



Clearing Permit Decision Report

1. Application details and outcomes

1.1. Permit application details

Permit number:	10161/1
Permit type:	Purpose Permit
Applicant name:	Hamersley Iron Pty Ltd
Application received:	21 April 2023
Application area:	0.66 hectares
Purpose of clearing:	Rail maintenance and associated activities
Method of clearing:	Mechanical Removal
Tenure:	Miscellaneous Licence 47/310
Location (LGA area/s):	Shire of Ashburton
Colloquial name:	Galah Rail Siding Renewals Project

1.2. Description of clearing activities

Hamersley Iron Pty Ltd proposes to clear up to 0.66 hectares of native vegetation within a boundary of approximately 0.79 hectares, for the purpose of rail maintenance and associated activities. The project is located approximately 65 km southeast of Karratha, within the Shire of Ashburton.

The application is to allow for rail maintenance and associated activities, environmental surveys and monitoring, heritage surveys and monitoring and access.

1.3. Decision on application and key considerations

Decision:	Grant
Decision date:	8 June 2023
Decision area:	0.66 hectares of native vegetation

1.4. 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 Mines, Industry Regulation and Safety (DMIRS) on 21 April 2023. DMIRS advertised the application for a public comment for a period of 21 days, and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix A), relevant datasets (Appendix D), the clearing principles set out in Schedule 5 of the EP Act (Appendix B), proposed avoidance and minimisation measures (Section 3.1), relevant planning instruments and any other matters considered relevant to the assessment (Section 3.3).

The assessment identified that the proposed clearing may result in:

- the potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is unlikely to lead to have adverse impacts on the conservation of significant flora and fauna and the impacts of clearing can be minimised and managed to be unlikely to lead to an unacceptable risk to environmental values

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- 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.

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 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)*
- *State Biosecurity and Agriculture Management Act 2007 (BAM Act)*
- *Conservation and Land Management Act 1984 (WA) (CALM Act)*
- *Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act)*
- *Mining Act 1978 (WA)*

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, 2016)*
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment (EPA, 2020)*

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

The applicant has provided the following avoidance and mitigation measures to support this clearing permit application (Rio Tinto, 2023a):

- Weed hygiene treatment of equipment prior to entering Project area;
- Visual inspections of disturbed areas for weed infestations;
- Control of known weed populations;
- All newly disturbed areas will be inspected during the annual Rail weed spraying program and if any new weeds are accidentally introduced then weed spraying/removal will be undertaken;
- Spraying program and if any new weeds are accidentally introduced then weed spraying/removal will be undertaken;
- All imported rail ballast and fill, shall be clean (weed, seed and propagule free) prior to coming to site;
- Staying within the existing disturbance footprint on site where possible;
- All new disturbances are kept to a minimum;
- Manage the sediment of stockpiled rail ballast and fill on site so that sediment isn't allowed to enter the surrounding environment;
- Inspect the work and stockpile areas on site post large rainfall events to ensure the sediment control measures (where required) are working;
- Appropriate management/use of hydrocarbons on site;
- Hydrocarbon spill response kits on site;
- No bulk hydrocarbons stored on site; and
- Manage dust emissions.

Moreover, in line with the Mining Proposal (REG ID 116513) related to this application, the management actions set out in Section 3 of the Mining Proposal will prevent potential risk to water resources (DWER, 2023). The management actions include sampling degraded ballast prior to storage, inspection of stockpiles, maintaining a register of material, use liners and bunds, and stockpiling away from watercourses and drainage lines, as well as stockpiling for a maximum duration of 2 months to reduce the potential for environmental impacts to occur (DWER, 2023).

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 A) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see Appendix B) identified the impacts of the proposed clearing are limited and able to be managed to be environmentally acceptable with an avoid and minimise, water resources management, and hygiene management conditions.

3.2.1. Biological values - Clearing Principles (a)

Assessment

Several biological surveys were undertaken in the vicinity of the application area. The most recent flora and vegetation survey was conducted during 15 – 16 August 2022 by Eco Logical Australia and in September by Rio Tinto, and it covered an area

totalling 11 hectares, which included the entire application area and its surroundings, hereafter named survey area (Eco Logical Australia, 2023).

The survey recorded a total of 109 native flora taxa from 32 families and 74 genera within the survey area, of which Fabaceae (24 species), Poaceae (14 species) and Malvaceae (nine species) were the families with the highest number of species included, respectively (Eco Logical Australia, 2023).

Eco Logical Australia (2023) conducted a pre-field flora likelihood assessment through desktop analysis and identified 13 conservation significant flora species as having the potential to occur within the survey area (four species listed by DBCA as Priority 1, seven as Priority 2 and two as Priority 4) (refer to section A.2 Flora analysis table). However, the post-field likelihood assessment of these flora species identified one species, *Eragrostis crateriformis* (P3) as having potential to occur within the application area, most likely in vegetation associated with drainage landform (Eco Logical Australia, 2023). The remaining 49 species were assessed as unlikely to occur or does not occur (Eco Logical Australia, 2023).

Since *Eragrostis crateriformis* (P3) was classified to have the potential to occur within the survey area in vegetation associated with drainage landform, the proponent redefined the proposal by excluding the areas containing this type of vegetation from the application area (Rio Tinto, 2023b). Therefore, the current proposal does not have the vegetation that could support this species, and therefore, this species is unlikely to occur within the application area (Rio Tinto, 2023b).

A total of four weeds were recorded within the study area (Eco Logical, 2023): *Aerva javanica* (Kapok bush), *Cenchrus ciliaris* (Buffel grass), *Cenchrus setiger* (Birdwood grass) and *Rumex vesicarius* (Ruby Dock). None of these weed species are listed as Weeds of National Significance (WoNS) or Declared Pests under the BAM Act (DPIRD, 2023a; Eco Logical Australia, 2023). Weeds have the potential to out-compete native flora and reduce the biodiversity of an area.

Conclusion

For the reasons set out above, it is considered that the proposed clearing is not likely to have significant impacts to Priority flora species or their habitat. There is potential for weeds being present within the application area and the proposed clearing has the potential to exacerbate the spread of weeds.

Conditions

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

3.3. Relevant planning instruments and other matters

The clearing permit application was advertised on 12 May 2023 by the Department of Mines, Industry Regulation and Safety inviting submissions from the public. No submissions were received in relation to this application.

There is one native title claim (WC1999/014 Ngarluma/ Yindjibarndi) over the area under application (DPLH, 2023). This claim has been registered with the National Native Title Tribunal on behalf of the claimant group. However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are two registered Aboriginal Sites of Significance within the application area (DPLH, 2023). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

Other relevant authorisations required for the proposed land use include:

- A Mining Proposal / Mine Closure Plan approved under the *Mining Act 1978*.

It is the proponent's responsibility to liaise with the Department of Water and Environmental Regulation and the Department of Biodiversity, Conservation and Attractions, to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

End

Appendix A. Site characteristics

A.1. Site characteristics

Characteristic	Details
Local context	The project is located approximately 65 km southeast of Karratha, within the Shire of Ashburton in the extensive land use zone (GIS Database). The predominant land use in the region is grazing of native pastures, conservation and mining activities.
Ecological linkage	According to available databases, the application area is not considered an ecological linkage (GIS Database).
Conservation areas	The application area falls within the Millstream Chichester National Park (GIS Database).
Vegetation description	<p>The vegetation of the application area is broadly mapped as the following Beard vegetation association (GIS Database): 587: Hummock grasslands, open low tree-steppe; snappy gum over <i>Triodia wiseana</i> / Hummock grasslands, shrub-steppe; kanji over <i>Triodia pungens</i>.</p> <p>A flora and vegetation survey was conducted over the application area by Eco Logical Australia (2023). The following two vegetation associations were recorded within the application area (Rio Tinto, 2023b):</p> <ul style="list-style-type: none"> • VT1: <i>Acacia coriacea</i> subsp. <i>pendens</i>, <i>A. trachycarpa</i> and <i>A. pyrifolia</i> sparse shrubland over *<i>Cenchrus ciliaris</i>, <i>Triodia wiseana</i> and <i>T. epactia</i> hummock grassland to open hummock grassland on slopes rises and plains. This unit covers 0.56 ha (70.20%) of the application area and was considered to be in Poor to Degraded Vegetation Condition. • VT2: <i>Corymbia hamersleyana</i> isolated trees over <i>Triodia wiseana</i>, <i>T. epactia</i> and *<i>Cenchrus ciliaris</i> open hummock grassland on rocky basaltic slopes and rises covers 0.11 ha (13.68%) of the application area and was considered to be in Degraded Vegetation Condition.
Vegetation condition	<p>The vegetation survey (Eco Logical Australia, 2023) and the assessment conducted by Rio Tinto (2023b) indicate the vegetation within the proposed clearing area is in poor to completely degraded condition (Trudgen, 1991), described as:</p> <ul style="list-style-type: none"> • 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. <p>to</p> <ul style="list-style-type: none"> • 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. <p>According to the vegetation mapping, 0.13 hectares (16.12 %) of the application area has been cleared for tracks and roads (Rio Tinto, 2023b).</p>
Climate and landform	The application area is mapped within elevations of 150 meters AHD (GIS Database). The climate of the region is semi-desert tropical, and the annual rainfall average of approximately 372 millimetres (BoM, 2023).
Soil description & Land degradation risk	<p>The soil is mapped as part of the following soil systems (DPIRD, 2023b):</p> <ul style="list-style-type: none"> • Rocklea system (282Rk): Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex and occasionally soft spinifex grasslands with scattered shrubs <p>The application area is adjacent to existing railway infrastructure and part of its area has been previously disturbed by access roads (Rio Tinto, 2023b; GIS Database).</p>
Waterbodies & Hydrogeography	<p>The application area is located within the Harding Dam catchment and within a Priority 1 Harding Dam Public Drinking Water Source Protection Area (Rio Tinto, 2023b; GIS Database).</p> <p>One minor ephemeral drainage line runs through the application area (GIS Database). The mapped groundwater salinity is 500-1,000 milligrams per litre total dissolved solids which is described as marginal (GIS Database).</p>
Flora	After the flora survey and redefinition of the proposed permit area, no Threatened or Priority flora species were recorded, or are likely to occur within the application area (Rio Tinto, 2023b).
Ecological communities	There are no mapped Threatened or Priority Ecological Communities (TEC/PEC) within the application area (Rio Tinto, 2023b; GIS Database). The closest PEC is located approximately eight kilometres south of the application area (Rio Tinto, 2023b).
Fauna	No conservation significant fauna species were recorded within the application area; however, two species have the potential to occur (Eco Logical Australia, 2023; Rio Tinto, 2023b).

A.2. Flora analysis table

With Flora analysis of records within 100 kilometres (DBCA, 2022), 20 kilometres (ALA, 2022; DAWE, 2022) of the survey area their likelihood of occurrence (Eco Logical Australia, 2023).

Search radius: DBCA 2022a (100km), DAWE 2022 (20km), ALA 2022 (20km)

Species	Conservation status			Description	Habitat	Likelihood Rating	
	EPBC Act	BC Act / DBCA	Source*			Pre-Survey	Post survey
<i>Abutilon</i> sp. Pritzelianum (S. van Leeuwen 5095)	-	3	DBCA 2022b	Shrub to 1.5m high. Fl. Orange, Apr-Jul.	Orange or brown-red sandplains in Acacia shrubland over <i>Triodia</i> grassland or open Eucalypt woodland over same.	Unlikely Two records (1982, 2014) 90-100km away. Suitable habitat may be present.	Does not Occur Not recorded in this survey. This shrub is of a size that would have been observed if present.
<i>Acacia daweana</i>	-	3	DBCA 2022b	Spreading shrub, 0.3-1.5(-2) m high. Fl. yellow, Jul to Sep.	Stony red loamy soils. Low rocky rises, along drainage lines.	Unlikely One record (2006)~85km away. Suitable habitat may be present.	Does not Occur Not recorded in this survey. This shrub is of a size that would have been observed if present.
<i>Acacia fecunda</i>	-	1	DBCA 2022b	Erect, obconic shrub to 3 m high, bark grey, smooth becoming yellow-brown on upper branches; phyllodes more or less sub-glaucous with a slight sheen; inflorescence of spikes. Fl. yellow, May or Aug.	Quartzite gibbers over grey-red skeletal soil. Along shallow creeks and drainage lines, hills, road verges.	Unlikely Three records (2014-2017)~90km away. Suitable habitat may be present.	Does not Occur Not recorded in this survey. This shrub is of a size that would have been observed if present.
<i>Atriplex lindleyi</i> subsp. <i>conduplicata</i>	-	3	DBCA 2022b	Monoecious, short-lived annual or perennial, herb, ca 0.2 m high.	Crabhole plains.	Unlikely One record (2006)~75km away on coastal plains. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. No suitable habitat in the study area.
<i>Bothriochloa decipiens</i> var. <i>cloncurrensis</i>	-	1	DBCA 2022b	Perennial, grass-like or herb, to 1.4 m high. Fl. green-yellow.	Eucalyptus open woodland over Acacia shrubland. Red-brown clay loam on plains or seasonally damp depressions.	Unlikely One record (1995)~80km away. Suitable habitat may be present.	Unlikely Not recorded in this survey but may have been present in ephemeral drainage in south of study area (which could not be accessed).
<i>Cladium procerum</i>	-	2	DBCA 2022b	Densely tufted perennial, grass-like or herb (sedge), 2 m high. Fl. Nov (?).	Perennial pools.	Unlikely Several records (1969-2008) ~35km away. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. No suitable habitat in the study area.
<i>Dicladantha glabra</i>	-	2	DBCA 2022b	Spreading perennial, herb or shrub, to 0.6(-1) m high. Fl. white/white-blue, Apr or Aug to Oct.	Alluvium. Along watercourses, near rock pools.	Unlikely One record (2015)~95km away. Suitable habitat may be present.	Unlikely Not recorded in this survey but may have been present in ephemeral drainage in south of study area (which could not be accessed).
<i>Dipteracanthus chichesterensis</i>	-	1	DBCA 2022b	Spreading, glabrescent, perennial subshrubs to 30 cm tall, with short-lived, quadrangular stems. Fl. Mauve, Mar?.	Red-brown cracking clay soils associated with basalts on the Chichester Plateau. The collections are from a variety of landforms on the plateau, including slopes, tablelands, benches and creek margins.	Unlikely Multiple records (1995-2013) ~75km away. Suitable habitat may be present.	Unlikely Not recorded in this survey, no close records, but potential habitat throughout study area.
<i>Dolichocarpa</i> sp. Hamersley Station (A.A. Mitchell PRP 1479)	-	3	DBCA 2022b	Small, spreading annual herb to 20cm high, much-branched from base. Fl. Blue or white, May-Sep.	Seasonally inundated clays on gibber plains.	Unlikely Two nearby older (1997) records ~14km and ~20km SE and one newer (2002) record ~20km SE. Multiple other records (1997-2020) 20-100km away. Suitable habitat unlikely to be present.	Unlikely Not recorded in this survey, no suitable habitat.
<i>Eragrostis crateriformis</i>	-	3	ALA 2022, DBCA 2022b	Annual, grass-like or herb, 0.17-0.42 m high. Fl. Jan to May or Jul.	Clayey loam or clay. Creek banks, depressions.	Potential One nearby older (1997) record ~15km NE and one (1997) ~21km SE. Suitable habitat may be present.	Potential Not recorded in this survey but VT3 and VT4 represent potential habitat, VT3 could not be accessed.
<i>Eragrostis lanicaulis</i>	-	3	DBCA 2022b	Knotty or bulbous rhizomatous, perennial, grass-like or herb, 0.45-0.5 m high. Fl. Mar to May or Aug to Oct.	Red sandy clay. Flats.	Unlikely Two records (1921) on coast. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. This grass is of a size that would have been observed if present. No suitable habitat in the study area.

<i>Eragrostis surreyana</i>	-	3	DBCA 2022b	Small tufted annual grass to 10cm high.	Seepage areas near or on sheet rock and also in fine alluvial sand on banks of seasonal drainage lines.	Potential Multiple records (1991-2009) ~70-95km away. Suitable habitat may be present.	Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed
<i>Eriochloa fatmensis</i>	-	3	DBCA 2022b	Upright, annual grass, culms to 1.2m and leaves to 30cm. Fl. Mar?	Seasonally inundated areas, heavy clay soils.	Unlikely One record (1981) ~40km away. Suitable habitat may be present.	Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed
<i>Euphorbia australis var. glabra</i>	-	3	DBCA 2022b	Prostrate, much-branched annual herb to 3cm.	Alluvial cracking clay loam in damp depression.	Unlikely Several records (1993-2004) ~40-95km away. Suitable habitat may be present.	Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed
<i>Euphorbia inappendiculata var. inappendiculata</i>	-	2	DBCA 2022b	Prostrate, much-branched herb. Stems to 30cm long.	Red loam in depressions in Triodia and Cenchrus grassland.	Potential One nearby older (1997) record ~17km NE. Suitable habitat may be present.	Does not Occur Not recorded in this survey. This herb is of a size that would have been observed if present.
<i>Euphorbia stevenii</i>	-	3	DBCA 2022b	Somewhat succulent perennial, herb, 0.1-0.5 m high.	Clay, sandy soils. Plains, gentle bedrock rises.	Potential One nearby older (1997) record ~18km NE. Suitable habitat may be present.	Does not Occur Not recorded in this survey. This herb is of a size that would have been observed if present.
<i>Euploca mutica</i>	-	3	DBCA 2022b	Grey-green perennial ascending herb to 30cm high. Fl. White, Jul?	Flats in red silty sand, in Triodia hummock grassland with emergent Acacia shrubs.	Potential Multiple recent records (2004-2014) ~80-95km away. Suitable habitat may be present.	Does not Occur Not recorded in this survey. This herb is of a size that would have been observed if present.
<i>Fimbristylis sieberiana</i>	-	3	DBCA 2022b	Shortly rhizomatous, tufted perennial, grass-like or herb (sedge), 0.25-0.6 m high. Fl. brown, May to Jun.	Mud, skeletal soil pockets. Pool edges, sandstone cliffs.	Unlikely Several records (1976-2021) ~35km S. Suitable habitat unlikely to be present.	Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed
<i>Glycine falcata</i>	-	3	DBCA 2022b	Mat-forming perennial, herb, to 0.2 m high. Fl. blue-purple, May or Jul.	Black clayey sand. Along drainage depressions in crabhole plains on river floodplains.	Unlikely Two records (2011) ~40km NW. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. No suitable habitat in the study area.
<i>Gomphrena axillaris</i>	-	1	DBCA 2022b	Annual or occasionally biennial herb, erect, 10-30 cm high, up to 20 cm wide. Fl. Pale pink-white-pale brown, Mar-Aug.	Sub-saline habitats or margins of salt-lakes and hummock or tussock grasslands on sand.	Unlikely One record (2006) on coast. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. No suitable habitat in the study area.
<i>Gomphrena cucullata</i>	-	3	DBCA 2022b	Spreading or erect annual, herb, to 0.25 m high, bracteoles forming hoods over the tepals. Fl. white/pink/purple, Feb or May.	Red sandy loam, clayey sand. Open floodplains.	Unlikely Two records (2004, 2012) ~50-70km NW on coastal plains. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. No suitable habitat in the study area.
<i>Gomphrena leptophylla</i>	-	3	DBCA 2022b	Prostrate or erect to spreading annual, herb, to 0.15 m high. Fl. white, Mar to Sep.	Sand, sandy to clayey loam, granite, quartzite. Open flats, sandy creek beds, edges salt pans & marshes, stony hillsides.	Unlikely One record (2004) ~70km NW on coastal plains. Suitable habitat may be present.	Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed
<i>Goodenia berringbinensis</i>	-	4	DBCA 2022b	Ascending annual, herb, 0.1-0.3 m high. Fl. yellow, Oct.	Red sandy loam. Along watercourses.	Unlikely One record (2011) ~90km S. Suitable habitat may be present.	Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed
<i>Goodenia nuda</i>	-	Delisted (ex. P4)	DBCA 2022b	Erect to ascending herb, to 0.5 m high. Glabrous or with few simple and glandular hairs. Fl. yellow, Apr to Aug.	Seasonally inundated clay soils and drainage lines, often in mulga. Sometimes scoured river beds and hillsides.	Potential Multiple recent records (2004-2014) ~65-95km away. Suitable habitat may be present.	N/A Species has been delisted between initiation of this project and current. Was not recorded during field survey.
<i>Goodenia pallida</i>	-	1	DBCA 2022b	Large glandular pubescent herb with long cauline leaves, to 0.5 m high. Fl. Purple-white, Aug.	Red soils. Acacia shrubland over grassland.	Unlikely One older record (1970) ~80km NW on coastal plains. Suitable habitat may be present.	Does not Occur Not recorded in this survey, no close records. This herb is of a size that would have been observed if present.

<i>Goodenia pallida</i>	-	1	DBCA 2022b	Large glandular pubescent herb with long cauline leaves, to 0.5 m high. Fl. Purple-white, Aug.	Red soils. Acacia shrubland over grassland.	Unlikely One older record (1970) ~80km NW on coastal plains. Suitable habitat may be present.	Does not Occur Not recorded in this survey, no close records. This herb is of a size that would have been observed if present.
<i>Gymnanthera cunninghamii</i>	-	3	DBCA 2022b	Erect shrub, 1-2 m high. Fl. cream-yellow-green, Jan to Dec.	Sandy soils in drainage lines. Eucalyptus woodland over Acacia shrubland over Triodia grassland.	Unlikely One recent record (2012) inland ~75km SW. Multiple other records (1818-2015) on offshore islands. Suitable habitat may be present.	Unlikely Not recorded in this survey but may have been present in ephemeral drainage in south of study area (VT3, which could not be accessed).
<i>Helichrysum oligochaetum</i>	-	1	DBCA 2022b	Erect annual, herb, to ca 0.25 m high. Fl. yellow, Aug to Nov.	Red clay. Alluvial plains.	Unlikely Two recent (2006, 2014) records inland ~85km SE. Two other records on coast. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. No suitable habitat in the study area.
<i>Indigofera rivularis</i>	-	3	DBCA 2022b	Erect shrub, 1–2.5 m high. Differs from <i>Indigofera monophylla</i> by its relatively tall, erect habit, generally shorter stipules, and sparse indumentum. Fl. Deep pink-red, May-Jul.	Along rocky creek-lines in open low woodland of eucalypts and Acacias on ironstone substrates.	Potential Multiple records (1998-2015) ~85-100km SW-SE. Suitable habitat may be present.	Unlikely Not recorded in this survey, no close records, but potential habitat (VT3) present in ephemeral drainage in south of study area (which could not be accessed).
<i>Iotasperma sessilifolium</i>	-	3	DBCA 2022b	Decumbent or erect herb to 30 cm high. Stems with dense indumentum. Fl. Pink, May-Oct.	Depressions, in swamps, on floodplains or around bores, in grassland or herbland communities. Soils are clays or clay-loams.	Unlikely One older record (1996) ~80km SE. Suitable habitat may be present.	Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed
<i>Ipomoea racemigera</i>	-	2	DBCA 2022b	Creeping annual, herb or climber. Leaves ovate to ovate-elliptic, entire, 2-6 x 1.5-4.5 cm, bluntly acute, mucronate, base cordate. Fl. White, throughout year.	Sandy soils along watercourses.	Unlikely One older record (1995) ~35km SE. Suitable habitat may be present.	Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed
<i>Livistona alfredii</i>	-	4	DBCA 2022b	Tree-like monocot (palm), to 10 m high. Fl. cream, Jul to Sep.	Edges of permanent pools.	Unlikely Multiple records (1932-2015) ~35km S in Millstream NP. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. This palm is of a size that would have been observed if present. No suitable habitat in the study area.
<i>Owenia acidula</i>	-	3	DBCA 2022b	Tree, 3-8 m high with pendulous branches. Leaves with 9-25 leaflets, to 15 cm long; leaflets linear-lanceolate to narrowly elliptic, oblique, acute, 2-5 cm long. Drupe globular, 15-20 mm diam., red. Fl. white-brown/cream, late Spring.	Clay. Floodplains, drainage lines.	Unlikely One older record (1990) ~35km S in Millstream NP on edge of river. Suitable habitat may be present.	Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed
<i>Paspalidium retiglume</i>	-	2	ALA 2022, DBCA 2022b	Tufted annual, grass-like or herb, 0.1-0.5 m high. Fl. Apr.	Clay flats with cracking clays, Clay with rocky surface. Flats, hills, slopes, drainage lines.	Potential Two nearby older (1997) records ~16km and ~18km SE and one newer (2004) record ~17km SE. Two older records (1995, 1997) >60km SE. Suitable habitat may be present.	Unlikely Not recorded in this survey, potential habitat present on the banks of VT3 but area miniscule, covered in <i>Cenchrus</i> and adjacent to large pipes, making it unlikely.
<i>Pentalepis trichodesmoides</i> subsp. <i>hispida</i>	-	2	DBCA 2022b	Shrubs 0.4–1.0 m tall. Leaves dull green; laminas ovate to lanceolate, 60–75 mm long, 15–25 mm wide, acute to acuminate. Fl. Yellow, Aug-Sep.	Triodia hummock grassland, often in the understorey of a shrubland of <i>Acacia</i> spp., <i>Gossypium</i> spp., <i>Senna</i> spp., <i>Brachychiton</i> spp. and <i>Eucalyptus</i> spp., on summits and slopes of low hills, on basaltic soils. at altitudes to 1150 m.	Potential One nearby older (1997) record ~19km E and one (1989) ~29km SE. More recent records (2013-2015) >30km SE. Suitable habitat may be present.	Does not Occur Not recorded in this survey. This shrub is of a size that would have been observed if present.
<i>Rhynchosia bungarensis</i>	-	4	DBCA 2022b	Compact, prostrate shrub, to 0.5 m high. Fl. yellow.	Pebbly, shingly coarse sand amongst boulders. Banks of flow line in the mouth of a gully in a valley wall.	Potential Multiple records (1962-2017), mostly on Burrup Peninsula but several recent records inland ~85-100km SW. Suitable habitat may be present.	Unlikely Not recorded in this survey, no close records, but VT3 and VT4 represent potential habitat, VT3 could not be accessed
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	-	3	DBCA 2022b	Spreading shrub, to 0.5 m high. Fl. yellow, Aug.	Skeletal rocky red soils. Steep slopes and bases of breakaways in gorges.	Unlikely Two recent (2014, 2015) records ~100km SW. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. No suitable habitat in the study area.

<i>Solanum albostellatum</i>	-	3	DBCA 2022b	Open, resprouting, clonal, suffruticose, subshrub to 40 cm high. Fl. Mauve with yellow centre, Mar-May.	Cracking clay soils on open floodplains in open scrubland over grasses. Associated species include <i>Acacia</i> spp., <i>Aristida latifolia</i> , <i>Chrysopogon fallax</i> and <i>Triodia</i> spp.	Unlikely Multiple recent records (2014-2018), mostly ~35-40km S. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. No suitable habitat in the study area.
<i>Solanum</i> sp. Red Hill (S. van Leeuwen et al. PBS 5415)	-	3	DBCA 2022b	Low to prostrate shrub to 20cm tall. Foliage sticky/resinous. Fl. Blue with yellow centre, Mar-Sep.	Skeletal red-brown soil over ironstone. Hill summits, slopes, rocky plains. Open <i>Eucalyptus</i> woodland over <i>Triodia</i> grassland.	Unlikely Two older (1998, 1999) records ~65-90km S. Suitable habitat may be present.	Does not Occur Not recorded in this survey. This shrub is of a size that would have been observed if present.
<i>Stackhousia clementii</i>	-	3	DBCA 2022b	Dense broom-like perennial, herb, to 0.45 m high. Fl. green/yellow/brown.	Skeletal soils. Sandstone hills.	Unlikely Three recent (2002-2013) records on Burrup Peninsula. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. No suitable habitat in the study area.

Species	Conservation status			Description	Habitat	Likelihood Rating	
	EPBC Act	BC Act / DBCA	Source*			Pre-Survey	Post survey
<i>Swainsona thompsoniana</i>	-	3	ALA 2022, DBCA 2022b	A prostrate, annual herb, to 10 cm high. Stems terete, slightly ribbed. Leaves 1.5-2cm long with 3-6 pairs of leaflets; leaflets narrowly obovate to ovate, 4-13mm long x 2-4mm wide. Fl. Mauve-cream with yellow centres, Aug-Sep?	Open flood plains on heavy clay soils.	Unlikely One nearby older (1997) record ~20km E and one (1989) ~29km SE. More recent records (2004-2006) ~40km S. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. No suitable habitat in the study area.
<i>Tephrosia lithosperma</i>	-	1	DBCA 2022b	Low, spreading woody herb to subshrub, possibly annual, to 0.5 m tall, at least 0.3 m wide, with numerous slender stems. Fl. Pink-mauve-purple, Mar-Jul.	Stony and rocky slopes of variable geology (limestone, sandstone, basalt, laterite, quartz), but also from clay soils on plains beneath slopes. Grows in open savanna woodland or shrubland, frequently among spinifex.	Unlikely One older record (1997) ~45km SE. Suitable habitat may be present.	Does not Occur Not recorded in this survey. This shrub is of a size that would have been observed if present.
<i>Tephrosia rosea</i> var. Port Hedland (A.S. George 1114)	-	1	DBCA 2022b	Spreading shrub to 1.2m high and 1.2m wide. Fl. Pink, Mar-Sep.	Low shrubland near coast. Plains and dunes in red-brown sandy loam, yellow and red sand.	Unlikely Multiple records (1984-2012) on coast at Port Samson. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. This shrub is of a size that would have been observed if present. No suitable habitat in the study area.
<i>Terminalia supranitifolia</i>	-	3	DBCA 2022b	Spreading, tangled shrub or tree, 1.5-3 m high. Fl. green-yellow, May or Jul or Dec.	Sand. Among basalt rocks on volcanic rockpiles or near rocky ridges in low hilly country near the coast.	Unlikely Multiple records (1971-2011) mostly on Burrup Peninsula but several recent (2010-2011) records ~95km W. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. This shrub is of a size that would have been observed if present. No suitable habitat in the study area.
<i>Teucrium pilbaranum</i>	-	2	DBCA 2022b	Upright shrub, 0.2 m high. Fl. white, May or Sep.	Clay. Crab hole plain in a river floodplain, margin of calcrete table.	Unlikely Two older (1976, 1996) records ~35km S in Millstream NP on edge of river. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. No suitable habitat in the study area.
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)	-	3	ALA 2022, DBCA 2022b	Tussocky perennial, grass-like or herb, 0.9-1.8 m high. Fl. Aug.	Red clay. Clay pan, grass plain.	Potential One nearby older (1997) record ~18km SE and one newer (2002) record ~20km SE. Multiple other records (1966-2010) 20-100km away. Suitable habitat may be present.	Does not Occur Not recorded in this survey. This grass is of a size that would have been observed if present.
<i>Trianthema</i> sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023)	-	2	ALA 2022, DBCA 2022b	Prostrate annual herb. Fl. White-pink, Mar-Jul.	Low undulating hills, valley floors, flats. Stony soils, loam, clayey sand. In shrubland or <i>Triodia</i> grassland.	Potential Two recent nearby records (2008, 2013) ~21km SE. Two older nearby records (1987-19km NW, 1997-22km SE). Suitable habitat may be present.	Unlikely Not recorded in this survey. This herb would have been observed if present.
<i>Triodia basitricha</i>	-	3	DBCA 2022b	Tussock-forming perennial, non-resinous or weakly resinous, not obviously stoloniferous; tussocks compact, c. 30-40 cm high, 40-60 cm diam.; flowering culms 35-70 cm high. Fl. Jan-Mar.	Slopes or crests of rocky hills.	Potential Multiple records (1994-2018) ~30-95km SW-SE. Suitable habitat may be present.	Does not Occur Not recorded in this survey. This grass is of a size that would have been observed if present.
<i>Triodia mallota</i>	-	1	DBCA 2022b	Foliage non-resinous; leaves amphistomatous (hard-type); orifice and sheaths densely woolly.	Rocky hillslopes that are a mixture of metasandstone and chert.	Unlikely Two recent (2015, 2017) records ~95km SW. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. This grass is of a size that would have been observed if present. No suitable habitat in the study area.

<i>Triodia pisollitcola</i>	-	3	DBCA 2022b	Foliage non-resinous; leaf sheath surfaces glabrous or hairy; leaf blades epistomatous (soft-type), 24–59 cm long and lax.	Ironstone mesas, slopes and gullies, or sometimes on flat loam.	Unlikely Multiple records (1975-2017) mostly ~90-100km SW on rocky crests and mesas. Suitable habitat unlikely to be present.	Does not Occur Not recorded in this survey. This grass is of a size that would have been observed if present. No suitable habitat in the study area.
<i>Vigna triodiophila</i>	-	3	ALA 2022, DBCA 2022b	Fine-stemmed prostrate or scrambling vine forming mats. Diminutive in all its parts. Ovate to elliptic leaves to 2.3 cm long, occasionally to 3 cm long, the small flowers 6–7 mm long, and the short pods to 2.5 cm long. The stems and peduncles are usually finer, less than 1 mm in diameter. Fl. yellow, May-Sep.	Endemic to basalt rockpile habitats in the north-west Pilbara. Grows in association with rockpiles among cobbles and boulders in shallow, red-brown or brown, clayey sand or loam. In Acacia shrublands over tussock and hummock grassland.	Unlikely Multiple records (1986-2011) mostly on Burrup Peninsula but several recent records (2000-2009) ~25-35km N on rockpiles and rocky upper slopes. Suitable habitat unlikely to be present.	Unlikely Not recorded in this survey. This vine would have been observed if present. VT1 represents potential habitat in a few areas.

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

Appendix B. Assessment against the clearing principles		
Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
<p><u>Principle (a):</u> “Native vegetation should not be cleared if it comprises a high level of biodiversity.”</p> <p><u>Assessment:</u></p> <p>According to available databases and flora surveys, as well as the post-survey likelihood of flora occurrence assessment there are no known Threatened or Priority flora within the application area (Eco Logical Australia, 2023; Rio Tinto, 2023b; GIS Database).</p> <p>No Threatened or Priority Ecological Communities were identified within the application area (Eco Logical Australia, 2023; Rio Tinto, 2023b; GIS Database).</p> <p>The two broad fauna habitats identified within the application are not considered to be restricted at a local or regional level, nor are they able to support diversified fauna due to their low fauna habitat value and presence of disturbed areas within the 0.66 hectares proposed to clear.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (b):</u> “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.”</p> <p><u>Assessment:</u></p> <p>A fauna habitat survey, conducted in August and September 2022, identified two habitats types within the survey area, which covers an area of 11 hectares in total; however, only one habitat (Low Hills and Slopes) was recorded within the application area (0.66 hectares) (Eco Logical Australia, 2023; Rio Tinto 2023b). This habitat was the most widespread within the broad survey area, and it was not considered to be restricted locally or regionally (Eco Logical Australia, 2023; Rio Tinto 2023b).</p> <p>A desktop assessment identified that two of the 34 conservation significant fauna species were considered to have the potential to occur within the application area (Eco Logical Australia, 2023; Rio Tinto, 2023b):</p> <ul style="list-style-type: none"> • Grey Falcon (<i>Falco hypoleucos</i>, EPBC Act 1999 and BC Act 2016 - Vulnerable); • Lined soil-crevice skink (<i>Notoscincus butleri</i>, DBCA Priority 4). <p><i>Falco hypoleucos</i> has a broad range habitat and forages in similar habitat to the Low Hills and Slopes and Major Drainage habitats, hence although the application area presents potential foraging habitat, it is considered small in scale compared to the broader surveyed area and its surroundings, as they have larger extents of similar habitat (Eco Logical Australia, 2023; Rio Tinto, 2023b).</p> <p>A similar situation applies for <i>Notoscincus butleri</i>, as it inhabits grassland and/or <i>Acacia</i> shrublands on plains and is widespread throughout the Pilbara. Eco Logical Australia (2023) identified that this species had a preferred habitat in Low Hills and Slopes; however, the relatively small extent and recent disturbance indicates the potential habitat within the application area compared to the whole Pilbara does not represent a significant habitat for the species (Rio Tinto, 2023b).</p>	Not likely to be at variance	No
<p><u>Principle (c):</u> “Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</p> <p><u>Assessment:</u></p> <p>There are no known records of Threatened flora within the application area (GIS Database). A desktop and flora survey of the application area did not record any species of Threatened flora, and none were considered likely to occur (Eco Logical Australia, 2023; Rio Tinto, 2023b).</p>	Not at variance	No
<p><u>Principle (d):</u> “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.”</p> <p><u>Assessment:</u></p> <p>There are no known Threatened Ecological Communities (TECs) located within or in close proximity to the application area (GIS Database).</p>	Not at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
A flora and vegetation survey of the application area did not identify any TECs (Eco Logical Australia, 2023; Rio Tinto, 2023b).		
Environmental value: significant remnant vegetation and conservation areas		
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u></p> <p>The application area falls within the Pilbara IBRA bioregion, within the Chichester subregion, comprised of the Beard vegetation association 587 (GIS Database).</p> <p>According to the Government of Western Australia (2019), the vegetation system association retain approximately 99% of its pre-European extent at the state and bioregion level. The application area does not contain any remnants nor does it form part of any remnants in the local area (GIS Database).</p>	Not at variance	No
<p><u>Principle (h):</u> <i>“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.”</i></p> <p><u>Assessment:</u></p> <p>The proposed clearing activities fall within Millstream Chichester National Park (MCNP) (GIS Database). The proponent advised that the location of the application area is the only way to access the rail alignment to undertake the proposed works; however, the application area has been refined to include only areas that are necessary for essential works to be completed (Rio Tinto, 2023b).</p> <p>In addition, the vegetation condition within the application area is considered to range between Poor and Completely Degraded (Trudgen, 1991), as part of it has been previously cleared and is adjacent to existing rail corridor infrastructure (Eco Logical Australia, 2023; Rio Tinto, 2023b). The Mining Proposal associated with this native vegetation clearing permit application sought approval/consultation from DBCA to be able to perform activities within the MCNP, and a consent letter was issued by DBCA (2023) subjected to conditions. The proposed measures to manage potential environmental impacts outlines in section 3.1 were considered appropriate (DBCA, 2023).</p> <p>Therefore, it is considered unlikely the proposal will have a significant impact to this conservation area (Rio Tinto, 2023b).</p>	At variance	No
Environmental value: land and water resources		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u></p> <p>There are no permanent waterbodies or watercourses within the application area, apart from one minor ephemeral drainage line that runs through (GIS Database).</p> <p>A major creekline, Harden River, runs parallel but it does not intersect the application area (Rio Tinto, 2023b). Eco Logical Australia (2023) identified two vegetation communities associated with the creekline within the broader survey area; however, the proposed clearing activities were refined and the vegetation communities were removed from the application area (Rio Tinto, 2023b).</p>	Not likely to be at variance	No
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u></p> <p>The mapped Rocklea System (282Rk) within the application are generally not susceptible to wind or water erosion (DPIRD, 2023b; Van Vreeswyk et al., 2004). In addition, part of the application area has previously been disturbed by railway activities. Therefore, the proposed activities to clear up to 0.66 hectares of native vegetation is unlikely to have an appreciable impact on land degradation.</p>	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
<p><u>Principle (i):</u> "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."</p> <p><u>Assessment:</u></p> <p>There are no permanent watercourses or wetlands within the area proposed to clear (GIS Database). The Harding River runs parallel to the application area, approximately 200 metres to the east (Rio Tinto, 2023b).</p> <p>The proposed application lies within the Priority 1 Harding Dam Public Drinking Water Source Protection Area (GIS Database). However, the proponent consulted DWER prior to the submission of the Mining proposal (REG ID 116513) which is associated with this native vegetation clearing application, and it was determined that the proposed management measures set out on Section 3 of the Mining Proposal (detailed on item 3.1 of the decision report) are considered appropriate to reduce the risk to water resources.</p> <p>The clearing of native vegetation itself is unlikely to impact on the surface or ground water quality.</p>	Not likely to be at variance	No
<p><u>Principle (j):</u> "Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."</p> <p><u>Assessment:</u></p> <p>Localised natural flooding events may occur in the Pilbara regions after cyclonic activities (Rio Tinto, 2023b). However, the proposed clearing of 0.66 hectares within a permit boundary of approximately 0.79 hectares is not likely to cause an increase in the incidence or intensity of flooding in the local area.</p> <p>Therefore, the application area is unlikely to cause an incidence of, or intensity increase to flooding.</p>	Not likely to be at variance	No

Appendix C. 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 D. Sources of information

D.1. GIS databases

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

- Clearing Regulations – Schedule One Areas (DWER-057)
- 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)
- Groundwater Salinity Statewide (DWER-026)
- Hydrographic Catchments – Catchments (DWER-028)
- Hydrography, Linear (DWER-031)
- IBRA Vegetation Statistics
- Pre-European Vegetation Statistics
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Mapping – Best Available (DPIRD-027)
- Soil Landscape Mapping – Rangelands (DPIRD-064)
- WA Now Aerial Imagery

Restricted GIS Databases used:

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

D.2. References

- Atlas of Living Australia (ALA) (2022) Biodiversity database. Available: <https://www.ala.org.au/>. Available: <https://www.dcceew.gov.au/environment/epbc/protected-matters-search-tool>
- Bureau of Meteorology (BoM) (2023) Bureau of Meteorology Website – Climate Data Online, Millstream Station. Bureau of Meteorology. <http://www.bom.gov.au/climate/data/> (Accessed 19 May 2023).
- Department of Agriculture, Water and the Environment (DAWE) (2022). Protected Matters Search Tool.
- Department of Biodiversity, Conservation and Attractions (DBCA) (2022) Threatened and Priority Flora database search. Reference number 34-0822FL. Department of Biodiversity, Conservation and Attractions, Perth.
- Department of Biodiversity, Conservation and Attractions (DBCA) (2023) Advice received in relation to Mining Proposal application REG ID 116513 – Mining Proposal for Small Operations – L47/310, L47/228. Department of Biodiversity, Conservation and Attractions, April 2023.
- 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.
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- Department of Planning, Lands and Heritage (DPLH) (2023) Aboriginal Heritage Inquiry System. Department of Planning, Lands and Heritage. <https://espatial.dplh.wa.gov.au/AHIS/index.html?viewer=AHIS> (Accessed 22 May 2023).
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- Department of Water and Environmental Regulation (DWER) (2021) 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) (2023) Advice received in relation to Mining Proposal application REG ID 116513 related to this Clearing Permit Application CPS 10161/1. Department of Water and Environmental Regulation, Western Australia, April 2023.
- Eco Logical Australia (2023) Galah Rail Siding reconnaissance and targeted flora survey. Unpublished report prepared for Rio Tinto by Eco Logical Australia, March 2023.
- Environmental Protection Authority (EPA) (2016) 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) (2020) Technical Guidance – Terrestrial Fauna Surveys. Available from: [2020.09.17 - EPA Technical Guidance - Vertebrate Fauna Surveys - Final.pdf](https://www.epa.wa.gov.au/sites/default/files/2020-09-17_-_EPA_Technical_Guidance_-_Vertebrate_Fauna_Surveys_-_Final.pdf)
- 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>

Rio Tinto (2023a) Cover Letter – Application for a Clearing Permit (Purpose Permit) – Galah Rail Siding Renewals Project – L47/310. Prepared by Rio Tinto to support CPS 10161/1, 21 April 2022.

Rio Tinto (2023b) Native Vegetation Clearing Permit - Clearing Principles Assessment. Prepared by Rio Tinto, April 2023.

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.

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4. Glossary

Acronyms:

BC Act	<i>Biodiversity Conservation Act 2016</i> , Western Australia
BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia (now DPLH)
DAFWA	Department of Agriculture and Food, Western Australia (now DPIRD)
DCCEEW	Department of Climate Change, Energy, the Environment and Water, Australian Government
DBCA	Department of Biodiversity, Conservation and Attractions, Western Australia
DER	Department of Environment Regulation, Western Australia (now DWER)
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia
DMP	Department of Mines and Petroleum, Western Australia (now DMIRS)
DoEE	Department of the Environment and Energy (now DCCEEW)
DoW	Department of Water, Western Australia (now DWER)
DPaW	Department of Parks and Wildlife, Western Australia (now DBCA)
DPIRD	Department of Primary Industries and Regional Development, Western Australia
DPLH	Department of Planning, Lands and Heritage, Western Australia
DRF	Declared Rare Flora (now known as Threatened Flora)
DWER	Department of Water and Environmental Regulation, Western Australia
EP Act	<i>Environmental Protection Act 1986</i> , Western Australia
EPA	Environmental Protection Authority, Western Australia
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Federal Act)
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
PEC	Priority Ecological Community, Western Australia
RIWI Act	<i>Rights in Water and Irrigation Act 1914</i> , Western Australia
TEC	Threatened Ecological Community

Definitions:

{DBCA (2019) Conservation Codes for Western Australian Flora and Fauna. Department of Biodiversity, Conservation and Attractions, Western Australia}:-

T Threatened species:

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR Critically endangered species

Threatened species considered to be “*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN Endangered species

Threatened species considered to be “*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU Vulnerable species

Threatened species considered to be “*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*”.

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct Species:

EX Extinct species

Species where “*there is no reasonable doubt that the last member of the species has died*”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW Extinct in the wild species

Species that “*is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species:

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI Migratory species

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD Species of special conservation interest (conservation dependent fauna)

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS Other specially protected species

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

P **Priority species:**

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

P1 **Priority One - Poorly-known species**

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

P2 **Priority Two - Poorly-known species**

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

P3 **Priority Three - Poorly-known species**

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

P4 **Priority Four - Rare, Near Threatened and other species in need of monitoring**

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Principles for clearing native vegetation:

- (a) Native vegetation should not be cleared if it comprises a high level of biological diversity.
- (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.
- (c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.
- (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.
- (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.
- (f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.
- (g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

- (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.
- (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.
- (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.