3. Project Description

3.1 Overview

Spinifex Ridge is a mining and processing project in the Pilbara which is proposed to produce molybdenum and copper concentrate products for export. The project will use conventional open pit mining and metallurgical processing techniques.

The main components of the project include:

- Open cut pit;
- Waste landforms;
- Crushing facilities;
- Conveying and access tunnel through Spinifex Ridge;
- Process plant;
- Tailings storage facility;
- Communications towers;
- Creek diversion (approximately 1.3km);
- Administration, office and storage buildings;
- Workforce accommodation camp (400 person);
- Airstrip;
- Access and internal service roads including through Kitty's Gap;
- Water supply borefield and pipeline; and
- Power supply.

The key characteristics of the project are shown in **Table 3-1**, and the preliminary project layout is shown in **Figure 3-1.**

Clearing requirements for the project are outlined in

Table 3-2. These areas represent best estimates at the feasibility stage of the project. Some minor changes to final layout are anticipated through the detailed design phase of the project, but these are not considered significant. For example, final road alignment may be amended to reflect site specific conditions; or waste landform design may be optimised, consistent with the environmental design constraints, resulting in a slightly modified footprint. Cleared areas represent area of disturbance throughout the project, not all of which will be disturbed at any one time. For example, construction laydown areas will be rehabilitated when no longer required and only the area immediately required for landfill activities will be cleared.

Table 3-1 Key Characteristics of the Spinifex Ridge Project

Element	Characteristics
Nominal Mine life	10 Years
Manpower	400 including contractors
Capital cost	~A$900 M
Total footprint	Approx. 1650 ha
Construction commencement	Q1 2008
Commence production	June 2009
Strip ratio	1:1.3 excluding 40Mt pre strip
Final depth of pit	Approximately 430 m from creek level
Treatment rate	Nominal 20 Mtpa (with potential 10% debottlenecking)
Mo concentrate production	Average 23 000 tpa (max ~25 000 tpa)
Cu concentrate production	Average 48 000 tpa
Power requirements	600 GWh/a
Water requirements	Average 15 GL/yr
Processing plant	Secondary and tertiary crushing, grinding and milling circuit, float and leach circuits
Tailings storage facility	660 ha circular TSF

Table 3-2 Indicative Cleared Areas

Description	Cleared Area (ha)
Roads	44
Borefield & Pipeline	186
Tailings Dam	660
Processing Plant	64
Accommodation Camp	54
Airport	76
Construction Laydown Areas	32
Landfill	10
Pit	120
Waste Dumps	400
Mine offices / workshop	15
Diversion Channel	5
Total Cleared Area (ha)	**1650**

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Spinifex Ridge Project
Western Australia

Figure 3-1
Project Layout

0 3.5km

Map Projection: MGA 51 (GDA94)

Compiled: 14 / 5 / 2007 Compiled by: MOL
Updated : 02 / 07 / 2007 Checked by : MOL
Plan No : Revision No : B

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Location Diagram :

Proposed Site Layout Footprint

Spinifex Ridge Project Mineral Tenements

Elevation Contour Line (10m interval)

3.2 Mining Operations

The nature and physical characteristics of the resource allow mining by open pit methods using conventional equipment and mining techniques. Drill and blast, and load and haul contractors will be used during the early production years.

3.2.1 Pre-Strip

Vegetation, topsoil and subsoil (where present) will be stripped prior to any mining activities commencing and either reused immediately or stockpiled for future rehabilitation works. The nature of the vegetation and soil profiles is such that the volume of material available for harvest is relatively small.

Approximately 40 Mt of overburden will need to be stripped prior to gaining access to the orebody.

3.2.2 Mining

The pit is a hard rock pit with minimal weathered material at surface. The 10 year pit will be approximately 430 m deep with a crest width of 1200 m in an east - west direction and 1170 m in a north – south direction.

Blasting will be required to facilitate mining. Blast holes will be drilled approximately 125 to 300 mm in diameter and 10 to 15 m deep. Conventional detonation and bulk slurry explosives will be used. Approximately 1000 tonnes of explosives will be required per month with powder factors ranging from 0.65 to 0.90 kg/m^3. During operations, the blasting process will be optimised based on the most appropriate technologies and knowledge. Risk assessment processes will be used to ensure that any changes to the blasting process do not have a significant impact on the environmental impacts of the project.

Production excavators will range in size between the 350–600 tonne class digging machines, loading ridged dump trucks in the 150–240 tonne class. Depending on scheduled volume requirements, 2-4 fleets (with 4-5 trucks per fleet) will be required at various stages of the mining production cycle. The waste material is hauled to waste landforms and the ore to the Run of Mine (ROM) pad for direct tipping into the primary crusher. During operations, the mining process will be regularly reviewed with a continual improvement focus and mining equipment may change over time. Risk assessment processes will be used to ensure that any changes to the equipment used do not have a significant impact on the environmental impacts of the project.

The ROM pad is located adjacent to the pit to minimise haulage distance. Ore stockpiled on the ROM provides a production buffer for the primary crushing process.

The northern side of the pit is bordered by the Talga Range. The processing plant will be placed on the north side of the ridge and the ROM pad and primary crusher on the southern side. To minimise haulage distances and avoid disturbance to Coppin Gap, a conveyor tunnel is to be developed through the ridge line. The dimensions of the tunnel will be approximately 7m x 5m to allow for a conveyor structure and access road. The tunnel will be approximately 1km long.

3.2.3 Waste Rock Management

Waste rock will be progressively placed into three waste rock landforms. Landform design is based on the results of waste characterisation and detailed computer modelling that takes into account constraints such as:

- location of creek lines and floodplains;
- assessment of impact on visual amenity;
- tenement boundaries;
- surrounding topography;
- mining schedules;
- project exclusion zones; and
- results of comprehensive geochemical analysis of waste.

Geochemical characterisation of the waste rock has determined that the majority of the rock is Non Acid-Forming (NAF) see **Section 4.3**. The smaller volumes of Potentially Acid-Forming (PAF) rock will be encapsulated within NAF rock in the waste landforms located west and southwest of the pit. This will facilitate management of any seepage from the landforms in the event of this seepage becoming acidic.

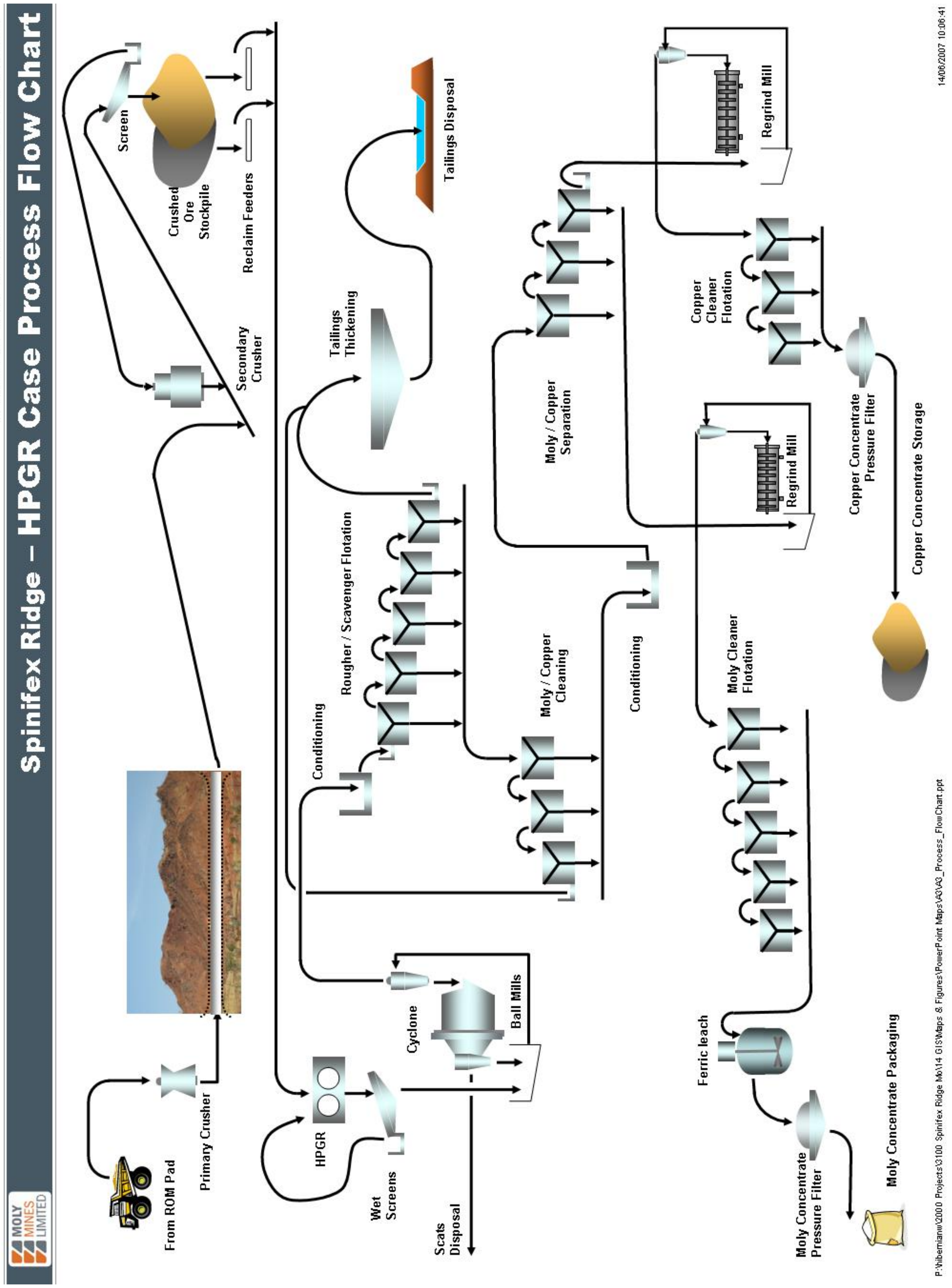
3.3 Ore Processing

The nature of the ore lends itself to a conventional flotation circuit, which is used commonly within the mineral processing industry in Australia. No special modifications or additional technology is required. Once in full production the treatment rate will be 20 Mtpa. Debottlenecking activities are anticipated over the initial years. Experience in other operations indicates that a 10% increase in throughput can be achieved without substantial change to the processing plant or significant change to environmental impacts. A schematic flowchart for the process is shown in **Figure 3-2**.

3.3.1 Comminution

A primary gyratory crusher will reduce the size of ROM ore to a nominal 80% less than (p80) 150 mm. As far as practical, the ore from the pit will be direct tipped into the receival hopper above this crusher. This will be supplemented by ore that is stockpiled on the ROM and fed by front end loader. The primary crusher product discharges onto an overland conveyor that transports the crushed ore through the tunnel from the southern side of Spinifex Ridge to the secondary cone crushers to further reduce ore size (nominal p80 of 40 mm) prior to stockpiling.

The crushed ore is reclaimed from the stockpile by feeders and fed to High Pressure Grind Rolls which produce a product with a p80 of a nominal 5mm. This product is wet screened with the screen underflow pumped for hydrocyclone classification, with underflow returned to two ball mills. The cyclone overflow product has a final p80 of 250µm and gravitates to the flotation circuit.



■ **Figure 3-2 Schematic Process Flow Chart**

3.3.2 Flotation, Leaching and Filtering

Cyclone overflow is conditioned with flotation reagents (refer **Section 3.3.3**) before flowing to the rougher/scavenger flotation circuit. Two trains, each comprising six 250 m^3 flotation rougher/scavenger tank-cells, operate in parallel to produce a primary sulphide concentrate, containing both molybdenum and copper, which is advanced to the cleaning and separation circuits. Flotation tailings are pumped to the tailings thickener.

The primary sulphide concentrate from the rougher/scavengers is cleaned using conventional mechanical flotation cells. The cleaned molybdenum and copper concentrate is pumped to the separation flotation circuit, conditioned with reagents to depress copper and produce a rougher molybdenum concentrate and a copper tailing. The rougher molybdenum concentrate is pumped to the molybdenum cleaning circuit for upgrade in a circuit that includes a regrind mill to reduce the particle size to a p80 of 38 microns and ten stages of conventional mechanical flotation cells. Final molybdenum concentrate is dewatered by a pressure leaf filter prior to leaching.

The molybdenum separation circuit tailings are further conditioned and the pH is adjusted before advancing to the copper cleaner circuit which includes a regrind mill to reduce the particle size to a p80 of 20 microns and three stages of conventional mechanical flotation cleaning cells, to produce a final copper concentrate. The copper cleaner circuit tail is discarded with the rougher/scavenger tailings. Final copper concentrate is dewatered by a pressure-leaf filter.

The molybdenum concentrate will be leached with ferric chloride if required to ensure the amount of copper in the concentrate is less than 0.4%. The leached concentrate is washed and dewatered by a pressure-leaf filter. The ferric chloride reagent is recycled in the process after regeneration of the reagent using chlorine. A bleed stream is treated with iron to remove copper as copper metal. The resultant solution is then discarded with the flotation tailings.

3.3.3 Reagent and Chemical Usage

The reagents to be used in the processing plant, together with the approximate quantities required, are listed in **Table 3-3**.

- **Table 3-3 List of Reagents and Estimated Usage**

Reagent	Tonnes/year
Kerosene	1007
RTD1148 Collector (Thionocarbamate)	311
Sodium Hydrosulphide (NaHS)	1548
Frother (MIBC)	5.9
Frother (Poly froth W22)	349
Flocculant (Non-ionic)	310
Ferric Chloride	133
Chlorine	600
Hydrochloric Acid	1333
Lime	173

3.3.4 Product Specifications

Results of laboratory test-work indicate a typical specification for Spinifex Ridge molybdenum concentrates as described in **Table 3-4**.

- **Table 3-4 Molybdenum Concentrate Specification**

Element	Concentration
Molybdenum	50-52%
Sulphur	35%
Copper	0.4%
Lead	<0.001%
Zinc	<0.1%
Iron	<2.0%
Phosphorus	<0.01%
Arsenic	<0.02%
Bismuth	<0.01%
Antimony	<0.01%
Mercury	Nil

3.4 Tailings Management

Process plant tailings will be thickened in an elevated steel tank thickener, utilising internal recirculation to control feed density. Thickener underflow is then pumped to the TSF. Overflow water from the thickener is recycled to the grinding circuit via the process water dam and pumps.

3.4.1 Tailings Storage Facility

3.4.1.1 Design and Construction

The TSF will be a single above ground circular cell having a diameter of approximately 2,900m, a footprint of 660 ha and, with embankments, approximately 25 m in height at end of life. The general arrangement for the TSF is provided in **Figure 3-3**. Upstream construction methods will be used to reduce the volume of fill required for each embankment lift. No preparation of the base of the TSF is required apart from the embankments. Topsoil will be salvaged as far as practicable, given the often skeletal soils over the area.

Stage 1 embankments will be constructed from fill material borrowed from within the storage area. Subsequent lifts will be created by pushing up tailings from within the TSF. External walls will be sheeted with crushed waste rock, from within the mining area, to ensure stability and prevent erosion. A sediment trench and embankment bund will be constructed around the TSF to prevent sediment laden water escaping the TSF. A road located on the embankment trench will allow access for operation and monitoring of the TSF.

The TSF has been sited outside the 1-in-100 year flood level of Coppin Creek. The outer embankment bund walls will have a layer of waste rock to prevent erosion. A short section of the Kookenyia Creek floodplain is covered by the western edge of the TSF. The embankment bund will be strengthened in this area to prevent erosion in an extreme flooding event.

3.4.1.2 Operation

Operation of the TSF will be in accordance with a management plan that will be developed to the satisfaction of the DoIR. This plan and developed operating procedures will address key risk activities associated with the ongoing operation of the facility.

Tailings comprising 60% solids will be discharged via sub-aerial deposition from the centre of the storage as well as from the peripheral embankment. This discharge pattern will form a cone sloping away from the centre of the storage area. The supernatant water will drain via decant channels and be returned (pumped) to the process plant for reuse. This decant system will minimise the volume of standing water within the TSF and the potential for seepage to occur. A water recovery system will be installed in the low point of the TSF to further minimise seepage and maximise water recovery from the TSF.

The area of the storage has been based on maintaining a maximum rate of rise for the tailings of less than 2 m/yr. Experience in Western Australia and elsewhere in the world has shown that, provided the rate of rise of the tailings beach is less than 2 m/yr, sub-aerially deposited tailings will have sufficient time to drain and air dry to the optimum *in situ* density. If this rate of rise is exceeded, a large percentage of the tailings *in situ* will remain saturated, increasing the potential for seepage (DE Cooper & Associates, 2006).

The construction of the TSF will be an ongoing operational requirement. Raising of embankments will be achieved by pushing up tailings and stabilising these with waste rock. TSF walls will be constructed to final design with overall TSF wall batter angles $<18^{o}$. Following construction of the initial Stage 1 walls, 4 m wide berms will be included for every 6 m rise. With ongoing construction at final design angle, revegetation of slopes will commence immediately after rock armouring has taken place. Salvaged topsoil will be respread and vegetation established. Substantial earthworks will be required on closure to rehabilitate the TSF surface.

3.4.2 Tailings Geochemistry

Characterisation studies of the tailings that will present to the TSF have been undertaken (Campbell, 2007, attached as **Appendix L**). These studies have demonstrated that the tailings that will present to the TSF are non-acid forming. They contain only trace sulphides (chiefly pyrite and pyrrhotite) associated with acid neutralising gangue material that includes accessory calcite.

The tailings composition reflects the mineralisation associated with the orebody. It is composed of mainly quartz and actinolite with a number of accessory minerals including calcite, chlorite, plagioclase, muscovite and potassium feldspar. The trace components include pyrite, pyrrhotite, molybdenite, arsenopyrite and chalcopyrite.

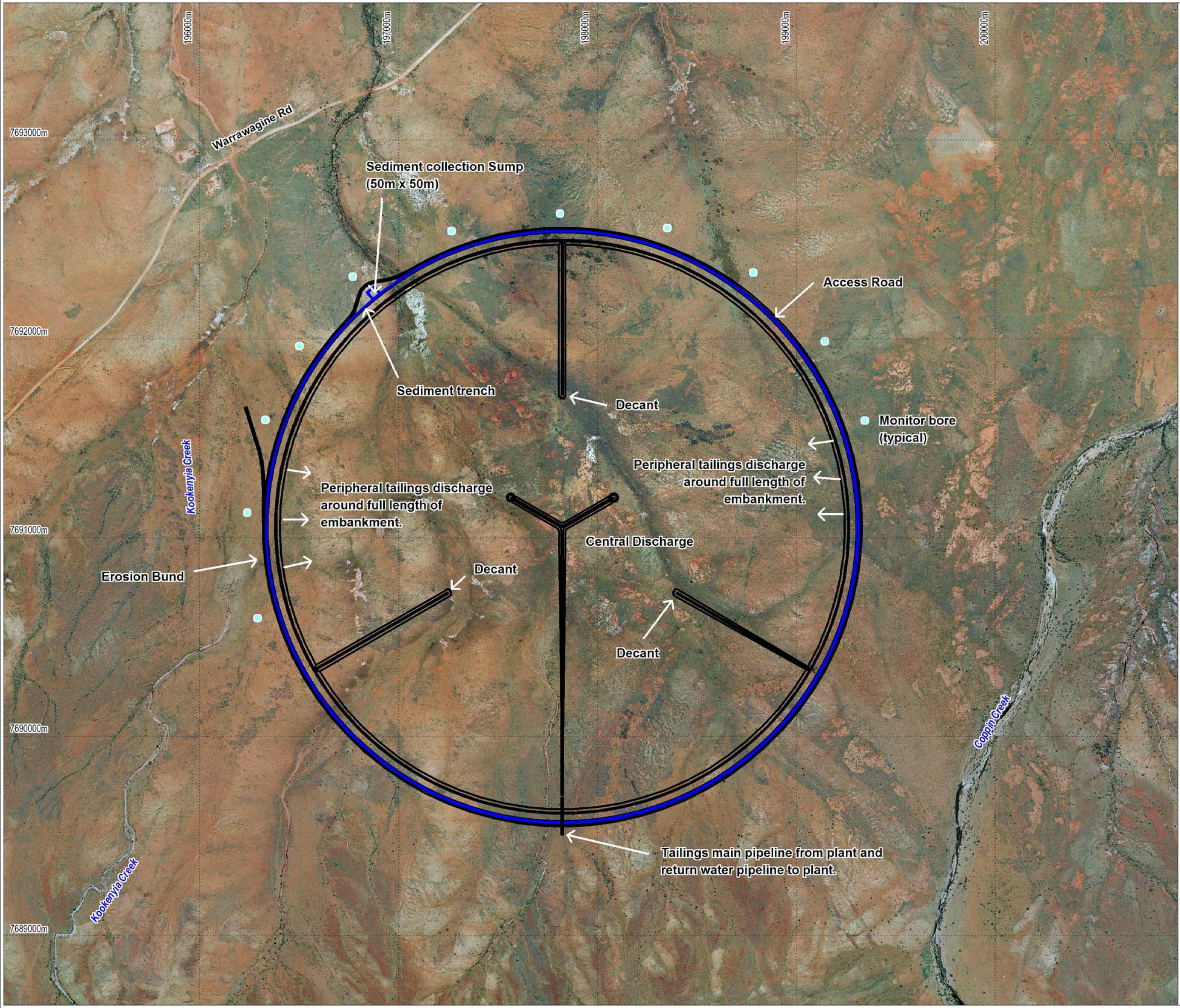


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Figure 3-3

TSF General Arrangement
Prelimary Design

0 1000m

Map Projection: MGA Zone 51 (GDA 94)

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Plan No :	Revision No : B

Elemental analysis indicates that the tailings are enriched in the minor elements silver (Ag), copper (Cu), cadmium (Cd), arsenic (As), bismuth (Bi), antimony (Sb), selenium (Se) and molybdenum (Mo) compared to un-mineralised soils and bedrocks. However, the degree of enrichment was not marked. Pilot plant testing of the process plant has indicated that the molybdenum content of the tailings is expected to be approximately 60 - 80 mg/kg.

Decant water was mildly alkaline (pH 8 - 9) and fresh to slightly brackish (460 - 600 mg/L total dissolved solids which are mainly sodium chloride). Concentrations of minor elements were generally low and close to or below their detection limits. The one exception was molybdenum which had a solubility in the order of 1 mg/L (compared to a natural soil Mo level in Coppin Gap pool of ~0.1mg/L). Soluble molybdenum would be present as the molybdate anion.

3.5 Product Transport and Handling

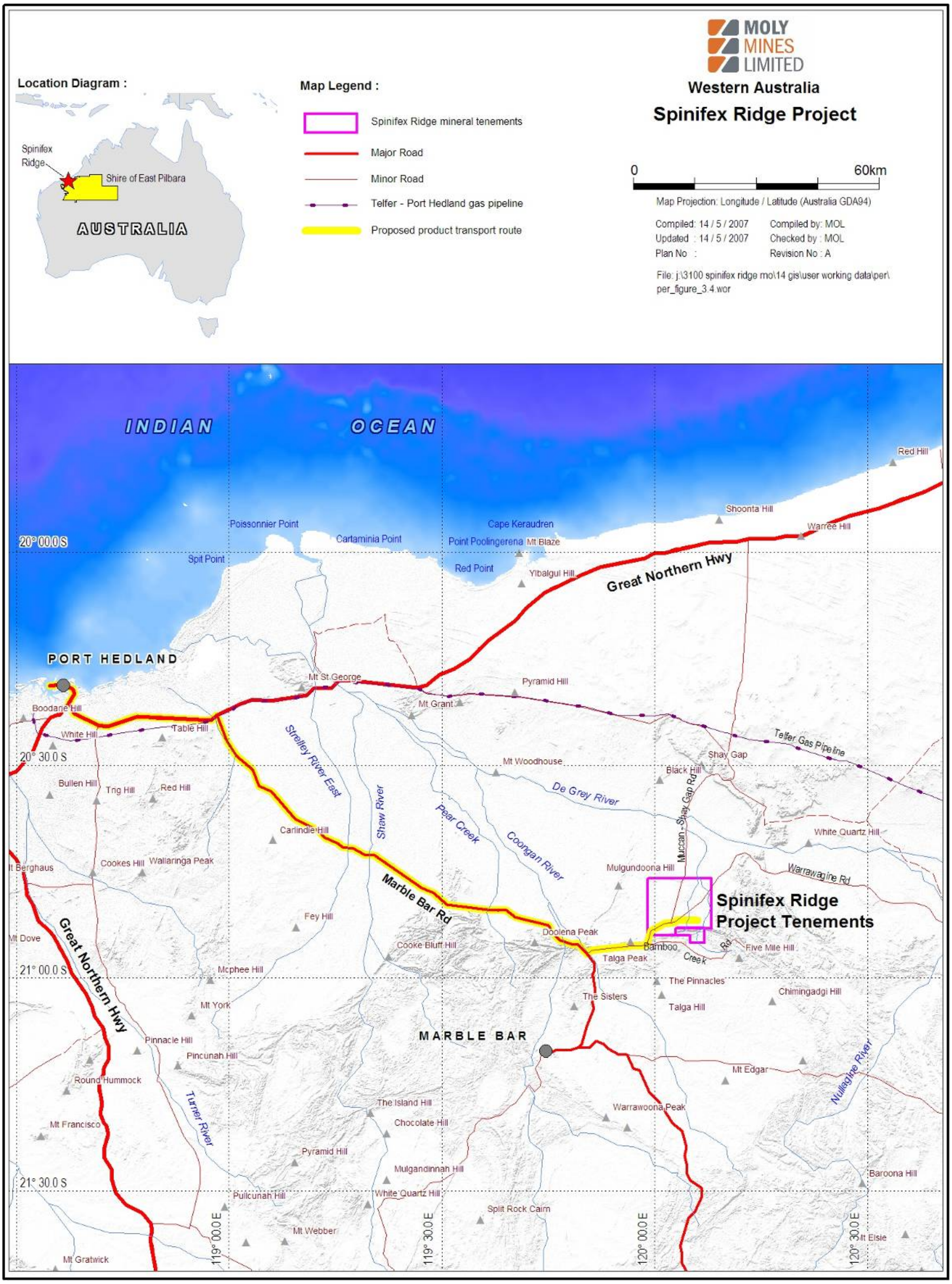
The molybdenum concentrates will be transported in drums or flexible intermediate bulk containers (FIBCs or "bulk bags") within shipping containers. At a production rate of 23,000 tpa of molybdenum concentrate approximately 1,150 containers will be filled per year.

The containerised molybdenum concentrate will be transported to Port Hedland for shipment. At full production, approximately 32 loaded trucks per month carrying molybdenum concentrate will travel to the designated port.

The copper concentrate will be trucked as a bulk product to Port Hedland for export shipping. At full production, approximately 40 loaded trucks per month of copper concentrate will travel to Port Hedland. At the port, the copper concentrate will be stored in existing or new facilities and be loaded using the existing shiploading infrastructure. A multi-user copper concentrate shed is under consideration for Port Hedland with scope for 3 producers to store up to 10,000 tonnes of concentrate each. This facility and operation of the port facilities will be subject to a separate approval process. It is anticipated that a new facility at Port Hedland would incorporate environmental controls equivalent to or better than those used at existing sheds. In addition, management controls on copper concentrate product storage and handling would be developed and implemented. Of particular relevance is maintenance of high product moisture levels to prevent issues from dust, odour and spontaneous combustion.

3.5.1 Transport Routes

Trucks carrying product will leave site via the Warrawagine Road. Internal roads will intersect public roads at right angles, with vehicles being required to stop prior to turning onto the road. Vehicles will travel along the Warrawagine Road to the Marble Bar Road and from there along public roads to Port Hedland. The vehicle route is identified in **Figure 3-4**.



■ **Figure 3-4 Proposed Product Transportation Route**

3.6 Infrastructure

The key infrastructure requirements for the project are presented in **Table 3-5.**

Table 3-5 Infrastructure Requirements

Element	Description
Operational village	400 person village with additional capacity to support shutdown personnel.
Power requirements	600 GWh/a from on site power station with gas supply via pipeline from Telfer.
Water requirements	8 GL/yr initially, dropping to 4 GL/yr from the De Grey River area and an average of 11 GL/yr sourced from Canning Basin pumped to the project via a pipeline.
Roads	Upgrade of existing public roads to standard suitable for product transport. Construction of internal roads for access around the project area.
Airstrip	All weather strip suitable for jet aircraft.
Communications systems	Installation of communications tower and associated components for safe operation of the project.

3.6.1 Accommodation

The accommodation village for the long term operation of the project will be designed to accommodate 400 people, to take into account the permanent workforce, additional contractors and visitors. Staff and contractors will be accommodated in single person quarters in the village. The accommodation village and services will be established progressively.

The contractor responsible for accommodation village services and catering will provide a waste minimisation, reuse and recycling program. The implementation of waste stream splitting and “green” purchasing initiatives will form part of this waste management program.

Waste that cannot be reused or recycled will be disposed of in landfill facilities, in accordance with relevant Local and State Government requirements.

The wastewater disposal requirements for the temporary and initial construction camps will be met by a packaged treatment plant. During the construction phase a suitable domestic wastewater treatment plant will be installed. The plant will meet both construction and ongoing operational needs of the project. It is proposed to discharge treated wastewater into an evaporation pond and reuse a portion of it to irrigate landscaped areas around the camp. Appropriate licences will be obtained from the DoH prior to construction of these facilities and prior to the reuse of treated effluent.

3.6.2 Power Supply

Electricity for the operational phase of the project will be supplied by an onsite gas power plant comprising multiple, spark ignition, reciprocating engines. The main substation and switchyard will be located in the grounds of the processing plant. The gas supply will be sourced by installation of a branch pipeline from the existing Port Hedland to Telfer gas pipeline. The pipeline route will follow existing tracks and will be adjacent to the water supply pipeline from the Canning borefield.

Initial construction power supply will be provided by on-site portable diesel generators.

3.6.3 Water Supply

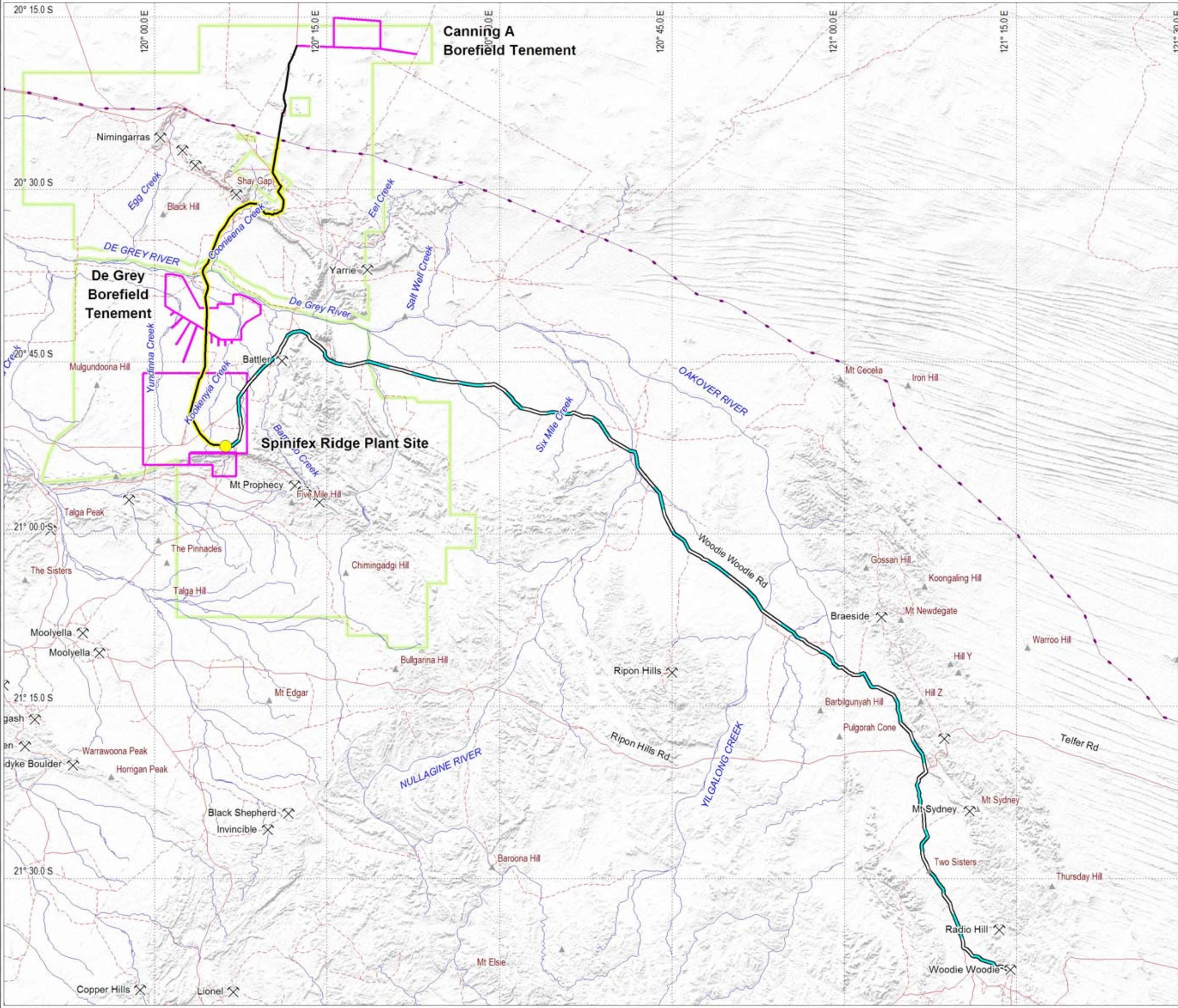
A borefield in the De Grey River area will provide the initial water source for the project and peak demand water. The water will be sourced from the palaeochannel of the river where investigations have indicated a suitable water source capable of providing 8GL for an initial period, dropping to 4 GL/yr for the later stages of the project. Investigations into the palaeochannel aquifer are outlined in the section on groundwater (**Section 4.5**).

The main water source for the project will be a borefield developed in the Canning Basin approximately 70 km north of the site, which will be brought into operation once the water demand increases above that available from the De Grey system. The borefield will consist of a series of bores sized to abstract sufficient water for the project within the capacity of the aquifer to supply an average of 11 GL/yr. Investigations into the Canning borefield have been undertaken and are discussed in the sections on groundwater (**Section 4.5**) and terrestrial flora and vegetation (**Section 4.7**). Water from the Canning borefield would be pumped to site via a buried pipeline. The section between the De Grey River and the site will utilise the De Grey borefield pipeline. The pipeline would run adjacent to and parallel with the existing Borefield Road and Muccan-Shay Gap Road. The alignment would only deviate from the existing road easements where significant environmental, heritage or engineering constraints are encountered. Locating the pipeline adjacent to existing roads minimises disturbance and allows for regular inspection and maintenance.

In the event of the Canning water source proving inadequate for project requirements, or having significant environmental constraints, water will be sourced form an abandoned mining void at the Woodie Woodie mine (refer **Section 2.2.7**). Water would be pumped some 170 km from Woodie Woodie to the project via a buried pipeline. The pipeline would run adjacent to and parallel with the existing Warrawagine and Woodie Woodie Roads. The alignment would only deviate from the existing road easements where significant environmental, heritage or engineering constraints are encountered. **Figure 3-5** shows proposed locations of water supply options and associated infrastructure (pipeline routes).

Existing roads will be used for the transport of pipeline materials and construction equipment. Existing areas of disturbance along the pipeline route will be used, where practicable, for the laydown of construction materials; so as to minimise disturbance associated with temporary storage and construction activities. While no actual clearing of additional laydown areas is expected due to the sparse nature of vegetation, some short term impact will occur at laydown areas.

The water pipeline will be buried where it crosses creeks and the De Grey River (or Oakover River in the event of the Woodie Woodie option). These crossings will be engineered to allow uninterrupted flow in the waterways and to ensure the integrity of the pipeline.



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Spinifex Ridge Project
Western Australia

Figure 3-5

Pipeline Routes from Borefields to Spinifex Ridge

0 15km

Map Projection: Longitude / Latitude (Australia GDA94)

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Updated : 16 / 07 / 2007 Checked by : MOL - GK
Plan No : Revision No : B

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Location Diagram :

Spinifex Ridge
Shire of East Pilbara
AUSTRALIA

Map Legend :

- Spinifex Ridge Mineral Tenements
- Major Road
- Minor Road
- Yarrie / Muccan Station boundary
- Telfer - Port Hedland Gas Pipeline

Pipeline Routes

- Woodie Woodie Mine to site.
- Canning A Borefield to site.
- Gas pipeline route to site.

3.6.3.1 Water Conservation Measures

An integral part of all planning for the operation has been the incorporation of measures to minimise the requirement for make-up water. This has been achieved by selecting water efficient machinery and processes; by recovery of storm water; and by maximising the re-use of water to the site. In addition to the environmental benefits of this approach, there are also economic benefits in reduced costs of operating and maintaining the borefields. For these reasons, environmental management of the site water circuit will include an ongoing capacity to identify and implement improvements in water efficiency.

The major opportunity for water savings is in minimising the volume of water sent out with the plant tailings. A tailings thickener will be constructed as part of the processing plant. The thickener is designed to reduce tailings solids from 38 % to a target of 60%, resulting in a recovery of 61% of the process water in tailings. The ultimate density that can be achieved will be dependent on the pumping characteristics of the thickened slurry and will be examined in future pump loop tests with the objective of increasing thickener underflow density and hence water recovery.

The tailing storage facility has been designed to maximize recovery of decant water by incorporating the flowing features,

- Operating philosophy to minimize water volume of the TSF to maximize both water recovery and TSF stability
- Peripheral and central discharge which results in effectively halving the tailings beach length and reducing evaporation.
- Provision of three decant towers with high capacity pumping systems to return water to the plant as fast as possible to reduce evaporation.
- Inclusion of a collection sump and recovery pump at the upstream toe of the embankment where the embankment crosses the stream bed at the northern end of the TSF.
- Provision of cased monitoring bores down stream of the TSF to enable pumps to be installed to recover water if required.

The processing plant is designed to maximise water reuse of all wash down water, spillage and hose up. This water will be collected in sumps and pumped either back into the process or to the tailing thickener feed inlet.

Other water conservation measures include:

- The provision of closed circuit water cooling systems for key lubrication systems.
- Closed water cooling system for the power station.
- Recycle of RO water waste stream to process water.
- Provision of low water use equipment in the village.
- Use of village grey water for landscaping.
- Use of fogger systems for dust suppression compared to deluge systems.

3.6.4 Access Roads

Access to the project area on the northern side of the Talga Range (processing plant, main administration areas, stores area and camp) will be via the Warrawagine Road, which intersects the Marble Bar Road. Access to the southern side of the Talga Range (mining area, mining administration office and heavy vehicle workshop) will be via the existing Bamboo Creek Road, which intersects the Warrawagine Road. Both Warrawagine Road and Bamboo Creek Road are unsealed.

A number of internal roads will be constructed to allow controlled travel around site. All site roads and light vehicle parking areas within the project area will be unsealed. The design of roads will take account of landforms and natural drainage patterns. Culverts will be installed to maintain natural drainage flows and to avoid pooling of storm water. The existing road through Kitty’s Gap will be upgraded and moved slightly east to distance it from the creekline.

It is proposed to obtain some fill material for road construction from mining waste rock. The location and number of borrow pits will be constrained by the availability of suitable rock.

3.6.5 Airstrip

An airstrip will be required to provide reliable and safe access to the site during operations. A temporary airstrip will be constructed to allow access during the initial project construction phase during which time the main strip will be completed. The airstrip will be suitable for jet aircraft and will be sealed. Overall length will be approximately 2.2 km and width will be 30 m. A terminal building and road access will also be required.

3.6.6 Dangerous Goods and Hazardous Materials

All dangerous goods and hazardous materials will be transported to site by truck along the public and internal access roads. The main categories of dangerous goods for the project are listed below:

- hydrocarbons – diesel, oils, hydraulic fluids, greases, degreaser, kerosene;
- processing reagents – refer to **Table 3-3**.; and
- explosives – fuel oil, ammonium nitrate, emulsions, boosters, detonators.

All dangerous and hazardous goods will be stored in accordance with relevant legislation and Australian Standards, including *Dangerous Goods Regulations 1992*, *Explosives and Dangerous Goods Act 1961-1986, Dangerous Goods (Transport) Act 1998* and AS 1940-2004: The storage and handling of flammable and combustible liquids.

There will be two bulk fuel storage areas. The first will be located near the mining area to service the heavy vehicle fleet and the second will be located near the processing plant to service light vehicles and the processing plant, including emergency power generation. All diesel tanks will be constructed and operated in compliance with relevant legislation and standards.

The accommodation village is unlikely to require significant quantities of hazardous or dangerous goods. Dedicated storage will be provided for cleaning products, solvents and paints.

3.6.7 Miscellaneous Buildings

The project will have a number of office buildings, a contractor's workshop and service areas. The mining office complex which will be located adjacent to the open cut mining pit and will have offices for approximately 40 staff. Contained within the mining office complex will be a training room, amenities facilities and an ablution block.

The maintenance workshop for the mining fleet will be located in proximity to the open cut mining pit. The maintenance workshop will have its own offices, amenities and ablution facilities.

The main administration office will be located at the entry to the processing plant and will have office space and a parking area for approximately 30 staff. The office will also have a second wing which will include First Aid and emergency response facilities processing operational offices and training and meeting rooms. The processing plant will have a number of support facilities including a substation, switchyard, warehouse, maintenance workshop, control rooms and laboratory located within the grounds of the processing plant.

3.6.8 Communications

The project will be linked via microwave repeaters to existing communications infrastructure in Port Hedland. The site will require a communication tower to be located on the Talga Range. The communications tower will serve not only to link the project with the regional communication systems, but will also transmit and receive the UHF and VHF radio signals necessary for the day-to-day operation of the mine.

3.7 Workforce

Spinifex Ridge will be a predominantly FIFO operation, with a small DIDO workforce sourced from the local community. The construction workforce is estimated to be up to 1200, with the operational workforce approximately 400 full time personnel.

3.8 Construction Activities

Construction activities are expected to last approximately 18 months and will include:

- detailed site surveys;
- erection of temporary facilities;
- bulk earthworks;
- construction of permanent facilities;
- establishment of services including water, power, communications, wastewater treatment and lighting will be progressively incorporated throughout the project site; and
- demobilisation, clean-up and rehabilitation.

3.8.1 Borrow Pits

Wherever possible, fill material for construction and road making activities will be recovered from mining waste rock. If suitable material cannot be recovered from mining waste to meet construction timing then fill will need to be sourced from borrow pits. The location and number of borrow pits required will be constrained by the availability of suitable fill material and have yet to be identified. Borrow pits will be located within the project disturbance footprint to minimise environmental impact.

3.8.2 Power Supply

Power supply for construction activities will initially be provided by on-site portable diesel generators.

3.9 Access and Security

Key project areas will be fenced to restrict access to humans and stock. This is consistent with discussions undertaken with the Yarrie pastoral lease holder. The main access roads will either have remotely operated gates or security personnel present.

The airstrip will also be fenced in line with CASA requirements.

Controls will be in place to restrict access to explosives. The explosives magazine and batch plant security will be in line with regulatory requirements.