



Report and recommendations of the Environmental Protection Authority



Parker Range (Mount Caudan) Iron Ore Project

Cazaly Iron Pty Ltd

Report 1410

August 2011

Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
21/09/09	Level of Assessment set (date appeals process completed)	
29/11/11	Proponent Document Released for Public Comment	114
10/01/11	Public Comment Period Closed	6
2/06/11	Final Proponent response to the issues raised	20
1/8/11	*EPA report to the Minister for Environment (including 2 weeks consultation on conditions)	9
3/08/11	Publication of EPA report	1
17/08/11	Close of appeals period	2

STATEMENT ON TIMELINES

Timelines for an assessment may vary according to the complexity of the project and are usually agreed with the proponent soon after the level of assessment is determined.

*In this case, the Environmental Protection Authority met its agreed timeline objective of 10 weeks for the completion of the assessment and provision of a recommendation to the Minister.



Dr Paul Vogel
Chairman
3 August 2011

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Summary and recommendations

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for Environment on the proposal by Cazaly Iron Pty Ltd (Cazaly) to develop and operate an open cut iron ore mine at the Parker Range (Mount Caudan) deposit in the Shire of Yilgarn.

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 is also required to have regard for the principles set out in section 4A of the EP Act.

Key environmental factors and principles

The EPA decided that the following key environmental factors relevant to the proposal required detailed evaluation in the report:

- (a) flora and vegetation;
- (b) fauna;
- (c) air quality - dust
- (d) groundwater; and
- (e) closure and rehabilitation.

There were a number of other factors which were relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

The following principles were considered by the EPA in relation to the proposal:

- (a) Principle 1: The precautionary principle;
- (b) Principle 2: The principle of intergenerational equity;
- (c) Principle 3: The principle of conservation and biological diversity and ecological integrity;
- (d) Principle 4: The principle relating to improved valuation, pricing and incentive mechanisms; and
- (e) Principle 5: The principle of waste minimisation.

- (e) Principle 5: The principle of waste minimisation.

Conclusion

The EPA has considered the proposal by Cazaly to develop and operate the Parker Range (Mount Caudan) Iron Ore Project with associated mining infrastructure located 15 kilometres (km) south-east of Marvel Loch, in the Shire of Yilgarn.

Vegetation and flora

The proposal requires the clearing of up to 418.1 hectares (ha) within the 929 ha project area. No Threatened Ecological Communities would be impacted. The mine area is located within the Priority 3 Parker Range Priority Ecological Community (PEC); however, clearing of 0.07% of this is not considered to be significant.

Clearing will be required of portions of two vegetation associations (8 and 1413) as described by Beard (1990 cited in Cazaly 2010) located with the Avon Wheat belt P1 Interim Biogeographic Regionalisation for Australia (IBRA) subregion. These vegetation associations already fall below the 30% “threshold level” as identified in (EPA 2000). Clearing is minimal and the EPA considers the proposed residual impact strategy (Cazaly 2011b) which includes establishment of the Parker Range Conservation Trust and the acquisition and rehabilitation of 1,311 ha of farmland located between two nature reserves to be commendable. The EPA has recommended a condition to give effect to the proposed residual impact strategy.

There is potential for Declared Rare Flora (DRF) *Isopogon robustus* to be indirectly impacted and eight species of Priority flora to be directly and/or indirectly impacted by the implementation of the proposal. Impacts include clearing, and edge effects, primarily from dust and weeds. The EPA considers that the impacts are unlikely to be significant subject to the implementation of recommended conditions which minimise impacts to the DRF and Priority flora.

Fauna

The EPA notes that a number of conservation significant fauna including the *Leipoa ocellata* (Malleefowl) and *Platyercus icterotis xanthogenys* (Western Rosella) have been recorded in the project area and other species are thought likely to be present due to the existence of suitable habitat.

The EPA considers that direct and indirect impacts to terrestrial fauna species from clearing, traffic movements, trenching and increase in introduced fauna can be managed through the implementation of recommended conditions.

Air quality – dust

The proposal has the potential to exceed *National Environment Protection (Ambient Air Quality) Measure* (NEPM) standards for dust, specifically particulate matter with diameters less than 10 millionths of a metre (PM₁₀) maximum 24 hour average at one sensitive premises in Liddell Road. This

potential exceedance would be as a result of dust from ore transport on the upper haul road and from the Moorine Rock Rail siding. This rail siding has not been referred to the EPA. The EPA note that this premises does not fall within the provisions of the EP Act works approval and licensing issued by the Department of Environment and Conservation. Therefore the EPA has taken a precautionary approach and recommended a condition to ensure the NEPM standard for PM₁₀ is not exceeded at the Liddell Road premises.

Groundwater

The groundwater drawdown and recovery predictions provided by the proponent on the referred proposal are reasonable and the EPA considers that monitoring and management measures can be adequately managed under the groundwater abstraction licensing process conducted by the Department of Water (DoW) under the *Rights in Water and Irrigation Act 1914*.

The proponent's static testing indicates that there is unlikely to be an impact to groundwater quality as a result of acid or metalliferous drainage (AMD). However further long term kinetic testing is required to confirm this. The EPA considers that the issue of AMD will be appropriately managed by the Department of Mines and Petroleum (DMP) under the statutory requirements of the *Mining Act 1978*.

There will be no impacts to other groundwater users as a result of this proposal.

Recent information from the DoW indicates that only 50% of the water required for the operation of the proposal can be provided by the proponent's dewatering program and an additional source of water will need to be found to supply the remaining water. An additional source of water was not included in the proponent's referral or documentation and therefore has not been assessed by the EPA. Additional bores outside of the mine footprint may require separate referral to the EPA if, as a result of additional vegetation, flora and fauna investigations, impacts are considered to be environmentally significant.

Closure and rehabilitation

The EPA notes that the proponent has prepared a draft mine closure plan, which is intended to be updated throughout the life of the project. The EPA expects that future versions of the mine closure plan will be consistent with the EPA and DMP *Guidelines for preparing mine closure plans 2011*.

In view of the statutory requirements of the *Mining Act 1978* the EPA is satisfied that rehabilitation and, mine closure and decommissioning including the management of impacts resulting from the pit lake can be managed by the DMP in accordance with the Guidelines.

The EPA urges the proponent to use its best endeavours to identify opportunities to backfill the pit void to reduce the project footprint and reduce the possibility of a saline, acidic and/or metalliferous pit lake. The EPA has

recommended conditions in order to ensure that there are no long term impacts on introduced fauna populations and groundwater quality as a result of the presence of a pit lake.

The EPA has therefore 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 4 and summarised in Section 4 and the proponents proposed residual impact strategy.

Recommendations

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

1. That the Minister notes that the proposal being assessed is for the development and operation of an iron ore mine at the Parker Range (Mount Caudan) deposit in the Shire of Yilgarn.
2. That the Minister considers the report on the key environmental factors and principles as set out in Section 3.
3. That the Minister notes 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 4 and summarised in Section 4.
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Conditions

Having considered the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Cazaly to develop and operate the Parker Range (Mount Caudan) Iron Ore Project is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

- a) Flora and vegetation – sets a buffer area in which vegetation health is to be monitored and requires that contingency actions are undertaken should a 25% (or greater) decline in health or abundance be recorded.
- b) Conservation significant flora – ensures that there is no loss of the DRF *Isopogon robustus* due to clearing and the genetic diversity of the Priority 1 *Lepidosperma* sp. Mt Caudan and *Lepidosperma* sp. Parker Range species are ensured. The condition would also ensure that a decline in health or abundance of *I. robustus* and the Priority 1 flora *Lepidosperma* sp. Mt Caudan are not adversely impacted due to dust generated as a result of the proposal.
- c) Fauna – minimises the impacts of traffic and ensures only one identified inactive Malleefowl mound is cleared and the local Malleefowl populations are not adversely impacted by the proposal.

- d) Trench management – ensures that open trenches associated with construction and burial of pipelines do not cause adverse impacts to fauna.
- e) Air quality – ensures the NEPM PM₁₀ standard is not exceeded at the Liddell Road property as a result of the proposal.

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- 3. Summary of identification of key environmental factors.

4. Recommended Environmental Conditions and nominated Decision-Making Authorities.
5. Summary of submissions and proponent's response to submissions.

1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for Environment on the key environmental factors and principles for the proposal by Cazaly, to develop and operate the Parker Range (Mount Caudan) Iron Ore Mine Project (Parker Range Project) located 15 kilometres (km) south-east of Marvel Loch in the Shire of Yilgarn.

The proposal includes a single mine pit to extract approximately 30 million tonnes of iron ore and associated mining infrastructure. The proposed mine requires disturbance of approximately 418 hectares (ha) of native vegetation. Dewatering below the watertable would also be required. The life of mine is expected to be up to 10 years.

The proposed mine is located on a section of isolated banded iron stone formation (BIF) range within the Great Western Woodlands. The woodlands cover 60 million ha and are floristically diverse as they are currently considered to contain 3000 flora species.

The project is being formally assessed due to potential impacts to native vegetation, native fauna, air quality and groundwater.

This proposal was originally referred to the EPA on 31 August 2009. The level of assessment was set at Public Environmental Review (PER) with a four week public review period on 21 September 2009 under the Western Australian *Environmental Protection Act 1986* (EP Act). The PER document was released for public review between 29 November 2010 and 10 January 2011. The public review period was extended by an additional two weeks as the PER was released over the Christmas period.

The project is considered by the Commonwealth of Australia to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) because of potential significant impacts to listed threatened species and communities and migratory species. The proposal has been assessed under the Bilateral Agreement between the Commonwealth and the State.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the key environmental factors and principles for the proposal. The conditions to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 provides other advice by the EPA.

Appendix 5 contains a summary of submissions and the proponent's response to submissions and is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this

process, and which have been taken into account by the EPA, appear in the report itself.

2. The proposal

The proposal involves the development and operation of the Parker Range Project, located in the Mount Caudan section of the Parker Range within the Shire of Yilgarn (Figure 1). The proposal includes the development and operation of an above and below the watertable greenfields iron ore mine and associated infrastructure. An existing gazetted road (Parker Range Road) runs across the ore body. A gazetted bypass road would be required around the proposed mine site requiring approximately 10 ha of clearing. Ore from the proposal would be transported via existing roads and a new 7 km section of private road to the proposed Moorine Rocks rail siding and then via existing rail infrastructure to port facilities on the coast. The mine would operate for up to 10 years and have a potential throughput of up to 4 million tonnes per annum.

The main components of the proposal consist of:

- Mine area (Mount Caudan):
 - the mine site:
 - mine pit;
 - waste rock landform;
 - Run-of-Mine (ROM) pad;
 - low grade ore landform;
 - ore treatment:
 - Year 1 - mobile dry crushing and screening plant
 - Year 2 onwards – permanent wet-plant/ beneficiation plant;
 - tailings storage facility (TSF);
 - operational infrastructure such as administration facilities and amenities, workshop, warehouse, laydown facility, fuel management facility, internal mine roads, vehicle park-up, and heavy/light vehicle wash down bays;
 - pit dewatering bores;
 - desalination plant;
 - storm water diversion system;
 - onsite generators will be used initially these will be replaced within the first year by a 33 kilovolts power supply connected to existing mains situated at Marvel Loch;
 - Power line corridor;
 - Parker Range Bypass Road; and
- Ore haulage road from the proposed mine area to the proposed Moorine Rock rail siding. This haul road consists of an upgraded public and new private road which is referred to as the upper haul road in this report.

Iron ore will be loaded into on-highway road trains and transported approximately 57 km northwest to railway infrastructure at the proposed Moorine Rock rail siding for transport along existing rail infrastructure to the port. The proposed Moorine Rock rail siding and the existing rail haulage transport to the port do not form part of this assessment. The proponent also

proposes to build a new 172-room village at Marvel Loch. This village has been excluded from this proposal by the proponent.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Section 2 and Section 4 of the PER (Cazaly, 2010).

Table 1: Summary of key proposal characteristics

Element	Description
General	
Project life	Up to 10 years
Location	See Figures 1, 2 and 3
Project Area	929 ha
Vegetation Clearing	Up to 418.1 ha composing of: <ul style="list-style-type: none"> • Mine area (414 ha) <ul style="list-style-type: none"> ○ Pit - 58.8 ha ○ Pit edge protection - 58.4 ha ○ Waste rock landform – 119.8 ha ○ Process plant and associated infrastructure – 89.5 ha ○ Mine roads and pipeline corridors – 42.0 ha ○ Site access road – 2.5 ha ○ TSF – 17.4 ha ○ Stormwater diversion levee – 0.7 ha ○ Power line corridor– 14.6 ha ○ Parker Range Bypass Road – 10.3 ha • Upper haul road (near Moorine Rock) – 4.1 ha
Rehabilitation	Approximately 333 ha
Mining	
Mining method	Open cut
Pit	Up to 4 km long, 0.4 km wide and 135 m deep
Waste rock Landform	Up to 2 km long, 0.5 km wide and 45 m high
Tailings Storage Facility	Up to 0.8 Mm ³ capacity, 400 m wide, 400 m long and 11 m high with five lifts
Water supply	Source: In-pit and perimeter dewatering bores located along the open pit. Maximum annual requirement: Mobile dry plant operations up to 321 ML/a Fixed wet plant operations up to 506 ML/a

Mm³ = Million cubic millimetre
km = kilometre
ha = hectare

ML/a = megalitres per annum
L/s = litres per second

Since release of the PER, a number of modifications to the proposal have been made by the proponent. These include:

- The native vegetation impact area of the upper haul road near Moorine Rocks has been revised from 6.8 km to 4.1 km. As a result the total area of disturbance has decreased from 421 ha to 418.1 ha.
- The TSF design has been revised from 350 m wide, 350 m long and 8 m high with four lifts of 2 m to 400 m wide, 400 m long and 11 m high with five lifts of 2 m.
- The proponent has indicated that 333 ha will be rehabilitated within the mine area.

The potential impacts of the proposal initially predicted by the proponent in the PER document (Cazaly 2010) and the proposed management are summarised in the Table 2 (Executive Summary) of the proponent's document.

Parker Range (Mount Caudan) Iron Ore project



Legend

- Town
- Roads
- Haul road route on existing roads
- Upper haul road (clearing required)
- Moorine Rock rail siding*
- Parker Range mine site

*Note: not part of proposal

0 2000 4000 6000 12000 m

Projection: Geographic Coordinate System
Datum: Geo centric Datum of Australia, 1994
Scale: 1:240,000

Data Source

- Parker Range mine site project area (Proponent, 2011)
- Parker Range haul road project area (Proponent, 2011)
- Roads (Landgate, 2004)
- Towns (Landgate, 2004)
- Imagery (Landsat, 2000)

Analysis
not applicable

Presentation
Creation date: 18/06/2011
Created by: Melania Webb

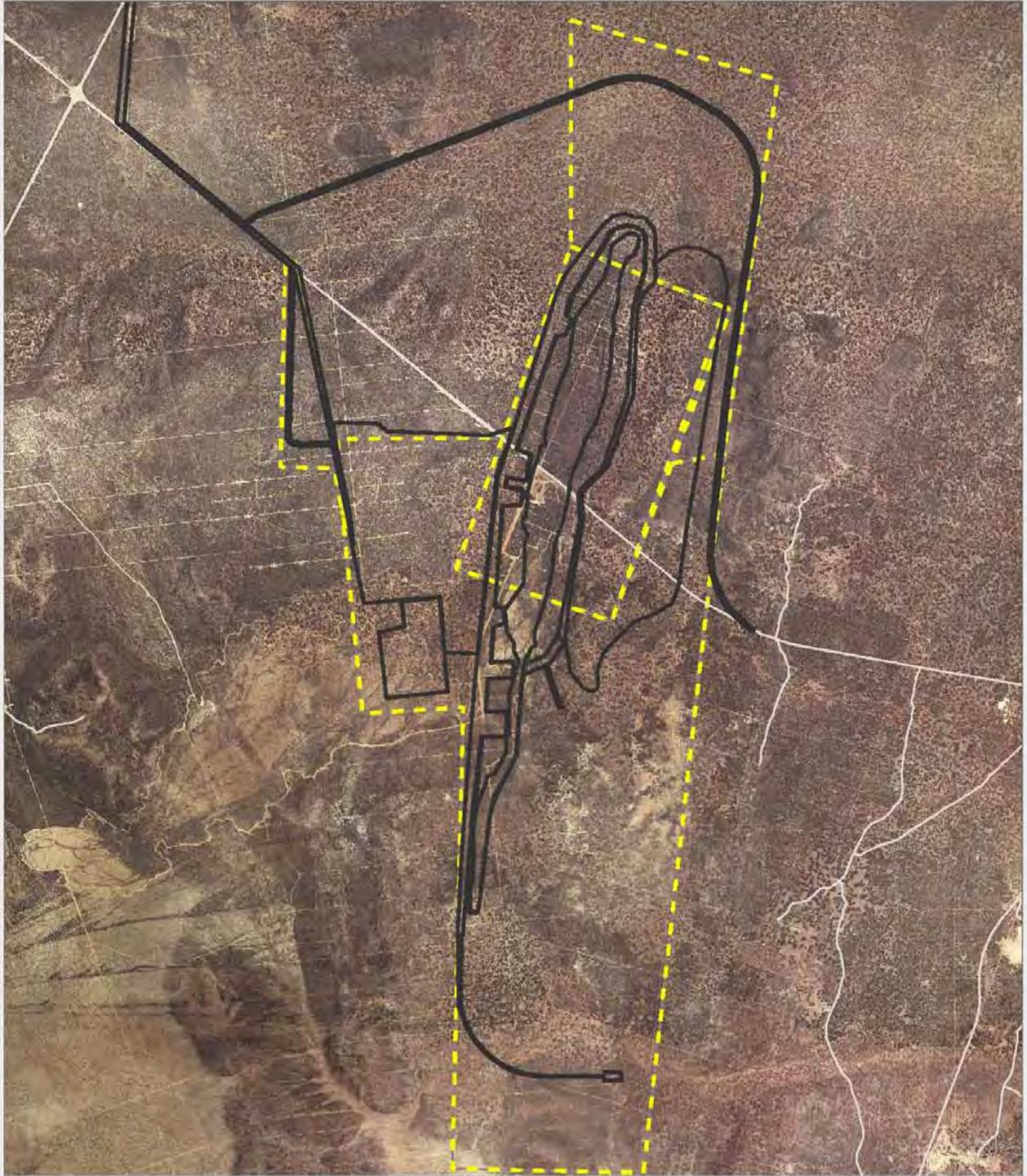
This map is produced for the Environmental Protection Authority, for inclusion into the Parker Range EPA report
This map depicts the boundaries of the proposed Parker Range (Mount Caudan) Iron Ore Mine

Disclaimer: This map is intended as a generalised interpretation of environmental issues. The information contained on this map is to be considered indicative only and in no event shall the Environmental Protection Authority be liable for any incident or consequential damages resulting from use of the material.

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Figure 1 Parker Range (Mount Caudan) Iron Ore Project

Mine site project area



Legend

- Town
- Roads
- ▭ Proposed Mine Site and Haul road
- ▭ Cazaly Parker Range tenements

0 190 380 760 1140 1520
 Projection: Geographic Coordinate System
 Datum: Geocentric Datum of Australia, 1994
 Scale: 1:30,000

Data Source
 Parker Range mine site project area (Proponent, 2011)
 Parker Range haul road project area (Proponent, 2011)
 Roads (Landgate, 2004)
 Towns (Landgate, 2004)
 Imagery (Landsat, 2000)

Analysis
 not applicable

Presentation
 Creation date: 16/05/2011
 Created by: Melanie Webb

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Figure 2 Mine site project area

Upper haul road project area



Legend

- Parker Range haul road alignment
- Rail siding area*
- Town
- Roads

*Note: not part of proposal

0 250 500 1,000 1,500 m
 Projection: Geographic Coordinate System
 Datum: Geocentric Datum of Australia, 1994
 Scale: 1:30,000

Data Source

Parker Range mine site project area (Proponent, 2011)
 Parker Range haul road project area (Proponent, 2011)
 Roads (Landgate, 2004)
 Towns (Landgate, 2004)
 Imagery (Landsat, 2000)

Analysis

not applicable

Presentation

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Figure 3 Upper haul road project area

3. Key environmental factors and principles

Section 44 of the EP Act requires the EPA to report to the Minister for Environment on the key environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The identification process for the key factors selected for detailed evaluation in this report is summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below. A number of these factors, such as troglofauna, Aboriginal heritage and surface water quality, are relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

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

- (a) Flora and vegetation;
- (b) Fauna;
- (c) Air quality – dust;
- (d) Groundwater; and
- (e) Closure and rehabilitation.

The above key factors were identified from the EPA's consideration and review of all environmental factors generated from the PER document and the submissions received, in conjunction with the proposal characteristics.

Details on the key environmental factors and their assessment are contained in Sections 3.1 - 3.6. 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.

The following principles were considered by the EPA in relation to the proposal:

- (a) Principle 1: The precautionary principle;
- (b) Principle 2: The principle of intergenerational equity;
- (c) Principle 3: The principle of conservation and biological diversity and ecological integrity;
- (d) Principle 4: The principle relating to improved valuation, pricing and incentive mechanisms; and
- (e) Principle 5: The principle of waste minimisation.

3.1 Flora and vegetation

Description

The Parker Range proposal is located on a discontinuous ridge of BIF which forms part of the southern extension of the Southern Cross Greenstone belt. The Parker Range Project has the potential to cause direct impacts to vegetation and flora through clearing of 418 ha within the 929 ha project area (mine area and upper haul road). The proposal also has the potential to cause indirect impacts reducing vegetation health. Indirect impacts can include edge effects such as dust deposition on vegetation preventing photosynthesis and plant respiration and competition from increased weeds.

Clearing

The project tenements are located within two Interim Biogeographic Regionalisation for Australia (IBRA) subregions, the Southern Cross Coolgardie 2 and Avon Wheatbelt P1. The Coolgardie 2 subregion is recognised as a centre of endemism and diversity for flora. The Avon Wheatbelt P1 subregion is recognised as a heavily cleared environment with little remaining remnant vegetation. The project area is located within five vegetation associations (vegetation association 8, 128, 552, 1068 and 1413) as described by Beard (1990 cited in Cazaly 2010).

The upper haul road is located within the Moorine Rock system association of the Avon Wheatbelt P1 IBRA subregion and contains vegetation associations 8 (VA8) and 1413 (VA1413). Currently VA8 is at 9.28% and VA1413 is at 29.68% of the original remaining extent for this system association. This falls below the 10% “endangered” level and 30% “threshold level” of the pre-European vegetation extent as identified in Position Statement No. 2 (EPA 2000). The proposal would result in the loss of a further 0.3 ha of VA8 which relates to an impact of 0.001% on the remaining vegetation and a loss of 3.8 ha of VA1413 equating to an impact of 0.004% on the remaining vegetation. The proponent considers the impact to these vegetation associations to be negligible and notes that 6.46% of VA8 and 6.47% of VA1413 are represented within the Department of Environment and Conservation (DEC) managed conservation estate.

Surveys undertaken between 2007 and 2010 (Botanica 2010a) identified 26 vegetation communities (more detailed identification than vegetation associations) within the project area, all of which will be impacted as a result of clearing. These communities are outlined in Appendix 11 of the proponent’s Response to Submissions document (Cazaly 2011a) which is located in Appendix 5 of this report. The majority of vegetation (77%) within the project area is in excellent condition.

No Threatened Ecological Communities listed under the EPBC Act were identified within the project area.

The mine area is located within the Priority 3 Parker Range Priority Ecological Community (PEC).

Flora surveys (Botanica 2010a) have been undertaken for the project area. Within the proposed mine area 268 flora species were identified. These species include one Declared Rare Flora (DRF), seven Priority flora and four weed species.

The species *Isopogon robustus* is listed as Critically Endangered under the EPBC Act and DRF under Schedule 1 of the *Wildlife and Conservation Act 1950* (WC Act). This species is endemic to Western Australia and is only known to occur at a single location in the Parker Range region adjacent to the proposed mine area. Four populations have been identified with a total of 1,020 mature plants and 206 seedlings. The proposal does not involve clearing of *I. robustus* plants.

Of the seven Priority flora species identified as occurring within the project area during initial surveys, *Lepidosperma* sp. Parker Range was originally only known to occur within the proposed mine area. As a result of further targeted surveys a number of other populations of this species and *Lepidosperma* sp. Mt Caudan were located outside of the project area.

In December 2010, the undescribed subspecies *Chamelaucium halophilum* ms was recognised as a distinct entity called *Chamelaucium* sp. Parker Range. This taxon was listed as Priority 1 in March 2011 as it was only known from a single population in the Parker Range. This population would be cleared as a result of the proposal. Subsequently the proponent determined that four populations occurred within the project disturbance footprint. The proponent commissioned a survey of *Chamelaucium* sp. Parker Range which identified five potential populations and 353 plants outside of the project area located both locally and regionally (Cazaly, Appendix 4).

Impacts to the eight priority flora species are provided in Table 2 below.

The proponent proposes to avoid, minimise and manage the impacts of clearing on flora and vegetation through various methods including:

- limiting vegetation clearing to the minimum necessary for the construction and operation of the proposal;
- identifying and tagging significant vegetation and Priority flora groups prior to disturbance. A targeted search will be undertaken in known areas of significance prior to disturbance and these areas will be avoided where practicable; and
- marking vegetation prior to clearing works to avoid over-clearing.

The proponent has committed to undertaking a rehabilitation research program for the *L.* sp. Parker Range which will focus on shallow soil analysis, transplantation trials and seed trials for the restoration of this species post mine decommissioning, during closure and rehabilitation.

Table 2: Impact to Priority flora as a result of clearing required for the Parker Range project area.

Species	Number of Plants Impacted	Total Number of Plants and populations in Project Area	% Impact at Project Level	Total Number of Plants and Populations in local area (within 10 km of Project Area)	% Impact at Local Level (within 10 km)	Regional Context
<i>Baeckea grandibracteata</i> subsp. Parker Range (K.Newbey 9270) (P1)	22	158 plants 5 populations	13.9%	158 plants 5 populations	13.9%	8 populations in Parker Range region from Marvel Loch to Skeleton Rocks.
<i>Chamelaucium</i> sp. Parker Range (B.H. Smith 1255) (P1)	actual number unknown – 27 plants positively identified	unknown number of plants 4 populations	unknown	298 plants 7 populations	unknown	9 populations in total within 20 km of project area.
<i>Lepidosperma</i> sp. Mt Caudan (N Gibson & M Lyons 2081) (P1)	3,629 (extrapolated) 2 populations	10,355 plants 4 populations	35%	77,152 plants (based on extrapolated no. and actual counts) 12 populations	4.7%	Parker Range Endemic. All 12 populations within Parker Range region.
<i>Lepidosperma</i> sp. Parker Range (N Gibson & M Lyons 2094) (P1)	219 1 population	219 plants 1 population	100%	416 plants 5 populations	52%	13 populations in total with 8 populations located outside the local area which include an additional 13,576 plants and an equivalent 1.6% regional impact.
<i>Acacia concolorans</i> (P2)	120	168 plants 6 populations	71.4%	9369 11 populations	1.3%	17 populations in Parker Range region (incl. Burbridge) and two east of Hyden.
<i>Hakea pendens</i> (P2)	630 3 populations	1,129 plants 7 populations	55.8%	4974 plants 27 populations	12.6 %	55 populations in total with an additional 28 populations located outside of the local area at four locations with a distribution over 160 km.
<i>Cyrtandra crispula</i> (P3)	3	46 plants 2 populations	6.5%	46 plants 2 populations (range extension)	6.5%	5 populations including Parker Range, Boorabbin, Dundas, Victoria Rock and South Karonie.
<i>Banksia shanklandiorum</i> (P4)	7,293 (extrapolated)	17,812 plants 1 population (extrapolated)	40.9%	17,812 plants 1 population (range extension)	40.9%	Wide distribution over 260 km range for more than 18 populations, in approximately six locations.

Indirect impacts

The potential edge effects on native flora that could occur as a result of the proposal include dust, changed hydrology, changed microclimate, intrusion of saline water, increased fire risk, potential risk of groundwater mounding from the TSF and invasion by weed species. The edge effects can be short to long term, and the intensity of the effect can vary between sites. The most significant for this proposal are dust and weeds.

The proponent has committed to establishing a buffer zone of 250 m around the final mine site area in which the vegetation condition and population health may decline up to 50% of baseline or reference site health condition, before requiring a contingency action plan to be implemented (Cazaly 2011a).

Dust

All DRF and Priority flora identified in surveys conducted for this proposal are dust sensitive. Cazaly confirmed this by email 26 August 2010.

Dust modelling (Ecotech 2011) used an assessment criterion of 7 grams per metre square per month ($\text{g/m}^2/\text{month}$) as the level above which direct physical effects of mineral dust on vegetation would become apparent. This limit originates from Farmer and is cited in Doley (2006).

Within the proposed mine area the peak dust deposition ($7 \text{ g/m}^2/\text{month}$) is estimated to occur within 100-150 m of the mine and plant operations. Dust modelling indicated that the $7 \text{ g/m}^2/\text{month}$ deposition level would occur within 80 m of the haul road (Cazaly 2010). These results are consistent the observed dust deposition (within 100 to 150 m of the mine pit) of other mines in the Yilgarn (Cazaly 2010).

Dust resulting from mining activities could impact the following species as remaining individuals are located adjacent to the proposed mine pit and waste dumps within the project area:

- *L. sp.* Mt Caudan (Priority 1)
- *Acacia concolorans* (Priority 2)
- *Hakea pendens* (Priority 2)
- *Cryptandra crispula* (Priority 3)

Dust caused by road use is also likely to impact individuals of the following species located adjacent to and within 80 m of unsealed access and internal mine roads:

- *Baeckea grandibracteata* subsp. Parker Range (Priority 1)
- *Hakea pendens* (Priority 2)
- *Cryptandra crispula* (Priority 3)

Dust modelling (Ecotech 2010) predicted peak dust levels of $2.0 \text{ g/m}^2/\text{month}$ at one of the *I. robustus* populations; this is below the proponents proposed target limit of $7 \text{ g/m}^2/\text{month}$. The PER states that *I. robustus* will not suffer any indirect impacts from dust as a result of the proposal due to the 350 m minimum buffer distance from any land disturbance area or operational activity.

The proponent proposes to use dust control measures such as minimising vegetation clearing, restriction of vehicle speeds, use of sealed roadways along the ore transport route; dampening of dust prone areas using water sprays and progressive rehabilitation. Monitoring of dust levels will be undertaken by the proponent in consultation with the DEC. A number of monitoring measures have been discussed in the proponent's documents (Cazaly 2010 and 2011a) including:

- annual vegetation and flora surveys of up to 500 m distance from the proposed mine area would be compared against baseline. Reference sites will also be established and monitored for comparison of impacts;
- monthly *I. robustus* monitoring using a portable dust deposition gauge at each known population; and
- installation and operation of two monitoring stations to measure dust deposition, wind speed temperature and humidity;

Weeds

None of the four weed species recorded during the mine area surveys are listed as Declared Plants under the *Agriculture and Related Resources Protection Act 1976*.

No weeds were identified during the flora survey of the proposed upper haul road (near Moorine Rocks) despite the survey area passing through agricultural regions (Botanica 2010).

The proponent has proposed to manage weeds through a range of management actions which include:

- implementing weed hygiene procedures for mining machinery entering the project area;
- identifying and mapping the extent and distribution of weed infestations occurring within the project area;
- undertaking regular inspections of areas susceptible to weed infestation;
- undertaking suitable control methods for identified weed species;
- separately storing topsoil from areas of known weed occurrence from other topsoil stockpiles;

Submissions

Key comments in submissions:

- The selection of truck route 5 will involve land clearing and the fragmentation of a large tract of bushland. Truck route 6 does not involve clearing and should therefore be selected.
- There are limitations to flora surveys including timing of surveys and the lack of identification of conservation significant species that have potential to occur in the project area.
- Adequate precautions need to be taken to avoid detrimental changes to the conservation status of priority listed flora for example *L. sp.* Parker Range (Priority 1) and *L. sp.* Mt Caudan (Priority 1).
- Further information should be provided regarding offsets prior to approval.

- Concerns were raised regarding the impact of saline water used for dust suppression over spraying and impacting vegetation.

Assessment

The area considered for assessment is the 929 ha Parker Range project area identified in Figures 1, 2 and 3. The EPA's environmental objectives for this factor are to:

- protect DRF, Priority flora and other species of conservation significance, consistent with the provisions of the *Wildlife Conservation Act 1950*; and
- maintain the abundance, diversity, geographic distribution and productivity of vegetation, flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement of knowledge.

The EPA notes that flora and vegetation surveys contain some limitations which include the timing of surveys. However, given that appropriate methodologies were used, the surveys are considered consistent with EPA Guidance Statement 51 (EPA 2004).

Although not extensively surveyed, the Parker Range is part of the Wheatbelt greenstone belt which is known habitat for a number of conservation significant, restricted, rare and endemic flora species. This has been illustrated during the assessment process with the determination of a new taxon which has been classified as a Priority 1 species as it was only known from one location in the Parker Range, the Parker Range endemic DRF *I. robustus* and Priority 1 *L. sp.* Mt Caudan and the diverse and restricted nature of some of the vegetation communities as indicated by the PATN analysis (Griffin 2010; Botanica 2010b; Cazaly 2011a). The DEC has advised that the level of conservation significance of the greenstone belt is high when compared to similar BIF surveyed within the Yilgarn Craton.

The EPA notes that due to the restriction of mining tenements the proponent has not been able to maximise the protection of restricted BIF communities in the mine site planning.

Clearing

The EPA considers that the loss of 414 ha (0.7%) of the Priority 3 Parker Range PEC which covers approximately 55,960 ha is not significant.

The EPA recognises that the proponent has selected haul road route 5 over other possible routes after consultation with the local Shire and community so that dust and noise impacts are minimised. Haul road route 6 which avoids vegetation clearing would significantly impact a residence set 20 m back from Liddell Road resulting in combined (Moorine Rock Rail Siding and haul road) dust levels potentially exceeding *National Environment Protection (Ambient Air Quality) Measure* (NEPM) standard of 50 micrograms per cubic metre of air ($\mu\text{g}/\text{m}^3$) and the proponent's amenity limit of 4 $\text{g}/\text{m}^2/\text{month}$. Averaging noise events as a result of the selection of route 6 would comply with the proponent's noise limits of $\text{LAeq}=60$ dB(A) for day-time and $\text{LAeq}=55$ dB(A) for night time. However, noise spikes in the order of 75 dB(A) would occur

during the 137 truck movements that would take place both day and night. Although the *Environmental Protection (Noise) Regulations 1997* (Noise Regulations) do not apply to transport noise the EPA considers that the noise spikes would impact the health and wellbeing of this sensitive premises if route 6 had been selected.

The EPA Position Statement No. 2 (EPA 2000) sets a “threshold level” of 30% of the pre-clearing extent for pre-European vegetation type. Below 30% species loss appears to accelerate exponentially at an ecosystem level. A level of 10% of the original extent is regarded as being a level representing “Endangered”. Position Statement No. 2 expects that a proposal would demonstrate that the vegetation removal would not compromise any vegetation type by taking it below the 30% “threshold level”. Where a proposal would result in a reduction below 30% the EPA would expect alternative mechanisms to be put forward to protect biodiversity.

The EPA notes that within the upper haul road area VA 8 and VA1413 already fall respectively below the 10% and 30% levels. Impacts of the proposal would further reduce the extent of VA 8 by 0.3 ha (0.001%) and VA 1413 by 3.8 ha (0.004%). The proponent has provided a residual impact strategy (Cazaly 2011b) which commits to the purchase of 1,311 ha of cleared agricultural farmland located between two nature reserves. Both the Nargalyerin Rock and Frog Rock Nature Reserves contain VA1413. The Nargalyerin Rock Nature Reserve contains VA8. Successful rehabilitation would link these two reserves and potentially increase the VA8 and VA 1413 population size.

The EPA considers that although minimal, the clearing proposed for the upper haul road area will further reduce the significant remnant vegetation in an extensively cleared area and cause fragmentation of habitat causing residual impact. Therefore the EPA supports the proponent’s offer of a residual impact strategy and considers that the successful acquisition and rehabilitation of the agricultural land would reduce threats to the existing reserves and increase their viability through connection. Condition 10 has been recommended to ensure that the residual impact strategy provided by the proponent (Cazaly 2011b) is implemented. See Section 3.2 for further comment on the proponent’s Environmental Offsets Strategy.

The proponent has noted that clearing of the DRF *I. robustus* will be avoided. To ensure that the DRF is protected from clearing by the proponent the EPA recommends that condition 7-1 is implemented.

The impacts to *L. sp.* Mt Caudan, is the loss of two populations (though one only consists of one plant) out of a total of 12 populations. Given the species is endemic to the Parker Range area, the impacts at the local, regional and species level are the same at 4.7% for the total number of plants estimated for this species.

The impact to *L. sp.* Parker Range is the loss of one population out of 13 which will result in a minor reduction in its extent of occurrence. The impacts

when considering the number of plants to be taken at the local level are significant at 52% but less than 2% impact at the regional and species level.

None of the known locations for either *L. sp. Parker Range* or *L. sp. Mt Caudan* are protected within existing *Conservation and Land Management Act 1984* (CALM Act) conservation reserves.

The DEC advised that the significance of the population loss cannot be accurately determined other than the loss of populations unless population genetic work is undertaken to demonstrate the potential loss of genetic diversity contained within those *L. sp. Mt Caudan* and *L. sp. Parker Range* populations. The Botanic Gardens & Parks Authority (BGPA) (2011) agrees with the DEC's advice and notes that given the restricted distribution of both species, distance between populations and specific habitat requirements, it is likely that significant genetic differences may be found between populations and sub-populations of these species.

The EPA notes the efforts of the proponent in undertaking genetic testing to determine the taxonomic relationship of the two *Lepidosperma* taxa. However the EPA is aware that a genetic analysis to determine the relative genetic diversity of the individual *L. sp. Parker Range* and *L. sp. Mt Caudan* populations has not been conducted. Therefore the loss of one of the populations of *L. sp. Parker Range* or *L. sp. Mt Caudan* could potentially result in a reduction of the long-term viability of the species. The EPA considers that to ensure long-term genetic diversity recommended condition 7-2 should be implemented. This condition requires that genetic material of the populations of *Lepidosperma* to be impacted are collected and stored appropriately for future use, potentially in conservation breeding initiatives. In addition the condition requires that genetic analysis of the *Lepidosperma* species is undertaken. Condition 7-2 also ensures that appropriate protection of populations should future development occur in the area.

The proponent has stated that it is currently in discussions regarding rehabilitation trials for endemic flora such as *L. sp. Mt Caudan* and *L. sp. Parker Range*, and has committed to a rehabilitation research program for the species *L. sp. Parker Range*.

The DEC has advised that any commitment for rehabilitation research programs or translocation should be undertaken in consultation with the DEC. The Botanic Gardens & Parks Authority (2011) advised that restoration of *Lepidosperma* species is currently difficult and detailed restoration plans will need to be determined based on the nature of the impact on genetic diversity.

The EPA considers that all efforts should be made to reduce impacts to Priority flora particularly the *L. sp. Parker Range*. Therefore the EPA has recommended that condition 7-2-3 be implemented. This condition ensures the proponent's commitment to undertake rehabilitation trials is legally enforceable and requires the proponent to undertake rehabilitation trials in consultation with the DEC.

The EPA notes that *Chamelaucium* sp. Parker Range was recognised as a distinct taxon in December 2010 and was listed as Priority 1 in March 2011. This resulted in an extremely short timeframe for the proponent to provide information on the impacts of this proposal on the new taxon. Within this time the proponent undertook a survey identifying four populations within the project footprint and an additional five populations that could potentially be *C. sp.* Parker Range outside of the project area (Cazaly 2011a, Appendix 4).

The EPA also notes that the survey provides a population count or estimation for the five sites identified outside of the project area but no population count for species occurring within the project area. The survey does not provide the means to determine the impact of the proposal on this particular species other than the loss of four out of a possible nine populations. However, the proponent considers from observations that this species occupies a range of habitats (disturbance areas, Mallee heath and Allocasuarina shrubland) which encompass approximately 7,463 ha of the Parker Range PEC. If this is the case the species would be more widespread in the area than previously thought.

To ensure the proponent's conclusion is validated the EPA recommends the implementation of conditions 7-3 and 7-4. These conditions require a targeted survey be undertaken prior to ground disturbing activities.

The EPA considers that the clearing impacts to the remaining Priority flora identified as occurring in the project area are not regionally significant.

Indirect impacts

The EPA notes the proponent's commitment to establishing a buffer zone of 250 m around the final mine site area in which to monitor vegetation health with a trigger value of 50% decline in vegetation condition and population health at which a contingency action plan would be implemented. The 250 m buffer zone is based on the predicted 150 to 250 m $5 \text{ g/m}^2/\text{month}$ dust zone of influence (Cazaly 2010).

The EPA considers that a buffer zone for vegetation health of 250 m at the mine area is acceptable and has incorporated it in condition 6. As all additional impacts to VA 8 and VA 1413 should be avoided the EPA has recommended that vegetation health and abundance should also be monitored within 125 m of the upper haul road. This is based on the proponent's predicted $5 \text{ g/m}^2/\text{month}$ zone of influence (Cazaly 2010). The condition also requires monitoring of vegetation health and abundance and management measures to be taken should the trigger level be exceeded. The EPA considers a trigger level of 50% as proposed by the proponent is not appropriate and has recommended a 25% health and abundance trigger level in condition 6 in line with previous Ministerial Statement 839 for the *Tropicana Gold Project*.

Dust

The dust deposition level of $7 \text{ g/m}^2/\text{month}$ used by the proponent was obtained from Farmer and is cited in Doley (2006). Farmer's research took

place in England on the effects of dust on lichen and therefore is unlikely to be directly applicable to Australian climates and flora. Doley (2006) notes that the level is relatively high and stated that effects depend on the characteristics of the dust, the plant species and the environmental conditions. The EPA notes that the impacts of dust on vegetation are not well understood. The EPA recognises that based on the outcomes of dust deposition from other mines in the area the proponent's predicted zones of impact are likely to be appropriate; however, the dust deposition level of 7 g/m²/month is not considered an appropriate measure of plant health.

The EPA recognises the proponent's commitment to maintain a 350 m exclusion zone from the closest *I. robustus* population, and a 400 m buffer for the remaining populations.

The DEC has advised that *I. robustus* would be susceptible to dust impacts due to the fine hairs present on branchlets and leaves.

The EPA notes that the DRF *I. robustus* is only known from one location in a restricted habitat adjacent to the proposed mine area. Therefore the EPA considers that *I. robustus* should be protected from indirect impacts caused by dust and recommends that conditions 7-5 through to 7-9 are implemented. Under these conditions the proponent is required to undertake monitoring of the health and abundance of *I. robustus*.

The EPA considers that the health and abundance of the remaining Priority 1 flora *L. sp.* Mt Caudan should be monitored to ensure that there are no further impacts to these restricted and potentially threatened species. Therefore the EPA recommends that this species be included in conditions 7-5 through to 7-9 to ensure detrimental changes to the conservation status of Priority listed flora are avoided. It also ensures that control sites are monitored for comparison, trigger levels are set and contingency actions are formulated and implemented should any impacts be identified.

The EPA considers that dust impacts to *Baeckea grandibracteata* subsp. Parker Range, *Acacia concolorans*, *Hakea pendens*, *Cryptandra crispula* can be adequately managed under condition 6 discussed above.

Weeds

To prevent the introduction of new weed species and the spread and increase of the existing weed populations, the EPA considers that recommended condition 6-5 should be implemented.

Summary

Having particular regard to the:

- (a) the remaining extent of vegetation associations 8 and 1413 in Avon Wheatbelt P1 subregion already fall below the EPA's 30% threshold and 10% endangered levels. However the impacts of the proposal are minimal and the proponent has offered a residual impact strategy for the residual impacts on vegetation;

- (b) based on the information provided the loss of populations of the two *Lepidosperma* species do not appear to be significant; however, there is a lack of genetic diversity information;
- (c) rehabilitation trials for endemic flora particularly *Lepidosperma* sp. Parker Range;
- (d) the proponent's proposed monitoring of dust impacts to vegetation within 250 m of the mine void; and
- (e) the dust sensitivity of the DRF *Isopogon robustus* and the other Priority flora identified within and adjacent to the project area,

it is the EPA's opinion that it is likely that the EPA's environmental objective(s) for this factor can be achieved provided conditions are imposed requiring the proponent to:

- (a) ensure that there are no loss of plants of the Declared Rare Flora species *Isopogon robustus* due to construction or operational activities; and
- (b) monitor the health and abundance of vegetation within a 250 m buffer area around areas approved for disturbance at the mine site and within a 125 m buffer around the upper haul road and undertake contingency measures should a decline in vegetation health or abundance impact of 25% (or greater) be identified;
- (c) ensure long-term genetic diversity of the populations of *Lepidosperma* sp. Parker Range and populations of *Lepidosperma* sp. Mt Caudan;
- (d) undertake further surveys to determine the local and regional impacts of the proposal on *Chamelaucium* sp. Parker Range; and
- (e) undertake weed management.

3.2 Fauna

Description

The construction and operation of the Parker Range Iron Ore Project has the potential to directly impact terrestrial fauna during vegetation clearing through vehicle strikes along the haul road and as a result of the trenching required to lay pipelines. There is also potential for the proposal to indirectly impact fauna as a result of dust and potential increased predation.

Seasonal and targeted fauna surveys were undertaken from 2008 to 2010 within the project area. These surveys recorded 90 fauna species comprising 25 reptiles, 17 mammals (including five introduced/feral fauna species) and 47 birds (KLA 2010a, Appendix B and C).

The proponent undertook searches of the DEC's Threatened and Priority Fauna database and the Department of Sustainability Environment Water Population and Communities (DSEWPaC) Protected Matters Search Tool which indicated that 23 fauna species of conservation significance could potentially occur in the project area. However, the surveys only recorded six fauna species of conservation significance (Table 3) within project area.

Table 3: Identified and potential conservation significant species and their occurrence within the project area.

Species	Conservation Status	Occurrence within project area
Species recorded during surveys:		
<i>Leipoa ocellata</i> (Malleefowl)	Vulnerable - EPBC Act Schedule 1 - WC Act	Mine area
<i>Platycerus icterotis xanthogenys</i> (Western Rosella)	Schedule 1 - WC Act	Mine area
<i>Aganippe castellum</i> (Tree-stem Trapdoor spider)	Priority 4 - DEC	Mine area
<i>Pomatostomus superciliosus</i> (White-browed Babbler)	Priority 4 - DEC	Mine area Upper haul road
<i>Oreoica gutturalis</i> (Crested Bellbird)	Priority 4 - DEC	Mine area
<i>Merops ornatus</i> (Rainbow Bee-eater)	Japan-Australia Migratory Bird Agreement (JAMBA)	Mine area
Species likely to occur include the following:		
<i>Leipoa ocellata</i> (Malleefowl)	Vulnerable - EPBC Act Schedule 1 - WC Act	possible in upper haul road
<i>Morelia spilota imbricata</i> (Carpet Python)	Priority 3 - DEC	possible in mine area
<i>Burhinus grallarius</i> (Bush Stone-curlew)	Priority 4 - DEC	possible in mine area
<i>Hylacola cauta whitlocki</i> (Shy Groundwren)	Priority 4 - DEC	possible in mine area

Direct impacts

The Malleefowl was once broadly distributed across the southern half of Australia but has undergone a significant range reduction and now occupies semi-arid regions of southern Australia. The Malleefowl is a large ground-dwelling omnivorous bird with an average life span of approximately 15 years. Pairs occupy permanent territories and can use and reuse a number of mound/nests over their lifetimes. The home ranges of the Malleefowl can extend to areas greater than 400 ha (Parsons *et al.* 2009 cited in KLA 2010a).

During surveys undertaken from September 2008 to August 2010 a total of four adult Malleefowl were sited, one recently moulted feather was discovered and five Malleefowl nesting mounds were located (Cazaly 2010; KLA 2010a). A Level 1 survey was conducted for the upper haul road which indicated that Malleefowl could occur in the area. No evidence of Malleefowl was found during a reconnaissance survey conducted in 2010. The consultant (KLA 2010a) notes that Malleefowl have been recorded recently within 50 km of Moorine Rock; however, it considers that foxes and dogs have decimated the population in the upper haul road area.

The proponent proposes to clear a nesting mound which it considers to be long abandoned. All other active and inactive nesting mounds are outside the proposed project area and will not be cleared. The proposal will also result in a loss of 414 ha of potential Malleefowl habitat at the proposed mine area (Cazaly 2011a).

The Western Rosella has undergone a significant change in distribution and status since 1970. It has declined or become extinct from more than 25% of

the shires where it was once found. This parrot has disappeared from the northern and eastern parts of the Wheatbelt because of the removal of its feeding and breeding habitat. There are no shires in Western Australia where the Western Rosella is thought to be increasing in number but it remains relatively common in the lower south. Breeding habitat and contiguous vegetation may be particularly important to the species.

At Mt Caudan, two Western Rosella birds were recorded within the vicinity of the proposed mine area during the autumn 2009 survey. During the Level 1 survey of the upper haul road area Western Rosella were not heard or seen. A targeted survey for this species was undertaken in the vicinity of the mine area in April 2011 as a response to submissions raised. This survey (Cazaly 2011a, Appendix 7) identified a total of 1,837 potential breeding hollows in identified eucalyptus habitat in and around the mine area. An estimated 1,222 potential breeding hollows are located within the mine area and 1,156 potential breeding hollows were recorded in the 251 ha surveyed outside of the mine area. These figures were extrapolated and an estimated 175,012 potential breeding hollows were estimated to exist within the PEC excluding the mine area.

The White-browed Babbler is a small bird reaching up to 21 cm in size. It forages near the ground for insects and seeds. The White-browed Babbler is a highly social bird who forms cooperative breeding groups. Babbler groups have an approximate range of five to 10 hectares.

Over three surveys conducted in 2008 to 2009 including a targeted survey, 17 recordings of the White-browed Babbler were made with more seen and heard opportunistically. The proponent considers that due to the contiguous vegetation in the Mt Caudan area there is unlikely to be an impact to this species as a result of clearing required for the mine area.

In the fragmented vegetation of the upper haul road area, up to 28 White-browed Babbler nests were recorded in proximity to the proposed haul road alignment. The proponent intends to avoid impacts to trees containing nests. The closest known nest would be located a distance of 20 m from the proposed upper haul road. Should any new nests be identified that cannot be avoided these will be GPS located and the details will be reported to the DEC (Cazaly 2010). The proponent proposes to limit impacts to this species through the provision of a 20 m buffer distance from the base of tree trunks supporting known White-browed Babbler nests in the upper haul road.

The Tree-stem Trapdoor spider builds a unique above ground burrow structure against the base of trees or shrubs. Females are long lived and remain the same burrow throughout their lives, while males disperse during wet months in order to find a mate and breed.

Four surveys were undertaken for invertebrate fauna including a targeted survey (KLA 2010 a and b). These surveys identified a total of 28 occupied Tree-stem Trapdoor spider burrows and 18 old or abandoned burrows within or adjacent to the proposed mine area. The proponent anticipates that of

those identified, five spider burrows are likely to be directly impacted by clearing for the power line alignment. The proponent considers that all other known locations can be avoided during construction.

Twenty Tree-stem Trapdoor spider burrows were found in a discreet vegetation complex (*Eucalyptus capillosa* subsp. *polyclada* woodland) at the southern portion of the proposed Parker Range bypass Road and another 'dense' population was recorded in Mallee Heath just south of the access road. More Tree-stem Trapdoor spider burrows were scattered throughout the areas searched in other vegetation associations. The survey report (KLA 2010b) noted that this distribution indicates that the Tree-stem Trapdoor spiders are not limited to any particular vegetation complex.

Habitat loss is also expected for the Crested Bellbird and Rainbow Bee-eater as a result of clearing proposed at the mine area.

Vehicle movement associated with the construction and operation of the proposal has the potential to cause the loss of individual fauna. The Malleefowl is considered to be susceptible to impacts from truck movements due to its terrestrial wandering and proximity of four mounds to roads the closest being 60 m from the Parker Range Bypass Road. The White-browed Babbler, which is a low and slow flying bird, and other slow moving species such as reptiles (including the Carpet Python if present) would also be vulnerable to road deaths.

The proponent intends to bury pipelines within trenches and backfill them. While open, these trenches have the potential to present a linear barrier to the movement of terrestrial fauna and entrap fauna resulting in injury or death.

The proponent has proposed that a number of management measures be implemented to minimise impacts to fauna these include:

- undertaking a targeted Malleefowl surveys weekly at known active nesting mounds, monthly during breeding periods of September to December and pre-clearing surveys prior to clearing of native vegetation greater than 1 ha;
- erecting signs to protect the existing known populations around the 50 m buffer zones which will be established around active Malleefowl mounds. Access will be prevented through the use of levee bunds across access tracks and permission will be required to enter these areas;
- to minimise road deaths speed limit and warning signs would be erected on roads where Malleefowl may occur; and
- avoidance of the known preferred habitat (*Eucalyptus capillosa* subsp. *polyclada* woodland and Mallee Heath) of Tree-stem Trapdoor spider where possible.

Indirect impacts

The implementation of the proposal could lead to an increase in introduced species (such as cats, foxes and dogs) through a number of actions including the availability of domestic waste. An increase in introduced fauna could adversely impact the composition of the types and number of native fauna

species. The proponent proposes to undertake appropriate waste management measures to ensure introduced fauna populations aren't increased by the implementation of the proposal. The Environmental Management Plan (EMP) (Cazaly 2011a, Appendix 13) contains the Malleefowl Management Sub-plan and the Waste Management Sub-plan which require the development and implementation of strategies to reduce predation in consultation with the DEC and the Department of Agriculture and Fisheries. These strategies could involve the monitoring of introduced predators and where appropriate implementation of an eradication program.

Dust modelling (Ecotech 2010) was undertaken for a number of receptors including the Malleefowl mounds located in the vicinity of the proposed mine footprint using a target criteria of 7 g/m²/month. The modelling predicted peak dust limits with the highest (3.6 g/m²/month) at the Malleefowl nesting mound located west of the crushing plant. As this falls below the dust criteria the proponent considers that the effects will be relatively small. The proponent anticipates that peak dust deposition along the haul road will occur within 80 m (Cazaly 2010). Therefore White-browed Babbler nests within a radius of 80 m from the haul road could be effected by dust impacts.

To manage the impact of dust on significant fauna the proponent has proposed a number of buffer zones (Active Malleefowl mounds minimum 50 m, White-browed Babbler nest tree trunks minimum 20 m).

Submissions

Key comments in submissions:

- Further information should be provided regarding the offset prior to approval.
- In addition to removing Malleefowl habitat, there is the potential for indirect and long-term impacts from the proposed development on the Malleefowl population.
- The proponent has not adequately addressed the impact of the proposal on the threatened Western Rosella population recorded within the project area.

Assessment

The relevant area for the consideration of this factor is the project area as illustrated in Figures 1, 2 and 3 and the surrounding areas. The EPA's environmental objectives for this factor are to:

- protect Threatened Fauna and Priority Fauna species and their habitats, consistent with the provisions of the *Wildlife Conservation Act 1950*; and
- maintain the abundance, species diversity, geographic distribution and productivity of terrestrial fauna at species and ecosystem levels through the avoidance or management of adverse impacts and the improvement of knowledge.

The DEC has advised that there is a paucity of information on fauna that have been recorded in the Wheatbelt greenstones and the Parker Range. As such searches of the databases are unlikely to be comprehensive.

The EPA notes that fauna surveys generally comply with EPA Guidance Statements 56, 54 and 54A and are adequate for environmental impact assessment. However, the surveys contain some limitations including low sampling effort. Surveys also demonstrate poor sampling methods, spatial representation and seasonal survey timing. In addition the survey reports and PER failed to recognise that the relatively intact faunal assemblage in the area was important because of widespread decline of similar assemblages due to extensive clearing in the Wheatbelt.

Direct impacts

The EPA considers that the loss of one inactive Malleefowl mound is not significant and has recommended condition 8-4 to ensure the proponent is restricted to clearing the one inactive Malleefowl mound identified during the surveys within its mine area.

The EPA note that the implementation of this proposal would result in the loss the loss of 414 ha of Malleefowl breeding, feeding and dispersal habitat within the 55,960 ha PEC.

The proponent has committed to monitor trends in Malleefowl abundance, distribution to assess threats and habitat under its EMP; however, this EMP does not:

- require consultation with the DEC when developing the monitoring program;
- define an area to be monitored; or
- provide contingency measures should it be demonstrated that the proposal is negatively impacting Malleefowl populations.

To ensure that the proponent's conclusion that there will be no local impacts to Malleefowl populations as a result of the implementation of the proposal is correct and to ensure that the proponent's intention to monitor Malleefowl populations is legally enforceable the EPA considers that conditions 8-4 to 8-6 should be implemented. These conditions require the proponent to undertake monitoring within a 1 km area surrounding the mine area which is the local area as defined by the proponent in the PER document. These conditions also require the proponent to undertake mitigation measures should a decline in Malleefowl population be detected.

The EPA notes that the proponent has undertaken a Western Rosella tree hollow survey as a response to submissions. This survey identified that potential breeding hollows for the Western Rosella are not confined to the mine area but exist locally outside the impact area and are likely to exist more widely in the contiguous remnant habitat provided with the Parker Range PEC resulting in the estimated loss of 0.7% of potential breeding hollows and 0.4% of potential habitat in the PEC. The EPA considers that this loss would not significantly impact the conservation status of the Western Rosella.

The DSEWPaC requires the proponent to provide offsets as a result of impacts to Malleefowl which is listed as threatened under the EPBC Act. The Environmental Offset Strategy (Cazaly 2011b) provided by the proponent as a response to this requirement is consistent with the EPA offsets guidance and proposes to mitigate residual impacts that it has identified to Malleefowl habitat and Western Rosella habitat as well as vegetation (see section 3.1). The Environmental Offset Strategy (Cazaly 2011b) includes the establishment of the Parker Range Conservation Trust which will deliver a positive conservation outcome for the Southern Yilgarn region and the acquisition and rehabilitation of 1,311 ha of farmland located between two nature reserves potentially creating a larger linked ecosystem. The EPA commends the work done by the proponent in producing this generous residual impact strategy in response to the requirements of the DSEWPaC and to mitigate for the residual impacts on vegetation.

The EPA considers that the proposal is unlikely to cause regional impacts as a result of clearing to the other conservation significant species such as the Rainbow Bee-eater, Crested Bellbird, White-browed Babbler and the Tree-stem Trapdoor spider as they have wide distributions and therefore loss of a small portion of habitat is not considered to be significant.

Trenching management is not addressed in any of the proponent's documentation. Due to the presence of Malleefowl and other conservation significant species that have the potential to inhabit the mine area the EPA considers that condition 9 should be implemented to ensure terrestrial fauna are not adversely impacted during the construction of trenches.

The EPA notes that the proponent's documentation (Cazaly 2010; 2011a, Appendix 13) does not consistently indicate whether vehicle speeds will be restricted within the mine site or only on roads where Malleefowl mounds are known to occur. The EPA considers the mine area and local area (1 km surrounding mine area) to be Malleefowl habitat and that based on previous sightings in the Moorine Rocks area Malleefowl habitat exists in the upper haul road. The upper haul road also contains populations of the low and slow flying White-browed Babbler which is known to fly in flocks, increasing risk of road deaths. The EPA considers that to minimise impacts to Malleefowl, the White-browed Babbler, and other slow moving fauna species which may include the Carpet Python conditions 8-1 through to 8-3 restricting speed limits in the mine footprint and upper haul road should be implemented.

Indirect impacts

The EPA notes the intent of the proponent's Waste and Malleefowl Management sub-plans to monitor and manage introduced predator populations to ensure impacts native fauna are minimised (Cazaly 2010; Cazaly 2011a, Appendix 13). The EPA considers that the proponent's EMP will provide sufficient management of introduced fauna populations during the implementation and operation of the proposal.

The EPA notes that dust impacts for Malleefowl mounds do not reach the proponent's trigger criteria and considers that dust impacts to Malleefowl are unlikely to be significant. The EPA is aware that White-browed Babblers are known to nest in verges next to roads. Therefore, the EPA considers that significant impacts to behaviour or population numbers as a result of noise and dust impacts cause by truck movements are unlikely.

Summary

Having particular regard to the:

- (a) loss of 414 ha of Malleefowl habitat;
- (b) estimated loss of 0.4% of Western Rosella habitat within the Parker Range PEC; and
- (c) potential threats to specially protected and priority fauna from vehicle movements and trenching,

it is the EPA's opinion that it is likely that the EPA's environmental objective(s) for this factor can be achieved provided conditions are imposed requiring the proponent to:

- (a) ensure Malleefowl monitoring and management measures are undertaken;
- (b) require trenching management and introduced fauna management is undertaken; and
- (c) restrict the speed of vehicles on roads within the mine site.

3.3 Air quality - dust

Description

Dust produced as a result of the implementation and operation of the proposal is likely to impact vegetation health (refer to Section 3.1), human health and amenity. Sources of dust include the removal and stockpiling of vegetation and topsoils, drilling and blasting within the mine, loading, hauling and unloading of waste rock and ore, wind erosion of ore and waste rock stockpiles.

The nearest residence/sensitive premises from the proposed mine area is located at a distance of approximately 10 km and therefore is unlikely to be impacted by dust. The proponent has selected a haul route to ensure dust impacts to residence will be minimised.

Modelling (Ecotec 2011) has been undertaken for the combined impact of dust from road transport and the operation of the Moorine Rock Rail Siding. The rail siding has not been referred to the EPA. Modelling indicated that Receptor 1 (Liddell Road property) located approximately 450 m from the dust generating activities associated with the rail siding would experience the highest dust concentrations. The Liddell Road property would experience particulate matter with diameters less than 10 millionth of a metre (PM₁₀) maximum 24 hour average of 50 µg/m³ (Ecotec 2011). This is equal to the

NEPM standard. The modelling results predict that the remaining six residences experience PM₁₀ maximum 24 hour average dust concentrations below the NEPM standards for human health (Cazaly 2010).

Modelling predicted that NEPM human health levels for PM_{2.5} and deposition levels of 2 g/m²/month would not be exceeded at any of the sensitive premises.

The proponent considers that modelling is conservative and with adequate dust controls impacts would be acceptable at all sensitive premises. The proponent proposes to manage and monitor dust impacts by:

- controlling product stockpiles using water sprays and surfactant additives if required;
- water spray road trains to limit the potential for dust lift-off during road transport;
- monthly dust monitoring of dust levels at locations along the ore haulage route through the community at sensitive dust receptor locations;
- a community incident reporting procedure for observed emissions associated with dust from mining or truck haulage operations;
- continued consultation with rural landholders, the community and the Shire of Yilgarn.

In the event that dust monitoring results in dust level concerns, a number of contingency actions may be employed including the retrofitting of trailer covers to road trains.

Submissions

Key comments in submissions:

- The proponent's dust management plan should include the installation of appropriate dust monitoring and dust control systems.
- Dust monitoring should be undertaken for a minimum period of 12 months.
- Modelling results presented in the air quality assessment report indicated that the dust PM₁₀ concentrations at all sensitive receptors are significant and reach or are close to the NEPM.

Assessment

The relevant area for the consideration of this factor is the project area and surrounds.

The EPA's environmental objective for this factor is to ensure that the dust levels generated by the proposal do not adversely impact upon welfare and amenity or cause health problems by meeting statutory requirements and acceptable standards.

The EPA recognises the haul route was selected to minimise impacts to residences.

The EPA notes that the Moorine Rock Rail Siding does not fall within the provisions of the EP Act works approval and licensing requirements administered by the DEC.

The EPA considers that monitoring is required to ensure that the NEPM PM₁₀ standard is not exceeded at the Liddell Road property in the Moorine Rocks area. Therefore the EPA recommends that condition 11 is implemented, which requires the proponent to monitor the PM₁₀ maximum 24 hour concentrations at the Liddell Road property and maintain a complaint register. Should the NEPM standard be exceeded the proponent is required to introduce management measures to reduce PM₁₀ levels below the NEPM standard.

Summary

The EPA considers the key environmental factor of air quality has been adequately addressed and the EPA's objective(s) for this factor can be achieved provided that a condition is imposed to ensure that the NEPM PM₁₀ standard is not exceeded at the Liddell Road property.

3.4 Groundwater

Description

Groundwater can potentially be impacted from mining activities such as pit dewatering and contamination of groundwater quality due to leachate from tailings storage facility and waste dumps and potential Acid and/or Metalliferous Drainage (AMD). The potential for AMD in pit lakes is discussed in Section 3.5.

Dewatering

The groundwater level in the Mt Caudan project area lies at approximately 365 m Australian Height Datum (AHD) which corresponds to approximately 40 m below ground level (bgl) under the terrain surrounding Mt Caudan and approximately 60 m bgl under Mt Caudan which is higher than the surrounding landscape. As the base of the orebody occurs at approximately 65 m below the current groundwater level (300 m AHD) dewatering will be required to enable dry floor mining.

Groundwater modelling (Rockwater 2010) was undertaken to predict the impact of dewatering of up to 657 megalitres per annum on the groundwater levels in the vicinity of the mine zones. This dewatering exceeds the anticipated rates required by the proponent for operational needs and therefore the findings could be considered to be conservative. Due to the low permeability of the country rocks surrounding the orebody, the radial influence of dewatering is predicted to be small on either side of the orebody (Rockwater 2010). The proponent considers that at a distance of 0.8 km from the mine groundwater drawdown will be approximately 1 m with no effect expected at a distance of greater than 1 km (Cazaly 2010).

The proponent proposes to monitor impacts to groundwater through monthly monitoring within and adjacent to the impact area at Mt Caudan. Results of groundwater monitoring will be reported to the Department of Water (DoW) annually. The hydrogeological model will be updated based upon empirical rate of aquifer drawdown to validate and monitor dewatering impacts. The model will be updated on an annual basis (Cazaly 2010; Cazaly 2011a, Appendix 10).

The PER notes that the closest known existing groundwater bores are the Southern Star borefield (to the east) and low yield pastoral bores (to the west). These bores are at least 7 km away from the project area. Groundwater modelling indicates that drawdown impacts will be restricted to 1 km from the pit boundary. The proponent considers that based on the groundwater modelling and the low permeability of the surrounding rocks the abstraction required for the proposal should not impact other groundwater users.

Groundwater quality

Materials with the potential to produce AMD could be uncovered during mining. If this is the case then incorrect storage of this material in the waste dump or exposure in pit walls may result in AMD leaching into the groundwater and reducing its quality.

Initial waste characterisation testing (IMO 2010) was undertaken using 22 samples from 13 holes. The static acid base accounting characterised the wastes as generally non-acid-forming. The short-term leach testing was undertaken for a standard range of elements such as arsenic and selenium as well as conductivity and pH. This leach test indicated that there were low level increases of iron, manganese, barium and sulphate, with the pH of the test solution decreasing after testing to a pH range of 5.9 to 6.2 (from 7.6). The test results noted that there was little or no leaching of metals from the broken solids into the groundwater (IMO 2010).

Based on the results of these tests the proponent has concluded that AMD is unlikely to occur and that the waste rock material is stable with very low metalliferous leaching properties.

The following management measures were cited in the PER document (Cazaly 2010) and the EMP (Cazaly 2011a, Appendix 13):

- Monitoring bores within and adjacent to the impact area at Mt Caudan will be established. These bores will be monitored monthly for salinity and pH. These bores will also be monitored quarterly for water quality.
- Mine waste will be visually monitored for potentially acid forming (PAF) material and if detected it will be segregated into a designed PAF encapsulation cell within the waste landform.

The proposal includes a dry processing plant which would be upgraded to a wet processing (beneficiation) plant during the second year of proposed project operation. Consequently the tailings produced will be stored in a tailings storage facility (TSF). The TSF is to be unlined; however, it will have a 10^{-08} m/s permeability as a result of being constructed from rolled and

formed clayey gravels. The proponent considers that the tailings material will contain no adverse reagents, and will have similar chemical composition to the fresh rock in the mine. The water salinity at the TSF is likely to be less than 60,000 mg/L Total Dissolved Solids (TDS) inclusive of the effect from evaporation. This is similar to the salinity of groundwater at Mt Caudan with an approximate TDS of 60,000 mg/L under the terrain surrounding Mt Caudan.

The proponent proposes to establish monitoring bores around the periphery of the TSF for the assessment of groundwater quality during TSF operation.

Submissions

The key comment in submissions states that further details will be required for the design of the TSF in the mining proposal.

Assessment

The relevant areas of consideration for this assessment are all areas which may be impacted by the dewatering of groundwater and decreased water quality.

The EPA's environmental objective for this factor is to maintain the quality and quantity of groundwater water so that existing and potential uses, including ecosystem maintenance are protected.

Dewatering

The EPA notes the DoW advice that the proponent's groundwater drawdown and recovery predictions are reasonable based on the scenarios provided.

The EPA considers that monitoring and management measures for the proposal referred to the EPA can be adequately managed under the groundwater abstraction licensing process conducted by the DoW in accordance with the *Rights in Water and Irrigation Act 1914*.

The EPA notes there is limited beneficial use for groundwater in the area. Based on the information provided the EPA considers that existing groundwater users in the area should not be impacted by the proposal.

The DoW recently advised that 50% of the water required for process requirements will be provided by the dewatering program. As a consequence an additional source of water will need to be found to provide the remaining water. The DoW advised the EPA that there is currently sufficient water allocation available in the region.

The proponent's documentation did not indicate the requirement for additional water outside of the mine footprint and therefore does not form part of this proposal. The proponent has advised the EPA that modelling was conservative and should further water be required above that requested in the proposal, it could be supplied from additional bores within the proponent's existing mining tenements adjacent to the mine footprint. Additional bores outside of the mine footprint may require separate referral to the EPA if as a

result of additional vegetation, flora and fauna investigations, impacts are considered to be environmentally significant.

Groundwater quality

The EPA notes that the AMD testing indicated that four of the 22 samples tested had a net acid generation capacity (Cazaly 2010). In addition one of the conclusions made in the AMD and Leach Testing report (IMO 2010) stated that some areas of the orebody may have some acid generation capacity and these areas will need to be monitored during production to ensure that blending with other ore prevents the production of acid.

The DEC has advised that the AMD “static” testing to determine the acid-base balance of ore and waste rock materials has been carried out in an appropriate manner and suggests that there is unlikely to be a significant AMD issue at the proposed mine area. However, the DEC go on to advise that further long term kinetic testing is required to determine resultant water quality over a longer time period as:

- there was a decline in the alkalinity of the well buffered groundwater used in the short term leach testing; and
- the extent to which leachate from these materials may contain significant concentrations of metals or metalloids under near neutral pH conditions has not been adequately determined.

The EPA notes that contingency actions for groundwater quality during operation and post closure are not clearly defined within the proponent’s documentation.

The EPA recognises that the levels of environmental risk can only be assessed by undertaking leaching tests over time (six months and over) on relevant rock types and then using the leachate data in geochemical models to predict the water quality. The EPA considers that AMD will be appropriately managed by the DMP through the statutory requirement of the *Mining Act 1978* in accordance with the EPA/DMP Guidelines (2011) and recommends that leaching tests are undertaken.

The EPA notes the DEC’s advice that impacts to groundwater depth and quality around the TSF will be managed through a licence issued under Part V of the EP Act. The EPA considers that this licence will adequately manage any potential impacts to groundwater as a result of the TSF.

Summary

Having particular regard to the:

- (a) hydrogeological modelling;
- (b) requirement for a DoW groundwater abstraction licence;
- (c) the limited beneficial uses of groundwater in the area;
- (d) static AMD and leach testing;

- (e) DMP/EPA Guidelines for Preparing Mine Closure Plans released in 2011 and the statutory requirements of the *Mining Act 1978*; and
- (f) management of impacts to groundwater as a result of the TSF under Part V of the EP Act,

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

3.5 Closure and rehabilitation

Description

The proposal would involve the clearing of approximately 418 ha of native vegetation. Depending on the success of environmental management, there is the potential for contamination and altered groundwater regimes, unstable landforms, erosion, impacts to native flora and fauna from increased feral fauna populations, and the unsuccessful return of vegetation to result from inappropriate closure and rehabilitation.

The proponent's Conceptual Rehabilitation and Closure Plan (CRCP) (Cazaly 2011a, Appendix 5) will be developed over the life of the project with reviews of the document occurring every three years. Specific post closure land use objectives, rehabilitation completion criteria, closure measures and schedules are yet to be developed.

Closure

Decommissioning

All above ground infrastructure would be removed and reused or recycled where possible. However, the proponent proposes to leave in situ buried mine infrastructure. Powerlines and a communication tower will also be left in situ and managed by third parties (Cazaly 2011a, Appendix 8). The upper haul road which is built on private land will be retained for use by the land owner. In addition the internal mine access road would be retained to enable long-term access for rehabilitation works, monitoring and maintenance (Cazaly 2010 & 2011a, Appendix 8).

The ore body is located above the watertable in the south zone of the mine pit, so this area will not require dewatering. The proponent considers the south zone to be conducive to strip mining and backfilling with waste rock. Strip mining is not possible for the north and central zones of the mine pit. The proponent will not back fill the north and central zones of the pit and an open pit (pit void) will remain.

Pit lake

In the north and central zones of the pit the orebody extends beneath the watertable located at 365 m AHD. Therefore to enable dry floor mining dewatering to a level of approximately 300 m AHD (approximately 65 m below current levels) would be required. After closure dewatering would cease and the remaining pit void would fill with water from the surrounding groundwater aquifer as groundwater levels start to rise and a pit lake would form. Water

balance calculations (Rockwater 2010) predicted that groundwater levels are likely to recover to approximately 45 m below original groundwater levels (320 m AHD) within 35 years; with 75% of water recovery within the first 1.5 years. The low stabilised water level in the pit relative to that in the surrounding country rocks (360-367 m AHD) indicates that the pit will act as a sink to groundwater flow thereby preventing any migration of highly saline water from the pit into the aquifer (Rockwater 2010).

Based on initial waste characterisation testing outlined in Section 3.4 the proponent considered that the accumulation of metals in the pit lake is unlikely to be significant. However, the proponent committed to monitoring the water quality of the pit lake for salinity, heavy metals and acidity and reporting the results annually to the DEC (Cazaly 2010).

The open water in the pit lake has the potential to attract native and introduced animals that may graze on native plants or prey on native fauna. The proponent has stated that it will undertake monitoring the indigenous and introduced fauna populations during mine closure and if found to materially increase in numbers, will install fauna exclusion fencing around the perimeter of open pit void (Cazaly 2010; Cazaly 2011a, Appendix 8).

Waste rock landform

Approximately 55 million tonnes of waste rock would be generated during the ten year mine life. It is proposed that waste rock would be deposited in a waste rock landform (WRL) to the east of the mine pit. The final batter slopes of the WRL will be less than 20 degrees, contoured to 15 degrees overall, separated by a back sloping 10 m wide berm between the lifts. The WRL will be designed to minimise rain water runoff and withstand 1 in 100 year rainfall events.

Should PAF material be discovered during mining it will be isolated in a PAF encapsulation cell in the WRL. The PAF encapsulation cell will be a minimum of 3 m from the natural ground level to prevent water ingress under the landform after closure. Construction of the encapsulation cell will be from high acid neutralising capacity waste rock material, with floor and roof to be minimum 1 m thickness. The roof will extend 3 m past the walls of the encapsulation cell. A convex crown will be constructed from non acid forming waste rock on the roof of the encapsulation cell to shed water away from the area (Cazaly 2010).

TSF

As a result of beneficiation the proponent considers that a TSF will be required to store approximately 0.8 Mm³ of tailings, with an area of 400 m x 400 m x 11 m high. The TSF will be constructed accordance with the Department of Mines and Petroleum (DMP) *Guidelines for the Safe Design and Operating Standards for Tailings Storage* (Cazaly 2011a, Appendix 8). Upon completion of processing operations and the achievement of suitable density of the residue material, the surface of the facility is planned to be capped with basalt waste material and then further capped with topsoil to support revegetation and regrowth (Cazaly 2011a).

Rehabilitation

The proponent proposes to rehabilitate all disturbed areas within the mine area (414 ha) with the exception of the north and central zones of the mine pit, i.e. the pit void. This equates to a rehabilitation area of approximately 333 ha.

Where possible, disturbed areas will be progressively rehabilitated (within six months) as they become available. The majority of rehabilitation would occur subsequent to decommissioning and closure.

Rehabilitation would involve:

- deep ripping of hardstand areas for improved soil condition and drainage;
- respreading of stored topsoil and retained vegetation to provide seed and an appropriate microclimate for seed growth;
- collection (18 months prior to closure) and spreading of local provenance native seed; and
- undertaking ongoing rehabilitation trials to optimise the regrowth potential of native species from seed.

The proponent will monitor the rehabilitation works annually to determine the success of the rehabilitation. Ecosystem Function Analysis (EFA) will be used to determine rehabilitation success. Methods and monitoring such as the comparison of species density, composition and canopy cover at rehabilitation and control sites will be undertaken in accordance with those developed by K. Tongway et. al. (Cazaly 2010; Cazaly 2011a, Appendix 8). The proponent considers that rehabilitation performance outcomes will be complete if criteria (which are yet to be defined) are achieved for any two consecutive years.

In the event that the decommissioning and rehabilitation performance indicators have not been achieved, the proponent proposes to undertake contingency actions or strategies which may include:

- review and further remediation of potentially contaminated areas;
- re-seeding;
- planting of seedlings; and
- importing alternative growth media.

Soil exposed to saline water during dust suppression would be evaluated for suitability to support rehabilitation growth. In the event soil is deemed unsuitable contingency actions will be undertaken. These actions involve removal of contaminated soil for disposal within the WRL and replacement with topsoil from the stockpile (Cazaly 2010).

Submissions

Key comments in submissions:

- Provide justification for retention and proof of acceptance of ongoing liability and responsibility from the agency/company that will be responsible for the remaining infrastructure.
- The further details should be provided on the design of the WRL.

- The proposal will leave a permanent pit lake which could potentially produce long-term impacts on the biodiversity of the area from increased grazing pressure. This proposal is located in an area with sensitive and significant habitats that provide habitats for a high concentration of conservation significant flora and fauna.
- Completion criteria and objectives for rehabilitation and closure should be developed to reflect the existing high conservation values of the project area.
- Sufficient information has not been provided as to why the mine void will not be backfilled.

Assessment

The relevant area for the consideration of this factor is the mine area as illustrated in Figure 2. The EPA's environmental objectives for this factor are to:

- ensure that closure and rehabilitation achieves stable, non polluting and functioning landforms which are consistent with surrounding landscape and other environmental values; and
- ensure that self-sustaining native vegetation communities are returned after mining, which, in species composition and ecological function are close as possible to naturally occurring analogue sites.

The EPA notes that the CRCP includes a set of conceptual objectives and considers that land use objectives, rehabilitation completion criteria, closure measures, monitoring schedules and reporting requirements would be developed in consultation with stakeholders over the life of the project. The EPA notes that the CRCP was prepared before the release of the *DMP/EPA Guidelines for Preparing Mine Closure Plans* (2011). Subsequent reviews of the CRCP will bring it in line with these guidelines.

The EPA note that third parties have confirmed (via letter and email) their management of powerlines and a communication tower left in situ after closure.

The PER document (Cazaly 2010) states that there are no permanent surface water bodies in the area and introduced fauna (house mouse, rabbit, fox, dog and cat) have been identified within the local area. As the proponent does not propose to back fill the mine void, a pit lake will form. This is likely to attract and increase introduced fauna and indirectly impact native fauna such as Malleefowl from increased predation and competition. In addition impacts to the DRF *I. robustus* and Priority flora species may increase due to grazing. These impacts have the potential to alter the conservation status of species for example the *Lepidosperma* sp. Mt Caudan which is restricted to the Parker Range.

The DEC has provided advice that the potential pit water quality after mine closure has not been adequately determined. Therefore there is potential for the pit lake to not only become hypersaline through evaporation but also become polluted by AMD. The EPA notes that leach testing for AMD was

undertaken using groundwater as the leachant and recommends that testing is undertaken using leachant of varying salinities to determine the actual AMD potential of the final pit lake.

The EPA considers that under certain conditions, such as stratification, the water from the pit lake could flow back into the local aquifer impacting groundwater quality. The possible release of AMD into the pit void could also impact birds and lead to bioaccumulation of toxicants such as selenium in wildlife through the food chain.

The potential impacts to native flora, native fauna and groundwater quality would not occur post closure if the proponent undertook to backfill the pit void above the watertable and the conditions cited above would not be required. Therefore, the EPA encourages the proponent to use its best endeavours to identify opportunities to backfill the pit void above the watertable. This strategy is considered to be best practice and would ultimately reduce the overall project footprint and reduce the possibility of ongoing environmental impacts and management by the proponent.

The proponent has committed to undertaking an annual rehabilitation monitoring program post-closure until EFA performance outcomes are achieved for any two consecutive years. However, the EPA recommends that it is more appropriate for rehabilitation activities to continue until approved completion criteria have been met for a minimum of five years following mine completion.

The EPA is satisfied that the long-term success of decommissioning, mine closure and rehabilitation will be managed by the DMP in accordance with the DMP/EPA *Guidelines for Preparing Mine Closure Plans* (2011) through the statutory requirements of the *Mining Act 1978*. The management of decommissioning, mine closure and rehabilitation will include the protection of native flora and fauna, pit lake and groundwater quality, and the requirement for the WRL and TSF to be safe stable and non-polluting.

Summary

Having particular regard to the:

- (a) remaining pit lake which has the potential to attract and increase introduced fauna populations and become saline and polluted by AMD;
- (b) proponent's commitment to undertake a monitoring and rehabilitation program post closure; and
- (c) DMP/EPA *Guidelines for Preparing Mine Closure Plans* released in 2011 and the statutory requirements of the *Mining Act 1978*,

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

3.6 Environmental principles

In preparing this report and recommendations, the EPA has had regard for the object and principles contained in s4A of the EP Act. Appendix 3 contains a summary of the EPA's consideration of the principles.

4. Conditions

Section 44 of the EP Act requires the EPA to report to the Minister for Environment on the key environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

4.1 Recommended conditions

Having considered the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Cazaly Resources Limited to develop and operate the Parker Range (Mount Caudan) Iron Ore Project, is approved for implementation.

These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

- a) Flora and vegetation – sets a buffer area in which vegetation health is to be monitored and requires that contingency actions are undertaken should a 25 % (or greater) decline in health or abundance be recorded.
- b) Conservation significant flora – ensures that there is no loss of the DRF *Isopogon robustus* due to clearing and the genetic diversity of the Priority 1 *Lepidosperma* sp. Mt Caudan and *Lepidosperma* sp. Parker Range species are ensured. The condition would also ensure that a decline in health or abundance of *I. robustus* and the Priority 1 flora *Lepidosperma* sp. Mt Caudan are not adversely impacted due to dust generated as a result of the proposal.
- c) Fauna – minimises the impacts of traffic and ensures only one identified inactive Malleefowl mound is cleared and the local Malleefowl populations are not adversely impacted by the proposal.
- d) Trench management – ensures that open trenches associated with construction and burial of pipelines do not cause adverse impacts to fauna.
- e) Air quality – ensures the NEPM PM₁₀ standard is not exceeded at the Liddell Road property as a result of the proposal.

It should be noted that other regulatory mechanisms relevant to the proposal are:

- *Rights in Water and Irrigation Act* 1914 – licence for abstraction (dewatering);

- *Wildlife Conservation Act 1950* – licence to handle and remove trapped native fauna from construction areas;
- Part V of the *Environmental Protection Act 1986* – various Works Approvals and an operating licence would be required for construction and operation of the project; and
- *Mining Act 1978* – mining proposal is required to be approved by the Department of Mines and Petroleum.

4.2 Consultation

In developing these conditions, the EPA consulted with the proponent and the DEC, DMP, DoW and BGPA in respect of matters of fact and matters of technical or implementation significance. Minor changes, which did not change the intent or scope, were made to conditions 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 13.

5. Other advice

The EPA notes that it was the intention of the proponent to remove the Moorine Rocks rail siding from the Parker Range Project despite the EPA's preference for projects to be referred in their entirety. As the DEC are unable to issue a works approval and licence under Part V of the EP Act to license this facility, the impacts of dust will not be assessed and impacts may reach and exceed the NEPM standard.

In addition, further impacts to vegetation associations of the Wheatbelt as a result of the proponent's activities will result in an approximate loss of a further 8.7 ha of VA 8 and 10.4 ha of VA1413. Further impacts below the 30% threshold and 10% endangered level (EPA 2000) are likely. As the rail siding has not been referred to the EPA, the EPA was unable to conduct an assessment of the cumulative impacts. The DEC will assess the clearing required for the Moorine Rocks proposal under a clearing permit required under the provisions of Part V of the EP Act. The DEC has undertaken a preliminary assessment and considers a residual impact strategy would be required for impacts to VA 8 and 1413. The EPA is aware that the proponent is considering the acquisition of land immediately to the west of Nargalyerin Nature Reserve. This land contains VA 8 and VA 1413 and would potentially form part of a larger area. This larger area includes Nargalyerin and Frog Rock Nature Reserves and Lots 363 and 789 which would be acquired and rehabilitated as part of the Environmental Offset Strategy (2011b) for the Parker Range Project. The larger area could ultimately be reserved should acquisition and rehabilitation be successful. The EPA notes that the successful acquisition and rehabilitation of this area would contribute towards a net environmental gain.

Appendix 1

List of submitters

Organisations:

- Department of Environment and Conservation
- Department of Indigenous Affairs
- Department of Mines and Petroleum
- Department of Water
- Main Roads Western Australia
- Wildflower Society of Western Australia

Individuals:

- Michael Tichbon

Appendix 2

References

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Appendix 3

Summary of identification of key environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
BIOPHYSICAL			
<p>Vegetation Communities</p>	<p>The project area covers 929 ha and clearing of up to 418 ha of native vegetation would be required during the construction and operation of this proposal.</p> <p>Surveys defined and mapped twenty-four vegetation communities within the project areas. The proposed mine area (mine site, Parker Range Bypass Road and power line corridor) occurs within the Priority 1, Parker Range Priority Ecological Community (PEC).</p> <p>None of the vegetation communities were considered to be Threatened Ecological Communities (TEC) under the EPBC Act.</p>	<p>Government Agencies Flora surveys appear to have been conducted largely outside the appropriate season.</p> <p>An appropriate buffer should surround the project area. Within this buffer trigger levels for vegetation condition and population health should be set and monitoring should take place and be reported.</p> <p>Government Agencies and Public Concerns were raised regarding the impact of saline water used for dust suppression over spraying and impacting vegetation</p> <p>Non Government Organisations The selection of truck route 5 will involve land clearing and the fragmentation of a large tract of bushland. Truck route 6 does not involve clearing and should therefore be selected.</p>	<p>Considered to be a key environmental factor.</p>
<p>Declared Rare and Priority Flora</p>	<p>Eight species of Priority flora occur within the project area. Impacts to these species from clearing are likely.</p> <p>The only known occurrence</p>	<p>Government Agencies There are limitations to flora surveys including the lack of identification of conservation significant species that have potential to occur in the project area and inappropriate surveys times.</p>	<p>Considered to be a key environmental factor.</p>

	<p>of the Declared Rare Flora (DRF) <i>Isopogon robustus</i> consisting of 1,020 plants occurs within close proximity of the project area. With the closest population occurring approximately 350 m to the south east of proposed mine area.</p>	<p>A DRF monitoring program should be developed on the advice of and in agreement with DEC to ensure indirect impacts to not affect the <i>Isopogon robustus</i>.</p> <p>Adequate precautions need to be taken to avoid detrimental changes to the conservation status of priority listed flora for example <i>Lepidosperma</i> sp. Parker Range ((Priority 1) and <i>Lepidosperma</i> sp. Mt Caudan (Priority 1).</p> <p>Mitigation measures should be provided for residual impact to Priority flora.</p> <p>The DEC should be consulted for advice on proposals for conservation reserve creation and research into threatened species, as proposed in the proponent's offsets.</p> <p>Cazaly will need to provide further information regarding the offset prior to approval.</p> <p>The offset should also be clearly described in terms of how they will provide an environmental gain to mitigate the impacts on matters of National Environmental Significance.</p> <p>Further details should be provided on the proposed mechanism/s to protect and manage the proposed offset areas purchased by the PRCT in perpetuity and the party/parties responsible.</p>	
<p>Weeds</p>	<p>Vegetation surveys of the Mt Caudan project area identified the following four weed species:</p> <ul style="list-style-type: none"> • <i>Sonchus oleraceus</i> (Common Sowthistle). • <i>Ursinia anthemoides</i> (African Daisy). 	<p>Government Agencies</p> <p>There is the potential for a number of indirect impacts including weeds fire and dust to impact native flora therefore ongoing monitoring and studies of vegetation surrounding the project areas should be required.</p>	<p>Considered to be a key environmental factor.</p>

	<ul style="list-style-type: none"> • <i>Bromus rubens</i> (Red Brome). • <i>Anagallis arvensis</i> (Blue Pimpernel). <p>None of these species are listed as Declared Plants under the <i>Agriculture and Related Resources Protection Act 1976</i>.</p>		
Dust	Dust produced during the construction and operation of the proposal has the potential to be deposited on vegetation and may prevent photosynthesis and plant respiration.	<p>Government Agencies There is the potential for a number of indirect impacts including weeds fire and dust to impact native flora therefore ongoing monitoring and studies of vegetation surrounding the project areas should be required.</p> <p>Non Government Organisations Dust from the mine and transport route is likely to damage a substantial area of vegetation.</p>	Considered to be a key environmental factor.
Fire	The introduction of mine operations has the potential to introduce new ignition sources that could lead to fire that could have an impact on the local vegetation and fauna habitat.	<p>Government Agencies There is the potential for a number of indirect impacts including weeds fire and dust to impact native flora therefore ongoing monitoring and studies of vegetation surrounding the project areas should be required.</p>	<p>The EPA considers the fire management measures that would be implemented as part of the proposal are sufficient to minimise the risk of fire occurring as a result of the proposal.</p> <p>Not considered to be a key environmental factor.</p>
saline water overspray	The proponent proposes to minimise dust levels through a number of methods including the use of bore water. Overspraying of this saline bore-water (50,000	<p>Government Agencies, Non Government Organisations and Public Concerns have been raised about the impact of saline overspray on the vegetation adjacent to the roads</p>	The EPA considers that the use of dribble bars will sufficiently reduce the impacts of overspray on fringing vegetation during mine operation.

	<p>milligrams per litre Total Dissolved Solids (mg/L TDS)) has the potential to adversely impact the health of native vegetation adjacent to mine access roads and roads along the haul route.</p> <p>The proponent proposes to use dribble-bars to minimise the impact of overspray and design in-plant roads to contain saline water through the use of mechanisms such as drains, culverts, floodways and detention basins.</p>		Not considered to be a key environmental factor.
Fauna and Habitat	<p>The implementation of the proposal would result in the direct disturbance of 418 ha of terrestrial fauna habitat.</p> <p>Within the project area surveys identified 25 reptiles, 16 mammals (including 5 introduced/feral fauna species) and 44 birds.</p>	<p>Government Agencies That DEC should be consulted for advice on proposals for conservation reserve creation and research into threatened species, as proposed in the proponent's offsets.</p> <p>Cazaly Resources will need to provide further information regarding the offset secured by the Parker Range Conservation Trust (PRCT) prior to approval.</p> <p>The offset should also be clearly described in terms of how they will provide an environmental gain to mitigate the impacts on matters of National Environmental Significance.</p> <p>Further details should be provided on the proposed mechanism/s to protect and manage the proposed offset areas purchased by the PRCT in perpetuity and the party/parties responsible.</p>	Considered to be a key environmental factor.
Light and noise	The proposal is likely to increase light levels in the mine area and as a result	<p>Public Noise and light impacts cause as a result of the proposal are likely to drive fauna from the area.</p>	The EPA considers that impacts on fauna from light and noise are likely to be relatively minor.

	<p>impact light on sensitive fauna species. These species include seven bat species identified during the surveys. The proponent proposes to reduce impacts through directional lighting to minimise light spill outside of the Mine project area. Also shrouding and the use of "Bug Yellow" fluorescent lighting (or similar) would be used to limit attraction of flying insects to permanently lit areas (Cazaly 2010).</p>		<p>The project area is not located in an area where known nocturnal migrations take place.</p> <p>The EPA considers the management measures outlined in the PER which includes directional lighting and the use of "Bug Lights" to be sufficient to reduce impacts to fauna during night time operations.</p> <p>No further assessment is required. Not considered to be a key environmental factor.</p>
<p>Scheduled and Priority Fauna</p>	<p>The proposal would potentially impact six State and Federally listed species:</p> <ul style="list-style-type: none"> • Malleefowl <i>Leipoa ocellata</i> (Vulnerable and Schedule 1); • Western Rosella <i>Platycerus icterotis xanthogenys</i> (Schedule 1); • Tree-stem Trapdoor spider <i>Aganippe castellum</i> (P4) • White-browed Babbler <i>Pomatostomus superciliosus</i> (P4); • Crested Bellbird <i>Oreoica gutturalis</i> (P4) • Rainbow Bee-eater 	<p>Government Agencies</p> <p>In addition to removing 49 hectares of mapped preferred Malleefowl habitat, there is the potential for indirect and long-term impacts from the proposed development on the Malleefowl population.</p> <p>The proponent has not adequately addressed the impact of the proposal on the threatened Western Rosella population recorded within the project area.</p> <p>Impacts to Malleefowl and Western Rosella may be significant and specific programs and strategies should be developed in consultation with DEC.</p>	<p>Considered to be a key environmental factor.</p>

	<i>Merops ornatus</i> (JAMBA).		
Short Range Endemic (SRE) Fauna	<p>Terrestrial invertebrate fauna surveys identified a total of 10 spider species, 1 scorpion genus, 4 families of pseudoscorpion, 1 millipede family and 4 species of land snails. (KLA 2010a and KLA 2010b)</p> <p>None of these were identified as SREs.</p>	No submissions were received.	<p>The EPA notes the north-south alignment of the Mt Caudan section of the Parker Range (east and west facing slopes). As SRE fauna are most likely to be encountered in sheltered, relatively mesic environments such as slopes with south-west facing aspects the EPA consider that SRE would not significant for this proposal.</p> <p>No further assessment required. Not considered to be a key environmental factor.</p>
Stygofauna	<p>Pilot surveys conducted in February 2010 suggested that stygofauna were not present in the project area. The DEC has confirmed that stygofauna habitat was unlikely to exist in the local project area (Cazaly 2010).</p>	No submissions were received.	Not considered to be a key environmental factor.
Troglofauna	<p>Surveys identified 22 species of troglofauna both inside and outside of the mine pit impact area. Of these four species were singletons, taxa represented by collections from a single location within the proposed mine area.</p>	<p>Government Agencies The nature, extent and continuity (connectivity) of the prospective troglofauna habitat has not been adequately described.</p>	<p>The EPA note that the proponent's response to submissions (Cazaly 2011a) document has sufficiently demonstrated that troglofauna habitat extends outside of the project area and therefore it considers that impacts to the</p>

			<p>singleton species will not/will be adversely impacted by the implementation of the proposal.</p> <p>No further assessment required. Not considered to be a key environmental factor.</p>
Surface water	<p>The development of mine pit and associated infrastructure could result in changes to surface water drainage patterns due to disturbance of surface water flow. This could potentially impact down gradient vegetation and fauna (e.g. Tree-stem Trapdoor Spider).</p> <p>The proponent proposes to undertake management and engineering measures to divert surface water around the project area re-connecting to downstream natural flow paths which are capable of withstanding 1 in 100 year storm events.</p>	No submissions were received.	<p>The EPA considers implementation of the proponents proposed management measures will ensure that impacts to surface water flow will be minimal.</p> <p>Not considered to be a key environmental factor.</p>
Groundwater	<p>Dewatering The groundwater level in the Mt Caudan deposit lies approximately 40 m below ground level (bgl) under the terrain surrounding Mt Caudan and approximately</p>	<p>Public Concern was raised over the impact to deep rooted trees.</p>	<p>Taking into consideration the depth to groundwater, salinity and narrow zone of influence (1 km) the impact of groundwater drawdown on vegetation is not considered to be a key environmental factor.</p>

	<p>60 m bgl under Mt Caudan which is higher than the surrounding landscape.</p> <p>The salinity of groundwater in areas adjacent to Mt Caudan are considered to be 60,000 mg/L TDS (saline).</p>		
POLLUTION			
Groundwater quality	<p>Mining has the potential to cause the release of acid and metalliferous waste into the surrounding environment.</p> <p>Incorrect storage of tailings could result in leakage and pollution of groundwater.</p> <p>Initial waste characterisation testing indicated that overall the acid neutralising capacity grossly exceeds the net acid generation capacity of the waste. Short-term leach testing indicated that there were low level increases of iron, manganese, barium and sulphate, with the pH of the test solution decreasing after testing falling to a pH range of 5.9 to 6.2.</p>	<p>Government Agencies Further details will be required for the design of the Tailings Storage Facility (TSF) will be required in the mining proposal.</p> <p>As the tailings storage facility will not be lined and the water at the TSF evaporation pond will be very saline its design should be examined in more detail.</p> <p>Public Historically acid forming materials have been found in the area.</p>	<p>Considered to be a key environmental factor.</p>
Air Quality – Dust	<p>Dust produced as a result of the implementation and operation may impact human</p>	<p>Government Agencies The proponent's dust management plan should include the installation of appropriate dust monitoring and dust control</p>	<p>Considered to be a key environmental factor.</p>

	<p>health and amenity. Sources of dust include the removal and stockpiling of vegetation and topsoils, drilling and blasting within the mine, loading, hauling and unloading of waste rock and ore, wind erosion of ore and waste rock stockpiles.</p> <p>In the event that dust monitoring results in dust level concerns then a number of contingency actions may be employed including the retrofitting of trailer covers to road trains.</p>	<p>systems.</p> <p>Dust monitoring should be undertaken for a minimum period of 12 months.</p> <p>Modelling results presented in the air quality assessment report indicated that the dust PM₁₀ concentrations at all sensitive receptors are significant and reach or are close to the NEPM</p> <p>Public Auditable standards of independent monitoring of dust levels are needed with realistic penalties attached.</p>	
<p>Air Quality - Greenhouse Gas and other air emissions</p>	<p>Greenhouse gas (GHG) emissions would occur from blasting, the operation of mine infrastructure, equipment and transport. The emission is estimated to be 43,129 tonnes of carbon dioxide equivalent (t CO₂-e) per year.</p>	<p>No submissions were received.</p>	<p>The EPA considers that GHG emissions for this proposal are comparable to similar mines in the region. The proponent would reduce emissions through the implementation of management measures in accordance with the <i>National Greenhouse and Energy Reporting Act 2007</i>.</p> <p>The EPA expects the proponent to pursue continuous improvement throughout the life of the project and strive to achieve reductions in energy consumption.</p>

			Not considered to be a key environmental factor.
Noise	<p>It is expected that given the large distance from the blast source (mine area), there will be no residential locations that would exceed the Environmental Protection (Noise) Regulations levels.</p> <p>The closest noise sensitive premises will be 500m from the proposed transport route and the modelled noise levels received at the nearest noise sensitive premises from the proposed haul road will be L_{Aeq} 37 dB(A) for both the day and night time periods. Therefore noise emissions from the transport of ore from the proposed mine site to the Moorine Rock rail siding will comply with the target noise levels of L_{Aeq}=55 dB(A) for day-time and L_{Aeq}=50 dB(A) for night-time as specified by the Western Australian Planning commission's State Planning Policy 5.4 "Road and Rail Transport Noise and Freight Considerations in Land Use Planning".</p>	No submissions were received.	<p>The potential noise impact issues identified have been adequately addressed by the proponent. The EPA considers that noise from the proposed mining operation and the transport route can be managed to comply with the Environmental Protection (Noise) Regulations.</p> <p>Not considered to be a key environmental factor.</p>
Chemical and Dangerous Goods Transport and	Hydrocarbons (including vehicle fuels), chemicals and explosives would be	No submissions were received.	Transport and storage of chemicals and dangerous goods would be conducted in

Storage	transported to and used at the proposed mine are. Poor management of these could lead to contamination of the environment.		accordance with relevant licensing and legislation including the <i>Dangerous Goods Safety Act 2004</i> ; <i>Dangerous Goods Safety (Storage and Handling of Non-Explosives) Regulations 2007</i> ; and the <i>Dangerous Goods Safety (Explosives) Regulations 2007</i> . Not considered to be a key environmental factor.
SOCIAL SURROUNDINGS			
Aboriginal heritage	An Aboriginal Heritage Survey has been conducted for the proposed mine area and upper haul road area near Moorine Rock. No heritage sites (archaeological or ethnographic) have been identified in the project area. Surveys of some infrastructure areas (i.e. the powerline route along Emu Fence Road) have not been completed.	Government Agencies The Aboriginal Heritage survey of the mine area and proposed bypass road is estimated to have covered only 50% of the area as the ground surface visibility was generally very poor. As such there is some possibility that current unidentified archaeological material will be discovered during construction works. Therefore the mine induction should train staff in identifying Aboriginal cultural material and provide procedures should any such material be discovered. The archaeological survey investigated all caves and overhangs within the project area and states that “no evidence of occupation was present and recent rockfall and erosion processes has obscured any evidence of past Aboriginal use of the area.” However the report does not indicate whether the caves and overhangs inspected were considered to have any potential archaeological deposit.	The proponent has committed undertaking gap surveys for infrastructure areas in accordance with the <i>Aboriginal Heritage Act 1972</i> in consultation with the local Aboriginal communities. Aboriginal heritage awareness will be included in the site induction programs. This factor does not require further EPA evaluation.
European Heritage	Shire of Yilgarn’s Municipal Heritage Inventory of heritage sites indicates that there are four European heritage sites	No submissions were received.	On 26 May 2010 DRDL advised that one hundred years ago (1910) Reserve 13208 contained a rock hole or

	<p>within the vicinity of the parker range project area with Water Supply Crown Reserve 13208 falling within the proposed mine area.</p> <p>Drawdown of groundwater is likely to impact the Reserve 13208. The Department of Regional Development and Lands (DRDL) manages this reserve.</p>		<p>catchment to support the then adjacent Parker Range Town site whose inhabitants were local prospectors and miners.</p> <p>DRDL confirmed drawdown of the Reserve would have no adverse impacts and it has no objections to the implementation of the proposal.</p> <p>Not considered to be a key environmental factor.</p>
Community values	<p>Should the proposal be approved then Mt Caudan will be removed in the course of mining. A waste landform will be deposited next to the mine void and will be of a similar height to Mt Caudan and be rehabilitated using native vegetation.</p>	<p>Non Government Organisations and Public The proponent should address the tourism and community values of the BIF range and the impacts of the loss of these values. Some of these values include, but are not exclusive to:</p> <ul style="list-style-type: none"> • Mount Caudan as a vantage point to view the vista of vegetation into the distance; and • Mount Caudan as a significant landmark in the Parker Range area. 	<p>Visual amenity is not considered to be a key environmental factor as visual impacts are likely to be minimal and the proponent would undertake rehabilitation measures to reduce visual impact in the long term.</p> <p>Not considered to be a key environmental factor.</p>
OTHER			
Rehabilitation and closure	<p>The project area would be decommissioned and rehabilitated.</p>	<p>Government Agencies If some infrastructure is to remain after closure (either permanently or temporarily), this has to be clearly identified and justified in the closure plan including the reason for retention and proof of acceptance of ongoing liability and responsibility from the agency/company that will be responsible for the infrastructure.</p> <p>The information provided at this stage on the Waste Rock Landform (WRL) needs to include further details on: the batter and berm design, drainage patterns, how the WRL will be</p>	<p>Closure and rehabilitation is considered to be a key environmental factor and is addressed in the Report.</p>

		<p>designed to manage high rainfall events whilst remaining safe, stable and non-polluting; and how the WRL will be designed to ensure long-term stability and enable the establishment of self-sustaining vegetation and habitat for local fauna.</p> <p>The proposal will leave a permanent water-filled void at which could potentially produce long-term impacts on the biodiversity of the area from increased grazing pressure. This proposal is located in an area with sensitive and significant habitats that provide habitats for a high concentration of conservation significant flora and fauna.</p> <p>That completion criteria and objectives for rehabilitation and closure should be developed to reflect the existing high conservation values of the project area.</p> <p>Non Government Organisations Sufficient information has not been provided as to why the mine void will not be backfilled.</p> <p>The legacy left for future generation following mining and closure the area could be poorer as a result of impacts including the impact on the flora as a result of the standard of revegetation and the landscape left after mining.</p> <p>The EPA should impose a significant financial bond should the mine be approved in the event of unplanned closure. The EPA should impose this rather than leaving it to the Department of Minerals and Petroleum.</p>	
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PRINCIPLES		
Principle	Relevant Yes/No	If yes, Consideration
1. The precautionary principle	Yes	In considering this principle, the EPA notes the following:

PRINCIPLES		
Principle	Relevant Yes/No	If yes, Consideration
<p><i>Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.</i></p> <p><i>In application of this precautionary principle, decisions should be guided by –</i></p> <p><i>(a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and</i></p> <p><i>(b) an assessment of the risk-weighted consequences of various options.</i></p>		<ul style="list-style-type: none"> • Investigations of the biological and physical environment should provide background information to assess risks and identify measures to avoid or minimise impacts. • The assessment of these impacts and management is provided in Section 3 of this report. • Conditions have been recommended as considered necessary.
<p>2. The principle of intergenerational equity</p> <p><i>The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.</i></p>	Yes	The proposal would result in the loss of 418.1 hectares of vegetation and fauna habitat and has the potential to impact diversity. Vegetation and habitat are relevant environmental factors discussed in this report.
<p>3. The principle of the conservation of biological diversity and ecological integrity</p> <p><i>Conservation of biological diversity and ecological integrity should be a fundamental consideration.</i></p>	Yes	The proposal would result in the clearing of native vegetation and fauna habitat. These impacts have the potential to affect biological diversity/integrity. Vegetation communities and flora and fauna are key environmental factors discussed in this report.
<p>4. Principles relating to improved valuation, pricing and incentive mechanisms</p> <p><i>(1) Environmental factors should be included in the valuation of assets and services.</i></p> <p><i>(2) The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.</i></p> <p><i>(3) The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.</i></p> <p><i>(4) Environmental goals, having been established, should be pursued in the most cost effective way, by</i></p>	Yes	The proposal would require decommissioning and rehabilitation. The proponent should bear the cost of any potential pollution, containment, monitoring, management, rehabilitation and closure.

PRINCIPLES		
Principle	Relevant Yes/No	If yes, Consideration
<i>establishing incentive structure, including market mechanisms, which enable those best placed to maximize benefits and/or minimize costs to develop their own solution and responses to environmental problems.</i>		
5. The principle of waste minimisation <i>All reasonable and practicable measures should be taken to minimize the generation of waste and its discharge into the environment.</i>	Yes	In considering this principle, the EPA notes the following: <ul style="list-style-type: none"> • Should it be identified potentially acid forming waste would be encapsulated in the waste rock landform. This is discussed in Section 3 of this report. • Tailings storage facility would be created to treat and contain tailings. This is discussed in Section 3 of this report. • Other waste products would be created as a result of implementation of the proposal, and would be disposed of according to relevant regulations and legislations.

Appendix 4

Identified Decision-making Authorities and Recommended Environmental Conditions

Identified Decision-making Authorities

Section 44(2) of the *Environmental Protection Act 1986* (EP Act) specifies that the EPA's report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This Appendix contains the EPA's recommended conditions and procedures.

Section 45(1) requires the Minister for Environment to consult with decision-making authorities, and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following decision-making authorities have been identified for this consultation:

Decision-making Authority	Approval
1. Minister for the Environment	<i>Wildlife and Conservation Act</i>
2. Minister for Water	<i>Rights in Water and Irrigation Act - Water extraction licence</i>
3. Minister for Indigenous Affairs	<i>Aboriginal Heritage Act 1972 – s18 approval</i>
4. Minister for Mines and Petroleum	<i>Mining Act 1978</i>
5. Minister for Lands	<i>Lands Administration Act</i>
6. Department of Environment and Conservation	<ul style="list-style-type: none"> • <i>Works Approval and Licence (Part V Environmental Protection Act 1986)</i> • <i>Environmental protection (Clearing of Native vegetation) Regulations 2004</i>
7. Department of Mines and Petroleum	<i>Mining Act 1978</i>
8. Shire of Yilgarn	Planning approval

Note: In this instance, agreement is only required with DMAs 1-5 since these DMAs are Ministerial DMAs.

RECOMMENDED ENVIRONMENTAL CONDITIONS

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

PARKER RANGE (MOUNT CAUDAN) IRON ORE PROJECT
SHIRE OF YILGARN

Proposal: The proposal to develop and operate of the Parker Range (Mount Caudan) Iron Ore Project is located approximately 15 kilometres south-east of Marvel Loch within the Shire of Yilgarn. The proposal consists of a mining area and haul road area. The mining area includes an above and below the watertable iron ore mine, associated infrastructure and the Parker Range Bypass Road.

The proposal is further documented in schedule 1 of this statement.

Proponent: Cazaly Iron Pty Ltd

Proponent Address: 2nd Floor, 38 Richardson Street,
WEST PERTH WA 6005

Assessment Number: 1811

Report of the Environmental Protection Authority: Report 1410

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 documented and described in schedule 1 of this statement subject to the conditions and procedures of this statement.

Published on

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 Office of the Environmental Protection Authority 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 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 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 CEO.
- 4-2 The proponent shall submit to the CEO the compliance assessment plan required by condition 4-1 at least six months prior to the first compliance report required by condition 4-6, or prior to implementation, whichever is sooner.

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 the method of reporting of potential non-compliances and corrective actions taken;
 - 5 the table of contents of compliance assessment reports; and
 - 6 public availability of compliance assessment 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 CEO.
- 4-5 The proponent shall advise the CEO of any potential non-compliance within seven days of that non-compliance being known.
- 4-6 The proponent shall submit to the CEO the first compliance assessment report fifteen months from the date of issue of this Statement addressing the twelve month period from the date of issue of this Statement and then annually from the date of submission of the first compliance assessment report.

The compliance assessment report shall:

- 1 be endorsed by the proponent's Managing Director or a person 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 Public Availability of Data

- 5-1 Subject to condition 5-2, within three months of approval by the CEO and for the remainder of the life of the proposal the proponent shall make publicly available, in a manner to the satisfaction of the CEO, all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g. maps)) relevant to the assessment of this proposal and implementation of this Statement.
- 5-2 If any data referred to in condition 5-1 would:
- i. involve the disclosure of any data which is confidential or commercially sensitive to the proponent or a third party including any model, formula or process which is a trade secret; or
 - ii. involve an infringement of copyright held by a third party.

The proponent may submit a request for approval from the CEO to not make this data publicly available. In making such a request the proponent shall provide the CEO with the data and an explanation and reasons why the data should not be made publicly available.

6 Flora and Vegetation

6-1 The proponent shall undertake monitoring of the health and abundance of vegetation within a 250 metre buffer area around areas approved for disturbance at the mine site and within a 125 metre buffer around the upper haul road as illustrated in Figures 4 and 5 in Schedule 1.

6-2 The monitoring required under condition 6-1 is to commence prior to ground disturbing activities required for the implementation and operation of the proposal and be carried out to the requirements of the CEO on advice of the Department of Environment and Conservation and will include:

1. the provision of baseline data;
2. identification of baseline and control sites;
3. definition of monitoring frequency, timing, intensity and replication;
4. definition of health and abundance;
5. identification of what and how parameters will be used to measure decline or rate of decline in health or abundance; and
6. definition of management responses required should a 25 per cent (or greater) decline in health or abundance be recorded.

6-3 Should the potential impact sites show a 25 per cent (or greater) decline in health or abundance as compared to the reference sites, the proponent shall provide a report to the CEO within 21 days of the decline being identified which:

1. describes the decline; and
2. provides information which allows determination of the likely root cause of the decline.

6-4 If the decline in health or abundance identified in 6-3 is determined by the CEO to be caused by activities undertaken in implementing the proposal the proponent shall implement the actions identified in 6-2-6 and continue to implement such actions until the CEO determines that the remedial actions may cease.

6-5 The proponent shall undertake weed management to ensure that:

- 1 No new species of declared weeds and environmental weeds are introduced into the proposal area and that the abundance and distribution of existing weeds is not increased as a direct or indirect result of implementation of the proposal.
- 2 Prior to ground disturbing activities the Proponent shall undertake a baseline weed survey to determine the species and extent of declared weeds and environmental weeds present at weed monitoring sites within the project footprint including the mine area (Schedule 1 Figure 2) and the upper haul road (Schedule 1 Figure 3) and at least three reference sites on nearby undisturbed land beyond 200 metres from the disturbance footprint in consultation with the Department of Environment and Conservation.
- 3 To determine whether changes in weed cover and type within the project footprint have occurred and are likely to have resulted from implementation of the proposal or broader regional changes, monitoring of baseline and reference sites surveyed as required by condition 6-5-2 shall commence within one year after initial ground disturbing activity required for the implementation of the proposal. These sites are to be monitored annually for 2 years during the time of year agreed to with the CEO on advice of the Department of the Environment and Conservation. Thereafter monitoring should take place at least every two years at the time of year agreed above for the life of the proposal, with monitoring within a two year period to coincide with the year of any favourable rainfall events.
- 4 If the results of monitoring under condition 6-5-3 indicate that adverse changes in weed cover and type within the project footprint are Proposal attributable, the Proponent shall report the monitoring findings to the CEO and Department of Environment and Conservation within 3 months of completion of the monitoring and shall immediately undertake weed control and rehabilitation in the affected areas, where Proposal attributable weed cover has adversely changed, using native flora species of local provenance.
- 5 The proponent shall continue to implement the remedial measures required by condition 6-5-4 until approval is given by the CEO to cease.

7 Conservation significant flora

Clearing

- 7-1 The proponent shall ensure that there is no loss of plants of the Declared Rare Flora species *Isopogon robustus* due to ground disturbing activities.
- 7-2 The proponent shall ensure the long term maintenance of genetic diversity of the *Lepidosperma* sp. Parker Range and of *Lepidosperma* sp. Mt Caudan species within the Parker Range region through the following actions:

1. Prior to ground disturbing activities required for the implementation and operation of the proposal, the proponent shall collect seed and plant material of the *Lepidosperma* sp. Parker Range and *Lepidosperma* sp. Mt Caudan populations that will be cleared as a result of this proposal. The seed and plant material will be vested in an appropriate facility which can ensure long-term viability of seed storage and protection of identified mother stock of genetic significance for storage and approved restoration works to the satisfaction of the CEO on advice of the Department of Environment and Conservation.
 2. The proponent shall undertake genetic analysis including:
 - a) Spatial analysis of population genetic structure;
 - b) Genetic analysis of the mating system; and
 - c) Genetic analysis of realized dispersal,to the satisfaction of the CEO to determine the relative genetic diversity of the populations of *Lepidosperma* sp. Parker Range and populations of *Lepidosperma* sp. Mt Caudan using the seed and plant material collected in accordance with condition 7-2-1.
 3. The proponent shall develop a rehabilitation and research program within six months of ground disturbing activities for Priority flora species with particular focus on the species *Lepidosperma* sp. Parker Range to the satisfaction of the CEO on advice of the Department of Environment and Conservation. This program shall:
 - a) include a time or timeframe for commencement and completion of the rehabilitation and research program;
 - b) focus on shallow soil analysis, water use efficiency, restoration practices, transplantation trials and seed trials;
 - c) be undertaken in consultation with the Department of Environment and Conservation; and
 - d) be based on the nature of the impact on genetic diversity determined in condition 7-2-2.
- 7-3 Prior to ground disturbing activities required for the implementation and operation of the proposal the proponent shall undertake a targeted survey of *Chamelaucium* sp. Parker Range to the satisfaction of the CEO on the advice of the Department of Environment and Conservation to determine the local and regional impact to this species.
- 7-4 The proponent shall provide a copy of the survey report required in condition 7-3 to the CEO and the Department of Environment and Conservation within three months of completion.

Indirect impacts

- 7-5 The proponent shall ensure that due to ground disturbing activities:
- there are no indirect impacts to the declared rare flora *Isopogon robustus*; and
 - that indirect impacts to Priority 1 flora *Lepidosperma* sp. Mt Caudan do not result in a loss of health and abundance outside the project footprint.
- 7-6 To verify the requirements of 7-5 are met the proponent shall undertake monitoring in accordance with condition 7-7 of the health and abundance of declared rare flora *Isopogon robustus* and Priority 1 flora *Lepidosperma* sp. Mt Caudan at reference and potential impact sites.
- 7-7 To meet the requirements under condition 7-6 the proponent shall prepare a monitoring plan prior to ground disturbing activities for the approval of the CEO on advice of the Department of Environment and Conservation. The monitoring plan shall include:
1. the provision of baseline data;
 2. identification of baseline and control sites;
 3. definition of monitoring frequency, timing, intensity and replication;
 4. definition of health and abundance;
 5. identification of what and how parameters will be used to measure decline or rate of decline in health or abundance; and
 6. definition of trigger levels and management responses.
- 7-8 Should the potential impact sites show a decline in health or abundance as determined by condition 7-7 compared to the reference sites the proponent shall provide a report to the CEO within 21 days of the decline being identified which:
1. describes the decline; and
 2. provides information which allows determination of the likely root cause of the decline.
- 7-9 If the decline in health or abundance identified in conditions 7-7 and 7-8 is determined by the CEO to be caused by activities undertaken in implementing the proposal the proponent shall, implement the actions identified in condition 7-7-6 and continue to implement such actions until the CEO determines that the remedial actions may cease.

8 Fauna

- 8-1 The proponent shall avoid, or where this is unavoidable, minimise the loss of conservation significant fauna such as the Malleefowl (*Leipoa ocellata*), Western Rosella (*Platycerus icterotis xanthogenys*) and the White-browed Babbler (*Pomatostomus superciliosus*).
- 8-2 To meet the requirements of condition 8-1 the proponent shall ensure that a maximum 40 kilometre per hour speed limit is enforced on all roads within the mine area as indicated in Figure 2 of Schedule 1 (with the exception of the Parker Range Bypass Road public road) and a maximum of 60 kilometres per hour along the upper haul road as indicated in Figure 3 of Schedule 1 during implementation of the proposal.
- 8-3 The proponent shall record and report the death or injury of any fauna protected under the *Environment Protection and Biodiversity Conservation Act 1999* and/or Scheduled species under the *Wildlife Conservation Act 1950* as a result of the implementation of this proposal to the CEO on the advice of the Department of Environment and Conservation within seven days of that death or injury being known.

Malleefowl

- 8-4 The proponent may clear one inactive Malleefowl (*Leipoa ocellata*) mound within the mine footprint at the following coordinates 741160E and 6498677N identified in Schedule 1 Figure 6.
- 8-5 The proponent shall ensure that the operation of the Parker Range (Mount Caudan) Iron Ore Project proposal does not adversely affect the population size of Malleefowl populations within 1 kilometre of the project area as identified in Schedule 1 (Figure 7).
- 8-6 To verify that the requirements of Condition 8-5 are met the proponent shall prepare a Malleefowl management plan prior to ground disturbing activities to the satisfaction of the CEO on advice of the Department of the Environment and Conservation which requires the:
1. submission of baseline monitoring of Malleefowl habitat and, active and inactive Malleefowl mounds, within 1 kilometre of the Parker Range (Mount Caudan) project area (Schedule 1 Figure 7), prior to ground disturbing activities;
 2. the determination of a level of impacts including the reduction in number of active Malleefowl mounds and number of Malleefowl deaths based on the results of condition 8-6-1 which would indicate an adverse impact to local Malleefowl populations; and
 3. monitor the numbers of active mounds and numbers of inactive mounds as identified in Condition 8-6-1. This monitoring is to be carried out to the requirements of the CEO on advice of the Department of Environment and Conservation.

8-7 In the event that fauna mortalities reported under condition 8-3 and monitoring required by condition 8-6 indicates an adverse impact as defined under condition 8-6-2 on the abundance of the Malleefowl population within 1 kilometre of the Parker Range project area:

1. the proponent shall report such findings to the CEO and the Department of Environment and Conservation within 21 days of the decline being identified;
2. provide to the CEO the results of an investigation into the findings and the potential cause of the decline;
3. if the adverse impact is determined by the CEO to be significant and a result of activities undertaken in implementing the proposal, the proponent shall submit actions to be taken to halt and reverse the decline to the CEO within 21 days of the determination made by the CEO; and
4. the proponent shall implement actions to halt and reverse the decline in the health or abundance of Malleefowl populations upon approval of the CEO and shall continue until such time the CEO on the advice of the Department of Environment and Conservation determines that the remedial actions may cease.

9 Trench Management

9-1 The proponent shall ensure that open trenches associated with construction of underground pipelines are cleared of trapped fauna by fauna-rescue teams at least twice daily. Details of all fauna recovered shall be recorded, consistent with condition 9-5. The first daily clearing shall take place no later than three hours after sunrise and shall be repeated between the hours of 3:00 pm and 6:00 pm. The open trenches shall also be cleared of trapped fauna by fauna-rescue teams, and fauna details recorded, no more than half an hour prior to backfilling of trenches.

9-2 The proponent shall ensure that a suitable number of fauna-rescue personnel involved in trench management shall obtain the appropriate licences as required for fauna rescue under the *Wildlife Conservation Act 1950* prior to undertaking actions required by condition 9-1.

9-3 Open trench lengths shall not exceed a length capable of being inspected and cleared by the fauna-rescue teams within the required times as set out in condition 9-1. The length of trench that each fauna rescue team may inspect and clear in one day is not to exceed 6km per clearing period, unless otherwise agreed by the CEO on advice of the Department of Environment and Conservation.

9-4 Trenches shall remain open no longer than 90 days without prior approval of the CEO.

- 9-5 Ramps with angles of repose no greater than 12 degrees, providing egress points and/or fauna refuges providing suitable shelter from the sun and predators for trapped fauna are to be placed in the trench at intervals not exceeding 50 metres.
- 9-6 The proponent shall produce a report on trench and fauna management within the open trenches to be provided to the CEO and the Department of Environment and Conservation no later than 21 days after the completion of underground pipeline installation. The report shall include the following:
- 1 the dates of when specific sections of the trench (or the entirety thereof) were opened and closed;
 - 2 details of all fauna inspections including any dates when fauna inspections were not undertaken;
 - 3 details of the fauna teams undertaking the works (i.e. names and accreditations);
 - 4 the number and species of fauna cleared from trenches and their release location details; and
 5. fauna injuries and mortalities including where required under the licence, vouchering of specimens to the standard required by the Museum of Western Australia.
- 9-7 In the event of a forecast of rainfall likely to cause partial or complete flooding of an open trench, all lengths of trench with potential to be flooded should be backfilled, with trench inspections and fauna clearing undertaken immediately prior to backfilling. The decision on whether the trench should be backfilled shall be undertaken in consultation with the Department of Environment and Conservation.
- 9-8 All mortalities of fauna listed in Schedule 1 and Schedule 2 of the Wildlife Conservation Act including the cause, location, number, species and any actions shall be reported and taken to the CEO and the Department of Environment and Conservation within 48 hours of the mortality being identified.
- 9-9 A euthanasia plan be prepared and approved by the Department of Environment and Conservation should the need arise to euthanize any injured fauna.

10 Residual Impacts and Risk Management Measures

- 10-1 Given the residual impacts and risks of the Proposal to Malleefowl habitat and vegetation, the proponent shall undertake measures during the implementation of the proposal, in accordance with the Cazaly Resources

Limited, *Environmental Offset Strategy*, June 2011 (Revision D) or subsequent revisions as approved by the CEO on advice of the Department of the Environment and Conservation.

11 Air Quality

11-1 The proponent shall monitor dust emissions at the nearest sensitive receptors to the Liddell Road property (located at coordinates 698176E and 6533022N and identified on Figure 8) during implementation of the proposal against an ambient PM₁₀ standard of 50 micrograms per cubic metre averaged over a 24 hour period to the satisfaction of the CEO on advice of the Department of Environment and Conservation.

Note: monitors should be sited in accordance with AS/NZS 3580.1.1:2007 or equivalent.

11-2 In the event that dust emission levels are in excess of the PM₁₀ standard defined by condition 11-1, the proponent shall notify the CEO within 7 days of the exceedence.

11-3 The proponent shall within 14 days of the exceedence of the PM₁₀ standard defined by condition 11-1 being recorded, provide a report to the CEO outlining the causes for the exceedence and management measures being implemented to address the cause of the exceedence.

11-4 The proponent shall maintain a complaints register to the satisfaction of the CEO on advice of the Department of Environment and Conservation for the duration of the proposal and investigate any dust complaints within 24 hours and commence measures to address the cause of any dust complaints.

11-5 The proponent shall submit annual reports on the PM₁₀ concentrations at the Liddell Road property to the CEO and the Chief Executive Officer of the DEC. The report shall:

1. detail the methodology and results of the testing;
2. compare the results of the testing with the expected levels described in the *Parker Range Project: Air Quality Impact Assessment*. Ecotech Pty Ltd, version P9 (Final), February 2011;
3. identify management actions to be undertaken should actual emissions be higher than PM₁₀ standard of 50 micrograms per cubic metre averaged over a 24 hour period; and
4. detail complaints received and measures taken to address the complaints.

Notes

1. The Office of the Environmental Protection Authority may seek advice from other agencies or organisations, as required.
2. The Minister for Environment will determine any dispute between the proponent and the Office of the Environmental Protection Authority over the fulfilment of the requirements of the conditions.
3. The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.

The Proposal (Assessment No. 1811)

The proposal is to develop and operate the Parker Range (Mount Caudan) Iron Ore Project located 15 km south-east of Marvel Loch in the Shire of Yilgarn.

The location of the various project components is shown in Figures 1, 2 and 3.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in sections 2 to 8 of the project assessment document, Parker Range Iron Ore Project Mt Caudan Deposit, *Environmental Impact Assessment (Public Environmental Review)*, prepared for Cazaly Resources Limited by Keith Lindbeck and Associates, Bullcreek, Western Australia (Revision E, November 2010).).

Table 1: Summary of Key Proposal Characteristics

Element	Description
General	
Project life	Up to 10 years
Location	See Figure 1, 2 and 3
Project Area	929 ha
Vegetation Clearing	Native vegetation clearing of up to 418.1 ha comprising of: <ul style="list-style-type: none"> • Mine area (414 ha) • Upper haul road (near Moorine Rock) – 4.1 ha
Rehabilitation	Approximately 333 ha
Mining	
Mining method	Open cut
Pit	Up to 4 km long, 0.4 km wide and 135 m deep
Waste rock Landform	Up to 2 km long, 0.5 km wide and 45 m high
Tailings Storage Facility	Up to 0.8 Mm ³ capacity, 400 m wide, 400 m long and 11 m high with five lifts
Water supply	Source: In-pit and perimeter dewatering bores located along the open pit. Maximum annual requirement: Mobile dry plant operations up to 321 ML/a Fixed wet plant operations up to 506 ML/a

Abbreviations

Mm³ = Million cubic millimetre
km = kilometre
ha = hectare

ML/a = megalitres per annum
L/s = litres per second

Figures (attached) :

Figure 1 Parker Range (Mount Caudan) Iron Ore Project.

Figure 2 Mine site project area

Figure 3 Upper haul road project area.

Figure 4 Mine site vegetation health and abundance monitoring.

Figure 5 Upper haul road vegetation health and abundance monitoring

Figure 6 Malleefowl mound location within mine site project area

Figure 7 Malleefowl monitoring area

Figure 8 Property requiring noise monitoring

Parker Range (Mount Caudan) Iron Ore project



Legend

- Town
- Roads
- Haul road route on existing roads
- Upper haul road (clearing required)
- Moorine Rock rail siding*
- Parker Range mine site

*Note: not part of proposal



Projection: Geocentric Coordinate System
 Datum: Geocentric Datum of Australia, 1994
 Scale: 1:240,000

Data Source

Parker Range mine site project area (Proponent, 2011)
 Parker Range haul road project area (Proponent, 2011)
 Roads (Landgate, 2004)
 Towns (Landgate, 2004)
 Imagery (Landsat, 2000)

Analysis
 not applicable

Presentation

Creation date: 16/06/2011
 Created by: Melanie Webb

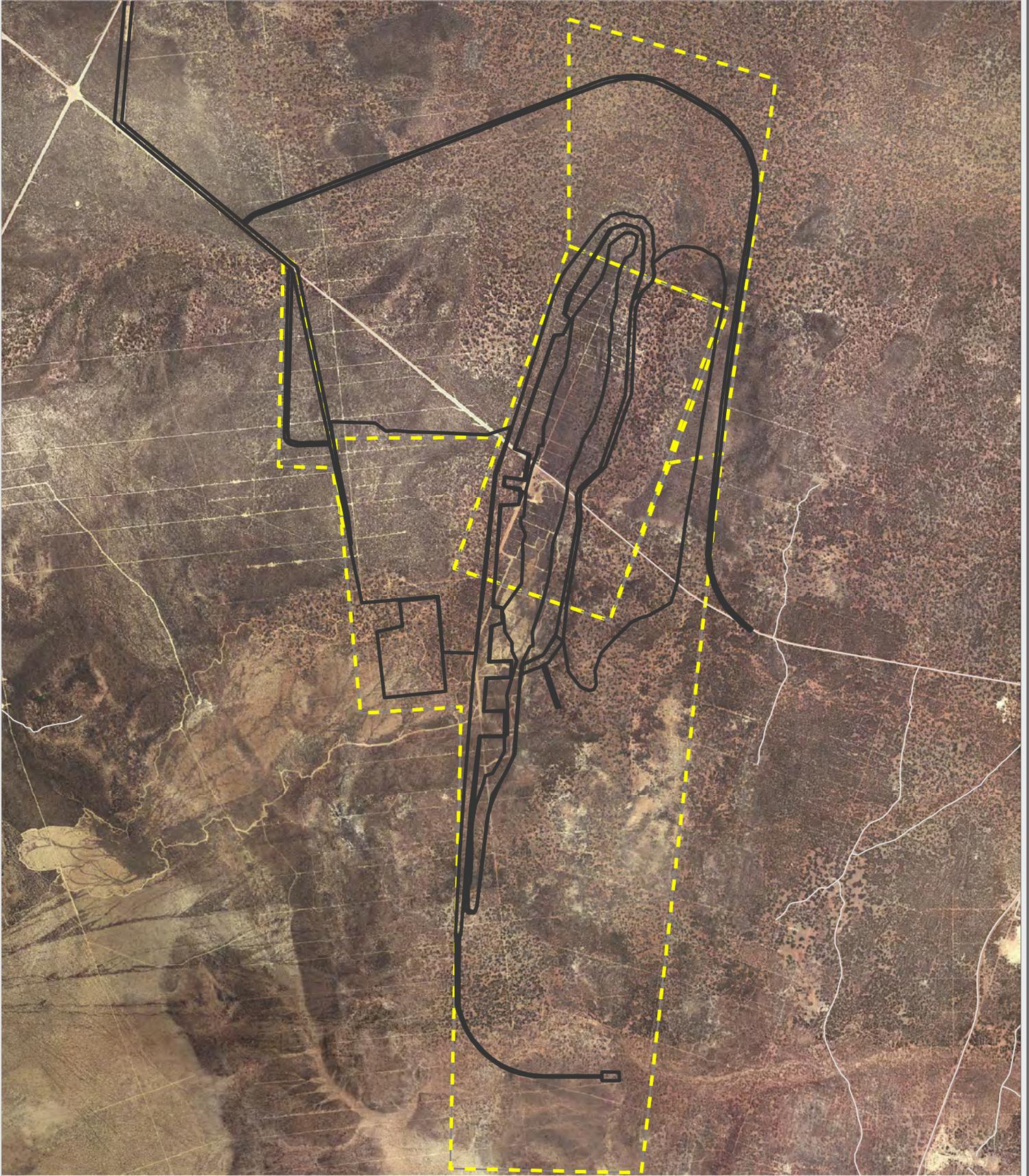
This map is produced for the Environmental Protection Authority, for inclusion into the Parker Range EPA report

This map depicts the boundaries of the proposed Parker Range (Mount Caudan) Iron Ore Mine

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Mine site project area



Legend

- Town
- Roads
- ▭ Proposed Mine Site and Haul road
- ▭ Cazaly Parker Range tenements

0 190 380 760 1,140 1,520 m



Projection: Geographic Coordinate System
Datum: Geocentric Datum of Australia, 1994
Scale: 1:30,000



Data Source

Parker Range mine site project area (Proponent, 2011)
Parker Range haul road project area (Proponent, 2011)
Roads (Landgate, 2004)
Towns (Landgate, 2004)
Imagery (Landsat, 2000)

Analysis

not applicable

Presentation

Creation date: 16/06/2011
Created by: Melanie Webb

This map is produced for the Environmental Protection Authority, for inclusion into the Parker Range EPA report

This map depicts the boundaries of the proposed Parker Range (Mount Caudan) Iron Ore Mine

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Upper haul road project area



Legend

- Parker Range haul road alignment
- Rail siding area*
- Town
- Roads

*Note: not part of proposal



Projection: Geographic Coordinate System
Datum: Geocentric Datum of Australia, 1994
Scale: 1:30,000



Data Source

Parker Range mine site project area (Proponent, 2011)
Parker Range haul road project area (Proponent, 2011)
Roads (Landgate, 2004)
Towns (Landgate, 2004)
Imagery (Landsat, 2000)

Analysis

not applicable

Presentation

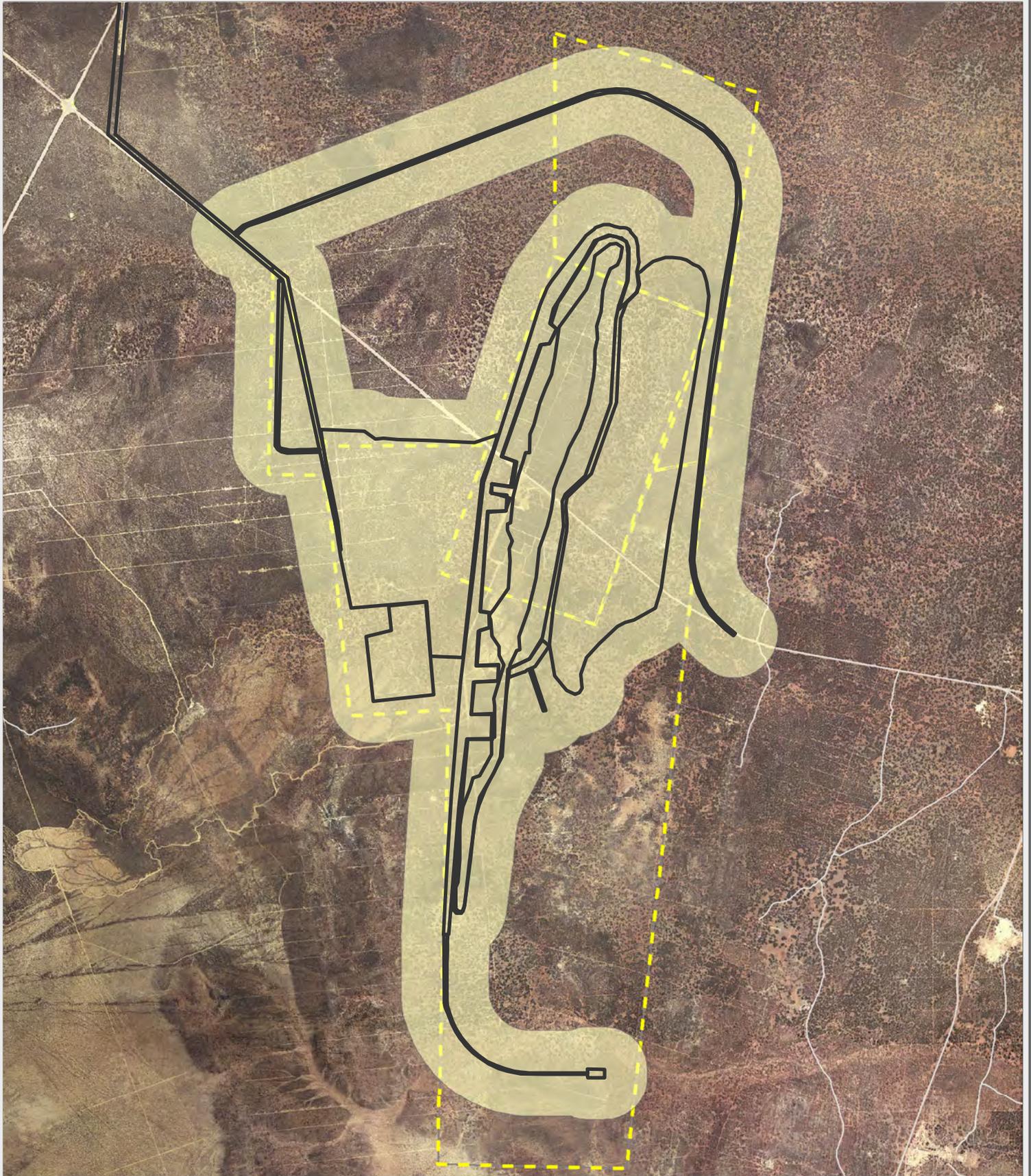
Creation date: 16/06/2011
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Office of the Environmental Protection Authority
Mine site vegetation health and abundance monitoring



Legend

- Town
- Roads
- 250m vegetation monitoring area
- Proposed Mine Site and Haul road
- Cazaly Parker Range tenements

0 195 390 780 1,170 1,560 m



Projection: Geographic Coordinate System
 Datum: Geocentric Datum of Australia, 1994
 Scale: 1:30,523



Data Source

Parker Range mine site project area (Proponent, 2011)
 Parker Range haul road project area (Proponent, 2011)
 Roads (Landgate, 2004)
 Towns (Landgate, 2004)
 Imagery (Landsat, 2000)

Analysis
 not applicable

Presentation
 Creation date: 16/06/2011
 Created by: Melanie Webb

This map is produced for the Environmental Protection Authority, for inclusion into the Parker Range EPA report

This map depicts the boundaries of the vegetation monitoring area for the proposed Parker Range (Mount Caudan) Iron Ore Mine

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Upper haul road vegetation health and abundance monitoring



Legend

- Town
- Roads
- ▭ Rail siding area*
- ▭ Parker Range haul road alignment
- ▭ 125m vegetation monitoring area

*Note: not part of proposal



Projection: Geographic Coordinate System
 Datum: Geocentric Datum of Australia, 1994
 Scale: 1:35,000

Data Source
 Parker Range mine site project area (Proponent, 2011)
 Parker Range haul road project area (Proponent, 2011)
 Roads (Landgate, 2004)
 Towns (Landgate, 2004)
 Imagery (Landsat, 2000)

Analysis
 not applicable

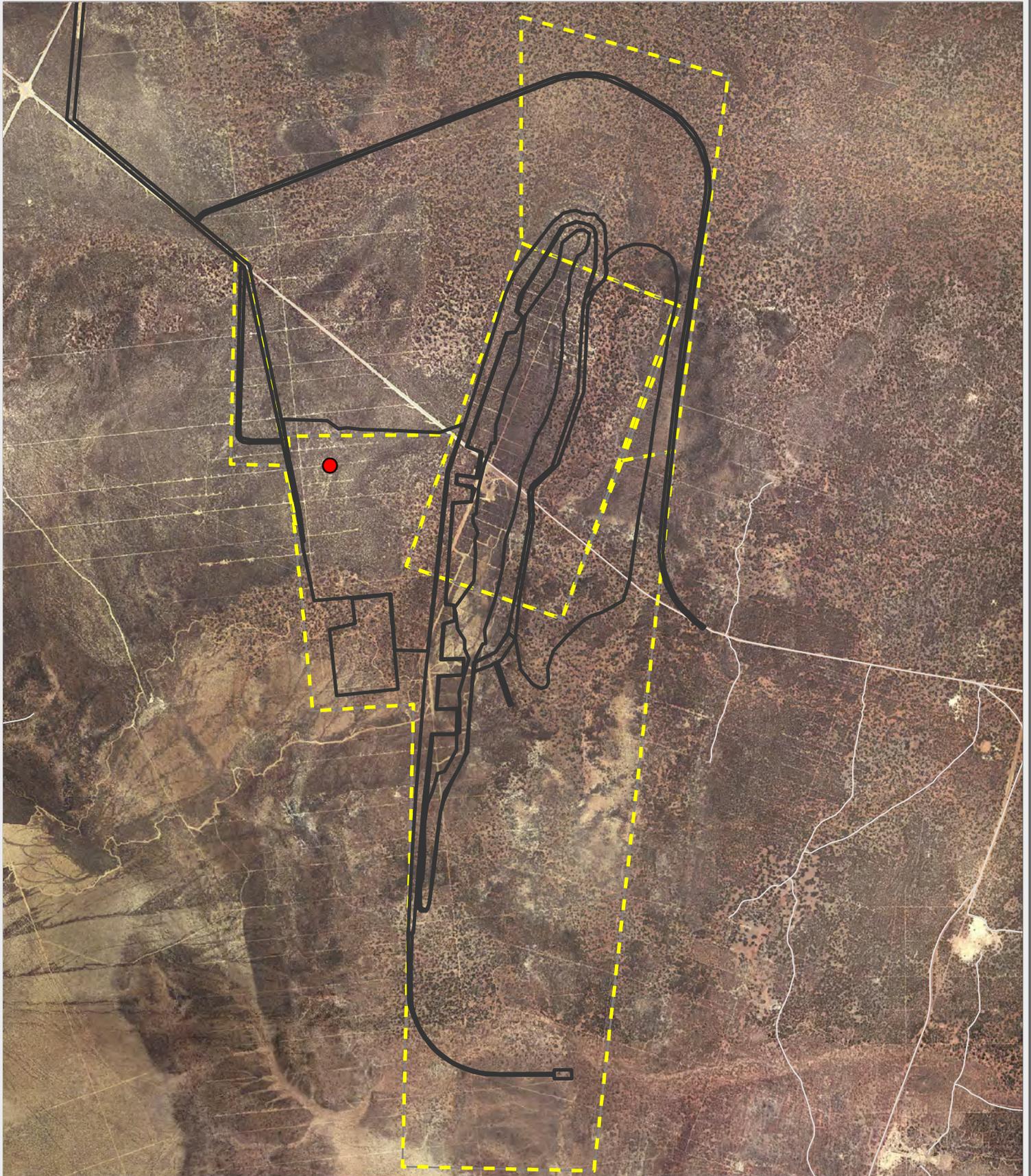
Presentation
 Creation date: 16/06/2011
 Created by: Melanie Webb

This map is produced for the Environmental Protection Authority, for inclusion into the Parker Range EPA report
 This map depicts the boundary of the vegetation monitoring area for the proposed Upper haul road for Parker Range (Mount Caudan) Iron Ore Mine

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Malleefowl mound location within mine site project area



Legend

- Malleefowl mound location (indicative)
- Town
- Roads
- Proposed Mine Site and Haul road
- Cazaly Parker Range tenements



Projection: Geographic Coordinate System
Datum: Geocentric Datum of Australia, 1994
Scale: 1:30,000

Data Source
 Parker Range mine site project area (Proponent, 2011)
 Parker Range haul road project area (Proponent, 2011)
 Roads (Landgate, 2004)
 Towns (Landgate, 2004)
 Imagery (Landsat, 2000)

Analysis
 not applicable

Presentation
 Creation date: 16/06/2011
 Created by: Melanie Webb

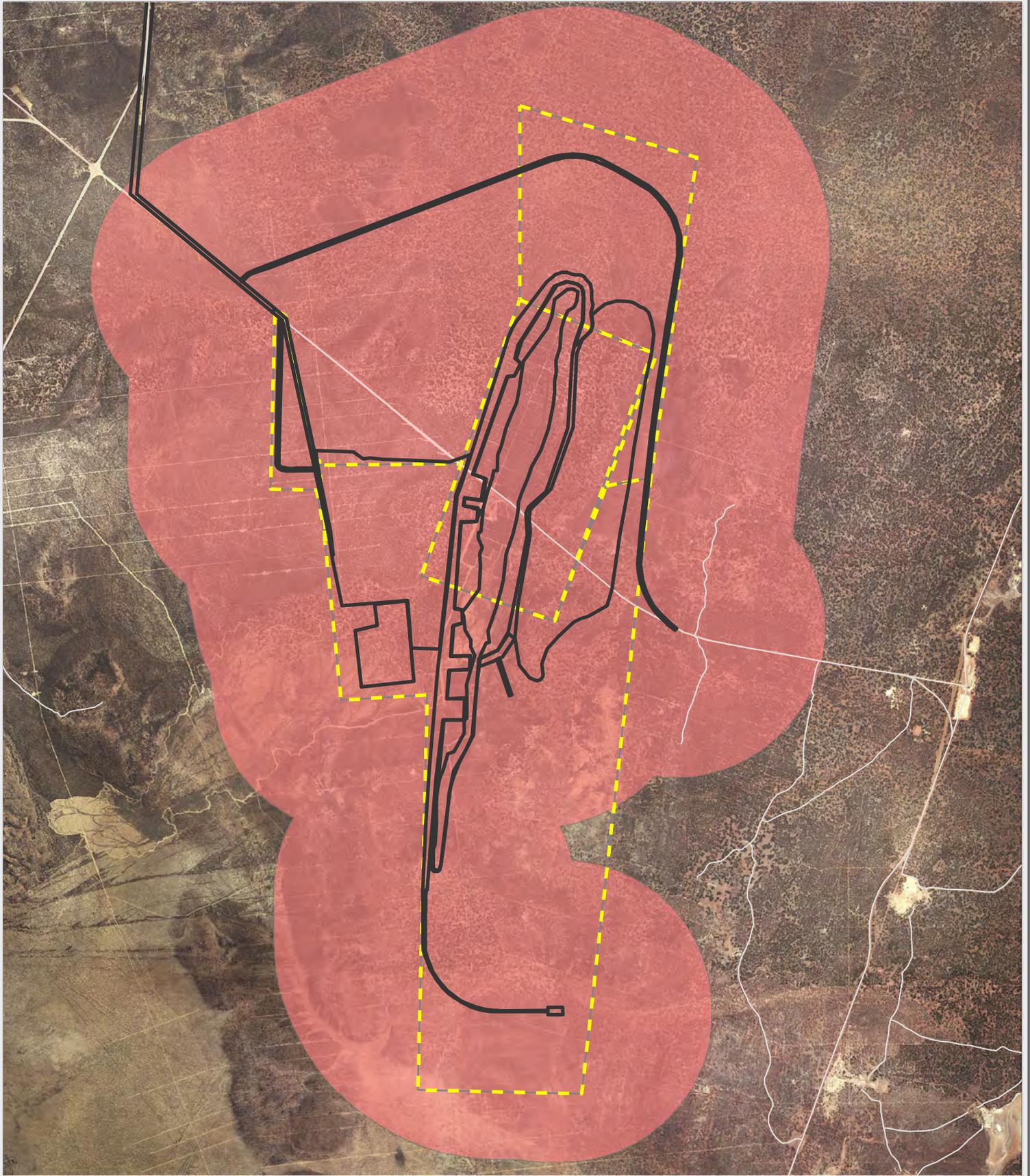
This map is produced for the Environmental Protection Authority, for inclusion into the Parker Range EPA report

This map depicts the indicative location of the Malleefowl mound within the proposed Parker Range (Mount Caudan) Iron Ore Mine

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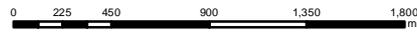
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Malleefowl monitoring area



Legend

- Town
- Roads
- 1km Malleefowl monitoring area
- ▭ Proposed Mine Site and Haul road
- ▭ Cazaly Parker Range tenements



Projection: Geographic Coordinate System
 Datum: Geocentric Datum of Australia, 1994
 Scale: 1:35,000

Data Source

Parker Range mine site project area (Proponent, 2011)
 Parker Range haul road project area (Proponent, 2011)
 Roads (Landgate, 2004)
 Towns (Landgate, 2004)
 Imagery (Landsat, 2000)

Analysis
 not applicable

Presentation
 Creation date: 16/06/2011
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This map is produced for the Environmental Protection Authority, for inclusion into the Parker Range EPA report

This map depicts the boundaries of the Malleefowl monitoring area for the proposed Parker Range (Mount Caudan) Iron Ore Mine

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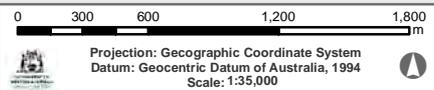
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Office of the Environmental Protection Authority
Property requiring noise monitoring



- Legend**
- Town
 - Roads
 - Private property, requires noise monitoring
 - ▭ Parker Range haul road alignment
 - ▭ Rail siding area*

*Note: not part of proposal



Data Source
 Parker Range mine site project area (Proponent, 2011)
 Parker Range haul road project area (Proponent, 2011)
 Roads (Landgate, 2004)
 Towns (Landgate, 2004)
 Imagery (Landsat, 2000)

Analysis
 not applicable

Presentation
 Creation date: 16/06/2011
 Created by: Melanie Webb

This map is produced for the Environmental Protection Authority, for inclusion into the Parker Range EPA report

This map depicts the location of the private property that requires noise monitoring for the proposed Parker Range (Mount Caudan) Iron Ore Mine

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Definition of terms and acronyms used in this Statement

“CEO” – means the Chief Executive Office of the Office of the Environmental Protection Authority.

“Environmental weeds” means are plants that establish themselves in natural ecosystems (marine, aquatic and terrestrial) and proceed to modify natural processes, usually adversely, resulting in the decline of the communities they invade. Impacts of environmental weeds on ecosystem function include:

- resource competition,
- prevention of seedling recruitment,
- alteration to geomorphological processes,
- alteration of hydrological cycle,
- changes to soil nutrient status,
- alteration of fire regime,
- changes to the abundance of indigenous fauna, and
- genetic changes.

(Carr et al., 1992; Humphries et al., 1993, Csurhes and Edwards, 1998).

“Fauna-rescue teams” are employees of the proponent (including contractors) whose responsibility it is to walk the open trench to recover and record fauna found within the trench and shall comprise of no less than two personnel, with one of those personnel having a level of experience and competence to meet the requirements for obtaining a licence for fauna handling, fauna identification and vouchering under the *Wildlife Conservation Regulations 1970*.

Appendix 5

Summary of Submissions and Proponent's Response to Submissions