Rover 1 Project

Proponent Initiated EIS Referral under the Environment Protection Act 2019

Referral Report

28 August 2023

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PUBLICATION STATEMENT

This Referral has been prepared by EcOz Environmental Consultants (EcOz) on behalf of Castile Resources Ltd. A listing of the key consultants involved in preparing the referral, their qualifications and experience in the environmental field are provided below.

Key consultant	Specialist area	Qualifications	Experience
Kylie Welch	Impact assessment	Bachelor of Science (Hons); Master of Social Science	25 years
Claire Jones	Mining environmental management	Batchelor of Science (Hons); Master of Science	20+ years
Suzane Barber	Impact assessment	Bachelor of Environmental Science	15+ years
Tom Reilly	Ecology	Bachelor of Science (Hons)	20 years
Stacey Kopf	GHG emissions	Bachelor of Science; Master of Science; PhD	20 years

A listing of the key technical consultants is provided below:

- Territory Groundwater Services - desktop groundwater assessment and bore plan.
- Environmental Geochemistry International - geochemical characterisation of mine waste.

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ABBREVIATIONS

ADWG	Australian Drinking Water Guidelines
AAPA	Aboriginal Areas Protection Authority
ABS	Australian Bureau of Statistics
ANCOLD	Australian National Committee on Large Dams
ANZG	Australian and New Zealand guidelines for fresh and marine water quality
BOM	Bureau of Meteorology
CLC	Central Land Council
Cth	Commonwealth
DAWE	Department of Agriculture, Water and the Environment (Commonwealth)
DCCEEW	Department of Climate Change, Energy, and Environment and Water (Commonwealth)
DENR	Department of Environment and Natural Resources (Northern Territory) – formerly DLRM
DEPWS	Northern Territory Department of Environment, Parks and Water Security
DISR	Commonwealth Department of Industry, Science and Resources
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environment Management Plan
EL	Exploration Lease
ELR	Exploration Lease in Retention
EP Act	*Environment Protection Act 2019* (Northern Territory)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
ESCP	Erosion and Sediment Control Plan
ha	Hectares
ICMM	International Council on Mining and Metals
IECA	International Erosion Control Association
IFC	International Finance Corporation
INAP	International Network for Acid Prevention
IOCG	Iron Oxide Copper Gold
MCP	Mine Closure Plan
ML	Mineral Lease (granted)
MLA	Mineral Lease Application
MMP	Mining Management Plan
NHMRD	National Health and Medical Research Council
NT	Northern Territory
NT EPA	Northern Territory Environment Protection Authority
NVIS	National Vegetation Information System
PFS	Pre-Feasibility Study
RMCP	Rehabilitation and Mine Closure Plan
TPWC Act	*Territory Parks and Wildlife Conservation Act 1976* (Northern Territory)

EXECUTIVE SUMMARY

This referral report has been prepared to inform the Northern Territory Environment Protection Authority (NT EPA) of the proposal by Castile Resources Ltd (Castile) to develop an Iron Oxide Copper Gold (IOCG) mine and processing plant approximately 70 km southwest of Tennant Creek. The targeted ore deposit, referred to as Rover 1, is situated within Aboriginal freehold lands of the Karlantijpa South Land Trust, with access from the Stuart Highway along the Kunayungka Road through Tennant Creek Station. Castile has determined that the Project is likely to require assessment under the NT *Environment Protection Act 2019* (EP Act) by Environmental Impact Statement (EIS) and is therefore submitting a proponent-initiated EIS referral to initiate the assessment process.

Project overview

Section 2 of the report referral report provides a detailed description of the Project proposal.

An underground mining operation is proposed at Rover 1, where the ore body occurs at a depth of between 300 m and +1,000 m. Ore will be mined and processed on site to produce copper, gold, cobalt and magnetite. The copper, cobalt and magnetite products will be trucked to the Tennant Creek rail siding for transport to Port Darwin, and on to overseas markets. Gold will be transported to a mint, likely the Perth Mint. The operational life of the mine is proposed to be 10 years; however, could be longer if further deposits are located.

The total area of surface disturbance required for the mine is estimated to be approximately 177 ha. The footprint will comprise of a decline box cut, waste rock dump, processing plant, paste plant, tailings storage facility, run-of mine pad, and supporting infrastructure including onsite accommodation village. Water for the mining operation will be supplied from dewatering the underground workings and from a groundwater bore field to be constructed nearby. The preferred option to power the mine is natural gas, sourced from the existing gas pipeline located approximately 40 km east of the Project area.

The Project is forecast to require an average operational workforce of 73 personnel. The workforce will mainly be fly-in fly-out (FIFO) through the Tennant Creek Airport and will be accommodated on the mine site.

Consultation

Section 4 of the referral report provides details of stakeholder engagement undertaken by Castile to date and plans for further engagement through the mine planning and approvals phase.

Castile has met with relevant government agencies and has entered discussions with Traditional Owners of the land on which the proposed mine is located, and with the leaseholders of Tennant Creek Station which is traversed by the access route. Community meetings were held in July 2023 to provide an update on Project progress.

The most common themes raised during the consultation to date, relate to opportunities for employment and business development. Castile is committed to further exploring these opportunities with the community.

Assessment of potential impacts

Section 5 of the referral report presents an assessment of the potential impacts of the proposed Project. Pre-referral screening undertaken by EcOz Environmental Consultants (EcOz) (Appendix A) determined that the Project has potential to impact six of the NT EPA's 14 environmental factors. For each of the relevant factors, surveys and assessments were undertaken to identify environmental values. Where important values were identified, work was undertaken by Castile to identify measures that could be implemented to avoid and minimise impacts. Given the mine is in the early stages of planning and design, information gaps and uncertainties were identified, and Castile plans to address through the EIS process. The outcomes of the impact assessment are summarised in the table below, noting that residual impact ratings are preliminary and will be subject to further assessment through the EIS process.

Summary of factors relevant to the Project, potential impacts, and residual impact ratings

Theme	Factor	Site-specific values	Potential impacts	Residual impact rating
Land	Terrestrial environmental quality Section 5.2	Soil integrity Soil quality	• Soil erosion • Soil contamination • Oxidation of waste rock or tailings	**Moderate**
	Terrestrial ecosystems Section 5.3	Vegetation and habitats Threatened species	• Direct loss of vegetation and habitat • Habitat degradation • Loss of Greater bilby habitat or individuals • Mortality of fauna • Increased competition and predation	**Moderate**
Water	Hydrological processes Section 5.4	Groundwater levels and discharges	• Altered groundwater levels	**Moderate to High**
	Inland water environmental quality Section 5.5	Groundwater quality	• Groundwater contamination, due to: o Spills or loss of containment of hazardous materials o Seepage of contaminated water from the Waste Rock Dump, Tailings Storage Facility or underground workings (including backfilled waste rock and tailings) o Land irrigation of treated sewage	**Uncertain**
People	Community and economy Section 5.6	Community Access Livelihoods	• Change in community composition, cohesion, or character due FIFO workforce • Increased traffic on local roads. • Restricted access to land • Stress and anxiety caused by concerns about environmental impacts, changes to the community, inequitable distribution of benefits from mining and lack of local decision-making power • Increased jobs and business opportunities	**Moderate**
	Culture and heritage Section 5.7	Archaeological sites Aboriginal sacred sites Culturally significant areas	• Loss or damage to sacred site(s) • Loss or damage to heritage site(s)	**Uncertain**

Conclusions

Based on the assessment provided in the referral report, the Rover 1 proposal has potential to impact on the environment. Castile has commenced environmental studies and consultation with stakeholders and the community; however, further work is required to inform mine planning and design so that environmental impacts can be avoided and mitigated to the greatest extent practicable. The draft TOR provided with the referral report identifies the information that Castile proposes to include in the EIS, so that the significance of residual impacts of the proposal can be properly assessed in accordance with the requirements of the *EP Act*.

1 INTRODUCTION

This referral report has been prepared to inform the Northern Territory Environment Protection Authority (NT EPA) of the proposal by Castile Resources Ltd (Castile) to develop an Iron Oxide Copper Gold (IOCG) mine and processing plant approximately 70 km southwest of Tennant Creek. The deposit, referred to as Rover 1, is situated within Aboriginal freehold lands of the Karlantijpa South Land Trust. The Project location is shown in Figure 1-1.

Castile has determined that the Project is likely to require assessment under the NT *Environment Protection Act 2019* (EP Act) by Environmental Impact Statement (EIS). This report has been prepared as part of a proponent-initiated EIS referral and accompanying Statement of Reasons (SOR) and draft Terms of Reference (TOR) documentation.

1.1 About the Proponent

Castile is a mining exploration company that owns 1,051 km^2 of tenements within the Rover Mineral Field, near Tennant Creek. In February 2020, Castile was demerged from Westgold Resources Limited (Westgold) and floated on the Australian Stock Exchange with the goal of investigating and developing its NT assets, of which the Rover 1 Project is the most advanced. The Project tenure comprises five exploration licenses (ELs) and two granted exploration licence in retention (ELRs). Collectively, these areas are referred to herein as the 'Project area'.

Castile has an existing mining authorisation (0417-04) under the NT *Mining Management Act* that covers surface drilling exploration operations. Under Authorisation A0417-04 an area of approximately 40.7 ha has been disturbed by exploration activities, of which 7.6 ha had been rehabilitated as of July 2020, and 103 holes have been drilled. This area is the subject of a separate Mining Management Plan (MMP) and is not considered further in this report. Exploration activities are carried out with due regard for the Aboriginal community, under the terms of a negotiated *Deeds of Exploration* with the Central Land Council (CLC).

1.2 About the proposal

Castile is planning an underground operation at Rover 1. As an IOCG deposit, the ore body contains copper, gold and cobalt mineralisation hosted in magnetite and hematite ironstones at a depth of between 300 m and +1,000 m. The ore will be processed onsite, with an estimated total revenue of $1,943.6 M (at $13,984.72/t copper $2,642/oz gold, $89,552.24/t cobalt and $350/t magnetite as selected for the pre-feasibility study (PFS) evaluation).

The total area of surface disturbance required for the mine is estimated to be approximately 177 ha. The footprint will comprise of a decline box cut, waste rock dump (WRD), processing plant, paste plant, tailings storage facility (TSF), run-of mine (ROM) pad, and supporting infrastructure including onsite accommodation village for a mainly fly-in fly-out (FIFO) workforce.

Castile is currently developing the Project as a 500,000 tonne (t) per annum mining operation. The operational life of the mine is proposed to be 10 years; however, the mine life could be extended if further deposits are located.

Castile anticipates the following timeline for development:

- 2023 - Completion of the Definitive Feasibility Study (DFS).
- 2023 to 2024 - Permitting and approvals, including completion of baseline surveys.
- 2025 - Construction phase to commence, subject to approvals.

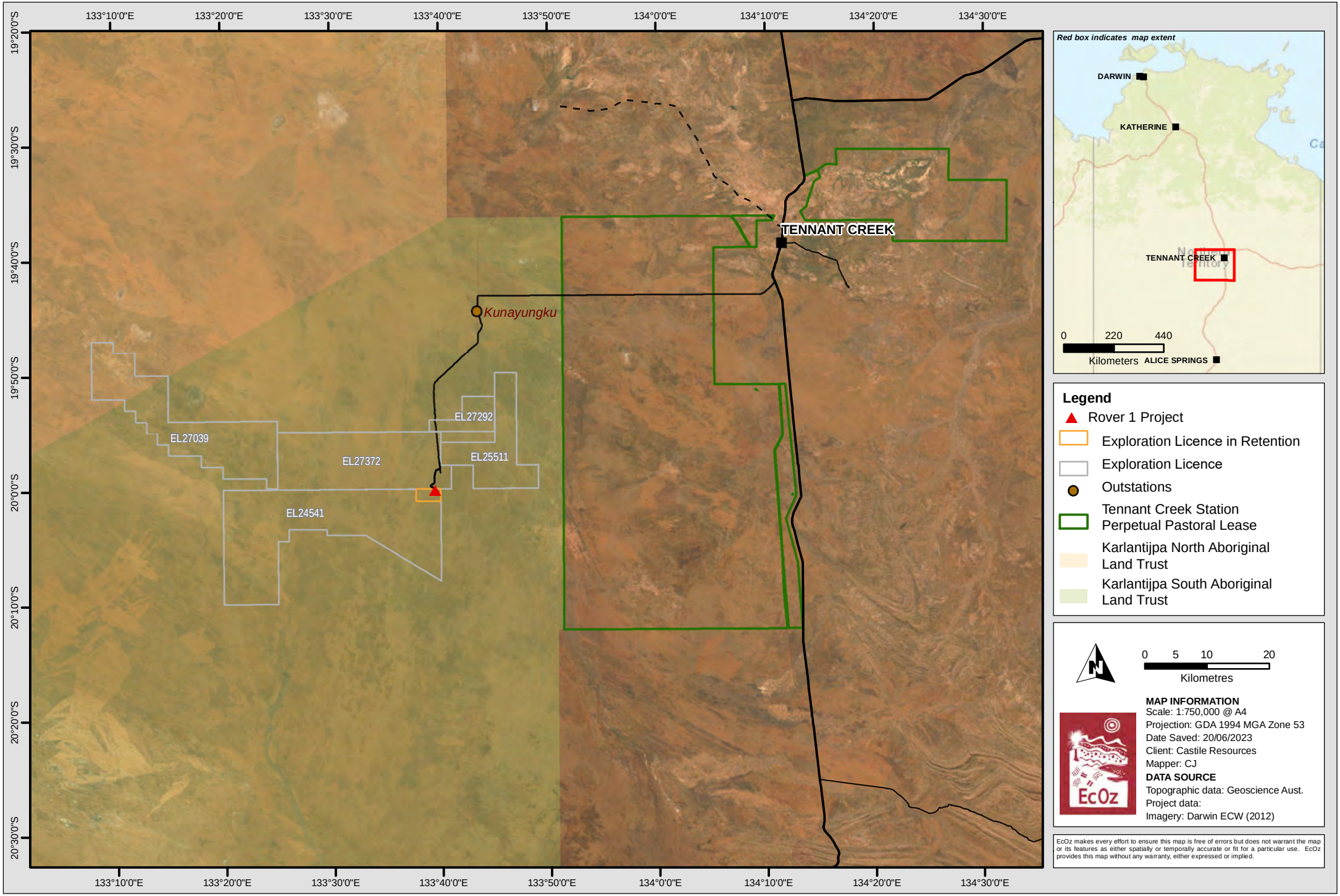

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Figure 1-1. Project Location

2 PROPOSAL DESCRIPTION

This section provides details of the key physical and operational components of the Project and their purpose. The information provided here is taken mainly from the following documents:

- *Rover 1 Pre-Feasibility Study*. Prepared by Castile Resources Ltd, November 2022 (Castile, 2022).
- *Pre-Feasibility Study, Rover Copper-Gold-Cobalt-Magnetite Project*. Prepared by Maca Interquip, September 2022 (Maca Interquip, 2022).

2.1 Purpose of the proposal

The Project will produce copper and cobalt which are experiencing increasing demand from the electric vehicle (EV) sector and will also produce magnetite and gold. Global energy research specialists Wood Mackenzie expect demand from the EV sector to significantly increase in the coming years if the 2050 Net Zero Carbon Target is to be met (DITT, 2023). The PFS identifies that Rover 1 will produce 58,600 t of copper, 2,600 t of cobalt, 652,000 t of magnetite and 252,300 t of gold over the life of the Project, as shown in Table 2-1 (Castile, 2022).

Table 2-1. Rover 1 production summary

Commodity	Unit	Annual Average	Life of Project	% Value Distribution
Total ore mined	t ore	500,000	4,315,000	-
Copper (Cu)	t Cu	6,900	58,600	42
Gold (Au)	oz Au	28,700	252,300	33
Cobalt (Co)	t Co	300	2,600	13
Magnetite	t Fe_3O_4	75,300	652,000	12

The final form for the copper produced at Rover 1 will be in copper plate form. This product was selected to ensure relative ease of transport and purity of final form. The primary use of copper is as a conductor of electricity used in many different applications including EVs.

The cobalt produced at Rover 1 will be as pure metal. Cobalt is used in lithium-ion batteries that form an integral part of EVs, mobile phones and laptop computers and as a result demand for cobalt is expected to rise significantly over the coming years. The Australian Federal Government has classified cobalt as a Critical Mineral to promote domestic supply chains in Australia (DITT, 2023).

The gold produced at Rover 1 will either be in the form of gold doré or as a gold concentrate. Both products will need to be sold to a Mint, likely the Perth Mint.

The magnetite will be produced as a concentrate. Magnetite's greatest use is as an important iron ore for steel manufacture. Other applications are as a catalyst in the Haber process for making ammonia, as a pigment for paints and ceramics, and as magnetic micro- and nanoparticles for a variety of processes and materials (American Chemical Society, n.d.).

2.2 Location and regional context

2.2.1 Location

The proposed development is situated 70 km southwest of Tennant Creek in central NT. Access to the Project area is from the Stuart Highway. The access route traverses the Tennant Creek Station (NT Parcel 494) before moving into the Karlantijpa South Aboriginal Lands. The access route crosses the Alice Springs to Darwin Railway line and Amadeus Gas Pipeline (AGP).

Tenements ELR29957 and ELR29958 contain the high-grade iron oxide-copper-gold resource. The Project key physical components will be located at EL27372. The mine site access road is via EL27292 (and EL27372).

Details of the Project location, tenements, land tenure and nearest residences are provided in Table 2-2.

Table 2-2. Summary of Project location details

Latitude	S 19° 58’ 48’’
Longitude	E 133° 10’ 1’’
Street address	NA
Project Tenement details	ELR29957, ELR29958, EL27372, EL27292
Tenement area	29,510 ha
Lot/Section number	NA
Town/Hundred	NA
Zoning	No zone
Tenure	Freehold Parcel number 3556
Ownership of land	Aboriginal land DCD2019/003. Karlantijpa South Aboriginal Land Trust
Project related Tenements	NT Parcel 494 (Perpetual Pastoral Lease). Tennant Creek Station.
Nearest residential community/town	• Kunayungku outstation (26 km N) – identified as a family outstation, with several buildings beyond economic repair. • Partnparinji (27 km WSW) – no identifying information or infrastructure can be found on satellite imagery. • Miyikampi (28 km W) – no identifying information can be found online. One dwelling was identified on satellite imagery. • Ngappamilarnu (45 km WNW) – identified as a family outstation, three dwellings were identified on satellite imagery. • Tennant Creek (70 km NE).

2.2.2 Land use history

The Project area is on Aboriginal Land and has a history of occupation and use by Aboriginal people. There has been mining interest in the land for over 50 years, with multiple owners and joint ventures exploring the area over that time. Exploration in the Rover Mineral Field was carried out between 1971 and 1982, predominantly by Geopeko, but was halted in 1982 when land ownership reverted to the Traditional Owners. From 1982 to 2005, the Project was owned by Normandy Mining Limited (acquired by Newmont Mining Corporation in 2002) and Acacia Limited (acquired by AngloGold Ashanti Limited). No groundwork was undertaken during this 23-year period, but some airborne photography and magnetic surveys were carried out. AngloGold Ashanti acquired 100% interest in the Project in 2005 but sold it to Navarre Resources Limited (Navarre) in the same year. Later in 2005, Westgold agreed to fund Navarre, with an option to acquire 100% of the Project. In December 2007 Westgold Resources Limited (Westgold) successfully negotiated access to continue exploration at Rover 1 and surrounding tenement areas.

Exploration activities in 2008 included diamond drilling and was concentrated on Exploration Leases (EL24541 and EL24989), covering the previously discovered copper and gold mineralisation at the Rover 1 prospect. Work completed through 2009-2011 was dominated by extensive diamond drilling at the Rover 1 prospect on EL24541 and EL24989, where a JORC-compliant resource has now been defined.

In 2011 Westgold undertook baseline studies to inform an exploration MMP for construction of a surface box cut of approximately 492 m long, 150 m at its widest, 10 m at its narrowest and 65 m depth. The location initially chosen for the box cut is approximately 2 km south of that currently proposed, immediately south of the existing airport strip. The outcomes of these preliminary studies, which include hydrogeology and assessment of the potential for acid mine drainage (AMD) are referenced in this referral report. The box cut and collection of the bulk sample; however, did not proceed.

2.2.3 Aboriginal land rights and interests

Rover 1 is located within Aboriginal Lands, and administration is provided by the CLC. As part of the approvals process, the endorsement of the Traditional Owners, will be required through the CLC. Employment opportunities for Aboriginal people must be considered by Castile and any Contractors (or sub-contractors).

A search of the National Indigenous Australians Agency (NIAA) website identified no Indigenous Protected Areas within the Project area. The nearest protected area is the Southern Tanami Indigenous Protected Area to the west/southwest of the Project area.

2.2.4 Regional environmental context

The following sections provide a brief overview of the key characteristics of the regional environment, which provides context for the identification of site-specific environmental values described in section 5.

Climate

The region is located within the hot semi-arid climatic zone (the Koppen-Geiger classification, BOM 2016) characterised by evapotranspiration exceeding rainfall. Mean annual maximum temperature at Tennant Creek is 32°C. The long-term annual average rainfall for the Tennant Creek station is 401mm, 85% of which occurs over the wet season (McPherson, *et al*., 2020). Climatic factors are a key consideration for planning and design of the mine water management system and water demand, which are discussed in sections 2.4.8 and 2.4.9 respectively.

Fire regime

Regional fire history and fire scare mapping was obtained through the Northern Australia and Rangelands Fire Information (NAFI) website. The dataset indicated that there have been four fire events in the past 20 years, being November 2017, August 2011, October 2006 and June 2001. These fires have resulted in all parts of the Project area burning at least once within the past 20 years. According to NAFI fire scar data, the entire footprint burnt in 2011 and 2017 (EcOz, 2022). Bushfire management and preparedness will be important to protection of the mine infrastructure, and in the long-term to achieving rehabilitation outcomes.

Bioregion and land units

The Project area is located on the eastern edge of the Tanami bioregion which is the largest bioregion in the Northern Territory and is characterised by flat or gently undulating spinifex sandplains. The sandplains support mixed shrub steppes of *Hakea spp.*, desert bloodwoods, *Acacia spp*. And *Grevillea spp*. Over soft spinifex (*Triodia pungens*) hummock grasslands. Wattle scrub over soft spinifex *(T. pungens*) hummock grass communities occur on the ranges (DCLM, 2002). The terrestrial ecosystems that occur in the Project area and surrounds are described in section 5.3.1.

Topography and surface water

The Project occurs within the Wiso River Basin. On a regional scale, the basin is characterized by ridges and hills. The ranges constitute a north-west trending watershed with temporary discontinuous creeks draining to the north, east and south-west. Local low relief channels and flat ill-defined drainage lines provide pathways for ephemeral drainage systems which are frequently flooded during high intensity rainfall events. Locally, there are no permanent surface water features in or surrounding the Rover 1 deposit, as shown in Figure 2-1. The nearest surface water feature is Bonnie Creek, approximately 20 km southeast of the Project area. On this basis, the mine is considered unlikely to pose risks to surface water.

Regional geology and soils

The Project area is covered entirely by recent sediments which blanket extensive flat-lying Cambrian siltstone, dolomitic siltstone and sandstone units of the Wiso Basin. Surface soils are red earths, red sandy loams and red earthy sands with a gravel or stony crust on regolithic rises. Montejinni limestone forms the basal rock of the Wiso Basin, consisting of basal conglomerate and sandstones grading upwards into a predominantly sandstone sequence and separated by a layer of mudstone. The upper sequence of the Montejinni limestone consists of dolomitic sandstones grading upwards to dolomitic siltstones (EGI, 2022). Site-specific geology, land and soils characteristics relevant to the assessment of potential for mine drainage and erosion issues are described in section 5.2.1.

Regional hydrogeology and groundwater quality

Regionally the Wiso Basin is described to contain semi-confined aquifer systems with bore yields up to 20L/s. The Wiso Basin aquifer is reported to be interconnected with the Georgina Basin aquifer through the Cambrian Limestone formations (Knapton, 2009). Groundwater from the aquifer underlying will be used to supply the Projects water demand as described in section 2.4.9. Details of the groundwater resources in the Project area and existing users are provided in section 5.4.1.

A search of the Groundwater Dependent Ecosystems Atlas (Bureau of Meteorology, 2019) was completed. There was no data available for the Project area (central NT) but being in the arid zone and with essentially no riparian vegetation nearby, there is no expectation of either aquatic or terrestrial GDE's in the Project area. The closest potential GDE (unclassified) is a wetland approximately 10 km to the southwest of the Project area (Figure 2-2). Accordingly, GDE's are not further considered in this report.

Parks and reserves

There are no national parks or other reserves within or near the Project area. The closest Sites of Conservation Significance (SoCS) to the Project area is the Davenport and Murchison Ranges located approximately 65 km to the south-east. The closest Site of Botanical Significance (SoBS), the Algoolgoora Swamp, is located approximately 35 km to the southeast (Figure 2-2). The Project will not impact on these areas and therefore they are not further considered in this report.

Surrounding land uses

The land uses surrounding the Project area include pastoral and traditional uses.

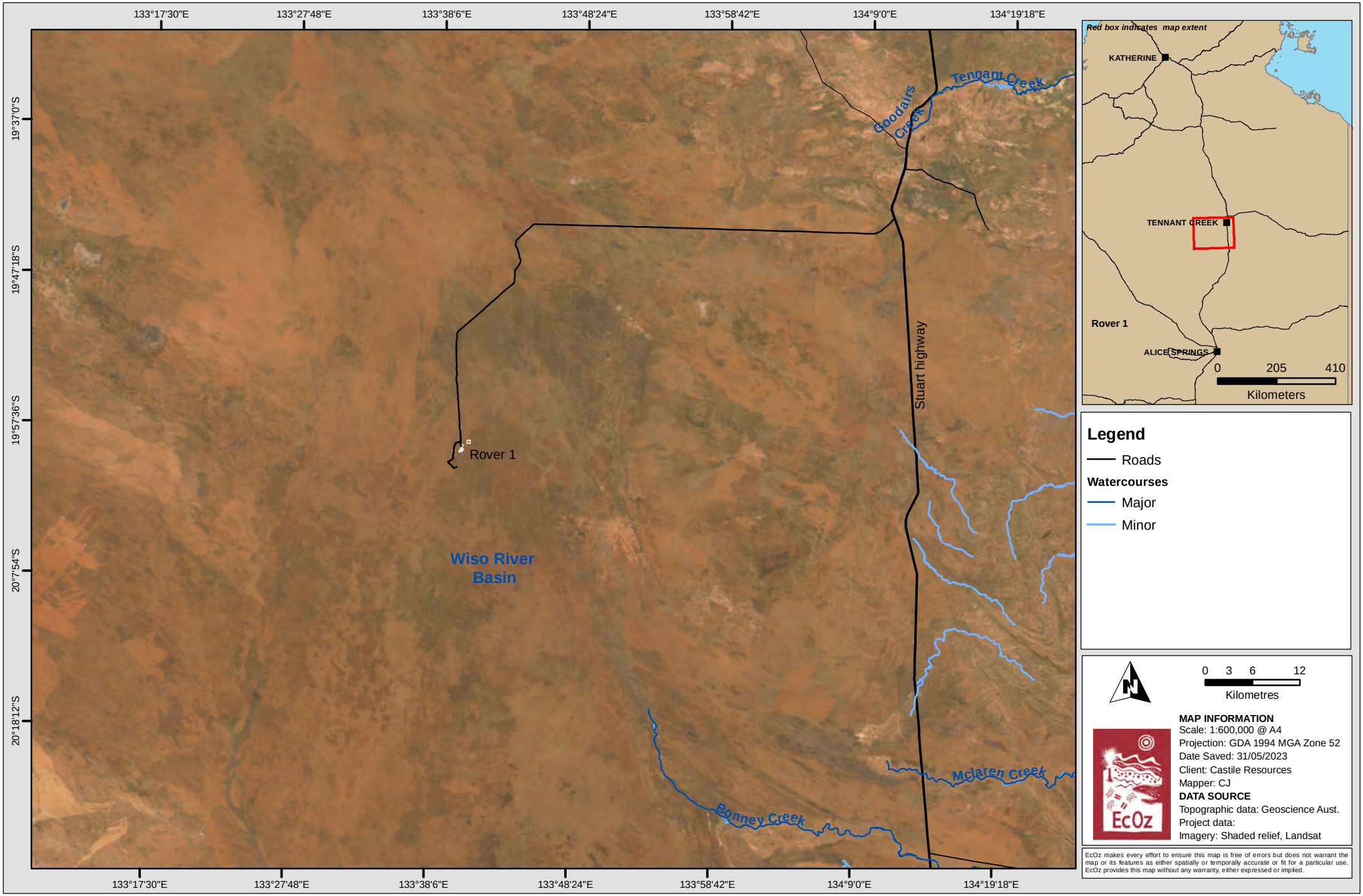

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Figure 2-1. Regional Hydrology

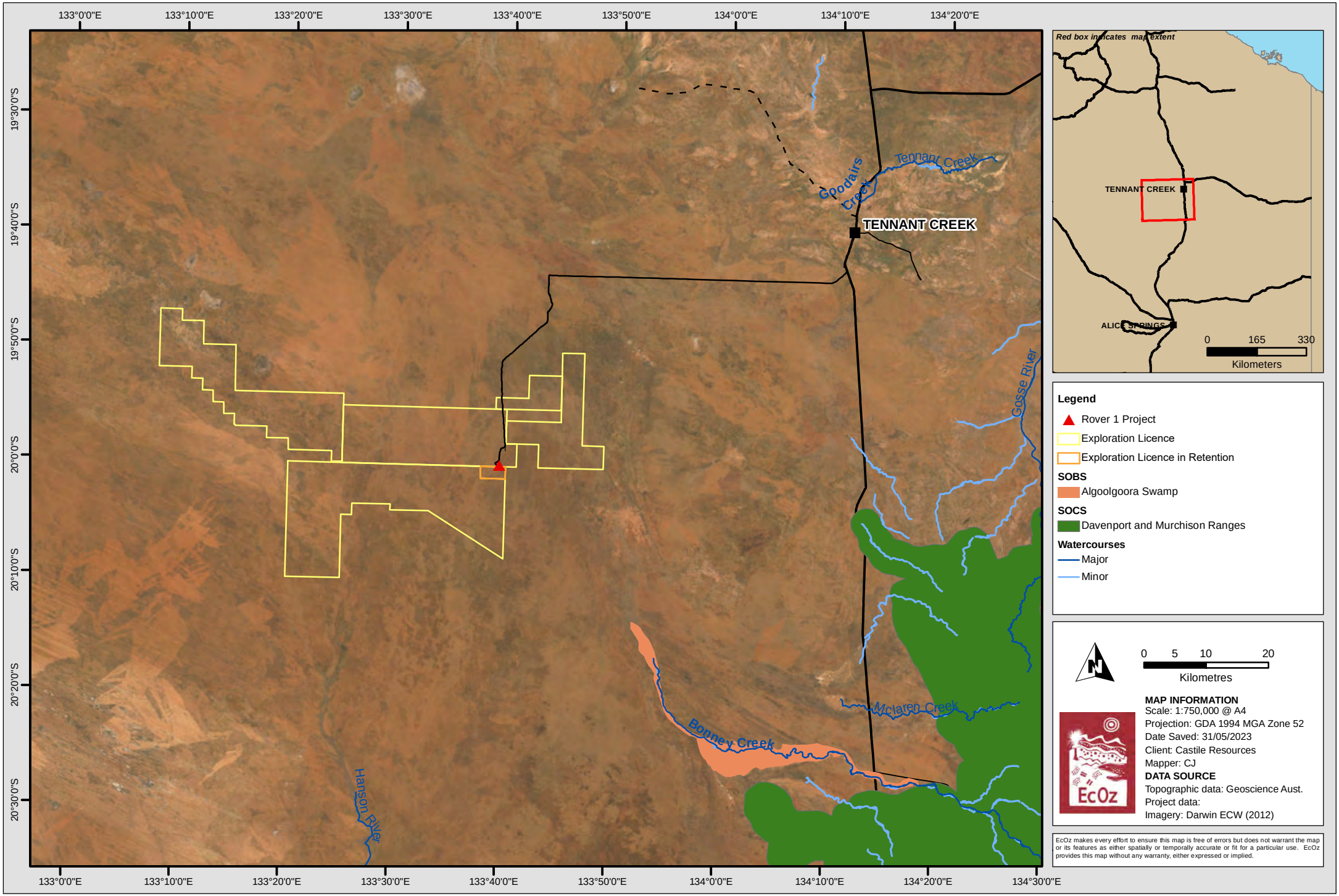

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Figure 2-2. Regional Sensitive Receptors

2.3 Key physical components

A preliminary Mine Plan showing the Rover 1 layout is provided as Figure 2-3. The total Project footprint is approximately 177 ha spread over an area of approximately 2.5 km by 5 km. In addition to the mine site footprint, the Project footprint will also encompass a new gas pipeline corridor and upgrades to the existing access road into the site. Key physical components of the Project are summarised in Table 2-3.

Castile is currently considering options to power the Project. The preferred option is natural gas, via an offtake from the AGP. The pipeline corridor represents 120 ha of the total area to be cleared (estimated as 40 km x 30 m). This option and pipeline alignment are to be confirmed, and baseline surveys have not been completed along the corridor to date. Given this uncertainty, the 'Project area' described herein relates to the key physical components identified in Figure 2-3. The gas pipeline alignment will be presented and assessed in the EIS.

Table 2-3. Project physical components

Component	Description
Decline box cut	Box cut and decline. The backs and walls of the decline, within the Wiso basin, will be sealed to reduce groundwater inflows
WRD	A single WRD is proposed with an anticipated footprint of approximately 12.6 ha
Explosives magazine	The explosives magazine will be located to the east of the WRD. An option to relocate or for an additional explosives magazine, underground, will be considered once the workings are established
Processing plant and ROM pad	The ROM pad and processing plant will be located north of the WRD. It is anticipated that the processing plant will be modular in design. The anticipated area of disturbance is approximately 7 ha
TSF	A single lined TSF is proposed, with an anticipated footprint of up to approximately 22 ha
Paste plant	The paste plant will be located at surface, above the underground workings. No detailed specifications for the paste plant are available at this time
Mine site water management infrastructure Pipelines	A series of ponds will be required to manage raw and mine waters. The sizing of water management infrastructure and length of pipelines required, is currently unknown and will be confirmed following collection of baseline data and development of a site water balance
Pads and laydown areas	A crusher pad is required to provide road base for safe operation of decline. This will utilise fresh non-acid forming (NAF) waste material and crushing will be on an 'as required' basis utilising a simple crushing and screening plant
Warehouse	A dedicated area is planned for the storage of goods at the Project. As part of the overall personnel, a Warehouse Superintendent along with three store-people are planned for the Project
Maintenance workshop	One or more maintenance workshops will be required to service light and heavy vehicles, machinery and equipment. Waste management will include triple interceptor waste oil trap(s)
Bulk fuel storage	Up to 60,000 L of diesel may be stored (consistent with existing Mining Authorisation A0417-04)
Gas pipeline	A gas pipeline of approximately 40 km long, via an offtake on the AGP. Alignment is yet to be determined but will be assessed in the EIS
Power station	Given the proximity to the AGP, an offtake and new pipeline is currently the preferred option for power supply. This will require construction of a small gas fired power station
Groundwater bore field	Groundwater will be extracted for potable use and use in processing from a series of groundwater production bores. The location of the bore field will be informed by the proposed groundwater investigation

Component	Description
Haulage roads and access tracks	Upgrades to a total of 68.8 km of existing roads are anticipated to be required. Product, except for gold doré will be hauled to the Tennant Creek rail siding via a short section of the Stuart Highway. Refer section 2.4.13 for additional information
Auxiliary infrastructure	The Project will require an accommodation village for the workforce. This will be constructed on the opposite side of the access road, as shown in Figure 2-3. It is expected this facility will be provided by an external party on a build-own-operate basis. In addition, a camp kitchen and administrative offices will be required
Wastewater management infrastructure	The Project area is unsewered. As a minimum, primary treatment via a septic system and discharge to ground (land application) is proposed
Landfill	Non-hazardous solid waste will be disposed of to an onsite landfill
Communications infrastructure	Radio communication, high frequency radios. Communication will be provided via a radio link back to the Stuart Highway. It is expected that the accommodation will provide Wi-Fi services to all rooms

2.4 Key Project activities

Construction will take approximately 18 months. Key stages and activities, for which Castile is seeking approval, are summarised below.

2.4.1 Preliminary works

Vegetation clearing

Work at the site will commence with surveying of site boundaries and clearing of vegetation. There will be minimal staging of vegetation removal as all areas of the Project footprint will be constructed on within the first six months of the Project schedule. Vegetation will be cleared by bulldozer and pushed into windrows. Vegetation debris will be windrowed along the contour and either retained for use in rehabilitation or burnt under a permit from Bushfires NT.

Topsoil stripping and storage

Topsoil and subsoil will be stripped from all cleared areas. These materials will be stockpiled separately for later use in rehabilitation. The height and slope requirements for the stockpiles will depend on the materials characteristics and final stockpile locations. Batter slopes will be minimised to maintain the structural integrity and soil seed bank.

Bulk earthworks

Materials specifications, sources and construction treatments, will be developed following further geotechnical testing. Once cleared, pads and footings will be constructed, and infrastructure built.

2.4.2 Haul road and gas pipeline construction

The haul road and gas pipeline corridor width are nominally 30 m wide. The entire 40 km gas pipeline corridor will require clearing, as there is no existing track in this area. Cleared vegetation will be windrowed alongside the corridor and then spread out to prevent concentration of surface water flows. Remaining vegetation, topsoil and subsoil all to be stockpiled within the disturbance corridor, either in discrete stockpiles and /or along the road length to one side. The pipeline corridor will be reinstated post construction.

Cut and fill requirements for the haul road will be determined during detailed design. If borrow materials are required, the borrow pit locations will be identified and assessed in the EIS. During construction, roadside drainage (swale drains) and watercourse crossings will be constructed according to the engineered design specifications that take account of local climatic conditions.

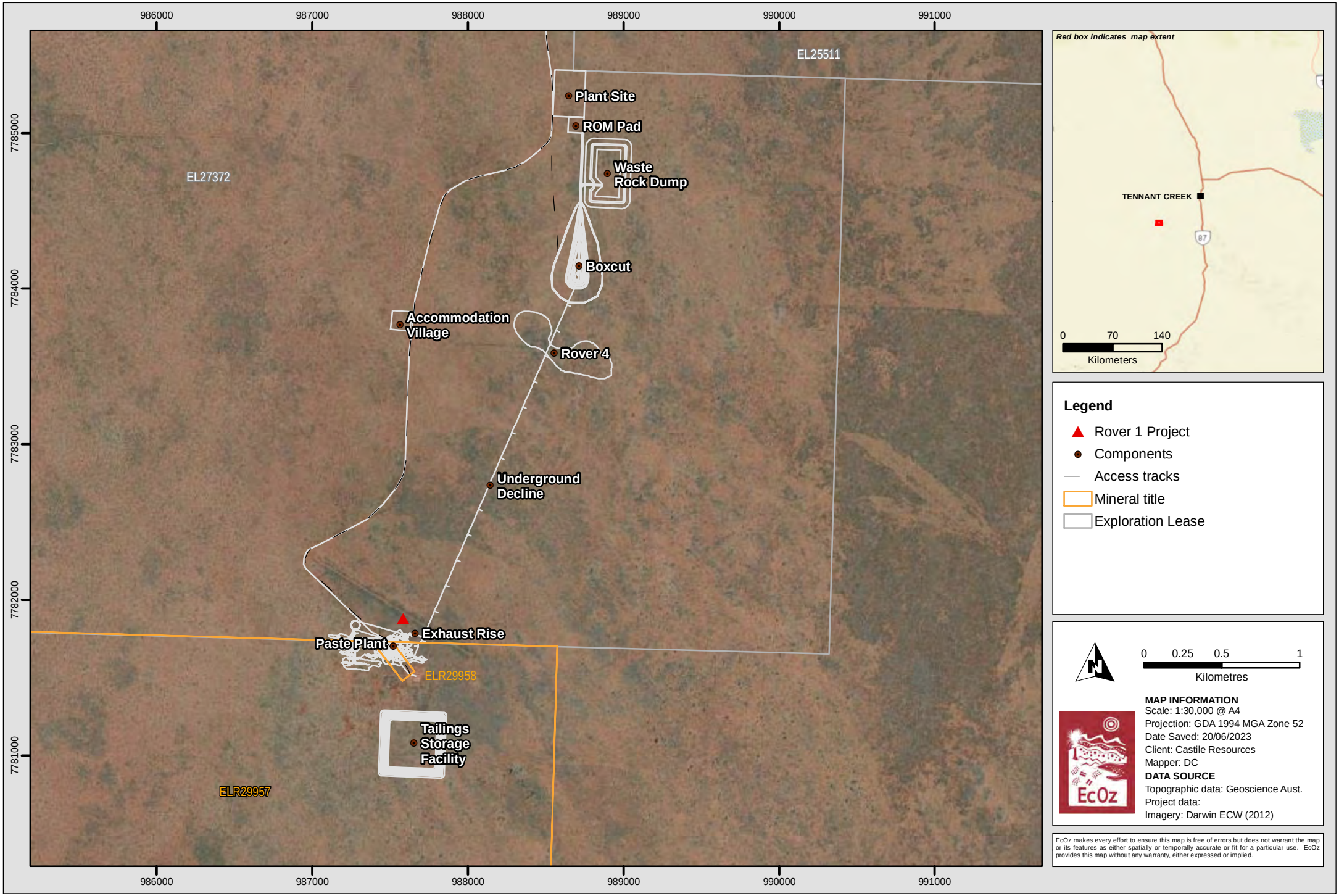

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Figure 2-3. Project Key Physical Components

2.4.3 Excavation of decline box cut

The box cut will be excavated using conventional truck and shovel methods. Construction of the box cut will involve excavation of 2,780kt (1,069kBCM) of waste rock that will be stored on the surface at the WRD. The decline will be constructed from the footwall of the box cut at 230 m AHD (65 m below surface) to approximately 100 m AHD (400m below the surface) to access the ore body.

Overburden and NAF material from the box cut and upper decline will be used to construct the WRD base layer and as decline road base. Excess materials and/or materials that do not meet construction specifications will be placed in the WRD.

An Armco style tunnel will be placed within the box cut to access the underground workings. Castile is considering an option to backfill the box cut with excavated material stored at the WRD. Feasibility studies are underway to determine the preferred option/s. These will be presented in the EIS, including the reasons why the option/s are preferred, and details of alternatives considered.

The proposed decline at Rover 1 is 5.5mW x 5.5mH and will descend at a rate of 1:7. The size of the decline allows a 65-tonne truck to access the ore body, and sufficient airflow at the desired velocity to minimise dust formation. Standard stockpile development will be put in place at intervals along the decline to manage the waste materials handling prior to trucking to the surface. Infrastructure includes a ventilation fan, dewatering pipelines and pumping infrastructure, underground water storage dam and/or process water header tank(s). Currently no refrigeration of the air for supply underground is considered. A separate escapeway network from the surface will be constructed.

Drill and blast, and mechanical excavation methods will be used depending upon the ground conditions. Castile intends to develop the initial part of the decline (through the Wiso Sediments) using a tunnel boring machine.

2.4.4 Mining

A conventional mining fleet, likely comprising the following will be used:

- dozer, wheel loader, front end loader, bobcat
- crane, foot crane, boom lift, forklift
- flat roller, grader, water cart
- B Double truck, tip truck, light truck, light vehicles, bus
- mobile batch plant.

Emulsion explosives will be used for both development and stoping practices. A stope level interval of 25 m is proposed. Ore will be trucked to the surface for processing. An indicative production timeline is provided as Figure 2-4.

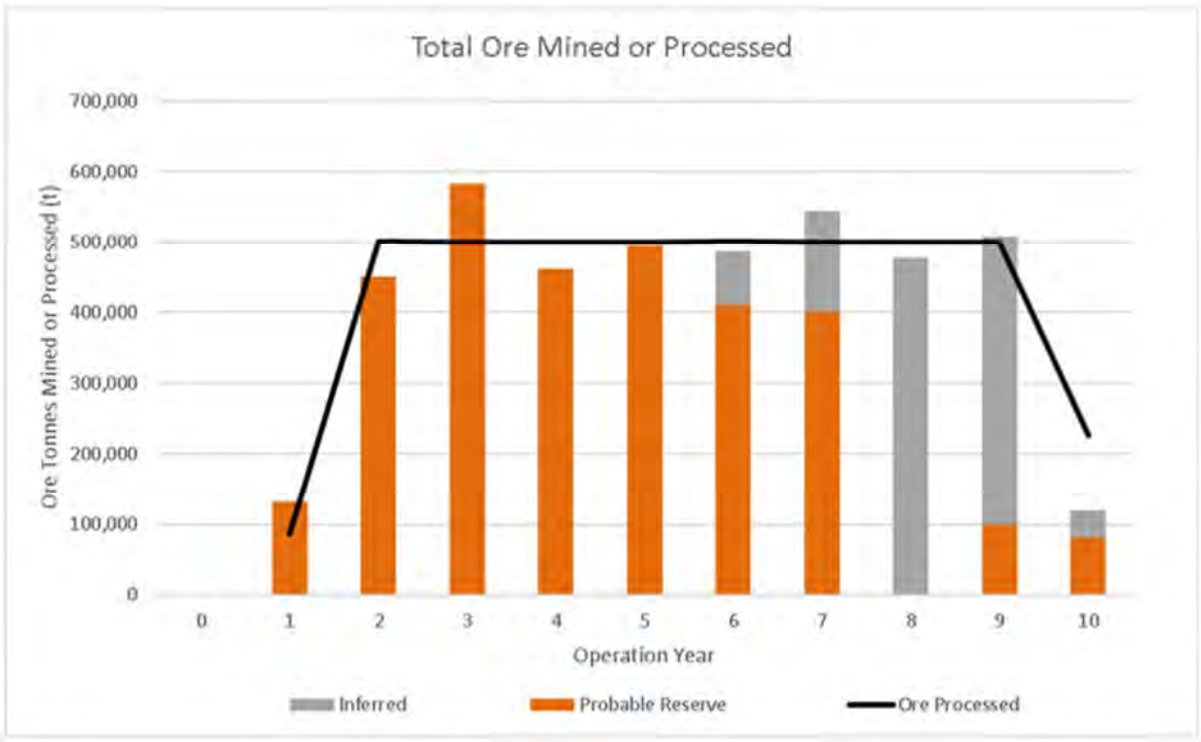

Figure 2-4. Indicative production timeline

2.4.5 Processing

The following description of the resource metallurgy and proposed process is sourced from MACA Interquip, (2022). The simplified process flowsheet is provided as Figure 2-5 and a brief description of each stage is provided below. Further test work is required to refine and confirm the process.

Copper

Copper occurs in the mineral chalcopyrite which is relatively fine grained within the pyrite. The chalcopyrite also contains gold and silver in low concentrations. Chalcopyrite can be selectively concentrated away from pyrite via froth flotation to produce a mineral concentrate which is contaminated with Bismuth. Copper can be cleanly separated from the bismuth by oxidative leaching of the sulphide minerals to liberate dissolved sulphate species. Bismuth is one of the strongest penalty elements which occurs in copper mineral concentrates. Bismuthinite does float extensively with the other sulphide minerals of chalcopyrite and pyrite.

Gold

The gold deportment in the ore is highly variable. The gold can be found as gravity gold, refractory gold in pyrite (and less extent chalcopyrite) and associated with non-sulfide minerals as well. Gold can also be found in sulphide minerals (pyrite, bismuthinite) most likely in refractory form. To recover this gold the sulphide minerals must be converted into a form which allows for cyanide leaching. The method selected for this is Pressure Oxidative Leaching (POX). The conversion of the sulphide minerals to sulphate releases copper and cobalt into solution allowing for their clean separation from bismuth. A modest amount of gold deportment is in non-sulfide minerals which do not concentrate with sulphide minerals via flotation.

Cobalt

Cobalt is present in the ore in pyrite and fine cobaltite in association with pyrite. In order to concentrate the cobalt, flotation of the pyrite is required. Separation of the cobalt from the pyrite can be performed by oxidation of the sulphide minerals generating soluble cobalt and iron in solution.

Magnetite

Magnetite makes up a significant proportion of the mass in the Rover 1 ore. It will be removed early in the process to reduce the mass flowing through the downstream of the flowsheet.

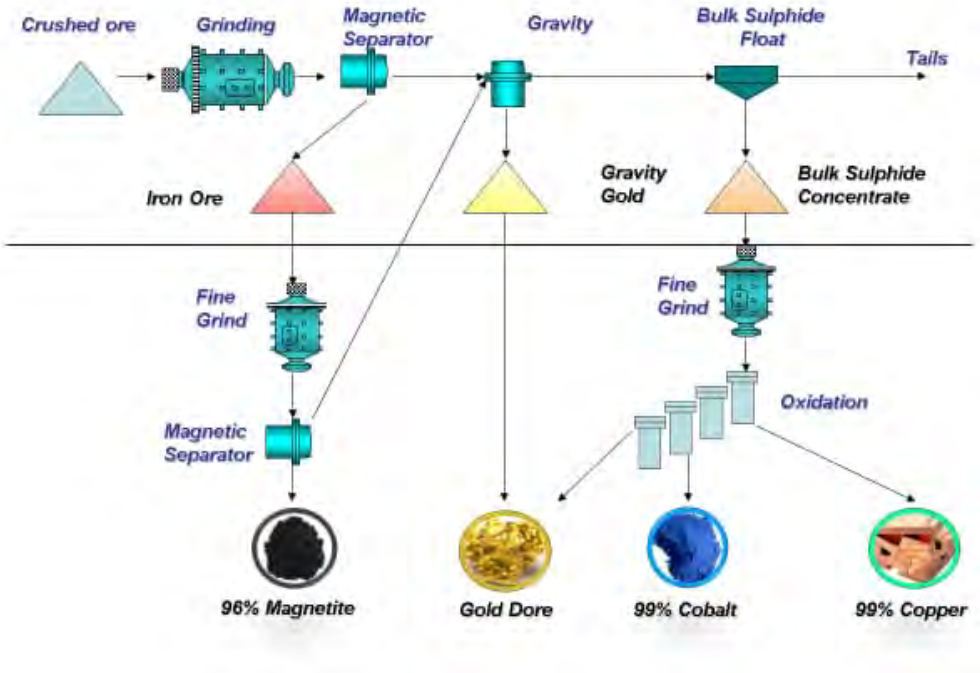

Figure 2-5. Process flowsheet

2.4.6 Waste rock and ore management

Initially, waste rock removed from the box cut will be transported to the surface for disposal at the WRD. It is anticipated that this will largely comprise non-acid forming (NAF) overburden material. As space becomes available underground, waste rock will remain underground and will be backfilled to stope voids. Ore will be stored at the ROM pad for processing.

Given the lithology, the Project has the potential to produce waste rock and tailings that are potentially acid forming (PAF). A coarse calculation of the volumes of each type of waste rock was undertaken by Castile. Waste rock characterisation work is ongoing (refer section 5.2), and as data become available, it will inform the geological model and the volumes will be refined. Over the life of the Project, the following volumes of waste rock are anticipated:

- Box cut waste 2,780kt (1,069kBCM)
- Underground waste 1,166kt (416kBCM)
    - PAF Waste 13kt
    - NAF Waste 1,153kt
- Underground ore 4,316kt
    - Mineralised waste (low grade ore) 58kt.
- Any PAF material at surface, will be disposed of to a designated, engineered cell within the WRD.

Segregation and management of waste rock is required since oxidation during surface storage has the potential to lead to acid mine drainage (AMD), neutral mine drainage (NMD) or saline drainage. Waste material will be segregated based on the total sulphur and NAPP (net acid production potential) values, for which preliminary criteria have been developed. The criteria will be refined as more data becomes available.

On-going characterisation of waste rock, including sample selection, preparation and analysis, will be undertaken during construction of the decline. Sample selection will ensure good spatial representation and compositional variability.

2.4.7 Tailings management

The processing plant will produce two tailings streams given the complexity of the proposed processing flow sheet, being bulk sulfide flotation tails and carbon in leach (CIL) tails. Tailing streams will be recombined and either thickened for use as underground paste fill or deposited to the TSF. Tailings will be neutralised prior to placement to minimise the risk of AMD.

Cement will be added to the tailings at the paste plant prior to deposition underground. A laboratory testwork program is required to determine optimum cement dose across a range of ore types. The testwork program will inform the paste plant design. Given this uncertainty, water and electricity demands and paste plant waste streams are not considered further in this referral, but will be considered in the EIS if it is confirmed this method will be used.

Castile is currently investigating options for dry stacking of tails at the TSF. In the dry stack method, the water content of the tails is reduced, and the solid material transported to the TSF where it can be compacted and reclaimed with native vegetation.

Testwork of the combined tailings product will commence as tails become available from the pilot treatment plant, anticipated as late 2023. The program will characterise the tails physical and chemical properties, and data will be used to refine the process flowsheet and disposal methods.

2.4.8 Water management

Groundwater inflows

Construction of the decline will intersect the Wiso Basin and Warrampungup discontinuity, from which groundwater will flow freely into the underground workings. Water intercepted will be directed to a small dam, constructed underground, just below the Warramungup Formation, which will store and settle water prior to pumping to the surface. In total, three underground pump stations are anticipated to be required to pump water to the surface. Water at surface will be pumped to the Raw Water Dam.

An allowance of 10 L/s (or 865 m^3/d) has been made for the use of water underground for development and stoping material prior to bogging, with minor volumes being consumed by mining equipment. This water will be sourced from the small dam. The use of raw water underground for dust suppression and for fire-fighting purposes is currently being investigated.

Pond water

A process model was developed to assist with the sizing of all water ponds required for the processing plant. The following water ponds are included in the MACA Interquip (2022) design to allow for effective operation of the processing plant:

- Grinding Circuit Process Water Pond. This pond water is separated from the process water as it is free of cyanide. Water with no cyanide content is required for the sulphide flotation process to work. This pond is fed by the Raw Water dam.
- Cyanide Circuit Process Water Pond. This pond contains water with dissolved cyanide. Cyanide is essential for gold leaching of the pressure oxidative leaching residue. Water which has been utilised by this process is recycled back to the Cyanide Circuit Process Water Pond rather than the Grinding Circuit Process Water Pond.

Stormwater

Stormwater will be directed away from mine workings, to prevent the potential for contamination or flood damage and loss of infrastructure. Stormwater infrastructure will be designed, constructed, and maintained in accordance with relevant Australian Standards and guidelines.

2.4.9 Water demand and sources

The primary source of water for the Project will be groundwater intercepted by, and dewatered from, the underground workings. Dewatering volumes will be ascertained by developing a groundwater model. A network of monitoring bores is planned to be installed in 2023 for this purpose. For planning purposes, Castile has assumed an average groundwater inflow rate of 45 L/s, which equates to an estimated total volume of 3,888 m^3/d.

The total estimated daily water demand for the mine is 4,382 m^3/d. To meet this deficit and provide sufficient water for year-round processing, a bore field will be constructed, and groundwater pumped to the Raw Water Dam for use across the mine site. The daily water demand of 4,382 m^3/d comprises:

- Processing: 3,336 m^3/d raw water; 149 m^3/d potable water (MACA Interquip, 2022)
- Underground operations: 865 m^3/d raw water; 10 m^3/d potable water
- Accommodation village: 22 m^3/d potable water.

A containerised reverse osmosis (RO) plant will be used to treat raw water to produce potable water. The RO plant will filter the salts from the water providing fresh water which can then be circulated where needed.

A detailed water balance will be developed as baseline data become available, to better understand any quantities of water required to be extracted and sizing of infrastructure.

2.4.10 Power demand and generation

The preferred option to power the Project is natural gas, taken from the existing AGP located approximately 40 km east of the Project area. Gas will be transported to the Project area via a new above ground pipeline, to a small gas power station located on site. An initial assessment has determined that Rover 1 has a relatively low power demand and that a power station of approximately 15 MW will be sufficient to power the operation. Of this, MACA Interquip estimates the total installed power requirement across all equipment at the processing plant is 9.7 MW (MACA Interquip, 2022).

A diesel power supply may be needed as a backup system (diesel generator) or to start the system and provide a spinning reserve for a gas system, however, Castile have indicated their preference not to use diesel unless necessary. There will be at least two electric underground pump stations for dewatering, however the final pump design has not been determined due to uncertainties in the expected inflow rates.

Solar is the preferred option for powering surface pumps and other auxiliary surface infrastructure to manage water and tailings. The mining fleet will preferably be powered by battery technology.

2.4.11 Management of hazardous materials

The type and quantities of dangerous goods including hazardous materials is to be determined. All hazardous materials will be stored, handled and disposed of as per relevant Australian Standards and guidelines.

It is anticipated that the majority of hazardous materials will be required for processing. The PFS process plant design includes a variety of reagent preparation and distribution stations which are required as inputs to the process. These include:

- limestone storage, grinding and preparation circuit
- hydrated lime storage, preparation and distribution

- oxygen plant - a Vacuum Pressure Swing Absorption (VPSA) oxygen plant is included in the design
- flocculent preparation and dosing plant for all the solid liquid separation duties
- cyanide (sodium cyanide) storage, preparation and distribution
- caustic (sodium hydroxide) storage, preparation and distribution
- process reagents such as hydrochloric acid, sulphuric acid, flotation chemicals and activated carbon
- LPG, specifically within the gold room
- key consumables include crusher liners, SAG mill liners and balls and water.

In addition, maintenance activities, water (potable) and wastewater treatment will require the use of chemicals and materials, some of which may be classified as hazardous. This will likely include for example, greases, oils and lubricants, oxygen and acetylene and cleaning chemicals.

Fuel, most significantly diesel will be stored and used on site. Up to 60,000 L of diesel may be stored (consistent with existing Mining Authorisation A0417-04). Fuel will be stored in accordance with *AS 1940-2004 (and amendments) Storage and handling of flammable and combustible liquids.*

2.4.12 Sewage and solid waste streams

Castile will install and operate a septic system. As a minimum, primary treatment via a septic system and discharge to ground (land application) is proposed. Consideration will be given to requirement for a secondary treatment system. Advice will be sought from a qualified soil/hydraulic consultant about the most suitable method of on-site wastewater management. Infrastructure and operation will be consistent with *NTG Code of Practice for Wastewater Management* (Department for Health, 2022) and relevant Australian Standards.

Municipal and inert waste will be disposed of to a purpose-built landfill at the Project area. Waste will be managed in accordance with relevant legislation including the *Guidelines for Siting, Design and Management of Solid Waste Disposal Sites in the Northern Territory* (NT EPA, 2013).

2.4.13 Transport

Road access to the Project area is via the Stuart Highway 6 km south of Tennant Creek, then west along the gravel Kunayungka Road for approximately 50 km before turning south at the outstation. The Rover 1 deposit is located approximately 26 km south of the outstation, accessed via an existing unsealed road, which is currently maintained by Castile for exploration purposes. As described above, the road will be upgraded to provide suitable access to the Project area for heavy vehicles.

Goods and products

Materials will be delivered by train to Tennant Creek, from where, it will be transported by road to the Project area. The exception to this is explosives, which will be delivered directly, via road, from Mount Isa.

Processed products will be transported via existing roads to the Stuart Highway intersection, then along a small section of the Stuart Highway (approximately 1.3 km) to the existing Tennant Creek rail siding. All products will be containerised for transport and moved using a semi-trailer to the rail siding, and then the product will be transported via rail to Port Darwin.

Workforce

The workforce for the Project will be transported via the existing commercial airport in Tennant Creek. Although there is a historic airstrip located at Rover 1, there are no plans to return regular commercial planes to this strip; however, work will be undertaken to return this strip to a level suitable to land a RFDS plane there during an emergency. Grading of the strip at regular intervals will be required to ensure the surface is suitable in the case of an emergency. Staff, contractors and visitors will be transported to the Project area via road from Tennant Creek.

2.4.14 Decommissioning and site rehabilitation

A Mine Closure Plan (MCP), including closure criteria will be developed consistent with:

- *Mine Closure and Completion – Leading Practice Sustainable Development Program for the Mining Industry* (Commonwealth of Australia, 2016).
- International Council for Mining and Metals (ICMM*) Integrated Mine Closure, Good Practice guide (2nd Edition, 2019).*
- *Key Performance Indicators – Tool for Closure* (ICMM, 2020).

Rehabilitation activities will be documented and undertaken consistent with the Commonwealth Government, *Mine Rehabilitation - Leading Practice Sustainable Development Program for the Mining Industry* (2006).

Upon rehabilitation and a decision to close the decline, salvageable mine infrastructure will be removed, and the dewatering pumps will be turned off which will allow the workings and decline to flood. Groundwater inflows will fill the voids until groundwater levels stabilise. A groundwater model will be developed by Castile for the operations and closure phases of the Project, which will be used to predict the timeframe for recovery of groundwater levels post closure. The modelling results will be presented in the EIS.

Two closure options are currently under consideration for the box cut:

(a) backfilling the void following installation of the Armco style tunnel, and creation of a stable, final landform engineered to shed water and minimise infiltration or

(b) allowing the box cut to flood with groundwater to create a pit lake post mining.

If the box cut is not backfilled, it will be made safe and stable, and a safety bund constructed around the perimeter. As above, the timeframe for recovery of ground water levels post closure will be modelled. A pit lake level and water balance assessment will be undertaken to determine the risk of overflow or flow through from the pit lake. The results of the pit lake assessment (if one is required) will be presented in the EIS.

The WRD and TSF landforms will be left in-situ. The top of the dump and the berm will be contoured to direct water into the dump to reduce erosion and pollution of the surrounding vegetation with the runoff. Likewise, the TSF will be designed such that a simple cap will be placed post completion of processing. The landforms will be made safe, stable and non-polluting, and will be revegetated with native species from the area.

Post closure, it is anticipated the land will be returned to pre-mining land use, being traditional uses and pastoral, noting that there will be some localised restrictions on land use around for example, the WRD/TSF landforms. The preferred post-closure land uses and objectives will be determined in consultation with stakeholders as part of the mine closure planning.

2.5 Workforce

Overall, it is expected that on average approximately 73 personnel will be onsite, with a maximum of 77. Castile proposes a 2/1 style predominately FIFO roster, across the following departments:

- Mining: 27 personnel.
- Maintenance: 22 personnel.
- Processing: 16 personnel.
- Other (HSEQ, social performance, and administrative): 8 personnel.

FIFO workers are proposed to be transported from Darwin to the Tenant Creek Airport via aeroplane, then shuttled to the Project area by bus. Site personnel will be housed in the proposed accommodation village.

2.6 Consideration of alternatives

The section examines the various alternative sites, layouts and approaches that were considered by Castile prior to deciding upon the Project presented in this referral.

The deposit sits ~300m below the surface, covered by barren sediments. Mining by open pit methods was considered uneconomic and not evaluated. Bulk mining options (such as caving) were not considered due to zonation of ore rather than a gradual degradation. Larger selective mining options were evaluated for different mining rates. The initial capital expenditure (CAPEX) of these options (relative to their incremental additional return) led to these options to be disregarded.

An alternative option considered for the design of Rover 1 was to utilise a conveyor to move the ore from the top of the ore body to the surface. This option is possible at Rover 1 as there is no ideal location for the box cut and the top economic level of the ore body is 375m below surface. Two options were preliminarily evaluated: a single decline with the conveyor and trucking together or a twin decline option with the access separate to the conveyor. These options were evaluated only for a Mining Contractor cost basis. The evaluation considered the quantity of ore which will need to be conveyed before the option is more cost effective. For a single access, there is a two-year, two-month payback period, while for a dual access, it is a three-year, six-month period for payback. No evaluation was completed for an owner operator situation, as the cost of trucking in this scenario is significantly cheaper. Given the desire to operate the Project on an owner operating basis, the decision to construct the conveyor decline was disregarded due to the increased CAPEX.

The final option considered to access the top ore body was to sink a shaft to -350mRL (650m below surface). In this option, a smaller steeper decline (5.0mW x 5.0mH, 1:5 gradient) was designed from the -100mRL to -265mRL to exploit the Jupiter ore body. The shaft access and haulage method demonstrated that at the current ore reserve size, the total cost of the Project is similar between the shaft access and decline access. Therefore, if the Project grew (as the ore body became deeper) the shaft would provide a lower overall cost. This option was however not considered ideal due to the limited specialised personnel within Australia. Currently there are very few shaft only ore bodies within Australia. The specialised skills of the winder driver and platman have largely been lost. Therefore, it was considered the execution of the Project would be significantly riskier if this method was selected.

Multiple options exist for the provision of electricity to site. Traditionally, power generation on a site of this size would be through diesel generation methods. The preferred option, assumed as the ‘base case’ for this proposal is natural gas, sourced from on offtake from the AGP. This option has proven successful at other mines in the region.

Where practicable, the mining fleet will use electric rather than diesel, and similarly solar will be preferentially used to power pumps and other small infrastructure.

An option was considered to seal the decline within the Wiso Basin from water ingress. Although this process should work well on the backs and walls of the decline, its impact on the floor of the decline is expected to be minimal. For this reason, a pump station location (Pump Station 1) just below the surface of the Warramungup Formation is considered a better approach. Three underground pump stations in total are anticipated to be required to pump water to the surface. A small dam will be constructed in Stockpile 2, just below this point, which will store and settle this water prior to pumping.

3 REGULATORY CONTEXT

3.1 Statutory obligations

The Project will adhere to all relevant NT and Commonwealth environment and heritage legislation and will be required to obtain all associated permits and approvals. Relevant primary legislation is described in Table 3-1.

Table 3-1. Relevant primary legislation

Legislation	Relevance
Control of Roads Act	Works, including within the road reserve, are required to upgrade existing roads. Permits will be obtained prior to commencement of works.
Dangerous Goods Act (NT) 1998 and Regulations (1985)	Dangerous goods include explosives, flammable, toxic and corrosive materials. In addition, the storage and transport of explosives requires a permit from NT WorkSafe.
Environmental Protection Biodiversity Conservation Act (Cth) 1999	Section 45 (Bilateral Agreement) of the *Environment Protection and Biodiversity Conservation Act 1999.* DCCEEW (Cth Department of Climate Change, Energy, and Environment and Water) Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (2013).
Environment Protection Act (2019) and Regulations (NT) 2020	The process for environmental impact assessment is legislated under the *Environment Protection Act 2019 and Environment Protection Regulations 2020.* Castile is required to hold an Environmental Approval, pursuant to Section 65 of the Act.
Heritage Act (NT) 2011	All Aboriginal and Macassan sites are protected under the Act. If previously unrecorded sites are uncovered by Project activities a Works Approval may be required from the NT Heritage Branch.
Mining Management Act and Regulations (*NT) 2001*	The Department of Industry, Tourism and Trade (DITT) oversees the approval and regulation of mining activities. The mining Authorisation is the key regulatory instrument used by the NT Government for approval and compliance monitoring of mining operations in the NT.
Mineral Titles Act (NT) 2010 and *Regulations 2011*	Castile is required to hold a mineral title granted under the Act, prior to submitting an Application for Authorisation, Mining Management Plan (MMP) and security calculation to DITT under the Mining Management Act (MMA).
National Greenhouse and Energy Reporting Act	Corporations must register and report if they emit greenhouse gases (GHG), produce energy, or consume energy at or above specified quantities in a given financial year.
Native Title Act (Cth) 1993	The Project is located on Aboriginal freehold lands of the Karlantijpa South Land Trust. Mineral lease (ML) applications are required to undergo an advertising period pursuant to Section 29 of the *Native Title Act*. The Act provisions the right to negotiate, and issuance of a Section 31 deed for exploration and mining activities.
Northern Territory Aboriginal Sacred Sites Act and *Regulations 2004*	Abstract of Records under regulation 7 of the *Northern Territory Aboriginal Sacred Sites Regulations 2004* (NT) identified no registered or recorded

Legislation	Relevance
	sacred sites, or restricted work areas on ELR29957, ELR29958, EL27372 or EL27292. An Authority Certificate will be obtained.
Public and Environmental Health Act (NT) 2011 and *Regulations 2014.*	Approvals will be required for onsite wastewater management systems that accept black and greywater from ablutions. These approvals are obtained from Department of Health.
Soil Conservation and Land Utilisation Act (NT) 1969	This Act provides for the prevention of soil erosion, and for the conservation and reclamation of soil, and requires Erosion and Sediment Control Plans (ESCPs) for development projects.
Territory Parks and Wildlife Conservation Act (NT) 2014	Amongst other things, applies statutory obligations in relation to the protection of flora and fauna. Under the Act, the taking or interfering with wildlife that is listed as threatened requires approval at the Ministerial level.
Transport of Dangerous Goods by Road and Rail (National Uniform Legislation) Act 2010 and Regulations (2011)	Provides for the transport of dangerous goods by road or rail, and for related purposes.
Water Act and Regulations (NT) 1992	The Act allows for the declaration of beneficial uses and Water Control Districts. The Project is located within the Tennant Creek Water Control District. Water control districts are areas identified as requiring improved management of water resources. There are no declared beneficial uses, within or adjacent to the Project area. A permit is required to abstract groundwater in a water control district.
Waste Management and Pollution Control Act and Regulations (NT) 1998	The Act provides for the protection of the environment through encouragement of effective waste management and pollution prevention and control practices.
Weeds Management Act (NT) 2001	Occupiers of land (including mine sites) have an obligation to ensure listed weeds are not introduced or spread.
Work Health Safety (National Uniform Legislation) Act and Regulations (NT) 2011	The Act establishes a duty to identify and manage risks to health and safety of workers, including providing safe facilities, first aid, emergency plans, personal protective equipment, managing risks from airborne contaminants, hazardous atmospheres, storage of flammable or combustible substances, hazardous work. The Act contains specific requirements for remote or isolated work, which will apply. Notification to WorkSafe NT is required if hazardous chemical volumes stored on site exceed manifest quantities.

3.2 Non-statutory obligations

3.2.1 Air quality

- *Greenhouse Gas Emissions – Management for New and Expanding Large Emitters* (DEPWS, 2021).
- *Northern Territory's Offsets Framework including Principles, Policies and Guidelines* (DEPWS).
- *National Environment Protection (Ambient Air Quality) Measure* (NEPC, 1998).

3.2.2 Land management

- *Best Practice Erosion & Sediment Control* (IECA, 2008).
- *Land clearing guidelines, Northern Territory Planning Scheme* (DEPWS, 2021).
- *National Environment Protection (Assessment of Site Contamination) Measure* (NEPC, 1999).
- *Northern Territory Contaminated Land Guideline* (NT EPA, 2017).
- *NT Weed Management Handbook* (DEPWS, 2016)
- *Tennant Creek Regional Weeds Strategy 2021-2026* (DEPWS, 2021).

3.2.3 Mine closure

- *Integrated Mine Closure, Good Practice Guide, 2nd Edition* (ICMM, 2019).

3.2.4 Sustainable mining

The Australian Government, Department of Industry, Innovation and Science (now the Department of Industry, Science and Resources), in co-operation with private industry and state/territory partners has developed a series of *Leading Practice Handbooks* for sustainable mining. These will be referenced in mine planning and design, with details provided in the EIS where relevant.

In 2021, the Australian minerals industry adopted Towards Sustainable Mining (TSM), a globally recognised accountability framework which supports minerals companies evaluate, manage and communicate their site-level sustainability performance. TSM in Australia is administered by the Minerals Council of Australia (MCA). Implementation of TSM is being rolled out in a phased process, with external verification of self-assessments and publication of company ratings anticipated to occur in 2026.

3.2.5 Waste characterisation

- *Global Acid Rock Drainage Guide* (INAP, 2014).
- *Environmental Assessment Guidelines - Acid and metalliferous drainage* (NT EPA, 2013).

3.2.6 Tailings management

- *Guidelines on Risk Assessment* (ANCOLD, 2022).
- *Guidelines on Tailings Dams - Planning, Design, Construction, Operation and Closure* (ANCOLD, 2019).
- *Tailings Management: Good Practice Guide* (ICMM, 2021).

3.2.7 Water management

- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality (*ANZG, 2018*).*
- *Australian Drinking Water Guidelines* (National Health and Medical Research Council, 2011).
- *Northern Territory Land Sustainability Guidelines* (DIPL, 2020).
- *Code of Practice for Wastewater Management and Guidance notes* (Northern Territory Department of Health, 2020).
- *Guidelines for preventing mosquito breeding sites associated with mining sites* (Department of Health and Families, 2005).
- *Water Accounting Framework for the Australian Minerals Industry* (Minerals Council of Australia, 2014).

3.2.8 Cyanide management

- *International Cyanide Management Code for the Manufacture, Transport and Use of Cyanide in the Production of Gold* (International Cyanide Management Institute).

3.2.9 Community and economy

- *Social Impact Assessment Guideline* (NSW Government, 2023).
- *Guidelines for the preparation of an Economic and Social Impact Assessment* (NT EPA, 2013).
- *Quality Assurance Standard for Community and Stakeholder Engagement* (IAP2, 2015).
- *Guidance for Proponents - Stakeholder Engagement* (NT EPA, 2019).

3.2.10 Codes and Standards

- AS/NZS 4360:2004 *Risk management*.
- AS 3833:2007 *Storage and handling of mixed classes of dangerous goods*.
- AS 1940:2017 *Storage and handling of flammable and combustible liquids*.
- AS 2187:2006 *Explosives - Storage and use.*
- *National Code of Practice for the Storage and Handling of Workplace Dangerous Goods* [NOHSC:2017(2001)].
- SAA/SNZ HB76:2010 *Dangerous Goods – Initial Emergency Response Guide*.
- Storage and Handling of Dangerous Goods: National Standard for Storage and Handling of Workplace Dangerous Goods [NOHSC:1015(2001)].

3.3 Principles of Environment Protection and Management

The proposal has applied the principles of environment protection and management (Part 2 of the EP Act), and Section 43 general duty on proponents. Details of this are provided in Table 3-2.

Table 3-2. Checklist of EP Act Sections 42 and 43 requirements

Section 43 General duty	Comment
Have the following principles of ecologically sustainable development been taken into consideration in the design of the proposed action?	
Decision-making principle	*Section 18 EP Act:* *(1) Decision-making processes should effectively integrate both long-term and short-term environmental and equitable considerations.* *(2) Decision-making processes should provide for community involvement in relation to decisions and actions that affect the community.* **Yes**. The Project has considered both short and long-term impacts and benefits, including impacts during construction, operation, and closure (section 5). Castile held community forums in July 2023 to present details of the Project to the community and discuss any concerns or feedback that was raised. Castile is committed to undertaking ongoing consultation and working closely with relevant stakeholder throughout all Project stages.
Precautionary principle	*Section 19 EP Act:* *(1) If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.* *(2) Decision-making should be guided by:* *a) a careful evaluation to avoid serious or irreversible damage to the environment wherever practicable; and* b) *an assessment of the risk-weighted consequences of various options.* **Yes**. This assessment is based on both existing information and studies undertaken specifically for the Project by suitably qualified professionals. Where information is unknown or sufficient detail to make an assessment is not yet available, the precautionary principle has been adopted. For example, mitigations for some potential water drawdown impacts or potential waste rock impacts are not yet finalised, therefore impacts have been assigned a higher level of significance (section 5).
Principle of evidence-based decision-making	*Section 20 EP Act:* *Decisions should be based on the best available evidence in the circumstances that is relevant and reliable.* **Yes**. This assessment is based on both existing information and studies undertaken specifically for the Project by suitably qualified professionals. Where information is unknown or sufficient detail to make an assessment is not yet

Section 43 General duty	Comment
	available, additional studies will be undertaken, by suitably qualified professionals to address information gaps.
Principle of intergenerational and intergenerational equity	*Section 21 EP Act: The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of present and future generations.* **Yes**. The Project aims to improve the community and environment, by providing benefits to local communities. The Project is committed to working with the local community and training providers to prioritise local employment and develop an industry that provides social and economic benefits to the region, and NT more broadly.
Principle of sustainable use	*Section 22 EP Act: Natural resources should be used in a manner that is sustainable, prudent, rational, wise and appropriate.* **Yes**. Castile intends to use battery to power the mining fleet, and solar energy for equipment e.g., pumping infrastructure.
Principle of conservation of biological diversity and ecological integrity	*Section 23 EP Act: Biological diversity and ecological integrity should be conserved and maintained.* **Yes**. Ecological assessments have been undertaken for the Project to inform the development (section 5). The Greater Bilby was recorded in the Project area and Castile have committed to undertaking further assessments to determine appropriate measures to avoid and minimise impacts to these species. Further information is provided in section 5.3.3.
Principle of improved valuation, pricing and incentive mechanisms	*Section 26 EP Act:* *(1) Environmental factors should be included in the valuation of assets and services.* *(2) Persons who generate pollution and waste should bear the cost of containment, avoidance and abatement.* *(3) Users of goods and services should pay prices based on the full life cycle costs of providing the goods and services, including costs relating to the use of natural resources and the ultimate disposal of wastes.* *(4) Established environmental goals should be pursued in the most cost-effective way by establishing incentive structures, including market mechanisms, which enable persons best placed to maximise benefits or minimise costs to develop solutions and responses to environmental problems.* **Yes**. This referral documents the lifecycle of the Project, including management of waste through the Project.
Have the following management hierarchies been taken into consideration in the design of the proposed action?	
Environmental decision-making hierarchy	*Section 26 EP Act:* *In making decisions in relation to actions that affect the environment, decision-makers, proponents and approval holders must apply the following hierarchy of approaches in order of priority:* *a) ensure that actions are designed to avoid adverse impacts on the environment;* *b) identify management options to mitigate adverse impacts on the environment to the greatest extent practicable;* *c) if appropriate, provide for environmental offsets in accordance with this Act for residual adverse impacts on the environment that cannot be avoided or mitigated.* *In making decisions in relation to actions that affect the environment, decision-makers, proponents and approval holders must ensure that the potential for actions to enhance or restore environmental quality is identified and provided for to the extent practicable.* **Yes**. Project design has been, and will continue to be, informed by results of due diligence assessments and further studies. Castile is committed to ensure impacts are within an acceptable level (section 5).
Waste management hierarchy	*Section 26 EP Act:*

Section 43 General duty	Comment
	(1) In designing, implementing and managing an action, all reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment. *(2) For subsection (1), waste should be managed in accordance with the following hierarchy of approaches in order of priority:* *a) avoidance of the production of waste;* *b) minimisation of the production of waste;* *c) re-use of waste;* *d) recycling of waste;* *e) recovery of energy and other resources from waste;* *f) treatment of waste to reduce potentially adverse impacts;* g) *disposal of waste in an environmentally sound manner.* **Yes.** This referral documents how the Project will manage generated waste. Castile is committed to implementing recycling processes and disposing of any unavoidable waste in a sustainable manner.
Other Section 43 considerations	
Have communities that may be affected by the proposed action been provided with information and opportunities for consultation?	Castile has undertaken engagement with the CLC, Major Projects (NT Government) and Tenant Creek Station. Castile delivered community forums in mid-2023. The forums presented an opportunity for Castile to inform the local community and seek comment on the Project. Most feedback raised during these forums related to potential employment and business opportunities. Castile will continue to engage with the CLC and local communities, to provide regular updates of Project status and address any community questions or concerns.
Has consultation with affected communities, including Aboriginal communities' been undertaken in a culturally appropriate manner?	The mid-2023 Community forums were delivered following consultation with the CLC. The forums included a presentation and appropriate time for discussions and questions during the session. All engagement with Aboriginal communities will continue to be undertaken in a culturally appropriate manner throughout all Project stages.
Has community knowledge and understanding (including scientific and traditional knowledge and understanding) of the natural and cultural values of areas that may be impacted by the proposed action been sought and documented?	Castile has engaged with the CLC and the Karlantijpa South Aboriginal Land Trust and will incorporate traditional knowledge and views where relevant. This engagement, the Community forums, and all future engagement will collect and document traditional knowledge relevant to the Project.
Have Aboriginal values and the rights and interests of Aboriginal communities' been addressed in relation to areas that may be impacted by the proposed action?	Castile will work with CLC to ensure the Aboriginal communities maintain access long-term to areas of value. Ongoing consultation will ensure the Project does not impact the values, rights, and interests of the local community and the region more broadly.

4 CONSULTATION

4.1 Stakeholders

The *EP Act 2019* requires proponents to engage with stakeholders who may be affected by their proposal and to support these communities and the public to understand the potential impacts and benefits of a proposed action. The *NT EPA's Stakeholder Engagement and Consultation Guidance for Proponents (2021*) recognises that stakeholder consultation is an important component of social, cultural and health impact assessments, over and above formal opportunities for feedback on documents placed on public exhibition.

The Project stakeholders include:

- Local community, services and businesses.
- Aboriginal trusts, Land Councils and Authorities:
    - Karlantijpa South Aboriginal Land Trust
    - Central Land Council
    - Aboriginal Areas Protection Authority (AAPA).
- Government:
    - Northern Territory Environment Protection Authority
    - Department of Industry, Tourism and Trade
    - Department of Environment, Parks and Water Security
    - Department of Climate Change, Energy, the Environment and Water.
- Private entities and corporations:
    - Tennant Creek Station (NT Parcel 494 - Perpetual pastoral lease)
    - APA Group (owner and operator of the Amadeus Gas Pipeline)
    - Aurizon Holdings Limited (owner and operator of the railway)
    - Port Darwin
    - Airport Development Corporation Pty Ltd
    - Capiteq Pty Ltd trading as Air North.

Castile has received letters of support from multiple local community services and businesses based on previous operations in the region, including from:

- Barkly Region Sport Education for Castile's contributions to the Barkley Region Sport Education program.
- Returned Services League (RSL) Australia - Tennant Creek Sub-branch NT Incorporated for Castile's ongoing support.

4.1.1 Central Land Council

Castile currently holds a signed deed for exploration activities with the CLC. This deed describes the pathway for converting the Rover 1 Project exploration leases to a mining lease, including the requirement for a mining agreement with the CLC. A commitment includes the requirement to form a Development Review Committee, with representation from the CLC, Traditional Owners and Castile.

4.1.2 Tennant Creek Station

Castile has verbally secured permission to access the Project area via NT Parcel 494 and is working closely with the landowner to document this, and any conditions in writing.

4.2 Stakeholder engagement

Castile has developed a *Stakeholder Engagement Register* and will develop and implement a *Stakeholder Engagement Plan* in mid-2023. Preliminary discussion with Government agencies, and the CLC have commenced.

4.2.1 Community forums

On Wednesday 12 July 2023, Castile presented at two meetings to the CLC and other stakeholders, in Tennant Creek. The purpose of the meetings was to update local stakeholders of the progress made over the past year and the work being done to advance the Project.

Questions raised heavily focused on future employment opportunities that will be available from the Project and the need for a supporting local workforce. Discussions were held around the use of the outstations for people to reside in whilst working at Rover 1.

On Wednesday 12 July 2023 Castile also presented the Tennant Creek Chamber of Commerce an update on the Rover 1 Project. The Chamber of Commerce meeting coincided with the Tennant Creek Show, resulting in people travelling into town from surrounding regions. The same presentation was given as at the CLC meetings. Questions here mainly focused on the business-to-business dealings that were being considered for local business.

4.2.2 Future engagement

Castile is committed to undertaking ongoing consultation throughout all stages of the Project. As noted above, Castile will implement a *Stakeholder Engagement Plan* that will guide ongoing consultation activities. Castile will provide copies of this referral report directly to key stakeholders and will be available for meetings to discuss any concerns or feedback that will be incorporated into the ongoing EIS process.

5 ENVIRONMENTAL FACTORS

5.1 Overview

The NT EPA has developed a framework for the assessment of environmental impact, which uses 14 environmental factors, categorised under five themes of Land, Water, Sea, Air and People, to provide a systematic approach to organising environmental information and to establish environmental objectives against which proposals will be assessed. The objective for each factor reflects the expected outcomes for these parts of the environment and provides an indicator against which to assess whether impacts from a proposal are likely to be significant[1].

Pre-referral screening undertaken of the Project by EcOz Environmental Consultants determined that the Project has potential to impact six of the 14 environmental factors. A copy of the pre-referral screening report is presented in Appendix A.

Table 5-1 provides details of the factors that were selected for further assessment either because the environmental values associated with the factor may be significantly impacted, or because there is insufficient information to conclude that they will not be.

Table 5-2 provides details of the factors that were excluded from further assessment because there is a high level of confidence that environmental values associated with that factor will not be significantly impacted.

Table 5-1. Environmental factors and site-specific valued components assessed in this referral

Theme	Factor	Environmental Objective	Site-specific values
Land	Terrestrial environmental quality	Protect the quality and integrity of land and soils so that environmental values are supported and maintained	Soil integrity Soil quality
	Terrestrial ecosystems	Protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning	Vegetation and habitats Threatened species
Water	Hydrological processes	Protect the hydrological regimes of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained	Groundwater levels and discharges
	Inland water environmental quality	Protect the quality of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and enmity of people are maintained	Groundwater quality
People	Community and economy	Enhance communities and the economy for the welfare, amenity and benefit of current and future generations of Territorians	Community Access Livelihoods
	Culture and heritage	Protect sacred sites, culture and heritage	Archaeological sites Aboriginal sacred sites Culturally significant areas

[1] As defined by Section 11 of the Environment Protection Act 2019, a significant impact is: an impact of major consequence having regard to the context and intensity of the impact; and sensitivity, value and quality of the environment impacted on and the duration, magnitude and geographic extent of the impact.

Table 5-2. Environmental factors not assessed in this referral

Theme	Factor	Reasons why not assessed
Land	Landforms	There are no significant or unique landforms in the Project area (such as caves, scarp, rocky outcrop or sink holes)
Water	Aquatic ecosystems	There are no permanent surface water features within or close to the Project area. There is no riparian vegetation nearby, and there is no expectation of either aquatic or terrestrial GDE's in the Project area
Sea	Costal processes	The Project is located 70 km southwest of Tennant Creek in central Northern Territory which is approximately 550 km from the nearest marine environment.
	Marine environmental quality	
	Marine ecosystems	
Air	Air quality	The Project will produce dust emissions (particulate matter), and nitrogen dioxide and sulphur dioxide from the burning of fossil fuels. These emissions are not of a magnitude that would alter air quality at the nearest residential receptor, as the Project area is remote, located 26 km from the nearest community. The rail siding is located south of the Tennant Creek township. Product to be transported to Darwin will be containerised. There is a high level of confidence that the Project will comply with the National Environment Protection (Ambient Air Quality) Measure will be used to evaluate performance.
	Atmospheric processes	An initial greenhouse gas assessment has been completed which indicates that the Project is unlikely to trigger the NT Government (DEPWS) Large Emitters Policy.
People	Human health	The Project area is remote, located 26 km from the nearest community and there are no sensitive land uses being undertaken in surrounding areas. Mine site noise and dust emissions are unlikely to be measurable at the nearest community. While not intended, it is noted that there is potential for groundwater or surface water contamination to occur, however, any such occurrence is unlikely to affect human health as there are no consumptive uses occurring in the area.

The six environmental factors that may be impacted are discussed in further detail in subsequent sections of this referral report. For each factor, the following steps were undertaken:

1. Site-specific values were identified and described using desktop and field-survey data where available.
2. Sources and pathways for impacts to occur to these values were identified considering the Project activities described in section 2.4. Potential impacts were identified and assessed.
3. The environmental decision-making hierarchy was applied to identify options to avoid and mitigate impacts.
4. The significance of residual impacts was assessed having regard to the context and intensity of the impact; and the sensitivity, value and quality of the environment impacted on and the duration, magnitude and geographic extent of the impact.

The criteria used to rate residual impacts is shown in Table 5-3. The results of the impact assessment are preliminary. Castile is referring the Project as a Proponent Initiated EIS and therefore is committing to undertaking further studies and impact assessment as part of the EIS process. The results were used to inform

the preparation of the Draft Terms of Reference (TOR) and Statement of Reasons (SOR) submitted with the referral.

Table 5-3. Residual impact ratings

High	Moderate	Low
A high impact generally has two or more of the following characteristics: **Scale:** Regional/ Widespread **Magnitude:** Moderate/Major **Duration**: Long-term/Permanent There are sensitive values or receptors present. Impacts are difficult or impracticable to avoid or mitigate, or there is a high degree of uncertainty. A high residual impact has potential to be significant.	A moderate impact generally has two or more of the following characteristics: **Scale:** Localised/Regional **Magnitude:** Moderate **Duration:** Medium-term/Long-term There are sensitive values or receptors present, but impacts can be effectively avoided or mitigated with a high degree of certainty. A moderate residual impact is unlikely to be significant subject to effective mitigation.	A low impact generally has two or more of the following characteristics: **Scale:** Limited/Localised **Magnitude:** Negligible/Minor **Duration:** Short-term/ Medium-term/Reversible. There are not sensitive values or receptors present. There is a high degree of certainty, and the impact is managed using routine measures that are proven effective. The impact is not significant.

5.2 Terrestrial environmental quality

The NT EPA's objective for Terrestrial environmental quality is to:

'Protect the quality and integrity of land and soils so that environmental values are supported and maintained.'

The sections below identify the land and soils values that occur within and surrounding the Project area and assess the potential impacts of the Project on these values and the NT EPA's objective.

5.2.1 Environmental values

The information for this section is primarily derived from the *Ecological Assessment* report (EcOz, 2022 - Appendix B) and the *Geochemical Characterisation of Waste Rock and Ore* report (EGi, 2022 – Appendix C).

Landform and soils

The Project area occurs within the Singleton land system, which comprises desert sandplains - an extensive land system in the Tanami region. Landform is gently undulating spinifex sandplain and soils comprise red sands and red clayey sands. There are no mapped land units in the Project area.

Erosion potential

In general, the Project area consists of largely undisturbed flat to gently undulating surfaces with slopes of 1% or less (EcOz, 2022). The potential for erodibility is therefore considered low.

Existing and past land use

The current condition of the Project area is largely undisturbed except for a small (approximately 15 ha) exploration camp that has been used by Castile and its predecessor Metals X since the early 2000's. The soil supports open shrubland with spinifex grass and patchy areas of open low trees, which in turn supports reptile, small mammals and bird biodiversity. Given the land is largely undisturbed, there is unlikely to be any significant contamination.

Waste rock and ore characteristics

The ore and waste rock materials that will be bought to the surface by mining activities have been subject to geochemical characterisation to determine whether they pose a risk of AMD, NMD or saline drainage. To date, geochemical characterisation has been completed on 110 representative samples of drill core collected during the 2021 drilling program (EGi, 2022). The test results indicate that some of the mined materials are likely to be problematic in terms of AMD, NMD or saline drainage risk and will therefore require specific management to minimise this risk. The preliminary findings of waste rock characterisation work to date are summarised below:

- The mine waste material from the Wiso Basin at shallow depths of up to approximately 60 m is expected to be highly weathered and contain relatively high dolomitic content. As such, the five samples representing this type of material had high acid neutralising capacity (ANC) and were all classified as NAF.
- The samples representing material collected from grater depths were generally all fresh materials. The total sulfur content in these samples varied from 0.01% (the laboratory limit of detection) to over 5%. Potentially acid producing sulfidic sulfur was the predominant species of sulfur in the samples. The ANC values of the tested samples also varied.
- 75% of the magnetite ironstone samples were reported as either NAF-HS (non-acid forming - high sulfur), PAF, or PAF-LC (potentially acid forming - low capacity). Up to 70% of sandstone, greywacke and siltstone samples were classified as PAF or PAF-LC, suggesting that mined wastes from these lithologies may also be problematic. Over 50% of the samples from other lithotypes (mudstone, vein, felsic volcanic and shale) were NAF. However, the sample numbers are limited at present.
- A large portion of the materials that were tested for multi-element composition were significantly enriched with bismuth (82% of the 39 samples tested), iron (82%), cobalt (67%), copper (62%), molybdenum (54%) and arsenic (46%). The deionised water extraction results indicated that most of the tested samples are not expected to pose a risk to the environment in terms of AMD, NMD or saline drainage when they are exposed to atmospheric conditions over a short period of time. However, as shown by the peroxide extraction results, if sulfides in these samples are oxidised, the PAF materials will generate large amounts of acidity, which will result in low pH with elevated concentrations of sulfate and a number of minor trace elements, while the NAF-HS materials may also generate NMD with high salinity. Concentrations of aluminium ranged from 1.2 to 3 mg/L indicating the presence of soluble aluminium containing phases in these materials.

Values that are supported by land and soils

Intact soils are valued because they minimise off site impacts from mining activities (associated with erosion and sedimentation) and support successful rehabilitation and post-mining land uses. Mining land uses make soils susceptible to erosion, and when erosion occurs, it can affect surface water quality and cause sedimentation that affects aquatic ecosystems and archaeological heritage values. Intact soils support rehabilitation success and protect the long-term integrity of post-mining landforms.

Clean (uncontaminated) soils are valued because they minimise offsite impacts to water quality and support successful rehabilitation and post-mining land uses. Soil contamination can result in runoff or seepage of contaminants to surface water and groundwater and can limit rehabilitation success and future land use options.

5.2.2 Potential impacts

The impact assessment process identified the following potential impacts to land and soils from the Project activities:

- Soil erosion
- Soil contamination

- Oxidation of waste rock or tailings.

Soil erosion

Land clearing and earthworks, and changes in existing drainage has the potential to impact soil integrity, cause erosion and dispersion of sediment to surface water. Soil erosion is likely to occur during construction, operations and post closure. The key pathways for soil erosion to occur are due to vegetation removal/ground disturbance, dust emissions, placement of dispersive waste rock in mining landforms, and instability of the landforms that remain post closure.

Erosion is likely to affect isolated areas around access tracks and other cleared areas where soil loss will occur due to dust emissions during the dry season and when surface water runoff is concentrated during wet season rainfall events.

Placement of dispersive waste rock materials in the WRD landform and/or use of that material for construction purposes has potential to cause erosion. Dispersive materials are not suitable for placement on the outer annulus of the WRD and should not be used to construct any part of a landform that will be exposed to erosion by wind or rainfall. As it is standard practice to undertake geotechnical assessment of materials used in engineered mining landforms, the erosion hazard associated with inappropriate materials placement is expected to be limited.

Contamination of soils

Soil contamination could occur by the accidental release of hazardous materials or wastes to the environment. Potential sources of contamination will include the processing plant, power station, water and wastewater treatment plant, and areas where hazardous materials are stored for example the warehouse and fuel storage.

Oxidation of waste rock or tailings

A portion of the waste rock (and potentially tailings) will be acid forming, which may result in the leaching of metals and soil and/or groundwater contamination. There is currently insufficient data to understand the potential for AMD and NMD. Additional geochemical studies are underway/planned, including kinetic testing to fully characterise the waste rock. The characterisation of tailings will commence in late 2023, once the pilot plant is operating.

5.2.3 Environment protection and management

The policies, guidelines codes and standards identified in section 3.2 of this referral report will be adopted to reduce and manage potential impacts to terrestrial environmental quality.

Erosion management

To avoid erosion, controls will be implemented to minimise the amount of vegetation clearing that takes place. This includes setting out limitations on clearing areas outside the proposed Project area, staging clearing to limit the areas of exposed soils at any given time, using existing access tracks and disturbances, and not clearing during the wet season.

An Erosion and Sediment Control Plan (ESCP) will be developed to establish the minimum requirements and detail the guiding principles for the site-specific ESCPs required, which will include drainage, erosion and sediment controls to be installed and maintained. The site-specific ESCP will align with the International Erosion Control Association (IECA) *Best Practice Erosion & Sediment Control* (IECA, 2008) and will be developed by a certified professional in erosion and sediment control or suitably qualified person prior to clearing and implemented during clearing and construction.

Waste rock management

As described in section 2.4.6, Castile will permanently dispose of waste rock in one of two ways. Preferentially, PAF material will remain underground and be backfilled to mined out stope voids. Upon cessation of mining activities, dewatering of the underground will stop, and the underground workings will be allowed to flood with groundwater. Modelling is required to understand the length of time water will take to rebound, and geochemical properties of waste rock and potential for acid generation under both unsaturated and saturated conditions. Solute modelling will be undertaken to determine any potential for migration of contaminants offsite in groundwater.

The characterisation and management of waste rock will be documented in a Waste Rock Management Plan (WRMP) as is standard practice for mining projects. The WRMP will describe training and other administrative measures to mitigate the potential for impacts from AMD, NMD or saline drainage.

Above ground, to minimise the potential for AMD, NMD or saline drainage, the WRD and TSF will be designed by an appropriately qualified engineer in accordance with accepted industry guidelines and standards (INAP, 2014; Commonwealth of Australia, 2016). The landform designs and closure strategies will be informed by detailed waste rock and ore characterisation studies to complement the preliminary studies already undertaken (EGi, 2022). Further confirmation of problematic materials volumes and the availability of suitable material to encapsulate the waste will occur during the mine planning. A PAF cell will be constructed, housed within the WRD to reduce the potential seepage to the soil below. Blending of PAF materials at the surface, with NAF from the box cut/upper decline (with higher neutralising capacities), will be undertaken prior to encapsulation.

Highly decomposed NAF clay materials are to be used to construct an impermeable base beneath the WRD and for providing a landscaped cap during rehabilitation and closure with the view to minimize ingress of oxygen and infiltration of rain.

The WRD design and construction will meet the standards required for a landform that could exist in perpetuity. For closure, Castille proposes that the entire outer zone of the dump comprises only NAF material to ensure any surface runoff does not contact PAF material. Given the prevailing climatic conditions, it is considered that a Store and Release cover system would be appropriate to reduce AMD, NMD or saline drainage. The placement of a store and release final cover will minimise the potential for significant rainfall to penetrate down into the dump over the long term, and therefore limit the volume of seepage at the base of the dump to the extent that it can be readily assimilated into the soil (and downstream environment) without significant impact.

More sampling and testing are planned/underway, including but not limited to:

- Potential for NMD or saline drainage from box cut and upper decline materials at the WRD.
- Geochemical kinetic field tests to verify the potential for acid formation and the sulfide oxidation rates of the materials classifying as PAF including those that fall within the zone of uncertainty.
- Characterisation tailings and quality of waste streams. Samples will be collected from the metallurgical pilot plant, anticipated in quarter 4, 2023.
- Surface storage and saturated conditions simulating leaching of previously oxidised materials used for backfilling and following inundation after groundwater rebound.

The data will be used to inform monitoring and management measures and refine calculations of waste volumes.

Tailings management

The TSF will be designed, constructed and operated and built in accordance with ANCOLD guidance (ANCOLD 2019, 2022), the ICMM *Tailings Management: Good Practice Guide* (ICMM, 2021) and Commonwealth Government guidance (Tailings Management - Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth of Australia, 2016).

Tailings will be neutralised using lime, prior to placement in the TSF or underground mined out stope voids. Tailings produced at the processing plant will be transferred to the paste plant via pipeline, thickened and if

they are to be deposited underground, cement will be added to improve structural integrity. Alternatively, tailings will be air dried and stacked at the TSF.

The cyanide remaining in tails streams from the processing plant is potentially hazardous. Cyanide used in processing will either be recovered at the plant and reused where possible or be destroyed. Castile is currently investigation the different options for cyanide destruction available and compatibility with the processing flowsheet. Activities relating to cyanide will be consistent with the Principles and Standards of Practice described in the Code.

The *Cyanide Code (the Code*) is a voluntary, performance driven program of best practices for the management of cyanide in gold and silver mining. The objective of the Code is to improve the management of cyanide used in gold and silver mining and to enhance protection of human health and the reduction of environmental impacts from inadvertent releases or exposures to the chemical. Based on Principles and Standards of Practice, the Code provides a management system for the safe management of cyanide throughout its use cycle, including production, transport, handling use recycling and disposal of the chemical at the mine site. Cyanide will be delivered to site in isotainers of dry sodium cyanide pellets.

Contaminated sites assessments and remediation

Upon completion of mining, or where progressive remediation of disturbed land is possible, Castile will undertake an assessment for soil contamination. The outcomes of the assessment will inform the remediation strategy and will consider the potential for bioaccumulation in edible plant species. All assessments will be carried out in accordance with the *National Environment Protection (Assessment of Site Contamination) Measure* (NEPC, 1999).

Mine closure and rehabilitation

A conceptual Mine Closure Plan (MCP) will be submitted to the NT EPA as part of the EIS process. The conceptual MCP will identify the measures that will be taken to decommission infrastructure and address any residual soil contamination and minimise erosion to ensure the long-term stability of the post-mining landforms.

A detailed MCP will be submitted with the Rover 1 Project Mining Management Plan (MMP) and will be subject to review and approval under the *Mining Management Act*. As part of the MCP, the WRD and TSF landforms will require long-term monitoring to ensure their structural integrity is maintained, minimising the generation and release of AMD, NMD or saline drainage. The MCP will be consistent with:

- *Integrated Mine Closure, Good Practice Guide*, 2nd Edition (ICMM, 2019).
- *Mine Closure - Leading Practice Sustainable Development Program for the Mining Industry* (Commonwealth of Australia, 2016).
- *Mine Closure Plan Guidance - How to prepare in accordance with the Statutory Guidelines* (DMIRS, 2020).

Hazardous materials management

The MMP will include provisions for the management and mitigation of risk, such as:

- storage, handling and disposal requirements in line with relevant legislative requirements, Australian Standards and guidelines
- inductions and training for the storage, handling and disposal of hazardous materials. An Emergency Response Plan will be in place and employees inducted in its application
- spill containment and response procedures
- absorbent and containment material (e.g., absorbent matting) and neutralising material will be available where hazardous materials are used and stored, and personnel trained in correct use
- a qualified person will be appointed as Site Safety Adviser and will have on-site a set of all relevant MSDS for hazardous materials

- inspection of storage areas, including bunding and maintenance
- waste management practices including consideration of waste hierarchy.

5.2.4 Residual impact

The Project is likely to have a moderate level of residual impact to land and soils inside the boundaries of the MLs, however, impacts to land and soils are unlikely to extend outside of the ML boundaries.

Erosion and soil loss can be reduced and managed by engineering the design of mining landforms in accordance with accepted standards and guidelines, geotechnical testing to confirm the suitability of construction materials, implementing ESCP's that meet the IECA Guidelines and good practice closure and rehabilitation. These measures are expected to be effective in limiting erosion to within the ML and reducing the potential for significant offsite impacts.

Soil contamination can be avoided and mitigated by ensuring onsite storage of chemicals and waste materials is in accordance with Australian Standards, and an Emergency Response Plan is in place to limit the environmental impact of spills/leaks when they occur. These measures are expected to be effective in limiting the potential for large contamination events, and offsite impacts.

Oxidation of waste rock materials can be minimised by proper identification and management of problematic materials. There is some uncertainty with respect to the geochemical properties and quantities of waste rock that will be mined. The available data indicate a portion of waste rock mined will be PAF and will require stringent management to prevent soil (and groundwater) contamination. Problematic materials should be managed by selective placement in accordance with the WRMP.

Uncertainties in relation to the longer-term risk of AMD, NMD or saline drainage will be resolved through further testing. The WRMP will subsequently be submitted for regulatory review and approval through the MMP process under the MMA.

Assuming implementation of the above measures, it is concluded that the Project is unlikely to have a significant impact on land and soils beyond the ML and the NT EPA's objective will be met.

5.3 Terrestrial ecosystems

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

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

The sections below identify the terrestrial ecosystem values that occur within and surrounding the Project area and assess the potential impacts of the Project on these values and the NT EPA's objective.

5.3.1 Environmental values

The information for this section was prepared using desktop spatial databases maintained by the NT Government and the findings of two ecological surveys, undertaken in 2022 and 2011 (EcOz, 2022 and 2012), provided as Appendix B and D respectively.

Vegetation and habitats

The Project area occurs within one broad land type - a flat to gently sloping spinifex sandplain with Acacia shrubs (variable structure; mainly *Acacia lysiphloia*) over open-sparse low trees (*Acacia sericophylla* +/- *Hakea macrocarpa*) +/- sparse-scattered emergent trees (*Corymbia opaca, C. aparrerinja*). There are several floristic variations present within this land type, which are mainly associated with the shrub and tree layers (due to fire history, disturbance and/or subsoils). These variations are listed below:

- Sparse shrubs (*Acacia spp.*) with scattered trees (*C. opaca, A. sericophylla*)

- Open tall-shrubs (*A. sericophylla, H. macrocarpa, A. lysiphloia*) +/- sparse trees (*Corymbia spp.*)
- Open mid-shrubs (*A. lysiphloia +/- A. stipuligera, A. adsurgens*)
- Closed patches of shrubs (*A. lysiphloia*) +/- scattered trees (*A. sericophylla, C. opaca*)
- Open-patchy shrubs (*A. ancistrocarpa, A. adsurgens*) +/- sparse trees (*A. sericophylla, C. opaca*)
- Open shrubs (*Melaleuca lasiandra, Acacia spp.*) +/- *A. sericophylla, H. macrocarpa, C. opaca*)
- Tussock grass dominated understorey (mainly *Eragrostis eriopoda, +/- Aristida holathera*).

Examples of vegetation and habitat within the Project area are provided in Figure 5-1, Figure 5-2 and Figure 5-3.

Figure 5-1. Photographs of vegetation and habitat within the proposed decline box cut

Figure 5-2. Photographs of vegetation and habitat within the proposed WRD and decline access

Figure 5-3. Photographs of vegetation and habitat within the proposed Process Plant and ROM pad

Terrestrial fauna

A standard flora and fauna survey comprising six sites was conducted during April 2011. The survey was undertaken in accordance with the following guidelines:

- *Northern Territory Guidelines and Field Methodology for Vegetation Survey and Mapping* (Brocklehurst et al. 2007).
- *Weed Data Collection – A Field Guide for Collecting Weed Data for the NT*.

The 2011 survey recorded a total of 64 flora species. No threatened flora species were identified during the surveys nor were any listed weeds. The survey recorded a total of 76 native fauna species, comprising of no amphibians, 20 reptiles, 48 birds, and 8 mammals. Four introduced species were identified. No Commonwealth threatened species were recorded during the field survey, but one NT listed threatened species was: the Australian Bustard (*Ardeotis australis*) which is listed as Vulnerable (EcOz, 2012). A second survey, undertaken in 2022 found minimal terrestrial fauna in the area (EcOz, 2022).

Threatened species

A desktop threatened species 'likelihood of occurrence' assessment was undertaken to identify which species have a reasonable chance of occurring within the Project area, and those that can be reasonably excluded from further consideration because likelihood of occurrence is inherently low. A total of 27 threatened species were assessed (Appendix E). The Greater bilby (*Macrotis lagotis*) was the only threatened species identified during the desktop review to have a reasonable chance of occurring within the Project area and subsequently, targeted surveys were carried out for this species. The Greater bilby is listed as Vulnerable under the *EPBC Act* and NT *Parks and Wildlife Conservation Act*. Other threatened species that have a 'low' likelihood of occurrence rating were not targeted during field survey; however, the field survey did include habitat suitability checks, and opportunistic surveys (where relevant), to validate the desktop assessment.

The entire Project area supports potential habitat for the Greater bilby (see survey report at Appendix B). No sign was observed within the proposed mine components; however, activities were observed in close proximity to the main access road and the ROM pad, process plant, WRD and decline box cut are all positioned within the foraging area of the found active burrows (i.e. within 1 km) - see Figure 5-4. It is likely that Greater bilby are also present in the surrounding areas, particularly patches of Acacia (*Acacia lysiphloia)* shrubland that were only partially burnt (or not burnt) in the 2017 fire.

Ten migratory bird species were identified in the *EPBC Protected Maters Search Tool* (Appendix F). The Project area is situated within extensive area of desert sandplains, which does not constitute important habitat for any of the migratory birds listed in the PMST and, as such, they are not further considered as part of this assessment (as the inherent risk from the Project on these species is deemed as low). There were no migratory species or habitat observed in the Project area during the surveys.

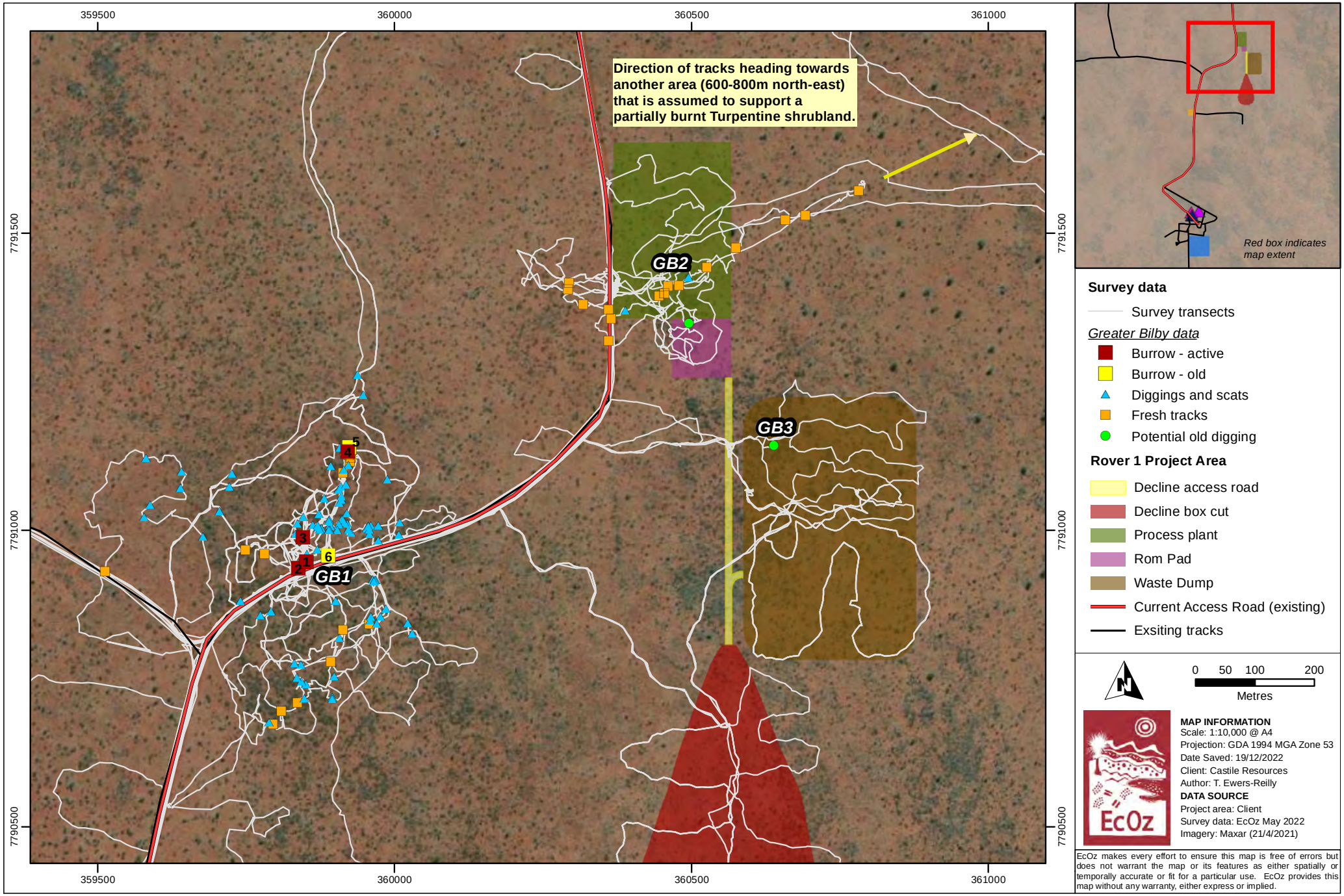

Figure 5-4. Map of Greater Bilby survey data at sites GB1, GB2 and GB3, May 2022

Significant vegetation types

There are no significant vegetation types, (e.g., closed forest, sandsheet heath and vegetation containing large trees with hollows suitable for fauna as defined by the *NT Land Clearing Guidelines*). Two locally important habitat tree species were observed and will be considered when designing the Project to minimise general biodiversity impacts:

- Large Bloodwoods (*C. opaca*) have potential to be hollow bearing; however, no significant hollow-bearing trees were recorded (potentially a consequence of fire history in the area).
- Ghost Gum (*C. aparrerinja*) were also noted within or adjacent to Project components. These trees (when mature) can be considered to hold local / regional biodiversity significance.

There are no groundwater-dependent ecosystems (GDEs) within the Project area. The closest potential GDE (unclassified) is a wetland approximately 10 km to the south-west of the Project area.

The EPBC Act allows for the listing of threatened ecological communities - of which there is only one in the NT, the Arnhem Plateau Sandstone Shrubland Complex. This does not occur within the Project area.

Weeds

The survey identified three weed species – Buffel Grass (*Cenchrus ciliaris*), Birdwood Grass (*Cenchrus setiger*) and Spiked Malvastrum (*Malvastrum americanum*), mostly concentrated at the existing Rover exploration camp with a few isolated occurrences on the edge of existing tracks - see Figure 5-5. No weeds were observed in undisturbed areas, and the majority of the exploration tracks and drill pads did not support weeds at the time of survey. No weed species declared under the *Weed Management Act* were observed during the survey.

Buffel Grass is a Category 3 weed of concern in the *Tennant Creek Regional Weeds Strategy 2021-2026*. This species is present around the edge of the existing exploration camp and assess roads. Infestation level is considered to be high and has likely been present for several years. The extent of the infestation it is currently limited to disturbed areas around the edge of the camp.

5.3.2 Potential impacts

The impact assessment process identified the following potential impacts to Terrestrial Ecosystems from the Project activities:

- Direct loss of vegetation and habitat
- Habitat degradation
- Loss of Greater bilby habitat or individuals
- Mortality of fauna
- Increased competition and predation.

Direct loss of vegetation and habitat

The total area to be cleared is approximately 117 ha. Land clearing will result in the direct loss of vegetation and habitats that are regionally common. There are no high biodiversity values as defined by the *NT Land Clearing Guidelines*, or EPBC listed threatened ecological communities within the Project area. The loss of locally important tree species (Desert bloodwood and Ghost gums) has the potential to reduce suitable habitat for birds and mammals, and will be avoided where possible, but some impact is likely to be unavoidable.

It is noted that a survey of the proposed gas pipeline corridor has not been completed to date, and so the assessment for that area is based on desktop information only. The presence/absence of sensitive receptors within the corridor will be confirmed by field surveys when the corridor alignment is confirmed.

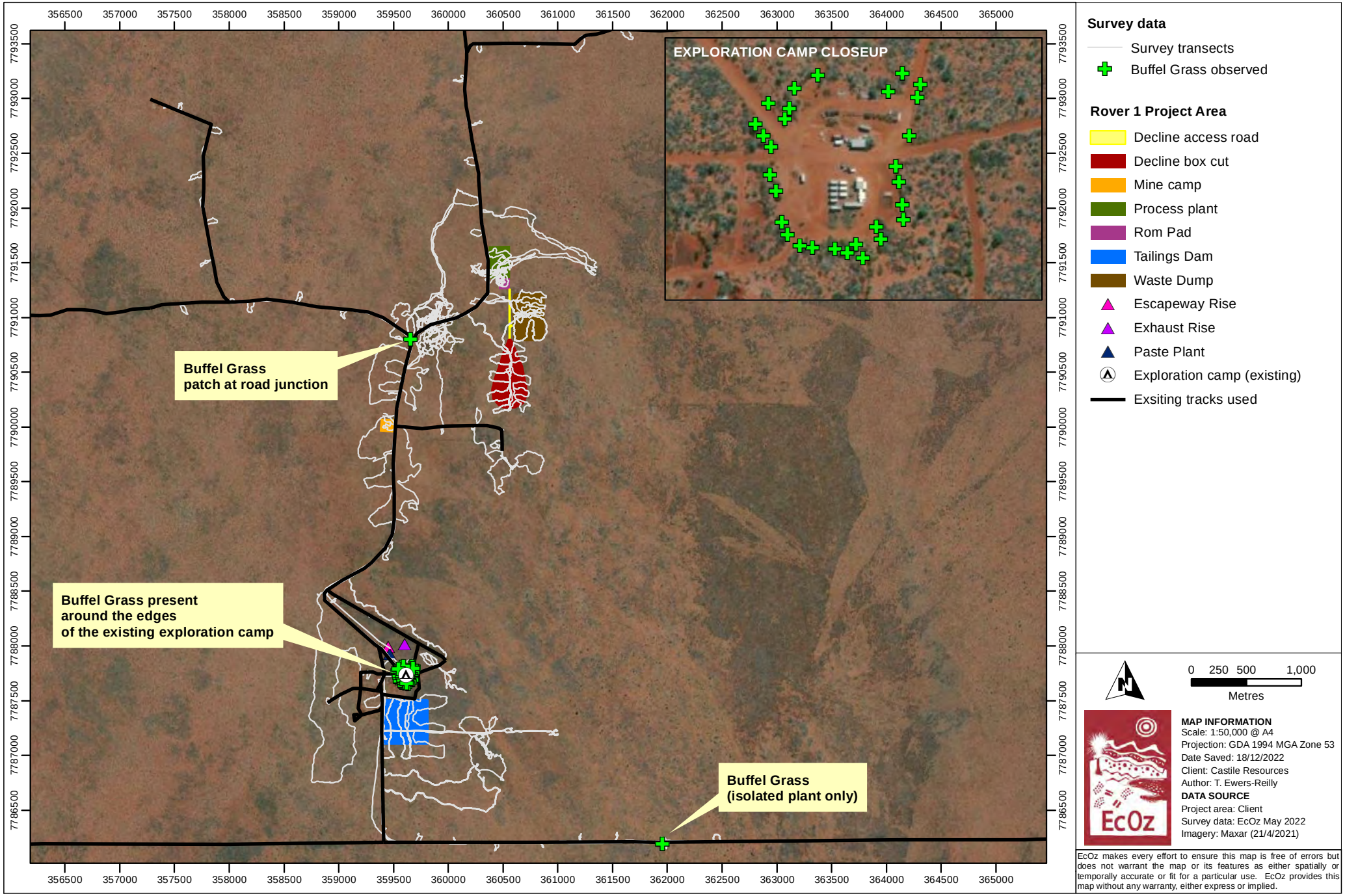

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Figure 5-5. Map of Rover 1 weed survey effort and results, May 2022

Habitat degradation

Habitat degradation is likely to occur around the edges of the mine site due to the combined effects of dust, noise and vibration, weeds and/or pests, bushfire, surface water and groundwater contamination and presence of the workforce. Because of these disturbances, fauna may avoid using the habitats in proximity to the mine site whilst it is operational. It is anticipated that habitat quality will gradually return post-mining as the Project area is rehabilitated, however, if weed infestations occur and are not controlled, there could be a longer-term impact associated with increased frequency and intensity of bushfires.

Loss of Greater bilby habitat or individuals

The loss of 57 ha of potential Greater bilby habitat, individual mortalities and/or increased threat from predators (i.e., cats) has potential to impact the population of this species. The Project area is situated close to the eastern edge of the current Greater bilby distribution, so the recorded occurrence will be classed as an 'important population' under the *EPBC Significant Impact Guidelines 1.1*. The significance of the impact will depend on a range of factors including the regional extent of the habitat, the final mine site footprint, timing of the activities, and the controls that can be implemented to avoid or mitigation impacts to the species. Further assessment is required to consider options to avoid and mitigate impacts to the species, and to determine the significance of residual impacts as part of the EIS process.

Mortality of fauna

Direct mortality of fauna could occur due to collision with vehicles/plant and interaction with contaminated water in the onsite water storages. The highest risk to fauna is during site clearing, when non-mobile or slow-moving species could be killed or injured. During operations it is likely that there will be occasional fauna deaths occur due to collision with vehicles/haul trucks, which will mostly affect larger mobile species such as wallabies but could also affect the Greater bilby as described above. Birds are unlikely to interact with the onsite water storages due to the high level of noise and disturbance occurring around the mine site; however, monitoring will be required and if birds are observed measures implemented to deter them from these areas.

Increased competition and predation

The onsite landfill has potential to attract pest and vermin species if not appropriately sited and managed. Due to the small size of the onsite landfill, it is considered unlikely to attract pests in numbers that would significantly impact fauna populations in general; however, the potential for attracting and increasing the population of feral cats is of concern as they are a threat to the Greater bilby.

5.3.3 Environment protection and management

The following policies and guidelines provide accepted good practice approaches that will be adopted to reduce and manage potential impacts to vegetation and habitat, terrestrial fauna, significant vegetation and threatened fauna:

- *NT Land Clearing Guidelines* (DEPWS, 2021).
- *NT Weed Management Handbook* (DEPWS, 2016).
- *Tennant Creek Regional Weeds Strategy* 2021-2026 (DEPWS, 2021).
- *Recovery Plan for the Greater bilby (Macrotis lagotis)* (DCCEEW, 2023).
- *Biodiversity management - Leading Practice Sustainable Development Program for the Mining Industry* (Commonwealth of Australia, 2016).
- *Threat abatement plan for predation by feral cats* (Commonwealth of Australia, 2015). Available from: http://www.environment.gov.au/biodiversity/threatened/publications/tap/threat-abatement-plan-feral-cats. In effect under the EPBC Act from 23-Jul-2015.

Clearing Plan

Where possible, the clearing of important vegetation and Greater bilby habitat, and large trees (>10 m high), in particular large Ghost gums and Desert bloodwoods will be avoided. Areas to be cleared (and avoided) will be identified in a Clearing Plan and the footprint physically marked. Clearing will be undertaken by experienced operators.

The Clearing Plan will stipulate controls to be implemented to minimise impacts to threatened species, and fauna in general, as a result of clearing. Measures may include:

- limit area of disturbance and where possible, avoid the disturbance of important vegetation and Greater bilby habitat.
- pre-clearance surveys by an ecologist (fauna spotter-catcher), prior to clearing and each morning before clearing commences.
- ensuring an ecologist is present during clearing to relocate wildlife found, or provide advice as required.
- steps to be followed in the event a threatened species is identified during clearing activities.
- checking any trenches/pits/excavations prior to works each morning and relocating any trapped wildlife.

Pre-clearance surveys and use of a fauna spotter-catcher

A pre-clearance survey will be conducted prior to the clearing and development by a qualified ecologist to identify any potential habitat for wildlife. This will include surveying for nests or breeding activity of the Greater bilby.

Greater bilby Management Plan

As part of approvals, it is expected that the Project will require a Greater bilby Management Plan that proposes well informed measures that will be implemented to avoid potential significant impact to the species. This will likely include:

- staff awareness
- road upgrade risk management,
- traffic management/precautions
- fire management
- habitat management and predator control/management.

Additional Greater bilby field surveys will be undertaken by Castile to inform the risk assessment of this Project, with the objective to better understand local activity/occurrence so that appropriate mitigation measures can be proposed.

Weed Management Plan

The introduction and/or spread of weeds will be managed through a Weed Management Plan. This plan will include hygiene and quarantine measures to prevent the introduction of new species to the Project area, prevent the spread of weeds, and will detail control measures for existing weed infestations. Biosecurity quarantine measures will include an inspection of all shipping/freight prior to entry to site. The plan will include weed identification and reporting procedures, monitoring and weed control. Weeds will be controlled as prescribed in the *Northern Territory Weed Management Handbook* (DEPWS, 2021) and will be consistent with the Strategy, Objectives and Actions outlined in the *Tennant Creek Regional Weeds Strategy 2021-2026* (DEPWS, 2021).

5.3.4 Residual impacts

The Project is likely to have a moderate level of residual impact to terrestrial habitats and fauna. Localised habitat loss will occur, and fauna may avoid using the degraded habitats around the edge of the mine site. These impacts will be greatest during construction and operations but should reduce over time post-mining as the site is rehabilitated. Acknowledging the challenges associated with rehabilitation and returning biodiversity values mine sites, it is assumed that rehabilitation may be unsuccessful and therefore the loss of habitat could be permanent. The impact is not expected to alter the local or regional biodiversity as the areas to be cleared are relatively small and there is no significant vegetation present.

There is currently insufficient information available to assess the significance of residual impacts to the Greater bilby. Further work is required to improve the level of confidence in the assessment and management of potential impacts to the Greater bilby.

5.4 Hydrological processes

The NT EPA's objective for the Hydrological processes is to:

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

The sections below describe the surface water and groundwater hydrology within and surrounding the Project area and assess the potential impacts of the Project to hydrological regimes and the NT EPA's objective.

5.4.1 Environmental values

The information for this section was sourced from the *Hydrogeology investigation report* (VDM Consulting, 2012a - Appendix G), *Preliminary groundwater report* (Woodgate, 2020 - Appendix H) and the revised *Groundwater investigation plan* (Groundwater Enterprises, 2022 - Appendix I).

Surface water

There are no permanent surface water features within or close to the Project area. Seasonal rains may yield very intermittent small streams and pools as runoff from low lying hills in the region. These streams and pools generally only last hours, but in extreme rains may last days to weeks. These extreme events may result in periodic road closures. Paleochannels do exist in the wider area but are not closely connected to the surface hydrology of the Project area.

Groundwater aquifers

The characteristics of the groundwater aquifers beneath the Project area have been inferred from desktop assessments and previous studies undertaken at the nearby original Rover 1 exploration target (VDM Consulting, 2012a). A total of seven investigative and environmental monitoring bores to 120 m depth were constructed at the Rover 1 exploration target, the details of which are described in VDM Consulting (2012a). The groundwater investigations provide relevant information about the geological and hydrogeological conditions that occur in the area, summarised as a series of porous rock aquifers hosted in over 100 m of Wiso Basin sedimentary formations. Similar conditions can be expected at the current Rover 1 Project area but cannot be assumed (Woodgate, 2020).

Groundwater levels recorded in monitoring bores at the Rover 1 exploration target are relatively close to the surface at a depth of between 4.6 m to 8.1 m. Rover 1 *Hydrogeological Assessment* (VDM, 2012a) identified the major aquifers as being between 90-120 m below surface in the dolomitic and sandstone sequences of the Montejinni Limestone formation. The water bearing lithologies appear to be porous sandstone bounded and confined by layers of low porosity such as siltstone. The deeper aquifer yields up to 11 L/s.

The Montejinni Limestone is also known as a major aquifer in the Tennant Creek West borefield area (Verhoeven and Knott, 1979). Minor aquifers (<3 L/s) occur in the shallower strata at less than 60 m depth in

the dolomitic siltstone of the Hooker Creek Formation. The shallow aquifers are deemed to be unconfined. Analysis of test pumping results indicate the deeper confined aquifer is a leaky system, with some degree of connection to the shallower aquifers.

Airlift water yields during bore development in 2012, range from 0.7L/s to about 25.5L/s. Deeper confined sedimentary sequences, particularly between 90 m and 120 m, contain large quantities of groundwater, but yields may be low. Inspections of drill cores and photos revealed that these sequences are subject to heterogeneity and limited in areal extent, and as such they may not sustain large yields over a prolonged period of time. The basement rock hosting the ore body contain no known aquifers (Woodgate, 2020).

Groundwater bore level data shows groundwater flowing in a north-easterly direction (Figure 5-6). The groundwater at the new Project site may continue northward although there are some subtle low drainage lines to the east which may influence flow direction towards the lower topography (Woodgate, 2020).

Existing uses

The Project area is located within the Tennant Creek Water Control District. Water Control Districts are declared in areas where there is a high level of competition for water and/or require closer management of the water resources. The Tennant Creek Water Control District was first declared in 2002 and then re-declared in 2009 after boundary amendments. Declaration of a Water Control District allows for the development of water allocation plans. There is currently no Water Allocation Plan for the surface and groundwater resources within the district.

There are no known groundwater users near the Project area. The nearest bore is an old unused, salty airstrip bore approximately 800 m southeast of the site (Woodgate, 2020). The Tennant Creek West borefield is located over 20 km northeast (of the Rover 1 airport strip bore RN011575) as the crow flies, at its closet point. Given the distance from the Project area, impacts to the bore field are unlikely; however, given the inferred northeast groundwater flow path (i.e., from the Project area towards the bore field), modelling is required to provide certainty that there will be no impacts from groundwater drawdown.

The nearest potential GDE is approximately 10 km southwest of the Project area, upgradient of the box cut and decline. This GDE is unlikely to be affected by any drawdown associated with the Project given the distance from the Project area and the location upgradient.

5.4.2 Potential impacts

This section only assesses potential impacts to groundwater hydrological processes. The likelihood of impacts to surface water is inherently low and is therefore not further assessed. The location and small disturbance footprint mean there is a high level of confidence that the Project will have minimal impact to surface hydrology.

The impact assessment process identified the following potential impacts to Hydrological Processes from the Project:

- Altered groundwater levels.

Altered groundwater levels

Interception of groundwater aquifers by the underground mine and the action of groundwater extraction is anticipated to result in a localised drawdown in groundwater levels. As the underground mine is developed, the majority of groundwater inflows will be pumped out to the surface, which will lower groundwater levels in the surrounding aquifer. The bore field proposed to supply potable water and makeup water for the mining operations, will also lower groundwater levels in the aquifer.

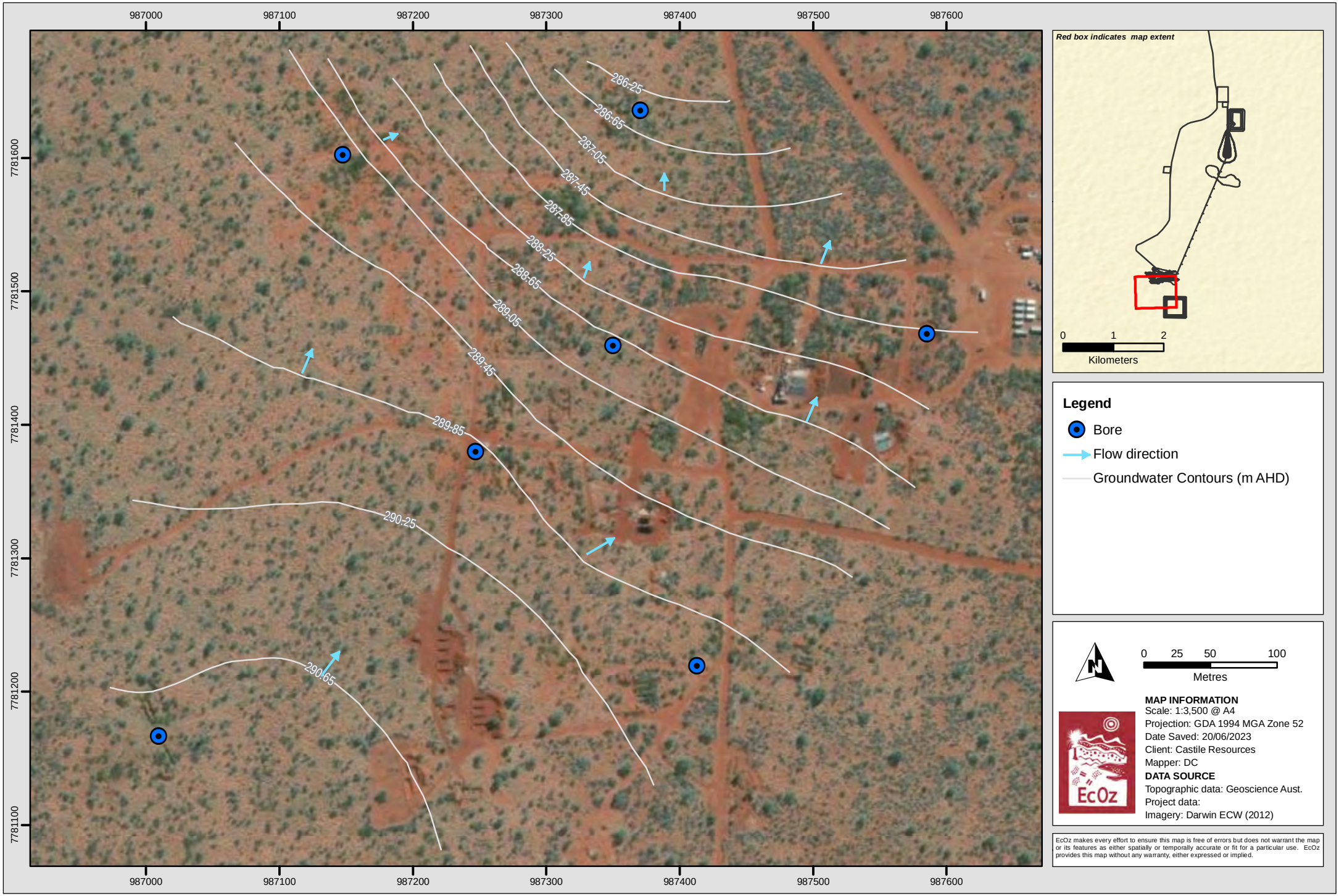

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Figure 5-6. Inferred Direction of Groundwater Flow

Upon completion of mining, pumping of water will cease and the mine voids will fill with groundwater. There is uncertainty with respect to the scale (extent) and magnitude of drawdown that could occur, and the timeframe for recovery of groundwater to pre-mining levels. Site-specific groundwater investigations are planned to commence in 2023. Data will be used to build and calibrate a groundwater model, with outputs presented in the EIS.

Sewage wastewater will be treated to an appropriate standard and then irrigated to land. Irrigation will be managed to avoid oversaturation and encourage evaporation and evapotranspiration as a means of wastewater disposal, with limited groundwater infiltration. At this time, Castile do not anticipate the need to land irrigate mine affected water, however, this will be confirmed by the Project water balance and model.

5.4.3 Environment protection and management

The following policies and guidelines provide accepted good practice approaches that will be adopted to reduce and manage potential impacts to groundwater:

- *Water Accounting Framework for the Australian Minerals Industry* (Minerals Council of Australia, 2014)
- *Water stewardship - Leading Practice Sustainable Development Program for the Mining Industry* (Commonwealth of Australia, 2016).

Water required for all phases of the Project, will primarily be sourced from dewatering of the box cut decline and underground workings. A small amount of water will be extracted from a bore field, for potable water and to supplement process water and water required for the washing down of vehicles and equipment underground. As the Project area is in a Water Control District, a water extraction licence will be required and that process will provide for further validation, monitoring and adaptive management that will ensure the rates of extraction and sustainable.

Castile has committed to establishing a series of groundwater monitoring bores in 2023 to commence the collection of site-specific groundwater baseline data. Nine bores are proposed, targeting the Hooker Creek formation and Montejinni Limestone (Figure 5-7). This will inform development of a multi-layered ground water model, which will be used to assess the dewatering requirements and impacts to groundwater levels and discharges as part of the EIS process.

5.4.4 Residual impacts

The Project is predicted to have a moderate to high level of residual impact to groundwater hydrological regimes. Groundwater levels will be lowered by dewatering the underground mine and groundwater extraction from a bore field. The distance of the Project area from other users and GDE's indicates that any lowering of groundwater levels is unlikely to affect environmental values and/or beneficial uses. However, there is a high level of uncertainty associated with this prediction and further site-specific investigations and modelling is required to inform more accurate assessment groundwater impacts through the EIS process, to determine whether the NT EPA's objective is likely to be met.

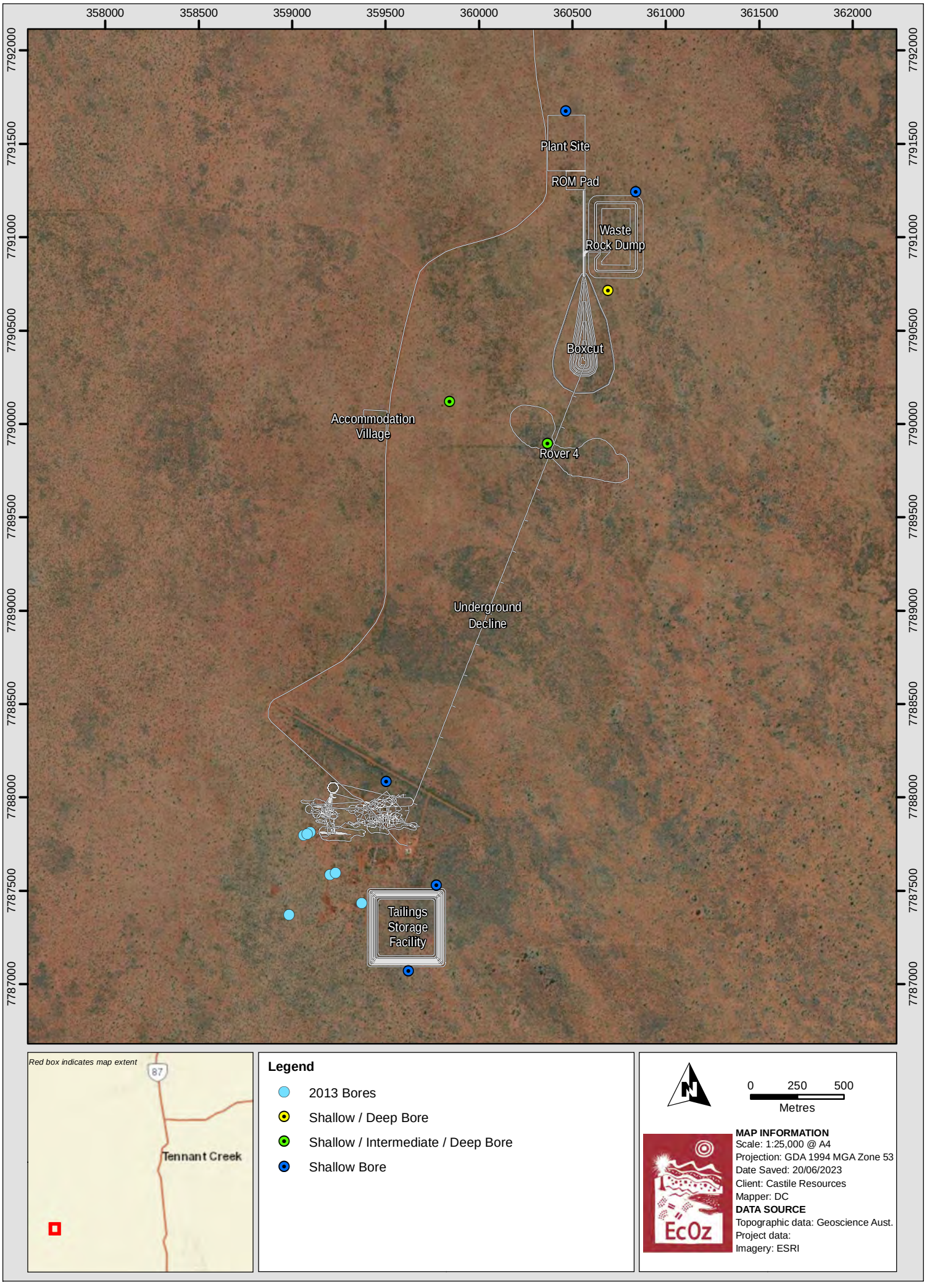

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Figure 5-7. Existing and Proposed Groundwater Monitoring Bores

5.5 Inland water environmental quality

The NT EPA's objective for the Inland water environmental quality factor is to:

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

Given the location and absence of surface water receptors (see section 2.2.4), this section assesses potential impacts to groundwater quality only. The sections below describe the groundwater quality within and surrounding the Project area and assess the potential impacts of the Project to water quality and the NT EPA's objective.

5.5.1 Environmental values

The information for this section was largely sourced from the *Rover 1 PFS* (Castile, 2022)*, Hydrogeology investigation report* (VDM Consulting, 2012a), *Acid Mine Drainage and Management Implications* report (VDM Consulting, 2012b), and the *Preliminary groundwater report* (Woodgate, 2020).

Groundwater quality

Water quality generally reflects water hosted by weathered dolomitic environments. Groundwater generally has a circum-neutral pH with elevated salinity (TDS 1,250 to 2,800 mg/L) making it non-potable (NHMRC/NRMMC, 2011 assessment levels). Salinity is derived principally from sodium, magnesium, potassium, calcium, chloride, and sulfate although nitrate concentrations are also elevated (50 to 120 mg/L). Generally metal(loid) concentrations are very low (VDM Consulting, 2012a).

Sulfate and chloride are present at concentrations ranging from 133 mg/L to 600 mg/L, and 177 mg/L to 1,190 mg/L respectively. Hardness as $CaCO_3$ ranged from 301 mg/L to 703 mg/L and most of the waters may be classified as hard to very hard with increasing to severe scaling. Fluoride concentrations of between 2.3 mg/L and 2.5 mg/L exceeded the guideline concentration of 1.5 mg/L.

It is expected that without any obvious local recharge mechanism (such as a creekline) the water quality at the Project area will be similarly brackish (Woodgate, 2020).

Existing uses

Environmental values of groundwater are discussed in section 5.4.1.

Given the inferred northeast groundwater flow path, it is possible that the Tennant Creek West borefield may act as a receptor in the longer-term (Woodgate, 2020). During operations, dewatering and water extraction activities will create a groundwater depression, towards the box cut and decline. Upon cessation of mining and pumping activities, groundwater is anticipated to return to pre-mining levels and flow direction will be re-established from the Project area towards the Tennant Creek West bore field.

5.5.2 Potential impacts

The impact assessment process identified the following potential impacts to Inland Water Environmental Quality from the Project:

- Groundwater contamination, due to:
    - Spills or loss of containment of hazardous materials that are stored and handled
    - Seepage of AMD, NMD or saline drainage from the WRD, TSF or underground workings (including backfilled waste rock and tailings)
    - Land irrigation of treated sewage.

Contamination by hazardous materials

Dangerous goods, including hazardous materials will be transported to the Project area, stored, handled and disposed of over the life of the Project. There is the potential for accidental release of hazardous materials to land, and infiltration through the soil to shallow groundwater. Potential sources of hazardous materials are identified in section 5.2.2.

Seepage of acid or neutral mine drainage

PAF waste rock will be preferentially backfilled to mined out stope voids underground. Until such a time the voids become available, waste rock will be disposed of to the WRD. This will include a portion of PAF materials, or NAF-HS materials. Similarly, a portion of the tailings produced will be stored at the TSF. There is the potential for seepage of water that has percolated through the WRD and TSF, to shallow groundwater.

Waste rock, including PAF material remaining underground, will oxidise albeit it is likely at a much slower rate. Tailings placed underground, will be physically stabilised using cement at the paste plant. The physical, chemical characteristics of tailing and paste tailings will be investigated as tailings become available at the pilot plant, and solute mobility modelled. The potential for migration of contaminants from tailings to groundwater will be further assessed in the EIS.

Contamination by treated wastewater effluent via land application

Contaminants present in treated wastewater effluent have the potential to accumulate in the soils and infiltrate shallow groundwater.

5.5.3 Environment protection and management

Environmental protection and management measures largely relate to the management of mining wastes, and storage and handling of hazardous materials. The policies, guidelines codes and standards identified in section 3.2 of this referral report will be adopted to reduce and manage potential impacts to groundwater quality.

Hazardous materials

As described in section 5.2.3, there are a range of standard controls that will be put in place to avoid these events, and to respond when they do occur. These controls are expected to ensure that spills and loss of containment are detected early, and soils remediated so that contaminants do not seep to the groundwater aquifer. A Hazardous Materials Management Plan will be prepared for all stages of works and will include provisions for the management and mitigation of risk, as described in section 5.2.3.

Waste rock dump

The base and cover of the WRD will be constructed using inert NAF, low dispersive materials. The use of a store and release final cover will minimise the potential for significant rainfall to penetrate down into the dump over the long term and therefore limit the volume of seepage at the base of the dump. PAF waste rock will, where practicable, remain underground and be backfilled into mined out voids as they become available. Until a time that stope voids become available, all PAF material at the surface will be disposed of to an engineered PAF cell(s) within the WRD.

Tailings storage facility

The TSF will be lined to minimise seepage to underlying groundwater. The TSF will be designed and constructed in accordance with ANCOLD guidelines (ANCOLD 2019, 2022). The properties, including geochemistry of tails is currently unknown. As a minimum, any cyanide in the tailings will be managed (either destroyed or recovered) and tails will be neutralised using lime. Tailings will be either deposited underground as paste, or to the TSF. Castile is currently investigating the option of dry stacking tails at the TSF. Further information on waste rock and tailings environment protection and management, can be found in section 5.2.3.

Water management

All potentially contaminated water will be contained and managed on site. Castile will prepare a Conceptual Site Model and water balance for each Project phase, based on the Minerals Council of Australia Water Accounting Framework (MCA, 2014). Water will be managed in accordance with a Water Management Plan to be included in the EIS and MMP for assessment under the *EP Act* and *MMA* respectively.

Baseline surface and groundwater monitoring will inform water management procedures, and additional test work is required to understand the behaviour of waste rock and tailings deposited underground, and fate of any contaminants present. Both unsaturated and saturated (oxidising/reducing) conditions will be considered. Solute transport modelling will be completed to identify the extent of any offsite migration of contaminants in groundwater.

Assessment of contamination

As described in section 5.2.3, upon completion of mining, or where progressive remediation of disturbed land is possible, Castile will undertake an assessment for soil contamination in accordance with the *National Environment Protection (Assessment of Site Contamination) Measure* (NEPC, 1999). The outcomes of the assessment will inform the remediation strategy and MCP. Remediation of contaminated soils will minimise the potential for groundwater contamination via seepage and infiltration.

5.5.4 Residual impacts

There is currently insufficient information available to assess the significance of residual impacts to inland water environmental quality. Backfilling problematic wastes and paste tailings underground, will reduce the potential for AMD, NMD or saline drainage and leaching of contaminants. Any material permanently placed underground will need to be carefully managed to ensure performance is as per design. The backfill mix design, and physical and chemical properties and behaviours, all need to be understood to ensure any contaminants present in the waste do not mobilise to groundwater. Further work is required to improve the level of confidence in the assessment and management of potential impacts to groundwater quality.

5.6 Community and economy

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

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

The sections below describe the community and economy within and surrounding the Project area and assess the potential impacts of the Project to the community and economy, and the NT EPA's objective.

5.6.1 Environmental values

The information for this section was largely sourced from the *Rover 1 Pre-Feasibility Study* (Castile, 2022). The Project is remote, some 70 km from Tennant Creek. There are four known outstations in the region, the closest of which is 26 km north of the Project area.

All materials required to successfully deliver the project will transverse Tennant Creek. The population of Tennant Creek as of the 2021 census us 3,080 people, of which 1,707 are Indigenous, and a median age of 33 years. The 2021 unemployment rate of 8.7% is higher than the NT average of 5.6%.

The NT Government has identified Tennant Creek as a mining, minerals and gas services and supply hub.

5.6.2 Potential impacts

Initial screening of potential negative and positive social impacts was undertaken with reference to the eight categories of social impact in the NSW Government *Social Impact Assessment Guideline (2023).* The sections

below provide some commentary on potential social impacts, noting that scoping and conduct of a Social Impact Assessment (SIA) will be undertaken as part of the EIS process.

Way of life

The Project is expected to have limited direct impact on people's way of life in Tennant Creek and surrounding communities. The mine site is remote and isolated, and planned to have a predominately FIFO workforce that has limited interaction with the Tennant Creek community. Castile employees will not be permitted to generally enter Tennant Creek without management permission and will likely be limited. Rover 1 employees will fly into Tennant Creek (likely on a charter flight) and then travel by bus out to site. The SIA will need to consider whether any specific controls are needed to ensure that impacts to way of life are minimised.

Community

While the direct impact on the community is expected to be limited for the reasons stated above, there is potential for royalty payments and other benefits to cause indirect impacts to community composition, cohesion or character. There are many examples of mine sites causing significant changes in remote towns in Australia both through in migration of workers and from royalties. The Rover 1 Project is small scale compared to these examples and is planned to have limited direct interaction with the Tennant Creek community. The SIA will need to consider how royalties and other benefits could affect the community.

Accessibility

The Project will increase traffic on the access road which runs through Tennant Creek station, and on a short section of the Stuart Highway between the mine site turnoff and the rail siding. Impacts on the local community of Tennant Creek are expected to be minimal as traffic through the town for Castile products will be limited to road trains delivering goods. There will be some increased road traffic south of the town to the Project turn-off, however all cartage of concentrates will be south of the town. Road traffic could impact on station operations and could pose a safety risk for other road users both on Tennant Creek station and on the highway.

The Project plans to maintain the airstrip for emergency medical evacuation and will have Emergency Response Plans in place to deal with emergency events like fires, spills of hazardous chemicals. The potential for the Project to access medical services, and police and emergency services in Tennant Creek had not been considered at the time of writing this referral. It is noted that services are limited, and any additional pressure could have an impact. The SIA will need to consider potential impacts to social infrastructure and services is required.

Culture

Mining activities involve intense land disturbance that has potential to affect sacred sites, Aboriginal archaeological sites and access to and use of land for cultural purposes. Measures to avoid and minimise impacts to heritage are discussed in section 5.7.3. As the mine site is located on Aboriginal land, all activities are subject to *Deeds of Agreement* with the landowners, which will prescribe requirements for protection of heritage, and access to and use of land for cultural purposes.

Health and wellbeing

There is potential for the Project to cause stress to some members of the community who are opposed to the Project and are concerned about environmental impacts and changes to the community. Royalty payments also have potential to be a source of stress in the community if not equitably distributed.

Surroundings

Local people are likely to have concerns about environmental impacts, and impacts to amenity from noise, dust, traffic etc. These issues will be addressed in the EIS. Environmental and amenity impacts are predicted to be limited to around the mine site, which is remote from sensitive receptors. There is potential for increase

traffic, noise and dust at the Tennant Creek rail siding that requires further assessment to determine impacts and management requirements.

Livelihoods

The Project has potential to improve livelihood for local people from increased jobs and business opportunities. Impact on the business community will be positive, with minor goods and services likely to be sourced preferentially out of Tennant Creek (due to reduction in cost and expediency). There will be some employment opportunities available for those people who are looking for work. The existing business community within Tennant Creek have a history of supply goods and services to the mining industry, with mining occurring surrounding Tennant Creek from the 1970's - 2000's and on a wider basis is still ongoing.

On a wider community basis, it is expected a large portion of the workforce for Rover 1 will be sourced from Darwin and surrounds. In addition to the workforce, transportation of the concentrates is planned to be undertaken via rail from Tennant Creek to Port Darwin prior to overseas shipping. As the capital of the NT, Darwin is expected to provide goods and services which cannot be sourced through Tennant Creek. This will have a positive impact on those communities upon which they are sourced.

As the mine will require skilled workers and the operational workforce is relatively small, the opportunities for local employment will be limited. There may be opportunities for businesses in Tennant Creek to service aspects of the construction and mining operations. Provisions for local jobs are expected to part of the *Deeds of Agreement* negotiated with the Aboriginal landowners, and opportunities for local businesses will be further explored through the SIA process.

Decision-making systems

Local community experience feelings of stress and anxiety if they are not afforded an influential voice in decision-making and/or do not benefit from the Project in the long-term. As the mine is located on Aboriginal Land there is a process in place for negotiating *Deeds of Agreement* with the landowners. Further Castile will continue to consult with the Tennant Creek Station, and the Tennant Creek community to identify issues and concern so that they can be considered when making decision about the Project. The SIA will need to involve broad stakeholder consultation to ensure that issues are adequately identified and addressed.

5.6.3 Environment protection and management

Castile is committed to having a positive social impact on Tennant Creek and in the NT more broadly and will work with relevant stakeholders to determine how the Project can best support and benefit the region and communities. Specific measures needed to address negative impacts and maximise benefits will be further developed in consultation with stakeholders, and Castile expect that achieving social and economic outcomes will be a part of negotiated agreement(s). The following policies and guidelines provide accepted good practice approaches that will be adopted to further assess and manage potential impacts:

- *Social Impact Assessment Guideline* (NSW Government, 2023).
- *Guidelines for the preparation of an Economic and Social Impact Assessment* (NT EPA, 2013).
- *Quality Assurance Standard for Community and Stakeholder Engagement* (IAP2, 2015).
- *Guidance for Proponents - Stakeholder Engagement* (NT EPA, 2019).
- *Community engagement and development - Leading Practice Sustainable Development Program for the Mining Industry* (Commonwealth of Australia, 2016).

5.6.4 Residual impacts

The Project is predicted to have a moderate level of residual impact to the community and economy. The Project will provide opportunities for the Tennant Creek community, and to the Territory more broadly. Tennant Creek and its surrounds has a long history of exploration and mining, and the Project is consistent with the NT

Governments intent to create a regional mining hub. The measures outlined in this Referral indicate with appropriate management, the Project is likely to provide benefits to the local community and economy but could also cause some negative impacts. Preparation of an SIA and Social Impact Management Plan (SIMP) will take place through the EIS process with the objective that positive impacts to the community and the economy are maximised and negative impacts avoided or mitigated, so that the Project is accepted by the community.

5.7 Culture and Heritage

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

'*Protect sacred sites, culture and heritage*'.

The sections below describe the culture and heritage within and surrounding the Project area and assesses the potential impacts of the Project to culture and heritage, and the NT EPA's objective.

5.7.1 Environmental values

The information for this section was prepared using the *Rover 1 Pre-Feasibility Study* (Castile, 2022) and *Archaeological Heritage Assessment – Rover 1 Exploration Decline* report (Tim Hill Heritage Management and Planning, 2012), prepared following desktop and survey for the exploration decline project.

Sacred sites and culture

The Project area is located on Aboriginal lands. The land has been, and will continue to be, used by the local Aboriginal owners for traditional uses and access. The extent of use and significance is, at present, not understood, and is the subject of further consultation. The archaeological predictive modelling, discussed further below, identified that use of this land historically was likely very ephemeral, if at-all by travelling and hunting parties (Tim Hill Heritage Management and Planning, 2012 provided as Appendix J).

A search of the NIAA website identified no Indigenous Protected Areas within the Project area and Abstract of Records obtained by Castile under regulation 7 of the *Northern Territory Aboriginal Sacred Sites Regulations 2004*, identified no registered or recorded sacred sites, or restricted work areas on ELR29957, ELR29958, EL27372 or EL27292. An application for an Authority Certificate will be made to provide a process for identifying any previously unrecorded sacred sites through consultation with Traditional Owners and site custodians.

An assessment was undertaken for the Rover 1 exploration decline project in 2012. The archaeological predictive model proposed that no archaeological sites would be present within the study area, primarily as a result of its relatively small size and the lack of either semi-permanent or ephemeral water available within the sandplain environment. Further, no geological features exist to procure stone resources for stone tool production (Tim Hill Heritage Management and Planning, 2012). An archaeological survey was then undertaken using pedestrian survey across the general area of the exploration decline and WRD. The transects, completed on EL24541 approximately 2 km south of the current proposal, were of a general nature and aimed to test the predictive model. No archaeological sites were recorded within the area of the proposed works; however, this is considered likely due to a lack of archaeological surveys in the area.

Heritage sites

A search of the NT Heritage Register identified no recorded sites within, or close by, the Project area.

5.7.2 Potential impacts

The impact assessment process identified the following potential impacts to Culture and Heritage from the Project:

- Loss or damage to sacred site(s)
- Loss or damage to heritage site(s).

Loss or damage to sacred or heritage sites

There is potential for Project activities, primarily during construction, to impact both known and unknown archaeological sites, or objects, heritage places or cultural features. This includes both tangible heritage and intangible heritage, through potential impacts to connections held between the local Aboriginal people and country.

5.7.3 Environment protection and management

Castile will implement measures to avoid impacts to cultural and heritage values. These include:

- The following policies and guidelines provide accepted good practice approaches that will be adopted to reduce and manage potential impacts:
    - *Quality Assurance Standard for Community and Stakeholder Engagement* (IAP2, 2015)
    - *Guidance for Proponents - Stakeholder Engagement* (NT EPA, 2019)
    - *Community engagement and development - Leading Practice Sustainable Development Program for the Mining Industry* (Commonwealth of Australia, 2016)
    - *Working with Indigenous communities - Leading Practice Sustainable Development Program for the Mining Industry* (Commonwealth of Australia, 2016).
- Project specific archaeological surveys of the proposed disturbance footprint and gas corridor pipeline prior to ground disturbance.
- Consultation with relevant authorities including but not limited to the AAPA, CLC and Karlantijpa South Aboriginal Land Trust to minimise the likelihood of impact to any sites or objects of cultural value.
- Castile will obtain an Authority Certificate from AAPA to ensure any sacred sites relevant to the Project are identified, and management measures implemented in accordance with the conditions of the certificate.
- Where possible, minimise clearance of large trees (>10m height) - in particular, large Ghost gums and Desert bloodwoods that can have Aboriginal significance.
- Consultation with the NT Heritage Branch to minimise the likelihood of impact to any sites or objects of heritage value. If previously unrecorded sites are uncovered by Project activities a Works Approval may be required from the NT Heritage Branch.
- The MMP prepared for the Project in accordance with the *Mining Management Act 2001*, will include measures to manage both known and unexpected finds, and include:
    - Inclusion of topics related to culture and heritage in inductions, such as management and awareness of cultural assets within the ML
    - Immediate cessation of works if historical or cultural material found or suspected
    - Immediate assessment of any new archaeological, historic or cultural discoveries during works
    - Any conditions of the AAPA Authority Certificate will be included in the MMP.

5.7.4 Residual impacts

There is currently insufficient information available to assess the significance of residual impacts to culture and heritage. While existing information indicates there are no significant sites or features present, further consultation with Traditional Owners, site custodians and the Aboriginal community, and surveys are required to identify previously unrecorded sites and other cultural values and uses of the land that could be impacted by the Project.

5.8 Cumulative impact assessment

The EP Regulations (regulation 79) defines matters that may be included in an environmental impact assessment, including a cumulative impact assessment that takes into account the combined impact of the action or proposal and other actions. The location of the Project is such that it is not anticipated to interact with other Projects to cause cumulative impacts.

There are no granted, or in application mineral titles within a 50 km radius of the Rover 1 deposit. Third party exploration licences are currently under application, within the Rover field. The Warrego Tailings Project is the nearest established mine, almost 70 km north, northeast of Rover 1.

Rover 4 is the closet mineral deposit located approximately 2 km north, northeast of Rover 1 below the proposed decline. The decline has been positioned and its design will allow access to the Rover 4 deposit, without the need for further ground disturbance. If Rover 4 (or other deposits were to be mined by Castile, ore would be processed at the existing processing plant.

Whilst located within the Wiso basin, the Project area is outside of the Georgina Wiso Water Allocation Plan area. The Project will require a permit(s) to extract water under the Water Act, given its location within the Tennant Creek Water Control District.

5.9 Summary

A summary of the avoidance and mitigation measures, for all the relevant environmental factors is provided in Table 5-4.

Table 5-4. Summary of potential impacts and avoidance/mitigation measures

Factor	Environmental value	Potential impacts and benefits	Avoidance and mitigation	Residual impact rating
LAND				
Terrestrial environmental quality	• Landform and soils • Soil quality	• Soil erosion • Contamination of soils • Oxidation of waste rock or tailings	• Erosion and Sediment Control Plan(s) • Waste Rock Management Plan • Tailings Management Plan • Contaminated site assessments and remediation • Remediation Action Plan(s) • Hazardous Materials Management Plan • Conceptual Closure Plan • Emergency response and training • Engineered design (inc. WRD, TSF) • Monitoring and maintenance • Reporting including statutory reporting • Inductions, training and qualified operators	Moderate
Terrestrial ecosystems	• Vegetation and habitat • Terrestrial fauna • Threatened species	• Direct loss of vegetation and habitat • Habitat degradation • Loss of Greater bilby habitat or individuals (uncertain impact rating) • Mortality of fauna • Increased competition and predation	• Limit and clearly delineate areas to be cleared • Retention of topsoils and seed bank • Where possible, minimise clearance of large trees • Clearing Plan • Pre-clearance surveys and use of a fauna spotter-catcher • Greater bilby Management Plan • Weed Management Plan and weed control • Vegetation and weed monitoring • Reporting including statutory reporting • Inductions, training and qualified operators	Moderate
WATER				
Hydrological processes	• Groundwater aquifers	• Altered groundwater levels	• Groundwater modelling (flow) • Conceptual Site Model • Water balance • Water Management Plan • Permitting • Conceptual Closure Plan • Monitoring and maintenance • Reporting including statutory reporting	Moderate to High

Factor	Environmental value	Potential impacts and benefits	Avoidance and mitigation	Residual impact rating
Inland water environmental quality	• Groundwater quality	• Contamination by hazardous materials • Seepage of acid or neutral mine drainage • Contamination by treated wastewater effluent via land application	• Groundwater modelling (contaminant transport) • Conceptual Site Model • Water Management Plan • Waste Rock Management Plan • Tailings Management Plan • Engineered design (inc. WRD, TSF) • Contaminated site assessments and remediation • Remediation Action Plan(s) • Hazardous Materials Management Plan inc. inductions, training • Conceptual Mine Closure Plan • Emergency response and training • Monitoring and maintenance • Reporting including statutory reporting	Uncertain
PEOPLE & COMMUNITIES				
Community and economy	• Community • Access • Livelihoods	• Positive impact on local economy through employment, lease payments and upgrades to local infrastructure such as roads • Changing social dynamic and pressure on existing utilities and services • Increased road traffic including heavy vehicles	• Social Impact Assessment • Social Impact Management Plan • Stakeholder engagement • Stakeholder engagement register • Stakeholder Engagement Plan • Incorporate Aboriginal knowledge and views where relevant • Code of Conduct • Traffic Management Plan(s)	Moderate
Culture and heritage	• Sacred sites and culture • Heritage sites	• Loss or damage to sacred site(s) • Loss or damage to heritage site(s)	• Project specific surveys • Stakeholder engagement • Stakeholder engagement register • AAPA Clearance Certificate • Works permits under the Heritage Act (if any archaeological features recorded)	Uncertain

6 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

There are nine Matters of National Environmental Significance (MNES) protected under the *EPBC Act*:

- World Heritage properties
- National Heritage places
- Wetlands of international importance (listed under the Ramsar Convention)
- Listed threatened species and ecological communities
- Migratory species protected under international agreements
- Commonwealth Marine Areas
- The Great Barrier Reef Marine Park
- Nuclear actions (including uranium mines)
- A water resource, in relation to coal seam gas development and large coal mining development.

The only MNES relevant to the Project is listed threatened species. The potential for impacts to threatened species, specifically the Greater bilby has been considered in section 5.3 of this referral report. There is currently insufficient information available to assess the significance of residual impacts to this species. Further work is required to improve the level of confidence in the assessment and management of potential impacts to the Greater bilby.

Castile intends to submit a referral to the Department of Agriculture, Water and the Environment as per the *Environment Protection and Biodiversity Conservation Act 1999*.

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APPENDIX A PRE-REFERRAL SCREENING REPORT

APPENDIX B ECOLOGICAL ASSESSMENT 2022

APPENDIX C GEOCHEMICAL CHARACTERISATION OF WASTE ROCK AND ORE 2022

APPENDIX D ECOLOGICAL ASSESSMENT 2012

APPENDIX E LIKELIHOOD OF OCCURANCE REPORT

APPENDIX F PROTECTED MATTERS SEARCH TOOL

APPENDIX G HYDROGEOLOGY INVESTIGATIONS 2012

APPENDIX H PRELIMINARY GROUNDWATER REPORT 2020

APPENDIX I REVIEW OF CASTILE RESOURCES GROUNDWATER INVESTIGATION DRILLING PROGRAM

APPENDIX J ARCHAEOLOGY REPORT

APPENDIX K GHG EMISSIONS REPORT