



1. Application details

1.1. Permit application details

Permit application No.: 2816/1
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: Tom Price Mine Development Project

1.4. Application

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

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description	Clearing Description	Vegetation Condition	Comment
<p>Vegetation Description</p> <p>The areas applied to clear have been broadly mapped at a scale of 1:250,000 as (GIS Database):</p> <p>Beard Vegetation Association 82: hummock grasslands, low tree steppe; snappy gum over <i>Triodia wiseana</i>; Beard Vegetation Association 162: Shrublands; snakewood scrub; and Beard Vegetation Association 567: Hummock grasslands, shrub steppe; mulga and Kanji over soft Spinifex and <i>Triodia basedowii</i>.</p> <p>Pilbara Flora (2008) undertook a flora and vegetation survey of the application areas over 15 field days on two separate trips in the period between 5 April 2008 and 8 May 2008. Pilbara Flora (2008) identified 30 vegetation types within the survey area broadly associated with landforms. From vegetation maps provided by Pilbara Flora (2008), the assessor has identified the following 18 vegetation units as being the most likely to occur within the application area.</p>	<p>Hamersley Iron Pty Ltd has applied to clear up to 106.7ha of native vegetation within an application area of approximately 190ha (GIS Database). The proposed clearing is located on <i>Iron Ore (Hamersley Range) Agreement Act 1963</i>, Mineral Lease 4SA (AML 70/04), approximately 10km south of Tom Price (GIS Database).</p> <p>The purpose of the proposed clearing is mineral production. Hamersley Iron (2008) propose to clear for the development and expansion of pits and waste dumps. Vegetation clearing will be undertaken by mechanical means and the vegetation and topsoil will be stockpiled for use in rehabilitation (Hamersley Iron, 2008).</p>	<p>Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery, 1994).</p> <p>To</p> <p>Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994).</p>	<p>The vegetation condition rating was based on the results from the flora and vegetation survey of the proposed clearing areas which was conducted by Pilbara Flora over a 15 day period from April to May 2008. The vegetation condition varied from areas that had experienced little disturbance to areas that had been heavily disturbed from mining and exploration activities, including previous rehabilitation and regrowth areas (Pilbara Flora, 2008).</p>

HILLS

1) Steep Hillside Open Woodland:

Steep Hillside associated with high relief Brockman Ranges with rocky outcropping and minimal soil development. The vegetation primarily consists of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia pruinocarpa* low woodland over *Acacia hamersleyensis* shrubland over *Triodia epactia*, *Triodia pungens*, *Triodia wiseana* hummock grassland. Four conservation taxa were recorded in this vegetation type: *Indigofera ixocarpa*, *Eremophila magnifica* subsp. *magnifica*, *Olearia mucronata* and *Dampiera anonyma*. This vegetation unit is described as being in good condition and is generally weed free except where proximate to mining disturbances.

2) Breakaway Steep Hillside Shrubland:

Very steep breakaway hillsides with massive outcropping on high relief large Brockman Ranges. The soil consists of outcropping ironstone with minimal soil development in interstitial pockets. The vegetation primarily consists of *Eucalyptus leucophloia* subsp.

leucophloia low open woodland over *Acacia hamersleyensis*, *Acacia maitlandii* and *Acacia marramamba* open scrub over *Cryptandra monticola* and *Dodonaea petiolaris* open heath over *Eriachne mucronata*, *Triodia epactia* and *Triodia wiseana* tussock/hummock grassland. Four conservation taxa were recorded in this vegetation type: *Indigofera ixocarpa*, *Eremophila magnifica* subsp. *magnifica*, *Olearia mucronata* and *Sida* sp. Barlee Range. This unit is described as being in good condition with little weed infestation.

3) Rocky Hillside Dense Shrubland

Undulating colluvial upland plains with pebble scree. The vegetation primarily consists of *Eucalyptus leucophloia* subsp. *leucophloia* scattered low trees over *Acacia hamersleyensis*, *Acacia maitlandii* and *Acacia sibirica* open scrub over *Triodia epactia*, *Triodia wiseana* hummock grassland. No weed species were recorded within this vegetation unit and it was reported as being in good to poor condition in areas of old gravel pits.

4) Rocky Hillside Acacia citrinoviridis Woodland

Sloping to undulating rocky hillsides with gravely ironstone and chert boulders. The vegetation consists of *Acacia citrinoviridis*, *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia ferriticola* subsp. *ferriticola* low open forest over *Dodonaea viscosa* and *Acacia maitlandii* shrubland over *Cymbopogon ambiguous* and *Triodia epactia* tussock hummock grasslands. The Priority 2 flora species *Indigofera ixocarpa* was common on disturbed areas within this vegetation unit. This vegetation unit is described as being in very poor condition as it has been extensively disturbed by previous mining and exploration and has moderate weed infestation.

5) Rocky Hillside Acacia Woodland

Sloping rocky ferruginous hillsides with rocky ironstone gravel. Vegetation consists of *Acacia citrinoviridis* and *Acacia aneura* var. *aneura* low open woodland over *Acacia maitlandii*, *Petalostylis labicheoides* and *Acacia kempeana* open heath over *Acacia spondylophylla* low shrubland over *Triodia wiseana* and *Triodia pungens* hummock grassland. This vegetation unit is described as being in very poor condition as it has been extensively disturbed by previous mining and exploration and has moderate weed infestation.

6) Hillside Mallee Woodland (*Eucalyptus trivalva* dominant)

Gently undulating to steep smaller hillsides with pebble scree mantle. Vegetation consists of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia aneura* var. *conifera* open woodland over *Eucalyptus trivalva* low open forest over *Acacia hamersleyensis* and *Ptilotus obovatus* var. *obovatus* open shrubland over *Triodia epactia* and *Triodia wiseana* hummock grassland. This vegetation unit is described as being in good condition with no weed infestations.

7) Hillside Mulga Grove

Slight rocky knolls, bluffs and hillsides with ironstone silt matrix. Vegetation consists of *Acacia aneura* var. *aneura*, *Acacia aneura* var. *intermedia* and *Acacia pruinocarpa* low closed forest over *Dodonaea petiolaris*, *Eremophila phyllopoda*, *Eremophila platycalyx* and *Senna glutinosa* subsp. *pruinosa* open heath over *Triodia epactia*, *Triodia melvillei* and *Triodia wiseana* open hummock grassland. This vegetation unit is described as being in very good condition with minimal weed species present.

PLAINS

8) Colluvial Plain Mixed Woodland

Stony colluvial plains with stony mantle colluvium. Vegetation structure consists of *Eucalyptus leucophloia* subsp. *leucophloia*, *Eucalyptus trivalva*, *Acacia aneura* spp. and *Acacia pruinocarpa* low open woodland over *Acacia rhodophloia*, *Acacia sibirica* and *Acacia hamersleyensis* high shrubland over *Triodia melvillei* and *Triodia wiseana* hummock grassland. This vegetation unit is described as being in good condition with no weed infestations.

9) Colluvial Plain Mixed Dense Woodland

Low relief colluvial plains with colluvial ironstone scree. Vegetation

structure consists of *Corymbia deserticola* subsp. *deserticola*, *Eucalyptus leucophloia* subsp. *leucophloia*, *Eucalyptus lucasii*, *Eucalyptus trivalva*, *Acacia aneura* var. *aneura*, *Acacia citrinoviridis* and *Acacia pruinocarpa* mixed species low woodland over *Acacia sibirica*, *Acacia hamersleyensis*, *Acacia monticola*, *Acacia rhodophloia*, *Acacia sibirica* and *Petalostylis labicheoides* closed scrub over *Cymbopogon ambiguous* and *Themeda* sp. Mt Barricade tussock grassland over *Triodia melvillei*, *Triodia wiseana* hummock grassland. This vegetation unit is described as being in good condition with no weed infestations.

10) Colluvial Plain Mulga Grove

Low relief colluvial plains with silt from mining runoff. Vegetation structure consists of *Acacia aneura* var. *aneura*, *Acacia aneura* var. *intermedia* and *Acacia pruinocarpa* low closed forest over *Triodia melvillei* open tussock grassland. This vegetation unit is described as being in very poor condition with massive silt runoff from nearby waste dumps and several weed species present.

11) Rocky Hillside Drainage Line

Rocky drainage lines on hillsides containing rocky outcropping with soil development. Vegetation structure consists of *Acacia citrinoviridis*, *Acacia pruinocarpa* and *Eucalyptus leucophloia* subsp. *leucophloia* low closed woodland over *Petalostylis labicheoides*, *Dodonaea pachyneura*, *Dodonaea petiolaris* and *Hibiscus coatesii* open scrub over *Cymbopogon ambiguous*, *Eriachne mucronata* and a mixed *Themeda* sp. Mt Barricade (M.E. Trudgen 2471) and *Triodia pungens* tussock/hummock grassland. The Priority 3 Flora species *Sida* sp. Barlee Range (S Van Leeuwen 1642) was recorded within this vegetation unit. This vegetation unit is described as being in good condition with no weed infestations.

12) Rocky Hillside Narrow Creek 2-3m width

Narrow creek at base of rocky hills with rock outcropping and pebblestones. Vegetation structure consists of *Acacia pruinocarpa* and *Eucalyptus leucophloia* subsp. *leucophloia* low woodland over *Acacia bivenosa*, *Acacia maitlandii*, *Acacia pyrifolia* var. *pyrifolia*, *Acacia spondylophylla*, *Dodonaea pachyneura*, *Gossypium robinsonii* and *Senna glutinosa* subsp. *glutinosa* shrubland over *Cenchrus ciliaris* closed grassland. The Priority Flora species *Sida* sp. Barlee Range (s Van Leeuwen 1642) was recorded within this vegetation unit. The vegetation unit is described as being in very poor condition due to a massive weed infestation of Buffel Grass (*Cenchrus ciliaris*).

13) Meadow Buffel Grass

Broad alluvial area at base of hills with alluvium soil. Vegetation structure consists of *Acacia citrinoviridis* and *Eucalyptus xerothermica* scattered low trees over *Acacia bivenosa* scattered shrubs over *Cenchrus ciliaris* closed tussock grassland. This vegetation unit is described as being in very poor condition due to massive infestation of Buffel Grass and minor occurrence of Ruby Dock (*Acetosa vesicaria*).

14) Mine Drainage Area Dense Woodland

Drainage line/creek from mining areas with a rocky creekbed covered by silt. Vegetation structure consists of *Eucalyptus leucophloia* subsp. *leucophloia*, *Acacia citrinoviridis*, *Acacia aneura* var. *intermedia* and *Acacia pruinocarpa* low woodland over *Acacia bivenosa*, *Acacia tumida* var. *pilbarensis* and *Petalostylis labicheoides* open scrub over *Panicum decompositum*, *Themeda* sp. Mt Barricade (M.E. Trudgen 2471), *Triodia pungens* and *Triodia wiseana* tussock/hummock grassland. This vegetation unit is described as being in very poor condition due to weeds and silt from mining areas.

MINESITE VEGETATION

15) Rehabilitation Colluvial Plains Shrublands

Rehabilitation over low relief colluvial plains with ripped colluvium. Vegetation structure consists of *Acacia hamersleyensis*, *Acacia pruinocarpa*, *Acacia rhodophloia*, *Acacia sibirica* and *Grevillea berryana* open scrub over *Triodia brizoides*, *Triodia epactia*, *Triodia melvillei* and *Triodia wiseana* hummock grassland. This vegetation unit is described as having poor quality native vegetation with no weed species recorded.

16) Regrowth Borrow Pit

Old borrow pit with no rehabilitation consisting of hardstand colluvium not ripped. Vegetation structure consists of *Acacia hamersleyensis*, *Acacia pruinocarpa*, *Acacia sibirica*, *Acacia synchronicia*, *Codonocarpus cotinifolius*, *Petalostylis labicheoides* shrubland over *Goodenia stobbsiana* scattered low herbland over *Eriachne mucronata*, *Triodia brizoides* and *Triodia melvillei* mixed tussock/hummock grassland. This vegetation unit is described as having very poor quality native vegetation with no weed species recorded.

17) Rehabilitation Stockpiles

Low stockpile with mine waste material. Vegetation structure consist of *Acacia ?colei*, *Acacia bivenosa* and *Acacia pruinocarpa*, *Salsola australis* high shrubland over *Melinis repens* and *Cenchrus ciliaris* tussock grassland. This vegetation unit is described as having poor quality native vegetation with heavy weed infestations.

18) Rehabilitation Waste Dumps

Rehabilitated waste dump with mine waste. Vegetation structure consists of *Acacia ancistrocarpa*, *Acacia aneura* var. *aneura*, *Acacia bivenosa*, *Acacia citrinoviridis*, *Acacia hamersleyensis*, *Acacia sclerosperma*, *Acacia aneura* var. *conifera* and *Acacia pyrifolia* var. *pyrifolia* open scrub over *Maireana georgei* and *Acetosa vesicaria* low shrubland. This vegetation unit is described as having poor quality native vegetation with heavy weed infestations of Ruby Dock.

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 may be at variance to this Principle

The application areas are located within the Hamersley Interim Biogeographic Regionalisation for Australia (IBRA) subregion (GIS Database). This subregion is generally a mountainous area of Proterozoic sedimentary ranges and plateaux, dissected by gorges (basalt, shale and dolerite) (CALM, 2002). The Hamersley subregion consists primarily of 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).

Pilbara Flora (2008) described 30 vegetation units from a flora and vegetation survey, which included the application areas and was performed over 15 days from April to May 2008. From vegetation maps provided by Pilbara Flora (2008) the assessor has identified 18 vegetation units as being the most likely to occur within the application areas. A total of 331 taxa were recorded within the survey area, from 147 genera and 54 families, which is considered to be representative of the high species diversity of the Pilbara region (Pilbara Flora, 2008). The most dominant families consisted of *Poaceae*, *Mimosaceae*, *Malvaceae* and *Amaranthaceae* (Pilbara Flora, 2008).

According to Pilbara Flora (2008) ten weed species have been recorded as occurring within the vegetation survey area; Ruby Dock (*Acetosa vesicaria*), Kapok Grass (*Aerva javanica*), Bipinnate Beggars Tick (*Bidens bipinnata*), Buffel Grass (*Cenchrus ciliaris*), Feathertop Rhodes Grass (*Chloris virgata*), Native Thornapple (*Datura leichhardtii*), Spiked Malvastrum (*Malvastrum americanum*), Red Natal (*Melinis repens*), Blackberry Nightshade (*Solanum nigrum*) and Mimosa Bush (*Vachellia farnesiana*). The presence of introduced flora species lowers the biodiversity of the application areas. Care must be taken to ensure that the proposed clearing activities do not spread or introduce weed species to non-infested areas. Should a clearing permit be granted, it is recommended that a condition be imposed for the purposes of weed management.

A desktop fauna search of a 50km radius around the application areas was performed by the assessing officer using the Western Australian Museum (WA Museum) Fauna Database. The database search recorded a total of 75 reptile species, 68 bird species, 25 mammal species and 7 amphibian species that may potentially occur within the survey area (Western Australian Museum, 2008). The results from this search indicate that the area is diverse in bird and reptile species, particularly skinks (23) and Geckos (13) (Western Australian Museum, 2008).

Based on the above, the proposed clearing may be at variance to this Principle. However, the landforms vegetation types and fauna habitats within the application areas are well represented locally and within the Pilbara region generally. In addition the areas to be cleared are immediately adjacent to other mining areas and therefore, the application areas are not expected to represent a higher level of diversity than other, undisturbed areas nearby.

Methodology CALM (2002)

Pilbara Flora (2008)
Western Australian Museum (2008)
GIS Database
- Pre-European Vegetation
- Interim Biogeographic Regionalisation of Australia (subregions)

(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

During the flora and vegetation survey performed by Biota (2008), an assessment was also undertaken of vegetation types and landscape units that could act as significant habitat for fauna. Biota (2008) report that apart from colluvial pebble scree areas, there were no other landscape units observed that contained features that were considered as providing significant fauna habitat. In addition, there were no deep gullies, caves or valleys recorded within the application area that would provide significant habitat for fauna species (Biota, 2008). The landscape units observed during the field survey are common throughout the Pilbara region (Biota, 2008).

A search of the Department of Environment and Conservation (DEC) databases conducted by DEC on behalf of the proponent, revealed 11 fauna species of conservation significance previously recorded within the Tom Price vicinity, which included the application areas (DEC, 2008). In addition, a search was conducted using the Department of Environment, Water, Heritage and the Arts (DEWHA) Protected Matters Search Tool (Pilbara Flora, 2008). In addition to identifying fauna species of conservation significance that may occur within the application areas, the search also identified numerous migratory marine and wetland bird species. However it is unlikely that the proposed clearing will impact on these migratory species due to their transitory presence within the application areas and the highly disturbed nature of the vegetation within some sections of the application areas. The fauna species of conservation significance most likely to occur within the application areas based on habitat and range are listed below (DEC, 2008; DEWHA, 2008):

- Peregrine Falcon (*Falco peregrinus*) - Schedule 4, *Wildlife Conservation (Specially Protected Fauna) Notice 2008*.
- Long-tailed Dunnart (*Sminthopsis longicaudatus*) - Priority 4 on the Department of Environment and Conservation's (DEC) Threatened and Priority Fauna List.
- Ghost Bat (*Macroderma gigas*) - Priority 4 on the DEC's Threatened and Priority Fauna List.
- Orange Leaf-nosed Bat (*Rhinonictis aurantius*) - Schedule 1 (Vulnerable), *Wildlife Conservation (Specially Protected Fauna) Notice 2008*.
- Western Pebble-mound Mouse (*Pseudomys chapmani*) - Priority 4 on the DEC's Threatened and Priority Fauna List.

The Peregrine Falcon is known to utilise cliffs, tall trees and granite outcrops for nesting (Australian Museum Online, 2003). The Peregrine Falcon is likely to occur sporadically within the application areas, but is not known to nest in the area. Given the vast amounts of available habitat within the Pilbara region that this species can utilise, it is unlikely that the vegetation within the application areas is significant habitat for this species.

The Long-tailed Dunnart (DEC - Priority 4) occurs in rugged rocky landscapes that support low open woodland or shrubland of Acacia's with an understorey of spinifex hummocks, and (occasionally) also perennial grasses and Cassias from the Pilbara and upper Gascoyne region (DNREA, 2007). They have also more recently been recorded from plateaus near breakaways and scree and rugged boulder strewn scree in the Goldfields region (DNREA, 2007). The habitat types found within the application areas may support populations of Long-tailed Dunnart. However it is unlikely that the vegetation to be cleared represents significant habitat for this species, given its widespread distribution.

The Ghost Bat and Orange Leaf-nosed Bat roost in caves, old mine shafts and deep cracks in rocks (Australian Museum Online, 1999). There are numerous shallow caves within the hillside breakaway country in the vegetation survey areas that could be used as roosting sites (Pilbara Flora, 2008). However, there are no deeper caves or underground mining workings with permanent water nearby that would constitute a preferred habitat for these species (Pilbara Flora, 2008). Therefore, it is considered that the shallow caves within the vegetation survey areas could provide roosting habitat but may not be preferred habitat (Pilbara Flora, 2008).

The Western Pebble-mound Mouse generally occurs on gentler slopes of rocky ranges where the ground is covered by a stony mulch and vegetated by hard spinifex, often with an overstorey of eucalypts and scattered shrubs (Van Dyck and Strahan, 2008). Mounds are often sited close to narrow ribbons of Acacia-dominated scrub that grow along incised drainage lines (Van Dyck and Strahan, 2008). No pebble mounds were observed within the application areas (Pilbara Flora, 2008). Based on preferred habitat, the vegetation within the application area may be significant habitat for this species, although the species is found in many locations within the Hamersley Iron ranges, including Karajini National Park.

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

Methodology Australian Museum Online (1999)

Australian Museum Online (2003)
DEC (2008)
DEWHA (2008)
DNREA (2007)
Pilbara Flora (2008)
Van Dyck and Strahan (2008)

(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

A desktop review was conducted using various databases for information on Rare and Priority Flora that could potentially occur near Tom Price and surrounding area (Pilbara Flora, 2008). In addition, Rio Tinto Iron Ore (RTIO) botanists and consultants have conducted 58 vegetation surveys over the Tom Price area, including the application areas (Pilbara Flora, 2008).

According to Pilbara Flora (2008) and available databases no Declared Rare Flora (DRF) has previously been recorded within the application areas (GIS Database), however, there have been recordings of the DRF *Lepidium catapycnon* in areas adjacent to the application areas.

Pilbara Flora (2008) report that eight Priority flora species have been recorded within the vegetation survey area. From information and maps provided by Pilbara Flora (2008) there are approximately four Priority flora species that occur within the application areas: *Indigofera ixocarpa* (Priority 2), *Olearia mucronata* (Priority 3), *Sida* sp. Barlee Range (Priority 3) and *Eremophila magnifica* subsp. *magnifica* (Priority 4).

Indigofera ixocarpa has been recorded at numerous locations over the Tom Price minesite vicinity (Pilbara Flora, 2008). Pilbara Flora (2008) report that observations at Tom Price suggest that this species responds favourably to both fire and disturbance. The RTIO Rare and Priority Database lists *Indigofera ixocarpa* as occurring at 60 locations within Tom Price on ironstone rocky hillsides, heavily disturbed and burnt ground with an estimated count of greater than 2500 plants (Pilbara Flora, 2008). A map provided by Pilbara Flora (2008) that shows the locations of Priority and Rare flora at Tom Price mine, indicates that the majority of *Indigofera ixocarpa* specimens are found in areas outside the application areas. In addition this species appears prolific in the Mt Tom Price area and it is unlikely that the vegetation within the application areas is necessary for the continued existence of this species.

Olearia mucronata has been recorded from 3 sites on rocky hillsides within the vegetation survey area (Pilbara Flora, 2008). The RTIO Rare and Priority Flora Database lists *Olearia mucronata* as occurring at 30 sites and 22 of these are within the Tom Price mine lease on rocky hillsides and slopes, disturbed ground and on a waste dump (Pilbara Flora, 2008). Approximately 120 plants have been located by RTIO within the Tom Price vicinity (Pilbara Flora, 2008). From the map provided by Pilbara Flora (2008) it appears that the majority of *Olearia mucronata* specimens occur outside of the application areas, often near or on disturbed ground at the edge of pits. This species appears to be fairly widespread within the Tom Price area and it is unlikely that the vegetation within the application areas is significant habitat for this species.

Sida sp. Barlee Range occurs at four locations within the vegetation survey area, two of which occur within the northern application area (Pilbara Flora, 2008). This species has been found at a number of sites from the Upper Gascoyne (Barlee Range) to the Tom Price region and south to Turee Creek (Florabase, 2007 as cited in Pilbara Flora, 2008). The range extends for over 220km in an east west direction and 250km from Turee Creek to Hamersley Station (Pilbara Flora, 2008). This species has been recorded from 14 locations throughout this area, often in dense populations (Western Australian Herbarium, 2008). The species has been recorded mainly from the Brockman Iron formation on the tops of hills in stony skeletal soil, although there is a record of the species occurring in well-draining stony loamy sand at the base of a steep slope (Western Australian Herbarium, 2008). Both these habitats are extensive in the Pilbara region. Given the vast amount of vegetation within the Pilbara region that could be potential habitat for this species and the relatively low range and intensity of surveys in the region, this species is likely to be much more widespread than currently known.

Eremophila magnifica subsp. *magnifica* was recorded at 8 locations during the vegetation survey (Pilbara Flora, 2008). It was reported to be widespread at some locations and appears to respond favourably to fire (Pilbara Flora, 2008). Pilbara Flora (2008) report that the RTIO Rare and Priority Database lists *Eremophila magnifica* subsp. *magnifica* as occurring at 71 locations with 19 locations and greater than 550 plants within the vicinity of Tom Price. Over 3750 individuals having been recorded in the RTIO and DEC databases (Pilbara Flora, 2008). The map provided by Pilbara Flora (2008) indicates that the majority of *Eremophila magnifica* subsp. *magnifica* specimens are located in areas outside of the application areas. This species appears to favour rocky hillsides and hill tops (Western Australian Herbarium, 2008) which are extensive in the Pilbara region. Given the large number of populations that are found in the local area and regionally, the proposed clearing is unlikely to have any significant impact on this species.

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

Methodology Pilbara Flora (2008)
Western Australian Herbarium (2008)
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**

There are no known Threatened Ecological Communities (TEC's) or Priority Ecological Communities (PEC's) within the application areas (GIS Database). The nearest known TEC is located approximately 35km north of the application areas (GIS Database). The nearest known PEC is the Plant Assemblages of the Wona Land System, which is located approximately 7km south of Tom Price. At such distance from the application areas these ecosystems are unlikely to be affected by the proposed clearing.

Pilbara Flora (2008) reported that no TEC's or PEC's were identified within the application areas during the flora and vegetation survey.

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

Methodology Pilbara Flora (2008)
GIS Database
- Threatened Ecological Communities

(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 areas fall within the IBRA Pilbara Bioregion (GIS Database). Shepherd et al. (2001) report that approximately 99.9% of the pre-European vegetation still exists in this Bioregion (see table below). The vegetation within the application areas is recorded as the following three Beard Vegetation Associations (Shepherd et al, 2001):

82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*;

162: Shrublands; snakewood scrub; and

567: Hummock grasslands, shrub steppe; mulga and Kanji over soft Spinifex and *Triodia basedowii*.

According to Shepherd et al., (2001) approximately 100% of these vegetation associations remain within the Bioregion (see table below). In addition all three Beard Vegetation Associations are well represented in conservation estate (see table below).

Therefore, the vegetation within the application areas is not a significant remnant of native vegetation within 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	17,804,164	17,794,651	~99.9	Least Concern	6.3
Beard veg assoc. – State					
82	2,565,930	2,565,930	~100	Least Concern	10.2
162	547,328	547,328	~100	Least Concern	11.4
567	777,517	777,517	~100	Least Concern	22.3
Beard veg assoc. – Bioregion					
82	2,563,610	2,563,610	~100	Least Concern	10.2
162	20,007	20,007	~100	Least Concern	0
567	776,883	776,883	~100	Least Concern	22.3

* Shepherd et al. (2001) updated 2005

** 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 et al. (2001)
GIS Database
- Interim Biogeographic Regionalisation for Australia
- 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 is at variance to this Principle

The application areas are located within a semi-desert-tropical region (ANRA, 2007). This region has an average annual rainfall of approximately 300mm falling mainly during the summer months, and an average annual evaporation rate of approximately 3,500mm (BOM, 2008). Hence, the presence of surface water resulting from significant rain events is relatively short-lived.

Several minor creeklines run through the application areas (GIS Database). Based on the above, the creeks are expected to be dry except following heavy rainfall which is usually associated with tropical cyclone events (ANRA, 2007). Hamersley Iron propose to control all mine drainage from mining areas so that mine runoff is contained within site and not allowed to affect natural systems (Pilbara Flora, 2008).

Based on the above, the proposed clearing is at variance to this Principle. However, the proposed clearing is not likely to significantly impact any watercourse or wetland due to the small scale of clearing of vegetation types associated with watercourses.

Methodology ANRA (2007)
BOM (2008)
Pilbara Flora (2008)
GIS Database
- 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

The application areas have been mapped as occurring within the Newman and Platform Land Systems (GIS Database).

The Newman Land System consists of rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands (Van Vreeswyk et al, 2004). This land system has a very low soil erosion risk due to surface coverage of either massive ironstone chert outcropping or pebble to cobblestone scree material (Pilbara Flora, 2008; Van Vreeswyk et al, 2004).

The Platform Land System consists of dissected slopes and raised plains supporting hard spinifex grasslands (Van Vreeswyk et al, 2004). This land system is 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 Pilbara Flora (2008)
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 nearest conservation area is Karajini National Park located approximately 10km east of the application areas (GIS Database). Given the distance of the application areas from any conservation areas, the proposed clearing of native vegetation is not expected to have an impact on the environmental values of any conservation areas.

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

Methodology GIS Database
- CALM Managed Land and Waters

(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 hydrogeology of Tom Price comprises of mineralised and permeable units of Dales Gorge Member within the Brockman Iron Formation (Pilbara Flora, 2008). Water quality within the Tom Price Mine region varies from potable to brackish with high acidities associated with sulphidic shale areas (Pilbara Flora, 2008).

There are no major rivers or watercourses near Tom Price although several ephemeral watercourses cross through the application areas (Pilbara Flora, 2008; GIS Database). Mine drainage systems are engineered so that all mine runoff is collected, contained and managed within the mining operations (Pilbara Flora, 2008).

Mining operations associated with the Tom Price Mine have had significant impacts on local hydrogeology (Pilbara Flora, 2008). Therefore, within the context of a very large and deep open cut iron ore mining operation, the further clearing of 106.7ha of vegetation is unlikely to have an additional impact on surface or groundwater quality or groundwater levels.

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

Methodology Pilbara Flora (2008)
GIS Database
- Hydrography - linear

(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 are located within the Ashburton River catchment area (GIS Database). Natural flooding can occasionally occur within this catchment area during the wet season (November to March), usually following significant rainfall associated with tropical cyclone events (BOM, 2008). These massive rainfall events create significant hillside runoff and creek flows, however, due to the low erodibility of the Newman and Platform land systems, little natural rilling or gulleying is observed, even after vegetation has been removed due to fire (Pilbara Flora, 2008).

The clearing of 106.7ha of native vegetation, in comparison to the Ashburton River catchment area (7,877,700ha) (GIS Database), is not likely to 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 (2008)
Pilbara Flora (2008)
GIS Database
- Hydrographic Catchments - Catchments

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

Comments

There is one native title claim (WC97/089) over the areas under application (GIS Database). This claim has been registered with the National Native Title Tribunal on behalf of the claimant group. However, the tenement has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of that 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*.

According to available databases there are four Aboriginal Sites of Significance within the application areas (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.

There were no public submissions received during the public comments period.

Methodology

GIS Database
- Aboriginal Sites of Significance
- Native Title Claims

4. Assessor's comments

Comment

The proposal has been assessed against the Clearing Principles, and is at variance to Principle (f), may be at variance to Principle (a), is not likely to be at variance to Principles (b), (c), (d), (g), (h), (i) and (j) and is not at variance to Principle (e).

Should the permit be granted it is recommended that conditions be imposed on the permit for the purposes of weed management, rehabilitation, record keeping and permit reporting.

5. References

- ANRA (2007) Rangelands overview: Pilbara [online]. Available from:
<http://www.anra.gov.au/tropics/rangelands/overview/wa/ibra-pil.html>. Accessed 19 December, 2008.
- Australian Museum Online (1999) Bats in Australia, Orange Leaf-nosed Bat. Available online from:
<http://www.amonine.net.au/bats/records/bat22.htm>. Accessed 17 December, 2008.
- Australian Museum Online (2003) Birds, Peregrine Falcon. Available online from:
http://www.austmus.gov.au/wild_kids/birds/peregrine_falcon.htm. Accessed 17 December, 2008.
- BOM (2008) Climate Averages - Paraburdoo. Bureau of Meteorology. Available online from:
www.bom.gov.au/climate/averages/tables/cw_007185.shtml. Accessed 18 December, 2008.
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land Management, Western Australia.
- DEC (2008) Threatened and Priority Fauna Database: Tom Price Area. Department of Environment and Conservation, Western Australia.
- 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.
- DEWHA (2008) Environmental Reporting Tool. Environmental Protection and Biodiversity Conservation Act 1999. Department of Water, Heritage and the Arts. Available online from:
<http://www.environment.gov.au/apps/boobook/mapervlet?app=ert>. Accessed 17 December 2008.
- DNREA (2007) Threatened Species Of The Northern Territory - Long-Tailed Dunnart (*Sminthopsis longicaudata*). Department of Natural Resources, Environment and the Arts, Northern Territory. Available online from:
http://nt.gov.au/nreta/wildlife/animals/threatened/pdf/mammals/longtailed_dunnart_vu.pdf Accessed 17 December, 2008.
- Hamersley Iron (2008) EP Act - Hamersley Iron Pty Ltd - Clearing Permit 2816/1. Hamersley Iron Pty Ltd, Western Australia.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Pilbara Flora (2008) Flora and Vegetation Survey for the Development of Multiple Areas within the Tom Price Mine and Supporting Documentation for a Native Vegetation Clearing Permit Application. Pilbara Flora, Western Australia.
- Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) Native Vegetation in Western Australia, Extent, Type and Status. Resource Management Technical Report 249. Department of Agriculture, Western Australia.
- Van Dyck, S. and Strahan, R. (eds.) (2008) The Mammals of Australia. Third Edition. New Holland Publisher (Australia) Pty Ltd, Australia.
- Van Vreeswyk, A.M.E., Payne, A.L., Hennig, P., and Leighton, K.A. (2004) An Inventory and Condition Survey of the Pilbara Region, Western Australia. Department of Agriculture, Western Australia.
- Western Australian Herbarium (2008) Florabase: the Western Australian Flora. Department of Environment and Conservation. Available online from: <http://florabase.calm.wa.gov.au/>. Accessed 17 December 2008.
- Western Australian Museum (2008) Collections databases. Available online from:
<http://www.museum.wa.gov.au/faunabase/prod/index.htm>. Accessed 24 November, 2008.

6. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government.
CALM	Department of Conservation and Land Management, Western Australia.
DAFWA	Department of Agriculture and Food, Western Australia.
DA	Department of Agriculture, Western Australia.
DEC	Department of Environment and Conservation
DEH	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
DEP	Department of Environment Protection (now DoE), Western Australia.
DIA	Department of Indigenous Affairs
DLI	Department of Land Information, Western Australia.
DoE	Department of Environment, Western Australia.
DOLA	Department of Land Administration, Western Australia.
DoW	Department of Water
EP Act	Environment Protection Act 1986, Western Australia.
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
GIS	Geographical Information System.
IBRA	Interim Biogeographic Regionalisation for Australia.
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
RIWI	Rights in Water and Irrigation Act 1914, Western Australia.
s.17	Section 17 of the Environment Protection Act 1986, Western Australia.
TECs	Threatened Ecological Communities.

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.