



# Clearing Permit Decision Report

## 1. Application details

### 1.1. Permit application details

Permit application No.: 4549/1  
Permit type: Purpose Permit

### 1.2. Proponent details

Proponent's name: Hamersley Iron Pty Ltd

### 1.3. Property details

Property: Iron Ore (Hamersley Range) Agreement Act 1963, Mineral Lease 4SA (AML 70/4)  
Local Government Area: Shire of Ashburton  
Colloquial name: Brockman 4 Drilling Program

### 1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
19.4		Mechanical Removal	Mineral exploration

### 1.5. Decision on application

Decision on Permit Application: Grant  
Decision Date: 13 October 2011

## 2. Site Information

### 2.1. Existing environment and information

#### 2.1.1. Description of the native vegetation under application

**Vegetation Description** Beard vegetation associations have been mapped for the whole of Western Australia and are useful to look at vegetation in a regional context. One Beard vegetation association has been mapped within the application area:

**Beard vegetation association 82:** Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (GIS Database; Shepherd, 2009).

Hamersley Iron Pty Ltd (2011) identified 37 vegetation communities in the application area within seven vegetation types, using a primary vegetation survey of the application area by Biota (2005a) and supporting flora surveys by Biota (2007; 2009). Hamersley Iron Pty Ltd (2011) described the vegetation communities of the application area as follows:

#### Creepline:

1. AmoAmAaTeTw – *Acacia monticola*, *A. maitlandii*, *A. atkinsiana* tall open shrubland over *Triodia epactia*, *T. wiseana* open hummock grassland; and
2. ExAciAbTe – *Eucalyptus xerothermica* scattered trees to open woodland over *Acacia citrinoviridis*, *A. bivenosa* (tall) shrubs to closed shrubland over *Triodia epactia* very open hummock grassland to open hummock grassland.

#### Drainage:

1. PlTe – *Petalostylis labicheoides* shrubland over *Triodia epactia* hummock grassland;
2. C11 – *Acacia citrinoviridis*, *A. ancistrocarpa* tall open shrubland to tall closed scrub over *Triodia epactia* mid-dense hummock grassland;
3. C12 – *Acacia monticola*, *A. maitlandii*, *A. atkinsiana* tall open shrubland over *Triodia epactia*, *T. wiseana*, mid-dense to open hummock grassland;
4. C14 – *Eucalyptus leucophloia* low woodland over *Acacia citrinoviridis*, *A. monticola*, *Dodonaea pachyneura* tall shrubland over *Triodia epactia* mid-dense hummock grassland;
5. C16 – *Corymbia hamersleyana* scattered low trees over *Acacia bivenosa*, *Petalostylis labicheoides* shrubland over *Triodia epactia* hummock grassland;
6. C20 – *Acacia* aff. *aneura* low open forest over *Acacia citrinoviridis* tall open shrubland over *Triodia epactia* open hummock grassland; and
7. C21 – *Petalostylis labicheoides* shrubland over *Triodia epactia* mid-dense hummock grassland.

#### Hills and Slopes:

1. AanEITe – *Acacia aneura*, *Eucalyptus leucophloia* subsp. *leucophloia* low open forest over *Triodia epactia* hummock grassland.

#### Hills, Slopes and Mesa:

1. AanGbCfTe – *Acacia aneura*, *Grevillea berrryana*, *Corymbia ferriticola* low open forest over *Triodia epactia* hummock grassland; and
2. AprTe – *Acacia pruinoarpa* open shrubland over *Triodia epactia* hummock grassland.

**Plains:**

1. AsyTloTa – *Acacia synchronicia* open shrubland over *Triodia longiceps*, *T. angusta* open hummock grassland;
2. AxTeTlo – *Acacia xiphophylla* tall open shrubland over *Triodia epactia*, *T. longiceps* hummock grassland;
3. ElAexTbr – *Eucalyptus leucophloia* subsp. *leucophloia* scattered trees over *Triodia longiceps*; *T. angusta*, *T. brizoides* hummock grassland;
4. ElTloTaTbr – *Eucalyptus leucophloia* subsp. *leucophloia* scattered trees over *Triodia longiceps*, *T. angusta*, *T. brizoides* hummock grassland;
5. P11 – *Acacia synchronicia* scattered shrubs over *Triodia angusta* mid-dense hummock grassland;
6. P12 – *Acacia synchronicia*, *A. bivenosa*, *Cassia pruinosa*, *C. luerssenii* mixed shrubland over *Triodia brizoides* closed hummock grassland;
7. P15 – *Acacia bivenosa*, *A. exilis*, *A. ancistrocarpa* open shrubland over *Triodia wiseana* mid-dense hummock grassland;
8. P2 – *Acacia ayersiana* low open forest/woodland over *Eremophila forrestii* open shrubland over *Triodia epactia*, *T. wiseana* hummock grassland;
9. P3 – *Eucalyptus leucophloia* scattered low trees over *Acacia aneura* (various forms), *A. ayersiana* tall open shrubland over *Triodia epactia*, *T. wiseana* mid-dense hummock grassland;
10. P4 – *Acacia xiphophylla*, *A. aneura* low woodland to tall open shrubland over *Eremophila cuneifolia*, *Rhagodia eremaea* low open shrubland over *Triodia wiseana* open to mid-dense hummock grassland;
11. P5 – *Acacia xiphophylla*, *A. aff. aneura* tall shrubland over *Triodia brizoides*, *T. epactia* open hummock grassland;
12. P6 – *Corymbia deserticola* scattered low trees over *Acacia atkinsiana*, *A. exilis* tall open shrubland over *Triodia wiseana* closed hummock grassland;

**Stony Hills:**

1. ElTw – *Eucalyptus leucophloia* scattered low trees over *Triodia wiseana* hummock grassland;
2. ElTwTm – *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Triodia wiseana*, *T. melvillei* hummock grassland;
3. H10 – *Eucalyptus leucophloia* low open woodland over *Acacia bivenosa* open shrubland over *Triodia brizoides*, *T. epactia* hummock grassland and *Themeda* sp. Mt. Barricade, *Cymbopogon ambiguous* open tussock grassland;
4. H12 – *Eucalyptus leucophloia* low open woodland over *Acacia hamersleyensis* open shrubland over *Triodia brizoides*, *T. epactia* mid-dense hummock grassland and *Themeda triandra*, *Eriachne mucronata* open tussock grassland;
5. H14 – *Eucalyptus leucophloia* scattered low trees over *Triodia wiseana* mid-dense hummock grassland;
6. H15 – *Eucalyptus leucophloia* scattered low trees over *Triodia epactia* mid-dense hummock grassland;
7. H16 – *Eucalyptus leucophloia* scattered low trees to low open woodland over *Astrotricha hamptonii*, *Ficus brachypoda* scattered tall shrubs over *Themeda* sp. Mt Barricade, *Eriachne mucronata* open tussock grassland;
8. H2 – *Eucalyptus leucophloia* scattered low trees over *Acacia atkinsiana* open shrubland over *Triodia wiseana* mid-dense hummock grassland;
9. H3 – *Eucalyptus leucophloia* scattered low trees over *Acacia maitlandii* shrubland to open heath over *Triodia wiseana* mid-dense hummock grassland;
10. H4 – *Acacia hamersleyensis* tall open shrubland over *Triodia wiseana* closed hummock grassland;
11. H8 – *Acacia ancistrocarpa* open heath to tall open shrubland over *Triodia wiseana* mid-dense to closed hummock grassland; and
12. H9 – *Eucalyptus leucophloia* scattered low trees over *Acacia inaequilatera* tall shrubland over *Triodia wiseana* mid-dense hummock grassland.

**Stony Plains:**

1. ElAanAayTeTw – *Eucalyptus leucophloia* scattered low trees over *Acacia aneura*, *A. ayersiana* tall open shrubland over *Triodia epactia*, *T. wiseana* hummock grassland.

**Clearing Description**

Hamersley Iron Pty Ltd is proposing to clear up to 19.4 hectares of native vegetation for the Brockman 4 Drilling Program (Hamersley Iron Pty Ltd, 2011). The clearing of vegetation is required for the purpose of establishing access tracks and drilling for mineral exploration.

The vegetation will be cleared using a blade down technique where practicable or scrub rake in level terrain. The vegetation and topsoil will be stockpiled separately for use in rehabilitation.

**Vegetation Condition**

Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994);

To:

Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery, 1994).

**Comment**

The application area is located in the Hamersley subregion of Western Australia and is situated approximately 60 kilometres west of the Tom Price town site (GIS Database).

The vegetation condition was derived from a vegetation survey conducted by Biota (2005a; 2007; 2009).

### 3. Assessment of application against clearing principles

#### (a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

##### Comments

##### **Proposal is not likely to be at variance to this Principle**

The application area occurs within the Hamersley (PIL3) subregion of the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). This subregion is characterised by mulga low woodland over bunch grasses on fine textured soils in valley floors and *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils of the ranges (CALM, 2002).

The vegetation within the application area consists of Beard vegetation association 82, which is common and widespread throughout the Pilbara bioregion with approximately 100% of the pre-European vegetation extent remaining (Shepherd, 2009; GIS Database). A search of the Department of Environment and Conservation Declared Rare and Priority Flora databases revealed that no Declared Rare Flora (DRF) species and two Priority species may potentially occur within a 20 kilometre radius of the application area (DEC, 2011). Biota (2005a; 2007; 2009) identified no DRF or Priority flora species within the application area. Hamersley Iron Pty Ltd (2011) identified 37 vegetation communities and seven vegetation types within the application area using a primary vegetation survey of the application area by Biota (2005a) and supporting flora surveys also by Biota (2007; 2009). The condition of these vegetation types were classified from 'degraded' to 'excellent' (Keighery, 1994).

No Threatened Ecological Communities or Priority Ecological Communities were recorded or identified within the application area (GIS Database).

Five weed species were identified during the survey: Buffel Grass (*Cenchrus ciliaris*), Birdwood Grass (*Cenchrus setigerus*), Whorled Pigeon Grass (*Setaria verticillata*), Beggars Ticks (*Bidens bipinnata*) and Spiked Malvastrum (*Malvastrum americanum*) (Biota, 2005a). None of these species are listed by the Western Australian Department of Agriculture and Food as Declared Plants. Weeds have the potential to significantly change the dynamics of a natural ecosystem and lower the biodiversity of an area. Potential impacts to the biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

The fauna habitats within the application area are considered to be common and widespread within the subregion and faunal assemblages are unlikely to be different to that found in similar habitat located elsewhere in the region (Biota, 2005b). Several habitat types are of high ecological significance however the clearing of 19.4 hectares of native vegetation within a 157.5 hectare application area is unlikely to have a significant impact on a regional and local context.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

##### Methodology

Biota (2005a)  
Biota (2005b)  
Biota (2007)  
Biota (2009)  
CALM (2002)  
DEC (2011)  
Keighery (1994)  
Shepherd (2009)  
GIS Database:  
- IBRA WA (regions - subregions)  
- Pre-European Vegetation  
- Threatened Ecological Sites Buffered

#### (b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

##### Comments

##### **Proposal is not likely to be at variance to this Principle**

There were five primary habitats were identified within the project area, largely based on vegetation structure and landforms by Biota (2005b):

1. Creeklines: comprising minor drainage lines to wide flood channels with *Acacia* shrublands over *Triodia epactia* hummock grasslands;
2. Mulga: Dense *Acacia aneura* tall shrublands over *Triodia epactia* and *T. wiseana* hummock grasslands in drainage areas within plains;
3. *Acacia* over *Triodia*: situated on stony soils and on soft soil in a wide valley
4. Gorge: gorges associated with the Brockman 4 range, which contains the ore bodies; and
5. *Triodia* hilltop: crests of the Brockman 4 range.

Biota (2005b) identified the vegetation condition to be 'very good' (Keighery, 1994). The landforms and habitat found within the application area is considered as being well represented in the Pilbara bioregion (Biota, 2005b; Hamersley Iron Pty Ltd, 2011). The application area does contain habitats or faunal assemblages that are ecologically significant, however it is unlikely that any species of conservation significance will be significantly impacted by the clearing of native vegetation in the application areas. The 19.4 hectares of native vegetation

proposed for clearing is not likely to contain significant habitat for fauna.

There is approximately 100% of the pre-European vegetation remaining within the Pilbara bioregion (Shepherd, 2009; GIS Database). Given the extent of the native vegetation remaining in the local area and bioregion, the vegetation to be cleared does not represent a significant ecological link.

Biota (2005b) conducted a level two fauna survey of the application area and surrounding areas during 18 to 30 October 2004. Biota (2005b) recorded two species of conservation significance within the application area. These species; the Australian Bustard (*Ardeotis australis*) and *Notoscincus butleri* (*Notoscincus butleri*) may use the study area for foraging as part of a larger territory area. The habitat present within the application areas is not considered significant habitat for these species (Biota, 2005b; Hamersley Iron Pty Ltd, 2011).

The proposed clearing of 19.4 hectares of native vegetation within a 157.5 hectare application area is not likely to impact critical feeding or breeding habitat for any conservation significant fauna species as the application area does not contain significant habitat for the potential species. The recorded conservation significant species are considered highly mobile and/or have a wide distribution; therefore the proposed clearing is unlikely to significantly impact these species (Biota, 2005b).

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

**Methodology** Biota (2005b)  
DEC (2011)  
Hamersley Iron Pty Ltd (2011)  
Keighery (1994)  
Shepherd (2009)  
GIS Database:  
- Pre-European Vegetation  
- IBRA WA (regions - subregions)

**(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.**

**Comments Proposal is not likely to be at variance to this Principle**

According to available databases, there are no records of Declared Rare Flora (DRF) within the application area (GIS Database). A search of the Department of Environment and Conservation Declared Rare and Priority Flora databases identified no DRF species as occurring within a 20 kilometre radius of the application area (DEC, 2011).

Biota (2005a; 2007; 2009) conducted a vegetation and flora survey of the application area during 2005, 2007 and 2009. No DRF were recorded within the survey area.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

**Methodology** Biota (2005a)  
Biota (2007)  
Biota (2009)  
DEC (2011)  
GIS Database:  
- Declared Rare and Priority Flora List

**(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.**

**Comments Proposal is not likely to be at variance to this Principle**

A search of the available databases shows that there are no Threatened Ecological Communities (TEC's) situated within the application area (GIS Database). A flora survey conducted by Biota (2005a; 2007; 2009) did not identify any TEC's. The nearest TEC buffer zone is located 30 kilometres from the application area and identified as the 'Themeda Grassland' complex (GIS Database). The vegetation units mapped within the application area do not match the vegetation units which comprise the TEC (Biota, 2005a; 2005; 2009).

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

**Methodology** Biota (2005a)  
Biota (2007)  
Biota (2009)  
GIS Database:  
- Threatened Ecological Sites Buffered

**(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.**

**Comments Proposal is not at variance to this Principle**

The application area falls within the Pilbara IBRA bioregion (GIS Database). The vegetation within the application area is recorded as:

**Beard vegetation association 82:** Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (GIS Database; Shepherd, 2009).

According to Shepherd (2009), Beard vegetation association 82 retains approximately 100% of its pre-European extent. Therefore, the areas proposed to be cleared are not a significant remnant of native vegetation in an area that has been extensively cleared.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion - Pilbara	17,804,193	17,785,000	~99.98	Least Concern	6.32
Beard vegetation associations - State					
82	2,565,901	2,565,901	~100	Least Concern	10.24
Beard vegetation associations - Bioregion					
82	2,563,583	2,563,583	~100	Least Concern	10.25

\* Shepherd (2009)

\*\* Department of Natural Resources and Environment (2002)

Based on the above, the proposed clearing is not at variance to this Principle.

**Methodology** Department of Natural Resources and Environment (2002)  
Shepherd (2009)  
GIS Database:  
- IBRA WA (regions - subregions)  
- Pre-European Vegetation

**(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.**

**Comments Proposal may be at variance to this Principle**

According to available databases there are several minor ephemeral drainage lines within the application area (GIS Database). The drainage lines only flow after major rainfall events. Based on vegetation mapping by Biota (2005a), there are nine riparian vegetation types associated with the drainage lines;

**Creepline:**

1. AmoAmAaTeTw - *Acacia monticola*, *A. maitlandii*, *A. atkinsiana* tall open shrubland over *Triodia epactia*, *T. wiseana* open hummock grassland; and
2. ExAciAbTe - *Eucalyptus xerothermica* scattered trees to open woodland over *Acacia citrinoviridis*, *A. bivenosa* (tall) shrubs to closed shrubland over *Triodia epactia* very open hummock grassland to open hummock grassland.

**Drainage:**

1. PITe - *Petalostylis labicheoides* shrubland over *Triodia epactia* hummock grassland;
2. C11 - *Acacia citrinoviridis*, *A. ancistrocarpa* tall open shrubland to tall closed scrub over *Triodia epactia* mid-dense hummock grassland;
3. C12 - *Acacia monticola*, *A. maitlandii*, *A. atkinsiana* tall open shrubland over *Triodia epactia*, *T. wiseana*, mid-dense to open hummock grassland;
4. C14 - *Eucalyptus leucophloia* low woodland over *Acacia citrinoviridis*, *A. monticola*, *Dodonaea pachyneura* tall shrubland over *Triodia epactia* mid-dense hummock grassland;
5. C16 - *Corymbia hamersleyana* scattered low trees over *Acacia bivenosa*, *Petalostylis labicheoides* shrubland over *Triodia epactia* hummock grassland;
6. C20 - *Acacia* aff. *aneura* low open forest over *Acacia citrinoviridis* tall open shrubland over *Triodia epactia* open hummock grassland; and
7. C21 - *Petalostylis labicheoides* shrubland over *Triodia epactia* mid-dense hummock grassland.

The condition of the riparian vegetation types is classified as 'good' to 'very good' (Keighery, 1994; Biota

2005a) and the clearing of some riparian vegetation is unlikely to result in any significant impact to vegetation growing in association with a watercourse or wetland. The vegetation communities growing in association with the watercourses are not unique and are considered common and widespread in the Pilbara bioregion (Shepherd, 2009; GIS Database). The proposed clearing is unlikely to significantly impact on vegetation communities growing in association with these minor ephemeral creek systems.

**Methodology** Based on the above, the proposed clearing may be at variance to this Principle.  
Biota (2005a)  
Keighery (1994)  
Shepherd (2009)  
GIS Database:  
- Geodata, Lakes  
- Hydrography, Linear

**(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.**

**Comments Proposal is not likely to be at variance to this Principle**

According to the available databases, the application area is comprised of the Newman land system (GIS Database).

The Newman land system is described as rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands (Van Vreeswyk et al., 2004). The land system contains erosional surfaces such as plateaux and mountains, moderately spaced dendritic and rectangular tributary drainage patterns of narrow valleys and gorges with narrow drainage floors and channels. This land system is generally not susceptible to erosion (Van Vreeswyk et al., 2004).

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

**Methodology** Van Vreeswyk et al. (2004)  
GIS Database:  
- Rangeland Land System Mapping

**(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.**

**Comments Proposal is not likely to be at variance to this Principle**

The application area is not located within any conservation area (GIS Database). The nearest conservation area is Karijini National Park, located approximately 68 kilometres east of the application area (GIS Database).

Given the distance of the application area from the Karijini National Park, the proposed clearing is not likely to provide a significant ecological linkage or fauna movement corridor and is not likely to impact the environmental values of the conservation area.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

**Methodology** GIS Database:  
- DEC Tenure

**(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.**

**Comments Proposal is not likely to be at variance to this Principle**

The application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database).

There are no permanent watercourses or water bodies within the application area (GIS Database). Any surface water within the application area is likely to only remain for short periods following significant rainfall events as the annual evaporation rate exceeds rainfall (BoM, 2011). The proposed clearing is not likely to cause deterioration in the quality of any surface water within or outside of the application area.

The application area is located within the proclaimed Pilbara groundwater area under the *Rights in Water and Irrigation Act 1994* (GIS Database). Any groundwater extraction and/or taking or diversion of surface water for the purposes other than domestic and/or stock watering is subject to licence by the Department of Water.

The rainfall in the Pilbara tends to be unpredictable and erratic, and the rocky-sloping topography of much of the upper catchments often produces considerable runoff (Van Vreeswyk et al., 2004). As a result, ephemeral watercourses tend to have high levels of sedimentation and turbidity after rainfall events (Van Vreeswyk et al., 2004). Therefore the proposed clearing of 19.4 hectares of native vegetation is unlikely to increase the sediment load of the surface water significantly compared to surrounding uncleared areas.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

**Methodology** BoM (2011)  
Hamersley Iron Pty Ltd (2011)  
Van Vreeswyk et al (2004)  
GIS Database:  
- Geodata, Lakes  
- RIWI Act, Groundwater Areas  
- Hydrography, Linear  
- Public Drinking Water Source Areas

**(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.**

**Comments Proposal is not likely to be at variance to this Principle**

The application areas experience a semi-desert tropical climate with summer cyclonic or thunderstorm events, with an annual average rainfall of approximately 312.3 millimetres per year (CALM, 2002; BoM, 2011). Based on an average annual evaporation rate of 3,200 - 3,600 millimetres (BoM, 2011), any surface water resulting from rainfall events is likely to be relatively short lived.

Given the size of the area to be cleared (19.4 hectares) compared to the size of the Ashburton catchment area (7,877,743 hectares) (GIS Database) it is not likely that the proposed clearing will lead to an appreciable increase in run off, and subsequently cause or exacerbate the incidence or intensity of flooding.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

**Methodology** BoM (2011)  
CALM (2002)  
GIS Database:  
- Hydrographic Catchments - Catchments  
- Hydrography, Linear

**Planning instrument, Native Title, Previous EPA decision or other matter.**

**Comments**

There is one Native Title claim (WC01/5) over the area under application. 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 (Site IDs: 22230 and 26876) (GIS Database). 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.

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

The clearing permit application was advertised on 22 August 2011 by the Department of Mines and Petroleum inviting submissions from the public. One submission was received in relation to the proposed clearing, stating no objection to the application.

**Methodology** GIS Database:  
- Aboriginal Sites of Significance  
- Native Title Claims - Registered with the NNTT

**4. References**

- Biota (2005a) Brockman 4 Vegetation and Flora Survey. Unpublished report prepared for Hamersley Iron.
- Biota (2005b) Fauna Habitats and Fauna Assemblage of the Brockman No. 4 Project Area. Unpublished report prepared for Hamersley Iron.
- Biota (2007) A Vegetation and Flora Survey of the White Quartz Road Corridor near Tom Price. Unpublished report prepared for Pilbara Iron.
- Biota (2009) A Vegetation and Flora Survey of Beasley River. Unpublished report prepared for RioTinto Iron Ore.
- BoM (2011) Climate Statistics for Australian Locations. A Search for Climate Statistics for Paraburdoo Aero, Australian Government Bureau of Meteorology, viewed 4 October 2011, <[http://reg.bom.gov.au/climate/averages/tables/cw\\_007185.shtml](http://reg.bom.gov.au/climate/averages/tables/cw_007185.shtml)>.
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions. Pilbara 3 (PIL3 - Hamersley subregion) Department of Conservation and Land Management, Western Australia.
- DEC (2011) NatureMap - Mapping Western Australia Biodiversity, Department of Environment and Conservation, viewed 4 October 2011, <<http://naturemap.dec.wa.gov.au>>.

- Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.
- Hamersley Iron Pty Ltd (2011) Statement Addressing the 10 Clearing Principles. Brockman 4 Resource and Hydro Drilling. Unpublished report, December 2010.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Shepherd, D.P. (2009) Adapted from: Shepherd, D.P., Beeston, G.R., and Hopkins, A.J.M. (2001), Native Vegetation in Western Australia. Technical Report 249. Department of Agriculture Western Australia, South Perth.
- Van Vreeswyk, A.M.E., Payne, A.L., Leighton, K.A & Hennig, P. (2004) An Inventory and Condition Survey of the Pilbara Region, Western Australia, Department of Agriculture, Western Australia.

## 5. Glossary

### Acronyms:

<b>BoM</b>	Bureau of Meteorology, Australian Government
<b>CALM</b>	Department of Conservation and Land Management (now DEC), Western Australia
<b>DAFWA</b>	Department of Agriculture and Food, Western Australia
<b>DEC</b>	Department of Environment and Conservation, Western Australia
<b>DEH</b>	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
<b>DEP</b>	Department of Environment Protection (now DEC), Western Australia
<b>DIA</b>	Department of Indigenous Affairs
<b>DLI</b>	Department of Land Information, Western Australia
<b>DMP</b>	Department of Mines and Petroleum, Western Australia
<b>DoE</b>	Department of Environment (now DEC), Western Australia
<b>DoIR</b>	Department of Industry and Resources (now DMP), Western Australia
<b>DOLA</b>	Department of Land Administration, Western Australia
<b>DoW</b>	Department of Water
<b>EP Act</b>	Environmental Protection Act 1986, Western Australia
<b>EPBC Act</b>	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
<b>GIS</b>	Geographical Information System
<b>ha</b>	Hectare (10,000 square metres)
<b>IBRA</b>	Interim Biogeographic Regionalisation for Australia
<b>IUCN</b>	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
<b>RIWI Act</b>	Rights in Water and Irrigation Act 1914, Western Australia
<b>s.17</b>	Section 17 of the Environment Protection Act 1986, Western Australia
<b>TEC</b>	Threatened Ecological Community

### Definitions:

{Atkins, K (2005). *Declared rare and priority flora list for Western Australia, 22 February 2005*. Department of Conservation and Land Management, Como, Western Australia} :-

- P1** **Priority One - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
- P2** **Priority Two - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
- P3** **Priority Three - Poorly Known taxa:** taxa which are known from several populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.
- P4** **Priority Four – Rare taxa:** taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years.
- R** **Declared Rare Flora – Extant taxa** (= *Threatened Flora = Endangered + Vulnerable*): taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.
- X** **Declared Rare Flora - Presumed Extinct taxa:** taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.



{Wildlife Conservation (Specially Protected Fauna) Notice 2005} [Wildlife Conservation Act 1950] :-

- Schedule 1**    **Schedule 1 – Fauna that is rare or likely to become extinct:** being fauna that is rare or likely to become extinct, are declared to be fauna that is need of special protection.
- Schedule 2**    **Schedule 2 – Fauna that is presumed to be extinct:** being fauna that is presumed to be extinct, are declared to be fauna that is need of special protection.
- Schedule 3**    **Schedule 3 – Birds protected under an international agreement:** being birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is need of special protection.
- Schedule 4**    **Schedule 4 – Other specially protected fauna:** being fauna that is declared to be fauna that is in need of special protection, otherwise than for the reasons mentioned in Schedules 1, 2 or 3.

{CALM (2005). *Priority Codes for Fauna*. Department of Conservation and Land Management, Como, Western Australia} :-

- P1**            **Priority One: Taxa with few, poorly known populations on threatened lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P2**            **Priority Two: Taxa with few, poorly known populations on conservation lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P3**            **Priority Three: Taxa with several, poorly known populations, some on conservation lands:** Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P4**            **Priority Four: Taxa in need of monitoring:** Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.
- P5**            **Priority Five: Taxa in need of monitoring:** Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

**Categories of threatened species (*Environment Protection and Biodiversity Conservation Act 1999*)**

- EX**            **Extinct:** A native species for which there is no reasonable doubt that the last member of the species has died.
- EX(W)**       **Extinct in the wild:** A native species which:  
(a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or  
(b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
- CR**            **Critically Endangered:** A native species which is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
- EN**            **Endangered:** A native species which:  
(a) is not critically endangered; and  
(b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
- VU**            **Vulnerable:** A native species which:  
(a) is not critically endangered or endangered; and  
(b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
- CD**            **Conservation Dependent:** A native species which is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.