NATIVE VEGETATION CLEARING PERMIT
NINGALOO MARINE RESEARCH CENTRE

PREPARED FOR:

MINDEROO

NOVEMBER 2020

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NINGALOO MARINE RESEARCH CENTRE
NATIVE VEGETATION CLEARING PERMIT APPLICATION

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1. INTRODUCTION

1.1 THE PROJECT

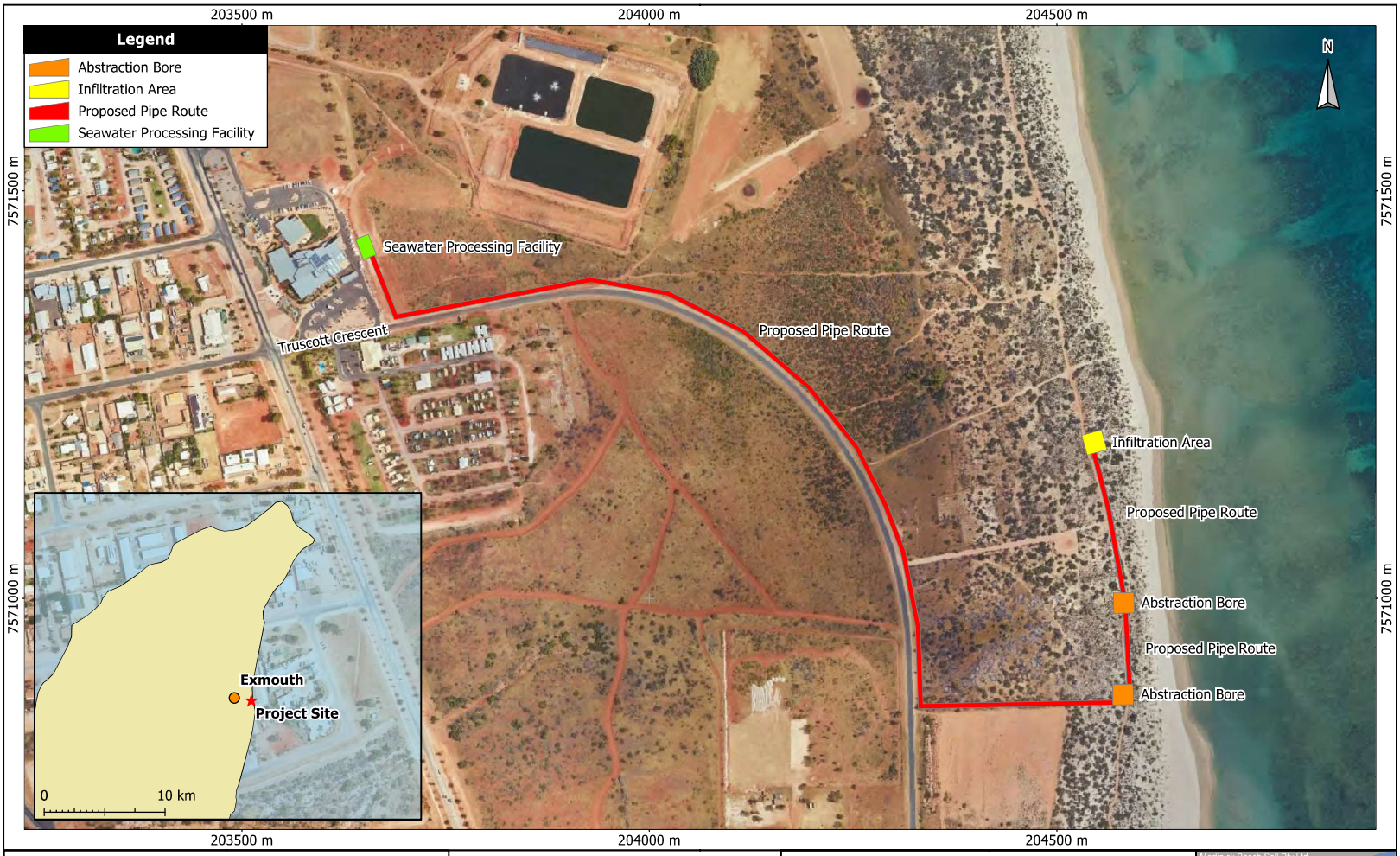
The Minderoo Foundation (Minderoo) is seeking to develop a state-of-the-art marine research facility at the Ningaloo Centre, Exmouth (the Project) (Plate 1).

Plate 1: Aerial View of Ningaloo Centre (Foreground) with Water Corporation Wastewater Ponds and Exmouth Gulf (top)

The proposed facility will deliver sophisticated aquarium and laboratory facilities to support and attract world class marine research to the Exmouth area. Dedicated spaces will be provided to researchers, students and industry partners on collaborative projects aimed at understanding and preserving the World's marine environments.

1.2 RESEARCH FACILITY

The intent is for the Project to support research that enables our oceans to withstand a changing climate and increasing human pressures and ensure it's healthy, resilient, free from pollution and with plentiful biomass of fished species. It is proposed that research related to climate change, reef restoration and adaptation, sexual reproduction in corals, coral holding and propagation and water quality and contaminants, will be undertaken. To complete the high-quality seawater experiments required of this facility, a stable and consistent supply of high-quality seawater is essential. This will be provided via a pipeline running south adjacent to Truscott Crescent then eastwards to the coast to connect to groundwater abstraction bores (Figure 1). The pipeline route was selected in consultation with the Shire of Exmouth so that future development within Lot 1404 and Lot 1403 will not be affected.



Scale: 1:6000 Original Size: A4 Air Photo Date: 2018 Grid: Australia MGA94 (50) 0 — 200 m	Minderoo Foundation Ningaloo Aquaculture Laboratory	**Figure 1** **Location Plan**	Martinick Bosch Sell Pty Ltd 4 Cook St West Perth WA 6005 Australia t:+61 8 9226 3166 info@mbsenvironmental.com.au www.mbsenvironmental.com.au MBS ENVIRONMENTAL

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1.3 SEAWATER SUPPLY

The facility requires a consistent supply of high-quality seawater, with a low suspended solids load, low nutrient concentrations and consistent salinity and temperature. All systems within the facility will work on full flow through (i.e. seawater is constantly flowing through the facility), which minimises water quality issues in experimental systems, with a turnover rate of between 1 to 24 volume/day (i.e. 1 to 24 times the facility storage volume flows through the facility each day), according to the experimental design(s).

To supply the Project with seawater, two abstraction bores will be constructed within the seaward dunes southeast of the Ningaloo Centre and a seawater supply pipeline run between the bores and the Ningaloo Centre (Figure 1). The pipeline connecting the bores to the facility will be constructed within a 6 m easement, running east then south along Truscott Crescent before heading east towards the coast (Figure 1). The pipeline will be buried 0.5 m to 2 m below the surface, subject to the natural topography. Inspection points and air bleed valves will be located at intervals to facilitate cleaning and maintenance of the pipeline. The pipeline will also supply power from a Horizon power substation in the south west corner of Lot 1403 to the abstraction bores.

Seawater leaving the facility, having circulated through the system, will be transported to an infiltration area (infiltration galleries) for infiltration into the ground within the dunes to the east of the Ningaloo Centre (Figure 1).

1.4 PROPOSED CLEARING

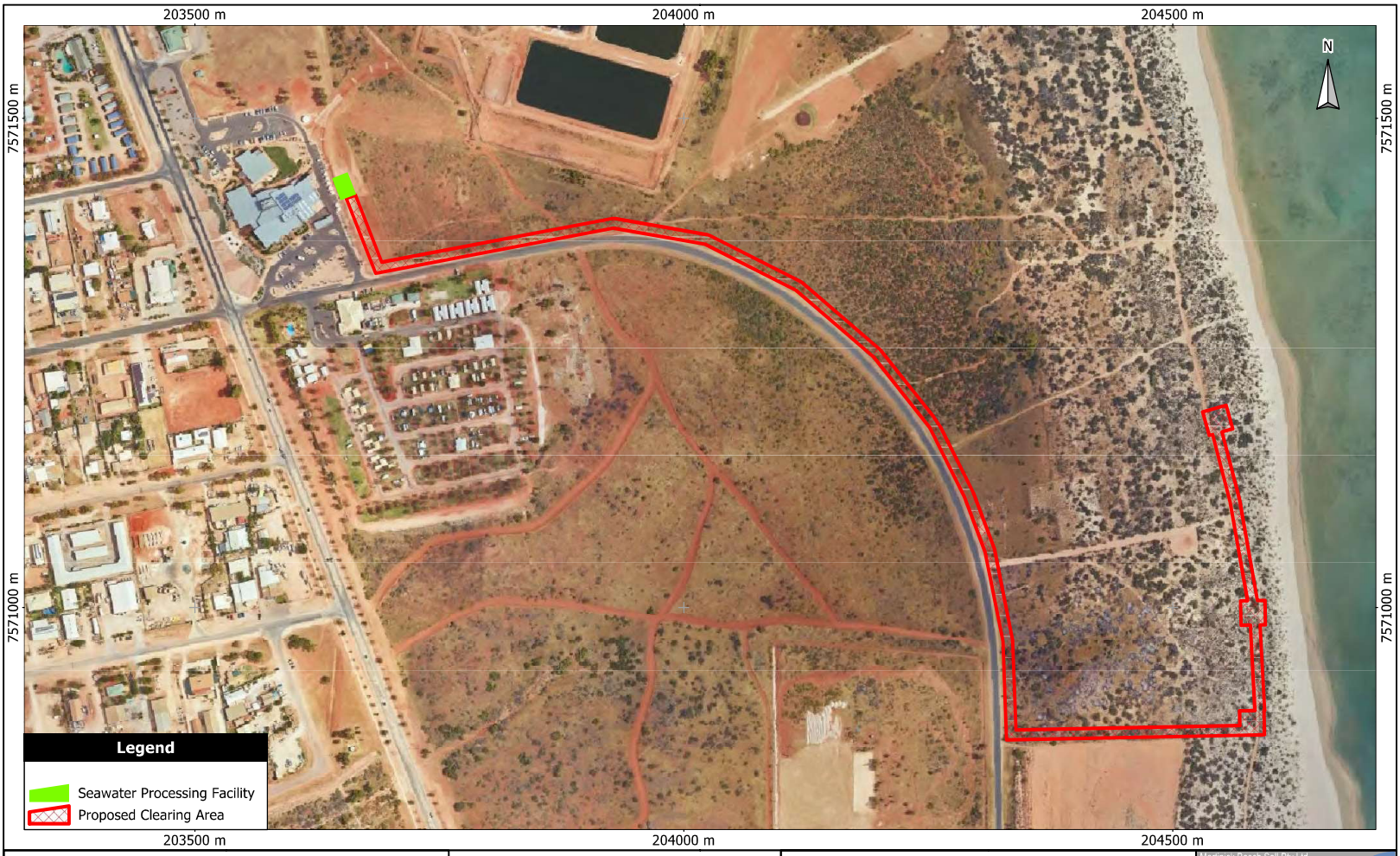
Approval for the clearing of up to 1.48 ha of native vegetation is sought (Figure 2). Clearing is required for:

- Construction of the abstraction bore pads (pad size of 25 m x 25 m) and infiltration area.
- Development of the pipeline easement (6 m wide).
- Corridor to allow construction works within easement (4 m wide). Following bore development and pipeline construction this corridor will be rehabilitated.

Clearing will be undertaken through mechanical removal, with cleared material stockpiled either in windrows along the pipeline easement (within the clearing footprint) or in low (<1 m) piles within the bore pad footprints. Procedures for the management of clearing, including the preservation of cleared vegetation and topsoil and the rehabilitation of construction areas at the end of the construction phase, will be detailed within a Construction Management Plan.

The proposed clearing has been minimised by:

- The choice of an 'amended pipeline easement' compared to an original easement (resulting in a 1.15 ha reduction in clearing area).
- Locating the amended pipeline easement within existing cleared areas (e.g. tracks and previously developed areas).
- Locating bore pads within areas of sparse vegetation, where possible, and working with the contractor to minimise the width of the construction corridor.



Scale: 1:5000 Original Size: A4 Air Photo Date: 2018 Grid: Australia MGA94 (50) 0 — 200 m	Minderoo Foundation Ningaloo Aquaculture Laboratory	**Figure 2** **Proposed Clearing Area**	Martinick Bosch Sell Pty Ltd 4 Cook St West Perth WA 6005 Australia t:+61 8 9226 3166 info@mbsenvironmental.com.au www.mbsenvironmental.com.au MBS ENVIRONMENTAL

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2. ENVIRONMENTAL SETTING

2.1 CLIMATE

The Project is located in a hot semi-arid climate with hot summers and mild winters. Climate data is available for the period since 1945, from the RAAF Learmonth Station located approximately 35 km south of the proposed clearing area. The annual mean maximum temperature is 31.9°C and the annual mean minimum temperature is 17.7°C. The mean annual rainfall was recorded at 260.7 mm (BoM 2017).

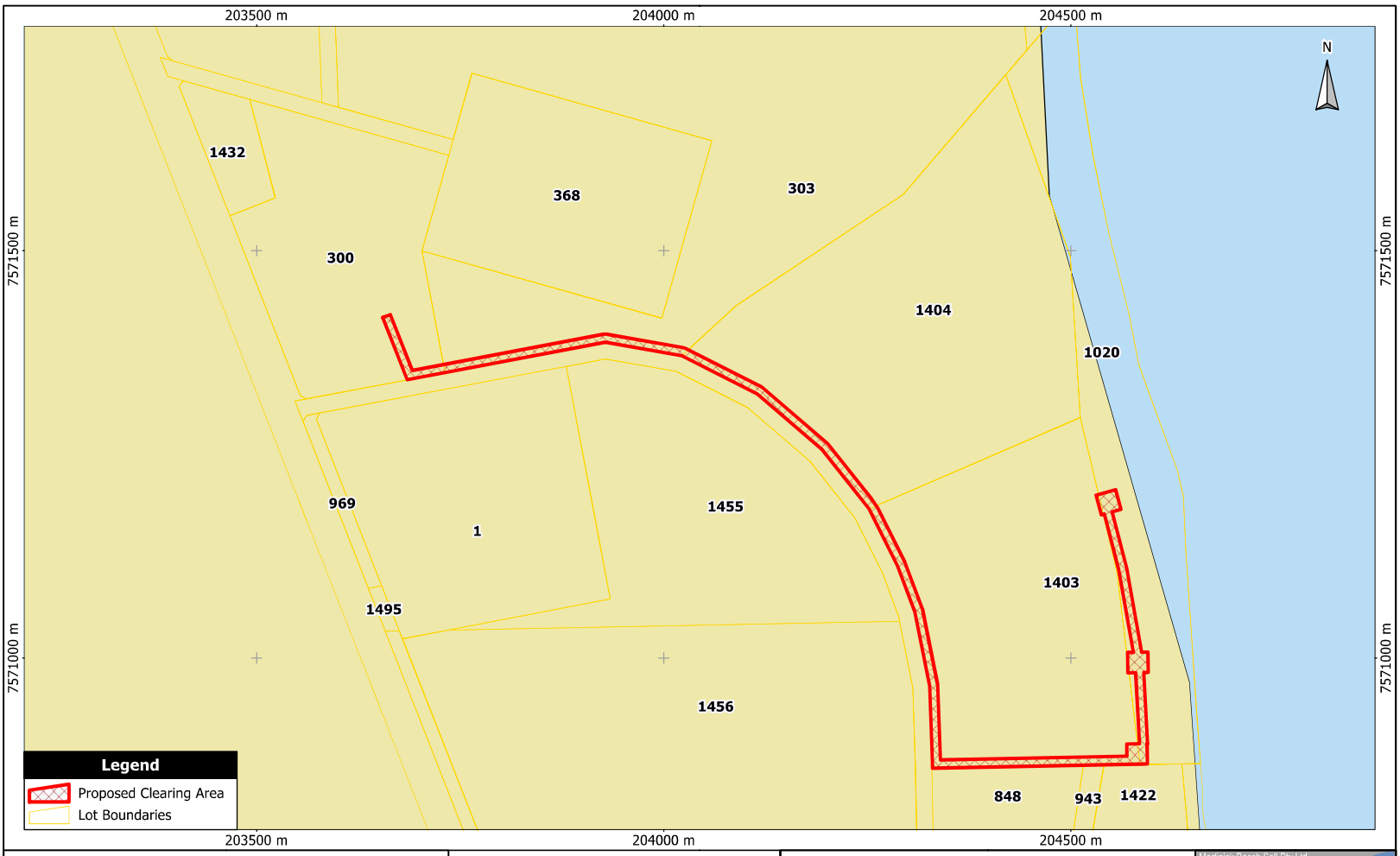
2.2 PLANNING AND TENURE

The Project (research centre and pipeline easement) traverses a number of Crown Land Lots, some of which are Reserves under Management Order to the Shire of Exmouth (or Reserves with no Management Order in place), and some of which are Unallocated Crown Land (UCL) (Appendix 5), as follows (refer Figure 3):

- Lot 300 – Civic and Community reserve.
- Lot 303 – Public Open Space reserve.
- Lot 1020 – Foreshore reserve.
- Lot 1403 – Special Use 4 zone (LPS 4 objectives are for tourism development) (UCL).
- Lot 1404 – Special Use 4 zone (as above) (UCL).

On 27 August 2020, the Shire of Exmouth Council approved the granting of consent for the proposed amended pipeline easement (Appendix 1). The Department of Planning, Lands and Heritage (DPLH) subsequently (6 November 2020) issued a letter granting authority to undertake the works, pending all necessary approvals (Appendix 1).

Development approval (DA) and approval for the Easement are being sought, from the Shire of Exmouth and DPLH respectively, for the permanent infrastructure (pipeline and the bores).



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Ningaloo Aquaculture Laboratory

Figure 3

Lots Intersected by the Clearing Area

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2.3 SOILS

The Australian Soil Resource Information System identified two soil units within the proposed clearing area, the Range System (204Le) and the Learmonth System (204Ra) (CSIRO 1991). The facility and a portion of the proposed pipeline occur within the Range System (204Ra), while the production bores and remainder of the pipeline occur within the Learmonth System (204Le).

These units are described as:

- Range System (204Ra) - Dissected limestone plateaux, hills and ridges with gorges and steep stony slopes supporting hard spinifex, sparse shrubs and eucalypts.
- Learmonth System (204Le) - Sandy outwash plains marginal to the Cape Range, supporting mainly soft spinifex hummock grasslands with scattered acacia shrubs.

The DWER Acid Sulfate Soil Risk Map: Pilbara Coastline (DWER-053) (DWER 2016) shows the proposed clearing area is located in an area with an extremely low probability of acid sulfate soils (ASS) occurring, progressing to a low probability of ASS occurring nearer the coast (Appendix 3).

A search of DWER's Contaminated Sites Database identified one confirmed and one potential contaminated site within 5 km of the Ningaloo Centre. The closest registered site is located approximately 120 m to the west (Appendix 3). An additional 'possibly contaminated' site is located on Lot 1404 On Plan 192085. This site has been used as an uncontrolled landfill for an unknown period since the 1970s and it is understood that asbestos-containing material and asbestos fibres may be present in the soil. The site is classified as 'Possibly contaminated - investigation required'. Following a realignment of the pipeline easement disturbance will not occur within 80 m of this site (Appendix 3).

2.4 VEGETATION

2.4.1 Regions and Land Systems

The proposed clearing area is located in the Cape Range subregion of the Carnarvon Bioregion. The Carnarvon bioregion is composed of quaternary alluvial, aeolian, and marine sediments overlying Cretaceous strata. It is characterised by a mosaic of saline alluvial plains with samphire and saltbush low shrublands, Bowgada low woodland on sandy ridges and plains, Snakewood scrub on clay flats, and tree to shrub steppe over hummock grasslands on and between red sand dune fields. Limestone strata with *Acacia stuartii* or *A. bivenosa* shrubland outcrop in the north, where extensive tidal flats in sheltered embayment support Mangal (Kendrick and Mau 2002).

Land systems of the Western Australian rangelands have been mapped and described by the Department of Agriculture and Food WA (DAFWA 2012), providing comprehensive descriptions and maps of the biophysical resources of the region, together with an evaluation of the condition of the soils and vegetation throughout. Two land systems intersect the proposed clearing area, the Cardabia and Littoral systems:

- Cardabia System: Undulating sandy plains with linear dunes, minor limestone plains and low rises, supporting mainly soft spinifex hummock grasslands with scattered acacias and other shrubs.
- Littoral System: Bare coastal mudflats (unvegetated), samphire flats, sand islands, coastal dunes and beaches, supporting samphire low shrublands, sparse Acacia shrublands, and mangrove forests.

2.4.2 Vegetation Associations

Mapping of Pre-European vegetation within Western Australia was completed on a broad scale (1:1,000,000) by Beard (1975) and later re-assessed by Shepherd *et al.* (2001) with some larger vegetation units divided into smaller units. One broad vegetation type was identified and mapped over the proposed clearing area:

- Beard vegetation association 663: Hummock grasslands, shrub steppe; waterwood over soft spinifex.

This vegetation association is limited to the Cape Range IBRA Sub-Region and the Shire of Exmouth. The proportionate representation of this regional vegetation in the Carnarvon Bioregion, Cape Range Sub-Region and the Shire of Exmouth, as well as its pre-European and current remaining extents in each context, are summarised in Table 1. The extent of vegetation association 663 within the vicinity of the proposed clearing area constitutes only a small proportion (less than 5%) of the extent within the IBRA Region, IBRA Sub-Region and the Shire of Exmouth (Table 1).

Table 1: Summary of Regional Extent of Association 663 (DBCA 2019a)

Extent Context	Total Context Area (ha)	Pre–European Extent (ha)	% of the Context Area	Current Extent (ha)	% Remaining
Carnarvon IBRA Region	8,430,170.47	29,068.26	0.35	25,866.32	88.98
Cape Range IBRA Sub-Region	2,380,497.87	29,068.26	1.22	25,866.32	88.98
Shire of Exmouth	649,310.92	30,474.41	4.69	25,976.66	85.24

A site inspection undertaken in February 2020, encompassing the originally proposed clearing area, identified four vegetation associations within and adjacent to the clearing area, as described in Table 2 and mapped in Figure 4 (refer also Appendix 4).

Table 2: Vegetation Association Descriptions

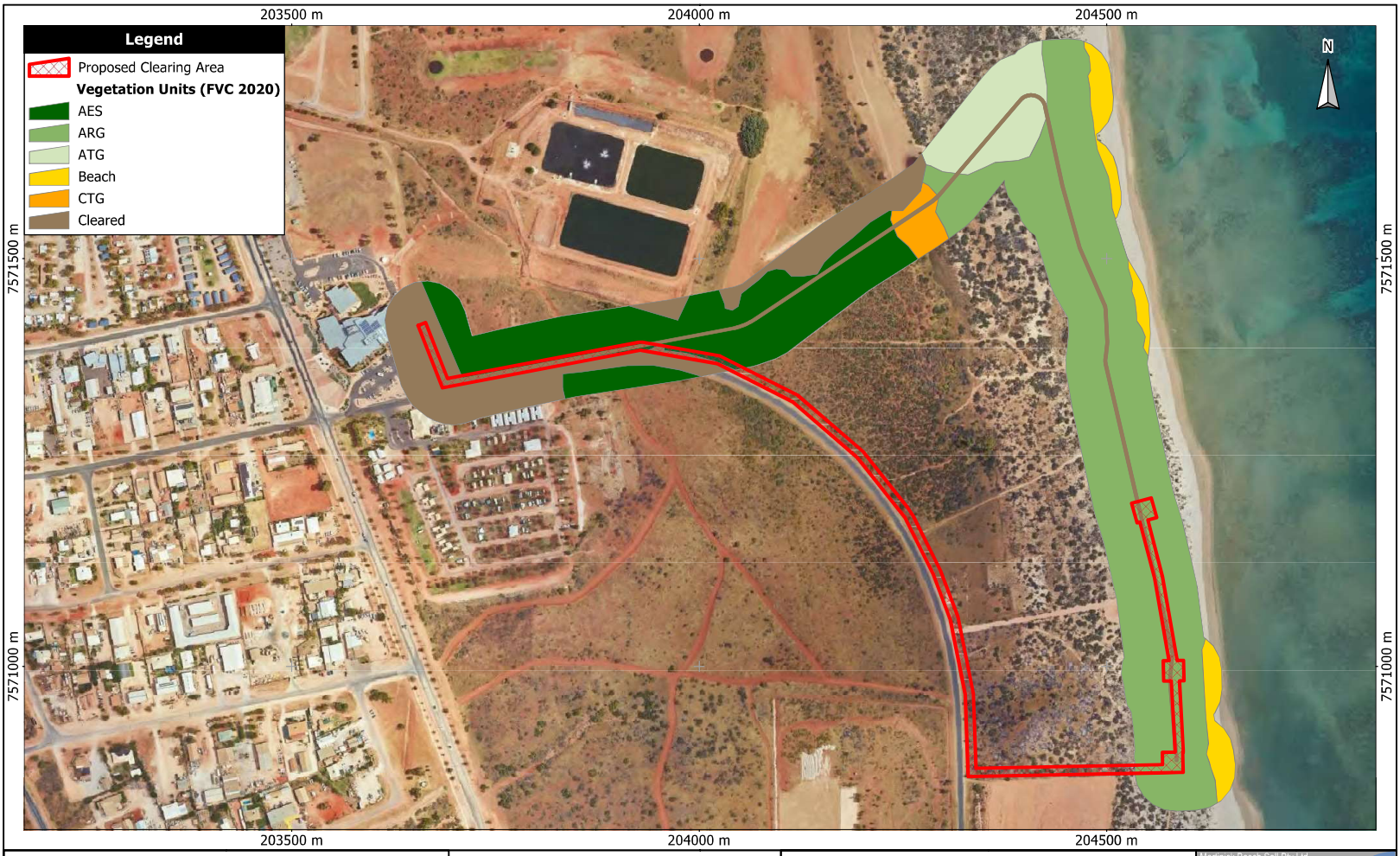
Code	Vegetation Description
AES	*Acacia* spp., *Exocarpos* sp. and *Scaevola* spp. Open Shrubland over *Enchylaena* sp. and *Rhagodia* sp. Low Sparse Chenopod Shrubland
ARG	*Acacia* spp. and *Rhagodia* spp. Open Shrubland over Tussock Grassland
ATG	*Acacia* spp. Open Shrubland over Tussock Grassland
CTG	Occasional *Acacia* spp. over Closed Tussock Grassland

The clearing area extends beyond the vegetation association mapping (Figure 4) but is expected to intersect cleared areas and vegetation associations AES and ARG. Association AES is expected to extend south adjacent to Truscott Crescent. Association ARG is expected to occur adjacent to the coast.

2.4.3 Vegetation Condition

The vegetation condition within the originally proposed clearing area ranged from 'Completely Degraded' in localised areas, to 'Good' (Figure 5, Appendix 4). The condition of the vegetation within the amended clearing area is expected to be 'Completely Degraded' (in areas alongside Truscott Crescent) and 'Good' (other areas). Vegetation of 'Good' condition is defined as having obvious signs of damage caused by human activity, some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.

Selected photographs of the vegetation within the amended clearing area, taken during site inspections (February and September 2020), are provided in Table 3.



Scale: 1:6000 Original Size: A4 Air Photo Date: 2018 Grid: Australia MGA94 (50) 0 — 200 m	Minderoo Foundation Ningaloo Aquaculture Laboratory Native Vegetation Clearing Permit	**Figure 4** **Vegetation Association Mapping**	Martinick Bosch Sell Pty Ltd 4 Cook St West Perth WA 6005 Australia t:+61 8 9226 3166 info@mbsenvironmental.com.au www.mbsenvironmental.com.au

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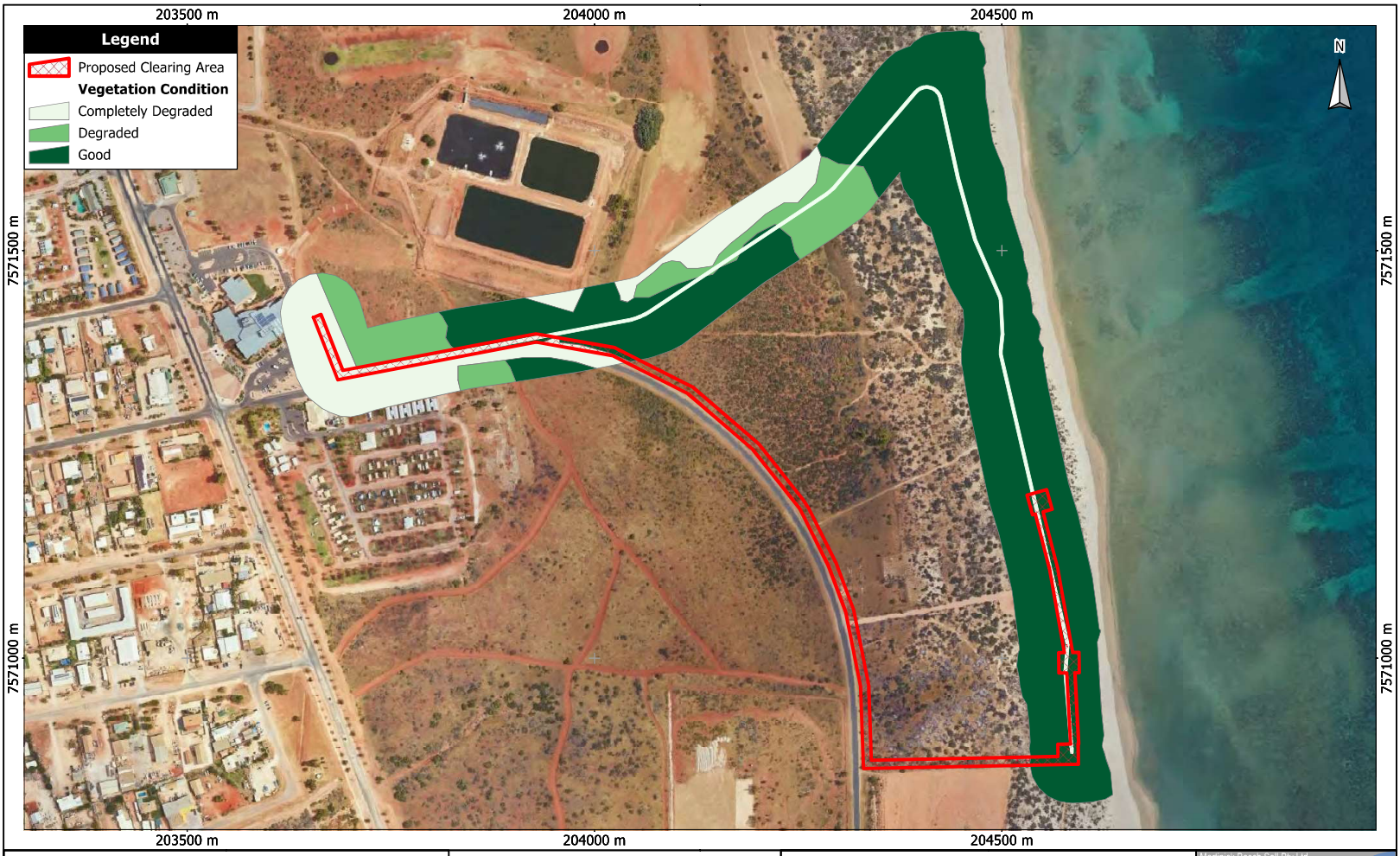

Scale: 1:6000 Original Size: A4 Air Photo Date: 2018 Grid: Australia MGA94 (50) 0 — 200 m	Minderoo Foundation Ningaloo Aquaculture Laboratory Native Vegetation Clearing Permit	**Figure 5** **Vegetation Condition Mapping**	Martinick Bosch Sell Pty Ltd 4 Cook St West Perth WA 6005 Australia t:+61 8 9226 3166 info@mbsenvironmental.com.au www.mbsenvironmental.com.au

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Table 3: Photographs of Vegetation Within the Proposed Clearing Area (February & September 2020)

Location	Photographs
Pipeline Easement (where alignment turns east away from Truscott Crescent) (right side of photo shows topsoil stockpile associated with development of Lot 848)	
Pipeline Easement (mid-point between Truscott Crescent and southern bore) (right side of photo shows topsoil stockpile associated with development of Lot 848)	
Northern Bore Pad	
Pipeline Easement (mid-point between infiltration area and northern abstraction bore)	
Southern Bore Pad	

2.4.4 Significant Flora Species

Searches of NatureMap (DBCA 2019b, Appendix 3) and the EPBC Protected Matters Search Tool (PMST) (DoEE 2019, Appendix 3) did not identify any threatened ecological communities or species in proximity to the proposed clearing area.

Three Priority flora species were identified as potentially occurring within a 5 km buffer of the proposed pipeline alignment and the preferred habitat for these species, and their status under the *Biodiversity Conservation Act 2018* (BC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) are presented in Table 4.

The Threatened and Priority Flora Database (TPFL) and the WA Herbarium database (WAHerb) did not return any records for these species within 5 km of the proposed pipeline alignment and none of these species were observed during a site inspection in February 2020[1]. *Corchorus congener* (P3) has recently been found to be widespread to the south at Learmonth (Subsea 7 2019).

The TPFL and WAHerb returned records of *Tephrosia* sp. North West Cape (P2) at several locations to the west of the Ningaloo Centre (DBCA 2020) (Table 4).

Table 4: Threatened and Priority Flora Potentially Occurring Within 5 km of the Proposed Pipeline Alignment

Species	Cons. Status		Description	Preferred Habitat	Likelihood of Occurrence
	BC Act	EPBC Act			
Corchorus congener	P3	NA	Spreading shrub, to 0.6 m high. Fl. yellow, Apr to Jun or Aug to Nov.	Sand, red sandy loam with limestone. Sand dunes, plains.	Likely
Brachychiton obtusilobus	P4	NA	Tree, 3.5-6 m high. Fl. cream, Aug to Sep.	Skeletal soils. Rocky limestone ranges, gorges, occasionally sandplains.	Possible
Eremophila youngii subsp. *lepidota*	P4	NA	Dense, spreading shrub, (0.2-)1-3 m high. Fl. purple-red-pink, Jan or Mar or Jun or Aug to Sep.	Stony red sandy loam. Flats plains, floodplains, sometimes semi-saline, clay flats.	Possible
Tephrosia sp. North West Cape	P2	NA	Small, spreading shrub, c. 0.2 m tall × 0.7 m wide. FL. orange, 6–6.5 mm long, observed in May and July.	On current knowledge, known only from two locations on North West Cape, where it has been collected from orange-red to brown soil with limestone fragments, over limestone, growing with *Triodia*, *Acacia* and *Ipomea* (Butcher et al. 2017).	Possible

Note: 'P' denotes Priority species (listed by DBCA).

[1] It is noted that the optimal time for survey in the Eremaean Botanical Province is 6-8 weeks post wet season (~March-June) with supplementary survey in the dry season (after winter rainfall if available), while the site inspection (not a botanical survey) was undertaken on 5 February 2020 with no rain recorded in Exmouth during the preceding 5 months. Available data from the site inspection, previous surveys in the region and various database searches, indicate that the likelihood of conservation significant flora species occurring within the clearing area is low.

2.4.5 Fauna Habitat

A desktop search of NatureMap (DBCA 2019b) and the PMST (DoEE 2019) was conducted within a 5 km buffer around the proposed pipeline alignment to identify Threatened and Migratory species potentially present within the proposed clearing area. The PMST search identified 26 threatened species and 39 migratory species and the NatureMap searched identified 37 significant fauna species as potentially occurring within a 5 km radius of the proposed pipeline alignment (Appendix 3). Given the absence of wetland or intertidal marine habitat within or immediately adjacent to the proposed clearing area, no impacts to the identified shorebirds or marine species are expected. Several other species may occur within or adjacent to the proposed clearing area, but they are generally species that exhibit a broad distribution, with the proposed clearing area unlikely to represent key habitat.

3. ASSESSMENT OF CLEARING PRINCIPLES

3.1 NATIVE VEGETATION CLEARING PRINCIPLES

Clearing applications are assessed against 10 principles outlined in Schedule 5 of the *Environmental Protection Act 1986*. These principles aim to ensure that all potential impacts resulting from removal of native vegetation are assessed in an integrated way and apply to all lands throughout Western Australia. The principles address the four environmental areas of biodiversity significance, land degradation, conservation estate and ground and surface water quality.

The following sections discuss the potential impacts associated with the proposed clearing. A summary of the outcomes of the assessment against the 10 Clearing Principles is provided in Table 5.

Table 5: Summary of Clearing Assessment Against Clearing Principles

Principle Number	Clearing Principle	Outcome
a	Native vegetation should not be cleared if it comprises a high level of biological diversity.	Unlikely to be at variance
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.	Unlikely to be at variance
c	Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	Unlikely to be at variance
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 (TEC).	Not at variance
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.	Not at variance
f	Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	Not at variance
g	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	Unlikely to be at variance
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 areas.	Not at variance
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.	Not at variance
j	Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.	Not at variance

3.2 BIODIVERSITY

Clearing principle a: Native vegetation should not be cleared if it comprises a high level of biological diversity.

The vegetation within the proposed clearing area is not considered to comprise a high level of biological diversity. Given the extensive previous disturbance within and adjacent to the proposed clearing area, the likelihood of occurrence of *Brachychiton obtusilobus* (P4), *Eremophila youngii* subsp. *Lepidota* (P4) and *Tephrosia* sp. North West Cape (P2) is considered low. *Corchorus congener* (P3) has been found to colonise disturbed areas at Learmonth to the south of Exmouth (Subsea 7 2019), so could occur, but was not recorded during the site inspection.

The proposed clearing area does not intersect any TECs, PECs or known locations of threatened flora. Vegetation condition varied from good to completely degraded. One broad vegetation type has been mapped across the proposed clearing area (Beard vegetation association 663) and over 85% of the pre-European extent of this vegetation type remains across the Shire of Exmouth, the Carnarvon IBRA Region, and the Cape Range IBRA Sub-Region (Table 1). Vegetation within the proposed clearing area is considered typical of the bioregion and is well represented immediately to the west and south.

The proposed clearing is unlikely to impact vegetation comprising a high level of biological diversity, and is unlikely to be at variance to Principle a.

3.3 SIGNIFICANT FAUNA HABITAT

Clearing principle b: Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Desktop searches identified 26 threatened species and 39 migratory species and the NatureMap searched identified 37 significant fauna species as potentially occurring within a 5 km radius of the proposed pipeline alignment (Appendix 3). Given the absence of wetland or intertidal marine habitat within or immediately adjacent to the proposed clearing area, no impacts to the identified shorebirds or marine species are expected. Several other species may occur within or adjacent to the proposed clearing area, but they are generally species that exhibit a broad distribution, with the proposed clearing area unlikely to represent key habitat.

The extent of vegetation association 663 within the vicinity of the proposed clearing area (pipeline alignment with 50 m buffer) constitutes only a small proportion (less than 5%) of the extent within the IBRA Region, IBRA Sub-Region and the Shire of Exmouth (Table 1). The vegetation within clearing area is considered typical of the bioregion and is well represented immediately to the west and south.

The vegetation proposed to be cleared is unlikely to comprise significant habitat for these species or other fauna indigenous to Western Australia, and it is unlikely that the proposed clearing will be at variance to Principle b.

Mitigation and management measures to prevent impacts to fauna will include retaining cleared vegetation for use in rehabilitation. Rehabilitation and trench management procedures will be outlined within a Construction Management Plan (CMP).

3.4 SIGNIFICANT FLORA

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

NatureMap (DBCA 2019b) identified three Priority flora species (Corchorus congener (P3), *Brachychiton obtusilobus* (P4) and *Eremophila youngii* subsp. *Lepidota* (P4)) as potentially occurring within 5 km buffer of the proposed pipeline alignment (Table 4, Appendix 3). The Threatened and Priority Flora Database (TPFL) and the WA

Herbarium database (WAHerb) did not return any records for these species within 5 km of the proposed pipeline alignment and none of these species were observed during a site inspection in February 2020. The TPFL and WAHerb returned records of *Tephrosia* sp. North West Cape (P2), located at 820 m, 1,200 m, 1,524 m and 1,600 m to the west of the Ningaloo Centre (DBCA 2020).

Given the extensive previous disturbance within and adjacent to the proposed clearing area, including road construction, and the existing track along which the proposed infiltration area and bores have been located, and the clearing within Lot 848, the likelihood of occurrence of *Brachychiton obtusilobus* (P4), *Eremophila youngii* subsp. *Lepidota* (P4) and *Tephrosia* sp. North West Cape (P2), is considered low. *Corchorus congener* (P3) has been found to colonise disturbed areas at Learmonth to the south of Exmouth (Subsea 7 2019), so could occur, but was not recorded during the site inspection.

The proposed clearing is unlikely to impact vegetation that includes, or is necessary for the continued existence of, rare flora. The proposed clearing is unlikely to be at variance to Principle c.

3.5 THREATENED ECOLOGICAL COMMUNITIES

Clearing principle 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.

The Cameron's Cave Threatened Ecological Community (TEC) is located near the Exmouth Townsite, approximately 2 km south of the proposed clearing area. No other TECs occur in proximity to the proposed clearing area.

Given the minor nature of the proposed clearing and distance from any TECs, no impacts on a TEC will occur and the clearing is not at variance to Principle d.

3.6 REMNANT VEGETATION

Clearing principle 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.

Vegetation association 663 is considered to be regionally significant, due to being regionally limited in its extent (Appendix 4). However, within the Carnarvon IBRA Region, Cape Range Sub-Region and Shire of Exmouth, vegetation association 663 is well represented by greater than 85% of the pre-European extent (Table 1).

EPA Position Statement No. 2 (EPA 2000) identifies a series of constraints in relation to biodiversity. One of which is to protect at least 30% of the original extent of vegetation complexes in unconstrained areas and 10% in constrained areas such as urban zones in accordance with the principles of Bush Forever (Government of Western Australia 2000 (superceded)). The study area is considered to be an unconstrained area and as such the minimum retention target of 30% applies. Within the Carnarvon IBRA Region, Cape Range Sub-Region and Shire of Exmouth, vegetation association 663 is represented by far greater than 30% (85.2 to 89.0%) of the pre-European extent (Table 1) and the small area of proposed clearing will not compromise the EPA objective for retention of vegetation for the purpose of biodiversity conservation.

The vegetation to be cleared is not significant as a remnant of native vegetation in an area that has been extensively cleared and the proposed clearing will not be at variance with Clearing Principle e.

3.7 WATERCOURSE OR WETLAND ENVIRONMENTS

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

The proposed clearing area is located at the eastern (or coastal) end of the Cape Range peninsula coastal 'floodplain'. The plain is relatively flat with numerous creeks and drainage lines which may flood during high rainfall events. Stormwater runoff is generally absorbed behind the coastal dunes with dissipation and infiltration occurring prior to the water reaching Exmouth Gulf (EPA 1997). No wetlands or major watercourses occur within or in proximity to the proposed clearing area. No riparian vegetation occurs within or in proximity to the proposed clearing area. The proposed clearing will not be at variance with Principle f.

3.8 LAND DEGRADATION

Clearing principle g: Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

The proposed clearing will occur within an area with a low to extremely low probability of ASS (Appendix 3).

The proposed clearing would occur within a relatively narrow corridor, with vegetation on either side remaining undisturbed, reducing the potential for wind erosion. The low regional rainfall and predominantly sandy soils (which promote infiltration) result in a low risk of erosion of the cleared area by surface water flows. Construction areas outside of the pipeline easement and access track footprints will be rehabilitated, to reduce the risk of land degradation during the operational phase of the Project.

As there is low potential for the exposure of ASS during the proposed clearing, any disturbed contaminated material will be removed from the site, and there is a low risk of wind or surface water erosion, the Project is unlikely to be at variance with Clearing Principle g.

3.9 CONSERVATION ESTATE

Clearing principle 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.

No Environmentally Sensitive Areas (ESA) as declared in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005* intersect or occur in proximity to the clearing area. The boundaries of the Ningaloo Marine Park and the Ningaloo Coast World Heritage Area are located approximately 6 km to the north of the proposed clearing area.

Considering no clearing will be undertaken within any reserve or ESA, the clearing will not be at variance to Clearing Principle h.

3.10 SURFACE AND GROUNDWATER QUALITY

Clearing principle 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.

The extent of clearing is very limited (limited to discrete areas adjacent to existing infrastructure) and the clearing is therefore unlikely to significantly impact surface water flows or groundwater infiltration. The sandy soils in the proposed clearing area are well drained and no drainage lines will be intersected. Impacts to surface water quality due to increased erosion are not expected. As the proposed clearing will occur within an area with a low probability of ASS, the generation of acid, leading to changes in surface or groundwater quality, is not expected. The proposed clearing will not be at variance with Clearing Principle I.

3.11 FLOODING POTENTIAL

Clearing principle j: Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.

Stormwater runoff flowing eastwards across the Cape Range peninsula coastal 'floodplain' is generally absorbed behind the coastal dunes, in proximity to the proposed clearing area, with dissipation and infiltration occurring prior to reaching Exmouth Gulf (EPA 1997). The low regional rainfall and predominantly sandy soils (which promote infiltration) result in a low occurrence of flooding. The proposed clearing is not expected to affect the incidence or the duration of flooding.

The proposed clearing is not at variance to Principle j.

4. CONCLUSION

The proposed clearing was assessed as not at variance or unlikely to be at variance with the ten clearing principles.

Given the small scale of the clearing, and the alignment of the pipeline easement and access track as much as possible along previously cleared areas, the impacts resulting from the proposed clearing will be minor and localised. All efforts will be made to minimise clearing and associated impacts to the environment.

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