



**WESTERN**  
**ENVIRONMENTAL**

## **Environmental Assessment Report and Management Strategy**

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Lot 9012 Jayes Rd, Piara Waters

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# Environmental Assessment Report and Management Strategy

Lot 9012 Jayes Rd, Piara Waters

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## Executive Summary

Celsius Land Syndicate #2 Pty Ltd ATF Jayes Road Unit Trust are submitting a Local Structure Plan (LSP) for Lot 9012 Jayes Road, Piara Waters (The Site). The LSP application is informed by and consistent with Metropolitan Regional Scheme (MRS) Amendment 1369/57 and Amendment 119 to the City of Armadale Town Planning Scheme (TPS) No.4. These amendments identified specific information that is required to support the Local Structure Plan and/or Subdivision stages, for all developments within the West Piara Urban Precinct.

- Local Water Management Strategy (LWMS) and subsequent Urban Water Management Plan (UWMP)
- Bushfire Management Plan (BMP) at both Structure Plan and Subdivision stage
- Acoustic Assessment
- Environmental Assessment Report and Management Strategy that specifically address:
  - Vegetation and fauna
  - Acid sulfate soils; and
  - Contamination

This Environmental Assessment Report and Management Strategy addresses the information requirements identified by proceeding planning processes and considers relevant environmental issues as per contemporary guidance and legislation.

The development of Lot 9012 Jayes Road is not significantly constrained by environmental and heritage factors and the requirement for management during development and post development is limited to the following:

- Noise - adherence to the noise mitigation measures described by the Noise Impact Assessment:
  - Construction of a noise barrier, comprising a 2.4 m high wall combined with deemed to comply facade protection; and
  - Implementation of noise reducing architectural packages to dwellings.
- Acid sulphate soils - site sampling has demonstrated that it is unlikely that the site poses a significant ASS risk. The extent of ASS management will be determined once the earthwork program is defined, including the depth of sewer and associated dewatering requirements.
- ASS management may be required in areas where material excavated below the water table. This will involve treatment with lime and reuse on site. It is considered unlikely that groundwater effluent

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resulting from dewatering will require management and monitoring, however this will be determined once an assessment of dewatering requirements is undertaken.

- Hydrology - Consistent with the Stormwater Management Manual of Western Australia, an Urban Water Management Plan will be required to support subdivision and demonstrate compliance with the stormwater and groundwater management criteria as described by the Local Water Management Strategy.
- Vegetation and fauna - Impact to the low value vegetation and fauna habitat present on the site is not significant. The ability to retain trees on site is limited. POS, drainage and landscape design has been informed by arborist advice and civil engineering requirements, to identify the potential to retain 17 trees on site. Construction will be implemented to protect and manage trees to be retained in accordance with AS4970 (2009) Protection of Trees on Development Sites.
- Bushfire - the Bushfire Management Plan demonstrates that BAL impacts on Lots is minimal and the development meets all Bushfire Protection Criteria through the implementation of acceptable solutions.
- Contamination - Investigations have demonstrated that the Site is not contaminated, there is no historical risk of contamination and that further investigations are not required
- Heritage - There are no heritage sites identified on the Site. The event that Aboriginal artefacts are identified during earthworks, obligations under the Aboriginal Heritage Act 1972 will be required to be complied with.

Implementation of the measures identified above will achieve an environmentally acceptable development outcome.

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Appendix B	Local Water Management Strategy
Appendix C	Tree Assessment

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Appendix D	Bushfire Management Plan
Appendix E	Landscape Plan

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# 1. Introduction

## 1.1 Background

Celsius Land Syndicate #2 Pty Ltd ATF Jayes Road Unit Trust are submitting a Local Structure Plan (LSP) for Lot 9012 Jayes Road, Piara Waters (The Site). See Figure A . The Site is located in the City of Armadale (The City) and is approximately 5.97 ha in area. The LSP application is informed by and consistent with Metropolitan Regional Scheme (MRS) Amendment 1369/57 and Amendment 119 to the City of Armadale Town Planning Scheme (TPS) No.4. These amendments identified specific information that is required to support the Local Structure Plan and/or Subdivision stages, for all developments within the West Piara Urban Precinct:

- Local Water Management Strategy (LWMS) and subsequent Urban Water Management Plan (UWMP)
- Bushfire Management Plan (BMP) at both Structure Plan and Subdivision stage
- Acoustic Assessment
- Environmental Assessment Report and Management Strategy that specifically address:
  - Vegetation and fauna
  - Acid sulfate soils; and
  - Contamination

## 1.2 Scope

This document addresses the requirements for an Environmental Assessment Report and Management Strategy (EARMS). The scope of this EARMS is to demonstrate that required environmental values are adequately identified, and potential impacts are considered and managed in accordance with legislative and policy requirements.

Additional required documents have been prepared by other parties and, where appropriate, have been referenced in the preparation of this EARMS, these being:

- Local Water Management Strategy - Waterinsight, 2022
- Bushfire Management Plan - Allerding and Associates, 2022
- Noise Impact Assessment - Lloyd George Acoustics, 2022
- Tree Assessment - Arboribus, 2022

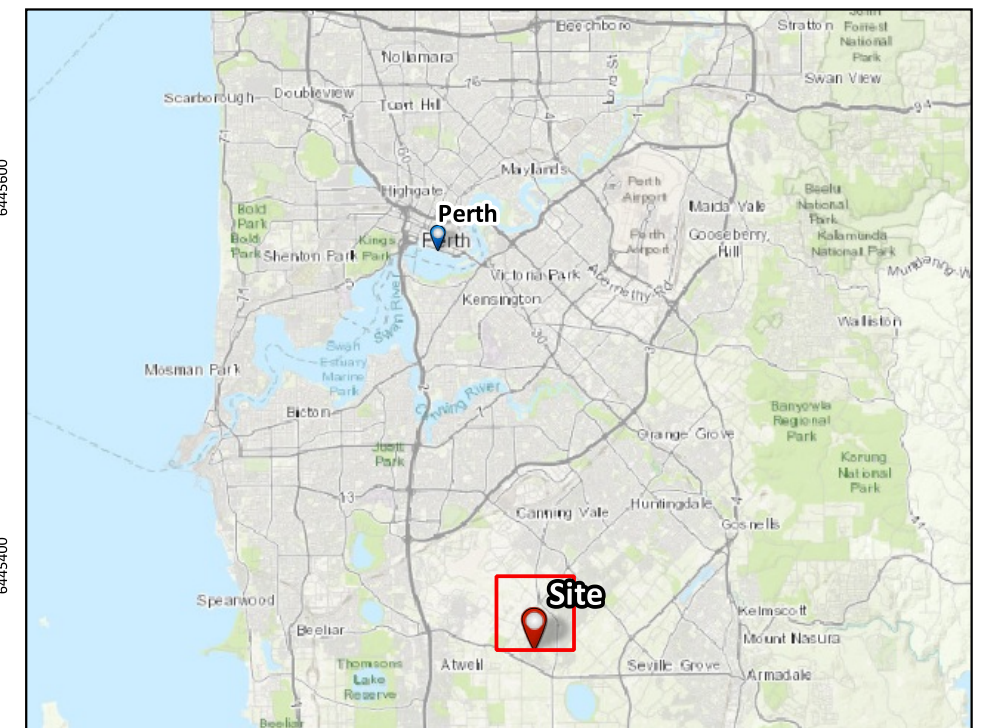
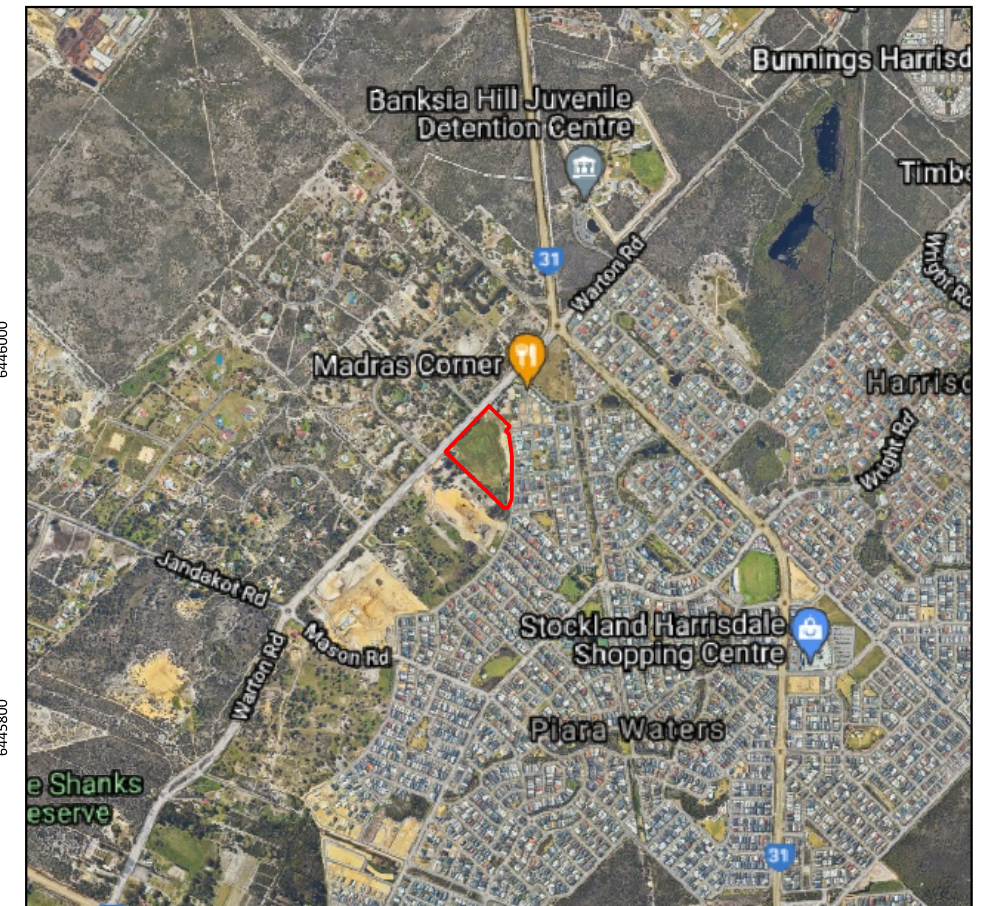
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- Landscape Plan - Plan E, 2022

The key findings of these documents are reproduced in this EARMs for reference and are included in full in the Appendices.

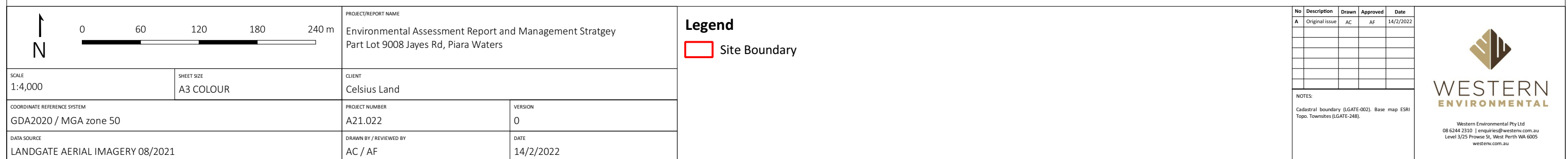
### **1.3 Structure Plan**

The Structure Plan and associated Subdivision Concept Plan (Figure B) meets the requirements of the *Planning and Development Act 2005* and is consistent with the preceding MRS and TPS Amendments. The Structure Plan makes provision for Urban land uses, internal road network and connections to the existing road network, areas of Public Open Space (POS), inclusive of drainage management and retention of trees.





### Figure A: Site Location







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## 2. Planning Context

### 2.1 MRS Amendment

In May of 2020 the West Piara Urban Precinct amendment application was approved under MRS Amendment 1369/57. The Site comprises 5.97 ha of the total 112.26 ha covered under the scheme amendment. This amendment allowed for a rezoning of the Site from Rural-Water Protection Zoning to Urban Zoning (WAPC, 2020).

The proposed Amendment 1369/57 was referred to the Environmental Protection Authority (EPA) for advice on whether environmental assessment would be required. The EPA has advised that the proposed amendment did not require formal assessment under Part IV of the *Environmental Protection Act 1986*. The EPA did provide advice on key environmental factors for the amendment (WAPC, 2020). Of relevance to this document is EPA advice that:

- The amendment area contains poorly represented remnant vegetation (Southern River complex - 14% remaining)
- Threatened species of black cockatoo habitat and wetland vegetation and fauna habitat may occur
- Amendment area may also contain threatened flora known to occur within the local area (such as *Caladenia huegelii*) and updated flora and vegetation and fauna surveys are required to inform future local planning scheme amendments.

In consideration of this advice, it is important to note that West Piara Urban Precinct Scheme Amendment zone included lots on which remnants of native vegetation were present. The Site is not considered to contain any intact remnants of native vegetation.

Consultation was undertaken with Department of Biodiversity Conservation and Attractions during the MRS scheme amendment process. The DBCA noted that during the amendment of TPS 4 a number of provisions were proposed to ensure planning commitments will be enforced at this Local Structure Plan and Subdivision Plan stage (WAPC, 2020).

### 2.2 Town Planning Scheme Amendment

The provisions of the *Planning and Development Act 2005* state that Town Planning Schemes are to be consistent with the State Government's MRS. As such the City of Armadale resolved to initiate Amendment 119 to Town Planning Scheme No.4 – (Rezoning of West Piara Urban Precinct North). The amendment allows for rezoning of the Site from 'General Rural' zone to the 'Urban Development' zone. The Urban Development zone allows the preparation of Structure Plans to support urban residential subdivision that is likely to be typical of adjoining residential areas in Piara Waters.

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Within the Town Planning Scheme No. 4 Amendment No. 119 (Rezoning of West Piara Urban Precinct North) report several provisions relevant to the preparation of the Structure Plan and the supporting EARMS were identified. These include:

- Preparation of an Environmental Management Plan in consultation with the Department of Biodiversity, Conservation and Attractions to the satisfaction of the City of Armadale. The Environmental Management Plan shall address as a minimum, actions to prevent and manage impacts of urban development on vegetation identified for retention, and be informed by a botanical survey to assess the potential presence of conservation significant flora
- The Structure Plan shall provide design and management responses for implementation through subdivision and development, addressing acid sulphate soils and potential site contamination
- Identification and protection of significant landscape trees and features as per *Local Planning Policy PLN 2.4 Landscape Feature and Tree Preservation*, where possible



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## 3. Environmental Legislation, Policy and Guidelines

Key statutory and policy documents are listed below, and where specifically relevant to the Site are discussed in detail below.

### 3.1 Commonwealth Legislation

No Matters of National Environmental Significance (MNES) in accordance with the *Environmental Protection and Biodiversity Conservation Act (1999)* (EPBC Act) were identified for the Site.

### 3.2 State Government Legislation

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

- *Biodiversity Conservation Act 2016* (BC Act)
- *Environmental Protection Act 1986* (EP Act)
- *Biosecurity and Agriculture Management Act 2007* (BAM Act)
- *Contaminated sites Act 2003* (CS Act)
- *Contaminated Sites Regulations 2006* (CS regulations)
- *Planning and Development Act 2005*
- *Aboriginal Heritage Act 1972* and *Aboriginal Cultural Heritage Act 2021* (under transitional phase)
- *Heritage Act 2018*.

### 3.3 State Planning Policies

The following State planning policies are identified as relevant to the Site as per the WAPC MRS Amendment 1369/57 and 1370/57 report:

- *Perth and Peel@3.5million / South Metropolitan Peel Sub-regional Planning Framework*
- *State Planning Policy No. 2.3 - Jandakot Groundwater Protection*
- *State Planning Policy 2.8 - Bushland Policy for the Perth Metropolitan Region*
- *State Planning Policy 3.7 - Planning for Bushfire Risk Management*
- *State Planning Policy 5.4 - Road and Rail Noise*

- 
- *Environmental Protection Authority Guidance Statement No. 3 – Separation Distances Between Industrial and Sensitive Landuses*
  - *Environmental Protection Authority Guidance Statement No. 33 - Environmental Guidance for Planning and Development*

Where relevant to this document, these policies are discussed in detail in the following sections. Policies relating to Groundwater Protection, Bushfire Risk Management and Road and Acoustic Assessment are dealt with in separate documents.

### **3.3.1 State Planning Policy 2.8 - Bushland Policy for the Perth Metropolitan Region**

*State Planning Policy 2.8: Bushland Policy for the Perth Metropolitan Region (SPP 2.8)* aims to provide a policy and implementation framework that ensures bushland protection and management issues throughout the Perth Metropolitan Region are adequately addressed and integrated with broader land use planning and decision-making (WAPC 2020). The policy does not prevent development where it is consistent with the policy measures in this policy and other planning and environmental considerations. The policy predominantly deals with two distinct subjects, Bush Forever areas and local bushland areas. In accordance with SPP 2.8, proposals must identify regionally significant bushland and describe methods by which it will avoid, minimise and offset any likely impacts on regionally significant bushland.

The Site has a history of agricultural and sand mining land uses with the majority cleared of native vegetation. No Bush Forever sites or regionally significant bushland occurs within the Site. It is considered that the proposal is consistent with the intent of SPP 2.8.

## **3.4 Environmental Protection Authority (EPA) Guidance**

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

- *Environmental Factor Guideline- Inland Waters*
- *Environmental Factor Guideline- Flora and Vegetation*
- *Environmental Factor Guideline- Terrestrial Fauna*
- *Environmental Factor Guideline- Social Surroundings*
- *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016).*
- *Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA, 2020)*
- *Environmental Protection Bulletin No. 20 - Protection of naturally vegetated areas through planning and development (EPA, 2013).*

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### 3.5 State Government Agency Guidance

The assessment has given consideration to the recommendations of State government agency guidance as listed below:

- *Aboriginal Heritage Due Diligence Guidelines* (DAA 2013)
- *inHerit* (State Heritage Office)
- *Environmentally Sensitive Areas: Clearing Regulation Fact Sheet 24* (Department of Environment Regulation)

### 3.6 Local Government Policies, Strategy and Guidance

The City's Town Planning Scheme No.4 is supported by a suite of local town planning policies. Reference to these documents has been made throughout this document where relevant.

- *Plan 2.4 Landscape feature and tree preservation*
- *Plan 2.7 Environmental Management*

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## 4. Existing Environment

### 4.1 Site Description

The Site comprises 5.97 ha and is bounded by Warton Road to the north and west, Jayes Rd and Southampton Rd to the east and farmland to the south. The site is predominantly cleared, with vegetation limited to a row of planted eastern state Eucalypts along the western boundary adjacent to Warton Road, and a mix of occasional remnant Melaleuca trees and planted non-endemic species in the southern corner of the site. A row of trees along the south-western boundary comprises a mixture of native endemic species such as *Eucalyptus rudis*, *Eucalyptus marginata* and *Melaleuca preissiana* interspersed with planted non-endemic Eucalyptus species (Arboribus, 2022). A drainage channel exists in the south-east of the site, which is a remnant from borrow pit works in 2011. The channel terminates at the site's southern boundary and is therefore not performing any drainage function.

#### 4.1.1 Historical Use of the Site

An examination of aerial photography dating from 1953 to 2020, shows that until 2011, the site was subject to a cyclical process of clearing and vegetation regrowth. The clearing is assumed to have been associated with non-intensive agricultural activities. The site has never supported buildings or other structures. In 2011, the site was used as a borrow pit for the extraction of sand material to support adjacent urban development. Owing to a low groundwater table in 2011, material was abstracted to a depth of 25.2 m AHD. Backfill from the adjacent site and three other nearby developments was used to achieve a final level of 27 m AHD. The fill material was placed in stages in accordance with the availability of fill material. The fill material comprised topsoil and as such contained organic material. Material such as peat was excluded from backfill operations. Testing for potential acid sulphate soil (ASS), subsequent lime dosing and retesting was undertaken to achieve a neutralised outcome (Bioscience 2011).

#### 4.1.2 Adjacent and Surrounding Land Uses

The Site is bound by CY O'Connor Village Tavern to the north, Southampton Drive and Jayes Road and adjacent urban development to the east, the under-construction Park Home (Lifestyle Village) on Lot 9007 Southampton Drive to the south and Warton Road and rural residential properties to the west. The rural residential properties are within a land use zone that permits the operation of dog kennels. Four dog kennel operations are within proximity to the Site.

Noise from Warton Road and the dog kennel operations are the only adjacent and surrounding land use that represents a potential constraint to development. A Noise Impact Assessment was undertaken by Lloyd George Acoustics (Appendix A) which included both traffic and kennel noise measurement and modelling.

The assessment concluded that indoor and outdoor noise parameters for residential development can be met with the implementation of the following management actions:

- 
- Construction of a noise barrier, comprising a 2.4 m high wall combined with deemed to comply facade protection; and
  - Implementation of noise reducing architectural packages to dwellings.

## **4.2 Topography, Geology and Soils**

The Site is generally flat with gentle slopes in the centre of the site, with steeper slopes around the Site boundary. The ground surface ranges from approximately RL 26 m AHD to RL 28 m AHD. The subject site generally slopes from the perimeter boundaries into the middle of the site, with slopes ranging from approximately 1 in 5 at the site boundary to 1 in 100 in the middle of the site.

Surface geology mapping by DMIRS (1986) is shown on Figure C. The surface geology of the Site is classified as Bassendean Sands comprising:

- S8: SAND - White to pale grey at surface yellow at depth fine to medium-grained moderately sorted subangular to sub-rounded minor heavy minerals of eolian origin
- S10: SAND - as S8 over sandy clay to clayey sand of the Guilford Formation of eolian origin





Figure C: Geology, Soil and Topograghy

0

300

600

900

1,200 m

0

300

600

900

1,200 m

SCALE

1:20,000

SHEET SIZE

A3 COLOUR

COORDINATE REFERENCE SYSTEM

GDA2020 / MGA zone 50

DATA SOURCE

LANDGATE AERIAL IMAGERY 08/2021

PROJECT/REPORT NAME

Environmental Assessment Report and Management Stratgey  
Part Lot 9008 Jayes Rd, Piara Waters

CLIENT

Celsius Land

PROJECT NUMBER

A21.022

VERSION

0

DRAWN BY / REVIEWED BY

AF / AF

DATE

14/2/2022

Legend

Site Boundary8

Topographic Contour Line (LGATE\_015)

Each 5m

Each 1m

GSWA

Cps

Ms5

S10

S8

Sp1

Sp2

Quarry or pit (inactive)

No	Description	Drawn	Approved	Date
A	Original issue	AC	AF	14/2/2022

NOTES:

Cadastral boundary from LANDGATE 2022, GSWA from Fremantle and Armadale (2033-I-2033IV) (1986)

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## 4.3 Contamination

A search of the DWER Contaminated Sites Database indicates the site does not contain any registered contaminated sites (Figure D).

Given the site history of imported material, a limited soil and groundwater investigation was undertaken by Western Environmental Pty Ltd to inform the potential risk of soil and groundwater contamination and ASS. This work comprised of the following:

- Installation of 6 soil bores to depths of up to 5m, opportunistic sampling for ASSS and contamination.
- Conversion of 3 soil bores to monitoring wells, sampling and laboratory analysis of samples for ASS and heavy metal suite.
- Collection and analysis of up to 10 soil samples for ASS parameters
- Analysis of 10 samples for metals, TRH screen and OC pesticides to screen for potential contamination related to historical land use
- Analysis of 3 groundwater samples for ASS parameters and heavy metals

No obvious impacts such as asbestos fragments or uncontrolled fill material have been observed on site by two separate geotechnical investigations and the intrusive environmental site assessment. The laboratory results for soil contamination have returned a negative result for all parameters, indicating that the risk of contamination across the site is low and further investigations are not expected to be required. Given the fill material brought onto the site was placed in lifts and homogenised, it is considered that the soils tested for contamination and ASS are representative of the wider site and limited variance is likely to be encountered.

No further assessment of contamination is considered to be required to support development of the Site.

## 4.4 Acid Sulphate Soil

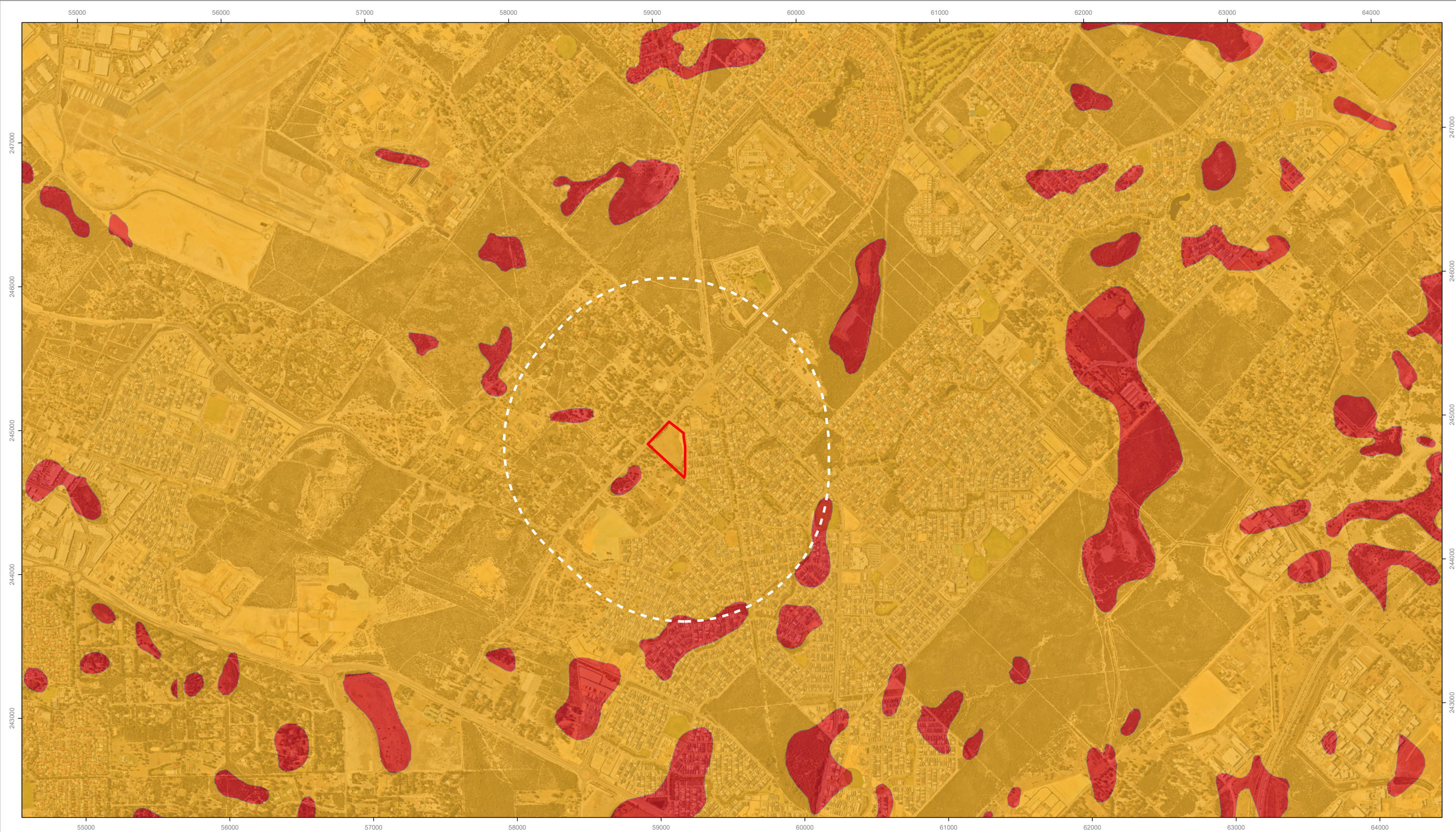
The DWER Acid Sulphate Soil Risk mapping (Figure E) indicates the site has a low to moderate risk of containing acid sulphate soils (ASS) occurring within 3 m of natural soil surface but high to moderate risk of ASS beyond 3 m of the natural soil surface.

Given the history of the site and the importation of fill material comprising topsoil and potentially organic material, testing of soils and groundwater for ASS and potential Acid Sulphate soils (PASS) was undertaken. Laboratory results show no ASS above the criteria.










**Figure E Acid Sulphate Soil Risk Map, Swan Coastal Plain (DWER-055)**

<div>00.30.61.2 Kilometers</div>		PROJECT / REPORT NAME		<div>LEGEND</div> <div><div>Site</div></div> <div>Acid Sulphate Soil Risk Map, Swan Coastal Plain (DWER-055)</div> <div><div>1 - High to moderate risk of ASS occurring within 3m of natural soil surface</div><div>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</div></div> <div>Site Buffer 5km</div>	<div></div> <div>WESTERN ENVIRONMENTAL</div>
SCALE 1:25,000	SHEET SIZE A3 COLOUR	CLIENT			
SPATIAL REFERENCE GDA2020 / MGA Zone 50		PROJECT NUMBER	VERSION V0		
DATA SOURCE		DRAWN BY / REVIEWED BY		DATE 11/10/2021 4:50 PM	



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## 4.5 Hydrology

A summary of the hydrological characteristics for the Site is provided in the following subsection. Further detailed discussion of hydrological characters is also provided in the Local Water Management Strategy (Waterinsight, 2022), which is provided in Appendix B.

### 4.5.1 Groundwater

The approved District Water Management Strategy (JDA, 2020) identified an Average Annual Maximum Groundwater Level of approximately 26.6 mAHD in the south to 26.65 mAHD in the north of the site (Figure F). This was informed by a two-year predevelopment groundwater monitoring program at the Piara Waters West Precinct between July 2018 to September 2020, including the installation of data loggers in June 2019. The monitoring program included the installation of 5 monitoring bores with the nearest monitoring bore MB01 being located immediately outside the site's western boundary in Lot 9007.

### 4.5.2 Surface Water and Wetlands

There are no natural surface water features on the site that require retention and protection. An agricultural drain is located adjacent to the site's eastern boundary. It appears this drain was constructed to divert rainfall to a constructed dam/watering hole located in the south of the site.

The northern corner of the site intersects with an area that was formerly a wetland but is now recognised as having no wetland value. The southern corner of the site intersects a Multiple Use Wetland (UFI 14155) (Figure G). Multiple Use wetlands are classified as being highly disturbed and retaining little environmental value. The wetland on the site aligns with this classification and the best outcome for this area will be used for drainage management.

### 4.5.3 Public Drinking Water Source Area

The Metropolitan Region Scheme Amendment 1369/57 – West Piara Urban Precinct, changed the site from a Priority 2 Drinking Water Source Protection Area to a Priority 3\* Drinking Water Source Protection Area, enabling urban development of the site. The site is also outside of any well-head protection zones for groundwater abstraction wells, and therefore whilst still mapped within the Jandakot Underground Water Pollution Control Area, urban development is an approved and unencumbered use.





Figure F: Predevelopment AAMGL (1975-2019)

<div><div></div><div>0100200300400m</div><div>N</div></div>		PROJECT/REPORT NAME Environmental Assessment Report CEL Lot 9012 Jayes Road Piara Water		<div>Legend</div> <div><div></div>Site Boundary</div> <div><div></div>Maximum Groundwater Contour (mMGL)</div> <div><div></div>1975 - 2019 Pre Development AAMGL (JDA, DWMS, 2020)</div>
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## 4.6 Vegetation and Flora

### 4.6.1 Desktop Assessment

#### *IBRA Sub region*

IBRA describes a system of 85 'biogeographic regions' (bioregions) and 403 sub-regions covering the entirety of the Australian continent (Thackway & Cresswell 1995). Bioregions are defined by climate, geology, landforms, vegetation and fauna.

The Site occurs within the Perth IBRA sub region of the Swan Coastal Plain Region. Vegetation for the Swan Coastal Plain Region is described as " Low lying coastal plain, mainly covered with woodlands. It is dominated by Banksia or Tuart on sandy soils, *Allocasuarina obesa* on outwash plains, and paperbark in swampy areas. In the east, the plain rises to duricrusted Mesozoic sediments dominated by Jarrah woodland. Warm Mediterranean. Three phases of marine sand dune development provide relief. The outwash plains, once dominated by *A. obesa*-marri woodlands and Melaleuca shrublands, are extensive only in the south" (Thackway & Cresswell 1995).

#### *System 6 and Vegetation System Association Mapping*

System 6 mapping refers to vegetation mapping undertaken at a Vegetation Complex scale by Heddle et al. (1980) and others. This is the primary source of information used to calculate potential impacts of proposals to clear native vegetation on the Swan Coastal Plain. The survey area occurs within the following vegetation complexes described by GoWA (2017) as:

- Southern River (42)- Open woodland of *Corymbia calophylla* (Marri) - *Eucalyptus marginata* (Jarrah) - *Banksia* species with fringing woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca raphiophylla* (Swamp Paperbark) along creek beds.

The Southern River Complex is identified as having approximately 18.42% of pre-European extent remaining within the Swan Coastal Plain (GoWA, 2017).

At a broader scale, state-wide mapping is undertaken at Vegetation System Association scale. This mapping is attributed to Beard, 1990 and others. The Site occurs within the BASSENDEAN\_1001 (VT7) vegetation association, characterised by low forest, woodland or low woodland with scattered trees of Jarrah, Banksia or Casuarina, *Eucalyptus marginata*, Banksia spp., *Allocasuarina* spp. The BASSENDEAN\_1001 (VT7) vegetation association is estimated to have approximately 21.38% remaining within the Perth IBRA sub-region (GoWA, 2018).

#### *Threatened and Priority Ecological Communities*

Potential presence of threatened and priority ecological communities was assessed through analysis of DBCA Threatened Ecological Communities Dataset (DBCA, 2021) and Department of Agriculture, Water and the Environment (DAWE) Protect Matters Search Tool (PMST) (DAWE, 2022). The DBCA dataset indicates that the northern corner of Site intersects with a feature mapped as potentially representing a threatened ecological community or an associated buffer. The DBCA Threatened Ecological Communities Dataset

includes both areas which have been confirmed and those which have been identified as potentially comprising a threatened community. Site assessment is required to confirm presence or absence.

### **Threatened and Priority Flora**

Potential presence of threatened and priority flora was assessed through analysis of DBCA Threatened and Priority Flora Dataset (DBCA, 2022) and DAWE Protect Matters Search Tool (DAWE, 2022). Existing survey reports covering the Site and adjacent lots were also assessed including:

- *Native Vegetation Clearing Permit Application Supporting Information Lot 9010 Warton Road, Piara Waters*- Coterra Environment 2020
- *Botanical Assessment of Selected Lots Along Warton Road, Armadale Road and Wright Road*- Bennett Environmental Consulting 2011

No previous records of threatened or priority flora were identified as occurring within the Site and none are considered likely to occur.

The EPA identified in their advice for Amendment 1369/57 that threatened flora including *Caladenia huegelii* may occur within the Amendment 1369/57 application area. This advice applied to the larger application area comprising several lots adjacent to and including the Site, some of which include remnant vegetation. Due to the lack of remnant vegetation, it is considered that this advice is likely not applicable for the Site.

### **4.6.2 Site Assessment**

A flora and vegetation site assessment of the Site was undertaken by Senior Environmental Scientist Andrew Fry on 3 February 2022. The site assessment was undertaken considering guidance provide in the Environmental Protection Authority (EPA) 2016 *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment* for Reconnaissance level flora and vegetation surveys. The site assessment broadly mapped vegetation types and condition and assessed potential occurrence of threatened or priority flora and ecological communities. Due to the timing of the survey in mid-summer, a targeted threatened flora survey in line with EPA technical guidance was not undertaken, as it is outside of the flowering/ growth period for most species. Due to the highly degraded nature of the site and the lack of suitable habitat, it is not considered likely that this comprises a significant limitation.

### **Vegetation Condition**

All areas of the Site were assessed as being in completely degraded condition as per the South West Province Vegetation Condition Scale (EPA, 2016). The Site has been historically cleared on multiple occasions and utilised for grazing for an extended period. Most of the Site comprises an open paddock. In areas with trees present the understory has been replaced by a mixture of pasture grasses and weed species with a small number of native species occasionally present. A significant number of the trees present on the site are *Eucalyptus* species not native to the Perth region, which have been planted as shade trees and wind breaks.

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### Vegetation Type

Four broad vegetation/ habitat types were identified (Figure H), these are:

**Flooded Gum over Paddock** (0.21 ha)- Open woodland of *Eucalyptus rudis* with occasional *Melaleuca preissii*, *Eucalyptus marginata* and planted *Eucalyptus camaldulensis*. Native mid and ground stratum species absent with introduced pasture grass species dominant. Completely degraded condition. See site images 1 -2.

**Melaleuca Dampland** (0.57 ha)- Very open woodland of *Melaleuca preissii* with scattered *Eucalyptus rudis*. Open mid stratum with occasional large thickets of Blackberry (*Rubus anglocandicans*). Ground stratum dominated by introduced pasture grass species with very occasional native species *Centella asiatica*, *Juncus pallidus* and *Isolepis marginata*. Completely degraded condition. See site images 3-4.

**River Red Gum over Paddock** (0.20 ha)- Planted windbreak of *Eucalyptus camaldulensis* over pasture grasses. Completely degraded condition. See site image 5.

**Paddock** (4.99 ha)- Open grassland of pasture grasses. Completely degraded condition. See site image 6.

### Threatened and Priority Ecological Communities

No vegetation types present within the Site are consistent with structural or species composition descriptions for any threatened or priority ecological communities listed by DBCA or DAWE.

### Threatened and Priority Flora

No threatened or priority flora species were recorded. Due to the completely degraded condition of the Site, the paucity of native species present and the replacement of mid and understory by pasture, no suitable habitat for threatened flora species is considered to be present.

## Site Images



Site Image 1



Site Image 2





Site image 3



Site image 4





Site image 5



Site image 6

### **Tree Assessment**

An Arboricultural inspection of trees with a trunk diameter greater than 300 mm was undertaken by Arboribus, 2022 (Appendix C).

A total of 88 trees met the size criteria and were assessed. The age of the assessed trees are defined as semi mature and mature. The following species were documented:

- *Eucalyptus rudis* (Flooded Gum) x 34
- *Eucalyptus camaldulensis* (River Red Gum) x 28
- *Melaleuca preissiana* (Stout Paperbark) x 18
- *Eucalyptus marginata* (Jarrah) x 3
- *Eucalyptus species* x 2
- *Allocasuarina fraseriana* (WA Sheoak) x 2
- *Eucalyptus botryoides* (Southern Mahogany) x 1

The majority of the trees were considered to be in Good or Reasonable health status. 13 trees displayed questionable or Poor health status.

The majority of the trees assessed displayed Good or Reasonable canopy structure. 17 trees were classified as having Questionable canopy structure.

An assessment of trees suitable for incorporation into an urban development identified the following:

- Optimal = 15
- Acceptable = 40
- Questionable = 24
- Unsuitable = 9

Appendix A of Arboribus 2022, (Appendix C) shows the locations of the trees and their assessed suitability.





Figure H Vegetation Types

0

30

60

90

120 m

↑

N

SCALE

1:2,200

SHEET SIZE

A3 COLOUR

COORDINATE REFERENCE SYSTEM

GDA2020 / MGA zone 50

DATA SOURCE

LANDGATE AERIAL IMAGERY 08/2021

PROJECT/REPORT NAME

Environmental Assessment Report and Management Strategy  
Part Lot 9008 Jayes Rd, Piara Waters

CLIENT

Celsius Land

PROJECT NUMBER

A21.022

VERSION

0

DRAWN BY / REVIEWED BY

AC / AF

DATE

14/2/2022

Legend

Site Boundary

Flooded Gum over paddock

Melaleuca dampland

Paddock

River Red Gum over paddock

Vegetation Habitat Types

No	Description	Drawn	Approved	Date
A	Original issue	AC	AF	14/2/2022

NOTES:

Cadastral boundary from LANDGATE 2022

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G:\GIS\Project Data\A21.022\A21.022.qgz

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## 4.7 Fauna and Habitat

### 4.7.1 Desktop

A desktop assessment of conservation significant fauna potentially occurring within the Site was undertaken using the Department of Agriculture Water and the Environment *Protected Matters Search Tool* and the Department of Biodiversity Conservation and Attractions Threatened and Priority Fauna public data layer (DBCA, 2020). Existing survey reports covering the Site and adjacent lots were also assessed including:

- *Native Vegetation Clearing Permit Application Supporting Information Lot 9010 Warton Road, Piara Waters*- Coterra Environment 2020
- *Botanical Assessment of Selected Lots Along Warton Road, Armadale Road and Wright Road*- Bennett Environmental Consulting 2011

No previous records of threatened or priority fauna occurring within the Site were identified through the desktop assessment

Considering habitat present within the Site comprises scattered trees over paddock grassland, the majority of species identified in the desktop assessment are not considered to have the potential to utilise the Site as significant habitat and have been omitted. Potential for the presence of suitable habitat for the following species was identified:

- *Calyptorhynchus banksii naso*, Forest Red-tailed Black Cockatoo – Vulnerable (EPBC Act and BC Act)
- *Calyptorhynchus baudinii*, Baudin's Black Cockatoo – Endangered (EPBC Act and BC Act)
- *Calyptorhynchus latirostris*, Carnaby's Black Cockatoo – Endangered (EPBC Act and BC Act)
- *Isodon fusciventer*, Quenda- Priority 4 (BC Act)

For this report, the term Black Cockatoos refers collectively to Baudin's black cockatoo (*Calyptorhynchus baudinii*), Carnaby's black cockatoo (*Calyptorhynchus latirostris*) and the forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*).

### 4.7.2 Site Assessment

A fauna habitat assessment of the Site was undertaken by Senior Environmental Scientist Andrew Fry on 3 February 2022. The site assessment was undertaken considering guidance provide in the Environmental Protection Authority (EPA) *Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment* for Basic level fauna surveys. The site assessment focused on assessment of potential presence of breeding, foraging or roosting habitat for black cockatoo species as per the Commonwealth referral guidelines for threatened black cockatoos (DotEE 2017; DSEWPaC 2012). The results of the black cockatoo habitat assessment are presented subsequently.

Four broad habitat types were identified. These align with the vegetation types and site images presented in Section 4.6. Fauna habitat types, conservation significant fauna observations and habitat suitability descriptions are shown in Figure I and described below.

**Flooded Gum over Paddock-** Open woodland of *Eucalyptus rudis* with occasional *Melaleuca preissii*, *Eucalyptus marginata* and planted *Eucalyptus camaldulensis*. Native mid and ground stratum species absent with introduced pasture grass species dominant. The habitat provides some value for black cockatoo species, (see detailed assessment below) along with other non-conservation significant bird species which commonly utilise isolated paddock trees and pasture areas. Due to the proximity to areas of dampland with understory cover in the south corner of the site (Melaleuca Dampland habitat type) and vegetated wetland in the adjacent lot, the habitat is likely utilised on occasion by Quenda for foraging. See site images 1 -2.

**Melaleuca Dampland-** Open woodland of *Melaleuca preissii* with scattered *Eucalyptus rudis*. Open mid stratum with occasional large thickets of Blackberry (*Rubus anglocandicans*). Ground stratum dominated by introduced pasture grass species with very occasional native species *Centella asiatica*, *Juncus pallidus* and *Isolepis marginata*. The habitat provides some value to non-conservation significant bird species which commonly utilise isolated paddock trees and damp pasture areas. The thickets of Blackberry and areas with dense thatch of Kikuyu grass in damplands provide suitable cover and habitat for Quenda. Evidence of distinctive Quenda diggings, scats and runnels was observed at several locations within the habitat type. The dense Blackberry thickets are likely to provide a daytime refuge for the species. See site images 3-4.

**River Red Gum over Paddock-** Planted windbreak of *Eucalyptus camaldulensis* over pasture grasses. The habitat provides some value for black cockatoo species, (see detailed assessment below) along with other non-conservation significant bird species which commonly utilise isolated paddock trees and pasture areas. Due to limited groundcover and the absence of native vegetation, the habitat is not considered likely to be utilised by any conservation significant ground dwelling fauna.

**Paddock-** Open grassland of pasture grasses. The habitat is not considered likely to be utilised by any conservation significant fauna. See site image 6.

### **Black Cockatoo Assessment**

The field survey methodology was designed in accordance with Commonwealth referral guidelines for threatened black cockatoos (DotEE 2017; DSEWPaC 2012). Potential black cockatoo breeding habitat comprise 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 (being greater than 50 cm DBH for most Eucalyptus species, or 30 cm for Wandoo and Salmon Gum). Foraging habitat is defined as areas including plants of species known to support foraging within the range of each cockatoo species. Marri and Jarrah woodlands are particularly important to Baudin's Black-Cockatoo and the Forest Red-tailed Black-Cockatoo, while proteaceous heaths (i.e. shrublands dominated by Banksia, Hakea and Grevillea species) are also important to Carnaby's Black-Cockatoo (DSEWPaC, 2012). In assessing the quality of Black-Cockatoo foraging habitat, the criteria detailed in both the current referral guideline (DSEWPaC, 2012) and the draft revised referral guideline (DotEE, 2017) were considered. These include foraging plant composition and density, foraging evidence such as chewed Marri nuts, proximity to

known roosting areas and breeding areas and proximity to water sources. During the field survey, searches were conducted for evidence of roosting (e.g. piles of scats, feeding debris chewed trees).

In addition to Commonwealth guidelines a scoring system based on that developed by Dr Mike Bamford was applied to class potential breeding trees.

**Table 1: Black Cockatoo Potential Breeding Tree Class**

Class	Description of Tree and Hollows/Activity
1	Active nest observed; adult (or immature) bird seen entering or emerging from hollow, eggs present.
2	Hollow of suitable size and angle visible with chew marks around entrance.
3	Potentially suitable hollow visible but no chew marks present; or potentially suitable hollow present (as suggested by structure of tree, such as large, vertical trunk broken off at a height of >10m).
4	Tree with large hollows or broken branches that might contain hollows, but hollows or potential hollows are not of a suitable size, or are aligned or obstructed so as to prevent access
5	Tree lacking large hollows or broken branches that might have large hollows; a tree with more or less intact branches and a spreading crown.

All trees were marked by GPS and assigned an identification number. The identification numbers were assigned to align with the arborist tree assessment numbering system (Appendix C). All trees are shown in Figure I.

### Breeding Habitat

A total of 25 trees qualifying as potential black cockatoo breeding trees were recorded within the Site. No trees were identified via a ground based visual assessment as having suitable structure (e.g. large dead broken branches) or containing any hollows of suitable size to be considered as a suitable breeding hollow. All trees were assessed as Class 5 as per scale in Table 3. **Error! Reference source not found..** See Figure I for tree locations.

### Foraging Habitat

An assessment of foraging habitat quality was undertaken using the Commonwealth foraging habitat scoring tool for each identified habitat type which contains native vegetation (DotEE, 2017). The habitat scoring tool includes criteria by which the score is adjusted upwards or downwards as per Table 3. The Paddock habitat type was excluded due to absence of native vegetation. No evidence of foraging (e.g. chewed Marri nuts) was recorded and no black cockatoos observed. All assessed habitat types were assigned a starting score of 1-Low quality habitat comprising individual foraging plants or a small stand of foraging plants. Identified key foraging species as per DotEE, 2017 including Banksia, Hakea, Grevillea and Marri are absent and Jarrah occurs in very low numbers. Calculated foraging habitat scores are shown below in Table 2.

**Table 2 Foraging Habitat Score**

Habitat Type	Area (ha)	Black cockatoo species score		
		Carnaby's	Baudin's	Forest Red-tailed black cockatoo
Flooded Gum over Paddock	0.21	3	3	2
Melaleuca Dampland	0.57	3	3	2
River Red Gum over Paddock	0.20	3	3	2
Paddock	4.99	Not scored, no foraging species present		

Application of foraging habitat quality scoring: 1-3-Low; 4-5 Quality; 6-7 High Quality; 8-10 Very High Quality.

All habitat types return foraging scores in the 1-3 Low quality scoring range. As per guidance in DotEE, 2017 corresponding acceptability of loss for foraging habit of this quality is >10 ha and is more likely to be acceptable.

### Roosting Habitat

The Site falls within the buffer of a roosting site as per DBCA dataset *Black Cockatoo Roosting Sites-Buffered (DBCA-064)* (DBCA, 2019). No evidence of roosting behaviour was recorded. The Flooded Gum over Paddock habitat type contains large mature trees which may be suitable for use as roosting habitat.



**Table 3 Black Cockatoo Foraging Habitat Scoring Tool (DotEE, 2017)**

Starting Score	Foraging habitat for Carnaby's Cockatoo	Foraging habitat for Baudin's Cockatoo	Foraging habitat for Forest Red-tailed Black cockatoo
10 (Very high quality)	Foraging habitat that is being managed for black cockatoos such as habitat that is the focus of successful <b>rehabilitation</b> , and/or has some level of <b>protection</b> from clearing, and/or is quality habitat described below with attributes contributing to meet a score of $\geq 10$ .	Foraging habitat that is being managed for black cockatoos such as habitat that is the focus of, successful <b>rehabilitation</b> , and/or has some level of <b>protection</b> from clearing, and/or is quality habitat described below with attributes contributing to meet a score of $\geq 10$ .	Foraging habitat that is being managed for black cockatoos such as habitat that is the focus of successful <b>rehabilitation</b> , and/or has some level of <b>protection</b> from clearing, and/or is quality habitat described below with attributes contributing to meet a score of $\geq 10$ .
7 (High quality)	Native shrubland, kwongan heathland and woodland dominated by proteaceous plant species such as <i>Banksia</i> spp. (including <i>Dryandra</i> spp.), <i>Hakea</i> spp. and <i>Grevillea</i> spp., as well as native eucalypt woodland and forest that contains foraging species, including along roadsides. Does not include orchards, canola, or areas under a RFA.	Native eucalypt woodlands and forest, and proteaceous woodland and heath, particularly marri, including along roadsides. Does not include orchards or areas under a RFA.	Jarrah and marri woodlands and forest, and edges of karri forests, including wandoo and blackbutt, within the range of the subspecies, including along roadsides. Does not include areas under a RFA.
5 (Quality)	Pine plantation or introduced eucalypts.	Pine plantation or introduced eucalypts.	Introduced eucalypts as well as the introduced Cape lilac ( <i>Melia azedarach</i> ).
1 (Low quality)	Individual foraging plants or small stand of foraging plants.	Individual foraging plants or small stand of foraging plants.	Individual foraging plants or small stand of foraging plants.
<b>Additions</b>	<b>Context adjustor - attributes improving functionality of foraging habitat</b>	<b>Context adjustor - attributes improving functionality of foraging habitat</b>	<b>Context adjustor - attributes improving functionality of foraging habitat</b>
+3	Is within the Swan Coastal Plain (important foraging area).	Is within the known foraging area (see map).	Jarrah and/or marri show good recruitment (i.e. evidence of young trees).
+3	Contains trees with suitable nest hollows.	Contains trees with suitable nest hollows.	Contains trees with suitable nest hollows.
+2	Primarily comprises marri.	Primarily contains marri.	Primarily contains marri and/or jarrah.
+2	Contains trees with potential to be used for breeding (dbh $\geq 500$ mm or $\geq 300$ mm dbh for salmon gum and wandoo).	Contains trees with potential to be used for breeding (dbh $\geq 500$ mm or $\geq 300$ mm dbh for salmon gum and wandoo).	Contains trees with potential to be used for breeding (dbh $\geq 500$ mm or $\geq 300$ mm dbh for salmon gum and wandoo).
+1	Is known to be a roosting site.	Is known to be a roosting site.	Is known to be a roosting site.
<b>Subtractions</b>	<b>Context adjustor - attributes reducing functionality of foraging habitat</b>	<b>Context adjustor - attributes reducing functionality of foraging habitat</b>	<b>Context adjustor - attributes reducing functionality of foraging habitat quality</b>
-2	No clear evidence of feeding debris.	No clear evidence of feeding debris.	No clear evidence of feeding debris.
-2	No other foraging habitat within 6 km.	No other foraging habitat within 6 km.	No other foraging habitat within 6 km.
-1	Is > 12 km from a known breeding location.	Is > 12 km from a known breeding location.	Is > 12 km from a known breeding location.
-1	Is > 12 km from a known roosting site.	Is > 12 km from a known roosting site.	Is > 12 km from a known roosting site.
-1	Is > 2 km from a watering point.	Is > 2 km from a watering point.	Is > 2 km from a watering point.
-1	Disease present (e.g. <i>Phytophthora cinnamomi</i> or marri canker).	Disease present (e.g. <i>Phytophthora cinnamomi</i> or marri canker).	Disease present (e.g. <i>Phytophthora cinnamomi</i> or marri canker).







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## 4.8 Conservation Areas

See Figure J for mapping of conservation areas and linkages.

### 4.8.1 Environmentally Sensitive Areas

Environmentally sensitive areas (ESAs) are areas where the exemptions for clearing vegetation under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* do not apply. The Site does not intersect any mapped ESAs (DWER, 2021). A mapped ESA is present 50 m to the south east of the Site.

### 4.8.2 Bush Forever Sites

Bush Forever is a 10 year strategic plan that aims to protect and retain at least 10% of each of the original 26 vegetation complexes that have been identified on the Swan Coastal Plain. The Site does not intersect or occur adjacent to any Bush Forever Sites (DPLH, 2022b).

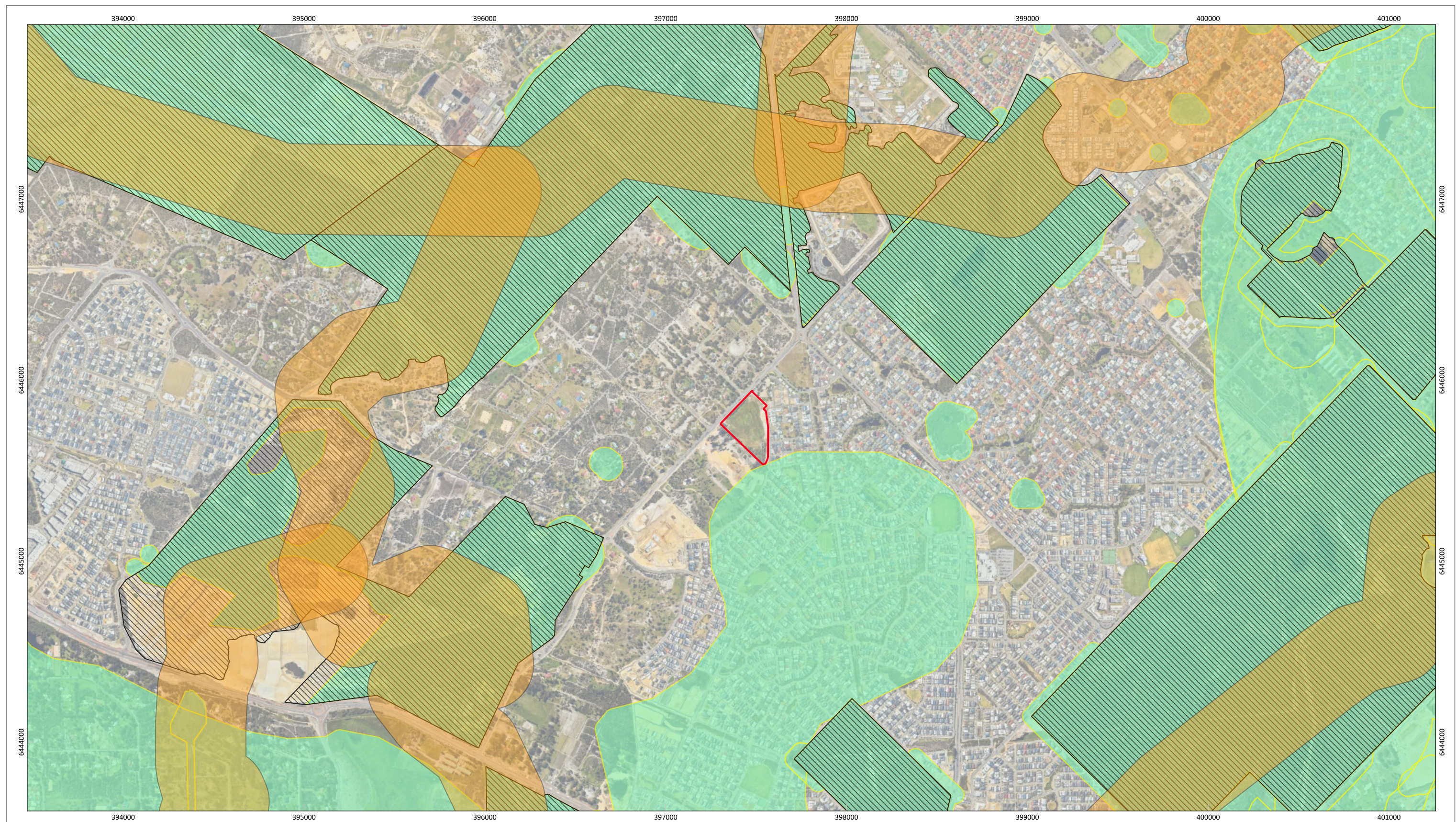
### 4.8.3 Local Natural Areas

Local Natural Areas (LNAs) are areas of bushland or other natural features which are considered or managed through local government planning strategies or activities. The Site is not known to intersect or occur adjacent to any LNAs (City of Armadale, 2009).

### 4.8.4 Regional Ecological Linkages

Regional Ecological Linkages are areas mapped to broadly represent a link between patches of remnant vegetation, judged to be of regional significance in the Perth Metropolitan Region (PMR) Scheme Area. The Site does not intersect or occur adjacent to any Regional Ecological Linkages (WALGA, 2022).





### Figure J Conservation Areas and Linkages

<p>N</p> <p>0      300      600      900      1,200 m</p>		PROJECT/REPORT NAME Environmental Assessment Report and Management Strategy Part Lot 9008 Jayes Rd, Piara Waters	
SCALE 1:20,000		SHEET SIZE A3 COLOUR	CLIENT Celsius Land
COORDINATE REFERENCE SYSTEM GDA2020 / MGA zone 50		PROJECT NUMBER A21.022	VERSION 0
DATA SOURCE LANDGATE AERIAL IMAGERY 08/2021		DRAWN BY / REVIEWED BY AF / AF	DATE 14/2/2022

### Legend

- Site Boundary
- Bush Forever Areas- 2000 (DPLH-019)
- Clearing Regulations- Environmentally Sensitive Areas (DWER-046)
- Perth Regional Ecological Linkages (2004)

No.	Description	Drawn	Approved	Date
A	Original Issue	AC	AF	14/2/2022

NOTES:

Cadastral boundary from LANDGATE 2022

WESTERN ENVIRONMENTAL

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Level 3/25 Prowse St, West Perth WA 6005  
western.com.au



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## 4.9 Bushfire

As outlined on the Department of Fire and Emergency Services (DFES) Western Australian Map of Bush Fire Prone Areas, the site is designated as bush fire prone. Consistent with *State Planning Policy 3.7 – Planning in Bushfire Prone Areas* (SPP3.7), a Bushfire Management Plan (BMP) has been prepared to accompany the Structure Plan. The BMP (Allerding and Associates 2022) is provided at Appendix D.

A BAL Contour Map has been prepared to determine the level of construction required for future dwellings within 100m of classified vegetation pursuant to Australian Standard AS3959-2018 Construction of buildings in bushfire-prone areas (AS3959) (Figure K).

The BMP demonstrates that the development meets all Bushfire Protection Criteria through the implementation of acceptable solutions.



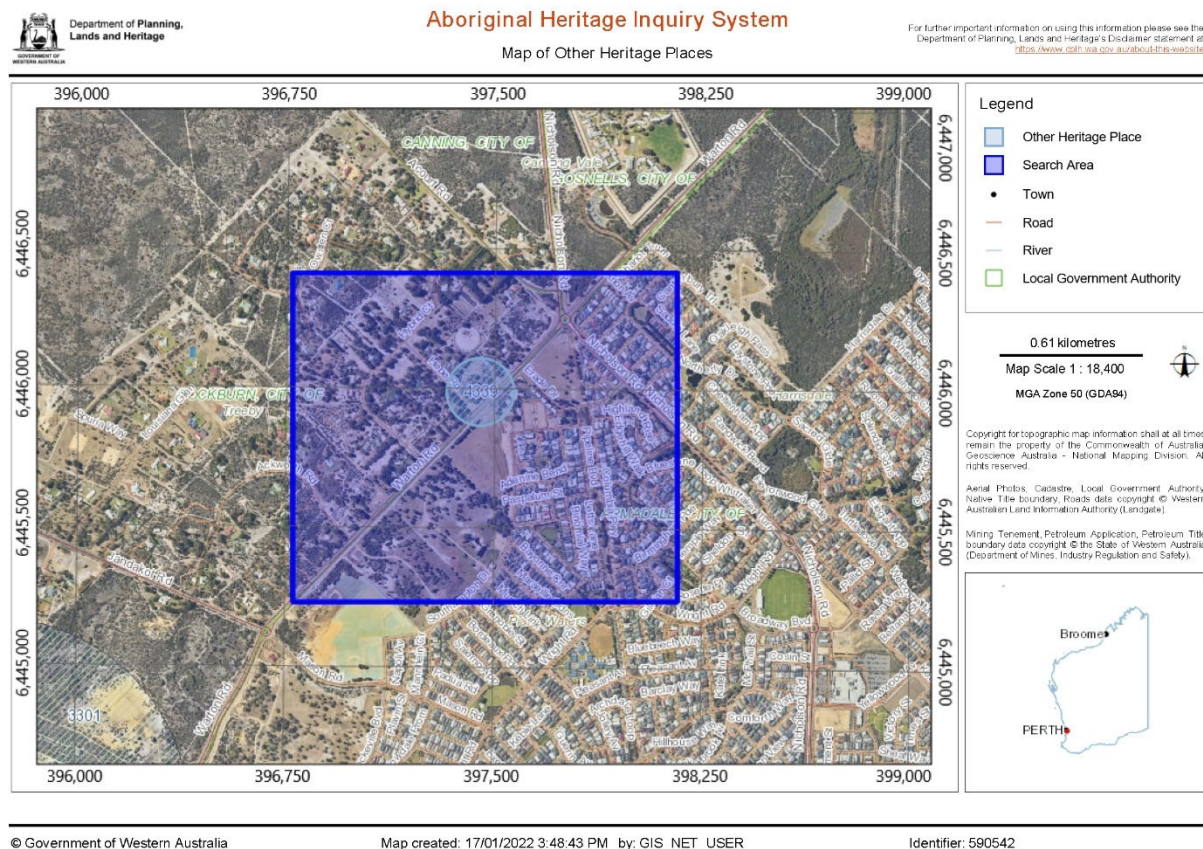




## 4.10 Heritage

### 4.10.1 Indigenous Heritage

A search of the Department of Planning, Lands and Heritage *Aboriginal Heritage Places* mapping (DPLH, 2022a) was undertaken. This search identified no registered Aboriginal Heritage Sites as occurring within the Site. One feature listed under 'Other Heritage Places' intersects the north corner of the Site (Figure L). This feature is identified as '4339 Warton Road, Banjup-Artifacts/Scatter'. The status of this feature is 'Lodged' indicating information has been received in relation to the place, but an assessment has not been undertaken and the site is not a Registered Site under the *Aboriginal Heritage Act 1972*. It is understood from engagement with the City of Armadale (Kobi Bradshaw-Chen, pers comms) that based on knowledge of the potential site, it does not intersect Lot 9012 Jayes Road.



**Figure L Aboriginal Heritage Inquiry System Search Results**

### 4.10.2 European Heritage

A search of the Heritage Council of Western Australia *inHerit* database did not identify any European heritage places within the Site (DPLH, 2022c).

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## 5. Potential Impacts, Mitigation and Management

### 5.1 Noise Management

The Noise Impact Assessment undertaken by Lloyd George Acoustics (Appendix A) concluded that indoor and outdoor noise parameters for residential development can be met with the implementation of the following management actions:

- Construction of a noise barrier, comprising a 2.4 m high wall combined with deemed to comply facade protection; and
- Implementation of noise reducing architectural packages to dwellings.

The noise barrier will be constructed as part of the civil construction program. The architectural packages for dwelling will be specified in the design guidelines and will be required to be implemented by future owners as dwellings are constructed.

### 5.2 Acid Sulphate Soil

Testing of soil and groundwater demonstrated that the site did not contain ASS material above criteria and that groundwater was not impacted by local sources.

ASS management may be required in areas where material excavated below the water table. This will involve treatment with lime and reuse on site. Similarly, any material required to be removed from the site or relocated for geotechnical purposes, may require testing and treatment as part of the removal or relocation process.

It is considered unlikely that groundwater effluent resulting from dewatering will require management and monitoring, however this will be determined once an assessment of dewatering requirements is undertaken.

### 5.3 Hydrology

The Local Water Management Strategy (Waterinsight 2022) has developed a conceptual stormwater management strategy with reference to the DWMS which demonstrates the site can effectively manage stormwater generated during small, minor, and major rainfall events.

Stormwater drainage design has been modelled to define the sizing of the basins. The drainage design incorporates water sensitive urban design practices, incorporates biofiltration swales and drainage basins to detain water on site to meet the sites allowable discharge rate and is consistent with the Stormwater Management Manual of Western Australia (DoW 2004-2007).

With regard to groundwater management, the design of the sewer has primarily set the site finish levels which will provide adequate clearance to groundwater. Sub soil drainage will be used beneath drainage



basins only as a contingency measure to ensure they remain dry and the POS is useable. The use of native vegetation in POS areas and smaller block sizes will minimise the use of fertiliser and pesticides to maintain groundwater quality.

Consistent with the Stormwater Management Manual of Western Australia, an Urban Water Management Plan will be required to support subdivision and demonstrate compliance with the stormwater and groundwater management criteria as described by the Local Water Management Strategy.

## 5.4 Vegetation and Flora

### 5.4.1 Potential Impacts

Due to the limited extent and degraded condition of vegetation within the Site, removal of remaining vegetation in proposed development areas is not considered to comprise a significant potential impact to vegetation and flora values for the area.

Without appropriate construction management procedures, clearing practices may result in accidental clearing of trees proposed for retention. Construction will be implemented to protect and manage trees to be retained in accordance with *AS4970 (2009) Protection of Trees on Development Sites*.

#### *Tree Retention*

Tree retention has been considered as per advice provided in City of Armadale *Plan 2.4 Landscape feature and tree preservation* in areas of public open space and drainage corridors. Significant Trees for retention are identified in the Landscape Concept which is provided in Appendix E. In total, 17 trees of High to Medium retention value are proposed to be retained.

The retention of identified trees reflects professional Arboriculture advice and the limitations posed by the development of the site. The trees are proposed to be retained within POS. Drainage basin locations within this POS have been augmented to increase retention. The site presents a number of challenges that has limited the ability to retain trees. The majority of the site is devoid of vegetation, with trees being generally limited to the Warton Road boundary, the southern lot boundary (interface with Lot 9007) and the south-eastern corner of the site. Retention along Warton Road cannot be achieved given the requirement for the installation of a noise barrier and earthwork requirements to achieve an appropriate level interface with Warton Road.

Retention along the interface with Lot 9007 cannot be achieved given the level changes required, timing of construction and requirement to install a boundary fence / wall separating the two developments. It is understood that the vegetation along this boundary is required to be cleared to support the earthwork requirements for Lot 9007 and that clearing of these trees is being pursued by the owners of this development.

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## 5.5 Fauna

### 5.5.1 Potential Impacts

Due to the limited habitat value provided by the vegetation on site the removal of the vegetation proposed is not considered likely to result in a reduction in loss of habitat extent or value of conservation significant species.

### 5.5.2 Mitigation and Management

As described in above, the retention of trees, supplemented by Landscape Planting as shown in Appendix E, will continue to provide a degree of habitat for avifauna.

A fauna specialist will inspect trees and areas of potential quenda habitat prior to clearing. Fauna relocation will be undertaken where considered necessary.

## 5.6 Bushfire

The Bushfire Management Plan demonstrates that the development meets all Bushfire Protection Criteria through the implementation of acceptable solutions. Implementation of the Structure Plan BMP will be guided by a subdivision level BMP, which will be required as a condition of subdivision.

## 5.7 Heritage

No sites of Aboriginal or European heritage are known to be present on the site. In the event that Aboriginal artefacts are identified during earthworks, obligations under the *Aboriginal Heritage Act 1972* will be required to be complied with. In the first instance, an archaeologist will be engaged to confirm the finds, provide advice on collection and engagement with Traditional Owners.



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## 6. Conclusion

The development of Lot 9012 Jayes Road is not significantly constrained by environmental and heritage factors and the requirement for management during development and post development is limited to the following:

- Noise - adherence to the noise mitigation measures described by the Noise Impact Assessment:
  - Construction of a noise barrier, comprising a 2.4 m high wall combined with deemed to comply facade protection; and
  - Implementation of noise reducing architectural packages to dwellings.
- Acid sulphate soils - site sampling has demonstrated that it is unlikely that the site poses a significant ASS risk. The extent of ASS management will be determined once the earthwork program is defined, including the depth of sewer and associated dewatering requirements.

ASS management may be required in areas where material excavated below the water table. This will involve treatment with lime and reuse on site. It is considered unlikely that groundwater effluent resulting from dewatering will require management and monitoring, however this will be determined once an assessment of dewatering requirements is undertaken.

- Hydrology - Consistent with the Stormwater Management Manual of Western Australia, an Urban Water Management Plan will be required to support subdivision and demonstrate compliance with the stormwater and groundwater management criteria as described by the Local Water Management Strategy.
- Vegetation and fauna - Impact to the low value vegetation and fauna habitat present on the site is not significant. The ability to retain trees on site is limited. POS, drainage and landscape design has been informed by arborist advice and civil engineering requirements, to identify the potential to retain 17 trees on site. Construction will be implemented to protect and manage trees to be retained in accordance with *AS4970 (2009) Protection of Trees on Development Sites*.
- Bushfire - the Bushfire Management Plan demonstrates that BAL impacts on Lots is minimal, and the development meets all Bushfire Protection Criteria through the implementation of acceptable solutions.
- Contamination - Investigations have demonstrated that the Site is not contaminated, there is no historical risk of contamination and that further investigations are not required
- Heritage - There are no heritage sites identified on the Site. The event that Aboriginal artefacts are identified during earthworks, obligations under the Aboriginal Heritage Act 1972 will be required to be complied with.



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Implementation of the measures identified above will achieve an environmentally acceptable development outcome.



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# **Appendix A**

## **Noise Impact Assessment**



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# Appendix B

## Local Water Management Strategy

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# Appendix C Tree Assessment



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# Appendix D Bushfire Management Plan

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# Appendix E Landscape Plan



