## Environmental Impact Assessment Process Timelines

<table>
<thead>
<tr>
<th>Date</th>
<th>Progress stages</th>
<th>Time (weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>29/06/2016</td>
<td>EPA decides to assess – level of assessment set</td>
<td></td>
</tr>
<tr>
<td>19/09/2016</td>
<td>EPA approved Environmental Scoping Document</td>
<td>11</td>
</tr>
<tr>
<td>18/04/2017</td>
<td>EPA accepted Environmental Review Document</td>
<td>30</td>
</tr>
<tr>
<td>08/05/2017</td>
<td>Environmental Review Document released for public review</td>
<td>3</td>
</tr>
<tr>
<td>06/06/2017</td>
<td>Public review period for Environmental Review Document closed</td>
<td>5</td>
</tr>
<tr>
<td>24/11/17</td>
<td>EPA accepted Proponent Response to Submissions</td>
<td>24</td>
</tr>
<tr>
<td>30/11/17</td>
<td>EPA completed its assessment</td>
<td>1</td>
</tr>
<tr>
<td>5/12/17</td>
<td>EPA provided report to the Minister for Environment</td>
<td>5 days</td>
</tr>
<tr>
<td>8/12/17</td>
<td>EPA report published</td>
<td>3 days</td>
</tr>
<tr>
<td>22/12/17</td>
<td>Close of appeals period</td>
<td>2</td>
</tr>
</tbody>
</table>

Timelines for an assessment may vary according to the complexity of the proposal and are usually agreed with the proponent soon after the EPA decides to assess the proposal and records the level of assessment.

In this case, the Environmental Protection Authority met its timeline objective to complete its assessment and provide a report to the Minister.

Dr Tom Hatton  
Chairman  
5 December 2017  

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Assessment No. 2085
Summary

This report provides the Minister for Environment with the outcomes of the Environmental Protection Authority’s (EPA’s) environmental impact assessment of the proposal to change the approved Mining Area C Project, by BHP Billiton Iron Ore Pty Ltd.

Proposal

The proposal is to change the approved Mining Area C – Northern Flank Project to include the Mining Area C – Southern Flank (the Proposal), which are located in the Hamersley Range of the Pilbara region of Western Australia (Figure 1).

The Proposal includes the development of an open-cut mine on a satellite orebody located at Southern Flank, with construction of an overland conveyor from the Southern Flank orebody to infrastructure at the Mining Area C hub and to increase the disturbance at the existing Mining Area C hub. The scope includes exploration activity, as well as the construction and operation of associated infrastructure.

Background and context

The Environmental Protection Act 1986 requires that the EPA’s report on the outcome of its assessment sets out the key environmental factors identified in the course of the assessment, as well as the EPA’s recommendations as to whether or not the proposal may be implemented and, if so, the conditions and procedures that should apply. The EPA may also include any other information, advice and recommendations in the assessment report that it thinks fit.

Public submissions

Key issues raised in the submissions included:

- impacts to local Priority Flora;
- potential impacts to Weeli Wolli Spring Priority Ecological Community (PEC), including Ben’s Oasis, and PECs at Coondewanna Flats as a result of changes to the hydrological regime;
- impacts to the local ghost bat population requiring minimisation, monitoring, mitigation and offsets;
- uncertainty regarding the extension of habitat beyond the impacts of the proposal for nine troglofauna species and three stygofauna species;
- that the ecohydrological model contains assumptions resulting in uncertainties including post mining stream flow at Weeli Wolli Spring and the role of dolerite dyke, which appears to act as a barrier slowing groundwater flow from Coondewanna Flats to Weeli Wolli Spring;
- the requirement for further work on the Central Pilbara Water Resource Management Plan to address current uncertainty; and
that post closure mine voids (pit lakes) will prevent full recovery of the groundwater level at Weeli Wolli Spring and groundwater levels at Coondewanna Flats will be lower than under the backfilling scenario.

Issues raised were addressed by the proponent in the Response to Submissions document (BHP Billiton Iron Ore, 2017a).

**Key environmental factors and relevant principles**

The EPA identified the following key environmental factors (see Section 4) during the course of its assessment:

- **Flora and Vegetation** – Loss of flora and vegetation from clearing and potential impacts to groundwater dependent vegetation.

- **Hydrological Processes and Inland Waters Environmental Quality** – Potential impacts on local groundwater dependent vegetation and surface water features, including Weeli Wolli Spring and Ben’s Oasis.

- **Terrestrial Fauna** – Loss of habitat for local population of threatened fauna species (in particular the Ghost Bat).

- **Subterranean Fauna** – Loss of habitat for subterranean fauna species as a result of groundwater abstraction and excavation of mine pits.

- **Social Surroundings (Heritage)** – Potential impacts on Aboriginal heritage (loss or disturbance) and potential impacts on traditional cultural activities.

- **Air Quality** – potential impacts from dust and greenhouse gas emissions.

In identifying the key environmental factors, the EPA had regard to the object and principles set out in section 4A of the EP Act. The EPA considered that all the principles were particularly relevant to this assessment (see Section 4):

1. precautionary principle;
2. principle of intergenerational equity;
3. principle of the conservation of biological diversity and ecological integrity;
4. principles relating to improved valuation, pricing and incentive mechanisms; and
5. principle of waste minimisation.

**Assessment**

The EPA has taken the following into account in its assessment of the Proposal as a whole:

- the impacts to all the key environmental factors;

- the EPA’s confidence in the proponent’s proposed mitigation measures;

- the relevant *Environmental Protection Act 1986* principles and the EPA’s objectives for the key environmental factors; and
the EPA’s view that the impacts to the key environmental factors are manageable, provided the recommended conditions are imposed.

Conclusion and recommendations

Having assessed the proposal, the EPA has concluded that the proposal is environmentally acceptable.

The EPA recommends that the Minister notes:

1. The proponent, BHP Billiton Iron Ore Pty Ltd, proposes a change (referred to in this report as the ‘Proposal’), to its approved project to develop and mine iron ore from the Northern Flank of Mining Area C.

2. The key environmental factors identified by the EPA in the course of its assessment are Flora and Vegetation; Hydrological Processes and Inland Water Environmental Quality; Terrestrial Fauna; Subterranean Fauna; Social Surroundings; and Air Quality, set out in Section 4.

3. The EPA has concluded that the Proposal may be implemented, provided the implementation of the Proposal is carried out in accordance with the recommended conditions and procedures set out in Appendix 6. Matters addressed in the conditions include the following:

   (a) implementation of measures to maintain the ecological integrity of the PECs found at Coondewanna Flats and the Weeli Wolli Spring PEC through the implementation of the Central Pilbara Water Resource Management Plan;

   (b) a requirement to back fill the Highway Deposit mine pit voids to maintain the recovery of groundwater post closure and the environmental values the groundwater supports;

   (c) continued implementation of a cultural heritage management plan to minimise impacts to sites of Aboriginal significance;

   (d) an environmental management plan to maintain the viability of the ghost bat population in the Mining Area C Development Envelope;

   (e) a requirement to report on greenhouse gas emissions;

   (f) an offset to counterbalance the significant residual impact of loss of ‘Good’ to ‘Excellent’ condition native vegetation; and

   (g) an offset to counterbalance the significant residual impact to habitat for threatened fauna.

4. Other advice and recommendations provided by the EPA, set out in Section 7.
Figure 2: Indicative area for managed aquifer recharge bores ........................................ 5
Figure 3: Hope Downs 1, Coondewanna Flats, Weeli Wolli Spring and Ben’s Oasis 11
Figure 4: High value Ghost Bat caves and foraging habitat ............................................. 24

Appendices
1. References
2. List of submitters
3. Consideration of principles
4. Evaluation of other environmental factors
5. Proposed changes to conditions for revised proposal
6. Identified Decision-Making Authorities and Recommended Environmental Conditions
1. Introduction

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for Environment on the outcomes of the EPA’s environmental impact assessment of the proposal by BHP Billiton Iron Ore Pty. Ltd. The proposal is to change the approved Mining Area C Project to include the Mining Area C – Southern Flank.

The EPA has prepared this report in accordance with section 44 of the Environmental Protection Act 1986 (EP Act), which requires that the EPA prepare a report on the outcome of its assessment of a proposal and provide this assessment report to the Minister for Environment. The report must set out:

- what the EPA considers to be 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 also include any other information, advice and recommendations in the assessment report as it thinks fit.

The proponent referred the proposal to the EPA on 30 May, 2016. On 29 June, 2016 the EPA decided to assess the proposal and set the level of assessment at Public Environmental Review (PER), with a public review period of four weeks. The EPA approved the Environmental Scoping Document (ESD) for the proposal on 19 September, 2016. The Environmental Review Document (Environmental Review Document) was released for public review from 8 May, 2017 to 6 June, 2017.

1.1 EPA procedures

The EPA introduced a new suite of environmental impact assessment procedures on 13 December, 2016. The EPA approved the ESD under the 2012 Administrative Procedures.

The EPA followed the procedures in the Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016 and the Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual 2016, to the extent that it was appropriate and practicable. The EPA consulted the proponent on the application of the current procedures to its assessment of the proposal.
2. The proposal

2.1 Proposal summary

The proponent, BHP Billiton Iron Ore Pty Ltd, proposes a change (referred to in this report as the ‘proposal’), to its approved project to develop and mine iron ore from the Northern Flank of Mining Area C.

The approved project consists of the existing approved proposal: Multiple Iron Ore Mine Development, Mining Area C - Northern Flank (Ministerial Statement 491), which involves mining 14 iron ore deposits on the Northern Flank of Mining Area C, including onsite processing and blending of ore, services and infrastructure of the mine sites, accommodation villages and the construction and operation of a rail spur.

The proposed change is to amend the existing Mining Area C operations, approximately 100 kilometres (km) northwest of Newman in the Shire of East Pilbara (Figures 1 and 2). The proposal includes the development of an open-cut mine on a satellite orebody located at Southern Flank, with construction of an overland conveyor from the Southern Flank orebody to infrastructure at the Mining Area C hub and to increase the disturbance at the existing Mining Area C hub. The scope includes exploration activity, as well as the construction and operation of associated infrastructure.

The proposed change is constituted by the following additional activities and/or elements:

- Development of the Southern Flank orebody.
- Construction of an overland conveyor.
- Additional clearing for the Mining Area C – Northern Flank.
- Additional dewatering and managed aquifer injection to allow mining of the Southern Flank orebody.

The key characteristics of the revised proposal (i.e. the amalgamation of the existing approved project and the proposed change) are summarised in Tables 1 and 2. A detailed description of the proposed change in relation to the existing approved project is provided in Section 2 of the Environmental Review Document (BHP Billiton Iron Ore, 2017).

In undertaking this assessment, the EPA has assessed the impacts of the proposed change in the context of the approved project, considering the cumulative impacts of the entire revised proposal where appropriate.
Table 1: Summary of the revised Proposal

<table>
<thead>
<tr>
<th>Proposal Title</th>
<th>Mining Area C – Southern Flank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short Description</strong></td>
<td>The proposal is to mine the Mining Area C Northern Flank and Southern Flank orebodies, which are located in the Hamersley Range of the Pilbara region of Western Australia. The proposal includes the mining of multiple iron ore deposits; onsite processing and blending of ore; construction of an overland conveyor; services and infrastructure of the mine sites; accommodation villages and the construction and operation of a rail spur. The ore will be transported via rail to Port Hedland.</td>
</tr>
</tbody>
</table>

Table 2: Location and proposed extent of physical and operational elements

<table>
<thead>
<tr>
<th>Element</th>
<th>Location</th>
<th>Existing approval (Ministerial Statement/s and other regulatory approvals)</th>
<th>Proposed change (This proposal)</th>
<th>Proposed extent (Revised proposal)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical elements</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native Vegetation Clearing</td>
<td>Figure 1</td>
<td>Clearing of 5,567 ha within a development envelope of 25,815 ha</td>
<td>The proposal represents an additional 16,257 ha of clearing</td>
<td>Clearing of no more than 21,824 ha within a development envelope of 38,909 ha</td>
</tr>
<tr>
<td><strong>Operational elements</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dewatering</td>
<td>Figure 1</td>
<td>Up to 15.3 gigalitres per annum (GL/a)</td>
<td>Up to an additional 22 GL/a</td>
<td>Up to 37.3 GL/a</td>
</tr>
<tr>
<td>Surplus Water Management</td>
<td>Figure 2</td>
<td>Managed Aquifer Recharge of 5.84 GL/a (+ 29 GL/a approved under a Part V licence.)</td>
<td>Up to an additional 1.46 GL/a</td>
<td>Managed aquifer recharge of up to 34.84 GL/a</td>
</tr>
</tbody>
</table>
Figure 1: Regional location and Development Envelope
Figure 2: Indicative area for managed aquifer recharge bores
2.2 Changes to the proposal during assessment

The proponent submitted a request for EPA consent for a change to the proposal during assessment on 27 October, 2017. The nature of the change is to reduce clearing from 19,671 hectares (ha) to 16,257 ha. Tables 1 and 2 include this change. The Chairman, as a delegate of the EPA, concluded that the change was unlikely to significantly increase any impact that the proposal may have on the environment and gave consent under section 43A of the EP Act to the change on 6 November, 2017.

2.3 Context

The MAC – Southern Flank Proposal is located within the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) bioregion and the Hamersley subregion. The eastern edge of Karijini National Park is located approximately 15 km west of the MAC – Southern Flank Proposal Development Envelope.

The proposal sits in the upper catchment of Weeli Wolli Creek, which eventually flows into Fortescue Marsh, 50 km north of the proposal. The Fortescue Marsh is listed in the Directory of Important Wetlands in Australia and is a proposed Ramsar site. The Fortescue Marsh is also listed as a PEC by the Department of Biodiversity, Conservation and Attractions.

The MAC – Southern Flank Proposal was initially to be assessed by the EPA as part of the BHP Pilbara Expansion Strategic Proposal assessment. As the proposal formed part of the Pilbara Expansion Strategic Proposal, much of the cumulative impact modelling for the Strategic Proposal included the MAC – Southern Flank Proposal. The EPA is yet to conclude its assessment of the Strategic Proposal.

The proposal will also have cumulative impacts with other mining projects which are located close to the MAC – Southern Flank Proposal. Hope Downs 1 (Rio Tinto) lies just to the south east of the proposal. Approved mines nearby are West Angeles (Rio Tinto), Hope Downs 4 (Rio Tinto), Yandicoogina (Rio Tinto) and Marillana Creek (Yandi) (BHP).

In 2014, the EPA released advice under s16(e) of the EP Act on the Cumulative Environmental Impacts of Development in the Pilbara Region. This advice included a recommendation that a strategic plan for biodiversity conservation in the Pilbara be developed by the State Government. The Government of Western Australia subsequently released the Pilbara Conservation Strategy in 2016.

The s16(e) advice and the Pilbara Conservation Strategy both identified some of the key threats to environmental values in the Pilbara. These include land clearing; altered fire regimes; and introduced flora and fauna species. The EPA’s s16(e) advice also recommended the establishment of a strategic, coordinated approach to offsets in the Pilbara. The Pilbara Environmental Offsets Fund was announced by the WA Government in July 2016 and is currently being established by the Department of Water and Environmental Regulation.
3. Consultation

The EPA advertised the referral information for the proposal for public comment in June 2016 and received one submission. The submission requested ‘Assess – Public Environmental Review’.

The proponent consulted with government agencies and key stakeholders during the preparation of the Public Environmental Review Document. The agencies and stakeholders consulted, the issues raised and the proponent’s response are detailed in Table 5 of the proponent’s Public Environmental Review Document (BHP Billiton Iron Ore, 2017).

Six agency submissions and no public submissions were received during the public review period. The key issues raised relate to:

- high local impact to Priority Flora;
- potential impacts to Weeli Wolli Spring PEC (including Ben’s Oasis) and the PECs found at Coondewanna Flats as a result of changes to the hydrological regime;
- high impacts to the local Ghost Bat population requiring minimisation, monitoring, mitigation and offsets;
- uncertainty regarding the extension of habitat beyond the impacts of the proposal for nine troglofauna species and three stygofauna species;
- the ecohydrological model, which contains assumptions resulting in uncertainties including post mining stream flow at Weeli Wolli Spring and the role of dolerite dyke, which appears to act as a barrier slowing groundwater flow from Coondewanna Flats to Weeli Wolli Spring;
- the requirement for further work on the Central Pilbara Water Resource Management Plan to address current uncertainty; and
- post closure mine voids (pit lakes), which may prevent full recovery of the groundwater level at Weeli Wolli Spring, and groundwater levels at Coondewanna Flats will be lower than under the backfilling scenario.

Issues raised were addressed by the proponent in the Response to Submissions document (BHP Billiton Iron Ore, 2017a).

The EPA considers that the consultation process has been appropriate and that reasonable steps have been taken to inform the community and stakeholders on the proposed development. Relevant significant environmental issues identified from this process were considered by the EPA during its assessment of the proposal.
4. Key environmental factors

In undertaking its assessment of this Proposal and preparing this assessment report, the EPA had regard for the object and principles contained in s4A of the EP Act to the extent relevant to the particular matters that were considered.

The EPA considered the following information during its assessment:

- the proponent’s referral information and Public Environmental Review Document;
- public comments received on the referral, stakeholder comments received during the preparation of proponent documentation, and public and agency comments received on the Public Environmental Review Document;
- the proponent’s response to submissions raised during the public review of the Public Environmental Review Document;
- the EPA's own inquiries;
- the EPA's Statement of environmental principles, factors and objectives; and
- the relevant principles, policy and guidance referred to in the assessment of each key environmental factor in sections 4.1 to 4.6.

Having regard to the above information, the EPA identified the following key environmental factors during the course of its assessment of the proposal:

- **Flora and Vegetation** – Loss of flora and vegetation from clearing and potential loss of Priority Ecological Communities through changes to hydrological regimes.
- **Hydrological Processes and Inland Waters Environmental Quality** – Potential impacts on local groundwater dependent vegetation and surface water features, including Weeli Wolli Spring and Ben’s Oasis.
- **Terrestrial Fauna** – Loss of habitat for local population of threatened fauna species (in particular the Ghost Bat)
- **Subterranean Fauna** – Loss of habitat for subterranean fauna species as a result of groundwater abstraction and excavation of mine pits.
- **Social Surroundings (Heritage)** – Potential impacts on Aboriginal heritage (loss or disturbance) and potential impacts on traditional cultural activities.
- **Air Quality** – potential impacts from dust and greenhouse gas emissions.

The EPA considered other environmental factors during the course of its assessment of the proposal. These factors, which were not identified as key environmental factors, are discussed in the Public Environmental Review Document (Mining Area C – Southern Flank, Public Environmental Review Document, 2017). Appendix 4 contains an evaluation of why these other environmental factors were not identified as key environmental factors.

Having regard to the EP Act principles, the EPA considered that all the principles were particularly relevant to its assessment of the proposal:
1. **Precautionary Principle** – Investigations on the biological and physical environment undertaken by the proponent have provided sufficient certainty to assess risks and identify measures to avoid or minimise impacts.

2. **Principle of intergenerational equity** – The EPA notes that the proponent has taken measures to avoid and minimise impacts, and this, together with the recommended conditions, will ensure the environment is maintained for future generations.

3. **Principle of the conservation of biological diversity and ecological integrity** – The EPA has considered the impacts to flora and fauna species and recommended conditions to manage impacts to conservation significant fauna so that biological diversity is maintained. Rehabilitation of the mine was also considered in regards to ecosystem function post mining.

4. **Principles relating to improved valuation, pricing and incentive mechanisms** - The EPA notes that the proponent would bear the cost relating to management of waste and pollution, including avoidance, containment, and rehabilitation.

5. **Principle of waste minimisation** – the EPA notes that the proponent proposes to backfill mine voids, use managed aquifer recharge rather than surface water discharge, and apply the waste management hierarchy to this proposal.

Appendix 3 provides a summary of the principles and how the EPA considered these principles in its assessment.

The EPA’s assessment of the proposal’s impacts on the key environmental factors is provided in Sections 4.1 – 4.6. These sections outline whether or not the EPA considers that the impacts to each factor are manageable. Section 6 provides the EPA’s conclusion as to whether or not the proposal as a whole is environmentally acceptable.

**Changes to EPA environmental policy and guidance**

The EPA introduced a new suite of environmental guidance for environmental impact assessment on 13 December, 2016. This replaced EPA policy and guidance that were current at the time of referral for the proposal.

In its assessment of the proposal, the EPA considered and gave due regard to, where relevant, its current environmental impact assessment policy and guidance documents. The EPA consulted the proponent on the application of the current environmental impact assessment policy and guidance documents relevant to their environmental review and the EPA’s assessment of the proposal.
4.1 Flora and Vegetation

EPA Objective

The EPA’s environmental objective for this factor is to protect flora and vegetation so that biological diversity and ecological integrity are maintained.

Relevant policy and guidance

The EPA considers that the following current environmental policy and guidance is relevant to its assessment of the proposal for this factor:

- Environmental Factor Guideline – Flora and Vegetation (EPA, 2016a);
- Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016b);
- WA Environmental Offsets Policy (Government of Western Australia, 2011); and
- WA Environmental Offsets Guidelines (Government of Western Australia, 2014)

The considerations for environmental impact assessment (EIA) for this factor are outlined in Environmental Factor Guideline – Flora and Vegetation (EPA, 2016a) and WA Environmental Offsets Guidelines (Government of Western Australia, 2014).

In addition to the relevant current policy and guidance above, the EPA also had regard to the requirements for flora and vegetation survey in Position Statement No.3 Terrestrial Biological Surveys as an Element of Biodiversity Protection (EPA, 2002) and Guidance Statement No. 51 Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA, 2004a) noting that those documents were in force when flora and vegetation surveys were undertaken across the area that is relevant to this proposal.

EPA Assessment

Receiving environment

The proposal is located in the Hamersley subregion of the Pilbara Bioregion of the IBRA. To the west of the Proposal across the Greater Northern Highway are the Coondewanna Flats and an area of conservation lands managed by the Department of Biodiversity, Conservation and Attractions (DBCA) ‘Ex Juna Downs’. To the east of the proposal is the active Hope Downs 1 mine and Weeli Wolli Spring. To the North of the proposal are the existing MAC operations (MAC-Northern Flank) (Figure 3). The EPA has considered potential impacts to Weeli Wolli Creek and Ben’s Oasis in Section 4.2.

The EPA considers that the two survey reports which form the basis of the assessment, Area C and Surrounds Study Area Level 2 Flora and Vegetation Survey (Onshore Environmental, 2011) and South Flank Study Area Level 2 Flora and Vegetation Survey (Onshore Environmental, 2012) meet the current EPA guidance for flora survey. In addition to this, the EPA is of the opinion that despite some variance to Guidance Statement 51, the flora and vegetation surveys meet the requirements of the ESD and sufficient information has been provided to describe the receiving environment and assess potential impacts.
Figure 3: Hope Downs 1, Coondewanna Flats, Weeli Wolli Spring and Ben's Oasis
Clearing of Flora

Surveys identified 479 flora taxa within the MAC development envelope. No Threatened flora species, range extensions, potentially new species, or locally endemic or restricted species were identified. Twenty-three introduced (weed) species were recorded in the MAC development envelope, two of which are located within the Indicative Additional Impact Assessment Area (IAIAA). None are listed under the *Biosecurity and Agriculture Management Act 2007*. Ten Priority flora species as listed by the DBCA were identified in the MAC development envelope with eight occurring in the IAIAA and two within the Revision 6 Area.

Of these, there is one Priority 2, seven Priority 3, and two Priority 4 species. The proponent has demonstrated that these species are broadly distributed within BHP tenements and across the Pilbara, and the regional impacts to these species will be low. Regional impacts (within BHP tenements) to eight species within BHP tenements are below 10%, with the exception of *Aristida lazaridis* (P2) 43% and *Nicotiana umbratica* (P3) at 50% of BHP records. However, these species are distributed widely across the Pilbara.

The loss of *Nicotiana umbratica* was previously considered as part of the Mining Area C-Life of Project Environmental Management Plan Revision 6 (EMP Rev 6) for the existing mine (MAC Northern Flank) and found to not be significant in light of known occurrences outside of BHP tenements and measures taken to minimise clearing.

The EPA notes that as well as being known outside of BHP tenements, *Aristida lazaridis* is also known to have distributions beyond Western Australia. Therefore, the calculated cumulative impacts to the Priority flora within the BHP tenements are expected to be an over-estimate due to the lack of comparable detailed regional data.

EPA does not consider impacts to identified priority species to be a significant issue for this project as all are broadly distributed regionally.

Clearing of Vegetation

Onshore Environmental (2017) identified 34 vegetation associations in the MAC development envelope with 15 of these considered to have local significance. The PER indicates that there are two locally significant vegetation units subject to significant impacts from the clearing of the IAIAA:

- HS AaApr ErjpAmarCocf TwTp (Mulga and Gidgee Woodland) – up to 73% impact within the development envelope.
- SP AcaoAa ArobDiaChf (Western Bendee and Mulga Forest) up to 48% impact within the development envelope.

The Response to Submissions document provides professional opinion from the DBCA that Mulga and Gidgee Woodland is not a distinct vegetation unit and only differs from similar communities as the result of fire regimes. The Western Bendee
and Mulga Forest community is considered an important community and is of high conservation value principally because of its long-unburnt status. The Response to Submissions document also states that this vegetation unit is believed to occur west of the Great Northern Highway, from west and south of Coondewanna Flats to West Angela and east to Wanna Munna. The proponent considers that the floristic analysis shows that representations of this community occur more widely in BHP tenure, and impacts to it are not likely to be significant.

The proposed MAC development envelope covers an area of 38,909 ha within which clearing of 5,564 ha was previously approved within the Revision 6 Area under Ministerial Statement 491. This proposal (Southern Flank) involves the clearing of an additional 5,942 ha within the Revision 6 Area and 10,315 ha within the New Modified IAIAA as stated in the Response to Submissions document (BHP, 2017a).

The vegetation condition within the MAC development envelope is considered to be mainly 'Good to Excellent'. The proponent considers that additional proposed clearing of vegetation within the Revision 6 Area (5,942 ha) and 9,425 ha within the New Modified IAIAA (total of 15,367 ha) is of Good to Excellent condition.

The Cumulative environmental impacts of development in the Pilbara region (EPA, 2014) was advice issued by the EPA in response to rising clearing rates in the Pilbara and concern with cumulative impacts in the region. At the time clearing between 1997 and 2013 was reported to be 230,000 ha. Since this time clearing is considered to have risen to 310,600 ha, representing approximately 2% of the Pilbara IBRA region. Clearing of an additional 16,257 ha represents a 5% increase in clearing.

The proponent’s Mine Closure Plan states that it will undertake progressive rehabilitation using local provenance native seed from the local area including significant flora species where practicable. Monitoring and control of weed populations will be undertaken to ensure weeds in rehabilitated areas do not exceed those found in representative sites. Ongoing performance assessment will also be carried out by the proponent on these rehabilitated areas.

The EPA notes that successful rehabilitation would be important for a project area in which 16,257 ha would be disturbed in addition to the proponent’s existing operations in this area. Establishment of clear rehabilitation criteria would be an essential part of the Mine Closure Plan. The EPA expects that regular monitoring of achievement against the plan and its completion criteria would be undertaken and reported publicly. The EPA recommends that this is required as part of the condition requiring a Mine Closure Plan, recommended in Section 4.2.

In noting the proposed area to be cleared and the resulting cumulative impacts the EPA considers that a significant residual impact from the loss of 6,635 ha of ‘Good’ to ‘Excellent’ condition native vegetation will remain as a result of this proposal., Therefore, in accordance with the WA Government Offset Policy and Guidelines, the EPA considers that an offset is required. This is discussed further in Section 5.
Coondewanna Flats – Coolibah-Lignum Flats PEC

Coondewanna Flats contains the PEC Coolibah-lignum flats: *Eucalyptus victrix* over *Muehlenbeckia* community (Coondewanna Flats PEC). This consists of a number of sub-types, two of which occur near Southern Flank. One of these has been classified as Priority 1 and one as Priority 3(i).

The Proposal will not result in direct impacts to the Coondewanna Flats PEC. Indirect impacts to the Coondewanna Flats PEC are possible from the following hydrological changes:
- reduction in surface water volume due to mining operations;
- groundwater drawdown from dewatering mine pits in the south of the MAC development envelope; and
- groundwater mounding from Juna Downs Managed Aquifer Recharge (MAR).

The proponent’s ecohydrological studies indicate that the Coondewanna Flats PEC is reliant upon a large soil moisture reservoir which is maintained by regular flooding events that inundate Lake Robinson at the southern end of Coondewanna Flats. The surface water assessment undertaken for the proposal (MWH, 2016) indicated that there would be a loss of 4.7% of the Coondewanna Flats catchment as a result of the Proposal. The proponent’s measures to minimise clearing in the Modified IAIAA has increased the impact to 5.4%. Cumulative impacts with Northern Flank result in a cumulative catchment loss of 7.6%.

The EPA considers that the overall run-off volumes would remain within regional and seasonal variations for the catchment and the 7.6% catchment reduction is unlikely to significantly impact the recharge of soil moisture of the Coondewanna Flats PEC or, as a result, the biological diversity of ecological integrity of the PEC.

The EPA notes that most flows originate from the northern and western parts of the Coondewanna Flats catchment, particularly Homestead Creek. The EPA considers that the cumulative impacts to the Coondewanna Flats catchment and PEC should be assessed for future proposals in the area, particularly as the Pilbara Strategic Proposal includes the Tandanya and Mudlark proposals located in areas that would obstruct the northern and western surface water flows.

The Coondewanna Flats PEC contains plant species which may be sensitive to changes in groundwater levels, such as *Eucalyptus victrix* (Coolibah). Coolibah is a facultative phreatophyte which means it is a species that can utilise groundwater where available within its root zone, and can also occur in areas where groundwater is inaccessible by accessing soil-stored moisture.

Research has indicated that Coolibah roots can extend to a depth of about 15 m. Current groundwater levels below the Coondewanna Flats are thought to be between 18-24 metres below ground level (mbgl) depending on ground surface elevation (BHP, 2016a) and approximately 24 mbgl at monitoring bore GWB0039. The proponent’s research therefore suggests that the Coolibah trees on the Coondewanna Flats are unlikely to be accessing groundwater, and are instead utilising unsaturated soil-stored moisture. As a result, the EPA considers that there is
a low likelihood that groundwater drawdown will impact the Coondewanna Flats PEC.

The proponent currently manages potential impacts to the Coondewanna Flats PEC through the Life of Project Environmental Management Plan Revision 6 (BHP Billiton, 2015) (EMP Rev 6) as required by Ministerial Statement 491 for the existing proposal. This plan contains triggers for groundwater drawdown at Coondewanna Flats PEC.

The proponent has submitted a Central Pilbara Water Resource Management Plan, Version 3 (BHP 2017b) (CPWRMP) to manage impacts to water across its Pilbara operations. The former Department of Water advised that the drawdown triggers in the EMP Rev 6 should be included in the CPWRMP for a defined period or until the proponent’s assumption can be confirmed. In response to this advice the proponent has included these trigger levels.

The proponent has included trigger levels for mounding and drawdown to manage the potential impacts to the Coondewanna Flats PEC and maintain hydrological conditions including groundwater levels and soil moisture levels. The effectiveness of the water management will be confirmed by vegetation health monitoring and measurement.

The EPA notes that further monitoring and revision of the hydrological model would improve understanding of the Coondewanna Flats hydrological system and the potential impacts to the PEC. The EPA considers that the proposed mounding triggers, thresholds and management are reasonable and should be subject to continual improvement based on monitoring and modelling data.

Summary
The EPA has paid particular attention to the:

- EPA’s Statement of Environmental Principles, Factors and Objectives;
- Environmental Factor Guidelines Flora and Vegetation;
- WA Environmental Offsets Policy and Guidelines;
- the application of mitigation hierarchy to minimise flora and vegetation clearing;
- Groundwater drawdown and proposed use of managed aquifer recharge and resulting impacts on Coondewanna Flats;
- Surface water flows remaining within seasonal variation;
- Central Pilbara Water Resource Management Plan; and
- Biodiversity Management Plan.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Flora and Vegetation, that the impacts to this factor are manageable and would no longer be significant, provided there is:
control through authorised extent in schedule 1 of the Recommended Environmental Conditions (Appendix 6);

implementation of measures to maintain the extent of the Coolibah-Lignum Flats PEC on the Coondewanna Flats and Weeli Wolli Spring PEC through the implementation of the Central Pilbara Water Resource Management Plan (Condition 6);

implementation of Condition 9 requiring back filling of the Highway Deposit mine pit voids to maintain the recovery of groundwater post closure and consequently the values of the Coondewanna Flats and Weeli Wolli Spring PEC; and

implementation of offsets (see Section 5, condition 10) to counterbalance the significant residual impact of loss of 6635 ha of ‘Good to Excellent’ vegetation.

4.2 Hydrological Processes and Inland Waters Environmental Quality

EPA Objective
The EPA’s environmental objectives for these factors are:

- to maintain the hydrological regimes of groundwater and surface water so that environmental values are protected.
- to maintain the quality of groundwater and surface water so that environmental values are protected.

Relevant policy and guidance
The EPA considers that the following current environmental policy and guidance is relevant to its assessment of the Proposal for these factors:

- Environmental Factor Guideline – Hydrological Processes (EPA, 2016h); and
- Environmental Factor Guideline – Inland Waters Environmental Quality (EPA, 2016i)

The considerations for environmental impact assessment (EIA) for these factors are outlined in Environmental Factor Guideline – Hydrological Process (EPA, 2016h) and Environmental Factor Guideline - Inland Waters Environmental Quality (EPA, 2016i).

EPA Assessment

Receiving environment
Groundwater resources are recharged through direct infiltration and run-off following high-intensity rainfall events. Aquifer types range within the Pilbara, with the majority in the central and eastern Pilbara being complex fractured rock aquifers with variable structure. Regionally, groundwater flows in a north-westerly direction towards the coast and reflects the topography of the area. Groundwater quality across the Pilbara is generally considered fresh to brackish.
Within the MAC development envelope, groundwater flows in an easterly direction from the Coondewanna Flats, through dolomite in the valley of Northern and Southern Flank. Groundwater flow within the orebody aquifers themselves is considered small and aligns with the surface water flow (BHP, 2017).

Surface water in the Pilbara in generally associated with rivers and smaller drainage lines. The MAC development envelope contains a number of surface water catchments, which are fed by high intensity rainfall associated with cyclonic events. These are Coondewanna Flats in the east and Pebble Mouse and Weeli Wolli creeks in the west of the development envelope.

Modelling has been carried out to predict the impacts from the MAC Southern Flank Proposal. The modelling considered the impacts from existing and expanded operations at MAC as well from the Hope Downs 1 mine.

The predicted impacts of the MAC Southern Flank Proposal are:

- Additional abstraction of 22GL/a of groundwater, principally for dewatering of the mine voids and water supply for the proposal.
- Managed aquifer recharge of surplus water.
- Disruption of surface water catchments from construction of the mine and other infrastructure.
- Creation of pit lakes once mining ceases.

The total cumulative area of mine-affected areas and diverted catchments for South Flank, North Flank, Baby Hope, and Hope Downs 1 is approximately 6.9% of the Coondewanna catchment, 7.2% of the Weeli Wolli Creek catchment, and approximately 2% of the Fortescue Marsh catchment (BHP, 2017).

The predictions for surface water flows are that the overall run-off volumes would remain within regional and seasonal variations for the surface water catchments that would be impacted (BHP, 2017). The EPA considers that the proposal is unlikely to significantly impact on the overall surface water regimes. The impacts of localised changes in the catchments on flora and vegetation were dealt with under that factor in Section 4.1.

The key water values that may be impacted by the proposal are Coondewanna Flats, Weeli Wolli Spring and Ben’s Oasis (Figure 3). Impacts to Coondewanna Flats were addressed in Section 4.1.

**Weeli Wolli Spring**

This spring is a natural expression of groundwater in Weeli Wolli Creek. It is 60km upstream of Fortescue Marsh and a number of permanent pools upgradient from the spring are sustained by the shallow groundwater regime. The hydrological regime supports a Priority Ecological Community (Priority 1), with the PEC comprising groundwater dependent vegetation, permanent pools supporting fauna and a diverse stygofauna community.
The hydrological regimes in the spring are currently influenced by other nearby mining operations, in particular Rio Tinto’s Hope Downs operations. Conditions are in place for the existing operations (via ministerial statements) that require management of dewatering and discharge to protect the values of the creek.

Predictions indicated that dewatering at MAC - Northern Flank undertaken to date would have a negligible impact on the spring. As MAC - Northern Flank is located up-hydraulic gradient of Hope Downs 1 the occurrence of any synergistic effects is difficult to ascertain, as any fall in groundwater level close to the spring (especially a minor fall) would be masked by the larger impacts due to Hope Downs 1. The EPA’s Evaluation Project for Weeli Wolli Spring found that there does not appear to be cumulative impacts on the key environmental values on the spring from dewatering to date (EPA, 2017).

The EPA considers that potential for cumulative impacts from mine sites and the successful deployment of closure commitments is an important consideration in ensuring the future of Weeli Wolli Spring. Given the requirements of Hope Downs 1 Ministerial Statement (MS 893) to ensure that supplementation of Weeli Wolli Spring protects dependent environmental values, the impacts of MAC are more important when Hope Downs is closed and supplementation is proposed to be ceased. An important consideration is how impacts will be managed when dewatering and discharge stops (e.g. feasibility in returning spring flow; how vegetation that is now dependent on permanent flow and supplementation will respond).

The EPA considers that management actions and management targets will need to be developed for the CPWRMP to prevent impacts to Weeli Wolli Spring that can be attributed to the MAC Proposal during operation. Cooperation will be essential as BHP may need to contribute dewatering discharge to maintain the vegetation of the spring while Rio Tinto works to backfill pits and re-establish the aquifer when Hope Downs 1 is being closed.

The CPWRMP includes a number of triggers related to protecting the environmental values of Weeli Wolli Spring. These triggers are currently commitments in MS491 and are based on particular events occurring that increase the risk of MAC having an impact on Weeli Wolli Spring rather than representing a limit of acceptable impact.

The EPA notes that developing accurate triggers and thresholds for the any impacts that MAC may have on Weeli Wolli Spring is difficult given that specific information about closure planning at Hope Downs 1 is not available and Weeli Wolli Springs is not located on BHP tenure. Therefore, the EPA expects that the CPWRMP will need to be revised in the future to refine the management actions and management targets for the MAC Proposal once information regarding mine closure, including cessation of dewatering, at Hope Downs 1 is known.

Whilst the specific triggers will still need to be determined, management measures currently utilised by Rio Tinto can be used by BHP to manage its operations post closure. These measures are contained in CPWRMP and future reviews of this EMP can take into consideration further learnings from the management of Hope Downs 1.
The EPA has previously noted that monitoring at Weeli Wooli Spring is important and that adaptive management is then required to reduce the impacts based on the results of the monitoring. It is also important to regularly update conceptual hydrological models as more information becomes available (EPA, 2017). Monitoring, adaptive management and updated groundwater models would all be expected to be considered when the CPWRMP is revised to consider impacts from MAC and the closure of Hope Downs 1.

**Ben’s Oasis**

Elements of the Weeli Wolli Spring Community PEC also occur at Ben’s Oasis, which is located approximately 20 km upstream of Weeli Wolli Spring. The surface water catchment for Ben’s Oasis is outside of the MAC - Southern Flank development envelope and on tenements held by Rio Tinto. Therefore, the primary potential for impacts associated with MAC – Southern Flank on Ben’s Oasis are from groundwater drawdown.

Ben’s Oasis is understood to be separated from BHP’s dewatering activities by a hydrogeological barrier and therefore is outside the domain of the groundwater model that was developed by BHP. To estimate the amount of potential drawdown at Ben’s Oasis, BHP selected a proxy location about 1 km inside the model domain to the north along Weeli Wolli Creek, considered the most likely pathway for drawdown propagation that could extend to Ben’s Oasis.

The former Department of Water advised that any groundwater drawdown and surface water decline at Ben’s Oasis should be managed through the CPWRMP. Development of triggers, thresholds and actions for Ben’s Oasis should consider the proponent’s current inability to physically access the site.

Although Weeli Wolli Spring and Ben’s Oasis are occurrences of the same PEC, the EPA considers that they should be dealt with separately in the CPWRM, as the sources, extent and nature of most impacts are separate, and should be managed and monitored separately. The current version of the CPWRM has separate schedules for Ben’s Oasis and Weeli Wolli Spring.

The EPA notes that there are access restrictions to Ben’s Oasis. In previous strategic advice on the cumulative impacts of the Pilbara, the EPA has expressed the view that sharing of data between companies would provide better information for environmental impact assessment (EPA, 2014; 2017). The assessment of the MAC - Southern Flank proposal is another example of this.

**Water quality**

Groundwater quality in the MAC – Southern Flank area is high so reinjection is not expected to result in negative impacts on the quality of the water in the receiving aquifers.

The biggest potential impact on water quality is associated with mine closure. In particular, there is the risk of significant impacts from poor water quality in mine voids creating plumes that contaminate groundwater. Mine voids are not expected to
become acidic as waste characterisation identifies low acid forming potential in the material. Therefore, the main risk is from increased salinity leading to the formation of saline plumes.

There is currently an approved mine closure plan in place for MAC – Northern Flank. This closure plan states that pit voids that go below the water table will be backfilled with inert overburden to at least the pre-mining water table level, where practical.

The proponent has included a revised mine closure plan with the PER for MAC – Southern Flank. The plan states that “At Northern Flank pits below water table will be backfilled during operations as part of a waste management program and also post operations to a level which prevents impacts to water quality and allows for aquifer recovery at the key receptors. Backfilling of below water table pit voids at Southern Flank to above pre-mining water is an option available and will be considered where unacceptable impacts to water quality or quantity are likely as a result of pit lakes”.

BHP has also committed to undertake ongoing conceptual model development to better inform closure options with regard to pit lakes, including predictions of water quality in pit lakes.

It is the EPA’s preference that mine pits are backfilled to help prevent the formation of pit lakes as well as to help restore groundwater regimes to as close as possible to their pre-mining state.

The EPA notes that there is some uncertainty in the modelling in regards to the impacts from the Highway Deposit pit voids should it not be backfilled, particularly as this pit sits close to one of the dykes previously discussed. The EPA notes that this could impact on groundwater movement and quality in the area if the pit void behaves significantly differently from what was modelled. Therefore, the EPA considers that it is important that the Highway Deposit pit voids is backfilled to prevent the formation of a pit lake, with significant impacts.

**Conditions**

The CPWRMP contains appropriate trigger and threshold criteria that would allow the proposal to be implemented in a manner that achieves the EPA’s objectives for these factors. The EPA considers that the CPWRMP should be implemented for the MAC Proposal. However, the version of the CPWRMP that was provided with the Response to Submissions for the Proposal requires minor amendments to capture all comments from decision making authorities. The EPA therefore considers that it is appropriate that the current version of the CPWRMP (Version 3.0, 2017) be implemented in the interim, while the proponent works with decision making authorities to update the CPWRMP.

To achieve this, the EPA has recommended a condition (Condition 6) that requires the proponent to implement the version of the CPWRMP that accompanied the Response to Submissions document in the interim, and provide a revised version of the CPWRMP within six months of issue of the Ministerial Statement.
To ensure that the Highway Deposit mine pit voids are backfilled to prevent impacts on hydrological regimes and water quality, the EPA has recommended condition 9 that specifically requires backfilling of these pit voids. The EPA still expects the proponent to backfill other pits associated with the MAC Proposal to ensure impacts are minimised from pit voids.

Summary
The EPA has paid particular attention to the:

- EPA’s Statement of Environmental Principles, Factors and Objectives;
- Environmental Factor Guidelines Hydrological Processes and Inland Waters Environmental Quality;
- Predicted cumulative impacts on Weeli Wolli Spring from MAC – Southern Flank, and the management and mine closure requirements of Hope Downs 1;
- Surface water flows remaining within seasonal variation;
- Uncertainty in regards to modelling of the impacts from the Highway Pit mine voids; and

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Hydrological Processes and Inland Waters Environmental Quality, that the impacts to this factor are manageable and would no longer be significant, provided there is:

- control through authorised extent in schedule 1 of the Recommended Environmental Conditions (Appendix 6);
- Continued implementation of the intent of condition 5 (Groundwater and Groundwater Dependent Ecology) and condition 7 (Life of Project Environmental Management Plan Reviews) of Ministerial Statement 491 through implementation of the Central Pilbara Water Resource Management Plan (Condition 6); and
- implementation of condition 9 requiring back filling of the Highway Deposit mine pit voids to maintain the recovery of groundwater post closure and consequently the values of the Coondewanna Flats and Weeli Wolli Spring PEC.

4.3 Terrestrial Fauna
EPA Objective
The EPA’s environmental objective for this factor is to protect terrestrial fauna so that biological diversity and ecological integrity are maintained.
Relevant policy and guidance

The EPA considers that the following current environmental policy and guidance is relevant to its assessment of the proposal for this factor:

- Environmental Factor Guideline – *Terrestrial Fauna* (EPA, 2016c);
- Technical Guidance – *Terrestrial Fauna Surveys* (EPA, 2016d);
- Technical Guidance – *Sampling Methods for Terrestrial Vertebrate Fauna* (EPA, 2016e);
- Technical Guidance – Sampling of Short Range Endemic Fauna (EPA, 2016f);
- *WA Environmental Offsets Policy* (Government of Western Australia, 2011);
- and
- *WA Environmental Offsets Guidelines* (Government of Western Australia, 2014).

The considerations for environmental impact assessment (EIA) for this factor are outlined in Environmental Factor Guideline – Terrestrial Fauna (EPA, 2016c) and *WA Environmental Offsets Guidelines* (Government of Western Australia, 2014).

In addition to the relevant current policy and guidance above, the EPA also had regard to the requirements for fauna survey in *Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA and Department of Environment and Conservation, 2010), *Guidance Statement No. 56 Terrestrial fauna surveys for environmental impact assessment in Western Australia* (EPA, 2004b) and *Guidance Statement No. 20 Sampling of Short Range Endemic Invertebrate Fauna for Environmental Impact Assessment in Western Australia* (EPA, 2009). These documents were in force when earlier fauna surveys were undertaken across the area that is relevant to this proposal. These earlier surveys provide important background information for this proposal.

EPA Assessment

The EPA considers that the level of survey and survey effort meets EPA guidance for Short Range Endemic and Terrestrial Fauna.

**Short Range Endemic Fauna**

Surveys identified 13 species from invertebrate taxonomic groups known to contain short range endemic (SRE) invertebrates in the MAC development envelope. Four confirmed SRE taxa were recorded in the IAIAA, with only the millipede, *Antichiropus ‘DP007’*, not found outside the MAC development envelope (BHP Billiton, 2017). The response to submissions document (BHP, 2017a) indicates that the proponent has undertaken further sampling and genetic analysis which provides evidence that the *Antichiropus ‘DP007’* is located outside of the proposed impact area. The EPA considers that the proponent has demonstrated that the short range endemic species identified as part of this proposal are located and have habitat that extends outside of the proposed New Modified IAIAA and therefore the impacts to these species are not considered to be significant.
Fauna

Surveys have identified 240 vertebrate fauna species in the MAC development envelope comprised of 30 native mammals, eight introduced mammals, 108 birds, 86 reptiles and eight amphibians. Of these, eleven conservation significant species have been recorded in the MAC development area with seven occurring in the IAIAA. Of these species, the development envelope contains large areas of suitable habitat for four species listed as vulnerable or endangered under both the Wildlife Conservation Act 1950 and the Environmental Protection Biodiversity Conservation Act 1999. These species are the *Dasyurus hallucatus* (Northern quoll), the *Liasis olivaceus barroni* (Pilbara olive python), the *Rhinonicterus aurantia* (Pilbara leaf-nosed bat), the *Macroderma gigas* (Ghost Bat). One of the key threats to these species is the loss of foraging and roosting or denning habitat and the proposal will result in the loss of foraging habitat for all four species, and 1,564 ha of rocky/gully habitat used by northern quolls and Pilbara Olive Pythons for denning and sheltering. However, the Ghost Bat is considered most at risk based on the potential for significant impacts from loss of caves and foraging habitat.

The Ghost Bat occurs across northern Australia from the Pilbara region of to central Queensland. Based on field observations the current Ghost Bat population estimate for the Pilbara region is 1300-2000 individuals and 300-400 individuals in the Hamersley subregion (including the development envelope area) (BHP Billiton 2017). The genetic study has shown that Ghost Bats within the Hamersley subregion form one widely distributed population with a high level of genetic diversity. Recent genetic work suggests the population in the Hamersley subregion could be around 780 individuals (Biologic, 2016). As uncertainty remains regarding the actual population in the Hamersley subregion the proponent has taken a precautionary approach and used the 300-400 individual population estimate when considering impacts.

The proponent’s studies indicate that there are approximately 50 individual Ghost Bats in the MAC development envelope, with approximately half this number occurring within the proposed IAIAA and half in the EMP Rev 6 Area. Sixty-three Ghost Bat caves have been recorded in the MAC development envelope. The proponent’s studies indicate that the IAIAA contains 11 high value caves (day or maternal roosts) and 21 low value caves (feeding roosts). The EMP Rev 6 Area contains ten high value caves. The proponent proposes to minimise clearing through the implementation of a New Modified IAIAA which will reduce the impacts to caves from 33 to 17 (5 high value, 12 low value) with caves remaining increasing from 12 to 27 (11 high value, 16 low value). Figure 4 shows the location of the high value caves in the MAC development envelope.

Studies undertaken in the Hamersley subregion, including studies undertaken for this proposal, indicate that the behaviour and range of Ghost Bats differs from that of populations in the Chichester subregion and in the Northern Territory. In the Hamersley subregion, small groups may move about within a local area and multiple groups may use a cave. Based on these studies it is thought that the bats move about the local area seasonally as prey becomes available, or in response to weather conditions, and do not use any caves continually.
Figure 4: High value Ghost Bat caves and foraging habitat
As there have been no published studies on Ghost Bat foraging in the Pilbara, the proponent has based its estimate of the extent of foraging habitat (all habitat within 2 km of a day roost) on the Northern Territory studies. Recently a male Ghost Bat was radio tracked in a BHP tenure west of Mining Area C (Biologic, 2017). The results of this suggest that Ghost Bats in the area may forage at distances of over 4 km, and may not use the same areas each night. This is a larger range than that observed in the Northern Territory.

Implementing the New Modified IAIAA will likely reduce the number of individuals impacted during mining. Also, mine sequencing could allow Ghost Bats to persist in the western and/or eastern end of the development envelope as they move away from mining areas.

The Biologic (2016) report notes that a reduction in numbers would be expected as approximately half of the high value caves are planned to be removed and the gap between the east and west caves could reduce Ghost Bats’ capacity to respond to natural or man-made events such as fire, drought, and noise. A Peer Review by Norman McKenzie, undertaken on behalf of the proponent, indicates that the conclusions drawn by Biologic (2016) are scientifically conservative and robust.

Taking a conservative approach, the proponent considers that the implementation of the Proposal would likely have a significant impact on the local group of Ghost Bats within the MAC development envelope during mining operations.

The proponent has stated in the PER that the outcome of its management measures is to “maintain long-term viability of Ghost Bat population in the development envelope”. The EPA supports maintaining the viability of this Ghost Bat population both during operation and post closure, and has therefore recommended an outcome based condition. The condition will require specific threshold and trigger criteria, monitoring and reporting so that a viable local population of Ghost Bats is maintained. Management to ensure criteria are not exceeded may include actions such as mine sequencing and ongoing rehabilitation to minimise impacts within the MAC development envelope.

The EPA notes that the actual foraging habitat for the Ghost Bat in the Hamersley region is uncertain. Taking a precautionary approach, the EPA has determined foraging habitat based on the 4 km foraging range from day roosts as discussed in the Biologic (2017) report. This equates to a 9,307 ha loss of habitat (Figure 4) when disturbance in the New Modified IAIAA is implemented. Further loss of foraging habitat is possible within the EMP Rev 6 Area as an additional 5,942 ha of clearing is required in this area as part of the MAC Southern Flank proposal. In noting the above proposed impacts on the Ghost Bat, and the clearing of native vegetation that contains habitat for the Pilbara Olive Python, Pilbara Leaf-nosed Bat and the Northern Quoll, the EPA considers that a significant residual impact remains and in accordance with the WA Government’s Environmental Offsets Policy and Guidelines an offset is required.

The proponent has proposed a Ghost Bat Research Plan to minimise and offset the residual impact to the Ghost Bat. The objectives of study are to:
• determine the temporal and spatial use of roosting habitat in the eastern Hamersley subregion.
• investigate the foraging strategy utilised by the Ghost Bat in the Pilbara.
• determine any key dispersal corridors for Ghost Bats in the eastern Hamersley subregion.

This will include research into the populations in caves within the MAC development envelope so conclusions can be made on impacts of current and future mining operations. The EPA considers that the outcomes of the proposed Ghost Bat Research Plan are primarily aimed at minimising impacts and do not offset the significant residual impacts (see Section 5).

Summary
The EPA has paid particular attention to the:

• EPA’s Statement of Environmental Principles, Factors and Objectives;
• Environmental Factor Guidelines Terrestrial Fauna;
• WA Environmental Offsets Policy and Guidelines;
• the application of mitigation hierarchy to address Ghost Bat cave and foraging habitat impacts;
• loss of five high-value caves, 12 low-value caves and over 9,307 ha of foraging habitat;
• Biodiversity Environmental Management Plan; and
• Disturbance of areas that are habitat for the Pilbara Olive Python, Northern Quoll and Pilbara Leaf-nosed Bat.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Terrestrial Fauna, that the impacts to this factor are manageable, provided there is:

• control through authorised extent in schedule 1 of the Recommended Environmental Conditions (Appendix 6)
• implementation of measures to maintain the viability of the MAC development envelope Ghost Bat population and retain 11 high value caves through the preparation and implementation of an Environmental Management Plan (Condition 7); and
• implementation of offsets (see Section 5, condition 10) to counterbalance the significant residual impact of loss of five high-value caves 12 low value caves and 9,307 ha of foraging habitat for the Ghost Bat, and the clearing of native vegetation that contains habitat for the Pilbara Olive Python, Pilbara Leaf-nosed Bat and the Northern Quoll.
4.4 Subterranean Fauna

EPA Objective

The EPA’s environmental objective for this factor is to protect subterranean fauna so that biological diversity and ecological integrity are maintained.

Relevant policy and guidance

The EPA considers that the following current environmental policy and guidance is relevant to its assessment of the Proposal for this factor:

- Environmental Factor Guideline – Subterranean fauna (EPA, 2016j);
- Technical Guidance – Sampling Methods for Subterranean Fauna (EPA, 2016k); and

The considerations for environmental impact assessment (EIA) for this factor are outlined in Environmental Factor Guideline – Subterranean Fauna (EPA, 2016j).

The EPA is satisfied that the proponent has conducted surveys consistent with technical guidance for subterranean fauna and has met the requirements of the ESD and has provided sufficient information to describe the receiving environment and assess potential impacts.

EPA Assessment

Troglofauna

Potential impacts to troglofauna are direct mortality and loss of habitat through subsurface disturbance for mining activities.

Previous development of MAC – Northern Flank has addressed troglofauna through the various iterations of the Life of Project Environmental Management Plan, required through Ministerial Statement 491 (MS491) issued on 24 December, 1998. In the most recent revision (Revision 6) of that plan, the former Office of the EPA noted that there was some uncertainty around habitat usage and distribution for some troglofauna species and that potential impacts may be overstated. It also noted that a referral for this current proposal was expected and that the expanded survey effort may assist in resolving uncertainty relating to these matters.

Surveys within the MAC Development Envelope have recorded a total of 3,585 specimens, with 126 species found from 19 orders. There were 88 species recorded within the envelope. Four singletons (species only ever recorded from one sample) were recorded in the proposed IAIAA. These are Prethopalpus sp. B15, Prethopalpus julianneae, NR Andricophiloscia sp. B16, and Parajapyidae ‘DPL024’. However, the proponent has subsequently provided sufficient information such that the EPA is satisfied that the evidence provided in the additional habitat assessment included in the proponent’s response to submissions, together with the distribution of widespread troglofauna species, supports the proponent’s conclusion that suitable
habitat extends out of the pit for the five species currently only known from the MAC – Southern Flank disturbance boundary. The EPA therefore considers that impacts to troglofauna are acceptable.

**Stygofauna**

Potential impacts to stygofauna are primarily from drawdown of groundwater as a result of dewatering the mine pits.

Within the Groundwater Assessment Area (GAA), Approved Drawdown Area and reference area, 4412 specimens of stygofauna were found, consisting of at least 60 species. Of the 60 species collected, 27 were recorded within the GAA. Six of these species are known only from the GAA.

*Ainudrilus* sp. WA26 was found 500 m from the edge of the GAA and is likely to be found downstream of Weeli Wolli Spring as there are no apparent hydrological barriers.

*Halacaridae* sp. B01, *Bathynella* sp. 1, and *Schizopera* sp. B02 were found near Weeli Wolli Spring and, given that habitat connectivity along Weeli Wolli Creek is likely to be high for all stygofauna species, this species is considered likely to occur outside areas of drawdown.

Four individuals of *Notobathynella* sp. were found, two from a single bore within the Approved Drawdown Area, and two from a bore 13.7 km away within the GAA. Both bores are within 1.5 km of the edge of the GAA or Approved Drawdown Area and there appears to be no hydrological barrier preventing the species’ range from extending eastwards or southwards into areas of no impact from MAC – Southern Flank.

The other species is *Parameltidae* sp. S04 (BR South), of which 88 occurrences have been recorded in 21 samples from 13 drill holes over a range of 11 km. One of these was found in a bore (EXR0733) that occurs only 5 m within the GAA. Given that active stygofauna are mobile and that the habitat to the west of the bore is hydrogeologically the same as that around the bore, at a local scale this species is certain to occur outside the GAA. In addition, the species was found at a bore 4 km to the west of this site approximately 280 m inside the GAA (AN0119R), and it is likely that the habitat between these two bores and outside the GAA forms part of the range for this species.

The EPA therefore considers that, given the likely extent of continuous habitat for those species found only within the GAA, the impacts to stygofauna are acceptable.

**Summary**

The EPA has paid particular attention to the:

(a) Environmental Factor Guideline *Subterranean Fauna*;

(b) proponent’s application of the mitigation hierarchy to avoid and minimise disturbance of habitat; and
(c) The likely extent of troglofaunal and stygofauna habitat within and outside the impact area and development envelope.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Subterranean Fauna that the impacts to this factor are manageable and would no longer be significant.

4.5 Social Surroundings

EPA Objective

The EPA’s environmental objective for this factor is to protect social surroundings from significant harm.

Relevant policy and guidance

The EPA considers that the following current environmental policy and guidance is relevant to its assessment of the Proposal for this factor:

- Environmental Factor Guideline – Social Surroundings (EPA, 2016g)

The considerations for environmental impact assessment (EIA) for this factor are outlined in Environmental Factor Guideline – Social Surroundings (EPA, 2016g).

EPA Assessment

Aboriginal Heritage

Potential impacts to Aboriginal heritage are from the disturbance of sites of significance and loss of access to areas to undertake traditional activities.

The Pilbara region has a rich and living Aboriginal culture with traditional owners retaining strong links to country and playing a key role in protecting cultural and natural heritage. The proposal is located in the East Pilbara Region within the determined Native Title of the Banjima People. BHP has an existing Indigenous Land Use Agreement (ILUA) with the Banjima People that covers the entire Native Title determination area.

As part of these agreements, BHP and the Native Title groups have agreed to specific cultural heritage commitments in relation to the management of heritage sites, including the recognition, mapping and capture of places of ethnographic importance (referred to as ‘confidential areas’).

There have been over 200 archaeological and ethnographic surveys within the proposed MAC Development Envelope. The environmental issues identified as important during this consultation included water, mine rehabilitation, impacts on bush tucker and bush medicine, impacts on flora and fauna, and the scale of disturbance/cumulative impacts.

Impacts on flora and fauna generally are addressed under the Flora and Vegetation and Terrestrial Fauna factors. Species considered to be conservation significant are
not generally considered to be important for bush tucker. However, the EPA notes in the Environmental Factor Guideline *Social Surroundings* that traditional customs such as hunting and gathering for bush tucker may be considered significant.

Archaeological surveys within the MAC development envelope have identified over 1500 places that show evidence of past human occupation and interaction with the environment, of these 924 are in the indicative additional impact assessment area. These consist mainly of rock shelters (approximately 85% of sites). All sites classed as Section 5 under the Aboriginal Heritage Act 1972 (as determined by the Aboriginal Cultural Heritage Committee) are managed in compliance with the ILUA.

Advice received from the former Department of Aboriginal Affairs identified that the proponent had lodged a statutory application under Section 18 of the *Aboriginal Heritage Act 1972*.

The proponent has avoided the Mount Robinson significant site as agreed with the Traditional Owners. In addition, two actively managed areas are within the Proposed MAC Development Envelope. Jandaru Jibalba will be avoided and will be managed through the proponent’s Project Environmental, Aboriginal, and Heritage, Review (PEAHR) process. As this site is considered culturally sensitive, no further information is available. The Stone Arrangement Relocation has been managed in line with the Cultural Heritage Management Plan for the place within the Banjima determined area.

**Summary**

The EPA has paid particular attention to the:

(a) Environmental Factor Guideline *Social Surroundings*;

(b) proponent’s application of the mitigation hierarchy to avoid and minimise disturbance of archaeological sites; and

(c) the proponent’s Cultural Heritage Management Plan that covers the management of heritage places within the Banjima determined area.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Social Surroundings, that the impacts to this factor are manageable, provided there is continued implementation of the proponent’s Cultural Heritage Management Plan (November 2017) (Condition 5).

### 4.6 Air Quality

**EPA Objective**

The EPA’s environmental objectives for this factor is *to maintain air quality and minimise emissions so that environmental values are protected.*
Relevant policy and guidance

- Environmental Factor Guideline – Air Quality (EPA, 2016m).

EPA Assessment

Potential impacts to air quality are emissions of particulates, principally dust, from mining activities, emissions from combustion for power generation; processing of mineral products and vehicles and equipment, and greenhouse gas emissions.

The location of crushers, ore handling infrastructure and conveyors was chosen in consideration of the location of key receptors at the accommodation camps to minimise impacts of dust emissions to these receptors. The EPA is satisfied that modelling has demonstrated that there will not be significant impacts from dust particulates.

The proponent has considered energy efficiency in the selection and design of equipment and plant. The proposal will emit approximately 385,000 tonnes of carbon dioxide equivalent per year over its life. This equates to approximately 0.46% of Western Australia’s total emissions.

The EPA considers that greenhouse gas emissions associated with this proposal do not present a significant impact to the environment. However, to maintain a robust data set on the state’s greenhouse gas emissions, the EPA has recommended condition 8, that requires the proponent to report annually on greenhouse gas emissions.

Summary

The EPA has paid particular attention to the:

- the scale of greenhouse gas emissions and proposed management measures;
- Environmental Factor Guideline – Air Quality (EPA, 2016m);
- the significance considerations in the Statement of Environmental Principles, Factors and Objectives.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Air Quality, that the impacts to this factor are manageable, however it has recommended condition 8 to ensure monitoring and reporting of greenhouse gas emissions is undertaken.
5. Offsets

As stated in the Procedures Manual, if a proposal relates to a change to, or an expansion of an approved proposal, current offsets practice applies to these changes. Consistent with this, the EPA is only assessing whether offsets are appropriate for the additional impacts from this proposal. The clearing approved under Ministerial Statement 491 is exempt from offsets requirements as offsets were not applied at the time the implementation agreement or decision was made.

Relevant policy and guidance

The EPA considers that the following policy and guidance is relevant to its assessment of offsets for the Proposal:

- *WA Environmental Offsets Policy* (Government of Western Australia 2011).
- *WA Environmental Offset Guidelines* (Government of Western Australia 2014).

The EPA has also considered its strategic advice on *Cumulative environmental impacts of development in the Pilbara Region – Advice of the Environmental Protection Authority to the Minister for Environment under Section 16 (e) of the Environmental Protection Act 1986* (EPA 2014), for the assessment of offsets.

EPA Assessment

Environmental offsets are actions that provide environmental benefits which counterbalance the significant residual impacts of a proposal. The EPA may apply environmental offsets where it determines that the residual impacts of a proposal are significant, after avoidance, minimisation, and rehabilitation, have been pursued.

Principle 1 of the WA Government’s Offset Policy (Government of WA 2011) states “environmental offsets will only be considered after avoidance and mitigation options have been pursued”. Consistent with this policy, the proponent has applied the mitigation hierarchy by identifying measures to avoid, minimise and rehabilitate.

Mitigation measures are assessed under the relevant environmental factor (see 4.1 – 4.6). Following the implementation of all mitigation measures, the EPA considers that implementation of the proposal would likely result in significant residual impacts from:

- the loss of five high value caves; 12 low value caves and the clearing of up to 9,307 ha of foraging habitat for the Ghost Bat; and
- the clearing of 6,635 ha of native vegetation in ‘Good’ to ‘Excellent’ condition in the Hamersley IBRA subregion including habitat for Pilbara Olive Python, Pilbara Leaf-nosed Bat and Northern Quoll.
In noting the above significant residual impacts, the EPA has considered Principle 2 (Environmental offsets are not appropriate for all projects) of the WA Government’s Offsets Policy (Government of WA, 2011) and has determined that offsets are appropriate and applicable for this proposal.

The proponent proposed the following offsets package as part of the PER document:

1. Offsetting the clearing of 19,671 ha of native vegetation that is in ‘Good’ to ‘Excellent’ condition through a monetary contribution to the Pilbara Environmental Offsets Fund (the Fund)
2. Continued research of the ecology of the Ghost Bat in the Pilbara
3. Funding additional studies on troglofauna to further the understanding of species and their distribution in the Pilbara.

The EPA notes the information provided in the proponent’s Response to Submissions document, in particular that the proponent has revised the proposal impact area down to 16,257 ha, provided additional troglofaunal habitat assessment information and provided further details on the proposed additional studies on Ghost Bats (Ghost Bat Research Plan).

Offset 1 – Contribution for clearing of ‘Good’ to ‘Excellent’ condition native vegetation

The Residual Impact Significance Model in the WA Environmental Offsets Guidelines (p11) identifies that an offset is required where there are significant impacts to areas recognised as having high biological value, where the cumulative impact may reach critical levels if not managed, and for impacts to habitat necessary to maintain threatened species.

In its strategic advice, under s16(e) of the EP Act, Cumulative Environmental Impacts of Development in the Pilbara Region, the EPA acknowledged that the Pilbara region is a national biodiversity hotspot and is characterised as an area of very high biodiversity with high species richness and many endemic flora and fauna species. The EPA also recognises that the Pilbara is an area of importance for the mining industry and has been experiencing significant growth over the past 10 years. The region is likely to remain the principal area for iron ore mining for the next 50 years given the size of the iron ore reserves.

The rate, scale and nature of current and future development, combined with the impacts of other threatening processes is of concern to the EPA. The EPA considers that without intervention, the increasing cumulative impacts of development and land use in the Pilbara region will significantly impact on biodiversity and environmental values (EPA, 2014).

In assessing this proposal, and considering the cumulative impacts to environmental values already experienced within the Pilbara, the EPA considers that further clearing of native vegetation within the Hamersley subregion, including the loss of habitat for the Pilbara Olive Python, Pilbara Leaf-nosed Bat and the Northern Quoll, constitutes a significant residual impact and requires an offset. The EPA also consider that the clearing of foraging habitat for the Ghost Bat constitutes significant residual impacts and requires offsetting.
The approach to offsets that is usually implemented in other areas of WA is the acquisition of land with similar environmental values and/or undertaking on ground management actions, usually within conservation areas. Conservation areas in the Pilbara total approximately 8 per cent of the area, with the remainder mostly Crown Land overlain with mining tenements and pastoral leases. The opportunity for proponents to implement traditional approaches to offsets of land acquisition and management is therefore limited.

The EPA also recognises that the scale and nature of the clearing within the Pilbara has additional consequences. These include loss and fragmentation of fauna habitat, interruption of and changes in overland surface water flows, and reduced vegetation condition and fauna population resilience through mechanisms such as changes in fire regimes and increased feral pests and weeds (Government of WA, 2015). There is also limited evidence of successful rehabilitation of mined areas (EPA, 2014).

The EPA’s 2014 strategic advice recognises these challenges faced in the Pilbara. This advice identified a number of environmental risks and impacts resulting from the nature and scale of development and recommended the establishment of a strategic conservation initiative to address these impacts through a coordinated approach at the landscape scale. This strategic conservation initiative is the Pilbara Environmental Offset Fund and is currently being established by the WA Government.

The EPA recognises that the establishment of the Fund is consistent with the principles in the WA Offsets Policy which states that environmental offsets will be focused on longer term strategic outcomes (Principle 6). Strategic approaches, such as the use of the Fund, will provide a coordination mechanism to implement offsets across a range of land tenures (Government of Western Australia, 2014).

The EPA notes that in establishing and implementing the Fund, the WA Government has committed to ensuring that the offsets implemented via the Fund will:

- be relevant and proportionate to the values being impacted (Principle 3);
- use sound knowledge and ensure the offset counterbalances the significant residual impact and delivers long term environmental benefits (Principle 4); and
- be adaptive and be evaluated to ensure that it achieves the outcomes required (Principle 5).

The EPA is therefore of the view that the proposed offset requiring a contribution to the Fund will counterbalance the significant residual impacts resulting from the proposal.

As discussed in Section 4.3, impacts to the Ghost Bat at the local and subregional levels are high. While the EPA has recommended a condition requiring a Ghost Bat population be maintained during operation and closure, the EPA considers that impacts to the Ghost Bat are additional to the loss of native vegetation. The EPA therefore considers that a higher rate should be applied to offset this additional
impact. This is consistent with the EPA’s approach to offset rates in the Pilbara IBRA region, where a higher rate per hectare is applied for areas cleared with additional important environmental values.

Commensurate with other decisions within the Hamersley IBRA subregion, the EPA recommends that the following rates per hectare should be contributed to the Fund:

- $798 per hectare for the clearing of native vegetation in ‘Good’ to ‘Excellent’ condition in the Hamersley IBRA subregion, including habitat for Pilbara olive python, Pilbara leaf-nosed bat and northern quoll.
- $1,596 per hectare for the clearing of native vegetation which is foraging habitat for the threatened fauna Ghost Bat.

The EPA is of the view that offsets delivered via the Fund should address all significant residual impacts from proposals. Funds should be used for landscape scale on-ground actions in the Pilbara IBRA region and indirect actions (such as research) that will directly counterbalance significant residual impacts and contribute to biodiversity conservation outcomes in the region.

The EPA’s view is that project funding for offsets should not be used to provide substitute funding for existing government programs or company obligations.

Offset 2 – Ghost Bat Research Plan

The EPA understands that the additional studies proposed for the Ghost Bat will be a research plan implemented over three years, and will include the following objectives:

- determine the temporal and spatial use of roosting habitat by Ghost Bats in the eastern Hamersley subregion, using genetics and hormone studies on scats collected from caves within the vicinity of BHP operations including Mining Area C and Newman, and Karijini National Park
- investigate the foraging strategies utilised by the Ghost Bat with a focus on determining the home range and preferred foraging habitats using radio-telemetry and VHF transmitters
- determine any key dispersal corridors in the eastern Hamersley subregion.

The anticipated research outcomes from the proposed additional studies are to inform effective on-ground management that will enable government and non-government organisations to reduce impacts and key threats to the Ghost Bat.

The EPA is of the view that the proposed research for the Ghost Bat is consistent with one of the four remaining principles (Principles 3 to 6) of the WA Environmental Offsets Policy (Government of Western Australia 2011). The three principles at variance are explained below.

Principle 3 requires environmental offsets to be proportionate to the significance of the environmental value being impacted. As discussed in Section 4.3, the EPA considers that the local and subregional impacts to the Ghost Bat from the
implementation of the proposal are high and therefore the three-year research plan is not commensurate with the likely impacts.

The EPA is of the view that the proponent has not demonstrated within the research plan how this offset counterbalances the significant residual impact and how it will deliver long-term benefits as required by Principle 4. In particular, the proponent has not committed to undertake on-ground management that could demonstrate a tangible benefit to the Ghost Bat. The EPA notes that the “The Motus Wildlife Tracking System will be trialled to determine if it can be utilised in Australia”, however should it be determined that this is not the case, the proponent has not provided any appropriate contingency measures to address this potential risk.

Principle 5 states that environmental offsets will be applied within a framework of adaptive management. The EPA considers that information demonstrating how knowledge gained from the research plan will inform on-site management and mitigation of impacts has not been provided.

To counterbalance the significant residual impact to the Ghost Bat from the loss of 9,307 ha of foraging habitat, consistent with the principles of the WA Environmental Offsets Policy (Government of Western Australia 2011), the EPA has recommended condition 10 that requires the proponent to contribute to the Pilbara Environmental Offset Fund.

Offset 3 – Troglofauna studies

The EPA is satisfied that the evidence provided in the additional troglofaunal habitat assessment, together with the distribution of widespread troglofaunal species, supports the proponent’s conclusion that suitable habitat extends out of the pit for the five species currently only known from the disturbance boundary. The EPA therefore considers that a significant residual impact no longer remains for troglofauna and an offset is not required.

Summary

The EPA recommends that an offset condition (condition 10) is imposed to counterbalance the significant residual impacts of the proposal. The EPA recommends an offset contribution to the Pilbara Environmental Offset Fund be applied at a rate of $798 per hectare in the Hamersley IBRA subregion be applied for the clearing of 6,635 ha of ‘Good’ to ‘Excellent’ condition native vegetation and the higher offset contribution rate ($1596 per hectare) be applied for the clearing of 9,307 ha of foraging habitat for the Ghost Bat.
6. Conclusion

The EPA has considered the proposal by BHP Billiton Iron Ore Pty Ltd to change the approved Mining Area C – Northern Flank Project to include the Mining Area C – Southern Flank.

Consistent with relevant policies and guidance, the proponent has addressed the mitigation hierarchy by identifying measures to avoid, minimise and rehabilitate environmental impacts including:

- using existing infrastructure where possible;
- reducing impacts on vegetation and fauna habitat by reducing the proposed impact area and retaining key areas of habitat;
- avoiding or minimising impact on sites of cultural significance;
- managed aquifer recharge to reduce groundwater drawdown below Coondewanna Flats; and
- backfilling of the Highway pits to prevent significant long term impacts on groundwater levels.

The Proposal would have a significant residual impact on foraging habitat for the Ghost Bat, which is considered a conservation significant fauna species. The EPA has recommended a condition that requires an offset for the significant residual impact to this species from long-term clearing associated with processing and supporting infrastructure. An additional offset is required for the clearing of ‘Good’ to ‘Excellent’ condition native vegetation, including habitat for the Pilbara Olive Python, Pilbara Leaf-nosed Bat and the Northern Quoll within the Hamersley IBRA subregion.

Conclusion

The EPA has taken the following into account in its assessment of the proposal as a whole:

- The impacts to all the key environmental factors.
- The EPA’s confidence in the proponent’s proposed mitigation measures.
- The relevant EP Act principles and the EPA’s objectives for the key environmental factors.
- The EPA’s view that the impacts to the key environmental factors are manageable, provided the recommended conditions are imposed.

Given the above, the EPA has concluded that the proposal is environmentally acceptable and therefore recommends that the proposal may be implemented subject to the conditions recommended in Appendix 6.
7. Other advice

**Ghost Bat foraging habitat**

The EPA notes that the proponent has increased understanding of the Ghost Bat, such as its use of caves and movements in small groups, through research for this assessment. However, key elements of Ghost Bat ecology are not well understood. This includes temporal and spatial movement between roosts by males and females and the size and location of foraging habitats. The EPA considers that further defining habitat to inform future assessments is of high importance.

The proponent has proposed to continue building on this research to help determine how Ghost Bats utilise foraging habitat as well as the key dispersal corridors in the eastern Hamersley subregion. This research will also be important in helping to determine the viability of Ghost Bat populations within the MAC development envelope and therefore whether the outcome required by condition 7 of the recommended conditions is being met.

**Coondewanna Flats future surface water impacts**

The Coondewanna Flats occurrence of PECs rely on surface water flows. Most surface water flows for the PEC originate from the northern and western parts of the Coondewanna Flats catchment, particularly Homestead Creek. The EPA considers that the cumulative impacts to the Coondewanna Flats catchment and PEC should be considered in the assessment of future proposals in the area, particularly as the Pilbara Strategic Proposal includes the Tandanya and Mudlark proposals located in areas that would obstruct the northern and western surface water flows.

**Clearing in the Hamersley subregion**

The EPA is aware that the cumulative impacts from the clearing of native vegetation within the Hamersley subregion is increasing, and further substantial clearing is proposed as part of both the Pilbara Strategic Proposal and other proposals currently under assessment by the EPA. The EPA will therefore consider reviewing the rate per hectare that is applied to offset the clearing of ‘Good’ to ‘Excellent’ condition native vegetation for this IBRA subregion when assessing future proposals.
8. Recommendations

That the Minister for Environment notes:

1. That the proposal assessed is for the development of an open-cut mine on a satellite orebody located at Southern Flank, with construction of an overland conveyor from the Southern Flank orebody to infrastructure at the Mining Area C hub and to increase the disturbance at the existing Mining Area C hub. The scope includes exploration activity, as well as the construction and operation of associated infrastructure.

2. The key environmental factors identified by the EPA in its assessment are Flora and Vegetation; Hydrological Processes and Inland Water Environmental Quality; Terrestrial Fauna; Subterranean Fauna; Social Surroundings; and Air Quality, set out in Section 4.

3. The EPA has concluded that the proposal may be implemented, provided the implementation of the proposal is carried out in accordance with the recommended conditions and procedures set out in Appendix 6. Matters addressed in the conditions include:

   a) implementation of measures to maintain the extent of the PECs found at Coondewanna Flats and the Weeli Wolli Spring PEC through the implementation of the Central Pilbara Water Resource Management Plan;

   b) a requirement to back fill the Highway Deposit mine pit voids to maintain the recovery of groundwater post closure;

   c) continued implementation of a cultural heritage management plan to minimise impacts to sites of Aboriginal significance;

   d) an environmental management plan to maintain the long term viability of the Ghost Bat population in the Mining Area C Development Envelope;

   e) a requirement to report on greenhouse gas emissions;

   f) an offset to counterbalance the significant residual impact of loss of ‘Good’ to ‘Excellent’ vegetation; and

   g) an offset to counterbalance the significant residual impact to habitat for threatened fauna.

4. The EPA’s Other Advice set out in Section 7 on Ghost Bat foraging habitat, the Coondewanna Flats future surface water impacts, and clearing in the Hamersley subregion.
Appendix 1

References


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Appendix 2

List of submitters
Organisations:
Department of Aboriginal Affairs (WA) (now Department of Planning, Lands and Heritage)
Department of Environment Regulation (WA) (now Department of Water and Environmental Regulation)
Main Roads Western Australia
Department of Mines and Petroleum (WA) (now Department of Mines, Industry Regulation and Safety)
Department of Parks and Wildlife (WA) (now Department of Biodiversity, Conservation and Attractions)
Department of Water (WA) (now Department of Water and Environmental Regulation)
Appendix 3

Consideration of principles
<table>
<thead>
<tr>
<th>EP Act Principle</th>
<th>Consideration</th>
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| **1. The precautionary principle**  
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. In application of this precautionary principle, decisions should be guided by –  
a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and  
b) an assessment of the risk-weighted consequences of various options. | In considering this principle, the EPA notes that Flora and Vegetation; Terrestrial Fauna; Hydrological Processes and Inland Waters Environmental Quality; Subterranean Fauna and Social Surroundings could be significantly impacted by the proposal. The assessment of these impacts is provided in this report.  
Investigations into the biological and physical environmental that have been undertaken by the proponent have provided sufficient certainty to assess risks and identify measures to avoid or minimise impacts. The EPA has recommended conditions to ensure relevant measures are undertaken by the proponent.  
From its assessment of this proposal the EPA has concluded that there is no threat of serious or irreversible harm. |
| **2. The principle of intergenerational equity**  
The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations. | In considering this principle, the EPA notes that Flora and Vegetation; Terrestrial Fauna; Hydrological Processes and Inland Waters Environmental Quality; Subterranean Fauna and Social Surroundings could be significantly impacted by the proposal. The assessment of these impacts is provided in this report.  
In considering this principle, the EPA notes that the proponent has taken measures to avoid and minimise impacts. In assessing this Proposal the EPA has recommended conditions to manage impacts to the key environmental factors identified during the course of this assessment. |
From its assessment of this proposal the EPA has concluded that the environmental values will be protected and that the health, diversity and productivity of the environment will be maintained for the benefit of future generations.

<table>
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<tr>
<th>3. The principle of the conservation of biological diversity and ecological integrity</th>
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<tr>
<td>Conservation of biological diversity and ecological integrity should be a fundamental consideration.</td>
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</table>

This principle is a relevant consideration for the EPA when assessing and considering the impacts of the proposal on the environmental factors of Flora and Vegetation; Terrestrial Fauna; Hydrological Processes and Inland Waters Environmental Quality; Subterranean Fauna and Social Surroundings.

The EPA notes that the proponent has identified measures to avoid or minimise impacts. The EPA has considered these measures during its assessment.

The EPA notes that impacts may affect biological diversity and ecological integrity due to the potential impacts on the Ghost Bat and two Priority Ecological Communities.

The EPA has considered the impacts on the Ghost Bat and considered that proposal should be managed in a manner that maintains a viable local population of this species.

The EPA has also considered the impacts on the Coondewanna Flats and Weeli Wolli Springs Priority Ecological Communities as a result of groundwater drawdown and mine closure.

The EPA has also considered to what extent the potential impacts from the proposal can be ameliorated by recommended conditions, including offsets. The EPA has concluded that given the nature of the impacts that the proposed offsets are likely to ameliorate the impacts of the loss of biological diversity and ecological integrity.
4. Principles relating to improved valuation, pricing and incentive mechanisms

(1) *Environmental factors should be included in the valuation of assets and services.*

(2) *The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.*

(3) *The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.*

(4) *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 maximise benefits and/or minimize costs to develop their own solution and responses to environmental problems.*

In considering this principle, the EPA notes that the proponent would bear the cost relating to waste and pollution, including avoidance, containment, and rehabilitation.

The EPA has had regard to this principle during the assessment of the proposal.

5. The principle of waste minimisation

*All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.*

In considering this principle, the EPA notes that the proponent proposes to backfill mine voids; use managed aquifer recharge rather than surface water discharge of excess water; and apply the waste management hierarchy (i.e. avoid, reduce, reuse, recycle, recover, treat, contain and dispose) to this Proposal.

The EPA has had regard to this principle during the assessment of the proposal.
Appendix 4

Evaluation of other environmental factors
<table>
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<tr>
<th>Environmental factor</th>
<th>Description of the proposal’s likely impacts on the environmental factor</th>
<th>Government agency and public comments</th>
<th>Evaluation of why the factor is not a key environmental factor</th>
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<td><strong>LAND</strong></td>
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<td>Landforms</td>
<td>• Alteration of the landform through the creation of pits, waste dumps, and other landforms created post-mining</td>
<td>No comments were received for this factor</td>
<td>Landforms was not identified as a preliminary key environmental factor when the EPA decided to assess the proposal or in the ESD. The proponent will implement its Project Environmental and Aboriginal Heritage Review process. In addition to this, progressive rehabilitation will be implemented across the proposal in accordance with the Mining Area C Mine Closure Plan. Mine closure can be managed by the DMIRS in accordance with the EPA/Department of Mines and Petroleum Guidelines for preparing mine closure plans and through the application of condition 9 in the recommended conditions. Having regard to: • Environmental Factor Guideline – <em>Landforms</em>; • the requirements of the <em>Guidelines for preparing mine closure plans</em>; and</td>
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<td>Environmental factor</td>
<td>Description of the proposal’s likely impacts on the environmental factor</td>
<td>Government agency and public comments</td>
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| Terrestrial Environmental Quality | • Acid and metalliferous drainage leading to soil contamination post closure.  
• Accidental spills or loss of hydrocarbons and other chemicals. | No comments were received for this factor | Terrestrial Environmental Quality was not identified as a preliminary key environmental factor when the EPA decided to assess the proposal or in the ESD.  
Licensing of discharges and emissions by the DWER under Part V of the EP Act would be required. The likelihood of a large-scale contamination event from spills of hydrocarbons and other chemicals is low.  
Mine closure can be managed in accordance with the EPA/Department of Mines and Petroleum Guidelines for preparing mine closure plans and through |

Accordingly, the EPA did not consider Landforms to be a key environmental factor at the conclusion of its assessment.
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<th>Environmental factor</th>
<th>Description of the proposal’s likely impacts on the environmental factor</th>
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<td>Having regard to:</td>
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<td>• the legislative requirements for managing hydrocarbons, chemicals and wastewater;</td>
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<td>• the requirements of the <em>Guidelines for preparing mine closure plans</em>; and</td>
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<td>• the significance considerations in the <em>Statement of Environmental Principles, Factors and Objectives</em>;</td>
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<td>• Environmental Factor Guideline – <em>Terrestrial Environmental Quality</em>; and</td>
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<td>• the significance considerations in the <em>Statement of Environmental Principles, Factors and Objectives</em>, the EPA considers that it is unlikely that the Proposal would have a significant impact on Terrestrial Environmental Quality and that the impacts to this factor are manageable.</td>
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<td>Accordingly, the **EPA did not consider <strong>Terrestrial Environmental Quality to be a key environmental factor</strong> at the conclusion of its assessment.</td>
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<tr>
<td>Environmental factor</td>
<td>Description of the proposal’s likely impacts on the environmental factor</td>
<td>Government agency and public comments</td>
<td>Evaluation of why the factor is not a key environmental factor</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------------------------------------------</td>
<td>--------------------------------------</td>
<td>----------------------------------------------------------------</td>
</tr>
<tr>
<td>PEOPLE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Health</td>
<td>Excessive noise from mining operations has the potential to impact sensitive receptors. Dust from operations could impact the Great Northern Highway.</td>
<td><strong>Agency comments – Main Roads WA</strong> • Activities should be restricted to times when the meteorological forecast shows no prevailing conditions which may cause particulate material to impede the vision of motorists on Great Northern Highway • A concern was raised surrounding potential visibility issues stemming from proposed mining operations in the areas shown in Figure 5A of the submitted report. Dust and particulate generation which is produced during blasting / mining operations has been noted as a moderate concern to Great Northern Highway. Close to 500 vehicles per day use this section of Great Northern Highway and a reduction in visibility is a large risk. • Blasting activities, including the imposition of any exclusion zones, should not impede traffic along Great Northern Highway. If there is a requirement for any traffic management along Great Northern Highway related to blasting activities a Blast Management Plan must be</td>
<td>Human Health was not identified as a preliminary key environmental factor when the EPA decided to assess the proposal or in the ESD. Mining operations will be managed in accordance with licence conditions under Part V of the Environmental Protection Act 1986. This will include reduced activities in the vicinity of Great Northern Highway when conditions require. The proponent will liaise with Main Roads and implement traffic management measures when undertaking blasting activities. Modelling showed that noise levels could impact the Mulla Mulla Accommodation Camp in a worst-case scenario that is unlikely to occur, however indoor noise levels would meet standards. Noise impacts will be monitored and regulated under the Environmental Protection (Noise) Regulations 1997. Having regard to: • the legislative requirements for managing noise through the</td>
</tr>
<tr>
<td>Environmental factor</td>
<td>Description of the proposal’s likely impacts on the environmental factor</td>
<td>Government agency and public comments</td>
<td>Evaluation of why the factor is not a key environmental factor</td>
</tr>
<tr>
<td>----------------------</td>
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<td>-------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>agreed in advance by BHP and Main Roads.</td>
<td>Environmental Protection (Noise) Regulations 1997; • the legislative requirements for managing emissions under Part V of the EP Act; • Environmental Factor Guideline – Human Health; and • the significance considerations in the Statement of Environmental Principles, Factors and Objectives,</td>
<td>the EPA considers that it is unlikely that the Proposal would have a significant impact on Human Health and that the impacts to this factor are manageable. Accordingly, the EPA did not consider Human Health to be a key environmental factor at the conclusion of its assessment.</td>
</tr>
</tbody>
</table>
Appendix 5

Proposed changes to conditions for revised proposal
Proposed Implementation Agreement (Ministerial Statement)

The EPA recommends that the proposal may be implemented and further recommends that the implementation of the proposal be subject to the Implementation Agreement (Ministerial Statement) set out in Appendix 6.

The recommended Ministerial Statement has been developed in accordance with the Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual 2016 and includes a review of the following implementation conditions:

- Ministerial Statement 491: Multiple Iron Ore Mine Development, Mining Area C – Northern Flank, 100km North West of Newman, issued on 24 December 1998

Proposed changes

The changes between the proposed new Ministerial Statement (Appendix 6) and the existing Ministerial Statement relate to the outdated nature of MS 491. This was released in 1998 and contains conditions that are have a very general approach and would not fit the contemporary approach relating to outcome and objective based conditions. As a result of this, the proposed new Ministerial Statement has not retained any of the conditions contained in MS 491.

The most recent condition added, condition 5 of MS 491 (Groundwater and groundwater dependent ecology) which was added through an amendment to the statement under s46 of the Environmental Protection Act, 1986, on 20 November 2014, required monitoring of dewatering activities to manage impacts on Coondewanna Flats and Weeli Wolli Spring. This conditions has been replaced with Condition 6, which requires the proponent to implement Central Pilbara Water Resource Management Plan (Version 3.0) until a revised Environmental Management Plan is submitted that achieves no net loss biological diversity and/or ecological integrity at Weeli Wolli Springs, Coondewanna Flats, or Ben’s Oasis.

The development envelope in the figures of the recommended conditions have also been updated to include the Juna Downs Borefield as it is within this area that the EPA has assessed the proposed managed aquifer recharge associated with the Revised Proposal. The recommended statement also includes clearing of native vegetation and discharge of water currently licensed under Part V of the Environmental Protection Act 1986.

Recommended environmental conditions

The EPA notes the following:

- Condition 5 of the recommended conditions that requires the proponent to continue to implement the BHP Iron Ore Cultural Heritage Management Plan (November 2017).
- Condition 6 of the recommended conditions that requires the proponent to continue implementing the Central Pilbara Water Resource Management Plan (Version 3.0) until a revised Environmental Management Plan is submitted that achieves no net loss biological diversity and/or ecological integrity at Weeli Wolli Springs, Coondewanna Flats, or Ben’s Oasis.
• Condition 7 of the recommended conditions that requires the proponent to prepare and submit a Ghost Bat Environmental Management Plan with the outcome of maintaining the long-term viability of the Ghost Bat population in the Mining Area C Development Envelope.
• Condition 8 of the recommended conditions that requires the proponent to report on greenhouse gas emissions.
• Condition 9 of the recommended conditions that requires the proponent to ensure that the proposal is rehabilitated and decommissioned in an ecologically sustainable manner, including backfilling of the Highway Deposit pits.
• Condition 10 of the recommended conditions that requires the proponent to provide offsets for significant residual impacts on Ghost Bat foraging habitat and ‘Good’ or to ‘Excellent’ condition native vegetation, including habitat for the Pilbara Olive Python, Pilbara Leaf-nosed Bat and the Northern Quoll within the Hammersley IBRA subregion.

**Recommended proposal details (Schedule 1)**

The Revised Proposal details contained in Schedule 1 (Appendix 6) have been amended to include an updated description which reflects the EPA’s contemporary approach to project descriptions described in the EPA’s Procedures Manual.

Changes include the following:

- revising the authorised clearing to a total of 21,824 ha to reflect the revised cumulative proposal; and
- updating the maps and the figures.
Appendix 6

Identified Decision-Making Authorities and Recommended Environmental
Identified Decision-making Authorities

Section 44(2) of 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 (DMAs), 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:

<table>
<thead>
<tr>
<th>Decision-making Authority</th>
<th>Legislation (and Approval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Minister for Aboriginal Affairs</td>
<td><em>Aboriginal Heritage Act 1972</em> (Section 18 clearances)</td>
</tr>
<tr>
<td>5. Minister for State Development</td>
<td><em>Iron Ore (Mount Goldsworthy) Agreement Act 1964</em></td>
</tr>
<tr>
<td>6. Department of Water and Environmental Regulation</td>
<td><em>Environmental Protection Act 1986</em> (Clearing of Native Vegetation Regulations) (Part V Works Approval and Licence)</td>
</tr>
<tr>
<td>8. Shire of East Pilbara</td>
<td><em>Building Act 2011</em></td>
</tr>
</tbody>
</table>

Note: In this instance, agreement is only required with DMA 1, 2, 3, 4, and 5 since these DMAs are Ministers.
RECOMMENDED ENVIRONMENTAL CONDITIONS

STATEMENT THAT A REVISED PROPOSAL MAY BE IMPLEMENTED

(\textit{Environmental Protection Act 1986})

MINING AREA C

\textbf{Revised Proposal:} Proposal to mine the Mining Area C Northern Flank and Southern Flank orebodies, located in the Hamersley Range. The proposal is a revision of the Multiple Iron Ore Mine Development, Mining Area C - Northern Flank, 100km North-West of Newman, the subject of Statement No. 491 dated 24 December 1998

\textbf{Proponent:} BHP Billiton Iron Ore Pty. Ltd.

\textbf{Proponent Address:} 125 St Georges Terrace
Perth Western Australia 6000

Australian Company Number 008 700 981

\textbf{Assessment Number:} 2085

\textbf{Report of the Environmental Protection Authority:} 1610

\textbf{Previous Assessment Number:} 1108

\textbf{Previous Report of the Environmental Protection Authority:} 913

\textbf{Previous Statement Number:} 491

Pursuant to section 45, read with section 45B of the \textit{Environmental Protection Act 1986}, it has been agreed that:

1. the Revised Proposal described and documented in Schedule 1 may be implemented; and

2. This Statement supersedes Statement No. 491, and from the date of this Statement each of the implementation conditions in Statement No. 491 no longer apply in relation to the Revised Proposal; and

3. the implementation of the Revised Proposal, is subject to the following implementation conditions:
1 Proposal Implementation

1-1 When implementing the Revised Proposal, the proponent shall not exceed the authorised extent of the Revised Proposal as defined in Table 2 in Schedule 1.

2 Contact Details

2-1 The proponent shall notify the CEO of any change of its name, physical address or postal address for the serving of notices or other correspondence within twenty eight (28) days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.

3 Compliance Reporting

3-1 The proponent shall prepare, and maintain a Compliance Assessment Plan which is submitted to the CEO at least six (6) months prior to the first Compliance Assessment Report required by condition 3-6.

3-2 The Compliance Assessment Plan shall indicate:

   (1) the frequency of compliance reporting;

   (2) the approach and timing of compliance assessments;

   (3) the retention of compliance assessments;

   (4) the method of reporting of potential non-compliances and corrective actions taken;

   (5) the table of contents of Compliance Assessment Reports; and

   (6) public availability of Compliance Assessment Reports.

3-3 After receiving notice in writing from the CEO that the Compliance Assessment Plan satisfies the requirements of condition 3-2 the proponent shall assess compliance with conditions in accordance with the Compliance Assessment Plan required by condition 3-1.

3-4 The proponent shall retain reports of all compliance assessments described in the Compliance Assessment Plan required by condition 3-1 and shall make those reports available when requested by the CEO.

3-5 The proponent shall advise the CEO of any potential non-compliance within seven (7) days of that non-compliance being known or suspected.

3-6 The proponent shall submit to the CEO a Compliance Assessment Report by 1 October each year addressing compliance in the previous financial year, or as agreed in writing by the CEO. The first Compliance Assessment Report shall be submitted by 1 October 2018 addressing the compliance for the period from the
date of issue of this Statement, notwithstanding that the first reporting period may be less than twelve (12) months.

The Compliance Assessment Report shall:
(1) be endorsed by the proponent's CEO or a person delegated to sign on the CEO’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 3-1.

4 Public Availability of Data

4-1 Subject to condition 4-2, within a reasonable time period approved by the CEO of the date of this Statement and for the remainder of the life of the Revised Proposal the proponent shall make publicly available, in a manner approved by the CEO, all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g. maps)), environment plans and reports relevant to the assessment of this Revised Proposal and implementation of this Statement.

4-2 If any data referred to in condition 4-1 contains particulars of:
(1) a secret formula or process; or
(2) confidential commercially sensitive information;

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

5 Cultural Heritage Management Plan

5-1 The proponent shall continue to implement the BHP Iron Ore Cultural Heritage Management Plan (November 2017).

5-2 The proponent shall implement the most recent version of the plan approved by the CEO.

5-3 Any changes to the plan referred to in condition 5-1 must be approved by the CEO in writing.
6 Water Management Environmental Management Plan

6-1 The proponent shall prepare and submit an Environmental Management Plan (the Plan), on the advice of the Department of Water and Environmental Regulation, and the Department of Biodiversity, Conservation and Attractions, that demonstrates how the proponent will achieve the following:

(1) no reduction in the extent of each of the following components of the Coolibah-Lignum Flats Priority Ecological Community occurrence on the Coondewanna Flats:

(a) Coolibah woodlands over lignum over swamp wandiree, or

(b) Coolibah and mulga woodland over lignum and tussock grasses on clay plains,

attributable to the Revised Proposal.

(2) no reduction in the extent of the Weeli Wolli Spring occurrence of the Weeli Wolli Spring Priority Ecological Community attributable to the Revised Proposal.

(3) no reduction in the extent of the Ben’s Oasis occurrence of the Weeli Wolli Spring Priority Ecological Community attributable to the Revised Proposal.

6-2 The Plan shall specify Outcome/s, Trigger Criteria, Threshold Criteria, Monitoring, Trigger Level Actions, Threshold Contingency Actions, and Reporting to demonstrate that the outcome in Condition 6-1(1) will be met.

6-3 The Plan shall specify Management Actions, Management Targets, Monitoring and Reporting to demonstrate that the objectives in Condition 6-1(2) and 6-1(3) will be met.

6-4 The Plan shall be prepared in accordance with the EPA’s Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans, or any guideline published by the EPA which amends or replaces this document from time to time.

6-5 The proponent shall submit the Plan to the CEO within six (6) months of the date of this statement, or as otherwise agreed in writing by the CEO.

6-6 The proponent shall implement the Central Pilbara Water Resource Management Plan (Version 3.0) until the CEO has confirmed by notice in writing that the Plan required by condition 6-1 satisfies the requirements of condition 6-2 and 6-3 to meet the objectives required by condition 6-1.

6-7 The proponent shall implement the most recent version of the Plan approved by the CEO.
In the event of exceedance of threshold criteria in Condition 6-2 or failure to meet management targets in Condition 6-3, the proponent shall meet the requirements in Condition 3 (Compliance Reporting) and shall implement the measures outlined in the Plan, including, but not limited to, actions and investigations to be undertaken, and reporting to the CEO.

Any changes to Trigger Criteria, Threshold Criteria, Trigger Level Actions, Threshold Contingency Actions, Management Actions, Management Targets Monitoring or Reporting in the Plan must be approved by the CEO in writing.

**7 Ghost Bat Environmental Management Plan**

The proponent shall prepare and submit an Environmental Management Plan (the Plan), on the advice of the Department of Biodiversity, Conservation and Attractions, that demonstrates how the proponent will achieve the following environmental outcomes:

1. maintain the long term viability of the Ghost Bat population in the Mining Area C Development Envelope as defined in Figure 1 of Schedule 1.

2. no disturbance of the eleven (11) Retained High Value Ghost Bat Caves as shown in Figure 2 of Schedule 1.

The Plan shall specify Outcome/s, Trigger Criteria, Threshold criteria, Monitoring, Trigger Level Actions, Threshold Contingency Actions, and Reporting to demonstrate that the outcomes in Condition 7-1 will be met.

The Plan shall include the monitoring of High Value Ghost Bat Caves as shown in Figure 2 of Schedule 1, including day roosts and any artificial roosts.

The Plan shall be prepared in accordance with the EPA’s Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans, or any guideline published by the EPA which amends or replaces this document from time to time.

The proponent shall submit the Plan to the CEO within three (3) months of the date of this Statement, or as otherwise agreed by the CEO.

The proponent shall implement the most recent version of the Plan approved by the CEO.

In the event of exceedance of threshold criteria, the proponent shall meet the requirements in Condition 3 (Compliance Reporting) and shall implement the measures outlined in the Plan, including, but not limited to, actions and investigations to be undertaken, and reporting to the CEO.

Any changes to Trigger Criteria, Threshold Criteria, Monitoring, Trigger Level Actions, Threshold Contingency Actions or Reporting in the Plan must be approved by the CEO in writing.
7-9 Within five (5) years from the date of this Statement, the proponent shall provide a report to the CEO that details how research undertaken by the proponent on Ghost Bat populations demonstrates that the outcomes in Condition 7-1 will be met.

8 **Greenhouse Gas Reporting**

8-1 The proponent shall publicly report the greenhouse gas emissions from the proposal on an annual basis, in a manner approved by the CEO.

9 **Rehabilitation and Decommissioning**

9-1 The Proponent shall manage the implementation of the Revised Proposal to meet the following environmental objective:

(1) ensure that the Proposal is rehabilitated and decommissioned in an ecologically sustainable manner.

9-2 Within six months of the date of this Statement or as otherwise agreed in writing from the CEO, the Proponent shall prepare and submit a Mine Closure Plan in accordance with the *Guidelines for Preparing Mine Closure Plans, May 2015* (or any subsequent revisions of the guidelines), to the requirements of the CEO, on advice of the Department of Mines, Industry Regulation and Safety, and the Department of Water and Environmental Regulation.

9-3 The proponent shall continue to implement the Mining Area Closure Plan AML7000281 (Revision 1, July 2014) until the CEO has confirmed by notice in writing that the Mine Closure Plan satisfies the requirements of condition 9-2 to meet the objective required by 9-1.

9-4 The plan shall include, but not limited to, the following:

(1) backfilling of the Highway Deposit Pits, as described in Figure 3 of Schedule 1, to a level that avoids the creation of a permanent mine pit lake;

(2) management of waste rock including waste rock capable of generating Acid and Metalliferous Drainage; and

(3) management of pit lakes.

9-5 The Proponent shall review and revise the Mine Closure Plan required by condition 9-2 at intervals not exceeding three years, or as otherwise agreed by the CEO, and submit the plan to the CEO at the agreed interval.

9-6 The Proponent shall implement the latest revision of the Mine Closure Plan, which the CEO has confirmed by notice in writing, satisfies the requirements of condition 9-2.
10 Offsets

10-1 In view of the significant residual impacts and risks as a result of the implementation of the Revised Proposal, the proponent shall contribute funds to the Pilbara Environmental Offset Fund calculated pursuant to condition 10-2, subject to any reduction approved by the CEO under condition 10-11.

10-2 The proponent’s contribution to the Pilbara Environmental Offset Fund shall be paid biennially, with the amount to be contributed calculated based on the clearing undertaken in each year of the biennial reporting period in accordance with the rates in condition 10-3. The first biennial reporting period shall commence from ground disturbing activities of the environmental values identified in condition 10-3.

10-3 Calculated on the 2016-2017 financial year, the contribution rates are:

1. $798 per hectare of ‘Good’ to ‘Excellent’ condition native vegetation, including habitat for Pilbara olive python, Pilbara leaf-nosed bat and Northern quoll cleared within Area A, as shown in Figure 4 of Schedule 1, within the Hamersley IBRA subregion.

2. $1,596 per hectare of ghost bat foraging habitat within Area B, as shown in Figure 4 of Schedule 1, within the Hamersley IBRA subregion.

10-4 From the commencement of the 2017-2018 financial year, the rates in condition 10-3 will be adjusted annually each subsequent financial year in accordance with the percentage change in the CPI applicable to that financial year.

10-5 Prior to ground disturbing activities within Areas A or B, or as otherwise agreed with the CEO, the proponent shall prepare and submit an Impact Reconciliation Procedure to the CEO.

10-6 The Impact Reconciliation Procedure required pursuant to condition 10-5 shall:

1. state that clearing calculations for each biennial reporting period will commence on 1 July of the required reporting period, unless otherwise agreed by the CEO;

2. include a methodology to calculate the amount of clearing undertaken during each year of the biennial reporting period for each of the environmental values identified in condition 10-3; and

3. indicate the timing and content of the Impact Reconciliation Reports.

10-7 The proponent shall not commence ground disturbing activities within Areas A or B, unless otherwise agreed by the CEO, until the CEO has confirmed in writing that the Impact Reconciliation Procedure satisfies the requirements of condition 10-6.
10-8 The proponent shall submit an Impact Reconciliation Report in accordance with the Impact Reconciliation Procedure approved in condition 10-7.

10-9 The Impact Reconciliation Report required pursuant to condition 10-8 shall provide the location and spatial extent of the clearing undertaken within Areas A and B during each biennial reporting period.

10-10 The clearing of 5564 hectares that was previously approved under Statement 491 is exempt from the requirement to offset under condition 10-2.

10-11 The proponent may seek the written approval of the CEO to reduce all or part of the contribution payable under condition 10-2 where:

(1) a payment has been made to satisfy a condition of an approval under the *Environment Protection and Biodiversity Conservation Act 1999* in relation to the Revised Proposal; and

(2) the payment counterbalances impacts of the Revised Proposal on matters of national environmental significance.
### Table 1: Summary of the Revised Proposal

<table>
<thead>
<tr>
<th><strong>Revised Proposal Title</strong></th>
<th><strong>Mining Area C</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short Description</strong></td>
<td>The Revised Proposal is to mine the Mining Area C Northern Flank and Southern Flank orebodies, which are located in the Hamersley Range of the Pilbara region of Western Australia. The proposal includes the mining of multiple iron ore deposits; onsite processing and blending of ore; construction of an overland conveyor; services and infrastructure of the mine sites; accommodation villages and the construction and operation of a rail spur. The ore will be transported via rail to Port Hedland.</td>
</tr>
</tbody>
</table>

### Table 2: Location and authorised extent of physical and operational elements

<table>
<thead>
<tr>
<th><strong>Element</strong></th>
<th><strong>Location</strong></th>
<th><strong>Authorised Extent</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Native Vegetation clearing</td>
<td>Figure 1</td>
<td>Clearing of no more than 21,824 ha within the Development Envelope of 38,909 ha</td>
</tr>
<tr>
<td>Dewatering</td>
<td>Figure 1</td>
<td>Up to 37.3 gigalitres per annum</td>
</tr>
<tr>
<td>Surplus water management</td>
<td>Figure 1</td>
<td>Up to 34.84GL per annum via manager aquifer recharge, infiltration ponds and discharge from sedimentation basins</td>
</tr>
</tbody>
</table>

### Table 3: Abbreviations and Definitions

<table>
<thead>
<tr>
<th><strong>Acronym or Abbreviation</strong></th>
<th><strong>Definition or Term</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>CEO</td>
<td>The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the <em>Environmental Protection Act 1986</em>, or his delegate.</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Authority</td>
</tr>
<tr>
<td>EP Act</td>
<td><em>Environmental Protection Act 1986</em></td>
</tr>
<tr>
<td>Ha</td>
<td>Hectare</td>
</tr>
<tr>
<td>Outcome</td>
<td>Proposal-specific, desired state for an environmental factor/s to be achieved from the implementation of outcome-based provisions</td>
</tr>
<tr>
<td>Trigger criteria</td>
<td>Criteria that provide an early warning that the threshold criteria may not be met.</td>
</tr>
<tr>
<td>Threshold criteria</td>
<td>Limit of acceptable impact beyond which there is likely to be a significant effect on the environment, which indicates the environmental outcome is not being met.</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Monitoring to determine if trigger criteria and threshold criteria are exceeded.</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Trigger level actions</td>
<td>Actions to be implemented in the event that trigger criteria are exceeded.</td>
</tr>
<tr>
<td>Threshold contingency actions</td>
<td>Actions to be implemented in the event that threshold criteria are exceeded.</td>
</tr>
<tr>
<td>Reporting</td>
<td>Reporting of monitoring results against trigger criteria and threshold criteria to demonstrate that the outcome/s have been met.</td>
</tr>
<tr>
<td>CPI</td>
<td>The All Groups Consumer Price Index numbers for Perth compiled and published by the Australian Bureau of Statistics.</td>
</tr>
<tr>
<td>IBRA</td>
<td>Interim Biogeographic Regionalisation for Australia</td>
</tr>
<tr>
<td>Pilbara Environmental Offset Fund</td>
<td>A special purpose account created pursuant to section 16(1)(d) of the Financial Management Act 2006 by the Department of Water and Environmental Regulation.</td>
</tr>
</tbody>
</table>

**Figures**

Figure 1  Mining Area C development envelope  
Figure 2  High Value Ghost Bat Caves and foraging habitat  
Figure 3  Highway Deposit – indicative pit layout  
Figure 4  ‘Good’ to ‘Excellent’ condition native vegetation (Area A) and Ghost Bat foraging habitat (Area B)
Figure 1: Mining Area C development envelope
Figure 2: High Value Ghost Bat Caves and foraging habitat.
Figure 4: ‘Good’ to ‘Excellent’ condition native vegetation (Area A) and Ghost Bat foraging habitat (Area B)
Coordinates defining the Mining Area C development envelope; high value bat cave locations; the indicative location of the Highway Deposit pits; Area A and Area B in Figures 1 to 4 are held by the Department of Water and Environmental Regulation (DWER file 2017-1512435548501, December, 2017).