



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 3169/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **Hamersley Iron Pty Ltd**

1.3. Property details

Property: Temporary Reserve 70/4737 pursuant to *Iron Ore (Rhodes Ridge) Agreement Authorisation Act 1972*
Local Government Area: Shire of East Pilbara
Colloquial name: Hope Downs 4 Rail Alignment Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
8.4		Mechanical Removal	Mineral exploration, and associated works.

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description Beard Vegetation Associations have been mapped at a 1:250,000 scale for the whole of Western Australia and are useful to look at vegetation extent in a regional context. The following three Beard Vegetation Associations are located within the application area (GIS Database):

- 18:** Low woodland; mulga (*Acacia aneura*);
- 29:** Sparse low woodland; mulga, discontinuous in scattered groups; and
- 82:** Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (Shepherd, 2007).

Mattiske Consulting Pty Ltd (Mattiske) (2008) undertook flora and vegetation surveys that covered the Hope Downs 4 Mine Infrastructure Corridor project area. Mattiske (2008) identified seven vegetation communities within the application areas:

Flowlines (Creeklines and Drainage Areas):

C2) Low woodland of *Eucalyptus xerothermica* and *Eucalyptus vitrix* over *Acacia citrinoviridis*, *Acacia maitlandii*, *Gossypium australe*, *Melaleuca lasiandra*, *Petalostylus labicheoides*, *Rulingia luteiflora* over *Triodia epactia*, *Chrysopogon fallax* and *Triodia pungens* on minor creeklines with sandy soils.

This vegetation assemblage is reported to occur on the creekline systems and contain vegetation that is dependent on seasonal surface water flows and groundwater supplies, and as such clearing should be limited. However, it is a widespread community with a regular occurrence in a regional context.

C3) Tall shrubland of *Acacia arida*, *Acacia bivenosa*, *Acacia ancistrocarpa*, *Acacia maitlandii*, *Acacia monticola* with occasional emergent *Corymbia deserticola* subsp. *deserticola*, *Eucalyptus gamophylla* and *Eucalyptus leucophloia* over *Gompholobium polyzygum*, *Indigofera monophylla*, *Rulingia luteiflora* over mixed *Triodia* species on sandy-loam soils in minor gullies.

This vegetation unit has occurrences of the Declared Rare Flora (DRF) species *Lepidium catapycnon* and includes species of flora outside of their normal range extensions. Additionally, this creekline community was one of the three vegetation assemblages which supported the highest number of species out of the vegetation assemblages identified within the survey area. As a result of the above, this vegetation assemblage has both regional and local significance when it contains DRF species and species occurring outside of their normal range.

Overall, this unit is reported as being a widespread community with a regular occurrence in a regional context.

Flats and Broad Plains:

M1) Low woodland to low open forest of *Acacia aneura* var. *aneura*, *Acacia pruinocarpa*, *Acacia catenulata* subsp. *occidentalis*, *Acacia rhodophloia*, *Grevillea berryana* with occasional emergent *Eucalyptus leucophloia* and *Eucalyptus gamophylla* over *Psydrax latifolia*, *Keraudrenia nephrosperma*, *Acacia distans*, *Eremophila fraseri*, *Acacia tetragonophylla*, *Eremophila forrestii* subsp. *forrestii*, *Solanum lasiophyllum* over *Chrysopogon fallax*, *Triodia pungens* and *Triodia epactia* and a range of annual species on sandy-loam flats and broad plains.

This vegetation unit has occurrences of the Priority Flora species *Rhagodia* sp. Hamersley (P3) and includes species of flora outside of their normal range extensions. Additionally, this mulga community was one of the

four vegetation assemblages which supported the highest number of species out of the vegetation assemblages identified within the survey area. As a result of the above, this vegetation assemblage has local significance when it contains Priority Flora species and species occurring outside of their normal range.

Overall, this unit is reported as being a widespread community with a regular occurrence in a regional context.

M5) Low woodland of *Acacia aneura* var. *aneura* to a tall shrubland of *Acacia pyrifolia*, *Acacia bivenosa*, *Acacia ancistrocarpa* and *Acacia maitlandii* with occasional emergent *Eucalyptus xerothermica*, *Corymbia aspersa*, *Psyrax latifolia* and *Acacia citrinoviridis* over *Gompholobium polyzygum*, *Rulingia luteiflora*, *Themeda triandra*, *Triodia epactia* and *Triodia pungens* on sandy soils on flats on edges of major creeklines.

Overall, this unit is reported as being a widespread community with a regular occurrence in a regional context.

Ranges, Hills and Hillslopes:

S1) Hummock grassland of *Triodia epactia* with pockets of *Triodia basedowii* and *Triodia pungens* with emergent patches of *Corymbia hamersleyana*, *Eucalyptus gamophylla*, *Eucalyptus leucophloia* over *Acacia aneura* var. *aneura*, *Acacia pruinocarpa*, *Acacia rhodophloia*, *Codonocarpus cotinifolius*, *Psyrax latifolia* and *Grevillea berryana* over *Acacia adoxa* var. *adoxo*, *Acacia arida*, *Acacia tenuissimam*, *Acacia tetragonophylla*, *Acacia bivenosa*, *Acacia distans*, *Acacia hilliana*, *Eremophila latrobei* and *Eremophila forrestii* subsp. *forrestii* over a range of annual species on gravelly soils on lower slopes.

This vegetation unit has occurrences of the Priority Flora species *Rhagodia* sp. Hamersley (P3) and includes species of flora outside of their normal range extensions. Additionally, this spinifex-mulga community was one of the three vegetation assemblages which supported the highest number of species out of the vegetation assemblages identified within the survey area. As a result of the above, this vegetation assemblage has local significance when it contains Priority Flora species and species occurring outside of their normal range.

Overall, this unit is reported as being a widespread community with a regular occurrence in a regional context.

S2) Hummock grassland of *Triodia basedowii*, *Triodia* aff. *wiseana* and *Triodia epactia* with emergent *Acacia pruinocarpa*, *Acacia inaequilatera*, *Corymbia deserticola* subsp. *deserticola*, *Corymbia hamersleyana*, *Eucalyptus leucophloia* and *Eucalyptus gamophylla* over *Eremophila latrobei*, *Acacia adoxa* var. *adoxo*, *Acacia arida*, *Acacia bivenosa*, *Eremophila exilifolia*, *Acacia spondylophylla*, *Acacia ancistrocarpa*, *Acacia bivenosa*, *Acacia inaequilatera*, *Acacia hilliana*, *Indigofera monophylla* and a range of annual species on gravelly soils on mid and upper slopes of small ranges.

This vegetation unit has occurrences of the DRF species *Lepidium catapycnon* and includes species of flora outside of their normal range extensions. Additionally, this spinifex-mulga community was one of the three vegetation assemblages which supported the highest number of species out of the vegetation assemblages identified within the survey area. As a result of the above, this vegetation assemblage has regional and local significance when it contains DRF species and species occurring outside of their normal range.

Overall, this unit is reported as being a widespread community with a regular occurrence in a regional context.

X4) Hummock grassland of *Triodia basedowii*, *Triodia wiseana* and *Triodia pungens* with emergent *Eucalyptus leucophloia* and *Corymbia hamersleyana* over *Acacia adoxa* var. *adoxo*, *Acacia tetragonophylla*, *Mirbelia viminalis*, *Acacia victoriae*, *Eremophila cuneifolia*, *Acacia hamersleyana*, *Petalostylis labicheoides*, *Senna glutinosa* subsp. *glutinosa* and *Acacia bivenosa* and a range of annual species on calcrete soils in lower slopes.

This unit is reported as includes species of flora outside of their normal range extensions. As a result of the above, this vegetation assemblage has local significance when it contains species occurring outside of their normal range.

Overall, this unit is reported as being a widespread community with a regular occurrence in a regional context.

Clearing Description Hamersley Iron Pty Ltd (hereafter referred to as Hamersley Iron) have applied for a Purpose Permit to clear up to 8.4 hectares within a 130.6 hectare area. The proposed clearing would allow the proponent to carry out mineral exploration (sterilisation drilling), establishment of access tracks and associated works. The application areas are located approximately 49 kilometres northwest of Newman.

Vegetation clearing will be conducted using mechanical means.

Vegetation Condition Degraded: Structure severely disturbed; regeneration to good condition requires intensive management; to
Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994).

Comment The vegetation condition rating is derived from information provided by Matiske (2008).

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**
Hamersley Iron (2009) propose to clear 8.4 hectares of native vegetation within a 130.6 hectare area for the purposes of mineral exploration, establishment of access tracks and associated works as part of the Hope

Downs 4 Rail Alignment Project. The application area is located within the Hamersley (PIL3) subregion of the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). The Hamersley subregion is characterised by mulga low woodland over bunch grasses on fine textured soils in valley floors, and *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils of the ranges (CALM, 2002).

Mattiske Consulting Pty Ltd (Mattiske) (2008) undertook flora and vegetation surveys that covered the Hope Downs 4 Mine Infrastructure Corridor project area (including the application areas). A total of 301 taxa (including subspecies and varieties) from 42 families and 124 genera were recorded within the Hope Downs 4 Mine Infrastructure Corridor survey area (Mattiske, 2008). One species of Declared Rare Flora (DRF) (*Lepidium catapycnon*) and two species of Priority Flora (*Rhagodia* sp. Hamersley (M Trudgen 17794) (P3) and *Eremophila youngii* subsp. *lepidota* (P4)), were discovered within the survey area (Mattiske, 2008). One additional P1 species, two additional P3 species and one additional P4 species of Priority Flora were discovered within adjacent areas from previous surveys (Mattiske, 2008). Additionally, four species were discovered to be outside their expected ranges or on the edges of their range; *Atriplex vesicaria* (slight northern range extension), *Eucalyptus ?sheathiana* (northern range extension), *Frankenia ?magnifica* (slight northeastern range extension) and *Sclerolaena eriacantha* (slight northern range extension) (Mattiske, 2008).

Twenty-five vegetation associations were discovered within the survey area and the condition of the vegetation was defined as ranging between 'degraded' in areas with high levels of disturbance due to fire and grazing and 'good' in the less-disturbed areas (Mattiske, 2008). Four vegetation assemblages that occur within the application areas (creekline community C3, mulga community M1 and spinifex-mulga communities S1 and S2) contained the highest level of diversity within the survey area (Mattiske, 2008). Some assemblages were deemed to be locally and/or regionally significant due to the presence of DRF, Priority Flora and/or species occurring outside of their expected ranges; however, the majority are widespread with regular occurrence in the regional context (Mattiske, 2008). All of the vegetation associations within the application areas are deemed to be widespread with regular occurrence in the regional context (Mattiske, 2008). Due to the relatively small amount of clearing associated with the mineral exploration, the impact of the clearing within the application areas will be minimal and will not influence the conservation status of the species and vegetation assemblages recorded within the survey area (Mattiske, 2008).

The Mattiske (2008) survey discovered six weed species within the survey area. These included:

- 1) *Bidens bipinnata* (Bipinnate Beggartick);
- 2) *Cenchrus ciliaris* (Buffel Grass);
- 3) *Datura leichhardtii* (Native Thornapple);
- 4) *Portulaca oleraceae* (Purslane);
- 5) *Sonchus oleraceus* (Common Sowthistle); and
- 6) *Tribulus terrestris* (Caltrop).

In order to minimise the risk of introducing weed species into the application area, it is recommended that a condition be imposed on the permit for the purposes of weed management should the permit be granted.

The Hope Downs 4 Rail Alignment Project area (including the application area) was surveyed by Ninox Wildlife Consulting (Ninox) in 2008. Four major fauna habitats were identified within the survey area as the majority of the area had been burnt prior to the survey (Ninox, 2008). This survey identified eleven mammals, one amphibian, 23 reptiles and 37 birds within the survey area and this represents quite low fauna diversity (potentially attributed to the fire) (Ninox, 2008). Overall, the fauna habitats within the survey area were determined to not support any greater range of terrestrial species compared to surrounding areas (Ninox, 2008), and the habitat types present within the application areas are well represented on a local and regional scale (Mattiske, 2008). The clearing associated with the mineral exploration is not expected to have an impact on any fauna species to the extent that their conservation status would be changed (Ninox, 2008).

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

Methodology CALM (2002).
Hamersley Iron (2009).
Mattiske (2008).
Ninox (2008).
GIS Database:
- Interim Biogeographic Regionalisation for Australia.
- Interim Biogeographic Regionalisation for 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**
Ninox (2008) surveyed the Hope Downs 4 Rail Alignment Project area (including the application areas). Four broad fauna habitat types were identified as the majority of the survey area had been destroyed prior to the survey by fire. These included:

HD07: Grassland of *Aristida* and *Eragrostis* species with emergent *Acacia aneura* var. *aneura* over occasional low subshrub and patch of *Triodia pungens* on cracking clays on flats;

- HD08:** Low open woodland of *Acacia aneura* var. *aneura*, *Acacia pruinocarpa* over *Acacia tetragonophylla*, *Eremophila forrestii* subsp. *forrestii* over *Triodia pungens* and a range of annual species on open sandy-loam flats and broad plains;
- HD09:** Hummock grassland of *Triodia basedowii* with pockets of *Triodia pungens* with emergent *Eucalyptus gamophylla*, *Eucalyptus leucophloia*, *Acacia aneura* var. *aneura*, *Acacia pruinocarpa*, *Psydrax latifolia* and *Grevillea berryana* over *Eremophila fraseri* subsp. *galeata* (ms), *Eremophila forrestii* subsp. *forrestii*, *Acacia adsurgens*, *Indigofera monophylla* and a range of annual species on gravelly soil on lower slopes; and
- HD10:** *Eucalyptus camaldulensis* var. *obtusata* over *Acacia citrinoviridis* and *Acacia coriacea* subsp. *sericophylla* over *Petalostylis labicheoides*, *Acacia pyriformis*, *Melaleuca lasiandra* over *Tephrosia rosea* var. *clementii*, *Themeda triandra* and *Cleome viscosa* on major creeklines with sandy soils.

Although the application areas are more closely located to HD10, HD09 corresponds to vegetation assemblage S1 which occurs within the application areas.

Overall, the fauna habitats within the survey area were determined to not support any greater range of terrestrial species compared to surrounding areas (Ninox, 2008), and the habitat types present within the application areas are well represented on a local and regional scale (Mattiske, 2008). Due to the relatively small amount of clearing associated with the mineral exploration (i.e. 8.4 hectares within a 130.6 hectare area), the impact of the clearing within the application areas will be minimal and is unlikely to result in a significant impact to any fauna species or their habitat.

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

Methodology Mattiske (2008).
Ninox (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

No species of DRF or any Priority Flora species had been discovered within the application areas (Mattiske, 2008). However, one species of DRF, *Lepidium catapycnon*, was recorded 500 metres south of the application areas and in two other locations within the survey area (Mattiske, 2008). Two species of Priority Flora, *Rhagodia* sp. Hamersley (M Trudgen 17794) (P3) and *Eremophila youngii* subsp. *lepidota* (P4), were discovered within the survey area (Mattiske, 2008). One additional P1 species, two additional P3 species and one additional P4 species of Priority Flora were discovered within adjacent areas from previous surveys (Mattiske, 2008). Additionally, three populations of *Lepidium catapycnon* had been previously discovered approximately 10 kilometres west-northwest of the application areas (GIS Database).

Lepidium catapycnon was discovered within the survey areas within vegetation associations B1, S2 and S4 and had previously been recorded in vegetation assemblages C3 and S3 (Mattiske, 2008). The population located 500 metres south of the application areas was growing in vegetation association S2 (Mattiske, 2008). The application areas include vegetation assemblages C3 and S2.

Although the application areas involve vegetation assemblages that are associated with *Lepidium catapycnon*, Mattiske (2008) deemed that the majority of the 25 vegetation communities are well represented within the Pilbara region. However, the vegetation communities that support DRF (such as vegetation communities B1, C3, S2, S3 and S4) are considered to be regionally significant when the vegetation communities contained these significant flora (Mattiske, 2008). Additionally, vegetation communities supporting Priority Flora species (such as vegetation communities C1, M1 and M3) or species at the edge of their range distribution (such as vegetation communities C3, S1, S2, X4 and X5) are considered to be locally significant when the vegetation communities contained these significant flora (Mattiske, 2008).

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

Methodology Mattiske (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 records of Threatened Ecological Communities (TECs) within the area subject to be cleared (GIS Database). The closest TEC is TEC 78: Ethel Gorge aquifer stygobiont community, located approximately 58 kilometres to the east-southeast of the proposed clearing areas (GIS Database). The proposed clearing is not likely to impact on any known TEC.

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

Methodology 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 clearing application area falls within the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion in which approximately 99.95% of the pre-European vegetation remains (Shepherd, 2007; GIS Database).

The vegetation within the application area is classified as:

- **Beard Vegetation Association 18:** Low woodland; mulga (*Acacia aneura*);
- **Beard Vegetation Association 29:** Sparse low woodland; mulga, discontinuous in scattered groups; and
- **Beard Vegetation Association 82:** Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (Shepherd, 2007; GIS Database).

As depicted within the table below, the application area does not represent a significant remnant of vegetation in an area that has been extensively cleared (Shepherd, 2007). The proposed clearing will not reduce the extent of Beard Vegetation Associations 18, 29 and 82 below the recognised threshold level, below which species loss accelerates exponentially at an ecosystem level (EPA, 2000). Therefore the bioregional conservation status for the Pilbara bioregion and for the Beard Vegetation Associations 18, 29 and 82 is of 'Least Concern' (Department of Natural Resources and Environment, 2002).

While a relatively small percentage of the vegetation types within the Pilbara bioregion are protected within conservation reserves, the bioregion remains largely uncleared. The proposed clearing is unlikely to impact on the conservation status for Beard Vegetation Associations 18, 29 and 82 within the Pilbara bioregion.

	Pre-European area (hectares)*	Current extent (hectares)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion – Pilbara	17,804,188	17,794,647	~99.95	Least Concern	~6.32
Beard veg assoc. – State					
18	19,892,305	19,890,195	~100	Least Concern	~2.1
29	7,903,991	7,903,991	~100	Least Concern	~0.3
82	2,565,901	2,565,901	~100	Least Concern	~10.2
Beard veg assoc. – Bioregion					
18	676,557	676,557	~100	Least Concern	~16.8
29	1,113,219	1,113,219	~100	Least Concern	~1.9
82	2,563,583	2,563,583	~100	Least Concern	~10.2

* Shepherd (2007).

** 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).
EPA (2000).
Shepherd (2007).
GIS Database:
- Interim Biogeographic Regionalisation of 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**

No permanent wetlands and watercourses occur within the application areas (GIS Database). However, the application areas contain numerous minor non-perennial watercourses (GIS Database). These watercourses seem to correspond with the Mattiske (2008) vegetation assemblages C2 and C3 (vegetation assemblages categorised as occurring within or along 'flowlines (creeklines and drainage areas)'). Vegetation assemblage C2 was determined to be restricted as it contains vegetation that is dependent on seasonal surface water flows

and groundwater supplies (Mattiske, 2008). Although vegetation assemblage C2 is considered to contain vegetation that is riparian in nature, it occurs infrequently within the application areas with minimal clearing proposed within that assemblage. Overall, these vegetation associations are determined to be widespread with regular occurrence in a regional context (Mattiske, 2008).

In addition, the application area lies within the Weeli Wolli / Marillana sub-catchment of the Fortescue River - Upper catchment (GIS Database). The majority of the drainage lines within the application areas drain northward towards the DEC-listed Priority Ecological Community (PEC) Weeli Wolli Creek, located approximately eleven kilometres northwest of the application areas (DEC, 2009; GIS Database).

Based on the above, the proposal is at variance to this Principle.

The proposed clearing is for mineral exploration purposes so only a relatively small amount of clearing is proposed (i.e. 8.4 hectares within a 130.6 hectare area). Therefore the impact of the clearing within the application areas will be minimal and is unlikely to result in a significant impact to the vegetation associations growing in, or in association with, the watercourses. Additionally, the vegetation growing in association with the watercourses was deemed to be widespread with regular occurrence in a regional context so the clearing is unlikely to pose a risk to the conservation status of the flora within the vegetation assemblages (Mattiske, 2008).

Methodology DEC (2009).
Mattiske (2008).
GIS Database:
- Hydrographic Catchments - Catchments.
- Hydrographic Catchments - Subcatchments.
- Hydrography, linear.
- RIWI Act, Rivers.

(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**

Land system mapping by the Department of Agriculture and Food Western Australia has mapped a variety of land systems for the Pilbara bioregion. Land systems are mapped based on biophysical features such as soil and landform type, geology, geomorphology and vegetation type (Van Vreeswyk et al., 2004). The proposed clearing areas include four different land systems (GIS Database). A broad description of each land system is given below:

The Newman land system is characterised by rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands (Van Vreeswyk et al., 2004). Relief can be up to 450 metres (Van Vreeswyk et al., 2004). The Newman land system is generally not prone to erosion (Van Vreeswyk et al., 2004). A small proportion of the proposed clearing areas have been mapped as the Newman land system (GIS Database).

The Rocklea land system is characterised by erosional surfaces; hills, ridges and plateaux remnants on basalt with steep stony slopes, restricted lower slopes, stony interfluves and minor gilgai plains; moderately spaced tributary drainage patterns of small channels in shallow valleys in upper parts becoming broader floors and channels downslope (Van Vreeswyk et al., 2004). Overall the relief is up to 110 metres (Van Vreeswyk et al., 2004). The Rocklea land system has a very low erosion hazard (Van Vreeswyk et al., 2004). A small proportion of the proposed clearing areas have been mapped as the Rocklea land system (GIS Database).

The Spearhole land system is characterised by depositional surfaces; gently undulating non-saline plains with hardpan at shallow depth and groved vegetation, sparse patterns of tributary drainage with restricted areas of shallow valleys and finely dissected slopes (Van Vreeswyk et al., 2004). Relief is up to 35 metres (Van Vreeswyk et al., 2004). The Spearhole land system is not prone to erosion (Van Vreeswyk et al., 2004). A large proportion of the proposed clearing areas have been mapped as the Spearhole land system (GIS Database).

The Wannamunna land system is characterised by depositional surfaces; level hardpan washplains subject to overland sheet flow, drainage foci as discrete arcuate groves and broad internal drainage flats both receiving run-on from adjacent hardpan surfaces; rare channelled tracts but mostly not organised through drainage (Van Vreeswyk et al., 2004). Relief is up to 5 metres (Van Vreeswyk et al., 2004). The Wannamunna land system has a low susceptibility to erosion (Van Vreeswyk et al., 2004). A tiny proportion of the proposed clearing areas have been mapped as the Wannamunna land system (GIS Database).

The applied area for clearing associated with the Hope Downs 4 Rail Alignment Project is relatively small given the activity is for mineral exploration.

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

Methodology Van Vreeswyk et al. (2004).
GIS Database:
- Rangeland land system mapping.

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

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

The application area is not located within a conservation area (GIS Database). The nearest conservation area is the 'A'-class Karijini National Park which is located approximately 63 kilometres west of the application areas (GIS Database). Given the small area of proposed clearing and the distance separating the application area and the nearest conservation area, the proposed clearing is unlikely to impact on the conservation values of the Karijini National Park.

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

Methodology GIS Database:
- CALM Managed Lands 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 proposed clearing areas are not located within a proclaimed, gazetted or declared management areas or catchments (GIS Database). There are no named watercourses within the proposed clearing areas; however the area contains a number of minor non-perennial watercourses which flow north into the unnamed main tributaries of the Weeli Wolli Creek (located approximately 11 kilometres to the north of the application areas) (GIS Database). As Weeli Wolli Creek is north of the proposed clearing areas, care must be taken when clearing to prevent large volumes of sediment entering into the perennial creek.

Rainfall in the Pilbara tends to be unpredictable and erratic, and the rocky-sloping topography of much of the upper catchments often produces considerable runoff (Van Vreeswyk et al., 2004). As such, the non-perennial watercourses tend to have high levels of sedimentation and turbidity after rainfall events (Van Vreeswyk et al., 2004). Given the distance of the application areas from Weeli Wolli Creek, the clearing of 8.4 hectares for the proposed mineral exploration program is unlikely to impact on surface water quality.

The application area is not located within a Public Drinking Water Source Area (GIS Database). Therefore, the clearing associated with the mineral exploration program is unlikely to have an adverse effect on groundwater quality.

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

Methodology Van Vreeswyk et al. (2004).
GIS Database:
- Geodata, Lakes.
- Hydrography, linear.
- Public Drinking Water Source Areas (PDWSAs).
- RIWI Act, Rivers.

(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 proposed clearing areas are located within land systems which feature high levels of topographic relief (up to 450 metres) on soils that are generally not prone to degradation or susceptible to soil erosion (Van Vreeswyk et al., 2004). On average, the annual evaporation rate is ten times greater than the annual rainfall rate in the Pilbara region (Van Vreeswyk et al., 2004). However, according to the isopleths and isohyets within the GIS Database, the application areas receive approximately 250 millimetres of rainfall per annum and have an average evaporation rate of between approximately 3,400 and 3,600 millimetres per annum (GIS Database). The drainage lines and watercourses in the vicinity of the proposed clearing areas (with the exception of the Weeli Wolli Spring and associated pools) are ephemeral in nature and flow as a result of heavy rainfall (DEC, 2009; GIS Database).

Rainfall in the Pilbara is unpredictable and erratic; it depends on cyclonic activity and thunderstorms that occur mainly during the wet season/summer months (Van Vreeswyk et al., 2004). The rocky-sloping topography of much of the upper catchments often produces considerable runoff, and widespread flooding naturally occurs in the major river systems (Van Vreeswyk et al., 2004).

The proposed clearing areas are located within the Fortescue River - Upper catchment (covering an area of 2,975,192 hectares) and is located approximately 11 kilometres south of Weeli Wolli Creek (GIS Database). This catchment experiences natural flooding occasionally and, as such, the clearing of approximately 8.4 hectares of native vegetation is unlikely to cause or exacerbate flooding within the greater catchment area.

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

- Methodology** DEC (2009).
Van Vreeswyk et al. (2004).
GIS Database:
- Evaporation Isoleths (Evaporation).
 - Hydrographic Catchments - Catchments.
 - Hydrography, linear.
 - Isohyets (Rainfall).
 - RIWI Act, Rivers.

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

Comments There is one native title claim over the area under application; WC99_004 (GIS Database). This claim has been registered with the National Native Title Tribunal on behalf of the 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 (i.e. the proposed clearing activity) has been provided for in that process; therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are no known Aboriginal Sites of Significance within the application area, and another eleven known Aboriginal Sites of Significance within 2 kilometres of the application area (GIS Database). 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.

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.

No submissions were received by the Department of Mines and Petroleum for this application.

- Methodology** GIS Database:
- Aboriginal Sites of Significance.
 - Native Title Claims.

4. Assessor's comments

Comment

The clearing principles have been addressed and the proposed clearing is at variance to Principle (f), is not likely to be at variance to Principle (a), (b), (c), (d), (g), (h), (i) or (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, retaining vegetation and topsoil, record keeping and permit reporting.

5. References

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- EPA (2000) Environmental protection of native vegetation in Western Australia. Clearing of native vegetation, with particular reference to the agricultural area. Position Statement No. 2. December 2000. Environmental Protection Authority, Western Australia.
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- Ninox (2008) A vertebrate survey of the proposed Hope Downs 4 Infrastructure Corridor, near Newman, Western Australia. Ninox Wildlife Consulting, Western Australia.
- Shepherd, D.P. (2007). Adapted from: Shepherd, D.P., Beeston, G.R., and Hopkins, A.J.M. (2001), Native Vegetation in Western Australia. Technical Report 249. Department of Agriculture Western Australia, South Perth. Includes subsequent updates for 2006 from Vegetation Extent dataset ANZWA1050000124.
- Van Vreeswyk, A.M., Payne, A.L., Leighton, K.A. & Hennig, P. (2004) Technical bulletin no. 92: An inventory and condition survey of the Pilbara region, Western Australia. Department of Agriculture, South Perth, Western Australia.

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.
DMP	Department of Mines and Petroleum, Western Australia.
DoE	Department of Environment, Western Australia.
DoIR	Department of Industry and Resources, Western Australia.
DOLA	Department of Land Administration, Western Australia.
DoW	Department of Water
EP Act	<i>Environment Protection Act 1986</i> , Western Australia.
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (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	<i>Rights in Water and Irrigation Act 1914</i> , Western Australia.
s.17	Section 17 of the <i>Environment Protection Act 1986</i> , 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.