

Chapter 2
Executive Summary

ESMERALDA GRAPHITE PROJECT

aarc ENVIRONMENTAL SOLUTIONS
APEM Group

GRAPHINEX

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2 Executive summary

This Environmental Impact Statement (EIS) has been prepared for Qld Aus Graphite Pty Ltd (Graphinex, the Proponent) for the Esmeralda Graphite Project (the Project) to address the requirements of the *State Development and Public Works Organisation Act 1971* (SDPWO Act).

The objective of the EIS is to identify and assess the potential environmental, social, economic and cumulative impacts of the Project, and provide measures to avoid, minimise, mitigate or offset adverse impacts.

The Project has been declared 'not a controlled action' under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Therefore, the Project does not require assessment or approval under the EPBC Act.

This EIS addresses the requirements of the Project Terms of Reference and is comprised of a main text report, supported by several attachments and appendices.

2.1 Project proponent

Qld Aus Graphite Pty Ltd is a wholly owned subsidiary of Graphinex Pty Ltd and is the registered entity proposing to carry out the Project. Graphinex Pty Ltd is a private Australian based company based in Brisbane, Queensland, and was founded in 2021. The executive team has a suite of experience in developing mineral projects in Australia.

The Proponent details are:

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2.2 Project summary

The Project is located in north-west Queensland, approximately 350 km northeast of Mount Isa and 70 km south of Croydon. The Project proposes to develop an open-cut mine with on-site mineral processing, producing up to 200 ktpa of graphite concentrate over an operational phase of approximately 53 years. The proposed life-of-mine (LOM) is approximately 65 years, including construction, operation, and progressive rehabilitation.

The key objectives of the Project are to:

- locally produce high-quality graphite concentrate for domestic markets and export;
- support economic development in rural Queensland and Townsville by creating workforce opportunities and procurement of local goods and services;
- assist the renewable energy transition at the State and Federal levels by establishing an integrated supply chain and producing graphite for use in batteries, renewable energy products and other markets;
- avoid and minimise adverse impacts on the social and natural environments during the design, construction and operation of the Project; and
- comply with all relevant statutory obligations and continue to improve processes which enhance sound environmental management.

The Project is to be delivered over three stages: construction, operations and closure. The key project components across these stages would include:

- site preparation works that include clearing vegetation, removing topsoil, stockpiling, earthworks, and temporary drainage works;
- open-cut mining of approximately 3.5 Mtpa of run-of-mine (ROM) ore, using conventional surface mining equipment (excavator, trucks, dozers, drill rig, grader) or equivalent;
- construction and use of a ROM pad for ore stockpiling and handling of ore;
- construction and operation of a Mineral Processing Plant (MPP), including an initial crushing and milling circuit, followed by a conventional flotation circuit consisting of rougher and flotation stages;
- product load-out area for stockpile and loading of graphite concentrate;
- construction of dedicated Tailings Storage Facilities (TSFs) for storage of process waste streams;
- construction of an on-site workers accommodation facility, ablutions, and sewage treatment plant;
- construction of an on-site airfield for transport of workers to and from the site;
- installation of water management infrastructure including a watercourse diversion, flood levee, dams, drains, and bunds;
- power supply through installation of an on-site solar array and energy storage system with back-up diesel generation and energy distribution infrastructure;
- potable water supply through on-site water treatment and/or importing water to site;
- supply of processing water from recycled sources on the mine site, including pit dewatering groundwater abstracted to enable the mining operations;
- construction of a private access road connecting the mine to the public road network at Esmeralda Prospect Road, located within the southern lease application area;
- backfilling of the mining void to natural surface level using a combination of tailings waste and waste rock stockpiled on the site. No final voids are proposed in perpetuity; and
- progressive rehabilitation commencing late in the mine life, as land becomes available for reclamation. Final landforms will be reshaped, topsoiled and revegetated to ensure safe, stable and non-polluting landforms post-mining.

Mining and mineral processing activities would occur within two proposed Mining Lease (ML) areas, currently under application as MLA 100431 and MLA 100430. Key activities within the MLAs are identified as follows:

- construction, operation and rehabilitation of an open cut graphite mine within MLA 100431 and MLA 100430;
- mineral processing of ore to produce a graphite concentrate, within MLA 100431; and
- haul road construction and transport of concentrate along a private road within MLA 100431, to an intersection with the public road network at Esmeralda Prosect Road.

The combined area of the two MLAs is approximately 4,444 ha. The maximum area of land proposed to be disturbed by the project is approximately 2,413.7 ha.

2.3 Project description

2.3.1 Construction

Construction and mine development activities required to enable the commencement of the open-cut mining operation are planned to occur over a period of approximately 18-24 months (Project Year -2 and

Year -1); anticipated to commence within 12 months of approval and grant of the mining leases (MLs), Environmental Authority (EA) and all other permit requirements for the Project.

The construction period would involve a civil and earthworks phase which is expected to include the following activities within the MLs:

- clearing the vegetation from areas where infrastructure is to be constructed;
- stripping and stockpiling of topsoil and/or subsoil for later use in rehabilitation;
- levelling the disturbance footprint in areas required to construct infrastructure;
- excavating footings of infrastructure areas and laying concrete footings;
- removal of topsoil and/or subsoil, and overburden in the area of the first stages of mining;
- establishment of infrastructure;
- preliminary removal of overburden from the location of the pit.

2.3.2 Operation

Mineral production would commence towards the end of the construction period and beginning of the operational phase (Year 1). The operational phase of the Project supports a mine production life of approximately 53 years under anticipated mining conditions. The Project would operate 24 hours per day, seven days per week. External factors, such as adverse weather events, may have the ability to influence production schedules.

Mining is proposed via conventional truck and excavator methods, to a depth of approximately 250 m below ground level. Open pit mining has been identified as the optimal mining method for accessing the graphite resource body. Resource extraction would necessitate the implementation of controlled blasting techniques.

On-site processing of the ore would produce 100 ktpa graphite concentrate during approximately the first three years of the Project, before increasing to approximately 200 ktpa graphite concentrate for the remainder of the Project. The increase from 100 ktpa to 200 ktpa production is based on the duplication of refinery capacity. During the first three years, any ROM ore not able to be processed would be stockpiled for later use.

Mining rates would equally ramp up to 3.5 Mtpa ROM over the first three years and remain relatively consistent thereafter.

Excavated overburden and non-ore-bearing material would be deposited in out-of-pit waste dumps located adjacent to the mining void.

ROM ore extracted from the pit would be trucked or conveyed to the MPP for stockpiling and concentration via conventional flotation methods in an on-site processing plant.

Graphite concentrate produced at the mine would be loaded into containers and transported by truck to Townsville for distribution.

Flotation tailings produced from the mineral processing circuit would be transferred to one of four purpose designed storage facilities, to be constructed in stages over the production life of the mine.

2.3.3 Rehabilitation

The Proponent has developed a progressive rehabilitation and closure plan (PRCP) for the Project in accordance with the requirements of the *Environmental Protection Act 1994* (EP Act) to ensure that:

- the land is safe and structurally stable;
- there is no environmental harm being caused by anything on or in the land; and

- the land can sustain a post-mining land use.

The PRCP addresses rehabilitation of all operational activities and associated infrastructure areas for the Project on the mine site, including the open-cut mining area, waste rock dumps, stockpile areas, mine infrastructure areas, and water storage areas.

Through consultation, the Proponent has determined that the preferred post mining land use (PMLU) for the majority of the Project site is a return to the existing land use of low intensity grazing of native vegetation. This includes progressively backfilling the mine pit to avoid a final void.

The Project does not involve any non-use management areas in the final landform. All disturbed land would be returned to a PMLU. Project infrastructure such as access roads and suitable dams may be retained through agreement with the landowner, which would be a separate PMLU to that of low intensity grazing of native vegetation. A waste rock dump and rehabilitated tailings storage facility would have a PMLU of grassland.

2.4 Assessment pathway

On 11 July 2025, the Coordinator-General declared the Project to be a 'coordinated project for which an environmental impact statement (EIS) is required' under section 26(1)(a) of the *State Development and Public Works Organisation Act 1971* (SDPWO Act). This declaration initiated an environmental impact assessment under Part 4 of the SDPWO Act, which required the Proponent to prepare an EIS for the Project.

On 29 September 2025, the Coordinator-General issued the Terms of Reference (TOR) under section 26(1)(a) of the SDPWO Act for an EIS of the Project.

This EIS has been prepared to ensure that sufficient information is provided to the Office of the Coordinator-General (OCG), the Department of the Environment, Tourism, Science and Innovation (DETSI), the Department of Primary Industries (DPI), and the Department of Climate Change, Energy, the Environment and Water (DCCEEW) to identify and assess any potential adverse and beneficial environmental, economic and social impacts of the Project. This EIS also provides a detailed description of the actions undertaken by the Proponent to avoid, mitigate and minimise adverse impacts.

Baseline scientific and technical investigations have been undertaken across a range of impact areas, consistent with the requirements of the TOR. While the key outcome of the EIS process is to obtain an Environmental Authority (EA) for the Project, the information provided throughout these investigations would be utilised to support secondary approvals, such as water licenses or offsets agreements.

The approval of the Project is subject to several Queensland government legislative requirements. The primary approvals required for the Project include:

- a site-specific Environmental Authority (EA), as an outcome of the EIS, which identifies the applicable 'Environmentally Relevant Activities' (ERAs) that would be authorised to be conducted on-site under the EP Act; and
- the granting of the required MLs for the Project under the *Mineral Resources Act 1989* (MR Act).

The Project was declared 'not a controlled action' under the EPBC Act, and therefore no further assessment at a Commonwealth level is required.

2.5 Community consultation and stakeholder engagement

Stakeholder engagement and community consultation was undertaken during the preparation of the EIS consistent with 'Preparing an environmental impact statement: Guideline for Proponents' (Department of State Development 2015). The process has included:

- on-the-ground dissemination of information about the Project;

- planning and implementing opportunities for stakeholders to comment on the Project;
- obtaining, considering, and responding to stakeholder comments and issues of concern; and
- developing relevant solutions and management strategies during the Project development phase to enhance benefits associated with the Project.

The Proponent would continue to consult with stakeholders, including relevant government agencies, landholders, and the community, and invites responses to this EIS.

2.6 Environmental assessment

2.6.1 Land

The Project is located within the Gulf Savannah region. The land surrounding the Project is primarily used for low intensity cattle grazing. The predominant land use of north-west Queensland is low intensity cattle grazing.

Land within the Project MLAs is used for grazing cattle on native vegetation with limited or no attempt at pasture modification. The land is not currently utilised for cropping or other higher production land uses. Built infrastructure in the site consists of unsealed access tracks, stock fencing, and bores.

The nearest homestead is located approximately 10 km from the Project's pit and 5 km from the access road.

Approximately 4,431 ha of the Project site is classified as Class A1 agricultural land, with 4.2 ha Class B, and 4.1 ha as Class C.

Several mitigation and management measures have been developed to reduce or avoid impacts to local land values arising from Project disturbance, including:

- erosion and sediment controls;
- appropriate storage and handling of hazardous materials and wastes to avoid and minimise land contamination; and
- the development and implementation of a soil management plan to direct removal, stockpiling, and placement of soil where possible to preserve the seedbank and reduce erosion.

2.6.1.1 Geology

The Project is situated on the Carpentaria and Karumba Basins, which cover parts of northern Queensland and the Northern Territory, extending over an area of 560,000 km^2. The Carpentaria Basin is Middle Jurassic to Late Cretaceous in age. Sediments overlie a basement of Proterozoic and Palaeozoic rocks of the inliers outcropping on edges of the basin. The central part of the onshore Carpentaria Basin is unconformably overlain by the Cainozoic Karumba Basin.

The Esmeralda Granite is a coarse-grained granite containing inclusions of graphite and graphitic meta-sedimentary rocks. Mackenzie (1988) noted that "parts of the granite are extremely rich in graphite", observing in the Croydon Goldfield tabular zones up to 120 m thick and several kilometres long, packed with graphitic metasedimentary enclaves and masses of almost pure graphite set in a matrix of intensely hydrothermally altered granite. The Project is located within an area of Cainozoic and Mesozoic cover sequences. Cainozoic sediments are underlain by the Mesozoic sediments of the Carpentaria Basin consisting of sandstone, siltstones, and shales of the Gilbert River Formation. A major unconformity exists between the Mesozoic sediments and Proterozoic basement. The basement is interpreted to be the Esmeralda Supersuite granites.

The typical stratigraphic sequence encountered in the Project area is illustrated in There are no faults mapped within the overburden sequence (Gilbert River Formation or Tertiary sediments). Exploration drilling

has identified some local scale joints and fractures within the orebody, with associated observations of slickensides and clay gouge. These joints and fractures have been identified in drill core samples and are associated with local scale deformation with minimal displacement. These localised joints and fractures are discontinuous and cannot be traced between nearby drillholes. The presence of these joints and fractures is not expected to influence groundwater conditions at a larger (pit) scale.

Table 2-1. Non-Proterozoic units are considered the cover sequence, or overburden. This may be unconformable and varies greatly in depth (up to 90 m). The project geology is well understood and is at Measured Joint Ore Reserves Committee (JORC) Resource stage.

There are no faults mapped within the overburden sequence (Gilbert River Formation or Tertiary sediments). Exploration drilling has identified some local scale joints and fractures within the orebody, with associated observations of slickensides and clay gouge. These joints and fractures have been identified in drill core samples and are associated with local scale deformation with minimal displacement. These localised joints and fractures are discontinuous and cannot be traced between nearby drillholes. The presence of these joints and fractures is not expected to influence groundwater conditions at a larger (pit) scale.

Table 2-1: Typical stratigraphic sequence of the region

Material Type	Unit	Age	Lithology
Soil		Quaternary	Sand, gravel, silt, and mud - alluvial and channel deposits
Overburden		Tertiary - Quaternary	Residual and alluvial sands, gravels, silt, and soil
		Tertiary - Quaternary	Ferricrete, alluvium, and colluvium
	Wallumbilla Formation	Cretaceous	Sandstone and mudstone (absent in the Project area)
	Gilbert River Formation	Jurassic - Cretaceous	Dominantly sandstones, lesser finer clastic
	Eulo Queen Group	Jurassic	Sandstones, siltstones, and minor conglomerates
		Permian	Rhyolites, local andesites, and randiorites
Ore body	Inorunie Group	Mid to Late Proterozoic	Dominantly sandstones and orthoquartzites, minor siltstones and mudstones
	Esmeralda Granite (& minor granites)	Middle Proterozoic	Dominantly biotite granites, some with muscovite and/or garnet
	Croydon Volcanic Group	Middle Proterozoic	Dominantly rhyolites and dacites, minor sediments and andesites
	Forest Home Trondhjemite	Middle Proterozoic	Biotite trondhjemite
	Langlovale Group	Middle Proterozoic	Sandstone overlain by finer clastic
	Etheridge Group	Middle Proterozoic	Dominantly fine clastic including carbonaceous shales

2.6.1.2 Resource

Exploration drilling has been extensively undertaken across the proponent held exploration tenure from the 1970s to 2025. Drilling primarily targeted metalliferous/gold mineralisation. Assay results of previous drilling indicated concentrations of combined niobium and tantalum pentoxide and molybdenum, and anomalous concentrations of other metals. In 2015, drill holes intersected graphite mineralisation in the Esmeralda Granite area, confirming graphite occurrences.

In 2023, Graphinex completed preliminary metallurgical test work on graphite cores to evaluate its potential to be used for battery anode material. The results successfully produced battery-grade purified spherical graphite and confirmed the potential for the Esmeralda Granite hosted graphite orebodies to produce a battery anode material.

Total tonnes of graphite ore have been assessed in accordance with the JORC Code (2012), indicating the presence of an estimated 435. 5 million tonnes (Mt) at 5.83% total graphitic carbon (TGC) for 25.35 Mt of contained graphite.

A summary of the Esmeralda mineral resource as of November 2024 is provided in Table 2-2.

Table 2-2: Mineral resource for the Esmeralda Graphite Project

Resource category	Total graphitic carbon (TGC) %	Tonnes (Mt)	Contained Graphite (Mt)
Indicated	5.84	173.1	10.11
Inferred	5.83	261.4	15.24
Total	5.83	434.5	25.35

2.6.1.3 Soils

A Soils and Land Suitability Assessment (Appendix H) was undertaken for the Project, which included a detailed field survey to map and validate soil type boundaries. The assessment additionally sampled soil to develop a land suitability assessment, agricultural land classification, and determine any limitations for Project development or site rehabilitation. The survey characterised soil profile classes (SPCs) for the Project area covering the MLA boundaries and disturbance extent. Detailed soil profile sites, representative sites for sampling, and observation-sites were selected to appropriately represent all soil types, and the unit boundaries present in the broader Project area.

A total of seven SPCs were identified and described. An overview of each SPC and its extent within the Project area is provided in Table 2-3.

Soil survey results found that topsoil chemistry is within a suitable range for plant growth and not expected to limit the availability of essential nutrients. The upper soil horizons of each SPC are considered suitable for rehabilitation purposes and would be stripped and stockpiled in advance of Project development. Subsoil would also be stripped to varying depths and combined with topsoil to create a growth medium for rehabilitation purposes.

Table 2-3: Soil profile classes

Soil Profile Class	Australian Soil Class	Area within Project footprint (ha)
1Cl(Ck)	Brown Tenosol	93.8
2Cl(Ck)	Brown Arenosol	1072.4
3Cl(Ck)	Brown Tenosol	1,159.6
4Cl(Ck)	Brown Kandosol	62.4
5Cl(Nm)	Leptic Tenosol	2.4
6Cl(El)	Brown Dermosol	19.1
7Cl(Nm)	Leptic Rudosol	4.1

*Areas have been rounded and may not match the Project footprint area of 2,413.7 ha.

2.6.1.4 Visual amenity

The Project is located 70 km south of Croydon, within the Gulf Plains Bioregion. This bioregion is dominated by grasslands, Eucalypt woodlands, *Melaleuca* and *Acacia*, which cover the landscape of plains and river channels, comprising clay and alluvial soils (DEHP 2015). The local area is generally flat to gently sloping upwards to the east, with elevations ranging between 120 m and 140 m Australian Height Datum (AHD). Elevation gently slopes upwards towards the east.

The dominant regional land use, as mapped by DES (2016), is grazing native vegetation, with some residential and farm infrastructure

The Project is located within the Gulf Savannah natural resource management (NRM) region, with land surrounding and underlying Project site used for low-intensity cattle grazing and resource exploration activities (DESI 2023). Queensland Land Use Mapping classifies the Project site and surrounding area as 'Grazing Native Vegetation' (DNRMMRRD 2025a).

During mine operation, the waste rock dumps may impact the visual amenity of the sensitive receptors during night-time (when lighting may be present). By year 40 of the Project, the western and eastern WRDs would reach a height of 90 m above surface with an elevation of 215 mAHD. The WRD's may appear prominently on the relatively flat regional terrain, however the terrain does gradually increase in elevation to the east, close to matching the WRD's height by sensitive receptor R1.

During the final years of the operation stage, waste rock from the WRDs would be used to backfill the open-cut pit, and consequently, the eastern WRD would not be present in the final landform, and the western WRD elevation would be significantly reduced to approximately 60 m above the surface with an elevation of 185 mAHD.

Once the Project site, including the features detailed above, have been rehabilitated, the proposed Project is considered unlikely to create a distinct landscape character that would negatively impact visual amenity.

2.6.2 Cultural heritage

2.6.2.1 Indigenous cultural heritage

A search of the National Native Title Tribunal Register of Native Title Claims was undertaken on 10 March 2026. It identified two successful Native Title determinations in favour of the Tagalaka people. The Project area is in the determination area, finalised and in effect from 10 December 2012.

The determinations can be found under 'Owens on behalf of the Tagalaka People and Tagalaka People #2 v State of Queensland', tribunal files QCD2012/012 and QCD2012/013, 10 December 2012 (National Native Title Register 2026).

The Cultural Heritage party for the Project area is the Tagalaka People – through a registered cultural heritage body, the Tagalaka Aboriginal Corporation RNTBC.

Other interests exist within the determination area, namely the:

- QI2013/034 Tagalaka People and Ergon Energy ILUA;
- QI2013/030 Croydon Shire Council - Tagalaka People Determination ILUA;
- QI2006/047 Tagalaka - Croydon Area ILUA #2 with the Croydon Shire Council;
- QI2004/019 Small Scale Mining and Exploration Activities North Queensland Area TAGALAKA with the State of Queensland; and
- QI2003/021 Tagalaka Croydon Area ILUA #1 with the Coordinator-General.

The indigenous land use agreement (ILUA) in the Project tenement is QI2003/007 Tagalaka People Exploration Permit Backlog Project with the State of Queensland (Native Title Vision 2026).

The Proponent is engaging with the Tagalaka People regarding the proposed activities. Consultation is discussed in Chapter 7, Stakeholder Consultation and Engagement. Cultural heritage values are discussed further in Chapter 11, First Nations Cultural Heritage.

2.6.2.2 Non-indigenous cultural heritage

Non-indigenous cultural heritage (NICH) in the Project area has been assessed by a detailed assessment. The findings indicate that the historical context of the Project region has the following themes:

- exploiting, utilising and transforming the land (e.g. exploring, surveying and mapping the land, pastoral activity and managing waters);
- moving goods, people and information (e.g. using draught animals); and
- building settlements, towns, cities and dwellings (e.g. establishing settlements).

The evaluations of the NICH values in the Project area concluded the following:

- There are no known NICH sites or places in the Project area which may threshold for entry to the Queensland Heritage Register (QHR) under the criteria outlined in the QH Act.
- There are no known NICH sites or places in the Project area which may threshold for entry to the Croydon Shire Council's Local Heritage Register (LHR).
- There are no known NICH archaeological deposits currently identified within the Project area that are likely to contain an archaeological artefact that is an important source of information about Queensland's history.
- Historical values that are likely to be of relevance to the Project area are likely limited to fossils.

The Project area would be impacted by the initial vegetation clearing, topsoil stripping, excavation and bulldozing, and mining activities.

A 'Stop Work' procedure would be utilised by the Project for NICH, including in dealing with the discovery of currently unknown and unidentified sites, places, or items. Fossils would be appropriately managed and handled in accordance with the recommendations from the Queensland Museum (QM), including:

- Unexpected Finds Protocols: Implement detailed procedures to be followed in the event that a fossil find is unexpectedly encountered during excavation activities.
- Worker Inductions: Conduct training sessions for all personnel who might come into contact with fossil finds.
- Engagement of a Palaeontologist: an 'on-call' specialist who can attend the site in an event of unexpected fossil find.
- Establish a collaborative agreement with QM to facilitate the assessment, removal, and preservation of significant fossil finds.

2.6.3 Water quality and water resource

2.6.3.1 Water resources

Surface water

The Project is located within the Norman River Catchment area, which drains north to the Gulf of Carpentaria. The Norman River Basin has a total catchment of 109,516 km^2 with the main rivers being the Norman River, Clara River and Yappar River.

The Project is located immediately north of Warrigal Creek and the Borer River and has an unnamed waterway (stream order 3) flowing through the northern extent of the proposed MLA. The Borer River/ Warrigal Creek is a tributary of the major Clara River, a stream order 6 watercourse with a sub-catchment area of 2275 km^2.

The following are considered relevant environmental values for the surface water in the Project area:

- aquatic ecosystems;
- aquaculture and human consumption;
- agriculture;
- recreational use;
- visual recreation; and
- cultural and spiritual values.

Controlled releases are not proposed for the Project, and the mine affected water management system is designed as a no-release system. Containment has been modelled to be in the 99th percentile, where overtopping would occur in less than 1% of years.

Modelling indicates that sediment dams overtop in less than 20% of years. The sediment dams have been designed to provide sufficient storage for settlement of suspended solids so that water quality during overtopping events has negligible impacts on the water quality in the receiving waterway.

The Project has the potential to have a minor impact on the behaviour of the local floodplain and would require the establishment of a permanent watercourse diversion and flood levee around key Project infrastructure including the pit. Potential impacts would be localised, with no significant impacts on flooding extending upstream or downstream of the Project.

The Project would not significantly alter the local flow regime or the surrounding catchment and is therefore not expected to result in significant impacts to in-stream or off-stream wetland inundation frequency or duration.

Sediment dam overflow events are expected to coincide with high flow conditions when watercourse sediment loads in the local watercourses are naturally high. Key ecosystem cycles (e.g. water, nutrients) would remain intact and are not expected to be compromised as a result of the Project. Subsequently, potential impacts to aquatic ecosystem environmental values are also of low risk and magnitude.

Proposed mitigation measures to minimise impacts of the Project include:

- A water management system has been developed to mitigate adverse environmental impacts on water resources, and infrastructure is planned for the storage and management of several categories of water associated with the Project. Water stored on site is recycled with a preference for mine affected water to be used ahead of other sources in the process plant.
- The water management system minimises the clean catchment runoff captured by site by diverting clean water around operations.
- Sediment dams would be used to collect runoff from overburden and disturbed areas and to reduce any concentrations of solids prior to release into the receiving environment during rainfall events.
- A Water Management Plan would be developed for the Project to detail management and monitoring of the water management system.
- A Receiving Environment Monitoring Program (REMP) would be developed for the Project. The aim of the REMP is to monitor and assess the potential impacts of controlled or uncontrolled releases of water and associated contaminants to the environment.

Groundwater

Groundwater modelling has been developed based on a review of past regional conceptualisation combined with site-specific hydrogeological data.

The model indicates that Tertiary sediments are consistently dry within the Project site, although where saturated outside the Project areas they are considered to form a low permeability unconfined aquifer (i.e. hold water).

Below the Tertiary sediments is the Gilbert River Formation (GRF), which is interpreted as a moderate to high permeability regional aquifer and represents the only laterally continuous aquifer beneath the Project. This is the primary groundwater bearing unit encountered within monitoring bores. Regionally, the GRF is considered a confined aquifer where overlain by the geological Wallumbilla Formation; however, due to the absence of the Wallumbilla Formation within the Project area, the GRF is locally interpreted as an unconfined aquifer.

The underlying igneous and metamorphic basement rocks are generally of very low permeability, with groundwater occurrence restricted to localised joints and fractures associated with secondary permeability and porosity. These basement rocks are therefore considered to act as an aquitard.

Groundwater levels in the Project area generally occur between 8 mbGL and 20 mbGL, with an average depth to groundwater of approximately 10 mbGL. The groundwater table broadly reflects topography, with regional groundwater flow inferred to occur from the east southeast to west northwest. Recharge to the GRF occurs from outcrop areas located approximately 25 km east of the Project, with additional localised recharge occurring during the wet season. Groundwater monitoring data indicates only minor groundwater level responses during the 2025/2026 wet season relative to the comparatively static conditions observed during the dry season. The groundwater table does not intersect the ground surface within the MLA areas, including within watercourses and drainage features, and therefore does not provide baseflow contributions to creeks within the MLA areas.

Potential drawdown impacts were assessed on the following:

- Groundwater users:
    - Third-party bores accessing the Gilbert River Formation for water supply are not located within the drawdown area. The risk and magnitude of mining related groundwater impacts on registered bores and is low.
- Groundwater dependent ecosystems:
    - Minor drawdown has been predicted as a result of the Project, however the extent of drawdown is contained, in all sensitivity cases, to a small lateral area surrounding the mining void. Drawdown is not predicted to extend to the alluvium, or any groundwater dependent ecosystems.
- Stygofauna:
    - The lack of suitable habitat in the aquifers within the Project area, and the absence of stygofauna from samples collected during the survey indicate that there are no stygofauna in the Project area. Therefore, the Project would have no significant impact on stygofauna communities.

2.6.3.2 Water quality

Surface water

Potential contaminant sources of surface water quality associated with the Project include:

- erosion from exposed surfaces;
- surface runoff from disturbed areas;
- surface runoff from mine waste or ore;
- incidental runoff from chemical/hydrocarbon spills;

- process waste streams and tailings; and
- seepage, overtopping or dam failure of mine water storages.

Assessments concluded the following:

- Erosion and sediment impact on environmental values are expected to be of low risk and magnitude.
- Impacts from mine affected water (MAW) or spills within the processing plant area on environmental values are expected to be of low risk and magnitude.
- The risk to water values associated with seepage, overtopping, and failure of storage is assessed to be low given design considerations.
- Given that the open-cut pit would be used as a contingency storage, no controlled or uncontrolled releases of mine water are predicted to occur. In the rare event that a release occurs, the impacts would be mitigated by the volume of water in the catchment. The impact of releases on surface water values is therefore expected to be of low risk and magnitude.

Additionally, it is concluded that the surface water quality results and groundwater quality results are dissimilar and do not indicate connectivity.

Groundwater

During operations, mining would occur below the local groundwater table within the Gilbert River Formation, and result in minor groundwater drawdown. The localised hydraulic sink would minimise the potential migration of pollutants from the Project site. Any seepage is expected to report to the pit, where it would be removed for use as water supply for mineral processing, and is unlikely to mobilise to the regional water table. Consequently, there would be negligible impacts on groundwater quality in aquifers during operation. Surface water quality in downstream waters would also not be impacted, due to hydrological disconnection and no interaction with the relevant groundwater.

In the late stages of operation, waste material including tailings and waste rock would be rehandled to backfill the void, to ensure that no residual void remains post-closure. An engineered capping layer over the tailings would also be installed, ensuring water infiltration of approximately 3%. An assessment of the post-closure backfilled void water quality was undertaken by RGS (2026). For most elements found in waste rock and tailings, modelled long-term concentrations are comparable with or below guideline values for protection of moderately disturbed freshwater aquatic ecosystems. Minor exceedances of molybdenum, selenium, and vanadium reflect source term concentrations rather than acid generation and are common.

An assessment of the potential for mobilisation of elements from the pit into the receiving environment was undertaken by Hydrogeologist (2026). Preliminary seepage transport calculations indicate a delay of more than 500 years before detectable changes could occur at receptors located approximately 100 m downgradient of the pit. This is indicative of the extremely slow advective velocity and dispersion within the aquifer. The distance of solute movement predicted by the seepage transport model (i.e. 100 m downgradient of the pit) are consistent with the results of the particle tracking, which shows that the particles remain well within the Project MLs after 1,000 years post mining. The particles that originated around the perimeter of the final void pit crest migrate approximately 100 m from the pit crest (to the west northwest). In accordance with the outcomes of the modelling which show extreme slow movement of elements from the pit, impacts on environmental values are not expected to be of significant risk or magnitude. This includes the distance from sensitive receptors including groundwater users or springs, lack of use of the relevant groundwater system by GDEs, lack of presence of stygofauna, and disconnection from the surface water system.

It is noted that neither the particle tracking nor the geochemical seepage transport modelling considers the geochemical degradation of solute constituents, nor the dilution effect that would occur from the mixing with upgradient (unaffected) groundwaters. If both geochemical degradation and dilution were to be taken into account, the geochemical modelling and seepage transport modelling results would likely result in further reduced geochemical changes and transport of solute from the backfilled final pit void, and subsequently lower potential risk or magnitude of impact.

2.6.4 Flora and fauna

The terrestrial ecology surveys have been undertaken by suitably qualified ecologists in accordance with all required permits and approvals. Seasonal field surveys were undertaken between 2024 and 2025, during the following dates:

- 13 to 19 August 2024;
- 14 to 27 November 2024;
- 11 to 15 February 2025; and
- 26 to 2 September 2025 (flora only).

The survey timing accounted for temporal and seasonal changes in faunal assemblages while avoiding the hottest and coldest months, as per the 'Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (V4.0)' (Eyre et al. 2022).

Additionally, an aquatic ecology survey was conducted for the Project between 13 to 19 February 2025 with all samples collected on 14 and 15 February.

2.6.4.1 Terrestrial flora

Results from terrestrial ecology field surveys indicate that the Project area is largely comprised of remnant vegetation. Regional Ecosystems (REs) within the Project site include:

- RE 2.3.22 - Long-fruited Bloodwood (*Corymbia polycarpa*) and *Melaleuca* spp. woodland on sandy channels and levees;
- RE 2.3.26a - River Red Gum (*Eucalyptus camaldulensis*) woodland to low woodland, with *Melaleuca* spp., on fringes and in channels of minor watercourses;
- RE 2.3.26a/2.3.50a - River Red Gum (*Eucalyptus camaldulensis*) low woodland, with *Melaleuca* spp., fringing minor watercourses, with areas of bare sand and rock, and scattered vegetation in channels;
- RE 2.3.26c - River Red Gum (*Eucalyptus camaldulensis*) low woodland, with Broad-leaved Paperbark (*Melaleuca viridiflora*), on fringes of minor watercourses in broad sand sheets;
- RE 2.3.29b - *Melaleuca* spp. low open woodland to low woodland on alluvial plains and drainage depressions;
- RE 2.3.41 - Annual tussock grassland on alluvial plains;
- RE 2.3.42b - Coolibah (*Eucalyptus microtheca*) low open woodland to woodland on alluvial plains;
- RE 2.3.55d - Seasonal swamp (wooded). Broad-leaved Paperbark (*Melaleuca viridiflora*) low woodland in shallow closed depressions on sand sheets;
- RE 2.3.61c - Seasonal swamp (wooded). Coolibah (*Eucalyptus microtheca*) and Broad-leaved Paperbark (*Melaleuca viridiflora*) woodland in closed depressions on alluvial plains;
- RE 2.5.14a - Broad-leaved Paperbark (*Melaleuca viridiflora*) low open woodland to low woodland on sand sheets;
- RE 2.5.14a/2.5.17b/2.3.29b/2.3.51 - Mixed community of *Melaleuca* spp. low open woodland to low woodland on fringes of alluvial plains and sand sheets, with seasonal swamps of River Red Gum (*Eucalyptus camaldulensis*) woodland;
- RE 2.5.17b - Gulbarn (*Melaleuca citrolens*) low open woodland to low woodland on broad sand sheets;
- RE 2.5.18a - Rough-leaved Bloodwood (*Corymbia setosa*) low open woodland to woodland on broad sand sheets; and
- RE 2.5.28a - Long-fruited Bloodwood (*Corymbia polycarpa*) woodland on broad plains of reworked sand deposits.

No Threatened Ecological Community (TEC) under the EPBC Act is present within the Project area.

A total of 87 native flora species were recorded in the Project area during repeated field surveys. No threatened flora species were identified. One introduced flora species was recorded, the Rubber Vine (*Cryptostegia grandiflora*), listed as a restricted matter under the Biosecurity Act (Qld).

The Project would clear or disturb approximately 2,413.7 ha of remnant vegetation as part of Project development.

Several mitigation measures are proposed to minimise impacts from the Project, including:

- vegetation clearing protocols;
- progressive rehabilitation; and
- weed and pest management.

2.6.4.2 Terrestrial fauna

A total of 144 native vertebrate species were identified during the field surveys, comprising six amphibians, 25 reptiles, 100 birds and 13 mammals. Five introduced fauna species were recorded, as Cane Toads (*Rhinella marina*), Dingo (*Canis lupus dingo*), Feral Cat (*Felis catus*), the Feral Pig (*Sus scrofa*) and Cattle (*Bos taurus*).

Two bird species of conservation significance, the White-throated Needletail (*Hirundapus caudacutus*), listed as vulnerable and migratory under the EPBC Act, and the Fork-tailed Swift (*Apus pacificus*), listed as migratory under the EPBC Act, were observed during the November 2024 field survey. The Fork-tailed Swift was also recorded during the February 2025 field survey.

2.6.4.3 Aquatic ecology

No aquatic flora or fauna species listed as threatened under the EPBC Act or NC Act were identified during the aquatic ecology survey.

The aquatic flora species encountered were common emergent macrophyte species, two semi-aquatic sedges, Cyperus sp. and Juncus sp. across the aquatic survey sites. The lack of both diversity and abundance of aquatic plants at some sites is likely indicative of harsh physical conditions, cattle grazing and trampling, or a combination of these factors.

No fish were recorded through the targeted fish survey methods, noting that conditions were unsuitable for fish trapping at most sites at the time of the survey. Unidentified fish species were opportunistically observed at site W7 during the macroinvertebrate survey.

No aquatic flora and fauna of conservation significance were identified in the Project area, and the flora and fauna present are not considered representative for the general region and not sensitive to change.

Aquatic habitat values of the Project area were described through the results of a physical assessment of the watercourses, habitat bioassessment and condition assessment. The physical assessment identified minimal effects of erosion on the waterways with the leading cause of local erosion described as due to stock access. The habitat bioassessment recorded most of the survey sites as representing ‘fair’ habitat quality, and one site (upstream on the unnamed tributary of Warrigal Creek) representing ‘poor’ quality. The condition assessment outcome was for all assessed sites to be considered minimally impacted by upstream activities.

The Map of Queensland wetland environmental values identified several GES wetlands intersecting the Project area. These included both palustrine and riverine wetlands (DNRMMRRD 2026). Palustrine wetlands are primarily vegetated (with more than 30% emergent vegetation) non-riverine or non-channel environments of less than eight hectares. This includes billabongs, swamps, bogs, springs, soaks and similar features (DETSI 2013b). In comparison, riverine wetlands include all wetland and deepwater habitat that

occurs within a channel. The channels can be naturally or artificially created, periodically or continuously contain moving water, or connecting two bodies of standing water. This includes rivers, streams, creeks, brooks, rivulets, canals, channels, and watercourses and tributaries (DETSI 2023).

In the Project area, Warrigal creek and the unnamed tributary of Warrigal creek are vegetated with River Red Gum (*Eucalyptus camaldulensis*) woodland to low woodland, with *Melaleuca* spp. along them. There are some areas of River Red Gum (*Eucalyptus camaldulensis*) low woodland, with Broad-leaved Paperbark (*Melaleuca viridiflora*), often in the smaller channels.

The wetlands are mapped as seasonal swamps with either Coolibah (*Eucalyptus microtheca*) and Broad-leaved Paperbark (*Melaleuca viridiflora*) woodland in closed depressions on alluvial plains, or Broad-leaved Paperbark (*Melaleuca viridiflora*) low woodland in shallow closed depressions on sand sheets.

In general, the water quality of the Project area watercourses was consistent with the expectations for a slightly disturbed ecosystem in the region with agricultural land use activities. The water was identified to be elevated compared to some water quality objectives including turbidity, nitrogen, phosphorus, dissolved aluminium, dissolved copper and dissolved silver. These issues are considered to be representative of the natural conditions of the catchment and the influence of existing land use practices.

2.6.4.4 Groundwater dependent ecosystems

A targeted groundwater dependent ecosystem survey was undertaken for the Project. During a dry season assessment under optimal seasonal conditions, there was no evidence that woody vegetation is reliant on groundwater to any degree to support transpiration. Additional conclusions include that:

- The dry-season moisture required to support transpiration in woody vegetation is supplied entirely within the vadose zone across all habitats sampled. Some habitats, including swamp wetland depressions (RE2.3.55d) and ephemeral flood channel habitats (RE2.3.26a), retain moisture for longer into the dry season by capturing surface flows and facilitating moisture infiltration. Moisture availability in these habitats declines as soil moisture reserves diminish under drier climate conditions.
- The wet-season ponding of surface water in swamp wetland depressions facilitates deep infiltration into the soil profile. Ephemeral zones of saturation may occur when infiltrating surface water is intercepted by clay soil horizons, though the saturation is fleeting and does not meet the definition of groundwater. The ecohydrological function of these swamp wetlands does not align with the definition of a GDE.
- In ephemeral drainage lines, wet-season recharge of fluvial sands facilitates the perching of shallow groundwater, hosted in channel sand deposits, on impermeable basement rock. Woody vegetation usage of this perched groundwater suggests that these watercourses represent GDEs when perched groundwater is present. Perched groundwater rapidly diminishes as the climate dries, and riparian woodlands become solely reliant on soil moisture held in the vadose zone.
- The recent installation of groundwater monitoring bores indicates a deeper groundwater zone, hosted in the Gilbert River Sandstones, inferred to be a Great Artesian Basin aquifer. This groundwater is under sub-artesian pressure, with a potentiometric surface at ~7 mbgl. There is no indication from biophysical assessment that this deeper groundwater interacts with the rooting zone of woody vegetation.

2.6.4.5 Stygofauna

A stygofauna assessment undertaken for the Project found no stygofauna in any of the bores assessed for stygofauna in the study area. It is noted that the nearest known stygofauna records are from Chillagoe in limestone strata, 290 km to the north-east of the Project and Lawn Hill, 430 km to the west (*Queenslandnella spinosa*) (Appendix F Stygofauna assessment). Both of those records were in or near limestone strata.

Most water quality variables were suitable for stygofauna, although temperature and pH were potentially high. Groundwater temperature was between 31.6 and 34.0 °C. pH was between 8 and 9 for all bores except ROWE1, which measured 7.88. Electrical conductivity was low and less than 1.3 mS/cm in most bores. Three of the production bores, ROWE2, ROWE1 and Pelican bore, had EC greater than 2. Dissolved oxygen was

lowest in the monitoring bores, being between 7.4 and 27.2% Saturation for 6 of the monitoring bores, and 41.2% Saturation for EMSB01. Dissolved Oxygen Concentration was greater than 30% Saturation for all production bores except NW Bore, which was 19.8% Saturation.

The sandstone of the Gilbert River Formation is considered unsuitable for stygofauna, unless it was sufficiently fractured to allow stygofauna movement through the network of cracks and fissures. The extent of fracturing in the Gilbert River Formation at the project location is not known, although it is likely to be greatest near the top of the formation or at fault zones. Without fracturing, the sandstone would lack habitable pore space for stygofauna, and there would be insufficient connectivity with the surface to sustain groundwater food webs.

2.6.4.6 Matters of State Environmental Significance

A significant residual impact from the Project on Matters of State Environmental Significance (MSES) would occur for the following matters:

- Regulated vegetation – Prescribed REs that intersect a VM Act Wetland:
  - RE 2.3.55d – 16.51 ha
  - RE 2.5.14a – 2.70 ha
  - RE 2.5.17b – 3.26 ha
- Regulated vegetation – Prescribed REs located within the defined distance of a VM Act watercourse:
  - RE 2.3.22 – 8.99 ha
  - RE 2.3.26a – 18.59 ha
  - RE 2.3.29b – 30.01 ha
  - RE 2.5.14a – 3.29 ha
  - RE 2.5.17b 2.81 ha

An offset would be required for the above impacts.

For all prescribed environmental matters, the size and scale of an offset is that which is necessary to achieve a conservation outcome.

Under the Queensland Environmental Offsets Policy, there are three offset delivery options, which include:

1) Proponent-driven offset: A proponent-driven offset may take the form of a traditional land-based offset; be undertaken through actions under a Direct Benefit Management Plan; or a combination of both. For a proponent-driven offset, the offset delivery liability remains with the proponent and the offset must be delivered in accordance with an Offset Delivery Plan approved by the administering agency.

2) Financial settlement offset: For financial settlement offsets, the payment amount must be calculated in accordance with the methodology set out in the QEOP. A web-based 'financial settlement offset calculator' is available on the Queensland government website that can assist in this process. The State is responsible for delivering a conservation outcome from the financial settlement offset payment.

3) A combination of a proponent-driven offset and financial settlement offset may be utilised. However, the Direct Benefit Management Plan can only contribute up to 10% of the offset delivery.

The Proponent would deliver offsets in accordance with the Queensland Environmental Offsets Policy. The preferred delivery mechanism is financial settlement; however, proponent-driven offsets or a combination may be considered, subject to availability of suitable land and conditions at the time of offset delivery.

An Environmental Offset Strategy has been prepared for the Project that presents the offset requirements for the MSES and proposed provision of offsets for impacted matters.

Monitoring and assurance of the Environmental Offset Strategy would be undertaken to be consistent with applicable condition requirements and policies.

2.6.5 Social environment

Under the SSRC Act, a proponent must prepare a social impact assessment (SIA) for an EIS. An SIA has been undertaken and is included in this EIS. The SIA assessed existing social values and undertook stakeholder and community consultation.

Key study areas, including the local area, were identified to support a comprehensive assessment of potentially impacted stakeholders. Study areas were chosen based on the geographic areas and communities likely to experience changes to social conditions as a result of the Project. The study areas are:

- Local:
  - Croydon LGA;
- Regional service centres:
  - Normanton UCL;
  - Richmond UCL;
  - Townsville UCL;
  - Cairns UCL;
- Regional:
  - LGAs of Croydon, Richmond, and Carpentaria.

The regional study area includes lands of the Tagalaka People (Croydon LGA), the Gkuthaarn, Kukatji and Kurtijar Peoples (Carpentaria LGA) and Wunumara, Mbara and Yirandhali Peoples (Richmond LGA). The local study area encompasses the entirety of the Project site, Esmeralda station and the township of Croydon, to provide a micro analysis of the immediate impact area.

The Proponent would seek to create and maintain employment and trade opportunities within the local townships, including through the establishment of targets for local employment and procurement. The Project would generate royalties for Queensland, and where minerals are exported, the Project would generate revenue for Australia.

The Project is expected to create up to 100 full time equivalent (FTE) jobs during construction, and 192 FTE jobs during peak operation.

Through the commitment to high Environmental, Social and Governance (ESG) standards, the Project would be a fully auditable production of asset materials. The highly regulated and best practice mining methods in Queensland would ensure the Project operates within a low-risk jurisdiction for ethically derived battery minerals. Continued stability and increased employment opportunity and wealth creation in the region are key positive economic outcomes of the Project.

Potential negative social and economic impacts include:

- an increase in demand for health, emergency and educational services;
- increase in regional demand for housing; and
- amenity impacts such as an increase in dust and noise emissions (expected to be of low risk and magnitude given remote location of Project site).

2.6.6 Economic environment

The development and operation of the Project would require significant investment. Capital expenditure would occur across two main stages - where Stage 2 is anticipated to commence 12 months after Stage 1.

- Stage 1 – construction, mining and processing plant development;
- Stage 2 – expansion works to peak capacity.

Capital expenditure would be funded via a mix of debt and equity, and operating expenditure would be funded through operating cash flows. The Project has strong support for equity funding from strategic shareholders with capacity to fund the project with equity. The Proponent's strategic shareholders have successfully secured funding and operated mines and energy infrastructure projects globally.

The Project would have beneficial impacts on the economy as it would:

- contribute to economic growth;
- increase employment and household incomes;
- provide support for local and regional businesses; and
- contribute to government taxation revenues through a variety of taxes and duties which can be used by governments to provide additional services and infrastructure to support businesses and households throughout Australia.

A cost-benefit analysis (CBA) was undertaken for the Project as part of an economic impact assessment (EIA)[1]. The CBA examined the costs and benefits associated with the Project over its full lifespan.

The CBA applies techniques in accordance with guidelines set out in the Queensland Government Cost Benefit Analysis Guide (Queensland Government 2021) and Australian Government Cost Benefit Analysis (Australian Government 2023). The CBA assessed the impact of the Project proceeding compared to a scenario without the Project, examining the stream of relevant economic, social and environmental costs and benefits anticipated from the Project to assess the net present value (NPV) of the Project to the Queensland community. All values are expressed in 2026 Australian dollar terms and discounted to 2026 present values.

The NPV and Benefit Cost Ratio (BCR) would be the primary decision criteria for the economic appraisal. The NPV of a project expresses the difference between the present value of future benefits and present value of future costs, i.e.: NPV = present value of benefits – present value of costs. The BCR provides the ratio between the present value of benefits and present value of costs, i.e., BCR = present value of benefits / present value of costs.

The CBA identified that, at a moderate discount rate, the Project is deemed to be economically desirable with the benefits outweighing the costs. The results below outline the present value (PV) of the costs and benefits associated with the Project, at stepped discount rates. The CBA identifies, across all discount rates examined, the Project would be deemed economically desirable under the CBA modelling assumptions used, with the benefits outweighing the costs.

A sensitivity analysis across the key assumptions in the CBA modelling was used in the economic impact assessment. The sensitivity analysis tested the validity of modelling assumptions and results. This indicated that the Project is likely to deliver a positive NPV across the scenarios.

2.6.7 Hazards and safety

A preliminary risk assessment has been undertaken to analyse and evaluate the potential risks and hazards for the Project. Of the total residual risks identified and assessed, no Class IV (Very High) risks were identified, while 4 Class III (High) risks were identified.

[1] A commercial-in-confidence version of Appendix P (Technical Report – Economic Impact Assessment) has been provided separately to the Coordinator-General to support the evaluation of the EIS. Appendix P contains commercially sensitive information relating to Graphinex's project economics and is therefore not publicly available.

Identified Class III potential risks relate to:

- loss of containment of tailings (seepage);
- design failure of levees (overtopping);
- construction, mining and industrial activities; and
- dust impacts to sensitive receptors.

Specific and targeted controls to reduce the risk of impacts on health, safety, and the environment have and would be developed and are listed in Section 2.7.

2.6.8 Air quality

The air quality of the local and regional air shed can be characterised as typical of a rural environment. Existing pollutant sources are wind-blown dust, sporadic traffic on unsealed roads, bushfires, and controlled burning activities within the region.

Background air quality was assessed by using the North Ward monitoring station located in Townsville, and managed by the Queensland Government. There are no DETSI monitoring stations near the Project, with the nearest potentially suitable stations located at Mount Isa and Townsville, roughly 350 km and 460 km away respectively. Given the large-scale mining and smelting operations present at Mount Isa, monitoring data from this area is not considered appropriately representative of air quality at the project site. Of the multiple monitoring stations active in Townsville, the North Ward station has been deemed to be the most appropriate for the purposes of the air quality assessment. The North Ward station would provide a conservative estimate of ambient background in the Project area, noting it is proximal to residential areas that would have higher levels of air pollutants due to anthropogenic activities such as vehicle use, than would occur in the project area.

CALPUFF, modelling (version 7.2.1), an advanced method of atmospheric pollution dispersion modelling, was conducted for the Project. The meteorological component of The Air Pollution Model (TAPM) was used to provide wind fields over the region. Wind speed and direction data was assimilated into the model. To provide a comprehensive assessment, the model conservatively included a 'worst-case' scenario in Year 42, including a high-production schedule under adverse weather conditions.

Key air quality parameters assessed were: $PM_{2.5}$, PM_{10}, total suspended particulate, dust deposition, sulphur dioxide, carbon monoxide (CO), and nitrogen dioxide (NO_2).

Modelled particulate concentrations at all sensitive receptors were below the relevant criteria, and therefore no impact on sensitive receptors is expected.

With regard to air quality impacts on flora and fauna, dust deposition on vegetation, including mapped wetlands classified as 'least concern' under the VM Act, is unlikely to result in any significant impact. The surrounding grazing cattle around the Project site are also not expected to be impacted by the Project's emissions.

Odour and fume impacts are not expected for the Project.

The Project would implement an Air Quality Management Plan to manage the impacts of dust emission throughout the Project's life.

2.6.9 Noise and vibration

The Project is in a rural area predominantly used for cattle grazing. Sensitive receptors relevant to the Project are limited to a few isolated residences, which are off-site, and the on-site mine accommodation.

Existing noise sources around the Project site which contribute to baseline noise levels are those that can be typically found in a remote, rural setting. These include distant road traffic and agricultural activities, and natural noises, such as birds, insects, and vegetation movement in the wind.

Noise measurements, including low frequency noise modelling, and vibration impacts were assessed. Blasting impact was also modelled, as blasting would be used in the Project operations. The noise source data for the Project's equipment has been obtained from a baseline noise monitoring event conducted over a 5-day period at two of the nearest receptors to the Project.

Noise emissions would be highest and longer-lived during the Project's mining operation phase, and lesser during the construction and decommissioning and rehabilitation phases due to the operation equipment used and the nature of the activities. Blasting is proposed to occur at the Project as part of mining activities.

Modelling indicates that the Project is compliant with the Environmental Protection (Noise) Policy 2019 (EPP (Noise)) acoustic quality objectives and background creep requirements. The predicted noise levels are under the acoustic quality objectives at residential sensitive receptors. The highest noise level is expected to occur at Receptor 2 (Prospect) in calm night conditions, at 31 dBA as measured with the CONCAWE algorithm. As the predicted noise levels are under the limit, the Project would be compliant with the acoustic quality objectives.

The Project is compliant with the vibration limits suggested by the 'Guideline – Model Mining Conditions' (DESI 2024i). Vibration levels are below the vibration limits of 5 and 10 mm/s at a distance of 1 to 2 km. The nearest receptor (R2) is approximately 10 km from the mine pit, at which point the vibration levels are well below the vibration limits.

The Project would implement a Noise Management Plan to avoid, minimise, and manage noise.

2.6.10 Transport

The total transport task for the Project includes the:

- transport of material by truck between estimated origin in Queensland and the Project site;
- transport of personnel by bus between the on-site worker's village and the Project site;
- transport of personnel by air to the on-site airfield;
- transport of personnel by light vehicle to the on-site worker's village; and
- transport of mining products by truck to the on-site processing plant and to Townsville for export of mining products by sea from Port of Townsville terminals to customers.

Where possible, the construction and operation workforces would be drawn from local and regional communities. Roles that are not able to be filled from local communities, including where appropriate or necessary experience is not available in those communities, would be filled with workers employed on a 'fly-in/fly-out' (FIFO) basis. This approach is consistent with the Strong and Sustainable Resource Communities Act 2017 (SSRC Act), which prohibits a workforce of 100% FIFO workers, and establishes a priority of employment in the following order:

1) workers from local and regional communities.

2) workers who would live in regional communities.

3) workers who would FIFO to the Project.

It is the intention of the Proponent that FIFO workers would be flown directly to site. Travel distance from Cloncurry airport to the Project site is approximately 428 km and would take approximately 5 hours and 15 minutes. Workers arriving by plane would be transported to the Project site and an on-site accommodation village by bus. This is the most efficient and effective method of workforce transport, given the site context of a rural and remote location, and the consideration of use of public roads and impact on the community.

On-site, most workers would travel to the working mine via bus from the accommodation village, with some travel by light vehicle from the Croydon or Richmond Shires for contract work. The on-site accommodation is intended to ensure worker safety by reducing fatigue and daily travel time.

A Transport Impact Assessment concluded that the Project would have an increased but manageable demand on road use, including the Richmond Woolgar Road, Flinders Highway, and other supporting infrastructure including the Port of Townsville for import of Project components, and export of mineral product.

2.6.11 Greenhouse gas

Given the remote location of the Project, it is not currently feasible to connect to the regional electricity grid. Therefore, the Project would require an on-site power supply solution. A baseline scenario, which considers a common scenario where the total electricity requirement for the Project is supplied by a diesel generator powerhouse, has been assessed and compared against a mitigated scenario, where renewable energy meets approximately 38.7% of the electricity requirement for the Project (with a combination of solar array and supporting batteries).

Scope 1, 2 and 3 emissions were assessed.

The potential impacts from the Project's Scope 1 and 3 emissions to environmental values are assessed as being of low risk and magnitude. The Project would result in no Scope 2 emissions as it would not source electricity from the grid. The Project's cumulative abated emissions from 2027 (approximate Project commencement) to 2050 (net zero) represent a small proportion of the assessed budgets of Queensland, Australia, and globally, comprising approximately 0.29% of the Queensland budget, 0.068% to 0.076% of the Australian budget, and 0.036% and 0.0046% of the remaining global 1.5°C and 2.0°C carbon budgets, respectively.

Furthermore, the Project would mine and sustain production of graphite concentrate which would be used in the manufacturing of battery anodes and other products at the forefront of electrification, including electric vehicles. These, in turn, would aid in the transformation and transition of electricity networks from fossil fuel dominated, to renewable energy based. By enabling the economy-wide transformation, the Project would have significant contributions to avoided emissions.

A Greenhouse Gas Abatement Plan has been developed to identify emissions reduction targets and opportunities to mitigate Scope 1 emissions of the Project.

2.7 Proposed environmental management measures

The Proponent has developed proposed draft Environmental Authority conditions that are generally consistent with the *General conditions for critical minerals projects* (ESR/2025/7261, version 1.00) and the guideline *Structures which are dams and levees constructed as part of environmentally relevant activities* (ESR/2016/1934, version 9.06).

Key environmental measures to be implemented for the Project include:

- progressive rehabilitation of the Project site to result in a final landform that is stable, safe, non-polluting and able to sustain post-mining land use of equal or improved value;
- biodiversity offsets for significant residual impacts to identified Matters of State Environmental Significance (MSES);
- operation of a Project water management system to sustain local and regional water resources and water quality values; and
- development and implementation of site-specific management plans to minimise impacts to environmental values.

The Proponent has committed to the preparation and implementation of plans, programs and strategies to minimise impacts to environmental values. The following plans have been prepared and are included in this EIS:

- Greenhouse Gas and Decarbonisation Technical Report (Appendix B);
- Social Impact Management Plans (Appendix J);
- Progressive Rehabilitation and Closure Plan (Appendix T);
- Noise and Vibration Management Plan (Appendix Y); and
- Technical Report for Tailings Storage Facilities (Appendix W).

General management plans to be prepared for the Project, as described across EIS chapters, are proposed as conditions of approval to ensure their development prior to the commencement of relevant activities or Project commencement. These include the following plans:

- Dust Management Plan;
- Topsoil Management Plan;
- Erosion and Sediment Control Plan;
- Water Management Plan;
- Receiving Environment Monitoring Program;
- Weed and Pest Management Plan;
- Emergency Response Plan;
- Non-mineral Waste Management Plan;
- Road Use Management Plan;
- Bushfire Management Plan;
- Emergency Response Plan;
- Irrigation Management Plan;
- Cultural Heritage Management Plan; and
- Safety and Health Management System.

2.8 TOR Reconciliation table

TOR	Terms of reference - Content requirements of the EIS	EIS Section
Section 2 – Executive summary		
2.1	Provide an executive summary that describes and conveys the most important aspects of the project, its potential impacts and how they will be managed, in a concise and readable form. It is to use plain English, avoid jargon, be written as a stand-alone document and broadly follow the structure of the EIS.	Section 2