GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 8921/1
Permit Holder:	IB Operations Pty Ltd
Duration of Permit:	28 August 2020 – 28 August 2025

The Permit Holder is authorised to clear native vegetation subject to the following conditions of this Permit.

PART I –CLEARING AUTHORISED

1. Purpose for which clearing may be done
Clearing for the purpose of the construction of the Wedgefield Laydown Facility.

2. Land on which clearing is to be done
Lot 370 on Deposited Plan 35619, Wedgefield (Crown Reserve 29082).

3. Area of Clearing
The Permit Holder must not clear more than 8.1 hectares of native vegetation within the area hatched yellow on attached Plan 8921/1.

4. Application
This Permit allows the Permit Holder to authorise persons, including employees, contractors and agents of the Permit Holder, to clear native vegetation for the purposes of this Permit subject to compliance with the conditions of this Permit and approval from the Permit Holder.

5. 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 *Ports Authorities Act 1999* or any other written law.

PART II – MANAGEMENT CONDITIONS

6. Avoid, minimise and reduce the impacts and extent of clearing
In determining the amount of native vegetation to be cleared as 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.

7. Soil erosion management
The Permit Holder shall not clear native vegetation unless construction activities commences within two months of the authorised clearing being undertaken.

8. Weed control
When undertaking any clearing or other activity authorised under this Permit, the Permit Holder must take the following steps to minimise the risk of the 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 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.

PART III – RECORD KEEPING AND REPORTING

9. Record keeping

The Permit Holder must maintain the following records in relation to the clearing of native vegetation authorised under this Permit:

(a) 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 or decimal degrees;
(b) the date(s) that the area was cleared;
(c) the size of the area cleared (in hectares);
(d) actions taken to avoid, minimise and reduce the impacts and extent of clearing in accordance with condition 6 of this Permit;
(e) actions taken to minimise the risk of the introduction and spread of *weeds* in accordance with condition 8 of this Permit.

10. Reporting

The Permit Holder must produce the records required under condition 9 of this Permit when required by the *CEO*.

DEFINITIONS

The following meanings are given to terms used in this Permit:

fill means material used to increase the ground level, or fill a hollow;

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;

weed/s 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 Parks and Wildlife Regional Weed Rankings Summary, regardless of ranking; or
(c) not indigenous to the area concerned.

Richard Newman
DIRECTOR
NATIVE VEGETATION PROTECTION

Officer delegated under Section 20
of the Environmental Protection Act 1986

29 July 2020

Plan 8921/1

Legend

- Imagery
- Clearing Instruments Activities
- Local Government Authority
- Roads

N

0 200m

1:4,715

(Approximate when reproduced at A4)

GDA 94 (Lat/Long)

Geocentric Datum of Australia 1994

..... Date 29 July 2020

Richard Newman

Officer with delegated authority under Section 20 of the Environmental Protection Act 1986

GOVERNMENT OF WESTERN AUSTRALIA

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 8921/1
Permit type:	Purpose permit
Applicant name:	Iron Bridge Operations Pty Ltd
Application received:	22 May 2020
Application area:	8.1 hectares (ha) of native vegetation
Purpose of clearing:	Construction of the Wedgefield laydown facility (WLF)
Method of clearing:	Mechanical Removal
Property:	Lot 370 on Deposited Plan 35619
Location (LGA area/s):	Town of Port Hedland
Localities (suburb/s):	Wedgefield

1.2. Description of clearing activities

The vegetation applied to be cleared is contained within a single contiguous area (see Figure 1, Section 1.5) that is bounded by an industrial area to the north and west and by a large span of native vegetation to the south-east.

Decision:	Granted
Decision date:	29 July 2020
Decision area:	8.1 hectares (ha) of native vegetation as depicted in Section 1.5, below.

1.3. Reasons for decision

This clearing permit application was made in accordance with section 51E of the *Environmental Protection Act 1986* (EP Act) and was received by the Department of Water and Environmental Regulation (DWER) on 22 May 2020.DWER advertised the application for public comment and no submissions were received.

In undertaking the assessment, and in accordance with section 51O of the EP Act, the Delegated Officer has given consideration to the Clearing Principles in Schedule 5 of the EP Act (see Appendix C), relevant planning instruments, and other pertinent matters deemed relevant to the assessment (see Section 3).

In particular, the Delegated Officer has determined that:

- the clearing is not likely to have an impact on an area of high biodiversity, significant flora or fauna habitat or on a significant remnant of native vegetation.
- the implementation of suitable weed management and soil erosion management conditions are appropriate to mitigate the risk of spreading weeds into adjacent vegetation and wind/water erosion (see Section 3.2.1 and 3.2.2).

The Delegated Officer also took into consideration stormwater management measures that the applicant will have in place in accodance with their Decelopment Approval from the Pilbara Ports Authority (see Section 3.2.2).

In determining to grant a clearing permit subject to conditions, the Delegated Officer found that the proposed clearing is not likely to lead to an unacceptable risk to the environment.

1.4. Site map

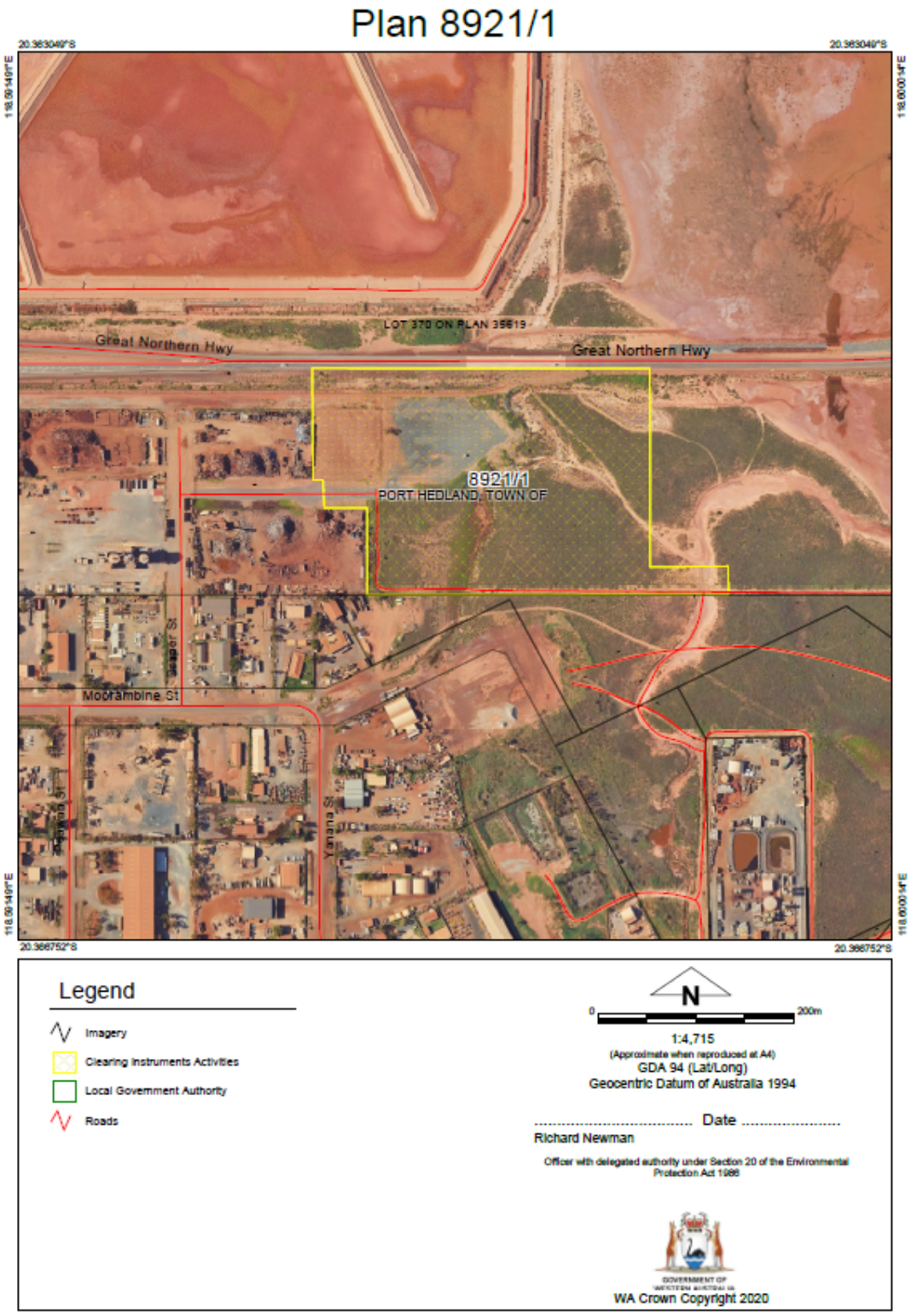

Figure 1. Map of the application area. The areas cross-hatched yellow indicates the area authorised to be cleared under clearing permit CPS 8921/1.

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:

1. the precautionary principle;
2. the principle of intergenerational equity; and
3. 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)
- *Environmental Protection and Biodiversity Conservation Act (1998)(Commonwealth) (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, 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016)

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

Stormwater management measures were submitted by the applicant, demonstrating that surface water will be sent into exiting drainage infrastructure with a proposed table drain at the southern extent of the laydown area, proposed v-drain to the west and a toe drain at the southern extent. A Drainage and Stormwater Management Plan will also be developed. This demonstrates that efforts have been taken to avoid and minimise potential impacts of the clearing on land and water resources.

3.2. Assessment of environmental impacts

In assessing the application in accordance with section 51O of the EP Act, the Delegated Officer has examined the application and site characteristics (Appendix B) and considered whether the clearing poses a risk to environmental values. The assessment against the Clearing Principles is contained in Appendix C.

This assessment identified that the clearing may pose a risk to the environmental values of land and water resources, and that these required further consideration. The detailed consideration and assessment of the clearing impacts against the specific environmental values is provided below. Where the assessment found that the clearing presents an unacceptable risk to environmental values, conditions aimed at controlling and/or ameliorating the impacts have been imposed under sections 51H and 51I of the EP Act. These are also identified below.

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

Assessment: One conservation significant fauna species was identified through desktop investigation to have a high likelihood of occurring within the application area. This species was the Brush Tailed Mulgara (*Dasycercus bluthi*) (P4).

Habitat for the Brush-tailed Mulgara includes sandy plains vegetated with spinifex up to one metre high. No borrow or scat evidence was observed within the application area and given the presence of feral cats it is unlikely for this species to be present (Ecoscape, 2020).

The majority of the application area (65%) is in a degraded to completely degraded (Keighery, 1994) condition and is on the north-western edge of a larger remnant of vegetation in similar or better condition. Given this, the application area is not considered to provide significant habitat for local fauna or be part of an ecological linkage. A weed management condition will be placed on the permit to mitigate the spread of weeds into adjacent vegetation.

Outcome: Based on the above assessment, the Delegated Officer has determined that the proposed clearing is considered **acceptable** in relation to this environmental value.

Conditions: No fauna management conditions required.

Weed management condition.

3.2.2. Environmental value: land and water resources – Clearing Principles (f), (g), (i) and (j)

Assessment:

Seasonally wet drainage lines (0.08 ha) and 1.3 hectares subject to seasonal inundation occur within the application area. The flora and fauna survey (Ecoscape, 2020) identified samphire vegetation in a good to degraded (Keighery, 1994) condition growing in association with these areas. Given this, it is considered for the vegetation under application to be growing in association with a wetland and watercourse. The proposed clearing of 1.38 hectares of

riparian vegetation is not considered significant given its location adjacent to an industrial area, the lack of biological values and degraded condition of the vegetation.

Given the occurrence of inundation areas and sandy/ loamy soils, the proposed clearing may lead to wind and water erosion and cause an increase in sedimentation of surface water during storm events, if bare soils are exposed for extended periods of time.

The applicant has advised that surface water will be managed through a Drainage and Storm Water Management Plan and that drainage infrastructure will be installed to manage surface water.

To minimise the risk of soil erosion and sedimentation of surface water caused by the proposed clearing, the applicant will be required to undertake construction works within two months of clearing.

Outcome: Based on the above assessment, the Delegated Officer has determined that the proposed clearing is considered **acceptable subject to relevant conditions** in relation to this environmental value.

Conditions: To address the above impacts, the following conditions will be added to the permit:

- Construction to occur within two months of clearing.

3.3. Relevant planning instruments and other matters

The application area falls within the Pilbara Port Authority (PPA) managed lands and therefore the construction of the laydown facility requires development approval from the PPA, in accordance with the Port Authorities Act 1999. The applicant received Development Approval for the proposal on the 16 July 2020. A condition of this approval is to develop a Drainage and Storm Water Management Plan (DSWMP) that identifies the methods employed to control flooding and erosion, prevent contamination and hazardous materials from infiltrating the waterways, and reduce the effect of stormwater on the adjacent lease area and the surrounding land, prior to construction. The Town of Port Hedland will be consulted regarding the DSWMP.

The Town of Port Hedland (2020) advised DWER that planning approval is not required from the Shire however the Shire objected to the clearing due to the potential effect on nearby businesses and residences. The clearing is located within the Town site boundary and is a significant stormwater drainage area in rainfall events. The Town of Port Hedland is concerned with the described fill amount required for the laydown facility as it may have a substantial effect on the drainage capacity of the area. The Town of Port Hedland advised that they are not aware of the provisions made to redirect stormwater away from nearby properties..

As part of the conditions of the Development Approval from the PPA, the Town of Port Hedland will be consulted in regards to the DSWMP.

The Town of Port Hedland (2020) has advised that in accordance with the Towns, Animal. Environment and Nuisance Local Law 2016, any owner or occupier of land proposing to clear shall submit a Dust Management Plan to the Town for approval prior to the commencement of work.

The subject property occurs outside the proclaimed Pilbara Surface Water Area, as proclaimed under the *Rights in Water and Irrigation Act 1914* and therefore a bed and banks permit is not required. Surface water management is to be managed through the PPA development approval process.

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.

A small portion of the application area is classified as a contaminated site under the *Contaminated Sites Act* 2003 (CS Act) due to the presence of metals and hydrocarbons present in the soil at concentrations exceeding ecological investigation levels for commercial and industrial sites. Further risk assessment was required, however, the site appears suitable for ongoing commercial and or industrial use. There is a potential for contaminants to be present in the soil that could pose a risk to human health in the event of direct contact with impacted soils during clearing activities. Risks from potentially impacted soils should be managed through appropriate health and safety planning. In the event that contamination is intercepted during any intrusive or clearing works, details of the nature of the contamination should be reported under the CS Act.

Appendix A – Additional information provided by applicant

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Summary of comments	Consideration of comment
Applicant provided additional information regarding surface water management.	Incorporated into section 3.1

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.

1. Site characteristics

<table>
<tr><th>Site characteristic</th><th>Details</th></tr>
<tr><td>Local context</td><td>The proposed clearing area occurs within the north-western extent of an expansive tract of native vegetation that spans to the southeast. It is adjacent to an industrial area to the west and north. The proposed clearing area does not contribute to an ecological linkage given its location on the northwest edge of a large area of vegetation. Aerial imagery indicates the local area (20 km radius of the proposed clearing area) retains approximately 98% of the original native vegetation cover.</td></tr>
<tr><td>Vegetation description</td><td>According to a reconnaissance flora and fauna assessment undertaken by Ecoscape (2020) the vegetation within the proposed clearing area consists of four vegetation types:
Table 1: Vegetation community types within the application area.
<table>
<tr><th>Vegetation Type</th><th>Extent (ha)</th><th>Proportion of application area (%)</th></tr>
<tr><td>Triodia epactia and Acacia stellaticeps low closed hummock grassland/shrubland</td><td>1.70</td><td>20.98</td></tr>
<tr><td>Triodia secunda and Frankenia ambita low hummock grassland/shrubland</td><td>1.84</td><td>22.73</td></tr>
<tr><td>Tecticornia auriculate, T. indica subsp. leiostachya and T.halocnemoides low open samphire shrubland</td><td>0.54</td><td>6.66</td></tr>
<tr><td>Tecticornia indica subsp. leiostachya and T. halocnemoides low samphire shrubland</td><td>0.57</td><td>7.04</td></tr>
<tr><td>Cleared</td><td>3.45</td><td>42.59</td></tr>
</table>
The full survey descriptions and mapping are available in Appendix E.
This is consistent with the mapped vegetation type:
Beard 647, which is described as Hummock grasslands, dwarf-shrub steppe; Acacia translucens over soft spinifex (Shepherd et al, 2001).</td></tr>
<tr><td>Vegetation condition</td><td>The vegetation survey (Ecoscape 2020) indicate the vegetation within the proposed clearing area is in completely degraded to very good (Keighery, 1994) condition, described as:
Completely degraded: The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These</td></tr>
</table>

<table>
<tr><th>Site characteristic</th><th>Details</th></tr>
<tr><td></td><td>areas are often described as ‘parkland cleared’ with the flora comprising weed or crop species with isolated native trees or shrubs.
• Degraded: Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
• Good: Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
• Very Good: Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Table 2: Vegetation condition within the application area
<table>
<tr><th>Condition</th><th>Extent (ha)</th><th>Proportion of application area (%)</th></tr>
<tr><td>Good to Very Good</td><td>3.646</td><td>45.02</td></tr>
<tr><td>Degraded</td><td>1.004</td><td>12.39</td></tr>
<tr><td>Cleared/Completely Degraded</td><td>3.450</td><td>42.59</td></tr>
</table>
The full Keighery condition rating scale is provided in Appendix D, below. The full survey descriptions and mapping are available in Appendix E.</td></tr>
<tr><td>Soil description</td><td>The soil is mapped De Grey-Roebourne Lowlands subsystem described as Alluvial plains and sandplains on alluvial and marine deposits over the northern Pilbara Craton with Red deep sandy duplexes, Red loamy earths, Red/brown non-cracking clays, Cracking clays, Red sandy earths and Red deep loamy duplexes (DPIRD, 2017).</td></tr>
<tr><td>Land degradation risk</td><td>• 93% has a high susceptibility for subsurface compaction;
• 0% has a high susceptibility of water repellence;
• So flood risk is low except during high rainfall events;
• Risk of water logging is unlikely;
• 0% of moderate to extreme risk of salinity at surface;
• Loamy sandy soils at risk of wind erosion;
• Risk of water erosion is high during large rainfall events.</td></tr>
<tr><td>Waterbodies</td><td>The desktop assessment indicates that no watercourses have been mapped within the application. The application is 100 metres south of an area that is subjected to inundation.
There is 0.08 hectares of minor drainage lines and no permanent surface water features occur within the application area (FMG, 2020).
Within the application area:
• 0.08 hectares of seasonally wet drainage lines with bare sandy soil and scattered samphire shrubs;
• 1.31 hectares of scattered samphire shrubs over sandy soil, ephemerally inundated (Ecoscape, 2020).</td></tr>
</table>

Site characteristic	Details
Conservation areas	The closet conservation areas to the application are North Turtle island Nature Reserve and the Mungaroona Range Nature Reserve located 64 km north and 115 km southwest of the application area, respectively.
Climate and landform	The application area is located within the Pilbara region, which includes two broad climatic zones: hot, humid summer with a warm winter and hot, dry summer with a mild winter (van Vreeswyk, et al., 2004). The application area is within Climate Zone 1 where there is the high humidity summer and warm winter. Annual rainfall in the Pilbara has substantial yearly variation, but generally follows an inland to coastal and southern to northern increasing trend. Tropical cyclones, many of which originate in the Timor Sea, along with local thunderstorms, produce much of the summer and early autumn rainfall. The driest months are in spring (September to October), and winter rainfall is highly variable, generally decreasing from the coast through to inland areas (Commonwealth of Australia, 2005). Rainfall: 400 Evapotranspiration: 400 Geology: Alluvial, shoreline, and eolian deposits Acid Sulfate Soil Risk: No Groundwater Salinity (Total Dissolved Soilds): 1000-3000 mg/L

2. Flora, fauna and ecosystem analysis

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

Species / Ecological Community	Distance of closest record to application area (kilometres)	Suitable soil type? (flora, ecological community)	Suitable vegetation type? (flora, ecological community)	Suitable habitat features (fauna)	Are surveys adequate to identify? (Y, N, N/A)
Tephrosia rosea var. Port Hedland (A.S. George 1114) – P1	0.251	Y	Y	N/A	Y
Comphrena pusilla – P2	7.6	Y	Y	N/A	Y
Goodenia nuda _ P4	7.5	Y	Y	N/A	Y
Gymnanthera cunninghamii – P3	0.3	Y	Y	N/A	Y
Heliotropium muticum – P3	9.3	Y	Y	N/A	Y
Rothia indica subsp. Australis – P3	10.9	Y	Y	N/A	Y
Eragrostis crateriformis – P3	9.2	Y	Y	N/A	Y
Abutilon sp. Pritzelianum (S. van Leeuwen 5095) – P3	14.7	Y	Y	N/A	Y
Brush-tailed Mulgara (Dasyercus blythi) – P4	-	-	-	Y	Y

Species / Ecological Community	Distance of closest record to application area (kilometres)	Suitable soil type? (flora, ecological community)	Suitable vegetation type? (flora, ecological community)	Suitable habitat features (fauna)	Are surveys adequate to identify? (Y, N, N/A)
Ctenotus angusticeps (Vulnerable under EPBC Act, P4 under BC Act)	-	-	-	Y	Y

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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 proposed clearing area does not contain locally or regionally significant flora, fauna, habitats or assemblages of plants. No groundwater dependent vegetation was observed within the application area during the flora survey.	Not likely to be at variance	No
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: The proposed clearing area does not contain significant foraging, roosting or breeding habitat for conservation significant fauna and is not a part of an ecological linkage.	Not likely to be at variance	Yes Refer to Section 3.2.1 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 occur within 20 km radius of the proposed clearing. An appropriately timed flora survey (Ecoscape 2020) did not identify any threatened flora species within the application area.	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: The proposed clearing area does not contain species that is consistent with a threatened ecological community (TEC) and no TECs have been recorded within the local (20 km radius) area.	Not likely to be at variance	No
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 extent of the mapped vegetation type and native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. Vegetation in the proposed clearing area is not considered to be part of a significant ecological linkage in the local area.	Not likely to be at variance	No

Assessment against the Clearing Principles	Variance level	Is further consideration required?
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 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 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: Drainage lines and an area of seasonal inundation occur within the application area. Samphire vegetation has also been identified.	Is at variance	Yes Refer to Section 3.2.2 above.
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The mapped soils are highly susceptible to wind and moderately susceptible for water erosion during storm events. Noting the extent of the proposed clearing the proposed clearing is may have an appreciable impact on land degradation.	May be at variance	Yes Refer to Section 3.2.2 above.
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: Given drainage lines and an area of inundation occur within the proposed clearing area, the clearing may impact surface water quality.	May be at variance	Yes Refer to Section 3.2.2 above.
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 soils in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding or increase 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.

Measuring Vegetation Condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very Good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Appendix E – Biological survey information excerpts

Landform	Mapping Unit	Vegetation Type	Floristic Quadrats/ Relevés	Representative Photograph	Other Characteristic Species	Area (ha) and Extent (%) of Survey Area
Flat, sandy clay depressions	Ta	*Tecticornia auriculata, T. indica* subsp. *leiostachya* and *T. halocnemoides* low open samphire shrubland	WF2004		*Eragrostis falcata* *Salsola australis*	0.54 ha 5.32%
	Ti	*Tecticornia indica* subsp. *leiostachya* and *T. halocnemoides* low samphire shrubland	WF2003		*Eragrostis falcata* *Eriachne obtusa* *Euphorbia coghlanii* *Frankenia ambita* *Neobassia astrocarpa* *Sesbania cannabina* *Surreya diandra*	0.84 ha 8.33%
	Not vegetated (cleared)					4.57 ha 45.26%
	TOTAL					10.11 ha

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Table 6: Vegetation types

Landform	Mapping Unit	Vegetation Type	Floristic Quadrats/ Relevés	Representative Photograph	Other Characteristic Species	Area (ha) and Extent (%) of Survey Area
Flat, sandplain	Te	*Triodia epactia* and *Acacia stellaticeps* low closed hummock grassland/shrubland	WF2002		*Bonamia alatisemina* *Bonamia media* *Cassytha capillaris* *Commelina ensifolia* *Crotalaria ramosissima* *Cyperus blakeanus* *Eriachne obtusa* *Hybanthus aurantiacus* *Panicum decompositum* *Pluchea rubelliflora* *Pterocaulon sphaeranthoides* *Rhynchosia minima* *Solanum diversiflorum* *Tephrosia rosea* *Trianthema turgidifolium*	2.15 ha 21.28%
	Ts	*Triodia secunda* and *Frankenia ambita* low hummock grassland/shrubland	WF2001		*Commelina ensifolia* *Eragrostis cumingii* *Trianthema turgidifolium*	2.00 ha 19.81%

Appendix F – References and databases

1. GIS datasets

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

- Aboriginal Heritage Places (DPLH-001)
- 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)
- IBRA Vegetation Statistics
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Regional Parks (DBCA-026)
- Soil and Landscape Mapping – Best Available

Restricted GIS Databases used:

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

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