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# **Koolanooka Hills Exploration Project**

Exploration Environmental  
Management Plan

**Westralian Iron Pty Ltd**

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# Contents

<b>1</b>	<b>Context, scope and rationale.....</b>	<b>1</b>
1.1	Proposal .....	1
1.2	Purpose and scope.....	1
1.3	Key environmental factors .....	1
1.4	Rationale and approach .....	4
1.4.1	Management approach.....	4
1.4.2	Environmental outcomes and objectives.....	1
1.4.3	Key assumptions and uncertainties.....	7
1.5	Index of Biodiversity Surveys for Assessments (IBSA) .....	7
<b>2</b>	<b>Environmental requirements .....</b>	<b>8</b>
2.1	Regulatory requirements .....	8
<b>3</b>	<b>Environmental management procedures .....</b>	<b>9</b>
3.1	General.....	9
3.1.1	Risk Assessment .....	9
3.2	Flora and vegetation .....	9
3.2.1	Potential impacts .....	9
3.2.2	Objectives .....	9
3.2.3	Performance indicators/targets .....	10
3.2.4	Management requirement .....	10
3.3	Terrestrial fauna .....	14
3.3.1	Potential impacts .....	14
3.3.2	Objectives .....	14
3.3.3	Performance indicators/targets .....	14
3.3.4	Management requirement .....	14
3.4	Soil and water quality .....	16
3.4.1	Potential impact .....	16
3.4.2	Objectives .....	16
3.4.3	Performance indicators.....	16
3.4.4	Management requirements .....	16
<b>4</b>	<b>Compliance management .....</b>	<b>18</b>
4.1	Roles and responsibilities.....	18
4.2	Environmental training and awareness .....	18
4.3	Monitoring.....	18
4.4	Incident management .....	18
4.5	Inspection and Audit .....	19
4.5.1	Post-drilling site inspection.....	19
4.6	Records and reporting .....	19

## Appendices

No table of contents entries found.

## Figures

Figure 3-1. Drill Sump / Costean Development and Rehabilitation

Figure 3-2. Drill Collar Plugging and rehabilitation.

## Tables

Table 1-1: Environmental factors and potential impacts of Project activities

Table 1-2: Environmental Management Measures

Table 3-1: Flora and Vegetation Management requirements

Table 3-2: Terrestrial Fauna Management Requirements

Table 3-3: Soil and Water Quality Management Requirements

# 1 Context, scope and rationale

## 1.1 Proposal

Westralian Iron Pty Ltd (Westralian Iron) is proposing to undertake an exploration drilling program at the Koolanooka Hills, within Mining Leases M70/1164 and M70/1190 (the Project), located in the Shire of Morawa approximately 20 kilometres (km) east-south-east of the township of Morawa, Western Australia.

The Project comprises:

- 25 drill pads (10 metres (m) x 18 m); and
- Access tracks (4 m width, connecting drill pads).

The exploration works are proposed for 2022 and are expected to be completed over three months.

## 1.2 Purpose and scope

This Exploration Environmental Management Plan (EEMP) has been prepared to accompany referral of the Project under s. 38 of the *Environmental Protection Act 1986* (EP Act) to the WA Environmental Protection Authority (EPA). This EEMP has been prepared with consideration given to the EPA *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environment Management Plans* (EPA, 2020) and relevant guidelines such as EPA factors and guidelines, species recovery plans and interim recovery plans, conservation advices, and threat abatement plans.

This EEMP outlines the environmental controls required to be implemented during exploration activities at the Koolanooka Hills undertaken by Westralian Iron. The Project scope includes clearing native vegetation, exploration drilling works, earthworks to create drill pads and access tracks, and final rehabilitation of cleared areas after drilling works are complete.

From time to time additional controls may be imposed through regulatory instruments used to approve exploration activities. This EEMP allows for additional controls to be implemented as required based on the outcome of risk assessments or as imposed by regulatory instruments.

## 1.3 Key environmental factors

Environmental factors relevant to the Project are described in Table 1-1 below in relation to:

- proposal activities that could affect the environmental factor
- site-specific environmental values, existing and/or potential uses, ecosystem health condition or sensitive component of the key environmental factor, which could be affected.

**Table 1-1: Environmental factors and potential impacts of Project activities**

Preliminary key environmental factors	
EPA Factor	Flora and vegetation
EPA objective	To protect flora and vegetation so that biological diversity and ecological integrity are maintained
Relevant activities	<ul style="list-style-type: none"> <li>■ Vegetation clearing and earthworks associated with creating drill pads and access tracks</li> <li>■ Exploration drilling (and sump use)</li> <li>■ Operation of machinery and vehicles</li> </ul>
Potential impacts	<ul style="list-style-type: none"> <li>■ Direct impacts through clearing of 2.95 hectares (ha) of remnant native vegetation, including:                             <ul style="list-style-type: none"> <li>– Clearing of 2.95 ha of ‘Plant assemblages of the Koolanooka System’ (Threatened Ecological Community (TEC) No. 59) (BC Act-listed as Vulnerable)</li> <li>– Loss of individuals of ‘priority’ flora taxa:                                     <ul style="list-style-type: none"> <li>■ <i>Acacia graciliformis</i> (P1);</li> <li>■ <i>Acacia muriculata</i> (P1);</li> <li>■ <i>Dodonaea scurra</i> (P1);</li> <li>■ <i>Drummondita rubriviridis</i> (P1);</li> <li>■ <i>Lepidosperma</i> sp. Koolanooka (P1);</li> <li>■ <i>Psammomoya implexa</i> (P3); and</li> <li>■ <i>Stenanthemum poecilum</i> (P3).</li> </ul> </li> </ul> </li> <li>■ Indirect impacts through:                             <ul style="list-style-type: none"> <li>– Introduction and spread of weeds</li> <li>– Dust deposition which may result in reduced plant photosynthesis and increased plant transpiration</li> <li>– Transmission of saline groundwater encountered during drilling</li> <li>– Erosion from cleared areas</li> <li>– Contamination due to hydrocarbon/chemical spills and leaks</li> </ul> </li> </ul>
EPA Factor	Terrestrial Fauna
EPA objective	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained
Relevant activities	<ul style="list-style-type: none"> <li>■ Vegetation clearing and earthworks associated with creating drill pads and access tracks</li> <li>■ Exploration drilling</li> <li>■ Vehicle movements and machinery operation</li> <li>■ Construction activities that generate noise</li> </ul>
Potential impacts	<ul style="list-style-type: none"> <li>■ Direct impacts:                             <ul style="list-style-type: none"> <li>– Clearing of 2.95 ha of fauna habitat associated with the following conservation significant fauna:                                     <ul style="list-style-type: none"> <li>■ Malleefowl (<i>Leipoa ocellata</i>) (BC Act and EPBC Act-listed as Vulnerable);</li> <li>■ Western Spiny-tailed Skink (<i>Egernia stokesii badia</i>) (BC Act-listed as Vulnerable; EPBC Act-listed as Endangered); and</li> <li>■ Gilled Slender Blue-tongue (<i>Cyclodomorphus branchialis</i>) (BC Act listed as Vulnerable)</li> </ul> </li> <li>– Loss and injury of fauna as a result of:                                     <ul style="list-style-type: none"> <li>■ vehicle and/or equipment strikes</li> </ul> </li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>■ entrapment or drowning in sumps</li> <li>■ Indirect impacts: <ul style="list-style-type: none"> <li>– Habitat loss, degradation or fragmentation as a result of vegetation clearing and earthworks, introduction of weeds, and increased risk of fire (resulting in increased competition for limited resources)</li> <li>– Introduction of feral fauna species (risk of competition, predation and disease)</li> <li>– Construction-related noise disturbance</li> <li>– Access to water and food waste, causing fauna behaviour changes</li> </ul> </li> </ul>
<b>Other environmental factors</b>	
<b>EPA Factor</b>	<b>Landform</b>
EPA objective	To maintain the variety and integrity of distinctive physical landforms so that environmental values are protected
Relevant activities	<ul style="list-style-type: none"> <li>■ Vegetation clearing and earthworks associated with creating drill pads and access tracks</li> <li>■ Exploration drilling</li> </ul>
Potential impacts	<ul style="list-style-type: none"> <li>■ Localised visual impacts on the vegetation and landform structure of the Koolanooka Hills</li> </ul>
<b>EPA Factor</b>	<b>Inland water</b>
EPA objective	To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected
Relevant activities	<ul style="list-style-type: none"> <li>■ Vegetation clearing and earthworks associated with creating drill pads and access tracks</li> <li>■ Exploration drilling</li> <li>■ Storage and handling of hydrocarbons and chemicals</li> <li>■ Vehicle movements and machinery operation</li> </ul>
Potential impacts	<ul style="list-style-type: none"> <li>■ Erosion of drill pads and exploration tracks leading to surface water contamination with sediment</li> <li>■ Contamination by wastewater generation or saline groundwater encountered during drilling</li> <li>■ Contamination with hydrocarbons due to leaks from fuel storage and spills during fuel handling activities</li> </ul>
<b>EPA Factor</b>	<b>Terrestrial environmental quality</b>
EPA objective	To maintain the quality of land and soils so that environmental values are protected
Relevant activities	<ul style="list-style-type: none"> <li>■ Vegetation clearing and earthworks associated with creating drill pads and access tracks</li> <li>■ Exploration drilling</li> <li>■ Storage and handling of hydrocarbons and chemicals</li> <li>■ Vehicle movements and machinery operation</li> </ul>
Potential impacts	<ul style="list-style-type: none"> <li>■ Erosion of drill pads and exploration tracks</li> <li>■ Leakage of water used or encountered during drilling activities causing contamination of the terrestrial environment</li> <li>■ Hydrocarbon and chemical leaks/spills causing contamination of the terrestrial environment</li> </ul>
<b>EPA Factor</b>	<b>Air Quality</b>
EPA objective	To maintain air quality and minimise emissions so that environmental values are protected
Relevant activities	<ul style="list-style-type: none"> <li>■ Vegetation clearing and earthworks associated with creating drill pads and access tracks</li> </ul>

	<ul style="list-style-type: none"> <li>■ Topsoil stockpiling</li> <li>■ Operation of machinery and vehicles</li> </ul>
Potential impacts	<ul style="list-style-type: none"> <li>■ Dust generation</li> </ul>

## 1.4 Rationale and approach

For each of the impacts listed in Table 1-1 above, this EEMP details:

- Environmental objectives
- Mitigation and management measures to address potential impacts
- Monitoring programs where direct and indirect impacts may occur
- A response framework including triggers, thresholds and contingency actions.

The development of the EMP has been informed by the results of baseline surveys (see Section **Error! Reference source not found.**) and is based on the assumptions and uncertainties stated in Section 1.4.3.

### 1.4.1 Management approach

The hierarchical approach taken focuses on avoiding conservation significant ecological communities and species, for example by design refinement to reduce the number of drill pads and reduce the length of access tracks.

Where not able to be avoided, management aims to minimise the intensity and/or extent of impacts during construction. The management measures proposed (Table1-2) are based on field studies and surveys (see Section **Error! Reference source not found.**), and relevant information provided in species Recovery Plans where they exist.



## 1.4.2 Environmental outcomes and objectives

Table 1-2: Environmental Management Measures

Factor	Potential impact	Objective	Environmental control	Timing
General	General – environmental awareness	All personnel to have a general awareness of environmental impacts and protection objectives	<ul style="list-style-type: none"> <li>■ All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site induction.</li> <li>■ <i>Reporting / evidence:</i> Attendance sheet</li> </ul>	Pre- and during construction works
<b>Preliminary key environmental factors</b>				
Flora and Vegetation	Direct loss of remnant native vegetation	Minimise direct loss	<ul style="list-style-type: none"> <li>■ Design and construct drill pads to the minimum safe working size to minimise vegetation clearing</li> </ul>	Pre-construction works
Flora and Vegetation		Restrict direct loss of remnant native vegetation to approved areas	<ul style="list-style-type: none"> <li>■ No clearing of vegetation outside of approved areas</li> <li>■ <i>Management actions:</i> <ul style="list-style-type: none"> <li>– Westralian Iron Ground Disturbance Permit (GDP) process to restrict vegetation clearing to within approved areas</li> <li>– Clear demarcation of vegetation to be cleared</li> <li>– Clearing areas to be clearly marked on all maps</li> <li>– Clearing activities shall comply with Project Approvals and Ground Disturbance and Clearing Permits</li> <li>– Vehicles and machinery shall only use designated tracks / roads. Access to work area shall avoid unauthorised disturbance outside of approved clearing permit areas</li> </ul> </li> <li>■ <i>Reporting/evidence:</i> GPS logs of access tracks and drill pad corner points</li> <li>■ <i>Performance Indicators:</i> No ground disturbance outside approved Project areas</li> </ul>	Pre- and during construction works
Flora and Vegetation		Promote the return of flora and vegetation	<ul style="list-style-type: none"> <li>■ Disturbed areas will be rehabilitated as soon as practicable to facilitate habitat restoration. Rehabilitation will include:</li> </ul>	Post-construction works

Factor	Potential impact	Objective	Environmental control	Timing
			<ul style="list-style-type: none"> <li>- securely plugging all drill holes below ground;</li> <li>- removing all waste and rubbish;</li> <li>- backfilling any sumps;</li> <li>- redistributing any cleared topsoil and vegetation.</li> <li>- The surface of the land will be re-shaped so that it is consistent with the surrounding 5 metres of uncleared land;</li> <li>- Vegetative material will be placed on top of the rehabilitated soil;</li> <li>- Within five years of the date of rehabilitation of cleared areas, Westralian Iron will conduct a flora survey (using a qualified botanist) to determine the flora species composition of the rehabilitated areas;</li> <li>- If the areas of rehabilitation have less than 70% species density (determined by surveying plots within the area of rehabilitation) than found in reference plots, WIPL will revegetate the areas of rehabilitation by deliberately planting and/or direct seeding native vegetation; and</li> <li>- The procedures in points 9 and 10 will be repeated within 24 months until at least 70% of species density has been achieved.</li> </ul> <p>■ Rehabilitation works will be undertaken no later than six (6) months after exploration activities have ceased.</p>	
Flora and Vegetation	Direct loss of individuals of Priority flora taxa	Restrict direct loss of 'priority' flora within approved areas	<p>■ Target: No loss of Conservation Significant Flora outside of approved areas</p> <p>■ <i>Management actions:</i></p> <ul style="list-style-type: none"> <li>- Westralian Iron Ground Disturbance Permit (GDP) process to restrict vegetation clearing to within approved areas</li> <li>- Clear demarcation of vegetation to be cleared</li> <li>- Clearing areas to be clearly marked on all maps</li> <li>- Clearing activities shall comply with Project Approvals and Ground Disturbance and Clearing Permits</li> <li>- Vehicles and machinery shall only use designated tracks / roads. Access to work area shall avoid unauthorised disturbance outside of approved clearing permit areas</li> <li>- Education and training of mine personnel on flora values</li> </ul>	Pre- and during construction works

Factor	Potential impact	Objective	Environmental control	Timing
			<ul style="list-style-type: none"> <li>■ <i>Reporting/evidence:</i> GPS logs of access tracks and drill pad corner points</li> <li>■ <i>Performance Indicators:</i> No ground disturbance outside approved Project areas</li> </ul>	
Flora and Vegetation	Introduction and/or spread of introduced flora taxa (weeds)	Prevent introduction and/or spread of introduced flora taxa	<ul style="list-style-type: none"> <li>■ <i>Target:</i> No introduction or spread of direct impacts to threatened flora</li> <li>■ <i>Management actions:</i> <ul style="list-style-type: none"> <li>– Implementation of weed hygiene protocols</li> <li>– Annual monitoring (two years) of introduced flora in rehabilitated areas to detect any new occurrences or spread of existing occurrences, and control (spraying) of introduced flora to minimise and/or eradicate known occurrences</li> </ul> </li> <li>■ <i>Reporting/evidence:</i> Survey reports and GPS recording of weed occurrences and treatments</li> </ul>	Pre-, during and post-construction
Flora and Vegetation	Dust deposition	Minimise dust emissions as far as is reasonably practicable	<ul style="list-style-type: none"> <li>■ <i>Management actions:</i> <ul style="list-style-type: none"> <li>– Implementation of dust control measures</li> </ul> </li> </ul> <p>Daily visual monitoring of dust generation by mine personnel</p>	
Flora and Vegetation	Uncontrolled discharge of sump wastewater or saline groundwater	Avoid the loss flora and vegetation degradation/loss because of an uncontrolled discharge of waste or saline water	<ul style="list-style-type: none"> <li>■ <i>Management actions:</i> <ul style="list-style-type: none"> <li>– Location of sumps away from vegetation (e.g. large trees, dense scrub)</li> <li>– Monitor groundwater in sumps (salinity)</li> <li>– Water used or encountered during drilling activities must be suitably contained in suitably sited and sized sumps.</li> <li>– Cease drilling if an uncontrolled discharge of saline groundwater (above 9000 micro siemens/cm or 4,500ppm TDS) is likely to occur</li> </ul> </li> </ul>	Pre-, during and post-construction
Flora and Vegetation	Increased fire risk and changes to fire regimes	Avoid flora and vegetation degradation/mortality as result of unintended fire events	<ul style="list-style-type: none"> <li>■ <i>Management actions:</i> <ul style="list-style-type: none"> <li>– Training of mine personnel in fire risks, fire prevention and fire control, including the provision of fire control equipment (fire extinguishers)</li> <li>– Hot works will be prohibited during days of extreme or catastrophic fire danger rating</li> <li>– Hydrocarbon and chemical storage facilities will be equipped with adequate fire control equipment</li> </ul> </li> <li>■ <i>Reporting/evidence:</i> Training (induction) records</li> </ul>	Pre- and during construction works

Factor	Potential impact	Objective	Environmental control	Timing
Flora and Vegetation	Contamination due to hydrocarbon/chemical spills and leaks	Avoid flora and vegetation degradation/mortality from spills	<ul style="list-style-type: none"> <li>■ <i>Management actions:</i> <ul style="list-style-type: none"> <li>– Hydrocarbon and chemical storage facilities will be equipped with adequate bunding and spill response equipment.</li> </ul> </li> </ul>	Pre- and during construction works
Terrestrial Fauna	Loss and injury of fauna (vehicle and/or equipment strikes, entrapment and/or drowning in sumps)	Avoid mortality of conservation significant fauna	<ul style="list-style-type: none"> <li>■ <i>Target:</i> No loss of conservation significant fauna species, including: <ul style="list-style-type: none"> <li>– Malleefowl (<i>Leipoa ocellata</i>)</li> <li>– Western Spiny-tailed Skink (<i>Egernia stokesii badia</i>)</li> <li>– Gilled Slender Blue-tongue (<i>Cyclodomorphus branchialis</i>)</li> </ul> </li> <li>■ <i>Management actions:</i> <ul style="list-style-type: none"> <li>– Clearing the</li> <li>– While sumps are open, at least one end is to be ramped (to approximately 10 degrees) to allow egress of fauna</li> <li>– Education and training of personnel on fauna values (with a particular focus on conservation significant fauna), and fauna management</li> </ul> </li> <li>■ <i>Reporting/evidence:</i> Incident reporting system for any fauna injured or killed on site</li> </ul>	Pre-, during and post-construction
Terrestrial Fauna	Loss of habitat	See Factor “Flora and Vegetation”  Cut and fill drill pads and access tracks are required to be re-profiled back into the natural hillside/terrain, to create a long term safe and stable landform which supports self-sustaining vegetation comprising of suitable local native flora species.		
Terrestrial Fauna	Access to water and food waste, causing fauna behaviour changes		<ul style="list-style-type: none"> <li>■ Control access to water</li> <li>■ Appropriate disposal of food wastes</li> </ul>	
<b>Other environmental factors</b>				
Landform	Localised visual impacts on the vegetation and landform structure of the Koolanooka Hills	See Factor “Flora and Vegetation”		

Factor	Potential impact	Objective	Environmental control	Timing
			■	
Inland water	Surface water contamination with sediment	Minimise erosion	<ul style="list-style-type: none"> <li>■ <i>Management actions:</i> <ul style="list-style-type: none"> <li>– Locating tracks along contours, where practicable, to reduce erosion</li> </ul> </li> </ul>	Pre-, during and post construction
Terrestrial environmental quality	Erosion of drill pads and exploration tracks			
Inland water	Contamination by wastewater generation or saline groundwater encountered during drilling		<ul style="list-style-type: none"> <li>■ <i>Management actions:</i> <ul style="list-style-type: none"> <li>– Water used or encountered during drilling activities must be suitably contained in suitably sited and sized sumps.</li> <li>– Cease drilling if an uncontrolled discharge of saline groundwater (above 9000 micro siemens/cm or 4,500ppm TDS) is likely to occur</li> </ul> </li> </ul> <p><i>Performance Indicators:</i></p>	Pre- and during construction
Terrestrial environmental quality				
Inland water	Contamination due to hydrocarbon/chemical spills and leaks activities		<ul style="list-style-type: none"> <li>■ <i>Management actions:</i> <ul style="list-style-type: none"> <li>– Hydrocarbon and chemical storage facilities will be equipped with adequate bunding and spill response equipment.</li> <li>– Material Data Sheets (MDS) will be available for all chemicals used on site. Handling, use and storage of chemicals will be compliant with the relevant MDS and DMIRS guidelines.</li> <li>– Hydrocarbons and oily wastes (e.g. fuels, greases, de-greaser, emulsified oils and oily wastewater) generated on site, will be captured and stored for removal from site by a licensed contractor for safe disposal or recycling</li> <li>– Contaminated soil will be collected and removed from site for offsite disposal</li> </ul> </li> </ul>	Pre- and during construction
Terrestrial environmental quality				
Air quality	Fugitive dust	Minimise dust emissions as far as is reasonably practicable	<ul style="list-style-type: none"> <li>■ <i>Management actions:</i> <ul style="list-style-type: none"> <li>– Implementation of dust control measures. This includes: <ul style="list-style-type: none"> <li>■ Applying water (or dust suppressants) to roads, working surfaces and stockpiles as required</li> </ul> </li> </ul> </li> </ul>	During construction

Factor	Potential impact	Objective	Environmental control	Timing
			<ul style="list-style-type: none"> <li>■ Restricted vehicle speeds</li> <li>■ Works that have the potential to generate high dust levels may be restricted during times of high winds</li> <li>– Works to be scheduled to ensure that topsoil stripping and earthworks occur as soon as possible after clearing (within one month) to minimise the potential for dust generation.</li> </ul> <p>Daily visual monitoring of dust generation by personnel</p>	

### 1.4.3 Key assumptions and uncertainties

- All significant direct and indirect impacts that may result from the Project have been identified
- Direct impacts to fauna during construction are limited to habitat loss and mortality during construction activities (clearing and vehicle movement)
- Mobile fauna will disperse in front of clearing activities
- The relevant studies and surveys have accurately recorded the presence of all conservation significant flora and fauna species within the Project area
- Existing cleared areas within the Project area do not contain habitat for or known records of conservation significant species; as such, conservation significant fauna are not expected to occur within areas cleared of native vegetation
- If any conservation significant species assumed not to occur in the Project area are subsequently recorded, the proposed management actions in this EEMP would ensure there are no additional impacts

## 1.5 Index of Biodiversity Surveys for Assessments (IBSA)

Terrestrial biodiversity survey data collected in preparing the s. 38 referral and this EEMP has been submitted to the Department of Water and Environmental Regulation (DWER) as an Index of Biodiversity Surveys for Assessments (IBSA) data package in accordance with the EPA's *Instructions for the Preparation of Data Packages for the Index of Biodiversity Surveys for Assessments (IBSA)* (EPA, 2020).

IBSA is a consolidated, indexed and publicly available repository of biodiversity survey information collected for environmental impact assessment under the EP Act. IBSA is administered by DWER on behalf of itself, the EPA and DMIRS.

## 2 Environmental requirements

### 2.1 Regulatory requirements

All Westralian Iron employees and contractors are required to comply with the requirements stated in this EEMP. Variations to this document may be approved in writing by Westralian Irons' Senior Exploration Geologist.

All Westralian Iron and contractor activities are required to comply with State and Commonwealth legislation. Relevant legislation and regulations include but is not limited to:

- WA legislation:
  - *Environmental Protection Act 1986* (EP Act) and its regulations (subsidiary legislation) including:
    - *Environmental Protection (Clearing of Native Vegetation Clearing) Regulations 2004*
  - *Biodiversity Conservation Act 2016* (BC Act) and *Biodiversity Conservation Regulations 2018*
    - As of the 1<sup>st</sup> January 2019, the BC Act replaced the *Wildlife Conservation Act 1950* (WC Act). The transitional provisions of the BC Act provide protection for threatened or otherwise specially protected taxa as listed in the *Wildlife Conservation (Rare Flora) Notice 2018* and *Wildlife Conservation (Specially Protected Fauna) Notice 2018* under the WC Act.
  - *Aboriginal Heritage Act 1972* and *Aboriginal Heritage Regulations 1974*
  - *Mining Act 1978* and *Mining Regulations 1981*
- Commonwealth legislation:
  - *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Environment Protection and Biodiversity Conservation Regulations 2000*

There are a range of regulatory instruments that may be directly relevant to the proposed exploration programme being undertaken and the requirements of these instruments must be checked, agreed and understood by all parties involved in field activities:

- Native Vegetation Clearing Permits
- Programme of Work (PoW) Permits
- Aboriginal Heritage Section 18 Permits
- DWER Section 5C groundwater abstraction permits.

Land Access Agreements and Aboriginal Heritage Agreements must also be complied with, as must any non-binding verbal agreements made with landowners relating to access and agreed activities approved on privately owned land.



## 3 Environmental management procedures

This section describes management actions that address potential impacts resulting from the Project.

### 3.1 General

#### 3.1.1 Risk Assessment

All exploration programmes are subject to an assessment of risk prior to programme commencement.

Common exploration related risks are documented in the Asia Iron Australia Resource Development Functional Risk Register (doc no 01-100-RI-LIS-0001).

### 3.2 Flora and vegetation

#### 3.2.1 Potential impacts

- Vegetation clearing can result in permanent changes to the topography and vegetation of the area. Impacts may include:
  - Direct loss of remnant native vegetation, TEC, individuals of 'priority' or Threatened flora taxa
  - Unauthorised ground disturbance or vegetation clearing could:
    - Directly impact significant flora or significant floristic communities
    - Carry significant risk in relation to the potential impact to registered Aboriginal Heritage sites.
- Introduction and/or spread of introduced flora taxa (weeds)
  - Environmental weeds have potential to establish, reproduce and disperse and have a serious impact on natural systems and nature conservation values. Weeds can displace native plants by competing for resources (water, nutrients, light, etc.), and may alter fuel and fire dynamics. The introduction and/or spread of weeds as a result of human activities may result in the decline of significant flora and/or floristic communities.
- Dust deposition
- Transmission of sump wastewater and saline groundwater
- Increased fire risk and changes to fire regimes
  - Fire ignition and subsequent spread may present a significant threat to personnel, flora, fauna, local communities and assets.
- Contamination due to hydrocarbon/chemical spills and leaks

#### 3.2.2 Objectives

- Minimise ground disturbance and/or vegetation clearing
- Prevent unapproved ground disturbance and/or vegetation clearing
- Prevent ground disturbance and/or vegetation clearing outside of the approved areas
- Prevent fire ignition (vehicles, equipment, hydrocarbon/chemical storage)
- Rehabilitate disturbed areas so as to create a long term safe and stable landform which supports self-sustaining vegetation comprising of suitable local native flora species
- Comply with Project approvals and relevant legislation.

### 3.2.3 Performance indicators/targets

- No unauthorised ground disturbance or vegetation clearing
- No ground disturbance and/or vegetation clearing outside of the approved areas
- Successful post-construction vegetation rehabilitation
- Project approval conditions and EEMP requirements are implemented

### 3.2.4 Management requirement

Management for flora and vegetation requirements are outlined in Table 3-3.

**Table 3-1: Flora and Vegetation Management requirements**

Aspect	Requirement	Timing
Minimising area of disturbance	<ul style="list-style-type: none"> <li>■ All exploration activities must be planned in a way that minimises the requirement for vegetation clearing.</li> <li>■ Tracks               <ul style="list-style-type: none"> <li>– Every effort must be made by site personnel during reconnaissance surveys to locate access tracks to work around large trees and dense vegetation wherever possible. Pre-existing tracks and previously disturbed areas must always be used in preference to new clearing.</li> <li>– Design new access tracks to be as short as practicable</li> <li>– Access tracks will be constructed to the minimum safe working width possible:                   <ul style="list-style-type: none"> <li>■ width must be adequate for the size and weight of fully laden exploration trucks.</li> <li>■ must incorporate an adequate turning radius for exploration drill rigs and trucks as well as safe turn around areas that allow for safe evacuation if required in bushfire risk areas.</li> </ul> </li> <li>– Tracks should be located along contours where practicable to reduce erosion risks.</li> </ul> </li> <li>■ Drill pads               <ul style="list-style-type: none"> <li>– Drill pads are to be designed to the minimum safe working size as advised by the drilling contractor. The design will include the area required to push up topsoil and vegetation.</li> <li>– Wherever possible drill pads will be located in an areas that require minimal or no clearing.</li> <li>– Design drill program for minimum number of drill pads</li> <li>– Drill pads will be situated away from drainage lines and watercourses, where possible, with a minimum 20 metre buffer zone established.</li> </ul> </li> </ul>	Pre-construction
Approvals	<ul style="list-style-type: none"> <li>■ Clearing activities shall comply with Project Approvals and Ground Disturbance and Clearing Permits</li> <li>■</li> <li>■ Permit to Take (issued by DWER) is required for any expected loss of Threatened flora or fauna</li> <li>■ A Ground Disturbance Permit (GDP) is required prior to conducting work that will in anyway change or disturb the ground surface. The 'ground surface' includes undisturbed areas, rehabilitated areas and all areas for which there is not a current GDP in place that covers the specific activity being undertaken.</li> </ul>	Pre-construction

Aspect	Requirement	Timing
	<ul style="list-style-type: none"> <li>– The Ground Disturbance Procedure (EHP-910-EV-PRO-0001) is available on the AIA Intranet. Ground Disturbance Request Form EHP-910-EV-FRM-0001 must be used as part of the Ground Disturbance Permit Procedure.</li> <li>– The GDP will incorporate the requirements of an approved Native Vegetation Clearing Permit and ensure excluded protected areas (Declared Rare Flora (DRF), TECs, heritage sites) and areas to be cleared are demarcated on site and all exploration maps . <ul style="list-style-type: none"> <li>■ Any Threatened flora must be flagged and a 50 m clearing buffer applied unless a Native Vegetation Clearing Permit and Permit to Take (issued by DWER) are in place.</li> <li>■ Areas associated with Threatened flora will be demarcated by the Exploration Manager or delegate prior to the commencement of any work.</li> </ul> </li> <li>■ Prior to clearing vegetation, a site inspection must be conducted to remove Threatened fauna (Malleefowl, Western Spiny-tailed Skink and Gilled Slender Blue-tongue Skink) from the clearing footprint (see Section 3.3 for fauna requirements).</li> </ul>	
Ground disturbance and vegetation clearing	<ul style="list-style-type: none"> <li>■ Cleared vegetation shall be collected and stockpiled (separately from topsoil stockpiles) for later use in rehabilitation.</li> <li>■ Tracks should be cleared using a raised blade method wherever possible and vegetation pushed aside for return during rehabilitation works.</li> <li>■ Topsoil (to a depth of up to 100 mm) should be removed from all disturbed areas where possible and stored for use in rehabilitation.</li> <li>■ Any topsoil that contains weeds must be segregated and will be quarantined from use in general rehabilitation</li> <li>■ Vehicles and machinery shall only use designated tracks / roads. Access to work area shall avoid unauthorised disturbance outside of approved clearing permit areas</li> </ul>	During construction
Weeds	<ul style="list-style-type: none"> <li>■ Implementation of weed hygiene protocols <ul style="list-style-type: none"> <li>– Vehicle and Mobile Equipment Weed Hygiene Form 01-912-EN-FRM-0002_0</li> <li>– Annual monitoring (two years) of introduced flora in rehabilitated areas to detect any new occurrences or spread of existing occurrences, and control (spraying) of introduced flora to minimise and/or eradicate known occurrences</li> </ul> </li> </ul>	During and post-construction
Transmission of sump wastewater and saline groundwater	<ul style="list-style-type: none"> <li>■ As depicted in Figure 3-1 below, sumps should be located away from significant vegetation (large trees or stands of dense scrub) where possible, to minimise disturbance to roots and prevent horizontal transmission of saline water and potentially hostile material coming into contact with vegetation.</li> </ul>	
Fire	<ul style="list-style-type: none"> <li>■ Training (induction) of personnel in fire risks, fire prevention and fire control, including the provision of fire control equipment (fire extinguishers) within mine vehicles</li> <li>■ Hydrocarbon and chemical storage facilities will be equipped with adequate fire control equipment</li> </ul>	Pre- and during construction
Artificial lighting	<ul style="list-style-type: none"> <li>■ Unidirectional lighting fixtures should be used to minimise potential artificial lighting impacts.</li> </ul>	
Rehabilitation	<ul style="list-style-type: none"> <li>■ Drill holes: <ul style="list-style-type: none"> <li>– At the completion of drilling, collars must be cut off 40 cm below natural ground level using a collar cutter. The drill collar must be plugged with a</li> </ul> </li> </ul>	Progressively and post construction

Aspect	Requirement	Timing
	<p>conical concrete drill plug (cut off black poly-tail piping from drill plugs) and the drill hole backfilled and covered over as shown in Figure 3-2 below.</p> <ul style="list-style-type: none"> <li>- Mound over the backfilled hole to facilitate water shedding away from the drill hole with low permeability material (approximately 20 cm high by 80 cm wide) and then cover with topsoil.</li> </ul> <ul style="list-style-type: none"> <li>■ Sumps: <ul style="list-style-type: none"> <li>- Within six months of completion of operations, the sumps are to be backfilled with excavated material (may include contents of sample bags and drill cuttings and debris) in the order they were removed, covered with topsoil/ cleared vegetation and the site scarified and left in a clean and tidy state.</li> </ul> </li> <li>■ Drill pads and access tracks: <ul style="list-style-type: none"> <li>- Remove survey pegs</li> <li>- Rip on the contour all compacted drill sites and grid lines</li> <li>- Cut and fill drill pads and access tracks are required to be re-profiled back into the natural hillside/terrain</li> <li>- Topsoil must be replaced on disturbed areas</li> <li>- Re-spread all cleared vegetative material over disturbed surfaces.</li> </ul> </li> </ul>	

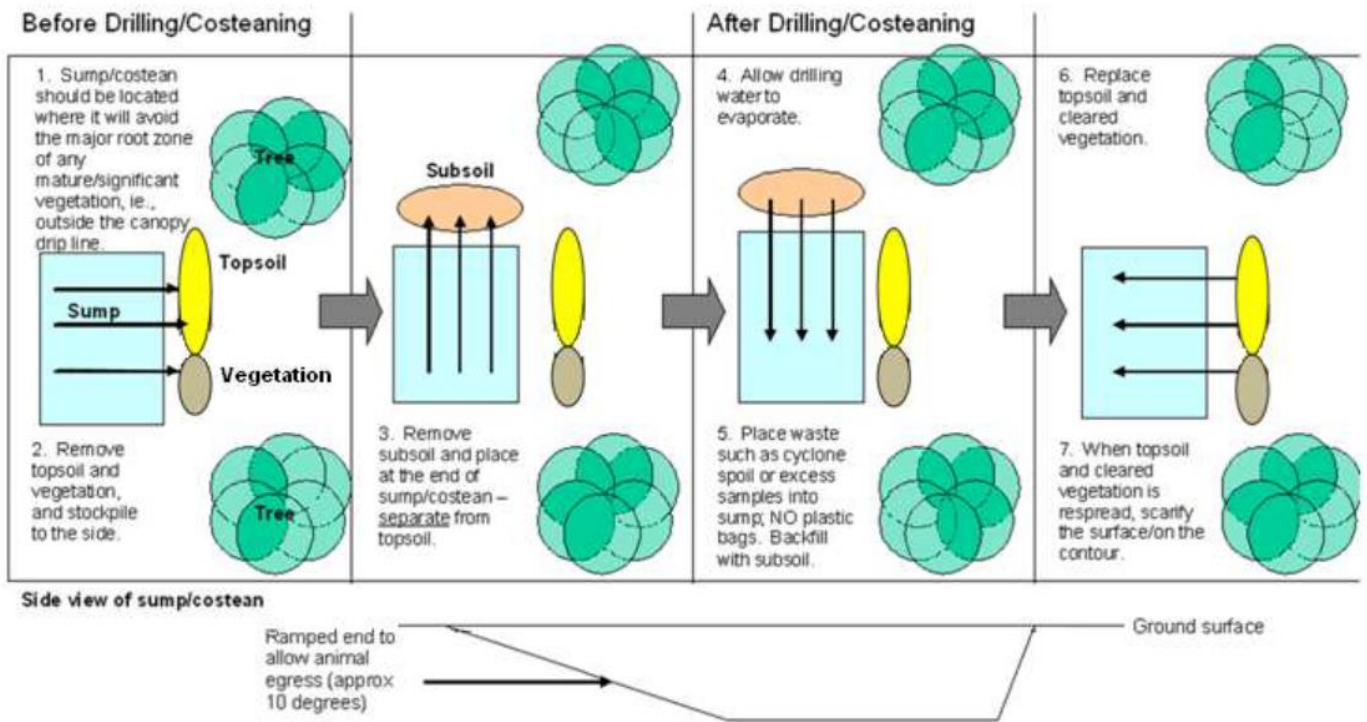


Figure 3-1. Drill Sump / Costean Development and Rehabilitation

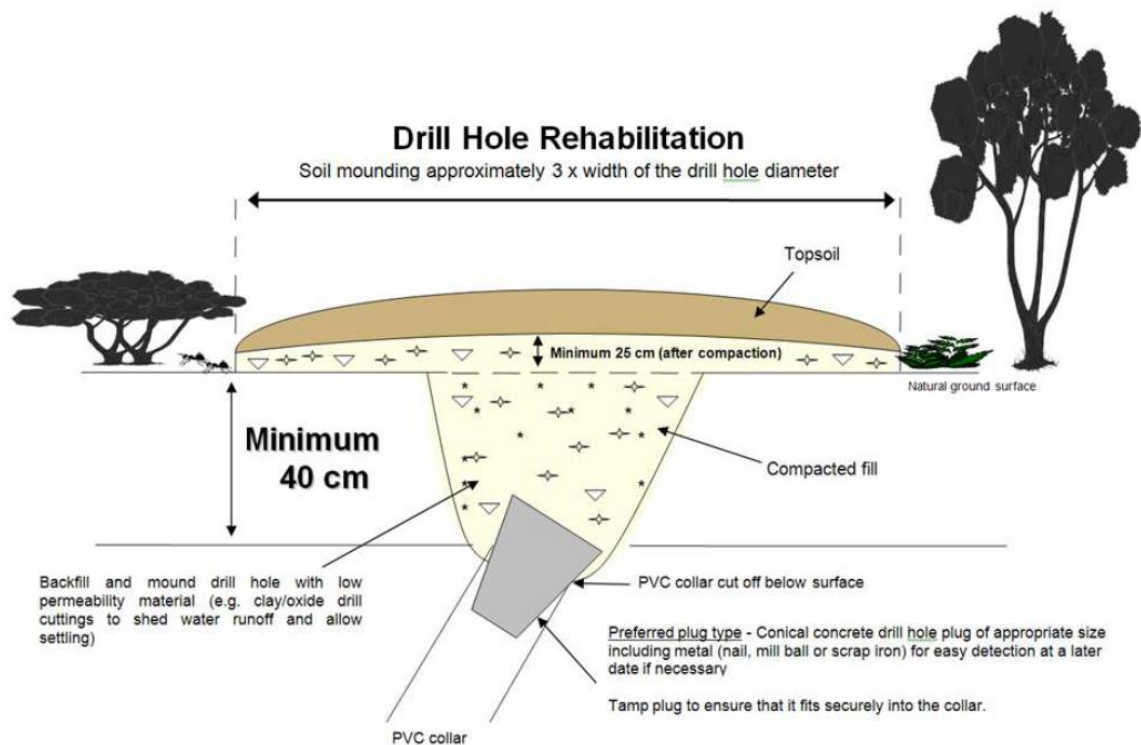


Figure 3-2. Drill Collar Plugging and rehabilitation.

## 3.3 Terrestrial fauna

### 3.3.1 Potential impacts

- Direct impacts:
  - Loss and injury of fauna as a result of:
    - vegetation clearing and earthworks (see section 3.2)
    - vehicle and/or equipment strikes
    - entrapment or drowning in open excavations (e.g. sumps)
- Indirect impacts:
  - Habitat loss, degradation or fragmentation through vegetation clearing, earthworks, weed introduction/spread, and increased risk of fire (resulting in increased competition for limited resources) (see section 3.2)
  - Introduction of feral fauna species (risk of competition, predation and disease)
    - An increase in human activity is often associated with an increase in the abundance of introduced fauna species.
  - Construction-related noise disturbance
  - Access to water and food waste, causing fauna behaviour changes
  - Contamination due to hydrocarbon/chemical spills and leaks

### 3.3.2 Objectives

- Protect terrestrial fauna so that biological diversity and ecological integrity are maintained
- Ensure that impacts to conservation significant fauna are avoided and minimised as far as practicable
- Prevent ground disturbance and/or vegetation clearing outside of the approved areas
- Avoid mortality or injury of conservation significant fauna
- Promote the return of fauna post construction
- Prevent the introduction of feral fauna
- Comply with Project approvals and relevant legislation.

### 3.3.3 Performance indicators/targets

- No ground disturbance and/or vegetation clearing outside of the approved areas
- Successful post-construction vegetation rehabilitation
- Project approvals and EEMP requirements are implemented

### 3.3.4 Management requirement

Management for terrestrial fauna requirements are outlined in Table 3-2.

Table 3-2: Terrestrial Fauna Management Requirements

Aspect	Requirement	Timing
Minimising area of disturbance	<ul style="list-style-type: none"><li>■ All exploration activities must be planned in a way that minimises the requirement for vegetation clearing.</li><li>■ Tracks</li></ul>	Pre-construction

Aspect	Requirement	Timing
	<ul style="list-style-type: none"> <li>– Every effort must be made by site personnel during reconnaissance surveys to locate access tracks to work around large trees and dense vegetation wherever possible. Pre-existing tracks and previously disturbed areas must always be used in preference to new clearing.</li> <li>– Design new access tracks to be as short as practicable</li> <li>– Access tracks will be constructed to the minimum safe working width possible: <ul style="list-style-type: none"> <li>■ width must be adequate for the size and weight of fully laden exploration trucks.</li> <li>■ must incorporate an adequate turning radius for exploration drill rigs and trucks as well as safe turn around areas that allow for safe evacuation if required in bushfire risk areas.</li> </ul> </li> <li>– Tracks should be located along contours where practicable to reduce erosion risks.</li> <li>■ Drill pads <ul style="list-style-type: none"> <li>– Drill pads are to be designed to the minimum safe working size as advised by the drilling contractor. The design will include the area required to push up topsoil and vegetation.</li> <li>– Wherever possible drill pads will be located in an areas that requires minimal or no clearing.</li> <li>– Design drill program for minimum number of drill pads</li> <li>– Drill pads will be situated away from drainage lines and watercourses, where possible, with a minimum 20 metre buffer zone established.</li> </ul> </li> </ul>	
Ground disturbance and vegetation clearing	<ul style="list-style-type: none"> <li>■ Clearing should be timed to avoid periods when Malleefowl are likely to have eggs or chicks.</li> <li>■ Prior to clearing vegetation, a site inspection must be conducted to remove Threatened fauna (Malleefowl, Western Spiny-tailed Skink and Gilled Slender Blue-tongue Skink) from the clearing footprint (see Section 3.3 for fauna requirements).Nesting trees should be inspected prior to clearing.</li> <li>■ Salvage and reuse of select trees (e.g. tree hollows) for use as fauna habitat in rehabilitation areas (e.g. habitat logs).</li> </ul>	During construction
Vehicle strike	<ul style="list-style-type: none"> <li>■ Implement speed limits, fauna crossing signage and removing roadkill from access tracks as soon as possible so as to minimise risk of attracting scavengers.</li> <li>■ Induction/training to include specific reference to Malleefowl significance and location of mounds around drill pad area (and the fact that birds may be visiting these).</li> </ul>	Pre- and during construction
Entrapment / rowing in open excavations	<ul style="list-style-type: none"> <li>■ Mechanisms must be in place to minimise the risk of fauna entering sumps and allowing fauna to exit sumps <ul style="list-style-type: none"> <li>– Whilst sumps are open, at least one end is to be ramped (to approximately 10 degrees) to allow egress of fauna.</li> </ul> </li> </ul>	Pre- and during construction
Introduction of feral fauna	<ul style="list-style-type: none"> <li>■ Provision of secured lids for rubbish bins and water tanks <ul style="list-style-type: none"> <li>– Access to water must be controlled</li> <li>– Appropriate disposal of any food waste that may encourage introduced species.</li> </ul> </li> <li>■ Consultation with surrounding landholders regarding co-ordination of feral animal control.</li> </ul>	Pre- and during construction

## 3.4 Soil and water quality

### 3.4.1 Potential impact

- Erosion from cleared areas, topsoil stockpiles causing sedimentation discharge to surrounding areas
- Contamination of soils, surface water and/or groundwater due to:
  - Hydrocarbon/chemical spills and leaks
  - Inappropriate waste management

### 3.4.2 Objectives

- Minimise impacts of erosion and sedimentation and pollution to surface water and drainage systems
- Transport, handle, store, use and dispose of hazardous / waste materials so as to prevent negative impacts to the environment and human health
- Minimise waste generation
- Prevent littering and the occurrence of wind-blown litter
- Comply with Project approvals and relevant legislation

### 3.4.3 Performance indicators

- EEMP requirements are implemented
- Minimal environmental incidents

### 3.4.4 Management requirements

Management for soil and water quality requirements are outlined in Table 3-3.

**Table 3-3: Soil and Water Quality Management Requirements**

Aspect	Requirement	Timing
Erosion and sediment control	<ul style="list-style-type: none"> <li>■ Tracks should be located along contours where practicable to reduce erosion risks.</li> <li>■ Drill pads will be situated away from drainage lines and watercourses, where possible, with a minimum 20 metre buffer zone established.</li> </ul>	During construction
Sumps	<ul style="list-style-type: none"> <li>■ Before drilling commences, suitably sited and sized sumps will be constructed for Diamond drill holes, and all Reverse Circulation (RC) drilling in areas where water is likely to be encountered.               <ul style="list-style-type: none"> <li>– Sumps must be of an appropriate size to accommodate the volume of the water/sediment intercepted to ensure containment.</li> <li>– Sumps should be located away from significant vegetation (see section 3.2 and Figure 3-1)</li> </ul> </li> <li>■ All material intercepted whilst drilling must be directed to the sump(s), excluding drill samples.</li> </ul>	Pre
Drilling	<ul style="list-style-type: none"> <li>■ Water used or encountered during drilling activities must be suitably contained.</li> <li>■ The Electrical Conductivity (EC) of the water will be measured using a Conductivity Meter to determine salinity levels. If identified as being potentially harmful to vegetation (approx. 9,000 micro siemens/cm or 4,500ppm TDS) water must not be allowed to contact vegetation.</li> </ul>	



Aspect	Requirement	Timing
	<ul style="list-style-type: none"> <li>■ Drilling will be suspended if the groundwater is saline or present in significant amounts, until appropriate management can be put in place.</li> </ul>	
Hydrocarbons and chemicals	<ul style="list-style-type: none"> <li>■ Transport, handling and use: <ul style="list-style-type: none"> <li>– Material Data Sheets (MDS) will be available for all chemicals used on site. Handling, use and storage of chemicals will be compliant with the relevant MDS;</li> <li>– Hydrocarbons and chemicals will be stored, used, transported and disposed in accordance with Dangerous Goods Regulations and DMIRS guidelines;</li> <li>– Hydrocarbons will be stored in accordance to Australian Standards for the Storage and Handling of Flammable and Combustible Liquids and will be segregated, where required, to ensure that incompatible classes of chemical are not stored together; and</li> <li>– Storage facilities will be equipped with adequate fire control equipment, bunding and spill response equipment.</li> </ul> </li> <li>■ Disposal: <ul style="list-style-type: none"> <li>– Used hydrocarbon containers will be adequately labelled and stored appropriately for future use or disposal;</li> <li>– Empty drum and containers will be periodically removed from site and disposed or recycled;</li> <li>– Hydrocarbons and oily wastes (e.g. fuels, greases, de-greaser, emulsified oils and oily waste water) generated on site, will be captured and stored for removal from site by a licenced contractor for safe disposal or recycling; and</li> <li>– Contaminated soil will be collected and removed from site for disposal and treatment at a licenced Land farm facility.</li> </ul> </li> </ul>	Pre-, during and post-construction
Waste	<ul style="list-style-type: none"> <li>■ All waste must be securely contained whilst drilling activities are in progress.</li> <li>■ All material brought into the exploration site must be removed from the site at the completion of drilling.</li> <li>■ All drill cuttings and debris should be suitably buried within sumps or removed from site</li> <li>■ General rubbish must not be buried in drill sumps</li> <li>■ If sample bags are used for drilling: <ul style="list-style-type: none"> <li>– Sample bags will be secured at all times to prevent their loss to wind gusts. Any bags that become wind borne will be retrieved immediately as well as any other windblown litter.</li> <li>– Prior to site rehabilitation bags will be slashed and removed. Contents will be pushed into sumps during rehabilitation</li> </ul> </li> </ul>	During and post-construction

## 4 Compliance management

### 4.1 Roles and responsibilities

All exploration activities are under the direct control of the Westralian Iron Registered Exploration Manager or an approved and appointed delegate.

The Registered Exploration Manager or an approved and appointed delegate is responsible for ensuring that the drilling crew operate in compliance with this EEMP and the Drillers' own environmental management plan.

### 4.2 Environmental training and awareness

All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include:

- Site induction
- Education of personnel on fauna values (with a particular focus on conservation significant fauna), and fauna management. This will include education about:
  - the area of restricted entry
  - speed limits
  - disposal of rubbish
  - reporting injured fauna
  - reporting sightings of conservation significant species and active Malleefowl mounds.
- Education of personnel on flora values (with a particular focus on Threatened flora)
- Education of personnel in fire risks, fire prevention and fire control, including the provision of fire control equipment (fire extinguishers) within mine vehicles

### 4.3 Monitoring

- Regular inspections (at a minimum weekly) of the Project site
- Potentially contaminated water (e.g. saline water) to be assessed prior to discharge to the environment

### 4.4 Incident management

An environmental incident is an event that negatively impacts, or has the potential to negatively impact, the environment.

All environmental incidents will be recorded and reported via the AIA Incident Reporting form.

Environmental incidents that must be reported, but are not limited to, include:

- Unauthorised clearing;
- Impacts on any avoidance sites;
- Death of native fauna;
- Contamination of ground or surface water;
- Breach from containment sumps;
- Major erosion of access tracks;
- Disturbance to existing, or identification of new Aboriginal Heritage Sites;
- Fires;

- Hydrocarbon or chemical spills;
- Incorrect disposal of waste;
- Non-compliance with regulatory permits; and
- Driving off access tracks.

## 4.5 Inspection and Audit

Periodic inspection and audit will be undertaken on exploration activities to assist with managing risk.

Inspection checklists are included in the Exploration Field Procedures Manual for:

- Management of groundwater;
- Management of solid waste;
- Weed and fire management;
- Topsoil management; and
- Post drilling clean up.

Inspection of all rehabilitated drilling sites will include:

- An assessment of disturbance areas and any avoidance sites;
- GPS recording of disturbance areas; and
- Photographic records of rehabilitation.

for inclusion in the DMIRS Exploration rehabilitation reports.

### 4.5.1 Post-drilling site inspection

At the completion of rehabilitation, the area will be photographed and the location of the photograph logged as a GPS coordinate. The area of rehabilitation will be recorded via hand-held GPS and corner coordinates logged.

All data will be collated for inclusion in the annual exploration rehabilitation report submitted to DMIRS and any related reporting required.

## 4.6 Records and reporting

- Ground Disturbance and Clearing Permit register
- Ground Disturbance and Clearing permits (signed) and all associated documentation
- Monthly reporting of:
  - Location and area (square metres (m<sup>2</sup>)) of areas cleared or rehabilitated
  - Location and volume (cubic metres (m<sup>3</sup>)) of topsoil / subsoil removed and stockpiled
- Annual weed monitoring reports with GPS recording of weed occurrences and treatments
- Inspection and audit checklists
- Register of incident reports and corrective actions
- Inspection and audit reports and corrective actions

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