GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 9160/1
Permit Holder:	Regional Power Corporation trading as Horizon Power
Duration of Permit:	15 July 2021 to 15 July 2026

The permit holder is authorised to clear *native vegetation* subject to the following conditions of this permit.

PART I –CLEARING AUTHORISED

1. Clearing authorised (purpose)

The permit holder is authorised to clear native vegetation for the purpose of geotechnical investigations.

2. Land on which clearing is to be done

Lot 678 on Deposited Plan 32810, Burrup
Lot 677 on Deposited Plan 32809, Maitland
Lot 669 on Deposited Plan 32484, Burrup
Lot 666 on Deposited Plan 30491, Maitland
Lot 645 on Deposited Plan 28840, Burrup
Lot 644 on Deposited Plan 28840, Burrup
Lot 642 on Deposited Plan 29300, Burrup
Lot 641 on Deposited Plan 29300, Burrup
Lot 640 on Deposited Plan 29300, Burrup
Lot 60 on Deposited Plan 241372, Maitland
Lot 559 on Deposited Plan 406755, Burrup
Lot 550 on Deposited Plan 406755, Burrup
Lot 540 on Deposited Plan 221364, Burrup
Lot 538 on Deposited Plan 221364, Burrup
Lot 501 on Deposited Plan 401915, Burrup
Lot 465 on Deposited Plan 220671, Maitland
Lot 464 on Deposited Plan 194584, Burrup
Lot 451 on Deposited Plan 194577, Burrup
Lot 446 on Deposited Plan 194568, Burrup
Lot 444 on Deposited Plan 220554, Burrup
Lot 369 on Deposited Plan 215500, Burrup
Lot 366 on Deposited Plan 215500, Burrup
Lot 32 on Deposited Plan 47815, Maitland
Lot 324 on Deposited Plan 42631, Maitland
Lot 323 on Deposited Plan 42629, Maitland
Lot 322 on Deposited Plan 42624, Maitland
Lot 310 on Deposited Plan 42288, Maitland

Lot 3013 on Deposited Plan 42282, Burrup
Lot 3006 on Deposited Plan 52072, Maitland
Lot 3005 on Deposited Plan 52072, Maitland
Lot 3003 on Deposited Plan 43833, Maitland
Lot 3001 on Deposited Plan 42721, Maitland
Lot 3000 on Deposited Plan 42721, Maitland
Lot 284 on Deposited Plan 242018, Burrup
Lot 273 on Deposited Plan 26559, Burrup
Lot 257 on Deposited Plan 217274, Burrup
Lot 24 on Deposited Plan 241372, Burrup
Lot 156 on Deposited Plan 215598, Burrup
Lot 150 on Deposited Plan 242287, Maitland
Lot 1502 on Deposited Plan 75876, Maitland
Dampier Road Reserve (PINs – 11441936 and 11736108) Maitland and Burrup
Unnamed Road Reserve (PIN – 1331774), Burrup
North West Coastal Highway Road Reserve (PIN – 11733157), Maitland

3. Clearing authorised

The permit holder must not clear more than 17.08 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1, Maps (a) to (d), of attached Schedule 1.

4. Type of clearing authorised

This permit authorises the permit holder to clear *native vegetation* for activities to the extent that the permit holder has the right to access land under the *Energy Operators Powers (Powers) Act 1979* or any other written law.

PART II –MANAGEMENT CONDITIONS

5. Avoid, minimise and reduce the impacts and extent of clearing

In determining the amount of native vegetation to be cleared authorised under this permit, the permit holder must have regard to the following principles, set out in order of preference:

(a) avoid the *clearing* of *native vegetation;*
(b) minimise the amount of *native vegetation* to be cleared; and
(c) reduce the impact of *clearing* on any environmental value.

6. Weed control

When undertaking any *clearing* authorised under this permit, the permit holder must take the following steps to minimise the risk of the introduction and spread of *weeds*:

(i) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
(ii) ensure that no *weed*-affected soil, *mulch*, *fill* or other material is brought into the area to be cleared; and
(iii) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

7. Vegetation management – significant ecological communities

Prior to undertaking any clearing authorised under this permit, the permit holder shall:

(a) demarcate 50 metre buffers in *hard copy* and *digital format* around the mapped VT01 vegetation type, representing the Priority 1 Burrup Peninsula rock pile communities, cross-hatched red in Figure 2, Maps (a) to (c), of attached Schedule 2;

(b) ensure that no *clearing* of *native vegetation* occurs within 50 metres of the mapped VT01 vegetation type, representing the Priority 1 Burrup Peninsula rock pile communities cross-hatched red in Figure 2, Maps (a) to (c), of attached Schedule 2; and

(c) ensure that no more than 0.68 hectares of *native vegetation* is cleared within the VT04 vegetation type cross-hatched red in Figure 3 of attached Schedule 3.

8. Flora management – avoidance of priority flora

Prior to undertaking any clearing authorised under this permit, the permit holder shall:

(a) demarcate 50 metre buffers in *hard copy* and *digital format* around the known locations of the three *priority flora* taxa listed in the attached Schedule 4 (priority flora);

(b) ensure that no *clearing* of *native vegetation* occurs within 50 metres of the known locations of the three *priority flora* taxa listed in the attached Schedule 4 (priority flora);

(c) demarcate a 20 metre buffer in *hard copy* and *digital format* around the known location of the *priority flora* taxa listed in the attached Schedule 5 (priority flora); and

(d) ensure that no *clearing* of *native vegetation* occurs within 20 metres of the known location of the *priority flora* taxa listed in the attached Schedule 5 (priority flora).

9. Fauna management - avoidance of significant habitat

Prior to undertaking any clearing authorised under this permit, the permit holder shall:

(a) demarcate 50 metre buffers in *hard copy* and *digital format* around the mapped VT01 vegetation type, representing rock pile fauna habitat cross-hatched red in Figure 2, Maps (a) to (c), of attached Schedule 2; and

(b) ensure that no *clearing* of *native vegetation* occurs within 50 metres of the mapped VT01 vegetation type, representing rock pile fauna habitat cross-hatched red in Figure 2, Maps (a) to (c), of attached Schedule 2.

10. Fauna management - backfilling

The permit holder must:

(a) cover all boreholes at the end of each day and backfill upon completion; and

(b) backfill all test pits with excavated material upon completion.

11. Fauna management – direction of clearing

The Permit Holder shall conduct clearing in a slow progressive manner in a single direction towards adjacent *native vegetation* to allow fauna to move into adjacent *native vegetation* ahead of the clearing activity.

12. Revegetation and rehabilitation – retention of vegetative material and topsoil

The permit holder must:

(a) retain the vegetative material and topsoil removed by *clearing* authorised under this permit and stockpile the vegetative material and topsoil in an area that has already been cleared;

(b) as soon as is practicable, and no later than 12 months following *clearing* authorised under this permit, *revegetate* and *rehabilitate* the areas that are no longer required for geotechnical investigations by:

(i) re-shaping the surface of the land so that it is consistent with the surrounding five metres land;

(ii) ripping the ground on the contour to remove soil compaction;

(iii) laying the vegetative material and topsoil retained under condition 12(a) on the cleared areas; and

(iv) undertake *weed* control activities on an 'as needed' basis to reduce *weed* cover within the cleared areas to no greater than the *weed* cover within the adjacent *native vegetation*.

PART III - RECORD KEEPING AND REPORTING

13. Records that must be kept

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

Table 1: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised *clearing* activities generally	(a) the species composition, structure, and density of the cleared area; (b) the location where the *clearing* occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings; (c) the date that the area was cleared; (d) the size of the area cleared (in hectares); (e) actions taken to avoid, minimise, and reduce the impacts and extent of *clearing* in accordance with condition 5; and (f) actions taken to minimise the risk of the introduction and spread of *weeds* in accordance with condition 6.
2.	In relation to vegetation management pursuant to condition 7	(a) actions taken to avoid *clearing* within 50 metres of the mapped VT01 vegetation type, representing the Priority 1 Burrup Peninsula rock pile communities. (b) actions taken to avoid *clearing* more than 0.68 hectares of the mapped VT04 vegetation type.
3.	In relation to flora management pursuant to condition 8	(a) actions taken to avoid *clearing* within 50 metres of *priority flora* taxa locations listed in Schedule 4. (b) actions taken to avoid *clearing* within 20 metres of the *priority flora* taxa location listed in Schedule 5.
4.	In relation to fauna management pursuant to condition 9	(a) actions taken to avoid *clearing* within 50 metres of the mapped VT01 vegetation type, representing the rock pile fauna habitat.
5.	In relation to fauna management pursuant to conditions 10 and 11	(a) actions taken to cover and backfill all boreholes and test pits. (b) actions taken to ensure fauna can escape ahead of the clearing activity.
6.	In relation to the *revegetation* and *rehabilitation* of areas pursuant to condition 12 of this permit:	(a) the location of any areas *revegetated* and *rehabilitated,* recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees; (b) a description of the *revegetation* and *rehabilitation* activities undertaken; (c) the date that the area was *revegetated* and *rehabilitated;* (d) the size of the area *revegetated* and *rehabilitated* (in hectares).

14. Reporting

(a) The permit holder must provide to the *CEO* on or before 30 June of each year, a written report:
   (i) of records required under condition 13 of this permit; and
   (ii) concerning activities done by the permit holder under this permit between 1 January to 31 December of the preceding calendar year.

(b) If no clearing authorised under this permit was undertaken between 1 January to 31 December of the preceding calendar year, a written report confirming that no clearing under this permit has been carried out, must be provided to the *CEO* on or before 30 June of each year.

(c) Prior to 15 April 2026, the permit holder must provide to the *CEO* a written report of records required under condition 13 of this permit where these records have not already been provided under condition 14(a) of this permit.

DEFINITIONS

In this permit, the terms in Table 2 have the meanings defined.

Table 2: Definitions

Term	Definition
CEO	Chief Executive Officer of the *department* responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*.
clearing	has the meaning given under section 3(1) of the EP Act
condition	a condition to which this clearing permit is subject under section 51H of the EP Act
digital format	provision of shapefiles to be utilised using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees
EP Act	*Environmental Protection Act 1986* (WA)
fill	means material used to increase the ground level, or to fill a depression
hard copy	provision of paper maps
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act
priority flora	means those plant taxa associated with that specific priority flora classification.
rehabilitate/ed/ion	means actively managing an area containing native vegetation in order to improve the ecological function of that area
revegetate/ed/ion	means the re-establishment of a cover of *local provenance* native vegetation in an area using methods such as natural regeneration, *direct seeding* and/or *planting*, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area

Term	Definition
weeds	means any plant – (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned

Mathew Gannaway
MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20
of the *Environmental Protection Act 1986*

20 June 2021

Schedule 1

Figure 1: Maps (a) to (d) of the boundaries of the areas within which clearing may occur

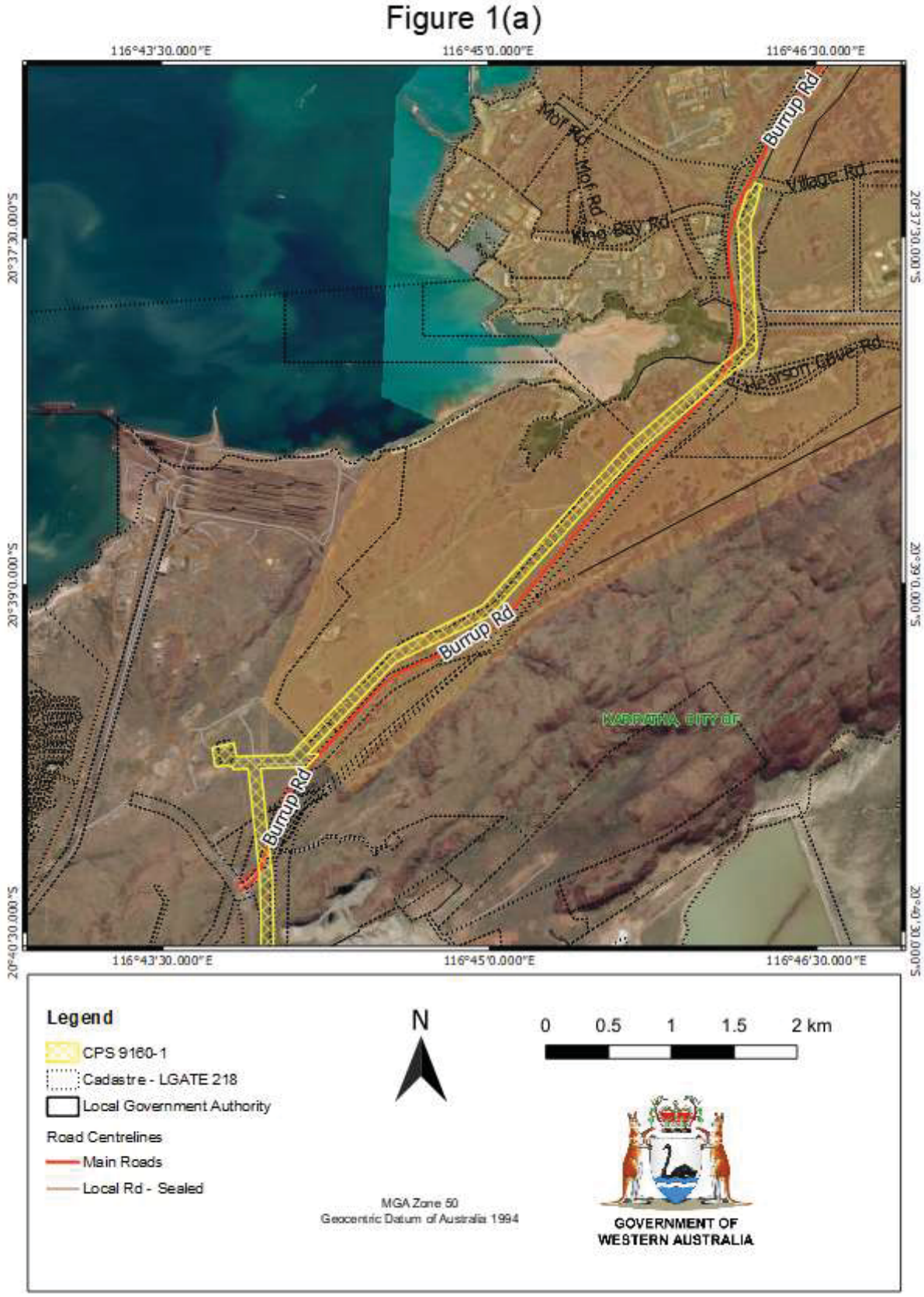


Figure 1(b)

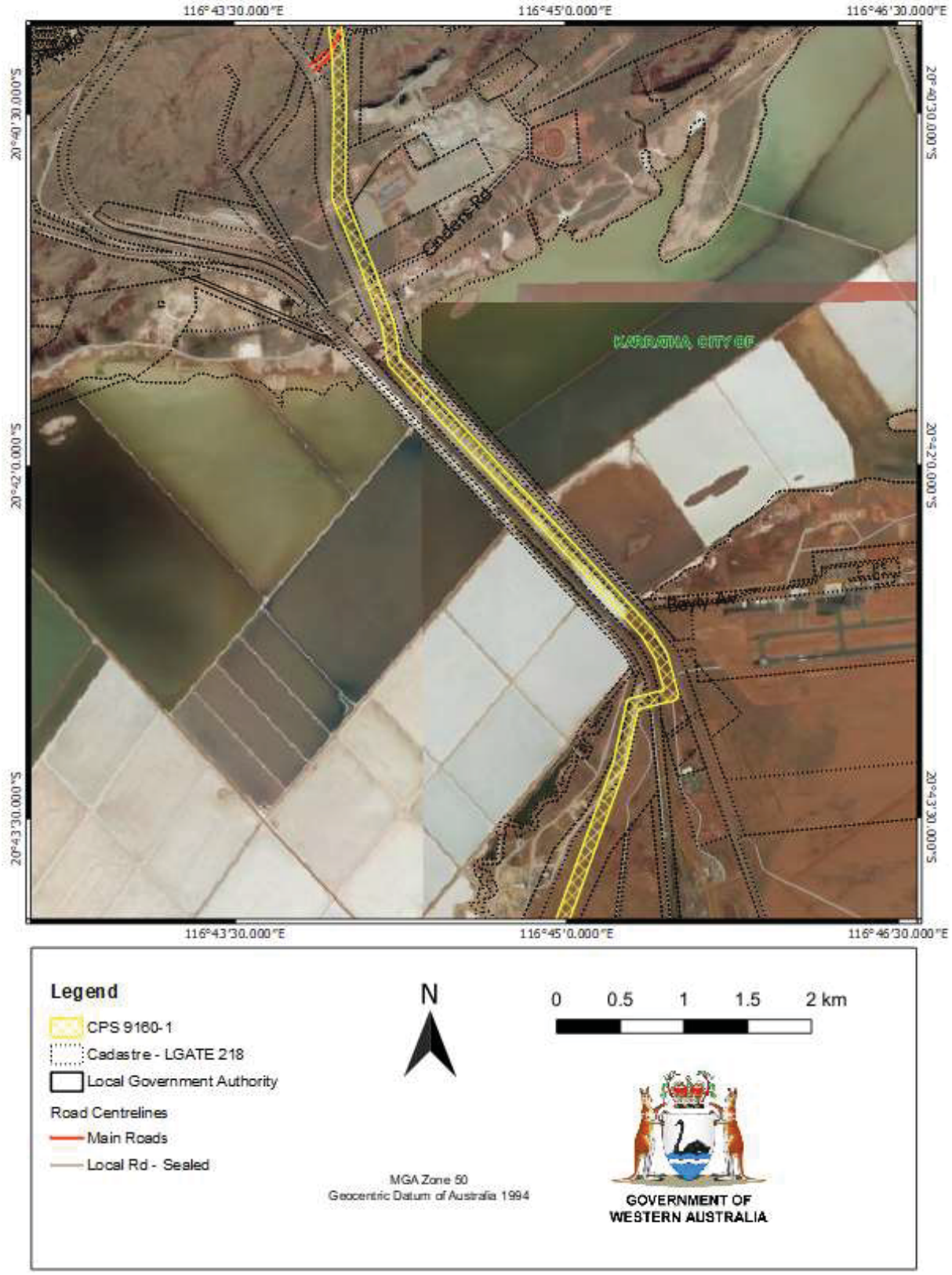
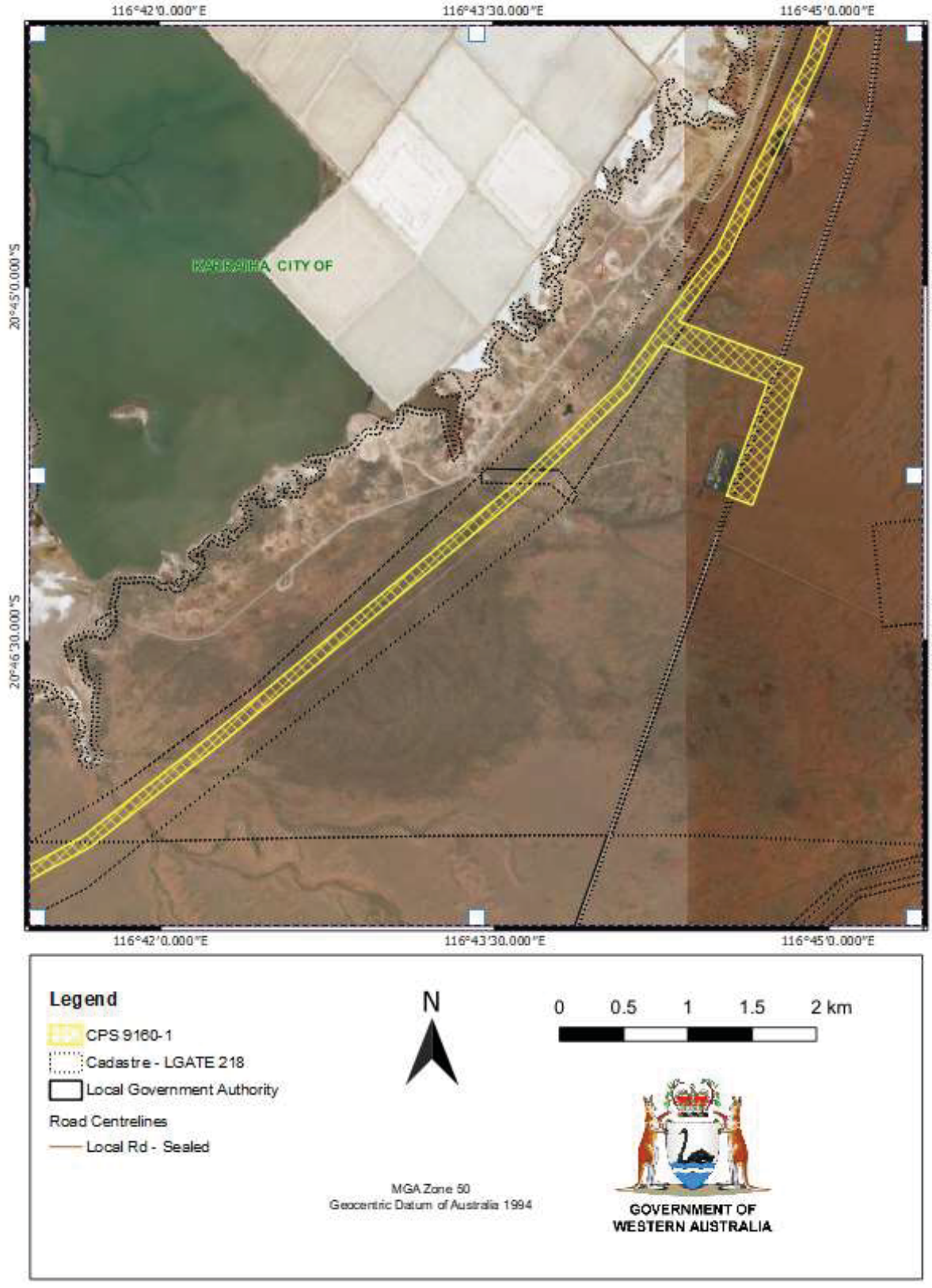

116°43'30.000"E
116°45'0.000"E
116°46'30.000"E
20°40'30.000"S
20°42'0.000"S
20°43'30.000"S
Cinders Rd
KARRATHA CITY OF
Legend
CPS 9160-1
Cadastre - LGATE 218
Local Government Authority
Road Centrelines
Main Roads
Local Rd - Sealed
N
0 0.5 1 1.5 2 km
MGA Zone 50
Geocentric Datum of Australia 1994
GOVERNMENT OF
WESTERN AUSTRALIA

Figure 1(c)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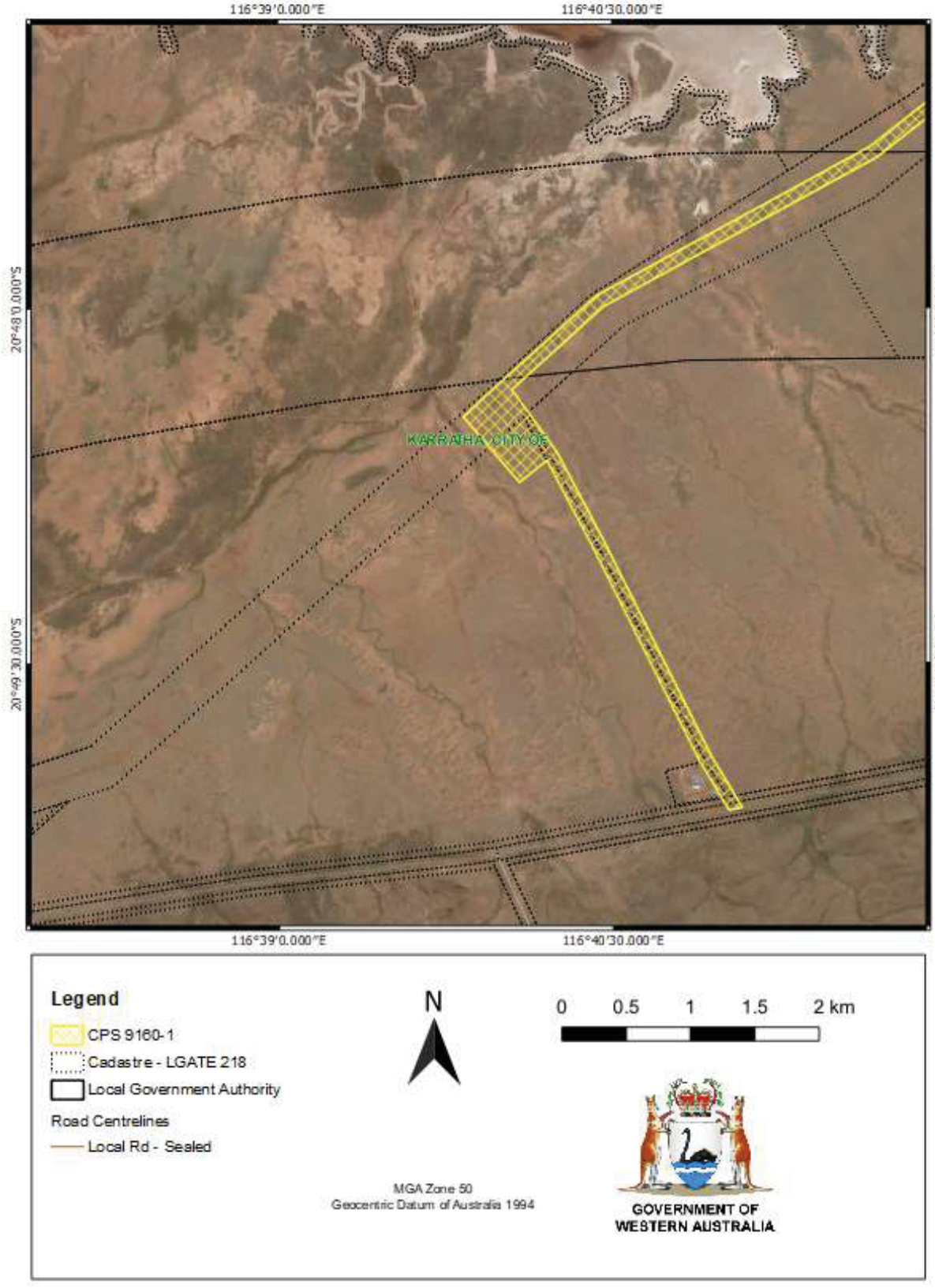
116°43'30.000"E
116°45'0.000"E
20°45'0.000"S
20°46'30.000"S
KARRATHA, CITY OF
Legend
CPS 9160-1
Cadastre - LGATE 218
Local Government Authority
Road Centrelines
Local Rd - Sealed
N
0 0.5 1 1.5 2 km
MGA Zone 50
Geocentric Datum of Australia 1994
GOVERNMENT OF
WESTERN AUSTRALIA

Figure 1(d)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20°48'0.000"S
20°49'30.000"S
KARRATHA CITY OF
Legend
CPS 9160-1
Cadastre - LGATE 218
Local Government Authority
Road Centrelines
Local Rd - Sealed
N
0 0.5 1 1.5 2 km
MGA Zone 50
Geocentric Datum of Australia 1994
GOVERNMENT OF
WESTERN AUSTRALIA

Schedule 2

Figure 2: Maps (a) to (c) of the boundaries where no clearing of native vegetation is to occur within 50 metres of the mapped VT01 vegetation type, representing the Priority 1 Burrup Peninsula rock pile communities

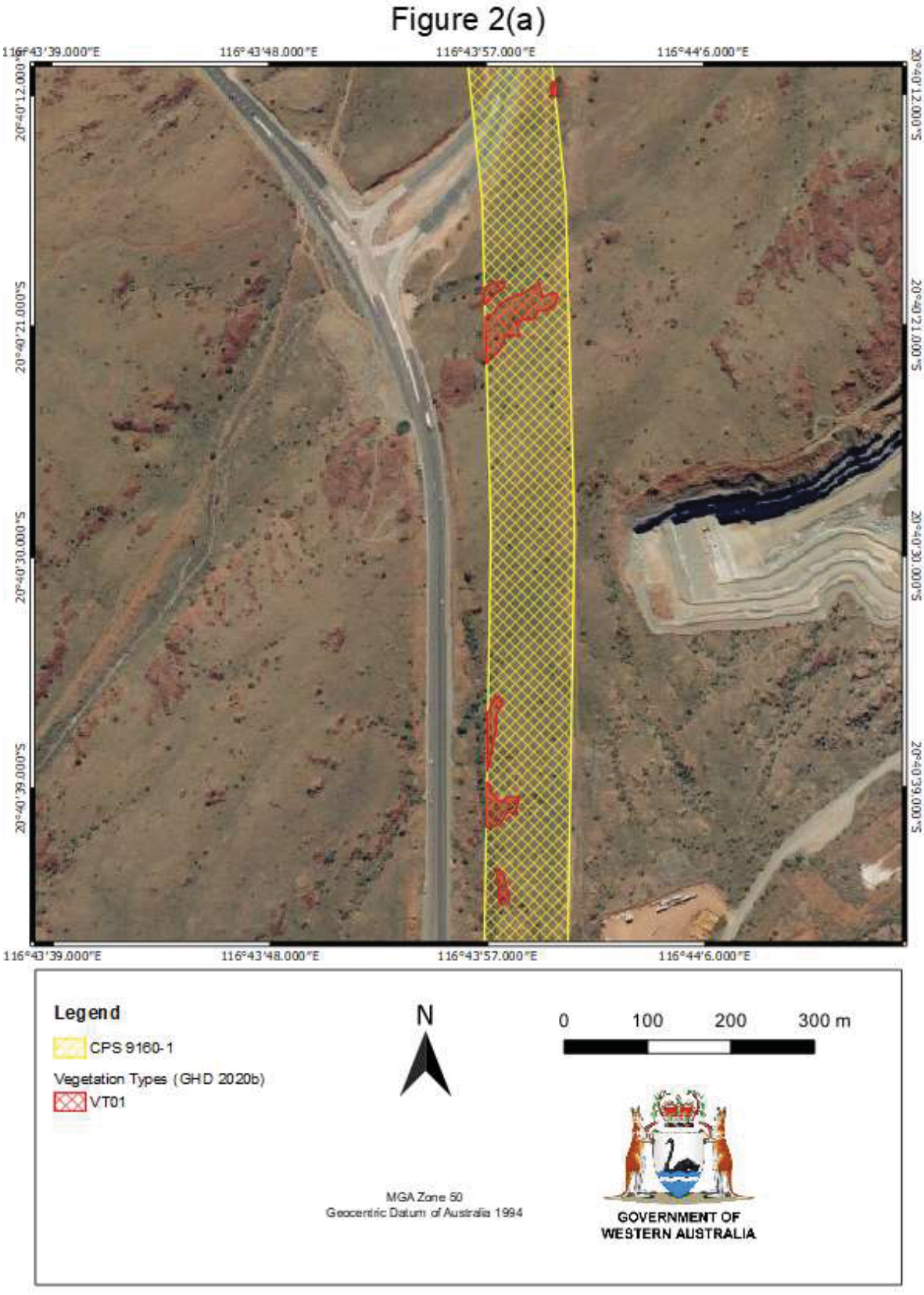
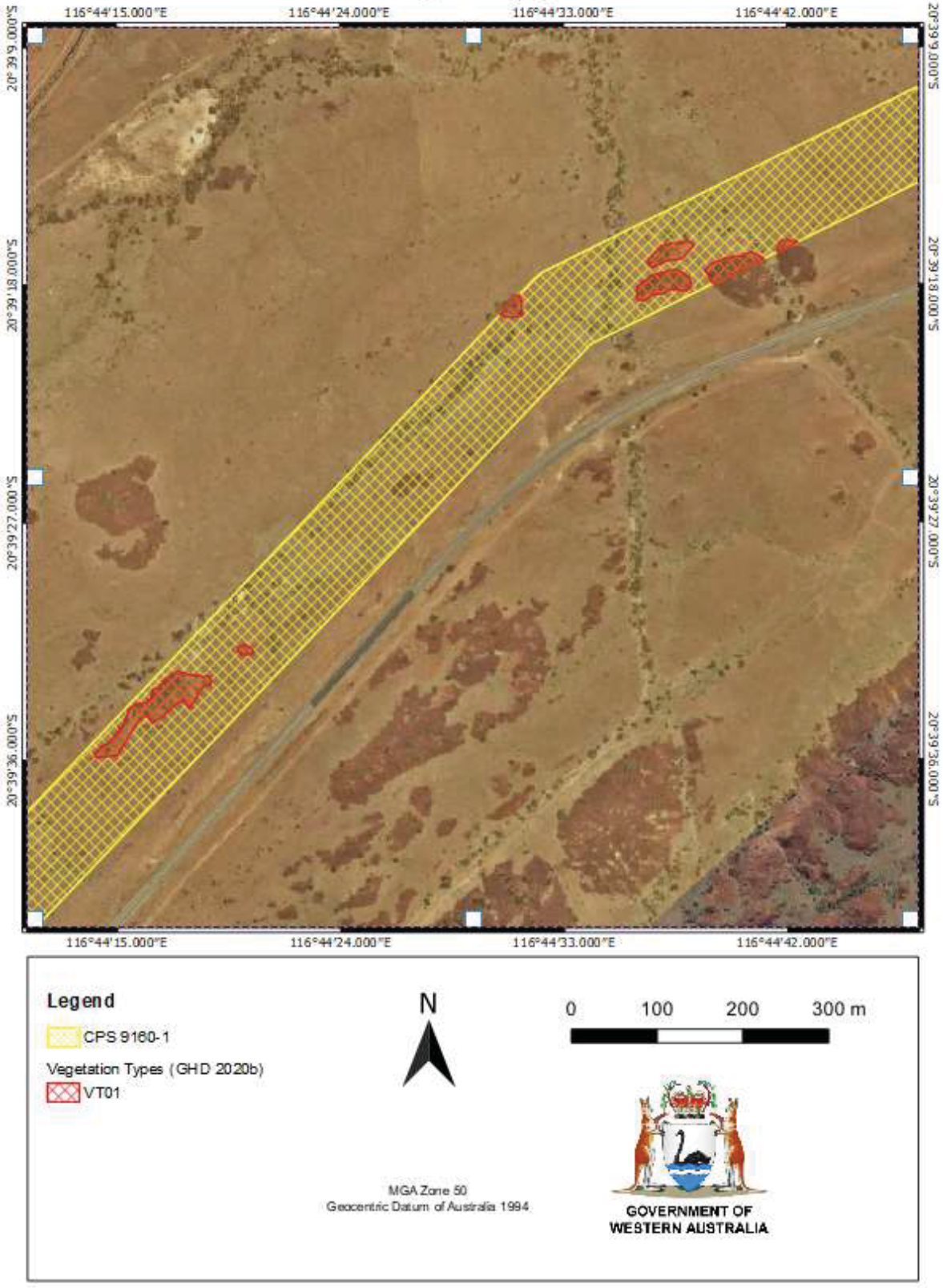


Figure 2(b)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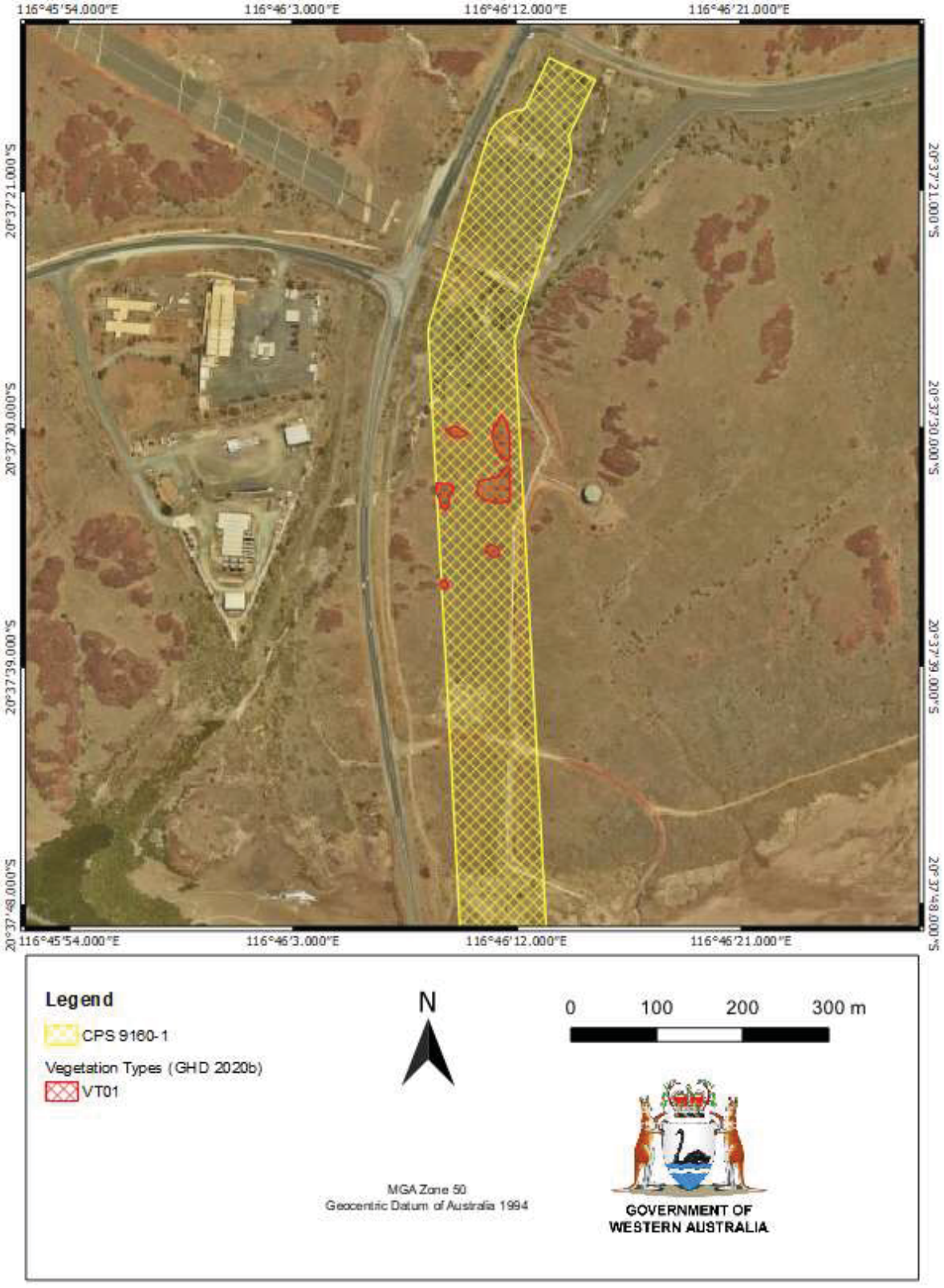
116°44'24.000"E
116°44'33.000"E
116°44'42.000"E
20°39'9.000"S
20°39'18.000"S
20°39'27.000"S
20°39'36.000"S
Legend
CPS 9160-1
Vegetation Types (GHD 2020b)
VT01
N
0
100
200
300 m
MGA Zone 50
Geocentric Datum of Australia 1994
GOVERNMENT OF
WESTERN AUSTRALIA

Figure 2(c)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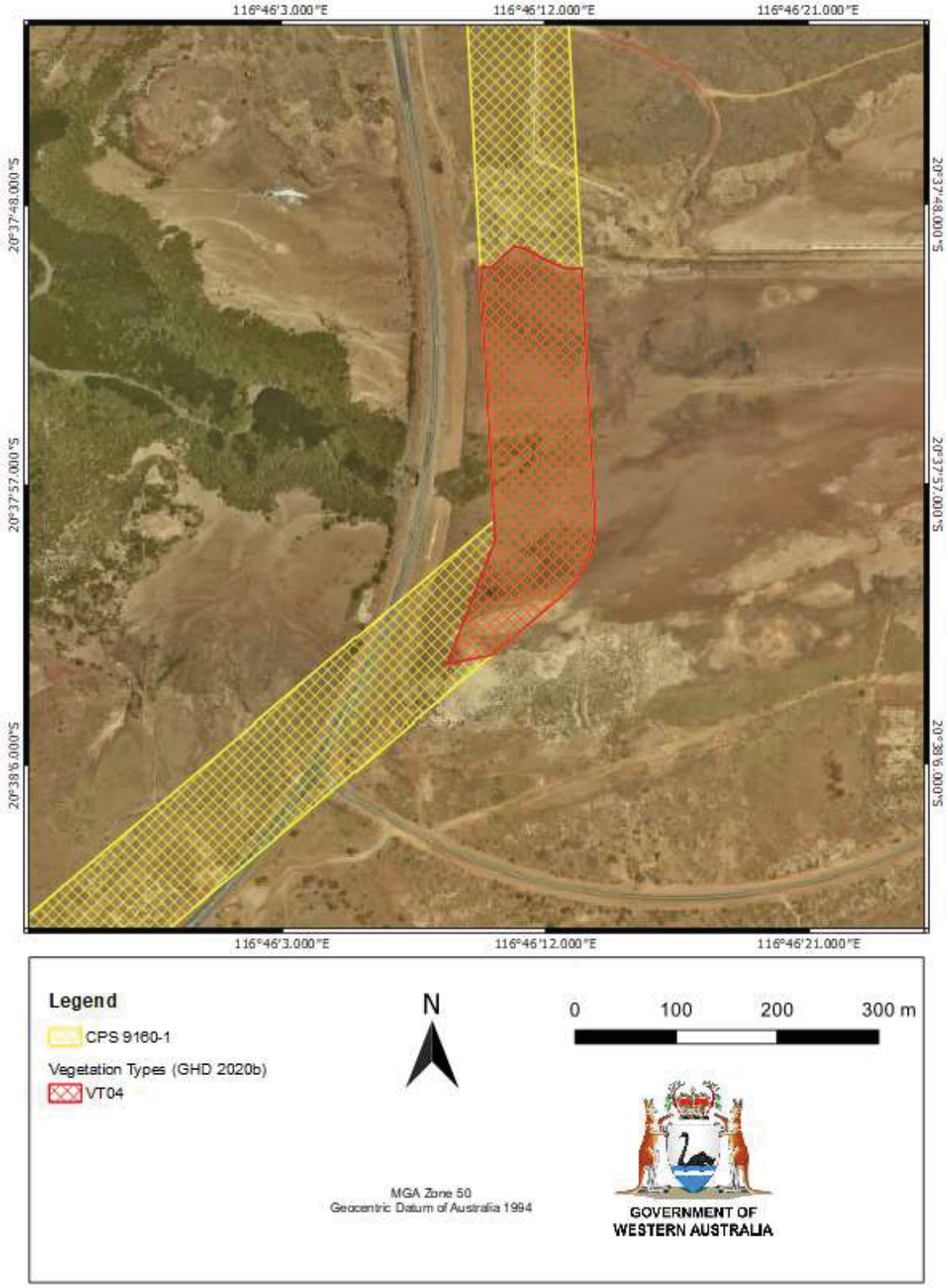
116°46'3.000"E
116°46'12.000"E
116°46'21.000"E
20°37'21.000"S
20°37'30.000"S
20°37'39.000"S
20°37'48.000"S
Legend
CPS 9160-1
Vegetation Types (GHD 2020b)
VT01
N
0
100
200
300 m
MGA Zone 50
Geocentric Datum of Australia 1994
GOVERNMENT OF
WESTERN AUSTRALIA

Schedule 3

Figure 3: No more than 0.68 hectares is to be cleared within the VT04 vegetation type cross-hatched red in Figure 3

Figure 3



Schedule 4

Locations of priority flora taxa

ID	Taxon	Status	Abundance	Easting	Northing	Buffer
1	*Rhynchosia bungarensis*	P4	20	472186	7714092	50m
2	*Vigna triodiophila*	P3	5	472802	7715583	50m
3	*Terminalia supranitifolia*	P3	4	472599	7715393	50m
4	*Terminalia supranitifolia*	P3	1	473326	7716055	50m
5	*Terminalia supranitifolia*	P3	4	473279	7716032	50m
6	*Terminalia supranitifolia*	P3	1	473002	7715801	50m
7	*Terminalia supranitifolia*	P3	3	472769	7715569	50m
8	*Terminalia supranitifolia*	P3	4	472786	7715577	50m
9	*Terminalia supranitifolia*	P3	3	472721	7715530	50m
10	*Terminalia supranitifolia*	P3	5	472743	7715552	50m
11	*Terminalia supranitifolia*	P3	1	472678	7715459	50m
12	*Terminalia supranitifolia*	P3	1	472696	7715523	50m
13	*Terminalia supranitifolia*	P3	1	472621	7715417	50m
14	*Terminalia supranitifolia*	P3	1	472645	7715439	50m
15	*Terminalia supranitifolia*	P3	2	472589	7715383	50m

Schedule 5

Locations of priority flora taxa

ID	Taxon	Status	Abundance	Easting	Northing	Buffer
1	*Oldenlandia sp.* Hamersley Station (A.A. Mitchel PRP1479)	P3	1	465339	7698986	20m

Clearing Permit Decision Report

1. Application details and outcome

1.1. Permit application details

Permit number:	CPS 9160/1
Permit type:	Purpose Permit
Applicant name:	Regional Power Corporation TA Horizon Power
Application received:	22 December 2020
Application area:	17.08 hectares
Purpose of clearing:	Geotechnical investigations
Method of clearing:	Mechanical removal
Property:	Lot 678 on Deposited Plan 32810, Burrup Lot 677 on Deposited Plan 32809, Maitland Lot 669 on Deposited Plan 32484, Burrup Lot 666 on Deposited Plan 30491, Maitland Lot 645 on Deposited Plan 28840, Burrup Lot 644 on Deposited Plan 28840, Burrup Lot 642 on Deposited Plan 29300, Burrup Lot 641 on Deposited Plan 29300, Burrup Lot 640 on Deposited Plan 29300, Burrup Lot 60 on Deposited Plan 241372, Maitland Lot 559 on Deposited Plan 406755, Burrup Lot 550 on Deposited Plan 406755, Burrup Lot 540 on Deposited Plan 221364, Burrup Lot 538 on Deposited Plan 221364, Burrup Lot 501 on Deposited Plan 401915, Burrup Lot 465 on Deposited Plan 220671, Maitland Lot 464 on Deposited Plan 194584, Burrup Lot 451 on Deposited Plan 194577, Burrup Lot 446 on Deposited Plan 194568, Burrup Lot 444 on Deposited Plan 220554, Burrup Lot 369 on Deposited Plan 215500, Burrup Lot 366 on Deposited Plan 215500, Burrup Lot 32 on Deposited Plan 47815, Maitland Lot 324 on Deposited Plan 42631, Maitland Lot 323 on Deposited Plan 42629, Maitland Lot 322 on Deposited Plan 42624, Maitland Lot 310 on Deposited Plan 42288, Maitland Lot 3013 on Deposited Plan 42282, Burrup Lot 3006 on Deposited Plan 52072, Maitland Lot 3005 on Deposited Plan 52072, Maitland Lot 3003 on Deposited Plan 43833, Maitland Lot 3001 on Deposited Plan 42721, Maitland Lot 3000 on Deposited Plan 42721, Maitland Lot 284 on Deposited Plan 242018, Burrup Lot 273 on Deposited Plan 26559, Burrup Lot 257 on Deposited Plan 217274, Burrup Lot 24 on Deposited Plan 241372, Burrup

	Lot 156 on Deposited Plan 215598, Burrup Lot 150 on Deposited Plan 242287, Maitland Lot 1502 on Deposited Plan 75876, Maitland Dampier Road Reserve (PINs – 11441936 and 11736108) Maitland and Burrup Unnamed Road Reserve (PIN – 1331774), Burrup North West Coastal Highway Road Reserve (PIN – 11733157), Maitland
LGA area:	City of Karratha
Localities:	Burrup and Maitland

1.2. Description of clearing activities

New transmission lines and substations are required to supply electricity from the Maitland Strategic Industrial Area to the Burrup Strategic Industrial Area. The route extends from Dampier on the Burrup Peninsula, down to Karratha and further south to the Maitland Strategic Industrial Area. The applicant (Horizon Power) requires up to 17.08 hectares of native vegetation to be cleared to facilitate geotechnical investigations to assist in determining the locations of the proposed substation, transmission line and access road infrastructure.

Approximately 15.53 hectares of native vegetation clearing has been calculated to be cleared, with an additional 10 per cent contingency added to allow for flexibility, totalling 17.08 hectares. Clearing will be required for access tracks, boreholes and test pits along a corridor length of approximately 31 kilometres, within an application area of 381 hectares. An indicative clearing footprint has been provided by the applicant.

Up to 25 geotechnical test pits and 47 boreholes are proposed to be located approximately every 500 to 700 metres to target transmission pole locations within the application area. For the boreholes, an area of up to 25 metres by 25 metres is required to accommodate the drilling of a borehole using a truck mounted auger, a laydown area for equipment, and drill spoil. Bore hole locations south of the Burrup and along the Burrup are based on proposed tower locations from the Burrup Expansion.

For the test pits, a clearing area of up to 30 metres by 25 metres is required. Test pit locations target the proposed substations and an access road in the southern most portion of the application area. Additional test pits or borehole locations may be required where there is limited existing geotechnical information should the ground condition significantly vary between one geotechnical test location to another. The additional 10 per cent contingency has been included to facilitate this consequence, and to allow for uncertainty in the terrain and access requirements on the Burrup Peninsula.

1.3. Decision on application and key considerations

Decision:	Granted
Decision date:	20 June 2021
Decision area:	Up to 17.08 hectares of native vegetation within a 381 hectare application area as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act).

The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and two submissions were received (Appendix B). The submissions raised concerns about lack of consultation with adjoining and overlapping tenure. These concerns have been addressed between the applicant and the submitters.

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix C), relevant datasets (Appendix H2), supporting information provided by the applicant (Appendix A) including the results of flora and vegetation survey (Appendix F), the clearing principles set out in Schedule 5 of the EP Act (Appendix D), relevant planning instruments and any other matters considered relevant to the assessment (Section 3). The Delegated Officer also took into consideration the purpose of the clearing to facilitate the construction of a new transmission line.

The assessment identified that the proposed clearing may result in:

- the removal of Priority flora species and vegetation representative of a Priority Ecological Community (Priority 1);
- the removal of locally significant samphire vegetation;
- impacts to rock pile fauna habitat that is an important refuge for fauna of conservation significance;
- injuring fauna that may be present at the time of the clearing activity;
- uncapped boreholes pose a threat to ground fauna moving through the landscape; and
- the introduction or spread of weeds into adjacent native vegetation could impact on the quality of that vegetation and its habitat values.

After consideration of the available information, as well as the applicant's avoidance, minimisation, and mitigation measures (see Section 3.1), the Delegated Officer determined that the proposed clearing can be managed through conditions to unlikely to lead to an unacceptable risk to the environment. The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise and reduce the impacts and extent of clearing;
- instate clearing buffers of 50 metres around the VT01 vegetation type, representing the Priority 1 Burrup Peninsula rock pile communities, and rock pile fauna habitat;
- instate clearing buffer areas of 50 metres around known locations of the Priority flora; *Terminalia supranitifolia, Vigna triodiophila,* and *Rhynchosia bungarensis*;
- Instate a clearing buffer area of 20 metres around the known location of the Priority 3 taxa; *Oldenlandia* sp. Hamersley Station (A.A. Mitchel PRP1479);
- ensure that no more than 0.68 hectares is to be cleared within the VT04 vegetation type (samphire vegetation);
- cover all boreholes at the end of each day and backfill all boreholes and test pits upon completion to prevent fauna getting trapped;
- conduct clearing in a slow progressive manner in a single direction towards adjacent native vegetation to allow fauna to move into adjacent native vegetation ahead of the clearing activity;
- revegetate mechanically cleared areas by returning vegetative material and topsoil removed by clearing back to the areas no longer required; and
- implement weed management measures to mitigate impacts to adjacent vegetation.

1.5. Site maps

Figure 1 (a - d). Maps (4) of the application area. The areas cross-hatched yellow indicates the area authorised to be cleared under the granted clearing permit.

Figure 1(a)

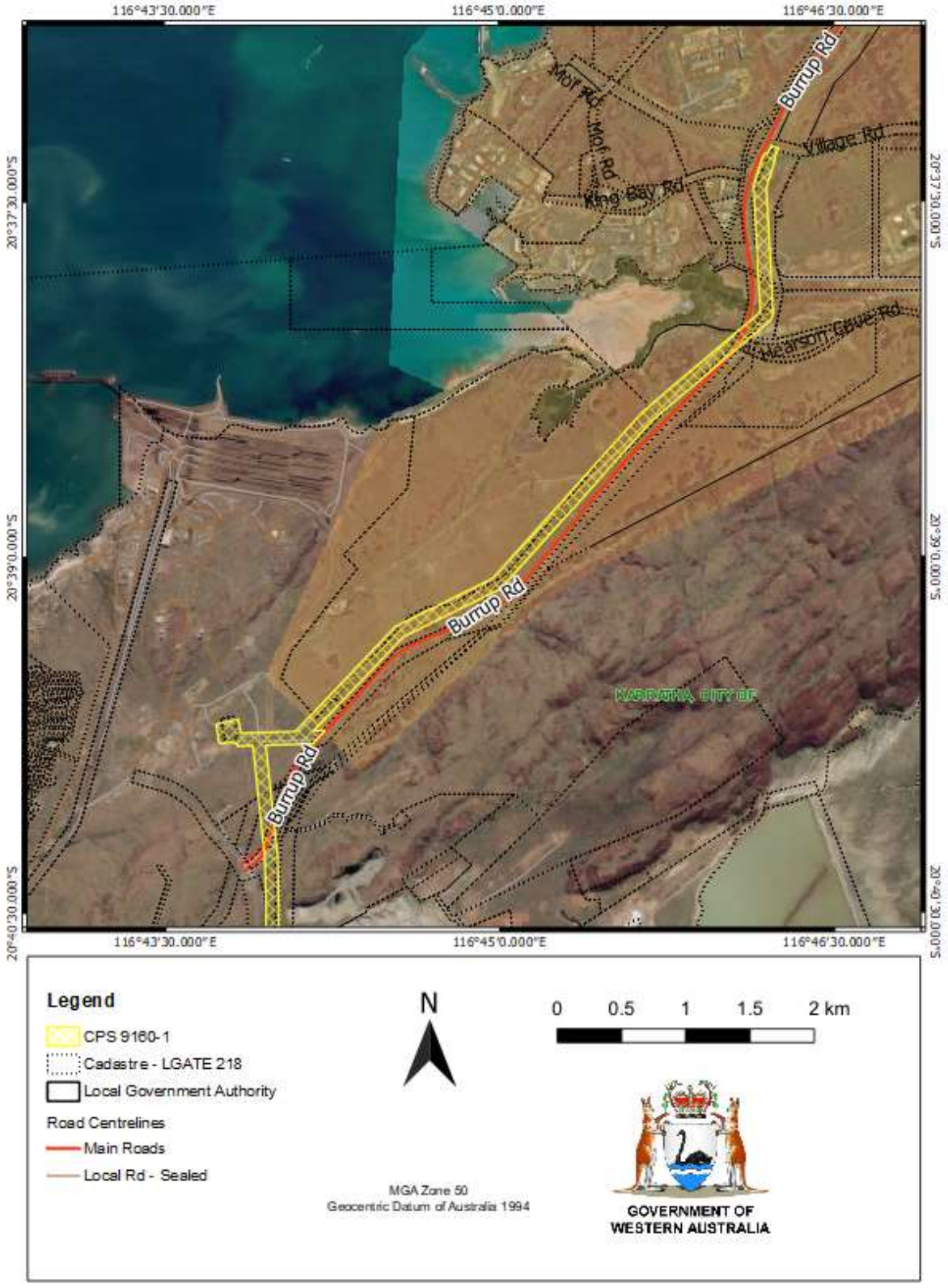


Figure 1(b)


116°43'30.000"E
116°45'0.000"E
116°46'30.000"E
20°40'30.000"S
20°42'0.000"S
20°43'30.000"S
Cinders Rd
MARBATHA CITY OF
Legend
CPS 9160-1
Cadastre - LGATE 218
Local Government Authority
Road Centrelines
Main Roads
Local Rd - Sealed
N
0 0.5 1 1.5 2 km
MGA Zone 50
Geocentric Datum of Australia 1994
GOVERNMENT OF WESTERN AUSTRALIA

Figure 1(c)

Legend

- CPS 9160-1
- Cadastre - LGATE 218
- Local Government Authority

Road Centrelines

- Local Rd - Sealed

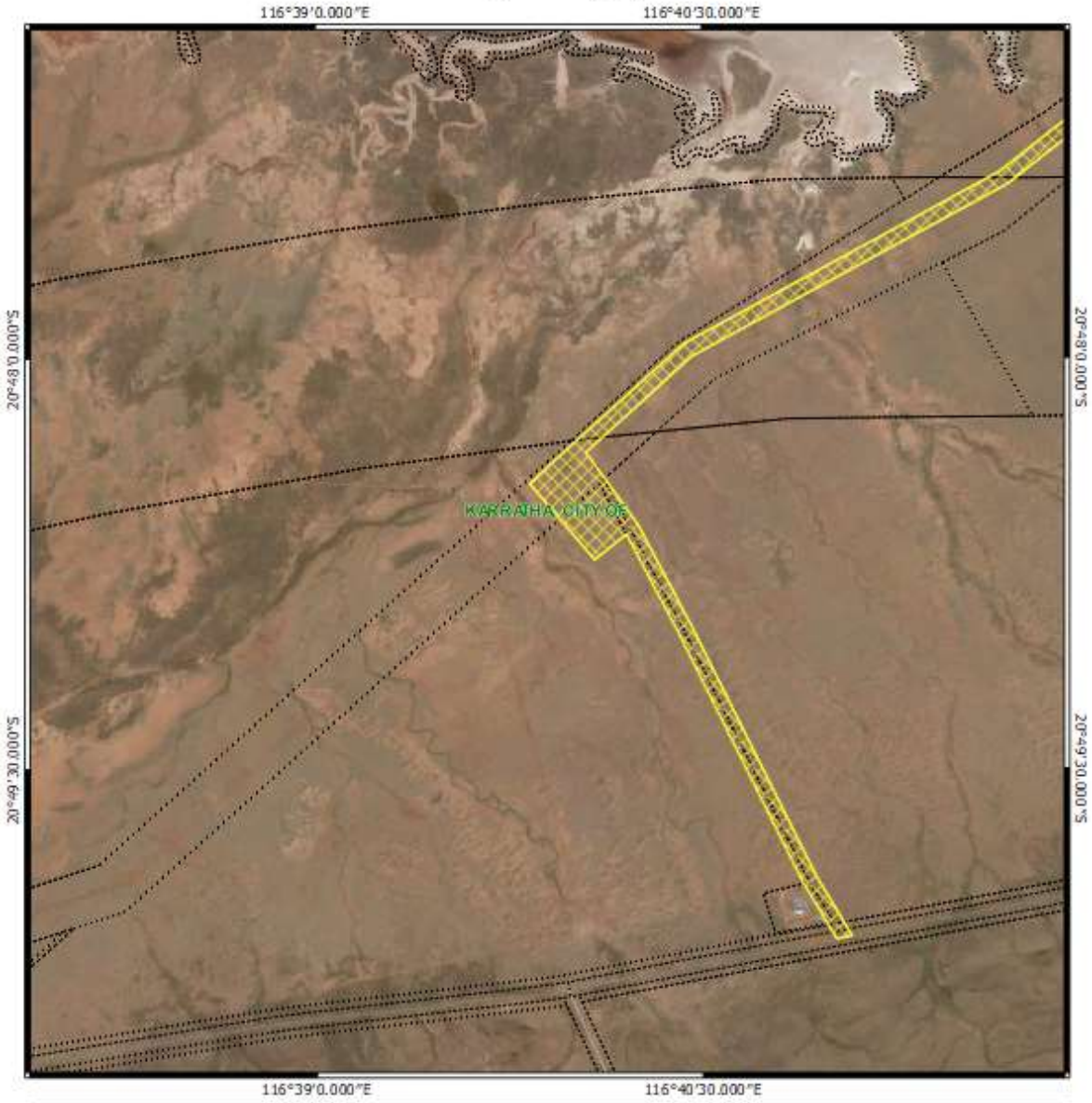
N

0 0.5 1 1.5 2 km

MGA Zone 50
Geocentric Datum of Australia 1994

GOVERNMENT OF WESTERN AUSTRALIA

Figure 1(d)



Legend

- CPS 9160-1
- Cadastre - LGATE 218
- Local Government Authority

Road Centrelines

- Local Rd - Sealed

N

0 0.5 1 1.5 2 km

MGA Zone 50
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GOVERNMENT OF WESTERN AUSTRALIA

2. Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.3), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Biosecurity and Agriculture Management Act 2007* (BAM Act),
- *Contaminated Sites Act 2003* (CS Act)
- *Energy Operators Powers (Powers) Act 1979*
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- Technical guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016a)

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

The applicant has demonstrated avoidance, minimisation, and mitigation measures. Clearing of significant areas will be avoided and/or minimised through the discrete placement of test locations and tracks. The avoidance hierarchy is achieved primarily through changes in scope and design to avoid environmentally-significant areas, and the development and implementation of relevant environmental management plans or strategies.

When considering the placement of the geotechnical boreholes and test pits, a site-by-site assessment with designers, geo-technicians and the Horizon Power environmental team was undertaken to identify constraints and the most practicable location of the sites utilising existing access tracks and existing cleared areas wherever possible (GHD 2020a). The site selection process also needed to consider other, non-environmental, constraints such as the location of the Dampier to Bunbury Natural Gas Pipeline corridor, overhead power lines, existing access, rocky terrain (particularly on the Burrup Peninsula), geological conditions, and Aboriginal heritage sites (GHD 2020a).

Potential impacts to native vegetation have been minimised initially by selecting locations that utilise existing access tracks, cleared areas, or sparsely vegetated areas (GHD 2020a). Upon the conclusion of drilling or test pit establishment, the same access track will be used to return to the main road. Proposed clearing for access tracks accounts for approximately 75 per cent of proposed clearing (11.65 hectares). This involves driving over native vegetation only, rather than removal of vegetation by mechanical means. Due to the nature of the proposed clearing, the impact on vegetation is expected to be minimal, with vegetation able to revegetate naturally.

Clearing of the VT01 vegetation type (corresponding with the Priority 1 Burrup Peninsula rock pile communities) has been avoided completely (GHD 2020a), and proposed clearing of the VT11 vegetation type (corresponding with the Priority 3 Horseflat Land System of the Roebourne Plains) has been minimised as far as practicable (Section 3.2.1). Clearing within the samphire flats community of the VT04 vegetation type has been minimised, with one borehole location present in this area only. The access route to this borehole as shown in the indicative clearing footprint is a 'worst case scenario' only, with the eventual route determined onsite with the objectives of a safe access that causes the least impact to the samphire flats (Horizon Power 2021).

Four Priority flora taxa (three Priority 3, and one Priority 4) have been identified from within the application area (GHD 2020b). All locations of Priority flora will be avoided, with at least a 50 metre buffer from clearing areas applied (GHD 2020a), except for one location (TPMS03-04) where a 20 metre buffer will apply due to a test pit location being constrained to target a proposed substation footprint (GHD 2020a).

No drainage lines will be significantly impacted. The application area has been modified during the assessment to exclude a prominent watercourse (Horizon Power 2021), and ephemeral drainage lines will only be intersected by access tracks where unavoidable, with clearing restricted to being driven over only (that is, not mechanically cleared) (GHD 2020a). Boreholes will be capped and the cleared drill pad and test pit areas will have topsoil reinstated to facilitate vegetation regrowth (GHD 2020a; Horizon 2021).

A Weed Management Plan will be developed prior to the works being undertaken and will be implemented to mitigate the risk of weeds entering the site or spreading (GHD 2020a).

Significant areas to be avoided will be provided to the geotechnical team in hard copy and digital format to ensure sites of environmental significance are avoided in the field when finalising the location of boreholes, test pits and access tracks. Geotechnical teams will avoid specified locations by referring to GPS data that delineates 'no-go' zones (GHD 2020a). The application area and indicative clearing footprint provided by the applicant reflect the avoidance strategies identified.

3.2. Assessment of impacts on environmental values

The assessment against the clearing principles (Appendix D) identified that the impacts of the proposed clearing present a potential risk to the biological values of significant vegetation, flora and fauna, as well as riparian areas and land and water resources. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1. Environmental value: biological values (biodiversity) – Clearing Principle (a)

Assessment: Fourteen vegetation types and six broad fauna habitat types have been described over the application area. Over 62 percent of the indicative clearing footprint provided by GHD (2020a) is in Very Good condition (Appendix C1). Two Priority Ecological Communities (PECs) listed by the Department of Biodiversity, Conservation and Attractions (DBCA) have also been identified over the application area (Appendix C3) (GHD 2020b). Two of the fourteen vegetation types described and mapped by GHD (2020a) correspond with PECs. That is;

- the VT01 vegetation type corresponds with the Priority 1 Burrup Peninsula rock pile communities; and
- the VT11 vegetation type corresponds with the Priority 3 Horseflat Land System of the Roebourne Plains.

The Priority 1 Roebourne Plains gilgai grasslands, mapped regionally in the local area, were not represented within the application area (GHD 2020a; GHD 2020b).

The VT01 vegetation type representing the Burrup Peninsula rock pile communities occurs over just 1.6 hectares or (0.4 per cent) of the application area in the northern Burrup Peninsula section. They consist of pockets of vegetation in rock piles and outcrops and are important for providing fire and refuge for flora (Kendrick and Stanley 2001). Rocky areas supporting the VT01 vegetation type will be avoided and borehole locations, test pit locations, and access tracks in the indicative clearing footprint provided by the applicant (GHD 2020a) does not intersect the VT01 vegetation type.

The VT11 vegetation type, representing the Horseflat Land System, is more widespread and has been mapped over approximately 120 hectares (or 31.5 per cent) by GHD (2020a) in the southern areas of the application area. Due to the widespread distribution of this vegetation type it can not be completely avoided as the planned transmission line route intersects areas where the VT11 vegetation type is the dominant ecological community within the landscape. Approximately 4.3 hectares of the VT11 vegetation type (or 3.6 per cent of that occurring within the application area) will require clearing to provide access and for boreholes and test pits that cannot be avoided (GHD 2020a). Over 75,700 hectares of the Horseflat Land System have been mapped in the local area of a 50 kilometre radius of the application area. The small area of clearing in relation to its occurrence in the local area will not likely be significant.

One vegetation type described by GHD (2020b) has been assessed by the Environmental Protection Authority (EPA) as demonstrating high conservation value within the Burrup peninsula (DWER 2021b). That is, the samphire flats of the VT04 vegetation type described by GHD (2020b) as; *Tecticornia ?indica* subsp. *leiostachya* and *Tecticornia ?pterygosperma* low chenopod shrubland with scattered *Avicennia marina* on saline flats with tidal inundation. Impact to this vegetation type has been minimised, however, one borehole location is required, with the associated access track location determined onsite with the objectives of a safe access that causes the least impact as possible to the Samphire flats (Horizon Power 2021).

The flora and vegetation survey of GHD (2020b) recorded 131 flora taxa (including subspecies and varieties), representing 35 families and 86 genera. This total comprises 126 native flora taxa and five introduced taxa, including four Priority species listed by the DBCA identified from within the application area, and wider survey area. Details of these four species as interpreted from GHD (2020b) data are provided in the table below.

Table 1: Details of the four Priority flora species identified during the GHD (2020b) survey

Taxon	Status	No. locations in total	No. plants in total	No. locations in application area	No. plants in application area	No. locations in indicative footprint	No. plants in indicative footprint
Terminalia supranitifolia	P3	86	110	13	31	Avoided	None

Taxon	Status	No. locations in total	No. plants in total	No. locations in application area	No. plants in application area	No. locations in indicative footprint	No. plants in indicative footprint
Vigna triodiophila	P3	3	16	1	5	Avoided	None
Oldenlandia sp. Hamersley Station (A.A. Mitchel PRP1479)	P3	2	2	1	1	Avoided	None
Rhynchosia bungarensis	P4	15	78	1	20	Avoided	None

A likelihood of occurrence of significant flora taxa occurring over the application area was undertaken by GHD (2020b), and is presented as Appendix F2. Considering the results of the likelihood of occurrence assessment, and survey effort over the application area, apart from the four Priority listed taxa identified above, additional flora taxa of significance are unlikely to occur over the application area (GHD 2020b).

No Priority flora are proposed to be cleared, with the indicative clearing footprint (GHD 2020a) designed to ensure significant flora species are avoided. One location each for *Vigna triodiophila* and *Rhynchosia bungarensis* were recorded by GHD (2020b) in boulders and rockpiles of the V1 vegetation type within the application area. The V1 vegetation type will be avoided altogether. For the vast majority of known Priority flora locations, a minimum 50 metre buffer will be applied to ensure significant flora are a sufficient distance from clearing areas. This includes the 13 locations of *Terminalia supranitifolia.* The one exception is the *Oldenlandia* sp. Hamersley Station (A.A. Mitchel PRP1479) location within the application area whereby a 50 metre buffer cannot practically be applied due to the constraint of test pit location TPMS04 targeting a proposed substation design footprint. A 20 metre buffer will be applied in this instance (GHS 2020a).

Conclusion: The native vegetation proposed to be cleared is comprised of vegetation types and flora taxa typical to the region. Noting the size and context of the proposed clearing, and the avoidance and minimisation strategies provided by the applicant (GHD 2020a), potential impacts are unlikely to affect Priority flora, nor the Priority 1 Burrup Peninsula rock pile community. Whilst the native vegetation is not considered to comprise a high level of biological diversity compared to surrounding areas, approximately 4.3 hectares of the Priority 3 Horseflat Land System of the Roebourne Plains (vegetation type VT11) will be impacted, along with up to 0.68 hectares of the Samphire flats (vegetation type VT04). These impacts are considered minimal in consideration of the distribution and abundance of adjacent habitat, and that vegetation will be driven over only for vehicle access (i.e. not mechanically cleared), and vegetation anticipated to regrow in these areas (GHD 2020a).

GHD (2020b) recorded five non-native flora species over, or immediately adjacent to, the application area including **Passiflora foetida* (Passionflower), **Cenchrus ciliaris* (Buffel Grass), **Aerva javanica* (Kapok), **Vachellia farnesiana* (Mimosa Bush), and **Tamarix aphylla* (Athel Pine). **Tamarix aphylla* is a Weed of National Significance (WoNS) and a declared pest under the *Biosecurity and Agricultural Management Act 2007. *Passiflora foetida* and **Tamarix aphylla* were not recorded within the indicative clearing footprint provided by the applicant (GHD 2020a), however, **Cenchrus ciliaris* and **Aerva javanica* have been rated as having a high potential impact under the invasive plant prioritisation process (DPaW 2013). Adjacent vegetation is susceptible to weed invasion which the clearing process may exacerbate, thereby reducing habitat quality.

For the reasons set out above, and the avoidance and mitigation measures provided by the applicant (Section 3.1), it is considered that potential impacts of the proposed clearing on flora and vegetation can be managed by avoiding Priority flora and vegetation of significance and implementing appropriate weed control.

Conditions: To address potential impacts to flora and vegetation of significance from proposed clearing, the following management measures will be required as conditions on the clearing permit:

- Instate clearing buffer areas of 50 metres around the VT01 vegetation type, representing the Priority 1 Burrup Peninsula rock pile communities;
- Instate clearing buffer areas of 50 metres around known locations of the Priority flora; *Terminalia supranitifolia, Vigna triodiophila,* and *Rhynchosia bungarensis*;
- Instate a clearing buffer area of 20 metres around the known location of the Priority flora taxa; *Oldenlandia* sp. Hamersley Station (A.A. Mitchel PRP1479);
- ensure that no more than 0.68 hectares is to be cleared within the VT04 vegetation type (samphire vegetation);
- Revegetate mechanically cleared areas (boreholes and test pits) by returning vegetative material and topsoil removed by clearing back to the areas no longer required; and
- Implement weed management measures to mitigate impacts to adjacent vegetation.

3.2.2. Environmental value: biological values (fauna) – Clearing Principle (b)

Assessment: Six broad fauna habitat types have been described over the application area (GHD 2020a): Rock piles, rocky plains and low rises, minor drainage lines, saline flats, sand loam plains, and gilgai grasslands.

A fauna survey of the northern section of the application area (GHD 2019) identified 77 fauna species, including; 50 birds, 13 mammals and 14 reptiles. A likelihood of occurrence of significant fauna species occurring over the application area was undertaken by GHD (2020b), and is presented as Appendix F3. The assessment concluded that six species were likely to occur over the application area (GHD 2020a):

- Northern Quoll *(Dasyurus hallucatus)* (EN)
- Pilbara Olive Python *(Liasis olivaceus* subsp. barroni) (VU)
- Water-rat *(Hydromys chrysogaster)* (P4)
- Lined soil crevice skink (Dampier) *(Notoscincus butleri)* (P4)
- Peregrine Falcon *(Falco peregrinus)* (OS)
- Eastern Osprey *(Pandion haliaetus)* (Mi)

Rocky areas of the VT01 vegetation type, potentially utilised by the Northern Quoll and Pilbara Olive Python, are present in the application area. The Northern Quoll and Pilbara Olive Python occur predominantly within Rocky habitats, gorges and major drainage lines that will not be impacted by the proposed clearing which will exclude rocky areas and avoids the prominent water course within the area.

The Peregrine Falcon and Eastern Osprey may regularly overfly the application area. The Peregrine Falcon may utilise any of the habitats present as foraging habitat whereas the Eastern Osprey forages over the open ocean and large rivers. Breeding sites for both species such as rocky ledges, cliffs or tall trees are not present over the application area.

The Lined Soil-crevice Skink has been recorded associated with spinifex-dominated areas near creek and river margins (Wilson and Swan 2008). No larger watercourses occur within the application area, and small ephemeral drainage lines will largely be avoided. However, the species may be present, particularly within the VT03 vegetation type representing minor drainage line habitat. A small area of 0.06 hectares of minor drainage line habitat potentially used by the Lined Soil-crevice Skink may be impacted by driving vehicles over this habitat. However, considering the minor area impacted in the local context, and the likely recovery of vegetation, proposed clearing is unlikely to impact this species.

Marshland habitat occurs to the south of the area surveyed by GHD (2019). That is, the Littoral Land System (286Li) consisting of bare coastal mudflats, samphire flats of samphire low shrublands and sparse acacia shrublands (DPIRD 2017). Over the application area the Littoral Land System corresponds with the VT04 vegetation type described by GHD (2020b), and known colloquially as Samphire flats. Twenty-nine shorebirds that are migratory (predominantly in the Families Charadriidae and Scolopacidae), with several also listed as Priority or Threatened species, have been recorded within the local area, many of which would occur in this habitat (Appendix C3).

The Water-rat is predominantly aquatic and occurs predominantly near permanent fresh water. However, they are also present along the Western Australian coastline. Although they live on land they depend on the water for food and if present would occur intermittently over the VT04 vegetation type.

Clearing within the marshland habitat of samphire flats, potentially utilised by migratory shorebirds and the Water-rat, will be minimised, however, approximately 0.68 hectares is required for access to one proposed borehole (BHT79) located within this habitat.

Fauna may be present at the time of the clearing activity. Fauna management measures such as undertaking clearing in a slow, progressive manner towards adjacent vegetation may mitigate any potential impacts to fauna. In addition, uncapped boreholes pose a potential threat to ground fauna. Capping boreholes at the end of each day and at completion will reduce the likelihood of death or injury to fauna.

Conclusion: The fauna habitat types within the application area will remain well-connected and part of a larger contiguous landscape of similar habitats within the local area and surrounding region. Over 537,000 hectares of native vegetation remains within the local area, representing 92 per cent of its original extent. The application area is unlikely to support fauna habitat that is in better condition than the surrounding available habitat. Nevertheless rocky outcrops and rockpiles of the VT01 vegetation type will be avoided and clearing within drainage line habitat and samphire flats minimised. The proposed indicative clearing footprint of GHD (2020a) is unlikely to comprise significant locally or regionally unique habitat for indigenous fauna dependent on the habitats present. Fauna may be present at the time of the clearing activity. Adjacent vegetation is susceptible to weed invasion which the clearing process may exacerbate, thereby reducing fauna habitat quality. Uncapped boreholes pose a potential threat to ground fauna and should be capped prior to the conclusion of works on each day.

For the reasons set out above, and the avoidance and mitigation measures provided by the applicant (Section 3.1), it is considered that potential impacts of the proposed clearing on fauna and fauna habitats can be managed by avoiding rocky outcrops and rockpile habitat of the VT01 vegetation type, and implementing appropriate weed control.

Conditions: To address potential impacts to fauna and fauna habitat from the proposed clearing, and potential weed encroachment, the following management measures will be required as conditions on the clearing permit:

- instate clearing buffer areas of 50 metres around the VT01 vegetation type representing rocky habitat and rock piles;
- ensure that no more than 0.68 hectares is to be cleared within the VT04 vegetation type (samphire vegetation);
- conduct clearing in a slow progressive manner in a single direction towards adjacent native vegetation to allow fauna to move into adjacent native vegetation ahead of the clearing activity
- cover all boreholes at the end of each day and backfill all boreholes and test pits upon completion; and
- implement weed management measures to mitigate impacts to adjacent vegetation.

3.2.3. Environmental value: watercourse or wetlands – Clearing Principle (f)

Assessment: No significant mapped rivers or drainage lines intercept, or are located within the vicinity of, the application area. The application area was modified during the assessment to exclude one prominent watercourse (Horizon Power 2021).

However, there are several minor drainage lines that intersect the application area, the majority orientated either north to south or east to west, from high to low elevation (GDH 2021a). These drainage lines are associated with infrequent surface water caused by sporadic weather events like seasonal cyclones. Drainage lines drain onto coastal flats towards the Indian Ocean with discharge points being either direct ocean outlet or dispersal through marshy flats such as the VT04 vegetation type.

Vegetation types VT03 and VT14 (GDH 2021b) align with drainage lines that incorporate *Eucalyptus victrix* and/or *Corymbia hamersleyana,* and are considered riparian vegetation, as is the VT19 vegetation type of degraded vegetation surrounding a wetland (Appendix C; Appendix F1).

The mapped VT04 vegetation type of GHD (2020b) corresponds with the Littoral Land System, and is known colloquially as Samphire flats. The samphire flats are reported as a sensitive environmental receptor (DWER 2021b), and also functioning as a nutrient filter and buffer for the protection of the downstream King Bay ecosystem. Both the samphire flats and King Bay ecosystems have been assessed by the EPA as demonstrating high conservation value within the Burrup peninsula (DWER 2021b).

The proposed geotechnical test locations were selected to avoid minor intermittent surface water drainage lines where riparian vegetation is present. The VT14 vegetation type will be avoided by the clearing proposed, however, minor areas of riparian vegetation within vegetation type VT03 (0.07 hectares) and vegetation type VT19 (0.16 hectares) will be impacted. The samphire vegetation type VT04 will also be impacted, therefore the proposed clearing is likely to intersect native vegetation growing in, or in association with, an environment associated with a watercourse or wetland.

Conclusion: The applicant has advised that no drainage lines will be significantly impacted as minor ephemeral drainage lines will be intersected by access tracks only where they are unavoidable, with clearing restricted to vegetation being driven over only (that is, not mechanically cleared) (GHD 2020a). One borehole and associated access is located in the samphire flats community of Vegetation Type VT04. Adjacent riparian vegetation is susceptible to weed invasion which the clearing process may exacerbate, thereby reducing riparian habitat quality.

Conditions: To address potential impacts to riparian vegetation from the proposed clearing, and potential weed encroachment, the following management measures will be required as conditions on the clearing permit:

- No more than 0.68 hectares to be cleared within the VT04 vegetation type;
- Revegetate mechanically cleared areas (boreholes and test pits) by returning vegetative material and topsoil removed by clearing back to the areas no longer required; and
- Implement weed management measures to mitigate impacts to adjacent vegetation.

3.2.4. Environmental value: land and water resources – Clearing Principles (g) and (i)

Assessment: Land degradation risks for water erosion and salinity are generally rated at low over the application area. Throughout the northern Burrup area of the application area in the Granitic Land System, the terrain is rugged, with an elevation of approximately 60 metres. Topography in the southern part of the application area (Dampier and Maitland) is relatively flat and stable, with an elevation of approximately 10 metres to 30 metres. Elevated, rugged

landscapes will be avoided by the works as they present difficulties to access and operate machinery. Vegetation type VT01 will be avoided as it represents the Priority 1 Burrup Peninsula rock pile communities (GHS 2020a).

Runoff from rainfall events may occur as sheet flow, as water forms a film over the landscape. In the northern Burrup Peninsula section of the application area, sheet flow typically occurs in broad inter-drainage areas on alluvial plains, near the baselines of hills and ridges (GHD 2020a). Sheet flow is likely to occur from time-to-time within the application area due to the presence of non-cracking clays. However, surrounding areas comprise remnant vegetation and access to boreholes and test pit locations will be gained by vegetation being driven over rather than mechanically cleared, thereby minimising the likelihood of wind or water erosion (GHD 2020a). Soils will be minimally exposed as a result of the proposed mechanical clearing for boreholes and test pits, causing a small and localised impact within the surrounding landscape. The risk of soil loss during rainfall events is considered minimal in consideration of the borehole and test pit locations.

The current surface water hydrology regime will be maintained. No increased incidence of flooding or erosion along drainage lines is likely to occur due to the limited extent of clearing over the length of the application area with minimal sheet flow over a short time-scale, and adequate surrounding native vegetation to allow water to infiltrate.

Groundwater is mapped at 1,000 to 3,000 TDS/mg/L (that is, fresh to brackish) and is unlikely to increase in the surrounding area of the application area due to small scale of clearing in the local context.

Acid sulphate soils (ASS) risk mapping indicates the soils of the survey area have a 'High to Moderate' or a 'Moderate to Low' risk of causing environmental damage, if those soils are disturbed. The High to Moderate risk rating suggests there is a high to moderate risk of ASS occurring within three metres of the natural soil surface and could be disturbed by earthworks and dewatering. The 'Moderate to Low' risk rating suggests a moderate to low risk of ASS occurring within three metres of the soil surface, but a high to moderate risk of ASS below 3 metres of the soil surface.

Due to the nature of the clearing and, in particular, that groundwater is unlikely to be intercepted, the risk of an increase in soil acidity due to the clearing activity is considered low. However, ASS are a standard consideration as part of any pre-mobilisation risk assessment (Horizon Power 2021), and a project specific management strategy will be developed to mitigate and manage any risk associated with ASS at the completion of the risk assessment, and prior to mobilisation (Horizon Power 2021). The applicant should refer to DWER's ASS guidelines for information to assist with the management of ground and/or groundwater disturbing works.

Conclusion: Noting the landforms of the application area, the extent and nature of the proposed clearing, the surrounding environment of native vegetation and condition of that vegetation, and the management prescriptions employed, the proposed clearing is not likely to cause appreciable land degradation.

Conditions: No land degradation or water management conditions required.

3.3. Relevant planning instruments and other matters

Clearing Permit application CPS 9117/1 was advertised on the DWER website for a 21 day public comment period on 30 November 2021. Two public submissions were received in relation to this application (Appendix B). The concerns of the holders of adjoining and overlapping tenure have been addressed by the applicant (Submission response 2021a; 2021b).

The City of Karratha (2021) (the City) provided advice that the proposed clearing is likely to impact, or occur in close proximity to, three DBCA declared PECs. The City submitted that the Roebourne Plains gilgai grasslands in particular, is a Priority 1 PEC that is restricted to the Karratha area and is under threat from the cumulative impacts of other industrial developments occurring in or near the Maitland Industrial Estate area. The City recommended that PECs be professionally mapped to understand their extent, and avoided wherever possible. GHD (2020b) have undertaken a flora and vegetation survey that has clarified the distribution of PECs over the application area, and the applicant has avoided these areas wherever possible. Section 3.2.1 of the decision report discusses the presence of PECs and their management.

The City also submitted that soil disturbance or clearing will encourage the spread of weeds, especially Buffel Grass *(*Cenchrus ciliaris)* and Passionflower *(*Passiflora foetida),* and that these weeds pose a threat to known PECs and to the biodiversity in the nearby Murujuga National Park. Both Buffel Grass and Stinking Passionflower were recorded by GHD (2020b) and weeds are considered in Section 3.2.1 with potential impacts to conservation areas considered under principle (h) in Appendix D.

Under the City of Karratha Local Planning Scheme No. 8, the application area is zoned: Industrial development (Zone No. 729); Strategic industry (Zone No. 2915); Infrastructure (Zone No. 750); State and regional roads (Zone No. 2908); District roads (Zone No. 601); Local roads (Zone No. 798); and Rural (Zone No. 55). The City did not identify any additional Local Government Agency approvals required. Horizon Power is a state agency and will access

relevant properties in accordance with the *Energy Powers (Powers) Act 1979,* including notice of entry (Horizon Power 2020).

The application area is located within the Pilbara Surface water Area (UFI 54) and the Pilbara Groundwater Area (UFI 44) proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act). There are no mapped rivers proclaimed under the RIWI Act in the vicinity, and the application area is not located within any *Country Areas Water Supply Act 1947* (CAWS Act) Clearing Control Catchments, or Public Drinking Water Source Areas.

Advice obtained from DWER (2021a) in relation to potential water quality impacts under the RIWI Act recognised that up to 75 per cent of the proposed clearing will be driven over only, with native vegetation not removed but impacted by vehicle transit alone. This activity should not pose any risk to the small waterways that the application area traverses (DWER 2021a). However, DWER (2021a) noted that the western side of the application area overlapped an intermittent waterway, and any activity that may impact the bed and banks of that watercourse, other than vehicular transit, may require a bed and banks permit. Ideally the application area should be reduced in size or moved to not include that waterway (DWER 2021a). The application area was amended by the applicant to exclude the waterway referred to by DWER (2021a) (Horizon Power 2021). No surface water or groundwater will be required to be taken for the proposed clearing (Horizon Power 2021), and no other permitting by DWER is required.

Advice was obtained from DWER (2021b) as to the suitability of the land for the proposed clearing under section 58(6)(b) of the *Contaminated Sites Act 2003* (CS Act). Several relevant lots were classified under the CS Act as '*possibly contaminated - investigation required'* on 16 September 2015 and, in particular, Part Lot 264 on Deposited Plan 220363 and Lot 322 on Deposited Plan 42624. Previous investigations have found hydrocarbons, such as from petrol or diesel, to be present in soil and/or groundwater in a number of locations associated with a nearby facility that includes a workshop, fuel storage area, refuelling area and oil storage (DWER 2021b). Groundwater abstraction is not permitted in some areas other than for analytical testing or remediation. DWER (2021b) advise that an appropriate management plan should be prepared to address the health and environmental risks associated with potential exposure of soil or groundwater contamination during excavations for geotechnical assessment or testing.

No groundwater abstraction will occur, and the specific locations of contamination can be avoided by the proposed geotechnical investigation locations (Horizon Power 2021). Horizon Power (2021) advise that contaminated soils are a standard consideration of the pre-mobilisation risk assessments, and if a risk to health or the environment as a result of exposure to contaminated soils is determined, an appropriate project-specific management strategy will be developed to mitigate any risk (Horizon Power 2021). It is the permit holder's responsibility to comply with the provisions of the *Contaminated Sites Act 2003*.

DWER (2021b) also advise of potential nutrient contamination on several lots associated with a nearby plant on Lot 3017 on Deposited Plan 50979. A current assessment of 'potential environmental risk' applies to the samphire flat ecosystem, corresponding with the mapped VT04 vegetation type of GHD (2020b). The Samphire flats are reported as a sensitive environmental receptor by DWER (2021b), and also function as a nutrient filter and buffer for the protection of the downstream King Bay ecosystem. DWER (2021b) advise that an appropriate management plan should be prepared to ensure any ground disturbing activity associated with geotechnical investigation or testing (or subsequent construction of transmission towers) are located to avoid and/or minimise clearing within the samphire flats. The applicant has demonstrated avoidance and minimisation of impact to samphire flats vegetation (Section 3.1; Section 3.2.3), and restrictions to the amount of clearing within this vegetation type will apply (Section 3.2.3).

A Native Title Determination encompasses the application area. That is; Ngarluma/Yindjibarndi (WCD2005/001). A Indigenous Land Use Agreement (ILUA) covers the southern section of the application area; RTIO Ngarluma Ilua (Body Corporate Agreement).

Spatial data indicates that over 120 Registered and Aboriginal Heritage sites listed in accordance with section 5 of the *Aboriginal Heritage Act 1972* (WA) and other Aboriginal Heritage sites occur over the entire length of the application area (Appendix G). Horizon Power will engage Murujuga heritage monitors for the entirety of the works on the Burrup, and Ngarluma heritage monitors for the entirety of the works south of the Burrup (GHD 2020a). It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

Appendix A – Additional information provided by applicant

Information	Description
Horizon Power (2020)	Supporting Information and clarification for clearing permit application CPS 9160/1. Regional Power Corporation. Received by DWER on 22 December 2020. (DWER Ref: A1976264).
Horizon Power (2021)	Additional supporting Information and clarification for clearing permit application CPS 9160/1. Regional Power Corporation. Received by DWER on 8 June 2021. (DWER Ref: A2015009).
GHD (2020a)	Report for Horizon Power. Supporting Information for Geotechnical Works Clearing Permit Application 12542051, including description of clearing activities and indicative footprint, assessment of impacts, assessment against the 10 clearing principles, and avoidance and minimisation strategies. December 2020 (DWER Ref A1976262)
GHD (2020b)	Flora and Vegetation Survey. Horizon Power. Burrup Expansion Project, 12530473. July 2020 (DWER Ref A1976263)
GHD (2019)	Results of a level 1 fauna assessment conducted for the northern section of the application area for the 124-KRTDMP 132kV Line Upgrade Project included in GHD (2020a).

Appendix B –Details of public submissions

Submission 1: Summary of comments	Consideration of comment
Lack of consultation with holders of adjoining and overlapping tenure.	The applicant has initiated and completed consultation with the holders of adjoining and overlapping tenure
A request that DWER provide contact details to the applicant to initiate discussion.	Relevant contact details have been provided to the applicant by DWER
No activities to be conducted within adjoining and overlapping tenure until concerns have been addressed by the applicant and support been provided.	Concerns of holders of adjoining and overlapping tenure have been addressed by the applicant (Submission response 2021a).

Submission 2: Summary of comments	Consideration of comment
Lack of consultation with holders of adjoining and overlapping tenure.	The applicant has initiated and completed consultation with the holders of adjoining and overlapping tenure
A request that DWER provide contact details to the applicant to initiate discussion.	Relevant contact details have been provided to the applicant by DWER
No activities to be conducted within adjoining and overlapping tenure until concerns have been addressed by the applicant and support been provided.	Concerns of holders of adjoining and overlapping tenure have been addressed by the applicant (Submission response 2021b).

Appendix C – Site characteristics

The information provided below describes the key characteristics of the area proposed to be cleared and is based on the best information available to DWER at the time of this assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix D.

C.1 Site characteristics

<table>
<tr><th>Site characteristic</th><th>Details</th></tr>
<tr><td>Local context</td><td>The application area is located within the Pilbara IBRA Bioregion, (PIL) of Thackway and Cresswell (1995) and the Roebourne Sub-region (PIL04).

The application area extends from the Burrup Peninsula, through Dampier and further south, and is located within the City of Karratha. The southern portion of the application area is less developed than the northern section which is adjacent to strategic and general industry. Almost 92 per cent of the original vegetation cover is retained in the local area, defined as a 50 kilometre radius of the application area.</td></tr>
<tr><td>Climate</td><td>The project is located in the Pilbara region of Western Australia and experiences a semi-arid climate. Temperatures are warm to hot all year and rainfall is generally low, mostly falling in the late summer months due to the influence of tropical cyclones and monsoon (Commonwealth of Australia 2005). The closest meteorological recording station is located in Karratha (No. 004083) approximately 1.4 km from the survey area. Climatic data from this station indicates that the mean maximum temperature ranges from 36.3 °C in March, to 26.4 °C in July. The mean minimum temperature ranges from 26.9 °C in January to 13.8 °C in July. The mean annual rainfall for all years is 292.4 mm.</td></tr>
<tr><td>Landform</td><td>The project is located in the Karratha Coast Zone of the Pilbara Province. The Pilbara Province lies over the Pilbara Craton, which consists of two different tectonic components. The two broad geologic sequences are the ancient Archaean granite-greenstone terrain and the younger volcano-sedimentary sequence of the Hamersley Basin (Tille 2006).

The Karratha Coast Zone is characterised by coastal mudflats with sandy coastal plains and some hills on marine deposits and some sedimentary and volcanic rocks of the Pilbara Craton. Soils include tidal soils with some calcareous loamy earths, salt lake soils and red/brown noncracking clays (Tille 2006).</td></tr>
<tr><td>Ecological linkage</td><td>No formal mapped ecological linkages in the vicinity</td></tr>
<tr><td>Conservation areas</td><td>The application area does not intersect with any DBCA managed lands. The Murujuga National Park is within 180 metres of the application area in the northern (Burrup) section.
<table>
<tr><th>Description</th><th>Proximity (m)</th><th>Number in local area</th></tr>
<tr><td>Murujuga National Park</td><td>176</td><td>3</td></tr>
<tr><td>DBCA Managed Lands</td><td>5,924</td><td>23</td></tr>
<tr><td>Conservation and Parks Commission</td><td>7,428</td><td>107</td></tr>
<tr><td>Executive Director Department Of CALM</td><td>11,978</td><td>2</td></tr>
<tr><td>CALM Executive Body WPL</td><td>13,571</td><td>1</td></tr>
<tr><td>Great Sandy Island Nature Reserve. Conservation and Parks Commission</td><td>36,406</td><td>4</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Site characteristic</th><th>Details</th></tr>
<tr><td>Vegetation description (Regional)</td><td>Three regional vegetation associations considered within the regional mapping of Shepherd et al. (2001) have been mapped over the application area.
<table>
<tr><td>Northern section</td><td>117</td><td>Hummock grassland of Triodia spp.</td></tr>
<tr><td>Central section</td><td>127</td><td>Tidal mud flats</td></tr>
<tr><td>Southern section</td><td>589</td><td>Short bunch-grass savanna / Grass-steppe</td></tr>
</table></td></tr>
<tr><td>Vegetation description (application area)</td><td>GHD (2020b) described and map 14 Vegetation types over the application area
<table>
<tr><th>Veg Type</th><th>Vegetation Unit</th><th>Area (ha)</th><th>Per cent</th></tr>
<tr><td>VT01</td><td>Brachychiton acuminatus scattered low trees over Grevillea pyramidalis subsp. pyramidalis, Terminalia supranitifolia (P3) and Flueggea virosa subsp. melanthesoides scattered shrubs over Triodia epactia open hummock grassland over Cymbopogon ambiguus</td><td>1.6</td><td>0.4</td></tr>
<tr><td>VT02</td><td>Corymbia hamersleyana open woodland over Acacia bivenosa, Grevillea pyramidalis subsp. pyramidalis and Hakea lorea subsp. lorea scattered shrubs over Triodia epactia open hummock grassland with *Cenchrus ciliaris scattered grass</td><td>2.7</td><td>0.7</td></tr>
<tr><td>VT03</td><td>Eucalyptus victrix open woodland over Terminalia circumalata low open woodland over Triodia wiseana open hummock grassland with *Cenchrus ciliaris and Eriachne benthamii scattered tussock grasslands over Hybanthus aurantiacus, Indigofera trita</td><td>5.5</td><td>1.4</td></tr>
<tr><td>VT04</td><td>Tecticornia ?indica subsp. leiostachya and Tecticornia ?pterygosperma low chenopod shrubland with scattered Avicennia marina on saline flats with tidal inundation.</td><td>3.7</td><td>1.0</td></tr>
<tr><td>VT05</td><td>*Cenchrus ciliaris open grassland over Trianthema turgidifolia and Neobassia astrocarpa open chenopod shrubland on disturbed edges of saline flats.</td><td>2.9</td><td>0.8</td></tr>
<tr><td>VT06</td><td>Grevillea pyramidalis subsp. pyramidalis and *Vachellia farnesiana scattered shrubs over Ipomoea costata, Indigofera monophylla and Scaevola spinescens open shrubland over Triodia epactia open hummock grassland</td><td>56.9</td><td>14.9</td></tr>
<tr><td>VT07</td><td>Grevillea pyramidalis subsp. pyramidalis, Hakea lorea subsp. lorea, Acacia inaequilatera and Ehretia saligna var. saligna open shrubland over Solanum lasiophyllum, Diplopeltis eriocarpa and Solanum lasiophyllum scattered shrubs over Triodia epactia</td><td>5.4</td><td>1.4</td></tr>
<tr><td>VT08</td><td>Acacia bivenosa, Acacia synchronicia and Acacia ancistrocarpa (Fitzroy Wattle) open shrubland over Triodia wiseana open hummock grassland and *Cenchrus ciliaris (Buffel Grass) sparse tussock grasses on disturbed sandy loam plains</td><td>3.1</td><td>0.8</td></tr>
<tr><td>VT11</td><td>Eragrostis xerophila and Chrysopogon fallax tussock grassland over Streptoglossa decurrens, Rhynchosia minima and Portulaca oleracea scattered herbs on gilgai light brown clay plains.</td><td>119.4</td><td>31.5</td></tr>
<tr><td>VT12</td><td>Acacia inaequilatera and Ehretia saligna var. saligna open shrubland over Solanum lasiophyllum, Corchorus incanus subsp. incanus and Hybanthus aurantiacus low open shrubland over Triodia epactia and Triodia wiseana open hummock grassland with Eragrostis</td><td>5.0</td><td>1.3</td></tr>
</table></td></tr>
</table>

Site characteristic	Details

VT13	*Acacia inaequilatera* and *Acacia bivenosa* open shrubland over *Solanum lasiophyllum*, *Scaevola spinescens* and *Indigofera monophylla* low open shrubland over *Triodia wiseana* open hummock grassland with **Cenchrus ciliaris* tussock grasses.	53.4	14.0
VT14	*Corymbia hamersleyana* and *Acacia coriacea* subsp. *coriacea* scattered trees over *Acacia inaequilatera* and *Hakea lorea* subsp. *lorea* over *Triodia wiseana* very open hummock grassland with **Cenchrus ciliaris* tussock grasses on brown sandy loam on minor drainage	2.7	0.7
VT18	*Eucalyptus camaldulensis* (planted) scattered trees over **Cenchrus ciliaris* (Buffel Grass) tussock grasses on brown sandy loam on disturbed road verge.	5.4	1.4
VT19	**Tamarix aphylla* scattered trees over *Sesbania cannabina* herbland on brown loamy clay surrounding wetland.	8.0	2.1
Cleared	Cleared	57.4	15.1
Not mapped		47.9	12.6
TOTAL		381.1	100.0

Vegetation condition

Vegetation condition over the application area has been described and mapped by GHD (2020b).

Vegetation Condition	Area	Per cent
Excellent	0.1	0.02
Very Good	196.0	51.5
Good	46.4	12.2
Poor	20.0	5.3
Degraded	4.8	1.3
Completely Degraded	8.5	2.2
Cleared	57.4	15.1
Not mapped	47.9	12.5
Total	**381.1**	**100**

Vegetation condition over the indicative clearing footprint of GHD (2020a) is provided below.

Indicative area Condition	Area	Per cent
Very Good	7.98	62.1
Good	1.54	12.0
Poor	1.10	8.6
Degraded	0.35	2.7
Completely Degraded	0.50	3.9
Cleared	1.36	10.6

The description for measuring vegetation condition for the Eremaean and Northern Botanical Provinces (Trudgen, 1991) is provided in Appendix E.

<table>
<tr><th>Site characteristic</th><th>Details</th></tr>
<tr><td>Soil description</td><td>The soil landscape within the application area changes from predominantly rugged, granitic hills in the north (Granitic Land System) supporting spinifex grasslands through bare, samphire flats, supporting shrublands (Littoral Land System), to clay plains which support grasslands and snakewood shrublands (Cheerawarra Land System and Horseflat Land System) (DPIRD 2017).

The soils within the northern area comprise tidal soils inter-dispersed with red, shallow sands and calcareous, loamy earths. Soils in the southern section are predominantly red/brown non-cracking clay with a small section of calcareous, shallow loam (Calcrete System) (GHD 2020a).

<table>
<tr><th>Symbol</th><th>Land System</th><th>Description</th><th>Area</th><th>Per cent</th></tr>
<tr><td>286Gr</td><td>Granitic Land System</td><td>Rugged granitic hills supporting shrubby hard and soft spinifex grasslands.</td><td>91.2</td><td>23.9</td></tr>
<tr><td>286Li</td><td>Littoral Land System</td><td>Bare coastal mudflats (unvegetated), samphire flats, sandy islands, coastal dunes and beaches, supporting samphire low shrublands, sparse acacia shrublands and mangrove forests.</td><td>37.9</td><td>9.9</td></tr>
<tr><td>286Ch</td><td>Cheerawarra Land System</td><td>Sandy coastal plains and saline clay plains supporting soft and hard spinifex grasslands and minor tussock grasslands.</td><td>49.3</td><td>12.9</td></tr>
<tr><td>281Hf</td><td>Horseflat Land System</td><td>Gilgaied clay plains supporting Roebourne Plains grass grasslands and minor grassy snakewood shrublands.</td><td>183.8</td><td>48.2</td></tr>
<tr><td>281Ca</td><td>Calcrete Land System</td><td>Low calcrete platforms and plains supporting shrubby hard spinifex grasslands.</td><td>19.4</td><td>5.1</td></tr>
</table>
</td></tr>
<tr><td>Land degradation risk</td><td>In regard to erosion, surface water is largely reliant on weather and waterways generally only flow for parts of the year, in response to larger cyclonic or rainfall events. Water erosion may occur as sheetflow in broad inter-drainage areas on alluvial plains, near the baselines of hills and ridges with the risk of soil erosion during rainfall events.

Groundwater is mapped at 1,000 to 3,000 TDS/mg/L (that is, fresh to brackish)

A review of the Acid Sulfate Soil (ASS) risk mapping indicates ASS is present intermittently within the application area with a risk rating of ‘High to Moderate’ risk of containing ASS, particularly in the north and central sections, and ‘Moderate to Low’ intermittently elsewhere if those soils are disturbed.</td></tr>
<tr><td>Waterbodies</td><td>There are no Internationally (Ramsar) or nationally important wetlands located within a 50 kilometre radius of the application area.

The application area is in proximity to the Indian Ocean, with the mapped Western Australian coastline located approximately 270 metres to the west at its closest point in the north of the application area where mapped Saline Coastal Flats are located. This is within the Littoral Land System of coastal marshes, and mapped as the VT04 vegetation type of GHD (2020b); *Tecticornia* low chenopod shrubland with scattered *Avicennia marina* on saline flats with tidal inundation.

No rivers intercept, or are within the vicinity of, the application area. However, there are numerous minor drainage lines that intersect the application area, the majority orientated either north to south or east to west, from high to low elevation. Drainage lines drain onto</td></tr>
</table>

<table>
<tr><th>Site characteristic</th><th>Details</th></tr>
<tr><td></td><td>coastal flats towards the Indian Ocean with discharge points being either direct ocean outlet or dispersal through marshy flats such as the VT04 vegetation type.</td></tr>
<tr><td>Hydrogeography</td><td>Rights in Water and Irrigation Act 1914
<table>
<tr><td>Surface water areas and irrigation districts</td><td>Located within the proclaimed Pilbara Surface Water Area (UFI 54)</td></tr>
<tr><td>Groundwater areas</td><td>Located within the proclaimed Pilbara Groundwater Area (UFI 44)</td></tr>
<tr><td>Rivers</td><td>No mapped rivers proclaimed under the Rights in RIWI Act</td></tr>
</table>
Country Areas Water Supply Act 1947
<table>
<tr><td>Clearing control catchments</td><td>None</td></tr>
</table>
Other
<table>
<tr><td>Public Drinking Water Supply Area (PDWSA)</td><td>None</td></tr>
</table></td></tr>
<tr><td>Ecological communities</td><td>GHD (2020b) described and map 14 Vegetation types over the application area. Two of these vegetation types correspond with Priority Ecological Communities (PEC) listed by the DBCA.
<table>
<tr><th>Priority Ecological Community (common ID)</th><th>Status</th><th>Vegetation type (GHD 2020b)</th></tr>
<tr><td>Burrup Peninsula rock pile communities</td><td>Priority 1</td><td>VT01</td></tr>
<tr><td>Horseflat Land System of the Roebourne Plains</td><td>Priority 3</td><td>VT11</td></tr>
</table>
One vegetation type of GHD (2020b) (VT04) has been assessed by the EPA as demonstrating high conservation value within the Burrup peninsula (DWER 2021b).
<table>
<tr><th>Ecological Community</th><th>Vegetation type (GHD 2020b)</th></tr>
<tr><td>Samphire flats (Tecticornia ?indica subsp. leiostachya and Tecticornia ?pterygosperma low chenopod shrubland with scattered Avicennia marina on saline flats with tidal inundation)</td><td>VT04</td></tr>
</table></td></tr>
<tr><td>Flora</td><td>GHD (2020b) recorded a total of 131 flora taxa (including subspecies and varieties) representing 35 families and 86 genera.
No Threatened flora species were recorded.
Four Priority species were recorded:
• Terminalia supranitifolia (Priority 3)
• Vigna triodiophila (Priority 3)
• Oldenlandia sp.Hamersley Station (A.A. Mitchell PRP 1479) (Priority 3)
• Rhynchosia bungarensis (Priority 4)</td></tr>
</table>

Site characteristic	Details
Fauna	GHD (2019) undertook a fauna survey of the northern section of the application area (only). A likelihood of occurrence assessment was conducted and concluded that six species were likely to occur: • Northern Quoll (*Dasyurus hallucatus*) (EN) • Pilbara Olive Python (*Liasis olivaceus* subsp. *barroni*) (VU) • Water-rat (*Hydromys chrysogaster*) (P4) • Lined soilcrevice skink (Dampier) (*Notoscincus butleri*) (P4) • Peregrine Falcon (*Falco peregrinus*) (OS) • Osprey (*Pandion haliaetus*) (Mi) Marshland habitat occurs to the south of the area surveyed by GHD (2019) (Littoral Land System - 286Li). Twenty-nine shorebirds that are migratory, with several also listed as Threatened species, have been recorded within the local area, many of which would occur in this habitat.

C.2 Vegetation extent

Factor	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current percentage remaining within all DBCA managed land (%)
IBRA Bioregion					
Pilbara	17,808,657	17,731,765	99.57	1,132,944	6.36
Vegetation association					
117 (Hummock grassland)	897,108	883,705	98.51	125,405	13.98
127 (Tidal mud flats)	716,161	691,516	96.56	58,741	8.20
589 (Shortbunch-grass savanna)	806,985	802,647	99.46	12,876	1.60
Local area (50 km radius)					
Remnant vegetation	584,543	537,088	91.9		

C.3 Ecosystem, flora and fauna analysis

With consideration for the site characteristics set out above, relevant datasets (Appendix H2), the following conservation significant ecological communities, flora and fauna species may be impacted by the clearing.

Significant ecological communities

Common ID	Name	Status	Present	Corresponding vegetation type (GHD 2020b)
Roebourne Plains gilgai grasslands	Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays (Roebourne Plains gilgai grasslands)	P1	No	None
Burrup Peninsula rock pile communities	Burrup Peninsula rock pile communities	P1	Yes	VT01
Horseflat Land System	Horseflat Land System of the Roebourne Plains	P3	Yes	VT11

The mapped VT04 vegetation type of GHD (2020b) described as Tecticornia low chenopod shrubland with scattered *Avicennia marina* on saline flats with tidal inundation, corresponds with the Littoral Land System, and is known colloquially as Samphire flats. The samphire flats are reported as a sensitive environmental receptor (DWER 2021), also functioning as a nutrient filter/buffer for the protection of (the downstream) King Bay ecosystem. Both the samphire flats and King Bay ecosystems have been assessed by the EPA as demonstrating high conservation value within the Burrup peninsula (DWER 2021)

Significant flora recorded from the local area (50 km radius)

Taxon	Status	Count	Min Distance (km)
Gomphrena sp. Martins Well (K.F. Kenneally 6116)	P1	1	0.67
Goodenia pallida	P1	2	17.28
Tephrosia rosea var. Port Hedland (A.S. George 1114)	P1	11	33.75
Helichrysum oligochaetum	P1	2	42.77
Trianthema sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023)	P2	2	21.33
Pentalepis trichodesmoides subsp. hispida	P2	1	44.73
Stackhousia clementii	P3	4	0.30
Terminalia supranitifolia	P3	43	0.32
Oldenlandia (Dolichocarpa) sp. Hamersley Station (A.A. Mitchell PRP 1479)	P3	3	0.32
Vigna triodiophila	P3	15	0.40
Themeda sp. Hamersley Station (M.E. Trudgen 11431)	P3	2	1.06
Eragrostis surreyana	P3	3	8.13
Gomphrena cucullata	P3	2	10.33
Gomphrena leptophylla	P3	1	10.33
Atriplex lindleyi subsp. *conduplicata*	P3	1	12.57
Gymnanthera cunninghamii	P3	6	14.31
Glycine falcata	P3	1	23.40
Solanum albostellatum	P3	1	23.40
Abutilon sp. Pritzelianum (S. van Leeuwen 5095)	P3	1	39.71
Eragrostis lanicaulis	P3	2	43.65
Eriochloa fatmensis	P3	1	43.79
Rhynchosia bungarensis	P4	37	0.39

GHD (2020b) recorded four Priority species within the application area and wider survey area.

- *Terminalia supranitifolia* (Priority 3)
- *Vigna triodiophila* (Priority 3)
- *Oldenlandia* sp.Hamersley Station (A.A. Mitchell PRP 1479) (Priority 3)
- *Rhynchosia bungarensis* (Priority 4)

A likelihood of occurrence table is presented in Appendix F2.

Significant fauna species recorded from the local area (50 km radius)

Common Name	Taxon	Status	Count	Min Distance	Comment
BIRDS					
Grey Falcon	*Falco hypoleucos*	VU	1	36.01	Raptor
Peregrine Falcon	*Falco peregrinus*	OS	13	3.24	Raptor
Osprey	*Pandion cristatus*	MI	554	0.85	Raptor

Common Name	Taxon	Status	Count	Min Distance	Comment
Glossy Ibis	*Plegadis falcinellus*	MI	8	1.79	Wetland
Fork-Tailed Swift	*Apus pacificus*	MI	7	7.98	Aerial
Barn Swallow	*Hirundo rustica*	MI	4	2.32	Terrestrial
Oriental Cuckoo	*Cuculus optatus*	MI	2	4.76	Terrestrial
Curlew Sandpiper	*Calidris ferruginea*	CR	35	0.85	Shorebird
Great Knot	*Calidris tenuirostris*	CR	40	1.06	Shorebird
Eastern Curlew	*Numenius madagascariensis*	CR	100	0.85	Shorebird
Red Knot	*Calidris canutus*	EN	15	1.06	Shorebird
Lesser Sand Plover	*Charadrius mongolus*	EN	40	1.79	Shorebird
Common Sandpiper	*Actitis hypoleucos*	MI	111	0.00	Shorebird
Common Noddy	*Anous stolidus*	MI	6	4.40	Shorebird
Wedge-Tailed Shearwater	*Ardenna pacifica*	MI	172	4.76	Shorebird
Ruddy Turnstone	*Arenaria interpres*	MI	197	0.04	Shorebird
Sharp-Tailed Sandpiper	*Calidris acuminata*	MI	43	0.00	Shorebird
Sanderling	*Calidris alba*	MI	23	1.79	Shorebird
Red-Necked Stint	*Calidris ruficollis*	MI	52	0.00	Shorebird
Long-Toed Stint	*Calidris subminuta*	MI	11	0.00	Shorebird
Oriental Plover	*Charadrius veredus*	MI	7	1.79	Shorebird
Pin-Tailed Snipe	*Gallinago stenura*	MI	2	8.75	Shorebird
Oriental Pratincole	*Glareola maldivarum*	MI	17	2.73	Shorebird
Broad-Billed Sandpiper	*Limicola falcinellus*	MI	5	1.79	Shorebird
Bar-Tailed Godwit	*Limosa lapponica*	MI	151	0.04	Shorebird
Black-Tailed Godwit	*Limosa limosa*	MI	5	14.11	Shorebird
Little Curlew	*Numenius minutus*	MI	20	0.85	Shorebird
Whimbrel	*Numenius phaeopus*	MI	170	0.04	Shorebird
Pacific Golden Plover	*Pluvialis fulva*	MI	16	1.99	Shorebird
Grey Plover	*Pluvialis squatarola*	MI	41	1.79	Shorebird
Wood Sandpiper	*Tringa glareola*	MI	40	0.00	Shorebird
Common Greenshank	*Tringa nebularia*	MI	148	0.00	Shorebird
Marsh Sandpiper	*Tringa stagnatilis*	MI	51	0.00	Shorebird
Terek Sandpiper	*Xenus cinereus*	MI	27	2.82	Shorebird
Grey-Tailed Tattler	*Tringa brevipes*	P4	206	0.04	Shorebird
Greater Sand Plover	*Charadrius leschenaultii*	VU	102	0.04	Shorebird
Fairy Tern	*Sternula nereis nereis*	VU	62	13.06	Tern
Bridled Tern	*Onychoprion anaethetus*	MI	95	10.86	Tern
Gull-Billed Tern	*Gelochelidon nilotica*	MI	29	3.24	Tern
Caspian Tern	*Hydroprogne caspia*	MI	340	0.85	Tern
White-Winged Black Tern	*Chlidonias leucopterus*	MI	16	0.85	Tern
Roseate Tern	*Sterna dougallii*	MI	56	4.76	Tern
Common Tern	*Sterna hirundo*	MI	25	10.13	Tern
Little Tern	*Sternula albifrons*	MI	14	1.79	Tern
Brown Booby	*Sula leucogaster*	MI	20	4.76	Tern
Crested Tern	*Thalasseus bergii*	MI	131	1.79	Tern
Wilson's Storm-Petrel	*Oceanites oceanicus*	MI	15	4.86	Marine

Common Name	Taxon	Status	Count	Min Distance	Comment
Lesser Frigatebird	*Fregata ariel*	MI	61	4.76	Marine
MAMMALS					
Northern Quoll	*Dasyurus hallucatus*	EN	493	0.10	
Banded Hare-Wallaby	*Lagostrophus fasciatus fasciatus*	VU	1	43.37	
Ghost Bat	*Macroderma gigas*	VU	9	4.69	
Pilbara Leaf-Nosed Bat	*Rhinonicteris aurantia (Pilbara)*	VU	2	5.59	
Rock Wallaby Species	*Petrogale sp.*	EN or VU or P	1	6.35	
North-Western Free-Tailed Bat	*Mormopterus cobourgianus*	P1	20	3.97	
Water-Rat	*Hydromys chrysogaster*	P4	15	1.38	Semi-aquatic
Spectacled Hare Wallaby (Mainland)	*Lagorchestes conspicillatus leichardti*	P4	1	34.81	
Northern Short-tailed Mouse	*Leggadina lakedownensis*	P4	18	0.51	
Western Pebble-Mound Mouse	*Pseudomys chapmani*	P4	19	1.38	
REPTILES					
Nevin's Slider	*Lerista nevinae*	EN	106	27.77	Terrestrial
Pilbara Olive Python	*Liasis olivaceus barroni*	VU	29	0.05	Terrestrial
Four-Lined Slider (Karratha)	*Lerista quadrivincula*	P1	3	23.34	Terrestrial
Airlie Island Ctenotus	*Ctenotus angusticeps*	P3	6	16.32	Terrestrial
Lined Soil-Crevice Skink (Dampier)	*Notoscincus butleri*	P4	63	8.75	Terrestrial

A likelihood of occurrence table is presented in Appendix F3.

Appendix D – Assessment against the Clearing Principles

Assessment against the Clearing Principles	Variance level	Is further consideration required?
Environmental value: biological values		
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment: Fourteen vegetation types and six broad fauna habitat types have been described over the application area. Two PECs have also been identified over the application area. The flora and vegetation survey completed by GHD (2020a) recorded four Priority species listed by the DBCA identified within the application area. Noting the size and context of the proposed clearing, potential impacts are unlikely to affect the conservation status of these species and communities and are not considered to be significant, given the distribution and abundance of adjacent habitat.	May be at variance	Yes Section 3.2.1
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."* Assessment: Six broad fauna habitats have been described over the application area (GHD 2020a). A likelihood of occurrence assessment was conducted and concluded that six species were likely to occur: • Northern Quoll *(Dasyurus hallucatus)* (EN) • Pilbara Olive Python *(Liasis olivaceus* subsp. barroni) (VU) • Water-rat *(Hydromys chrysogaster)* (P4) • Lined soilcrevice skink (Dampier) *(Notoscincus butleri)* (P4) • Peregrine Falcon *(Falco peregrinus)* (OS) • Osprey *(Pandion haliaetus)* (Mi) Marshland habitat occurs to the south of the area surveyed by GHD (2019) (Littoral Land System - 286Li). Twenty-nine shorebirds that are migratory, with several also listed as Threatened species, have been recorded within the local area, many of which would occur in this habitat. Given the scale and location of the proposed clearing it is unlikely to comprise of significant habitat for fauna.	May be at variance	Yes Section 3.2.2
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: No Threatened flora have been identified within 50 kilometres radius of the application area. The vegetation and flora survey of GHD (2020) did not identify any Threatened flora over the application area, or any Threatened flora species likely to occur.	Not at variance	No
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."* Assessment: No Threatened Ecological Communities (TEC) endorsed by the Western Australian Minister for Environment, have been mapped within 50 kilometres of the application area. No vegetation types identified within the application area are representative of any TECs (GHD 2020b). Native vegetation proposed to be cleared is unlikely to comprise the whole, or a part of, or be necessary for the maintenance of, a TEC.	Not at variance	No

Assessment against the Clearing Principles	Variance level	Is further consideration required?
Environmental values: significant remnant vegetation and conservation areas		
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."* Assessment: The national objectives and targets for biodiversity conservation in Australia has a target to prevent the clearance of ecological communities with an extent below 30 per cent of that present prior to the year 1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia 2001). All three vegetation associations identified within the application exceed the 30 per cent threshold, with all retaining over 95 per cent of their original cover (Appendix C2). Over 90 percent of the original native vegetation has been retained within 50 kilometres of the application area. Regional vegetation types present over the application area exceed national targets, and the application area is not considered significant as a remnant of native vegetation in an area that has been extensively cleared.	Not at variance	No
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."* Assessment: The application area does not intersect with any DBCA managed lands. The Murujuga National Park is within 180 metres of the application area in the northern (Burrup) section. Given the location and scale of proposed clearing, and the separation distance to lands managed for conservation, the proposed clearing is not likely to have an impact on the environmental values of adjacent or nearby formal conservation areas.	Not likely to be at variance	No
Environmental values: land and water resources		
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."* Assessment: No significant mapped rivers or drainage lines intercept, or are within the vicinity of, the application area. However, there are numerous minor drainage lines that intersect the application area. Proposed clearing is likely to intersect native vegetation growing in, or in association with, an environment associated with a watercourse or wetland. The applicant has advised that no drainage lines will be significantly impacted as drainage lines will only be intersected by access tracks where unavoidable, with clearing restricted to riparian vegetation being driven over only (that is, not mechanically cleared) (GHD 2020a).	Is at variance	Yes Section 3.2.3
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: Land degradation risks for water erosion and salinity are generally rated at low over the application area. Overall, vegetation will be driven over rather than cleared to create access tracks to the boreholes and test pit locations. Areas assessed as contaminated sites ('possibly contaminated - investigation required') intersect the application area. Soils will be minimally exposed as a result of the proposed clearing causing a small and localised impact within the surrounding landscape.	Not likely to be at variance	Yes Section 3.2.4

Assessment against the Clearing Principles	Variance level	Is further consideration required?
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."* Assessment: The application area is located within the Pilbara Surface Water Area (UFI 54) proclaimed under the RIWI Act, and the Pilbara Groundwater Area (UFI 44) proclaimed under the RIWI Act. Acid sulphate soils (ASS) risk mapping indicates the soils of the survey area have a High to Moderate and Moderate to Low risk of causing environmental damage, if those soils are disturbed.	Not likely to be at variance	Yes Section 3.2.4
Principle (j): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."* Assessment: Surface water is largely reliant on weather and surface water in waterways is generally only present or flowing for parts of the year, in response to larger cyclonic or rainfall events. The application area is not located within an area subject to flooding or inundation, however, the northern section of the application area, aligning with the Littoral Land System is located within a mapped saline coastal flat. Noting the extent of the proposed clearing and management prescriptions employed, the proposed clearing of native vegetation is not likely to cause, or exacerbate, the incidence or intensity of flooding.	Not likely to be at variance	No

Appendix E – Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Measuring vegetation condition for the Eremaean and Northern Botanical Provinces (Trudgen, 1991)

Condition	Description
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Very poor	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

Appendix F –Biological survey information excerpts (GHD 2019; GHD 2020a and GHD 2020b)

F.1 Vegetation of the application area

Vegetation type code	Vegetation type description	Sample locations	Extent (ha)	Extrapolated extent (ha)	Total extent (ha)	Photograph
VT01	*Brachychiton acuminatus* scattered low trees over *Grevillea pyramidalis* subsp. *pyramidalis*, *Terminalia supranitifolia* (P3) and *Flueggea virosa* subsp. *melanthesoides* scattered shrubs over *Triodia epactia* open hummock grassland over *Cymbopogon ambiguus* and **Cenchrus ciliaris* open tussock grassland and *Tinospora smilacina* and *Ipomoea costata* open vineland on rock piles. Associated species includes *Evolvulus alsinoides*, *Gomphrena cunninghamii*, *Triumfetta clementii* and *Abutilon lepidum*. Conservation listed species; *Rhynchosia bungarensis* (P4) and *Vigna triodiophila* (P3). Represents Priority 1 PEC Burrup Peninsula rock pile communities.	HPKAR_02, HPKAR_09, HPKAR_10	4.67	-	-	

Vegetation type code	Vegetation type description	Sample locations	Extent (ha)	Extrapolated extent (ha)	Total extent (ha)	Photograph
VT02	*Corymbia hamersleyiana* open woodland over *Acacia bivenosa*, *Grevillea pyramidalis* subsp. *pyramidalis* and *Hakea lorea* subsp. *lorea* scattered shrubs over *Triodia epactia* open hummock grassland with **Cenchrus ciliaris* scattered grasss over over *Hybanthus aurantiacus*, *Cleome viscosa* and *Trichodesma zeylanicum* var. *zeylanicum* open forbland on brown sandy loam on elevated rocky plain. Associated species include *Chrysopogon fallax*, *Bonamia erecta*, *Euphorbia tamnesis* subsp.	HPKAR_01	2.74	-	-	

Vegetation type code	Vegetation type description	Sample locations	Extent (ha)	Extrapolated extent (ha)	Total extent (ha)	Photograph
VT03	*Eucalyptus victrix* open woodland over *Terminalia circumalata* low open woodland over *Triodia wiseana* open hummock grassland with **Cenchrus ciliaris* and *Eriachne benthamii* scattered tussock grasslands over *Hybanthus aurantiacus, Indigofera trita* and *Gossypium australe* scattered herbs on rocky sandy loam on minor drainage lines. Associated species include *Cyperus vaginatus, Rhynchosia minima* and *Boerhavia coccinea.*	HPKAR_03, HPKAR_07, HPKAR_08, HPKAR_12, HPKAR_38	14.10	0.15	14.25	

Vegetation type code	Vegetation type description	Sample locations	Extent (ha)	Extrapolated extent (ha)	Total extent (ha)	Photograph
VT04	*Tecticornia ?indica* subsp. *leiostachya* and *Tecticornia ?pterygosperma* low chenopod shrubland with scattered *Avicennia marina* on saline flats with tidal inundation.	HPKAR_04	7.07	1.36	8.43	
VT05	**Cenchrus ciliaris* open grassland over *Trianthema turgidifolia* and *Neobassia astrocarpa* open chenopod shrubland on disturbed edges of saline flats.	HPKAR_05, HPKAR_06	7.12	-	-	

Vegetation type code	Vegetation type description	Sample locations	Extent (ha)	Extrapolated extent (ha)	Total extent (ha)	Photograph
VT06	*Grevillea pyramidalis* subsp. *pyramidalis* and **Vachellia farnesiana* scattered shrubs over *Ipomoea costata, Indigofera monophylla* and *Scaevola spinescens* open shrubland over *Triodia epactia* open hummock grassland over *Cleome viscosa, Rhynchosia minima* and *Hybanthus aurantiacus* scattered herbs on red/brown sandy loam on rocky slopes with frequent basalt outcropping. Associated species include *Abutilon lepidum, Gomphrena cunninghamii, Streptoglossa decurrens* and *Indigofera monophylla*	HPKAR_11, HPKAR_37	112.16	2.89	115.05	

Vegetation type code	Vegetation type description	Sample locations	Extent (ha)	Extrapolated extent (ha)	Total extent (ha)	Photograph
VT07	*Grevillea pyramidalis* subsp. *pyramidalis, Hakea lorea* subsp. *lorea, Acacia inaequilatera* and *Ehretia saligna* var. *saligna* open shrubland over *Solanum lasiophyllum, Diplopeltis eriocarpa* and *Solanum lasiophyllum* scattered shrubs over *Triodia epactia* sparse hummock grassland on flat sandy plains/dunes above saline flats. Associated species include *Indigofera monophylla, Triumfetta propinqua, Acacia orthocarpa, Trichodesma zeylanicum* var. *zeylanicum* and *Acacia ampliceps*.	HPKAR_13, HPKAR_14	5.38	-	-	

Vegetation type code	Vegetation type description	Sample locations	Extent (ha)	Extrapolated extent (ha)	Total extent (ha)	Photograph
VT08	*Acacia bivenosa, Acacia synchronicia* and *Acacia ancistrocarpa* (Fitzroy Wattle) open shrubland over *Triodia wiseana* open hummock grassland and **Cenchrus ciliaris* (Buffel Grass) sparse tussock grasses on disturbed sandy loam plains (GHD 2019).	KAR_18 (GHD 2019)	3.14	-	-	

Vegetation type code	Vegetation type description	Sample locations	Extent (ha)	Extrapolated extent (ha)	Total extent (ha)	Photograph
VT11	*Eragrostis xerophila* and *Chrysopogon fallax* tussock grassland over *Streptoglossa decurrens*, *Rhynchosia minima* and *Portulaca oleracea* scattered herbs on gilgai light brown clay plains. Other species include *Operculia aequisepala*, *Ipomoea coptica*, *Dichanthium sericeum* subsp. *humilius*, *Heliotropium cunninghamii*, *Xerochloa ?laniflora*, *Panicum laevinode* and *Eriachne benthamii*. Conservation listed species; *Oldenlandia* sp. Hamersley Station (A.A. Mitchel PRP1479) P3. Represents Priority 3 PEC Horseflat land system of the Roebourne Plains.	HPKAR 17, HPKAR 18, HPKAR 20, HPKAR 23, HPKAR 25, HPKAR 26, SFRE 01, SFRE 03, HPKAR_33	173.47	51.0	224.47	

Vegetation type code	Vegetation type description	Sample locations	Extent (ha)	Extrapolated extent (ha)	Total extent (ha)	Photograph
VT12	*Acacia inaequilatera* and *Ehretia saligna* var. *saligna* open shrubland over *Solanum lasiophyllum*, *Corchorus incanus* subsp. *incanus* and Hybanthus aurantiacus low open shrubland over *Triodia epactia* and *Triodia wiseana* open hummock grassland with *Eragrostis xerophila* and *Chrysopogon fallax* scattered tussock grasses on brown sandy loam stony plain. Other associated species include *Acacia bivenosa*, *Cleome viscosa*, *Ptilotus calostachyus*, *Indigofera linifolia* and *Phyllanthus maderaspatensis*.	HPKAR 19, HPKAR_21	5.00	-	-	

Vegetation type code	Vegetation type description	Sample locations	Extent (ha)	Extrapolated extent (ha)	Total extent (ha)	Photograph
VT13	*Acacia inaequilatera* and *Acacia bivenosa* open shrubland over *Solanum lasiophyllum*, *Scaevola spinescens* and *Indigofera monophylla* low open shrubland over *Triodia wiseana* open hummock grassland with **Cenchrus ciliaris* tussock grasses. Other species include *Acacia ancistrocarpa*, *Diplopeltis eriocarpa*, *Tephrosia supina*, *Triumfetta clementii* and *Senna artemisioides*.	HPKAR_22, HPKAR_36	108.37	2.34	110.71	

Vegetation type code	Vegetation type description	Sample locations	Extent (ha)	Extrapolated extent (ha)	Total extent (ha)	Photograph
VT14	*Corymbia hamersleyana* and *Acacia coriacea* subsp. *coriacea* scattered trees over *Acacia inaequilatera* and *Hakea lorea* subsp. *lorea* over *Triodia wiseana* very open hummock grassland with **Cenchrus ciliaris* tussock grasses on brown sandy loam on minor drainage lines. Other species include *Acacia xiphophylla*, **Vachellia farnesiana*, *Chrysopogon fallax*, *Portulaca oleracea* and **Aerva javanica*.	HPKAR24, HPKAR27	44.96	2.35	47.31	

Vegetation type code	Vegetation type description	Sample locations	Extent (ha)	Extrapolated extent (ha)	Total extent (ha)	Photograph
VT18	*Eucalyptus camaldulensis* (planted) scattered trees over **Cenchrus ciliaris* (Buffel Grass) tussock grasses on brown sandy loam on disturbed road verge.	HPKAR_35	5.44	-	-	
VT19	**Tamarix aphylla* scattered trees over *Sesbania cannibina* herbland on brown loamy clay surrounding wetland.	Not described with quadrat or releve.	8.00	-	-	

F.2 Significant flora– Likelihood of occurrence

Likelihood of occurrence

A likelihood of occurrence assessment was conducted post-field survey for all conservation significant flora taxa identified in the desktop assessment based on the desktop searches (provided in Appendix C). This assessment took into account previous records, habitat requirements, efficacy of the survey, intensity of the survey, flowering times and the cryptic nature of the species (Appendix D).

The likelihood of occurrence assessment post-field survey concluded there are four priority species known to occur within the survey area (*Vigna triodiophila, Terminalia supranitifolia*, *Rhynchosia bungarensis* and *Oldenlandia* sp. Hamersley Station) and the remaining priority flora are considered unlikely to occur.

Flora likelihood of occurrence assessment

Family	Taxon	Status		Description (if available) (WA Herbarium 1998–)	Likelihood of occurrence	Source
		EPBC Act	BC Act / DBCA			
Aizoaceae	*Trianthema* sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023)		P2	Prostrate to near prostrate annual herb. Flowers pink. Clayey-sand, clayey-loam. Plains, low undulating hills.	**Unlikely –** the closest known record is located approximately 20 km south of the survey area. It has not been previously recorded in the survey area (GHD 2019).	WAHerb
Apocynaceae	*Gymnanthera cunninghamii*		P3	Erect shrub, 1-2 m high. Flowers cream-yellow-green, January to December. Sandy soils.	**Unlikely** – no suitable habitat is present within the survey area.	NatureMap
Celastraceae	*Stackhousia clementii*		P3	Dense broom-like perennial, herb, to 0.45 m high. Flowers green/yellow/brown. Skeletal soils. Sandstone hills.	**Unlikely –** the species has been recorded within 500 m of the survey area. Suitable habitat is present however given survey effort this species is considered unlikely to occur within the survey area.	NatureMap, TPFL, WAHerb
Combretaceae	*Terminalia supranitifolia*		P3	Spreading, tangled shrub or tree, 1.5-3 m high. Flowers green-yellow, May or July or December. Sand. Among basalt rocks.	**Known** – this species was recorded atop rockpiles on the Burrup Peninsula, and on the slopes adjacent the major rockpile formations.	NatureMap, TPFL, WAHerb
Cyperaceae	*Schoenus punctatus*		P3	Shortly rhizomatous, tufted perennial, grass-like or herb (sedge), ca 0.6 m high. Flowers brown, August. Watercourses.	**Unlikely** – there are no records of the species in close proximity to the survey area. Limited suitable habitat is present however given the survey effort this species is considered unlikely to occur within the survey area.	NatureMap
Fabaceae	*Rhynchosia bungarensis*		P4	Compact, prostrate shrub, to 0.5 m high. Flowers yellow. Pebbly, shingly coarse sand amongst boulders. Banks of flow line in the mouth of a gully in a valley wall.	**Known**– the species was recorded in the northern section of the survey area on the Burrup Peninsula, inside large rock piles and also aside a flow line around a section of pipeline development. .	NatureMap, WAHerb

Family	Taxon	Status		Description (if available) (WA Herbarium 1998–)	Likelihood of occurrence	Source
		EPBC Act	BC Act / DBCA			
Fabaceae	*Vigna triodiophila*		P3	Fine-stemmed prostrate or scrambling vine, small, ovate to elliptic leaves. Known to flower and fruit between May and September. Endemic to basalt rockpile habitats in shallow, red-brown or brown, clayey sand or loam.	**Known** – The species was recorded atop the rockpiles on the Burrup Peninsula.	NatureMap, WAHerb
Malvaceae	*Corchorus congener*		P3	Spreading shrub, to 0.6 m high. Flowers yellow, April to June or August to November. Sand, red sandy loam with limestone. Sand dunes, plains	**Unlikely** – limited suitable habitat present. Given survey effort this species is unlikely to occur within the survey area.	NatureMap
Poaceae	*Eragrostis surreyana*		P3	Annual tufted grass growing to 0.02 m tall. Occurs in drainage soaks, adjacent river beds and plains bordered by steep hills. Occurs on red-brown clay soils.	**Unlikely** – the species has not been recorded within 10 km of the survey area. No soaks of standing water were located within the survey area.	NatureMap
Poaceae	*Themeda* sp. *Hamersley Station* (M.E. Trudgen 11431)		P3	Tussocky perennial, grass-like or herb, 0.9-1.8 m high. Flowers August. Red clay. Clay pan, grass plain.	**Unlikely** – there is one record immediately adjacent to the survey area (1992). This area was thoroughly searched in the 2019 survey (GHD 2019) and no specimens were identified. The area was also disturbed. Given survey effort this species is unlikely to occur within the survey area.	NatureMap, WAHerb
Rubiaceae	*Oldenlandia* sp. *Hamersley Station* (A.A. Mitchell PRP 1479)		P3	Spreading annual, herb, 0.05-0.1 m high. Flowers blue, March. Cracking clay, basalt. Gently undulating plain with large surface rocks, flat crabholed plain.	**Unlikely** – the species has been recorded within 5 km of the survey area. Limited suitable habitat is present.	NatureMap

F.3 Significant fauna – Likelihood of occurrence

Likelihood of occurrence

A likelihood of occurrence assessment was conducted post-field survey for the conservation significant fauna identified above in the desktop assessments. The likelihood of occurrence assessment concluded that six species are likely to occur, and the remaining species are unlikely or highly unlikely to occur within the survey area. Species likely to occur are listed in Table 3-4.

Table 3-4 Conservation significant fauna likely to occur in the clearing area

Species	EPBC Act	BC Act/ DBCA	Description	Likelihood of occurrence
Peregrine Falcon (*Falco peregrinus*)		OS	The Peregrine Falcon is found on and near cliffs, gorges, timbered watercourses, riverine environments, wetlands, plains, open woodlands, and pylons and spires of buildings, though less frequently in desert regions (Morcombe 2004). They are not common but can be found almost anywhere throughout WA and in the southwest, including particularly at Fitzgerald River, Stirling Range, Porongurup National Parks, Kondinin, and Peak Charles, with many more locations north of Perth (Nevill 2013).	Likely – The habitats present within the survey area represents suitable foraging habitat, however, lacks suitable breeding habitat. Therefore, likely to occur at least on an occasional basis within all fauna habitats.
Osprey (*Pandion haliaetus*)	Mi	Mi	Ospreys have a wide distribution because they are able to live almost anywhere where there are safe nest sites and shallow water with abundant fish. Nests are generally found within 3 to 5 km of a water body such as a salt marsh, mangrove (*Rhizophora*) swamp, cypress (*Taxodium*) swamp, lake, bog, reservoir or river. The frequency with which each of these habitat types is used varies by geographic region.	Likely – The survey area is situated near the coastline. This species is likely to fly over, and opportunistically utilise portions of all fauna habitat.
Northern Quoll (*Dasyurus hallucatus*)	En	En	The Northern Quoll have suffered range restrictions throughout its distribution and now exists in several geographically disjunct populations spread across the northern parts of Australia. Populations include far North Queensland, the Northern Territory, Kimberley region and the Pilbara region in Western Australia. The population of Northern Quolls in the Pilbara Region of Western Australia are considered isolated from other populations. Importantly the Pilbara Quolls are not suffering from the precipitous decline facing the species in other regions; this decline is, at least in part, attributed to the toxic Cane Toad (*Bufo marinus*) (Hill and Ward 2010).	Likely – Known to occur locally. The rocky areas provide suitable habitat. However, no evidence of their presence was observed during the fauna survey. Rock plains and low rises and rock piles are likely habitat.
Water-rat (*Hydromys chrysogaster*)		P4	The Water-rat has a widespread distribution near permanent water bodies of Australia, New Guinea and offshore Islands. In Western Australia, species distribution ranges from the south-west to the Pilbara region and across to the north-west of the state. *Hydromys chrysogaster* individuals live mainly near permanent fresh water. They live on land but depend on the water for food. Also present along the coastline, *H. chrysogaster* do not need completely fresh water. They can also survive in areas where rivers and streams have become polluted or are brackish. (Watts and Aslin, 1981).	Likely – Known to occur on the Burrup Peninsula, however, not on the mainland. The habitat within the Fauna Survey Area is considered marginally suitable, whilst the northern portion of the DE (the Burrup Peninsula) is suitable.
Pilbara Olive Python (*Liasis olivaceus* subsp. *barroni*)	Vu	Vu	The Pilbara Olive Python's range is restricted to the Pilbara region, north Western Australia, and including the Dampier Archipelago (Tutt et al 2002). Habitat consists of rocky escarpments, gorges and waterholes. The preferred microhabitats for this species are under rock piles, on top of rocks, and under spinifex as well as in man-made 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).	Likely - Species known to occur locally. rocky habitat within the fauna survey area is considered suitable habitat, however, no permanent natural pools within the fauna survey area or within the DE.
Lined soil-crevice skink (Dampier) (*Notoscincus butleri*)		P4	The Lined soil crevice skink occurs is endemic to Western Australia and is restricted to the arid NorthWest, in a pocket of the Pilbara region of Western Australia. This small skink species has been recorded associated with spinifex-dominated areas near creek and river margins (Wilson and Swan 2008).	Likely – Species known to occur locally (West Intercourse Island and less than 2 km south of Karratha). The rocky habitat within the survey area is considered suitable habitat, however, there are no major creeks or rivers within the fauna survey area or the DE.

Appendix G – Aboriginal sites of significance intersecting the application area

Aboriginal Site of Significance:
Salt Flats 1 - Artefacts / Scatter, Midden / Scatter
Borrow Area 7 - Engraving
CEM-09-Sc-002 - Artefacts / Scatter, Engraving, Arch Deposit
Mainland (Maitland River) Site 31 - Artefacts / Scatter, Grinding Patches / Grooves, Shell
DRD 61 - Engraving, Other: New Info Received - Lot 575-14 (BMIEA)
Pp-06/21 - Engraving
Gas Pipeline 109 - Artefacts / Scatter, Midden / Scatter
DRD Area A-07 - Artefacts / Scatter, Engraving, Midden / Scatter, Other: New Info Received - Lot 575-29, 30 & 36 (BMIEA)
Gas Pipeline 123 - Engraving
Pump Road Quarry - Artefacts / Scatter, Quarry
Nickol Bay Quarry (W9) - Artefacts / Scatter, Quarry
Rock Shot - Engraving, Other: New Info Received - Lot 575-29, 30 & 36 (BMIEA)
Dampier King Bay South - Artefacts / Scatter, Grinding Patches / Grooves
EDL Maitland/ Fs04-4 - Artefacts / Scatter, Grinding Patches / Grooves, Quarry
Gas Pipeline 121 - Engraving
Burrup Pipeline Project Site 30 - Grinding Patches / Grooves
CEM-09-ENG-002 - Engraving, Arch Deposit
Gas Pipeline 101 - Engraving, Midden / Scatter
EDL Maitland/ Fs04-5 - Artefacts / Scatter
Kissing Birds - Engraving, Other: New Info Received - Lot 575-29, 30 & 36 (BMIEA)
Dampier, Woodside C - Engraving
Snake Rock - Engraving
DP-285 (Relocated 01/02/2004) - Engraving
Mainland (Maitland River) Site 30 - Artefacts / Scatter, Grinding Patches / Grooves, Quarry, Other: Exploited Stone Sources
Haul Road South 06. - Artefacts / Scatter, Engraving, Grinding Patches / Grooves, Water Source, Other: New Info Received - Lot 575-29, 30 & 36 (BMIEA)
Gas Pipeline 122 - Artefacts / Scatter
Burrup Pipeline Project Site 3 - Engraving, Grinding Patches / Grooves
Field Site 8 - Engraving
Dampier - Artefacts / Scatter, Engraving, Grinding Patches / Grooves, Man-Made Structure, Quarry
Borrow Area 7-1 - Engraving
DRD 28 - Man-Made Structure, Other: New Info Received - Lot 575-03 (BMIEA)
King Bay 2, Dampier - Engraving, Midden / Scatter
Pp-20 - Man-Made Structure, Mythological
Gas Pipeline 108 - Artefacts / Scatter, Midden / Scatter
Burrup Pipeline Project Site 6 - Engraving
Dampier Road Engraving 1 - Engraving, Man-Made Structure
EDL Maitland/ Fs04-1 - Artefacts / Scatter
WGTO Pb 152 - Engraving
DP-286 - Engraving
Borrow Pit Views - Engraving, Grinding Patches / Grooves
WGTO Pb 138 - Engraving
The Thylacines - Engraving

Aboriginal Site of Significance:
Burrup Pipeline Project Site 28 - Engraving
Haul Road South 07 - Artefacts / Scatter, Engraving, Other: New Info Received - Lot 575-29, 30 & 36 (BMIEA)
Dry Stream - Midden / Scatter
Gas Pipeline 105 - Engraving
Dampier, Woodside A - Engraving
Burrup Pipeline Project Site 31 - Grinding Patches / Grooves
Woodside Pluto Area B 22 - Engraving
Dampier, Woodside B - Artefacts / Scatter, Engraving, Quarry
DRD 69 - Engraving, Other: New Info Received - Lot 575-14 (BMIEA)
Cajuput Well Midden - Artefacts / Scatter, Midden / Scatter, Quarry
Gas Pipeline 103 - Engraving
Woodside Haul Road Expansion 08 - Engraving, Other: New Info Received - Lot 575-03 (BMIEA)
CEM-09-SA-002 - Man-Made Structure, Arch Deposit
King Bay East - Artefacts / Scatter
Desalination Plant Engraving 1 - Engraving
Desalination Plant Engraving 7 - Engraving
King Bay 3, Dampier - Engraving, Man-Made Structure
Gas Pipeline 102 - Engraving, Midden / Scatter
Dampier Road Engraving 3 - Engraving
Pot Valley Carved Tree - Modified Tree
Field Site 7 - Engraving
Gas Pipeline 104 - Artefacts / Scatter
Burrup Pipeline Project Site 22 - Engraving, Grinding Patches / Grooves
Burrup Pipeline Project Site 27 - Engraving
DRD 73 - Artefacts / Scatter, Engraving, Man-Made Structure, Quarry, Other: New Info Received - Lot 575-14 (BMIEA)
DP-287 - Engraving
Mainland (Maitland River) Site 32 - Grinding Patches / Grooves
Burrup Pipeline Project Site 19 - Engraving
Woodside Pluto Area B 3 - Man-Made Structure
DRD 71 - Engraving, Other: New Info Received - Lot 575-14 (BMIEA)
Burrup Pipeline Project Site 16 - Engraving
Dancing Dogs - Engraving, Other: New Info Received - Lot 575-29, 30 & 36 (BMIEA)
Dampier Road Engraving 4 - Engraving
Isolated Flake - Artefacts / Scatter
Kangaroo Rocks - Engraving
DRD 60 - Engraving, Other: New Info Received - Lot 575-14 (BMIEA)
Grinding Patch - Grinding Patches / Grooves
DP-288 - Engraving
Burrup Pipeline Project Site 2 - Engraving
Bird Nest Dune - Artefacts / Scatter, Midden / Scatter
DRD 55 - Engraving, Other: New Info Received - Lot 575-14 (BMIEA)
Desalination Plant Engraving 4 - Engraving
Burrup Peninsula, Murujuga - Artefacts / Scatter, Ceremonial, Engraving, Fish Trap, Grinding Patches / Grooves, Historical, Man-Made Structure, Midden / Scatter, Modified Tree, Mythological, Quarry, Rockshelter, Skeletal Material / Burial, Arch Deposit, Camp, Hunting Place, Massacre

Aboriginal Site of Significance:
DRD 57 - Engraving, Other: New Info Received - Lot 575-14 (BMIEA)
Hearson Bay Road - King Bay A - Engraving
Borrow Pit 1 - Artefacts / Scatter, Quarry
Main Roads Engravings 16 - Engraving
Dampier, Woodside D - Engraving
Burrup Pipeline Project Site 18 - Engraving
Gas Pipeline 21 - Engraving
Burrup Pipeline Project Site 4 - Engraving
Burrup Pipeline Project Site 29 - Engraving
Gas Pipeline 17 - Engraving, Man-Made Structure
Salt Flats 2 - Artefacts / Scatter, Midden / Scatter
KDR / EFS 7 - Engraving
Burrup Service Corridor 3 - Engraving
Midden Road 3 - Artefacts / Scatter, Grinding Patches / Grooves, Midden / Scatter
Gas Pipeline 18 - Engraving
Pp-19 (Relocated 01/02/2004) - Engraving
Burrup Pipeline Project Site 5 - Engraving
Parker Point 57 (Pp-57) - Engraving
King Bay 1, Dampier - Engraving, Midden / Scatter
NATGAS 260 (RTM-Dampier 067a) - Artefacts / Scatter, Quarry, Shell
Dampier - Engraving, Man-Made Structure
Stairway To Heaven - Engraving, Man-Made Structure
Dungong Midden - Artefacts / Scatter, Engraving, Grinding Patches / Grooves, Midden / Scatter, Bp Dating: 2270 +/- 100 Bp
Grinding Cluster - Grinding Patches / Grooves
PE 3 Men's And Ceremonial Engravings - Ceremonial, Engraving, Mythological
Dampier Highway Engraving - Engraving
Midden Road 1 - Artefacts / Scatter
Median Strip - Engraving
Gas Pipeline 120 - Artefacts / Scatter
Desalination Plant Engraving 6 - Engraving
Burrup Pipeline Project Site 1 - Engraving
Borrow Pit 3f - Artefacts / Scatter
Borrow Pit 4 - South - Artefacts / Scatter
Jillys Valley - Artefacts / Scatter, Engraving, Grinding Patches / Grooves, Man-Made Structure, Midden / Scatter
Gas Pipeline 08. - Engraving, Grinding Patches / Grooves, Man-Made Structure, Water Source
Gas Pipeline 97 - Artefacts / Scatter, Engraving
Grindstone 2 - Grinding Patches / Grooves
AIC/08 - Engravings - Engraving
King Bay East A - Engraving, Grinding Patches / Grooves

Appendix H – References and databases

H.1 References

City of Karratha (2021) Advice received in relation to clearing permit application CPS 9160/1. City of Karratha. Received on 02 February 2021. (DWER Ref: DWER DT40845)

Commonwealth of Australia (2005) Climate classification maps: Climate classification of Australia (Köppen – All Classes). Accessed at http://www.bom.gov.au/jsp/ncc/climate_averages/climate-classifications/index.jsp?maptype=kpn# mapshttp://www.bom.gov.au/jsp/ncc/climate_averages/climate-classifications/index.jsp?maptype=kpn#maps Accessed December 2020.

Department of Parks and Wildlife (DPaW) (2103) Weed Prioritisation Process for DPaW (formerly DEC) – "An integrated approach to Weed Management on DPaW-managed lands in WA". (As at November 2013).

Department of Primary Industries and Regional Development (DPIRD) (2017) NRInfo Digital Mapping. Accessed at https://maps.agric.wa.gov.au/nrm-info/ Accessed June 2020. Department of Primary Industries and Regional Development, Government of Western Australia.

Department of Water and Environmental Regulation (DWER) (2021a) Regulatory Services – Water - *Rights in Water and Irrigation Act 1914* advice received for CPS 9160/1. Received on 03 February 2021 (DWER Ref: A1984266).

Department of Water and Environmental Regulation (DWER) (2021b) Contaminated Sites – Science and Planning advice received for CPS 9160/1. Received on 24 February 2021 (DWER Ref: A1984266).

Environmental Protection Authority (EPA) (2008) Environmental Guidance for Planning and Development Guidance Statement No 33. Environmental Protection Authority, Western Australia.

Environmental Protection Authority (EPA) (2016a) Technical guidance - Flora and Vegetation Surveys for Environmental Impact Assessment.

Environmental Protection Authority (EPA) (2016b) Technical Guidance – Protecting the Quality of Western Australia's Marine Environment.

GHD (2019) Line Upgrade Project – 124-KRT-DMP- 132 kV. Flora and Fauna Survey, August 2019.

GHD (2020a) Report for Horizon Power. Geotechnical Works Clearing Permit Application, 12542051. December 2020 (DWER Ref A1976262)

GHD (2020b) Flora and Vegetation Survey. Horizon Power. Burrup Expansion Project, 12530473. July 2020 (DWER Ref A1976263)

Government of Western Australia (2019) 2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019. W.A. Department of Biodiversity, Conservation and Attractions, Perth. Available from: https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics.

Horizon Power (2020) Supporting Information for clearing permit application CPS 9160/1. Regional Power Corporation. Received by DWER on 22 December 2020. (DWER Ref: A1976264).

Horizon Power (2021) Additional supporting Information for clearing permit application CPS 9160/1. Regional Power Corporation. Received by DWER on 8 June 2021. (DWER Refs: A2015009, A2015176, A2015458).

Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) Native Vegetation in Western Australia, Extent, Type and Status. Resource Management Technical Report 249. Department of Agriculture, Western Australia.

Submission (2021a) Public submission received in relation to clearing permit application CPS 9160/1. Received on 16 February 2021. (DWER Ref DWERDT414923)

Submission (2021b) Public submission received in relation to clearing permit application CPS 9160/1. Received on 18 February 2021. (DWER Ref DWERDT416285)

Submission response (2021a) Public submission response in relation to clearing permit application CPS 9160/1. Received on 21 May 2021. (DWER Ref A2010675)

Submission response (2021b) Public submission received in relation to clearing permit application CPS 9160/1. Received on 24 May 2021 (DWER Ref A2010671)

Thackway, R and Cresswell, I.D. (eds) (1995) An interim biogeographical regionalisation of Australia. Australian Nature Conservation Agency (now Department of Agriculture, Water and the Environment), Canberra.

Trudgen, M.E. (1991) Vegetation condition scale in National Trust (WA) 1993 Urban Bushland Policy. National Trust of Australia (WA), Wildflower Society of WA (Inc.), and the Tree Society (Inc.), Perth.

Wilson, S. and Swan, G. (2017), A Complete Guide to Reptiles of Australia, Fifth edition, Sydney, Australia, New Holland Press.

Webb, A., Kinloch, J., Keighery, G. and Pitt, G. 2016. The Extension of Vegetation Complex Mapping to Landform boundaries within the Swan Coastal Plain Landform and Forested Region of South West Western Australia. Department of Parks and Wildlife, Bunbury, WA.

H.2 GIS databases

Publicly available GIS Databases used (sourced from www.data.wa.gov.au):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Pre-European Vegetation Statistics
- Remnant Vegetation, All Areas
- Native Vegetation Extent (DPIRD-005)
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)