



1. Application details

1.1. Permit application details

Permit application No.: 1157/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Hamersley Iron Pty Ltd

1.3. Property details

Property: AM70/272
Local Government Area: Shire Of Ashburton
Colloquial name: Marandoo Iron Ore Mine -State Agreement Act M272 SA (AM 70/272)

1.4. Application

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

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
Beard Vegetation Association 18: Low Woodland; Mulga.	Hamersley Iron is proposing to carry out an evaluation drilling program at the Marandoo Iron Ore Minesite. The program includes: maintaining and establishing tracks; clearing of drill lines (33.5 km by 3 m); creation of drill pads (15 x 20 m) and sumps (2 per drill pad, 5 m x 3 m x 0.5 m); and, drilling of 395 percussion holes (within a 75 m x 75 m grid pattern). An estimated 26 ha of clearing is proposed. The clearing will occur in an area to the north and east of the current Marandoo pit area. All drill holes will be cut and capped and sumps backfilled in accordance with Hamersley Iron environmental practices. Standard weed hygiene and rehabilitation practices will apply. Cleared vegetation and topsoil will be stockpiled and used in rehabilitation (Hamersley Iron, 2006).	Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery 1994)	Surveys for Declared Rare Flora (DRF) and Priority flora have been conducted in 2002, 2004, and 2005 over 95% of the proposed clearing area. No DRF and one P4 species were recorded (Hamersley Iron, 2006). The southern portion of the area was sampled on the 2nd February 2005 by Emil Thoma and Anna Joda. The 2005 flora survey revealed a total of 104 vascular plant taxa representing 56 genera and 29 families. An area to the north of the 2005 survey area, and extending beyond the proposed clearing area was surveyed in April/May 2002 by Emil Thoma, however no species list was prepared. The remaining northwest portion of the Application area was surveyed in June 2004 by Ana Joder and Emil Thoma, this area also extended beyond the proposed clearing area (Hamersley Iron, 2006). The 2004 flora survey revealed a total of 130 vascular plant taxa representing 63 genera and 30 families. Two weed species were identified during the 2005 flora survey: <i>Cenchrus ciliaris</i> (Buffel grass) and <i>Bidens bipinnata</i> . These species were also recorded during the survey by Mattiske and Associates in 1991. The weed species, <i>Malvustrum americanum</i> was recorded during the 2004 survey; however, it is not known whether it was recorded in the proposed clearing area.
Beard Vegetation Association 82: Hummock Grasslands Low Tree Steppe; Snappy Gum over <i>Triodia wiseana</i> .			
In 1991 Mattiske and Associates prepared a more detailed vegetation map of the Marandoo Project Area. Of the 37 vegetation communities mapped, four occur in the Application area. These units are described as follows: (1) Broad drainage areas and basins: 1c Hummock Grassland of <i>Triodia melvillei</i> ; (2) Major flow-lines and creeks: 2b Woodland of <i>Eucalyptus patellaris</i> (?)- <i>Acacia aneura</i> ; (3) Minor creeks: 3a Low Shrubland of mixed <i>Acacia</i> species; and (4) Ridges, erosional spurs, banded iron formation: 5h Hummock Grassland of <i>Triodia wiseana</i> with emergent shrubs of mixed <i>Acacia</i> spp. (Hamersley Iron, 2006). Although the Application	The vegetation in the Application area has been previously disturbed by historical exploration activities, the construction of vehicle tracks and a power line (Hamersley Iron, 2006).		

area encompasses several creekline vegetation units, the dominant vegetation unit is hummock grasslands with emergent Acacia spp. (5h) (Hamersley Iron, 2006).

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**

Marandoo Mining Lease is located within Karijini National Park which covers an area of 627 444 ha in the Hamersley Range in the Pilbara Region (GIS Database; CALM, 1999). Karijini National Park is also a Redbook area and is listed by the National Heritage Commission on the Register of the National Estate (GIS Database). The Marandoo tenement and the associated transport corridors were excised from the Park in 1991 (CALM, 1999) and is therefore not included within the Redbook area. The Hamersley Range has had a relatively brief history of European settlement, with mining and pastoralism being major land uses (DEH, n.d). The Park remains in a relatively undisturbed condition compared with the surrounding pastoral country and is valued as a representative example of the Hamersley Ranges (CALM, 1999). Karijini National Park contains flora, fauna and landforms that are unique to the Pilbara region (CALM, 1999). The area shows considerable biological diversity and is especially rich in species of the genus Acacia, with forty-six of the fifty-four Acacia species which occur in the Pilbara region occurring in the Park (CALM, 1999). At least 30 species of native mammals, 133 species of birds, 90 species of reptiles and amphibia, and 8 species of fish are found in the Park. Many birds utilise the creekside and gorge vegetation whilst hummock grasslands are the preferred habitats for many species of ground-living mammals and for a large proportion of the reptiles of the Park (CALM, 1999).

The application area is situated within the Pilbara 3 (PIL3 - Hamersley) Interim Biogeographic Regionalisation for Australia (IBRA) subregion (GIS Database). High species and ecosystem diversity within the PIL3 Hamersley IBRA subregion are described in Kendrick (2001) which include: Acacia, Triodia, Ptilotus, Corymbia, and Sida species within the Hamersley Range, and the stygofaunal crustacean fauna within calcrete environments. Detailed vegetation mapping by Matiske and Associates (1991) identified 37 plant communities in the Marandoo Project area, most of which extended into Karijini National Park. Four of the 37 vegetation communities occur within the application area. Although the application area encompasses several creekline vegetation units, the dominant vegetation unit is hummock grasslands with emergent Acacia spp. (5h). The vegetation proposed to clear is widespread in the project area, and is already partially disturbed from historical exploration activities, the construction of vehicle tracks and a power line. Two weed species are known to occur in the proposed clearing area: *Cenchrus ciliaris* (Buffel grass) and *Bidens bipinnata*.

CALM (2006) notes that the proposed drilling program involves the clearing of 26 hectares for the establishment of tracks and drill pads across a total application area of approximately 420 hectares of previously disturbed land which has been degraded by past exploration and associated mining activities. Furthermore, based on the nature of the clearing for the creation of drill pads, it is likely that the proposal can be managed in an environmentally acceptable manner under pre-existing exploration management systems undertaken by the proponent and managed under separate Mining Act processes (CALM, 2006).

Given that the proposed clearing area is adjacent to an active minesite and has been historically disturbed, it is unlikely that the vegetation in it is of higher biodiversity significance than the vegetation within the nearby Karijini National Park. Therefore, it is not likely that the proposal is at variance to this principle.

Methodology CALM (1999).
CALM (2006).
DEH (n.d).
GIS Database:
-Clearing Regulations - Environmentally Sensitive Areas - DoE 30/05/05.
-Clearing Regulations - Schedule One Areas - DoE 10/03/05
-IBRA Subregions - EA 18/10/2000.
-Pastoral leases - DOLA 10/01
-Pre-European Vegetation - DA 01/01.
Hamersley Iron (2006).
Kendrick (2001).

(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**

The application area has been subjected to detailed fauna surveys as part of the preparation of the 1992 Marandoo Iron Ore Mine and Central Pilbara Railway Environmental Review and Management Programme (ERMP) (Hamersley Iron, 2006). A total of 225 species of native mammals, birds and reptiles have been recorded in the Marandoo tenement and immediately adjacent areas (Ninox Wildlife Consulting, 1992). The

1992 ERMP suggested that no fauna species would be affected at a regional level by the Marandoo mine but noted there would be some loss of habitat of the Pebble-mound Mouse, *Pseudomys chapmani*, then listed as threatened under Schedule 1 of the *Wildlife Conservation Act 1950*. The habitat of the Pebble-mound Mouse consists of rocky, hummock grasslands, with little or no soil and occupies burrows beneath mounds of pebbles which are collected from nearby. Mounds are most common on the spurs and lower slopes of ridges (Davis, 2001). The Pebble-mound Mouse has since been de-listed following extensive surveys showing that the animal was far more common than previously thought (Mawson, 2003). Mining and pastoralism are the only environmental impacts within the Pebble-mound Mouse range, however mining is very localised and grazing is not likely to impact the Pebble-mound Mouse as it is fairly low density.

Currently, one Schedule 1 fauna species, the Pilbara Olive Python, *Morelia olivacea barroni*, and one Schedule 4 species, the Peregrine Falcon, *Falco peregrinus*, occur in Karijini National Park (CALM, 1999). The Peregrine Falcon is distributed throughout Australia but is not common anywhere. It is an infrequent visitor to the Pilbara, mostly between March and August. It is a highly mobile bird with little habitat specificity apart from an affinity with water where ducks and pigeons are the preferred prey species (Ninox Wildlife Consulting, 1992). The amount of proposed clearing is unlikely to adversely affect this species. The Pilbara Olive Python is endemic to the Pilbara and was recorded during the fauna survey conducted in 1990-1991 by Ninox Wildlife Consulting (1992) and by Texasgulf staff. It was most frequently recorded along major drainage systems, particularly those in rocky areas with permanent or seasonal water which attract birds such as pigeons and doves, that are common prey species of this large python (Ninox Wildlife Consulting, 1992). Given the small extent of clearing proposed relative to the surrounding national park, the Pilbara Olive Python is not likely to be adversely affected by the proposed clearing. One mammal recorded from Karijini National Park, the Greater Bilby (*Macrotis lagotis*), is listed under the EPBC Act 1999 as vulnerable at the national level. Burrows possibly dug by Bilbies have been recorded in the Park (Ninox Wildlife Consulting 1992), however Bilbies are now thought to be absent from Karijini National Park (CALM, 1999). It is therefore unlikely the Bilby will be affected by the proposed clearing.

CALM (2006) notes that although the application area encompasses vegetation communities which provide local fauna habitat values such as the major and minor perennial creeklines, and ridges and banded iron formations, the dominant vegetation unit proposed to be cleared is hummock grasslands with emergent Acacia species. As noted by previous vegetation mapping on the minesite undertaken by Mattiske and Associates (1991), this vegetation unit is well represented in a local and regional context and is unlikely to represent an area of significant fauna habitat (CALM, 2006).

Given the availability of similar (and generally better quality) habitat in the surrounding conservation reserve, the relatively small scale of clearing proposed, and its close proximity to the existing minesite and associated infrastructure, it is not likely that the proposed clearing will represent a significant habitat loss for any associated fauna. Therefore, it is not likely that the proposed clearing is at variance to this principle.

Methodology CALM (1999).
CALM (2006).
Davis (2001).
GIS Database: CALM Threatened Fauna - CALM (30/09/2005).
Hamersley Iron (1992).
Hamersley Iron (2006).
Mawson (2003).
Ninox Wildlife Consulting (1992).

(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

Three flora surveys have been conducted in 2002, 2004, and 2005 that cover over 95% of the area proposed to clear. No Declared Rare Flora (DRF) scheduled under the *Wildlife Conservation Act 1950*, or CALM listed Priority species were recorded in either the 2002 flora survey, which covers most of the northern area, or the 2004 flora survey which covers the north-western section of the proposed clearing area. The 2005 flora survey, which covers the southern half of the proposed clearing area, revealed no DRF but twenty three populations (ranging from 1 to 100+ plants) of the P4 taxa *Eremophila magnifica* ssp. *magnifica* (Hamersley Iron, 2006). Fourteen of the 23 populations were located within the proposed clearing area.

Eremophila magnifica ssp. *magnifica* occurs on stony slopes in the Hamersley Ranges. It has been recorded on numerous occasions before in the Tom Price and the Marandoo area (Thoma and Joder, 2005). This plant occurs throughout the Hamersley Ranges with the total population estimated in the 1000's. The majority of the population is moderately healthy (Thoma and Joder, 2005). An area of approximately 43 ha, some of which is within the proposed clearing area, has previously been approved by the Environmental Protection Authority (EPA) under Section 45C of the *Environmental Protection Act 1986*, and covers five of these *Eremophila magnifica* ssp. *magnifica* populations.

The locations of the *Eremophila magnifica* ssp. *magnifica* species were recorded with a hand held GPS (Hamersley Iron, 2006). CALM (2005) have advised Hamersley Iron to ensure none of the *Eremophila magnifica* ssp. *magnifica* plants recorded in the area are disturbed by the drilling works and that the areas to be

avoided should be clearly marked in the field in order to prevent disturbance. Hamersley Iron have made a commitment that none of these plants will be disturbed by the drilling work and that they will modify hole locations as required to protect them (S. Hall, Superintendent Ground Disturbance, Rio Tinto, pers comm., 18 November 2005). Should any vegetated areas within the proposed clearing area that is outside the flora survey areas need to be disturbed, a full DRF and priority flora survey will be conducted prior to earthworks, and any flora species of significance avoided (Hamersley Iron, 2006).

Given that there are no rare flora in the proposed clearing area, and that the proposed clearing area does not appear to be necessary for the continued existence of priority flora, this proposal is not likely to be at variance to this principle.

Methodology CALM (2005).
GIS Database
-Declared Rare and Priority List - CALM 01/07/05.
-Pre-European Vegetation - DA 01/01.
Hamersley Iron (2006).
Thoma and Joder (2005).

(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) within the area applied to clear (GIS Database). The nearest known TEC's are non-endorsed and are approximately 3.8 to 7 km east of the proposed clearing area, which include; Coolibah01, Coolibah1A, Coolibah02, Coolibah03, Coolibah04, and Coolibah05 (GIS Database). These TEC's comprises the Coolabah *Eucalyptus coolabah* forest and surrounding mixed Mulga *Acacia aneura*/Coolabah woodland. These habitats appear to be poorly represented regionally. They support specialised fauna such as the Black-tailed Treecreeper (*Climacteris melanura*) and more litter dwelling reptiles than most other habitats (Ninox Wildlife Consulting, 1992). The Marandoo Iron Ore Mine and Central Pilbara Railway ERMP (Ninox Wildlife Consulting, 1992) had identified that some surface drainage from the Marandoo Tenement may collect in this area and there is the potential that some surface drainage from the Marandoo Tenement may collect in this area and there is the potential for it to be affected by upslope disturbance. However, the location of the proposed clearing area are not likely to affect the TEC's as the drainage system in this area runs in the opposite direction from the TEC's, which are located within an internal draining basin. Furthermore, it is not likely that the proposed works will occur during a flow event, and all tracks and drill pads will be rehabilitated within six months of ceasing drilling activities (S. Madden, Environmental Advisor, Rio Tinto, pers comm., 16 May 2006).

Given the small extent of proposed clearing and the location of the application area relative to the TEC's, it is unlikely that the identified TEC's will be adversely affected. The proposal is not likely to be at variance to this principle.

Methodology GIS Database:
-Hydrography, linear - DoE 01/02/04.
-Threatened Ecological Community Database- CALM 12/4/05.
Ninox Wildlife Consulting (1992).

(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 likely to be at variance to this Principle

The area proposed to clear is situated within the Pilbara 3 IBRA subregion which has an area of 14.10% in conservation reserves (GIS database; Kendrick, 2001). According to Shepherd et al. (2001) approximately 100% of the native vegetation cover remains within this subregion. The vegetation within the application area is a component of Beard Vegetation Associations 18 and 82 (GIS Database), of which 24,659,110 (~99.9%) and 2,920,910 hectares (~100%) of the pre-European extent remains, respectively (Shepherd et al., 2001). While the benchmark of 15% representation in conservation reserves (JANIS, 1997) has not been met for Beard Vegetation Associations 18 and 82, approximately 100% of the pre-European extent remains and it is therefore of 'least concern' for biodiversity conservation (Department of Natural Resources and Environment, 2002).

	Pre-European Area (ha)	Current Extent (ha)	Remaining %*	Conservation Status**	% in Reserves/ CALM managed land
IBRA Bioregion - Pilbara	17,944,694	17,944,694	100	Least Concern	7.7
Beard vegetation association					
-18	24,675,970	24,659,110	99.9	Least Concern	4.8
-82	2,920,910	2,920,910	100	Least Concern	10.1

- * Shepherd et al. (2001)
- ** Department of Natural Resources and Environment (2002)

Therefore, it is not likely the proposal is at variance to this principle.

Methodology Department of Natural Resources and Environment (2002).
 GIS Database:
 -IBRA Subregions - EA 18/10/2000.
 -Pre-European Vegetation - DA 01/01.
 JANIS (1997).
 Kendrick (2001).
 Shepherd et al. (2001).

(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 not likely to be at variance to this Principle

There are no wetlands or significant watercourses located within or associated with the proposed clearing area (GIS Database). There are several minor and one major drainage line which traverse the application area (GIS Database; Hamersley Iron, 2006). However, watercourses are dry for the majority of the year (Hamersley Iron, 2006). The work will be limited to clearing of 3 m wide drill lines (blade up) and creation of 15 m x 20 m drill pads with a sump on each pad to manage run off. The work will be conducted to minimise the impact on heavily vegetated areas. The main small gully feeding water out onto the flats from the adjacent hill is already being pre-stripped for mining as approved under the state agreement (S. Hall, Superintendent Ground Disturbance, Rio Tinto, pers comm., 18 November 2005). Hamersley Iron (2006) have committed to a 50 m buffer zone for the riparian vegetation around the broad drainage line. It should be noted that one grid line and a couple of access/cross lines have already been established in and around the immediate area, and will be used for this programme (Hamersley iron, 2006). Other tracks and disturbances have been created in the immediate area – which have been approved previously.

Due to the ephemeral nature of water courses in the Pilbara, and with the majority of rainfall occurring from December to April, it is unlikely that drilling will occur during a flow event thus contributing to sediment load within the drainage line (S. Madden, Rio Tinto, pers comm., 16 May 2006). Hamersley Iron (2006) have further stated that all tracks, drill pads and sumps will be decommissioned and rehabilitated within six months of ceasing exploration activities, thus avoiding long-term alterations to drainage patterns or significant impact to riparian vegetation. The proposed clearing is not likely to be at variance to this principle.

Methodology GIS Database:
 -Linear Hydrography (hierarchy) - DoE 13/4/2005
 -Topographic Contours, Statewide - DPLA 12/09/02.
 Hamersley Iron (2006).

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

Comments Proposal may be at variance to this Principle

Many of the soils found in Karijini National Park are considered to be highly erodible (CALM, 1999). This particularly applies to alluvial clay soils which are very susceptible to erosion in the form of sheeting, rilling and gullying. These more fertile soils have also been exposed to the greatest grazing pressure under pastoral management (CALM, 1999). Other soil types are protected by a mantle of stones which if removed, can expose the soil to erosion. Due to the arid environment, soil development in the Pilbara is generally poor. The soil/vegetation system within this region is therefore susceptible to disturbance (CALM, 1999). The proposed area to clear is situated on the Newman and Boolgeeda Land Systems. The Newman Land System supports spinifex and scattered trees and shrubs on shallow red loamy stony soils (DAWA, 2006). The Department of Agriculture (DAWA) (2006) have advised that there is some risk of soil erosion where vegetation is cleared and the soil surface disturbed. The Boolgeeda Land System supports hard and soft spinifex, mulga and other shrubs on red loamy soils (DAWA, 2006). DAWA (2006) have advised that there is some risk of accelerated soil erosion following clearing and soil disturbance.

After consultation between Hamersley Iron and DAWA, DAWA agreed that due to the nature of the clearing, impacts are likely to be minimal unless clearing occurs on steep slopes and during heavy rainfall events (S. Madden, Hamersley Iron, pers comm., 16 May 2006). Hamersley Iron consider the environmental impacts of the proposed clearing at the Marandoo minesite, particularly on drainage patterns and other land degradation processes, will either be minimal or can be adequately managed. This is largely due to the fact that the 26 ha of clearing for tracks and drill pads is spread over almost 420 ha of land that has been previously disturbed by mining and exploration activities. Furthermore, the method of clearing is raised blade and all vegetation and topsoil will be stockpiled and used in rehabilitation (S. Madden, Hamersley Iron, pers comm., 16 May 2006). DAWA have advised that should any problems occur, Hamersley Iron are to address them by diverting surface flow until rehabilitated areas are stable or by installing bunds or spur drains (S. Madden, Hamersley Iron, pers comm., 16 May 2006). As there is possibility of the proposed clearing causing land degradation the proposal

may be at variance to this principle.

Methodology CALM (1999).
DAWA (2006).
Hamersley Iron (2006).
GIS Database:
-Hydrography, linear - DoE 01/02/04
-Soils, Statewide - DA 11/99

(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 may be at variance to this Principle

The Marandoo minesite is located on a 48 square kilometre reserve held under a State Agreement Act that is surrounded by Karijini National Park (CALM, 1999). Karijini National Park is a Redbook area that is listed by the Australian Heritage Commission on the Register of the National Estate (GIS Database; CALM, 1999). Karijini National Park contains a representative sample of many of the geological types, plant and animal communities and landscape forms of the central portion of the Hamersley Range (CALM, 1999). It is managed by the Department of Conservation and Land Management. The Marandoo tenement and the associated transport corridors have been excised from the Park, dividing it in two and resulting in extensive common boundaries (CALM, 1999). The Marandoo tenement is therefore no longer a component of the Redbook area. Considering the application area is located adjacent to existing mining operations and on previously disturbed land, and that the nature of the proposed clearing is of low impact, it is not likely that the proposal will cause any appreciable additional impact on the conservation values of Karijini National Park.

During the 2005 flora survey and the 1991 survey by Matisse and Associates, two weed species were identified; *Cenchrus ciliaris* (Buffel grass) and *Bidens bipinnata*. The species *Malvustrum americanum* was recorded during the 2004 survey, however it is not known whether it was recorded in the application area (Hamersley Iron, 2006). CALM (2005) advise that it is important appropriate weed management and hygiene procedures are undertaken in order to avoid the introduction and spread of weeds into and within the site. All machinery, vehicles, and personnel should be cleaned down before entering the site, and when moving from areas where weeds are present to areas free from weeds. Any weed introduction caused by the clearing and exploration activities should be eradicated (CALM, 2005). Weed management and hygiene procedures are important in controlling the introduction of invasive weed species so as not to compromise the environmental values of the adjacent conservation estate. The proposal may be at variance to this principle.

Methodology CALM (1999).
CALM (2005).
GIS Database:
-CALM Managed Lands and Water - CALM 1/07/05.
Hamersley Iron (2006).

(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 does not fall within a Public Drinking Water Source Area (PDWSA) or PDWSA Protection Zone (GIS Database). There are no permanent watercourses or waterbodies in the vicinity of the application area (GIS Database). Several minor and one major drainage line traverse the application area (GIS Database). The major drainage line has already been disturbed by approved mining activities (Hamersley Iron, 2006).

The proposed clearing is within the Fortescue River (southern branch) catchment (CALM, 1999). A feature of catchments in the Pilbara is their variable rate of surface discharge. Significant stream flow is generated for short periods after intense rainfall. Overall stream flow in Karijini National Park is low and highly variable. The largest volume tends to occur between December and April after cyclonic rainfall (CALM, 1999). Due to the small area of proposed clearing in relation to the total size of the catchment, it is unlikely that the removal of vegetation will impact catchment hydrology (Hamersley Iron, 2006). The proposed work will be limited to clearing 3 m wide drill lines (blade up) and creation of 15 m x 20 m drill pads with a sump on each pad to manage runoff (S. Hall, Superintendent Ground Disturbance, Rio Tinto, pers comm., 18 November, 2005). Hamersley Iron (2006) state that all tracks, drill pads and sumps will be decommissioned and rehabilitated within six months of ceasing exploration activities, thus avoiding long-term alterations to drainage patterns or significant impact to riparian vegetation.

Groundwater quality in the Hamersley Range is generally good and most groundwater is likely to be potable although brackish water may occur in shales or in low lying areas (CALM, 1999). Water tables are generally deep, up to 40 m deep in the Marandoo- South Fortescue area. Given the low impact nature and small area of the proposed clearing it is unlikely the proposal will affect surface or groundwater quality. Therefore, the proposal is not likely to be at variance to this principle.

Methodology CALM (1999).
GIS Database:

-Groundwater Provinces - WRC 98.
-Groundwater Salinity, Statewide - 22/02/00.
-Hydrography, linear - DoE 01/02/04.
-PDWSA Protection Zones - DoE 7/1/04.
-Public Drinking Water Source Areas (PDWSAs) - DoE 28/4/05.
-Topographic Contours, Statewide - DOLA 12/09/02.
Hamersley Iron (2006)

(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 Pilbara is a semi-arid region characterised by high temperatures, low and variable rainfall and high evaporation (CALM, 1999). Karijini National Park receives an average annual rainfall of 200-350 mm and an average evaporation of 3400 mm (CALM, 1999; GIS Database). Pan evaporation exceeds mean monthly rainfall for each month of the year (CALM, 1999). Local flooding occurs seasonally in the Pilbara region between December and March (Hamersley Iron, 2006). The event of flooding is generally a result of cyclones. The severity of flooding is not likely to be significantly influenced by the amount of vegetation clearing proposed under this application.

Given the local climatic conditions and the small area and relatively low impact nature of the proposed ground and vegetation disturbance, the proposed clearing is unlikely to increase the naturally occurring flood events, or cause or exacerbate the incidence or intensity of flooding. Therefore, the proposal is not likely to be at variance to this principle.

Methodology CALM (1999).
GIS Database:
-Evaporation Isopleths- BOM (09/1998).
-Mean annual rainfall Surface (1975-2003)- DoE 09/05
-Topographic Contours, Statewide- DOLA 12/09/02
Hamersley Iron (2006).

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

Comments

An area of approximately 43 hectares within the application area was approved by the Environmental Protection Authority (EPA) under Section 45C of the *Environmental Protection Act 1986* in 2005. It was considered by the EPA that the proposed additional disturbance for the extension of the tails pit and new stockpiles will not result in additional significant adverse impact. The EPA approved area makes up about 4 hectares of the total area applied to be cleared for exploration drilling.

There is a native title claim over the area under application; WC97/089. This claim has been registered with the National Native Title Tribunal on behalf of the Eastern Guruma claimant group. However, the mining tenement has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (ie. 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*.

The proposed clearing occurs in an area that is covered by the following Registered Indigenous Heritage Sites - [Ophthalmia River, Marandoo](ID [11268]), [Marandoo Waste Dump, 1; 5; and 8](ID [737; 741; 744]), [Grimace Gulch](ID [11912; 11913; 11273; 11914]), [Manganese Gorge Complex](ID[11906]), and Marandoo Manganese Gorge 1; 2; and 3](ID[785; 732; 733]). It is the proponent's responsibility to comply with the Aboriginal Heritage Act 1972 and ensure that no Sites of Aboriginal Significance are damaged through the clearing process. The Department of Indigenous Affairs (DIA) are satisfied that Hamersley Iron have or will take the appropriate steps to ensure their actions do not impact on heritage sites. DIA are also satisfied that Hamersley Iron have or will obtain the appropriate consent from the Minister or Register as required (Corsini, 2005). An examination of the relevant site files and mapping databases indicated that the proposed drilling will not impact directly on any of the recorded Aboriginal Heritage sites (Department of Indigenous Affairs, 2005).

Hamersley Iron Pty Ltd Marandoo Iron Ore Mine AM70/272 has a current licence/works approval 6869/10 granted in accordance with the *Environmental Protection Act 1986*. The proposed clearing is not at variance to this licence, and no amendment to the licence will be required (DoE, 2006).

The proposed clearing and subsequent land use do not require water, therefore a water licence under the *Rights in Water and Irrigation Act 1914* is not required.

Methodology DIA (2005).
DoE (2006).
EPA (2005).
GIS Database:
-Aboriginal Sites of Significance- DIA 04/07/02.

4. Assessor's recommendations

Purpose	Method	Applied area (ha)/ trees	Decision	Comment / recommendation
Mineral Exploration	Mechanical Removal	26	Grant	<p>The clearing principles have been addressed and the proposed clearing is not likely to be at variance with principles a, b, c, d, e, f, i and j.</p> <p>The proposed clearing may be at variance with principle g as DAWA have advised that the land units associated with clearing are at risk of soil erosion where vegetation is cleared and soil surface disturbed. Due to the nature of the clearing, impacts are likely to be minimal unless clearing occurs on steep slopes and during heavy rainfall events.</p> <p>The proposed clearing may be at variance with principle h due to the risk of introducing and/or spreading weeds which may compromise the environmental values of the adjacent Karijini National Park.</p> <p>The assessing officer recommends that the permit be granted with the following conditions.</p> <ol style="list-style-type: none">1. To reduce the risk of soil erosion the Permit Holder shall not clear whilst it is raining.2. The Permit Holder shall ensure that all vehicles, tools and machinery are cleaned of all soil and plant material when entering or exiting the area cross-hatched yellow on attached Plan 1157/1. Any weed introductions caused by exploration activity shall be eradicated.3. When clearing native vegetation for access tracks under this permit, the Permit Holder must use a raised blade or hand clearing.4. The Permit Holder must stockpile all native vegetation cleared under this permit for use in rehabilitation in accordance with condition 6. Cleared native vegetation must be stockpiled in an area that has already been cleared.5. Permit Holder must record the following for each instance of clearing:<ol style="list-style-type: none">(a) the location where clearing occurred, expressed as grid coordinates using the Geocentric Datum of Australia 1994 coordinate system;(b) the area cleared in hectares;(c) the method of clearing;(d) the purpose of clearing; and(e) the area rehabilitated in hectares.6. For each instance of clearing recorded under condition 5, the Permit Holder must, within six months of the completion of exploration activities, rehabilitate all cleared areas by re-shaping the surface so that it is consistent with the surrounding 5 metres of uncleared land, and re-spreading the topsoil and vegetative material stockpiled under condition 4 over each cleared area.7. The Permit Holder shall provide a report to the Director, Environment, DoIR by 31st March 2007 and each subsequent year for the life of this permit setting out the records required under condition 5 of this permit in relation to the clearing activities carried out between 1 January and 31 December of the previous year.

5. References

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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.
DEH	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia Department of Environment Protection (now DoE), Western Australia.
DEP	
DIA	Department of Indigenous Affairs
DLI	Department of Land Information, Western Australia.
DoE	Department of Environment, Western Australia.
DoIR	Department of Industry and Resources, Western Australia.
DOLA	Department of Land Administration, Western Australia.
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.