



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 5826/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **BHP Billiton Iron Ore Pty Ltd**

1.3. Property details

Property: Miscellaneous Licence 47/95
Local Government Area: Shire of East Pilbara
Colloquial name: Yandi Rail Spur Project

1.4. Application

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

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 7 November 2013

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description Beard vegetation associations have been mapped for the whole of Western Australia and are useful to look at vegetation in a regional context. The following Beard vegetation associations are located within the application area (GIS Database):

18: Low woodland; mulga (*Acacia aneura*) and

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

The application area contains thirteen vegetation associations, as described by Astron Environmental Services (2010):

Triodia Hummock Grasslands -

1a: Open hummock grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) and *Triodia pungens* with open shrubland of *Acacia tenuissima*, *Grevillea wickhamii* subsp. *hispidula* and *Acacia dictyophleba* and scattered low trees of *Corymbia hamerslyana*, *Hakea chordophylla* and *Eucalyptus gamophylla* on fine red-brown clayey loams on some open plains;

1b: Open hummock grassland to hummock grassland of *Triodia wiseana* with very open herbs of mixed species, and scattered low trees of *Acacia inaequilatera* and *Corymbia hamerslyana* over low scattered shrubs to scattered tall shrubs of *Grevillea wickhamii* subsp. *hispidula*, *Hakea Chordophylla* and mixed *Acacia* and *Senna* species on fine redbrown clayey loams on some plains and slopes;

1c: Open hummock grassland to closed hummock grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835), *Triodia wiseana* and *Triodia pungens* with low scattered shrubs to open shrubland of *Acacia hilliana*, *Acacia adoxa* var. *adoxa* and *Grevillea wickhamii* subsp. *hispidula* with scattered low trees to low open woodland of *Eucalyptus leucophloia* subsp. *leucophloia*, *Hakea chordophylla* and *Corymbia hamerslyana* on fine red-brown sandy to clayey loams on hill crests, slopes and some plains;

1d: Open hummock grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with low open woodland of *Acacia inaequilatera*, *Corymbia deserticola* and *Hakea chordophylla* over scattered shrubs of *Grevillea wickhamii* subsp. *hispidula* and mixed *Senna* species on red-brown fine clayey loams on low stony hills;

1e: Very open hummock grassland to hummock grassland of *Triodia wiseana* with occasional *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835), with low scattered shrubs to shrubland of mixed *Acacia* species and *Grevillea wickhamii* subsp. *hispidula*, with scattered low trees to open woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Hakea chordophylla* and occasionally associated with *Eucalyptus gamophylla* and *Eucalyptus deserticola* on fine clays to clayey loams on typically rocky upper slopes and some plains;

1f: Closed hummock grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with scattered low trees of *Eucalyptus leucophloia* subsp. *leucophloia* and *Eucalyptus trivalva* with scattered tall shrubs of *Acacia sibirica* and *Acacia bivenosa* on orange-brown fine clayey loams on low open plains/overflow drainage flat;

1g: Open hummock grassland to hummock grassland of *Triodia wiseana* with scattered low trees of *Eucalyptus leucophloia* subsp. *leucophloia* on red-brown fine clayey loams on upper, mid and lower slopes;

2 Eucalyptus Woodlands -

2a: Woodland of *Eucalyptus victrix* over tussock grassland of *Eulalia aurea*, *Eriachne mucronata* and *Eriachne tenuiculmis* with scattered shrubs of *Tephrosia rosea* var. *glabrior*, *Gossypium robinsonii* and *Acacia pyrifolia* var. *pyrifolia* on orange-brown fine clayey loams in some major incised creeklines;

2b: Woodland of *Eucalyptus camaldulensis* and *Eucalyptus victrix* over tussock grassland of *Eulalia aurea*, *Cyperus vaginatus* and *Cymbopogon* sp. indeterminate over high open shrubland of *Melaleuca glomerata*, *Gossypium robinsonii* and *Acacia tumida* var. *pilbarensis* on brown coarse sands and sandy loams in some major incised creeklines;

Acacia Open Heath -

3a: Open heath of *Acacia maitlandii* and *Acacia pyrifolia* var. *pyrifolia* with high open shrubland of *Grevillea wickhamii* subsp. *hispidula*, *Acacia tumida* var. *pilbarensis* and *Acacia inaequilatera* over scattered hummock grass of *Triodia wiseana* on red-brown fine clayey loams in some minor creeklines;

Petalostylis Heath -

4a: Open heath to closed heath of *Petalostylis labicheoides* and *Acacia tumida* var. *pilbarensis* with scattered low trees of *Corymbia hamersleyana* and *Eucalyptus gamophylla* over scattered hummock grass of *Triodia pungens* on red-brown fine clayey loams in minor drainage lines;

Themeda Tussock Grasslands -

5a: Very open tussock grassland of *Themeda triandra* and *Cymbopogon ambiguus* with scattered hummock grass of *Triodia pungens* with open shrubland of *Gossypium robinsonii*, *Acacia tumida* var. *pilbarensis* and *Petalostylis labicheoides* with low open woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* in some minor incised drainage gullies; and

5b: Very open tussock grassland of *Themeda triandra* with scattered hummock grasses of *Triodia pungens*, with low open woodland of *Acacia tumida* var. *pilbarensis* and *Corymbia hamersleyana* with high open shrubland of *Acacia maitlandii*, *Petalostylis labicheoides* and *Grevillea wickhamii* subsp. *hispidula* on redbrown clayey loams in some minor drainage gullies.

Clearing Description	Yandi Rail Spur Project. BHP Billiton Iron Ore Pty Ltd has applied to clear 107 hectares of native vegetation within a total boundary of approximately 2180.24 hectares, for the purpose of rail maintenance, construction, and associated activities. The application area is located approximately 85 kilometres north-west of Newman, in the Shire of East Pilbara.
Vegetation Condition	Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994); to Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994).
Comment	Clearing will be by mechanical means. Vegetation condition was determined by Astron Environmental Services (AES) (AES, 2010). In pre-existing cleared areas, vegetation condition is Completely Degraded (AES, 2010). The flora and vegetation survey by Astron (2010) indicated that the vegetation associations present in the application area range from high to low local conservation significance due to their representation within the Pilbara region. Annual and herbaceous flora were largely absent in the survey, or not identifiable, due to poor seasonal conditions.

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 at variance to this Principle The application is located within the Pilbara (PIL) Interim Biogeographic Regionalisation of Australia (IBRA) region and the Hamersley (PIL3) subregion (GIS Database). The Pilbara region represents a transitional zone between semi-arid and tropical climates (Kendrick, 2001). The Hamersley IBRA subregion comprises Proterozoic ranges, plateaus, and gorges of basalt, shale and dolerite (Kendrick, 2001). Vegetation associated with the Hamersley subregion consists of low mulga (<i>Acacia aneura</i>) woodland over tussock grasses on fine soils, and (within ranges) Snappy Gum <i>Eucalyptus leucophloia</i> over spinifex grassland (<i>Triodia brizoides</i>) on skeletal soils (Kendrick, 2001; AES, 2010). The Hamersley Range also contains biologically important assets such as refugial ecosystems in gorges, waterfalls and mountaintop 'sky islands', which contain a high level of floristic, vertebrate and invertebrate species richness (Kendrick, 2001). A Level 2 flora and vegetation survey was conducted within the application area on 6 – 11 September 2010 by
-----------------	---

Astron Environmental Services (AES, 2010). The survey consisted of a desktop assessment of previous surveys conducted in the area, conservation significant flora and ecological communities, Environmentally Sensitive Areas, and Declared weeds. A field survey was also conducted to map and describe vegetation associations present within the application area, describe the current condition of native vegetation, and identify any conservation significant flora, ecological communities, and weed species.

The vegetation within the application area is mapped as belonging to Beard associations 18 and 82 (GIS Database). AES (2010) also described 13 vegetation associations from within the application area, which ranged from Good to Excellent condition (Keighery, 1994). Where pre-existing infrastructure occurs, vegetation condition is Completely Degraded (BHP, 2013a). In some areas, disturbance from cattle, vehicles, vegetation clearing and recent fire was evident (AES, 2010). No weeds were recorded during the survey. However, their absence is attributed to the season of sampling, as prior surveys covering the application area did record weed species (ENV, 2009; Ecologia, 2009; AES, 2010). A total of seven weed species have been previously recorded within the application area, two of which (Mexican Poppy *Argemone ochroleuca* and Native Thornapple *Datura leichhardtii*) are listed as Declared plant species under the *WA Agriculture and Related Resources Protection Act, 1976* (AES, 2010). Weeds have the potential to significantly change the dynamics of a natural ecosystem and lower the biodiversity of an area. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

Three of the thirteen vegetation associations are particularly important in capturing the diversity of the Pilbara flora (AES, 2010). Vegetation association 1f, a *Triodia* Hummock Grassland dominated by *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835), is located almost entirely within the Robe land system (AES, 2010; GIS Database). This land system occupies a comparatively small area within the Pilbara bioregion and, combined with the presence of *Triodia* sp. Shovelanna Hill, this may indicate that vegetation association 1f is poorly represented in the region (AES, 2010). Vegetation association 2a, a *Eucalyptus victrix* woodland, is associated with major incised creeklines within the application area. AES (2010) advises that riparian vegetation containing *Eucalyptus victrix* is likely to be of higher conservation value than the Beard vegetation associations and land system mapping indicate. Woodlands dominated by *E. victrix* in other areas have been listed as a PEC (Batini, 2009). Similarly, vegetation association 2b, a Eucalypt woodland dominated by *Eucalyptus camaldulensis* and *E. victrix*, also occurs in association with major creeklines within the application area (AES, 2010). This riparian vegetation is noted by AES (2010) to be of high conservation value in terms of both ecological function and the relative scarcity of this vegetation type within the region.

No Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) were recorded during the flora and vegetation survey (AES, 2010). This is supported by available databases (GIS Database). However, the application area contains two ecosystems listed by Kendrick (2001) to be 'Vulnerable'. These ecosystems are:

- (a) Hill-top floras of the Hamersley Range (covering 1,107.46 hectares within the application area). This ecosystem is congruent with Beard vegetation association 82 within the application area; and
- (b) Major ephemeral watercourses (which include vegetation associations 2a and 2b, and collectively cover 48.59 hectares within the application area) (AES, 2010). The application area includes the major ephemeral watercourse Yandicoogina Creek. The condition rating of riparian vegetation in this area was Very Good to Excellent, within no weed invasion evident and minimal signs of grazing by cattle (AES, 2011). High quality examples of this ecosystem are considered to be at risk of deterioration (AES, 2010).

A total of 91 flora species from 20 families and 43 genera were identified within the application area (AES, 2010). No Declared Rare Flora (DRF) or Threatened flora were identified within the application area by AES (2010), however, Matiske Consulting Pty Ltd (2009) identified the Threatened (Declared Rare Flora) species *Lepidium catapycnon* at the northern end of the application area. BHP has placed a 50 metre exclusion buffer around this population, such that this does not form part of the application area (BHP, 2013a). Ten metre buffers have also been placed around known Priority flora to exclude them from the application, including one individual each of *Acacia bromilowiana* Maslin (Priority 4), *Rhagodia* sp. Hamersley (M. Trudgen 17794) (Priority 3) and *Sida* sp. Barlee Range (S. van Leeuwen 1642) (Priority 3) (BHP, 2013a). *Acacia bromilowiana* Maslin is a tree/ shrub which grows to 12 metres high, and is found upon a range of soil types including red skeletal stony loam, orange-brown pebbly gravel loam, laterite, banded ironstone, and basalt, and a range of habitats, including rocky hills, breakaways, scree slopes, gorges and creek beds (Western Australian Herbarium, 2013). AES (2010) propose that there are likely to be more individuals of *A. bromilowiana* present within the application area due to availability of these soils and habitat types.

According to NatureMap (DEC, 2013), 35 mammal, 110 avian, 109 reptile, five amphibian, two fish and 26 invertebrate species have been recorded within a 20 kilometre radius of the application area. These included the conservation significant species *Ardeotis australis* (Australian Bustard; Priority 4), *Macronectes giganteus* (Southern Giant Petrel; Priority 4), *Merops ornatus* (Rainbow Bee-eater; International Agreement), *Ninox connivens subsp. connivens* (Barking Owl; Priority 2), *Dasyurus hallucatus* (Northern Quoll; Schedule 1), *Macroderma gigas* (Ghost Bat; Priority 4), *Pseudomys chapmani* (Western Pebble-mound Mouse; Priority 4), and *Liasis olivaceus subsp. barroni* (Pilbara Olive Python; Schedule 1).

A Level 1 fauna survey was conducted within the application area by Biologic on 13 - 20 September 2009 (Biologic, 2011). The survey recorded 13 native and three introduced mammal species, 47 birds, 10 reptiles, and one amphibian species (Biologic, 2011). The Western Pebble-mound Mouse (Priority 4) was recorded

along with numerous active mounds, and the Star Finch (*Neochmia ruficauda subclarescens*) (Priority 4) and Australian Bustard were detected at one site each. Evidence of the Ghost Bat occupancy was detected within one cave (Biologic, 2011). BHP has placed 50 metre exclusion buffers around each of the three caves identified within the application area (BHP, 2013a). In addition to the Priority and Schedule fauna species identified from within the NatureMap database (DEC, 2013), an additional seven conservation significant fauna are likely to occur within the application area based on habitat suitability (Biologic, 2011). These include the Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*; Schedule 1) which may occur within cave ACY 2, Grey Falcon (*Falco hypoleucos*; Schedule 1), Bush Stone-curlew (*Burhinus grallarius*; Schedule 3), Eastern Great Egret (*Ardea modesta*; Schedule 3), Fork-tailed Swift (*Apus pacificus*; Schedule 3), Peregrine Falcon (*Falco peregrinus*; Schedule 4), and the Pilbara Flat-headed Blind Snake (*Ramphotyphlops ganei*; Priority 1).

Five fauna habitats were described within the application area, including (Biologic, 2011):

- Valley (including one Basalt Valley)
- Hilltops and Slopes
- Major Drainage Line
- Minor Drainage Line, and
- Gorge.

Habitat types Valley, Valley Basalt, Gorge and Major Drainage Line each support a high number of conservation significant fauna. Impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of flora and fauna management conditions which exclude clearing from important habitat types and vegetation associations. Given the diversity of vegetation associations and habitat types, and the confirmed and potential presence of a number of conservation significant flora and fauna, the proposed clearing is at variance to this Principle.

Methodology	<p>AES (2010) Batini (2009) BHP (2013a) Biologic (2011) DEC (2013) Ecologia (2009) ENV (2009) Kendrick (2001) Western Australian Herbarium (2013) GIS Database:</p> <ul style="list-style-type: none"> - IBRA WA (Regions - Sub Regions) - Pre-European Vegetation - Rangeland Land System Mapping - Threatened and Priority Flora - Threatened Ecological Sites Buffered - Weeli Wolli 50cm Orthomosaic – Landgate 2004
--------------------	---

(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	<p>Proposal may be at variance to this Principle</p> <p>A Level 1 fauna survey was conducted within the application area by Biologic from 13- 20 September 2010 (Biologic, 2011). This consisted of a series of opportunistic searches for herpetofauna, observational bird surveys, bat call surveillance, camera traps, and targeted searches for conservation significant fauna (Biologic, 2011). The fauna survey identified five habitat types within the application area, including Valley (inclusive of Basalt Valleys), Hilltops and Slopes, Major Drainage Line, Minor Drainage Line, and Gorge (Biologic, 2011).</p> <p>Hilltop and Slope habitat was recorded on rocky hills and ridges, and covered a majority of the application area (Biologic, 2011). It is considered to be relatively common throughout the Pilbara (Biologic, 2011). Significant species associated with this habitat are the Western Pebble-mound Mouse (<i>Pseudomys chapmani</i>; Priority 4) and the Long-tailed Dunnart (<i>Sminthopsis longicaudata</i>; Priority 4) (Biologic, 2011). Forty eight mounds of the Western Pebble-mound Mouse were observed across Hilltop and Slope habitat across the application area (Biologic, 2011). BHP (2013a) has advised that the proposed clearing is unlikely to include Western Pebble-mound Mouse habitat, and that any mounds encountered will be avoided where feasible.</p> <p>Major Drainage Line habitat occurs along a portion of the eastern edge of the application area (Biologic, 2011). This habitat has large hollow-bearing trees present, and its range is limited throughout the Pilbara. Eleven conservation significant species are associated with Major Drainage Line habitat (Biologic, 2011). Of these, the Australian Bustard (Priority 4), Star Finch (Priority 4), and Rainbow Bee-eater (IA) were recorded during the fauna survey. Minor Drainage Line habitat occurs at three locations within the application area, and is similarly restricted in its distribution across the Pilbara region (Biologic, 2011).</p> <p>Gorge habitat consists of deep valleys with sheer cliff walls, and a rocky base that has the ability to hold water for long periods of time (Biologic, 2011). Yandicoogina gorge is crossed by the existing rail line, and minor gorges occur throughout the mid-section of the application area (Biologic, 2011; GIS Database). The</p>
-----------------	---

application area includes both dry and wet gorge habitat. While dry gorges are common within the region, wet gorges containing *Melaleuca glomerata* and *Melaleuca argentea* (consistent with vegetation association 2b) are considered to represent an uncommon habitat type in the Pilbara (Biologic, 2011). These gorge habitats collectively support 16 conservation significant fauna species, and two caves which may provide habitat for the Pilbara Leaf-nosed Bat (Schedule 1) and the Ghost Bat (Priority 4) (Biologic, 2011).

While Drainage Line and Gorge habitats support a number of conservation-significant fauna, BHP have advised that some clearing within these areas may be required in order to undertake maintenance works on bridge footings and trim vegetation under the rail structure (BHP, 2013b). These areas are accessed via an access track within Valley and Gorge habitat, which may require minor clearing to maintain accessibility (BHP, 2013b). BHP has stated that clearing within these areas will be for maintenance only, not construction (BHP, 2013b).

The Northern Brushtail Possum (*Trichosurus vulpecular arnhemensis*) is considered to be locally significant due to a dramatic decline in its distribution throughout the arid zone (Biologic, 2011). The few recent records which exist all occur within gorges, and major drainage lines dominated by *Eucalypt* woodland (DEC, 2010 as cited in Biologic, 2011), which are consistent with those habitats mentioned above. Scats have been recently identified west of the application area, and the species may occur as an uncommon breeding resident (Biologic, 2011).

Valley habitat is scattered across the application area, and a Basalt Valley exists in one restricted location at the lower eastern edge of the application boundary (Biologic, 2011). These valleys often contain rocky outcrops, which is suitable habitat for six conservation-significant species, including the Northern Quoll (Biologic, 2011). The Valley Basalt habitat includes Cave ACY 1, which is used by Ghost Bats for roosting (Biologic, 2011).

Potential impacts to Valley Basalt, Gorge, and Major Drainage Line habitat as a result of the proposed clearing may be minimised by the implementation of a fauna management condition which excludes clearing from within this habitat type. Valley, Gorge and Major Drainage Line habitats have not been completely excluded from clearing as there will be some minor impact to this habitat type where it crosses over the railway line.

Based on the above, the proposed clearing may be at variance to this Principle.

Methodology BHP (2013a)
BHP (2013b)
Biologic (2011)
GIS Database:
- Hydrography, linear

(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

One individual of DRF species *Lepidium catapycnon* was identified in a previous survey of the application area (Mattiske Consulting Pty Ltd, 2009). BHP has placed a 50 metre exclusion zone around DRF flora, which excludes this area from the application. Activities proposed under this clearing permit are primarily for track maintenance, but may involve the sources of fill for emergency repair (BHP, 2013b). However, BHP will exclude any conservation- significant flora identified during operations from clearing (BHP, 2013b). The proposed clearing is not expected to impact these flora.

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

Methodology BHP (2013b)
Mattiske Consulting Pty Ltd (2009)

(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

No TECs or PECs were identified within the application area by the flora and vegetation survey conducted by Astron (AES, 2010). These findings are consistent with available databases (GIS Database). The nearest TEC is the Ethel Gorge TEC, 81 kilometres south east of the application area (GIS Database). The nearest PEC is approximately 4.5 kilometres south east and is the Weeli Wolli Spring community (GIS Database).

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

Methodology AES (2010)
GIS Database:
- Threatened Ecological Sites Buffered

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Comments Proposal is not at variance to this Principle

The application area falls within the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion, in which approximately 99.6% of the pre-European vegetation remains (see table) (Government of Western Australia, 2013; GIS Database).

The vegetation within the application area has been mapped as Beard vegetation associations 18 and 82 (GIS Database). Over 90% of these Beard vegetation associations remain at both a state and bioregional level (see Table; Government of Western Australia, 2013). Therefore, the area proposed to be cleared does not represent a significant remnant of native vegetation within an area that has been extensively cleared. Based on aerial imagery, the vegetation within the application area is neither a remnant itself nor does it form part of any remnants within the local area (GIS Database).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in DEC Managed Lands
IBRA Bioregion – Pilbara	17,808,657	17,733,584	~99.6	Least Concern	8.4
Beard veg assoc. – State					
18	19,892,305	19,843,727	~99.8	Least Concern	6.29
82	2,565,901	2,553,217	~99.5	Least Concern	10.51
Beard veg assoc. – Bioregion					
18	676,557	672,424	~99.39	Least Concern	17.16
82	2,563,583	2,550,899	~99.5	Least Concern	10.52

* Government of Western Australia (2013)

** Department of Natural Resources and Environment (2002)

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

Methodology Government of Western Australia (2013)
 Department of Natural Resources and Environment (2002)
 GIS Database:
 - Pre-European Vegetation
 - Weeli Wolli 50cm Orthomosaic – Landgate 2004

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

Comments Proposal may be at variance to this Principle

There are no permanent watercourses or wetlands within the application area; however, there is one major and several minor ephemeral drainage lines (GIS Database). The application area is dissected by Yandicoogina Creek, a major creek running from east to west (AES, 2010; GIS Database).

The flora and vegetation survey completed by AES (2010) identified seven vegetation associations to occur in association with watercourses and drainage areas. These were:

- 1f (*Triodia* Hummock Grassland): located on Low Open Plains/ Overflow Drainage Flats
- 2a (*Eucalypt* Woodland): within major incised creeklines
- 2b (*Eucalypt* woodland): within major incised creeklines
- 3a (*Acacia* Open Heath): within minor creeklines
- 4a (*Petalostylis* Heath): within minor drainage lines
- 5a (*Themeda* Tussock Grassland): within minor incised drainage gullies
- 5b (*Themeda* Tussock Grassland): within minor drainage gullies

BHP have advised that any clearing within creeks and drainage lines will be restricted to the maintenance of existing tracks, and that any clearing for new infrastructure will involve consultation with DMP (BHP, 2013b).

Potential impacts to vegetation association 2b as a result of the proposed clearing may be minimised by the implementation of a flora management condition, which excludes clearing from this vegetation association.

Based on the above, the proposed clearing may be at variance to this Principle.

Methodology AES (2010)
 BHP (2013b)
 GIS Database:

- Hydrography, linear
- Weeli Wolli 50cm Orthomosaic – Landgate 2004

(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 area encompasses five land systems (GIS Database). A majority of the proposed clearing lies within the Newman land system, and the rest occurs across the Boolgeeda land system, Rocklea land system, Platform land system, and Robe land system (GIS Database). Newman is a rugged land system, consisting of mountains, ridges and plateaus (Van Vreeswyk et al., 2004). This land system is the second largest within the Pilbara, and especially common within the Hamersley Range (Van Vreeswyk et al., 2004). A very small proportion of this land system has been affected by erosion.

The Boolgeeda land system comprises the lower slopes and plains adjacent to hill systems (such as the Newman land system), dissected by numerous closely-spaced drainage lines (Van Vreeswyk et al., 2004). Despite this, the Boolgeeda land system appears to be resistant to soil erosion, as are the Platform, Rocklea and Robe land systems (Van Vreeswyk et al., 2004). A majority of the planned activities under this permit involves track maintenance of linear structures; borrow pits will only be required in the event of emergency repairs (BHP, 2013b).

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

Methodology BHP (2013b)
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 does not lie within any conservation areas of the Department of Parks and Wildlife managed lands (GIS Database). The nearest conservation area is Karijini National Park (GIS Database). It is located approximately 44 kilometres west of the application area (GIS Database). From this distance, the proposed clearing is not likely to impact the environmental values of the proposed conservation area.

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

Methodology GIS Database:
- DEC Tenure

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

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

The application area does not occur within a Public Drinking Water Source Area (PDWSA), however it is located within the proclaimed Pilbara groundwater area under the *Rights in Water and Irrigation Act 1914* (GIS Database). Any groundwater extraction and/or taking or diversion of surface water for the purposes other than domestic and/or stock watering is subject to licence by the Department of Water. The application area covers numerous minor, non-perennial watercourses, and is intersected by Yandicoogina Creek (AES, 2010; GIS Database)

The clearing of native vegetation has the potential to destabilise soils and cause temporary sedimentation to watercourses. However, clearing within creeks and drainage lines will be avoided where possible (BHP, 2013b). Furthermore, annual evaporation rates exceed rainfall in this region (BoM, 2013), and the hydroperiod of ephemeral watercourses within the application area is likely to be restricted, limiting the scope for surface water deterioration.

Groundwater salinity in the local area is estimated to be between 500 - 1,000 milligrams/Litre Total Dissolved Solids (TDS), which is considered marginal (GIS Database). The proposed clearing activity is not likely to significantly alter salinity levels within the application area.

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

Methodology AES (2010)
GIS Database:
- Groundwater Salinity, Statewide
- Hydrography, linear
- Public Drinking Water Source Areas (PDWSAs)

(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

Mean annual rainfall in Newman is approximately 318 millimetres (BoM, 2013). The Pilbara region represents a transitional zone between semi-arid and tropical climates, and receives a majority of its rainfall during the summer months (Kendrick, 2001; CALM, 2002). It is likely that during times of intense rainfall there may be some localised flooding. The proposed clearing is unlikely to significantly alter the intensity of flooding within the application area or surrounding areas.

The application area is located within the Fortescue River Upper catchment area (GIS Database). However, given the size of the area to be cleared (107 hectares) in relation to the size of the catchment area (2,975,192 hectares), the proposed clearing is not likely to increase the potential for flooding in this region (GIS Database).

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

Methodology BoM (2013)
CALM (2002)
Kendrick (2001)
GIS Database:
- Hydrographic Catchments - Catchments

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

Comments There is one native title claim over the area under application (GIS Database). This claim (WC2011/006) has been registered with the Native Title Tribunal on behalf of the claimant group (GIS Database). However, tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

According to available databases, there are 32 registered Aboriginal Sites of Significance within the application area (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 Regulation (formerly the Department of Environment and Conservation) and the Department of Water, to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

The clearing permit application was advertised on 14 October 2013 by the Department of Mines and Petroleum inviting submissions from the public. There were no submissions received

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

4. References

- AES (2010) Area C to Yandi Flora and Vegetation Survey. Unpublished Report for BHP Billiton Iron Ore Pty Ltd.
Batini, F. (2009) Eucalyptus Victrix, Karijini National Park Report to EPA. Consultants report prepared for the OEPA.
BHP (2013a) Mining Area C to Yandi Rail Spur NVCP: Application to Clear Native Vegetation (Purpose) Permit under the Environmental Protection Act 1986. BHP Billiton Iron Ore, Western Australia.
BHP (2013b) Further information provided to the assessing officer by BHP Billiton Iron Ore Pty Ltd on 22 October 2013.
Biologic (2011) Area C to Yandi Fauna Survey. Unpublished Report for BHP Billiton Iron Ore Pty Ltd.
BoM (2013) Climate Statistics for Australian Locations. Climate Statistics for Australian Locations. A Search for Climate Statistics for Newman, Australian Government Bureau of Meteorology, http://www.bom.gov.au/climate/averages/tables/cw_007176.shtml, viewed October 2013.
CALM (2002) Bioregional Summary of the 2002 Biodiversity Audit for Western Australia. Department of Conservation and Land Management, Western Australia.
DEC (2013) NatureMap: Mapping Western Australia's Biodiversity, DEC, <http://naturemap.dec.wa.gov.au/default.aspx>, viewed October 2013.
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.
Ecologia (2009) UMC Area A and Additional Areas: Vegetation and Flora Survey. Consultants report prepared for United Minerals Corporation (UMC).
ENV (2007) Ministers North Exploration Leases Flora and Vegetation Assessment. Consultants report prepared for BHP Billiton Iron Ore Pty Ltd.
ENV (2009) Newman to Yandi Transmission Line Flora and Vegetation Assessment. Consultants report prepared for BHP Billiton Iron Ore Pty Ltd.
Government of Western Australia (2013) 2012 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full

Report). Current as of October 2012. WA Department of Environment and Conservation, Perth.

Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Kendrick, P. (2001) Pilbara 3 (PIL3 – Hamersley Subregion). In A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002 (eds J. E. May & N. L. McKenzie). Department of Conservation and Land Management, WA.

Mattiske Consulting Pty Ltd (2009) Flora and Vegetation of the Hope Downs 1 Area. Published Report for Pilbara Iron.

Van Vreeswyk, A.M.E, Payne, A.L., Leighton, K.A., and Hennig, P. (2004) An inventory and condition survey of the Pilbara region, Western Australia, Department of Agriculture Technical Bulletin No. 92, December 2004.

Western Australian Herbarium (2013) Florabase - The Western Australian Flora. Department of Environment and Conservation. Available online at <http://florabase.dec.wa.gov.au/>, viewed October 2013.

5. Glossary

Acronyms:

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

Definitions:

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

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

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

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

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

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

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

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