Northern Territory Environment Protection Authority

TERMS OF REFERENCE FOR PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT

PROPOSAL NAME:	**Fountain Head Gold Project**
LOCATION:	**Pine Creek / Adelaide River (Victoria Daly LGA)**
PROPONENT:	**PNX Metals Limited**
ISSUED:	**11 May 2020**

CONTENTS

1 INTRODUCTION

1.1 Overview

The PNX Metals Limited (the Proponent) – Fountain Head Gold Project (the Proposal) is being assessed by the Northern Territory Environment Protection Authority (NT EPA) under the *Environmental Assessment Act 1982* (EA Act) at the level of an Environmental Impact Statement (EIS).

The assessment process in accordance with the EA Act will be modified following commencement of the *Environment Protection Act 2019* (EP Act). Section 296 of the EP Act will modify the timeframes and some public exhibition requirements in the assessment process that are specified in the *Environmental Assessment Administrative Procedures 1984* (EAAP). Section 301 of the EP Act states that, following completion of the assessment under the EA Act, an environmental approval will be required for the Proposal under the EP Act.

These Terms of Reference (TOR) set out the matters relating to the environment that are to be addressed in a Draft EIS for this Proposal, in accordance with clause 8(3) of the EAAP. The matters relating to the environmental approval under the EP Act, that need to be addressed in the Draft EIS, are outlined in section 3.1 of this document.

The Draft EIS must also address all requirements in the NT EPA General Guidance for Proponents Preparing an EIS (NT EPA, 2019a) and any relevant guidance published in relation to the commencement of the EP Act.

1.2 Background

A Notice of Intent for the Proposal was submitted to the NT EPA for consideration under the EA Act on 20 December 2019. The Proponent proposes to recommence open-cut gold mining at Fountain Head (currently non-operational), and extract gold from the ore using heap leaching. The life of mine is three years. The Proposal is located on Ban Ban Springs Station, approximately 170 km south of Darwin.

The Proposal, as outlined in the Notice of Intent, involves the following:

- expansion and mining of the existing open pit[1], currently 75 m deep, using drilling and blasting techniques to encompass the existing void; approximately doubling its footprint and deepening it by 65 m to a total depth of about 140 m.
- expansion of the existing waste rock stockpile (to approximately double its current size) to accommodate an additional ~23 Mt of waste rock
- construction of processing related heap leach pads, solution ponds, crushing facilities and gold processing plant
- construction of supporting infrastructure including workshops, power station, roads and offices.

The NT EPA decided on 16 March 2020 that the Proposal required assessment at the level of an EIS. Further details on the Proposal and the reasons contributing to the NT EPA's decision are outlined in the Statement of Reasons (NT EPA, 2020) available at: https://ntepa.nt.gov.au/environmental-assessments/register/pnx-metals-limited.

[1] Dewatering of 1.9 gigalitres from the pit, and temporary storage of the water in an upgraded storage dam, is required to enable mining and will be part of current care and maintenance arrangements for the site under the *Mining Management Act 2001 (and do not form part of the Proposal being assessed under the Environmental Assessment Act 1982)*.

Following completion of mining for this Proposal, the site is also proposed for use as part of the Hayes Creek Project. This is a separate proposal by the same Proponent to mine polymetallic ore at Mount Bonnie and Iron Blow and haul it to Fountain Head for processing at a new facility to be constructed as part of that proposal. Tailings generated from that process would be deposited subaqueously in the Fountain Head pit lake to prevent oxidation of reactive materials.

The NT EPA decided in December 2018 that the Hayes Creek Project required assessment under the EA Act at the level of an EIS, and the Proponent is currently preparing that EIS. Further information is available at: https://ntepa.nt.gov.au/environmental-assessments/register/hayes-creek-project.

1.3 Structure of these Terms of Reference

- Part 1 – Introduction: an overview of the Proposal and decisions relating to its environmental impact assessment.
- Part 2 – Matters to be addressed in the Draft EIS: a description of the information requirements specific to this Proposal. The Proponent is required to address all these matters, relating to the Proposal and the surrounding environment, in its Draft EIS. This part must be read in conjunction with the NT EPA General Guidance for Proponents Preparing an EIS (NT EPA 2019a), which outlines the general information that is also required in the Draft EIS.
- Part 3 – Other requirements for the Draft EIS: a list of applicable guidelines and policies, and description of the public exhibition requirements.

2 MATTERS TO BE ADDRESSED IN THE DRAFT EIS

2.1 Summary

A summary of the Draft EIS is required to provide a clear and concise overview of the Proposal, its environmental implications, the approvals process and the function of the EIS in the context of the approvals process. The summary should be written as a stand-alone document, able to be provided on request to interested parties who may not wish to read the full EIS. It should address the site selection process, existing environment including location of the nearest sensitive receptors, the proposed activities and closure outcomes, and the intended future use of the site.

2.2 Proposal description

2.2.1 Overview

Provide an overview of the objectives of the Proposal.

2.2.2 Historical environmental disturbance

Historical mining has contributed to pre-existing environmental issues at the Proposal site and a range of ongoing management measures are currently required to limit impacts on the surrounding environment. It is important for the Proponent, the NT EPA and stakeholders to understand these pre-existing environmental issues. Provide a summary[2] of previous land use/s and the current state of the environment at the Proposal site.

[2] Detailed analysis is required as part of the characterisation of environmental values of each key environmental factor

Clearly describe the disturbances to historical mining components, including infrastructure and landforms, which are part of this Proposal. Describe how the Proposal may interact with the pre-existing site conditions. Describe measures that will be implemented as part of the Proposal to manage any significant pre-existing environmental issues at the Proposal site.

2.2.3 Construction and operation

Provide a detailed description of all aspects of the Proposal as outlined in Table 1.

Table 1: Minimum information requirements for the Proposal description

Topic	Required information
Site layout maps	The description of the Proposal must include, but not be limited to, detailed maps and graphic illustrations of: • the location and dimensions of existing disturbance, infrastructure, roads/tracks and natural and modified landforms (including a depiction of these overlaid on aerial photos or high resolution satellite imagery) • the location and approximate dimensions of areas to be disturbed, structures to be built or repurposed, including (as relevant): o all areas to be cleared[3] or disturbed o the open pit o heap leach facility o processing plant o power station and any transmission infrastructure o water storage facilities o roads and service infrastructure o stormwater and drainage infrastructure o buildings and structures o temporary stockpiles of topsoil, waste rock, ore o other significant mine infrastructure • the Proposal layout overlain with environmental values and existing infrastructure (e.g. roads, railway and pipeline) • the boundaries of the Proponent's mineral lease(s); any overlapping or adjacent permits (mineral, petroleum or other); and any other interests in land including Native Title (claims or determined), Aboriginal freehold land, and pastoral land.
Design	Describe design options considered, reasons for selection and how the proposed design avoids and/or mitigates environmental constraints and potential impacts and risks to the surrounding environment including long-term legacy contamination. Outline and justify any trade-offs in the design. Describe how the Proposal has been designed, or allows for, adaptation to a changing climate e.g. capacity and efficiency of water facilities to allow for potential increase in evaporation and/or large rainfall events.
Construction	Describe all elements of the construction phase including:

[3] To avoid direct impacts to areas sensitive to disturbance (near waterways), native vegetation buffers should be adopted consistent with the Land Clearing Guidelines. https://nt.gov.au/__data/assets/pdf_file/0007/236815/land-clearing-guidelines-2019.pdf

Topic	Required information
	• construction methods and any limitation of these in the area of the Proposal • construction materials required – major types, quantities, qualities, sources, storage requirements and potential hazards • an overview of water quality of any controlled discharge[4] (including targets in accordance with ANZG (2018) or otherwise), location of the discharge point/s, and schedule for the discharge • an assessment of the suitability of the existing evaporation dam, and upgrades, for storing water from the pit • timeframes • any new ancillary infrastructure and upgrades required to service the Proposal, including supply of electricity and road access.
Mining operation and ore processing	Describe all elements of the operation of the Proposal including: • schematic of the operation • methods for open pit expansion • requirements for dewatering including expected volumes and any expected controlled discharge (as required above for the construction phase) • quantity of material to be mined annually (ore and waste rock) • material characterisation (waste rock and ore) and classification (including cut-off grades) and expected volumes of each material type (e.g. non-acid-forming, potentially acid-forming) • timetable for mining operations • processing methods, including the equipment and chemicals to be used in the heap leach facility and gold processing plant • chemicals, reagents and fuel to be used in the heap leach facility and processing circuit (volumes and type of storage) • processing water requirements (volume and quality; including any distinction between mining and post-mining), sources and storage.
Non-mineral waste and hazardous materials	Provide relevant information on non-mineral waste and hazardous materials to be used, including but not limited to: • list and describe potentially hazardous materials to be used or produced and methods for storage, transport, handling, containment, disposal and emergency management of these materials (including fuel) • describe predicted solid and liquid waste streams, both industrial and domestic, including information on the streams to be disposed in landfill/septic on site and/or transported offsite for recycling, reuse or disposal in a licenced landfill facility • describe how the Proposal design conforms with legislation, guidelines, and standards applicable to the Proposal's landfill, sewage treatment and any other waste disposal facilities.
Water Use	Provide relevant information on water use, including but not limited to:

[4] Wastewater discharge off the mine lease would trigger requirements for an application for a Waste Discharge Licence (WDL). The proponent should be aware that a WDL should not form part of the water management strategy and should be considered as a last resort water management tool.

Topic	Required information
	• a water balance (including schematic) and account for the Proposal[5], based on the Minerals Council of Australia Water Accounting Framework (MCA 2014), incorporating: o predicted water demand requirements for each aspect and all phases of the Proposal (including dust suppression, drinking water, ablutions and sewage treatment, mine water, processing of ore and any other uses) o proposed water supply sources, volumes and yields, including details of any peak periods and seasonal variations, and required water quality for uses including processing and dust suppression o proposed water storages and volumes o pit dewatering requirements o management of process waters o options for the recycle and reuse of water. • measures for using water sustainably, with reference to International Council on Mining and Metals guidance (ICMM 2017).
Traffic and transport	Describe traffic and transport activities during construction and operation, including but not limited to: • type, size, number and frequency of vehicles and hours of operation • details on access, haulage routes, vehicle types, volumes of traffic.
Energy	Provide relevant information with respect to energy during construction and operation, including but not limited to: • energy requirements and sources • consideration of renewable sources of energy and justification of selected option • estimate of the greenhouse gases emissions • measures to maximise energy efficiency and avoid and/or reduce greenhouse gas emissions, particularly relating to source and consumption of energy, and consistent with the NT Government's aspirational target of achieving net zero greenhouse gas emissions by 2050 (NT Government 2019).
Workforce	Provide a summary, for each phase of the Proposal, of the: • estimated number of people to be employed • skills base required • likely sources (local, regional, overseas).

2.2.4 Rehabilitation and closure

Provide clear descriptions and maps of the mine lease that delineate and define the Proponent's responsibility for rehabilitation of legacy disturbances that may or may not be further disturbed by the Proposal. Provide an explanation of which physical

[5] Noting the *Water Act 1992* requires proponents to prepare a plan that demonstrates how and when water will be used over the life of the Proposal. An assessment against Section 90 factors in the *Water Act 1992* will be required and any gazetted exemptions should be discussed.

components of the Proposal may be used for part of the Hayes Creek Project, and for what period of time, following completion of this Proposal.

As the Proposal has a short life of mine and the closure and rehabilitation approach could be dependent on the Hayes Creek project that is subject to a separate environmental assessment and approvals process, include two conceptual Mine Closure Plans. These are to address each potential scenario: (1) the Hayes Creek project proceeds within a short period after completion of mining in this project; and (2) the Hayes Creek project is delayed or does not proceed. The Mine Closure Plans are to be developed according to leading practice guidance (e.g. DIIS 2016; DMP & EMP 2015; ICMM 2019), the principles of the International Council of Mining and Minerals Mine Closure Guidelines (ICMM 2015), and as outlined in Table 2.

As recommended by the ICMM (2015 and 2019), planning for mine rehabilitation and closure should be an integral part of early mine planning. Sufficient information is required to demonstrate how mine closure objectives can be met. Rehabilitation and closure plans are to be framed by considering the assessment of potential environmental impacts from the Proposal into the long term future in accordance with the key environmental factors listed in section 2.3 below.

Table 2: Minimum information required in the conceptual Mine Closure Plans

Topic	Required information
Closure objectives	• Proposal-specific closure objectives and an explanation of how they are consistent with closure objectives in leading practice guidelines • intended future/next land-use and land tenure arrangements • stakeholder expectations and an outline of methods (including milestones) for reaching agreement with stakeholders on closure objectives.
General plans	• a site plan identifying the intended final landforms of the site • intended closure timeframes • expected post closure monitoring and management arrangements, including identification of how these arrangements would be funded and who would be responsible for them • indicative volumes, sources and characterisation of materials required for rehabilitation and closure (e.g. fill, cover materials) • methods and processes that will be implemented to address any knowledge gaps associated with specific rehabilitation and closure activities.
Key components: • open pit • waste rock stockpile • heap leach facility • site drainage	For each of the key components, provide the following: • closure options o outline all rehabilitation and closure options that have been or are being considered, and where uncertainties remain, outline a process that will be used to decide which closure options will be adopted o evaluate and compare the potential environmental outcomes and the costs, benefits and residual environmental and social risks of the rehabilitation and closure alternatives considered[6]

[6] Include information on the methods, assumptions and limitations used in any calculations of cost, time and materials required for rehabilitation options.

Topic	Required information
• revegetation	o demonstrate that the selected closure option delivers superior post-closure environmental outcomes over other feasible options. Where backfilling the pit is not the selected closure option, demonstrate that the selected option presents an environmental improvement over the pre-existing conditions at the Proposal site. Demonstrate that there will be no ongoing costs borne by the community and government in future. This should be demonstrated with respect to the principles of ecologically sustainable development. • plans for progressive rehabilitation, including details of any audits and reporting on its progress that would be undertaken • explanation of how it contributes to meeting the overall closure objectives. Also provide, as relevant to the component: • the intended dimensions and shape of final landforms and detail on whether they will shed or retain surface water and act as a source or sink to groundwater • an assessment of the intended pit lake in accordance with Appendix H of the Western Australian Guidelines for Preparing Mine Closure Plans (DMP & EPA 2015), including density driven exchange between pit lake water and surrounding groundwater. This assessment should be provided as a contingency measure in the instance the Hayes Creek Project does not proceed) • methods for topsoil management and soil profile reconstruction, with demonstration of their effectiveness for rehabilitating disturbed areas and ensuring long term stability • a schedule and strategies to be used for revegetation, including species to be used and their source, and identification of any research that may be required to determine appropriate revegetation methods • a conceptual site model including landforms and final structures that are designed to divert, capture, retain and/or treat surface runoff from the site.
Risks to successful rehabilitation and closure	• description of matters that could influence unanticipated or early closure or care and maintenance of the mine, how this may affect rehabilitation objectives, and the contingency and mitigation measures to be implemented • discussion of the potential risk that the Proposal may create an ongoing environmental, social and/or economic legacy if operations are required to cease ahead of schedule due to unforeseen circumstances, prior to the planned closure and rehabilitation of the site • describe and discuss the design, measures, maintenance and monitoring to ensure a safe, geochemically and physically stable waste rock stockpile landform. Discuss the potential risk and impact of a worst-case failure affecting the adjacent railway land and operation. • discussion of the potential risks associated with earthquakes, unusual rainfall events, weeds, fire, flood and climate change.

2.3 Information requirements for key environmental factors

The NT EPA identified five key environmental factors that could be significantly impacted by the Proposal (Table 3). These have been selected from the NT EPA's environmental factors and objectives (NT EPA 2018a).

Table 3: Preliminary key environmental factors that must be addressed in the Draft EIS

Theme	Key environmental factor	Objective
Water	Hydrological processes	Maintain the hydrological regimes of groundwater and surface water so that environmental values are protected.
Land	Terrestrial environmental quality	Maintain the quality of land and soils so that environmental values are protected.
Water	Inland water environmental quality	Maintain the quality of groundwater and surface water so that environmental values including ecological health, land uses, and the welfare and amenity of people are protected.
Water	Aquatic ecosystems	Protect aquatic ecosystems to maintain environmental water requirements and the biological diversity of flora and fauna and the ecological functions they perform.
People and communities	Social, economic and cultural surroundings	Protect the rich social, economic, cultural and heritage values of the Northern Territory.

For each of the preliminary key environmental factors listed in Table 3, the Draft EIS is to provide an assessment of how the NT EPA's environmental objective would be met, as outlined in the NT EPA General Guidance for Proponents Preparing an EIS (NT EPA 2019a) and detailed below.

A Proposal footprint (direct disturbance) and zone of influence (indirect disturbance) are to be established to identify the components of the environment (under each environmental factor) and their specific values that could be impacted by implementation of the Proposal.

The assessment of potential environmental impacts must consider, where relevant; normal operations, abnormal operations, unplanned shutdowns of part or all of the operations, and emergency shutdowns of part or all of the operations. In this case, it also must address the scenarios with and without the Hayes Creek Project proceeding.

If additional potential environmental impacts are identified through the environmental impact assessment process, they must also be included in the Draft EIS, even if this requires addressing additional environmental factors not specified in Table 3.

2.3.1 Hydrological processes

Provide sufficient information to enable assessment of whether the Proposal is likely to meet the NT EPA's objective. Specific information requirements are outlined in Table 4. These should be addressed in consideration of the NT EPA General Guidance for Proponents Preparing an EIS.

Table 4: Minimum information required for assessment of hydrological processes

Aspect	Specific information required
Environmental objective: Maintain the hydrological regimes of groundwater and surface water so that environmental values are protected.	
Environmental values	Characterise and, where appropriate, quantify the current hydrological regime of the Proposal area and receiving waterways that may be impacted by the Proposal, using maps and/or schematic diagrams of flow directions where applicable, including: • the surface water hydrology, including:

Aspect	Specific information required
	o major and minor rivers, drainage lines and wetlands (permanent and ephemeral) o surface water flow directions and rates, based on field data and modelled data o water reservoirs (natural and artificial) o beneficial uses. • groundwater aquifers and hydrogeological properties, including: o groundwater flows, volumes, yields, and connectivity (considering seasonal variation) of the site and surrounding area of influence o connectivity between the existing pit and the surrounding groundwater environment o groundwater behaviour in the vicinity of the waste rock stockpile o surface connections via springs or recharge zones o local and regional aquifers o depth to water tables, including temporal variation. Include a discussion and analysis of how hydrological processes may have been impacted by previous mining.
Potential impacts and risks	Identify, quantify and discuss the potential impacts (negative and positive) for all phases of the Proposal (including both closure scenarios), based on appropriate modelling, related to: • altered surface water flow pathways, volumes and timing (seasonality) for each phase of the Proposal including post-closure • impacts to the site and consequences of the 1% annual exceedance probability riverine flooding from nearby creeks • groundwater drawdown during operations and post-mining/closure, indicating the peak drawdown and predictions of post-closure recovery of groundwater levels – predict the time required for full recovery, and give predicted groundwater level contours at four regular intervals from the time of peak drawdown until the time of full recovery • any uncontrolled discharge to the environment (ground or surface) from the pit lake, including density-driven discharge, post-closure, based on a predicted water balance of the final pit lake • availability of surface water and groundwater resources to other persons and the environment.
Mitigation and management	Outline the measures for avoiding, mitigating, or offsetting adverse impacts identified above. These may be incorporated into management plans.
Monitoring and reporting	Address, at a minimum: • groundwater levels and flows (rate and direction) • surface water volumes and flow rates • frequency of reporting, intended audience and method of delivery.

2.3.2 Terrestrial environmental quality

Provide sufficient information to enable assessment of whether the Proposal is likely to meet the NT EPA's objective. Specific information requirements are outlined in Table 5.

These should be addressed in consideration of the NT EPA General Guidance for Proponents Preparing an EIS.

Table 5: Minimum information required for assessment of terrestrial environmental quality

Aspect	Specific information required
Environmental objective: Maintain the quality of land and soils so that environmental values are protected.	
Environmental values	Describe the terrestrial environmental values within the Proposal area that could be potentially impacted by the Proposal, including • regional and significant topography, geomorphology and geology • soil types and land units, including a summary of expected natural elevations of minerals that could become contaminants if released. To provide a baseline, describe the current status of land contamination due to historic land use at the Proposal site, based on a geochemical assessment conducted in accordance with the NT EPA's Environmental Assessment Guidelines for Acid and Metalliferous Drainage (2013a).
Potential impacts and risks	Identify, quantify and/or discuss the potential impacts (negative and positive) for all phases of the Proposal (including both closure scenarios), related to: • erosion of land/soils and the movement of sediment, including the identification of vulnerable areas • spread of weeds • possible loss of containment of hazardous substances and subsequent contamination, with reference to the volumes of each hazardous material (including hydrocarbons) to be used/stored on site during operation • generation and release of contaminants from mined materials in all phases of the Proposal, including for the long term following closure • long term stability of landforms considering erosion by water or wind and as a result of seismic instability. The discussion of the latter two points must refer to a material characterisation and the conceptual Mine Closure Plan. The material characterisation[7] should identify the potential for acid, metalliferous and any other non-benign drainage (AMD) from mined materials, including a comprehensive classification of waste rock, tailings and other materials in accordance with the NT EPA's Environmental Assessment Guidelines for Acid and Metalliferous Drainage (2013a). It should include results of investigations to identify the presence of sulfides, other potential contaminants, and naturally occurring radioactive material. The investigation should characterise individual lithologies and the level of homogeneity for each. Spatial distribution and density should be designed to define waste and not limited to sampling from locations intended for ore definition.
Mitigation and management	Outline the measures for avoiding, mitigating, or offsetting adverse impacts identified above, and for enhancing or restoring terrestrial environmental quality. These may be incorporated into management plans[8].
Monitoring and reporting	Address, at a minimum: • waste rock and tailings characterisation updates

[7] The NT EPA recommends the Proponent communicate with the Department of Primary Industry and Resources regarding the requirements for material characterisation

[8] For example, an AMD Management Plan, Weed Management Plan, Erosion and Sediment Control Plan

Aspect	Specific information required
	• frequency and audience of reporting.

2.3.3 Inland water environmental quality

Provide sufficient information to enable assessment of whether the Proposal is likely to meet the NT EPA's objective. Specific information requirements are outlined in Table 6. These should be addressed in consideration of the NT EPA General Guidance for Proponents Preparing an EIS.

Table 6: Minimum information required for assessment of inland water environmental quality

Aspect	Specific information required
Environmental objective: Maintain the quality of groundwater and surface water so that environmental values including ecological health, land uses, and the welfare and amenity of people are protected.	
Environmental values	Describe the values associated with the quality of surface water and groundwater within and downstream of the Proposal area that could be potentially impacted by the Proposal, including: • declared beneficial uses of receiving waters and other downstream users and values (including a map) • an assessment of baseline water quality, including a comparison with relevant water quality guidelines (e.g. ANZG 2018), and incorporating any additional parameters of relevance to the Proposal site, of: o receiving waters (surface and groundwater), including the Margaret River and control sites o water currently in the pit and water storage dam o groundwater (to be dewatered and used for dust suppression and other purposes) o water in dams and lakes o surface runoff from existing landforms. Provide details of the monitoring program and analysis used to characterise baseline water quality, including timing (seasons) and sampling site locations. This is to demonstrate appropriate and sufficient survey effort and to demonstrate that results are not influenced by pre-Proposal activities such as pit lake water level reduction. Analyse and quantify any impacts to water quality resulting from historic land use at the site.
Potential impacts and risks	Identify, quantify and/or discuss the potential impacts (negative and positive) for all phases of the Proposal (including both closure scenarios), related to: • any untreated, uncontrolled discharge or seepage of non-benign contaminants (including from AMD and saline drainage) from historical or Proposal-related mine waste storages[9], including density-driven seepage from the pit lake, taking into account pit filling rates and predicted water quality • the release of water from the Proposal site through controlled and uncontrolled discharge

[9] This may refer to an AMD Management Plan

Aspect	Specific information required
	• potential loss of containment of any hazardous substances (including hydrocarbons) • uncontrolled runoff or leachate from the heap leach facility during high rainfall events, supported by a flood risk assessment. This should be supported by conceptual site models describing sources of potential contaminants, mechanisms for their release, transport pathways, receptors, and fate of any potentially contaminated waters from the Proposal, with reference to the NT EPA Guidelines on Conceptual Site Models (NT EPA 2013e). A conceptual site model should be provided for each phase of the Proposal, including: • preparation, including any dewatering of the existing pit • during mining/processing, including any dewatering • post-mining, while pit lake is refilling • at closure • beyond the expected time of stabilisation (for the case that the Hayes Creek Project does not proceed or is substantially delayed).
Mitigation and management	Outline the measures for avoiding, mitigating, or offsetting adverse impacts identified above and for enhancing or restoring inland water environmental quality. Provide a draft Water Management Plan to demonstrate that all potential impacts identified above will be sufficiently addressed in accordance with the environmental decision-making hierarchy, including: • strategies for managing stormwater including stormwater drainage infrastructure • the methodology for treating any poor-quality water from the pit, and a predicted schedule for any controlled discharge • sufficient detail[10] to demonstrate that mine closure strategies will be implemented to avoid impacts to values dependent on good water quality, both during operation and into the long-term following closure • containment of runoff or leachate from the heap leach facility, along with consideration of the potential for environmental and structural impacts on railway operations and downstream impacts on railway land in a worst-case scenario. • details of the processes undertaken for internal review of the Plan.
Monitoring and reporting	Address and include a monitoring plan for all phases of the Proposal (including post-closure) for: • pit lake • groundwater in the vicinity of the Proposal • surface water in the vicinity of the Proposal and downstream • frequency and audience of reporting.

[10] Including reference to the conceptual Mine Closure Plan required in section 2.2.4

2.3.4 Aquatic ecosystems

Provide sufficient information to enable assessment of whether the Proposal is likely to meet the NT EPA's objective. Specific information requirements are outlined in Table 7. These should be addressed in consideration of the NT EPA General Guidance for Proponents Preparing an EIS.

Table 7: Minimum information required for assessment of aquatic ecosystems

Aspect	Specific information required
Environmental objective: Protect aquatic ecosystems to maintain the biological diversity of flora and fauna and the ecological functions they perform.	
Environmental values	Describe the values of all aquatic ecosystems in the area where hydrological processes and inland water environmental quality may be impacted by the Proposal and at nearby control sites. This is to include: • a map/s delineating the area of potential impact • distribution and abundance or extent of aquatic ecosystems within this area and comparable control areas • baseline data of aquatic ecosystems downstream of the Proposal that is sufficiently statistically robust to enable detection of any impacts to these ecosystems in the event of an unplanned pollution event e.g. uncontrolled discharge of contaminated water or hazardous substances from the Proposal.
Potential impacts and risks	Identify, quantify and/or discuss the potential impacts (negative and positive) for all phases of the Proposal (including both closure scenarios), related to: • changes, in comparison to baseline data, in the distribution, abundance or health of aquatic ecosystems and their constituent taxa due to (at a minimum): o changes to hydrological processes (including reduction or increase in surface water flows or ephemeral pools) o changes in water quality.
Mitigation and management	Outline the measures for avoiding, mitigating, or offsetting adverse impacts identified above. These may be incorporated into management plans.
Monitoring and reporting	Address and include a monitoring plan for, at a minimum: • water availability (quantity and quality) for any aquatic ecosystems • distribution, abundance and/or health of aquatic ecosystems and constituent taxa, as applicable • frequency and audience of reporting.

2.3.5 Social, economic and cultural surroundings

Provide sufficient information to enable assessment of whether the Proposal is likely to meet the NT EPA's objective. Specific information requirements are outlined in Table 8. These should be addressed in consideration of the NT EPA General Guidance for Proponents Preparing an EIS, including section 2.4.

The description of values and assessment of potential impacts in this factor should take into account the community's views on these matters, as assessed by the Proponent

from stakeholder and community engagement undertaken in accordance with section 3.2 below.

Table 8: Minimum information required for assessment of social, economic and cultural surroundings

Aspect	Specific information required
Environmental objective: Protect the rick social, economic, cultural and heritage values of the Northern Territory.	
Environmental values	Describe, using maps where appropriate, the existing social, economic and cultural values of the area, including: • population and demographics of the Proposal area and nearby towns, using the most recent statistics • economy in the region such as tourism and recreation, pastoral and mineral industries • the railway corridor land and operators using the railway • water users in the area, including the location of groundwater bores in the immediate vicinity and offtake points for surface water users in the vicinity and downstream[11] • areas listed on Australian Government and Northern Territory Government registers of historic and/or cultural heritage • a description and location of Aboriginal and non-Aboriginal sites, places or objects of historic or cultural heritage value, based on archaeological and/or anthropological survey and any other research • the spiritual or cultural significance of places to Aboriginal people, including sacred sites and other places associated with water, and details of any current utilisation of these areas.
Potential impacts and risks	Identify, quantify and/or discuss the potential impacts (risks and benefits/opportunities) for all phases of the Proposal (including both closure scenarios), related to: • social and economic benefits and potential impacts in the region, addressed in an Economic and Social Impact Assessment (ESIA) in accordance with NT EPA (2013c) that provides an independent analysis of the social and economic value and potential impacts of the Proposal on a local/regional, NT and national scale, including: o overall contribution to economy , as expressed by the estimated capital and annual operational expenditure and estimated total revenue o training and employment, including for Aboriginal people o impacts on local accommodation if workers are not accommodated in a mining camp o changes to economic and social activity in regional centres, which may have positive and/or negative impacts on local people o potential social impacts associated with not achieving the proposed economic benefits[12] o reduction in the availability of water of appropriate quality for other water users (current or future) in the vicinity or downstream

[11] Including the potential Adelaide River Off-stream Water Storage (AROWS), its catchment area and offtake point

[12] Accompanied by a summary of the economic feasibility of the Proposal

Aspect	Specific information required
	o changes to social, cultural and recreational values through potential water contamination, if applicable, pending assessment of inland water environmental quality o potential impacts on existing and future road and rail transport infrastructure and road and rail users from project transport requirements[13], long term stability of landforms and any discharge of contaminated water. • biophysical and intangible (e.g. amenity or access) changes to sacred sites, heritage places[14] or other places with identified cultural or social values, including downstream water and land • potential impacts and risks from blasting activities on people travelling on the AustralAsia Railway.
Mitigation and management	Outline the measures for avoiding, mitigating, or offsetting adverse impacts identified above. These may be incorporated into management plans[15]and are to include: • strategies for engaging with local Aboriginal communities to facilitate employment including identification of suitable roles, how training may be delivered, and how cultural values would be accommodated • assessment criteria that will give early warning in the event that management measures are not achieving the expected benefits or are not avoiding negative impacts • procedures that would be implemented in the event that any items or sites of heritage and/or cultural significance (additional to those identified in the EIS) are identified during implementation of the Proposal • measures to avoid or minimise a reduction in water of suitable quality available to any other water users • measures to avoid impacts to any sacred sites[16] • measures to avoid impacts to heritage and archaeological sites • an outline of a plan for ongoing communication with stakeholders • timing or communications of blasting activities in relation to train operations e.g. the Ghan train schedule • approach to procurement of goods and services sourced from the local area.
Monitoring and reporting	Address, at a minimum: • social and economic benefits and impacts, including ease of identification of impacts and consideration of the concerns of the community about the level of risk of an impact that would trigger remedial action

[13] To the satisfaction of the Transport and Civil Services Division NT Department of Infrastructure, Planning and Logistics and the AustralAsia Railway Corporation.

[14] Outline the status of any approvals, permits or clearances in relation to the protection of heritage items or places

[15] For example, a draft Economic and Social Impact Management Plan

[16] Consistent with obligations under the *Northern Territory Aboriginal Sacred Sites Act 1989* and in consultation with the Aboriginal Areas Protection Authority

Aspect	Specific information required
	• water availability (quantity and quality) for other users and downstream aquatic and riparian ecosystems that may have social values • condition of cultural sites • regular reporting of changes to economic or social benefits or impacts and ongoing consultation with key stakeholders and associated decisions made.

3 OTHER REQUIREMENTS FOR THE DRAFT EIS

3.1 Addressing transition requirements relating to the *Environment Protection Act 2019*

The NT EPA's assessment of the Proposal will not be complete prior to the anticipated commencement of the EP Act (28 June 2020). Transitional arrangements allow for the environmental impact assessment to continue under the EA Act with a modified process as defined in section 296 of the EP Act.

Also, following the completion of the assessment, the requirement for an environmental approval would apply in accordance with section 301 and Part 5 of the EP Act. The purpose of the environmental approval is to manage the potentially significant environmental impacts of the Proposal. The decision on whether to grant environmental approval is made by the Minister, based on advice from the NT EPA including a draft environmental approval or draft statements of unacceptable impact.

The Minister is required to take certain matters into account when making the decision. To inform the Minister in making a decision on an environmental approval for the Proposal the Draft EIS should demonstrate how the matters at section 73 of the EP Act have been taken into account. Matters that are additional to those outlined elsewhere in these Terms of Reference are:

- principles of ecologically sustainable development and management hierarchies, as outlined in Part 2 of the EP Act
- the objects of the EP Act (section 3), including object 3(e) to recognise the role that Aboriginal people have as stewards of their country as conferred under their traditions and recognised in law, and the importance of participation by Aboriginal people and communities in environmental decision-making processes. Other objects of the EP Act (Section 3) are addressed within the TOR.
- that any proposed environmental offsets that form part of this Proposal and/or the EIS can be provided in accordance with the EP Act
- a signed declaration that the Proponent is a fit and proper person to hold an environmental approval in accordance with section 62 of the EP Act.

3.2 Stakeholder engagement and consultation

The Proponent must engage and consult with stakeholders[17] who are affected by and interested in the Proposal. Further guidance is given in section 2.4 of the NT EPA General Guidance for Proponents Preparing an EIS (NT EPA 2019a) and the NT EPA Guidance

[17] As defined in the NT EPA Guidance for Proponents - Stakeholder Engagement (NT EPA 2019b)

for Proponents – Stakeholder Engagement (NT EPA 2019b). The Proponent must document the following in the EIS:

- identified stakeholders
- the stakeholder consultation undertaken and the outcomes, including decision-making
- agencies' or authorities' specific regulatory approvals
- any adjustments to the Proposal as a result of consultation
- any future plans for consultation.

3.3 Relevant guidance material / references

As outlined in the NT EPA General Guidance for Proponents Preparing an EIS (section 3.2.1), the Proponent is expected to refer to guidance material considered relevant to the Proposal. A list of such material is provided below, but is not exhaustive. The NT EPA expects the Proponent to refer to the most up-to-date and relevant evidence-based information.

- ANZG 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines
- APEC, 2018. *Mine Closure Checklist for Governments.* Asia-Pacific Economic Cooperation.
- Austroads, 2016. *Guide to Traffic Management Part 12: Traffic Impacts of Development.*
- Barnett B., Townley L.R., Post V., Evans R. E., Hunt R. J., Peeters L., Richardson S., Werner A. D., Knapton A. and Boronkay A., 2012. *Australian Groundwater Modelling Guidelines,* Waterlines Report. National Water Commission, Canberra.
- CSIRO. *Sediment Quality Assessment - A Practical Guide* and *Handbook for Sediment Quality Assessment*. Commonwealth Scientific and Industrial Research Organisation.
- Commonwealth of Australia, 2016. *Preventing Acid and Metalliferous Drainage – Leading Practice Sustainable Development Program for the Mining Industry*.
- Commonwealth of Australia, 2013. *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance.*
- Commonwealth of Australia, 2012. *Aquatic ecosystems toolkit*. Department of Sustainability, Environment, Water, Population and Communities.
- Commonwealth of Australia, 2010 – 2014. *Survey Guidelines for Nationally Threatened Species*, available at http://www.environment.gov.au/epbc/policy-statements
- Department of Environment and Natural Resources' NT Flora and Fauna Atlases at http://www.lrm.nt.gov.au/nrmapsnt
- DISER, 2016. Mine Closure - Leading Practice Sustainable Development Program for the Mining Industry. Department of Industry and Innovation, Australian Government, Canberra.

- DMP & EPA, 2015. *Guidelines for Preparing Mine Closure Plans.* Department of Mines and Petroleum & Environmental Protection Authority, Government of Western Australia, Perth, Western Australia.
- DoH, 2018. *Health requirements for mining and construction camps*. Department of Health, Environmental Health Branch. Available at: https://www.nt.gov.au/property/building-and-development/health-and-safety/health-requirements-mining-construction-projects. Last updated 1 March 2018.
- DoH, 2014. *Code of practice for on-site wastewater management*. Department of Health, Northern Territory Government.
- DoH, 2005. *Guidelines for preventing mosquito breeding sites associated with mining sites*. Medical Entomology, Department of Health. Northern Territory Government.
- DPIR, 2017. *Water Management Plan* – Chapter 6 of the Mining Management Plan Structure Guide for Mining Operations. Department of Primary Industry and Resources, Northern Territory Government.
- IECA 2008. *Best Practice Erosion and Sediment Control Guidelines*. Picton NSW: International Erosion Control Association.
- ICMM, 2015. *ICMM 10 Principles*. International Council of Mining & Metals. available at: https://www.icmm.com/en-gb/about-us/member-commitments/icmm-10-principles/the-principles
- ICMM, 2017. *Position statement on water stewardship*. International Council on Mining and Metals, London, UK.
- ICMM, 2019. *Integrated Mine Closure, Good Practice Guide, 2nd Edition.* International Council on Mining and Metals. London, United Kingdom. Available at: https://www.icmm.com/en-gb/environment/mine-closure/integrated-mining-closure
- INAP, 2009. *The Global Acid Rock Drainage Guide* (incorporating best practices and technology to address acid and metalliferous drainage issues). International Network for Acid Prevention.
- MCA, 2014. *Water accounting framework for the minerals industry – User guide*. Minerals Council of Australia. NEPC, 1998. *National Environment Protection (National Pollutant Inventory) Measure*. National Environment Protection Council.
- NT EPA, 2020. *Statement of Reasons: PNX Metals Limited – Fountain Head Gold Project.* Northern Territory Environment Protection Authority.
- NT EPA, 2019a. *General guidance for proponents preparing an environmental impact statement.* Northern Territory Environment Protection Authority, Darwin.
- NT EPA, 2019b. *Guidance for proponents – stakeholder engagement*. Northern Territory Environment Protection Authority, Darwin.
- NT EPA, 2018a. *Environmental Factors and Objectives*. Northern Territory Environmental Protection Authority.
- NT EPA, 2018b. *Guidance on adaptive management*. Northern Territory Environment Protection Authority.
- NT EPA, 2018c. *Opportunities and timeframes for community engagement in the environmental impact assessment process: Information for proponents and the public.* Northern Territory Environment Protection Authority.
- NT EPA, 2013a. *Environmental Assessment Guidelines on Acid and Metalliferous Drainage (AMD).* Northern Territory Environment Protection Authority.

- NT EPA, 2013b. *Guidelines for Assessment of Impacts on Terrestrial Biodiversity*. Northern Territory Environment Protection Authority.
- NT EPA, 2013c. *Guidelines for the Preparation of an Economic and Social Impact Assessment.* Northern Territory Environment Protection Authority.
- NT EPA, 2013d. *Guidelines for the Siting, Design and Management of Solid Waste Disposal Sites in the NT.* Northern Territory Environment Protection Authority.
- NT EPA, 2013e. *Guideline on Conceptual Site Models.* Northern Territory Environment Protection Authority.
- NT Government, 2019. *Northern Territory climate change Response - towards 2050*. https://haveyoursay.nt.gov.au/climate-change-response
- McCullough, C. D., Marchand, G. & Unseld, J., 2013. *Mine closure of pit lakes as terminal sinks: Best available practice when options are limited?* Mine Water and the Environment, Volume 32, pp. 302-313.
- Moffat, K. & Zhang, A. 2014. *The paths to social licence to operate: An integrative model explaining community acceptance of mining*. Resources Policy, Volume 39, pp 61-70. https://doi.org/10.1016/j.resourpol.2013.11.003
- Queensland Government, 2016. *Queensland Technical Guidelines for Wastewater release to Queensland Waters* and *Receiving Environment Monitoring Program Guideline*. Department of Environmnent and Science.

3.4 Public exhibition requirements

The public exhibition requirements are outlined in section 3.6.3 of the NT EPA General Guidance for Proponents Preparing an EIS. Additional specific details are provided below.

3.4.1 Exhibition period

Recognising the Terms of Reference are released at an early stage of the assessment of this Proposal, the NT EPA proposes an eight week public exhibition period for the Draft EIS, in accordance with NT EPA guidance on community engagement (2019b). This will be confirmed or adjusted during the Draft EIS pre-lodgement phase.

3.4.2 Exhibition locations

The Draft EIS should be provided to and be made available for public exhibition at:

- NT EPA, Level 1, Arnhemica House, 16 Parap Road, Parap
- Department of Primary Industry and Resources, 3rd Floor, Paspalis Centrepoint, 48 Smith Street Mall, Darwin
- Northern Territory Library, Parliament House, Darwin
- Environment Centre Northern Territory, Unit 3, 98 Woods Street, Darwin
- Northern Land Council, 45 Mitchell Street, Darwin
- Adelaide River Post Office Store, 1 Stuart Highway, Adelaide River
- Victoria Daly Regional Council – Pine Creek Office, 55 Moule Street, Pine Creek.