



Clearing Assessment Report – CPS 818

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Western Australia.*

Burrup Peninsula Rd Infrastructure
Upgrades

April 2022

2514

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Amendments

Report Compilation & Review	Name and Position	Document Revision	Date
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1 PURPOSE

The purpose of this Clearing Assessment Report (CAR) is to provide a report detailing the assessment of native vegetation clearing that is proposed to be undertaken using the Statewide Clearing Permit CPS 818 issued to Main Roads Western Australia (Main Roads).

The CAR outlines the key activities associated with the project, the existing environment and an assessment of native vegetation clearing. This assessment provides an evaluation of the vegetation clearing impacts associated with the project using the ten Clearing Principles, and the strategies used to manage vegetation clearing.

2 SCOPE

2.1 Project Scope

Project Name: Burrup Peninsula Rd Infrastructure Upgrades

Project Purpose / Components: Perdaman Chemical and Fertilisers (Perdaman) are proposing to develop and construct a urea plant, and conveyor facility connecting to Dampier Port. The plant will be on two main sites, C and F, both requiring access to the Burrup Peninsula Road which is under Main Roads' jurisdiction.

Main Roads were commissioned by the Department of Jobs, Tourism, Science and Innovation (JTSI) to manage the design and construction of both access ways (to areas C and F). The Main Roads scope of works includes:

- Realigning the first kilometre of Hearson Cove Road including constructing a new Hearson Cove Road/ Burrup Peninsula Road intersection;
- Construction of access way to site C;
- Relocation of existing services (overhead power & water pipeline);
- Protection of existing services (fibre optic cable, gas pipelines);
- Upgrading box culvert on Burrup Peninsula Road;
- Extension of culverts on Burrup Peninsula Road;
- Widening of Burrup Peninsula Road; and
- Other ancillary works.

The proposed clearing undertaking using CPS 818 is : 8.53 ha within a development envelope of 13.68 ha (there is only 8.53 ha of vegetation within the development envelope, the rest is cleared)

The proposed temporary clearing undertaking using CPS 818 is: 0

Project Location(s): The project area is located on Burrup Peninsula Road (SLK 4.600 to 6.850) within the City of Karratha as shown in Figure 1.

- MGA reference: Zone 50
- 475,725E 7,718,376N

2.2 Assessment Report Scope

The assessment area, see Figure 2, is confined to a local area of a 40 km radius.



Figure 1. Project Area

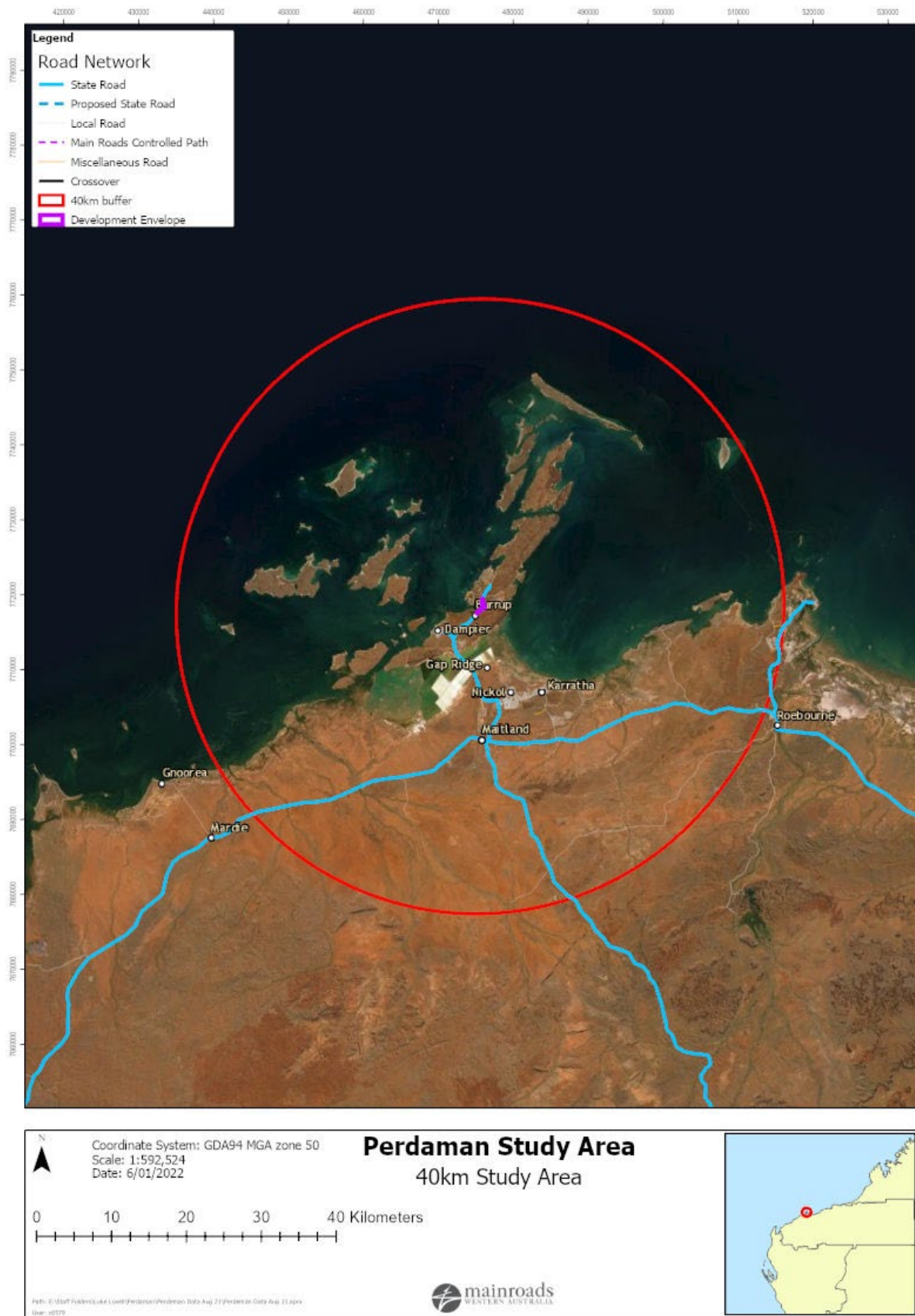


Figure 2. Assessment Area

2.3 Alternatives to clearing

Due to safety issues associated with trucks turning in and out of the Perdaman project and the increased number of trucks in the area, the road upgrades are required and hence clearing is required. The alternative to clearing would place lives at danger.

The culvert located at SLK 6.040 along Burrup Peninsula Rd causeway is structurally deteriorating due to regularly working at maximum capacity. In addition the traditional owners in the area have requested to see better flow through the culvert and reduced backwater in the basin that is currently caused by Burrup Peninsula Rd. To achieve the improvements, the culvert is required to be replaced. The flow improvement is likely to facilitate an increase in mangrove regeneration, as has been observed by Main Roads at the Popes Nose structure in Point Samson.

2.4 Measures to Avoid, Minimise, Reduce and Manage Project Clearing Impacts

The design and management measures implemented to avoid and minimise the clearing impacts by the project are provided in Table 1. Key measures included:

- Prioritising the use of pre-cleared areas and disturbed vegetation as far as possible, ahead of clearing good quality native vegetation.
- Designing the works so that the footprint is as small as possible.

Table 1. Measures undertaken to Avoid, Minimise, Reduce and Manage the Project Clearing Impacts

Design or Management Measure	Discussion and Justification
Steepen batter slopes	Safety standards on highways of this traffic volume require a specific batter ratio to be used. Due to the vehicle type and posted speeds these batters cannot be changed significantly as they are already considered steep.
Installation of safety barriers	Safety barriers will be installed throughout most of the project and these have reduced the amount of clearing required.
Alignment to one side of existing road	The works are utilising the existing road as much as possible.
Alternative alignment to follow existing road (or) to preferentially locate within pasture or a degraded areas	The proposed infrastructure is predominantly on the existing alignment which has minimised the amount of clearing required.
Installation of kerbing	Kerbing has been considered and implemented in the design where possible particularly at intersections to control runoff.
Simplification of design to reduce number of lanes and/or complexity of intersections	The widening scope of works cannot be further simplified whilst retaining the necessary safety benefits.
Preferential use of existing cleared areas for access tracks, construction storage and stockpiling	Further project clearing will be avoided as the site office, materials storage areas, construction vehicles/machinery and access tracks will be located on previously disturbed or cleared areas.
Drainage modification	Culvert upgrades at 6 SLK will increase water flow bringing the hydrology closer to the natural state.

2.5 Approved Policies and Planning Instruments

The clearing of native vegetation in Western Australia is regulated under the EP Act and the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.3), Main Roads has also had regard to the below instruments.

Other Legislation of relevance for assessment of clearing and planning/other matters

- Biodiversity Conservation Act 2016 (WA) (BC Act)
- Conservation and Land Management Act 1984 (WA) (CALM Act)
- Country Areas Water Supply Act 1947 (WA) (CAWS Act)
- Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act)
- Planning and Development Act 2005 (WA) (P&D Act)
- Soil and Land Conservation Act 1945 (WA)
- Rights in Water and Irrigation Act 1914
- Aboriginal Heritage Act 1972 (WA)
- Town Planning and Development Act 1928

Environmental Protection Policies

- Environmental Protection (Peel Inlet - Harvey Estuary) Policy 1992;
- Environmental Protection (Western Swamp Tortoise Habitat) Policy 2011

Other Relevant policies and guidance documents:

- Environmental Offsets Policy (Government of Western Australia, 2011)
- A guide to the assessment of applications to clear native vegetation (DEC, December 2014)
- Procedure: Native vegetation clearing permits (DWER, October 2019)
- Environmental Offsets Guidelines (Government of Western Australia, August 2014)
- Technical guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016)
- Technical guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA, 2020)
- Approved conservation advice under section 266B of the EPBC Act for threatened flora/fauna/vegetation communities
- Approved Recovery Plans for threatened species
- EPBC Act Referral guidelines for the three threatened black cockatoo species
- Strategic advice - EPA

3 SUMMARY OF SURVEYS

3.1 Biological Survey

The Burru Peninsula Road Infrastructure Upgrades Biological Assessment was conducted on 30 September and 8 October 2021 by Biota Environmental Sciences (Biota 2022). Section 3.1.1 contains a summary of the survey.

3.1.1 Summary of Biological Survey

Main Roads requested a biological survey to delineate key flora, fauna, soil and surface water values (wetlands) associated with infrastructure upgrades between SLK 4.6 to 7.0 on the Burru Peninsula Road. The survey area comprised a small (16.82 ha) area located in a highly disturbed landscape. The majority of the length of the survey area comprised very narrow (less than 20 m) habitat fringing the Burru Peninsula Road, with wider areas located on and to the north of the section that crosses tidal mudflat.

The site was visited on two days in late September/early October 2021. Vegetation types were described and mapped, along with their condition, and searches were undertaken for significant flora. Fauna habitats were described and mapped, and motion-sensitive cameras and ultrasonic recording units were deployed for eight nights to target significant fauna species.

The survey recorded seven vegetation types that are all common in the local area. Vegetation condition varied from Excellent to Completely Degraded. The only significant vegetation recorded was the Priority 1 "Burru Peninsula rock pile communities" Priority Ecological Community (PEC). Only two small rockpiles occurred in the survey area, totalling 0.06 ha; these comprise 0.2% of the mapped extent of this habitat in the local area (defined as the survey area and contextual area combined).

A total of 119 native taxa from 81 genera and 35 families were recorded from the survey area, all of which have been recorded previously from the study area (40 km radius). None of the Priority flora known to occur in the locality were recorded in the survey area, and none are considered likely to occur. No Threatened flora are listed for the locality.

The survey recorded six fauna habitat types (and a cleared type) that are all common in the local area. Two significant fauna species, both bats, were either confidently or tentatively identified from ultrasonic calls; the Pilbara Leaf-nosed Bat (*Rhinoicteris aurantia* (Pilbara Form), listed as Vulnerable, was detected over a drainage line, while the Priority 1 Northern Coastal Free-tailed Bat (*Ozimops cobourgianus*) may have been recorded over mangal. No signs of other significant fauna were recorded, however the Northern Quoll (Endangered), and Ghost Bat and Pilbara Olive Python (both Vulnerable), would be likely to occur or may be transient through the area at times.

4 VEGETATION DETAILS

4.1 Project Site Vegetation Description

Seven vegetation types are present within the development envelope (Biota 2022) as shown in Table 1.

Table 1. Vegetation Units within Development Envelope

Unit Code	Description	Extent within DE (ha)	% of extent mapped in survey and contextual areas
Vegetation Units			
AbTa	<i>Acacia bivenosa</i> , (<i>A. pyrifolia</i> , <i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>) tall open shrubland over <i>Triodia angusta</i> , (<i>T. epactia</i>) open hummock grassland to very open hummock grassland with * <i>Cenchrus ciliaris</i> very open tussock grassland to tussock grassland	3.11	5.50
AvRs	<i>Avicennia marina</i> , (<i>Rhizophora stylosa</i>) low closed forest	1.19	5.64
BaAclc	<i>Acacia coriacea</i> subsp. <i>coriacea</i> , <i>Brachychiton acuminatus</i> scattered low trees over <i>Ipomoea costata</i> scattered shrubs (potential Priority 1 ecological community)	0.06	0.16
CE	Scattered shrubs over * <i>Cenchrus</i> spp. closed tussock grassland	2.62	12.42
EvCETaTe	<i>Eucalyptus victrix</i> scattered low trees to low open woodland over mixed tall open shrubland over * <i>Cenchrus</i> spp. Open tussock grassland with <i>Triodia angusta</i> , <i>T. epactia</i> very open hummock grassland	0.09	1.26
GpTe	<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i> , <i>Acacia bivenosa</i> , <i>A. coriacea</i> subsp. <i>coriacea</i> scattered tall shrubs to tall open shrubland over <i>Triodia epactia</i> hummock grassland	0.20	3.55
ThTil	<i>Tecticornia halocnemoides</i> subsp. <i>tenuis</i> , <i>Tecticornia indica</i> subsp. ? <i>lelostachya</i> low open shrubland	1.27	5.71
	Subtotal	8.53	
Other Mapping Units			
Mudflat	Tidal mudflat/seawater; largely bare of vegetation except occasional samphire shrubs.	0.29	1.02
Cleared	Cleared roads and other infrastructure.	4.86	N/A
	Total	13.68	N/A

Vegetation condition within the development envelope as mapped by Biota (2022) is listed in Table 2.

Table 2. Vegetation Condition within Development Envelope

Vegetation Condition	Extent with DE (ha)
Excellent	2.46
Very Good	0.34
Good	1.89
Good to Poor	0.50
Degraded	1.55
Completely Degraded	1.78
Subtotal	8.53
Cleared	4.85

N/A (mudflat)	0.29
Total	13.68

4.2 Vegetation Associations and Representation

Tables 3 and 4 provide details of the Pre-European Vegetation Associations within the project area and the remaining extents of these associations.

Table 3. Summary of Project Area's Mapped Pre-European Vegetation Associations

Pre-European Vegetation Association(s)	Clearing Description	Vegetation Condition	Comments
Vegetation Association 117 described as a Hummock grassland <i>Triodia</i> spp. (Government of Western Australia, 2019)	Clearing of up to 8.53 ha for infrastructure upgrades	Excellent - Completely Degraded	Vegetation description and condition determined from the biological survey (Biota 2022).

Table 4. Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre-European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
Veg Assoc No. 117	Statewide	919,517.05	886,005.79	96.36	14.25
	IBRA Bioregion Pilbara	82,705.78	78,096.64	94.43	21.28
	IBRA Sub-region Roebourne	50,962.94	46,901.57	92.03	34.54
	Local Government Authority City of Karratha	41,173.74	31,921.58	77.53	44.99

5 ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

In assessing whether the project's proposed clearing is likely to have a significant impact on the environment, the project was assessed against the ten Clearing Principles (Environmental Protection Act 1986, Schedule 5).

Each principle has been assessed in accordance with DWER's 'A Guide to the Assessment of Applications to Clear Native Vegetation' and other relevant CPS Decision Reports prepared by DWER.

The proposed clearing is at variance to principle (f), may be at variance to principles (a) and (b), and is not likely to be at variance to the remaining clearing principles. This is consistent with DWER's assessment of CPS 9160 which was granted for adjacent areas in 2021.

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

Proposed clearing may be at variance to this Principle
The development envelope lies within the Pilbara Bioregion in the Roebourne subregion. The Roebourne subregion is described by Kendrick and Stanley (2003) as follows: "Quaternary alluvial and older colluvial coastal and subcoastal plains with a grass savannah of mixed bunch and

hummock grasses, and dwarf shrub steppe of *Acacia stellaticeps* or *A. pyrifolia* and *A. inaequilatera*. Uplands are dominated by *Triodia* hummock grasslands. Ephemeral drainage lines support *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands. Samphire, *Sporobolus* and mangal occur on marine alluvial flats and river deltas. Resistant linear ranges of basalts occur across the coastal plains, with minor exposures of granite. Islands are either Quaternary sand accumulations, or composed of basalt or limestone, or combinations of any of these three. Climate is arid (semi-desert) tropical with highly variable rainfall, falling mainly in summer. Cyclonic activity is significant, with several systems affecting the coast and hinterland annually.”

One Beard vegetation sub-association is mapped over the development envelope and the entire Burrup Peninsula, Abydos Plain – Roebourne 117. This vegetation association is described as *Acacia* spp. sparse shrubland over Soft Spinifex (*Triodia epactia*) open hummock grassland.

The proposed vegetation clearing area is up to 8.53 ha, covering all native vegetation within the development envelope and comprising a total of seven vegetation types (Biota 2022) (see Section 4.1). All of these vegetation types were also mapped within the wider survey area and contextual area and are known to occur more broadly in the surrounding region (Biota 2022). Clearing impact as a % of the mapped extent of a vegetation type (in Biota 2022) is less than 6% for all vegetation types apart from CE (Scattered shrubs over **Cenchrus* spp. closed tussock grassland) for which clearing impact is 12.42% (see Section 4.1). CE is a heavily disturbed, partly cleared vegetation community in Completely Degraded condition and therefore not associated with high biodiversity.

No vegetation recorded in the proposed clearing area or the survey area more broadly resembles any known TEC (Biota 2022). The areas of rockpile (vegetation type BaAclc) in the survey area and contextual area are considered likely to represent the Priority 1 “Burrup Peninsula rock pile communities” PEC (Biota 2022). It is not clear why only some rockpiles on the Burrup are currently designated as this PEC and therefore there is uncertainty as to whether the surveyed rockpiles represent this PEC. The proposed clearing of 0.06 ha of this rockpile community comprises less than 0.2% of the mapped extent of this habitat from the Biota (2022) survey alone. Hence it is unlikely that the proposed clearing will be detrimental to the PEC on a local and regional scale.

The proposal involves clearing of up to 1.19 ha of mangal, vegetation type AvRs (*Avicennia marina*, (*Rhizophora stylosa*) low closed forest). This vegetation type is covered by EPA (2001) advice ‘Protection of Tropical Arid Zone Mangroves Along the Pilbara Coastline’. Under this advice, the mangal proposed to be cleared falls within the lowest significance, ‘Guideline 4: Other mangrove areas – inside designated industrial areas and associated port areas’. The EPA’s operational objective for Guideline 4 areas is that the impacts of development on mangrove habitat and ecological function of the mangroves in these areas should be reduced to the minimum practicable level. The proposed clearing is in line with this guideline as the proposed clearing of mangal has been reduced as far as feasible to still allow construction of cofferdams for the replacement of the main culvert at SLK 6 and associated access.

The condition of vegetation in the clearing area ranges from Excellent to Completely Degraded (See Table 2 in Section 4.1), with the lower condition categories largely reflecting the degree of previous disturbance and weed invasion, particularly by **Cenchrus species*. Approximately 39% of vegetation proposed to be cleared is in Degraded or Completely Degraded condition. Vegetation mapped in Excellent condition (29% of clearing area), comprises AvRs mangal and ThtTil samphire.

The desktop search of the 40km study area identified 21 Priority species as being known from the study area, including:

- three Priority 1 species: *Gomphrena axillaris*, *Goodenia pallida* and *Tephrosia rosea* var. Port Hedland (A.S. George 1114);
- two Priority 2 species: *Euphorbia australis* var. *glabra* and *Trianthema* sp. Python Pool (G.R.Guerin & M.E. Trudgen GG 1023);
- 15 Priority 3 species: *Abutilon* sp. Pritzelianum (S. van Leeuwen 5095), *Atriplex lindleyi* subsp. *conduplicata*, *Corchorus congener*, *Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479), *Eragrostis surreyana*, *Gomphrena cucullata*, *Gomphrena leptophylla*, *Gymnanthera cunninghamii*,

Nicotiana umbratica, *Schoenus punctatus*, *Stackhousia clementii*, *Stackhousia umbellata*, *Terminalia supranitifolia*, *Themeda* sp. Hamersley Station (M.E. Trudgen 11431) and *Vigna triodiophila*; and

- one Priority 4 species: *Rhynchosia bungarensis*.

The reconnaissance vegetation and flora survey and targeted survey for significant flora by Biota (2022) did not record any of the above Priority flora species or other significant flora species in the proposed clearing area or the wider survey area, but did record *Terminalia supranitifolia* (P3) in the contextual area (approximately 100 m from survey area). Post-survey likelihood of occurrence assessment considered all significant flora species as either 'Unlikely to Occur' or 'Would not Occur' within the survey area. Therefore the proposed clearing is not expected to impact on significant flora.

A total of 119 native taxa from 81 genera and 35 families were recorded from the biological survey area (Biota 2022), all of which have been recorded previously from the 40km study area. Five weed species were also recorded, all of these species are common and widespread weeds in the locality. None are Declared Plants or WoNS.

Six fauna habitats were identified within the development envelope (Biota 2022) and are proposed to be cleared:

- Hummock grassland on midslopes (3.31 ha)
- Degraded tussock grasslands (2.62 ha)
- Rockpiles (0.06 ha)
- Drainage line (0.09 ha)
- Mangal (1.19 ha)
- Tidal Mudflat (vegetated portion 1.27 ha)

The hummock grassland on midslopes is dominant in terms of area, followed by large areas of degraded tussock grasslands adjacent to the Burrup Peninsula Road. The habitat loss from proposed clearing is not likely to be significant as the same habitat types are widely available immediately adjacent to the cleared areas.

The desktop search of the 40 km study area identified 70 fauna species of significance as either previously recorded from the study area, or potentially occurring in the study area. This excluded purely marine species (e.g. whales) for which habitat is not available within the clearing area.

The vast majority of the significant species identified by the desktop search comprised migratory bird species, many of which were considered 'likely to occur' or 'may occur' in the survey area. A range of species have been recorded previously from King Bay and/or Hearsons Cove, to the west and east of the survey area respectively, and could utilise the tidal mudflats and adjacent fringing vegetation at times.

The Pilbara Olive Python (*Liasis olivaceus barroni*) was found as a roadkill specimen within the survey area in 2015 and was considered likely to be transient through the development envelope at times. The Endangered Northern Quoll (*Dasyurus hallucatus*) is known from rockpiles on the Burrup Peninsula, however the small size of the rockpiles in the development envelope would suggest that the species probably only occur as a foraging visitor. Northern Coastal Freetailed Bat (*Ozimops cobourgianus* / *Mormopterus loriae cobourgiana*) is considered likely to occur / potentially recorded, Pilbara Leaf-nosed Bat (*Rhynonictis aurantia*) was recorded (foraging habitat only) and the development area may also provide foraging habitat for Vulnerable Ghost Bat (*Macroderma gigas*).

Fork-tailed swift, Barn Swallow, Osprey and Peregrine Falcon are considered likely to occur in the area but were not observed (Biota 2022) and are expected to be largely aerial within the development envelope. More detailed information on fauna is provided under principle b.

Overall, the native vegetation within the development envelope is broadly representative of the vegetation from the surrounding area, no significant flora will be impacted, and the proposed clearing of 0.06 ha of vegetation type BaAclC (potential PEC) is not significant on a local scale. This is in line with DWER's assessment of the adjacent CPS 9160 (for a larger area sharing the same vegetation complexes) that concluded, "*the native vegetation proposed to be cleared is comprised of vegetation types and flora taxa typical*

to the region” (DWER 2021). Given the linear shape of the development envelope adjacent to an existing road, the fact that the landscape surrounding the development envelope is largely vegetated and that comparable fauna habitat occurs in the immediate vicinity of the works, the vegetation to be cleared is not expected to comprise a higher level of biological diversity than the surrounding areas.

Based on the above, the proposed clearing may be at variance with this principle.

Methodology

- Biota (2022)
- DBCA shapefiles
- DWER (2021)
- EPA (2021)
- Kendrick and Stanley (2003)
- Main Roads GIS Shapefiles
- NatureMap (Accessed 9/3/2021)

(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.

Proposed clearing may be at variance to this Principle

Six fauna habitat types were recorded in the development envelope by Biota (2022):

- Hummock grassland on midslopes
- Degraded tussock grasslands
- Rockpiles
- Mangal
- Rockpile
- Drainage line
- Tidal mudflat

The desktop search of the 40 km study area identified 70 fauna species of significance as either previously recorded from the study area, or potentially occurring in the study area. This excluded purely marine species (e.g. whales) for which habitat is not available within the clearing area. The vast majority of the significant species identified by the desktop search comprised migratory bird species, many of which were considered likely to occur in the survey area, or may occur as transient visitors.

Based on DBCA database search results, two significant fauna species have been recently recorded from within the biological survey area:

- Olive Python (*Liasis olivaceus barroni*)
- Northern Quoll (*Dasyurus hallucatus*)

Granophyre rockpiles (Rockpiles habitat) are a characteristic feature of the Burrup Peninsula. In the broader locality, this habitat provides potential denning sites for the Threatened Northern Quoll (*Dasyurus hallucatus*), along with shelter for other small mammal species. However, the rockpiles in the proposed clearing area and the wider survey area were all small in size and would be unlikely to be considered core habitat for the Northern Quoll, particularly given the much larger rockpiles with better developed vegetation occurring to the east and west (Biota 2022).

There were similarly no signs of the Pilbara Olive Python during the biological survey (Biota 2022), however the species was recorded as a roadkill in the survey area several years ago. Like the Northern Quoll, this species would not be expected to be resident in the rockpile habitats in the proposed clearing area or the wider survey area, but may move through the area at times.

No calls of the Ghost Bat were recorded, however this species was detected by APM (2019) in close vicinity

and is therefore considered likely to forage over the proposed clearing area at times. There was no suitable habitat for roosting or breeding of this species within the proposed clearing area or wider survey area.

Calls of the Pilbara Leaf-nosed Bat were recorded from the drainage line habitat. This species was not previously recorded in the area. Given that the nearest known roost of this species is 120 km away, no roosting habitat is available in the survey area and that the number of recorded calls was low, it is considered likely that there is a small number of vagrants in the survey area (Biota 2022) and this applies also to the proposed clearing area.

Some calls that potentially represent the Priority 1 Northern Coastal Free-tailed Bat (*Ozimops cobourgianus*) were recorded in the bat call recorder deployed in the mangal habitat, however these calls could not be distinguished from the common species *Chalinolobus gouldii*. Regardless, the species is considered likely to occur as there are numerous records in the study area, including recent records from the adjacent area by APM (2019). This species is a mangrove specialist, restricted to mangrove forest and adjacent areas (Churchill 1998).

A number of listed Migratory bird species have been recorded from the King Bay-Hearson’s Cove system, which the survey area traverses, and others are known from the Dampier Salt salt ponds to the south. A large number of these species could potentially occur within the tidal mudflat and samphire habitats, but only a small portion of these habitats will be impacted by the proposed clearing.

As per the adjacent approval CPS 9160 which shares adjoining fauna habitats, DWER’s assessment concluded *“The fauna habitat types within the application area will remain well-connected and part of a larger contiguous landscape of similar habitats within the local area and surrounding region. Over 537,000 hectares of native vegetation remains within the local area, representing 92 per cent of its original extent”* (DWER 2021). Given the linear shape of the development envelope adjacent to an existing road, the fact that the landscape surrounding the development envelope is largely vegetated and that all six habitat types recorded are widespread in the region and are not limited to within the development envelope, the proposed clearing of 8.53 ha is not considered to comprise the whole or a part of, or be necessary for the maintenance of, a significant habitat for fauna.

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

Methodology

- APM (2019)
- Biota (2022)
- DBCA Shapefiles
- DWER (2021)

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

Proposal is not at variance to this Principle

No threatened flora are listed for the locality, none were recorded during the field assessment (Biota 2022) and none are considered likely to occur in the development envelope. Therefore, the proposed clearing is not at variance to this Principle.

Methodology

- Biota (2022)
- DBCA shapefiles

(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.

Proposed clearing is not at variance to this Principle
The desktop assessment indicated no Threatened Ecological Communities (TECs) occur within the study area. In addition, the vegetation recorded in the proposed clearing area does not resemble any known TEC (Biota 2022). No impacts are expected to occur to TECs, and therefore the proposed clearing is not at variance to this Principle.
Methodology Biota (2022) DBCA shapefiles

(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.

Proposed clearing is not at variance to this Principle																											
<p>The project area falls within the Pilbara Bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database). Approximately 99.6% of the pre-European vegetation still exists in the IBRA Pilbara Bioregion (Government of Western Australia 2019). The project area is broadly mapped as Beard vegetation association 117: Hummock grassland <i>Triodia</i> spp. (GIS Database). Approximately more than 94% of the pre-European extent of this vegetation association remains uncleared at both the state and bioregional level (Government of Western Australia 2019). Even within City of Karratha, 77.53% of the pre-European extent of this vegetation association remains.</p> <p>The national objectives and targets for biodiversity conservation in Australia set a threshold of 30% of the pre-European extent of an ecological community, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia 2001). The vegetation association impacted by the proposed clearing is well above this threshold at all scales. Therefore, the proposed clearing area does not represent a significant remnant of native vegetation in an area that has been extensively cleared.</p>																											
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(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.**Proposed clearing is at variance to this Principle**

There are no formally mapped watercourses or wetlands in the proposed clearing area but three of the vegetation types recorded within the development envelope and proposed to be cleared, represent vegetation growing in or in association with an environment associated with a watercourse or wetland (Biota 2022):

AvRs - *Avicennia marina*, (*Rhizophora stylosa*) low closed forest (1.19 ha)

ThtTil - *Tecticornia halocnemoides* subsp. *tenuis*, *Tecticornia indica* subsp. ? *leiostachya* low open shrubland (1.27 ha)

EvCETaTe - *Eucalyptus victrix* scattered low trees to low open woodland over mixed tall open shrubland over **Cenchrus* spp. Open tussock grassland with *Triodia angusta*, *T. epactia* very open hummock grassland (0.09 ha)

EvCETaTe is associated with minor ephemeral drainage lines that during heavy rainfall events run from the rocky outcrops towards the tidal flats and the King Bay to the west. **AvRs** and **ThtTil** are associated with the tidal and supratidal flats extending from the King Bay on both sides of the Burrup Peninsula Road. All three vegetation types are common in the local area.

The mangal vegetation type (AvRs) is covered by EPA (2001) advice 'Protection of Tropical Arid Zone Mangroves Along the Pilbara Coastline'. Under this advice, the mangal proposed to be cleared falls within the lowest significance, 'Guideline 4: Other mangrove areas – inside designated industrial areas and associated port areas'. The EPA's operational objective for Guideline 4 areas is that the impacts of development on mangrove habitat and ecological function of the mangroves in these areas should be reduced to the minimum practicable level. The proposed clearing is in line with this guideline as the proposed clearing of mangal has been reduced as far as feasible to still allow construction of cofferdams for the replacement of the main culvert at SLK 6 and associated access.

Overall, the vegetation proposed to be cleared relevant to principle (f) is located adjacent to existing infrastructure, within an area zoned for roads and industrial use. The original construction of the causeway and associated culverts and the various industrial operations in the local area have already modified the hydrology and water quality of the tidal/supratidal flats. The proposed clearing and associated works aim to maintain the current hydrology in most areas but in the case of the main causeway culvert (SLK 6), the aim is to provide more flow capacity than currently and potentially return more natural hydrology. As the scale of proposed clearing is minor in the context of the overall size of the ephemeral drainage lines and the tidal/supratidal flats, and the surrounding areas remain largely vegetated, the impacts of the proposed clearing on the surface water systems are not expected to be significant.

Based on the above, the proposed clearing is at variance with this principle.

Methodology

Biota (2022)

EPA (2021)

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.**Proposed clearing is not likely to be at variance to this Principle**

The project lies within the Granitic System and Littoral Pilbara land systems. These land systems have been mapped and described in technical bulletins produced by the former Department of Agriculture (now the Department of Primary Industries and Regional Development).

The Granitic land system is described as hill tracts of granitic rocks with pockets of shallow gritty surfaced acidic soils, relief up to 100 m. This land system is not generally susceptible to erosion (van Vreeswyk et al. 2004).

The Littoral land system is described as bare coastal mudflats subject to occasional tidal inundation, minor samphire flats, sandy plains and islands, mangrove outer margins, coastal dunes and beaches. This land system is not generally susceptible to erosion (van Vreeswyk et al. 2004).

The development envelope intersects only a small proportion (<5%) of the local extent of each land system, and a negligible proportion of the extent mapped for the Roebourne subregion.

Management measures will be incorporated to Construction Environmental Management Plan (CEMP) to address potential sedimentation associated with vegetation clearing and associated works within tidal mangal and samphire areas. However it is noted that these areas are subject to highly variable levels of turbidity as part of natural processes.

The SLIP/ASRIS database indicates that the causeway area (the Littoral land system) is classified as High to Moderate risk of ASS. The proposed vegetation clearing is not expected to disturb ASS, however ASS management measures will be incorporated to CEMP to appropriately managed the associated construction works and will ensure that any potential disturbance of ASS will be appropriately managed and adverse ASS related impacts are avoided.

Overall, the proposed clearing is unlikely to cause appreciable land degradation.

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

Methodology

DWER and DBCA shapefiles
 Biota (2022)
 Van Vreeswyk et al. (2004)

(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.

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

The application area does not intersect with any DBCA managed lands. Murujuga National Park is located approximately 1.2 km east of the project area (GIS Database). As the vegetation proposed to be cleared is located adjacent to existing infrastructure, better condition vegetation is locally abundant, and no ecological linkage lines to the national park are being impacted, the proposed clearing is unlikely to impact on the environmental values of the nearby conservation area.

Main Roads will implement weed management measures to ensure the construction does not impact the biodiversity values of the local area, including the nearby park, inclusive of vehicle hygiene checks and cleans being done off site.

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

Methodology

DBCA shapefiles

(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.

<p>Proposed clearing is not likely to be at variance to this Principle</p>
<p>There are no Public Drinking Water Source Areas within or in close proximity to the application area (GIS Database). The nearest PDWSA is Roebourne Water Reserve approximately 43km South East. The proposed clearing area is located within a proclaimed surface water area (Pilbara Surface Water Area) and a proclaimed groundwater area (Pilbara Groundwater Area). There are no mapped watercourses or wetlands within the area proposed to be cleared (GIS Database), however there are ephemeral drainage lines and a major tidal/supratidal flat associated with King Bay.</p> <p>The proposed clearing is located adjacent to existing infrastructure, is linear in nature and is relatively minor in scale considering the large extents of native vegetation remaining in the local area. Therefore the clearing itself is unlikely to result in deterioration in the quality of surface or underground water.</p> <p>Infrastructure upgrades will be installed to ensure that current surface hydrology is maintained or in the case of the causeway culvert at SLK 6, the increase in culvert size will potentially return a more natural flow regime.</p> <p>Based on the above, the proposed clearing is not likely to be at variance to this principle.</p>
<p>Methodology Biota (2022) DWER and DBCA shapefiles</p>

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

<p>Proposed clearing is not likely to be at variance to this Principle</p>
<p>The climate of the region is semi-arid, characterised by hot summers and cool winters. The area has a low average rainfall of approximately 297 millimetres per year (BoM, 2021). There are no mapped watercourses or wetlands within the development envelope proposed to be cleared.</p> <p>Seasonal drainage lines are common in the region and temporary localised flooding may occur briefly following heavy rainfall events. Also, the Burrup Peninsula Road causeway crosses a tidal/supratidal system that is subject to periodic flooding from tides and storm surges. As the proposed clearing is relatively minor in scale and adjacent to existing infrastructure it is unlikely to increase the incidence or intensity of natural flooding events.</p> <p>Based on the above, the proposed clearing is not likely to be at variance to this principle.</p>
<p>Methodology Biota (2022) Bom (2022)</p>

6 ADDITIONAL ACTIONS REQUIRED

Table 5 summarises what further pre-clearing impact assessment and vegetation management is required in accordance with CPS 818.

Table 5. Summary of Additional Management Actions Required by CPS 818

Impact of Clearing	Yes/No or NA	Further Action Required
<p>1. The CAR indicates that the clearing is 'At Variance' or 'May be at Variance' with one or more of the Clearing Principles.</p> <p>Where the clearing is at variance or may be at variance to Clearing Principle (f) and no other Clearing Principle, and the area of the proposed clearing is less than 0.5 hectares in size and the Clearing Principle (f) impacts only relate to:</p> <ul style="list-style-type: none"> (i) a minor non-perennial watercourse(s); (ii) a wetland(s) classed as a multiple use management category wetland(s); and/or (iii) a wetland that is not a defined wetland; <p>the preparation of an Assessment Report, as required by condition 6(e), is not required.</p>		<ol style="list-style-type: none"> 1. Submissions will be sought from relevant parties, including the LGA, in accordance with Condition 8 of CPS 818/15 published on the website. 2. VMP has been completed, refer to Appendix 1. 3. An offset proposal for approval by DWER is required where clearing is 'at variance'. The offset proposal must be approved prior to undertaking clearing of the area to which the offset is related.
<p>2. Clearing is at variance or may be at variance with Clearing Principle (g) land degradation, (i) surface or underground water quality or (j) the incidence of flooding.</p>		No further action required.
<p>3. The project involves clearing for temporary works (as defined by CPS 818).</p>		No further action required.
<p>4 a. Project is within Region that:</p> <ul style="list-style-type: none"> - Has rainfall greater than 400mm and - Is South of the 26th parallel and - Works are in 'Other than dry conditions' and - Works have potential for uninfested areas to be impacted 		Proceed with standard Vehicle and Plant management actions from PEMR's and Vehicle and Plant Hygiene Checklists

Impact of Clearing	Yes/No or NA	<i>Further Action Required</i>
<p>4b. Does the proposed works require clearing within or adjacent to DBCA estate in non-dry conditions?</p>		<p>No further action required.</p>
<p>5. Main Roads has been notified by DWER or an environmental specialist that the area to be cleared is susceptible to a pathogen other than dieback</p>		<p>No further action required.</p>
<p>6. The vegetation within the area to be cleared and/or the surrounding vegetation in a good or better condition and weeds likely to spread to and result in environmental harm to adjacent areas of native vegetation that are in good or better condition</p>		<p>No further action required.</p>

7 STAKEHOLDER CONSULTATION

In accordance with CPS 818/15 Condition 8 Main Roads sought submissions from relevant stakeholders between 04/04/2022 and 26/04/2022. A single submission was received from the Department of Water, Environment and Regulation (DWER) who raised the following comments:

- Agreed with Main Roads assessment of the clearing principles
- Recommended MRWA undertake clearing in accordance with the Fauna Principal Environmental Management Requirements.

The Fauna Principal Environmental Management Requirements will be integrated into the projects contract and CEMP to ensure compliance.

8 VEGETATION MANAGEMENT

Main Roads will avoid clearing native vegetation where possible. Where clearing cannot be avoided then this clearing is kept to a minimum. A Vegetation Management Plan (VMP) has been developed to manage and minimise vegetation clearing for the project (refer to Appendix 1).

9 REFERENCES

- APM (2019). Perdaman Urea Project Pre and Post-wet Season Biological Survey, Burrup Peninsula, WA. Report prepared on behalf of Cardno, Animal Plant Mineral, Western Australia.
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Appendix 1: Vegetation Management Plan

BURRUP PENINSULA RD INFRASTRUCTURE UPGRADES

Purpose and Scope

This Vegetation Management Plan (VMP) has been prepared by Main Roads for the purpose of managing native vegetation clearing impacts associated with the Burrup Peninsula Rd infrastructure upgrades project.

Perdaman Chemical and Fertilisers (Perdaman) are proposing to develop and construct a urea plant, and conveyor facility connecting to Dampier Port. The plant will be on two main sites, C and F, both requiring access to the Burrup Road which is under Main Roads' jurisdiction.

Main Roads were commissioned by the Department of Jobs, Tourism, Science and Innovation (JTSI) to manage the design and construction of both access ways (to areas C and F). The Main Roads scope of works includes:

- Realigning the first kilometre of Hearson Cove Road including constructing a new Hearson Cove Road/ Burrup Peninsula Road intersection;
- Construction of access way to site C;
- Relocation of existing services (overhead power & water pipeline);
- Protection of existing services (fibre optic cable, gas pipelines);
- Upgrading box culvert on Burrup Peninsula Road;
- Extension of culverts on Burrup Peninsula Road;
- Widening of Burrup Peninsula Road; and
- Other ancillary works.

In specified circumstances, Main Roads VMP is required to be approved by Department of Water and Environmental Regulation (DWER) as a condition of Main Roads Statewide Clearing Permit CPS 818.

Action

Appendix 1.1 references the standard Principal Environmental Management Requirements (PEMRs) (Tables 1 to 9) that will be utilised for all projects that involve clearing to avoid, mitigate and manage the environmental impacts of the project.

Project Specific Environmental Management Requirements are contained in Table 1.

Timeframes

Actions shall be undertaken in accordance with those described in the relevant PEMR and the Project Specific Environmental Management Requirements.

Responsibilities

It is the responsibility of the Superintendent's Contract Management Team to ensure that the requirements are implemented by the Contractor. This shall be done by adhering to the Environmental Measurement and Evaluation Checklist.

Appendix 1.1: Vegetation Management

VMP Requirement	Standard Management Action	Specific Management Action
Clearing	<p>Refer to Table 1: Clearing PEMR</p> <ul style="list-style-type: none"> • Specification 204 Environmental Management • Construction Environmental Management Plan • Specification 301 Vegetation Clearing and Demolition • Environment Measurement and Evaluation Checklist (for release of HOLD POINTS) <p>Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/</p>	not applicable
Erosion and Sedimentation Control	<p>Refer to Table 3: Erosion and Sedimentation Control PEMR</p> <ul style="list-style-type: none"> • Specification 204 Environmental Management • Construction Environmental Management Plan <p>Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/</p>	not applicable
Fauna	<p>Refer to Table 4: Fauna PEMR</p> <ul style="list-style-type: none"> • Specification 204 Environmental Management • Construction Environmental Management Plan <p>Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/</p>	not applicable
Machinery and Vehicle Management	<p>Refer to Table 5: Machinery and Vehicle Management PEMR</p> <ul style="list-style-type: none"> • Specification 204 Environmental Management • Construction Environmental Management Plan <p>Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/</p>	not applicable
Mulch and Topsoil Management	<p>Refer to Table 6: Mulch and Topsoil Management</p> <ul style="list-style-type: none"> • Specification 204 Environmental Management • Construction Environmental Management Plan • Specification 301 Vegetation Clearing • Specification 304 Revegetation and Landscaping <p>Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/</p>	not applicable
Pegging and Flagging	<p>Refer to Table 7: Pegging and Flagging PEMR</p> <ul style="list-style-type: none"> • Specification 204 Environmental Management 	not applicable

VMP Requirement	Standard Management Action	Specific Management Action
	<ul style="list-style-type: none"> Construction Environmental Management Plan Specification 301 Vegetation Clearing and Demolition <p>Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/</p>	
Water Drainage Management	<p>Refer to Table 8: Water Drainage PEMR</p> <ul style="list-style-type: none"> Specification 204 Environmental Management Construction Environmental Management Plan 	not applicable
Weed Management	<p>Refer to Table 9: Weed Management PEMR</p> <ul style="list-style-type: none"> Specification 204 Environmental Management Construction Environmental Management Plan <p>Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/</p>	not applicable
Monitoring	<ul style="list-style-type: none"> Specification 204 Environmental Management Construction Environmental Management Plan Superintendent’s Contract Management Plan & Environmental Measurement and Evaluation Checklist. <p>Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/</p>	not applicable
Auditing	<ul style="list-style-type: none"> Specification 204 Environmental Management Superintendent’s Contract Management Plan & Environmental Measurement and Evaluation Checklist. <p>Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/</p>	not applicable

Principal Environmental Management Requirements (PEMR's)

Table 1: Clearing PEMR

STANDARD MANAGEMENT ACTIONS

STANDARD MANAGEMENT REQUIREMENTS
<p>PRE WORKS</p> <ol style="list-style-type: none"> 1. The Contractor must prepare, implement and maintain processes to ensure that the movement of all vehicles, plant and machinery does not occur outside of the Limits of Vegetation Clearing. This must include all turnaround areas. 2. The Contractor must minimise vegetation clearing and the area of disturbance on ground by utilising existing cleared area where possible.
<p>DURING WORKS</p> <ol style="list-style-type: none"> 1. The Contractor must report any damage to vegetation beyond the Limits of Vegetation Clearing as an Environment Incident. 2. The Contractor must ensure Movements are confined to the Limits of Vegetation Clearing during the works 3. The Contractor must undertake the clearing in accordance with the Fauna PEMR.
<p>POST WORKS</p> <ol style="list-style-type: none"> 1. NIL

Table 2: Dieback PEMR

STANDARD MANAGEMENT ACTIONS

STANDARD MANAGEMENT REQUIREMENTS
<p>PRE WORKS</p> <ol style="list-style-type: none"> 1. Contractor’s Pre-starts must detail the requirements from the DMP/HMP, where relevant, dieback management areas and the requirements of each area, maps of infested and uninfested locations, and hygiene requirements 2. Where relevant a copy of the DMP/HMP must be onsite. This plan will include maps of management areas and obligatory control actions 3. Prescribe where vehicles, machinery and plant are going to be stored/parked during the works. 4. Use the Plant, Vehicle and Equipment Hygiene Checklist or equivalent Hygiene form to check that all machinery and vehicles are clean on entry (i.e. free of soil and vegetation).
<p>DURING WORKS</p> <ol style="list-style-type: none"> 1. If required, locations of dieback infested or dieback free areas and hygiene control locations marked on site in accordance with contract HMP or DMP. 2. Hygiene works to be undertaken as per the HMP or DMP, where required. 3. Restrict movement of machines and other vehicles to the Limits of Vegetation Clearing. 4. Ensure no known weed affected soil, mulch, fill or other material is brought into the Limits of Vegetation Clearing. 5. Ensure cleared materials are stockpiled or disposed at waste at the locations approved by the Superintendent.
<p>POST WORKS</p> <ol style="list-style-type: none"> 1. Record that the project was undertaken in dry soil conditions (unless an approved DMP authorises otherwise). 2. Use the Plant, Vehicle and Equipment Hygiene Checklist to check that all machinery and vehicles are clean on exit (i.e. free of soil and vegetation).

Table 3: Erosion and Sedimentation

<p>PRE WORKS</p> <p>1. The Contractor must develop, implement and maintain processes and procedures to ensure that:</p> <ul style="list-style-type: none">• The Contractor is responsive to and addresses incidents of erosion and sedimentation within and adjacent to the work areas.• Prevent water and wind soil erosion within and adjacent to the works areas.• Prevent the sedimentation and siltation of watercourses located within and adjacent to the works area.• Ensure that sedimentation and siltation of drainage lines due to the removal of riparian vegetation is avoided, minimised and mitigated.• Ensure that loose surfaces and recently cleared areas are protected from wind and soil erosion.• Minimise exposed soil working surfaces or protect them from stormwater erosion.• Ensure material such as gravel, crushed rock and excavated material is stockpiled away from drainage paths and covered to prevent erosion.• Ensure that water quality monitoring is undertaken when turbidity and sedimentation is an issue.
<p>DURING WORKS</p> <p>1. Implement, monitor and adhere to the sedimentation and erosion processes developed to address the requirements in the pre-works.</p>
<p>POST WORKS</p> <p>1. If required, the Contractor must continue to monitor water quality until the turbidity/sedimentation dissipates.</p> <p>2. The Contractor must ensure that disturbed areas are stabilised as soon as is practicable after construction activities are completed.</p>

Table 4: Fauna

<p>PRE WORKS</p> <ol style="list-style-type: none"> 1. The Contractor must ensure that fauna management requirements are communicated to the crew undertaking the clearing works during the induction and pre-start meeting. 2. Where active nests, burrows or dens are identified, works must not proceed until the Contractor obtains the Superintendents approval of the management of active nests, burrows or dens adheres to the Superintendents advice.
<p>DURING WORKS</p> <ol style="list-style-type: none"> 1. The Contractor must undertake the clearing in the following manner to allow fauna to move out of the clearing area; <ol style="list-style-type: none"> i. Prior to the clearing activities commencing, use machinery to tap large trees with habitat hollows to encourage any animals evacuate. ii. Undertake the clearing in one direction and towards areas of native vegetation to allow the animals to escape to adjacent habitat. 2. The Contractor must ensure that all onsite personnel undertake visual monitoring and are vigilant to the presence of fauna. Any sightings of fauna, including injury or fatality, must be reported as an Environmental Incident. 3. The Contractor must ensure that; <ol style="list-style-type: none"> i. No pets, traps or firearms are brought into the project area. ii. Fauna are not fed iii. Fauna are not intentionally harmed or killed iv. Fauna that venture into the work area are encouraged to leave in a manner that does not harm the animal or operator (loud noise, slowly approaching in a vehicle etc.) 4. The Contractor must ensure that in the event that sick, injured or orphaned native wildlife are located on the project site, the WILDCARE Helpline ((08) 9474 9055) will be contacted for assistance. The Contractor must maintain records of any animal taken to a wildlife carer.
<p>POST WORKS</p> <ol style="list-style-type: none"> 1. The Contractor must provide any records of fauna impact to the Superintendent.

Table 5: Machinery and Vehicle Management

<p>PRE WORKS</p> <ol style="list-style-type: none"> 1. The Contractor must ensure that all areas associated with the storage, parking, servicing, wash down and refuelling of all vehicles, plant and machinery is located within the Limits of Clearing and approved by the Superintendent. 2. The Contractor must ensure that all vehicles, machinery and plant are clean on entry (i.e. free of all soil and vegetation material) and comply with the requirements of 204.B.32. 3. The Contractor must ensure that vehicle servicing and refuelling will be undertaken at designated areas approved by the Superintendent. 4. The Contractor must ensure that all staff suitably qualified and competent to undertake works, especially refuelling activities.
<p>DURING WORKS</p> <ol style="list-style-type: none"> 1. The Contractor must maintain records of checking all vehicles, machinery and plant are clean on entry.
<p>POST WORKS</p>

Table 6: Mulch and Topsoil Management

<p>PRE WORKS</p> <ol style="list-style-type: none"> 1. The Contractor must ensure that the movement of soil and vegetation is only undertaken in dry conditions unless otherwise approved and / or directed by the Superintendent. 2. The Contractor must ensure that poor quality topsoil and mulched vegetation does not contaminate the good quality topsoil and vegetation.
<p>DURING WORKS</p> <ol style="list-style-type: none"> 1. The Contractor must ensure that all machinery used in the removal of weed-infested topsoil must be cleaned down before and between operations to prevent the introduction and spread of weeds. 2. The Contractor must ensure the movement of large equipment over topsoil materials is avoided to minimise compaction. 3. The Contractor must ensure that Dieback and weed infected topsoil and mulch vegetation must be handled separately to minimise the risk of spreading dieback and weed species across the site and stockpiles. 4. The Contractor must ensure that stockpiling operations must occur in a manner to ensure that the properties of the topsoil are not degraded and the topsoil made unsuitable for use in revegetation.
<p>POST WORKS</p>

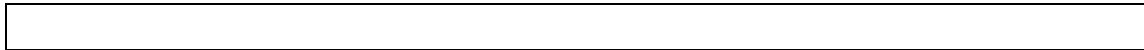


Table 7: Pegging and Flagging

<p>PRE WORKS</p> <ol style="list-style-type: none"> 1. Pegging must be done in accordance with the requirements detailed in Specification 301. 2. The Contractor must clearly communicate, either at the pre-start meeting or equivalent, to the crew undertaking the clearing works, through clear maps and other additional means, what the Pegging represents.
<p>DURING WORKS</p> <ol style="list-style-type: none"> 1. The Contractor must peg the Limits of Clearing by PINK flagging tape. 2. The Contractor peg/demarcate vegetation proposed to be retained is demarcated by WHITE flagging tape. 3. The Contractor must ensure that the vegetation demarcated with PINK and WHITE flagging tape is consistent with the approved clearing areas.
<p>POST WORKS</p> <ol style="list-style-type: none"> 1. The Contractor remove and dispose of appropriately any demarcation, pegging or flagging once project works are completed.

Table 8: Water Drainage

<p>PRE WORKS</p> <ol style="list-style-type: none"> 1. Use pollution control and containment strategies for project activities in Public Drinking Water Source Areas (PDWSAs) / Underground Water Pollution Control Areas (UWPCAs) and liaise with the DWER where necessary
<p>DURING WORKS</p> <ol style="list-style-type: none"> 1. Existing natural drainage paths and channels along the road or the vicinity of the project area will not be unnecessarily blocked or restricted. 2. Temporary drainage systems may be installed to carry surface water away from the areas where excavation and foundation construction work is taking place or from any other area where the accumulation of water could cause delay or damage to the work. 3. Maintain these drainage systems in proper working order at all times. 4. Runoff from disturbed areas must be managed to minimise adverse impacts on surrounding vegetation, watercourses and properties. 5. Booms and silt fences must be used when working over or adjacent to areas of surface water in order to protect the quality of surface water from construction impacts.

POST WORKS

1. Water quality monitoring to be undertaken (if turbidity/ sedimentation is an issue).
2. Prior to backfilling the completed pipe work certify that the entire system is flushed clean and tested
3. Disturbed areas will be stabilised soon after construction activities are completed.
4. Culvert and drainage structures will be free of all grass, weeds, silt and debris

Table 9: Weed Management

PRE WORKS

1. The Contractor must remove or kill any weeds growing in project area that are likely to spread and result in environmental harm to adjacent areas of native vegetation that are in good or better condition.
2. The Contractor must develop, implement and maintain procedures to identify and control declared and invasive weed species within the Contract areas, to the satisfaction of the Superintendent.
3. The Contractor must prepare a weed control program, for nominated weed species for control and disposal, to the satisfaction of the Superintendent.
4. The Contractor must undertake weed management in Stockpiles as directed by the Superintendent.

DURING WORKS

1. The Contractor must implement the weed control procedures and management plan and record and manage records of its implementation.
2. The Contractor must treat nominated weed infestations as many times as necessary to control and eradicate the weed species in accordance with the approved weed control program
3. The contractor must ensure that no known weed, pest or diseased affected soil, mulch, fill or other material is brought into the Site.

POST WORKS

1. The relevant [Vegetation Maintenance Record Sheets](https://www.mainroads.wa.gov.au/BuildingRoads/Contracting/Pages/ReportingForms.aspx) available at: <https://www.mainroads.wa.gov.au/BuildingRoads/Contracting/Pages/ReportingForms.aspx> must be completed and sent to the Superintendent.