



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 7549/1
Permit Holder:	Commissioner of Main Roads
Duration of Permit:	25 November 2017 – 25 November 2027

The Permit Holder is authorised to clear native vegetation subject to the following conditions of this Permit.

PART I – CLEARING AUTHORISED

1. Purpose for which clearing may be done

Clearing for the purpose of road realignment and material extraction.

2. Land on which clearing is to be done

Lot 108 on Deposited Plan 220193, Marble Bar
Lot 111 on Deposited Plan 238589, Marble Bar
Lot 306 on Deposited Plan 58955, Marble Bar
Lots 307 and 516 on Deposited Plan 58953, Marble Bar

3. Area of Clearing

The Permit Holder must not clear more than 51.41 hectares of native vegetation within the combined areas hatched yellow on attached Plan 7549/1a and Plan 7549/1b.

4. Period in which clearing is authorised

The Permit Holder shall not clear any native vegetation after 25 November 2022.

5. Application

This Permit allows the Permit Holder to authorise persons, including employees, contractors and agents of the Permit Holder, to clear native vegetation for the purposes of this Permit subject to compliance with the conditions of this Permit and approval from the Permit Holder.

6. Type of clearing authorised

This Permit authorises the Permit Holder to clear native vegetation for the project activities described in condition 1 of this Permit to the extent that the Permit Holder has the power to carry out works involving clearing for those *project activities* under the *Main Roads Act 1930* or any other written law.

PART II – MANAGEMENT CONDITIONS

7. Avoid, minimise etc clearing

In determining the amount of native vegetation to be cleared authorised under this Permit, the Permit Holder must have regard to the following principles, set out in order of preference:

- avoid the clearing of native vegetation;
- minimise the amount of native vegetation to be cleared; and
- reduce the impact of clearing on any environmental value.

8. Weed control

When undertaking any clearing or other activity authorised under this Permit, the Permit Holder must take the following steps to minimise the risk of the introduction and spread of *weeds*:

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) ensure that no *weed*-affected soil, *mulch*, *fill* or other material is brought into the area to be cleared; and
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

9. Fauna management

- (a) The Permit Holder shall undertake clearing authorised under this permit between 1 April and 1 August of any given year;
- (b) A pre-clearance trapping and relocation survey must be completed within three days prior to the commencement of clearing;
- (c) The Permit Holder shall engage a *fauna specialist* to trap and relocate northern quolls, in accordance with a fauna licence pursuant to Regulation 15 of the *Wildlife Conservation Regulations 1970*;
- (d) The Permit Holder shall engage a fauna spotter to traverse the project area ahead of clearing machinery, at the time of clearing;
- (e) The Permit Holder must install a minimum of eight box culverts suitable for the use by northern quolls as fauna underpasses;
- (f) The Permit Holder must undertake annual monitoring of culverts, using remote cameras for three years post construction;
- (g) The Permit Holder must create a minimum of 15 artificial rock habitat 'mounds' within the M030 material pit 356 SLK and along the decommissioned roads and side tracks;
- (h) The Permit Holder must complete a northern quoll monitoring report and provide it to the Department of Water and Environmental Regulation annually for five years post clearing;
- (i) The northern quoll monitoring report must include, but not be limited to;
 - (i) number of northern quolls trapped and relocated under condition 9(c);
 - (ii) the location of any relocated northern quolls using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
 - (iii) the location of culverts and artificial rock habitat 'mounds' constructed in accordance with conditions 9(e) and 9(g), using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
 - (iv) the results of the remote camera monitoring of culvert use.

10. Retain vegetative material and topsoil, revegetation and rehabilitation

The Permit Holder shall:

- (a) retain the vegetative material and topsoil removed by clearing authorised under this Permit and stockpile the vegetative material and topsoil in an area that has already been cleared.
- (b) within 3 months following completion of the extractive activity, *revegetate* and *rehabilitate* the area(s) that are no longer required for the purpose for which they were cleared under this Permit by:
 - (i) re-shaping the surface of the land so that it is consistent with the surrounding 5 metres of uncleared land; and
 - (ii) ripping the ground on the contour to remove soil compaction; and
 - (iii) laying the vegetative material and topsoil retained under condition 10(a) on the cleared area(s).
- (c) within 24 months of laying the vegetative material and topsoil on the cleared area in accordance with condition 10(b) of this Permit:
 - (i) engage an *environmental specialist* to determine the species composition, structure and density of the area *revegetated* and *rehabilitated*; and

- (ii) where, in the opinion of an *environmental specialist*, the composition structure and density determined under condition 10(c)(i) of this Permit will not result in a similar species composition, structure and density to that of pre-clearing vegetation types in that area, *revegetate* the area by deliberately *planting* and/or *direct seeding* native vegetation that will result in a similar species composition, structure and density of native vegetation to pre-clearing vegetation types in that area and ensuring only *local provenance* seeds and propagating material are used.
- (d) Where additional *planting* or *direct seeding* of native vegetation is undertaken in accordance with condition 10(c)(ii) of this permit, the Permit Holder shall repeat condition 10(c)(i) and 10(c)(ii) within 24 months of undertaking the additional *planting* or *direct seeding* of native vegetation.
- (e) Where a determination by an *environmental specialist* that the composition, structure and density within areas *revegetated* and *rehabilitated* will result in a similar species composition, structure and density to that of pre-clearing vegetation types in that area, as determined in condition 10(c)(i) and (ii) of this permit, that determination shall be submitted for the CEO's consideration. If the CEO does not agree with the determination made under condition 10(c)(ii), the CEO may require the Permit Holder to undertake additional *planting* and *direct seeding* in accordance with the requirements under condition 10(c)(ii).

PART III - RECORD KEEPING AND REPORTING

11. Records must be kept

The Permit Holder must maintain the following records for activities done pursuant to this Permit:

- (a) In relation to the clearing of native vegetation authorised under this Permit:
 - (i) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings;
 - (ii) the date that the area was cleared; and
 - (iii) the size of the area cleared (in hectares).
- (b) In relation to the *revegetation* and *rehabilitation* of areas pursuant to condition 10 of this Permit:
 - (i) the location of any areas *revegetated* and *rehabilitated*, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
 - (ii) a description of the *revegetation* and *rehabilitation* activities undertaken;
 - (iii) the size of the area *revegetated* and *rehabilitated* (in hectares);
 - (iv) the species composition, structure and density of *revegetation* and *rehabilitation*, and
 - (v) a copy of the environmental specialist's report.

12. Reporting

- (a) The Permit Holder must provide to the CEO on or before 30 June of each year, a written report:
 - (i) of records required under condition 11 of this Permit; and
 - (ii) concerning activities done by the Permit Holder under this Permit between 1 January to 31 December of the preceding calendar year.
- (b) If no clearing authorised under this Permit was undertaken between 1 January to 31 December of the preceding calendar year, a written report confirming that no clearing under this permit has been carried out, must be provided to the CEO on or before 30 June of each year.
- (c) Prior to 25 August 2027, the Permit Holder must provide to the CEO a written report of records required under condition 9 and 11 of this Permit where these records have not already been provided under condition 12(a) of this Permit.

DEFINITIONS

The following meanings are given to terms used in this Permit:

direct seeding means a method of re-establishing vegetation through the establishment of a seed bed and the introduction of seeds of the desired plant species;

environmental specialist: means a person who holds a tertiary qualification in environmental science or equivalent, and has experience relevant to the type of environmental advice that an environmental specialist is required to provide under this Permit, or who is approved by the CEO as a suitable environmental specialist;

fauna specialist: means a person who holds a tertiary qualification specializing in environmental science or equivalent, and has a minimum of 2 years work experience in fauna identification and surveys of fauna native to the region being inspected or surveyed, or who is approved by the CEO as a suitable fauna specialist for the bioregion, and who holds a valid fauna licence issued under the *Wildlife Conservation Act 1950*;

fill means material used to increase the ground level, or fill a hollow;

local provenance means native vegetation seeds and propagating material from natural sources within 200 kilometres and the same Interim Biogeographic Regionalisation for Australia (IBRA) subregion of the area cleared;

mulch means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation;

planting means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species;

regenerate/ed/ion means re-establishment of vegetation from in situ seed banks and propagating material (such as lignotubers, bulbs, rhizomes) contained either within the topsoil or seed-bearing *mulch*;

rehabilitate/ed/ion means actively managing an area containing native vegetation in order to improve the ecological function of that area;

revegetate/ed/ion means the re-establishment of a cover of *local provenance* native vegetation in an area using methods such as natural *regeneration*, *direct seeding* and/or *planting*, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area.

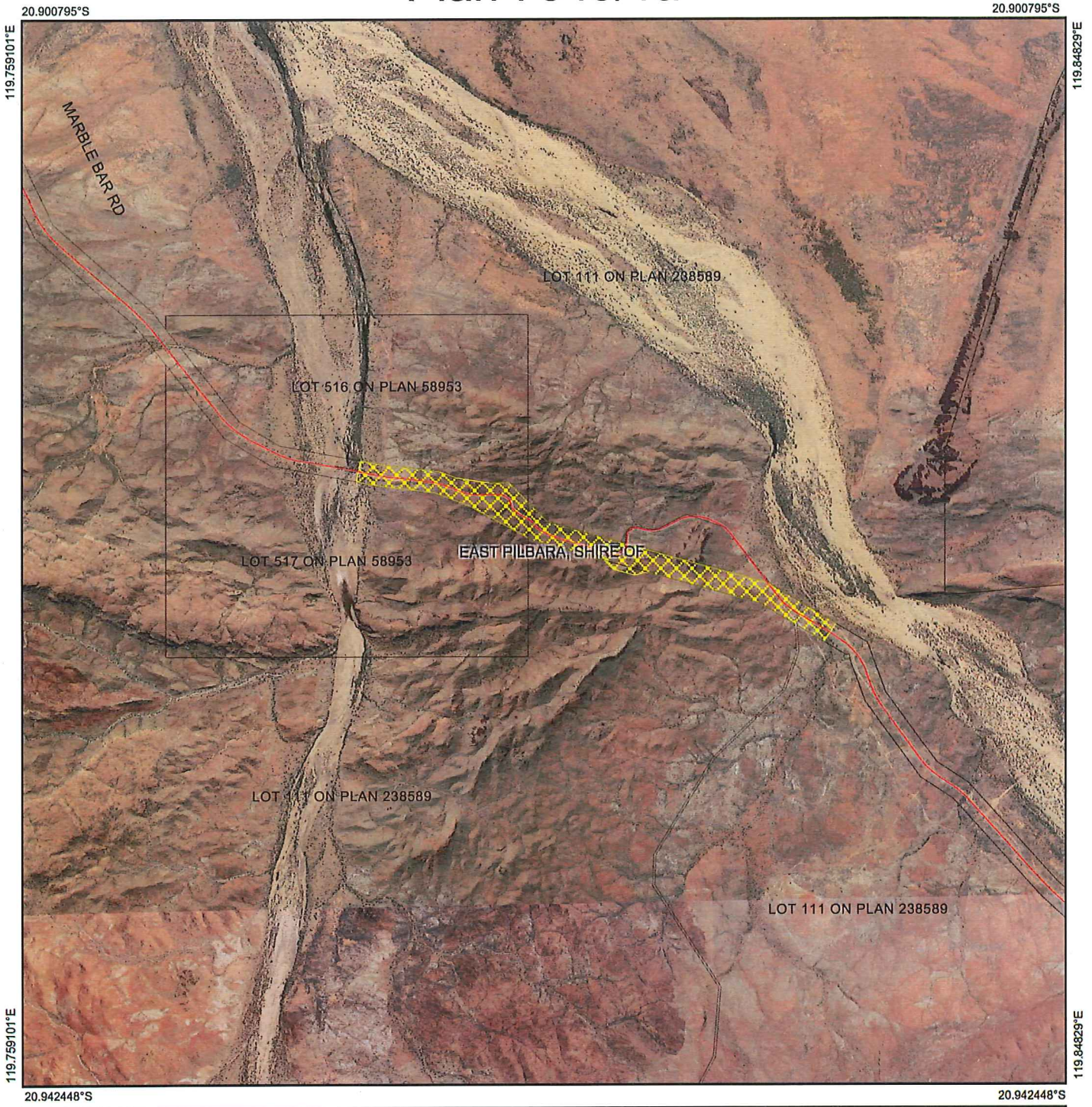


James Widenbar
A/ SENIOR MANAGER
CLEARING REGULATION

Officer delegated under Section 20
of the *Environmental Protection Act 1986*

26 October 2017

Plan 7549/1a



Legend

-  Imagery
-  Clearing Instruments Activities
-  Local Government Authority

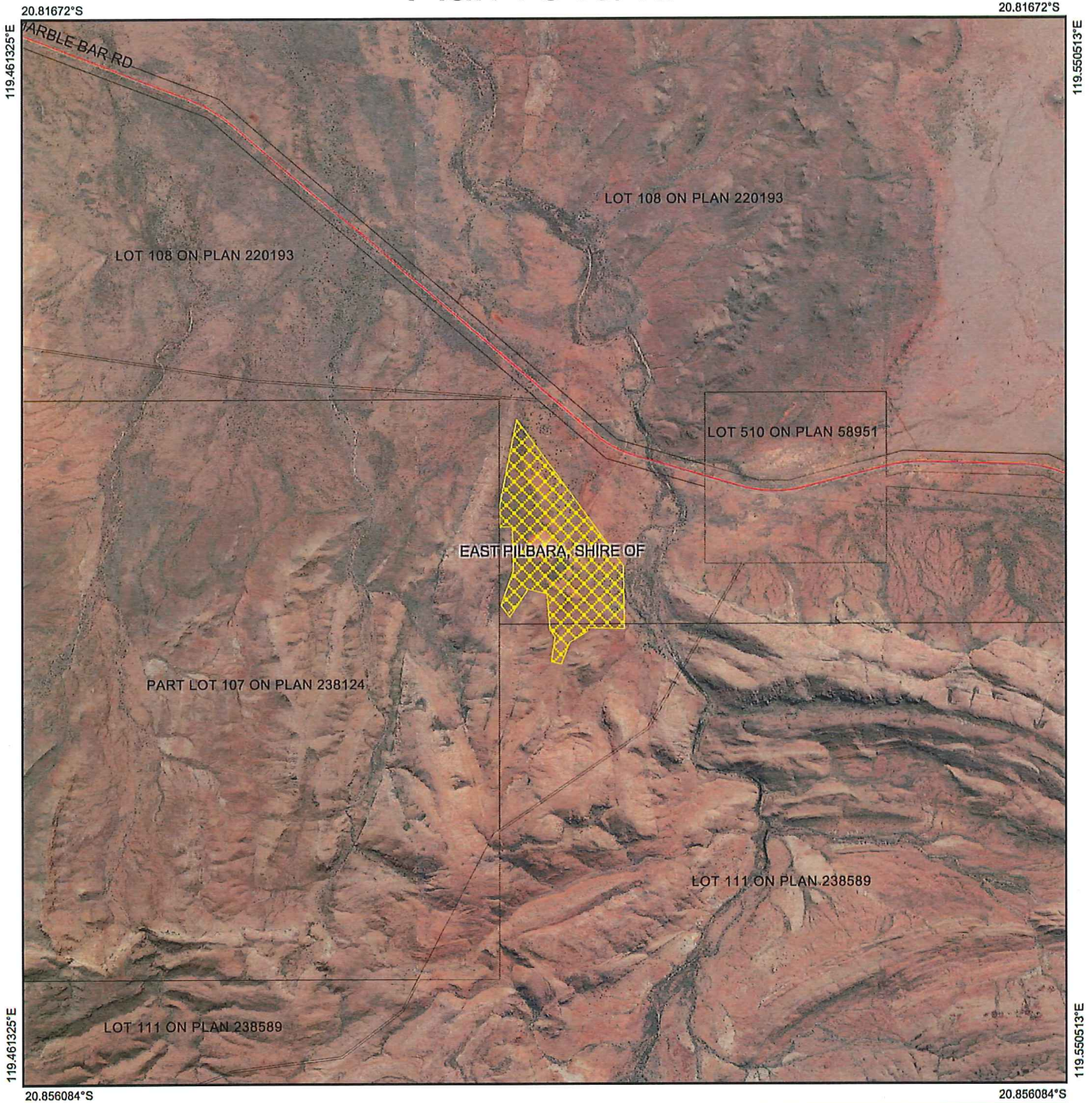


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Signature Date 26/10/17

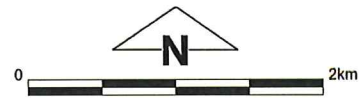
Officer with delegated authority under Section 20 of the Environmental Protection Act 1986

Plan 7549/1b



Legend

-  Imagery
-  Clearing Instruments Activities
-  Local Government Authority



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Officer with delegated authority under Section 20 of the Environmental Protection Act 1986



This report has been prepared to fulfil the requirements of an accredited environmental assessment process between the Commonwealth and State governments, pursuant to a bilateral agreement established under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This report is set out in three parts:

- Part 1: Application and site details;
- Part 2: Assessment against matters of national environmental significance (pursuant to the EPBC Act); and
- Part 3: Assessment against the clearing principles (pursuant to the *Environmental Protection Act 1986* (EP Act)). Appeal rights pursuant to section 101A of the EP Act are relevant to this section of the report.

Part 1: Application and site details

1. Application details

1.1. Permit application details

Permit application No.: 7549/1
Permit type: Purpose Permit

1.2. Applicant details

Applicant's name: Commissioner of Main Roads Western Australia

1.3. Property details

Property: LOT 516 ON PLAN 58953, MARBLE BAR
LOT 307 ON PLAN 58953, MARBLE BAR
LOT 306 ON PLAN 58955, MARBLE BAR
LOT 111 ON PLAN 238589, MARBLE BAR
LOT 108 ON PLAN 220193, MARBLE BAR

Colloquial name:
Local Government Authority: EAST PILBARA, SHIRE OF
DER Region: North West
DPaW District: no district
Localities: MARBLE BAR

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
51.41		Mechanical Removal	Road realignment and extractive industry

1.5. Decision on application

Decision on Permit Application: Grant

Decision Date: 26 October 2017

Reasons for Decision: The clearing permit application received on 5 April 2017 has been assessed against the clearing principles, planning instruments and other matters in accordance with s51O of the *Environmental Protection Act 1986*. The Delegated Officer determined that the proposed clearing is at variance to Principle (f), may be at variance to Principle (b), is not at variance to Principle (e) and is not likely to be at variance to any of the remaining clearing principles.

The Delegated Officer determined that the application area may comprise significant habitat for northern quoll. Astron, on behalf of Main Roads, has developed a northern quoll management plan which aims to minimise, mitigate and manage impacts to the local northern quoll population. The clearing permit has been conditioned to only allow clearing to be undertaken outside of the northern quoll breeding season. A fauna specialist must trap and relocate northern quolls within three days prior to clearing commencing and a fauna spotter must be on site during clearing. Relocating fauna within three days of clearing will reduce the possibility of fauna returning to the site or other fauna moving into the vacant site. In addition, the applicant is required to install culverts as fauna underpasses and create artificial habitat. The use of culverts will facilitate the safe dispersal of northern quolls under the road and artificial habitat will attempt to link culverts with existing northern quoll rocky habitat. The Delegated Officer considers that these actions will ensure that the northern quoll population is not significantly impacted by the proposed clearing.

Through assessment it has been determined that the application area intersects three watercourses. The Delegated Officer determined that the proposed clearing will not significantly impact on the identified watercourses.

Ten hectares of the proposed clearing is for the purpose of material extraction. Due to the temporary nature of this land use the Delegated Officer has included a revegetation and rehabilitation condition to the permit to minimise long term environmental impacts.

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description	Clearing Description	Vegetation Condition	Comment
<p>The application area is mapped as the following Beard vegetation associations:</p> <p>93: Hummock grasslands, shrub steppe; kanji over soft spinifex; and</p> <p>171: Hummock grasslands, low tree steppe; snappy gum over soft spinifex and <i>Triodia brizoides</i>.</p> <p>(Shepherd et al., 2001)</p>	<p>The applicant proposes to clear 51.41 hectares of native vegetation within Lot 108 on Deposited Plan 220193, Lot 111 on Deposited Plan 238589, Lot 306 on Deposited Plan 58955, Lots 307 and 516 on Deposited Plan 58953, Marble Bar, for the purpose of road realignment and material extraction.</p>	<p>Very Good; Vegetation structure altered; obvious signs of disturbance (Keighery, 1994).</p> <p>To:</p> <p>Completely Degraded; No longer intact, completely/almost completely without native species (Keighery, 1994).</p>	<p>A biological survey of the application area and surrounding environment identified nine vegetation types within the project area, being:</p> <ul style="list-style-type: none"> • Cleared/Degraded; • Riparian Woodland; • Floodplain Low Open Woodland; • Spinifex Steppe with Emergent Scrub on Sandy Lower Slopes; • Spinifex Steppe with Emergent Scrub on Sandy Lower Slopes; • Spinifex Steppe on Stony Mid Slopes; • Spinifex Steppe on Stony Upper Slopes with Emergents; • <i>Terminalia - Atalaya</i> Low Woodland on Steep Slopes; • <i>Atalaya - Flueggea</i> Shrublands on Large Stony Scree; <p>(GHD, 2016)</p>

Part 2: Assessment against matters of national environmental significance

3. Assessment of application against Matters of National Environmental Significance

Background

Main Roads Western Australia (MRWA; the applicant) is proposing to upgrade a section of Marble Bar Road at Coongan Gorge from 318.4 to 323.5 Straight Line Kilometre (SLK). The purpose of the proposed works is to improve safety on this section of Marble Bar Road, connecting Port Hedland to Marble Bar (MRWA, 2017a).

The proposed clearing consists of 41.41 hectares within a 99 hectares footprint area for the road upgrade and 10 hectares within a 132.8 hectare footprint for the material extraction pit.

The applicant intends to use the material pit for construction, only if the excess cut material from the realigned section of Marble Bar Road cannot be made into suitable basecourse quality material (MRWA, 2017a).

The proposed material extraction pit is located approximately 70 kilometres north of the Marble Bar town site and the proposed road upgrade is located approximately 30 kilometres north of the Marble Bar town site.

The proposed project works will include:

- Realignment and reconstruction of approximately five kilometres of Marble Bar Road between 318.4-323.5 SLK. Road formation width will vary significantly due to varying batter slope distances (at the narrowest road formation will be 10 metres wide, and in isolated areas road formation will be up to 170 metres wide)
- Associated works including significant road batter construction, minor floodways, culverts and off road drainage
- Development and use of a side track to divert traffic during stages of construction
- Extraction of base course material from M030 material pit if excess cut material is not suitable for road base. M030 material pit is located on the Marble Bar road at 356 SLK. (MRWA, 2017a)

The vegetation within the application area ranges in condition from completely degraded to excellent (Keighery, 1994). A survey of the application area identified nine vegetation types, which are described in Table 1.

Table 1. Vegetation types of the survey area (GHD, 2016)

Vegetation Type Code	Vegetation Type	Description
VT01	Cleared/Degraded	Areas mostly devoid of native vegetation – covering roads, access tracks and material pits. Flora taxa present include representation from adjacent vegetation types and also include disturbance response taxa.
VT02	Riparian Woodland	Woodland to Low Woodland of <i>Eucalyptus camaldulensis</i> , <i>Melaleuca argentea</i> with <i>Sesbania formosa</i> , <i>E. victrix</i> , <i>Atalaya hemiglauca</i> over Tall Shrubland to Open Shrubland of <i>Acacia ampliceps</i> , <i>*Calotropis procera</i> , <i>A. trachycarpa</i> with <i>*Vachellia farnesiana</i> , <i>Petalostylis labicheoides</i> over Low Open Shrubland of <i>Corchorus parviflorus</i> , <i>Pluchea tetranthera</i> , over Very Open Sedgeland of <i>Cyperus vaginatus</i> with Open Tussock Grassland of <i>*Cenchrus ciliaris</i> with mixed Herbs.
VT03	Floodplain Low Open Woodland	Low Open Woodland of <i>Corymbia hamersleyana</i> over Tall Open Shrubland to Scattered Shrub of <i>Acacia inaequilatera</i> with <i>A. trachycarpa</i> over Tussock Grassland of <i>*Cenchrus ciliaris</i> with Hummock Grassland of <i>Triodia longiceps</i> , <i>T. epactia</i> .
VY04	Sprinifex Steppe with Emergent Scrub on Sandy Lower Slopes	Hummock Grassland of <i>Triodia epactia</i> with <i>T. schinzii</i> , <i>T. longiceps</i> with emergent Scattered Trees of <i>Corymbia hamersleyana</i> , Scattered Shrubs to Tall Shrubland of <i>Acacia inaequilatera</i> , <i>Grevillea wickhamii</i> , <i>A. tumida</i> var. <i>Pilbarensis</i> Scattered Low Shrubs to Low Shrubland of <i>Corchorus parviflorus</i> , <i>A. spondylophylla</i> , <i>A. ptychophylla</i> , with Scattered Herbs
VT05	Spinifex Steppe with Emergent Scrub on Sandy Lower Slopes	Hummock Grassland of <i>Triodia epactia</i> with <i>T. schinzii</i> , <i>T. longiceps</i> with <i>*Cenchrus ciliaris</i> , with emergent Scattered Trees of <i>Corymbia hamersleyana</i> , Open Shrubland to Tall Shrubland of <i>Acacia tumida</i> , <i>Grevillea wickhamii</i> , <i>G. pyramidalis</i> , <i>A. inaequilatera</i> , <i>Petalostylis labicheoides</i> , Scattered Low Shrubs to Low Shrubland of <i>Corchorus parviflorus</i> , <i>A. spondylophylla</i> , <i>A. ptychophylla</i> , with Mixed Herbs of <i>Cleome</i> spp., <i>Heliotropium</i> spp.
VT06	Spinifex Steppe on Stony Mid Slopes	Hummock Grassland of <i>Triodia epactia</i> with emergent Scattered Trees of <i>Corymbia hamersleyana</i> , Scattered Shrubs to Tall Shrubland of <i>Acacia inaequilatera</i> , <i>Grevillea wickhamii</i> , <i>Hakea lorea</i> with Scattered Low Shrubs to Low Shrubland of <i>Corchorus parviflorus</i> , <i>A. spondylophylla</i> , <i>A. ptychophylla</i> , with Scattered Herbs
VT07	Spinifex Steppe on Stony Upper Slopes with Emergents	Hummock Grassland of <i>Triodia epactia</i> with Very Open Tussock Grassland of <i>Eriachne mucronata</i> , <i>Cymbopogon ambiguus</i> , <i>*Cenchrus ciliaris</i> with emergent Scattered Trees of <i>Corymbia amersleyana</i> , <i>Atalaya hemiglauca</i> with Scattered Shrubs to Tall Shrubland of <i>Acacia inaequilatera</i> , <i>Grevillea wickhamii</i> , <i>Hakea lorea</i> with Scattered Low Shrubs to Low Shrubland of <i>Corchorus parviflorus</i> , <i>A. spondylophylla</i> , <i>A. ptychophylla</i> , <i>Indigofera monophylla</i> , <i>Triumfetta chaetocarpa</i> with Scattered Herbs
VT08	<i>Terminalia</i> - <i>Atalaya</i> Low Woodland on Steep Slopes	Low Open Forest to Low Open Woodland of <i>Terminalia circumalata</i> , <i>Atalaya hemiglauca</i> over Tall Shrubland to Shrubland of <i>Ehretia saligna</i> , <i>Acacia inaequilatera</i> , <i>Flueggea virosa</i> , over Low Shrubland of <i>Corchorus parviflorus</i> , <i>A. spondylophylla</i> , <i>A. ptychophylla</i> , <i>Indigofera monophylla</i> , <i>Triumfetta chaetocarpa</i> over Hummock Grassland of <i>Triodia epactia</i> with Open Tussock Grassland of <i>Eriachne mucronata</i> , <i>E. lindleyanus</i> , <i>Cymbopogon ambiguus</i> , <i>*Cenchrus ciliaris</i> with Scattered Herbs
VT09	<i>Atalaya</i> - <i>Flueggea</i> Shrublands on Large Stony Scree	Open Shrubland to Tall Open Shrubland of <i>Atalaya hemiglauca</i> , <i>Flueggea virosa</i> , <i>Clerodendrum floribundum</i> with <i>Ehretia saligna</i> over Shrubland to Low Open Shrubland of <i>Gossypium australe</i> , <i>Senna glutinosa</i> subsp. <i>glutinosa</i> , <i>Corchorus parviflorus</i> over Very Open Hummock Grassland of <i>Triodia epactia</i> , <i>T. wiseana</i> with Very Open Tussock Grassland of <i>*Cenchrus ciliaris</i> , <i>Eriachne mucronata</i> , <i>Cymbopogon ambiguus</i> with Scattered Herbs of <i>Cucumis variabilis</i> and <i>Boerhavia coccinea</i>

Description of controlling provision

On 16 March 2017 the project was determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for the following controlling provisions: Listed Threatened Species and Communities. The controlled action is likely to have a significant impact on the northern quoll (*Dasyurus hallucatus*), which is listed as endangered under the EPBC Act.

Northern quoll (*Dasyurus hallucatus*)

Northern quolls are small, nocturnal, carnivorous marsupials. Northern quolls are sedentary with a moderately large home range with female home ranges known to average 35 hectares and male home ranges covering 100 hectares or more during the breeding season (Commonwealth of Australia, 2011).

Historically, the northern quoll was common across northern Australia occurring almost continuously from the Pilbara, Western Australia to near Brisbane, Queensland. A 75 per cent reduction in the northern quoll's range between 1900-1990 has been suggested such that, during this time, the northern quoll has been reduced to six major geographical centres: Drummond Range, central Queensland; wet tropics Northern Queensland; northern Cape York Peninsula; northern and western Top End, Northern Territory; north Kimberley and Pilbara, Western Australia (DotEE, 2017).

The northern quoll occupies a variety of habitats across its current range including rocky areas, eucalypt forest and woodlands, dry rainforests and vine thickets, sandy lowlands and beaches, shrublands, grasslands and deserts (Commonwealth of Australia, 2011). Habitat usually includes some form of rocky area or structurally diverse woodland or forest used for shelter with surrounding vegetated habitats used for foraging and dispersal. Shelter habitat is important for breeding and refuge from fire and/or predation (Commonwealth of Australia, 2011).

Little is understood about the characteristics of foraging or dispersal habitat for the northern quoll. However, on current knowledge, foraging or dispersal habitat is recognised to be any land comprising predominately native vegetation in the immediate area (within two kilometres) of denning / shelter habitat, quoll records or land comprising predominately native vegetation that is connected to denning / shelter habitat within the species range. (Commonwealth of Australia, 2011). Habitats critical to survival for the northern quoll are areas that provide shelter for breeding, refuge from fire and/or predation and/or potential poisoning from cane toads (Commonwealth of Australia, 2011).

Where denning / shelter habitat occurs within the modelled distribution of the species, it is considered habitat critical to the survival of the species. Habitat critical to the survival of the northern quoll occurs in three forms across the species range which includes:

- Rocky habitats such as ranges, escarpments, mesas, ranges, gorges, breakaways, boulder fields, major drainage lines or treed creek lines
- Structurally diverse woodland or forest areas containing large diameter trees, termite mounds or hollow logs
- Off shore islands where the northern quoll is known to exist
(Commonwealth of Australia, 2011)

The major threats to the northern quoll are mortality caused by poisoning from cane toads, inappropriate fire regimes (and predation by introduced animals after fire) and the removal, degradation and fragmentation of habitat as a result of development actions and pastoralism (Commonwealth of Australia, 2011).

There is no approved Conservation Advice or Threat Abatement Plan for this species.

Methodology References:
Commonwealth of Australia (2011)
DotEE (2017)
GHD (2016)
Keighery (1994)
MRWA (2017a)

Summary of Impacts

Northern quoll (*Dasyurus hallucatus*)

According to the recovery plan for the northern quoll, core populations of this species occur in rocky and/or high rainfall areas. In Western Australia the northern quoll has been recorded from many areas in the Kimberley, and several areas in the Pilbara, including the lower reaches of the Fortescue River, Wittenoom Gorge (in the early 1990s), and banded ironstone ranges northeast of Marble Bar (Hill and Ward, 2010). In line with the recovery plan, the application area contains habitat for the northern quoll.

The northern quoll was recorded within the Coongan Gorge project area during a Level 1 fauna survey (GHD, 2016). While not recorded in the area associated with the proposed extraction pit, one female was observed moving from the ranges onto the plain moving directly towards the Talga River north of the application area (MRWA, 2017a). The species was also captured 10 times on camera traps from five localities, four of which were from the project area. At least three males and seven females were recorded from the larger biological survey area (MRWA, 2017a).

It is likely that this species is routinely moving between the range and rivers (water bodies) for resources (MRWA, 2017a).

The proposed clearing will lead to the loss of 51.41 hectares of known and potential habitat including hunting and breeding habitat. The core area of habitat for this species is within the Coongan Gorge section of the application area (MRWA, 2017a).

Approximately 41.41 hectares of hunting, corridor, and denning (including breeding) habitat will be removed along a corridor for the road realignment. The 10 hectare area proposed for the material pit is limited to hunting and corridor habitat (MRWA, 2017a). The proposed road realignment will partially bisect habitat to the north and south of the project area. This may impact movement of the northern quoll across core habitat in this area.

Northern quolls experience a male-die-off following the breeding season, and populations are dependent on the survival of juveniles from year to year (Hill and Ward, 2010). Therefore, if the proposed clearing leads to an increase in juvenile mortality through the loss of denning and foraging habitat, it may have a significant impact on the local population.

The surrounding area was not subject to detailed surveys, and it is unknown whether or how far northern quoll denning habitat extends outside the project area.

The recovery plan states that habitat degradation, habitat destruction and population isolation are three of the main threatening processes for the northern quoll (Hill and Ward, 2010).

An objective of the northern quoll recovery plan is to halt the decline of this species in areas not yet colonised by cane toads, and the recovery plan notes that northern quolls have already declined within the Pilbara region (Hill and Ward, 2010). If the proposed clearing causes the decline of the local northern quoll population, the proposal may be inconsistent with the objectives of the recovery plan.

Methodology References:
 GHD (2016)
 Hill and Ward (2010)
 MRWA (2017a)

Public consultation

The application was advertised online on 2 May 2017 for a 21 day submission period. A publication summary was advertised in *The West Australian* on Monday 8 May 2017. No submissions were received in relation to this application.

Avoidance, mitigation and offset

The applicant has provided the following information regarding avoidance and mitigation in the EPBC referral (MRWA, 2017a; 2017c):

Avoidance and Mitigation

Refinement of disturbance footprint

Main Roads has modified the original extent of clearing to avoid and minimise clearing impacts as far as practicable at the concept design stage, while still achieving the required road safety objectives. Main Roads will continue to explore opportunities to further reduce the project area by micro aligning and reducing the width of the construction zone where possible.

Delineation of disturbance footprint

One of the key strategies to avoid impacts to fauna and habitat during the clearing phase of the project is to strictly adhere to clearing and disturbance boundaries. The clearing area will be established by a surveyor and pegged and then checked by a member of the Main Roads environment team before clearing is approved and then it will be checked again after clearing.

Early education

An environmental pre-start meeting for staff and contractors will be undertaken for the project which will include a presentation for minimising indirect and direct impacts to northern quoll and Pilbara olive python and other animals and habitat.

Timing of clearing

It has been proposed that initial clearing will be undertaken outside of the breeding season. This is based on the likelihood that the cleared land and active machinery will discourage any northern quolls from re-entering the project area during the breeding season. There will not be suitable breeding habitat remaining after clearing has taken place and therefore the likelihood of a direct impact to breeding northern quolls are considered low. Any areas that have not been cleared between 1 April and 30 September, will not be cleared until the following year to prevent disturbance to any breeding northern quolls.

As far as practical clearing and disturbance of Pilbara olive python habitat will be timed to prevent coinciding with the breeding season (May – February). Where this is not possible additional mitigation measures will be implemented.

Objectives and performance

The two key objectives of the avoidance and mitigation management measures are to:

1. Avoid, then minimise the clearing of habitat for the northern quoll and Pilbara olive python
2. Avoid direct impacts (e.g. injury or death) to individual northern quoll and Pilbara olive python during the clearing process

In order to gauge the success of these key objectives, relevant management targets and key performance indicators have been identified.

Offset

To date no offset has been proposed.

Northern Quoll Management Plan

Astron were commissioned by Main Roads to develop a northern quoll management plan. The intention of management plan is to provide Main Roads with sufficient control and management strategies to minimise potential impacts to individual northern quolls during clearing and construction of the project and to assist with other suitable management actions which will assist the local populations to continue to utilise the local area and ensure their long-term persistence (Astron, 2017).

The management plan includes such actions as pre-clearing trapping and relocation, clearing outside of breeding season, installation of culverts/fauna underpasses, rehabilitation of existing road, the creation of artificial habitat, speed limit control, minimising night works, implementation of confined blasting techniques instead of unconfined, and management of indirect impacts such as light and noise pollution, air quality, and feral animal activity (Astron, 2017; MRWA, 2017c).

Methodology References:
Astron (2017)
MRWA (2017a)
MRWA (2017c)

Other relevant considerations

Economic and Social Matters

The applicant has provided the following information in regards to the economic and social matters relating to this project (MRWA, 2017b; 2017c):

Benefits

Marble Bar Road has emerged as a priority based on its function in servicing mining activity and supporting local communities between Newman, Nullagine, Marble Bar and a number of aboriginal communities including Jigalong and Punmu. The road is an important enabler for the achievement of State Government goals relating to a strong focus on the regions and facilitating economic and regional development. The proposed road upgrade will make travel to the Central Pilbara Region safer and more accessible by the provision of a direct sealed link of a consistent standard, which will increase road user safety and comfort as well as reduce travel times. It will also significantly improve the safety of the travelling public and road train operators using this section of road, and safeguard against potential contamination of the adjacent environment that often results during incidents on the network.

Coongan Gorge is approximately 35 kilometres north of Marble Bar. The four kilometre section of road through Coongan Gorge is a narrow winding section of road with steep descents and curve radii which are well below the acceptable minimum standard. This results in restrictive sight distances that are a safety hazard and cause problems at certain sections for oncoming vehicles to pass one another. Currently, road train drivers communicate with other drivers using two-way radios when entering the gorge. There is a mix of traffic using the road, from quad road train operators to tourists with caravans, locals and mine workers. The mix of road users with varying travel speeds and inconsistent communication results in a high risk of head-on accidents. This is also adding significantly to the cost of maintaining the network as vehicles are continually damaging the edges of the seal.

Marble Bar Road is a critical access road for mining operations in the area. The road is utilised to transport heavy machinery during the construction phase and to service the operational needs of the mine during production. Other smaller mining operations exist north of the Fortescue River Crossing including Moly Metals, Millennium Minerals and Auvex. Marble Bar Road is used for the establishment, operation and cartage of product from these smaller mines to Port Hedland for export. Expansion of the resources industry is expected in the Eastern Pilbara which will necessitate road upgrades to improve condition, freight efficiency and safety. The road provides access to the mines operating along the Ripon Hills Road. Copper Manganese concentrate is carted through the gorge to Port Hedland for export. The mines rely on Marble Bar Road to support operational and maintenance needs. Despite the recent deferral of investment by some large mining companies in a number of expansion projects, it is considered that the mining and resources sector will continue to produce high volumes in the short to medium term. The shift from an expansionary approach to a focus on existing operations is a response to current global economic conditions and reflects mining companies desire to sustain existing production rather than invest in expansionary projects that will increase production volumes even further.

Marble Bar Road connects to Ripon Hills Road and carries a significant amount of freight (in excess of 1.3M tonnes per annum) to and from the mines in the East Pilbara and Port Hedland. This freight is predominantly carried by 53.5m long quad road trains. The last unsealed section between Great Northern Highway and the Ripon Hills turnoff was upgraded in 2003 to a two lane sealed standard. Coongan Gorge is now the lowest standard section of this link with geometry that is well below acceptable standards.

The road carries in excess of 300 vehicles per day; quad road trains account for approximately 50 per cent of this traffic. The road speed is restricted through the gorge to 40km/h for trucks and 80km/h for other vehicles.

This proposal is being developed to:

- Improve road safety;
- Reduce transport vehicle operating costs and travel times between coastal and inland communities and developments; and
- Assist in developing the tourist potential of the Region.

Improved access along Marble Bar Road is required to meet the expected demand placed on this section of the road network due to growth in the resource industry and the resulting increase in traffic mix, goods and services and freight movement. This proposal will also provide a direct sealed route, of a consistent and appropriate standard, that will service existing and proposed resource developments in the East Pilbara.

Access to the town of Marble Bar, and tourist and pastoral destinations will be enhanced, and residents will benefit from a higher volume of tourist traffic and subsequent economic opportunities.

Risk of closures associated with crashes will be reduced which will minimise interruptions to mining production, and remote communities will experience less periods of isolation during the monsoonal season.

There is considerable risk and cost associated with serious crashes, increased travel time and high maintenance costs. The risk of accidents occurring due to restricted sight distance and deficient geometry through the Gorge has consequences that could be catastrophic. Fuels and chemicals (including concentrated sulphuric acid) are transported along Marble Bar Road. The concern is that if the problem is not addressed, it is only a matter of time before a serious crash occurs.

Cost

The proposal has funding of \$54.5 million.

Employment opportunities

Government has estimated 230 direct and indirect jobs will be created after applying regional indices on the infrastructure component of the project.

Government has also announced the introduction of mandatory targets for Aboriginal employment, procurement and contracting. Government agencies are required to ensure contractors take on local Aboriginal staff when delivering regional contracts. The package also mandates government agencies to purchase more goods and services from Aboriginal owned businesses in the regions.

Australian Government's White Paper on Developing Northern Australia states the requirement of Aboriginal engagement for Commonwealth funded projects under Northern Australia Roads Program and Beef Roads Program. To meet Aboriginal engagement requirements, Special Conditions of Contract for this Project will include Aboriginal engagement mandatory minimum target that the Contractor must achieve, and Aboriginal engagement stretch targets that the Contractor should seek to achieve.

The two mandatory minimum targets are:

- 10 per cent of the Contractor's Total Labour Hours associated with the works under the Contract are undertaken by Local Aboriginal People (for On Site works); and
- 4.5 per cent of the Total Contract Value (being the Contract Sum including all additions and deductions required under the Contract) is undertaken by Local Aboriginal Businesses (for On Site works).

The four stretch targets are:

- Local Aboriginal employment stretch target - in excess of 10 per cent (up to a maximum of 38 per cent) of the Contractor's Total Labour Hours associated with the works under the Contract are undertaken by Local Aboriginal People (for On Site works);
- Non-local Aboriginal employment stretch target - in excess of 10 per cent (up to a maximum of 20 per cent) of the Contractor's Total Labour Hours associated with the works under the Contract are undertaken by Non-local Aboriginal People (for On Site works);
- Local Aboriginal Business engagement stretch target - in excess of 4.5 per cent (up to a maximum of 10 per cent) of the Total Contract Value (being the Contract Sum including all additions and deductions required under the Contract) is undertaken by Local Aboriginal Businesses (for On Site works); and
- Local Aboriginal Business engagement stretch target - in excess of 4.5 per cent (up to a maximum of 10 per cent) of the Total Contract Value is undertaken by Local Aboriginal Businesses (for Off Site works).

The Contractor will also be required to submit an Aboriginal Engagement Plan for approval and is to provide a monthly Aboriginal Engagement Report to demonstrate how targets have been met.

Applicant's Environmental History

Main Roads is a State agency and has a sound record of responsible environmental management and environmental management systems.

Main Roads seeks to achieve balanced and sustainable outcomes for the community with responsible environmental stewardship in developing and maintaining the road network critical to its success. Main Roads is committed to:

- Protecting and enhancing the environmental values of road reserves
- Minimising the impact on the natural environment of roads and road use
- Conserving natural resources and minimising energy consumption and waste.

A corporate Environmental Management System facilitates management of environmental risks and performance improvement. The independently certified and audited system is integrated into all key processes including planning, delivery, maintenance, network operations and supporting services.

Main Roads holds Certificate No. EMS 530437 and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope: Main Roads Total Management System comprising Planning, Delivery, Maintenance, Network Operations and Supporting Services. Officially registered since 14 July 2005 under Certificate 149459.

Part 3: Assessment against the clearing principles

4. Assessment of application against clearing principles

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

Comments

Proposed clearing is not likely to be at variance to this Principle

The applicant proposes to clear 51.41 hectares of native vegetation within Lot 108 on Deposited Plan 220193, Lot 111 on Deposited Plan 238589, Lot 306 on Deposited Plan 58955, Lots 307 and 516 on Deposited Plan 58953, Marble Bar, for the purpose of road realignment and material extraction.

GHD were commissioned by Main Roads to undertake a biological survey of the application area and surrounding environment. The survey area consists of a 100 metre buffer either side of Marble Bar Road (146.39 hectares) and 132.81 hectares for the material pit. The biological survey consisted of a Level 1 vegetation and flora assessment, a targeted single season flora of conservation significance survey and a Level 1 fauna assessment which included a targeted habitat assessment for fauna species of conservation significance and camera trap surveys (GHD, 2016).

The majority of the survey area has been impacted to some degree by past disturbances including minor roads, communication line establishment, historical rail corridor, weed infestation, cattle grazing, flood and fire (GHD, 2016).

The survey recorded 120 flora taxa representing 39 families. This total comprised 110 native species and ten introduced (exotic) species (GHD, 2016).

The survey did not identify any rare or priority flora species, however a recent burn of approximately half of the survey area made it difficult to preclude the presence of six priority flora species (GHD, 2016). Two of these priority species were considered likely to occur within the application area. The first is a priority 2 species which is found on gravelly hillsides and stony grounds (WA Herbarium, 1998-). This species has a distribution of approximately 320 kilometres north south and 290 kilometres east west. The second is a priority 3 species which is found in shallow soils and rocky outcrops (WA Herbarium, 1998-). This species has a distribution of approximately 315 kilometres north south and 380 kilometres east west. Given the relatively large distribution of these species and the extent of similar habitat within the local area (50 kilometre radius) the proposed clearing is not likely to impact upon their conservation status if they were located within the application areas.

No priority ecological communities (PEC) have been recorded within the local area and the biological survey did not identify any PECs within the application area.

As discussed in principle (b) five fauna species of conservation significant have been recorded within the survey area, being; northern quoll (*Dasyurus hallucatus*), ghost bat (*Macroderma gigas*), bilby (*Macrotis lagotis*), rainbow bee eater (*Merops ornatus*) and western pebble-mound mouse (*Pseudomys chapmani*) (GHD, 2016). The proposed clearing is unlikely to have a significant impact on conservation significant fauna as long as the clearing is undertaken in accordance with the northern quoll management plan and western pebble-mound mouse mounds are avoided where possible.

Given the above, the application area is not likely to contain a high level of biological diversity. Therefore, the proposed clearing is not likely to be at variance to this Principle.

Methodology

References:

GHD (2016)

Western Australian Herbarium (1998-)

GIS Datasets:

Sac Bio Datasets – accessed May 2017

(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

Proposed clearing may be at variance to this Principle

Five fauna species listed as rare or likely to become extinct under the *Wildlife Conservation Act 1950* have been recorded within the local area (50 kilometre radius), being; northern quoll, grey falcon (*Falco hypoleucos*), Pilbara olive python (*Liasis olivaceus subsp. barroni*), ghost bat, and bilby (*Macrotis lagotis*) (DBCA, 2007-).

A biological survey, consisting of a Level 1 fauna assessment which included a targeted habitat assessment for fauna species of conservation significance and camera trap surveys was conducted for the application area and surrounding environment (GHD, 2016). The biological survey identified five main fauna habitats within the survey area, being (GHD, 2016):

1. *Triodia* hummock grassland on plain or undulating plain
2. Minor drainage lines with small dense patches of trees/shrubs and scattered trees
3. *Eucalyptus camaldulensis* and *Melaleuca argenticia* along Talga and Coongan Rivers
4. Rocky ridgelines /rocky ranges (with scree) with hummock grasslands and scattered trees and shrubs
5. Water bodies and riverine habitats along the Talga River.

The biological survey recorded five fauna species of conservation significant within the survey area, being; northern quoll, ghost bat, bilby, rainbow bee eater (*Merops ornatus*; protected under international agreement) and western pebble-mound mouse (*Pseudomys chapmani*; listed as a priority 4 species) (GHD, 2016).

The species most likely to be impacted by the proposed clearing are the northern quoll and the western pebble-mound mouse as they were confirmed as being present within the application areas (Parks and Wildlife, 2017).

The northern quoll was recorded active in the survey area during nocturnal searches. One individual (a female) was observed moving from the ranges onto the plain moving directly towards the Talga River. It is likely that this species is routinely moving between the range and rivers (water bodies) for resources. The species was also captured twice on camera trap (at least one male other unknown individual). Further evidence of this was the presence of numerous sets of prints located in the soft sands of the river beds. Three latrine sites were identified on the range and near to the water body (but still on rocky habitat) all of which were fresh sites (GHD, 2016).

Astron, on behalf of Main Roads, has developed a northern quoll management plan which aims to minimise, mitigate and manage impacts to the local northern quoll population (Astron, 2017). The key actions of this management plan have been conditioned on the clearing permit to ensure that the northern quoll population is not significantly impacted by the proposed clearing. Conditions include;

- Clearing outside of breeding season;
- Fauna trapping and relocation within three days of clearing;
- Having a fauna spotter on site during clearing;
- Installing culverts; and
- Creating artificial habitat.

Relocating fauna within three days of clearing will reduce the possibility of fauna returning to the site or other fauna moving into the vacant site. Culverts are to be installed to be used as fauna underpasses which will facilitate the safe dispersal of northern quolls under the road and artificial habitat will attempt to link culverts with existing northern quoll rocky habitat.

Evidence of the western pebble-mound mouse was recorded at 19 locations within the survey area. In total seven active and 12 inactive mounds were recorded on the range, low stony hills or undulating plains (GHD, 2016). The active mounds within the material pit are on the western side near the boundary and one of the active mounds within the footprint area for the road realignment is near the outer edge. Given the location of the majority of the active mounds it is unlikely that they will be disturbed during clearing and if clearing within the vicinity of the mounds occurs then there will be a fauna spotter on site to ensure mice are not impacted.

The bilby was not confirmed within either clearing area. The potential for occurrence is based on confirmed records of the species within the regional area (approximately 20 kilometres) and tracks and an old burrow of either bilby or rabbit being recorded during the Coongan Gorge biological survey of the loop road area to the north of the application area. The locations of the old burrow and tracks are outside of the application area and, from the information provided, there does not appear to be suitable habitat for bilby within the application areas (Parks and Wildlife, 2017).

Pilbara olive python was not recorded during the biological surveys for either the road realignment or the material pit area, however the habitat was noted as being suitable for the species.

The rainbow bee-eater was recorded on nine occasions (with 17 birds) in the survey area including one old burrow in the banks of a drainage line (GHD, 2016). If the proposed clearing is conducted outside of the rainbow bee-eater nesting season (August to January) then the species will not be impacted due to their migratory nature. The applicant has provided information that the clearing is scheduled to be undertaken in April/May 2018 (Astron, 2017) and the clearing permit has been conditioned to ensure that clearing is undertaken between April and August. This timing should be adequate to ensure that rainbow bee-eaters are not directly impacted by the proposed clearing.

An individual ghost bat was visually recorded flying within the *Melaleuca* Woodland presumably hunting (GHD, 2016). Suitable roosting and breeding habitat for this species was not identified within the application area.

The survey area provides suitable hunting, roosting and breeding habitat for the grey falcon, however limited breeding habitat occurs within the survey area (GHD, 2016). The application area is not likely to provide significant habitat for this species.

The application area is known to contain habitat for the northern quoll, western pebble-mound mouse and rainbow bee-eater, however if clearing is undertaken in accordance with the northern quoll management plan and western pebble-mound mouse mounds are avoided where possible impact to these species are unlikely to be significant.

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

Methodology

References:
Astron (2017)
DBCA (2007-)
GHD (2016)
Parks and Wildlife (2017)

GIS Datasets:
Sac Bio Datasets – accessed May 2017

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

Comments Proposed clearing is not likely to be at variance to this Principle

No rare flora has been recorded within the local area.

A biological survey of the application area, and surrounding environment, did not identify any rare flora (GHD, 2016).

The proposed clearing is not likely to be at variance to this Principle.

Methodology References:
GHD (2016)

GIS Datasets:
Sac Bio Datasets – accessed May 2017

(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 Proposed clearing is not likely to be at variance to this Principle

No threatened ecological communities (TEC) have been recorded within the local area.

A biological survey of the application area, and surrounding environment, did not identify any TECs (GHD, 2016).

The proposed clearing is not likely to be at variance to this Principle.

Methodology References:
GHD (2016)

GIS Datasets:
Sac Bio Datasets – accessed May 2017

(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 Proposed clearing is not at variance to this Principle

The application area is located within the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion. This IBRA bioregion has approximately 99.6 per cent of its pre-European vegetation extent remaining (Government of Western Australia, 2016).

The vegetation under application is mapped as Beard vegetation associations 93 and 171 of which there is approximately 99.9 and 99.6 per cent of their pre-European extent remaining within the Pilbara bioregion, respectively (Government of Western Australia, 2016).

The area under application is located within the Shire of East Pilbara, within which there is approximately 99.9 per cent pre-European extent remaining (Government of Western Australia, 2016).

The local area retains approximately 99 per cent native vegetation.

The national objectives and targets for biodiversity conservation in Australia have a target to prevent clearance of ecological communities with an extent below 30 percent of that present pre-1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001).

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

	Pre-European (ha)	Current Extent (ha)	Remaining (%)	Extent in Parks and Wildlife Managed Lands (%)
IBRA Bioregion* - Pilbara	17,808,657	17,733,584	99.6	10
Shire* - Shire of East Pilbara	37,183,060	37,155,265	99.9	4.5
Beard Vegetation Association in Bioregion*				
93	3,042,114	3,038,472	99.9	2
171	331,307	330,026	99.6	11

Methodology References:
Commonwealth of Australia (2001)
Government of Western Australia (2016)

GIS Databases
Pre-European vegetation
NLWRA, Current Extent of Native 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 **Proposed clearing is at variance to this Principle**
The area proposed for the realignment of Marble Bar Road is located between two major rivers, being; Talga River to the east and Coongan River to the west.

A minor, non-perennial watercourse intersects the south eastern corner of the footprint area of the proposed extraction pit and two minor, non-perennial watercourses intersect the area proposed to be cleared for the road realignment.

One of the nine vegetation types identified in the biological survey is 'riparian woodland'.

Given the above the application area includes areas growing in association with a watercourse. Therefore the proposed clearing is at variance to this Principle.

The applicant has provided advice that it is expected the surface water hydrology can be maintained in its current regime with appropriate drainage design, including the use of culverts, floodways and off road drainage (GHD, 2016). Given the minor nature of the watercourses and the use of culverts, the proposed clearing will not have a significant impact on the identified watercourses.

Methodology References:
GHD (2016)

GIS Databases
Hydrography, linear

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

Comments **Proposed clearing is not likely to be at variance to this Principle**
The following three soil types have been mapped within the application area (Northcote et al., 1960-68):

Gf1: Steep ranges on basic lavas along with dolomites, tuff, banded iron formations, and dolerite dykes, with some narrow valley plains and high-level gently undulating areas of limited extent. The soils are generally shallow and stony and there are large areas without soil cover: chief soils are brown loams along with significant areas of earthy loam soils.

B27: Low terrace associated with main stream channels: chief soils are loose sands with some soils on patches of calcrete (kunkar).

Oc61: Dissected pediments and steep residual hills with iron formations: chief soils are hard alkaline red soils.

The biological survey of the application area, and surrounding environment, states that majority of the area consists of rocky soils, with sandier soils associated with areas of water flow (sheetwash, rivers and creeks) (GHD, 2016).

Sand and stony soils are highly permeable and therefore the proposed clearing is not likely to cause appreciable land degradation in the form of water erosion or water logging.

Areas of sandy soil are restricted to areas associated with water flow. The proposed clearing of these areas could cause wind erosion, however it is unlikely that appreciable land degradation will result.

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

Methodology References:
GHD (2016)
Northcote et al. (1960-68)

GIS Databases
Soils, statewide
Salinity Risk

(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 **Proposed clearing is not likely to be at variance to this Principle**
An area of unallocated Crown land (former Meentheena Pastoral Station) which is proposed to be included into conservation estate is located approximately 39 kilometres south east of the application area.

There are no conservation areas in close proximity to the application area, therefore the proposed clearing is not likely to be at variance to this Principle.

Methodology GIS Databases
Parks and Wildlife 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 **Proposed clearing is not likely to be at variance to this Principle**
The application is located adjacent to two major rivers (Talga River and Coongan River) and intersects three minor non-perennial watercourses.

The proposed clearing may increase the sediment load entering the abovementioned watercourses, however the impact is likely to be short term and minimal during the construction phase.

Groundwater salinity within areas associated with the proposed material extraction pit is mapped as 1,000-3,000 total dissolved solids, milligrams per litre. This level of groundwater salinity is considered to be moderately saline to marginal.

Groundwater salinity within the area proposed for road realignment is mapped as 500-1,000 total dissolved solids, milligrams per litre. This level of groundwater salinity is considered to be brackish to moderately saline.

The local area surrounding the application areas retains approximately 99 per cent native vegetation and therefore the proposed clearing is not likely to increase groundwater salinity. In addition, the former Department of Water (DoW) advised that the proposed clearing is unlikely to impact on groundwater resources in the area, provided the applicant adheres to the DoW's advice and guidelines (DoW, 2017).

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

Methodology References:
DoW (2017)

GIS Databases
Hydrography, linear
Groundwater Salinity

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

Comments **Proposed clearing is not likely to be at variance to this Principle**
The proposed clearing of 51.41 hectares over two sites, within an area that retains approximately 99 per cent vegetation is not likely to increase the incidence or intensity of flooding.

The proposed clearing is not likely to be at variance to this Principle.

Methodology GIS Databases
Soils, statewide

Planning instruments and other relevant matters.

Comments The application area falls within the Pilbara ground and surface water areas as proclaimed under the *Rights in Water and Irrigation Act 1914*. The then Department of Water (DoW) advised that the application area does not appear to occur across waterways (the applicant will not require any new crossing points), therefore a bed and banks permit is not required (DoW, 2017). DoW further advised that the applicant has submitted an application to take water (surface water licence) to facilitate these works. DoW will liaise with the proponent regarding these water licensing requirements (DoW, 2017). DoW considers that the proposed clearing is unlikely to impact on groundwater resources in the area, provided the applicant adheres to the DoW's advice and guidelines (DoW, 2017).

The application was advertised online on 2 May 2017 for a 21 day submission period. Publication summary was advertised in *The West Australian* on Monday 8 May 2017. No submissions were received in relation to this application.

No Aboriginal Sites of Significance have been recorded within the application area.

Methodology References:
DoW (2017)

GIS Databases:
Aboriginal Sites of Significance
RIWI, Irrigation Areas

5. References

- Astron (2017) Marble Bar Road (M030) Coongan Gorge Realignment Northern Quoll Management Plan May 2017. Prepared for Main Roads Western Australia (DER Ref: A1490100).
- Commonwealth of Australia (2001) National Objectives and Targets for Biodiversity Conservation 2001-2005, Canberra.
- Commonwealth of Australia (2011) *Environment Protection and Biodiversity Conservation Act 1999* referral guidelines for the endangered northern quoll, *Dasyurus hallucatus*, EPBC Act Policy Statement 3.25, Commonwealth of Australia, Canberra.
- Department of Biodiversity, Conservation and Attractions (DBCA) (2007-) NatureMap: Mapping Western Australia's Biodiversity. Department of Biodiversity, Conservation and Attractions. URL: <http://naturemap.dpaw.wa.gov.au/>. Accessed September 2017.
- Department of Parks and Wildlife (Parks and Wildlife) (2017) Fauna advice for Clearing Permit Application CPS 7549/1. Received on 22 June 2017 (DER Ref: A1459277).
- Department of the Environment and Energy (DotEE) (2017) Northern Quoll (*Dasyurus hallucatus*) Advice to the Minister for the Environment and Heritage from the Threatened Species Scientific Committee (TSSC) on Amendments to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Department of the Environment and Energy. <http://www.environment.gov.au/node/16356>
- Department of Water (DoW) (2017) *Rights in Water and Irrigation Act 1914* advice for Clearing Permit Application CPS 7549/1 (DER Ref: A1443348).
- GHD (2016) Coongan Gorge Road Realignment Biological Assessment. Prepared for Main Roads Western Australia (DER Ref: A1407519).
- GHD (2017) Coongan Gorge Realignment. Environmental Impact Assessment and Environmental Management Plan. Prepared for Main Roads Western Australia. January 2017 (DER Ref: A1407556).
- Government of Western Australia (2016). 2016 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of October 2016. WA Department of Parks and Wildlife, Perth.
- Hill B.M. and Ward S.J. (2010) National Recovery Plan for the Northern Quoll *Dasyurus hallucatus*. Department of Natural Resources, Environment, The Arts and Sport, Darwin.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Main Roads Western Australia (MRWA) (2017a) EPBC Referral for the Marble Bar Road (M030) Coongan Gorge Realignment. EPBC 2017/7880.
- Main Roads Western Australia (MRWA) (2017b) Email containing information on the social and economic matters relating to Clearing Permit Application CPS 7549/1. Received on 31 May 2017 (DER Ref: A1442041).
- Northcote, K. H. with Beckmann G G, Bettenay E., Churchward H. M., van Dijk D. C., Dimmock G. M., Hubble G. D., Isbell R. F., McArthur W. M., Murtha G. G., Nicolls K. D., Paton T. R., Thompson C. H., Webb A. A. and Wright M. J. (1960-68): 'Atlas of Australian Soils, Sheets 1 to 10, with explanatory data'. CSIRO and Melbourne University Press: Melbourne.
- Western Australian Herbarium (1998-) FloraBase - The Western Australian Flora. Department of Parks and Wildlife. <http://florabase.dpaw.wa.gov.au/> (Accessed May 2017).