

## **Bidaminna Project: Strategic Conservation Management Plan**

Prepared for Image Resources NL

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# 1 Introduction

Image Resources NL (Image) commissioned Terratree Pty Ltd (Terratree) to prepare this Strategic Conservation Management Plan (CMP). A strategic CMP is an overarching environmental management plan designed to identify and manage the environmental risks associated with Image's mineral exploration activities in the Shire of Gingin. The exploration programmes are part of Image's Bidaminna project, and are being undertaken within exploration tenements E70/2844, E70/3298, E70/4245, E70/4779 and E70/4794 (hereafter referred to as the 'project area').

The CMP has been prepared for submission to Department of Mines, Industry Regulation and Safety (DMIRS) as part of regulatory requirements to obtain approval, and subsequently manage Image's exploration programs within the Swan Coastal Plain bioregion of Western Australia.

In addition to the Strategic CMP, a bridging document will be prepared to provide details about the biodiversity values and specific management requirements for each Program of Work (PoW) application area.

## 1.1 Background

Image is undertaking exploration drilling programs within exploration tenements E70/2844, E70/3298, E70/4245, E70/4779 and E70/4794. These tenements are primarily comprised of freehold and Unallocated Crown Land (UCL), but also encompass stock routes, leased Crown land and areas of Department of Biodiversity, Conservation and Attractions (DBCA) managed lands, including:

- Moore River National Park (R 28462);
- Namming Nature Reserve (R 28558);
- South Mimegarra Nature Reserve (R 30618);
- Eneminga Nature Reserve (R27394); and
- P152860 3333 (un-named).

## 1.2 Purpose and Scope

This strategic CMP is an overarching environmental management plan and is intended to address all the environmental risks and management issues associated with Image's mineral exploration activities in the Swan Coastal Plain bioregion. According to DBCA (DEC, 2011), the purpose of a CMP is to "provide a preliminary framework to adequately limit changes to ecological and landscape processes that could result in the unacceptable diminishment of values, for which lands in the conservation estate are managed".

Although the majority of the Bidaminna project is outside DBCA managed lands, , preparing a Strategic CMP in accordance with the Department's guidelines will provide Image with a plan that is based on best-practice guidelines to manage future exploration projects.

Values managed under a CMP include:

- Biodiversity conservation (e.g. threatened flora and fauna, priority flora and fauna undescribed taxa, new affinities, range extensions and poorly known taxa);
- Landscape conservation (e.g. banded iron formation ranges, sand dunes, drainage lines);
- Recreation activities;
- Research and scientific study/interest (e.g. long-term monitoring sites);
- Education;
- Recreation;
- Commercial activity;
- Heritage (indigenous and European);
- Timber production; and

- Water catchment protection, including water storage and removal.

The CMP provides information relating to the conservation values within the entire project area, potential environmental impacts and proposed environmental management of exploration programs. This information is provided to enable impacts to be avoided or, if unavoidable, to minimise and mitigate these impacts. The CMP will include information pertaining to the following:

- An assessment of the risks of impacts posed by the program to conservation values within the project area;
- Management strategies and actions to be taken to avoid, minimise and mitigate impacts (including rehabilitation); and
- Performance criteria, monitoring and reporting commitments.

The CMP addresses a range of potential impacts to ecological and landscape values/processes arising from exploration activities, including:

- Introduction and spread of exotic species (weeds and plant pathogens);
- Habitat modification due to poor rehabilitation;
- Alteration to surface or subsurface water flows which can have both direct and indirect impacts on habitats;
- Soil destabilisation and erosion;
- Uncontrolled fires (originating from campfires, machinery etc.);
- Site contamination (including from hydrocarbon, chemicals, litter and drilling wastes); and
- Reduction in vegetation biomass/cover.

This document may be adapted to incorporate new tenements or changes in information regarding biodiversity values and appropriate management measures.

CMP bridging documents will provide specific details about each exploration program, including details of the proposed activities, their location and their proposed general periods of operation; as well as localised information about conservation values and appropriate management measures.

These details will include the number, depth and location of drill holes, timing, access and number of hectares of native vegetation to be impacted. The location and extent of conservation values present and specific avoidance and minimisation measures to be implemented will also be included.

This information will be submitted to DMIRS with Program of Works applications. Should Image decide to submit a PoW application on conservation estate, then the Strategic CMP will be submitted for approval and registration with DBCA, after which, a bridging document will be submitted to both departments with the PoW application.

### **1.3 Regulatory Context**

Western Australia has several legislative land management provisions, with varying security and levels of access, the application of which is dependent on location and proposed activities. The *Mining Act 1978* applies to land tenure including Crown, reserved and freehold land. Reserved land, which includes proposed Conservation Parks, is vested in the Conservation Commission of WA and managed by the DBCA under the *Conservation and Land Management Act 1984*.

Under Section 24 of the *Mining Act 1978* the Minister for Mines and Petroleum may grant consent to 'mine' on reserved land, where mining includes exploration, prospecting and fossicking as well as productive mining. Prior to granting consent to mine, for conservation reserves (such as Conservation Parks and non-class A Nature Reserves), the Minister for Mines and Petroleum must first obtain the recommendation of the Minister for Environment and of the Conservation Council.



The Minister for Environment requires information to make recommendations regarding mining activities on tenements within conservation reserves. Development of a Conservation Management Plan (CMP) in accordance with CMP guidelines enables the Regional Manager of the DBCA to assess mining activities on behalf of the Minister for Environment. The CMP must outline how potential impacts to biodiversity values, as a result of mineral exploration within the reserved lands, will be avoided in the first instance, and if unavoidable, be minimised and mitigated. A copy of the CMP and DBCA 's decision on its acceptability is lodged with the Programme of Work (POW) application to the Department of Mines and Petroleum (DMP).

Terratree has prepared this CMP in accordance with the *Guidelines for Conservation Management Plans Relating to Mineral Exploration on Lands managed by the Department of Environment and Conservation* (DEC 2011) (hereafter referred to as the 'CMP Guidelines'). The CMP Guidelines were developed by the DBCA with input from, and endorsement by, the Department of Mines and Petroleum (DMP).

A CMP is required to manage the impacts of mineral exploration on lands that are vested with the Conservation Commission, or managed by DBCA under the *Conservation and Land Management Act 1984* (CALM Act). CMPs are also required for proposed reserves where tenement conditions require the program to be developed in consultation with and to the acceptance of DBCA under the *Memorandum of Understanding between the Department of Mines and Petroleum and the Environmental Protection Authority in relation to Mineral and Petroleum (Onshore and Offshore) and Geothermal Proposals* (EPA and DMP 2009).

Lands that require the submission of a CMP include the following tenures:

- National Parks;
- Nature Reserves;
- Conservation Parks;
- State Forests;
- Timber Reserves;
- CALM Act Section 5(1)(g) and 5(1)(h) Reserves; and
- Proposed Reserves.

### **1.3.1 Mining Act 1978**

Mineral exploration and mining in WA is administered under the *Mining Act 1978*. Mineral explorers can apply for approval to undertake mineral exploration on Crown land and conservation estate. The DMP ensures that the exploration of mineral resources in WA provides economic and social benefits to the community while regulating environmental management requirements and ensuring that environmental impacts are minimised and mitigated.

### **1.3.2 Other Relevant Legislation**

The following legislation applies to mineral exploration:

- *Aboriginal Heritage Act 1972;*
- *Agriculture and Related Resources Protection Act 1976;*
- *Bush Fires Act 1954;*
- *Conservation and Land Management Act 1984;*
- *Country Areas Water Supply Act 1947;*
- *Dangerous Goods Regulations 1992;*
- *Dangerous Goods Safety Act 2004;*
- *Environmental Protection Act 1986;*
- *Environmental Protection and Biodiversity Conservation Act 1999;*
- *Land Administration Act 1997;*
- *Local Government Act 1995;*

- *Mining Act 1978;*
- *Occupational Safety and Health Act 1984;*
- *Rights in Water and Irrigation Act 1914;*
- *Waterways Conservation Act 1976; and*
- *Wildlife Conservation Act 1950.*

### **1.3.3 Regulatory Guidelines**

The following regulatory guidelines apply to mineral exploration:

- Guidelines for Conservation Management Plans Relating to Mineral Exploration on DEC Managed Lands;
- EPA Environmental Factor Guideline: Terrestrial Flora;
- EPA Environmental Factor Guideline: Terrestrial Fauna;
- EPA Guidance Statements N<sup>o</sup> 6 – Rehabilitation of Terrestrial Ecosystems;
- EPA Guidance Statements N<sup>o</sup> 19 – Environmental Offset;
- EPA Guidance Statements N<sup>o</sup> 54 – Consideration of Subterranean Fauna in Groundwater and Caves during Environmental Impact Assessment in Western Australia;
- EPA Guidance Statements N<sup>o</sup> 56 – Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia;
- EPA Position Statements N<sup>o</sup> 2 – Environmental Protection of Native Vegetation in Western Australia;
- EPA Position Statements N<sup>o</sup> 3 – Terrestrial Biological Surveys as Element of Biodiversity Protection;
- EPA Position Statements N<sup>o</sup> 5 – Environmental Protection and Ecological Sustainability of the Rangelands in Western Australia;
- EPA Position Statements N<sup>o</sup> 7 – Principles of Environmental Protection;
- EPA Position Statements N<sup>o</sup> 9 – Environmental Offset;
- Guidelines for Environmentally Responsible Mineral Exploration & Prospecting in Western Australia (DMP, 2012);
- Management of Declared Rare Flora for Onshore Petroleum and Mineral Activities (DMP, 2006);
- Mineral Exploration and Mining within Conservation Reserves and other Environmentally Sensitive Lands in Western Australia, 1998;
- Memorandum of Understanding between the Department of Mines and Petroleum (DMP) and the Environmental Protection Authority in relation to the referral of Mineral and Petroleum (Onshore and Offshore) and Geothermal Proposals (EPA and DMP 2009); and
- Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016c)

### **1.3.4 Flora and Vegetation**

All Australian native flora is protected under the WC Act, where flora is defined as any plant (including wildflower, palm, shrub, tree, fern, creeper or vine) which is either native to Western Australia or declared to be flora under the Act, and includes any part of flora and all seed and spores thereof. Any activity in Western Australia that involves taking part of or the whole of a WA native plant may require a licence or permit to do so.

Species of flora may be listed as 'Threatened' pursuant to Schedule 1 of the EPBC Act. Any action likely to have a significant impact on a species listed under the EPBC Act requires referral to the Commonwealth Department of the Environment (DotE) and potentially the approval of the Commonwealth Minister for the Environment.

A flora species may be designated 'Declared Rare' species under subsection 2 of section 23F of the WC Act and it is an offence to 'take' or damage rare flora without Ministerial approval. Section 23F of the Act defines 'to take' as "... to gather, pluck, cut, pull up, destroy, dig up, remove or injure the flora to cause or permit the same to be done by any means". The WA State Minister for the Environment can declare taxa (species, subspecies or variety) as 'Declared Rare Flora' (DRF) if they are considered to be in danger of extinction, rare or otherwise in need of special protection. At the State level, the term 'Threatened Flora' is now commonly used to refer to DRF regardless of their Commonwealth status.

Species of flora acquire a 'Declared Rare' or 'Priority' conservation status when populations are restricted geographically or threatened by local processes (**Table 1**). The Department of Parks and Wildlife (DPaW) recognises these threats and applies regulations towards population protection and species conservation. DPaW enforces regulations under the WC Act to conserve Declared Rare Flora (DRF) and Priority Flora and protect significant populations.

The list of Threatened (Declared Rare) flora is reviewed annually by a scientific panel that assess a taxon's conservation status and ranks them into categories. The Priority Flora list is dynamic, as new information becomes available conservation status is reviewed and changes to the listing may result. The categories for Priority Flora give an indication of the priority for undertaking further surveys based on the number of known sites, and degree of threat to those populations.

**Table 1: Definition of Threatened and Priority Flora Species (DPaW 2014)**

Code	Definition
T	<b>Threatened Flora – (Declared Rare Flora – Extant)</b> Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection and have been gazetted as such (Schedule 1 under the <i>Wildlife Conservation Act 1950</i> ).
X	<b>Presumed Extinct Flora (Declared Rare Flora - Extinct)</b> Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such Schedule 2 under the <i>Wildlife Conservation Act 1950</i> ).
P1	<b>Priority One – Poorly Known Species</b> Species that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.
P2	<b>Priority Two – Poorly Known Species</b> Species that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.
P3	<b>Priority Three – Poorly Known Species</b> Species that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.
P4	<b>Priority Four – Rare, Near Threatened and other species in need of monitoring</b> (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.

Code	Definition
	(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
P5	<b>Priority Five - Conservation Dependent species</b> Species that are not threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

### 1.3.5 Threatened Ecological Communities

In Western Australia "Threatened Ecological Communities" (TECs) are defined by the Western Australian Threatened Ecological Communities Scientific Advisory Committee (within DPaW) and are assigned to one of the categories outlined below (**Table 2**). While they are not afforded direct statutory protection at a State level (unlike Threatened Flora) under the WC Act their significance is acknowledged through other State environmental approval processes (i.e. Environmental Impact Assessment process pursuant to Part IV of the EP Act).

**Table 2: Definition of Codes for Threatened Ecological Communities**

Code	Definition
PD: Presumed Totally Destroyed	An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future. An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant
CR: Critically Endangered	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated. An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future.
EN: Endangered	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future. An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future.
VU: Vulnerable	An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range. An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future.

Selected TECs are also afforded statutory protection at a Federal level pursuant to the EPBC Act. Not all State listed TECs are given Federal protection, only a select few. The *EPBC Act* provides for the strong protection of TECs, which are listed under section 181 of the *EPBC Act*, and are defined as "Critically Endangered", "Endangered" or "Vulnerable" under Section 182 of the *EPBC Act*.

The EPBC Act provides protection for TECs under federal legislation, which are defined as communities which are:

- **Critically Endangered** (if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future);
- **Endangered** (if, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future); or

- **Vulnerable** (if, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future).

### 1.3.6 Fauna

Biodiversity in Western Australia is protected, managed and assessed under international, national and state agreements, legislation and policy. For Environmental Impact Assessment, the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Western Australian Wildlife Conservation Act 1950* (WC Act) are of particular relevance to Western Australian fauna.

#### 1.3.6.1 EPBC Act

At the national level, fauna is protected under the EPBC Act. Schedule 1 of the Commonwealth EPBC Act contains a list of species that are considered Critically Endangered (CE), Endangered (E), Vulnerable (V), Extinct (Ex), Extinct in the wild (ExW) and Conservation Dependent (CD). The significance levels for fauna used in the EPBC Act are those recommended by the International Union for the Conservation of Nature and Natural Resources (IUCN) and reviewed by Mace and Stuart (1994).

Under the provisions of the Commonwealth EPBC Act proposed actions which have the potential to have a significant impact on a matter of national environmental significance must be referred to the Commonwealth Minister for the Environment for a decision as to whether an assessment is required under the provisions of that Act (EPA, 2004).

The EPBC Act also has lists of migratory species that are recognised under international treaties such as the China Australia Migratory Bird Agreement (CAMBA), the Japan Australia Migratory Bird Agreement (JAMBA) and the Bonn Convention (The Convention on the Conservation of Migratory Species of Wild Animals).

#### 1.3.6.2 Wildlife Conservation Act

At the state level, significant fauna is listed under the *Western Australian Wildlife Conservation Act 1950: Wildlife Conservation (Specially Protected Fauna) Notice 2016*. There are seven levels of conservation significance provided for fauna. Scheduled species are prioritised and listed as:

- Schedule 1 (S1): Fauna that is rare or likely to become extinct – Critically Endangered;
- Schedule 2 (S2): Fauna that is rare or likely to become extinct – Endangered;
- Schedule 3 (S3): Fauna that is rare or likely to become extinct – Vulnerable;
- Schedule 4 (S4): Fauna that is rare or likely to become extinct – Extinct;
- Schedule 5 (S5): Birds subject to international agreements – the protection of migratory species;
- Schedule 6 (S6): Fauna that are of special conservation need - species dependent on ongoing conservation intervention; and
- Schedule 7 (S7): Fauna that is in need of special protection.

## 1.4 Commitments

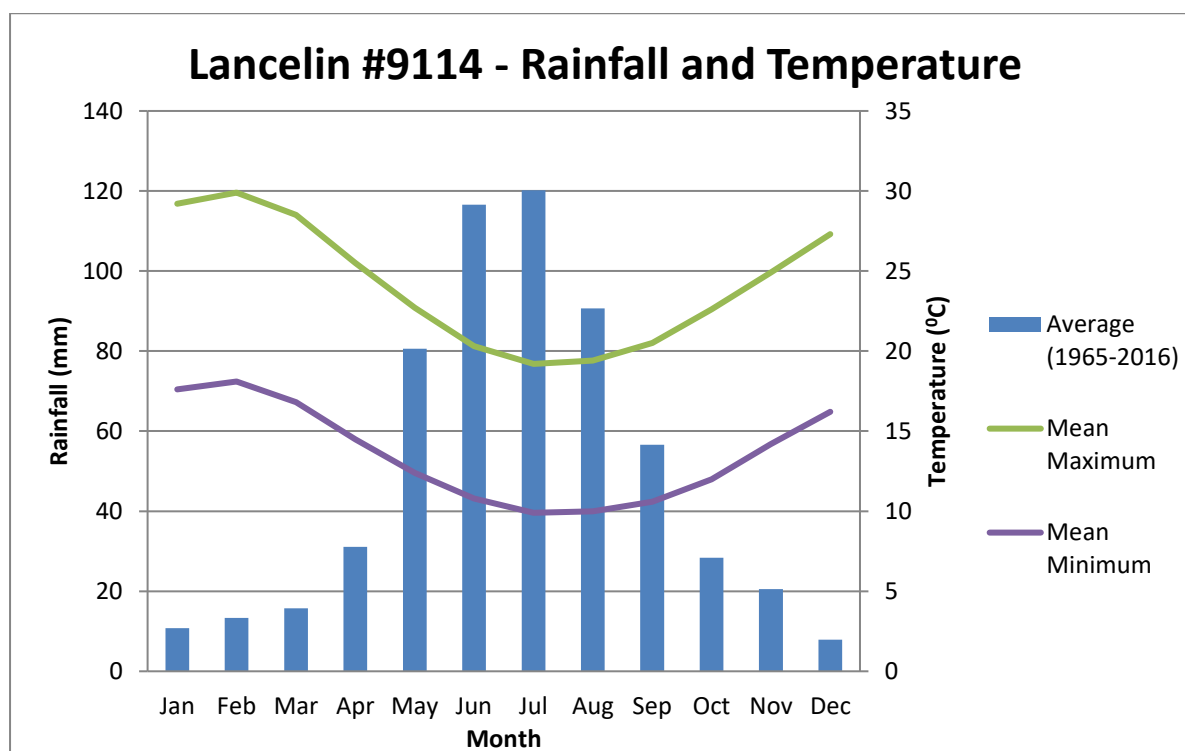
The Exploration Manager will be responsible, on behalf of Image, to ensure that all exploration works and associated environmental management and rehabilitation commitments are undertaken in accordance with this Conservation Management Plan. The following commitments have been made in this CMP:

- Avoid or, if unavoidable, to minimise and mitigate impacts to native vegetation
- Avoid direct impacts to native fauna
- Avoid or, if unavoidable, minimise and mitigate impacts to native fauna habitat
- Prevent soil erosion and to rehabilitate areas disturbed during exploration
- Prevent the introduction and spread of weed species during exploration
- Prevent the introduction and spread of pathogens during exploration, notably *Phytophthora* spp.
- Zero waste to be left within the project area
- Prevention of soil and water contamination and to minimise air and noise pollution as a result of exploration activities
- Rehabilitate disturbed areas and mitigate the impacts caused by the exploration program;
- Avoid impacts to fauna as a result of uncapped drill holes
- To promptly address and take appropriate measures regarding any incident or complaint
- To ensure all personnel receive adequate training and information in relation to environmental values of the projects area, the risks the exploration program pose to those values and management actions to be taken to address those risks

## 2 Existing Environment, Land Tenure and Constraints

### 2.1 Climate

The climate of the Swan Coastal Plain bioregion is Mediterranean, with cool wet winters and hot dry summers. Rainfall predominantly April-October, with low rainfall totals during December-March. Weather station Lancelin (#9114), located approximately 20km west of the project area, records an average of 602.2mm of rainfall on an annual basis, and experience average temperatures ranging between 10 and 30 degrees Celsius (Graph 1).



Graph 1: Average monthly rainfall and maximum temperature at Lancelin (#9114)

### 2.2 Biogeography

The assessment area is located within the Swan Coastal Plain 2 (SWA2) subregion, in accordance with the Interim Biogeographic Regionalisation for Australia (IBRA). The IBRA system identifies 89 bioregions and 419 subregions across Australia, based on climate, geology, landforms and characteristic vegetation and fauna.

Mitchell, Williams and Desmond (2002) describe the SWA2 subregion (1,333,901 ha) as a low lying coastal plain, dominated by Banksia or Tuart on sandy soils, *Casuarina obesa* on outwash plains and paperbark in swampy areas. The plain rises to duricrusted Mesozoic sediments dominated by Jarrah woodland in the east, with three phases of marine sand dune development providing relief to the west.

The Perth subregion is composed of colluvial and Aeolian sands, alluvial river flats and coastal limestone. Vegetation comprises heath and/or Tuart woodlands on limestone, Banksia and Jarrah/Banksia woodlands on Quaternary marine dunes and Marri on colluvials and alluvials. The climate is Mediterranean, with annual rainfall ranging between 600 to 1000mm.

Dominant land uses include urban development, dry land agriculture, Unallocated Crown Land and Crown reserves, conservation, forestry plantations, and road easements and infrastructure.

The SWA2 subregion retains 41.59% (464,855.95ha) of its pre-European vegetation cover, of which 11.20% is contained in land protected (reserved) for conservation.

### 2.3 Geology

The Bidaminna project area is on the Swan Coastal Plain west of the Gingin Scarp in the Perth Basin, which is a thick sedimentary basin extending north–south along for 1000 km in the southwest of Western Australia, with in excess of 15 km of Phanerozoic sediment.

The economic detrital heavy mineral deposits of Western Australia are associated with ancient beach deposits formed along fossil shorelines that developed during one or more marine transgressions during the Pleistocene. Such deposits occur along much of the west coast of Western Australia from Cape Naturaliste in the south to the north of Dongara.

The eastern limit of the beach deposits between Gingin and Dongara is the Gingin Scarp, which is the western edge of outcropping Mesozoic sediments of the Perth Basin. The target heavy mineral sands occur in beach sediments which lie on or to the west of the Gingin Scarp.

Mineralisation occurs in Quaternary nearshore sediments west of the Gingin Scarp, and in underlying fluvial Mesozoic sediments that typically form the basement to deposits elsewhere. The Quaternary mineralisation is interpreted to have formed during periods of sea level stability within a cycle of shoreline regression.

The sediments of the Perth Basin within the project area comprise the Coolyena Group overlying the Leederville Formation of the Warnbro Group. The Coolyena Group consists of a glauconitic shale, siltstone and silty to clayey sandstone in the east and characteristically glauconitic interbedded sandstone, siltstone, shale and claystone of the Osborne Formation in the west. To the north the Leederville Formation is underlain by the Yarragadee Formation and Parmelia Group. The Leederville Formation consists of sandstone, siltstone and shale.

Overlying the Coolyena Group is the Guildford Formation (which hosts the Bidaminna mineral sands deposit). This overlies the Ascot Beds and in turn is overlain by the Bassendean Sand. The Tamala Limestone is present within part of E70/2844 and E70/3086.

The Bidaminna tenements cover the Bidaminna paleoshoreline, which is prospective for heavy minerals along its length of about 38km. The Bidaminna deposit is associated with a prominent magnetic trend that is identified on the tenements. The mineralisation is hosted within the Guildford Formation. Image is investigating magnetic anomalies that are thought to be associated with heavy minerals within the Guildford Formation throughout the project area.

### 2.4 Regional Vegetation

Swan Coastal Plain Subregion of the Drummond Botanical Subdistrict, as described in *Plant Life of Western Australia* (Beard, 1990). The Drummond Botanical Subdistrict is described as ‘Mainly *Banksia* low woodland on leached sands with *Melaleuca* swamps where ill-drained; woodland of Tuart (*Eucalyptus gomphocephala*), Jarrah (*E. marginata*) and Marri (*Corymbia calophylla*) on less leached soils.

Three vegetation associations are mapped as occurring within the project area. ?? described their characteristics, their extant remaining cover and the percentage of that within conservation estate.



## 2.5 Flora and Vegetation of Conservation Significance

Multiple flora and vegetation surveys have been completed within Image tenements since 2009. **Table 2** lists the prior work conducted in the tenements by author, content, month of field work and year.

**Table 3: Previous flora and vegetation reports within the project area**

Date	Consultant	Title	Key Results
December 2016	Plantecology Consulting	Image Resources NL North Perth Basin – Bidaminna Threatened and Priority Flora Survey	The assessment area is covered by the Threatened <i>Banksia woodland on the Swan Coastal Plain</i> ecological community. Identification of the Priority 3 <i>Banksia dallanneyi</i> subsp. <i>pollostata</i>
February 2014	Brian Morgan	A Survey of Proposed Bidaminna Exploration Grid Lines	Identification of <i>Banksia dallanneyi</i> subsp. <i>pollostata</i> (Priority 3) and <i>Verticordia lindleyi</i> subsp. <i>lindleyi</i> (Priority 4)
June 2009	Rockwater Pty Ltd	Flora Survey for Bidaminna North Exploration Drilling Programme (E70/2844)	Identification of <i>Banksia dallanneyi</i> subsp. <i>pollostata</i> (Priority 3), <i>Dodonaea hackettiana</i> (Priority 4), <i>Hypolaena robusta</i> (Priority 4), <i>Schoenus griffinianus</i> (Priority 4) and <i>Verticordia lindleyi</i> subsp. <i>lindleyi</i> (Priority 4)

The desktop review identified total of 59 flora taxa of conservation significance as previously recorded within 20km of the project area, consisting of 16 Threatened, one Priority 1, seven Priority 2, 21 Priority 3 and 14 Priority 4. The complete list of conservation significant flora recorded in the desktop search is presented in **Appendix 3**.

Five flora species of conservation significance have been recorded within the project area. These consist of *Banksia dallanneyi* subsp. *pollostata* (Priority 3), *Dodonaea hackettiana* (Priority 4), *Hypolaena robusta* (Priority 4), *Schoenus griffinianus* (Priority 4) and *Verticordia lindleyi* subsp. *lindleyi* (Priority 4).

## 2.6 Fauna of Conservation Significance

The project area is located within the range of the Threatened (Endangered) Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*), and is likely to contain breeding, roosting and foraging habitat for this species.

The project area may contain habitat for the Threatened (Vulnerable) Chuditch (*Dasyurus geoffroii*).

No other Threatened fauna species are expected to occur within the project area.

## 2.7 Environmentally Sensitive Areas

The DMP and the DBCA have reached a Memorandum of Understanding (MoU) that affords a higher level of protection to areas referred to as Environmentally Sensitive Areas (ESAs). These include:

- Defined wetlands and riparian vegetation within 50m;
- Areas covered by Threatened Ecological Communities;
- Area of vegetation within 50m of Declared Rare Flora (DRF);
- Bush Forever sites; and
- Declared World Heritage property sites

ESAs are reviewed periodically to ensure that the mining industry is kept informed about boundary changes and their relevance to field activities associated with mineral exploration and mining.

Numerous geomorphic wetlands were identified as occurring within the project area (**Figure 1**).

The Protected Matters database identified two Threatened Ecological Communities as potentially occurring within the project area:

- Banksia Woodlands of the Swan Coastal Plain (Endangered); and
- Clay Pans of the Swan Coastal Plain (Critically Endangered).

The *Banksia Woodlands of the Swan Coastal Plain* ecological community is likely to be widespread within the project area.

## 2.8 Pathogens and Weeds

### 2.8.1 *Phytophthora* Dieback

Dieback is a soil borne pathogen with a range of hosts in the southwest of WA, predominantly from the Proteaceae, Ericaceae, Myrtaceae, Xanthorrhoeaceae and Fabaceae plant families. While some plant species are resistant, others are susceptible to the disease caused by the pathogen, which can result in chlorosis, dieback and usually death (Wills and Keighery, 1994). Numerous species of *Phytophthora* are found in southwest WA, both introduced and endemic, with the most virulent and pathogenic form being the introduced *P. cinnamomi*.

According to the most recent Western Australian State of the Environment Report, Dieback (listed as a Priority 1 threat) is the third greatest threat to biodiversity after salinity and climate change (EPA, 2011). It is considered a more serious threat than weeds, clearing of native vegetation, acid sulphate soils and soil erosion. The effect of Dieback is significant in WA because:

- Over 40% (2,300) of the native plant species, including half of endangered plant species, in the south-west of WA are susceptible to the pathogen;
- Changes in the composition and structure of floral communities as a result of Dieback has impacts throughout the whole ecosystem, including impacts on the indigenous fauna; and
- Dieback can lead to significant soil erosion as a result of the loss of susceptible vegetation.

Dieback is spread through the movement of water and soil within the landscape. Major vectors of Dieback include, but are not limited to, wet soil adhering to vehicle tyres/tracks and earthmoving equipment. Therefore, quarantine management procedures are an effective tool to reduce the spread of Dieback as a result of earthmoving activities.

The *Phytophthora* Dieback pathogen is widespread in areas with greater than 800 mm of annual rainfall, less extensive in areas that receive between 600–800 mm, and mainly restricted to water-gaining sites in areas that receive 400–600 mm. The pathogen only very rarely occurs in areas that receive less than 400 mm of annual rainfall. In Western Australia Dieback is a significant environmental issue for projects between Geraldton in the Midwest and Esperance on the South Coast, and is widespread in the Southwest region.

### 2.8.2 Weeds

The State of the Environment Report (EPA 2007) identifies over 300 weed species as occurring in the South West bioregion. The Environmental Weeds Strategy for WA (EWSWA) (CALM, 1999) rated all weeds known for Western Australia at the time of publication, according to invasiveness, distribution and environmental impact (**Table 4**). The weeds were classified into four categories; High, Moderate, Mild and Low. High rated species are those that all three criteria apply to and Moderate rated species are those which only two of the criteria apply.

**Table 4: Criteria for Environmental Weeds Strategy Rating (CALM 1999)**

Criteria	Description
<b>Invasiveness</b>	Ability to invade bushland in good to excellent condition or ability to invade waterways.
<b>Distribution</b>	Wide current or potential distribution including consideration of known history of wide spread distribution elsewhere in the world.
<b>Environmental Impacts</b>	Ability to change the structure, composition and function of ecosystems. In particular an ability to form a monoculture in a vegetation community.

In WA, the EWSWA (CALM, 1999) list assesses 1350 weed species recorded in Western Australia, with 34 weed species classified as High.

Under the *Agriculture and Related Resources Protection Act 1976 (ARRP Act)* and *Agriculture and Related Resources Protection Regulations 2011*, an exotic flora species may be 'Declared', which then legally requires landholders to control or eradicate the species when it occurs on their land. A list of Declared Plants is issued and regularly updated by the Department of Agriculture and Food (WA).

When weeds are introduced into an existing native vegetation complex, ecological and landscape values can be negatively impacted. Impacts from weeds include, but are not limited to:

- Competition with native flora for light, water, space and nutrients;
- Introduction of associated plant pathogens and pests;
- Reduced floristic diversity;
- Altered vegetation structure;
- Increased risk of soil erosion in some instances; and
- Altered fire regimes.

Weeds can be introduced into existing vegetation complexes by a variety of vectors, both natural and human influenced. Several of these, including wind, surface water and fauna are naturally occurring processes. Human activities and influences which can introduce exotic flora species into an area include, but are not limited to:

- Wheels and machinery, digging/drilling components etc. which contain plant material or seeds;
- Altered surface water flow;
- Introduction of exotic fauna; and
- Disturbance to vegetation and/or soil.

### 3 Environmental Context and Management

The management practices outlined in this Strategic CMP are based on *Draft Guidelines for Environmentally Responsible Mineral Exploration & Prospecting in Western Australia* (DMP 2012) and the *Guidelines for Conservation Management Plans Relating to Mineral Exploration on DEC Managed Lands* (DEC 2011).

#### 3.1 Land Access

##### 3.1.1 Regulatory Guidelines

The purpose of regulatory guidelines in relation to land access is to prevent impacts related to public access and traffic management within the project area.

The Exploration Licence applies to all land within the tenements listed in **Table 1** with the exclusion of:

- land subject to any assessment lease, mining lease or mineral claim under the *Mining Act 1978*, at the date of grant of this licence;
- land subject to any residence area or business area, granted under the *Mining Act 1906*, at the date of grant of this licence;
- land subject to any pending application for a mining lease, mining purposes lease or claim under the *Mining Act, 1978*, or any application for a coal lease under the *Coal Mining Act, 1973*, made prior to the Ninth day of May 1980; and
- land subject to any pending application for an assessment lease, mining lease or mineral claim under the *Mining Act 1978*, made prior to the Ninth day of May, 1980.

##### 3.1.2 Management

###### Management Objectives:

To minimise any environmental and social impacts related to land use, ownership and public entities.

###### Management Actions:

Implementation of the following management actions and commitments will be overseen by the Exploration Manager:

- The use of public roads and tracks will be identified during the planning stage to determine whether public/fire fighting use of roads/tracks will be affected (if public use will be affected, written approval will be sought from the Department);
- Avoid track construction or, if this is not possible, minimise track construction by preferentially using existing tracks;
- Depending on the condition of the road, wet weather access will be restricted so as to prevent damage to the road or track, and minimize risk of erosion;
- The location of existing transmission and communication lines, pipelines and other public utilities will be identified and written approval sought from the Department if it is likely that the utilities will be affected by exploration. The authority in control of the public utility will also be notified should exploration impact on the utility; and
- All fences and gates will be kept in the same position and condition in which they were found.

## 3.2 Flora and Vegetation

### 3.2.1 Regulatory Guidelines

The conservation of vegetation and flora is covered primarily by the following statutes:

- Wildlife Conservation Act 1950;
- Conservation and Land Management Act 1984;
- Environmental Protection Act 1986; and
- Environment Protection and Biodiversity Conservation Act 1999.

The following EPA Position Statements, Guidance Statements and Technical Guides are relevant to the management of vegetation and flora at tenements E70/2844, E70/3298, E70/4245, E70/4779 and E70/4794:

- Position Statement No. 2, Environmental Protection of Native Vegetation in Western Australia (EPA 2000)
- Position Statement No. 3, Terrestrial Biological Surveys as an Element of Biodiversity Protection (EPA 2002)
- Guidance Statement No. 33, Environmental Guidance for Planning and Development (EPA 2008)
- Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016c)

Any plant that is native to WA is protected under the *WC Act*, the State's primary wildlife conservation legislation. Some flora species have additional protection at a Federal level under the *EPBC Act 1999*. Penalties apply for any damage to individuals, populations or habitats of protected species.

### 3.2.2 Management

#### Management Objective:

To minimise impacts to native flora and vegetation through the application of effective environmental management

#### Management Actions:

Implementation of the following management actions and commitments will be overseen by the Exploration Manager:

- Prior to ground disturbance activities, a flora and vegetation survey should be undertaken. The level of survey is to be determined in accordance with the guidelines detailed in Table 3 of the CMP Guidelines (DEC, 2011)
- Descriptions and photographs of conservation significant species and features potentially occurring in the project area will be made readily available to field staff;
- Existing tracks will be used as much as possible;
- Vegetation will be cleared using a raised blade, to avoid disturbance of topsoil and understory root mass;
- Clearly demarcate area of approved soil disturbance i.e. tracks, pads and sumps so as to avoid, or where unavoidable to minimise, impacts to Threatened and Priority flora and ecological communities;
- Documentation, survey and field demarcation standards will be implemented to prevent unnecessary clearing;
- Where possible, significant vegetation e.g. large trees, thickets will be avoided;
- Appropriate machinery for the task will be used to minimise impacts; and

- Education and awareness programs will be conducted to ensure field personnel are aware of the biodiversity values present within the project area and understand their role in protecting these values (e.g. hygiene control measures).

### 3.3 Dieback and Weed Hygiene

#### 3.3.1 Regulatory Guidelines

*Phytophthora* Dieback management is required under several regulatory mechanisms including:

- *Environmental Protection Act* (1986) Part V S.50A “Serious Environmental Harm” provisions;
- Projects being assessed under the *Environmental Protection Act* (1986) which require DBCA and/or DMIRS to comment on Dieback management and provide these agencies with the right to impose conditions to new approvals; and
- All operations – *Phytophthora* Dieback is listed as a Key Threatening Process with the Federal Government under the *Environment Protection and Biodiversity Conservation Act* (1999).

The major legislation relevant to the management of weeds is contained within:

- *The Noxious Weeds Regulation 1973*
- *Agriculture and Related Resources Protection Act 1976*
- *The National Weed strategy 1997 and the Australia Weed Strategy 2007*
- *The Weed Plan for Western Australia 2001*
- *A 100-year Biodiversity Conservation strategy for Western Australia* (DEC, 2006)

#### 3.3.2 Management

##### Management Objective:

To prevent *Phytophthora* and weed species from entering the project area, and prevent existing Dieback infestations and weed populations being spread beyond their current distribution.

##### Management Actions:

Implementation of the following management actions and commitments will be overseen by the Exploration Manager:

- Prior to the commencement of each exploration program, a *Phytophthora* Dieback assessment and a Noxious or Declared Weeds population survey will be conducted within the project area, with results to be reported to DBCA for regulatory approval (this will be detailed in specific Bridging Documents)
- Prior to the commencement of each exploration program, a Hygiene Management Plan will be developed and implemented to manage Dieback and weed risk to biodiversity within the project area (this will be detailed in specific Bridging Documents)

Bridging documents will address the specific environmental conditions of exploration programs, and will include management and implementation of the following hygiene protocols:

- All vehicles, machinery and equipment to be free of soil and propagules on entry to the site
- Vehicles and machinery will avoid ground disturbance activities in wet soil conditions
- Vehicles and machinery will avoid ground disturbance activities in weed infested areas, especially when these plant species are bearing fruit/seed
- Dieback management procedures

- Field clean-down stations
- Descriptions and photographs of significant environmental weeds potentially occurring in the program area will be made readily available to field staff

### 3.4 Fauna and Fauna Habitats

#### 3.4.1 Regulatory Guidelines

The conservation of fauna is covered primarily by the following legislation and international treaties:

- Environment Protection and Biodiversity Conservation Act 1999
- Wildlife Conservation Act 1950
- Environmental Protection Act 1986
- Conservation and Land Management Act 1984
- China-Australia Migratory Bird Agreement
- Japan-Australia Migratory Bird Agreement
- Republic of Korea and Australia Migratory Bird Agreement

The following documents are relevant to fauna surveys:

- EPA Position Statement No. 3: Terrestrial Biological Surveys
- EPA Guidance Statement No. 56: Terrestrial Fauna Surveys

Any animal that is native to WA is protected under the State's primary wildlife conservation legislation, the *WC Act*. Some fauna species have additional protection at a Federal level under the *EPBC Act*. Penalties apply for any damage to individuals, populations or habitats of protected species.

#### 3.4.2 Management

##### Management Objective:

To avoid impacts to native fauna and their habitats through the application of effective environmental management.

##### Management Actions:

Implementation of the following management actions and commitments will be overseen by the Exploration Manager:

- Prior to ground disturbance activities, a fauna survey should be undertaken. The level of survey is to be determined in accordance with the guidelines detailed in Table 3 of the CMP Guidelines (DEC, 2011)
- Descriptions and photographs of conservation significant species and features (e.g. Threatened, Schedule and Priority fauna) potentially occurring in project area will be made readily available to field staff
- Existing tracks will be used wherever possible
- Documentation, survey and field demarcation standards will be applied to prevent unnecessary or excessive clearing
- Direct impacts to fauna will be avoided as much as possible
- All drill holes will be capped immediately after drilling or re-discovery (if historic) to avoid fauna becoming trapped or harmed
- No pets will be allowed into the exploration areas
- All sumps will incorporate egress ramps to prevent fauna from becoming trapped

- Any riparian vegetation, significant vegetation (e.g. large trees, thickets) and natural structures (e.g. piles of woody debris) likely to be habitats of native fauna will be avoided to the greatest extent possible
- Appropriate machinery for task will be used to minimise impacts
- The duration of drilling will be minimised to reduce effects of noise, dust and other atmospheric emissions
- All domestic wastes will be managed to deter the attraction of fauna and stored within receptacles that are fauna proof
- Education and awareness training will be provided to ensure that field personnel are aware of the biodiversity values present within the project area and understand their role in protecting these values during the exploration activities (e.g. capping drill holes)

### **3.5 Waste Management**

Waste can be generated from the following sources during an exploration program:

- Putrescible waste
- Drilling wastes such as drilling muds, sample bags, casing etc.
- Vehicles and machinery
- Camp or village building infrastructure, tools, packaging etc.

#### **3.5.1 Regulatory Guidelines**

The major legislation relevant to Waste is contained within:

- The Waste Avoidance and Resource Recovery Act 2007
- The Waste Avoidance and Resource Recovery Levy Act 2007
- The Waste Avoidance and Resource Recovery Regulations 2008
- The Waste Avoidance and Resource Recovery Levy Regulations 2008

#### **3.5.2 Management**

##### **Management Objective:**

To leave zero waste in the project area.

##### **Management Actions:**

Implementation of the following management actions and commitments will be overseen by the Exploration Manager:

- All rubbish will be removed from site for disposal at a suitably licensed facility
- No cigarettes or other burning matter will be disposed of on the exploration site
- Drip trays will be used under rigs to minimise risk of hydrocarbon spillage
- Drill vehicles will carry hydrocarbon absorptive material
- Sumps of appropriate size will be used to contain water and sediment encountered during drilling (sump to be located away from significant vegetation)
- All domestic waste will be managed to deter the attraction of fauna and stored with receptacles that are fauna proof
- All sewage will be treated in a licensed sewage treatment facility
- Drilling will be wet to control dust and will use sumps to contain materials If fibrous material encountered (e.g. asbestos)



- If fibrous material encountered (e.g. asbestos), sample bags will be used to prevent dispersion of drill samples into the environment
- Drill spoil/ samples will be buried 1.5m below surface level if fibrous material encountered (e.g. asbestos)
- Liquid drilling waste will be disposed of into a sealed (covered) sump
- Suitable storage facilities for waste from project activities will be provided
- Lids or covers will be provided for bins to prevent wind-blown waste entering terrestrial environments or habitats
- All sample bags will be removed and suitably disposed of within six months of completion of drilling

### **3.6 Erosion and Sediment Control**

Soil erosion can be accelerated by exploration related activities such as vegetation clearing and pad/sump construction. Water quality can be affected by erosion or sedimentation through run off from roads and open spaces, and by the clearing of native vegetation. Surface water and sub-surface water flows can be altered and impact natural hydrological regimes, potential surface water or sub-surface water dependant ecosystems.

There are two main forms of soil erosion: wind erosion where soil is being blown off the land, and water erosion which occurs when soil is washed from the land. These are processes that occur naturally at low levels but can be exacerbated by human activity. The degree of susceptibility of an area to soil erosion will depend on the type of landscape, climate, soil, vegetation cover and land use occurring at that locality.

#### **Water Erosion**

Water erosion occurs where soil is removed by surface water run-off. The mobilisation of the topsoil layer causes both a loss of nutrient and a subsequent decrease in agricultural productivity or in the health of native vegetation. Areas most susceptible to water erosion occur on steep slopes with dispersive soils and a high rainfall. Soils with a high level of plant cover are less susceptible to water erosion, because vegetation helps to reduce water flow and allow improved water infiltration into the soil.

#### **Wind Erosion**

Wind erosion happens where dry soil is mobilised by the wind. The erosion of fine soil particles can result in increased airborne particulates and contribute to dust storms. The most susceptible areas are those with dry soils and a high proportion of fine sands with a weakly cohesive structure and water repellent properties. Vegetation cover and undulating landscapes reduce wind velocity and act to ameliorate a soil's vulnerability to wind erosion.

#### **3.6.1 Regulatory Guidelines**

- Environmental Protection Act 1986
- Waterways Conservation Act 1976

The following guidelines area also relevant:

- DEC (2008) A Guideline for the Development and Implementation of a Dust Management Program
- The National Environmental Protection (Ambient Air Quality) Measure

### 3.6.2 Management

#### Management Objective:

To prevent soil erosion and sedimentation of watercourses as a result of exploration activities.

#### Management Actions:

Implementation of the following management actions and commitments will be overseen by the Exploration Manager:

- Existing tracks will be used wherever possible and minimise footprint if use of existing tracks is not possible
- Impacts to significant vegetation (e.g. large trees, thickets) will be avoided
- Any tracks will be planned to fit topography so as to minimise earthworks and erosion
- Tracks will be formed without sharp twists and turns to the greatest extent possible because these cause erosion and wheel ruts on the corners
- Drainage pattern modification will be avoided, particularly in soils susceptible to erosion
- Any clearing for tracks and drill pads will be done with a raised blade to avoid disturbance of topsoil and understory root mass
- Appropriate machinery for task will be used to minimise impacts
- Minimise creating windrows which could channel water
- Cleared vegetation and topsoil will be stockpiled separately for use in rehabilitation
- All windrows will be removed and re-spread during rehabilitation of exploration disturbance
- All compacted tracks no longer required will be ripped to an appropriate depth that relieves compaction but minimises topsoil loss, soil profile mixing and bringing subsurface material to the surface
- If modified, the original surface contours will be restored to their previous state where possible
- Access to non-retained tracks will be blocked
- Rehabilitated tracks will be appropriately marked or removed from company maps and GIS layers to discourage future use
- Machines and vehicles will be restricted to the limits of the areas to be cleared

### 3.7 Pollution

Pollution within in the project area can take the form of soil contamination, noise and dust or air emissions. Exploration activities can lead to pollution of the natural environment, including, but not limited to:

- Soil or water contamination from hydrocarbon or chemical spills
- Vehicle emissions - particulates, NOx and SOx
- Dust from tracks and cleared / open areas
- Water pollution from sedimentation
- Excessive machinery noise

#### 3.7.1 Regulatory Guidelines

The major legislation relevant to Contaminated Sites in WA is contained within:

- *The Contaminated Sites Act WA 2003*
- The Contaminated Sites Regulations 2006

## **Dust**

- A Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and Other Related Activities (DEC, 2011)

## **Noise**

- Environmental Protection (Noise) Regulations 1997
- EPA Guidance No 3 - Separation Distances between Industrial and Sensitive Land Uses
- EPA Guidance No 8 - Environmental Noise (Draft)
- EPA Guidance No 33 - Environmental Guidance for Planning and Development

## **Water**

All water flowing from any drill holes must be managed and contained and the disposal of any such waters must be in accordance with the ANZECC/ARMCANZ 2000 Water Quality Guidelines in order to meet the environmental values of the receiving watercourse, or must be disposed of in accordance with a licence issued by the DBCA.

### **3.7.2 Management**

#### **Management Objective:**

To avoid releasing pollutants into the natural environment in the first instance; the release of pollutants should be minimised and mitigated if contamination is unavoidable.

#### **Management Actions:**

Implementation of the following management actions and commitments will be overseen by the Exploration Manager:

- All rubbish will be removed from site for disposal in a suitably licensed facility
- All equipment used on site will be maintained in good working order
- Pre-start inspections of equipment will include inspections of noise and dust controls to ensure they are operational at all times
- All drill rigs used on site will be fitted with the appropriate dust and noise suppression equipment (e.g. water sprays and mufflers)
- Drilling will be wet to control dust and will use sumps to contain materials if fibrous material encountered (e.g. asbestos)
- Any requirements for discharging water will be identified during exploration planning and the appropriate licenses obtained
- Drip trays will be used under rigs to minimise risk of hydrocarbon spillage
- Drill vehicles will carry hydrocarbon absorptive material
- Sumps of appropriate size will be used to contain water and sediment encountered during drilling (sump to be located away from significant vegetation)
- If fibrous material encountered (e.g. asbestos), sample bags will be used to prevent dispersion of drill samples into the environment
- Drill spoil/ samples will be buried 1.5m below surface level if fibrous material encountered (e.g. asbestos)
- Liquid waste will be disposed of into a sealed (covered) sump
- All fuel storage areas are to be bunded

## **3.8 Fire Management**

### **3.8.1 Regulatory Guidelines**

The major legislation relevant to fire management in WA is contained within:

- Bush Fires Act 1954
- Emergency Management Act 2005
- Conservation and Land Management Act 1984
- Environmental Protection Act 1986
- Litter Act 1979
- Environmental Protection (Clearing of Native Vegetation) Regulations 2004
- Forest Management Regulations 1993

### **3.8.2 Management**

#### **Management Objective**

To minimise the risk of bushfires resulting from exploration activities

#### **Management Actions**

Implementation of the following management actions and commitments will be overseen by the Exploration Manager:

- All vehicles and machines being operated are fitted with well-maintained exhaust systems that will prevent the accumulation of combustible material against heat surfaces and that injectors on diesel vehicles are in good working order
- All exploration vehicles will carry an appropriate, serviced fire extinguisher
- Comply with all relevant fire control legislation, guidelines and instructions
- No cigarettes or other burning matter will be disposed of on the exploration site
- A dedicated fire fighting vehicle will be made available during Restricted or Prohibited fire periods
- The DBCA Duty Officer will be notified each day during Restricted or Prohibited fire periods of planned presence onsite and all personnel will abide by any restrictions imposed by the Duty Officer

## **3.9 Drilling and Vehicle Movement**

### **3.9.1 Regulatory Guidelines**

- Guidelines for Environmentally Responsible Mineral Exploration & Prospecting in Western Australia (DMP 2017)

### **3.9.2 Management**

#### **Management Objective:**

To minimise and mitigate impacts of drilling activities

#### **Management Actions:**

Implementation of the following management actions and commitments will be overseen by the Exploration Manager:

- Existing tracks will be used wherever possible
- Impacts to significant vegetation (e.g. large trees, thickets) will be avoided

- Avoid driving on vegetation; follow bare areas where possible
- Avoid driving in creek lines and riparian zones
- Appropriate machinery for task will be used to minimise impacts
- Clearing of tracks and drill pads will be done with a raised blade to avoid disturbance of topsoil and understory root mass
- Cleared vegetation and topsoil will be stockpiled separately when excavating sumps, cut and fill pads and tracks
- Topsoil and vegetation will be stockpiled separately for use in rehabilitation when constructing pads and sumps
- Roads will be planned to fit topography to minimise earthworks and erosion
- Minimise creating windrows which could channel water
- Sharp twists and turns in the track will be avoided as these cause erosion and wheel ruts on the corners
- Track entrance points will be aligned to minimise visibility from public roads, where applicable
- Drip trays will be used under rigs to minimise risk of hydrocarbon spillage
- All waste will be removed from site (including any hydrocarbon spills)
- Drill vehicles will carry hydrocarbon absorptive pads for potential water contamination
- All vehicles will carry an appropriate, serviced fire extinguisher
- Sumps of appropriate size will be used to contain water and sediment encountered during drilling (sump to be located away from significant vegetation)
- Drilling will be wet to control dust and will use sumps to contain materials
- If fibrous material encountered (e.g. asbestos) sample bags will be used to prevent dispersion of drill samples into the environment
- Drilling will be planned to avoid water courses wherever possible
- Drill holes plugged at ground level immediately after drilling (preferably with an appropriately sized conical concrete plug)
- Drill holes securely plugged below ground at minimum depth of 400mm within 6 months of drilling (If not using concrete conical plugs, please specify type)
- Drill sample piles will be rehabilitated or buried
- Sample bags will be removed on completion of the drilling program
- Use of track mounted rigs or knockdown rigs on platforms in steep terrain
- Cleared grid lines/cross are to be closed off at the completion of the programme to prevent them being used as a thoroughfare by vehicles. Cleared vegetative material can be used as a barrier for this purpose
- Clearing for drill pads will be kept to a minimum
- If groundwater is encountered whilst drilling, appropriate measures must be taken to contain the material being ejected/discharged (i.e. sumps or tanks). Drilling will cease immediately upon discharge of water until the appropriate and approved containment facilities are implemented

### **3.10 Maintenance of Open Drill Holes**

#### **3.10.1 Regulatory Guidelines**

Plugging drill holes is necessary to minimise risk to fauna and prevent groundwater contamination (DMP 2012). Drill holes are must be temporarily plugged immediately after drilling is completed.

Temporarily plugged drill holes must be managed in accordance with the DMP guidelines (DMP 2012). The collar arrangement must be long lasting and it must minimise the likelihood of danger to stock, personnel or machinery, also providing security against unauthorised access to the hole which may jeopardise its future utility. Drill sites should be regularly inspected to ensure that the drill holes remain securely plugged (DMP 2012).

Drill holes must be permanently plugged and rehabilitated within six months after drilling, unless permission from the DMP is acquired for them to remain temporarily plugged for longer. According to DMP guidelines (DMP 2012), permanent plugging and rehabilitation should involve the following:

- Cutting the PVC collar to a minimum depth of 400mm below the surface
- Inserting a conical (preferably concrete) plug so that it has a tight fit with the PVC collar
- Backfilling the hole with low permeability material (to provide a secondary plug)
- Mounding over the backfilled hole to facilitate water shedding away from the drill hole with low permeability material (approximately 25cm high by 80cm wide) and then cover with topsoil

### **3.10.2 Management**

#### **Management Objective:**

To avoid any impacts to fauna through negligently leaving drill holes uncapped or open.

#### **Management Actions:**

Implementation of the following management actions and commitments will be overseen by the Exploration Manager:

- Drill holes will be plugged or capped immediately after drilling
- Drill string or wire line instrumentation will be used so drill holes can be easily located and re-accessed
- Long lasting collar arrangements will be used
- Temporarily plugged drill holes will be regularly inspected to ensure they remain secure
- Drill holes permanently plugged and rehabilitated in accordance with DMP guidelines (DMP 2012) within 6 months of drilling

### **3.11 Rehabilitation**

#### **3.11.1 Regulatory Guidelines**

The *Draft Guidelines for Environmentally Responsible Mineral Exploration & Prospecting in Western Australia* (DMP, 2012) set out the requirements and standards for rehabilitation of ground disturbance arising from mining exploration activities, as well as procedures for the construction of pads (including cut and fill), sumps and costeans.

#### **3.11.2 Management**

##### **Management Objective:**

To restore the area disturbed during exploration to a safe and stable landform which resembles the area prior to disturbance.

##### **Management Actions:**

The following management actions are based on the *DRAFT Guidelines for Environmentally Responsible Mineral Exploration & Prospecting in Western Australia* (DMP, 2012):

- Appropriate rehabilitation methods will be developed, including revegetation species selection (where revegetation is required), and provided to staff undertaking the rehabilitation work
- Topsoil and vegetation will be stockpiled separately for use in rehabilitation when constructing pads, sumps or tracks
- Sediment and erosion controls will be maintained for the duration of exploration activities
- Exploration activities will be restricted to the designated drill site and access tracks
- Rehabilitation activities will be completed as soon as possible; either progressively, or after the cessation of exploration work and will be completed before the expiry of the license
- As soon as the exploration program finishes all drill holes will be sealed, surveyed and marked
- The PVC or steel drill collars will be removed or cut off at approximately 40cm below surface within six months of the hole being drilled and plugged securely with an appropriately sized conical concrete plug
- Black poly-tail piping will be cut from drill plugs and survey pegs removed
- The remaining drill hole will be backfilled to the surface, with low permeability material e.g. clay/oxide drill cuttings
- The backfilled hole should be mounded to facilitate water shedding away from the drill hole with low permeability material (approximately 20cm high by 80cm wide) and then cover with topsoil
- Drill pads and other disturbed areas which will be cut and filled and will be re-contoured so that it has the same slope and profile as the adjacent undisturbed land
- All sumps and costeans will be backfilled with materials in the order in which they were removed within six months of completion of operations
- Any compacted area to be ripped to an appropriate depth and re-contoured
- Once the earthworks are completed, the stockpiled topsoil and cleared vegetation will be spread over the disturbed area
- All rubbish (including drilling waste and sample bags) will be removed from site for disposal at a suitably licensed facility
- Once exploration activities have ceased, written approval for extension of time to have sumps or drill holes open must be obtained from the Environmental Officer, DMP
- Regular audits will implemented to ensure compliance with DMP guidelines, Mining Act 1978 and Regulations 1981 requirements
- The Environmental Officer will be notified when exploration operations are completed so that an inspection of the site may be conducted
- Any alteration or expansion of exploration operations beyond approved activities must be coordinated and approved by the Environmental Officer prior to commencement of ground disturbing activities
- All in situ hydrocarbon contaminated soils must be removed or suitably remediated to promote revegetation
- Within six months of construction, all sumps must be backfilled with excavated material, covered with topsoil and cleared vegetation, if available, and seeded with suitable local native flora species where required
- All compacted drill sites and grid lines will be ripped on the contour, respread with cleared vegetation if available and where required, seeded with suitable local native flora species
- All cleared vegetative material will be re-spread over disturbed surfaces

- Access tracks will be re-profiled back into the natural hillside/terrain to create a long term safe and stable landform which supports self-sustaining vegetation comprised of suitable local native flora species
- All compacted tracks no longer required will be ripped to an appropriate depth that relieves compaction but minimises topsoil loss, soil profile mixing and bringing subsurface material to the surface
- Access to non-retained tracks will be blocked

### **3.12 Incidents and Complaints**

#### **3.12.1 Regulatory Guidelines**

Exploration License conditions require that, following an incident or complaint, a report must be submitted to the DMP so appropriate action can be taken to address the incident or complaint.

For any serious environmental incident or serious complaint from landholders or from the public, the incident report must be submitted within 24 hours of confirmation of breach of any licence conditions or other environmental regulations.

The report must include the details of the exploration licence, contact details for the exploration manager, complainant and landholder, a map showing the area of concern, the nature of the incident or complaint, likely causes and consequences, and a timetable showing actions taken or planned to fix the problem.

Any incidents or complaints occurring within the licence period must be included in reports prepared in accordance with it.

#### **3.12.2 Management**

##### **Management Objective:**

To promptly address and take appropriate action to address any reported incident or complaint

##### **Management Actions:**

Implementation of the following management actions and commitments will be overseen by the Exploration Manager:

- Any serious incidents and complaints will be reported to the DMIRS within 24 hours of the incident, complaint or breach of the Exploration License
- The report will include details of the exploration license, the contact details for the Exploration Manager, complainant and landholder, a map showing the location of the incident or complaint, a description of the likely cause and consequences i.e. the results of the preliminary investigation, and an action plan outlining what is planned to address the incident
- Regular updates will be provided on the status of the incident or complaint investigation and the progress of the implementation of the remedial actions
- A community response line for community enquiries and complaints will be established and a senior officer will be nominated to be responsible for all community contact/enquiries/issues



## 4 Risk Assessment

According to *Table 2: Examples of ranges in risk levels for typical program activities* in the CMP Guidelines (DEC 2011, Appendix 1) the proposed exploration programme is considered to pose a Moderate risk due to the drill hole spacing (<100m) and the small number of drill holes (5). The level of risk assessment detail required for an exploration program of this size “is a semi-quantitative assessment indicating likely or actual occurrence and extent of conservation values in and outside the program area” (DEC 2011)

A risk assessment of the main exploration activities within the project area has been undertaken. While the risk assessment is not exhaustive, it demonstrates how the management actions applied to potential impacts significantly reduces the risks associated with exploration activities. The risk assessment considers the likelihood and consequence of environmental impacts (**Table 5**). Risk is calculated by multiplying consequence with likelihood, resulting in a value range of 1-25, with 1 being highest risk and 25 being of least concern. Proposed exploration activities within the project area have been subject to a risk assessment, with the results presented in **Table 6**. Definitions of the likelihood and consequence categories are presented in **Appendix 1**.

**Table 5: Risk Assessment Indicators**

		Likelihood (L)				
		Almost Certain (1)	Likely (2)	Possible (3)	Unlikely (4)	Rare (5)
Consequence (C)	Catastrophic (1)	Extreme 1	Extreme 2	Extreme 3	High 4	Medium 5
	Major (2)	Extreme 2	Extreme 4	High 6	Medium 8	Medium 10
	Moderate (3)	Extreme 3	High 6	Medium 9	Medium 12	Low 15
	Minor (4)	High 4	Medium 8	Medium 12	Low 16	Low 20
	Insignificant (5)	Medium 5	Medium 10	Low 15	Low 20	Low 25

**Table 6: Risk Assessment Table**

Activity	Potential Impact(s)	Likelihood	Consequences	Level of Risk	Management Strategies	Residual Risk after management strategies implemented		
						Likelihood	Consequences	Residual Risk
Clearing	Clearing in excess of what is approved. Clearing Threatened flora or fauna habitats without required regulatory approvals.	Possible	Moderate	Medium 13	Pre-exploration flora and vegetation surveys to ensure impact to conservation significant biodiversity values are avoided in the first instance and if unavoidable are minimised and mitigated.  Implementation of a Ground Disturbance Permit system  Examples of avoidance/ minimisation/mitigation measures include the use of existing tracks where possible  Clearing boundaries will be clearly demarcated prior to the commencement of ground-disturbing activities.	Unlikely	Minor	Low 21
	Introduction and spread of <i>Phytophthora</i> Dieback and weeds within the project area	Likely	Major	Extreme 4	Dieback assessment and weed mapping undertaken prior to commencing ground disturbance activities. Ground disturbance activities to be managed in accordance with a Hygiene Management Plan	Unlikely	Moderate	Medium 12
Drilling	Intercepting saline groundwater that overflows sumps	Possible	Major	High 6	Groundwater contours will be determined prior to drilling and sumps will be excavated to adequate depths	Unlikely	Moderate	Medium 12

Activity	Potential Impact(s)	Likelihood	Consequences	Level of Risk	Management Strategies	Residual Risk after management strategies implemented		
						Likelihood	Consequences	Residual Risk
	and impacts soil and vegetation							
Excavating	Excavating results in erosion due to altered surface water flows.  Fauna fatalities due to poor ingress/ egress from sumps	Possible	Minor	Medium 12	Sump excavation and pad preparation will be undertaken so as to minimise the disturbance area and soil will be stockpiled away from drainage channels. Create shallow, sloped batters to enable fauna egress from sump areas.	Unlikely	Minor	Low 16
Vehicle Movement	Vehicle create new disturbance/impacts to vegetation /fauna habitats unnecessarily when existing tracks could be used	Likely	Minor	Medium 14	Planning exploration activities and predetermined access routes that preferentially use existing tracks.	Possible	Minor	Medium 18
Rehabilitation	Drill pads, sumps and tracks are poorly rehabilitated  Fauna fatalities as a result of unplugged drill holes	Possible	Minor	Medium 12	Pads are constructed to minimise disturbance area  Topsoil and vegetative materials are stockpiled separately for use in rehabilitation  Pads and tracks are ripped prior to covering with vegetative material  Drill holes are plugged after drilling	Unlikely	Minor	Low 16

## 5 Monitoring

The Field Geologist, Lead Driller and Drilling crew are responsible for monitoring dust, exhaust emissions, noise and any other potential causes of pollution during drilling. Where excessive dust and noise are being generated measures should be taken immediately to reduce emissions. Specific quantitative monitoring will be undertaken as required in response to complaints.

The Exploration Manager will be responsible for undertaking inspections of each drill site to ensure that exploration activities are being conducted in accordance with this plan and pollution is being prevented. The Exploration Manager will recommend remedial action if required.

Post-rehabilitation monitoring of affected areas will be undertaken at least quarterly, where possible, to determine if any maintenance or remediation is required until exploration sites have been successfully rehabilitated. Post rehabilitation monitoring reports should address:

- Vegetation density, diversity and foliage cover;
- Landform stability;
- Local disturbances impacting on rehabilitation success;
- Monitoring for introduction or spread of weed species; and
- Monitoring for introduction or spread of Phytophthora Dieback.

## 6 Reporting and Maps

An Exploration Completion Report must be submitted to both DMIRS and DBCA when rehabilitation work is finished (no later than 18 months after the PoW approval date). An Environmental Officer may conduct an inspection to determine compliance with tenement conditions and PoW commitments (DMP 2012).

Additional reporting may be necessary if an exploration program requires a Native Vegetation Clearing Permit (NVCP) from DBCA. Clearing that 'is the result of carrying out prospecting or exploration under an authority granted under the *Mining Act 1978*' does not require an NVCP from DBCA or DMP unless clearing occurs in an Environmentally Sensitive Area (DEC 2010) or Schedule 1 Non-Permitted-areas. Environmentally Sensitive Areas are listed in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005* published in the *Western Australian Government Gazette*.

### Records to be kept:

For areas which require an NVCP, the following records should be kept:

- The location where the clearing occurred (using a Global Positional System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Easting and Northings)
- The date that the area was cleared
- The size of the area cleared (in hectares)
- The purpose for which clearing was undertaken

### Reporting:

For all exploration programs on DBCA managed lands, the following information should be included in Exploration Completion Reports:

- Tenement number
- Land affected
- Plan of access points and routes into program
- Reference to original proposals and CMP
- Copies of any audits
- Maps and /or GIS shape files showing the location of all tracks developed and other ground disturbances
- Copies of flora/vegetation/fauna reports completed post-exploration
- Deviations from the original approved plan(s) and explanation for each (any deviation should be discussed and agreed to with DBCA prior to implementation)
- Road and track closures, and rehabilitation programs undertaken (include photographs)
- Outstanding rehabilitation works and problem areas
- Access to remain open as agreed by DBCA
- Current and future plans
- DBCA and DMP contact and consultation over the period
- An assessment of the program against any performance criteria

Moreover, all maps provided within the Exploration Completion Report are to include:

- Scale
- North arrow
- Major roads and /or other orientation features in the locality
- Conservation estate boundaries and cadastral information underlying topographical map or aerial photos to assist in interpretation (with GDA 94 coordinates)

- Locations of all proposed activities and disturbance (showing drill holes or lines as much as possible)
- Major landforms and topographical features
- Locations of conservation values including medium, high and critical assets as defined in EPA Guidance Statements 51 and 56 (EPA, 2004a and 2004b)
- Existing tracks / routes within reserves and routes to proposed drill holes/costeans
- Proposed Class One tracks - full track preparation(one blade width) for heavy drilling access (DEC 2011)
- Proposed Class Two tracks - no general blading, work on creek crossings and escarpments only
- Drilling target zones including type of rig e.g. light 4wd scout RAB, diamond etc.
- Camp sites (both fly and permanent camps)

Exploration Completion Reports must be presented with all information required according to DMIRS guidelines for environmental and rehabilitation reporting on exploration licenses (DMP 2012). These reports must be lodged within one month of expiry, earlier termination of the license, or whenever part of the license ceases to have effect. The reports must include information on all surface disturbing prospecting operations and rehabilitation carried out in the license area or in the part of the license that has ceased to have effect. A template for an Exploration Completion Report can be found in Appendix 4 of the DMP guidelines (DMP 2012). The report should include sufficient information to demonstrate that the requirements, objectives and management measures within this Conservation Management Plan and within the exploration licence have been satisfied.

The Exploration Completion Reports must contain all rehabilitation activities, including activities relating to roads and tracks, such as: minimisation of erosion and control of sediment movement, activities undertaken in regards to refuse, chemicals, fuels and waste materials management; monitoring of activities undertaken to minimise air pollution, water pollution and soil contamination and the development of the drilling activities. All incidents and complains must also be reported

In addition to the above reporting, the licence holder must report orally and forthwith to the Department all over-pressure gas occurrences that occur during drilling within 24 hours of the occurrence.

Exploration Completion Reports must also detail the exploration performance with all relevant information provided to aid in the ease of interpretation of exactly what was conducted during the operation. This information may include: maps, plans and data.

Summary reports must include not only a brief summary of prospecting operations carried out and expenditure thereon during the 6 month period, but also the results and conclusions of all surveys and other operations. The summary reports must be lodged within twenty eight (28) days of the expiry of each 6 month period during the currency of the licence.

A Final Report must also be lodged on the expiry or earlier termination of the licence and must contain all surveys and other operations carried out by or on behalf of the licence holder during the full term of the licence from grant to termination; the results of the surveys and operations and the conclusions reached by the licence holder as to the coal resources potential of the licence area. This final report must include a detailed summary of all work conducted, the main results and the conclusions of each phase of operations.

Additional reports may be required providing details on surveys and other operations from time to time and they also must be lodged as instructed (DEC 2011).

## 7 Training Requirements

An essential part of this CMP is the training induction, which is to be conducted for all relevant personnel including drilling crew and technical services personnel prior to commencement of work. Training must cover all of the relevant components of the Environmental Context and Management section.

The training induction must include:

- Proper use of roads and tracks, gates etc.
- Control measures for the management of Aboriginal and historic heritage
- Control measures and awareness regarding native flora and fauna
- Control measures and awareness regarding Dieback and weed and management. It is recommended that by key exploration and environmental personnel is undertake Green Card training: <https://www.dwg.org.au/green-card>
- Correct handling, storage and disposal of waste
- Procedures relating to sediment and erosion control
- Control measures to be implemented in regards to surface and groundwater management
- Control measures to be implement in regards to the management of pollution including dust, noise and water pollution
- The reporting of complaints and incidents
- Rehabilitation of borehole sites and access tracks

Records will be maintained of all training completed and refresher training will be undertaken following review of the CMP.

## 8 References

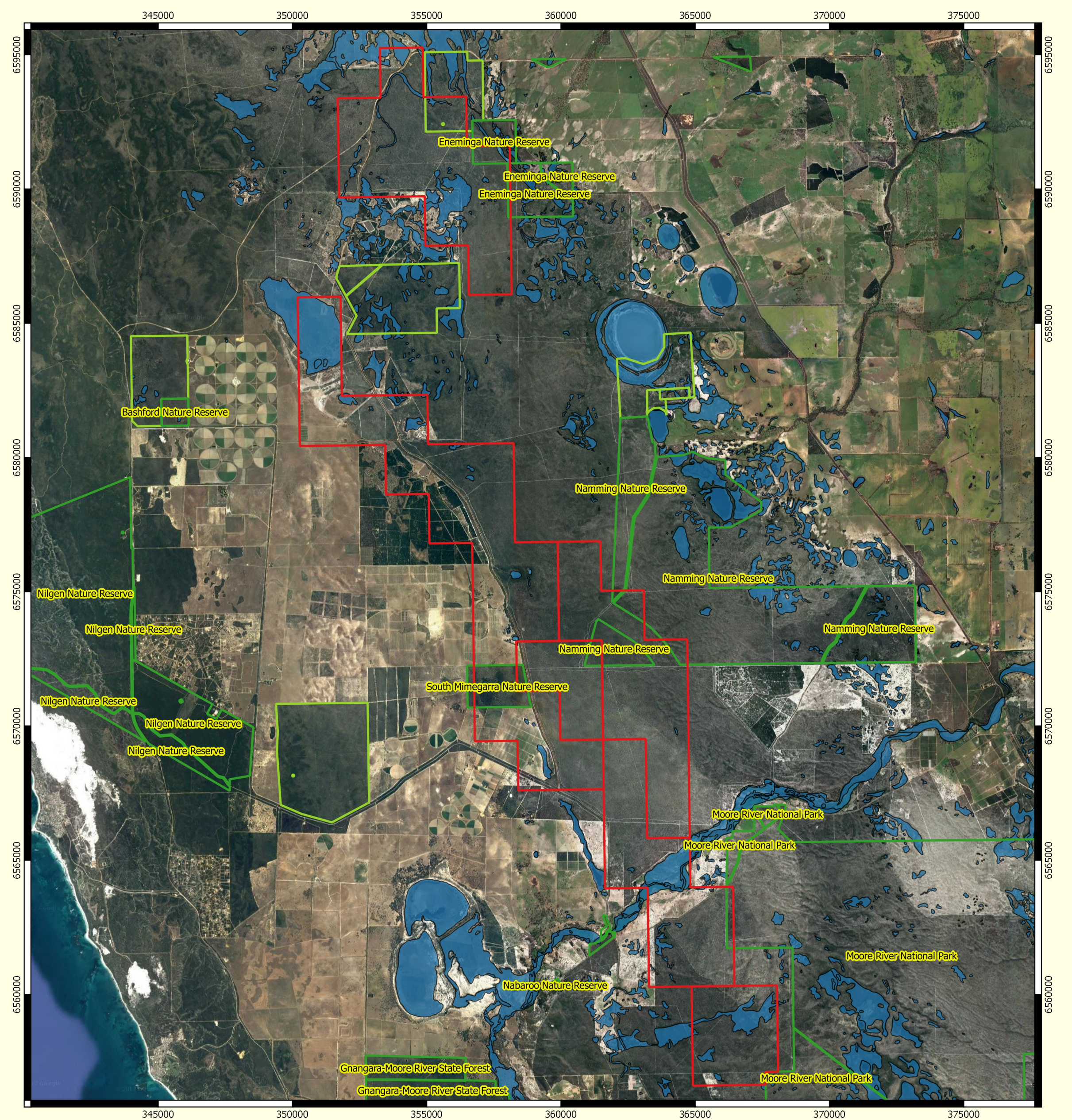
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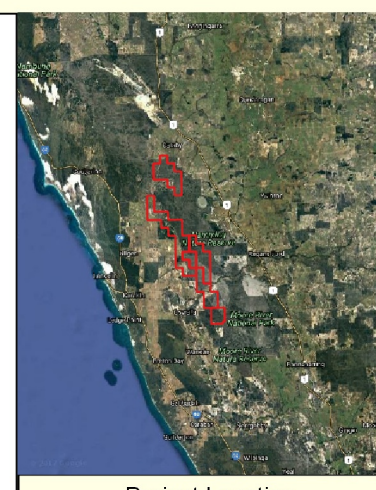
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## 9 Figures



- Legend**
- Bindammina Project Area
  - DBCA Legislated Lands and Waters
  - DBCA Interest Lands and Waters
  - Geomorphic Wetlands Swan Coastal Plain DPAW\_017
  - Google Satellite



<b>Bindaminna Project Area</b>		
Bindaminna Project: Strategic Conservation Management Plan		
N	Scale: 1: 100,000	Datum: GDA 1994 Projection: MGA Zone 50
Date Created: 20/10/2017	Prepared: K Jennings	Project No: T17013
	Checked: J Grehan	Revision: Rev A
<b>Figure 1</b>		<b>Terratree</b>

## 10 Appendices

## Appendix 1: Risk Matrices

LIKELIHOOD RATING			
Descriptor	Definition	Probability	Frequency
<b>Rare</b>	The event may occur only in exceptional circumstances	<5%	At least once in 50 years
<b>Unlikely</b>	The event could occur at some time	5-24%	At least once in 25 years
<b>Possible</b>	The event should occur at some time	25-49%	At least once in 10 years
<b>Likely</b>	The event will probably occur in most circumstances	50-74%	At least once in 2 years
<b>Almost Certain</b>	The event is expected to occur in most circumstances	>75%	At least one per year

CONSEQUENCE RATING		
Descriptor	Environment	Compliance
<b>Insignificant</b>	Limited damage to area of low significance. <b>Example:</b> a small hydrocarbon spill <1litre.	Technical breach of legal obligation without fines or damages claims.
<b>Minor</b>	Minor effects on biological or physical environment <b>Example:</b> Clearing a small area of vegetation in excess of what has been approved <1ha	Breach of legal obligations resulting in minor penalties or damages claims.
<b>Moderate</b>	Moderate effects on the local environment. <b>Example:</b> clearing an area that contains a Priority species or Ecological Community in excess of what has been approved.	Breach of legal obligations resulting in moderate penalties or damages claims.
<b>Major</b>	Very serious, long-term localised impact on biodiversity and ecosystem function. <b>Example:</b> clearing Threatened species and/or its habitat, Threatened Ecological Community or significant fauna habitat (e.g. significant Black Cockatoo habitat trees) without the required regulatory approvals.	Breach of legal obligations resulting in major penalties or damages claims, or prosecution
<b>Catastrophic</b>	Critical widespread impact on biodiversity and ecosystem function. <b>Example:</b> Drilling intercepts saline groundwater under pressure which overflows sump and destroys large area (>100 ha) Threatened species and/or its habitat, Threatened Ecological Community or significant fauna habitat.	Breach of legal obligations resulting in catastrophic penalties or damages claims, imprisonment of directors or senior managers, or loss of ability to operate multiple operational areas.

## **Appendix 2: All Commitments from the Strategic CMP**

<b>Commitments</b>	<b>Management Purpose</b>
The use of public roads and tracks will be identified during the planning stage to determine whether public/firefighting use of roads/tracks will be affected (if public use will be affected, written approval will be sought from the Department)	Land Access
Avoid track construction or, if this is not possible, minimise track construction by preferentially using existing tracks	Land Access
Depending on the condition of the road, wet weather access will be restricted so as to prevent damage to the road or track, and minimize risk of erosion	Land Access
The location of existing transmission and communication lines, pipelines and other public utilities will be identified and written approval sought from the Department if it is likely that the utilities will be affected by exploration. The authority in control of the public utility will also be notified should exploration impact on the utility	Land Access
All fences and gates will be kept in the same position and condition in which they were found	Land Access
Descriptions and photographs of conservation significant species (e.g. Schedule and Priority species) and features potentially occurring in the project area will be made readily available to field staff	Flora and Vegetation, Fauna and Fauna Habitats
Existing tracks will be used as much as possible	Flora and Vegetation, Fauna and Fauna Habitats, Weeds and Hygiene, Drilling and Vehicle Movement
Vegetation will be cleared using a raised blade, as much as possible, to avoid disturbance of topsoil and understory root mass	Flora and Vegetation
Clearly demarcate area of approved soil disturbance i.e. tracks, pads and sumps so as to avoid impacts to Threatened and Ecological Communities and minimise the impacts to Priority flora and Ecological Communities	Flora and Vegetation
Where possible, significant vegetation e.g. large trees, thickets will be avoided	Flora and Vegetation
Appropriate machinery for the task will be used to minimise impacts )	Flora and Vegetation, Fauna and Fauna Habitats, Erosion and Sediment Control, Drilling and Vehicle Movement
Education and awareness programs will be conducted to ensure field personnel are aware of the biodiversity values present within the project area and understand their role in protecting these values (e.g. hygiene control measures)	Flora and Vegetation
Prior to the commencement of each exploration program, noxious or declared weed populations will be identified within the project area and reported to DBCA (this may occur in the Bridging Documents)	Weeds and Hygiene
Vehicles and machinery will avoid ground disturbance activities in weed infested areas, especially when these plant species are bearing fruit/seed	Weeds and Hygiene
All vehicles, machinery and equipment must be free of soil and propagules on entry to the site	Weeds and Hygiene
<b>Commitments</b>	<b>Management Purpose</b>
Descriptions and photographs of significant environmental weeds potentially occurring in the program area will be made readily available to field staff	Weeds and Hygiene
Impacts within 100m of active Malleefowl mounds will be avoided	Fauna and Fauna Habitats
Activities to occur near active Malleefowl mounds will be restricted to clearly marked and mapped corridors	Fauna and Fauna Habitats
Impacts to active nests, inactive Malleefowl mounds and potential Shield-backed Trapdoor Spider burrows will be avoided as much as possible; corridor marking may be used to restrict access to these features.	Fauna and Fauna Habitats
Documentation, survey and field demarcation standards will be applied to prevent unnecessary or excessive clearing	Flora and Vegetation Fauna and Fauna Habitats

Direct impacts to fauna will be avoided as much as possible	Fauna and Fauna Habitats
All drill holes will be capped immediately after drilling or re-discovery (if historic) to avoid fauna becoming trapped or harmed	Fauna and Fauna Habitats, Pollution
No pets will be allowed into the exploration areas	Fauna and Fauna Habitats
All sumps will incorporate egress ramps to prevent fauna from becoming trapped	Fauna and Fauna Habitats
Any riparian vegetation, significant vegetation (e.g. large trees, thickets) and natural structures (e.g. piles of woody debris) likely to be habitats of native fauna will be avoided to the greatest extent possible	Fauna and Fauna Habitats
The duration of drilling will be minimised to reduce effects of noise, dust and other atmospheric emissions	Fauna and Fauna Habitats
All domestic wastes will be managed to deter the attraction of fauna and stored within receptacles that are fauna proof	Fauna and Fauna Habitats, Waste Management
Education and awareness training will be provided to ensure that field personnel are aware of the biodiversity values present within the project area and understand their role in protecting these values during the exploration activities (e.g. capping drill holes)	Fauna and Fauna Habitats
All rubbish (including drilling waste and sample bags) will be removed from site for disposal at a suitably licensed facility	Waste Management, Pollution, Rehabilitation
No cigarettes or other burning matter will be disposed of on the exploration site	Fire Management, Waste Management
Drip trays will be used under rigs to minimise risk of hydrocarbon spillage	Waste Management
Drill vehicles will carry hydrocarbon absorptive material	Waste Management, Pollution, Drilling and Vehicle Movement
Sumps of appropriate size will be used to contain water and sediment encountered during drilling (sump to be located away from significant vegetation)	Waste Management, Pollution, Drilling and Vehicle Movement
All sewage will be treated in a licensed sewage treatment facility	Waste Management
Drilling will be wet to control dust and will use sumps to contain materials If fibrous material encountered (e.g. asbestos)	Waste Management, Pollution, Drilling and Vehicle Movement
<b>Commitments</b>	<b>Management Purpose</b>
If fibrous material encountered (e.g. asbestos), sample bags will be used to prevent dispersion of drill samples into the environment	Waste Management, Pollution, Drilling and Vehicle Movement
Drill spoil/ samples will be buried 1.5m below surface level if fibrous material encountered (e.g. asbestos)	Waste Management, Pollution
Liquid drilling waste will be disposed of into a sealed (covered) sump	Waste Management, Pollution
Suitable storage facilities for waste from project activities will be provided	Waste Management
Lids or covers will be provided for bins to prevent wind-blown waste entering terrestrial environments or habitats	Waste Management
All sample bags will be removed and suitably disposed of within six months of completion of drilling	Waste Management, Drilling and Vehicle Movement
Existing tracks will be used wherever possible and minimise footprint if use of existing tracks is not possible	Erosion and Sediment Control
Impacts to significant vegetation (e.g. large trees, thickets) will be avoided	Erosion and Sediment Control, Drilling and Vehicle Movement
Any tracks will be planned to fit topography so as to minimise earthworks and erosion	Erosion and Sediment Control
Tracks will be formed without sharp twists and turns to the greatest extent possible because these cause erosion and wheel ruts on the corners	Erosion and Sediment Control



Drainage pattern modification will be avoided, particularly in soils susceptible to erosion	Erosion and Sediment Control
Any clearing for tracks and drill pads will be done with a raised blade to avoid disturbance of topsoil and understory root mass	Erosion and Sediment Control
Minimise creating windrows which could channel water	Erosion and Sediment Control Drilling and Vehicle Movement
Cleared vegetation and topsoil will be stockpiled separately for use in rehabilitation	Erosion and Sediment Control, Drilling and Vehicle Movement
All windrows will be removed and re-spread during rehabilitation of exploration disturbance	Erosion and Sediment Control
All compacted tracks no longer required will be ripped to an appropriate depth that relieves compaction but minimises topsoil loss, soil profile mixing and bringing subsurface material to the surface	Erosion and Sediment Control, Rehabilitation
If modified, the original surface contours will be restored to their previous state where possible	Erosion and Sediment Control
Access to non-retained tracks will be blocked	Erosion and Sediment Control, Rehabilitation
Rehabilitated tracks will be appropriately marked or removed from company maps and GIS layers to discourage future use	Erosion and Sediment Control
Machines and vehicles will be restricted to the limits of the areas to be cleared	Erosion and Sediment Control
All equipment used on site will be maintained in good working order	Pollution
<b>Commitments</b>	<b>Management Purpose</b>
Pre-start inspections of equipment will include inspections of noise and dust controls to ensure they are operational at all times	Pollution
Any requirements for discharging water will be identified during exploration planning and the appropriate licenses obtained	Pollution
Drip trays will be used under rigs to minimise risk of hydrocarbon spillage	Pollution, Drilling and Vehicle Movement
Drill vehicles will carry hydrocarbon absorptive material	Pollution
All fuel storage areas are to be bunded	Pollution
All vehicles and machines being operated are fitted with well-maintained exhaust systems that will prevent the accumulation of combustible material against heat surfaces and that injectors on diesel vehicles are in good working order	Fire Management
All exploration vehicles will carry an appropriate, serviced fire extinguisher	Fire Management
Comply with all relevant fire control legislation, guidelines and instructions	Fire Management
A dedicated fire fighting vehicle will be made available from the mine site during Restricted or Prohibited fire periods	Fire Management
The DBCA Duty Officer will be notified each day during Restricted or Prohibited fire periods of planned presence onsite and all personnel will abide by any restrictions imposed by the Duty Officer	Fire Management
Avoid driving on vegetation; follow bare areas where possible	Drilling and Vehicle Movement
Avoid driving in creeklines and riparian zones	Drilling and Vehicle Movement
Clearing of tracks and drill pads will be done with a raised blade to avoid disturbance of topsoil and understory root mass	Drilling and Vehicle Movement
Topsoil and vegetation will be stockpiled separately for use in rehabilitation when constructing pads, sumps or tracks	Drilling and Vehicle Movement, Rehabilitation
Roads will be planned to fit topography to minimise earthworks and erosion	Drilling and Vehicle Movement

Sharp twists and turns in the track will be avoided as these cause erosion and wheel ruts on the corners	Drilling and Vehicle Movement
Track entrance points will be aligned to minimise visibility from public roads, where applicable	Drilling and Vehicle Movement
All waste will be removed from site (including any hydrocarbon spills)	Drilling and Vehicle Movement
All vehicles will carry an appropriate, serviced fire extinguisher	Drilling and Vehicle Movement
Drilling will be planned to avoid water courses wherever possible	Drilling and Vehicle Movement
Drill holes plugged at ground level immediately after drilling (preferably with an appropriately sized conical concrete plug)	Drilling and Vehicle Movement, Maintenance of Open Drill Holes
Drill holes securely plugged below ground at minimum depth of 400mm within 6 months of drilling (If not using concrete conical plugs, please specify type)	Drilling and Vehicle Movement
Drill sample piles will be rehabilitated or buried	Drilling and Vehicle Movement
Use of track mounted rigs or knockdown rigs on platforms in steep terrain	Drilling and Vehicle Movement
<b>Commitments</b>	<b>Management Purpose</b>
Cleared grid lines/cross are to be closed off at the completion of the programme to prevent them being used as a thoroughfare by vehicles. Cleared vegetative material can be used as a barrier for this purpose	Drilling and Vehicle Movement
Clearing for drill pads will be kept to a minimum	Drilling and Vehicle Movement
If groundwater is encountered whilst drilling, appropriate measures must be taken to contain the material being ejected/discharged (i.e. sumps or tanks). Drilling will cease immediately upon discharge of water until the appropriate and approved containment facilities are implemented	Drilling and Vehicle Movement
Drill string or wire line instrumentation will be used so drill holes can be easily located and re-accessed	Maintenance of Open Drill Holes
Long lasting collar arrangements will be used	Maintenance of Open Drill Holes
Temporarily plugged drill holes will be regularly inspected to ensure they remain secure	Maintenance of Open Drill Holes
Drill holes permanently plugged and rehabilitated in accordance with DMP guidelines (DMP 2012) within 6 months of drilling	Maintenance of Open Drill Holes
Appropriate rehabilitation methods will be developed, including revegetation species selection (where revegetation is required), and provided to staff undertaking the rehabilitation work	Rehabilitation
Sediment and erosion controls will be maintained for the duration of exploration activities	Rehabilitation
Exploration activities will be restricted to the designated drill site and access tracks	Rehabilitation
Rehabilitation activities will be completed as soon as possible; either progressively, or after the cessation of exploration work and will be completed before the expiry of the license	Rehabilitation
As soon as the exploration program finishes all drill holes will be sealed, surveyed and marked	Rehabilitation
The PVC or steel drill collars will be removed or cut off at approximately 40cm below surface within six months of the hole being drilled and plugged securely with an appropriately sized conical concrete plug	Rehabilitation
Black poly-tail piping will be cut from drill plugs and survey pegs removed	Rehabilitation
The remaining drill hole will be backfilled to the surface, with low permeability material e.g. clay/oxide drill cuttings	Rehabilitation

The backfilled hole should be mounded to facilitate water shedding away from the drill hole with low permeability material (approximately 20cm high by 80cm wide) and then cover with topsoil	Rehabilitation
Drill pads and other disturbed areas which will be cut and filled and will be re-contoured so that it has the same slope and profile as the adjacent undisturbed land	Rehabilitation
All sumps and costeans will be backfilled with materials in the order in which they were removed within six months of completion of operations	Rehabilitation
Any compacted area to be ripped to an appropriate depth and re-contoured	Rehabilitation
Once the earthworks are completed, the stockpiled topsoil and cleared vegetation will be spread over the disturbed area	Rehabilitation
Once exploration activities have ceased, written approval for extension of time to have sumps or drill holes open must be obtained from the Environmental Officer, DMP	Rehabilitation
<b>Commitments</b>	<b>Management Purpose</b>
Regular audits will implemented to ensure compliance with DMP guidelines, Mining Act 1978 and Regulations 1981 requirements	Rehabilitation
The Environmental Officer will be notified when exploration operations are completed so that an inspection of the site may be conducted	Rehabilitation
Any alteration or expansion of exploration operations beyond approved activities must be coordinated and approved by the Environmental Officer prior to commencement of ground disturbing activities	Rehabilitation
All in situ hydrocarbon contaminated soils must be removed or suitably remediated to promote revegetation	Rehabilitation
Within six months of construction, all sumps must be backfilled with excavated material, covered with topsoil and cleared vegetation, if available, and seeded with suitable local native flora species where required	Rehabilitation
All compacted drill sites and grid lines will be ripped on the contour, respread with cleared vegetation if available and where required, seeded with suitable local native flora species	Rehabilitation
All cleared vegetative material will be re-spread over disturbed surfaces	Rehabilitation
Access tracks will be re-profiled back into the natural hillside/terrain to create a long term safe and stable landform which supports self-sustaining vegetation comprised of suitable local native flora species	Rehabilitation
Any serious incidents and complaints will be reported to the DPI within 24 hours of the incident, complaint or breach of the Exploration License	Incidents and Complaints
The report will include details of the exploration license, the contact details for the Exploration Manager, complainant and landholder, a map showing the location of the incident or complaint, a description of the likely cause and consequences i.e. the results of the preliminary investigation, and an action plan outlining what is planned to address the incident	Incidents and Complaints
Regular updates will be provided on the status of the incident or complaint investigation and the progress of the implementation of the remedial actions	Incidents and Complaints
A community response line for community enquiries and complaints will be established and a senior officer will be nominated to be responsible for all community contact/enquiries/issues	Incidents and Complaints

### Appendix 3: Threatened and Priority flora

Conservation Category	Taxa	Likelihood
Threatened	<i>Anigozanthos viridis</i> subsp. <i>terraspectans</i>	Possible
	<i>Andersonia gracilis</i>	Unlikely

Conservation Category	Taxa	Likelihood
	<i>Asterolasia nivea</i>	Unlikely
	<i>Caladenia huegelii</i>	Unlikely
	<i>Darwinia acerosa</i>	Unlikely
	<i>Darwinia carnea</i>	Unlikely
	<i>Drakaea elastica</i>	Possible
	<i>Eleocharis keigheryi</i>	Unlikely
	<i>Eucalyptus argutifolia</i>	Unlikely
	<i>Grevillea curviloba</i> subsp. <i>incurva</i>	Unlikely
	<i>Lepidosperma rostratum</i>	Possible
	<i>Macarthuria keigheryi</i>	Possible
	<i>Paracaleana dixonii</i>	Possible
	<i>Thelymitra dedmaniarum</i>	Unlikely
Priority 1	<i>Grevillea evanescens</i>	Possible
Priority 2	<i>Dampiera tephrea</i>	Unlikely
	<i>Hypocalymma</i> sp. Cataby (G.J.Keighery5151)	Possible
	<i>Lepyrodia curvescens</i>	Possible
	<i>Leucopogon squarrosus</i> subsp. <i>trigynus</i>	Possible
	<i>Stylidium</i> sp. Moora (J.A.Wege713)	Unlikely
Priority 3	<i>Allocasuarina grevilleoides</i>	Possible
	<i>Babingtonia urbana</i>	Possible
	<i>Banksia dallanneyi</i> subsp. <i>pollostata</i>	Previously Recorded
	<i>Banksia kippistiana</i> var. <i>paenepeccata</i>	Unlikely
	<i>Conostylis bracteata</i>	Possible
	<i>Desmocladius biformis</i>	Unlikely
	<i>Dillwynia dillwynioides</i>	Possible
	<i>Eryngium</i> sp. subdecumbens (G.J. Keighery 5390)	Unlikely
	<i>Haemodorum loratum</i>	Possible
	<i>Hensmania stoniella</i>	Possible
	<i>Hypocalymma serrulatum</i>	Unlikely
	<i>Leucopogon</i> sp. Yanchep (M. Hislop 1986)	Possible
	<i>Persoonia rudis</i>	Possible
	<i>Petrophile biternata</i>	Unlikely
	<i>Phlebocarya pilosissima</i> subsp. <i>pilosissima</i>	Possible
<i>Stylidium nonscandens</i>	Possible	
<i>Thryptomene</i> sp. Lancelin (M.E. Trudgen 14000)	Unlikely	
Priority 4	<i>Anigozanthos humilis</i> subsp. <i>chrysanthus</i>	Possible
	<i>Calothamnus accedens</i>	Possible
	<i>Calothamnus pachystachyus</i>	Unlikely
	<i>Conostylis pauciflora</i> subsp. <i>euryrhipis</i>	Possible
	<i>Dodonaea hackettiana</i>	Previously Recorded
	<i>Eucalyptus macrocarpa</i> subsp. <i>elachantha</i>	Possible
	<i>Grevillea rudis</i>	Possible
	<i>Hypolaena robusta</i>	Previously Recorded

Conservation Category	Taxa	Likelihood
	<i>Rumex drummondii</i>	Possible
	<i>Schoenus griffinianus</i>	Previously Recorded
	<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>	Previously Recorded
	<i>Verticordia paludosa</i>	Possible