Balla Balla Magnetite Project

Ferro Metals Australia Pty Ltd

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Report 1309
January, 2009

Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
23/06/08	**Referral received**	
21/07/08	**Intention to set EPS Level of Assessment advertised (no appeals)**	**4**
10/12/08	**Proponent's Final EPS document received by EPA**	**21**
5/01/09	**EPA report to the Minister for Environment**	**3**

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1. Introduction and background

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for Environment on the proposal by Ferro Metals Australia Pty Ltd (FMA) to mine and process up to 10.1 million tonnes per annum (Mtpa) of magnetite ore to produce 6 Mtpa of magnetite concentrate over a 15 year mine life. The proposal is located approximately 10 kilometres (km) north-west of Whim Creek, midway between the regional centres of Karratha and Port Hedland (Figure 1).

Section 44 of the *Environmental Protection Act 1986* (EP Act) requires the EPA to report to the Minister for Environment on the outcome of its assessment of a proposal. The report must set out:

- the key environmental factors identified in the course of the assessment; and
- the EPA's recommendations as to whether or not the proposal may be implemented, and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject. The EPA may include in the report any other advice and recommendations as it sees fit.

The EPA was advised of the proposal in June 2008. Based on the information provided, the EPA considered that while the proposal had the potential to have an effect on the environment, the proposal, as described, could be managed to meet the EPA's environmental objectives. Consequently it was notified in *The West Australian* newspaper on 21 July 2008 that, subject to preparation of a suitable Environmental Protection Statement (EPS) document, the EPA intended to set level of assessment at EPS.

The proponent has prepared the EPS document which accompanies this report (FMA, November 2008). The EPS document sets out the details of the proposal, potential environmental impacts and appropriate commitments to manage those impacts. The EPA notes that the proponent has consulted with relevant stakeholders.

The EPA considers that the proposal can be managed to meet the EPA's environmental objectives, subject to the EPA's recommended conditions being made legally binding.

The EPA therefore has determined, under Section 40 of the EP Act, that the level of assessment for the proposal is EPS, and this report provides the EPA advice and recommendations in accordance with Section 44 of the EP Act.

2. The proposal

The proposal is described in detail in the proponent's EPS document (FMA, 2008). The proponent proposes to mine up to 10.1 Mtpa of magnetite ore to produce 6 Mtpa of ore concentrate over a 15 year mine life. The magnetite concentrate would be conveyed to Port Hedland from the mine via a 110 km slurry pipeline located alongside the existing Pilbara Energy Pipeline (PEPL). The concentrate would be dewatered at a purpose-built facility located at Utah Point in the Port Hedland Port area, prior to shipping overseas, where it would be used predominantly in steel manufacture. FMA operations at Utah Point are covered under the Port Hedland Port Authority Utah Point Berth Project (SKM, 2008) currently being assessed by the EPA.

A copy of the EPS is available on Aurox Resources website at http://www.aurox.com.au. A CD version of the EPS is enclosed with this report.

The key components of the proposal are summarised in Table 1. The potential impacts of the proposal are discussed by the proponent in the EPS document (FMA, 2008).

Table 1: Summary of key proposal characteristics

Element	Description
Mining operations	
Life of mine (mine production)	15 years approximately
Ore type	Magnetite (iron ore)
Ore mining rate	Approximately 10.1 million tonnes per annum (6 million tonnes per annum of magnetite concentrate)
Mining method	Open pit – 2 pits Central and Western to be mined concurrently
Mine pit dimensions (length x width x depth, metres)	Central pit (approximately 1800 x 300 x 135) Western pit (approximately 4000 x 200 x 165)
Depth of water table	Approximately 7 metres below ground surface
Processing requirements	
Tailings	Total quantity of tailings material is approximately 59 million tonnes
*Option 1 - Size of 2 hexagonal tailings storage facilities	Approximately 232 hectares x 45 metres
*Option 2 - Size of tailings storage facility and Integrated Waste Landform	Approximately 175 hectares x 45 metres
Number of waste rock dumps	Six
Water requirement	Not more than 8.54 gigalitres per annum (with approximately 65% of the water used to convey slurry to Port Hedland returned to the Balla Balla ore processing circuit)
Mine site infrastructure	
Disturbance area	Mining: Not more than 1010 hectares Pipeline: Not more than 505 hectares
Power source and requirements	Initial power supply by diesel or cogen type generators (until adequate gas supplies confirmed) – 40 megawatts.
Greenhouse gas emissions	Approximately 5.06 million tonnes (over life)
Access roads	New all weather access road from site to North West Coastal Highway (approximately 9 kilometres)
Transport	
Slurry pipeline to port (corridor length x width)	Approximately 110 kilometres x 40 metres
Additional vehicle movements on North West Coast Highway per week	Approximately 16 road trains

** Note: The proposed tailings storage facility would consist of a staged approach, initially with a traditional hexagonal paddock-style tailings storage facility, with options for a second paddock or a proposed integrated waste landform, pending trials during operation.*

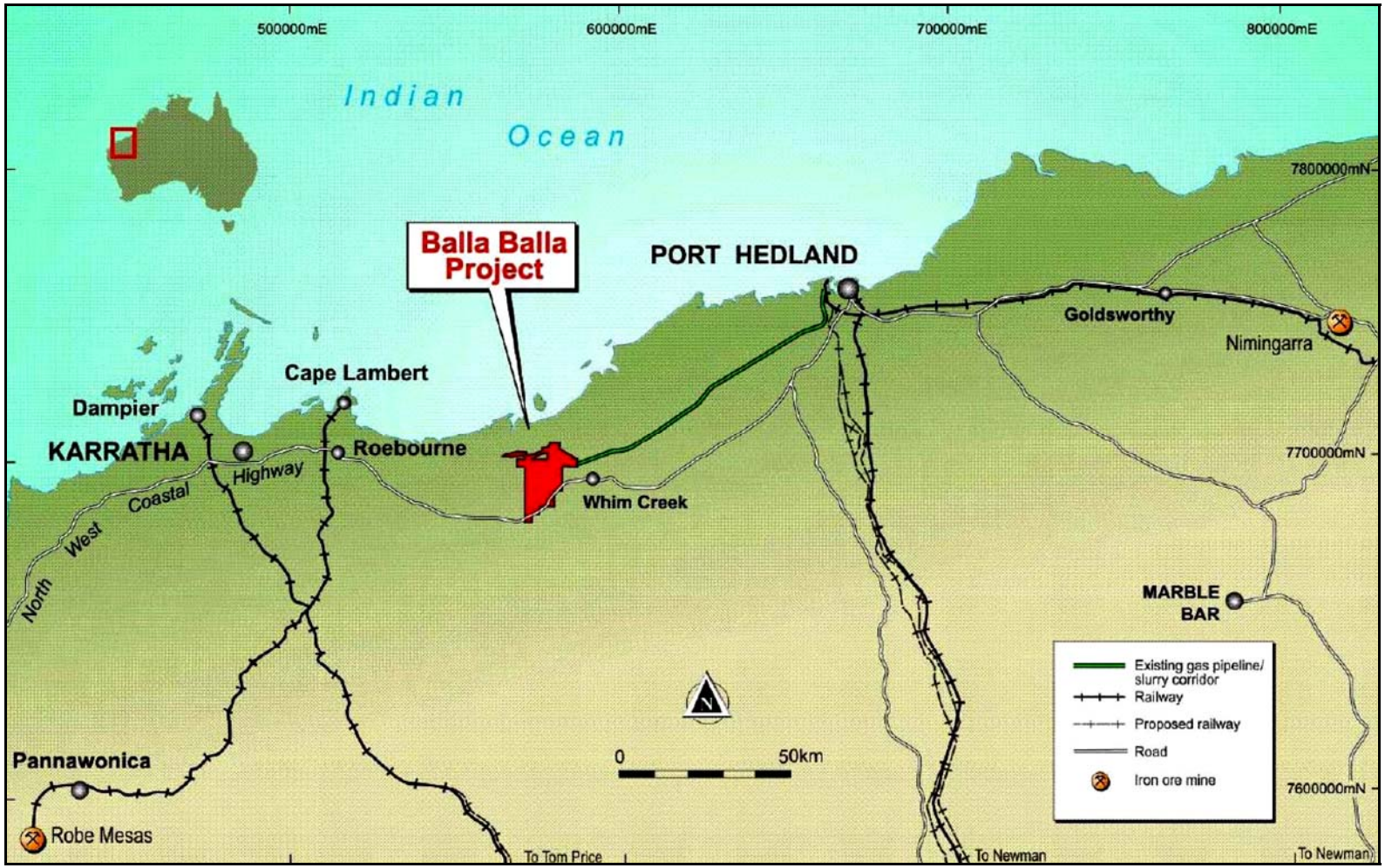

Figure 1: Regional location of the mine site and pipeline corridor

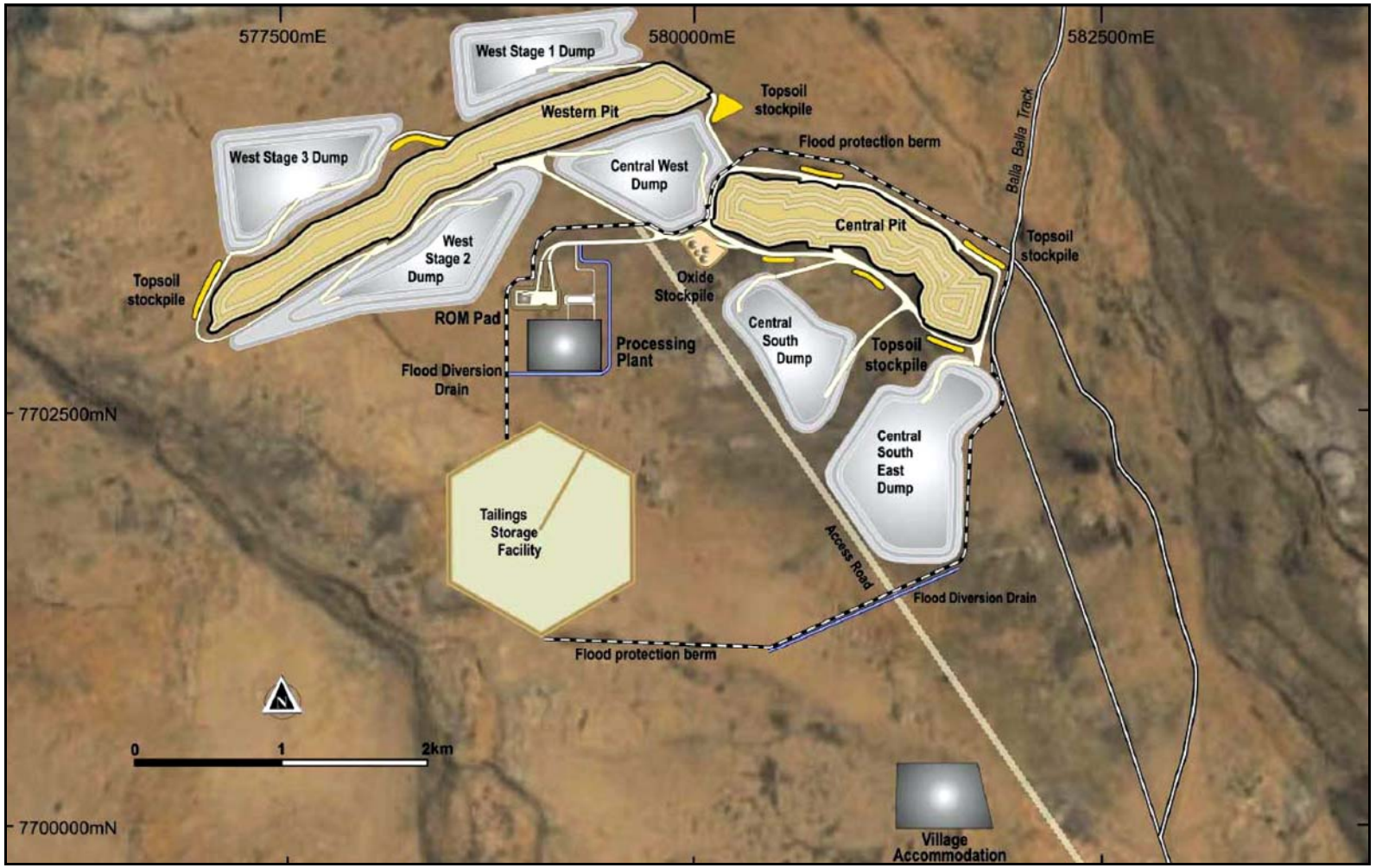

Figure 2: Conceptual mine site layout

3. Consultation

During the preparation of the EPS document, the proponent has undertaken consultation with government agencies and key stakeholders.

The main issues raised in consultation related to:

- flora and vegetation;
- terrestrial fauna;
- groundwater contamination and impact to groundwater dependent species;
- aboriginal heritage; and
- mine closure and rehabilitation.

Table 9 of the EPS document (FMA, 2008) details the agencies, groups and organisations consulted, the issues raised, comments received and the proponent's responses.

The EPA considers that the consultation process has been appropriate and that reasonable steps have been taken to inform the community and stakeholders on the proposed development.

4. Key environmental factors

It is the EPA's opinion that the following key environmental factors relevant to the proposal require evaluation in this report:

(a) Flora and Vegetation;

(b) Fauna;

(c) Surface Water and Groundwater;

(d) Aboriginal Heritage; and

(e) Mine Closure and Rehabilitation

The key environmental factors are discussed in Sections 4.1 to 4.5 of this report. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

4.1 Flora and Vegetation

Description

The mine site is located on the Abydos Plain within the Fortescue Botanical District (Pilbara Region) of the Eremaean Province. The majority of vegetation within the project area consists of hummock grasslands dominated by *Triodia* species, with occasional shrublands and woodlands. The Horseflat land system on which the project area lies is well represented from Regnard Bay to Balla Balla. The proposed mine site is located on the Sherlock Station and Mallina Station pastoral leases within the Shire of Roebourne. Both stations are operated together and are used predominantly for low-density grazing of cattle. The vegetation communities of the project area are considered to be in fair condition albeit declining due to grazing pressure, feral animals and weeds.

Effects of clearing on vegetation

The proposal would impact on approximately 1010 hectares (ha) of vegetation through clearing for mining activities and associated infrastructure. The proposal would also impact flora and vegetation through the introduction or spread of weed species, and lowering of the water table through dewatering activities. The slurry and return water pipeline corridor construction would require vegetation clearing of 505 ha, as the corridor would follow the easement of the existing PEPL.

The proponent has undertaken two flora and vegetation surveys (Astron, November 2005 and Mattiske, June 2006) of the Balla Balla mine site area and one flora and vegetation survey of the pipeline corridor (Mattiske, April 2008).

No Threatened Ecological Communities (TEC's) or Declared Rare Flora (DRF) were identified in any of the surveys.

Of the Priority species recorded in the project area only the potential Priority species (*Gomphrena sp*. and *Mimulus sp.*) would be directly impacted by the mine site. Figure 3 shows the location of Priority species recorded in the project area.

Two vegetation communities considered "locally significant" are present within the proposed mine site area (FMA, 2008). The major channel community (MC1) which is present along the two watercourses that run through the project area (Balla Balla River and Salt Creek) is considered locally significant because a small population of the Priority 2 species *Themeda* sp. Hamersley Station was recorded in this community. The MC1 community is poorly represented in the Horseflat land system (<1%) and also provides habitat and breeding areas for fauna. The woodland community DZw8 is also considered locally significant because it is restricted to one isolated population in the study area and is floristically different to the other communities defined. Impacts to these two local communities from the proposal are minimal (MC1 impact = 0.1 ha, 2.9% and DZw8 impact = 0.5 ha, 20%).

The Clay Plains communities located in the project area appear to support a few species in common with the Roebourne Plains Grassland Communities identified by the DEC as Priority Ecological Communities (PECs). This could not be established for certain as these communities have been subjected to grazing and burning resulting in modification. FMA proposes to impact 25% of these communities identified in the project area.

From previous flora and vegetation surveys and the proponent's surveys in the project area, a total of three Priority species has been identified in the project area (one Priority 2 *Gomphrena cucullata*, two Priority 3 *Acacia glaucocaesia* and *Themeda sp*. Hamersley Station). Two genera recorded in the 2005 survey (*Gomphrena sp*. and *Mimulus sp.*) could not be identified to species level as the specimens had senesced. These species were not recorded in the second 2008 flora and vegetation survey, however have been assumed by the proponent to have high conservation significance for the purpose of this impact assessment. The *Gomphrena sp*. could potentially be the Priority 2 species *Gomphrena cucullata* (this taxon is known from 4 records at the WA Herbarium) or Priority 2 species *Gomphrena pusilla.* (this taxon is known from 8 records at the WA Herbarium).The *Mimulus sp*. could potentially be Priority 1 species *Mimulus clementii* (there are currently no published descriptions for this species).

FMA has attempted to design the mine layout to minimise disturbance to locally significant communities, potential PECs and Priority species.

Effects of dewatering on flora and vegetation

Mining below the water table in the two pits, Central and Western, requires dewatering to enable dry-floor mining. Dewatering has the potential to affect the health of groundwater dependent local flora and vegetation.

Riparian vegetation along the Balla Balla River (to the east of the mine pits) and remnants along Salt Creek (to the west of the proposed mine pits) could be adversely affected by lowering of the water table. Specifically there is a risk that the health of River Red Gums (*Eucalyptus camaldulensis*) along the water courses could suffer if prolonged, excessive drawdown occurs.

Intense rainfall events are known to occur in the Balla Balla area, particularly those associated with cyclonic activity. Groundwater level rises in response to rainfall recharge can be significant and were recorded at a number of bores between December 2005 and September 2006 (GRM, 2008). The measured rises over this period ranged from 0.6 metres (m) to 5.5 m. The proponent assumes that the scale of these fluctuations is within the bounds of normal yearly fluctuations and therefore predicts that local vegetation communities are adapted to tolerate this rate and magnitude of groundwater fluctuation.

Groundwater modelling undertaken for the proposal (GRM, 2008) suggests that with no recharge, over 5 years, the drawdown along most of the length of the Balla Balla River would be generally less than 2 m and drawdown along Karinha and Salt Creeks would be generally less than 5 m. Figure 4 shows the predicted groundwater drawdown over 5 years with no recharge. The proponent has provided a worst case scenario prediction (no recharge for the life of the project) and under these conditions drawdown along the Balla Balla River would be 4 m or less after 12 years, drawdown along Karinha and Salt Creeks would range from 20 m in the vicinity of the production bores to approximately 10 m along the creek lines and drawdown at Coorinjinna Pool would be less than 1 m. It is considered overly conservative to assume no recharge over mine life in this area.

Proposed management

The proponent has developed a Ground Disturbance and Rehabilitation Management Plan and proposed measures to mitigate impacts to flora and vegetation such as:

- minimise clearing of remnant vegetation and vegetation associations containing riparian systems and Priority species;
- mark and avoid large habitat trees;
- progressively rehabilitate disturbed areas;
- restrict vehicles to established roads and implement speed limits;
- ensure washdown facilities for vehicle and machinery are used;
- monitor and manage weeds;
- adopt dust management practices;

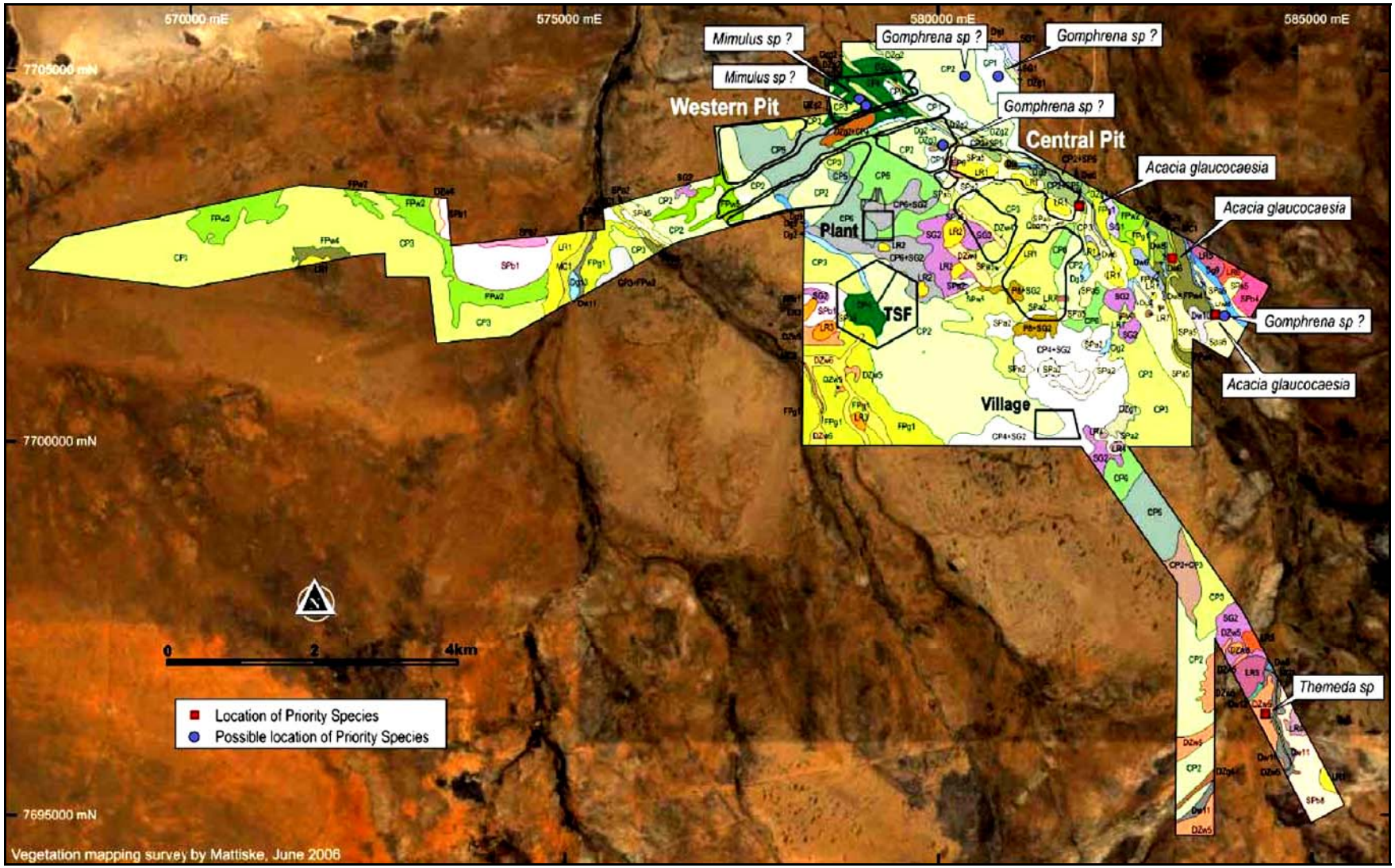

Figure 3: Location of Priority flora species

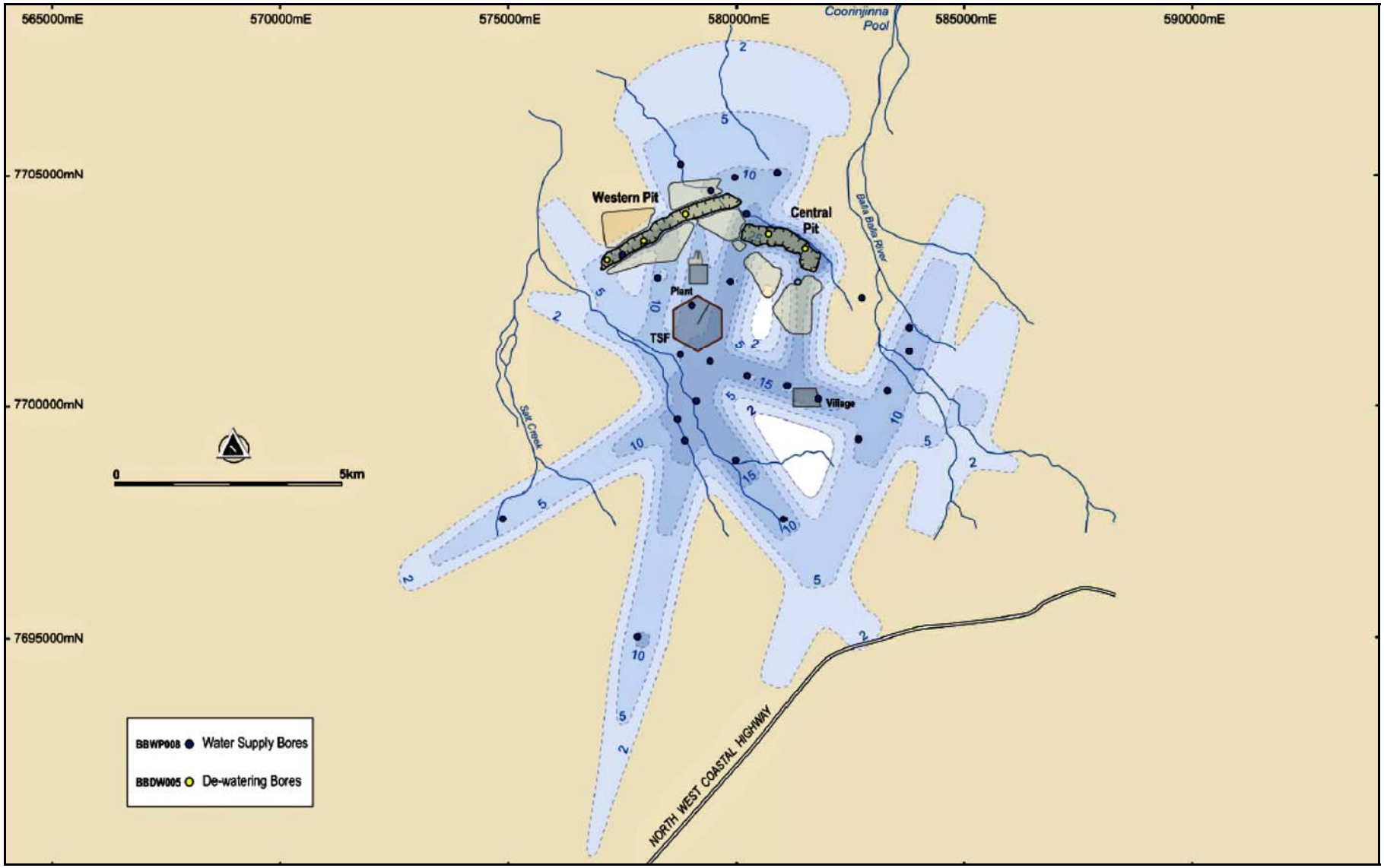

Figure 4: Predicted groundwater drawdown over 5 years (no recharge)

- implement a fire prevention and management strategy;
- undertake staff induction and awareness programs;
- monitor vegetation condition;
- monitor groundwater levels; and
- employ contingency actions if monitoring indicates excessive groundwater drawdown.

Assessment

The area considered for assessment of this factor is the proposed mine site and adjacent areas, the pipeline corridor and areas affected by groundwater drawdown.

The EPA's environmental objectives for this factor are to:

- protect Declared Rare and Priority Flora consistent with the provision of the *Wildlife Conservation Act 1950*; and
- maintain the adundance, species diversity, geographical distribution and productivity of vegetation communities.

The EPA notes that no TECs or DRF were identified within the project area.

The EPA notes that three flora and vegetation surveys have been undertaken for the project area, two of these surveys were in accordance with EPA Guidance Statement 51. The EPA considers the level of flora and vegetation work undertaken for the project to be acceptable.

Approximately 25% of the local Clay Plains communities would be impacted by the mine site. These communities appear to be similar to the Roebourne Plains Coastal Grasslands, some of which have been identified as PECs by DEC. The identification of these communities as PECs could not be established for certain due to grazing and fire modification. The EPA acknowledges that FMA has amended the mine plan to minimise impact to these potential communities. The EPA notes that the Pilbara region has not been adequately surveyed to map the extent of the Roebourne Plains associations, in particular, there is currently no definitive DEC species list for the Roebourne Plains Coastal Grasslands communities. However, these communities are represented relatively widely in the area from Forty Mile Beach to Sherlock Station. The EPA considers that the relatively small area of clearing of the local Clay Plains communities is unlikely to change or impact the conservation status of the Roebourne Plains Coastal Grasslands.

The MC1 community in the project area is considered locally significant and the EPA notes that the proponent has taken all practical measures to avoid and minimise disturbance to this community. The EPA notes that approximately 2.9% of this vegetation community would be impacted and that the proponent would avoid impact to the Priority species *Themeda sp*. Hamersley Station and any large habitat trees.

The proposal is expected to have a low impact on the local populations of the identified Priority species. The *Mimulus sp.* and *Gomphrena sp.* recorded in the 2005 mine site flora and vegetation survey could not be identified due to senescence. The proponent has assumed the unidentified species have high conservation significance for the purpose of this impact assessment. The EPA notes that a further survey undertaken at the mine site in 2008 did not record these species. The potential Priority species from the *Gomphrena* genera are recorded from other records in the Pilbara. On advice from DEC, it is likely that the potential Priority species from the *Mimulus* genera are poorly collected rather than rare. The EPA commends the proponent's commitment to undertake further targeted surveys for *Gomphrena sp*. and

Mimulus sp. and acknowledges the contribution to improving the knowledge base of potentially threatened WA flora.

The EPA considers that the proposed management actions which include monitoring and rehabilitation, are appropriate to mitigate the low level of risk to groundwater dependent vegetation arising from dewatering. River Red Gums (*Eucalyptus camaldulensis*) obtain water from three main sources: groundwater, rainfall and river flooding. The EPA recognises that the project area is subject to intense rainfall events that contribute to groundwater level fluctuations and considers that groundwater dependent vegetation could tolerate fluctuations in groundwater. The EPA also notes that a number of creek lines in the area such as Marnipurl, Karinha and Salt have been subjected to cattle grazing and are degraded with minimal vegetation remaining.

The EPA considers that the proposal is unlikely to cause significant impacts to groundwater dependent vegetation in the area and acknowledges that all flora that may potentially be impacted by groundwater drawdown are well represented outside the area to be mined. The EPA notes that the proponent has committed to closely monitor the health of any groundwater dependent vegetation in consultation with DEC and the Department for Water (DOW).

Summary
Having particular regard to the:

a) low risk of groundwater drawdown on groundwater dependent vegetation; and
b) implementation of the recommended condition 6, which addresses the impacts of groundwater drawdown to vegetation,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

4.2 Fauna

Description

Clearing for the mine site and the pipeline corridor has the potential to impact on terrestrial fauna by direct loss and disturbance of habitat.

Mine site

One individual species of conservation significance was recorded in the mine site area, the Rainbow bee-eater (*Merops ornatus*). The species is widespread in grassland and open woodland and not expected to be impacted by the proposal.

Pipeline corridor

There is the potential for a variety of native fauna to become trapped in open pipeline trenches and fauna mortality may result if trapped fauna are not removed in a timely manner. The proponent proposes to manage this under its Construction Environmental Management Plan and has identified management measures such as: limiting the length of trench open at any one time; trench inspections; fauna shelter boxes and soil plugs (ramps); and reporting regularly to DEC.

Construction of the pipeline would not occur from November to March (inclusive) when reptiles are most active.

Subterranean fauna

Surveys undertaken for stygofauna in the project area have shown the area to support a diverse and abundant stygofauna population. The taxa identified were typical of the Pilbara region and were widely distributed in the drainage basin associated with the project area, the Port Hedland Coastal Basin, or within the project area. Species recorded from the potential impact zones were also recorded in the control bores outside these areas. The project area is considered not suitable for troglofauna based on geomorphological characteristics (FMA, 2008).

Short-range endemic fauna

Surveys for short-range endemic (SRE) species were undertaken for the mine site and pipeline corridor. Four species of land snails were identified during the mine site survey however these species occur within and outside the project area and are widely distributed throughout the region.

No taxa likely to be SRE species were identified along the pipeline corridor, however it was identified that survey conditions were not ideal for the collection of such species. An assessment for the suitability of habitat for SRE species in the project area was carried out. Potential habitat that could support SRE is likely to be primarily found along watercourses and creek lines, considering the proposals minimal impact to these areas impacts to SRE species are not expected.

Assessment

The area considered for this assessment is the Balla Balla mine site and pipeline corridor.

The EPA's environmental objectives for this factor are to:

- protect Specially Protected (Threatened) and Priority Fauna and their habitats, consistent with the provisions of the *Wildlife Conservation Act 1950*;
- protect fauna listed on the Schedules of the *Environment Protection and Biodiversity Conservation Act 1999*; and
- maintain the abundance, species diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impact and improvement in knowledge.

The EPA considers that the fauna surveys undertaken for the mine site and the pipeline corridor (Bamford, June 2006 and April 2008) were carried out in accordance with EPA Guidance Statement 56 and are acceptable. The EPA notes that only one individual species of conservation significance was recorded, the Rainbow bee-eater (*Merops ornatus*). The Rainbow bee-eater is a federally-listed migratory species but common in the Pilbara bioregion. The EPA does not expect this species to be impacted by the proposal. The EPA notes that the proponent has committed to protect potential habitat areas such as riparian vegetation and watercourses and therefore considers that the proposal is unlikely to cause significant impacts on fauna. The EPA has recommended conditions 6 and 8 to protect riparian vegetation and water quality in the project area.

The EPA acknowledges the proponent's management measures to reduce the potential for native fauna to be adversely impacted by open trenches associated with the pipeline construction. The EPA considers that the implementation of recommended condition 7 which requires management of pipeline corridor construction will ensure that pipeline construction can be managed in an environmentally acceptable manner.

The EPA notes that two stygofauna surveys were undertaken for the project area in accordance with EPA Guidance Statement 54 and 54a and these surveys ascertain that the stygofauna taxa identified are widely distributed outside the project impact areas. The EPA acknowledges that the geomorphology of the Balla Balla project site does not appear to be suitable for troglofauna.

The EPA considers potential impact to SRE in the mine site area and pipeline corridor to be low and commends the proponent in its commitment to protect habitats that may potentially support SRE invertebrates through avoidance and protection of hydrological systems. The EPA supports the proponent's commitment to undertake a further SRE survey in optimal conditions prior to ground disturbance. High quality survey work is integral to addressing critical gaps in scientific knowledge of poorly surveyed species.

Summary

Having particular regard to the:

(a) measures taken by the proponent to avoid and minimise environmental impacts to fauna; and
(b) the implementation of condition 7 requiring management measures to reduce the potential impacts on fauna from the open pipeline trench,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor provided that the recommended conditions are made legally enforceable.

4.3 Surface Water and Groundwater

Description

The project requires 7.80 gigalitres per annum (GLpa) of fresh to brackish water for the processing plant operations on-site. An additional 0.56 GLpa is required for dust suppression and other mining uses. This water supply would be sourced from a combination of mine dewatering and groundwater abstracted from 38 bores. FMA is committed to extensive water recycling to minimise demands and reduce environmental impacts. Over 85% of the water used in ore processing would be recycled within the plant. Approximately 65% of the water used to convey slurry to Port Hedland would be returned to the mine site.

The Balla Balla proposal lies within the hydrological unit known as the Port Hedland Coastal Drainage Basin. Surface water flow in the region occurs almost exclusively as a direct response to rainfall. The rivers within the Port Hedland Coastal Drainage Basin flow northwards across the flat coastal plain towards the Indian Ocean (FMA, 2008). The Balla Balla River and Whim Creek are located to the east of the mine site area and the Salt Creek and Karinha Creek (a tributary of Salt Creek) are located to the west of the mine site area.

The average depth to groundwater in the mine site area is approximately 7 m below ground level. The water table is generally expected to be flat, with a low northerly hydraulic gradient towards the coast.

The proposal has the potential to impact surface water and groundwater in the project area and adjacent areas through dewatering of mine pits and the formation of pit lakes following mine closure. Surface water and groundwater at the mine site may also be impacted by potentially acid forming materials, the storage of chemicals, hydrocarbons, wastes and tailings on the mine site and the disturbance to natural surface water and groundwater flow patterns.

There will be no discharge of excess or disturbed water to the environment.

Groundwater drawdown – dewatering and water supply pumping

Groundwater drawdown would occur because of dewatering and pumping of water supply bores. Dewatering would occur at 35 Litres per second (L/sec) consistent with the low permeability conditions identified in the area of the planned pits (GRM, 2008). A dewatering methodology has been devised for both the Central and Western pits in order to allow mining operations to proceed safely, supply process water to the plant and promote minimal groundwater drawdown impacts. 38 production bore sites would be spread over a wide area to promote minimal drawdown by preventing between-bore interference effects. A comprehensive monitoring and management regime has been developed based on the hydrogeological investigations. A Groundwater Operations Strategy would be submitted to the DOW as part of the Part V regulatory approvals process.

Hydrogeological studies (GRM, 2008) indicate that drawdown along most of the length of the Balla Balla River is predicted to be 4 m or less at the completion of mining and generally less than 2 m after 5 years. Groundwater drawdown is expected to be less than 5 m along the creek lines after 5 years, studies also indicate that whilst the impact to the Coorinjinna Pool is expected to be minimal, a number of stock watering bores close to the project area may be affected.

Tailing Storage Facility and waste rock dumps

Seepage from the Tailings Storage Facility (TSF) has the potential to affect both water quality and groundwater levels due to mounding.

Process plant tailings would be managed using a TSF. The proposed TSF would consist of a staged approach, initially with a traditional hexagonal paddock-style TSF, with options for a second paddock or a proposed integrated waste landform, pending trials during operation. During the first four years of operations, FMA proposes to undertake further work to improve tailings storage. Modelling has been undertaken (Coffey, 2008) to assess the likely rate at which seepage from the TSF would occur. The TSF would be designed and constructed using the following design components:

- starter embankments designed as free standing structures with mine waste placement being progressive over the life of the project;
- a central decant with dedicated recovery pump to return supernatant water;
- closely spaced spigots to enable cyclic deposition of tailings;
- underlying clay liner with a permeability of 1×10^{-9} metres per second;
- underdrainage system;

- incorporation of airlock into underdrainage design;
- design for a 1 in 100 year, 72 hour storm event; and
- freeboard of 300 millimetres, with a minimum beach freeboard of 200 millilitres to the satisfaction of Department of Industry and Resources (DOIR).

Modelling studies (Coffey, 2008) were carried out to determine the impact of seepage from the TSF on groundwater levels. Studies show that based on a seepage rate of 43 cubic metres per day (about 0.5 L/sec) from the TSF, groundwater levels would not be affected.

Testing has also been undertaken to evaluate the likely quality of tailings leachate and none of the leachate samples exceeded the guideline values recommended by Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC) for water used for watering livestock.

Six waste landforms would be developed following construction. FMA has developed a conceptual waste rock landform designed to be safe, stable, non-erodable and integrated into the surrounding environment. There would be sufficient waste rock available for encapsulation as the majority of mine waste material would be rock. FMA would determine the appropriate final waste rock landform design through rehabilitation trials during the operational phase of the project in consultation with the DOIR.

Pit voids

At the cessation of mining, dewatering of the mine pits would stop and groundwater would seep back into the pit void. The pit void lakes are predicted to act as groundwater sinks. Pit void modelling (GRM, 2008) predicts that salinity would increase by 2 to 3 times from pre-mining levels.

The groundwater monitoring program to be implemented by the proponent would continue post mining to ensure that the groundwater quality in the project area does not exceed ANZECC requirements.

Pipeline corridor

The proposed pipeline corridor crosses two water resource protection areas, the Yule River water reserve and the Turner River water reserve. The Yule River forms part of the public water supply for Port Hedland and South Hedland. The Turner River bore field was closed in the 1980s. The proponent is committed to best practice construction of the slurry pipeline such as horizontal drilling beneath the watercourses and minimising impact to riparian vegetation. The construction of the pipeline corridor is unlikely to impact surface water and groundwater.

Assessment

The area for assessment consists of the mine site and the pipeline corridor.

The EPA's environmental objectives for this factor are to:

- maintain the quality of groundwater so that existing and potential users, including ecosystem maintenance, are protected;
- maintain the integrity, ecological function and environmental values of watercourses, and to ensure that alterations to surface drainage do not adversely impact native vegetation or flow regimes; and

- ensure surface water does not adversely affect environmental values or the health, welfare or amenity of people and land uses.

Groundwater can be impacted by a number of mining activities including dewatering, bore pumping, TSF and pit voids. There would be no discharge of dewater to the environment.

Groundwater drawdown on vegetation has been discussed in section 4.1 of this report. Groundwater drawdown also has the potential to impact on stock watering bores and watercourses. FMA has committed to provide an alternative water source of suitable quality at locations where these stock watering bores are likely to be affected.

The TSF will be designed using best practice technology which includes an underlying non-permeable clay liner to manage leachate, an underdrainage system, design for unlikely extreme storm events and freeboard. The EPA considers that the impacts from seepage from the TSF are expected to be negligible and therefore it is unlikely that groundwater quality would be affected. Rivers within the Port Hedland Coastal Drainage Basin flow northwards across the flat coastal plain towards the Indian Ocean. The Balla Balla River and Whim Creek are located to the east of the mine site area and the Salt Creek and Karinha Creek are located to the west of the mine site area. The EPA therefore considers that, based on the design of the TSF and the hydrological location of the river systems, it is unlikely that groundwater quality would be affected.

The EPA considers that, with the implementation of condition 8 which requires the proponent to monitor potential run-off and seepage from the TSF and waste rock areas, and to meet ANZECC standards for existing and potential uses, groundwater quality can be managed in an environmentally acceptable manner.

The EPA notes that the Central and Western pits would not be backfilled at closure and that pit lakes are expected to form. The EPA notes that hydrogeological modelling predicts that these lakes would act as groundwater sinks due to low permeability surrounding the pits and considers it unlikely that groundwater quality would be affected. However, the EPA has recommended condition 9-3 requiring the proponent to ensure that final pit voids do not impact groundwater quality.

Summary

Having particular regard to:

(a) the implementation of condition 8 to protect groundwater quality; and
(b) the implementation of condition 9-3 to address mine pit voids,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objectives for this factor.

4.4 Aboriginal Heritage

Description

The local native title claimant groups for the project area are the Ngarluma and the Yinjibarndi.

Five previous archaeological and/or ethnographic surveys have been conducted over the mine site and pipeline corridor. In 2006 FMA commissioned Australian Interaction Consultants (AIC) to survey the Balla Balla project area. This survey was undertaken in April 2006 with representatives from the Ngarluma Aboriginal Corporation (NAC). Department of Indigenous Affairs (DIA) database searches have been conducted with the most recent being May 2008.

A number of heritage sites have been identified. FMA has designed the mine plan and pipeline corridor to ensure that none of the heritage sites identified would be directly impacted. FMA have committed to further professional heritage surveys at site identification level for potential cultural heritage sites prior to project construction to confirm their location and boundary. NAC representatives would be invited to consult regarding this survey.

FMA has committed to engaging a suitably qualified professional to develop a Cultural Heritage Management Plan to protect heritage sites from impacts by works associated with the project. FMA lists a number of management measures in their EPS document including:

- Maintaining a buffer of at least 50 m from Salt Creek, Balla Balla River, ABB06 and ABB07 and 30 m from all other sites;
- continued consultation with the Ngarluma and Yindjibarndi people on heritage matters;
- demarcation of all sites and appropriate exclusion zones, signage and fencing;
- a staff heritage awareness program is implemented; and
- indirect impacts such as blasting and dust will be avoided.

FMA are aware of their obligations under the *Aboriginal Heritage Act 1972* and will not alter any sites without Ministerial approval.

Assessment

The area for assessment consists of the mine site and the pipeline corridor.

The EPA's environmental objectives for this factor are to:

- to ensure that changes to the biophysical environment do not adversely affect historical and cultural associations and comply with relevant heritage legislation.

The EPA notes that a number of archaeological and/or ethnographic surveys have been conducted in the project area and that heritage sites have been identified. The AIC report was not released to the EPA at the request of the traditional owners to ensure confidentiality of sites recorded.

The EPA is aware through advice from FMA, NAC and the DIA that the AIC report recommended that any further works beyond exploration of the Balla Balla tenements be conducted only after an additional survey and consultation with the NAC. The survey undertaken by AIC and NAC representatives in 2006 was to basic reconnaissance level only. The EPA notes that DIA advice concurs with the AIC recommendation and specifies that a Cultural Heritage Management Plan should be developed which includes the requirement for further aboriginal heritage surveys to site identification level for potential cultural heritage sites in the project area. These surveys should be undertaken prior to the commencement of works associated with the project and should be in consultation with the relevant Indigenous stakeholders.

The EPA acknowledges the proponent's commitment in the EPS to engage a suitably qualified professional to develop a Cultural Heritage Management Plan and to undertake further professional surveys at site identification level to confirm all heritage sites location and boundary.

Summary

Having particular regard to:

(a) the proponent's commitment to develop a Cultural Heritage Management Plan which includes further surveys at site identification level for potential heritage sites, provisions for involving all stakeholders and management of the sites within the project area,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objectives for this factor.

4.5 Mine Closure and Rehabilitation

Description

Open cut mining would be used to mine the Balla Balla magnetite deposit. The proposed mine is anticipated to have a mine life of 15 years.

Approximately 1010 ha of vegetation will be disturbed within the mine site and 505 ha for the pipeline construction. There is the potential for unstable landforms, erosion, contamination, and altered ground and surface water regimes to result.

The post mining land use for the project area is proposed to be re-incorporation within the existing Mallina Station and Sherlock Station pastoral activities. Two final pit voids would remain as permanent features in the landscapes. At cessation of mining the Central pit dimensions would be approximately 160 m deep with a crest length of 2000 m and a 500 m width while the Western pit dimensions would be approximately 3600 m long by 350 m wide. The pit voids would be made safe following the cessation of mining by establishing an abandonment bund in accordance with *Safety Bund Walls around Abandoned Open Mine Pits* (DOIR, 1997). Modelling (GRM, 2008) has predicted that the pit void lakes would act as groundwater sinks over time with evaporation exceeding inflows due to low permeability surrounding the pits, this would minimise the movement of saline water from the pits to the surrounding groundwater environment. The modelling predicts that water levels in both pit void lakes would equilibrate well below the ambient pre-mining groundwater level and therefore would not act as a water source for feral animals and native fauna.

Approximately 284 Mt of waste rock would be generated during the mine life. It is proposed that the waste would be distributed between six waste landforms. There would be sufficient waste rock available for encapsulation as the majority of mine waste material would be rock. The waste landforms would have a nominal maximum height of 55 m. The cover materials used on waste rock landform side slopes would comprise of coarse, rocky waste to provide erosion resistance. Topsoil would be added and ripped to create a suitable environment for moisture retention and plant growth. On the advice of the DOIR, FMA would determine the appropriate final waste rock landform design through rehabilitation trials during the operational phase of the project.

Several options are being considered for closure of the TSF. The final surface is likely to require a multi-layer capping to limit infiltration of the incident rainfall, to minimise oxidation of the tailings and to enable rehabilitation to conform to the surrounding environment. Rehabilitation trials would be conducted to determine the most appropriate species mix for revegetation.

The proponent has prepared a Ground Disturbance and Rehabilitation Plan with a view to returning the mine site and pipeline corridor to a self sustaining ecosystem that is consistent with the natural surrounding environment. The proponent proposes to liaise with relevant stakeholders and review and update the Ground Disturbance and Rehabilitation Plan over the life of mine.

Decommissioning would involve the dismantling and removal of infrastructure, the appropriate disposal of waste materials, and the return of impacted areas to the vegetation types and fauna habitats that reflect their original condition as closely as possible. Rehabilitation would be undertaken progressively, topsoil and cleared vegetation would be stockpiled and returned to landforms and disturbed areas and local provenance seed material would be used. Cattle would be excluded from rehabilitation areas through fencing.

The slurry pipeline would be decommissioned *in situ* in accordance with the Australian Pipeline Association Code of Environmental Practice which is considered to be the environmentally preferable option.

Rehabilitated areas would be monitored and maintained.

Assessment

The EPA's environmental objectives for this factor are to:

- ensure that closure and rehabilitation achieves stable, non-polluting functioning landforms which are consistent with the surrounding landscapes and other environmental values;
- ensure that self-sustaining native vegetation communities are returned after mining, which in species composition and ecological function are as close to as possible to naturally occurring analogue sites; and
- ensure that final mine pit lakes do not cause significant environmental impacts through groundwater pollution or by attracting native or introduced fauna.

The EPA acknowledges that the proponent has committed to a closure and rehabilitation strategy for the proposed Balla Balla mine site and pipeline corridor and intends to liaise with the relevant government departments and stakeholders. In order to ensure the long term success of mine closure and rehabilitation the EPA recommends that condition 9 be imposed on the proponent.

The EPA notes that two mine pit voids would remain at the cessation of mining and that the potential exists for pit lakes to form. Pit lakes have the potential to impact on groundwater and attract fauna which may subsequently be harmed, or which may harm surrounding native vegetation. Accordingly, recommended condition 9 referred to above also includes a requirement that the proponent ensures that the final pit voids do not pose a risk to groundwater, fauna or native vegetation.

Summary

Having particular regard to:

(a) the recommended condition 9 which sets outcomes for rehabilitation and addresses mine pit lakes,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objectives for this factor.

5. Other Advice

Dust from the mine site operations was not considered as a key significant environmental factor because of the large separation distance to the nearest sensitive receptor. The EPA notes, however, that the magnetite concentrate would be conveyed from the mine to Port Hedland via a 110 km slurry pipeline located alongside the existing Pilbara Energy Pipeline (PEPL). The concentrate would be dewatered at a purpose-built facility located at Utah Point in the Port Hedland Port Area. FMA operations at Utah Point are covered under the Port Hedland Port Authority Utah Point Berth Project currently being assessed by the EPA. Cumulative dust issues at Port Hedland are addressed in that assessment.

6. Conclusions

The EPA has considered the proposal by Ferro Metals Australia Pty Ltd to construct and operate a magnetite mine located approximately 10 km north-west of Whim Creek on the North West Coastal Highway and slurry and return water pipelines connecting the mine site to the proposed Utah Point Berth Project at Port Hedland.

The EPA has determined that the key environmental factors relevant to the proposal were flora and vegetation, fauna, surface water and groundwater, aboriginal heritage and closure and rehabilitation.

The EPA has recommended that conditions be imposed on the proponent in relation to:

- protection of vegetation against excessive groundwater drawdown;
- the clearing of trapped fauna within open pipeline trenches by a suitably trained person(s) during specified daily time periods;
- monitoring and management of leachate or run-off from the tailings storage facility and waste rock dumps; and
- mine closure and rehabilitation.

The EPA has concluded that it is likely that the EPA's objectives would be achieved provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 2.

7. Recommendations

The EPA submits the following recommendations to the Minister for Environment:

1. That the Minister notes that the proposal being assessed is for magnetite mining at the proposed Balla Balla mine site in the Pilbara region and the transfer of magnetite slurry to Utah Point, Port Hedland via a 110 km underground pipeline;

2. That the Minister considers the report on the key environmental factors as set out in Section 4;
3. That the Minister notes that the EPA has concluded that the proposal can be managed to meet the EPA's environmental objectives, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 2; and
4. That the Minister imposes the conditions and procedures recommended in Appendix 2 of this report.

Appendix 1

References

Australia and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* Canberra, ACT.

Australian Interaction Consultants (2007) *Report of an Archaeological and Ethnographic Survey at Balla Balla, Western Australia*. Prepared for FMA.

Astron Environmental Services (2005). *Balla Balla Vanadium Project, Vegetation and Flora Survey Report.* November 2005.

Bamford Consulting Ecologists (2008) *Fauna Assessment, Balla Balla Project, Linear Infrastructure Corridor*. Prepared for Ferro Metals Australia Pty Ltd. May 2008.

Bamford Consulting Ecologists (2006) *Fauna Assessment of the Balla Balla Vanadium Project.* Prepared for URS Australia Pty Ltd, August 2006.

Coffey Mining (2008) *Balla Balla Magnetite Project – Conceptual Design of Tailings Storage Facility Whim Creek,* September 2008.

DOIR (1997) *Safety Bund Walls Around Abandoned Open Mine Pits*. Department for Industry and Resources, Perth, Western Australia.

Ferro Metals Australia (2008) *Balla Balla Magnetite Project – Environmental Protection Statement*, November 2008.

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Groundwater Resource Management (2008) *Hydrogeological investigations for 6 Mtpa Case Study, Balla Balla Iron Ore Project*. Unpublished report prepared for Aurox Resources Limited, September 2008.

Mattiske Consulting Pty Ltd (2008) *Flora and Vegetation of Balla Balla Pipeline Corridors*. Unpublished report prepared for Aurox Resources Limited, June 2008.

Mattiske Consulting Pty Ltd (2006) *Flora and Vegetation of Balla Balla Vanadium Project.* Unpublished report prepared for Aurox Resources Limited, August 2006.

Sinclar Knight Merz (2008) *Utah Point Berth Project Public Environmental Review*. Port Hedland Port Authority, June 2008.

URS (2008*) Groundwater Numerical Modelling for the proposed Balla Balla Tailings Storage Facility*. Prepared for Aurox Resources Limited, May 2008.

Appendix 2

Recommended Environmental Conditions

Statement No.

RECOMMENDED ENVIRONMENTAL CONDITIONS

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986

BALLA BALLA MAGNETITE MINING PROJECT, 1O KILOMETRES NORTH-WEST OF WHIM CREEK, SHIRE OF ROEBOURNE

Proposal: To undertake mining and processing of up to 129 million tonnes of magnetite iron ore in the Central and Western deposits at the Balla Balla mine site and to construct and operate a pipeline to convey the magnetite slurry to Utah Point, Port Hedland.

Proponent: Ferro Metals Australia Pty Ltd

Proponent Address: Unit 1, 245 Churchill Avenue, Subiaco WA 6008

Assessment Number: 1770

Report of the Environmental Protection Authority: Report 1309

The proposal referred to in the above report of the Environmental Protection Authority may be implemented. The implementation of that proposal is subject to the following conditions and procedures:

1 Proposal Implementation

1-1 The proponent shall implement the proposal as assessed by the Environmental Protection Authority and described in schedule 1 of this statement subject to the condition and procedures of this statement.

2 Proponent Nomination and Contact Details

2-1 The proponent for the time being nominated by the Minister for Environment under sections 38(6) or 38(7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal.

2-2 The proponent shall notify the Chief Executive Officer (CEO) of the Department of Environment and Conservation of any change of the name and address of the proponent for the serving of notices or other correspondence within 30 days of such change.

3 Time Limit of Authorisation

3-1 The authorisation to implement the proposal provided for in this statement shall lapse and be void within five years after the date of this statement if the proposal to which this statement relates is not substantially commenced.

3-2 The proponent shall provide the CEO of the Department of Environment and Conservation with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.

4 Compliance Reporting

4-1 The proponent shall prepare and maintain a compliance assessment plan to the satisfaction of the Chief Executive Officer of the Department of Environment and Conservation.

4-2 The proponent shall submit to the Chief Executive Officer of the Department of Environment and Conservation, the compliance assessment plan required by condition 4-1 at least 6 months prior to the first compliance report required by condition 4-6. The compliance assessment plan shall indicate:

1 the frequency of compliance reporting;

2 the approach and timing of compliance assessments;

3 the retention of compliance assessments;

4 reporting of potential non-compliances and corrective actions taken;

5 the table of contents of compliance reports; and

6 public availability of compliance reports.

4-3 The proponent shall assess compliance with conditions in accordance with the compliance assessment plan required by condition 4-1.

4-4 The proponent shall retain reports of all compliance assessments described in the compliance assessment plan required by condition 4-1 and shall make those reports available when requested by the Chief Executive Officer of the Department of Environment and Conservation.

4-5 The proponent shall advise the Chief Executive Officer of the Department of Environment and Conservation of any potential non-compliance as soon as practicable.

4-6 The proponent shall submit a compliance assessment report annually from the date of issue of this Implementation Statement addressing the previous twelve month period or other period as agreed by the Chief Executive Officer of the Department of Environment and Conservation. The compliance assessment report shall:

1 be endorsed by the proponent's Managing Director or a person, approved in writing by the Department of Environment and Conservation, delegated to sign on the Managing Director's behalf;

2 include a statement as to whether the proponent has complied with the conditions;

3 identify all potential non-compliances and describe corrective and preventative actions taken;

4 be made publicly available in accordance with the approved compliance assessment plan; and

5 indicate any proposed changes to the compliance assessment plan required by condition 4-1.

5 Performance Review and Reporting

5-1 The proponent shall submit to the CEO of the Department of Environment and Conservation Performance Review Reports at the conclusion of the first, second, third and fifth years after the commencement of productive mining and then, at such intervals as the CEO of the Department of Environment and Conservation may regard as reasonable, which addresses:

1 the major environmental risks and impacts; the performance objectives, standards and criteria related to these; the success of risk reduction/impact mitigation measures and results of monitoring related to management of the major risks and impacts;

2 the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable; and

3 significant improvements gained in environmental management which could be applied to this and other similar projects.

6 Flora and Vegetation

6-1 The proponent shall ensure that during construction and operation of the proposal that groundwater abstraction from the mine and borefield does not adversely affect vegetation to be retained in the project area.

6-2 The proponent shall monitor groundwater levels in the project area, including in the vicinity of riparian and groundwater dependent vegetation, to facilitate determination of whether the requirements of condition 6-1 are being met. This monitoring is to be carried out to the satisfaction of the CEO of the Department of Environment and Conservation.

6-3 The proponent shall monitor the health and condition of riparian and groundwater dependent vegetation to be retained to facilitate determination of whether the requirements of condition 6-1 are being met. This monitoring is to be carried out to the satisfaction of the CEO of the Department of Environment and Conservation.

6-4 The proponent shall submit the results of the monitoring of groundwater and vegetation required by condition 6-2 and condition 6-3 to the CEO of the Department of Environment and Conservation.

6-5 The proponent shall immediately provide proposed management measures to the CEO of the Department of Environment and Conservation in the event that the requirements of condition 6-1 are not being met or are not likely to be met.

7 Fauna

7-1 The proponent shall limit the length of open trenches to a maximum length of two and a half kilometres at any time.

7-2 Fauna refuges are to be placed in the trench at intervals not exceeding 50 metres.

7-3 The proponent shall employ at least two "fauna clearing people" to remove fauna from the trench. The "fauna clearing people" shall be able to demonstrate suitable experience to obtain a fauna handling licence from the Department of Environment and Conservation.

7-4 Inspection and clearing of fauna from trenches by fauna clearing people shall occur twice daily and at least half an hour prior to the backfilling of trenches, with the first daily inspection and clearing to be undertaken no later than 3.5 hours after sunrise, and the second inspection and clearing to be undertaken daily between the hours of 3:00 pm and 6:00 pm.

7-5 In the event of significant rainfall, the proponent shall, following the clearing of fauna from the trench, pump out any pooled water in the open trench (with the exception of groundwater) and discharge it via a mesh (to dissipate energy) to adjacent vegetated areas.

7-6 Within 14 days following completion of the construction of the slurry and return water pipelines, the proponent shall provide a report on fauna deaths, within the pipeline corridor to the CEO of the Department of Environment and Conservation.

8 Surface Water and Groundwater Quality

8-1 The proponent shall ensure that run-off and/or seepage from the tailings storage facility and waste rock do not cause the quality of surface water or groundwater within or leaving the proposal area to exceed ANZECC* requirements, taking into consideration natural background water quality, so that existing and potential uses, including ecosystem maintenance, are protected.

*- Australian Water Quality Guidelines for Fresh and Marine Waters, ANZECC (November 1992, and its updates).

8-2 The proponent shall monitor the quality of any run-off and/or seepage from the tailings storage facility and waste rock entering surface water and groundwater on or in proximity to the proposal area. This monitoring is to be carried out to the satisfaction of the Department of Environment and Conservation.

8-3 The proponent shall submit the results of monitoring required by condition 8-2 to the CEO of the Department of Environment and Conservation.

8-4 The proponent shall provide proposed management measures to the CEO of the Department of Environment and Conservation in the event that the requirements of condition 8-1 are not being met or are not likely to be met.

9 Mine Closure and Rehabilitation

9-1 Prior to the commencement of ground-disturbing activities, the proponent shall conduct surveys of the proposal area to collect baseline information on the following:

1 pre-mining soil profiles;
2 groundwater levels;
3 surface water flows;
4 vegetation complexes; and
5 landscape and landforms.

9-2 As mining progresses, the proponent shall commence rehabilitation of the mine site area in accordance with the following:

1 Re-establishment of vegetation in the rehabilitation area to be comparable with that of the pre-mining vegetation such that the following criteria are met within four years following the cessation of productive mining:

(1) flora and vegetation are re-established with not less than 70 percent coverage (not including weed species); and

(2) weed coverage less than 10 percent.

2 A schedule of the rate of rehabilitation acceptable to the CEO of the Department of Environment and Conservation.

9-3 The proponent shall ensure that the final pit voids do not cause significant environmental impacts arising from groundwater pollution or through attracting native fauna which may subsequently be harmed or fauna which may harm surrounding native vegetation.

9-4 In liaison with the Department of Environment and Conservation, the proponent shall monitor progressively the performance of rehabilitation required by condition 9-2 based on annual reporting.

9-5 The proponent shall submit annually a report of the rehabilitation performance monitoring required by condition 9-4 to the CEO of the Department of Environment and Conservation.

Note: In fulfilment of the above mine closure and rehabilitation conditions, the Environmental Protection Authority expects the proponent to liaise with the Department of Industry and Resources.

Procedures

1. Where a condition states “on advice of the Environmental Protection Authority”, the Environmental Protection Authority will provide that advice to the Department of Environment and Conservation for the preparation of written notice to the proponent.

2. The Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environment and Conservation.

3. The Minister for Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environment and Conservation over the fulfilment of the requirements of the conditions.

4. Where a condition list advisory bodies, it is expected that the proponent will obtain the advice of those listed as part of its compliance reporting to the Department of Environment and Conservation.

5. The proponent is required to apply for a Works Approval Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986.*

Schedule 1

The Proposal (Assessment No. 1770)

General Description

The proposal is to mine magnetite iron ore in the Central and Western deposits located approximately 10 km north-west of Whim Creek, midway between the regional centres of Karratha and Port Hedland.

The proposal is described in the following document – *Balla Balla Magnetite Project Environmental Protection Statement, November 2008.*

Summary Description
A summary of the key proposal characteristics is presented in Table 1.

Table 1: Summary of key proposal characteristics

Element	Description
Mining operations	
Life of mine (mine production)	15 years approximately
Ore type	Magnetite (iron ore)
Ore mining rate	Approximately 10.1 million tonnes per annum (6 million tonnes per annum of magnetite concentrate)
Mining method	Open pit – 2 pits Central and Western to be mined concurrently
Mine pit dimensions (length x width x depth, metres)	Central pit (approximately 1800 x 300 x 135) Western pit (approximately 4000 x 200 x 165)
Depth of water table	Approximately 7 metres below ground surface
Processing requirements	
Tailings	Total quantity of tailings material is approximately 59 million tonnes
*Option 1 - Size of 2 hexagonal tailings storage facilities	Approximately 232 hectares x 45 metres
*Option 2 - Size of tailings storage facility and Integrated Waste Landform	Approximately 175 hectares x 45 metres
Number of waste rock dumps	Six
Water requirement	Not more than 8.54 gigalitres per annum (with approximately 65% of the water used to convey slurry to Port Hedland returned to the Balla Balla ore processing circuit)
Mine site infrastructure	
Disturbance area	Mining: Not more than 1010 hectares Pipeline: Not more than 505 hectares
Power source and requirements	Initial power supply by diesel or cogen type generators (until adequate gas supplies confirmed) – 40 megawatts.
Greenhouse gas emissions	Approximately 5.06 million tonnes (over life)
Access roads	New all weather access road from site to North West Coastal Highway (approximately 9 kilometres)
Transport	
Slurry pipeline to port (corridor length x width)	Approximately 110 kilometres x 40 metres

Element	Description
Additional vehicle movements on North West Coast Highway per week	Approximately 16 road trains

** Note: The proposed tailings storage facility would consist of a staged approach, initially with a traditional hexagonal paddock-style tailings storage facility, with options for a second paddock or a proposed integrated waste landform, pending trials during operation.*

Figures (attached):

Figure 1: Regional location of mine site and pipeline corridor (see figure 1 page 3 above).
Figure 2: Conceptual mine site layout (see figure 2 page 4 above).