WESTERN
ENVIRONMENTAL

Environmental Assessment Report

Lots 1 and 500 Dampier Road, Gap Ridge

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Environmental Assessment Report

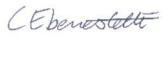
Lots 1 and 500 Dampier Road, Gap Ridge

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23-Mar-2026
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FINAL

Prepared for:
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19-Mar-2026	**23-Mar-2026**	**23-Mar-2026**

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The scope of services did not include any assessment of the title to or ownership of the properties, buildings and structures referred to in this report, or the application or interpretation of laws in the jurisdiction in which those properties, buildings and structures are located.

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In preparing this report, WEPL has relied on data, surveys, analyses, designs, plans and other information provided by the Client (or its agents), other individuals and organisations ("the data").

Except as otherwise stated in this report, WEPL has not verified the accuracy or completeness of the data. WEPL does not represent or warrant that the data is true or accurate, and disclaims any and all responsibility or liability with respect to the use of the data.

To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in this report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data.

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The conclusions must also be considered in light of the agreed scope of services (including any constraints or limitation therein) and the methods used to carry out those services, both of which are as stated or referred to in this report.

Environmental Conclusions

In accordance with the scope of services, WEPL has conducted environmental field monitoring and/or testing in the preparation of this report. The nature and extent of monitoring and/or testing conducted is described in this report.

On all sites, varying degrees of non-uniformity of vertical and horizontal conditions in media (soil, water, air, waste or other media as described in the report) are encountered. Hence no monitoring, common testing or sampling technique can eliminate the possibility that monitoring or testing results/samples are not totally representative of media conditions encountered. The conclusions are based on the data and the environmental field monitoring and/or testing actually undertaken, and are therefore merely indicative of the environmental condition of the site at the time of preparing this report, including the presence or otherwise of contaminants or emissions. It should be recognised that site conditions, including the extent and concentration of contaminants, can change.

Within the limitations imposed by the scope of services, the monitoring, testing, sampling and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. To the maximum extent permitted by law, no other warranty, express or implied, is made.

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Other Limitations

This report is intended to be read in its entirety, and sections or parts of this report should therefore not be read and relied on out of context.

WEPL will not be liable to update or revise this report to take into account any events or circumstances or facts becoming apparent after the date of this report.

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Appendix A Likelihood of Occurrence Assessment

1. Introduction

1.1 Background

This Environmental Assessment Report (EAR) has been prepared to support a Local Structure Plan (LSP) over Lot 1 and Lot 5 Dampier Road, Gap Ridge (the Site). The purpose of the LSP is to guide strategic industrial development within the Site, and is required by the City of Karratha.

The Site is located in the City of Karratha, approximately 8.5 km west of Karratha, Western Australia (Figure 1). The Site is currently zoned Rural under the City of Karratha Local Planning Scheme No. 8 (LPS 8). A portion of the Site (Lot 500) is also zoned for "Additional Use A8 - Industry Noxious (restricted)." The southern portion of the Site (Lot 1) is subject to a scheme amendment to rezone the Lot from Rural to Industrial. The WA Environmental Protection Authority (EPA) decided not to formally assess the scheme amendment on the 7th of January 2025.

1.2 Purpose and Scope

This EAR has been prepared to support a LSP over the Site to guide strategic industrial development. This EAR will form the central environmental document that summarises and communicates key environmental and heritage issues relating to the Site.

The EAR has been prepared using publicly available datasets and provides the following:

- Summary of the legislative, policy, and planning framework relating to the Site, and associated approvals.
- Methodology used for desktop assessment.
- Description of the Site's environmental context, based on desktop information held in publicly available datasets, government databases and published literature, where available.
- Assessment of the likelihood of occurrence of Threatened and Priority flora, fauna, and ecological communities within the Site based on the environmental characteristics (above) and known records held by the Department of Biodiversity, Conservation and Attractions (DBCA) within the area surrounding the Site.
- Description of potential impacts, and mitigation strategies relevant to applicable EPA factors and other relevant environmental matters; including:
    - Flora and vegetation.
    - Terrestrial environmental quality.
    - Terrestrial fauna.

  - Inland waters.
  - Social surroundings.
  - Bushfire.
  - Heritage (both Aboriginal and European).
  - Holistic environmental impact assessment and recommended management responses.

- Advice and recommended management of any areas of significance.





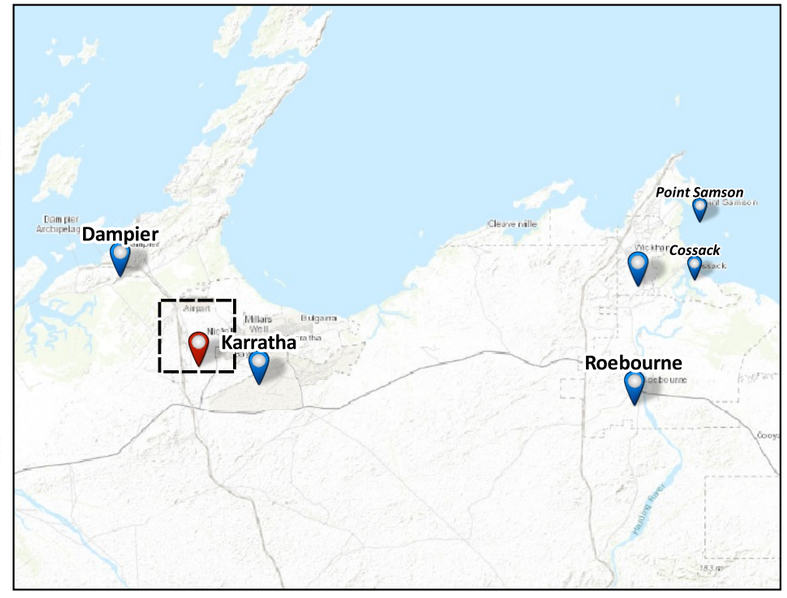


Figure 1: Site Location

N

0 70 140 210 280 m

PROJECT/REPORT NAME	Environmental Assessment Report Lot 1 and 500 Dampier Road, Gap Ridge
SCALE	1:5,100
SHEET SIZE	A3 COLOUR
CLIENT	RFF
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A26.045
VERSION	0
DATA SOURCE	NEARMAPS (Sept 2025)
DRAWN BY / REVIEWED BY	SC/CE
DATE	25/2/2026

Legend

- Site
- Cadastre (No Attributes) (LGATE-001)

No	Description	Drawn	Approved	Date
A	Original issue	SC	CE	25/2/2026

NOTES:

Cadastral boundary (LGATE-002). Base map ESRI Topo. Townsites (LGATE-248).

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2. Legislation, Policy and Guidelines

Key statutory and policy documents are listed below. Detail is provided where they relate specifically to the proposed action.

2.1 Commonwealth

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) and seeks to balance the protection of environmental and cultural values with societal economic and social needs. Nine Matters of National Environmental Significance (MNES) are protected under the EPBC Act, which are:

- World Heritage Properties.
- National Heritage Place.
- Wetlands of international importance (listed under the Ramsar Convention).
- Listed threatened species and ecological communities.
- Migratory species protected under international agreements.
- Commonwealth Marine Areas.
- The Great Barrier Reef Marine Park.
- Nuclear actions (including uranium mines).
- Water resources, in relation to coal seam gas development and large coal mining development.

2.2 State

2.2.1 Legislation

Environmental Protection Act 1986 (EP Act)

The EP Act provides for the prevention, control and abatement of pollution and environmental harm, for the conservation, preservation, protection, enhancement and management of the environment and for matters incidental to or connected with the foregoing. It is administered by the Department of Water and Environmental Regulation (DWER), the EPA, and the Minister for Environment.

Other Relevant State Legislation

All assessments have been conducted with reference to the following State legislation and regulations, which provides for the environmental values and contamination risks addressed within this document:

- *Biodiversity Conservation Act 2016* (BC Act).
- *Biosecurity and Agriculture Management Act 2007* (BAM Act).
- *Aboriginal Heritage Act 1972* (AH Act).
- *Contaminated Sites Act 2003* (CS Act).
- *Contaminated Sites Regulations 2006* (CS regulations)
- *Planning and Development Act 2005* (PD Act).
- *Heritage Act 2018.*

2.2.2 State Planning Policies

State planning policies (SPP) are prepared and adopted by the Western Australian Planning Commission (WAPC) under statutory procedures set out in Part 3 of the PD Act. The SPPs relevant to the proposed development are identified below:

- *State Planning Policy 2.9: Water Resources* (SPP 2.9)
- *State Planning Policy 3.7: Planning in Bushfire Prone Areas* (SPP 3.7).
- *State Planning Policy 5.4: Road and Rail Noise* (SPP 5.4).

2.2.3 Environmental Protection Authority (EPA) Guidance

This assessment has given consideration to the recommendations of EPA regulatory guidance as listed below:

- *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016).
- *Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA, 2020).
- *Guidance Statement No. 33: Environmental Guidance for Planning and Development* (EPA, 2008).
- *Separation Distances between Industrial and Sensitive Land Uses* (EPA, 2005).

2.3 Local Government

The following local planning documents are relevant to the proposed LSP:

- *City of Karratha. (2021). Local Planning Strategy*.
- *City of Karratha. (2019). Local Planning Scheme No. 8*.

2.4 Approvals Context

A Local Scheme Amendment over the southern portion of the Site (Lot 1) was referred the EPA under s48a of the EP Act to rezone the area from 'Rural' to 'Industrial Development'. The City of Karratha required that the scheme amendment be modified to include Lot 500 within the rezoning in addition to Lot 1, to assist with long term planning of the Gap Ridge industrial estate. The EPA determined the scheme amendment did not require formal assessment on the 7th of January 2025, and no advice was given.

The scheme amendment is awaiting final gazettal as of March 2026. The LSP is being prepared concurrently across the entire Site, in accordance with the zone requirements under the City of Karratha Local Planning Scheme.

3. Methodology

This EAR is based on a desktop assessment of the Site. The desktop assessment was undertaken to understand the environmental context of the Site and assess the likelihood of occurrence of Threatened and Priority flora, fauna, and ecological communities within the Site.

The Site's environmental context has been described following a review of desktop information held in publicly available datasets, government databases and published literature, where available.

Following this, a likelihood of occurrence assessment (LOOA) was undertaken to identify Threatened and Priority flora, fauna, and ecological communities that may occur within the Site. To inform the LOOA, DBCA database searches and a search of the Protected Matters Search Tool (PMST) were undertaken. These searches are summarised in Table 3-1.

Table 3-1: Database Searches of the Site.

Database Name	Date	Search Type	Search Area
Protected Matters Search Tool (DCCEEW)	February 2026	Commonwealth listed Threatened flora and fauna and TECs	50 km buffer around the Site.
Threatened and Priority Flora database search (DBCA)	October 2024	Threatened and Priority Flora	50 km buffer around the Site.
Western Australian Herbarium (WAHerb) flora database search (DBCA)	October 2024	Threatened and Priority Flora	50 km buffer around the Site.
Threatened and Priority Ecological Communities database search (DBCA)	October 2024	Threatened and Priority Ecological Communities	50 km buffer around the Site.
Threatened and Priority Fauna database search (DBCA)	October 2024	Threatened and Priority Fauna	50 km buffer around the Site.

To identify potential habitat suitability for conservation significant species and communities within the Site, the LOOA considered the environmental context of the Site and known records held by DBCA (from the database searches listed above) within the area surrounding the Site. The criteria presented in Table 3-2 below were applied to determine likelihood of occurrence.

Table 3-2: Likelihood of Occurrence Criteria

Likelihood	Criteria
Recorded	Recorded in the Survey Area from database searches (if confident record is accurate), previous survey by others or by current survey.
High	Suitable habitat occurs within the Survey Area; and • Records of flora or community <2 km from the Survey Area. With record <30 years old.
Medium	Suitable or marginally suitable habitat occurs within the Survey Area; and

Likelihood	Criteria
	• Records of flora or community <5 km from the Survey Area. • Species or community is strongly linked to a specific habitat, which occurs within the Survey Area and records are present <10 km from the Survey Area.
Low	• The species or community has a well understood and specific habitat preference/ requirements, which is absent from the Survey Area. • Records are historical only, or are pre mapping procedures (e.g. records assigned to towns or place names). • Suitable habitat is present, but there are no existing records of the species or community from the region despite reasonable previous search effort.

The desktop assessment is considered to provide a sufficient understanding of the Site to inform and support the proposed LSP and no surveys are proposed to be undertaken. The environmental context of the Site is well understood, with sufficient publicly available data available for the Pilbara region. The Site has been historically disturbed (section 4.2) and currently contains limited flora and vegetation values (section 4.7). The Site is also unlikely to comprise core habitat for conservation significant fauna (Section 4.10) due to its small size and historic disturbance. Therefore, the desktop assessment is considered an appropriate environmental assessment to inform and support the proposed LSP.

4. Environmental Context

4.1 Biogeographic and Regional Setting

The Interim Biogeographic Regionalisation for Australia (IBRA) recognises 89 bioregions. The Site is located within Pilbara (PIL) region. The Pilbara has been subdivided into four subregions, and the Site is within the Roebourne Subregion (PIL04).

The Roebourne Subregion is described by Kendrick and Stanley (2001) as:

"*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.*"

The climate is described as arid tropical with highly variable rainfall. Rainfall is mainly in summer. Cyclonic activity is significant, with several systems affecting the coast and hinterland annually.

4.2 Land Use

4.2.1 Current Land Use

The majority of the Site has been cleared of native vegetation. There is a patch of remnant vegetation present in the centre of the Site and the remainder is bare ground or hardstand. There is an existing building in the centre of the Site.

The Site is zoned Rural under LPS No. 8 and is within the airport noise restriction and obstacle height limitation special control area.

The zoning of northern portion of the Site (Lot 500), was amended to include Additional Use - Industry Noxious (restricted) for 'Crushing of building materials' in 2020. This portion of the Site is held under a crown lease by Karratha Environmental Crushing and is currently operating as a materials storage, sorting and processing facility.

The southern portion of the Site (Lot 1) is subject to a scheme amendment to change the zoning from Rural to Industrial. Lot 1 was acquired by Green Grid Energy in 2023 and is under development in accordance with Development Approval DA23-146, issued by the City of Karratha on the 12th of September 2024, to be a Storage Facility/ Depot/ Lay Down Area.

4.2.2 Previous Land Use

The earliest available imagery of the Site is dated 22 August 1981 and shows the entirety of the Site as remnant native vegetation (Plate 1). Imagery dated 5 August 2000 shows clearing and development in the northwest portion of the site and over a small area in the south (Plate 2). The Site has been progressively cleared and the current extent of clearing and development within the Site was reached in 2025 (Plate 3).

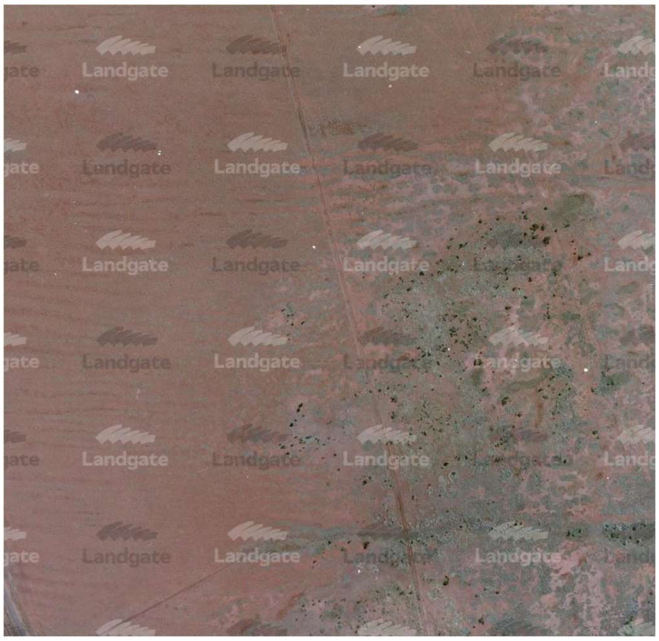


Plate 1: Aerial Imagery Dated 22 August 1981 (Landgate, n.d.)

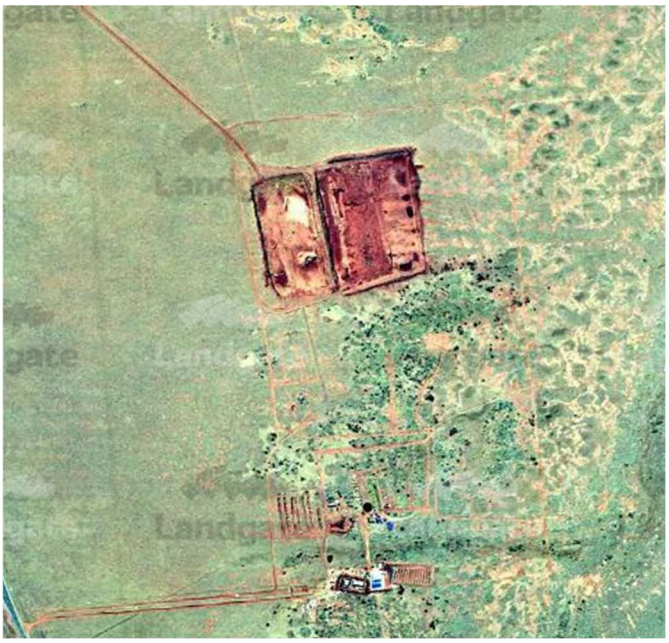


Plate 2: Aerial Imagery Dated 5 August 2000 (landgate, n.d.)



Plate 3: Aerial Imagery Dated 22 July 2025 (Landgate, n.d.)

4.2.3 Surrounding Land Use

The Site is bound by vacant land with remnant native vegetation on all sides. The surrounding land is zoned Rural under the City of Karratha LPS 8 (Figure 2). To the west of Dampier Highway, land is zoned 'Industrial Development'.

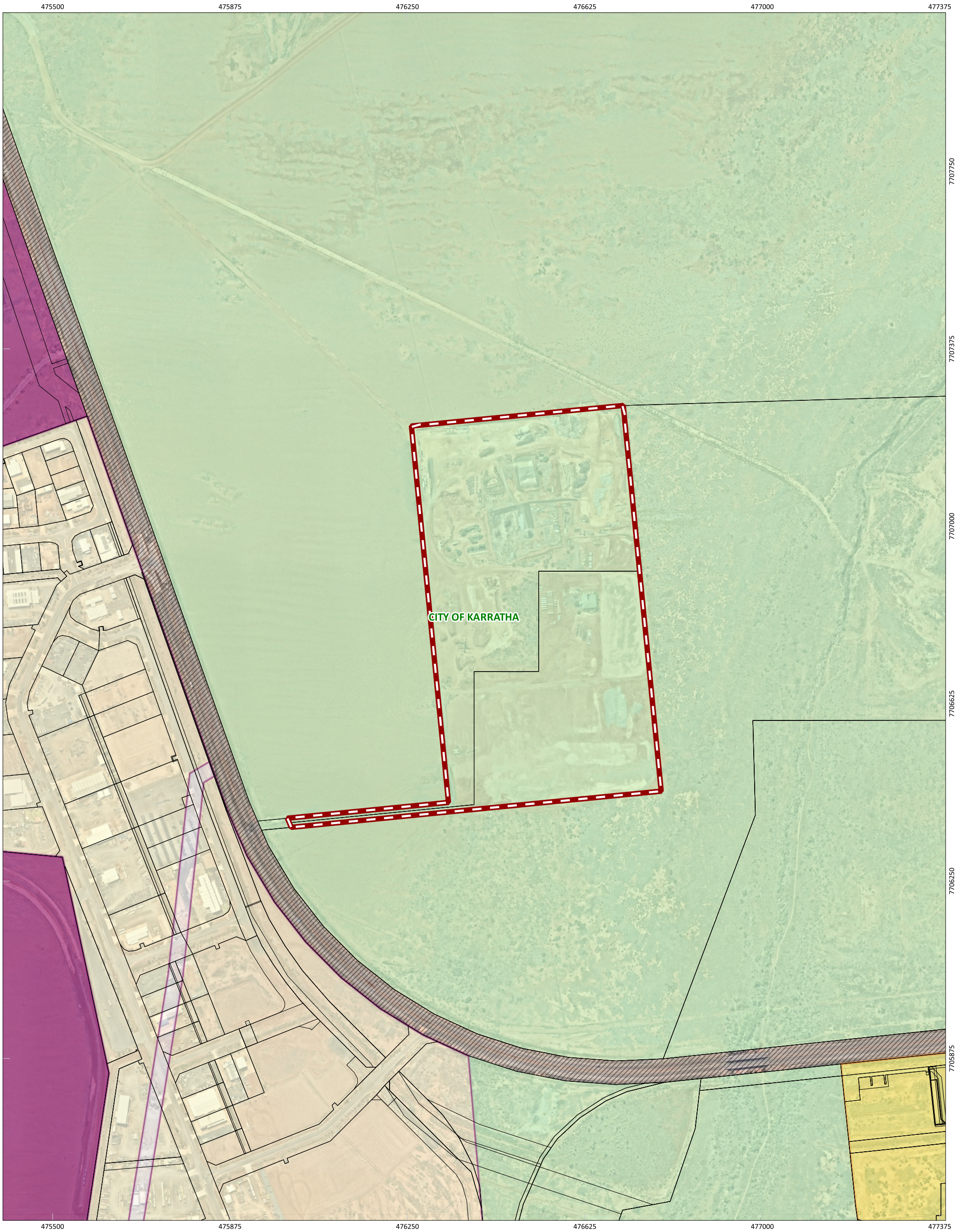


Figure 2: Surrounding Land Use and Zoning

N 0 50 100 150 200 m	PROJECT/REPORT NAME: Environmental Assessment Report Lot 1 and 500 Dampier Road, Gap Ridge		
SCALE: 1:7,500	SHEET SIZE: A3 COLOUR	CLIENT: RFF	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50		PROJECT NUMBER: A26.045	VERSION: 0
DATA SOURCE: NEARMAPS (Sept 2025)		DRAWN BY / REVIEWED BY: SC/CE	DATE: 25/2/2026

Legend

- Site
- Cadastre (No Attributes) (LGATE-001)

Local Planning Scheme - Zones and Reserves (DPLH-071)

- Industrial development
- Local roads
- Rural
- State and regional roads
- Strategic industry
- Urban development

No	Description	Drawn	Approved	Date
A	Original issue	SC	CE	25/2/2026

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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4.3 Topography, Geology and Soils

4.3.1 Topography

Topographic contours are not available for the Site. Available contours southeast of the Site show the land is relatively flat and sits at approximately 10 m Australian Height Datum (LGATE-141) (Figure 3).

4.3.2 Regional Geology and Soils

Two geological units are found within the Site, according to 1:500,000 State Regolith Geology mapping. These are:

- Af-PIP: Clay, silt, and sand on floodplains,
- Ac-PIP: Clay, silt, sand, and gravel in fluvial channels.

The Site is within the Horseflat system (218Hf) according to regional soil-landscape mapping (DPIRD-027) which is described as '*Gilgaied clay plains supporting Roebourne Plains grass grassland and minor grassy snakewood shrublands*'. Surface geology of the Site is presented in Figure 3.

4.3.3 Acid Sulphate Soils

Acid Sulfate Soil (ASS) risk mapping (DWER-053) identifies that the eastern portion of the Site has a moderate to low risk of ASS occurring within 3 m of the natural soil surface (Figure 4). There is no mapped risk of ASS occurring in the remainder of the Site.

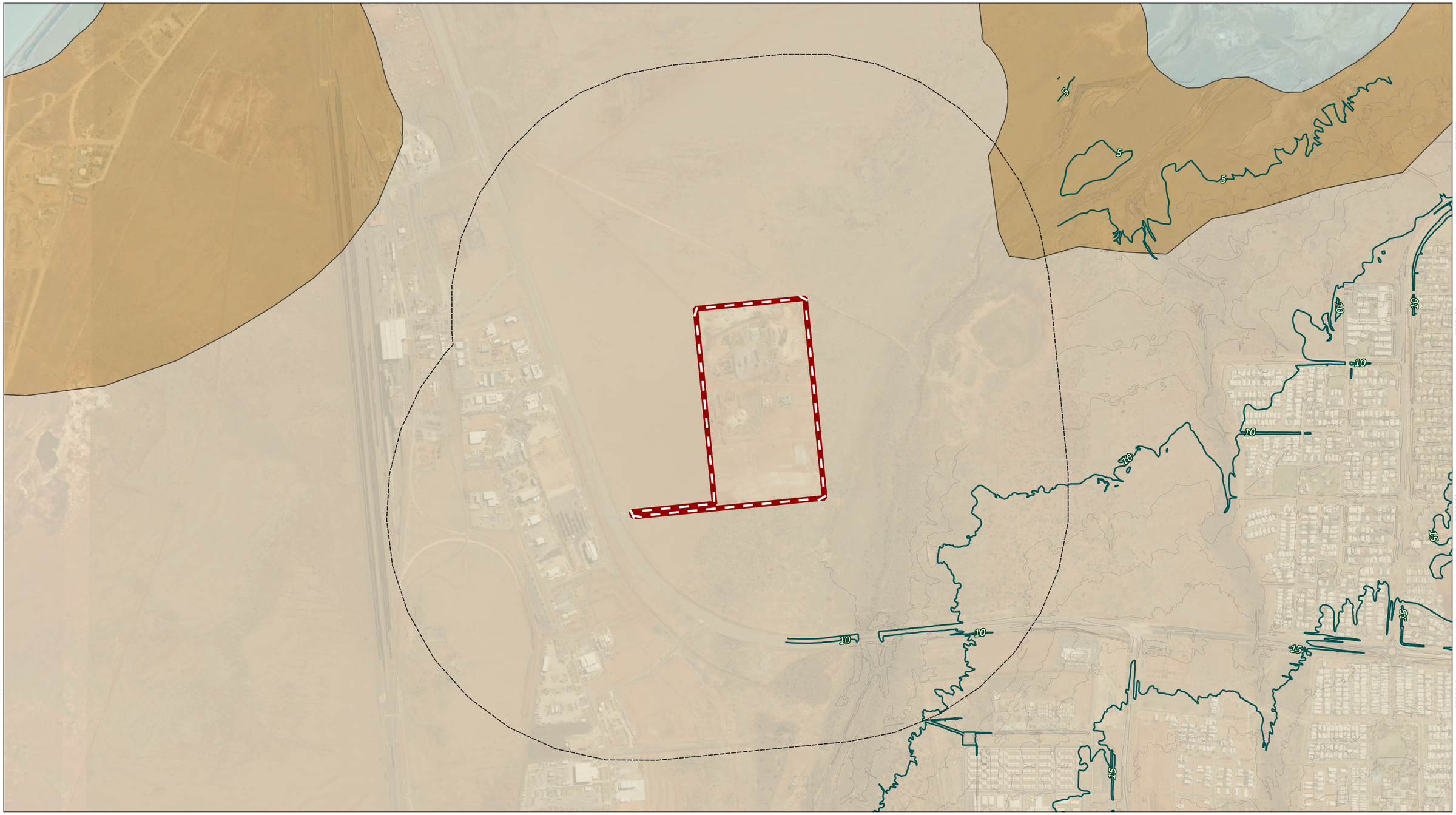


Figure 3: Surface Geology (Soils)

N

0 200 400 600 800 m

PROJECT/REPORT NAME: Environmental Assessment Report Lot 1 and 500 Dampier Road, Gap Ridge		
SCALE: 1:15,200	SHEET SIZE: A3 COLOUR	CLIENT: RFF
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A26.045	VERSION: 0
DATA SOURCE: NEARMAPS (Sept 2025)	DRAWN BY / REVIEWED BY: SC / CE	DATE: 25/2/2026

Legend

- Site
- 1km Buffer

Topographic Contours (m AHD) (LGATE-140)

- Each 5m
- Each 1m

Soil Landscape Mapping - Best Available (DPIRD-027)

- Cheerawarra system
- Horseflat system
- Littoral system

No	Description	Drawn	Approved	Date
A	Original issue	SC	CE	25/2/2026

NOTES:

Cadastral boundary from LANDGATE 2022. UFID stands for Unique Identifier

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Figure 4: Acid Sulfate Soils Risk

N 0 50 100 150 200 m		PROJECT/REPORT NAME: Environmental Assessment Report Lot 1 and 500 Dampier Road, Gap Ridge	
SCALE: 1:7,500	SHEET SIZE: A3 COLOUR	CLIENT: RFF	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50		PROJECT NUMBER: A26.045	VERSION: 0
DATA SOURCE: NEARMAPS (Sept 2025)		DRAWN BY / REVIEWED BY: SC/CE	DATE: 9/3/2026

Legend

- Site
- Acid Sulfate Soil Risk Map, Pilbara Coastline (DWER-053)
  - 2 – Moderate to low risk of ASS occurring within 3m of natural soil surface but high to moderate risk of ASS beyond 3m of natural soil surface

No	Description	Drawn	Approved	Date
A	Original issue	SC	CE	9/3/2026

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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4.4 Contamination

According to the Contaminated Sites Database (DWER-059) there are no contaminated sites within or immediately adjacent to the Site.

The nearest registered contaminated site (ID 36575) is approximately 900 m east of the Site to the opposite side of Dampier Highway (Figure 5). This site is classified as 'contaminated - remediation required' with the contaminated sites database identifying that petroleum hydrocarbons have been found at multiple locations across a large portion of this site. Groundwater is impacted by both dissolved phase hydrocarbons and light non-aqueous phase liquid, such as pure hydrocarbon floating on the surface of groundwater. The affected land is restricted to the current industrial land use, and groundwater abstraction for any purpose other than remediation or monitoring is not permitted. The direction of groundwater flow between the Site and contaminated site ID 36575 is unknown. However, the Site is unlikely to be affected by this contamination, as no groundwater abstraction is proposed.

Whilst the Site is not a registered contaminated site, the current leaseholder of Lot 500 was notified by DWER in November 2025 that the Site is a possibly contaminated and that investigation is required. The following potential sources of contamination were identified during a site inspection by DPLH on 20 August 2025:

- Intermediate bulk containers (IBCs) containing an emulsion likely for asphalt production.
- Emulsion and building waste aggregate observed on unsealed land (unknown composition).
- Stockpiling of various materials.
- Liquid waste ponds.

The entirety of Lot 500 is therefore now classified by DWER as 'possibly contaminated - investigation required'. The leaseholder is proceeding with a site audit, and remediation will be undertaken as required.

4.5 Conservation Areas and Environmentally Sensitive Areas

The Site does not intersect any conservation areas (DBCA-011). The nearest conservation area to the Site is Murujuga National Park which is situated 7.5 km to the north (Figure 6).

Similarly, there are no mapped Environmentally Sensitive Areas (ESAs) with or adjacent to the Site (DWER-046). The nearest ESA is 16 km to the northwest, associated with the Dampier Archipelago.



Figure 5: Known and Potential Contamination Risk

N; 0 150 300 450 600 m		PROJECT/REPORT NAME: Environmental Assessment Report Lot 1 and 500 Dampier Road, Gap Ridge	
SCALE: 1:10,000	SHEET SIZE: A3 COLOUR	CLIENT: RFF	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50		PROJECT NUMBER: A26.045	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY NOW		DRAWN BY / REVIEWED BY: SC / CE	DATE: 23/3/2026

Legend

- Site
- Potentially contaminated - investigation required

Contaminated Sites Database (DWER-059)

- Contaminated - remediation required

No	Description	Drawn	Approved	Date
A	Original issue	SC	CE	23/3/2026

NOTES:

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Figure 6: Conservation Areas

0 1 2 km
N

PROJECT/REPORT NAME	Environmental Assessment Report Lot 1 and 500 Dampier Road, Gap Ridge
SCALE	1:91,500
SHEET SIZE	A3 COLOUR
CLIENT	RFF
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A26.045
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY NOW
DRAWN BY / REVIEWED BY	SC/CE
DATE	9/3/2026

Legend

Site

DBCA - Legislated Lands and Waters (DBCA-011)

National Park

Section 5(1)(h) Reserve

No	Description	Drawn	Approved	Date
A	Original issue	SC	CE	9/3/2026

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4.6 Hydrology

4.6.1 Groundwater

The Site is within the Pilbara Groundwater Area (DWER-034) and is underlaid by the Pilbara - Fractured Rock aquifer (DoW, 2013). Fractured rock aquifers have complex and irregular structures and characteristics such as water availability, recharge, and storage (DoW, 2013). Allocation limits are not set for fractured rock aquifers (DoW, 2013; Essential Environmental, 2016).

There are two existing groundwater licences within the Site which have both expired (DWER, n.d.):

- GL208352 for an allocated 95,000 KL, expiry 7/2/2023.
- GL105005 for an allocated 95,000 KL, expiry 7/2/2023.

4.6.2 Surface Water

There are no natural surface water features within the Site. There is one un-named watercourse approximately 240 m east of the Site (Geoscience Australia, 2015) as shown on Figure 7. This watercourse connects to major watercourses in the surrounding area including Lulu Creek, Cockatoo Creek, and Maitland River, and coastal watercourses.

4.6.3 Wetlands

There are no ecologically significant wetlands, as recognised on the Directory of Important Wetlands, in the vicinity of the Site (DBCA-045). The nearest significant wetland is Millstream Pools, approximately 140 km to the south (DBCA-045).

4.6.4 Public Drinking Water Source Areas

The Site is not mapped within or in proximity to a public drinking water source area (DWER-033).



Figure 7: Surface Water Features

N 0 60 120 180 240 m	PROJECT/REPORT NAME: Environmental Assessment Report Lot 1 and 500 Dampier Road, Gap Ridge	
SCALE: 1:6,600	SHEET SIZE: A3 COLOUR	CLIENT: RFF
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A26.045	VERSION: 0
DATA SOURCE: NEARMAPS (Sept 2025)	DRAWN BY / REVIEWED BY: SC/CE	DATE: 25/2/2026

Legend

- Site
- Surface Hydrography (GA, 2015)
  - Watercourse

No	Description	Drawn	Approved	Date
A	Original issue	SC	CE	25/2/2026

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4.7 Flora and Vegetation

4.7.1 Pre-European Vegetation

During the 1970s, John Beard and associates conducted a systematic survey of native vegetation, describing the vegetation systems in Western Australia at a scale of 1:250 000 in the south-west and at a scale of 1:1,000,000 in less developed areas (Beard, 1981).

This mapping sought to describe the native vegetation presumed to occur prior to European settlement and, as such, is referred to as pre-European vegetation associations. These vegetation maps are maintained in digital form by the Department of Primary Industries and Regional Development (DPIRD) (DPIRD-006).

Extents are updated periodically by DBCA (GoWA, 2019). The Site is mapped as the Abydos Plain - Roebourne vegetation association (Figure 8). The estimated pre-European and current extent of the vegetation association is provided in Table 4-1.

Table 4-1: Pre-European Vegetation Association within the Site and Proportions Remaining within the Abydos Plain - Roebourne

Vegetation Association	Description	Original Extent (ha)	Current Extent (ha)	% Remaining	% Managed for Conservation
Abydos Plain - Roebourne_589	Mosaic: Short bunch grassland - savanna / grass plain (Pilbara) / Hummock grasslands, grass steppe; soft spinifex.	80,741.91	78,549.79	97.29%	0.75%

Extent of Remnant Vegetation

Remnant vegetation extent mapping (DPIRD-005) estimates that there is 15.7 ha of remnant vegetation within the Site. However, based on aerial imagery, this is expected to be approximately 2 ha.

4.8 Threatened and Priority Flora

A search of DBCA databases and the PMST was undertaken to identify records of Threatened and Priority flora within 50 km of the Site. DBCA Database records within 10 km of the Site are shown in Figure 9.

The likelihood of each species occurring within the Site was assessed based on the following:

- Distance of each record from the Site.
- Age of most recent record.
- Habitat preferences and presence/absence of suitable habitat from the Site.
- Previous survey effort.

There are no records of Threatened or Priority flora species occurring within the Site, according to a search of DBCA database records. Further, there are no records of Threatened flora species within 50 km of the Site.

Priority flora species assigned a 'Medium' or 'High' likelihood of occurring within the Site are shown in Table 4-2.

Table 4-2: Conservation Significant Flora with a 'Medium' or 'High' Likelihood of Occurring within the Site

Scientific Name	Conservation Status		Assessed Likelihood of Occurrence
	State	Commonwealth	
Dolichocarpa sp. Hamersley Station **(A.A. Mitchell PRP 1479)**	P3	-	High
Themeda sp.Hamersley Station **(M.E. Trudgen 11431)**	P3	-	High
Neptunia longipila	P2	-	Medium
Paspalidium retiglume	P2	-	Medium
Trianthema sp. Python Pool **(G.R. Guerin & M.E. Trudgen GG 1023)**	P2	-	Medium
Stackhousia clementii	P3	-	Medium
Vigna triodiophila	P3	-	Medium

4.9 Threatened and Priority Ecological Communities

A search of DBCA databases and the PMST was undertaken to identify records of Threatened and Priority ecological communities within 50 km of the Site. DBCA Database records within 10 km of the Site are shown in Figure 9.

Seven Priority Ecological Communities (PECs) have been recorded within 50 km of the Site. The likelihood of each community occurring within the Site was assessed based on the habitat characteristics of the Site. Five PECs were found to have a medium or high likelihood of occurrence. These PECs are detailed in Table 4-3. There are no records of Threatened Ecological Communities (TECs) within 50 km of the Site. The complete likelihood of occurrence assessment is provided as Appendix A.

Table 4-3: Conservation Significant Ecological Communities with a 'Medium' or 'High' Likelihood of Occurring within the Site

Floristic Community Name	Community Description	Conservation Status		Likelihood of Occurrence
		State	Common wealth	
Horseflat Land System	**Horseflat land system of the Roebourne Plains** The Horseflat Land System (Roebourne Plains) land units forming extensive clay plains dominated by tussock grasslands	P3		High

Floristic Community Name	Community Description	Conservation Status		Likelihood of Occurrence
		State	Common wealth	
	on mostly alluvial, red clay loams gilgaied and non-gilgaied for this community. The community is dominated by perennial tussock grasses include *Eragrostis xerophila* (Roebourne Plains grass), *Chrysopogon fallax* (ribbon grass) and other *Eragrostis* spp. and *Eriachne* spp. The community also supports a suite of annual grasses including *Dichanthium* spp. and *Sorghum* spp.. The community extends from *Peedamulla* to Balla Balla surrounding the towns of Karratha and Roebourne. The land units of the Horseflat land system that align with this PEC are units 3 (excluding areas of snakewood and hummock grass; mosaic areas, and areas of heavily gilgaied soils			
Roebourne Plains gilgai grasslands	**Roebourne Plains coastal grasslands with gilgai microrelief on cracking clays** These grasslands occur on microrelief on strongly gilgaied self-mulching cracking clays, and emergent depositional surfaces. The grasslands are surrounded by non-gilgaied clay plains/flats and sandy coastal and alluvial plains. The gilgai depressions support ephemeral and perennial tussock grasslands dominated by Sorghum sp. and *Eragrostis xerophila* (Roebourne Plains grass) along with other native species including *Eriachne benthamii* (swamp wanderrie grass), *Chrysopogon fallax* (golden beard grass) and Panicum decompositum (native millet). Restricted to the Karratha area, where it has been largely removed.	P1		High
Roebourne chenopod association	**Chenopod vegetation associations of the Roebourne Plains** The community is dominated by *Eragrostis xerophila* and chenopods (Sclerolaena, Atriplex species) growing in saline clay soils with moderate surface strew of pebbles and cobbles. The association appears to be uncommon and only been located to date at Roebourne Airport and west of Nickol (Karratha) however it is likely some other small occurrences occur between Cape Preston and Mundabullangana.	P1		Medium

The following PECs were assigned a 'High' likelihood of occurring (or are known to occur) within the Site:

- Roebourne Plains gilgai grasslands - Priority 1.
- Horseflat Land System - Priority 3.

The following PEC was assigned a 'Medium' likelihood of occurring within the Site:

- Roebourne chenopod association - Priority 1.

The Site intersects a known record of the Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays (Roebourne Plains gilgai grasslands), which is a Priority 1 PEC.

The Horseflat Land System of the Roebourne Plains PEC (Priority 3) has also been recorded in very close proximity to the Site.

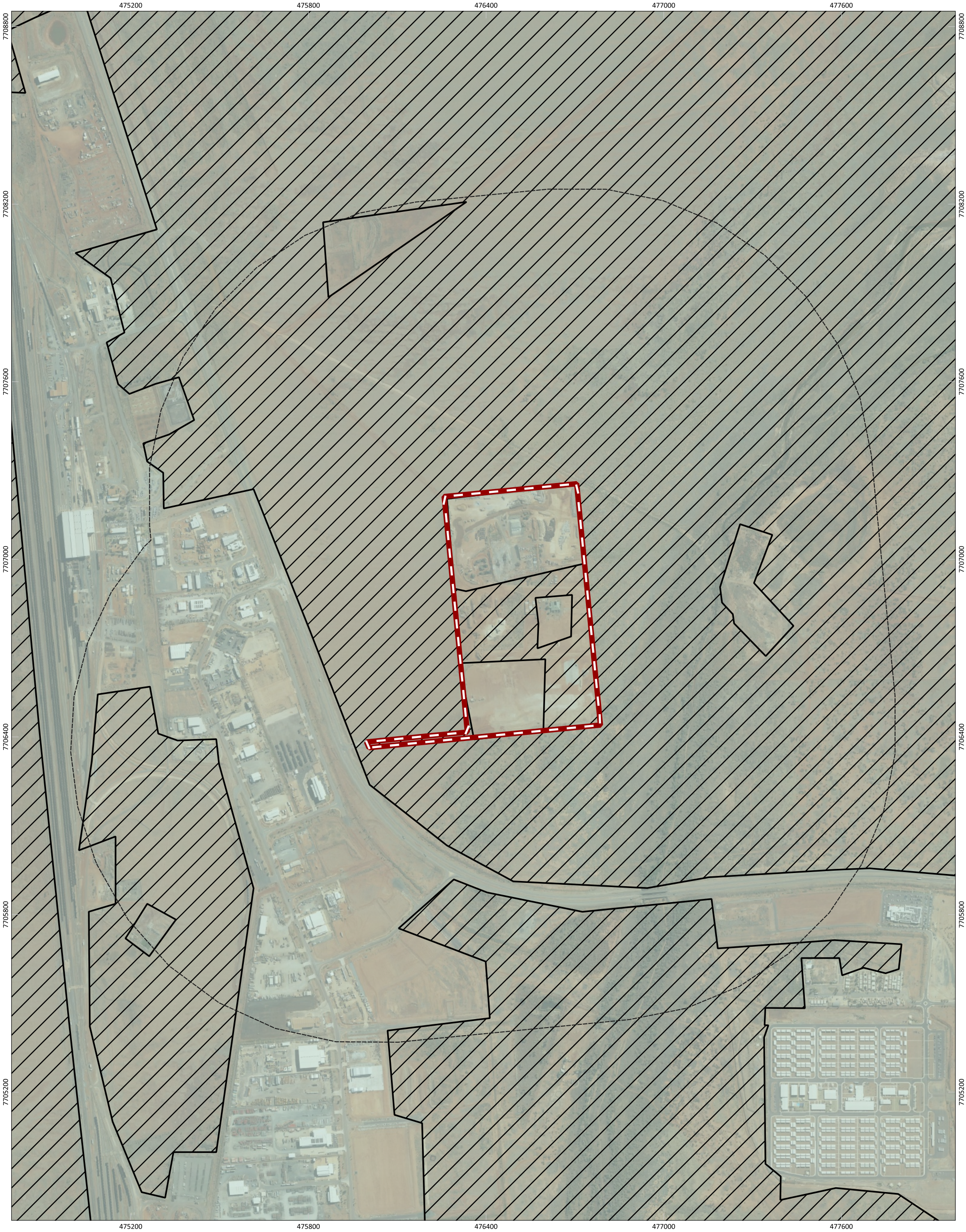


Figure 8: Vegetation Association

0 90 180 270 360 m

N

PROJECT/REPORT NAME	Environmental Assessment Report Lot 1 and 500 Dampier Road, Gap Ridge
SCALE	1:12,000
SHEET SIZE	A3 COLOUR
CLIENT	RFF
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A26.045
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY NOW
DRAWN BY / REVIEWED BY	SC/CE
DATE	9/3/2026

Legend

- Site
- 1km Buffer
- Native Vegetation Extent (DPIRD-005)

Vegetation Associations (DPIRD-006)

- ABYDOS PLAIN - ROEBOURNE_589

No	Description	Drawn	Approved	Date
A	Original issue	SC	CE	9/3/2026

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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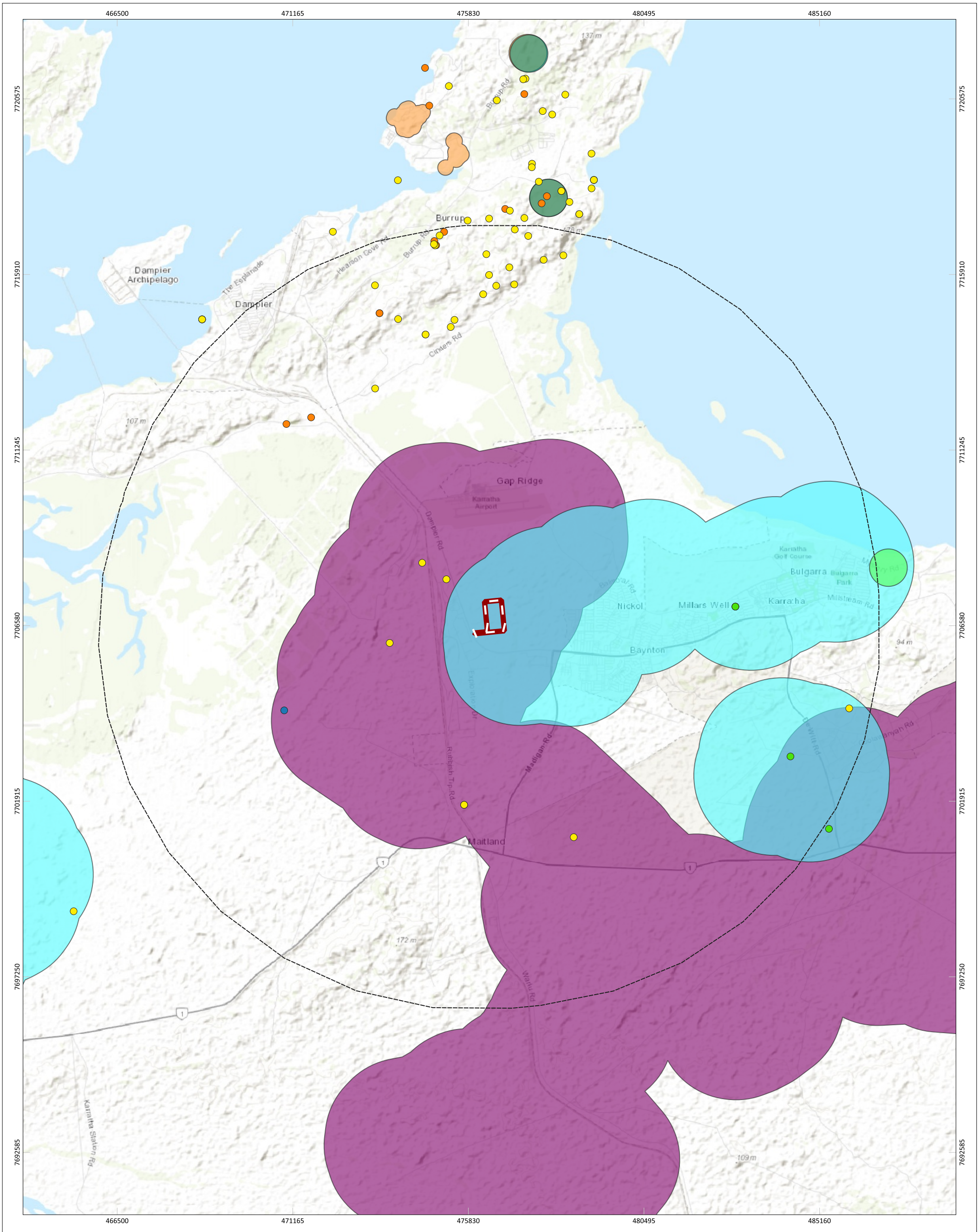


Figure 9: DBCA Database Search Results Flora and Communities

N
0 1 2 km

PROJECT/REPORT NAME: Environmental Assessment Report Lot 1 and 500 Dampier Road, Gap Ridge		
SCALE: 1:93,300	SHEET SIZE: A3 COLOUR	CLIENT: RFF
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A26.045	VERSION: 0
DATA SOURCE: ESRI Topographic Map	DRAWN BY / REVIEWED BY: SC/CE	DATE: 27/2/2026

Legend

- Site
- 10km Buffer

Conservation Significant Flora (DBCA Records)

- Priority 1
- Priority 2
- Priority 3
- Priority 4

Conservation Significant Ecological Communities (DBCA Records – buffered)

- Burrup Peninsula rock pile communities (P1)
- Burrup Peninsula rock pool communities (P1)
- Coastal dune native tussock grassland (P3)
- Horseflat Land System (P3)
- Roebourne Plains gilgai grasslands (P1)

No	Description	Drawn	Approved	Date
A	Original issue	SC	CE	27/2/2026

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4.10 Terrestrial Fauna

4.10.1 Threatened and Priority Fauna

A search of DBCA databases and the PMST was undertaken to identify records of conservation significant fauna within a 50 km radius of the Site. The search returned records of 15 Threatened fauna taxa, 40 Specially Protected fauna taxa, and nine Priority fauna taxa within 50 km of the Site. No records of conservation significant fauna occur within the Site. Records that occur within 10 km are shown in Figure 10.

The likelihood of each fauna species occurring within the Site was assessed based on:

- Distance of each record from the Site.
- Age of most recent record.
- Habitat preferences and presence/absence of suitable habitat from the Site.
- Previous survey effort.

A total of 14 species of conservation significant fauna were assessed as having a 'Medium' or 'High' likelihood of occurring within the Site. These are provided in Table 4-4.

Table 4-4. Conservation Significant Fauna with a 'Medium' or 'High' Likelihood of Occurring within the Site

Scientific Name Common Name	Conservation Status		Assessed Likelihood of Occurrence
	State	Commonwealth	
Calidris ferruginea **Curlew sandpiper**	CR	CR, MI	Medium
Numenius madagascariensis **Eastern curlew**	CR	CR, MI	Medium
Calidris tenuirostris **Great Knot**	CR	CR & MI	Medium
Charadrius mongolus **Lesser sand plover**	EN	EN & MI	Medium
Dasyurus hallucatus **Northern quoll**	EN	EN	High
Tringa nebularia **Common greenshank**	Specially Protected - Migratory	EN, MI	Medium
Charadrius leschenaultia **Greater sand plover**	VU	VU & MI	Medium
Liasis olivaceus barroni	VU	VU	Medium

Scientific Name Common Name	Conservation Status		Assessed Likelihood of Occurrence
	State	Commonwealth	
Pilbara olive python			
Hydroprogne caspia **Caspian tern**	Specially Protected - Migratory	Specially Protected - Migratory	Medium
Pluvialis squatarola **Grey Plover**	Specially Protected - Migratory	Specially Protected - Migratory	Medium
Numenius minutus **Little curlew**	Specially Protected - Migratory	Specially Protected - Migratory	Medium
Tringa brevipes **Grey-tailed tattler**	P4 & MI	Specially Protected - Migratory	High
Leggadina lakedownensis **Northern short-tailed mouse, Lakeland Downs mouse, kerakenga**	P4	N/A	Medium
Notoscincus butleri **Lined soil-crevice skink (Dampier)**	P4	N/A	Medium

Conservation significant fauna species with a 'Medium' or 'High' likelihood of occurring within the Site are migratory or have a large distribution and home range. These species are likely to pass over the Site on occasion, however any habitat present within the Site itself would be classed as supporting or non-significant habitat only. No core habitat is expected to be present. As defined by DotE (2013) supporting habitat is that which is likely to be used for foraging and connective purposes, but is not essential habitat for the continuation of a local population. Non-significant habitat is that which would be used only very infrequently or for foraging or dispersing.

As such, whilst fauna species of conservation significance are likely to pass over or through the Site on occasion, it is unlikely to represent core habitat given its small size and history of disturbance.

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Figure 10: Records of Conservation Significant Fauna within 10 km of the Site

N 0 1 2 km	PROJECT/REPORT NAME: Environmental Assessment Report Lot 1 and 500 Dampier Road, Gap Ridge		
SCALE: 1:84,200	SHEET SIZE: A3 COLOUR	CLIENT: RFF	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A26.045	VERSION: 0	
DATA SOURCE: LANDGATE AERIAL IMAGERY NOW	DRAWN BY / REVIEWED BY: SC/CE	DATE: 27/2/2026	

Legend

- Site
- 10km Buffer

Conservation Significant Fauna (DBCA Records)

- Critically Endangered
- Endangered
- Vulnerable
- Priority 1
- Priority 4
- Migratory
- Other Specially Protected Species

No	Description	Drawn	Approved	Date
A	Original issue	SC	CE	27/2/2026

NOTES:

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4.11 Bushfire Prone Areas

The Department of Fire and Emergency Services (DFES) map of *Bush Fire Prone Area Planning* (2025) indicates that the majority of the Site is mapped as bushfire prone (Figure 11) (OBRM-023).

Designated bush fire prone areas have been identified by DFES as being subject, or likely to be subject, to bushfire attack. Additional planning and building requirements may apply to development within these areas. A further assessment of the bushfire risk may also be required under the *Planning and Development (Local Planning Scheme) Regulations 2015* and the Building Code of Australia.

4.12 Heritage

4.12.1 Aboriginal Heritage Places

The Site is located on Ngarluma and Yindjibarndi country and forms part of the Ngarluma/Yindjibarndi Native Title Determination (WCD2005/001).

A search of the Aboriginal Cultural Heritage Inquiry System (ACHIS) did not identify any Aboriginal Heritage places within the Site.

There are four Registered Aboriginal Heritage Places within 2 km of the Site (Figure 12), which are:

- Registered Place ID 9601, Thirteen Mile Well - Artefacts / Scatter, 450 m southeast of the Site.
- Registered Place ID 10963, Powerline Survey 054 - Artefacts / Scatter; Engraving; Grinding areas / Grooves, 1.3 km west of the Site.
- Registered Place ID 31573, Sub-surface cultural material; artefacts/scatter; quarry, 1.1 km southeast of the Site.
- Registered Place 31565, Sub-surface cultural material; artefacts/scatter; quarry, 1.2 km southeast of the Site.

4.12.2 Other Heritage Places

No European Heritage places are located within or in close proximity to the Site. The nearest is the De Grey-Mullewa Stock Route No. 9701 (DPLH-090) which is located 5.3 km south of the Site.

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Figure 11: Bush Fire Prone Areas

N

0 30 60 90 120 m

PROJECT/REPORT NAME: Environmental Assessment Report Lot 1 and 500 Dampier Road, Gap Ridge		
SCALE: 1:3,900	SHEET SIZE: A3 COLOUR	CLIENT: RFF
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A26.045	VERSION: 0
DATA SOURCE: NEARMAPS (Sept 2025)	DRAWN BY / REVIEWED BY: SC/CE	DATE: 25/2/2026

Legend

- Site
- Bush Fire Prone Area Planning (OBRM-023)
- Bushfire Prone Area 2

No	Description	Drawn	Approved	Date
A	Original issue	SC	CE	25/2/2026

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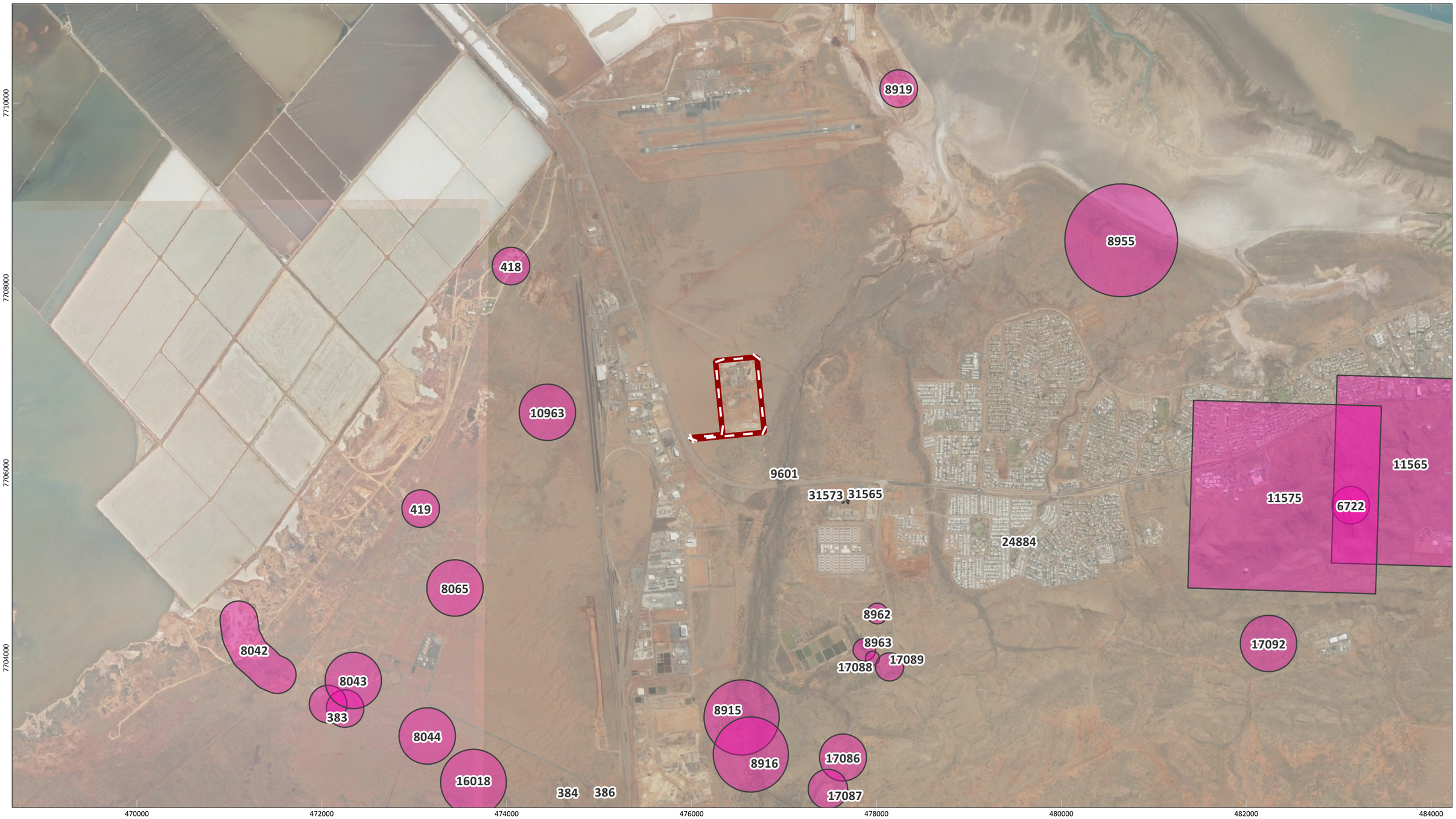


Figure 12: Heritage

N 0 1 2 km		PROJECT/REPORT NAME: Environmental Assessment Report Lot 1 and 500 Dampier Road, Gap Ridge	
SCALE: 1:40,000	SHEET SIZE: A3 COLOUR	CLIENT: RFF	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50		PROJECT NUMBER: A26.045	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY NOW		DRAWN BY / REVIEWED BY: SC / CE	DATE: 25/2/2026

Legend

- Site
- Aboriginal Cultural Heritage - Register (DPLH-099)

No	Description	Drawn	Approved	Date
A	Original issue	SC	CE	25/2/2026

NOTES:

Cadastral boundary from LANDGATE 2022. UFID stands for Unique Identifier

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5. Potential Impacts and Assessment Against the EPA's Environmental Factors

The proposed LSP will result in the entirety of the Site being developed for industrial land uses. As such, it is assumed that the Site will be cleared of remaining native vegetation. This will result in the loss of up to 2 ha of remnant native vegetation, based on the latest aerial imagery.

An assessment of the proposed impacts has been undertaken against the EPA's Environmental Factors and Objectives, as detailed in Table 5-1.

Given the Site is not located within a marine or coastal environment, the EPA's 'Sea' theme is deemed not applicable.

Table 5-1: Assessment of Potential Impacts against the EPA's Environmental Factors

Factor	Objective	Assessment
Flora and vegetation	To protect flora and vegetation so that biological diversity and ecological integrity are maintained.	The proposed LSP will result in the loss of an estimated 2 ha of remnant native vegetation that is mapped within the Abydos Plain - Roebourne_589 vegetation association. This vegetation association is well-represented at the State, IBRA, and local scales, with over 99% of the pre-European extent remaining. One mapped PEC intersects the Site, which is: • Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays (Roebourne Plains gilgai grasslands) - Priority 1. One PEC has been recorded in close proximity to the Site, which is: • Horseflat Land System of the Roebourne Plains - Priority 3. The Site itself does not provide suitable habitat for either community. Seven Priority flora species have been recorded in close proximity to the Site or are considered to have suitable habitat within the Site. The vegetation within the Site has been historically disturbed, through partial clearing, construction of a number of structures, and equipment laydown areas. As such, it is not expected to represent a high-quality remnant vegetation and is unlikely to demonstrate a high level of biological diversity. Higher quality vegetation is expected to be present approximately 400 m east of the Site, associated with a mapped watercourse. As impacts associated with the structure plan will be constrained to the boundaries of the Site, no impacts will occur to surrounding areas. Given the above, the proposed structure plan can be managed in consistence with the EPA's objective for flora and vegetation.
Landforms	To maintain the variety and integrity of distinctive physical landforms so that environmental values are protected.	No significant landforms are present within the Site. The proposed industrial land use does not require altering the landform and no impacts to the landform are proposed. Given the above, the proposed structure plan can be managed in consistence with the EPA's objective for landforms.

Factor	Objective	Assessment
Subterranean fauna	To protect subterranean fauna so that biological diversity and ecological integrity are maintained.	The Site is not situated in an area of karst geology, calcrete geology, or banded iron formations. As such, significant habitat for subterranean fauna is unlikely to be present. Given the above, the proposed structure plan can be managed in consistence with the EPA's objective for subterranean fauna.
Terrestrial environmental quality	To maintain the quality of land and soils so that environmental values are protected.	No portion of the Site is mapped as having a high risk of ASS occurrence. The eastern portion of the Site is mapped as having a moderate to low risk of ASS occurring within 3 km of the natural soil surface. The remainder of the Site is not mapped as having ASS risk. Further, no excavation or dewatering is proposed, so the risk of disturbing ASS-containing material is very low. Lot 500 is identified by DWER as 'potentially contaminated - investigation required' due to the current use of the area. Further investigations are required to confirm potential sources of contamination, with a Preliminary Site Investigation (PSI) to be completed and submitted to DWER in accordance with DWER (2025) *Identification, Reporting, and Classification of Contaminated Sites in Western Australia*. The current leaseholder of Lot 500 is proceeding with a site audit, following which specific remediation actions will be implemented as required. As such, the Site will be appropriately remediated to ensure an acceptable level of risk to human and environmental health. Given the above, the proposed structure plan can be managed in consistence with the EPA's objective for terrestrial environmental quality.
Terrestrial fauna	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.	The Site contains approximately 2 ha of remnant native vegetation which has value for terrestrial fauna. A search of DBCA databases and assessment of habitat values within the Site identified 14 conservation significant fauna species with a 'Medium' or 'High likelihood of occurring within the Site. Of these, ten are migratory species. All species with a 'Medium' or 'High' likelihood of occurring within the Site are migratory or are wide-ranging. Given the extent of remnant native vegetation within the Site and history of disturbance, these species are expected to pass over the Site on occasion; however, core habitat is not expected to be present. Instead, the Site is expected to provide supporting or non-significant habitat for these species. The Site is not expected to provide core habitat for conservation significant fauna, and the proposed structure plan can be managed in consistence with the EPA's objective for terrestrial fauna.
Inland Waters	To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.	The Site forms part of the Pilbara - fractured rock aquifer. No dewatering or abstraction of groundwater is proposed through the scheme amendment. The Site does not intersect any surface water features. The nearest mapped watercourse is approximately 400 m to the east. The proposed land use under the structure plan is industrial and works are not expected to impact any surface or groundwater features. There is sufficient separation between proposed works

Factor	Objective	Assessment
		and the nearest watercourse, with a 400 m vegetated buffer between the Site and nearest watercourse. Further, appropriate controls will be implemented at development application stage to ensure there are no indirect or consequential impacts to nearby waterways. Given the above, the proposed structure plan can be managed in consistence with the EPA's objective for inland waters.
Air quality	To maintain air quality and minimise emissions so that environmental values are protected.	Clearing of the Site may result in minor dust emissions, which should be managed through standard dust suppression measures as required. Impacts are not expected to be significant given the presence of clay soils. Some industrial land uses have potential to impact air quality. This includes the stockpiling of bulk material and crushing of materials as is currently undertaken at the existing materials storage, sorting and processing facility within the Site. Dust emissions from such operations can be managed through standard dust suppression measures as required. With the application of standard dust suppression measures, the proposed structure plan can be managed in consistence with the EPA's objective for air quality.
Greenhouse gas emissions	To minimise the risk of environmental harm associated with climate change by reducing greenhouse gas emissions as far as practicable.	The proposed structure plan is not expected to cause a significant increase in scope 1, 2 and 3 greenhouse gas emissions, given the small scale of development. Some emissions will be caused by removal of native vegetation and increased transport to and from the Site, however this will be insignificant in the context of the thresholds identified in the greenhouse gas factor guideline. Given the above, the proposed structure plan can be managed in consistence with the EPA's objective for greenhouse gas emissions.
Social surroundings	To protect social surroundings from significant harm.	The Site does not intersect any known Aboriginal or European heritage sites. The Site is surrounded by vacant land, and the proposed use of the Site is consistent with land use further to the east. As such appropriate separation distances between industry and sensitive land use (such as residential) will be maintained and social impacts are expected to be minimal. Given the above, the proposed structure plan can be managed in consistence with the EPA's objective for social surroundings.
Human health	To protect human health from significant harm.	The proposed structure plan is not expected to have any negative impacts on human health. Therefore, the EPA's objective will be upheld.

6. Conclusion

This EAR presents the results of a desktop assessment of environmental values within the Site to inform and support the development of a LSP to guide strategic industrial development within the Site. The key findings from the desktop assessment include:

- No potentially conflicting land uses were identified in the surrounding area, and the proposed use is consistent with that to the north.
- Topography, geology and soils within the Site do not present a constraint to development.
- Lot 500 has been identified as 'potentially contaminated - investigation required' through correspondence from DWER in November 2025. The current leaseholder is proceeding with a site audit, following which appropriate remediation actions will be delivered to ensure an acceptable level of risk to human and environmental health.
- The proposed use of the Site will not impact any surface or groundwater features. The nearest surface water feature is 400 m to the east.
- The eastern portion of the Site is mapped as having a moderate to low risk of ASS occurrence. However, as no excavation is proposed as part of the proposed use, this does not represent a constraint to development.
- The Site has been historically disturbed and currently contains limited flora and vegetation values. The Site intersects a mapped occurrence of Roebourne Plains gilgai grasslands PEC (Priority 3), however the portion of the Site that intersects the PEC has been previously cleared for an access track. The buffer of a second Priority 3 PEC, Horseflat Land System of the Roebourne Plains, also intersects the Site. Two Priority 3 flora species were assessed as having a 'High' likelihood of occurrence within the Site based on the proximity of the nearest record and presence of suitable habitat. Based on the extent of prior clearing and development within the Site, neither PEC is considered to be present.
- The Site may provide supporting or non-significant habitat for up to 14 fauna species of conservation significance. These species are migratory or wide-ranging, and the Site is unlikely to comprise core habitat due to its small size and historic disturbance.
- Potential for increased risk of noise, odour, or air quality impacts associated with industrial land use can be managed through standard management measures at development approval stage.
- There are no known sites of Aboriginal or European heritage value within or in close proximity to the Site.

Based on the desktop assessment, the proposed structure plan can be implemented such that it is consistent with the EPA's Environmental Factors.

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Appendix A
Likelihood of Occurrence Assessment

Flora Database Search Results (DBCA TPFL and WAH Database Search using 50 km Buffer) and Likelihood of Occurrence

Species	Conservation Status		Species information (WAH 1998-)		Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence
	State	Federal	Flowering Period	Preferred Habitat		
Gomphrena axillaris	P1		Mar-May and Jul-Aug	Prefers subsaline habitats or margins of salt lakes and hummock or tussock grasslands on sand, known from locations near Karratha and Dampier Island (Davis et al., 2021).	No	Low One record was mapped 5.5 km from the Site. However, the record is within a tidal streamline and saline drainage area. The Site does not provide the preferred habitat.
Goodenia pallida	P1		Aug	Red soils.	Yes	Low Only one record known from 1970, 30 km south-west of the Site.
Helichrysum oligochaetum	P1		Aug-Nov	Red clay. Alluvial plains. Heavy soils subject to periodic inundation (Barker,).	No	Low Records are within tidal mudflats. Soil systems and landscapes on which species was found does not match the Site conditions. Closest record is 43 km away from the Site.
Minuria tridens	P1		Sep	Roadside.	No	Low

Species	Conservation Status		Species information (WAH 1998-)		Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence
	State	Federal	Flowering Period	Preferred Habitat		
				All records on low coastal dune systems adjacent to tidal, saline mudflats. South facing slopes or steep rocky cliffs in low shrubland on dolomite, limestone and calcrete-impregnated sandstone hills and ranges (Nano and Pavey, 2008).		All DBCA records are mapped on a different soil system than what is present within the Site. Closest record is 56 km from the Site.
***Tephrosia rosea* var. Port Hedland (A.S. George 1114)**	P1		Jul or Aug or Sep	All DBCA records within coastal dune sands and low rocky ridges.	No	Low All DBCA records are mapped on a different soil system than what is present within the Site. Closest record is 35 km from the Site.
Uvedalia clementii	P1		Aug-Sep	Recorded on fine alluvial soil with some river rocks - soil hard and compact.	No	Low Recorded within lake/river edges. This type of habitat is not present within the Site. Closest record is 47 km south-east from the Site.
Acacia ryaniana	P2		Jun-Nov	White or red sand. Coastal sand dunes.	No	Low Site does not assemble coastal environment. Only historical DBCA

Species	Conservation Status		Species information (WAH 1998-)		Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence
	State	Federal	Flowering Period	Preferred Habitat		
						records. Closest record is 6 km east of the Site.
Cladium procerum	P2		Nov (?)	Perennial pools. Recorded within wetland close to river.	No	Low Habitat not present within the Site. Closest record is >95 km from the Site.
Neptunia longipila	P2		Mar-Sep	Confined to the Pilbara bioregion, from Karratha to Newman. Reddish-brown to orange-brown cracking clay, or red to brown gravelly loam, on flat or very gently sloping terrain, in grassland or open shrubland (Bean, 2022).	Yes	Medium Records mapped within the same soil subsystem. Habitat is present within the Site, closest record is 8.3 km from the Site.
Paspalidium retiglume	P2		Apr	Clay. Red-brown cracking clay.	Potentially	Medium Similar soils are present within the Site. Conditions may match the preferred habitat. Most recent record from 2004 is 80 km from the Site.
Pentalepis trichodesmoides **subsp. *hispida***	P2		Aug-Sep	Found in *Triodia* hummock grassland, often in the understorey of a shrubland of *Acacia* spp., *Gossypium* spp., *Senna* spp., *Brachychiton* spp., and *Eucalyptus* spp.	No	Low Records are mapped on different soil types, and on higher

Species	Conservation Status		Species information (WAH 1998-)		Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence
	State	Federal	Flowering Period	Preferred Habitat		
				On summits and slopes of low hills, on basaltic soils, at altitudes to 1150 m (Orchard and Cross, 2012).		altitudes with larger slopes. Closest record is >70 km south-east of the Site.
Teucrium pilbaranum	P2		May or Sep	Clay. Crab hole plain in a river floodplain, margin of calcrete table.	No	Low Habitat not present within the Site. Only historic records.
***Trianthema* sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023)**	P2			Plains with a substrate of loam to clay loam with a gravelly/cobbly surface. Brown, dry, rocky soils, floodplains supporting spinifex grasslands	Possibly	Medium Habitat may match Site conditions but records are mapped on a different soil system. Closest record is 23 km south of the Site.
***Abutilon* sp. Pritzelianum (S. van Leeuwen 5095)**	P3		Aug	Recorded on red stony loam	Possibly	Low Only one historic record, 40 km east of the Site.
Atriplex lindleyi* subsp. *conduplicata	P3			Crabhole plains	No	Low Habitat not present. Only one historic record, 26 km west of the Site.
Corchorus congener	P3		Apr-Jun or Aug-Nov	Sand, red sandy loam with limestone. Sand dunes, plains.	No	Low

Species	Conservation Status		Species information (WAH 1998-)		Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence
	State	Federal	Flowering Period	Preferred Habitat		
						Habitat not present within the Site. One record within coastal habitat, 68 km from the Site.
***Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479)**	P3		Records showed flowers in Jul and Sep	Open flat grasslands, gentle slopes, red-brown cracking silt and clay.	Yes	High Habitat is present within the Site. Closest record is 2.5 km west of the Site.
Eragrostis lanicaulis	P3		Mar-May or Aug-Oct	Red sandy clay. Flats.	Possibly	Low Only historic records 43 km from the Site.
Eragrostis surreyana	P3		May-Sep	Seasonally wet, shallow, grey alluvial soils over rock, with some from deeper soils in a seasonally wet creek line. Most collections have been made from streams, with one from a seasonal seepage area on a gentle slope near the base of the Chichester escarpment. Associated species include a sedgeland – tussock grassland (Shepherd and Trudgen, 2011).	No	Low Habitat not present within the Site. Closest records are 19 km north of the Site within Murujuga National Park
Eriochloa fatmensis	P3		Flowers sporadically throughout the year but mostly Jan-May	Wet habitats, coastal grasslands, and tropical sub-humid grasslands.	No	Low Historical records only. Closest record within river edges 43 km from the Site.

Species	Conservation Status		Species information (WAH 1998-)		Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence
	State	Federal	Flowering Period	Preferred Habitat		
Euphorbia inappendiculata* var. *inappendiculata	P3		May or Aug	Heavy clay soils on open plains or gentle slopes (Halford and Harris, 2012).	Possibly	Low Records are mapped within vegetation types that do not seem to be present within the Site. Closest record is mapped 65 km south of the Site.
Euphorbia stevenii	P3		N/A	Clay, sandy soils.	Possibly	Low DBCA records are more than 20 years old, closest is 59 km from the Site.
Euploca mutica	P3		N/A	Grows primarily in the desert or dry shrubland biome. Recorded on flats. Red/brown sand/clay.	Possibly	Low One record 90 km from the Site.
Fimbristylis sieberiana	P3		May-Jun	Mud, skeletal soil pockets. Pool edges, sandstone cliffs.	No	Low Habitat type is not present within the Site. Closest record 90 km from the Site along river.
Glycine falcata	P3		May or Jul	Black clayey sand. Along drainage depressions in crabhole plains on river floodplains.	No	Low Habitat type is not present within the

Species	Conservation Status		Species information (WAH 1998-)		Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence
	State	Federal	Flowering Period	Preferred Habitat		
						Site. Closest record 31 km from the Site.
Gomphrena cucullata	P3		Feb or May	Red sandy loam, clayey sand. Open floodplains.	Possibly	Low Closest record is 24 km from the Site.
Gomphrena leptophylla	P3		Mar-Sep	Sand, sandy to clayey loam, granite, quartzite. Open flats, sandy creek beds, edges salt pans & marshes, stony hillsides.	No	Low Habitat is not present within the Site. Closest record within roadside 23 km from the Site.
Goodenia obscurata	P3		Apr, May and Aug-Oct	Floodplains or low rocky ridges, growing in red-brown sandy clay or lateritic loam over banded ironstone.	No	Low Habitat is not present within the Site. Only one historical record.
Gymnanthera cunninghamii	P3		Jan-Dec	Sandy soils.	Possibly	Low Only historical records
Ipomoea racemigera	P3		Mainly Mar-Aug	Growing on sandy soils along watercourses	No	Low No watercourses intersect the Site.
Owenia acidula	P3			Clay. Outback woodlands.	No	Low No woodlands present within the Site. Only historical records, with the closest 95 km from the Site.

Species	Conservation Status		Species information (WAH 1998-)		Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence
	State	Federal	Flowering Period	Preferred Habitat		
Solanum albostellatum	P3		Mar-May	Cracking clay soils on open floodplains in open scrubland over grasses (Davis and Hurter, 2012).	Yes	Low Mapped record within river system, which does not match Site conditions. Closest record is 30 km south of the Site.
Stackhousia clementii	P3			Skeletal soils. Sandstone hills.	Possibly	Medium No sandstone hills present. Closest record is 2.4 km from the Site.
Swainsona thompsoniana	P3		Aug-Sep or Mar	Restricted to the central south-western parts of the Pilbara bioregion (Davis and Hurter, 2013).	No	Low Site is outside of species distribution range.
Terminalia supranitifolia	P3		May or Jul or Dec	Sand. Among basalt rock.	No	Low Several records on Dampier Peninsula. Closest record is 4.6 km from the Site. The preferred habitat is however not present within the Site. Mapped on different soil systems.

Species	Conservation Status		Species information (WAH 1998-)		Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence
	State	Federal	Flowering Period	Preferred Habitat		
***Themeda* sp. Hamersley Station (M.E. Trudgen 11431)**	P3		Aug	Red clay. Clay pan, grass plain.	Yes	High Habitat likely present. One record from 1992 is 1.6 km from the Site.
Triodia basitricha	P3		Mar-Aug	Slopes or crests of rocky hills (Barrett and Barrett, 2015).	No	Low Only one historic record 94 km from the Site. Habitat types doesn't match the Site conditions.
Triodia pisoliticola	P3		Feb-Aug	Edges of mesas capped with Robe Pisolite or on the tops of the mesas of that geology and other iron-rich geology (Barrett and Trudgen, 2018).	No	Low Habitat does not match the Site conditions.
Vigna triodiophila	P3		May-Sep	Grows in association with rockpiles among cobbles and boulders in shallow, red-brown or brown, clayey sand or loam (Holland and Butcher, 2016).	Possibly	Medium The Site does not seem to provide the same amount of rocks and cobbles as recorded as preferred habitat of the species. Closest records are within the Dampier Peninsula, 10 km from the Site.
Livistona alfredii	P4		Jul-Sep	Edges of permanent pools.	No	Low

Species	Conservation Status		Species information (WAH 1998-)		Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence
	State	Federal	Flowering Period	Preferred Habitat		
						Habitat is not present within the Site. Only historical records. All records within Millstrewam Chichester National Park, >90 km from the Site.
Rhynchosia bungarensis	P4		unknown	Pebbly, shingly coarse sand amongst boulders. Banks of flow line in the mouth of a gully in a valley wall.	No	Low Habitat is not present within the Site. All records within Dampier Peninsula and Archipelago.

Threatened and Priority Ecological Communities Database Search Results (50 km Buffer) and Likelihood of Occurrence

Floristic Community Name	Community Description	Conservation Status		Database		Likelihood of Occurrence	Justification
		State	Federal	PMST	DBCA		
Burrup Peninsula rock pool communities	Calcareous tufa deposits. Interesting aquatic snails.	P1			x	Low	The Site does not provide suitable habitat for this community, which is restricted to the Burrup Peninsula.
Roebourne Plains gilgai grasslands	**Roebourne Plains coastal grasslands with gilgai microrelief on cracking clays** These grasslands occur on microrelief on strongly gilgaied self-mulching cracking clays, and emergent depositional surfaces. The grasslands are surrounded by non-gilgaied clay plains/flats and sandy coastal and alluvial plains. The gilgai depressions support ephemeral and perennial tussock grasslands dominated by Sorghum sp. and *Eragrostis xerophila* (Roebourne Plains grass) along with other native species including *Eriachne benthamii* (swamp wanderrie grass), *Chrysopogon fallax* (golden beard grass) and *Panicum decompositum* (native millet). Restricted to the Karratha area, where it has been largely removed.	P1			x	High	The buffer of a DBCA mapped record of the community intersects with the Site. The Site has been largely cleared but patches of remnant native vegetation are present.
Roebourne chenopod association	**Chenopod vegetation associations of the Roebourne Plains** The community is dominated *by Eragrostis xerophila* and chenopods (*Sclerolaena, Atriplex* species) growing in saline clay soils with moderate surface strew of pebbles and cobbles. The association appears to be uncommon and only been located to date	P1			x	Medium	While no buffered DBCA records intersect with the Site, the Site is located west of Nickol. The community incorporates Unit 5 (alluvial plains) of the Horseflat land system, which is mapped as intersecting with the Site (see below).

Floristic Community Name	Community Description	Conservation Status		Database		Likelihood of Occurrence	Justification
		State	Federal	PMST	DBCA		
	at Roebourne Airport and west of Nickol (Karratha) however it is likely some other small occurrences occur between Cape Preston and Mundabullangana.						
Wona Land System	**Four plant assemblages of the Wona Land System (previously 'Cracking clays of the Chichester and Mungaroona Range')** • Cracking clays of the Chichester and Mungaroona Range. This shrubless plain of stony gibber community occurs on the tablelands with very little vegetative cover during the dry season, however during the wet a suite of ephemerals/annuals and short-lived perennials emerge, many of which are poorly known and range-end taxa. • Annual Sorghum grasslands on self-mulching clays with a moderate-dense overlay of rocks. This community appears very rare and restricted to the Pannawonica-Robe valley end of Chichester Range. Naturally species poor when dry	P1			x	Low	Habitat is not present within the Site. Closest buffered record is 47 km south of the Site.
Coastal dune native tussock grassland	Coastal dune native tussock grassland dominated by *Whiteochloa airoides* Priority 3 24 Tussock grassland of *Whiteochloa airoides* occurs on the landward side of foredunes, hind dunes or remnant dunes with white or pinkish white medium sands with marine fragments. There may be	P3			x	Low	The only buffered records are associated Murujuga National Park on Dampier Archipelago.

Floristic Community Name	Community Description	Conservation Status		Database		Likelihood of Occurrence	Justification
		State	Federal	PMST	DBCA		
	occasional *Spinifex longifolius* tussock or *Triodia epactia* hummock grasses and scattered low shrubs of *Olearia dampierii* subsp. *dampierii*, *Scaevola spinescens, S. cunninghamii, Trianthema turgidifolia* and *Corchorus* species (*C. walcottii, C. laniflorus*). Occurs on Barrow Island, Tent Island and possibly some unaffected littoral areas in west Pilbara.						
Horseflat Land System	**Horseflat land system of the Roebourne Plains Priority 3(iii)** The Horseflat Land System (Roebourne Plains) land units forming extensive clay plains dominated by tussock grasslands on mostly alluvial, red clay loams gilgaied and non-gilgaied for this community. The community is dominated by perennial tussock grasses include *Eragrostis xerophila* (Roebourne Plains grass), *Chrysopogon fallax* (ribbon grass) and other *Eragrostis* spp. and *Eriachne* spp. The community also supports a suite of annual grasses including *Dichanthium* spp. and *Sorghum* spp.. The community extends from Peedamulla to Balla Balla surrounding the towns of Karratha and Roebourne. The land units of the Horseflat land system that align with this PEC are units 3 (excluding areas of snakewood and hummock grass; mosaic areas, and areas of heavily gilgaied soils	P3			x	High	The buffer of a DBCA mapped record of the community intersects with the Site. The Site has been largely cleared but patches of remnant native vegetation are present.

Floristic Community Name	Community Description	Conservation Status		Database		Likelihood of Occurrence	Justification
		State	Federal	PMST	DBCA		
Wona Land System	• Mitchell grass plains (*Astrebela* spp.) on gilgai • Mitchell grass and Roebourne Plain grass (*Eragrostis xerophila*) plain on gilgai. *Astrebla pectinata, A. elymoides, E. xerophila, Aristida latifolia, Eriachne* and *Sida fibulifera*. Typical type, heavily grazed	P3			x	Low	Habitat is potentially present within the Site. Closest buffered record is 47 km south of the Site.

Threatened and Priority Fauna Database Search Results (50 km Buffer) and Likelihood of Occurrence

Species	Conservation Status		Database		Likelihood of Occurrence on Site
	WA	Commonwealth	DBCA	PMST	
AVES					
Barn swallow *(Hirundo rustica)*	Specially Protected Migratory -	Specially Protected Migratory -	x		Low In Australia, the Barn Swallow is recorded in open country in coastal lowlands, often near water, towns and cities. Barn Swallows are often sighted perched on overhead wires and also in or over freshwater wetlands, paperbark Melaleuca woodland, mesophyll shrub thickets and tussock grassland. The Site does not provide suitable habitat for the species.
Bar-tailed Godwit *(Limosa lapponica)*	Specially Protected Migratory -	Specially Protected Migratory -	x		Low Site does not support habitat for the species, which mainly utilises estuarine mudflats, beaches and mangroves. Closest record is <10 km from the Site.
Black-tailed Godwit (*Limosa limosa*)	Specially Protected Migratory -	Specially Protected Migratory -	x	x	Low In Australia the Black-tailed Godwit has a primarily coastal habitat environment. The species is commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand or shell-grit. No suitable habitat is present within the Site. Closest record >30 km from the Site.
Bridled tern (*Onychoprion anaethetus*)	Specially Protected Migratory -	Specially Protected Migratory -	x		Low Species is only rarely recorded along mainland coasts, occurs on islands. Occurs within the Dampier Archipelago but not south of it.
Broad-billed sandpiper (*Limicola falcinellus*)	Specially Protected Migratory -	Specially Protected Migratory -	x		Low They mostly occur on the coasts of the Pilbara and Kimberley between Onslow and Broome, but are also recorded north to the mouth of Lawley River, and inland

Species	Conservation Status		Database		Likelihood of Occurrence on Site
	WA	Commonwealth	DBCA	PMST	
					at Lake Daley. The Site does not support suitable habitat for the species.
Brown booby (*Sula leucogaster*)	Specially Protected - Migratory	Specially Protected - Migratory	x		Low Only historical and only coastal records. Found on islands. Habitat is not supported by the Site.
Caspian tern (*Hydroprogne caspia*)	Specially Protected - Migratory	Specially Protected - Migratory	x		Medium Widespread in coastal regions, from the Great Australian Bight to the Dampier Peninsula. The species is mostly found in sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries and river deltas) and those with sandy or muddy margins are preferred. They also occur on near-coastal or inland terrestrial wetlands that are either fresh or saline, especially lakes (including ephemeral lakes), waterholes, reservoirs, rivers and creeks. The Site does not provide suitable foraging or breeding habitat. Species may occur as a visitor. Closest record in Nickol, 2.5 km east of the Site.
Common greenshank (*Tringa nebularia*)	Specially Protected - Migratory	EN, MI	x	x	Medium The species utilises variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. The Site does not provide suitable habitat, but habitat is found in surrounding areas. Species may be a visitor to the Site. Closest record is 4 km from the Site.

Species	Conservation Status		Database		Likelihood of Occurrence on Site
	WA	Commonwealth	DBCA	PMST	
Common noddy (*Anous stolidus*)	Specially Protected - Migratory	Specially Protected - Migratory	x		Low Occurs on or near islands, on rocky islets and stacks with precipitous cliffs, or on shoals or cays of coral or sand. The Site does not provide suitable habitat for the species. All records are located on islands.
Common Sandpiper (*Actitis hypoleucos*)	Specially Protected - Migratory	Specially Protected - Migratory	x		Low Site does not provide foraging or breeding habitat for the species. Closest record < 5 km from the Site. The species may occur as a visitor to the Site.
Common tern (*Sterna hirundo*)	Specially Protected - Migratory	Specially Protected - Migratory	x		Low Species forage in marine environments, often close to the shore, including sheltered embayments and in the surf-zone, but also well out to sea. They nest on the ground in the open, usually on bare substrates, occasionally near vegetation or in it, or on a floating mat of vegetation. They usually nest on islands, either marine or in lakes, only sometimes on mainland beaches or promontories or salt or freshwater marshes. No foraging or breeding habitat is present within the Site.
Crested tern (*Thalasseus bergii*)	Specially Protected - Migratory	Specially Protected - Migratory	x		Low Species is listed as marine species. Closest record < 5 km from the Site. The species may occur as a visitor to the Site.
Curlew sandpiper (*Calidris ferruginea*)	CR	CR, MI	x	x	Medium Intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains,

Species	Conservation Status		Database		Likelihood of Occurrence on Site
	WA	Commonwealth	DBCA	PMST	
					usually with bare edges of mud or sand. The Site does not provide the preferred habitat. Closest record is 2.2 km from the Site. Species may occur as visitor to the Site.
Eastern curlew (*Numenius madagascariensis*)	CR	CR, MI	x	x	Medium Intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. The Site does not provide the preferred habitat. Closest record is 2.2 km from the Site. Species may occur as visitor to the Site.
Fairy tern (*Sternula nereis nereis*)	VU	VU	x	x	Low Species nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. The subspecies has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline. The Site does not provide the preferred habitat.
Fork-tailed swift (*Apus pacificus*)	Specially Protected Migratory -	Specially Protected Migratory -	x		Low Utilises habitats along the coast, inland records updare sparsely scattered. Wetland habitat is not present within Site.
Glossy ibis (*Plegadis falcinellus*)	Specially Protected Migratory -	Specially Protected Migratory -	x		Low Fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. The Site does not provide the preferred habitat of the species.

Species	Conservation Status		Database		Likelihood of Occurrence on Site
	WA	Commonwealth	DBCA	PMST	
Great Knot (*Calidris tenuirostris*)	CR	CR & MI	x	x	Medium Species may visit the Site but usually occurs in coastal areas.
Greater sand plover (*Charadrius leschenaultia*)	VU	VU & MI	x	x	Medium Species may visit the Site but usually occurs in coastal areas.
Grey Plover (*Pluvialis squatarola*)	Specially Protected - Migratory	Specially Protected - Migratory	x	x	Medium Species may visit the Site but usually occurs in coastal areas.
Grey-tailed tattler (*Tringa brevipes*)	P4 & MI	Specially Protected - Migratory	x		High Often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral or stony reefs as well as platforms and islets that are exposed at low tide. It has been found around shores of rock, shingle, gravel or shells and also on intertidal mudflats in embayments, estuaries and coastal lagoons, especially fringed with mangroves. Closest record 350 m from the Site.
Gull-billed tern (*Gelochelidon nilotica*)	Specially Protected - Migratory	Specially Protected - Migratory	x		Low Wetland habitat is not present within Site.
Lesser frigatebird (*Fregata ariel*)	Specially Protected - Migratory	Specially Protected - Migratory	x		Low No island habitat present within the Site.
Lesser sand plover (*Charadrius mongolus*)	EN	EN & MI	x	x	Medium Usually occurs in coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut

Species	Conservation Status		Database		Likelihood of Occurrence on Site
	WA	Commonwealth	DBCA	PMST	
					rock platforms and rocky outcrops. It also sometime occurs in short saltmarsh or among mangroves. Species may visit the Site.
Little curlew (*Numenius minutus*)	Specially Protected - Migratory	Specially Protected - Migratory	x		Medium Closest record is 2 km from the Site.
Red knot (*Calidris canutus*)	EN	EN	x	x	Low Mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours. Preferred habitat is not present within the Site. Species may visit the Site. Closest record is 5 km from the Site.
MAMMALS					
Australian humpback dolphin (*Sousa sahulensis*)	Priority 4		x		Low No marine habitat occurs within the Site.
Banded hare-wallaby, mernine (*Lagostrophus fasciatus fasciatus*)	VU	VU	x		Low Only one historical record.
Northern quoll (*Dasyurus hallucatus*)	EN	EN	x	x	High Habitat potentially present. Closest record is 1 km from the Site.
Dugong (*Dugong dugon*)	MI	MI	x		Low No marine habitat present within the Site.
Dwarf spinner dolphin (*Stenella longirostris roseiventris*)	P4	MI	x		Low No marine habitat present within the Site.
Fin whale (*Balaenoptera physalus*)	EN	VU	x		Low No marine habitat present within the Site.

Species	Conservation Status		Database		Likelihood of Occurrence on Site
	WA	Commonwealth	DBCA	PMST	
Fraser dolphin (*Lagenodelphis hosei*)	MI	MI	x		Low No marine habitat present within the Site.
Ghost bat (*Macroderma gigas*)	VU	VU	x	x	Low Preferred habitat not present within the Site. Closest record is 30 km from the Site.
Humpback whale (*Megaptera novaeangliae*)	CD & MI	MI	x		Low No marine habitat present within the Site.
Northen coastal free-tailed bat (*Ozimops cobourgianus*)	P1		x		Low Occurs mostly in mangrove forests and woodlands. Habitat not present within the Site. Closest record is 15 km from the Site.
Northern short-tailed mouse, Lakeland Downs mouse, kerakenga (*Leggadina lakedownensis*)	P4		x		Medium Suitable habitat (sandy soils, cracking clays, tussock grasslands) may be present. Closest record 6.5 km from the Site.
Pilbara leaf-nosed bat (*Rhinonicteris aurantia* (Pilbara form))	VU	VU	x	x	Low The site does not provide preferred foraging or breeding habitat (caves). One historical record, 19 km from the Site.
Spectacled hare-wallaby (mainland) (*Lagorchestes conspicillatus leichardti*)	P4		x		Low One historical record, 48 km from the Site.
Water-rat, rakali (*Hydromys chrysogaster*)	P4		x		Low No wetland habitat present within the Site.
Western pebble-mound mouse, ngadji (*Pseudomys chapmani*)	P4		x		Low The Western Pebble-mound Mouse is found on stony hillsides with hummock grassland (Menkhorst & Knight,

Species	Conservation Status		Database		Likelihood of Occurrence on Site
	WA	Commonwealth	DBCA	PMST	
					2021). This species favors scree and stony plains habitat where it constructs conspicuous, extensive mounds of small stones. The pebble-mounds are found on gently sloping hills where the ground is stony with continuous small pebbles. No suitable habitat present within the Site.
REPTILES					
Airlie Island ctenotus, northwestern coastal ctenotus (*Ctenotus angusticeps*)	P3		x		Low Only one location of record within 50 km radius. Closest record is 14 km from the Site.
Flatback turtle (*Natator depressus*)	VU	VU	X		Low No marine or coastal breeding habitat within the Site. However, direct impacts can occur through light and vibration.
Four-lined slider (Karratha) (*Lerista quadrivincula*)	P1		x		Low Only historical records, closest record is 30 km from the Site.
Green turtle (*Chelonia mydas*)	VU	VU	x	x	Low No marine or coastal breeding habitat within the Site. However, direct impacts can occur through light and vibration.
Hawksbill turtle (*Eretmochelys imbricata*)	VU	VU	x	x	Low No marine or coastal breeding habitat within the Site. However, direct impacts can occur through light and vibration.
Lake Disappointment dragon (*Ctenophorus nguyarna*)	P1		x		Low The Site lies outside the species distribution range.
Lined soil-crevice skink (Dampier) (*Notoscincus butleri*)	P4		x		Medium

Species	Conservation Status		Database		Likelihood of Occurrence on Site
	WA	Commonwealth	DBCA	PMST	
					Habitat is potentially present. Closest record is 7 km from the Site.
Loggerhead turtle (*Caretta caretta*)	EN	EN	x	x	Low No marine or coastal breeding habitat within the Site. However, direct impacts can occur through light and vibration.
Nevin's slider (*Lerista nevinae*)	EN	EN	x	x	Low The Site lies outside the species distribution range.
Pilbara barking gecko (*Underwoodisaurus seorsus*)	P2		x		Low Site is outside known species distribution range.
Pilbara olive python (*Liasis olivaceus barroni*)	VU	VU	x	x	Medium All records within Dampier Peninsula, the Burrup Peninsula population was found to prefer granophyre rock-piles, though occasionally were found in neighbouring spinifex grasslands. These individuals, especially males, travelled large distances, suggesting the species has a large home range. Habitat is potentially present within the Site. Species may visit the Site.
Short-nosed seasnake (*Aipysurus apraefrontalis*)	CR	CR	x	x	Low No marine habitat present within the Site.

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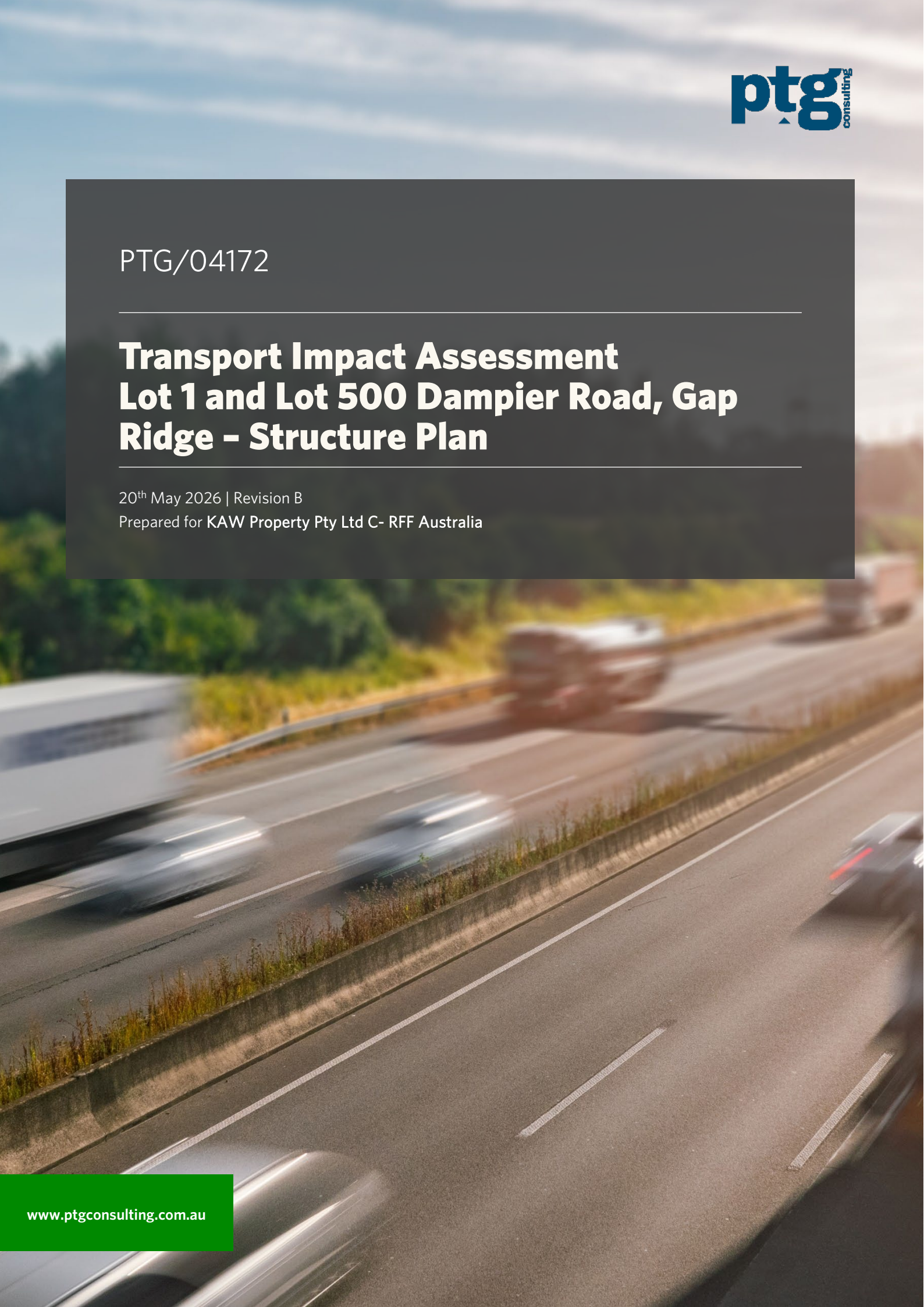
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PTG/04172

Transport Impact Assessment Lot 1 and Lot 500 Dampier Road, Gap Ridge – Structure Plan

20th May 2026 | Revision B

Prepared for **KAW Property Pty Ltd C- RFF Australia**

www.ptgconsulting.com.au

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REPORT DETAILS

Unique Document Identification

	Information
Document Title	TIA
Project Number	PTG/04172
Document ID	Rev B
Client	KAW Property Pty Ltd C- RFF Australia

Revision Details

Revision No.	Date	Comments	Author	Approved by
Rev A	9/03/2026	For issue	BS/LH	AW
Rev B	20/05/2026	For issue	BS/LH	AW

1 INTRODUCTION

1.1 Background

PTG Consulting WA (PTG) has been commissioned by KAW Property Pty Ltd C- RFF Australia ('the Client') to prepare a Traffic Impact Assessment (TIA) for a proposed Local Structure Plan (LSP) for Lot 1 and Lot 500 Dampier Road located in the suburbs of Gap Ridge, within the City of Karratha ('the Site').

This report has been prepared in accordance with the Western Australian Planning Commission (WAPC) Transport Assessment Guidelines for Developments: Volume 2 – Planning Schemes, Structure Plans and Activity Centre Plans (2016) and the Transport Impact Assessment (TIA) Checklist is included at Appendix A.

Specifically, this report aims to assess the proposed internal transport networks' accessibility and impacts on the Dampier Highway intersection.

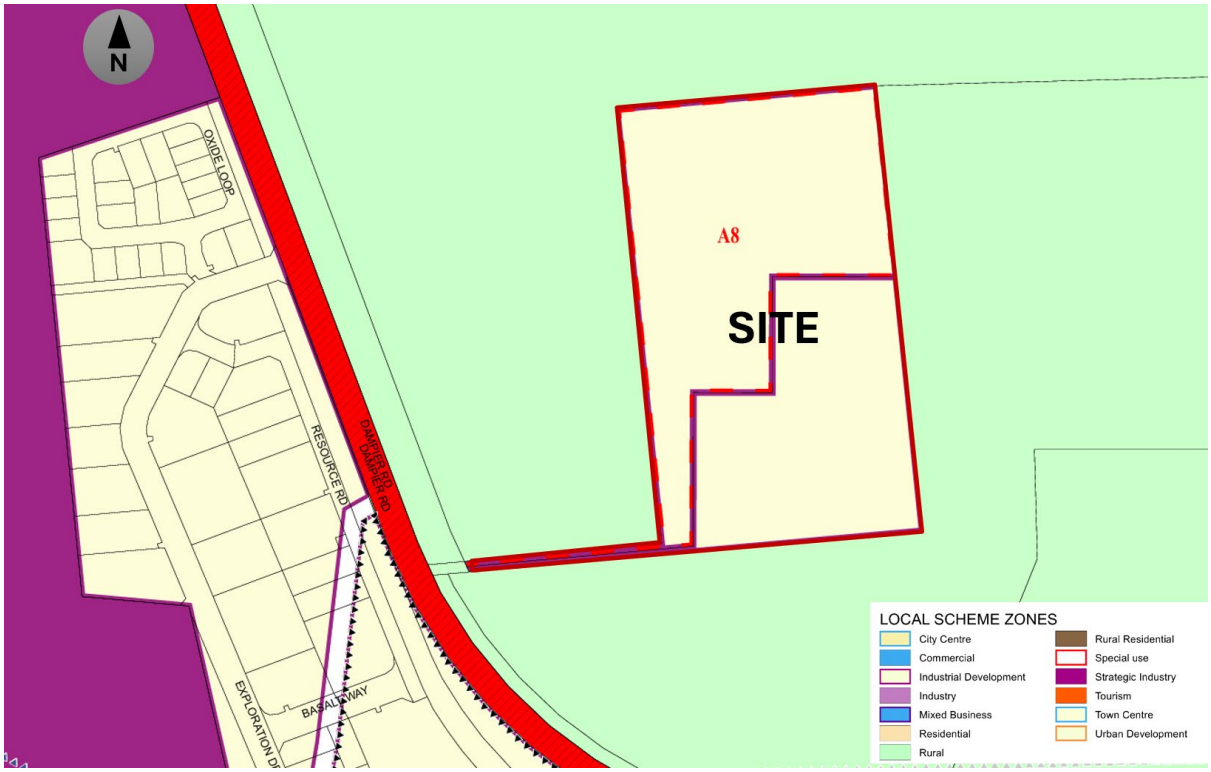
This report also outlines the requirements and opportunities associated with traffic and transport within the development, referencing relevant Council and WAPC policies and guidelines as well as best-practice planning within Western Australia.

2 PROPOSED STRUCTURE PLAN

2.1 Regional Context

According to the City of Karratha Local Planning Scheme No.8, the Site is currently zoned as 'Industrial Development'. **Figure 1** illustrates the Site and the surrounding land uses. The surrounding areas are predominantly rural land, while the area to the west of Dampier Road is zoned 'Strategic Industry' and 'Industrial Development'. The subject Site was recently rezoned from 'Rural' to 'Industrial Development' and the preparation of a local structure plan to facilitate industrial redevelopment has been initiated.

Figure 1 - Local Structure Plan



Source: City of Karratha Local Planning Scheme No.8 (Map 10)

2.2 Site Location

The Site comprises of Lot 1 and Lot 500 Dampier Road, Karratha. It is located to the west of the Karratha townsite, approximately 2 km to the south of Karratha Airport. The location of the subject site is shown in Figure 2.

Figure 2 – Location Map



Source: MetroMap

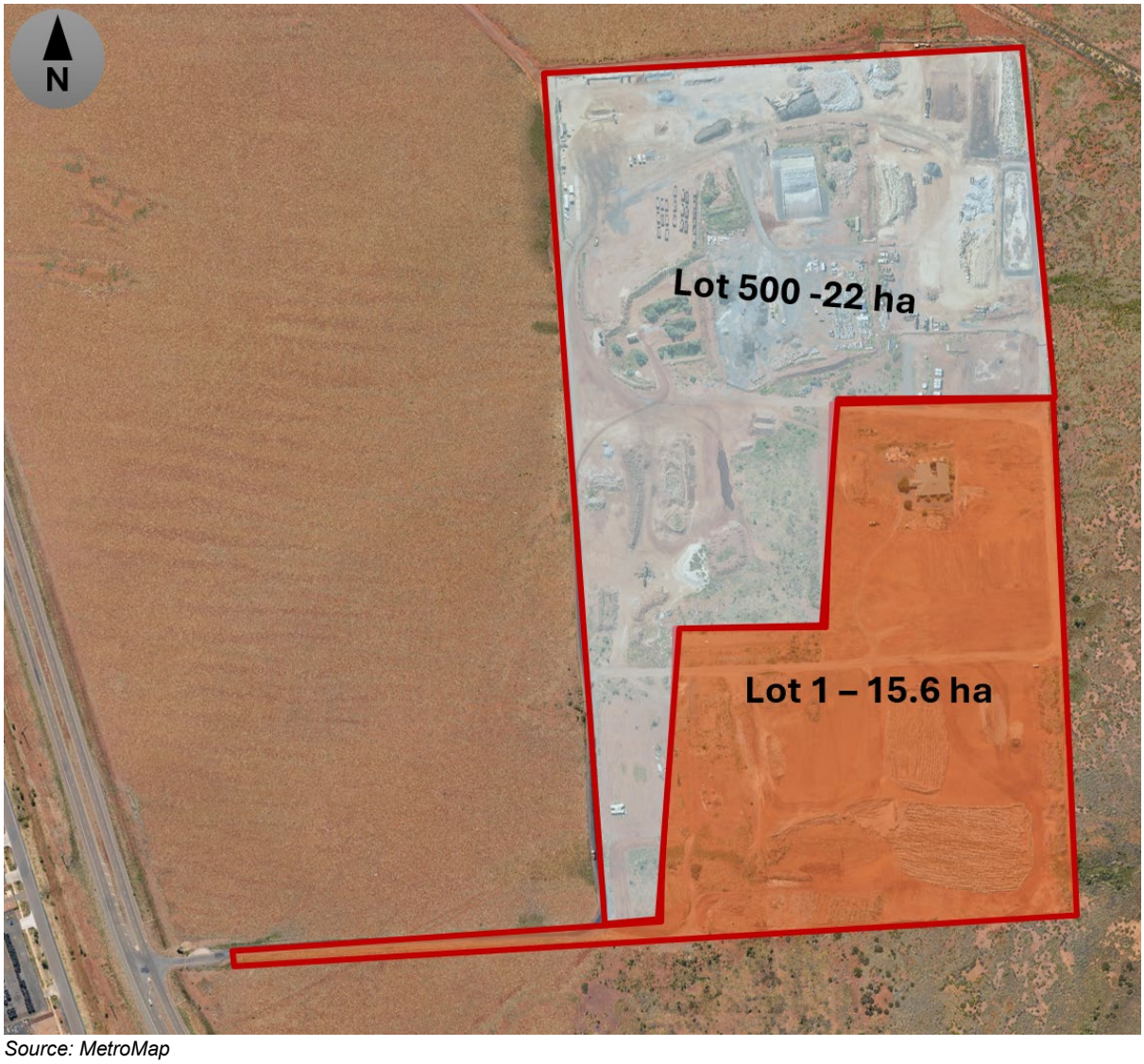
2.3 Proposed Land Uses

The proposed LSP would change the land use zoning for Lots 1 and 500 from 'Rural' to 'Industry'. The Lot sizes are shown in **Table 1** and graphically in **Figure 3**.

Table 1 - Land uses allocation

Area	Lot Area	Proposed Land Uses
Lot 1	15.6ha	Industry
Lot 500	22.0ha	Industry

Figure 3 - Lot Locations



Source: MetroMap

2.4 Major Attractors/Generators

The major generators and attractors adjacent to the Site are shown in **Figure 4** and include the Dampier port, Karratha Airport and the Karratha townsite.

Figure 4 - Major Attractors/Generators within the Surrounding Area



Source: Google Maps

2.5 Specific Issues

No specific issues are identified for the Site.

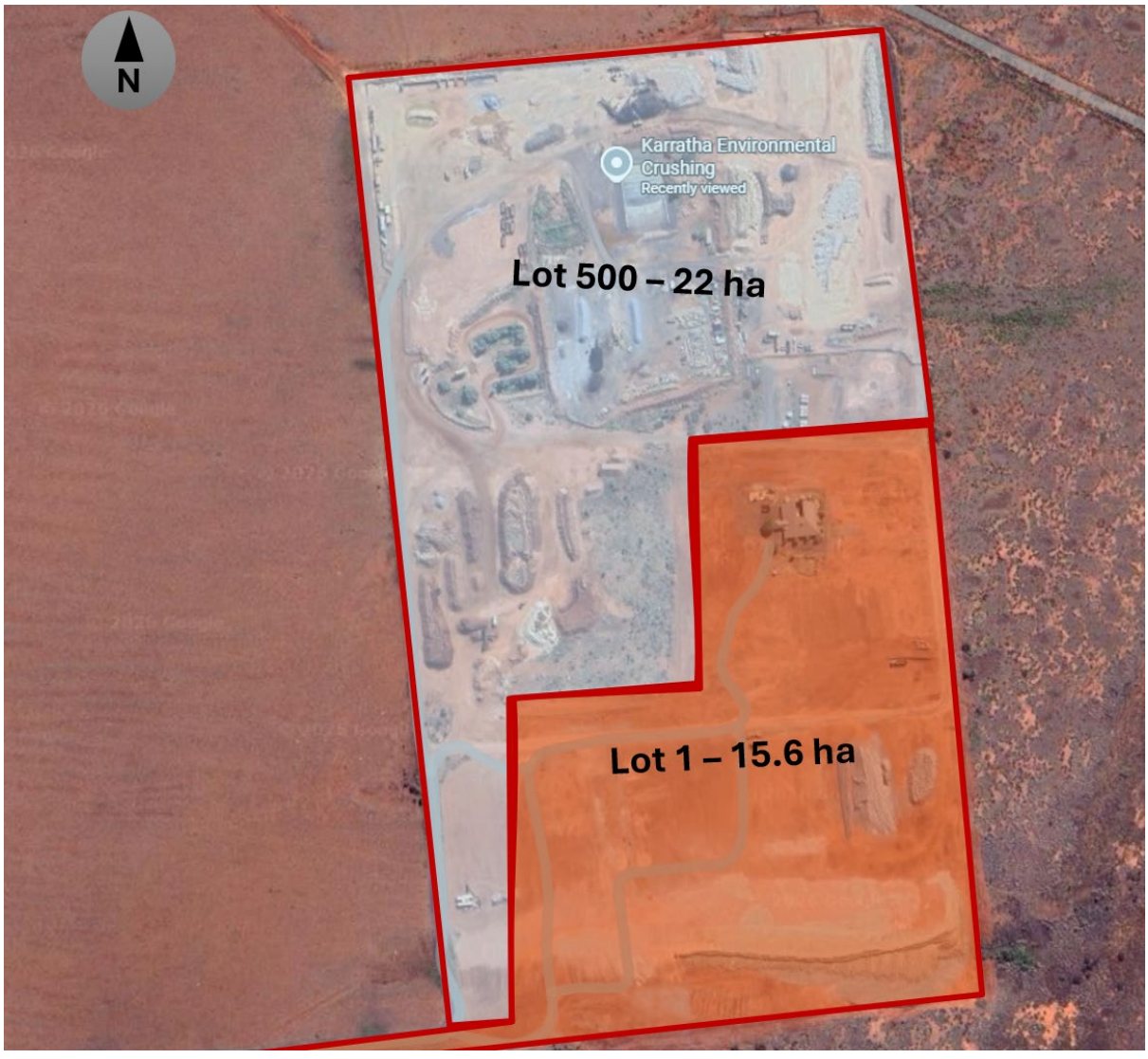
3 EXISTING SITUATION

3.1 Existing Land Uses

The subject site has a total area of approximately **37.6 hectares (ha)**, as shown in **Figure 5**, and comprises two allotments:

- **Lot 1** has an area of approximately **15.6ha** and is currently zoned 'Rural' but parts of the Lot have historically also been used informally as a laydown area.
    - It is estimated by the Lot 1 landowner that this site currently generates 10-15 daily truck movements in and out of this Lot.
- **Lot 500** has an area of approximately **22ha** and is currently occupied by a recycling facility operated by **Karratha Environmental Crushing**, which includes the crushing, screening and recycling of building materials. This operation is permitted on this Lot as it received approval in November 2020 for this additional use, as shown in **Figure 6**. The proposed industrial rezoning will enable this use to continue operating without the discretionary designation.
    - No information is available regarding the existing traffic generation for this Lot, although it is understood to be substantially higher than Lot 1.

Figure 5 - Existing Land Uses



Source: Google Maps

Figure 6 Additional Permitted Use for Lot 500

A8	Lot 500 Dampier Road, Gap Ridge AMD 52 GG 17/11/2020	Rural	Industry Noxious (restricted)	1. The use of the site is to be restricted to the following additional uses as defined in Schedule 1 of the Environmental Protection Regulations 1987 (as amended): 13 – Crushing of building matterials 2. The additional uses shall be considered a 'D' use - the use is not permitted unless the local government has exercised its discretion before granting development approval. 3. At the discretion of the local government, applications for development approval for the listed uses may need to be accompanied by appropriate environmental management plans.

Source: City of Karratha Local Planning Scheme No. 8

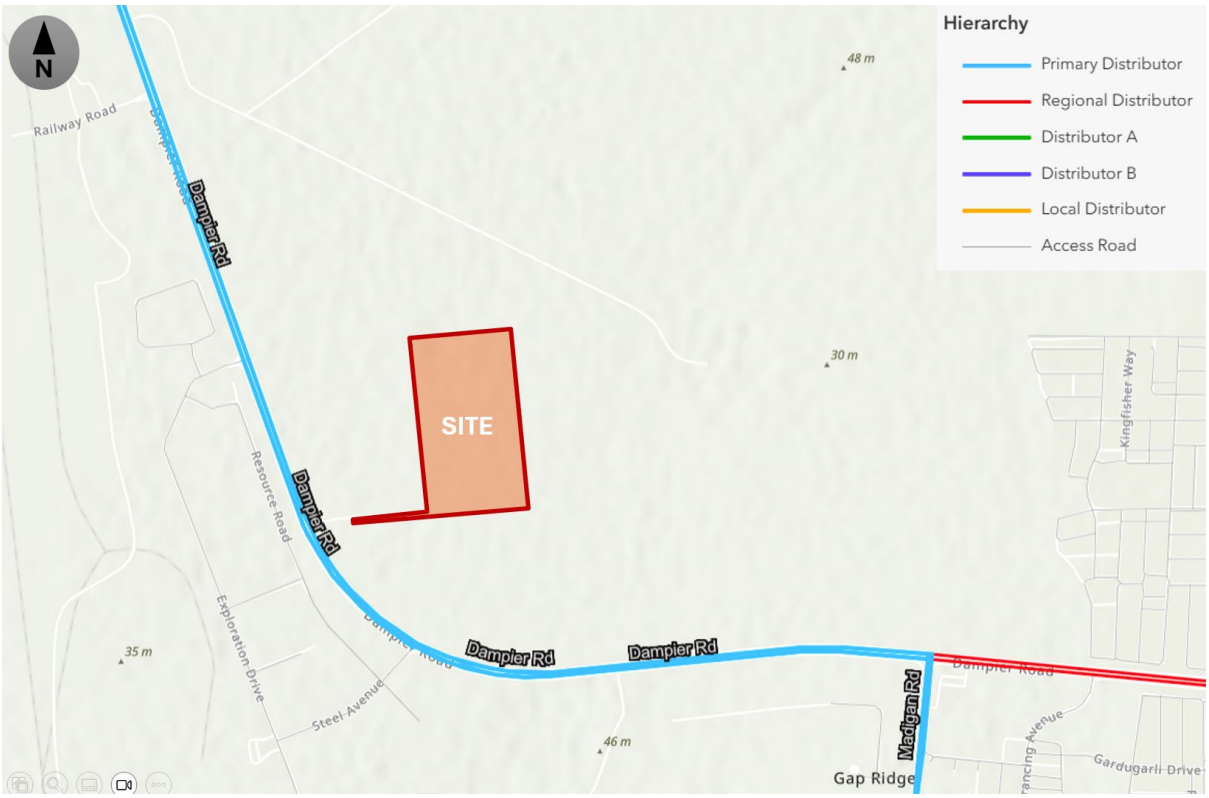
3.2 Existing Road Network

The road network within Western Australia is defined by Main Roads WA Road Hierarchy which describes the function, characteristic and management of each type of road. A description of each road type as per Main Roads WA Road Hierarchy criteria is summarised in **Table 2.** The hierarchy and characteristics of the surrounding roads are shown in **Figure 6** and are summarised in **Table 3** respectively**.**

Table 2 – Road Hierarchy Description

Road Type	Description
Primary Distributors	Provide for major regional and inter-regional traffic movement and carry large volumes of generally fast-moving traffic. Some are strategic freight routes, and all are State Roads. They are managed by Main Roads Western Australia.
District Distributor A	Carry traffic between industrial, commercial and residential areas and generally connect to Primary Distributors. These are likely to be truck routes and provide only limited access to adjoining property. They are managed by local government.
District Distributor B	Perform a similar function to type A District Distributors but with reduced capacity due to flow restrictions from access to and roadside parking alongside adjoining property. These are often older roads with a traffic demand in excess of that originally intended. District Distributor A and B roads run between land-use cells and generally not through them, forming a grid which would ideally space them around 1.5 kilometres apart. They are managed by local government.
Regional Distributor	Roads that are not Primary Distributors, but which link significant destinations and are designed for efficient movement of people and goods within and beyond regional areas. They are managed by local government.
Local Distributor (Urban)	Roads that carry traffic within a cell and link District Distributors or Regional Distributors at the boundary, to access roads. The route of Local Distributors should discourage through traffic so that the cell formed by the grid of District Distributors only carries traffic belonging to or serving the area. These roads should accommodate buses but discourage trucks. Urban Local Distributor roads are managed by local government.
Local Distributor (Rural)	Connect to other Rural Distributors and to Rural Access Roads. Not Regional Distributors, but which are designed for efficient movement of people and goods within regional areas. Rural Local Distributor roads are managed by local government.
Access Roads	Provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian friendly. They are managed by local government.

Figure 7 - Road Hierarchy



Source: Main Roads WA Road Information Mapping System

Table 3 – Surrounding Network Road Hierarchy

Road Name	Road Hierarchy	Jurisdiction	Footpath	No. of Lanes	Road Pavement Width (m)	Speed Limit
Dampier Road	Primary Distributor	MRWA	0	4	23 (4-9m median)	70 - 100 km/h

3.3 Existing Pedestrian / Cycle Networks

The Site does not contain an existing pedestrian/cycle network.

3.4 Existing Public Transport Services

The Site does not contain an existing public transport network.

The nearest bus stops located at Bayton West Primary/Wagari Drive which is around 2km from the Site. There are 2 bus services No.880 and No. 881 operated by TransKarratha that run from Dampier to Point Samson. Bus services route is shown in **Figure 7** and bus route timetable is provided in **Table 4**.

Figure 8 - Existing Bus Routes



Source: Google Maps

Table 4 - Bus Route Frequencies

Bus Route	Route Description	Service Frequencies		
		Weekday (Tuesday and Thursday)	Saturday	Sunday
880	Point Samson - Dampier Community Hub	2 – 4 services	3 services	3 services
881	Dampier Community Hub - Point Samson	2 - 3 services	2 services	2 services

Given the frequency and location of the bus stops, it is unlikely that the service will be used by staff or visitors accessing the Site.

3.5 Traffic Flows on Surrounding Roads and Intersections

The existing traffic volumes on Dampier Road were obtained from the Main Roads WA Traffic Map database and summarised in **Table 5.**

Table 5 - Traffic Volumes

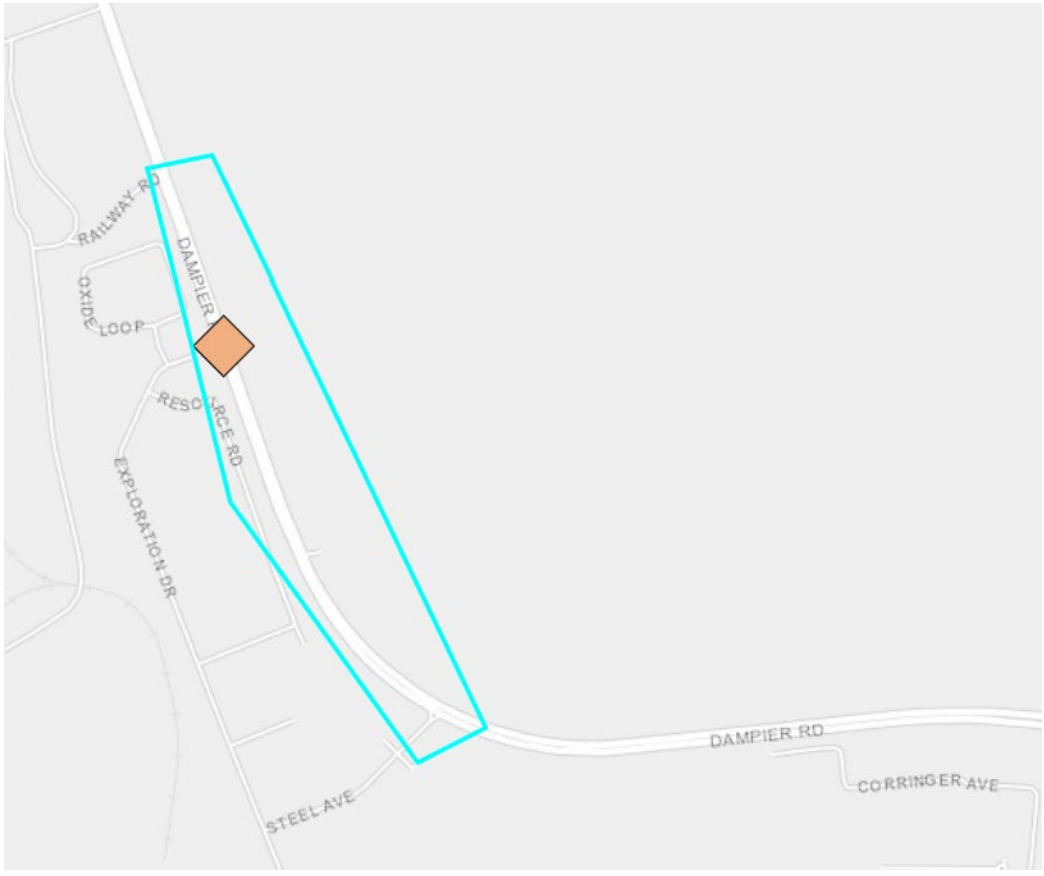
Road Name	Date	Jurisdiction	AM Peak	PM Peak	Daily	%HV (Daily)
Dampier Road (North of Maligan Road) (ID: 50097)	2025	MRWA	1,312 (5:00 – 6:00)	1,139 (17:00 – 18:00)	10,829	21.3

3.6 Crash Data

A crash assessment for the surrounding road network of the Site has been completed using Main Roads WA Reporting Centre. The assessment covers all the recorded crashes for the 5-year period between 1 January 2020 to 31 December 2024.

According to MRWA Crash map, there was only **1** crash was recorded and occurred at the Dampier Road/Exploration Drive intersection. The crash location is illustrated in **Figure 8.**

Figure 9 - Crash Locations



Source: MRWA Reporting Centre

4 CHANGES TO INTERNAL TRANSPORT NETWORKS

4.1 Existing Internal Road Network

Access to the Site is currently provided via the existing crossover, with existing internal road network shown in **Figure 9**. It is noted that these roads are private and not part of any formal road reservation.

Figure 10 - Internal Road Network



Source: MetroMap

4.2 Road Reservation Widths

The LSP will not include any public roads; all internal roads will be private and only used for access and circulation.

4.3 Pedestrian / Cycle Networks and Crossing Facilities

No pedestrian/cycling networks are proposed as part of the LSP.

5 CHANGES TO EXTERNAL TRANSPORT NETWORKS

5.1 Road Network

There are no proposed changes to the road network in the vicinity of the Site.

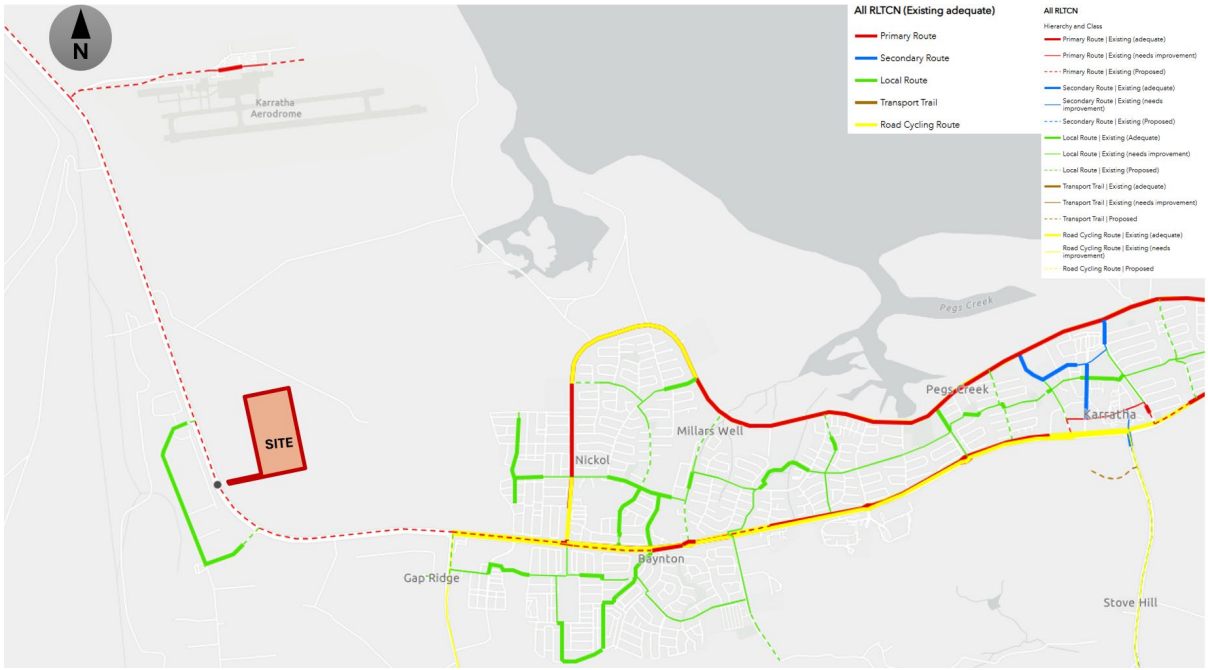
5.2 Pedestrian/Cycle Networks and Crossing Facilities

Figure 7 shows the aspirational future cycling network within the Karratha Townsite and surroundings. The map shows the proposed cycle route hierarchy which is summarised below:

- Dampier Highway – Primary Route

The surrounding cycle network is shown in **Figure 10**. Cycling facilities are available throughout the Karratha Townsite, including road cycling routes, local routes and primary routes. Sealed shoulders are provided on both sides of Dampier Road fronting the Site access and marked as bicycle lanes. These form part of the proposed cycle network along Dampier Highway, which is intended to function as a primary route connecting key destinations such as Karratha Townsite and Karratha Airport.

Figure 11 - Long-Term Cycle Network



Source: Regional Long-Term Cycle Network

5.3 Public Transport Services

PTG Consulting is not aware of any proposed changes to bus services in the vicinity of the Site.

6 INTERGRATION WITH SURROUNDING AREA

6.1 Trips Attractors/Generators

Significant local attractors/generators within the vicinity of the Site include:

- Karratha Airport
- Karratha Townsite
- Gap Ridge Industrial Estate
- Dampier Townsite

6.2 Proposed Changes to Land Uses within 800 metres

There are no immediate changes proposed to the existing land uses within the Site's vicinity.

6.3 Travel Desire Lines from Structure Plan to the Attractors / Generators

Travel to/from the key trip attractors and generators will be via Dampier Highway.

7 ANALYSIS OF INTERNAL TRANSPORT NETWORKS

7.1 Assessment Years and Time Periods

It is understood that in the short-and-medium terms that if the Site is rezoned to Industrial in accordance with the proposed LSP, that current operations on Lot 500 would continue, while warehouse-type developments would be likely to occur on Lot 1.

It is noted that any potential Development Applications (DAs) that may be lodged for individual development on either Lot 1 or Lot 500 will require separate TIA or TIS reports as part of the DA process.

The adopted peak hours for the assessment are expected as follows:

- AM Peak: 6:00am – 7:00am
- PM Peak: 5:15pm – 6:15pm

As per WAPC Transport Impact Assessment Guidelines for Structure Plans, the assessment was undertaken for the year of assumed full build-out of the Site, which is estimated to be 2030.

7.2 Structure Plan Generated Traffic

The traffic generation rates used to calculate the traffic generated by the proposed LSP were sourced from the *Transport for NSW – Guide to Transport Impact Assessment*. The adopted trip generation rates are summarised in **Table 6**, while the assumed in/out distribution proportions of the development-generated traffic are summarised in **Table 7**. The resulting total in/out traffic volumes are summarised in **Table 8**.

Table 6 - Trip Generation Rate

Land Use	Source	Yield	Unit	AM Peak	PM Peak	Daily
Warehouse & Industry	TfNSW	11.28ha*	100m2 GFA	0.17	0.15	1.94

**assumed as 30% of the total gross area*

Table 7 - Directional Trip Distribution

Land Use	Source	AM Peak		PM Peak		Daily	
		IN	OUT	IN	OUT	IN	OUT
Warehouse & Industry	TfNSW	58%	42%	62%	38%	50%	50%

Table 8 - Total Trip Generation

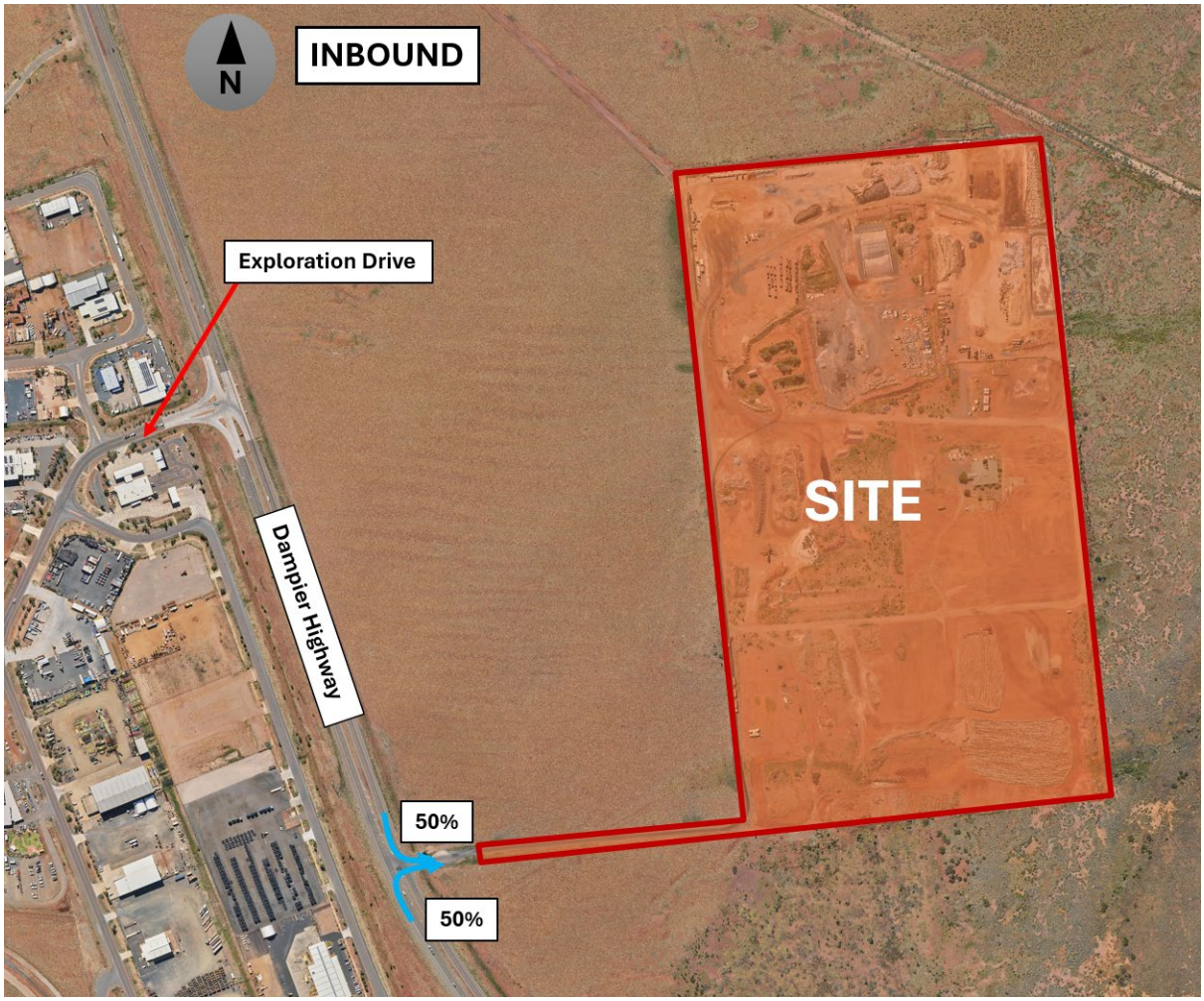
Land Use	AM Peak		PM Peak		Daily	
	IN	OUT	IN	OUT	IN	OUT
Warehouse & Industry	119	73	58	113	1,094	1,094
Total	192		171		2,188	

Upon full development of the proposed LSP, the Site is expected to generate a net total of 2,188 vehicle trips per day, around 192 vehicle trips during AM peak and 171 vehicle trips during PM peak hour.

7.3 Distribution of Generated Traffic

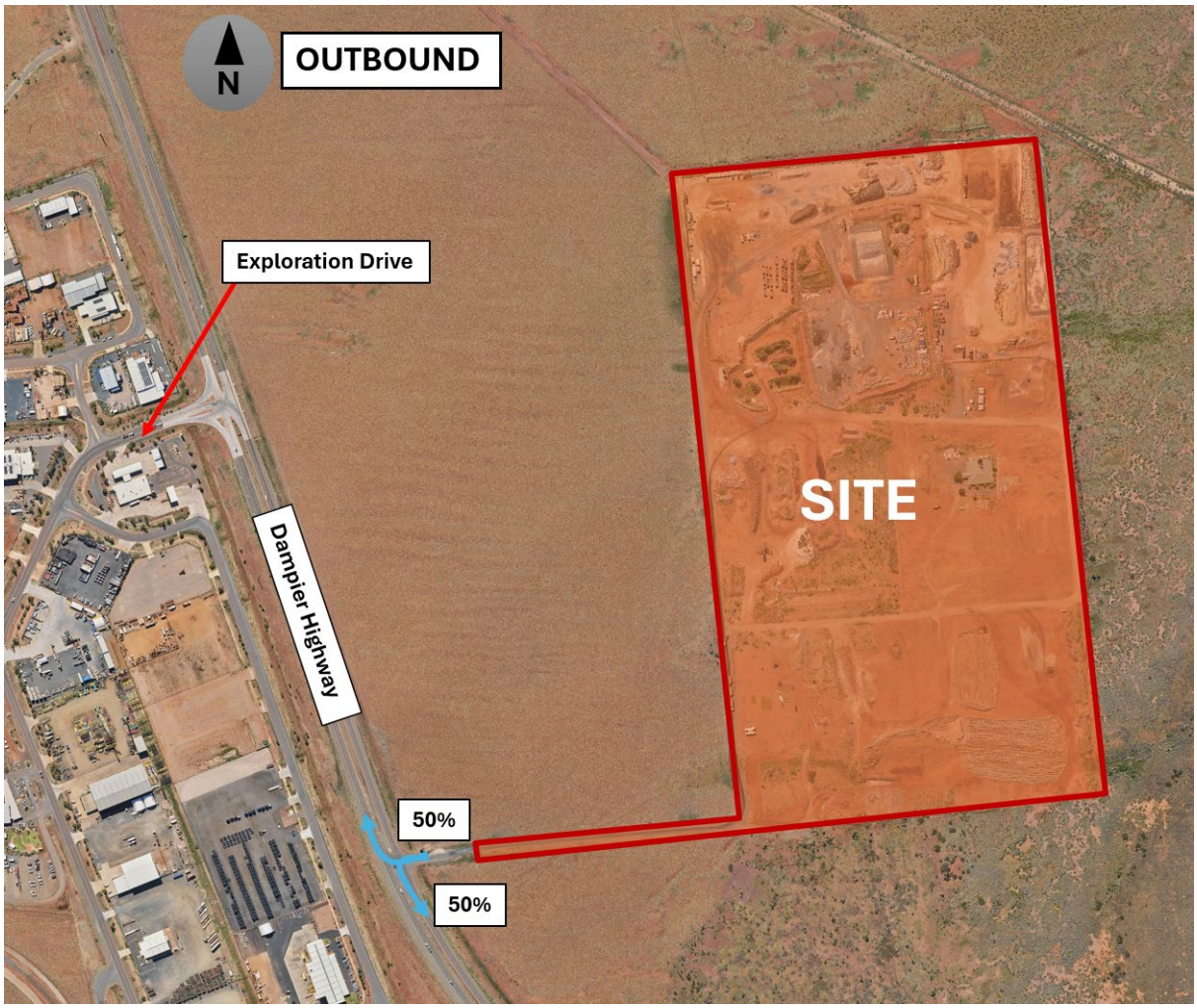
The traffic development traffic distribution throughout the surrounding network is shown in **Figure 11** and **Figure 12** for the inbound and outbound movements respectively.

Figure 12 - Estimated Traffic Distribution (Inbound)



Source: Metro Map

Figure 13 - Estimated Traffic Distribution (Outbound)



Source: Metro Map

7.4 Access To Public Transport

No changes are proposed to public transport routes.

8 ANALYSIS OF EXTERNAL TRANSPORT NETWORKS

8.1 Extent of Analysis

To determine the traffic impacts of the proposed development on the surrounding network, a SIDRA assessment was conducted for the Dampier Highway/Accessway intersection.

8.2 Key Assumptions

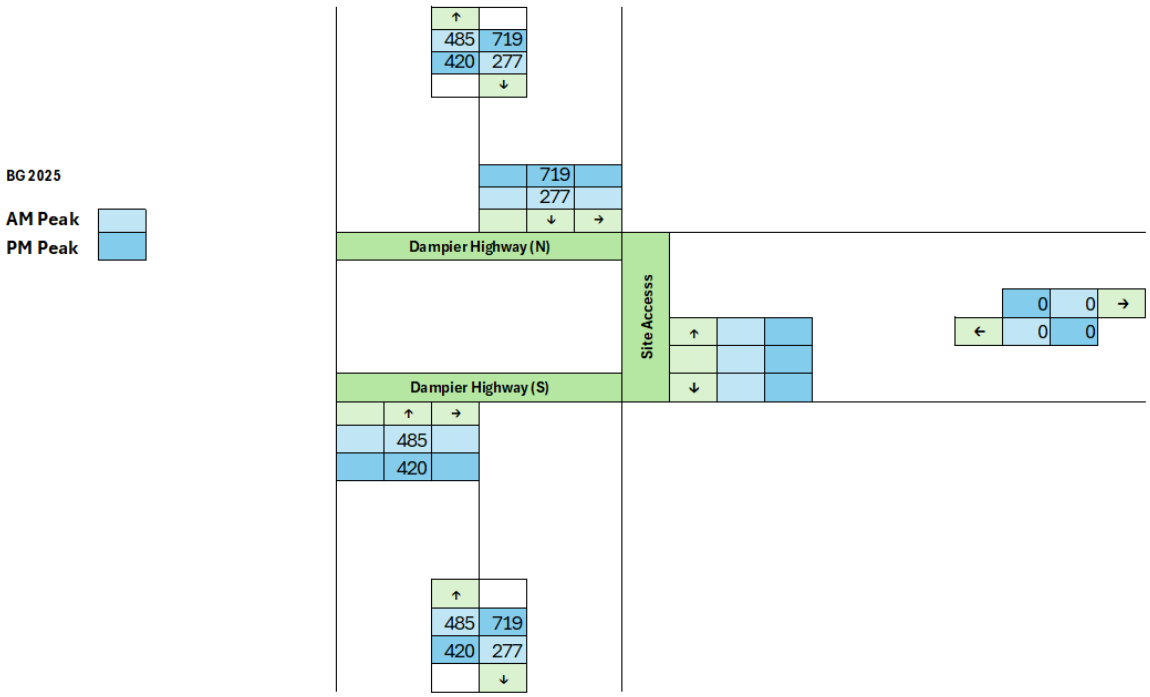
For the purposes of this assessment, the following assumptions have been made based on the best available information at the time of preparation of this report:

- The LSP is assumed to be fully built-out by 2030.
- Due to the wide median on Dampier Highway, this intersection has been modelled as a networked intersection in SIDRA, with a 2-stage crossing.
- Heavy vehicle proportions for the Accessway were sourced from the *Transport for NSW – Guide to Transport Impact Assessment* for industrial land use.
- An annual growth rate of 8% was calculated and applied to estimate the future traffic volume along Dampier Highway.

8.3 Base Flows for Assessment Years

Base traffic volume plot is shown in **Figure 13**. The adopted peak hour for the proposed development is 6:00am – 7:00am for AM Peak and 5:15pm – 6:15pm for PM Peak.

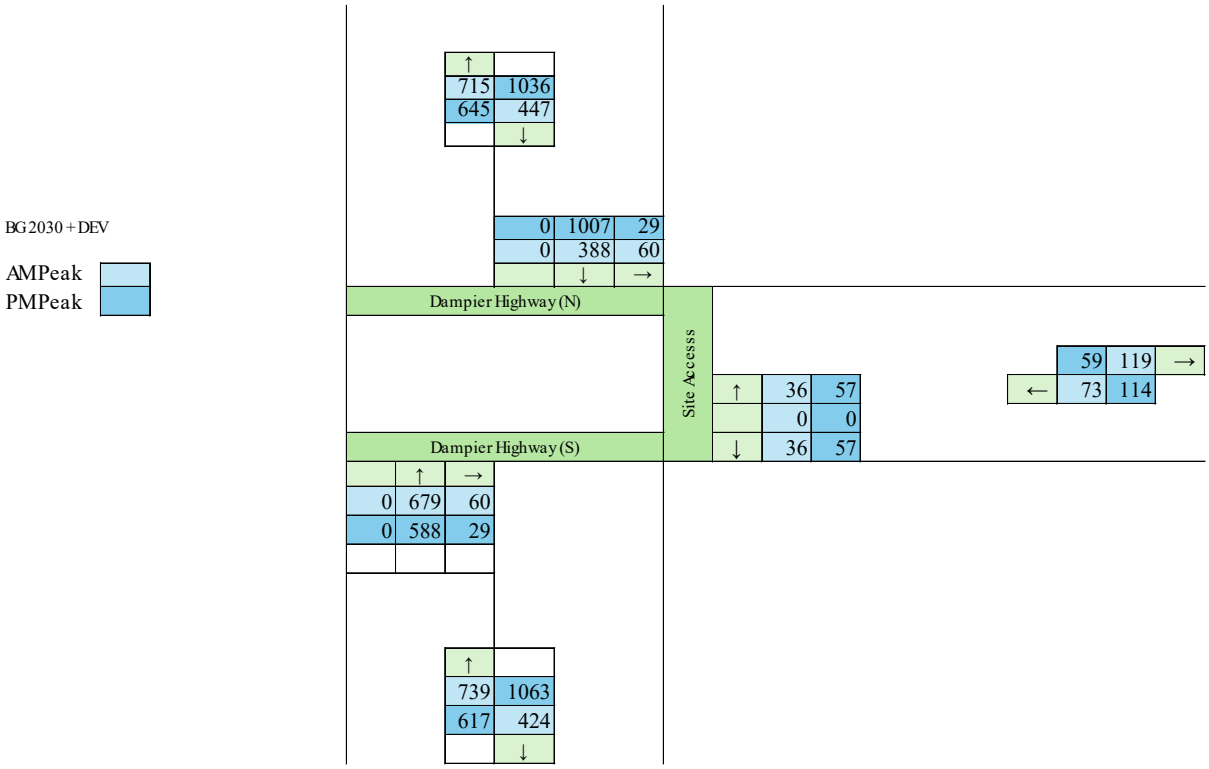
Figure 14 - Base Traffic Flows



8.4 Total Traffic Flows

The total traffic volumes are shown in **Figure 14**.

Figure 15 - Total Traffic Flows



8.5 SIDRA Analysis

Analysis was conducted for the following key accesses and intersections:

- Dampier Highway/Accessway Intersection.

The above intersections have been analysed using the SIDRA intersection analysis program. This program calculates the performance of intersections based on input parameters, including geometry and traffic volumes. As an output, SIDRA provides values for the Degree of Saturation (DOS), queue lengths, delays, level of service, and 95th Percentile Queue. These parameters are defined as follows:

- Degree of Saturation (DOS): is the ratio of the arrival traffic flow to the capacity of the approach during the same period. The theoretical intersection capacity is exceeded for an unsignalized intersection where DOS > 0.80;
- 95% Queue: is the statistical estimate of the queue length up to or below which 95% of all observed queues would be expected.
- Average Delay: is the average of all travel time delays for vehicles through the intersection. An unsignalized intersection can be considered to be operating at capacity if the average delay exceeds 40 seconds for any movement; and
- Level of Service (LOS): is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers. The different levels of service can generally be described as shown in Table 9.

Table 9 – Level of Service Definitions

LOS	Description	Signalised Intersection	Unsignalised Intersection	Roundabout
A	No or minimal delays (best condition). Queues are rarely more than one vehicle	≤10 sec	≤10 sec	≤10 sec
B	Short traffic delays. Occasionally more than one queued vehicle.	10-20 sec	10-15 sec	10-20 sec
C	Average traffic delays. Often more than one queued.	20-35 sec	15-25 sec	20-35 sec
D	Long traffic delays. Regularly more than one queued vehicle.	35-55 sec	25-35 sec	35-50 sec
E	Very long traffic delays. Traffic demand is near or equal to the practical capacity of the intersection. Almost always more than one queued vehicle.	55-80 sec	35-50 sec	50-70 sec
F	Forced flow conditions with extensive delays caused by geometric and/or operational constraints external to the intersection.	≥80 sec	≥50 sec	≥70 sec

Source: Highway Capacity Manual, 1997

8.5.1 Dampier Highway (S)/Accessway Intersection

The SIDRA layout for the Dampier Highway/Accessway intersection is shown in **Figure 15** with the results summarised in **Table 10**. It is noted that due to the wide median width (approximately 9.0m), the intersection has been modelled as a staged crossing as a SIDRA network.

The SIDRA model results for suggest that the intersection has sufficient capacity to accommodate the traffic generated by the proposed LSP, as well as the increased background traffic volumes.

Figure 16 - Dampier Highway (S)/Accessway Intersection

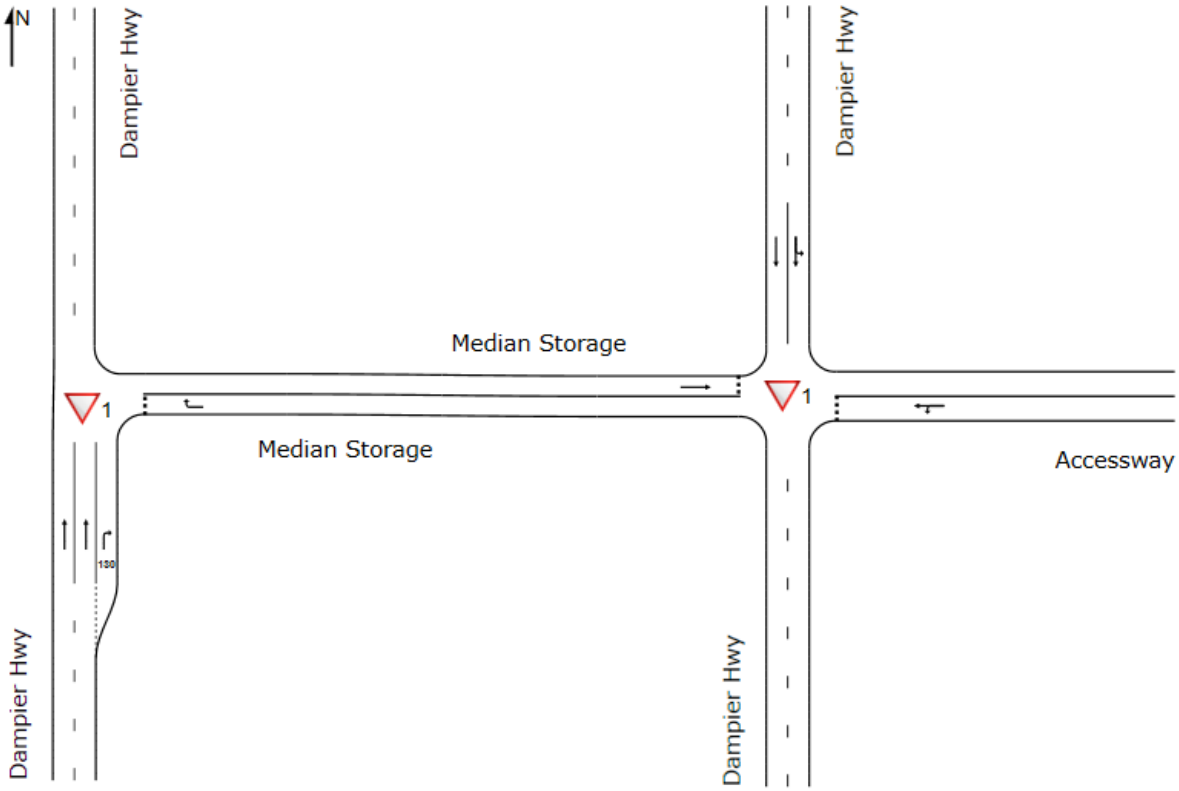


Table 10 - SIDRA results for Dampier Highway/Accessway (South of Dampier Highway) Intersection – 2030

Approach	Turn	AM Peak				PM Peak			
		DOS	Delay	LOS	95% Queue (m)	DOS	Delay	LOS	95% Queue (m)
Dampier Highway (S)	T	0.23	7	A	0	0.20	7	A	0
	R	0.10	10	B	3	0.17	24	C	4
Dampier Highway (N)	L	0.15	8	A	0	0.33	8	A	0
	T	0.15	7	A	0	0.33	7	A	0
Accessway (E)	L	0.09	8	A	3	0.34	9	A	11
	R	0.13	18	C	3	0.34	32	D	11
Overall	-	0.23	-	-	3	0.34	-	-	11

9 SUMMARY AND CONCLUSIONS

This report has been prepared in accordance with the Western Australian Planning Commission (WAPC) Transport Assessment Guidelines for Developments: Volume 2– Planning Schemes, Structure Plans and Activity Centre Plans (2016); the checklist is included at Appendix A.

The following conclusions can be drawn from this TIA:

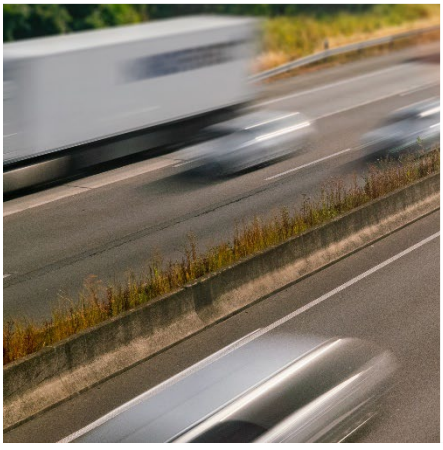
- While the proposed LSP has good connectivity to the adjacent cycling network, it is not anticipated that many staff or visitors will travel to the Site via cycling.
- Public transportation is limited within the surrounding area, and it is therefore not anticipated that any staff or visitors will travel to the Site via public transport.
- Upon full build-out of the LSP, the Site is estimated to generate 2,188 trips per day, 192 trips in AM peak hour and 171 trips in the PM peak hour.
    - It is noted that in the short-and-medium terms that if the Site is rezoned to Industrial in accordance with the proposed LSP, that current operations on Lot 500 would continue, while warehouse-type developments would be likely to occur on Lot 1.
    - It is also noted that any potential Development Applications (DAs) lodged for individual development on either Lot 1 or Lot 500 will require separate TIA or TIS reports as part of the DA process.
- The SIDRA model results suggest that the Dampier Highway intersection has sufficient capacity to accommodate the traffic generated by the proposed LSP, as well as the increased background traffic volumes.

Overall, the proposed LSP is considered to unlikely to have any material impact on the surrounding network.



Appendix A

WAPC CHECKLIST PLANNING SCHEMES, STRUCTURE PLANS AND ACTIVITY CENTRE PLANS - TRANSPORT IMPACT ASSESSMENT





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CONSULTANTS



Lots 1 & 500 Dampier Road, Gap Ridge

Local Water Management Report

Prepared for:

KAW PROPERTY GROUP PTY LTD

May 2026

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EXECUTIVE SUMMARY

Avant Hydro has been pointed by KAW Property Group Pty Ltd to prepare a Local Water Management Report [LWMR] for Lots 1 & 500 Dampier Road, Gap Ridge (37.5 ha) in support of the proposed Lots 1 & 500 Dampier Road, Gap Ridge Structure Plan (RFF, 2026), and is herein referenced as the Study Area, Figure 1.

This LWMR provides a framework for the application of total water cycle management to the proposed industrial structure of the Study Area, consistent with the Department of Water and Environmental Regulation's principles on Water Sensitive Urban Design as described in the *Decision Process for Stormwater Management in Western Australia* (DWER, 2017), *Stormwater Management Manual for Western Australia*, (DWER, 2022), and *State Planning Policy 2.9 - Water* (WAPC, 2025a) and the associated implementation guidelines (WAPC, 2025b). A summary of the key elements of this LWMR in addressing the objectives and principles of water management is presented in Table 1.

Table 1: Summary of Proposed Local Water Management Report

Principle	Key LWMS Elements
Water Supply and Conservation To consider all potential water sources in water supply planning and maximise the reuse of stormwater.	• Minimise the use of potable water where drinking water quality is not essential, particularly ex-building use. • Apply water-wise landscaping measures to swales in road reserves to reduce and/or avoid irrigation.
Surface Water Flows To protect the development from flooding and to ensure that existing flow pathways are maintained.	• Maintain flow paths for existing external catchments and integrate the existing overland flow path into the development footprint. • Maintain peak flows from the Study Area similar to pre-development. • Incorporate swales within the development footprint to disperse flow and minimise peak flow velocities prior to discharge eastward to Seven Mile Creek.
Water Quality To minimise discharge or pollutants to receiving waterways and maintain water quality in specified environments. to pre-development conditions.	• No sensitive ecosystems in the immediate vicinity. • The receiving environment is Seven Mile Creek which discharges to the inter-tidal zone prior to discharging to the ocean.
Development To ensure the delivery of best practice stormwater management through planning and development of high quality developed areas in accordance with sustainability & precautionary principles.	• Urban water management in accordance with *State Planning Policy 2.9 – Water* (WAPC, 2025a); and • Development of the LWMR in accordance with government agency guidelines and best management practice recommendations.

1. INTRODUCTION

1.1 BACKGROUND

This Local Water Management Report [LWMR] has been prepared by Avant Hydro for Lot 1 (15.6 ha) and Lot 500 (21.9 ha) Dampier Road, Gap Ridge, on behalf of KAW Property Group Pty Ltd, the owner of Lot 1. Lot 500 is held under State lease.

The Study Area covers an area of 37.5 ha and is proposed for industrial development. Both lots currently have approvals from the City of Karratha for storage facilities and laydown uses.

1.2 PLANNING CONTEXT

The Study Area is zoned *Industrial Development* in the City of Karratha Local Planning Scheme No. 8. Both Lots 1 & 500 were rezoned from *Rural* to *Industrial Development* under Amendment No. 64 which was gazetted on 27 March 2026.

Development Investigation Area 9 [DIA9] (270 ha) is located west and north of the Study Area and has been identified in the City of Karratha's Local Planning Strategy (2021) as potential general industry. Avant Hydro understands the City of Karratha is currently undertaking technical feasibility studies for DIA 9, of which will also incorporate the Study Area (Lots 1 and 500).

This Local Water Management Report [LWMR] has been prepared to support a local structure plan as part of the planning process in *State Planning Policy 2.9 – Water* (WAPC, 2025a) and the associated *Planning for Water Guidelines* (WAPC, 2025b) and details recommended water management strategies for the Study Area which are to be developed into a suitable detailed design to support any future Subdivision and Development Water Management Reports [SDWMR].

1.3 GUIDING DOCUMENTS

This LWMR uses the following key document to define its content, principles and objectives:

1.3.1 Karratha Coastal Vulnerability Study (JDA et al., 2012)

The *Karratha Coastal Vulnerability Study* [KCVS] was prepared by JDA Consultant Hydrologists [JDA] for LandCorp (now DevelopmentWA) with technical guidance from the then Department of Water (now Department of Water and Environmental Regulation) and Department of Transport. The KCVS incorporated the study of the impacts of future climate change, hydrology around Karratha, shoreline stability and modelling of storm surge and riverine flooding by JDA and other consultants including Coastal Zone Management, Damara WA Pty Ltd, Global Environmental Modelling Systems and DHI.

The purpose of the study was to evaluate the cumulative impacts of storm surge, coastal inundation and shoreline stability on the then future expansion of the Karratha townsite and to:

- Identify areas in Karratha likely be affected by floods at present-day (2010), in 50 years (2060) and in 100 years (2110);
- Identify the likely shoreline position for Karratha for the above dates;
- Assess the accuracy of these predictions; and
- Outline a model/process for monitoring and tracking any changes to these predictions.

Sixteen scenarios were analysed from event frequency 2 year ARI to 500 year ARI and 2010 (present-day), 2060 and 2110 climate. 100 year ARI flood maps were presented for present-day, 2060 and 2010 and were highlighted as the 100 year ARI was widely adopted as the basis for land use planning in Western Australia.

The Study recommended projected shoreline changes to 2110 should be considered in the context of existing infrastructure and future land use planning and coastal setbacks proposed should be adopted. This included protection of coastal dunes which form a major natural protection for the Karratha townsite.

1.3.2 City of Karratha Coastal Hazard Risk Management Adaption Plan (City of Karratha, 2014)

The *City of Karratha Coastal Hazard Risk Management Adaption Plan* [CHRMAP] (City of Karratha, 2014) was prepared by the City of Karratha for the entire City district to establish a hierarchical approach to the management of coastal hazard and risk.

The document is a non-statutory document but was prepared to fulfil the requirement of the then version of State Planning Policy 2.6 – *Coastal Planning* to provide a risk management and adaptation planning framework for areas at risk of being affected by coastal hazards over the relevant planning timeframe.

The relevant planning timeframes for different coastal processes were given as:

- Coastal erosion and accretion processes – 100 year planning timeframe.
- Storm Surge events – 500 year planning timeframe.
- Allowance for sea level rise – vertical sea level rise of 0.9 metres over a 100 year planning timeframe and was to be factored into the above events.

The CHRMAP was informed by several regional scale coastal vulnerability assessments for townsites within the City of Karratha with the Karratha locality informed by the *Karratha Coastal Vulnerability Study* (JDA et al., 2012). Storm surge vulnerability mapping presented in the document does not extend as far west as the Gap Ridge area including that of the Study Area.

1.3.3 Stormwater Management Manual for Western Australia (DWER, 2022)

The Water and Rivers Commission (Department of Water, DoW, 2006-2017; Department of Water and Environmental Regulation, DWER, 2017-present) released *A Manual for Managing Urban Stormwater Quality in Western Australia* in 1998 to define and practically describe Best Management Practices (BMP's) to reduce pollutant and nutrient inputs to stormwater drainage systems. The Manual also aimed to provide guidelines for the incorporation of water sensitive design principles into urban planning and design, which would enable the achievement of improved water quality from urban development.

The document was released to provide a guideline for best planning and management practices and was intended for use by Water and Rivers Commission, but also by other State and Local Government Authorities and sectors of the urban development industry.

In consultation with a working team comprising industry and government representatives a major review of the manual was completed in 2007. The revised manual was officially launched in August 2007.

Principle objectives for managing urban water in WA are stated as:

Principle objectives for managing urban water in WA are stated as:

- Water Quality: To maintain or improve the surface and groundwater quality within development areas relative to pre-development conditions.
- Water Quantity: To maintain the total water cycle balance within development areas relative to the pre-development conditions.
- Water Conservation: To maximise the reuse of stormwater.
- Ecosystem Health: To retain natural drainage systems and protect ecosystem health.
- Economic Viability: To implement stormwater systems that are economically viable in the long term.

- Public Health: To minimise the public risk, including risk of injury or loss of life to the community.
- Protection of Property: To protect the built environment from flooding and waterlogging.
- Social Values: To ensure that social aesthetic and cultural values are recognised and maintained when managing stormwater.
- Development: To ensure the delivery of best practice stormwater management through planning and development of high quality developed areas in accordance with sustainability and precautionary principles

The manual was reviewed and updated in 2022 from the August 2007 version to ensure all information contained in the document was correct and up-to-date.

1.3.4 State Planning Policy 2.9 – Water (WAPC, 2025a) and *Planning for Water Guidelines (WAPC, 2025b)*

State Planning Policy 2.9 – Water (WAPC, 2025a) and its associated Planning for Water Guidelines (WAPC, 2025b) were prepared under Part 3 of the *Planning and Development Act 2005* and released by the Western Australian Planning Commission in December 2025. This document repealed a number of former State Planning Policies and replaced *Better Urban Water Management* (WAPC, 2008) and Government sewerage policy which had till then been the planning instrument and process for urban water development in Western Australia.

The Policy outlines how water resource management should be integrated into the planning process with objectives to:

- Protect and improve the environmental and the social, cultural and economic values of the state's water resources;
- Protect public health and the long-term supply of good quality and affordable drinking water;
- Manage the risk of flooding to people, property and infrastructure;
- Ensure the secure and sustainable supply, use, disposal and re-use of water resources;
- Ensure future development is resilient to the water-related impacts of climate change; and
- Minimise future costs and protect public health by ensuring that appropriate wastewater infrastructure is provided.

This Policy and its Guidelines apply to the preparation and assessment of proposals in relation to water matters, including regional and sub-regional frameworks, region and local planning schemes and scheme amendments, local planning policies, planning strategies, precinct plans, activity centre plans, structure plans, subdivision applications and development applications across Western Australia.

This LWMR has been prepared to support a local structure plan and is the most appropriate report type for this planning stage as detailed in WAPC (2025b). The stated requirements in for a LWMR in WAPC (2025b) largely mirror those of the similarly titled Local Water Management Strategy in WAPC (2008).

1.3.5 Local Government Subdivisional Guidelines (IPWEA, 2026)

The Institution of Public Works Engineering Australia [IPWEA] Subdivisional Guidelines (Edition 3.1 – March 2026) aim to achieve best practice for managing both water quantity and quality in a sustainable way as required in *State Planning Policy 2.9 – Water* (WAPC, 2025a).

Design criteria are to be used as a guide for development of the urban water management system for strategic planning, subdivision and development. Water management requires consideration of water quality and quantity.

Post-development annual discharge (the critical 1 Exceedance per Year [EY] event) volume and peak flow should be maintained relative to pre-development conditions in all parts of the catchment where there are identified impacts on significant ecosystems. The built environment also needs to be protected from flooding (up to the 1% Annual Exceedance Probability [AEP]) and waterlogging, minimising the public risk.

Surface and groundwater quality should be at least maintained at pre-development levels (winter concentrations) and, if possible, improved. This should be achieved through a treatment train approach including non-structural measures (e.g. community education), on-site retention of the first 15 mm of rainfall and bio-retention structures/systems sized at 2% of the constructed impervious areas. As compared to a development that does not actively manage stormwater quality; the following design objectives are required:

- At least 80% reduction of the total suspended solids;
- At least 60% reduction of total phosphorus;
- At least 45% reduction of total nitrogen; and
- At least 70% reduction of gross pollutants.

Key elements of the water-sensitive design include water conservation, flood protection, management of frequent events, groundwater drainage and general drainage design principles.

1.3.6 Water Quality Protection Notes [WQPNs]

Specific to industrial sites, the then Department of Water [DoW] released WQPN 52 *Stormwater Management at Industrial Sites* (DoW, 2010) which states that all industrial sites need to effectively manage stormwater runoff from roofs, pavements and material storage and processing areas to avoid flooding or contamination of water resources. The stormwater management should minimise the contamination risks which may arise as stored or split process chemicals are flushed offsite or into the ground following rainfall. Chemicals of concern include acids, alkalis, detergents, dyes, engine coolant, fertilisers, fuels, litter, lubricants, metal solution, poisons and solvents.

WQPN 93 *Light Industry Near Sensitive Waters* (DoW, 2009) provides a general guide on issues of environmental concern on light industry near sensitive waters, and offers potential solutions based on professional judgement and precedent.

WQPN 68 *Mechanical equipment wash down* (DoW, 2013a) provides guidance on small-scale (< 5 L wastewater/day) and non-automated wash down facilities. Large, automated wash down facilities that discharge wastewater to the receiving environment require individual assessment of water quality and community risks.

Chemical/General Industry land use is generally the most demanding in meeting WSUD design objectives as large areas of impervious surfaces (e.g. roofs, carparks, roads) are developed and create the potential for large volumes and peak flows of stormwater which must be catered for. It is common for light industrial/commercial business areas to comprise 70% impervious surface, however, in the Pilbara it is common to have a larger proportion of yard areas which are not fully sealed.

Industrial facilities should be constructed using weather-proof material with impervious flooring designed and graded to contain any spill material, washdown water or contaminated stormwater. This is to ensure that at no stage, i.e. during normal operation or emergencies, is the surrounding environment at risk of contamination. The area could, if practical, have a graded floor or perimeter bund with speed humps to allow vehicles into the contained area if required.

If chemicals are stored on the premises, they should be kept within the contained compound on chemical resistant surfaces. The compound should have the capacity to store at least 110% of the volume of the largest container plus 25% of the volume of all other containers.

Any chemical bulk storage tanks that are 250 L or greater in capacity; permanent or temporary; above-ground and underground; or outside or within another structure (e.g. shipping container, shed, trailer), should follow the recommendations made in WQPN 56 *Tanks for fuel and chemical storage near sensitive water resources* (DWER, 2018). All toxic or hazardous chemicals, such as fuel, paint, solvents and pool chemicals, should be stored within contained compounds or chemically resistant surfaces and should follow the recommendations made in WQPN 65 *Toxic and hazardous substances – storage and use* (DoW, 2015).

All stormwater and runoff from roofs and pavements should be diverted away from where chemicals are stored, used or may be spilt. Where practical, employee training and signs erected adjacent to stormwater drainage gully grates should be used to inform all staff that disposal of chemicals and process wash-down water to drains will likely flow into natural water bodies causing environmental harm. The recommendations given in WQPN 52 (DoW, 2010) should be followed.

1.4 AUSTRALIAN RAINFALL & RUNOFF TERMINOLOGY

The new edition of Australian Rainfall and Runoff (ARR) (Ball et al., 2019) adopts different probability terminology from that used in the previous ARR 1987 (IE Aust., 1987). In line with Ball et al. (2019), this report adopts new terminology Exceedances Per Year (EY) and Annual Exceedance Probability (AEP) instead of previous terminology, Average Recurrence Interval (ARI) used in ARR 1987, see conversions below.

- 1 EY is equivalent to 1 Year ARI
- 20% AEP equates to 4.49 Year ARI. (For simplicity, this report adopts 20% AEP as equivalent to 5 Year ARI)
- 10% AEP equates to 9.49 Year ARI. (For simplicity, this report adopts 10% AEP as equivalent to 10 Year ARI)
- 2% AEP equates to 49.5 Year ARI. (For simplicity, this report adopts 2% AEP as equivalent to 50 Year ARI)
- 1% AEP is equivalent to 100 Year ARI.
- 0.2% AEP is equivalent to 500 Year ARI.

The *Karratha Coastal Vulnerability Study* (JDA et al., 2012) was informed by ARR 1987 (IE Aust., 1987) and uses "ARI" which should interpreted in AEP as detailed in this report.

2. PRE-DEVELOPMENT ENVIRONMENT

2.1 Location and Land Use

The Study Area, being Lot 1 & Lot 500 Dampier Road, Gap Ridge, covers an area of 37.5 ha and is located within the City of Karratha, about 7 km west of Karratha Town Centre, Figure 1. The Study Area comprises of main lot areas covering about 36.7 ha and a 0.7 ha access road to Dampier Highway split evenly between both Lots 1 & 500. The Study Area is bound by Crown land with the 400 m access road providing connectivity to Dampier Highway and the nearby Gap Bridge Industrial Estate managed by DevelopmentWA.

Both lots currently have approvals from the City of Karratha for storage facilities and laydown uses. The majority of the Study Area has been cleared to support current industrial operation activities.

2.2 Topography

The topography across the Study Area has a generally consistent grade west to east with the exception of locations or past or current works/constructions. Figure 2 shows 2010 LiDAR topography as sourced from JDA et al. (2012) and reflected the state of the landform at the time which does necessarily reflect development to date as shown in the NearMaps aerial on Figure 2 from 09 September 2025.

The topography of the access road ranges from 10.5 mAHD (west) to about 9.7 mAHD (east) and the topography in the main lots generally ranges from about 9.5-9.7 mAHD (west) to 8-8.3 mAHD (east).

The 2010 LiDAR topography suggests an about 1 m incised drainage channel running west to east in the south of the Study Area, Figure 2, which generally aligns with the mapped waterways as shown on Figure 1. The drainage channel appears to have been partially filled in its eastern extent of the Study Area in 2022/23 with the whole channel completed filled-in in early 2025 as shown in the 09 September 2025 NearMaps aerial on Figure 2.

Recent aerial imagery suggests the landform across the Study Area has been extensively and repeatedly modified since the 2010 LiDAR and current detailed feature survey is required to ascertain the “pre-development” topography of the Study Area, including along the access road, to inform any future SDWMR. A feature survey of Lot 1 was previous conducted by Land Surveys in September 2023 but this predates recent earthworks across the lot.

2.3 Climate

Karratha has an arid climate characterised by hot summers with periodic heavy rain and mild winters with occasional rainfall. The Pilbara coast experiences more cyclones than any other part of Australia.

The Bureau of Meteorology’s *Karratha Aero* rain gauge (Site ID: 004083) is located approximately 2.7 km south of the Study Area. The average annual rainfall, 1973 to 2025, is 298 mm, however the range between years is high from 53 mm in 1983 to 855 mm in 2006. Most of the rainfall is recorded in the wet season as a result of tropical cyclone activity and local thunderstorms. Along the Pilbara coast, the cyclone season runs from mid-December to April and peaking in February (JDA et al., 2012).

The estimated average annual pan evaporation for Karratha is 3,400 mm (Luke et al., 1987).

2.4 Surface Geology

The surface geology of the Study Area is mapped in Hickman & Strong (2000) as *Qs – Eolian Sand* in the west and north of the Study Area, *Qao – Alluvial Sand* in the centre and south of the Study Area and *Qaa – Alluvium* in the east of the Study Area, Figure 3. The boundaries of these classifications generally aligns with regional 1: 1,000,000 surface geology mapping denoted as sand plain, colluvium and alluvium, respectively, Figure 3.

Detailed descriptions of the geological units are summarised on Figure 3. The surface geology encountered within the Study Area generally comprises of deposits from present-day drainage systems.

Substantive earthworks across the majority of the Study Area, as shown in the topography on Figure 2 and recent aerial imagery, will have resulted in blending of much of the former surficial soils and the current condition of the Study Area likely differs from that discerned from the regional mapping in Hickman & Strong (2000).

Local geotechnical investigations are recommended to inform any future SDWMR.

2.5 Acid Sulphate Soils

Regional Acid Sulphate Soil [A.S.S.] risk mapping, Figure 3, shows an eastern section of the Study Area is classified as Class 2 and having a moderate to low risk of A.S.S. occurring within 3 m of natural soil surface but a high to moderate risk at depths of greater than 3 m (DWER, 2020).

The balance of the Study Area is classified as Class 3 and as having no known risk of A.S.S. within 3 m of natural soil surface.

2.6 Groundwater

Groundwater occurs throughout the Pilbara region but is most accessible near alluvial channels and in coastal alluvial aquifer (Essential Environmental, 2016).

Groundwater underlying the Study Area and wider Karratha townsite occurs within a single aquifer known as the Pilbara Fractured Rock Aquifer (DoW, 2013b). Water in fractured rock aquifers is less accessible and difficult to predict in terms of quantity and quality and is mainly abstracted for mine water use and mine dewatering purposes (Essential Environmental, 2016).

There are no DWER monitoring bores in or within a 20 km radius of the Karratha townsite.

The groundwater table underlying the Study Area is likely to be about 5 m below natural surface and may vary spatially due to fissures in the fractured rock and seasonally in depth in response to significant cyclonic events.

Aerial imagery suggests pools of water remain close to year-round in Seven Mile Creek downstream of Lot 500 and may represent a shallow alluvial aquifer, Figure 1. Based on 2010 LiDAR topography contours, this may represent an approximate groundwater level of 4.5 to 5 mAHD, about 3 to 5 m below existing natural surface across the Study Area. Locally, Seven Mile Creek will act as a control of groundwater levels within the Study Area.

2.7 Surface Water

2.7.1 Existing Surface Drainage

There are currently no surface channels through the Study Area. A defined surface water channel existed in the south of the Study Area, as shown in mapped waterlines on Figure 4 *left*, but was filled-in during recent earthworks across the southern third of the Study Area (Section 2.2).

The former channel conveyed surface water flows from areas west of the main Study Area. This may have included areas from what is now DevelopmentWA's Gap Ridge Industrial Estate, however, the internal Estate swale system now appears to convey all stormwater generated from the Estate south-east to a detention basin at the Dampier Highway bridge for Seven Mile Creek prior to discharging to the creek, Figure 4 *left*. The contributing catchment to the former channel now likely comprises of areas between the southbound Dampier Highway carriageway and the western Study Area boundary. Majority of stormwater runoff from the southward carriageway will be conveyed directly to Seven Mile Creek via the existing roadside swale but some runoff will discharge via existing drainage lines towards the former channel. There are no identified Main Roads WA culverts nor structures which suggest there is flow west to east across Dampier Highway.

Due to the soil clay content, there is typically minimal infiltration of rainfall with runoff occurring as sheet flow. Stormwater runoff will generally shed eastward and discharge to the waterway just east of the Study Area which thereafter discharges to Seven Mile Creek, Figure 4 *left*.

2.7.2 Seven Mile Creek

Seven Mile Creek is generally located about 250 m east of the Study Area and flows south-west to north-east to the downstream inter-tidal zone prior to discharging to the ocean.

A flood study of Seven Mile Creek was conducted by GHD in 2009 for the then LandCorp (now DevelopmentWA) Karratha Support Industry Estate. The flood study focused on the proposed industrial estate to ensure that it was not adversely impacted by flooding from the Creek. A 1D-2D flood model was constructed by GHD but generally restricted to upstream of the Dampier Road Bridge. Modelled 100 year ARI flood levels in GHD (2009) for these areas were generally similar to JDA et al. (2012) present-day (2010) 100 year ARI flood levels, shown on Figure 4 *right*.

Based on JDA et al. (2012) flood mapping, the Study Area is located within the 100 year ARI floodplain of Seven Mile Creek and the impact of development to Seven Mile Creek should be modelled to inform any future SDWMR.

2.7.3 JDA et al. (2012) Flood Mapping

Flood mapping from the *Karratha Coastal Vulnerability Study* (JDA et al., 2012) for the present-day (2010) 100 year ARI (1% AEP) event is shown on Figure 4 *right*. Flood levels along the eastern Study Area boundary range from about 8.8 mAHD (south) and 8.25 mAHD (north).

Flood mapping on Figure 4 *right* suggests that stormwater runoff from areas east of Dampier Highway will overtop the highway and flow east to west via the former southern waterway through the Study Area, or around the Study Area (north then east) to Seven Mile Creek. Flooding in the Study Area is shown predominantly around the outer boundary but given the dynamic landform of the Study Area since JDA et al. (2012) this is unlikely to represent present-day flood extent.

JDA et al. (2012) modelling used 2010 LiDAR, Section 2.2 and Figure 2, and was captured prior to the current upgrades to Dampier Highway and associated with the Gap Ridge Industrial Estate. The flood extent shown between the main Study Area lots and Dampier Highway is unlikely to occur under current conditions as the majority of this stormwater will have been conveyed south-east to the Estate detention basin with no overtopping of Dampier Highway.

The 2D flood modelling in JDA et al. (2012) should be reviewed and revised within the vicinity of the Study Area given the significant changes to topography upstream (west) of Dampier Highway. This should be informed by current LiDAR. It is possible this modelling will already form part of the suite of technical feasibility studies requested by the City of Karratha for Development Investigation Area 9, which incorporates the Study Area.

2.8 CONTAMINATED SITES

A search of DWER's publicly available Contaminated Site Database (DWER, 2026a) indicated no contaminated sites within or immediately around the Study Area. This database only identifies 3 of the 7 contaminated sites classifications: *Contaminated – restricted use; Contaminated – remediation required*; *and Remediated for restricted use*. The remaining classifications are *Report not substantiated*; *Possibly contaminated – investigation required*, *Not contaminated – unrestricted use;* and *Decontaminated*.

Avant Hydro understands Lot 500 has been classified under Section 15 of the *Contaminated Sites Act 2003* as *"Possibly contaminated – investigation required"* as the site has a history of various land uses that have the potential to cause contamination and no site investigations or risk assessments have been undertaken to assess the suitability of Lot 500 as a whole for any land use.

Lot 175 Dampier Road, Gap Ridge, which comprises of rail yards and associated facilities is located 500 m west of the Study Area and is classified as *Contaminated – Remediation required* due to petroleum hydrocarbon contamination of soils and various hydrocarbon contamination including PFAS in groundwater in multiple areas of the site (DWER, 2026b).

2.9 ABORIGINAL HERITAGE

There are no registered aboriginal places within or immediately around the Study Area. Nearest registered place is *Thirteen Mile Well* (ID: 9601) and is located 600 km south-east of the Study Area within Seven Mile Creek. The Aboriginal Cultural Heritage Enquiry System (DPLH, 2026) denotes this area as "*artefacts / scatter"*.

3. PROPOSED DEVELOPMENT

The Study Area, Lots 1 & 500 Dampier Road, is located within the City of Karratha and is bound by Crown land with a shared access road connecting the main pre-development lots to Dampier Highway, 400 m to the west.

The proposed land use is smaller-lot industrial development and will have an internal road/swale system, similar to the existing Gap Ridge Industrial Estate. Avant Hydro understands Lot 1 will not be subdivided and instead be leased as allotments with an internal access road whilst the final form of Lot 500 has not been decided. A development layout for the Study Area including internal access roads is to be detailed in any future Subdivision or Development Water Management Report(s).

Key elements of the Structure Plan relating to urban water management include:

- Drainage swales within road reserves across the development;
- Integration of the existing overland flow path passing through the Study Area into the development structure;
- Use of local native species and drop structures within drainage swales to manage stormwater quality and reduce peak flow velocities; and
- Conveyance of minor and major rainfall events within swales to the downstream outlets of the Study Area at the eastern boundary and thereafter ultimately into Seven Mile Creek.

4. WATER SUPPLY AND CONSERVATION STRATEGY

The supply and sustainable use of water within the proposed development are key components of the management strategy.

4.1 WATER BALANCE

A water balance is generally required at the LWMR stage to support the identification and management of excess water generated by the development. Whilst development generally leads to an increase in surface water discharge and peak flow to the receiving environment, the limited infiltration and high runoff rates in the Study Area are similar for both the pre- and post-development condition. Consequently, change in land use will result in relatively negligible changes to the overall water balance of the Study Area.

4.2 WATER SUPPLY

It is envisioned that the development will connect to existing services associated with Gap Ridge Industrial Estate with further details to be provided in the Engineering Servicing Report supporting the Local Structure Plan.

4.3 WATER EFFICIENCY MEASURES

The State Planning Policy 2.9 regarding water resources (WAPC, 2025a) was developed to ensure that urban development is located adequately, serviced with appropriate wastewater, stormwater and groundwater management infrastructure and contributes towards the management of water quality and quantity, ecological health and the social and cultural values of water resources. This section addresses water conservation measures and fit for purpose non-potable supply.

Water conservation strategies to be considered for adoption include:

- Promotion of use of waterwise practices including water efficient fixtures and fittings (WELD rated taps, toilets, appliances) and water-wise landscaping including native plant species; and
- Use of native vegetation requiring no irrigation in proposed drainage swales.

Specific measures to achieve water conservation will be further detailed in any SWMP(s).

5. STORMWATER MANAGEMENT

Stormwater management is required across the Study Area to maintain existing flow paths whilst protecting people and infrastructure from stormwater inundation. As there is currently no indicative internal layout for the Study Area, this LWMR details strategies for stormwater management which are to be considered and detailed in any future SDWMR(s).

The stormwater management system for the Study Area should comprise of kerbed roads, culverts under road crossings, sedimentation basins and open drainage swales to convey stormwater runoff from the Study Area, generally west to east, in accordance with drainage principles as detailed in *Australian Rainfall and Runoff* (Ball et al., 2019) and City of Karratha drainage guidance.

The stormwater drainage system should be designed using a major/minor approach. The minor drainage system is defined as the system of kerbs, gutters swales etc. designed to carry runoff generated by low frequency ARI storms, typically less than 10% AEP for commercial and industrial areas. The major drainage system, up to 1% AEP, is defined as the arrangement of roads and drainage swales basins planned to provide safe passage of stormwater runoff from extreme events which exceeds the capacity of the minor system.

Proposed industrial lots should be graded to the road reserve with stormwater conveyed overland as sheet flow into roadside drainage swales. Road carriageways should be crowned with stormwater runoff contained within the depth of the kerb for rainfall events up to the 20% AEP (minor event). For greater rainfall events, stormwater runoff may exceed the depth of the kerb and flow over part of the road reserve prior to discharge into the drainage swale.

Outflow locations into drainage swales and culvert outlets should be protected by rock armouring or other appropriate engineered structures, e.g. drop structures, to minimise scouring and erosion of the swale base.

Stormwater modelling for the Study Area should be conducted in any future SDWMR(s) in accordance with the methodologies in *Australian Rainfall and Runoff* (Ball et al., 2019) and City of Karratha guidance. Design rainfalls for the Study Area should be sourced from the Bureau of Meteorology and adjusted to 2030 (*current climate*) using climate change factors from the *Australian Rainfall and Runoff* Data Hub as recommended in Book 1, Chapter 4 of Ball et al. (2019). Model tailwaters for Seven Mile Creek should be based on 100 year ARI *present-day* (2010) flood levels as shown on Figure 4 *right*.

Boundary drains are recommended around the western perimeter of the Study Area to convey upstream catchment stormwater flows west to east around the Study Area. These drains should be sized for the major event (1% AEP) and should be considered in any future SDWMR(s) in conjunction with the detailed civil drainage design and based on revised modelled external inflows as recommended in Section 2.7.3.

Minimum building floor levels should have a 300 mm clearance from the 1% peak flood level within the roadside swales and 500 mm clearance from the 1% AEP flood level for Seven Mile Creek as recommended in DWER (2017).

6. GROUNDWATER MANAGEMENT

A groundwater management strategy is typically required to ensure there is sufficient separation between development building floor levels and any regional/perched groundwater tables to prevent waterlogging and/or flooding from rising groundwater levels.

The regional water table beneath the Study Area is likely about 3 to 4.5 m below existing natural surface and therefore no groundwater management is required, as occurs across much of the Gap Ridge / Karratha localities.

Infiltration is likely to be minimal within the Study Area as stormwater runoff is conveyed via internal road swales, without significant detention, to the downstream outlets at the east of the Study Area and thereafter into Seven Mile Creek.

7. WATER QUALITY MANAGEMENT

7.1 STRUCTURAL AND NON-STRUCTURAL CONTROLS

Water quality management will be achieved through the use of drainage swales across the Study Area, as occurs across the Gap Ridge / Karratha localities.

The following structural controls are proposed:

- Vegetated swales within road reserves (if requested by the City of Karratha); and
- Use of drop structures, where appropriate, and road crossovers to reduce the longitudinal grade and peak channel velocities.

The following non-structural controls are proposed:

- Planning practices – wide road reserves to accommodate dedicated drainage swales;
- Construction practices – construction management; use of appropriate native plantings for drainage swale vegetation; and
- Maintenance practices – maintenance of swale systems to ensure efficient operation.

Maximum flow velocities can be used to identify areas where stabilization will be required. Higher flow velocities will likely occur through culvert structures and these areas are where bank and channel stabilisation works, such as concrete wing walls and rock/concrete bedding, could be incorporated to minimise erosion and scour.

Other water quality parameters such as oils, grease and hydrocarbons from transport enterprises, are considered to be treated by structural controls but should be confirmed by the City of Karratha for the proposed industrial land use.

7.2 ASSESSMENT OF PROPOSED STRUCTURAL BMP'S TO DESIGN CRITERIA

Table 2 details a summary from DWER's *Stormwater Management Manual for Western Australia* (2022) of expected pollutant removal efficiencies for vegetated swales and detention/retention systems in relation to the water quality design criteria in Table 1. Expected nutrient input reductions via non-structural control measures calculated in Section 7.1 are also detailed in Table 2.

While DWER (2022) does not provide expected pollutant removal efficiencies for all BMP's, application of a treatment train approach using a combination of non-structural and structural measures detailed in Section 7.1 will achieve design objectives for water quality.

Specific details on the location, scale of application, and responsibilities for individual BMP's are to be assessed for individual development areas within the Study Area during preparation of any Subdivision Water Management Plan(s).

Table 2: BMP Water Quality Performance in relation to Design Criteria

Parameter	Design Criteria (required removal as compared to a development with no WSUD)	Non Structural Controls (refer Section 7.1) Nutrient Input Reduction	Structural Controls Nutrient Output Reduction [1]	
			Vegetated Swales	Detention/ Retention Measures
Total Suspended Solids	80%	-	60-80%	65-99%
Total Phosphorus	60%	45%	30-60%	40-80%
Total Nitrogen	45%	28%	25-40%	50-70%
Gross Pollutants	70%	-	-	>90%

1. Typical Performance Efficiencies via DWER (2022)

8. IMPLEMENTATION

Implementation of the Local Water Management Report involves defining the roles and responsibilities of the developer and local authority, outlining future documentation required to support the development and defining operation, monitoring and maintenance of the stormwater system.

8.1 ROLES AND RESPONSIBILITIES

Table 3 details the roles and responsibilities to undertake the implementation plan.

The operation and maintenance of the stormwater management system will initially be the responsibility of the developer, and then revert to the Local Authority in the case of a subdivision. Where there is no subdivision proposed (ie. Lot 1) , the maintenance responsibilities will be held by the lessor or the appointed development manager.

Preparation of a Subdivision or Development Water Management Report will be the responsibility of the developer of each lot.

Table 3: Implementation Responsibilities

Implementation		Responsibility	
LWMR Section	Action	Developer	City of Karratha
8.2	Preparation of Subdivision or Development Water Management Reports to support development.	✓	-
8.4	Construction of stormwater system	✓	-
8.5	Long-term stormwater system operation and maintenance	✓ (Development)	✓ (Subdivision)

8.2 DEVELOPMENT PROCESS

A Subdivision or Development Water Management Report [SDWMR] forms part of the planning process outlined in *State Planning Policy 2.9 – Water* (WAPC, 2025a&b). Any future SDWMR(s) will need to address:

- Detailed stormwater management including the size, location and design of internal swales integrating major and minor flood management capability and suitable plant selection for swales as related to stormwater function.
- Detailed modelling and management of external stormwater inflows from east of the Study Area and impact to Seven Mile Creek.
- Local geotechnical investigations to support design of the stormwater management system.
- Detailed feature surveys to ascertain the “pre-development” topography of the Study Area.
- Detail measures to reduce velocity of stormwater discharge to prevent erosion and sediment transportation.
- Agreed/proposed measure to achieve water conservation and efficiencies of use including sources of water for non-potable uses.
- Management of development works including soil, dust and sediment management.

8.3 Construction Management

8.3.1 Dewatering

Dewatering is unlikely to be required for development construction.

Should groundwater be encountered, any potential dewatering is likely to fall under the dewatering licencing exception where a licence is not required for dewatering if the pump rate does not exceed 10 L/s over a period of less than 30 days and the volume of water taken over the period does not exceed 25,000 kL.

8.3.2 Acid Sulphate Soils

Figure 3 shows no known risk of Acid Sulphate Soils (A.S.S.) within 3 m of natural surface across most of the Study Area. The east of the Study Area which is proximal to Seven Mile Creek is mapped with a moderate to low risk of A.S.S. within 3 m of natural surface but a high to moderate risk of A.S.S. beyond 3 m.

Therefore, there is no foreseeable management required for A.S.S. However, if A.S.S. is encountered, a Dewatering and Management Plan will be required to demonstrate the measures that will be taken to minimise the risk from disturbance of A.S.S. If A.S.S. is encountered, it will be investigated and managed in accordance with the applicable DWER Acid Sulphate Guidelines for Identification and Investigation (DER, 2015a) and Treatment and Management (DER, 2015b) of Disturbed Acid Sulphate Soils. Specific methods for treatment and holding times of A.S.S. are specified in these guidelines.

8.4 Stormwater System Operation and Maintenance

The stormwater drainage system will require maintenance to ensure correct operation. It is considered the following operating and maintenance practices will be required periodically:

- Inspection and removal of debris, litter and sediments surrounding pipe/culvert inlets/outlets and at base of drainage swales to prevent blockages.
- Street sweeping to reduce particulate build-up on road surfaces, particularly during the initial construction phase of the development.

The operating and maintenance schedule required is presented in Table 4.

Table 4: Maintenance Schedule for Drainage Infrastructure

Item	Maintenance Interval		
	Quarterly	Bi-annually	As required
Drainage Swales, incl. pipe/culvert inlets/outlets			
Removal of debris to prevent blockages	✓		
Inspect for erosion and sediment accumulation		✓	
Assess health of vegetation. Remove dead plants and replace where necessary.	✓		
Removal of sediment and leaf litter build-up.			✓

8.5 Monitoring

The stormwater management system outlined in this LWMR focuses on current best management practice for the Gap Ridge / Karratha localities including minimisation of infiltration to groundwater and a maximisation of stormwater conveyance to the swale drainage system. As such, no post-development monitoring is proposed.

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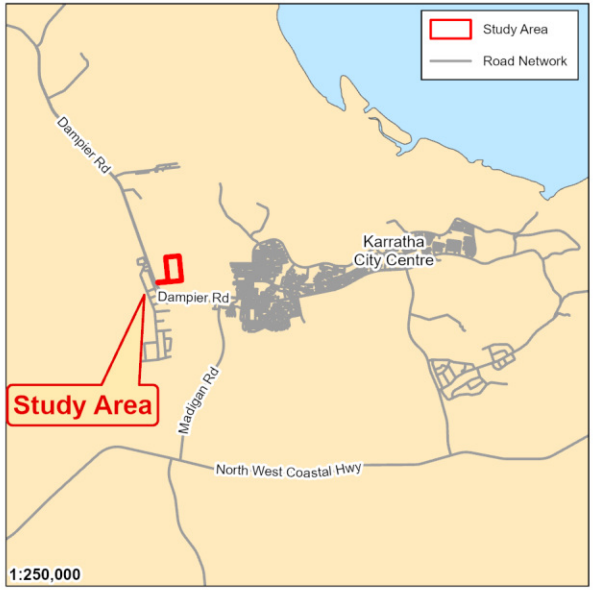
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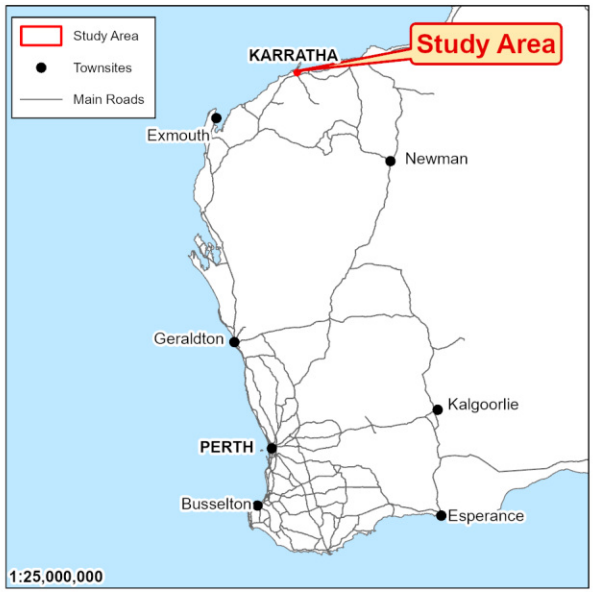
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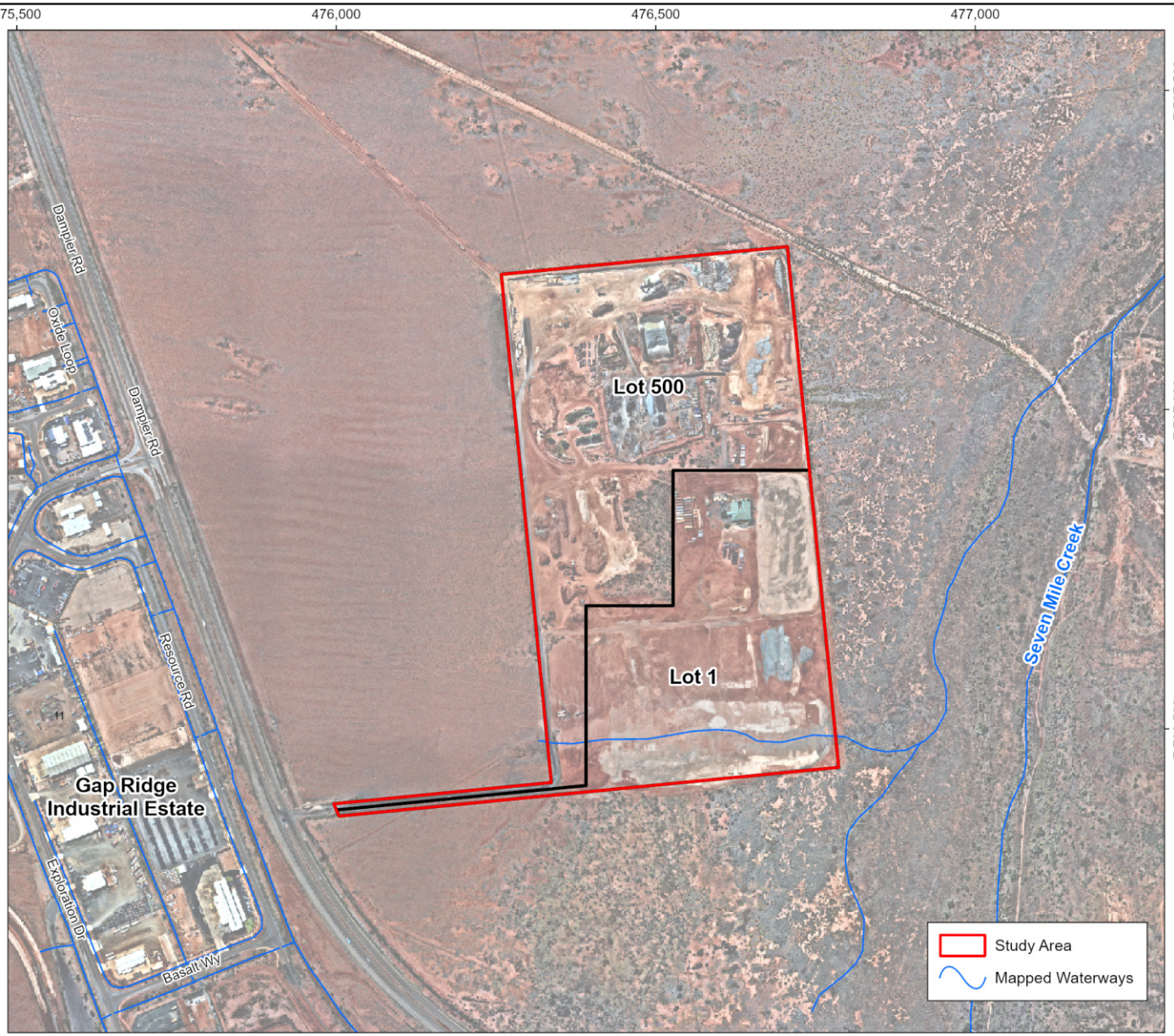
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FIGURES







Data Source: NearMaps (2026) *09 September 2025.*

GDA2020 MGA Zone 50

AVANT HYDRO CONSULTANTS

Project No: AVH1128

Scale: 1:10,000 @A4

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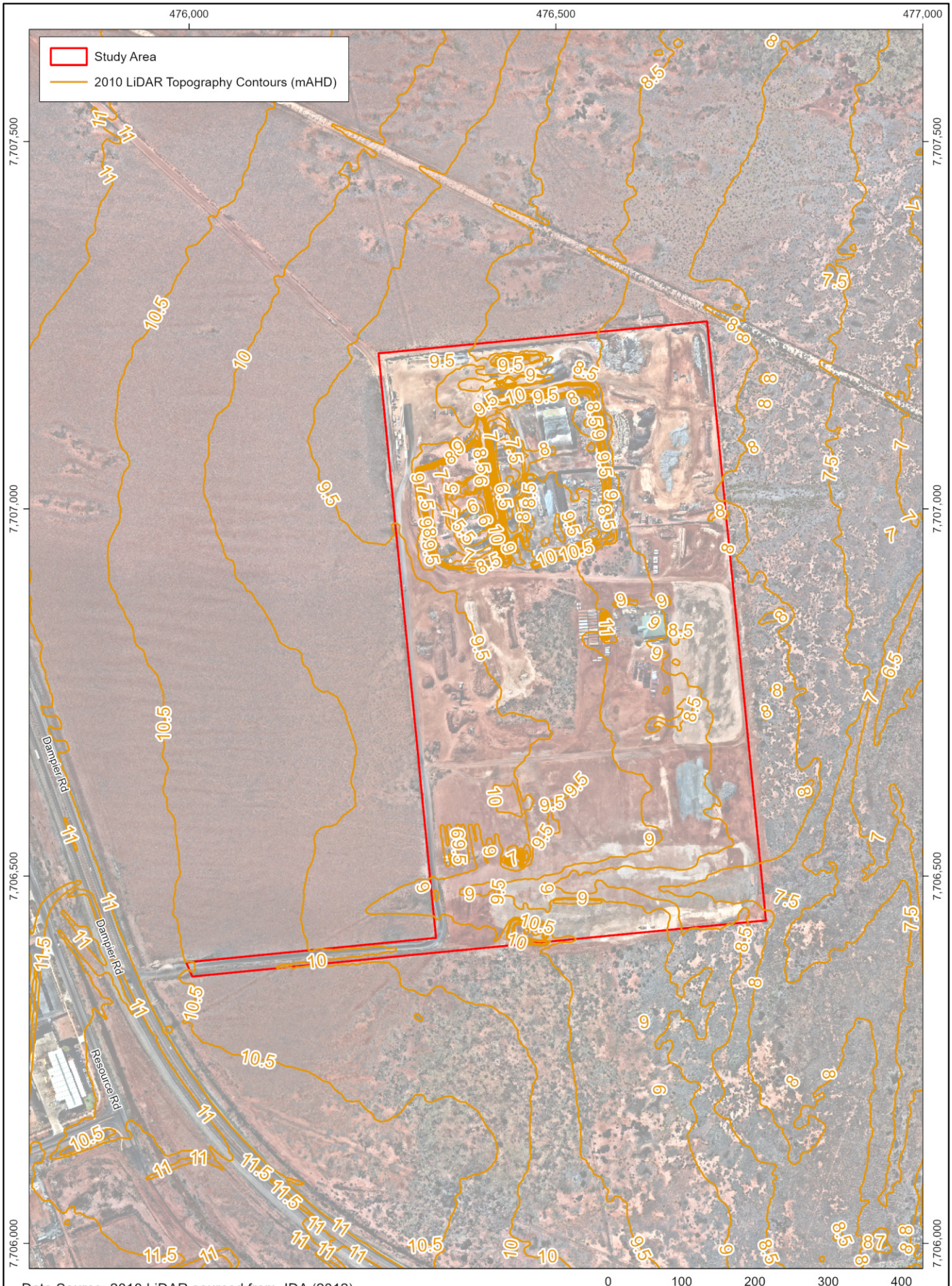
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Lots 1 & 500 Dampier Road, Gap Ridge: Local Water Management Report

Figure 1: Location Plan



Data Source: 2010 LiDAR sourced from JDA (2012).

AVANT HYDRO CONSULTANTS

Project No: AVH1128

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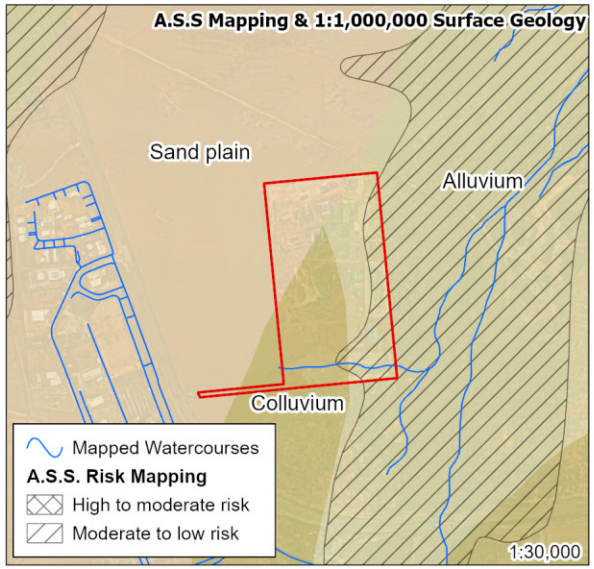
Coordinate System: GDA2020 MGA Zone 50

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Lots 1 & 500 Dampier Road, Gap Ridge:
Local Water Management Report

Figure 2: Topography



Qs Eolian Sand: red-yellow, wind-blown sand; local sand ridges.

Qao Alluvial Sand: with silt and clay on floodplains.

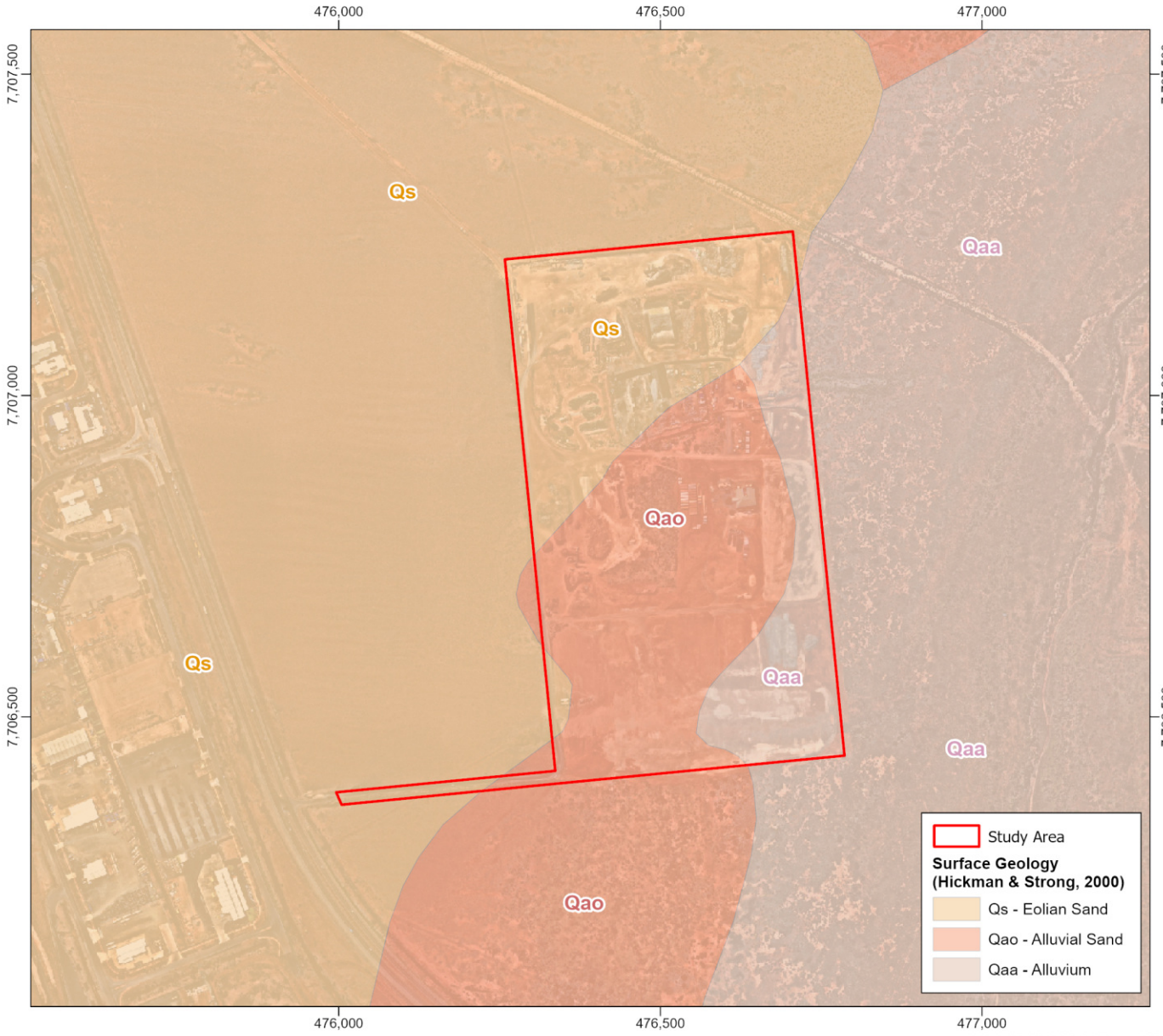
Qaa Alluvium: sand and gravel in rivers and creeks; clay, silt and sand in channels on floodplains.

1:1,000,000 Surface Geology:

Sand plain - Sand or gravel plains; quartz sand sheets commonly with ferruginous pisoliths or pebbles, minor clay; local calcrete, laterite, silcrete, silt, clay, alluvium, colluvium, aeolian sand.

Colluvium - Colluvium, sheetwash, talus; gravel piedmonts and aprons over and around bedrock; clay-silt-sand with sheet and nodular kankar; alluvial and aeolian sand-silt -gravel in depressions and broad valleys in Canning Basin; local calcrete, reworked laterite.

Alluvium - Channel and flood plain alluvium; gravel, sand, silt, clay, locally calcreted.



Data Source: Hickman and Strong (2000) *1:250 000 Geological Survey - Dampier-Barrow Island*; A.S.S Risk Mapping (DWER, 2024); NearMaps (2026).

GDA2020 MGA Zone 50

AVANT HYDRO CONSULTANTS

Project No: AVH1128

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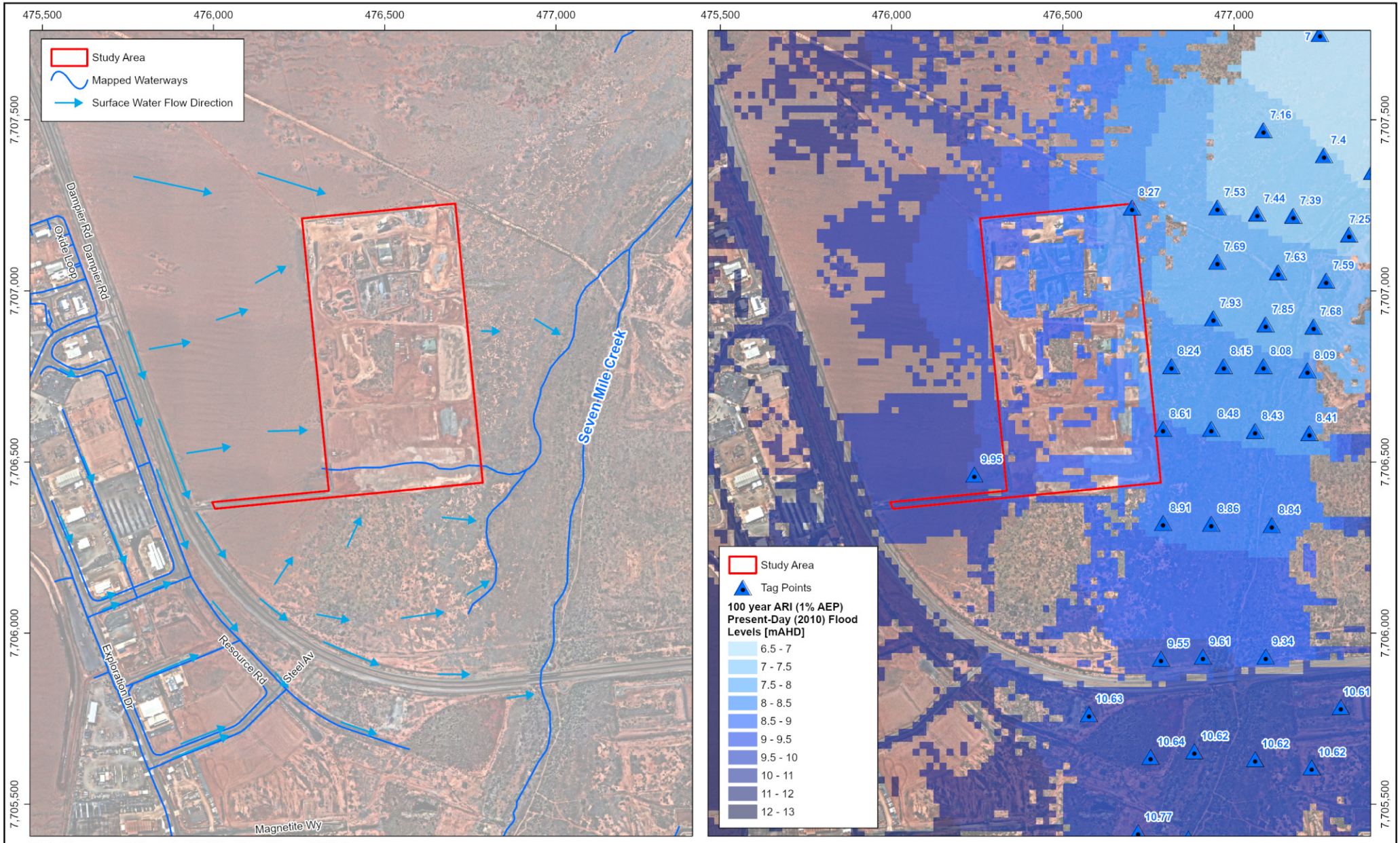
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Lots 1 & 500 Dampier Road, Gap Ridge: Local Water Management Report

Figure 3: Surface Geology and A.S.S. Mapping



Data Source: JDA et al. (2012); NearMaps (2026).

GDA2020 MGA Zone 50

AVANT HYDRO CONSULTANTS

Project No: AVH1128

Scale: 1:15,000 @A4

0 100 200 300 400 Metres

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Lots 1 & 500 Dampier Road, Gap Ridge: Local Water Management Report

Figure 4: Surface Water Hydrology

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Bushfire management plan/Statement addressing the Bushfire Protection Criteria coversheet

Site address: Lot 1 and 500 Dampier Road, Gap Ridge

Site visit: Yes ☑ No ☐

Date of site visit (if applicable): Day 13 Month February Year 2026

Report author or reviewer: Linden Wears

WA BPAD accreditation level (please circle):

Not accredited ☐ Level 1 BAL assessor ☐ Level 2 practitioner ☐ Level 3 practitioner ☑

If accredited please provide the following.

BPAD accreditation number: 19809 Accreditation expiry: Month June Year 2026

Bushfire management plan version number: Rev 0

Bushfire management plan date: Day 27 Month February Year 2026

Client/business name: RFF Pty Ltd

	Yes	No
Has the BAL been calculated by a method other than method 1 as outlined in AS3959 (tick no if AS3959 method 1 has been used to calculate the BAL)?		✔
Have any of the bushfire protection criteria elements been addressed through the use of a performance principle (tick no if only acceptable solutions have been used to address all of the bushfire protection criteria elements)?		✔

Is the proposal any of the following (see SPP 3.7 for definitions)?	Yes	No
Unavoidable development (in BAL-40 or BAL-FZ)		✔
Strategic planning proposal (including rezoning applications)	✔	
High risk land-use		✔
Vulnerable land-use		✔

None of the above ☐

Note: Only if one (or more) of the above answers in the tables is yes should the decision maker (e.g. local government or the WAPC) refer the proposal to DFES for comment.

Why has it been given one of the above listed classifications (E.g. Considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?

BMP to support Structure Plan application

The information provided within this bushfire management plan to the best of my knowledge is true and correct:

Signature of report author or reviewer 

Date 27 Feb 2026

Lot 1 and 500 Dampier Road, Gap Ridge

Bushfire Management Plan

Date: 27 February 2026

Prepared for: RFF Pty Ltd

Linfire Ref: 20260204401RFF-BMP-001_0

Linfire Consultancy

ABN: 577 930 47299

Revision	Issue Date	Revision Description	Approved By
0	27 Feb 2026	Issued for Approval	Linden Wears (Level 3 BPAD 19809)

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Fire is an unpredictable force of nature. Changing climatic factors (whether predictable or otherwise) either before or at the time of a fire can also significantly affect the nature of a fire and in a bushfire prone area it is not possible to completely guard against bushfire. The mitigation strategies contained in this Bushfire Management Plan (BMP) are considered to be prudent minimum standards only, based on the standards prescribed by relevant authorities. It is expressly stated that Linfire do not guarantee that if such standards are complied with or if a property owner exercises prudence, that a building or property will not be damaged or that lives will not be lost in a bush fire.

Further, the achievement of the level of implementation of fire precautions will depend on the actions of the landowner or occupiers of the land, over which Linfire has no control. If the proponent becomes concerned about changing factors then either a review of the existing BMP, or a new BMP, should be requested. Linfire accepts no liability or responsibility whatsoever for or in respect of any use or reliance upon this report and its supporting material by any third party.

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1.0 Proposal details

1.1 Background

RFF Pty Ltd, on behalf of the Proponent, are seeking to lodge a Structure Plan (SP) application for the proposed development across Lots 1 and 500 Dampier Road (on Plan 400638), Gap Ridge (the subject site) in the City of Karratha. The proposed Structure Plan is intended to facilitate future industrial development at the subject site. In accordance with the City of Karratha Local Planning Scheme (LPS) zones, the subject site is to be entirely zoned "industry" under the proposed structure plan

1.2 Site description

The subject site comprises approximately 38 ha, and includes:

- Lot 1 previously had several rural dwellings on it (although only one dwelling remains) and has been recently cleared of all vegetation other than some managed vegetation around the dwelling.
- Lot 500 contains an existing crushing business, with most of the site cleared of vegetation

The subject site is surrounded by the following (see Figure 1):

- North of Lot 500, and to the west of the subject site, is undeveloped Unallocated Crown Land containing unmanaged grassland vegetation.
- To the east and south of the subject site, is Lots 570 and 571 Dampier Road, which are undeveloped Unallocated Crown Land containing unmanaged vegetation.

Access to the subject site is currently from Dampier Road to the west, via 450 m long driveway mostly sited within the battle-axe leg providing access to the main part of the Lot 500 (noting each lot has its own cadastral battle-axe leg but current access is only in the Lot 500 leg).

The nearest reticulated water supply to the site is currently within industrial development further west of Dampier Road, however there doesn't appear to be existing town main supply or street hydrants along Dampier Road or the subject site.

The majority of the subject site is designated as bushfire prone on the *Map of Bush Fire Prone Areas* (DFES 2026; see Plate 1).

1.3 Purpose

Due to the bushfire prone designation of much of the subject site, this proposal is required to demonstrate compliance with *State Planning Policy 3.7: Bushfire* (SPP 3.7; WAPC 2024) and the *for Planning for Bushfire Guidelines* (the Guidelines; WAPC 2024).

This Bushfire Management Plan (BMP) has been prepared to address requirements under Policy Measure 7(ii) of SPP 3.7 and Sections 2.2 and 4.4 of PBG including:

- An assessment of the broader landscape;
- The identification of any environmental, biodiversity or conservation values on the subject site(s):
    - Where relevant, details on how the clearing of native vegetation specifically for bushfire mitigation to achieve the bushfire protection measures, can be avoided through the use of siting and design measures; and
    - Where the clearing of native vegetation cannot be avoided, details on how the

proposal will minimise the clearing are to be provided;

- A pre-development BHL assessment that demonstrates a BHL of predominantly moderate or low:
    - Where the pre-development BHL assessment results in areas with a predominantly extreme BHL, further detail should be provided on the level of native vegetation clearing that will be necessary to reduce the BHL to moderate or low;
- The identification of any bushfire hazard issues arising from the assessment; and
- Assessment against the bushfire protection criteria, demonstrating compliance via either the acceptable solutions, or through an outcomes-based approach.
    - As there is no lot detail for this SP, this proposal has been assessed against Bushfire Protection Criteria (BPC) 4 (Strategic Planning) of the Guidelines.

1.4 Other plans/reports

The only known bushfire assessment conducted for the site, was the BMP prepared by Linfire to accompany the LPS Amendment (Linfire ref: 20230922316RFF-BMP-001 Revision 0, dated 10 October 2024).

Other than the above there are no known bushfire reports or assessments that have been prepared previously for the subject site.



Plate 1: Map of Bush Fire Prone Areas (DFES 2026)



Legend

- Subject Land
- Assessment Area (100m)
- Assessment Buffer (150m)
- Cadastre

Scale 1:7,000

0 100 200 300 Metres

Linfire Consultancy

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Lot 1 & 500 Dampier Road, Gap Ridge

Figure 1: Site Layout

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2.0 Environmental considerations

2.1 Native vegetation - modification and clearing

The subject site has mostly been cleared of vegetation, with the expectation that the site will need to be fully cleared to accommodate the proposed industrial development as part of future planning applications. Linfire understand that environmental assessment and reporting is being addressed by the project environmental consultant.

Notwithstanding, Linfire assumes that all relevant environmental and aboriginal heritage studies will be undertaken to support the project, and if any State and Federal environmental referrals and approvals are required, they will be sought prior to commencing on-site vegetation modification or clearing required to construct future industrial development.

2.2 Revegetation / Landscaping

Pre-development mapping depicting the current vegetation classifications and extent, is provided in Section 3.1.3, with the anticipated post-development vegetation classifications following completion of the proposed development, identified in Section 3.1.4.

While the subject site currently has isolated plots of vegetation, all vegetation is expected to be cleared as part of future industrial development. Any required Asset Protection Zones (APZs) are to be either non-vegetated elements or landscaped in accordance with Schedule 1 of the Guidelines (refer to Appendix 2). All other future landscaping onsite, is to comply with the requirements of AS 3959 Clause 2.2.3.2 (e) and (f) (refer to Appendix 3), and align with the principles of Schedule 1 of the Guidelines.

3.0 Bushfire assessment results

3.1 Assessment inputs

3.1.1 Vegetation classification

Linfire assessed classified vegetation and exclusions within 150 m of the subject site through on-ground verification on 13 February 2026 in accordance with *AS 3959—2018 Construction of Buildings in Bushfire-Prone Areas* (AS 3959; SA 2018) and the *Visual Guide for Bushfire Risk Assessment in Western Australia* (DoP 2016). Georeferenced site photos and a description of the vegetation classifications and exclusions are contained in Appendix 1, depicted in Figure 2 (pre-development) and Figure 3 (post-development) and summarised on Table 1 and Table 2.

The assessed classified vegetation that is expected to remain following future industrial development works is as follows:

- Glass G Grassland
- Class C Shrubland
- Class D Scrub

A summary of the assessed exclusions are as follows:

- Clause 2.2.3.2 (a) plots of unmanaged vegetation further than 100 m from the subject site
- Clause 2.2.3.2 (e) areas of non-vegetated land such as land cleared for existing and proposed roads, infrastructure and buildings
- Clause 2.2.3.2 (f) land managed in a minimal fuel low threat condition, such as road verges, managed gardens and lawns.

Other exclusions that may be relevant for future development are as follows:

- Clause 2.2.3.2 (c) isolated plots of unmanaged vegetation, that will be less than 2500 m^2 and will be located so it is further than 20 m from any proposed lots or any other classified vegetation
- Clause 2.2.3.2 (d) isolated plots of unmanaged vegetation, that will be less than 20 m wide and will be located so it is further than 20 m from any proposed lots or any other classified vegetation

Exclusions under Clauses 2.2.3.2 (e) and (f) used for all non-vegetated elements and managed vegetation proposed as part of the development, with Clauses 2.2.3.2 (c) and (d) potentially used to exclude vegetation associated with small plots of unmanaged vegetation such as future drainage areas, if possible.

3.1.2 Effective slope

Linfire assessed effective slope under classified vegetation through on-ground verification on 13 February 2026 in accordance with AS 3959. Results were cross-referenced with Landgate 10m contour data and are depicted in Table 1, Table 2 and Figures 3 and 4.

Site observations are that there is a gentle slope from west to east across the landscape, toward a local waterway 300 m east of the subject site.

3.1.3 Pre-development inputs

A summary of the assessed pre-development classified vegetation, exclusions and effective slope

within the subject site, and the adjacent 150 m, are listed in Table 1 and illustrated in Figure 2.

Table 1: Pre-development vegetation classifications/exclusions and effective slope

Vegetation plot	Vegetation classification	Effective slope	Comments
1	Class G Grassland	Flat/upslope (0°)	Unmanaged grassland >100 mm in height outside the subject site
2	Class G Grassland	Downslope >0–5°	
3	Class G Grassland	Flat/upslope (0°)	Unmanaged grassland >100 mm in height within the subject site
4	Class C Shrubland	Downslope >0–5°	Vegetation less than 2m high outside the subject site, containing areas of grassland and smaller shrubs, with very occasional shrub.
5	Class C Shrubland	Downslope >0–5°	Vegetation less than 2m high within the subject site, containing areas of grassland and smaller shrubs, with very occasional shrub.
6	Class D Scrub	Downslope >0–5°	Plots of vegetation 2 m to 6 m high (more typically 4m high) outside the subject site. This classification still includes a significant amount of grass and shrubland vegetation, however the more concentrated presence of taller vegetation has required a more conservative classification.
7	Class D Scrub	Downslope >0–5°	Plots of vegetation 2 m to 6 m high (more typically 4m high) within the subject site. This classification still includes a significant amount of grass and shrubland vegetation, however the more concentrated presence of taller vegetation has required a more conservative classification.
8	Excluded – Clause 2.2.3.2 [a]	N/A	Plots of unmanaged vegetation further than 100 m from the subject site.
9	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Existing non-vegetated elements and low threat vegetation outside subject site, largely consisting of roads, paths, buildings, cultivated gardens and maintained lawns.
10	Excluded – Non-vegetated (Clause 2.2.3.2 [e])	N/A	Existing non-vegetated elements and low threat vegetation within the subject site, largely consisting of roads, buildings, cleared land and managed vegetation near dwelling.

3.1.4 Post-development inputs

A summary of the potential post-development classified vegetation, exclusions and effective slope within the subject site, and the adjacent 150 m, are listed in Table 2 and illustrated in Figure 3.

The post-development vegetation classifications for all land external to the subject site has remained

the same as for the pre-development classifications. If external vegetation is altered prior to future planning stages, the change in vegetation condition is to be captured through a future BHL assessment or BAL contour map assessment.

Within the subject site, the BMP assumes that there will be no onsite vegetation retention following construction of future industrial development, internal roads and infrastructure. Should any vegetation retention or revegetation be proposed as part of future development, or should proposed drainage swales or basins be unable to be excluded from classification, it is expected that sufficient separation will need to be provided as part of future planning so that any BAL impact on habitable buildings is limited to BAL-29 or lower and captured through a future BHL assessment or BAL contour map assessment.

Table 2: Post-development vegetation classifications/exclusions and effective slope

Vegetation plot	Vegetation classification	Effective slope	Comments
1	Class G Grassland	Flat/upslope (0°)	Unmanaged grassland >100 mm in height outside the subject site
2	Class G Grassland	Downslope >0–5°	
4	Class C Shrubland	Downslope >0–5°	Vegetation less than 2m high outside the subject site, containing areas of grassland and smaller shrubs, with very occasional shrub.
6	Class D Scrub	Downslope >0–5°	Plots of vegetation 2 m to 6 m high (more typically 4m high) outside the subject site. This classification still includes a significant amount of grass and shrubland vegetation, however the more concentrated presence of taller vegetation has required a more conservative classification.
8	Excluded – Clause 2.2.3.2 [a]	N/A	Plots of unmanaged vegetation further than 100 m from the subject site.
9	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Existing non-vegetated elements and low threat vegetation outside subject site, largely consisting of roads, paths, buildings, cultivated gardens and maintained lawns.
10	Excluded – Non-vegetated (Clause 2.2.3.2 [e])	N/A	Existing non-vegetated elements and low threat vegetation within the subject site, largely consisting of roads, buildings, cleared land and managed vegetation near dwelling.
11	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Existing classified vegetation within the subject site (Plots 3, 5 and 7 from Table 1), to be modified to non-vegetated elements and low threat vegetation as part of this development.



Legend

- Contours
- Subject Land
- Assessment Area (100m)
- Assessment Buffer (150m)
- Cadastre
- Vegetation Plot

Classified Vegetation

- C. Shrubland
- D. Scrub
- G. Grassland
- Excluded Clause 2.2.3.2(a)
- Excluded Clause 2.2.3.2(e&f)

Scale 1:5,000

0 70 140 210 Metres

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Lot 1 & 500 Dampier Road, Gap Ridge

Figure 2: Pre-development vegetation classification and effective slope

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Legend

- Photo Location
- Contours
- Subject Land
- Assessment Area (100m)
- Assessment Buffer (150m)
- Cadastre
- Vegetation Plot

Classified Vegetation

- C. Shrubland
- D. Scrub
- G. Grassland
- Excluded Clause 2.2.3.2(a)
- Excluded Clause 2.2.3.2(e&f)

Scale 1:4,000

0 60 120 180 Metres

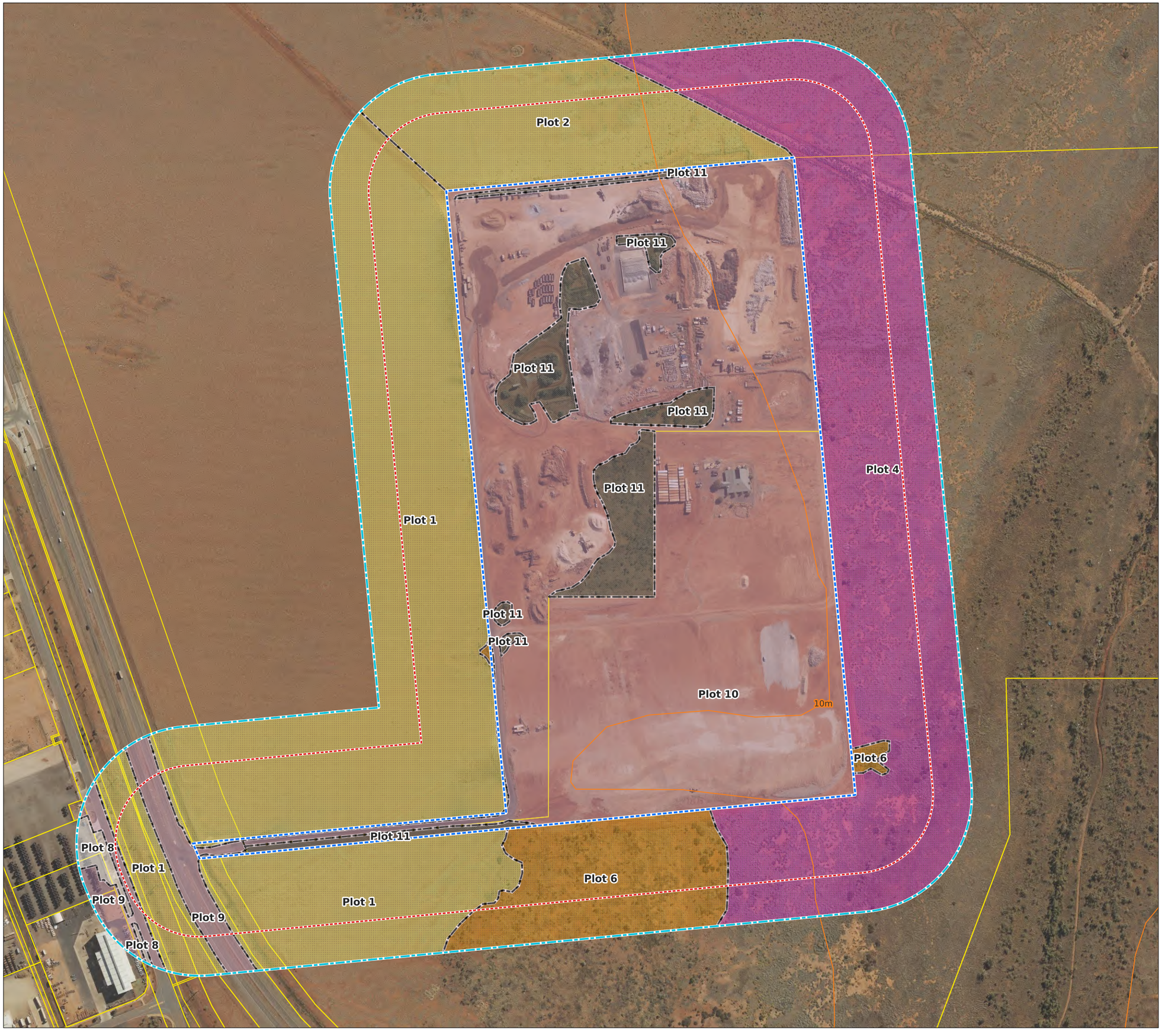
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Figure 2: Pre-development vegetation classification and effective slope (zoomed)

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Legend

- Contours
- Subject Land
- Assessment Area (100m)
- Assessment Buffer (150m)
- Cadastre
- Vegetation Plot

Classified Vegetation

- C. Shrubland
- D. Scrub
- G. Grassland
- Excluded Clause 2.2.3.2(a)
- Excluded Clause 2.2.3.2(e&f)
- Modified to non vegetated and low threat

Scale 1:5,000

0 70 140 210 Metres

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Figure 3: Post-development vegetation and effective slope

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3.2 Assessment outputs

In accordance with SPP 3.7 Policy Measure 7(ii), a bushfire hazard level (BHL) assessment can be used for strategic proposals, or where lot layout is known, a Bushfire Attack Level (BAL) contour assessment to determine the indicative acceptable BAL ratings across the site. In this instance, given the lot layout is not currently known, a BHL assessment has been provided to demonstrate that compliance can be achieved at future planning stages.

3.2.1 Bushfire Hazard Level (BHL) assessment

Pre- and post-development vegetation extents have been assigned a bushfire hazard level in accordance with the methodology detailed in Appendix A.2 of the Guidelines as outlined in Table 3.

Table 3: Bushfire hazard levels and characteristics

Bushfire hazard level	Characteristics*
Extreme	• Class A Forest • Class B Woodland (05) • Class D Scrub • Any classified vegetation with a greater than 10° slope.
Moderate	• Class B Low woodland (07) • Class C Shrubland • Class E Mallee/Mulga • Class G Grassland, including sown pasture and crops • Class G Grassland: Open woodland (06), Low open woodland (08), Open shrubland (09) • Vegetation that has a low hazard level but is within 100 metres of vegetation classified as a moderate or extreme hazard, is to adopt a moderate hazard level.
Low	• Low threat vegetation may include areas of maintained lawns, golf courses, public recreation reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks • Managed grassland in a minimal fuel condition (insufficient fuel is available to significantly increase the severity of the bushfire attack). For example, short-cropped grass to a nominal height of 100 millimetre • Non-vegetated areas including waterways, roads, footpaths, buildings and rock outcrops.

*Vegetation classifications from AS 3959-2018 Table 2.3.

3.2.1.1 Pre-development BHL assessment

Linfire has mapped the pre-development bushfire hazard levels within the subject site and adjacent 150 m wide assessment area. The bushfire hazard levels have been assessed on the basis of the vegetation discussed in Section 3.1.3 (i.e. the current pre-development extent of vegetation within, and surrounding, the subject site).

The pre-development BHL assessment (refer to Figure 4) show that based on the existing vegetation, the subject site contains land with Low, Moderate and Extreme bushfire hazard levels.

3.2.1.2 Post-development BHL assessment

Linfire has mapped the potential post-development bushfire hazard levels to demonstrate that the future bushfire hazard levels will be acceptable for future industrial development to occur within the subject site. The bushfire hazard levels have been assigned on the basis of the vegetation discussed in Section 3.1.4 and the future expected vegetation extent within and surrounding the subject site.

The post-development BHL assessment (refer to Figure 5) demonstrate that all future habitable development will be located on land with be Moderate and Low bushfire hazard level.



Legend

- Subject Land
- Assessment Area (100m)
- Assessment Buffer (150m)
- Cadastre
- Vegetation Plot

Bushfire Hazard Level

- Extreme
- Moderate
- Low

Scale 1:5,000

0 70 140 210 Metres

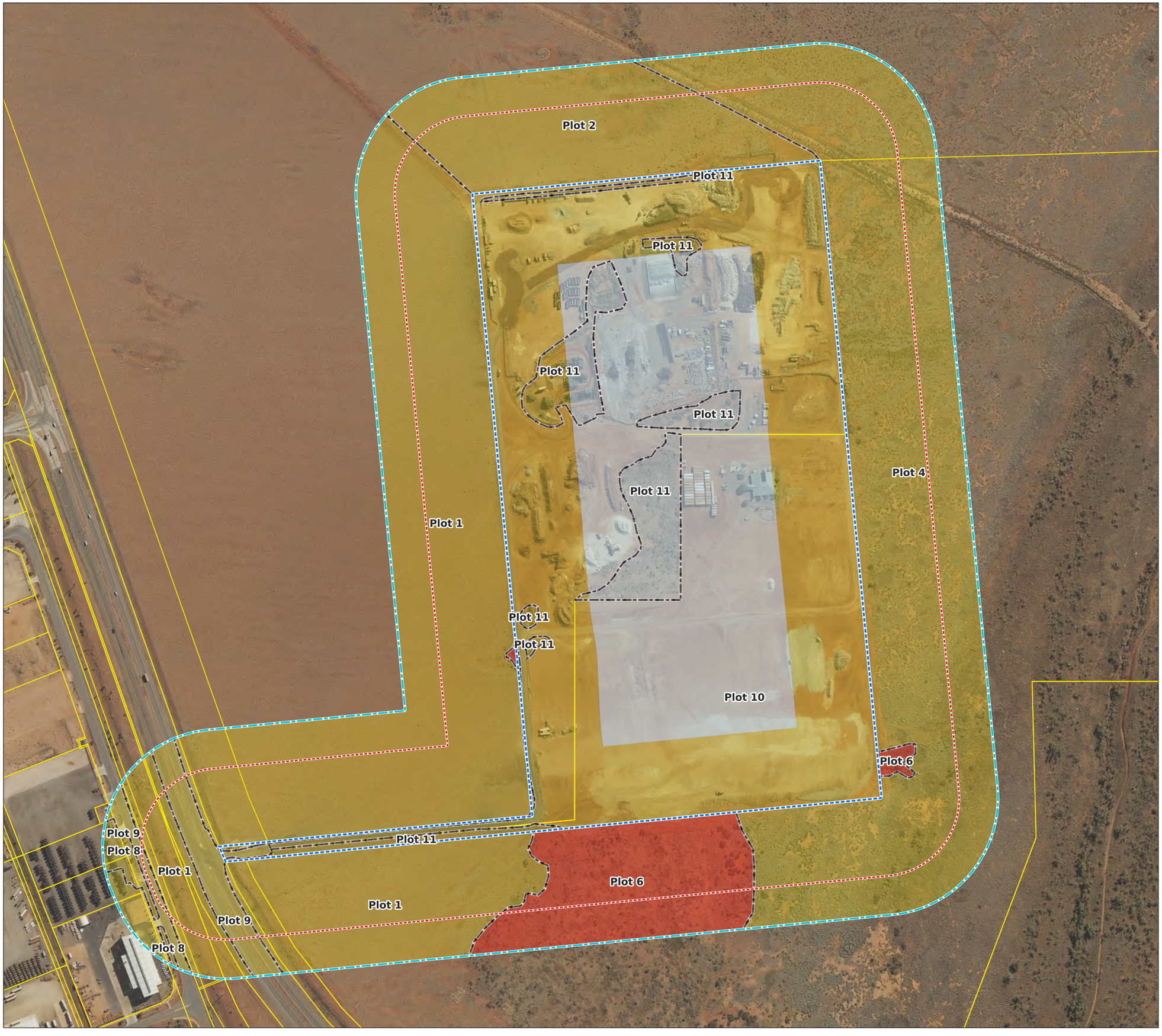
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Figure 4: Pre-development Bushfire Hazard Level (BHL) Assessment

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Legend

- Subject Land
- Assessment Area (100m)
- Assessment Buffer (150m)
- Cadastre
- Vegetation Plot

Bushfire Hazard Level

- Extreme
- Moderate
- Low

Scale 1:5,000

0 70 140 210 Metres

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Figure 5: Post-development Bushfire Hazard Level (BHL) Assessment

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4.0 Identification of bushfire hazard issues

4.1 Bushfire context

Upon completion of future industrial development, the predominant bushfire risk to the subject site is from the broad extent of unmanaged grassland shrubland and scrub vegetation to east, north and south of the subject site, with continuous fires runs kilometres long possible in these directions. Bushfires from the west are shorter due to existing development west of Dampier Road reducing fire runs to 500 m long, and depending on the existing land use to the north, if the existing cleared land here were to remain, it would provide some reduction in bushfire impact on future development within the subject site. Notwithstanding, bushfires do have the potential to impact the site with elevated radiant heat and ember attack if the risk is not managed.

4.2 Bushfire hazard issues

Examination of strategic development design in accordance with the concept plan and pre and post-development bushfire hazards has identified the following bushfire hazard issues to be considered at future planning stages:

1. Based on the existing extent of vegetation outside the subject site, parts of the proposed development would subject to an initial BAL of BAL-FZ, if unmanaged. In order for the development to achieve a compliant rating of BAL-29 or less, sufficient separation need to be provided between future habitable buildings and classifiable, unmanaged vegetation. Similarly, sufficient separation will also be required from any classifiable onsite vegetation, if any, to achieve BAL-29 or less.
2. Provision of a coherent internal vehicular access network to ensure occupants are able to egress away from bushfire, and fire brigade has appropriate and flexible access to habitable development and direct interfaces with unmanaged vegetation.
3. Provision of a secure water supply for bushfire fighting activities.
4. Ensure the bushfire risk to any future vulnerable land uses is appropriately considered and mitigated.

4.3 Bushfire safety strategy

The following bushfire safety strategy is proposed to demonstrate compliance with the Bushfire Protection Criteria of the Guidelines at future planning stages, in order to address the bushfire hazards identified above:

1. Create sufficient separation between future habitable buildings and post-development classified vegetation outside the subject site, to achieve BAL-29 or lower in accordance with AS 3959. All land within the subject site is expected to be either non-vegetated or low threat landscaping, otherwise APZ will also be required from any classified vegetation within the subject site. Internal APZ setbacks may be required within some lots to prevent future development in areas of BAL-40/FZ.
2. Ensure vehicular access to and from the proposed development complies with the technical specifications of Guidelines.
3. Ensure a secure bushfire fighting water supply, most likely through use of static firewater tanks.
4. Ensure a Bushfire Emergency Evacuation Plan accompanies the BMP for any future planning applications for vulnerable land uses, and Bushfire Risk Management Plans for any future high-risk land uses.

Based on the above, Linfire considers the bushfire hazards within and adjacent to subject site and the associated bushfire risks are manageable through standard management responses outlined in

the Guidelines and AS 3959. These responses will be factored into proposed development as early as possible at all stages of the planning process to ensure a suitable, compliant and effective bushfire management outcome is achieved for protection of future life, property and environmental assets.

5.0 Assessment against the bushfire protection criteria

An acceptable solutions assessment against BPC 4 is provided in Table 4.

Table 4: Compliance with the bushfire protection criteria of the Guidelines

Bushfire protection criteria		Development response	
Outcomes	**Acceptable Solutions**	**Method of compliance**	**Proposed bushfire management measures**
Element 1: Location			
Outcome O1 Avoid broader landscapes that present an unacceptable risk to life, property and infrastructure.	***Area 1 (Urban):*** Does not require assessment of Element 1: Location ***Area 2:*** Determine the Broader Landscape Type in accordance with Appendix A.1 and proceed with the following Acceptable Solutions A1.1 Location *A1.1a Broader Landscape Type A* The subject site is located in an area that is a Broader Landscape Type A. This location satisfies the policy outcome for Element 1:Location and no additional consideration is required. *A1.1b Broader Landscape Type B* The subject site is located in an area that is a Broader Landscape Type B which presents an unacceptable bushfire risk of a landscape scale bushfire resulting in impacts to people, property and infrastructure. This location does not satisfy the policy outcome for Element 1: Location. Where the practitioner considers that further analysis could demonstrate to the decision-maker that the risks can be appropriately managed, and/or mitigated, an outcomes-based approach should be prepared in accordance with policy measure 7.5 of SPP 3.7. Further explanatory notes are provided in Appendix B.1 of the Guidelines.	**Acceptable Solution**	In accordance with Section 1.3.1 of the Guidelines: *Where a strategic planning proposal, subdivision or development application was assessed against SPP 3.7 (2015) and the Guidelines, the subsequent stage(s) of the planning process, or modification or addition to the development approval, should demonstrate compliance with SPP 3.7 (2024) and these Guidelines, with the exception of the new methodology for Element 1: Location (if required).* The BMP supporting the LPS amendment (Linfire; 2024) assessed the subject site against the 2015 version of SPP 3.7, with the LPS endorsed by the City of Karratha in June 2025. Given the above, there is no requirement to assess this SP against Element 1 of this version of SPP 3.7 and PBG, nor conduct a Broader Landscape Assessment. Additionally, the following is noted regarding the subject site: • It is relatively close to areas not designated bushfire prone, including ○ Existing industrial area 500 m to the west, on western side of Dampier Road ○ Karratha townsite (Nickol, Baynton) approximately 3 km to the east ○ Dampier townsite to the north • The road network from the subject site to the above places is relatively simple • Most of the land around the subject site is either Class G grassland or land cleared for various land uses, with non-grassland vegetation only on 2 interfaces. Given the above, even if the proposal was required to conduct a BLA, it would certainly be Type A, compliant with Element 1, and not requiring additional consideration.
Element 2: Siting and Design			
Outcome O2 Ensure siting and design solutions: • manage or mitigate the bushfire risk to people, property and infrastructure; and • avoid, or where unavoidable, minimises the clearing of native vegetation	***Area 1 (Urban):*** Does not require assessment of Element 2: Siting and Design ***Area 2:*** Proceed with the following Acceptable Solutions A2.1 Siting and Design The areas of the subject site(s) identified for intensification and/or the future development site(s) achieve a pre- or post-development bushfire hazard level of moderate or low	**Acceptable Solution**	The post-development BHL assessment (Figure 5), which assumes future development will modify the subject site to non-vegetated or low threat vegetation, demonstrates that on completion, all developable land will comprise Moderate and Low bushfire hazard level, which is compliant with A2.1. Where post-development vegetation (including any proposed onsite unmanaged retention, rehabilitation or drainage vegetation) is not able to be excluded in accordance with AS 3959 Clause 2.2.3.2, sufficient separation will be required to achieve BAL-29 at proposed habitable buildings. Strategies to achieve this separation include the use of: • interfacing roads or driveways, • firebreaks, • building setbacks • targeted onsite non-vegetated elements and/or managed low threat landscaping • strategically located and vegetated drainage basins to reduce separation requirements. The required separation distances (including APZs where required) will be identified for each stage of planning application, where required, based confirmed lot layout and BAL contour assessment. Based on the vegetation classifications identified during the site assessment, or considered potentially likely within the assessment area, the following separation distances may apply to

Bushfire protection criteria		Development response	
Outcomes	**Acceptable Solutions**	**Method of compliance**	**Proposed bushfire management measures**
			achieve BAL-29: • 8 m from Class G grassland (flat/upslope) • 9 m from Class G grassland (downslope 0°-5°) • 9 m from Class C shrubland (flat/upslope) • 10 m from Class C shrubland (downslope 0°-5°) • 13 m from Class D scrub (flat/upslope) • 15 m from Class D scrub (downslope 0°-5°) At future planning stages, it will be possible to define the required APZs widths and locations to respond to unmanaged vegetation more accurately. Any identified APZs are to be implemented and maintained in accordance with Schedule 1 of the Guidelines (see Appendix 2) and the City of Karratha Firebreak Notice (see Appendix 6). Outside of nominated APZs and areas of unmanaged vegetation, any landscaping within the subject site, will likely consist of low threat and managed gardens in accordance with AS 3959 Clause 2.2.3.2 (f) (refer Appendix 3) and Schedule 1 of the Guidelines (refer to Appendix 2). If any staging of development is to occur, it may be necessary to consider staging buffers to remove any temporary BAL-40/FZ impacts from vegetation remaining in undeveloped parts of the subject site, or temporarily quarantine until the bushfire hazard can be removed.
	A2.2 Clearing of native vegetation The strategic planning proposal avoids, or where unavoidable, minimises the clearing of native vegetation.	**Acceptable Solution**	Given most of the subject site is already cleared of vegetation, only minor clearing is anticipated to accommodate future industrial development. Notwithstanding, Linfire assumes that all relevant environmental studies will be undertaken to support the project, and if any State and Federal environmental referrals and approvals are required, they will be sought prior to commencing on-site vegetation modification or clearing required to construct the future development.
Element 3: Vehicular access			
Outcome O3 Ensure the design and capacity of vehicular access and egress provide: • for efficient and effective evacuation to a suitable destination(s) and/or • as a contingency measure for vulnerable land uses, an on-site shelter, where demonstrated appropriate, as a last resort option.	***Area 1 (Urban):*** Does not require assessment of Element 3: Vehicular Access ***Area 2:*** Proceed with the following Acceptable Solutions A3.1 Public Roads Public roads are to meet the requirements in Appendix B.3, Table 10.	**Not Applicable**	No public roads are currently proposed as part of future development. Vehicular access to subject site is from Dampier Road, which is a sealed two-way road that appear to be compliant with Guidelines, and are sufficient for occupant egress and emergency services access. Should any public roads be proposed as part of future development, they will be required to comply with the relevant technical requirements of the Guidelines (see Appendix 4).
	A3.2 Access Routes Public road access should be provided in two different directions, to two different suitable destinations; and with an all-weather surface.	**Acceptable Solution**	The subject site is already well-serviced by the existing public road network, namely Dampier Road, which is a two-way road providing for travel north (to Dampier) and south then east (to Karratha) to suitable destinations. Internal access from the subject site to Dampier Road, is expected to be via the existing battle-axe legs. Based on the above, future development is able to be provided with at least, two access routes which meets and exceeds the requirements of Acceptable Solution A3.2. While access to proposed development within the existing lot via the battle-axe leg can be compliantly achieved with the Guidelines, it is noted that the ability to subdivide the subject site will be contingent on the ability to extend a second vehicular access route to Lots 1 and 500 through the adjacent lots, namely Unallocated Crown Land. The likely vehicular access options available should subdivision be pursued, would be either a public road via a gazetted road reserve, or an Emergency Access Way via an access easement, which would need to be secured across land outside of the Proponents control. Linfire are not aware of any specific decision whether to seek subdivision of the subject site, however simply raise that there would need to be vehicular access arrangements secured in order to comply with the Guidelines, should subdivision be pursued.

Bushfire protection criteria		Development response	
Outcomes	**Acceptable Solutions**	**Method of compliance**	**Proposed bushfire management measures**
	A3.3a No-through Roads If the public road access to the subject site is via a no-through road which cannot be avoided due to demonstrated site constraints, the public road access is to be a maximum of 200 m from the subject site boundary to an intersection where two-way access is provided. The no-through road may exceed 200 metres if it is demonstrated that an alternative access, including an emergency access way, cannot be provided due to site constraints, and the following requirements are met • the no-through road travels towards a suitable destination; and • the balance of the no-through road that is greater than 200 metres from the subject site, is wholly within BAL-LOW, or is within a residential built-out area, or is within Area 1 (Figure 29). A3.3b No-through Road Requirements A no-through road is to meet all the following requirements: • requirements of a public road (Appendix B.3, Table 10, Column 2); and • turn-around area/head (Figure 30).	**Not Applicable**	No public roads are currently proposed as part of future development and Dampier Road is an existing through road. If as part of future planning, the development requires any permanent no-through roads, or on a temporary basis as part of development staging, they will need to be less than 200 m in length and include either an 18 m turning head or compliant hammerhead, or be excludable under A3.3a, and are to be constructed to the relevant technical requirements of the Guidelines (see Appendix 4).
Element 4: Water			
Outcome O4 Ensure that sufficient water is available and accessible for emergency services, to enable people, property and infrastructure to be defended from bushfire.	***Area 1 (Urban):*** Does not require assessment of Element 4: Water Supply ***Area 2:*** Proceed with the following Acceptable Solutions A4.1 Water Supply Evidence that a sufficient and accessible reticulated or non-reticulated water supply for bushfire firefighting can be provided at the subdivision and/or development application stage, in accordance with the specifications of the relevant water supply authority or the requirements in Appendix B4: Water Supply dedicated for bushfire firefighting	**Acceptable Solution**	There are currently not known street hydrants in Dampier Road, so it is expected that static bushfire water tanks would be required to achieve compliance with A4.1. Assuming that providing a compliant reticulated water supply is not achievable to any part of the proposed development, static bushfire water tanks would need to be installed within the subject site, and appropriately sized in accordance with Table 11 in Appendix B4 (refer to Appendix 5), and designed in accordance with the requirements of the local council and the technical requirements of Appendix B4 of the Guidelines. Firefighting water supply to larger developments within the subject site, may be provided by onsite fire hydrant systems that may be installed at these facilities, if triggered by the National Construction Code).

6.0 Responsibilities for implementation and management of the bushfire measures

This BMP has been prepared as a strategic guide to demonstrate how development compliance will be delivered at future planning stages in accordance with the Guidelines. Aside from the preparation of future BMPs to accompany future subdivision and development applications where appropriate, there are no further items to implement, enforce or review at this strategic stage of the planning process.

Future BMPs prepared for subsequent subdivision and development applications are to meet the relevant commitments outlined in this strategic level BMP, address the relevant requirements of SPP 3.7 (i.e. Policy Measure 7.1 (ii)) and demonstrate in detail how the proposed development will incorporate the relevant acceptable solutions or meet the performance requirements of the Guidelines. Future BMPs are to include the following detailed information:

- Proposed development layout, including any lots, roads, drainage areas, etc
- Detailed landscape plans for any drainage and areas of revegetation or retention, to confirm the final extent of classified vegetation (retained or revegetated) and exclusions (non-vegetated areas and low threat vegetation).
- Final determination of post development classified vegetation extent, exclusions and effective slope
- BAL contour map demonstrating that proposed development areas will achieve BAL–29 or lower (may require designation of building envelopes)
- Width and alignment of compliant APZs/setbacks
- Confirmation of how bushfire management will be addressed during future development staging including consideration of low threat staging buffers and vehicular access (temporary no-through roads/EAWs)
- Proposed approach to vegetation management throughout vacant land, staging buffers, adjacent properties and road verges; or application of AS 3959 in response to classified vegetation
- Vehicular access provisions, including demonstration that a minimum of two access routes will be achieved for each stage of proposed development in accordance with Acceptable Solution A3.2
- Water supply provisions with regards to reticulated water supply provisions (including network of street hydrants), or static firewater tanks if required
- Demonstration of compliance with the bushfire protection criteria of the Guidelines
- Requirements for any proposed vulnerable land uses including provision of a BMP and Bushfire Emergency Evacuation Plan to accompany future development application/s.
- Requirements for BMP compliance reports as a condition of subdivision
- Provisions for notification on Title for any future lots with a rating of BAL–12.5 or greater as a condition of subdivision
- Compliance requirements with the current local government annual firebreak notice, as amended or varied
- Construction of Class 1, 2, 3 or associated 10a buildings in accordance with AS 3959 to the assessed BAL rating
- Proposed implementation and audit program outlining all measures requiring implementation and the appropriate timing and responsibilities for implementation.

On the basis of the information contained in this BMP, Linfire considers the bushfire hazards within and adjacent to the subject site and the associated bushfire risks are manageable through standard management responses outlined in the Guidelines and AS 3959. Linfire considers that on implementation of the proposed management measures, the subject site will be able to be developed with a manageable level of bushfire risk whilst maintaining full compliance with the Guidelines and AS 3959.

7.0 References

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Western Australian Planning Commission (WAPC) 2024, *Planning for Bushfire Guidelines*, November 2024. Western Australian Planning Commission, Perth.

Appendix 1 Vegetation plot photos and description

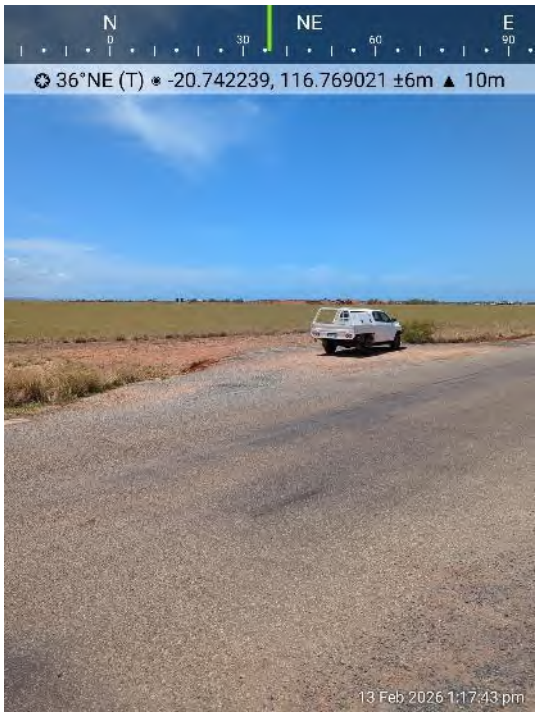


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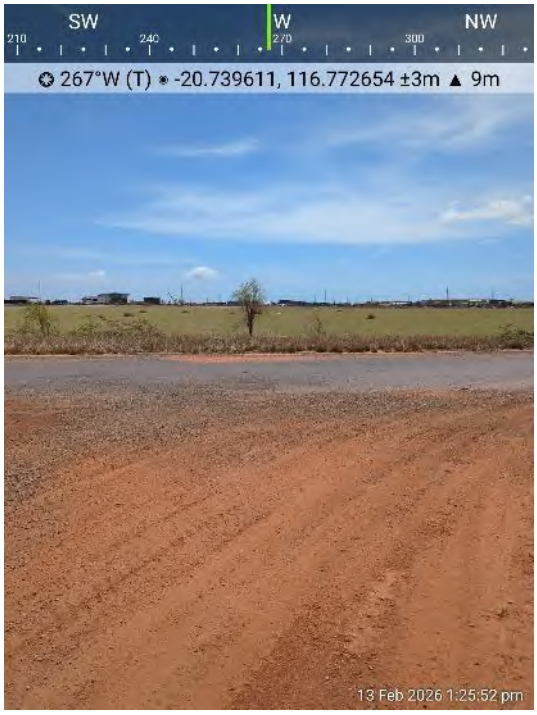


Photo ID: 1g

Plot number	Plot 1
Vegetation classification	Class G Grassland
Description / justification	Grassland greater than 100 mm in height



Photo ID: 2a



Photo ID: 2b



Photo ID: 2c



Photo ID: 2d

Plot number	Plot 2
Vegetation classification	Class G Grassland
Description / justification	Grassland greater than 100 mm in height



Photo ID: 3a

Plot number	Plot 3
Vegetation classification	Class G Grassland
Description / justification	Grassland greater than 100 mm in height



Photo ID: 4a



Photo ID: 4b



Photo ID: 4c



Photo ID: 4d



Photo ID: 4e



Photo ID: 4f



Photo ID: 4g

Plot number	Plot 4
Vegetation classification	Class C Shrubland
Description / justification	Shrub vegetation less than 2 m high at maturity



Photo ID: 6a



Photo ID: 6b



Photo ID: 6c



Photo ID: 6d

Plot number	Plot 6
Vegetation classification	Class D Scrub
Description / justification	Vegetation with a continuous horizontal and vertical structure, greater than 2 m high at maturity



Photo ID: 7a

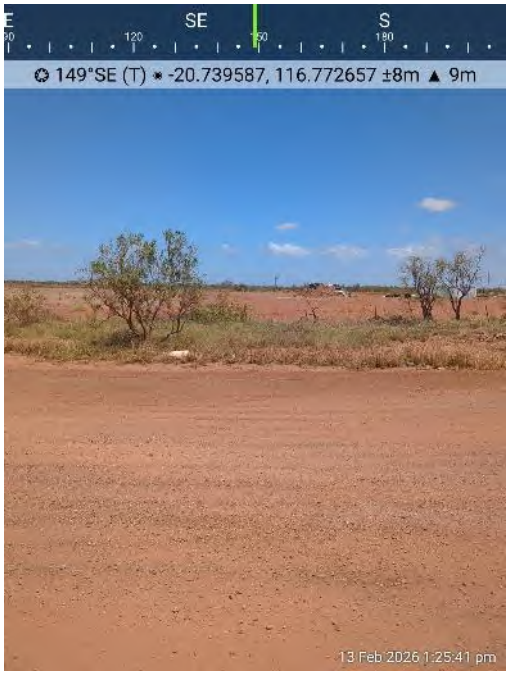


Photo ID: 7b



Photo ID: 7c

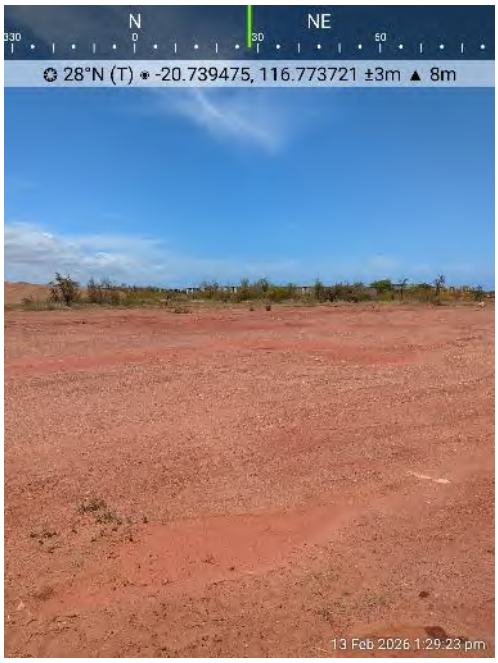


Photo ID: 7d



Photo ID: 7e



Photo ID: 7f



Photo ID: 7g



Photo ID: 7h

Plot number	Plot 7
Vegetation classification	Class D Scrub
Description / justification	Vegetation with a continuous horizontal and vertical structure, greater than 2 m high at maturity



Photo ID: 9a

Plot number	Plot 9
Vegetation classification	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])
Description / justification	Existing non-vegetated elements and low threat vegetation outside subject site, largely consisting of roads, paths, buildings, cultivated gardens and maintained lawns.



Photo ID: 10a



Photo ID: 10b



Photo ID: 10c



Photo ID: 10d



Photo ID: 10e



Photo ID: 10f



Photo ID: 10g



Photo ID: 10h



Photo ID: 10i



Photo ID: 10j



Photo ID: 10k



Photo ID: 10l



Photo ID: 10m



Photo ID: 10n



Photo ID: 10o



Photo ID: 10p

Plot number	Plot 10
Vegetation classification	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])
Description / justification	Existing non-vegetated elements and low threat vegetation within the subject site, largely consisting of roads, buildings, cleared land and managed vegetation near dwelling.

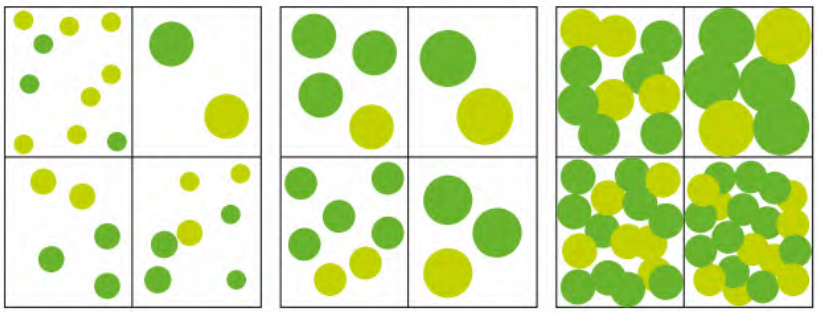
Appendix 2 APZ standards (from Bushfire Guidelines)

An APZ is a low fuel area maintained around a habitable building to increase the likelihood that it will survive a bushfire, by providing a defendable space and reducing the potential for direct flame contact, radiant heat exposure and ember attack.

Vegetation management within an APZ should provide defendable space and be maintained to a low threat state, in perpetuity, in accordance with the requirements outlined in Schedule 1.

Schedule 1: Standards for Asset Protection Zones

- **Trees* (> 6 metres in height)**
  - Trunks at maturity should be a minimum distance of six metres from all elevations of the building.
  - Branches at maturity should not touch or overhang a building or powerline.
  - Lower branches and loose bark should be removed to a height of two metres above the ground and/or surface vegetation.
  - Canopy cover within the APZ should be <15 per cent of the total APZ area.
  - Tree canopies at maturity should be at least five metres apart to avoid forming a continuous canopy. Stands of existing mature trees with interlocking canopies may be treated as an individual canopy provided that the total canopy cover within the APZ will not exceed 15 per cent and are not connected to the tree canopy outside the APZ.



- **Shrub* and Scrub* (0.5 metres to 6 metres in height)**
  - Should not be located under trees or within three metres of buildings.
  - Should not be planted in clumps >5 square metres in area.
  - Clumps should be separated from each other and any exposed window or door by at least 10 metres.
  - Shrub and scrub >6 metres in height are to be treated as trees.
- **Ground covers (<0.5 metres in height)**
  - Can be planted under trees but must be maintained to remove dead plant material, as prescribed in 'Fine fuel load' above.
  - Can be located within two metres of a structure, but three metres from windows or doors if >100 millimetres in height.
  - Ground covers >0.5 metres in height are to be treated as shrubs
- **Grass**
  - Grass should be maintained at a height of 100 millimetres or less, at all times.
  - Wherever possible, perennial grasses should be used and well-hydrated with regular application of wetting agents and efficient irrigation.
- **Fine Fuel load (combustible dead vegetation mater <6 mm in thickness)****
  - Should be managed and removed on a regular basis to maintain a low threat state.
  - Should be maintained at <2 tonnes per hectare (on average).
  - Mulches should be non-combustible such as stone, gravel or crushed mineral earth or wood mulch

Schedule 1: Standards for Asset Protection Zones

>6 millimetres in thickness.

- **Defendable Space**
  - Within three metres of each wall or supporting post of a habitable building, the area is kept free from vegetation, but can include ground covers, grass and non-combustible mulches as prescribed above.
- **Fences within the APZ**
  - Should be constructed from non-combustible materials (for example, iron, brick, limestone, metal post and wire, or bushfire-resisting timber referenced in Appendix F of AS 3959)
- **LPG Cylinders**
  - Should be located on the side of a building furthest from the likely direction of a bushfire or on the side of a building where surrounding classified vegetation is upslope, at least one metre from vulnerable parts of a building.
  - The pressure relief valve should point away from the house.
  - No flammable material within six metres from the front of the valve.
  - Must sit on a firm, level and non-combustible base and be secured to a solid structure.

** Plant flammability, landscaping design and maintenance should be considered – refer to explanatory notes*

*** Fine fuel load should be maintained to less than two tonnes per hectare, however this is often a subjective assessment.*

- *Reducing fuel load levels does not necessarily require the removal of existing vegetation. A combination of methods can be utilised to reduce fuel load such as raking, weed removal, pruning, mulching and/or the removal of plant material.*
- *A simple method to estimate fuel load is to roughly equate one tonne of fuel load per hectare as 100 grams per square metre. For example, two tonnes per hectare of leaf litter is roughly 200 grams of leaf litter per square metre and eight tonnes per hectare is roughly 800 grams.*
- *Eucalyptus leaf litter is approximately 100 grams per handful, so two handfuls of litter per square metre will roughly equate to two tonnes per hectare.*
- *Different types of fine fuel, like mulch or pine needles may be more or less than a handful, however the 100 grams per square metre rule of thumb can still be used.*

E2 Plant flammability

There are certain plant characteristics that are known to influence flammability, such as moisture or oil content and the presence and type of bark. Plants with lower flammability properties may still burn during a bushfire event, but may be more resistant to burning and some may regenerate faster post-bushfire.

There are many terms for plant flammability that should not be confused, including:

- Fire resistant – plant species that survive being burnt and will regrow after a bushfire and therefore may be highly flammable and inappropriate for a garden in areas of high bushfire risk.
- Fire retardant – plants that may not burn readily or may slow the passage of a bushfire.
- Fire wise – plants that have been identified and selected based on their flammability properties and linked to maintenance advice and planting location within a garden.

Although not a requirement of these Guidelines, local governments may develop their own list of fire wise or fire retardant plant species that suit the environmental characteristics of an area. When developing a recommended plant species list, local governments should consult with ecologists,

land care officers or environmental authorities to ensure the plants do not present a risk to endangered ecological communities, threatened, or endangered species or their habitat.

When selecting plants, private landholders and developers should aim for plants within the APZ that have the following characteristics:

- grow in a predicted structure, shape and height;
- are open and loose branching with leaves that are thinly spread;
- have a coarse texture and low surface-area-to-volume ratio;
- will not drop large amounts of leaves or limbs, that require regular maintenance;
- have wide, flat, and thick or succulent leaves;
- trees that have bark attached tightly to their trunk or have smooth bark;
- have low amounts of oils, waxes, and resins (which will often have a strong scent when crushed);
- do not produce or hold large amounts of fine dead material in their crowns; and/or
- will not become a weed in the area.

Refer to the WAPC Bushfire and Vegetation Fact Sheet for further information on clearing and vegetation management and APZ landscaping, design and plant selection reference material.

Appendix 3 Low Threat Vegetation (AS 3959 Clause 2.2.3.2)

2.2.3.2 *Exclusions—Low threat vegetation and non-vegetated areas*

The following vegetation shall be excluded from a BAL assessment:

(a) Vegetation of any type that is more than 100 m from the site.

(b) Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified vegetation.

(c) Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other or of other areas of vegetation being classified vegetation.

(d) Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified vegetation.

(e) Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.

(f) Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks.

NOTES:

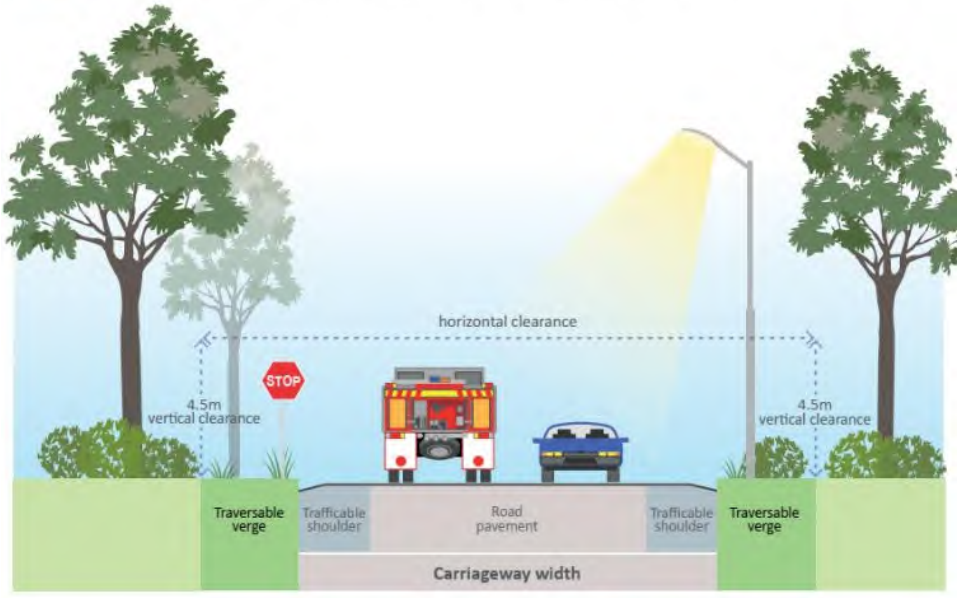
1 Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack (recognizable as short-cropped grass for example, to a nominal height of 100 mm).

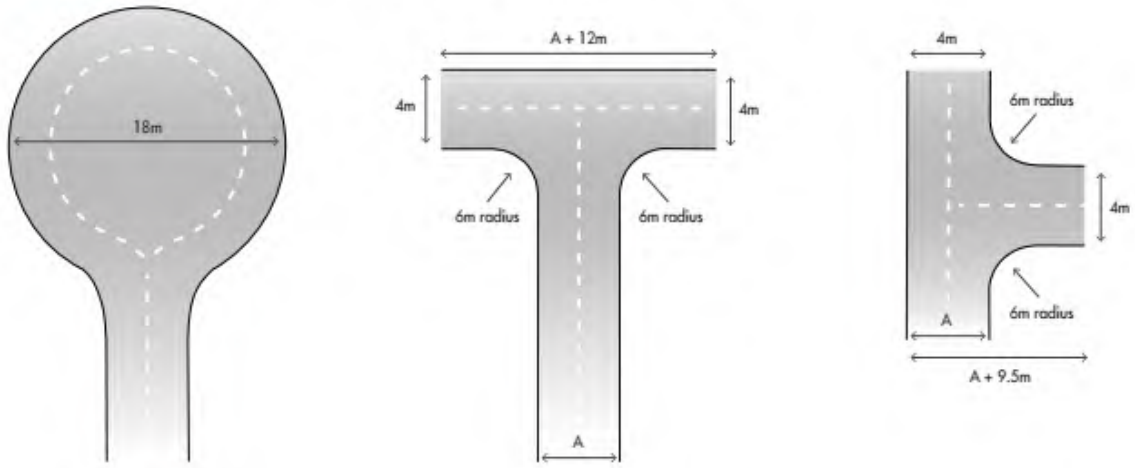
2 A windbreak is considered a single row of trees used as a screen or to reduce the effect of wind on the leeward side of the trees.

Appendix 4 Vehicular access technical standards of the Guidelines

Public Roads
Acceptable Solution A3.1
Public roads, including perimeter roads should meet the technical requirements in Appendix B.3, Table 10
Explanatory note B3.1
The Guidelines do not prescribe values for the carriageway width or the horizontal clearance for public roads (except for perimeter roads). Public roads should be in accordance with the class of road as specified in the Public Works Engineering Australasia (IPWEA) subdivision guidelines, Liveable Neighbourhoods, Austroads Standards, any applicable or relevant Main Roads standards, supplements, policies and any applicable or relevant local government standards or policies. However, it is important that public roads (and other forms of access) in bushfire prone areas, allow for emergency services vehicles to stop and operate on the side of the public road, specifically where the public road traverses large areas of classified vegetation. It is, therefore, recommended that public roads achieve a minimum six metres horizontal clearance. Perimeter roads require additional width. Where local or state government roads are proposed to be widened or modified by the proponent, as part of the structure planning process or at the subdivision stage, approval is required from the relevant government authority.
Definition
Horizontal clearance: The carriageway width (including the road pavement and trafficable shoulder) and traversable verge that provides for the movement and parking of vehicles and area required by emergency services to operate. Infrastructure and vegetation within the traversable verge should be frangible, however, non-frangible items can occur providing they do not restrict vehicular movement in the event of an emergency

Figure 26: Area encompassing horizontal clearance and vertical clearance



No-Through Roads
Acceptable Solution A3.3a and A3.3b
A3.3a No-through Roads If the public road access to the subject site is via a no-through road which cannot be avoided due to demonstrated site constraints, the public road access is to be a maximum of 200 m from the subject site boundary to an intersection where two-way access is provided. The no-through road may exceed 200 metres if it is demonstrated that an alternative access, including an emergency access way, cannot be provided due to site constraints, and the following requirements are met • the no-through road travels towards a suitable destination; and • the balance of the no-through road that is greater than 200 metres from the subject site, is wholly within BAL-LOW, or is within a residential built-out area, or is within Area 1 (Figure 29). A3.3b No-through Road Requirements A no-through road is to meet all the following requirements: • requirements of a public road (Appendix B.3, Table 10, Column 2); and • turn-around area/head (Figure 30). Figure 30: Design requirements for a turn-around area 
Explanatory note B3.3
No-through roads reduce the legibility of a road network and options available for access and egress in the event of a bushfire emergency. The inclusion of new no-through roads within subdivision or structure plan designs, in the first instance, should be avoided in bushfire prone areas. However, where it is demonstrated, to the satisfaction of the decision-maker that a no-through road cannot be avoided due to site or design characteristics, the inclusion of a new no-through road is to be treated as an acceptable solution, if it satisfies the prescribed maximum road length. Where this is not demonstrated, a decision-maker is able to request a redesign to remove the no-through road. The acceptable solution for no-through roads in areas shown as Area 2 on the Map of Bush Fire Prone Areas includes a maximum of 200 metres from the lot(s) boundary to an intersection where two-way access is provided (Figure 28). There is no prescribed maximum length for no-through roads in areas shown as Area 1 (Urban) on the Map of Bush Fire Prone Areas. B3.3.1 Outcomes-based approach – no-through roads It becomes more challenging to comply with the acceptable solutions where the proposal includes existing no-through roads that exceed 200 metres. The 200 metres is a nationally accepted standard and support for development on existing no-through roads longer than the prescribed 200 metres, particularly within

No-Through Roads
vegetation classified as Forest, should be considered carefully. They should be the exception to the rule where it is demonstrated through an outcomes-based approach that the hazards and the road network within the broader landscape are such that, in the event of a bushfire, evacuation to a suitable destination is possible. An outcomes-based approach should demonstrate the increase in length, and/or the proposed additional lots, on an existing non-compliant no-through road and should consider: • the broader landscape • size and scale of the development • whether the no-through road travels away from the source of the bushfire hazard • evacuation in the event of a bushfire scenario • the vegetation within and adjoining the road reserve • legibility of the broader road network • whether the no-through road is straight and provides a line of sight • any improvements to the bushfire resilience of the area, including improvements to the existing road network • the precedent within the broader area that would be set by supporting development on a non-compliant no-through road. Figure 28: Demonstration of a lot achieving two-way access within 200 metres 

Table 10: Vehicular access technical requirements

	1		2		3		4		5	
TECHNICAL REQUIREMENTS	**PERIMETER ROADS**		**PUBLIC ROADS**		**EMERGENCY ACCESS WAY[3]**		**FIRE SERVICE ACCESS ROUTE[3]**		**BATTLE-AXE & PRIVATE DRIVEWAYS[1]**	
MAP OF BUSH FIRE PRONE AREAS DESIGNATION	**Area 2**	**Area 1**	**Area 2**	**Area 1**	**Area 2**	**Area 1**	**Area 2**	**Area 1**	**Area 2**	**Area 1**
Minimum horizontal clearance (metres)	12	8	See note 5		10	6	10	6	6	
Minimum vertical clearance (metres)	4.5									
Minimum weight capacity (tonnes)	15									
Maximum grade unsealed road[2]	See note 5		See note 5		1:10 (10% or 6°)					
Maximum grade sealed road[2,4]					1:7 (14.3% or 8°)					
Maximum average grade sealed road					1:10 (10% or 6°)					
Minimum inner radius of road curves (metres)					8.5					

Notes:

[1] Driveways and battle-axe legs to comply with the Residential Design Codes and Development Control Policy 2.2 Residential Subdivision where not required to comply with the widths in this Appendix or the Guidelines.

[2] Dips must have no more than a 1 in 8 (12.5% - 7.1 degrees) entry and exit angle.

[3] To have crossfalls between 3 per cent and 6 per cent.

[4] For sealed roads only the maximum grade of no more than 1 in 5 (20 per cent) (11.3 degrees) for no more than 50 metres is permissible, except for short constrictions to 3.5 metres for no more than 30 metres in length where an obstruction cannot be reasonably avoided or removed.

[5] As outlined in the Institute of **Public Works Engineering Australasia (IPWEA) subdivision guidelines, Liveable Neighbourhoods, Austroads Standards** Main Roads standard, supplement, policy or guideline and/or any applicable or relevant local government standard or policy.

Appendix 5 Water technical standards of the Guidelines

Appendix B.4 – Water Supply
B4.1 Construction and Design Technical requirements
• An above-ground tank and associated stand should be constructed of non-combustible material. • Below-ground tanks should have a 200 millimetres diameter access hole to allow tankers or emergency services vehicles to refill direct from the tank, with the outlet location clearly marked on the surface. • Above and below ground tanks may need to comply with AS/NZS 3500.1:2018. • An inspection opening may double as the access hole provided that the inspection opening meets the requirements of AS/NZS 3500.1:2018. • Where an outlet for an emergency services vehicle is provided, then an unobstructed, hardened ground surface is to be supplied within four metres of any water supply. B4.1.1 Pipes and Fittings All above-ground, exposed water supply pipes and fittings should be metal. Fittings should be located away from the source of bushfire hazard and be in accordance with the applicable section below, unless otherwise specified by the local government. B4.1.2 Fittings for above-ground water tanks • Commercial land uses: 125mm Storz fitting; or • Strategic water tanks: 50mm or 100mm (where applicable and adapters are available) male camlock coupling with full flow valve; or • Standalone water tanks: 50mm male camlock coupling with full flow valve; or • Combined water tanks: 50mm male camlock coupling with full flow valve or a domestic fitting, being a standard household tap that enables an occupant to access the water supply with domestic hoses or buckets for extinguishing minor fires. B4.1.3 Remote outlets In certain circumstances, it may be beneficial to have the outlet located away from the water supply. In instances in which a remote outlet is to be used, the applicant should consult the local government and DFES on their proposal.
B4.2 Use of Water Supply
• The combination of drinking water and water for firefighting purposes is not recommended, as stagnant water may alter the quality of the drinking water and the emergency services, by law, may not be able to take water from the water supply to suppress a bushfire. • Combining drinking water and water for firefighting purposes is contrary to provisions within clause 4.2.3 of AS/ NZS 3500.1:2021
B4.3 Independent Water and Power Supply
• Water tank/s are to be provided in accordance with Table 11, Water supply dedicated for bushfire firefighting purposes.
B4.5 Location of Water Tanks and Hydrants
• Surrounding vegetation should be considered when locating a water tank. • Avoid locations where the tank will be situated underneath existing vegetation or where vegetation will grow against or overhang the tank, (Figure 39). Where a tank is on the bushfire hazard side of a building, sufficient shielding for the protection of firefighters should be provided. In addition to the tank location, the fitting should be positioned and/or shielded from the bushfire hazard to allow access by emergency services.

Figure 39: A good and bad example of landscaping around a water tank



Table 11: Water supply dedicated for bushfire firefighting purposes

SECTIONS FROM THE PLANNING FOR BUSHFIRE GUIDELINES					
SECTION 5[2] STRUCTURE PLANS AND SUBDIVISION APPLICATIONS		**SECTION 6[2] DEVELOPMENT – RESIDENTIAL**	**SECTION 7[2] DEVELOPMENT – COMMERCIAL & INDUSTRIAL**	**SECTION 8[2] – DEVELOPMENT – VULNERABLE LAND USES**	
One additional lot	10,000 litre water tank per lot	10,000 litre water tank per habitable building	For each habitable building - 10,000 litre per 1,500 m² of floor space up to 50,000 litre. Provided in a water tank	Camping ground	At the discretion of the local government
Three to 24 lots	10,000 litre water tank per lot[1] **or** 50,000 litre strategic water tank				
25 lots or more	50,000 litre per 25 lots or part thereof, provided as a strategic water tank(s) **and/or** 10,000 litre water tank per lot			Other vulnerable land uses	For each habitable building - 10,000 litre per 500 m² of floor space up to 50,000 litre. Provided in a water tank

Notes:
[1] Evidence that the identified water supply amounts in either column denoted is to be provided at the relevant planning stage.
[2] where more than one habitable building is proposed, strategic water tanks are to be provided in accordance with Section 5 requirements and at the discretion of the Local Government.

Appendix 6 City of Karratha Firebreak Notice

IMPORTANT
FIRE MITIGATION NOTICE

ALL OWNERS AND/OR OCCUPIERS OF LAND SITUATED IN THE CITY OF KARRATHA

This is a requirement under the *Bush Fires Act 1954* Section 33. Failure to comply with this Notice may incur penalties of up to $5,000 and the works required by this Notice will be carried out at the expense of the owner/occupier.

Pursuant to the powers contained in Section 33 of the Bush Fires Act 1954, you are hereby required on or before the 1st day of January,(or within fourteen days of your becoming owner or occupier of land should this be after the 1st day of January), to clear and maintain mineral earth breaks and reduce the fuel load from the land owned or occupied by you as specified hereunder and to have the specified land and firebreaks clear of all flammable material all year round.

LAND IN TOWNSITES- INCLUDING MINING AND OR CONSTRUCTION ACCOMMODATION FACILITIES

1.1 Where the area of land is 2000 square metres (approximately 1/2 an acre) or less, all flammable material must be reduced over the whole of the land. Grasses shall be slashed to a height 75mm.

1.2 Where the area of land exceeds 2000 square metres, mineral earth breaks of at least five (5) metres in width must be cleared of all flammable material immediately inside and along the boundaries of the land. Where there are buildings on the land additional mineral earth breaks five (5) metres in width must be cleared immediately surrounding each building.

1.3 Ensure a minimum vertical clearance of 4 metres is maintained along the firebreaks to enable vehicles to drive along the firebreaks without access being obstructed.

LAND OUTSIDE TOWNSITES INCLUDING MINING AND OR CONSTRUCTION ACCOMMODATION FACILITIES

2.1 For all buildings on land outside of the townsite, two mineral earth breaks with a width not less than five (5) metres and cleared of all flammable material must surround the buildings. The inner mineral earth break must be no less than twenty (20) metres from the perimeter of the building or group of buildings and the outer mineral earth break no less than one hundred (100) metres from the inner mineral earth break.

POWERLINES AND POWER TRANSMISSION LINES IN TOWNSITES INCLUDING MINING AND OR CONSTRUCTION ACCOMMODATION FACILITIES

3.1 Aerial hazards to power and power transmission lines must be maintained as per the guidelines issued by the Energy Safety - Department of Mines, Industry Regulation and Safety.

For power lines conducting less than or equal to 33,000 volts; ground fuels such as grasses and ground storey species must be cleared to a minimum of five (5) metres either side of a centre line created by the poles, or towers. The total cleared area must not be less than ten (10) metres wide and the entire area must be maintained to the standard of a mineral earth break.

3.2 For power transmission lines greater than 33,000 volts, a mineral earth break of not less than five (5) metres in width must be maintained either side of the widest point of any arms or cross arms on the pole or tower. A mineral earth break of no less than five (5) metres width is to be maintained directly under the power line corridor. All power and transmission lines are to be maintained as per Australian Standard AS7000, to assist in minimizing the risk from sparks or arcing and shall be the responsibility of the owner of the transmission line.

WATER SUPPLY PIPELINES AND INFRASTRUCTURE

4.1 All water supply pipelines and associated infrastructure must have mineral earth breaks not less than five (5) metres wide on both sides of the pipeline and all associated infrastructure and be cleared of all flammable material to prevent the spread of fire and damage to the pipelines or associated infrastructure. Access points must be installed and maintained to allow for Emergency Services access and maintenance use.

EXPLOSIVES MAGAZINES AND STORAGE AREAS

5.1 All Flammable Materials are to be removed to bare earth between any bunkers or storage facilities and all Flammable Materials are to be removed for a distance of not less than fifteen (15) metres from the perimeter of any such storage area.

FUEL DEPOT / FUEL STORAGE AREA / HAYSTACKS / STOCKPILED FLAMMABLE MATERIAL

6.1 For all fuel depots/fuel storage areas, all flammable matter within 10 metres of where fuel drums, fuel ramps or fuel dumps are located, and where fuel drums, whether containing fuel or not are stored, a mineral earth break of not less than five (5) metres in width must be installed immediately adjacent

6.2 For all haystacks/stockpiled flammable materials, a mineral earth break of not less than five (5) metres in width must be installed immediately adjacent to any haystacks or stockpiled flammable material.

RAILWAY RESERVES IN TOWNSITES

7.1 Mineral earth breaks of at least five (5) metres in width must be installed immediately inside all boundaries continuous with any railway reserve on which railway traffic operates and are the responsibility of the owner of the railway.

APPLICATION TO VARY FIREBREAK REQUIREMENTS

If you consider it to be impractical to clear a mineral earth break or remove flammable material as required by this Notice, you may apply to Council or its Authorised Officer no later than the 30th day of August, for permission to provide firebreaks in alternative positions or take alternative action to remove or abate fire hazards. If permission is not granted by Council or Authorised Officer, you must comply with the requirement of this Notice. An application must include a detailed map (google map or similar) of the area you intend to vary, outlining the variation you require, along with the reason for variation.

BURNING GARDEN REFUSE DURING LIMITED BURNING TIMES

9.1 A person must not burn garden refuse at a place (other than a rubbish tip) during the limited burning times for that place unless it is burned:

(a) in an incinerator in accordance with subsection (2); or

(b) on the ground in accordance with subsection (3).

9.2 Garden refuse burned in an incinerator is burned in accordance with this subsection where:

(a) the incinerator is designed and constructed so as to prevent the escape of sparks or burning material; and

(b) either

(i) the incinerator is situated not less than two (2) metres from any building or fence; or

(ii) if the incinerator is less than two (2) metres from a building or fence, the Council or its Authorised Officer has given written permission in writing for the incinerator to be used; and there is no flammable material within two (2) metres of the incinerator while it is in use; and

(c) there is no flamable material within two (2) metres of the incinerator while it is in use; and,
(d) at least one person is present at the site of the fire at all times until it is completely extinguished; and
(e) the fire is no longer required, the person ensures that the fire is completely extinguished by the application of water or earth.
9.3 The Council or Authorised Officer must not give permission under subsection 9.2
(b) (ii) unless it is satisfied that the use of the incinerator is not likely to create a fire hazard.

ADDITIONAL WORKS

10.1 In addition to the requirements of this Notice, you may be required to carry out further works which are considered necessary by an Authorised Officer and specified by way of a separate written notice forwarded to the address of the owner/s as shown on the City rates record for the relevant land.

10.2 If the requirements of this Notice are carried out by burning, such burning must be in accordance with the relevant provisions of the Act.

10.3 Pursuant to Section 33(4) of the Act, where the owner and/or occupier of land fails or neglects to comply with the requisitions of this Notice within the times specified, the City may by its officers and with such servants, workmen and contractors, vehicles and machinery as the officers deem fit, enter upon the land and carry out the requisitions of this Notice which have not been complied with and pursuant to Section 33(5) of the Act, the amount of any costs and expenses incurred may be recovered from the owner and or occupier of the land.

10.4 Failing to comply with this notice may incur a modified penalty or prosecution. A person in default is also liable, whether prosecuted or not, to pay the cost of performing the work directed in this notice, if it is not carried out by the owner or occupier by the date required by this notice.

Signed for and on behalf of **CITY OF KARRATHA** by
An Authorised Officer:

VMiltrup

Virginia Miltrup
Chief Executive Officer



SERVICING REPORT

Lot 1 & 500 Dampier Rd, Gap Ridge

JDS262540 – May 2026

Prepared for:

KAW Property Group
&
RFF

JDSi
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Rev A	08/05/2026	Issued for Review	BT	BT

1 Executive Summary

JDSi Consulting Engineers has been engaged by KAW Property Group Pty Ltd to assess the Engineering constraints and opportunities associated with the proposed development of Lot 1 & 500 Damier Rd, Gap Ridge (herein referred to as the Site).

This report addresses the civil engineering and servicing engineering elements relating to the proposed development. It is specifically targeted at the external land development and service authority requirements to facilitate the proposed development and does not address the internal built form development requirements.

As detailed in the report there are several recommendations for further action to progress the development, with regards to the civil infrastructure requirements. These are summarised below:

- Confirm the development yield and layouts to inform calculation of final peak loads for all services.
- Preparation of formal applications to all service authorities to confirm connection arrangements and conditions.
- Finalisation of detailed civil designs and submission to City of Karratha and Service Authorities for approval.

The above summary of recommendations is not exhaustive as there will be numerous actions required to achieve an approved design that meets industry and regulatory requirements for quality, price, sustainability and safety.

Based on the investigations to date, there does not appear to be any significant constraints that would impact the proposed development of the Site.

2 Key Objectives

The key objectives of this report are to:

- Review and analyse existing documentation associated with the Site.
- Summarise any existing infrastructure assets within the vicinity of the Site, including roads, drainage and utility services.
- Provide commentary on any clearing and earthworks required within the Site.
- Provide commentary on potential road upgrades and improvements required to facilitate access to the Site.
- Provide commentary on the overall stormwater drainage strategy for the proposed development.
- Summarise requirements for sewer and water reticulation and supply to the Site.
- Summarise requirements for electrical reticulation and supply to the Site.
- Summarise servicing and supply requirement for telecommunication and gas reticulation to the Site.
- Provide commentary on any potential major infrastructure upgrades required to accommodate the proposed development.
- Summarise key engineering and servicing constraints and opportunities associated with the proposed development.

3 Introduction

KAW Property Group Pty Ltd (the Developer) have engaged JDSi to assess the engineering constraints and opportunities associated with the proposed development of Lot 1 & 500 Dampier Rd, Gap Ridge (herein referred to as the Site).

Lot 1 is currently owned by KAW Property Group Pty Ltd and is used as a temporary laydown area. This lot is proposed to be subdivided into 4 industrial strata lots of varying size.

Lot 500 is currently in use by Karratha Environmental Crushing operations, and this land use is intended to remain in place for the foreseeable future.

Based on preliminary information provided by the Client, the Development of Lot 1 will create 4 industrial lots and an internal road network to service each lot. This report has been based on the proposed lot layout shown in Figure 1, which consists of the following:

- Unit 1 ~ 7.67ha
- Unit 2 ~ 2.61ha
- Unit 3 ~ 3.59ha
- Unit 4 ~ 1.67ha
- Road 1 ~ 1.47ha

This report covers the engineering infrastructure requirements to service the proposed development. JDSi have considered earthworks, roads, stormwater drainage, wastewater, potable water and utility services with a particular emphasis on the existing service capacity and the potential infrastructure upgrades required to support the proposed development.

The report has been based on a desktop study of existing services information, aerial imagery, industry standards and policies and JDSi's in-house experience related to similar developments. The information is current as of May 2026 and may be subject to change as development progresses in the area.



Figure 1: Lot 1 Proposed Layout (Porters)

4 Study Area

The Site is located in Gap Ridge, Karratha and is generally surrounded by undeveloped land. Dampier Rd is located to the west and south of the Site, with existing industrial land to the west of Dampier Rd and the Karratha residential area approximately 1.8km's to the east. The Karratha Airport is located approximately 2.5km's to the north. Refer Figure 2.

Lots 1 and 500 have respective land areas of 15.59 ha and 21.98 ha.



Figure 2: Site Location (RFF and MNG)

4.1 Topography

The site generally grades from west to east, with levels of approximately 10.5mAHD near Damier Rd, through to 7.5mAHD towards to the eastern boundary.

4.2 Geological Conditions

Mapping by the Geological Survey of Western Australia for the Dampier – Barrow Island area indicates that the site is situated on Qaa: Alluvium; sand and gravel in rivers and creeks; clay, silt, and sand in channels on floodplains and Qao: Alluvial sand, silt, and clay on floodplains.

A geotechnical investigation was undertaken on Lot 1 by STATS Australia in July 2025. This found typical sandy clay to gravel in test pits, with termination on a hard layer at depths ranging from 1.2 – 2.4m. The site is classified as "H1" in accordance with AS2870 and could be improved to "M-D" through replacement (or import) of 600mm of non-plastic fill material, or lime / cement stabilisation. A Field CBR correlated value of 28% was recommended for pavement designs.

Based on the available geotechnical reporting Lot 1 is suitable for development, however it is recommended that additional testing be undertaken once building locations and loads are known.

Given the current use of Lot 500 and uncertainty on any future development layout or usage, it is difficult to confirm the required earthworks levels for this lot. Based on aerial imagery, current operations inside Lot 500 are wholly contained in the lot and are setback from adjoining boundaries. Prior to any future redevelopment progressing on Lot 500 a detailed survey and design process will be required to ensure earthworks tie into adjoining lots and consider drainage and serviceability of the Site.

4.3 Groundwater

Based on available information groundwater in Karratha is expected to be 5-10m below surface level and may vary seasonally in depth by 2-3m. The geotechnical investigation undertaken on Lot 1 did not find groundwater at a maximum investigation depth of 2.5m.

4.4 Surface Water

7 Mile Creek is considered a major waterway and lies to the east of the Site. The site is located within a 500-year flood and storm surge area as previously documented by JDA in the Karratha Coastal Vulnerability Study.

Proposed earthworks for the site completed by Porter Consulting indicate a varying lot level between 10.4mAHD and 8.4mAHD. The final finished floor levels for the developments are unknown as development footprints are not yet confirmed.

As per the City of Karratha Storm Surge Risk Policy (DP19) habitable floor levels shall be raised to a level above the 500-year storm surge level. Further assessment may be required to confirm the level at the subject Site however the extract below from the Karratha Coastal Vulnerability Study by JDA shows the 500-year flood extents for a range of climate scenarios.

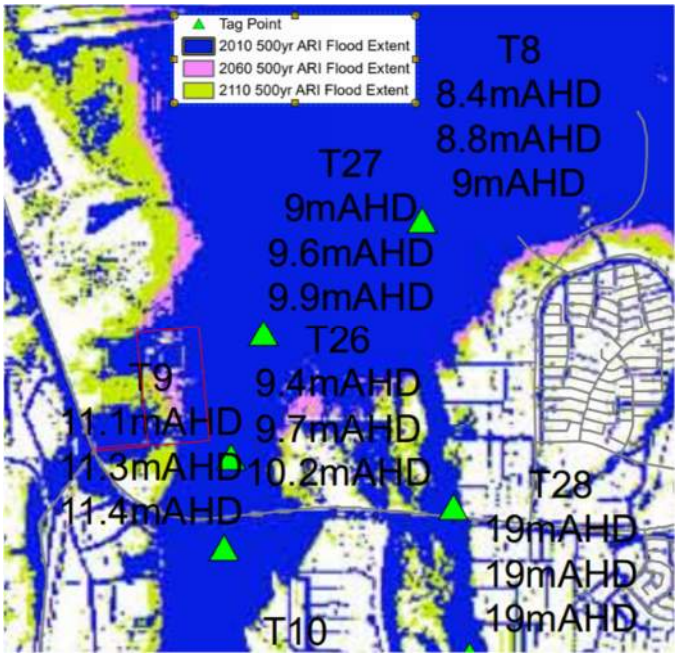


Figure 3: 500-year flood extents (JDA)

4.5 Acid Sulphate Soils

Based on available mapping the eastern portion of the site has a low to moderate risk of acid sulphate soils (ASS) within 3m of the surface whilst the remainder of the site has no known risk of ASS. All excavation works and dewatering in at risk ASS soils must be carefully managed to avoid any potential damage to surrounding land and water ways. It is recommended a high-level investigation into the occurrence of ASS should be included in any future geotechnical and environmental investigation to ensure any risks of encountering ASS are mitigated however based on the current development it is not expected that deep excavations will occur along this eastern edge of the site.



Figure 4: ASS Risk Map (MNG)

5 Earthworks and Demolition

5.1 Demolition & Clearing

Prior to development works commencing any redundant infrastructure, fencing, scrap material or rubbish located on the site will need to be removed and disposed of to an approved tipping location.

Any demolition works associated with existing habitable structures is subject to a detailed assessment by others and is not captured within the scope of this report. All demolition works should consider City of Karratha requirements and the potential presence of asbestos containing materials, contamination and septic tanks.

All vegetation marked for clearing will also be removed from the site. Any areas of protected vegetation shall be clearly marked, and physical controls implemented to restrict access by construction machinery.

It is recommended that if there is any vegetation to be retained, a suitably qualified arborist be engaged to assess and provide commentary on the required tree protection methodologies.

5.2 Bulk Earthworks

All earthworks will need to be undertaken in accordance with AS3798 *'Guidelines on earthworks for commercial and residential developments'* and recommendations in the Geotechnical Investigation undertaken by STATS Australia. It is anticipated that the earthworks can be undertaken onsite utilising standard civil construction equipment.

The scope and magnitude of earthworks to be undertaken and the final earthworks levels will be dictated by the following:

- The requirement to manage stormwater drainage onsite and applicable levels for this to be achieved.
- Drainage outfall levels for the stormwater drainage system and industry standard requirements for freeboard from the proposed finished floor level to 100 year and 500-year flood levels and storm surge levels. This is subject to further advice provided by the hydrologist and will be verified during preliminary design.
- Interface and coordination with the existing levels of the adjacent road network and development sites.

JDSi understand that Porters have completed an earthworks design over the site as this work will subject to final approval by the relevant authorities.

6 Roadworks

The adjacent public road network, specifically Dampier Rd, is under the control of the City of Karratha and as such all works on and abutting the public roads will be subject to their approval. Dampier Rd is a RAV 10 network with a posted speed of 100km/h reducing to 70km/h at the Exploration Drive signalised intersection.

PTG have completed a Traffic Impact Assessment which found that there will be no material impact to the existing access point and traffic volumes on Dampier Drive. Once traffic numbers are known consideration may be required for a short AUL treatment.

Access to the Site is currently from a 7.5m wide sealed battleaxe driveway and JDSi understand that agreement for this has been reached between the owners of Lots 1 and 500. This access arrangement is to remain as part of the development.

The development of Lot 1 proposes a 2 lane east-west spray sealed road to provide suitable access to the 4 strata lots from the existing battleaxe driveway. The typical internal road cross section consists of 4m wide lanes and a 1.0m wide sealed shoulder located in a 31m wide road reserve. A 17.5m radius turn-around is proposed at the eastern end of the internal road, with this section to be asphalted.

All internal, private roads should be constructed to typical City of Karratha and IPWEA Standards and road geometry should consider the largest design vehicle for the development, noting Dampier Rd allows a RAV 10 (53.5m) long vehicle.

7 Stormwater Drainage

Urban Water Management (UWM) is now a key part of any development process incorporating principles of integrating water and land use planning, considering all water sources in water planning, integrating water use and natural water processes and a total catchment integration of natural resource use and management.

Stormwater drainage management is a major component of an overall UWM strategy for which achievement of the principals of the plan may be facilitated through the application of Water Sensitive Urban Design (WSUD) techniques during planning, design and construction of urban development projects. Objectives of WSUD include but are not limited to the following:

- Detention of stormwater rather than rapid conveyance to maintain predevelopment flows for quantity management;
- Use of vegetation for filtering purposes and nutrient stripping for quality management;
- Use of stormwater to conserve potable water; and
- Water efficient landscaping.

The stormwater drainage from the development will need to be designed and constructed in accordance with City of Karratha and DWER design guidelines. The internal drainage in Lot 1 and 500 will need to be maintained by the Developer.

JDSi understand a Stormwater Drainage Strategy has been developed for Lot 1 and this general approach should be followed for Lot 500 as part of any future works. The proposed drainage strategy should consider:

- Matching pre-development and post-development outflows from the site, noting the existing predevelopment flows are in an easterly direction towards 7 Mile Creek.
- Capture and conveyance of overland sheet flow from lots into roadside and lot boundary swales, with these graded towards the eastern boundary.
- Construction of 2 detention basins (north-east and south-east corners) to manage peak flow volumes, with a low flow pipe and higher-level weir implemented to manage post-development outfall rates.
- Management of potential scour in open drains and outlets through stone pitching and/or riprap.
- Habitable floor levels to be raised to 300mm above the 1% AEP Flood Event
- Compliance with the requirements of the City of Karratha Storm Surge Risk Policy (DP19).

The requirements of the stormwater drainage system, and the wider terrestrial water management approaches, will need to be approved by the City of Karratha through submission of an Urban Water Management Plan or similar document. It is recommended a suitably qualified hydrologist is engaged to assist with the study and preparation of this report.

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8 Sewer Reticulation

The Water Corporation owns and maintains the sewerage reticulation system in the vicinity of the Site. Any connection into this system will need to be designed, approved and constructed in accordance with standard Water Corporation requirements. Any internal plumbing works on the Site will need to meet the requirements of AS3500 'Plumbing and drainage' as documented by a suitably qualified consultant.

Based on the Water Corporation ESInet data there is an existing DN225 PVC gravity network within the existing industrial area to the west of Dampier Rd, running along Resource Rd. This gravity feeds south to an existing WWPS (Gap Ridge PS8) on Magnetite Way, which then discharges via a DN200 PVC pressure main back to the Water Corporation treatment plant.

A second WWPS (Karratha PS9) is situated on Resource Rd, opposite the existing access way to the Site. This discharges via a DN100 pressure main to the south, ultimately discharging into the gravity system feeding into Gap Ridge PS 8.

The existing gravity system is not at a sufficient depth to provide a gravity connection point to Lot 1 and 500 and therefore a private pump station will be required onsite.

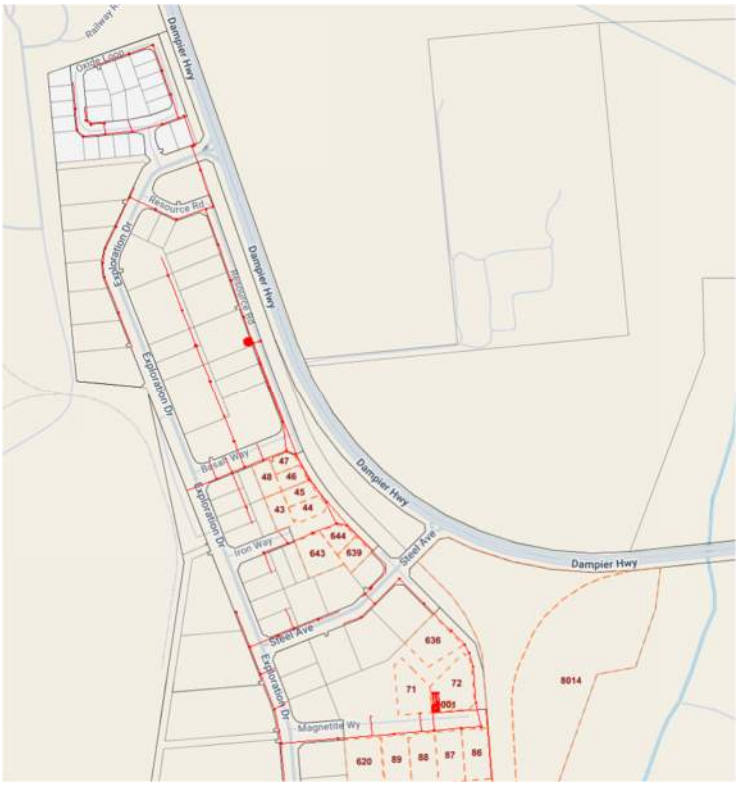


Figure 5: Existing Water Corporation sewer infrastructure (Esinet)

Based on advice from the Developer, JDSI understand the 4 strata lots are to accommodate approximately 300 employees. With reference to the State Governments Supplement to Regulation 29 and Schedule 9, daily flow rates could be in the order of 30-70L/day/person. This equates to approximately 9,000-21,000L/day from the site and does not consider additional flows associated operations and manufacturing.

Water Corporation typically allow a maximum discharge rate for private pump stations of 2 L/s. The above employee usage rates would fall under this requirement however other operational waste

generating flows would need to be considered. If peak flow rates exceed the maximum 2 L/s rate, then additional buffer tanks can be incorporated on site to manage peak and off-peak flow rates.

A private pump station typically has an external vent, control cabinet and dual macerating pumps. A high-level alarm for each sewer pump station can be connected to remote BMS system or mobile phone to assist with maintenance and emergency management.

Considering the proposed industrial usage of the site, and subject to confirmation of waste to be disposed, a trade waste application will need to be lodged with Water Corporation as part of any approvals to connect to their network. Water Corporation will need to confirm the required discharge point for a private pump station.

The proposed strata lots will be serviced by a private wastewater network, designed with sizes and grades in compliance with AS/NZS 3500.2 or as a performance solution in accordance with Water Corporation regulations. Clean out access points and inspection openings on the wastewater drains will be provided at regular intervals.

9 Water Reticulation

The Water Corporation owns and maintains the potable water reticulation system in the vicinity of the Site. Any connection into this system will need to be designed, approved and constructed in accordance with standard Water Corporation requirements.

To provide a potable water supply to the development, suitably qualified persons will be required to design the proposed water reticulation network and submit to the Water Corporation for approval. Applicable headworks charges will need to be paid by the Developer, and these will be determined by the Water Corporation at the time of application. All water main extensions required for the development site will be laid within the existing and proposed road reserves, on the correct alignment and in accordance with the Utility Providers Code of Practice and Water Corporations Water Reticulation Pipelines DN250 and Smaller (DS63). These mains can then be used to provide both potable and fire water connections to each lot, noting that flow and pressure checks will need to be done as part of any assessment of fire water supply for the industrial lots.

All internal potable and fire water systems will need to be designed and installed in accordance with AS3500 and DFES requirements.

Based on the Water Corporation EsiNet data there is an existing DN150 PVC water reticulation main within the existing industrial area to the west of Dampier Rd, running along Resource Rd. This was constructed in approximately 2011. To the south of the site near the 7 Mile Creek crossing is a DN250 PVC main, also constructed in 2011. This runs under Damier Rd and heads south, connecting into Magnetite Way.



Figure 6: Existing Water Corporation water infrastructure (Esinet)

Based on advice from the Developer JDSi understand the 4 strata lots are to accommodate approximately 300 employees with additional usage required for on-site operations. Final peak flow rates will dictate the required master meter size required for the development, with this rate to be confirmed once fixture units and loadings are known for each lot. Individual sub-meters can be installed on each strata lot to manage water usage fees and charges. Depending on final water usage rates (daily volumes and peak flows) the mains extension to the site may require an interconnection of the existing

DN150 and DN250 mains identified above however this will be determined once a formal application has been made to Water Corporation.

A fire water system will likely be required for the site and assuming individual structure sizes below 10,000m2, it is expected that a minimum flow rate of 20L/s will be required to service 2 hydrants, with this service provided as a dedicated fire water connection off the Water Corporation mains. Depending on the results of a flow and pressure test, a pump and tank system may be required to manage peak flows and volumes.

10 Power Supply

Horizon Power (HP) owns and operates all electrical distribution network assets in the vicinity of the proposed development. All new electrical infrastructure and installations will be required to comply with Horizon Power standards, WASIR (Western Australian Service and Installation Requirements), AS/NZS 3000, and other relevant Australian Standards.

The following advice is based on JDSi desktop investigations, supported by information provided by the Developer and utility records obtained from Before You Dig Australia (BYDA).

Existing

An existing 132kV transmission overhead line (Karratha to Dampier Line 81) is located along the eastern side of Dampier Road. Whilst not immediately impacting this development, it may introduce construction constraints.

Existing high voltage (HV) overhead and underground infrastructure is present near to the development site, particularly on the eastern side of Dampier Road near Resource Road. With overhead lines extending to the site. It is anticipated that this infrastructure will provide a suitable point of connection for the proposed development, subject to Horizon Power assessment.

Information provided by the client indicates that the Site currently has an allocated 200kVA connection located along the south-western boundary. This connection is supplied via overhead infrastructure, which is capable of being upgraded. However, the capacity of this infrastructure is limited to 1000kVA and is therefore insufficient to support the proposed development demand.

Refer to Figure 7 for BYDA utility mapping of the surrounding area.

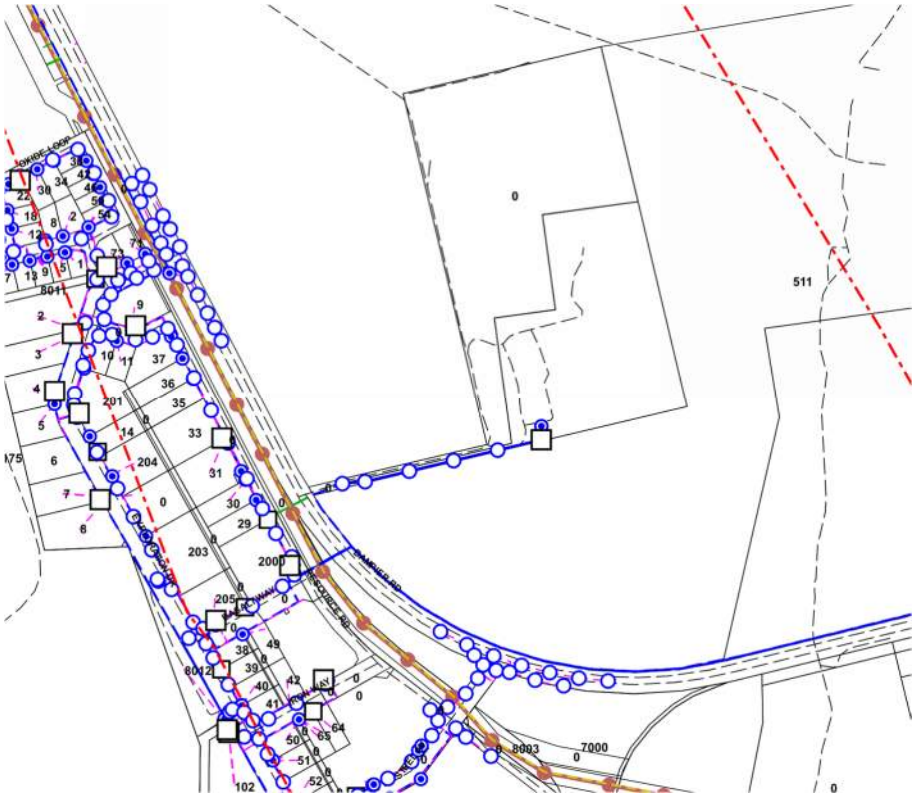


Figure 7: Horizon Power BYDA utility mapping

Proposed

The estimated total load for the development has been provided by the Developer and is summarised in the table below.

Unit	Proposed Usage	Load Allocation
Unit 1	Workshop/Manufacturing Facility	2,500kVA
Unit 2	Galvanising Plant	2,500kVA
Unit 3	Vehicle Maintenance Centre	430kVA
Unit 4	Container Storage	72kVA
Total Proposed Load		**5,502 kVA**

Based on the anticipated total load of 5.5MVA, the development will require a new high voltage supply derived from the existing network in the vicinity of Resource Road.

The existing overhead connection servicing the site is insufficient to support the proposed load and will require decommissioning and removal as part of the supply upgrade works.

It is expected that the development will be serviced via a high voltage metered supply provided by Horizon Power. A formal HV Submission will accompany the connection application to be submitted to Horizon Power who can then determine the specific connection requirements, including supply configuration, metering arrangements, and any network constraints.

Network Reinforcement

Horizon Power does not reserve network capacity. As such, the advice provided above is indicative only and reflects conditions at the time of this report.

Given that this servicing advice for power is based on desktop investigations, it is recommended that, once development planning is sufficiently advanced, a formal Design Information Package (DIP) request or Pre-Application Enquiry is submitted to Horizon Power. This process will confirm:

- Available network capacity
- Connection methodology and staging requirements
- Any augmentation or reinforcement works
- Network interface and compliance requirements

11 Gas

Before You Dig Australia (BYDA) information indicates that there is no reticulated gas network in Karratha. Reticulated gas is not an essential service and therefore if it is required for the proposed development, then a bottled gas solution will need to be considered.

12 Telecommunications

Before You Dig Australia (BYDA) information indicates existing communication infrastructure provided by Telstra and NBN is currently available along Dampier Rd and within the adjacent industrial area to the west of the site.

The site is shown on the NBN Coverage Map has having an available satellite service.

A fixed line service could be extended from the existing network on Dampier Rd, or alternatively a wireless satellite system implemented for onsite communication and internet services.

13 Disclaimer

JDSi have undertaken this assessment based on a desktop study and subsequently assumptions have been made which, if incorrect, have potential to change the assessment and/or recommendations. Major cost implications exist through factors which cannot be assured at this time including upgrading and provision of utility services, WAPC conditions of development, Local Authority Scheme Requirements, ground conditions, timing of adjacent developments, etc.

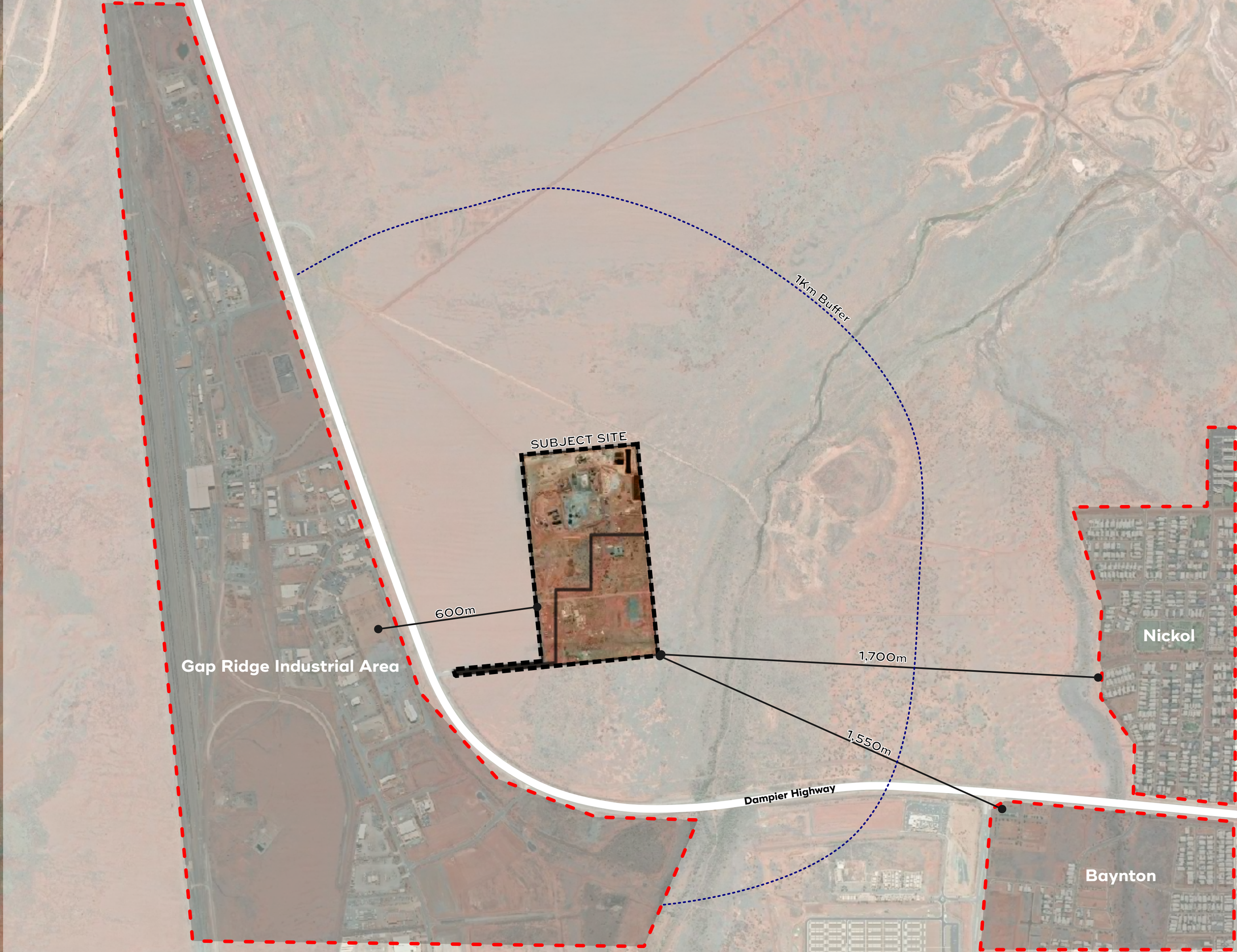
While JDSi has taken all care in the preparation of the likely development requirements and has noted key assumptions, JDSi accepts no responsibility for the accuracy of this report and provides it only as an indicative summary of engineering requirements.

If any further information is required or should you wish to clarify any issue, please contact our office.

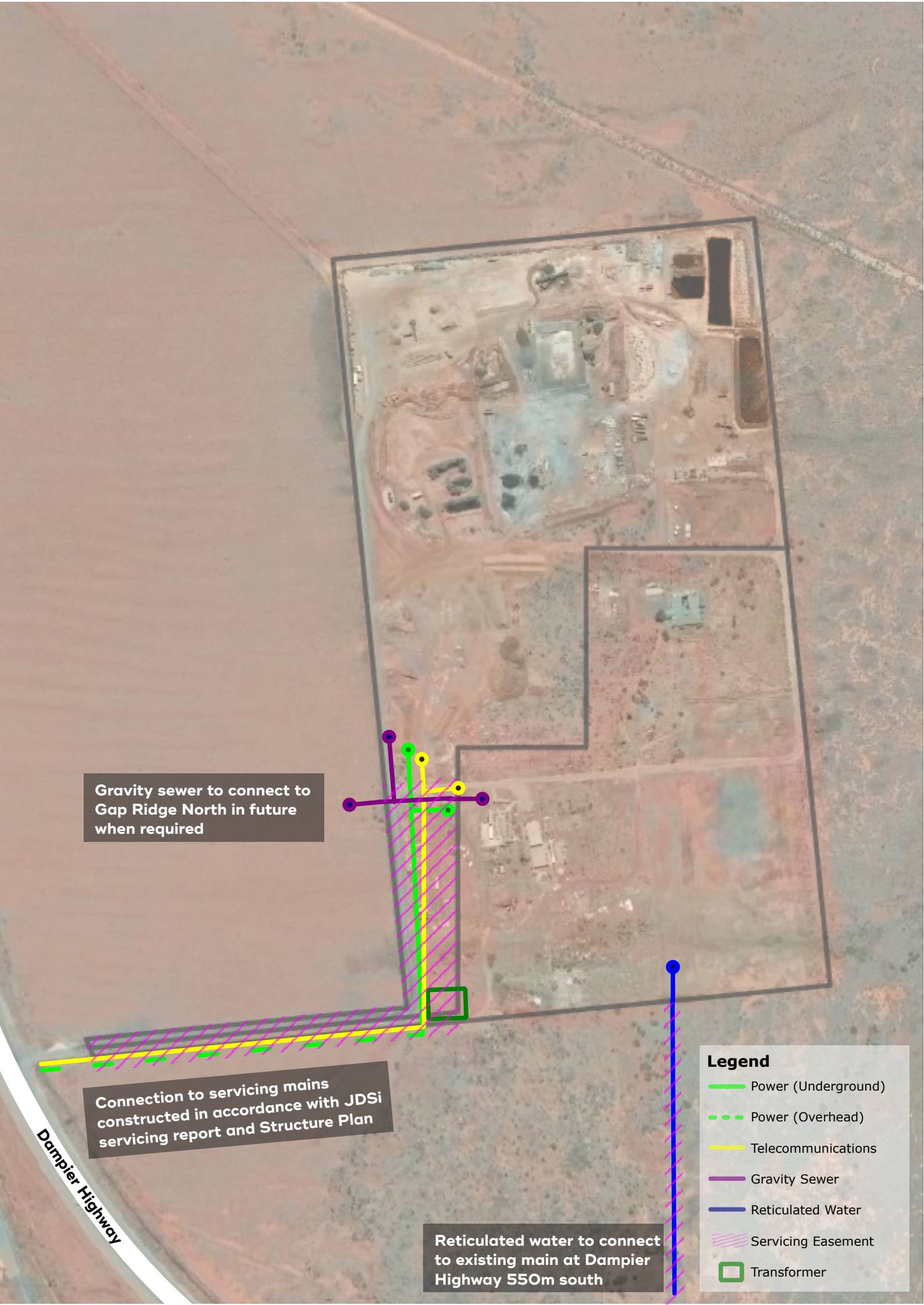
Plan 1 : Indicative Site Access Plan


Road widening required to allow for left turn in from Dampier Highway
Dampier Highway
Legend
Main Ingress
Main Egress
Internal Circulation
Site Access
Shared Access Agreement

Plan 2 : Sensitive Uses Separation Plan


SUBJECT SITE
1Km Buffer
600m
1,700m
1,550m
Gap Ridge Industrial Area
Nickol
Baynton
Dampier Highway

Plan 3 : Indicative Servicing Connection Plan


Gravity sewer to connect to Gap Ridge North in future when required
Connection to servicing mains constructed in accordance with JDSi servicing report and Structure Plan
Reticulated water to connect to existing main at Dampier Highway 550m south
Dampier Highway
Legend
Power (Underground)
Power (Overhead)
Telecommunications
Gravity Sewer
Reticulated Water
Servicing Easement
Transformer

Plan 4 : LSP Area Environmental Constraints


Dampier Highway
Legend
Bushfire Prone Areas
Acid Sulphate Soil (Medium - High Risk)
1:100 AEP Floodplain
Native Vegetation