GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 9550/1
Permit Holder:	Yangibana Pty Ltd
Duration of Permit:	From 10 September 2022 to 8 August 2024

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 and baseline surveys.

2. Land on which clearing is to be done

Lot 600 on Deposited Plan 400249, Talandji

3. Clearing authorised

The permit holder must not clear more than 1.37 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1 of Schedule 1.

PART II – MANAGEMENT CONDITIONS

4. Avoid, minimise, and reduce impacts and extent of clearing

In determining the *native vegetation* authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending 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.

5. Weed management

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

(a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;

(b) ensure that no known *weed*-affected soil, *mulch*, *fill*, or other material is brought into the area to be cleared; and

(c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

6. Directional clearing

The permit holder must conduct clearing activities 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.

7. 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 on the day of drilling/excavating with excavated material when no longer required.

PART III - RECORD KEEPING AND REPORTING

8. 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 4 of this Permit; (f) actions taken to minimise the risk of the introduction and spread of *weeds* in

No.	Relevant matter	Specifications
		accordance with condition 5 of this Permit; (g) the direction in which clearing was undertaken in accordance with condition 6 of the Permit; and (h) evidence of capping all boreholes and backfilling all test pits on the day of drilling/excavating in accordance with condition 7 of this Permit.

9. Reporting

The permit holder must provide to the *CEO* the records required under condition 8 of this permit when requested by the *CEO*.

DEFINITIONS

In this permit, the terms in Table 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.
fill	means material used to increase the ground level, or to fill a depression.
department	means the department established under section 35 of the *Public Sector Management Act 1994* (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
EP Act	*Environmental Protection Act 1986* (WA)
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.
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.

END OF CONDITIONS

C. Robertson
12.08.2022
3.46PM

Caron Robertson
A/MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

12 August 2022

Schedule 1

The boundary of the area authorised to be cleared is shown in the map below (Figure 1).

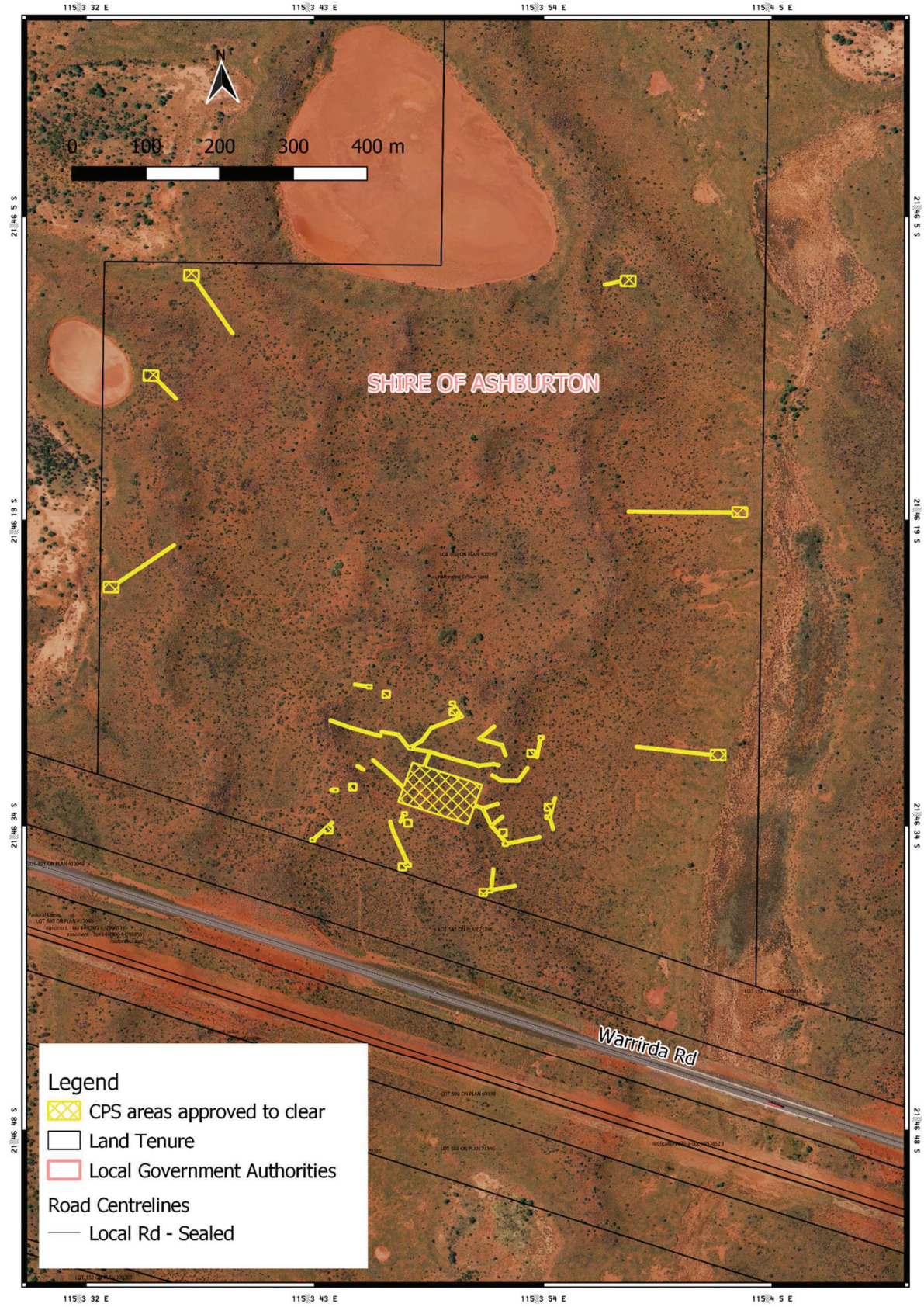

Figure 1: Map of the boundary of the area within which clearing may occur

Government of Western Australia
Department of Water and Environmental Regulation

Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9550/1
Permit type:	Purpose permit
Applicant name:	Yangibana Pty Ltd
Application received:	4 January 2022
Application area:	1.37 hectares (revised) of native vegetation
Purpose of clearing:	Geotechnical investigations and baseline surveys
Method of clearing:	Mechanical
Properties:	Lot 600 on Deposited Plan 400249
Location (LGA area):	Shire of Ashburton
Locality (suburb):	Talandji

1.2. Description of clearing activities

Yangibana Pty Ltd (Yangibana) (previously Hastings Metals Technology Ltd (Hastings)) has identified the need to undertake geotechnical investigations and baseline surveys within the application area. This application proposes to clear up to 1.37 hectares of native vegetation within Lot 600 on Deposited Plan 400249, Talandji (see Figure 1, Section 1.5).

The application to clear native vegetation forms part of a bigger project, whereby the applicant proposes to construct the Onslow Rare Earths Plant (OREP) (construction of a hydrometallurgical process plant and the construction of a lined evaporation pond), within the Ashburton North Strategic Industrial Area (ANSIA) (Hastings, 2022a).

The geotechnical investigations and baseline surveys are required to finalise the plant foundations and detailed design and will compromise of the following:

- Conduct a baseline (contamination) report - prepared by an Environmental Consultant which must be signed or approved by an auditor accredited under Section 69 of the *Contaminated Sites Act 2003*, as a contaminated sites auditor which shall identify known or suspected contamination on the Property and generally report on the state of any contamination which has occurred or suspected of having occurred within Lot 600 on Deposited Plan 400249, Talandji;
- 10 test pits - each test pit is approximately 1.5 metres long by three metres wide by three metres deep. The area required for each test pit measures seven metres x five metres;
- 10 boreholes - boreholes are proposed approximately three metres below groundwater level, typically 15 metres in depth. Each borehole will be constructed of slotted PVC pipe. The borehole would be left in place and capped as a potential future monitoring site. Drillers onsite, use mud tanks and small sumps are proposed to be dug at each site to contain the drilling muds to reduce contamination. As per the test pits a disturbance area of approximately 10 metres by 10 metres is allowed for the borehole, sumps and supporting equipment. These are for the hydromet process plant area;
- 33 Cone Penetration Tests (CPT) - CPT tests (three metres x three metres) are proposed on the existing and new tracks and are proposed to be of a depth of approximately 15 metres;
- One pad for Dynamic Compaction Test work - would include a cleared area of approximately 60 metres by 100 metres for dynamic compaction test work. This is to inform a decision on earthworks cost reduction. Exact location to be considered but is likely proposed under the kiln or general process plant area;

- Six monitoring bores (around TSF) - as part of the Evaporation Pond monitoring bores requirement, 32 millimetres monitoring standpipes with covers will be established using the CPT rig; and
- One new access track (1611 meters long by three metres wide) (Hastings, 2022e).

This proposal forms part of a bigger project (the Yangibana Project), whereby the proposed hydrometallurgical (hydromet) process plant, once constructed (following these works) hopes to process a mineral concentrate from the proposed Yangibana Rare Earths Project site, which is located approximately 300 kilometres (direct) south-east of Onslow. The mineral concentrate will undergo hydromet process to produce a mixed rare earth carbonate, which will be exported to overseas customers (Hastings, 2022a).

It should be noted that the original application was submitted by (parent company) Hastings Metals Technology Ltd (Hastings), but then was later revised and changed to Yangibana Pty Ltd (daughter company) (Yangibana) to reflect the future business operating structure, related to the future development and operation of the Yangibana Project (Hastings, 2022e). Hastings and Yangibana company names detailed in this report are used interchangeably and for the content of this report are the same company (the applicant).

1.3. Decision on application

Decision:	Granted
Decision date:	12 August 2022
Decision area:	1.37 hectares of native vegetation, 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 original application, for the purpose of the construction of hydromet process plant, associated infrastructure and pipeline, for 85.6 hectares within 128 hectares application area for 21 days and no submissions were received. The applicant later revised the application to be for geotechnical investigations, for the proposed clearing of 1.37 hectares (revised application area) and revised the company name to Yangibana Pty Ltd from Hastings Metals Technology Ltd. The revised application was advertised for a further seven days and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix B), relevant datasets (see Appendix F.1), the findings of biological surveys (see Appendix E), the clearing principles set out in Schedule 5 of the EP Act (see Appendix C), relevant planning instruments, and any other pertinent matters that were deemed relevant to the assessment (see Section 3.3) and information provided by the applicant (see Appendix A). The Delegated Officer also took into consideration the purpose of the clearing to facilitate the construction of the proposed hydromet process plant and associated infrastructure.

The assessment identified that the proposed clearing may result in:

- injuring fauna that may be present at the time of the clearing activity;
- uncapped boreholes and uncovered test pits 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.

The Delegated Officer noted that priority flora may be impacted by the proposed clearing. It is considered that the loss of priority flora as a result of the clearing will not impact the conservation status of any particular taxa, and will not significantly impact their local or regional occurrence. 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;
- 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; and

- implement weed management measures to mitigate impacts to adjacent vegetation.

1.5. Site map

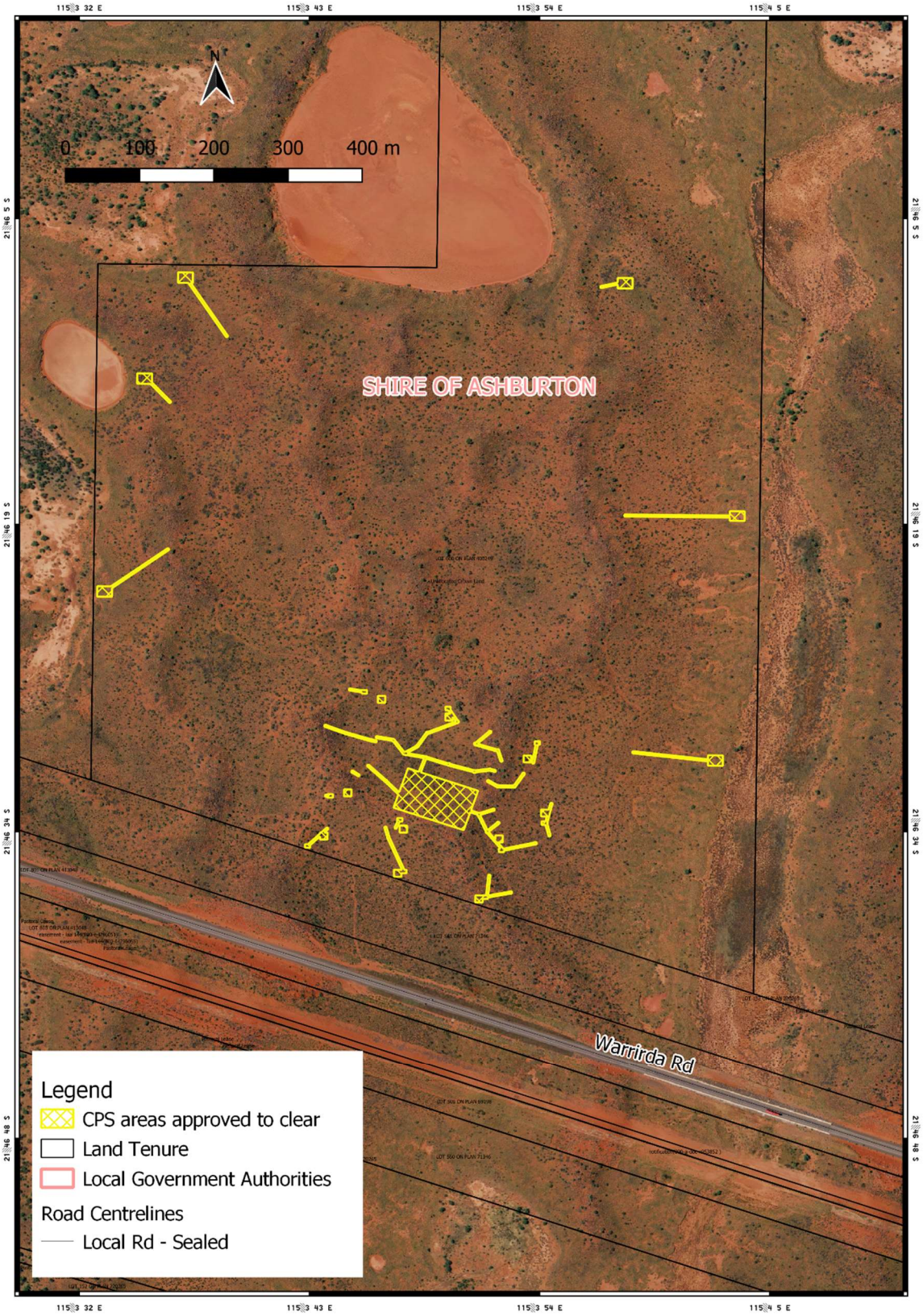

Figure 1 Map of the application area

The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit.

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 1.4), 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 polluter pays principle
- 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)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016a)
- Technical guidance – *Sampling of short range endemic invertebrate fauna* (EPA, 2016b)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016c)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

The following avoidance and mitigation measures were submitted by the applicant (Hastings, 2022e):

Avoidance measures:
The applicant has advised the following avoidance measures were considered in the project design and will be implemented during the proposal:

- Clearing occurs in approved areas;
- Vehicles/equipment and personnel staying on tracks/roads and within the application area boundary;
- Existing tracks will be utilised to the maximum extent practicable; and
- Implementation of strict hygiene procedures to prevent introduction of new or additional populations of weed species into the application area.

Minimisation measures:
The applicant has advised the following minimisation measures will be implemented:

- Vegetation clearing shall be kept to the minimum amount necessary to allow access or for the approved works.

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix B) and the extent to which the impacts of the proposed clearing present a risk to biological values.

The assessment against the clearing principles (see Appendix C) identified that the impacts of the proposed clearing may present a risk to the biological values of priority flora and fauna. 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. Biological values (flora) - Clearing Principle (a) and (c)

Assessment:

The area proposed to be cleared (1.37 hectares) contains three vegetation types and two broad fauna habitat types, with over 98 percent of the proposed clearing area is in a very good condition (Appendix B.1).
A review of the site characteristics and habitat preferences of the conservation significant flora species recorded in the local area (see Appendix B) identified that the application area may provide suitable and potentially significant habitat for the following species:

- *Eremophila forrestii* subsp. *viridis (E.forrestii)* (listed as Priority 3 by the Department of Biodiversity, Conservation and Attractions (DBCA)), and
- *Triumfetta echinata* (listed as Priority 3 by the DBCA).

The applicant advised that flora values within the application area are well understood, as numerous surveys have been undertaken for the Ashburton North Strategic Industrial Area since 2008, which have been used to inform the most recent flora and vegetation surveys (360 Environmental, 2021; Biota 2010; Ecological Australia, 2021b; ENV, 2012; Hastings, 2022a; RPS, 2021a; Spectrum, 2021).

The applicant commissioned RPS (2021a) to undertake a detailed flora and vegetation assessment, between the dates of 16 to 23 October 2020 and Ecological Australia (2021b) to undertake a Targeted *Eremophila forrestii subsp. viridis* (P3) survey, between the dates of 13 to 16 December 2020 (Hastings, 2022a). Previous survey results were also used to calculate the number of individual records found within and outside of the application area, with the findings of these surveys detailed below (Hastings, 2022d).

Eremophila forrestii subsp. viridis

Eremophila forrestii subsp. *viridis* (*E. forrestii*) is a multi-branched shrub with pink-cream flowers occurring in August and occurs in red to brown sandy soils, usually in *Acacia* shrubland over hummock grassland of *Triodia* spp. (Western Australian Herbarium, 1998-). *E. forrestii* is known from five locations in Western Australia, three of these records occur between 15 and 25 kilometres south of Onslow townsite, with an additional record from 75 kilometres south-east of Onslow, just off the North-West Coastal Highway (DCBA, 2022). The final record is approximately 1100 kilometres to the east, from a collection made at well 38 on the Canning Stock Route (DCBA, 2022). In the area near Onslow, *E. forrestii* is known to inhabit red to red-brown sands and sandy loams in association with the dunes and interdunal flats (DBCA 2022a and WAH, 2021).

E. forrestii, listed as a Priority 3 flora by DBCA, is considered a poorly known species in need of further survey (DBCA, 2022). *E. forrestii* was recorded during the 2020 and 2021 surveys within the application area, associated with sand dune and sand plain vegetation units; *Acacia tetragonophylla* Tall to Mid Isolated Shrubs to Open Shrubland over *Triodia epactia* Hummock Grassland (AstTe) (0.305 hectares), *Grevillea stenobotrya* Tall Sparse to Open Shrubland over *Triodia epactia* Open Hummock Grassland (GsTe) (0.5 hectares) and *Hakea stenophylla subsp. stenophylla* Mid Sparse and *Acacia stellaticeps* Mid Sparse Shrubland over *Triodia epactia* Hummock Grassland (HsAstTe) (0.559 hectares) (Ecological Australia, 2021b and RPS, 2021a). RPS (2021a) mapped an additional 10.4 hectares of AstTe, 26.35 hectares of GsTe and 2.24 hectares of HsAstTe outside the application area.

The flora surveys identified 13 *E. forrestii* individuals from four locations within the application area and a total of 6,481 individuals from 1,805 locations have been mapped inside and outside of the application area (360 Environmental 2021; Biota 2010; Ecological Australia 2021b; ENV 2012; RPS 2021a; Spectrum 2021). With 6,481 *E. forrestii* individuals known within a 50-kilometre radius (equating to 0.2 percent of known individuals within a 50-kilometre radius), which suggests this species may not be restricted to the application area and is likely locally common within areas of suitable habitat (DBCA, 2022b). It is likely that more individuals or populations are present in the broader area noting similarities in the mapped soil and vegetation types.

Considering the above, removal of this Priority 3 flora from the application area is unlikely to result in the significant decline of the species population within the local and regional contexts nor have a detrimental impact on its conservation status.

Triumfetta echinate

Triumfetta echinate, listed as a Priority 3 flora by DBCA, is a prostrate shrub that flowers in August and occurs in red to brown sandy soils, typically in dune systems of *Triodia* hummock grassland (Western Australian Herbarium, 1998-). *Triumfetta echinata* is known from three locations in Western Australia over a range of 40 kilometres east-west by

40 kilometres north-south from Peedamulla to Talandji (DBCA, 2022). An additional southernmost record of *Triumfetta echinata* in Yannarie was recorded in 1905, however, it is not considered to accurately represent the location of collection of the specimen, and it is unlikely that plants persist at this location (DBCA, 2022).

Triumfetta echinata was recorded from a single population on dune crests and is known from eight records on NatureMap (DBCA, 2022 and WAH, 2021), all which occur within the vicinity of Onslow. The Detailed Flora and Vegetation Assessment, undertaken over seven days in October 2020, did not identify any individuals within the application area (RPS, 2021). The closest record is approximately 1.80 kilometers from the application area. However, the proposed activities will have no impact to *Triumfetta echinate* as no individuals were found in the application area.

Conclusion:
The proposed clearing will not impact on any Threatened flora taxa, as none were located within the application area. Based on the above assessment, the removal of the 13 *E.forrestii* (Priority 3) individuals from within the application is considered unlikely to result in a significant decline of the *E.forrestii* population in the local and regional contexts. When considering distribution and abundance information, additional to the robust data provided by surveys over the application area, survey area, and contextual area, impacts to Priority flora taxa are not considered significant at the local scale. The proposed activities will have no impact to *Triumfetta echinate.*

For the reasons set out above, the proposed clearing area does not represent a significant impact to conservation flora, and the applicant's commitment to undertake avoidance and mitigation measures will result in no long-term impacts to Priority flora taxa.

Outcome:
Based on the above assessment, and the avoidance and mitigation measures provided by the applicant (Section 3.1), the Delegated Officer has determined that the proposed clearing requires management conditions in relation to this environmental value.

Conditions:
To address the potential impacts, the following management measures will be added to the Permit:

- avoid, minimise to reduce the impacts and extent of clearing; and
- take hygiene steps to minimise the risk of the introduction and spread of weeds into adjacent vegetation.

3.2.2. Biological values (fauna) - Clearing Principles (a) and (b)

Assessment:

Fauna habitats

The Onslow Rare Earth Plant Detailed Fauna Assessment conducted by Ecological Australia (2021b) and Onslow Rare Earth Plant Fauna Assessment by Bamford Consulting Ecologists (2021), recorded two fauna habitat types within the application area, that could potentially support populations of conservation fauna:

- **Undulating dunes or red sandy dunes** - described as undulating sandy dunes with scattered shrubs (Acacia and Hakea) over spinifex on sand and sandy loam in valleys (this corresponds largely with the Dune Land System); and
- **Sandy loam flats with termite mounds** - described as sandy loam flats tending towards clay with some chenopod shrubs, and a few areas with termite mounds (this corresponds largely with the Onslow Land System).

The habitat types found within the application area are known to extend into the surrounding ANSIA area (Bamford Consulting Ecologists, 2021; Ecological Australia, 2021a) suggesting these habitats are not restricted to the application area.

Fauna species

No threatened or endangered fauna species listed under the EPBC Act or Biodiversity Conservation Act (BC Act), nor priority species listed by DBCA were found within the application area during the surveys (Bamford Consulting Ecologists, 2021 and Ecological Australia, 2021a). However, there are a total of 20 fauna species that were identified in likelihood assessments and assessed to be regular visitors or residents, based on habitat preferences which include:

- *Dasycercus blythi* (Brush-tailed mulgara) (listed as Priority 4 by DBCA);
- *Dasyurus hallucatus* (Northern Quoll) (listed as Endangered under the EPBC Act and BC Act);
- *Leggadina lakedownensis* (Lakeland Downs mouse or northern short-tailed mouse) (listed as Priority 4 by DBCA);
- *Liasis olivaceus barroni* (Pilbara olive python) (listed as Vulnerable by DBCA);
- *Lerista planiventralis maryani* (Maryan's keeled slider (Ashburton) (listed as Priority 1 by DBCA); and
- 16 Migratory waterbird species (including *Actitis hypoleucos* (Common Sandpiper), *Gelochelidon nilotica* (Gull-billed Tern) and *Hirundo rustica* (Barn Swallow) (Bamford Consulting Ecologists, 2021; Ecological Australia, 2021).

Brush-tailed mulgara
The Brush-tailed mulgara is noted to occupy the Pilbara region and central Western Australia as well as central Australia (southern Northern Territory and northern South Australia). This species is often compared with its congener, the Crest-tailed Mulgara (*D. cristicauda*), as the two are sympatric over parts of their range (Van Dyck and Strahan 2008). In general, the Brush-tailed Mulgara is less closely associated with the dune fields than the Crest-tailed Mulgara (Woolley *et al.* 2013). Where the two co-occur, the Crest-tailed Mulgara is restricted to sandridges with an understorey dominated by spinifex (*Triodia*), whereas the Brush-tailed Mulgara occupies sand plain and gibber plain (Pavey *et al.* 2011).

No individuals, burrows or other evidence of the Brush-tailed mulgara were recorded within the greater survey area or application area during the fauna assessments (Bamford Consulting Ecologists, 2021; Ecological Australia 2021a). Based on previous record locations and habitat within the application area, the Brush-tailed mulgara is considered unlikely to utilise the application area, but rather occasionally pass through (Bamford Consulting Ecologists, 2021).

Northern Quoll
The Northern Quoll occupies a diverse range of habitats including rocky areas, eucalypt forest and woodlands, shrubland and grassland (TSSC, 2005), but occurs predominantly in rocky habitat and often with gorges, breakaways and hills, with rugged rocky areas used for denning purposes, but can also occur along creek lines and beaches (van Dyck and Strahan, 2008). The Northern Quoll's habitat preferences were absent from the application area and greater survey area, with no individuals or other evidence of the Northern Quoll were recorded during the fauna assessments (Bamford Consulting Ecologists, 2021; Ecological Australia, 2021a). The closest record of this species was identified seven kilometres west of the application area from 2013 (DBCA, 2007-2022). The surveys determined that there was no suitable denning habitat within the application area and thus this species would only visit or pass through the area (Bamford Consulting Ecologists, 2021; Ecological Australia, 2021a).

Lakeland Downs mouse or northern short-tailed mouse
The Lakeland Downs mouse occupies spinifex and tussock grasslands in *Acacia* shrublands on deep sandy soils (CALM, 2002). The species is nocturnal, residing in burrows during the day and foraging on invertebrates and plant material at night (CALM, 2002). The Onslow Rare Earths Plant Fauna Assessment identified that the three fauna habitat types within the application area may provide suitable substrate and vegetation for the Lakeland Downs mouse (Bamford Consulting Ecologists, 2021), usually associated with areas that are seasonally inundated on red or white sandy-clay soils (Van Dyck and Strahan, 2008). The Pilbara population of the mouse, which may represent a distinct taxon (Van Dyck and Strahan, 2008) has a preference for sandy and cracking clay/gilgai soils (Bamford Consulting Ecologists, 2021).

While no individuals, burrows or other evidence of the Lakeland Downs mouse were recorded within the greater survey area or the application area, during the fauna assessments, the Lakeland Downs mouse was assessed to be likely a resident within the application area (Bamford Consulting Ecologists, 2021; Ecological Australia, 2021a). It is acknowledged that the proposed clearing will result in the loss of suitable habitat for the Lakeland Downs mouse (undulating dunes and sandy loam flats habitat types), whereby the Lakeland Downs mouse are considered likely to occur within the application area. It is noted the undulating dunes and sandy loam flats habitat types may be subject to a proportionally higher level of impact than the other habitat types. However, these habitat types are expected to be relatively common in the region and wider subregion and not restricted to the clearing area. Therefore, any subsequent impact on the Lakeland Downs mouse is expected to be low (Bamford Consulting Ecologists, 2021; Ecological Australia, 2021a).

Maryan's keeled slider
The Maryan's keeled slider is thought to be restricted to an area between Onslow and Barridale and is known from a small number of records (Bamford Consulting Ecologists, 2021). The Maryan's keeled slider occurs in sandy areas along the north-west coast and in near-coastal sands between Onslow and Barridale (Wilson and Swan, 2017). While it is noted that the application area is not coastal (approximately ten kilometres from the coast), the application area

consists of undulating dunes which may provide suitable habitat for the species. While no individuals or evidence of the Maryan's keeled slider was found during the surveys, the Maryan's keeled slider was assessed to be likely a resident within the application area (Bamford Consulting Ecologists, 2021; Ecological Australia, 2021a). Similarly, to the Lakeland Downs mouse, as while it is noted the undulating dunes are subject to a proportionally higher level of impact than the other habitat types, the undulating dunes are expected to be relatively common in the region and wider subregion and not restricted to the application area and therefore any subsequent impact on the Maryan's keeled slider mouse is expected to be low.

Pilbara Olive Python

This species is known to be restricted to ranges within the Pilbara region and Mount Augustus in the Gascoyne and is often recorded near waterholes and usually associated with rocky substates (Bamford Consulting Ecologists, 2021). The Pilbara Olive Python is usually found in proximity to water, although breeding males and juveniles may disperse widely. An ambush predator that feeds predominately on mammals and birds (Bamford Consulting Ecologists, 2021). The Onslow Rare Earths Plant Fauna Assessment identified that this species has been previously recorded along the Ashburton River in the 2019 Onslow Reconnaissance Flora and Fauna Survey – Dry Season conducted by Ecoscape, approximately 7.3 kilometres away of the application area (Ecoscape, 2019). The application area is noted to be approximately 500 meters away from Quick Mud Creek. However, the application area does not contain any waterholes or suitable habitat. No individuals or evidence of the Pilbara Olive Python were recorded within the survey areas and thus it is likely that the occasional Pilbara Olive Python will pass through the application area as a visitor (Bamford Consulting Ecologists, 2021; Ecological Australia, 2021a).

Migratory waterbirds (including Barn Swallow, Common Sandpiper and Gull-billed Tern)

Migratory waterbirds may occur across a range of habitats throughout Australia, including wetlands, coasts, rivers, lakes and mudflats (Bamford et al, 2009). These species, including the Barn Swallow, Common Sandpiper and Gull-billed Tern were considered to be irregular visitors given the claypan habitat type, which is noted to be outside of the application area. Claypan habitat type may contain these species, but the habitat within the application area does not (Bamford Consulting Ecologists, 2021; Ecological Australia,2021).

No individuals or evidence of these species were recorded during the surveys (Bamford Consulting Ecologists, 2021; Ecological Australia, 2021). These migratory waterbird species may occasionally visit the application area, but due to the irrelevant habitat types within the application area, they do not rely solely on it.

Short range endemics

Bennelongia Environmental Consultants conducted the Onslow Rare Earths Plant Short Range Endemic Invertebrate Survey over five days from 22 to 26 April 2021, over 20 sites within four study areas, including the application area.

The Pilbara region is well represented with potential Short Range Endemics (SREs), although much of this species richness is concentrated within Cape Range and Barrow Island (Bennelongia Ecological Consultants, 2021). Most Cape Range SRE species are exclusively associated with caves and Barrow Island species appear to be restricted to the island (Bennelongia Ecological Consultants, 2021). Vegetation mapping within the study areas revealed that the application area is in good to very good (Trudgen, 1991) condition with the potential for microhabitats to occur. The area is therefore likely to provide habitat refugia for many SRE species (Bennelongia Ecological Consultants, 2021).

No SREs individuals were collected or found in the either the study areas or the application area in the 2021 SRE Survey, and the only records of SRE species in the survey area were mygalomorph spiders, with one species, *Aname* 'MYG034', recorded within the ANSIA - but not within the Bennelongia (2021) study areas. However, three species have the potential to occur based on habitat preferences, which included the slater *Buddelundia* `BIS437`, pseudoscorpion *Atemnidae* `*BPS349*` and the scorpion *Urodacus* `BSCO068` (Bennelongia Ecological Consultants, 2021).

All pseudoscorpion species recorded, including the two recorded from the study areas, were considered by Bennelongia Ecological Consultants (2021) unlikely to be SREs (i.e. to have confined distributions). The pseudoscorpion *Indolpium* `BPS347`was also thought to occupy differing habitats, including sand dunes, swales, flood plains and sand plains and therefore not expected to be significantly impacted by the clearing proposal (Bennelongia Ecological Consultants, 2021). The potential SRE *Urodacus* sp. was collected from a burrow on sand dunes in the survey area. However, this habitat is locally common and considering the relatively small scale of the application area, the *Urodacus* sp. are not expected to be significantly affected (Bennelongia, 2021).The potential SRE *Buddelundia* `BIS437` recorded during the 2021 SRE survey is likely a new species. However, the species is not considered to be under threat from the proposal, as the *Buddelundia* `BIS437` were found across all SRE study areas, including outside of the application area (Bennelongia Ecological Consultants, 2021).

Conclusion:
The undulating dunes and sandy loam flats are noted to be well-represented in the vicinity of the survey area during the fauna assessment and that similar habitat is also likely to be well-represented in the extensively vegetated local area (Bamford Consulting Ecologists, 2021, Ecological Australia, 2021). Given the extent of suitable habitat in the local area, which is recorded well beyond the application area, the proposed clearing of 1.37 hectares of undulating dunes and sandy loam flats habitat types are unlikely to significantly reduce or be a threat to the aforementioned fauna and SRE species.

No evidence of threatened, endangered or priority aforementioned fauna or SRE species individuals were observed during the fauna and SRE assessments. Each fauna and SRE species has a scattered distribution across northern Australia. It is not expected that the application area comprises significant habitat for the aforementioned fauna or SRE species or is critical for the continuation of the forementioned fauna species.

Noting the nature of the proposed clearing and that abundant suitable habitat for the aforementioned fauna and SRE species is located adjacent to and within close proximity to the application area, fauna species may be present at the time of the clearing activities. 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 and uncovered test pits pose a potential threat to ground fauna. Capping boreholes and backfilling test pits at the end of each day and at completion will reduce the likelihood of death or injury to fauna.

Outcome:
Based on the above assessment, and the avoidance and mitigation measures provided by the applicant (Section 3.1), the Delegated Officer has determined that the proposed clearing requires management conditions in relation to fauna values.

Conditions:
To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- 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; and
- Cover all boreholes at the end of each day and backfill all boreholes and test pits upon completion.

3.3. Relevant planning instruments and other matters

Overview
Yangibana Pty Ltd proposes to establish the Onslow Rare Earths Plant (OREP) within the Ashburton North Strategic Industrial Area (ANSIA) (Hastings, 2022a). ANSIA is administered by the Department for Jobs, Tourism, Science and Innovation (JTSI) and managed by DevelopmentWA. The Proposal occurs within the General Industrial Zone as defined in Improvement Plan No. 41 and Improvement Scheme No. 1 for the ANSIA (Hastings, 2022a). This application forms part of a bigger project, whereby the proposed hydrometallurgical (hydromet) process plant, once constructed (following these works) hopes to process a mineral concentrate from the proposed Yangibana Rare Earths Project site, which is located approximately 300 kilometres (direct) south-east of Onslow. The mineral concentrate will undergo hydromet process to produce a mixed rare earth carbonate, which will be exported to overseas customers (Hastings, 2022a).

In addition to a Native Vegetation Clearing Permit, the following other planning and environmental approvals were undertaken as part of this Proposal:

Referral decision - Department of Agriculture, Water and Environment under the EPBC Act and Proposal decision - Environmental Protection Authority under Part IV of the EP Act
Hastings (2022a), has obtained a “not a controlled action” decision (EPBC 2021/9046) from the Commonwealth Department of Climate Change, Energy, the Environment and Water (previously Department of Agriculture, Water and the Environment) and does not intend to refer the proposal to the Environmental Protection Authority (EPA) under Part IV of the EP Act following consultation with EPA Services and with due consideration to:

- ANISA has been identified by the WA Government as a location suitable for strategic industrial development, specifically downstream processing. During their assessment of these areas, extensive environmental studies were undertaken to ensure development of the location would not significantly affect environmental factors. The applicant has complemented these studies with proposal specific studies;
- ANSIA having previously been given a ‘not assessed’ decision by the EPA (ref. CMS14338); and

- Application of the significance test in the EPA's Statement of environmental principles, factors, objectives and aims of EIA (Hastings, 2022a).

Land Transfer - Department of Planning, Lands and Heritage

It is noted that when Hastings originally applied for the clearing permit, the process of transferring Part of Lot 152 on Deposited Plan 220265 (which was previously a Pastoral Lease) was underway through the Department of Planning, Lands and Heritage (DPLH) (Hastings, 2022a). DPLH gave the applicant conditional authority to submit applications for Native Vegetation Clearing Permit and Development Application over portion of Lot 152 on Deposited Plan 220265 (Hastings, 2022a). On 25 July 2022, Hastings notified the Department, that the land transfer was complete, and the land is now described as Lot 600 on Deposited Plan 400249, with providing the new Certificate of Title for the property (Hastings, 2022f). It is noted that DevelopmentWA own the land, and whereby Hastings/ Yangibana have entered into a 'Option to Lease Agreement' for this property (Hastings, 2022g).

Option to Lease Agreement – DevelopmentWA

On 8 August 2022, Hastings provided the Department the 'Option to Lease Agreement', between DevelopmentWA and Yangibana, whereby DevelopmentWA have authorised Yangibana to access the land to undertake surveys and testing in relation to geotechnical works (Hastings, 2022g). It is noted that this Option to Lease Agreement does not authorise any construction and development works for a two year period, or before certain milestones are completed and submitted to DevelopmentWA, before the option to exercise the Lease Agreement comes into effect.

Development Approval – Western Australian Planning Commission (WAPC)

Under the ANSIA improvement scheme no. 1, Hastings submitted a Development Application to WAPC on 22 November 2021, which encompasses the design (this proposal – geotechnical investigations) and (a separate clearing permit) for the construction of the Hydromet Process plant, evaporation pond and associated infrastructure on the then part of Lot 152 on Deposited Plan 220265 (now Lot 600 on Deposited Plan 400249) (Hastings, 2022c). A determination was made by WAPC on 22 July 2022 to approve a Development Application (reference 103-1-5) under the *Planning and Development Act 2005* for Yangibana Pty Ltd the proposed development of the Rare earth's processing plant, subject to conditions (Hastings, 2022g). This Development Approval is noted to expiry on 22 July 2024.

Local Government Approvals - Shire of Ashburton

The Shire of Ashburton advised the Department that no local government approvals are required as the Development Application approval is being sought from WAPC, and that the proposed clearing is consistent with the Shire's Local Planning Scheme No.7 (Shire of Ashburton, 2022). The Shire had concerns in relation to the priority flora records that have been found within the study area commissioned by the applicant and requested the protection of priority flora species (Shire of Ashburton, 2022). These concerns have been addressed in the above assessment.

Works Approvals under the *Environmental Protection Act 1986* – DWER

Yangibana on 23 November 2021, submitted an application for a Works Approval to the department, for Category 44 to construct a hydromet process plant and evaporation pond (Hastings, 2022c). It is noted this application for the works approval application is on 'stop the clock' – waiting on applicant, whereby Yangibana is required to conduct geotechnical investigations and baseline surveys, to finalise the plant foundations and provide detailed design drawings, as proposed in this clearing permit application (DWER, 2022a). Following the results from the geotechnical investigations and baseline surveys, the application for the works approval can be progressed. It should be noted that Yangibana will amend the clearing permit in the future to allow for the construction (and commissioning) of the hydrometallurgical (hydromet) process plant and associated infrastructure, which is not just constrained to Lot 600 on Deposited Plan 400249 (Hastings, 2022c).

Aboriginal sites under the *Aboriginal Heritage Act 1972*

No Aboriginal sites of significance have been mapped within the application area. 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.

Clearing Permit Decision Report

Appendix A. Additional information provided by applicant

Information	Description
Hastings (2022b)	Additional supporting Information for clearing permit application CPS 9550/1 - Desktop Hydrology and Hydrogeology Assessment Report. Received by DWER on 8 June 2022. (DWER Ref: DWERDT631335)
Hastings (2022c)	Additional supporting Information for clearing permit application CPS 9550/1 - Environmental approvals summary. Received by DWER on 9 June 2022. (DWER Ref: DWERDT619212).
Hastings (2022d)	Additional supporting Information for clearing permit application CPS 9550/1, including results and additional regional surveys undertaken include: - Biota Environmental Sciences. 2010. *A Vegetation and Flora Survey of the Wheatstone Study Area, near Onslow.* Unpublished report prepared for Chevron Australia; - ENV Australia Pty Ltd. 2012. *Ashburton North Strategic Industrial Area Flora and Vegetation Assessment*. Unpublished report prepared for The Planning Group; - Spectrum Ecology. 2021. *Warrida Road Detailed & Targeted Flora & Basic Fauna Assessment*. Unpublished report prepared for Main Roads; - 360 Environmental Pty Ltd. 2021. *Ashburton Infrastructure Project. Flora and Vegetation Assessment*. Report prepared for Mineral Resources Limited; Received by DWER on 10 June 2022. (DWER Ref: DWERDT619217).
Hastings (2022e)	Applicant revised clearing permit application for CPS 9550/1, to include changes to applicant name, application area and purpose (and noting reduction in properties). Received by DWER on 12 July 2022. (DWER Ref: DWERDT629529).
Hastings (2022f)	Additional supporting Information for clearing permit application CPS 9550/1 – New Certificate of Title and associated Taking Order for Lot 600 on Deposited Plan 400249. Received by DWER on 25 July 2022. (DWER Ref: DWERDT635164).
Hastings (2022g)	Additional supporting Information for clearing permit application CPS 9550/1 - Development Approval (Date 22 July 2022 – expires 22 July 2024, reference 103-1-5. WAPC and Option to Lease Agreement (Date 8 August 2022 – expires 8 August 2024, reference ONSLO 2022-08-08 Executed Option to Lease Lot 600 Warrirda Road Talandji - YANGIBANA PTY LTD). DevelopmentWA. Received by DWER on 8 August 2022. (DWER Ref: DWERDT641962).

Appendix B. 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 C.

B.1 Site characteristics

Characteristic	Details
Local context	The application area is approximately 15 kilometres south of Onslow and approximately 1,360 kilometres north of Perth. The application area occurs within the General Industrial Zone within the Ashburton North Strategic Industrial Area (ANSIA) and within the Carnarvon region of Western Australia. The historical land use has been pastoral, and evidence of degradation occurs due to previous disturbances (roads and tracks, services such as gas, water and power corridors) within the ANSIA, as well as grazing and weeds. The application area is part of an extensive remnant of native vegetation in the Carnarvon Bioregion and the Cape Yannare Coastal Plain (670) mapped vegetation type. The application area occurs on linear and reticulate dunes consisting of dark red sands and loamy sands and are characterised by vegetation consisting of hummock grasslands of *Triodia schinzii* with numerous low shrubs and forbs (RPS, 2021). Spatial data indicates the local area (50-kilometre radius from the centre of the area proposed to be cleared) retains approximately 99.4 per cent of the original native vegetation cover.
Ecological linkage	The application area does not intersect any formally mapped ecological linkages.
Conservation areas	There are no conservation areas located within or adjacent the application area. The nearest conservation area is the Mt Minnie former pastoral lease, located approximately 8.4 kilometres southeast of the application area.
Vegetation description	Vegetation types delineated and mapped within the RPS (2021) and Ecoscape (2019) survey areas were merged with recent vegetation mapping undertaken by Ecological Australia (2021). As a result, a total of three vegetation types were mapped within the application area: • AteTe: *Acacia tetragonophylla* tall to mid isolated shrubs to open shrubland over *Triodia epactia* hummock grassland (0.305 hectares); • GsTe: *Grevillea stenobotrya* tall sparse to open shrubland over *Triodia epactia* open hummock grassland (0.5 hectares); and • HsAstTe: *Hakea stenophyl/a* subsp. *stenophyl/a*, *Acacia stellaticeps* mid sparse shrubland over *Triodia epactia* hummock grassland (0.559 hectares). Representative photographs and the full survey descriptions and maps are available in Appendix E. This is broadly consistent with the mapped Beard vegetation association: • 670 (Cape Yannare Coastal Plain), which is described as hummock grasslands, shrub steppe and scattered shrubs over *Triodia basedowii*, (Shepherd et al, 2001).
Vegetation condition	The vegetation condition mapped within the RPS (2021) and Ecoscape (2019) survey areas were merged with recent vegetation mapping undertaken by Ecological Australia (2021). The surveys identified that the vegetation within the application area is in Very Good to Good (Trudgen, 1991) condition.

Characteristic	Details
	The vegetation conditions identified within the application area are described as: • Very Good: Some relatively slight signs of damage caused by human activities since European settlement (98 per cent); and • 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 (2 per cent). The full Trudgen (1991) condition rating scale is provided in Appendix D.
Climate and landform	The application area is located on flat topography within Cape Range sub-region, characterised by limestone ranges and extensive areas of red dune fields, coastal beach dunes and mud flats, with topographic high of 15 meters AHD and a low of seven metres AHD at the east and western boundaries. The climate is arid, semidesert to subtropical climate, with variable summer and winter rainfall; cyclonic activity can be significant (Kendrick and Mau, 2002). The application area has a mean annual maximum temperature of 32.1 degrees Celsius and a mean annual minimum temperature of 19.2 degrees Celsius. The mean annual rainfall and the annual evapotranspiration rate are both 400 millimetres.
Soil description	The Carnarvon bioregion consists of a sedimentary basin composed of quaternary alluvial, aeolian and marine sediments with locally exposed rocks of Permian to Recent age (Kendrick and Mau 2002; Beard 1990). The dominant soil type in the application area is represented by the Dune System (201Du) (over 98 per cent) and is described as coastal mudflats (with some sandplains and coastal dunes) on coastal deposits over sedimentary rocks of the Carnarvon Basin with tidal soils, calcareous deep sands and some red deep sands, red/brown non-cracking clays and salt-lake soils (making up 98.8 hectares of the application area). The secondary soil type in the application area is represented by the Onslow Land System (201On) and is described as undulating sand plains, dunes and level clay plains supporting soft spinifex grasslands and minor tussock grasslands (making up 28.8 hectares of the application area).
Land degradation risk	While the mapped soils generally are not prone to land degradation, sandy units of the Onslow System and Dune System are susceptible to wind erosion when bared by overgrazing or fire, but revegetate rapidly after rain (Van Vreeswyk et al., 2004). Clay plains with tussock grasses within the Onslow System are also sensitive to overgrazing and are susceptible to erosion (Van Vreeswyk et al., 2004).
Waterbodies and hydrogeography	The application area is mapped within the Pilbara Surface Water Area and the Pilbara Groundwater Area proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act) but does not transect any water resources proclaimed under either the *Metropolitan Water Supply Sewerage and Drainage Act 1909* or *Country Areas Water Supply Act 1947* (CAWS Act). Groundwater salinity within the application area is mapped at 7,000 to 14,000 milligrams per litre total dissolved solids.
Flora	The desktop assessment identified that eight rare flora species have been recorded within the local area, compromising of one Priority 1 (P1) flora and seven Priority 3 (P3) flora (WAH and DBCA, 2021). None of these existing records occur within the application area. The closest records being occurrences of *Triumfetta echinata* (P3) approximately 1.80 kilometres away from the application area and *Eremophila forrestii* subsp. *viridis* (P3) approximately 615 metres from the application area. No flora species listed as threatened under the BC Act or EPBC Act have been recorded in the local area. The closest record of a threatened flora species is an occurrence of *Abutilon*

Characteristic	Details
	sp. *Onslow* (F. Smith s.n. 10/9/61), approximately 26 kilometres east from the application area. With consideration for the site characteristics set out above, relevant datasets (see Appendix F.1), the habitat preferences and conservation statuses of the aforementioned species, the distribution and extent of existing records, and biological survey information (360 Environmental, 2021; Biota, 2010; Ecological Australia, 2021; ENV, 2012; RPS, 2021; Spectrum, 2021), the application area may provide suitable habitat for two priority flora species and impacts to these species required further consideration (see Appendix B.3).
Ecological communities	There are no mapped Priority or Threatened Ecological Communities within the application area. There nearest known PEC is the Tanpool Land System (P1), located approximately 54 kilometres east of the application.
Fauna	The desktop assessment identified that a total of 70 threatened or priority fauna species have been recorded within the local area, including 21 threatened fauna species, 11 priority fauna species, 34 fauna species protected under international agreement, and four other specially protected fauna species (DBCA, 2007-). No records of conservation significant fauna are found within the application area. The closest records are *Pseudomys chapmani* (Western pebble-mound mouse), located approximately 2.5 kilometres away from the application area and *Leggadina lakedownensis* (Lakeland Downs mouse) located approximately 2.4 kilometres away from the application area. With consideration for the site characteristics set out above, relevant datasets (see Appendix F.1), the habitat preferences and conservation statuses of the aforementioned species, the distribution and extent of existing records, and biological survey information (BCE, 2021, Ecological Australia, 2021 and Ecoscape, 2019), the application area may provide suitable habitat for 20 conservation significant fauna species and impacts to these species required further consideration (see Appendix B.4).

B.2 Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Carnarvon	8,382,890.35	8,360,801.46	99.74	1,020,434.08	12.17
Vegetation complex*					
Beard vegetation association Cape Yannare Coastal Plain (670) *	147,808.61	147,792.06	99.99	17,242.88	11.67
Local area					
50km radius	521,868.00	518,773.54	99.4	-	-

*Government of Western Australia (2019)

B.3 Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix F.1), the distribution and extent of existing records, and biological survey information (Ecological Australia, 2021 and RPS, 2021), impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (m)	Number of known records in local area (total)	Are surveys adequate to identify? [Y, N, N/A]
Eremophila forrestii subsp. *viridis*	P3	Y	Y	Y	615	8	Y
Triumfetta echinata	P3	Y	Y	Y	1,800	6	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

B.4 Fauna analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix F.1), the distribution and extent of existing records, and biological survey information (Bamford Consulting Ecologists, 2021 and Ecoscape, 2019), impacts to the following conservation significant fauna required further consideration.

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records in local area (total)	Are surveys adequate to identify? [Y, N, N/A]
Hirundo rustica (Barn Swallow)	MI	Y	Y	16.7	10	Y
Leggadina lakedownensis (Short-tailed mouse)	P4	Y	Y	2.3	348	Y
Lerista planiventralis maryani (Maryan's keeled slider (Ashburton)	P1	Y	Y	17.8	2	Y
Liasis olivaceus barroni (Pilbara olive python)	VU	Y	Y	14.2	1	Y
Migratory waterbirds (16 species)	MI	Y	Y	0.715	1,355	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority; MI: migratory species protected under International Agreement; OS: other specially protected fauna

B.5 Land degradation risk table

Risk categories	*Land Unit 1*
Wind erosion	M1: 10-30% of the map unit has a high to extreme hazard
Water erosion	L2: 3-10% of the map unit has a very high to extreme hazard
Salinity	L2: 3-10% of the map unit has a moderate or high hazard or is presently saline
Subsurface Acidification	M2: 30-50% of the map unit has a high susceptibility
Flood risk	L1: <3% of the map unit has a moderate to high hazard
Water logging	L2: 3-10% of the map unit has a moderate to very high to risk
Phosphorus export risk	L2: 3-10% of the map unit has a high to extreme hazard

Appendix C. 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: The area proposed to be cleared (1.37 hectares) contains three vegetation types and two broad fauna habitat types. Flora and vegetation surveys completed by Ecological Australia (2021a & 2021b) and RPS (2021a) recorded one Priority 3 species 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 (DBCA, 2022b), given the distribution and abundance of adjacent habitat.	Not likely to be at variance	Yes *Refer to Section 3.2.1 and 3.2.2 above.*
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: Three broad fauna habitat types have been described over the application area (Bamford Consulting Ecologists, 2021). A likelihood of occurrence assessment was conducted and concluded that five species were likely to occur: • Brush-tailed mulgara (*Dasycercus blythi)* (P4) • Lakeland Downs mouse or northern short-tailed mouse (*Leggadina lakedownensis*) (P4) • Maryan's keeled slider (Ashburton) (*Lerista planiventralis maryani)* (P1) • Northern Quoll (*Dasyurus hallucatus*) (EN) • Pilbara Olive Python (*Liasis olivaceus* subsp. *barroni*) (VU) However, given the size and context of the proposed clearing, it is unlikely to comprise of significant habitat for fauna.	Not likely to be at variance	Yes *Refer to Section 3.2.2, above.*
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 species listed under the BC Act are known to occur within a 50-kilometre radius of the application area. Therefore, the area proposed to be cleared is unlikely to contain suitable or significant habitat necessary for the continued existence of threatened flora species.	Not likely to be 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: There are no known Threatened Ecological Communities (TECs) located within or in close proximity to the application area. Flora and vegetation surveys of the application area did not identify any vegetation that would form part of a TEC (Ecological Australia, 2021a & 2021b and RPS, 2021a).	Not likely to be at variance	No
Environmental value: 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 extent of native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area.	Not likely to be 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: Given the distance to and separation from the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of conservation areas.	Not likely to be at variance	No
Environmental value: 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: Given no water courses or wetlands are recorded within the application area, the proposed clearing is unlikely to impact on any vegetation growing in association with a watercourse or wetland.	Not likely to be at variance	No
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The application area lies within the Dune and Onslow land systems. The Dune land system is described as dune fields supporting soft spinifex grasslands (Van Vreeswyk et al., 2004). Potential wind erosion occurs when vegetation cover is reduced or removed (Van Vreeswyk et al., 2004). The Onslow land system is described as sandplains, dunes and clay plains supporting soft spinifex grasslands and minor tussock grasslands (Van Vreeswyk et al., 2004). This land system is susceptible to erosion when vegetation cover is reduced or removed (Van Vreeswyk et al., 2004). However, given the size and context of the proposed clearing activities, the proposed clearing is not considered likely to have an appreciable impact on land degradation.	Not likely to be at variance	No
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: There are no Public Drinking Water Source Areas within or in close proximity to the application area. There are no permanent or ephemeral watercourses or	Not likely to be at variance	No

wetlands within the area proposed to clear. The proposed clearing is unlikely to result in significant changes to surface water flows or to cause deterioration in the quality of underground water.		
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: The mapped and surveyed soils and topographic contours and in the surrounding area and the nature of the vegetation to be removed does not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding or waterlogging.	Not likely to be at variance	No

Appendix D. 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.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from 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.

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 E. Biological survey excerpts / photographs of the vegetation

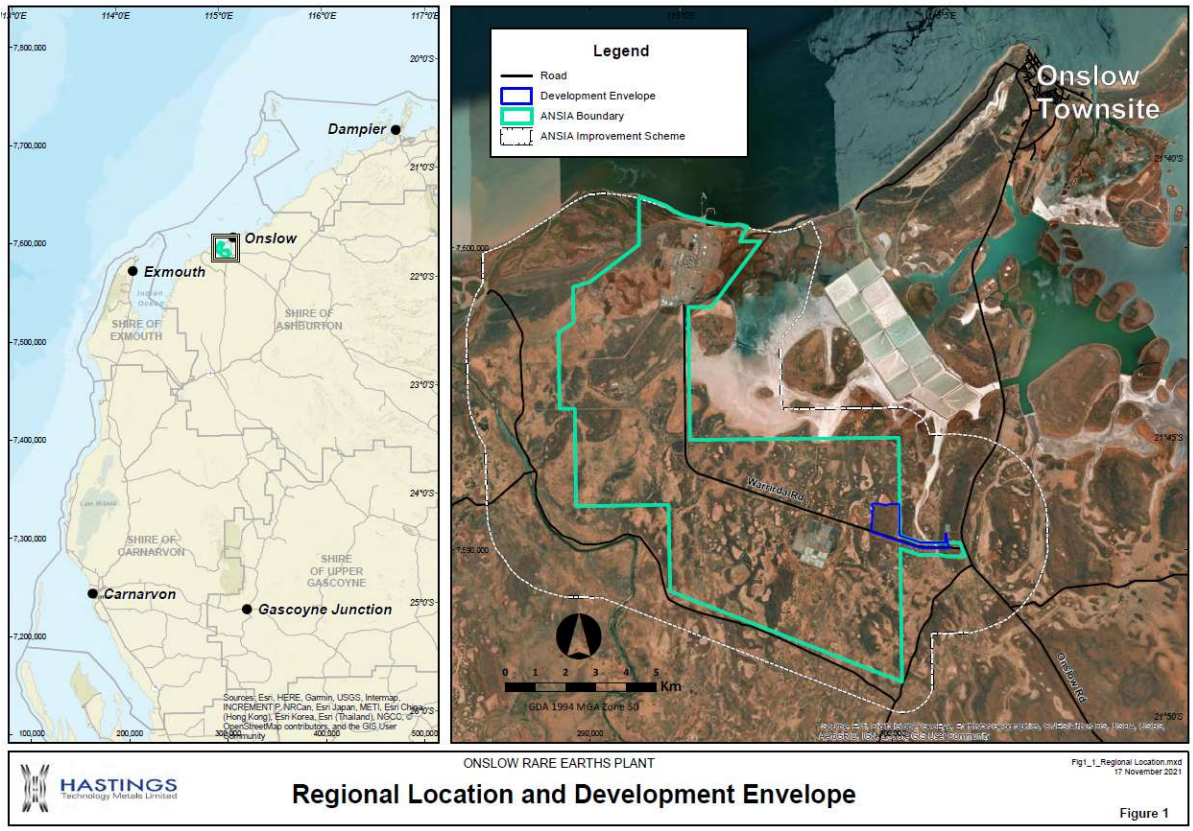

Figure 2 – Regional Location and application's Development Envelope (Hastings, 2022a)

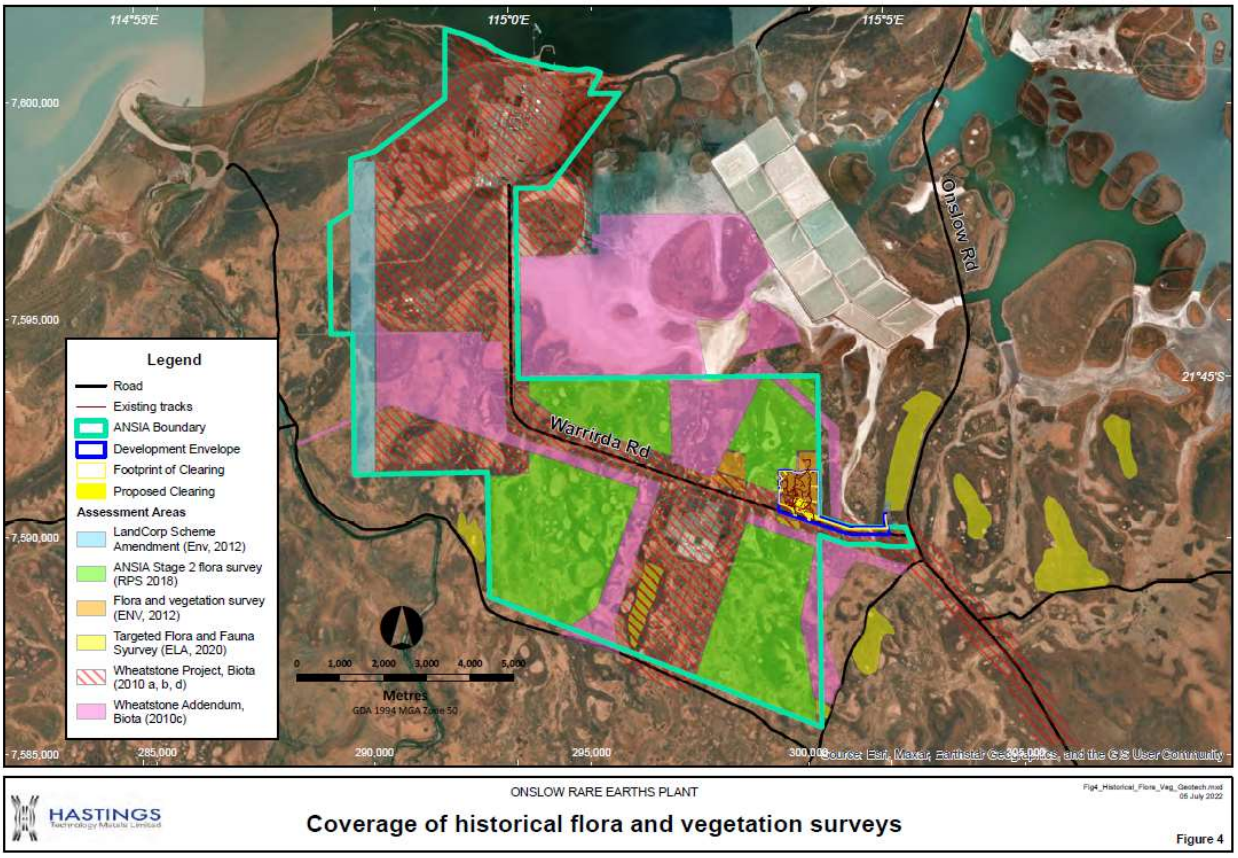

Figure 3 – Coverage of historical flora and vegetation surveys within ANSIA (Hastings, 2022e)

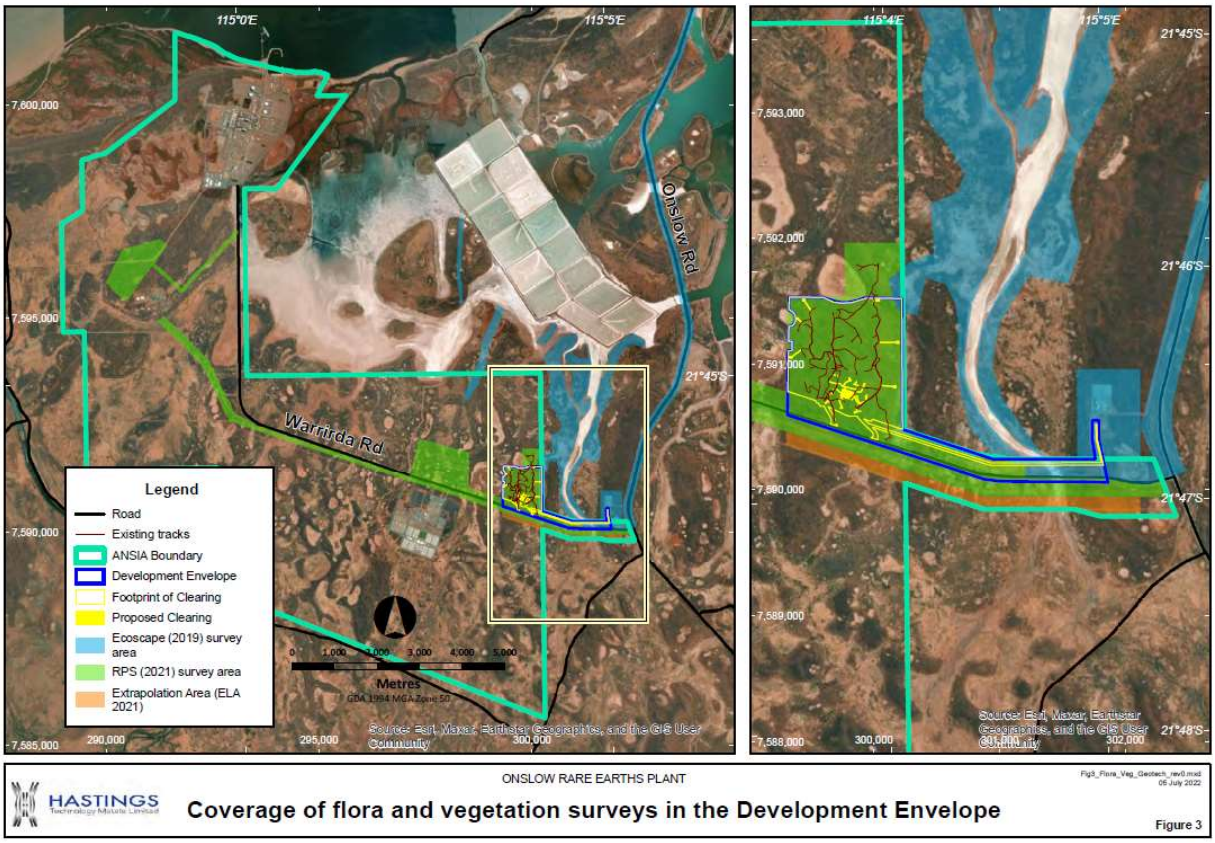

Figure 4 – Coverage of flora and vegetation surveys in the application area and Development Envelope (Hastings, 2022e)

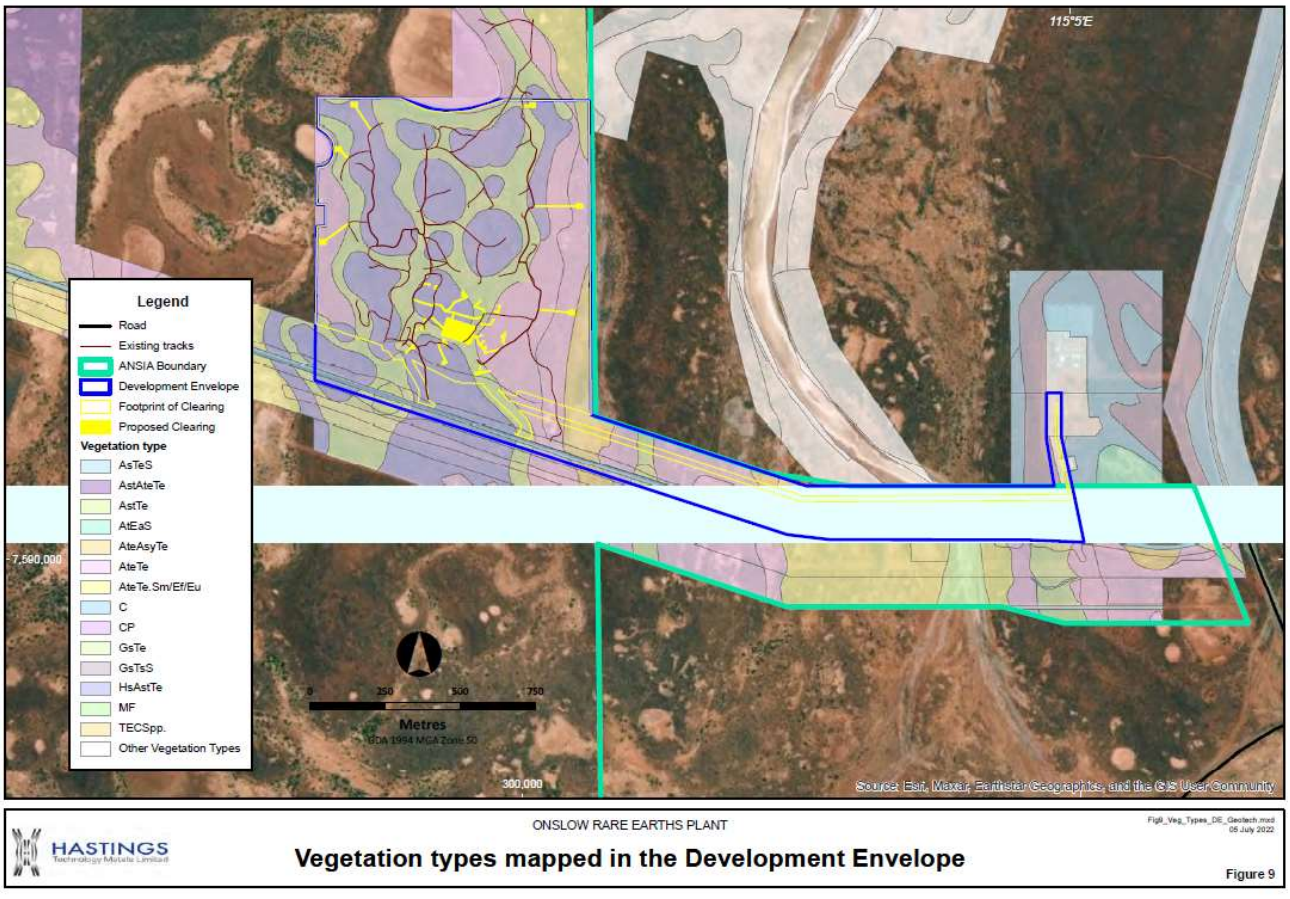

Figure 5 - Mapped Vegetation Types within the Development Envelope (Hastings, 2022e)

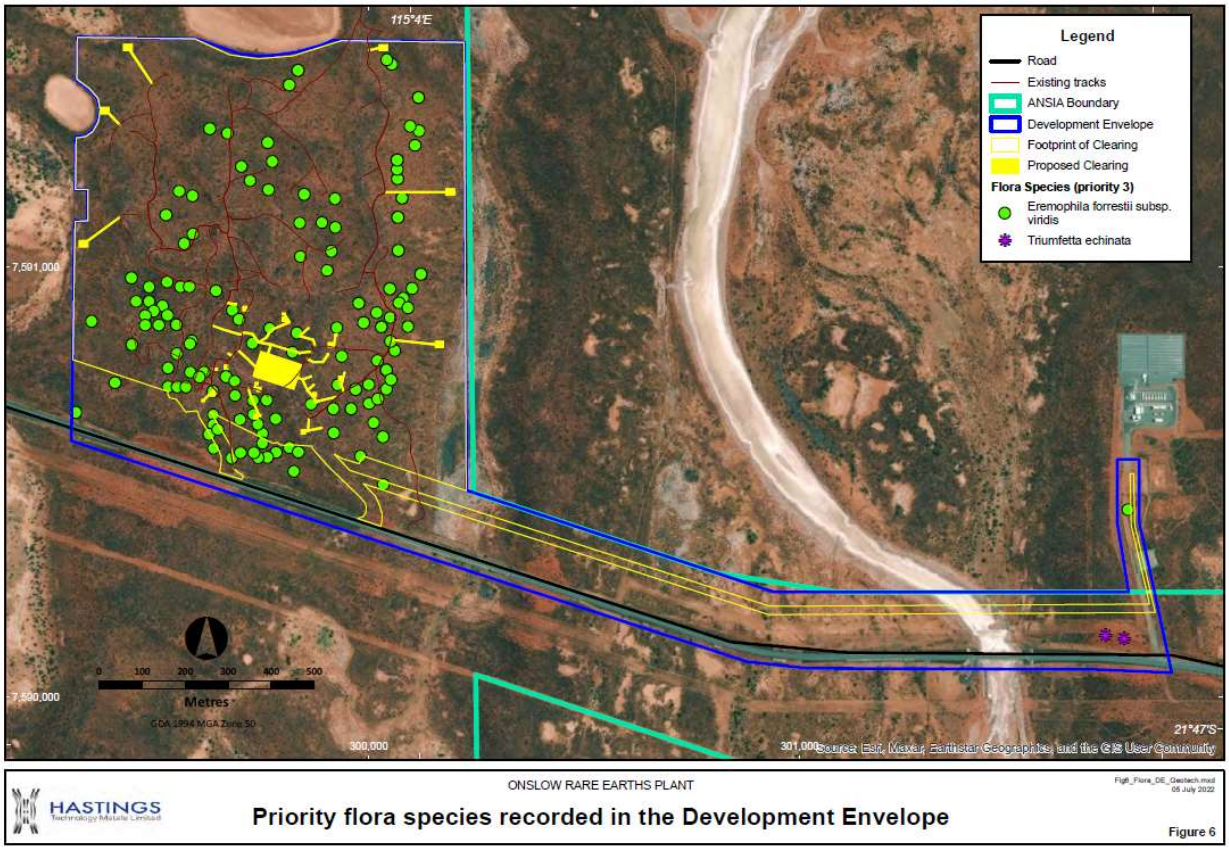

Figure 6 - Priority flora species recorded within the application area and Development Envelopment (Hastings, 2022e)

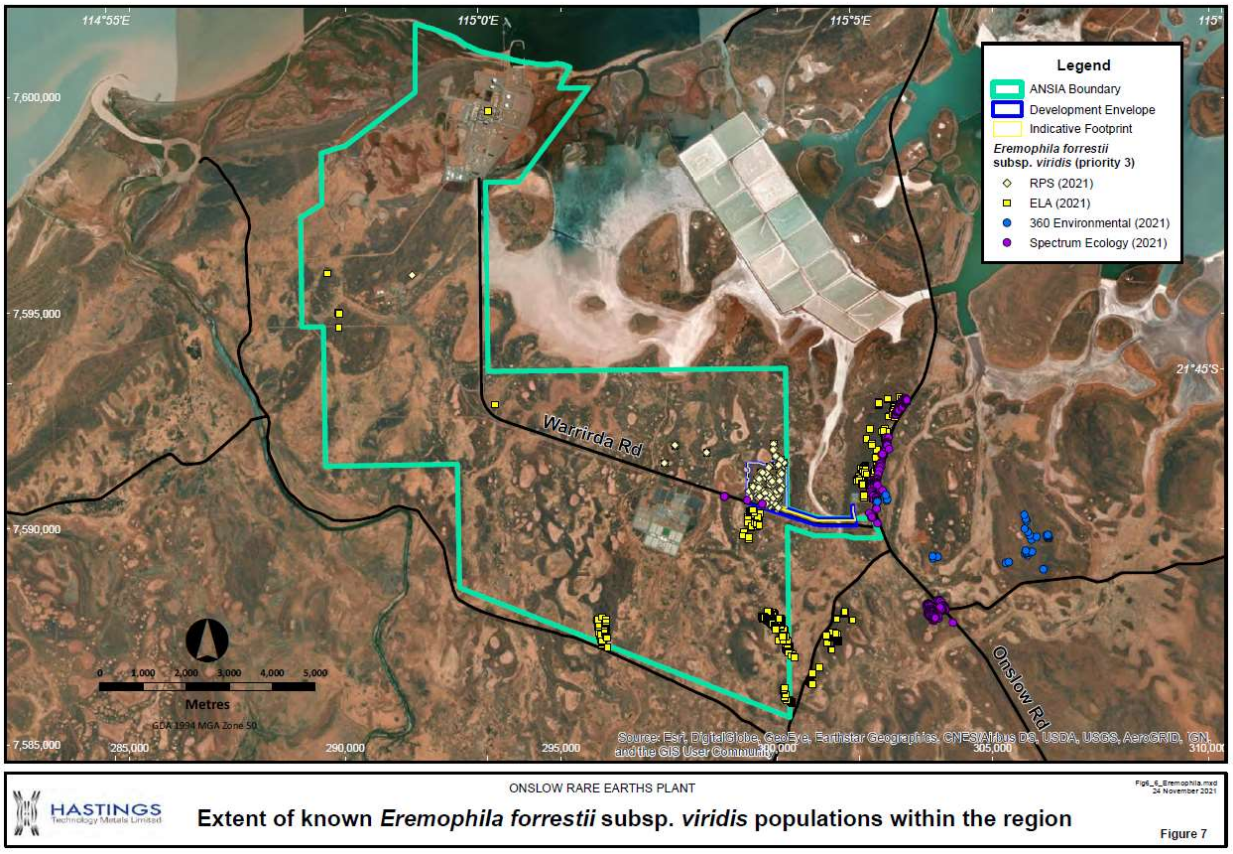

Figure 7 - Known *Eremophila forrestii subsp. Viridis* populations within the region (Hastings, 2022a)

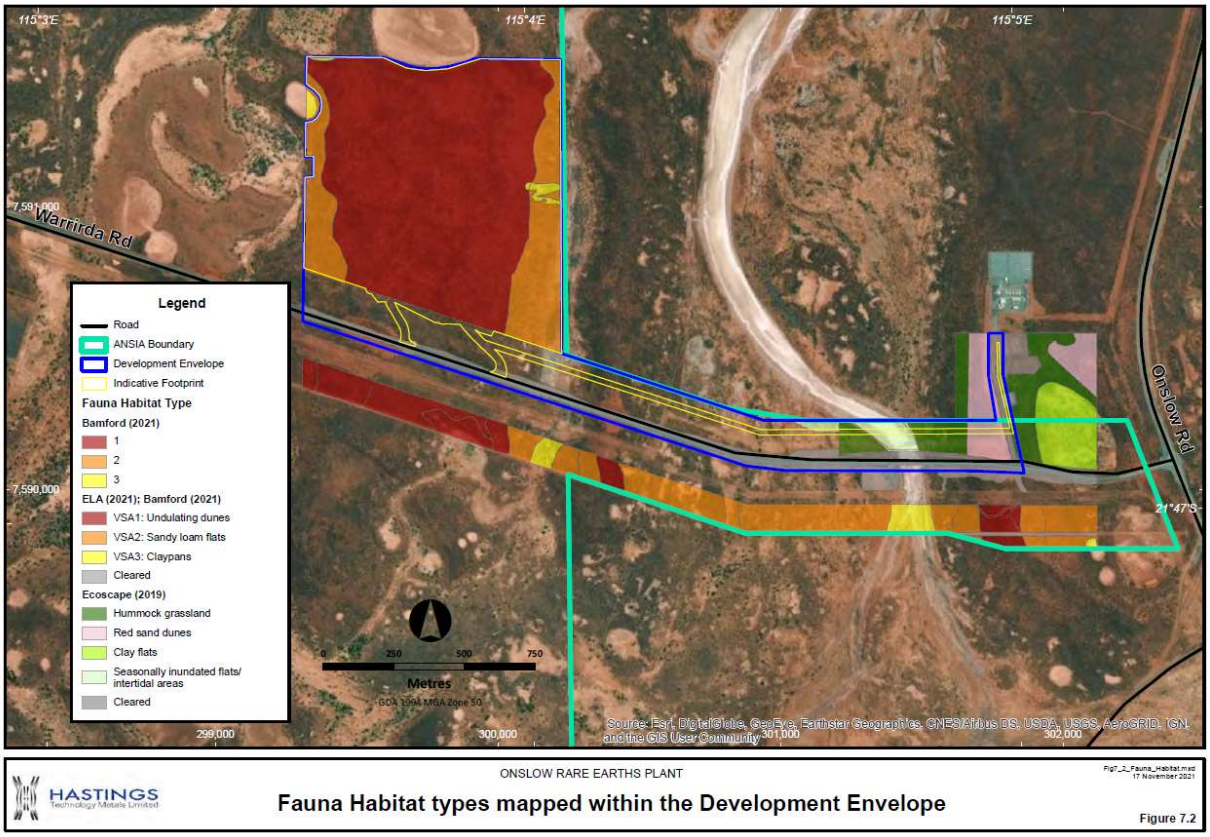

Figure 8 - Fauna Habitat types mapped within the Development Envelopment (Hastings, 2022a)

Figure 9 – Representative photograph of Undulating dunes in the application area (Bamford Consulting Ecologists, 2021)

Figure 10 – Representative photograph of Sandy loam flats, with terminate mounds in the application area (Bamford Consulting Ecologists, 2021)

Figure 11 - *Eremophila forrestii* subsp. *viridis* photographed during the Targeted Flora field survey (Ecological Australia, 2021)

Figure 12 - *Eremophila forrestii* subsp. *viridis* photographed during the Detailed Flora and vegetation assessment (RPS, 2021)

Vegetation type	Photograph
AteTe *Acacia tetragonophylla* Tall to Mid Isolated Shrubs to Open Shrubland over *Triodia epactia* Hummock Grassland	
GsTe *Grevillea stenobotrya* Tall Sparse to Open Shrubland over *Triodia epactia* Open Hummock Grassland	
HsAstTe *Hakea stenophylla* subsp. *stenophylla* Mid Sparse Shrubland over *Acacia stellaticeps* Low Sparse Shrubland over *Triodia epactia* Open Hummock Grassland	

Figure 13 - Representative vegetation types AteTe, GsTe and HsAstTe, within application area photographed (Hastings, 2022a)

Appendix F. Sources of information

F.1. 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)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- 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:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

F.2. References

Bancroft, W. J. and Bamford, M. J (Bamford Consulting Ecologists). (2021) *Onslow Rare Earth Plant Fauna Assessment*. Prepared for Hastings Technology Metals Ltd.

Bamford, M. J., Cherriman, S. and Bamford, A. R. (2009) *Survey for Migratory Waterbirds in the Wheatstone LNG Project Area, November 2008 and March 2009*. Techical Appendix K1 within the Draft Environmental Impact Statement/Environmental Review and Management Programme for the Proposed Wheatstone Project prepared for URS Australia Pty Ltd on behalf of Chevron Australia Pty Ltd

Bennelongia Environmental Consultants (2021) Onslow Rare Earths Plant Short Range Endemic Invertebrate Survey, April 2021

Biota Environmental Sciences (Biota) (2010a) *A Vegetation and Flora Survey of the Wheatstone Study Area, near Onslow,* 3 to 7 April 2009*,* Unpublished report prepared for Chevron Australia.

Biota Environmental Sciences (Biota) (2010b) *Vegetation of the Wheatstone Addendum Area*. Unpublished report prepared for Chevron Australia.

Brown, A. and Buirchell, B (2011) *A Field Guide to the Eremophilas of Western Australia.*

Commonwealth of Australia (2001) *National Objectives and Targets for Biodiversity Conservation 2001-2005*, Canberra.

Commonwealth of Australia (2015) *Wildlife Conservation Plan for Migratory Shorebirds*. Department of the Environment, Canberra, ACT. Available from: https://www.awe.gov.au/sites/default/files/documents/shorebird-plan.pdf

Department of Biodiversity, Conservation and Attractions (DBCA) (2007-2022) *NatureMap: Mapping Western Australia's Biodiversity*. Department of Parks and Wildlife. Available from: http://naturemap.dpaw.wa.gov.au/ (accessed May 2022).

Department of Biodiversity, Conservation and Attractions (DBCA) (2022a) *Species and Communities Branch flora advice for clearing permit application CPS 9550/1*, received 5 July 2022. Department of Biodiversity, Conservation and Attractions, Western Australia (DWER Ref: DWERDT631442).

Department of Biodiversity, Conservation and Attractions (DBCA) (2022b) *Species and Communities Branch Revised flora advice for clearing permit application CPS 9550/1*, received 21 July 2022. Department of Biodiversity, Conservation and Attractions, Western Australia (DWER Ref: DWERDT634587).

Department of Conservation and Land Management (CALM) (2002*) Lakeland Downs short-tailed mouse, Leggadina lakedownensis (Watts, 1976)*. Department of Biodiversity, Conservation and Attractions, Perth, WA.

Department of the Environment (DoE) (2015a) *Conservation Advice Calidris ferruginea curlew sandpiper*. Department of the Environment, Canberra, ACT. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/856-conservation-advice.pdf.

Department of Environment Regulation (DER) (2013) *A guide to the assessment of applications to clear native vegetation*. Perth. Available from: https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Guidelines/Guide2_assessment_native_veg.pdf.

Department of Primary Industries and Regional Development (DPIRD) (2019) *NRInfo Digital Mapping. Department of Primary Industries and Regional Development.* Government of Western Australia. URL: https://maps.agric.wa.gov.au/nrm-info/ (accessed May 2022).

Department of Water and Environmental Regulation (DWER) (2019). *Procedure: Native vegetation clearing permits*. Joondalup. Available from: https://dwer.wa.gov.au/sites/default/files/Procedure_Native_vegetation_clearing_permits_v1.PDF.

Department of Water and Environmental Regulation (DWER) (Regulatory Services – Industry Regulation – Waste and Process sectors) (2022a) *Works Approvals and Licence advice for clearing permit application CPS 9550/1*, received 20 June 2022 (DWER Ref: DWERDT620323).

Department of Water and Environmental Regulation (DWER) (Regulatory Services – North West Region) (2022b) *North West Planning advice for clearing permit application CPS 9550/1*, received 24 June 2022 (DWER Ref: DWERDT624795).

Department of Water and Environmental Regulation (DWER) (Regulatory Services – Water) (2022c) *Rights in Water and Irrigation Act 1914 advice for clearing permit application CPS 9550/1*, received 29 June 2022.

Ecoscape (2019) *2018 Onslow Reconnaissance Flora and Fauna Surveys – Dry Season*, 10 to 14 December 2018

Eco Logical Australia (ELA) (2021a) *Onslow Rare Earth Plant Detailed Fauna Assessment*. June 2021. Prepared for Hastings Technology Metals Ltd. 4 August.

Eco Logical Australia (ELA) (2021b) *Targeted Eremophila forrestii subsp. viridis (P3) Survey at Onslow*. 13 to 16 December 2020. Prepared for Hastings Technology Metals Ltd.

ENV Australia Pty Ltd (2012a) *Ashburton North Strategic Industrial Area (Level Two) Flora and Vegetation Assessment,* 16-18 May and 20-22 July 2011. Prepared for Landcorp

ENV Australia Pty Ltd (ENV) (2012b) *Ashburton North Strategic Industrial Area Biological Desktop Review*. Report prepared for The Planning Group

Environmental Protection Authority (EPA) (2016a). *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment*. Available from: http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/EPA%20Technical%20Guidance%20-%20Flora%20and%20Vegetation%20survey_Dec13.pdf

Environmental Protection Authority (EPA) (2016b) *Technical Guidance: Sampling of short range endemic invertebrate fauna*. Available from: https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Tech%20guidance-%20Sampling-SREs-Dec-2016.pdf

Environmental Protection Authority (EPA) (2016c). *Technical Guidance – Terrestrial Fauna Surveys.* Available from: https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Tech%20guidance-%20Terrestrial%20Fauna%20Surveys-Dec-2016.pdf.

Galt Geotechnics (2013) *Report on geotechnical study - Eastern General Industrial Area, Ashburton North, Onslow.* December 2013. Unpublished report prepared for LandCorp.

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

Hastings Technology Metals Limited (the applicant) (Hastings) (2022a) *(Original) Clearing permit application and supporting information CPS 9550/1*, received 4 January 2022 (DWER Ref: DWERDT544406).

Hastings Technology Metals Limited (Hastings) (2022b) *Additional supporting Information for clearing permit application CPS 9550/1 - Desktop Hydrology and Hydrogeology Assessment Report*, received 8 June 2022 (DWER Ref: DWERDT631335)

Hastings Technology Metals Limited (Hastings) (2022c) *Additional supporting Information for clearing permit application CPS 9550/1 - environmental approvals summary*, received 9 June 2022 (DWER Ref: DWERDT619212).

Hastings Technology Metals Limited (Hastings) (2022d) *Additional supporting Information for clearing permit application CPS 9550/1, including results and additional regional surveys,* received 10 June 2022 (DWER Ref: DWERDT619217).

Hastings Technology Metals Limited (Hastings) (2022e) *Applicant's revised clearing permit application for CPS 9550/1, to include changes to applicant name, application area and purpose*, received 12 July 2022 (DWER Ref: DWERDT629529).

Hastings Technology Metals Limited (Hastings) (2022f) *Additional supporting Information for clearing permit application CPS 9550/1 – New Certificate of Title and associated Taking Order for Lot 600 on Deposited Plan 400249*, received 25 July 2022 (DWER Ref: DWERDT635164)

Hastings Technology Metals Limited (Hastings) (2022e) *Additional supporting Information for clearing permit application CPS 9550/1 - Development Approval (Date 22 July 2022 – expires 22 July 2024, reference 103-1-5. WAPC and Option to Lease Agreement (Date 8 August 2022 – expires 8 August 2024, reference ONSLO 2022-08-08 Executed Option to Lease Lot 600 Warrirda Road Talandji - YANGIBANA PTY LTD).* DevelopmentWA*,* received 8 August 2022. (DWER Ref: DWERDT641962).

Kendrick, P. and Mau, R. (2002) *Carnarvon 1 (CAR1 - Cape Range subregion) in: 'A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002'*. Accessed from https://www.dpaw.wa.gov.au/about-us/science-and-research/ecoinformatics-research/117-a-biodiversity-audit-of-wa

Northcote, K. H. with Beckmann G G, Bettenay E., Churchward H. M., van Dijk D. C., Dimmock G. M., Hubble G. D., Isbell R. F., McArthur W. M., Murtha G. G., Nicolls K. D., Paton T. R., Thompson C. H., Webb A. A. and Wright M. J. (1960-68) *Atlas of Australian Soils*, Sheets 1 to 10, with explanatory data. CSIRO and Melbourne University Press: Melbourne.

Pavey, C. R., Nano, C. E. M., Cooper, S. J. B., Cole, J. R. and McDonald, P. J. (2011). Habitat use, population dynamics and species identification of mulgara, *Dasycercus blythi* and *D. cristicauda*, in a zone of sympatry in central Australia. *Australian Journal of Zoology* 59: 156-169.

Payne, A. L. (2004). Land Systems. In: Van Vreeswyk, A. M. E., Payne, A. L., Leighton, K. A. and Hennig, P. (Eds), *Technical Bulletin No. 92: An Inventory and Condition Survey of the Pilbara Region, Western Australia,* pp. 175-384. Department of Agriculture, South Perth, Western Australia.

RPS Environment and Planning Pty Ltd (2021a) *Detailed Flora and Vegetation Assessment – Onslow Rare Earths Plant. Single phase survey*, 16 to 23 October 2020, prepared for Hastings Technology Metals, Perth, WA.

RPS Environment and Planning Pty Ltd (RPS) (2021b) *Desktop Hydrology and Hydrogeology Assessment, Onslow Rare Earths Plant.* Prepared for Hastings Technology Metals Ltd

RPS Environment and Planning Pty Ltd (RPS) (2019a) *Environmental Assessment Report: Ashburton Strategic Industrial Area - Phase 2*. Unpublished report prepared for LandCorp.

RPS Environment and Planning Pty Ltd (2019b) (Level 1) *Reconnaissance Flora and Vegetation Assessment within the Ashburton North Strategic Industrial Area (ANSIA)* – Phase 2 Area, 27 July to 3 August 2018

RPS Environment and Planning Pty Ltd (RPS) (2009) *Baseline Flora and Vegetation Survey Ashburton North Pipeline Route Option 3*. Unpublished report prepared for Chevron Australia.

Schoknecht, N., Tille, P. and Purdie, B. (2004) *Soil-landscape mapping in South-Western Australia – Overview of Methodology and output*s Resource Management Technical Report No. 280. Department of Agriculture.

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.

Shire of Ashburton (2022) *Advice for clearing permit application CPS 9550/1*, received 4 February 2022 (DWER Ref: DWERDT560789).

Spectrum Ecology & Spatial (Spectrum) (2021) *Warrirda Road Detailed & Targeted Flora & Basic Fauna Assessment, prepared for Main Roads Western Australia*, conducted 4 to 7 May 2021. (DWER Ref: DWERDT552140).

Threatened Species Scientific Committee (TSSC) (2005) *Commonwealth Listing Advice on Northern Quoll (Dasyurus hallucatus).* Available from: http://www.environment.gov.au/biodiversity/threatened/species/dasyurus-hallucatus.html

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.

Van Dyck, S. and Strahan, R. (Eds). (2008). *Mammals of Australia.* New Holland Publishers, Sydney, New South Wales.

Van Vreeswyk, A.M.E., Payne, A.L., Leighton, K.A., and Hennig, P. (2004) *Technical Bulletin: An inventory and condition survey of rangelands in Pilbara Region, Western Australia, No 92*. Department of Agriculture, Western Australia.

Western Australian Herbarium (1998-). *FloraBase - the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions, Western Australia. https://florabase.dpaw.wa.gov.au/ (Accessed 20 May 2022)

Wilson, S. and Swan, G. (2021) *A Complete Guide to Reptiles of Australia*. New Holland Publishers. Sixth edition.

360 Environmental Pty Ltd (2021) *Ashburton Infrastructure Project Flora and Vegetation Assessment Report*, Prepared for Mineral Resources Limited. September 2021