WESTERN
ENVIRONMENTAL

Lot 822 Stirling Crescent, Hazlemere

Environmental Assessment Report

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Lot 822 Stirling Crescent, Hazlemere

Environmental Assessment Report

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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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1. Introduction

1.1 Background

Western Environmental Approvals Pty Ltd (WEPL) was commissioned by Hesperia to prepare an Environmental Assessment Report (EAR) to support a Development Application (DA) for Lot 822 Stirling Cresent, Hazelmere (hereafter referred to as the 'Site') (Figure 1).

The proposed development comprises the construction of an industrial facility on the Site (Figure 2). The proposed development layout is attached as Appendix A.

The Site is approximately 2.9 ha in size and is located approximately 17 km northeast of Perth Central Business District (CBD) within the City of Swan (CoS). The Site is zoned 'Urban' under the Metropolitan Region Scheme (MRS) and 'Special Use 15' under Local Planning Scheme No.17 (LPS17) which includes a range of light industrial and/or institutional uses (Figure 3).

The Site is part of the Hazelmere Enterprise Area Draft Structure Plan (HEADSP) (City of Swan, 2011). Helena River runs along the northern boundary of the Site. The HEADSP provides for the Site to be developed for light industrial uses, with institutional uses related to education, health, research and recreation being promoted (Precinct 2A).

This report has been prepared to identify the environmental values within the Site, potential impacts and risks associated with the proposed development of the Site.

1.2 Purpose and Scope

This EAR has been prepared to support the DA using publicly available datasets and information collected during a site inspection undertaken by WEPL in April 2026. The EAR provides the following:

- An overview of legislation, policies, strategies and guidance that exist at the Commonwealth, State, and local levels that apply to and must be considered by the proposed development.
- Detail of the Site's environmental context through a review of existing information relating to the Site (including publicly available datasets and government-managed databases).
- A summary of the environmental characteristics of the Site.
- Details of likely and possible environmental impacts and recommended mitigation and management measures.

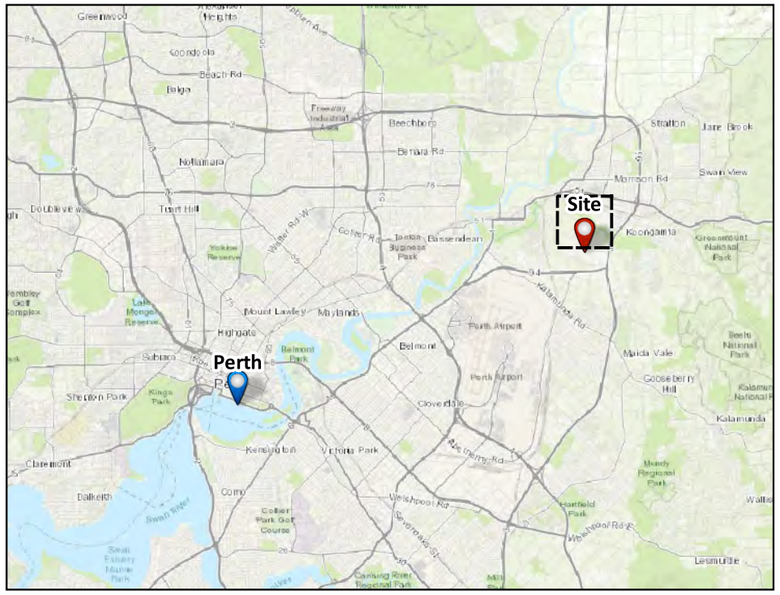

Figure 1: Site Location

N

0 20 40 60 80 m

PROJECT/REPORT NAME	Environmental Assessment Report Lot 822 Stirling Cr, Hazelmere
SCALE	1:1,600
SHEET SIZE	A3 COLOUR
CLIENT	Hesperia
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A26.150
VERSION	0
DATA SOURCE	Nearmap (11th April 2026)
DRAWN BY / REVIEWED BY	SC/JB
DATE	15/6/2026

Legend

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

No	Description	Drawn	Approved	Date
A	Original issue	SC	JB	15/6/2026

NOTES:

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

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Figure 2: Concept Plan

N

0 10 20 30 40 m

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CLIENT	Hesperia
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Legend

- Site
- Foreshore Boundary
- Access Road / Parking
- Drainage Basin
- Landscape Area
- Warehouse / Office

No	Description	Drawn	Approved	Date
A	Original issue	SC	JB	25/6/2026

NOTES:

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

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Figure 3: Local Planning Scheme Zoning

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0 40 80 120 160 m

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CLIENT	Hesperia
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A26.150
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY NOW
DRAWN BY / REVIEWED BY	SC/JB
DATE	15/6/2026

Legend

- Site
- Local Planning Scheme - Zones and Reserves (DPLH-071)
  - General industrial
  - General rural
  - Highway service
  - Industrial development
  - Special use

No	Description	Drawn	Approved	Date
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2. Legislation

This EAR has been prepared with reference to the following key legislation listed below, which provide for the protection and management of environmental values, heritage values, and bushfire risk associated with the Site and proposed development.

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.

2.2 State

- *Environmental Protection Act 1986* (EP Act).
- *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).
- *Planning and Development Act 2005* (PD Act).
- *Swan and Canning Rivers Management Act 2006* (SCRM Act)
- *Heritage Act 2018.*

2.3 Local Government

The Site is subject to the provisions of the City of Swan Local Planning Scheme 17 (LPS 17).

3. Environmental Context

3.1 Land Use History

3.1.1 Current Land Use

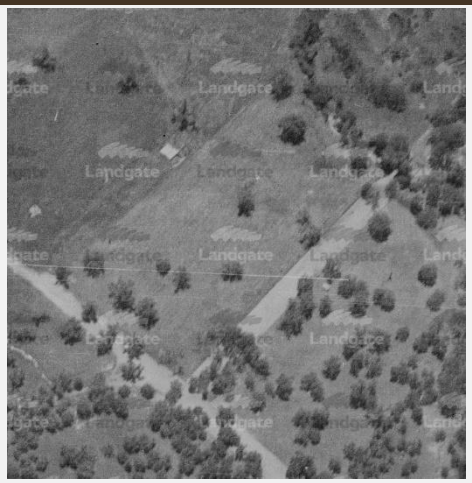
The Site is zoned 'Urban' under the Metropolitan Region Scheme, and 'Special Use 15' under LPS 17.

The Site is currently abandoned. A concrete slab, being a remainder of previous poultry farm facilities remains within the south-east of the Site.

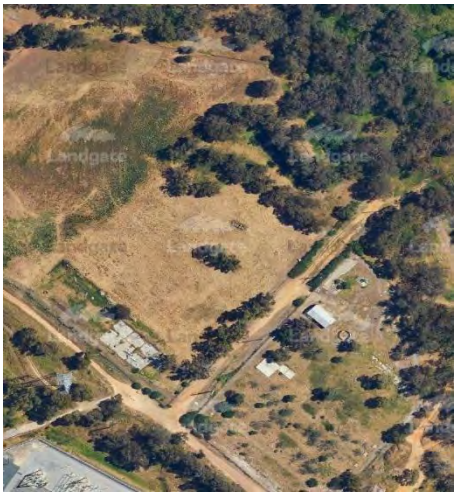
3.1.2 Historical Aerial Photographs

The Site has been extensively cleared historically and developed for paddocks, and rural dwellings, with planted gardens and trees between 1995 - 2012. This was confirmed by an assessment of historical aerial imagery as shown below in Table 1 (Landgate, 2024).

Table 1: Historical Imagery and Land Use

Year	Description	Image
1953	The Site contains limited native vegetation.	
1974	The Site has been completely cleared. A building (agricultural shed) has been constructed on the southern boundary of the Site.	

Year	Description	Image
1995	The Site has been used for grazing and poultry farming. A dam has been excavated at the back of the property adjacent to the site boundary facing Helena River in the north.	
2000	Trees have been planted on top of the dam walls.	
2018	Chicken shed has been demolished.	

Year	Description	Image
2022	Further structures that were part of the poultry farm have been removed. The concrete slab of the initial chicken shed remains. This reflects the current state of the Site.	

3.1.3 Surrounding Land Use

To the north-east of the Site is the Helena River, Guildford Terminal, an electrical substation is located to the south-west of the Site. The private property to the east (Lot 823) is currently vacant, while the private property to the west is used as horse paddock.

3.2 Topography, Geology and Soils

3.2.1 Topography

Elevation across the Site ranges from 8 m Australian Height Datum (AHD) along the north-eastern boundary adjacent to Helena River to 14 m AHD in the south-east of the Site (DPIRD-072). A manmade dam is, however located within the northern portion of the Site, surrounded by elevated dam walls.

3.2.2 Geology and Soils

The Site is located within the Pinjarra Zone of the Swan Province and features:

> *'Alluvial deposits (early Pleistocene to Recent) between the Bassendean Dunes Zone and the Darling Scarp, colluvial and shelf deposits adjacent to the Darling Scarp. Clayey to sandy alluvial soils with wet areas'* (Schoknecht et al., 2004).

Department of Primary Industries and Regional Development (DPIRD) (DPIRD-027) mapped two soil units within the Site (Table 2).

Table 2: Soil-Landscape Units within Survey Area (DPIRD-027).

Soil-Landscape Unit	Description
213Pj_Gf9	Pinjarra, phase Gf9. Minor sandy rises (aeolian deposits) with moderately deep well drained sands overlying gravelly mottled clay

3.2.3 Acid Sulfate Soils

Acid Sulfate Soils (ASS) are naturally occurring soils containing iron sulphides, which when oxidised, can lead to acidification of soils and groundwater and, consequently, extensive environmental damage.

According to mapping by the Department of Water and Environmental Regulation (DWER) *Acid Sulphate Soil Risk Map - Swan Coastal Plain* (DWER-055), approximately 1.02 ha of the southern portion of the Site is identified to have a moderate to low risk of ASS occurring within 3 m of the natural soil surface, and a high to moderate risk of ASS beyond 3 m of the natural soil surface (Figure 4).

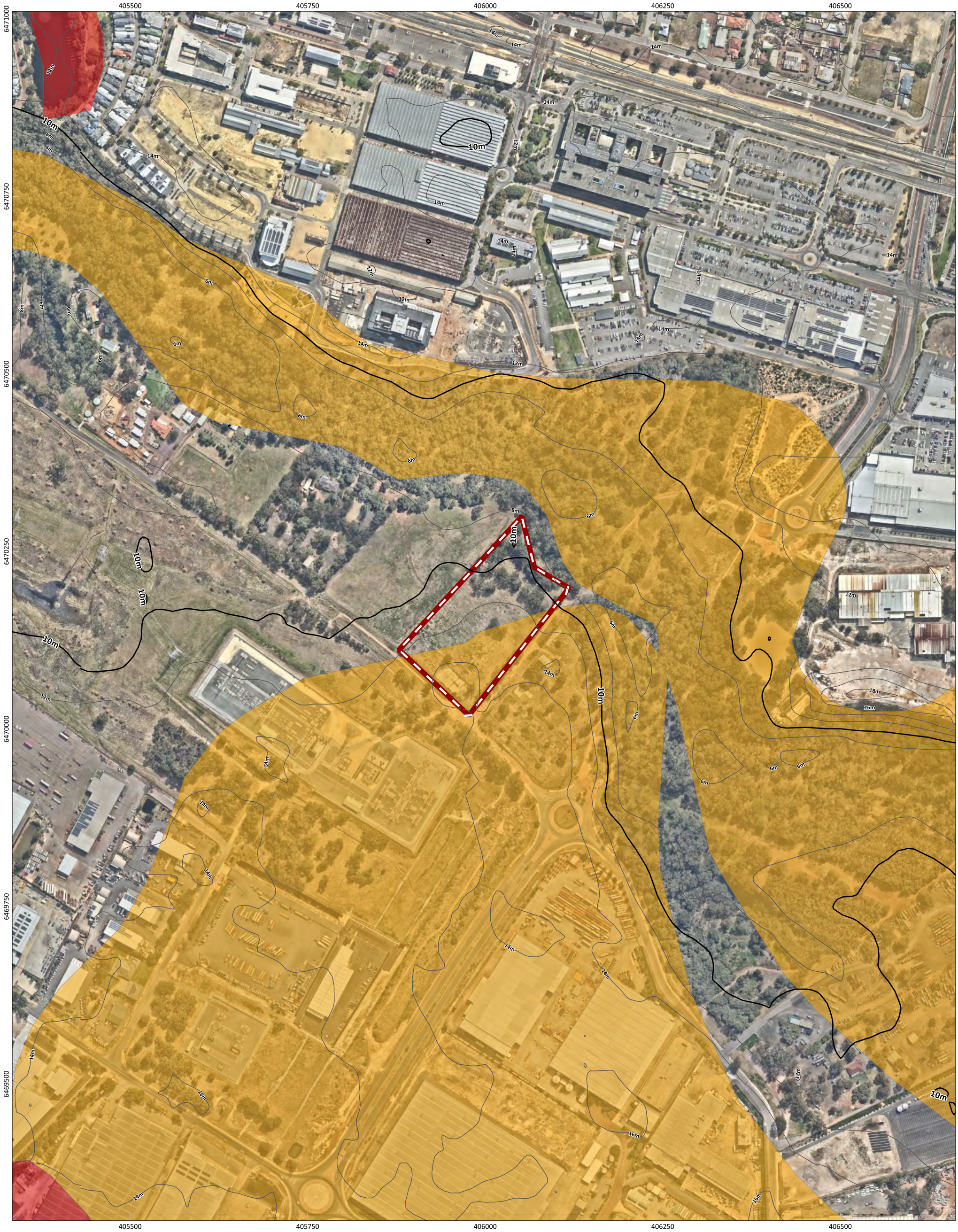


Figure 4: Topography and ASS Risk

N

0 30 60 90 120 m

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SCALE: 1:5,000	SHEET SIZE: A3 COLOUR	CLIENT: Hesperia	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50		PROJECT NUMBER: A26.150	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY NOW		DRAWN BY / REVIEWED BY: SC/JB	DATE: 15/6/2026

Legend

Site

2 metre contours (DPIRD-072)

- 2m Contour
- 10m Contour

Acid Sulfate Soil Risk Map, Swan Coastal Plain (DWER-055)

- 1 - High to moderate risk of ASS occurring within 3m of natural soil surface
- 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

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A	Original issue	SC	JB	15/6/2026

NOTES:

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

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3.3 Hydrology

3.3.1 Surface Water

The Site is situated within the Helena River catchment which is a tributary of the Swan River. The Site has no mapped drainage lines or water courses, according to mapping available through DWER (DWER-031). The Helena River is located approximately 28 m north-east of the Site, as shown on Figure 5.

A detailed foreshore definition study was undertaken by AECOM in 2010 which had the purpose to define the Helena River foreshore area boundary based on the presence of values requiring protection (Appendix B). The AECOM (2010) foreshore boundary mapping for the Site is presented in Figure 5.

The Site is adjacent to the Helena River floodplain area. According to mapping of 1 in 100 Annual Exceedance Probability (AEP) Floodway and Flood Fringe Area (DWER-014) and Floodplain Areas (DWER 020), the floodplain abuts the Site in the north-east (Figure 5).

The north-eastern boundary of the Site aligns with the Swan Canning Development Control Area (DCA) as shown in Figure 5. In accordance with Corporate Policy Statement No. 48 - Planning for Development Setback Requirements affecting the Swan Canning Development Control Area (DBCA, 2016), a 10 m soft surface buffer from the DCA boundary is required to be implemented for developments. This buffer is included in Figure 5.

3.3.2 Groundwater

Groundwater mapping indicates that the minimum depth to groundwater ranges from 2-3 m, while the maximum depth to groundwater ranges from 1-6 m as presented in Figure 6 (DWER-095; DWER-096). It is, noted that the public data sets contain uncertainty due to multiple limitations, such as the absence of sufficient data density. Within the Swan area, contours have predominately been derived based on extrapolation.

The HEADSP provides groundwater levels following monitoring over 18 months (City of Swan, 2011). This study indicates that the groundwater depth for the Site is expected to be greater than 1.2 m, aligning closely with information provided by DWER online mapping.

Groundwater generally flows from south-east to north-west.

3.3.3 Wetlands

DBCA has mapped wetlands on the Swan Coastal Plain according to hydrological attributes and landform types, as described in the methodology for the evaluation of wetlands on the SCP (DBCA, 2017). Many of the wetlands have been evaluated and assigned a management category which provides guidance on how they should be managed and protected: Conservation wetlands (Highest priority wetlands); Resource Enhancement wetlands (Priority wetlands); and Multiple Use wetlands.

According to the Geomorphic Wetlands Swan Coastal Plain dataset (DBCA-019), the Site comprises a Multiple-Use wetland (MUW) UFID 15,266 which is associated with the Helena River Floodplain, as shown on Figure 5.

A Conservation Category Wetland (CCW) (UFI 15440) associated with Helena River is adjacent to the northern boundary of the Site, which extends into the Site by approximately 4 m².

3.3.4 Public Drinking Water Source Areas

The Site is not located within or near any Public Drinking Water Sources Areas (PWDSA) (DWER-033). The closest PDWSA is the Protection Area (P1) Gnangara Underground Water Pollution Control Area is located approximately 10.9 km north-west of the Site.

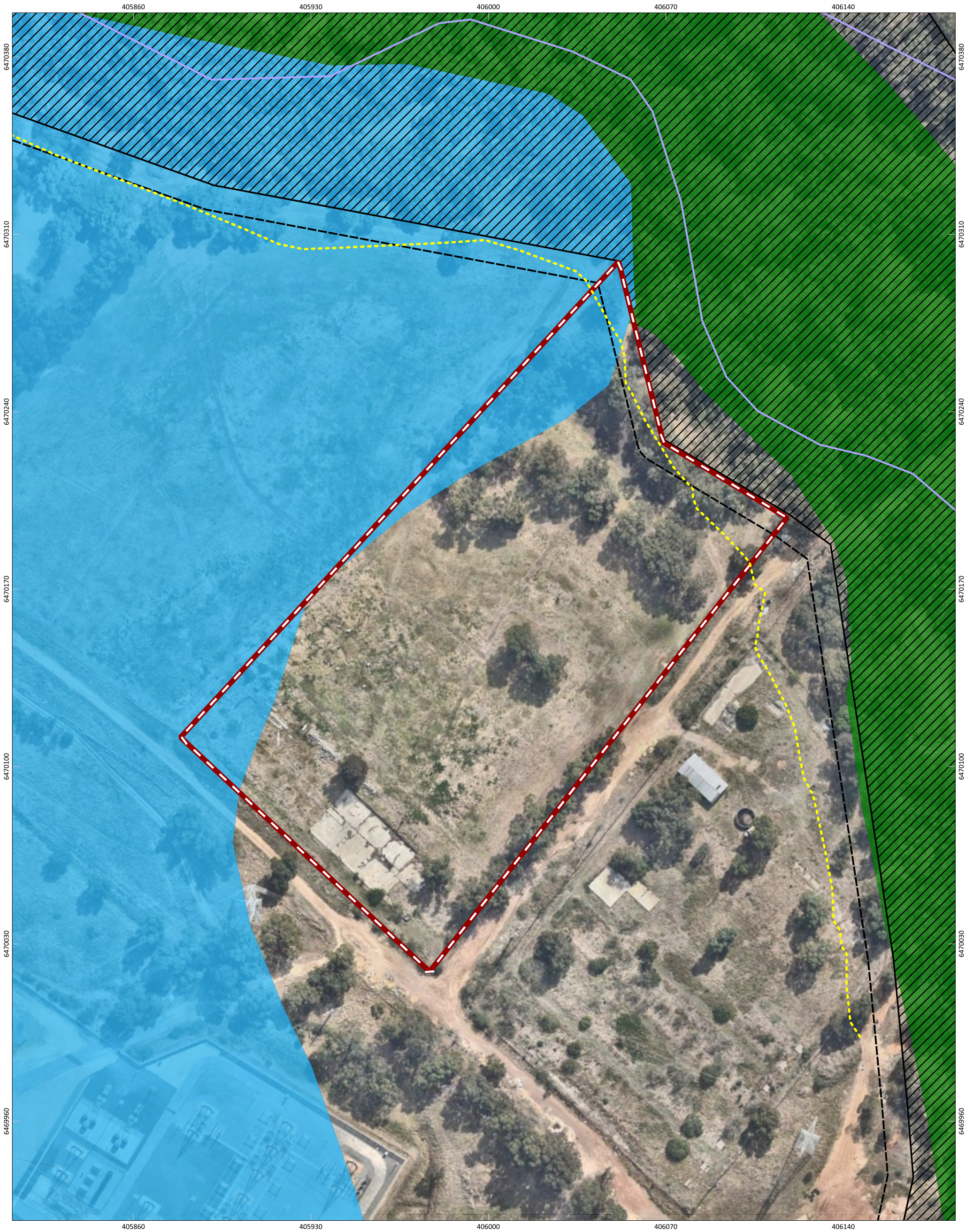

Figure 5: Surface Water Features and Wetlands

N

0 10 20 30 40 m

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SHEET SIZE	A3 COLOUR
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DATA SOURCE	Nearmap (11th April 2026)
DRAWN BY / REVIEWED BY	SC/JB
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Legend

- Site
- Foreshore Boundary
- Hydrography Linear (Hierarchy) (DWER-031)
- Swan and Canning River - Development Control Area (DBCA-028)
- 10 m buffer from DCA

Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)

- Conservation
- Multiple Use

No	Description	Drawn	Approved	Date
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Figure 6: Groundwater Contours

N

0 30 60 90 120 m

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COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A26.150
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY NOW
DRAWN BY / REVIEWED BY	SC/JB
DATE	17/6/2026

Legend

- Site
- Gnangara Jandakot Water Table Elevation (Contours) – 2019 Max (DWER-100)
- Gnangara Jandakot Depth to Groundwater (Contours) – 2019 Min (DWER-095)

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3.4 Flora & Vegetation

3.4.1 Pre-European Vegetation

Original vegetation community mapping was undertaken by John Beard and associates (1981), who conducted a systematic survey of native vegetation during the 1970s and described the vegetation systems in WA. 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 types and extent. These vegetation maps are maintained in digital form by DPIRD (DPIRD-006).

The Site is located within the Bassendean_1001 and Pinjarra_1009 vegetation association. The pre-European and current extents of the Beard (1981) vegetation association within the Perth (SW02) IBRA subregion are described below in Table 3.

Table 3: Pre-European Vegetation Association Representation

Vegetation Association or Complex within the Site	Description	Original Extent (ha)	Current Extent (ha)	% Remaining	% Managed for Conservation
Bassendean_1001	Medium very sparse woodland; jarrah, with low woodland; banksia & casuarina	53,283.54	11,394.19	21.38	3.01
Pinjarra_1009	Jarrah, marri and wandoo *Eucalyptus marginata, Corymbia calophylla, E. wandoo.*	6,958.20	314.27	4.52	-

Vegetation complexes of the Swan Coastal Plain were mapped by Heddle et al. (1980) at a scale of 1:250,000 (DBCA-046). According to this data, the Site is mapped as Guildford Complex (DBCA-046). The pre-European and current extents of the Heddle (1980) vegetation complexes are presented in Table 4 (Government of Western Australia, 2019a; Government of Western Australia, 2019b).

Table 4: Pre-European Vegetation Complex Representation

Vegetation Association or Complex within the Site	Description	Original Extent (ha)	Current Extent (ha)	% Remaining	% Managed for Conservation
Guildford Complex	A mixture of open forest to tall open forest of *Corymbia calophylla* (Marri) - *Eucalyptus wandoo* (Wandoo) - *Eucalyptus marginata* (Jarrah) and woodland of *Eucalyptus wandoo* (Wandoo) (with rare occurrences of *Eucalyptus lane-poolei* (Salmon White Gum)). Minor components include *Eucalyptus rudis* (Flooded Gum) -	90,513.13	4,607.91	5.09	0.33

Vegetation Association or Complex within the Site	Description	Original Extent (ha)	Current Extent (ha)	% Remaining	% Managed for Conservation
	Melaleuca rhaphiophylla (Swamp Paperbark).				

Given the lack of remnant native vegetation, the Site is not considered to be representative of Pre-European vegetation types.

3.4.2 Vegetation

A preliminary site assessment was undertaken by a WEPL Environmental Scientist on 23 April 2026. The assessment included a broad evaluation of existing vegetation and condition. The findings of the site assessment, together with a desktop review of publicly available datasets have informed the current assessment of vegetation values within the Site.

Analysis of historical aerial imagery indicates that the Site has been extensively cleared and modified over time, having previously been used for agricultural purposes and poultry farming. Tree plantings appear to have been established between 1995 and 2000, contributing to the current vegetation assemblage.

The Remnant Vegetation Extent of the Swan Coastal Plain and Perth–Peel Region (DWER-141) dataset indicates that approximately 26.9 m² of native vegetation associated with the Helena River is mapped within the Site, occurring along the north-western boundary. This State Government dataset is derived from aerial photography and provides an indicative estimate of on-ground vegetation extent.

The Site was assessed as being in Completely Degraded condition, with the majority of the Site parkland cleared and devoid of native vegetation. Existing vegetation is limited to two native trees (flooded gums) and planted non-native trees (river red gums), with no understorey or mid-storey present. Vegetation occurs primarily within the northern portion of the Site, on top of a man-made dam adjacent to the Helena River foreshore and along the eastern road reserve.

A total of 14 trees with a diameter at breast height (DBH) of or greater than 500 mm were recorded during the site inspection, comprising one native flooded gum (*Eucalyptus rudis*) and 13 non-native river gums (*Eucalyptus camaldulensis*). Of these trees, seven (six river red gums and one flooded gum) are located within the Site, while the remaining seven river red gums form a grove situated immediately outside the Site boundary within the road reserve to the east. One river red gum located within the Site forms part of this grove and, together with the seven trees in the road reserve, is expected to be retained in accordance with the proposed concept design (Figure 2).

Tree locations and species are shown in Figure 12 and Appendix C.

3.4.3 Threatened and Priority Flora

Threatened and Priority Flora Mapping maintained by DBCA (DBCA-036) indicates that no threatened or priority flora records occur within the Site. The nearest record is a Priority 4 flora species located approximately 2 km south-east of the Site.

No threatened or priority flora were observed during the site inspection conducted by WEPL (2026). Although the site inspection was preliminary in nature and did not constitute a targeted flora assessment, the Completely Degraded condition of vegetation within the Site indicates that it is highly unlikely that threatened or priority flora occur within the Site.

3.4.4 Threatened and Priority Ecological Communities

Threatened and Priority Ecological Community mapping maintained by the DBCA (DBCA-038) indicates that no Threatened Ecological Communities (TECs), Priority Ecological Communities (PECs), or associated buffers intersect the Site. One PEC buffer occurs along the south-eastern boundary of the Site and extends into the surrounding area to the east. The nearest TEC is located approximately 1.1 km south-east of the Site.

Despite the proximity of these conservation-significant ecological communities, no TECs or PECs were identified during the site inspection. Although the site inspection was preliminary in nature and did not constitute a detailed vegetation assessment, the Completely Degraded condition of vegetation within the Site indicates that it does not support any TECs or PECs.

3.5 Conservation Significant Fauna

A preliminary site assessment was undertaken by a WEPL Environmental Scientist on 23 April 2026. The assessment included a broad evaluation of black cockatoo habitat. The findings of the site assessment, together with a desktop review of publicly available datasets, have informed the current assessment of conservation significant fauna values within the Site.

Threatened and Priority Fauna Mapping maintained by DBCA (DBCA-037) indicates that no threatened or priority fauna species have been recorded within the Site. The nearest record is of a Threatened (Endangered) bird species located approximately 800 m north of the Site.

No conservation significant fauna species were observed during the site inspection. While the inspection was preliminary in nature and did not constitute a targeted fauna survey, the Site is largely cleared and in a Completely Degraded condition, providing very limited habitat value for conservation significant fauna.

The Site contains 14 mature eucalypt trees with a DBH ≥ 500 mm, which constitute potential habitat for black cockatoos. This is discussed further below. The Completely Degraded condition of the vegetation and the absence of native understorey and mid-storey vegetation indicate that the Site is highly unlikely to represent core habitat which is relied upon by conservation significant fauna species.

3.5.1 Black Cockatoos

Three species of black cockatoo occur in the south-west of Western Australia: Carnaby's cockatoo (*Zanda latirostris)*, Baudin's black cockatoo (*Zanda baudinii*) and the forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*). Both the Carnaby's cockatoo and Baudin's cockatoo are listed as Endangered under Commonwealth EPBC Act and the State BC Act. The forest red-tailed black cockatoo is listed as Vulnerable under both the Commonwealth EPBC Act and the State BC Act.

Existing vegetation and trees of the Site and immediately adjacent were assessed for the potential to provide black cockatoo habitat.

Potential black cockatoo breeding habitat comprises species of Eucalyptus known to support breeding within the range of the black cockatoo species, which either have a suitable nest hollow or are of a suitable diameter at breast height (DBH) to develop a nest hollow (≥ 500 mm DBH). All trees which qualified as "potential nesting trees" (DBH ≥ 500 mm) were identified and assessed for hollows that are potentially suitable for breeding via a ground-based visual assessment. Species and GPS coordinates were recorded for each tree.

The site inspection also included recording evidence of roosting or feeding and any observations of black cockatoos. Foraging habitat is defined as areas including plants of species known to support foraging within the range of each cockatoo species. The quality of black cockatoo foraging habitat was assessed in accordance with the criteria detailed in the current referral guideline (DAWE, 2022). Any high value foraging species were recorded during the inspection, including trees with a DBH < 500 mm.

A broad assessment of roosting habitat values has also been undertaken (e.g. searches for piles of scats, feeding debris chewed trees).

Site Inspection

A total of 14 potential nesting trees (eucalypts with a DBH ≥500mm) were recorded during the site inspection. Seven of those trees are located outside the Site boundaries in the easterly adjacent road reserve. Tree locations and species are shown in Figure 7 and in Appendix C. Key findings of the assessment were:

- 14 trees qualifying as potential black cockatoo nesting trees (*Eucalyptus* sp. with DBH ≥500 mm) were recorded, comprising 13 river red gums (*Eucalyptus camaldulensis*) and one flooded gum (*Eucalyptus rudis*). Of those, seven trees (six river red gums and one flooded gum) are located within the Site.
- None of the recorded trees have suitable breeding hollows.
- Eight of the 14 potential breeding trees are located within a grove associated with the road reserve to the east. These trees are to be retained as part of the proposed concept design.
- The trees within the Site have the potential to provide roosting habitat. No roosting evidence was recorded.
- The only black cockatoo foraging habitat present within the Site is comprised of two flooded gums, comprising a total of approximately 0.05 ha of Low to Moderate quality foraging habitat in accordance with the DAWE (2022) *Referral guideline for 3 WA threatened black cockatoo species*. River red gums are not considered to provide suitable foraging habitat (DAWE, 2022).
- According to Birdlife (2025) the closest roosting site is located 1.1 km to the north-west, which was identified to be utilised by forest red-tailed black cockatoo. A second roosting site, utilised by both forest red-tailed and Carnaby's black cockatoo, is located 1.6 km north-west of the Site.
- No foraging evidence was recorded.

Figure 7: Contamination Risks

N

0 20 40 60 80 m

PROJECT/REPORT NAME	Environmental Assessment Report Lot 822 Stirling Cr, Hazelmere
SCALE	1:2,700
SHEET SIZE	A3 COLOUR
CLIENT	Hesperia
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A26.150
VERSION	0
DATA SOURCE	Nearmap (11th April 2026)
DRAWN BY / REVIEWED BY	SC/JB
DATE	15/6/2026

Legend

Site

Contaminated Sites Database (DWER-059)

Remediated for restricted use

No	Description	Drawn	Approved	Date
A	Original issue	SC	JB	15/6/2026

NOTES:

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

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3.6 Contamination

A search of the publicly available online government database (DWER-059) showed that the Site is not registered as a contaminated site.

The closest registered contaminated site (ID 80766) is located approximately 40 m south of the Site (Figure 8). Historical land uses at this site include wastewater treatment, intensive agriculture and the burial of animal carcasses. The site is currently classified as Remediated for Restricted Use.

Additionally, a registered contaminated site (ID 52712) is located approximately 110 m north of the Site. This site is associated with the former Midland Railway Workshops and is also classified as Remediated for Restricted Use.

Given the direction of groundwater flow from south-east to north-west and the proposed land use of the Site, the presence of those contaminated sites in the surrounding area are not considered to be a constraint to development.

Due to previous land uses, such as poultry farming, there is, however, a potential for contamination to be present within the Site. A Contamination Due Diligence Assessment has been undertaken by Emerge in April 2026. The assessment identified no evidence of actual or potential contamination that would pose a limitation or restriction on the planned development and land uses.

3.7 Conservation Areas

The Site is not located within any conservation estate or listed Bush Forever sites (DPLH-019). There is a mapped Environmentally Sensitive Areas (ESA) (DWER-046) intersecting with the Site which is associated with CCW UFI 15440 and the Helena River foreshore, as shown in Figure 9.

Figure 8: Site Assessment – Key Findings

N

0 10 20 30 40 m

PROJECT/REPORT NAME	Environmental Assessment Report Lot 822 Stirling Cr, Hazelmere
SCALE	1:1,100
SHEET SIZE	A3 COLOUR
CLIENT	Hesperia
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A26.150
VERSION	0
DATA SOURCE	Nearmap (11th April 2026)
DRAWN BY / REVIEWED BY	SC/JB
DATE	25/6/2026

Legend

- Site
- Tree Species
  - Flooded Gum
  - River Red Gum
- Bamford Tree Class
  - 5
- Access Road / Parking
- Drainage Basin
- Landscape Area
- Warehouse / Office

No	Description	Drawn	Approved	Date
A	Original issue	SC	JB	25/6/2026

NOTES:

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

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Figure 9: Conservation Areas

N

0 20 40 60 80 m

PROJECT/REPORT NAME	Environmental Assessment Report Lot 822 Stirling Cr, Hazelmere
SCALE	1:2,700
SHEET SIZE	A3 COLOUR
CLIENT	Hesperia
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A26.150
VERSION	0
DATA SOURCE	Nearmap (11th April 2026)
DRAWN BY / REVIEWED BY	SC/JB
DATE	17/6/2026

Legend

- Site
- Clearing Regulations - Environmentally Sensitive Areas (DWER-046)

No	Description	Drawn	Approved	Date
A	Original issue	SC	JB	17/6/2026

NOTES:

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

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3.8 Bush Fire Risk

The Department of Fire and Emergency Services, Mapping indicates that the northern portion of the Site is mapped as a Bush Fire Prone Area 2 (OBRM-023) (Figure 10).

Designated bush fire prone areas have been identified by the Fire and Emergency Services Commissioner as being subject, or likely to be subject, to bushfire attack. Additional planning and building requirements apply to development within these areas in accordance with *State Planning Policy 3.7: Bushfire* (WAPC, 2024a) and the *Planning for Bushfire Guidelines* (WAPC, 2024b).

A Bushfire management Plan has been prepared to identify the strategic ability to address bushfire risk and the consideration of bushfire protection criteria to support the development of the Site. The Bushfire Management Plan should be read in conjunction with this EAR.

3.9 Heritage

3.9.1 Aboriginal Heritage

According to the Aboriginal Cultural Heritage Inquiry System, the entirety of the Site intersects with a registered site associated with Helena River (ID 3758), which has been subject to a foreshore definition study by AECOM (2010) in order to define the required buffer area to protect environmental and cultural values associated with the waterway (Figure 11).

In addition, three registered Aboriginal heritage places associated with artefact/scatter values occur in close proximity to the Site. Site ID 4006 immediately adjoins the northern boundary of the Site, while Site ID 4009 is located approximately 60 m north of the Site boundary and Site ID 4010 is located approximately 100 m north-east of the Site boundary. All registered Aboriginal heritage places are illustrated in Figure 11.

Urbis has undertaken an Aboriginal cultural heritage due diligence and heritage survey for the proposed development. A desktop assessment was completed in accordance with the *Aboriginal Heritage Act 1972*, 2023 DPLH Guidelines and 2013 Aboriginal Heritage Due Diligence Guidelines, and involved a review of the Aboriginal Cultural Heritage Inquiry System (ACHIS), previous archaeological and ethnographic investigations, environmental and geomorphological context, and historical land use of the Site and surrounding Helena River corridor.

The assessment confirmed that the Site is located within the Helena River cultural landscape, an area of high Aboriginal heritage sensitivity associated with long-term Aboriginal occupation and use. In addition to being within the public boundary of the Helena River registered Aboriginal site (ID 3758), the Site is adjacent to the mapped boundary of the eastern polygon of Hump Paddock (ID 4006), a registered artefact scatter with a non-reliable boundary. The site is also in proximity to the registered Aboriginal sites on the northern bank of the Helena River, including Railway Dump (ID 4009) and Metro Meats (ID 4010), and in proximity to several Historic Aboriginal places, including Dinner Camp (ID 3518) to the east, which documents the use of the broader area as a camping and gathering place during the post-contact period.

While the Site has been subject to extensive historical disturbance associated with agricultural use, buildings, hardstand and infrastructure, the assessment identified a high potential for subsurface archaeological material, particularly in areas underlain by alluvial soils and in proximity to the Helena River. The proposed works in proximity to the river present a high risk of impact to Aboriginal cultural heritage. DPLH is currently assessing the proposed works to determine whether there is potential for impact to Registered Aboriginal sites and to advise on any statutory approvals that may be required in addition to consultation with Traditional Owners.

To address these risks, Urbis has initiated engagement with the Whadjuk Aboriginal Corporation to commence formal consultation and to undertake a site identification–level archaeological survey with nominated Whadjuk Knowledge Holders. This work will confirm the location and extent of any Aboriginal cultural heritage within or adjacent to the Site, inform impact avoidance and mitigation measures, and guide any further investigative work, such as targeted archaeological test-pitting, prior to ground-disturbing activities.

3.9.2 European Heritage

There are no listed sites mapped within the Site (DPLH-090), the nearest European heritage place is located approximately 1.2 km north of the Site:

- Heritage Place No. 2513: Midland Post Office.

Figure 10: Heritage

N

0 20 40 60 80 m

PROJECT/REPORT NAME	Environmental Assessment Report Lot 822 Stirling Cr, Hazelmere
SCALE	1:2,700
SHEET SIZE	A3 COLOUR
CLIENT	Hesperia
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A26.150
VERSION	0
DATA SOURCE	Nearmap (11th April 2026)
DRAWN BY / REVIEWED BY	SC/JB
DATE	17/6/2026

Legend

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

No	Description	Drawn	Approved	Date
A	Original issue	SC	JB	17/6/2026

NOTES:

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

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Figure 11: Bushfire Prone Areas

N

0 10 20 30 40 m

PROJECT/REPORT NAME	Environmental Assessment Report Lot 822 Stirling Cr, Hazelmere
SCALE	1:1,800
SHEET SIZE	A3 COLOUR
CLIENT	Hesperia
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A26.150
VERSION	0
DATA SOURCE	Nearmap (11th April 2026)
DRAWN BY / REVIEWED BY	SC/JB
DATE	17/6/2026

Legend

Site

Bush Fire Prone Area Planning (OBRM-023)

Bushfire Prone Area 1

Bushfire Prone Area 2

No	Description	Drawn	Approved	Date
A	Original issue	SC	JB	17/6/2026

NOTES:

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

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4. Potential Impacts and Recommended Management

Where potential impacts or likely approval and management considerations have been identified for the Site, these are summarised below.

Table 5: Potential Impacts and Approval, Mitigation and Management Considerations

Environmental Aspect	Potential Impacts	Approval, Mitigation and Management Considerations
Acid Sulfate Soils	1.02 ha of the southern portion of the Site is mapped as "moderate to low risk of ASS occurring within 3 m of the natural soil surface but high to moderate risk of ASS beyond 3 m of the natural soil surface".	The potential presence of ASS is not a constraint to development but may require further investigation and potential management during development and earthwork phases. ASS and dewatering management plan may be required.
Groundwater / Surface Water	It is critical that the development of the Site be managed to avoid adverse impacts to groundwater which could then have an impact on the adjacent Helena River and its associated ecological values.	Foreshore boundary to be implemented as defined by Figure 5, with the requirement for revegetation within the foreshore area. Development and the placement of drainage structures are precluded from the foreshore area. Additionally, a 10 m soft surface buffer from the DCA requires to be implemented. Where the DCA buffer extends beyond the foreshore boundary, no development is to be placed, however, drainage structures such as swales or drainage basins can be located within the DCA buffer. Bushfire setback requirements apply and need to be taken into consideration. The development should demonstrate capture and treatment of stormwater prior to being discharged from site, toward the adjacent Helena River. If the Site is not connected to the sewer there may be opportunity to provide onsite wastewater management if the discharge is at a manageable level, by use of an Aerobic Treatment Unit (ATU) with onsite storage and/or discharge.
Wetlands	The following wetlands intersect the Site: • MUW UFID 15266. • CCW UFID 15440.	Modification or removal of Multiple Use Wetlands is not a constraint to development when they have low ecological values present, as is the case on the Site. CCW UFID 15440 is associated with the Helena River foreshore reserve, which will be protected via the implementation of the foreshore area based on the AECOM (2010) foreshore study.

Environmental Aspect	Potential Impacts	Approval, Mitigation and Management Considerations
Flora and Vegetation	The Site is predominantly cleared. Vegetation is limited to scattered native trees (two flooded gums) and planted non-native trees, with no understorey or mid-storey present, and is considered to be in a Completely Degraded condition. No threatened or priority flora, TECs or PECs were identified within the Site during the preliminary site inspection, nor were any considered likely to occur due to the Completely Degraded condition of the vegetation.	If clearing of native vegetation is required for the development, a clearing exemption may apply. Where it is found that no clearing exemption applies, Native Vegetation Clearing Permit (NVCP) may be required.
Fauna	The degraded condition and lack of intact native vegetation within the Site provide limited habitat value for fauna. The Site contains limited black cockatoo habitat, comprising approximately 0.05 ha of low to moderate quality foraging habitat and seven potential nesting trees (six red river gums and one flooded gum). An additional seven red river gums are located within the road reserve immediately adjacent to the south-east of the Site. No suitable breeding hollows were identified. The Site is not considered to represent core habitat or be relied upon by black cockatoos or other conservation significant fauna species.	Eight mature non-native river red gums located within the road reserve will be retained, of which seven are outside the Site boundary. The remaining six potential nesting are expected to be impacted as per concept design. The six impacted trees comprise one flooded gym and five non-native river red gums. No evidence of roosting behaviour was recorded during the assessment. Foraging habitat within the Site comprises one flooded gum (*Eucalyptus rudis*), which equates to approximately 0.05 ha of black cockatoo foraging habitat of Low to Moderate quality. The Commonwealth referral guidelines identify that "loss of greater than or equal to 1 ha of foraging habitat scoring 5-10 using the foraging quality scoring tool is likely to require referral". As the Site contains comprises 0.05 ha of Low to Moderate foraging habitat, referral under the EPBC Act is not required.
Contamination	The closest registered contaminated site is located approximately 40m to the south of the Site. Previous land uses pose a risk of contamination being present within the Site. A contamination due diligence assessment was undertaken by Emerge in 2026. The assessment identified no evidence of actual or potential contamination that would pose a limitation or restriction on the planned development and land uses.	Given the proposed industrial use of the Site, the proximity of the remediated sites is not considered a constraint to development.

Environmental Aspect	Potential Impacts	Approval, Mitigation and Management Considerations
Aboriginal Heritage	Registered Aboriginal Heritage Site ID 3758 Helena River. Three registered Aboriginal heritage places associated with artefact/scatter values occur within a 100 m radius of the Site: Site ID 4006, Site ID 4009 and Site ID 4010.	The Helena River Registered Site covers a very large area and is not considered a constraint to development on the Site. Given the proximity of the surrounding artefact scatter sites, consultation with the Department of Planning, Lands and Heritage is being undertaken along with consultation with Traditional Owners. Heritage matters are considered more detailed in a separate assessment report prepared by Urbis.
Bushfire	The northern portion of the Site is mapped as a Bushfire Prone Area 2.	A Bushfire Management Plan has been prepared, independent of this EAR to address bushfire safety considerations.

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Appendix A

Proposed Development Layout

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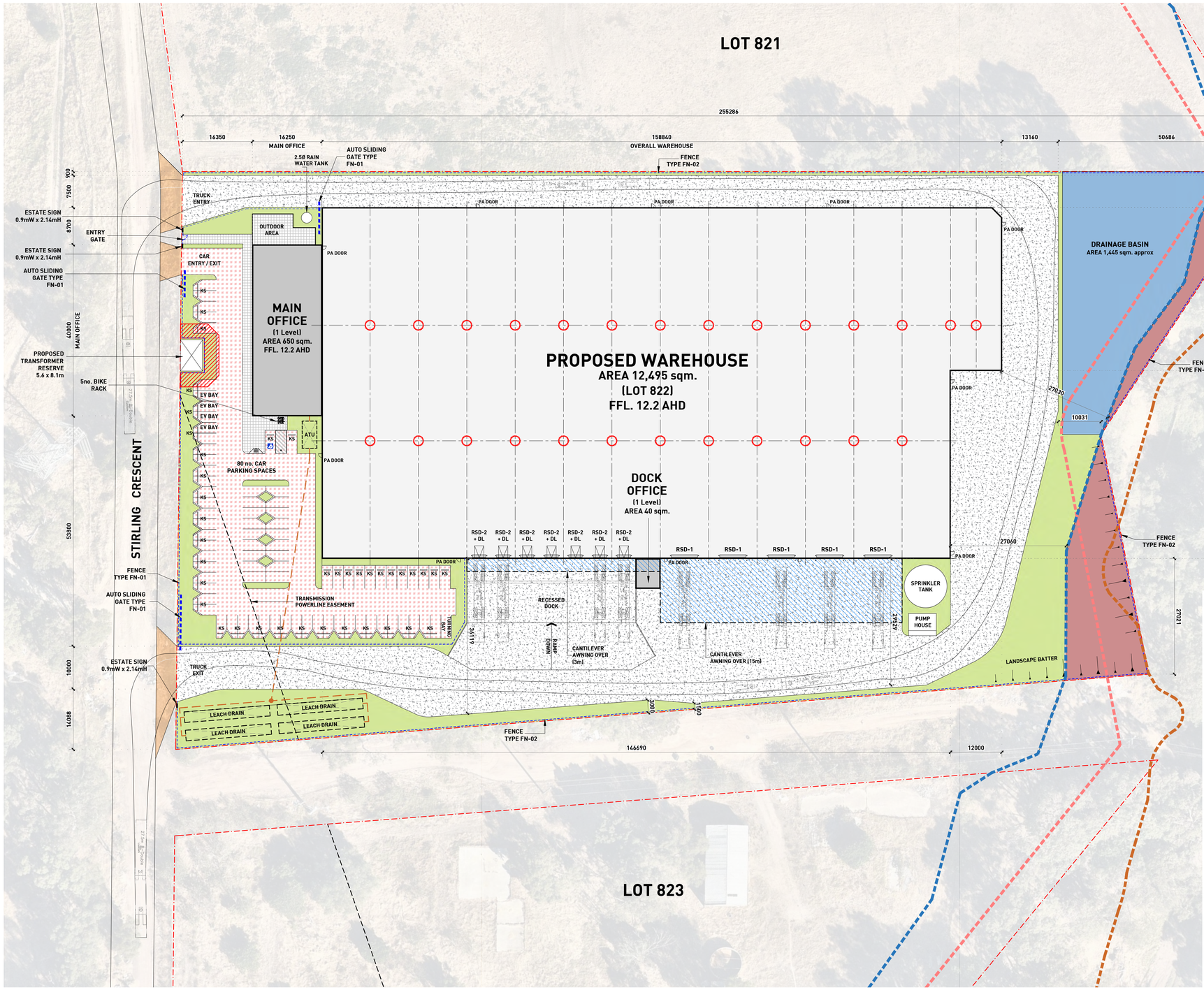
FOR DEVELOPMENT APPLICATION ONLY
SUBJECT TO STATUTORY APPROVAL

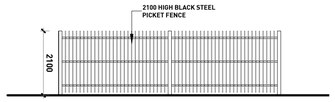


DEVELOPMENT SUMMARY

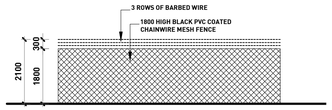
PROPOSED SITE AREA	28,837	sqm. approx.
Warehouse Area	12,495	sqm.
Main Office Area (1 Level)	650	sqm.
Dock Office Area (1 Level)	40	sqm.
TOTAL BUILDING AREA	13,185	sqm.
Total Heavy Duty Paving Area	7,620	sqm. approx.
Total Light Duty Paving Area	2,205	sqm. approx.
Total Landscape (incl. Drainage Basin Area & No works Area)	5,490	sqm. approx.
Total Warehouse Cantilever Awning Area	980	sqm. approx.
Total Car Parking Provided	80	spaces

- EXTENT OF HEAVY DUTY PAVING AREA
- EXTENT OF LIGHT DUTY PAVING AREA
- EXTENT OF LANDSCAPE
- EXTENT OF FORESHORE (NO WORKS)
- EXTENT OF DRAINAGE BASIN
- EXTENT OF WAREHOUSE AWNING AREA
- **RSD-1** ROLLER SHUTTER DOOR 6mW x 6mH
- **RSD-2 + DL** ROLLER SHUTTER DOOR 3mW x 3.3mH WITH DOCK LEVELLER
- FORESHORE BOUNDARY (AECOM 2010)
- FLOOD PLAIN FRINGE
- DEVELOPMENT CONTROL AREA (DCA) BUFFER 10m
- INDICATIVE WAREHOUSE INTERNAL PORTAL PROP COLUMN LOCATION
- TREE PLANTING WELL AT 2.3m x 1.75m TO BE PROVIDED AT EVERY SECOND CAR PARKING BAY
- **KS** KERB STOP

TYPICAL ESTATE SIGNS
SCALE 1:40



TYPICAL FENCE & GATE TYPE FN-01 ELEVATION
SCALE 1:100



TYPICAL FENCE TYPE FN-02 ELEVATION
SCALE 1:100

LANDSCAPING
Landscaping to be in accordance with requirements of the relevant Statutory Authority. Refer to Landscape Consultant's drawings and specifications for full details.

LIGHTING
External lighting must be designed, baffled and located so as to prevent any adverse effect on adjoining land to the satisfaction of the relevant Statutory Authority. Building mounted flood lights to be provided within the car park area.

CAR PARKING
Car parking spaces to be 5400mm long x 2500mm wide (unless noted otherwise). Disabled car parking spaces to be 5400mm long x 2500mm wide, with a shared vacant space of equal size to one side of the allocated disabled space in accordance with A.S. 2890.6 (2009). All car parking bays to be line marked in 80mm wide white weatherproof paint in accordance with A.S. 2890.1 (2004).

VEHICLE CROSSINGS AND ACCESS
All new vehicle crossings shall be to the requirements of the relevant Statutory Authority.

PLANT & EQUIPMENT
All external plant and equipment to be screened or positioned to prevent unreasonable visual impact.

DISABILITY ACCESS
All building entrances are to be in accordance with A.S. 1428.1 (2009).

NOTE:
- This concept plan is intended for Development Application purposes only. All setbacks, site coverage, car parking numbers, landscape areas and the like are subject to statutory approval.
- No assurance is given as to the features, attributes, feasibility or accuracy of anything shown on or disclosed in this plan.
- All existing & proposed features, dimensions, areas and boundaries are approximate only and subject to verification via detailed site survey by licensed surveyor.

CLIENT:
HESPERIA

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546 Collins Street
Melbourne VIC 3000
t: (03) 9978 9888
e: architect@concepty.com.au

PROPOSED DEVELOPMENT

Lot 822 Stirling Crescent, Hazelmere WA

SITE PLAN

DRAWING TYPE: DEVELOPMENT APPLICATION
DRAWING NUMBER: 2613-153-DA-002
REVISION: C
DATE: 19.06.2026
SCALE: 1:500 @ A1 / 1:1000 @ A3
0 25 50
SCALE BAR @ A1

Appendix B

Foreshore Mapping

(ACOEM, 2010)

Helena River Foreshore Definition

Adjacent to Hazelmere Enterprise Area

Helena River Foreshore Definition

Adjacent to Hazelmere Enterprise Area

Prepared for

HASSELL

Prepared by

AECOM Australia Pty Ltd
3 Forrest Place, Perth WA 6000, GPO Box B59, Perth WA 6849, Australia
T +61 8 6430 2000 F +61 8 6430 2999 www.aecom.com
ABN 20 093 846 925

12 August 2010

60150301

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Quality Information

Document Helena River Foreshore Definition

Ref 60150301

Date 12 August 2010

Prepared by Francoise Kercheval

Reviewed by David Westwater

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
A	17-Jun-2010	For Internal Review	Ryan Warrington Engineer	Ryan Warrington
1	12-Aug-2010	Issued to Client	Francoise Kercheval Principal Engineer	Francoise K.

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Executive Summary

The objective of this report is to present the findings of investigations associated with defining the ultimate River Foreshore for the Helena River adjacent to the proposed Hazelmere Enterprise Area (HEA). In particular, the report will be used in discussions with the Department of Water in order to facilitate 'approval in-principle' of the ultimate foreshore reserve which will be incorporated into a Draft District Structure Plan.

The HEA is to the south of Helena River, and so only the reserve adjacent to the HEA is considered in this report, that is the southern foreshore between the Midland – Forrestfield railway line bridge and Roe Highway.

AECOM is currently preparing a District Stormwater Management Strategy for the HEA to support HASSELL and City of Swan in the development of a District Structure Plan for the same area. In order to ensure that adequate protection and consideration is given to the Helena River adjacent to this area, a Foreshore Reserve has been defined in accordance with the *Waters and Rivers Commission Report No. RR16 Determining foreshore reserves (2001)*.

The biophysical criteria considered in the development of the ultimate foreshore reserve include:

- Vegetation.
- Hydrology.
- Soil type/Geology.
- Erosion.
- Topography.
- Habitat.
- Landuse.
- Heritage.
- Wetlands.

There is an existing reserve over the Helena River adjacent to the proposed HEA, and the modifications to the reserve are in the form of increased areas as a result of the considerations of biophysical criteria above. In particular the following modifications resulted from the aforementioned considerations:

- Allow for delineation between low density residential area and ultimate foreshore reserve in the form of either a road or shared path.
- Allow for continuity in vegetation buffers and potential habitat creation in a linear form adjacent and parallel to the riverbank.
- Allow for flood fringe identified through flood mapping.
- Allow for a buffer in locations susceptible to erosion.
- Allow for delineation of top of valley through assessment of topography and cross-section information.

The resulting ultimate river foreshore is proposed to be incorporated into a draft District Structure Plan for the HEA and will ultimately form a reservation within which appropriate authorities can adequately protect the health of the Helena River.

1.0 Introduction

1.1 Objective

The objective of this report is to present the findings of investigations associated with defining the River Foreshore for the Helena River adjacent to the proposed HEA. In particular, the report will be used in discussions with the Department of Water in order to facilitate 'approval in-principle' of the foreshore reserve which will be incorporated into a Draft District Structure Plan.

The HEA is to the south of Helena River, and so only the reserve adjacent to the HEA is considered in this report, that is the southern foreshore between the Midland - Forrestfield railway line bridge and Roe Highway.

1.2 Background

AECOM is currently preparing a District Stormwater Management Strategy (DSMS) for the HEA to support HASSELL and City of Swan in the development of a District Structure Plan for the same area. In order to ensure that adequate protection and consideration is given to the Helena River adjacent to this area, a Foreshore Reserve has been defined in accordance with the *Waters and Rivers Commission Report No. RR16 Determining foreshore reserves* (2001).

The Helena River was dammed with the construction of Mundaring Weir in the 1890's. This resulted in a drastically different hydrological regime to that seen prior to European settlement, with significantly reduced flows and sediment transport. The land adjacent to the river was predominantly used for sheep and cattle farming up to the 1920's, when disease resulted in the closure of many farms and the slaughter of stock, according to the Swan River Trust's Swan and Canning Rivers Foreshore Management Strategy. The majority of the land directly adjacent to the Helena River in HEA is still used for rural purposes, with some apparent cropping occurring within the bounds of the river itself.

1.3 Data Collection

A site visit was undertaken by Ryan Warrington and Luke Cummins of AECOM which included the following considerations:

- Locate existing defined flow paths entering the Helena River foreshore.
- Inspect (where possible) locations of areas susceptible to erosion.
- Confirmation of vegetation boundaries predicted by desktop studies using aerial photography.

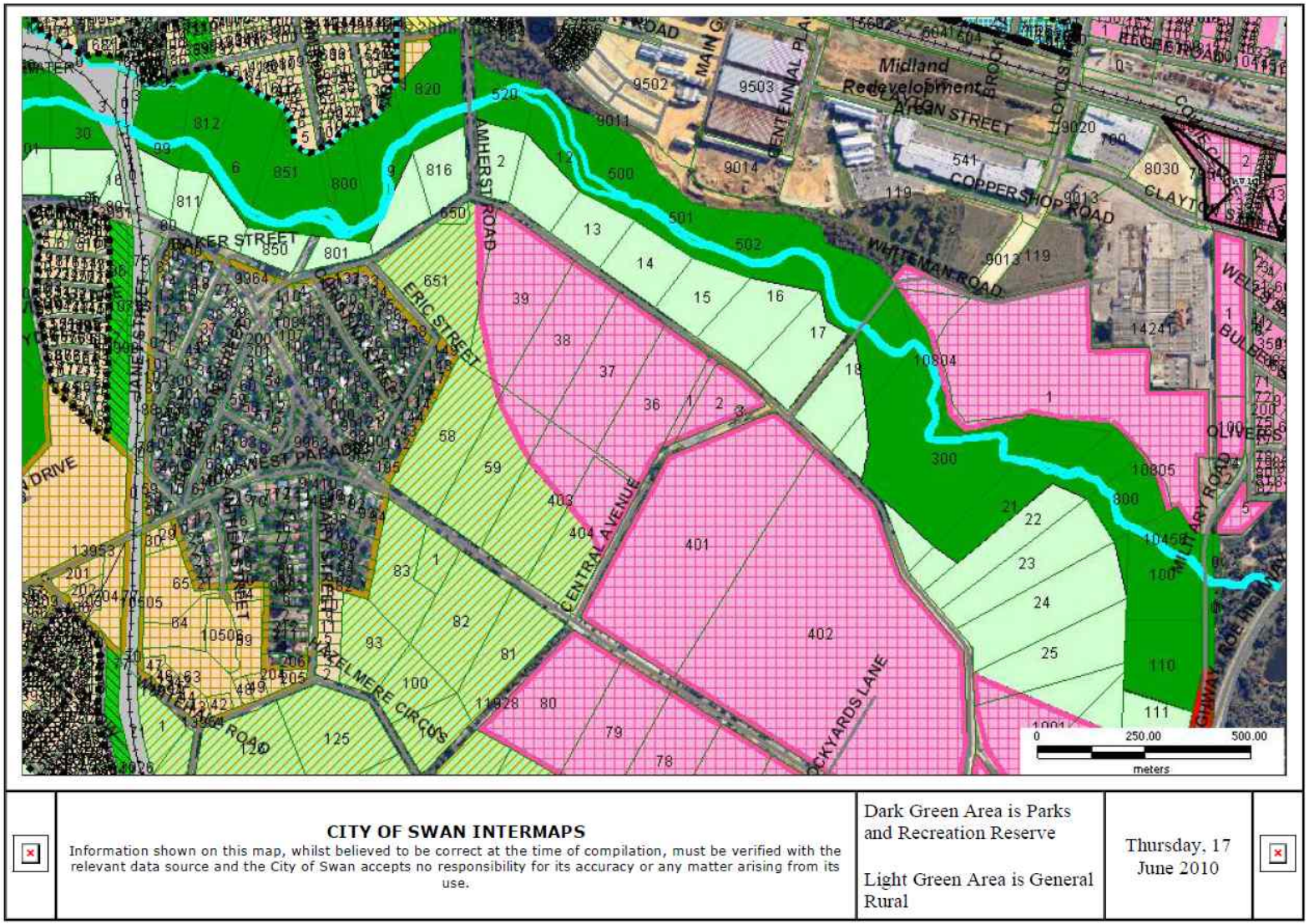
In addition to the data collected during the site inspection, the following information has been used in this investigation:

- Swan and Canning Rivers Foreshore Management Strategy – Swan River Trust – March 2008.
- Surface and Groundwater Monitoring Report – ENV – June 2009.
- Draft District Structure Plan – HASSELL June 2010.
- Metropolitan Region Scheme – 1 : 25 000 Map Sheet 16 – Western Australian Planning Commission.
- Aerial Photography – SkyView.
- LiDAR topographic survey – obtained through HASSELL.
- Local Planning Scheme 17 – City of Swan – 2008.

1.4 Existing Zoning

The existing Metropolitan Region Scheme (MRS) defines a Parks and Recreation boundary over the Helena River, as does the current City of Swan's Local Planning Scheme 17 (LPS17). Figure 1 shows LPS17 with the dark green indicating Regional Reserve Parks and Recreation and the lighter green adjacent representing General Rural.

The working District Structure Plan is shown in Figure 2 and shows the lots east of Amherst Road adjacent to the Helena River remaining as General Rural and the lots west of Amherst Road adjacent to the Helena River proposed to be amended from General Rural to Low Density Residential. The current Foreshore Reserve shown in this plan is a starting point and will be amended based on the findings of these investigations.



CITY OF SWAN INTERMAPS

Information shown on this map, whilst believed to be correct at the time of compilation, must be verified with the relevant data source and the City of Swan accepts no responsibility for its accuracy or any matter arising from its use.

Dark Green Area is Parks and Recreation Reserve

Light Green Area is General Rural

Thursday, 17 June 2010

Figure 1 - City of Swan Local Planning Scheme 17 at HEA

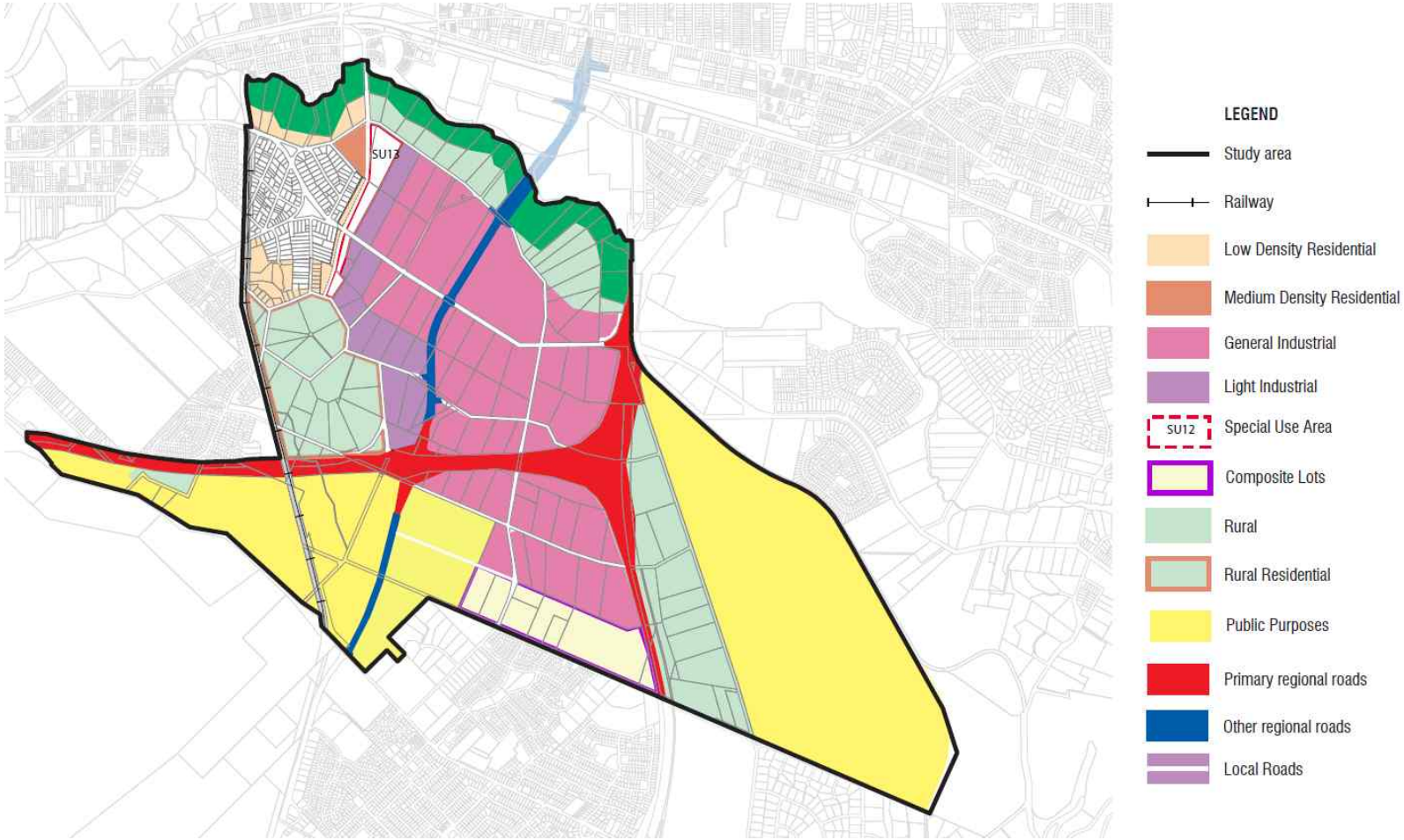


Figure 2 - Draft District Structure Plan at HEA – starting point for incorporating Foreshore Reserve considerations

2.0 Identification of Biophysical Factors

2.1 Extent of Riparian Vegetation

The aerial photograph, in conjunction with the site visit, was used to define the extent of riparian vegetation, and areas of potential vegetation regeneration. A combination of the following considerations was used to define the extent:

- Existing native vegetation which are considered to be useful in habitat and wildlife corridors, protection from erosion, additional 'polishing' zones for water quality and nutrient stripping.
- Cleared areas where re-establishing vegetation may be beneficial to the health of the waterway, and crucial to creating ecological corridors and habitat.

2.2 Soil Types that support Riparian Vegetation

Figure 3 indicates the soil and geology of the area. The soils of interest are:

- The bed of the Helena River shown as CM_2 which is Clay: Hard when dry, alluvial of origin.
- The areas adjacent to the Helena River bed shown as MgS which is Guildford Formation Pebbly silt, strong brown silt of alluvial origin.

The soil mapping indicates that the historical river bed extended well beyond its current obvious bounds, although this is typical of these types of rivers where development occurs adjacent to the river and land is filled and disturbed, and vegetation is cleared. This also highlights the effect of reduced flows and sediment transport resulting from damming of the Helena River in the late 1890's.

It is not considered practical to extend the foreshore boundary out to follow the historical river bed (as indicated by the alluvial soils Clay and Guildford Formation Pebbly Silt), however the soil extents needs to be considered as part of the process.

2.3 Floodway and Floodplain

Mapping associated with a flood study which was undertaken in 1986 was provided by the Department of Water. The physical extent of both the floodway and flood fringe were also provided and these are depicted in Figure 4.

There are several areas of flood fringe indicated in the DoW mapping which are not in the current Parks and Reserve boundary shown in the current Draft Structure Plan and these are proposed to be included in the foreshore reserve.

2.4 Soil types that are prone to erosion

The soil mapping shown in Figure 3 was used to assess where soils are prone to erosion. The areas of Clay and Pebbly silt (strong brown silt) are not considered to be highly susceptible to erosion. There are areas, however, where the Bassendean Sand (very light grey at surface, yellow at depth) encroach close to the river bed, and these areas may require additional buffers to ensure there is sufficient protection and land allocated to vegetation such that erosion is less likely to occur.

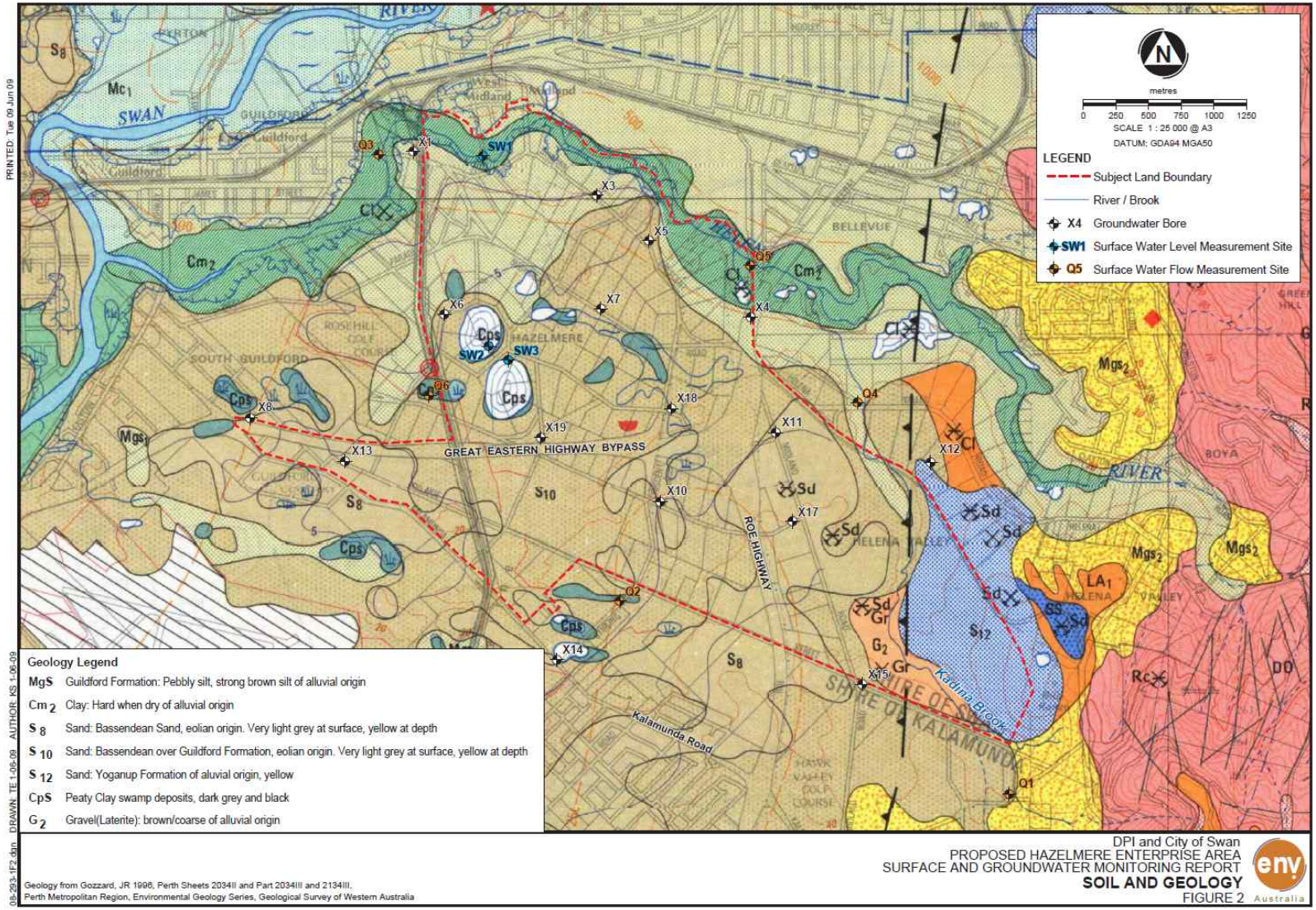


Figure 3 - ENV Report Soil and Geology

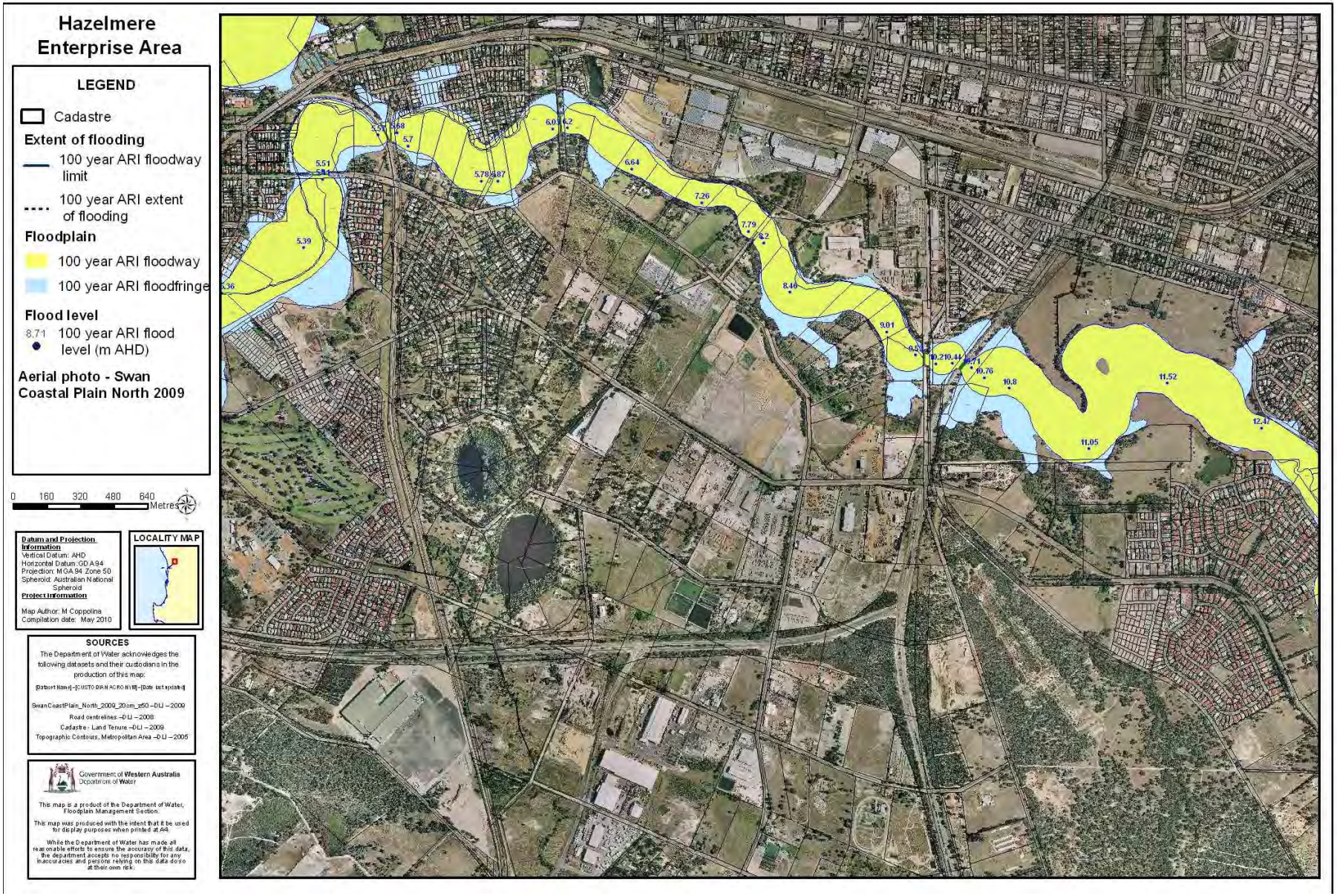


Figure 4 - Floodway and Flood Fringe

2.5 Landforms important to water course function

Aerial photography, LiDAR topographic survey and the findings of the site inspection were used to identify features including steep slopes, drainage lines and low-lying storage areas which are considered to be important to the function of the Helena River and need to be included in the reserve to ensure their protection.

In particular, the following issues were identified:

- Some bank sections of the Helena River were relatively steep and appropriate buffers need to be applied for both bank stability and public safety issues.
- Existing drainage lines entering the Helena River foreshore have been identified, and are proposed to remain in the proposed Structure Plan. Areas have been allocated to allow for end of line treatment areas and revegetation (or protection of existing vegetation) prior to discharge directly into the river.
- Low lying areas which coincide with DoW mapping of flood fringe are considered to be critical to the health of the river and as such will be included where they are currently excluded from the Draft Structure Plan foreshore reserve boundary.

2.6 Valuable habitat areas

Limited information is available on fauna within this area, however the considerations where made in terms of likely habitat and opportunities for the creation of habitat. In particular, where existing vegetation appears to have been cleared, creating isolated zones, the area has been allocated to allow for the corridor to be reconnected where practical.

2.7 Land Use Pressures

Given that the majority of the directly adjacent land is remaining as General Rural, there is not likely to be increased pressure on the system due to this land use.

There is a portion of General Rural which is proposed to be changed to Low Density Residential which may increase both stormwater runoff and public access to the foreshore (potentially increasing disturbance). Considerations that need to be made to account for these impacts include:

- Sufficient allowance for runoff from residential areas such that areas susceptible to erosion are protected.
- Clear delineation of foreshore reserve from residential areas such that minimal disturbance to foreshore occurs, this can be in the form of a shared path or a road.

Further away from the directly adjacent lots, south of Stirling Crescent, the area is proposed to be rezoned to include the following land uses:

- A small portion of Medium Residential.
- Light Industrial.
- General Industrial (as existing).

A critical consideration for this landuse change as the lots are developed is water quality to the Helena River as a receiving system. The District Stormwater Management Strategy will provide guidance on the allocation of areas within the lots and within the road reserve to allow for adequate water quality measures, and adequate areas also need to be allocated within the foreshore reserve for:

- Protection of existing vegetation and areas which provide ‘polishing’ function and natural water quality treatment.
- The creation of new areas of water quality treatment.

- Ensuring protection from erosion associated with increased flow velocities.

2.8 Archaeological and ethnographic sites

A search was undertaken on the Department of Indigenous Affairs Aboriginal Heritage Inquiry System and 15 records were found in the immediate area. There were many more found across the HEA site, however the search was focused on the foreshore boundary location rather than the wider study area for the DSMS.

The results of the search have been included in Appendix A.

Of particular interest are the sites on Permanent Register:

- *Site 3758 Helena River* covers a large area encompassing the Helena River and in excess of 1km north and south. It is listed as Ceremonial, Mythological, Repository/cache and is a closed site so the actual coordinates are not provided. As the exact location is not known, it is difficult to consider where modifying the foreshore reserve boundary would impact on this site.
- *Site 4005 Central Ave/Bushmead Road* and *Site 4385 Bushmead Road Complex* are both listed as Artefacts/Scatter. They are within the industrial area to the south of the foreshore reserve and are not expected to be impacted by any modifications to the foreshore reserve.
- *Site 4006 Hump Paddock* is listed as Artefacts/Scatter and is the only site which is currently within the foreshore reserve. Any modifications at this location should ensure that the site is maintained within the foreshore reserve.
- *Site 4009 Railway Dump* and *4010 Metro Meats* are both listed as Artefacts/Scatter and are located to the north of the existing foreshore reserve and so are not expected to be impacted by any modification to the foreshore reserve.

2.9 Wetlands

The location and classification of geomorphic wetlands were included in the assessment of the foreshore. Much of the land within HEA is classified as wetland, based on Geomorphic Wetland mapping obtained from Landgate, although the majority is sub-classified as multiple use wetlands. However, a large section of the Helena River flood valley is classed as conservation category wetland, with some adjacent sections of resource enhancement that have been included in the foreshore reserve in accordance with geomorphic wetland classification objectives. A plan of wetland mapping throughout HEA is provided in Figure 5.

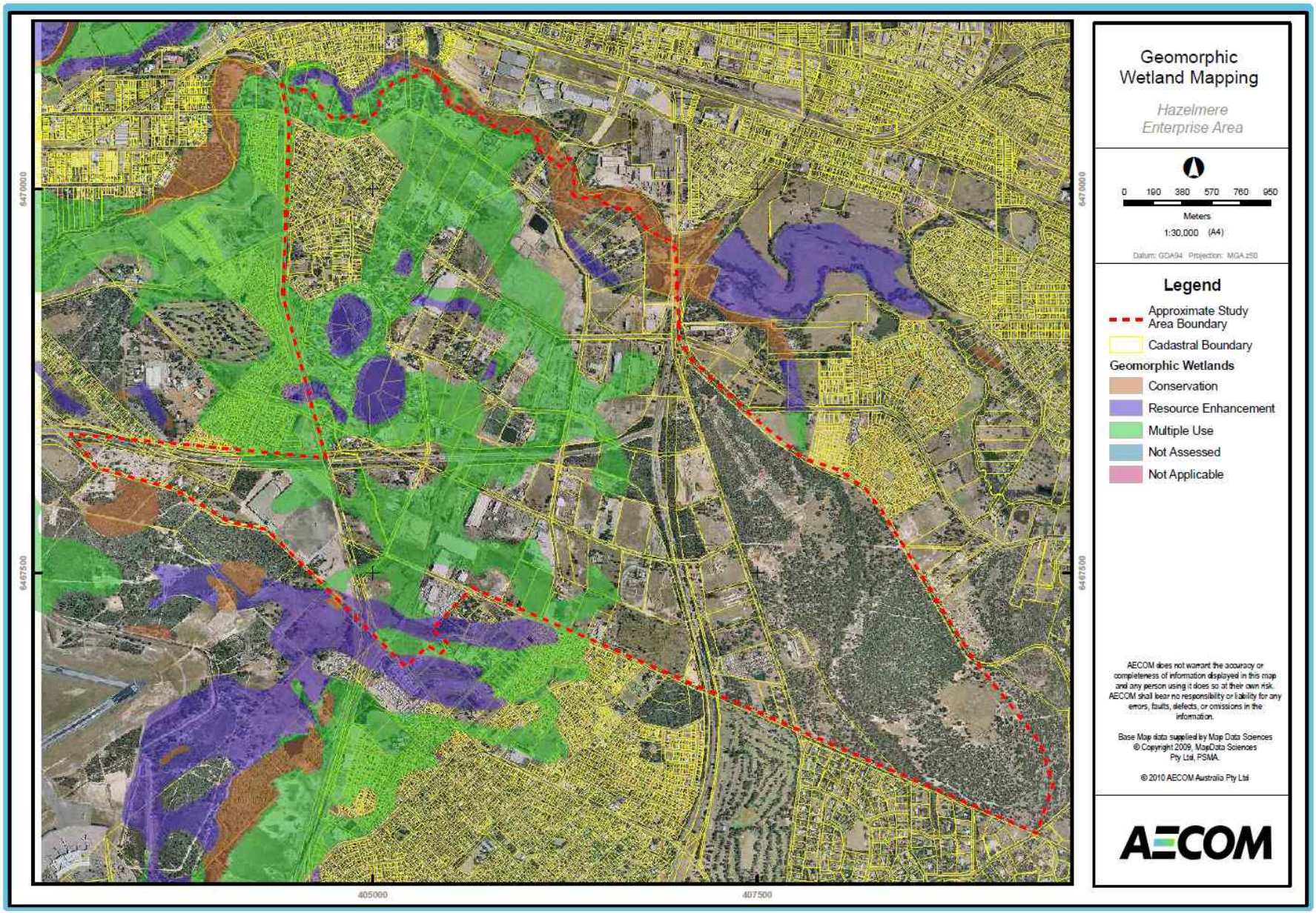


Figure 5 - Geomorphic Wetland Mapping

3.0 Recommendation for Proposed Ultimate Foreshore Reserve

The ultimate foreshore reserve shown in Figure 5 is the result of consideration of the biophysical criteria listed above. The map has been annotated to show the decision making process that was involved in creating the reserve.

In addition to the information above, topographic information has been provided in more detail in Appendix B, including a plan and cross-sections showing the river valley and the location of the ultimate foreshore reserve on the cross-sections.

The ultimate foreshore reserve shown in Figure 6, Figure 7 and Figure 8 is proposed to be incorporated in the Draft Structure Plan being prepared by HASSELL, which will be referred to the Department of Water at the appropriate timing. It should be noted that wetland mapping has been superimposed on Figure 8 as it was particularly relevant to the foreshore reserve in this area, but has not been included on the other figures.

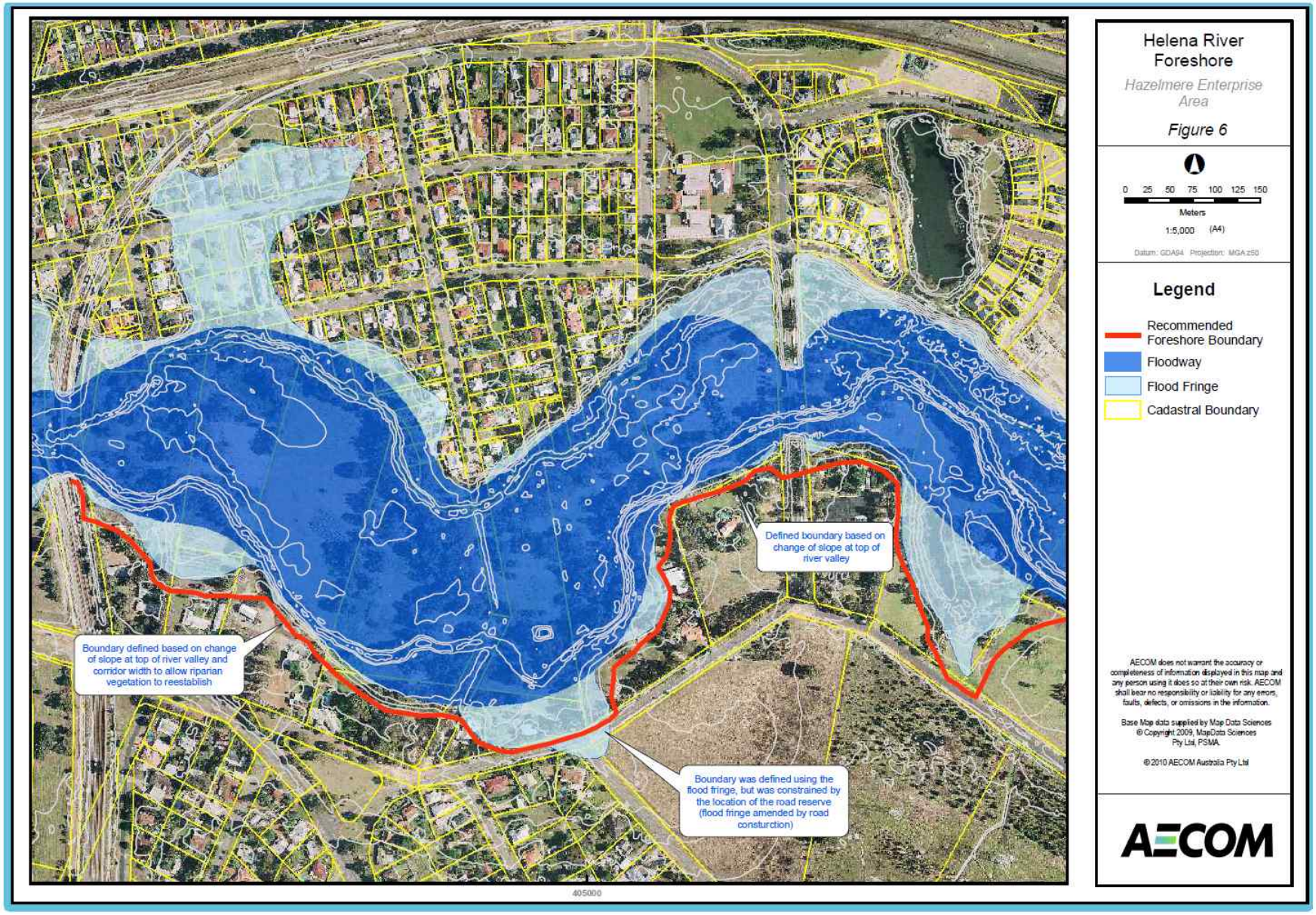


Figure 6 - Proposed Ultimate Foreshore Reserve (1 of 3)

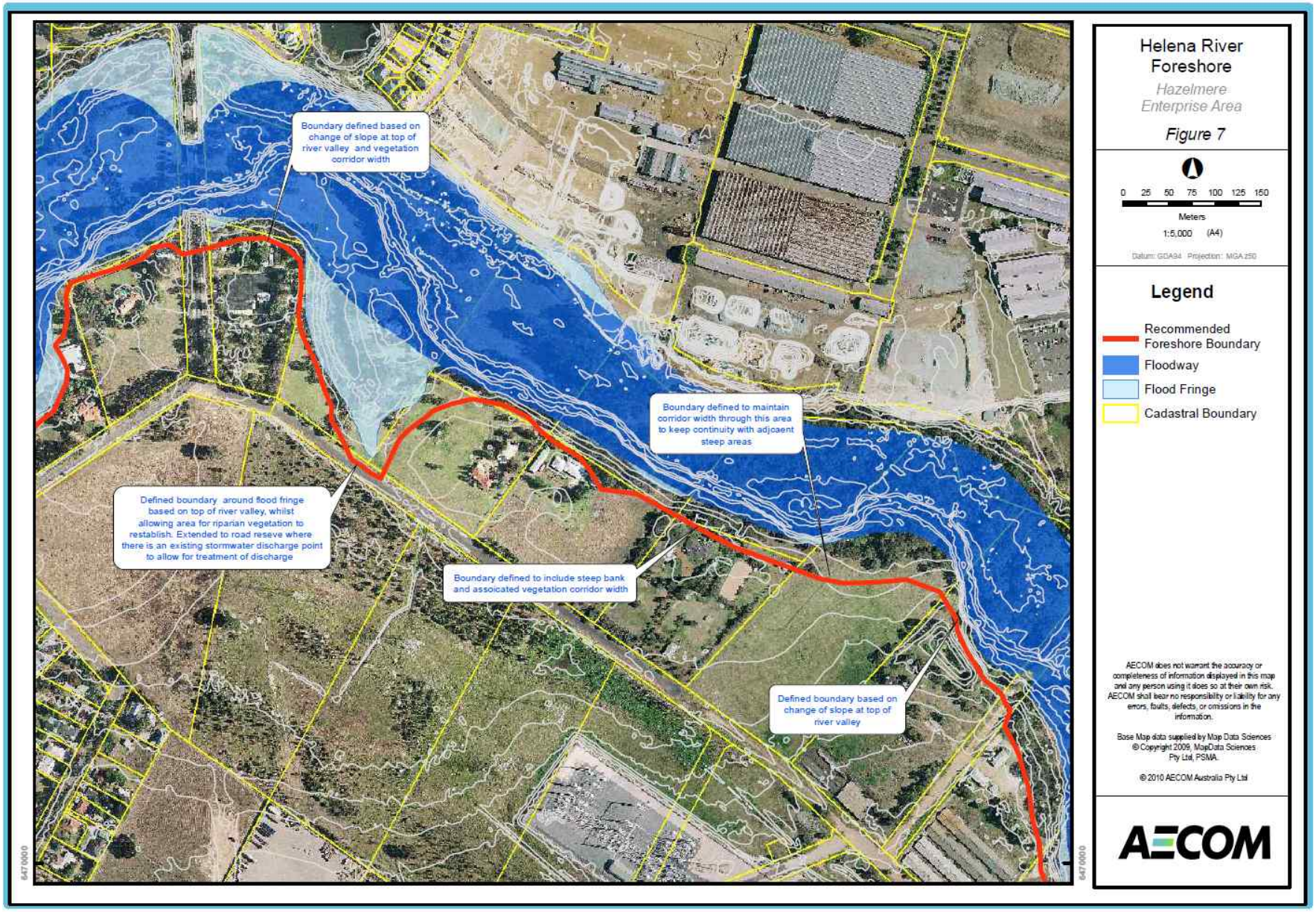


Figure 7 - Proposed Ultimate Foreshore Reserve (2 of 3)

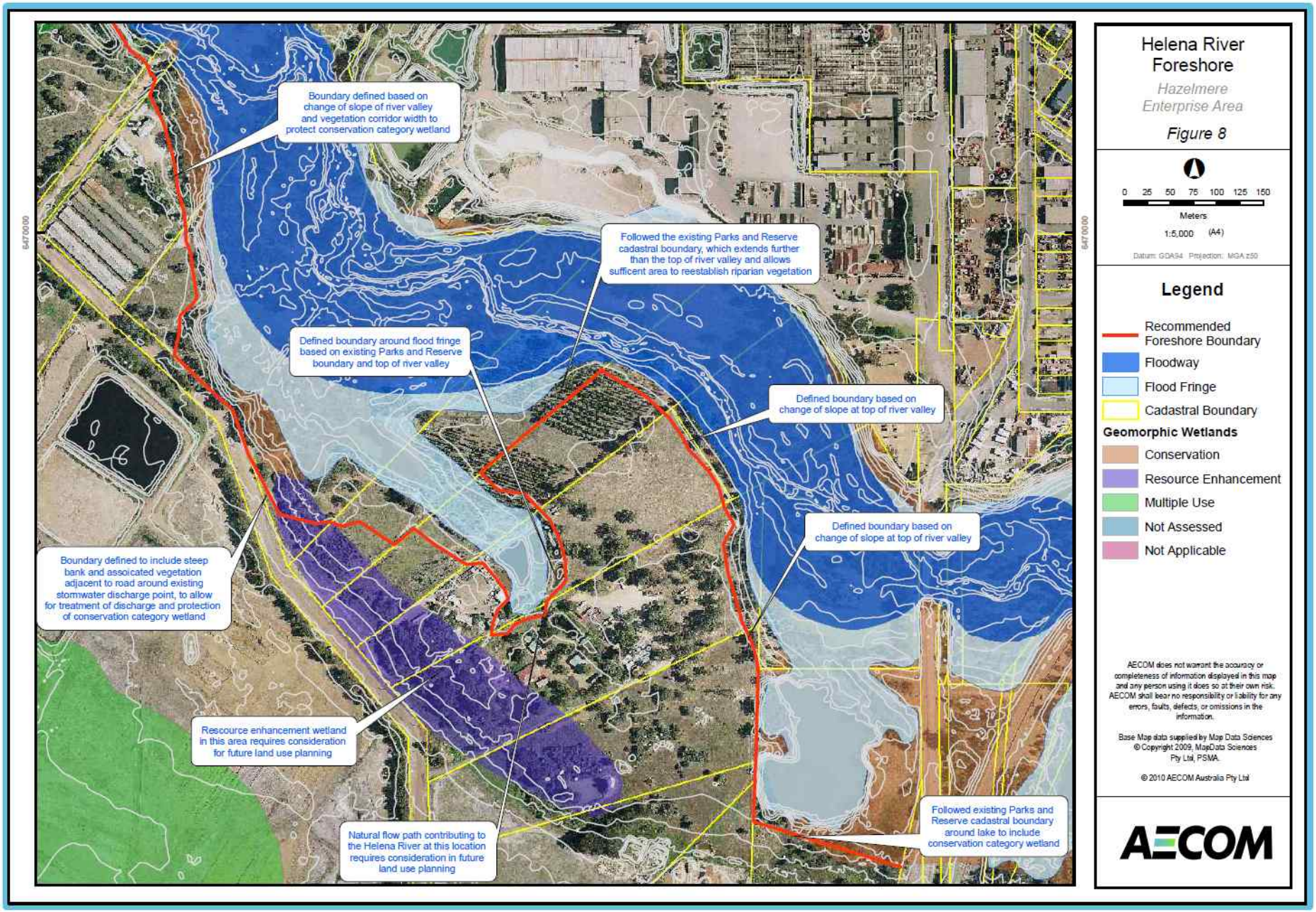


Figure 8 - Proposed Ultimate Foreshore Reserve (3 of 3)

Appendix A

DIA – Register of Aboriginal Sites

Search Criteria

15 sites in a search box. The box is formed by these diagonally opposed corner points:

MGA Zone 50	
Northing	Easting
6469426	404380
6470802	406958

Disclaimer

Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist. Consultation with Aboriginal communities is on-going to identify additional sites. The AHA protects all Aboriginal sites in Western Australia whether or not they are registered.

Copyright

Copyright in the information contained herein is and shall remain the property of the State of Western Australia. All rights reserved. This includes, but is not limited to, information from the Register of Aboriginal Sites established and maintained under the Aboriginal Heritage Act 1972 (AHA).

Legend

Restriction

N	No restriction
M	Male access only
F	Female access

Access

C	Closed
O	Open
V	Vulnerable

Coordinate Accuracy

Accuracy is shown as a code in brackets following the site coordinates.

[Reliable]	The spatial information recorded in the site file is deemed to be reliable, due to methods of capture.
[Unreliable	The spatial information recorded in the site file is deemed to be unreliable due to errors of spatial data capture and/or quality of spatial information reported.

Status

L	Lodged	IR	Insufficient Information (as assessed by Site Assessment Group)
I	Insufficient Information	PR	Permanent register (as assessed by Site Assessment Group)
P	Permanent register	SR	Stored data (as assessed by Site Assessment Group)
S	Stored data		

Site Assessment Group (SAG)

Sites lodged with the Department are assessed under the direction of the Registrar of Aboriginal Sites. These are not to be considered the final assessment.

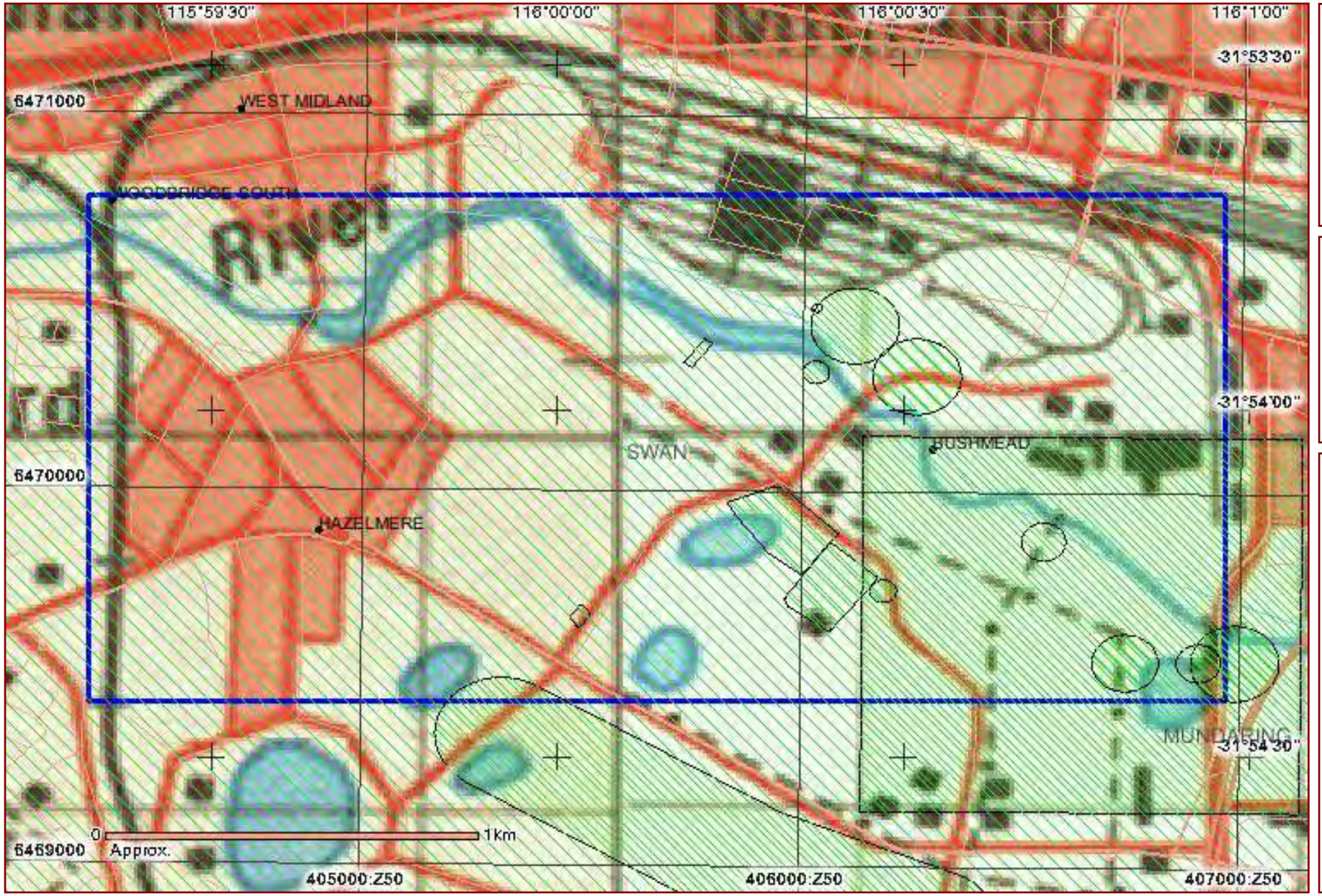
Final assessment will be determined by the Aboriginal Cultural Material Committee (ACMC).

Spatial Accuracy

Index coordinates are indicative locations and may not necessarily represent the centre of sites, especially for sites with an access code “closed” or “vulnerable”. Map coordinates (Lat/Long) and (Easting/Northing) are based on the GDA 94 datum. The Easting / Northing map grid can be across one or more zones. The zone is indicated for each Easting on the map, i.e. '5000000:Z50' means Easting=5000000, Zone=50.

Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Info	Informants	Coordinates	Site No.
632	S	O	N	Hazelmere 1	Artefacts / Scatter			406187mE 6469737mN Zone 50 [Reliable]	S02885
633	S	O	N	Hazelmere 2	Artefacts / Scatter			406066mE 6469745mN Zone 50 [Reliable]	S02886
3518	S	O	N	Dinner Camp.		Camp		406639mE 6469649mN Zone 50 [Unreliable]	S02618
3758	P	C	N	Helena River	Ceremonial, Mythological, Repository / cache		*Registered Informant names available from DIA.	Not available for closed sites	S02148
3770	S	O	N	Abattoirs Camp.		Camp		406989mE 6469549mN Zone 50 [Reliable]	S02163
3964	I	O	N	Power Lagoon	Artefacts / Scatter			406739mE 6469549mN Zone 50 [Reliable]	S01450
4005	P	O	N	Central Ave/bushmead Road	Artefacts / Scatter			405498mE 6469665mN Zone 50 [Reliable]	S01439
4006	P	O	N	Hump Paddock	Artefacts / Scatter			405929mE 6470337mN Zone 50 [Unreliable]	S01440
4007	S	O	N	Helena Spring West	Artefacts / Scatter			406906mE 6469549mN Zone 50 [Unreliable]	S01441
4009	P	O	N	Railway Dump	Artefacts / Scatter			406117mE 6470444mN Zone 50 [Reliable]	S01443
4010	P	O	N	Metro Meats	Artefacts / Scatter		*Registered Informant names available from DIA.	406259mE 6470309mN Zone 50 [Reliable]	S01444

Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Info	Informants	Coordinates	Site No.
4012	I	O	N	Trough & Dead Sheep Paddock	Artefacts / Scatter			406551mE 6469871mN Zone 50 [Reliable]	S01446
4385	P	O	N	Bushmead Road Complex	Artefacts / Scatter			405813mE 6469095mN Zone 50 [Unreliable]	S00733
21241	S	O	N	Isolated Finds		[Other: Isolated finds]	*Registered Informant names available from DIA.	406030mE 6470491mN Zone 50 [Reliable]	
21560	S	O	N	Hazelmere Artefact Site	Mythological, Artefacts / Scatter		*Registered Informant names available from DIA.	405957mE 6469896mN Zone 50 [Reliable]	



Legend

- Highlighted Area
- Town
- Map Area
- Search Area

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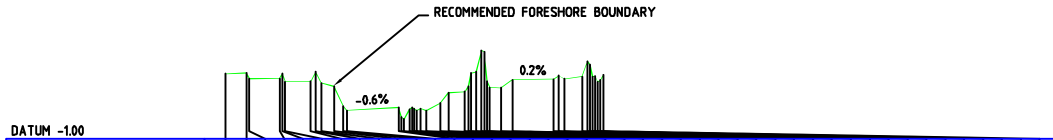
Appendix B

Top of River Valley - Topographic Information

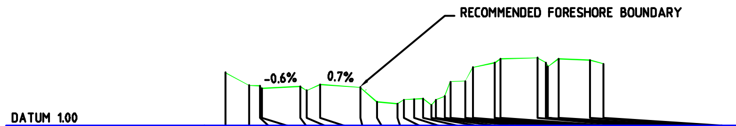
3341
2758
2818
3170
2885
3010
2461
2000
1675
1370
1180
966
250
288

AECOM



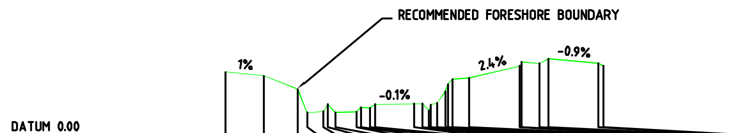
CENTRELINE OFFSET	HEIGHT
-500.00	16.17
-444.01	16.43
-436.69	14.87
-356.17	14.91
-348.85	16.18
-341.53	14.07
-274.22	14.11
-260.52	16.66
-246.37	13.76
-212.60	12.83
-187.80	7.53
-178.38	6.45
-41.40	7.28
-34.08	4.69
-26.76	4.17
-12.12	6.77
-4.80	7.25
0.00	6.87
6.46	6.37
17.16	6.97
31.81	6.41
68.41	8.42
90.37	11.12
134.29	11.41
143.37	12.92
150.22	16.33
163.91	16.70
178.21	22.35
185.53	22.06
192.85	14.11
200.17	12.54
229.45	12.43
259.75	14.57
369.28	14.75
383.18	15.64
397.82	14.79
444.58	15.41
458.27	19.48
465.12	18.53
471.96	15.41
478.81	15.55
485.66	13.99
492.98	14.44
500.00	15.89

CHAINAGE 966



CENTRELINE OFFSET	HEIGHT
-500.00	15.02
-436.68	11.66
-408.51	11.53
-403.05	10.83
-302.13	11.39
-285.31	10.29
-249.54	11.85
-143.21	11.15
-99.00	7.30
-44.24	6.82
-27.42	7.89
0.00	8.02
23.48	8.14
45.46	6.39
57.61	7.89
80.36	8.80
95.92	12.60
135.16	12.79
155.24	16.42
213.65	17.65
228.25	18.67
325.77	18.95
348.20	17.65
354.21	16.66
381.84	18.62
464.75	18.29
500.00	17.35

CHAINAGE 288

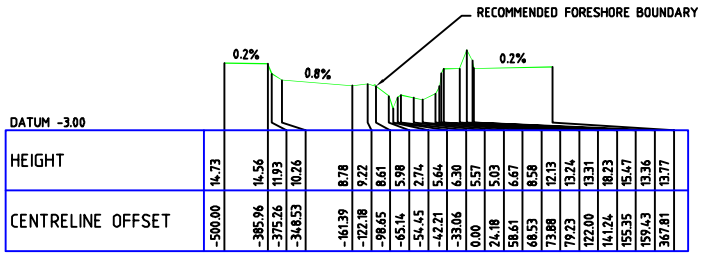


CENTRELINE OFFSET	HEIGHT
-500.00	16.57
-398.24	15.54
-308.27	11.98
-283.45	5.76
-239.80	6.09
-228.87	8.04
-209.01	5.83
-152.39	5.96
-141.46	7.22
-117.59	6.99
-103.22	7.98
0.00	8.13
22.44	8.16
39.11	6.29
44.29	7.89
60.68	8.32
82.54	11.46
88.74	13.32
101.14	14.64
145.99	14.97
279.22	18.14
284.68	19.22
331.48	18.81
355.70	20.09
487.68	18.90
500.00	18.18

CHAINAGE 250

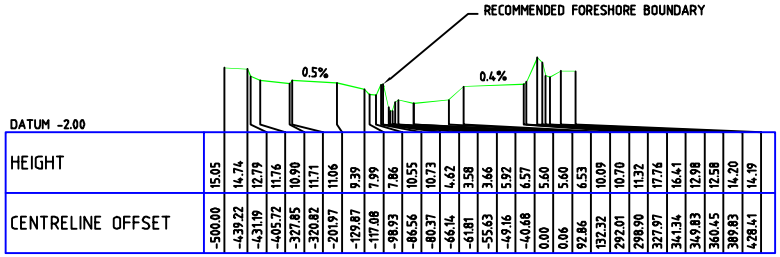
AECOM

AECOM



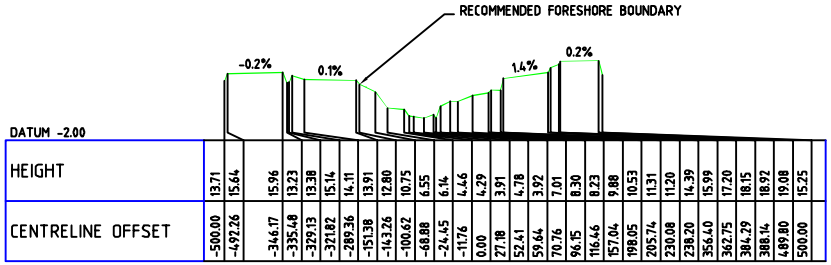
HEIGHT	14.73		14.56	11.93	10.26		8.78	9.22	8.61	5.98	2.74	5.64	6.30	5.57	5.03	6.67	8.58	12.13	13.24	13.31	18.23	15.47	13.36	13.77		
CENTRELINE OFFSET	-500.00		-385.96	-375.26	-348.53		-161.39	-122.18	-98.65	-65.14	-54.45	-42.21	-33.06	0.00	24.18	58.61	68.53	73.88	79.23	122.00	141.24	155.35	159.43	367.81		

CHAINAGE 1675



HEIGHT	15.05	14.74	12.79	11.76	10.90	11.71	11.06	9.39	7.99	7.86	10.55	10.73	4.62	3.58	3.66	5.92	6.57	5.60	5.60	6.53	10.09	10.70	11.32	17.76	16.41	12.98	12.58	14.20	14.19
CENTRELINE OFFSET	-500.00	-439.22	-431.19	-405.72	-327.85	-320.82	-201.97	-129.87	-117.08	-98.93	-86.56	-80.37	-66.14	-61.81	-55.63	-49.16	-40.68	0.00	0.06	92.86	132.32	292.01	298.90	327.97	341.34	349.83	360.45	389.83	428.41

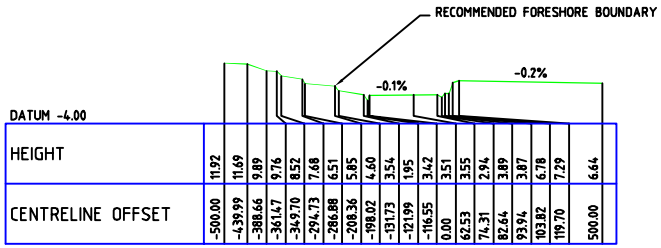
CHAINAGE 1370



HEIGHT	13.71	15.64	15.96	13.23	13.38	15.14	14.11	13.91	12.80	10.75	6.55	6.14	4.46	4.29	3.91	4.78	3.92	7.01	8.30	8.23	9.88	10.53	11.31	11.20	14.39	15.99	17.20	18.15	18.92	19.08	15.25
CENTRELINE OFFSET	-500.00	-492.26	-346.17	-335.48	-329.13	-321.82	-289.36	-151.38	-143.26	-100.62	-68.88	-24.45	-11.76	0.00	27.18	52.41	59.64	70.76	96.15	116.46	157.04	198.05	205.74	230.08	238.20	356.40	362.75	384.29	388.14	489.80	500.00

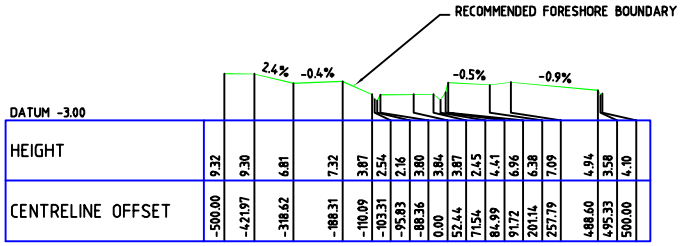
CHAINAGE 1181

AECOM



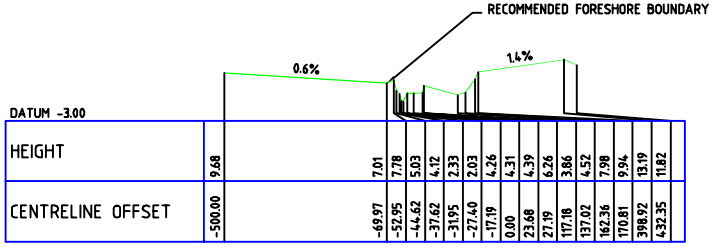
HEIGHT	11.92	11.69	9.89	9.76	8.52	7.68	6.51	5.85	4.60	3.54	1.95	3.42	3.51	3.55	2.94	3.89	3.87	6.78	7.29	6.64
CENTRELINE OFFSET	-500.00	-439.99	-388.66	-361.47	-349.70	-294.73	-286.88	-208.36	-198.02	-131.73	-121.99	-116.55	0.00	62.53	74.31	82.64	93.94	103.82	119.70	500.00

CHAINAGE 2818



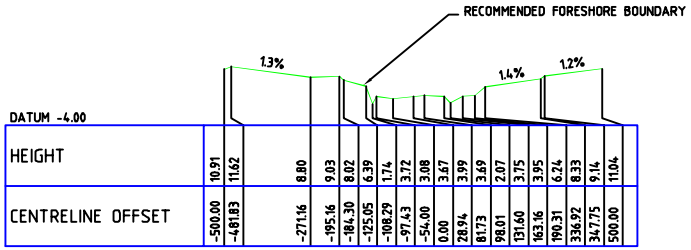
HEIGHT	9.32	9.30	6.81	7.32	3.87	2.54	2.16	3.80	3.84	3.87	2.45	4.41	6.96	6.38	7.09	4.94	3.58	4.10
CENTRELINE OFFSET	-500.00	-421.97	-318.62	-188.31	-110.09	-103.31	-95.83	-88.36	0.00	52.44	71.54	84.99	91.72	201.14	257.79	488.60	495.33	500.00

CHAINAGE 2759



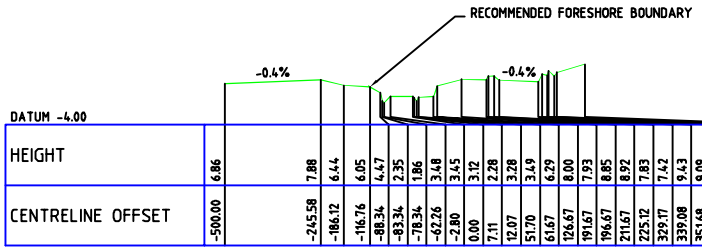
HEIGHT	9.68	7.01	7.78	5.03	4.12	2.33	2.03	4.26	4.31	4.39	6.26	3.86	4.52	7.98	9.94	13.19	11.82
CENTRELINE OFFSET	-500.00	-69.97	-52.95	-44.62	-37.62	-31.95	-27.40	-17.19	0.00	23.68	27.19	117.18	137.02	162.36	170.81	398.92	432.35

CHAINAGE 2461



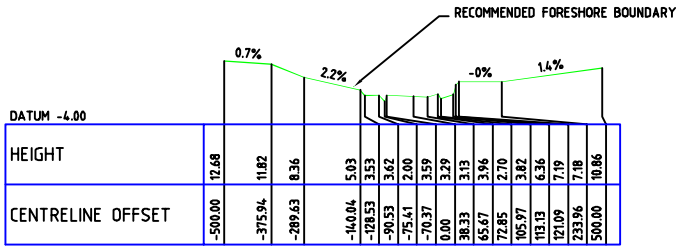
HEIGHT	10.91	11.62	8.80	9.03	8.02	6.39	1.74	3.72	3.08	3.67	3.99	3.69	2.07	3.75	3.95	6.24	8.33	9.14	11.04	
CENTRELINE OFFSET	-500.00	-481.83	-271.16	-195.16	-184.30	-125.05	-108.29	-97.43	-54.00	0.00	28.94	81.73	98.01	131.60	163.16	190.31	336.92	347.75	500.00	

CHAINAGE 3011



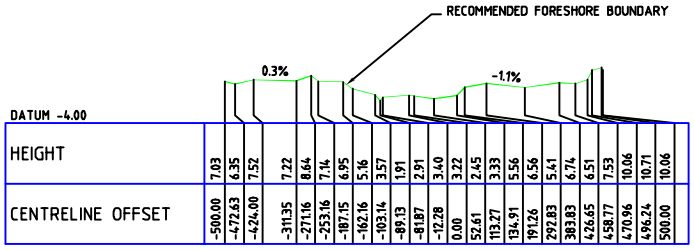
HEIGHT	6.86	7.88	6.44	6.05	4.47	2.35	1.86	3.48	3.45	3.12	2.28	3.28	3.49	6.29	8.00	7.93	8.85	8.92	7.83	7.42	9.43	9.09	10.25	8.83	9.86	12.04						
CENTRELINE OFFSET	-500.00	-245.58	-186.12	-116.76	-88.34	-83.34	-78.34	-62.26	-2.80	0.00	7.11	12.07	51.70	61.67	126.67	191.67	196.67	211.67	225.12	329.17	339.08	351.68	356.68	371.68	378.72	451.68						

CHAINAGE 3342



HEIGHT	12.68	11.82	8.36	5.03	3.53	3.62	2.00	3.59	3.29	3.13	3.96	2.70	3.82	6.36	7.19	7.18	10.86	
CENTRELINE OFFSET	-500.00	-375.94	-289.63	-140.04	-128.53	-90.53	-75.41	-70.37	0.00	38.33	65.67	72.85	105.97	113.13	121.09	233.96	500.00	

CHAINAGE 2885



HEIGHT	7.03	6.35	7.52	7.22	8.64	7.14	6.95	5.16	3.57	1.91	2.91	3.40	3.22	2.45	3.33	5.56	6.56	5.41	6.74	6.51	7.53	10.06	10.71	10.06								
CENTRELINE OFFSET	-500.00	-472.63	-424.00	-311.35	-271.16	-253.16	-187.15	-162.16	-103.14	-89.13	-81.87	-12.28	0.00	52.61	113.27	134.91	191.26	292.83	383.83	426.65	458.77	470.96	496.24	500.00								

CHAINAGE 3170

Appendix C

Trees Recorded During Site Walkover (WEPL,2026)

Table 1: Trees Recorded During Site Walkover (WEPL, 2026)

Tree	DBH	Species	Native/Non-native	Observation
1	DBH > 500 mm	*Eucalyptus camaldulensis*	Non-native	No hollow
2	DBH > 500 mm	*Eucalyptus camaldulensis*	Non-native	No hollow
3	DBH > 500 mm	*Eucalyptus camaldulensis*	Non-native	No hollow
4	DBH > 500 mm	*Eucalyptus camaldulensis*	Non-native	No hollow
5	DBH > 500 mm	*Eucalyptus camaldulensis*	Non-native	No hollow
6	DBH > 500 mm	*Eucalyptus camaldulensis*	Non-native	No hollow
7	DBH > 500 mm	*Eucalyptus camaldulensis*	Non-native	No hollow
8	DBH > 500 mm	*Eucalyptus camaldulensis*	Non-native	No hollow
9	DBH > 500 mm	*Eucalyptus camaldulensis*	Non-native	No hollow
10	DBH > 500 mm	*Eucalyptus camaldulensis*	Non-native	No hollow
11	DBH > 500 mm	*Eucalyptus grandis*	Non-native	No hollow
12	DBH > 500 mm	*Eucalyptus camaldulensis*	Non-native	No hollow
13	DBH > 500 mm	*Eucalyptus camaldulensis*	Non-native	No hollow
14	DBH > 500 mm	*Eucalyptus camaldulensis*	Non-native	No hollow