Executive Summary

JERVOIS
BASE METAL PROJECT

DRAFT ENVIRONMENTAL IMPACT STATEMENT

OCTOBER 2018

KGL RESOURCES

KGL Resources Limited

In early 2015 the major shareholders and the KGL directors set a strategic direction to improve the mineral resource at Jervois, particularly to increase the grade of copper, before committing to mine development. We aimed to give ourselves the confidence that Jervois could be developed as a low-cost producer, placed in the bottom half of the international cost curve, so that its sustained viability would be assured in a fluctuating market. We engaged modern, cost efficient exploration methods to ensure that the expensive business of drilling produced results.

In parallel to the exploration program, all aspects of Project development - mine planning, metallurgical, processing, infrastructure and commercial studies – are well advanced. Being awarded major project status by the Northern Territory Government last year facilitated the negotiation of government approval processes. This Draft Environmental Impact Statement is the only major approval outstanding for the Jervois Base Metal Project.

We are advancing Jervois towards mine re-opening at a time of growing world copper demand spurred by strong economic growth in developing countries and the beginning of the electric vehicle era. In this positive environment, we are now focused on updating the Resource and bringing Jervois into production as a modern, sustainably profitable copper and multi-metal mine.

Denis Wood
Executive Chairman

JERVOIS BASE METAL PROJECT

EXECUTIVE SUMMARY

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Prepared for KGL Resources Limited by Nitro Solutions Pty Ltd

KGL RESOURCES | NITRO SOLUTIONS

1 Introduction

KGL Resources Pty Ltd (KGL) proposes to develop the Jervois Base Metal Project (the Project) located approximately 380 kilometres (km) north-east of Alice Springs in Central Australia, off the Plenty Highway. The nearest occupied communities are Bonya and Harts Range.

The reopening of the Jervois Mine will involve the extraction of existing and expanded base metal resources within the Project area. The Project contains a significant and high-grade copper resource, as well as silver, gold, lead and zinc in several deposits. The ore would be mined by open pit and underground methods and processed to a concentrate on site. The concentrate would then be trucked via the Plenty and Stuart Highways to the current rail freight terminal in Alice Springs, and then on to Darwin and/or Adelaide by rail. An option to shorten the road haulage being investigated by KGL involves the construction of a rail siding adjacent to the Adelaide to Darwin rail line north of Alice Springs on the Ghan Railway Line where it crosses the Plenty Highway.

The Project footprint is estimated at 970 hectares (ha) of which a significant portion has been disturbed by historical mining activities. The Project area is located within the boundaries of ML30180, ML30182 and ML30829.

This EIS has been based upon KGL's current understanding of the resource and an allowance for potential growth. Based upon this, the initial operations will focus upon optimising the recovery of the currently estimated copper resource of 25.2 million tonnes (Mt). These operations are anticipated to produce approximately 87 Mt of waste rock and 20 Mt of tailings. The rate of mining is influenced by the processing plant capabilities which currently allows for Run of Mine feed of up to 1.6 Mtpa, producing 150,000 tonnes of base metal concentrate per annum (assuming a two percent copper grade).

Mining operations at the Project area will be initially split between three operational areas:

- Reward
- Bellbird; and
- Rockface.

Mining at Reward and Bellbird will bw both open cut and underground, whilst Rockface will be underground only. Ore from all three mining areas will be trucked to the ROM stockpile for processing at the plant.

Mine infrastructure will include pits, waste rock landforms, tailings storage facilities, topsoil stockpiles, haul roads, heavy vehicle parking areas, ROM pads and fuel storage areas. The processing plant will include associated water tanks, workshops, fuel facilities, concentrate load out facility, mobile equipment, power plant, air and water supply facilities and storage areas.

Other infrastructure associated with the Project will include laydown areas, production and monitoring bores, a magazine and explosives store, an accommodation camp, administration buildings, new sediment catchment dams, access and haul roads, monitoring and supply bores, power generation and supply facilities, workshops, hardstands and laydown areas. Proposed infrastructure will be located over previously disturbed mine infrastructure areas wherever feasible.

Once approved, it is anticipated that construction will commence in 2019, with mining and commissioning occurring in approximately 2020. It is currently anticipated that there will be up to 360 people employed to facilitate the construction requirements and up to 300 for the proposed Project operations.

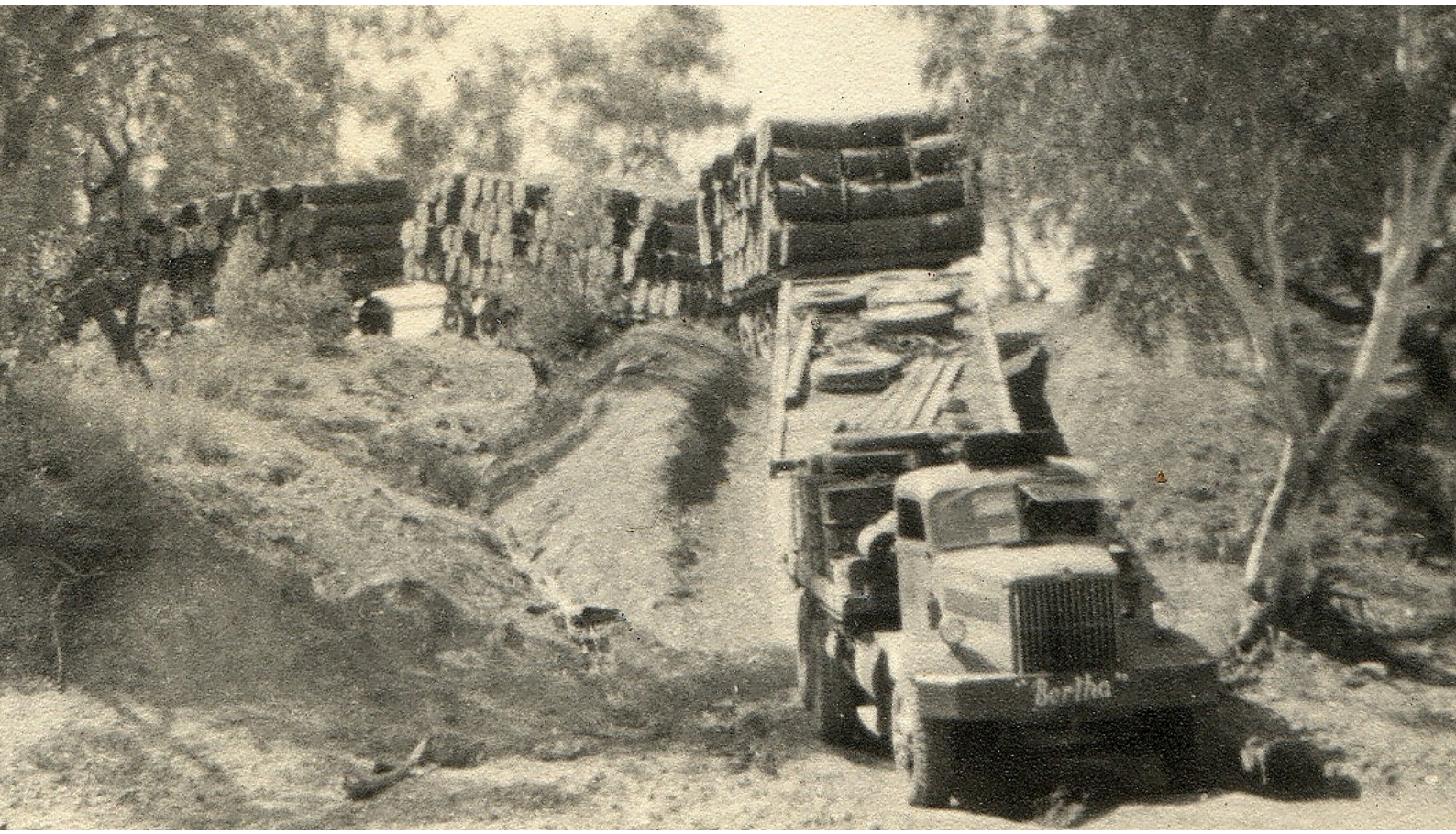

Q4
2018
Regulatory
Approval
Final Investment
Decision
Mid
2019
Start
Commissioning
and Mining
Submit EIS
Early
2019
Start
Construction
2020

1 Introduction

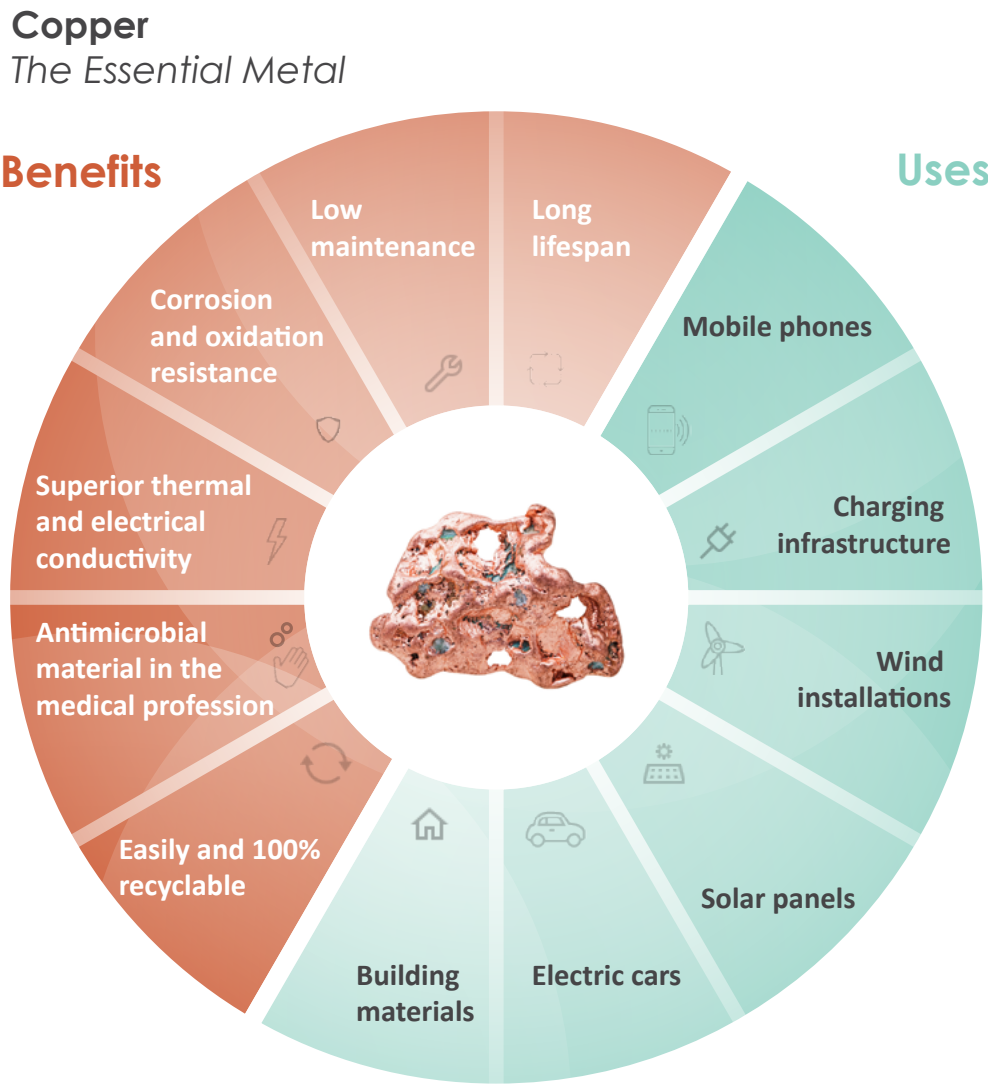
1.1 Project History

The Jervois Project has a rich history and is well known within the region with exploration and mining activities occurring for almost 90 years. In the 1950's, leases covering the area were acquired by Kurt Johannsen, who mined copper carbonate on a small scale for the fertiliser industry and later as a flux in the smelting process at Mount Isa. Throughout the Project's history there has been a strong link to the local community and KGL is focused upon maintaining this commitment into the future.

KGL has built upon these historical findings to establish a world class base metal mining project which encompasses the full diversity of this geological deposit whilst focusing upon delivering copper product demanded by the global markets. This focused approach upon copper as the main product paired with technological advancement in mining and processing methods has enabled KGL to create a viable project.



"Big Bertha" returning to the Jervois Mine from Mt Isa - Circa 1950's (Photo courtesy Lindsay Johannsen)



1 Introduction

1.1 Project Objectives and Scope

The overall objective for the Project is to create a robust, low cost production that can sustain its viability during times of fluctuating international base metal markets. The target commodity is copper with subordinate lead, zinc and potentially silver and gold. Copper is a fundamental element for current and future technologies, including batteries and is forecast to be in increasing demand well into the future.

The Project is currently at planning stage with detailed mine planning underway. Once the Project activities are approved for this Project, it is anticipated that a final investment decision will be made to commence further detailed design, construction and operational works.

1 Introduction

1.3 The Environmental Assessment Process

In January 2017 KGL lodged a variation notice with the Northern Territory Environment Protection Authority (NT EPA) in accordance with Section 14A 'Procedure where proposed action altered' under the *Environmental Assessment Act 1982* (EA Act). This submission was made by KGL upon the basis that since the original 2013 Notice of Intent (NOI) lodgment, further geological exploration works had identified additional mineral resources of economic viability.

Subsequently, in accordance with the legislative provisions of the EA Act, the NT EPA determined that the environmental significance of the Project had not changed and that the altered Project will continue to be assessed at the level of an Environmental Impact Statement (EIS).

Under the EPBC Act self-assessment, the Project required a referral to be made to the to the Australian Government Environment Minister. The subsequent NCA determination in 2014 considered the Project as not a controlled action, hence no further approvals were required under the EPBC Act. Given that none of the amendments resulted in the requirement of changes to the originally submitted Commonwealth Referral EPBC 2014/7111 there was no further requirement for processes under the *Environmental Protection and Biodiversity Conservation Act 1999*. Therefore, the Project remains as originally determined in 2014 as not a controlled action.

The Northern Territory EIS process aims to identify the key impacts and risks associated with a project and is used to develop the draft Environmental Management Plan which in its finalised and operationally functional form is used to actively manage the proposed operations. This environmental management focus is supported by the Environmental Management System and the Mining Management Plan.

This process is guided by the Terms of Reference issued by the NT EPA at the time of assessment requirements determination. The NT EPA has issued a Terms of Reference (ToR) which is reflective of establishing the context of the Project, including the potential risks to the environment, before, during and after the proposed reopening of the Jervois Mine.

The ToR stipulated that the following elements for all environmental aspects, including socio-economic and heritage, were addressed:

- Detailed Project Description
- Existing Environment
- Impact Assessment (as guided by the Preliminary Impact Assessment conducted by the NT EPA); and
- Draft Environmental Management Plan.

The following Sections of this Executive Summary provide an overview of the key activities and findings associated with each element of the resulting EIS.

2 Project Description

The Jervois Project comprises the mine site which includes supporting infrastructure and accommodation, a borefield area, and access via the Lucy Creek Access Road No.194. The project description was developed based upon the mine plan concept developed for the purposes of this draft EIS.

Table 2.1 (EIS Estimates)

Project Life

Construction period	2 years.
Operational period	Up to 15 years.
Rehabilitation	Progressive rehabilitation will occur throughout operational period. Final rehabilitation will occur over a period of 2 years.

Production Assumptions

Ore Mined	25.2 million tonnes (Mt) life of mine (LOM).
Plant feed	Up to 1.6 Mt per annum.
Production	Up to 150,000 tonnes of base metal concentrate per annum.

Mining Operations

Pits & Underground areas	3 pit areas: Reward, Bellbird and Rockface.
Ore processing plant	A single integrated processing plant capable of processing the primary copper ores, the transitional copper ores and the lead/zinc ores. The plant will be capable of processing approximately 1.6 Mt of ore (ROM) per annum to produce approximately 150,000 tonnes of base metal concentrate per annum (both a copper concentrate and a lead/zinc concentrate).
Tailings	Tailings dam with 2 cells. Total capacity 17.37 Mt.
Waste rock	3 waste rock dumps (WRDs) will receive a total LOM waste quantity of 87 Mt. Waste Rock Landforms will be developed adjacent to each open pit.
Transport	During construction up to 22 vehicles per day will be travelling to site along the Plenty Highway. During operations this number will increase to 34 vehicles per day, travelling to site along the Plenty Highway. Vehicles during both phases will range from light vehicles up to triple road trains.
Water	Jervois Dam. Borefield in the South Georgina Basin Carbonate Aquifer. Water demand 1,200 megalitres per annum.
Power	The power supply will be a 12 megawatt diesel power station. Other power infrastructure includes a plant sub-station, step down transformers and transmission lines.
Accommodation village	Located on-site away from operations will accommodate up to 360 people.
Waste water	Waste water will be treated by on-site sewage treatment facilities.

Workforce

Construction	Approximately 360 at peak, average 200.
Operations	Approximately 300 at peak, average 200.

Ancillary Infrastructure

Telecommunications	Satellite coverage for communications systems. Fixed two-way digital radio towers. Solar powered field WiFi modules. Solar powered relocatable two-way radio repeaters.
Airstrip	Currently, the two options available are the upgrade of the existing Bonya or Lucy Creek airstrips. Upgrade of selected option will be to all weather standard and will include a carpark, small departure shed and baggage area. Ultimate option selection will be in accordance with access safety requirements as stipulated by emergency services.

2 Project Description

2.1 Closure and Rehabilitation

KGL understands the importance of planning for the end of mine life and establishing a plan for progressive rehabilitation which is operationally functional and consistent with the environmental and community objectives identified as part of the EIS process.

Final decommissioning and rehabilitation activities is scheduled to occur in Year 11 period, with mining of the actual orebody scheduled to cease in 2030. Full rehabilitation is scheduled for completion in 2031 with a site monitoring and management program extending well beyond this point. Proposed timeframes for mining, decommissioning and rehabilitation activities are detailed in Section 2.3 Closure & Rehabilitation.

A conceptual Mine Rehabilitation and Closure Plan has been developed for the Project as part of the EIS, taking into account the following:

- Materials characterisation, including topsoil characterisation, geochemical characterisation for waste rock and ore, geochemical characterisation for historical mine materials and geochemical characterisation for tailings;
- Data on the local environmental and climate conditions; and
- Consideration of potential impacts, including social and economic, environment, human health and safety.

This plan will continue to be refined as the Project progresses, subject to future consultation with relevant stakeholders and taking into account additional information obtained about environmental and other constraints.

3 Existing Environment

The existing environment is influenced by the substantial amount of historical disturbance for the Jervois Project site a result of the historical activities within the area. Historic mining disturbance includes tailings storage facilities, waste rock dumps, decomissioned processing plants and equipment, pits, prospecting trenches, ROMs, water storages and evaporation ponds, an exploration camp, exploration disturbances, roads and tracks. The existing disturbance covers an area of 163.15 ha which equates to approximately 16.8% of the proposed Project footprint area of 970 ha.

The investigation and subsequent discussion with the EIS reflect a holistic approach to understanding the existing environment, comprised by the following aspects:

- Physical
- Biological
- Cultural and historic; and
- Socio-economic.

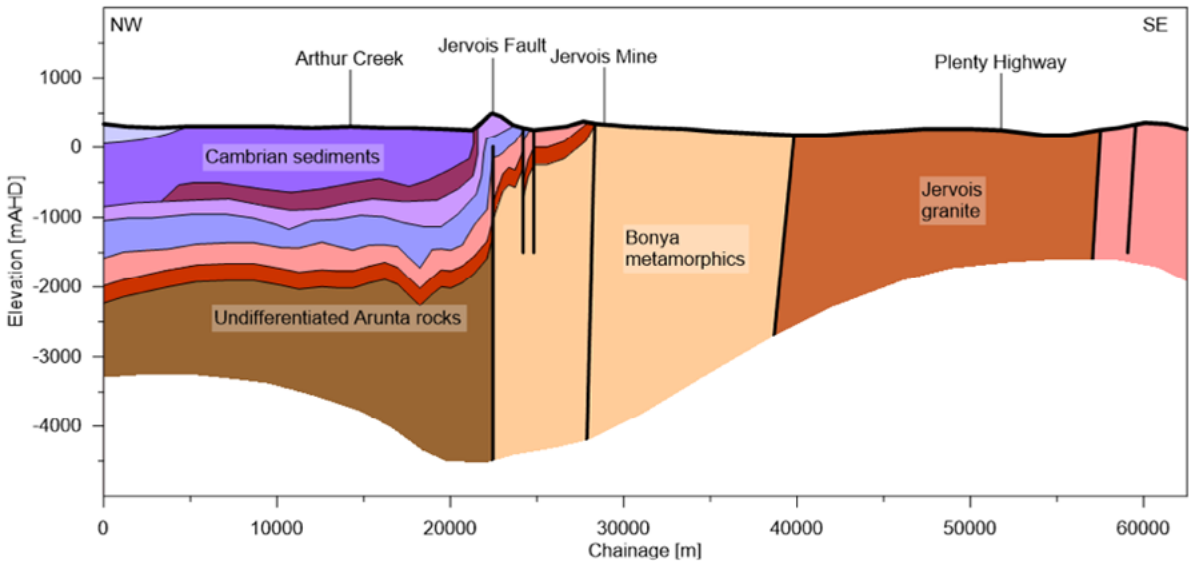
3 Existing Environment

3.1 Physical Environment

The Project area lies at the south edge of the Channel Country bioregion and is located almost entirely within the Jervois Range Site of Botanical Significance (SoBS) which is of bioregional significance. The Project area is broadly within a desert climate; however, the area receives more than 290 mm of rain annually, which can be classified as Bsh: Subtropical steppe using the Köppen climate classification system. The annual rainfall for the area typically falls between the months of October and March.

Geology

The region has experienced a long and complex structural history. The more resistant lithologies crop out as a series of hills that prominently define the J-structure on aerial photographs and satellite images. This distinctive J-shape of the Bonya Schist outcrop in the Project area has been interpreted as the result of re-folding of pre-existing folds and also as a drag feature to a regional fault that lies to the west. There are a series of faults in the region, with the three closest to the site are the Jervois Fault, the Bonya Fault and the Lucy Creek Fault. Further detailed discussion of the local and regional geology is provided in Section 3.1 Physical Environment.



Surface Water

The only watercourse of note in the vicinity of the Jervois Project is Unca Creek. Unca Creek originates about nine (9) km upstream of the Project and joins Arthur Creek approximately 45 km southeast of the Project. Components of the Project including the proposed Marshall/Reward pits, processing plant and most of the Tailings Storage Facility (TSF) are located within the Unca Creek floodplain. Unca Creek has a catchment area of 21.8 km^2 upstream of the Project area, with 17.1 km^2 (78%) of this catchment being captured in Jervois Dam upstream of the Project area. Further details of the catchment are provided in Section 3.1 Physical Environment.

Groundwater

The hydrology of the Project area can be separated into two distinct groundwater systems being the Georgina Bain and the Arunta Region (hosting the Jervois Mine ore bodies). The Georgina Sedimentary Basin commences immediately west of the Project in the adjacent Jervois Range. Limited aquifers are known to occur in the Formations that form this range. Groundwater resources capable of meeting the water demand for the process water supply (45 L/s) are most likely located within the Georgina Basin in the regionally extensive fractured and karstic rocks of the Arrinthrunga Formation, Steamboat Sandstone and Arthur Creek Formation.

The water table through the area generally mirrors the topography - flowing generally from northwest to southeast and locally from areas of higher topography to areas of lower topography such as drainage features and discharging as small seepages adjacent to the rivers and lowlands.

The potentiometric surface indicates that there is a groundwater flow divide associated with the contact between the Fractured Rock and Georgina Basin groundwater systems. To the north of the divide, groundwater flows into the Georgina Basin and northeast toward the Queensland border. South of the divide groundwater flows within the Fractured Rock groundwater system to the south.

Further information on the hydrogeology of the Project area is provided in Section 3.1 Physical Environment.

3 Existing Environment

3.2 Biological Environment

Terrestrial Ecology

The flora and fauna of the Project area, including groundwater dependent ecosystems and stygofauna, were considered as part of the biological investigations. The existing vegetation was mapped, and it was established that there were two broad vegetation classes within the Project area. These vegetation types closely correspond to land system boundaries, with Class 74 occurring within the Sonder land system, while Class 71 covers the remainder of the Project area. Further information in relation to this is provided within Section 3.2 Biological Environment.

In addition, land systems, land units and vegetation communities present within the Project area were surveyed. It was established that the majority of the Project area falls within the Bond Springs land system, a unit of undulating plains and drainage flats at the base of other Bond Springs land systems.

No threatened flora species listed under the EPBC Act were recorded in the Project area during on ground surveys in 1999, 2012, 2013, 2017 and 2018. Two flora species listed as near threatened under the Territory Parks and Wildlife Conservation Act (TPWC Act), *Eremophila cordatisepala* and *Sauropus rigens*, were recorded during on-ground surveys. The *Eremophila cordatisepala* in the Project area is the western most population of the species distribution in the Channel Country bioregion. One species listed as endangered under the TPWC act, *Bolboschoenus caldwellii*, has a low-moderate likelihood of occurring in the Project area. Two additional species listed as data deficient under the TPWC Act have a high likelihood of occurring in the Project area; *Fimbristylis velata* and *Sida sp. Hale River*; due to the proximity of nearby records and the presence of potential habitat.

A total of 118 fauna species have been recorded during the 1999, 2012, 2013 and 2017 surveys; 79 birds, 22 mammals, 14 reptiles and three amphibians. Invertebrates including wolf spiders, huntsman spiders, scorpions, centipedes, snails and cockroaches were not recorded in a systematic way during the surveys and have not been included in the report. There were 79 species of native birds recorded during the surveys.

Aquatic Ecology

Aquatic ecosystems in the Project area and surround are ephemeral, as watercourses only contain water following good rainfall. There are no records of aquatic fauna, such as fish or freshwater invertebrates, in the NT Fauna Atlas within a 20 km buffer of the Project area.

Stygofauna

At the mine site the habitat suitability is poor. The lithology of metamorphosed rocks is fine grained and these rocks will not provide the pore spaces required to support stygofauna.

At the process water supply borefield the habitable suitability is higher. The aquifer comprises limestone with low salinity groundwater. The extent of the potential habitat is immense. The Georgina Basin is an intra-cratonic sedimentary basin extending approximately 330,000 km^2 within the NT and Queensland with a thickness exceeding 1,000 m at the basin centre and thinning at the margins. Given the size of Georgina Basin it is considered unlikely that there will be notable impacts to stygofauna as a result of the proposed borefield.

3 Existing Environment

3.3 Cultural and Historic Environment

The Plenty Basin region has a rich Indigenous cultural environment which includes a long history of Eastern Arrernte, Alyawarra and Anmatyerre occupation (at least 32,000 years, likely much longer) and a recent past that includes contact with European explorers, miners and pastoralists from the 1880s onwards. The archaeological findings associated with the Archaeological site investigations are provided in Appendix C-8.

The 2018 archaeological assessment identified 62 historical features which relate to past exploration and mining activities, and possibly pastoral activities. The majority of these historical features relate to early prospecting between 1929 and 1950, the Kurt Johannsen period of mining between 1950 and 1963 and activities by the Plenty River Mining Company Pty Ltd. These features are many and include mining equipment, vehicles and vehicle parts, mine infrastructure, generators, tanks, drums, mine pits and workings, a camp site, refuse sites, food cans, lamps, bottles and other bits and pieces associated with human occupation on site. A complete list of the historic features recorded can be found in Appendix C-8.

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The archaeological assessment considered that these historical features were mostly of relatively low heritage significance and rated them all as low with the exception of an automobile and associated parts which were rated at low-medium. The assessment did not believe any of the historical features were significant enough to be gazetted to the NT Heritage Register for permanent protection.

3 Existing Environment

3.4 Socio-Economic Environment

The Project area is characterised by small Indigenous communities and homelands and large pastoral leases. The closest significant population centre to the Project is Alice Springs, approximately 380 km by road. Alice Springs is the major service centre in the region with a regional economy that consists of a traditional pastoral industry, tourism, sporadic mining activity, Indigenous communities and transport services. There are two Aboriginal communities within 20 km of the Project. The Bonya Community is approximately 17 km to the south-west and the Maperte Community is approximately 16 km to the north-east.

The Maperte Community consists of two abandoned houses. According to the local property owners and members of the Bonya Community, Maperte has been mostly unoccupied for some time. The next closest permanent settlement is the Atitjere Aboriginal Community, also known as Harts Range, which is located 160 km west by road.

Lucy Creek Station is a 405,522 ha beef cattle station running about 10,000 head of beef cattle owned and operated by Fogarty Holdings Pty Ltd. The Lucy Creek homestead is about 24 km from the Project and has an airstrip which is capable of use for night time landings. At the time the social impact assessment consultations were completed, there were eight people living at the station, including five employees.

Jervois Station is a 273,600 ha beef cattle station owned by the Jervois Pastoral Company Pty Ltd. The Jervois Station is a regular stopover point for travellers along the Plenty Highway, consisting of local community residents and tourists driving between Alice Springs in the NT and Boulia in Western Queensland.

Economic Feasibility

The Jervois Project is proposed to come into production at an auspicious time. Demand for copper is increasing, there are questions over the supply sources, and higher prices for copper are being forecast. Macquarie Bank forecasts a substantial and widening deficit in copper supply over the next three to five years. RBC Capital Markets analysts forecast a need by 2028 for 5 Mt of new contained copper supply, that is, 25% of current annual production. The timing of the Project in the global copper market can be expected to enhance the profitability of Jervois from its early stages.

4 Impact Assessment

Guided by the Jervois Base Metal Project EIS Terms of Reference the impact assessment process has been undertaken with specific emphasis upon the identification, analysis and mitigation of potential environmental impacts and risk through a whole-of-project impact and risk assessment.

A total of one hundred and seven (107) risks in relation to environment, social and economic, human health and safety were identified *(Table 4.1)*. The residual risks were determined based on the assumption that the proposed mitigation measures were implemented effectively. The resulting risk ratings provide a good understanding of the Project risks and identifies key risks which will require more focus. No environmental, social, economic or human health and safety risks with an extreme initial or residual risk rating were identified for the Project. Three (3) potential social and economic risks with a high residual risk rating were identified during the assessment process. There are positive impacts for local businesses being awarded contracts from the Project, opportunities for direct and indirect jobs and training for local Indigenous people and residents in Alice Springs and benefits to the local community through distribution of sponsorship funds and royalties. One (1) human health and safety impact provided a high rating was Project traffic and workers travelling by road to and from site being involved in accidents. The likelihood for this risk was 'unlikely' whilst the consequence can be 'catastrophic'. The following mitigation measures will be implemented to reduce the chance of accidents involving mine workers driving on public roads:

- Worker Code of Behaviour
- Road safety initiatives
- Road safety public awareness campaign
- Traffic Management Plan
- Provision of alternative transport arrangements to and from site; and
- Workplace health and safety procedures.

Risk Levels	Environment Residual Risk Rating	Social and Economic Residual Risk Rating	Human Health and Safety Residual Risk Rating
Very Low	28	16	5
Low	14	14	7
Medium	2	5	12
High	0	3	1
Extreme	0	0	0
Total	44	38	25
Total Risks Identified - 107			

Table 4.1 (summary of Risk Assessment). Detailed risk assessment process and findings available in Appendix C-11 Risk Assessment.

The NT EPAs identified preliminary environmental factors for the Project were included within the Project Risk Assessment process subsequently undertaken and were found to address all potential risks associated with the proposed operations.

The resulting EIS has been structured as per the ToR requirements and the findings of the Preliminary Project Risk Assessment. The technical studies and final presentation of the EIS have been undertaken to address each of these identified risks in a holistic fashion which draws upon the relevant technical disciplines that contribute to these broad environmental factor groupings.

4 Impact Assessment

4.1 Terrestrial Flora and Vegetation

Based on the results of extensive surveys conducted to date, eight refined vegetation communities have been mapped over the entire Project area, which is estimated at 3,800 ha. The broad vegetation classification associated with these vegetation units is Acacia with grass understorey, sparse shrubland.

Two flora species listed as near threatened under the *Territory Parks and Wildlife Conservation Act* (TPWC Act), *Eremophila cordatisepala* and *Sauropus rigens*, were recorded during on-ground surveys.

There are five records of *E. cordatisepala* from the Project area in association with *Corymbia* and *Acacia sibirica* woodland (3 records) and *Acacia estrophiolata* woodland (1 record) and all are outside the proposed extent of disturbance for new mine infrastructure and pits. One record is within 10 m of the existing Marshall Reward Pit access road and another record is within 30 m of existing Lucy Creek Station Road (in the south of the Project area) and these specimens may be subject to indirect impacts from dust deposition.

The *S. rigens* was located in Hummock grassland habitat on the western side of the Project area. There are two records from the Project area and both are outside the proposed extent of disturbance.

The current assessment has recorded the presence of a variety of exotic flora, including two declared weeds which are detailed in Section 4.1 Terrestrial Flora and Vegetation.

Exotic flora species are concentrated in areas suffering some form of disturbance, associated with clearing for cattle grazing, and historic mining and exploration activities. Weeds threaten populations of native flora and fauna by competing with native flora and eventually changing the habitat, which is no longer suitable for the majority of native species. The EPBC Act lists weed invasion as a 'key threatening process' to biodiversity due to the impact on wildlife and the landscape.

There is a low likelihood of weeds spreading into adjoining native woodland/forest vegetation as a result of the Project due to the of declared weeds control strategy to be implemented for the Project area. Further, construction areas and the post-mine landforms will be progressively rehabilitated with native vegetation (limiting opportunities for weeds to grow).

The NT EPAs objective for terrestrial environmental quality is to maintain the quality of land and soils so that environmental values of site fauna, flora and vegetation communities are protected. To achieve this objective the Jervois Project has given consideration to land, soil, biological and hydrological aspects during its design and has developed management plans to minimise impacts from the Project. The preceding section focused on biological aspects, and later sections will focus on hydrological aspects. This section focusses on erosion and sedimentation, acknowledging the interactions between soil, vegetation and water to maintain terrestrial environmental quality.

Activities potentially impacting soils and their susceptibility to erosion include the clearing of vegetation and stripping of in-situ soil resources in mining disturbance areas. The new infrastructure will have an impact area of approximately 389 ha, which includes 32.5 ha of new infrastructure being located over existing disturbance areas.

Water may collect sediments during overland flow and as it passes through the proposed creek diversions. Suspended sediments would be deposited as stream flow velocity reduces further downstream. Sedimentation in downstream areas (where the velocities are lower) can lead to filling of the waterway channel and encroachment of the riparian vegetation into the waterway channel. Deposited sediments can cause adverse effects on aquatic ecosystems, although these are limited in the Jervois Project area due to the ephemeral nature of the watercourses.

The soils across the Jervois Project area comprise well drained, light to moderately textured soils (maximum clay content 20-30%) with low electrical conductivity values and low fertility (low CEC) (Perry *et al* 1962). Field analysis of the soil characteristics indicates that the risks from soil salinity and acidity are very low (VPS 2018). Erosion risk associated with soil disturbance within the Project area is considered moderate due to the nature of both the surface and subsoils to slake when wet.

Mitigation measures will be required to avoid, control, reduce or eliminate impacts of Project activities on terrestrial qualities. Monitoring may be required for some aspects to evaluate the level of residual impact and the effectiveness of mitigation.

An Erosion and Sediment Control Plan (ESCP) has been prepared for the Project (refer Section 5). It outlines prescriptive measures that will be implemented to avoid, minimise, mitigate and manage the movement and deposition of sediment.

4 Impact Assessment

4.3 Terrestrial Fauna

Surveys recorded two species of conservation significance; *Dromaius novaehollandiae* (emu) and *Rattus villosissimus* (long-haired rat) within the Project area. Another four conservation significant fauna species were indicated as 'likely' to occur within the Project 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); and
- Australian painted snipe (*Rostratula australis*) – Endangered (EPBC Act), Vulnerable (TPWC Act).

The construction of the Project has the potential to impact terrestrial fauna and their supporting habitat. This may include direct and indirect effects such as habitat loss, fragmentation or degradation, and fauna mortality.

The habitat types most affected by the Project would be habitat type 4 – Tall *Corymbia sp.* and *Acacia sp.* woodland, closely followed by habitat type 2 – Low *Acacia sp.* shrubland. This is a reflection of the distribution of these habitat types over the Project area.

Due to the availability of suitable habitat within the site and surrounds there are anticipated to be no significant impacts to threatened fauna.

Hydrological and groundwater assessments have been undertaken for the Project (Appendix C-5 and C-6). The studies undertaken consisted of desktop assessments, hydrological and hydrogeological surveys and numeric modelling.

The assessments undertaken demonstrate that with appropriate water management and mitigation measures in place, the potential impact of the Project on groundwater, surface flows and water quality in the receiving waters downstream of the Project will be acceptable.

Surface Water

The modelling undertaken in this study demonstrates that with appropriate surface water management and mitigation measures in place, the potential impact of the Project on surface flows and water quality in the receiving waters downstream of the Jervois Mine will be insignificant.

To prevent the potential for flooding of Reward pit it is proposed to construct a permanent diversion of Unca Creek around this domain. The Unca Creek diversion will ensure that the Reward pit is protected from floodwater from the upstream catchment (including overflows from Jervois Dam) for events up to and including 0.1% annual exceedance probability (AEP), equivalent to 1,000 years average recurrence interval (ARI).

The final landform between the Reward pit and the creek diversion will ensure that the final void is protected from inundation for all flood events up to and including the Probable Maximum Flood (PMF) event. The Unca Creek diversion will remain in place as part of the final landform.

Groundwater

The main groundwater impact of the Project is the potential drawdown of groundwater levels due to pumping from the process water supply borefield and dewatering at the mine site during mining activities.

The proposed extraction from the process water supply is within the capacity of the aquifer and removes a very small fraction of the immense volume in storage. Water table drawdown impacts at the nearest sensitive receptors (Lucy Creek domestic water supply and stock watering bores) are unlikely to exceed 3 m. This drawdown will not reduce water availability for these users due to the very significant available drawdown at each site. There are no mapped groundwater dependant ecosystems identified within the zone of drawdown.

The groundwater impacts associated with mine dewatering are relatively localised around the mining activities and forecast drawdowns do not flow onto the identified closest existing users.

This Section of the EIS examines the potential impacts and risks to inland waters environmental quality and sensitive receptors. It explores potential sources, pathways, receptors, and fate of any potentially contaminated waters. It describes the potential impacts to surface and groundwater and outlines the mitigation measures proposed to meet the NT EPAs objective related to inland waters environmental quality.

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Acid Mine Drainage

A geochemical assessment of the Project was undertaken as part of the technical studies for the preparation of the EIS. The objectives of the geochemical assessment were to identify issues and opportunities, and clarify implications for materials handling, storage and construction considerations.

As part of this investigation 704 samples were tested comprised of 662 waste rock and ore samples; 22 historic mine samples and 20 ore feed and tailings samples.

Results show that the Project open cut and underground mine waste rock materials will comprise mainly Non-Acid Forming (NAF) material, accounting for 70% of the waste rock samples tested. Note that this proportion does not reflect the true proportion of materials to be mined, and the overall proportion of NAF is expected to be higher once an acid rock drainage (ARD) block model has been completed, providing significant flexibility in materials segregation and handling. The smaller portion of Potentially Acid Forming (PAF) (including PAF-LC and NAF-HS) materials occur mainly within a halo around the sulphidic ore. Inspection of the core showed that PAF units in the waste rock should be readily visually identified, with sulphur being a good discriminator of ARD rock types.

Water extract testing indicates that the majority waste rock materials will not liberate significant acid, salinity or metals/metalloids. Most waste rock from pit and underground development is expected to be NAF and environmentally benign, and will not require specific management for control of ARD. Controlling ARD from the smaller portion of PAF (including PAF-LC and NAF-HS) should be relatively straight forward, but will require selective handling and specific management to prevent ARD into the long term.

Tailings from fresh ore processing are expected to be PAF, and the proposed TSF will require management to prevent ARD. The TSF will require a secure low permeability base to prevent leaching of process water and oxidation products during operations, and is likely to require an infiltration control cover system for closure. The potential for paste backfill of tailings into underground workings will be assessed further to help reduce the inventory of tailings requiring surface management.

Historic mine materials are metalliferous and show varying potential for generating acid, saline, and metalliferous drainage, although on a localised scale. Given the small volume of these materials, the uncertainty of the current effects from these materials on the receiving environment, and the uncertainty in regard to the security of facilities constructed to contain them, reactivation of any of the old facilities for storage of waste rock and tailings as part of the proposed Project should allow for re-handling or incorporation of historic mine materials into management approaches that demonstrate isolation from the receiving environment.

Surface Water

Water captured and stored in the site water management system would comprise a mixture of runoff water from various catchment land use types and groundwater from seepage into the underground mines. A water management system has been developed to keep the different types of water segregated (contaminated and uncontaminated) in order to prevent unacceptable levels of sediments and contaminants from leaving the Project and entering the receiving waters.

The Project has the potential to impact on water quality in Unca Creek and its tributaries due to controlled and uncontrolled releases of sediment laden water.

The results of the water balance model show that no uncontrolled or controlled releases of mine affected water are predicted from the process water dam in any of the water balance model simulations. No dewatered groundwater will be released to the environment.

Geotechnical assessment indicates runoff from the waste dumps will be is similar in quality to background runoff from undisturbed catchments (i.e. will not contain acid rock drainage or significantly elevated concentrations of metalloids). The sediment dams are designed to allow total suspended solids and associated metalloids to drop out of suspension and therefore any overflowing water would likely achieve the water quality objectives. As a result, it is considered that potential 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.

Groundwater

Waste Rock Dump (WRD) seepage is expected to be non-acid forming. Particle tracking indicates that the ultimate fate of groundwater affected by WRDs seepage will be captured by the local sink features associated with the pits and underground workings during life of mine and the pit-lakes post closure.

TSF seepage is expected to be potentially acid forming and the TSF will be designed to intercept tailings liquid. Seepage that is not intercepted and recycled will slowly flow to the water table and may cause groundwater rises (although this will be dependent on the efficiency of the underdrainage system) and change groundwater quality beneath the TSF. Particle tracking indicates that the ultimate fate of groundwater affected by TSF seepage will be captured by the local sink features associated with the pits and underground workings during life of mine and the pit-lakes post closure.

4 Impact Assessment

4.6 Air, Greenhouse Gas and Noise

The nearest sensitive receptors are located at large separation distances from the Project area, ranging from 16 to 35 km with the closest occupied receptor being the Bonya Community which is 17 km from the Project. The nearest sensitive receivers to the haul route include the Gemtree Caravan Park (200 m separation), and other homesteads and communities at distances ranging from 800 m to 8.3 km.

The Project is located in an area of historic mining disturbance and there are currently no existing industrial or mining operations for a radius of 25 km or more from the site. On this basis, air quality at the site and the nearest potentially sensitive receptors will be similar to a typical inland rural area in Australia. Key sources that are expected to define background air quality are:

- Smoke from natural bushfires (localised, and larger regional savannah bushfires) and controlled burns; and
- Dust emissions from motor vehicles using unsealed roads.

The air quality investigations associated with the Project indicate that the risk of impacts to sensitive receptors associated with particulate emissions from mining activities at the Project site is very low. As it is located along the sealed section of the Plenty Highway, particulate emissions are unlikely to be a risk for the Gemtree Caravan Park.

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In relation to air quality, the primary air pollutants for the Project relate to particulates from materials handling activities (e.g. excavation, loading, crushing), and gaseous combustion emissions from the operation of mobile and stationary equipment. Particulate matter is typically defined as Total Suspended Particulates, PM10, PM2.5 and deposited dust. Primary combustion pollutants include particulate matter, nitrogen oxides and carbon monoxide. Air emissions from underground mining activity would be emitted via exhaust fans forming part of the underground mine ventilation system. The GHG Assessment has estimated that emissions from the Project are expected to trigger the National Greenhouse Energy Reporting threshold.

The existing acoustic environment of the Jervois Project and surrounds is one defined by natural noise sources (birds, insects etc) superimposed with intermittent noise from local traffic and farm machinery. Generally, very low noise levels are experienced throughout the year, with readings typically at or below 30 dB(A). Average noise levels from unsealed vehicle routes in the area experience short term increases in noise levels (typically 1 to 3 minutes per event, dependent upon vehicle speed) and may be auditable at receptors located in close proximity to the road.

Desktop assessment indicates that the noise levels associated with the mine development are unlikely to have impacts upon surrounding communities or fauna species.

4 Impact Assessment

4.7 Social, Economic and Cultural Surrounds

The Jervois Project has a long history of exploration and mining dating back to 1929 as detailed in the Introduction in Section 1 of this EIS. As a result of the historic activity and disturbance, some impacts are expected to have a lower impact than if it were a greenfield site. Furthermore, the local community has become quite accustomed to having the Jervois Mine in the local region which further mitigates potential local community impacts and risks.

Economic opportunities recognised by the community included job opportunities, boosting of the local and regional economies, and local businesses winning work. Social opportunities which may arise from the development of the Project are the distribution of sponsorship funds, the justification for improved local infrastructure such as roads and telecommunications and improved educational outcomes for local Indigenous people. Other flow-on effects may include the return of Indigenous community members to Bonya, a raised level of excitement in the Bonya community, potential for the upskilling of Indigenous people and the possible early sealing of the Plenty Highway.

Photo: Members of the KGL board pictured at the Project site.

The issues of highest concern to the community were in relation to increased road safety risk resulting from increased traffic on the unsealed section of the Plenty Highway associated with the recommencement of operations. Other concerns included the fears of impacts to local water resources, the reduction of tourist traffic along the Plenty Highway, and pressure on local emergency services and health services. Potential social and economic impacts on the local Bonya community include reduced social cohesion due to the influx of money and community members, expectations of local Indigenous jobs not being met, a reduced sense of safety and wellbeing, rumours and misinformation leading to feelings of anxiety, an influx of the Project workforce and reduced spiritual or cultural connections. Economic impacts raised by stakeholders were in relation to local job expectations not being met, a low take up of jobs due to a lack of work readiness, structural and cultural issues, local content targets not being met due to capacity and skill levels and the reduced productivity of other sectors due to increased competition.

Whilst mining projects have the potential to create impacts on the community, they also have the opportunity to provide benefits to communities and the local economy. Overall, feedback on the Project from stakeholders was mostly optimistic due to the positive benefits it could bring to Central Australia such as those to local businesses and people, the economy and communities in general. There is an expectation that the Project will provide local employment and work for local suppliers and services although there was some scepticism and reserved optimism about the Project proceeding due to its long history and lack of development to a stage where these benefits come to fruition.

Economic study

Estimated Project capital expenditure is in the order of $190 million. Of this $55.6 m is expected to benefit the Alice Springs region, $55.3 m to the remainder of the NT and $37.6 m to the rest of Australia. Assuming construction occurs over one year, the initial construction phase impact of the Project on the Alice Springs region Gross Regional Product including “flow-on” effects is estimated at $44 million, being an increase of about 2%. In relation to the Northern Territory economy, the Projects construction phase is estimated to result in an increase in Gross Regional Product of the order of $91 million including “flow-on” effects, ie. an increase of the order of 0.4%. At a national level impact on Gross Domestic Product including “flow-on” increases to $133 million (representing about a 0.01% increase).

Operating cost expenditure has been estimated at $127.7 m with $117.4 m to be spent Australia wide. Of this $107.6 m would be spend in the whole of the NT and $73.3 m in the Alice Springs Region, $107.6 m. $10.3 m of the total estimated operating costs would be spent on shipping outside of Australia. This equates to an increase in Gross Regional Product including “flow-on” effects in Alice Springs of about $50 million (2%), about an $80 million increase in the NT (0.3%) and approximately $120 m for Australia (0.008%).

2018 modelling estimated that the company will pay a total of $413 million in royalties and corporate taxes (Royalties $215 m, Corporate Taxes $198 m) over the life of the Project. In addition, it is expected that the company will pay payroll tax in the order of $8 million over the life of the Project.

The Jervois Project is expected to contribute to Australia’s export earnings an amount of $2.39 billion over the life of the mine.

4 Impact Assessment

4.8 Human Health

As part of the EIS, a preliminary risk assessment for the Jervois Project was undertaken to identify the potential risks and hazards during construction, operation and closure of the Project. These include identifying and assessing human health and safety risks regarding mine workers and the general public.

A total of twenty-four (24) hazards were identified and associated risk rankings were established (Appendix C-11 Risk Assessment Report). The highest risk identified is driving on the public road to and from site. The following mitigation measures will be implemented to manage the risk:

- Implement a Traffic Management Plan
- Reduce driving on public roads - workers to travel by bus/flights
- Fitness for work policy, drug & alcohol policy and fatigue management
- Establish a public awareness campaign
- Regular vehicle maintenance including pre-start inspections; and
- Transport of dangerous goods to be carried out according to the NT Transport of Dangerous Goods by Road and Rail (National Uniform Legislation) Act and Regulation and Australian Dangerous Goods Code.

Mitigation measures and control strategies for each risk were discussed, developed and will be implemented to reduce the risks to as low as practically possible and at an acceptable level. A Health and Safety Management System will be developed and implemented to manage the risks identified. Ongoing monitoring and periodical review of the risk management process and outcomes will be carried out. Further risk assessments will be undertaken to continuously identify hazards and risks and to develop relevant mitigation measures to manage human health and safety risks during different stages of the Project.

The Health and Safety Management System will also incorporate standard operating procedures, management plans, systems such as a permit system, and task related risk assessments such as job safety analyses at the operational stage of the Project.

4 Impact Assessment

4.9 Cumulative Impacts

In March 2018 the Northern Territory Government provided notification that they had identified five significant resource projects in the Central Australian and Barkly Regions, of which the Project is one. These projects have received NT major project status and have expected commencement dates in the coming two to five years. The NT Government estimated that these projects have a capital expenditure of $2.2 billion and the potential to create over 2,000 jobs throughout their construction and operational phases.

The purpose of this “Five Mines Project” is to design a coordinated program which will ensure businesses and individuals have appropriate skill levels, capabilities and knowledge to enable them to benefit from opportunities created by these projects.

KGL’s participation in this coordinated program acknowledges that whilst the Project is likely to provide many positives to the Northern Territory there is the potential for negative cumulative impacts to arise. Commitments have been made to mitigation measures centered around planning and regular communications with the regulators, participant companies and the community.

Northern Territory Government reporting as at September 2018 indicates that the other major projects are unlikely to commence within the Project’s construction timetable.

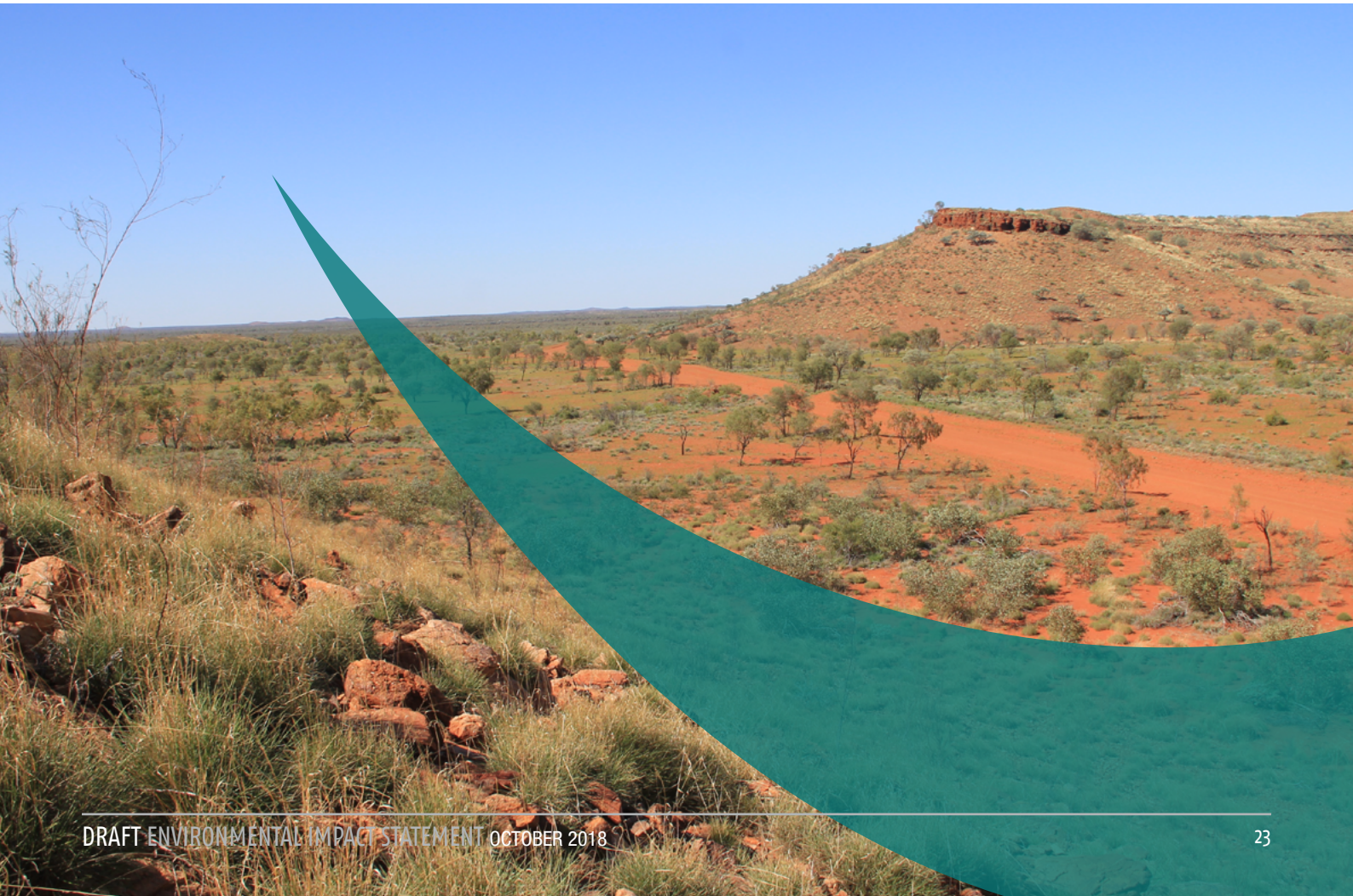
5 Environmental Management

Developed in accordance with the Northern Territory Environment Protection Authority's *Guideline for the preparation of an Environmental Management Plan*, the Jervois Mine Environmental Management Plan (EM Plan) is designed to provide a functional environmental management framework for the mine to operate within. It has been designed to ensure ease of use for regulators, contractors and employees associated with the Jervois Mine throughout the Project's lifecycle.

The draft EM Plan is an overarching document that coordinates environmental management within the mine site. On this basis, the document discusses all aspects of environmental impact management and where required refers to detailed technical management plans which provide greater detail or specific actions for management activities. These detailed plans include:

- Draft Mine Rehabilitation and Closure Plan
- Draft Biodiversity and land management Plan
- Draft Erosion and Sediment Control Plan
- Draft Water Management Plan
- Draft Social Impact Management Plan
- Draft Waste Management Plan; and
- Draft Bushfire Management Plan.

As this is a reopening of the mine, the impacts identified are similar to those of the existing mine and are able to be managed accordingly. Recognised and proven measures have been identified and will be applied to the recommencement of operations. In combination with the additional measures outlined in this draft EM Plan and the knowledge of current operations, potential for environmental risks of the proposed mining operations are considered to be suitably managed. These actions are summarised in the draft EM Plan in Volume 3: Section 5: Environmental Management of the EIS.



6 Summary of Findings

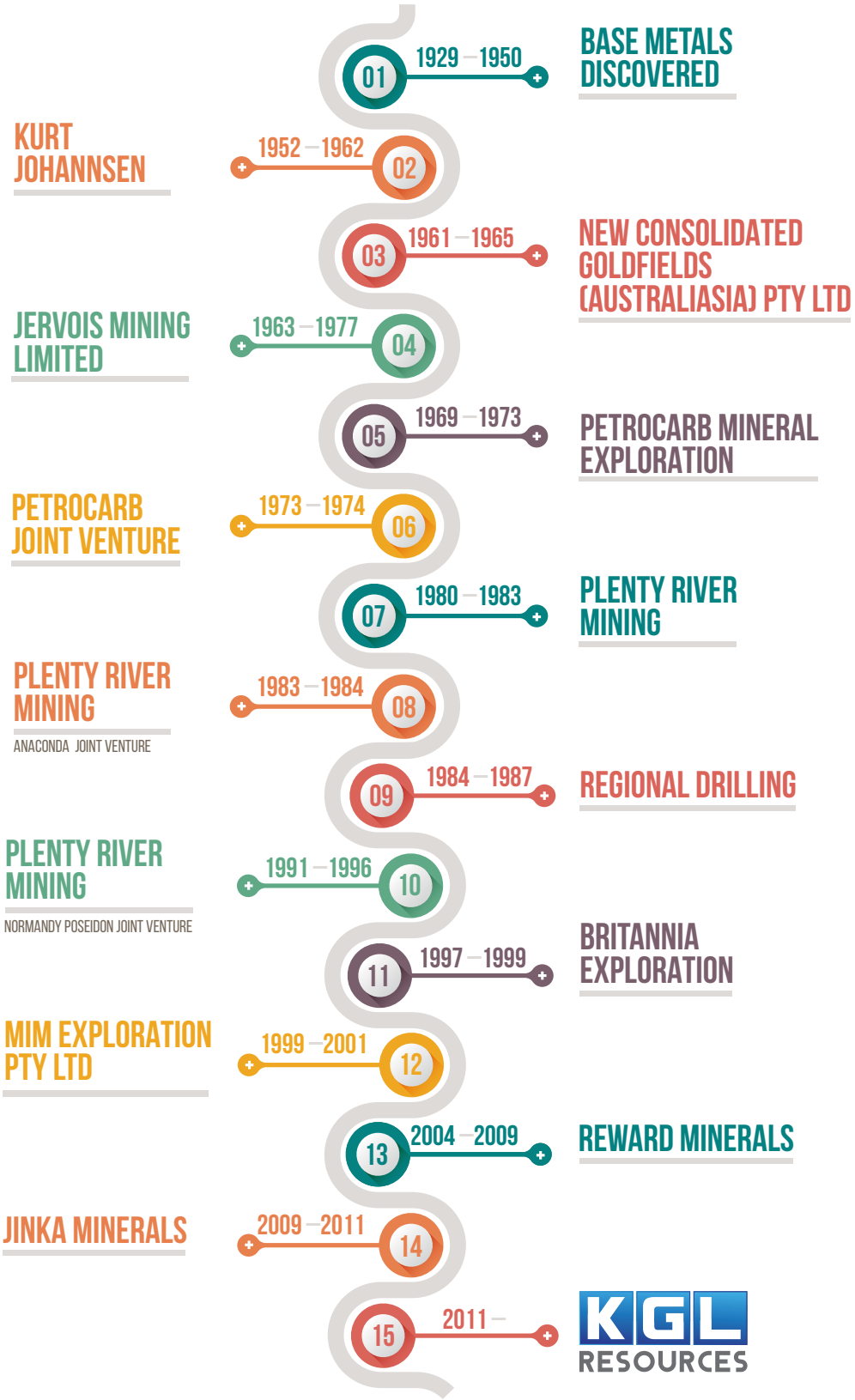
As this Project is considered to be a reopening of the Jervois Mine with expansion of the resource, the risks and potential impacts associated with this Project are well known to KGL. Throughout this EIS process investigations have been undertaken to further investigate potential risks and impacts and ensure that any uncertainties are managed. This impact assessment process has considered the land and water resources and biodiversity and community that is dependent upon these resources. The socio-economic and heritage aspects of this Project and its surrounds have also been considered, as has the potential implications to human health and safety, including transport of materials to and from site.

The findings have been largely positive, especially in terms of the positive implications for the socio-economic aspects associated with the Project. The potential for acid mine draining has been investigated and the findings were that the majority of the site is non-acid forming. This means that with careful management and adherence to the management actions developed as part of this EIS the Project will not interfere with land and water resources within the area.

With regards to the water resources, careful investigation over a number of years has taken place to ensure that the proposed borefield is situated within an aquifer that does not pose a risk to the current users of groundwater within the region. A program for continuing to develop the modelled knowledge of the groundwater resources has been developed as part of this EIS process. As this knowledge is built upon this will be utilised to inform the site water balance model which is focused on accounting for site water demands now and in the future. This will ensure there is careful management of this vital resource for the community and the operations.

The Project is based on a long running relationship with the neighbouring community and landholders. The social impact assessment and resulting social impact management plan demonstrate a clear intention and commitment to continuing to foster positive community relationships and opportunities throughout the Project lifecycle.

Finally, developing on the Project's knowledge of the area and lessons from other historical operations, KGL is committed to ensuring that closure and rehabilitation is considered from the outset and this is demonstrated through the development of the draft Mine Rehabilitation and Closure Plan completed as part of this EIS process. These plans and commitments will be further developed as detailed engineering works are undertaken and will ensuring that these outcomes remain a focus during operations.


01
1929 – 1950
BASE METALS DISCOVERED
KURT JOHANNSEN
1952 – 1962
02
03
1961 – 1965
NEW CONSOLIDATED GOLDFIELDS (AUSTRALIASIA) PTY LTD
JERVOIS MINING LIMITED
1963 – 1977
04
05
1969 – 1973
PETROCARB MINERAL EXPLORATION
PETROCARB JOINT VENTURE
1973 – 1974
06
07
1980 – 1983
PLENTY RIVER MINING
PLENTY RIVER MINING
ANACONDA JOINT VENTURE
1983 – 1984
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09
1984 – 1987
REGIONAL DRILLING
PLENTY RIVER MINING
NORMANDY POSEIDON JOINT VENTURE
1991 – 1996
10
11
1997 – 1999
BRITANNIA EXPLORATION
MIM EXPLORATION PTY LTD
1999 – 2001
12
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2004 – 2009
REWARD MINERALS
JINKA MINERALS
2009 – 2011
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2011 –
KGL RESOURCES

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Prepared for KGL Resources Limited by Nitro Solutions Pty Ltd

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