted to process water dam;
- Any potential TSF seepage will be managed by diversion of contaminated water and storage in the process water dam. The TSF dam walls will be designed such that no seepage occurs to the creek and alluvium;
- The selection of the material for the construction of the tailings dam will satisfy geotechnical and geochemical criteria such that it is stable, and that any seepage is managed;
- Historic PAF materials will be collected and treated as PAF material on site;
- Groundwater monitoring bores have been installed around the TSF, Reward, Bellbird and Rockface operations, and WRDs to monitor the changes in water chemistry over time, including potential metalliferous and saline drainage; and,
- Should the investigation and monitoring find any adversely impacted groundwater and exceedance above the guidelines, the sampling will be repeated, and the reason of a change investigated.

Post-mining Monitoring and Maintenance

Areas identified as having potential for contamination post mining will be managed as follows:

- Bellbird and Reward waste rock dumps will have a cover design which will focus on limiting acid drainage and mobilisation of salts and metals. Any contaminated water that seeps from the WRD and reaches groundwater via presentational flow will be captured by the cone of depression resulting from Bellbird and Reward open pits and underground operations and will report to each of the pit lakes respectively;
- TSF will be covered post operation to limit any further exposure to weather conditions. Any potential seepage from the TSF will move at a very slow rate and captured by the Reward pit lake; and

- Monitoring of groundwater quality in the vicinity of the TSF and WRD will be carried out for a period of at least ten (10) years post mining. During this time, the results will be statistically reviewed, and further monitoring will be adjusted to the findings of the analysis. Should the investigation and monitoring find any adversely impacted groundwater and exceedance above the guidelines, the sampling will be repeated, and the reason of a change investigated.

4.7 Air, Greenhouse Gases & Noise

In support of the air quality and noise emission assessment which was undertaken by Air Noise Environment (ANE) in 2018, an additional assessment was undertaken by ANE in March/April 2019 to address feedback from stakeholders. This feedback included a request to demonstrate the suitability of the locations of the two air monitoring locations on the Project and the quantification of greenhouse gas emissions from land clearing.

This Section provides the information required to quantify greenhouse gas emissions from land clearing. This Section also provides a brief summary of the air and noise assessment of the proposed borefield and water pipeline. The complete Air and Noise Assessment Report can be found in Appendix A-7.

4.7.1 Greenhouse Gas Emissions from Land Clearing

Land clearing is associated with greenhouse gas emissions through release of carbon dioxide from decaying plant matter and the reduction in carbon sequestration provided by trees. For the estimation of emissions associated with land clearing, the Full Carbon Accounting Model (FullCAM) was utilised (Air Noise Environment, 2019).

As estimated in Section 2.1 of this report, additional clearing required to accommodate the Project development has been estimated at 246 ha. The carbon stock for the area is based on Acacia shrublands and has been estimated at 4.38 tC/ha which equates to a total carbon stock of 1077 tC. Using a factor of 3.67 (CO₂:C ratio), the estimated total carbon to be removed is 3,954 tC.

The revised estimated Scope 1 emissions as a result of land clearing are provided in the following Tables.

Table 4.7-1: Construction Scope 1 Emissions

Stage	Total Energy Consumed (Gj)	Total CO ₂ -e (tonnes)
Construction	115,800	8,164
Land Clearing	-	3,954

Source: Air Noise Environment, 2019

Table 4.7-2: Operations Scope 1 Emissions

Stage	Total Energy Consumed (Gj)	Total CO ₂ -e (tonnes)
Power Generation (assuming 20% solar power)	324,240	22,859
Other Operational Equipment	613,740	43,269
Lube and Hydraulic Oil	815	11
Total Per Annum	938,795	66,139
Total for Project Life (15 years)	14,081,925	992,085

Source: Air Noise Environment, 2019

Based on these emission estimations, the Project will still trigger the NGER reporting threshold for a single facility of 25,000 tonnes CO₂-e of greenhouse gases and 100,000 MJ of energy consumed. This revised annual estimate is less than the 71,854 reported in the draft EIS. This analysis indicates that the use of 20-30% solar will result in approximately 8-12% less greenhouse gas emissions (Air Noise Environment, 2019).

4.7.2 Borefield and Pipeline Air & Noise Assessment

ANE completed an assessment of noise for the construction and operational phases of the water pipeline and borefield infrastructure. Whilst construction noise will be associated with heavy machinery, operational noise will be generated by well head pumps and diesel generators. Predicted noise levels during construction and operation indicate compliance with relevant noise criteria by a significant margin due to the large separation distances from the proposed water pipeline and borefield infrastructure (at least 2.5 km).

Table 4.7-3: Water Infrastructure Noise Predictions

Sensitive Receptor	Predicted LAeq Noise Levels dB(A)	
	Pump Operations	Worst-case Construction Activity
Lucy Creek Homestead	18	29
Maperte Community	<10	20
Criteria	30	35

Potential air quality impacts during the construction period of the borefield and pipeline will primarily be associated with particulates from earthworks and truck movements over unpaved surfaces. The key air quality indicators for these activities are Total Suspended Particulates, PM₁₀ and PM_{2.5}. The main operational air emission sources will be diesel generators at each well head which emit combustion products, including nitrogen oxides (NO_x), carbon monoxide (CO) and particulates (PM₁₀ and PM_{2.5}).

A full explanation of the air dispersion prediction and air emission estimate methodology can be found in Section 4 of the Air and Noise Assessment Report provided in Appendix A-7. Predicted air

quality results for the construction and operational scenarios are provided in Tables 4.7-4 and 4.7-5 below. The results confirm that concentrations are significantly below the relevant ambient air quality criteria at the nearest sensitive receptors.

Table 4.7-4: Air Quality Predictions - Construction

Pollutant	Highest Predicted Sensitive Receptor Concentrations (ug/m3) – 1 hour averages	Average Time	Criteria
PM ₁₀	27.2	24 hour	50
PM _{2.5}	3.3	24 hour	25

Table 4.7-5: Air Quality Predictions - Operations

Pollutant	Highest Predicted Sensitive Receptor Concentrations (ug/m3) – 1 hour averages	Average Time	Criteria
TSP	0.11	Annual	90
PM ₁₀	0.11	24 hour	50
	0.11	Annual	25
PM _{2.5}	0.11	24 hour	25
	0.11	Annual	8
CO	1.97	8 hour	11,000
NO ₂	2.69	1 hour	250
	2.69	Annual	62

4.8 Cultural and Historic Features

Other than ensuring that archaeological sites and artefact sites are protected and their locations kept confidential, feedback on the draft EIS in relation to archaeological matters was in relation to the lack of information on the archaeological values of the borefield and water supply pipeline as provided by the NT EPA.

EarthSea Pty Ltd were employed to undertake an archaeological desktop assessment and field survey of the Project in March/April 2018. To address the feedback on the lack of archaeological information on the borefield and water pipeline, EarthSea were engaged again in 2019 to undertake another desktop assessment and field survey.

This Section provides the information required to address the requirements of the ToR in relation to assessing the archaeological values of the Project area, including the borefield and water pipeline. The complete Supplementary Archaeological Report for the borefield and water pipeline can be found in Appendix A-8.

Earthsea reported that the field survey component of the study was not conducted in direct consultation with Traditional Owners of the area and that the consultations with the CLC and Traditional Owners, the Arrernte People (also spelled Aranda in some documents), will be undertaken through KGL Resources Ltd and the CLC.

4.8.1 Aboriginal Archaeological Sites

The Archaeological Database held by the Heritage Branch, NT Department of Tourism and Culture records only one site within a 50 km radius of the borefield and pipeline as reported in the draft EIS.

EarthSea recorded 16 archaeological sites and 99 isolated artefacts of Aboriginal origin within the borefield and water pipeline area. Of the 16 archaeological sites, 15 were classified as minor lithic scatters which were assessed as having low archaeological significance. One site was a larger, low density surface site which was assessed as having a low-medium archaeological significance. This site was assigned this level of significance due to its rarity and potential to provide information on past human occupation of the area. All of the isolated finds are also considered as having low significance due to their local abundance and lack of potential for loss of valuable scientific information if they were salvaged.

Wherever possible, these sites will be avoided during the borefield and water pipeline construction and operation. Where this is not feasible, an application under Sections 72-75 of the NT Heritage Act will be made.

4.8.2 Historical Features

A search of the Northern Territory Heritage Register found that there are two declared heritage places within Lucy Creek Station, being two European Launcher Development Organisation (ELDO) rocket shelters constructed during or after 1966. Both of these lie outside of the proposed borefield and pipeline area and will not be impacted by any Project activities.

There are no heritage sites recorded on the National and Commonwealth Heritage Lists within the borefield and pipeline area.

The archaeological assessment of the borefield and water pipeline did not identify any historical features.

4.8.3 Approvals, Permits and Clearances

The AAPA Authority Certificate issued for EL 25429 which states no works can be undertaken and no damage shall occur within the nominated Restricted Works Area encompasses 0.5 km of the proposed pipeline route.

A separate Authority Certificate has been issued for activities associated with the proposed borefield and the remainder of the pipeline route which lies outside of EL25429. No sites were recorded within the proposed borefield or pipeline however some Restricted Work Areas and Recorded Sacred Site

Boundaries are located adjacent to the pipeline route. The sites recorded on this Certificate as being likely Aboriginal Heritage Places will be avoided during the construction and operation of the borefield and pipeline.

Should any future activities require additional Certificates, application will be made to ensure there is no accidental damage to sites that are sacred or otherwise significant to Aboriginal tradition.

4.8.4 Potential Impacts and Risks

The archaeological assessment reported a potential for the disturbance of 13 of the 16 Aboriginal Archaeological Sites during the construction of the borefield and pipeline. The archaeological assessment also identified the potential for the disturbance of previously undetected Aboriginal archaeological sites.

The draft EIS (Section 4.7.3.2) identified the initial risk rating for potential disturbance to Indigenous heritage and non-indigenous heritage items to be low for the EL 25429 area. As the Aboriginal Archaeological sites within the borefield and pipeline area have a low to low-medium archaeological significance, this initial risk rating has not changed

4.8.5 Mitigation and Monitoring

As recommended in the survey report, a Permit to Carry Out Work on Heritage Places or Objects under section 72 of the Heritage Act is being sought from NT Heritage Branch for those sites which may be impacted by the proposed works associated with the borefield and pipeline.

As outlined in the draft EIS, mitigation measures which will be implemented to manage potential impacts on the archaeological values of the borefield and water pipeline area will include:

- Cross cultural training of workers;
- Implementation of an Environmental Management Plan including a detailed Cultural Heritage Management Plan; and
- Liaison with the CLC, the AAPA and Traditional Owners.

Again, as nominated in Section 4.7 of the draft EIS, it is expected that the residual risk ratings to the archaeological values of the borefield and water pipeline will be reduced to very low following the implementation of these mitigation measures.

5 SUPPLEMENT REPORT COMMITMENTS

This Section provides a list of the commitments provided throughout this Supplement. These commitments are categorised according to the environmental aspect to which they apply.

5.1 Terrestrial Flora and Fauna

Table 5.1-1: Terrestrial Flora and Fauna Commitments

Management Commitments
The MRCP will be updated to include more detailed information on outcomes and completion criteria for the Unca Creek diversion and specifically address habitat quality and connectivity.
The community of Mulga in the south-east of the Project EL will be physically demarcated as an exclusion zone.
The area of <i>E. cordatisepala</i> in the west of the Project will be physically demarcated as an exclusion zone.
KGL will collect genetic material from the <i>S. rigens</i> species east of the Jervois Mine Dam for use in rehabilitation works prior to repair works on the dam wall.
Athel Pine infestations will be managed and potential damage to environmental, cultural and agricultural values mitigated in accordance with the requirements of the Weed Management Plan for Athel Pine.
All personnel, contractors and visitors to the Project will be educated on the Bushfire Management Plan during the site induction process and at staff meetings.
Permits to burn will be obtained if necessary or as directed by Bushfires NT.
Monitoring Commitments
Monitoring of the Mulga community will be integrated into the regular monitoring program outlined in the Environmental Management Plan.
Monitoring of the <i>E. cordatisepala</i> in the west of the Project will be integrated into the regular monitoring program outlined in the Environmental Management Plan.

5.2 Surface Water

Table 5.2-1: Surface Water Commitments

Management Commitments
The risk associated with any flocculant use associated with ore processing or production of potable water will be minimised or avoided through the confinement of these substances within the mine water management system and recycling through the process water dam. No process water that has been in contact with flocculants will be released to the environment.
The final ESCP will ensure that erosion and sediment control measures are appropriate for an arid zone climate.
The final ESCP will be prepared by a suitably qualified and experienced professional and will be approved by a Certified Professional in Erosion and Sediment Control.

Monitoring Commitments

Implementation of the ESCP will be regularly monitored by a suitably qualified third-party auditor to the satisfaction of the Consent Authority.

Implement and adhere to the Surface Water Monitoring Program.

5.3 Groundwater

Table 5.3-1: Groundwater Commitments

Management Commitments

KGL will implement actions to conform with the application of the Water Act as recommended, including the development of a Water Abstraction Management Plan.

The ongoing review of groundwater data and modelling will be assessed by an independent technical specialist during operations and post-closure.

Should unacceptable impacts to groundwater from TSF leachate be measured, specific contingency options will be undertaken.

Monitoring Commitments

Implement and adhere to the Groundwater Management Plan.

5.4 Acid Rock Drainage

Table 5.4-1: Acid Rock Drainage Commitments

Management Commitments

The S distribution model will be continually developed as the Project progresses.

Identified PAF materials will preferentially be placed in final locations as per the follow up geochemical assessment report.

Complete column leachate testing.

Monitoring Commitments

Conduct ongoing geochemical water monitoring and modelling.

5.5 Rehabilitation

Table 5.5-1: Rehabilitation Commitments

Management Commitments
The Mine Rehabilitation and Closure Plan will ensure that there is more intense management of the Unca Creek diversion to support the growth and recruitment of native groundcovers, minimise the mortality of planted juvenile shrubs and canopy trees and manage exotic weeds.
KGL will undertake progressive rehabilitation in accordance with the practices outlined in the draft EIS Mine Closure and Rehabilitation Plan.
Monitoring Commitments
Contingency measures to be implemented in the event that monitoring demonstrates that rehabilitation closure objectives are not met • review of rehabilitation completion criteria to take into consideration additional information obtained about environmental and other constraints; • changes in mine planning; • consideration of feedback from future stakeholder consultations; • regular review of the risk assessment throughout the life of the Project; and review of management strategies to ensure the early identification of issues.

5.6 Air, Greenhouse Gases and Noise

Table 5.6-1: Air, Greenhouse Gases and Noise Commitments

Management Commitments
Throughout the life of the Project KGL will introduce initiatives to improve energy efficiency.
Monitoring Commitments
Additional dust monitoring locations will be added during the construction and operational phases and include locations in the south adjacent to the proposed Bellbird waste rock stockpile and in the north adjacent to the Reward waste rock and topsoil stockpiles.

5.7 Social, Economic and Cultural Surrounds

Table 5.7-1: Communication and Stakeholder Engagement Commitments

Management Commitments
KGL will continue with ongoing engagement with stakeholders to address any emerging issues and to provide continued input to decision making by those stakeholders that may be impacted by the Project.
KGL will maintain good communication and engagement with stakeholders through numerous measures such as: • Providing Project updates to key stakeholders through various means including emails and community noticeboards; • Posting regular updates and community reports on the KGL website;

• Ongoing liaison with pastoralists and the Bonya community; • Annual satisfaction surveys; • The maintenance of easily accessible public enquiry methods; and • Communication with the Gemtree Caravan Park and other tourism bodies during peak tourist season.
The annual report to be provided to the Community Liaison Committee will include the measurement of environmental indicators against baseline data.
A summary of the company's social and environmental performance will be included as part of the Annual Report for shareholders.
KGL will ensure the SIMP is stand-alone document which is communicated in a community-friendly format.
KGL will implement the Project SIMP including ongoing community input, monitoring and evaluation, reporting and management being held accountable for KGL's social performance.
The SIMP will be updated to include aspects of the MOU such as cooperating and working together with the Bonya community throughout the life of the Project.
The SIMP will be updated to include training and awareness in relation to Free Prior and Informed Consent.
Management actions will include the development of a Communication Strategy which will be specific and include methods for proactive and open communications with relevant and affected stakeholders.
A Socio-Economic Management Plan will form part of the MMP's for the Project.
KGL will keep relevant stakeholders informed of any Project updates prior to an assessment decision being made.
KGL will further investigate the indicator of self-harm incidence and mitigation of good FIFO rosters along with additional measures such as awareness campaigns, communications systems, support programs and counselling services to ensure the wellbeing of the workforce.
A Traffic Management Plan, procedures and bus driver guidelines will be implemented to mitigate road safety risks.
KGL will continue to consult with the NT Government and relevant stakeholders regarding road safety strategies.
KGL will ensure Traditional Owners are provided reasonable access to all cultural or significant sites on the Mineral Leases and be provided reasonable access to all sites on the borefield area.
All agents, employees, contractors and sub-contractors will be made aware of the conditions and their obligations under the <i>Northern Territory Aboriginal Sacred Sites Act 1989</i> .
Information regarding sacred sites and heritage information will be kept strictly confidential.
KGL will consult with native title holders regarding the management of artefacts prior to permits being issued to disturb these sites.
KGL will provide training opportunities for the local Aboriginal community which will be tailored to individuals and equip them with the skills necessary to gain employment.

5.8 Human Health

Table 5.8-1: Human Health Commitments

Management Commitments
KGL and the Project contractors and subcontractors will comply with the Department of Health's requirements for the accommodation village facilities.
A detailed Emergency Management Plan will be developed and managed by appropriately qualified health and safety representatives.
The Health and Safety Management System will be based on AS/NZS 4801:2001 Occupational Health and Safety Management Systems and will adopt the relevant NT Worksafe Codes of Practice.
Monitoring Commitments
The Environmental Management Plan will be updated to address mosquito monitoring and control in accordance with the Department of Health Guidelines for Preventing Mosquito Breeding Sites Associated with Mining Sites.
Ongoing monitoring and periodic reviews of the Health and Safety Management System will be conducted.

5.9 Licensing and Regulation

Table 5.9-1: Licensing and Regulation Commitments

Management Commitments
Both the MMPs and the EM Plan will be updated as necessary in order to maintain compliance with any revised mining and environmental regulatory regimes.
Monitoring and management strategies will continue to be updated in accordance with best practice strategies in order to comply with regulatory requirements.

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