

Application to Amend NVCP CPS 4875/3 Wheelarra Hill North

**Native Vegetation Clearing Permit Amendment
Application Supporting Document**

July 2022



Table of Contents

1	INTRODUCTION	1
1.1	LOCATION	1
1.2	TENURE.....	1
1.3	LOCAL GOVERNMENT JURISDICTION.....	1
1.4	PROJECT DESCRIPTION.....	1
1.5	PROJECT CHARACTERISTICS AND COMMITMENTS	1
1.6	NVCP RECORDS.....	1
2	ASSOCIATED APPROVALS	2
3	EXISTING ENVIRONMENT	3
3.1	CLIMATE	3
3.2	BIOREGION, LANDFORMS AND LAND SYSTEMS	3
3.3	GEOLOGY AND SOILS.....	3
3.4	FLORA, VEGETATION AND FAUNA	4
3.4.1	Vegetation Communities	4
3.4.2	Significant Flora	7
3.4.3	Weeds.....	8
3.4.4	Fauna Habitats and Significant Fauna.....	8
3.5	GROUNDWATER.....	15
3.6	SURFACE WATER.....	15
4	ENVIRONMENTAL MANAGEMENT	15
5	PROJECT COMPLIANCE WITH THE TEN CLEARING PRINCIPLES	15
6	ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES.....	16
6.1	PRINCIPLE A	16
6.2	PRINCIPLE B	18
6.3	PRINCIPLE C	21
6.4	PRINCIPLE D	23
6.5	PRINCIPLE E	25
6.6	PRINCIPLE F	27
6.7	PRINCIPLE G	29
6.7.1	Erosion.....	29
6.7.2	Changes to pH	29
6.7.3	Water logging and salinisation.....	29
6.7.4	Weeds.....	29
6.8	PRINCIPLE H	31
6.9	PRINCIPLE I.....	33
6.10	PRINCIPLE J	35
7	HERITAGE	37
8	CONCLUSION.....	37
9	REFERENCES	38

Tables

Table 1	Project Characteristics and Commitments.....	1
Table 2	Pre European extent of vegetation associations occurring within the Amendment Application Area (Shepherd <i>et al.</i> , 2001).....	4
Table 3	Vegetation associations of the Amendment Application Area (Onshore 2014)	5
Table 4	Conditioned Species to be Removed from Condition 7 of CPS 4875/3.....	8
Table 5	Introduced Flora of the Amendment Application Area.....	8
Table 6	Conservation Significant Fauna Potentially Occurring within the Amendment Application Area.....	11
Table 7	Assessment against Principle A components	17
Table 8	Assessment against Principle B components	19
Table 9	Assessment against Principle C components.....	22
Table 10	Assessment against Principle D components.....	24
Table 11	Assessment against Principle E components	26
Table 12	Assessment against Principle F components	28
Table 12	Assessment against Principle G components.....	30
Table 14	Assessment against Principle H components.....	32
Table 15	Assessment against Principle I components.....	34
Table 16	Assessment against Principle J components.....	36

Figures

Figure 1	CPS 4875/3 Renewal – Regional Overview.....	41
Figure 2	CPS 4875/3 Renewal – Vegetation Associations and Significant Flora	42
Figure 3	CPS 4875/3 Renewal – Fauna Habitat and Significant Fauna.....	42

Appendices

Appendix 1:	Consolidation of Regional Vegetation Mapping BHP Billiton Iron Ore Pilbara Tenure (Onshore Environmental, 2014a)
Appendix 2:	Wheelarra Hill North Level 2 Flora and Vegetation Assessment (Syrinx Environmental PI, 2012)
Appendix 3:	Orebody 31 - Targeted Significant Flora Survey June 2014 (Onshore Environmental, 2014b)
Appendix 4:	Targeted Survey for <i>Acacia</i> sp. East Fortescue (surrounding OB31) (Onshore Environmental, 2015)
Appendix 5:	BHP WAIO Jimblebar <i>Eremophila capricornica</i> Targeted Flora Survey (Biologic, 2021)
Appendix 6:	Consolidated Fauna Habitat Mapping 2017 (Biologic Environmental Survey, 2017)

1 INTRODUCTION

BHP Iron Ore Pty Ltd (BHP) currently holds Native Vegetation Clearing Permit (NVCP) CPS 4875/3 for the purposes of mineral exploration, haul roads, hydrological and geotechnical investigations and associated activities. (Figure 1). The clearing period of this permit expires on 30 November 2022.

The full extent of these works is yet to be undertaken and therefore BHP therefore seeking to:

- Extend the permit duration to 30 November 2037; and
- Extend the clearing period to 30 November 2032
- Extend the final reporting date to 30 November 2037.

BHP is also seeking to:

- Update the Permit Holder to BHP Iron Ore Pty Ltd.; and
- Update flora species listed under Condition 7.

No other changes to the permit are required.

In accordance with Part V Division 2 of the *Environmental Protection Act 1986* (EP Act), BHP hereby refers the application to amend NVCP CPS 4875/3 to the Department of Mines, Industry Regulation and Safety (DMIRS).

BHP considers that the proposed amendment 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 Amendment Application Area is located approximately 40 km east of Newman in the Pilbara region of Western Australia (**Figure 1**).

1.2 TENURE

The Amendment Application Area is located on State Agreement Mining Lease 244SA (M244SA).

1.3 LOCAL GOVERNMENT JURISDICTION

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

1.4 PROJECT DESCRIPTION

The proposed works will involve mineral exploration, haul roads, hydrological and geotechnical investigations and associated activities.

1.5 PROJECT CHARACTERISTICS AND COMMITMENTS

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

1.6 NVCP RECORDS

BHP reports on each NVCP in accordance with the permit reporting conditions. For a majority of BHP reports on each NVCP in accordance with the permit reporting conditions. For a majority of NVCPs this is incorporated into BHP Iron Ore's Annual Environmental Report (AER) which is submitted to government prior to the 01 October each year.

Clearing commenced in 2012 with a total of 34.78 ha cleared to date with 9.22 ha rehabilitated (BHP, 2021). The remaining locations cleared are still required for the purpose for which they were cleared. No further clearing or rehabilitation has occurred since the reporting in BHP Iron Ore's FY21 AER.

Clearing has been minimised by restricting activities to the minimal required for safety and equipment access. Populations of significant flora have been avoided using the BHP Project Environmental and Heritage Review (PEAHR) procedure. This internal BHP procedure authorises ground disturbing activities and locations of priority flora have been clipped from the PEAHR boundary to prevent disturbance within 10 m of these populations.

No environmental offsets are required for this NVCP.

Table 1 Project Characteristics and Commitments

Permit Characteristics	
Authorising Agency	DMIRS
Permit Title	Mesa Gap Exploration Project
Area to be cleared	302 hectares
Amendment Application Area	2,700 hectares
Purpose of the permit	Clearing for the purposes of mineral exploration, haul roads, hydrological and geotechnical investigations and associated activities
Tenure	Mineral Lease M244SA.
Clearing Duration	Until 30 November 2022
Permit Duration	Until 30 November 2037
Proposed Annual Reporting Date	01 October for the previous Financial Year
Proposed Final Reporting Date	30 November 2037
Application boundary	Map Reference: <ul style="list-style-type: none"> EXP_017NVCP_001_RevA_0 EXP_017NVCP_002_RevA_0 EXP_017NVCP_003_RevA_0 BHP Shapefile 1 Doc Reference: http://io1doc/webtop/drl/objectId/0b03c41a83fe4741
Application Commitments	Section
Populations of Priority flora will be avoided by a 10 m buffer where practicable.	3.4.2 6.1
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
In the event that active Mulgara burrows are identified they will be avoided using a 10 m buffer, where practicable.	3.4.4 6.2
Active mounds of the Western Pebble-mound Mouse will be avoided using a 10 m buffer, where practicable.	3.4.4 6.2
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

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 Amendment Application Area. Average annual rainfall at Newman Aero is 324.4.6 mm (BOM, 2022a). This is mainly derived from tropical storms and cyclones during summer, producing sporadic, heavy rains over the area. Mean monthly rainfall varies from 3.5 mm in September to 72.3 mm in February (BoM, 2022a). Daily rainfall is highly variable; the highest maximum daily rainfall ranges from 34.8 mm in October, to 305.6 mm in February (BoM, 2022a). The mean maximum temperature in summer months (October to March) is 35.2°C to 39.3°C, and mean maximum temperature in winter (April to September) is between 23.1°C and 32.2°C (BoM, 2022a).

Wittenoom meteorological site (005026) is the closest station to the Amendment Application Area that records daily evaporation. Wittenoom is located approximately 200 km north west of the Amendment Application Area. Mean daily evaporation at Wittenoom throughout the year is 8.6 mm/day (BoM, 2018b), 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, 2022b).

3.2 BIOREGION, LANDFORMS AND LAND SYSTEMS

The Amendment Application Area is situated in the following biogeographic subregions:

- Fortescue subregion (PIL2) of the Pilbara region described as: *"Alluvial plains and river frontage. Extensive salt marsh, mulga-bunch grass, and short grass communities on alluvial plains in the east. Deeply incised gorge systems in the western (lower) part of the drainage. River gum woodlands fringe the drainage lines. Northern limit of Mulga (Acacia aneura). An extensive calcrete aquifer (originating within a palaeo-drainage valley) feeds numerous permanent springs in the central Fortescue, supporting large permanent wetlands with extensive stands of river gum and cadjeput Melaleuca woodlands. Climatic conditions are semi desert tropical, with average rainfall of 300 mm, falling mainly in summer cyclonic events. Drainage occurs to the north-west. Subregional area is 2,041,914ha."* (Kendrick, 2001a).
- 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 Amendment Application Area is also located in the following land systems, as mapped by van Vreeswyk et al. (2004):

Boolgeeda: Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands and mulga shrublands.

Newman: Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands

These Land Systems are well represented in the Pilbara covering between 2.3% to 8.0% of the Pilbara bioregion.

3.3 GEOLOGY AND SOILS

The Australian Soil Resource Information System (ASRIS) provides soil and land resource information across Australia. The following soil types occur within the Amendment 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, Dr2.32) soils on the limited areas of dissected pediments, while (Um5.52) and (Uf6.71) soils occur on the valley plains; and

Mz25 Plains associated with the Fortescue valley; there is a surface cover of stony gravels close to the ranges and hills: chief soils are acid red earths (Gn2.11) with some neutral red earths (Gn2.12); red-brown hardpan is absent. Associated are areas of calcareous earths (Gc) and loams (Um1) on calcrete (kunkar) and some hard red (Dr) soils around creek lines.

3.4 FLORA, VEGETATION AND FAUNA

A total of 30 flora and vegetation surveys have previously been completed within and adjacent (within 2 km) the proposed Amendment Application Area. The key flora and vegetation surveys relevant to this application are:

- Consolidation of Regional Vegetation Mapping BHP Billiton Iron Ore Pilbara Tenure (Onshore Environmental, 2014a) (**Appendix 1**).
- Wheelarra Hill North Level 2 Flora and Vegetation Assessment (Syrinx Environmental PI, 2012) (**Appendix 2**);
- Orebody 31 - Targeted Significant Flora Survey June 2014 (Onshore Environmental, 2014b) (**Appendix 3**);
- Targeted Survey for *Acacia* sp. East Fortescue (surrounding OB31) (Onshore Environmental, 2015) (**Appendix 4**); and
- BHP WAO Jimblebar *Eremophila capricornica* Targeted Flora Survey (Biologic, 2021) (**Appendix 5**).

A total of 42 vertebrate fauna surveys have been completed within and adjacent (within 10 km) of the Amendment Application Area. The key vertebrate fauna surveys relevant to this application are:

- Consolidated Fauna Habitat Mapping (Biologic Environmental Survey, 2017) (**Appendix 6**).
- Wheelarra Hill North Fauna Assessment (ENV Australia, 2011);
- North Jimblebar Vertebrate Fauna Survey (GHD, 2019); and
- Jimblebar Targeted Ghost Bat Survey (GHD, 2020).

3.4.1 Vegetation Communities

The Amendment Application Area is located within the Interim Biogeographic Regionalisation for Australia (IBRA) Pilbara Bioregion (Department of Environment and Heritage, 2005). According to the Government of Western Australia (2013), the bioregion is 99.9% vegetated (**Table 2**).

The vegetation within the Amendment Application Area is classified as the following vegetation associations, as mapped by Beard (1975):

82	Hummock grasslands, low tree steppe; snappy gum over <i>Triodia wiseana</i>
216	Low woodland; mulga (with spinifex) on rises.

There is more than 98% of the pre-European vegetation remaining of these vegetation associations (**Table 2**).

The Amendment 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 Amendment Application Area (Shepherd *et al.*, 2001)

Vegetation Sub-Association	Pre-European Extent (ha)	Current Extent (ha)	% Remaining	Pre-European % in IUCN Class I-IV Reserves
Pilbara IBRA Bioregion	17,808,657.06	17,733,583	99.58	6.34
Vegetation Association 82 within Western Australia	2,565,901	2,553,217	99.51	10.25
Vegetation Association 82 within the Pilbara Bioregion	2,563,583	2,550,898	99.51	10.26
Vegetation Association 216 within Western Australia	280,759	279,237	99.6	0.00
Vegetation Association 216 within the Pilbara Bioregion	26,669	26,372	98.89	0.0

A total of 10 broad floristic formations with 28 vegetation associations have been described and mapped within the Amendment Application Area (**Figure 2 and Error! Not a valid bookmark self-reference.**).

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

Broad Floristic Formation		Vegetation Association Description
Acacia High Shrubland	FP AaAssAanc Tp	High Shrubland of <i>Acacia aptaneura</i> , <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> and <i>Acacia ancistrocarpa</i> over Very Open Hummock Grassland of <i>Triodia pungens</i> on red brown sandy loam on floodplains and medium drainage lines.
Acacia Low Open Forest	HS AcaoAaApr ScaErlAb TbrTw	Low Open Forest of <i>Acacia catenulata</i> subsp. <i>occidentalis</i> , <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i> over Open Shrubland of <i>Scaevola acacioides</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Acacia bivenosa</i> over Open Hummock Grassland of <i>Triodia brizoides</i> and <i>Triodia wiseana</i> on red brown clay loam on breakaway scree slopes and steep hill slopes.
	MI AaApEII AwAteAb TpTs	Low Open Forest of <i>Acacia aptaneura</i> , <i>Acacia paraneura</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Open Scrub of <i>Acacia wanyu</i> , <i>Acacia tetragonophylla</i> and <i>Acacia bivenosa</i> over Open Hummock Grassland of <i>Triodia pungens</i> and <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) on brown loam on minor drainage lines through undulating ironstone ridges, hills and valleys.
Acacia Low Open Woodland	ME EvAci AmApy	Low Open Woodland of <i>Eucalyptus victrix</i> and <i>Acacia citrinoviridis</i> over High Open Shrubland of <i>Acacia monticola</i> and <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> on brown loamy sand on medium drainage lines
Acacia Low Woodland	FP AaAprAcao ErffDopeSie ArcDiaAri	Low Woodland of <i>Acacia aptanerua</i> , <i>Acacia pruinocarpa</i> and <i>Acacia catenulata</i> subsp. <i>occidentalis</i> over Open Shrubland of <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Dodonaea petiolaris</i> and <i>Sida ectogama</i> over Open Tussock Grassland of <i>Aristida contorta</i> , <i>Digitaria ammophila</i> and <i>Aristida inaequiglumis</i> on red orange clay loam on floodplains.
	FP AciChAa AancApyPI TtAriCc	Low Woodland of <i>Acacia citrinoviridis</i> , <i>Corymbia hamersleyana</i> and <i>Acacia aptanerua</i> over High Shrubland of <i>Acacia ancistrocarpa</i> , <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> and <i>Petalostylis labicheoides</i> over Very Open Tussock Grassland of <i>Themeda triandra</i> , <i>Aristida inaequiglumis</i> and <i>*Cenchrus ciliaris</i> on brown sandy loam on floodplains and medium drainage lines
Acacia Open Scrub	MI AtpPIAm TpTs ChEII	Open Scrub of <i>Acacia tumida</i> var. <i>pilbarensis</i> , <i>Petalostylis labicheoides</i> and <i>Acacia monticola</i> over Open Hummock Grassland of <i>Triodia pungens</i> and <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Woodland of <i>Corymbia hamersleyana</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> on red brown sandy loam on minor drainage lines.
Corymbia Low Open Woodland	SP ChEoCd AancApaAad s TbTscTs	Low Open Woodland of <i>Corymbia hamersleyana</i> , <i>Eucalyptus odontocarpa</i> and <i>Corymbia deserticola</i> subsp. <i>deserticola</i> over Open Shrubland of <i>Acacia ancistrocarpa</i> , <i>Acacia pachyacra</i> and <i>Acacia adsurgens</i> over Open Hummock Grassland of <i>Triodia basedowii</i> , <i>Triodia schinzii</i> and <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) on red brown sandy loam on footslopes and stony plains.
Eragrostis Tussock Grassland	FP ErerPamuAr c ChHICa AmeSeao	Tussock Grassland of <i>Eragrostis eriopoda</i> , <i>Paraneurachne muelleri</i> and <i>Aristida contorta</i> with Low Open Woodland of <i>Corymbia hamersleyana</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> and <i>Corymbia aspera</i> and Open Shrubland of <i>Acacia melleodora</i> and <i>Senna artemisioides</i> subsp. <i>oligophylla</i> on orange sandy loam on floodplains.
Eucalyptus Low Woodland	ME TtEuaEte ApyAtpPI EvCh	Tussock Grassland of <i>Themeda triandra</i> , <i>Eulalia aurea</i> and <i>Eriachne tenuiculmis</i> with High Shrubland of <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> , <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Petalostylis labicheoides</i> and Open Woodland of <i>Eucalyptus victrix</i> and <i>Corymbia hamersleyana</i> on red brown silty loam on medium drainage lines and flood plains.
Triodia Hummock Grassland	CP TwTa Ese AbPIApy	Hummock Grassland of <i>Triodia wiseana</i> and <i>Triodia angusta</i> with Open Mallee of <i>Eucalyptus socialis</i> subsp. <i>eucentrica</i> and Open Shrubland of <i>Acacia bivenosa</i> , <i>Petalostylis labicheoides</i> and <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> on light brown clay loam on calcrete plains and rises.
	FP Tp ChApr GrwhApyA b	Hummock Grassland of <i>Triodia pungens</i> with Scattered Low Trees of <i>Corymbia hamersleyana</i> and <i>Acacia pruinocarpa</i> over Open Shrubland of <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> , <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> and <i>Acacia bivenosa</i> on brown loamy sand on floodplains

Broad Floristic Formation	Vegetation Association Description	
	FS Ts CdHc AancAiGrwh	Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Woodland of <i>Corymbia deserticola</i> subsp. <i>deserticola</i> and <i>Hakea chordophylla</i> over Open Shrubland of <i>Acacia ancistrocarpa</i> , <i>Acacia inaequilatera</i> and <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> on red brown sandy loam on footslopes and stony plains.
	GG Tp EIIcF Dop	Hummock Grassland of <i>Triodia pungens</i> with Low Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia ferritcola</i> over Open Shrubland of <i>Dodonaea pachyneura</i> on red brown sandy clay loam in gullies.
	HC TwTbrTp EIICh AmaGrwhAb	Hummock Grassland of <i>Triodia wiseana</i> , <i>Triodia brizoides</i> and <i>Triodia pungens</i> with Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> over High Open Shrubland of <i>Acacia maitlandii</i> , <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> and <i>Acacia bivenosa</i> on red brown sandy loam on hill crests and upper hill slopes.
	HS TsTbrTb EIIAa Ab	Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835), <i>Triodia brizoides</i> and <i>Triodia basedowii</i> with Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia aptaneura</i> over Open Shrubland of <i>Acacia bivenosa</i> on red loamy sand on hill slopes.
	HS TsTwTp EIICh AhiAaa	Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835), <i>Triodia wiseana</i> and <i>Triodia pungens</i> with Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> over Low Open Shrubland of <i>Acacia hilliana</i> and <i>Acacia adoxa</i> var. <i>adoxo</i> on red brown sandy loam on hill slopes.
	HS Tw EIIChHc AancAbAa	Hummock Grassland of <i>Triodia wiseana</i> with Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Corymbia hamersleyana</i> and <i>Hakea chordophylla</i> and Open Shrubland of <i>Acacia ancistrocarpa</i> , <i>Acacia bivenosa</i> and <i>Acacia aptaneura</i> on red sandy loam on hill slopes.
	MI TsTp AancAmGrw h	Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) and <i>Triodia pungens</i> with Shrubland of <i>Acacia ancistrocarpa</i> , <i>Acacia monticola</i> and <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> on brown sandy loam on minor drainage lines.
	SP Tb AtrHIGrwh AancSeaoSe ah	Hummock Grassland of <i>Triodia basedowii</i> with High Open Shrubland of <i>Acacia trudgeniana</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> and <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> and Open Shrubland of <i>Acacia ancistrocarpa</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> and <i>Senna artemisioides</i> subsp. <i>helmsii</i> on red brown loamy sand on stony plains.
	SP TbTp HIAancAi Ch	Hummock Grassland of <i>Triodia basedowii</i> and <i>Triodia pungens</i> with High Open Shrubland of <i>Hakea lorea</i> subsp. <i>lorea</i> , <i>Acacia ancistrocarpa</i> and <i>Acacia inaequilatera</i> and Scattered Low Trees of <i>Corymbia hamersleyana</i> on red brown loamy sand on stony plains.
SP TpTwTs ErfrSegpSea o	Hummock Grassland of <i>Triodia pungens</i> , <i>Triodia wiseana</i> and <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Open Shrubland of <i>Eremophila fraseri</i> , <i>Senna glutinosa</i> subsp. <i>pruinosa</i> and <i>Senna artemisioides</i> subsp. <i>oligophylla</i> on red brown loamy sand on stony plains and hill slopes.	
Triodia Open Hummock Grassland	GG Tp CfFibAcao DopAh	Open Hummock Grassland of <i>Triodia pungens</i> with Low Open Woodland of <i>Corymbia ferritcola</i> , <i>Ficus brachypoda</i> and <i>Acacia catenulata</i> subsp. <i>occidentalis</i> over High Open Shrubland of <i>Dodonea pachyneura</i> and <i>Acacia hamerselyensis</i> on red sandy clay loam in gullies.
	HS Tp AaApr ErfrAmarSeg I	Open Hummock Grassland of <i>Triodia pungens</i> with Low Open Woodland of <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i> over Open Shrubland of <i>Eremophila fraseri</i> , <i>Acacia marramamba</i> and <i>Senna glutinosa</i> subsp. x <i>luerssenii</i> on red brown loam on undulating hills
	HS TpTb EIIAaAcao SesSeglErcu	Open Hummock Grassland of <i>Triodia pungens</i> and <i>Triodia basedowii</i> with Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Acacia aptaneura</i> and <i>Acacia catenulata</i> subsp. <i>occidentalis</i> over Open Shrubland of <i>Senna stricta</i> , <i>Senna glutinosa</i> subsp. x <i>luerssenii</i> and <i>Eremophila cuneifolia</i> on orange sandy loam on hill slopes.
	HS TsTpTb AaAprAw AteEreErll	Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835), <i>Triodia pungens</i> and <i>Triodia basedowii</i> with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia pruinocarpa</i> and <i>Acacia wanyu</i> and Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Eremophila exilifolia</i> and <i>Eremophila latrobei</i> subsp.

Broad Floristic Formation	Vegetation Association Description
	<i>latrobei</i> on red sandy loam on hill slopes.
SP TbTs AaAprCh ErplAwAsy	Open Hummock Grassland of <i>Triodia basedowii</i> and <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia pruinocarpa</i> and <i>Corymbia hamersleyana</i> and High Open Shrubland of <i>Eremophila platycalyx</i> , <i>Acacia wanyu</i> and <i>Acacia synchronicia</i> on red brown sandy loam on stony rises, plains and footslopes.
SP TI AancApa ApAprCh	Open Hummock Grassland of <i>Triodia lanigera</i> with Open Shrubland of <i>Acacia ancistrocarpa</i> and <i>Acacia pachyacra</i> and Scattered Low Trees of <i>Acacia paraneura</i> , <i>Acacia pruinocarpa</i> and <i>Corymbia hamersleyana</i> on red sandy loam 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 vegetation consolidation project also identified one Threatened Ecological Community (TEC) and six Priority Ecological Communities (PECs) within the Project Area. None of the vegetation associations or landforms identified within the boundaries of CPS 4875/3 are associated with a TEC or PEC (Onshore Environmental, 2014). The closest PEC is more than 50km north west of CPS 4875/3.

The distinct mapped broad floristic communities and vegetation associations identified within CPS 4875/3 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 Amendment Application Area were affiliated with any TECs or PECs and there are no vegetation associations within the Amendment Application Area that would be likely to be included in any updates to TEC or PEC listings.

Vegetation condition within the Amendment Application Area ranges from excellent to completely degraded.

3.4.2 Significant Flora

No species listed under the *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) or gazetted as Threatened Flora species under the *Biodiversity Conservation Act, 2016* (BC Act) were identified within the Amendment Application Area.

One Priority Flora has been identified within the Amendment Application Area (**Figure 2**):

- *Triodia* sp. Mt Ella (M.E. Trudgen 12739) (Priority 3).

Populations of Priority flora will be avoided by a 10 m buffer where practicable.

CPS 4875/3 Condition 7 identifies four other flora species which have specific management measures which are no longer relevant to this permit (**Table 4**).

In addition to the broader flora and vegetation surveys, two targeted surveys for locally significant flora species (*Acacia corusca*, formally known as *Acacia* sp. East Fortescue and *Eremophila capricornica*) have included the Amendment Application Area. Neither *Acacia corusca* or *Eremophila capricornica* were found to occur in the Amendment Application Area (Onshore Environmental 2015, Biologic 2021).

Table 4 Conditioned Species to be Removed from Condition 7 of CPS 4875/3

Species Listed in CPS 4875/3	Priority	Recorded within the Amendment Application Area
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>	3	No
<i>Eragrostis olida</i>	Not listed	Yes
<i>Hibiscus</i> aff. <i>apodus</i>	Not listed	No
<i>Oldenlandia galioides</i>	Nomenclatural synonym for <i>Hedyotis galioides</i> Not listed	Yes

3.4.3 Weeds

Four introduced flora species (weeds) have been recorded within the Amendment Application Area (**Table 5**). Control of established weed populations will be carried out according to BHP's standard *Weed Control and Management Procedures*.

Table 5 Introduced Flora of the Amendment Application Area

Species	Common Name	DPAW Rating (DPAW, 2016)	Declared Pest ¹
* <i>Aerva javanica</i>	Kapok Bush	High and Rapid	No
* <i>Bidens bipinnata</i>	Bipinnate Beggartick	Unknown and Rapid	No
* <i>Cenchrus ciliaris</i>	Buffel Grass	High and Rapid	No
* <i>Rumex vesicarius</i>	Ruby Dock	High and Rapid	No

3.4.4 Fauna Habitats and Significant Fauna

Biologic (2014) and GHD (2019) identified the following six vertebrate fauna habitats within the Amendment Application Area (

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

Figure 3 CPS 4875/3 Renewal – Fauna Habitat and Significant Fauna

):

- **Drainage Area / Floodplain:** Characterised by *Eucalyptus xerothermica* and *Corymbia hamersleyana* woodland over broad-leaved *Acacia* shrubland on sandy loam soils sometimes with exposed rocky areas. These can have high vegetation density, complexity and diversity, and because they tend to occur on accretional or depositional areas, often have deeper and richer soils than other fauna habitats. Grasses tend to be dominated by tussock grasses rather than spinifex, or the weed Buffel Grass **Cenchrus ciliaris*.
- **Gorge / Gully:** Gorges and gullies are rugged, steep-sided valleys incised into the surrounding landscape. Gorges tend to be 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.
- **Hillcrest / Hill slope:** These fauna habitats tend to be more open and structurally simple due to their recent depositional history than other fauna habitats, and are dominated by varying species of spinifex. A common feature of these habitats is a rocky substrate, often with exposed bedrock, and skeletal red soils. These are usually dominated by *Eucalyptus* woodlands, *Acacia* and *Grevillea* scrublands and *Triodia* spp. low hummock grasslands.
- **Minor Drainage Line:** Located within the minor gullies and depressions, generally through the Crest/Slope habitat. Consists primarily of *Acacia* low shrubland. The understorey generally lacks density and often consists solely of sparse tussock grassland, often including the weed Buffel Grass **Cenchrus ciliaris* where it has been introduced. The substrate can be sandy in places but generally consists of a skeletal loam gravel or stone.
- **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:** These are erosional surfaces of gently undulating plains, ridges and associated footslopes. Mainly support hard spinifex (and occasionally soft spinifex) with a mantle of gravel and pebbles.

There are also five significant Ghost Bat caves, which have been clipped from the NVCP boundary with a 150m buffer. These caves were re-visited during the *Jimblebar Targeted Ghost Bat Survey* (GHD, 2020) and are the subject of ongoing ghost bat monitoring.

The Biologic (2014) *Consolidated Fauna Habitat Mapping BHP Billiton Iron Ore Pilbara Tenure (Appendix 2)* undertook a detailed review of all previous fauna surveys across BHP's Pilbara operations and the outputs from the Onshore Environmental (2014) Consolidation project. This review was supported by field visits where the analysis indicated that further information was required to confirm the fauna habitats.

The Project resolved the inconsistencies between previous mapping and created one consolidated regional Geographic Information System (GIS) database which:

- Serves as BHP's base line fauna habitat dataset.
- Maps and describes a total of 17 fauna habitats across BHP's Pilbara operations; and
- provides consistency in methods and nomenclature across BHP's Pilbara operations.

The fauna habitats identified within CPS 4875/3 extend beyond the project boundary and are common in the surrounding region.

The surveys undertaken across the Amendment Application Area have resulted in two fauna species of significance being recorded from within the Amendment Application Area (**Figure 3**):

- Ghost Bat (*Macroderma gigas*) (Vulnerable, EPBC Act; Vulnerable, BC Act); and
- Western Pebble-mound Mouse (*Pseudomys chapmani*) (Priority 4, DBCA).

Based on the occurrence of the habitat types and significant fauna species previously recorded in the vicinity (ENV Australia, 2011; Biologic 2014 and GHD, 2019), an additional nine species are considered to potentially occur within the Amendment Application Area (i.e. those considered 'likely' or 'possible' to occur within the Amendment Application Area):

- Brush-tailed mulgara (*Dasycercus blythi*) (DBCA Priority 4);
- Fork-tailed Swift (*Apus pacificus*) (Migratory, EPBC Act; Schedule 5, BC Act);

- Grey Falcon (*Falco hypoleucos*) (Vulnerable, BC Act);
- Long-tailed Dunnart (*Sminthopsis longicaudata*) (DBCA Priority 4);
- Peregrine Falcon (*Falco peregrinus*) (Other Specially Protected Fauna, BC Act);
- Pilbara Flat-headed Blind Snake (*Anilius ganei*) (DBCA Priority 1);
- Pilbara Olive Python (*Liasis olivaceus barroni*) (Vulnerable, EPBC Act; Vulnerable, BC Act);
- Rainbow Bee-eater (*Merops ornatus*) (EPBC Act Marine); and
- Spectacled Hare Wallaby (*Lagorchestes leichardti*) (DBCA Priority 4).

An assessment of the potential impact of the proposed clearing on the species of significant fauna that may occur in the application amendment area is provided in **Table 6**.

Table 6 Significant Fauna Potentially Occurring within the Amendment Application Area

Significant Species	Conservation Status	Distribution and Ecology	Habitat Relevance	Likelihood	Potential Impact on Species
Birds					
Fork-tailed Swift (<i>Apus pacificus</i>)	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 Amendment 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 Amendment Application Area.	Possible	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 (<i>Falco hypoleucos</i>)	Vulnerable (BC Act)	The Grey Falcon inhabits lightly timbered country, especially stony plains and lightly timbered <i>Acacia</i> scrub. This species is considered scarce to rare and is usually found singularly or sometimes in pairs (Morcombe, 2004).	The Grey Falcon may forage within the Minor Drainage Line, Drainage Area/ Floodplain, Stony and Sand Plain habitat within the Amendment Application Area. Closest record of this species is approximately 80 km north of the Amendment Application Area (GHD, 2019).	Likely	Low The Grey Falcon is highly mobile, has a wide range and prefers habitats that are widespread locally and in the surrounding region. Although suitable foraging habitat occurs within the Amendment Application Area, this species is more likely to be found within the nearby major drainage lines (e.g. Jimblebar Creek) and is not considered to be reliant on habitats within the Amendment Application Area. Potential impacts on this species is therefore considered to be low.
Perergrine Falcon (<i>Falco peregrinus</i>)	Other Specially Protected Fauna (BC Act)	The Preregrine Falcon is uncommon but wide-ranging across Australia. Habitat is extremely diverse, from rainforests to arid scrub, from coastal heath to alpine, and also occurs in urban environments and city scapes. The Peregrine Falcon nests primarily on ledges pf cliffs, shallow tree hollows, and ledges of buildings in cities (Morcombe, 2004)	The Peregrine Falcon may forage opportunistically within the hillcrest/ hillslope, gorge gully, minor drainage line and drainage area/ floodplain habitat types within the Amendment Application Area. No suitable breeding habitat is known from the Amendment Application Area. This species has been recorded within 10 km of the Amendment Application Area.	Likely	Low Given the availability of suitable foraging habitat in the local area and surrounding region and the wide ranging and highly mobile nature of the Peregrine Falcon (GHD, 2019), the potential impact to this species is considered to be low.

Significant Species	Conservation Status	Distribution and Ecology	Habitat Relevance	Likelihood	Potential Impact on Species
Rainbow Bee-eater (<i>Merops ornatus</i>)	Marine (EPBC Act)	The Rainbow Bee-eater is a common and widespread species in Western Australia, except in the drier interior of the State and the far south-west. It occurs in lightly wooded, often sandy country, preferring areas near water. The Rainbow Bee-eater feeds on airborne insects, and nests throughout its range in burrows excavated in sandy ground or banks, often at the margins of roads and tracks (Johnstone and Storr, 1998).	This species may forage over the Amendment Application Area however there is not suitable breeding habitat present.	Possible	Low This species is common and widespread in the Pilbara therefore the potential impact on this species is considered low. The Rainbow Bee-eater is not likely to be reliant on habitat within the Amendment Application Area as suitable breeding and foraging habitat is widespread in the Amendment Application Area surrounds.
Mammals					
Brush-tailed Mulgara (<i>Dasyurus blythi</i>)	Priority 4 (DBCAs) (only Brush-tailed Mulgara)	Brush-tailed mulgaras occur in a range of vegetation types, however, the principal habitat is mature hummock grasslands of spinifex, especially <i>Triodia basedowii</i> and <i>T. pungens</i> (Masters <i>et al.</i> , 2003). Note: Woolley, <i>et. al.</i> (2013) noted that the Crest-tailed Mulgara (<i>Dasyurus cristicauda</i>) is unlikely to occur within the Pilbara.	Sandplain habitats of the Amendment Application Area represent suitable habitat for this species. Sandplains are present within and adjacent to the Amendment Application Area. There are multiple records of the Brush-tailed Mulgara in the broader region.	Possible	Low No Mulgara have been recorded from the Amendment Application Area. An area of preferred habitat (sandplain) occurs within the Amendment Application Area. In addition large areas of Sandplain habitat occur outside of the Amendment Application Area and in the broader region (Biologic, 2014). In the event that active Mulgara burrows are identified they will be avoided using a 10 m buffer, where practicable.
Ghost Bat (<i>Macroderma gigas</i>)	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 <i>et al.</i> 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).	Five suitable caves for this species have been clipped from the Amendment Application Area with a 150m buffer. Given the presence of roosts, it is likely that Ghost Bats will forage over the Amendment Application Area.	Recorded	Low This species would forage across the Amendment Application Area and its surrounds. Suitable roosting habitat has been identified within the Amendment Application Area, with evidence of ghost bat presence found in two of the five caves. All five caves have been clipped from the Amendment Application Area with a 150 m buffer.

Significant Species	Conservation Status	Distribution and Ecology	Habitat Relevance	Likelihood	Potential Impact on Species
Long-tailed Dunnart (<i>Sminthopsis longicaudata</i>)	Priority 4 (DBCA)	The Long-tailed Dunnart occurs throughout the Gibson Desert, Murchison, southern Carnarvon Basin and the Pilbara in Western Australia. Its habitat includes rugged, rocky areas with hummock grasses, shrubs and tall open shrublands and woodlands (Van Dyck and Strahan, 2008).	The Hillcrest/ Hillslope, Gorge/ Gully, Minor Drainage Line and Stony Plain habitats of the Amendment Application Area are suitable for this species. This species has been recorded within 10 km of the Amendment Application Area	Likely	Low This species is unlikely to be reliant on habitats within the Amendment Application Area given extensive foraging habitat is present in the local area and surrounding region (GHD, 2019).
Spectacled Hare Wallaby (<i>Lagorchestes leichardti</i>)	Priority 4 (DBCA)	The Spectacles Hare Wallaby was once widely distributed across the lower latitudes of northern Australia from eastern Queensland, through northern Territory to the Pilbara and Kimberley in Western Australia, with a subspecies on Barrow Island. In the Pilbara region this species has declined drastically, possibly due to fox predation and because frequent burning of spinifex grasslands has prevented the development of the large hummocks required for shelter (Van Dyck and Strahan, 2008). They live in open woodlands, shrublands and hummock grasslands, sheltering under vegetation or in burrows during the day and searching for herb, grass and fruits at night.	This species may use the Sand Plain and Minor Drainage Line habitats within the Amendment Application Area. Nearest record of this species is within 10 km of the Application Amendment Area.	Likely	Low This species is unlikely to be reliant on habitats within the Amendment Application Area. Suitable, connected habitat is present in the surrounding area (GHD, 2019).
Western Pebble-mound mouse (<i>Pseudomys chapmani</i>)	Priority 4 (DBCA)	The Western Pebble-mound Mouse is restricted to the Pilbara region, where it is recognized 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).	The Stony Plain habitat of the Amendment Application Area is suitable for this species. This species has been recorded within the Amendment Application Area. Active mounds of the Western Pebble-mound Mouse will be avoided using a 10 m buffer, where practicable.	Recorded	Low There are large areas of suitable habitat adjacent to the Amendment Application Area. Active mounds of the Western Pebble-mound Mouse will be avoided using a 10 m buffer, where practicable.

Significant Species	Conservation Status	Distribution and Ecology	Habitat Relevance	Likelihood	Potential Impact on Species
Reptiles					
Pilbara Flat-headed Blind Snake (<i>Anilius ganei</i>)	Priority 1 (DBCAs)	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, 2017)	Within the Amendment Application Area, potential habitat for this species exists within the rocky features associated with the Hillcrest/ Hillslope habitat type. This species has been recorded approximately 20 km north west of the Application Amendment Area.	Likely	Low No Pilbara Flat-headed Blind Snakes have been recorded from the Amendment Application Area. Hillcrest/ Hillslope habitat occurs within and extensively outside of the Amendment Application Area (GHD, 2019).
Pilbara Olive Python (<i>Liasis olivaceus barroni</i>)	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 and 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).	Within the Amendment Application Area, potential habitat for this species exists within the rocky features associated with the Hillcrest/ Hillslope and Gorge/ Gully habitat types. This species has been recorded approximately 20 km west of the Application Amendment Area.	Likely	Low Pilbara Olive Python may forage within the Hillcrest/ Hillslope and Gorge/ Gully habitats within the Amendment Application Area but are unlikely to be reliant on these habitats (GHD, 2019).

3.5 GROUNDWATER

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

Four unnamed non-perennial minor drainage line run south to north across the Amendment Application Area before feeding into the Jimblebar 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 Amendment 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 Amendment 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 Amendment Application Area is located outside the Amendment 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 Amendment Application Area.

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

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

Table 7 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 Amendment 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 Amendment 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 Amendment 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 Amendment 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 Amendment 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 were recorded in the Amendment Application Area. The records of identified Priority flora populations will be avoided using a 10 m buffer where practicable.	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 six broad fauna habitat types within the Amendment Application Area (**Figure 3**).

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

Two fauna species of significance have been recorded from within the Amendment Application Area with an additional nine species considered to potentially occur within the Amendment Application Area (**Table 6**). As described in **Section 3.4.4** and **Table 6** clearing of the Amendment Application Area is expected to have a low impact on these species.

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

Table 8 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.	One BC Act protected species has been recorded from the Amendment Application and four BC Act protected species are considered 'possible' or 'likely' to occur within the Amendment Application Area (Table 6). The proposed activities are unlikely to have a significant impact on these species as: <ul style="list-style-type: none"> All species are wide-ranging and found throughout the broader region; All suitable cave habitat has been clipped from the Amendment Application Area with a 150m buffer. All species are only likely to forage within the Amendment Application Area; These species do not exclusively depend on any habitat type or feature within the Amendment Application Area; and similar habitat is well represented outside the Amendment Application Area. 	Not 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.	One priority fauna species has been recorded within the Amendment Application Area, with another four species potentially occurring. As detailed in Table 6 these species is unlikely to be impacted for the following reasons: <ul style="list-style-type: none"> the preferred habitat for these species is well represented outside the Amendment Application Area; similar habitat within close vicinity to the Amendment Application Area was found to be the same or better condition than that of the Amendment Application Area; and In the event that active Mulgara burrows are identified they will be avoided using a 10 m buffer, where practicable; 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 Amendment Application Area may be suitable for use by conservation significant fauna, however similar habitat in the same or better condition is widespread in the Amendment 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 Amendment 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 Amendment 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.

Application to amend CPS 4875/3 Wheelarra Hill North

Principle	Criteria	Assessment	Outcome
	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 Amendment 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 provides significant habitat for fauna communities (assemblages) and meta-populations.	The Amendment Application Area is not considered to contain significant habitat for faunal assemblages that are not also present in other areas within the vicinity. The Amendment Application Area is not considered likely to contain geographically isolated fauna populations.	Not at variance with 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 Amendment Application Area. One species listed as Priority Flora by the DBCA was recorded in the Amendment Application Area (**Section 3.4.2**).

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

Table 9 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 <i>in situ</i> existence of populations of Declared Rare Flora under the <i>BC Act 2016</i>	No Threatened flora species were recorded in the Amendment Application Area (ENV Australia, 2010a; Onshore Environmental, 2014a).	Not at variance with clearing principle.
	c2) Native vegetation should not be cleared if it is necessary for the continued <i>in situ</i> existence of other significant flora.	No species listed under the EPBC Act or other significant flora species were recorded in the Amendment Application Area (ENV Australia, 2010a; Onshore Environmental, 2014a).	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 the boundaries of CPS 4875/3 are associated with a TECs or PECs (Onshore Environmental, 2014). The closest PEC is more than 50km north west of CPS 4875/3(**Section 3.4.1**). **Table 10** provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle D.

Table 10 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 <i>Environment Protection and Biodiversity Conservation Act 1999</i> are present.	No EPBC Act TECs are present in the Amendment 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 <i>Environment Protection and Biodiversity Conservation Act 1999</i> .	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 other significant ecological communities are known to occur or are likely to occur within the Amendment Application Area.	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 <i>in situ</i> 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.	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 Amendment Application Area is well represented in the Land Systems of the region (**Section 0**), and therefore it is unlikely individual species would be restricted to a particular habitat and vegetation occurring in the Amendment Application Area.

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

Table 11 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 Amendment 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 Amendment 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 almost 100% 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 Amendment 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 Amendment 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 Amendment 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 Amendment 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 not likely to be at variance to this Principle.

There are no permanent watercourses or wetlands within or associated with the Amendment Application Area. A number of unnamed non-perennial minor drainage line run south to north across the Amendment Application Area.

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

Table 12 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 watercourse or wetland with significant environmental values occurs within the Amendment Application Area or immediate surrounds.	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).	A number of unnamed non-perennial minor drainage line run south to north across the Amendment Application Area. 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.
	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 proposed clearing, it 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.	There are no permanent watercourses or wetlands within the Amendment Application Area. 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.

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 13** provides an assessment of the proposed clearing activities within the Amendment 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 Amendment 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 Amendment Application Area or adjacent areas.

6.7.2 Changes to pH

The Amendment Application Area is not in an area at risk of acid sulphate soils and there are no recorded acid sulphate soils within the Amendment 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

Four introduced flora species have been recorded in the Amendment Application Area (**Table 5**). 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 13 **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 Amendment 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 Amendment 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 Amendment 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 Amendment 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 150 km west north west of the Amendment Application Area.

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

An assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle H is provided in **Table 14** below.

Table 14 **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 Amendment 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 Amendment 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 150 km west-north-west of the Amendment 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 Amendment 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.

The disturbance footprint of the Amendment Application Area does not intersect any significant watercourses. A number of unnamed non-perennial minor drainage line run south to north across the Amendment Application Area.

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.

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

Table 15 **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 groundwater within the Amendment Application Area due to the small amount of clearing within the Amendment Application Area and lack of permanent waterbodies in the vicinity.	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 no permanent waterbodies present within the vicinity of the Amendment Application Area.	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 Amendment 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 Amendment 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 16 provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle J.

Table 16 **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 Amendment Application Area is situated within the Nyiyaparli Native Title Claim (WC05/6). A number of heritage sites were identified within the Amendment Application Area (site details are not provided here out of respect of the wishes of the Traditional Owners). All heritage sites will be avoided in this area. If any heritage site cannot practicably be avoided, BHP 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 in the Amendment Application Area is unlikely to be at variance to any of the Ten Clearing Principles. CPS 4875/3 authorises the clearing of up to 90 ha. To date BHP has cleared 34.78 ha and the clearing of the remaining 55.22 ha within an Amendment Application Area of 2,000.83 ha is unlikely to have any significant negative impacts on biodiversity and environmental values in the area.

9 REFERENCES

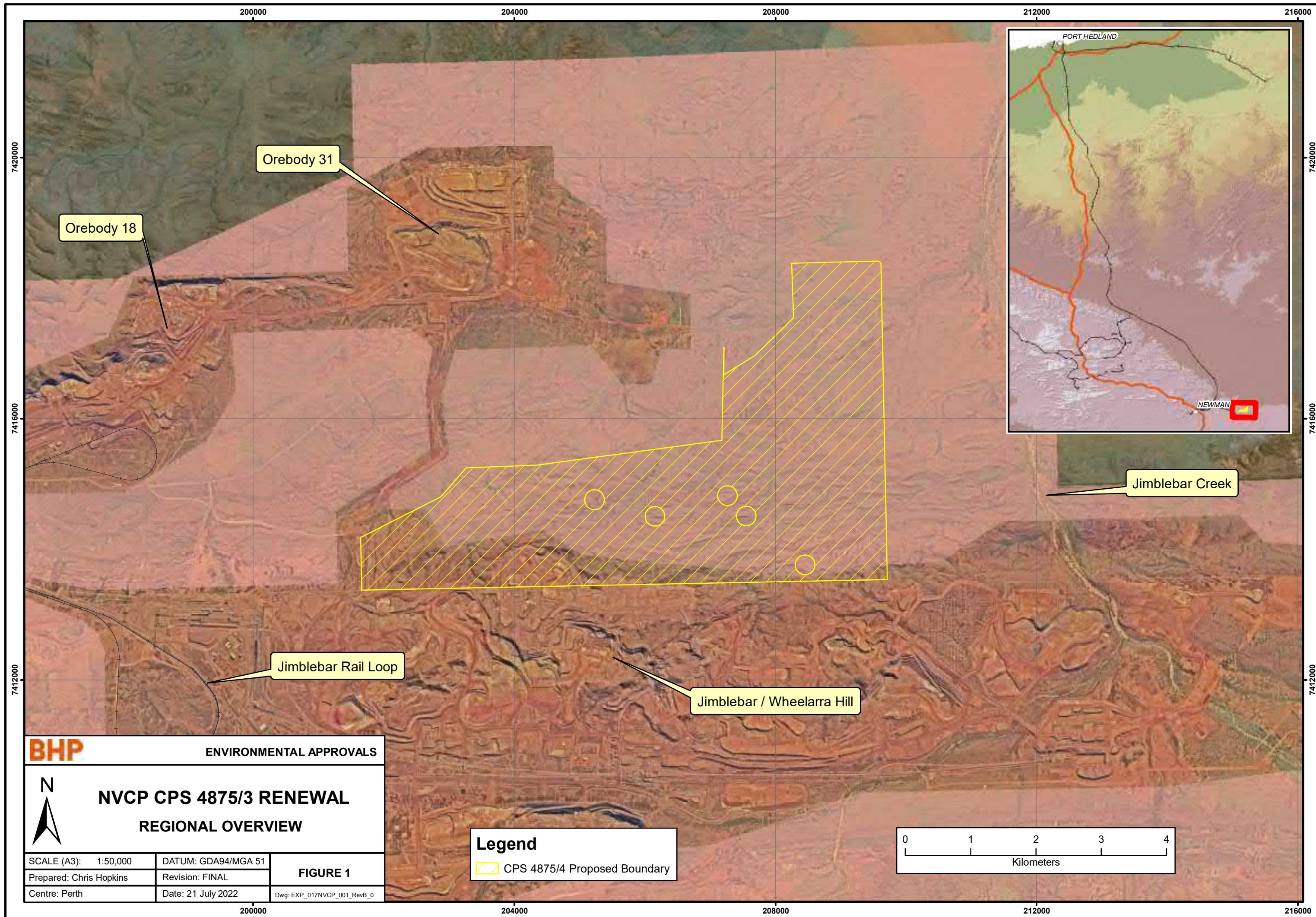
- Beard, JS (1975) *Vegetation Survey of Western Australia; Sheet 5 Pilbara*. University of Western Australia Press, Perth, Western Australia.
- Beard J. S. (1990) *Plant Life of Western Australia*. Kangaroo Press, Perth.
- BHP (2021) *BHP Iron Ore Annual Environmental Report July 2020 – June 2021*.
- Biologic (2017) *Consolidated Fauna Habitat Mapping 2017*. Unpublished report prepared for BHP Pty Ltd.
- Biologic (2021) *BHP WAIO Jimblebar Eremophila capricornica Targeted Flora Survey*. Unpublished report prepared for BHP Pty Ltd.
- BoM (Bureau of Meteorology) (2022a) Climate statistics for Australian locations – Newman Aero. Website: www.bom.gov.au/climate/averages/tables/cw_007176.shtml Accessed: 09 March 2022.
- BoM (Bureau of Meteorology) (2022b) Climate statistics for Australian locations – Wittenoom. Website: www.bom.gov.au/climate/averages/tables/cw_005026.shtml Accessed: 09 March 2022.
- CALM (1999) *Environmental Weed Strategy for Western Australia*.
- CSIRO (2014) *Australian Soil Resource Information System (ASRIS)*. Available from: <http://www.asris.csiro.au/index.html>, Accessed 31/03/2021.
- Department of Water, 2009a. *Groundwater Proclamation Areas 2009*. Accessed 19 February 2015 at <http://www.water.wa.gov.au/PublicationStore/first/86307.pdf>.
- Department of Water, 2009b. *Surface Water Proclamation Areas 2009*. Accessed 19 February 2015 at <http://www.water.wa.gov.au/PublicationStore/first/86306.pdf>.
- Department of Water (2015a) *Hydrogeological Atlas: Hamersley – Fractured Rock*. http://www.water.wa.gov.au/idelve/hydroatlas/loiQuery.jsp?ts=1421024384008&d=hydroatlas&bb=116_2710462,-23.570724506092837,119.38272319999999,-21.29263989390716&k=NONE&w=1034&h=757&z=1003199.8498259148&x=118.62436478220502&y=-23.254741832011604&i=782&j=652 Accessed 12 January 15.
- ENV Australia (2011) *Wheelarra Hill North Fauna Assessment*. Unpublished report for BHP Pty Ltd.
- Department of Water and Environmental Regulation (DWER) (2020) *Groundwater Proclamation Areas 2020*. Accessed April 2021 at [86307.pdf \(water.wa.gov.au\)](http://86307.pdf(water.wa.gov.au))
- GHD (2019) *North Jimblebar Vertebrate Fauna Survey*. Unpublished report for BHP Iron Ore
- GHD (2020) *Jimblebar targeted ghost bat survey*. Unpublished report for BHP Iron Ore
- Kendrick (2001b) *Bioregion: Pilbara 3 Subregion (PIL3)*. Department of Conservation and Land Management, Perth.
- Kendrick (2001b) *Bioregion: Pilbara 2 Subregion (PIL2)*. Department of Conservation and Land Management, Perth.
- Masters, P. (2008) *Brush-tailed Mulgara*. In: Van Dyck, S. & R. Strahan, eds. *The Mammals of Australia*. Page(s) 49-50. 3rd edition. New Holland Publishers.
- Onshore Environmental (2014a) *Consolidated Pilbara Vegetation Mapping*. Unpublished report prepared for BHP Pty Ltd.
- Onshore Environmental (2014b) *Orebody 31 - Targeted Significant Flora Survey June 2014*. Unpublished report prepared for BHP Pty Ltd;
- Onshore Environmental (2015) *Targeted Survey for Acacia sp. East Fortescue (surrounding OB31)*. Unpublished report prepared for BHP Pty Ltd
- Syrix Environmental PI (2012) *Wheelarra Hill North Level 2 Flora and Vegetation Mapping BHP Billiton Iron Ore Pilbara Tenure*. Unpublished report prepared for BHP Pty Ltd.

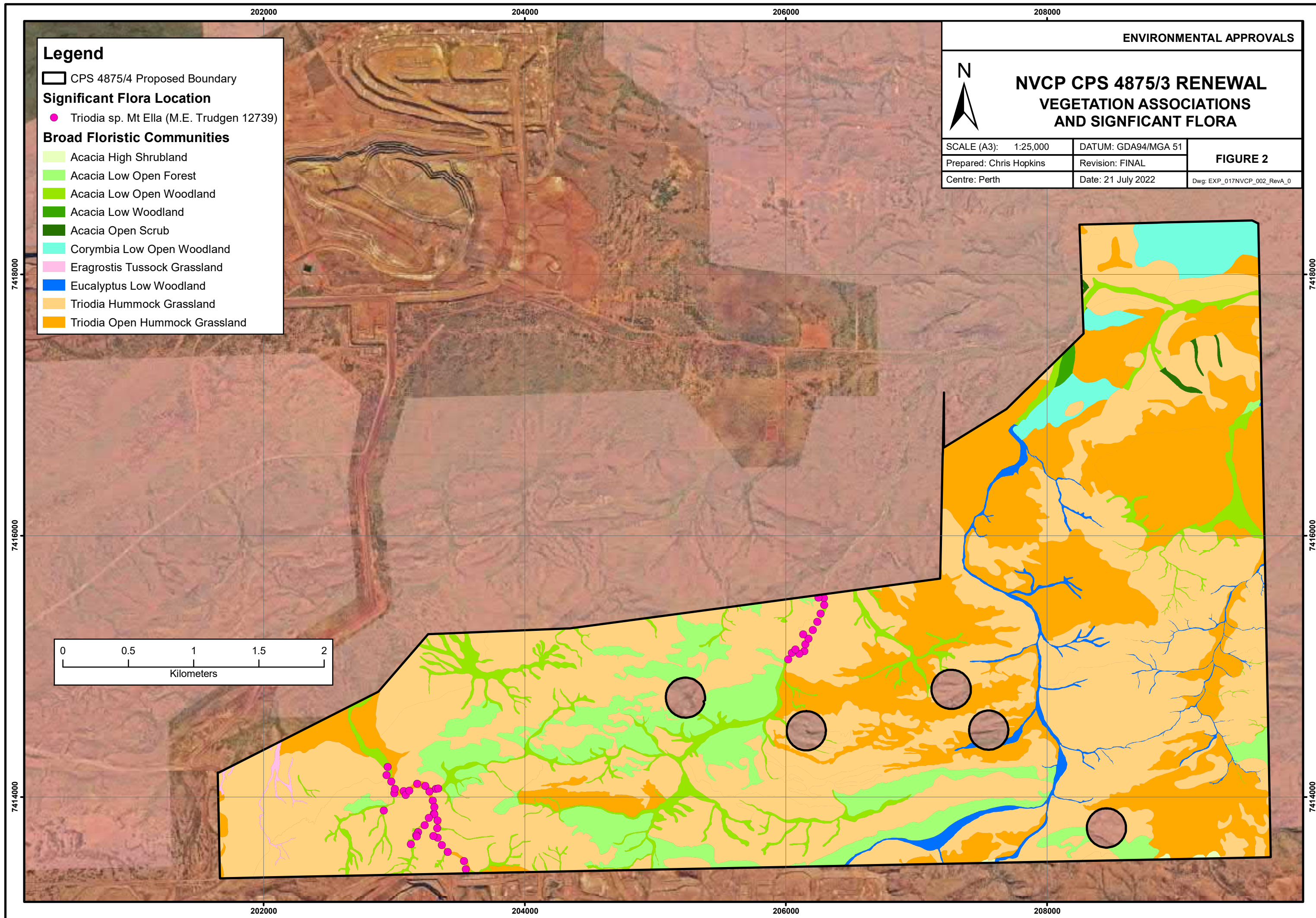
Thackway and Cresswell (1995) *An Interim Biogeographic Regionalisation for Australia: A framework for setting priorities in the National Reserves System Cooperative Program Version 4*. Australian Nature Conservation Agency, Canberra.

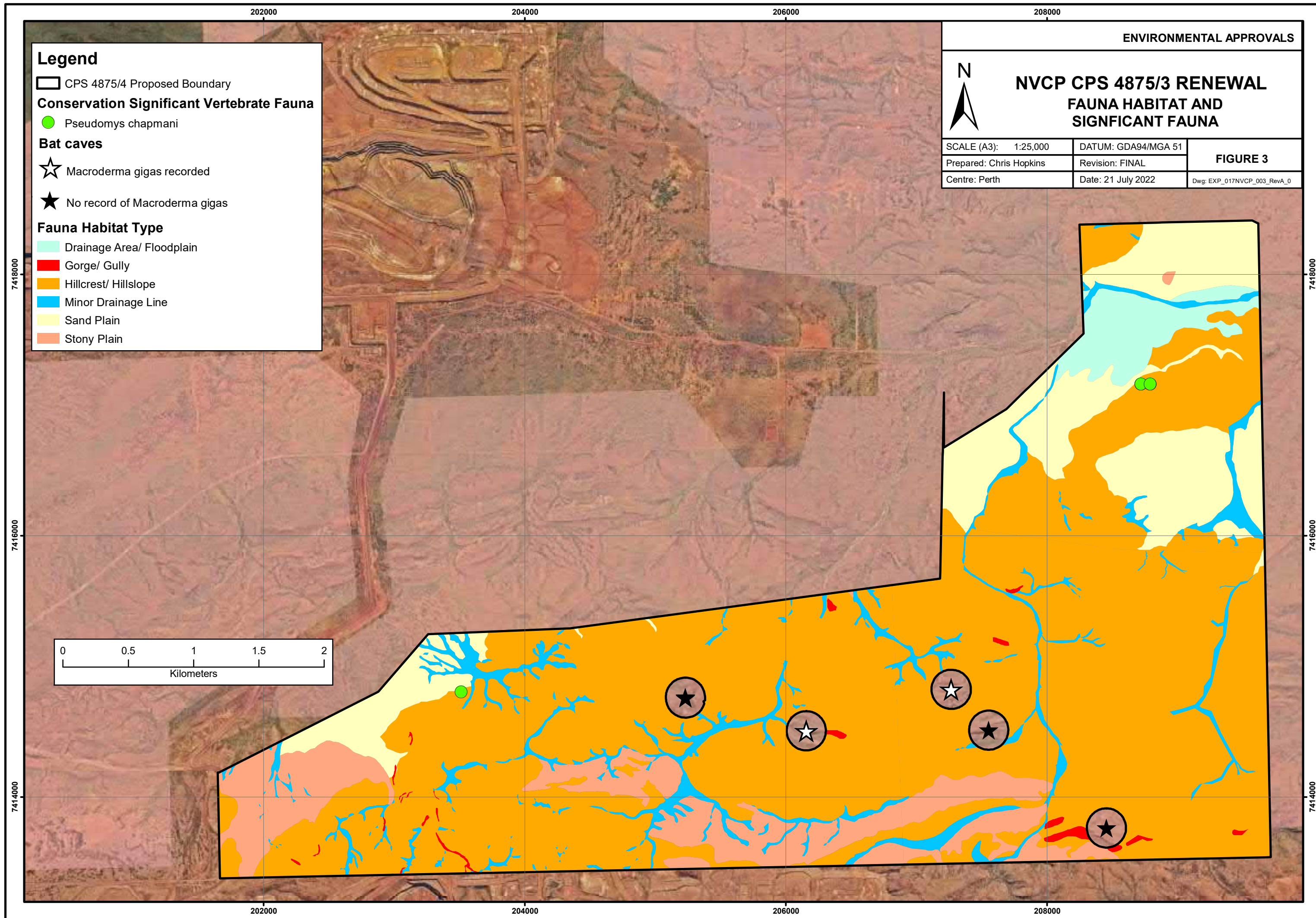
van Vreeswyk, A.M.E, Payne, A.L, Leighton, K.A. and Hennig, P. (2004) *An inventory and condition survey of the Pilbara region, Western Australia*. Western Australian Department of Agriculture Technical Bulletin No. 92.

Woolley, P.A., Haslem, A and Westerman M (2013) *Past and present distribution of Dasycercus: toward a better understanding of the identity of specimens in cave deposits and the conservation status of the currently recognised species D. blythi and D. cristicauda (Marsupialia : Dasyuridae)*. Australian Journal of Zoology, 2013, 61, 281–290.

Figures







Appendices



**Appendix 1: Consolidation of Regional Vegetation Mapping BHP Billiton Iron Ore
Pilbara Tenure (Onshore Environmental, 2014a)**

Appendix 2: Wheelarra Hill North Level 2 Flora and Vegetation Assessment (Syrinx Environmental PI, 2012)



Appendix 3: Orebody 31 - Targeted Significant Flora Survey June 2014 (Onshore Environmental, 2014b)

**Appendix 4: Targeted Survey for *Acacia* sp. East Fortescue (surrounding OB31)
(Onshore Environmental, 2015)**

**Appendix 5: BHP WAIO Jimblebar *Eremophila capricornica* Targeted Flora Survey
(Biologic, 2021)**

Appendix 6: Consolidated Fauna Habitat Mapping 2017 (Biologic Environmental Survey, 2017)