

14. ENVIRONMENTAL IMPACT ASSESSMENT - INTEGRATING FACTOR - OFFSETS

The EPA's objective for offsets is "to counterbalance any significant residual environmental impacts or uncertainty through the application of offsets".

14.1 KEY STATUTORY REQUIREMENTS, ENVIRONMENTAL POLICY AND GUIDANCE

The application and assessment of environmental offsets for the project has been undertaken with consideration to the following:

- WA Environmental Offsets Guidelines (EPA 2014c).
- WA Environmental Offsets Policy (Government of WA 2011).
- Environmental Protection Bulletin No. 1 Environmental Offsets (EPA 2014b).
- Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (DSEWPC 2012a).
- How to Use the Offsets Assessment Guide (DoEE 2016a).
- Offset Calculation Excel spreadsheet with embedded formulae (DoEE 2016b).

14.2 ASSESSMENT OF OFFSET REQUIREMENTS

Under both the WA Environmental Offsets Guidelines and the Australian Government's Environmental Offsets Policy, environmental offsets are required where a project is likely to cause significant residual impacts. Residual impacts are unavoidable impacts that remain after avoidance, minimisation and rehabilitation have been pursued (EPA 2014b). Environmental offsets counterbalance the significant residual environmental impacts of a project (EPA 2014b).

The ESD identifies potential residual significant impacts of the project on flora, vegetation, and fauna habitat as a result of the following activities within the mining area:

- Land clearing for permanent infrastructure.
- Groundwater abstraction.

This PER has conducted the EIA for the project for Key, Other, and Integrating Environmental Factors within Sections 8 to 13. Sheffield has developed management and mitigation measures to minimise environmental impacts of the project. Design of the project has taken into account the mitigation hierarchy of:

- Avoid.
- Minimise.
- Rehabilitate.
- Offset.

Significant avoidance and minimisation measures have been incorporated into decision making and Mine Site design. Key actions that have resulted in avoidance or minimisation of impacts include the following:

- Mining rate - The proposed ore mining rate has been reduced from 18 Mtpa over 40 years, to an initial 7.5 Mtpa over the first five years, ramping up to 15 Mtpa with an extended production life of over 40 years.

This will reduce the area of clearing to be undertaken annually, as well as the area under rehabilitation at any one time. It will also reduce water requirements and the aquifer recovery time.

- Ore processing - The initial processing stage MUPs are located within the mining void so that no additional land clearing is required. These units are skid mounted and will be relocated as the mining void advances.
- Mining excavation - The initial mining location was selected based on minimising overburden removal requirements, to minimise the need for stockpiling outside the mining area. The mining footprint has been reduced from the original proposed footprint to maintain an adequate buffer for identified Aboriginal heritage sites.
- Excess water – The proposed reinjection of excess water is anticipated to assist the aquifer to recover more readily as opposed to surface discharge and/or surface storage and evaporation of excess water.
- Site access - Using the existing Mt Jowlaenga Rd, with modifications rather than construct a new access road will:
 - Avoid ephemeral watercourses and low lying areas likely to be subject to inundation during the wet season, thus minimising the need for engineered crossings.
 - Avoid heritage areas and any associated buffers.
 - Minimise additional land clearance and thus vegetation disturbance.

Rehabilitation will be undertaken progressively over the life of the mine, as overburden from new mining areas and waste from the processing plant will be used to backfill mined sections of pit. This would be followed by topsoil placement (resourced from recently cleared areas), deep ripping and direct seeding for final rehabilitation of the land surface. Detail on the proposed rehabilitation is included in Section 12 and the MCP in Appendix 4.

After application of the mitigation hierarchy, Sheffield considers that the project will have a significant residual impact on only one Key Environmental Factor – Terrestrial Fauna. Specifically the residual impacts are to the Greater Bilby, which is also a Matter of National Environmental Significance. The Greater Bilby is listed as Vulnerable under the *WC Act* and the *EPBC Act*.

The significant residual impacts identified in relation to the Greater Bilby are through direct clearing of habitat. Although Ecologia (2015a) state that the Greater Bilby prefer Pindan Shrubland habitat, a precautionary approach has been taken given that it is well documented that the Greater Bilby occurs across a wide range of habitats (Southgate 1990). A total proposed disturbance of 2,280 ha is required for the project. Of this, 1632.9 ha are temporary and will be progressively cleared over the 40+ year project timeframe. Of this amount, approximately 200 ha of mine pit will be open at any one time, with progressive backfilling and rehabilitation occurring as the excavation progresses. The remaining 639.6 ha are for permanent infrastructure required throughout the project life.

14.3 PROPOSED OFFSET STRATEGY

Consistent with the WA Environmental Offsets Guidelines, Sheffield intends for any environmental offsets to be relevant and proportionate to the significance of the environmental impact. Given that the Greater Bilby is a Matter of National Environmental Significance, the following principles from the *EPBC Act Environmental Offsets Policy* have also been considered in the development of an appropriate offsets package. Suitable offsets are required to:

- Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action.
- Be built around direct offsets, but may include other compensatory measures (direct offsets are offsets that maintain or increase a matter's viability, or reduce any threats of damage, destruction or extinction, providing a measurable conservation gain).
- Be in proportion to the level of statutory protection that applies to the protected matter.

- Be of a size and scale proportionate to the residual impacts on the protected matter.
- Effectively account for and manage the risks of the offset not succeeding.
- Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs.
- Be efficient, effective, timely, transparent, scientifically robust and reasonable.
- Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.

14.3.1 Offset Calculation

The DoEE Offsets Guide was used to assess applicability of proposed offsets for the Greater Bilby.

The DoEE Offsets Guide and the draft EPA offsets calculators are difficult to use in an extensive land use zone, such as the Kimberley where the project is located due to the absence of freehold land. The majority of land in the surrounding project area that is likely to provide habitat for the Greater Bilby consists of long term (99 year) pastoral leases, Aboriginal reserves or Unallocated Crown Land. As a result, Sheffield has considered ways other than the purchase of land for an offsets package.

The EPA Offset Calculation Spreadsheet has also been used in the offset calculation process, and is provided in Table 88.

Table 88: EPA Offset Calculation Spreadsheet

	Mitigation			Significant Residual Impact	Offset Calculation Methodology					
	Avoid and Minimise	Rehabilitation Type	Likely Rehabilitation Success		Type	Risk	Likely Offset Success	Time Lag	Offset Quantification	
Total proposed disturbance of no more than 2,280 ha of vegetation	<p>2,499 ha of Bilby habitat within the Mine Site Development Envelope have been avoided.</p> <p>Management and mitigation measures in Section 13.4 include:</p> <ul style="list-style-type: none"> • Clearing activities will be managed to ensure clearing is strictly limited to that necessary for operations. • Land clearing will be undertaken progressively over 40 + years with the amount of active disturbance minimised. • Disturbed areas will be rehabilitated progressively as they become available. • Topsoil and vegetation will be respread over rehabilitated areas to act as a seed source and mulch to protect the soil from erosion and provide habitat for fauna. 	<p>Mining areas progressively cleared and rehabilitated - 1,632.9 ha over 40+ years.</p> <p>Areas of mine infrastructure rehabilitated at end of mine life - 639.6 ha.</p>	<p><u>Can the environmental values be rehabilitated?</u> Yes</p> <p><u>Operator experience in undertaking rehabilitation?</u> Best practise rehabilitation techniques and methodology will be used. Site rehabilitation research and trials during the life of the project will focus on restoration of Bilby habitat. Results will be applied to ongoing rehabilitation. Proponent has no direct experience as this is their first project. Individual employees within the current team have significant mining experience including management of mine closure.</p> <p><u>Credibility of rehabilitation proposed?</u> Success at Lennard Shelf (400 km east of Broome) shows that rehabilitation in the West Kimberley can be achieved. Restoration of landforms following mineral sands has been demonstrated in WA and in other areas of Australia.</p> <p><u>What is the type of vegetation being rehabilitated?</u> Pindan Shrubland</p> <p><u>Time lag?</u> Mining areas will be progressively rehabilitated throughout the 40+ year mine life.</p>	<p><u>Extent</u> 639.6 ha of Greater Bilby habitat for life of mine infrastructure.</p> <p><u>Quality</u> Condition of vegetation ranged from good to excellent (Matiske 2016). Some low level disturbance, associated with cattle and some areas subject to fire. Quality varies across site.</p> <p><u>Conservation Significance</u> Provides habitat for the Greater Bilby, which is Vulnerable under WC Act and EPBC Act.</p> <p><u>Tenure</u> Pastoral lease</p> <p><u>Time Scale</u> Life of mine (40+ years) plus time taken to complete rehabilitation.</p>	Provide funds to establish a Kimberley Greater Bilby Trust; develop and implement a WA Bilby Record Database; provide logistical support for researchers; institute a feral animal control program within Mine site Development Envelope.	Low	Sheffield is committed to providing funding for the offset initiatives. It is also expected that the offsets will be a condition of the Part IV environmental approval of the project.	N/A	N/A	<p><u>DoEE Calculator</u> The DoEE calculator indicates that an offset of 447.72 ha is required to adequately compensate for the long term/permanent loss of 639.6 ha habitat. Recent Ministerial Statements and offset packages for the Pilbara have resulted in offset values of between \$1,500 to \$3,000 per ha being applied. This equates to a value of between \$671, 580 and \$1,343,160 over the life of the project.</p> <p>Establish the Kimberley Greater Bilby Trust - \$750,000 The purpose of this Trust will be to administer funds for research into the Greater Bilby, support onground conservation actions, facilitate Traditional owner involvement in land management for benefit of the species and ensure public access to information on results of projects supported by the trust. Sheffield will commit a total of \$750,000 over the life of the project with 60% of Sheffield funds to be allocated for completion of projects by the end of Year 20.</p> <p>WA Bilby Record Database - \$85,000 Work collaboratively with other interested stakeholders to develop and implement a WA Bilby Record Database and fund administration for 10 years. Estimated costs are \$40,000 for establishment in the first year and \$5,000 per year for 9 years for a total of \$85,000.</p> <p>Logistical support for researchers - \$90,000 Provide logistical support for people undertaking relevant research projects (flights to site, accommodation, and field work assistance) for research projects. Estimated costs are \$10,000 per person per project per year for a total of \$90,000 based on three research projects for three years' duration each.</p> <p>Feral animal control program - \$225,000 Feral animal control within the Mine Site Development Envelope. It is recognised the project may result in increased predator populations. Sheffield will allocate \$5,000 per year for 45 years for a total of \$225,000.</p> <p>Total package - \$1,150,000 The offsets package proposed totals \$1,150,000 over the life of the project which will generate significant positive outcomes for the Greater Bilby in the Kimberley.</p>

Of the proposed clearing, 1,632.9 ha are classified as temporary for the mine excavation. Input to the offsets guide indicates rehabilitation in situ of this area is suitable as an offset for this clearing. The remaining proposed clearing of 639.6 ha is for permanent infrastructure for the life of project (40+ years). The DoEE calculator indicates that an offset of 447.72 ha is required to adequately compensate for the long term and permanent loss of habitat. Outputs from the DoEE Offsets Guide are provided in Appendix 27.

Recent Ministerial Statements and offset packages for the Pilbara have resulted in offset values of between \$1,500 to \$3,000 per ha being applied. Proposed offsets for the Thunderbird Mineral Sands Project have been calculated based on the residual impacts to the 639.6 ha for permanent infrastructure for the life of project. Using the DoEE calculated offset requirement of 447.72 ha and the rates of \$1,500 to \$3,000 per hectare, this equates to values of between \$671, 580 and \$1,343,160 over the life of the project. In line with other projects in the extensive land use zone, an offset will only be paid for actual clearing undertaken and this will be reconciled as part of the construction process.

14.3.2 Proposed Offset Package

Sheffield proposes an offsets package to mitigate the residual impacts of clearing 639.6 ha of Greater Bilby habitat through a combination of research funds and contribution to regional programs focused on gaining greater understanding of the Greater Bilby including improved collation of data relevant to the species.

Specifically, in order to offset significant residual impacts of the Greater Bilby, Sheffield proposes to:

- Establish the Kimberley Greater Bilby Trust. The purpose of this Trust will be to administer funds for research into the Greater Bilby. Sheffield will commit a total of \$750,000 over the life of the project with 60% of Sheffield funds to be allocated for completion of projects by the end of Year 20.
 - Work collaboratively with other interested stakeholders to develop and implement a WA Bilby Record Database and fund administration for 10 years. Estimated costs are \$40,000 for establishment in the first year and \$5,000 per year for 9 years for a total of \$85,000.
 - Provide logistical support for people undertaking relevant research projects (flights to site, accommodation, and field work assistance) for research projects. Estimated costs are \$10,000 per person per project per year for a total of \$90,000 based on three research projects for three year's duration each.
 - Feral animal control within the Mine Site Development Envelope. It is recognised the project may result in increased predator populations. Sheffield will allocate \$5,000 per year for 45 years for a total of \$225,000.
- The offsets package proposed totals \$1,150,000 over the life of the project which will generate significant positive outcomes for the Greater Bilby in the Kimberley.

14.3.2.1 Kimberley Greater Bilby Trust

Sheffield will champion establishment of the Kimberley Greater Bilby Trust. The objectives of the Trust would be to:

- Facilitate priority research for the Greater Bilby in the Kimberley.
- Fund on-ground environmental and conservation management at the landscape level, with emphasis on net conservation benefits to the Greater Bilby.
- Facilitate indigenous involvement in land management and conservation activities relevant to the greater Bilby.
- Share outcomes of work supported by the Trust to assist with increasing effectiveness of conservation activities.

A Management Panel would be appointed to ensure the objectives of the Trust are achieved. Representation from regulatory authorities, NGO's, Traditional Owners and Sheffield as the founder are proposed.

Similar to the recently established Greater Victoria Desert Biodiversity Trust, Sheffield envisages the Kimberley Greater Bilby Trust would be open to contributions from a range of stakeholders to support this initiative.

Given the long life of the project and long term need for protection of the species, it is anticipated that research priorities will change over time, particularly as results of initial projects are published and understood. Establishment of the Kimberley Greater Bilby Trust would enable independent determination and prioritisation of research and conservation needs most effective for conservation of the species.

14.3.2.2 *Establish and Implement WA Bilby Records Database*

During stakeholder consultation, the issue of a lack of a centralised database for Greater Bilby records in Western Australia was raised. During baseline surveys it also became apparent that records obtained from DPaW data base searches are not comprehensive and do not include results from a range of work undertaken for the Greater Bilby. Other stakeholders with interests in Greater Bilby conservation have identified that conservation efforts would benefit from centralisation of records from scientific surveys (research institutions, regulators and private industry), surveys conducted by Traditional Owners and Aboriginal Ranger Programs.

Sheffield will commit funds to assist with establishment of such a records database and provide funding for ongoing maintenance.

14.4 PREDICTED OUTCOME

The proposed offset package is designed to counterbalance the loss of Greater Bilby habitat which has the potential to occur through permanent modification of habitat characteristics in the Mine Site Development Envelope. This will be achieved by reducing threats to the Greater Bilby, potentially improving habitat condition, and increasing numbers across the broader Dampier Peninsula.

Sheffield considers that the potential significant residual impacts to the Greater Bilby will be able to be counterbalanced by the proposed offsets package such that the environmental objective for offsets (Section 14) will be met.