Application for a new NVCP: Marillana Exploration

Native Vegetation Clearing (Purpose) Permit Application Supporting Document

August 2024

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1 INTRODUCTION

BHP Iron Ore Pty Ltd (BHP) currently operates a number of Iron Ore mines and associated rail and port infrastructure within the Pilbara region of Western Australia (WA). Current mining operations include the:

- Newman Operations consisting of:
  - The Mount Whaleback hub (including Orebodies 29, 30 and 35) located approximately two kilometres (km) west of Newman Township; and;
  - The Eastern Ridge hub (Consisting of Orebodies 23, 24, 25 25 West and 32) located approximately 5 km east of Newman Township;
- Mining Area C located approximately 90 km north west of Newman Township;
- Orebodies 18 and Wheelarra Hill (Jimblebar) Mine located approximately 35 km east of Newman Township; and
- Yandi Mine located approximately 100 km north west of Newman Township.

Ore from the above mining operations is transported to Port Hedland via the BHP Newman to Port Hedland Mainline (and associated spur lines) and is then shipped out through Port Hedland at the BHP facilities at Nelson Point and Finucane Island.

BHP is seeking a Native Vegetation Clearing (Purpose) Permit (NVCP) to clear up to 500 hectares (ha) of native vegetation within the Marillana tenement for the purposes of mineral exploration, geotechnical investigations, hydrological investigations, installation of meteorological masts and LiDAR stations and any associated activities (**Figure 1**).

In accordance with Part V Division 2 of the *Environmental Protection Act 1986* (EP Act), BHP hereby refers the application to the Department of Energy, Mines, Industry Regulation and Safety (DMIRS).

BHP considers that the proposed application will not result in any significant environmental or social impacts and that the proposed Project complies with the 'Ten Clearing Principles', as defined in Schedule 5 of the *Environmental Protection Act 1986* (EP Act).

1.1 LOCATION

The Application Area is located approximately 100 km south-east of Wittenoom and approximately 50 kilometres east of the Great Northern Highway in the Pilbara region of Western Australia (**Figure 1**).

1.2 TENURE

The Application Area is located on State Agreement Mining Lease AM270SA.

1.3 LOCAL GOVERNMENT JURISDICTION

The Application Area is located within the Shire of Ashburton and the Shire of East Pilbara.

1.4 PROPONENT

The Project is managed and operated by BHP Iron Ore on behalf of the owners, the the Yandi Joint Venture (YJV). The split between the partners of the YJV is as follows:

- BHP Minerals Pty Ltd 85%
- Itochu Minerals and Energy Australia Pty Ltd 8%
- Mitsui Iron Ore Corporation Pty Ltd 7%

The key contact for this proposal is:

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1.5 PROJECT DESCRIPTION

The proposed works will involve clearing for the purposes of mineral exploration, geotechnical investigations, hydrological investigations, installation of meteorological masts and LiDAR stations and any associated activities.

1.6 PROJECT CHARACTERISTICS AND COMMITMENTS.

BHP commits to undertake the Project in accordance with the details set out in **Table 1**.

Table 1 Project Characteristics and Commitments

Permit Characteristics	
Authorising Agency	DEMIRS
Permit Title	Marillana Exploration Project
Area to be cleared	500 hectares
Application Area	10,907.17 ha
Purpose of the permit	Clearing for the purposes of mineral exploration, geotechnical investigations, hydrological investigations, installation of meteorological masts and LiDAR stations and any associated activities.
Tenure	Mining Lease AM270SA.
Clearing Duration	Until 30 November 2029
Permit Duration	Until 30 November 2034
Proposed Annual Reporting Date	01 October for the previous Financial Year
Proposed Final Reporting Date	30 November 2034
Application boundary	Map Reference: • EXP_029NVCP_001_RevA_0 • EXP_029NVCP_002_RevA_0 • EXP_029NVCP_003_RevA_0 • EXP_029NVCP_004_RevA_0 • EXP_029NVCP_005_RevA_0 BHP Shapefile D2 Reference: https://waio-dctm.bhp.com/D2/?docbase=bhpbio_od_prod&locateId=0b03c41a84788a85&application=ManagedDocuments

Application Commitments	**Section**
Control of established weed populations will be carried out according to BHP's standard Weed Control and Management Procedures.	3.4.3 6.7.4
Active Pebble-mouse mounds will be avoided using a 10 m buffer, where practicable.	3.4.4 6.2
Existing cleared tracks will be used to cross Weeli Wolli Creek	3.6 6.6 6.9
Where practicable, existing cleared tracks will be used to cross the unnamed non-perennial minor drainage line. If it is necessary for new crossings to be installed, clearing will be kept to a bare minimum and will be constructed flat level to the surface (i.e. a simple clearing with no bunds) to maintain the natural surface flow.	3.6 6.6 6.9

1.7 EXISTING DISTURBANCE

On 9 October 2007, BHP submitted a Programme of Work (PoW) application to the Department of Industry and Resources (DoIR), to undertake exploration activities at Marillana. DoIR declined to process this PoW and advised "*It is the Department of Industry and Resources' view that there is no requirement for BHP Billiton Iron Ore ("BHPBIO") to submit a PoW for ML270SA. Furthermore, BHPBIO is exempt from the requirement to obtain a Vegetation Clearing Permit under item 25 of the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 for ML270SA*." Based on this advice there has been 409 ha of disturbance at Marillana, of which 295ha has been rehabilitated.

BHP has reviewed this advice a number of times, however the most recent review indicated that further approvals may be required. As a result, this clearing was formally reported to DEMIRS on 09 of August 2024. This NVCP application is to allow for new clearing within Marillana to support future exploration programmes.

2 ASSOCIATED APPROVALS

Any other additional approvals will be sought as required.

3 EXISTING ENVIRONMENT

3.1 CLIMATE

Newman Aero meteorological site (007176) is the closest Bureau of Meteorology (BoM) station to the to the Application Area. Average annual rainfall at Newman Aero is 318.0 mm (BOM, 2024a). This is mainly derived from tropical storms and cyclones during summer, producing sporadic, heavy rains over the area. Mean monthly rainfall varies from 4.6 mm in September to 71.6 mm in February (BoM, 2024a). Daily rainfall is highly variable; the highest maximum daily rainfall ranges from 34.8 mm in October, to 305.6 mm in February (BoM, 2024a). The mean maximum temperature in summer months (October to March) is 35.2°C to 39.4°C, and mean maximum temperature in winter (April to September) is between 23.0°C and 32.1°C (BoM, 2024a).

Wittenoom meteorological site (005026) is the closest station to the Application Area that records daily evaporation. Wittenoom is located approximately 120 km northwest of the Application Area. Mean daily evaporation at Wittenoom throughout the year is 8.6 mm/day (BoM, 2024b), which equates to 3.1 metres per year. Evaporation greatly exceeds rainfall in the region throughout the year and on a month-by-month basis (BoM, 2024b).

3.2 BIOREGION, LANDFORMS AND LAND SYSTEMS

The Application Area is situated in the following biogeographic sub-region:

- Hamersley subregion (PIL3) of the Pilbara region described as: "*Mountainous area of Proterozoic sedimentary ranges and plateaux, dissected by gorges (basalt, shale and dolerite). Mulga low woodland over bunch grasses on fine textured soils in valley floors, and Eucalyptus leucophloia over Triodia brizoides on skeletal soils of the ranges. The climate is semi-desert tropical, average 300 mm rainfall, usually in summer cyclonic or thunderstorm events. Winter rain is not uncommon. Drainage into either the Fortescue (to the north), the Ashburton to the south, or the Robe to the west*. *Subregional area is 6,215,092ha*" (Kendrick, 2001).

The proposed Application Area is also located in the following land systems, as mapped by van Vreeswyk et al. (2004):

Boolgeeda: Stony lower slopes, level stony plains and narrow sub-parallel drainage floors, relief up to 20 m. A common system in shallow valleys below hill systems such as Newman and Rocklea.

Newman: Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands. Erosional surfaces; plateaux and mountains - extensive high plateaux, mountains and strike ridges with vertical escarpments and steep scree slopes and more gently inclined lower slopes; moderately spaced dendritic and rectangular tributary drainage patterns of narrow valleys and gorges with narrow drainage floors and channels. Relief up to 450 m.

River: Narrow floodplains and major channels.

Urandy: Alluvial plains with or without stony mantles and river channels.

These Land Systems are well represented in their bioregions.

3.3 GEOLOGY AND SOILS

The Australian Soil Resource Information System (ASRIS) provides soil and land resource information across Australia. The following two soil types occur within the Application Area (CSIRO, 2021):

Fa13: Ranges of banded jaspilite and chert along with shales, dolomites, and iron ore formations; some areas of ferruginous duricrust as well as occasional narrow winding valley plains and steeply dissected pediments. This unit is largely associated with the Hamersley and Ophthalmia Ranges. The soils are frequently stony and shallow and there are extensive areas without soil cover: chief soils are shallow stony earthy loams (Um5.51) along with some (Uc5.11) soils on the steeper slopes. Associated are (Dr2.33 and Dr2.32) soils on the limited areas of dissected pediments, while (Um5.52) and (Uf6.71) soils occur on the valley plains.

Fa14: High-level valley plains set in extensive areas of the Fa13 unit. There are extensive areas of pisolitic limonite deposits: the principal soils are deep earthy loams (Um5.52) along with small areas of (Gn2.12) soils.

Ja2: This unit occupies the central position within the high-level valley plains represented by unit Fb3: chief soils are earthy clays (Uf6.71) along with extensive areas of (Ug5.38) soils.

3.4 FLORA, VEGETATION AND FAUNA

There have been 19 flora and vegetation surveys across the Application Area. The most relevant surveys are:

- Marillana Tenement Targeted Flora Survey (Onshore Environmental, 2016) (**Appendix 1**);
- *Consolidation of Regional Vegetation Mapping BHP Billiton Iron Ore Pilbara Tenure* (Onshore Environmental, 2014) (**Appendix 2**); and
- *Marillana ML70/270 Flora and Vegetation Survey Assessment* (Onshore Environmental, 2013) (**Appendix 3**).

There have been 11 vertebrate fauna surveys across the Application Area. The most relevant surveys are:

- *Marillana Tenement and Infrastructure Corridor Targeted Vertebrate Fauna Survey* (Biologic, 2019) (**Appendix 4**); and
- *Consolidated Fauna Habitat Mapping* (Biologic, 2017) (**Appendix 5**);

3.4.1 Vegetation Communities

The Application Area is located within the Interim Biogeographic Regionalisation for Australia (IBRA) Pilbara Bioregion (Department of Environment and Heritage, 2005). The vegetation within the Application Area is classified as the following vegetation associations, as mapped by Beard (1975):

29 Sparse low woodland; mulga, discontinuous in scattered groups.
82 Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*.
111 Hummock grasslands, shrub steppe; *Eucalyptus gamophylla* over hard spinifex.

There is more than 99% of the pre-European vegetation remaining of these vegetation associations (**Table 2**). The Application Area is not part of any significant remnant vegetation in the wider regional area.

Table 2 Pre European extent of vegetation associations occurring within the Application Area (Shepherd *et al*., 2001)

Vegetation Association	Pre-European Extent (ha)	Current Extent (ha)	% Remaining	Pre-European % in IUCN Class I-IV Reserves
Pilbara IBRA Bioregion	17,804,187	17,794,646	~99.9	6.3
Vegetation association 29 within Western Australia	7,903,991	7,900,200	99.95	0.29
Vegetation association 29 within the Pilbara IBRA	1,133,219	1,132,939	99.98	1.91
Vegetation association 82 within Western Australia	2,565,901	2,553,217	99.51	10.25
Vegetation association 82 within the Pilbara IBRA	2,563,583	2,550,899	99.51	10.26
Vegetation association 111 within Western Australia	762,963	762,326	99.92	5.46
Vegetation association 111 within the Pilbara IBRA	550,286	550,232	99.99	1.29

A total of nine broad floristic formations with 14 vegetation associations have been described and mapped within the Application Area (**Figure 2 and Table 3**).

Table 3 Vegetation associations of the Application Area (Onshore 2014)

Broad Floristic Formation	Vegetation Association Description	
Acacia High Shrubland	MA AtpApypAse Ecr ThmbTtCyp	High Shrubland of Acacia tumida var. pilbarensis, Acacia pyrifolia var. pyrifolia and Acacia sericophylla with Scattered Trees of Eucalyptus camaldulensis subsp. refulgens over Open Tussock Grassland of Themeda sp. Mt Barricade (M.E. Trudgen 2471), Themeda triandra and Cymbopogon procerus on brown loam and gravels on major drainage channels.
	MI AtpPlAm TpTs Ch Ell	High Shrubland of Acacia tumida var. pilbarensis, Petalostylis labicheoides and Grevillea wickhamii over Open Tussock Grassland of Cymbopogon ambiguus, Eriachne tenuiculmis and Themeda triandra with Low Open Woodland of Corymbia hamersleyana in minor drainage lines and gorges.
Acacia Low Open Forest	SA Aa TpTwTb CcChf	Low Open Forest of Acacia aptaneura over Open Hummock Grassland of Triodia pungens, Triodia wiseana and Triodia basedowii over Open Tussock Grassland of *Cenchrus ciliaris and Chrysopogon fallax on red brown sandy loam on sandy plains and undulating low hills.
Acacia Low Open Woodland	FP AaAciApr AsyAssAb Tp	Low Open Woodland of Acacia aptaneura, Acacia citrinoviridis and Acacia pruinocarpa over Open Shrubland of Acacia synchronicia, Acacia sclerosperma subsp. sclerosperma and Acacia bivenosa over Very Open Hummock Grassland of Triodia pungens on red brown clay loam on floodplains and medium drainage lines.
Acacia Low Woodland	FP ApAaApr AsyErffPto CcAriArc	Low Woodland of Acacia paraneura, Acacia aptaneura and Acacia pruinocarpa over Open Shrubland of Acacia synchronicia, Eremophila forrestii subsp. forrestii and Ptilotus obovatus over Open Tussock Grassland of *Cenchrus ciliaris, Aristida inaequiglumis and Aristida contorta on red brown loam on floodplains.
Acacia Open Scrub	MI AtpGrwhApy p TpTb CcCs	Open Scrub of Acacia tumida var. pilbarensis, Grevillea wickhamii subsp. hispidula and Acacia pyrifolia var. pyrifolia over Hummock Grassland of Triodia pungens and Triodia basedowii over Open Tussock Grassland of *Cenchrus ciliaris and *Cenchrus setiger on brown sandy loam on minor drainage lines and floodplains.
**Cenchrus* Open Tussock Grassland	GP CcCs AaApr AsyAa	Open Tussock Grassland of *Cenchrus ciliaris and *Cenchrus setiger with Low Open Woodland of Acacia aptaneura and Acacia pruinocarpa over High Open Shrubland of Acacia synchronicia and Acacia aptaneura on red sandy clay loam on gilgai plains.
**Cenchrus* Tussock Grassland	MA CcCs EvAciAthe	Tussock Grassland *Cenchrus ciliaris and *Cenchrus setiger with Low Woodland of Eucalyptus victrix, Acacia citrinoviridis and Atalaya hemiglauca on brown sandy loam on major drainage lines and adjacent flood plains.
Eucalyptus Low Open Forest	MA EcrEvEx ApypAtpGor o TtEuaCyp	Low Open Forest of Eucalyptus camaldulensis subsp. refulgens, Eucalyptus victrix and Eucalyptus xerothemica over High Shrubland of Acacia pyrifolia var. pyrifolia, Acacia tumida var. pilbarensis and Gossypium robinsonii over Open Tussock Grassland of Themeda triandra, Eulalia aurea and Cymbopogon procerus on red brown clay loam on major drainage lines.
Triodia Hummock Grassland	FS Ts CdHc AancAiGrwh	Hummock Grassland of Triodia vanleeuwenii with Low Open Woodland of Corymbia deserticola subsp. deserticola, Eucalyptus leucophloia subsp. leucophloia and Corymbia hamersleyana and Low Open Shrubland of Acacia hilliana and Acacia adoxa var. adoxa on low hillslopes and crests
	HC TwTbrTp EllCh AmaGrwhAb	Hummock Grassland of Triodia wiseana, Triodia brizoides and Triodia pungens with Low Open Woodland of Eucalyptus leucophloia subsp. leucophloia and Corymbia hamersleyana over High Open Shrubland of Acacia maitlandii, Grevilllea wickhamii subsp. hispidula and Acacia bivenosa on red brown sandy loam on hill crests and upper hill slopes
	HS TsTwTp EllCh AhiAaa	Hummock Grassland of Triodia sp. Shovelanna Hill (S. van Leeuwen 3835), Triodia wiseana and Triodia pungens with Low Open Woodland of Eucalyptus leucophloia subsp. leucophloia and Corymbia hamersleyana over Low Open Shrubland of Acacia hilliana and Acacia adoxa var. adoxa on red brown sandy loam on hill slopes
	SD TscTb Ad CoteCrcSica	Hummock Grassland of Triodia schinzii and Triodia basedowii with High Open Shrubland of Acacia dictyophleba over Low Open Shruland of Corchorus tectus, Crotalaria cunninghamii and Sida cardiophylla on red sand on linear sand dunes
	SP TbTp HlAancAi Ch	Hummock Grassland of Triodia basedowii and Triodia pungens with High Open Shrubland of Hakea lorea subsp. lorea, Acacia ancistrocarpa and Acacia inaequilatera and Scattered Low Trees of Corymbia hamersleyana on red brown loamy sand on stony plains

The Onshore Environmental (2014) *Consolidation of Regional Vegetation Mapping BHP Billiton Iron Ore Pilbara Tenure* (**Appendix 1**) undertook a detailed review of all previous flora and vegetation surveys across BHP's Pilbara operations (162 baseline flora and vegetation surveys between 2004 and 2013). This review was supported by field visits where the analysis indicated that further information was required to confirm the exact vegetation associations.

Historical survey reports often used different techniques and/or nomenclature, however they generally utilised similar field methods. The Project resolved the inconsistencies between previous vegetation mapping and created one consolidated regional Geographic Information System (GIS) database which:

- Serves as BHP's base line vegetation dataset;
- Maps and describes a total of 53 broad floristic communities with 218 distinct vegetation associations across BHP's Pilbara operations; and
- Provides consistency in methods and nomenclature across BHP's Pilbara operations.

The Onshore vegetation consolidation project also identified one Threatened Ecological Community (TEC) and six Priority Ecological Communities (PECs) within the Consolidation Study Area. None of the vegetation associations or landforms identified within the boundary of the Application Area are associated with a TEC or PEC (Onshore Environmental, 2014). Four records of the Priority 3 Ecological Community "*Vegetation of sand dunes of the Hamersley Range/Fortescue Valley*" have been clipped from the Application Area with a 100m buffer, except where there is existing disturbance to enable this disturbance to be rehabilitated. There has been no previous disturbance within 30 m of the PEC.

The PEC *Vegetation of sand dunes of the Hamersley Range/Fortescue Valley* is linked to the clear and distinctive sand dune feature in the landscape. All sand dune features, including those not currently mapped as "*Vegetation of sand dunes of the Hamersley Range/Fortescue Valley*", have been clipped from the Application Area.

The distinct mapped broad floristic communities and vegetation associations identified within Application Area extend or occur beyond the project boundary. It is considered unlikely that any changes in vegetation associations and local species over the time since the vegetation consolidation project would lead to elevated significance of the vegetation given that none of the vegetation associations identified within the Application Area were affiliated with any TECs or PECs and there are no vegetation associations within the Application Area that would be likely to be included in any updates to TEC or PEC listings.

Vegetation condition within the Application Area ranges from excellent to Completely Disturbed.

3.4.2 Significant Flora

No species listed under the *Environment Protection and Biodiversity Conservation Act*, *1999* (EPBC Act) were identified adjacent to the Application Area.

One species gazetted as Threatened Flora species under the *Biodiversity Conservation Act, 2016* (BC Act) were identified from 5,819 locations adjacent to the Application Area: *Synostemon hamersleyensis*. All known locations of this species have been clipped from the Application Area using a 50m buffer, except where there is existing disturbance so this disturbance can be rehabilitated (**Figure 3**).

One Priority 4 Flora species has been identified from one location adjacent to the Application Area: *Eremophila magnifica* subsp. *magnifica*. This location has been clipped from the Application Area using a 10m buffer (**Figure 3**).

3.4.3 Weeds

Seven introduced flora species (weeds) have been recorded within the Application Area (**Table 4**). Control of established weed populations will be carried out according to BHP's standard *Weed Control and Management Procedures.*

Table 4 Introduced Flora of the Application Area

Species	Common Name	DPAW Rating (DPAW, 2016)	Declared Pest[1]
Aerva javanica	Kapok Bush	High and Rapid	No
Argemone ochroleuca	Mexican Poppy	Unknown and Rapid	No
**Bidens bipinnata*	Bipinnate Beggartick	Unknown and Rapid	No
**Cenchrus ciliaris*	Buffel Grass	High and Rapid	No
**Cenchrus setiger*	Birdwood Grass	High and Rapid	No
**Setaria verticillata*	Whorled Pigeon Grass	High and Rapid	No
**Sisymbrium orientale*	Indian Hedge Mustard	Low and Unknown	No

3.4.4 Fauna Habitats and Significant Fauna

Biologic (2017) identified the following nine vertebrate fauna habitats within the Application Area (**Figure 4**):

- **Sand Plain:** Sand Plain habitat is characterised by relatively deep sandy soils supporting dense spinifex grasslands and sparse shrubs. This habitat transitions into patches of Mulga in places. This habitat often occurs as terraces along Major Drainage Lines.
- **Stony Plain:** Comprises low-lying open plains and the rolling hills below upland areas, with very slight to no gradient. The substrate consists of gravel and pebbles, with vegetation dominated by *Triodia* and scattered Mulga, eucalpyt and *Acacia* trees, with patches of various small to medium shrub species
- **Hillcrest/ Hillslope:** Comprises a rocky substrate, often with exposed bedrock, on moderate to steep slopes leading into lower footslopes. This habitat was characterised by steep slopes with a high proportion of coarse fragments dominated by ironstone. These can contain cracks and crevices. Instances of Gorge/ Gully is contained within this habitat. This habitat is usually dominated by open *Eucalyptus* woodlands, *Acacia* and *Grevillea* scrublands and *Triodia* low hummock grasslands.
- **Gorge/ Gully:** Characterised by rugged, steep-sided valleys incised into the surrounding landscape. Gorges are deeply incised with vertical cliff faces, while gullies are more open (but not as open as Minor Drainage Lines). Caves and rock pools are most often encountered in this habitat type. Vegetation can be dense and complex in areas of soil deposition or sparse and simple where erosion has occurred.
- **Drainage Area/ Floodplain:** Lower lying plain often subjected to sheet flow following large rainfall events. Vegetation and substrates of this habitat was variable, often comprising scattered *Eucalyptus* over *Acacia* and/or *Grevillea* shrubs with an understory dominated by *Triodia* hummock grasses and/or mixed tussock grasses on alluvial substrates, often with heavy clays and gravel. Tussock grasses can be dominant within Drainage Area/ Floodplain habitat as a result of high rainfall events.
- **Minor Drainage Line:** Usually lacks a tall dense upper storey, but with a dense mid storey, including sparse *Eucalyptus* sp., and *Acacia* sp. over tussock grasses and *Triodia* sp. hummock grasses.
- **Major Drainage Line:** Comprises scattered *Eucalyptus* and *Acacias*, or mulga woodland, with an understory dominated by tussock grasses. The structure and condition of vegetation often varies seasonally, particularly following rainfall events. Vegetation condition often subject to heavy cattle grazing. This habitat type is prone to pooling and ponding in areas. Also supports the Weeli Wolli PEC, which has groundwater dependent vegetation species including silver cadjeput (*Melaleuca argentea*).
- **Mulga Woodland:** Comprises stands of mulga (*Acacia aneura*) over clay or stony substrates. Differs from other plains by having a monoculture of mulga compared to a diversity of other Acacia species.

[1] *Biosecurity and Agriculture Management Act*, 2007 (BAM Act) s22

The surveys undertaken across the Application Area have resulted in five fauna species of significance being recorded from within the Application Area (**Figure 5**):

- *Anilios ganei* (Pilbara Flat-headed Blind-snake) (DBCA Priority 1)
- *Apus pacificus* (Fork-tailed Swift) (EPBC Act Migratory)
- *Falco peregrinus* (Peregrine Falcon) (BC Act Other Specially Protected Fauna)
- *Liasis olivaceus* subsp. *barroni* (Pilbara Olive Python) (EPBC Act and BC Act Vulnerable); and
- *Pseudomys chapmani* (Western Pebble-mound Mouse) (DBCA Priority 4).

Two other fauna species has been recorded from solely from habitat features which have been excluded from the Application Area. Given the proximity of the habitat features and the highly mobile nature of these species they are considered to be recorded within the Application Area:

- *Dasyurus hallucatus* (Northern Quoll) (EPBC Act and BC Act Endangered)
- *Macroderma gigas* (Ghost Bat) (EPBC Act and BC Act Vulnerable).

Based on the occurrence of the habitat types and significant fauna species previously recorded in the vicinity one additional species is considered to possibly occur within the Application Area: *Falco hypoleucos* (Grey Falcon) (EPBC Act and BC Act Vulnerable).

An assessment of the potential impact of the proposed clearing on the species of significant fauna that may occur in the application area is provided in **Table 5**.

Table 5 Significant Fauna Potentially Occurring within the Application Area

Significant Species	Conservation Status	Distribution and Ecology	Habitat Relevance	Likelihood	Potential Impact on Species
Birds					
Fork-tailed Swift (*Apus pacificus*)	Migratory (EPBC Act) Schedule 5 (BC Act)	The Fork-tailed Swift breeds in north-east and east Asia, wintering in Australia and southern New Guinea (Johnstone and Storr, 1998). Fork-tailed Swifts are entirely aerial within the Pilbara and may forage sporadically over the Application Area in the summer months, associated with thunderstorms and cyclonic systems (Johnstone and Storr, 1998).	The Fork-tailed Swift is largely an aerial species and has a broad distribution across much of Western Australia. It is viewed as a nomadic species and may fly over the Application Area.	Recorded	**Negligible** As this species is entirely aerial and not reliant on terrestrial habitats, the impact to this species is considered to be negligible.
Grey Falcon (*Falco hypoleucos*)	Vulnerable (EPBC Act) Vulnerable (BC Act)	The Grey Falcon occurs at low densities across inland Australia. This species frequents timbered lowlands, particularly Acacia shrublands that are crossed by tree-lined drainage systems (Threatened Species Scientific Committee, 2020). The species also frequents spinifex and tussock grassland.	This species has not been recorded however it is possible that potential nesting habitat for this species may occur in the large trees found in the Minor and Major Drainage Line habitat of the Application Area. This species may also forage within the drainage line and other broader habitats of the Application Area	Possible	**Low** The proposed clearing activities will have negligible impact on the Grey Falcon as: • This species has not been recorded in the Application Area; • Disturbance within the Minor and Major Drainage Line habitat (potential nesting habitat) will be minimised; • Its key habitats occur extensively throughout the Pilbara; and • this species ability to egress from the area.
Peregrine Falcon (*Falco peregrinus*)	Other Specially Protected Fauna (BC Act)	The Peregrine Falcon is uncommon but wide ranging across Australia. They occur mainly along coastal cliffs, rivers and ranges as well as wooded watercourses and lakes. The Peregrine Falcon nests primarily on cliffs, granite outcrops and quarries, and feed mostly on birds (Johnstone and Storr 1998).	There are no suitable breeding sites in the Application Area for this species. Although it may forage in this area as part of a wider home range.	Recorded	**Low** The proposed clearing activities are unlikely to impact on the Peregrine Falcon as it has the ability to egress from areas being disturbed. More suitable habitat for this species occurs outside of the Application Area.
Mammals					
Ghost Bat (*Macroderma gigas*)	Vulnerable (EPBC Act) Vulnerable (BC Act)	Ghost Bats are patchily distributed across most of northern Australia, however the recent contraction in the distribution in central Australia has left the Pilbara population of ghost bats isolated by extensive sandy deserts (Worthington-Wilmer et al., 1994). They are generally associated with Gorge / Gully or drainage line habitats, requiring an undisturbed cave, deep fissure or disused mine shaft in which to roost. The Ghost Bat forages in areas of open woodland (Churchill, 2008).	The 20 suitable (of which 9 are associated with Ghost Bat records) and 13 unsuitable caves for this species have been clipped from the Application Area with a 100 m buffer. This species may forage over the Drainage Area/ Floodplain, Stony Plain, Gorge/ Gully, Minor Drainage Line and Major Drainage Line habitats of the Application Area as part of a larger home range.	Recorded within 100m	**Low** All suitable caves have been clipped from the Application Area. This species is likely to forage over the habitats within the Application Area and surrounds, however given the nature of the proposed activities the Ghost Bat is unlikely to be impacted from proposed activities.
Northern Quoll (*Dasyurus hallucatus*)	Endangered (EPBC Act) Endangered (BC Act)	Northern Quoll populations occur in six geographical centres around Australia, including: Drummond Range, central Queensland; the wet tropics of Northern Queensland; northern Cape York Peninsula; northern and western Top End, Northern Territory; north Kimberley and the Pilbara, Western Australia (Braithwaite and Griffiths, 1994). Northern Quoll denning habitat in the Pilbara is associated with rocky habitats or riverine habitats with mature Eucalypt trees with hollows (SEWPaC, 2011).	There is one record of the Northen Quoll (scat) within a small area of Minor Drainage Line habitat in the north of the Application Area. This record has been excluded from the Application Area (it falls within a cave exclusion zone). The Gorge/ Gully and Major Drainage Line habitats provide key foraging and dispersal habitat for the species. Based on the overall scarcity and concentration of records, the species is unlikely to be reliant on the habitats within the Application Area for long-term persistence at a local and/or regional scale and based on the results of the current survey the record of Northern Quoll is unlikely to be representative of an important population.	Recorded within 100m	**Low** The proposed clearing activities will have negligible impact on the Northern Quoll as: • The record of this species adjacent to the Application Area is not considered to be representative of an important population; • Disturbance within the Gorge/ Gully and Major Drainage Line habitats will be minimised; and • the proposed area for clearing is small in a regional context.
Western Pebble-mound mouse (*Pseudomys chapmani*)	Priority 4 (DBCA)	The Western Pebble-mound Mouse is restricted to the Pilbara region, where it is recognised as an endemic species. Abandoned mounds to the east of its current range indicate a decline in distribution (Menkhorst and Knight, 2004). Abandoned mounds in disturbed areas suggest that the species is under threat by grazing and mining activities. The construction of extensive pebble mounds, built from small stones, which typically cover areas from 0.5-9.0 square metres, is characteristic of this species. Mounds are restricted to suitable class stones, and are usually found on gentle slopes and spurs (van Dyck and Strahan, 2008).	This species is common in the Hill Crest / Hill Slope habitat of the local and regional area. There are 24 records of this species within the Application Area.	Recorded	**Low** This species was recorded and typically occurs within the Hill Crest / Hill Slope habitats within the Application Area. While the Hill Crest / Hill Slope is utilised by the Western Pebble-mound Mouse, the proposed area for clearing is small in a regional context and is contiguous with habitats in the local and regional area. Active Pebble-mouse mounds will be avoided using a 10 m buffer, where practicable.
Reptiles					
Pilbara Flat-headed Blind Snake (*Anilios ganei*)	Priority 1 (DBCA)	The Pilbara Flat-headed Blind Snake is a moderately robust blind snake known from widely separated areas between Newman and Pannawonica. A very cryptic species. Most often recorded in rocky or stony areas and considered to be possibly associated with moist gorges and gullies (Wilson and Swan, 2010)	Suitable habitat for this species occurs in the Application Area, although limited records make habitat relevance hard to assess. However a recording was made by Outback Ecology (2009) within an alluvial floodplain. This habitat type (Drainage Area / Floodplain) occurs in the Application Area. The Hill Crest / Hill Slope habitats of the Application Area may also provide suitable habitat for this species, so it may disperse and forage through the Application Area.	Recorded	**Low** It is possible that the grading of access tracks and drill pads may result in a localised impact on this species' habitat. Any potential impact is likely to be moderated by the minimal disturbance associated with the clearing activities, and extensive undisturbed areas. Given the regional distribution of Pilbara Flat-headed Blind Snake, the loss of some habitat from the proposed clearing associated with the Application Area is considered as being low when compared to the expansive areas of suitable habitat remaining and throughout in the Pilbara.

Significant Species	Conservation Status	Distribution and Ecology	Habitat Relevance	Likelihood	Potential Impact on Species
Pilbara Olive Python (*Liasis olivaceus barroni)*	Vulnerable (EPBC Act) Vulnerable (BC Act)	The Pilbara Olive Python's range is restricted to the Pilbara region, north Western Australia and the Dampier Archipelago. Habitat consists of rocky escarpments, gorges and waterholes within the Pilbara Region. The preferred microhabitat for this species are under rock piles, on top of rocks and under spinifex as well as in artificial features such as overburden heaps, railway embankments an sewerage treatment ponds. The species' breeding season occurs from June to August, with males moving long distances in search of breeding females (Wilson and Swan, 2017).	The 10 known waterholes (key habitat features for the Pilbara Olive Python) within the Application Area have been excluded from the Application Area with a 10m buffer. This species may utilise the Gorge / Gully, Major Drainage Line, Minor Drainage Line and Drainage Area / Floodplain habitats of the Application Area in a transitory nature when conditions are suitable.	Recorded	**Low** The impact upon this species is likely to be low as • there are larger areas of suitable rocky habitat and drainage line habitat in a similar or better condition adjacent to the Application Area and in the wider area; • Disturbance within the Gorge/ Gully and Major Drainage Line habitats will be minimised; and • the proposed area for clearing is small in a regional context.

3.5 GROUNDWATER

The Application Area is located in the Pilbara Groundwater Area, proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act) (DoW, 2009a).

There is one main aquifers within the Application Area:

Hamersley – Fractured Rock Aquifer which is described as: "The Precambrian rocks of the Hamersley Basin are principally volcanics, shales and iron formations. Groundwater is contained within fractures within these rocks. The groundwater level may be deep below the surface, and is generally fresh. The main use of this aquifer is for mining and mine dewatering from iron ore mines. Bores have also been drilled for road and railway construction. There will be increasing dewatering from the fractured rocks around iron ore mines as the pits become deeper (DoW, 2015)".

3.6 SURFACE WATER

The Application Area is situated in the Pilbara Surface Water Area, proclaimed under the RIWI Act (DoW, 2009b).

There is one named non-perennial creek, Weeli Wolli Creek, which runs across the eastern corner of the Application Area. Existing cleared tracks will be used to cross Weeli Wolli Creek.

There are also multiple unnamed non-perennial drainage lines that flow predominately to the north east across the Application Area before joining Weeli Wolli Creek.

Where practicable, existing cleared tracks will be used to cross the unnamed non-perennial minor drainage line. If it is necessary for new crossings to be installed, clearing will be kept to a bare minimum and will be constructed flat level to the surface (i.e. a simple clearing with no bunds) to maintain the natural surface flow.

4 ENVIRONMENTAL MANAGEMENT

The management of the environmental aspects of BHP's operations at the Application Area are managed under the company's AS/NZS ISO 14001:2004 certified Environmental Management System (EMS). The EMS describes the organisational structure, responsibilities, practices, processes and resources for implementing and maintaining environmental objectives at all BHP sites

Additionally, operational controls for environmental management for the Project area are guided by BHP's Charter values. The Charter Values outline a commitment to develop, implement and maintain management systems for sustainable development that drive continual improvement and set and achieve targets that promote efficient use of resources. In order to give effect to the Charter Values, a series of Our Requirements Documents have been developed.

BHP has also developed a Sustainable Development Policy for its operations. The Sustainable Development Policy outlines a commitment to setting objective and targets to achieve sustainable outcomes and to continually improve our performance.

BHP also has an internal Project Environmental and Aboriginal Heritage Review (PEAHR) Procedure. The purpose of the procedure is to manage implementation of environmental, Aboriginal heritage, land tenure and legal commitments prior to and during land disturbance. All ground disturbance activities will meet the requirements of the PEAHR procedure, all relevant legislative and regulatory requirements, the BHP Charter, industry standards, and codes of practice.

All personnel carrying out works associated with clearing activities are required to comply with BHP's Charter Values, BHP's Our Requirements, and relevant legislative and licensing requirements.

5 PROJECT COMPLIANCE WITH THE TEN CLEARING PRINCIPLES

BHP considers that native vegetation clearing within the Application Area will not result in any significant environmental or social impacts, and complies with the Ten Clearing Principles, as defined in Schedule 5 of the EP Act. **Section 6** provides an assessment of project compliance with the Ten Clearing Principles.

6 ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

The information used to assess the application against the Ten Clearing Principles has been based on the findings of multiple baseline surveys (**Section 3**).

6.1 PRINCIPLE A

Native vegetation should not be cleared if it comprises a high level of biological diversity

This proposal is not likely to be at variance to this Principle.

Similar habitat to the Application Area is located outside the Application Area. These other areas of similar vegetation type are therefore expected to have a similar biological diversity and conservation value than that of the Application Area.

The proposed clearing is therefore unlikely to have any significant impact on the biodiversity of the region.

Table 6 provides an assessment of the proposed clearing activities within the Application Area against the components of clearing Principle A.

Table 6 Assessment against Principle A components

Principle	Criteria	Assessment	Outcome
a) Native vegetation should not be cleared if it comprises a high level of biological diversity.	a1) Native vegetation should not be cleared if it is representative of an area of outstanding biodiversity in the Bioregion.	The native vegetation within the Application Area is represented in the same condition within the broader region and is not considered to be of outstanding biodiversity in the Bioregion.	Not at variance with clearing principle.
	a2) Native vegetation should not be cleared if it has higher diversity of indigenous aquatic or terrestrial plant or fauna species than native vegetation of that ecological community in good or better condition in the Bioregion.	The native vegetation within the Application Area is in the same condition as other areas of similar vegetation type within the broader region.	Not at variance with clearing principle.
	a3) Native vegetation should not be cleared if it has higher diversity of indigenous aquatic or terrestrial plant or fauna species than the remaining vegetation of that ecological community in the local area.	The native vegetation within the Application Area is not considered to have higher biodiversity and conservation value than that of the surrounding vegetation within the local area.	Not at variance with clearing principle.
	a4) Native vegetation should not be cleared if it has higher ecosystem diversity than other native vegetation of that local area.	The native vegetation within the Application Area is not considered to have a higher ecosystem diversity than other native vegetation of that local area.	Not at variance with clearing principle.
	a5) Native vegetation should not be cleared if it has higher genetic diversity than the remaining native vegetation of that ecological community.	The native vegetation within the Application Area is not considered to have a higher genetic diversity than the remaining native vegetation of that ecological community as the vegetation is contiguous with adjacent native vegetation and has no special features.	Not at variance with clearing principle.
	A6) Native vegetation should not be cleared if it is necessary for the continued in situ existence of significant habitat for priority flora species published by the Department of Environment and Conservation.	One Priority flora species has been clipped from the Application Area with an 10 m buffer.	Not at variance with clearing principle.

6.2 PRINCIPLE B

Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia

This proposal is not likely to be at variance to this Principle.

There are nine broad fauna habitat types within the Application Area (**Figure 4**).

The vegetation and habitat found within the Application Area are considered to be well represented in the Pilbara bioregions.

Five fauna species of significance have been recorded from within the Application Area (or specific exclusion zones). Two other fauna species have been recorded from areas clipped out of the Application Area, but for this assessment are considered to occur within the Application Area.

One additional species considered to potentially occur within the Application Area (**Table 5**). As described in **Section 3.4.4** and **Table 5** clearing of the Application Area is expected to have a low impact on these species.

Table 7 provides an assessment of the proposed clearing activities within the Application Area against the components of clearing Principle B.

Table 7 Assessment against Principle B components

Principle	Criteria	Assessment	Outcome
b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	b1) Native vegetation should not be cleared if it is or is likely to be habitat for fauna that is declared Specially Protected under the BC Act.	Four BC Act protected species have been recorded from the Application (or specific exclusion zones) and one BC Act protected species are considered 'possible' or 'likely' to occur within the Application Area (**Table 5**). The proposed activities are unlikely to have a significant impact on these species as: • All species are wide-ranging and found throughout the broader region; • There are no key habitat features (caves and waterhole habitats) within the Application Area; • All species are only likely to forage within the Application Area; • These species do not exclusively depend on any habitat type or feature within the Application Area; and • Similar habitat is well represented outside the Application Area.	Unlikely to be at variance with clearing principle.
	b2) Native vegetation should not be cleared if it is or is likely to be habitat for Priority Listed Fauna.	Two Priority fauna species have been recorded within the Application Area with two species considered 'possible' or 'likely' to occur within the Application Area. As detailed in **Table 6** these species are unlikely to be impacted for the following reasons: • The preferred habitat for these species is well represented outside the Application Area; • Similar habitat within close vicinity to the Application Area was found to be the same or better condition than that of the Application Area; and • Active mounds of the Western Pebble-mound Mouse will be avoided using a 10 m buffer, where practicable.	Not at variance with clearing principle.
	b3) Native vegetation should not be cleared if it is or is likely to be habitat for fauna that is otherwise significant.	Habitat found within the Application Area may be suitable for use by conservation significant fauna, however similar habitat in the same or better condition is widespread in the Application Area surrounds	Not at variance with clearing principle.
	b4) Native vegetation should not be cleared if it provides significant habitat for fauna species in the local area.	Habitat within the Application Area is not considered significant habitat for fauna species within the local area. Similar habitat to that proposed to be cleared is located to the area surrounding of the Application Area.	Not at variance with clearing principle.
	b5) Native vegetation should not be cleared if it maintains ecological functions and processes that protect significant habitat for fauna.	The clearing of native vegetation is not considered to alter ecological functions and processes that protect significant habitat for fauna.	Not at variance with clearing principle.
	b6) Native vegetation should not be cleared if it forms, or is part of, an ecological linkage that is necessary for the maintenance of fauna.	No ecological linkages run through the Application Area that are necessary for the maintenance of fauna.	Not at variance with clearing principle.
	b7) Native vegetation should not be cleared if it	The Application Area is not considered to contain significant habitat for faunal	Not at variance with

Principle	Criteria	Assessment	Outcome
	provides significant habitat for fauna communities (assemblages) and meta-populations.	assemblages that are not also present in other areas within the vicinity. The Application Area is not considered likely to contain geographically isolated fauna populations.	clearing principle.

6.3 PRINCIPLE C

Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora

This proposal is not likely to be at variance to this Principle.

No species listed under the EPBC Act or gazetted as Threatened under the BC Act were recorded in the Application Area. There are 5,819 locations of *Synostemon hamersleyensis* which have been clipped from the Application Area using a 50m buffer, except where there is existing disturbance so this disturbance can be rehabilitated. This species is known from multiple records in the broader region.

One species listed as Priority Flora by the DBCA has been recorded in the Application Area (**Section 3.4.2 and Section 6.1**).

Table 8 provides an assessment of the proposed clearing activities within the Application Area against the components of clearing Principle C.

Table 8 Assessment against Principle C components

Principle	Criteria	Assessment	Outcome
c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	c1) Native vegetation should not be cleared if it is necessary for the continued *in situ* existence of populations of Threatened Flora under the *BC Act 2016*	No Threatened flora species were recorded in the Application Area. All records of *Synostemon hamersleyensis*. All known locations of this species have been clipped from the Application Area using a 50m buffer, except where there is existing disturbance so this disturbance can be rehabilitated.	Not at variance with clearing principle.
	c2) Native vegetation should not be cleared if it is necessary for the continued *in situ* existence of other significant flora.	No species listed under the EPBC Act or other significant flora species were recorded in the Application Area.	Not at variance with clearing principle.

6.4 PRINCIPLE D

Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community

This proposal is not likely to be at variance to this Principle.

None of the vegetation associations or landforms identified within Application Area are associated with a TECs or PECs (Onshore Environmental, 2014). The closest PEC is the *Vegetation of sand dunes of the Hamersley Range/Fortescue Valley* (Priority 3). Four records of this PEC have been clipped from the Application Area with a 100m buffer, except where there is existing disturbance to enable this disturbance to be rehabilitated. There has been no previous disturbance within 30 m of the PEC.

The PEC *Vegetation of sand dunes of the Hamersley Range/Fortescue Valley* is linked to the clear and distinctive sand dune feature in the landscape. All sand dune features, including those not currently mapped as "*Vegetation of sand dunes of the Hamersley Range/Fortescue Valley*", have been clipped from the Application Area (**Section 3.4.1**).

Table 9 provides an assessment of the proposed clearing activities within the Application Area against the components of clearing Principle D.

Table 9 Assessment against Principle D components

Principle	Criteria	Assessment	Outcome
d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.	d1) Native vegetation should not be cleared if threatened ecological communities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* are present.	No EPBC Act TECs are present in the Application Area.	Not at variance with clearing principle.
	d2) Native vegetation should not be cleared if it is necessary for the maintenance of Threatened Ecological Communities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.	No EPBC Act TECs or associated native vegetation will be impacted by the proposed works.	Not at variance with clearing principle.
	d3) Native vegetation should not be cleared if other significant ecological communities are present.	No significant ecological communities are known to occur or are likely to occur within the Application Area as the mapped records of the PEC *Vegetation of sand dunes of the Hamersley Range/Fortescue Valley* along with any other sand dune features have been clipped from the Application Area using a 10m buffer.	Not at variance with clearing principle.
	d4) Native vegetation should not be cleared if it is necessary for the maintenance of other significant ecological communities.	No DBCA listed TECs or associated native vegetation will be impacted by the proposed works.	Not at variance with clearing principle.
	d5) Native vegetation should not be cleared if it is necessary for the continued *in situ* existence of significant examples of priority threatened ecological communities published by the Department of Environment and Conservation.	No DBCA listed PECs or associated native vegetation will be impacted by the proposed works as the PEC *Vegetation of sand dunes of the Hamersley Range/Fortescue Valley* is linked to the clear and distinctive sand dune feature in the landscape, all of which have been clipped from the Application Area using a 100m buffer..	Not at variance with clearing principle.

6.5 PRINCIPLE E

Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared

This proposal is not likely to be at variance to this Principle.

The habitat and vegetation within the Application Area is well represented in the Land Systems of the region (**Section 3.4.1**), and therefore it is unlikely individual species would be restricted to a particular habitat and vegetation occurring in the Application Area.

Table 10 provides an assessment of the proposed clearing activities within the Application Area against the components of clearing Principle E.

Table 10 Assessment against Principle E components

Principle	Criteria	Assessment	Outcome
e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	e1) Native vegetation should not be cleared if the remaining native vegetation represents less than 30%, or the clearing would reduce the representation of remaining native vegetation to less than 30% in the Bioregion (or subregion where applicable).	Clearing native vegetation within the Application Area will not reduce the extent of native vegetation below 30% in the bioregion or subregion.	Not at variance with clearing principle.
	e2) Native vegetation should not be cleared if an ecological community represents less than 30% of its original extent or clearing would reduce the representation of any ecological community to less than 30% of its original extent in the Bioregion (or subregion where applicable).	Clearing native vegetation within the Application Area will not significantly reduce the known extent of the ecological community from pre-European extents. Current remaining extents of the vegetation communities in the bioregion are more than 99% of pre-European extents.	Not at variance with clearing principle.
	e3) Native vegetation should not be cleared if clearing would reduce an ecological community to less than 1% of the Bioregion (or subregion where applicable)	Clearing native vegetation within the Application Area will not significantly reduce the known extent of the vegetation community in the bioregion.	Not at variance with clearing principle.
	e4) Native vegetation should not be cleared if the remaining native vegetation represents less than 30% or the clearing would reduce the representation of remaining native vegetation to less than 30% in the Local Area.	Clearing native vegetation within the Application Area will not reduce the representation of remaining native vegetation to less than 30% in the local area.	Not at variance with clearing principle.
	e5) Native vegetation should not be cleared if an ecological community represents less than 30% of its original extent or clearing will reduce the representation of any ecological community to less than 30% of its original extent in the Local Area.	Clearing native vegetation within the Application Area will not reduce the representation of any ecological community to less than 30% of its original extent in the local area.	Not at variance with clearing principle.
	e6) Native vegetation should not be cleared if clearing would reduce any ecological community to less than 1% of the Local Area.	Clearing native vegetation within the Application Area will not significantly reduce the known extent of the vegetation community in the local area.	Not at variance with clearing principle.

6.6 PRINCIPLE F

Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland

This proposal is unlikely to be at variance to this Principle.

There is one named non-perennial creek, Weeli Wolli Creek, which runs across the north west corner of the application Area. Existing cleared tracks will be used to cross Weeli Wolli Creek.

There are also multiple unnamed non-perennial drainage lines that flow predominately to the north east across the Application Area before joining Weeli Wolli Creek.

Where practicable, existing cleared tracks will be used to cross the unnamed non-perennial minor drainage line. If it is necessary for new crossings to be installed, clearing will be kept to a bare minimum and will be constructed flat level to the surface (i.e. a simple clearing with no bunds) to maintain the natural surface flow.

Table 11 provides an assessment of the proposed clearing activities within the Application Area against the components of clearing Principle F.

Table 11 Assessment against Principle F components

Principle	Criteria	Assessment	Outcome
f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	f1) Native vegetation should not be cleared if it is growing in a watercourse or wetland that has been identified as having significant environmental values.	No permanent watercourses or wetlands are located within with the Application Area. There is one named non-perennial creek, Weeli Wolli Creek, which runs across the eastern corner of the Application Area. Existing cleared tracks will be used to cross Weeli Wolli Creek. There are also multiple unnamed non-perennial drainage lines that flow predominately to the north east across the Application Area before joining Weeli Wolli Creek. Where practicable, existing cleared tracks will be used to cross the unnamed non-perennial minor drainage line. If it is necessary for new crossings to be installed, clearing will be kept to a bare minimum and will be constructed flat level to the surface (i.e. a simple clearing with no bunds) to maintain the natural surface flow.	Not at variance with clearing principle.
	f2) Native vegetation should not be cleared if it provides a buffer area for watercourses and wetlands identified in criteria (f1) and (f2).	No permanent watercourses or wetlands are located within with the Application Area. There is one named non-perennial creek, Weeli Wolli Creek, which runs across the eastern corner of the Application Area. Existing cleared tracks will be used to cross Weeli Wolli Creek. There are also multiple unnamed non-perennial drainage lines that flow predominately to the north east across the Application Area before joining Weeli Wolli Creek. Where practicable, existing cleared tracks will be used to cross the unnamed non-perennial minor drainage line. If it is necessary for new crossings to be installed, clearing will be kept to a bare minimum and will be constructed flat level to the surface (i.e. a simple clearing with no bunds) to maintain the natural surface flow.	Not at variance with clearing principle.

Principle	Criteria	Assessment	Outcome
	f3) Native vegetation should not be cleared if water tables are likely to change and adversely affect ecological communities that are wetland or groundwater dependent.	Due to the small scale of clearing this project is not considered likely to adversely alter water tables, and as such will not impact on any ecological communities that are wetland or groundwater dependent.	Not at variance with clearing principle.
	f4) Native vegetation should not be cleared if it is growing in other watercourses or wetlands.	No permanent watercourses or wetlands are located within with the Application Area or in association with any other immediate watercourses or wetland in the surrounding area.	Not at variance with clearing principle.

6.7 PRINCIPLE G

Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation

This proposal is not likely to be at variance to this Principle.

Land degradation may include impacts such as erosion, changes to pH, water logging, salinisation or spread of weeds. These potential impacts are assessed in the sections below. **Table 12** provides an assessment of the proposed clearing activities within the Application Area against the components of clearing Principle G.

Given the relatively small amount of clearing required for the project, the proposed management strategies for weed species within the Application Area and the low susceptibility of the soils to erosion, it is considered that the project will not be at variance to Principle G.

6.7.1 Erosion

It is not anticipated that the removal of vegetation will contribute to increased amounts of wind or water erosion in the Application Area or adjacent areas.

6.7.2 Changes to pH

The Application Area is not in an area at risk of acid sulphate soils and there are no recorded acid sulphate soils within the Application Area. It is not expected that the proposed clearing will result in changes to soil pH.

6.7.3 Water logging and salinisation

It is not expected that there will be a significant reduction in groundwater uptake due to the proposed clearing. No water logging or increased salinisation is expected to occur as a result of the proposed clearing.

6.7.4 Weeds

Seven introduced flora species have been recorded in the Application Area (**Table 4**). None are listed as a Declared Pest under the BAM Act. These are typical introduced species commonly recorded in the Pilbara region.

Control of established weed populations will be carried out according to the *BHP Weed Control and Management Procedure*.

Table 12 Assessment against Principle G components

Principle	Criteria	Assessment	Outcome
g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	g1) Native vegetation should not be cleared if wind or water erosion of soil is likely to be increased (on or off site).	Soil erosion is not anticipated to occur as any areas cleared will be revegetated where practicable, if not required for infrastructure.	Not considered to be at variance with clearing principle.
	g2) Native vegetation on land with soils with high or low pH should not be cleared.	The Application Area is not considered to contain soils at risk of having acid sulphate soils present. No vegetation on soils with significantly low (or high) pH will be impacted by the proposed works.	Not at variance with clearing principle.
	g3) Native vegetation should not be cleared if water logging is likely to be increased (on or off site).	It is not expected that water logging would be increased by the clearing of native vegetation within the Application Area.	Not at variance with clearing principle.
	g4) Native vegetation should not be cleared if land salinisation is likely to be increased (on or off site).	Soil salinity is not considered to be increased in the Application Area (on or off site) by the clearing of native vegetation.	Not at variance with clearing principle.

6.8 PRINCIPLE H

Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area

This proposal is not likely to be at variance to this Principle.

The Application Area is not within any conservation areas as listed by the DBCA or those protected under the EPBC Act. The closest conservation area is Karijini National Park which is more than 45 km west of the Application Area.

The Application Area is not considered to form an ecological linkage to these conservation areas.

An assessment of the proposed clearing activities within the Application Area against the components of clearing Principle H is provided in **Table 13** below.

Table 13 Assessment against Principle H components

Principle	Criteria	Assessment	Outcome
h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	h1) Native vegetation should not be cleared if it contributes significantly to the environmental values of a conservation area.	The vegetation of the Application Area does not contribute to the environmental values of a conservation area.	Not at variance with clearing principle.
	h2) Native vegetation should not be cleared if that vegetation provides a buffer to a conservation area.	There are no conservation areas within the vicinity of the Application Area.	Not at variance with clearing principle.
	h3) Native vegetation should not be cleared if the land contributes to an ecological linkage to a conservation area.	The nearest conservation area is 45 km west of the Application Area.	Not at variance with clearing principle.
	h4) Native vegetation should not be cleared if it provides habitats not well represented on conservation land.	There are no habitats within the Application Area that are not well represented on conservation land.	Not at variance with clearing principle.

6.9 PRINCIPLE I

Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water

This proposal is not likely to be at variance to this Principle.

Appropriate surface water management practices will be implemented to minimise erosion and minimise potential impacts on the quality of surface water. The clearing is unlikely to cause deterioration in the quality of any surface or underground water.

Existing cleared tracks will be used to cross Weeli Wolli Creek.

Where practicable, existing cleared tracks will be used to cross the unnamed non-perennial minor drainage line. If it is necessary for new crossings to be installed, clearing will be kept to a bare minimum and will be constructed flat level to the surface (i.e. a simple clearing with no bunds) to maintain the natural surface flow.

Table 14 provides an assessment of the proposed clearing activities within the Application Area against the components of clearing Principle I.

Table 14 Assessment against Principle I components

Principle	Criteria	Assessment	Outcome
i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	i1) Native vegetation should not be cleared if clearing the vegetation will reduce the quality of surface or underground water in proclaimed, gazetted or declared areas or catchments.	The clearing of native vegetation is not considered likely to alter the quality of surface or ground water within the Application Area due to the limited nature of the clearing within the Application Area.	Not at variance with clearing principle.
	i2) Native vegetation should not be cleared if sedimentation, erosion, turbidity or eutrophication of water bodies on or off site is likely to be caused or increased.	Localised erosion will not impact any waterbodies as clearing will be restricted to a bare minimum near surface water features and cleared areas that are no longer required will be revegetated.	Not at variance with clearing principle.
	i3) Native vegetation should not be cleared if water tables are likely to change significantly altering salinity or pH.	The clearing of native vegetation is not considered likely to alter the quality of surface or ground water within the Application Area.	Not at variance with clearing principle.
	i4) Native vegetation should not be cleared if the clearing is likely to alter the water regimes of groundwater-dependent ecosystems on or off site, causing degradation to the biological communities associated with these systems.	The clearing of native vegetation is not considered likely to alter the regimes of surface or groundwater dependent vegetation within the vicinity of the Application Area.	Not at variance with clearing principle.

6.10 PRINCIPLE J

Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding

This proposal is not likely to be at variance to this Principle.

Massive surface water runoff and localised flooding occurs following intense rainfall events during December to April. However, the incidence or intensity of flooding is not likely to be significantly influenced by the proposed vegetation clearing. It is highly improbable that surface runoff generated from the cleared area could create sufficient concentrated water volumes to cause even a localised flood event. Drainage infrastructure will be designed to ensure that post-construction flows will not differ significantly from pre-construction flows. Therefore the proposed clearing is unlikely to cause or exacerbate the incidence or intensity of flooding.

Table 15 provides an assessment of the proposed clearing activities within the Application Area against the components of clearing Principle J.

Table 15 Assessment against Principle J components

Principle	Criteria	Assessment	Outcome
j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.	j1) Native vegetation should not be cleared if it is likely to lead to an incremental increase in peak flood height.	The clearing of native vegetation is not considered likely to cause any alteration to peak flood height.	Not at variance with clearing principle.
	j2) Native vegetation should not be cleared if it is likely to lead to an incremental increase in duration of flood peak.	The clearing of native vegetation is not considered likely to cause any impact on duration of flood peak.	Not at variance with clearing principle.

7 HERITAGE

The Land Access Unit is the internal group within BHP that manages Aboriginal heritage matters. The Land Access Unit is responsible for ensuring that BHP complies with the *Aboriginal Heritage Act*, *1972*, and all other state and federal heritage legislation. All land disturbance activities are subject to ethnographic and archaeological surveys as part of an internal PEAHR. The PEAHR process ensures that all heritage sites in the vicinity of the Project Area are identified and avoided where practicable.

The Application Area is located within the Nyiyaparli People Native Title Claim (WC2005/006) and the Banjima People Native Title Claim (WC2011/006). Ethnographic and archaeological surveys of the Application Area have been conducted in consultation with the Banjima and Nyiyaparli people. A number of heritage sites were identified within the Application Area (site details are not provided here out of respect of the wishes of the Traditional Owners).

If any heritage site cannot practicably be avoided, BHP Iron Ore would consult the relevant traditional owners and seek approval under the *Aboriginal Heritage Act 1972* before the site is disturbed.

8 CONCLUSION

The proposed clearing of up to 500 ha within the 10,907.17 ha Application Area is unlikely to have any significant negative impacts on biodiversity and environmental values in the area and is therefore unlikely to be at variance to any of the Ten Clearing Principles.

9 REFERENCES

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Figures

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ENVIRONMENTAL APPROVALS

N

MARILLANA EXPLORATION

REGIONAL OVERVIEW

SCALE (A3): 1:65,000	DATUM: GDA2020/MGA 50	**FIGURE 1**
Prepared: Chris Hopkins	Revision: FINAL	
Centre: Perth	Date: 08 April 2024	Dwg: EXP_029NVCP_001_RevA_0

0 1 2 3 4
Kilometers

PORT HEDLAND

716000 718000 720000 722000 724000 726000 728000 730000 732000 734000 736000 738000 740000

7502000 7500000 7498000 7496000 7494000 7492000 7490000 7488000 7486000

Legend

Marillana Proposed NVCP Boundary

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ENVIRONMENTAL APPROVALS

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MARILLANA EXPLORATION

VEGETATION ASSOCIATIONS

SCALE (A3): 1:65,000	DATUM: GDA2020/MGA 50	**FIGURE 2**
Prepared: Chris Hopkins	Revision: FINAL	
Centre: Perth	Date: 08 April 2024	Dwg: EXP_029NVCP_002_RevA_0

0 1 2 3 4
Kilometers

716000 718000 720000 722000 724000 726000 728000 730000 732000 734000 736000 738000 740000

7502000 7500000 7498000 7496000 7494000 7492000 7490000 7488000 7486000

Legend

Marillana Proposed NVCP Boundary

Vegetation Associations

- *Cenchrus Open Tussock Grassland (GP CcCs AaApr AsyAa)
- *Cenchrus Tussock Grassland (MA CcCs EvAciAthe)
- Acacia High Shrubland (MA AtpApypAse Ecr ThmbTtCyp)
- Acacia High Shrubland (MI AtpPlAm TpTs Ch Ell)
- Acacia Low Open Forest (SA Aa TpTwTb CcChf)
- Acacia Low Open Woodland (FP AaAciApr AsyAssAb Tp)
- Acacia Low Woodland (FP ApAaApr AsyErffPto CcAriArc)
- Acacia Open Scrub (MI AtpGrwhApyp TpTb CcCs)
- Eucalyptus Low Open Forest (MA EcrEvEx ApypAtpGoro TtEuaCyp)
- Triodia Hummock Grassland (FS Ts CdHc AancAiGrwh)
- Triodia Hummock Grassland (HC TwTbrTp EllCh AmaGrwhAb)
- Triodia Hummock Grassland (HS TsTwTp EllCh AhiAaa)
- Triodia Hummock Grassland (SD TscTb Ad CoteCrcSica)
- Triodia Hummock Grassland (SP TbTp HlAancAi Ch)
- Disturbed

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MARILLANA EXPLORATION

SIGNIFCANT FLORA

SCALE (A3): 1:65,000	DATUM: GDA2020/MGA 50	FIGURE 3
Prepared: Chris Hopkins	Revision: FINAL	
Centre: Perth	Date: 08 April 2024	Dwg: EXP_029NVCP_003_RevA_0

0 1 2 3 4
Kilometers

716000 718000 720000 722000 724000 726000 728000 730000 732000 734000 736000 738000 740000

7502000 7500000 7498000 7496000 7494000 7492000 7490000 7488000 7486000

Legend

Marillana Proposed NVCP Boundary

Significant Flora

- Eremophila magnifica subsp. magnifica (DBCA Priority 4)
- Synostemon hamersleyensis (BC Act Threatened)

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ENVIRONMENTAL APPROVALS

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MARILLANA EXPLORATION

FAUNA HABITAT

SCALE (A3): 1:65,000	DATUM: GDA2020/MGA 50	**FIGURE 4**
Prepared: Chris Hopkins	Revision: FINAL	
Centre: Perth	Date: 08 April 2024	Dwg: EXP_029NVCP_004_RevA_0

0 1 2 3 4
Kilometers

716000 718000 720000 722000 724000 726000 728000 730000 732000 734000 736000 738000 740000

7502000 7500000 7498000 7496000 7494000 7492000 7490000 7488000 7486000

Legend

- Marillana Proposed NVCP Boundary
- Waterhole
- Cave

Fauna Habitat

- Drainage Area/ Floodplain
- Minor Drainage Line
- Major Drainage Line
- Mulga Woodland
- Sand Plain
- Stony Plain
- Hillcrest/ Hillslope
- Gorge/ Gully
- Cleared/ Disturbed

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ENVIRONMENTAL APPROVALS

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MARILLANA EXPLORATION
SIGNIFICANT FAUNA WITHIN AND CLIPPED FROM THE APPLICATION AREA

SCALE (A3): 1:65,000	DATUM: GDA2020/MGA 50	FIGURE 5
Prepared: Chris Hopkins	Revision: FINAL	
Centre: Perth	Date: 09 April 2024	Dwg: EXP_029NVCP_005_RevA_0

0 1 2 3 4
Kilometers

716000 718000 720000 722000 724000 726000 728000 730000 732000 734000 736000 738000 740000

7502000 7500000 7498000 7496000 7494000 7492000 7490000 7488000 7486000

Legend

Marillana Proposed NVCP Boundary

Significant Fauna Records Clipped from the Application Area

- Dasyurus hallucatus (Northern Quoll) (EPBC Act and BC Act Endangered)
- Falco peregrinus (Peregrine Falcon) (BC Act Other Specially Protected Fauna)
- Liasis olivaceus subsp. barroni (Pilbara Olive Python) (EPBC Act and BC Act Vulnerable)
- Macroderma gigas (Ghost Bat) (EPBC Act and BC Act Vulnerable)

Significant Fauna Records within the Application Area

- Anilios ganei (Pilbara Flat-headed Blind-snake) (DBCA Priority 1)
- Apus pacificus (Fork-tailed Swift) (EPBC Act Migratory)
- Falco peregrinus (Peregrine Falcon) (BC Act Other Specially Protected Fauna)
- Liasis olivaceus subsp. barroni (Pilbara Olive Python) (EPBC Act and BC Act Vulnerable)
- Pseudomys chapmani (Western Pebble-mound Mouse) (DBCA Priority 4)

Appendices

Appendix 1: *Marillana Tenement Targeted Flora Survey* (Onshore Environmental, 2016)

Appendix 2: ***Consolidation of Regional Vegetation Mapping BHP Billiton Iron Ore Pilbara Tenure*** **(Onshore Environmental, 2014)**

Appendix 3: ***Marillana ML70/270 Flora and Vegetation Survey Assessment*** **(Onshore Environmental, 2013)**

Appendix 4: ***Marillana Tenement and Infrastructure Corridor Targeted Vertebrate Fauna Survey*** **(Biologic, 2019)**

Appendix 5: *Consolidated Fauna Habitat Mapping* (Biologic, 2017)