



Koolyanobbing Iron Ore Project – Mt Jackson J1 Deposit



Cliffs Asia Pacific Iron Ore Pty Ltd



**Report and recommendations
of the Environmental Protection Authority**

**Environmental Protection Authority
Perth, Western Australia**

**Report 1347
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Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
6/10/08	Level of Assessment set (date appeals process completed)	
20/07/09	Proponent Document Released for Public Comment	41
31/08/09	Public Comment Period Closed	6
03/12/09	Final Proponent Response to the Issues Raised	13
08/02/10	EPA Report to the Minister for Environment	9
08/02/10	Publication of EPA report	10
22/02/10	Close of appeals period	2

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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 Cliffs Asia Pacific Iron Or Pty Ltd (Cliffs) to develop an iron ore mine at the Koolyanobbing Iron Ore Project-Mt Jackson J1 Deposit (Mt Jackson J1 Deposit), located approximately 110 kilometres (km) north-north-east of Southern Cross 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; and
- (c) 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.

Conclusion

The EPA has considered the proposal by Cliffs to develop and operate the Mt Jackson J1 Deposit iron ore project with associated mining infrastructure located approximately 110 km north-north-east of Southern Cross in the Shire of Yilgarn.

Flora and Vegetation

The Mt Jackson J1 Deposit proposal requires the clearing of 605 hectares (ha) of native vegetation. Clearing impacts to priority flora species, flora species of conservation interest, a Priority Ecological Community (PEC) and 23 vegetation communities are expected. No Declared Rare Flora (DRF) or Threatened Ecological Communities (TECs) were recorded in the project area.

The plant species and vegetation community which would be subject to potentially significant impacts due to direct impacts (clearing) and indirect impacts (dust) were identified as, *Spartothamnella* sp. Helena & Aurora Range (Priority 3), *Calytrix* sp. Paynes Find (species of conservation interest) and the previously unknown *Eucalyptus ebbanoensis* Woodland over Heath with *Calytrix* sp. Paynes Find (EeWH1) vegetation community.

The EPA has recommended the implementation of conditions to:

- minimise disturbance of *Spartothamnella* sp. and EeWH1;
- research seed germination and propagation; and
- monitor and manage priority vegetation within 'Biodiversity Areas' and *Spartothamnella* sp. individuals and the EeWH1 vegetation community within the project area (including the haul road) to ensure that indirect impacts to these species and community are minimised and mitigated.

Fauna

The EPA notes that the direct impacts to the Schedule 1 Malleefowl include the clearing of 408 ha of lower quality nesting habitat and the loss of 9 inactive mounds. There is also a potential for indirect impacts to Malleefowl due to predation from feral animals.

A condition has been recommended to ensure the continued monitoring and management of Malleefowl.

There is a predicted loss of 148 ha of potential Tree-stem Trapdoor spider habitat which will result in a predicted local impact on habitat of 6 % and cumulative impact of 9.5 %. In addition the effects of indirect impacts from dust and vibration remain unknown.

As the Tree-stem Trapdoor Spider is listed as Schedule 1 fauna and is therefore a protected species the EPA has recommended that conditions be implemented to restrict clearing of spider habitat to 148 ha and monitor Tree-stem Trapdoor Spider populations adjacent to the mine pit and implement adaptive management of operations to minimise impacts on these species.

The EPA notes that the two millipedes and six potential troglofauna identified within the project area may be impacted by the proposal; however, the impacts are unlikely to be significant as these species occur on other locations outside of the project area.

Closure and Rehabilitation

An overburden landform potentially containing approximately 6.6 % Potentially Acid Forming (PAF) material, a pit lake, some infrastructure and the haul road would remain at the cessation of mining. Rehabilitation would be undertaken on 450 ha (based on clearing of 605 ha).

In order to ensure the long-term success of mine closure and rehabilitation the EPA recommends conditions requiring the proponent:

- submit a detailed and project-specific Conceptual Closure Strategy;
- submit a final closure and decommissioning plan;
- monitor and manage impacts of grazing and predation resulting from an increase in fauna and introduced animals attracted to the pit lake;
- remove infrastructure located within the proposed Class A Reserve post-mining and rehabilitate disturbance; and
- undertake rehabilitation to achieve acceptable species diversity and weed coverage and composition comparable to analogue sites.

The EPA has concluded that it is unlikely that the EPA's objectives would be compromised provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4 and summarised in Section 4.

Recommendations

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

1. That the Minister notes that the proposal being assessed is for an iron ore mine at the Mt Jackson J1 Deposit, located approximately 110 km north-north-east of Southern Cross 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 that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4; and
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 Cliffs to develop an iron ore mine at the Mt Jackson J1 Deposit, located approximately 110 km north-north-east of Southern Cross in the Shire of Yilgarn is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

- (f) Biodiversity Areas, Priority Flora and Conservation Significant Vegetation Community – minimise disturbance of vegetation due to clearing and monitoring and management.
- (g) Fauna – continued monitoring and management of Malleefowl.

- (h) Short Range Endemic Fauna – restrict habitat clearing and monitor populations of Tree-stem Trapdoor Spiders adjacent to the mine pit.
- (i) Rehabilitation – to achieve acceptable species diversity and minimise weed coverage.
- (j) Closure Strategy – preparation of a conceptual closure strategy.
- (k) Final Closure and Decommissioning Plan.

Contents

	Page
Summary and recommendations.....	i
1. Introduction and background.....	1
2. The proposal.....	2
3. Key environmental factors and principles.....	8
3.1 Flora and Vegetation.....	8
3.2 Fauna.....	19
3.3 Closure and Rehabilitation.....	24
3.4 Environmental principles.....	28
4. Conditions.....	28
4.1 Recommended conditions.....	28
5. Other Advice.....	29
6. Recommendations.....	30

Table

Table 1: Summary of key proposal characteristics.....	3
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Figures

Figure 1: Regional Location Map

Figure 2: Koolyanobbing Iron Ore Project

Figure 3: Mt Jackson J1 Project Area

Figure 4: Priority Flora identified within the Mt Jackson J1 Project Area

Figure 5: Flora of Conservation Interest within the Mt Jackson J1 Project Area

Figure 6: Original mine layout with predicted impacts to EeWH1

Figure 7: Amended mine layout with predicted impacts to EeWH1

Appendices

1. List of submitters
2. References
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 Cliffs, to develop and operate an iron ore mine at the Mt Jackson J1 Deposit, located approximately 110 kilometres (km) north-north-east of Southern Cross in the Shire of Yilgarn.

The proposal includes two mine pits to extract approximately 33 million tonnes of iron ore and associated mining infrastructure. The proposed mine required disturbance of approximately 605 hectares (ha) of native vegetation for pits, associated mine infrastructure, gravel extraction and construction of internal roads and a haul road. Dewatering below the water table would also be required. The life of mine is expected to be 10 years.

The proposed mine is located within the Mount Manning region on a section of banded ironstone formation (BIF) range which forms part of a series of ridgelines of BIF within the Yilgarn Region of Western Australia. This region falls within the Great Western Woodlands which cover 60 million ha and is currently considered to contain 3000 flora species.

The project is being formally assessed as it would directly impact on 605 ha of native vegetation and fauna habitat including 8 Priority flora species, a previously unknown vegetation community and other flora species and communities of limited distribution. Fauna including State and Commonwealth listed fauna are also likely to be impacted during clearing and mine operations. In addition, potentially acid forming (PAF) material has the potential to impact the environment. After mine closure the formation of a pit lake may increase feral fauna populations, this has the potential to indirectly impact native flora and fauna populations through predation and grazing.

This proposal was originally referred to the EPA on 29 August 2008. A level assessment was set at Public Environmental Review (PER) with a six week public review period on 6 October 2008 under the *Western Australian Environmental Protection Act 1986*. The PER document was released for public review between 20 July 2009 and 31 August 2009.

The project is considered by the Commonwealth of Australia to be a controlled action under the *Environmental Protection and Biodiversity Conservation Act 1999* because of potential significant impacts to listed threatened fauna species and communities namely Malleefowl. The proposal will be assessed separately by the Commonwealth through Preliminary documentation.

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 and Section 7, the EPA's Recommendations.

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 an iron ore mine at the Mt Jackson J1 Deposit, located approximately 110 km north-north-east of Southern Cross in the Shire of Yilgarn. Mining is proposed over 10 years and will produce approximately 33 million tonnes of iron ore. The estimated project area is 1052.5 ha within which the proposed Mt Jackson J1 will be sited. The resulting disturbance area is estimated to be 605 ha, 114 ha of which will be an open pit void. The pit depths are nominally 417 meters above Australian Height Datum (m AHD) at J1 East pit and 342 m AHD at J1 West pit and will result in mining below the watertable in the J1 West Pit.

The main components of the proposal are:

- Two proposed open cut mine pits (J1 East and J1 West).
- One overburden landform/waste dump.
- Operational area:
 - material stockpiles for ore, topsoil, gravel and cleared vegetation;
 - internal mine roads;
 - administration facilities;
 - workshops and maintenance facilities;
 - equipment storage facilities;
 - hydrocarbon, chemical and explosives storage facilities;
 - water treatment facility;
 - water supply dams;
 - wastewater treatment facility; and
 - power generation facilities.
- Gravel pit.
- A haul road connecting to the existing haul road at the Mt Jackson J2 Deposit mine.

The project area also contains 'Biodiversity Areas' totalling 212 ha which will be protected from clearing during implementation of the proposal. A number of Priority flora species and 11 of the 23 vegetation communities identified as occurring in the Mt Jackson J1 Deposit project area are represented within these 'Biodiversity Areas'. Fauna values will also be protected within these areas, particularly the mounds and high-quality habitat of the Malleefowl which is listed as Schedule 1 under the *Wildlife and Conservation Act 1950* and Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*. In addition, Aboriginal Heritage site 25820 Curragibbin Hill West (artefact scatter) will be protected within one of the biodiversity areas.

The proposed locations and footprints of associated infrastructure have not been defined. The proposal is being assessed on a worst case basis, assuming that all vegetation and fauna habitat outside of the proponent's proposed biodiversity areas and within the project area will be impacted.

The proposal would be integrated into Cliffs’ existing Koolyanobbing Iron Ore Project which does not form part of this proposal. Iron ore would be processed at Cliffs’ existing Koolyanobbing mine and then transported via road and rail to the Esperance port for export.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Section 1 of the PER (Cliffs 2009a).

Table 1: Summary of key proposal characteristics

Element	Description	
General		
Project life	10 years (approximately)	
Location	See Figure 3 M77/993, M77/994, M77/1248, M77/1249 & L77/216.	
Project Area	1052.5 ha of which 212 ha have been designated as ‘Biodiversity Areas’ which must not be cleared	
Vegetation Clearing	Clearing up to 605 ha comprising: <ul style="list-style-type: none"> ○ mine pits – 114 ha ○ overburden landform – 211 ha ○ operational areas – 225 ha ○ haul road – 44 ha ○ gravel pit – 11 ha Clearing of up to 10.7 ha of vegetation community EeWH1 and individual plants of Spartothamnella sp. within the J1 mine pit area only.	
Rehabilitation	All areas with the exception of the mine voids (114 ha) will be rehabilitated	
Mining Operation		
Iron ore reserve	33 Mt (approximately) comprising: <ul style="list-style-type: none"> ○ 23 Mt – above groundwater table ○ 10 Mt – below groundwater table 	
Mining method	Open cut	
Depth to groundwater	417 m AHD	
Mine pits: <ul style="list-style-type: none"> ○ Nominal depth ○ Depth below groundwater table ○ Dewatering rate 	J1 West Pit	J1 East Pit
	342 m AHD	417 m AHD
	75m below groundwater table	Above Groundwater table
	Years 1-5 - 0.63 GL/a Years 6-8 – 0.31 GL/a Years 9-10 – 0.16 GL/a	No dewatering
Overburden landform	Area: 211 ha (approximately) Height: 520 m AHD (approximately)	
Haul Road	No greater than 11 km long and 40 m wide.	

m – metres
km – kilometres
ha –hectares

Mt – Million tonnes
AHD – Australian Height Datum
GL/a - Gigalitres per annum

Since release of the PER, a number of modifications to the proposal have been made by the proponent (Cliffs 2009b; e). These include:

- Changes to mining tenements:
 - Tenement L77/216 - the width of the boundary has been changed from 40m to 60m. This change would provide flexibility for the alignment of the haul road and would not alter the predicted clearing impact of 44 ha;
 - Tenement M77/1248 – defines the location of the gravel pit;
 - Tenement M77/1249 – replaces Tenement P77/3600.
- The nominal height of the overburden landform has been revised from 510 m AHD to 520 m AHD.
- An additional commitment was provided to undertake monitoring of vegetation health in the ‘Biodiversity Areas’.

Additional information has been provided (Cliffs 2009b; e; Biota 2009c) regarding:

- Flora and Vegetation:
 - additional individuals of *Spartothamnella* sp. Helena Aurora Range have been identified during ongoing field investigations; and
 - the ongoing targeted regional survey for *Bossiaea* sp. Jackson Range identified additional individuals. A new population of this species was also recorded by Department of Environment and Conservation (DEC) outside of the project area.
- Additional information was provided regarding the millipede species *Antichiropus* sp. nov. Mt Jackson and *Atelomastix* sp.
- Further modelling was undertaken to determine the likely final surface water level and water salinity within the J1 West Pit.
- Aboriginal Heritage:
 - consent has been provided under Section 18 of the Aboriginal Heritage Act 1972 to undertake supporting mine operations within parts of Tenements M77/1249 and parts of Tenement L77/216; and
 - The mapped area of DIA Site ID 22944 Mt Jackson Ranges has been reduced and no longer coincides with the Mt Jackson J1 Deposit Proposal.

In response to the request received from the EPA to reduce impacts to vegetation community EeWH1 the proponent has:

- submitted a modified mine layout which includes an additional ‘Biodiversity Area’ and increases the number of hectares protected from mining in these areas from 206 to 212;
- amended the area of the overburden landform from 213 ha to 211 ha and the operational areas from 223 ha to 225 ha; and
- provided an additional commitment to undertake vegetation clearing within the recorded areas of the EeWH1 vegetation community only for the purposes of mine pits and mine access roads (Cliffs 2009d).

The potential impacts of the proposal initially predicted by the proponent in the PER document (Cliffs 2009a) and their proposed management are summarised in Table E1 (Executive Summary) of the proponent’s document.



Figure 1: Regional Location Map

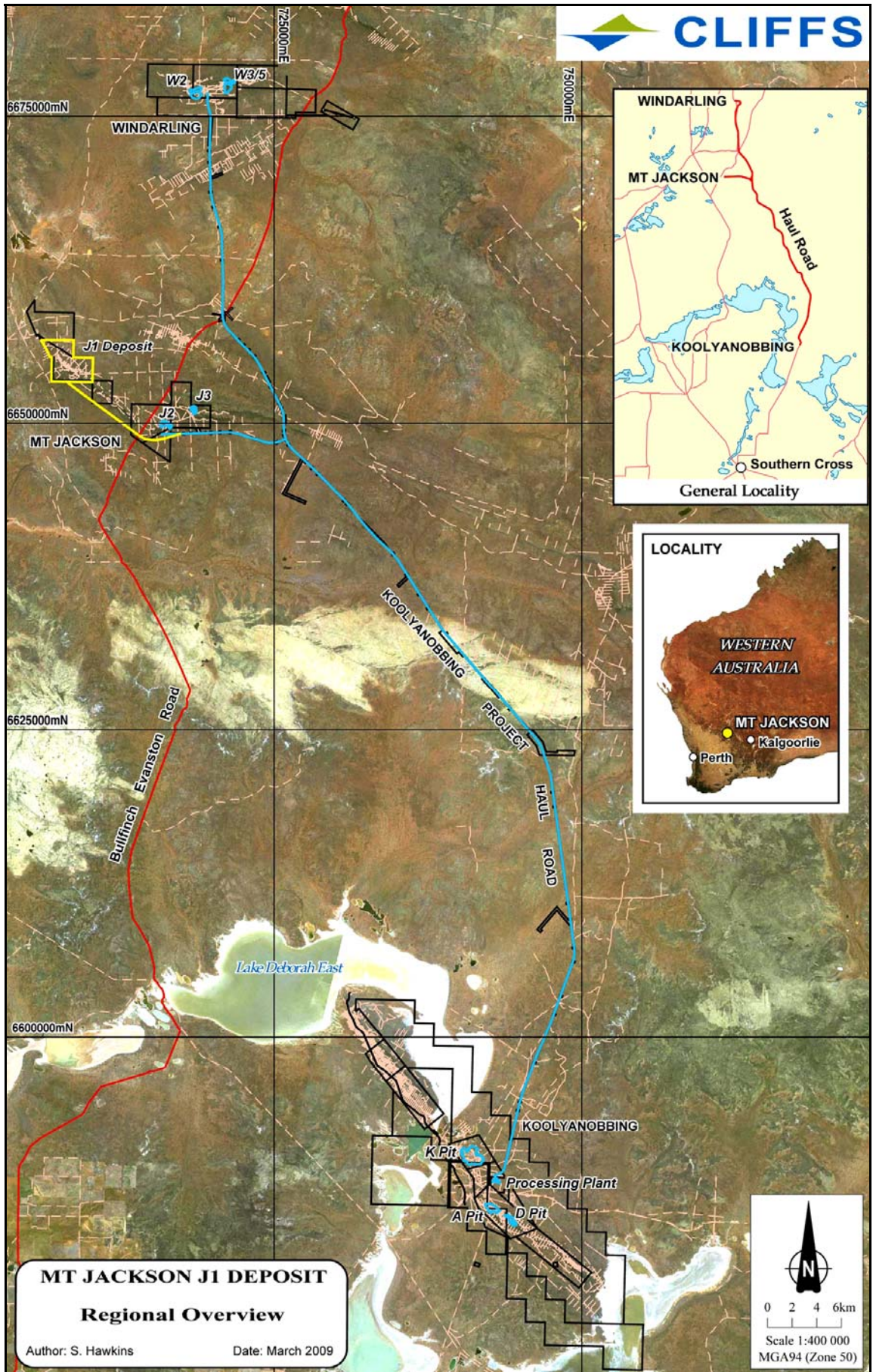


Figure 2: Koolyanobbing Iron Ore Project

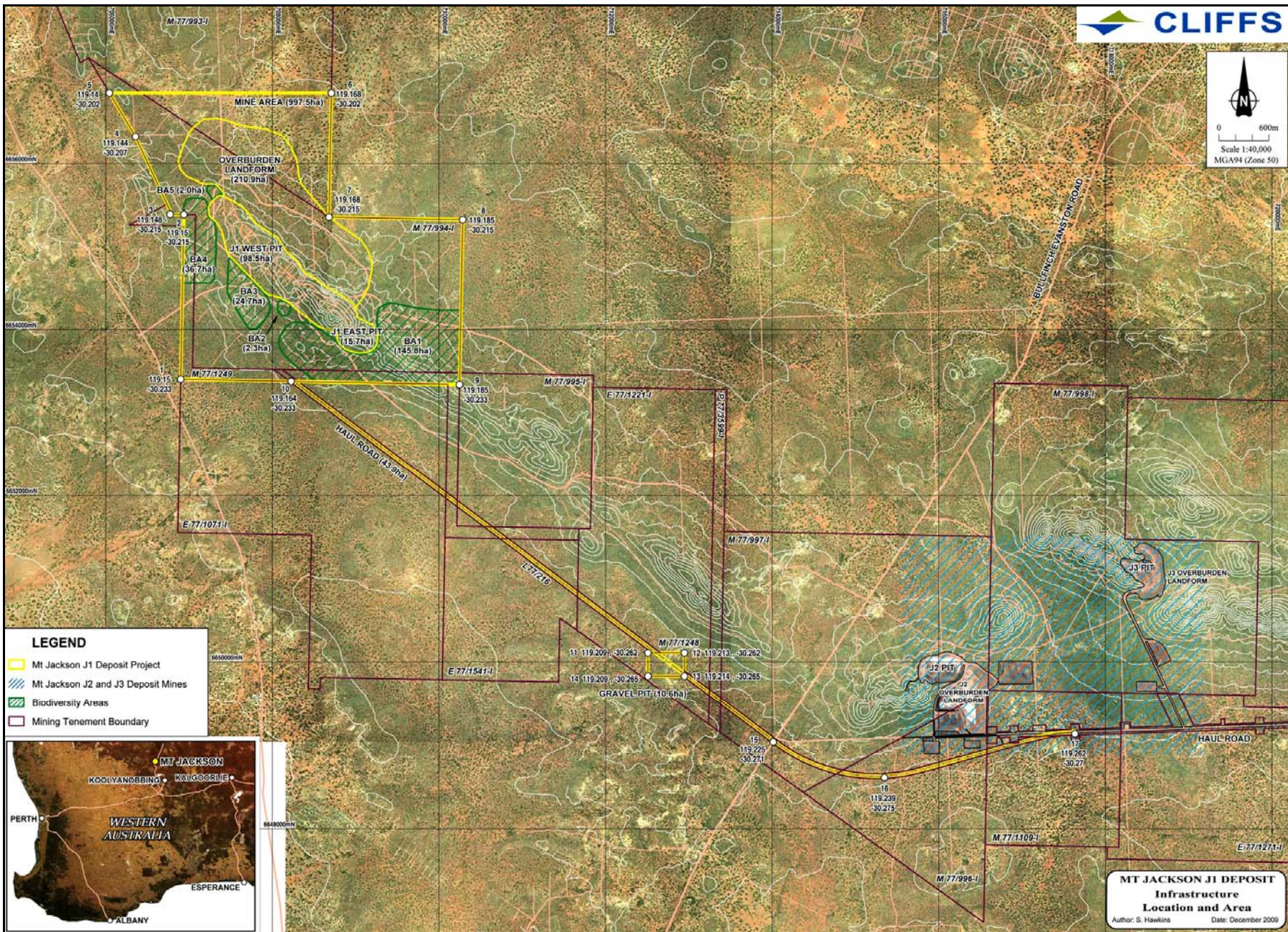


Figure 3: Mt Jackson J1 Project Area

3. Key environmental factors and principles

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for Environment on the 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 waste, greenhouse gas and Aboriginal heritage, 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; and
- (c) 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 - 3.3. 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:

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

3.1 Flora and Vegetation

Description

The Mt Jackson J1 Deposit proposal has the potential to cause direct impacts to vegetation and flora through clearing. Indirect impacts are likely from dust, weeds and altered water regimes.

Clearing

The project will result in the clearing of up to 605 ha of native vegetation within the 1052 ha Mt Jackson J1 project area. This has the potential to impact conservation significant flora species and the biodiversity values of the Range.

Flora and vegetation surveys were undertaken within an area of approximately 3,200 ha on the western portion of the Jackson Range during 2004 to 2008. These surveys identified a total of 234 plant species, comprising 231 native species and 3 weed species (Western Botanical 2009a). Within the project area, 8 Priority flora species, 2 species of conservation interest, 1 Priority Ecological Community (PEC) and 23 vegetation communities including 1 previously unknown vegetation community were identified and would potentially be impacted by clearing (Figures 4 and 5).

No Declared Rare Flora (DRF) species or Threatened Ecological Communities (TEC) were identified within the project area.

Those species most at risk locally, regionally and cumulatively include:

- *Bossiaea* sp. Jackson Range, which is classified as Priority 1 flora by the DEC;
- *Spartothamnella* sp. Helena & Aurora Range, which is classified as Priority 3 flora by the DEC; and
- *Calytrix* sp. Paynes Find, which has been identified as a species of conservation interest (Western Botanical 2009a).

Bossiaea sp. Jackson Range is potentially a new species. Information provided by the proponent on 7 December 2009 (Cliffs 2009e) notes that of the 658 known individuals on the Mt Jackson Range, 100 would be impacted as a result of this proposal i.e. a regional impact of 15%. Approximately 347 individuals would be protected from clearing within 'Biodiversity Areas'. Due to the limited number of known individuals and the taxonomic uncertainty, the Mt Jackson J1 Deposit proposal has the potential to pose a significant risk to this species. The proponent is conducting a regional survey prior to mining to determine whether more individuals can be found. If enough individuals are not found to reduce the regional impact to 10% or less, then taxonomic studies will be carried out after commencement of mining, to determine if *Bossiaea atrata* (found on other ranges) is the same species. If *Bossiaea* sp. is in fact *B. atrata* then the impact of this proposal would be less than 10% and the significance of the impact would be reduced.

There are a limited number of known *Spartothamnella* sp. Helena & Aurora Range plants, with a total regional population estimated to be approximately 134 individuals within populations consisting of less than 22 individuals (Cliffs 2009a; b; e). A total of 41 individuals were recorded on the Mt Jackson Range of which 5 individuals (2 at the J1 West Pit and 3 on the haul road) could be impacted by the proposal (Figure 4). This equates to an approximate local impact of 12% and regional impact of 4%. A cumulative impact of approximately 23 % is predicted due to potential impacts to 5 individual plants for the Mt Jackson J1 and 26 individuals at the proponent's existing Koolyanobbing C Pit mine operations.

Surveys undertaken for this proposal identified a new population of *Calytrix* sp. Paynes Find (Figure 5). *Calytrix* sp. Paynes Find is the dominant understorey species

for the previously unknown *Eucalyptus ebbanoensis* Woodland over Heath with *Calytrix* sp. Paynes Find (EeWH1) vegetation community. Vegetation community EeWH1 is considered to be subject to high impacts from the J1 Proposal as it appears to be restricted to the Mt Jackson Range.

The four known populations of community EeWH1 cover a total of approximately 20 ha. The largest of the four populations (15.42 ha) is located on what the proponent considers to be the richest iron ore deposit in the proposed Mt Jackson J1 mine. Clearing of all but 1.23 ha was anticipated in the proponent's PER document (Cliffs 2009a). This includes the clearing of part of a smaller population of EeWH1 located on the route of the proposed haul road. The proponent states that impacts along the haul road cannot be avoided due to engineering requirements. In addition a remaining population is located adjacent to (minimum of 20 m from) the existing Mt Jackson J2 mine pit (Figure 6).

There are four other types of *Eucalyptus ebbanoensis* Woodland over Heath communities recorded on the Mt Jackson Range, with only EeWH1 having *Calytrix* sp. Paynes Find as the dominant understorey species. The total impact to all *E. ebbanoensis* Woodland over Heath communities, including EeWH1 would be 9% (Cliffs 2009a). The proponent considers the communities would perform similar ecological functions and therefore loss of EeWH1 is not significant.

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

- 'Biodiversity Areas' which will protect native vegetation including individual plants of *Lepidosperma ferricola* (P1), *Leptospermum macgillivrayi* (P1), *Bossiaea* sp. Jackson Range (P1), *Spartothamnella* sp. Helena & Aurora Range (P3) and a portion of vegetation community EeWH1 from clearing.
- Annual monitoring of vegetation health within the 'Biodiversity Areas' during mine operations.
- Seed collection for *Bossiaea* sp. Jackson Range, *Spartothamnella* sp. Helena & Aurora Range and community EeWH1 prior to and during mine operations for use in rehabilitation.
- Separate seed collection and stockpiling/storage of topsoil from areas of *Bossiaea* sp. Jackson Range, *Spartothamnella* sp. Helena & Aurora Range and community EeWH1 during initial mine development for use in rehabilitation;
- Research into germination, propagation and seedling translocation trials.
- Rehabilitation works which seek to establish 20 ha of native vegetation containing representative species of community EeWH1.

Indirect Impacts

The implementation of the Mt Jackson J1 Deposit proposal has the potential to cause indirect impacts reducing vegetation health. Indirect impacts can include competition from increased weeds, dust deposition on vegetation preventing photosynthesis and plant respiration and altered water regimes (e.g. an increase of water to flow into some communities adjacent to the overburden landform during rains or a reduction of water in soil at the edge of the mine pit), which may be detrimental to vegetation.

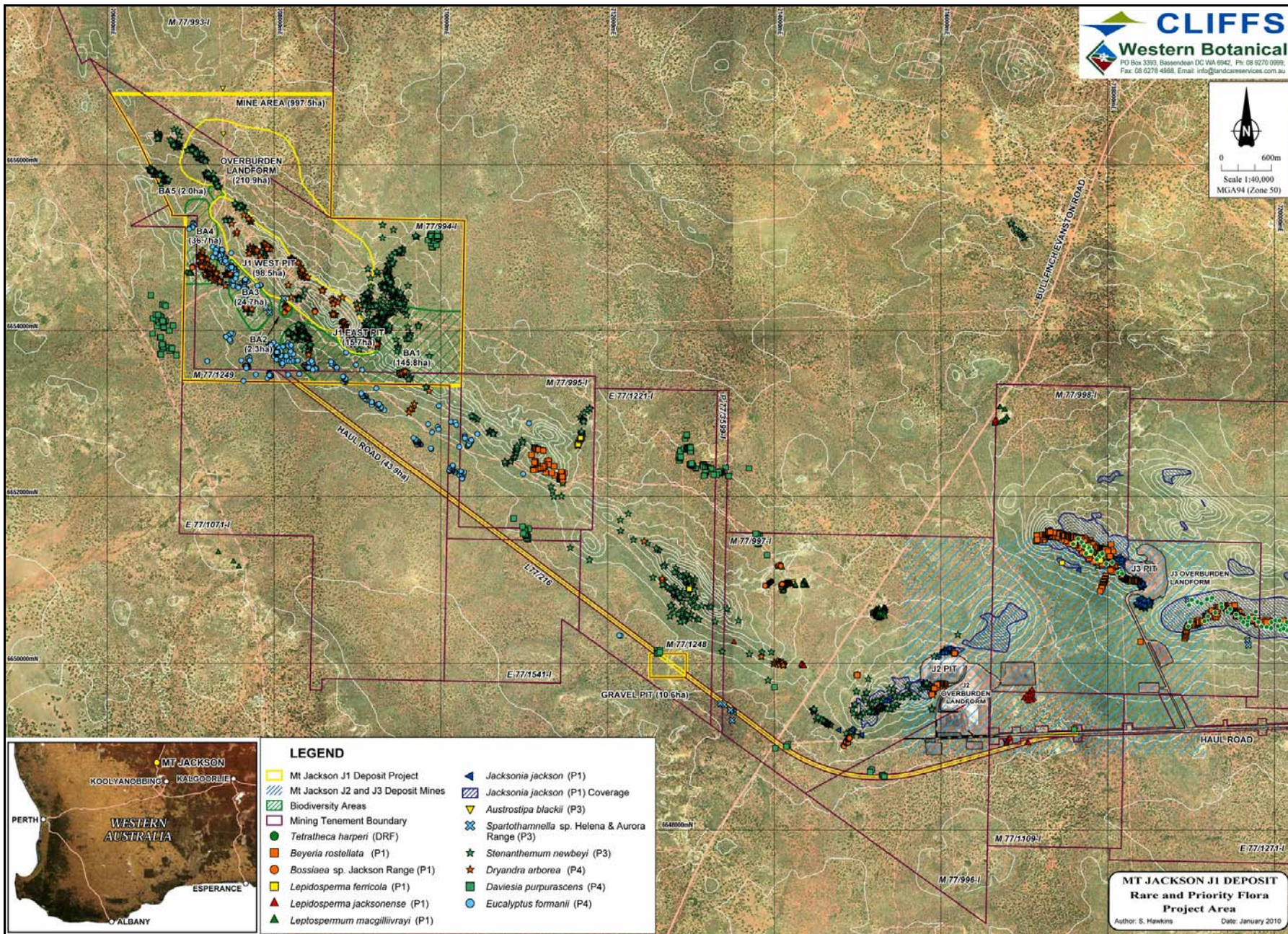


Figure 4: Priority Flora identified within the Mt Jackson J1 Project Area

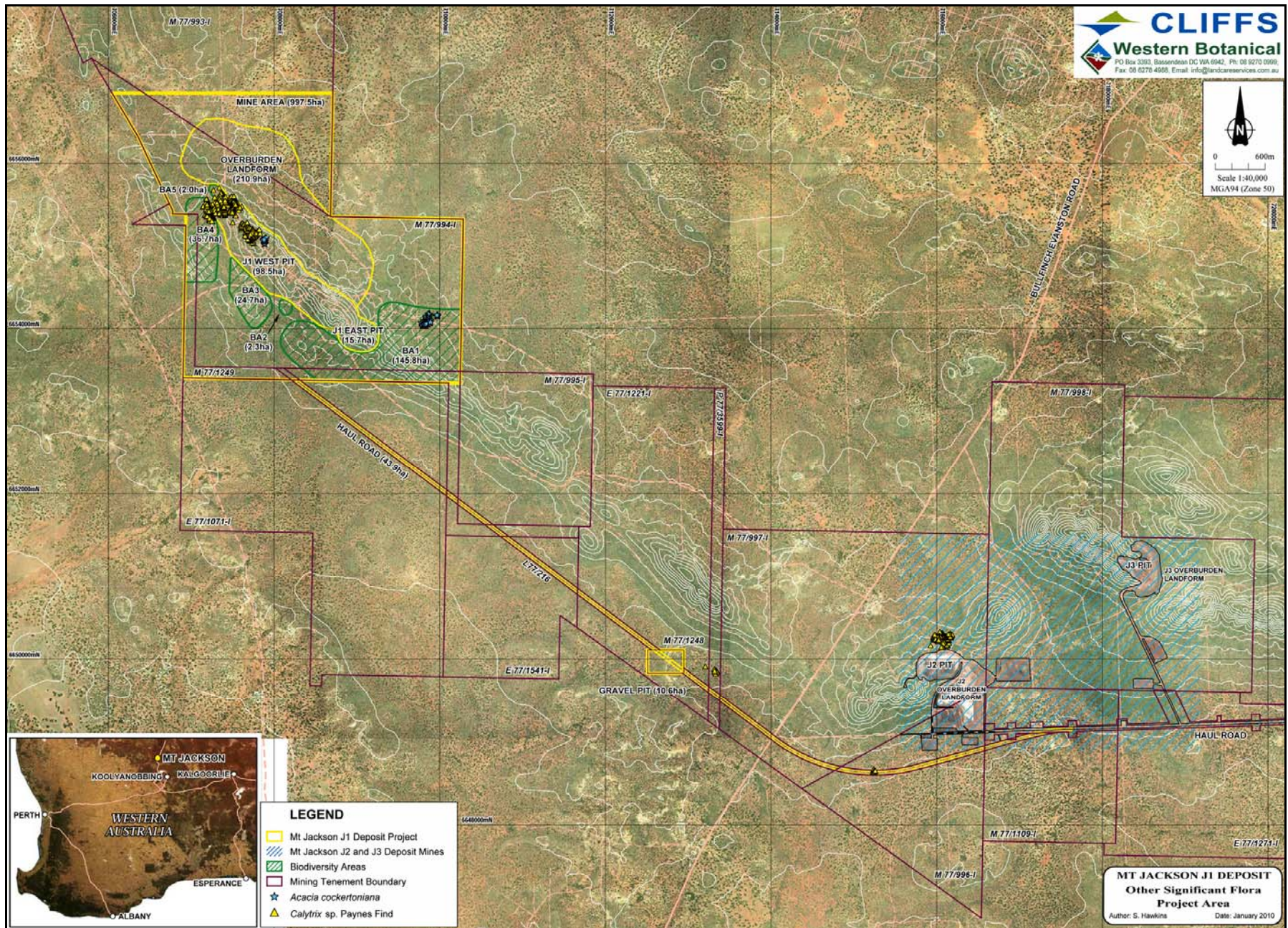


Figure 5: Flora of Conservation Interest identified within the Mt Jackson J1 Project Area

The proponent identified in its PER document that dust deposition on vegetation, weed invasion and altered fire regimes may impact native vegetation health.

The proponent considers that based on the selected mine layout, the known meteorological conditions and the dominant dust generation sources, the flora at greatest risk of dust impacts is located to the north-east, east and south-east of the overburden landform. The impacts to the flora values of these areas are unlikely to be regionally significant as the Priority flora species within these impact areas also occur in non-impact areas across the Mt Jackson Range (Cliffs 2009a).

The proponent has indicated that there would be buffer areas of 70 m and 90 m between the edge of the mine pit and 'Biodiversity Areas' during the mining operation. Potential buffers ranging from 0 m to 95 m will also be present between the Biodiversity Areas and access roads. These buffer areas may protect the vegetation contained within the 'Biodiversity Area' from the effects of dust. The buffer area between the 'Biodiversity Areas' and edge of the pits will be cleared during mine closure for a bunding area as required by the department of Minerals and Petroleum. The pit outlines in Figures 3, 4 and 5 illustrate the edge of the bunding area rather than the edge of the mine pits.

The proponent has proposed to manage fire, weeds and dust in accordance with its management plans. The revised Koolyanobbing Iron Ore Dust Management Plan (Cliffs 2009a; Appendix 8) contains a range of management actions including:

- Dust control measures such as minimising vegetation clearing, restriction of vehicle speeds, dampening of dust prone areas using water sprays and progressive rehabilitation; and
- Daily visual monitoring of dust generated from pits and stockpiles.

The proponent has also committed to undertaking annual monitoring of vegetation health within 'Biodiversity Areas' during mine operation (Cliffs 2009b).

Submissions

Concerns raised in submissions included:

- The impacts to flora including *Spartothamnella* sp. Helena and Aurora, *Bossiaea* sp. Jackson Range, *Calytrix* sp. Paynes and EeWH1 vegetation community are significant.
- Indirect impacts, particularly dust, may be a significant threat to native vegetation surrounding the proposed mine site, associated infrastructure and haul road. Appropriate dust management measures and buffer zones should be implemented.

Assessment

The area considered for assessment of this factor is the 1052.5 ha Mt Jackson J1 project area within the mining tenements M77/993, M77/994, M77/1248, M77/1249 and L77/216.

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

- protect DRF, Priority flora and other species on conservation significance, consistent with the provisions of the *Wildlife Conservation Act 1950*; and

- maintain the abundance, diversity, geographic distribution and productivity of flora and species and ecosystem levels through the avoidance or management of adverse impacts and improvement of knowledge.

Clearing

The EPA considers the flora and vegetation surveys conducted by Western Botanical (2009a) comply with EPA Guidance Statement No. 51 (EPA 2004) and are adequate (comprehensive) for environmental impact assessment.

The EPA recognises that local, regional and cumulative impacts are calculated on the basis that all flora and vegetation within the project area, with the exception of that located in the 'Biodiversity Areas', will be cleared. However the maximum of 605 ha of vegetation (within the 1052 ha project area) to be cleared, as a result the proponent's predictions, is worst case.

No DRF species or TEC were identified within the project area.

***Bossiaea* sp. Jackson Range**

The EPA notes that the targeted regional survey for *Bossiaea* sp. is continuing. Since the publication of the proponent's PER document an additional 88 plants have been identified outside of the proposed project area reducing predicted regional impacts from 18% to 15 % (Cliffs 2009b; e; Western Botanical 2009b). The EPA considers that impacts to *Bossiaea* sp. are unlikely to be significant as ongoing surveys have yielded more individuals. Also, of the 88 individuals recently located, 20 have been found approximately 250 km away at Karara. This indicates that there is likely to be a broader distribution of this species than originally thought.

***Spartothamnella* sp. Helena and Aurora**

The DEC advises that Priority 3 *Spartothamnella* sp. is currently only known from the Mt Manning area. The Threatened Species Scientific Committee will consider the nomination of this species as DRF at a future meeting.

Since the preparation of the proponent's PER document a further 31 individual plants of *Spartothamnella* sp. have been identified outside of the proposed project area. In addition the proponent now considers that the 3 individual plants within the haul road tenement are can be avoided. This would reduce approximate local impacts from 12% to 5%, regional impacts from 4% to 1.5% and cumulative impacts from 23% to 21%.

The EPA considers that this proposal can meet the EPA objectives subject to the avoidance of impacts to *Spartothamnella* sp. along the route of the haul road and recommends that Condition 6 be implemented to manage and monitor impacts.

***Calytrix* sp. and vegetation community EeWH1**

Vegetation community EeWH1 does not contain any DRF or threatened flora (Cliffs 2009b). It is one of the 11 communities that make up the *Mount Jackson Range Vegetation complex (banded ironstone formation)* PEC although it is not classified as a PEC itself. Vegetation community EeWH1 is not protected under the *Environment Protection and Biodiversity Conservation Act 1999* or the *Wildlife Conservation Act 1950*.

The EPA notes that vegetation community EeWH1 is small, fragmented, highly restricted and that this proposal would potentially result in a regional loss of 65 % and a cumulative loss of 75 %.

The EPA considers that impacts to EeWH1 should be minimised and as such avoidance and successful rehabilitation are vital. Therefore the EPA requested the proponent to further reduce clearing impacts to vegetation community EeWH1. A modified mine layout expanding 'Biodiversity Area 4' (BA4) and creating a new 'Biodiversity Area 5' (BA5) was provided by the proponent on 3 December 2009 (Cliffs 2009e) (Figures 6 & 7). The proposed change to the internal mine layout would result in:

1. a reduction in the area of EeWH1 impacted by the proposal from 12.88 ha to 10.70 ha (including the 0.3 ha impact of the haul road). This reduces the impact of the Mt Jackson J1 Deposit Proposal from 65% to 54% and cumulative impact from 75% to 64%;
2. an increase in the area of the EeWH1 vegetation community within Biodiversity areas from 1.23 ha (6%) to 3.39 ha (17%);
3. an increase in the number of remaining hectares of EeWH1 from 4.95 ha to 7.15 ha; and
4. a reduction in the proposal's impact to the flora species *Calytrix* sp. Paynes Find recorded on the Mt Jackson Range from 58% to 52% which equates to a reduction of impact from 4,436 individuals to 3,967 individuals (the regional population is estimated to be 35,000 individuals).

The proponent has also stated that it would seek to further minimise clearing of the EeWH1 vegetation community through limiting mine infrastructure within this area to only access roads and mine pits and estimates the clearing impact could be as low as between 47% (9.3ha) and 50% (9.9ha) (Cliffs 2009e).

The EPA notes that the proponent will seek to rehabilitate 20 ha of the EeWH1 community thereby reducing residual impacts. However, successful rehabilitation of *Calytrix* sp. Paynes Find (and therefore EeWH1) is uncertain due seed viability, poor germination, and potential changes in the soil profile that make it difficult for *Calytrix* sp. Paynes Find to establish in other areas (Western Botanical 2009a). The proponent has included research into germination and propagation in its Decommissioning and Rehabilitation Plan (Cliffs 2009b; Appendix 3) to improve the likelihood of rehabilitation success for EeWH1 and also *Spartothamnella* sp. and *Bossiaea* sp.. The DEC has advised that the proposed research, which would include studies into the restoration ecology and biology of the EeWH1 community and *Calytrix* sp. Paynes Find, is appropriate.

The EPA considers that to meet the objectives for this factor the revised 'Biodiversity Areas' should be defined in the proposed conditions and the proponent's proposed research into germination and propagation of EeWH1 community, *Calytrix* sp. Paynes Find, *Spartothamnella* sp. and *Bossiaea* sp. should be implemented under Condition 9.

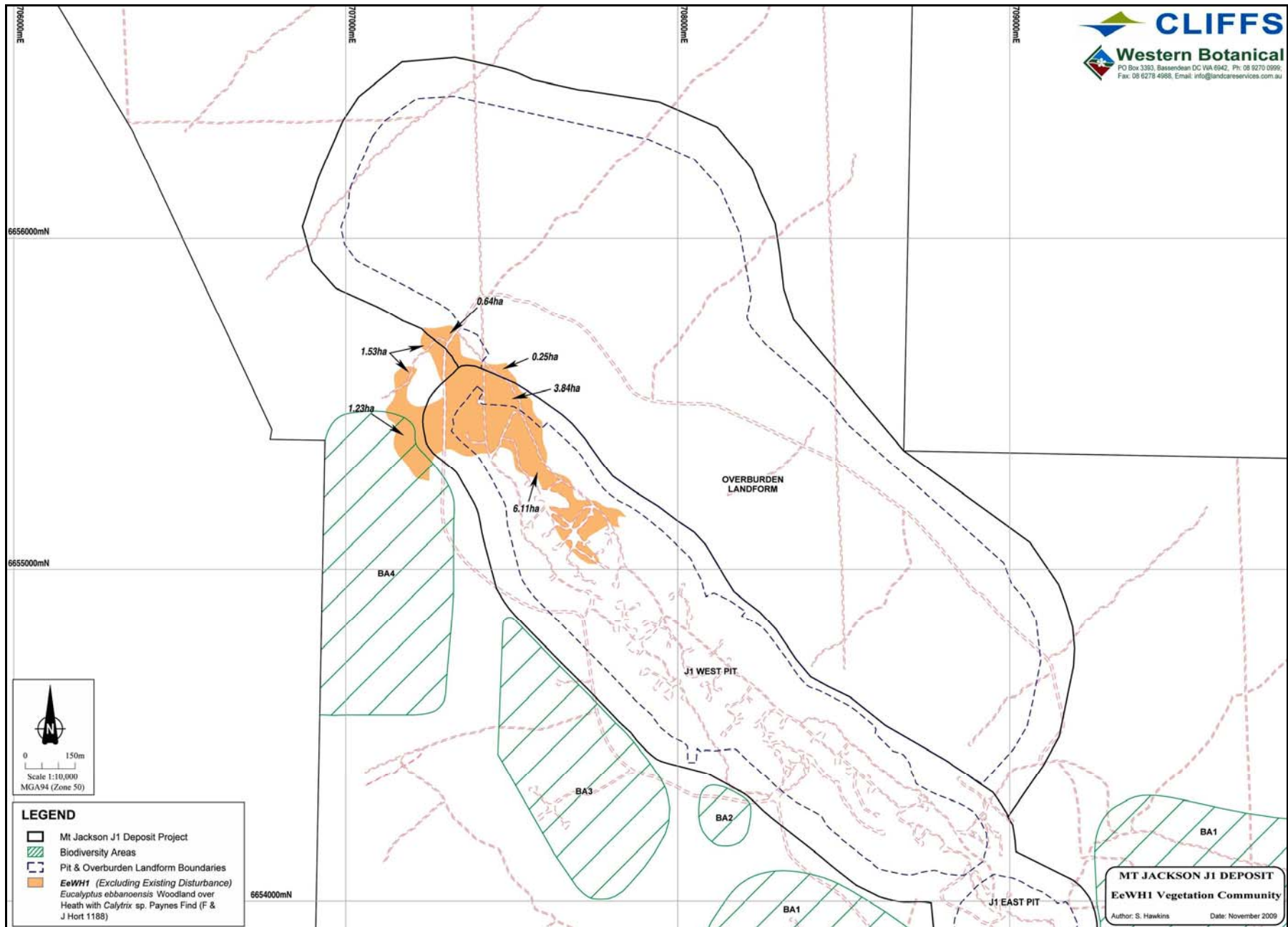


Figure 6: Original mine layout with predicted impacts to EeWH1

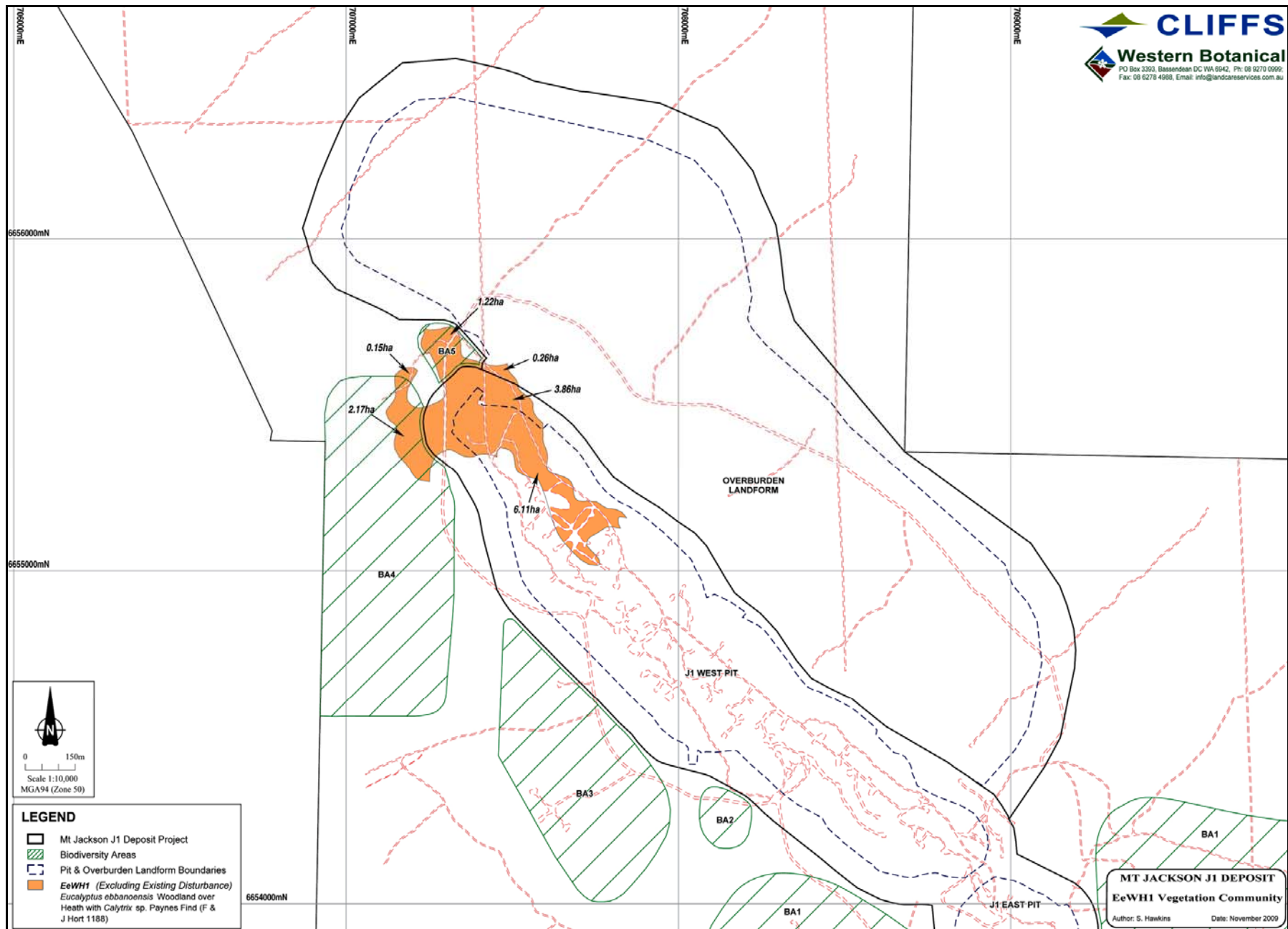


Figure 7: Amended mine layout with predicted impacts to EeWH1

The EPA notes that a number of Priority flora, vegetation communities and *Mount Jackson Range vegetation complex (banded ironstone formation)* PEC (Priority 1) were identified in the Mt Jackson surveys and have the potential to occur in the Mt Jackson J1 Deposit project area. The EPA considers that clearing impacts from this proposal are unlikely to be significant as in general these species and communities are likely to occur outside of the project and therefore the regional impacts are considered to be low.

Indirect Impacts

The EPA considers that indirect impacts from fire can be adequately managed through the implementation of the proponent's Bush Fire Management Plan and Environmental Operating Procedure EOP03 Bushfire Management.

The DEC has advised that the proponent's Weed Management Plan (Cliffs 2009a; appendix 6) is acceptable subject to the inclusion of the EPA or the DEC in its weed reporting requirements.

The EPA recognises that altered water regimes may have an indirect impact on the health of remaining vegetation at the Mt Jackson J1 Deposit project area, with the remaining vegetation community EeWH1 in the project area being of greatest concern.

The EPA notes that monitoring of the Windarling mining operations demonstrated that the majority of dust impacts were within 50 m of the mine void and overburden landform and 10 m from the edge of haul and access roads depending on site characteristics. This provides an indication of the likely impacts of dust at the Mt Jackson J1 Deposit.

The EPA also notes the presence of potential buffer areas which may mitigate indirect impacts on the 'Biodiversity Areas' during mining. These range from 70 m and 90 m between the edge of the mine pit and 'Biodiversity Areas' and from 0 m to 95 m between the Biodiversity Areas and access roads. The EPA considers that the following plant species would be at highest risk:

- *Spartothamnella* sp. Helena & Aurora Range – which is located close to the edge of 'Biodiversity Area 3' and haul road. Although the proponent has stated in its letter of 7 December 2009 (Cliffs 2009e) that there will be a minimum separation distance of 10 m for the haul road the stellate hairs on the stems and leaves of this species make it susceptible to impacts from dust; and
- *Calytrix* sp. Paynes Find and vegetation community EeWH1 – which are located in 'Biodiversity Area 5' and retained between the 'Biodiversity Area 4' and 'Biodiversity Area 5', and the remaining population on the haul road. The sensitivity to dust of this species and community is unknown therefore a precautionary approach should be taken.

The proponent has committed to annual monitoring of vegetation health within the 'Biodiversity Areas' during mine operations to determine the consequences of indirect impacts.

The EPA recommends that the proponent retains buffers of 10 m of vegetation between the Biodiversity Areas and access roads to ensure that vegetation health within the Biodiversity Areas is maintained and the requirements of Condition 6 are met.

The EPA considers that the implementation of recommended Condition 6 should also ensure that indirect impacts from weeds, dust and altered water regimes do not increase local, regional and cumulative impacts to remaining vegetation within 'Biodiversity Areas' or to *Spartothamnella* sp. individuals and the EeWH1 vegetation community within the project area (including the haul road).

Summary

Having particular regard to the:

- (a) revised mine layout which further reduces clearing impacts to vegetation community EeWH1 from 65 % to 54 % locally and 75% to 64 % cumulatively;
- (b) DEC advice that *Spartothamnella* sp. has been nominated for possible listing as a DRF;
- (c) Condition 6 requiring monitoring and management of direct and indirect impacts to the 'Biodiversity Areas', and *Spartothamnella* sp. individuals and EeWH1 populations within the Mt Jackson J1 project area; and
- (d) Condition 9 requiring research into seed germination and propagation for vegetation community EeWH1, *Calytrix* sp. Paynes Find, *Spartothamnella* sp. and *Bossiaea* sp,

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

3.2 Fauna

Description

The construction and operation of the Mt Jackson J1 project has the potential to directly impact terrestrial fauna during vegetation clearing and through vehicle strikes along the haul road. There is also potential for the proposal to indirectly impact fauna through loss of habitat, dust deposition vibration and potential increased predation.

Vertebrate Fauna

A number of fauna surveys and assessments of the Windarling and Mt Jackson Range have been conducted since 2000. These surveys were summarised in the consultants review (Bamford 2009). A total of 250 fauna species were identified as having the potential to occur within the Mt Jackson J1 Deposit project area. Of the expected species, a total of 182 fauna species were recorded during surveys, these species consisted of 2 amphibians; 54 reptiles; 105 birds; and 21 mammals including 5 introduced (feral) fauna species (Cliffs 2009a; Appendix 16).

Malleefowl (*Leipoa ocellata*) is listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and as Schedule 1 fauna under the *State Wildlife Conservation Act 1950* (WA Cons Act). Malleefowl is a large ground-dwelling omnivorous bird with an average life span of approximately 15 years.

The consultant's review (Bamford 2009) summarises seven Malleefowl reports undertaken in the Mt Jackson Range or relevant nearby areas between 2003 and 2008. In addition three reports by the Malleefowl Preservation Group conducted between 2007 and 2009 are summarised in the PER (Cliffs 2009a).

These surveys identified that the proposed Mt Jackson J1 Deposit project area contains 1 recently active Malleefowl mound, 31 inactive mounds and approximately 620 ha of nesting habitat. The proposal is predicted to result in the direct loss of 9 inactive Malleefowl nesting mounds and 414 ha of nesting habitat and result in a 12% habitat loss on the Mt Jackson Range. Combined with the loss of 85 ha of habitat from the proponent's existing Mt Jackson J2 and J3 mines the predicted cumulative impact would be approximately 499 ha which is 14 % of the currently estimated 3,504 ha of nesting habitat on the Mt Jackson Range.

The proponent will protect 204 ha of nesting habitat, 1 active mound and 22 of the inactive mounds within its designated 'Biodiversity Areas'. The active Malleefowl mound is located approximately 310 m from the J1 East Pit, and this distance provides a vegetation buffer. A similar vegetation separation buffer (330 m) used at the existing J3 Deposit mine has resulted in the protection of Malleefowl (Cliffs 2009a).

The Mt Jackson J1 Deposit haul road has been positioned to avoid impact to active Malleefowl mounds and inactive Malleefowl mounds. The haul road will also largely avoid nesting habitat. The 7 recently active Malleefowl mounds in the vicinity of the proposed haul road have a vegetation separation buffer of between approximately 500 m and 985 m.

Based on the existing 100 km Koolyanobbing haul road which resulted in one Malleefowl death in five years of operation, the proponent claims that the shorter (10.7 km) and less busy Mt Jackson J1 haul road is unlikely to result in any significant impact to Malleefowl from vehicle mortalities.

In addition to minimising impacts to fauna species through the designation of 'Biodiversity Areas', the proponent proposes to manage the impacts to fauna by implementing the existing Environmental Operating Procedure EOP06 Fauna (Cliffs 2009; Appendix 17). This procedure contains a range of management actions including speed restrictions on haul roads and fencing of water supply dams to exclude fauna. The proponent has stated that annual monitoring of Malleefowl mounds and habitat across the Mt Jackson Range, conducted in collaboration with the Malleefowl Preservation Group, will continue in accordance with environmental approval for the Mt Jackson J2 and J3 Deposit mine operations.

Short Range Endemic Fauna

Tree-stem Trapdoor Spider

The Tree-stem Trapdoor Spider (*Aganippe castellum*) is listed as Schedule 1 fauna under the WA Cons Act. Surveys for the Tree-stem Trapdoor Spider on the Mt Jackson Range were undertaken during 2007 (Bamford 2009) and 2008 (Biota 2009a). The surveys identified 244 Tree-stem Trapdoor Spider burrows, comprising of 109 active burrows, 117 inactive (unoccupied) burrows, and 18 burrows with activity unable to be determined.

Due the cryptic nature of Tree-stem Trapdoor Spider burrows and the spatial limitations associated with fauna surveys, Bamford (2009) calculated that the Tree-stem Trapdoor Spider population within the Mt Jackson Range survey area would be approximately 200,000 individuals with 12,000 individuals impacted by the Mt Jackson J1 proposal. This was based on the loss approximately 148 ha of spider habitat (loss of 6% of Mt Jackson habitat). The cumulative impact to the Tree-stem Trapdoor Spider including 104 ha of clearing for the proponent's other active mines (J2 and J3) is estimated to be approximately 9.5% of the inferred habitat.

Approximately 80 ha of spider habitat within the project area would be protected from clearing within the proposed 'Biodiversity Areas'. The proponent will also seek to obtain a licence from DEC under *Wildlife Conservation Regulations 1970* to take the Schedule 1 Tree-stem Trapdoor Spider prior to ground disturbing activities.

Millipedes

Two previously unrecorded species of millipede (*Antichiropus* sp. nov. Mt Jackson and *Atelomastix* sp. Mt Jackson) were identified on the Mt Jackson Range during the 2006 Short Range Endemic (SRE) invertebrate fauna survey which predominantly covered the J1 West Pit area (Bamford 2009). Two further targeted surveys were conducted in August 2009 (Biota 2009b & c) to determine the regional distribution of these millipedes.

As a result of the regional surveys *Atelomastix* sp. Mt Jackson has been preliminarily identified as taxon *Atelomastix 'bamfordi'* sp. nov.. Of the four ranges surveyed (Mt Jackson, Windarling, Die Hardy and Koolyanobbing) 187 individuals were collected from 28 sites established on the Koolyanobbing Range and Windarling range. *Atelomastix 'bamfordi'* sp. nov. is also known to occur at Marvel Loch, 60 km to the south of the Koolyanobbing Range (Biota 2009c).

The survey also collected 263 specimens of *Antichiropus* sp. (including *Antichiropus* sp. nov. Mt Jackson) from 48 survey sites. *Antichiropus* sp. nov. Mt Jackson was recorded on the Mt Jackson Range beyond the impact area of the Mt Jackson J1 Deposit proposal and on the Windarling and Die Hardy Ranges. Specimens were very abundant at two sites on the Windarling Range.

As these species are found in other locations in the region the proponent does not propose to undertake any specific management measures.

Troglofauna

Troglofauna are air-breathing subterranean animals that inhabit underground caves or small humid air-filled voids above the water table.

Troglofauna sampling at the Mt Jackson Range was undertaken during 2007 and 2008 (Bennelongia 2008). From these samples six potential troglofauna species were identified. These species were also recorded at other locations; *Araneomorphae* sp. B4, *Philosciidae* sp. B4, *Trichorhinae* sp. B2, and *Hanseniella* sp. B3 were identified on other parts of the Mt Jackson Range and the Helena and Aurora Range, and *Polyxenida* sp. B1 and *Curculionidae* sp. B4 were identified at the Koolyanobbing Range (Bennelongia 2008).

The proponent considers that based on their distribution these potential troglofauna species are either located within a continuous habitat which has enabled them to extend their spatial distribution or are particularly mobile species and has concluded that they are not geographically restricted to the Mt Jackson J1 Deposit.

The proponent does not propose to undertake any specific management measures.

Submissions

Key comments in submissions focused on:

- The proposed level of loss of preferred Malleefowl habitat is considered significant and should be reduced or offset.

- The information currently available on the Tree-stem Trapdoor Spider and potential SRE millipede fauna is insufficient.

Assessment

The area considered for assessment of this factor is the 1052.5 ha Mt Jackson J1 project area within the tenements M77/993, M77/994, M77/1248, M77/1249 and L77/216.

The EPA's environmental objective for this factor is to:

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

Vertebrate Fauna

The EPA notes the proponent's efforts to minimise direct impacts to Malleefowl by the placement of the haul road and infrastructure and the designation of 'Biodiversity Areas' protecting 204 ha of the highest quality nesting habitat and the single active Malleefowl nest identified within the project area.

The EPA considers that the impacts to the Schedule 1 Malleefowl (clearing of 9 inactive mounds and 408 ha lower quality nesting habitat of the 3,504 ha of the Mt Jackson Malleefowl habitat) to be acceptable in this case. This represents 12% local impact and 14% cumulative impact on Mt Jackson Range.

The EPA recognises the ongoing work undertaken by the proponent to monitor Malleefowl in its Mt Jackson project areas and to reduce and control feral fauna through the regional feral fauna control program. However, the proponent's existing Malleefowl management procedures (Environmental Operating Procedure EOP06 (Cliffs 2009a; Appendix 17) and the *Koolyanobbing Iron Ore Project – Malleefowl Conservation Plan* (Cliffs 2009c)) have not been tailored to meet the environmental impacts posed by the Mt Jackson J1 Deposit proposal.

The EPA considers that the proponent should continue monitoring of the Mt Jackson J1 project area in consultation with the DEC to provide information on cumulative and indirect impacts from mine activities on the Mt Jackson Malleefowl population and provide adaptive management of operations where significant impacts are identified. Monitoring of the Malleefowl habitat area should be maintained during the life of this proposal. The EPA recommends the implementation of Condition 7 which requires the proponent to monitor Malleefowl activity in the proposal area and demonstrate that the proposal does not adversely affect Malleefowl populations in the area.

The EPA notes that a number of other conservation significant species were identified in the Windarling and Mt Jackson surveys and have the potential to occur in the Mt Jackson J1 Deposit project area. The EPA does not consider the impacts to these other species to be significant.

Short Range Endemic Fauna

Tree-stem Trapdoor Spider

The EPA recognises that the proponent is undertaking an ongoing genetic assessment in collaboration with the Western Australian Museum and in consultation with DEC to confirm that the species identified in surveys is the Tree-stem Trapdoor Spider. The proponent has taken a precautionary approach by assuming that all spiders on the Mt Jackson Range are the Tree-stem Trapdoor Spider.

The proponent believes that recent data supports a review of the protection status of the Tree-stem Trapdoor Spider and will apply to the Threatened Species Scientific Committee for reconsideration of its current listing as a Schedule 1 fauna.

Taking into consideration to the current listing of the Tree-stem Trapdoor Spider, the EPA recommends that Condition 8 be implemented. This condition should ensure that the loss of potential spider habitat does not exceed the proponent's predicted 148 ha (6% local impact).

The proponent considers that indirect impacts such as dust and vibration will not impact Tree-stem Trapdoor Spider populations adjacent to the mine pit.

The DEC advised that there have been impacts from short-term exploration activities on recruitment of mygalomorph spiders. There is the potential for similar impacts from the proposed mining activities. In addition insufficient evidence has been provided to rule out the significance of indirect impacts (e.g. dust, change to microclimate, vibrations and disruption to the spider's breeding cycle).

The proponent's PER document states that spiders may demonstrate opportunistic characteristics following land disturbance such as colonisation of mine tracks.

The DEC noted that it is not clear whether the proponent's statement is justified by survey data or backed by appropriate analysis.

The EPA notes that the effects of indirect impacts from dust and vibration remain unknown and there is no scientifically supported evidence that Tree-stem Trapdoor Spiders recolonise areas of disturbance. The EPA considers that the proponent should monitor Tree-stem Trapdoor Spider populations adjacent to the mine pit to provide information on indirect impacts from mine activities and implement adaptive management of operations to minimise impacts on these species, on the advice of and in agreement with DEC. Therefore Condition 8 has been recommended.

Millipedes

The EPA notes that the proponent has undertaken further surveys to demonstrate that the millipede habitat extends beyond the Mt Jackson J1 Deposit proposal.

The EPA considers that the proposal will not significantly impact *Atelomastix 'bamfordi'* sp. nov. and *Antichiropus* sp. nov. Mt Jackson as they occur on other locations outside of the project area for example the Windarling Range.

Troglofauna

The EPA notes that the potential troglofauna species found within the project area have also been identified on other parts of the Mt Jackson Range, the Helena and Aurora Range and also the Koolyanobbing Range.

The EPA considers that the proposal is unlikely to cause a significant direct impact to the six potential troglofauna species in the proposed mine pit as all the species have been identified in areas outside of the Mt Jackson J1 Deposit project impact zone.

Summary

The EPA considers the issue of fauna has been adequately addressed and the proposal can meet the EPA's objectives for this factor provided that Conditions 7 and 8 are imposed requiring the proponent to ensure that:

- Malleefowl monitoring continues to provide information on cumulative and indirect impacts from mine activities on the Mt Jackson Malleefowl population and provide adaptive management of operations where significant impacts are identified;
- the loss of potential Tree-stem Trapdoor Spider habitat does not exceed the proponent's predicted 148 ha; and
- Tree-stem Trapdoor Spider populations adjacent to the mine pit are monitored to provide information on indirect impacts from mine activities and implement adaptive management of operations to minimise impacts on these species.

3.3 Closure and Rehabilitation

Description

The proposed mining activities would involve the clearing of approximately 605 ha of native vegetation. Depending on the success of the environmental management, there is the potential for contamination and altered groundwater regimes, impacts to native flora and fauna from increased feral fauna populations, unstable landforms, erosion, and the unsuccessful return of vegetation to result from inappropriate closure and rehabilitation.

Decommissioning

Decommissioning would involve the appropriate disposal of waste materials and the dismantling and removal of above-ground infrastructure (that has no foreseeable future use) with the exception of the haul road and an internal mine access road (Cliffs 2009a).

Dewatering would cease once mining has been completed at Mt Jackson J1 Deposit. Modelling recently provided by the proponent's consultant predicts that depending on the permeability of the country rocks the J1 West Pit may either remain dry, or start to fill with water from the surrounding groundwater aquifer from approximately 22 days after dewatering has ended. The level of this pit lake would eventually stabilise around 370 m AHD after 250 years (Rockwater 2009). It is predicted that the pit lake would act as a water sink with groundwater slowly flowing into the pit lake. Evaporation would increase salinity in the pit lake over time (Rockwater 2007b; 2009). The proponent has stated that backfilling of the pit would not be considered as this is not practicable. A final pit void would remain as a permanent feature in the landscape. The pit void would be made safe following the cessation of mining by establishing an abandonment bund in accordance with *Safety Bund Walls around Abandoned Open Mine Pits* (DoIR 1997).

The open water in the J1 West Pit has the potential to attract native and feral animals that may graze on native plants and/or prey on native fauna. The proponent considers the risk of the J1 West Pit sustaining a feral fauna population to be low (Cliffs 2009a). If, during decommissioning and rehabilitation, feral fauna (dingo/feral dog, goat and

fox) are identified as having formed significant populations that are sustained by surface water within the J1 West Pit the proponent will undertake the following management actions:

- installation of fauna exclusion fencing around the J1 West Pit; and
- implementation of feral animal eradication and monitoring program.

Approximately 59 million m³ of waste rock will be generated during the 10 year mine life. It is proposed that waste rock would be deposited in the overburden landform to the north of the open cut pits. The proponent considers that waste rock with a sulphur content exceeding 0.3% has the potential to produce acids and leach out metals and metalloids (e.g. Antimony and Arsenic) from the rocks and subsequently affect surface and groundwater, and potentially impact native fauna. Approximately 6.6 % (3,920,000 m³) of the Mt Jackson J1 waste rock has a sulphur content exceeding 0.3%. As this includes both reactive sulphides (PAF) and non-reactive sulphates (non-acid forming) the proponent considers the estimated volume of 6.6% acid forming waste rock to be conservative.

Overburden which has the potential for acid generation would be isolated and contained within the centre of the overburden landform and encapsulated within a minimum of 5 m of inert overburden. In addition, the overburden landform will be nominally 50 m above the natural groundwater level with this distance providing an additional separation buffer from the groundwater. The proponent expects that these management actions would prevent potentially acid forming material within the excavated overburden from impacting groundwater quality (Cliffs 2009a).

The proponent has stated that the risk of exposed rock in the mine void forming acid leachate is low risk. However, should this occur the surrounding groundwater is not expected to be impacted as the surface water within the J1 West Pit would act as a groundwater sink locally (Cliffs 2009a).

Rehabilitation

The proponent proposes to rehabilitate approximately 450 ha (based on clearing of up to 605 ha) of the impacted areas. Some of this rehabilitation would be undertaken progressively with the majority occurring subsequent to decommissioning and closure. Topsoil and cleared vegetation would be stockpiled and returned to landforms and disturbed areas, and local native provenance seed material would be used. The proponent has proposed the following performance indicators:

- $\geq 20\%$ projected foliar cover;
- ≥ 20 local provenance native flora species per quadrat; and
- $\leq 5\%$ weed cover.

Rehabilitated areas would be monitored annually and maintained.

Submissions

Concerns raised in submissions included:

- After closure, the availability of free water within the J1 pit void may result in long-term impacts on the biodiversity of the area from grazing pressures.
- Acid metalliferous drainage (AMD) may discharge into the mine void lake posing a long term threat to wildlife that might use these features as a source of food or water. These toxicants could accumulate through the food-chain.

Assessment

The area considered for assessment is the proposed project area.

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

- ensure that mining is planned and carried out so to ensure a sustainable mine closure outcome is achieved, consistent with mining industry best practice as set out in the Australia and New Zealand Minerals and Energy Council / Mining Council of Australia, 2000, *Strategic Framework for Mine Closure*;
- ensure that final mine pit lakes do not cause significant environmental impacts through groundwater pollution or by attracting native or introduced fauna which may be harmed by contact with contaminated water, or, if the water is of good quality, by attracting increased numbers of grazing and predatory animals which may consequently impact on the ecology of the surrounding area; and
- ensure that self-sustaining native vegetation communities are returned after mining, which in species composition and ecological function are as close to as possible to naturally occurring analogue sites.

Mine Closure

Decommissioning

The EPA notes the proponent's decommissioning strategy and revised Mt Jackson J1 Deposit Decommissioning and Rehabilitation Plan (Cliffs 2009b Appendix 3). The EPA considers that this strategy and plan is not acceptable in its current form as:

- it does not demonstrate how the overburden landform will be made safe, stable and non-polluting; and
- does not contain specific workable procedures in the event of unplanned or temporary mine closure, including confirmation that appropriate materials are available on site to make the overburden landform secure and non-polluting.

In order to ensure the long-term success of mine closure and rehabilitation the EPA recommends that Condition 11 be imposed. Condition 11 requires that the proponent submit a final closure and decommissioning plan at least five years prior to mine completion.

Pit lake

The EPA notes that modelling to assess the final void water level and salinity cannot be determined with more accuracy unless an investigation into the permeability of the ore body and adjacent country rock is undertaken. The EPA has based its assessment on the worst case scenario provided in the available information, i.e. the formation of a pit lake.

As permanent surface water in the area is scarce (Cliffs 2009a) and feral fauna (rabbit, cat, camel, dingo/feral dog, fox, goat and house mouse) have been identified within the local area there is likely to be an adverse effect on native fauna from increased predation and competition, and to native flora from grazing. As the pit may take some time to fill with water any impacts to fauna and flora would need to be determined by monitoring undertaken at that time. The EPA recommends that Condition 11 be implemented to which requires the appropriate monitoring and minimisation of impacts from grazing and predation resulting from an increase in native and feral fauna attracted to pit lake.

Acid Metalliferous Drainage

The EPA notes that geochemical data for the Koolyanobbing mine has been provided. However, site specific geochemical data for the Mt Jackson J1 Deposit proposal is not available and there is uncertainty regarding the amount and distribution of potentially acid forming material. Therefore the EPA recommends that Condition 10 be implemented requiring a detailed and project-specific Conceptual Closure Strategy. This shall include detailed results of geochemical and geophysical characterisation of materials, in particular the potential for acid drainage, metalliferous drainage, and of the occurrence of dispersive materials and asbestiform minerals to be submitted to the Office of the EPA for approval prior to ground disturbing activities.

The possible release of AMD into the pit void could lead to bioaccumulation of toxicants in wildlife through the food chain. Condition 10-3 ensures that appropriate management measures will be taken to protect the environment should there be a potential for the production of acid and/or metalliferous drainage.

Rehabilitation

In the PER document (Cliffs 2009a) the proponent's stated intention is that the "haul road and the internal mine-access road will be left in a safe condition for ongoing use by the Pastoral Leaseholder", which is the proponent. The EPA notes that existing tracks could provide alternate access to the Mt Jackson J1 Deposit project area for inspections following mine closure.

EPA Report 1256 (EPA 2007) and the BIF Review (DEC & DoIR 2007) recommended a number of Class A Nature Reserves including the Die Hardy/Jackson/Windarling Ranges in which approximately 13 ha of the proposed haul road occurs. This recommended Class A area is also due to be excised from its pastoral lease and placed in a conservation park tenure process in 2015 for management by the DEC. The proposal to leave the haul road and any other mining related infrastructure in the proposed Class A Reserve is inconsistent with the intended land use objectives. Therefore the EPA considers that all infrastructure located within the proposed Class A Reserve should be removed post-mining and any disturbance rehabilitated, and therefore recommends Condition 11-3, which requires the closure decommissioning and rehabilitation of the haul road and Condition 9, which requires rehabilitation shall be comparable with analogue sites representative of the pre-disturbance condition of the haul road.

The EPA recognises that the proponent has proposed rehabilitation performance indicators of 20 per cent foliar cover based on the existing 20% to 40% cover, and no greater than 5% weed cover due to the naturally low weed occurrence on the Mt Jackson Range (Cliffs 2009a). The EPA considers these figures to be reasonable; however, as the weed cover is naturally low, the diversity and cover of weed species should be commensurate with either the baseline monitoring undertaken or analogue sites in surrounding undisturbed areas. Rehabilitation Condition 9 is recommended to address this matter.

The EPA recommends that to reduce the spread of weeds, the proponent should identify areas of weeds during the clearing works and keep these areas separate from topsoil to be used in rehabilitation.

The proponent has based its proposed criteria for species diversity of 20 species per quadrat on the existing vegetation communities ranging between 12 and 36 species and the results of the Mt Jackson J2 and J3 rehabilitation. The DEC has advised that

20 species per quadrat appears to be low when the J2 rehabilitation achieved 12-36 species and the J3 rehabilitation achieved 18-47 species in 2007 and 21-48 species in 2008. There is no baseline or analogue data to compare this existing rehabilitation with, so the effectiveness can not be readily determined. The EPA notes that achieving 20 species per quadrat could ultimately mean that there is lower species diversity with potentially only 20 species throughout the entire rehabilitated area.

Recognising the difficulties in rehabilitating overburden landforms the EPA has recommended Condition 9, which provides separate rehabilitation criteria for overburden landforms to those for areas in which the soil/rock profile is similar to pre-mining conditions. For the overburden landforms, similar vegetation cover to natural landforms in the area is required, where as in other areas, similar diversity and species abundance is required.

Summary

The EPA considers the issue of decommissioning and rehabilitation has been adequately addressed and the proposal can meet the EPA's objective(s) for this factor provided that conditions are imposed requiring the proponent to:

- (a) Submit a full project-specific conceptual closure strategy prior to the start of ground-disturbing activities.
- (b) Submit a final closure and decommissioning plan at least five years prior to mine completion.
- (c) Minimise the impacts of grazing and predation resulting from an increase in fauna and introduced animals attracted to pit lake.
- (d) Undertake rehabilitation to achieve acceptable species diversity and weed coverage and composition comparable to analogue sites.

3.4 Environmental principles

In preparing this report and recommendations, the EPA has had regard for the object and principles contained in s4A of the *Environmental Protection Act (1986)*. Appendix 3 contains a summary of the EPA's consideration of the principles.

4. Conditions

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for Environment on the 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 Cliffs to develop an iron ore mine at the Mt Jackson J1 Deposit is approved for implementation.

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 Cliffs to develop an iron ore mine at the Mt Jackson J1 Deposit, located approximately 110 km north-north-east of Southern Cross in the Shire of Yilgarn is approved for

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

- (a) Biodiversity Areas, Priority Flora and Conservation Significant Vegetation Community – minimise disturbance of vegetation due to clearing and monitoring and management.
- (b) Fauna – continued monitoring and management of Malleefowl.
- (c) Short Range Endemic Fauna – restrict habitat clearing and monitor populations of Tree-stem Trapdoor Spiders adjacent to the mine pit.
- (d) Rehabilitation – to achieve acceptable species diversity and minimise weed coverage.
- (e) Closure Strategy – preparation of a conceptual closure strategy.
- (f) Final Closure and Decommissioning Plan.

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.

5. Other Advice

The Mount Manning Region (MMR) has been recommended as a conservation reserve since 1962. In April 2003 the then Government decided to expand the Mount Manning Nature Reserve as part of the approval granted for the Koolyanobbing Iron Ore Expansion project Bulletin 1082 (EPA 2002). The then Minister for the Environment requested section 16 advice from the EPA as to what areas of the MMR would be environmentally unacceptable in terms of development.

EPA Report 1256 (EPA 2007) considered the MMR worthy of recognition as a Biodiversity Hotspot due to high flora and fauna diversity and endemism, DRF and Priority flora, Declared, Threatened and Priority Listed Fauna, undescribed or newly described taxa and unique vegetation communities restricted to BIF range. Therefore it was recommended that core areas of the MMR become A Class Nature Reserves. An area was also identified as requiring further investigation to determine whether it should also be recommended as A Class Nature Reserves in the future. The subsequent BIF Review (DEC & DoIR 2007) reached similar conclusions and recognised that a number of ranges in the MMR including the Mt Jackson Range have the highest environmental values and recommended a number of areas become A Class Conservation Reserves.

The EPA considers that it is important to promptly place the areas recommended in EPA Report 1256 and the BIF Review into the conservation estate to ensure the conservation of restricted and rare and poorly represented flora, vegetation types, fauna habitats and landform units maintain ecological connectivity within ranges.

A portion of the Mt Jackson J1 Deposit proposal (approximately 13ha of haul road) occurs within a recommended A Class Nature Reserve. This Report recommends that this area be appropriately rehabilitated during decommissioning of the proposal. Approximately 235 ha of the project area mainly consisting of the haul road and potential infrastructure areas are located in an area recommended in Report 1256 as requiring further investigation. This area currently has no statutory protection for its biodiversity values.

6. Recommendations

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

1. That the Minister notes that the proposal being assessed is for an iron ore mine at the Mt Jackson J1 Deposit, located approximately 110 km north-north-east of Southern Cross 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 that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4; and
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Appendix 1

List of submitters

Organisations:

Department of Environment and Conservation

Department of Indigenous Affairs

Department of Mines and Petroleum

Department of Water

Goldfields Land & Sea Council

The Wilderness Society Inc.

Toodyay Naturalists Club Inc.

Wildflower Society of Western Australia Inc.

Individuals:

Anthony John McPherson

Ray Paynter

Appendix 2

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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			
Conservation values	Of the 605 ha of the project area approximately 13 ha of the haul road lies within the EPA recommended A Class Nature Reserve and 235 ha lies within the area recommended for further investigation to determine the need to extend the A Class Nature Reserve.	<p>NGOs The PER has not given adequate recognition to EPA Bulletin 1256 or to <i>Strategic Review of the Conservation and Resource Values of the Banded Iron Formation of the Yilgarn Craton</i> and the EPA’s objectives for this factor cannot be met.</p>	Considered to be a key environmental factor.
Vegetation	A total of 231 native plant species were identified during the surveys conducted for the Mt Jackson J1 proposal.	<p>NGO’s and Public Submitters noted that even the best surveys are unable to capture the entire collection of the flora present.</p>	Considered to be a key environmental factor.
Vegetation communities	Twenty three vegetation communities will be impacted by the proposed iron ore mine including the previously unknown <i>Eucalyptus ebbanoensis</i> Woodland over Heath with <i>Calytrix</i> sp. Paynes Find community (EeWH1).	<p>Government Agencies and NGO’s The proposed 65 per cent loss of the EeWH1 vegetation community is not consistent with Key Principle (ii) of the BIF Strategic Review or the EPA’s objective “to maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels”.</p>	Considered to be a key environmental factor.
Declared Rare and Priority Flora	No DRF are found within the impact area. Eight Priority flora species will be directly impacted by clearing for the proposed iron ore mine. In additions two species of conservation interest will also be impacted by clearing.	<p>Government Agencies & NGO’s</p> <ul style="list-style-type: none"> • Potential impacts to Priority flora particularly <i>Spartothamnella</i> sp. Helena and Aurora, <i>Bossiaea</i> sp. Jackson Range, are significant. 	Considered to be a key environmental factor.
Weeds	Three weed species were recorded during flora and vegetation surveys undertaken for the Mt Jackson J1 proposal:	<p>NGO’s The entry of soil pathogens should be considered in the PER and addressed in the Environmental Operation Procedure for Weed Management (EOP16).</p>	<p>Cliffs’ weed management plan and operational plan contain hygiene procedures. Soil pathogens do not require further EPA evaluation.</p> <p>Weeds are considered to be a key environmental factor.</p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
Vegetation / habitat	<p>The semi-arid Mediterranean climate of the Yilgarn region makes it susceptible to ecological impacts due to the spread of fire.</p> <p>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>	No submissions were received.	<p>The proponent would monitor, manage and report fires in the vicinity of the Mt Jackson J1 Deposit through the implementation of its Bush Fire Management Plan and Environmental Operating Procedure EOP03 Bushfire Management.</p> <p>This factor does not require further EPA evaluation.</p>
Fauna	A total of 250 fauna species were identified as having the potential to occur within the Mt Jackson J1 project area. Of the expected species, a total of 182 fauna species were recorded during surveys. This includes six species of introduced (feral) fauna.	<p>NGO's and Public</p> <ul style="list-style-type: none"> • Protection of fauna is not of a high enough standard. • Submitters noted that even the best surveys are unable to capture all fauna species present at a site. 	Considered to be a relevant environmental factor.
Scheduled and Priority Fauna	<p>The proposal would potentially impact State and Federally listed species including:</p> <ul style="list-style-type: none"> ○ Malleefowl <i>Leipoa ocellata</i>; ○ Tree-stem Trapdoor Spider <i>Aganippe castellum</i>; ○ Peregrine Falcon <i>Falco peregrinus</i>; ○ Carpet Python <i>Morelia spilota imbricate</i>; and ○ Rainbow Bee-eater <i>Merops ornatus</i>. 	<p>Government Agencies</p> <ul style="list-style-type: none"> • The information currently available on the Tree-stem Trapdoor spider is insufficient to adequately determine the impacts from this proposal. • The proposed level of loss of preferred Malleefowl habitat is considered significant. <p>NGO's</p> <ul style="list-style-type: none"> • The destruction of habitat of the Malleefowl is likely to increase pressure on this listed fauna (Rare or likely to become extinct). • Translocating Malleefowl mounds is essential. • Carpet Pythons are likely to be present and therefore at risk from the Mt Jackson J1 proposal. 	Considered to be a relevant environmental factor.
Short Range Endemic (SRE) Fauna	<p><u>SRE Invertebrates</u></p> <p>Two previously unrecorded species of millipede have been identified on the Mt Jackson Range.</p>	<p>Government Agencies</p> <ul style="list-style-type: none"> • The information currently available on the potential short range endemic (SRE) millipede fauna is insufficient to adequately determine the impacts from this proposal. 	Considered to be a relevant environmental factor.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p><u>SRE Subterranean Fauna</u> Six potential troglofauna species will be directly impacted by the proposal.</p>		
Groundwater Features and Water Use	<p>As mining of Mt Jackson J1 will be undertaken to approximately 75m below the current groundwater table dewatering of 0.63GL per annum will be required for dry floor mining of the Mt Jackson J1 Deposit. This will result in a cone of depression (lowering of the groundwater table) which has the potential to impact hydrology and vegetation.</p>	<p>Government Agencies Vegetation is likely to have a higher groundwater dependency as Mt Jackson J1 is the only recorded brackish groundwater in the area where groundwater is generally hypersaline, therefore dewatering is likely to cause impacts to groundwater dependent vegetation.</p> <p>Changes in the groundwater flow regime will be caused by the removal of part of the BIF ridge and the creation of mine void lakes. This will remove the source of groundwater recharge and create discharge features that will greatly increase the salinity of groundwater in the area.</p> <p>Public A submitter was concerned with the accuracy of the hydrological investigation and modelling.</p>	<p>Apart from the Eucalyptus genus the roots of the dominant flora species are not considered to reach the groundwater table which ranges from 50m to 130m below ground surface. Although the Eucalyptus genus have roots that could extend beyond 50m in depth the water supply to these species is predominantly thought to occur through lateral roots sourcing water from within the soil profile.</p> <p>Any groundwater changes from mining the Mt Jackson J1 Deposit are expected to be localised to the mining area and its immediate surrounds. Based on information provided Significant impacts to regional groundwater infiltration, flow or quality are not expected.</p> <p>All modelling contains a margin of error. The EPA is satisfied with the modeling provided and has assessed impacts to groundwater based on this modelling.</p> <p>This factor does not require further EPA evaluation.</p>
	<p>Overspray of abstracted groundwater during dust suppression activities has the potential to impact vegetation. Groundwater salinity in the Mt</p>	<p>NGO's</p> <ul style="list-style-type: none"> • Saline water runoff from roads can adversely impact surrounding native vegetation. • Prior to commissioning baseline soil samples should be taken from road side areas containing native vegetation. This data can be 	<p>Salinity in the Mt Jackson J1 Deposit groundwater is low compared to other Ranges in the region. Therefore intrusion due to dust suppression activities are not</p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>Jackson J1 project area is considered to be brackish with salinity of between 3,800 and 7,200 mg/L TDS which is approximately one-fifth of that found in the WA deposit at Windarling (Rockwater 2007).</p>	<p>compared to subsequent samples taking during operation. If these samples show considerably higher salt content remedial action should be taken.</p>	<p>expected to occur; however, the proponent will implement management measures as outlined in Cliffs PER (Cliffs 2009; Cliffs 2009 Appendix 19).</p> <p>This factor does not require further EPA evaluation.</p>
	<p>Groundwater at the Mt Jackson Range forms part of the Goldfields Groundwater Management Area. This is protected under the <i>Rights in Water and Irrigation Act 1914</i>, accordingly a licence to abstract and use groundwater will be required from the Department of Water (DoW).</p>	<p>No submissions were received.</p>	<p>Abstraction of 0.63GL per annum and use of abstracted groundwater will be licensed under the <i>Rights in Water and Irrigation Act 1914</i> and as such this factor does not require further EPA evaluation.</p>
POLLUTION			
<p>Air Quality – Dust</p>	<p>Dust and air emissions would be generated from construction and operation of the mine and haul and access roads.</p> <p>These activities have the potential to adversely impact the workforce with adverse health effects; and surrounding vegetation from smothering.</p>	<p>Government Agencies</p> <ul style="list-style-type: none"> the proponent had not delineated areas or developed monitoring programs for areas that will be subject to indirect impacts such as dust. Dust deposition during construction and operation should be clarified. There has been no modelling of dust deposition. <p>NGO's and Public</p> <p>Indirect impacts, particularly from dust, are considered to be significant to native vegetation surrounding the mine site, associated infrastructure and haul road. Appropriate dust management measures and buffer zones should be implemented.</p>	<p>Dust is considered to be a relevant environmental factor for impact to native vegetation. Vegetation impact is addressed in the Vegetation and Flora Section.</p>
<p>Air Quality - Greenhouse Gas and other air emissions</p>	<p>Greenhouse gas (GHG) emissions would occur from mine infrastructure powered by fuel-burning equipment such as bulldozers, haulage trucks and mine offices. The emission is estimated to be 40,000 tonnes</p>	<p>Government Agencies</p> <p>DEC advised that other emissions i.e. principle pollutants such as CO, NOx, SOx should be addressed in the PER.</p>	<p>The EPA considers that GHG emissions of 40,000 tonnes are not large enough to require formal assessment. However, the EPA expects the proponent to pursue continuous improvement throughout the life of the project</p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	per year.		and strive to achieve reductions in energy consumption. Not considered to be a relevant environmental factor.
Water quality	An estimated 59 million m ³ of overburden and waste rock would be produced throughout the life of the project. Approximately 6.6% of the overburden material would be Potentially Acid forming (PAF) material.	Government Agencies <ul style="list-style-type: none"> There is a risk of PAF reacting with oxygen and causing Acid Metalliferous Drainage (AMD) to discharge into the mine void lake and posing a long term threat to wildlife that might use these features as a source of food or water. 	Considered to be a relevant environmental factor.
Waste	Solid putrescible and inert wastes will be generated during the operation of the proposed Mt Jackson J1 mine. A 10KL/day water treatment plant would generate potable drinking water from the abstracted groundwater. The byproducts of this treatment would include minimal solid and liquid wastes. Approximately 10KL a day of liquid waste will be generated from wastewater treatment.	Public A submitter was concerned that based on waste management of effluent at Windarling, effluent waste management would be a significant issue for this proposal.	Waste would be disposed of in accordance with state waste disposal laws including the <i>Environmental Protection Regulations 1997</i> and the <i>Environmental Protection (Rural Landfill) Regulations 2002</i> . Treatment of abstracted groundwater would produce potable water that meets the water quality targets of the National Health and Medical Research Council and the Natural Resource Management Ministerial council (NHMRC & NRMMC 2004). The quantities of liquid waste produced fall below licensing and registration levels of the <i>Environmental Protection Regulations 1997</i> . Wastewater will be treated in accordance with the requirements of the Department of Health (DoH) under the <i>Health Treatment of</i>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
			<p><i>Sewage and Disposal of Effluent and Liquid Water) Regulations 1774 and the Shire of Yilgarn.</i></p> <p>Not considered to be a relevant environmental factor.</p>
Chemical and Dangerous Goods Transport and Storage	Hydrocarbons (including vehicle fuels), chemicals and explosives would be transported to and used at the proposed mine site. Poor management of these could lead to contamination of the environment.	No submissions were received.	<p>Transport and storage of chemicals and dangerous goods will be conducted in 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>.</p> <p>Not considered to be a relevant environmental factor.</p>
Noise and vibration	Noise and vibration emitted from blasting, operations and transport could impact fauna and human health.	No submissions were received.	<p>As the nearest noise sensitive premises are located 50km to the north (Diemals Station) and the approximately 22km north (Windarling accommodation village) there will be no impact from noise and vibration to human receptors caused by the operation of the proposed mine.</p> <p>This factor can be adequately managed under the <i>Environmental Protection (Noise) Regulations 1997</i>.</p> <p>Not considered to be a relevant environmental factor.</p>
SOCIAL SURROUNDINGS			
Heritage/Aboriginal heritage	The Department of Indigenous Affairs (DIA) register of Aboriginal Heritage sites has	<p>NGO's</p> <ul style="list-style-type: none"> The proposed Mt Jackson J1 mine will have a significant negative impact on the cultural and historical associations and values of the 	The proponent has avoided and minimised potential impacts to sites of Aboriginal Heritage by

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>identified nine sites listed on the permanent register as occurring in the vicinity of the Mt Jackson J1 project area (Site ID 22944). A potential Aboriginal Heritage site is also located near the proposed haul road and gravel pit.</p> <p>Site ID 25821 Curragibbin Hill Rockshelter will be lost as it is located within the proposed J1 mine pit.</p>	<p>Koolyanobbing area in that it would result in the destruction of numerous important Aboriginal sites.</p> <ul style="list-style-type: none"> • Sites on the DIA register, whether they are ‘permanent’, ‘temporary or undergoing or awaiting assessment are all aboriginal sites. Therefore the number of known Aboriginal sites in the Shire of Yilgarn is 105. • The Curragibbin Hill Rockshelter is the chief camping ground of the Traditional Owners of the Yilgarn region which would make it a site of ethnographic, historical and archaeological significance. • The Mt Jackson Ranges (Site ID 22944) is an Aboriginal site and is listed as a ‘closed’ site on the DIA Sites Register and therefore is a place of significant Aboriginal heritage values. • A comprehensive, best practice, archaeological recording and excavation of the rock shelters and surrounding area should be undertaken before the J1 proposal is finalised. <p>Public A submitter proposed that the Curragibbin Hill Rockshelter it should be preserved by relocating it to another area of Mt Jackson.</p>	<p>locating infrastructure away from known locations of registered and potential heritage sites.</p> <p>Consent has been provided under Section 18 of the <i>Aboriginal Heritage Act 1972</i> to undertake supporting mine operations within parts of Tenements M77/1249 and parts of Tenement L77/216.</p> <p>DIA Site ID 22944 Mt Jackson Ranges has been identified as stored data and the mapped area has been reduced and no longer coincides with the Mt Jackson J1 Deposit Proposal.</p> <p>The location of the proposed Mt Jackson J1 project will lead to the loss of the Curragibbin Hill Rockshelter. The proponent has permission to disturb this site from the Minister for Indigenous Affairs under the <i>Aboriginal Heritage Act 1972</i>.</p> <p>The proponent will implement its existing Aboriginal Heritage Operating Procedure for the Mt Jackson J1 proposal to ensure that Aboriginal Heritage is appropriately managed.</p> <p>This factor does not require further EPA evaluation.</p>
Landscape value/Visual amenity	The during the operation of the Mt Jackson J1 proposal the mine pit and waste dump are likely to be visible to some degree from	No submissions were received.	Visual amenity is not thought to be a relevant environmental factor as visual impacts are considered to be minimal and would not be

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	the Windarling, Die Hardy and Mt Manning Ranges during the mine operations.		<p>permanent due to the rehabilitation proposed subsequent to mine closure.</p> <p>Not considered to be a relevant environmental factor.</p>
OTHER			
Rehabilitation and closure	<p>The project area would be decommissioned and rehabilitated.</p> <p>Approximately 450ha of the 605ha of cleared native vegetation would be rehabilitated.</p>	<p>Government Agencies</p> <ul style="list-style-type: none"> The current proposal will leave a permanent water-filled void at closure. The availability of this free water within the J1 pit void may attract fauna and feral animals and increase grazing pressures on vegetation. All infrastructure located within the proposed class A Mt Manning Nature Reserve expansion area should be removed post-mining, and disturbance rehabilitated, particularly the haul road. <p>NGO's</p> <ul style="list-style-type: none"> Rather than setting a rehabilitation criteria of 5% for weed cover weeds should be maintained at a level less what currently occurs on the site. A specific rehabilitation performance indicator of DEC classified priority species should be set. An independent audit of the cost of backfilling should be undertaken. 	Rehabilitation and closure is considered to be a relevant environmental factor and is addressed in the Report.

PRINCIPLES		
Principle	Relevant Yes/No	If yes, Consideration
<p>1. The precautionary principle</p> <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>(a) <i>careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and</i></p> <p>(b) <i>an assessment of the risk-weighted consequences of</i></p>	Yes	The proposal will impact a PEC and significant flora and fauna. Therefore the proponent is required to evaluate options to avoid serious or irreversible harm to the floristic communities, flora and fauna, and demonstrate the chosen options results in the least impact practicable. Floristic communities, flora and fauna are relevant environmental factors discussed in this report.

PRINCIPLES		
Principle	Relevant Yes/No	If yes, Consideration
<i>various options.</i>		
<p>2. The principle of intergenerational equity <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	<p>The proposal would result in the loss of native vegetation and fauna and a portion of the Mt Jackson Range. This range forms part of the Mt Manning Region which, as part of a banded iron stone formation, is considered to be uniquely diverse.</p> <p>The resource (iron ore) would be permanently depleted in this area. The product (iron) can be used for infrastructure which may benefit future generations, and can also be recycled for future use.</p>
<p>3. The principle of the conservation of biological diversity and ecological integrity <i>Conservation of biological diversity and ecological integrity should be a fundamental consideration.</i></p>	Yes	<p>The proposal would result in the clearing of native vegetation and fauna habitat and has the potential to affect biological diversity/integrity. Vegetation communities and flora and fauna are relevant environmental factors discussed in this report.</p>
<p>4. Principles relating to improved valuation, pricing and incentive mechanisms</p> <p>(1) <i>Environmental factors should be included in the valuation of assets and services.</i></p> <p>(2) <i>The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.</i></p> <p>(3) <i>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>(4) <i>Environmental goals, having been established, should be pursued in the most cost effective way, by 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></p>	Yes	<p>The proposal would result in waste dumps and pits. The proponent should bear the cost of rehabilitation and closure management.</p>
<p>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></p>	Yes	<p>The proposal would generate waste hence the proponent should address the waste hierarchy and minimise generation of unavoidable wastes.</p>

Appendix 4

Recommended Environmental Conditions and Nominated Decision-Making Authorities

Nominated 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 Environment	Environmental approval.
2. Minister for Water	<i>Rights in Water and Irrigation Act</i> – water abstraction licences
3. Minister for Indigenous Affairs	<i>Aboriginal Heritage Act</i> – section 18 clearances
4. Minister for Mines	<i>Mining Act 1978</i>
5. Department of Environment and Conservation	Works Approval and Licence (Part V <i>Environmental Protection Act 1986</i>)
6. Department of Mines and Petroleum	<i>Mining Act 1978</i>
7. Department of Water	<i>Rights in Water and Irrigation Act</i> – water abstraction licences
8. Department of Indigenous Affairs	<i>Aboriginal Heritage Act</i> – section 18 clearances
9. Department for Planning and Infrastructure	
10. Esperance Port Authority	
11. Shire of Yilgarn	Decision maker for permits and development approvals

Note: in this instance agreement is only required with DMAs 1-4 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*)

Koolyanobbing Iron Ore Project – Mt Jackson J1 Deposit

Proposal: The proposal is to develop and operate the Koolyanobbing Iron Ore Project-Mt Jackson J1 Deposit open pit iron ore mine and associated infrastructure on leases M77/993, M77/994, P77/360 and haulage road on Lease L77/216 in the Sire of Yilgarn.

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

Proponent: Cliffs Asia Pacific Iron Ore Pty Ltd

Proponent Address: Level 12, The Quadrant, 1 William Street, PERTH WA 6000

Assessment Number: 1753

Report of the Environmental Protection Authority: Report 1347

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.

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 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 Chief Executive Officer of the Office of the Environmental Protection Authority with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.

4 Compliance Reporting

4-1 The proponent shall prepare and maintain a compliance assessment plan to the satisfaction of the Chief Executive Officer of the Office of the Environmental Protection Authority.

4-2 The proponent shall submit to the Chief Executive Officer of the Office of the Environmental Protection Authority, the compliance assessment plan required by condition 4-1 at least 6 months prior to the first compliance report required by condition 4-6. The compliance assessment plan shall indicate:

- 1 the frequency of compliance reporting;
- 2 the approach and timing of compliance assessments;
- 3 the retention of compliance assessments;
- 4 reporting of potential non-compliances and corrective actions taken;
- 5 the table of contents of compliance reports; and
- 6 public availability of compliance reports.

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

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

4-5 The proponent shall advise the Chief Executive Officer of the Office of the Environmental Protection Authority of any potential non-compliance within two business day of that non-compliance being known.

4-6 The proponent shall submit its first compliance assessment report fifteen months from the date of issue of this Implementation Statement addressing the twelve month period or other period from the date of issue of this Implementation Statement and then annually from the date of submission of the first compliance 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 Performance Review and Reporting

- 5-1 The proponent shall submit to the Chief Executive Officer of the Office of the Environmental Protection Authority a Performance Review Report at the conclusion of the first, second, fourth, sixth, eighth and tenth years after the start of implementation which addresses:
1. the major environmental risks and impacts; the performance objectives, standards and criteria related to these; the success of risk reduction/impact mitigation measures and results of monitoring related to management of the major risks and impacts;
 2. the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable; and
 3. significant improvements gained in environmental management which could be applied to this and other similar projects.

6 Biodiversity Areas, Priority Flora and Conservation Significant Vegetation Community

- 6-1 Prior to construction the proponent shall ensure the area of works is delineated by coordinates and subsequently marked in order to minimise the disturbance to, or loss of:
1. the vegetation community *Eucalyptus ebbanoensis* Woodland over Heath with *Calytrix* sp. Paynes Find (Figures 4 and 5);
 2. *Spartothamnella* sp. Helena & Aurora (Figure 6); and
 3. Flora within 'Biodiversity Areas' (Figure 6),
- as identified in Schedule 1 .
- 6-2 The proponent shall ensure that access to areas that support the vegetation community *Eucalyptus ebbanoensis* Woodland over Heath with *Calytrix* sp. Paynes Find, Priority flora *Spartothamnella* sp. Helena & Aurora Range and Priority flora within the 'Biodiversity Areas' as identified in Schedule 1, is restricted to authorised personnel only.

6-3 The proponent shall ensure that mining and mining related activities of this proposal shall not cause the loss of or adverse impacts on any native flora, including the areas vegetation community *Eucalyptus ebbanoensis* Woodland over Heath with *Calytrix* sp. Paynes Find and *Spartothamnella* sp. Helena & Aurora Range within 'Biodiversity Areas' as shown in Figure 6 of Schedule 1.

6.4 The proponent shall monitor impacts from activities undertaken in implementing the proposal, including:

1. dust;
2. drainage/change in surface water flows;
3. weeds; and
4. attraction of and increase in introduced fauna,

on the health and condition of the vegetation community *Eucalyptus ebbanoensis* Woodland over Heath with *Calytrix* sp. Paynes Find, Priority flora *Spartothamnella* sp. Helena & Aurora Range and Priority flora within the 'Biodiversity Areas' as identified in Figure 6 of Schedule 1. This monitoring is to be carried out to the requirement of the Chief Executive Officer of the Office of the Environmental Protection Authority on advice of the Department of Environment and Conservation.

6.5 In the event that the monitoring required by condition 6-4 indicates a decline in the health or condition of the vegetation community *Eucalyptus ebbanoensis* Woodland over Heath with *Calytrix* sp. Paynes Find, Priority flora *Spartothamnella* sp. Helena & Aurora Range and Priority flora within the 'Biodiversity Areas', outside areas approved to be cleared of vegetation as specified in Schedule 1, the proponent shall:

1. report such findings to the Chief Executive Officer of the Office of the Environmental Protection Authority within 21 days of the decline being identified;
2. provide evidence which allows determination of the cause of the decline;
3. if determined by the Chief Executive Officer to be a result of activities undertaken in implementing the proposal, state the actions to be taken to remediate the decline; and
4. the proponent shall implement actions to remediate the decline upon approval of the Chief Executive Officer of the Office of the Environmental Protection Authority and shall continue until such time the Chief Executive Officer of the Office of the Environmental Protection Authority determines that the remedial actions may cease.

7 **Fauna**

7-1 The proponent shall record and report the death of any fauna protected under the *Environment Protection and Biodiversity Conservation Act 1999* and/or the *State Wildlife Conservation Act 1950* to the Chief Executive Officer of the Office of the Environmental Protection Authority within seven days of that death being known.

7-2 The proponent shall ensure that the operation of the Mt Jackson J1 Deposit proposal does not adversely affect Malleefowl populations within the project area as identified in Schedule 1.

7-3 To verify that the requirements of condition 7-2 are met the proponent shall:

1. undertake baseline monitoring of Malleefowl habitat and, active and inactive Malleefowl mounds, within the uncleared portion of the Mt Jackson J1 Deposit project area identified in Schedule 1, prior to ground disturbing activities;
2. monitor the numbers of active mounds and numbers of inactive mounds as identified in condition 7-3-1.

7-4 In the event that monitoring required by condition 7-3 indicates a decline in the health or abundance of the Malleefowl population within the Mt Jackson J1 Deposit project area:

1. the proponent shall report such findings to the Chief Executive Officer of the Office of the Environmental Protection Authority and the Department of Environment and Conservation within 21 days of the decline being identified;
2. the proponent shall provide evidence which allows determination of the cause of the decline;
3. if determined by Chief Executive Officer of the OEPA to be a result of activities undertaken in implementing the proposal, the proponent shall submit actions to be taken to remediate the decline within 21 days of the determination being made to the Chief Executive Officer of the Office of the Environmental Protection Authority on the advice of the Department of Environment and Conservation; and
4. the proponent shall implement actions to remediate the decline Malleefowl populations upon approval of the Chief Executive Officer of the Office of the Environmental Protection Authority and shall continue until such time the Chief Executive Officer of the Office of the Environmental Protection Authority on the advice of the Department of Environment and Conservation determines that the remedial actions may cease.

7-5 The proponent shall make reports of the monitoring required by condition 7-3 publicly available in a manner approved by the Chief Executive Officer of the Office of the Environmental Protection Authority.

8 Short Range Endemic Fauna

8-1 The proponent shall ensure that the clearing of potential Tree-stem Trapdoor Spider (*Aganippe castellum*) habitat does not exceed 148 hectares within the project area as identified in Schedule 1.

8-2 The proponent shall ensure that the implementation and operation of the Mt Jackson J1 Deposit proposal does not adversely affect *Aganippe castellum* populations within the project area as identified in Schedule 1.

8-3 To verify that the requirements of condition 8-2 are met the proponent shall:

1. submit a proposed monitoring program to measure *Aganippe castellum* populations adjacent to the mine pit to provide information on the effect of indirect impacts (dust, vibration, change in microclimate) from mine activities to the requirements of the Chief Executive Officer of the Office of the Environmental Protection Authority on advice of the Department of Environment and Conservation;
2. establish *Aganippe castellum* population monitoring reference sites on the advice of the Chief Executive Officer of the Office of the Environmental Protection Authority on advice of the Department of Environment and Conservation;
3. monitor the *Aganippe castellum* populations adjacent to the Mt Jackson J1 Deposit mine pits and compare this to monitoring undertaken at the reference sites.

8-4 In the event that monitoring required by condition 8-3 indicates a decline in the population number and health of *Aganippe castellum* populations adjacent to the Mt Jackson J1 mine pits:

1. the proponent shall report such findings to the Chief Executive Officer of the Office of the Environmental Protection Authority within 21 days of the decline being identified;
2. the proponent shall provide evidence which allows determination of the cause of the decline;
3. if determined by Chief Executive Officer of the Office of the Environmental Protection Authority to be a result of activities undertaken in implementing the proposal, the proponent shall submit actions to be taken to remediate the decline to the Chief Executive Officer within 21 days of the decline being identified; and
4. the actions to remediate the decline in the number and health of *Aganippe castellum* populations shall be undertaken upon approval of the Chief Executive Officer of the Office of the Environmental Protection Authority.

8-5 The proponent shall make the reports of the monitoring required by condition 8-3 publicly available in a manner approved by the Chief Executive Officer of the Office of the Environmental Protection Authority.

9 **Rehabilitation**

9-1 The proponent shall undertake rehabilitation to achieve the following outcomes:

1. The waste dump shall be non-polluting and shall be constructed so that their final shape, stability, surface drainage, resistance to erosion and ability to support local native vegetation are comparable to natural landforms in the area.
2. The waste dumps and other areas disturbed through implementation of the proposal (excluding mine pits), shall be progressively rehabilitated with vegetation composed of native plant species of local provenance (defined as seed or plant material collected within 10 kilometres of the proposal).

3. The percentage cover of living vegetation in all rehabilitation areas shall be comparable with that of similar natural landforms in the area which have not been disturbed during implementation of the proposal.
 4. For rehabilitation areas where a similar geological profile to the pre mining condition can be re-established, such as areas cleared for infrastructure, the species diversity and abundance shall be comparable with analogue sites representative of the pre disturbance condition of those areas. The analogue sites must be selected in consultation with the Department of Environment and Conservation prior to ground disturbing activities.
 5. To improve the likelihood of rehabilitation success for the flora species *Bossiaea* sp. Jackson Range, *Spartothamnella* sp. Helena & Aurora Range and *Calytrix* sp. Paynes Find the proponent shall:
 1. submit a proposed research program including seed germination trials, and propagation trials, to the requirements of the Chief Executive Officer of the Office of the Environmental Protection Authority on advice of the Department of Environment and Conservation prior to the implementation of the Mt Jackson J1 Deposit mine operations;
 2. undertake the research program during the Mt Jackson J1 Deposit mine operations; and
 3. report the findings of the research program to the Chief Executive Officer of the, Office of the Environmental Protection Authority.
 6. No new species of weeds (including both declared weeds and environmental weeds) shall be introduced into the area as a result of the implementation of the proposal.
 7. The coverage of weeds (including both declared weeds and environmental weeds) within the rehabilitation areas shall not exceed that identified in baseline monitoring undertaken prior to commencement of operations, or exceed that existent on comparable, nearby land which has not been disturbed during implementation of the proposal, whichever is less.
- 9-2 Rehabilitation activities shall commence within 12 months of the cessation of operations and continue as necessary until such time as the requirements of condition 9-1 and are demonstrated by inspections and reports to be met, for a minimum of five years to the satisfaction of the Chief Executive Officer of the Office of the Environmental Protection Authority on advice of the Department of Environment and Conservation and the Department of Mines and Petroleum.

10 **Conceptual Closure Strategy**

- 10-1 Prior to commencing ground-disturbing activity, the proponent shall submit a detailed and project-specific Conceptual Closure Strategy to the requirements of the Chief Executive Officer of the Office of the Environmental Protection Authority on advice of the Department of Environment and Conservation and the Department of Mines and Petroleum.

- 10-2 The Conceptual Closure Strategy shall include detailed results of geochemical and geophysical characterisation of materials, in particular the potential for acid drainage, metalliferous drainage, and of the occurrence of dispersive materials and asbestiform minerals. Testing for materials with potential to cause acid and/or metalliferous drainage shall include static and kinetic testing carried out using techniques and timeframes consistent with national and international standards (Leading Practice Sustainable Development Program for the Mining Industry – Managing Acid and Metalliferous Drainage 2009 – Department of Industry, Tourism and Resources; The Global Acid Rock Drainage Guide 2009 – International Network for Acid Prevention).
- 10-3 The Conceptual Closure Strategy shall provide detailed technical information on proposed management measures to prevent pollution, environmental harm or human health impacts during implementation of the proposal and after mine completion and closure.
- 10-4 The Conceptual Closure Strategy shall include maps and diagrams showing the proposed placement, dimensions, design and proposed methods of construction and closure of waste disposal facilities and mine pits.
- 10-5 The Conceptual Closure Strategy shall demonstrate that waste dump will be located, designed and constructed to ensure that they are non-polluting and so that their final shape, height, stability, surface drainage, resistance to erosion and ability to support native vegetation are comparable to natural landforms in the area.
- 10-6 The Conceptual Closure Strategy shall provide detailed technical information demonstrating that sufficient quantities of suitable materials are available on site for the implementation and closure (including unplanned or temporary closure) of the proposal.
- 10-7 The Conceptual Closure Strategy shall include specific practicable procedures to ensure the protection of the environment in the event of unplanned or temporary mine closure.
- 10-8 The proponent shall implement the proposal consistent with the Conceptual Closure Strategy referred to in conditions 10-1 to 10-7.

11 **Final Closure and Decommissioning Plan**

- 11-1 At least 5 years prior to mine completion, the proponent shall prepare and submit a Final Closure and Decommissioning Plan to the requirement of the Chief Executive Officer of the Office of the Environmental Protection Authority on advice of the Department of Environment and Conservation and the Department of Mines and Petroleum.
- 11-2 The Final Closure and Decommissioning Plan shall be prepared consistent with:
- ANZMEC/MCA 2000, Strategic Framework for Mine Closure Planning; and

- Department of Industry Tourism and Resources 2006 Mine Closure and Completion (Leading Practice Sustainable Development Program for the Mining Industry), Commonwealth Government, Canberra;

and shall provide detailed technical information on the following:

1. final closure of all areas disturbed through implementation of the proposal so that they are safe, stable and non-polluting;
2. decommissioning of all plant and equipment;
3. disposal of waste materials;
4. final rehabilitation of the waste dump facilities and other areas (outside the mine pits);
5. management and monitoring following mine completion; and
6. inventory of all contaminated sites and proposed management.

11-3 The Final Closure and Decommissioning Plan shall include the following requirements:

1. closure, decommissioning and rehabilitation of the haul road;
2. details of a monitoring program to be carried out to inform final closure procedures for the pit void such that the standing water body does not cause environmental harm by:
 - i. attracting native fauna which may be subsequently harmed; or
 - ii. attracting fauna which may harm native fauna populations and/or surrounding native vegetation.
3. management actions to be undertaken based on the findings under condition 11-3-2.

11-4 The proponent shall close, decommission and rehabilitate the proposal consistent with the approved Final Closure and Decommissioning Plan.

11-5 The proponent shall make the Final Closure and Decommissioning Plan required by 11-1 and 11-2 publicly available in a manner acceptable to the Chief Executive Officer of the Office of the Environmental Protection Authority.

Notes :

1. Where a condition states “on advice of the Department of Environment and Conservation”, the Department of Environment and Conservation will provide that advice to Office of the Environmental Protection Authority for the preparation of written notice to the proponent.
2. The Office of the Environmental Protection Authority may seek advice from other agencies or organisations, as required.
3. 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.
4. 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 proponent should consult with the Department of Environment and Conservation in order to clarify requirements under Part V of the *Environmental Protection Act 1986*.

Schedule 1

The Proposal (Assessment No. 1753)

The proposal is to develop and operate the Koolyanobbing Iron Ore Project-Mt Jackson J1 Deposit open pit iron ore mine and associated infrastructure on leases M77/993, M77/994, P77/360 and haulage road on Lease L77/216 in the Sire of Yilgarn.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in section 1.4 of the Public Environmental Review document, *Koolyanobbing Iron Ore Project: Mt Jackson J1 Deposit – Revision H*, prepared by Globe Environments (July 2009).

Table 1: Summary of Key Proposal Characteristics

Element	Description	
General		
Project life	10 years (approximately)	
Location	See Figure 3 M77/993, M77/994, M77/1248, M77/1249 & L77/216.	
Project Area	1052.5 ha of which 212 ha have been designated as 'Biodiversity Areas' which must not be cleared	
Vegetation Clearing	Clearing up to 605 ha comprising: <ul style="list-style-type: none"> ○ mine pits – 114 ha ○ overburden landform – 211 ha ○ operational areas – 225 ha ○ haul road – 44 ha ○ gravel pit – 11 ha Clearing of up to 10.7 ha of vegetation community EeWH1 and individual plants of <i>Spartothamnella</i> sp. within the J1 mine pit area only.	
Rehabilitation	All areas with the exception of the mine voids (114ha) will be rehabilitated	
Mining Operation		
Iron ore reserve	33 Mt (approximately) comprising: <ul style="list-style-type: none"> ○ 23 Mt – above groundwater table ○ 10 Mt – below groundwater table 	
Mining method	Open cut	
Depth to groundwater	417 m AHD	
Mine pits: <ul style="list-style-type: none"> ○ Nominal depth ○ Depth below groundwater table ○ Dewatering rate 	J1 West Pit	J1 East Pit
	342 m AHD	417 m AHD
	75m below groundwater table	Above Groundwater table
	Years 1-5 - 0.63 GL/a Years 6-8 – 0.31 GL/a Years 9-10 – 0.16 GL/a	No dewatering
Overburden landform	Area: 211 ha (approximately) Height: 520 m AHD (approximately)	
Haul Road	No greater than 11 km long and 40 m wide.	

Abbreviations

m – metres
km – kilometres
ha –hectares

Mt – Million tonnes
AHD – Australian Height Datum
GL/a - Gigalitres per annum

Figures (attached)

- Figure 1 Regional Location Map (see fig 1 above)
- Figure 2 Koolyanobbing Iron Ore Project (see fig 2 above)
- Figure 3 Mt Jackson J1 Project Area (see fig 3 above)
- Figure 4 Pit Area - vegetation community *Eucalyptus ebbanoensis* Woodland over Heath with *Calytrix* sp. Paynes Find (see fig 7 above)
- Figure 5 Haul Road - vegetation community *Eucalyptus ebbanoensis* Woodland over Heath with *Calytrix* sp. Paynes Find
- Figure 6 Priority flora (see fig 4 above)

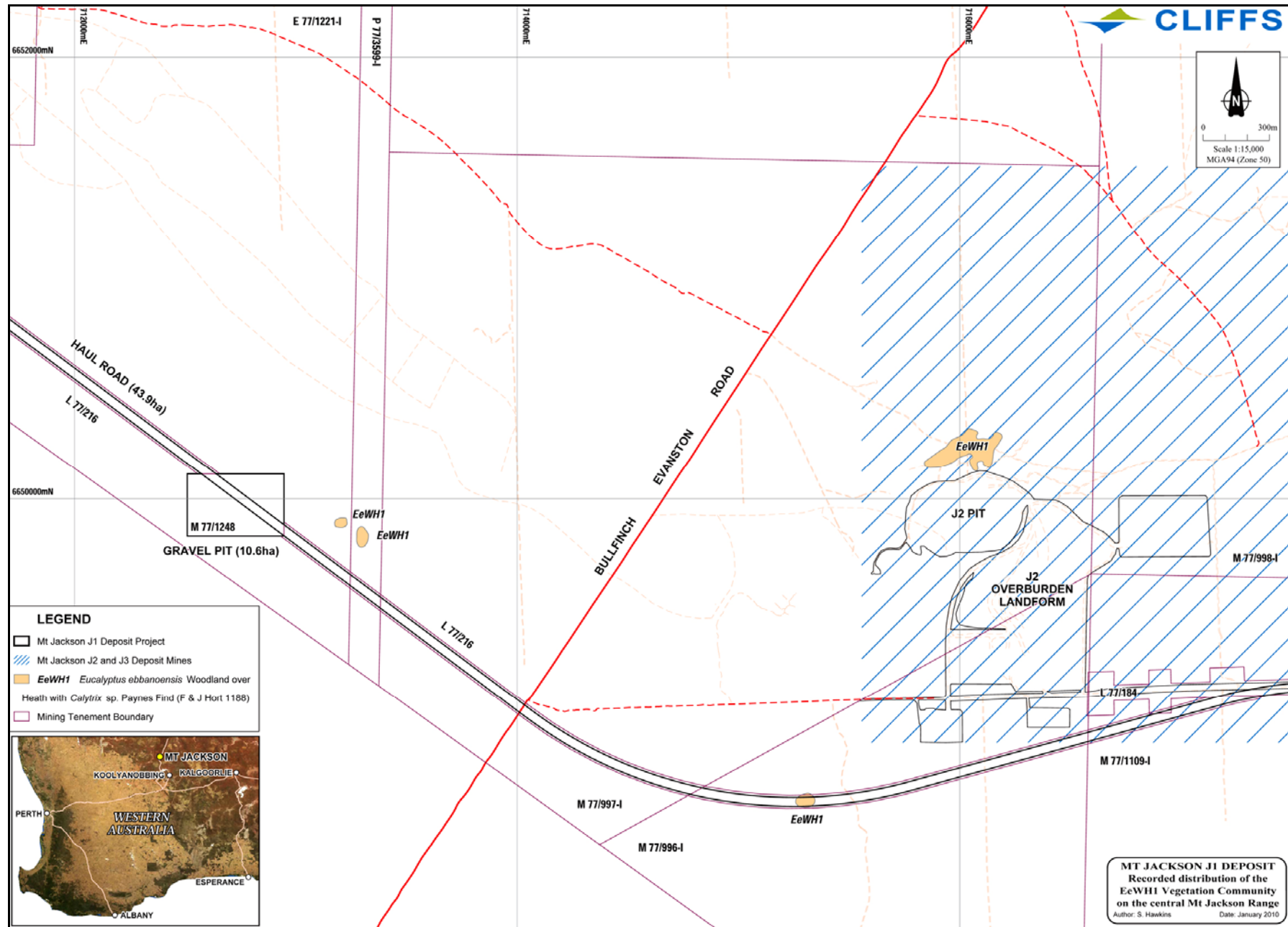


Figure 5: Haul Road - vegetation community *Eucalyptus ebbanoensis* Woodland over Heath with *Calytrix* sp. Paynes Find

Appendix 5

Summary of Submissions and Proponent's Response to Submissions