

# Notice of Application for a Planning Permit

The land affected by the application is located at:	Lot 1 TP099673B, Reserve 1 on LP98925, Allot. 2016 Parish of Pakenham, Allot. 2008 Parish of Nar Nar Goon & Lot A PS905631 92 Enterprise Road, Pakenham, Henry Road, Pakenham & Cardinia Road, Officer South
The application is for a permit to:	Subdivision of land adjacent to a road in a Transport Zone 2, creation of easements including carriageway easement, construct a minor utility installation and associated works

**A permit is required under the following clauses of the planning scheme:**

Clause 37.01-3	Subdivide land
Clause 37.01-4	Construct a building or construct or carry out works
Clause 37.07-10	Subdivide land
Clause 37.07-11	Construct a building or construct or carry out works on land designated for employment in Plan 1 specified in Schedule 2 to this zone
Clause 36.03-2	Construct a building or construct or carry out works
Clause 44.03-2	Construct a building or construct or carry out works
Clause 52.02	To proceed under Section 23 of the <i>Subdivision Act 1988</i> to create, vary or remove an easement or restriction or vary or remove a condition in the nature of an easement in a Crown grant
Clause 52.29	Subdivide land adjacent to a road in a Transport Zone 2

**APPLICATION DETAILS**

The applicant for the permit is:	ESR Investment Management 1 (Australia) C/- KLM Spatial
Application number:	T240250

You may look at the application and any documents that support the application at the office of the responsible authority:

Cardinia Shire Council, 20 Siding Avenue, Officer 3809.

This can be done during office hours and is free of charge.

Documents can also be viewed on Council's website at [cardinia.vic.gov.au/advertisedplans](http://cardinia.vic.gov.au/advertisedplans) or by scanning the QR code.



**HOW CAN I MAKE A SUBMISSION?**

This application has not been decided. You can still make a submission before a decision has been made. The Responsible Authority will not decide on the application before:

**09 April 2025**

**WHAT ARE MY OPTIONS?**

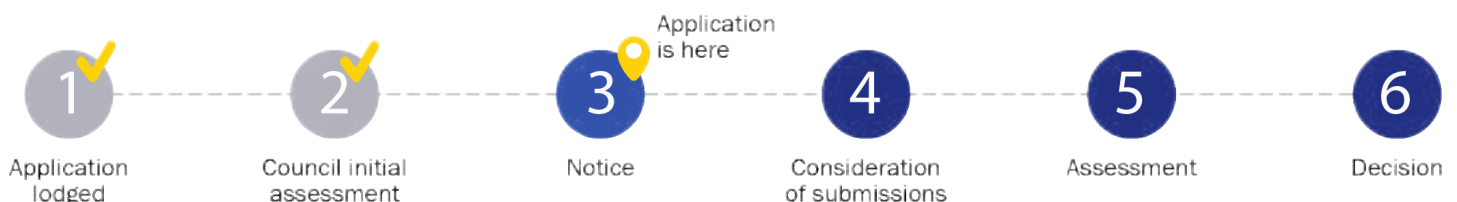
Any person who may be affected by the granting of the permit may object or make other submissions to the responsible authority.

If you object, the Responsible Authority will notify you of the decision when it is issued.

An objection must:

- be made to the Responsible Authority in writing;
- include the reasons for the objection; and
- state how the objector would be affected.

The Responsible Authority must make a copy of every objection available at its office for any person to inspect during office hours free of charge until the end of the period during which an application may be made for review of a decision on the application.



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# Request to amend a current planning permit application

This form is used to request an amendment to an application for a planning permit that has already been lodged with Council, but which has not yet been decided. This form can be used for amendments made before any notice of the application is given (pursuant to sections 50 / 50A of the *Planning and Environment Act 1987*) or after notice is given (section 57A of the Act).

## PERMIT APPLICATION DETAILS

Application No.:	
Address of the Land:	

## APPLICANT DETAILS

Name:	
Organisation:	
Address:	
Phone:	
Email:	

## AMENDMENT TYPE

Under which section of the Act is this amendment being made? (select one)	
Section 50 – Amendment to application at request of applicant <b>before</b> notice:	
Section 50A - Amendment to application at request of responsible authority <b>before</b> notice:	
Section 57A – Amendment to application <b>after</b> notice is given:	

## AMENDMENT DETAILS

What is being amended? (select all that apply)		
What is being applied for	Plans / other documents	Applicant / owner details
Land affected	Other	
Describe the changes. If you need more space, please attach a separate page.		

Secretary, DEECA, 8 Nicholson St Melbourne		
- Lot A PS905631T - McMullin Commercial Pty Ltd		
A permit is sought for works within a Special Use Zone, Public Conservation & Resource Zone and Floodway Overlay.		
<b>Specify the estimated cost of any development for which the permit is required:</b>		
Not applicable <input type="checkbox"/>	Unchanged <input type="checkbox"/>	New amount \$ 350,000

## DECLARATION

I declare that all the information in this request is true and correct and the owner (if not myself) has been notified of this request to amend the application.	
<b>Name:</b>	
<b>Signature:</b>	
<b>Date:</b>	13.12.2024

## LODGEMENT

Please submit this form, including all amended plans/documents, to [mail@cardinia.vic.gov.au](mailto:mail@cardinia.vic.gov.au)

You can also make amendments to your application via the Cardinia ePlanning Portal at <https://eplanning.cardinia.vic.gov.au/>

If you have any questions or need help to complete this form, please contact Council's Statutory Planning team on 1300 787 624.

## IMPORTANT INFORMATION

It is strongly recommended that before submitting this form, you discuss the proposed amendment with the Council planning officer processing the application.

Please give full details of the nature of the proposed amendments and clearly highlight any changes to plans (where applicable). If you do not provide sufficient details or a full description of all the amendments proposed, the application may be delayed.

No application fee for s50/s50A requests unless the amendment results in changes to the relevant class of permit fee or introduces new classes of permit fees. The fee for a s57A request is 40% of the relevant class of permit fee, plus any other fees if the amendment results in changes to the relevant class (or classes) of permit fee or introduces new classes of permit fees. Refer to the *Planning and Environment (Fees) Regulations 2016* for more information.

The amendment may result in a request for more under section 54 of the Act and/or the application requiring notification (or re-notification). The costs associated with notification must be covered by the applicant.

Council may refuse to amend the application if it considers that the amendment is so substantial that a new application for a permit should be made.

Any material submitted with this request, including plans and personal information, will be made available for public viewing, including electronically, and copies may be made for interested parties for the purpose of enabling consideration and review as part of a planning process under the *Planning and Environment Act 1987*.

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## Application Summary

Portal Reference: A22459LZ

## Basic Information

Proposed Use: Subdivision, creation of easement, removal of dam, and associated works.  
Current Use: Stage 1 earthworks commencing, vacant land, buildings removed.  
Site Address: 92 Enterprise Road Pakenham 3810

## Covenant Disclaimer

Does the proposal breach, in any way, an encumbrance on title such as restrictive covenant, section 173 agreement or other obligation such as an easement or building envelope? No such encumbrances are breached.

Note: During the application process you may be required to provide more information in relation to any encumbrances.

## Contacts

Type	Name	Address	Contact Details
Applicant	ESR Investment Management 1 (Australia) CA- KLM Spatial	Suite 1/Building 2, 3 Ordish Road, Dandenong South VIC 3175	W: 03-8794-1600 E: Manager@klms.com.au
Owner	ESR Investment Management 1 (Australia)	Level 24/88 Phillip Street, Sydney NSW 2000	E: Manager@klms.com.au
Preferred Contact	[REDACTED] KLM Spatial	Suite 1/Building 2, 3 Ordish Road, Dandenong South VIC 3175	W: 03-8794-1600 E: Manager@klms.com.au

## Fees

Regulation Fee Condition	Amount	Modifier	Payable
9 - Class 20 To subdivide land (3 Lobb)	\$1,415.10	100%	\$1,415.10
9 - Class 21 To: treat, vary or remove a restriction within the meaning of the Subdivision Act 1988; or create or remove a right of way; or treat, vary or remove an easement other than a right of way; or vary or remove a condition in the nature of an easement (other than right of way) in a Crown grant.	\$1,415.10	50%	\$707.55
<b>Total</b>			<b>\$2,122.70</b>

## Meetings

Meeting Type	Officer Name	Date of Meeting
Pre Application	[REDACTED]	30 Oct 2023



Civic Centre  
20 Siding Avenue, Officer, Victoria  
Council's Operations Centre (Depot)  
Purton Road, Pakenham, Victoria

Postal Address  
Cardinia Shire Council  
P.O. Box 7, Pakenham VIC, 3810  
Email: [mail@cardinia.vic.gov.au](mailto:mail@cardinia.vic.gov.au)

Monday to Friday 8.30am-5pm  
Phone: 1300 787 624  
After Hours: 1300 787 624  
Fax: 03 5941 3784



## Documents Uploaded

Date	Type	Filename
31-05-2024	Subdivision Plan	2. Certificate of Title Vol 5622 fol 089.pdf
06-05-2024	Explanatory Letter	5. Planning Statement May 2024.pdf
06-05-2024	Additional Document	_2024.05.06 Letter to Council.pdf
06-05-2024	Additional Document	1. Completed Planning Permit Application Form.pdf
06-05-2024	Additional Document	3. Proposed Subdivision P59141387 V5 (unreg).pdf
06-05-2024	Additional Document	4. Plan of Survey 8889 ESR D801 V7.pdf
06-05-2024	Additional Document	6. Traffic Impact Assessment 22064671A005C-F-A1.pdf
06-05-2024	Additional Document	7. Landscape Masterplan REV A.03.pdf
06-05-2024	Additional Document	8. SWMP Stage 2 R02_3673-01.pdf
06-06-2024	Additional Document	9. Bushfire Development Report Terramatrix V1.1 on 19 Jan 2023.pdf
06-05-2024	Additional Document	10. Environmental and Hydrogeological Site Assessment LUPA 222543 on February 2023 (updated in eportal).pdf

Remember it is against the law to provide false or misleading information, which could result in a heavy fine and cancellation of the permit.

## Lodged By

Site User	ILM Spatial	51/82-3 Ordish Road, Dandenong South VIC 3175	W: 0794-1600 E: manager@ilms.com.au
Submission Date	06 June 2024 - 01:13 PM		

## Declaration

By ticking this checkbox, [redacted] declare that all the information in this application is true and correct; and the Applicant and/or Owner (if not myself) has been notified of the application.



**Civic Centre**  
20 Siding Avenue, Officer, Victoria  
  
**Council's Operations Centre (Depot)**  
Purton Road, Pakenham, Victoria

**Postal Address**  
Cardinia Shire Council  
P.O. Box 7, Pakenham VIC, 3810  
Email: mail@cardinia.vic.gov.au

**Monday to Friday**  
8:30am-5pm  
Phone: 1300 787 624  
After Hours: 1300 787 624  
Fax: 03 5941 3784

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Planning Enquiries  
 Phone: 1300 787 624  
 Web: [www.cardinia.vic.gov.au](http://www.cardinia.vic.gov.au)

**Office Use Only**

Application No.:

Date Lodged: / /

# Application for a Planning Permit

If you need help to complete this form, read MORE INFORMATION at the end of this form.

**⚠** Any material submitted with this application, including plans and personal information, will be made available for public viewing, including electronically, and copies may be made for interested parties for the purpose of enabling consideration and review as part of a planning process under the *Planning and Environment Act 1987*. If you have any questions, please contact Council's planning department.

**⚠** Questions marked with an asterisk (\*) must be completed.

**⚠** If the space provided on the form is insufficient, attach a separate sheet.

**i** Click for further information.

Clear Form

## The Land **i**

Address of the land. Complete the Street Address and one of the Formal Land Descriptions.

**Street Address \***

Unit No.:	St. No.: 92	St. Name: Enterprise Road
Suburb/Locality: Pakenham		Postcode: 3810

**Formal Land Description \***

Complete either A or B.

**⚠** This information can be found on the certificate of title.

If this application relates to more than one address, attach a separate sheet setting out any additional property details.

A   Lodged Plan  Title Plan  Plan of Subdivision

OR

B

## The Proposal

**⚠** You must give full details of your proposal and attach the information required to assess the application. Insufficient or unclear information will delay your application.

**i** For what use, development or other matter do you require a permit? \*

Subdivision, creation of easement, removal of a dam, and associated works

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**📎** Provide additional information about the proposal, including: plans and elevations; any information required by the planning scheme, requested by Council or outlined in a Council planning permit checklist; and if required, a description of the likely effect of the proposal.

**⚠** You may be required to verify this estimate. Insert '0' if no development is proposed.

If the application is for land within metropolitan Melbourne (as defined in section 3 of the *Planning and Environment Act 1987*) and the estimated cost of the development exceeds \$1 million (adjusted annually by CPI) the Metropolitan Planning Levy **must** be paid to the State Revenue Office and a current levy certificate **must** be submitted with the application. Visit [www.sro.vic.gov.au](http://www.sro.vic.gov.au) for information.

**i** Estimated cost of any development for which the permit is required \*

## Existing Conditions 1

### Describe how the land is used and developed now \*

For example, vacant, three dwellings, medical centre with two practitioners, licensed restaurant with 80 seats, grazing.

Stage 1 earthworks commencing, vacant land, buildings removed

Provide a plan of the existing conditions. Photos are also helpful.

## Title Information 1

### Encumbrances on title \*

Does the proposal breach, in any way, an encumbrance on title such as a restrictive covenant, section 173 agreement or other obligation such as an easement or building envelope?

- Yes (if 'yes' contact Council for advice on how to proceed before continuing with this application.)
- No
- Not applicable (no such encumbrance applies).

Provide a full, current copy of the title for each individual parcel of land forming the subject site. The title includes: the covering 'register search statement', the title diagram and the associated title documents, known as 'instruments', for example, restrictive covenants.

## Applicant and Owner Details 1

Provide details of the applicant and the owner of the land.

### Applicant \*

The person who wants the permit.

Name:		
Title:	First Name:	Surname:
Organisation (if applicable): ESR Investment Management 1 (Australia) CI-KLM Spatial		
Postal Address: <small>If it is a P.O. Box, enter the details here:</small>		
Unit No.: S1	St. No.: B2, 3	St. Name: Ordish Road
Suburb/Locality: Dandenong South	State: Vic	Postcode: 3175

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Please provide at least one contact phone number \*

Contact information for applicant OR contact person below	
Business phone: 9794 1600	Email: Manager@klms.com.au
Mobile phone:	Fax:

Where the preferred contact person for the application is different from the applicant, provide the details of that person.

Contact person's details* <span style="float: right;">Same as applicant <input type="checkbox"/></span>		
Name:		
Title:	First Name:	
Organisation (if applicable): KLM Spatial		
Postal Address: <small>If it is a P.O. Box, enter the details here:</small>		
Unit No.: S1	St. No.: B2, 3	St. Name: Ordish Road
Suburb/Locality: Dandenong South	State: Vic	Postcode: 3175

### Owner \*


The person or organisation who owns the land

Where the owner is different from the applicant, provide the details of that person or organisation.

Name: <span style="float: right;">Same as applicant <input type="checkbox"/></span>		
Title:	First Name:	Surname:
Organisation (if applicable): ESR Investment Management 1 (Australia)		
Postal Address: <small>If it is a P.O. Box, enter the details here:</small>		
Unit No.: L 24	St. No.: 88	St. Name: Phillip Street
Suburb/Locality: Sydney	State: NSW	Postcode: 2000
Owner's Signature (Optional):	Date: <small>day / month / year</small>	

## Declaration

This form must be signed by the applicant \*

 Remember it is against the law to provide false or misleading information, which could result in a heavy fine and cancellation of the permit.

I declare that I am the applicant, and that all the information in this application is true and correct, and the owner (if not myself) has been notified of the permit application.

Signature: 

Date: 06/06/2024

day / month / year

## Need help with the Application?

General information about the planning process is available at [planning.vic.gov.au](http://planning.vic.gov.au)

Contact Council's planning department to discuss the specific requirements for this application and obtain a planning permit checklist. Insufficient or unclear information may delay your application.

Has there been a pre-application meeting with a council planning officer?

No  Yes

If 'Yes', with whom?: 

Date: 30/10/23


day / month / year

## Checklist

Have you:

Filled in the form completely?

Paid or included the application fee?

 Most applications require a fee to be paid. Contact Council to determine the appropriate fee.

 Provided all necessary supporting information and documents?

A full, current copy of site information for each individual parcel of land forming the subject site.

A plan of existing conditions.

Plans showing the layout and details of the proposal.

Any information required by the planning scheme, requested by council or outlined in a council planning permit checklist.

If required, a description of the likely effect of the proposal (for example, traffic, noise, environmental impacts).

If applicable, a current Metropolitan Planning Levy certificate (a levy certificate expires 90 days after the day on which it is issued by the State Revenue Office and then cannot be used). Failure to comply means the application is void.

Completed the relevant council planning permit checklist?

Signed the declaration?

## Lodgement

Lodge the completed and signed form, the fee and all documents with:

Cardinia Shire Council  
PO Box 7  
Pakenham VIC 3810

In person: 20 Siding Avenue, Officer

Contact information:

Telephone: 1300 787 624

Email: [mail@cardinia.vic.gov.au](mailto:mail@cardinia.vic.gov.au)

DX: 81006

Deliver application in person, by post or by electronic lodgement.

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**REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958**

VOLUME 09622 FOLIO 089

Security no : 124114160817J  
Produced 15/04/2024 09:07 AM

**LAND DESCRIPTION**

Lot 1 on Title Plan 099673B.  
PARENT TITLE Volume 09345 Folio 244  
Created by instrument L657928M 09/05/1985

**REGISTERED PROPRIETOR**

Estate Fee Simple  
Sole Proprietor  
ESR INVESTMENT MANAGEMENT 1 (AUSTRALIA) PTY LTD of LEVEL 24 88 PHILLIP STREET SYDNEY NSW 2000  
AW774665M 28/04/2023

**ENCUMBRANCES, CAVEATS AND NOTICES**

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

AGREEMENT Section 173 Planning and Environment Act 1987  
AX422024L 06/11/2023

**DIAGRAM LOCATION**

SEE TP099673B FOR FURTHER DETAILS AND BOUNDARIES

**ACTIVITY IN THE LAST 125 DAYS**

NIL

-----END OF REGISTER SEARCH STATEMENT-----

Additional information: (not part of the Register Search Statement)

Street Address: 92 ENTERPRISE ROAD PAKENHAM VIC 3810

**ADMINISTRATIVE NOTICES**

NIL

eCT Control 19207U CORRS CHAMBERS WESTGARTH  
Effective from 28/04/2023

DOCUMENT END

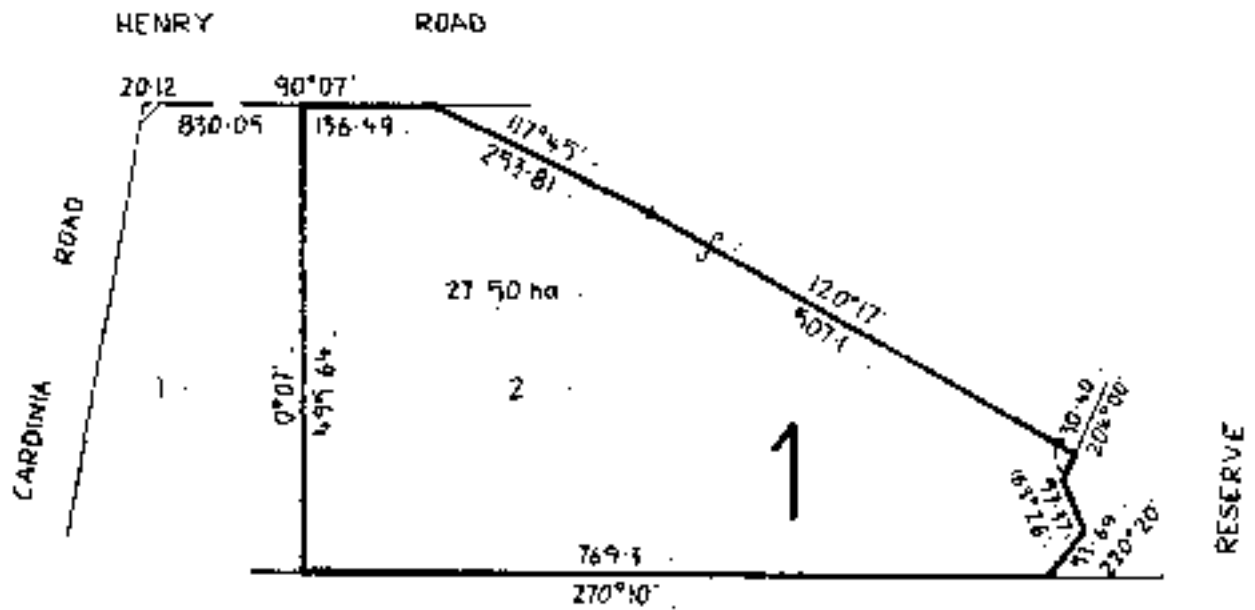
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<b>TITLE PLAN</b>		<b>EDITION 1</b>	<b>TP 99673B</b>
Location of Land Parish: TASMANIA Township: Section: Crown Allocation: Crown Tenure:		Notations	
Last Plan Reference: P95527 District Name: VIC 5622 FIVE ISLANDS Geom Location: 1: 24 m		ANY OTHER REFERENCE TO THIS TITLE PLAN IS TO BE MADE TO THE APPROPRIATE EDITION OF THIS TITLE PLAN	

**Description of Land / Easement Information**

THIS PLAN HAS BEEN PREPARED FOR THE LAND REFORM BY LAND VICTORIA FOR TITLE DIAGRAM PURPOSES AS PART OF THE LAND TITLES AUTOMATION PROJECT  
 COMPLETED: 06/07/1999  
 VERSION: 001



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TABLE OF PARCEL IDENTIFIERS	
WARNING: Where multiple parcels are referred to a station on this Title Plan this does not imply separately situated parcels under Section 84 of the Land and Act 1962	
PARCELS 1 - 101 2 101; 101 101 101	



# Department of Environment, Land, Water & Planning

## Electronic Instrument Statement

Copyright State of Victoria. No part of this publication may be reproduced except as permitted by the Copyright Act 1968 (Cth), to comply with a statutory requirement or pursuant to a written agreement. The information is only valid at the time and in the form obtained from the LANDATA REGD TM System. None of the State of Victoria, its agents or contractors, accepts responsibility for any subsequent publication or reproduction of the information.

The Victorian Government acknowledges the Traditional Owners of Victoria and pays respects to their ongoing connection to their Country, History and Culture. The Victorian Government extends this respect to their Elders, past, present and emerging.

Produced 15/04/2024 09:07:35 AM

Status	Registered	Dealing Number	AX422024L
Date and Time Lodged	06/11/2023 08:18:37 AM		

### Lodger Details

Lodger Code	17829T
Name	RUSSELL KENNEDY
Address	
Lodger Box	
Phone	
Email	
Reference	SYB 302786-00126

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## APPLICATION TO RECORD AN INSTRUMENT

Jurisdiction	VICTORIA
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### Privacy Collection Statement

The information in this form is collected under statutory authority and used for the purpose of maintaining publicly searchable registers and indexes.

### Estate and/or Interest

FEE SIMPLE

### Land Title Reference

9622/089

### Instrument and/or legislation

RECORD - AGREEMENT - SECTION 173  
Planning & Environment Act - section 173

### Applicant(s)

Name	CARDINIA SHIRE COUNCIL
Address	
Street Number	20
Street Name	SIDING
Street Type	AVENUE
Locality	OFFICER
State	VIC
Postcode	3809

### Additional Details



# Department of Environment, Land, Water & Planning

## Electronic Instrument Statement

Refer Image Instrument

The applicant requests the recording of this Instrument in the Register.

### Execution

1. The Certifier has taken reasonable steps to verify the identity of the applicant or his, her or its administrator or attorney.
2. The Certifier holds a properly completed Client Authorisation for the Conveyancing Transaction including this Registry Instrument or Document.
3. The Certifier has retained the evidence supporting this Registry Instrument or Document.
4. The Certifier has taken reasonable steps to ensure that this Registry Instrument or Document is correct and compliant with relevant law and any Prescribed Requirement.

Executed on behalf of	CARDINIA SHIRE COUNCIL
Signer Name	[REDACTED]
Signer Organisation	PARTNERS OF RUSSELL KENNEDY
Signer Role	AUSTRALIAN LEGAL PRACTITIONER
Execution Date	06 NOVEMBER 2023

**File Notes:**  
NIL

This is a representation of the digitally signed Electronic Instrument or Document certified by Land Use Victoria.

Statement End.

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**CARDINIA SHIRE COUNCIL**

and

**ESR INVESTMENT MANAGEMENT 1  
(AUSTRALIA) PTY LTD**

**AGREEMENT MADE PURSUANT TO  
SECTION 173 OF THE PLANNING AND  
ENVIRONMENT ACT 1987  
ACKNOWLEDGEMENT OF DEVELOPMENT  
CONTRIBUTIONS**

---

Land: 92 Enterprise Road Pakenham VIC 3810

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**Russell Kennedy Pty Ltd** ACN 126 792 470 ABN 14 940 129 185  
Level 12, 469 La Trobe Street, Melbourne VIC 3000 Australia PO Box 5146, Melbourne VIC 3001 Australia  
T +61 3 9609 1555 F +61 3 9609 1600 info@rk.com.au russellkennedy.com.au

Liability limited by a scheme approved under Professional Standards Legislation.

An international member of

**AillyLaw**

## THIS AGREEMENT IS DATED

10/8/2023 | 2:43:40 PM AEST

## PARTIES

- 1 **CARDINIA SHIRE COUNCIL**  
of 20 Siding Avenue, Officer VIC 3809  
(Council)
- 2 **ESR INVESTMENT MANAGEMENT 1 (AUSTRALIA) PTY LTD**  
ACN 626 831 945  
of Level 24, 88 Phillip Street, Sydney NSW 2000  
(Owner)

## RECITALS

- A The Council is the responsible authority under the Act for the Scheme.
- B The Owner is registered or is entitled to be registered as proprietor of the Land.
- C The Owner has made the following planning permit applications:
  - 1.1.1 planning application T230062 – Carry out earthworks;
  - 1.1.2 planning application T230059 – Subdivision of land; and
  - 1.1.3 planning application T230139 - Construction of a warehouse and associated works, a reduction to the statutory car parking requirements, and advertising signage.
  - 1.1.4 planning application T230289 - Construction of a warehouse and associated works, a reduction to the statutory car parking requirements, and advertising signage.
- D Pursuant to Schedule 3 of clause 45.06 of the Scheme a planning permit must not be granted until there is an agreement which makes provision for development contributions.
- E This Agreement has been entered into in order to:
  - (i) satisfy Schedule 3 of clause 45.06 of the Scheme;
  - (ii) achieve and advance the objectives of planning in Victoria or the objectives of the Scheme in relation to the Land.
- F This Agreement is made under Division 2 of Part 9 of the Act.

## OPERATIVE PROVISIONS

### 2 DEFINITIONS

In this Agreement:

- 2.1.1 **Act** means the Planning and Environment Act 1987 (Vic).
- 2.1.2 **Agreement** means this Agreement, including the recitals and any annexures to this Agreement.

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- 2.1.3 **Business Day** means Monday to Friday excluding public holidays in Victoria.
- 2.1.4 **CPI** means annual Consumer Price Index (All Groups-Melbourne) as published by the Australian Bureau of Statistics series ABS6401, or if that index number is no longer published, its substitute as determined by Council from time to time.
- 2.1.5 **CREP** means the Cardinia Road Employment Precinct Structure Plan.
- 2.1.6 **Development Contributions Levy** means the levy payable per hectare or part thereof at the rate specified in the Development Contributions Plan for the Land, which as at the date of this Agreement is \$234,600 per hectare as at 1 July 2022. The Development Contributions Levy is subject to Indexation.
- 2.1.7 **Development Contributions Plan or DCP** means the development contributions plan described in and attached as Annexure 11, which is an extract of the relevant components of the CREP. The parties acknowledge the Development Contributions Plan is not an incorporated document within the Scheme.
- 2.1.8 **Government Agency** means any:
- (a) government or government department or other body;
  - (b) governmental, semi-governmental, municipal, administrative, statutory or judicial person, body or authority;
  - (c) a person (whether autonomous or not) charged with administration of any applicable Law.
- 2.1.9 **GST** means the goods and services tax as provided for by the GST Law, including penalties and interest. If under or in relation to the *National Taxation Reform (Consequential Provisions) Act 2000* (Vic) or a direction given under section 6 of that Act, the supplier makes voluntary or notional payments, the definition of "GST" includes those voluntary or notional payments and expressions containing the term "GST" have a corresponding expanded meaning.
- 2.1.10 **GST Act** means the A New Tax System (Goods and Services Tax) Act 1999 (Cth) (as amended).
- 2.1.11 **GST Law** means the GST Act and any associated legislation including without limitation delegated legislation.
- 2.1.12 **Indexation** means an annual adjustment to the Development Contributions Levy effective from 1 July of the relevant calendar year (or such other date determined by Council) (**Indexation Date**) using the following formula:
- $$\text{Development Contributions Levy} = (\text{construction projects} \times \text{PPI}) + (\text{Land items} \times \text{CPI}) / \text{Net Developable Area of the CREP}$$
- Provided that the Development Contributions Levy assessed on and from any Indexation Date cannot be less than the Development Contributions Levy payable immediately prior to that Indexation Date.
- 2.1.13 **Input Tax Credit** in relation to a supply, means a credit under the GST Act for the GST payable by the recipient in respect of the supply.
- 2.1.14 **Land** means the land known as 92 Enterprise Road Pakenham VIC 3810, being the whole of the land more particularly described in certificate of title volume 9622 folio 089.

- 2.1.15 **Law** means any law, rule, Act, ordinance, regulation, by-law, local law, order, statutory instrument, control, restriction, direction, notice or proclamation and includes the requirements of any Government Agency.
- 2.1.16 **Localised Infrastructure** means works, services or facilities necessitated by the subdivision or development of the Land, including but not limited to provision of utility services such as water supply, stormwater drainage, sewerage, gas and electricity services, telecommunications infrastructure and local road, bridges, culverts and other water crossings, any required associated traffic control measures and devices. For the purposes of this Agreement, Localised Infrastructure does not include any of the infrastructure required in accordance this Agreement, the CREP, the Development Contributions Plan, and any infrastructure that is in the nature of regional or state infrastructure.
- 2.1.17 **Mortgagee** means the person or persons registered or entitled from time to time to be registered by the Registrar as mortgagee of the Land or any part of it.
- 2.1.18 **Occupancy Permit** means the issue of an occupancy permit under the *Building Act 1993*.
- 2.1.19 **Owner** means the person or persons who are registered or are entitled to be registered as proprietor of an estate in fee simple in the Land or any part thereof, and includes a mortgagee in possession.
- 2.1.20 **Plan of Subdivision** means a plan of subdivision under the *Subdivision Act 1988* (Vic) of or affecting the Land.
- 2.1.21 **PPI** means the annual Consumer Price Index (Building Construction Victoria and Road & Bridge Construction Victoria) as published by the Australian Bureau of Statistics series ABS6427 table 17, or if that index number is no longer published, its substitute as determined by Council from time to time.
- 2.1.22 **Register** means the register of land kept and maintained by the Registrar pursuant to the *Transfer of Land Act 1958* (Vic).
- 2.1.23 **Registrar** means the Registrar of Titles for the purpose of the *Transfer of Land Act 1958* (Vic).
- 2.1.24 **Scheme** means the Cardinia Planning Scheme or any other planning scheme which applies to the Land from time to time.
- 2.1.25 **Stage** means:
- (a) any stage of a Plan of Subdivision; or
  - (b) or any staged development or use of the Land.
- 2.1.26 **Tax Invoice** in relation to a supply, means an invoice for the supply required by the GST Act to support a claim by the recipient for an Input Tax Credit for the GST on the supply.
- 2.1.27 **Statement of Compliance** means a statement of compliance issued under the *Subdivision Act 1988* (Vic).

### 3 COMMENCEMENT

This Agreement comes into force on the date it was made as set out above.

## **4 ENDING OR AMENDING AGREEMENT**

### **4.1 Ending or amending**

4.1.1 This Agreement ends on the earlier of:

- (a) the date the Owner has complied with all of its obligations under this Agreement and Council agrees that this Agreement is no longer required;
- (b) the subsequent recording of an agreement under section 173 of the Act which makes provision for the payment of Development Contribution Levies and expressly refers to the cancellation of this Agreement; and
- (c) in respect of that part of the Land within any Stage, upon payment of the Development Contribution Levy in respect of that Stage, the issue of a Statement of Compliance for that Stage, and Council's agreement that this Agreement is no longer required for that part of the Land within that Stage.

4.1.2 Otherwise, this Agreement ends or may be amended in accordance with the Act.

### **4.2 Cancellation or alteration of recording**

As soon as reasonably practicable after this Agreement has ended or has been amended, the Council must, at the request and at the cost of the Owner, apply to the Registrar under the Act to cancel or alter the recording of this Agreement on the folio of the Register to the Land.

## **5 OWNER'S COVENANTS**

### **5.1 Payment of Development Contributions Levy**

5.1.1 The Owner covenants and agrees that the Owner must pay the Development Contributions Levy in cash (unless otherwise agreed in writing), including on a Stage by Stage basis as applicable:

- (a) prior to the earlier of:
  - (1) the issue of a Statement of Compliance for any stage of a Plan of Subdivision of the Land; or
  - (2) the issue of an Occupancy Permit in respect of any development of the Land; or
- (b) such other time(s) as agreed by Council in writing.

5.1.2 For the avoidance of doubt no Development Contributions Levy is payable if the Land is not developed.

### **5.2 No deemed satisfaction of other obligations**

The parties acknowledge and agree that this Agreement is only intended to deal with the satisfaction of Schedule 3 of clause 45.06 of the Scheme.

Compliance with this Agreement does not relieve the Owner of any obligation imposed by Council or a relevant authority to provide Localised Infrastructure.

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### 5.3 Successors in title

Until this Agreement is recorded on the folio of the Register which relates to the Land pursuant to section 181 of the Act, the Owner must ensure that the Owner's successors in title give effect to and do all acts and sign all documents which will require those successors to give effect to this Agreement including requiring the successors in title to execute a deed agreeing to be bound by the terms of this Agreement. Until that deed is executed, the Owner, being a party to this Agreement, remains liable to perform all of the Owner's obligations contained in this Agreement.

### 5.4 Further assurance

The Owner must do all things necessary (including signing any further agreement, acknowledgment or document) to enable the Council to record this Agreement on the folio of the Register which relates to the Land.

### 5.5 Payment of Council's costs

The Owner agrees to pay on demand to the Council the Council's costs and expenses (including any legal fees incurred on a solicitor-client basis) of and incidental to the preparation, execution, recording, removal, amendment and enforcement of this Agreement.

### 5.6 Mortgagee to be bound

The Owner covenants to obtain the consent of any Mortgagee to be bound by the covenants in this Agreement if the Mortgagee becomes mortgagee in possession of the Land.

### 5.7 Covenants run with the Land

The Owner's obligations in this Agreement are intended to take effect as covenants which shall be annexed to and run at law and in equity with the Land and every part of it, and bind the Owner and its successors, assignees and transferees, the registered proprietor or proprietors for the time being of the Land and every part of the Land.

### 5.8 Owner's warranty

The Owner warrants and covenants that:

- 5.8.1 the Owner is the registered proprietor (or is entitled to become the registered proprietor) of the Land and, subject to clause 10, is also the beneficial owner of the Land;
- 5.8.2 the execution of this Agreement by the Owner complies with the Registrar's Requirements for Paper Conveyancing Transactions made under the *Transfer of Land Act 1958* (Vic);
- 5.8.3 there are no mortgages, liens, charges or other encumbrances or leases or any rights inherent in any person other than the Owner affecting the Land which have not been disclosed by the usual searches of the folio of the Register for the Land or notified to the Council;
- 5.8.4 no part of the Land is subject to any rights obtained by adverse possession or subject to any easements or rights described or referred to in the *Transfer of Land Act 1958* (Vic); and
- 5.8.5 until this Agreement is recorded on the folio of the Register which relates to the Land, the Owner will not sell, transfer, dispose of, assign, mortgage or otherwise part with possession of the Land or any part of the Land without first disclosing to

any intended purchaser, transferee, assignee or mortgagee the existence and nature of this Agreement.

## 6 GOODS AND SERVICES TAX

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### 6.1 Definitions and expressions

Expressions used in this Agreement that are defined in the GST Act have the same meaning as given to them in the GST Act, unless expressed to the contrary.

### 6.2 Amounts payable do not include GST

Each amount, of whatever description, specified as payable by one party to the other party under this Agreement is expressed as a GST exclusive amount unless specified to the contrary.

### 6.3 Liability to pay any GST

Subject to clause 6.4, in addition to any amount payable by one party to the other party under this Agreement in respect of a taxable supply, the party liable to pay the amount (**Recipient**) must pay to the other party (**Supplier**) a sum equivalent to the GST payable, if any, by the Supplier in respect of the taxable supply on the date on which the Supplier makes a taxable supply to the Recipient irrespective of when the Supplier is liable to remit any GST under this Agreement in respect of a taxable supply to any governmental authority.

### 6.4 Tax Invoice

A party's right to payment under clause 6.3 is subject to a Tax Invoice being delivered to the Recipient.

## 7 GENERAL

### 7.1 No fettering of Council's powers

This Agreement does not fetter or restrict the Council's power or discretion in respect of any of the Council's decision making powers including but not limited to an ability to make decisions under the *Local Government Act 2020* (Vic), and the Act or to make or impose requirements or conditions in connection with any use or development of the Land or the granting of any planning permit, the approval or certification of any plans of subdivision or consolidation relating to the Land or the issue of a statement of compliance in connection with any such plans.

### 7.2 Time of the essence

Time is of the essence as regards all dates, periods of time and times specified in this Agreement.

### 7.3 Governing law and jurisdiction

This Agreement is governed by and is to be construed in accordance with the laws of Victoria. Each party irrevocably and unconditionally submits to the non-exclusive jurisdiction of the courts and tribunals of Victoria and waives any right to object to proceedings being brought in those courts or tribunals.

### 7.4 Enforcement and severability

7.4.1 This Agreement shall operate as a contract between the parties and be enforceable as such in a court of competent jurisdiction regardless of whether, for



any reason, this Agreement were held to be unenforceable as an agreement pursuant to Division 2 of Part 9 of the Act.

7.4.2 If a court, arbitrator, tribunal or other competent authority determines that a word, phrase, sentence, paragraph or clause of this Agreement is unenforceable, illegal or void, then it shall be severed and the other provisions of this Agreement shall remain operative.

## 7.5 Execution and counterparts

7.5.1 The parties consent to execution of this Agreement by electronic means, in paper format or a combination of both.

7.5.2 This Agreement:

(a) may be executed and exchanged in any number of counterparts, whether in electronic or paper format or a combination of both, and all the counterparts together constitute one and the same instrument; and

(b) is binding on the parties on the exchange of executed counterparts.

7.5.3 If this Agreement is executed and exchanged by electronic means or witnessed by audio visual means, the relevant party, signatory and/or witness does so in accordance with:

(a) the *Electronic Transactions (Victoria) Act 2000* (Vic); or

(b) in relation to a corporation, the *Corporations Act 2001* (Cth).

7.5.4 If the signatures on behalf of one party are on different counterparts, this will be taken to be, and have the same effect as, signatures on the same counterpart and on a single copy of this Agreement.

## 7.6 Party preparing document not to be disadvantaged

No rule of contract interpretation must be applied in the interpretation of this Agreement to the disadvantage of one party on the basis that it prepared or put forward this Agreement or any document comprising part of this Agreement.

## 8 NOTICES

### 8.1 Service of notice

A notice or other communication required or permitted, under this Agreement, to be served on a person must be in writing and may be served:

8.1.1 personally on the person;

8.1.2 by leaving it at the person's address set out in this Agreement;

8.1.3 by posting it by prepaid post addressed to that person at the person's current address for service;

8.1.4 by email to the person's current email address notified to the other party; or

8.1.5 by facsimile to the person's current number notified to the other party.

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## 8.2 Time of service

A notice or other communication is deemed served:

- 8.2.1 if served personally or left at the person's address, upon service;
- 8.2.2 if posted within Australia to an Australian address by express post, two Business Days; by standard post, six Business Days after posting;
- 8.2.3 if sent by email, subject to the clause 8.2.5, at the time of receipt as specified in section 13A of the *Electronic Transactions (Victoria) Act 2000 (Vic)*;
- 8.2.4 if served by facsimile, subject to the clause 8.2.5, at the time indicated on the transmission report produced by the sender's facsimile machine indicating that the facsimile was sent in its entirety to the addressee's facsimile; and
- 8.2.5 if received after 5.00pm in the place of receipt or on a day which is not a Business Day, at 9.00am on the next Business Day.

## 8.3 Proof of receipt of notice by email

In proving that a notice given by email has been received by the recipient, it is sufficient to produce an acknowledgement or receipt that the email has reached the recipient's email address.

## 9 INTERPRETATION

In this Agreement, unless the contrary intention appears:

- 9.1 the singular includes the plural and vice versa;
- 9.2 a reference to a document or instrument, including this Agreement, includes a reference to that document or instrument as novated, altered or replaced from time to time;
- 9.3 a reference to an individual or person includes a partnership, body corporate, government authority or agency and vice versa;
- 9.4 a reference to a party includes that party's executors, administrators, successors, substitutes and permitted assigns;
- 9.5 words importing one gender include other genders;
- 9.6 other grammatical forms of defined words or expressions have corresponding meanings;
- 9.7 a covenant, undertaking, representation, warranty, indemnity or agreement made or given by:
  - 9.7.1 two or more parties; or
  - 9.7.2 a party comprised of two or more persons,is made or given and binds those parties or persons jointly and severally;
- 9.8 a reference to a statute, code or other law includes regulations and other instruments made under it and includes consolidations, amendments, re-enactments or replacements of any of them;
- 9.9 a recital, schedule, annexure or description of the parties forms part of this Agreement;

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- 9.10 if an act must be done on a specified day that is not a Business Day, the act must be done instead on the next Business Day;
- 9.11 if an act required to be done under this Agreement on a specified day is done after 5.00pm on that day in the time zone in which the act is performed, it is taken to be done on the following day;
- 9.12 a reference to an authority, institution, association or body (original entity) that has ceased to exist or been reconstituted, renamed or replaced or whose powers or functions have been transferred to another entity, is a reference to the entity that most closely serves the purposes or objects of the original entity;
- 9.13 headings and the provision of a table of contents are for convenience only and do not affect the interpretation of this Agreement;
- 9.14 compliance with the obligations of this Agreement does not relieve the Owner of any obligation imposed by Council or a Tribunal to provide Localised Infrastructure which obligation may be imposed as a requirement in a planning permit for the subdivision or development of the Land.

## 10 LIMITATION OF LIABILITY

10.1 Where a party (**First Party**) enters into this Agreement as trustee of a trust and has disclosed this in writing to the other parties to this Agreement prior to that party signing this Agreement, then subject to the remainder of this clause 10:

- 10.1.1 the First party enters into this Agreement only in its capacity as trustee of the relevant trust and in no other capacity;
- 10.1.2 a liability arising under or in connection with this Agreement is limited to and can be enforced against the First Party only to the extent to which it can be satisfied out of the property of the relevant trust.
- 10.1.3 no party to this Agreement may, in connection with a claim under this Agreement, sue the First Party in any capacity other than as trustee in respect of the relevant trust, including seeking the appointment to the First Party of a receiver (except in relation to property of the relevant trust), a liquidator, administrator or any similar person or proving in any liquidation, administration or arrangement of or affecting the First Party (except in relation to the relevant trust); and
- 10.1.4 each party to this Agreement other than the First Party waives its rights and releases the First Party from any personal liability in respect of any loss which it may suffer as a consequence of a failure of the First Party to perform its obligations under this Agreement, which cannot be paid or satisfied out of any property held by the First Party.

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10.2 The First Party warrants that:

- 10.2.1 the relevant trust has been duly established;
- 10.2.2 it is the sole trustee of the relevant trust;
- 10.2.3 it has been validly appointed as trustee of the relevant trust and no action has been taken or proposed to remove it as trustee of the relevant trust;
- 10.2.4 entry into this Agreement is not a breach of the terms of the relevant trust;
- 10.2.5 it is indemnified under the relevant trust for all actions and liabilities contemplated or arising under this Agreement;

- 10.2.6 the assets of the relevant trust are sufficient to indemnify the First Party in respect of all of its obligations and potential liabilities under or in relation to this Agreement;
  - 10.2.7 the First Party has not done and will not do, cause or permit to be done anything that would void the indemnity of the First Party under the relevant trust or give rise to any circumstances that would or could cause any indemnity available to the First Party under the trust from being unavailable or voidable;
  - 10.2.8 no action has been taken or proposed to terminate the relevant trust;
  - 10.2.9 the First Party will not permit any variation, amendment, re-settlement, or distribution of or from the relevant trust where that would materially negatively impact the First Party's ability to perform any relevant obligations, or meet any liabilities, under or in connection with this Agreement; and
  - 10.2.10 where the First Party includes an Owner, that the Land forms part of the assets of the relevant trust;
- 10.3 The provisions of clause 10.1 do not apply to any obligation or liability of the First Party to the extent arising as a result of the First Party's fraud, gross negligence or wilful default, breach of any warranty under clause 10.2, or where the First Party's right of indemnity is otherwise reduced by operation of Law.
- 10.4 No act or omission of the First Party (including any related failure to satisfy its obligations or breach of the representations or warranty under this Agreement) will be considered fraud, gross negligence or wilful default of the First Party for the purposes of clause 10.3 to the extent to which the act or omission was caused by any act of omission of any other person (other than any agent, servant, employee, consultant, or contractor of the First Party).

**EXECUTED** pursuant to Division 2 of Part 9 of the Act.

**SIGNED SEALED AND DELIVERED** by and )  
on behalf, and with the authority, of )  
**CARDINIA SHIRE COUNCIL** )  
 )  
 ) (Name), )  
 ) (Title) )  
 ) Manager Planning & Design )  
in the exercise of a power conferred by an )  
Instrument of Delegation in the presence of: )



1C1828EC9C4B4AD

*Signature of Authorised Delegate*

*[If witnessing in person and not by audio visual link the following paragraph does not apply]*

The requirements for witnessing by audio-visual link under section 12 of the Electronic Transactions (Victoria) Act 2000 have been met.



Signature of witness



Name of witness (print)

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**EXECUTED by ESR INVESTMENT  
MANAGEMENT 1 (AUSTRALIA) PTY LTD**

In accordance with section 127(1) of the  
Corporations Act 2001 (Cth) by:



signature

Director name

Director/company secretary name

AX4220241

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### MORTGAGEE'S CONSENT

**##[MORTGAGEE'S NAME]** as Mortgagee under Mortgage No. **##[mortgage no.]** which encumbers the Land consents to the Owner entering into this Agreement and agrees to be bound by the terms of and conditions of this Agreement if the Mortgagee becomes mortgagee in possession of the Land.

DATED:

Executed by **##[MORTGAGEE'S NAME]**

.....  
Signature of authorised officer

.....  
Name and title of authorised officer

.....  
Witness signature

.....  
Witness name

AX4220241

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Annexure C  
 Land Budget

PROPERTY NUMBER	PLOT AREA (sqm)	TOTAL LAND AREA (sqm)	TRANSPORT				COMMUNITY	ELECTRICITY	WATER SUPPLY			SEWERAGE	TOTAL COST
			Land Area	Cost	Area	Cost			Area	Cost	Area		
Property 1	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 2	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 3	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 4	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 5	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 6	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 7	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 8	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 9	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 10	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 11	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 12	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 13	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 14	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 15	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 16	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 17	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 18	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 19	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 20	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 21	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 22	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 23	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 24	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 25	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 26	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 27	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 28	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 29	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Property 30	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
<b>Total</b>	<b>30000</b>	<b>30000</b>	<b>30000</b>	<b>30000</b>	<b>30000</b>	<b>30000</b>	<b>30000</b>	<b>30000</b>	<b>30000</b>	<b>30000</b>	<b>30000</b>	<b>30000</b>	<b>30000</b>

Landmark: (include description, correct date, dimensions per approved plan)  
 or Plot Number/Section name/Development code

Lotting: (only for units and lots)  
 or Plot Number/Section name and the Plot Number/Section name used for units/lots

Calculation of Derivative (Units)

Total Derivative Area	429.54
Derivative Area (Total Units)	3.81
Derivative Area (Total Units)	3.81
Total Derivative (Units)	429.54

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Annexure B  
 Infrastructure Project List

Project Name	Infrastructure Project Number	Current Status	Description of Project	Estimated Project Cost	Project Category	Priority	Start Date	End Date	Current Project Cost	Final Project Cost	
...	...	...	...	...	...	...	...	...	...	...	
<b>CONTRACT OBLIGATION AND BIDDING</b>											
...	...	...	...	...	...	...	...	...	...	...	
<b>COMMITMENT/INITIATION</b>											
...	...	...	...	...	...	...	...	...	...	...	

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## Annexure G

### Development Contribution Rate

SUMMARY PROJECT COSTS	Land	Construction	TOTAL
ROADS	\$ 6,529,700.00	\$ 14,875,001.00	\$ 21,404,701.00
INTERSECTIONS	\$ -	\$ 14,951,048.00	\$ 14,951,048.00
GRADE SEPARATION AND BRIDGES	\$ -	\$ 6,916,408.00	\$ 6,916,408.00
PUBLIC TRANSPORT	\$ -	\$ 548,728.00	\$ 548,728.00
COMMUNITY FACILITIES	\$ -	\$ 3,945,871.00	\$ 3,945,871.00
OPEN SPACE & LANDSCAPING	\$ 5,812,892.00	\$ 10,408,551.80	\$ 16,221,443.80
OFF-ROAD PEDESTRIAN & CYCLE TRAILS	\$ -	\$ 4,969,441.00	\$ 4,969,441.00
<b>TOTAL</b>	<b>\$ 12,342,592.00</b>	<b>\$ 56,615,048.80</b>	<b>\$ 68,957,640.80</b>
<b>DEMAND UNITS</b>	<b>430.13 hectares</b>		
<b>CONTRIBUTION RATE</b>	<b>\$ 160,318.14 per hectare</b>		<b>or \$ 16.03 per square metre *</b>

\* Expressed in Dec '08 \$

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Development Infrastructure - Road Network  
Cardinia Road Employment Precinct Structure Plan DCP

**urban**  
CITYS  
CITYS  
CITYS

**CARDINIA**

**urban**  
CITYS  
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CITYS

LEGEND	
[Symbol]	Boundary Line Style
[Symbol]	Water Body
[Symbol]	Carriageway
[Symbol]	Proposed Carriageway
[Symbol]	Proposed Carriageway (2024)
[Symbol]	Proposed Carriageway (2025)
[Symbol]	Proposed Carriageway (2026)
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[Symbol]	Proposed Carriageway (2099)
[Symbol]	Proposed Carriageway (2100)

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# PLAN OF SUBDIVISION

LV USE ONLY  
**EDITION**

**PS914138Y**

## LOCATION OF LAND

PARISH: PAKENHAM  
 TOWNSHIP:  
 SECTION:  
 CROWN ALLOTMENT: 7A (PART)  
 CROWN PORTION:  
 TITLE REFERENCES: VOL. 9622 FOL. 089  
 LAST PLAN REFERENCES: LOT 1 on TP99673B  
 POSTAL ADDRESS: 92 ENTERPRISE ROAD  
 (At time of subdivision) PAKENHAM  
 MGA Co-ordinates E 363750 ZONE: 55  
 (of approx centre of land in plan) N 5873540 GDA 2020

CERTIFYING AUTHORITY  
**CARDINIA SHIRE COUNCIL**

**WARNING**  
 THIS IS AN UNREGISTERED PLAN OF SUBDIVISION.  
 OWNERS CORPORATION ENTITLEMENT AND LIABILITY,  
 EASEMENTS, RESERVES, DIMENSIONS, AREAS,  
 RESTRICTIONS AND LAYOUTS SHOWN ON SUBSEQUENT  
 SHEETS MAY VARY PRIOR TO REGISTRATION OF THE PLAN.

### VESTING OF ROADS AND/OR RESERVES

IDENTIFIER	COUNCIL/BODY/PERSON
ROAD R-1	CARDINIA SHIRE COUNCIL

### NOTATIONS

STAGING This is not a staged subdivision.

### NOTATIONS

DEPTH LIMITATION 15.24 m

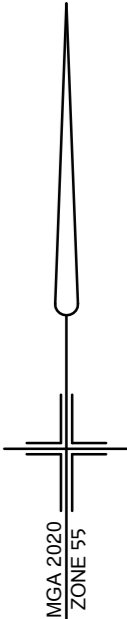
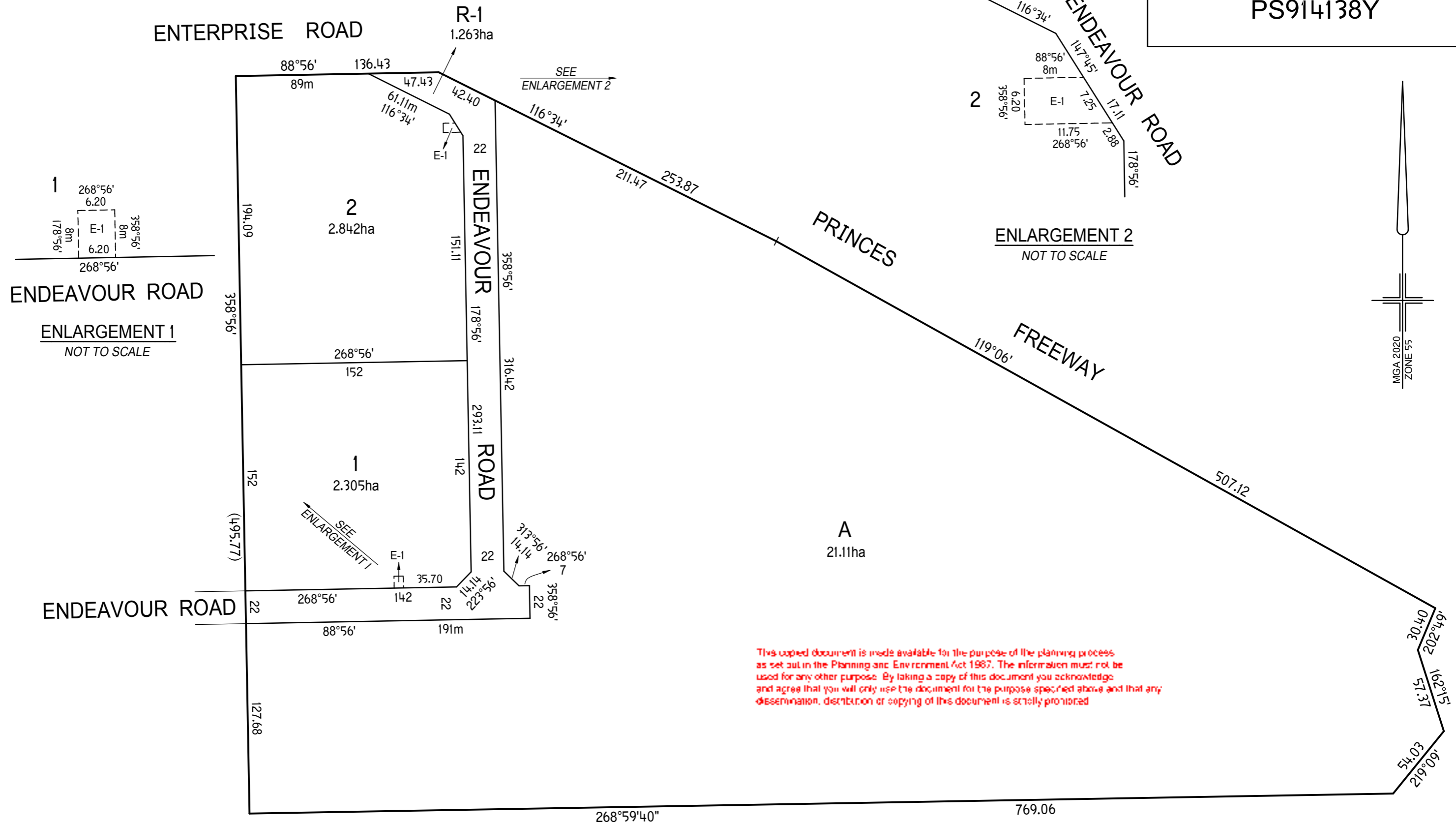
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Survey: This plan is based on survey.  
 This survey has been connected to permanent marks no.(s) PM144, PM117 in Proclaimed Survey Area no. 71

### EASEMENT INFORMATION

LEGEND A - Appurtenant Easement E - Encumbering Easement R - Encumbering Easement (Road)

Easement Reference	Purpose	Width (Metres)	Origin	Land Benefited/In Favour Of
E-1	SUPPLY OF ELECTRICITY	SEE DIAG.	THIS PLAN & SECTION 88 ELECTRICITY INDUSTRY ACT 2000	AUSNET ELECTRICITY SERVICES PTY. LTD.



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Planners Building Designers  
 Surveyors Engineers  
 Suite 1, Building 2  
 3 Ordish Road  
 Dandenong South 3175  
 Telephone 03 9794 1600  
 manager@klms.com.au

KLMS REF: 8889.ESR	SCALE 1:2500	<p>LENGTHS ARE IN METRES</p>	ORIGINAL SHEET SIZE A3	SHEET 2
DAMIEN MARC RIVALLAND VERSION 5				



**CROWN FOLIO STATEMENT**

VOLUME 11761 FOLIO 427  
No Coft exists

Security no : 124119603781T  
Produced 06/11/2024 08:52 AM

CROWN FOLIO

**LAND DESCRIPTION**

Crown Allotment 2007 Parish of Nar-nar-goon.  
Created by instrument MI166970C 06/08/2016

**CROWN LAND ADMINISTRATOR**

SECRETARY TO THE DEPARTMENT OF ENVIRONMENT, LAND, WATER AND PLANNING of 8  
NICHOLSON STREET EAST MELBOURNE VIC 3002  
MI166970C 06/08/2016

**STATUS, ENCUMBRANCES AND NOTICES**

**DIAGRAM LOCATION**

SEE CD065518B FOR FURTHER DETAILS AND BOUNDARIES

**ACTIVITY IN THE LAST 125 DAYS**

NIL

-----END OF CROWN FOLIO STATEMENT-----

Additional information: (not part of the Crown Folio Statement)

Street Address: HENRY ROAD PAKENHAM VIC 3810

DOCUMENT END

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Document Identification	<b>CD065518B</b>
Number of Pages (excluding this cover sheet)	<b>2</b>
Document Assembled	<b>06/11/2024 08:53</b>

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CROWN FOLIO STATEMENT

VOLUME 11764 FOLIO 971  
No Coft exists

Security no : 124118681423G  
Produced 01/10/2024 04:03 PM

CROWN FOLIO

LAND DESCRIPTION

Crown Allotment 2016 Parish of Pakenham.  
Created by instrument MI176847U 06/08/2016

CROWN LAND ADMINISTRATOR

SECRETARY TO THE DEPARTMENT OF ENVIRONMENT, LAND, WATER AND PLANNING of 8  
NICHOLSON STREET EAST MELBOURNE VIC 3002  
MI176847U 06/08/2016

STATUS, ENCUMBRANCES AND NOTICES

DIAGRAM LOCATION

SEE CD069059L FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

-----END OF CROWN FOLIO STATEMENT-----

Additional information: (not part of the Crown Folio Statement)

Street Address: HENRY ROAD PAKENHAM VIC 3810

DOCUMENT END

Delivered from the LANDATA System by Dye & Durham Terrain Pty Ltd

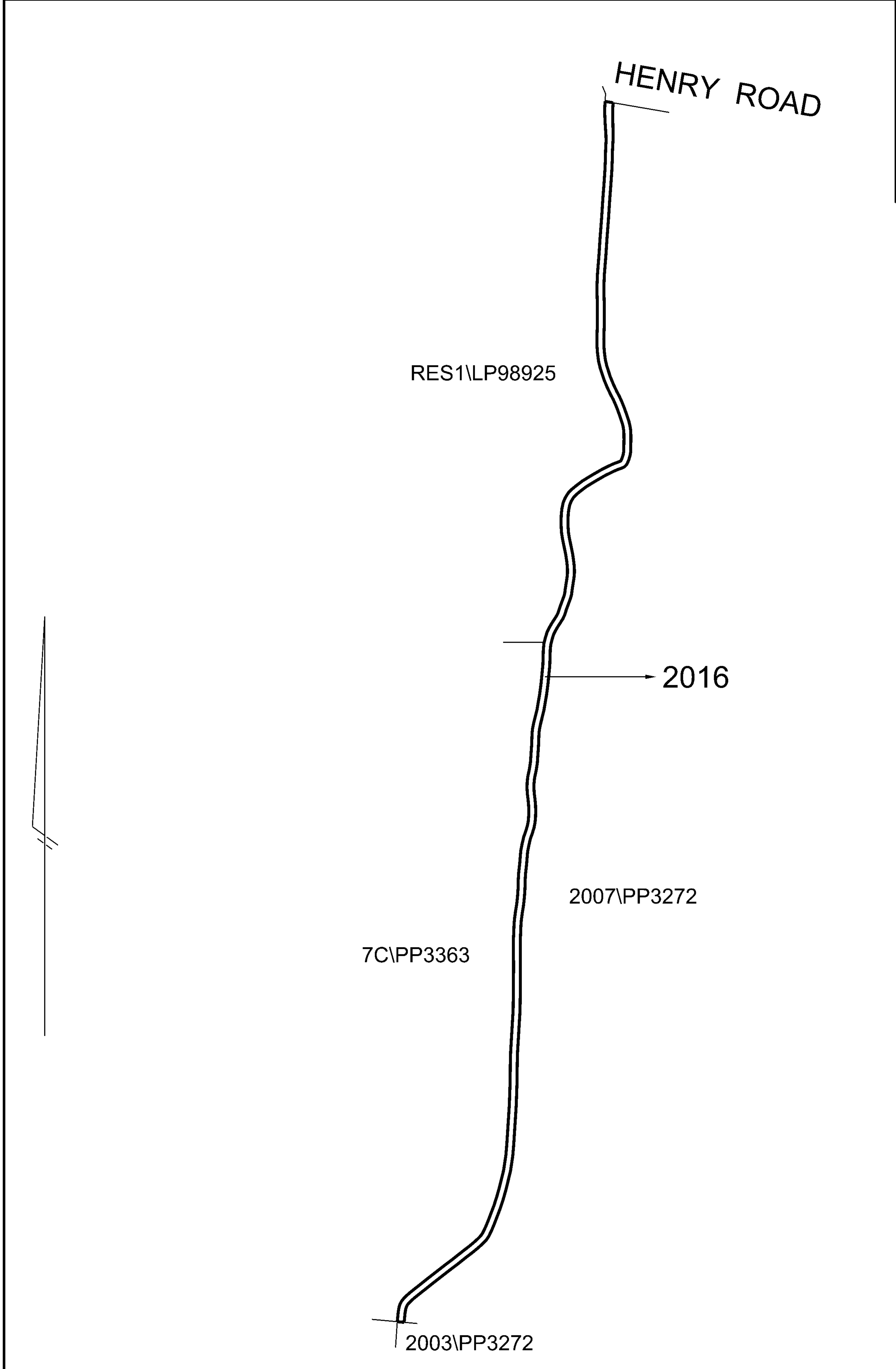
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<b>CROWN DIAGRAM</b>	EDITION 2	<b>CD069059L</b>
----------------------	-----------	------------------

**LOCATION OF LAND**  
PARISH: PAKENHAM (3363)  
TOWNSHIP: -  
SECTION: -  
CROWN ALLOTMENT: 2016  
LAST PLAN REFERENCE: PARISH PLAN P5(5)  
DERIVED FROM: -  
SPI: 2016\PP3363

**NOTATIONS**

THIS PLAN HAS BEEN PREPARED  
BY LAND VICTORIA FOR  
CROWN DIAGRAM PURPOSES  
  
Checked by: NT  
  
Date: 9 / 01 / 2020



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**REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958**

VOLUME 12556 FOLIO 021

Security no : 124120568904W  
Produced 11/12/2024 11:24 AM

**LAND DESCRIPTION**

Lot A on Plan of Subdivision 905631T.  
PARENT TITLES :  
Volume 08319 Folio 753      Volume 12334 Folio 744  
Created by instrument PS905631T 18/06/2024

**REGISTERED PROPRIETOR**

Estate Fee Simple  
TENANTS IN COMMON  
As to 3 of a total of 4 equal undivided shares  
Sole Proprietor  
    MCMULLIN COMMERCIAL PTY LTD of SUITE 101 LEVEL 1 12 CATO STREET HAWTHORN  
    EAST VIC 3123  
As to 1 of a total of 4 equal undivided shares  
Sole Proprietor  
    BAYLIN PARK PTY LTD of SUITE 2 418 PRINCES HIGHWAY NARRE WARREN VIC 3805  
    PS905631T 18/06/2024

**ENCUMBRANCES, CAVEATS AND NOTICES**

MORTGAGE AM001915S 01/07/2015  
    NATIONAL AUSTRALIA BANK LTD  
  
MORTGAGE AX303928D 28/09/2023  
    NATIONAL AUSTRALIA BANK LTD

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Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

NOTICE Section 201UB Planning and Environment Act 1987  
    AH336996N 01/07/2010

NOTICE Section 45 Melbourne Strategic Assessment (Environment Mitigation Levy) 2020  
    AT390567C 01/07/2020

AGREEMENT Section 173 Planning and Environment Act 1987  
    AV390884W 02/03/2022

**DIAGRAM LOCATION**

SEE PS905631T FOR FURTHER DETAILS AND BOUNDARIES

**ACTIVITY IN THE LAST 125 DAYS**

NIL

-----END OF REGISTER SEARCH STATEMENT-----

Additional information: (not part of the Register Search Statement)



## REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

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Street Address: CARDINIA ROAD OFFICER SOUTH VIC 3809

### ADMINISTRATIVE NOTICES

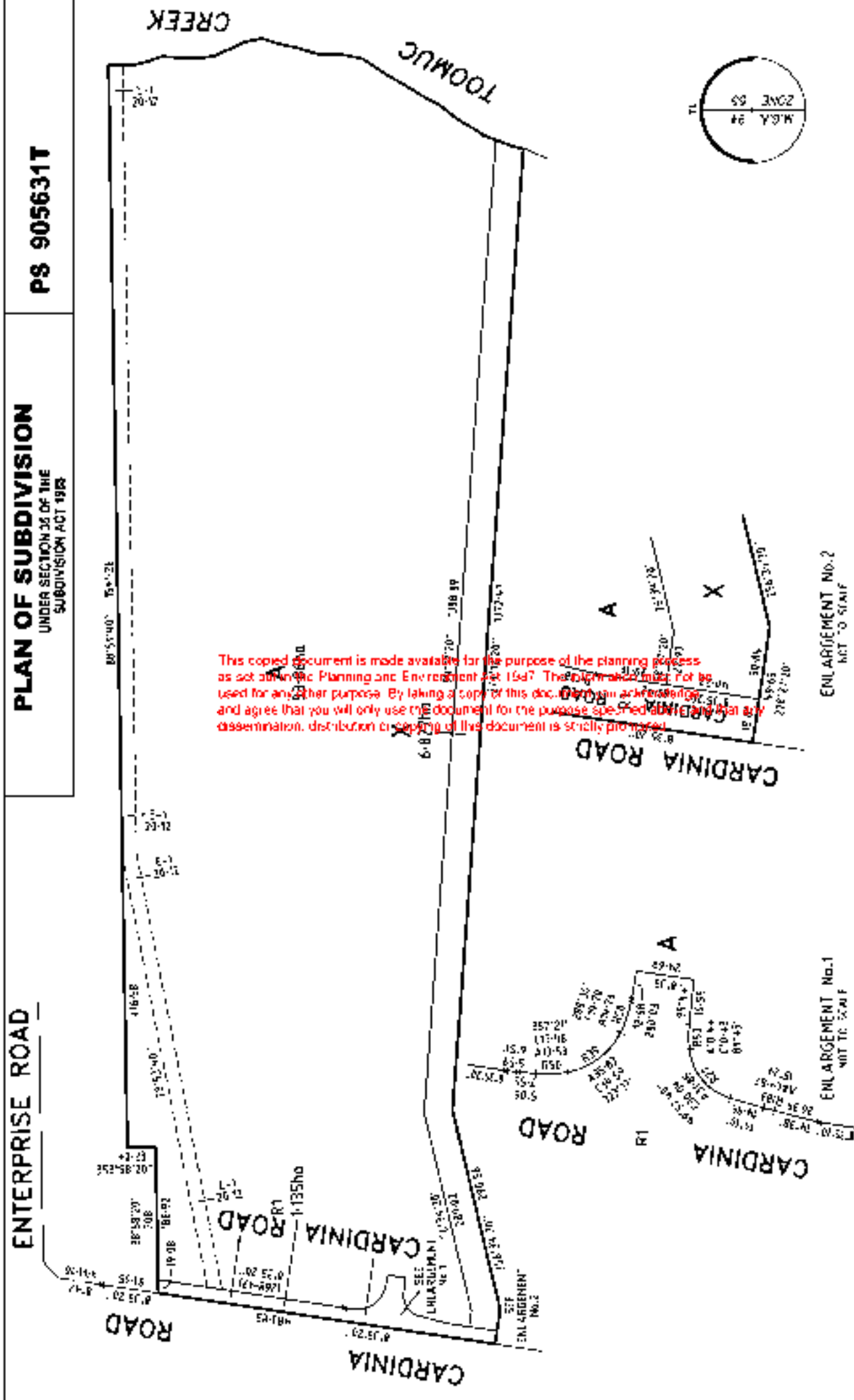
NIL

eCT Control 19436D KING & WOOD MALLESONS  
Effective from 18/06/2024

DOCUMENT END

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<b>PLAN OF SUBDIVISION</b> UNDER SECTION 35 OF THE SUBDIVISION ACT 1988		<b>EDITION 1</b>	<b>PS 905631T</b>		
<p style="text-align: center;"><b>LOCATION OF LAND</b></p> <p><b>PARISH:</b> PAKENHAM</p> <p><b>TOWNSHIP:</b> -</p> <p><b>SECTION:</b> -</p> <p><b>CROWN ALLOTMENT:</b> 70 &amp; 2009</p> <p><b>CROWN PORTION:</b> -</p> <p><b>TITLE REFERENCE:</b> VOL 02319 FOL 150 VOL 12134 FOL 744 (CROWN FOLG)</p> <p><b>LAST PLAN REFERENCE:</b> NA - Sec CROWN ALLOTMENT 70 ON TQ27601H NA - Sec CROWN ALLOTMENT 2009 ON T958803L</p> <p><b>POSTAL ADDRESS:</b> 265 CARDINA ROAD <i>(in line of subdivision)</i> OFFICER SOUTH 1609</p> <p><b>NGA 94 CO-ORDINATES:</b> E 353 350 ZONE 56 <i>(at the centre of land in plan)</i> N 5753 040</p>		<p><b>City and State:</b> Geelong (State) Victoria</p> <p><b>Council Reference Number:</b> 92 - 125</p> <p><b>Planning Permit Reference:</b> P1100000000 - 1 assigned</p> <p><b>SPEAR Reference Number:</b> S1565165</p> <p>This is a plan under section 35 of the Subdivision Act 1988 which does not create any additional lots.</p> <p>This plan is exempted under Part 3 of the Subdivision Act 1988.</p> <p><b>Qualification:</b></p> <p>This plan is registered under section 5 of the Subdivision Act 1988.</p> <p>Digitally signed by: Brendon Munnari, Licensed Surveyor, 14/10/2022</p>			
<b>VESTING OF ROADS AND/OR RESERVES</b>		<b>NOTATIONS</b>			
<p>ROADS AND RESERVES VEST IN THE COUNCIL/SUBDIVISION NAME WHEN THE APPROPRIATE VESTING DATE IS RECORDED OR TRANSFER REGISTERED. ONLY ROADS AND RESERVES MARKED (HUS,%) VEST UPON REGISTRATION OF THIS PLAN.</p>		<p><b>STAGING:</b> THIS PLAN IS NOT A STAGED SUBDIVISION PLANNING PERMIT NO. 1210104</p>			
<b>IDENTIFIER</b>	<b>COUNCIL/SUBDIVISION</b>	<p><b>SURVEY:</b> THIS PLAN IS <del>BASED</del> BASED ON SURVEY</p> <p>THIS SURVEY HAS BEEN CONNECTED TO PERMANENT MARKS (AC) 3, 15, 101, 110 &amp; 111 IN PROCLAIMED SURVEY AREA NO. 71</p> <p><b>DEPTH LIMITATION:</b> 15.24m</p> <p>LOTS B TO W (BOTH INCLUSIVE) HAVE BEEN OMITTED FROM THIS PLAN</p> <p>WATERWAY NOTATION LAND IN THIS PLAN MAY ABUT CROWN LAND THAT MAY BE SUBJECT TO A CROWN LICENCE TO USE.</p>			
ROAD R1	CARDINIA SHIRE COUNCIL				
<p style="color: red; text-align: center;">This copied document is made available for the purpose of the planning process as set out in the Planning and Environment Act 1987. The information must not be used for any other purpose. By taking a copy of this document you acknowledge and agree that you will only use the document for the purpose specified above and that any dissemination, distribution or copying of this document is strictly prohibited.</p>					
<p>LAND TO BE ACQUIRED BY AGREEMENT: ROAD R1</p> <p>LAND TO BE ACQUIRED BY COMPULSORY PROCESS:</p> <p>ALL THE LAND IS TO BE ACQUIRED FREE FROM ALL ENCUMBRANCES OTHER THAN ANY EASEMENTS SPECIFIED ON THIS PLAN.</p>					
<b>EASEMENT INFORMATION</b>					
<p><b>LEGEND:</b> E - ENCUMBERING EASEMENT CONDITION IN CROWN GRANT IN THE NATURE OF AN EASEMENT OR OTHER ENCUMBRANCE      A - APPURTENANT EASEMENT</p>					
<p>EASEMENTS MARKED (E) ARE EXISTING EASEMENTS.</p> <p>EASEMENTS MARKED (H) ARE CREATED UPON REGISTRATION OF THIS PLAN.</p> <p>EASEMENTS MARKED (I) ARE CREATED WHEN THE APPROPRIATE VESTING DATE IS RECORDED OR TRANSFER REGISTERED.</p> <p>EASEMENTS MARKED (R) ARE REMOVED WHEN THE APPROPRIATE VESTING DATE IS RECORDED OR TRANSFER REGISTERED.</p>					
SYMBOL	SUBJECT LAND	PURPOSE	WIDTH (metres)	ORIGIN	LAND BENEFITED IN FAVOUR OF
-	C-1	TRANSMISSION OF GAS	900.00m	INST 2700056	GAS AND FUEL CORPORATION OF VICTORIA
<p><b>CARDINIA ROAD AND BALANCE LOTS A &amp; X</b></p>					
<p><small>VERIS SURVEYS PTY LTD 100/101 Colac Street Geelong VIC 3220 P: 03 52418181 E: <a href="mailto:enquiries@veris.com.au">enquiries@veris.com.au</a> W: <a href="http://www.veris.com.au">www.veris.com.au</a></small></p>		<p><b>LICENSED SURVEYOR: BRENDAN MUNNARI</b></p>			
		<p><b>DATE:</b> 13/10/22      <b>REFERENCE:</b> I12268-SL01</p> <p><b>VERSION:</b> D      <b>DRAWING:</b> I12268-SL01-AD</p>	<p><b>ORIGINAL SHEET SIZE:</b> A3</p> <p><b>SHEET 1 OF 3 SHEETS</b></p>		
<p>Digitally signed by: Brendon Munnari, Licensed Surveyor, 14/10/2022 SPEAR Ref: S1565165</p>				<p><b>PLAN REGISTERED</b> TIME: 12:20 PM DATE: 18/06/2024 R.O. Assistant Registrar of Titles</p>	



**PLAN OF SUBDIVISION**  
 UNDER SECTION 32 OF THE  
 SUBDIVISION ACT 1988

**PS 905631T**

<p>                 1100 South Macquarie St                  Suite 101, Sydney NSW 1585                  Australia                  Tel: +61 (0)2 9550 1111                  Fax: +61 (0)2 9550 1112                  Email: info@veris.com.au             </p>	LICENSED SURVEYOR: BRENDAN MUMARI	ENLARGEMENT No. 1 NOT TO SCALE	SCALE: 1:5000	ORIGINAL SHEET SIZE A3
	DATE: 13/02/22 VERSION: D	REFERENCE: 322268-SL01 DRAWING: 322268-SL01-AD	ENLARGEMENT No. 2 NOT TO SCALE	SHEET: 2



<b>PLAN OF SUBDIVISION</b> UNDER SECTION 35 OF THE SUBDIVISION ACT 1968	<b>PS 905631T</b>
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**VESTING DATES & TRANSFER REGISTRATION DATES OF ACQUIRED LAND**

LAND AFFECTED	LAND ACQUIRED BY COMPULSORY PROCESS				LAND ACQUIRED BY AGREEMENT	LY REFERENCE	ASSISTANT REGISTRAR OF TITLES SIGNATURE
	VESTING DATE	GOVERNMENT GAZETTE		DATE OF RECORDING OF VESTING DATE	DATE OF REGISTRATION OF TRANSFER		
		PAGE	YEAR				
R043R1	-	-	-	-	19/06/2024	AY10/001/16	R.L.

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<div style="font-size: 0.8em; margin-top: 5px;">                 VERIS SURVEILLANT PTY LTD                  4   Level 3   100/1000 Pitt                  Road   Sydney NSW 1500                  T   +61 2 9219 8124                  E   veris@veris.com.au                  W   www.veris.com.au             </div>	LICENSED SURVEYOR: BRENDAN MURPHY	
	DATE 13/10/22      REFERENCE I12268-SL01 VERSION D              DRAWING I12268-SL01-AD	ORIGINAL SHEET SIZE A3 SHEET 3
	Digitally signed by: Brendan Murphy, Licensed Surveyor, Surveyor's (The Director of) 14/10/2022 SPEAR Pt 57 866 65	



# Department of Environment, Land, Water & Planning

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The Victorian Government acknowledges the Traditional Owners of Victoria and pays respects to their ongoing connection to their Country, History and Culture. The Victorian Government extends this respect to their Elders, past, present and emerging.

Produced 11/12/2024 11:24:08 AM

Status	Registered	Dealing Number	AV390884W
Date and Time Lodged	02/03/2022 05:45:12 PM		

### Lodger Details

Lodger Code	17223H
Name	MADDOCKS
Address	
Lodger Box	
Phone	
Email	
Reference	TGM: 8674199

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## APPLICATION TO RECORD AN INSTRUMENT

Jurisdiction	VICTORIA
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### Estate and/or Interest

FEE SIMPLE

### Land Title Reference

8319/753  
12334/744

### Instrument and/or legislation

RECORD - AGREEMENT - SECTION 173  
Planning & Environment Act - section 173

### Applicant(s)

Name	CARDINIA SHIRE COUNCIL
Address	
Property Name	CARDINIA SHIRE OFFICE
Street Number	20
Street Name	SIDING
Street Type	AVENUE
Locality	OFFICER
State	VIC



# Department of Environment, Land, Water & Planning

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## Electronic Instrument Statement

Postcode 3809

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### Additional Details

Refer Image Instrument

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The applicant requests the recording of this Instrument in the Register.

---

### Execution

1. The Certifier has taken reasonable steps to verify the identity of the applicant or his, her or its administrator or attorney.
2. The Certifier holds a properly completed Client Authorisation for the Conveyancing Transaction including this Registry Instrument or Document.
3. The Certifier has retained the evidence supporting this Registry Instrument or Document.
4. The Certifier has taken reasonable steps to ensure that this Registry Instrument or Document is correct and compliant with relevant legislation and any Prescribed Requirement.

Executed on behalf of	CARDINIA SHIRE COUNCIL
Signer Name	[REDACTED]
Signer Organisation	PARTNERS OF MADDOCKS
Signer Role	AUSTRALIAN LEGAL PRACTITIONER
Execution Date	02 MARCH 2022

---

### File Notes:

NIL

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This is a representation of the digitally signed Electronic Instrument or Document certified by Land Use Victoria.

Statement End.

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**Date**     /     /  
28/2/2022

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## **Agreement under Section 173 of the Planning and Environment Act 1987**

**Subject Land: 295 and 325 Cardinia Road, Officer South - CREP**

**Purpose of Agreement - Development Contributions**

**Cardinia Shire Council**  
and

**McMullin Commercial Pty Ltd ACN 116 196 646**

and

**Baylin Park Pty Ltd ACN 113 300 913**



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---

## Agreement under Section 173 of the Planning and Environment Act 1987

**Dated**        /        / 28/2/2022

---

### Parties

Name	<b>Cardinia Shire Council</b>
Address	Municipal Offices, 20 Siding Avenue, Officer, Victoria
Short name	<b>Council</b>
Name	<b>McMullin Commercial Pty Ltd ACN 115 196 546</b>
Address	Level 3 -2 – 8 Railway Parade Camberwell
Name	<b>Baylin Park Pty Ltd ACN 113 300 913</b>
Address	Suite 29 4 Cardinia Road Officer
Collectively	<b>Owner</b>

---

### Background

- A. Council is the responsible authority for the Planning Scheme. Council is also the Collecting Agency and the Development Agency under the Development Contributions Plan.
- B. The Owner is or is entitled to be the registered proprietor of the Subject Land.
- C. Pursuant to Schedule 3 of clause 45.08 of the Planning Scheme a planning permit for the subdivision or development of the Subject Land must not be granted until there is an agreement which makes provision for development contributions
- D. This Agreement is to satisfy the requirement of Schedule 3 of clause 45.08 of the Planning Scheme
- E. The Development Contributions Plan specifies the contributions required from individual landholders within the area covered by the Development Contributions Plan to fund infrastructure and essential services required as a result of development of the area. The Development Contributions Plan is not an incorporated document in the Planning Scheme. It is only given effect by this Agreement.
- F. Subject to further agreement of the Parties, the Council, may accept the carrying out of infrastructure projects by the Owner and the transfer or vesting of Land Projects in return for

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a credit against its development contribution liability under the Development Contributions Plan.

- G. As at the date of this Agreement the Subject Land is encumbered by a Mortgage in favour of the Mortgagee. The Mortgagee consents to the Owner entering into this Agreement

## THE PARTIES AGREE

### 1. Definitions

In this Agreement the words and expressions set out in this clause have the following meanings unless the context admits otherwise.

**Act** means the *Planning and Environment Act 1987*

**Agreement** means this Deed and includes this Deed as amended from time to time.

**CPI** means the annual Consumer Price Index (All Groups-Melbourne) as published by the Australian Bureau of Statistics, or, if that index number is no longer published, its substitute as a cumulative indicator of the inflation rate in Australia, as determined by Council from time to time

**Current Address** means:

- (a) for Council, the address shown on page one of this Agreement, or any other address listed on Council's website; and
- (b) for the Owner, the address shown on page one of this Agreement or any other address provided by the Owner to Council for any purpose relating to the Subject Land.

**Current Email** means:

- (a) for Council, mail@cardinia.vic.gov.au, or any other email address listed on Council's website; and
- (b) for the Owner, any email address provided by the Owner to Council for the express purpose of electronic communication regarding this Agreement.

**Development Contributions Levy** means the development infrastructure levy to be paid upon development of the Subject Land at the calculated rate as set out in the Development Contributions Plan. In this Agreement it means the levy payable per hectare of the Net Developable Area or per square metre described in the Development Contributions Plan at the rate specified in the Development Contributions Plan for the Subject Land and which at the date of this Agreement is (after Indexation) \$212,942.34 per hectare.

**Development Contributions Plan or DCP** means the Development Contributions Plan described in Schedule 2 and which is attached to this Agreement at Attachment 1 which for clarity is not an incorporated document in the Planning Scheme.

**Net Developable Area** has the same meaning and is the same amount as set out in the Development Contribution Plan.

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- 7.2.2 consents to Council applying to the Registrar of Titles to record this Agreement on the certificate of title of the Subject Land in accordance with section 181 of the Act; and
- 7.2.3 agrees to do all things necessary to enable Council to do so including:
- (a) sign any further agreement, acknowledgment or document; and
  - (b) obtain all necessary consents to enable the recording to be made.

**7.3 Council's costs to be paid**

The Owner must pay to Council within 14 days after a written request for payment Council's costs and expenses (including reasonable legal expenses) relating to this Agreement including:

- 7.3.1 preparing, drafting, finalising, signing, recording and enforcing this Agreement;
- 7.3.2 preparing, drafting, finalising and recording any amendment to this Agreement, and
- 7.3.3 preparing, drafting, finalising and recording any document to give effect to the ending of this Agreement.

**7.4 Interest for overdue money**

The Owner agrees:

- 7.4.1 the Owner must pay to Council interest in accordance with section 227A of the *Local Government Act 1989* on any amount due under this Agreement that is not paid by the due date; and
- 7.4.2 if interest is owing, Council will apply any payment made to interest and any balance of the payment to the principal amount.

---

**8. Agreement under section 173 of the Act**

Without limiting or restricting the respective powers to enter into this Agreement, and insofar as it can be so treated, this Agreement is made as a deed in accordance with section 173 of the Act

---

**9. Owner's warranties**

- 9.1 Without limiting the operation or effect which this Agreement has, the Owner warrants that apart from the Owner and any other person who has consented in writing to this Agreement, no other person has any interest, either legal or equitable, in the Subject Land which may be affected by this Agreement.

---

**10. Successors in title**

Until such time as a memorandum of this Agreement is recorded on the certificate of title of the Subject Land, the Owner must require successors in title to:

- 10.1 give effect to this Agreement, and



- 12.3 If GST is payable in respect of any supply made by a supplier under this Agreement, subject to clause 12.4 the recipient will pay to the supplier an amount equal to the GST payable on the supply at the same time and in the same manner as the consideration for the supply is to be provided under this Agreement.
- 12.4 The supplier must provide a tax invoice to the recipient before the supplier will be entitled to payment of the GST payable under clause 12.3.

---

### 13. Commencement of Agreement

Unless otherwise provided in this Agreement, this Agreement commences from the date of this Agreement.

---

### 14. Amendment of Agreement

- 14.1 This Agreement may be amended in accordance with the Act.
- 14.2 If notice of a proposal to amend this Agreement is required pursuant to section 178C of the Act, the parties agree that only Council and the Owner of the Subject Land or that part of the Subject Land that is the subject of the proposal to amend this Agreement are required to be notified of the proposal.

---

### 15. Ending of Agreement

- 15.1 This Agreement ends.
- 15.1.1 when the Owner has complied with all of its obligations under this Agreement; or
- 15.1.2 otherwise by agreement between the Parties in accordance with section 177 of the Act.
- 15.2 Notwithstanding clause 15.1 the Owner may request in writing Council's consent to end the Agreement in respect of Lots in any Stage upon the issue of a Statement of Compliance in respect of that Stage.
- 15.3 Council will not unreasonably withhold its consent to a written request made pursuant to clause 15.2 if it is satisfied, acting reasonably, that the obligations in this Agreement are secured to its satisfaction.
- 15.4 If notice of a proposal to end this Agreement is required pursuant to section 178C of the Act, the parties agree that only Council and the Owner of the Subject Land or that part of the Subject Land that is the subject of the proposal to end this Agreement are required to be notified of the proposal.
- 15.5 Once this Agreement ends as to part of the Subject Land in accordance with clause 15.1 Council will, within a reasonable time following a request from the Owner and at the cost of the Owner, execute all documents necessary to make application to the Registrar of Titles under section 183 of the Act to cancel the recording of this Agreement on the register as to that part of the Subject Land.
- 15.6 On completion of all the Owner's obligations in accordance with this Agreement Council must as soon as practicable following the ending of this Agreement and at the request and at the cost of the Owner, execute all documents necessary to make application to the Registrar







---

## Schedule 2

### Development Contributions Plan

The Development Contributions Plan is the development contributions plan for the Cardinia Road Employment Precinct which is not an incorporated document in the Planning Scheme and which comprises 11 pages. The Development Contributions Plan is an informal plan which is given effect by this Agreement and is attached as Attachment 1.

### Precinct Structure Plan

The Precinct Structure Plan is the Cardinia Road Employment Precinct Structure Plan as amended from time to time, being an Incorporated Document in the Planning Scheme

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## Signing Page

Signed, sealed and delivered as a deed by the Parties.

Signed by and on behalf, and with the authority, of the **Cardinia Shire Council** by  
(Name),  
(Title),



in the exercise of a power conferred by an Instrument of Delegation in the presence of:

)  
Manager Planning and Design



Witness

This document was witnessed by audio visual link in accordance with the requirements of s12 of the Electronic Transactions (Victoria) Act 2000

Executed as a deed by McMullin Commercial Pty Ltd )  
ACN 116 196 546 in accordance with s 127(1) and s  
127(3) of the Corporations Act 2001;



Signature

Print full name



Signature

Print full name

Executed as a deed by Baylin Park Pty Ltd ACN 113 )  
300 913 in accordance with s 127(1) and s 127(3) of )



Print full name

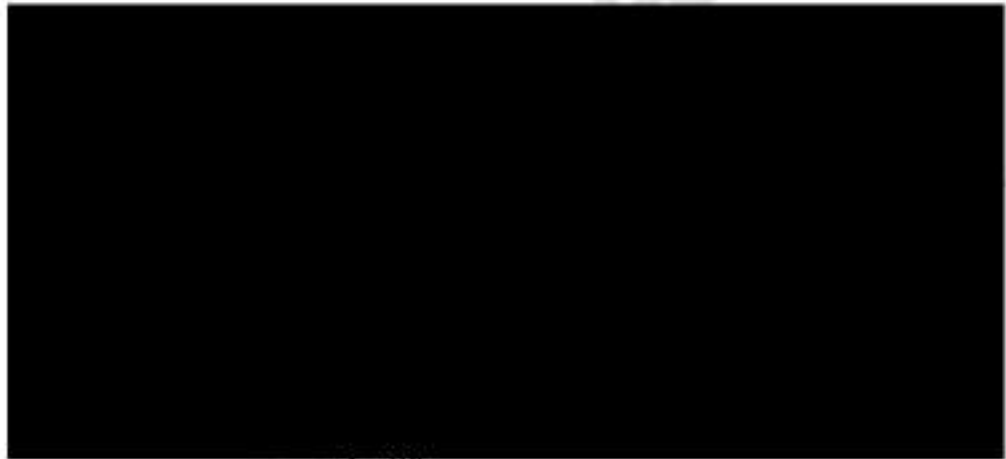


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### Mortgagee's Consent

National Australia Bank LTD as Mortgagee under instrument of mortgage no. AM001915S consents to the Owner entering into this Agreement and in the event that the Mortgagee becomes mortgagee-in-possession, agrees to be bound by the covenants and conditions of this Agreement.

.....



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# Attachment 1

## Development Contributions Plan



Future Urban Structure - Property Plan  
Cardinia Road Employment Precinct Structure Plan

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# Annexure G

## Development Contribution Rate

SUMMARY PROJECT COSTS	Land	Construction	TOTAL
ROADS	\$ 6,529,700.00	\$ 14,875,001.00	\$ 21,404,701.00
INTERSECTIONS	\$ -	\$ 14,951,048.00	\$ 14,951,048.00
GRADE SEPARATION AND BRIDGES	\$ -	\$ 6,916,408.00	\$ 6,916,408.00
PUBLIC TRANSPORT	\$ -	\$ 548,728.00	\$ 548,728.00
COMMUNITY FACILITIES	\$ -	\$ 3,945,871.00	\$ 3,945,871.00
OPEN SPACE & LANDSCAPING	\$ 5,812,892.00	\$ 10,408,551.80	\$ 16,221,443.80
OFF-ROAD PEDESTRIAN & CYCLE TRAILS	\$ -	\$ 4,969,441.00	\$ 4,969,441.00
<b>TOTAL</b>	<b>\$ 12,342,592.00</b>	<b>\$ 56,615,048.80</b>	<b>\$ 68,957,640.80</b>
<b>DEMAND UNITS 430.13 hectares</b>			
<b>CONTRIBUTION RATE</b>			
	<b>\$ 160,318.14 per hectare</b>		
	<b>or \$ 16.03 per square metre *</b>		

\* Expressed in Dec '08 \$

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# G1 Application to Record Notification

Section 201UB Planning and Environment Act 1987

Use to notify the Registrar of land subject to GAIC

Privacy Collection Statement: The information from this form is collected by the Registrar of Titles and is used for the purpose of maintaining publicly searchable registers and indexes.

AH336996N

01/07/2010 \$0 201UB



## Read this before you start

- 1 Fill page 1 online
- 2 Print form single sided
- 3 Sign with a blue or black pen

## Purpose

The Growth Areas Authority applies to the Registrar of Titles to record a notification on the folio(s) of the Register described at Item 1 that a growth areas infrastructure contribution may be payable.

### 1. What land is subject to GAIC?

Land Title 1

Volume Folio

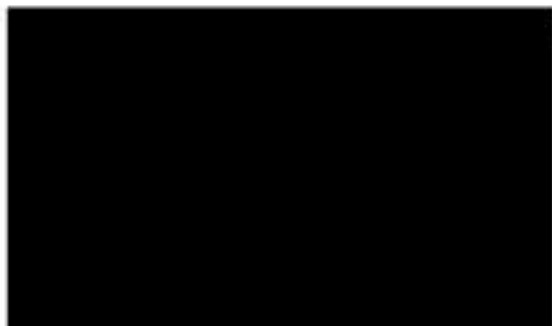
Land Title 2

Volume Folio

Other Land Titles

see attached listing

### 2. Signature/s



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### 3. Date (dd/mm/yyyy)

28/06/2010

### 4. Does the lodging party have a customer code?

No Go to question 5

Yes What is the customer code? Reference

14273H

0/10/5935

### 5. Lodging party details

Lodging party

Given Name(s)

Family Name/ Company Name GAA

Phone 03 9651 9600

Address

No. Level 29 Street 35 Collins St

Suburb Melbourne Postcode 3000

## You may lodge this form in two ways:

**1. In person**  
Level 9, 570 Bourke Street  
Melbourne 3000

**2. By mail**  
P.O. Box 500  
East Melbourne 3002



Vol/Fol	Vol/Fol	Vol/Fol	Vol/Fol	Vol/Fol	Vol/Fol	Vol/Fol
2853/484	8460/840	8928/757	9400/806	9573/296	9768/808	1028/7865
2739/613	8499/602	8958/110	9400/807	9573/297	9769/001	10310/687
3351/178	8499/603	9019/664	9400/808	9573/298	9769/550	10335/090
3431/066	8499/604	9041/695	9400/809	9573/299	9769/551	10346/417
3451/097	8499/605	9041/696	9409/902	9573/300	9769/552	10348/420
3494/753	8510/612	9047/508	9412/866	9573/301	9769/553	10353/885
3498/413	8510/613	9047/509	9418/330	9584/888	9769/554	10354/868
3529/743	8525/626	9068/407	9434/235	9584/889	9769/555	10354/869
3659/736	8525/627	9068/408	9441/095	9584/890	9769/556	10364/835
4024/688	8535/846	9068/410	9441/096	9584/891	9769/558	10387/819
420/995	8559/003	9068/411	9441/097	9584/892	9769/559	10392/883
4144/895	8570/377	9068/412	9441/098	9584/894	9792/811	10392/884
4317/220	8574/170	9068/413	9441/099	9589/589	9797/850	10467/987
4643/431	8574/171	9091/159	9445/813	9603/847	9818/407	10488/902
5244/653	8589/156	9091/160	9459/267	9603/848	9818/408	10515/165
5378/559	8590/053	9091/161	9464/464	9603/849	9818/409	10515/167
5419/738	8618/945	9091/162	9464/465	9603/850	9818/410	10529/857
5623/570	8618/946	9091/163	9464/466	9613/003	9818/411	10529/858
5861/083	8618/947	9091/164	9464/467	9613/004	9818/413	10529/859
5879/798	8618/948	9091/167	9464/468	9613/006	9818/414	10529/860
5897/243	8618/949	9091/168	9464/469	9613/007	9818/415	10529/861
6153/539	8618/950	9091/169	9464/470	9622/089	9818/416	10533/550
6268/567	8645/298	9091/170	9464/472	9622/479	9818/417	10548/571
6313/505	8645/297	9091/171	9464/477	9630/985	9823/781	10555/205
6588/458	8645/298	9091/172	9464/478	9630/988	9828/775	10558/952
6828/581	8645/299	9158/474	9464/479	9637/198	9829/168	10559/138
6850/889	8645/300	9152/231	9472/647	9637/199	9829/169	10559/139
7016/149	8645/301	9162/233	9505/016	9637/200	9829/170	10578/614
7241/131	8645/302	9162/235	9506/354	9645/118	9829/171	10591/867
7297/320	8645/303	9162/236	9506/355	9645/119	9829/172	10591/868
7649/106	8645/304	9162/239	9506/356	9646/711	9829/173	10631/394
7721/063	8693/465	9164/126	9506/357	9653/943	9847/761	10631/395
8060/150	8693/466	9212/048	9506/358	9670/430	9850/172	10631/396
8105/078	8693/467	9281/403	9506/359	9670/431	9850/173	10643/019
8139/039	8693/468	9281/404	9506/360	9679/020	9891/057	10643/020
8139/040	8693/469	9281/405	9506/361	9679/022	9904/374	10652/609
8139/041	8693/470	9302/167	9511/336	9679/031	9911/058	10682/610
8139/042	8695/976	9307/840	9512/652	9690/926	9943/887	10688/112
8139/043	8716/634	9310/362	9512/655	9690/928	9943/888	10684/297
8139/044	8716/635	9317/264	9530/273	9690/929	9947/688	10684/298
8158/838	8716/636	9317/265	9531/535	9690/930	9947/689	10699/832
8164/741	8716/637	9317/266	9530/875	9692/053	9951/963	10699/833
8167/220	8733/753	9317/267	9536/876	9702/195	9961/562	10703/758
8182/120	8756/898	9317/269	9538/957	9708/679	9968/697	10703/759
8223/415	8776/891	9320/510	9546/805	9717/080	10008/331	10710/963
8255/346	8776/892	9320/987	9546/806	9717/081	10035/791	10710/964
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8294/528	8810/831	9327/703	9546/808	9723/056	10091/288	10728/732
8319/753	8817/127	9327/704	9546/809	9784/061	10111/889	10731/092
8322/627	8831/247	9327/706	9547/026	9764/062	10191/894	10743/778
8322/628	8833/446	9329/578	9547/027	9764/063	10267/821	10803/208
8413/375	8844/913	9332/136	9547/028	9764/064	10267/822	10817/497
8413/376	8889/376	9378/582	9547/030	9784/065	10276/848	10817/498
8426/111	8900/410	9394/598	9550/779	9784/066	10276/849	10817/864
8451/208	8901/079	9400/604	9573/295	9768/697	10276/966	10820/364



Vol/Fol	Vol/Fol	Vol/Fol
10821/508	11134/054	11198/849
10821/507	11134/056	11198/850
10822/764	11141/164	11198/851
10822/765	11144/531	11198/852
10825/741	11157/739	11198/853
10844/147	11168/738	11198/854
10844/148	11163/432	11198/855
10850/382	11183/433	11198/856
10850/383	11183/434	11198/857
10858/584	11184/928	11198/858
10858/585	11188/429	11198/859
10879/860	11188/800	11198/860
10891/490	11188/801	11198/861
10891/491	11188/802	11198/862
10893/012	11188/815	11198/863
10893/013	11189/027	11198/864
10893/908	11189/028	11198/865
10893/909	11189/076	11198/866
10896/875	11191/050	11198/867
10898/876	11191/089	
10919/796	11192/901	
10928/419	11192/902	
10928/421	11192/903	
10931/283	11192/904	
10931/288	11192/948	
10936/548	11192/950	
10938/477	11196/320	
10939/559	11196/321	
10947/739	11196/322	
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10995/818	11196/327	
11018/870	11196/328	
11018/871	11196/329	
11036/793	11196/330	
11036/794	11196/331	
11041/313	11196/332	
11049/193	11196/333	
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11054/791	11196/335	
11062/880	11196/336	
11067/255	11196/337	
11068/855	11196/338	
11072/880	11196/339	
11085/720	11196/340	
11100/896	11196/341	
11105/203	11196/342	
11105/204	11196/343	
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11117/312	11196/345	
11127/035	11198/846	
11134/051	11198/847	
11134/053	11198/848	

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# Application to record an instrument

Section 45 Melbourne Strategic Assessment (Environment Mitigation Levy) Act 2020

## Privacy Collection Statement

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# AT390567C

Lodged by

Name:

Address:

8 NICHOLSON ST, EAST MELBOURNE 3002

Reference:

Customer code: 237655

The Secretary of the Department of Environment, Land, Water and Planning applies for the recording of a notification in the Register that an environmental mitigation levy may be payable.

Land: (volume and folio)

SEE ATTACHMENT

Applicant: (full name and address, including postcode)

SECRETARY, DEPARTMENT OF ENVIRONMENT, LAND, WATER AND PLANNING  
8 NICHOLSON ST, EAST MELBOURNE 3002

Signing:

Executed on behalf of

Signer Name

Signature

SECRETARY, DEPARTMENT OF ENVIRONMENT, LAND, WATER AND PLANNING

DIRECTOR, REGULATORY STRATEGY AND DESIGN,  
DEPARTMENT OF ENVIRONMENT, LAND, WATER AND PLANNING  
PURSUANT TO INSTRUMENT OF DELEGATION DATED 2 JULY 2020

35271702A

MSA1

Page 1 of 1

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Land Use Victoria contact details: [www.delwp.vic.gov.au/property](http://www.delwp.vic.gov.au/property)>Contact us

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# AT390567C

Vol/fol	Vol/fol	Vol/fol	Vol/fol	Vol/fol	Vol/fol	Vol/fol
585/111	11862/853	11917/655	11949/051	11982/726	12004/463	12037/471
645/920	11862/859	11917/665	11949/057	11982/729	12004/471	12037/476
2232/231	11862/871	11917/678	11949/078	11982/732	12005/071	12037/481
2468/575	11862/872	11917/698	11949/080	11982/764	12005/078	12037/482
2551/057	11864/711	11917/717	11949/211	11982/933	12005/411	12039/048
3465/824	11864/723	11917/726	11949/212	11982/987	12005/415	12039/050
4019/684	11864/727	11918/477	11949/217	11984/388	12006/655	12039/056
5873/592	11864/748	11918/479	11949/225	11984/390	12006/657	12039/058
6229/723	11866/743	11918/490	11949/22E	11984/401	12006/667	12039/061
6588/416	11866/753	11918/494	11949/232	11984/406	12006/670	12039/064
8072/405	11866/774	11918/499	11949/235	11984/408	12007/332	12039/074
8075/235	11866/906	11918/504	11949/230	11984/421	12007/333	12039/076
8153/441	11868/105	11918/517	11949/242	11984/428	12010/470	12039/338
8154/334	11868/106	11920/063	11949/249	11984/434	12010/479	12039/353
8235/066	11869/393	11920/263	11949/256	11984/451	12010/484	12039/377
8260/388	11869/913	11920/265	11949/269	11984/452	12010/487	12039/384
8289/600	11869/921	11920/291	11949/278	11984/453	12010/502	12039/388
8319/753	11869/939	11920/366	11949/282	11984/456	12010/713	12039/389
8338/001	11869/900	11920/473	11949/284	11984/459	12010/714	12039/390
8353/923	11869/901	11920/470	11949/285	11984/462	12010/715	12039/394
8372/793	11869/964	11920/483	11949/305	11984/465	12010/717	12039/403
8379/885	11870/523	11920/484	11949/782	11984/489	12010/725	12039/404
8400/901	11870/524	11920/502	11949/786	11985/235	12010/733	12039/420
8412/401	11870/538	11920/503	11949/789	11985/240	12010/741	12039/438
8452/913	11870/544	11922/665	11949/792	11985/258	12010/754	12039/439
8452/931	11870/545	11922/707	11950/057	11985/282	12011/424	12039/440
8459/281	11870/546	11922/710	11950/067	11985/297	12011/433	12039/441
8478/729	11870/673	11922/713	11950/075	11985/660	12011/451	12039/442
8485/438	11870/577	11922/716	11950/093	11986/665	12011/452	12039/443
8485/475	11870/585	11922/718	11950/228	11986/668	12011/456	12039/461
8485/493	11870/596	11922/719	11952/952	11986/669	12015/189	12039/492
8485/538	11871/734	11922/726	11952/954	11987/026	12015/196	12039/494
8485/540	11871/749	11922/732	11952/980	11989/481	12015/199	12039/512
8485/546	11872/336	11922/741	11952/992	11989/509	12017/378	12039/517
8485/547	11872/341	11923/139	11952/995	11989/603	12017/379	12040/279
8485/551	11872/343	11923/164	11952/998	11989/746	12017/388	12040/290
8485/556	11872/353	11923/177	11953/006	11989/754	12017/476	12040/294
8506/147	11872/355	11923/183	11953/007	11989/755	12017/492	12040/299
8520/173	11874/131	11923/222	11953/199	11989/765	12017/496	12040/336
8521/749	11874/404	11923/229	11953/207	11989/770	12018/822	12040/543
8521/758	11874/423	11923/232	11953/225	11989/910	12018/823	12040/553
8521/760	11874/424	11923/236	11953/378	11989/924	12018/836	12040/562
8521/775	11874/426	11923/245	11953/383	11989/925	12018/839	12040/612
8521/779	11874/434	11923/247	11954/900	11989/927	12018/841	12040/622
8521/784	11874/544	11923/250	11954/911	11989/946	12018/843	12040/632

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# AT390567C

Vol/fol	Vol/fol	Vol/fol	Vol/fol	Vol/fol	Vol/fol	Vol/fol
8521/795	11874/553	11924/273	11954/91E	11990/037	12018/913	12040/633
8521/804	11874/730	11924/775	11954/920	11990/040	12018/935	12040/636
8539/185	11877/002	11924/784	11954/956	11990/042	12018/938	12041/153
8540/602	11877/011	11924/788	11954/957	11990/048	12019/537	12041/154
8540/873	11877/014	11924/789	11954/959	11990/050	12019/538	12041/169
8546/308	11877/015	11924/922	11956/390	11990/052	12019/543	12043/041
8549/657	11877/019	11924/935	11956/425	11990/079	12019/563	12043/047
8549/658	11877/020	11924/946	11956/740	11990/099	12019/570	12043/054
8556/276	11877/025	11925/763	11957/060	11990/103	12019/727	12043/057
8559/102	11877/030	11925/771	11957/071	11990/249	12022/011	12043/065
8570/012	11877/037	11925/774	11957/077	11990/253	12022/015	12046/735
8576/175	11881/426	11925/794	11957/081	11990/623	12022/024	12046/738
8603/842	11881/427	11926/015	11957/092	11990/644	12022/026	12046/742
8616/406	11881/428	11926/167	11957/097	11990/660	12022/028	12046/750
8634/882	11882/894	11926/168	11957/107	11990/662	12022/032	12046/753
8638/791	11882/897	11926/191	11957/108	11990/680	12022/033	12046/758
8641/757	11884/345	11926/279	11957/120	11990/718	12022/420	12046/761
8646/467	11884/368	11926/280	11959/858	11990/741	12022/426	12046/762
8659/092	11884/375	11926/293	11959/861	11990/751	12022/428	12047/889
8673/041	11884/378	11926/304	11959/880	11990/752	12022/443	12047/896
8681/746	11884/460	11926/305	11961/257	11990/759	12022/461	12047/898
8683/583	11884/486	11926/310	11961/484	11990/763	12022/469	12047/924
8727/999	11884/499	11926/632	11961/502	11990/765	12022/612	12048/335
8735/468	11884/510	11926/634	11961/515	11990/795	12022/622	12048/338
8747/086	11884/523	11926/636	11962/612	11990/799	12022/630	12048/348
8757/993	11885/079	11926/661	11967/438	11990/801	12022/631	12050/550
8785/899	11885/092	11926/665	11967/630	11990/904	12023/348	12050/571
8803/697	11885/231	11926/766	11967/724	11990/909	12023/355	12050/624
8810/763	11885/234	11928/633	11967/736	11990/916	12023/357	12050/848
8820/218	11885/293	11928/634	11967/754	11990/917	12023/359	12050/908
8833/949	11885/294	11928/635	11967/754	11991/314	12023/360	12050/931
8835/307	11885/296	11928/638	11968/861	11992/123	12023/364	12051/170
8842/134	11885/5E2	11928/862	11968/863	11992/144	12023/368	12051/174
8844/913	11885/5E6	11929/575	11968/87E	11992/148	12023/369	12051/184
8851/930	11885/5E9	11930/074	11968/881	11992/152	12023/377	12051/382
8854/242	11885/732	11932/345	11968/88E	11992/164	12025/355	12051/386
8866/898	11885/738	11932/350	11972/174	11992/293	12026/362	12052/223
8874/267	11885/755	11932/375	11972/175	11992/294	12026/369	12052/232
8879/008	11885/756	11933/408	11972/178	11992/300	12026/377	12052/236
8885/394	11887/040	11933/421	11972/861	11992/309	12026/392	12052/249
8889/658	11887/044	11933/422	11975/393	11992/312	12026/393	12053/398
8895/136	11887/048	11933/852	11975/403	11992/321	12026/394	12053/439
8895/865	11887/0E4	11934/475	11976/350	11992/418	12026/399	12053/531
8898/691	11887/079	11934/481	11976/792	11992/452	12026/401	12053/562
8900/270	11887/092	11934/483	11976/800	11992/456	12026/414	12053/565

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Vol/fol	Vol/fol	Vol/fol	Vol/fol	Vol/fol	Vol/fol	Vol/fol
8900/274	11887/005	11934/485	11976/811	11992/591	12026/415	12053/569
8900/297	11887/100	11935/645	11977/238	11992/596	12026/972	12053/583
8900/318	11887/110	11935/667	11977/240	11992/599	12026/975	12053/585
8909/819	11887/125	11935/670	11977/249	11992/622	12026/983	12053/586
8945/313	11887/126	11937/326	11977/256	11992/626	12026/993	12053/598
8950/581	11887/527	11937/345	11977/257	11992/636	12027/367	12053/607
8953/965	11887/534	11937/350	11977/263	11992/660	12027/374	12058/528
8954/148	11887/548	11937/388	11978/083	11992/672	12031/629	12058/533
8955/075	11887/553	11937/396	11978/100	11992/678	12031/649	12058/543
8952/218	11887/6E1	11937/411	11978/10E	11992/688	12033/147	12058/554
8967/405	11887/671	11939/043	11978/951	11992/692	12033/152	12058/591
8978/928	11887/673	11939/069	11978/960	11992/693	12034/287	12058/598
8989/801	11889/071	11939/070	11978/961	11993/276	12034/745	12058/600
8989/868	11889/072	11939/072	11978/962	11993/573	12034/813	12058/601
8995/335	11889/073	11939/076	11978/975	11993/578	12034/817	12058/608
9004/424	11889/078	11941/117	11978/980	11993/583	12034/821	12059/992
9023/630	11889/094	11944/136	11979/163	11993/589	12034/824	12059/996
9042/237	11889/941	11944/140	11979/314	11993/596	12034/831	12060/000
9050/021	11889/950	11944/140	11979/317	11993/905	12034/838	12060/004
9056/065	11889/964	11944/153	11979/319	11993/921	12034/842	12060/018
9060/518	11889/989	11944/167	11979/323	11993/924	12034/844	12060/019
9060/561	11890/120	11944/168	11979/329	11993/925	12036/718	12060/025
9070/708	11890/136	11944/197	11979/333	11993/929	12036/720	12060/031
9070/723	11890/232	11944/237	11979/339	11993/930	12036/737	12060/042
9077/350	11890/235	11944/341	11979/421	11994/082	12036/739	12060/044
9080/872	11890/325	11944/360	11979/42E	11994/085	12036/744	12060/051
9096/302	11890/327	11944/362	11979/440	11994/090	12036/745	12060/054
9105/145	11892/703	11944/369	11979/443	11994/099	12036/751	12060/056
9109/393	11894/577	11944/370	11979/445	11994/114	12036/765	12060/060
9109/398	11894/594	11944/374	11979/450	11994/115	12036/768	12060/061
9117/024	11899/052	11945/057	11979/568	11994/289	12036/869	12060/172
9121/202	11899/055	11945/075	11979/569	11995/435	12036/874	12060/185
9135/417	11899/0E3	11945/086	11979/677	11995/977	12036/875	12060/187
9148/765	11899/072	11945/534	11979/68E	11995/979	12036/879	12060/193
9181/676	11899/075	11945/548	11979/688	11995/983	12036/886	12060/206
9181/804	11902/433	11945/549	11979/696	11995/989	12036/954	12060/348
9183/748	11902/446	11945/562	11980/429	11996/004	12036/955	12060/696
9193/778	11903/802	11945/566	11980/430	11996/006	12036/957	12060/711
9208/990	11903/806	11945/567	11980/442	11996/009	12036/961	12060/716
9231/022	11904/003	11945/574	11980/446	11996/010	12036/967	12060/717
9271/947	11907/687	11945/577	11980/450	11996/014	12036/968	12060/720
9290/872	11907/690	11945/579	11980/463	11999/408	12036/969	12061/451
9297/224	11910/763	11945/725	11981/490	12000/304	12036/976	12064/402
9307/840	11910/767	11945/731	11981/494	12000/311	12036/981	12064/403
9310/308	11910/768	11947/667	11981/527	12000/318	12036/988	12064/407

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# AT390567C

Vol/fol	Vol/fol	Vol/fol	Vol/fol	Vol/fol	Vol/fol	Vol/fol
9312/072	11910/773	11947/669	11982/052	12000/327	12037/017	12064/610
9332/088	11910/774	11947/675	11982/420	12000/329	12037/020	12064/878
9341/958	11910/777	11947/681	11982/423	12000/330	12037/032	12064/887
10044/151	11910/792	11947/687	11982/434	12004/031	12037/034	12064/889
11860/183	11910/798	11947/696	11982/686	12004/032	12037/437	12064/893
11860/189	11914/098	11948/999	11982/688	12004/445	12037/452	12064/904
11860/580	11914/185	11949/000	11982/705	12004/458	12037/454	12064/908
11860/602	11917/654	11949/003	11982/707	12004/461	12037/466	

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**REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958**

VOLUME 06588 FOLIO 416

Security no : 124119490488N  
Produced 31/10/2024 01:38 PM

CROWN GRANT

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**LAND DESCRIPTION**

Reserve 1 on Plan of Subdivision 098925 and Road R1 on Plan of Subdivision 098925.  
Created by instrument LP098925 13/12/1973

**REGISTERED PROPRIETOR**

Estate Fee Simple  
Sole Proprietor  
CARDINIA SHIRE COUNCIL of HENTY WAY PAKENHAM VIC 3810  
AR440442R 11/09/2018

**ENCUMBRANCES, CAVEATS AND NOTICES**

Any crown grant reservations exceptions conditions limitations and powers noted on the plan or imaged folio set out under DIAGRAM LOCATION below. For details of any other encumbrances see the plan or imaged folio set out under DIAGRAM LOCATION below.

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan or imaged folio set out under DIAGRAM LOCATION below.

NOTICE as to part Section 10(1) Land Acquisition and Compensation Act 1986  
ROADS CORPORATION  
ADDRESS FOR SERVICE OF NOTICES  
PROPERTY SERVICES ROADS CORPORATION of 60 DENMARK STREET KEW VIC 3101  
AG051202C 27/08/2008

NOTICE Section 45 Melbourne Strategic Assessment (Environment Mitigation Levy) 2020  
AT390567C 01/07/2020

**DIAGRAM LOCATION**

SEE LP098925 FOR FURTHER DETAILS AND BOUNDARIES

**ACTIVITY IN THE LAST 125 DAYS**

NIL

-----END OF REGISTER SEARCH STATEMENT-----

Additional information: (not part of the Register Search Statement)

Street Address: HENRY ROAD PAKENHAM VIC 3810

**ADMINISTRATIVE NOTICES**



## REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

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NIL

eCT Control 09857J CARDINIA SHIRE COUNCIL  
Effective from 11/09/2018

DOCUMENT END

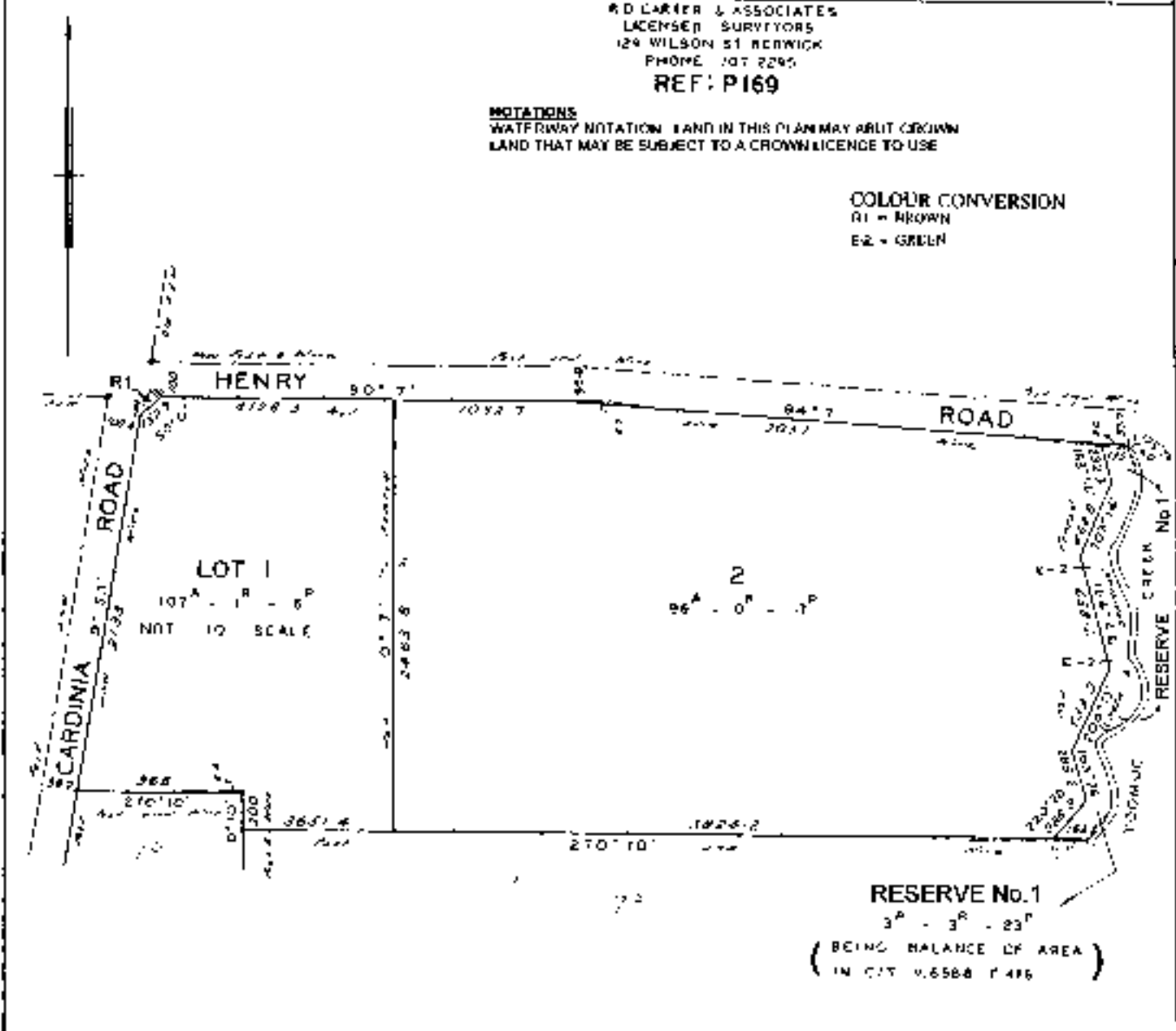
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NO FURTHER AMENDMENTS ARE TO BE MADE TO THE ORIGINAL DOCUMENT OF THE REGISTER

**LP98925**  
**EDITION 1**  
APPROVED 13/02/13

<p><b>PLAN OF SUBDIVISION OF</b> <b>CROWN ALLOTMENT 7A</b> <b>PARISH OF PAKENHAM</b> <b>COUNTY OF MORNINGTON</b></p> <p>Measurements are in Links Conversion Factor LINKS X 0.201168 = METRES VOL. 6588 FOL. 416</p>	<p><b>APPROPRIATIONS</b></p> <p>BROWN - MAP &amp; GRAYNADE GREEN - DRAINAGE</p>	<p><b>NOTATIONS</b></p> <p>ROADWIDTHS ARE NOT DRAWN TO SCALE FOR DATUM SEE COPY OF FIELDNOTES</p>
	<p><b>RD CARTER &amp; ASSOCIATES</b> LICENSED SURVEYORS 129 WILSON ST REDWICK PHONE 107 2295 REF: P169</p> <p><b>NOTATIONS</b> WATERWAY NOTATION: LAND IN THIS PLAN MAY ABUT CROWN LAND THAT MAY BE SUBJECT TO A CROWN LICENCE TO USE</p> <p><b>COLOUR CONVERSION</b> R1 = BROWN E2 = GREEN</p>	



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**AG051202C**

27/08/2008 \$51.10 LACA

MADE Office Use Only

# APPLICATION BY ACQUIRING AUTHORITY

Approved Form APA  
Victorian Land Titles Office

## Section 106(e) Transfer of Land Act 1958

Lodged by: Roads Corporation  
 Name: Rod Roetman  
 Phone: 9854 1852  
 Address: 60 Denmark St Kew 3101  
 Ref No: 5810 Customer Code: 26E

The applicant applies for endorsement of the Notice of Intention to Acquire in respect of the land described and requires notice of any dealing with the land to be served upon the applicant at the address for service of notice.

Land (Volume and folio reference)

That part of the land in Certificate of Title Volume 6588 Folio 416 as is specified in the Notice of Intention to Acquire a copy of which is attached and referred to in the Notice of Intention to Acquire panel below.

Applicant: Roads Corporation  
 60 Denmark Street  
 Kew VIC 3101

Notice of Intention to Acquire

The Notice of Intention to Acquire a copy of which is annexed was served on 27 June 2008.

*\*Insert date of service of notice of intention to acquire on the persons having an interest in the land*

Address for Service of Notice (Including postcode)

Property Services, Roads Corporation  
60 Denmark Street, KEW VIC 3101

Dated: 27 June 2008

Signed for and on behalf of the applicant acquiring authority



Administrative Officer

# APA

Approval No. 554066A



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Land Registry, 570 Bourke Street, Melbourne, 3000, Phone 8636-2010

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**FORM 1**

Ss.6 and 8(1)  
Reg.7

**NOTICE OF INTENTION TO ACQUIRE**

T  
o [Redacted]

Roads Corporation (VicRoads) intends to acquire an interest in the following described land.

Title particulars: Being part of the land contained in Certificate of Title Volume 6588 Folio 416.

Area: 4185.0 square metres

Description: part of Parish of Pakenham shown as Parcel 349 on Survey Plan 20680C and being the property situated at McGregor Road, Nar Nar Goon, Vic, 3812.

The description of the land set out above refers to a document called Survey Plan 20680C. A copy of this document can be inspected without charge at the office of Property Services, 3rd Floor, South Building, 60 Denmark Street, Kew during the hours 9.00 am to 4.00 pm.

VicRoads thinks that the land is suitable for the construction of the Pakenham Bypass (Princes Freeway), because the land is appropriately located for planning, engineering and construction purposes associated with the project.

The land described is reserved for a public purpose under the Shire of Cardinia Planning Scheme.

VicRoads requires you to provide it with information about the following -

1. The name of any person who has, or you think may have, an interest in the land. (Such a person might be a tenant or a mortgagee or a person to whom you have agreed to sell the land.)
2. If you have a current building permit or approval or a planning permit concerning the land.
3. If you have sold or let or in any other way dealt with the land or were intending to deal with land immediately before you received this notice.
4. If you know of any other person proposing to do any of those things mentioned in paragraph 3.
5. Any other matters of which you are aware which will help VicRoads to work out what compensation you should receive for the land. (This information may include details of any mortgage, lease or other arrangement affecting the land. If you claim financial loss, please provide financial documents and other records to substantiate all losses. All documents provided will be held in confidence.)

For and on behalf of VicRoads

Date: 27 June 2008



**G051202C**

27/06/2008 \$51.10 LACA







# Application to record an instrument

Section 45 Melbourne Strategic Assessment (Environment Mitigation Levy) Act 2020

## Privacy Collection Statement

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# AT390567C

Lodged by

Name:



Address:

8 NICHOLSON ST, EAST MELBOURNE 3002

Reference:

Customer code: 237655

The Secretary of the Department of Environment, Land, Water and Planning applies for the recording of a notification in the Register that an environmental mitigation levy may be payable.

Land: (volume and folio)

SEE ATTACHMENT

Applicant: (full name and address, including postcode)

SECRETARY, DEPARTMENT OF ENVIRONMENT, LAND, WATER AND PLANNING  
8 NICHOLSON ST, EAST MELBOURNE 3002

Signing:

Executed on behalf of



SECRETARY, DEPARTMENT OF ENVIRONMENT, LAND, WATER AND PLANNING

Signer Name



TH, DIRECTOR, REGULATORY STRATEGY AND DESIGN,

Signature

DEPARTMENT OF ENVIRONMENT, LAND, WATER AND PLANNING  
NOTIFICATION DATED 2 JULY 2020



35271702A

MSA1

Page 1 of 1

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Land Use Victoria contact details: [www.delwp.vic.gov.au/property](http://www.delwp.vic.gov.au/property)>Contact us

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645/920	11862/859	11917/665	11949/057	11982/729	12004/471	12037/476
2232/231	11862/871	11917/678	11949/078	11982/732	12005/071	12037/481
2468/575	11862/872	11917/698	11949/080	11982/764	12005/078	12037/482
2551/057	11864/711	11917/717	11949/211	11982/933	12005/411	12039/048
3465/824	11864/723	11917/726	11949/212	11982/987	12005/415	12039/050
4019/684	11864/727	11918/477	11949/217	11984/388	12006/655	12039/056
5823/592	11864/748	11918/473	11949/225	11984/390	12006/657	12039/058
6229/723	11866/743	11918/490	11949/22E	11984/401	12006/667	12039/061
6588/416	11866/753	11918/494	11949/232	11984/406	12006/670	12039/064
8072/405	11866/774	11918/499	11949/235	11984/408	12007/332	12039/074
8075/235	11866/906	11918/504	11949/230	11984/421	12007/333	12039/076
8153/441	11868/105	11918/517	11949/242	11984/428	12010/470	12039/338
8154/334	11868/106	11920/063	11949/249	11984/434	12010/479	12039/353
8235/066	11869/393	11920/263	11949/256	11984/451	12010/484	12039/377
8260/388	11869/913	11920/265	11949/269	11984/452	12010/487	12039/384
8289/600	11869/921	11920/291	11949/278	11984/453	12010/502	12039/388
8319/753	11869/939	11920/366	11949/282	11984/456	12010/713	12039/389
8338/001	11869/900	11920/473	11949/284	11984/459	12010/714	12039/390
8353/923	11869/901	11920/470	11949/285	11984/462	12010/715	12039/394
8372/793	11869/964	11920/483	11949/305	11984/465	12010/717	12039/403
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8452/913	11870/544	11922/665	11949/792	11985/258	12010/754	12039/439
8452/931	11870/545	11922/707	11950/057	11985/282	12011/424	12039/440
8459/281	11870/546	11922/710	11950/067	11985/297	12011/433	12039/441
8478/729	11870/673	11922/713	11950/075	11985/660	12011/451	12039/442
8485/438	11870/577	11922/716	11950/093	11986/665	12011/452	12039/443
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8485/538	11871/734	11922/726	11952/954	11987/026	12015/196	12039/494
8485/540	11871/749	11922/732	11952/980	11989/481	12015/199	12039/512
8485/546	11872/336	11922/741	11952/992	11989/509	12017/378	12039/517
8485/547	11872/341	11923/139	11952/995	11989/603	12017/379	12040/279
8485/551	11872/343	11923/164	11952/998	11989/746	12017/388	12040/290
8485/556	11872/353	11923/177	11953/006	11989/754	12017/476	12040/294
8506/147	11872/355	11923/183	11953/007	11989/755	12017/492	12040/299
8520/173	11874/131	11923/222	11953/199	11989/765	12017/496	12040/336
8521/749	11874/404	11923/229	11953/207	11989/770	12018/822	12040/543
8521/758	11874/423	11923/232	11953/225	11989/910	12018/823	12040/553
8521/760	11874/424	11923/236	11953/378	11989/924	12018/836	12040/562
8521/775	11874/426	11923/245	11953/383	11989/925	12018/839	12040/612
8521/779	11874/434	11923/247	11954/900	11989/927	12018/841	12040/622
8521/784	11874/544	11923/250	11954/911	11989/946	12018/843	12040/632

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8539/185	11877/002	11924/784	11954/956	11990/042	12018/938	12041/153
8540/602	11877/011	11924/788	11954/957	11990/048	12019/337	12041/154
8540/873	11877/014	11924/789	11954/959	11990/050	12019/338	12041/169
8546/308	11877/015	11924/922	11956/390	11990/052	12019/343	12043/041
8549/657	11877/019	11924/935	11956/425	11990/079	12019/563	12043/047
8549/658	11877/020	11924/946	11956/740	11990/099	12019/570	12043/054
8556/276	11877/025	11925/763	11957/060	11990/103	12019/727	12043/057
8559/102	11877/030	11925/771	11957/071	11990/249	12022/011	12043/065
8570/012	11877/037	11925/774	11957/077	11990/253	12022/015	12046/735
8576/175	11881/426	11925/794	11957/081	11990/623	12022/024	12046/738
8603/842	11881/427	11926/015	11957/092	11990/644	12022/026	12046/742
8616/406	11881/428	11926/167	11957/097	11990/660	12022/028	12046/750
8634/882	11882/894	11926/168	11957/107	11990/662	12022/032	12046/753
8638/791	11882/897	11926/191	11957/108	11990/680	12022/033	12046/758
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8659/092	11884/375	11926/293	11959/861	11990/751	12022/428	12047/889
8673/041	11884/378	11926/304	11959/880	11990/752	12022/443	12047/896
8681/746	11884/460	11926/305	11961/257	11990/759	12022/461	12047/898
8683/583	11884/486	11926/310	11961/484	11990/763	12022/469	12047/924
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8835/307	11885/296	11928/638	11968/861	11992/123	12023/364	12051/170
8842/134	11885/5E2	11928/862	11968/863	11992/144	12023/368	12051/174
8844/913	11885/5E6	11929/575	11968/87E	11992/148	12023/369	12051/184
8851/930	11885/5E9	11930/074	11968/881	11992/152	12023/377	12051/382
8854/242	11885/732	11932/345	11968/88E	11992/164	12025/355	12051/386
8866/898	11885/738	11932/350	11972/174	11992/293	12026/362	12052/223
8874/267	11885/755	11932/375	11972/175	11992/294	12026/369	12052/232
8879/008	11885/756	11933/408	11972/178	11992/300	12026/377	12052/236
8885/394	11887/040	11933/421	11972/861	11992/309	12026/392	12052/249
8889/658	11887/044	11933/422	11975/393	11992/312	12026/393	12053/398
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8900/297	11887/100	11935/645	11977/238	11992/596	12026/972	12053/583
8900/318	11887/110	11935/667	11977/240	11992/599	12026/975	12053/585
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8954/148	11887/548	11937/388	11978/083	11992/672	12031/629	12058/533
8955/075	11887/553	11937/396	11978/100	11992/678	12031/649	12058/543
8952/218	11887/6E1	11937/411	11978/10E	11992/688	12033/147	12058/554
8967/405	11887/671	11939/043	11978/951	11992/692	12033/152	12058/591
8978/928	11887/673	11939/069	11978/960	11992/693	12034/287	12058/598
8989/801	11889/071	11939/070	11978/961	11993/276	12034/745	12058/600
8989/868	11889/072	11939/072	11978/962	11993/573	12034/813	12058/601
8995/335	11889/073	11939/076	11978/975	11993/578	12034/817	12058/608
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9023/630	11889/094	11944/136	11979/163	11993/589	12034/824	12059/996
9042/237	11889/941	11944/140	11979/314	11993/596	12034/831	12060/000
9050/021	11889/950	11944/140	11979/317	11993/905	12034/838	12060/004
9056/065	11889/964	11944/153	11979/319	11993/921	12034/842	12060/018
9060/518	11889/989	11944/167	11979/323	11993/924	12034/844	12060/019
9060/561	11890/120	11944/168	11979/329	11993/925	12036/718	12060/025
9070/708	11890/136	11944/197	11979/333	11993/929	12036/720	12060/031
9070/723	11890/232	11944/237	11979/339	11993/930	12036/737	12060/042
9077/350	11890/235	11944/341	11979/421	11994/082	12036/739	12060/044
9080/872	11890/325	11944/360	11979/42E	11994/085	12036/744	12060/051
9096/302	11890/327	11944/362	11979/440	11994/090	12036/745	12060/054
9105/145	11892/703	11944/369	11979/443	11994/099	12036/751	12060/056
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9121/202	11899/055	11945/075	11979/569	11995/435	12036/874	12060/185
9135/417	11899/0E3	11945/086	11979/677	11995/977	12036/875	12060/187
9148/765	11899/072	11945/534	11979/68E	11995/979	12036/879	12060/193
9181/676	11899/075	11945/548	11979/688	11995/983	12036/886	12060/206
9181/804	11902/433	11945/549	11979/696	11995/989	12036/954	12060/348
9183/748	11902/446	11945/562	11980/429	11996/004	12036/955	12060/696
9193/778	11903/802	11945/566	11980/430	11996/006	12036/957	12060/711
9208/990	11903/806	11945/567	11980/442	11996/009	12036/961	12060/716
9231/022	11904/003	11945/574	11980/446	11996/010	12036/967	12060/717
9271/947	11907/687	11945/577	11980/450	11996/014	12036/968	12060/720
9290/872	11907/690	11945/579	11980/463	11999/408	12036/969	12061/451
9297/224	11910/763	11945/725	11981/490	12000/304	12036/976	12064/402
9307/840	11910/767	11945/731	11981/494	12000/311	12036/981	12064/403
9310/308	11910/768	11947/667	11981/527	12000/318	12036/988	12064/407

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9312/072	11910/773	11947/669	11982/052	12000/327	12037/017	12064/610
9332/088	11910/774	11947/675	11982/420	12000/329	12037/020	12064/878
9341/958	11910/777	11947/681	11982/423	12000/330	12037/032	12064/887
10044/151	11910/792	11947/687	11982/434	12004/031	12037/034	12064/889
11860/183	11910/798	11947/696	11982/686	12004/032	12037/437	12064/893
11860/189	11914/098	11948/999	11982/688	12004/445	12037/452	12064/904
11860/580	11914/185	11949/000	11982/705	12004/458	12037/454	12064/908
11860/602	11917/654	11949/003	11982/707	12004/461	12037/466	

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8889.ESR.02

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13 December 2024

**Growth Areas Planning**  
**Cardinia Shire Council**  
**Attention: Karen Egan – Lead Principal Growth Area Planner**  
**Via: Email [K.Egan@cardinia.vic.gov.au](mailto:K.Egan@cardinia.vic.gov.au) [mail@cardinia.vic.gov.au](mailto:mail@cardinia.vic.gov.au)**

Dear Karen,

**Re- Request to amend Planning Application – Section 50 of the Act**  
**92 Enterprise Road, Pakenham**  
**Planning Application: T240250 (Subdivision)**

KLM Spatial continues to act on behalf of the applicant, ESR Investment Management 1 (Australia) Pty Ltd, in regard to lodgment of a s.50 application to amend.

Broadly, the application is amended to include an interim outlet for the temporary retarding basin to Toomuc Creek, and to allow for the option of battering along the southern boundary of Lot A into the adjacent gas easement. The application is amended to include these adjoining land parcels. The overriding purpose of the works is to facilitate the construction phase of the ESR development within the Cardinia Road Employment Precinct and State Significant Industrial Precinct. The Proposed Plan of Subdivision is amended to support these changes.

A temporary retarding basin forms part of earthworks permit application T230644. Melbourne Water has issued conditional approval for that permit application and the associated Site Environment Management Plan. DEECA has likewise approved the Environmental Management Plan for the Growling Grass Frog. The earthworks application awaits issue of a planning permit.

A future road is proposed along the southern boundary of Lot A. The level of the road has been subject of detailed discussion to limit the height differential between the road and the adjacent gas easement to provide for appropriate integration and surveillance of the future public land. The submitted plans provide for a retaining wall along the easement should battering into the easement not be permitted by the adjacent land owner at the time of construction. It is requested that plans showing battering into the easement be required by way of a permit condition prior to construction of the road.

The amendments reflect ongoing discussions with Council and the outcomes of the meeting held on 29<sup>th</sup> November 2024, attended by [REDACTED]

The following documents are provided for Council's consideration: [REDACTED]

1. Completed S.50 Application to Amend form
2. Copy of Title Vol.06588 Fol.416 (Council Reserve)
3. Copy of Title Vol.11764 Fol.971 (Crown Land)
4. Copy of Title Vol.11761 Fol.427 (Crown land)
5. Copy of Title Vol. 12556 Fol. 021 (Mcmullin Commercial P/L)
6. Proposed Plan of Subdivision Ref 8889.ESR PP15 V3, 1/11/2024, KLM Spatial
7. Toomuc Creek Outlet, Detail Plan, Dwg 22084.2DP01 Rev B, Sheet 1-3, 13/12/24, DCE.



8. Cultural Heritage Management Plan No 19535, Approved, Rev E, Ref 19535, prepared by Tardis, 14/8/2024;
9. Biodiversity Assessment (Toomuc Creek), Ref 18506, prepared by Ecology and Heritage Partners, 17/10/2024;
10. Environmental Management Plan for Stage 2, 92 Enterprise Road, Rev V3, Ref 16811, prepared by Ecology and Heritage Partners, 17/10/24;
11. EMP Endorsement Letter, prepared by DEECA, 23/10/24;
12. Site Environment Management Plan - Drainage Outfall Works, 92 Enterprise Road, Winslow Constructors, 1/11/2024.
13. Civil Drawings Gas Easement Works, 92 Enterprise Road, Ref 22084.2SE Rev H,
  - Gas Easement Work Locality Plan & Typical section, Sheets D01 D02,
  - Gas Easement Works Layout Plan, Sheet SELP01 P01,
  - Gas Easement Works Detail Plan, Sheets SEDP01, P02,
  - Gas Easement Works Interface Cross Sections, Sheets SECS01 – SECS05
14. Email advice, [REDACTED] Senior Project Development Engineer, APA Transmission, 13/5/24

The S.50 application for the proposed works activates the following permit triggers:

- Pursuant to Clause 37.07 Schedule 2 of the UGZ, Section 2.5, a permit is required for works in Employment land.
- Pursuant to Clause 37.01-4 a permit is required to carry out works in the Special Use Zone,
- Pursuant Clause 36.03-2 a permit is required for works in the Public Conservation & Resource Zone, and
- Pursuant to Clause 44.03 a permit is required for works in the Floodway Overlay.

### Subject Site and Surrounds

The proposed drainage works are generally located to the southeast of 92 Enterprise Road, extending from the proposed temporary retarding basin in that property, across Reserve 1 LP 98925, with the eastern extent of the pipe and outlet extending into the Crown land (CA 2016 and CA 2007) to discharge to Toomuc Creek.

We note that the eastern boundary of Reserve 1 is defined by Toomuc Creek rather than a 'set on-ground' title boundary. Thus, as Toomuc Creek appears to have moved eastwards over time, the boundary of Reserve 1 shown below in LASSI, does not accurately show the eastern boundary of the Reserve.



Figure 1: Property Boundaries and indicative location of outlet works

Source: LASSI 6/11/24

The area of the proposed drainage pipe within 92 Enterprise Road is cleared pasture. A post and wire fence separates the development site from the reserve. The reserve contains weed species and minimal native vegetation, as described in the accompanying Biodiversity Assessment. The approximate location of the works is shown above.

The current application makes allowance for the option of battering from the southern property boundary into the adjacent gas easement at the time of road construction along the southern boundary. The adjacent land forms part of Lot A PS 905613T under the ownership of McMullin Commercial Pty Ltd. At the time of the road construction the gas easement land may be in Council ownership as provided for in the subdivision permit issued for that land. The land in the gas easement is currently cleared pasture.

All affected landowners have been notified of this s.50 application to amend the current permit application.

### PART A - PROPOSAL – DRAINAGE WORKS

The drainage works connecting from the proposed temporary retarding basin to Toomuc Creek comprise:

- A 1.75m x 1.75m submerged offtake pit for the drainage pipe within the temporary retarding basin,
- Two (2) x 4500mm diameter pipes to the outfall,
- Pipe outlets and end wall with rock beaching to suit batter (refer image on following page), and
- Safety barrier installed to limit access located above the end wall.



Figure 2: Toomuc Creek Outlet, Detail Plan, Dwg 22084.2DP01 Rev A

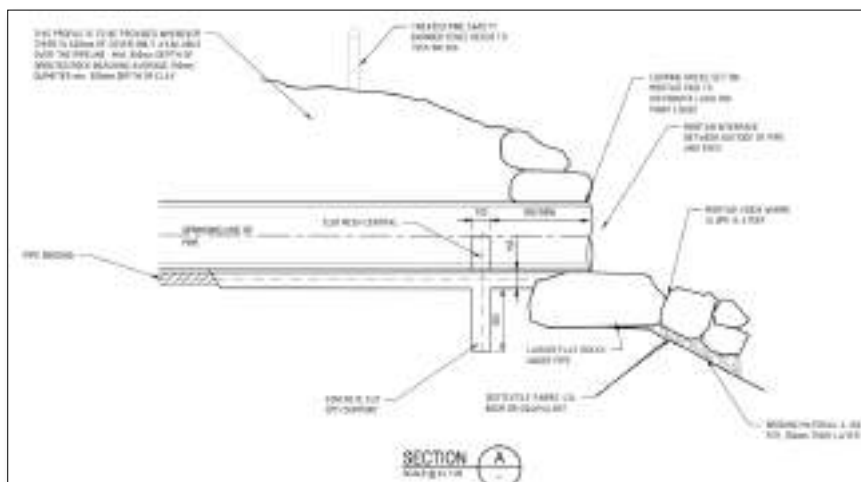


Figure 3: Pipe End Wall Detail from Dwg 22084.2DP01 Rev A

## Site Environment Management Plan

A Site Environment Management Plan is submitted with the application which aims to protect the Toomuc Creek environs during the works phase and includes:

- Construction fencing on either side of the pipe alignment providing adequate area for trenching and construction activities,
- Silt fencing along the works boundary and Toomuc Creek interface,
- No-go fencing including fencing to be adjusted when undertaking the outlet works, and
- Location of temporary stockpiles during trench excavation.

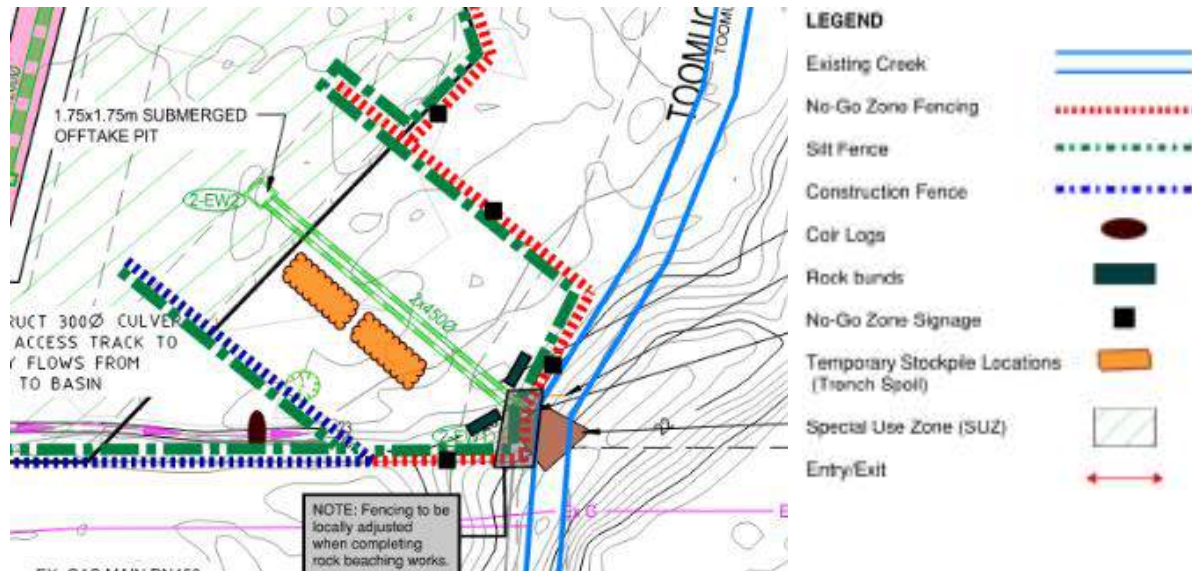


Figure 4: From SEMP – Drainage Outfall Works, Winslow Constructors, 6/11/24

## Cultural Heritage Management Plan

The eastern-most portion of 92 Enterprise Road and adjacent land to the south is affected by an area of Cultural Heritage Sensitivity. A Cultural Heritage Management Plan was completed as part of CREP in 2012, by Murphy and Morris. There were no recommendations for further investigation or salvage within this area.

Cultural Heritage Management Plan No 19535, sponsored by the applicant, was approved on 14/8/2024 for drainage infrastructure and earthworks for the area east of 92 Enterprise Road. The Activity Area aligns with the area of the current application including the outfall to Toomuc Creek.

The Activity Description allows for the works proposed under the current application. The Activity Description includes:

- Pipes
- Sediment basins
- Retention ponds
- Wetlands

The Complex Assessment included the investigation of twelve 1m by 1m test pits but no cultural heritage was found. The report concluded that there are *no areas within the activity area that are considered likely to contain Aboriginal cultural heritage*, and accordingly no salvage or further investigations are required.

The CHMP includes conditions requiring a cultural heritage induction of construction staff prior to commencement and relevant contingency arrangements should cultural heritage items be found during works.



## Biodiversity Assessment

The Biodiversity Assessment prepared by EHP investigated the full extent of land between 92 Enterprise Road and Toomuc Creek. Large areas of noxious weeds were identified along with several small highly modified patches of Swampy Riparian Woodland.

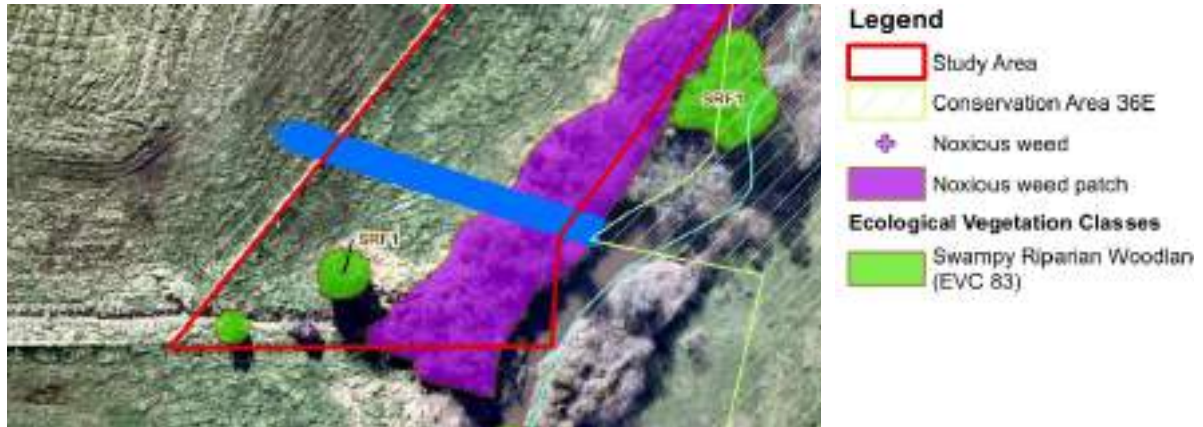


Figure 5: From Figure 2 Ecological Features, Biodiversity Assessment (Toomuc Creek), 17/10/24, EHP.

A small area of Swamp Riparian vegetation (SRF1) was identified in the vicinity of the proposed works which comprised a fallen Silver Wattle. Whilst the fallen tree is located adjacent to proposed Construction Fencing, it will be left in situ and there is no reason to occasion its removal. The Biodiversity Assessment indicates at section 4.2 that there are no impacts to native vegetation and accordingly no offset payments are required.

## Growling Grass Frog Environmental Management Plan

An Environmental Management Plan for the protection and enhancement of Growling Grass Frog habitat has been prepared which addresses the temporary retardation basin and the proposed drainage outfall to Toomuc Creek. The EMP was prepared in consultation with James Walshe of the DEECA, and recent email advice of 23/10/24 indicates the EMP is considered satisfactory by the authority. The document responds to Clause 4.4 of Schedule 2 of the Urban Growth Zone. A copy of the GGFEMP and email advice is submitted.

The GGFEMP indicates in section 3.3.2 p21 that a works specific *Construction Environmental Management Plan (CEMP)* must be prepared and implemented for works within the Toomuc Creek corridor.

Whilst the general location for protective fencing for the outfall is shown in the GGFEMP at Figure 2b, this is developed in further detail as part of the SEMP submitted for the drainage outlet as part of this application.

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## Cardinia Planning Scheme

The entirety of the drainage works is within the State Significant Industrial Precinct whilst 92 Enterprise Road is located within the Urban Growth Zone (CREP) and the adjoining creek reserve is a Public Conservation and Resource Zone.

### 92 Enterprise Road

Pursuant to the Cardinia Planning Scheme the following planning controls apply to the subject site:

- Clause 37.01 Special Use Zone, Schedule 4

Pursuant to Clause 37.01-4 a permit is required to carry out works.

Schedule 4 of the Zone provides for the transition of the land to urban use in accordance with the Cardinia Road Employment Precinct Structure Plan (CREP). Under CREP the subject land is within the Special Use Zone and is set aside for drainage purposes. Schedule 4 stipulates the following condition requirements apply to works applications:

- A Construction Environment Management Plan must be provided for works within 50 metres of native vegetation to be retained and/or within 200 metres of any creek or waterbody, and/or
- Appropriate requirements for the management of Growling Grass Frog habitat, which is further outlined in the subsequent the Cardinia Road Employment Precinct, Conservation Management Plan for Growling Grass Frog (CREPCMPGGF).

In response to these two requirements the application is accompanied by:

- An Environmental Management Plan October 2024 prepared by EHP which provides for GGF habitat enhancements and includes the drainage connection, and
- A Site Environment Management Plan for the Drainage Outfall Works, as previously described.

It is considered the application suitably addresses the provisions of CREP by providing drainage infrastructure within an area specifically set aside for drainage. The temporary drainage outlet to Toomuc Creek was not envisaged by CREP but is considered acceptable by MW at the current time and will facilitate a drainage outcome for a large scale industrial subdivision, implementing the overall intent of CREP and the SSIP, whilst giving due consideration to environmental management and protection.

### Reserve No 1 and Crown Land

Pursuant to the Cardinia Planning Scheme, the following planning controls apply to this land as indicated in the Planning Scheme map below:

- Clause 36.03 Public Conservation and Resource Zone (PCRZ)
- Clause 44.03 Floodway Overlay

The following permit triggers apply:

- Pursuant Clause 36.03-2 a permit is required for works in the PCRZ.
- Pursuant to Clause 44.03 a permit is required for works in the Floodway Overlay.

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Figure 6: From Cardinia Planning Scheme, approximate location of works indicated Source: Vicmap

The purpose of the PCRZ includes:

- To implement the Municipal Planning Strategy and the Planning Policy Framework.
- To protect and conserve the natural environment and natural processes for their historic, scientific, landscape, habitat or cultural values.

The relevant purpose of the Floodway Overlay includes:

- To protect water quality and waterways as natural resources by managing urban stormwater, protecting water supply catchment areas, and managing saline discharges to minimise the risks to the environmental quality of water and groundwater.
- To ensure that development maintains or improves river and wetland health, waterway protection and flood plain health.

Clause 44.03-4 specifies that a Flood Risk Report must be submitted to the satisfaction of the responsible authority. It is considered that the hydraulic modelling and stormwater management plan submitted as part of the overall development and approved by Melbourne Water appropriately addresses this requirement.

Having regard to both the PCRZ and Floodway Overlay, the Biodiversity Assessment indicates that much of the area of the application is occupied by noxious weeds and no native vegetation will be impacted by the proposal.

The proposed drainage infrastructure and the associated temporary retarding basin have been subject of detailed consideration by DEECA and Melbourne Water, the floodplain manager. Hydraulic modelling underpins a Stormwater Management Plan for the earthworks and subdivision applications, and the current drainage outlet and temporary retardation basin implements the SWMP.

Environmental considerations are addressed in substantial detail in the GGFEMP (approved by DEECA), the temporary retardation basin SEMP (approved by MW and Council) and the submitted SEMP for the current outlet works. Accordingly, it is considered that the proposed works will appropriate respond to and continue to manage appropriate outcomes for the health of Toomuc Creek and its environs.

More broadly, the construction of the proposed drainage infrastructure will implement the broader intent of the Planning Policy Framework to encourage economic development of a State Significant Industrial Precinct and implement the intent of the CREP, by providing an appropriate drainage solution during the construction phase and prior to the approval of a revised DSS. Significantly, Melbourne Water is in agreement with providing this interim outfall to Toomuc Creek.

## PART B - PROPOSAL – FILLING GAS EASEMENT

The application is amended to include land within the gas easement adjacent to the southern road to allow for the option of battering into easement at the time of road construction.

Following consultation with Council, a cross section of the future road is provided as part of the submitted plans. The height of the road has been reduced by remodeling of the drainage solution, including the provision of storage within Lot 3 and Lot 4, and drainage to the south. This provides a subsequent reduction of the future retaining wall and/or batter height to the south of the road in line with Council's comments. We note that the difference in levels between the road and gas easement diminishes along the length of the proposed road in an easterly direction down to natural grade.

Whilst the submitted plans do not show a batter into the gas easement, a 1 in 6 batter could be easily achieved given the retaining wall height is typically no greater than 1.4 metres.

Email advice from APA Transmission dated 13/5/24 (attached) indicates that the authority could accept a better in the easement provided that it does not create a water channel and or erode cover. The authority recommends a batter of no more than 1 in 6 on the basis that cover over the pipeline does not exceed 2 metres.

It is proposed that any permit to issue contain a condition with the following intent, requiring either:

- Construction of a batter with a grade no greater than 1 in 6, from the southern property boundary adjacent to the proposed road into the gas easement, pending the provision of written permission from the owner of the gas easement land, or
- Construction of a retaining wall along the southern boundary adjacent to the proposed road generally in accordance with the plans provided in this submission including a pedestrian access point to the shared user path within the easement.

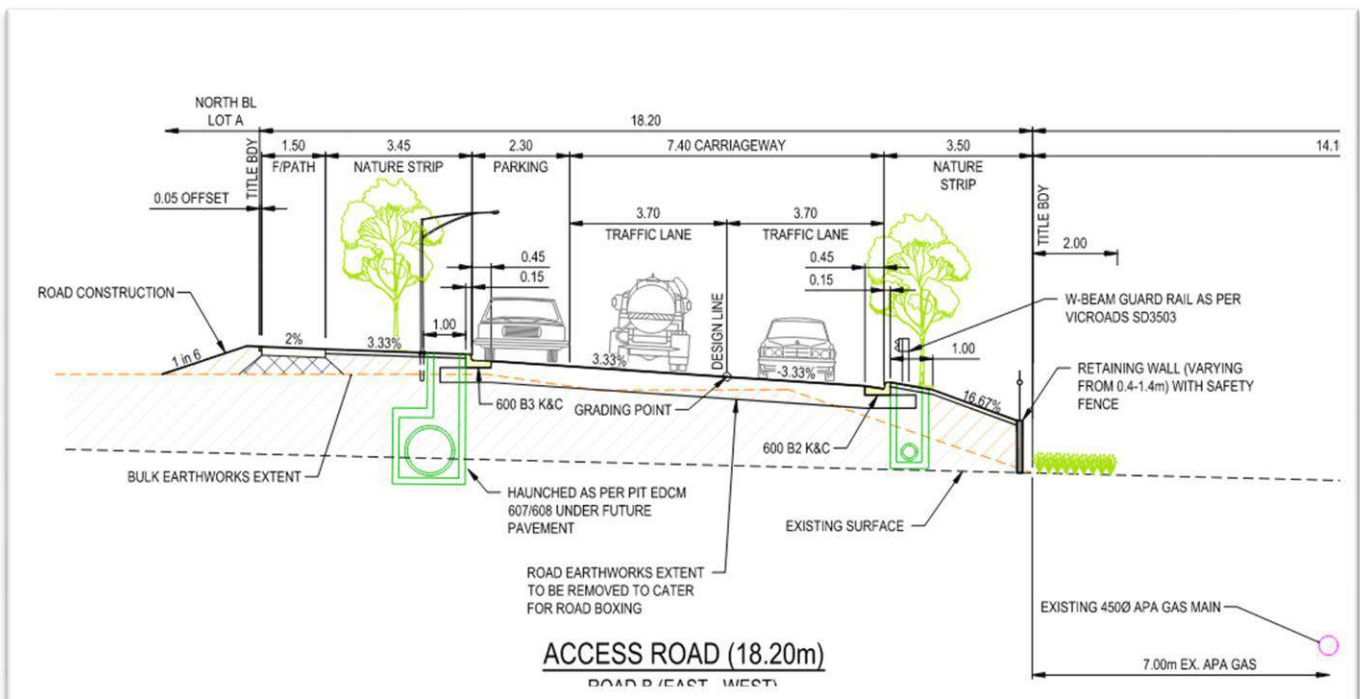


Figure 7: From Civil Drawings, Gas easement Works, Ref 22084.2SETD01 Rev H

The retaining wall and/or battering works are within the Urban Growth Zone and a permit is required for works under section 2.5 of the Schedule to the Urban Growth Zone.

The CREP Open Space Planning and Design Guidelines include the following:

- *A road reserve is to be provided.... adjacent and parallel to all open space corridors and waterways*
- *Streetscape planting and paths are to be completed and integrated with the design of adjoining open space areas.*

It is considered the proposal road alignment adjacent to the gas easement is generally in accordance with the PSP, and the cross section (either with or without retaining walls) provides for appropriate integration of the road with the encumbered open space, and will ensure a suitable level of passive surveillance and landscaping opportunities.

## **PART C – PROPOSED PLAN OF SUBDIVISION**

The Proposed Plan of Subdivision is amended as follows:

- Renaming of the Drainage Reserve as Lot B, such that the temporary retarding basin is retained within private ownership until the asset is either removed or modified to accord with the future Melbourne Water DSS as provided for in an associated s.173 agreement,
- Provision of a single stage subdivision with the construction and vesting of the proposed southern road to be subject of a s.173 agreement, and
- Removal of the indicative Melbourne Water access track as the location will be determined as part of the future DSS.

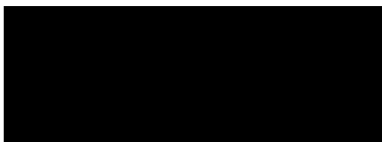
## **Conclusion**

It is submitted that the proposed interim outfall to Toomuc Creek is an integral component of the temporary retarding basin which will provide for appropriate drainage solution for the eastern portion of the 92 Enterprise Road, and in doing so facilitate its further development for large scale industrial purposes. The opportunity for battering or a retaining wall adjacent to the southern road, at the time of its construction, will provide for suitable integration and surveillance of the gas easement as discussed and agreed with Council. All proposed works and amendments to the Proposed Plan of Subdivision accord with the overriding intent of the SSIP and CREP to encourage the economic development of the employment precinct.

We trust the above is acceptable to Council and look forward to hearing from you in due course.

If you have any queries regarding the above, please contact the undersigned on 9794 1600 or via email at [manager@klms.com.au](mailto:manager@klms.com.au)

Yours sincerely,



**KLM Spatial**

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**From:** [REDACTED]  
**Sent:** Monday, 13 May 2024 7:37 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** APA 500385- 92 Enterprise Rd, Pakenham ESR 42569

Hi [REDACTED]

Pls see response below.

APA could accept additional spoil/batter over the gas pipeline easement on the basis it does not create a water channel to potentially erode cover.

A maximum 1:6 batter and no more than an additional 1m of cover over the pipeline on the basis final cover over the pipeline does not exceed 2m is acceptable.

In this case we will need APA supervision to check existing cover and measure final cover such that it's not more than 2m.

The additional cover must be clean spoil and free of rock.

Pls confirm above and let us know when the works will be done.

We will need a valid APA permit for any works within APA easement.



Kind Regards

[REDACTED] MIEAust,NER Prof Engr  
Senior Project Development Engineer  
APA Transmission

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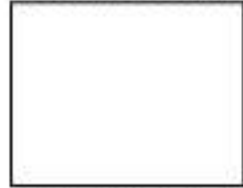
**From:** [REDACTED]  
**Sent:** Friday, May 3, 2024 9:16 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** [EXT]: RE: [#22084-92 Enterprise Rd, Pakenham] APA 500385- 92 Enterprise Rd, Pakenham

Hi [REDACTED]

Just following up on the below? Could you please provide advise if APA would allow battering into the gas easement

Thanks

Project Director  
Associate Director



**DALTON CONSULTING ENGINEERS PTY LTD**

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wurundjeri . wadawurrung . turrbal

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From: [Redacted]

Sent: Wednesday, April 17, 2024 11:25 AM

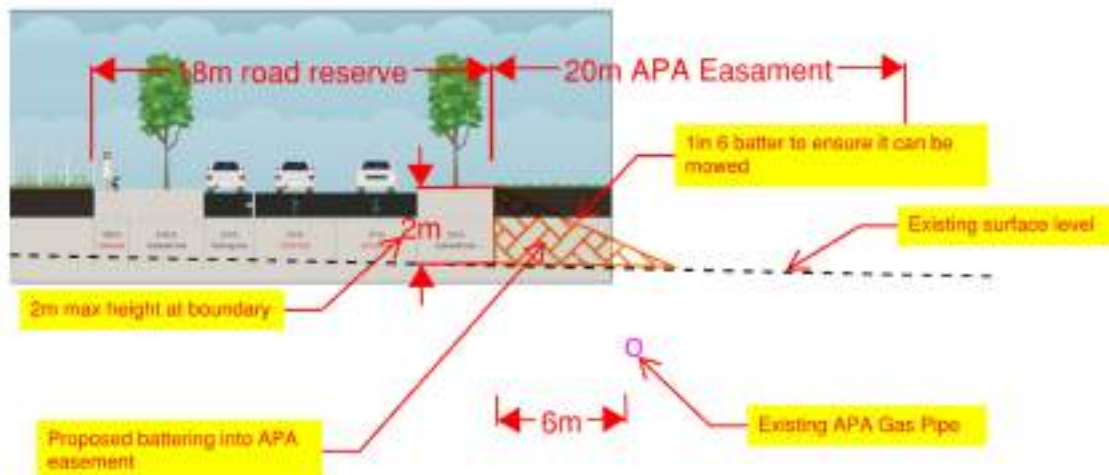
To: [Redacted]  
Cc: [Redacted]  
<[Redacted]>

Subject: [#22084-92 Enterprise Rd, Pakenham] APA 500385- 92 Enterprise Rd, Pakenham

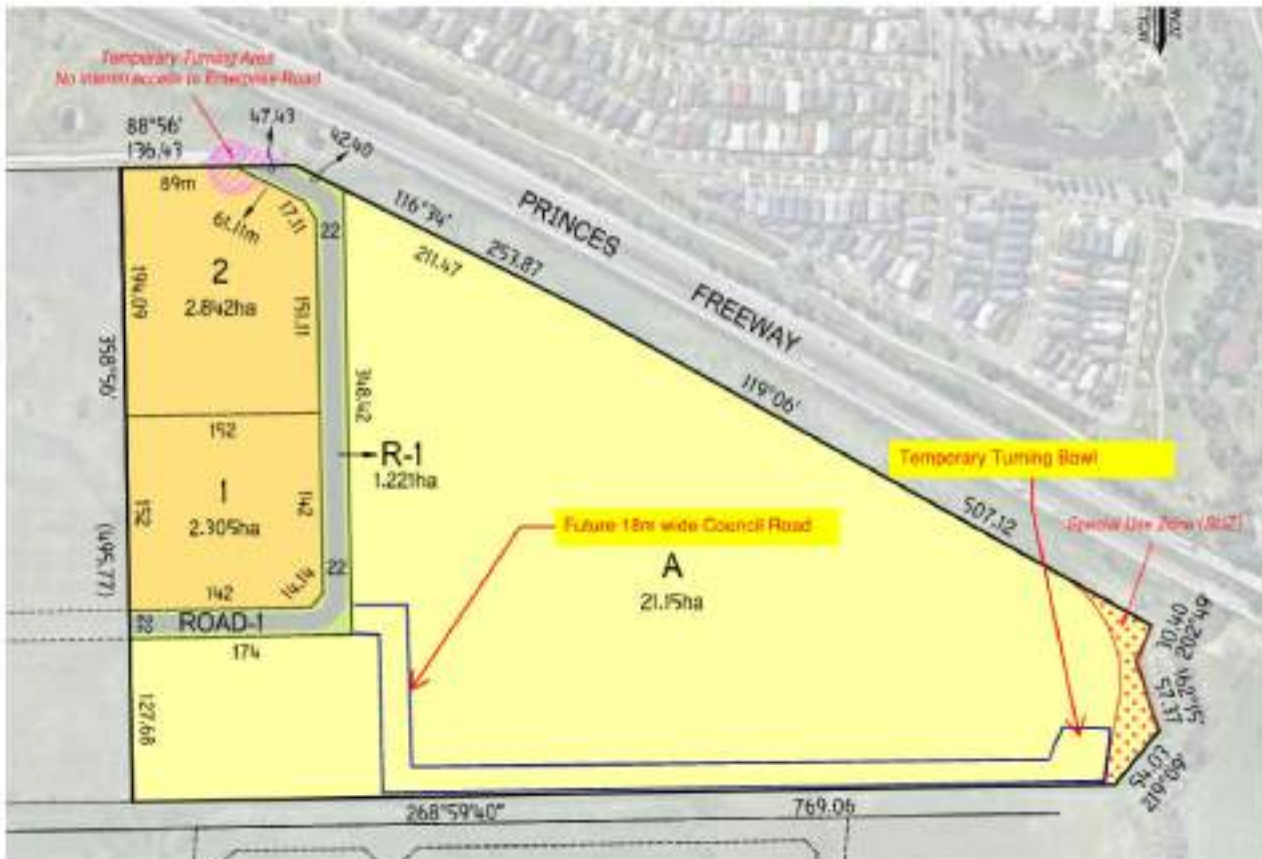
H [Redacted]

As part of the development works at 92 Enterprise Rd, Pakenham we are now master planning our Stage 2 works. As part of the works, there may be a provision for a new Council Rd which will run parallel to the Gas main reserve (not within the reserve as part of our works). Due to the site being relatively flat, the road will need to be constructed above existing surface level which may result in some earth battering over the gas easement.

Below is a very high level sketch. Could APA please provide some guidance on any filling over the area and what may or may not be accepted? We will then use these limits as part of our design works. Hypothetically could we have 2m off fill at the edge of the easement however this would batter down at 1 in 6 with only 500mm fill over the gas pipe itself?

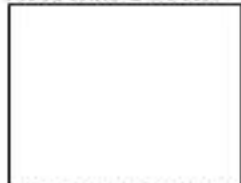






Thanks in advance

Project Director  
Associate Director



**DALTON CONSULTING ENGINEERS PTY LTD**

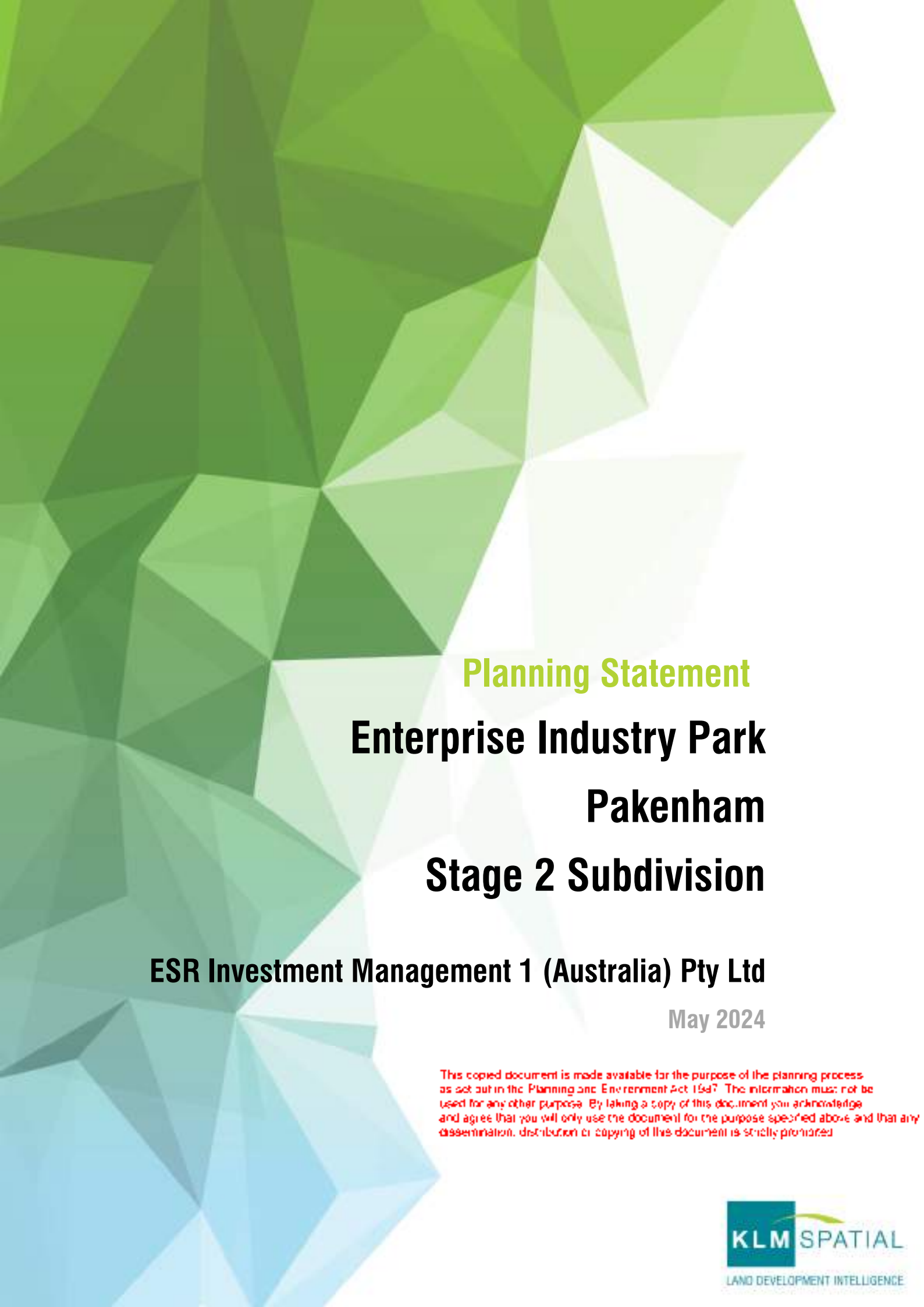
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**Planning Statement**  
**Enterprise Industry Park**  
**Pakenham**  
**Stage 2 Subdivision**

**ESR Investment Management 1 (Australia) Pty Ltd**

May 2024

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# Enterprise Industry Park

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### Document Control

Date Prepared	Version Number	Author	Reviewer	Distributed
30 May 2024	Draft			Client
31 May 2024	Final			Client, Council

## Executive Summary

KLM Spatial acts on behalf of ESR Investment Management 1 (Australia) Pty Ltd in submitting this application for a planning permit for the second stage of subdivision for Enterprise Industry Park at 92 Enterprise Road, Pakenham. The applicant is currently delivering key road infrastructure items which will enable ongoing investment across the precinct.

This subdivision will deliver two lots for future warehouse distribution centres, and a 12.4-hectare parcel. This larger lot is under contract of sale to an Australian owned company for the development a substantial warehouse/office/display and servicing facility. A separate Economic Analysis will outline the direct and multiplier benefits of establishing this large format subdivision design for both the Cardinia Road precinct and the municipality.

The subdivision will enable substantial investment within the State Significant Industrial Precinct (SSIP) and achieve key elements of the Vision for the Cardinia Road Employment Precinct Structure Plan (PSP), by contributing to the establishment of a regional economic hub and stimulating local employment and business activity.

The overriding benefits of the proposal are sufficient to warrant a variation of the road layout proposed in the PSP. The large lot sizes render a road adjacent to the freeway as unnecessary. A road connection is proposed to the estate to the south on development of the large employment facility.

The Stage 2 subdivision is within the eastern catchment of the site draining towards Toomuc Creek. A Stormwater Management Plan for this stage was submitted to Melbourne Water for review in late 2023 with comments pending from the authority.

### Subject Site

92 Enterprise Road, Pakenham - Lot 1 TP99673 (Volume 09622 Folio 089).

### Proposal

Subdivision of land, removal of a dam, creation of easement and associated works

### Planning Controls

Pursuant to the Cardinia Planning Scheme, the following planning controls apply to the subject site:

#### Zone

Urban Growth Zone, Schedule 2

Special Use Zone, Schedule 4

#### Overlays

Development Contributions Plan Overlay, Schedule 3

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### Permit Triggers

A planning permit is required under the following provisions of the Cardinia Planning Scheme:

- Pursuant to Clause 37.01-3 a permit is required to subdivide land.
- Pursuant to 37.01-4 and Clause 2.3 of Schedule 2 a permit is required to remove a dam.
- Pursuant to Clause 37.07-10 a permit is required to subdivide land.
- Pursuant to Clause 52.02 a permit is required to create an easement.

### Cultural Heritage

A Cultural Heritage Management Plan was approved for this site, including the Special Use Zone area as part of the Cardinia Road Employment PSP process.

A separate Cultural Heritage Management Plan is currently under preparation to facilitate drainage works within the adjacent Toomuc Creek Reserve. Site investigations are complete, and no items of cultural heritage have been identified.

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## Key Planning Considerations

The proposed subdivision will complete the substantial ESR industrial estate in the Cardinia Road precinct. The subdivision will enable large scale investment and employment opportunities. It is considered the proposal is generally in accordance with the Cardinia Road Employment Precinct Structure Plan (PSP) with the applicant delivering key road infrastructure in the vicinity.

The applicant seeks to highlight several key considerations associated with the development:

- **Employment generation** – The subdivision seeks to create two large lots for warehouse distribution centres and create a 12.4-hectare parcel for a substantial facility for a large Victorian company. The employment generation by all three lots is substantial and will have multiplier effects for the emerging employment precinct. This will be detailed in a separate Economic Analysis.
- **State Significant Industrial Precinct (SSIP)** – The PSP nominates the northern part of the site for Service Business use and smaller lot sizes than proposed, as well as a road along the Princes Freeway interface. In comparison, the more recent Melbourne Industrial Commercial Land Use Plan (MICLUP) identifies the land as a State Significant Industrial Precinct (SSIP). The ultimate employment outcomes and investment in the precinct encourages Council to consider large scale industrial uses as suitable on the site and vary the road alignment proposed in the PSP.
- **Road Network** – The applicant proposes road connections to Enterprise Road, Axis Boulevard and south to Kaduna Business Park, achieving a suitable permeable road network. The overriding economic benefit of the subdivision and future development, and provision of only two large format lots adjacent to the freeway, determines that the freeway interface road is not required.
- **Princes Freeway Interface** – The concurrent application (T240191) for a Warehouse on proposed Lot 3 illustrates that development applications can provide a suitable interface to the freeway. That development proposes a bold and high-quality presentation to the freeway and proposes a continuous and layered landscape treatment along the freeway edge. A similar response could be expected for Lot A. The size of these lots allows for continuous and quality urban design outcomes.
- **East-West Road** - It is proposed that the construction of an east-west road along the gas easement be delayed until the development of Lot A commences. This will ensure the road is actively used, rather than providing a dead-end 500 metre long road which is likely to attract anti-social behaviour. The applicant proposes a s.173 agreement to require construction of the road in concert with development of Lot A.
- **Toomuc Creek** - The application provides land to widen the Toomuc Creek reserve for drainage purposes. A maintenance track is provided to ensure appropriate access to the creek by authorities and shared path users. This section of drainage reserve has a length of only 130 metres and the overriding economic benefit of future development, and its potential to provide surveillance of the creek reserve, determines a dead-end road along the drainage reserve is not required or desirable.

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- **Stormwater management** – The site drains towards Toomuc Creek and a Stormwater Management Plan has been submitted to Melbourne Water for review.
- **Specialist Reports** – The required specialist reports accompany the application including traffic, bushfire, hydrogeology, preliminary site assessment, and a Landscape Master Plan, in accordance with the requirements of the Urban Growth Zone. An Economic Analysis of the employment benefits will be submitted separately.

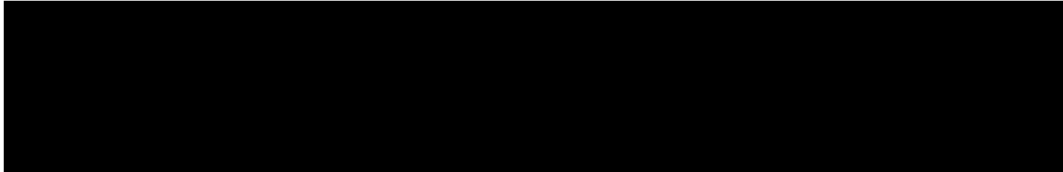
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## 1.0 Background Information

### 1.1. Pre-Application Meeting

A pre-application meeting was held on 30 October 2023 to discuss this subdivision and several subsequent meetings have taken place.

The following persons were in attendance to these meetings:



### 1.2. Previous Planning Permits & Subdivision

The following applications have been approved by Council preceding the commencement of works at 92 Enterprise Road:

- Section 35 to acquire land to provide access to the subject site via the future Axis Boulevard.
- T230059 Stage 1 subdivision of two lots and balance lot (subject of current application).
- T230062 Stage 1 Bulk Earthworks.
- T230139 Warehouse Use and Development WH1.
- T230569 Use for Industry WH1
- T230289 Warehouse Development WH2. Use and Development.
- T230644 Stage 2 Bulk Earthworks (application lodged awaiting Melbourne Water advice)
- T240191 Warehouse WH3 (application lodged)

### 1.3. Eastern Arterial Road

Works on the Eastern Arterial/Axis Boulevard are currently underway to facilitate a permanent access to the ESR Estate and to provide an alternative southern access in the precinct for other developments. Construction of various Cardinia Road works including IN\_02, are due to commence imminently, as specified in the Planning Permit for Stage 1 subdivision, noting that the Cardinia Road works are also requirements of the Kaduna Business Park, Cadence and Growlands permit applications.

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## 2.0 Proposal Details

### 2.1. Proposal Summary

This subdivision proposal seeks to deliver Stage 2 of the ESR Estate in the Cardinia Road Employment Precinct. Stage 2 drains towards Toomuc Creek, whilst the Stage 1 subdivision drains to the west in the Cardinia Road drain catchment.

- Lots 3 (4.475ha) and Lot 4 (2.545ha) front Endeavour Road (as approved under T230059). The lots are intended to be developed by ESR for large scale distribution warehouses (subject of separate permit applications).
- Lot A (12.4ha) is irregular in area and will generally occupy the eastern section of the land providing a site for a future large employer with excellent freeway visibility.
- A road is proposed from Endeavour Road to the southern boundary with a temporary court bowl adjacent to the gas easement which will be constructed as part of the subdivision.
- The east-west leg of the road, adjacent to the gas easement, is proposed to be constructed on commencement of the development of Lot A, with completion prior to issue of Certificate of Occupancy of any buildings. The applicant proposes a s.173 agreement to obligate the owner of Lot A to undertake these works. This road will connect to Wattlebird Way on construction of the gas easement crossing by the neighbouring developer.
- A drainage reserve (0.3404 ha) is proposed along Toomuc Creek to accord with the Special Use Zone boundary. A maintenance track will be provided to service the reserve.
- The proposed road reserve will provide a drainage outfall to Toomuc Creek. A 6 metre wide drainage easement will provide a drainage connection from the end of the road to the proposed connect the road reserve to the
- A shared path is proposed along the east side of Endeavour Road extending south along the new road alignment to join with the proposed shared trail in the gas easement.

Table 1: Land Budget Table

LAND	AREA (hectares)
Lot 3	4.475
Lot 4	2.545
Lot A	12.400
Road	1.346
Reserve	0.340
Total	21.11

The applicant seeks to defer the construction of the 500 metre long east-west road to such time when development occurs on Lot A. The construction of the road when there is no adjacent development or connection, is likely to result in a road length attracting anti-social behaviour and the dumping of rubbish, as well as the deterioration of the road.

It is proposed the land owner enter a S.173 Agreement such that the road is constructed prior to the issue of a Certificate of Occupancy for any development on Lot A. This will allow for the owner of Lot A to commence development concurrently with the road construction. We consider that this arrangement provides Council with the certainty of delivery and avoids unnecessary maintenance of the road (and rubbish) in the intervening period.

### Job Yield and Lot 5 Future Development

This prominent site on the Princes Freeway interface will provide the Cardinia Shire with a highly visible employment anchor, the benefits of which will be outlined in a separate Economic Assessment.

A large Victorian owned company has entered into a contract of sale with ESR to purchase Lot A for the development of a substantive operation including:

- Large office,
- Maintenance facilities,
- Warehouse, and
- Freeway fronting display areas.

It is anticipated that the proposal will provide a significant number of direct jobs in the precinct, relocating staff from an aging facility in south-east Melbourne.

Lots 3 and 4 are yet to be leased, hence we refer to job generation rate data to gauge likely job yield. *The South East Economic Corridor Study, October 2020* anticipates that the 246 hectares of net developable employment land in Cardinia Road State Significant Industrial Precinct (SSIP) will generate 7900 jobs, or the equivalent of 32.11 jobs/hectare. (In 2010 the PSP, in comparison, forecast 50 jobs per hectare in the service business area and 18 jobs per hectare in the industrial areas.) On the basis of the SEEC estimate, Lot 3 and 4 which have a combined area of 7 hectares are forecast to deliver 126 jobs.

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## 3.0 Subject Site and Surrounds

### 3.1. Certificate of Title

The subject site is located at 92 Enterprise Road, Pakenham and is legally identified as Lot 1 TP99673B (Volume 09622 Folio 089). There are no easements registered on the certificate of title.

A GAIC NOTICE applies to the subject site, pursuant to Section 201UB Planning and Environment Act 1987 (register number AH336996N). GAIC was paid at the time of purchase.

### 3.2. Subject Site Description

The subject site is generally triangular in shape and is bordered by Princes Freeway to the north and Toomuc Creek to the east. The title has an overall area of 27.5 hectares, and the Stage 2 subdivision covers an area of approximately 21.1 hectares.

The eastern boundary adjacent to Toomuc Creek is 141.9m long and the southern boundary adjacent to 295 Cardinia Road is 767m long. Refer to the Proposed Subdivision Plan full site dimensions.

The subject site has been used for farming purposes in the past but has recently been cleared of buildings, and earthworks are currently progressing. No mature vegetation is present on the site.

A small dam is located central to the freeway boundary and the site drains in an eastern direction towards Toomuc Creek.

Figure 1: Aerial image of the subject site



Source: Nearmap, 29/3/24.

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### 3.3. Adjacent Sites and Site Context Description

The land is located within the Cardinia Road Employment Precinct with the Princes Freeway along the long northern boundary. The precinct is at the early stage of development across several properties.

The following land is directly adjacent to the subject site:

**North** Beyond the Princes Freeway reserve are residential properties behind a freeway acoustic wall.

**East** Toomuc Creek lies to the east beyond which is undeveloped employment land.

**South** Kaduna Business Park at 295 Cardinia Road is under development.

**West** Axis Boulevard connection is currently under construction by the applicant through this site.

Figure 2: Aerial image of the surrounds



Source: Nearmap 29/3/24

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## 4.0 Planning Assessment

### 4.1. Melbourne Industrial and Commercial Land Use Plan

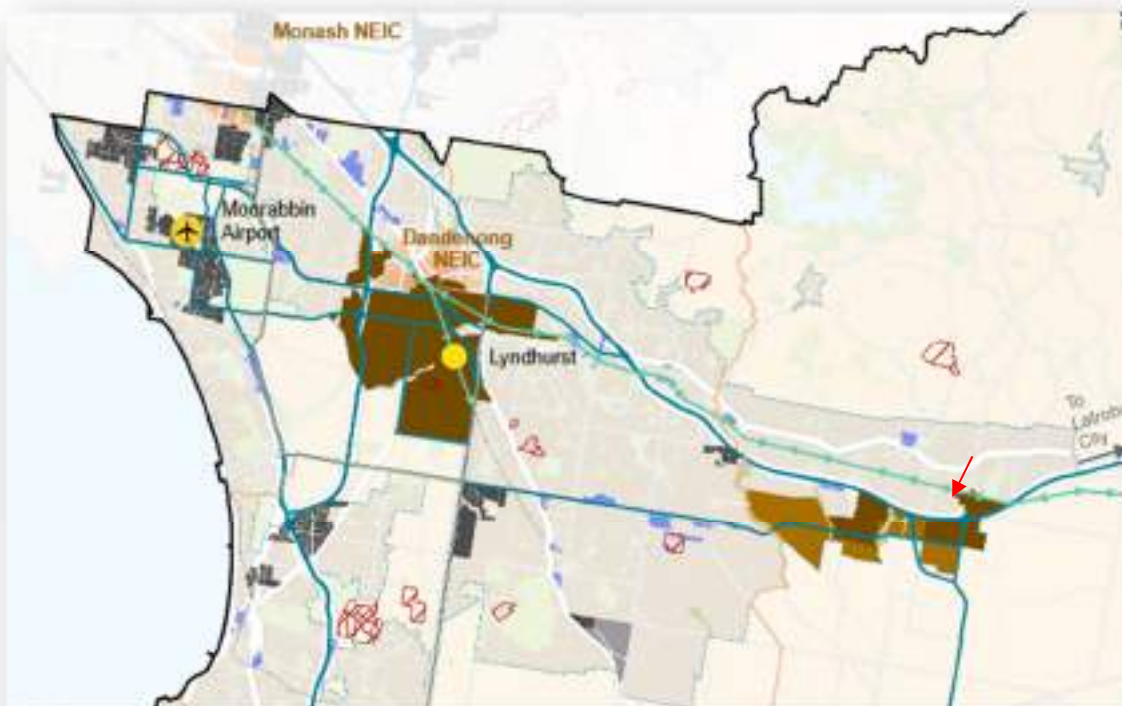
The Melbourne Industrial and Commercial Land Use Plan (MICLUP) informs State planning policy for key metropolitan employment area. MICLUP outlines the present and future demand for industrial and commercial land and proposes strategic approaches towards supplying this land. This is in response to intense future growth in population and corresponding demand for business land and employment.

The MICLUP focuses on six metropolitan regions. The subject site is located in Pakenham, within Cardinia Shire. Cardinia Shire is located in the MICLUP Southern Region, alongside Greater Dandenong, Casey, Frankston, Kingston and Mornington Peninsula.

The subject site is located within the Southern Region's Officer-Pakenham State Significant Industrial Precinct (SSIP) and directly adjacent to the Principal Freight Network (PFN) being the Princes Freeway.

Whilst the PSP identifies the north of the site for 'Service Business' MICLUP clearly identifies the land as SSIP, thereby encouraging the provisions of industrial lots as proposed, accordingly it is considered the subdivision implement this important state policy directive and can be considered as is 'generally in accordance with' the PSP.

Figure 3: From Melbourne Industrial Commercial Land Use Plan (MICLUP)



Subject site identified by arrow

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## 4.2. Permit Triggers

A planning permit is required under the following provisions of the Cardinia Planning Scheme:

- Clause 37.01-3 – Pursuant to Clause 37.01-3, a permit is required to subdivide land.
- Clause 37.07-10 – Pursuant to Clause 37.07-10, a permit is required to subdivide land.
- Pursuant to 37.01-4 and Clause 2.3 of Schedule 2 a permit is required to remove a dam.
- Pursuant to Clause 52.02 a permit is required to create an easement.

## 4.3. Urban Growth Zone, Schedule 2

The subject site is located within the Urban Growth Zone, Schedule 2 – Cardinia Road Employment Precinct Structure Plan under the Cardinia Planning Scheme, other than the most eastern portion of the site which is Special Use Zone – Schedule 4 for drainage purposes.

Figure 4: Cardinia Planning Scheme



Urban Growth Zone - Pink

Special Use Zone – Yellow

The purposes of this Zone are:

*To manage the transition of non-urban land into urban land in accordance with a precinct structure plan.*

Pursuant to Clause 37.07-10, a permit is required to subdivide the site and an application is required to be 'generally in accordance' with Precinct Structure Plan (PSP).

The zone provisions require the submission of the following information to support applications for subdivision under clause 3.1 of the schedule. The following table indicates how the information requirements are addressed.

Table 2: Table of application information requirements as set out in Clause 3.0 to Schedule 2 to Clause 37.07.

Information Requirement	Response
Table setting out lot sizes and stages	Refer to Table 1 Refer to Proposed Subdivision Plan
Details of road connections, open space, walking connections, drainage networks	Refer to Proposed Subdivision Plan Refer to section 2.1
Details of appropriate buffers to sensitive uses	No land uses are proposed as part of the application, although Princes Freeway provides separation to the residential land to the north.
Transport Impact Assessment	Refer to TIAR prepared by One Mile Grid
A plan showing access arrangement to major roads	Refer to Proposed Subdivision Plan Access to Cardinia Road is via Axis Boulevard as provided for under T230059.
Delivery of roads shown in Plan 1	As above
A plan showing encumbered open space with description to the satisfaction of Melbourne Water	The Proposed Subdivision Plan shows encumbered open space/drainage reserve aligned with the Special Use Zone. A SWMP has been provided to Melbourne Water and Council.
Overall landscape concept consistent with Water Sensitive Urban Design techniques	Refer Landscape Master Plan. The Landscape plan for the drainage reserve will be prepared once Melbourne Water has approved the SWMP.
Assessment of how the lots and building design respond to sensitive interfaces.	The development application T240191 for Lot 3 provides a well considered interface with the Princes Freeway. A similar approach is anticipated for Lot A.
Hydrogeological assessment of groundwater	Refer to Environmental Site Assessment and Hydrogeological Report, prepared by LR Pardo & Associates.
Site assessment by qualified environmental consultants detailing past land uses, potential for contamination, having regard to the practice Note for Potentially Contaminated land	Refer to Environmental Site Assessment and Hydrogeological Report, prepared by LR Pardo & Associates.  All remediation works outlined in the report have been completed with documentation submitted to the satisfaction of Council in relation to T230059.
Sustainability Statement. This requirement may be waived.	It is submitted that sustainability requirements are more relevant to the construction of buildings when fine grain ESD requirements will be given consideration.  The subdivision will achieve a high level of sustainability through the provision of the drainage works.

### Removal of dam

A single small existing dam is proposed to be removed. The dam is not identified in either the PSP or the Growling Grass Frog Conservation Management Plan, suggesting that it did not exist at the time the PSP was prepared. The dam is therefore not subject of the specific dam removal provisions of the PSP and its removal is consider reasonable.



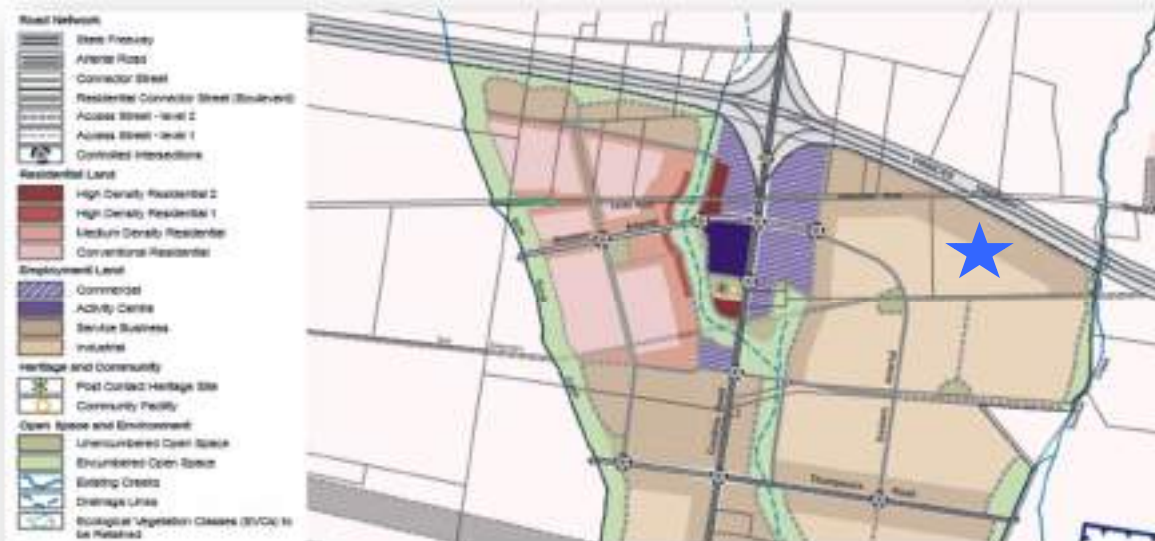
#### 4.4. Cardinia Road Employment Precinct Structure Plan

The site is located in the Cardinia Road Employment Precinct with the Precinct Structure Plan approved in 2010. This PSP provides a framework for the integrated development of Cardinia Road Employment Precinct, coordinating land use, transport, infrastructure and natural environment matters.

The PSP is articulated in a Vision, Objectives, Plans and Planning and Design Guidelines. The Future Urban Structure Plan provides a broad framework for the PSP intended outcomes. The Future Land Use Plan provides the following direction for the development of the subject site, namely:

- Service Business land for a depth of approximately 180 metres from the Princes Freeway frontage, with the balance of the land identified for Industrial purposes,
- Encumbered open space adjacent to the existing Toomuc Creek Reserve,
- Access Street Level 1 adjacent to the Princes Freeway, along Toomuc Creek and within the adjacent gas easement,
- A new Eastern Arterial Road extending towards the site from an upgraded Cardinia Road.

Figure 5: Excerpt from the Cardinia Road Employment Precinct Structure Plan, Plan 5: Future Urban Structure.



The PSP Land Use Budget and the corresponding areas proposed in the subdivision layout are outlined in the table below. The table below and the accompanying Subdivision Plan show that this proposal generally seeks to comply with the PSP Land Use Budget requirements.

There is a discrepancy between the PSP budget for the drainage reserve and the alignment of the Special Use Zone, which is intended to be the extent of the drainage area, as determined from a Vicmap Planning Scheme Definition Map. It is considered that the official SUZ boundary should be applied to the drainage scheme extent.

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Table 3: Table of land budget allocation, with reference to the Cardinia Road Employment PSP.

Property 17	PSP Land Budget (hectares)	Proposal based on survey (hectares)
Stage 1 Subdivision (approved) Net Developable Area	-	6.41
Stage 2 Net Developable Area Lots 3, 4, A and road	-	20.766
<b>Total Net Developable Area</b>	27.26	27.176
Waterways – Drainage Corridor	0.48	0.3404*
<b>Total Land Area</b>	27.24	27.518*

\* The drainage reserve is defined by the SUZ boundaries from a Planning Scheme Definition map supplied by Department of Transport and Planning. Total Land Area defined by Survey.

### Urban Design Framework

Clause 2.6 specifies the preparation of an Urban Design Framework for the Service Business land abutting the Freeway ‘generally north of Enterprise Road, extending to Toomuc Creek...’ As the subject land is south of Enterprise Road, it is not considered that the UDF requirement applies to this site. Further, the PSP anticipated small Service Business lots along this frontage which may have benefited from a co-ordinated design approach of a UDF. However, given that only two large lots are proposed within the subdivision adjacent to the freeway the imperative for a UDF is greatly reduced. Significantly, the ultimate development form aligns with the SSIP designation.

Clause 2.6 of the Schedule allows for the responsible authority to issue a permit prior to the preparation of a UDF provided it is satisfied appropriate urban design outcomes as envisaged by the PSP are achieved. A development application has been submitted for proposed Lot 3 showing a high quality building interface with the freeway with no back-of-house operations along that frontage, and continuous and layered tree planting along the freeway edge. It is anticipated a similar quality interface outcome will be achieved for proposed Lot 5 as part of that development application. The size of these sites assists to ensure that a well co-ordinated design response to the freeway interface can be achieved and implemented.

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### Planning and Design Guideline Assessment

A comprehensive assessment of the proposal against relevant Planning and Design Guidelines listed in the PSP matters is provided in Appendix 1.

Since the approval of the PSP in 2010, the State Government MICLUP document has identified the land as a State Significant Industrial Precinct (SSIP), accordingly it is considered reasonable that the emphasis on ‘Service Business’ outcomes and associated lot sizes should be given less weight. The application proposes substantially larger lots than proposed in the Service Business area in the PSP, with the intent of developing a large scale distribution warehouse and providing a land parcel for a large employer.

Due to the size of these lots and prospective developments the applicant seeks an alternative road alignment to that proposed along the Freeway, whilst still achieving western and southern road connectivity to the adjoining subdivision and Enterprise Road. An alternative alignment for the shared path along the freeway is provided along Endeavour Road connecting to the future gas easement shared path in the Kaduna Business Park.

It is considered that these variations of the PSP Service Business lot sizes and road alignments is entirely reasonable in the interest of achieving substantial investment and employment outcomes, whilst still ensuring a permeable road network and good design outcomes. Accordingly, it is considered the proposal is 'generally in accordance with' the PSP.

#### **4.5. Cardinia Road Employment Precinct – Conservation Management Plan**

The Conservation Management Plan for the Growling Grass Frog (CMP) forms part of the Cardinia Road Employment PSP. The CMP establishes a detailed framework and methodology for the protection of the Growling Grass Frog pursuant to the *Environment Protection and Biodiversity Act 1988*.

The CMP does not identify any dams within the area of the current subdivision, however, the applicant seeks to remove a more recently constructed small dam from the site which is considered entirely reasonable.

#### **4.6. Cardinia Road Employment Precinct – Native Vegetation Precinct Plan**

The Native Vegetation Precinct Plan (NVPP) forms part of the Cardinia Road Employment PSP. The NVPP identifies indigenous vegetation and sets out which such specimens may be removed or required protection. No indigenous vegetation was identified on the subject site, and no established vegetation is present on the site.

#### **4.7. Special Use Zone, Schedule 4**

The far eastern portion of the site is located within the Special Use Zone, Schedule 4 of the Cardinia Planning Scheme. The purpose of Schedule 4 to this Zone is:

*To manage the transition of non-urban land into an urban land context in accordance with the Cardinia Road Employment Precinct Structure Plan (September 2010).*

*To identify land within a growth area where the Growth Areas Infrastructure Contribution is not applicable.*

*To provide a range of uses and the development of land in accordance with the Cardinia Road Employment Precinct Structure Plan (September 2010).*

Pursuant to Clause 37.01-3, a permit is required to subdivide the site.

The subdivision proposes the provision of a drainage reserve for that land identified as Special Use Zone in accordance with the schedule and the PSP, widening the Toomuc Valley creek environs and providing a buffer between the creek and future development.

Pursuant to Clause 37.01-4 a permit is required for works within the Special Use Zone.

It is intended that drainage works including the construction of a Melbourne Water maintenance track will take place in the reserve/SUZ area in accordance with an approved Stormwater Management Plan.

The Schedule to the Zone requires that any works within 200 metres of a waterbody (including creeks) will include a condition requiring preparation a Construction Environment Management Plan (CEMP) which considers the requirements of the Growling Grass Frog Conservation Management Plan.

Accordingly, the proposal is considered to accord with the provisions of the zone.

#### **4.8. Development Contributions Plan Overlay, Schedule 3**

The site is located within the Development Contributions Plan Overlay – Schedule 3 – Cardinia Road Employment Precinct Development Contributions Plan.

There is no DCP incorporated into Schedule 3 of the DCP Overlay and pursuant to Clause 4.0 to Schedule, the applicant has entered into a Section 173 under the *Planning and Environment Act 1987* confirming DCP payment. This agreement is registered on title.

A second agreement specifying land contributions and DCP item works-in-kind details is currently being finalised.

#### **4.9. Particular Provisions**

##### **Clause 52.02 Easements Restrictions and Reserves**

A planning permit is required to create an easement pursuant to Clause 52.02.

A 6 metre wide drainage easement is proposed from the eastern end of the proposed road to connect drainage infrastructure to Toomuc Creek.

It is considered the easement ensures appropriate planning and drainage outcomes.

##### **Clause 53.01 Public Open Space Contribution and Subdivision**

A public open space contribution of 1.62% of land value is required across the area of the PSP to fund passive open space provision. The relevant amount is required to be paid prior to Statement of Compliance for the subdivision.

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## 5.0 Strategic Planning Policy Assessment

### 5.1. Planning Policy Framework

The Planning Policy Framework (PPF) ensure that the objectives of Section 4 of the Planning and Environment Act 1987 are implemented through appropriate land use and development planning policies to achieve appropriate development, employment and environmental outcomes.

#### Clause 11.01 Victoria

- 11.01-1S Settlement
- 11.011R Settlement – Metropolitan Melbourne

#### Clause 11.02 Managing Growth

- 11.02-1S Supply of Urban Land
- 11.02-2S Structure Planning
- 11.02-3S Sequencing of Development

This subdivision proposal supports the delivery of employment land to by implementing the Precinct Structure Plan with suitable sequencing of development to ensure the orderly provision of key infrastructure and services.

#### Clause 12.01 Biodiversity

- 12.01-1S Protection of Biodiversity

The Cardinia Road Employment PSP addresses the concurrent challenges of native vegetation management and biodiversity protection. This planning and direction is set through the GGFCMP and the NVPP. The subdivision provides for the widening of the Toomuc Creek corridor and an appropriate CEMP will be put in place to manage construction works.

#### Clause 13.02 Bushfire

- 13.02-1S Bushfire Planning

The bushfire risks for the site and proposed subdivision have been identified, assessed and designed for via the accompanying Bushfire Development Report, prepared by Terramatrix.

#### Clause 13.04 Soil Degradation

- 13.0-1S Contaminated and Potentially Contaminated Land

An Environmental Site Assessment, prepared by LR Pardo & Associates is submitted and all remediation works have been completed to Council's satisfaction.

#### Clause 15.01 Built Environment and Heritage

- 15.01-3S Subdivision Design

The proposal will contribute to an attractive and functional industrial estate. The proposed road network provides for a well-connected subdivision with large lot sizes providing opportunity for large scale industrial developments.



**Clause 17.01 Employment and Clause 17.03 Industry**

- 17.01-1S Diversified Economy
- 17.01-17.03-1S Industrial Land Supply
- 17.03-3S State Significant Industrial Land
- 1R Diversified Economy – Metropolitan Melbourne

This subdivision proposal will result in the creation of three serviced lots for industrial purposes, on a site identified within the Officer-Pakenham SSIP and the Cardinia Road Employment PSP. These plans and strategies are directly geared towards providing industrial land, expanded employment opportunities and protecting such land and opportunities from future threats to their viability. This proposal delivers industrial land in keeping with these employment objectives.

**Clause 18.01 Land Use and Transport and Clause 18.02 Movement Networks**

- 18.01-1S Land Use and Transport Integration
- 18.01-2S Transport System
- 18.02-4S Roads

As part of the development of the subject site, the Eastern Arterial Road within 26 Enterprise Road is being construction by the applicant. This ensures the timely provision of efficient transport infrastructure within this Precinct.

Roads will be designed and landscaped to provide a safe environment for drivers, pedestrians and cyclists while also accommodating the high-intensity industrial freight that is anticipated in this industrial precinct.

**Clause 19.02 Community Infrastructure**

- 19.02-6S Open Space
- 19.02-6R Open Space – Metropolitan Melbourne

Encumbered open space is provided, widening the Toomuc Creek corridor providing improved biodiversity outcomes.

**5.2. Local Planning Policy Framework**

The Local Planning Policy Framework (LPPF) is comprised of the Municipal Strategic Statement (MSS) and Local Planning Policies. The elements of the Local Planning Policy Framework including Municipal Strategic Statement relevant to this proposal include:

**Clause 21.04-4 Industry**

Clause 21.04-4 Industry seeks to facilitate the development of the Cardinia Road Employment Precinct. Specifically, the subdivision strategy,

- Encourages a range of lot size for various uses, and large lots on main or arterial roads,
- Encourages limited retailing and restricted retail along main roads,

- Encourages provision of appropriate services, vehicle, pedestrian and bicycle infrastructure.

It is considered the proposal is consistent with this policy within the context of the requirements of the PSP applying to the land and incorporated into the proposed subdivision.

### **Clause 21.02 Environment**

The Environment policies in Clause 21.02 identify the importance of:

- Using appropriate measures to manage and treat stormwater in urban areas,
- Re-establishing vegetation along waterways and minimising erosion and sedimentation,
- Addressing shallow ground water where present and identifying appropriate mitigation measures,
- Minimise development in areas subject to flooding, and
- Maintain and enhance the diversity of indigenous habitats and species.

All matters outlined above will be addressed by the applicant in preparing this comprehensive development application and supporting reports.

### **5.3. Clause 65 - Decision Guidelines**

In determining whether a permit should be granted, the responsible authority must decide whether the proposal will produce acceptable outcomes in terms of the decision guidelines in Clauses 65.01 and 65.02.

#### **Clause 65.01 Approval of an Application or Plan**

The proposal will favourably achieve the outcomes sought by the decision guidelines in Clause 65.01 and 65.02 for the reasons below.

- The proposal is assessed against the policies of the Municipal Planning Strategy and Planning Policy Framework above. That assessment demonstrated the proposal would favourably achieve the outcomes sought within the Municipal Planning Strategy and Planning Policy Framework.
- The subdivision has been assessed against the provisions and requirements of the underlying Urban Growth Zone, Special Use Zone, the Development Contributions Plan Overlay, relevant Particular Provisions and the documents forming the PSP and demonstrate that the proposal would favourably achieve the outcomes sought in these Clauses and documents.
- An Environmental Site Assessment, prepared by LR Pardo & Associates, identified levels of soil and groundwater contamination that were acceptable for any proposed industrial use. Minor site clean-up actions have been completed to Council's satisfaction.

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- The subdivision will provide for substantial employment initiatives and will not reduce human health and local amenity and will result in an orderly planning outcome for the subject site and the locale.
- There are no factors originating from this subdivision that are likely to cause or contribute to land degradation, salinity nor reduce water quality, noting the preparation of a stormwater management plan and provision of an enlarged Toomuc Creek reserve.
- The potential for bushfire hazard is appropriately addressed.
- The subdivision will achieve reticulated water supply, stormwater drainage, and electricity supply.
- Road design ensures connectivity to Cardinia road and employment land to the east and south, and is addressed appropriately in the accompanying Traffic Impact Assessment.

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## 6.0 Conclusion

This Planning Statement has demonstrated that the proposal is generally in accordance with the Cardinia Road Employment Precinct Structure Plan and accords with the relevant provisions of the Cardinia Planning Scheme.

Approval of the subdivision is the first step in achieving substantial economic and employment benefits for the precinct and wider municipality, facilitating the provision of land for a major employer and large scale distribution warehouses. Whilst the subdivision seeks variation of the road layout and Service Business area as envisaged by the PSP, the overriding economic benefit and alignment with the State Significant Industrial precinct determines the proposal will achieve a desirable outcome.

The application is comprehensive and is consistent with the purpose and intent of the relevant planning controls and policies as assessed in this report and will not result in any significant adverse environmental effects.

It is respectfully requested that the application be supported and that a planning permit is issued in due course.

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## Appendix A

### Planning and Design Guidelines Assessment

The following table provides an assessment of the current permit application against the relevant Planning and Design Guidelines listed in the Cardinia Road Employment Precinct Structure Plan.

### Image and Character

#### Urban Design

MUST BE MET	Response
A variety of land uses, public spaces and environments is to allow for a range of different experiences for people in the Precinct.	Stage 2 of the ESR estate is intended to provide a high-quality employment environment. A Landscape Master Plan is submitted, and the drainage reserve will contribute to the open space environment along Toomuc Creek with linking shared paths.

#### Interfaces with Sensitive Uses

This subdivision does not interface with any proposed sensitive uses. Separation distances to any existing dwellings on adjoining land or north of the freeway will need to be considered should approval be sought for any future uses listed in Clause 53.10.

#### Landscape Character

MUST BE MET	Response
Wide road reserves are to be provided, incorporating wide nature strips that allow tree lined boulevards to be provided throughout the Precinct, particularly on Cardinia Road and Western Arterial.	NA
The Australian Landscape theme is to be a focus throughout the Precinct. All development is to front onto and address its natural and vegetated landscape, vegetation and waterway features, maximising access to vistas along open space corridors from the built form.	The proposed landscaping details appropriate native species to be planted along and within the road reserve.
SHOULD BE MET	Response
Planting and vegetation is to be Australian native species with a preference to local indigenous species.	As above.
Non-Indigenous vegetation is permitted as feature plantings (i.e. garden beds) throughout the Precinct.	As above.

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## Employment and Activity Centres

### Employment Areas

MUST BE MET	Response
Service Business uses are to be located along the Princes Freeway, along Cardinia Road and key sections of Thompsons Road, to provide a high-quality built form edge to the Precinct.	The application is for subdivision only, however ESR intends to develop high quality-built form within its estate.
Industrial uses are to be located where potential amenity impacts are minimised and high levels of access to arterial roads can be achieved through subdivision design.	The application is for subdivision only. Direct access will be provided to Axis Boulevard and Cardinia Road.
Commercial and Industrial development is to be well integrated through: <ul style="list-style-type: none"> <li>– road network design that creates a permeable environment between adjoining developable parcels and provides direct connections to arterial roads; and</li> </ul>	The subdivision road layout provides connections to both the Eastern Arterial Road, Enterprise Road and the McMullen land at ultimate development. .

**Table 6: Service Business**

SHOULD BE MET	Response
Allotments ranging between 500m <sup>2</sup> and 2000m <sup>2</sup> are to be provided.	ESR seeks to develop a high quality estate of large distribution centres, and a significant employer on a 12.4ha parcel, embracing the intent of the SSIP, with high quality presentation to the Princes Freeway. It is considered that variation of the lot size is justified

**Table 6: Industrial**

MUST BE MET	Response
Allotments up to 5 hectares are to be provided, to cater for a wide range of industry types. Larger lots can be provided where a specified use is identified.	Lot 4 will meet this requirement.
Heavier industrial uses are to locate in the southern and eastern parts of the Industrial Area.	NA – no heavy industrial uses are proposed
A grid street network is to be developed, creating a variety of lot sizes that enable flexibility in land use and development intensity over time, as demonstrated in Figure 5.	Western and southern road connections are proposed. The ESR Estate provides larger lots than other nearby proposed industrial subdivisions providing a lot mix.

## Open Space and Natural Systems

### Open Space

MUST BE MET	Response
Along Toomuc Creek, an encumbered open space corridor of no less than 50 metres from the top of the bank is to be provided.	The subdivision provides for the encumbered open space corridor along Toomuc Creek.
Waterway corridors are to be wider than the requirements of the 1 in 100-year ARI flood line to provide adequate buffers to biodiversity and accommodate the trail network.	The drainage reserve accords with the alignment of the SUZ as intended in the PSP.
Local parks are to be provided in the commercial and industrial areas as shown in Plan 11.	NA

**Table 11: Open Space - General**

MUST BE MET	Response
Encumbered open space is to be designed to provide for environmental conservation and management in an attractive landscape setting, including paths and spaces for activity integrated with the design.	A SWMP will direct drainage and landscape works in the reserve. Following approval of the SWMP, a landscape plan will be prepared for the reserve including a shared path along the dual use maintenance track.
Open space design is to be contemporary and innovative, reflecting the local, historical and environmental context and community values	As above.

**Table 11: Interface with Road Network**

MUST BE MET	Response
A road reserve is to be provided: <ul style="list-style-type: none"> <li>– adjacent and parallel to all open space corridors and waterways; and</li> <li>– on all sides of all unencumbered open space areas;</li> <li>– except where an edge of the unencumbered open space is shared with encumbered open space</li> </ul>	<p>Road access is provided to the drainage reserve via the east-west road and Wattlebird Way to the south. A maintenance track is proposed within the drainage reserve which will double as a shared path.</p> <p>This section of drainage reserve is only 130 metres in length and abuts the Princes Freeway. It is considered that the future large scale development of Lot A can be designed in a manner to allow appropriate surveillance and enjoyment of the encumbered open space.</p> <p>The benefit of accommodating a major employer in the precinct outweighs the necessity for a road along this short section of drainage reserve.</p>
SHOULD BE MET	Response
Streetscape planting and paths are to be completed and integrated with the design of adjoining open space areas.	A Landscape Master Plan is submitted.

**Table 11: Interface with Adjoining Development**

MUST BE MET	Response
Development adjoining open space is to 'front onto' the open space, promoting use and provide passive surveillance over the public realm.	A future development application for Lot A will provide for surveillance of the reserve.

**Table 11: Interface with Conservation Areas**

MUST BE MET	Response
Existing native vegetation within open space areas is to be retained in accordance with the Native Vegetation Precinct Plan.	The site is cleared and does not contain any mature native vegetation. No native vegetation is note on the site in the NVPP.

Open space containing native vegetation, waterways or Growling Grass Frog ponds is to be designed to protect sensitive areas from vehicle, pedestrian and bicycle traffic in line with the Conservation Management Plan.	No existing or proposed GGF ponds are shown in the site. A GGF pond in the freeway reserve no longer appears to exist. The SWMP and landscaping plan will consider GGF requirements as appropriate.
Shared path trails within encumbered open space areas are to be set back from the drainage line and be located at least 30 metres from the edge of Growling Grass Frog ponds.	NA
Paths, bridges and boardwalks are to be located above the 1 in 10-year flood line at a minimum, outside the 30-metre buffer zone for ponds and wetlands. These are to be designed to the satisfaction of the responsible authority	Path location will align with the wetland maintenance track.

**Table 11: Interface with the Drainage System**

MUST BE MET	Response
Shared trails along waterway corridors are to be integrated with the street network.	Trail location will be addresses following approval of the SWMP and will be shown in the final Landscape Master Plan.
Trail bridges across drainage lines and creeks are to be provided to maximise pedestrian and cyclist access throughout the Precinct and to adjacent precincts.	NA
The location of trail paths and bridges is to minimise potential impacts on biodiversity.	As above.

**Table 11: Park Buildings**

No park buildings are proposed in this application.

**Table 11: Public Safety and Lighting**

MUST BE MET	Response
Open space areas are to be designed for use by a wide range of people.	As above, this will be addressed by the landscape master plan if required.
Sightlines within the open space area are to be maximised, with landscaping, building design and planting to maximise visibility within, to and from the open space areas.	To be addressed in Landscape master Plan for drainage reserve.
Path and trail networks within open space areas are to maximise connectivity between key destinations within the Precinct, with a clear and direct system of paths.	The subdivision will achieve connectivity with adjacent paths.
SHOULD BE MET	Response
Lighting within the open space area is to be minimised, with lighting from abutting streets encouraging use of paths in the street network after dark.	It is considered unlikely the trail will be used after dark.
Lighting is to be energy efficient, minimise unnecessary 'spill' above and to the sides and emit 'white light' to maximise visibility.	As above.

**Table 11: Landscape Character and Vegetation**

MUST BE MET	Response
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Throughout the Precinct, planting and vegetation is to be Australian native species, preferably local indigenous species.	Native vegetation is proposed in road reserves, as per the Landscape Master Plan.
Online wetlands and Growling Grass Frog Ponds are to be vegetated with indigenous grassland species that lead into scattered shrubs and eventually patches of EVCs in areas approximately 40 metres from waterbodies.	NA
Large trees are not to be planted adjacent to Growling Grass Frog Ponds and must be located at least 30 metres from the edges of waterbodies.	NA

**Table 11: Other Park Landscape Elements and Infrastructure**

Any other proposed park landscaping elements and infrastructure will be considered in the Landscape Master Plan for the drainage reserve on approval of the SWMP by Melbourne Water.

**Table 11: Water Sensitive Urban Design (WSUD)**

<b>MUST BE MET</b>	<b>Response</b>
Design and layout of open space areas is to maximise efficient water use, stormwater quality and the viability of vegetation through use of Water Sensitive Urban Design (WSUD) initiatives.	A SMWP has been submitted for the site including stormwater treatment. Future development applications will include ESD assessments.
WSUD is to maximise use of water run-off within open space areas rather than divert it to drains	As above.
<b>SHOULD BE MET</b>	<b>Response</b>
All open space is to be finished to the satisfaction of the responsible authority prior to the transfer of land, including: <ul style="list-style-type: none"> <li>– cleared of all existing disused structures, foundations, pipelines or stockpiles;</li> <li>– cleared of all rubbish and environmental weeds; and</li> <li>– provision of bollards or other means of restricting vehicle access to open space areas.</li> </ul>	Required works are to be completed prior to SOC and/or during the maintenance period.
In the case of unencumbered open space, the following must also be finished: <ul style="list-style-type: none"> <li>– site must be levelled, top soiled and grassed with warm climate grass; and</li> <li>– provided with a water source suitable for the management of the open space.</li> </ul>	As above.

### Biodiversity Conservation

<b>MUST BE MET</b>	<b>Response</b>
Development is to be staged to ensure constructed habitat (eg. part of the wetland drainage system) is established prior to removal of existing habitat within the Precinct.	To be addressed as part of MW requirements in the drainage reserve.
A Construction Environmental Management Plan must be prepared to the satisfaction of the Department of sustainability and Environment and the responsible authority, prior to works occurring in proximity to: <ul style="list-style-type: none"> <li>– native vegetation identified to be protected and retained in the Cardinia Road Employment Precinct Native Vegetation Precinct Plan; and</li> </ul>	A CEMP will be prepared prior to the commencement of works.

– any waterbody, including creeks, drains, dams or wetlands as per the Cardinia Road Employment Precinct Conservation Management Plan for Growling Grass Frog.	
The Construction Environmental Management Plan must address the following: – measures to be used to limit and manage earthworks in proximity to the native vegetation or waterbody, including fencing; – erosion and sedimentation controls; – weed management actions; – feral animal control measures; – management of subdivisional and open space drainage to support the health of vegetation or dam/s to be protected or identified; – and any other conditions and requirements of the Cardinia Road Employment Precinct Native Vegetation Precinct Plan and Cardinia Road Employment Precinct Conservation Management Plan for Growling Grass Frog.	As above.
Prior to the removal of any dams or native vegetation, a salvage and translocation plan for likely threatened species must be prepared and implemented to the satisfaction of the Department of Sustainability and Environment.	The GGFCMP does not identify any habitat dams on the site.
Permits for development of open space and drainage works are to include design requirements for fauna habitat and flora, as appropriate.	As above.

**Table 12: Biodiversity – General**

MUST BE MET	Response
Cardinia Road Drain, Toomuc and Gum Scrub creeks are to provide north-south biodiversity corridors.	The drainage reserve will widen the corridor and provide habitat opportunities.
The use of the Australian Landscape Theme throughout the Precinct is to provide street trees and public open space landscaping to create habitat for indigenous fauna species.	Native trees are proposed in the Landscape Master Plan.

**Table 12: Flora**

MUST BE MET	Response
Any native vegetation located in open space areas is to be retained and incorporated into its design.	The NVPP does not identify any native vegetation on the land.
Revegetation along Gum Scrub Creek, Toomuc Creek and the Cardinia Road Open Space Corridor is to: – create viable habitat corridors for native species; – consist of local indigenous species in line with the Australian Landscape Theme; and – create native grasslands leading into patches of existing Ecological Vegetation Communities in the area (eg. Swamp Scrub, Swampy Woodland) that are to be retained.	The drainage reserve will widen the corridor and provide habitat opportunities.

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**Table 12: Fauna**

MUST BE MET	Response
Growling Grass Frog ponds are to be retained and managed in accordance with the Cardinia Road Employment Precinct Conservation Management Plan (Ecology Partners September 2010).	No GGF ponds are identified on the land.
Habitat for a range of native fauna species is to be provided in constructed environments and areas of remnant vegetation, including public open space areas and waterway corridors.	The drainage reserve will widen the Toomuc Creek corridor and provide habitat opportunities.
Constructed wetlands forming part of the drainage system are to be designed and constructed to provide additional fauna habitat, particularly for wetland birds and the Growling Grass Frog.	No GGF ponds are proposed on the land
Planning and Design Guidelines outlined in Table 13 apply to existing and new Growling Grass Frog Habitat. Open space corridors are to provide a minimum buffer of 30 metres around Growling Grass Frog ponds.	As above.

## Transport and Movement

### Road Network

MUST BE MET	Response
The road network is to be developed to ensure: <ul style="list-style-type: none"> <li>– Cardinia Road is an attractive boulevard and provides for long-term connections south of the urban area to the greater region of south east Melbourne and the Port of Hastings;</li> <li>– Eastern Arterial acts as the primary north-south route for large and heavy vehicles;</li> <li>– Thompsons Road provides the primary east-west route for freight and movement across the Frankston-Dandenong-Casey-Cardinia area;</li> </ul>	The specified Eastern Arterial Route is under construction by ESR to access 92 Enterprise Road (the site).
Roads shown in Plan 14 are to be constructed in accordance with Plan 14, Table 14 and the corresponding cross section shown in Figure 11 to Figure 14 (except Figure 12, Section 3).	Road connections are shown to Enterprise Road, Eastern Arterial and southwards adjacent to the creek reserve. Given that only two lots are proposed adjacent to the freeway the construction of a road along the full length of the freeway is not warranted. Discussions with Council have indicated that the road is not required provided the western and southern connections to adjoining land is provided given the overriding economic benefit of the proposal.
Road reservation widths and design are to be in accordance with Table 14.	Some variations are made to road reserve design. Refer to the Traffic Impact Assessment prepared by One Mild Grid for full detail.

A road reservation is to be provided along the edge of all open space areas and waterway corridors.	A road connection to the south of the drainage reserve and maintenance track is provided within the reserve. In this location the reserve has a limited length of only 130 metres to the freeway, negating the need to provide a road along this section. It is considered this response is 'generally in accordance with' the PSP given overriding economic benefits.
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## Public Transport

MUST BE MET	Response
Roads and streets forming part of a potential bus route to be designed in accordance with the Public Transport Guidelines for Land Use and Development (DoT 2008).	NA No bus route is proposed within the land.
In relation to bus stops: – Local bus stop facilities must be constructed by development proponents as part of the subdivision works (prior to the issue of a statement of compliance for the relevant stage) to accord with the requirements of the Public Transport Guidelines for Land Use and Development and to the satisfaction of the Director of Public Transport;	NA

## Walking and Cycling

MUST BE MET	Response
Footpaths, shared paths, trails and on-road cycle lanes to be provided in accordance with Plan 16 and Table 16.	A shared path is proposed from Enterprise Road to the gas easement trail, and along the drainage reserve within adjacent land, and along the drainage reserve.
The design of walking and cycle paths is to maximise the level use and user safety through choice of materials (all weather surfacing), lighting, and path design.	Will comply with Council requirements
Shared walking and cycle paths are to be provided along the Cardinia Road Open Space Corridor, Gum Scrub and Toomuc Creeks and the Transmission Line Easement in accordance with Plan 16.	A shared path is proposed along Toomuc Creek, with connections to the gas easement shared path.

## Utilities, Energy and Sustainability

### General

MUST BE MET	Response
Requirements of the relevant authority or provider are to be met.	All servicing authority requirements will be met prior to issue of SOC.
The location of services are: – not to impede future road alignments; – to be located along the edges of open space/waterway corridors, ideally within abutting road reserves; – have regard to the requirements for the location of stormwater wetlands and frog ponds so as not to compromise biodiversity outcomes.	All servicing will be provided within road reserve boundaries unless otherwise indicated.
SHOULD BE MET	Response
Service infrastructure is to be provided in accordance with Plan 17: Physical Services.	Servicing will accord with authority requirements.

Services are to cross waterways and creek corridors at the following locations: planned road culverts and bridges; existing culverts or underpasses (if they are being retained); or adjacent to or as part of existing easements for other service infrastructure.	NA – no services are proposed to cross waterways
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## Water Supply

Reticulated water supply will be made available to Lots 1 and 2.

## Electricity

MUST BE MET	Response
All new power lines are to be located underground.	Will comply
Any existing overhead powerlines are to be relocated underground or removed where an alternative underground power source is made available.	Will comply
Development and staging is to be coordinated with SP AusNet to deliver the timely upgrading and extension of electricity supply facilities to meet demand.	Will comply.

## Sewage

MUST BE MET	Response
The implementation of sewerage facilities is to be staged.	Sewage reticulation can be accommodated in the subdivision. Discussions are proceeding with South East Water.

## Drainage

MUST BE MET	Response
Underground drainage is to be designed to convey 1 in 10-year storm events to discharge into open drainage channels or waterways through the area.	A SWMP has been provided to with Melbourne Water.
Design and construction of waterways is to: <ul style="list-style-type: none"> <li>– comply with the future Melbourne Water Development Services Scheme requirements; and</li> <li>– meet the minimum buffer and corridor width requirements (as shown in Plan 12) for the waterways to ensure they provide adequate land for biodiversity conservation and recreation purposes.</li> </ul>	As above.
Drainage systems (including the design of arterial and collector roads) are to be designed to ensure that no increase in the 100-year ARI flood levels occur upstream or adjacent to the development area.	As above.
The finished surface level of the area is to be at least 300 millimetres freeboard to the 100 Year ARI flood level, as per Melbourne Water requirements. The following applies: <ul style="list-style-type: none"> <li>– all habitable buildings are to have a finished floor level of 600 millimetres freeboard to the 100 Year ARI flood level; and</li> <li>– the finished surface level of the Activity Centre site is to match the finished floor level of buildings. The edges of the Activity Centre site may be at a grade of 1:40 to enable seamless transition to the surface level of the surrounds.</li> </ul>	Building floor levels will comply with authority requirements.

## Telecommunications

MUST BE MET	Response
Fibre optic cable (or superior technology) is to be made directly available to every building, dwelling or separate leasable tenancy in the Precinct.	Will comply
The best available technology for telecommunications at the time of development is to be made available to all properties and separate tenancies in the Precinct.	As above.
Development and staging is to be coordinated with Telstra and other potential providers to deliver the timely upgrading and extension of telecommunication facilities to meet demand within the Precinct.	As above.

## Water Management

SHOULD BE MET	Response
Reuse and recycling of water is encouraged.	Water reuse will be addressed as part of future development applications and will address ESD standards.
The integrated stormwater treatment systems are to be provided and landscapes should be designed to significantly minimise the demand for irrigation water from potable sources and to improve the quality of stormwater runoff.	A SWMP has been submitted for consideration.

8 July 2024

Our Reference: 32407B

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██████████  
 Planning Manager  
 ESR Australia

Dear ██████████

**Enterprise Industry Park Economic Assessment relating to Planning Permits T240250 and T240191**

This letter of advice outlines the economic rationale and benefits associated with development of Enterprise Industry Park (EIP). EIP is located at 92 Enterprise Road, Pakenham, within the Cardinia Road Employment Precinct (CREP).

The advice has been prepared for ESR Investment Management Pty Ltd (ESR) and responds to a Request for Information (RFI) from Cardinia Shire Council (Council) regarding ESR’s Development Application for the subdivision of Stage 2 (of EIP) and the construction of a warehouse on Lot 3 (Stage 2). Council’s RFI sought an economic assessment of the anticipated employment and investment generated by the proposed development to support a proposed departure from the road network set out in the CREP.

This letter is structured as follows:

1. Subject Site and Planning Vision
2. Development Scheme
3. The Case for Large Format Warehouses
4. Economic Benefits of the Proposed Development
5. Conclusion

**Key Economic Benefits in the Construction and Operational Phases**

<u>Construction Phase</u>	
<b>1,080 total FTE job-years</b> Including 330 direct (onsite) FTE job-years over the construction period.	<b>\$152 million in total (direct and indirect) value added</b>
<u>Operational Phase</u>	
<b>200 direct FTE jobs per annum</b> Supporting an additional 320 indirect jobs through multiplier effects on an ongoing basis.	<b>\$97 million in total value added annually</b>
<b>550 direct FTE jobs per annum</b> Supporting an additional 770 indirect jobs through multiplier effects on an ongoing basis.	<b>\$226 million in value added per annually</b>



# 1.0 Subject Site and Planning Vision

## Site and Surrounds

EIP is located immediately south of the Princes Freeway in the CREP, a developing employment precinct situated in the Officer-Pakenham development corridor in Cardinia Shire.

Cardinia Shire is one of Melbourne’s fastest growing municipalities and accommodated an estimated 126,960 persons in 2023. The Shire’s population has increased by more than +40,000 persons over the last ten years and is forecast to reach 178,300 persons by 2036.

EIP is bounded by the following features:

- **To the north**, the site has frontage to the Princes Freeway. Proximity to the Princes Freeway provides exposure to passing traffic and easy access to the Principal Freight Network (PFN).
- **To the east**, Toomuc Creek forms the eastern boundary of the site. Beyond Toomuc Creek is undeveloped land in the Pakenham West Precinct Structure Plan area that is designated for future industrial/employment development.
- **To the south** is Kaduna Business Park, a 92-hectare master planned industrial estate in the development phase. South Point Business Park, immediately south of Kaduna Business Park, is also developing.
- **To the west** is land designated for future employment uses. This land is bisected by Axis Boulevard which is currently under construction and will provide access to Princes Freeway via Cardinia Road.



Figure 1 Subject Site and Surrounds

Source: Ethos Urban

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## Strategic Planning Vision

Gazetted in 2010, the Cardinia Road Employment Precinct Structure Plan (the PSP) provides the planning framework to guide development of the CREP. Refer Figure 2.

The PSP identifies the northern section of EIP for 'service business' and the balance of EIP for 'industrial'.

The PSP defines 'service business' and 'industrial' as follows:

- **Service Business:** *"Land used for combined office/warehouse (sales/admin/warehouse/distribution) and outlets servicing local needs including trade supplies, equipment hire, motor repairs, motor vehicle sales, boat or caravan sales."*
- **Industrial:** *"Land used for heavy industry, manufacturing, engineering works, warehousing, distribution and supporting industry."*

Refer Glossary at p118 of the PSP.

'Service business' essentially refers to an amalgam of finer grain local industry and showroom uses, while 'industrial' denotes more traditional larger format industrial uses. Overall, the PSP identifies approximately 134 hectares for 'service business' and approximately 186 hectares for 'industrial'.

Development elsewhere in the CREP is not specifically in accordance with the defined 'service business' and 'industrial' areas. For example, Kaduna Business Park and South Point Business Park primarily encompass land designated for 'industry', yet the scale and type of industrial uses likely to be delivered in these precincts more closely reflects the 'service industry' classification, based on available subdivision plans.

Given the PSP was gazetted over 14 years ago, departures from the planning vision of this nature are expected as developers best respond to the evolving market context (which still generally aligns with the aspirations of the PSP).

In this time, Plan Melbourne 2017-2050 (Plan Melbourne) introduced State Significant Industrial Precincts (SSIPs) to the Planning Policy Framework, including an SSIP at Officer-Pakenham (Officer Pakenham SSIP) which encompasses parts of the CREP, including EIP.

SSIPs are Melbourne's largest and highest order industrial precincts. Plan Melbourne notes they:

- Provide strategically located land for major industrial development linked to the PFN and transport gateways.
- Will be protected from incompatible land uses to allow continual growth in freight, logistics and manufacturing investment.

The inclusion of areas of the CREP (including EIP) within the Office-Pakenham SSIP in Plan Melbourne was reflected in the Melbourne Industrial and Commercial Land Use Plan (2020). Refer Figure 3.

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**Figure 2** Future Urban Structure, Cardinia Road Employment Precinct Structure Plan (2010)

Source: Cardinia Shire



**Figure 3** Officer-Pakenham SSIP

Source: Ethos Urban; MICALUP

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## 2.0 Development Scheme

ESR's vision for EIP is to deliver a premium quality industrial estate accommodating a range of higher-order large-format industrial uses. This vision responds to:

- The site's proximity and connection to the Princes Freeway, which provides convenient access to the eastern and south-eastern metropolitan areas and supply chains extending into Gippsland.
- The characteristics of the industrial market in Melbourne's south-eastern region, which is evolving as:
  - the remaining developable supply in the Southern SSIP (Melbourne's premier industrial precinct) is extinguished; and
  - demand for higher-order industrial uses is pushed to the Officer-Pakenham SSIP.

EIP is being planned and developed in two stages.

### Stage 1

Stage 1 is approved and currently under construction (refer Figure 5). It comprises:

- Lot 1: supporting a 12,000m<sup>2</sup> textile factory with an office component.
- Lot 2: supporting a 16,300m<sup>2</sup> warehouse with two attached offices.

### Stage 2

Stage 2 is currently in the development approval phase. ESR have submitted two applications that relate to Stage 2 (refer Figure 6).

The first relates to subdivision of the balance of the site into three lots:

- Lot 3 and Lot 4: which would accommodate large logistics-aligned warehouses.
- Super Lot A (12.4ha). A national, Australian-owned, machinery company is in negotiations with ESR to purchase Lot A.

The subdivision proposal realigns the northern service road which was proposed to run adjacent to the Princes Freeway and replaces it with a similar connection along the southern boundary. The purpose of this change is to provide for higher-order, large format warehouse/manufacturing uses as opposed to the smaller service business uses set out in the PSP. Essentially the large format warehouses can achieve the same urban design aims of the PSP (orientation of offices etc) without the need for a loop road.

Concurrent with the Stage 2 subdivision application is a planning permit application for the use and development of two adjoining warehouses with attached offices on Lot 3:

- Warehouse 3A: a 14,900m<sup>2</sup> warehouse with an attached office.
- Warehouse 3B: a 11,400m<sup>2</sup> warehouse with an attached office.

It is understood that civil works connecting EIP to Cardinia Road are well advanced.



**Figure 4 Warehouse 3A and 3B Artist Impression**

Source: Watson Young

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**Figure 5 Proposed Development Scheme, Stage 1**

Source: ESR



**Figure 6 Proposed Development Scheme, Stage 2**

Source: ESR

### 3.0 The Case for Large Format Warehouses

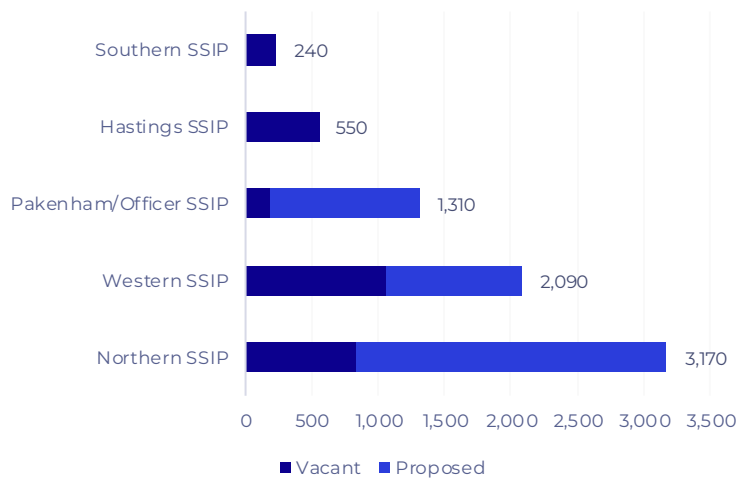
#### The Southern SSIP's constrained supply is pushing demand to the Officer-Pakenham SSIP

The Southern SSIP is Melbourne's most sought-after and expensive industrial precinct. It is nationally renowned for its export-orientated manufacturing activities and logistics and warehousing role.

However, of Melbourne's remaining total industrial land supply, only 235ha or 5.0% is located in the Southern SSIP according to the most recent 2022 Urban Development Program (UDP) release.

Accordingly, the Southern SSIP represents Melbourne's most constrained industrial market and is forecast to run out of supply before 2028. For large industrial lots, this is likely to occur sooner.

In contrast, the Officer/Pakenham SSIP has an estimated 1,310ha of vacant or proposed industrial land supply, according to the UDP. However, only 183ha is classified as vacant (available for development). Note, this figure is likely to have significantly reduced since the time of analysis.



**Figure 7 SSIP Industrial Land Supply, 2022**

Source: Urban Development Program 2022

Overall, Melbourne's industrial land market is now extremely supply constrained. This is highlighted in recent research commissioned by the Property Council of Australia (PCA) which found that the metropolitan industrial supply was equivalent to only 5.3 years at Q2 2022.

#### Melbourne's Industrial landscape has changed since the PSP was gazetted in 2010

Melbourne's industrial market has evolved significantly since the PSP was gazetted. Key changes include:

- A rapid acceleration in the uptake of e-commerce which has significantly increased supply-chain throughput and demand for warehouses and distribution centres.
- Shifts in supply chain strategy. The modern requirements for faster and more efficient delivery of packages have led to heightened tenant demand for strategic metropolitan industrial sites.

As a result of both trends, demand for well located industrial sites capable of supporting large format warehouses has increased considerably.



## **Kaduna Business Park and South Point Business Park are delivering a range of smaller industrial lots**

Kaduna Business Park and South Point Business Park are developing industrial estates located south of EIP and comprise 92-hectares and 70-hectares in area, respectively.

The majority of land in both estates is designated for 'industrial' uses by the PSP. Yet their subdivision plans generally reflect a finer-grain subdivision pattern more suited to 'service industry' type activities.

For example, nearly 50% of lots in Kaduna Business Park are less than 2,000m<sup>2</sup>.

South Point's first stage comprises approximately 89 lots, of which, 69% are less than 2,500m<sup>2</sup>. This excludes the 14.8 hectares allocated for service business. Approximately 28.7 hectares of this estate is yet to be subdivided.

Both estates:

- Support a range of lot sizes that will cater to small to medium businesses across the industrial, service and commercial sectors.
- Will develop in parallel to EIP, resulting in a large availability of finer-grain industrial lots in the CREP as EIP is constructed and occupied.

## **EIP is a strategically located to support large-format warehouses within the Officer-Pakenham SSIP**

Unlocking large industrial lots in CREP will support policy objectives for SSIP's to deliver strategically located land for major industrial development linked to the PFN. As previously outlined:

- EIP will be easily accessed from the Princes Freeway, allowing tenants to service the eastern and south-eastern metropolitan areas, as well as supply chains into Gippsland.
- The limited remaining supply in the Southern SSIP means the Office-Pakenham SSIP will be needed to play a role in supporting higher-order large-format industrial activity.

The larger lots and warehouses also provide an opportunity to attract national businesses that may elevate credentials of the CREP in the eyes of potential occupiers and act as significant employment anchors.

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## 4.0 Economic Benefits of the Proposed Development Scheme

### Economic modelling approach

Ethos Urban has estimated the economic benefits of the proposed development in the construction and operational phases. The primary way to measure the economic footprint of a property development or operational business is to estimate the contribution to the economy by way of the employment and value added supported.

The employment and value added estimates outlined in this report flow from Ethos Urban's proprietary input-output (IO) model. This IO model is based on ABS National Accounts data and has been developed to comply with best practice guidelines. The modelling estimates the following:

- **Construction Employment** – the total construction job-years supported by construction of the direct (onsite) and indirect (multiplier) job years supported over the construction period. Jobs years are estimated in the construction phase to account for the length of the construction phase (i.e. if construction is over 10 years, 100 job-years is equivalent to 10 FTE jobs per year).
- **Ongoing Employment** – the direct and indirect full-time equivalent (FTE) jobs supported by the ongoing operations of activities supported by the proposed development once operational.
- **Value-Added** – the direct and indirect value-added generated during the construction and operational phase of the project. Value added is defined as the wages, salaries and supplements plus gross operating surplus (income earned by businesses) required to produce an additional unit of output.

The **direct** economic contribution is a representation of the flow from labour and capital committed in the economic activity. The **indirect** economic contribution is a measure of the (flow-on) demand for goods and services produced in broader economy as a result of demand generated by the direct economic activity.

Estimates of the economic benefits of the proposed development will be accrued across the national economy. But given the scale and diversity of the economy in Cardinia Shire and Melbourne's south-east, it is anticipated that a significant share of the economic benefits will be realized locally.

The economic benefits have been estimated for the:

- **Construction Phase:** Economic activity during the construction phase of the project which will be spread across the construction program.
- **Operational Phase:** Ongoing economic activity once EIP is completed.

### Construction phase benefits

#### Indicative construction costs

A high-level estimate of the construction cost has been undertaken to understand the economic benefits that would accrue in the construction phase.

Indicative construction costs for Lots 1-4 and associated civil related construction costs have been provided by ESR. The construction cost for Super Lot A has been estimated by the consultant with reference to Rider Levett Bucknall's (RLB) construction costs for Melbourne in the 2024 RLB Rider Digest.

The proposed development's construction cost is estimated at \$183.5 million. This comprises approximately:

- \$31 million for Lots 1 and 2 in Stage 1
- \$103.7 million for Lots 3, 4 and Super Lot A in Stage 2
- \$48.8 million for total civil construction.

#### Employment and value added

Based on a construction cost of \$183.5 million, the construction phase is expected to support 330 direct (onsite) job-years generating \$47.6 million in direct value added.

When the multipliers are considered, total national-wide economy effects over the construction period for the proposed development are forecast to be:

- Total FTE employment of 1,080 job-years (direct and indirect).
- Total value-add to the economy of \$151.6 million.

**Table 1 Construction Phase Employment and Value Added**

Category	Direct	Indirect	Total
Employment Job Years (FTE)	330	750	1,080
Value Added (\$M)	\$47.6	\$104.1	\$151.6

Source: ABS, National Accounts 2020/21; ABS; Ethos Urban

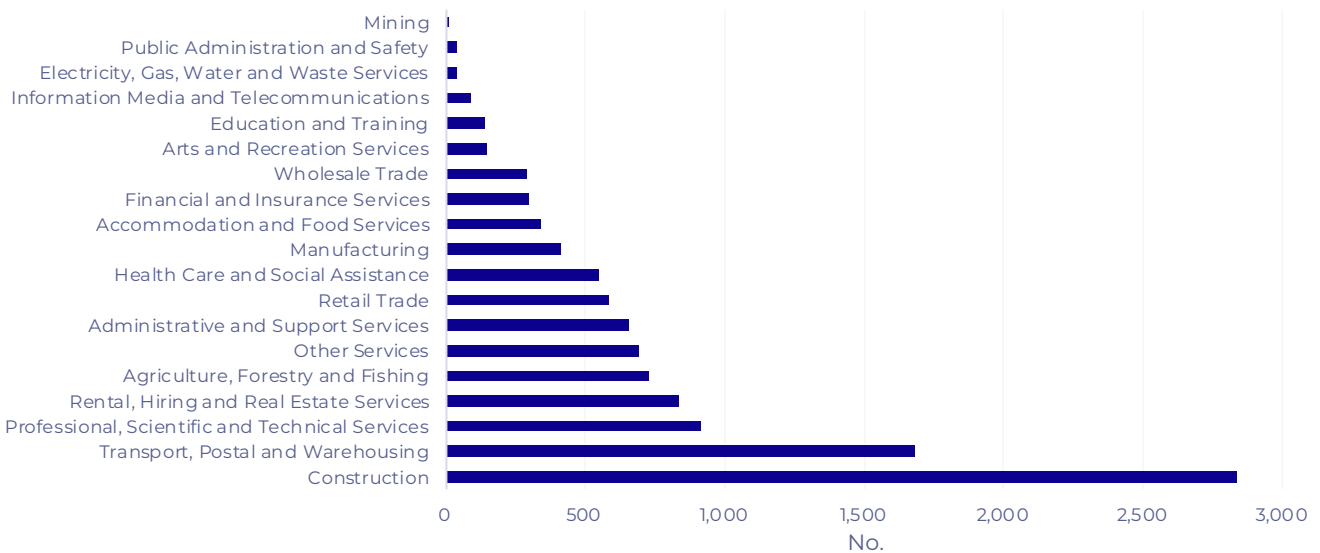
Job-years - Number of FTE jobs supported over the construction period. i.e. if construction is over 10 years, 100 job-years is equivalent to 10 FTE jobs per year.

### Business Participation Opportunities

The proposed development’s construction phase is expected to generate business participation opportunities for local construction-related businesses in Cardinia Shire.

In June 2023, construction businesses comprised approximately one quarter (25.2%) of all businesses in the municipality based on ABS Business Counts (refer Figure 8). Moreover, approximately 36.7% of Cardinia Shire’s labour force are in construction related occupations (refer Figure 9) – i.e., technicians and trade workers, labourers, and machinery drivers and operators. This compares to approximately 26.3% in Greater Melbourne.

Local businesses in Cardinia Shire would be well placed to benefit from the construction phase of the proposed development, as indicated by the municipality’s business and occupational structure.



**Figure 8 Business Counts by Industry, Cardinia Shire, June 2023**

Source: ABS, Counts of Australian Businesses; Ethos Urban



**Figure 9 Share of Construction and Non-Construction Related Employment, Cardinia Shire, 2021**

Source: ABS, Counts of Australian Businesses; Ethos Urban

## Operational Phase Benefits

The economic contribution of industrial uses accommodated by Stage 1 and Stage 2 of EIP (once constructed and fully occupied) have also been estimated.

Approximately 750 direct (onsite) jobs would be supported by EIP when fully occupied, comprising:

- Approximately 200 FTE jobs supported by Stage 1
- Approximately 550 FTE jobs supported by Stage 2

Direct FTE employment estimates are based on an assumed 150m<sup>2</sup> (of warehouse space) per FTE worker for Lots 1-4. Indicative FTE employment for Super Lot A was provided to ESR by the prospective occupier.

The anticipated onsite jobs accommodated by Stage 1 and Stage 2 would support an estimated 320 and 770 FTE indirect jobs, respectively, in the broader economy.

Based on the above, on completion, the proposed development is estimated to generate up to \$322.8 million in total (direct and indirect) value added. This consists of \$170.5 million in direct value added, plus an additional \$152.3 million of indirect value added.

**Table 2      Operation Phase Economic Benefits (Annual)**

Category	Direct	Indirect	Total
<b>Stage 1</b>			
Employment (FTE)	200	320	520
Value Added (\$M)	\$51.4	\$45.8	\$97.2
<b>Stage 2</b>			
Employment (FTE)	550	770	1,320
Value Added (\$M)	\$119.0	\$106.6	\$225.6
<b>Total</b>			
Employment (FTE)	750	1,090	1,840
Value Added (\$M)	\$170.5	\$152.3	\$322.8

Source: ABS, National Accounts 2020/21; ABS; Ethos Urban

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## 5.0 Conclusion

The departure from the PSP road network facilitates the development of higher-order, large format industrial uses (i.e. warehousing, manufacturing etc) as opposed to the service business uses originally envisaged by the PSP. ESR's vision for larger format industrial uses aligns with the site's subsequent designation within the Officer-Pakenham SSIP, noting that SSIP's are to support major industrial developments linked to the PFN and transport gateways, according to Plan Melbourne.

The strategic economic rationale for the proposed scheme is underpinned by:

- The EIP's location in the Officer-Pakenham SSIP and connectivity to the PFN via the Princes Freeway.
- Melbourne's constrained industrial land supply, particularly in the Southern SSIP.
- The substantial increase in demand and limited supply of large industrial lots due to growth in e-commerce and nearshoring trends.
- The necessity for EIP to service different segments of the industrial market compared to nearby Kaduna Business Park and South Point Business Park which will develop in parallel to EIP.
- The opportunity to attract national businesses that would enhance CREP's market credentials and function as a local employment anchor.

Economic benefits generated in the construction and operational phase of the proposed development include:

- Total capital investment of \$183.5 million.
- Approximately 1,080 FTE job-years (direct and indirect) supported by construction phase activities, generating \$151.6 million in total value added.
- Business participation opportunities in the construction phase for local businesses in Cardinia Shire, noting that construction is a specialisation of the regional economy.
- Some 1,840 total FTE jobs (direct and indirect) supported when EIP is fully developed and tenanted, generating \$322.8 million in total (direct and indirect) value added.

\*\*\*

We trust this letter of advice addresses your requirements.

Yours sincerely



Associate Director, Economic



Senior Economist



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## Attachment A Measuring the Economic Impacts of the Proposed Development

Economic impacts associated with the proposed development have been prepared with input-output modelling undertaken with reference and compliance to best-practice guidelines.

### Input Output Modelling

Input-output tables are a 'map' of the economy that track the flow of products, services, and payments through the many industries, households, government organisations and foreign transactions that make up the Australian economy.

Every industry requires inputs from many other industries, plus the inputs of workers and machinery and equipment to produce output. Input-output modelling uses averages derived from the ABS Input Output Tables to estimate the impact on all industries when one industry expands its production. The modelling used in this report is based on the 2020/21 ABS National Accounts release.

As with all economic models, input-output models (I/O models) have a number of limitations, which include the following inherent assumptions: unlimited supplies of all resources including labour and capital, prices remaining constant, technology is fixed in all industries, and import shares are fixed.

Having regard for these limitations, the modelling used for the purposes of this assessment applies the **Simple Multiplier effect measure**. The Simple Multiplier effects measure estimates the expansion of other industries required to support the initial (direct) increase in the original industry; and does not include the additional impacts of extra wages and employment income being spent across the economy (spill-over effects).

Use of the Simple Multiplier effect measure is in-line with best practice industry standards and reflects a more conservative position. As consumption induced effects are tentative and unobservable, it is considered good practice to exclude them from I/O impact analysis, using the 'simple multiplier' instead of the 'total multiplier' (which includes the 'simple multiplier' plus consumption induced effects).

Results from the modelling should be interpreted as indicative of the potential impact likely to result from the proposed development on the Australian economy.

The modelling provides estimates of the following economic benefits as a result of the project:

- **Construction Employment** - direct construction job-years supported by construction of the development and indirect job-years supported across all other industries over the construction period.
  - '**Job-years**' is defined as the number of full-time equivalent (FTE) jobs supported over the construction period. i.e. if construction is over 10 years, 100 job-years is equivalent to 10 FTE jobs per year. Only applies to construction employment.
- **Ongoing Employment** - direct and indirect FTE jobs supported by the ongoing operation of the project annually.
- **Value Added** - direct and indirect value added generated during the construction and operational phase of the project.

Value Added is defined as the wages, salaries, and supplements plus gross operating surplus (income earned by businesses) required in producing the extra output (construction investment and operating output/turnover). This represents the standard measure of economic contribution, that is, the increase in economic activity as measured by gross domestic product (GDP).

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## **92 Enterprise Road, Pakenham**

### Transport Impact Assessment



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5 June 2024

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## APPENDICES

### APPENDIX A SWEEP PATH DIAGRAMS

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# 1 INTRODUCTION

onemilegrid has been requested by Dalton Consulting Engineers to undertake a Transport Impact Assessment of the proposed industrial subdivision at 92 Enterprise Road, Pakenham.

onemilegrid has previously prepared a Transport Impact Assessment for the initial stage of development (report dated 8 February 2023), with supplementary assessments undertaken subsequently. This report includes the full site development, and all current analysis.

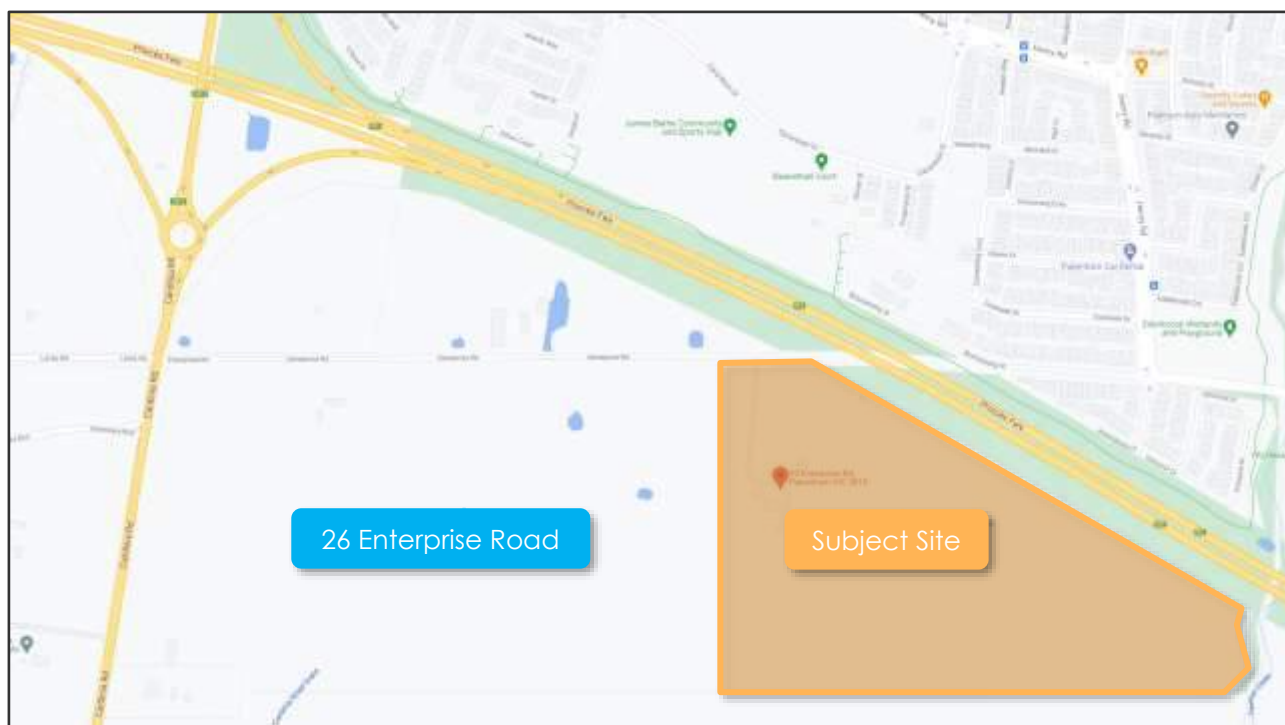
As part of this assessment the subject site has been inspected with due consideration of the development proposal, traffic data has been sourced and relevant background reports have been reviewed.

## 2 EXISTING CONDITIONS

### 2.1 Site Location

The subject site is located to the east of Cardinia Road, bound to the northeast by Princes Freeway and Enterprise Road to the north, as shown below.

Figure 1 Site Location



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The site is currently vacant, though works associated with the first stages of development are currently underway, with construction access via Enterprise Road.

Future access to the site will be provided via 26 Enterprise Road to the west, for which the PSP road network is currently being constructed as part of a previous Section 35 application. Once the road network is constructed, access via Enterprise Road will be closed.

An aerial view of the subject site in the context of its surrounds is provided in Figure 2.

**Figure 2 Site Context (29 March 2024)**



Copyright Nearmap

## 2.2 Planning Zones and Overlays

It is shown in Figure 3 that the site is located within an Urban Growth Zone (UGZ).

**Figure 3 Planning Scheme Zones**



## 2.3 Road Network

### 2.3.1 Enterprise Road

Enterprise Road is a local road with a gravel surface of approximately 5 to 6 metres, running east from Cardinia Road and terminating at the northwest corner of the subject site. Enterprise Road currently intersects with Cardinia Road at a give-way controlled cross-intersection with Lecky Road to the west.

### 2.3.2 Cardinia Road

Cardinia Road is currently a local road generally aligned north-south, running between Princes Freeway in the north and Ballarto Road in the south.

Cardinia Road provides a single traffic lane in each direction in the vicinity of the site.

An 80 km/h speed limit applies to Cardinia Road in the vicinity of the site, increasing to 100 km/h south of Centenary Boulevard, which is anticipated to be reduced to 80 km/h as development in the area continues.

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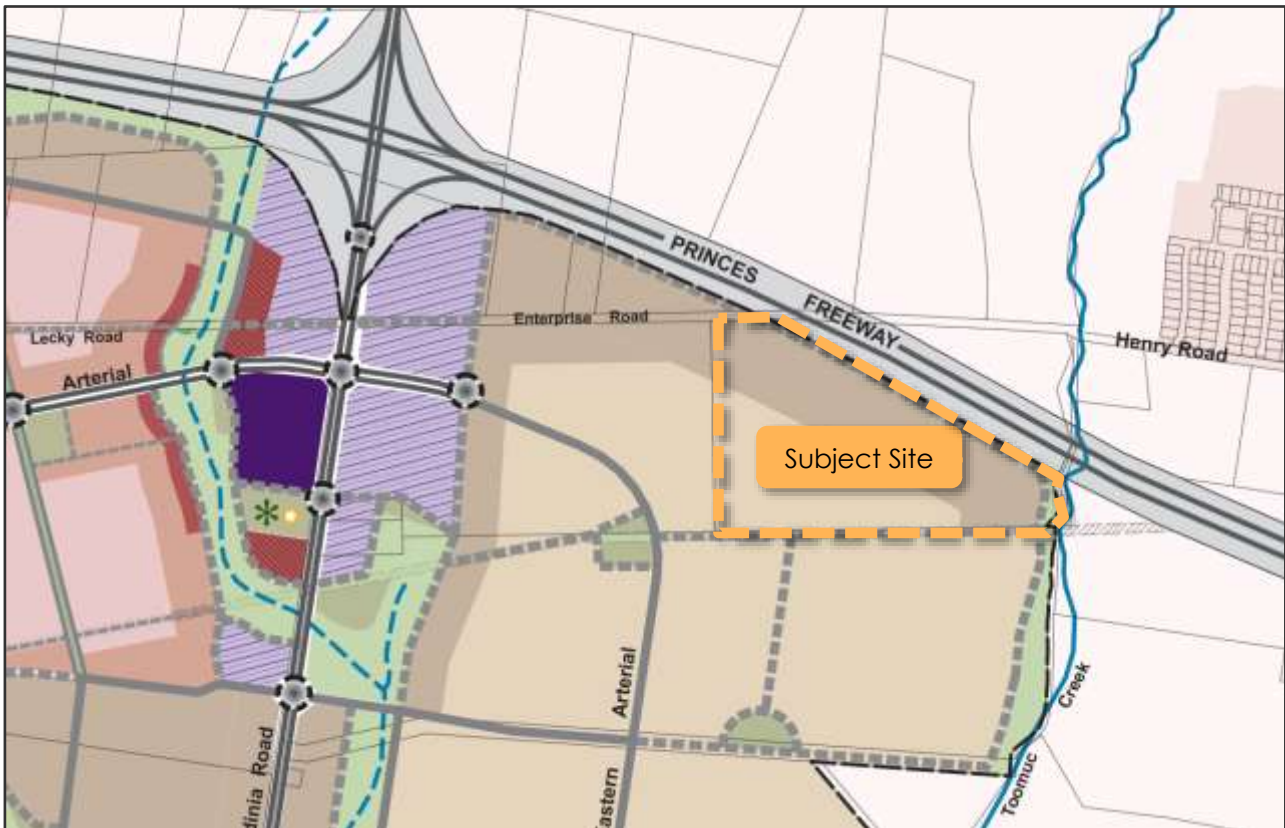


### 3 CARDINIA ROAD EMPLOYMENT PRECINCT STRUCTURE PLAN

#### 3.1 General

The site is located within the Cardinia Road Employment Precinct (CREP) Structure Plan area, for which an extract of the PSP 'Map' is shown in Figure 4. This site is nominated in the PSP as Industrial and Service Business Land.

**Figure 4 Cardinia Road Employment Precinct PSP Map**



- Employment Land**
-  Commercial
  -  Activity Centre
  -  Service Business
  -  Industrial
- Heritage and Community**
-  Post Contact Heritage Site
  -  Community Facility
- Open Space and Environment**
-  Unencumbered Open Space
  -  Encumbered Open Space
  -  Existing Creeks
  -  Drainage Lines
  -  Ecological Vegetation Classes (EVCs) to be Retained

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### 3.2 Road Network

The Cardinia Road Employment PSP provides guidance on the internal road network for the site and the ultimate road network in the vicinity. The PSP road network is shown in Figure 5 below.

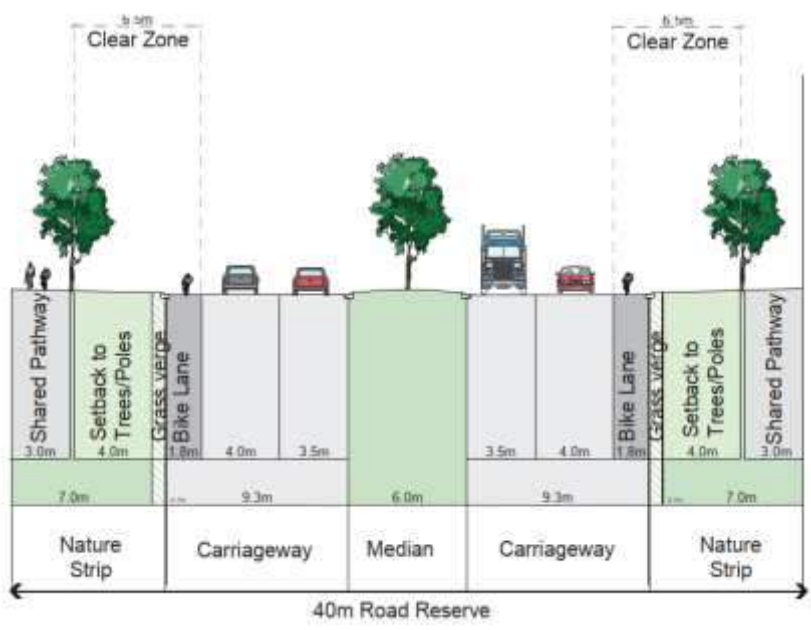
**Figure 5 PSP Road Network Plan**



The PSP shows that the nearest site access to Cardinia Road will be provided from the Eastern Arterial, via a road which runs along the gas easement to the south, or along the Princes Freeway to the north-west.

The PSP specifies that the Eastern Arterial between Cardinia Road and the first roundabout to the east is proposed as an Arterial Road with the cross section as shown in Figure 6.

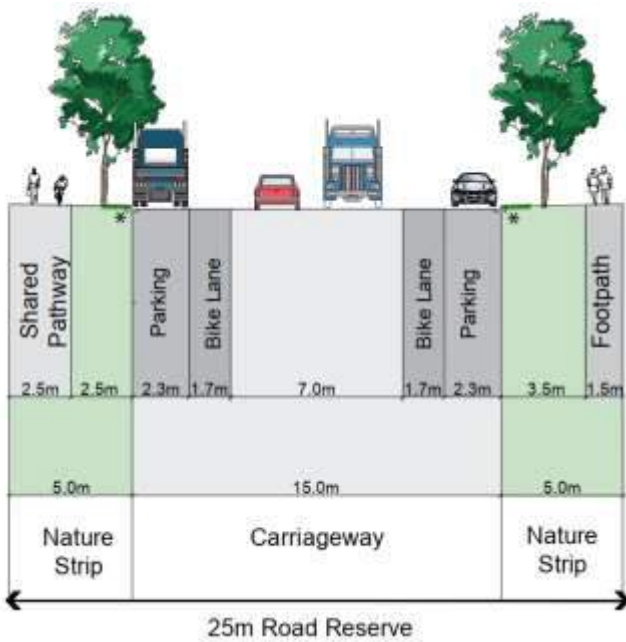
**Figure 6 Arterial Road – 40 m Road Reserve**





To the east of the roundabout, the Eastern Arterial is proposed as a Connector Street with the cross section shown in Figure 7.

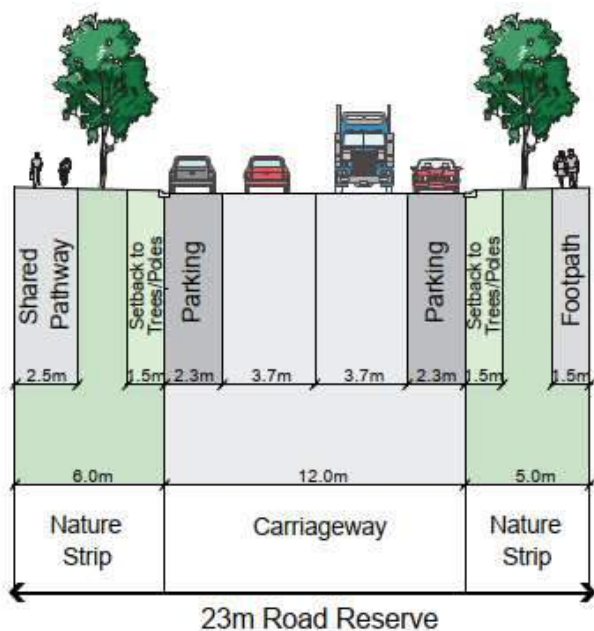
**Figure 7 Connector Street – 25 m Road Reserve**



The PSP specifies that the road within the gas easement along the southern boundary, and along the north-eastern boundary will be an Industrial Access Street – Level 2. It is noted that the road within the gas easement will not be permitted by the service authority, and therefore access to surrounding development will require alternate road connections.

The Industrial Access Street Level 2 in the PSP has a 7.4 m carriageway (3.7 m lanes), 2.3 m kerbside parking lanes on both sides of the road and a 6 metre verge on one side and 5 metre verge on the other. The cross section for an Industrial Access Street – Level 2 is shown in Figure 8.

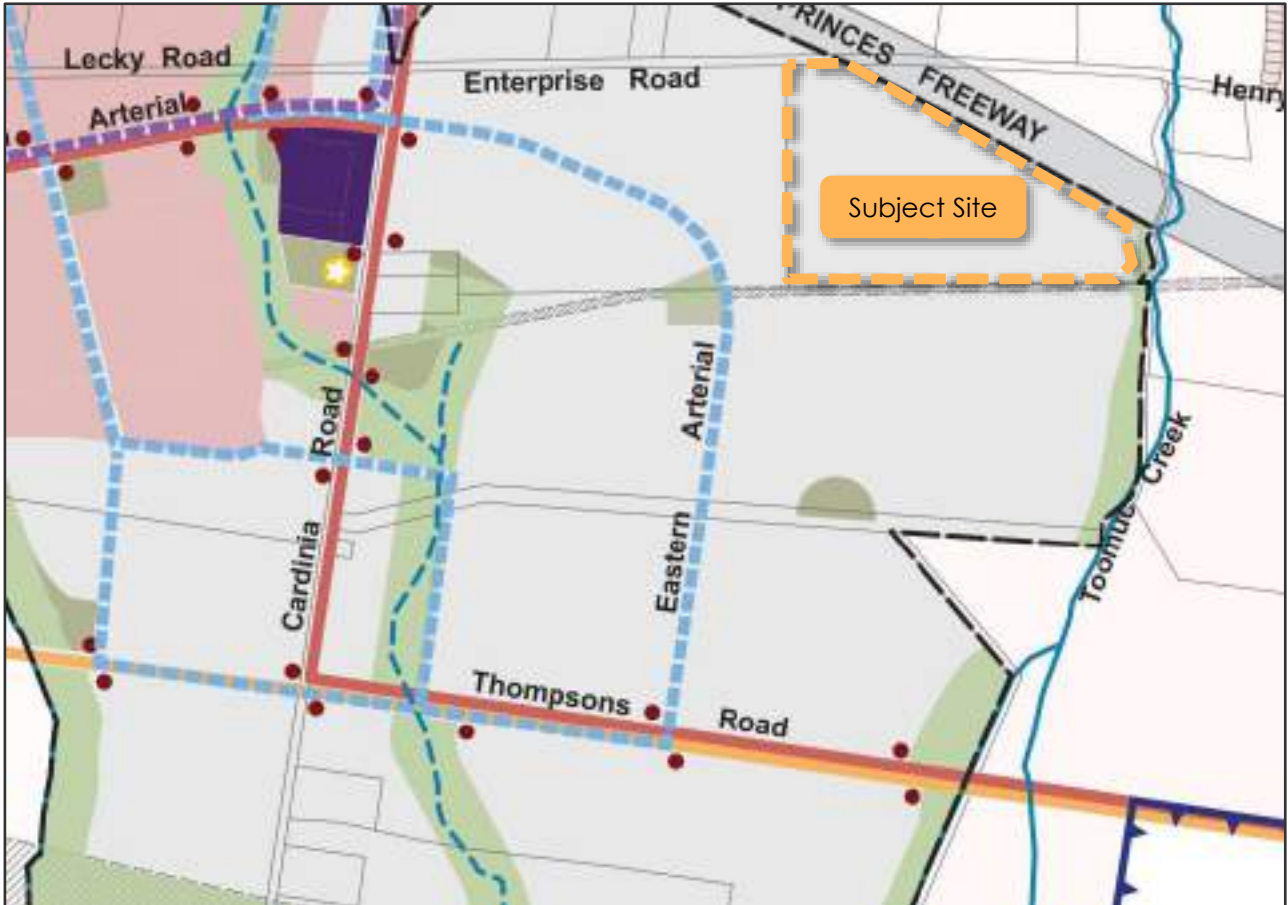
**Figure 8 Industrial Access Street Level 2 – 23 m Road Reserve**



### 3.3 Public Transport

The PSP nominates potential future bus routes on the Eastern Arterial, Cardinia Road and Centenary Boulevard to the west, as shown below.

**Figure 9 PSP Public Transport**



**Public Transport Network**

-  Rail line and Stations
-  Principal Public Transport Network (PPTN) Bus Route
-  Potential Regional Bus Route (Frankston to Pakenham via Glasscocks Rd Extension)
-  Potential Regional Bus Route (Frankston to Pakenham via Thompsons Road)
-  Potential Local Bus Route
-  Local Loop (Potential Local Bus Route)
-  Bus Stops (approx. location)
-  Future Grade Separated Crossing
-  Future Freeway Interchange

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### 3.4 Walking and Trails Network

Shared paths are indicated by the PSP along the northern, eastern and southern boundaries of the site, as shown below.

**Figure 10 PSP Walking and Trails Network**



- Movement Network**
- Signalised Intersection
  - Potential Future Signalised Intersection
  - Roundabout
  - Signalised Pedestrian Crossing
  - On Road Cycle lanes
  - Shared Paths
  - Key Local Footpaths
  - Trail Network
  - Future Bridges/Underpasses

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## 4 CARDINIA ROAD EMPLOYMENT PRECINCT DEVELOPMENT CONTRIBUTIONS PLAN (DCP)

The subject site is located within the area covered by the Cardinia Road Employment Precinct Development Contributions Plan.

The road projects identified within the Cardinia Road Employment Precinct (CREP) DCP are shown below, including the Interim (UP) design.

**Figure 11 Cardinia Road Employment Precinct DCP**



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## 5 26 ENTERPRISE ROAD CONSTRUCTION

Access to the subject site (92 Enterprise Road) is proposed via the adjacent site (26 Enterprise Road) through the construction of a portion of the PSP road network, which is currently underway. The road network proposed within 26 Enterprise Road is shown in Figure 12.

**Figure 12 Proposed Road Network**



The works include the construction of the Cardinia Road/Centenary Boulevard/Eastern Arterial roundabout in accordance with the interim concept plan (IN-02) within the CREP. The north, south and west approaches to the roundabout will match back into the existing road network.

Within 26 Enterprise Road, it is proposed to construct the eastern arterial between the western and southern boundaries, including RD-05 and IN-05.

The eastern approach for IN-05 will be provided with two lanes in each direction, tapering down to one lane in each direction over approximately 160 m.

At the southern site boundary, the road has been designed to match tangentially into the current road design for the approved industrial development to the south at 295 Cardinia Road.

Finally, it is proposed to construct an Industrial Access Street between the Eastern Arterial and the boundary between 26 Enterprise Road and 92 Enterprise Road, to facilitate future access to the subject site. Refer to Section 8.2 for further discussion on works.

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## 6 DEVELOPMENT PROPOSAL

### 6.1 General

The application seeks to subdivide the balance of the ESR land creating three lots, with associated road and drainage reserves. This subdivision will form Stage 2 of the ESR industrial estate.

A development application T240191 has been lodged for a warehouse distribution centre on Lot 3 and a similar application will be lodged on Lot 4. Lot A will provide a 12.4 hectare land parcel for a major employer comprising office, warehouse, display and servicing facilities.

**Figure 13 Subdivision Masterplan**



A breakdown of the site areas for each of the stages is shown below.

**Table 1 Development Staging**

Stage	Use	Lots	Area
1	Industrial	Lot 1 and Lot 2	5.15ha
2	Industrial	Lot 3 and Lot 4	7.02ha
		Lot A	12.40ha
<b>Total</b>			<b>24.57ha</b>

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## 6.2 Road Network

Access to the site is proposed from 26 Enterprise Road along the western boundary of the site with a future connection along the northern boundary of the site through the existing Enterprise Road road reserve.

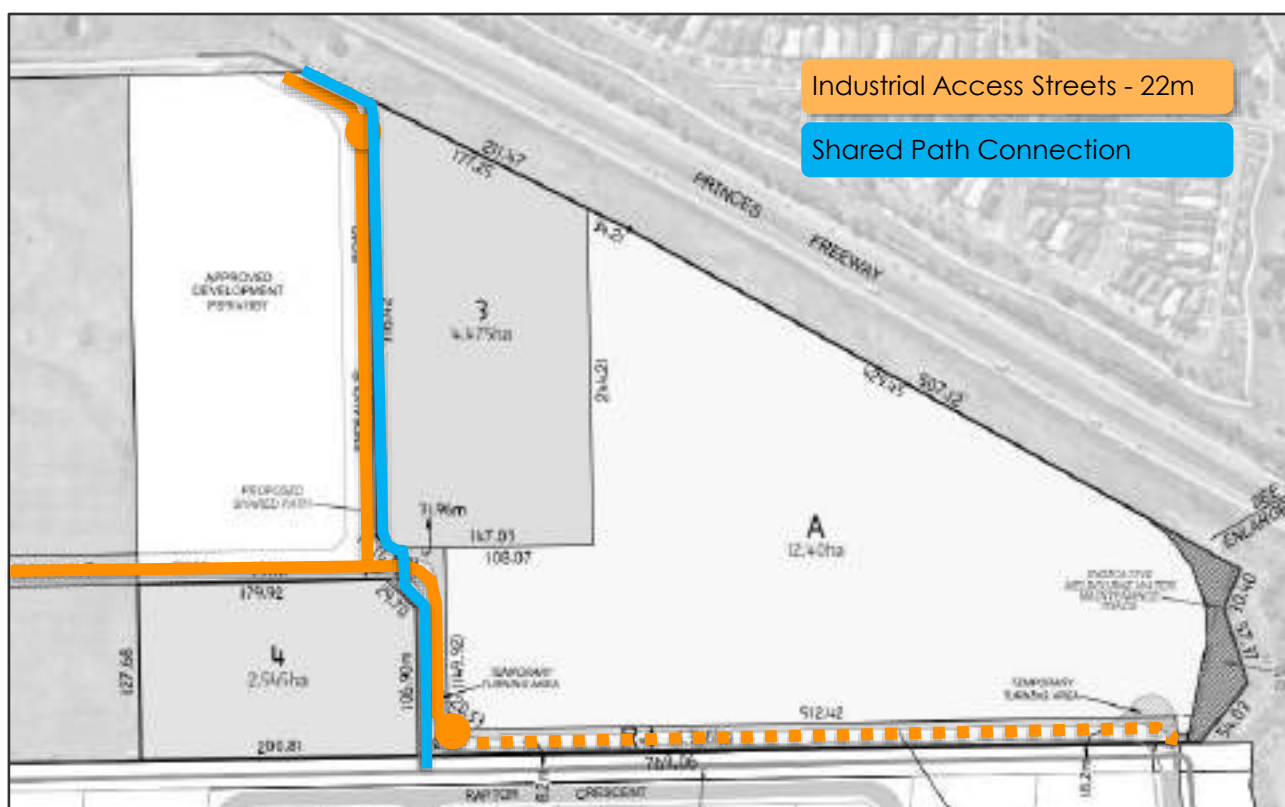
Access is proposed via the Eastern Arterial and the IN-02 roundabout to Cardinia Road in accordance with the road network proposed as part of a separate S35 application.

Connection is provided to the western boundary of the future Lot A development, which will allow for the extension of the road network south of Lot A in the future, as per the PSP. It is intended that this future road construction be facilitated via a Section 173 agreement placed on the title of Lot A, which will require the road connection along the southern boundary to be constructed prior to Certificate of Occupancy for any buildings on Lot A. Should the connection to the land to the south of the gas easement not be available at the time of the road construction, a temporary court bowl will be provided at the eastern end of the extension road.

A court bowl is proposed at the southern end of the internal road to allow for vehicle turnaround in the interim.

The proposed road network is shown in Figure 14.

**Figure 14 Road Network Plan**



Whilst generally in accordance with the PSP, a cross-sectional variation is proposed for the Industrial Access Streets through the development, which are proposed with a 22m road reserve. This includes a slight modification from the PSP cross-section, with a small reduction in the verge width on one-side of the road, which is consistent with the 5m verge widths identified for the PSP Connector Road cross-section. This is consistent with the road cross-sections adopted and approved within the Permit 1 area.

To provide for vehicle turnaround prior to the extension of the proposed road network to the north, a temporary turnaround area is provided partially within Lot 2, and partially within the existing Enterprise Road road reserve.

## 7 SUBDIVISION DESIGN ASSESSMENT

---

### 7.1 General

The design of the subdivision has been assessed, in relation to the Cardinia Road Employment Precinct Structure Plan, as per the PSP documentation summarised in Section 3.

### 7.2 Road Network

The proposed internal road network is generally in accordance with that specified within the PSP, including the provision of Industrial Access Streets. It is noted that a variation to the PSP nominated road cross-section is proposed, based on rationalisation of verge widths, and in accordance with that approved within the first permit area. Noting that the PSP Connector Street cross-section adopts the same verge design as that proposed for the Industrial Access Street Level 2, the modified cross-section is considered to be appropriate.

The PSP specifies that an Industrial Access Street should be provided along the southern boundary of the site within the gas easement. It is noted that the road within the gas easement will not be permitted by the service authority, and as a result the internal road network and access to the site has been amended. As discussed in Section 6.2, it is proposed to construct an internal road with a temporary court bowl to the northern side of the gas easement in the interim, with the continuation of the road along the gas easement occurring at a later date, and prior to the occupation of any buildings on Lot A (via a S173 Agreement). This will ensure that suitable site and pedestrian/cycle access is provided in the interim period, and ultimately, the road connection across the gas easement will be provided to the south, as required by the PSP.

Furthermore, rather than construct the road along the gas easement initially, it is considered preferable to delay the construction, due to the following:

- The connecting road within the development to the south is within the last stage of the adjacent Kaduna Park Industrial Estate, with the road network not expected to be constructed for some time. The connection across the gas easement can therefore not be made until the adjoining road is constructed, therefore the road within the proposed development would serve no purpose;
- Additionally, with no connection to the south, a temporary court bowl will be required to be constructed at the eastern end of the road, which would require removal once the connection to the south was made. This results in unnecessary construction and demolition works which may otherwise be avoided;
- With no passive surveillance, the road along the southern boundary (and particularly the temporary court bowl) may generate anti-social behaviour ('hooning'). Delaying the construction until occupancy of Lot A (at which time there will be additional surveillance over the road) will therefore minimise the potential for hooning on the road network.

It is also noted that the PSP identifies an Access Street along the north-eastern site boundary, running alongside the Princes Freeway, and connecting to adjacent land to the north and south. The proposed subdivision includes this access street connection to the north, although diverts the access street to the south away from the freeway frontage, and will provide the ultimate road connection via the future road along the gas easement. This provides similar levels of connection to the road network suggested by the PSP, and is therefore considered to be appropriate.

The road network has been designed to accommodate trucks up to a B-triple, with turn around manoeuvres at both court bowls possible for trucks up to a 26m B-Double (BD), as demonstrated in the swept paths attached in Appendix A.

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### 7.3 Walking and Trails

The proposed subdivision includes the provision of off-road shared paths throughout the development, including a connection from Enterprise Road in the north, through to the shared path proposed within the gas easement. As discussed above, whilst the PSP identifies a shared path connection adjacent to the Princes Freeway, the proposed shared path connection through the site provides a similar level of connection between the eastern site boundary and the northern boundary, whilst providing improved connections to the west and centre of the site. The proposed shared-path connection is therefore considered to be appropriate.

The proposed walking and cycling network has been designed with due consideration of the objectives within the PSP and has been modified to ensure cyclist and pedestrian safety through the industrial area.

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## 8 TRAFFIC

### 8.1 Traffic Generation

In order to establish appropriate traffic generation rates for use in analysis of development impacts, **onemilegrid** has undertaken case-studies of two industrial precincts (located in Derrimut and Laverton North) that exhibit similar characteristics to that of the proposed development.

The two areas comprised a total of 31 industrial and warehouse lots, with site areas ranging in size between approximately 6,000 m<sup>2</sup> and 55,000 m<sup>2</sup>. It is noted that the site area does not include the area of adjacent road reserves.

A summary of the case-study data is provided in Table 2 below.

**Table 2 Industrial Case Study Data**

Location	No. Lots	Site Area (m <sup>2</sup> )	Building Area (m <sup>2</sup> )	Site Coverage	Traffic Generation Rate (Trips/100m <sup>2</sup> Building Area)		
					Daily	AM Peak	PM Peak
Gilbertson Road, Laverton North	16	396,000	149,500	38%	2.23	0.17	0.21
Fulton Drive, Derrimut	15	290,000	108,000	37%	3.78	0.27	0.29
<b>Average</b>					<b>3.00</b>	<b>0.22</b>	<b>0.25</b>

As shown above, the two precincts generated an average of 3 vehicle movements per 100m<sup>2</sup> of building area per day, and between 0.22 and 0.25 movements per 100 m<sup>2</sup> of building area during the peak hours.

It is noted that the PSP identifies the potential development of service business along the freeway boundary of the site, which would likely generate higher traffic volumes. It is understood that the proposed development will consist of large warehouse developments only (no service business type development) which are expected to have lower traffic generation rates than the office and industrial uses that are typically located within business parks, or service business developments.

For the purposes of this assessment, based on previous Council feedback, a conservatively high traffic generation rate of 0.4 movements per 100m<sup>2</sup> building area will be adopted for both peak hours.

Furthermore, a site coverage ratio of approximately 40% has been observed, and adopted for analysis purposes.

Application of the above yield and traffic generation rates to the proposed 24.57 ha of developable area (adopting the full site area for Lot A for the purposes of a conservative analysis) gives a daily traffic generation in the order of 3,932 vpd with 393 vehicle movements in the AM and PM peak hours.

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## 8.2 Traffic Impact

### 8.2.1 General

The development provides an internal road network generally consistent with the Cardinia Road Employment PSP. The internal roads have a capacity to accommodate the total daily traffic volumes expected to be generated by the proposed development, until such time as additional connections are made to the north and south.

The works under construction in the adjacent site at 26 Enterprise Road includes the construction of the Eastern Arterial, IN-02 (Cardinia Road/Eastern Arterial/Centenary Boulevard roundabout), RD-05 and IN-05, generally as per the Interim (UP) designs identified within the PSP. These designs have been prepared to accommodate the full development of the Cardinia Road Employment Precinct, until such time that Cardinia Road is further duplicated, and intersections upgraded by Department of Transport and Planning (DTP). The road network facilitating access for the site is therefore considered to be acceptable in accommodating the anticipated traffic generation.

It is not proposed to undertake works at the IN\_01 intersection (the southern Princes Freeway ramps). To ensure this intersection will operate suitably into the future, analysis has been undertaken of the IN\_01 intersection for a 3-year period, with upgrade works expected to occur thereafter (as a result of the current and expected development progression of other permitted development in the area, and noting the permit requirements identified above).

In relation to the proposed subdivision on the subject site, whilst Statement of Compliance (SoC) may be sought for the entire subdivision within this timeframe, it is noted that there will be a delay between the issue of SoC and any the commencement of any use on the site.

Regardless, for the purposes of a conservative assessment, a lot area of approximately 25 ha will be assessed as operational by 2026.

As per the previous Transport Impact Assessment and consistent with previous assessments within the CREP, the following has been included in the traffic analysis:

- A traffic generation rate of 0.4 trips per 100 m<sup>2</sup> building area;
- A site coverage ratio of approximately 40%;
- 90% of traffic will have a northern origin/destination and the remaining 10% will have a southern origin/destination;
- During the AM peak hour 60% of traffic will be inbound and 40% outbound. Conversely, during the PM peak hour it is expected that 40% will be inbound and 60% outbound;
- A total of 26% growth to the 2023 survey volumes through to 2026 as per Council recommended growth rates.

As per discussion with Council's traffic engineer, the high growth rates applied to the existing volumes are understood to encapsulate growth from all sources, including traffic diverted from parallel routes, background growth and other permitted development within the CREP.

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## 8.2.2 Intersection Analysis

To assess the operation of the intersection, the expected 2026 traffic volumes have been input into SIDRA Intersection, a traffic modelling software package.

The SIDRA Intersection software package has been developed to provide information on the capacity of an intersection with regard to a number of parameters. Those parameters considered relevant are, Degree of Saturation (DoS), 95th Percentile Queue, and Average Delay, as described in Table 3 below.

**Table 3 SIDRA Intersection Parameters**

Parameter	Description														
Degree of Saturation (DoS)	The DoS represents the ratio of the traffic volume making a particular movement compared to the maximum capacity for that particular movement. The value of the DoS has a corresponding rating depending on the ratio as shown below.														
	<table border="1"> <thead> <tr> <th>Degree of Saturation</th> <th>Rating</th> </tr> </thead> <tbody> <tr> <td>Up to 0.60</td> <td>Excellent</td> </tr> <tr> <td>0.61 – 0.70</td> <td>Very Good</td> </tr> <tr> <td>0.71 – 0.80</td> <td>Good</td> </tr> <tr> <td>0.81 – 0.90</td> <td>Fair</td> </tr> <tr> <td>0.91 – 1.00</td> <td>Poor</td> </tr> <tr> <td>Above 1.00</td> <td>Very Poor</td> </tr> </tbody> </table>	Degree of Saturation	Rating	Up to 0.60	Excellent	0.61 – 0.70	Very Good	0.71 – 0.80	Good	0.81 – 0.90	Fair	0.91 – 1.00	Poor	Above 1.00	Very Poor
	Degree of Saturation	Rating													
	Up to 0.60	Excellent													
	0.61 – 0.70	Very Good													
	0.71 – 0.80	Good													
	0.81 – 0.90	Fair													
0.91 – 1.00	Poor														
Above 1.00	Very Poor														
It is noted that whilst the range of 0.91 – 1.00 is rated as 'poor', it is acceptable for critical movements at an intersection to be operating within this range during high peak periods, reflecting actual conditions in a significant number of suburban signalised intersections.															
Average Delay (seconds)	Average delay is the time delay that can be expected for all vehicles undertaking a particular movement in seconds. This includes time taken to accelerate or decelerate, time taken to undertake the manoeuvre, and delay at a hold line or stop line.														
95th Percentile (95%ile) Queue	95%ile queue represents the maximum queue length in metres that can be expected in 95% of observed queue lengths in the peak hour.														

The results of the analysis are provided in Table 4.

**Table 4 Southern Cardinia Road Interchange – Interim Conditions**

Approach	DoS	Avg. Delay (sec)	Queue (m)
AM Peak			
Cardinia Road (S)	0.778	22	74
Princes Freeway (E)	0.482	18	21
Cardinia Road (N)	0.606	7	0
PM Peak			
Cardinia Road (S)	0.849	29	121
Princes Freeway (E)	0.653	17	34
Cardinia Road (N)	0.498	6	0

It is shown above that the intersection is expected to operate well under the typically adopted practical capacity for a roundabout of 0.85 DoS during the AM peak hour, with minimal delays and queues experienced by motorists. The intersection is expected to operate effectively at practical capacity during the PM peak hour, noting that the capacity limitations are on the southern leg, which is impacted by the volume of right turners from the north.

It should be noted that by this time, the Koo Wee Rup Road upgrade will have been completed and traffic will begin returning to the preferred north-south route. Similarly, it is expected that further intersection works, by others, will have been completed along Cardinia Road, including the intersections at Thompsons Road (IN\_08) and Central Arterial (IN\_07), therefore reducing the convenience of Cardinia Road as a through-traffic route. The combination of these two factors is anticipated to ensure that the growth rates adopted along Cardinia Road will overestimate the actual future traffic volumes.

Finally, it is also expected that upgrades to IN\_01, by others, will be completed (or underway), given the development progression and permit requirements of existing development proposals in the vicinity.

### 8.2.3 Other Operational Considerations

It is noted that the right turn movement onto the freeway from the north is the prevailing movement in the peak periods at the IN\_01 intersection, with recent upgrades to IN\_01 completed to provide a second right turn lane and additional capacity for this movement.

The delivery of the IN\_01\_UP design would amend the lane configurations on the northern leg to provide 2 through lanes and a single right turn, reducing capacity for this movement in favour of the southbound movement. Consequently, the upgrades required by Council are expected to negatively impact the intersection performance during peak periods.

Delays to the intersection works will therefore result in improved intersection operation in regard to this revised lane configuration.

### 8.2.4 Summary

As part of the proposed industrial subdivision at 92 Enterprise Road, Pakenham, the developer (ESR) has committed to a considerable package of roadworks, including two large dual lane PSP roundabouts (IN\_02 and IN\_05), a connecting duplicated road (RD\_05), and further arterial road works to provide a connection to existing permitted development to the south (Axis Boulevard).

Council is also requiring additional works at the southern freeway interchange (IN\_01), and the upgrade of Cardinia Road to the south (RD\_01).

Noting that these two road upgrade projects (IN\_01 and RD\_01) are currently a requirement of existing permitted development to the south, based on current development progression of the adjacent development, it is anticipated that the IN\_01 and RD\_01 road projects would be complete within 3 years. Until this time, it is expected that the IN\_01 intersection will operate within practical capacity, allowing for growth on Cardinia Road, and full development within the proposed ESR industrial subdivision.

Furthermore, the alterations in the lane configuration resulting from the IN\_01 upgrades are expected to reduce the intersection capacity in regard to the existing peak movements, and therefore negatively impact intersection operation.

In light of the above, the delay of the works required at IN\_01 and RD\_01 is considered acceptable.

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## 9 CONCLUSIONS

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It is proposed to develop the subject site for the purposes of an industrial subdivision.

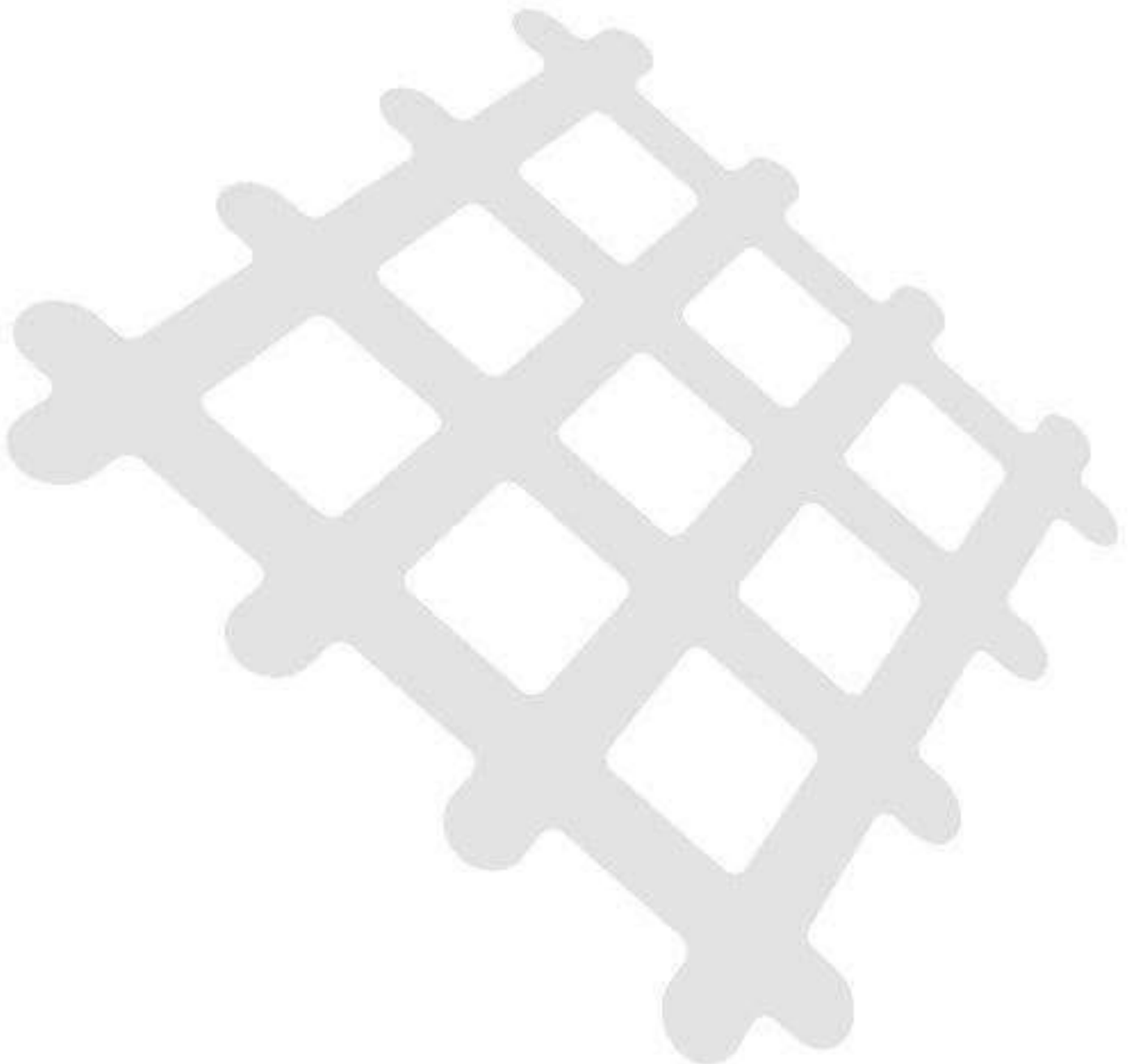
Considering the analysis presented above, it is concluded that:

- The proposed subdivision design is considered to be generally in accordance with the transport related requirements of the Cardinia Road Employment PSP;
- The proposed access for the site is proposed generally in accordance with the PSP and is considered acceptable;
- The proposed road network can adequately accommodate the anticipated traffic volumes;
- The road network facilitating access for the site is considered to be acceptable in accommodating the anticipated traffic generation; and
- The delay of the works required at IN\_01 and RD\_01 is considered acceptable.

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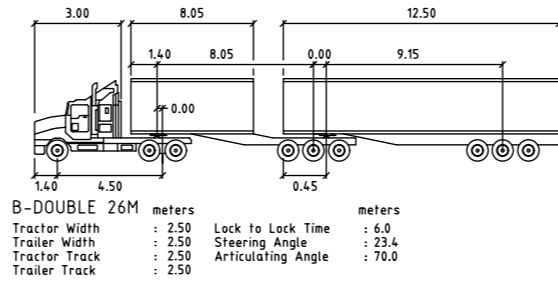
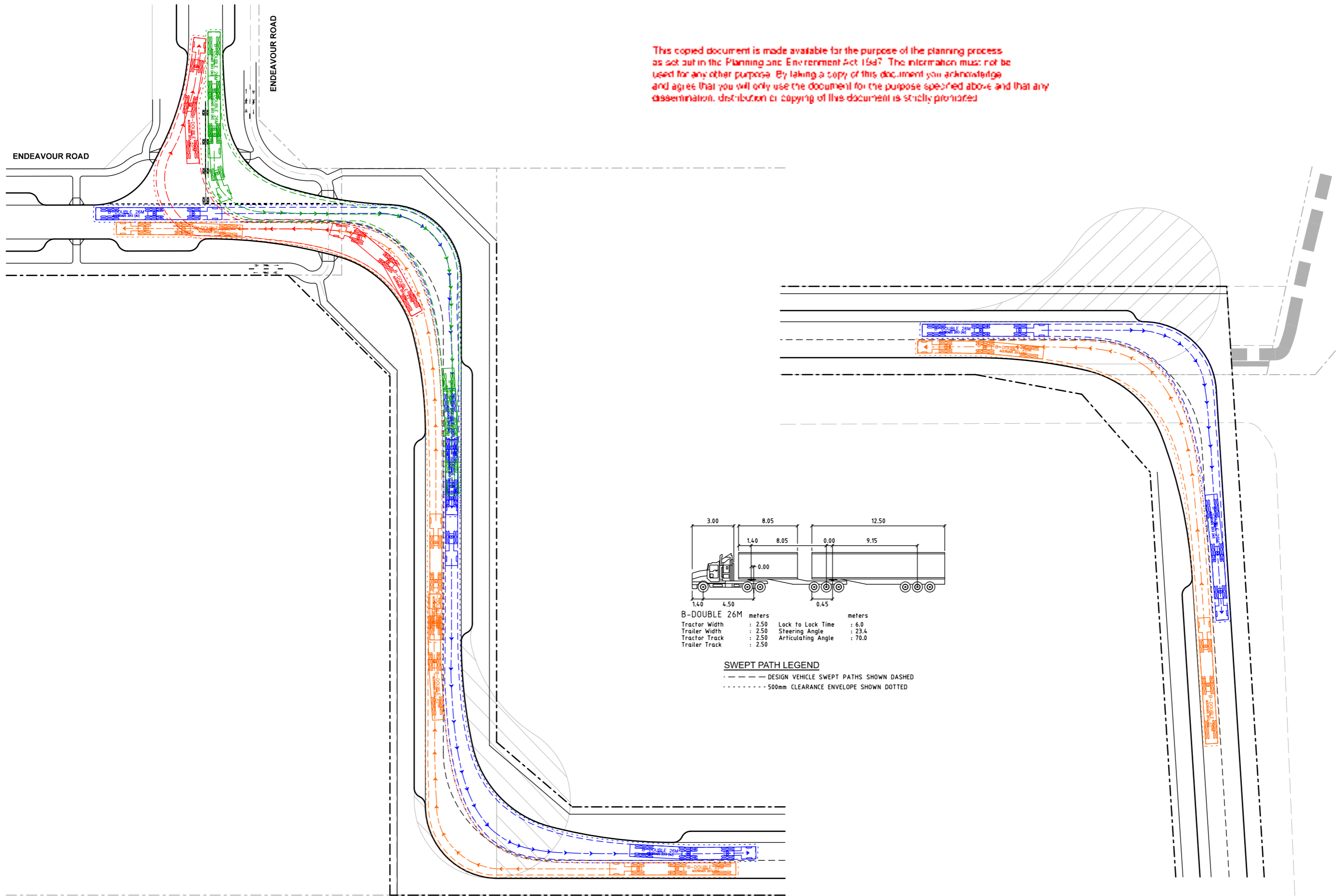
# Appendix A Swept Path Diagrams

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 Trailer Width : 2.50  
 Tractor Track : 2.50  
 Lock to Lock Time : 6.0  
 Steering Angle : 23.4  
 Articulating Angle : 70.0

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 . . . . . 500mm CLEARANCE ENVELOPE SHOWN DOTTED

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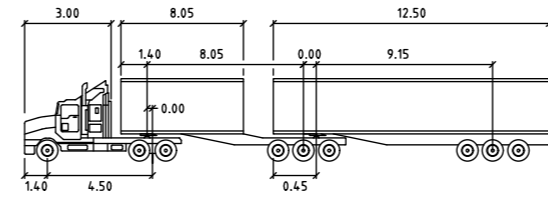
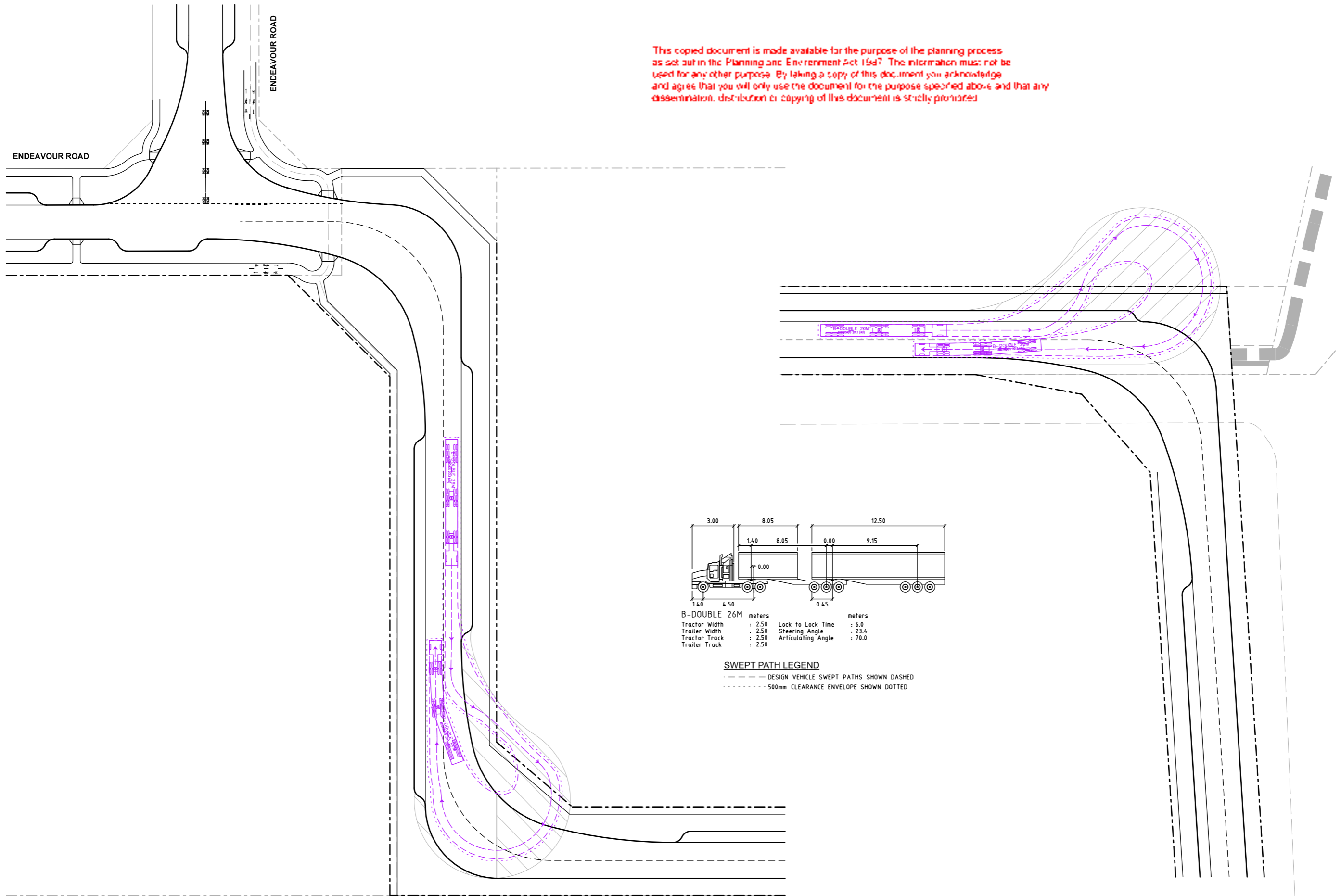
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Drawing Title 92 ENTERPRISE ROAD, CARDINIA ENDEAVOUR ROAD SWEPT PATH ANALYSIS - ULTIMATE		
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Project Number 220846	Drawing Number SPA200	Revision A

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 Trailer Track : 2.50

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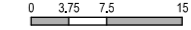
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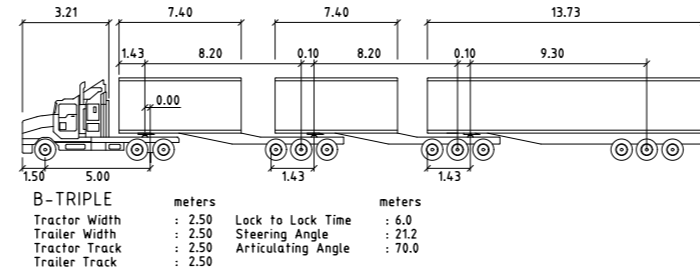
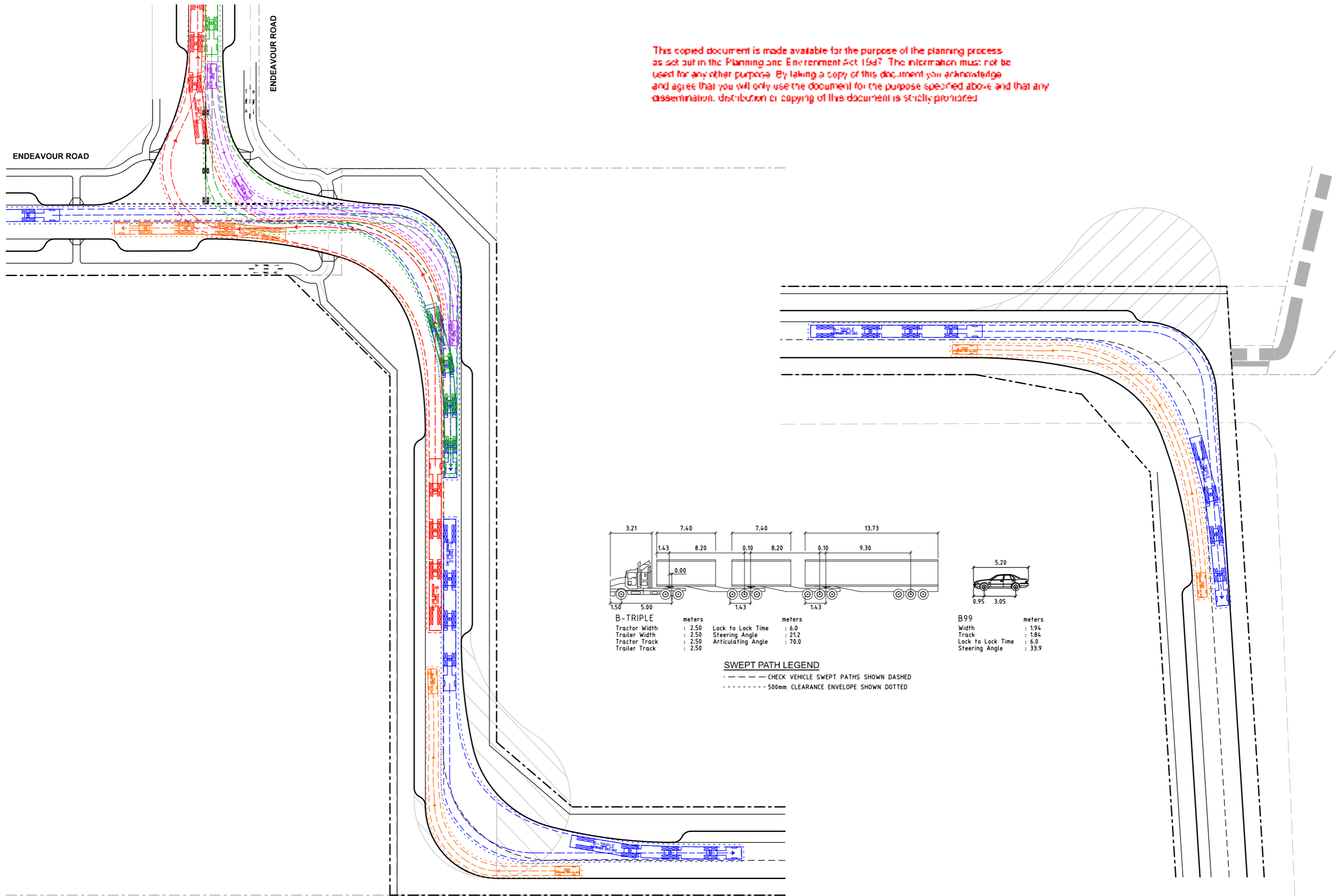
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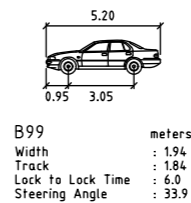
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Trailer Width	: 2.50	Steering Angle	: 21.2
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		



B99		meters	
Width	: 1.94		
Track	: 1.84		
Lock to Lock Time	: 6.0		
Steering Angle	: 33.9		

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# STORMWATER MANAGEMENT PLAN

92 Enterprise Rd, Pakenham Stages 2-3

Date 30 November 2023

Project No. J673-01

Version 02

Author SS

Client ESR Australia

## Project History

Project Number	J673-01
Author/s	SS
Checked	CMB
Approved	CMB
Issued to	ESR Australia

## Document History

Version	Date	Description
01	21/11/2023	Initial Version
02	04/12/2023	Minor Revisions per Client Review

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## Climate Change Statement

A wide range of sources, including but not limited to the IPCC, CSIRO and BoM, unanimously agree that the global climate is changing. Unless otherwise stated, the information provided in this report does not take into consideration the varying nature of climate change and its consequences on our current engineering practices. The results presented may be significantly underestimated; flood characteristics shown (e.g. flood depths, extents and hazards) may be different once climate change is taken into account.

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# 1. Introduction

Afflux Consulting have been engaged by ESR Australia to prepare a stormwater management plan for the Stages 2-3 of the proposed development at 92 Enterprise Rd, Pakenham Stages 2-3 (Figure 1). Stage 1 of the development has commenced work with a separate SWMP (DCE, July 2023) covering this work. For completeness, a number of Stage 1 elements have also been investigated in this SWMP to ensure a comprehensive stormwater strategy. Accordingly, this document will cover the major drainage, flooding and water quality associated with the development. If necessary, it will include an assessment of associated stormwater drainage assets, regional overland flow paths/creek systems and stormwater conditions within neighbouring properties. The intention of this report is to:

- Provide an assessment of major drainage and flooding associated with site;
- Retention of post development flows to pre-development levels;
- Ensure flooding of the site, or potential off-site impacts are reduced or eliminated;
- Ensure safe conveyance of existing overland flow regimes, if required;
- Meet the EPA best practice environmental management (BPEM) water quality requirements;
- Inclusion and consideration of guidelines and advice for stormwater management in line with Cardinia Shire and Melbourne Water requirements; and
- Identification of mitigation and treatment options, if required.

To meet these requirements a range of hydrological, hydraulic and water quality modelling has been undertaken.



Figure 1. Aerial of site





## 2. Existing Catchment

The site is within the broader calibrated Toomuc Creek catchment and subsequent RORB model (Figure 3). The site catchments drains south and east towards Toomuc Creek, and consists primarily of existing farmland with Stage 1 in particular naturally draining into a sub-reach of Toomuc Creek (Figure 4) The Toomuc Creek catchment is approximately 6472.04 ha, with the subject land towards the lower end of the catchment. Much of the upper catchment is subject to higher rainfall bands associated with orographic changes. As per communications with MW, an upper banding rainfall centroid is preferred for this catchment, and as such local estimations from this model could be expected to be up to 10% higher.



Figure 3. Existing catchment

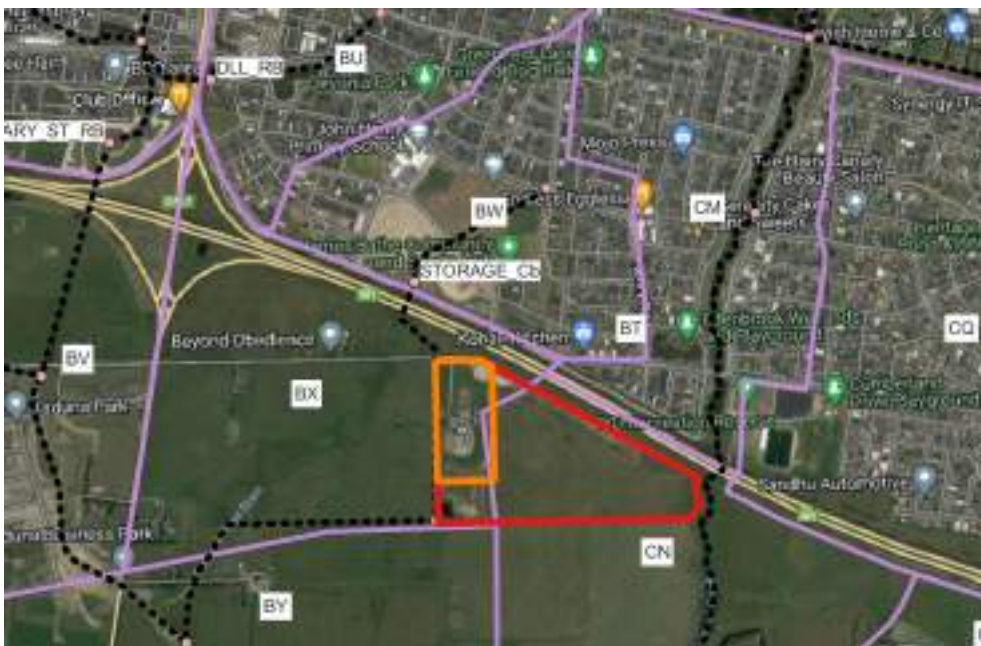


Figure 4. Site Subset

## 2.1. Site Visit

Investigation into the best discharge configuration to meet water management requirements will be undertaken in this report. A number of photos of the existing site can be seen in Figure 5 through Figure 9:



Figure 5. Site



Figure 6. Upstream side of the Princes Fwy bridge



Figure 7. Upstream portion of Toomuc Creek under Princes Fwy bridge



Figure 8. Upstream portion of Toomuc Creek under the westbound span of Princes Fwy bridge



Figure 9. Vegetation on the eastern side of the site lined up along Toomuc Creek

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## 3. Scheme Review

### 3.1. Melbourne Water Drainage Scheme

The site is subject to the Cardinia Industrial DSS arrangements. The scheme (Figure 10) recommends that Stage 1 of the works drain to the D2-D3-D4 nodes, with Stage 2 and Stage 3 draining to the M1 node. The following points are made regarding this scheme:

- The eastern portion is to drain to the M1 node. This node will inherently be depth limited by the surface wetland to the south and the low surface gradients between the two points.
- The western portion of the site will need large drainage to convey the catchment from the north of the bypass, and any local catchments. Again this catchment will be depth limited, however the surface gradients are steeper in this catchment than the eastern catchment (Figure 10)
- There does not appear to be any retardation proposed in this catchment south (downstream) of the site in the DSS. All of the assets are labelled as wetlands only. Presumably there is an assumption that the flows are retarded either upstream or downstream of this catchment. This assumption speaks to the site assumptions required.

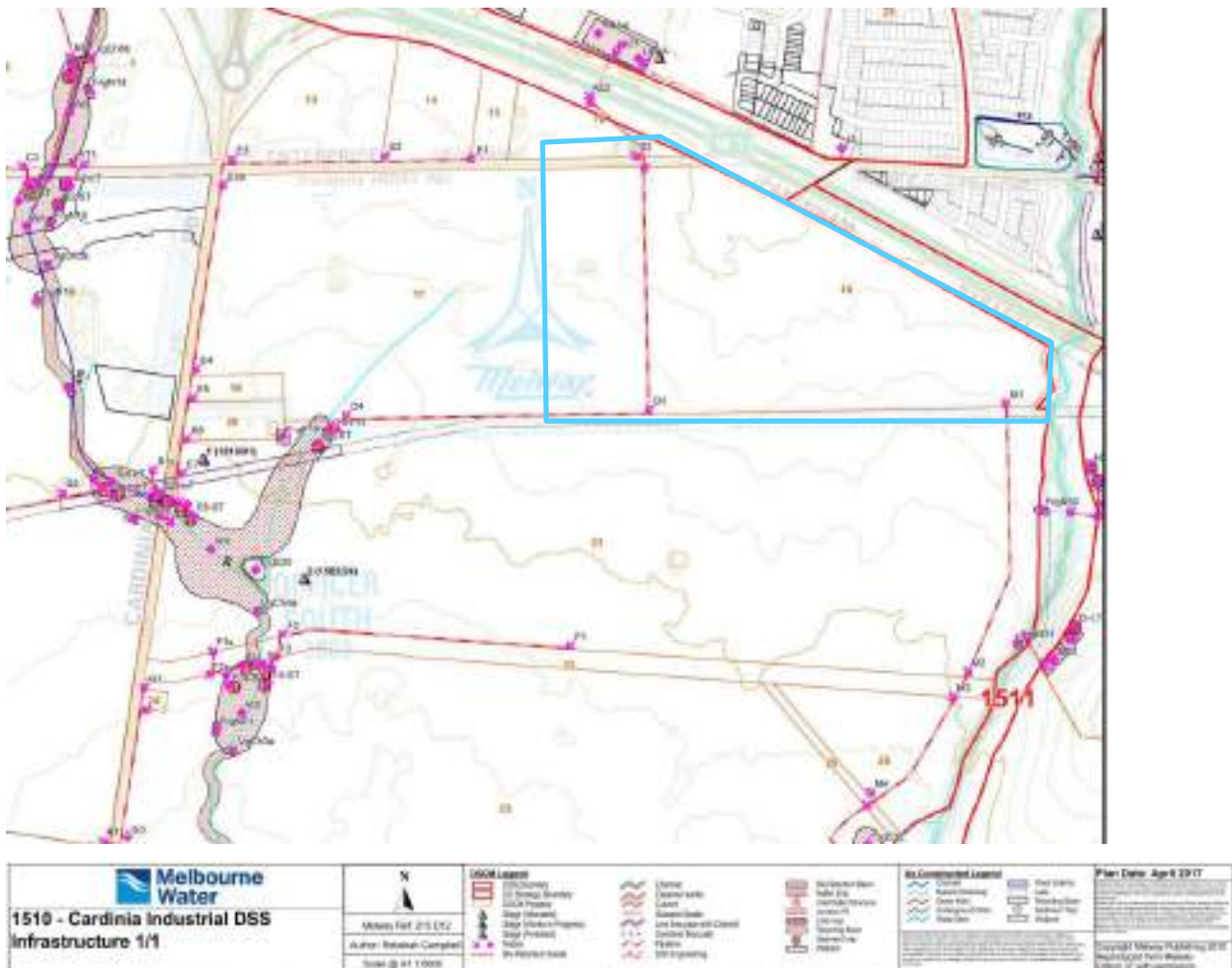


Figure 10. Cardinia Industrial DSS

## 3.2. Greater Scheme Review

For the drainage scheme review, refer to *Scheme Options Study* report by Afflux Consulting dated 10 September 2023. For completeness the executive summary has been included below. For this report it is assumed that the scheme recommendation (option 18) is adopted in some form close to that which was modelled.

*This study has examined a number of options for flood protection within the Cardinia Road Employment PSP (CREP) and possible augmentation of the Cardinia Industrial Drainage Services Scheme. Eighteen separate options were trialled, across 3 broad categories of flood protection including:*

- *Upstream construction of the Browns Road retarding basin. These options significantly reduced flows in the Toomuc Creek, resulting in much lower in channel flows both upstream and downstream of the Pakenham Bypass. This option requires significant land acquisition and engineering works at considerable cost to complete.*
- *Downstream levee construction. Construction of levee's downstream of the Pakenham bypass. These options contain the flooding within the CREP footprints, but result in increases in flood levels both upstream and downstream of the bypass particularly on the eastern floodplain. Additional mitigation to lower the creek invert can achieve a no upstream increase result, but it is unlikely that the creek works could occur in the Growling Grass Frog corridor. Works could be initiated on the eastern floodplain but again this has a number of difficult land access issues.*
- *Downstream floodplain excavation with minor upstream works. Options to increase the floodplain capacity downstream of the bypass were explored and found to result in a net reduction in flood levels. These options can also incorporate a number of design responses recommended in the CREP.*

*Based on both a quantitative assessment of flood levels and a qualitative assessment of these options the downstream floodplain excavation options would seem to have the most net community benefit and can be adapted to meet a number of proposed CREP objectives. Floodplain mitigation option 18 is the preferred option and has been depicted below. A concept design for the floodplain has been included.*

*The flood depth plot for option 18 can be seen below along with a possible wetland concept for the 30m floodplain excavation. The flood difference plot, or change in water level can also be seen and shows significant floodplain reductions both upstream and to the east of the CREP area.*

*Based on the analysis performed in this report, the following recommendations are made:*

- *Of the presented options, the Floodplain excavation options have the most promise for the financial management of the Development Services Scheme. This meets Scheme Principle 4*
- *The 30m west side option provides a number of opportunities to incorporate elements as recommended in the CRE PSP and provides an innovative solution in line with contemporary best practice. This meets Scheme Principle 14*
- *This report should be used to provide the basis of further DSS development and financial calculation.*
- *Functional and detailed design of the proposed assets should proceed based on the recommendations in this report.*
- *The SWMP for the development report proceed on the basis of the floodplain excavation options for the site.*

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Design Option	Cost	Environmental Detriment	Environmental Benefit	Timing	Flood Level Benefit	
Excavation option	•	•	●	●	●	13
Basin Option	●	●	•	•	●	8
Levee Option	●	●	●	●	•	8

• Low    ● Medium    ● High

Figure 11. Qualitative Analysis of Design Macro options

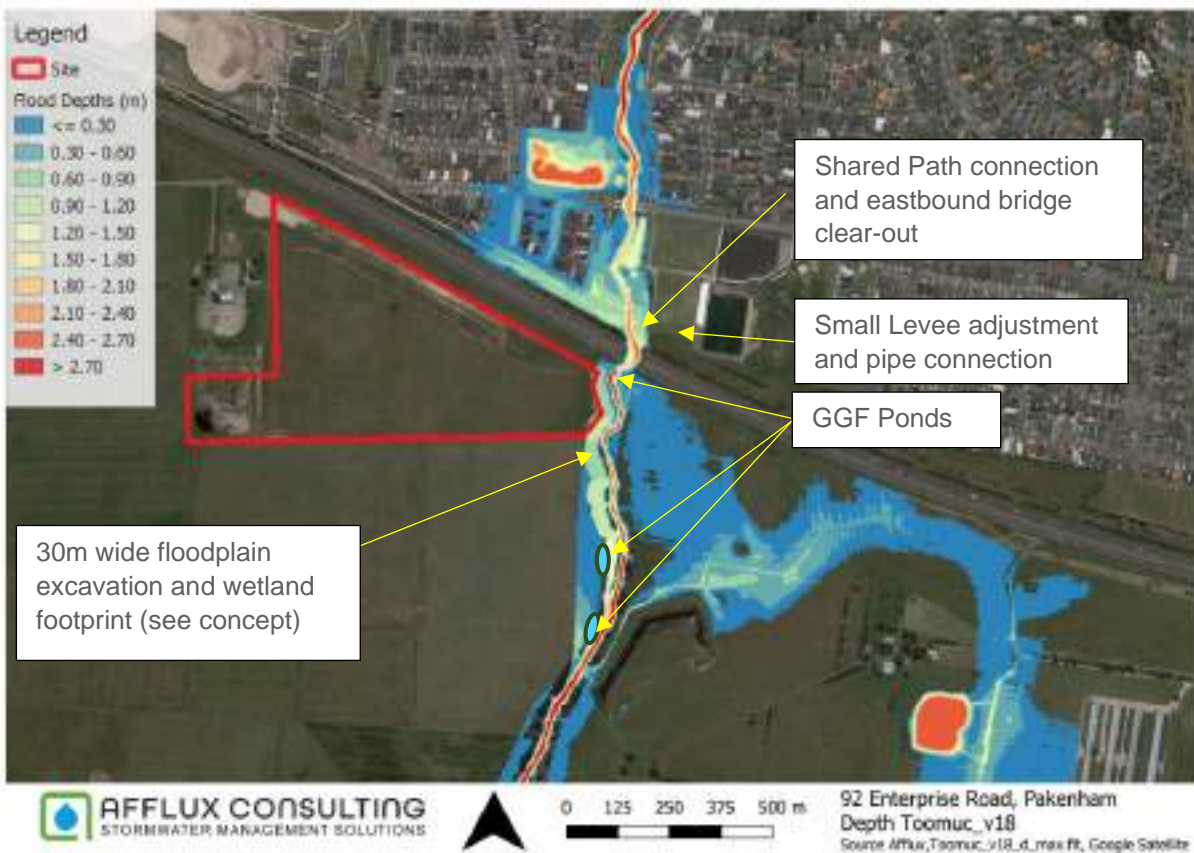


Figure 12. Recommended Mitigation 18 – 30m Wetland excavation and IYU Levee



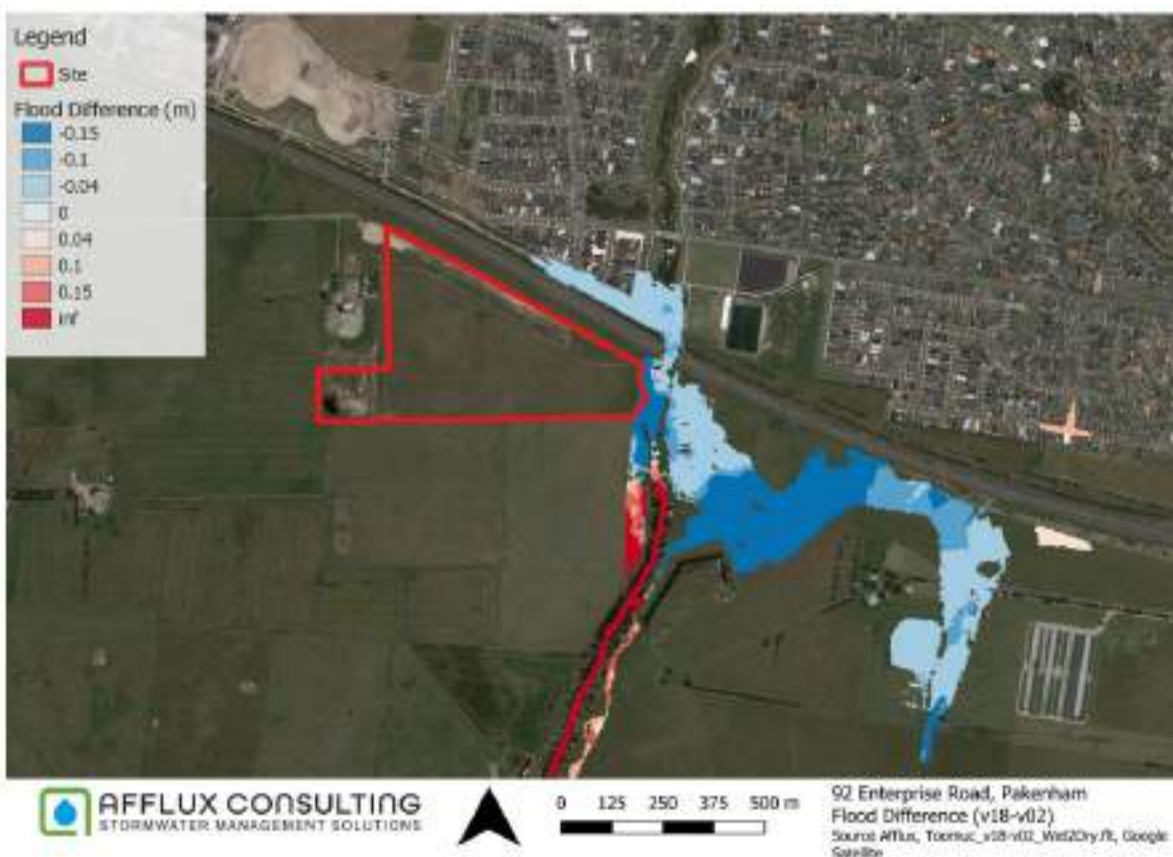


Figure 13. Flood Difference Map (Scenario v18 minus Existing Conditions)

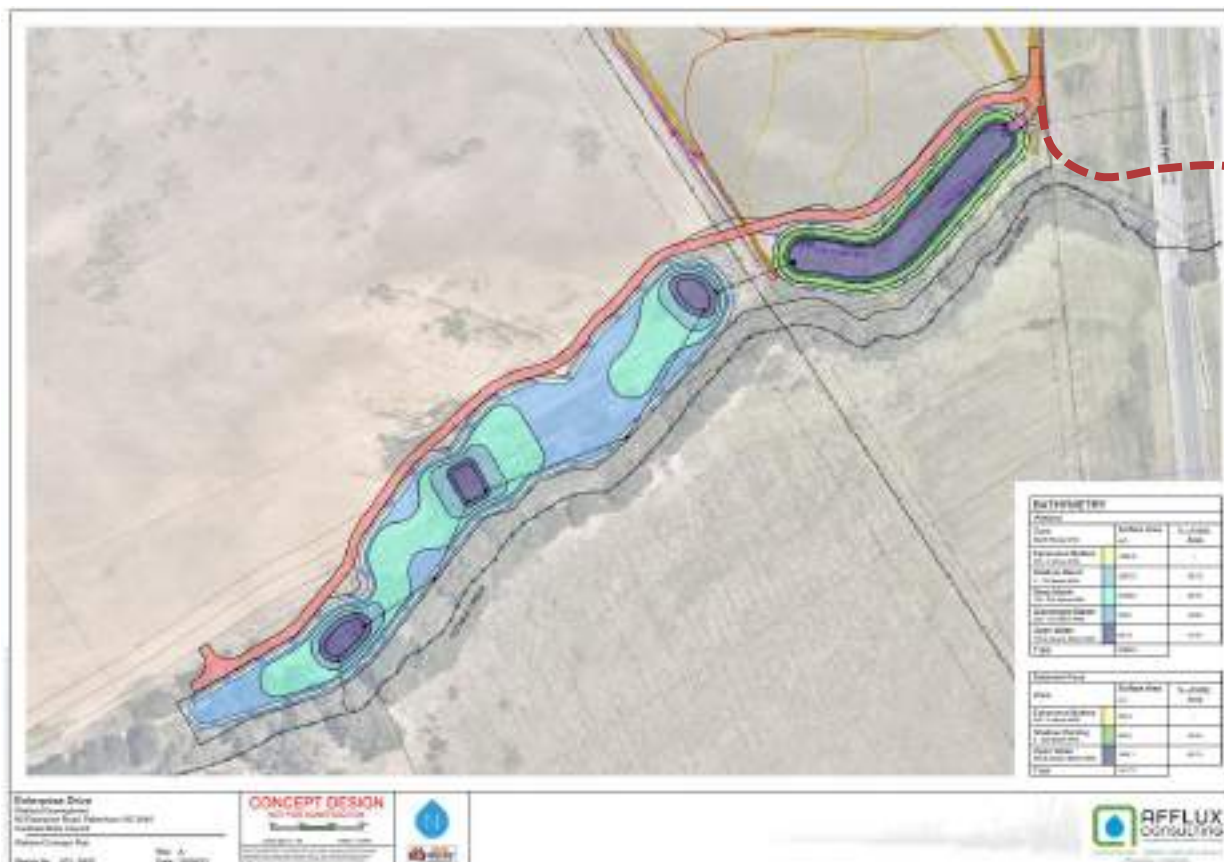


Figure 14. Concept Design of possible wetland system in 30m Western Excavation

### 3.3. Scheme recommendations for this report

Based on the macro and micro catchment reviews the following points are relevant for this SWMP:

- This report will adopt the recommendations of the Toomuc Creek Catchment review and assume that a floodplain expansion will be applied to supplement the Cardinia Creek DSS
- Any site flows will not require local attenuation. It will be recommended that low AEP (high frequency) events be attenuated through the proposed wetland system, with a target of at least the 63% AEP in line with local stormwater policies.
- Water quality for stage 1 will be achieved through scheme contributions.
- Water quality for stages 2-3 will be applied through scheme contributions, though some nexus will apply between the creek expansion wetland and the proposed development. This will be checked in this report.
- The site will need to meet standard stormwater protection requirements including major and minor drainage, flood and freeboard protection, and consideration of waterway offsets and volumetric considerations.

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## 4. Hydrology

To evaluate the hydrology of the proposed development a number of hydrological models have been formed and compared. This method has been chosen to best represent hydraulic influences and hydrologic challenges in the area.

### 4.1. Rainfall Information

Rainfall depths were extracted from the BoM IFD database. The temporal rainfall patterns were taken from the ARR Data Hub as per guidelines, and as shown below, VIC/NSW (SSmainland) data set was applicable for this site (Figure 15).

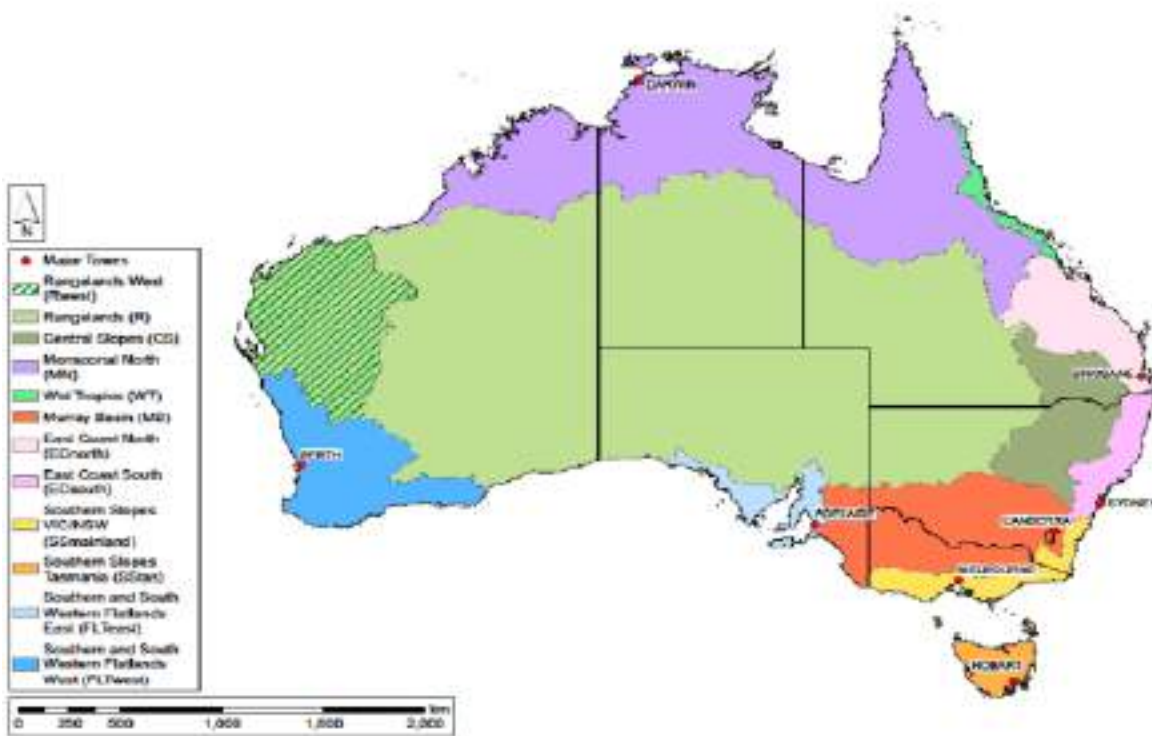


Figure 15. Map of temporal pattern regions

### 4.2. Rorb Model Review

The MW-supplied RORB model was reviewed for general catchment areas and fraction imperviousness (FI). Figure 16 shows the sub catchment delineation of the existing catchment. Based on the review, the MW impervious levels were adopted except for the BX subcatchment which encompasses the site. For this particular subarea, FI was increased for the proposed development as shown in Table 1 (0.1 to 0.85).

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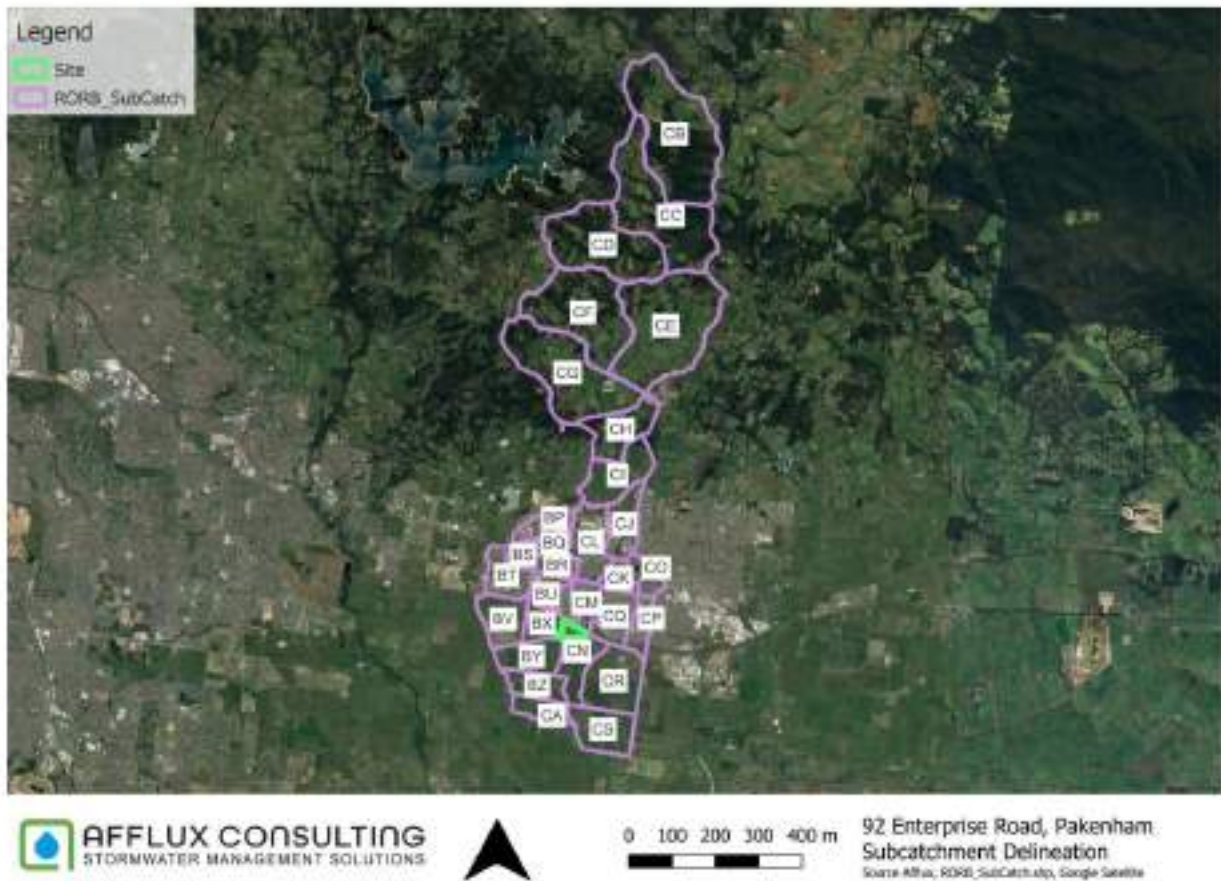


Figure 16. Sub-catchment delineation

Table 1. Sub catchment areas and fractions of imperviousness

Catchment Name	Area (ha)	FI (developed)
BP	82.07	0.75
BQ	53.26	0.75
BR	68.39	0.75
BS	53.12	0.75
BU	59.73	0.75
BT	134.84	0.75
BV	160.29	0.85
BW	65.48	0.7
<b>BX</b>	<b>96.02</b>	<b>0.1</b>
BY	147.56	0.85
BZ	110.72	0.85
CA	85.27	0.85



CB	678.49	0.05
CC	576.31	0.05
CD	486.85	0.05
CE	693.32	0.05
CF	526.49	0.05
CG	558.74	0.05
CH	203.24	0.05
CI	212.64	0.1
CJ	143.29	0.6
CK	63.93	0.6
CL	205.31	0.75
CM	82.65	0.75
CN	167.91	0.85
CO	75.76	0.65
CP	83.19	0.75
CQ	149.46	0.75
CR	256.11	0.85
CS	190.27	0.1

The parameters and loss values used in these models were provided by MW (Table 2). These have been applied as full losses as preferred by Melbourne Water. For further details, refer to *Scheme Options Study* report by Afflux Consulting dated 10 September 2023.

Table 2. RORB Model Parameters

Parameter	Value
Kc	17.7
m	0.8
Initial Loss (mm)	25
Continuing Loss (mm)	3



## RORB Inputs

Design rainfall grid was obtained from the Australian Bureau of Meteorology (BoM). As can be seen in Figure 17 and Figure 18 this catchment has a significant rainfall gradient across the sub-catchments and as such the rainfall centroid location is of particular importance. MW have specified a sampling location as shown. This will result in conservative assumptions for this SWMP location.

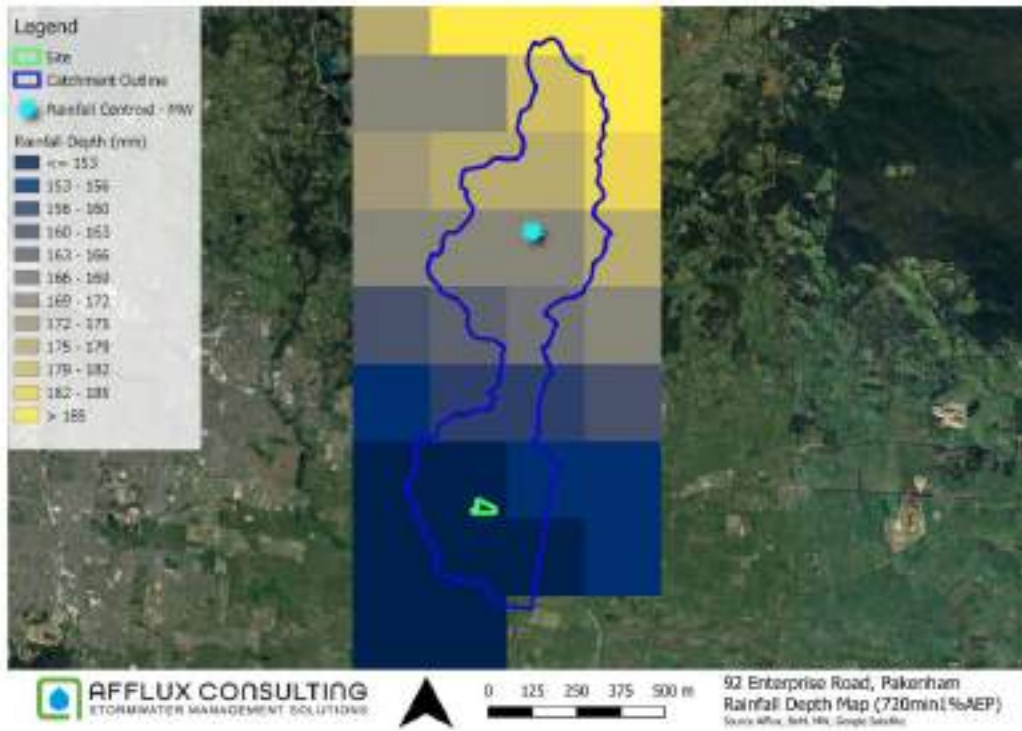


Figure 17. Rainfall Depths for 1%AEP 720min storm

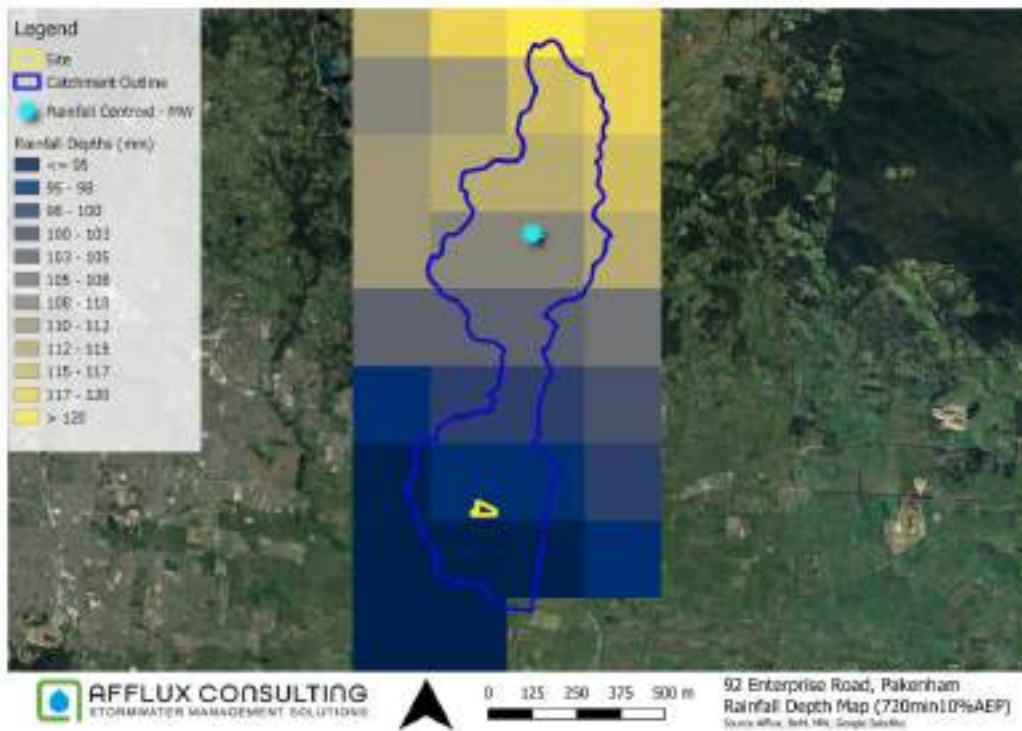


Figure 18. Rainfall Depths for 10%AEP 720min storm

### 4.3. RORB Results

A number of hydrographs have been derived from the Rorb model for this SWMP. These include:

- The rainfall excess hydrograph for testing of flows through BX catchment (both pre-dev and post dev)
- Hydrograph of Storage Cb flows (RB AA)

These catchments and flow locations can be seen in Figure 19 below.



Figure 19. Rorb Catchments as they relate to this site

The Ensemble Event approach was adopted, as per ARR2019 guidelines involving the use of a set of 10 temporal rainfall patterns. All temporal patterns were run from the 10min storm to the 168hr storm from gauged local catchments to derive a set of hydrographs for each event AEP and critical duration. Each hydrograph was run through the hydrologic model; however, only the mean for the critical duration storm results was selected for design as recommended. Note the peak storm is a function of the RB, both inflows and outflow critical durations have been selected and tested.

The following results are presented:

- Peak inflows and outflow storms for Storage Cb (Figure 21)
- Catchment BX rainfall excess hydrograph 3hr storm
- Catchment BX rainfall excess 20min storm



Peak Closest to the Median							Average Values								
Duration	Test	Peak (l/s)	Duration	Average	Peak Closest	Local Ranking	Duration	Test	Peak (l/s)	Duration	Average	Peak Closest	Local Ranking		
10 min	25	6.387	10 min	6.284	6.357	28	6	10 min	26	6.346	10 min	6.347	0.946	28	6
15 min	35	7.725	15 min	7.781	7.758	35	6	15 min	24	6.118	15 min	6.122	1.120	25	7
20 min	25	6.680	20 min	6.452	6.278	24	4	20 min	27	6.217	20 min	6.213	1.125	24	4
25 min	35	6.344	25 min	6.407	6.408	31	7	25 min	26	6.462	25 min	6.463	1.482	26	6
30 min	22	6.221	30 min	6.440	6.454	25	7	30 min	28	6.616	30 min	6.616	1.634	28	6
40 min	35	6.088	40 min	6.046	6.068	35	6	40 min	29	6.882	40 min	6.877	1.981	29	6
1 hour	35	7.551	1 hour	7.024	7.006	27	7	1 hour	28	6.222	1 hour	6.219	2.224	27	6
1.5 hour	25	6.794	1.5 hour	7.147	7.184	21	7	1.5 hour	28	6.388	1.5 hour	6.412	2.389	28	6
2 hour	30	7.182	2 hour	6.589	7.123	30	6	2 hour	21	6.818	2 hour	6.829	2.600	22	6
3 hour	28	6.586	3 hour	6.179	6.811	29	7	3 hour	27	6.485	3 hour	6.493	2.754	28	7
4.5 hour	28	6.888	4.5 hour	6.885	6.882	28	8	4.5 hour	28	6.596	4.5 hour	6.515	2.952	22	7
6 hour	25	6.770	6 hour	6.091	6.702	23	6	6 hour	26	6.506	6 hour	6.545	2.940	23	7
9 hour	27	6.498	9 hour	6.171	6.252	29	7	9 hour	28	6.472	9 hour	6.831	2.472	28	6
12 hour	22	6.021	12 hour	5.791	6.813	22	6	12 hour	26	6.200	12 hour	6.578	2.564	22	7
18 hour	29	6.393	18 hour	6.444	6.352	29	6	18 hour	21	6.608	18 hour	6.845	1.690	21	6
24 hour	25	6.124	24 hour	6.037	6.198	24	5	24 hour	28	6.843	24 hour	6.871	1.667	21	1
30 hour	29	6.678	30 hour	6.571	6.858	24	7	30 hour	21	6.465	30 hour	6.582	1.534	24	7
36 hour	30	6.888	36 hour	6.094	6.811	25	7	36 hour	21	6.562	36 hour	6.896	1.689	21	8
48 hour	24	6.081	48 hour	6.594	6.825	32	7	48 hour	28	6.475	48 hour	6.843	1.721	22	8
72 hour	30	6.542	72 hour	6.596	6.542	30	6	72 hour	30	6.213	72 hour	6.268	1.228	30	6
96 hour	21	6.568	96 hour	6.657	6.568	25	7	96 hour	28	6.128	96 hour	6.294	1.220	28	7
120 hour	30	6.481	120 hour	6.586	6.492	30	6	120 hour	30	6.345	120 hour	6.285	1.345	30	6
144 hour	21	6.188	144 hour	6.311	6.383	22	7	144 hour	21	6.902	144 hour	6.122	1.081	21	6
180 hour	28	6.376	180 hour	6.824	6.876	28	6	180 hour	25	6.436	180 hour	6.312	1.296	28	5

Figure 20. Storage Cb inflow/outflow peaks

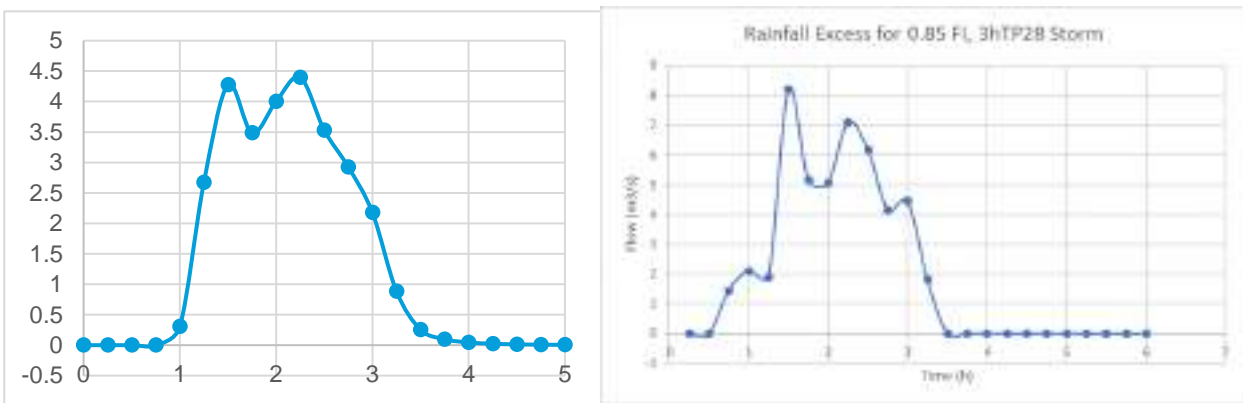


Figure 21. Rainfall Excess (BX) hydrograph (1 % AEP,3hr TP28 storm) (rural and dev)

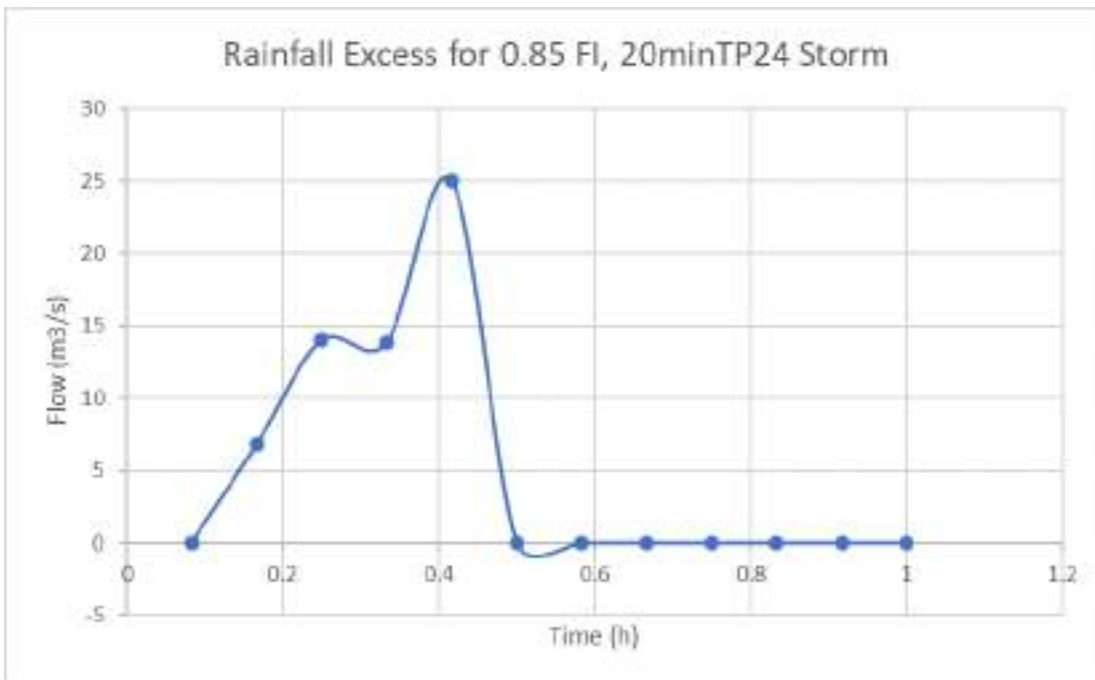


Figure 22. Rainfall Excess Hydrograph to be applied (1 % AEP,20mTP\_24 storm)

## 5. Stage 1 Flood Modelling

As part of flooding investigations for Stage 1, the regional and local stormwater conditions were considered. This model has been constructed to test the designs implemented in the DCE (2023) SWMP.

The major influencing factors include the impact of flooding from rainfall on the immediate catchment as well as interactions with greater regional flows and relevant upstream events. The main considerations include the availability of floodplain storage, safe overland flow conveyance, water surface levels in relation to proposed developed floor levels and any changing impacts to neighbouring properties.

Once the estimated rainfall magnitudes were decided upon (discussed within Hydrology section), a high-definition model was constructed to understand flood mechanisms during a 1% AEP storm event. The model was built and run in TUFLOW using a linked 1d/2d approach, parameters, and data sources.

### 5.1. Topographic Data

Combinations of terrain data was used in Stage 1 modelling (Figure 23). This includes commercially sourced 2017 LiDAR tiles, client-provided developed conditions terrain, and 1m resolution DEM from James Bathe Recreational Reserve flood model.



Figure 23. Site topography

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## 5.2. Model Parameters

The initial model setup for the catchment model involved accessing survey surface levels and a setup of existing drainage networks for the model area. Model extent is based on topographical catchment boundaries. Land use in the model has been determined based on inspection of aerial imagery and visual inspection and has been used to inform Manning's roughness factors in the model. Downstream boundary conditions have been established based on an examination of topography. This has been set a considerable distance downstream of the proposed assets to ensure no undue model boundary influence. Parameters for the model area are included in the table below.

Table 3. Model parameter table output from model QA

Model Parameter/ output		
Grid Cell Size	1 m	High resolution model to characterise flow across land.
Time Step	N/A	HPC solver selected
Model Run Duration	4 hours	Allows sufficient time for peak flows to pass through the site.
Model Solver	GPU	HPC adaptive Times
Manning's Roughness	Figure 24	Manning's Roughness applied to cells not covered by materials layer set to a value of 0.02
Inflow	2d_sa	Flow over time hydrograph inflow upstream of the site. Located at in Toomuc creek at north boundary
Outflow Boundaries (2D)	HQ	Slope boundary with a grade of 0.2% Located approximately 1400 m downstream of the site and freeway control.
Mass Balance		N/A – HPC Solver Selected

These assumptions and Manning's roughness values for existing and developed conditions can be seen in Figure 24 and Figure 25, respectively.

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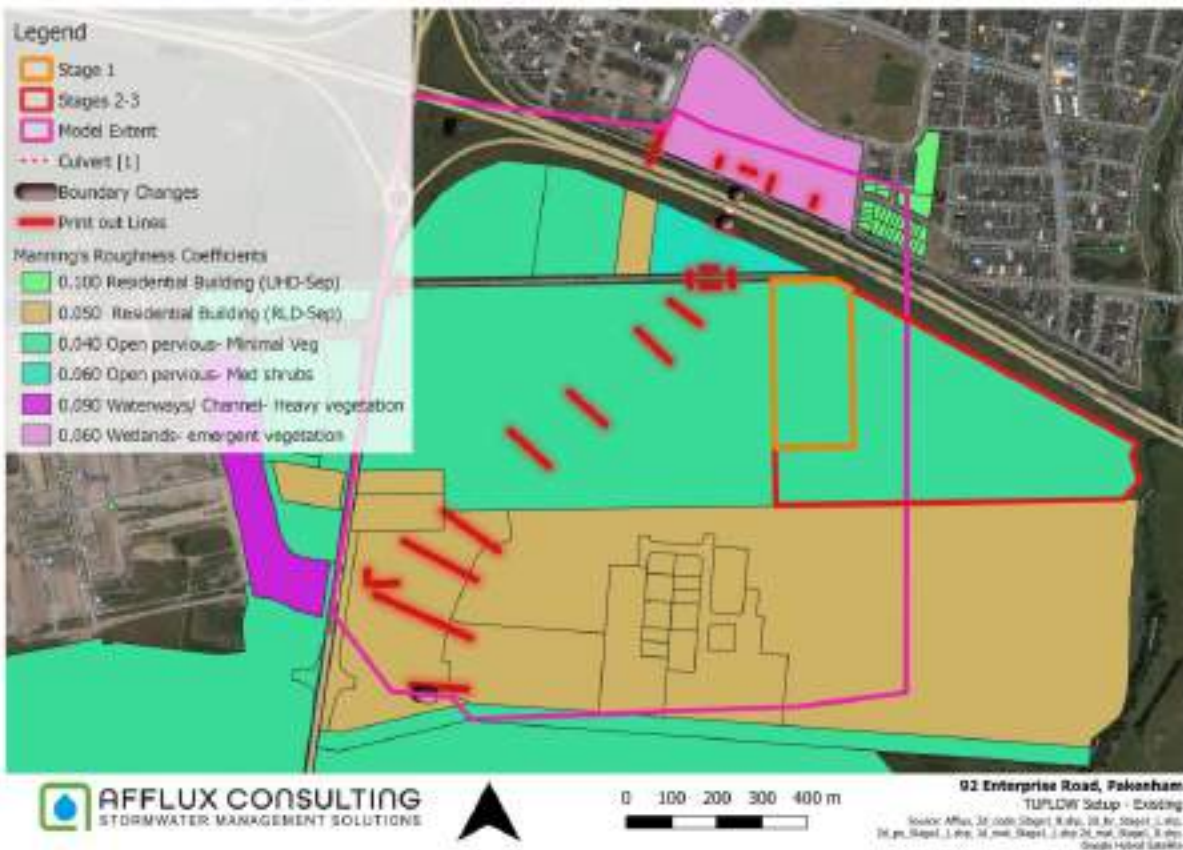


Figure 24. Model parameters and setup for Existing Scenario

Figure 25. Model parameters and setup for Developed Scenario

### 5.3. Existing Conditions

After incorporating all the model elements, a simulation was run. The resulting flood model results for existing development conditions are plotted below.

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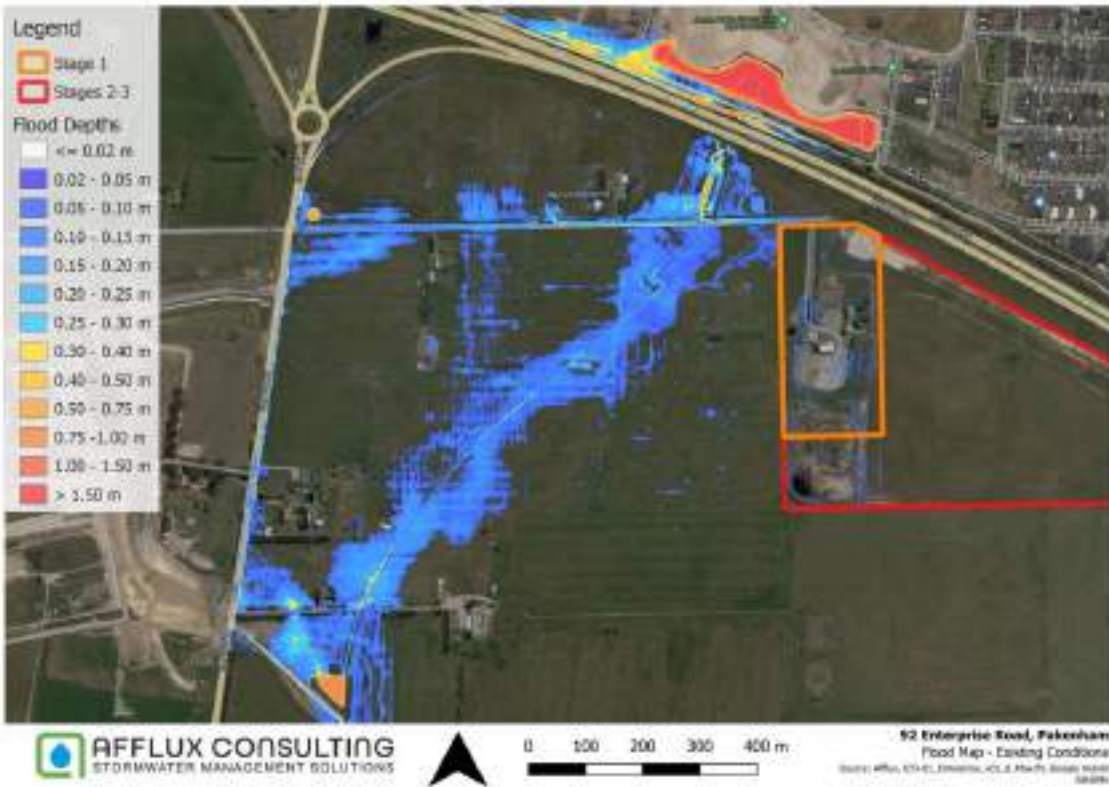


Figure 26. Flood Depth Map for Existing Conditions (3hr)

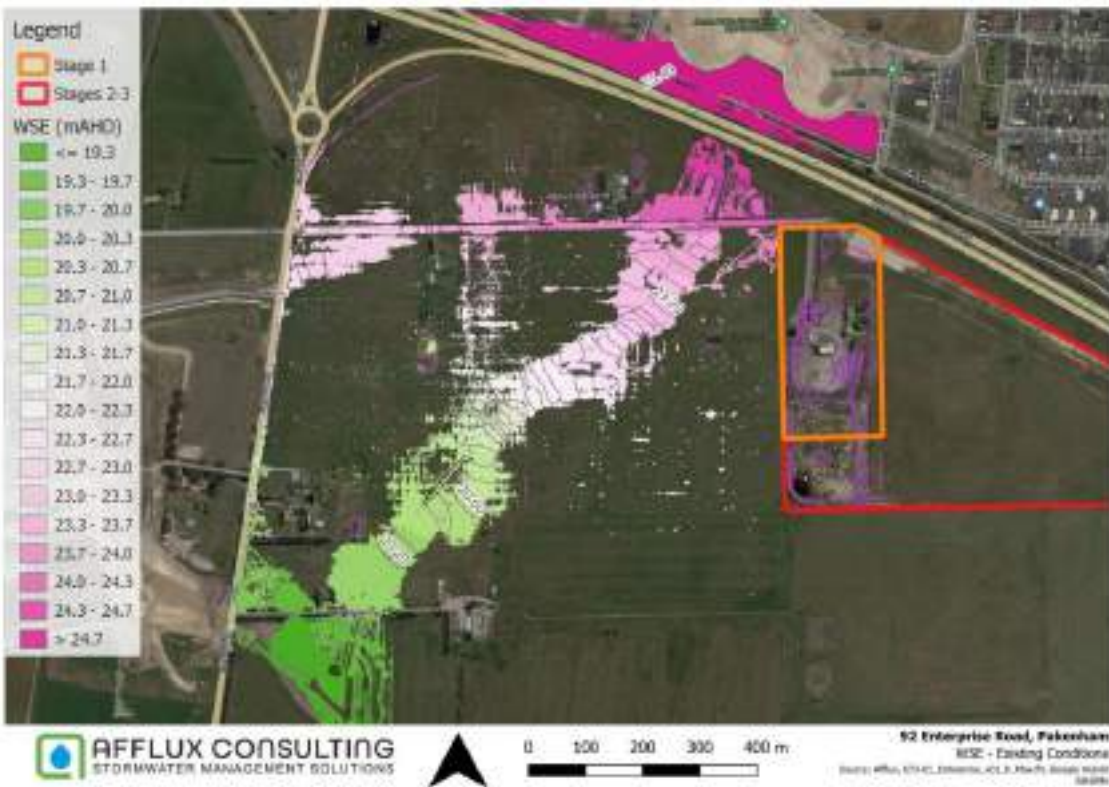


Figure 27. Water Surface Elevation Map for Existing conditions (3hr)

## Key Outputs

The key points from this analysis are:

- A significant overland flow path (OFP) occurs in the adjacent lot;
- The peak flow from the JB reserve under the FWY is approximately 4m<sup>3</sup>/s (Figure 28)
- The peak flow depths through the OFP are around under 300mm deep;
- The flow in this area appears as sheet flow, as expected in broad flat flood plain;
- The majority of flow travels southwest towards Cardinia Road Drain
- Small breakout flows travel westwards along Enterprise Rd;

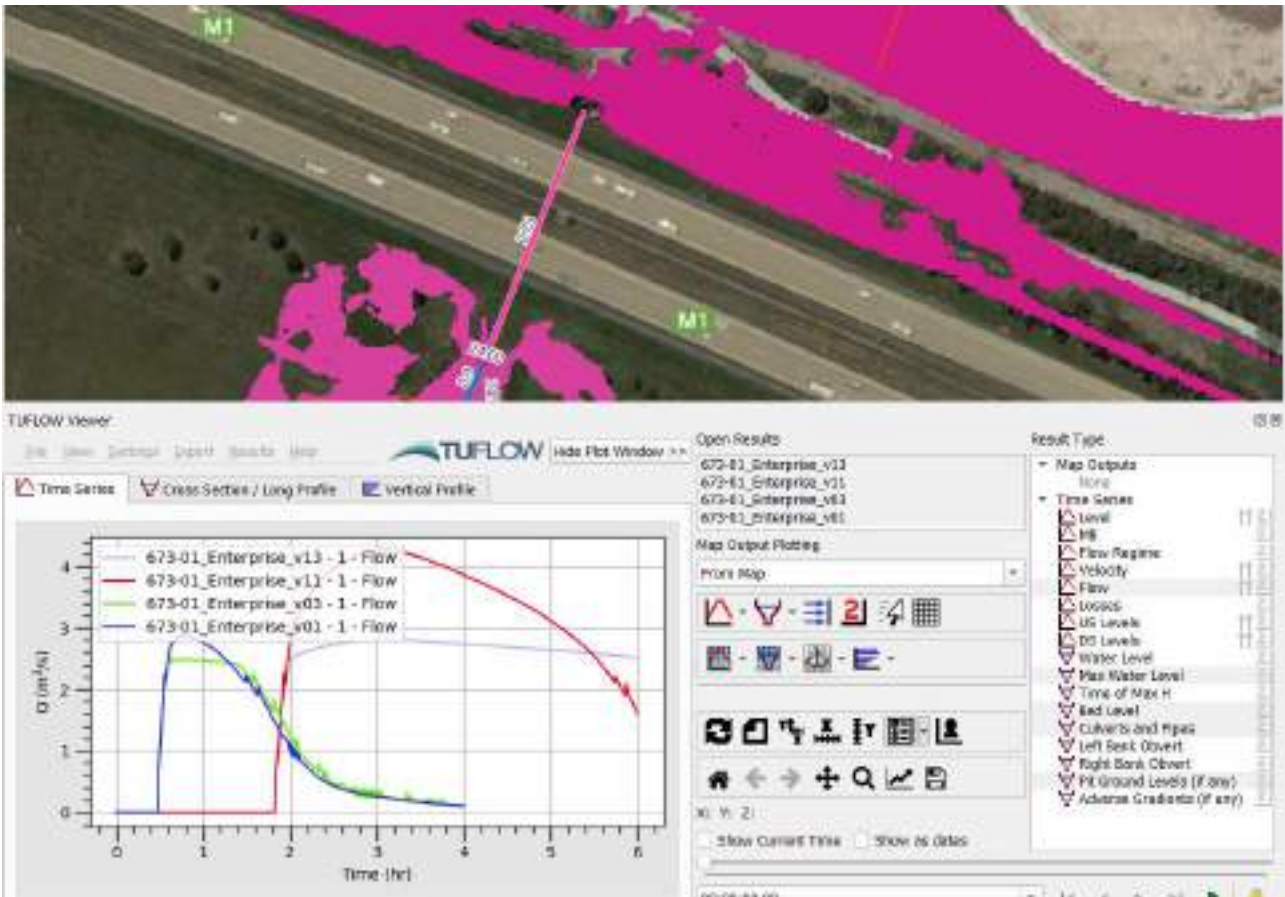


Figure 28. Peak Outflows from JB reserve (Storage Cb)

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## 5.4. Interim Conditions

### Rainfall Input

Sub catchment plan from the DCE report was used as basis for inflow distribution throughout catchment BX as shown in Figure 29. The flow excess hydrograph was distributed on an area basis and applied to each of the shown catchments. Flows in the B, C, D and F catchments were directly applied to the pits. JB Reserve (Basin Cb) flows were connected directly to the proposed pipe connection.

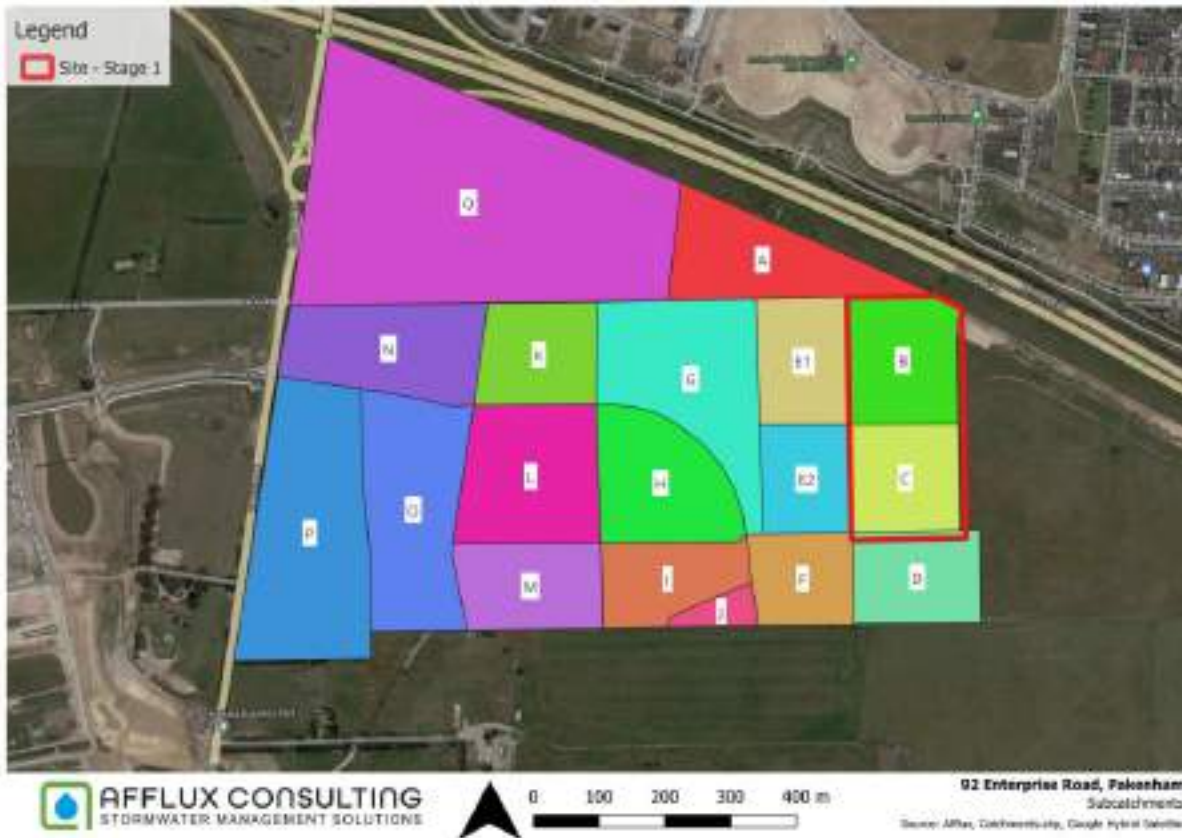


Figure 29. Sub catchment Map

### Interim Modelling Conditions

The interim conditions with proposed minor pipe connections can be seen below

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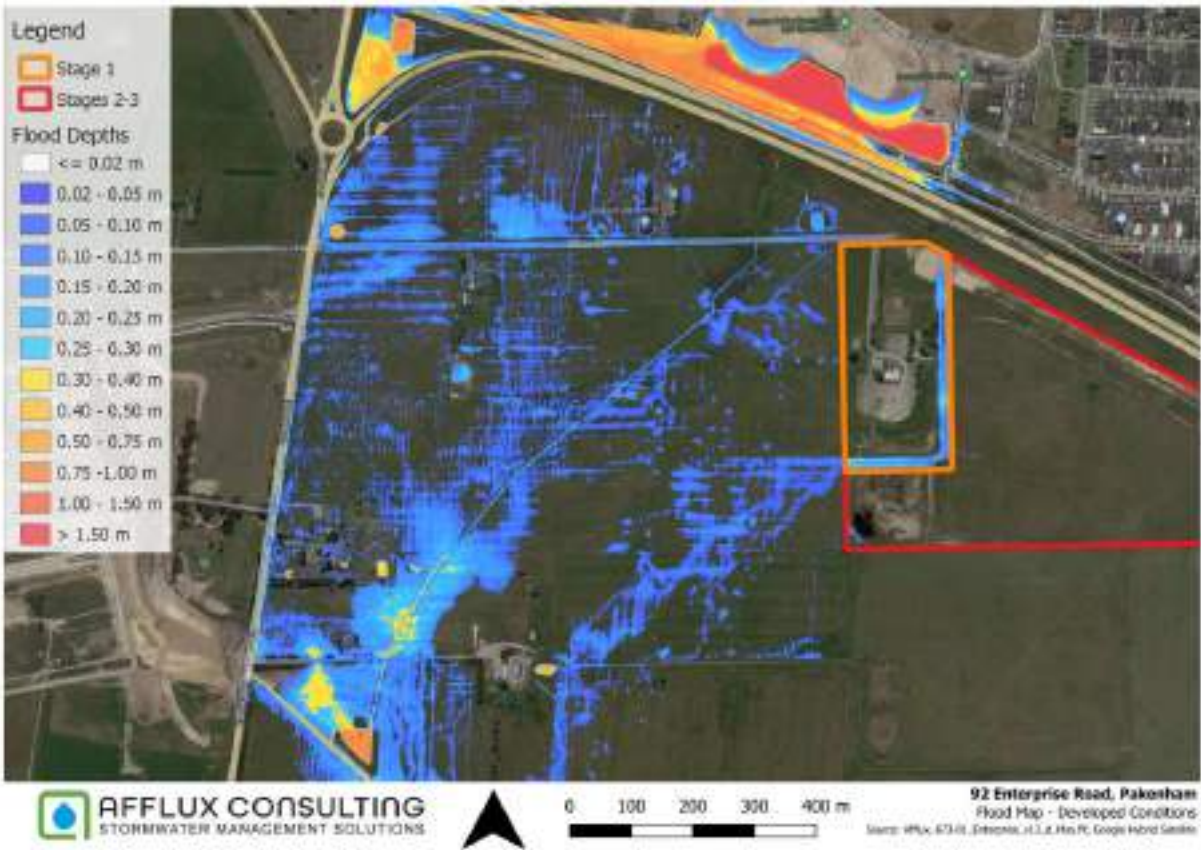


Figure 30. Interim Modelling Conditions with 900mm connection to FWY culverts

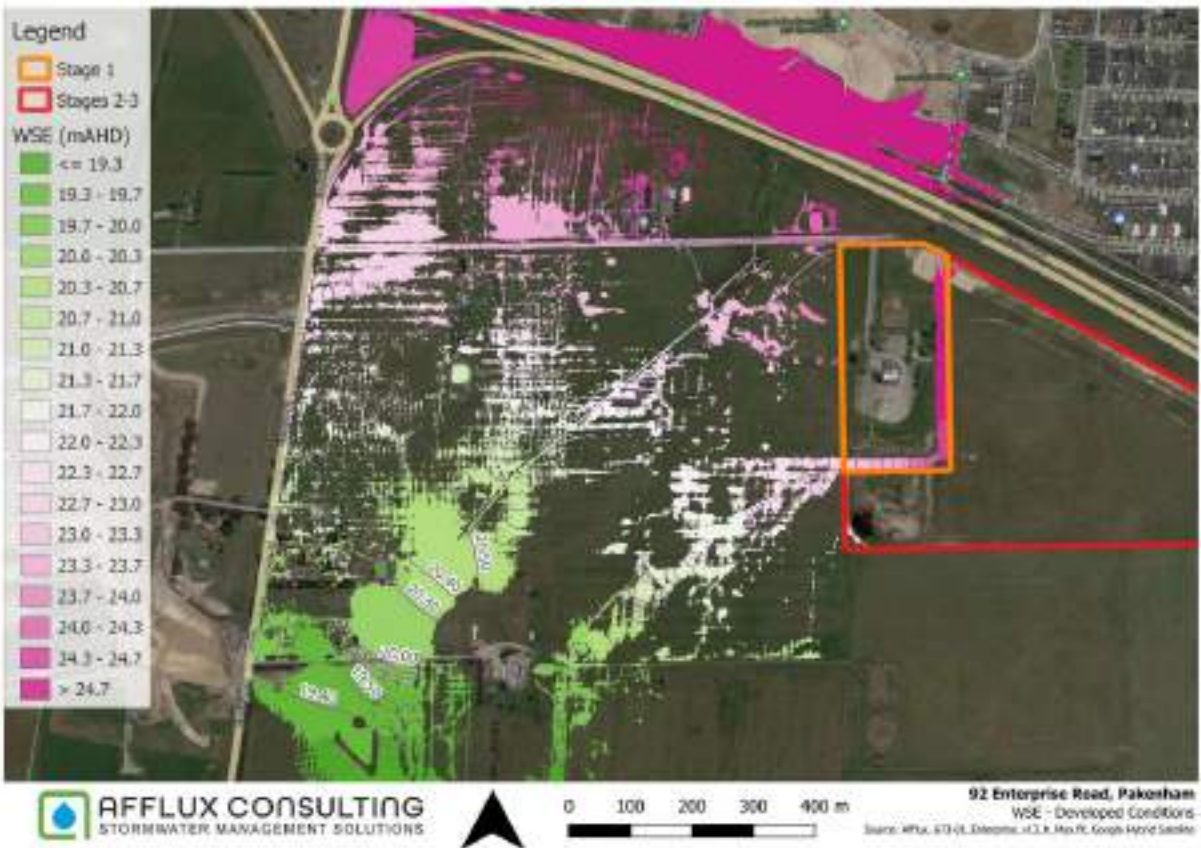


Figure 31. Interim Modelling Conditions with 900mm connection to FWY culverts



### 5.4.1. Interim Developed Conditions with Retarding Basin

The DCE (2023) temporary storage basin below Stage 1 site were modelled to determine its practicality. The basin was input as described in the DCE drawings with an area of 4260 m<sup>2</sup>. A half basin scenario was also tested for sensitivity. Both scenarios showed retardation of flow, but with little influence on the downstream environs as shown below.

#### Full-Size Retarding Basin

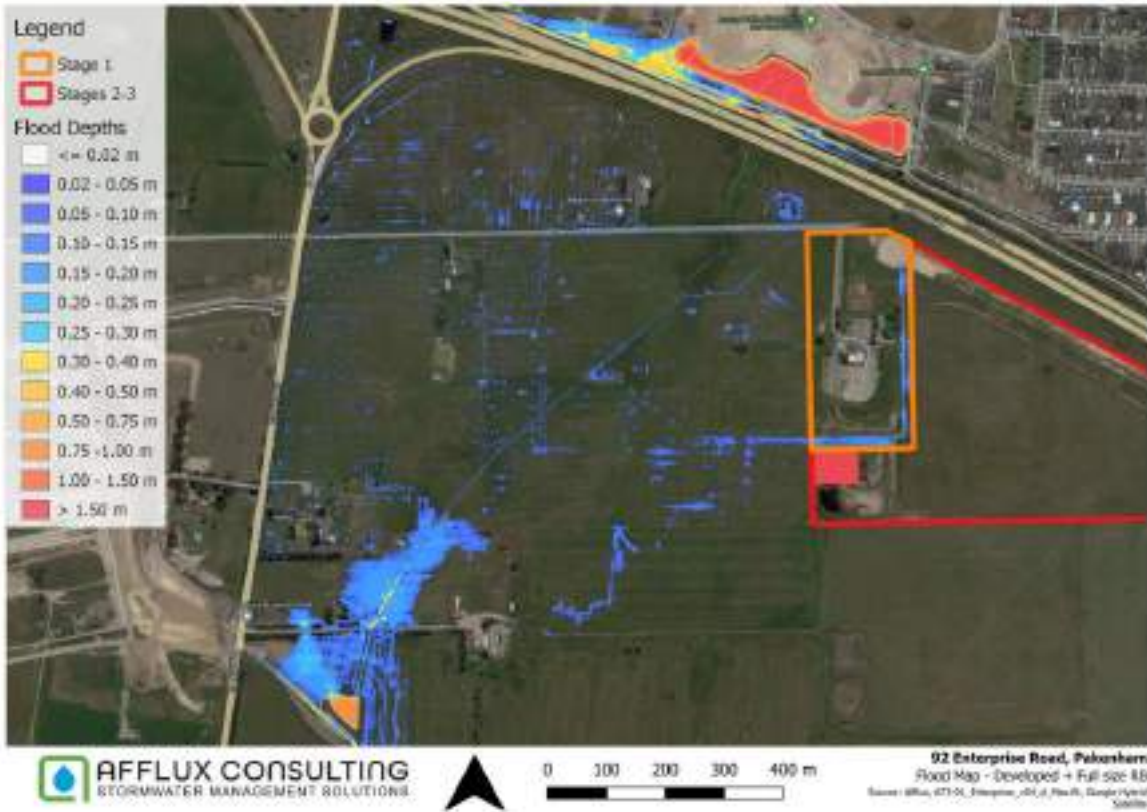


Figure 32. Flood Depth Map for Developed Conditions with a Full-Size Retarding Basin

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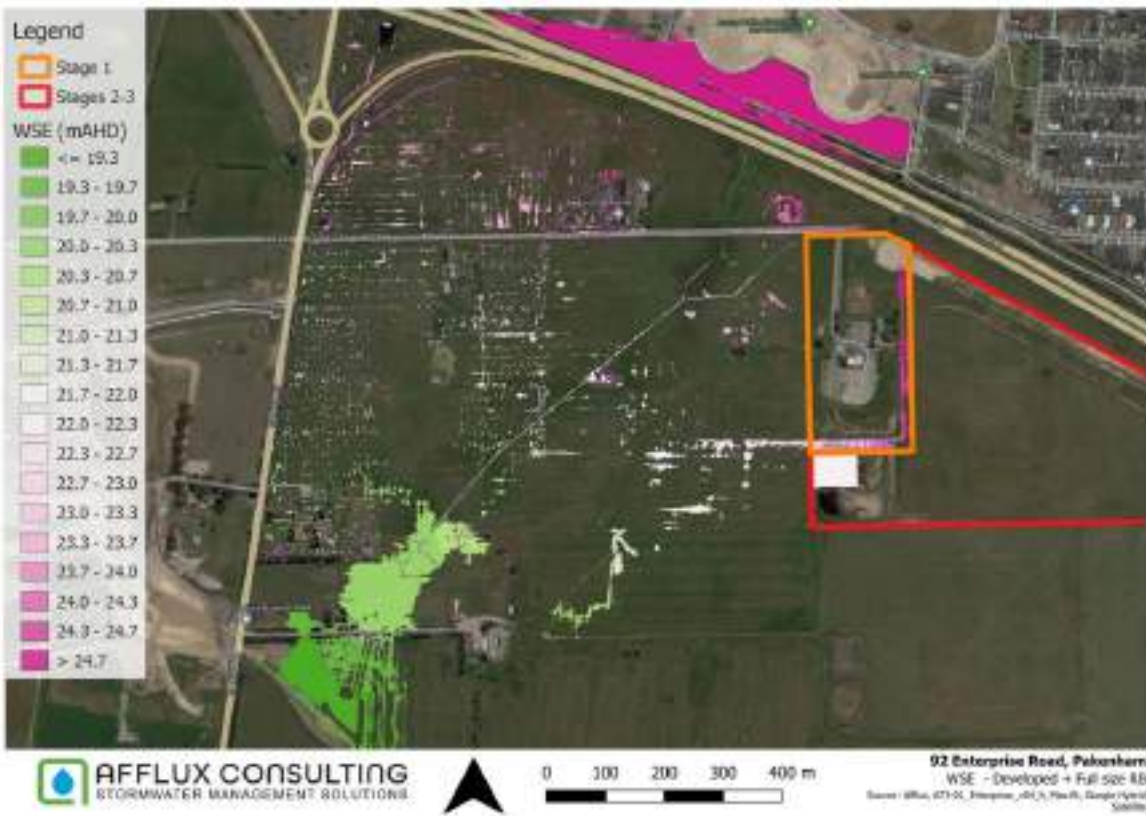


Figure 33. Water Surface Elevation Map for Developed Conditions with a Full Size Retarding Basin

#### 5.4.2. Sensitivity Testing Blockage

For a more conservative assessment, sensitivity testing was conducted by setting 50% blockage on the outlet pipe. This result also tests the viability of placing an orifice constriction on the outlet in the interim. Results showed practically no difference in the flood levels (Figure 34 and Figure 35).

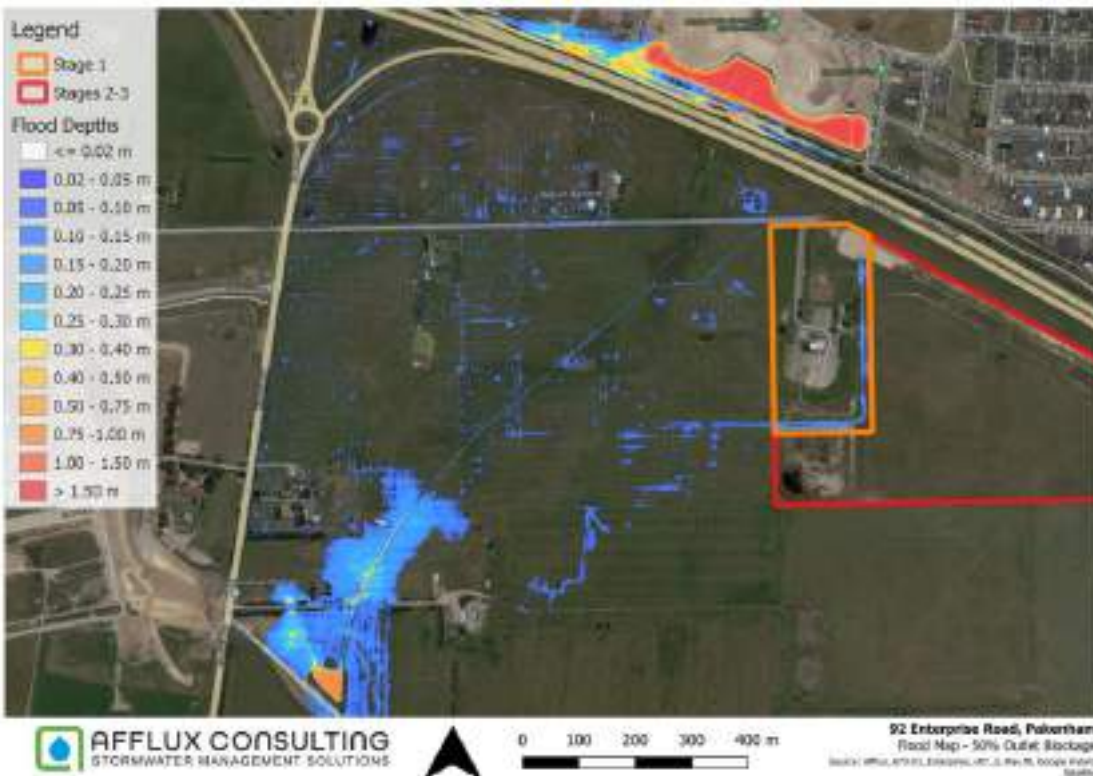




Figure 34. Flood Depth Map for Developed Conditions with 50% Outlet Blockage

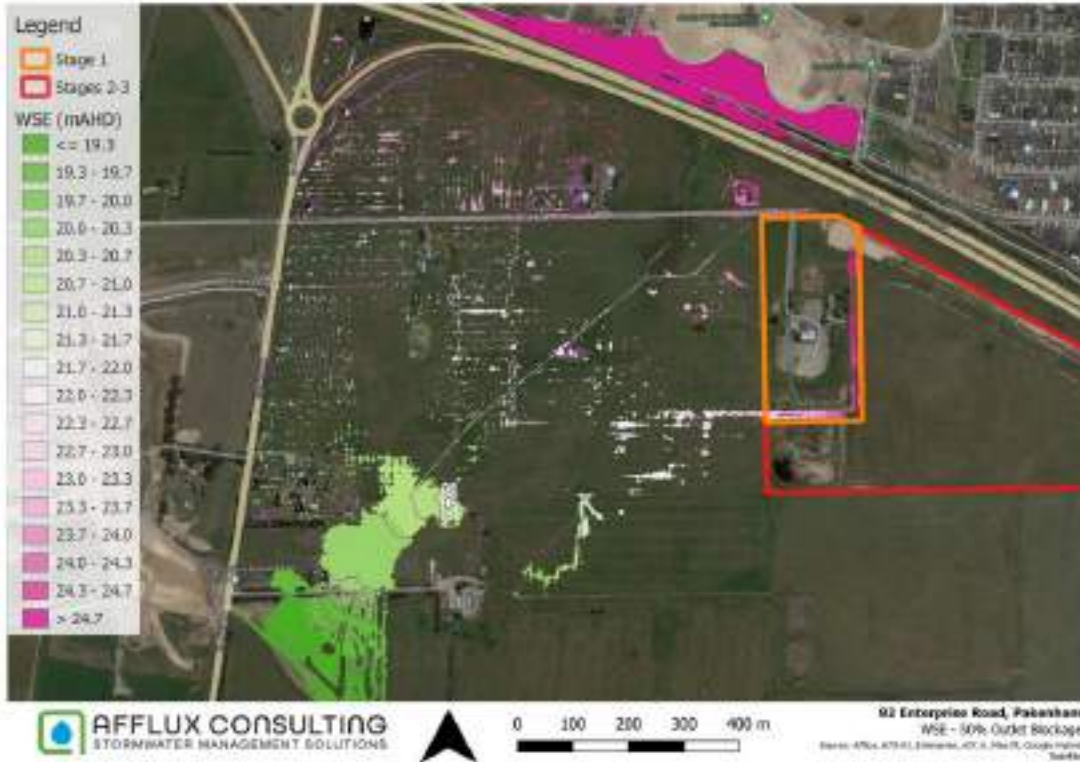


Figure 35. Water Surface Elevation Map for Developed Conditions with 50% Outlet Blockage

## 5.5. Ultimate Developed Conditions

### Pipe Changes

The DCE (2023) SWMP for the site provided a temporary low flow connection to the FWY culverts. For the ultimate developed Conditions this connection has been upgraded to a 1500RCP connection.

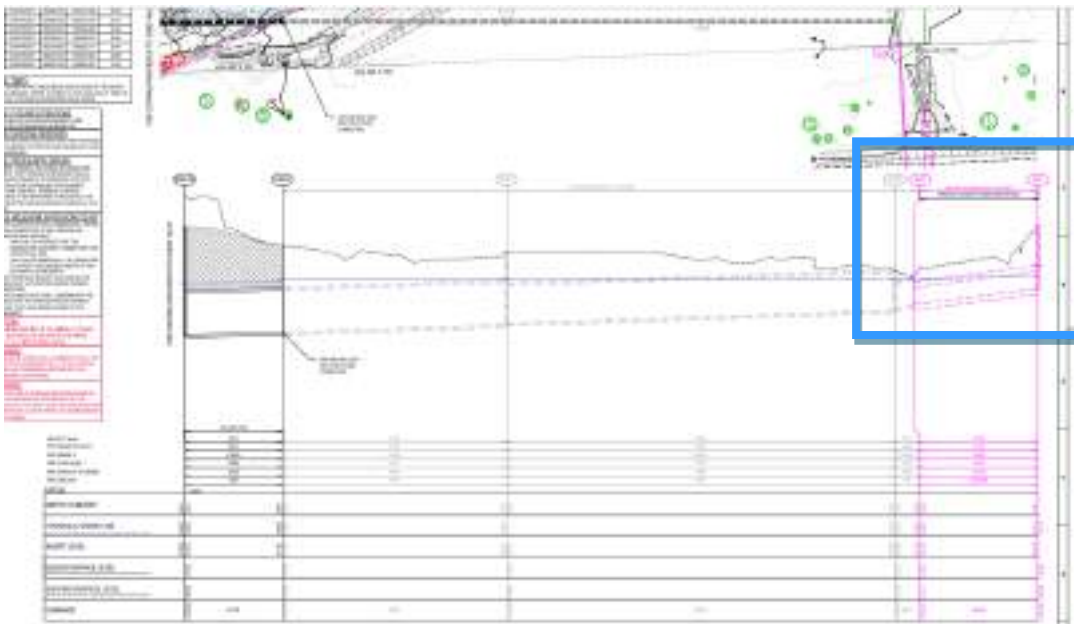


Figure 36. Ultimate Conditions Pipe Changes

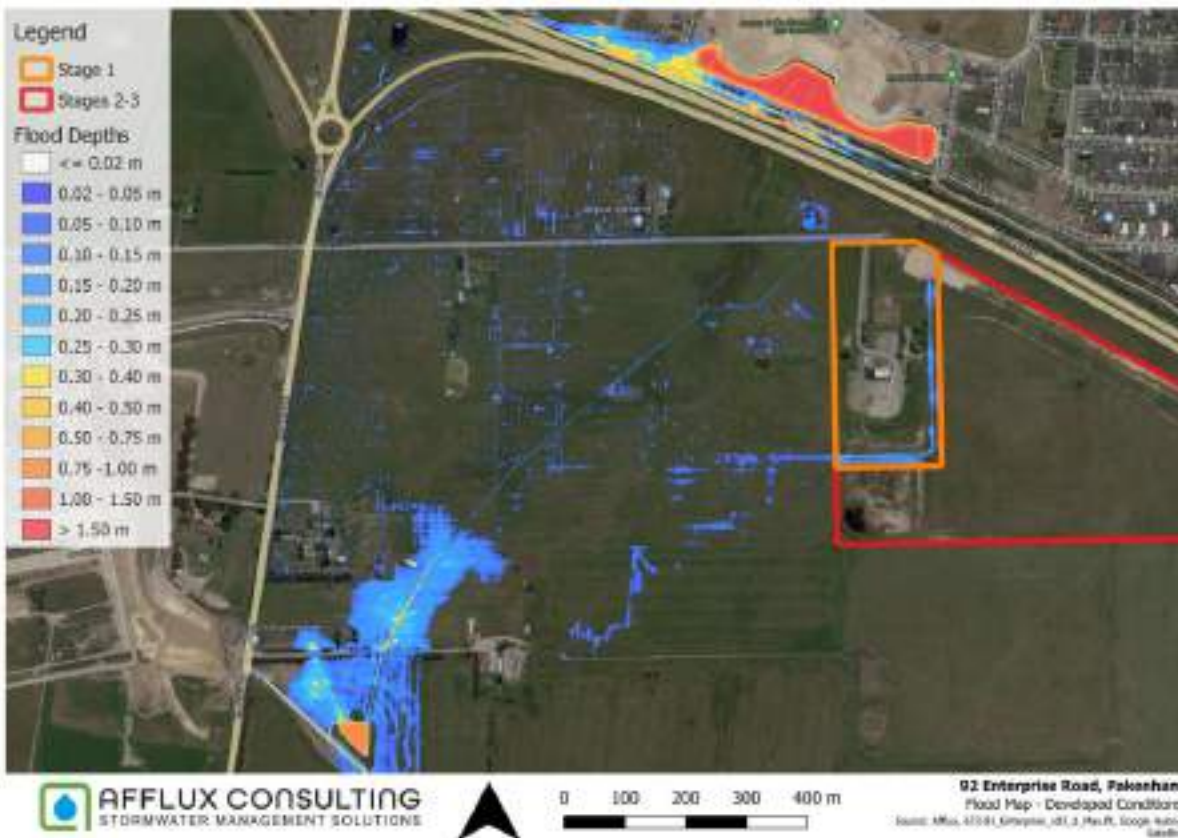


Figure 37. Flood Depth Map for Developed Conditions

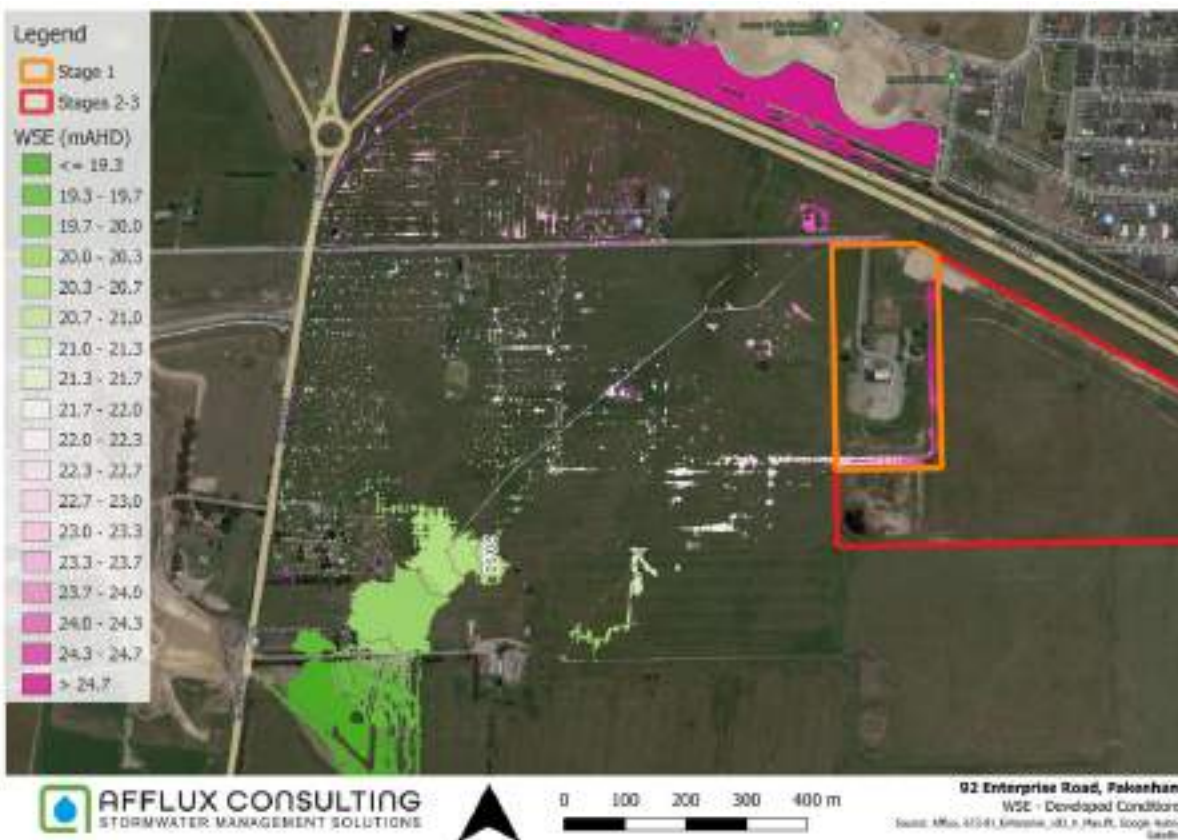


Figure 38. Water Surface Elevation Map for Developed Conditions



## 5.6. Results and Recommendations

Analysing the results above indicates the following recommendations:

- The proposed DCE pipe connection is adequate to convey flows through the Stage 1 subdivision
- The connection to the FWY culverts needs to be upgraded to a 1500RCP between the Stage 1 boundary and the connection in the ultimate conditions. Ideally this is a low head-loss setup (curved pipe or other)
- The influence of the retarding basin or orifice control is minor at the property boundary for the 20m storm (and can be slightly negative). The flows as measured at the property boundary can be seen in Figure 39. There is some influence in the 3hr storm, but it is noted that a site based basin designed for short durations has little influence on this longer duration storm. Based on this, and the short period between this temporary arrangement and the construction of the downstream asset, the temporary RB could be removed in this case.

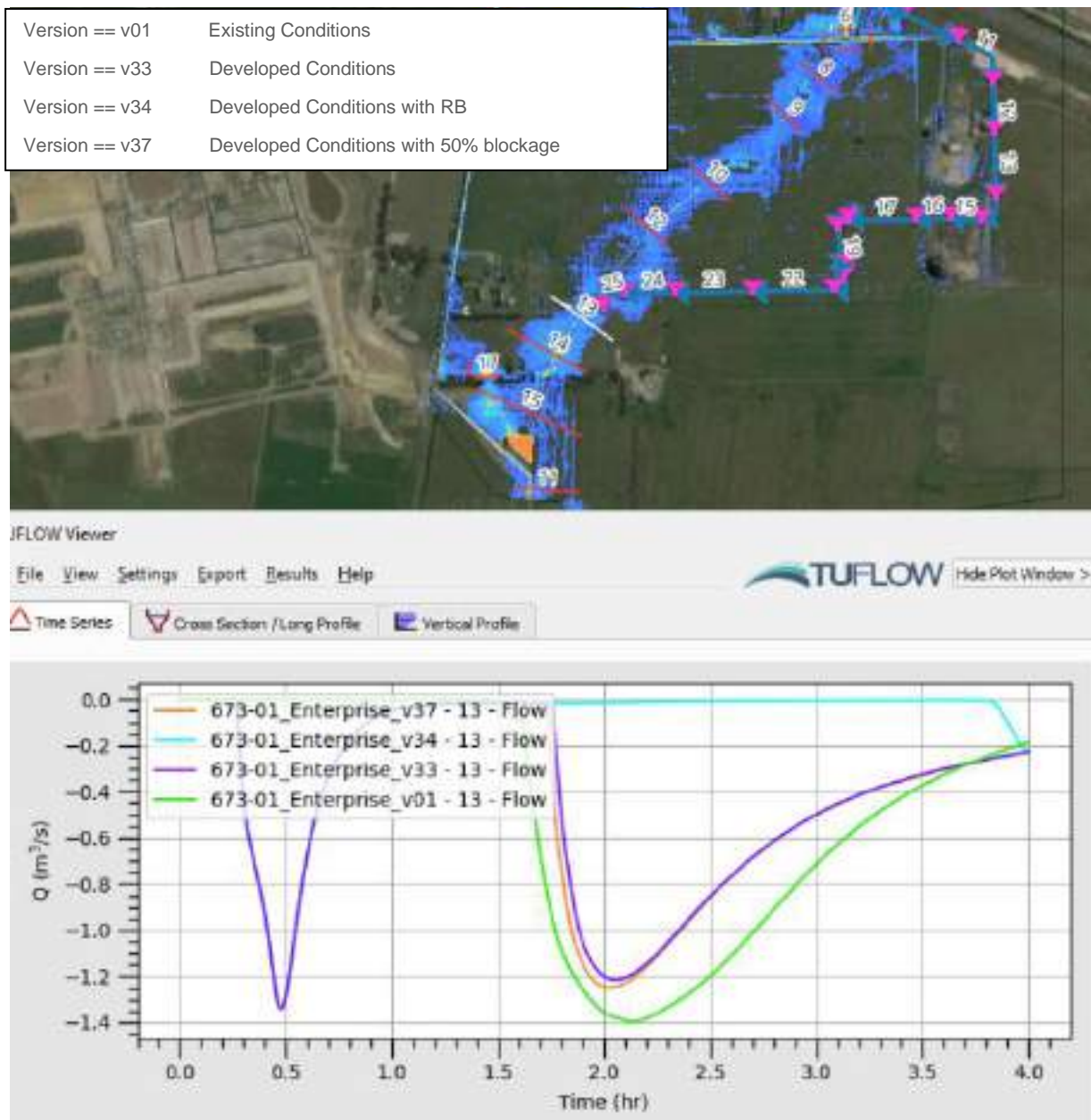


Figure 39. Basin and Pipe scenarios testing (20 min storm)



## 6. Stage 2 Design Requirements

In modelling flood interactions across the site, design requirements are highlighted to reduce the impact of the development on neighbouring properties and surrounding water systems, while increasing amenity for future development.

### 6.1. Flow Paths and Drainage

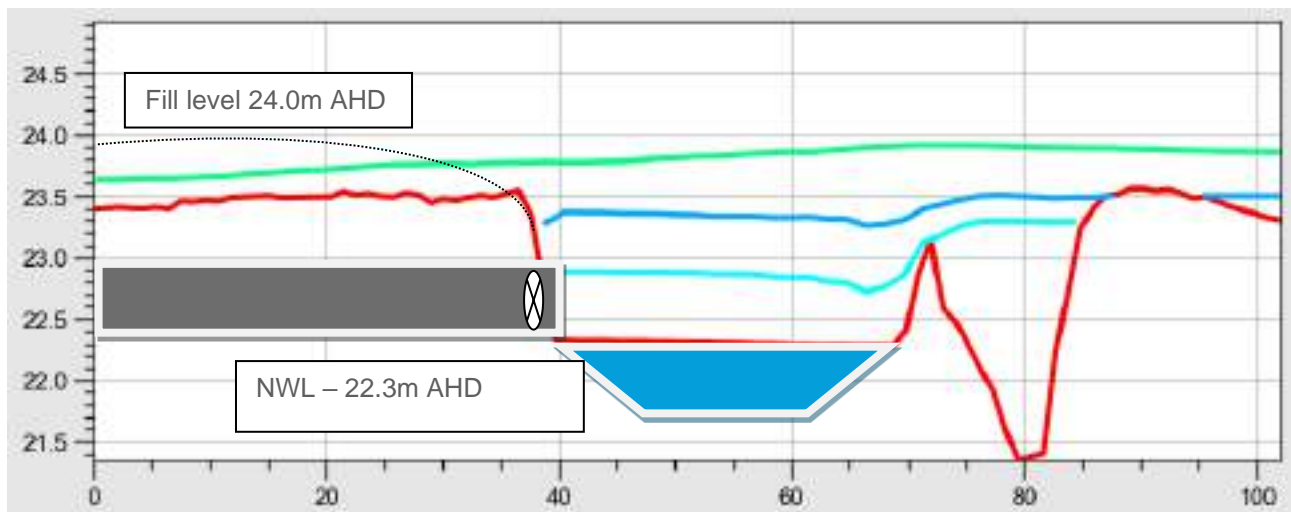
A concept drainage plan of the site has been developed to determine how the site can manage surface water. This concept considers the runoff from the developed site as well as upstream surface water from the existing waterway systems.

#### Site Controls and Legal Point of Discharge

The existing conditions of the site help to determine both the development potential, but also the drainage treatments for the area. The most significant aspects in this respect are the downstream conditions.

The nominal Legal Point of Discharge (LPD) has been advised as east of the site to the proposed sediment basin/open water zone of the wetland. The nominal NWL at this pond is 22.3m AHD. The following preliminary levels will apply to this outfall at this location (note levels vary north and south):

- 10y Creek level @ ~22.8 – flap valve recommended
- 100y Creek Level @ 23.4 (blue)
- Existing Conditions 100y Flood Level (Green)



#### Minor Drainage

Given the site constraints and layout, the minor drainage should direct flows towards the proposed treatment system (Figure 44). This minimises the distance between inlets and outfall across such a low surface gradient area.

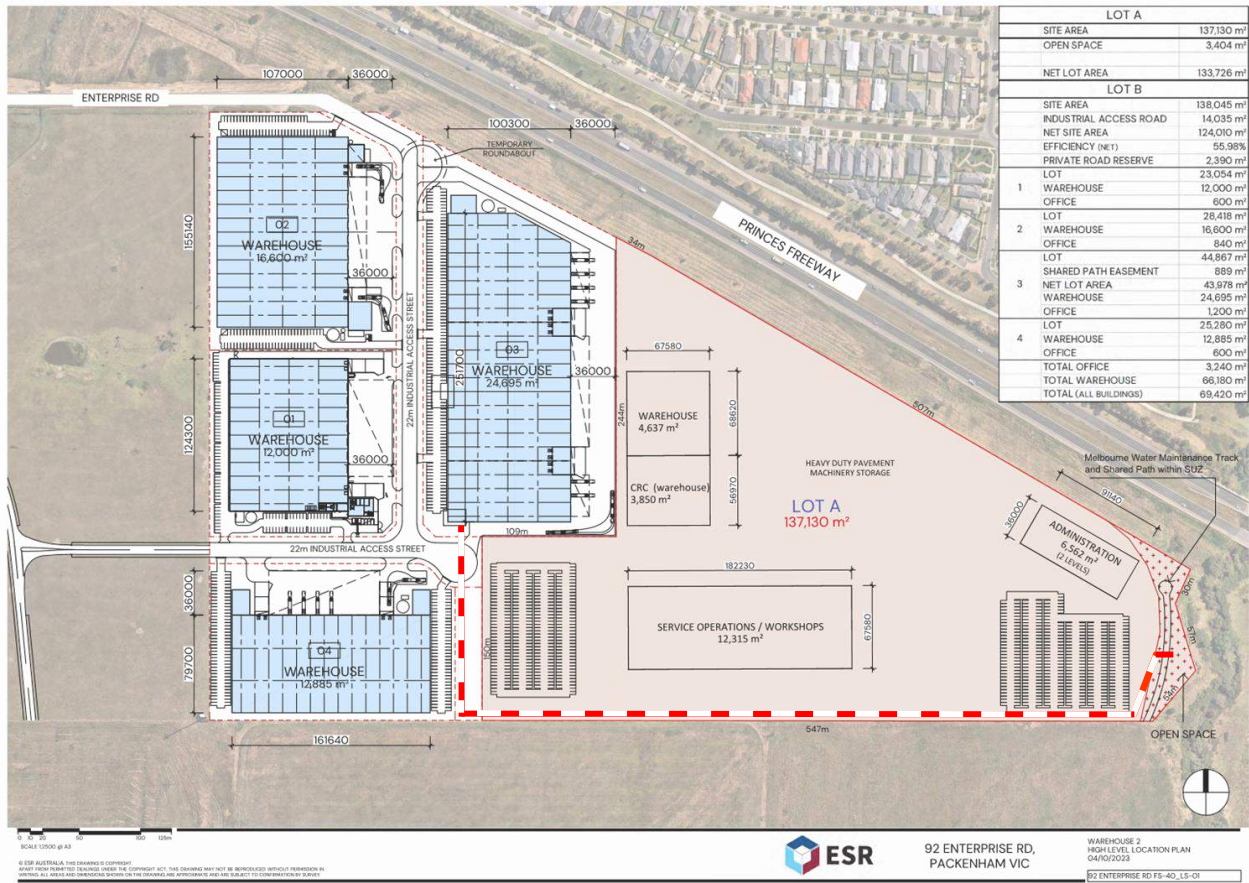


Figure 40. Proposed Minor Drainage

## 6.2. Floor Levels

Using the floodplain excavation option, the following Water Surface levels should be used as the preliminary floor level requirements. A 600mm freeboard will be required on these levels. As can be seen a fill level of 24.0m AHD would be appropriate for most of the site.

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Figure 41. Option 18 – Preliminary Flood Levels Zoomed



Figure 42. Preliminary Flood Levels

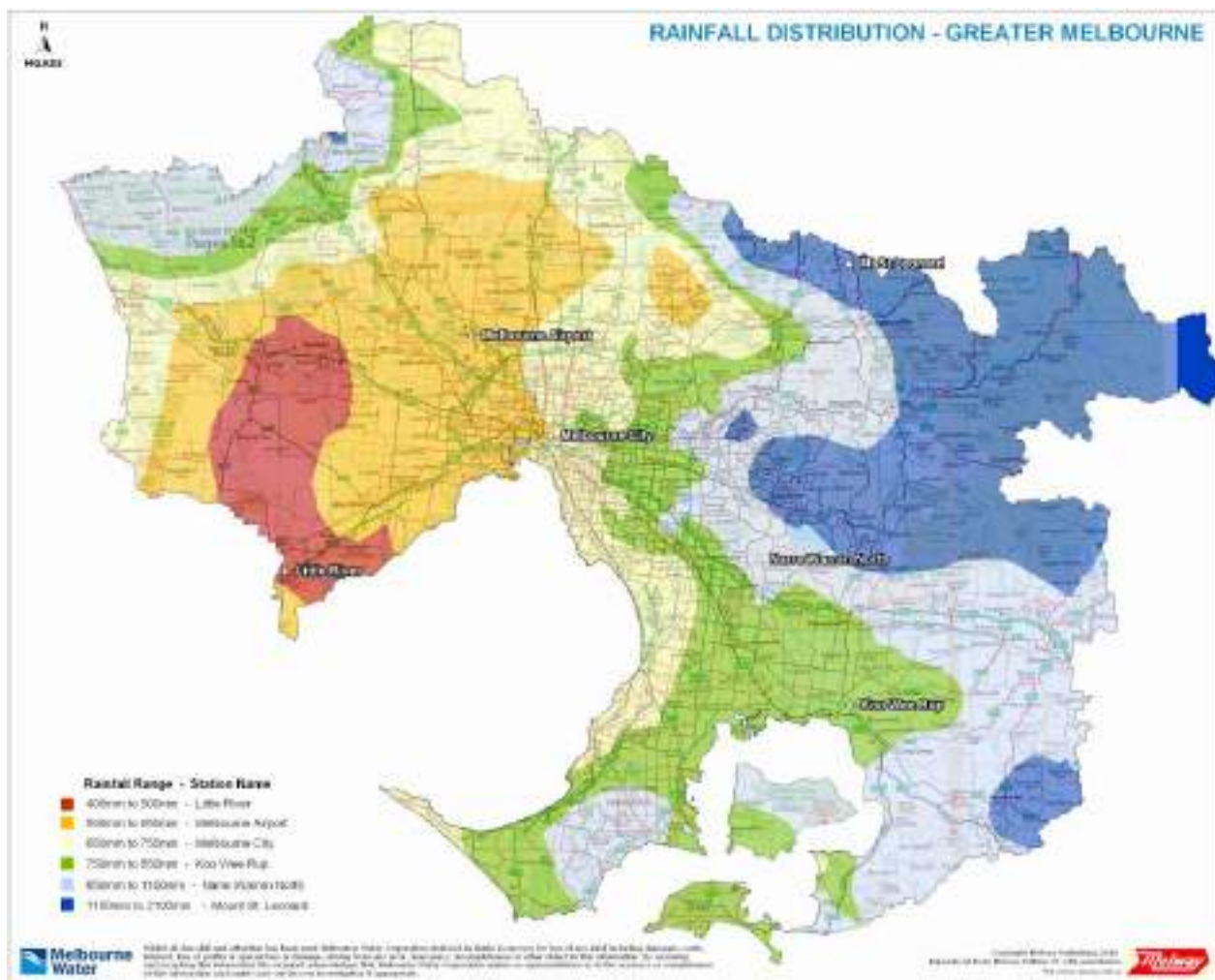


## 6.3. Water Quality

The water quality for this site has been assessed for the development. Treatment is modelled to ensure water quality for the site meets best practice load-based reduction requirements. Whilst it is acknowledged that the site is within the Cardinia Industrial DSS (and water quality will be met through scheme contributions) the site has been tested with the proposed creek widening wetland option. This is predominantly to check if nutrient reduction can be met at the creek outfall (thereby providing an environmental benefit).

### 6.3.1. Rainfall Information

The mean annual rainfall (MAR) for this site is 1020.5 mm/y and as such the Narre Warren North rainfall data template was used. The reference years of 1984-1993 has been applied. Rainfall was run at a 6-minute interval to match the lowest Time of Concentration of the catchment.



Source: Melbourne Water MUSIC Guidelines

Figure 43. Greater Melbourne rainfall distribution

### 6.3.2. MUSIC Model Setup

In order to reach BPEM Guidelines, the model has been set up with the following notes:

- The model has been designed in alignment with proposed layout;
- The model is built using the most recent guidelines including soil losses field capacity;
- The model is built with an assumed 350mm EDD;



- The model is built using rainfall templates that include 10-year periods of rainfall data;
- The measured catchments are in alignment with hydrological models; and
- Source node sub-catchment areas for the development are separated by impervious fraction per Table 4, in alignment with MUSIC guidelines.

All other parameters were set as per Melbourne Water Guidelines.

Table 4. Sub-catchment areas and impervious fraction

Catchment Name	Area (ha)	FI (developed)
Site	20.91	85%

### 6.3.3. Proposed Treatment

The proposed creek widening conceptual wetland (Figure 44) has been modelled in MUSIC to assess its influence on this site. The model setup and results can be seen below.

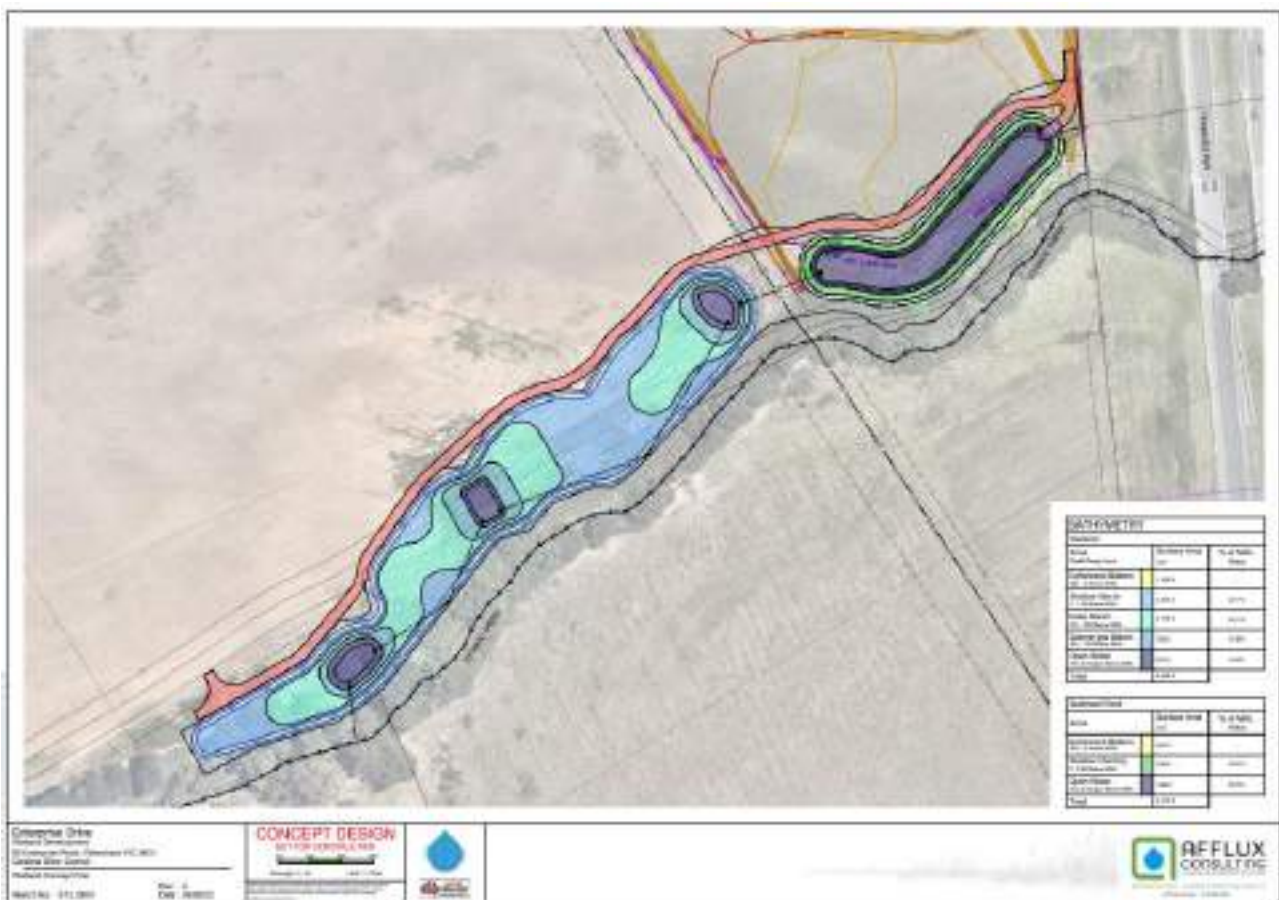
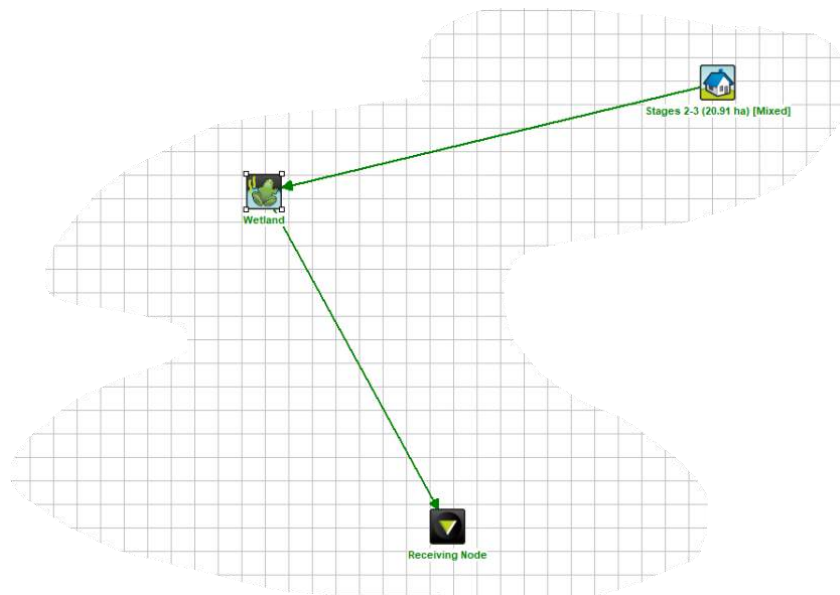


Figure 44. Creek Widening Wetland Concept plan

The results of the MUSIC simulation provide an estimation of the expected nutrient reduction performance as shown in Figure 47.

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Source: .EnterpriseRd.sqz

Figure 45. Catchment MUSIC model layout

Location		Wetland
<b>Inlet Properties</b>		
Low Flow By-pass (cubic metres per sec)		0.00000
High Flow By-pass (cubic metres per sec)		100.0000
Inlet Pond Volume (cubic metres)		1320.0
		Estimate Inlet Volume
<b>Storage Properties</b>		
Surface Area (square metres)		10200.0
Extended Detention Depth (metres)		0.35
Permanent Pool Volume (cubic metres)		1650.0
Initial Volume (cubic metres)		1650.00
Vegetation Cover (% of surface area)		50.0
Exfiltration Rate (mm/hr)		0.00
Evaporative Loss as % of PET		125.00
<b>Outlet Properties</b>		
Equivalent Pipe Diameter (mm)		100
Overflow Weir Width (metres)		3.0
Notional Detention Time (hrs)		71.9

Source: . EnterpriseRd.sqz

Figure 46. MUSIC Wetland Design Inputs

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	Sources	Residual Load	% Reduction
<b>Flow (ML/yr)</b>	149	136	8.5
<b>Total Suspended Solids (kg/yr)</b>	29500	2520	91.5
<b>Total Phosphorus (kg/yr)</b>	60.6	12.2	79.9
<b>Total Nitrogen (kg/yr)</b>	424	179	57.9
<b>Gross Pollutants (kg/yr)</b>	5600	0	100

Figure 47. MUSIC model results - Treatment Efficiencies

### 6.3.4. Sediment Control

Control of sediment from a developed area is an important consideration for both the hydraulic function of drainage and water quality assets.

Given the general principal that any development should not directly discharge into a creek system, a sedimentation basin has been recommended to service the development.

Sedimentation basins were sized using the Fair and Geyer equations, with the results summarised below. This has then been modelled in MUSIC as a sediment basin node, as shown in Figure 49.

Source	Parameter	Basin 1
Melbourne Water requires R = 95% for a 125 micrometer particle	Target	Very fine sand
Pond shape assumption (Figure 10.5)	k	0.26
	n	1.35
From Table 1	V <sub>sc</sub> (m/s)	0.011
Use rational method to obtain 1 Year ARI flow for sub catchment	Q (m <sup>3</sup> /s)	1.10
Area of basin	A (m <sup>2</sup> )	1100.00
	V <sub>sc</sub>	11.00
	Q/A	
EDD	d <sub>e</sub> (m)	0.35
Depth of permanent pool	d <sub>p</sub> (m)	1.50
Lower of 1m or d <sub>p</sub>	d <sup>*</sup> (m)	1.50
	(d <sub>e</sub> +d <sub>p</sub> )	1.00
	(d <sub>e</sub> +d <sup>*</sup> )	
<b>Fraction of Initial Solids Removed</b>	<b>R =</b>	<b>95%</b>

Figure 48. Sedimentation Basin Sizing - Fair and Geyer

Source: EnterpriseRd.sqz

Figure 49. MUSIC Sediment Basin Design Inputs

Table 5. Sediment Basin Parameters

Asset	Sed Pond Size (m2)	Target Size	Fraction Removal	Clean out Frequency
Sediment Pond	1100	125 micrometer	95%	15.1 years

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# 7. Waterway Requirements

The Stage 3 boundary fronts Toomuc Creek and will need to consider waterway interactions. These include:

- The PSP states that a biodiversity corridor of at least 30m should be applied to the Toomuc Creek interface (Figure 50). The proposed wetland/creek extension should be located in this zone
- Any direct discharge to the creek will need to be pre-treated for sediment control
- The biodiversity corridor has been identified as a Growling Grass Frog habitat zone. Frog sensitive interfaces outside of this zone should be considered
- An access way will be required along the waterway interface. The PSP proposes a shared path along the interface and these two objectives could be combined.
- The Toomuc Creek corridor under existing conditions is highly infested with many weed species. Vegetation and weed management will need to be considered by Melbourne water as part of the future management of the area.



Figure 50. Biodiversity Management Mapping

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## 8. Conclusions

This report presents a stormwater management plan for the proposed development stages 2&3 at 92 Enterprise Rd, Pakenham Stages 2-3 within Cardinia Shire. The site has important interactions with its immediate catchment, and these interactions have been considered in this report. In order to maintain the behaviour of the hydraulic systems, including flood plain storage and water quality requirements, this report presents the following requirements:

- Adoption of the Afflux (2023) floodplain expansion concept and revision of the Cardinia Industrial DSS outfall for this site
- Enter into negotiations with Melbourne Water for drainage scheme changes and possible scheme works to fund the floodplain expansion option
- Construction of pre-creek discharge sediment treatments
- Provision of minor and major drainage to discharge towards the floodplain expansion concept
- Fill levels of at least 24.0mAHD based on preliminary flood modelling
- Adoption of the DCE pipe design through stage one without the storage basin option.

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## 9. Abbreviations and glossary

For clarification, provided are terms referred to within this report and their definitions as applicable to stormwater and water engineering.

<b>TERM (Abbreviation)</b>	<b>DEFINITION</b>
<b>Afflux</b>	A measure of the increase in water elevation (or flood level difference) at a given location, relative to the water elevation that would have occurred.
<b>Alluvium/alluvial material</b>	Extensive deposits of sand, silt and/or clay formed by a river or flood, typically forming a floodplain. Alluvium is generally unconsolidated.
<b>Annual Exceedance Probability (AEP)</b>	The likelihood of a storm event or flood occurring or being exceeded within any year. Where, $AEP = 1 - e^{\left(\frac{-1}{ARI}\right)}$
<b>Attenuation</b>	Reduction in the magnitude of a flood peak
<b>Australian Rainfall and Runoff (ARR)</b>	Australian Rainfall and Runoff guidelines document.
<b>Average Recurrence Interval (ARI)</b>	A statistical estimate of the average length of time (in years) between equivalent (or larger) flood events.  Note. Events do not occur at regular intervals. This is an average and not the expected elapsed time until the next exceedance.  e.g. a “100 year ARI flood event” has a 1% exceedance probability each year.
<b>Australian Height Datum (AHD)</b>	Vertical height in meters above the mean sea level.
<b>Baseflow</b>	The slow component of catchment runoff, not immediately in response to a storm event. Encompasses interactions with seepage and groundwater discharge into a waterway.
<b>BPEM</b>	Best practice environmental management guidelines used for planning, designing or managing stormwater systems or urban land uses
<b>Catchment</b>	The upstream land and water surface area that drains to a specified location under consideration.
<b>Consequence</b>	Outcome or impact of an event.
<b>Critical Storm Duration</b>	The length of time of a rainfall event that results in the peak flow or level at a particular location of interest for a given AEP.
<b>Cumec</b>	An abbreviation of cubic meters per second, a unit of discharge (m <sup>3</sup> /s)
<b>Drainage Network or System</b>	A system of natural or constructed flow paths within a catchment used to convey runoff to its outlet. This may include surface or subsurface systems such as pipes, channels, gutters, overland flow paths, culverts, water storages, etc.

<b>Design Event</b>	A probabilistic or statistical flood or rainfall event used for flood/flow estimation processes for a given AEP.
<b>DELWP</b>	Department of Environment, Land, Water and Planning
<b>EPA</b>	Environmental protection agency
<b>Extended Detention</b>	Distance above normal water level in where stormwater is temporarily stored
<b>Evaporation</b>	The transfer of water, as vapour, from a water surface to the air
<b>Evapotranspiration</b>	The transfer of water, as vapour, from near the earth's surface to the air. Includes open water surfaces, ice, frost, soil and transpiration from plants.
<b>Freeboard</b>	The difference in height between the calculated water surface elevation and the top, obvert, crest of a structure or the floor level of a building, provided for the purpose of ensuring a safety margin above the calculated design water elevation.
<b>Flood</b>	Inundation of normally dry land by water that has exceeded the capacity of the normal confines of waterbodies, water storages or watercourses.
<b>Flood Frequency</b>	Descriptor for the annual exceedance probability or average recurrence interval of a flood
<b>Floodplain</b>	The land area which experiences flooding during high discharge events.
<b>Hazard</b>	Potential for damage or harm. Considered alongside consequence and likelihood of occurrence.
<b>Hydrological Analysis</b>	Developing and understanding a set of relationships to determine how rainfall is converted into runoff or streamflow (includes consideration of climate, losses, soil types, etc).
<b>Hydraulic Design</b>	The process of numerically analysing actual or expected flow conditions (such as water surface elevation and velocity) associated with a given hydraulic structure or overland flow.
<b>Infiltration</b>	The downward movement of water into a catchment surface or infiltration system. Largely governed by soil conditions, vegetation and antecedent moisture content.
<b>Loss rate</b>	Removal (loss) of water from the rate of rainfall that occurs during the process of forming stormwater runoff. Usually measured in units of mm/hr. The assumed loss rate usually varies across the drainage catchment in accordance with known or assumed surface conditions.
<b>Local Authority</b>	Any local or regional external authorities (including local and State Governments or non-government authorities) that have a legal interest in the regulation or management of a given activity, or the land on which the activity is occurring, or is proposed to occur.
<b>Manning's 'n' Roughness Coefficient</b>	The numerical representation of the hydraulic roughness of a conduit, flow path or channel as used in the Manning's formula.
<b>Rainfall Excess</b>	The portion of rainfall that contributes to streamflow
<b>Rainfall Intensity</b>	The rate at which rain falls, typically measured in mm/hour.



<b>Runoff</b>	The part of rainfall (or snow/hail) not lost to infiltration, evaporation, transpiration or depression storage that flows from the catchment area past a specified point.
<b>Sedimentation Basin</b>	A basin or tank in which sediment collects primarily through the actions of gravitational settlement.  The basin facilitates low-velocity, low-turbulent flows to facilitate the settling of coarse sediment particles from stormwater runoff.
<b>Soil Erosion</b>	The detachment and transportation of soil and its deposition at another site by wind, water or gravitational effects. Although a component of natural erosion, it becomes the dominant component of accelerated erosion as a result of human activities, and includes the removal of chemical materials.
<b>Stage</b>	Elevation of the water surface in a stream measure to some convenient datum
<b>Storm</b>	In hydrology this includes any rainfall event. Unlike common usage implying a period of extreme weather with intense rain and strong wind.
<b>Stormwater Flooding</b>	Inundation by local runoff caused by heavier than usual rainfall. Stormwater inundation is caused by local runoff before it has entered a watercourse or joined watercourse flow. In a rural setting and within large rural allotments, we define stormwater flooding as sheet flow caused by local runoff before it has concentrated into a watercourse, including a drainage channel, stream, gully, creek, river, estuary, lake or dam, or any associated water holding structure.
<b>Surface Water or Inundation</b>	Any water collecting on the ground or in an open drainage system or receiving water body. In this report we use these terms to discuss water before it is categorised into flood, stormwater or other.
<b>Temporal pattern</b>	The time sequence of rainfall intensity. A representation of the variability of rainfall throughout a storm event.
<b>Water Balance</b>	An account of all the water in a specified system. Includes measurement of all inflows, outflows and changes in stored water volumes.
<b>Wetland</b>	A natural or constructed area of land inundated temporarily or permanently with shallow water that is usually slow moving or stationary

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## Bushfire Development Report

for an industrial subdivision at  
92 Enterprise Road  
Pakenham VIC 3810

Report prepared for  
ESR Developments (Australia) Pty Ltd

January 2023  
(updated July 2024)

[WWW.TERRAMATRIX.COM.AU](http://WWW.TERRAMATRIX.COM.AU)

Terramatrix project code: ESR\_Developments\_PtyLtd-2022-01 CI1302\_BPA-Pakenham

Cover image: Looking south into the site from Enterprise Road.

### Accountability

Stage	Date completed	Name	Title
Site assessment	20-11-2022	[REDACTED]	Managing Director
Analysis & report preparation	08-12-2022	[REDACTED]	Managing Director
Peer review	08-12-2022	[REDACTED]	Manager, Bushfire Analysis and Research

### Version Control

Version	Date issued	Comments	Issued by
1.0	08-12-2022	Bushfire Development Report (BDR) to client	Jon Boura
1.1	19-01-2023	Updated to show Permit Areas	Jon Boura
1.2	17-07-2024	Clarification of management regime of Toomuc Creek reserve	Jon Boura

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## 1 Introduction

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This Bushfire Development Report (BDR) has been prepared for ESR Developments (Australia) Pty Ltd, to assess how the proposed subdivision of 92 Enterprise Road, Pakenham VIC 3810, subsequent industrial development, and construction of an arterial road and connector street, can respond to the bushfire risk and the applicable Victorian planning and building controls that relate to bushfire, in particular the objective and applicable strategies of the Planning Policy Framework (PPF) at Clause 13.02-1S *Bushfire planning* in the Victoria Planning Provisions (Cardinia Planning Scheme, 2018a).

The site forms part of the Cardinia Road Employment Precinct Structure Plan (PSP) and the proposal is to subdivide the land for subsequent industrial development. The development is to be delivered through three planning permit applications. The site is in a designated Bushfire Prone Area (BPA). BPAs are those areas subject to or likely to be subject to bushfires, as determined by the Minister for Planning.

This report assesses the bushfire hazard and identifies how the proposed development can appropriately mitigate any bushfire risk and respond to and comply with the applicable bushfire planning and building controls. These are:

- Clause 13.02-1S *Bushfire Planning*, which is the State planning policy for bushfire. The development proposal needs to show that it meets the objective and applicable strategies of the policy.
- The Building Act 1993 and associated Building Regulations 2018, which require bushfire protection standards in designated BPAs, for Class 1, 2 and 3 buildings, certain Class 9 buildings (and associated Class 4 buildings) and associated Class 10a buildings or decks.

This report has been prepared in accordance with guidance for the assessment of, and response to, bushfire risk provided in:

- *Bushfire State Planning Policy Amendment VC140*, Planning Advisory Note 68 (DELWP, 2018)
- *Local planning for bushfire protection*, Planning Practice Note 64 (DELWP, 2015a)
- *Planning Permit Applications Bushfire Management Overlay Technical Guide* (DELWP, 2017)
- *Design guidelines for settlement planning at the bushfire interface* (DELWP, 2020a)
- AS 3959-2018 *Construction of buildings in bushfire prone areas* (Standards Australia, 2020).

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## 2 Overview of site

The site comprises land south of Enterprise Road that will become part of the commercial and industrial area of Pakenham in the Shire of Cardinia. The site is in the north-eastern corner of the Cardinia Road Employment Precinct. The Employment Precinct comprises approximately 590 ha of land generally bounded by Princes Freeway to the north, Toomuc Creek to the east, the electricity transmission line to the south and Gum Scrub Creek to the west (Cardinia Shire Council, 2010).

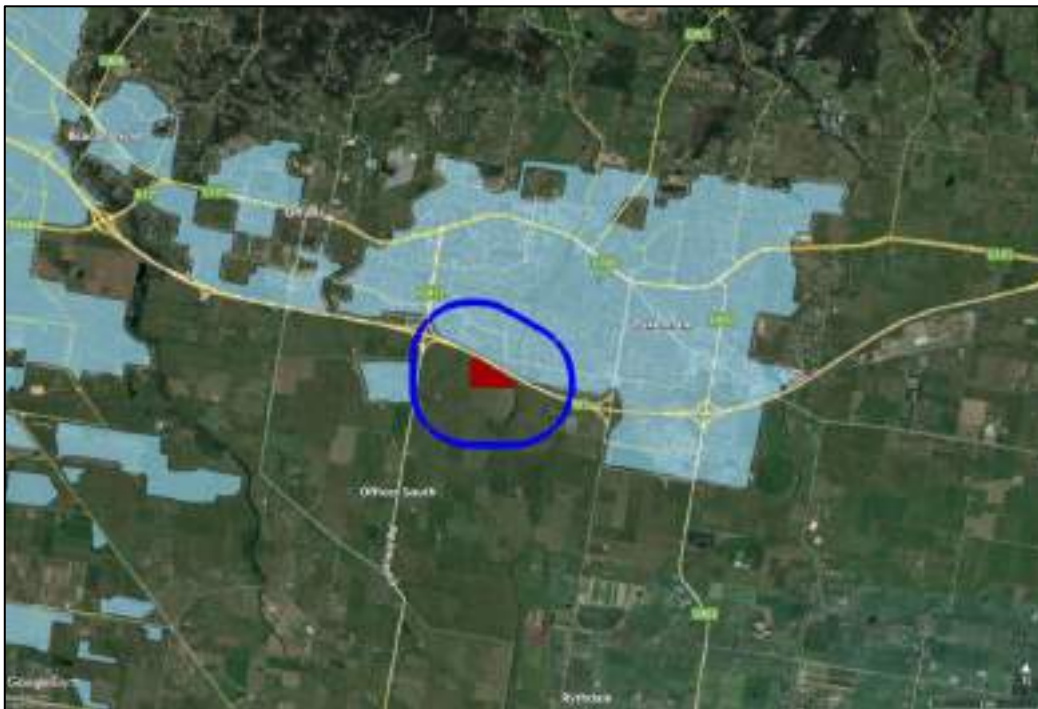


Figure 1 – 92 Enterprise Road area (site shown in red fill, 1 km buffer in blue outline, non-BPA land is shown in light blue shading) (2022 Google Earth).

### 2.1 Proposed development

The site is set in the currently undeveloped pastoral area on the southern edge of the Pakenham urban area, adjacent to the Princes Freeway to the north.

The development proposal is for subdivision of the site, subsequent industrial development, and construction of an arterial road from Cardinia Road and a connector street to the industrial estate (see Figure 2). The site is to be delivered through three planning permit applications (see Figure 3). The proposal includes the development of warehouses on Permit Areas 1 and 2 and the retention of Permit Area 3 as a single lot for future development.

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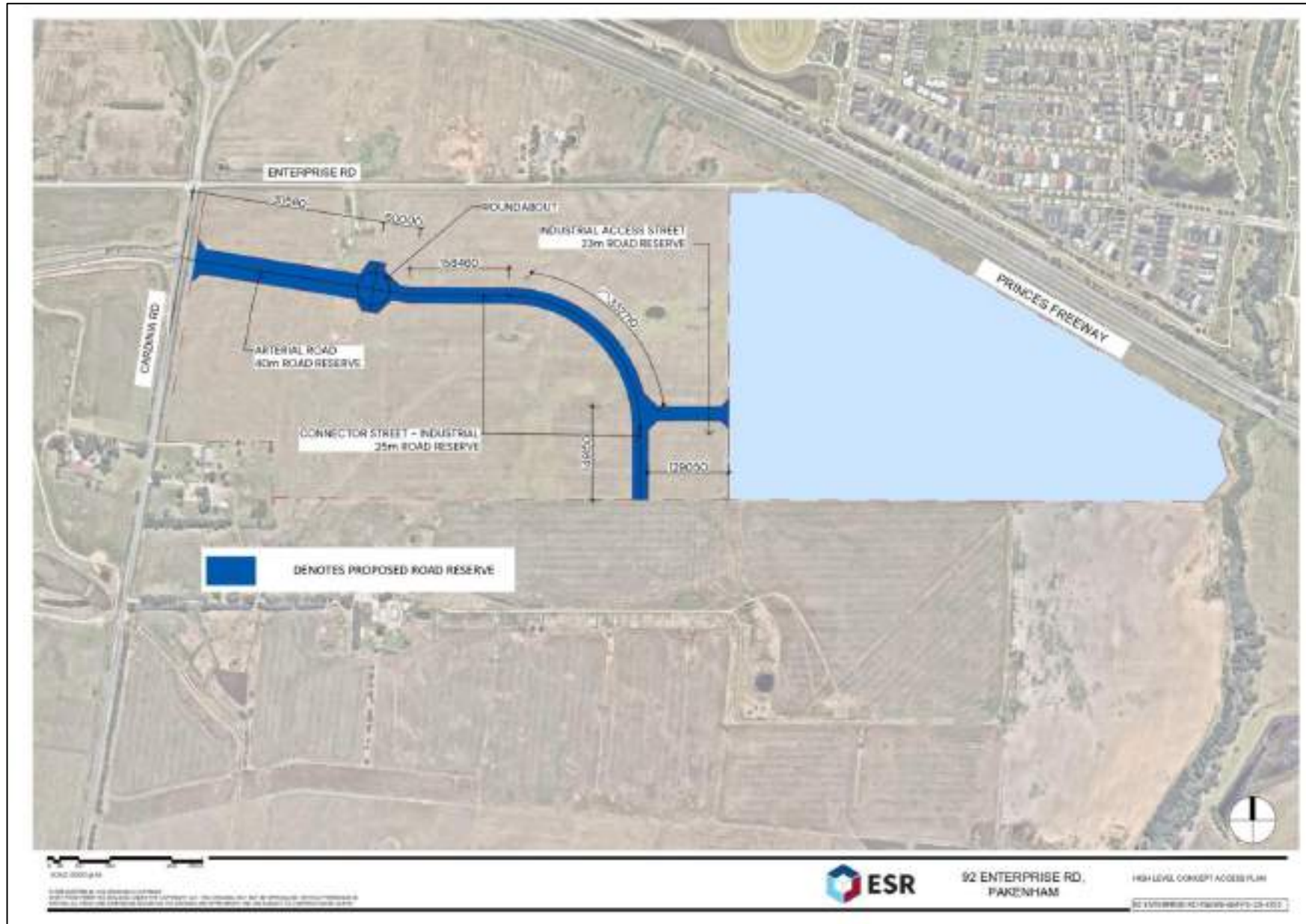


Figure 2 – Arterial road and industrial connector street (ESR, 2022a).





Figure 3 – 92 Enterprise Road Master Plan (ESR, 2023).

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### 3 Bushfire planning and building controls

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This section identifies the applicable planning and building controls that relate to bushfire.

#### 3.1 Clause 13.01-1S Natural hazards and climate change

The objective of this Clause is to minimise the impacts of natural hazards and adapt to the impacts of climate change through risk-based planning. Specified strategies to achieve the objective are:

- *'Consider the risks associated with climate change in planning and management decision making processes.*
- *Identify at risk areas using the best available data and climate change science.*
- *Integrate strategic land use planning with emergency management decision making.*
- *Direct population growth and development to low risk locations.*
- *Develop adaptation response strategies for existing settlements in risk areas to accommodate change over time.*
- *Ensure planning controls allow for risk mitigation or risk adaptation strategies to be implemented.*
- *Site and design development to minimise risk to life, property, the natural environment and community infrastructure from natural hazards'* (Cardinia Planning Scheme, 2018b).

Especially in southern and eastern Australia, since the 1950's there has been an increase in the length of the fire weather season and a greater number of higher risk days associated with climate change (CSIRO/BOM, 2022). The Australasian Fire and Emergency Service Authorities Council (AFAC) identify that a failure of building codes and land use planning to adequately adapt to climate change is a significant risk (AFAC, 2018).

This clause in the PPF supports the adoption of a precautionary and conservative approach to assessing and responding to bushfire risk.

#### 3.2 Clause 13.02-1S Bushfire Planning

Clause 13.02-1S has the objective *'To strengthen the resilience of settlements and communities to bushfire through risk based planning that prioritises the protection of human life'* (Cardinia Planning Scheme, 2018a). The policy must be applied to all planning and decision making under the Planning and Environment Act 1987, relating to land which is:

- Within a designated BPA;
- Subject to a BMO; or
- Proposed to be used or developed in a way that may create a bushfire hazard.

Clause 13.02-1S requires priority to be given to the protection of human life by:

- *'Prioritising the protection of human life over all other policy considerations.*



- *Directing population growth and development to low risk locations and ensuring the availability of, and safe access to, areas where human life can be better protected from the effects of bushfire.*
- *Reducing the vulnerability of communities to bushfire through consideration of bushfire risk in decision-making at all stages of the planning process’ (Cardinia Planning Scheme, 2018a).*

Key strategies are stipulated in Clause 13.02-1S, which require that strategic planning documents, planning scheme amendments and development plan approvals properly assess bushfire risk and include appropriate bushfire protection measures. This also applies to planning permit applications for:

- Subdivisions of more than 10 lots
- Accommodation
- Childcare centre
- Education centre
- Emergency services facility
- Hospital
- Indoor recreation facility
- Major sports and recreation facility
- Place of assembly
- Any application for development that will result in people congregating in large numbers.

Development should not be approved where ‘...a landowner or proponent has not satisfactorily demonstrated that the relevant policies have been addressed, performance measures satisfied or bushfire protection measures can be adequately implemented’ (Cardinia Planning Scheme, 2018a).

This study assesses the hazard and identifies the bushfire protection measures that will be required for future development of the site. It is considered that development can appropriately prioritise the protection of human life and meet the objectives of Clause 13.02-1S by ensuring compliance with the applicable bushfire planning and building controls.

A response to the applicable strategies of Clause 13.02-1S is provided in Section 6 of this report.

### **3.3 Clause 71.02-3 Integrated Decision Making**

Clause 71.02-3 states that planning and responsible authorities should endeavour to integrate policies and balance conflicting objectives in favour of net community benefit and sustainable development. However, in bushfire affected areas, the protection of human life must be prioritised over all other policy considerations (Cardinia Planning Scheme, 2018c).

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### 3.4 Bushfire Prone Area (BPA)

The site is in a BPA (see Figure 4), which are those areas subject to or likely to be subject to bushfire, as determined by the Minister for Planning. Large areas of land to the north have been excised from the BPA, and additional areas south of the freeway are expected to be excised as urban development proceeds. Note that land not within the BPA is defined as an area of low bushfire hazard, where the extent, configuration and/or management of vegetation results in low potential for bushfire spread (DELWP, 2019).

Those areas of highest bushfire risk within the BPA are designated as BMO areas. The site is not covered by the BMO, with the closest BMO coverage being more than 4 km to the north-west, beyond Browns Road north of Officer.



Figure 4 - BPA (brown shading) coverage around the site (highlighted in blue outline).

In a BPA, the Building Act 1993 and associated Building Regulations 2018, through application of the National Construction Code 2022 (NCC), require specific design and construction standards for Class 1, 2 and 3<sup>1</sup> buildings, certain Class 9 and 4 buildings<sup>2</sup>, and Class 10A buildings<sup>3</sup> or decks adjacent to, or connected with, these classes of buildings.

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<sup>1</sup> Class 1, 2 and 3 buildings are defined in the NCC and are generally those used for residential accommodation, including houses and other dwellings, apartments, hotels and other buildings with a similar function or use.

<sup>2</sup> Applicable Class 9 buildings are Class 9a health-care buildings, Class 9b early childhood centres, primary and secondary schools, Class 9c residential care buildings, and any Class 4 parts of a building associated with these Class 9 buildings.

<sup>3</sup> Class 10a buildings are defined in the NCC as non-habitable buildings including sheds, carports, and private garages.

Compliance with AS 3959-2018 *Construction of buildings in bushfire prone areas* or, for Class 1 and associated 10A buildings or decks, the NASH standard for steel framed houses (NASH, 2021) is 'deemed-to-satisfy' the performance requirement (ABCB, 2020).

The Victorian building regulations require that applicable buildings be constructed to a minimum Bushfire Attack Level (BAL)-12.5, or higher as determined by a site assessment or planning scheme requirement. A BAL is a means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact. There are six BALs defined in AS 3959-2018, ranging from BAL-LOW which has no bushfire construction requirements, to BAL-FZ (Flame Zone) where flame contact with a building is expected (see Appendix A).

Larger developments and certain vulnerable uses in a BPA (see Section 3.2) are also required by Clause 13.02-1S *Bushfire Planning* to:

- *'Consider the risk of bushfire to people, property and community infrastructure.*
- *Require the implementation of appropriate bushfire protection measures to address the identified bushfire risk.*
- *Ensure new development can implement bushfire protection measures without unacceptable biodiversity impacts'* (Cardinia Planning Scheme, 2018a).

The proposed buildings are commercial in nature and do not require a BAL under the building code. It is noted, however, that due to the requirement to comply with other aspects of the building regulations and construction code (which typically require robust construction and materials), these types of buildings may reach, or even exceed, the minimum BAL-12.5 standard for at least some elements e.g. use of non-combustible materials and thicker glazing.

### 3.5 Other controls

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#### 3.5.1 Zoning

The Urban Growth Zone - Schedule 2 (UGZ2) (Cardinia Planning Scheme, 2021a) that applies to most of the site, and the Special Use Zone – Schedule 4 (SUZ4) (Cardinia Planning Scheme, 2021b) that applies to a strip along the eastern boundary associated with Toomuc Creek, have no bushfire planning implications.

#### 3.5.2 Overlays

The site vision is covered by the Development Contributions Plan Overlay -Schedule 4 (DCPO3) (Cardinia Planning Scheme, 2021c), which has no bushfire planning implications for the site.

### 3.6 Cardinia Road Employment Precinct Structure Plan

The Cardinia Road Employment Precinct Structure Plan (Cardinia Shire Council, 2010) does not address bushfire and has no implications for the site regarding bushfire protection planning.

### 3.7 Regional bushfire risk assessments and plans

#### **Regional Bushfire Planning Assessment (RBPA) Melbourne Metropolitan Region**

As part of the response to the 2009 Victorian Bushfires Royal Commission, Regional Bushfire Planning Assessments (RBPAs) were undertaken across six regions that covered the whole of Victoria. The RBPAs provide information about ‘identified areas’ where a range of land use planning matters intersect with a bushfire hazard to influence the level of risk to life and property from bushfire. The RBPAs state that ‘*This information should be addressed as part of strategic land use and settlement planning at the regional, municipal and local levels*’ (DPCD, 2012).

The *Regional Bushfire Planning Assessment – Melbourne Metropolitan Region* covers the Cardinia Shire LGA. It recognises Pakenham as the main urban centre in the municipality and that development is directed to occur around the township. The RBPA does not identify any bushfire matters of concern in or around Pakenham (DPCD, 2012).

#### **Cardinia Municipal Fire Management Plan (MFMP)**

The Cardinia MFMP identifies priority risks across the Cardinia LGA and integrates a wide range of programs to address these risks. Programs are identified for prevention, preparation, response and recovery, during and in the period following significant bushfires.

The MFMP assesses the bushfire risk to residences on the edge of Pakenham as ‘Low’ and does not identify a bushfire risk to commercial/industrial areas in this area (Cardinia Shire Council, 2015).

#### **Metropolitan Bushfire Management Strategy 2020**

The Strategy identifies the forested east of the region as being at greatest risk, as settlements are potentially exposed to high intensity forest fires on rugged terrain (DELWP, 2020). Figure 1 shows that the vicinity of 92 Enterprise Road on the southern edge of the built-up area with low risk of dwelling loss. The areas of high potential bushfire loss are in the hills to the north of Pakenham.

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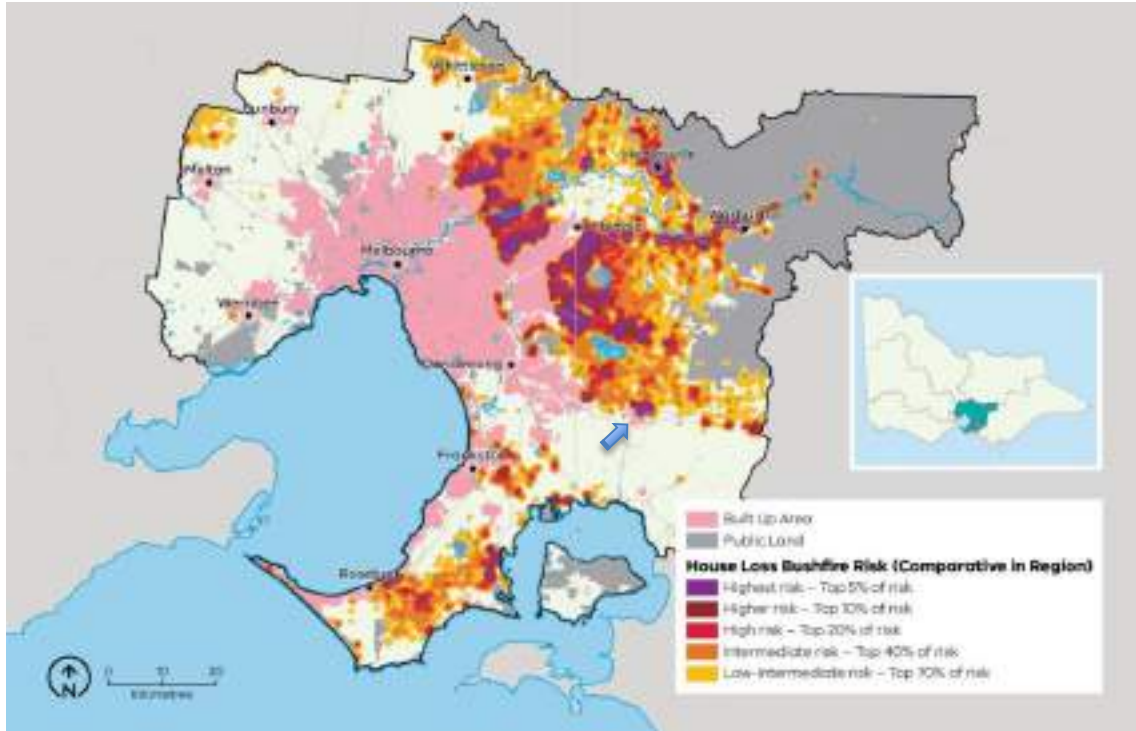


Figure 5 - Modelled bushfire risk to dwellings, Metropolitan Region (DELWP, 2020). Approximate location of 92 Enterprise Road indicated by blue arrow.

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## 4 Bushfire hazard assessment

One of the bushfire hazard identification and assessment strategies in Clause 13.02-1S is to use the best available science to identify the hazard posed by vegetation, topographic and climatic conditions. The basis for the hazard assessment should be:

- *'Landscape conditions - meaning the conditions in the landscape within 20 kilometres and potentially up to 75 kilometres from a site;*
- *Local conditions - meaning conditions in the area within approximately 1 kilometre from a site;*
- *Neighbourhood conditions - meaning conditions in the area within 400 metres of a site; and,*
- *The site for the development'* (Cardinia Planning Scheme, 2018a).

This section includes a bushfire assessment at:

- The wider landscape scale, for at least 20 km around the site (see Figure 1 and Map 1);
- The local landscape scale extending up to 1 km from the site and the neighbourhood scale up to 400 m around the site boundary, to identify any risk arising around the site beyond the site assessment zone (see Map 2); and
- The site scale, for 100 m around the site, to determine likely future BALs (if required) (see Map 3).

The BPA coverage invokes AS 3959-2018, which requires a site assessment of the vegetation and topography up to 100 m around a building for the purposes of determining the applicable BAL construction standard for applicable types of buildings (Standards Australia, 2020). It should be noted, however, that the commercial/industrial buildings proposed for 92 Enterprise Road are not of a type that require a BAL under the Victorian building regulations, and in this report the 100 m site assessment is used solely to gauge the bushfire hazard close to the buildings.

### 4.1 Landscape assessment

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#### 4.1.1 Landscape – to 20km

92 Enterprise Road is on the southern edge of the urban area of Pakenham, approximately 55 km south-east of the Melbourne CBD.

The landscape within 20 km is characterised by three main land types:

- To the immediate north and east is existing urban development that comprise a large low threat area;
- A large proportion land to the south and east comprises flat pastoral land, with limited treed vegetation; and
- A more complex landscape of bushland on steeper topography occurs to the north and north-east, around Upper Beaconsfield, Cockatoo and Gembrook, more than 5 km from the site.

The designated BPA covers all the 20 km landscape assessment zone, other than the established urban areas to the north and west along the Princes Highway and south-west around Cranbourne. The BMO covers the large areas of treed vegetation to the north of Pakenham and some smaller patches of bushland to the south-west.

There is an extensive fire history within 20 km, including the 1983 Ash Wednesday fires at Upper Beaconsfield and Cockatoo and 2009 Black Saturday fires in the Bunyip State Forest and smaller fires at Narre Warren South and Harkaway (see Map 1).

In Victoria, the most likely scenarios for a large landscape fire are an approach from those directions typically associated with the direction of the wind on severe, or higher, fire danger days i.e. approach of bushfire from the north, north-west, west or south-west (Long, 2006).

The site has an exposure to areas of grass to the south and south-west. Consequently, the site could currently be affected by a potentially fast-moving grassfire, with possible impact by smoke, ember attack (although likely to be less than that generated by a fire in woodland or forest) and radiant heat. All the adjacent land is zoned UGZ, and the bushfire hazard is anticipated to be removed over time through urban development.

The site has access to the nearby low threat areas of Pakenham to the north via Cardinia Road.


To assist in assessing landscape risk, four 'broader landscape types', representing different landscape risk levels, are described in the technical guide *Planning Applications Bushfire Management Overlay*. These are intended to streamline decision-making, and support more consistent decisions based on the landscape risk (DELWP, 2017).

The four types range from low risk landscapes where there is little hazardous vegetation beyond 150 m of a site and extreme bushfire behaviour is not credible, to extreme risk landscapes with limited or no evacuation options and where fire behaviour could exceed AS 3959 assumptions (see Table 1).

The development site and surrounding landscape accords with Broader Landscape Type 2, with the risk generated by Grassland rather than higher fuel load vegetation types. The risk to the site is likely to be reduced in the short- to medium-term as adjacent properties in the UGZ and Cardinia Road Employment Precinct Structure Plan area are developed, and hazardous vegetation removed.

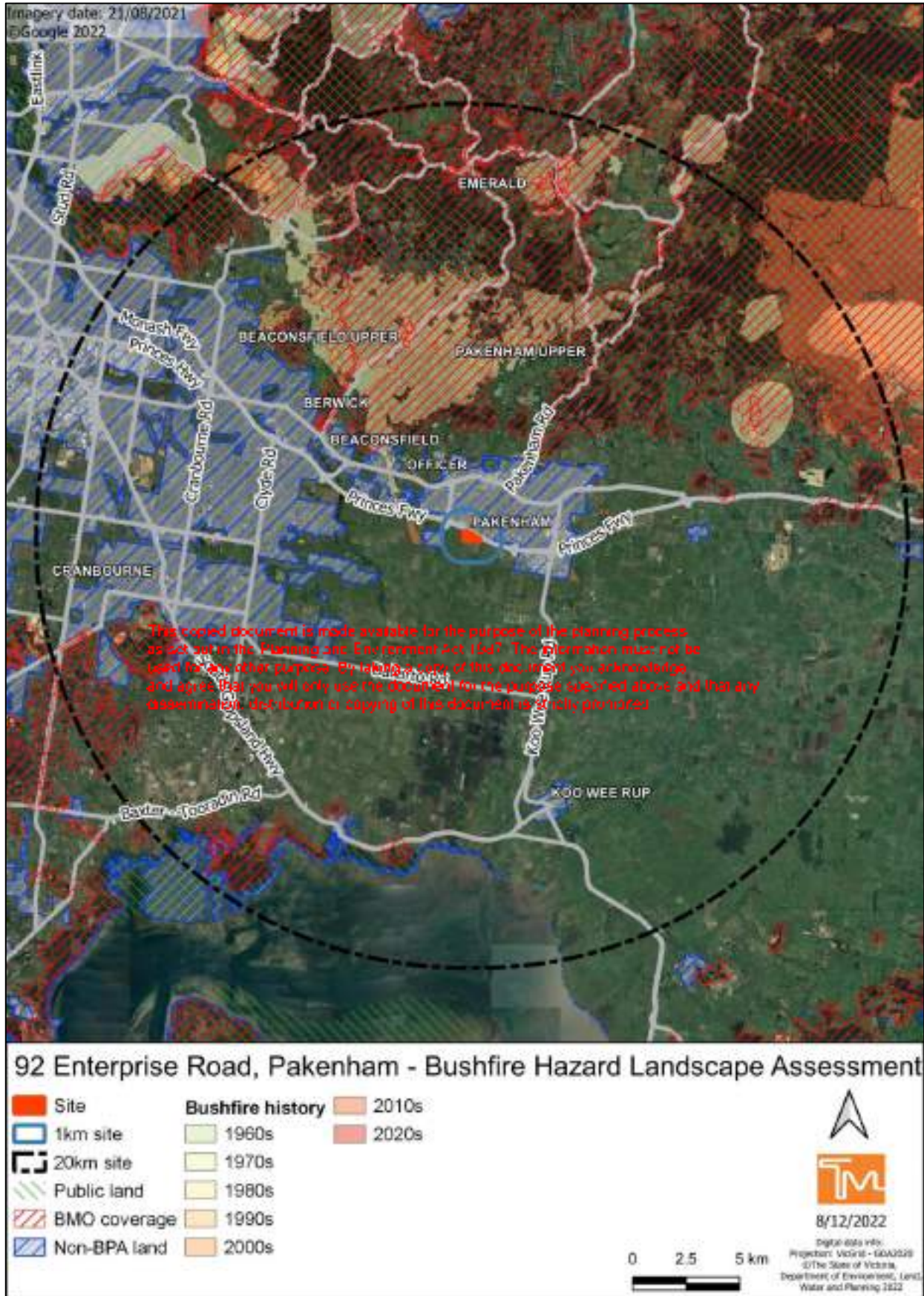
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**Table 1 - Landscape risk typologies (from DELWP, 2017).**

Broader Landscape Type 1	Broader Landscape Type 2	Broader Landscape Type 3	Broader Landscape Type 4
<ul style="list-style-type: none"> <li>• There is little vegetation beyond 150 metres of the site (except grasslands and low-threat vegetation).</li> <li>• Extreme bushfire behaviour is not possible.</li> <li>• The type and extent of vegetation is unlikely to result in neighbourhood-scale destruction of property.</li> <li>• Immediate access is available to a place that provides shelter from bushfire.</li> </ul>	<ul style="list-style-type: none"> <li>• The type and extent of vegetation located more than 150 metres from the site may result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to a site.</li> <li>• Bushfire can only approach from one aspect and the site is located in a suburban, township or urban area managed in a minimum fuel condition.</li> <li>• Access is readily available to a place that provides shelter from bushfire. This will often be the surrounding developed area.</li> </ul>	<ul style="list-style-type: none"> <li>• The type and extent of vegetation located more than 150 metres from the site may result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to a site.</li> <li>• Bushfire can approach from more than one aspect.</li> <li>• The site is located in an area that is not managed in a minimum fuel condition.</li> <li>• Access to an appropriate place that provides shelter from bushfire is not certain.</li> </ul>	<ul style="list-style-type: none"> <li>• The broader landscape presents an extreme risk.</li> <li>• Fires have hours or days to grow and develop before impacting.</li> <li>• Evacuation options are limited or not available.</li> </ul>
			

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Map 1 – Bushfire hazard landscape assessment.

## 4.2 Local and neighbourhood conditions

### 4.2.1 Local – to 1 km

Within the 1 km local assessment zone, the landscape is split between low threat urban area to the north of the Princes Freeway and flat grassland to the south, as reflected in the extent of BPA coverage (see Map 2). The predominant bushfire hazard are the areas of Grassland around the site to the south.

### 4.2.2 Neighbourhood – to 400 m

Within 400 m, the neighbourhood scale bushfire risk to the site is largely consistent with that for 1 km (see Map 2).

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## 4.3 Site conditions

### 4.3.1 Vegetation

Vegetation within a 100 m assessment zone around the site has been classified in accordance with the AS 3959-2018 methodology. Classified vegetation is vegetation that is deemed hazardous from a bushfire perspective.

The classification system is not directly analogous to Ecological Vegetation Classes (EVCs) but uses a generalised description of vegetation based on the AUSLIG (Australian Natural Resources Atlas: No. 7 - Native Vegetation) classification system. The classification is largely based on the structural characteristics of the vegetation at maturity, but the key determinant should be the likely fire behaviour that it will generate.

#### Grassland

Vegetation on adjacent land in all directions matches the AS 3959-2018 classification of Grassland, which is defined as all forms of vegetation (except Tussock Moorlands) including situations with shrubs and trees, if overstorey foliage cover is less than 10%. Includes pasture and cropland (Standards Australia, 2020).

Grassland vegetation is considered hazardous and therefore classifiable when it is not managed in a minimal fuel condition. Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack (e.g. short-cropped grass, to a nominal height of 100 mm) (Standards Australia, 2020). Grassland areas should be assumed to be unmanaged and classifiable unless there is 'reasonable assurance' that they will be managed in perpetuity, in a low threat state, e.g. no more than approx. 100 mm high.

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Figure 6 – Looking south from Enterprise Road at Grassland to the west of the site.



Figure 7 – Looking north over Grassland between the site and the Princes Freeway.

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**Figure 8 – Looking west along Enterprise Road, with the site to the left and Grassland between the site and Princes Freeway to the right.**



**Figure 9 –Grassland anticipated to be rendered low threat through industrial development.**

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Figure 10 – Looking south into the site from Enterprise Road.

#### Excluded vegetation and non-vegetated areas

Areas of low threat vegetation and non-vegetated areas can be excluded from classification in accordance with Section 2.2.3.2 of AS 3959-2018, if they meet one or more of the following criteria:

- (a) 'Vegetation of any type that is more than 100 m from the site.
- (b) Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified vegetation.
- (c) Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other, or of other areas of vegetation being classified vegetation.
- (d) Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified vegetation.
- (e) Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.
- (f) Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks' (Standards Australia, 2020).

For the purposes of this report, it is assumed that all vegetation on the site will be managed in a low threat state (i.e. as non-classified vegetation), therefore Map 3 does not show any classified vegetation on the site.

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Non-vegetated areas excluded from classification include the roads, driveways and structures within the site assessment zone (see Map 3).



Figure 11 – Looking west from Cardinia Road at residential area, west of the site.

### 4.3.2 Topography

AS 3959-2018 requires that the 'effective slope' be identified to determine the BAL and applicable vegetation setback distances. This is the slope of the land under the classified vegetation<sup>4</sup> that will most significantly influence the bushfire attack on a building. Two broad types apply:

- Flat and/or Upslope - land that is flat or on which a bushfire will be burning downhill in relation to the development. Fires burning downhill (i.e. on an upslope) will generally be moving more slowly with a reduced intensity.
- Downslope - land under the classified vegetation on which a bushfire will be burning uphill in relation to the development. As the rate of spread of a bushfire burning on a downslope (i.e. burning uphill towards a development) is significantly influenced by increases in slope, downslopes are grouped into five classes in 5° increments from 0° up to 20°.

The site and surrounding landscape are predominantly flat, or only very gently sloping, without significant changes in elevation that would appreciably influence bushfire behaviour. The applicable slope class is 'All upslopes and flat land'.

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<sup>4</sup> The slope of the land between the classified vegetation and the building is called the site slope, which in the Method 1 procedure of AS 3959, is assumed to be the same as the effective slope.





Map 3 – Bushfire hazard site assessment.

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#### 4.4 Future Urban Structure

92 Enterprise Road lies in the north-eastern corner of the Cardinia Road Employment Precinct area. The PSP indicates the site will be bound on all sides by an Access Street – Level 2, with a 12 m wide carriageway (Cardinia Shire Council, 2010).

Permit Areas 1 and 2 will be developed as warehousing as per Figure 3. The final form of Permit Area 3 is yet to be determined and it may remain a large lot to be developed with a larger warehouse and parking of heavy machinery or be subdivided for development of smaller warehouses as per Figure 12. The development option selected for Permit Area 3 has no implications for bushfire planning for the site.

The proposed arterial road will originate at Cardinia Road and extend east and then south to the southern edge of the area of interest. A connector road will link the arterial road to the industrial estate (see Figure 2).

At a wider scale, the site will be subsumed within the urban area of Pakenham, with the existing township to the north, commercial/industrial areas immediately to the west and then residential areas currently under development west of Cardinia Road, industrial areas to the south and the Pakenham West PSP Area to the east beyond Toomuc Creek.

The site will be connected to the local road network, with easy access to Cardinia Road and the Princes Freeway.



Figure 12 – Cardinia Road Employment Precinct future urban structure (Cardinia Shire Council, 2010), with site indicated by red circle.

## 4.5 Vegetation proposed under the PSP

The Cardinia Road Employment Precinct will include a network of minor reserves, local parks, drainage reserves and conservation reserves, including along Toomuc Creek to the east of the site (Cardinia Shire Council, 2010). We understand that the grass in the Toomuc Creek reserve will be managed to a 'rural to parkland standard', mown once before the fire season and once during it.

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## 5 Bushfire protection measures

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This section identifies how future development can respond to the bushfire risk, including the requirements of Clause 13.02-1S, published guidance and the building regulations applicable to construction in a BPA.

### 5.1 BAL construction standard

The proposed buildings are industrial/commercial in nature and do not require a BAL under the building code; this is additionally justified by the low-moderate bushfire risk currently at the site, neighbourhood and landscape scale, and that this risk will decrease further as the Cardinia Road Employment Precinct and Pakenham West PSP Area are developed.

It is noted that due to the requirement to comply with other aspects of the building regulations and construction code (which typically require robust construction and materials), these types of buildings may reach, or even exceed, a BAL-12.5 standard for at least some elements e.g. use of non-combustible materials and thicker glazing.

### 5.2 Building setbacks from enduring bushfire hazard

Permit Area 3 will abut the Toomuc Creek reserve on its eastern boundary. The Option 1 development can be designed to provide an appropriate setback between buildings and the enduring bushfire hazard. The Option 2 subdivision provides open space and car parks between the proposed warehouses and the creek reserve, resulting in a setback of more than 40 m.

The design for all three Permit Areas provides a pedestrian and bicycle path along the northern boundary, that will provide a fuel free break between the buildings and the Princes Freeway road reserve.

### 5.3 Grassland fuel management

The site is currently exposed to classified Grassland in all directions. Other than the Toomuc Creek reserve, which will retain classified vegetation, the Grassland is a short- to medium-term bushfire hazard, that will be progressively removed as the Cardinia Road Employment Precinct is developed.

Grassland on undeveloped parts of 92 Enterprise Road will be maintained at less than 100 mm in height during the declared Fire Danger Period.

If required, the grass hazard on the adjacent private land could be addressed through referral to the Cardinia Shire Municipal Fire Prevention Officer, who can issue Fire Prevention Notices to create low threat slashed buffers adjacent to the buildings.

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## 5.4 Roads and fire hydrants

There is currently no published fire service guidance regarding the provision of water and access specific to industrial areas for bushfire protection. Access standards for fire service vehicles under the Building Code of Australia will meet bushfire access requirements at this site.

A reticulated hydrant system and/or static water supplies required under the Building Code of Australia for industrial/commercial buildings, will provide an adequate water supply for bushfire protection at this site.

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## 6 Clause 13.02-1S Bushfire Planning

The applicable strategies at Clause 13.02-1S are detailed in the following sub-sections, and a summary response is provided about how the proposed development can respond to them.

### 6.1 Protection of human life strategies

Priority must be given to the protection of human life.

#### ***Prioritising the protection of human life over all other policy considerations***

The site is in a low-moderate bushfire risk location, and the risk will lessen as development in and around the site occurs. Staff and visitors to the site will have easy access to reliably low threat areas within the urban area immediately to the north.

There will be no increase in risk to nearby residents or community infrastructure from the proposed development.

#### ***Directing population growth and development to low risk locations and ensuring the availability of, and safe access to, areas where human life can be better protected from the effects of bushfire.***

As identified in Section 4.1, the site is in a lesser risk landscape. The nearest lowest risk locations are the developed areas of Pakenham to the north of the site that are not in the BPA.

As development occurs within the site and on adjacent land, reliably low threat areas within the site will become eligible for excision from the BPA if they satisfy the exclusion criteria (see DELWP, 2019).

#### ***Reducing the vulnerability of communities to bushfire through consideration of bushfire risk in decision-making at all stages of the planning process***

This report provides the basis for incorporating bushfire risk into decision making associated with planning development in the site.

The CFA (and FRV) consider that community resilience to bushfire will be strengthened (and hence, presumably, vulnerability to bushfire will be reduced) when a strategic planning proposal demonstrates that Clause 13.02-1S strategies have been applied, and where a proposal takes advantage of existing settlement patterns so that new development will not expose the community to increased risk from bushfire.

The CFA provide principles to respond to Clause 13.02-1S including that settlement planning decisions should;

- 'Direct development to locations of lower bushfire risk.'

- *Carefully consider development in locations where there is significant bushfire risk that cannot be avoided.*
- *Avoid development in locations of extreme bushfire risk.*
- *Avoid development in areas where planned bushfire protection measures may be incompatible with other environmental objectives' (CFA, 2015).*

It is considered that development of the site can appropriately implement the strategies in Clause 13.02-1S that aim to prioritise protection of human life.

## 6.2 Bushfire hazard identification and assessment strategies

The bushfire hazard must be identified, and an appropriate risk assessment be undertaken.

### ***Applying the best available science to identify vegetation, topographic and climatic conditions that create a bushfire hazard.***

This report identifies the hazard in accordance with the commonly accepted methodologies of AS 3959-2018 and, as appropriate, additional guidance provided in *Planning Practice Note 64 Local planning for bushfire protection* (DEWLP, 2015a), *Planning Advisory Note 68 Bushfire State Planning Policy Amendment VC140* (DEWLP, 2018a) and *Planning Permit Applications Bushfire Management Overlay Technical Guide*<sup>5</sup> (DELWP, 2017).

The type and extent of (hazardous) vegetation within, and up to 400 m around, the site has been identified and classified into AS 3959-2018 vegetation groups. Classification was based on the anticipated long-term state of the vegetation, Ecological Vegetation Class mapping, aerial imagery, site assessment, published guidance on vegetation assessment for bushfire purposes and experience with the fuel hazard posed by the vegetation types that occur within the region.

GIS analysis of publicly available contour data for the area was undertaken to determine slopes, extending to 100 m around the site (see Map 3).

In relation to climatic conditions and fire weather, the AS 3959-2018 default FFDI 100/GFDI 130 benchmark used in the Victorian planning and building system, has been applied.

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<sup>5</sup> Although the site is not affected by the BMO, the BMO technical guide provides useful descriptors and guidance for assessing the bushfire risk at the landscape scale, as discussed in Section 4.1.

***Considering the best available information about bushfire hazard including the map of designated bushfire prone areas prepared under the Building Act 1993 or regulations made under that Act.***

The extent of BPA coverage has been considered (see Section 3.4) and is shown Map 1 and Map 2. This is based on the most recent BPA mapping for the area, which was gazetted on 15<sup>th</sup> December 2023.

***Applying the Bushfire Management Overlay in planning schemes to areas where the extent of vegetation can create an extreme bushfire hazard.***

No part of the site is covered by the BMO. This is considered appropriate and reflects state-wide BMO mapping introduced into the Cardinia Planning Scheme by amendment GC13, which was gazetted on 3<sup>rd</sup> October 2017.

***Considering and assessing the bushfire hazard on the basis of:***

- ***Landscape conditions - meaning the conditions in the landscape within 20 kilometres and potentially up to 75 kilometres from a site;***
- ***Local conditions - meaning conditions in the area within approximately 1 kilometre from a site;***
- ***Neighbourhood conditions - meaning conditions in the area within 400 metres of a site; and***
- ***The site for the development.***

The hazard has been assessed and described at the landscape, site, neighbourhood and local scales (see Section 4 and Maps 1, 2 and 3).

At the site scale, the assessment follows the AS 3959-2018 methodology applied in a BPA, of classifying vegetation and topography within 100 m of a building and, for this study, extending 100 m around the site (see Map 3). At the local and neighbourhood scales, the site has been assessed at the 1 km and 400 m scales (see Map 2).

At the broader landscape scale a 20 km radius around the site has been applied (see Section 4.1 and Map 1) in accordance with guidance about assessing risk for planning scheme amendments in Planning Advisory Note 68 (DEWLP, 2018a) and Planning Practice Note 64 (DELWP, 2015a).

***Consulting with emergency management agencies and the relevant fire authority early in the process to receive their recommendations and implement appropriate bushfire protection measures.***

Terramatrix is unaware of any consultation with fire authorities. This Bushfire Development Report can form the basis for any consultation required with FRV.

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***Ensuring that strategic planning documents, planning scheme amendments, planning permit applications and development plan approvals properly assess bushfire risk and include appropriate bushfire protection measures.***

DTP advisory and practice notes, Clause 13.02-1S specify the general requirements and standards for assessing the risk, and the bushfire hazard landscape assessment has been considered. The guidance and requirements have been applied in this report as appropriate and bushfire protection measures have been identified commensurate with the risk.

***Not approving development where a landowner or proponent has not satisfactorily demonstrated that the relevant policies have been addressed, performance measures satisfied or bushfire protection measures can be adequately implemented.***

If the objectives and applicable strategies of Clause 13.02-1S are successfully implemented, as discussed in this report, and the building and planning regulations for construction in a BPA are complied with, then the risk can be deemed to be acceptably mitigated such that development can proceed.

The CFA specify that areas where development should not proceed could include:

- *'Isolated settlements where the size and/or configuration of the settlements will be insufficient to modify fire behaviour and provide protection from a bushfire.*
- *Where bushfire protection measures will not reduce the risk to an acceptable level.*
- *Where evacuation (access) is severely restricted.*
- *Where the extent and potential impact of required bushfire protection measures may be incompatible with other environmental objectives or issues, e.g. vegetation protection, land subject to erosion or landslip' (CFA, 2015).*

None of these criteria or characteristics are applicable to the site.

### **6.3 Settlement planning strategies**

As the proposed development does not require a planning scheme amendment and is consistent with the existing zoning and the Cardinia Road Employment Precinct Plan, it is considered that the settlement planning strategies are not applicable. They are listed below but not responded to.

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***Directing population growth and development to low risk locations, being those locations assessed as having a radiant heat flux of less than 12.5 kilowatts/square metre under AS 3959-2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2018).***

***Ensuring the availability of, and safe access to, areas assessed as a BAL-LOW rating under AS 3959-2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2018) where human life can be better protected from the effects of bushfire.***

***Ensuring the bushfire risk to existing and future residents, property and community infrastructure will not increase as a result of future land use and development.***

***Achieving no net increase in risk to existing and future residents, property and community infrastructure, through the implementation of bushfire protection measures and where possible reduce bushfire risk overall.***

***Assessing and addressing the bushfire hazard posed to the settlement and the likely bushfire behaviour it will produce at a landscape, settlement, local, neighbourhood and site scale, including the potential for neighbourhood-scale destruction.***

***Assessing alternative low risk locations for settlement growth on a regional, municipal, settlement, local and neighbourhood basis.***

***Not approving any strategic planning document, local planning policy, or planning scheme amendment that will result in the introduction or intensification of development in an area that has, or will on completion have, more than a BAL-12.5 rating under AS 3959-2018'***

## **6.4 Areas of high biodiversity conservation value**

***Ensure settlement growth and development approvals can implement bushfire protection measures without unacceptable biodiversity impacts by discouraging settlement growth and development in bushfire affected areas that are of high biodiversity conservation value***

Terramatrix is not aware of any significant biodiversity impacts associated with the development proposal. The land has a history of pastoral use.

## **6.5 Use and development control in a Bushfire Prone Area**

Clause 13.02-1S requires that 'In a bushfire prone area designated in accordance with regulations made under the Building Act 1993, bushfire risk should be considered when assessing planning applications for the following uses and development:

- Subdivisions of more than 10 lots.
- Accommodation.
- Childcare centre.

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- *Education centre.*
- *Emergency services facility.*
- *Hospital.*
- *Indoor recreation facility.*
- *Major sports and recreation facility.*
- *Place of assembly.*
- *Any application for development that will result in people congregating in large numbers'* (Cardinia Planning Scheme, 2018a).

It further states that:

*'When assessing a planning permit application for the above uses and development:*

- *Consider the risk of bushfire to people, property and community infrastructure.*
- *Require the implementation of appropriate bushfire protection measures to address the identified bushfire risk.*
- *Ensure new development can implement bushfire protection measures without unacceptable biodiversity impacts'* (Cardinia Planning Scheme, 2018a).

The proposed development may result in people congregating in a BPA. This BDR shows that bushfire risk has been considered in the development application. The bushfire risk to the site is currently low-moderate, and likely to reduce further as nearby urban development proceeds.

The proposed development should be able to respond to this strategy and achieve acceptable safety as:

- Adequate access and egress for emergency management vehicles is to be provided by the public road network.
- A reliable water supply for firefighting is to be provided, via a reticulated hydrant system.
- The interim grassfire hazard on adjoining private land can be managed through the issuing of Fire Prevention Notices by the Cardinia Shire Municipal Fire Prevention Officer as required.

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## 7 Conclusion

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This report has assessed the bushfire hazard in and around the 92 Enterprise Road site in accordance with Clause 13.02-1S in the Cardinia Planning Scheme, the AS 3959-2018 methodology, and additional guidance provided in *Planning Practice Note 64 Local planning for bushfire protection* (DEWLP, 2015a) and *Planning Advisory Note 68 Bushfire State Planning Policy Amendment VC140* (DEWLP, 2018).

The site is currently in a designated BPA but, following development, parts of the site will likely be eligible for excision from the BPA. The landscape is of low to moderate bushfire risk, which will lessen as development on the subject site and neighbouring land proceeds.

The type and extent of (hazardous) vegetation within, and up to 100 m around the site, has been identified and classified into AS 3959-2018 vegetation groups, based on aerial imagery and site investigation. The classification is based on the current state of the vegetation and identifies that the hazard is exposure to Grassland in all directions.

The terrain of the site and the surrounding landscape is benign from a bushfire perspective, being predominantly flat or gently rising towards the site. Bushfire behaviour can reasonably be expected to be within AS 3959-2018 presumptions and design parameters.

The proposed buildings are not required to be built to a BAL construction standard under the Victorian building regulations, but all will be sited in an area that could receive a BAL-12.5 rating under AS 3959-2018 following development of the site and adjacent land in the Cardinia Road Employment Precinct. The interim grass fire hazard on adjacent private land could be referred to the Cardinia Shire Municipal Fire Prevention Officer if unmanaged during the declared Fire Danger Period.

A reliable water supply for firefighting can be provided via a reticulated hydrant system and/or static water supply required under the Building Code of Australia for commercial or industrial developments.

The risk to existing residents of Pakenham will be further reduced by the development of additional industrial/commercial areas and associated low threat or non-vegetated land on the southern edge of the township. This will eventually create BAL-LOW areas with the potential to be excised from the BPA if they are sufficiently distant from hazardous vegetation.

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## 8 Appendix A - BALs explained

Bushfire Attack Level (BAL)	Risk Level	Construction elements are expected to be exposed to...	Comment
BAL-Low	VERY LOW: There is insufficient risk to warrant any specific construction requirements but there is still some risk.	No specification.	At 4 kW/m <sup>2</sup> pain to humans after 10 to 20 seconds exposure. Critical conditions at 10 kW/m <sup>2</sup> and pain to humans after 3 seconds. Considered to be life threatening within 1 minute exposure in protective equipment.
BAL-12.5	LOW: There is risk of ember attack.	A radiant heat flux not greater than 12.5 kW/m <sup>2</sup> .	At 12.5 kW/m <sup>2</sup> standard float glass could fail and some timbers can ignite with prolonged exposure and piloted ignition.
BAL-19	MODERATE: There is a risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to radiant heat.	A radiant heat flux not greater than 19 kW/m <sup>2</sup> .	At 19 kW/m <sup>2</sup> screened float glass could fail.
BAL-29	HIGH: There is an increased risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to an increased level of radiant heat.	A radiant heat flux not greater than 29 kW/m <sup>2</sup> .	At 29 kW/m <sup>2</sup> ignition of most timbers without piloted ignition after 3 minutes exposure. Toughened glass could fail.
BAL-40	VERY HIGH: There is a much increased risk of ember attack and burning debris ignited by windborne embers, a likelihood of exposure to a high level of radiant heat and some likelihood of direct exposure to flames from the fire front.	A radiant heat flux not greater than 40 kW/m <sup>2</sup> .	At 42 kW/m <sup>2</sup> ignition of cotton fabric after 5 seconds exposure (without piloted ignition).
BAL- FZ (i.e. Flame Zone)	EXTREME: There is an extremely high risk of ember attack and a likelihood of exposure to an extreme level of radiant heat and direct exposure to flames from the fire front.	A radiant heat flux greater than 40 kW/m <sup>2</sup> .	At 45 kW/m <sup>2</sup> ignition of timber in 20 seconds (without piloted ignition).

Source: derived from AS 3959-2018 (Standards Australia, 2020).

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## Technical Report

### ENVIRONMENTAL SITE ASSESSMENT & HYDROGEOLOGICAL REPORT

*Phase 1 and Modified Phase 2 Environmental Site Assessment*

26A & 92 Enterprise Road/2

Pakenham, Victoria



Prepared for:

Dalton Consulting Engineers Pty Ltd

222643 92 Enterprise Rd/2

16/12/2022

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## Executive Summary

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Dalton Consulting Engineers Pty Ltd engaged LR Pardo & Associates (LRP&A) to complete an environmental site assessment for 26A & 92 Enterprise Road, Pakenham, Victoria.

The purpose of this report is to determine the suitability of the site, from a contamination perspective, for a proposed industrial development. The development will consist of a multi-warehouse complex at 92 Enterprise Road, and an arterial road constructed across 26A Enterprise Road that will connect Cardinia Road to the complex.

LRP&A conducted a review of the site background and history (Phase 1 investigation). 26A Enterprise Road is currently utilised in a semi-rural and agricultural capacity, with land use remaining largely consistent throughout the available site records and aerial images. 92 Enterprise Road is understood to have most recently been used in a semi-rural/commercial capacity in the main infrastructure area (described as "machinery yard"). Prior to this, the site was primarily used in an agricultural capacity. An anecdotal reporting of a historical spill is suggested to have occurred in this area.

LRP&A conducted a site investigation on 30/11/2022, 01/12/2022 and 02/12/2022, during which a total of twenty-nine (29) soil samples were collected across both lots. In addition, three (3) groundwater wells were installed across both lots to determine the level of groundwater and any potential contamination.

Results of laboratory testing indicated that majority of the site returned concentrations that would classify the soil as "Fill Material" (clean fill) under EPA Victoria guidelines. One sample obtained from a stockpile of incinerated material returned concentrations exceeding "Fill Material" upper limits which would classify it as "Category D Contaminated" following leachability testing.

In addition, a previous investigation indicated "Category D Contaminated" arsenic concentrations in stockpiles located northwest of the main infrastructure area at 92 Enterprise Road.

Note that the above classifications are only preliminary. If these soils are to be exported off-site, however, further testing will need to be undertaken in line with the frequencies stated by relevant EPA Victoria Guidelines, including careful examination for any asbestos containing material for both off- and on-site reuse.

A comparison of soil testing results to the NEPM Health Investigation Levels (HILs) was also undertaken. None of the reported analytic concentrations from laboratory testing exceeded the HILs for commercial/industrial use. The soil may therefore be reused at the site from a human-health risk standpoint. However, some locations could not be tested. Specifically, we refer to the area under existing shed slab at 92 Enterprise Road which is understood to have been used for the storage of machinery. It is recommended that these soils be carefully inspected for any evidence of contamination following demolition works in this area (odours, staining, etc.).

Groundwater sampling at each well was also undertaken on 09/12/2022. Results of laboratory testing indicated some exceedances of the adopted quality objectives for the "Maintenance of Ecosystem" beneficial use applicable to the site. However, this was not deemed prohibitive to the intended development. Groundwater levels were noted to be shallow during the subsequent groundwater monitoring event, with levels varying between 0.5 to 0.6m at 92 Enterprise Road and 1.1m at 26A Enterprise Road.

With reference to the above, the site is considered to present low contamination risk in regard to future industrial land use. **The land encompassed within the site is considered acceptable for the permitted commercial/industrial use from a contamination perspective.**

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## Project Details

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**Project**

222643 92 Enterprise Rd/2

**Prepared for**

Dalton Consulting Engineers Pty Ltd

Level 3, 678 Victoria Street

Melbourne VIC 3121

**Prepared by**

[REDACTED]

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LR Pardo & Associates Pty Ltd (LRP&A)

**Date**

16/12/2022

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## Commission

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To undertake a Phase 1 and Modified Phase 2 Environmental Site Assessment, for the properties located at 26A and 92 Enterprise Road in Pakenham, Victoria as requested and authorised by our client representative Mr James Cappellari, for Dalton Consulting Engineers Pty Ltd.

This report outlines the findings and recommendations of the environmental site investigations.

# 1 Introduction

---

LR Pardo & Associates (LRP&A) were commissioned to conduct a Phase 1 and Modified Phase 2 Environmental Site Assessment (ESA) for the properties located at 26A and 92 Enterprise Rd, Pakenham, Victoria, ('the site').

The scope of works, as outlined in our proposal 222643 92 Enterprise Rd/1.1, dated 16/11/2022 included the following:

- A site visit/walk over of the subject land.
- A site history search through land titles, aerial photographs, etc.
- Review of soils and geological maps.
- Collect a minimum of fifteen (15) soil samples for soil contamination testing, from a maximum depth of 2.0m.
- Leachability potential of contaminants in the sampled material as required.
- Installation of three (3) piezometers to a maximum depth of 7m.
- Collect one (1) groundwater sample per well for contamination and Total Dissolved Solids (TDS) testing.
- Prepare a report addressing the findings from the ESA, including test results and recommendations on any further testing required.

The ESA aims to identify the presence, or otherwise, of potential contaminants and any hazards these may pose to future occupants of the site and to beneficial uses of the site. The land's intended future use is for an industrial area and arterial road.

To date LRP&A has been provided with the following documents and drawings:

- Lotsearch Report for 26A & 92 Enterprise Rd, Pakenham 3810, dated 22/11/2022, received 22/11/2022.
- Register Search Statement (Title Search) for Lot 1 on Title Plan 099673B, Volume 09622, Folio 089, received 28/11/2022.
- Historical Search Statement for Lot 1 on Title Plan 099673B, Volume 09622, Folio 089, received 28/11/2022.
- Title Plan TP099673B, dated 28/11/2022, received 28/11/2022.
- Register Search Statement (Title Search) for Lot 2 on Plan of Subdivision 436220E, Volume 10559, Folio 139, received 28/11/2022.

- Historical Search Statement for Lot 2 on Plan of Subdivision 436220E, Volume 10559, Folio 139, received 28/11/2022.
- Plan PS436220E for Plan of Subdivision of Part of Crown Allotment 7A, Volume 9471, Folio 569, received 28/11/2022.
- Concept plan for 92 Enterprise Road by ESR Australia, received 31/10/2022
- Concept Access Plan for 92 Enterprise Road by ESR Australia, received 31/10/2022
- Eastern Arterial Specifications, produced by KLM Spatial, dated July 2021, received 31/10/2022
- Preliminary Soil Contamination Assessment for 92 Enterprise Road, Pakenham. Report no. 1018006-RPT-ENV-001.v1 by Tonkin+Taylor, dated August 2021, received 21/11/2022
- Preliminary Geotechnical Investigation for 92 Enterprise Road, Pakenham. Report no. 1018006-RPT-ENG-001.v1 by Tonkin+Taylor, dated July 2021, received 21/11/2022
- Eurofins MGT laboratory testing reports:
  - Report no. 947152-S, dated 05/12/2022, received dated 06/12/2022.
  - Report no. 948009-S, dated 07/12/2022, received dated 08/12/2022.
  - Report no. 048009-L, dated 07/12/2022, received dated 08/12/2022.
  - Report no. 949241-W, dated 12/12/2022, received dated 13/12/2022.

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## 2 Site Background

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### 2.1 Site Description

General site information is summarised in Table 1 below.

**Table 1: General site information**

Aspect	Detail
<b>Site Address</b>	<b>92 &amp; 26A Enterprise Rd, Pakenham, Victoria</b>
<b>Site Area</b>	<b>69.89ha</b> (both sites)
<b>Title Identification Details</b>	<b>Lot 1 on Title Plan 099673B, Volume 09622, Folio 08999673 and Lot 2 on Plan of Subdivision 436220E, Volume 10559, Folio 139</b>
<b>Current Zoning</b>	<b>UGZ2 (Urban Growth)</b>
<b>Local Government Area</b>	<b>Cardinia</b>
<b>Most Recent Site Use</b>	<b>Semi-Rural (Agricultural/Residential)</b>

### 2.2 Topography and Site Description

The site comprises of two properties and has a total area of 69.89ha and is currently used in a semi-rural/commercial/agricultural capacity. See Figure 1 for the site boundaries.

#### **26A Enterprise Road**

This section of the site broadly consists of a residential property bordering Enterprise Road and large paddocks used by cattle for grazing. Cattle were still present at the time of the investigation. A site walkover was conducted during the investigation on 01/12-02/12/2022.

The residential property comprises of a single-storey brick house with associated sheds/horse stables. The property is connected to Cardinia Road via a gravel driveway. The residential paddocks directly surrounding the property were overgrown with tall grass. A gated path (blocked by roofing sheets) runs west of the property towards the rear of the residence. This area contained shipping containers, sheds, stockpiles of soil as well as stockpiles of various debris including timber boards and planks, metal and some plastics.

Vegetation on the paddocks ranged from short to medium length, presumably as a result of cattle grazing. The Cardinia Road Drain runs in a northeast to southwest direction across this section of the site, in addition to several other meandering water channels, which made it difficult to navigate the site. Multiple dams also exist at the site. Site surface was generally soft and boggy, with depressions in the ground formed by stomping of cattle around the site.

## **92 Enterprise Road**

This section of the site broadly consists of three areas:

- A main infrastructure area
- A large open area
- A track running parallel to Princes Highway

A site walkover was conducted during the investigation on 01/12-02/12/2022.

The main infrastructure area comprises of three freestanding buildings/structures, which included two residential properties and a large shed. A gravel track leads from Enterprise Road towards this area. Two of the buildings were in generally good condition, however the northernmost residence was visibly older. The shed was open during the site investigation and was largely empty at the time of the investigation. The concrete slab floor of the shed had visible tire marks across its surface. A stockpile of incinerated material was observed between the older and newer infrastructure.

An area covered by gravel exists directly south of the shed. This area is enclosed by an elevated embankment, which is covered with overgrown grass. A historical spill was anecdotally reported to have occurred in this area (T+T, 2021). A barricaded slope ending in a small water catchment is located the corner of this open gravel area. This may have been used as a truck/machinery wash bay; however, this could not be ascertained.

A large dam is located further south of the main infrastructure area. The dam did not contain water at the time of the investigation, however the soil in the area was generally wet with a few dry spots. A large stockpile is located at the centre of the dam. A driveable track exists between the main infrastructure area and the large open area and runs around the border of the main infrastructure area.

The large open area is situated directly east of the main infrastructure area and was overgrown with tall grass (around 1.0m tall at its highest). An open channel borders this area, as evidenced by the presence of reeds. During the walkover, saturated soft spots were encountered which resulted in vehicles frequently becoming 'bogged'. The overgrown grass and soft spots made this area difficult to navigate. Toomuc Creek borders this area at the east.



A narrow driveable track starting from Enterprise Road and running parallel to Princes Highway is located at the northern site boundary. The area at the start of the track is at a higher elevation than the rest of the track and large open area. This area was seemingly used for stockpiling as evidenced by presence of multiple stockpiles. The track runs in a northwest to southeast direction towards Toomuc Creek. Shallow swales run along both sides of the track. The northern swale was filled with water, while the southern swale was dry but consisted of soft, saturated soils.

Please refer to site plan and photographs in Appendix D for details.



Figure 1: Site boundaries

## 2.3 Proposed Site Use

This investigation was conducted as a due diligence for an industrial development, which will include:

- Warehouse complex with internal roads and sewerage (92 Enterprise Road)
- An arterial road connecting Cardinia Road to the warehouse complex (26A Enterprise Road).

## 2.4 Adjoining Land Uses

Adjoining land uses to the site are indicated in Table 2. Please refer to the Planning Report for a detailed zoning description of surrounding land use.

Table 2: Adjoining land zoning

Direction	Land Zoning
North	Principal Road Network
South	Urban Growth
East	Special Use/Urban Growth
West	Urban Growth/Special Use

## 2.5 Geology

Geological Survey maps (Figure 2) indicate that the subject site of 26A/92 Enterprise Rd, Pakenham lies within the Quaternary (Holocene) aged Unnamed Alluvium, classified as Sedimentary (Non-Marine (Alluvial)) and described as: Fluvial: alluvium, gravel, sand and silt<sup>1</sup>.



Figure 2: Geological Map at 26-92 Enterprise Road; Source: Earth Resources – GeoVic

## 2.6 Existing Borehole Search

A desktop study using the Visualising Victoria's Groundwater (VVG) website encountered nine (9) boreholes within 500 meters of the site (Appendix A). Under half of these boreholes were augered for the purpose of groundwater monitoring. Groundwater levels were not recorded for these boreholes. The lithological logs for the boreholes are given in the Lotsearch report under Appendix B.

Please note that LRP&A has also undertaken a geotechnical investigation at the site. Detailed lithological logs will be provided in the LRP&A geotechnical report upon its issue.

## 2.7 Hydrology and Hydrogeology

### 2.7.1 Groundwater

Information taken from the *Visualising Victoria's Groundwater* (VVG) website indicates that groundwater is likely to be present at a depth shallower than 5m below ground level. Actual standing groundwater levels (SWL) were measured via the installed monitoring wells and are provided in Table 3 below.

<sup>1</sup> Geological Survey of Victoria (Second Edition), SJ 55-10, MELBOURNE, 1:250,000.

**Table 3: Standing Water Levels in monitoring wells**

Test Location	SWL (m below TOC*)
GW1	0.65
GW2	0.57
GW3	1.10

\***TOC**: Top of Casing

Given the proposed site use and depth of groundwater, groundwater is expected to have an influence on the proposed site use during the construction phase. Monitoring well elevations were not surveyed.

The *Groundwater Resource Report* from the Department of Environment, Land, Water and Planning (DELWP) indicates groundwater at the site has properties as specified in Table 4 below (note that some variation exists across the site). The site is also noted to be within the Koo Wee Rup Groundwater Management Unit (GMU), which signifies restrictions to groundwater use may apply. Please refer to the *Groundwater Resource Report* in Appendix B for details.

**Table 4: Groundwater properties at 26A and 92 Enterprise Road.**

Groundwater layer (Aquifers and Aquitards)	Depth below surface (m)	Indicative Groundwater salinity (mg/L)	Segment
<b>Quaternary Aquifer (sand, gravels, clay, silts)</b>	0-24	1,001 – 3,500	B
<b>Upper Tertiary Aquifer (sand, gravel and clay)</b>	24-31	3,501 – 13,000	C - F

Please refer to Section 5.1.3 for the regulatory framework for groundwater assessment, including relevant beneficial uses applicable to the site.

### 2.7.2 Proximity of Watercourses

The site is surrounded by multiple waterbodies (Figure 3). Two sections of the Cardinia Road Drain connect approximately 300m south of the site. One section of the Cardinia Road Drain runs through the centre of the site, running approximately 300m from the site’s west boundary. The second section of the Cardinia Road Drain runs approximately 250m to the west of the western site boundary. The closest exterior water body is the Toomuc Creek, which runs approximately 20m from the east boundary.

Pakenham Water Recycle Plant is located approximately 3.95km to the southeast of the site. Other nearby water bodies include a further section of the Toomuc Creek, which runs approximately 850m to the east, and the Lower Gum Scrub Creek, which is approximately 1.10km west of the site.

Multiple farm dams/wetlands are located within the site boundary.

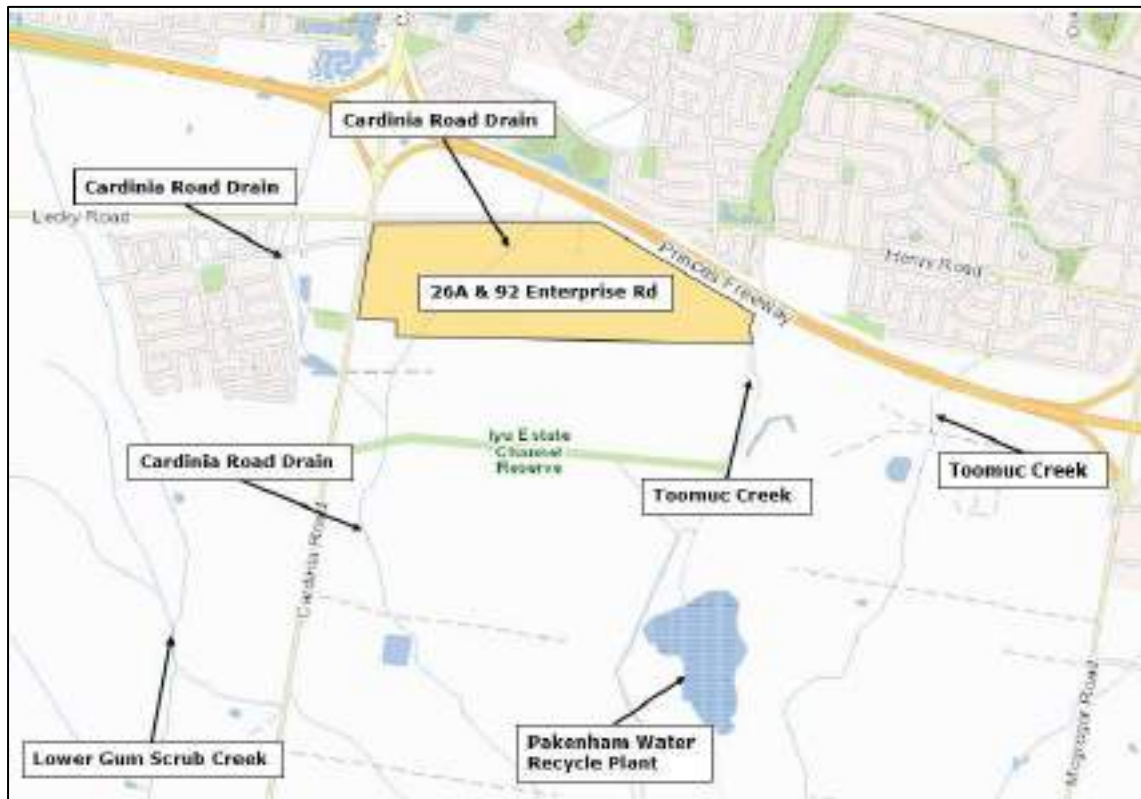


Figure 3: Closest waterbodies to the site

## 2.8 Land Planning Overlays

Please refer to the *Planning Property Report* in Appendix B for details.

### 2.8.1 Environmental Significance Overlay

The Greater Dandenong Planning Scheme indicates an environmental significance overlay (ESO) exists over the site, which is considered to lie within the “Eastern Treatment Plant Buffer Area”. The Eastern Treatment Plant provides sewage and wastewater treatment facilities for most of eastern Melbourne. The establishment or siting of odour-sensitive uses could impact on the operation of the Treatment Plant. A permit may be required if the proposed works at this site are to impact the plant activities.

### 2.8.2 Melbourne Strategic Assessment

The Cardinia Property Report indicates that the site is within the Melbourne Strategic Assessment (MSA) program area.

“The MSA program is aimed at protecting nationally threatened plants, animals and ecosystems in and around Melbourne’s growth areas. The Melbourne Strategic Assessment (Environmental Mitigation Levy) Act 2020 imposes a levy to fund measures to mitigate impacts on biodiversity caused by the development of land in Melbourne’s growth corridors” (Department of Environment, Land, Water and Planning (DELWP), 2021).

Development at this site is therefore subject to requirements of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. Accordingly, a levy liability may be applicable to the site subject to the Melbourne Strategic Assessment (Environment Mitigation Levy) Act 2020<sup>2</sup>.

### 2.8.3 Designated Bushfire Prone Areas

The site is within a designated bushfire prone area. Special bushfire construction requirements apply to developments at the site. Planning provisions may also apply:

‘Victoria’s bushfire prone areas are subject to or are likely to be subject to bushfires. Building construction and planning controls apply to developments in designated bushfire prone areas, as they aim to improve bushfire protection for residential buildings and other sensitive land uses’ (Department of Environment, Land, Water and Planning (DELWP), 2022).

### 2.8.4 Cultural Heritage

Information from the Land Channel Property Report indicates that the section of the site bordering Toomc Creek is within an Aboriginal Cultural Heritage area under the Aboriginal Heritage Regulations 2018 (AHR 2018). A Cultural Heritage Management Plan (CHMP) is required when a ‘high impact activity’ is planned in an area of ‘cultural heritage sensitivity’. As per AHR 2018, exemptions apply when:

- The building or works are in an area that has been subject to ‘significant ground disturbance’, and
- The statutory authorisation was granted before 28 May 2007.

All definitions are as defined by ARH2018 and the Aboriginal Heritage Act 2006.

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<sup>2</sup> Regulatory requirements - MSA Levy (Department of Environment, Land, Water and Planning (DELWP), 2022)



## 2.9 EPA Victoria Records

### 2.9.1 Priority Sites Register

On 28/11/2022, LRP&A undertook a search of the Victorian Environmental Protection Authority's (EPA Victoria) priority sites register (last updated on 15/11/22). The priority sites register is a list of sites which have been issued a clean-up notice or a pollution abatement notice. These sites generally present a potential risk to human health or the environment through either the contamination of soil or water.

LRP&A's search revealed that the site is not listed on the priority sites register. The search also revealed no priority sites within 2km of the site.

The closest priority registered site is 2.1km east of the subject site:

- 725 Five Mile Road, Pakenham (Notice no. 0090011249) – Former Landfill. Requires ongoing management.

### 2.9.2 Register of Completed Audit Sites

On 26/10/2022, LRP&A carried out a search of the EPA's records of environmental audit. The search revealed no environmental audit reports completed within 500m of the site. The closest audit was located approximately 1.40 km north-east of the site.

## 2.10 Australian Wetlands Database

A search of The Australian Wetlands Ramsar Database was carried out to confirm if any wetlands or protected areas lay within 2km of the subject site. No protected Ramsar wetlands were identified within 2km of the site. The Western port Wetlands Environmental Area, which is a protected Ramsar Wetland, is located approximately 10-20km north of the site.

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## 3 Site History and Contaminants of Potential Concern

### 3.1 Historical Information Review

#### 3.1.1 Certificates of Title

A search of the records held by the *Department of Transport, Planning and Local Infrastructure* (DTPLI) and review of previous site assessments were conducted to gain an appreciation of the historical ownership of the site. Copies of current and historical certificates of title are presented in Appendix B. Key events relevant to the site are summarised in Table 5 and Table 6 below.

**Table 5: Historical information summary (26A Enterprise Road)**

Date	Source	Parcels Included	Information
12/12/2000	Register Search Statement (Title Search) Volume 10559 Folio 139	Lot 2 on Plan of Subdivision 436220E	<ul style="list-style-type: none"> <li>Joint proprietors listed as:               <ul style="list-style-type: none"> <li>- <b>Avni Selimi, Gulnur Selimi, John Mexhit Selimi and Kathryn Michele Selimi</b>, individually as to 1 of a total of 4 equal undivided shares.</li> </ul> </li> </ul>
18/10/2021			<ul style="list-style-type: none"> <li>Joint proprietors listed as:               <ul style="list-style-type: none"> <li>- <b>Gulnur Selimi</b>, as to 100 of a total of 400 equal undivided shares</li> <li>- <b>Avni Selimi</b>, as to 153 of a total of 400 equal undivided shares</li> <li>- <b>Katryn Michele Burgess</b>, as to 147 of a total 400 equal undivided shares</li> </ul> </li> </ul>
02/08/2022			<ul style="list-style-type: none"> <li>Joint proprietors listed as:               <ul style="list-style-type: none"> <li>- <b>Katunga Nominees Pty Ltd</b>, as to 147 of a total 400 equal undivided shares</li> <li>- <b>Avni Selimi</b>, as to 153 of a total of 400 equal undivided shares</li> <li>- <b>Gulnur Selimi</b>, as to 100 of a total of 400 equal undivided shares</li> </ul> </li> </ul>
20/06/2002	Plan of Subdivision 09471 Folio 569	Crown Allotment 7A	<ul style="list-style-type: none"> <li>Subdivision of land.</li> </ul>

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**Table 6: Historical information summary (92 Enterprise Road)**

Date	Source	Parcels Included	Information
09/05/1985	Certificate of Title Volume 9622, Folio 089	Lot 1 on Title Plan 099673B (Formally known as Lot 2 on Plan of Subdivision No. 98925)	<ul style="list-style-type: none"> <li>Sole proprietor listed as:                             <ul style="list-style-type: none"> <li>- <b>L. B. Very Proprietary Limited.</b></li> </ul> </li> </ul>
18/09/1986			<ul style="list-style-type: none"> <li>Sole proprietor listed as:                             <ul style="list-style-type: none"> <li>- <b>Doreen Frances Cleopatra.</b></li> </ul> </li> </ul>
13/02/1997			<ul style="list-style-type: none"> <li>Joint proprietors listed as:                             <ul style="list-style-type: none"> <li>- <b>Richard John Green and Joanie Ada Green</b> as to joint proprietors as to nine equal undivided thirty fourth parts or shares</li> <li>- <b>Gary Michael Quigley and Jillian Christine Quigley</b> as joint proprietors as to twenty-five equal undivided thirty fourth parts or shares.</li> </ul> </li> </ul>
22/10/2007			<ul style="list-style-type: none"> <li>Sole proprietor listed as:                             <ul style="list-style-type: none"> <li>- <b>Henry Road Investments Pty Ltd</b> of 1/86 Mt Eliza Way Mt Eliza Vic 3930</li> </ul> </li> </ul>
09/11/2018			<ul style="list-style-type: none"> <li>Sole proprietor listed as:                             <ul style="list-style-type: none"> <li>- <b>Durasteel Structures Pty Ltd</b> of 34-50 Nathan Road Dandenong South Vic 3175</li> </ul> </li> </ul>

### 3.1.2 Aerial Photographs

A search of relevant historical aerial photographs was conducted to review the use of the land over the years. Seven (7) aerial photographs were retrieved by Lotsearch from 1991, 2002, 2004, 2010, 2015, 2017 and 2022 for examination as part of an assessment of development and land use activities onsite and in the surrounding area. Copies of the reviewed aerial photographs are included in the Lotsearch report in Appendix B.

Key events relevant to the site are summarised in Table 7.

**Table 7: Historical aerial photograph summary (26A and 92 Enterprise Rd)**

Date	Source	Information
<b>1991</b>	Google Inc	<ul style="list-style-type: none"> <li>The site is divided by fencing into approximately 16 paddocks of varying sizes.</li> <li>There are for housing/shed structures in the northwest with a driveway lined with large trees leading to Enterprise Road.</li> <li>A further two large housing structures and four smaller shed structures are in the northeast of the property. The structure grouping has a driveway, running north to Enterprise Road, lined with large trees.</li> <li>Large trees are scattered around the eastern section of the property with a high concentration around the structures.</li> <li>The Cardinia Road Drain runs north to south through the site, spanning four sections. There are four major dams, two of which are connected to the Cardinia Road Drain. Approximately a further 13 smaller dams are scattered around the site.</li> </ul>
<b>2002</b>	Google Inc	<ul style="list-style-type: none"> <li>Two sheds from the northeast have been removed and replaced by one large rectangular structure. The original house in the northeast has been renovated and extended.</li> <li>A small enclosure has been added in the backyard of the residence.</li> </ul>

**Table 7 : Historical aerial photograph summary (26A and 92 Enterprise Rd Cont'd)**

Date	Source	Information
<b>2004</b>	Google Inc	<ul style="list-style-type: none"> <li>There are approximately 28 sections of varying sizes.</li> <li>A medium sized shed has been constructed towards the southeast corner of the property.</li> </ul>
<b>2010</b>	Google Inc	<ul style="list-style-type: none"> <li>Southeast region cleared, shed and fencing removed.</li> <li>The princes Freeway has been constructed to the north of the site.</li> </ul>
<b>2015</b>	Google Inc	<ul style="list-style-type: none"> <li>Earthworks have commenced to the south of the house in the the eastern section of the property. A debris stockpile is enclosed by an embankment formed from excavated vegetation and soil.</li> </ul>
<b>2017</b>	Aeromatrex Pty Ltd	<ul style="list-style-type: none"> <li>Earthworks have progressed in the southern section, adjacent to the eastern house. Grass has been cleared/stripped and is bare, with soil. A large number of vehicles are stored in this area.</li> <li>Significant earthworks evident along the northern boundary.</li> <li>Water pooling in several locations along the northeast boundary.</li> </ul>
<b>2022 (latest image)</b>	Aeromatrex Pty Ltd	<ul style="list-style-type: none"> <li>The site is divided in approximately 23 sections of varying sizes. A house, shed and large trees are located in one of these sections, at the centre along the north border of site. A large shed and 6 small sheds are present in a section to the south of the house. A secondary house, small shed, two large sheds and large trees are located in a central section towards the east of the property. There are a total of six large dams located around the site with two connecting to the Cardinia Road Drain, a further 13 small dams are spread throughout the western half of the property. Ca</li> </ul>

There were some general observations for the site, including:

- Dam water levels and channelling between waterbodies varied seasonally across the site.
- Vehicular tracking is observed across most of the site, and
- Sectioning of the site occurred on several occasions over time, with the site now sectioned into approximately twenty-three areas of varying sizes.

### 3.1.3 Summary of Site History

The section of the site comprising of 92 Enterprise Road is understood to have been occupied prior to 1939 as evidenced by the presence of structures in aerial imagery circa 1939. Preparation for the development of housing within the section of the site comprising 26A Enterprise Road is inferred to have commenced sometime between 1968 and 1974, evidenced by the structures observed in 1974 imagery.

Across both sections of the site, land use appears to have been generally consistent. Both lots primarily consisted of one main cluster of infrastructure surrounded by paddocks for rural activities throughout the majority of recorded site history.

Prior to 2015 significant earthworks and soil stockpiling was undertaken, south of the housing structure within 92 Enterprise Road, and continued until sometime between 2017 and 2022. Significant earthworks also appeared to have occurred between 2015 and 2017 along the northern site boundary.

### 3.2 Review of Previous Reports

A preliminary soil contamination assessment was completed by Tonkin & Taylor Pty Ltd (T+T) in 2021, for the proposed subdivision development site located at 92 Enterprise Road.

Main findings of these investigations included:

- FILL material was uncovered, within the residential area, to a depth of up to 2.5m, consisting of Clay FILL/Sandy Gravel FILL/Silty Sand FILL.
- Stockpiled soils to the north of the main infrastructure Indicated arsenic concentrations of "Category C Contaminated" material concentrations. However, arsenic within these materials were reported as non-leachable.
- Solid inert waste was observed within the stockpiled soils. Such items have a potential to contain asbestos.
- An area seemingly used for incineration of materials was observed north of the main infrastructure. No samples were collected in this area. Additional testing was recommended by T+T in this area.
- A historical spill of diesel exceeding 1,000L was noted to have possibly occurred in the area directly south of the shed. However, targeted testing in this location did not indicate any contaminants with elevated concentrations. T+T recommended undertaking a more conclusive establishment of the spill and any residual contamination of soil or groundwater in the area.

T+T concluded that the majority of the site is unlikely to present a significant constraint to the proposed development for commercial/industrial use.

### 3.3 Contaminants of Potential Concern (CoPC)

Site history from title searches, aerial imagery and review of previous site investigations indicates the site has been primarily used in a semi-rural capacity, including development of low-density residential housing.



Given the current and historical site use for grazing, the use of herbicides/weedicides on-site should be considered which could suggest presence of Volatile Organic Compounds (VOCs), nitrates, sulphates, OCPs and OPPs. Areas used for parking of vehicles and areas that have experienced vehicular tracking could be considered a potential source of contamination from hydrocarbons and heavy metals.

The previous investigation undertaken by T+T at 92 Enterprise Road indicated levels of arsenic above "Fill Material" (clean fill) upper limits for the stockpiles located northwest of the property at 92 Enterprise Road. The report also highlighted two areas of interest; first a historical spill of diesel (>1,000L) that may have occurred south of the shed. Also highlighted was an incineration area between the residences at the site. These two areas could potentially present risks of hydrocarbon (PAH, TRH and BTEXN) and heavy metals contamination.

As such, potential contaminants associated with previous and current site uses were considered to include:

- Heavy Metals,
- Total Recoverable Hydrocarbons (TRH),
- Benzene, Toluene, Ethyl benzene and Total Xylenes (BTEX),
- Polycyclic Aromatic Hydrocarbons (PAH),
- Volatile and Semi-volatile Organic Compounds (VOCs/SVOCs),
- Ammonia, Nitrates
- Chloride

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## 4 Site Investigation Works

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### 4.1 Investigation Works

During the investigation, the following samples were obtained:

- A total of twenty-nine (29) soil samples were collected across eighteen (18) sample locations, which included:
  - Ten (10) samples obtained from stockpiled soils via excavator bucket.
  - Nineteen (19) soil samples collected via hand-tools.
- A total of three (3) groundwater samples were obtained from the site; one from each installed groundwater well.

#### 4.1.1 Field Observations

The following observations were made at and around some sampling locations

- Sample S5-1 was collected from the stockpile of incinerated material at 92 Enterprise Road. Samples from S5-2 were obtained from the adjacent soils.
- Samples S6 and S7 were obtained by augering into the elevated stockpiling area north-west of the main infrastructure at 92 Enterprise Road. No evidence of the waste noted by T+T was encountered during sampling.
- Sample S11 was obtained from a layer of FILL around the former dam area at 92 Enterprise Road.
- Groundwater was initially murky at all locations but became noticeably clearer during the purging process.

Please refer to Section 2.2 for a description of the site including the presence of any waste, fill and any other points of interest at the site.

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#### 4.1.2 Soil Sampling Methodology and Field Validation

Sampling was conducted in areas of potential concern across both sites, as well as to obtain representative samples covering the entire area. Samples were taken from both the natural material and fill material.

Whilst sampling on site all precautions were taken to avoid cross contamination and contact with human skin. The sampling protocol followed hand-augered sampling location is detailed below:

1. Wash clean sampling tools with tap water and mild detergent.
2. Use a set of new sterilised gloves for each new sample.
3. Dig down to prescribed depth.
4. Use clean sampling tool to collect the required soil.
5. Fill pre-sterilised sampling jars.
6. Fasten lid (air-tight) and store in Esky with iced cooler blocks.
7. Deliver to analytical laboratory.

Sample obtained from the excavator were taken from soil not in direct contact with the excavator bucket to avoid any introduced contamination.

Sample storage was provided by Eurofins MGT, which consisted of sterilised glass jars, Esky's and ice blocks. All soil samples were stored on ice while on site, and during transit. Samples were tested within the specified holding times identified in AS 4482.1.

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#### 4.1.3 Groundwater Sampling Methodology and Field Validation

A low flow groundwater pump was used for obtaining a groundwater sample. The protocol below was followed:

1. Measure standing water level from 'top-of-casing' prior to purging using a water level meter.
2. Lower the bladder pump intake to the screen interval.
3. Set extraction (flow) rate using the electronic control unit between 0.1 and 0.5L/min as per EPA Publication 669. Standing water level must be measured regularly to ensure drawdown limits are not exceeded. Flow rates may need to be reduced below 0.1L/s.
4. Insert the WQM into the flow cell. Then connect the supply line to the Flow Cell inlet tube and begin recording readings of pH, conductivity, redox, dissolved oxygen and temperature at regular intervals until stable. Readings are considered to be stable once they are within limits specified by EPA Publication 669.
5. Once readings are stabilised, direct the supply line directly into sampling bottles. Use a set of new sterilised gloves for each new sample.

#### 4.1.4 Laboratory Testing

A total of twenty-two (22) soil samples were submitted to the designated laboratory for the purpose of contamination testing, including:

- 9 x samples for testing as per Table 3 of EPA 1828.2 (Suite R1<sup>3</sup>)
- 8 x samples for pH, and heavy metals testing (M8 Metals<sup>4</sup>)
- 5 x samples for pH, hydrocarbon and metals testing (Suite B7<sup>5</sup>)

A total of three (3) groundwater samples were submitted to the designated laboratory for testing, including:

- 3 x samples for testing as per Table 3 of EPA 1828.2 (Suite R1) and TDS testing
- 1 x sample for Nitrate (as N), Chloride and Ammonia (as N) testing (GW3)

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<sup>3</sup> **Suite R1:** Total Recoverable Hydrocarbons (TRHs)/ Polycyclic Aromatic Hydrocarbons (PAHs)/ Phenols/ Organochlorine Pesticides (OCPs)/ Polychlorinated Biphenyls (PCBs)/ Volatile Organic Compounds (VOCs)/ Vinyl Chloride/ Metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Tin, Zinc)/ Cr6+/ Cyanide (CN)/ Total Fluoride/ pH

<sup>4</sup> **M8 Metals:** Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc

<sup>5</sup> **Suite B7:** TRH, BTEXN, PAH, M8 Metals

## 5 Regulations and Discussion of Results

### 5.1 Regulatory Framework

#### 5.1.1 Regulatory Framework for Soil Assessment

The *State Environmental Protection Policy* (Prevention and Management of Contamination of Land - Land SEPP) states the regulatory framework for the prevention and management of contaminated land and applies to all land within the state of Victoria. The goal of this policy is to “maintain and where appropriate and practicable improve the condition of the land environment sufficient to protect current and future beneficial land uses of land from the detrimental effects of contamination.” Protected beneficial uses of land are summarised below in Table 8.

**Table 8: Protected beneficial uses of land<sup>6</sup>**

Beneficial Uses	Parks & Reserves	Agriculture	Sensitive Use		Recreation/ Open Space	Commercial	Industrial
			High Density	Other			
<b>Maintenance of Ecosystems</b>							
Natural Ecosystems							
Modified Ecosystems							
Highly Modified Ecosystems							
<b>Human Health</b>							
<b>Buildings and Structures</b>							
<b>Aesthetics</b>							
Production of Food, Flora and Fibre							

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<sup>6</sup> Victorian Government Gazette, No. S 95 Tuesday 4th June 2002, Environmental Protection Act 1970, State Environmental Protection Policy (Prevention and Management of Contamination of Land)



EPA Victoria considers soils to be polluted when any current or future beneficial land uses for the relevant land use category are impeded. For example, using Table 8 above, if the land is currently used for agriculture and it is assessed and considered to not be able to support buildings and structures, then the EPA would consider this land to be polluted. This can happen due to increased levels of sulfate or other chemicals which are known to weaken concrete structures.

### 5.1.2 Human Health

The protection of the beneficial use “human health” is assessed with reference to the NEPM guidelines<sup>7</sup>. These guidelines provide for a range of site uses including:

- Exposure setting A – Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary schools.
- Exposure setting B – Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.
- Exposure setting C – Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. This does not include undeveloped public open space where the potential for exposure is lower and where a site-specific assessment may be more appropriate.
- **Exposure setting D – Commercial/industrial, includes premises such as shops, offices, factories and industrial sites.**

It is emphasised within the NEPM that HILs are not intended for use as default trigger or remediation target criteria but are intended to prompt an appropriate site-specific assessment when they are exceeded. However, it is considered reasonable in the first instance to use these investigation limits as default acceptance criteria, and only consider impacts more closely if they are exceeded.

HILs associated to exposure setting ‘D’ were adopted and were compared against the sample laboratory analyte concentrations.

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<sup>7</sup> NEPM, 1999 & 2013

Table 9: Health-based investigation levels<sup>8</sup>

Chemical	Health-based investigation levels (mg/kg)			
	Residential <sup>1</sup> A	Residential <sup>1</sup> B	Recreational <sup>1</sup> C	Commercial/ industrial <sup>1</sup> D
<b>Metals and Inorganics</b>				
Arsenic <sup>2</sup>	100	500	300	3 000
Beryllium	60	90	90	500
Boron	4500	40 000	20 000	300 000
Cadmium	20	150	90	900
Chromium (VI)	100	500	300	3600
Cobalt	100	600	300	4000
Copper	6000	30 000	17 000	240 000
Lead <sup>3</sup>	300	1200	600	1 500
Manganese	3800	14 000	19 000	60 000
Mercury (inorganic) <sup>5</sup>	40	120	80	730
Methyl mercury <sup>4</sup>	10	30	13	180
Nickel	400	1200	1200	6 000
Selenium	200	1400	700	10 000
Zinc	7400	60 000	30 000	400 000
Cyanide (free)	250	300	240	1 500
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>				
Carcinogenic PAHs (as BaP TEQ) <sup>6</sup>	3	4	3	40
Total PAHs <sup>7</sup>	300	400	300	4000
<b>Phenols</b>				
Phenol	3000	45 000	40 000	240 000
Pentachlorophenol	100	130	120	660
Cresols	400	4 700	4 000	25 000
<b>Organochlorine Pesticides</b>				
DDT+DDE+DDD	240	600	400	3600
Aldrin and dieldrin	6	10	10	45
Chlordane	50	90	70	530
Endosulfan	270	400	340	2000
Endrin	10	20	20	100
Heptachlor	6	10	10	50
HCB	10	15	10	80
Methoxychlor	300	500	400	2500
Mirex	10	20	20	100
Toxaphene	20	30	30	160
<b>Herbicides</b>				
2,4,5-T	600	900	800	5000
2,4-D	900	1600	1300	9000
MCPA	600	900	800	5000

<sup>8</sup> National Environment Protection Council (2013). National Environment Protection (Assessment of Site Contamination) Measure, 2013, Table 1a

**Table 9: Health-based investigation levels (Cont'd)**

Chemical	Health-based investigation levels (mg/kg)			
	Residential <sup>1</sup> A	Residential <sup>1</sup> B	Recreational <sup>1</sup> C	Commercial/ industrial <sup>1</sup> D
MCPB	600	900	800	5000
Mecoprop	600	900	800	5000
Picloram	4500	6600	5700	35000
<b>Other Pesticides</b>				
Atrazine	320	470	400	2500
Chlorpyrifos	160	340	250	2000
Bifenthrin	600	840	730	4500
<b>Other Organics</b>				
PCBs <sup>5</sup>	1	1	1	7
PBDE Flame Retardants (Br1-Br9)	1	2	2	10

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### 5.1.3 Regulatory Framework for Groundwater Assessment

SEPP (Waters) divides groundwaters into segments based on background levels of Total Dissolved Solid (TDS) concentrations. These concentrations are then used to set protected beneficial uses of the groundwater.

Based on the average measured groundwater TDS concentrations of 4,300 mg/L (Section 5.4.1), this would categorise the site as being within Segment C. This is summarised below in Table 10 (Schedule 1, Table 2, SEPP Waters), with site relevant segments shown in green.

**Table 10: Beneficial uses of groundwater for the relevant segments**

Beneficial Use	Segment (TDS mg/L)						
	A1 (0-600)	A2 (601-1,200)	B (1,201-3,100)	C (3,101-5,400)	D (5,401-7,100)	E (7,101-10,000)	F (>10,001)
Water dependent ecosystems and species	✓	✓	✓	✓	✓	✓	✓
Potable water supply (desirable)	✓						
Potable water supply (acceptable)	✓	✓					
Potable mineral water supply	✓	✓	✓	✓			
Agriculture and irrigation (irrigation)	✓	✓	✓				
Agriculture and irrigation (stock watering)	✓	✓	✓	✓	✓	✓	
Industrial and commercial	✓	✓	✓	✓	✓		
Water based recreation (primary contact recreation)	✓	✓	✓	✓	✓	✓	✓
Traditional Owners' and Aboriginal Victorians' cultural values	✓	✓	✓	✓	✓	✓	✓
Cultural and spiritual values	✓	✓	✓	✓	✓	✓	✓
Buildings and structures	✓	✓	✓	✓	✓	✓	✓
Geothermal properties	✓	✓	✓	✓	✓	✓	✓

## 5.2 Quality of Analytical Data

The National Association of Testing Authority (NATA) accredits laboratories on a parameter-by-parameter basis and the laboratories must provide quantitative evidence of their ability and competency to produce reliable results against recognised benchmarks (i.e. NATA proficiency programs, other national and international proficiency programs, and performance against certified reference materials). Accredited laboratories are able to demonstrate the ability to produce reliable, repeatable results for a range of parameters within a range of sample matrices.

Laboratories performing analysis for environmental purposes will normally base their methods on a range of guidelines and 'standard methods' including:

- National Environment Protection (Assessment of Site Contamination) Measure (NEPM) 2013;
- A Guide to the Sampling and Analysis of Waters, Wastewater, Soil and Wastes - EPA Publication IWRG701 (2009);
- Australian Standard 4482.1-2005 Guide to the sampling and investigation of potentially contaminated soil- Part 1: Non-volatile and semi-volatile compounds) & Australian Standard 4482.2-1999 Guide to the sampling and investigation of potentially contaminated soil- Part 2: Volatile substances);
- American Public Health Association (APHA), American Water Works Association and WPCF *Standard Methods for the Examination of Waters and Waste Waters* (Latest Publication);
- United States Environmental Protection Agency (US EPA) Test Methods for *Evaluating Solid Waste, Laboratory Manual, Physical/Chemical Methods, SW846* (Latest Edition);
- US EPA Contract Laboratory Program for Organic (1999) and Inorganic (2002) Data Review;
- US EPA Guidance on Environmental Data Verification and Data Validation (2002);
- Other Publications (e.g., ASTM) or accredited in house methods as may be developed and accredited for specific parameters.

Analysis of samples requires a number of important steps including sub-sampling, pre-treatment including digestion/extraction, and physical/chemical/biological measurement of specific parameters against relevant standard materials.



With regard to the specific issue of specified recoveries, the EPA and APHA methods nominate acceptable broad recovery ranges for both soils and waters. However, it must be emphasized that certain parameter recoveries can vary significantly depending on sample type and matrix. The 'APHA Standard Methods' provide a discussion at the end of most methods on precision and bias. Similarly, the USEPA Methods SW-846 provides quantitative data for precision and accuracy for most methods.

The adoption of the general advisory ranges for specific recoveries has been used to screen laboratory data. Where recoveries are outside these ranges the data was assessed in relation to specific laboratory comments, published industry 'norms' for specific parameters and/or the likely impact on the interpretation of the meaning of the results.

If significant doubt exists regarding a laboratories performance then data can be requested on their estimates of uncertainty of measurement, control chart information and proficiency program performance. Laboratories must maintain this information as a requirement of their NATA accreditation.

The following section outlines a consideration of the QC information provided as part of this preliminary environmental investigation.

### 5.2.1 Laboratory

Accuracy of laboratory QC results (laboratory control samples, matrix spikes and surrogates) is measured by percentage recovery (%R) of known additions. Acceptance targets for laboratory control samples and matrix spikes is generally between 70% and 130% recovery for organics and 80-120% recovery for metals (APHA 1992), however acceptable accuracy for certain methods may exceed these limits (USEPA 1986). Acceptance targets for surrogates are between 80% and 120% recovery for organics. It should be noted that matrix dependant QC methods (matrix spikes, surrogates) can be affected by the matrix; hence these %R results have been reviewed qualitatively.

Results were determined to be within the acceptable range which was between 80-120%, where results were not in undetectable low regions.

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## 5.3 Land Contamination

### 5.3.1 Soil Hazard Categorisation and Management

Having carried out the site investigation and associated laboratory analysis, the results were reviewed against contaminant levels per the following waste categorisation publications:

- EPA Victoria Publication IWRG621 *Soil Hazard Categorisation and Management* (IWRG621), dated June 2009.
- EPA Publication 1828.8 *Waste disposal categories – characteristics and thresholds*, dated March 2021.

Laboratory test results are presented in Appendix C and summarised below in Table 11.

**Table 11: Soil Classification Summary**

Test Pit	Typical Material	Depth (m)	Contaminants of concern
S1	Silty Sand FILL	0.41	-
S2	Sandy Gravelly Silt FILL	0.27	-
S2	Sandy Silty CLAY	0.64	-
S3	Silty Sandy Clay FILL with Gravel	0.52	-
S4	Silty Sand FILL	0.35	-
S5-1	Gravelly Silty/Silty Gravel FILL	0.05-0.10	-
S5-1	Sandy Silty CLAY	0.41	-
S5-2	Sandy Silty CLAY (incinerated stockpile)	0.00-0.01	Arsenic and Zinc
S6	Sandy Silty CLAY with Gravel	0.40	-
S7	Sandy Clay FILL	0.28	-
S8	Sand FILL	0.58	-

**Table 12: Soil Classification Summary (Contin'd)**

Test Pit	Typical Material	Depth (m)	Contaminants of concern
S11	Sandy Clay/Clayey Sand FILL	0.00-0.02	-
TP9	Clayey SAND	1.00	-
TP13	Clayey SAND	1.00	-
TP18	Sandy CLAY	1.50	-
TP21	Sandy CLAY	2.00	-
TP33	Sandy CLAY	1.00	-
TP34	Sandy CLAY	1.50	-
TP37	Silty CLAY	0.50	-
TP 38	Clayey SAND	1.00	-
TP40	Silty CLAY trace Sand	1.50	-
TP43	Sandy CLAY	1.00	-

Legend	Fill Material	Category D Contaminated	Category C Contaminated	Category B Contaminated	Category A Contaminated
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### 5.3.2 Leachability Testing Results

Laboratory testing indicated that leachability testing is required for all samples.

Leachability testing is conducted for semi-volatiles as per Australian Standard Leaching Procedures (ASLP). As per IWRG621/1828.2, the higher class of contamination between total concentration and leachability is used to categorise the material.

Analysis of leachability testing results from laboratory tests on the collected samples indicated that none of the collected samples exceeded "Category D" leachability limits (ASLP1) for any of the contaminants. Therefore, samples where contaminant concentrations exceeded the "Fill Material" upper limit are reclassified to "Category D Contaminated" as none of the contaminants exceeded "Category D" ASLP limits

### 5.3.3 National Environment Protection Measures

Laboratory results were also assessed with respect to Human Health-based Investigation Levels (HILs) within the National Environment Protection Measure, guidelines. These guidelines provide a range of HILs for generic land use scenarios.

The adopted criterion for this investigation is the exposure setting "D". Within the NEPM Guidelines Land described as HIL "D" is "Commercial/industrial, includes premises such as shops, offices, factories and industrial sites."

The above HILs have been derived based on long-term exposures for the sections of the populous that would be most sensitive. Necessary precautions should be taken to avoid ingestion and skin/eye contact with the contaminated soil encountered.

According to the NEPM guidelines, the results of laboratory testing on soils collected indicated that the levels of contaminants are within the limits of HIL "D". Therefore, none of the soil samples are considered to be prohibitive to the intended commercial/industrial development of the site.

Note that soil testing was however limited due areas of accessible soils. Certain structures including the residence and shed could not be accessed during the initial investigation which may present potential for contamination. Therefore, it is recommended that these areas be monitored for contamination during demolition and considered for future testing.

### 5.3.4 Soil Management

#### **Off-site export**

Soils were given preliminary categorisation in line with EPA Victoria publications IWRG621 and 1828.8. Results of testing on soils collected indicated the following:

- The stockpile of incinerated material is given preliminary classification as “Category D Contaminated” due to elevated concentrations of arsenic and zinc.
- The previous investigation undertaken by T+T in 2021 indicated elevated arsenic in soils for stockpiles to the north-west of the main infrastructure area. However, these were determined to be non-leachable which would classify it as “Category D Contaminated” as per EPA1828.2.
- Majority of the collected samples did not exceed the upper limits for “Fill Material” (clean fill). Therefore, other than those locations highlighted, the rest of the site is given preliminary classification as “Fill Material” (clean fill).

For “Category D Contaminated” material, these soils may be disposed of at a landfill certified to accept this level of soil contamination. Please note that this is only a preliminary classification, and that further testing will be required in to provide a final classification of any material that is intended to be disposed off-site.

It should also be noted that T+T noted waste in the northwestern stockpiles at 92 Enterprise Road, which could potentially indicate presence of ACM. Careful examination of these stockpiles is recommended to identify presence of any asbestos containing material (ACM) prior to disposal.

**Table 13: Soil Management Options**

Category	Management Options	Disposal Specifications
Category D Contaminated	<ul style="list-style-type: none"> <li>• On-site remediation</li> <li>• Off-site remediation</li> <li>• Licensed facility</li> </ul>	Disposal to licensed facility: <ul style="list-style-type: none"> <li>• EPA Transport certificate system must be used.</li> <li>• Vehicles must hold EPA permit (unless exemption issued)</li> </ul>

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### *On-site reuse*

As none of the adopted HILs were exceeded, the soils may be considered for onsite reuse, from a human-health risk standpoint. Onsite reuse may, however, be precluded by the potential presence of ACM in the stockpiled soils north-west of the main infrastructure at 92 Enterprise Road, due to presence of waste in soils as identified by T+T. Careful examination of these stockpiles is recommended to identify presence of any asbestos containing material (ACM) if these are retained on-site.

IF reuse is desired, it is recommended, however, that all soils be maintained as close to the excavated area as possible. All excavated soils to be reused on-site must be maintained within the site boundary.

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## 5.4 Groundwater

### 5.4.1 Laboratory Results

Analytical results for groundwater samples were reviewed against the relevant assessment criteria based on the Relevant Beneficial Use Assessment Criteria. This includes:

- NEPM Schedule B1 *Guidelines on Investigation Levels for Soil and Groundwaters*
- ANZECC (2000) *Guidelines for Fresh and Marine Water Quality*
- National Water Quality Management Strategy (NWQMS) *Australian Drinking Water Guidelines 6* (2011).
- Australia New Zealand Food Standards Code (FSANZ)– Standard 2.6.2– *Non-alcoholic beverages and brewed soft drinks*.

**Table 14: Laboratory testing summary (groundwater)**

Test Location	Depth of Sample (m)	Total Dissolved Solids (mg/L)	Contaminants exceeding quality objectives
GW1	3.30	3,900	Copper, Lead, Mercury, Nickel, Zinc.
GW2	5.50	4,800	
GW3	7.00	4,200	

### 5.4.2 Relevant Beneficial Uses

Based on TDS results, "Groundwater Segment C" beneficial uses are adopted for this site, which exclude the following beneficial uses previously highlighted in Section 2.7:

- Potable water supply (acceptable)
- Potable mineral water supply
- Agriculture and irrigation (irrigation)

#### 5.4.2.1 Maintenance of Ecosystems

ANZECC (2000) Maintenance of Ecosystems criteria applies to the point of discharge of the groundwater body. The nearest known point of discharge is likely to be Toomuc Creek which lies at the eastern site boundary of 92 Enterprise Road. This also considers the section of the Cardinia Road Drain running through the site, which also discharges into Toomuc Creek. Toomuc Creek is located within the *Central Foothills and Coastal Plains* segment under the Water SEPP and is therefore considered to be a slightly to moderately modified aquatic ecosystem requiring 95% species protection for a freshwater body.

The groundwater well sample exceeded the adopted groundwater criteria for the beneficial use "Maintenance of Ecosystems" in all three samples for zinc and copper. In addition, two samples exceeded this objective for nickel and mercury. One sample also exceeded the objective for lead.

#### 5.4.2.2 Agriculture and Irrigation (Stock Watering)

For this beneficial use, the Groundwaters SEPP refers to ANZECC (2000) water quality objectives for livestock. ANZECC (2000) values for stock water were therefore adopted for the assessment of this beneficial use of groundwater.

None of the groundwater well samples exceeded the quality objectives for this beneficial use. However, TDS concentration may limit use of groundwater for certain livestock. It is considered highly unlikely that this beneficial use will be realised at the site given its intended use for industrial activities.

#### 5.4.2.3 Primary Contact Recreation (PCR)

In the assessment of primary contact recreation, the ANZECC (2000) guideline also refers to the NWQMS *Australian Drinking Water Guidelines 6* for some substances where they do not have their own criteria.

The groundwater well samples did not exceed any of the adopted groundwater criteria for this beneficial use. It is considered highly unlikely that this beneficial use will be realised at the site given its intended use for industrial activities.

#### 5.4.2.4 Traditional Owner Cultural Values

There are no specific assessment criteria for the protected beneficial use of Traditional Owner Cultural Values. These are defaulted to values based around Water Dependent Ecosystems (WDE) & Species and Water-based Recreation (WPR). Exceedances for these beneficial uses have been established above (Section 5.4.2.1 and Section 5.4.2.3). This protected beneficial use is not expected to be realised at the site.

#### 5.4.2.5 Cultural and Spiritual Values

There are no specific assessment criteria for the protected beneficial use of Cultural and Spiritual Values. These are defaulted to values based around WDE & Species and WPR.

Exceedances for these beneficial uses have been established above (Section 5.4.2.1 and Section 5.4.2.3). This protected beneficial use is not expected to be realised at the site.

#### 5.4.2.6 Buildings and Structures

Buildings and structures are assessed based on the Australian Standard *AS2159 Piling Design and Installation*, as well as *AS3600 Concrete Structures*. Foundations for buildings are assessed in terms of durability based on the Sulphate content, Chloride content and the pH.

Assessment of the groundwater with respect to Buildings and Structures was not carried out as it is outside of the scope of this investigation.

#### 5.4.2.7 Industrial and Commercial

ANZECC (2000) notes there is no specific guidance for industrial water use, given the high variability in industry requirements (both within and between). However, it is noted that background information would classify it under Segment C, which includes the use of groundwater from industrial and commercial use.

#### 5.4.2.8 Geothermal Properties

It is considered highly unlikely that this beneficial use will be realised at the site given its intended use for industrial activities.

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## 6 Conclusion and Recommendations

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A review of historical information indicated that the site contains two properties:

- 26A Enterprise Road, and
- 92 Enterprise Road.

26A Enterprise Road consisted of grass paddocks until sometime between 1968 and 1974, at which time housing structures were built towards the northern boundary. Since 1974 there has been little change to the overall site, with changes only to the main infrastructure cluster.

92 Enterprise Road has been occupied since before 1939, with housing structures evident in 1939 imagery. The site appears to have been used for farming purposes with little change to the land from 1939 to between 2010 and 2015. From between 2010 and 2015 to sometime between 2017 and 2022 soil disturbance and stockpiling can be seen south of the infrastructure cluster. In 2017 imagery a number of vehicles can be seen stored adjacent to the infrastructure, indicating a potential commercial use. Previous investigations conducted at the site also

Having carried out the site investigation and associated laboratory analysis, the results were reviewed with respect to contaminant levels, beneficial uses of the site and waste categorisation.

Based on results of laboratory testing, soils for majority of the site were given preliminary categorisation as "Fill Material". However, this investigation and the previous investigation undertaken by T+T indicated higher contamination classification for certain areas, namely:

- "Category D Contaminated" soils for stockpiles to the north-west of the main infrastructure area due to elevated arsenic and zinc.
- "Category D Contaminated" soils for the stockpile of incinerated within the residential area due to elevated arsenic (T+T, 2021)

Please note that if in-situ material is to be exported off-site, further testing must be conducted on any excavated soils around these areas to provide a final categorisation of these soils, particularly in untested areas.



Results were reviewed with respect to HILs to determine the suitability of the premises for industrial/commercial use. None of the reported analytic concentrations from laboratory testing exceeded the Health Investigation Levels (HIL's) for commercial/industrial use.

Groundwater quality was also assessed with respect to protected beneficial uses. Results indicated there were exceedances of the adopted environmental quality indicators for the "Maintenance of Ecosystems" beneficial use. However, these exceedances of groundwater quality objectives are not considered prohibitive to the intended industrial site use.

With reference to the above, the site is considered to present low contamination risk in regard to future industrial land use.

**The land encompassed within the site is considered acceptable for the permitted commercial/industrial use from a contamination perspective.**

Recommendation for clean-up of the site includes:

- Removal of all loose debris from site.
- Removal of stockpiles from the site, unless these are intended be used for 'cut and fill'. In either case, careful examination of these stockpiles is recommended to identify presence of any asbestos containing material (ACM).
- Removal of the incinerated material within the residential area at 92 Enterprise Road.
- Inspection of soil underneath shed concrete slab for any signs of residual contamination (odours, stains, unusual colours, etc.).

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## 7 References

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## 8 Report Limitations

- a) This technical report has been prepared in good faith based on the information provided by our Client's representative Mr James Cappellari of Dalton Consulting Engineers Pty Ltd and in accordance with LRP&A quality system.
- b) This report has been commissioned by and for the specific use of our Client the Dalton Consulting Engineers Pty Ltd for the "226 Bangholme Road" project, located at 26A and 92 Enterprise Rd, Pakenham, Victoria. Therefore, no responsibility or liability to any third party is accepted for any damages, howsoever arising, from contents of this report or its use by any third party. Where such liability cannot be excluded it is reduced to the full extent lawful.
- c) Please note that only limited laboratory testing was undertaken, and that all soil properties have been inferred to similar soils across the soil profile based on visual identification only. However, soil may vary greatly within a site, and therefore, further testing may be required to increase the degree of confidence in this assumption, if warranted by a risk assessment and/or project requirement. It should also be noted that whenever applicable, no responsibility or liability is accepted where the appropriate testing as detailed in this report is not undertaken by a qualified NATA Testing Authority. Please note that LRP&A can coordinate the appropriate geotechnical testing.
- d) The use of this report is **not** appropriate where there have been any changes in the nature of the project or the conditions present during any field investigation or site inspection.
- e) No responsibility or liability is accepted where any part of this report is used in isolation, out of context or without consideration of the total document.
- f) If at a later time it is found that the information previously provided to LRP&A was incorrect, incomplete and/or if at the time of construction, the soil conditions differ drastically from those initially reported, LRP&A **should be contacted immediately** and this report may need to be reviewed and amended if appropriate.

Should you require any further information regarding this report or any of our services, please do not hesitate to contact the undersigned on 1300 922 964

Prepared by

**StudIEAust**  
**Undergraduate Engineer**  
**LR Pardo & Associates Pty Ltd**



ENGINEERS  
AUSTRALIA  
Professional Engineers  
STUDENT MEMBER

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Reviewed and authorised by

**(BE [Environmental, Hons], MIEAust)**  
**Environmental Engineer**  
**LR Pardo & Associates Pty Ltd**



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## Appendix A

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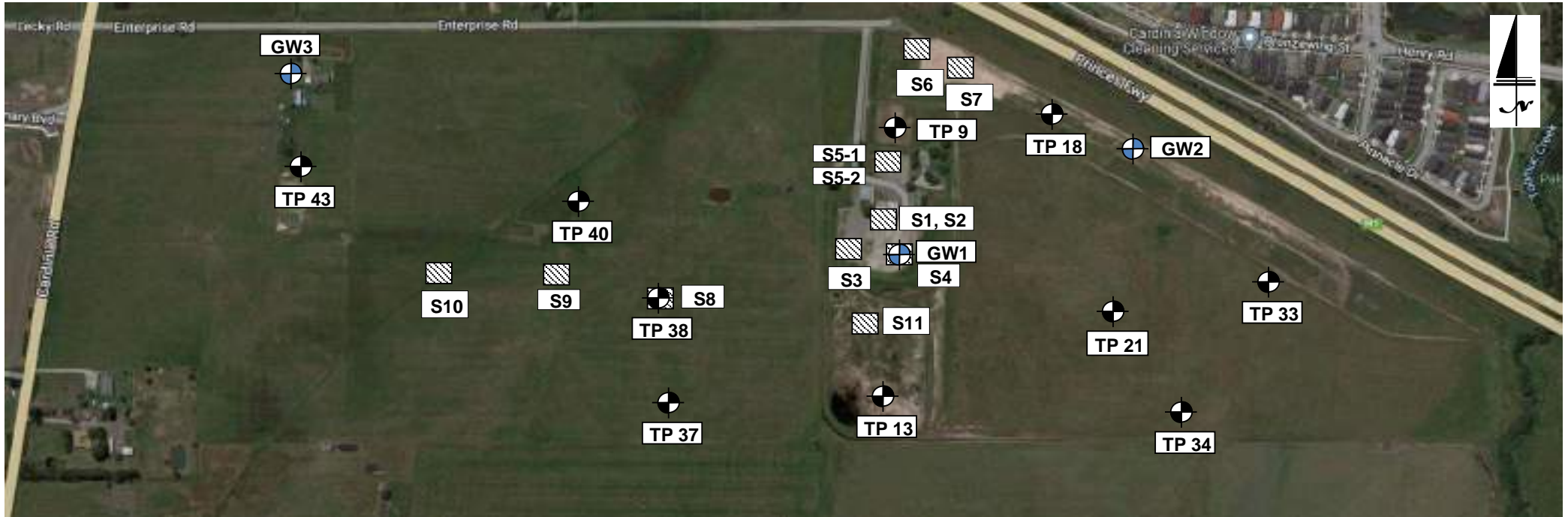
Sampling Location Plan

Groundwater Borehole Logs

Groundwater Monitoring Logs

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## Test Pit Locations



**Legend**

- Test Pit Location (enviro sample)**
- Hand-Augered Enviro Sample**
- Groundwater Wells**

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This drawing shall be read in conjunction with LRP&A Report No. 222643 92 Enterprise Rd/2

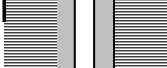
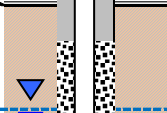


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<p><b>Consulting Civil &amp; Geotechnical Engineers</b>                  Melbourne: 2 Alex Avenue, Moorabbin VIC 3189                  Truganina: 18/4 Network Drive, Truganina VIC 3029                  Geelong: 7 Fairlie Street, Hamlyn Heights VIC 3215                  Tel: 1300 922 964 - www.pardoengineering.com.au</p>	Source: Nearmap  NOT TO SCALE	<p><b>Title</b> Test Pit Locations  <b>Locality</b> 26A and 92 Enterprise Rd                  Pakenham,   <b>Dwg. No</b> 222643/2 TP  <b>Prepared</b> JZ                      14/12/2022  <b>Checked</b> YC                      14/12/2022</p>	<p><b>Geo-environmental Investigation</b>                  Investigation date: 1/12-2/12/22                   Project: 222643 92 Enterprise Rd/2</p>
	<p><b>Sheet No</b> Site plan</p>	<p><b>File</b> 222643-2 Site Plan.xlsm</p>	


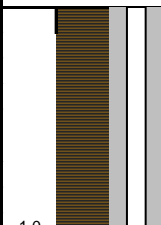
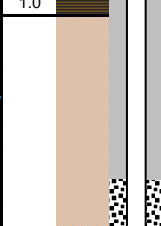
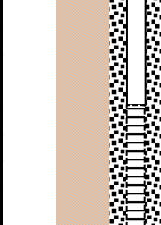
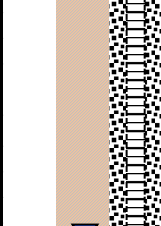
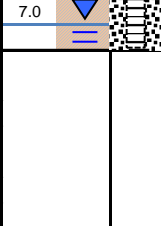








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 <b>BOREHOLE LOG</b>	Client: Dalton Consulting Engineers	Borehole No: <b>GW1</b>
	Project: 92 Enterprise Rd	Date: 13/12/2022
	Borehole Location: See Site Plan	Logged by: JZ
	Borehole Elevation: Surface level	Checked by: YC

Method	Depth (metres)	Graphic Log	Material Description Type, Plasticity, Colour, Particle characteristics	Soil Classification	Consistency / Density	Moisture	Other	Type	Test Results	Structure and additional observations
A	0.2		Sandy Gravel FILL Max size 60mm Grey to white	FILL	D-VD	D				Gravel at surface Some grass
	1.0		Sandy CLAY High plasticity Light brown	CH	St	M				
	1.50									Water table at 1.50m after drilling.
	2.50									Water table at 2.50m during drilling.
	3.30							TDS	3,900 mg/L	3.30m
	6.0		Borehole 3 terminated at 6.0m							
	7.0									<b>Groundwater well details:</b> Bentonite: 0.0-2.0m Screening sand: 2.5-5.5m Solid pipe: 0.0-2.5m Screen: 2.5-5.5m
	8.0									
	9.0									
	10.0									

<b>Consistency/density:</b> VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense	<b>samples/tests:</b> V pilcon shear vane kPa U63 undisturbed sample 63mm SS soil sample (250ml jar) PP pocket penetrometer kPa CT samples for contamination test N standard penetration test	<b>Legend</b>  Casing (solid PVC)  Screen (slotted PVC)  Cement  Cap (gatic cover)  Bentonite  Screening Sand (8/16)
<b>method:</b> A auger drilling W washbore NDD non destructive digging C coring H hand auger AH air Hammer	<b>moisture:</b> D dry M moist W wet Sat Saturated	<b>Doc. No. LBH-001</b> Issued Date: 20/11/08

 <b>BOREHOLE LOG</b>			Client: Dalton Consulting Engineers Borehole No: <b>GW2</b> Project: 92 Enterprise Rd Borehole Location: See Site Plan Borehole Elevation: Surface level		Date: 9/12/2022 Logged by: JZ Checked by: YC					
Method	Depth (metres)	Graphic Log	Material Description Type, Plasticity, Colour, Particle characteristics	Soil Classification	Consistency / Density	Moisture	Other	Type	Test Results	Structure and additional observations
A	0.0 - 1.0		Silty Clay FILL with gravel High plasticity Brown	FILL	F	M-W				
	1.0 - 2.0		Silty CLAY Some sand High plasticity Light brown	CH	F-St	M				
A	2.0 - 5.0		Becoming more stiff with depth.		St-VSt	M-W				
	5.0 - 7.0				VSt	W		TDS	4,800 mg/L	5.50m
	7.0 - 10.0		GW2 terminated at 7.2m							Water table at 7.0m during drilling.
										<b>Groundwater well details:</b> Bentonite : 0.0-3.0m Screening sand: 3.0-7.2m Solid pipe: 0.0-4.2m Screen: 4.2-7.2m
<b>Consistency/density:</b> VS very soft      Fb friable S soft              VL very loose F firm                L loose St stiff               MD medium dense VSt very stiff        D dense H hard                VD very dense				<b>samples/tests:</b> V pilcon shear vane kPa U63 undisturbed sample 63mm SS soil sample (250ml jar) PP pocket penetrometer kPa CT samples for contamination test N standard penetration test				<b>Legend</b>  Casing (solid PVC)  Screen (slotted PVC)  Cement  Cap (gatic cover)  Bentonite  Screening Sand (8/16)		
<b>method:</b> A auger drilling      C coring W washbore        H hand auger NDD non destructive digging      AH air Hammer				<b>moisture:</b> D dry      W wet M moist      Sat Saturated				<b>Doc. No. LBH-001</b> Issued Date: 20/11/08		

 <b>LR Pardo &amp; Associates</b> <b>BOREHOLE LOG</b>	Client: Dalton Consulting Engineers Borehole No: <b>GW3</b>	Date: 9/12/2022
	Project: 92 Enterprise Rd	Logged by: AT
	Borehole Location: See Site Plan	Borehole Elevation: Surface level
		Checked by: YC

Method	Depth (metres)	Graphic Log	Material Description <small>Type, Plasticity, Colour, Particle characteristics</small>	Soil Classification	Consistency / Density	Moisture	Other	Type	Test Results	Structure and additional observations	
A	1.0		Sandy Silt/Clay FILL Low plasticity Dark brown Medium grained	FILL	S	M-W				Grass cover	
	2.0		Sandy Silty CLAY Medium plasticity to low plasticity Light brown	CH	S	M					
	3.0		SAND Medium grained Light brown to cream	SM	L-MD	M					
	4.0		Becoming more clayey with depth Low plasticity to medium plasticity								
	5.0		Sandy Silty CLAY Thin layer of grey, high plasticity Silty CLAY at 5.0m Light brown Medium grained	CH	St	M					
	6.0			CL	S-F	M-W					
	7.0							TDS	4,200 mg/L	7.0m	
	8.0									Water table at 7.50m after drilling.	
	9.0		GW3 terminated at 8.70m.							<b>Groundwater well details:</b> Bentonite : 0.0-5.7m Screening Sand: 5.7-8.7m Solid pipe: 0-5.7m Screen: 5.7-8.7m	
	10.0										

<b>Consistency/density:</b> VS very soft      Fb friable S soft              VL very loose F firm                L loose St stiff               MD medium dense VSt very stiff       D dense H hard                VD very dense	<b>samples/tests:</b> V pilcon shear vane kPa U63 undisturbed sample 63mm SS soil sample (250ml jar) PP pocket penetrometer kPa CT samples for contamination test N standard penetration test	<b>Legend</b> 
<b>method:</b> A auger drilling      C coring W washbore          H hand auger NDD non destructive digging      AH air Hammer	<b>moisture:</b> D dry      W wet M moist      Sat Saturated	<b>Doc. No. LBH-001</b> Issued Date: 20/11/08

**Project:** 222643 92 Enterprise Rd

**Client:** Dalton Consulting Engineers Pty Ltd

**Page:** 1 of 3

**Consulting Civil and Geotechnical Engineers**

2 Alex Avenue, Moorabbin VIC 3189

**Sampling device/Calibration by:** QED Sample Pro Bladder Pump, YSI 556/Pro+ Water Quality Meter; Lachlan Ward

**Bore ID:** GW1

**Pre-purging SWL:** 0.65m

**Time:** 8:20

**Screen (depth):** 2.5-5.5m

**Sample Location (depth):** 3.30m

**Post-Sampling SWL:** 0.78m

**Time:** 9:20

**Weather Conditions:** Sunny, 19°C

**Trafalgar Landfill Monitoring Program- GW Field Stabilisation Measurements**

Time	Purge Rate	Total Volume purged	Temperature	Conductivity	pH	ORP	Dissolved Oxygen	Physical Appearance of Sample (eg. Colour, turbidity, odour, etc.)
	(L/min)	(L)	(°C) ± 0.2	(µS/cm) ± 20	± 0.2	(mV) ± 20	(%) ± 2%	
8:40 AM	0.25	0.00	16.10	7,423	6.64	218.7	15.7	Muddy  Becoming more clear with depth
8:43 AM	0.25	0.75	16.00	7,445	6.63	200.4	13.5	
8:46 AM	0.25	1.50	16.00	7,295	6.64	191.9	14.5	
8:49 AM	0.25	2.25	16.00	7,009	6.63	185.3	19.3	
8:52 AM	0.25	3.00	16.00	6,880	6.62	180.2	21.5	
8:55 AM	0.25	3.75	16.00	6,900	6.60	176.7	22.3	
8:58 AM	0.25	4.50	16.00	6,925	6.60	173.4	23.5	
9:01 AM	0.25	5.25	16.00	6,943	6.6	170.8	23.7	

**Project:** 222643 92 Enterprise Rd

**Client:** Dalton Consulting Engineers Pty Ltd

**Page:** 2 of 3

**Consulting Civil and Geotechnical Engineers**

2 Alex Avenue, Moorabbin VIC 3189

**Sampling device/Calibration by:** QED Sample Pro Bladder Pump, YSI 556/Pro+ Water Quality Meter; Lachlan Ward

**Bore ID:** GW2

**Pre-purging SWL:** 0.57m

**Time:** 10:25

**Screen (depth):** 4.2-7.2m

**Sample Location (depth):** 5.50m

**Post-Sampling SWL:** 3.70m

**Time:** 11:20

**Weather Conditions:** Sunny, 19°C

**Trafalgar Landfill Monitoring Program- GW Field Stabilisation Measurements**

Time	Purge Rate	Total Volume purged	Temperature	Conductivity	pH	ORP	Dissolved Oxygen	Physical Appearance of Sample (eg. Colour, turbidity, odour, etc.)
	(L/min)	(L)	(°C) ± 0.2	(µS/cm) ± 20	± 0.2	(mV) ± 20	(%) ± 2%	
10:32 AM	0.25	0.00	16.7	7,989	6.22	138.6	35.4	Slightly Murky/Milky
10:35 AM	0.25	0.75	15.5	8,796	6.19	144.2	37.2	
10:38 AM	0.25	1.50	15.3	8,813	6.16	147.0	32.4	
10:41 AM	0.25	2.25	15.7	8,792	6.13	148.1	34.9	
10:44 AM	0.25	3.00	15.9	8,788	6.18	149.6	32.8	
10:47 AM	0.25	3.75	16	8,738	6.20	150.2	31.5	
10:50 AM	0.25	4.50	15.7	8,676	6.21	150.6	28.99	
10:53 AM	0.25	5.25	15.1	8,578	6.2	151.7	26.5	



Project: 222643 92 Enterprise Rd  
 Client: Dalton Consulting Engineers Pty Ltd

Consulting Civil and Geotechnical Engineers  
 2 Alex Avenue, Moorabbin VIC 3189

Sampling device/Calibration by: QED Sample Pro Bladder Pump, YSI 556/Pro+ Water Quality Meter; Lachlan Ward

Bore ID: GW3      Pre-purging SWL: 1.10m      Time: 12:04      Screen (depth): 5.7-8.7m  
 Sample Location (depth): 7.0m      Post-Sampling SWL: 4.25m      Time: 12:41      Weather Conditions: Sunny, 19°C

Trafalgar Landfill Monitoring Program- GW Field Stabilisation Measurements

Time	Purge Rate	Total Volume purged	Temperature	Conductivity	pH	ORP	Dissolved Oxygen	Physical Appearance of Sample (eg. Colour, turbidity, odour, etc.)
	(L/min)	(L)	(°C) ± 0.2	(µS/cm) ± 20	± 0.2	(mV) ± 20	(%) ± 2%	
12:04 PM	0.25	0.00	15.6	7,554	6.34	164.3	55.1	Slightly Cloudy
12:07 PM	0.25	0.75	16.1	8,080	6.35	163.2	50.8	
12:10 PM	0.25	1.50	16.3	8,129	6.33	163.1	52.0	
12:13 PM	0.25	2.25	16.2	8,154	6.39	162.3	53.3	
12:16 PM	0.25	3.00	16.9	8,142	6.33	160.6	52.0	
12:19 PM	0.25	3.75	16.4	8,128	6.39	159.0	52.1	
12:22 PM	0.25	4.50	16.2	8,176	6.34	158.0	48.8	
12:25 PM	0.25	5.25	16.4	7,888	6.31	157.1	44.1	
12:29 PM	0.25	6.00	16.4	7,706	6.31	154.4	38.1	
12:32 PM	0.25	6.75	16.5	7,647	6.29	153.9	35.3	

## Appendix B

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Lotsearch Report

DELWP Groundwater Report

Planning Property Reports

Current and Historical Certificates of Title

Groundwater Construction License

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# LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

**Date: 22 Nov 2022 08:32:32**

**Reference: LS038272 EP**

**Address: 92 & 26A Enterprise Road, Pakenham, VIC 3810**

**Disclaimer:**

The purpose of this report is to provide an overview of some of the site history, environmental risk and planning information available, affecting an individual address or geographical area in which the property is located. It is not a substitute for an on-site inspection or review of other available reports and records. It is not intended to be, and should not be taken to be, a rating or assessment of the desirability or market value of the property or its features. You should obtain independent advice before you make any decision based on the information within the report. The detailed terms applicable to use of this report are set out at the end of this report.

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## Dataset Listing

Datasets contained within this report, detailing their source and data currency:

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Topographic and Cadastre data	State Government Victoria - Department of Environment, Land, Water & Planning	08/11/2022	04/11/2022	Monthly	-	-	-	-
Current EPA Priority Sites	Environment Protection Authority (Vic)	09/11/2022	10/10/2022	Monthly	1000m	0	0	0
Former EPA Priority Sites & other Remedial Notices	Environment Protection Authority (Vic)	04/10/2021	01/09/2021	Monthly	1000m	0	0	0
EPA PFAS Site Investigations	Environment Protection Authority (Vic)	25/10/2022	19/01/2022	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Investigation Sites	Department of Defence	09/11/2022	09/11/2022	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Management Sites	Department of Defence	09/11/2022	09/11/2022	Monthly	2000m	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	09/11/2022	09/11/2022	Monthly	2000m	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	02/09/2022	02/09/2022	Quarterly	2000m	0	0	0
EPA Environmental Audit Reports	Environment Protection Authority (Vic)	19/07/2022	19/07/2022	Monthly	1000m	0	0	1
EPA Groundwater Zones with Restricted Uses	Environment Protection Authority (Vic)	09/11/2022	09/11/2022	Monthly	1000m	0	0	0
Current EPA Licensed Activities	Environment Protection Authority (Vic)	19/07/2022	22/07/2021	Monthly	1000m	0	0	0
Former EPA Licensed Activities	Environment Protection Authority (Vic)	19/07/2022	26/11/2021	Monthly	1000m	0	0	0
EPA Works Approvals	Environment Protection Authority (Vic)	09/11/2022	09/11/2022	Monthly	1000m	0	0	0
National Waste Management Facilities Database	Geoscience Australia	26/05/2022	07/03/2017	Annually	1000m	0	0	0
Statewide Waste and Resource Recovery Infrastructure Plan Facilities	State Government Victoria - Department of Sustainability	27/11/2014	31/12/2012	None planned	1000m	0	0	0
EPA Prescribed Industrial Waste	Environment Protection Authority (Vic)	12/08/2020	12/08/2020	Quarterly	1000m	0	0	2
EPA Victorian Landfill Register	Environment Protection Authority (Vic)	02/09/2022	25/08/2020	Quarterly	1000m	0	0	0
Former Gasworks	Various historical sources collated by Lotsearch	15/08/2017	15/08/2017	Not required	1000m	0	0	0
National Liquid Fuel Facilities	Geoscience Australia	23/08/2022	15/03/2012	Annually	1000m	0	0	0
Historical Business Directories (Premise & Intersection Matches)	Hardie Grant; Sands & McDougall, State Library Victoria			Not required	150m	0	0	0
Historical Business Directories (Road & Area Matches)	Hardie Grant; Sands & McDougall, State Library Victoria			Not required	150m	-	0	0
Historical Business Directory Dry Cleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant; Sands & McDougall, State Library Victoria			Not required	500m	0	0	0
Historical Business Directory Dry Cleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant; Sands & McDougall, State Library Victoria			Not required	500m	-	0	0
Features of Interest	State Government Victoria - Department of Environment, Land, Water & Planning	18/10/2022	18/10/2022	Quarterly	1000m	0	2	49
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1000m	1	1	1
Groundwater Salinity	State Government Victoria - Department of Environment, Land, Water & Planning	14/08/2015	29/08/2012	Unknown	0m	1	-	-
Depth to Watertable	State Government Victoria - Department of Environment, Land, Water & Planning	14/08/2015	29/08/2012	Unknown	0m	1	-	-
Surface Elevation	State Government Victoria - Department of Environment, Land, Water & Planning	14/08/2015	23/09/2013	Unknown	0m	1	-	-

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Basement Elevation	State Government Victoria - Department of Environment, Land, Water & Planning	14/08/2015	23/09/2013	Unknown	0m	1	-	-
Groundwater Boreholes WMIS	State Government Victoria - Department of Environment, Land, Water & Planning	31/08/2022	31/08/2022	Quarterly	2000m	0	0	34
Groundwater Boreholes Earth Resources Database	State Government Victoria - Department of Economic Development, Jobs, Transport and Resources	20/05/2021	17/02/2010	Annually	2000m	0	0	4
Groundwater Boreholes Fed Uni	Federation University Australia	21/12/2017	07/01/2014	As required	2000m	0	0	0
Historical Mining Activity - Shafts	State Government Victoria - Department of Economic Development, Jobs, Transport and Resources	26/05/2022	26/05/2022	Annually	1000m	0	0	0
Geological Units 1:250,000	State Government Victoria - Department of Economic Development, Jobs, Transport and Resources	13/01/2015	24/06/2014	Unknown	1000m	1	1	3
Geological Structures 1:250,000	State Government Victoria - Department of Economic Development, Jobs, Transport and Resources	13/01/2015	24/06/2014	Unknown	1000m	0	0	0
Shear zones 250k	State Government Victoria - Department of Economic Development, Jobs, Transport and Resources	13/01/2015	24/06/2014	Unknown	1000m	0	0	0
Atlas of Australian Soils	ABARES	19/05/2017	17/02/2011	As required	1000m	1	1	1
Victorian Soil Type Mapping	State Government Victoria - Department of Economic Development, Jobs, Transport and Resources	24/08/2017	21/03/2016	Unknown	1000m	3	3	5
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000m	1	1	1
Coastal Acid Sulfate Soils	State Government Victoria - Department of Economic Development, Jobs, Transport and Resources	28/03/2017	30/03/2011	None planned	1000m	0	0	0
Planning Scheme Zones	State Government Victoria - Department of Environment, Land, Water & Planning	09/11/2022	02/11/2022	Monthly	1000m	2	7	14
Planning Scheme Overlay	State Government Victoria - Department of Environment, Land, Water & Planning	09/11/2022	02/11/2022	Monthly	1000m	2	5	15
Commonwealth Heritage List	Australian Government Department of Agriculture, Water and the Environment	03/06/2022	13/04/2022	Annually	1000m	0	0	0
National Heritage List	Australian Government Department of Agriculture, Water and the Environment	03/06/2022	13/04/2022	Annually	1000m	0	0	0
Victorian Heritage Register	State Government Victoria - Department of Environment, Land, Water & Planning	19/10/2022	19/10/2022	Quarterly	1000m	0	0	0
Cultural Heritage Sensitivity	State Government Victoria - Department of Premier and Cabinet	18/10/2022	18/10/2022	Quarterly	1000m	1	3	28
Bushfire Prone Area	State Government Victoria - Department of Transport, Planning and Local Infrastructure	18/10/2022	17/08/2022	Quarterly	1000m	1	1	1
Fire History	State Government Victoria - Department of Environment, Land, Water & Planning	04/11/2022	03/11/2022	Quarterly	1000m	0	0	1
Flood - 1 in 100 Year Modelled Flood Extent	State Government Victoria - Department of Environment, Land, Water & Planning	19/10/2022	22/06/2022	Quarterly	1000m	0	0	0
Victorian Coastal Inundation Sea Level Rise	State Government Victoria - Department of Environment, Land, Water & Planning	10/04/2018	24/10/2017	Unknown	1000m	0	0	0
Native Vegetation (Modelled 2005 Ecological Vegetation Classes)	State Government Victoria - Department of Environment, Land, Water & Planning	13/01/2015	31/12/2005	None planned	1000m	1	2	3
Ramsar Wetland Areas in Victoria	State Government Victoria - Department of Environment, Land, Water & Planning	28/03/2022	13/03/2019	Annually	1000m	0	0	0
Groundwater Dependent Ecosystems Atlas	Bureau of Meteorology	28/10/2022	26/10/2022	Annually	1000m	0	1	1
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	28/10/2022	26/10/2022	Annually	1000m	0	1	4

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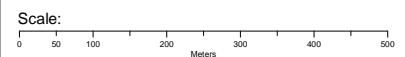
# Site Diagram

92 & 26A Enterprise Road, Pakenham, VIC 3810



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<b>Legend</b>  Site Boundary  Internal Parcel Boundaries	<b>Total Area:</b> 698919m <sup>2</sup>
	<b>Total Perimeter:</b> 4.07km
<b>Disclaimers:</b> Measurements are approximate only and may have been simplified or smaller lengths removed for readability. Parcels that make up a small percentage of the total site area have not been labelled for increased legibility.	



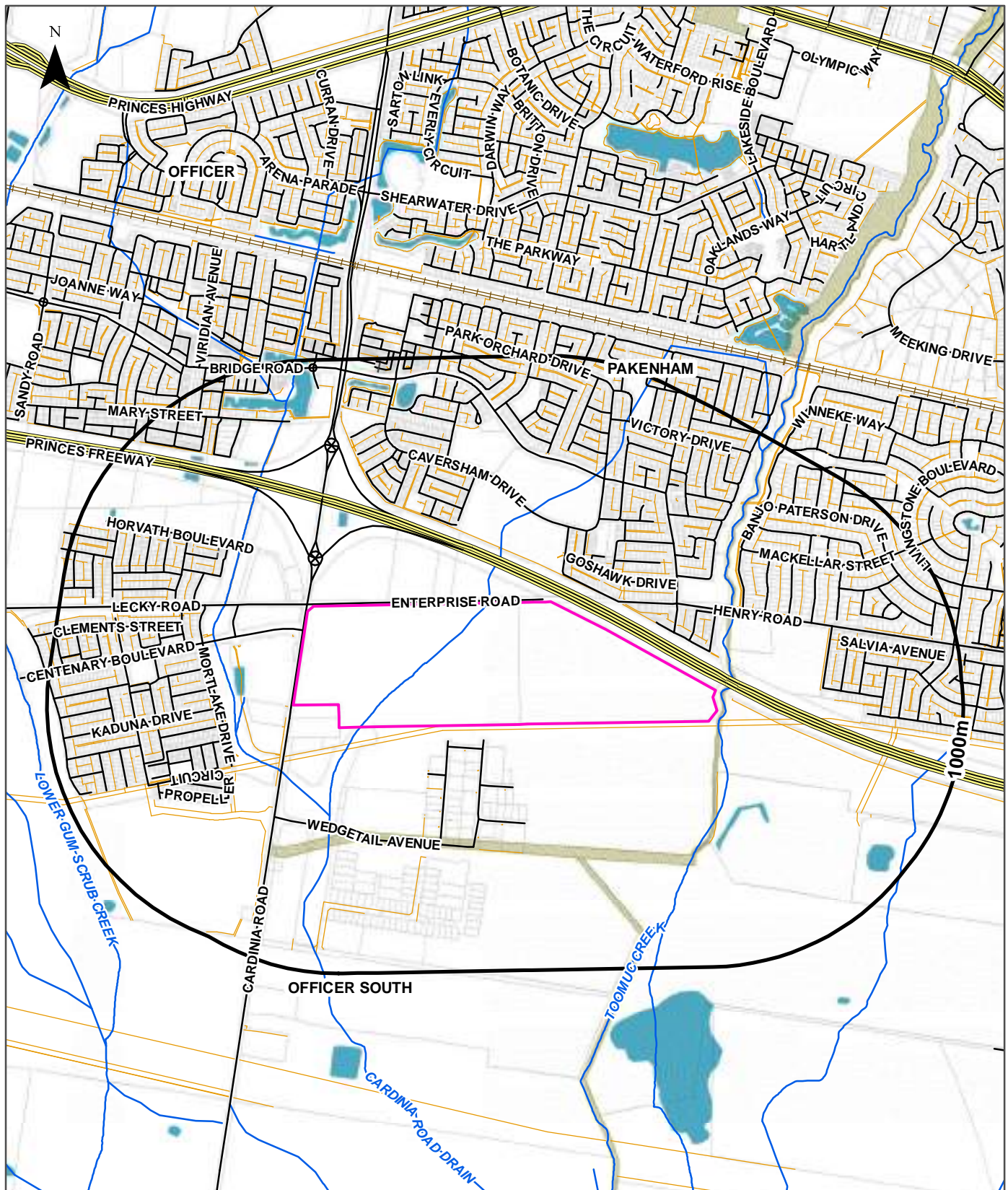
Data Source Aerial Imagery:  
© Aerometrex Pty Ltd

Date: 22 November 2022

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# Topographic Data

92 & 26A Enterprise Road, Pakenham, VIC 3810



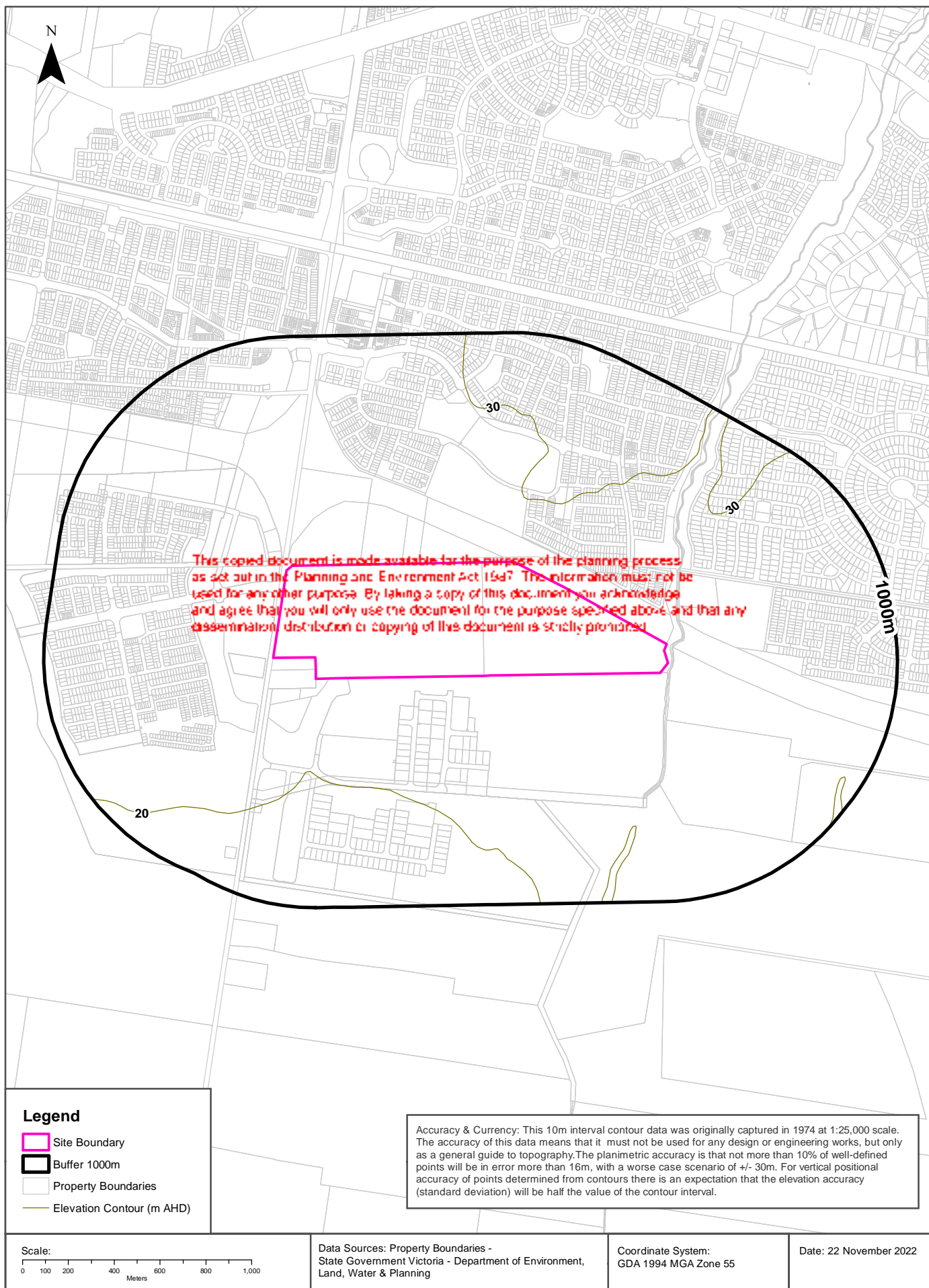
Legend		
Site Boundary	Water Area	Major Road
Buffer 1000m	Crown or Commonwealth Land	Road
Property Boundaries	Statewide Forest	Track/Pathway
		Railway
		Light Rail
		Rail - Underground/Tunnel
		Watercourse
		Easement

<p>Scale:</p>	<p>Data Sources: Property Boundaries - State Government Victoria - Department of Environment, Land, Water &amp; Planning</p>	<p>Coordinate System: GDA 1994 MGA Zone 55</p>	<p>Date: 22 November 2022</p>
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# Elevation Contours (m AHD)

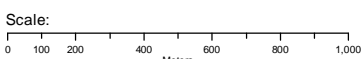
92 & 26A Enterprise Road, Pakenham, VIC 3810



### Legend

- Site Boundary
- Buffer 1000m
- Property Boundaries
- Elevation Contour (m AHD)

Accuracy & Currency: This 10m interval contour data was originally captured in 1974 at 1:25,000 scale. The accuracy of this data means that it must not be used for any design or engineering works, but only as a general guide to topography. The planimetric accuracy is that not more than 10% of well-defined points will be in error more than 16m, with a worse case scenario of +/- 30m. For vertical positional accuracy of points determined from contours there is an expectation that the elevation accuracy (standard deviation) will be half the value of the contour interval.



Data Sources: Property Boundaries - State Government Victoria - Department of Environment, Land, Water & Planning

Coordinate System: GDA 1994 MGA Zone 55

Date: 22 November 2022

# EPA Priority Sites & Pollution Notices

92 & 26A Enterprise Road, Pakenham, VIC 3810

## Current EPA Priority Sites Register

Sites on the current EPA priority sites register that exist within the dataset buffer:

Notice No	Address	Suburb	Issue	Loc Conf	Dist (m)	Direction
N/A	No records in buffer					

Priority Sites Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

## Former EPA Priority Sites & Other Pollution Notices

Sites within the dataset buffer that have been issued a Pollution Notice:

**Note. Due to pollution notices being revoked and removed from published lists this is not an exhaustive list of all past pollution notices.**

Notice No	Notice Type	Company	Address	Suburb	Status	Issue	Date Issued	Loc Conf	Dist	Dir
N/A	No records in buffer									

Pollution Notice Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

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# PFAS Investigation & Management Programs

92 & 26A Enterprise Road, Pakenham, VIC 3810

## EPA PFAS Site Investigations

Sites being investigated by the EPA for PFAS contamination within the dataset buffer:

Map ID	Site Name	Address	Location Confidence	Distance	Direction
N/A	No records in buffer				

EPA PFAS Site Investigations Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

## Defence PFAS Investigation & Management Program Investigation Sites

Sites being investigated by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Location Confidence	Distance	Direction
N/A	No records in buffer				

Defence PFAS Investigation & Management Program Data Custodian: Department of Defence, Australian Government

## Defence PFAS Investigation & Management Program Management Sites

Sites being managed by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Location Confidence	Distance	Direction
N/A	No records in buffer				

Defence PFAS Investigation & Management Program Data Custodian: Department of Defence, Australian Government

## Airservices Australia National PFAS Management Program

Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

Map ID	Site Name	Impacts	Location Confidence	Distance	Direction
N/A	No records in buffer				

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

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## Defence Sites

92 & 26A Enterprise Road, Pakenham, VIC 3810

### Defence 3 Year Regional Contamination Investigation Program

Sites which have been assessed as part of the Defence 3 Year Regional Contamination Investigation Program within the dataset buffer:

Property ID	Base Name	Address	Known Contamination	Loc Conf	Dist	Dir
N/A	No records in buffer					

Defence 3 Year Regional Contamination Investigation Program, Data Custodian: Department of Defence, Australian Government

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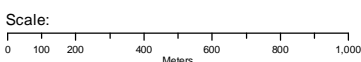
# EPA Records - Audit Reports & GQRUZ

92 & 26A Enterprise Road, Pakenham, VIC 3810



### Legend

- Site Boundary
- Buffer 1000m
- Property Boundaries
- Environmental Audits
- Groundwater Zones with Restricted Uses
- Potential Forest Audit Program Area
- Audit of Management of Sewerage Systems Area



Data Sources: Property Boundaries - State Government Victoria - Department of Environment, Land, Water & Planning

Coordinate System: GDA 1994 MGA Zone 55

Date: 22 November 2022

## EPA Records

92 & 26A Enterprise Road, Pakenham, VIC 3810

## EPA Environmental Audits

EPA environmental audit records that exist within the dataset buffer:

Note. Please click on CARMS No. to activate a hyperlink to online documentation. If link does not work, documentation may still be accessible via the EPA Interaction Portal.

CARMS No	Transaction No	Site	Address	Suburb	Date Complete	Audit Category	Loc Conf	Distance	Direction
<a href="#">74407-1</a>	8004991	SOUTH EAST WATER 101 WELLS ST	SOUTH EAST WATER 101 WELLS ST	FRANKSTON	08/02/2018	53V Audit recommendations	Premise Match	110m	North

Environmental Audit Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

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## EPA Records

92 & 26A Enterprise Road, Pakenham, VIC 3810

### EPA Groundwater Zones with Restricted Uses

EPA GQRUZ records that exist within the dataset buffer:

Note. Please click on CARMS No. to activate a hyperlink to online documentation.

CARMS No	EPA Id	Site History	Site Address	Restricted Uses	Status	Loc Conf	Distance	Direction
N/A	No records in buffer							

Environmental GQRUZ Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

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## EPA Activities

92 & 26A Enterprise Road, Pakenham, VIC 3810

## EPA Licensed Activities

EPA licensed activities that exist within the dataset buffer:

Trans No	Licence No	Licence Type	Organisation	Premise Ref	Premise Address 1	Premise Address 2	Activities	Loc Conf	Dist (m)	Direction
N/A	No records in buffer									

Licensed Activity Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

## Former EPA Licensed Activities

Former EPA licensed activities that exist within the dataset buffer:

Licence No	Organisation	Premise Address	Suburb	Activities	Loc Conf	Dist (m)	Direction
N/A	No records in buffer						

Former Licensed Activity Data Custodian: State Government Victoria - Environmental Protection Authority (EPA)

## EPA Works Approvals

EPA works approvals that exist within the dataset buffer:

Transaction No	Status	Approval No	Organisation	Premise Address	Suburb	Scheduled Categories	Loc Conf	Dist (m)	Direction
N/A	No records in buffer								

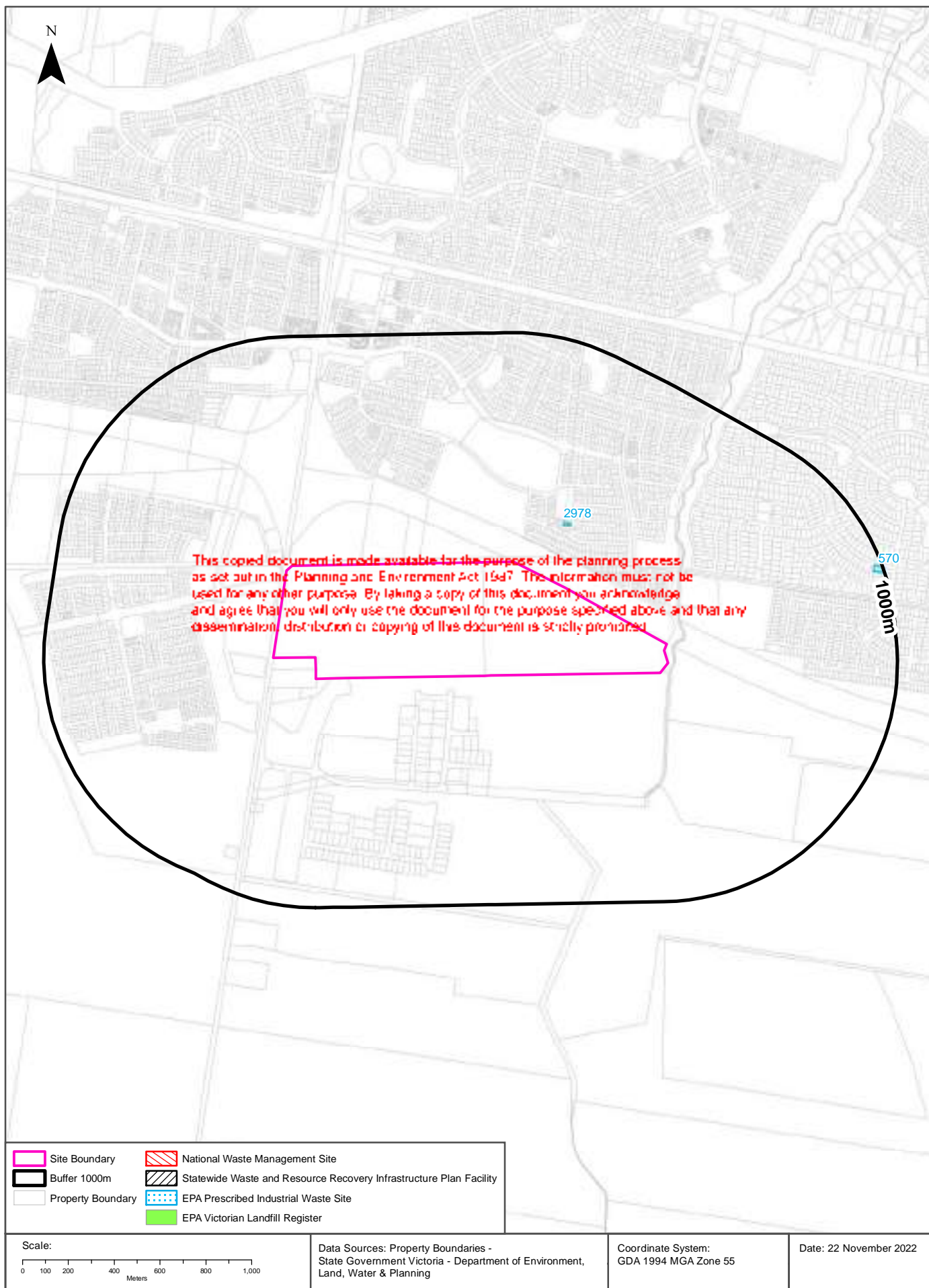
Works Approvals Data Custodian: State Government Victoria - Environment Protection Authority (EPA)

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# Waste Management Facilities and Landfills

92 & 26A Enterprise Road, Pakenham, VIC 3810



## Waste Management Facilities & Landfills

92 & 26A Enterprise Road, Pakenham, VIC 3810

### National Waste Management Site Database

Sites on the National Waste Management Site Database within the dataset buffer:

Site Id	Owner	Name	Address	Suburb	Class	Landfill	Reprocess	Transfer	Comments	Loc Conf	Dist (m)	Direction
N/A	No records in buffer											

Waste Management Facilities Data Source: Australian Government Geoscience Australia  
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### Statewide Waste and Resource Recovery Infrastructure Plan Facilities

Statewide Waste and Resource Recovery Infrastructure Plan Facilities within the dataset buffer:

Map Id	Owner	Site Name	Address	Suburb	Category	Sub Category	Loc Conf	Distance	Direction
N/A	No records in buffer								

SWRRIPF Data Source: State Government Victoria - Department of Sustainability

### EPA Prescribed Industrial Waste

EPA Prescribed Industrial Waste treaters, disposers and permitted transporters within the dataset buffer:

Map Id	Company Name	Address	Suburb	Treatment /Disposal	Transport	Accredited Agent	EPA List Status	Loc Conf	Dist (m)	Dir
2978	S & S SERVICES GROUP PTY LTD	36 CURRAWONG CR	PAKENHAM VIC 3810	No	Yes	No	Current EPA List	Premise Match	240m	North East
570	SOUTHERN CROSS ENVIRONMENTAL SERVICES VICTORIA PTY LTD	1 RIDDELL GR	PAKENHAM VIC 3810	No	Yes	No	Previous EPA List	Premise Match	951m	East

Prescribed Industrial Waste Data Source: State Government Victoria - Environment Protection Authority (EPA)

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# Waste Management Facilities & Landfills

92 & 26A Enterprise Road, Pakenham, VIC 3810

## EPA Victorian Landfill Register

EPA Victorian Landfill Register sites within the dataset buffer:

Landfill Register No.	Site	Address	Operating Status	Est. Year Of Closure	Waste type	Loc Conf	Dist (m)	Direction
N/A	No records in buffer							

EPA Victorian Landfill Register Data Source: State Government Victoria - Environment Protection Authority (EPA)

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# Former Gasworks and Liquid Fuel Facilities

92 & 26A Enterprise Road, Pakenham, VIC 3810

## Former Gasworks

Former Gasworks identified from various historical sources within the dataset buffer:

Note - As this is a dataset collated from various historical sources, it is not an exhaustive list of all former Gasworks

Map Id	Site Name	Date Opened	Year Closed	Location Confidence	Distance	Direction
N/A	No records in buffer					

Former Gasworks Data Source: Collated from various historical sources

## National Liquid Fuel Facilities

National Liquid Fuel Facilities within the dataset buffer:

Map Id	Owner	Name	Address	Suburb	Class	Operational Status	Operator	Revision Date	Loc Conf	Dist (m)	Direction
N/A	No records in buffer										

National Liquid Fuel Facilities Data Source: Geoscience Australia

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# Historical Business Directories

92 & 26A Enterprise Road, Pakenham, VIC 3810

## Business Directory Records 1905-1991 Premise or Road Intersection Matches

Universal Business Directory and Sands & McDougall Directory records, from years 1991, 1984, 1980, 1970, 1960, 1950, 1945, 1925 & 1905, mapped to a premise or road intersection within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
N/A	No records in buffer						

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## Business Directory Records 1905-1991 Road or Area Matches

Universal Business Directory and Sands & McDougall Directory records, from years 1991, 1984, 1980, 1970, 1960, 1950, 1945, 1925 & 1905, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer					

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# Historical Business Directories

92 & 26A Enterprise Road, Pakenham, VIC 3810

## Dry Cleaners, Motor Garages & Service Stations Premise or Road Intersection Matches

Dry Cleaners, Motor Garages & Service Stations from Sands & McDougall's Directories and UBD Business Directories, mapped to a premise or road intersection within the dataset buffer.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
N/A	No records in buffer						

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## Dry Cleaners, Motor Garages & Service Stations Road or Area Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories and Sands & McDougall's Directories, mapped to a road or an area within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.



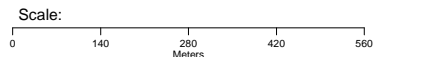
Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer					

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<p><b>Legend</b></p> <p> Site Boundary</p> <p> Buffer 150m</p>				
<p>Scale:</p> 	<p>Data Source Aerial Imagery: © Aerometrex Pty Ltd</p>	<p>Coordinate System: GDA 1994 MGA Zone 55</p>	<p>Date: 22 November 2022</p>	



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**Legend**

- Site Boundary
- Buffer 150m

Scale: 0 140 280 420 560 Meters	Data Source Aerial Imagery: © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 55	Date: 22 November 2022
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## Aerial Imagery 2015

92 & 26A Enterprise Road, Pakenham, VIC 3810





## Aerial Imagery 2010

92 & 26A Enterprise Road, Pakenham, VIC 3810







# Aerial Imagery 2004

92 & 26A Enterprise Road, Pakenham, VIC 3810

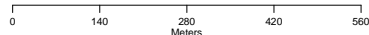


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### Legend

-  Site Boundary
-  Buffer 150m

Scale:



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Coordinate System:  
GDA 1994 MGA Zone 55

Date: 23 November 2022



## Aerial Imagery 2002

92 & 26A Enterprise Road, Pakenham, VIC 3810

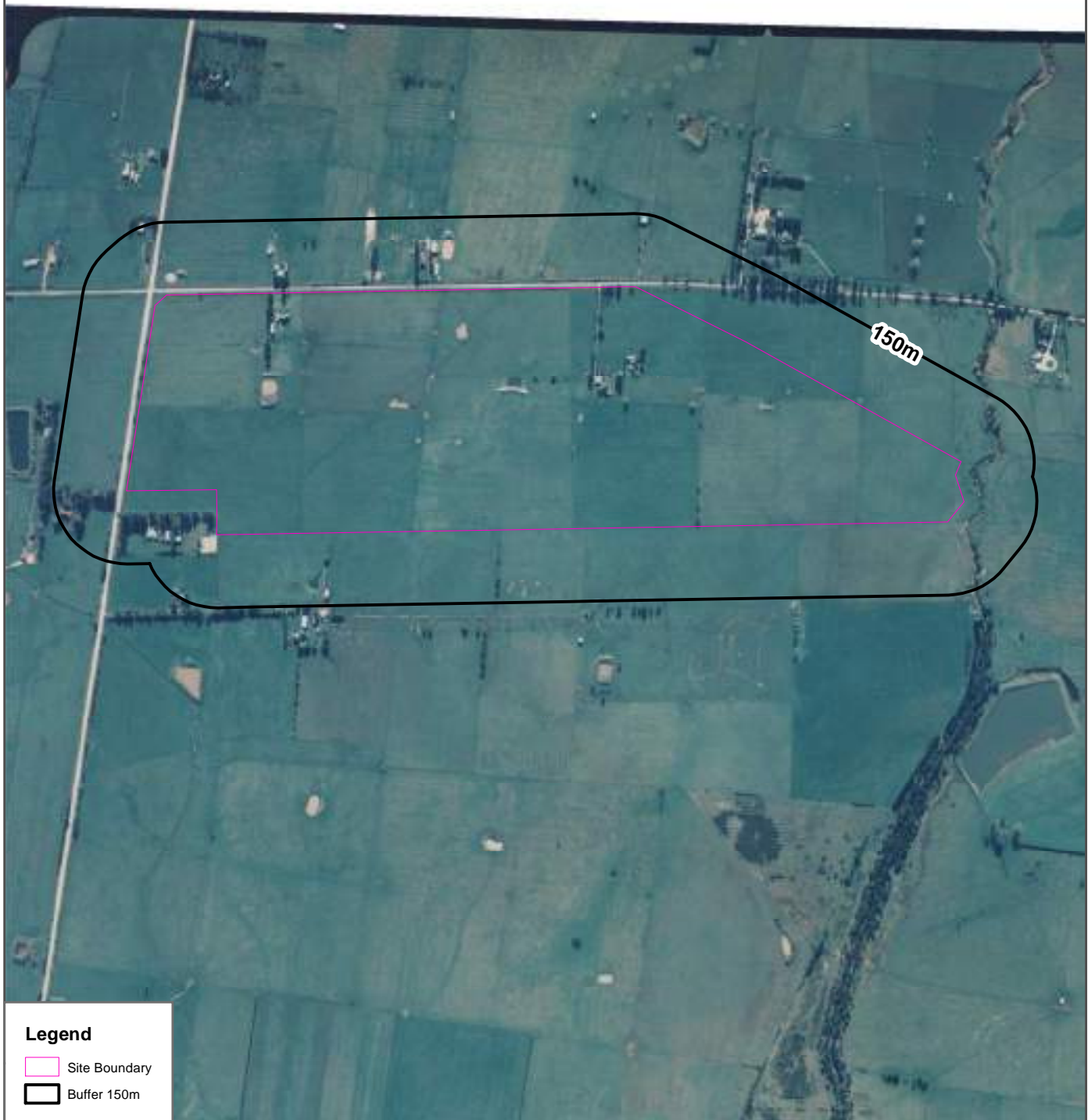


# Aerial Imagery 1991



92 & 26A Enterprise Road, Pakenham, VIC 3810



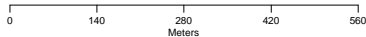
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## Legend

-  Site Boundary
-  Buffer 150m

Scale:



Data Source Aerial Imagery:  
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(Vicmap Topographic Mapping Program)

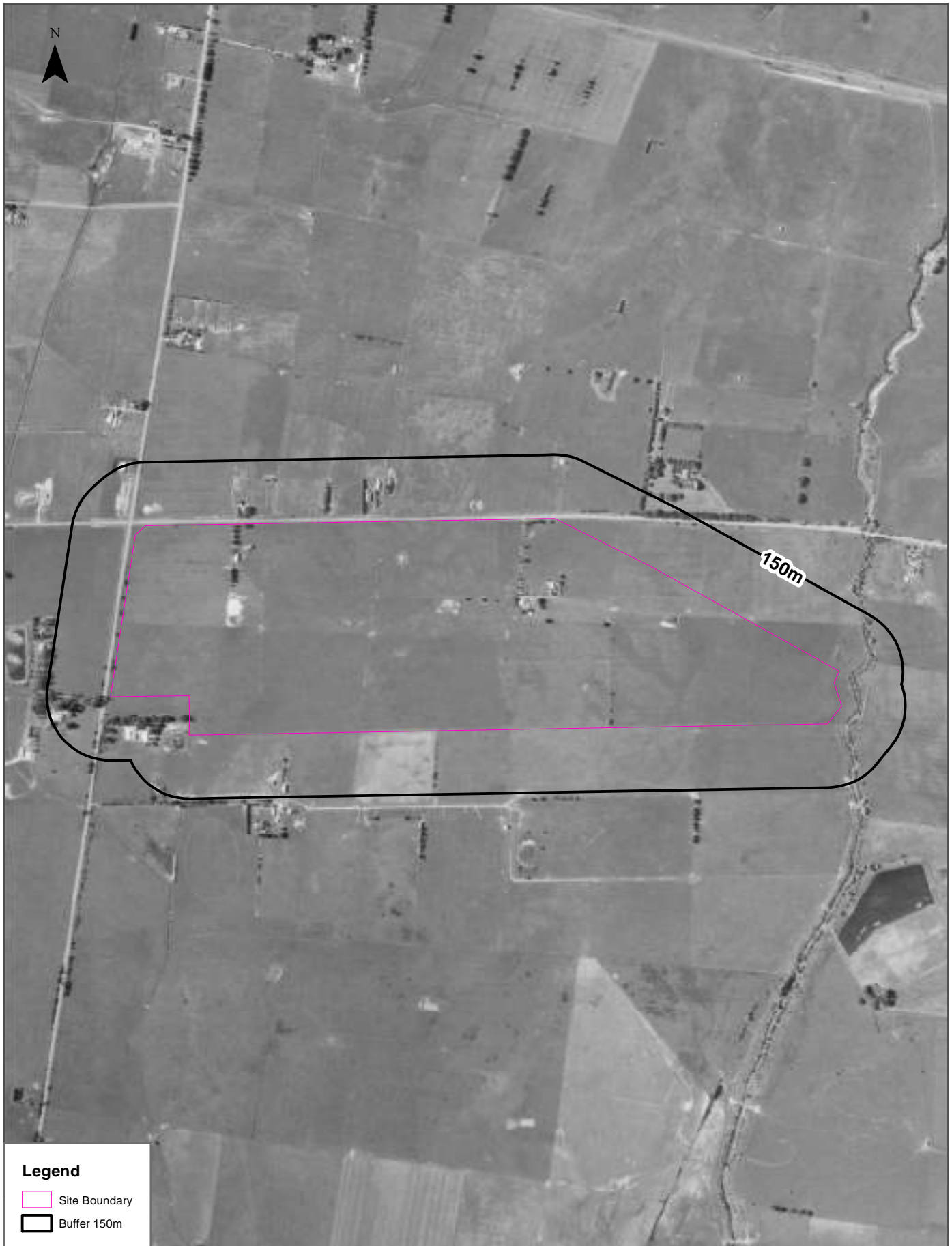
Coordinate System:  
GDA 1994 MGA Zone 55

Date: 22 November 2022



# Aerial Imagery 1985

92 & 26A Enterprise Road, Pakenham, VIC 3810





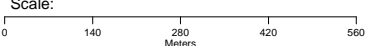
<b>Scale:</b> 0 140 280 420 560 Meters	Data Source Aerial Imagery: © Department of Environment, Land, Water and Planning (Vicmap Topographic Mapping Program)	Coordinate System: GDA 1994 MGA Zone 55	Date: 22 November 2022
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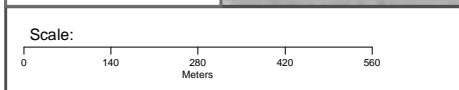
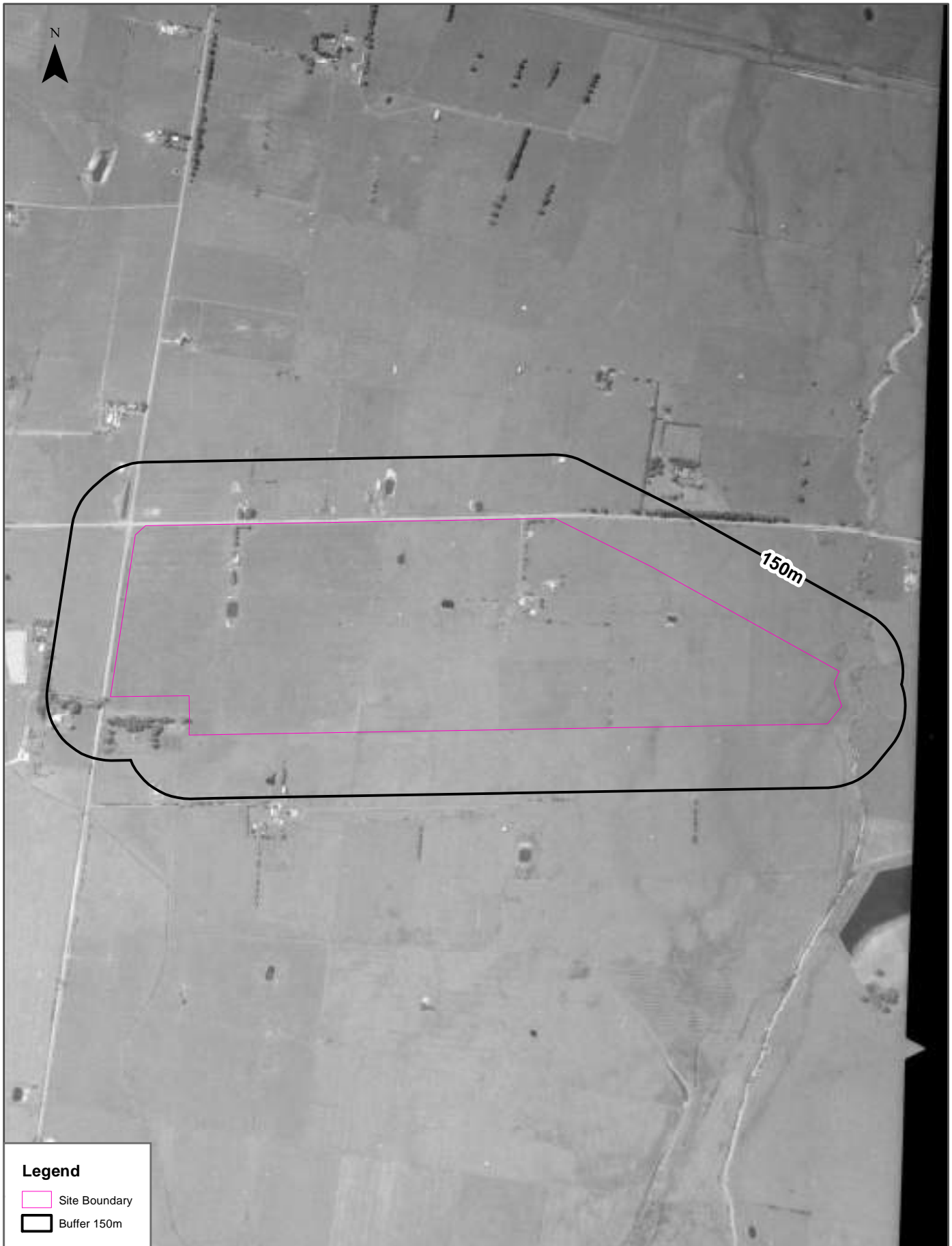
**Legend**

-  Site Boundary
-  Buffer 150m

<p>Scale:</p> 	<p>Data Source Aerial Imagery: © Department of Environment, Land, Water and Planning (Vicmap Topographic Mapping Program) and Photomapping Services</p>	<p>Coordinate System: GDA 1994 MGA Zone 55</p>	<p>Date: 22 November 2022</p>
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# Aerial Imagery 1974

92 & 26A Enterprise Road, Pakenham, VIC 3810



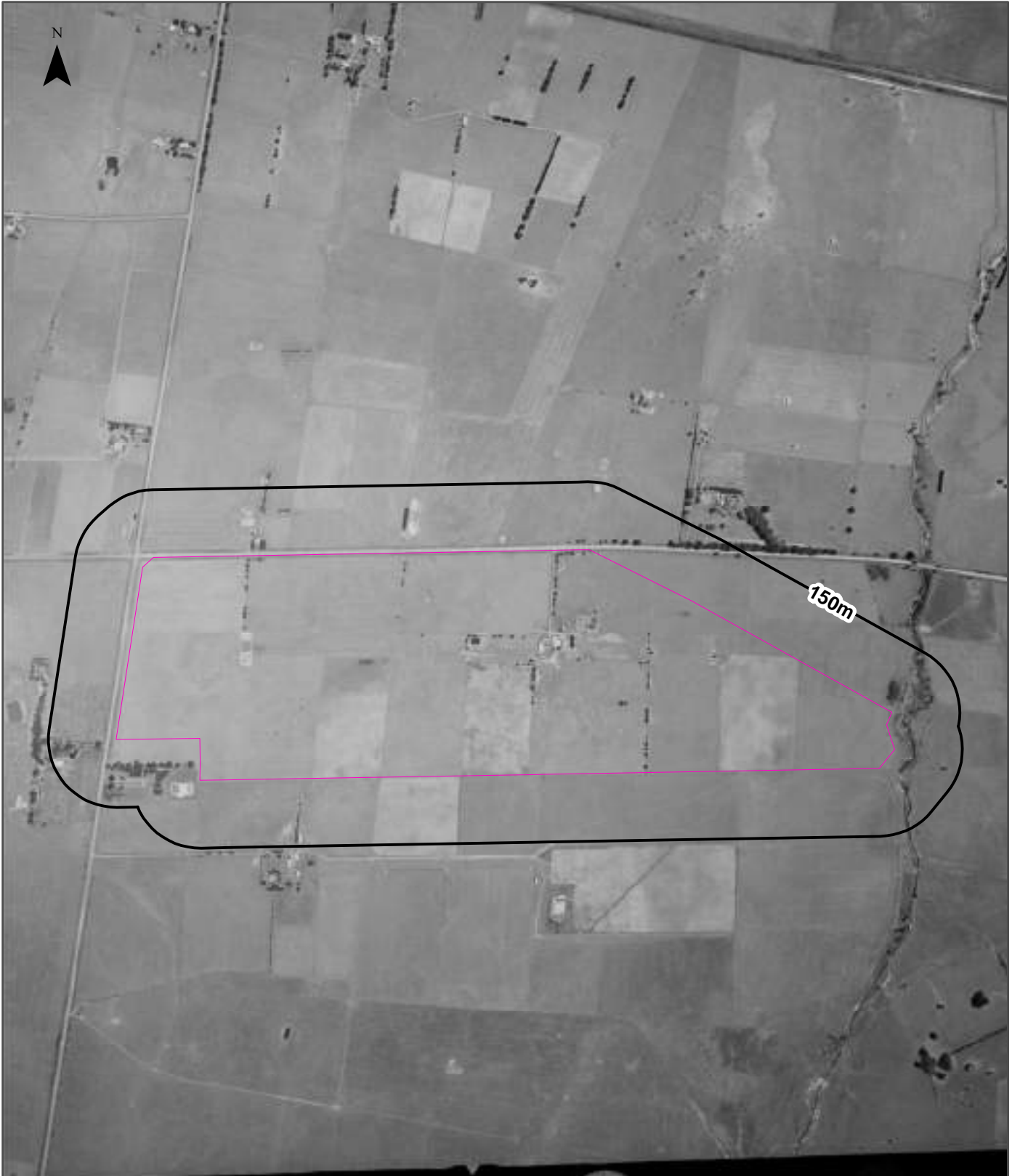
Data Source Aerial Imagery:  
© Department of Environment, Land, Water and Planning  
(Vicmap Topographic Mapping Program)

Coordinate System:  
GDA 1994 MGA Zone 55

Date: 22 November 2022

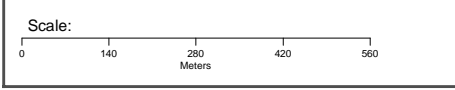
# Aerial Imagery 1968

92 & 26A Enterprise Road, Pakenham, VIC 3810



**Legend**

- Site Boundary
- Buffer 150m



Data Source Aerial Imagery:  
© Department of Environment, Land, Water and Planning  
(Vicmap Topographic Mapping Program)

Coordinate System:  
GDA 1994 MGA Zone 55

Date: 22 November 2022


# Aerial Imagery 1939

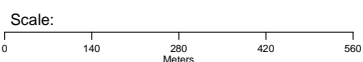
92 & 26A Enterprise Road, Pakenham, VIC 3810



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### Legend

-  Site Boundary
-  Buffer 150m



Data Source Aerial Imagery: © 2022 Geoscience Australia

Coordinate System:  
GDA 1994 MGA Zone 55

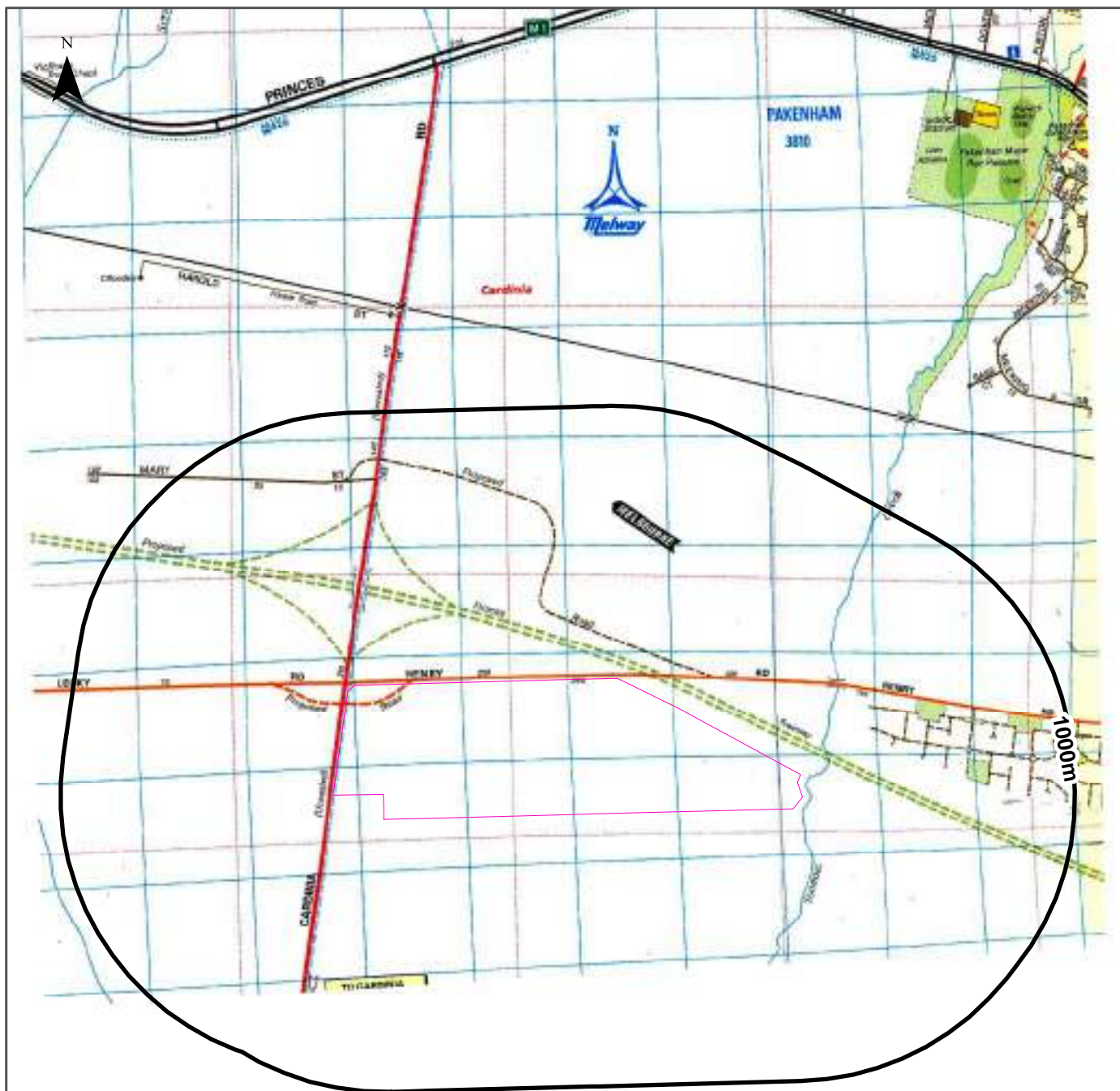
Date: 23 November 2022





# Historical Map 1998

92 & 26A Enterprise Road, Pakenham, VIC 3810



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**Legend**

- Site Boundary
- Buffer 1000m

**Scale:**

0 260 520 780 1,040  
Meters

Data Sources: Maps reproduced from 1998, Edition 25 of the Melway Street Directory

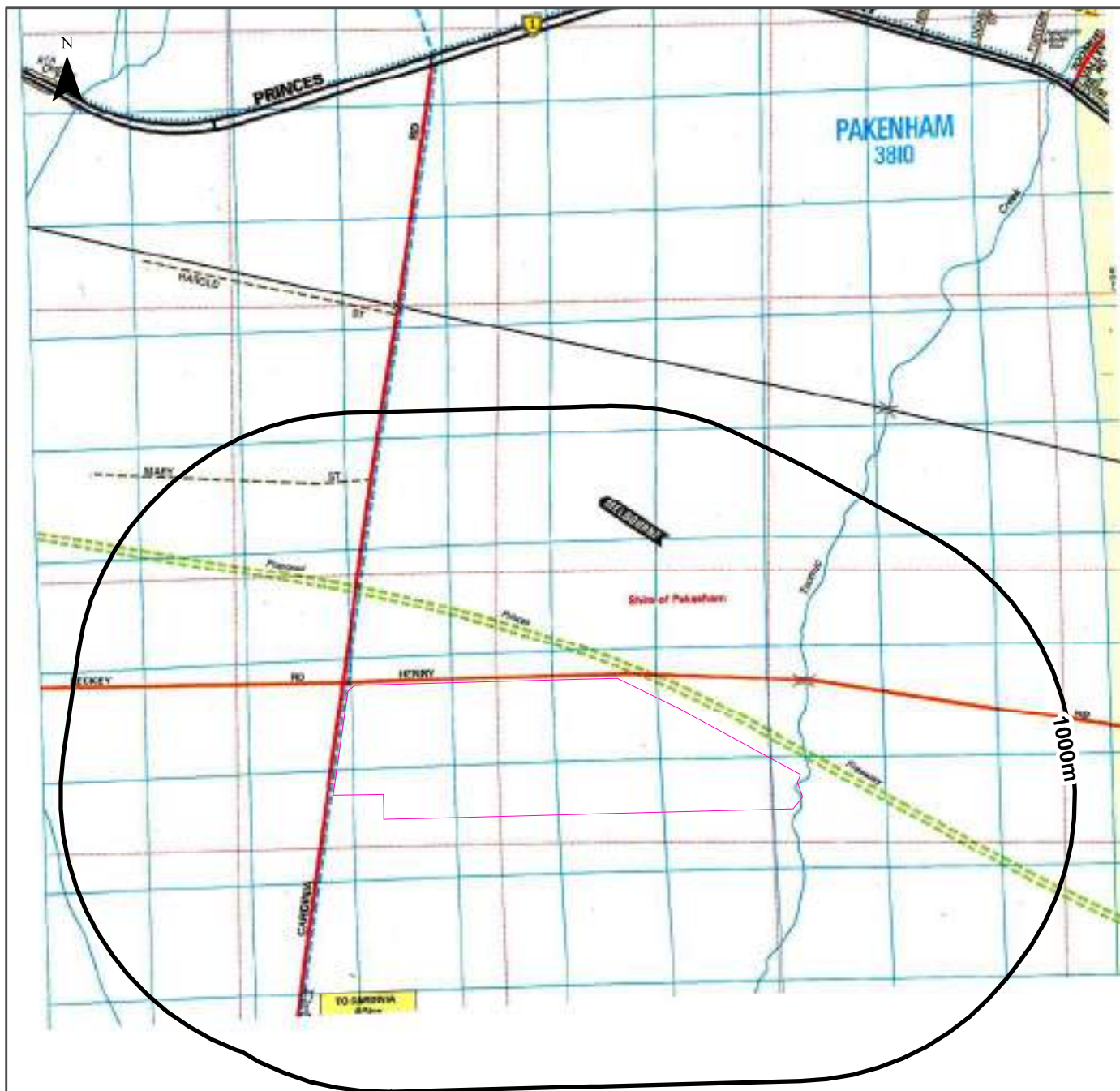
Coordinate System:  
GDA 1994 MGA Zone 55

Date: 22 November 2022





# Historical Map 1986

92 & 26A Enterprise Road, Pakenham, VIC 3810

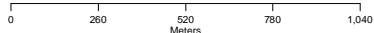


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## Legend

-  Site Boundary
-  Buffer 1000m

## Scale:



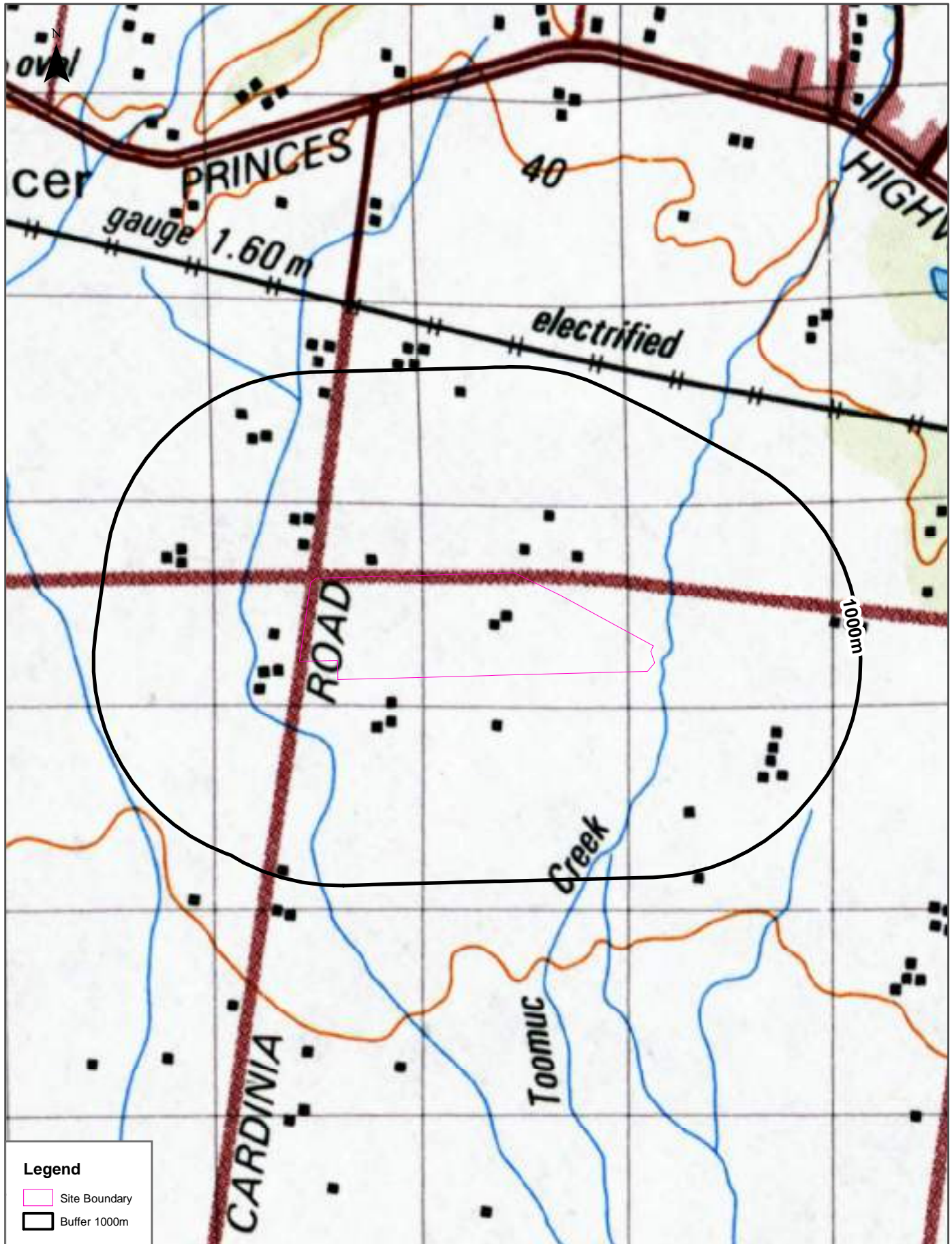
Data Sources: Maps reproduced from 1986, Edition 16 of the Melway Street Directory

Coordinate System: GDA 1994 MGA Zone 55

Date: 22 November 2022

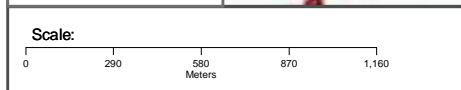
# Historical Map 1979

92 & 26A Enterprise Road, Pakenham, VIC 3810



**Legend**

- Site Boundary
- Buffer 1000m



Data Sources: NATMAP 1:100,000 Topographic Maps  
Geoscience Australia

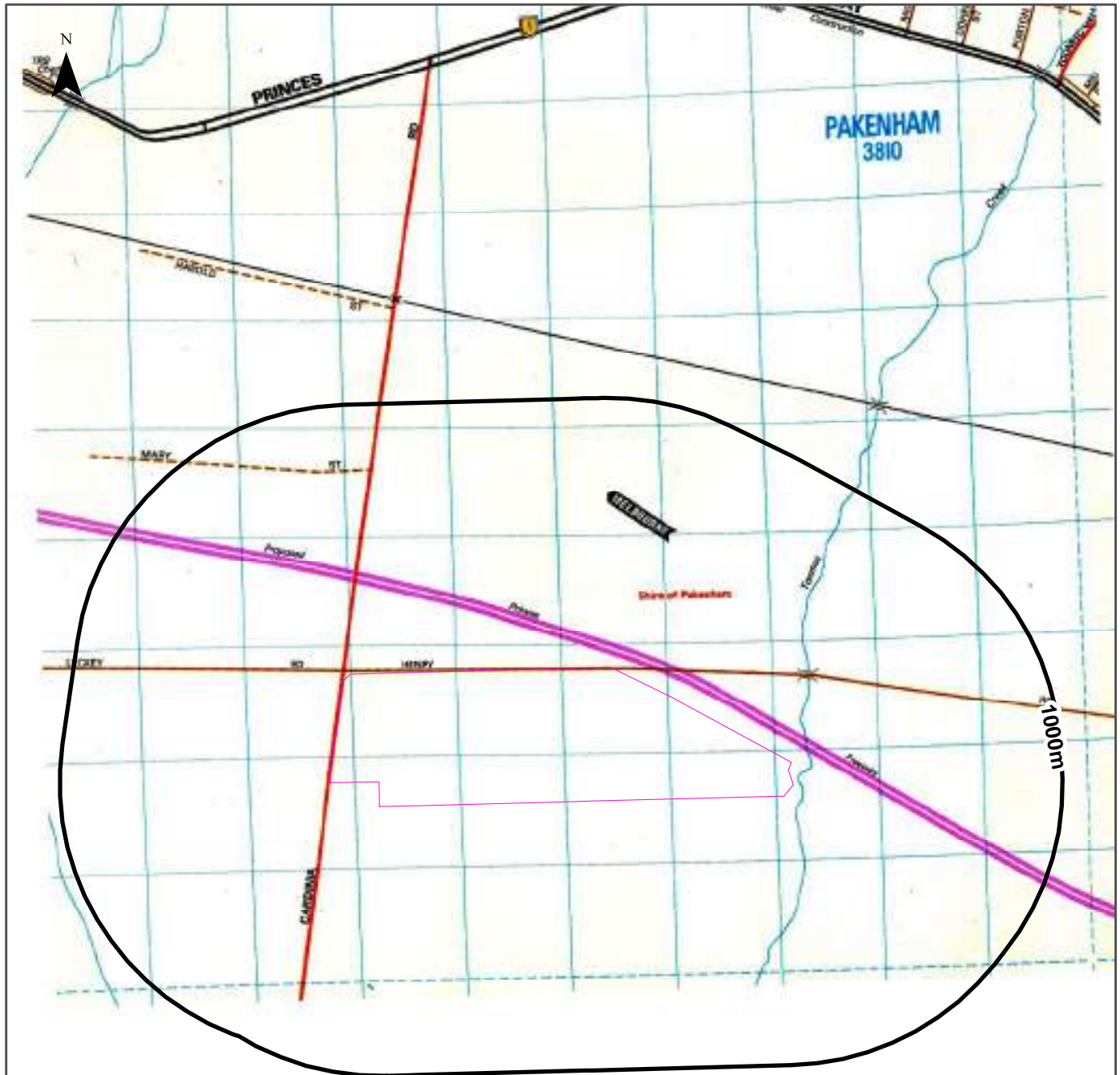
Coordinate System:  
GDA 1994 MGA Zone 55

Date: 22 November 2022




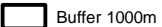
# Historical Map 1978

92 & 26A Enterprise Road, Pakenham, VIC 3810

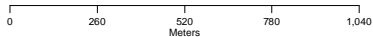


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## Legend

-  Site Boundary
-  Buffer 1000m

## Scale:



Data Sources: Maps reproduced from 1978, Edition 11 of the Melway Street Directory

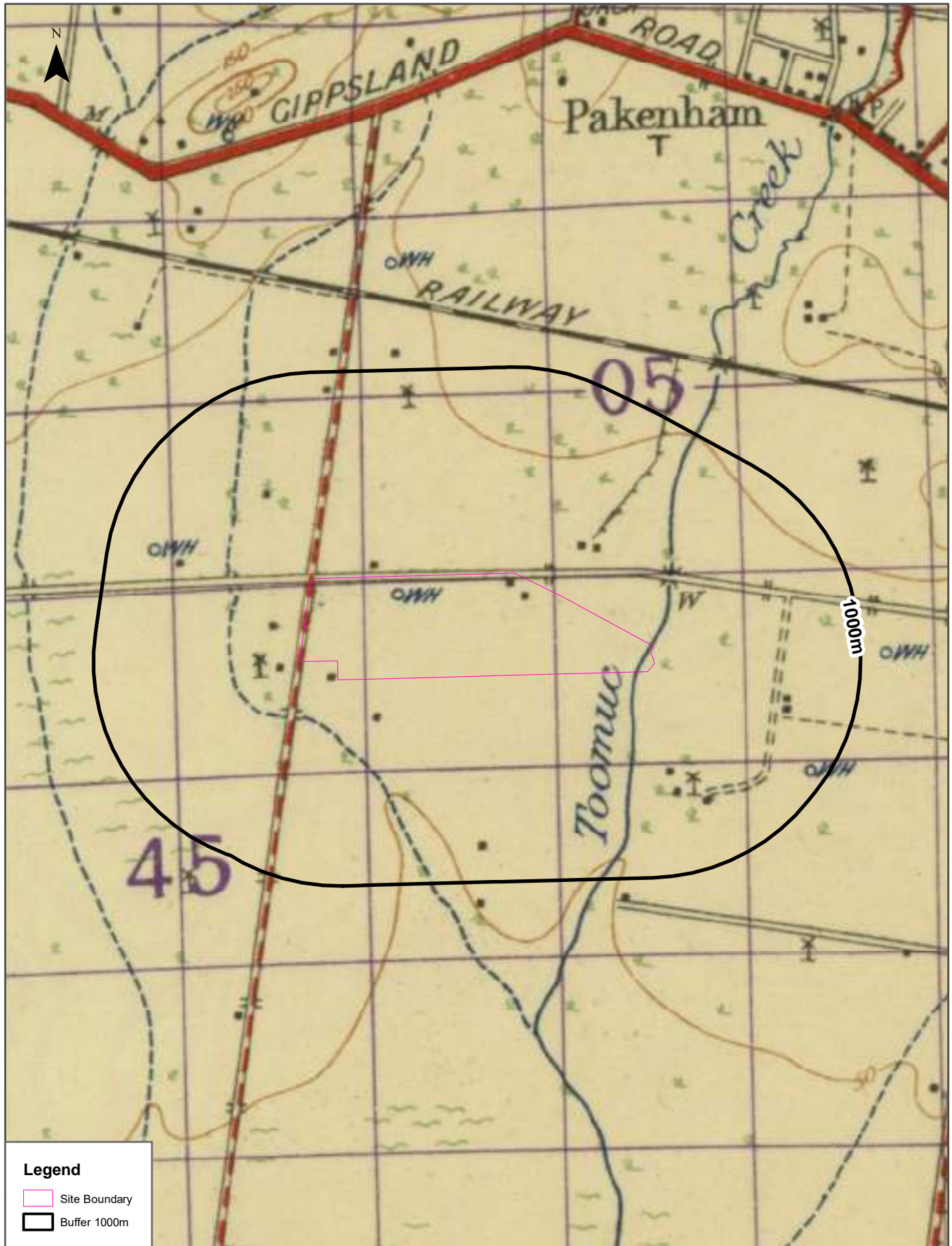
Coordinate System: GDA 1994 MGA Zone 55

Date: 22 November 2022



# Historical Map 1938

92 & 26A Enterprise Road, Pakenham, VIC 3810



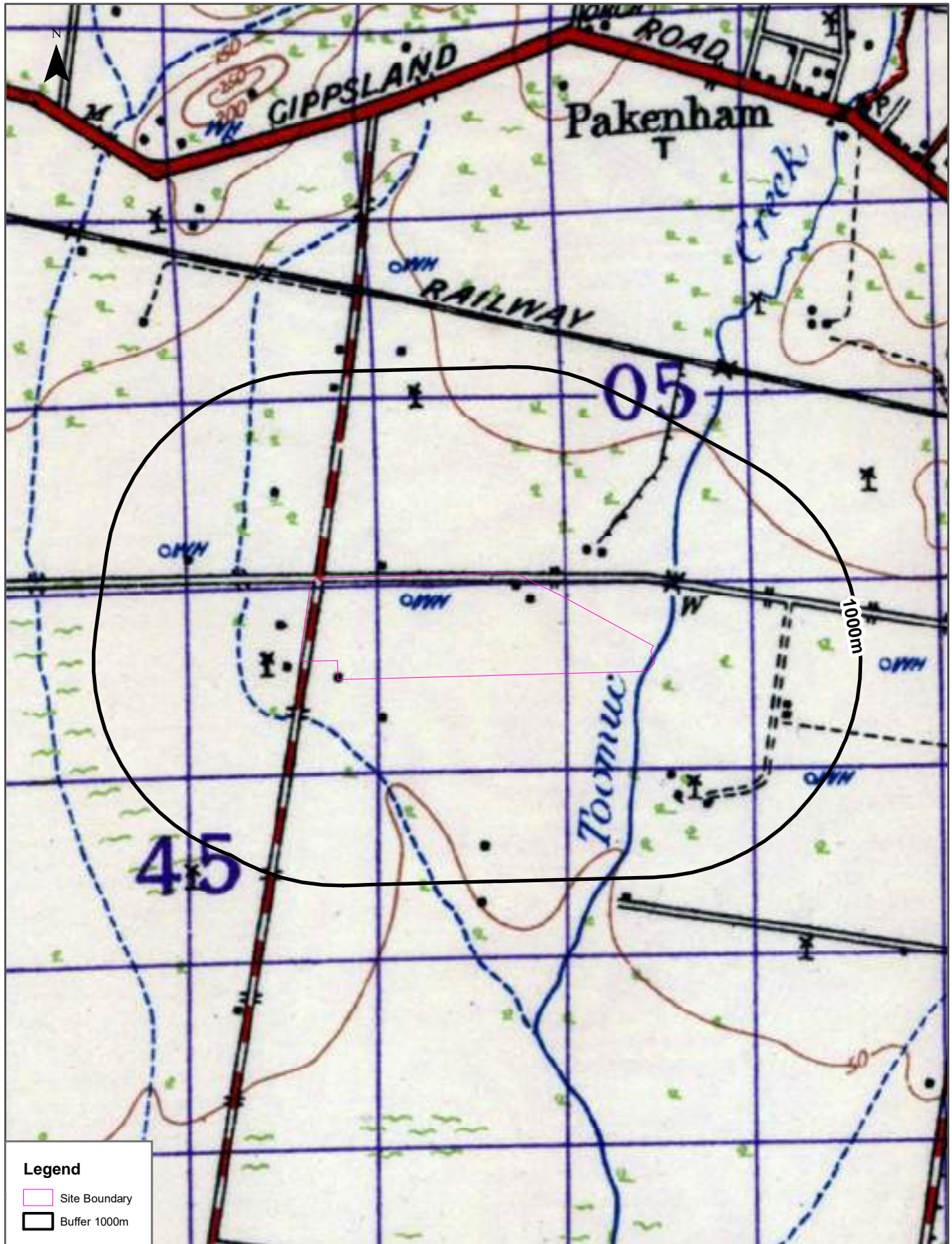
<b>Scale:</b> 0 290 580 870 1,160 Meters	Data Sources: Australia 1:63360 Prepared by Commonwealth Section Imperial General Staff	Coordinate System: GDA 1994 MGA Zone 55	Date: 22 November 2022
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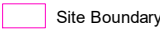

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# Historical Map 1924

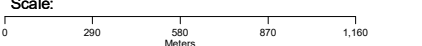
92 & 26A Enterprise Road, Pakenham, VIC 3810



**Legend**

-  Site Boundary
-  Buffer 1000m

**Scale:**



0 290 580 870 1,160  
Meters

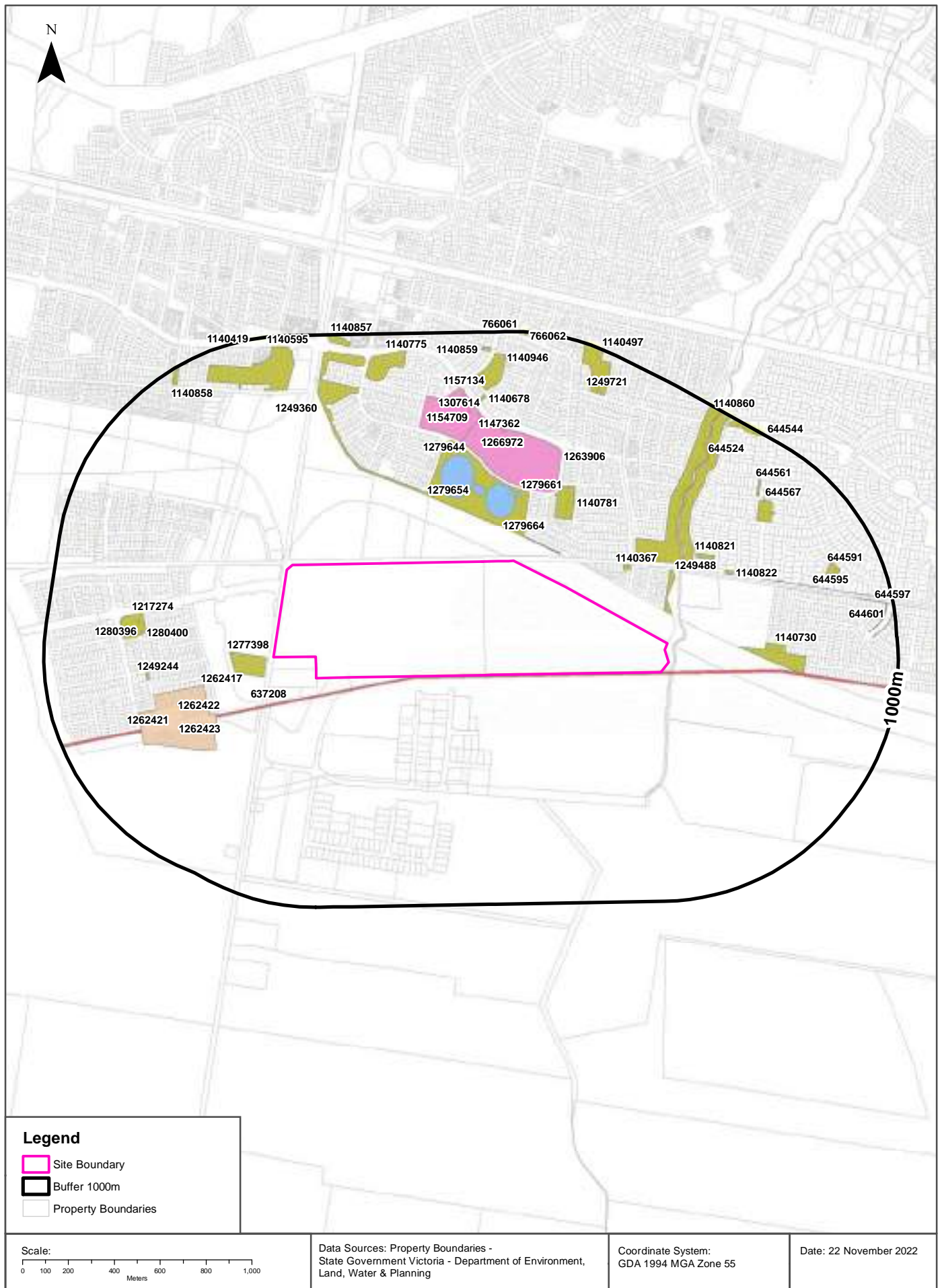
Data Sources: Australia 1:63360  
Prepared by Commonwealth Section Imperial General Staff

Coordinate System:  
GDA 1994 MGA Zone 55

Date: 22 November 2022

# Features of Interest

92 & 26A Enterprise Road, Pakenham, VIC 3810





## Features of Interest

92 & 26A Enterprise Road, Pakenham, VIC 3810

### Features of Interest

Features of Interest within the dataset buffer:

Feature Id	Feature Type	Feature Sub Type	Name	Distance	Direction
637208	pipeline	gas pipeline	Morwell - Dandenong	0m	South East
1277398	reserve	park		31m	West
1249360	reserve	park		110m	North
1249488	reserve	park		118m	East
1140367	reserve	park		185m	East
1279664	sport facility	sports ground		189m	North
1140781	reserve	park		249m	North East
644524	reserve	park		251m	North East
1279661	sport facility	basketball court		275m	North East
1279644	sport facility	sports ground		280m	North
1279654	sport facility	netball court		284m	North
1140730	reserve	park		300m	East
1140860	reserve	park		318m	North East
1263906	education centre	education complex		324m	North
1262417	residential building	retirement village	Lifestyle Kaduna Park	329m	West
1140821	reserve	park		386m	East
1140822	reserve	park		392m	East
1262422	sport facility	bowling green		482m	West
1262423	sport facility	croquet green		490m	West
644595	reserve	park		494m	East
1262421	sport facility	tennis court		503m	West
1157134	education centre	education complex		519m	North
1249244	reserve	park		550m	West
1266972	education centre	secondary school	Edenbrook Secondary College	558m	North
1217274	reserve	park		565m	West
1280400	recreational resource	picnic site		578m	West
1280396	recreational resource	playground		602m	West
1147362	education centre	primary school	John Henry Primary School	639m	North
1307614	care facility	child care	Ymca John Henry Primary School Oshc	649m	North
644567	reserve	park		662m	East
1154709	care facility	child care	Pakenham Ymca Early Learning Centre	666m	North

Feature Id	Feature Type	Feature Sub Type	Name	Distance	Direction
1140678	reserve	park		698m	North
1000562	care facility	child care	Henry Family Childrens Centre	723m	North
1140946	reserve	park		744m	North
644561	reserve	park		748m	North East
644591	reserve	park		749m	East
1140595	reserve	park		763m	North West
1140775	reserve	park		795m	North
1140497	reserve	park	Cockatoo Road Reserve	810m	North East
1249721	recreational resource	playground		823m	North East
644597	reserve	park		847m	East
644601	reserve	park		891m	East
1140859	reserve	park		915m	North
1140858	reserve	park		935m	North West
1140857	reserve	park		945m	North
644544	reserve	park	Long Paddock Park	951m	North East
766061	reserve	park		981m	North
766062	reserve	park		981m	North
1140419	reserve	park		983m	North West

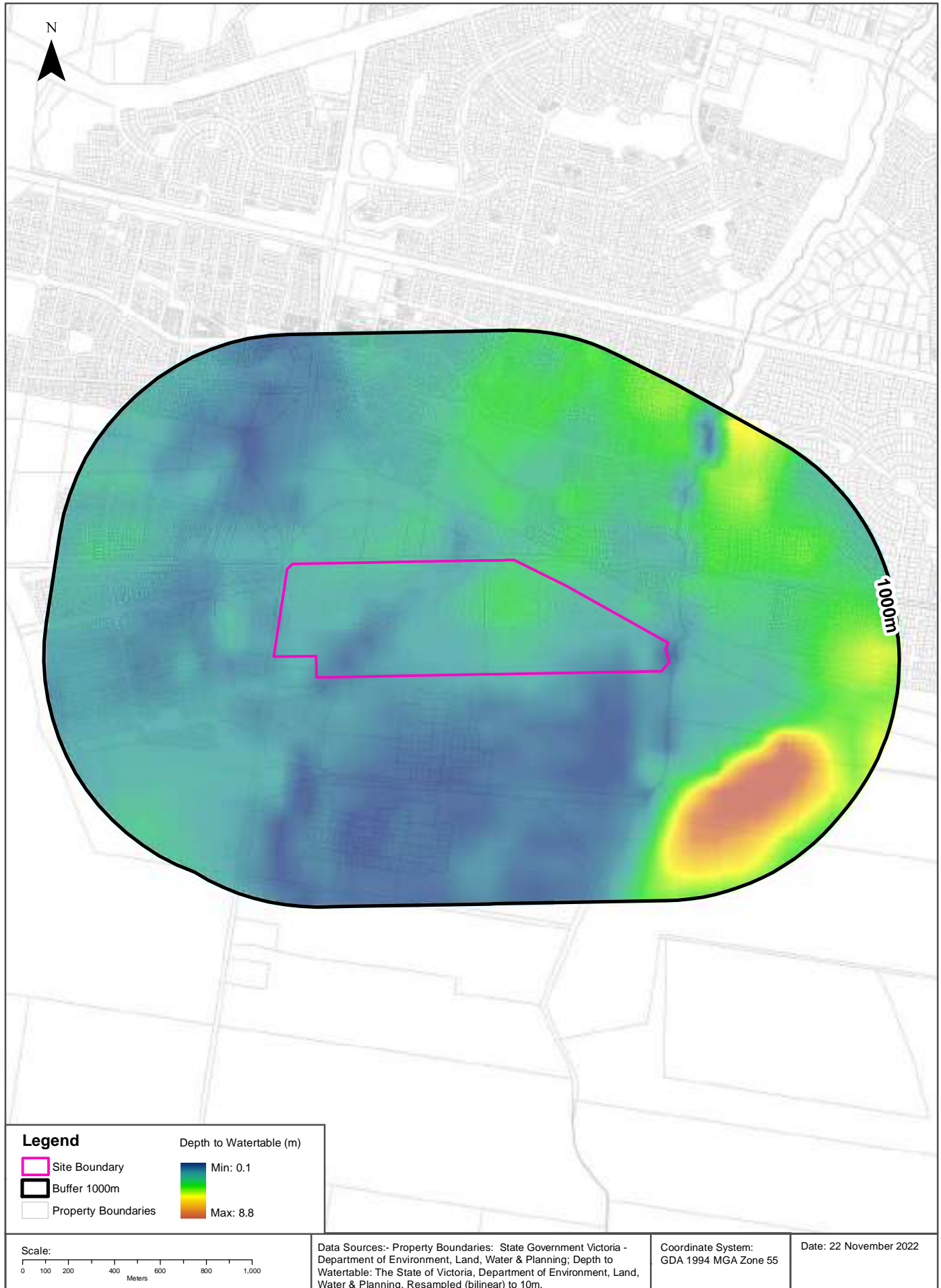
Features of Interest Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning  
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# Depth to Watertable

92 & 26A Enterprise Road, Pakenham, VIC 3810



# Hydrogeology & Groundwater

92 & 26A Enterprise Road, Pakenham, VIC 3810

## Hydrogeology

Description of aquifers within the dataset buffer:

Description	Distance	Direction
Porous, extensive aquifers of low to moderate productivity	0m	On-site

Hydrogeology Map of Australia: Commonwealth of Australia (Geoscience Australia)

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## Groundwater Salinity

On-site Groundwater Salinity:

Groundwater Salinity	Percent Of Site Area
3,500 - 7,000 mg/l	100

## Depth to Watertable

On-site Depth to Watertable:

Depth to Watertable	Percent Of Site Area
Less than 5 metres	100

## Surface Elevation

Approximate on-site Surface Elevation:

Surface Elevation
20 AHDm to 25 AHDm

## Basement Elevation

Approximate on-site Basement Elevation:

Basement Elevation - Basement Rocks comprise Lower Palaeozoic basement rocks that form the highlands and the crystalline basement; and Mesozoic rocks of the Otway and Gippsland basins both outcropping and subsurface
-10 AHDm to 0 AHDm

Groundwater Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning

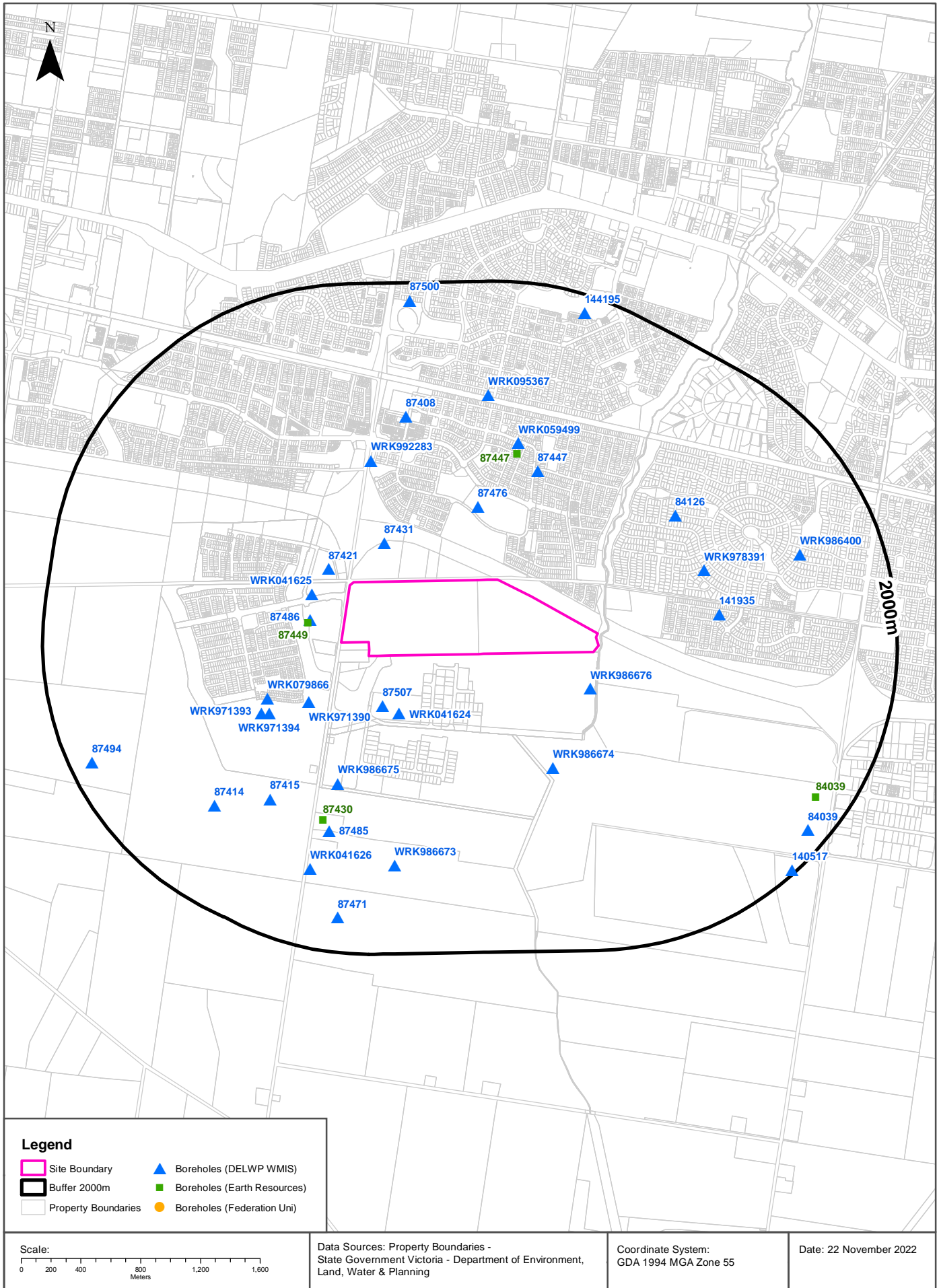
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# Groundwater Boreholes

92 & 26A Enterprise Road, Pakenham, VIC 3810



# Groundwater Boreholes

92 & 26A Enterprise Road, Pakenham, VIC 3810

## Boreholes (DELWP WMIS)

Boreholes from the Department of Environment, Land, Water & Planning's Water Measurement Information System, within the dataset buffer:

Bore Id	Use Type	Drillers Log	Construction	Latest Water Levels	Geology	Completed Date	Dist (m)	Dir
87421	Domestic, Dairy, Stock	0.00m-0.30m TOPSOIL 0.30m-20.72m CLAY	0.00m-20.72m INNER LINING - CASING = Not Known 16.76m-20.72m INNER LINING - SCREEN = Not Known		16.76m-20.72m	09/12/1972	180m	West
87486	Stock					01/01/1988	229m	West
WRK041625	Dairy						243m	West
WRK986676							247m	South East
87431	Domestic, Stock	0.00m-1.00m TOPSOIL 1.00m-32.40m CLAY	0.00m-32.40m INNER LINING - CASING = Pvc 30.00m-32.40m INNER LINING - SCREEN = Pvc		30.00m-32.40m	09/06/1976	260m	North West
87507	Stock					01/01/1988	335m	South West
WRK041624	Domestic, Dairy, Stock	0.00m-0.30m TOPSOIL 30.48m-35.05m CLAY 35.05m-40.20m SANDSTONE	0.00m-37.03m INNER LINING - CASING = Not Known 39.62m-41.45m INNER LINING - SCREEN = Not Known		39.62m-41.45m	07/12/1972	391m	South West
WRK971390	Domestic & Stock	0.00m-0.50m SILTY SAND CLAY 0.50m-5.00m SILTY CLAY	0.00m-4.50m INNER LINING - CASING = Pvc 4.50m-7.50m INNER LINING - SCREEN = Pvc 0.00m-7.50m OUTER LINING - GRAVEL = Gravel			12/10/2005	456m	South West
87476	Stock					01/01/1988	492m	North
WRK079866	Observation	0.00m-1.00m SILT 1.00m-12.00m CLAY	0.00m-6.00m INNER LINING - CASING = Pvc 6.00m-12.00m INNER LINING - SCREEN = Pvc 0.00m-4.50m OUTER LINING - GRAVEL = Cement 4.50m-5.50m OUTER LINING - GRAVEL = Bentonite 5.50m-12.00m OUTER LINING - GRAVEL = Gravel		6.00m-12.00m Clay	21/05/2014	619m	West
WRK971394	Domestic & Stock	0.00m-0.40m SILTY SANDY CLAY 0.40m-3.00m SILTY CLAY BR OR 3.00m-7.00m SANDY SILTY CLAY	0.00m-4.00m INNER LINING - CASING = Pvc 4.00m-7.00m INNER LINING - SCREEN = Pvc 0.00m-0.40m OUTER LINING - GRAVEL = Cement 3.00m-3.80m OUTER LINING - GRAVEL = Bentonite 3.80m-7.00m OUTER LINING - GRAVEL = Seal			12/10/2005	677m	South West
WRK971393	Domestic & Stock	0.00m-500.00m SILTY SANDY CL	0.00m-4.00m INNER LINING - CASING = Pvc 4.00m-7.00m INNER LINING - SCREEN = Pvc 0.00m-0.40m OUTER LINING - GRAVEL = Cement 3.00m-3.80m OUTER LINING - GRAVEL = Bentonite 3.80m-7.00m OUTER LINING - GRAVEL = Gravel			12/10/2005	714m	South West
WRK986674							771m	South East
87447	Domestic, Stock	0.00m-0.40m TOP SOIL 0.40m-11.00m TOUGH YELLOW CLAY 11.00m-13.00m YELLOW SANDY CLAY 13.00m-16.50m HARD GREY CLAY 16.50m-22.00m RED AND GREY CLAY	0.00m-16.00m INNER LINING - CASING = Pvc 16.00m-22.00m INNER LINING - SCREEN = Pvc		16.00m-22.00m Clay	24/12/1983	776m	North East
WRK992283							812m	North West

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Bore Id	Use Type	Drillers Log	Construction	Latest Water Levels	Geology	Completed Date	Dist (m)	Dir
141935	Domestic	0.00m-0.30m SURFACE SOIL 0.30m-33.00m CLAY 33.00m-80.00m SANDSTONE	-0.20m-33.00m INNER LINING - CASING = Pvc -0.20m-48.00m INNER LINING - CASING = Pvc 48.00m-54.00m INNER LINING - SCREEN = Pvc 0.00m-0.00m OUTER LINING - GRAVEL = Seal		48.00m-54.00m Sandstone	26/04/1999	823m	East
WRK978391							829m	East
WRK986675							881m	South West
WRK059499	Observation					01/11/2010	925m	North
84126	Stock					01/01/1988	945m	North East
87408	Domestic, Stock					01/01/1970	1102 m	North
87415	Stock		0.00m-18.29m INNER LINING - CASING = Not Known 14.94m-18.29m INNER LINING - SCREEN = Not Known			01/04/1971	1154 m	South West
87485	Domestic, Stock					01/01/1988	1201 m	South West
WRK095367	Investigation	0.00m-0.80m FILL/SANDY GRAVEL 0.80m-8.90m CLAY/SANDY 8.90m-9.30m SAND/CLAY 9.30m-10.30m SAND	0.00m-3.70m INNER LINING - CASING = UPVC class 18 3.70m-9.70m INNER LINING - SCREEN = UPVC class 18 0.00m-0.30m OUTER LINING - GRAVEL = Cement 0.30m-3.00m OUTER LINING - GRAVEL = Bentonite 3.00m-9.70m OUTER LINING - GRAVEL = Gravel		3.70m-9.70m Clay	02/08/2016	1238 m	North
87414	Domestic, Stock	0.00m-0.30m GREY SANDY SOIL 0.30m-0.91m HARD SANDY CLAY 0.91m-2.74m YELLOW CLAY 2.74m-4.88m GREY SANDY CLAY 4.88m-6.71m GREY CLAYEY SAND 6.71m-10.06m GREY AND BROWN CLAY 10.06m-13.10m SAND LIKE SUGAR WHITE	0.00m-13.10m INNER LINING - CASESCRN = Not Known		0.00m-13.10m	31/03/1971	1383 m	South West
WRK986673							1405 m	South
WRK986400	Groundwater Investigation	0.00m-1.50m fill silty clay 1.50m-24.50m granitedorite	0.70m-18.50m INNER LINING - CASING = Pvc 18.50m-24.50m INNER LINING - SCREEN = Pvc 0.00m-16.50m OUTER LINING - GRAVEL = Cement 16.50m-17.50m OUTER LINING - GRAVEL = Bentonite 17.50m-24.50m OUTER LINING - GRAVEL = Gravel			04/02/2009	1454 m	East
WRK041626	Dairy, Irrigation, Stock	0.00m-0.30m TOP SOIL 0.30m-5.50m FIRM YELLOW SANDY CLAY 5.50m-6.00m SOFT WET SAND 6.00m-12.00m FIRM BROWN SANDY CLAY 12.00m-25.50m FIRM SANDY YELLOW CLAY 25.50m-27.00m SOFT CLAYEY SAND 27.00m-28.00m SOFT SANDY CLAY 28.00m-29.50m SOFT CLAYEY SAND 29.50m-34.50m SOFT SILURIAN CLAY 34.50m-45.00m MEDIUM HARD MUDSTONE 45.00m-53.00m MEDIUM HARD BLUE SHALE 53.00m-64.00m HARD SANDSTONE	0.00m-38.00m INNER LINING - CASING = Pvc 38.00m-39.00m INNER LINING - CASING = Steel			22/10/1976	1479 m	South West
87471	Stock					01/01/1988	1765 m	South
87494	Stock					01/01/1988	1852 m	West
84039	Domestic, Stock					31/12/1970	1869 m	South East

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Bore Id	Use Type	Drillers Log	Construction	Latest Water Levels	Geology	Completed Date	Dist (m)	Dir
144195	Miscellaneous	0.00m-0.30m TOP SOIL 0.30m-7.00m CLAY 7.00m-8.00m SANDY CLAY 8.00m-11.00m SILTY CLAY 11.00m-12.00m SAND LENSES & CLAY 12.00m-16.00m WEATHERED MUDSTONE 16.00m-42.00m FIRM MUDSTONE 42.00m-50.00m FRACTURED SANDSTONE 50.00m-60.00m SANDSTONE VERY FIRM 60.00m-75.00m FRACTURED SANDSTONE WITH QUARTZ 75.00m-91.00m VERT FIRM SANDSTONE	0.00m-18.00m INNER LINING - CASING = Pvc 1.00m-61.00m INNER LINING - CASING = Pvc Class 9 45.00m-50.00m INNER LINING - SCREEN = Pvc Class 9 61.00m-91.00m INNER LINING - CASING = Pvc Class 12 62.00m-75.00m INNER LINING - SCREEN = Pvc Class 12 0.00m-0.00m OUTER LINING - GRAVEL = Packer		45.00m-50.00m Sandstone 62.00m-75.00m Sandstone	12/12/2001	1881 m	North
87500	Domestic, Stock					01/01/1988	1882 m	North
140517	Domestic, Stock	0.00m-0.25m TOPSOIL 0.25m-2.00m GREY CLAY 2.00m-5.00m HARD ORANGE & GREY SAND CLAY 5.00m-9.00m HARD GREY SANDY CLAY 9.00m-25.00m HARD ORANGE & GREY SANDY CLAY 25.00m-29.00m GREY GRANITE CLAY 29.00m-31.00m ORANGE MEDIUM GRANITE SAND 31.00m-32.20m DECOMPOSED GRANITE	-0.40m-32.20m INNER LINING - CASING = Pvc 29.00m-31.00m INNER LINING - SCREEN = Pvc 0.00m-3.50m OUTER LINING - GRAVEL = Cement 3.50m-29.00m OUTER LINING - GRAVEL = Gravel		29.00m-31.00m Sand	17/03/2000	1977 m	South East

Boreholes WMIS Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning  
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## Groundwater Boreholes

92 & 26A Enterprise Road, Pakenham, VIC 3810

### Boreholes (Earth Resources Database)

Boreholes from the Earth Resources dataset, within the dataset buffer:

Bore Id	Bore Type	Company	Usage	Method	Status	Drill Date	Depth	Elevation	Accuracy (m)	Dist (m)	Dir
87449		Private Individual/Corporation	Stock/Poultry water supply	Percussion (cable)		02/08/1982	38.10		100	239m	West
87447		Private Individual/Corporation	Domestic & Stock water supply	Percussion (cable)		24/12/1983	22.00		100	849m	North
87430		Private Individual/Corporation	Irrigation	Air Percussion/Air Rotary		22/10/1976	64.01		100	1142 m	South West
84039		Private Individual/Corporation	Stock/Poultry water supply	Shaft/Well		31/12/1970	7.62		100	1776 m	South East

Boreholes Earth Resources Data Source: © The State of Victoria, Department of Economic Development, Jobs, Transport and Resources 2015. Creative Commons Attribution 3.0 Australia

### Boreholes (Federation University)

Boreholes from the Federation University Australia dataset, within the dataset buffer:

Bore Id	Authority	Type	Uses	Initial TD	Log	Dist (m)	Dir
N/A	No records in buffer						

Boreholes FedUni Data Source: © Federation University Australia

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## Historical Mining Activity - Shafts

92 & 26A Enterprise Road, Pakenham, VIC 3810

### Historical Mining Activity - Shafts

Mine Shaft Locations were collected by a variety of methods from 1869 in some areas of the state, mainly concentrating in Ballarat and Bendigo. In places a shaft may be recorded multiple times with a different source. In cases where several shaft locations are shown close together (generally with separations less than stated position errors) and they have different sources, it is possible that one shaft has been mapped several times. In cases where several shaft locations are shown close together but they have the same information source, it is possible that each shaft location represents a different shaft on the ground.

Historical Mine Shafts within the dataset buffer:

Map Id	Name	Source	Depth (m)	Collar (ft)	Fill/Cap Method	Location Desc	Location Accuracy	Distance	Direction
N/A	No records in buffer								

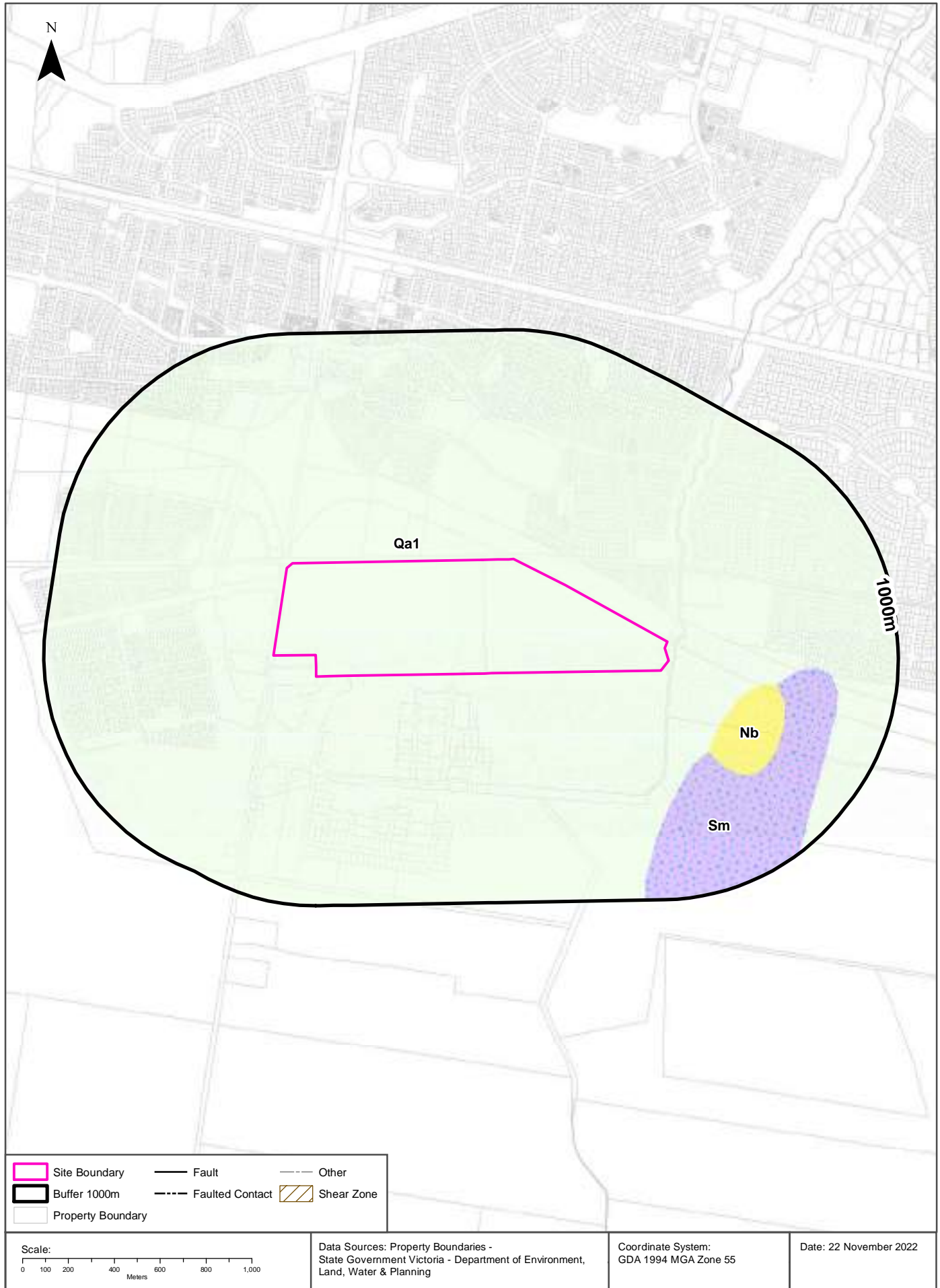
Historical Mining Activity Data Custodian: State Government Victoria - Dept of Economic Development, Jobs, Transport & Resources

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# Geology

92 & 26A Enterprise Road, Pakenham, VIC 3810



# Geology

92 & 26A Enterprise Road, Pakenham, VIC 3810

## Geological Units 1:250,000

What are the Geological Units within the dataset buffer?

Symbol	Name	Description	Geological Age	Lithology	Distance	Direction
Qa1	alluvium( Qa1): generic	Gravel, sand, silt: variably sorted and rounded; generally unconsolidated; includes deposits of low terraces; alluvial floodplain deposits	Pleistocene to Holocene	gravel material (significant); sand (significant); silt material (significant)	0m	On-site
Nb	Brighton Group( Nb): generic	Gravel, sand, silt: variably calcareous to ferruginous sandstones and coquinas; marine to nonmarine	Miocene to Pliocene	silt material (significant); sand (significant); gravel material (significant)	343m	East
Sm	Murrindindi Supergroup( Sm): hornfels	hornfels	Late Ordovician to Middle Devonian; Middle Devonian to Late Devonian	hornfels (all)	411m	South East

Geology Data Custodian: State Government Victoria - Dept of Economic Development, Jobs, Transport & Resources  
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# Geology

92 & 26A Enterprise Road, Pakenham, VIC 3810

## Geological Structures 1:250,000

What are the Geological Faults or Faulted Contacts within the dataset buffer?

Map Id	Type	Name	Contact	Positional Accuracy	Distance	Direction
N/A	No records in buffer					

What are the Shear Zones within the dataset buffer?

Map Id	Type	Name	Description	Positional Accuracy	Distance	Direction
N/A	No records in buffer					

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<b>Legend</b> Site Boundary Buffer 1000m Property Boundary		<b>Australian Soil Classification Orders</b> <table border="0"> <tr> <td> Anthrosol</td> <td> Dermosol</td> <td> Kandosol</td> <td> Podosol</td> <td> Tenosol</td> <td> No Data</td> </tr> <tr> <td> Calcarosol</td> <td> Ferrosol</td> <td> Kurosol</td> <td> Rudosol</td> <td> Vertosol</td> <td></td> </tr> <tr> <td> Chromosol</td> <td> Hydrosol</td> <td> Organosol</td> <td> Sodosol</td> <td> Lake</td> <td></td> </tr> </table>						Anthrosol	Dermosol	Kandosol	Podosol	Tenosol	No Data	Calcarosol	Ferrosol	Kurosol	Rudosol	Vertosol		Chromosol	Hydrosol	Organosol	Sodosol	Lake	
Anthrosol	Dermosol	Kandosol	Podosol	Tenosol	No Data																				
Calcarosol	Ferrosol	Kurosol	Rudosol	Vertosol																					
Chromosol	Hydrosol	Organosol	Sodosol	Lake																					
Scale: 		Data Sources: Property Boundaries - State Government Victoria - Department of Environment, Land, Water & Planning		Coordinate System: GDA 1994 MGA Zone 55		Date: 22 November 2022																			

## Soils

92 & 26A Enterprise Road, Pakenham, VIC 3810

### Atlas of Australian Soils

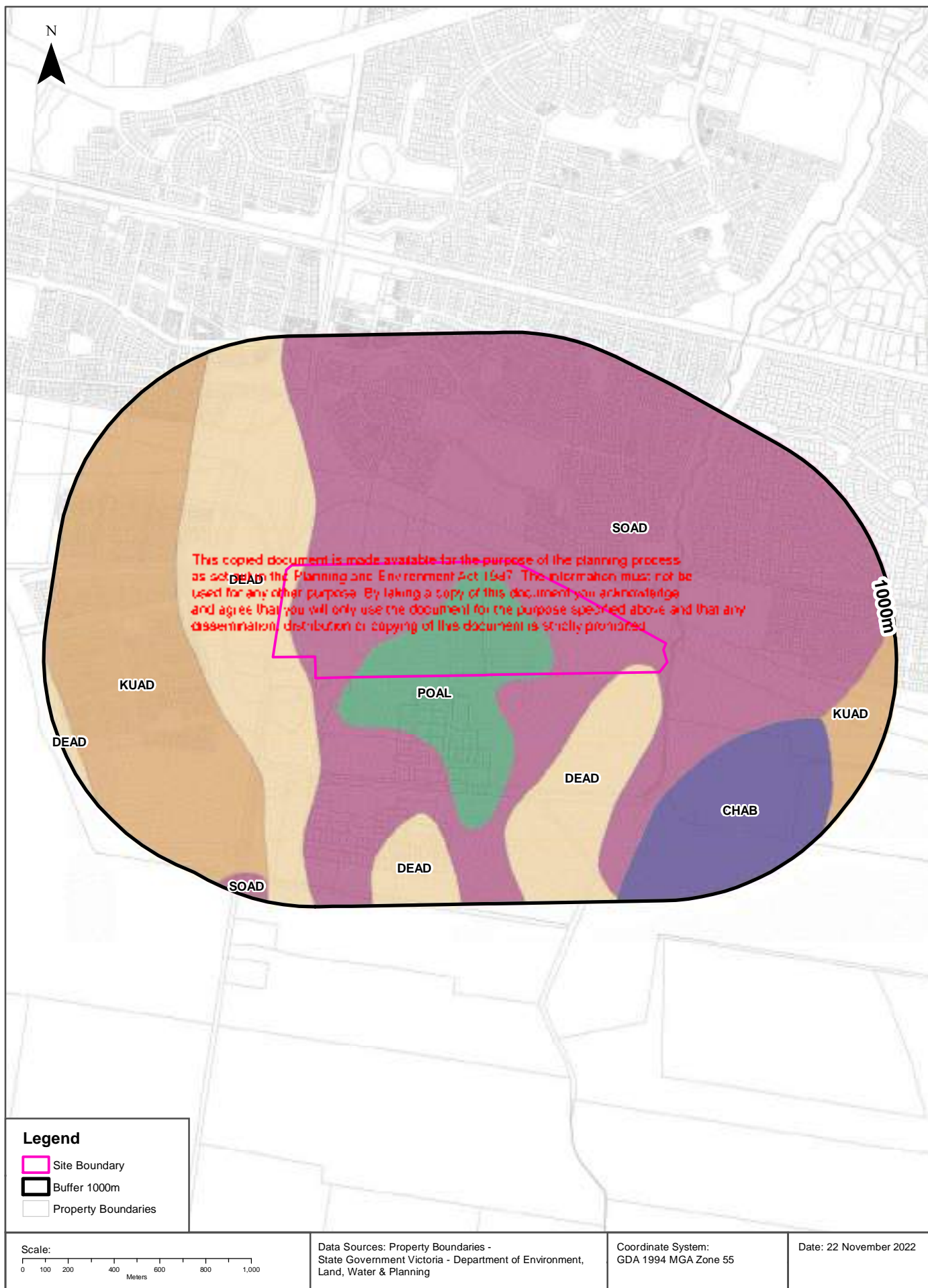
Soil mapping units and Australian Soil Classification orders within the dataset buffer:

Map Unit Code	Soil Order	Map Unit Description	Distance	Direction
Cb23	Podosol	Coastal plains: plains of leached sands (Uc2.33) and other (Uc2.3) soils in association with sandy acidic yellow mottled soils (Dy5.41 and Dy5.81) and small areas of (Dy3.4) soils with dunes of leached sands, (Uc2.2) on dune crests, and (Uc2.3) on dune slopes; and with small swampy areas and possibly some lunettes both with undescribed soils.	0m	On-site

Atlas of Australian Soils Data Source: CSIRO

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## Soils

92 & 26A Enterprise Road, Pakenham, VIC 3810

### Victorian Soil Type Mapping

Victorian Soil Types within the dataset buffer:

Symbol	Description	Distance	Direction
SOAD	Grey Sodosols	0m	On-site
POAL	Aeric Podosols	0m	On-site
DEAD	Grey Dermosols	0m	On-site
KUAD	Grey Kurosols	312m	West
CHAB	Brown Chromosols	414m	South East

Victorian Soil Type Mapping Data Source: Department of Economic Development, Jobs, Transport and Resources  
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# Atlas of Australian Acid Sulfate Soils

92 & 26A Enterprise Road, Pakenham, VIC 3810



<b>Legend</b> <span style="display: inline-block; border: 2px solid pink; width: 20px; height: 10px; margin-right: 5px;"></span> Site Boundary <span style="display: inline-block; border: 2px solid black; width: 20px; height: 10px; margin-right: 5px;"></span> Buffer 1000m <span style="display: inline-block; border: 1px solid black; width: 20px; height: 10px; margin-right: 5px;"></span> Property Boundary		<b>Probability of occurrence of Acid Sulfate Soils</b> <span style="display: inline-block; width: 20px; height: 10px; background-color: #f08080; border: 1px solid black; margin-right: 5px;"></span> A. High (>70%) <span style="display: inline-block; width: 20px; height: 10px; background-color: #90ee90; border: 1px solid black; margin-right: 5px;"></span> C. Extremely Low (1-5%) <span style="display: inline-block; width: 20px; height: 10px; background-color: #ffff00; border: 1px solid black; margin-right: 5px;"></span> B. Low (6-70%) <span style="display: inline-block; width: 20px; height: 10px; background-color: #d3d3d3; border: 1px solid black; margin-right: 5px;"></span> D. No Chance (0%) <span style="display: inline-block; width: 20px; height: 10px; border: 1px solid black; margin-right: 5px;"></span> No Data	
Scale: 		Data Sources: Property Boundaries & Topographic Data: State of Victoria - Department of Environment and Primary Industries	Coordinate System: GDA 1994 MGA Zone 55
Date: 22 November 2022			

# Acid Sulfate Soils

92 & 26A Enterprise Road, Pakenham, VIC 3810

## Atlas of Australian Acid Sulfate Soils

Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance	Direction
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m	On-site

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO

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## Acid Sulfate Soils

92 & 26A Enterprise Road, Pakenham, VIC 3810

### Coastal Acid Sulfate Soils

Coastal Acid Sulfate Soil types within the dataset buffer:

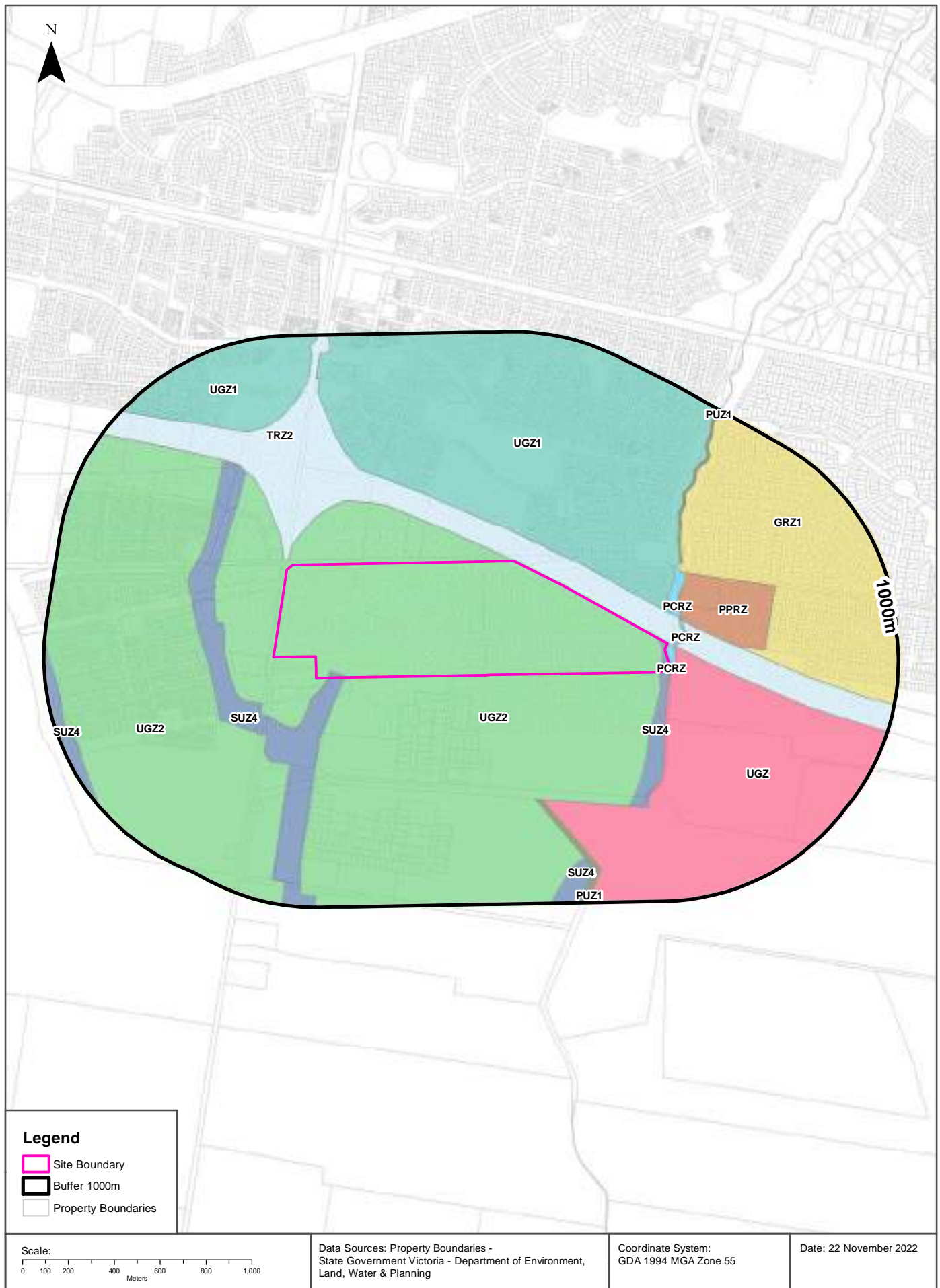
Coastal Acid Sulfate Soil Types	Distance	Direction
No records in buffer		

Coastal Acid Sulfate Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning  
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# Planning Zones

92 & 26A Enterprise Road, Pakenham, VIC 3810



# Planning

92 & 26A Enterprise Road, Pakenham, VIC 3810

## Planning Zones

Planning zones within the dataset buffer:

Zone Code	Description	Distance	Direction
UGZ2	URBAN GROWTH ZONE - SCHEDULE 2	0m	On-site
SUZ4	SPECIAL USE ZONE - SCHEDULE 4	0m	On-site
TRZ2	TRANSPORT ZONE 2 - PRINCIPAL ROAD NETWORK	0m	North
PCRZ	PUBLIC CONSERVATION AND RESOURCE ZONE	0m	East
UGZ	URBAN GROWTH ZONE	23m	South East
PCRZ	PUBLIC CONSERVATION AND RESOURCE ZONE	73m	East
PCRZ	PUBLIC CONSERVATION AND RESOURCE ZONE	82m	East
UGZ1	URBAN GROWTH ZONE - SCHEDULE 1	110m	North
PPRZ	PUBLIC PARK AND RECREATION ZONE	119m	East
UGZ2	URBAN GROWTH ZONE - SCHEDULE 2	286m	West
GRZ1	GENERAL RESIDENTIAL ZONE - SCHEDULE 1	300m	East
PUZ1	PUBLIC USE ZONE - SERVICE AND UTILITY	329m	North East
PUZ1	PUBLIC USE ZONE - SERVICE AND UTILITY	545m	South East
UGZ1	URBAN GROWTH ZONE - SCHEDULE 1	608m	North West

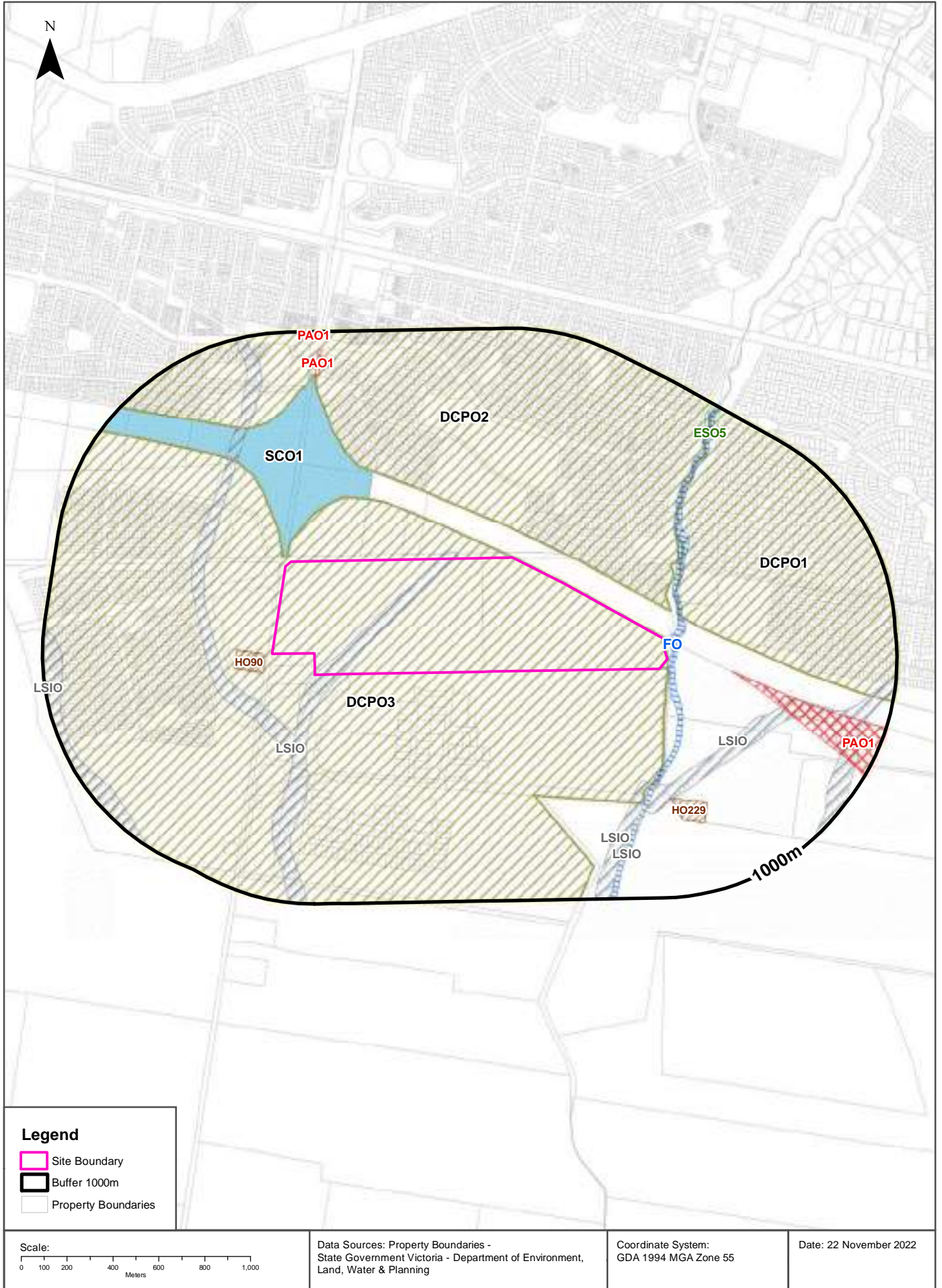
Planning Zone Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning  
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# Planning Overlays

92 & 26A Enterprise Road, Pakenham, VIC 3810



# Planning

92 & 26A Enterprise Road, Pakenham, VIC 3810

## Planning Overlays

Planning overlays within the dataset buffer:

Zone Code	Description	Distance	Direction
DCPO3	DEVELOPMENT CONTRIBUTIONS PLAN OVERLAY - SCHEDULE 3	0m	On-site
LSIO	LAND SUBJECT TO INUNDATION OVERLAY	0m	On-site
FO	FLOODWAY OVERLAY	4m	East
SCO1	SPECIFIC CONTROLS OVERLAY - SCHEDULE 1	24m	North West
HO90	HERITAGE OVERLAY (HO90)	41m	West
DCPO2	DEVELOPMENT CONTRIBUTIONS PLAN OVERLAY - SCHEDULE 2	110m	North
DCPO1	DEVELOPMENT CONTRIBUTIONS PLAN OVERLAY - SCHEDULE 1	119m	East
PAO1	PUBLIC ACQUISITION OVERLAY 1	282m	East
LSIO	LAND SUBJECT TO INUNDATION OVERLAY	437m	East
HO229	HERITAGE OVERLAY (HO229)	568m	South East
LSIO	LAND SUBJECT TO INUNDATION OVERLAY	772m	South East
PAO1	PUBLIC ACQUISITION OVERLAY 1	807m	North West
ESO5	ENVIRONMENTAL SIGNIFICANCE OVERLAY - SCHEDULE 5	880m	North East
LSIO	LAND SUBJECT TO INUNDATION OVERLAY	915m	West
PAO1	PUBLIC ACQUISITION OVERLAY 1	968m	North West

Planning Overlay Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning  
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## Heritage

92 & 26A Enterprise Road, Pakenham, VIC 3810

### Commonwealth Heritage List

What are the Commonwealth Heritage List Items located within the dataset buffer?

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch  
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### National Heritage List

What are the National Heritage List Items located within the dataset buffer?

Note. Please click on Place Id to activate a hyperlink to online website.

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch  
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### Victorian Heritage Register

What are the Victorian Heritage Register items located within the dataset buffer?:

VHR Number	Description	Distance	Direction
N/A	No records in buffer		

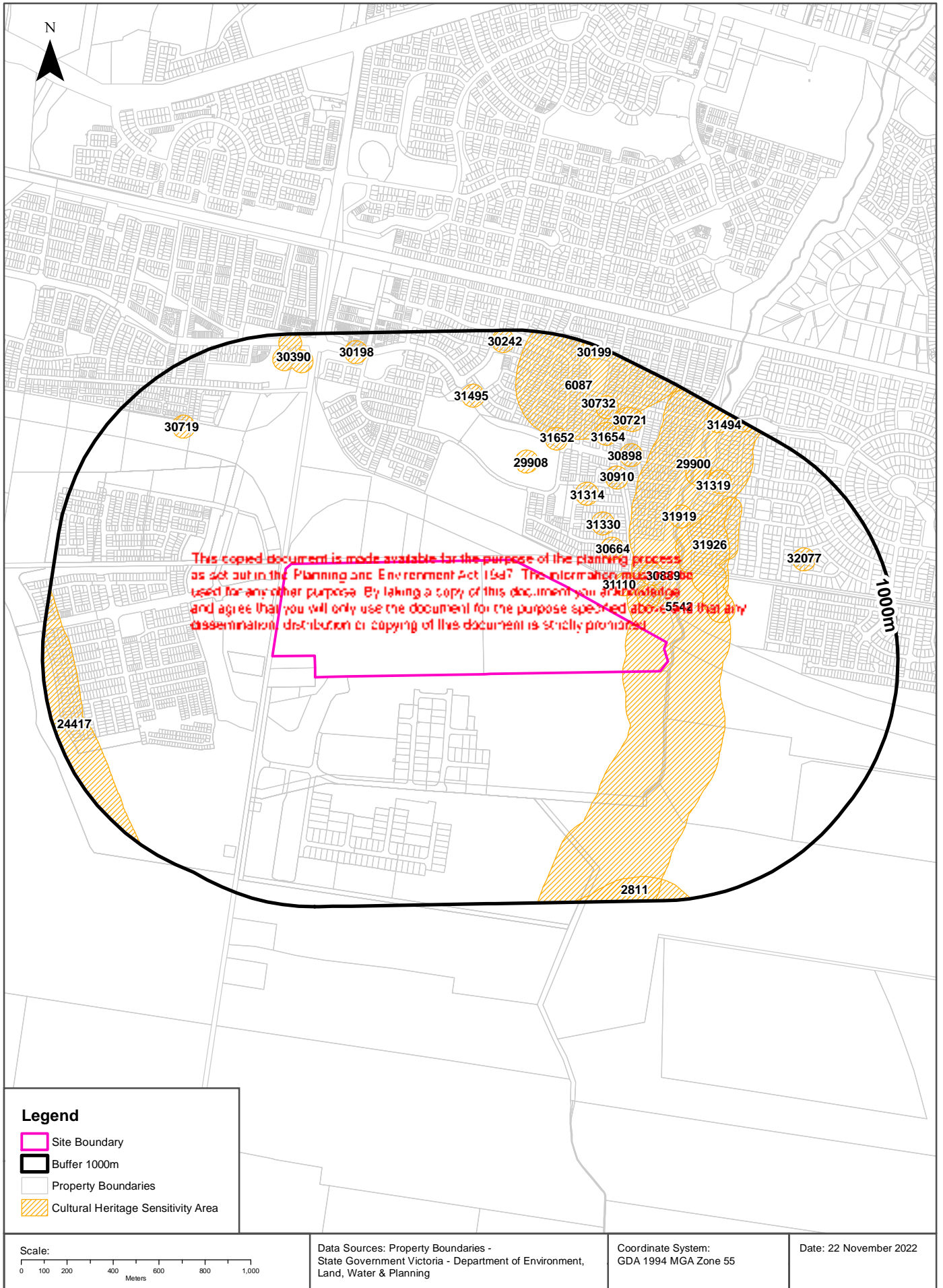
Victorian Heritage Register Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning  
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# Cultural Heritage Sensitivity

92 & 26A Enterprise Road, Pakenham, VIC 3810



## Heritage

92 & 26A Enterprise Road, Pakenham, VIC 3810

### Cultural Heritage Sensitivity

Areas of Cultural Heritage Sensitivity as specified in Division 3 of Part 2 in the Victorian Aboriginal Heritage Regulations 2018, within the dataset buffer:

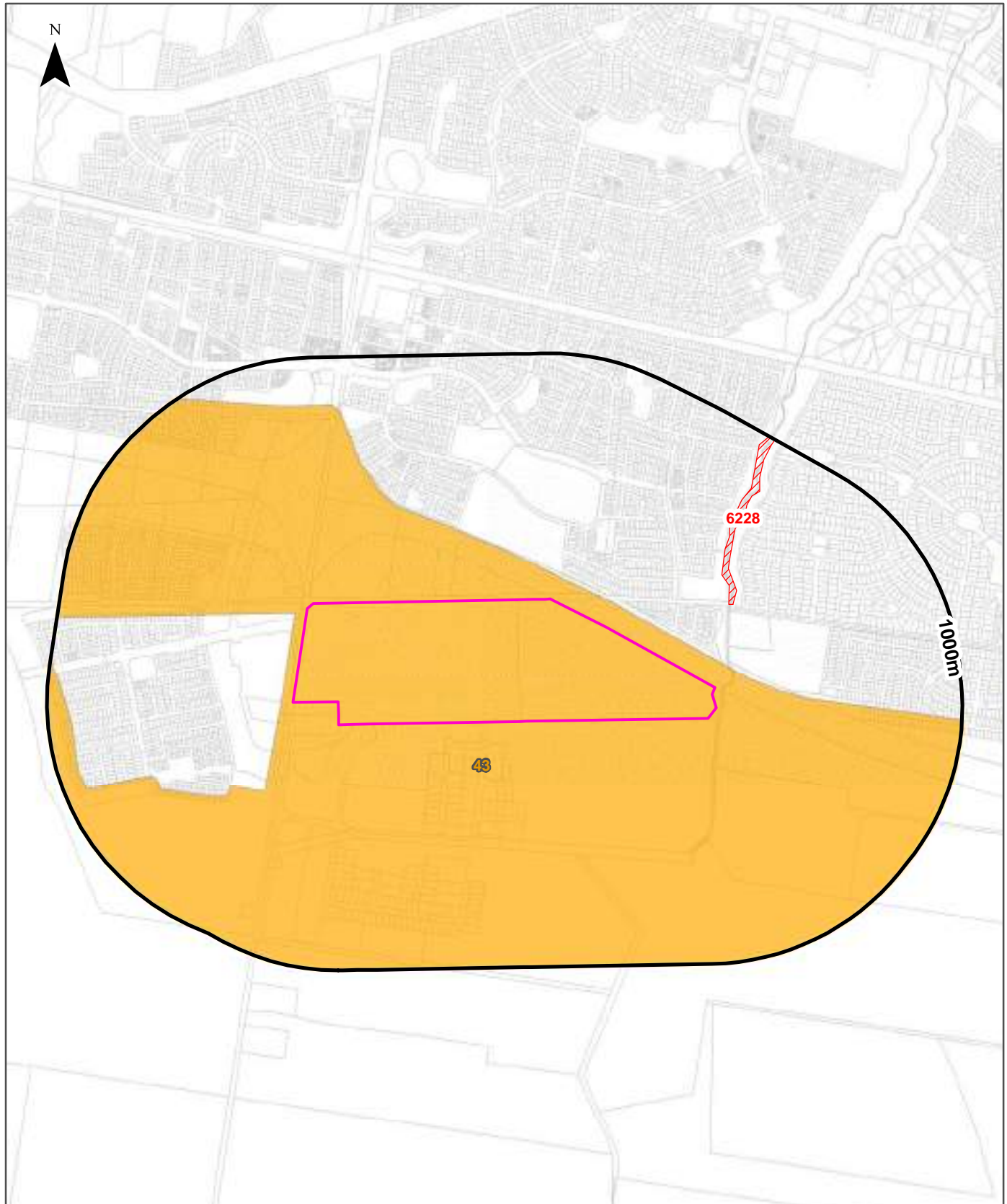
Map Id	Distance	Direction
5542	0m	On-site
31110	81m	East
30889	87m	East
30664	191m	North East
31926	218m	East
31330	268m	North East
31314	351m	North East
29908	381m	North East
31919	459m	North East
30910	473m	North East
31652	510m	North East
6087	563m	North East
30898	588m	North East
31654	622m	North East
32077	648m	East
29900	656m	North East
31495	667m	North
31319	672m	North East
30719	709m	North West
30721	723m	North East
30732	728m	North East
30390	831m	North West
24417	844m	West
30198	867m	North
2811	893m	South East
31494	901m	North East
30242	903m	North
30199	940m	North East

Cultural Heritage Sensitivity Data Custodian: State Government Victoria - Department of Premier and Cabinet  
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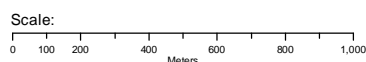
# Natural Hazards

92 & 26A Enterprise Road, Pakenham, VIC 3810



### Legend

- |                     |                                |                                 |                                 |
|---------------------|--------------------------------|---------------------------------|---------------------------------|
| Site Boundary       | Flood 1 in 100 Year Extent     | Sea Level 0cm (2009)            | Sea Level 47cm (2070)           |
| Buffer 1000m        | Fire History Records           | 1 in 100 Year Storm Tide (2009) | 1 in 100 Year Storm Tide (2070) |
| Property Boundaries | Designated Bushfire Prone Area | Sea Level 20cm (2040)           | Sea Level 82cm (2100)           |
|                     |                                | 1 in 100 Year Storm Tide (2040) | 1 in 100 Year Storm Tide (2100) |



Data Sources: Property Boundaries - State Government Victoria - Department of Environment, Land, Water & Planning

Coordinate System: GDA 1994 MGA Zone 55

Date: 22 November 2022

## Natural Hazards

92 & 26A Enterprise Road, Pakenham, VIC 3810

### Bushfire Prone Areas

What are the designated bushfire prone areas within the dataset buffer?

Map ID	Feature	Plan No	LGA	Gazetted Date	Distance	Direction
43	Designated Bushfire Prone Area	LEGL./22-172	CARDINIA	17/08/2022	0m	On-site

Bushfire Prone Area Data Custodian: State Government Victoria - Dept of Transport, Planning & Local Infrastructure  
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### Fire History

What are the fire history records of fires primarily on public land, within the dataset buffer?

Map Id	Fire Type	Fire Key	Season	Fire No	Fire Name	Treatment	Fire Cover	Start Date	Dist (m)	Direction
6228	BURN		2010	MW26	Toomuc Creek	FUEL REDUCTION	70-89	29/10/2009	323m	North East

Fire History Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning  
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### Flood - 1 in 100 year modelled flood extent

What 1 in 100 year flood extent features exist within the dataset buffer?

Feature	Source	Method	Scale	Modified Date	Distance	Direction
N/A	No records in buffer					

Flood Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning  
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# Natural Hazards

92 & 26A Enterprise Road, Pakenham, VIC 3810

## Victorian Coastal Inundation Sea Level Rise

What coastal inundation sea level rise features exist within the dataset buffer?

Description	Distance	Direction
No records in buffer		

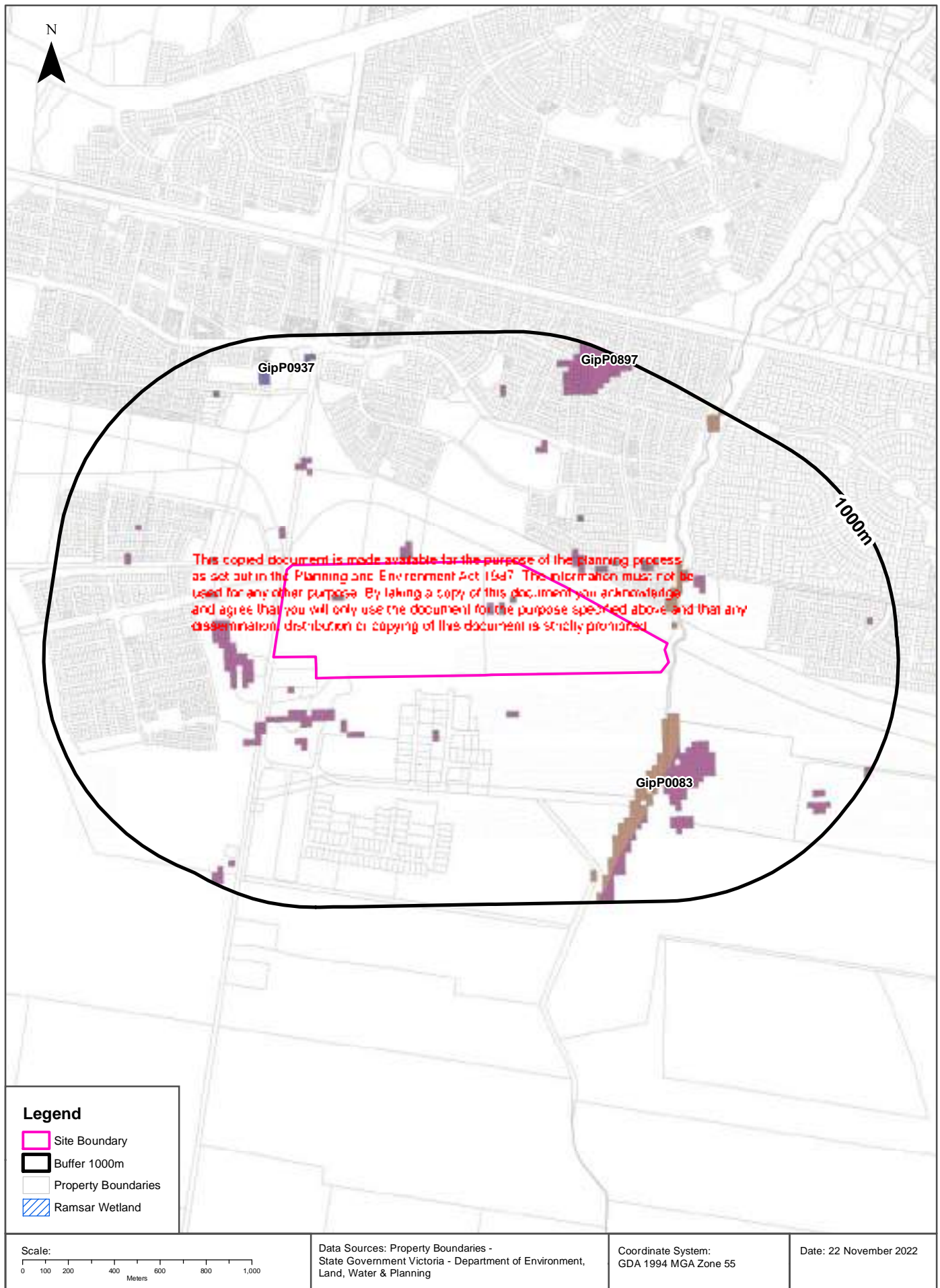
Victorian Coastal Inundation Sea Level Rise Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning

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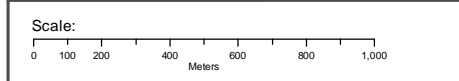
# Ecological Constraints - Native Vegetation 2005 & Ramsar Wetlands

92 & 26A Enterprise Road, Pakenham, VIC 3810



**Legend**

- Site Boundary
- Buffer 1000m
- Property Boundaries
- Ramsar Wetland



Data Sources: Property Boundaries - State Government Victoria - Department of Environment, Land, Water & Planning

Coordinate System: GDA 1994 MGA Zone 55

Date: 22 November 2022

## Ecological Constraints

92 & 26A Enterprise Road, Pakenham, VIC 3810

### Native Vegetation (Modelled 2005 Ecological Vegetation Classes)

What native vegetation exists within the dataset buffer?

Veg Code	EVC Name	EVCCode	Group	Subgroup	Bioregion	Conservation Status	Geographic Occurance	Dist	Dir
GipP0897	Plains Grassland/Plains Grassy Woodland Mosaic	0897	Plains Grasslands and Chenopod Shrublands	Clay soils	Gippsland Plain	Endangered	not applicable	0m	On-site
GipP0083	Swampy Riparian Woodland	0083	Riparian Scrubs or Swampy Scrubs and Woodlands		Gippsland Plain	Endangered	Common	66m	East
GipP0937	Swampy Woodland	0937	Riparian Scrubs or Swampy Scrubs and Woodlands		Gippsland Plain	Endangered	Common	793m	North West

Native Vegetation Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning  
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### Ramsar Wetlands

What Ramsar wetland areas exist within the dataset buffer?

Map ID	Site Name	Lake Name	Distance	Direction
N/A	No records in buffer			

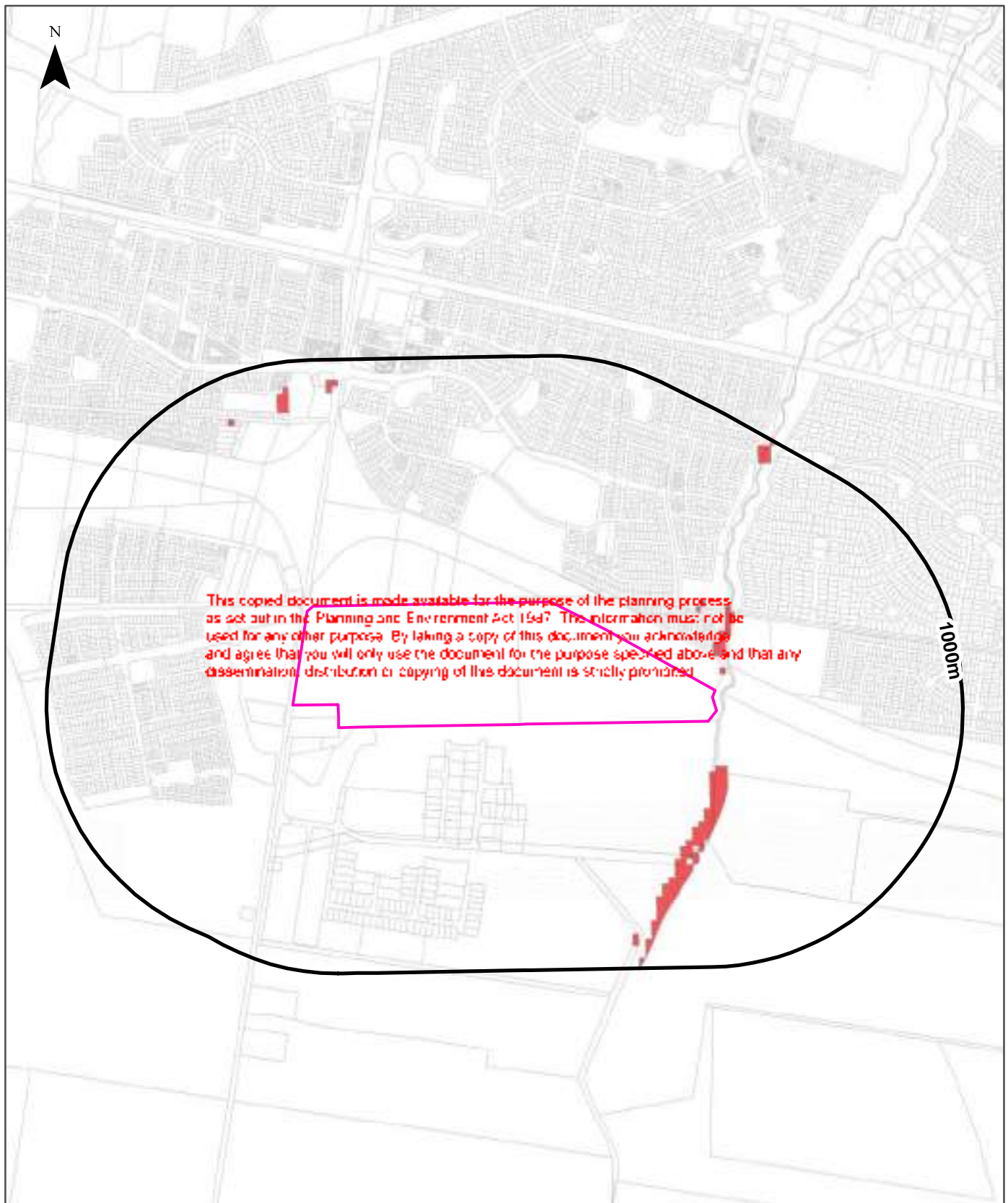
Ramsar Wetland Area Data Custodian: State Government Victoria - Dept of Environment, Land, Water & Planning  
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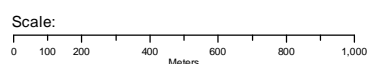
# Ecological Constraints - Groundwater Dependent Ecosystems Atlas

92 & 26A Enterprise Road, Pakenham, VIC 3810



## Legend

Site Boundary	High potential GDE - from national assessment	Low potential GDE - from national assessment
Buffer 1000m	High potential GDE - from regional studies	Low potential GDE - from regional studies
Property Boundaries	Moderate potential GDE - from national assessment	Known GDE - from regional studies
	Moderate potential GDE - from regional studies	Unclassified potential GDE - from regional studies



Data Sources: Property Boundaries - State Government Victoria - Department of Environment, Land, Water & Planning

Coordinate System: GDA 1994 MGA Zone 55

Date: 22 November 2022

# Ecological Constraints

92 & 26A Enterprise Road, Pakenham, VIC 3810

## Groundwater Dependent Ecosystems Atlas

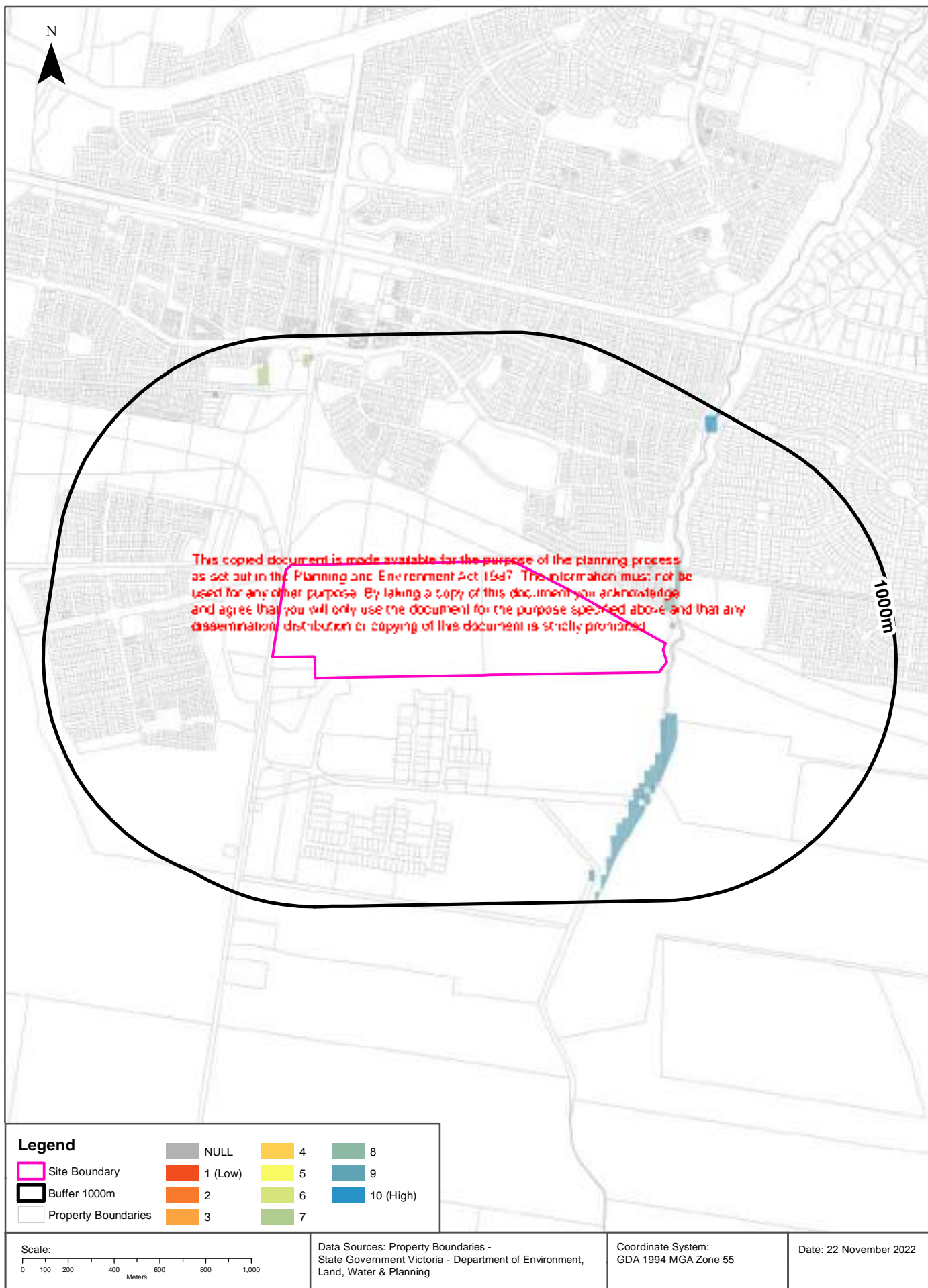
Type	Name	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Terrestrial		High potential GDE - from national assessment	Low fault blocks, mainly of tilted and dissected sandstone; granite hills and islands, in two parts either side of Port Phillip Bay.	Vegetation	Unconsolidated sedimentary	66m	East

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology  
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# Inflow Dependent Ecosystems Likelihood

92 & 26A Enterprise Road, Pakenham, VIC 3810



# Ecological Constraints

92 & 26A Enterprise Road, Pakenham, VIC 3810

## Inflow Dependent Ecosystems Likelihood

Type	Name	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Terrestrial		8	Low fault blocks, mainly of tilted and dissected sandstone; granite hills and islands, in two parts either side of Port Phillip Bay.	Vegetation	Unconsolidated sedimentary	66m	East
Terrestrial		9	Low fault blocks, mainly of tilted and dissected sandstone; granite hills and islands, in two parts either side of Port Phillip Bay.	Vegetation	Unconsolidated sedimentary	185m	South East
Terrestrial		10	Low fault blocks, mainly of tilted and dissected sandstone; granite hills and islands, in two parts either side of Port Phillip Bay.	Vegetation	Unconsolidated sedimentary	266m	East
Terrestrial		7	Low fault blocks, mainly of tilted and dissected sandstone; granite hills and islands, in two parts either side of Port Phillip Bay.	Vegetation	Unconsolidated sedimentary	793m	North West

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology  
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Where Lotsearch has had to georeference features from supplied addresses, a location confidence has been assigned to the data record. This indicates a confidence to the positional accuracy of the feature. Where applicable, a code is given under the field heading "LC" or "LocConf". These codes lookup to the following location confidences:

LC Code	Location Confidence
Premise Match	Georeferenced to the site location / premise or part of site
Area Match	Georeferenced to an approximate or general area
Road Match	Georeferenced to a road or rail corridor
Road Intersection	Georeferenced to a road intersection
Buffered Point	A point feature buffered to x metres
Adjacent Match	Land adjacent to a georeferenced feature
Network of Features	Georeferenced to a network of features
Suburb Match	Georeferenced to a suburb boundary
As Supplied	Spatial data supplied by provider

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# PLANNING PROPERTY REPORT

From [www.planning.vic.gov.au](http://www.planning.vic.gov.au) at 16 December 2022 03:56 PM

## PROPERTY DETAILS

Address: **26 ENTERPRISE ROAD PAKENHAM 3810**  
Lot and Plan Number: **Lot 2 PS436220**  
Standard Parcel Identifier (SPI): **2\PS436220**  
Local Government Area (Council): **CARDINIA**  
Council Property Number: **4382550100**  
Planning Scheme: **Cardinia**  
Directory Reference: **Melway 215 D10**

[www.cardinia.vic.gov.au](http://www.cardinia.vic.gov.au)

[Planning Scheme - Cardinia](#)

## UTILITIES

Rural Water Corporation: **Southern Rural Water**  
Melbourne Water Retailer: **South East Water**  
Melbourne Water: **Inside drainage boundary**  
Power Distributor: **AUSNET**

## STATE ELECTORATES

Legislative Council: **EASTERN VICTORIA**  
Legislative Assembly: **PAKENHAM**

## OTHER

Registered Aboriginal Party: **Bunurong Land Council Aboriginal Corporation**

[View location in VicPlan](#)

## Note

**This land is in an area added to the Urban Growth Boundary after 2005. It may be subject to the Growth Area Infrastructure Contribution.**

For more information about this project go to [Victorian Planning Authority](#)

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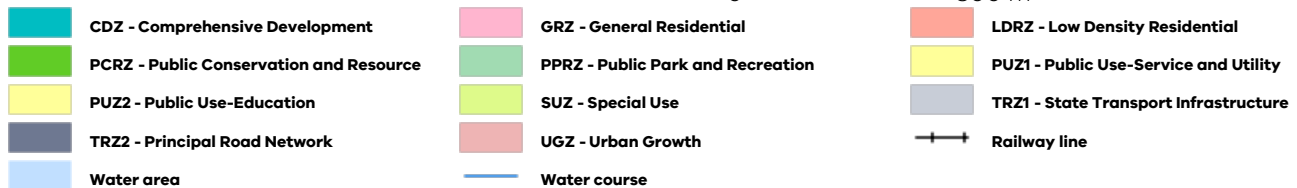
## Planning Zones

[SPECIAL USE ZONE \(SUZ\)](#)

[SPECIAL USE ZONE - SCHEDULE 4 \(SUZ4\)](#)

[URBAN GROWTH ZONE \(UGZ\)](#)

[URBAN GROWTH ZONE - SCHEDULE 2 \(UGZ2\)](#)



Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

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## Planning Overlays

[DEVELOPMENT CONTRIBUTIONS PLAN OVERLAY \(DCPO\)](#)

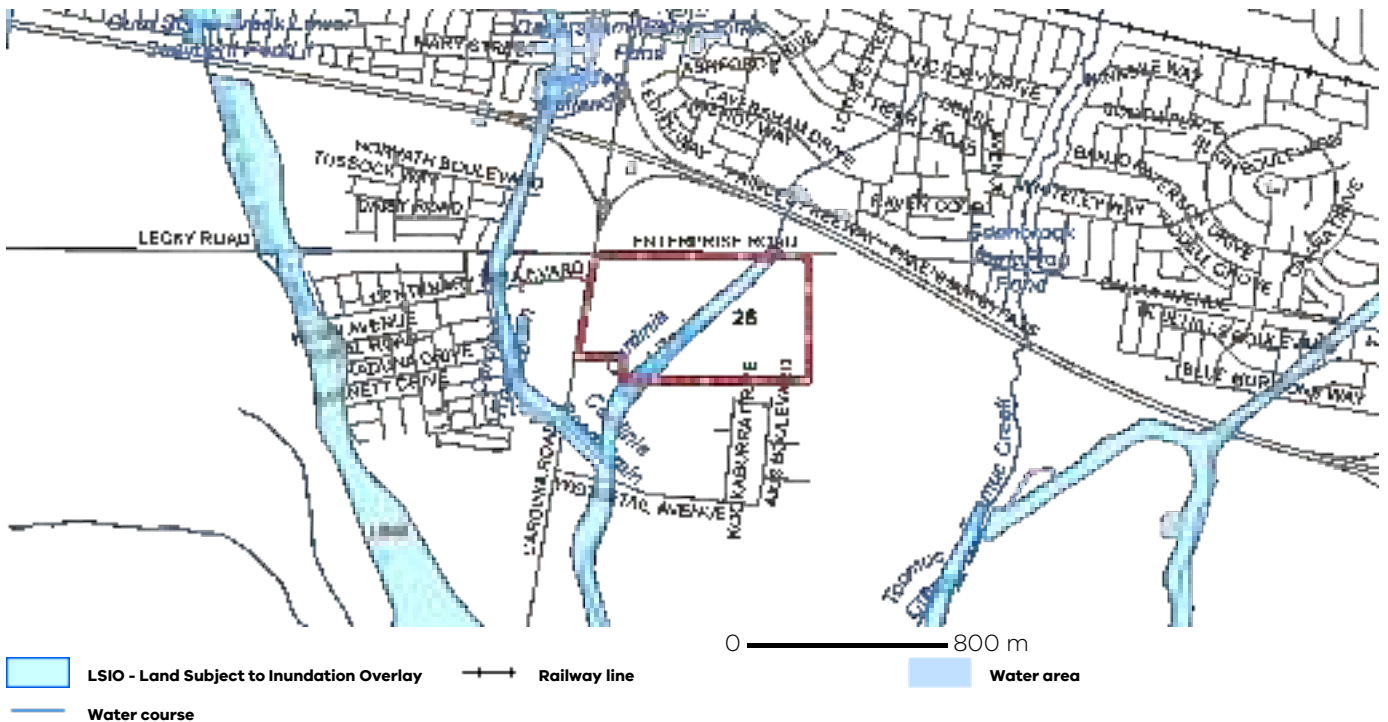
[DEVELOPMENT CONTRIBUTIONS PLAN OVERLAY - SCHEDULE 3 \(DCPO3\)](#)



Note: due to overlaps, some overlays may not be visible, and some colours may not match those in the legend

[LAND SUBJECT TO INUNDATION OVERLAY \(LSIO\)](#)

[LAND SUBJECT TO INUNDATION OVERLAY SCHEDULE \(LSIO\)](#)



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## Planning Overlays

### OTHER OVERLAYS

Other overlays in the vicinity not directly affecting this land

[DESIGN AND DEVELOPMENT OVERLAY \(DDO\)](#)

[ENVIRONMENTAL SIGNIFICANCE OVERLAY \(ESO\)](#)

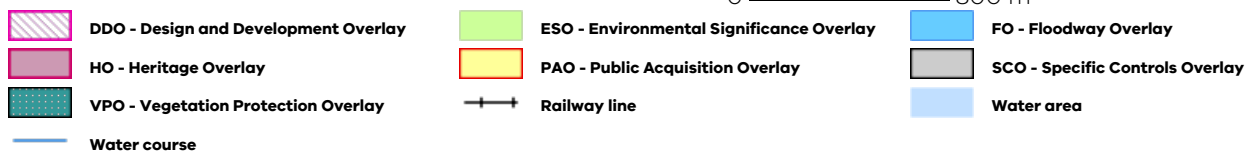
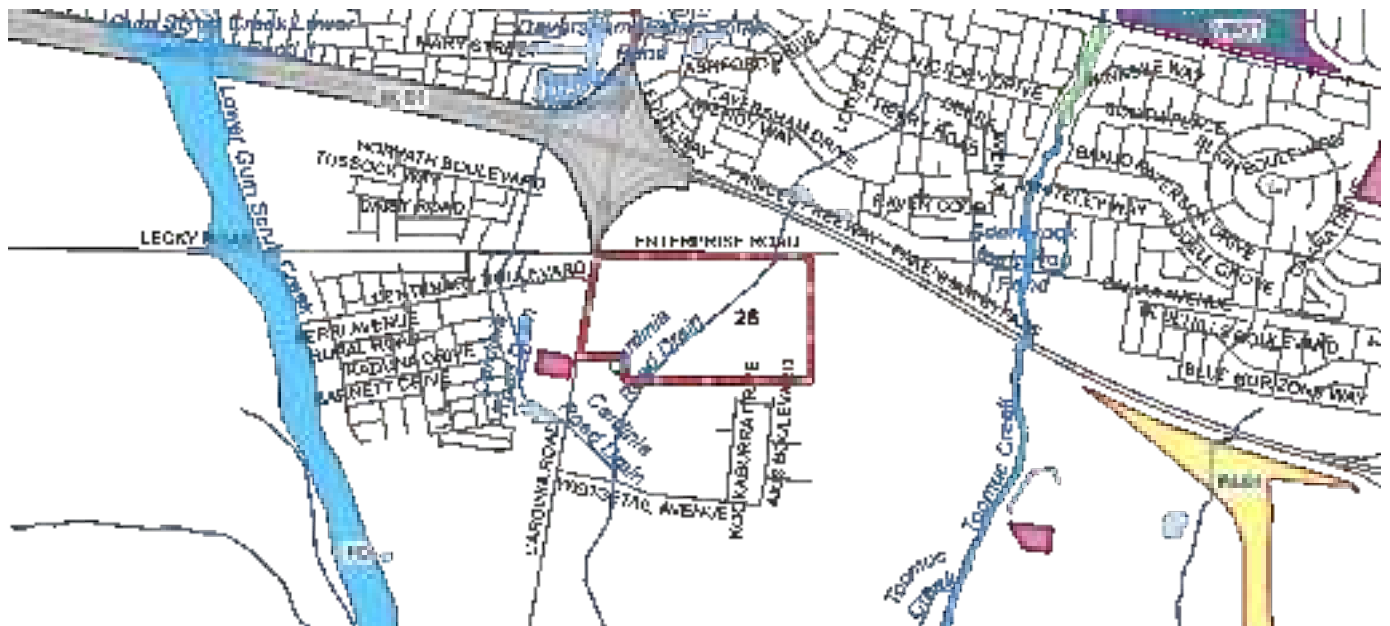
[FLOODWAY OVERLAY \(FO\)](#)

[HERITAGE OVERLAY \(HO\)](#)

[PUBLIC ACQUISITION OVERLAY \(PAO\)](#)

[SPECIFIC CONTROLS OVERLAY \(SCO\)](#)

[VEGETATION PROTECTION OVERLAY \(VPO\)](#)



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## Growth Area Infrastructure Contribution

This property is in an area added to the Urban Growth Boundary after 2005. It may be subject to the Growth Area Infrastructure Contribution. For more information about this contribution go to [Victorian Planning Authority](http://www.vpa.vic.gov.au)



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## Melbourne Strategic Assessment

This property may be located within the Melbourne Strategic Assessment program area. Actions associated with urban development are subject to requirements of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. Follow the link for more details: <https://nvm.delwp.vic.gov.au/BCS>



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## Further Planning Information

Planning scheme data last updated on 7 December 2022.

A **planning scheme** sets out policies and requirements for the use, development and protection of land. This report provides information about the zone and overlay provisions that apply to the selected land. Information about the State and local policy, particular, general and operational provisions of the local planning scheme that may affect the use of this land can be obtained by contacting the local council or by visiting <https://www.planning.vic.gov.au>

This report is NOT a **Planning Certificate** issued pursuant to Section 199 of the **Planning and Environment Act 1987**. It does not include information about exhibited planning scheme amendments, or zonings that may affect the land. To obtain a Planning Certificate go to Titles and Property Certificates at Landata - <https://www.landata.vic.gov.au>

For details of surrounding properties, use this service to get the Reports for properties of interest.

To view planning zones, overlay and heritage information in an interactive format visit <https://mapshare.maps.vic.gov.au/vicplan>

For other information about planning in Victoria visit <https://www.planning.vic.gov.au>

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## Designated Bushfire Prone Areas

**This property is in a designated bushfire prone area. Special bushfire construction requirements apply to the part of the property mapped as a designated bushfire prone area (BPA). Planning provisions may apply.**

Where part of the property is mapped as BPA, if no part of the building envelope or footprint falls within the BPA area, the BPA construction requirements do not apply.

Note: the relevant building surveyor determines the need for compliance with the bushfire construction requirements.



Designated BPA are determined by the Minister for Planning following a detailed review process. The Building Regulations 2018, through adoption of the Building Code of Australia, apply bushfire protection standards for building works in designated BPA.

Designated BPA maps can be viewed on VicPlan at <https://mapshare.vic.gov.au/vicplan/> or at the relevant local council.

Create a BPA definition plan in [VicPlan](#) to measure the BPA.

Information for lot owners building in the BPA is available at <https://www.planning.vic.gov.au>

Further information about the building control system and building in bushfire prone areas can be found on the Victorian Building Authority website <https://www.vba.vic.gov.au>. Copies of the Building Act and Building Regulations are available from <http://www.legislation.vic.gov.au>. For Planning Scheme Provisions in bushfire areas visit <https://www.planning.vic.gov.au>.

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# PLANNING PROPERTY REPORT

From [www.planning.vic.gov.au](http://www.planning.vic.gov.au) at 06 November 2022 01:32 PM

## PROPERTY DETAILS

Address: **92 ENTERPRISE ROAD PAKENHAM 3810**  
Lot and Plan Number: **Lot 1 TP99673**  
Standard Parcel Identifier (SPI): **1\TP99673**  
Local Government Area (Council): **CARDINIA**  
Council Property Number: **4382550200**  
Planning Scheme: **Cardinia**  
Directory Reference: **Melway 215 F10**

[www.cardinia.vic.gov.au](http://www.cardinia.vic.gov.au)

[Planning Scheme - Cardinia](#)

## UTILITIES

Rural Water Corporation: **Southern Rural Water**  
Melbourne Water Retailer: **South East Water**  
Melbourne Water: **Inside drainage boundary**  
Power Distributor: **AUSNET**

## STATE ELECTORATES

Legislative Council: **EASTERN VICTORIA**  
Legislative Assembly: **BASS**

## OTHER

Registered Aboriginal Party: **Bunurong Land Council Aboriginal Corporation**

[View location in VicPlan](#)

## Note

**This land is in an area added to the Urban Growth Boundary after 2005. It may be subject to the Growth Area Infrastructure Contribution.**

For more information about this project go to [Victorian Planning Authority](#)

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## Planning Zones

[SPECIAL USE ZONE \(SUZ\)](#)

[SPECIAL USE ZONE - SCHEDULE 4 \(SUZ4\)](#)

[URBAN GROWTH ZONE \(UGZ\)](#)

[URBAN GROWTH ZONE - SCHEDULE 2 \(UGZ2\)](#)



0 ————— 700 m

ACZ - Activity Centre	C1Z - Commercial 1	GRZ - General Residential
IN1Z - Industrial 1	LDRZ - Low Density Residential	PCRZ - Public Conservation and Resource
PPRZ - Public Park and Recreation	PUZ1 - Public Use-Service and Utility	PUZ2 - Public Use-Education
SUZ - Special Use	TRZ1 - State Transport Infrastructure	TRZ2 - Principal Road Network
TRZ3 - Significant Municipal Road	UGZ - Urban Growth	Railway line
Water area	Water course	

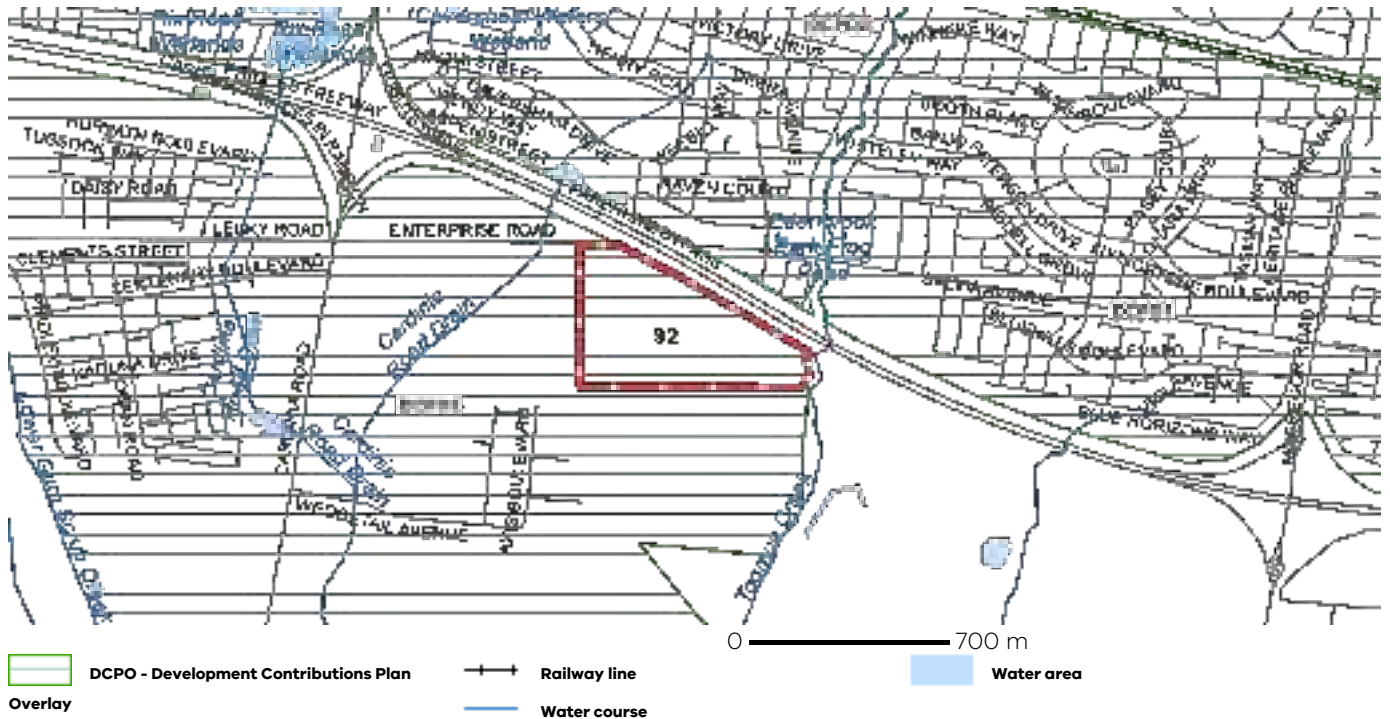
Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

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## Planning Overlays

[DEVELOPMENT CONTRIBUTIONS PLAN OVERLAY \(DCPO\)](#)

[DEVELOPMENT CONTRIBUTIONS PLAN OVERLAY - SCHEDULE 3 \(DCPO3\)](#)



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# PLANNING PROPERTY REPORT

## OTHER OVERLAYS

Other overlays in the vicinity not directly affecting this land

[DESIGN AND DEVELOPMENT OVERLAY \(DDO\)](#)

[DEVELOPMENT PLAN OVERLAY \(DPO\)](#)

[ENVIRONMENTAL SIGNIFICANCE OVERLAY \(ESO\)](#)

[FLOODWAY OVERLAY \(FO\)](#)

[HERITAGE OVERLAY \(HO\)](#)

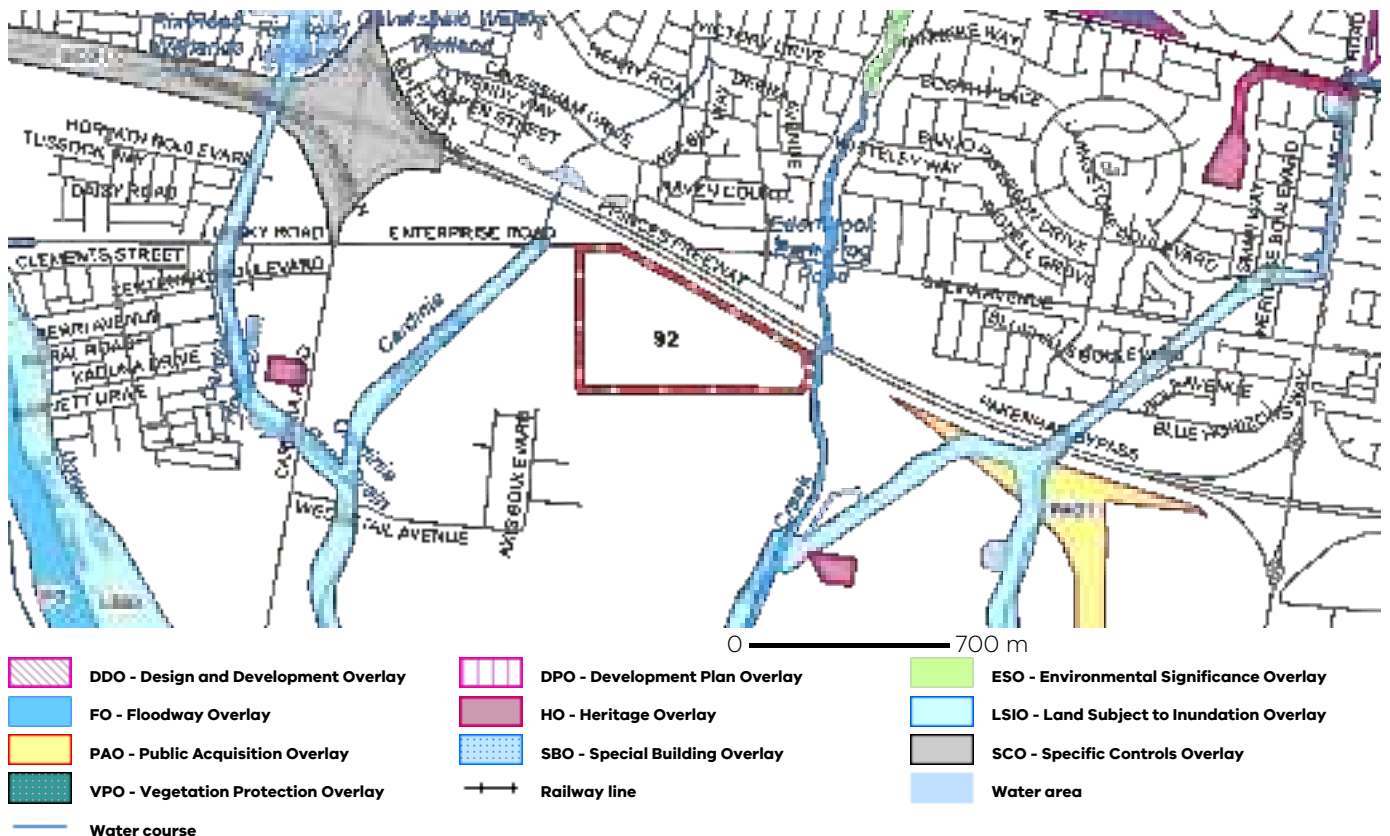
[LAND SUBJECT TO INUNDATION OVERLAY \(LSIO\)](#)














[PUBLIC ACQUISITION OVERLAY \(PAO\)](#)

[SPECIAL BUILDING OVERLAY \(SBO\)](#)

[SPECIFIC CONTROLS OVERLAY \(SCO\)](#)

[VEGETATION PROTECTION OVERLAY \(VPO\)](#)



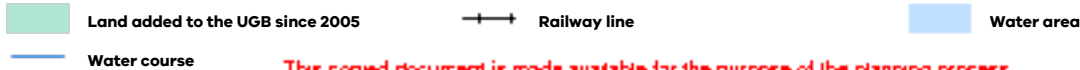
- |   |   |   |                                       |   |  |
|---|---|---|---------------------------------------|---|--|
|  | <b>DDO - Design and Development Overlay</b> |  | <b>DPO - Development Plan Overlay</b> |  | <b>ESO - Environmental Significance Overlay</b>  |
|  | <b>FO - Floodway Overlay</b>                |  | <b>HO - Heritage Overlay</b>          |  | <b>LSIO - Land Subject to Inundation Overlay</b> |
|  | <b>PAO - Public Acquisition Overlay</b>     |  | <b>SBO - Special Building Overlay</b> |  | <b>SCO - Specific Controls Overlay</b>           |
|  | <b>VPO - Vegetation Protection Overlay</b>  |  | <b>Railway line</b>                   |  | <b>Water area</b>                                |
-  **Water course**

Note: due to overlaps, some overlays may not be visible, and some colours may not match those in the legend

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## Growth Area Infrastructure Contribution

This property is in an area added to the Urban Growth Boundary after 2005. It may be subject to the Growth Area Infrastructure Contribution. For more information about this contribution go to [Victorian Planning Authority](http://www.victorianplanningauthority.gov.au)

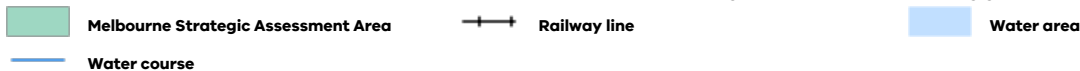


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## Melbourne Strategic Assessment

that you will only use the document for the purpose specified above and that any dissemination, distribution or copying of this document is strictly prohibited.

This property may be located within the Melbourne Strategic Assessment program area. Actions associated with urban development are subject to requirements of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. Follow the link for more details: <https://nvm.delwp.vic.gov.au/BCS>



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 Read the full disclaimer at <https://www.delwp.vic.gov.au/disclaimer>

Notwithstanding this disclaimer, a vendor may rely on the information in this report for the purpose of a statement that land is in a bushfire prone area as required by section 32C (b) of the Sale of Land 1962 (Vic).



## Areas of Aboriginal Cultural Heritage Sensitivity

All or part of this property is an 'area of cultural heritage sensitivity'.

'Areas of cultural heritage sensitivity' are defined under the Aboriginal Heritage Regulations 2018, and include registered Aboriginal cultural heritage places and land form types that are generally regarded as more likely to contain Aboriginal cultural heritage.

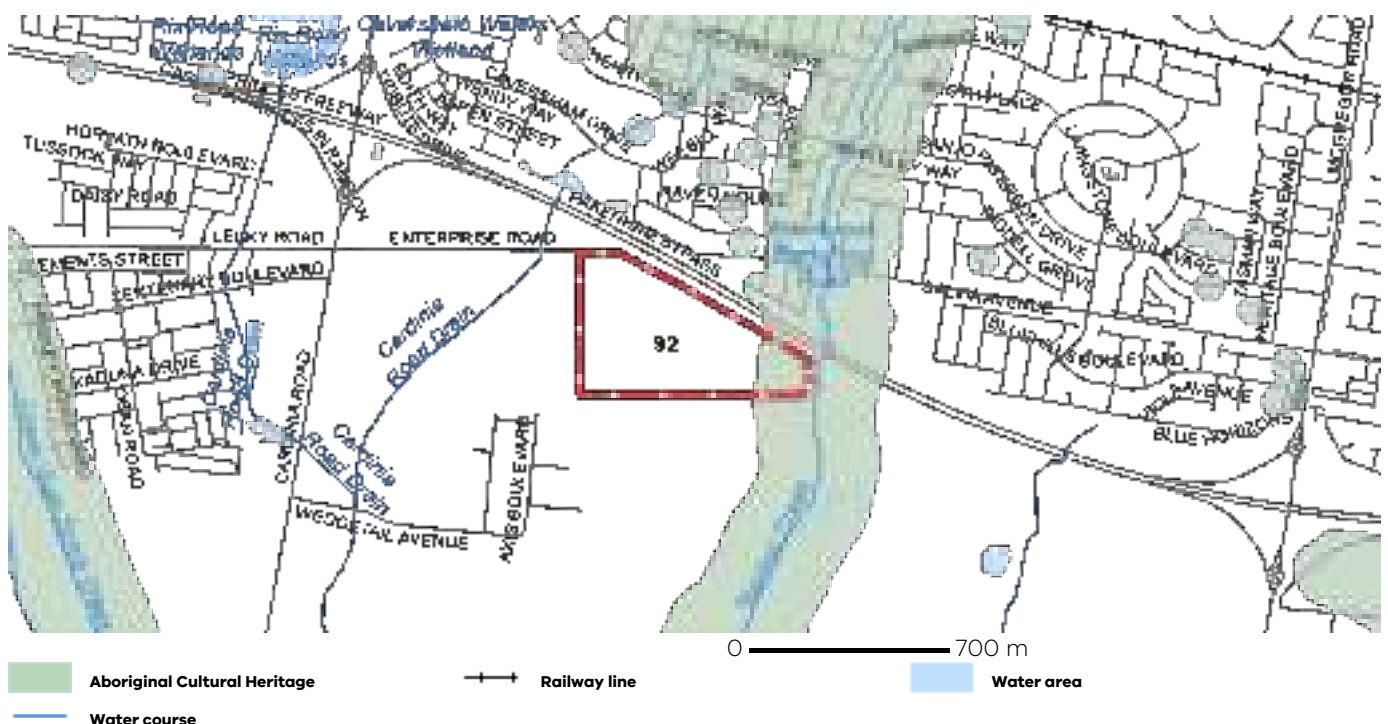
Under the Aboriginal Heritage Regulations 2018, 'areas of cultural heritage sensitivity' are one part of a two part trigger which require a 'cultural heritage management plan' be prepared where a listed 'high impact activity' is proposed.

If a significant land use change is proposed (for example, a subdivision into 3 or more lots), a cultural heritage management plan may be triggered. One or two dwellings, works ancillary to a dwelling, services to a dwelling, alteration of buildings and minor works are examples of works exempt from this requirement.

Under the Aboriginal Heritage Act 2006, where a cultural heritage management plan is required, planning permits, licences and work authorities cannot be issued unless the cultural heritage management plan has been approved for the activity.

For further information about whether a Cultural Heritage Management Plan is required go to <http://www.aav.nrms.net.au/aavQuestion1.aspx>

More information, including links to both the Aboriginal Heritage Act 2006 and the Aboriginal Heritage Regulations 2018, can also be found here - <https://www.aboriginalvictoria.vic.gov.au/aboriginal-heritage-legislation>



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## Further Planning Information

Planning scheme data last updated on 2 November 2022.

A **planning scheme** sets out policies and requirements for the use, development and protection of land.

This report provides information about the zone and overlay provisions that apply to the selected land.

Information about the State and local policy, particular, general and operational provisions of the local planning scheme that may affect the use of this land can be obtained by contacting the local council

or by visiting <https://www.planning.vic.gov.au>

This report is NOT a **Planning Certificate** issued pursuant to Section 199 of the **Planning and Environment Act 1987**.

It does not include information about exhibited planning scheme amendments, or zonings that may affect the land.

To obtain a Planning Certificate go to Titles and Property Certificates at Landata - <https://www.landata.vic.gov.au>

For details of surrounding properties, use this service to get the Reports for properties of interest.

To view planning zones, overlay and heritage information in an interactive format visit

<https://mapshare.maps.vic.gov.au/vicplan>

For other information about planning in Victoria visit <https://www.planning.vic.gov.au>

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## Designated Bushfire Prone Areas

**This property is in a designated bushfire prone area. Special bushfire construction requirements apply to the part of the property mapped as a designated bushfire prone area (BPA). Planning provisions may apply.**

Where part of the property is mapped as BPA, if no part of the building envelope or footprint falls within the BPA area, the BPA construction requirements do not apply.

Note: the relevant building surveyor determines the need for compliance with the bushfire construction requirements.



Designated BPA are determined by the Minister for Planning following a detailed review process. The Building Regulations 2018, through adoption of the Building Code of Australia, apply bushfire protection standards for building works in designated BPA.

Designated BPA maps can be viewed on VicPlan at <https://mapshare.vic.gov.au/vicplan/> or at the relevant local council.

Create a BPA definition plan in [VicPlan](#) to measure the BPA.

Information for lot owners building in the BPA is available at <https://www.planning.vic.gov.au>

Further information about the building control system and building in bushfire prone areas can be found on the Victorian Building Authority website <https://www.vba.vic.gov.au>. Copies of the Building Act and Building Regulations are available from <http://www.legislation.vic.gov.au>. For Planning Scheme Provisions in bushfire areas visit <https://www.planning.vic.gov.au>.

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# Groundwater Resource Report

Groundwater catchment: Westernport

VICGRID94 Easting: 2538961 Northing: 2379423

Depth to water table: < 5m

Water table salinity (mg/L): 3501 - 7000

Groundwater layers (Aquifers and Aquitards)	Depth below surface (m)	Groundwater salinity (mg/L)
QA Quaternary Aquifer sand, gravels, clay, silts	0 - 27	1001 - 3500
UTAF Upper Tertiary Aquifer (fluvial) sand, gravel and clay	27 - 32	3501 - 13000
BSE Mesozoic and Palaeozoic Bedrock (basement) sedimentary (fractured rock): Sandstone, siltstone, mudstone, shale. Igneous (fractured rock): includes volcanics, granites, granodiorites.	32 - 232	3501 - 13000

Groundwater management unit (GMU)	Depth below surface (m)	PCV (ML/yr)
KOOWEERUP WSPA	ALL	12,915

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Department of Environment, Land, Water & Planning  
Email: [ground.water@delwp.vic.gov.au](mailto:ground.water@delwp.vic.gov.au)

For further information on groundwater licensing in this area contact:  
Southern Rural Water Corporation  
Phone: 1300 139 510  
Email: [srw@srw.com.au](mailto:srw@srw.com.au)  
Website: [www.srw.com.au](http://www.srw.com.au)

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Printed: 16 December 2022  
Date Updated: 11 January 2019

# How to read this report

## Introduction

Groundwater is part of the water cycle. When rain or snow falls on land, some of it evaporates, some flows to streams and rivers, and some seeps into the soil. Some of the water in the soil is used by plants but some continues to move down through the soil and rock until all the pores and cracks are full of water. This is known as the water table and this water is called groundwater.

Groundwater is a finite resource that, like surface water, is allocated under the Water Act (1989). A Bore Construction Licence is required to drill for groundwater including for domestic and stock purposes. Taking and using groundwater for commercial or irrigation purposes requires an additional licence.

## Purpose of this report

This report has been prepared to provide potential groundwater users with basic information about groundwater beneath their property. This includes the different geological layers, the depths of the layers and the salinity of groundwater in the layers. Information on the groundwater management units (GMU) and any associated caps on the volume that can be licensed (the PCV) are also provided.

## Definitions and context

Term	Description
Groundwater Catchment	An identified area of the State within which groundwater resources are connected.
Easting / Northing	The VICGRID 94 coordinates of the spot that was selected on the interactive map.
Groundwater Salinity	Indicates the possible concentration of salts within the groundwater. The salt content indicates the possible uses of the water (see the Beneficial Use Table below). Fertilisers and other contaminants can also enter groundwater and affect its use. It is up to you to make sure that the groundwater you use is suitable for your purpose.
Aquifer	An aquifer is a layer of soil or rock which stores usable volumes of groundwater. Aquifers are generally limestones, gravels and sands, as well as some fractured rocks where the cracks in the rock are open and connected (some basalts, sandstones and limestones). How much water can be pumped from an aquifer depends on how much water is stored in pores and cracks, how well connected the pores and cracks are, and how thick the layer is. It is more likely that volumes of water for irrigation and urban water supply will come from gravels, sands, limestones and basalts that are at least 30 metres thick. Low volumes of water for domestic and stock use are likely from any aquifer greater than 10 metres thick. The advice above is a guide only, as the amount of water available can be highly variable. Actual pumping volumes can only be determined from drilling, appropriate construction and testing of a bore.
Aquitard	<del>This aquifer is a layer of rock or soil that does not allow water to move through it easily, limiting its capacity to supply water. Aquitards are generally silts, clays and fractured rocks (where there are few cracks in the rock or the cracks are poorly connected).</del> An aquitard is a layer of rock or soil that does not allow water to move through it easily, limiting its capacity to supply water. Aquitards are generally silts, clays and fractured rocks (where there are few cracks in the rock or the cracks are poorly connected).
Groundwater Management Unit (GMU)	<del>A collective term for groundwater management areas (GMAs) and water supply protection areas (WSPAs). GMAs and WSPAs are defined areas and depths below the surface where rules for groundwater use may apply. WSPAs often have caps on groundwater use and plans describing how the resource is managed. GMAs usually have caps on groundwater use and may have local plans and rules. All other areas are managed directly through the Water Act (1989). Always check with your local Rural Water Corporation to be sure that the information on the GMU is correct for your specific location.</del> A collective term for groundwater management areas (GMAs) and water supply protection areas (WSPAs). GMAs and WSPAs are defined areas and depths below the surface where rules for groundwater use may apply. WSPAs often have caps on groundwater use and plans describing how the resource is managed. GMAs usually have caps on groundwater use and may have local plans and rules. All other areas are managed directly through the Water Act (1989). Always check with your local Rural Water Corporation to be sure that the information on the GMU is correct for your specific location.
Permissible Consumptive Volume (PCV)	A cap that is set under the Water Act (1989) declaring the total volume of groundwater that may be taken from the area. Once the PCV is reached, no additional extraction can be licensed for use within the area unless traded from another groundwater licence holder.
Depth to Water Table	This is an indication of the depth at which groundwater might first be encountered when drilling a bore. The depth can vary from year to year, and from place to place and may vary significantly from that indicated in this report.

## Beneficial Use Table

Salinity range (mg/L TDS)	Beneficial use as described by State Environment Protection Policy (Groundwaters of Victoria) s160							
	Potable water - preferred	Potable water - acceptable	Potable mineral water	Irrigation	Stock water	Industry	Ecosystem protection	Buildings and structures
<500	✓	✓	✓	✓	✓	✓	✓	✓
501-1000		✓	✓	✓	✓	✓	✓	✓
1001-3500			✓	✓	✓	✓	✓	✓
3501-13000					✓	✓	✓	✓
13001+						✓	✓	✓

## Accessibility

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# Groundwater Resource Report

Groundwater catchment: Westernport

VICGRID94 Easting: 2538238 Northing: 2379628

Depth to water table: < 5m

Water table salinity (mg/L): 3501 - 7000

Groundwater layers (Aquifers and Aquitards)	Depth below surface (m)	Groundwater salinity (mg/L)
QA Quaternary Aquifer sand, gravels, clay, silts	0 - 23	1001 - 3500
UTAF Upper Tertiary Aquifer (fluvial) sand, gravel and clay	23 - 26	3501 - 13000
BSE Mesozoic and Palaeozoic Bedrock (basement) sedimentary (fractured rock): Sandstone, siltstone, mudstone, shale. Igneous (fractured rock): includes volcanics, granites, granodiorites.	26 - 226	3501 - 13000

Groundwater management unit (GMU)	Depth below surface (m)	PCV (ML/yr)
KOOWEERUP WSPA	ALL	12,915

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<500	✓	✓	✓	✓	✓	✓	✓	✓
501-1000		✓	✓	✓	✓	✓	✓	✓
1001-3500			✓	✓	✓	✓	✓	✓
3501-13000					✓	✓	✓	✓
13001+						✓	✓	✓

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## REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

Page 1 of 2

VOLUME 10559 FOLIO 139

Security no : 124102210792R  
Produced 28/11/2022 11:35 AM

### LAND DESCRIPTION

Lot 2 on Plan of Subdivision 436220E.  
PARENT TITLE Volume 09471 Folio 569  
Created by instrument PS436220E 12/12/2000

### REGISTERED PROPRIETOR

Estate Fee Simple  
TENANTS IN COMMON  
As to 147 of a total of 400 equal undivided shares  
Sole Proprietor  
KATUNGA NOMINEES PTY LTD of 318 HALLAM NORTH ROAD LYSTERFIELD VIC 3156

### ENCUMBRANCES, CAVEATS AND NOTICES

CAVEAT as to part AU232024V 13/04/2021

Caveator  
TELSTRA CORPORATION LTD  
Grounds of Claim  
LEASE WITH THE FOLLOWING PARTIES AND DATE.  
Parties  
THE REGISTERED PROPRIETOR(S)  
Date  
01/03/2020  
Estate or Interest  
LEASEHOLD ESTATE  
Prohibition  
ANY INSTRUMENT THAT AFFECTS MY/OUR INTEREST  
Lodged by  
THOMSON GEER  
Notices to  
THOMSON GEER of LEVEL 7 19 GOUGER STREET ADELAIDE SA 5000

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Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

NOTICE Section 201UB Planning and Environment Act 1987  
AH336996N 01/07/2010

### DIAGRAM LOCATION

SEE PS436220E FOR FURTHER DETAILS AND BOUNDARIES

## REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

Page 2 of 2

### ACTIVITY IN THE LAST 125 DAYS

NUMBER		STATUS	DATE
AV813079W (E)	DISCHARGE OF MORTGAGE	Registered	02/08/2022
AV813080N (E)	DISCHARGE OF MORTGAGE	Registered	02/08/2022
AV813081L (E)	TRANSFER	Registered	02/08/2022
AV813082J (E)	MORTGAGE	Registered	02/08/2022
AV813083G (E)	CAVEAT	Registered	02/08/2022
AV813084E (E)	CAVEAT	Registered	02/08/2022
AV923821G (E)	MORTGAGE	Registered	12/09/2022
AV923825X (E)	MORTGAGE	Registered	12/09/2022
AV923848K (E)	MORTGAGE	Registered	12/09/2022
AV923869B (E)	MORTGAGE	Registered	12/09/2022
AW113006V (E)	DISCHARGE OF MORTGAGE	Registered	04/10/2022
AW113007T (E)	DISCHARGE OF MORTGAGE	Registered	04/10/2022
AW113008R (E)	MORTGAGE	Registered	04/10/2022

-----END OF REGISTER SEARCH STATEMENT-----

Additional information: (not part of the Register Search Statement)

### ADMINISTRATIVE NOTICES

NIL



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**HISTORICAL SEARCH STATEMENT**

**Land Use Victoria**

Produced 28/11/2022 11:36 AM

Volume 10559 Folio 139  
 Folio Creation: Created as a computer folio  
 Parent title Volume 09471 Folio 569

**RECORD OF HISTORICAL DEALINGS**

Date Lodged for Registration	Date Recorded on Register	Dealing	Imaged	Dealing Type and Details
------------------------------	---------------------------	---------	--------	--------------------------

**RECORD OF VOTS DEALINGS**

Date Lodged for Registration	Date Recorded on Register	Dealing	Imaged
------------------------------	---------------------------	---------	--------

22/07/2002	22/07/2002	AB431170P	Y
------------	------------	-----------	---

DISCHARGE OF MORTGAGE  
 MORTGAGE(S) REMOVED  
 S500600M  
 U383379L  
 W148727N

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22/07/2002	22/07/2002	AB431171M	Y
------------	------------	-----------	---

MORTGAGE OF LAND  
 MORTGAGE AB431171M 22/07/2002  
 LA TROBE CAPITAL & MORTGAGE CORPORATION LIMITED

14/06/2005	14/06/2005	AD678573T	Y
------------	------------	-----------	---

DISCHARGE OF MORTGAGE  
 MORTGAGE(S) REMOVED  
 AB431171M

14/06/2005	14/06/2005	AD678574R	Y
------------	------------	-----------	---

MORTGAGE OF LAND  
 MORTGAGE AD678574R 14/06/2005  
 BENDIGO BANK LTD

01/07/2010	02/07/2010	AH336996N	Y
------------	------------	-----------	---

NOTICE SECTION 201UB PLANNING AND ENVIRONMENT ACT 1987  
 NOTICE Section 201UB Planning and Environment Act 1987  
 AH336996N 01/07/2010

26/03/2015	26/03/2015	AL778445B	Y
------------	------------	-----------	---

CAVEAT  
 CAVEAT AL778445B 26/03/2015  
 Caveator  
 TELSTRA CORPORATION LTD  
 Grounds of Claim  
 LEASE WITH THE FOLLOWING PARTIES AND DATE.  
 Parties

**HISTORICAL SEARCH STATEMENT**

**Land Use Victoria**

THE REGISTERED PROPRIETOR(S)  
 Date  
 07/02/2015  
 Estate or Interest  
 LEASEHOLD ESTATE  
 Prohibition  
 ANY INSTRUMENT THAT AFFECTS MY/OUR INTEREST  
 Lodged by  
 AUSTRALIAN GOVERNMENT SOLICITOR  
 Notices to  
 AUSTRALIAN GOVERNMENT SOLICITOR of LEVEL 21 200 QUEEN STREET MELBOURNE VIC  
 3000

08/05/2017      30/05/2017      AN808843J      N

RECTIFICATION - REFER TO INSTRUMENT  
 Lot 2 on Plan of Subdivision 436220E.  
 PARENT TITLE Volume 09471 Folio 569  
 Created by instrument PS436220E 12/12/2000

20/12/2018      21/12/2018      AR788878J      N

RECTIFICATION ADD/REINSTATE NOTICE

29/06/2020      01/07/2020      AT383228R (E)      N

CAVEAT

CAVEAT AT383228R 29/06/2020  
 Caveator  
 MILLBROOK FUNDS PTY LTD  
 Grounds of Claim  
 MORTGAGE WITH THE FOLLOWING PARTIES AND DATE.  
 Parties  
 THE REGISTERED PROPRIETOR(S)  
 Date  
 22/06/2020  
 Estate or Interest  
 INTEREST AS MORTGAGEE  
 Prohibition  
 UNLESS AN INSTRUMENT IS EXPRESSED TO BE SUBJECT TO MY/OUR CLAIM  
 Lodged by  
 CAPSTONE KORONEOS LEGAL  
 Notices to  
 CAPSTONE KORONEOS LEGAL of LEVEL 9 91 WILLIAM STREET MELBOURNE VIC 3000

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13/07/2020      13/07/2020      AT423542R (E)      N

APPLICATION TO NOMINATE AN ECT TO AN ELECTRONIC INSTRUMENT  
 ELF Id: 204835362  
 Removed by Dealing AT424880P

14/07/2020      17/07/2020      AT424880P (E)      N

MORTGAGE OF LAND  
 MORTGAGE AT424880P 14/07/2020  
 MILLBROOK FUNDS PTY LTD  
 AND LAPSING OF CAVEAT AT383228R

21/12/2020      04/01/2021      AT898763V (E)      N

CAVEAT

CAVEAT AT898763V 21/12/2020



Grounds of Claim  
 DECLARATION OF TRUST WITH THE FOLLOWING PARTIES AND DATE.

**HISTORICAL SEARCH STATEMENT**

**Land Use Victoria**

DATE  
10/11/2019  
Estate or Interest  
FREEHOLD ESTATE  
Prohibition  
ABSOLUTELY  
Lodged by  
WHITE ELLIS LAWYERS

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29/01/2021      03/02/2021      AT993389N (E)      N

**CAVEAT**

CAVEAT AT993389N 29/01/2021  
Caveator  
MILLBROOK FUNDS PTY LTD  
Grounds of Claim  
MORTGAGE WITH THE FOLLOWING PARTIES AND DATE.

27/01/2021  
Estate or Interest  
INTEREST AS MORTGAGEE  
Prohibition  
UNLESS AN INSTRUMENT IS EXPRESSED TO BE SUBJECT TO MY/OUR CLAIM  
Lodged by  
CAPSTONE KORONEOS LEGAL  
Notices to  
CAPSTONE KORONEOS LEGAL of LEVEL 9 91 WILLIAM STREET MELBOURNE VIC 3000

23/02/2021      23/02/2021      AU076441V (E)      N

APPLICATION TO NOMINATE AN ECT TO AN ELECTRONIC INSTRUMENT  
ELF Id: 205837157

04/03/2021      04/03/2021      AU108506V (E)      N

APPLICATION TO WITHDRAW A NOMINATION OF AN ECT

17/03/2021      17/03/2021      AU145565T (E)      N

APPLICATION TO NOMINATE AN ECT TO A PAPER INSTRUMENT  
Nominated Dealing Type: Mortgage  
Nominated Dealing Party : to AVNI SELIMI, GULNUR SELIMI, MILLBROOK  
Removed by Dealing AU187621Y

30/03/2021      30/03/2021      AU187621Y      Y

MORTGAGE OF LAND  
MORTGAGE AU187621Y 30/03/2021  
MILLBROOK FUNDS PTY LTD  
As to the interest of

AND LAPSING OF CAVEAT AT993389N

09/04/2021      14/04/2021      AU219194T (E)      N

WITHDRAWAL OF CAVEAT  
CAVEAT AL778445B REMOVED

13/04/2021      14/04/2021      AU232024V      Y

**HISTORICAL SEARCH STATEMENT**

**Land Use Victoria**

**CAVEAT**

CAVEAT as to part AU232024V 13/04/2021

Caveator

TELSTRA CORPORATION LTD

Grounds of Claim

LEASE WITH THE FOLLOWING PARTIES AND DATE.

Parties

THE REGISTERED PROPRIETOR(S)

Date

01/03/2020

Estate or Interest

LEASEHOLD ESTATE

Prohibition

ANY INSTRUMENT THAT AFFECTS MY/OUR INTEREST

Lodged by

THOMSON GEER

Notices to

THOMSON GEER of LEVEL 7 19 GOUGER STREET ADELAIDE SA 5000

26/05/2021            31/05/2021            AU382157K (E)            N

**WITHDRAWAL OF CAVEAT**

CAVEAT AT898763V REMOVED

27/05/2021            03/06/2021            AU388970B (E)            N

**CAVEAT**

CAVEAT AU388970B 27/05/2021

Caveator

MILLBROOK FUNDS PTY LTD

Grounds of Claim

MORTGAGE WITH THE FOLLOWING PARTIES AND DATE

[REDACTED]

Date

25/05/2021

Estate or Interest

INTEREST AS MORTGAGEE

Prohibition

UNLESS AN INSTRUMENT IS EXPRESSED TO BE SUBJECT TO MY/OUR CLAIM

Lodged by

CAPSTONE KORONEOS LEGAL

Notices to

CAPSTONE KORONEOS LEGAL of LEVEL 9 91 WILLIAM STREET MELBOURNE VIC 3000

10/06/2021            10/06/2021            AU438810A (E)            N

**APPLICATION TO NOMINATE AN ECT TO AN ELECTRONIC INSTRUMENT**

ELF Id: 206519617

Removed by Dealing AU447386K

11/06/2021            17/06/2021            AU447386K (E)            N

**TRANSMISSION APPLICATION**

FROM

[REDACTED]

TO:

RESULTING PROPRIETORSHIP:

Estate Fee Simple

TENANTS IN COMMON

As to 1 of a total of 4 equal undivided shares

[REDACTED]

AU447386K 11/06/2021

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## HISTORICAL SEARCH STATEMENT

## Land Use Victoria

Page 5 of 9



PS436220E 12/12/2000

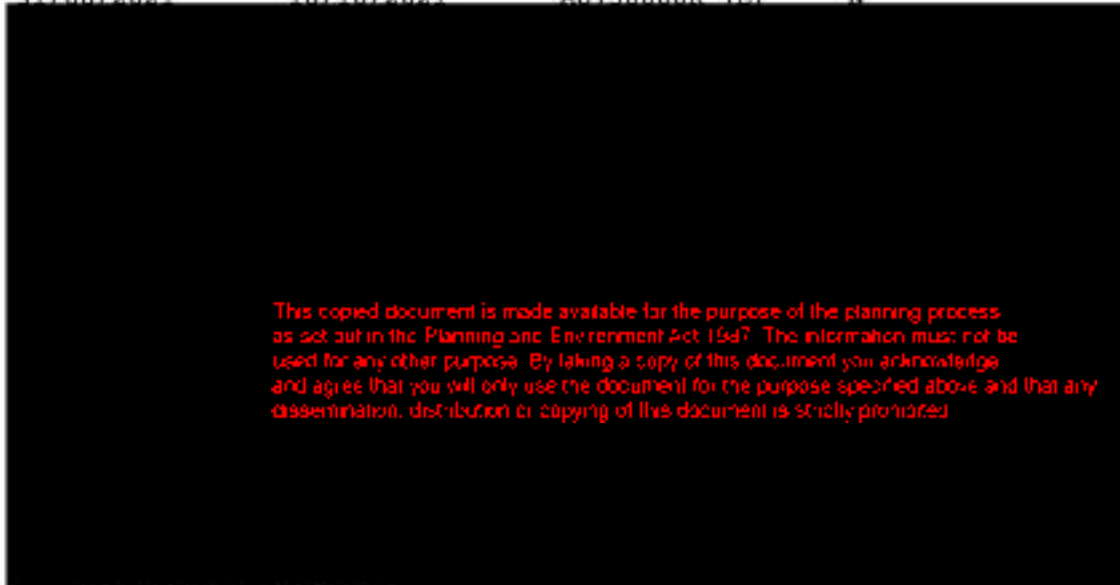
11/08/2021 11/08/2021 AU679260N (E) N

APPLICATION TO NOMINATE AN ECT TO AN ELECTRONIC INSTRUMENT

ELF Id: 206643651

Removed by Dealing AU758866K

31/08/2021 18/10/2021 AU758866K (E) N



01/07/2022 02/08/2022 AV813079W (E) N

DISCHARGE OF MORTGAGE

AFFECTED ENCUMBRANCE(S) AND REMOVED MORTGAGE(S)

MORTGAGE AD678574R

01/07/2022 02/08/2022 AV813080N (E) N

DISCHARGE OF MORTGAGE

AFFECTED ENCUMBRANCE(S) AND REMOVED MORTGAGE(S)

MORTGAGE AT424880P

MORTGAGE AU187621Y

01/07/2022 02/08/2022 AV813081L (E) N

TRANSFER OF LAND BY ENDORSEMENT



RESULTING PROPRIETORSHIP:

Estate Fee Simple





VIC 3156

01/07/2022      02/08/2022      AV813082J (E)      N

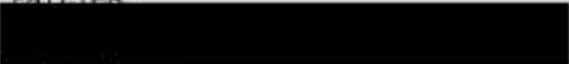
MORTGAGE OF LAND

MORTGAGE AV813082J 01/07/2022  
MILLBROOK MORTGAGE MANAGEMENT LTD

01/07/2022      02/08/2022      AV813083G (E)      N

CAVEAT

CAVEAT AV813083G 01/07/2022  
Caveator  
MILLBROOK FUNDS PTY LTD  
Grounds of Claim  
MORTGAGE WITH THE FOLLOWING PARTIES AND DATE.  
Parties



22/06/2020  
Estate or Interest  
INTEREST AS MORTGAGEE  
Prohibition  
UNLESS AN INSTRUMENT IS EXPRESSED TO BE SUBJECT TO MY/OUR CLAIM  
Lodged by  
CAPSTONE KORONEOS LEGAL  
Notices to  
CAPSTONE KORONEOS LEGAL of LEVEL 9 91 WILLIAM STREET MELBOURNE VIC 3000

01/07/2022      02/08/2022      AV813084E (E)      N

CAVEAT

CAVEAT AV813084E 01/07/2022  
Caveator  
MILLBROOK FUNDS PTY LTD  
Grounds of Claim  
MORTGAGE WITH THE FOLLOWING PARTIES AND DATE.



Date  
27/01/2021  
Estate or Interest  
INTEREST AS MORTGAGEE  
Prohibition  
UNLESS AN INSTRUMENT IS EXPRESSED TO BE SUBJECT TO MY/OUR CLAIM  
Lodged by  
CAPSTONE KORONEOS LEGAL  
Notices to  
CAPSTONE KORONEOS LEGAL of LEVEL 9 91 WILLIAM STREET MELBOURNE VIC 3000

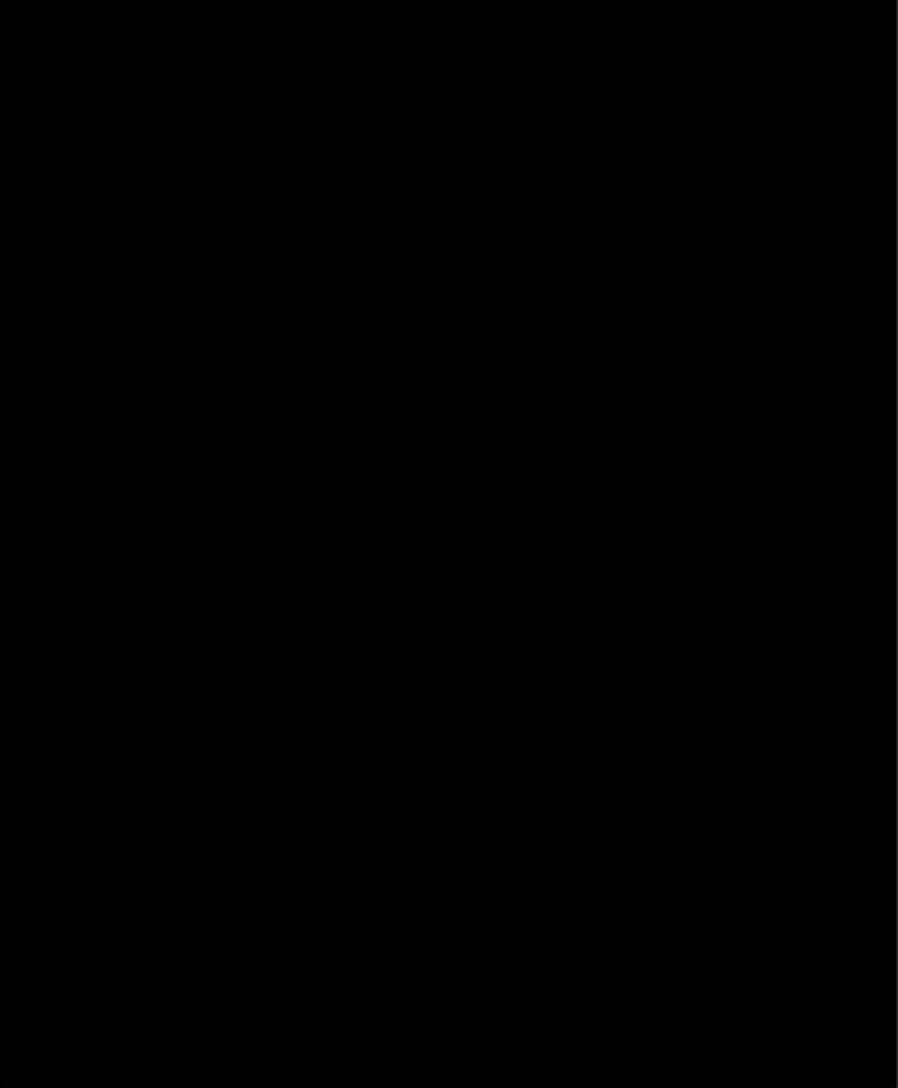
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03/08/2022      12/09/2022      AV923821G (E)      N

MORTGAGE OF LAND

MORTGAGE AV923821G 03/08/2022  
MILLBROOK FUNDS PTY LTD  
AND LAPSING OF CAVEAT AU388970B

03/08/2022 12/09/2022 AV923825X (E) N



STATEMENT END

**VOTS Snapshot**

Volume 10559 Folio 139  
124002422308K  
Produced 22/07/2002 11:23 am

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**LAND DESCRIPTION**

Lot 2 on Plan of Subdivision 436220E.  
PARENT TITLE Volume 09471 Folio 569  
Created by instrument PS436220E 12/12/2000

**REGISTERED PROPRIETOR**

Estate Fee Simple



**ENCUMBRANCES, CAVEATS AND NOTICES**

MORTGAGE S500600M 24/05/1993  
M.M. & R. MORTGAGE NOMINEES PTY LTD  
Variation of Mortgage U383379L 30/08/1996  
Variation of Mortgage W148727N 08/07/1999

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

**DIAGRAM LOCATION**

SEE PS436220E FOR FURTHER DETAILS AND BOUNDARIES

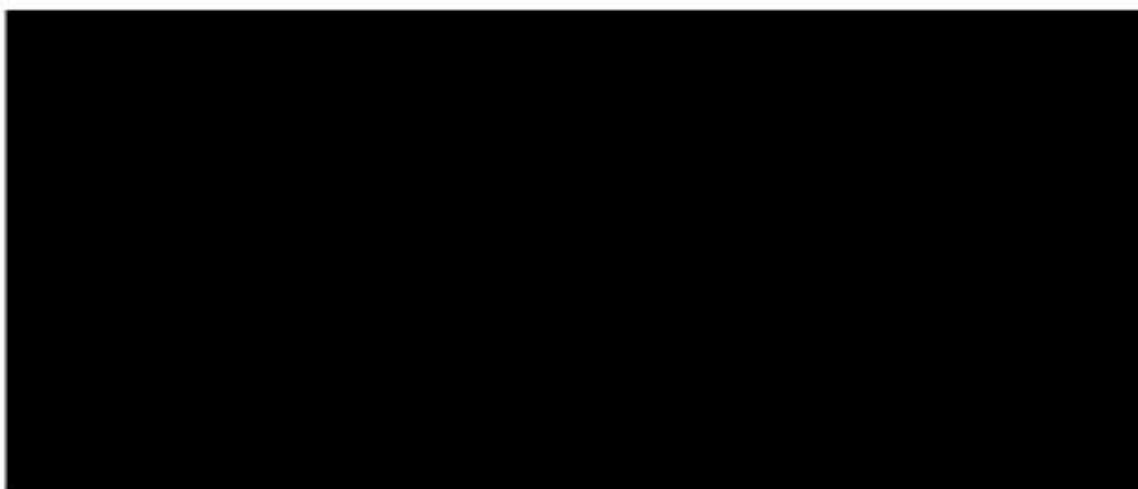
**HISTORICAL REPRINT(S)**

Volume 10559 Folio 139  
113480679676J Page 1  
Produced 13/12/2000 02:16 pm

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**LAND**

LOT 2 on Plan of Subdivision 436220E.  
PARENT TITLE Volume 09471 Folio 569  
Created by instrument PS436220E 12/12/2000



**ENCUMBRANCES, CAVEATS AND NOTICES**

**MORTGAGES AND CHARGES IN PRIORITY RANKING**

1	S500600M	24/05/1993	MORTGAGE		
	M.M. & R. MORTGAGE NOMINEES PTY LTD				
	Variation of Mortgage			U383379L	30/08/1996
	Variation of Mortgage			W148727N	08/07/1999

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988.

Any other encumbrances shown or entered on the plan.

SEE PS436220E FOR FURTHER DETAILS AND BOUNDARIES

END OF CERTIFICATE

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Document Type	<b>Plan</b>
Document Identification	<b>PS436220E</b>
Number of Pages (excluding this cover sheet)	<b>2</b>
Document Assembled	<b>28/11/2022 11:36</b>

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<b>PLAN OF SUBDIVISION</b>	STAGE No.	LTO USE ONLY <b>EDITION 1</b>	PLAN NUMBER <b>PS436220 E</b>
----------------------------	-----------	----------------------------------	----------------------------------

**LOCATION OF LAND**

PARISH: Pakanham

TOWNSHIP: —

SECTION: —

CROWN ALLOTMENT: 7<sup>A</sup> (Part)

CROWN PORTION: —

LTO BASE RECORD: Parish Plan  
TITLE REFERENCES: Vol. 9471 Fol. 56A

LAST PLAN REFERENCES: LP 98925 Lot 1

POSTAL ADDRESS: 715 Henry Road  
(At time of subdivision) Pakanham 3810

AMG Co-ordinates  
(of approximate centre of land in plan) E 462 900  
N 5 453 600 ZONE 55

**COUNCIL CERTIFICATION AND ENDORSEMENT**

COUNCIL NAME: **CARDINIA SHIRE COUNCIL** REF: **500/020**

1 This plan is certified under Section 6 of the Subdivision Act 1988

2 This plan is certified under Section 117 of the Subdivision Act 1988.  
Date of original certification under Section 6: / /

3 This is a statement of compliance issued under Section 21 of the Subdivision Act 1988

**OPEN SPACE**

(i) A requirement for public open space under Section 18 of the Subdivision Act 1988 has/has not been made

(ii) The requirement has been satisfied

(iii) The requirement is to be satisfied in Stage

Council Delegate  
Council Seal  
Date: **2/5/2020**

Re-certified under Section 117 of the Subdivision Act 1988

Council Delegate  
Council Seal  
Date: / /

**VESTING OF ROADS AND/OR RESERVES**

LENGTH	COUNCIL BODY/PERSON
Nil	Nil

**NOTATIONS**

STAGING: This is not a staged subdivision  
Planning permit No. **T9800257**

DEPTH LIMITATION: 15 - 24 m

Lot 1 is not the subject of this survey.

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SURVEY: THIS PLAN IS ~~NOT~~ BASED ON SURVEY  
THIS SURVEY HAS BEEN CONNECTED TO PERMANENT WORKS No. 15  
IN PROCLAIMED SURVEY AREA No.

**EASEMENT INFORMATION**

LEGEND: A - Appurtenant Easement    E - Encumbering Easement    R - Encumbering Easement (Rigid)

Easement Reference	Purpose	Width (Metres)	Origin	Land Benefited in Favour Of

**LTO USE ONLY**

STATEMENT OF COMPLIANCE/EXEMPTION STATEMENT

RECEIVED

DATE: **5/6/20**

**LTO USE ONLY**

PLAN REGISTERED:  
TIME: **2:00**  
DATE: **12/12/20**

*[Signature]*  
Assistant Registrar of Titles

SHEET: **OF 2 SHEETS**

NOBELIUS LAND SURVEYOR'S P/L  
P.O. Box 461  
PAKENHAM 3810  
PHONE 59414112  
FAX 59414330

LICENSED SURVEYOR (PRACTICE) **R. P. NOBELIUS** ...  
SIGNATURE: ..... DATE: **3/2/2020**  
REF: **P 2436** VERSION: .....

DATE: **2/5/2020**  
COUNCIL DELEGATE SIGNATURE  
ORIGINAL SHEET SIZE: **A3**

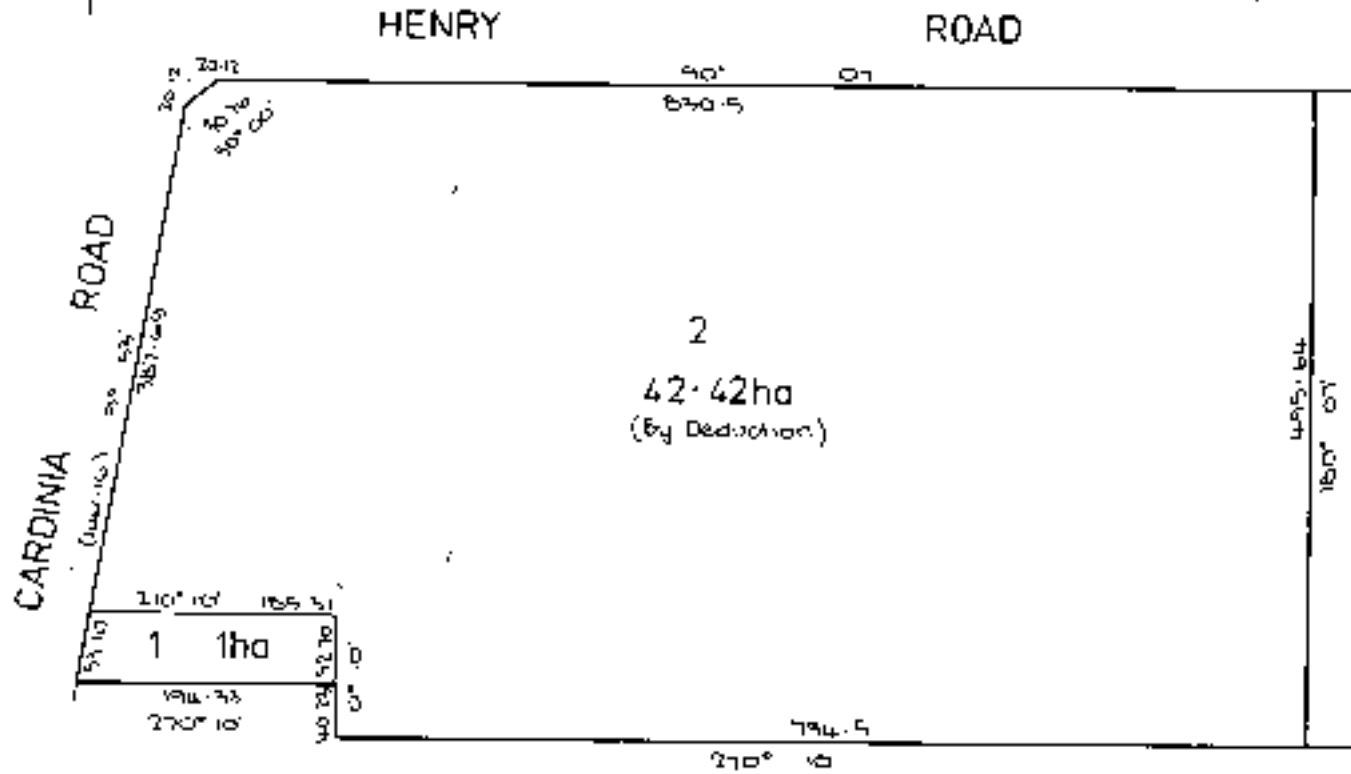
**PLAN OF SUBDIVISION**

STAGE No.

PLAN NUMBER

**PS 436220E**

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NOBILIUS LAND SURVEYORS PT.  
 P.O. Box 461  
 PARKVIEW QLD  
 PHONE 59414912  
 FAX 59414930

<p>0 40 80 120 160 200 1 FOOT = 30.48 CM</p>	ORIGINAL
	SCALE SHEET 1:4000 A3

LICENSED SURVEYOR (PRINT) **R. P. NOBILIUS**  
 SIGNATURE .....  
 No. P 24766 VERSION

SHEET 2 OF 2 SHEETS  
 DATE ..  
 COUNCIL DELEGATE SIGNATURE

**REGISTER SEARCH STATEMENT (Title Search) Transfer of  
Land Act 1958**

Page 1 of 1

VOLUME 09622 FOLIO 089

Security no : 124102209500V  
Produced 28/11/2022 11:11 AM

**LAND DESCRIPTION**

Lot 1 on Title Plan 099673B (formerly known as part of Lot 2 on Plan of Subdivision 098925).  
PARENT TITLE Volume 09345 Folio 244  
Created by instrument L657928M 09/05/1985

**REGISTERED PROPRIETOR**

Estate Fee Simple  
Sole Proprietor  
DURASTEEL STRUCTURES PTY LTD of 34-50 NATHAN ROAD DANDENONG SOUTH VIC 3175  
AR473138J 20/09/2018

**ENCUMBRANCES, CAVEATS AND NOTICES**

CAVEAT AV078921L 30/11/2021

Caveator  
ESR INVESTMENT MANAGEMENT 1 (AUSTRALIA) PTY LTD ACN: 626831945  
Grounds of Claim  
PURCHASERS' CONTRACT WITH THE FOLLOWING PARTIES AND DATE.

Parties  
THE REGISTERED PROPRIETOR(S)

Date  
30/11/2021  
Estate or Interest  
FREEHOLD ESTATE

Prohibition  
ABSOLUTELY

Lodged by  
CORRS CHAMBERS WESTGARTH

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[REDACTED] of LEVEL 29 20 BOND STREET SYDNEY NSW 2000

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

**DIAGRAM LOCATION**

SEE TP099673B FOR FURTHER DETAILS AND BOUNDARIES

**ACTIVITY IN THE LAST 125 DAYS**

NIL

-----END OF REGISTER SEARCH STATEMENT-----

Additional information: (not part of the Register Search Statement)

Street Address: 92 ENTERPRISE ROAD PAKENHAM VIC 3810

DOCUMENT END

## HISTORICAL SEARCH STATEMENT

## Land Use Victoria

Page 1 of 6

Produced 28/11/2022 11:16 AM

Volume 9622 Folio 089

Folio Creation: Created as paper folio continued as computer folio

Parent title Volume 09345 Folio 244

THE IMAGE OF THE FOLIO CEASED TO BE THE DIAGRAM LOCATION ON 24/08/2002 05:01:25 AM

### RECORD OF HISTORICAL DEALINGS

Date Lodged for Registration	Date Recorded on Register	Dealing	Imaged	Dealing Type and Details
------------------------------	---------------------------	---------	--------	--------------------------

### RECORD OF VOTS DEALINGS

Date Lodged for Registration	Date Recorded on Register	Dealing	Imaged
------------------------------	---------------------------	---------	--------

25/08/2006	25/08/2006	AE567391L	Y
------------	------------	-----------	---

#### CAVEAT

CAVEAT AE567391L 25/08/2006

Caveator

PORTBURY DEVELOPMENT CO. PTY LTD

Capacity PURCHASER/FEE SIMPLE

Lodged by

O'DONOHUE N & CO

Notices to

O'DONOHUE N & CO of 1ST FLOOR, 180 QUEEN STREET, MELBOURNE 3000

07/09/2007	22/10/2007	AF323201Y	Y
------------	------------	-----------	---

#### DISCHARGE OF MORTGAGE

MORTGAGE(S) REMOVED

U635450S

	202W		Y
--	------	--	---

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#### RESULTING PROPRIETORSHIP:

Estate Fee Simple

Sole Proprietor

HENRY ROAD INVESTMENTS PTY LTD of 1/86 MT ELIZA WAY MT ELIZA VIC

3930

AF323202W 07/09/2007

AND LAPSING OF CAVEAT AE567391L

07/09/2007	22/10/2007	AF323203U	Y
------------	------------	-----------	---

## HISTORICAL SEARCH STATEMENT

## Land Use Victoria

### MORTGAGE OF LAND

MORTGAGE AF323203U 07/09/2007  
NATIONAL AUSTRALIA BANK LTD

01/07/2010            02/07/2010            AH336996N            Y

NOTICE SECTION 201UB PLANNING AND ENVIRONMENT ACT 1987  
NOTICE Section 201UB Planning and Environment Act 1987  
AH336996N 01/07/2010

24/03/2018            26/03/2018            AQ857024U (E)            N

### CAVEAT

CAVEAT AQ857024U 24/03/2018  
Caveator  
DURASTEEL STRUCTURES PTY LTD  
Grounds of Claim  
PURCHASERS' CONTRACT WITH THE FOLLOWING PARTIES AND DATE.  
Parties  
THE REGISTERED PROPRIETOR(S)  
Date  
20/03/2018  
Estate or Interest  
FREEHOLD ESTATE  
Prohibition  
ABSOLUTELY  
Lodged by  
MACPHERSON KELLEY LAWYERS VICTORIA  
Notices to  
MACPHERSON KELLEY of 40-42 SCOTT STREET DANDENONG VIC 3175

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04/09/2018            04/09/2018            AR415696A (E)            N

APPLICATION TO NOMINATE AN ECT TO A PAPER INSTRUMENT  
Nominated Dealing Type: Discharge of Mortgage  
Nominated Dealing Party : to National Australia Bank Limited

13/09/2018            13/09/2018            AR449862T (E)            N

### APPLICATION TO WITHDRAW A NOMINATION OF AN ECT

20/09/2018            09/11/2018            AR473137L (E)            N

DISCHARGE OF MORTGAGE  
AFFECTED ENCUMBRANCE(S) AND REMOVED MORTGAGE(S)  
MORTGAGE AF323203U

20/09/2018            09/11/2018            AR473138J (E)            N

### TRANSFER OF LAND BY ENDORSEMENT AQ857024U

FROM:  
HENRY ROAD INVESTMENTS PTY LTD  
TO:  
RESULTING PROPRIETORSHIP:  
Estate Fee Simple  
Sole Proprietor  
DURASTEEL STRUCTURES PTY LTD of 34-50 NATHAN ROAD DANDENONG SOUTH VIC  
3175  
AR473138J 20/09/2018

CANCELLED

20/12/2018            20/12/2018            AR787456S            N

### RECTIFICATION ADD/REINSTATE NOTICE



**HISTORICAL SEARCH STATEMENT**

**Land Use Victoria**

04/03/2019 12/08/2019 AR976895L N

**RECTIFICATION - REFER TO INSTRUMENT**

Lot 1 on Title Plan 099673B (formerly known as part of Lot 2 on Plan of Subdivision 098925).  
 PARENT TITLE Volume 09345 Folio 244  
 Created by instrument L657928M 09/05/1985

04/03/2019 18/10/2019 AR976904N N

**RECTIFICATION - REFER TO INSTRUMENT**

Lot 1 on Title Plan 099673B (formerly known as part of Lot 2 on Plan of Subdivision 098925).  
 PARENT TITLE Volume 09345 Folio 244  
 Created by instrument L657928M 09/05/1985

30/11/2021 06/12/2021 AV078921L (E) N

**CAVEAT**

CAVEAT AV078921L 30/11/2021  
 Caveator  
 ESR INVESTMENT MANAGEMENT 1 (AUSTRALIA) PTY LTD  
 Grounds of Claim  
 PURCHASERS' CONTRACT WITH THE FOLLOWING PARTIES AND DATE.  
 Parties  
 THE REGISTERED PROPRIETOR(S)  
 Date  
 30/11/2021  
 Estate or Interest  
 FREEHOLD ESTATE  
 Prohibition  
 ABSOLUTELY  
 Lodged by  
 CORRS CHAMBERS WESTGARTH  
 Notices to  
 [REDACTED] of LEVEL 29 20 BOND STREET SYDNEY NSW 2000

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09/02/2022 09/02/2022 AV314516J N

APPLICATION FOR REMOVAL OF ENCUMBRANCE  
 NOTICE AH336996N REMOVED

STATEMENT END

**VOTS Snapshot**

Volume 09622 Folio 089  
 124018892273Y  
 Produced 25/08/2006 09:38 am

**LAND DESCRIPTION**

Lot 1 on Title Plan 099673B (formerly known as part of Lot 2 on Plan of Subdivision 098925).  
 PARENT TITLE Volume 09345 Folio 244  
 Created by instrument L657928M 09/05/1985

**REGISTERED PROPRIETOR**

## HISTORICAL SEARCH STATEMENT

## Land Use Victoria

Page 4 of 6

Estate Fee Simple  
TENANTS IN COMMON



### ENCUMBRANCES, CAVEATS AND NOTICES



Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

### DIAGRAM LOCATION

SEE TP099673B FOR FURTHER DETAILS AND BOUNDARIES

---

### Paper Title Images

9622/089 - Version 0, Date 22/03/1999

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3<sup>rd</sup> Cert.  
L 657928M

**ORIGINAL**

**NOT TO BE TAKEN FROM THE OFFICE  
OF TITLES**



REGISTER BOOK

VOL. 9622 FOL. 089

# Certificate of Title

UNDER THE "TRANSFER OF LAND ACT"

L. B. VARY PROPRIETARY LIMITED of 14 Wakefield Street Hawthorn is the proprietor of an estate in fee simple subject to the encumbrances notified hereunder in so much as lies above the depth of 15.24 METRES below the surface of all that piece of land in the Parish of Pakenham County - - - - of Mornington being part of Lot 2 on Plan of Subdivision No.98925 which land is shown enclosed by continuous lines on the map hereon - - - - -

DATE: 9/5/85  
DERIVED FROM VOL.9345 FOL.244  
L657928M

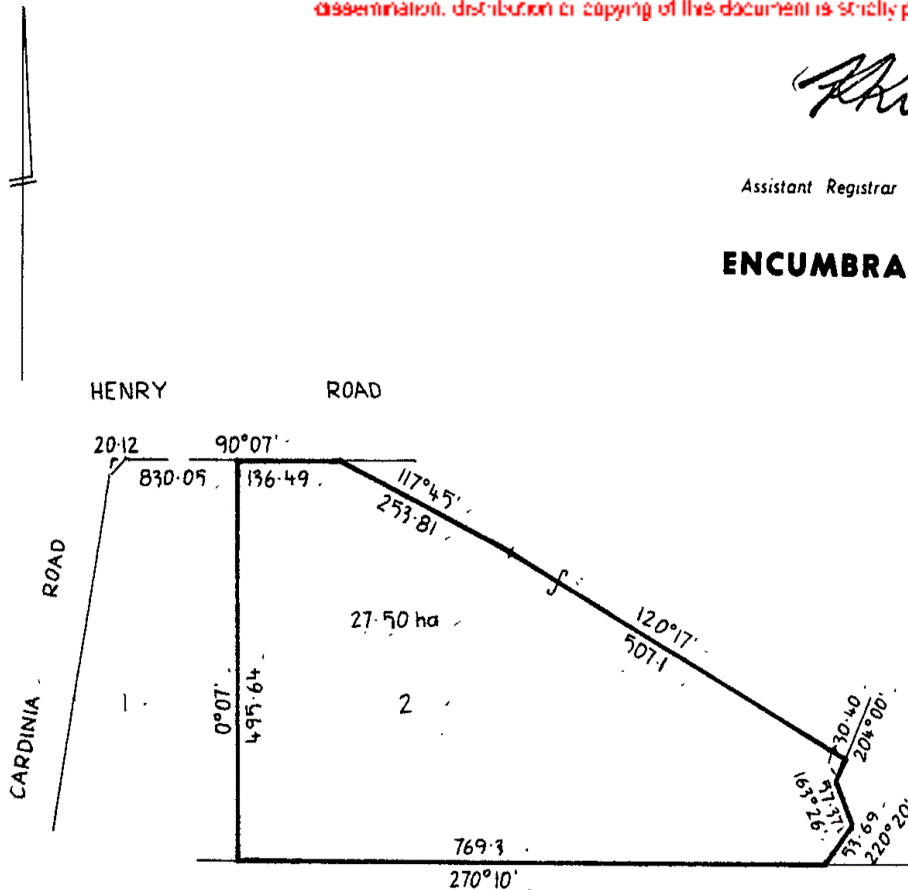
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*Thione*

Assistant Registrar of Titles



## ENCUMBRANCES REFERRED TO



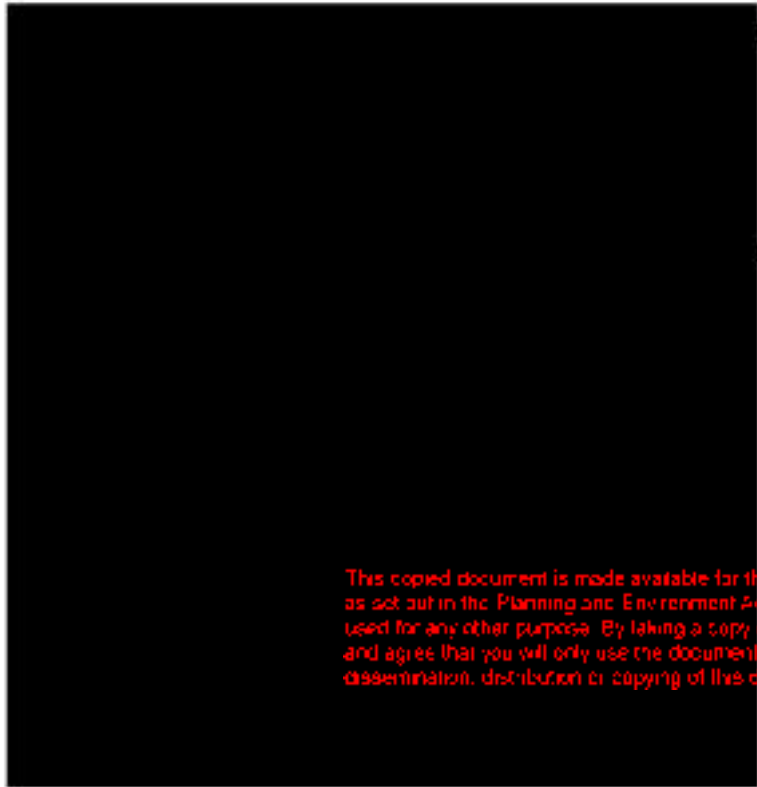
T09622-089-1-7

RESERVE

MEASUREMENTS ARE IN METRES

RM

VOL 9622 FOL 089



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# Imaged Document Cover Sheet

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Document Type	<b>Plan</b>
Document Identification	<b>TP099673B</b>
Number of Pages (excluding this cover sheet)	<b>1</b>
Document Assembled	<b>28/11/2022 11:17</b>

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TITLE PLAN

EDITION 1

TP 99673B

Location of Land

Notations

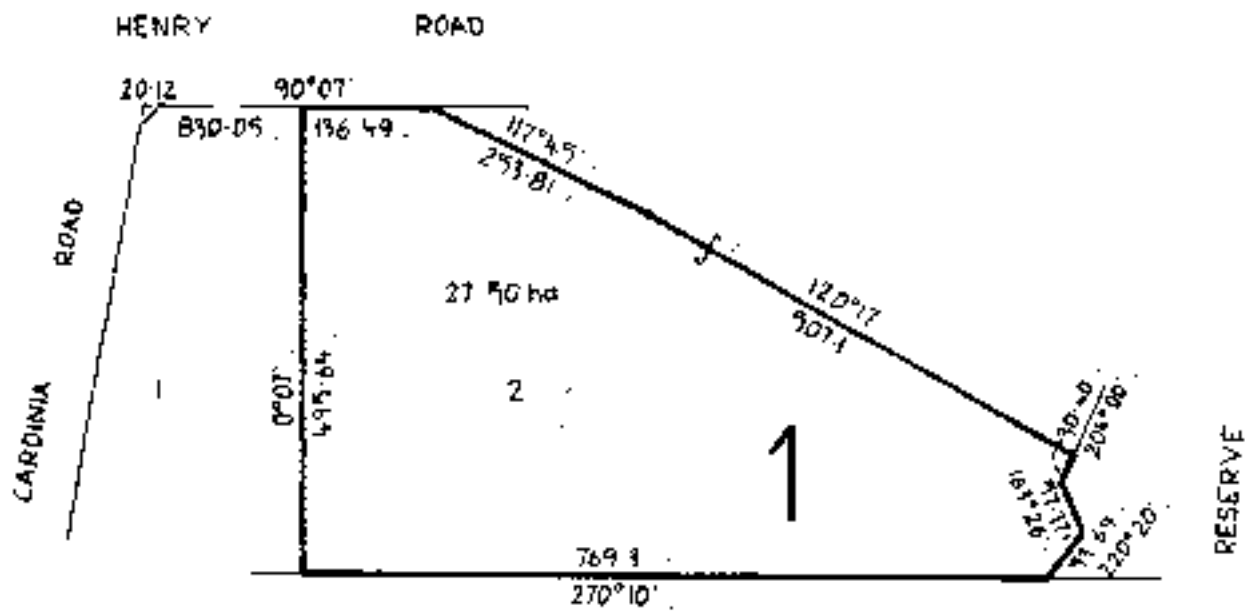
Name: PARKHUB  
 Township:  
 Section:  
 Crown Allotment:  
 Crown Portion:

Lot File Reference (LFR'S)  
 Derived From: VOL 9822 FOL 980  
 Depth Limitation: 15.24 -

ANY REFERENCE TO MAP IN THE TEXT MEANS THE DIAGRAM SHOWN ON THIS TITLE PLAN

Description of Land + Easement Information

THIS PLAN IS ULN PLAN 440 FOR THE LAND REGISTRY, LAND VICTORIA FOR TITLE DIAGRAM NUMBER 8 AS PART OF THE LAND TITLES AUTOMATION PROJECT  
 COMPILED: 05/06/2022  
 VERIFIED: 5/00



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TABLE OF PARCEL IDENTIFIERS

NOTE: (1) Where multiple parcels are generated or shown on this title plan this copy will apply separately to each parcel under Section 24 of the Survey and Land Act 1957.

Parcel 1 = AT 2 (7) 1410-515

LENGTHS ARE IN METRES

Scale = 0.004 : 1  
 1:25000

Sheet 1 of 1 sheets

# COPY OF RECORD IN THE VICTORIAN WATER REGISTER LICENCE TO CONSTRUCT WORKS

## *under Section 67 of the Water Act 1989*

*The information in this copy of record is as recorded at the time of printing. Current information should be obtained by a search of the register. The State of Victoria does not warrant the accuracy or completeness of this information and accepts no responsibility for any subsequent release, publication or reproduction of this information.*

*This licence does not remove the need to apply for any authorisation or permission necessary under any other Act of Parliament with respect to anything authorised by the works licence.*

*Water used under this licence is not fit for any use that may involve human consumption, directly or indirectly, without first being properly treated.*

*This licence is not to be interpreted as an endorsement of the design and/or construction of any works (including dams). The Authority does not accept any responsibility or liability for any suits or actions arising from injury, loss, damage or death to person or property which may arise from the maintenance, existence or use of the works.*

*Each person named as a licence holder is responsible for ensuring all the conditions of this licence are complied with.*

This licence authorises its holders to construct the described works, subject to the conditions.

### **Licence Holder(s)**

YOVAN CANABADY of 2 ALEX AVENUE MOORABBIN VIC 3189

### **Licence Contact Details**

Y CANABADY

2 ALEX AVENUE  
MOORABBIN VIC 3189

### **Licence Details**

Expiry date	12 Dec 2023
Status	Active
Authority	Southern Rural Water
Name of waterway or aquifer	NA for construct/decommission
Water system	Koo Wee Rup (GMU)

### **Summary of Licensed Works**

The details in this section are a summary only. They are subject to the conditions specified in this licence.

<i>Works ID</i>	<i>Works type</i>	<i>Use of water</i>
WRK135488	Bore	Investigation
WRK135489	Bore	Investigation
WRK135490	Bore	Investigation

### **Description of Licensed Works**

---

**WORKS ID** WRK135488

Works type Bore  
Works subtype Drilled bore  
Proposed maximum depth 50.000 metres

**Works location**

*Easting* *Northing* *Zone MGA*  
363848.078 5783638.996 Zone 55

**Land description**

Volume 9622 Folio 089  
Lot 1 of Plan TP099673B

**Property address**

92 ENTERPRISE ROAD, PAKENHAM, VIC 3810

**Description of Licensed Works**

---

**WORKS ID** WRK135489

Works type Bore  
Works subtype Drilled bore  
Proposed maximum depth 50.000 metres

**Works location**

*Easting* *Northing* *Zone MGA*  
363541.394 5783530.424 Zone 55

**Land description**

Volume 9622 Folio 089  
Lot 1 of Plan TP099673B

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**Property address**

92 ENTERPRISE ROAD, PAKENHAM, VIC 3810

**Description of Licensed Works**

---

**WORKS ID** WRK135490

Works type Bore  
Works subtype Drilled bore  
Proposed maximum depth 50.000 metres

**Works location**

*Easting* *Northing* *Zone MGA*  
362823.159 5783727.044 Zone 55

**Land description**

Volume 10559 Folio 139  
Lot 2 of Plan PS436220E

**Property address**

26A ENTERPRISE ROAD, PAKENHAM, VIC 3810

**Related Instruments**

**Related entitlements** Nil

**Related water-use entities** Nil

**Application History**

<i>Reference</i>	<i>Type</i>	<i>Status</i>	<i>Lodged date</i>	<i>Approved date</i>	<i>Recorded date</i>
WLI617500	Issue	Approved	12 Dec 2022	12 Dec 2022	

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## Conditions

Licence WLE084604 is subject to the following conditions:

### Siting and construction

- 1 The bore(s) must be drilled at the location specified in the application approved by the Authority.
- 2 If after drilling the bore is considered unsatisfactory a replacement bore may be drilled on the land specified in the licence.

### Preventing pollution

- 3 All earthworks must be carried out, and all drilling fluids and waters produced during construction and development must be disposed of, in ways that avoid contaminating native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.
- 4 Construction must stop immediately if the Authority reasonably believes that fuel, lubricant, drilling fluid, soil or water produced during construction and development is at risk of being spilled into native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.
- 5 The licence holder must construct and maintain bund walls, in accordance with the timeframe, specifications, guidelines or standards prescribed by the Authority, to prevent fuel, lubricant, drilling fluid, soil or water produced during construction and development from being spilled into native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.

### Drilling licence and supervision requirements

- 6 The bore(s) must be constructed by, or under the direct supervision of, a driller licensed under the Water Act 1989 and endorsed as a Class 1, 2, or 3 driller, with appropriate endorsements.
- 7 If artesian pressure is expected or encountered, then a driller licensed under the Water Act 1989, and endorsed as a class 3 driller, must install casing in the bore(s) to a suitable depth, and in a suitable manner, to prevent its outbreak. A suitable valve must also be fitted to the bore.

### Bore completion report

- 8 A Bore Completion Report must be submitted to the Authority within 28 working days of the bore(s) being completed.

### Protecting water resources

- 9 At the completion of drilling, and before the drilling rig leaves the site, all bore(s) must be decommissioned so as to eliminate physical hazards, conserve aquifer yield, prevent groundwater contamination and prevent the intermingling of desirable and undesirable waters.
- 10 The bore(s) must be located at least 30 metres from any authority's channel, reserve or easement unless authorised by the Authority.

### Protecting water quality

- 11 Drilling must not exceed the maximum depth.
- 12 The bore(s) must be constructed so as to prevent aquifer contamination caused by vertical flow outside the casing.
- 13 If two or more aquifers are encountered, the bore(s) must be constructed to ensure that an impervious seal is made and maintained between each aquifer to prevent aquifer connection through vertical flow outside the casing; under no circumstances are two or more aquifers to be screened within the one bore or in any other manner to allow connection between them.
- 14 Boreheads must be constructed, to ensure that no flood water, surface runoff or potential subsurface contaminated soakage can enter the bore or bore annulus.

### Fees and charges

- 15 The licence holder must, when requested by the Authority, pay all fees, costs and other charges under the Water Act 1989 in respect of this licence.



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END OF COPY OF RECORD

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## Appendix C

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Laboratory Results Summary Table

Laboratory Results

Calibration Certificates

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## Laboratory test results summary

LOCATION AND DEPTH (mm)	S1 410	S2 270	S2 640	S3 520	S4 350	S5-1 50- 100	S5-1 410	S5-2 0- 100	S6 400	S7 280
Moisture (%)	9.5	11	11	12	20	16	13	15	14	17
<b>Metals and Inorganics</b>										
Arsenic (mg/kg)	<2	3.2	2.1	2.3	<2	3.1	3.5	29	7.4	2.1
Cadmium (mg/kg)	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium VI (mg/kg)	< 1	-	-	< 1	-	-	< 1	< 1	-	-
Copper (mg/kg)	<5	8.6	13	10	<5	78	15	100	<5	<5
Lead (mg/kg)	<5	7.8	11	23	5.8	6.8	15	27	7.4	7.2
Mercury (mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel (mg/kg)	<5	11	8.1	11	<5	54	12	36	<5	<5
Selenium (mg/kg)	<2	-	-	<2	-	-	<2	<2	-	-
Zinc (mg/kg)	<5	37	11	15	8.1	63	21	320	6.5	<5
Cyanide (total) (mg/kg)	< 5	-	-	< 5	-	-	< 5	< 5	-	-
<b>Polychlorinated Biphenyls</b>										
Total PCB (mg/kg)	< 0.1	-	-	< 0.1	-	-	< 0.1	< 0.1	-	-
<b>Phenols (non-Halogenated)</b>										
2-Methylphenol (o-Cresol) (mg/kg)	< 0.2	-	-	< 0.2	-	-	< 0.2	< 0.2	-	-
Phenol (mg/kg)	< 0.5	-	-	< 0.5	-	-	< 0.5	< 0.5	-	-
<b>Phenols (Halogenated)</b>										
2,4,5-Trichlorophenol (mg/kg)	< 1	-	-	< 1	-	-	< 1	< 1	-	-
2,4-Dinitrophenol (mg/kg)	< 0.5	-	-	< 0.5	-	-	< 0.5	< 0.5	-	-
Pentachlorophenol (mg/kg)	< 1	-	-	< 1	-	-	< 1	< 1	-	-
<b>Polycyclic Aromatic Hydrocarbons</b>										
Carcinogenic PAHs (as BaP TEQ) (mg/kg)	<1.21	<1.21	-	<1.21	<1.21	<1.21	<1.21	<1.21	-	-
Total PAH (mg/kg)	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	-

HIL A	HIL B	HIL C	HIL D
-	-	-	-
100	500	300	3000
20	150	90	900
100	500	300	3600
6000	30000	17000	240000
300	1200	600	1500
40	120	80	180
400	1200	1200	6000
200	1400	700	10000
7400	60000	30000	400000
250	300	240	1500
1	1	1	7
400	4700	4000	25000
3000	45000	40000	240000
600	900	800	5000
900	1600	1300	9000
100	130	120	660
3	4	3	40
300	400	300	4000

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This drawing shall be read in conjunction with LRP&A Report No. 222643 92 Enterprise Road/1

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**Consulting Civil & Geotechnical Engineers**  
 2 Alex Avenue, Moorabbin VIC 3189  
 18/4 Network Drive, Truganina VIC 3029  
 7 Fairlie Street, Hamlyn Heights VIC 3215  
 Tel: 1300 922 964  
 www.pardoengineering.com.au

**Title** Laboratory test results summary  
**Locality** 92 Enterprise Road  
 Pakenham , Victoria  
**Dwg. No** 222643/1 TP  
**Drawn** DM 13/12/2022  
**Checked** YC 16/12/2022

**Geo-environmental Investigation**  
 Investigation date: 31/11/2022-02/12/2022  
 Project: 222643 92 Enterprise Road/1

<b>Sheet No</b> Test (1.1)	<b>File</b> 222643-1 Results Sum.xlsn
----------------------------	---------------------------------------

## Laboratory test results summary

LOCATION AND DEPTH (mm)	S1 410	S2 270	S2 640	S3 520	S4 350	S5-1 50- 100	S5-1 410	S5-2 0- 100	S6 400	S7 280
<b>Organochlorine Pesticides</b>										
4.4'-DDD (mg/kg)	< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-
4.4'-DDE (mg/kg)	< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-
4.4'-DDT (mg/kg)	< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-
Aldrin (mg/kg)	< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-
Dieldrin (mg/kg)	< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-
Chlordanes - Total (mg/kg)	< 0.1	-	-	< 0.1	-	-	< 0.1	< 0.1	-	-
Endosulfan I (mg/kg)	< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-
Endosulfan II (mg/kg)	< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-
Endosulfan sulphate (mg/kg)	< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-
Endrin (mg/kg)	< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-
Endrin aldehyde (mg/kg)	< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-
Endrin ketone (mg/kg)	< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-
Heptachlor (mg/kg)	< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-
Heptachlor epoxide (mg/kg)	< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-
Methoxychlor (mg/kg)	< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-
Toxaphene (mg/kg)	< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-
<b>Volatile Organics</b>										
Toluene (mg/kg)	< 0.05	< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	-
Ethylbenzene (mg/kg)	-	-	-	-	-	-	-	-	-	-
Xylenes - Total (mg/kg)	-	-	-	-	-	-	-	-	-	-
Benzene (mg/kg)	-	-	-	-	-	-	-	-	-	-
<b>Total Recoverable Hydrocarbons</b>										
Naphthalene (mg/kg)	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	-
TRH C6-C10 Less BTEX (mg/kg)	< 20	< 20	-	< 20	< 20	< 20	< 20	< 20	-	-
TRH >C10-C16 Less Naphthalene (mg/kg)	< 50	< 50	-	< 50	< 50	< 50	< 50	< 50	-	-

HIL A	HIL B	HIL C	HIL D
240	600	400	3600
6	10	10	45
50	90	70	530
270	400	340	2000
10	20	20	100
6	10	10	50
300	500	400	2500
20	30	30	160
480	-	-	-
-	-	-	-
110	-	-	-
0.7	-	-	4
5	-	-	-
60	-	-	310
280	-	-	-

This drawing shall be read in conjunction with LRP&A Report No. 222643 92 Enterprise Road/1

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**Title** Laboratory test results summary  
**Locality** 92 Enterprise Road  
 Pakenham , Victoria  
  
**Dwg. No** 222643/1 TP  
**Drawn** DM 13/12/2022  
**Checked** YC 16/12/2022

**Geo-environmental Investigation**  
 Investigation date: 31/11/2022-02/12/2022  
  
**Project:** 222643 92 Enterprise Road/1

**Sheet No** Test (1.2) **File** 222643-1 Results Sum.xlsm

## Laboratory test results summary

LOCATION AND DEPTH (mm)	S8 580	S11 0-200	TP9 1000	TP13 1000	TP18 1500	TP21 2000	TP33 1000	TP34 1500	TP37 500
Moisture (%)	14	17	15	14	11	17	14	16	14
<b>Metals and Inorganics</b>									
Arsenic (mg/kg)	<2	<2	<2	<2	<2	<2	<2	<2	<2
Cadmium (mg/kg)	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium VI (mg/kg)	< 1	-	< 1	< 1	-	-	< 1	-	< 1
Copper (mg/kg)	<5	5.4	9.2	10	9.3	15	10	15	8.8
Lead (mg/kg)	<5	9	9	9.8	7	16	14	15	9.7
Mercury (mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel (mg/kg)	<5	<5	8.4	12	10	13	9	12	5.3
Selenium (mg/kg)	<2	-	<2	<2	-	-	<2	-	<2
Zinc (mg/kg)	<5	5.1	9.2	15	12	11	8.2	11	7.2
Cyanide (total) (mg/kg)	< 5	-	< 5	< 5	-	-	< 5	-	< 5
<b>Polychlorinated Biphenyls</b>									
Total PCB (mg/kg)	< 0.1	-	< 0.1	< 0.1	-	-	< 0.1	-	< 0.1
<b>Phenols (non-Halogenated)</b>									
2-Methylphenol (o-Cresol) (mg/kg)	< 0.2	-	< 0.2	< 0.2	-	-	< 0.2	-	< 0.2
Phenol (mg/kg)	< 0.5	-	< 0.5	< 0.5	-	-	< 0.5	-	< 0.5
<b>Phenols (Halogenated)</b>									
2,4,5-Trichlorophenol (mg/kg)	< 1	-	< 1	< 1	-	-	< 1	-	< 1
2,4-Dinitrophenol (mg/kg)	< 0.5	-	< 0.5	< 0.5	-	-	< 0.5	-	< 0.5
Pentachlorophenol (mg/kg)	< 1	-	< 1	< 1	-	-	< 1	-	< 1
<b>Polycyclic Aromatic Hydrocarbons</b>									
Carcinogenic PAHs (as BaP TEQ) (mg/kg)	<1.21	<1.21	<1.21	<1.21	-	<1.21	<1.21	-	<1.21
Total PAH (mg/kg)	< 0.5	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	-	< 0.5

HIL A	HIL B	HIL C	HIL D
-	-	-	-
100	500	300	3000
20	150	90	900
100	500	300	3600
6000	30000	17000	240000
300	1200	600	1500
40	120	80	180
400	1200	1200	6000
200	1400	700	10000
7400	60000	30000	400000
250	300	240	1500
1	1	1	7
400	4700	4000	25000
3000	45000	40000	240000
600	900	800	5000
900	1600	1300	9000
100	130	120	660
3	4	3	40
300	400	300	4000

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This drawing shall be read in conjunction with LRP&A Report No. 222643 92 Enterprise Road/1

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**Title** Laboratory test results summary  
**Locality** 92 Enterprise Road  
 Pakenham , Victoria

**Dwg. No** 222643/1 TP

**Drawn** DM 13/12/2022

**Checked** YC 16/12/2022

**Geo-environmental Investigation**

Investigation date: 31/11/2022-02/12/2022

Project: 222643 92 Enterprise Road/1

**Sheet No** Test (2.1) **File** 222643-1 Results Sum.xlsm



## Laboratory test results summary

LOCATION AND DEPTH (mm)	S8 580	S11 0-200	TP9 1000	TP13 1000	TP18 1500	TP21 2000	TP33 1000	TP34 1500	TP37 500
<b>Organochlorine Pesticides</b>									
4.4'-DDD (mg/kg)	< 0.05	-	< 0.05	< 0.05	-	-	< 0.05	-	< 0.05
4.4'-DDE (mg/kg)	< 0.05	-	< 0.05	< 0.05	-	-	< 0.05	-	< 0.05
4.4'-DDT (mg/kg)	< 0.05	-	< 0.05	< 0.05	-	-	< 0.05	-	< 0.05
Aldrin (mg/kg)	< 0.05	-	< 0.05	< 0.05	-	-	< 0.05	-	< 0.05
Dieldrin (mg/kg)	< 0.05	-	< 0.05	< 0.05	-	-	< 0.05	-	< 0.05
Chlordanes - Total (mg/kg)	< 0.1	-	< 0.1	< 0.1	-	-	< 0.1	-	< 0.1
Endosulfan I (mg/kg)	< 0.05	-	< 0.05	< 0.05	-	-	< 0.05	-	< 0.05
Endosulfan II (mg/kg)	< 0.05	-	< 0.05	< 0.05	-	-	< 0.05	-	< 0.05
Endosulfan sulphate (mg/kg)	< 0.05	-	< 0.05	< 0.05	-	-	< 0.05	-	< 0.05
Endrin (mg/kg)	< 0.05	-	< 0.05	< 0.05	-	-	< 0.05	-	< 0.05
Endrin aldehyde (mg/kg)	< 0.05	-	< 0.05	< 0.05	-	-	< 0.05	-	< 0.05
Endrin ketone (mg/kg)	< 0.05	-	< 0.05	< 0.05	-	-	< 0.05	-	< 0.05
Heptachlor (mg/kg)	< 0.05	-	< 0.05	< 0.05	-	-	< 0.05	-	< 0.05
Heptachlor epoxide (mg/kg)	< 0.05	-	< 0.05	< 0.05	-	-	< 0.05	-	< 0.05
Methoxychlor (mg/kg)	< 0.05	-	< 0.05	< 0.05	-	-	< 0.05	-	< 0.05
Toxaphene (mg/kg)	< 0.05	-	< 0.05	< 0.05	-	-	< 0.05	-	< 0.05
<b>Volatile Organics</b>									
Toluene (mg/kg)	-	-	-	-	-	-	-	-	-
Ethylbenzene (mg/kg)	-	-	-	-	-	-	-	-	-
Xylenes - Total (mg/kg)	-	-	-	-	-	-	-	-	-
Benzene (mg/kg)	-	-	-	-	-	-	-	-	-
<b>Total Recoverable Hydrocarbons</b>									
Naphthalene (mg/kg)	< 0.5	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	-	< 0.5
TRH C6-C10 Less BTEX (mg/kg)	< 20	< 20	< 20	< 20	-	< 20	< 20	-	< 20
TRH >C10-C16 Less Naphthalene (mg/kg)	< 50	< 50	< 50	< 50	-	< 50	< 50	-	< 50

HIL A	HIL B	HIL C	HIL D
240	600	400	3600
6	10	10	45
50	90	70	530
270	400	340	2000
10	20	20	100
6	10	10	50
300	500	400	2500
20	30	30	160
480	-	-	-
-	-	-	-
110	-	-	-
0.7	-	-	4
5	-	-	-
60	-	-	310
280	-	-	-

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**Title** Laboratory test results summary  
**Locality** 92 Enterprise Road  
 Pakenham , Victoria  
  
**Dwg. No** 222643/1 TP  
**Drawn** DM 13/12/2022  
**Checked** YC 16/12/2022

**Geo-environmental Investigation**  
 Investigation date: 31/11/2022-02/12/2022  
  
**Project: 222643 92 Enterprise Road/1**

**Sheet No** Test (2.2) **File** 222643-1 Results Sum.xlsm

## Laboratory test results summary

LOCATION AND DEPTH (mm)	TP38 1000	TP40 1500	TP43 1000
Moisture (%)	15	23	16
<b>Metals and Inorganics</b>			
Arsenic (mg/kg)	<2	5.3	2.2
Cadmium (mg/kg)	<0.4	<0.4	<0.4
Chromium VI (mg/kg)	-	-	-
Copper (mg/kg)	5.3	22	12
Lead (mg/kg)	6	14	12
Mercury (mg/kg)	<0.1	<0.1	<0.1
Nickel (mg/kg)	5.2	15	11
Selenium (mg/kg)	-	-	-
Zinc (mg/kg)	5.7	9.2	10
Cyanide (total) (mg/kg)	-	-	-
<b>Polychlorinated Biphenyls</b>			
Total PCB (mg/kg)	-	-	-
<b>Phenols (non-Halogenated)</b>			
2-Methylphenol (o-Cresol) (mg/kg)	-	-	-
Phenol (mg/kg)	-	-	-
<b>Phenols (Halogenated)</b>			
2,4,5-Trichlorophenol (mg/kg)	-	-	-
2,4-Dinitrophenol (mg/kg)	-	-	-
Pentachlorophenol (mg/kg)	-	-	-
<b>Polycyclic Aromatic Hydrocarbons</b>			
Carcinogenic PAHs (as BaP TEQ) (mg/kg)	-	-	-
Total PAH (mg/kg)	-	-	-

HIL A	HIL B	HIL C	HIL D
-	-	-	-
100	500	300	3000
20	150	90	900
100	500	300	3600
6000	30000	17000	240000
300	1200	600	1500
40	120	80	180
400	1200	1200	6000
200	1400	700	10000
7400	60000	30000	400000
250	300	240	1500
1	1	1	7
400	4700	4000	25000
3000	45000	40000	240000
600	900	800	5000
900	1600	1300	9000
100	130	120	660
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300	400	300	4000

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**Title** Laboratory test results summary  
**Locality** 92 Enterprise Road  
 Pakenham , Victoria

**Dwg. No** 222643/1 TP  
**Drawn** DM 13/12/2022  
**Checked** YC 16/12/2022

### Geo-environmental Investigation

Investigation date: 31/11/2022-02/12/2022

Project: 222643 92 Enterprise Road/1

<b>Sheet No</b>	Test (3.1)	<b>File</b>	222643-1 Results Sum.xlsm
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## Laboratory test results summary

LOCATION AND DEPTH (mm)	TP38 1000	TP40 1500	TP43 1000
<b>Organochlorine Pesticides</b>			
4.4'-DDD (mg/kg)	-	-	-
4.4'-DDE (mg/kg)	-	-	-
4.4'-DDT (mg/kg)	-	-	-
Aldrin (mg/kg)	-	-	-
Dieldrin (mg/kg)	-	-	-
Chlordanes - Total (mg/kg)	-	-	-
Endosulfan I (mg/kg)	-	-	-
Endosulfan II (mg/kg)	-	-	-
Endosulfan sulphate (mg/kg)	-	-	-
Endrin (mg/kg)	-	-	-
Endrin aldehyde (mg/kg)	-	-	-
Endrin ketone (mg/kg)	-	-	-
Heptachlor (mg/kg)	-	-	-
Heptachlor epoxide (mg/kg)	-	-	-
Methoxychlor (mg/kg)	-	-	-
Toxaphene (mg/kg)	-	-	-
<b>Volatile Organics</b>			
Toluene (mg/kg)	-	-	-
Ethylbenzene (mg/kg)	-	-	-
Xylenes - Total (mg/kg)	-	-	-
Benzene (mg/kg)	-	-	-
<b>Total Recoverable Hydrocarbons</b>			
Naphthalene (mg/kg)	-	-	-
TRH C6-C10 Less BTEX (mg/kg)	-	-	-
TRH >C10-C16 Less Naphthalene (mg/kg)	-	-	-

HIL A	HIL B	HIL C	HIL D
240	600	400	3600
6	10	10	45
50	90	70	530
270	400	340	2000
10	20	20	100
6	10	10	50
300	500	400	2500
20	30	30	160
480	-	-	-
-	-	-	-
110	-	-	-
0.7	-	-	4
5	-	-	-
60	-	-	310
280	-	-	-

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**Title** Laboratory test results summary  
**Locality** 92 Enterprise Road  
 Pakenham , Victoria

**Dwg. No** 222643/1 TP  
**Drawn** DM 13/12/2022  
**Checked** YC 16/12/2022

### Geo-environmental Investigation

Investigation date: 31/11/2022-02/12/2022

Project: 222643 92 Enterprise Road/1

<b>Sheet No</b>	Test (3.2)	<b>File</b>	222643-1 Results Sum.xlsm
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 inspection, proficiency testing scheme providers and  
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Attention:

**Report** 947162-S  
**Project name** 92 ENTERPRISE RD/2  
**Project ID** 222643  
**Received Date** Dec 05, 2022

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Client Sample ID			S1 0.41m	S2 0.27m	S3 0.52m	S4 0.35m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008498	M22-De0008499	M22-De0008500	M22-De0008501
Date Sampled			Dec 02, 2022	Dec 02, 2022	Dec 02, 2022	Dec 02, 2022
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons</b>						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	58	< 50	< 50
TRH C29-C38	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-C38 (Total)	50	mg/kg	< 50	58	< 50	< 50
Naphthalene <sup>NO</sup>	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) <sup>NO</sup>	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C18	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C18 less Naphthalene (F2) <sup>NO</sup>	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C18-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
<b>Volatile Organics</b>						
1,1-Dichloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1,2,4-Trichlorobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
Hexachlorobutadiene	0.5	mg/kg	< 0.5	-	< 0.5	-
1,1-Dichloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1,1,1-Trichloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1,1,1,2-Tetrachloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1,1,2-Trichloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1,1,2,2-Tetrachloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1,2-Dibromoethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1,2-Dichlorobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
1,2-Dichloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1,2-Dichloropropane	0.5	mg/kg	< 0.5	-	< 0.5	-
1,2,3-Trichloropropane	0.5	mg/kg	< 0.5	-	< 0.5	-
1,2,4-Trimethylbenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
1,3-Dichlorobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
1,3-Dichloropropane	0.5	mg/kg	< 0.5	-	< 0.5	-
1,3,5-Trimethylbenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
1,4-Dichlorobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
2-Butanone (MEK)	0.5	mg/kg	< 0.5	-	< 0.5	-
2-Propanone (Acetone)	0.5	mg/kg	< 0.5	-	< 0.5	-
4-Chlorotoluene	0.5	mg/kg	< 0.5	-	< 0.5	-

Client Sample ID			S1 0.41m	S2 0.27m	S3 0.52m	S4 0.35m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008498	M22-De0008499	M22-De0008500	M22-De0008501
Date Sampled			Dec 02, 2022	Dec 02, 2022	Dec 02, 2022	Dec 02, 2022
Test/Reference	LOR	Unit				
<b>Volatile Organics</b>						
4-Methyl-2-pentanone (MIBK)	0.5	mg/kg	< 0.5	-	< 0.5	-
Allyl chloride	0.5	mg/kg	< 0.5	-	< 0.5	-
Benzene	0.1	mg/kg	< 0.1	-	< 0.1	-
Bromobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
Bromochloromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Bromodichloromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Bromoform	0.5	mg/kg	< 0.5	-	< 0.5	-
Bromomethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Carbon disulfide	0.5	mg/kg	< 0.5	-	< 0.5	-
Carbon Tetrachloride	0.5	mg/kg	< 0.5	-	< 0.5	-
Chlorobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
Chloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Chloroform	0.5	mg/kg	< 0.5	-	< 0.5	-
Chloromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
cis-1,2-Dichloroethene	0.5	mg/kg	< 0.5	-	< 0.5	-
cis-1,3-Dichloropropene	0.5	mg/kg	< 0.5	-	< 0.5	-
Dibromochloromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Dibromomethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Dichlorodifluoromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Ethylbenzene	0.1	mg/kg	< 0.1	-	< 0.1	-
Iodomethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Isopropyl benzene (Cumene)	0.5	mg/kg	< 0.5	-	< 0.5	-
m&p-Xylenes	0.2	mg/kg	< 0.2	-	< 0.2	-
Methylene Chloride	0.5	mg/kg	< 0.5	-	< 0.5	-
o-Xylene	0.1	mg/kg	< 0.1	-	< 0.1	-
Styrene	0.5	mg/kg	< 0.5	-	< 0.5	-
Tetrachloroethene	0.5	mg/kg	< 0.5	-	< 0.5	-
Toluene	0.1	mg/kg	< 0.1	-	< 0.1	-
trans-1,2-Dichloroethene	0.5	mg/kg	< 0.5	-	< 0.5	-
trans-1,3-Dichloropropene	0.5	mg/kg	< 0.5	-	< 0.5	-
Trichloroethene	0.5	mg/kg	< 0.5	-	< 0.5	-
Trichlorofluoromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Vinyl chloride	0.5	mg/kg	< 0.5	-	< 0.5	-
Xylenes - Total*	0.3	mg/kg	< 0.3	-	< 0.3	-
Total MAH*	0.5	mg/kg	< 0.5	-	< 0.5	-
Vic EPA IWRG 621 CHC (Total)*	0.5	mg/kg	< 0.5	-	< 0.5	-
Vic EPA IWRG 621 Other CHC (Total)*	0.5	mg/kg	< 0.5	-	< 0.5	-
4-Bromofluorobenzene (surr.)	1	%	78	-	55	-
Toluene-d8 (surr.)	1	%	66	-	61	-
<b>Polycyclic Aromatic Hydrocarbons</b>						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene <sup>N07</sup>	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5



Client Sample ID			S1 0.41m	S2 0.27m	S3 0.52m	S4 0.35m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008498	M22-De0008499	M22-De0008500	M22-De0008501
Date Sampled			Dec 02, 2022	Dec 02, 2022	Dec 02, 2022	Dec 02, 2022
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons</b>						
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	56	55	53	52
p-Terphenyl-d14 (surr.)	1	%	59	52	128	51
<b>Organochlorine Pesticides</b>						
Chlordanes - Total	0.1	mg/kg	< 0.1	-	< 0.1	-
4.4'-DDD	0.05	mg/kg	< 0.05	-	< 0.05	-
4.4'-DDE	0.05	mg/kg	< 0.05	-	< 0.05	-
4.4'-DDT	0.05	mg/kg	< 0.05	-	< 0.05	-
a-HCH	0.05	mg/kg	< 0.05	-	< 0.05	-
Aldrin	0.05	mg/kg	< 0.05	-	< 0.05	-
b-HCH	0.05	mg/kg	< 0.05	-	< 0.05	-
d-HCH	0.05	mg/kg	< 0.05	-	< 0.05	-
Dieldrin	0.05	mg/kg	< 0.05	-	< 0.05	-
Endosulfan I	0.05	mg/kg	< 0.05	-	< 0.05	-
Endosulfan II	0.05	mg/kg	< 0.05	-	< 0.05	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	< 0.05	-
Endrin	0.05	mg/kg	< 0.05	-	< 0.05	-
Endrin aldehyde	0.05	mg/kg	< 0.05	-	< 0.05	-
Endrin ketone	0.05	mg/kg	< 0.05	-	< 0.05	-
g-HCH (Lindane)	0.05	mg/kg	< 0.05	-	< 0.05	-
Heptachlor	0.05	mg/kg	< 0.05	-	< 0.05	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	< 0.05	-
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	< 0.05	-
Methoxychlor	0.05	mg/kg	< 0.05	-	< 0.05	-
Toxaphene	0.5	mg/kg	< 0.5	-	< 0.5	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	< 0.05	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	< 0.05	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	-	< 0.1	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	-	< 0.1	-
Dibutylchloroendate (surr.)	1	%	98	-	77	-
Tetrachloro-m-xylene (surr.)	1	%	51	-	51	-
<b>Polychlorinated Biphenyls</b>						
Aroclor-1016	0.1	mg/kg	< 0.1	-	< 0.1	-
Aroclor-1221	0.1	mg/kg	< 0.1	-	< 0.1	-
Aroclor-1232	0.1	mg/kg	< 0.1	-	< 0.1	-
Aroclor-1242	0.1	mg/kg	< 0.1	-	< 0.1	-
Aroclor-1248	0.1	mg/kg	< 0.1	-	< 0.1	-
Aroclor-1254	0.1	mg/kg	< 0.1	-	< 0.1	-
Aroclor-1260	0.1	mg/kg	< 0.1	-	< 0.1	-

Client Sample ID			S1 0.41m	S2 0.27m	S3 0.52m	S4 0.35m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008498	M22-De0008499	M22-De0008500	M22-De0008501
Date Sampled			Dec 02, 2022	Dec 02, 2022	Dec 02, 2022	Dec 02, 2022
Test/Reference	LOR	Unit				
<b>Polychlorinated Biphenyls</b>						
Total PCB*	0.1	mg/kg	< 0.1	-	< 0.1	-
Dibutylchloroendate (surr.)	1	%	98	-	77	-
Tetrachloro-m-xylene (surr.)	1	%	51	-	51	-
<b>Phenols (Halogenated)</b>						
2-Chlorophenol	0.5	mg/kg	< 0.5	-	< 0.5	-
2,4-Dichlorophenol	0.5	mg/kg	< 0.5	-	< 0.5	-
2,4,5-Trichlorophenol	1	mg/kg	< 1	-	< 1	-
2,4,6-Trichlorophenol	1	mg/kg	< 1	-	< 1	-
2,6-Dichlorophenol	0.5	mg/kg	< 0.5	-	< 0.5	-
4-Chloro-3-methylphenol	1	mg/kg	< 1	-	< 1	-
Pentachlorophenol	1	mg/kg	< 1	-	< 1	-
Tetrachlorophenols - Total	10	mg/kg	< 10	-	< 10	-
Total Halogenated Phenol*	1	mg/kg	< 1	-	< 1	-
<b>Phenols (non-Halogenated)</b>						
2-Cyclohexyl-4,6-dinitrophenol	20	mg/kg	< 20	-	< 20	-
2-Methyl-4,6-dinitrophenol	5	mg/kg	< 5	-	< 5	-
2-Nitrophenol	1.0	mg/kg	< 1	-	< 1	-
2,4-Dimethylphenol	0.5	mg/kg	< 0.5	-	< 0.5	-
2,4-Dinitrophenol	5	mg/kg	< 5	-	< 5	-
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2	-	< 0.2	-
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4	-	< 0.4	-
Total cresols*	0.5	mg/kg	< 0.5	-	< 0.5	-
4-Nitrophenol	5	mg/kg	< 5	-	< 5	-
Dinoseb	20	mg/kg	< 20	-	< 20	-
Phenol	0.5	mg/kg	< 0.5	-	< 0.5	-
Phenol-d6 (surr.)	1	%	107	-	148	-
Total Non-Halogenated Phenol*	20	mg/kg	< 20	-	< 20	-
<b>Chromium (hexavalent)</b>						
Chromium (hexavalent)	1	mg/kg	< 1	-	< 1	-
<b>Cyanide (total)</b>						
Cyanide (total)	5	mg/kg	< 5	-	< 5	-
<b>Fluoride</b>						
Fluoride	100	mg/kg	< 100	-	< 100	-
<b>pH (1:5 Aqueous extract at 25 °C as rec.)</b>						
pH (1:5 Aqueous extract at 25 °C as rec.)	0.1	pH Units	7.5	6.8	7.3	7.0
<b>% Moisture</b>						
% Moisture	1	%	9.5	11	11	12
<b>Heavy Metals</b>						
Arsenic	2	mg/kg	< 2	3.2	2.3	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	7.4	9.8	21	8.1
Copper	5	mg/kg	< 5	8.6	10	< 5
Lead	5	mg/kg	< 5	7.8	23	5.8
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	5	mg/kg	< 5	-	< 5	-
Nickel	5	mg/kg	< 5	11	11	< 5
Selenium	2	mg/kg	< 2	-	< 2	-
Silver	2	mg/kg	< 2	-	< 2	-
Tin	10	mg/kg	< 10	-	< 10	-
Zinc	5	mg/kg	< 5	37	15	8.1

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Client Sample ID			S1 0.41m	S2 0.27m	S3 0.52m	S4 0.35m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008498	M22-De0008499	M22-De0008500	M22-De0008501
Date Sampled			Dec 02, 2022	Dec 02, 2022	Dec 02, 2022	Dec 02, 2022
Test/Reference	LOR	Unit				
<b>BTEX</b>						
Benzene	0.1	mg/kg	-	< 0.1	-	< 0.1
Toluene	0.1	mg/kg	-	< 0.1	-	< 0.1
Ethylbenzene	0.1	mg/kg	-	< 0.1	-	< 0.1
m&p-Xylenes	0.2	mg/kg	-	< 0.2	-	< 0.2
o-Xylene	0.1	mg/kg	-	< 0.1	-	< 0.1
Xylenes - Total*	0.3	mg/kg	-	< 0.3	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	-	103	-	90

Client Sample ID			S5-1 0.41m	S5-2 0-0.1m	S7 0.28m	S8 0.58m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008502	M22-De0008503	M22-De0008504	M22-De0008505
Date Sampled			Dec 02, 2022	Dec 02, 2022	Dec 02, 2022	Dec 02, 2022
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons</b>						
TRH C6-C9	20	mg/kg	< 20	< 20	-	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	-	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	-	< 50
TRH C29-C36	50	mg/kg	53	< 50	-	< 50
TRH C10-C36 (Total)	50	mg/kg	53	< 50	-	< 50
Naphthalene <sup>N02</sup>	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	-	< 20
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	20	mg/kg	< 20	< 20	-	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	-	< 50
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	50	mg/kg	< 50	< 50	-	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	-	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	-	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	-	< 100
<b>Volatile Organics</b>						
1.1-Dichloroethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.2.4-Trichlorobenzene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Hexachlorobutadiene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.1-Dichloroethene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.1.1-Trichloroethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.1.1.2-Tetrachloroethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.1.2-Trichloroethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.1.2.2-Tetrachloroethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.2-Dibromoethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.2-Dichlorobenzene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.2-Dichloroethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.2-Dichloropropane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.2.3-Trichloropropane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.2.4-Trimethylbenzene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.3-Dichlorobenzene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.3-Dichloropropane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.3.5-Trimethylbenzene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.4-Dichlorobenzene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
2-Butanone (MEK)	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5

Client Sample ID			S5-1 0.41m	S5-2 0-0.1m	S7 0.28m	S8 0.58m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008502	M22-De0008503	M22-De0008504	M22-De0008505
Date Sampled			Dec 02, 2022	Dec 02, 2022	Dec 02, 2022	Dec 02, 2022
Test/Reference	LOR	Unit				
<b>Volatile Organics</b>						
2-Propanone (Acetone)	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
4-Chlorotoluene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
4-Methyl-2-pentanone (MIBK)	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Allyl chloride	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Bromobenzene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Bromochloromethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Bromodichloromethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Bromoform	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Bromomethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Carbon disulfide	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Carbon Tetrachloride	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Chlorobenzene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Chloroethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Chloroform	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Chloromethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
cis-1.2-Dichloroethene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
cis-1.3-Dichloropropene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Dibromochloromethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Dibromomethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Dichlorodifluoromethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Iodomethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Isopropyl benzene (Cumene)	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	-	< 0.2
Methylene Chloride	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Styrene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Tetrachloroethene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Toluene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
trans-1.2-Dichloroethene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
trans-1.3-Dichloropropene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Trichloroethene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Trichlorofluoromethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Vinyl chloride	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	-	< 0.3
Total MAH*	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Vic EPA IWRG 621 CHC (Total)*	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Vic EPA IWRG 621 Other CHC (Total)*	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
4-Bromofluorobenzene (surr.)	1	%	51	65	-	87
Toluene-d8 (surr.)	1	%	60	60	-	102
<b>Polycyclic Aromatic Hydrocarbons</b>						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	-	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	-	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5

Client Sample ID			S5-1 0.41m	S5-2 0-0.1m	S7 0.28m	S8 0.58m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008502	M22-De0008503	M22-De0008504	M22-De0008505
Date Sampled			Dec 02, 2022	Dec 02, 2022	Dec 02, 2022	Dec 02, 2022
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons</b>						
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(b&j)fluoranthene <sup>N07</sup>	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
2-Fluorobiphenyl (surr.)	1	%	51	51	-	53
p-Terphenyl-d14 (surr.)	1	%	109	83	-	114
<b>Organochlorine Pesticides</b>						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
a-HCH	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
b-HCH	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
d-HCH	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
g-HCH (Lindane)	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
Toxaphene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	-	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Dibutylchloroendate (surr.)	1	%	68	88	-	84
Tetrachloro-m-xylene (surr.)	1	%	113	134	-	57
<b>Polychlorinated Biphenyls</b>						
Aroclor-1016	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Aroclor-1221	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Aroclor-1232	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Aroclor-1242	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Aroclor-1248	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1



Client Sample ID			S5-1 0.41m	S5-2 0-0.1m	S7 0.28m	S8 0.58m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008502	M22-De0008503	M22-De0008504	M22-De0008505
Date Sampled			Dec 02, 2022	Dec 02, 2022	Dec 02, 2022	Dec 02, 2022
Test/Reference	LOR	Unit				
<b>Polychlorinated Biphenyls</b>						
Aroclor-1254	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Aroclor-1260	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Total PCB*	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Dibutylchloroendate (surr.)	1	%	68	88	-	84
Tetrachloro-m-xylene (surr.)	1	%	113	134	-	57
<b>Phenols (Halogenated)</b>						
2-Chlorophenol	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
2,4-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
2,4,5-Trichlorophenol	1	mg/kg	< 1	< 1	-	< 1
2,4,6-Trichlorophenol	1	mg/kg	< 1	< 1	-	< 1
2,6-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
4-Chloro-3-methylphenol	1	mg/kg	< 1	< 1	-	< 1
Pentachlorophenol	1	mg/kg	< 1	< 1	-	< 1
Tetrachlorophenols - Total	10	mg/kg	< 10	< 10	-	< 10
Total Halogenated Phenol*	1	mg/kg	< 1	< 1	-	< 1
<b>Phenols (non-Halogenated)</b>						
2-Cyclohexyl-4,6-dinitrophenol	20	mg/kg	< 20	< 20	-	< 20
2-Methyl-4,6-dinitrophenol	5	mg/kg	< 5	< 5	-	< 5
2-Nitrophenol	1.0	mg/kg	< 1	< 1	-	< 1
2,4-Dimethylphenol	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
2,4-Dinitrophenol	5	mg/kg	< 5	< 5	-	< 5
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2	< 0.2	-	< 0.2
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4	< 0.4	-	< 0.4
Total cresols*	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
4-Nitrophenol	5	mg/kg	< 5	< 5	-	< 5
Dinoseb	20	mg/kg	< 20	< 20	-	< 20
Phenol	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Phenol-d6 (surr.)	1	%	74	101	-	114
Total Non-Halogenated Phenol*	20	mg/kg	< 20	< 20	-	< 20
<b>Other Parameters</b>						
Chromium (hexavalent)	1	mg/kg	< 1	< 1	-	< 1
Cyanide (total)	5	mg/kg	< 5	< 5	-	< 5
Fluoride	100	mg/kg	< 100	< 100	-	< 100
pH (1:5 Aqueous extract at 25 °C as rec.)	0.1	pH Units	7.6	7.6	7.3	7.1
% Moisture	1	%	20	16	15	14
<b>Heavy Metals</b>						
Arsenic	2	mg/kg	3.5	29	2.1	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	40	60	13	< 5
Copper	5	mg/kg	15	100	< 5	< 5
Lead	5	mg/kg	15	27	7.2	< 5
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	5	mg/kg	< 5	< 5	-	< 5
Nickel	5	mg/kg	12	36	< 5	< 5
Selenium	2	mg/kg	< 2	< 2	-	< 2
Silver	2	mg/kg	< 2	< 2	-	< 2
Tin	10	mg/kg	< 10	< 10	-	< 10
Zinc	5	mg/kg	21	320	< 5	< 5

Client Sample ID			S11 0-0.2m	TP13 1.0m	TP18 1.5m	TP21 2.0m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008506	M22-De0008507	M22-De0008508	M22-De0008509
Date Sampled			Dec 02, 2022	Dec 01, 2022	Nov 30, 2022	Dec 01, 2022
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons</b>						
TRH C6-C9	20	mg/kg	< 20	< 20	-	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	-	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	-	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	-	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	-	< 50
Naphthalene <sup>N02</sup>	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	-	< 20
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	20	mg/kg	< 20	< 20	-	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	-	< 50
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	50	mg/kg	< 50	< 50	-	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	-	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	-	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	-	< 100
<b>Volatile Organics</b>						
1.1-Dichloroethane	0.5	mg/kg	-	< 0.5	-	-
1.2.4-Trichlorobenzene	0.5	mg/kg	-	< 0.5	-	-
Hexachlorobutadiene	0.5	mg/kg	-	< 0.5	-	-
1.1-Dichloroethene	0.5	mg/kg	-	< 0.5	-	-
1.1.1-Trichloroethane	0.5	mg/kg	-	< 0.5	-	-
1.1.1.2-Tetrachloroethane	0.5	mg/kg	-	< 0.5	-	-
1.1.2-Trichloroethane	0.5	mg/kg	-	< 0.5	-	-
1.1.2.2-Tetrachloroethane	0.5	mg/kg	-	< 0.5	-	-
1.2-Dibromoethane	0.5	mg/kg	-	< 0.5	-	-
1.2-Dichlorobenzene	0.5	mg/kg	-	< 0.5	-	-
1.2-Dichloroethane	0.5	mg/kg	-	< 0.5	-	-
1.2-Dichloropropane	0.5	mg/kg	-	< 0.5	-	-
1.2.3-Trichloropropane	0.5	mg/kg	-	< 0.5	-	-
1.2.4-Trimethylbenzene	0.5	mg/kg	-	< 0.5	-	-
1.3-Dichlorobenzene	0.5	mg/kg	-	< 0.5	-	-
1.3-Dichloropropane	0.5	mg/kg	-	< 0.5	-	-
1.3.5-Trimethylbenzene	0.5	mg/kg	-	< 0.5	-	-
1.4-Dichlorobenzene	0.5	mg/kg	-	< 0.5	-	-
2-Butanone (MEK)	0.5	mg/kg	-	< 0.5	-	-
2-Propanone (Acetone)	0.5	mg/kg	-	< 0.5	-	-
4-Chlorotoluene	0.5	mg/kg	-	< 0.5	-	-
4-Methyl-2-pentanone (MIBK)	0.5	mg/kg	-	< 0.5	-	-
Allyl chloride	0.5	mg/kg	-	< 0.5	-	-
Benzene	0.1	mg/kg	-	< 0.1	-	-
Bromobenzene	0.5	mg/kg	-	< 0.5	-	-
Bromochloromethane	0.5	mg/kg	-	< 0.5	-	-
Bromodichloromethane	0.5	mg/kg	-	< 0.5	-	-
Bromoform	0.5	mg/kg	-	< 0.5	-	-
Bromomethane	0.5	mg/kg	-	< 0.5	-	-
Carbon disulfide	0.5	mg/kg	-	< 0.5	-	-
Carbon Tetrachloride	0.5	mg/kg	-	< 0.5	-	-
Chlorobenzene	0.5	mg/kg	-	< 0.5	-	-
Chloroethane	0.5	mg/kg	-	< 0.5	-	-
Chloroform	0.5	mg/kg	-	< 0.5	-	-
Chloromethane	0.5	mg/kg	-	< 0.5	-	-

Client Sample ID			S11 0-0.2m	TP13 1.0m	TP18 1.5m	TP21 2.0m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008506	M22-De0008507	M22-De0008508	M22-De0008509
Date Sampled			Dec 02, 2022	Dec 01, 2022	Nov 30, 2022	Dec 01, 2022
Test/Reference	LOR	Unit				
<b>Volatile Organics</b>						
cis-1.2-Dichloroethene	0.5	mg/kg	-	< 0.5	-	-
cis-1.3-Dichloropropene	0.5	mg/kg	-	< 0.5	-	-
Dibromochloromethane	0.5	mg/kg	-	< 0.5	-	-
Dibromomethane	0.5	mg/kg	-	< 0.5	-	-
Dichlorodifluoromethane	0.5	mg/kg	-	< 0.5	-	-
Ethylbenzene	0.1	mg/kg	-	< 0.1	-	-
Iodomethane	0.5	mg/kg	-	< 0.5	-	-
Isopropyl benzene (Cumene)	0.5	mg/kg	-	< 0.5	-	-
m&p-Xylenes	0.2	mg/kg	-	< 0.2	-	-
Methylene Chloride	0.5	mg/kg	-	< 0.5	-	-
o-Xylene	0.1	mg/kg	-	< 0.1	-	-
Styrene	0.5	mg/kg	-	< 0.5	-	-
Tetrachloroethene	0.5	mg/kg	-	< 0.5	-	-
Toluene	0.1	mg/kg	-	< 0.1	-	-
trans-1.2-Dichloroethene	0.5	mg/kg	-	< 0.5	-	-
trans-1.3-Dichloropropene	0.5	mg/kg	-	< 0.5	-	-
Trichloroethene	0.5	mg/kg	-	< 0.5	-	-
Trichlorofluoromethane	0.5	mg/kg	-	< 0.5	-	-
Vinyl chloride	0.5	mg/kg	-	< 0.5	-	-
Xylenes - Total*	0.3	mg/kg	-	< 0.3	-	-
Total MAH*	0.5	mg/kg	-	< 0.5	-	-
Vic EPA IWRG 621 CHC (Total)*	0.5	mg/kg	-	< 0.5	-	-
Vic EPA IWRG 621 Other CHC (Total)*	0.5	mg/kg	-	< 0.5	-	-
4-Bromofluorobenzene (surr.)	1	%	-	88	-	-
Toluene-d8 (surr.)	1	%	-	111	-	-
<b>Polycyclic Aromatic Hydrocarbons</b>						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	-	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	-	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(b&j)fluoranthene <sup>N07</sup>	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
2-Fluorobiphenyl (surr.)	1	%	51	59	-	51
p-Terphenyl-d14 (surr.)	1	%	97	50	-	52

Client Sample ID			S11 0-0.2m	TP13 1.0m	TP18 1.5m	TP21 2.0m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008506	M22-De0008507	M22-De0008508	M22-De0008509
Date Sampled			Dec 02, 2022	Dec 01, 2022	Nov 30, 2022	Dec 01, 2022
Test/Reference	LOR	Unit				
<b>Organochlorine Pesticides</b>						
Chlordanes - Total	0.1	mg/kg	-	< 0.1	-	-
4,4'-DDD	0.05	mg/kg	-	< 0.05	-	-
4,4'-DDE	0.05	mg/kg	-	< 0.05	-	-
4,4'-DDT	0.05	mg/kg	-	< 0.05	-	-
a-HCH	0.05	mg/kg	-	< 0.05	-	-
Aldrin	0.05	mg/kg	-	< 0.05	-	-
b-HCH	0.05	mg/kg	-	< 0.05	-	-
d-HCH	0.05	mg/kg	-	< 0.05	-	-
Dieldrin	0.05	mg/kg	-	< 0.05	-	-
Endosulfan I	0.05	mg/kg	-	< 0.05	-	-
Endosulfan II	0.05	mg/kg	-	< 0.05	-	-
Endosulfan sulphate	0.05	mg/kg	-	< 0.05	-	-
Endrin	0.05	mg/kg	-	< 0.05	-	-
Endrin aldehyde	0.05	mg/kg	-	< 0.05	-	-
Endrin ketone	0.05	mg/kg	-	< 0.05	-	-
g-HCH (Lindane)	0.05	mg/kg	-	< 0.05	-	-
Heptachlor	0.05	mg/kg	-	< 0.05	-	-
Heptachlor epoxide	0.05	mg/kg	-	< 0.05	-	-
Hexachlorobenzene	0.05	mg/kg	-	< 0.05	-	-
Methoxychlor	0.05	mg/kg	-	< 0.05	-	-
Toxaphene	0.5	mg/kg	-	< 0.5	-	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	-	< 0.05	-	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	-	< 0.05	-	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	-	< 0.1	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	-	< 0.1	-	-
Dibutylchloroendate (surr.)	1	%	-	78	-	-
Tetrachloro-m-xylene (surr.)	1	%	-	67	-	-
<b>Polychlorinated Biphenyls</b>						
Aroclor-1016	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1221	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1232	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1242	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1248	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1254	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1260	0.1	mg/kg	-	< 0.1	-	-
Total PCB*	0.1	mg/kg	-	< 0.1	-	-
Dibutylchloroendate (surr.)	1	%	-	78	-	-
Tetrachloro-m-xylene (surr.)	1	%	-	67	-	-
<b>Phenols (Halogenated)</b>						
2-Chlorophenol	0.5	mg/kg	-	< 0.5	-	-
2,4-Dichlorophenol	0.5	mg/kg	-	< 0.5	-	-
2,4,5-Trichlorophenol	1	mg/kg	-	< 1	-	-
2,4,6-Trichlorophenol	1	mg/kg	-	< 1	-	-
2,6-Dichlorophenol	0.5	mg/kg	-	< 0.5	-	-
4-Chloro-3-methylphenol	1	mg/kg	-	< 1	-	-
Pentachlorophenol	1	mg/kg	-	< 1	-	-
Tetrachlorophenols - Total	10	mg/kg	-	< 10	-	-
Total Halogenated Phenol*	1	mg/kg	-	< 1	-	-

Client Sample ID			S11 0-0.2m	TP13 1.0m	TP18 1.5m	TP21 2.0m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008506	M22-De0008507	M22-De0008508	M22-De0008509
Date Sampled			Dec 02, 2022	Dec 01, 2022	Nov 30, 2022	Dec 01, 2022
Test/Reference	LOR	Unit				
<b>Phenols (non-Halogenated)</b>						
2-Cyclohexyl-4,6-dinitrophenol	20	mg/kg	-	< 20	-	-
2-Methyl-4,6-dinitrophenol	5	mg/kg	-	< 5	-	-
2-Nitrophenol	1.0	mg/kg	-	< 1	-	-
2,4-Dimethylphenol	0.5	mg/kg	-	< 0.5	-	-
2,4-Dinitrophenol	5	mg/kg	-	< 5	-	-
2-Methylphenol (o-Cresol)	0.2	mg/kg	-	< 0.2	-	-
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	-	< 0.4	-	-
Total cresols*	0.5	mg/kg	-	< 0.5	-	-
4-Nitrophenol	5	mg/kg	-	< 5	-	-
Dinoseb	20	mg/kg	-	< 20	-	-
Phenol	0.5	mg/kg	-	< 0.5	-	-
Phenol-d6 (surr.)	1	%	-	142	-	-
Total Non-Halogenated Phenol*	20	mg/kg	-	< 20	-	-
<b>Chromium (hexavalent)</b>						
Chromium (hexavalent)	1	mg/kg	-	< 1	-	-
<b>Cyanide (total)</b>						
Cyanide (total)	5	mg/kg	-	< 5	-	-
<b>Fluoride</b>						
Fluoride	100	mg/kg	-	< 100	-	-
<b>pH (1:5 Aqueous extract at 25 °C as rec.)</b>						
pH (1:5 Aqueous extract at 25 °C as rec.)	0.1	pH Units	7.6	7.3	7.3	7.3
<b>% Moisture</b>						
% Moisture	1	%	17	14	11	17
<b>Heavy Metals</b>						
Arsenic	2	mg/kg	< 2	< 2	< 2	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	11	25	19	32
Copper	5	mg/kg	5.4	10	9.3	15
Lead	5	mg/kg	9.0	9.8	7.0	16
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	5	mg/kg	-	< 5	-	-
Nickel	5	mg/kg	< 5	12	10	13
Selenium	2	mg/kg	-	< 2	-	-
Silver	2	mg/kg	-	< 2	-	-
Tin	10	mg/kg	-	< 10	-	-
Zinc	5	mg/kg	5.1	15	12	11
<b>BTEX</b>						
Benzene	0.1	mg/kg	< 0.1	-	-	< 0.1
Toluene	0.1	mg/kg	< 0.1	-	-	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	-	-	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	-	-	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	-	-	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	-	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	132	-	-	131

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Client Sample ID			TP33 1.0m	TP34 1.5m	TP37 0.50m	TP40 1.5m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008510	M22-De0008511	M22-De0008512	M22-De0008513
Date Sampled			Nov 30, 2022	Nov 30, 2022	Dec 02, 2022	Dec 02, 2022
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons</b>						
TRH C6-C9	20	mg/kg	< 20	-	< 20	-
TRH C10-C14	20	mg/kg	< 20	-	< 20	-
TRH C15-C28	50	mg/kg	< 50	-	< 50	-
TRH C29-C36	50	mg/kg	< 50	-	< 50	-
TRH C10-C36 (Total)	50	mg/kg	< 50	-	< 50	-
Naphthalene <sup>N02</sup>	0.5	mg/kg	< 0.5	-	< 0.5	-
TRH C6-C10	20	mg/kg	< 20	-	< 20	-
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	20	mg/kg	< 20	-	< 20	-
TRH >C10-C16	50	mg/kg	< 50	-	< 50	-
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	50	mg/kg	< 50	-	< 50	-
TRH >C16-C34	100	mg/kg	< 100	-	< 100	-
TRH >C34-C40	100	mg/kg	< 100	-	< 100	-
TRH >C10-C40 (total)*	100	mg/kg	< 100	-	< 100	-
<b>Volatile Organics</b>						
1.1-Dichloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.2.4-Trichlorobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
Hexachlorobutadiene	0.5	mg/kg	< 0.5	-	< 0.5	-
1.1-Dichloroethene	0.5	mg/kg	< 0.5	-	< 0.5	-
1.1.1-Trichloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.1.1.2-Tetrachloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.1.2-Trichloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.1.2.2-Tetrachloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.2-Dibromoethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.2-Dichlorobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
1.2-Dichloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.2-Dichloropropane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.2.3-Trichloropropane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.2.4-Trimethylbenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
1.3-Dichlorobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
1.3-Dichloropropane	0.5	mg/kg	< 0.5	-	< 0.5	-
1.3.5-Trimethylbenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
1.4-Dichlorobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
2-Butanone (MEK)	0.5	mg/kg	< 0.5	-	< 0.5	-
2-Propanone (Acetone)	0.5	mg/kg	< 0.5	-	< 0.5	-
4-Chlorotoluene	0.5	mg/kg	< 0.5	-	< 0.5	-
4-Methyl-2-pentanone (MIBK)	0.5	mg/kg	< 0.5	-	< 0.5	-
Allyl chloride	0.5	mg/kg	< 0.5	-	< 0.5	-
Benzene	0.1	mg/kg	< 0.1	-	< 0.1	-
Bromobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
Bromochloromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Bromodichloromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Bromoform	0.5	mg/kg	< 0.5	-	< 0.5	-
Bromomethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Carbon disulfide	0.5	mg/kg	< 0.5	-	< 0.5	-
Carbon Tetrachloride	0.5	mg/kg	< 0.5	-	< 0.5	-
Chlorobenzene	0.5	mg/kg	< 0.5	-	< 0.5	-
Chloroethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Chloroform	0.5	mg/kg	< 0.5	-	< 0.5	-
Chloromethane	0.5	mg/kg	< 0.5	-	< 0.5	-

Client Sample ID			TP33 1.0m	TP34 1.5m	TP37 0.50m	TP40 1.5m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008510	M22-De0008511	M22-De0008512	M22-De0008513
Date Sampled			Nov 30, 2022	Nov 30, 2022	Dec 02, 2022	Dec 02, 2022
Test/Reference	LOR	Unit				
<b>Volatile Organics</b>						
cis-1.2-Dichloroethene	0.5	mg/kg	< 0.5	-	< 0.5	-
cis-1.3-Dichloropropene	0.5	mg/kg	< 0.5	-	< 0.5	-
Dibromochloromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Dibromomethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Dichlorodifluoromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Ethylbenzene	0.1	mg/kg	< 0.1	-	< 0.1	-
Iodomethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Isopropyl benzene (Cumene)	0.5	mg/kg	< 0.5	-	< 0.5	-
m&p-Xylenes	0.2	mg/kg	< 0.2	-	< 0.2	-
Methylene Chloride	0.5	mg/kg	< 0.5	-	< 0.5	-
o-Xylene	0.1	mg/kg	< 0.1	-	< 0.1	-
Styrene	0.5	mg/kg	< 0.5	-	< 0.5	-
Tetrachloroethene	0.5	mg/kg	< 0.5	-	< 0.5	-
Toluene	0.1	mg/kg	< 0.1	-	< 0.1	-
trans-1.2-Dichloroethene	0.5	mg/kg	< 0.5	-	< 0.5	-
trans-1.3-Dichloropropene	0.5	mg/kg	< 0.5	-	< 0.5	-
Trichloroethene	0.5	mg/kg	< 0.5	-	< 0.5	-
Trichlorofluoromethane	0.5	mg/kg	< 0.5	-	< 0.5	-
Vinyl chloride	0.5	mg/kg	< 0.5	-	< 0.5	-
Xylenes - Total*	0.3	mg/kg	< 0.3	-	< 0.3	-
Total MAH*	0.5	mg/kg	< 0.5	-	< 0.5	-
Vic EPA IWRG 621 CHC (Total)*	0.5	mg/kg	< 0.5	-	< 0.5	-
Vic EPA IWRG 621 Other CHC (Total)*	0.5	mg/kg	< 0.5	-	< 0.5	-
4-Bromofluorobenzene (surr.)	1	%	100	-	122	-
Toluene-d8 (surr.)	1	%	111	-	101	-
<b>Polycyclic Aromatic Hydrocarbons</b>						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	-	< 0.5	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	-	0.6	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	-	1.2	-
Acenaphthene	0.5	mg/kg	< 0.5	-	< 0.5	-
Acenaphthylene	0.5	mg/kg	< 0.5	-	< 0.5	-
Anthracene	0.5	mg/kg	< 0.5	-	< 0.5	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	-	< 0.5	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	-	< 0.5	-
Benzo(b&j)fluoranthene <sup>N07</sup>	0.5	mg/kg	< 0.5	-	< 0.5	-
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	-	< 0.5	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	-	< 0.5	-
Chrysene	0.5	mg/kg	< 0.5	-	< 0.5	-
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	-	< 0.5	-
Fluoranthene	0.5	mg/kg	< 0.5	-	< 0.5	-
Fluorene	0.5	mg/kg	< 0.5	-	< 0.5	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	-	< 0.5	-
Naphthalene	0.5	mg/kg	< 0.5	-	< 0.5	-
Phenanthrene	0.5	mg/kg	< 0.5	-	< 0.5	-
Pyrene	0.5	mg/kg	< 0.5	-	< 0.5	-
Total PAH*	0.5	mg/kg	< 0.5	-	< 0.5	-
2-Fluorobiphenyl (surr.)	1	%	103	-	54	-
p-Terphenyl-d14 (surr.)	1	%	134	-	71	-

Client Sample ID			TP33 1.0m	TP34 1.5m	TP37 0.50m	TP40 1.5m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008510	M22-De0008511	M22-De0008512	M22-De0008513
Date Sampled			Nov 30, 2022	Nov 30, 2022	Dec 02, 2022	Dec 02, 2022
Test/Reference	LOR	Unit				
<b>Organochlorine Pesticides</b>						
Chlordanes - Total	0.1	mg/kg	< 0.1	-	< 0.1	-
4,4'-DDD	0.05	mg/kg	< 0.05	-	< 0.05	-
4,4'-DDE	0.05	mg/kg	< 0.05	-	< 0.05	-
4,4'-DDT	0.05	mg/kg	< 0.05	-	< 0.05	-
a-HCH	0.05	mg/kg	< 0.05	-	< 0.05	-
Aldrin	0.05	mg/kg	< 0.05	-	< 0.05	-
b-HCH	0.05	mg/kg	< 0.05	-	< 0.05	-
d-HCH	0.05	mg/kg	< 0.05	-	< 0.05	-
Dieldrin	0.05	mg/kg	< 0.05	-	< 0.05	-
Endosulfan I	0.05	mg/kg	< 0.05	-	< 0.05	-
Endosulfan II	0.05	mg/kg	< 0.05	-	< 0.05	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	< 0.05	-
Endrin	0.05	mg/kg	< 0.05	-	< 0.05	-
Endrin aldehyde	0.05	mg/kg	< 0.05	-	< 0.05	-
Endrin ketone	0.05	mg/kg	< 0.05	-	< 0.05	-
g-HCH (Lindane)	0.05	mg/kg	< 0.05	-	< 0.05	-
Heptachlor	0.05	mg/kg	< 0.05	-	< 0.05	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	< 0.05	-
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	< 0.05	-
Methoxychlor	0.05	mg/kg	< 0.05	-	< 0.05	-
Toxaphene	0.5	mg/kg	< 0.5	-	< 0.5	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	< 0.05	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	< 0.05	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	-	< 0.1	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	-	< 0.1	-
Dibutylchloroendate (surr.)	1	%	103	-	143	-
Tetrachloro-m-xylene (surr.)	1	%	51	-	59	-
<b>Polychlorinated Biphenyls</b>						
Aroclor-1016	0.1	mg/kg	< 0.1	-	< 0.1	-
Aroclor-1221	0.1	mg/kg	< 0.1	-	< 0.1	-
Aroclor-1232	0.1	mg/kg	< 0.1	-	< 0.1	-
Aroclor-1242	0.1	mg/kg	< 0.1	-	< 0.1	-
Aroclor-1248	0.1	mg/kg	< 0.1	-	< 0.1	-
Aroclor-1254	0.1	mg/kg	< 0.1	-	< 0.1	-
Aroclor-1260	0.1	mg/kg	< 0.1	-	< 0.1	-
Total PCB*	0.1	mg/kg	< 0.1	-	< 0.1	-
Dibutylchloroendate (surr.)	1	%	103	-	143	-
Tetrachloro-m-xylene (surr.)	1	%	51	-	59	-
<b>Phenols (Halogenated)</b>						
2-Chlorophenol	0.5	mg/kg	< 0.5	-	< 0.5	-
2,4-Dichlorophenol	0.5	mg/kg	< 0.5	-	< 0.5	-
2,4,5-Trichlorophenol	1	mg/kg	< 1	-	< 1	-
2,4,6-Trichlorophenol	1	mg/kg	< 1	-	< 1	-
2,6-Dichlorophenol	0.5	mg/kg	< 0.5	-	< 0.5	-
4-Chloro-3-methylphenol	1	mg/kg	< 1	-	< 1	-
Pentachlorophenol	1	mg/kg	< 1	-	< 1	-
Tetrachlorophenols - Total	10	mg/kg	< 10	-	< 10	-
Total Halogenated Phenol*	1	mg/kg	< 1	-	< 1	-

Client Sample ID			TP33 1.0m	TP34 1.5m	TP37 0.50m	TP40 1.5m
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-De0008510	M22-De0008511	M22-De0008512	M22-De0008513
Date Sampled			Nov 30, 2022	Nov 30, 2022	Dec 02, 2022	Dec 02, 2022
Test/Reference	LOR	Unit				
<b>Phenols (non-Halogenated)</b>						
2-Cyclohexyl-4,6-dinitrophenol	20	mg/kg	< 20	-	< 20	-
2-Methyl-4,6-dinitrophenol	5	mg/kg	< 5	-	< 5	-
2-Nitrophenol	1.0	mg/kg	< 1	-	< 1	-
2,4-Dimethylphenol	0.5	mg/kg	< 0.5	-	< 0.5	-
2,4-Dinitrophenol	5	mg/kg	< 5	-	< 5	-
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2	-	< 0.2	-
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4	-	< 0.4	-
Total cresols*	0.5	mg/kg	< 0.5	-	< 0.5	-
4-Nitrophenol	5	mg/kg	< 5	-	< 5	-
Dinoseb	20	mg/kg	< 20	-	< 20	-
Phenol	0.5	mg/kg	< 0.5	-	< 0.5	-
Phenol-d6 (surr.)	1	%	148	-	97	-
Total Non-Halogenated Phenol*	20	mg/kg	< 20	-	< 20	-
<b>Chromium (hexavalent)</b>						
Chromium (hexavalent)	1	mg/kg	< 1	-	< 1	-
<b>Cyanide (total)</b>						
Cyanide (total)	5	mg/kg	< 5	-	< 5	-
<b>Fluoride</b>						
Fluoride	100	mg/kg	< 100	-	110	-
<b>pH (1:5 Aqueous extract at 25 °C as rec.)</b>						
pH (1:5 Aqueous extract at 25 °C as rec.)	0.1	pH Units	7.5	6.9	7.1	7.4
<b>% Moisture</b>						
% Moisture	1	%	14	16	14	23
<b>Heavy Metals</b>						
Arsenic	2	mg/kg	< 2	< 2	< 2	5.3
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	30	32	22	29
Copper	5	mg/kg	10	15	8.8	22
Lead	5	mg/kg	14	15	9.7	14
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	5	mg/kg	< 5	-	< 5	-
Nickel	5	mg/kg	9.0	12	5.3	15
Selenium	2	mg/kg	< 2	-	< 2	-
Silver	2	mg/kg	< 2	-	< 2	-
Tin	10	mg/kg	< 10	-	< 10	-
Zinc	5	mg/kg	8.2	11	7.2	9.2

Client Sample ID			TP43 1.0m	TP9 1.0m	S6 0.40m
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M22-De0008514	M22-De0008515	M22-De0008516
Date Sampled			Not Provided <sup>12</sup>	Dec 01, 2022	Dec 02, 2022
Test/Reference	LOR	Unit			
<b>Total Recoverable Hydrocarbons</b>					
TRH C6-C9	20	mg/kg	-	< 20	-
TRH C10-C14	20	mg/kg	-	< 20	-
TRH C15-C28	50	mg/kg	-	< 50	-
TRH C29-C36	50	mg/kg	-	< 50	-
TRH C10-C36 (Total)	50	mg/kg	-	< 50	-
Naphthalene <sup>N02</sup>	0.5	mg/kg	-	< 0.5	-
TRH C6-C10	20	mg/kg	-	< 20	-
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	20	mg/kg	-	< 20	-

Client Sample ID			TP43 1.0m	TP9 1.0m	S6 0.40m
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M22-De0008514	M22-De0008515	M22-De0008516
Date Sampled			Not Provided <sup>12</sup>	Dec 01, 2022	Dec 02, 2022
Test/Reference	LOR	Unit			
<b>Total Recoverable Hydrocarbons</b>					
TRH >C10-C16	50	mg/kg	-	< 50	-
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	50	mg/kg	-	< 50	-
TRH >C16-C34	100	mg/kg	-	< 100	-
TRH >C34-C40	100	mg/kg	-	< 100	-
TRH >C10-C40 (total)*	100	mg/kg	-	< 100	-
<b>Volatile Organics</b>					
1.1-Dichloroethane	0.5	mg/kg	-	< 0.5	-
1.2.4-Trichlorobenzene	0.5	mg/kg	-	< 0.5	-
Hexachlorobutadiene	0.5	mg/kg	-	< 0.5	-
1.1-Dichloroethene	0.5	mg/kg	-	< 0.5	-
1.1.1-Trichloroethane	0.5	mg/kg	-	< 0.5	-
1.1.1.2-Tetrachloroethane	0.5	mg/kg	-	< 0.5	-
1.1.2-Trichloroethane	0.5	mg/kg	-	< 0.5	-
1.1.2.2-Tetrachloroethane	0.5	mg/kg	-	< 0.5	-
1.2-Dibromoethane	0.5	mg/kg	-	< 0.5	-
1.2-Dichlorobenzene	0.5	mg/kg	-	< 0.5	-
1.2-Dichloroethane	0.5	mg/kg	-	< 0.5	-
1.2-Dichloropropane	0.5	mg/kg	-	< 0.5	-
1.2.3-Trichloropropane	0.5	mg/kg	-	< 0.5	-
1.2.4-Trimethylbenzene	0.5	mg/kg	-	< 0.5	-
1.3-Dichlorobenzene	0.5	mg/kg	-	< 0.5	-
1.3-Dichloropropane	0.5	mg/kg	-	< 0.5	-
1.3.5-Trimethylbenzene	0.5	mg/kg	-	< 0.5	-
1.4-Dichlorobenzene	0.5	mg/kg	-	< 0.5	-
2-Butanone (MEK)	0.5	mg/kg	-	< 0.5	-
2-Propanone (Acetone)	0.5	mg/kg	-	< 0.5	-
4-Chlorotoluene	0.5	mg/kg	-	< 0.5	-
4-Methyl-2-pentanone (MIBK)	0.5	mg/kg	-	< 0.5	-
Allyl chloride	0.5	mg/kg	-	< 0.5	-
Benzene	0.1	mg/kg	-	< 0.1	-
Bromobenzene	0.5	mg/kg	-	< 0.5	-
Bromochloromethane	0.5	mg/kg	-	< 0.5	-
Bromodichloromethane	0.5	mg/kg	-	< 0.5	-
Bromoform	0.5	mg/kg	-	< 0.5	-
Bromomethane	0.5	mg/kg	-	< 0.5	-
Carbon disulfide	0.5	mg/kg	-	< 0.5	-
Carbon Tetrachloride	0.5	mg/kg	-	< 0.5	-
Chlorobenzene	0.5	mg/kg	-	< 0.5	-
Chloroethane	0.5	mg/kg	-	< 0.5	-
Chloroform	0.5	mg/kg	-	< 0.5	-
Chloromethane	0.5	mg/kg	-	< 0.5	-
cis-1.2-Dichloroethene	0.5	mg/kg	-	< 0.5	-
cis-1.3-Dichloropropene	0.5	mg/kg	-	< 0.5	-
Dibromochloromethane	0.5	mg/kg	-	< 0.5	-
Dibromomethane	0.5	mg/kg	-	< 0.5	-
Dichlorodifluoromethane	0.5	mg/kg	-	< 0.5	-
Ethylbenzene	0.1	mg/kg	-	< 0.1	-
Iodomethane	0.5	mg/kg	-	< 0.5	-
Isopropyl benzene (Cumene)	0.5	mg/kg	-	< 0.5	-



Client Sample ID			TP43 1.0m	TP9 1.0m	S6 0.40m
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M22-De0008514	M22-De0008515	M22-De0008516
Date Sampled			Not Provided <sup>12</sup>	Dec 01, 2022	Dec 02, 2022
Test/Reference	LOR	Unit			
<b>Volatile Organics</b>					
m&p-Xylenes	0.2	mg/kg	-	< 0.2	-
Methylene Chloride	0.5	mg/kg	-	< 0.5	-
o-Xylene	0.1	mg/kg	-	< 0.1	-
Styrene	0.5	mg/kg	-	< 0.5	-
Tetrachloroethene	0.5	mg/kg	-	< 0.5	-
Toluene	0.1	mg/kg	-	< 0.1	-
trans-1.2-Dichloroethene	0.5	mg/kg	-	< 0.5	-
trans-1.3-Dichloropropene	0.5	mg/kg	-	< 0.5	-
Trichloroethene	0.5	mg/kg	-	< 0.5	-
Trichlorofluoromethane	0.5	mg/kg	-	< 0.5	-
Vinyl chloride	0.5	mg/kg	-	< 0.5	-
Xylenes - Total*	0.3	mg/kg	-	< 0.3	-
Total MAH*	0.5	mg/kg	-	< 0.5	-
Vic EPA IWRG 621 CHC (Total)*	0.5	mg/kg	-	< 0.5	-
Vic EPA IWRG 621 Other CHC (Total)*	0.5	mg/kg	-	< 0.5	-
4-Bromofluorobenzene (surr.)	1	%	-	92	-
Toluene-d8 (surr.)	1	%	-	122	-
<b>Polycyclic Aromatic Hydrocarbons</b>					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	< 0.5	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	0.6	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	1.2	-
Acenaphthene	0.5	mg/kg	-	< 0.5	-
Acenaphthylene	0.5	mg/kg	-	< 0.5	-
Anthracene	0.5	mg/kg	-	< 0.5	-
Benz(a)anthracene	0.5	mg/kg	-	< 0.5	-
Benzo(a)pyrene	0.5	mg/kg	-	< 0.5	-
Benzo(b&j)fluoranthene <sup>N07</sup>	0.5	mg/kg	-	< 0.5	-
Benzo(g,h,i)perylene	0.5	mg/kg	-	< 0.5	-
Benzo(k)fluoranthene	0.5	mg/kg	-	< 0.5	-
Chrysene	0.5	mg/kg	-	< 0.5	-
Dibenz(a,h)anthracene	0.5	mg/kg	-	< 0.5	-
Fluoranthene	0.5	mg/kg	-	< 0.5	-
Fluorene	0.5	mg/kg	-	< 0.5	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	-	< 0.5	-
Naphthalene	0.5	mg/kg	-	< 0.5	-
Phenanthrene	0.5	mg/kg	-	< 0.5	-
Pyrene	0.5	mg/kg	-	< 0.5	-
Total PAH*	0.5	mg/kg	-	< 0.5	-
2-Fluorobiphenyl (surr.)	1	%	-	51	-
p-Terphenyl-d14 (surr.)	1	%	-	90	-
<b>Organochlorine Pesticides</b>					
Chlordanes - Total	0.1	mg/kg	-	< 0.1	-
4.4'-DDD	0.05	mg/kg	-	< 0.05	-
4.4'-DDE	0.05	mg/kg	-	< 0.05	-
4.4'-DDT	0.05	mg/kg	-	< 0.05	-
a-HCH	0.05	mg/kg	-	< 0.05	-
Aldrin	0.05	mg/kg	-	< 0.05	-
b-HCH	0.05	mg/kg	-	< 0.05	-
d-HCH	0.05	mg/kg	-	< 0.05	-

Client Sample ID			TP43 1.0m	TP9 1.0m	S6 0.40m
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M22-De0008514	M22-De0008515	M22-De0008516
Date Sampled			Not Provided <sup>12</sup>	Dec 01, 2022	Dec 02, 2022
Test/Reference	LOR	Unit			
<b>Organochlorine Pesticides</b>					
Dieldrin	0.05	mg/kg	-	< 0.05	-
Endosulfan I	0.05	mg/kg	-	< 0.05	-
Endosulfan II	0.05	mg/kg	-	< 0.05	-
Endosulfan sulphate	0.05	mg/kg	-	< 0.05	-
Endrin	0.05	mg/kg	-	< 0.05	-
Endrin aldehyde	0.05	mg/kg	-	< 0.05	-
Endrin ketone	0.05	mg/kg	-	< 0.05	-
γ-HCH (Lindane)	0.05	mg/kg	-	< 0.05	-
Heptachlor	0.05	mg/kg	-	< 0.05	-
Heptachlor epoxide	0.05	mg/kg	-	< 0.05	-
Hexachlorobenzene	0.05	mg/kg	-	< 0.05	-
Methoxychlor	0.05	mg/kg	-	< 0.05	-
Toxaphene	0.5	mg/kg	-	< 0.5	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	-	< 0.05	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	-	< 0.05	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	-	< 0.1	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	-	< 0.1	-
Dibutylchloroendate (surr.)	1	%	-	52	-
Tetrachloro-m-xylene (surr.)	1	%	-	109	-
<b>Polychlorinated Biphenyls</b>					
Aroclor-1016	0.1	mg/kg	-	< 0.1	-
Aroclor-1221	0.1	mg/kg	-	< 0.1	-
Aroclor-1232	0.1	mg/kg	-	< 0.1	-
Aroclor-1242	0.1	mg/kg	-	< 0.1	-
Aroclor-1248	0.1	mg/kg	-	< 0.1	-
Aroclor-1254	0.1	mg/kg	-	< 0.1	-
Aroclor-1260	0.1	mg/kg	-	< 0.1	-
Total PCB*	0.1	mg/kg	-	< 0.1	-
Dibutylchloroendate (surr.)	1	%	-	52	-
Tetrachloro-m-xylene (surr.)	1	%	-	109	-
<b>Phenols (Halogenated)</b>					
2-Chlorophenol	0.5	mg/kg	-	< 0.5	-
2,4-Dichlorophenol	0.5	mg/kg	-	< 0.5	-
2,4,5-Trichlorophenol	1	mg/kg	-	< 1	-
2,4,6-Trichlorophenol	1	mg/kg	-	< 1	-
2,6-Dichlorophenol	0.5	mg/kg	-	< 0.5	-
4-Chloro-3-methylphenol	1	mg/kg	-	< 1	-
Pentachlorophenol	1	mg/kg	-	< 1	-
Tetrachlorophenols - Total	10	mg/kg	-	< 10	-
Total Halogenated Phenol*	1	mg/kg	-	< 1	-
<b>Phenols (non-Halogenated)</b>					
2-Cyclohexyl-4,6-dinitrophenol	20	mg/kg	-	< 20	-
2-Methyl-4,6-dinitrophenol	5	mg/kg	-	< 5	-
2-Nitrophenol	1.0	mg/kg	-	< 1	-
2,4-Dimethylphenol	0.5	mg/kg	-	< 0.5	-
2,4-Dinitrophenol	5	mg/kg	-	< 5	-
2-Methylphenol (o-Cresol)	0.2	mg/kg	-	< 0.2	-
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	-	< 0.4	-
Total cresols*	0.5	mg/kg	-	< 0.5	-

Client Sample ID			TP43 1.0m	TP9 1.0m	S6 0.40m
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M22-De0008514	M22-De0008515	M22-De0008516
Date Sampled			Not Provided <sup>12</sup>	Dec 01, 2022	Dec 02, 2022
Test/Reference	LOR	Unit			
<b>Phenols (non-Halogenated)</b>					
4-Nitrophenol	5	mg/kg	-	< 5	-
Dinoseb	20	mg/kg	-	< 20	-
Phenol	0.5	mg/kg	-	< 0.5	-
Phenol-d6 (surr.)	1	%	-	137	-
Total Non-Halogenated Phenol*	20	mg/kg	-	< 20	-
<b>Chromium (hexavalent)</b>					
Chromium (hexavalent)	1	mg/kg	-	< 1	-
Cyanide (total)	5	mg/kg	-	< 5	-
Fluoride	100	mg/kg	-	< 100	-
pH (1:5 Aqueous extract at 25 °C as rec.)	0.1	pH Units	7.1	6.9	6.7
% Moisture	1	%	16	15	13
<b>Heavy Metals</b>					
Arsenic	2	mg/kg	2.2	< 2	7.4
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	28	22	17
Copper	5	mg/kg	12	9.2	< 5
Lead	5	mg/kg	12	9.0	7.4
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Molybdenum	5	mg/kg	-	< 5	-
Nickel	5	mg/kg	11	8.4	< 5
Selenium	2	mg/kg	-	< 2	-
Silver	2	mg/kg	-	< 2	-
Tin	10	mg/kg	-	< 10	-
Zinc	5	mg/kg	10	9.2	6.5

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**Sample History**

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Vic EPA 1828.2 Table 3 (Solids)			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 05, 2022	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 05, 2022	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 05, 2022	14 Days
Volatile Organics - Method: LTM-ORG-2150 VOCs in Soils Liquid and other Aqueous Matrices (USEPA 8260)	Melbourne	Dec 05, 2022	7 Days
Polycyclic Aromatic Hydrocarbons - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Melbourne	Dec 05, 2022	14 Days
Organochlorine Pesticides - Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8270)	Melbourne	Dec 05, 2022	14 Days
Polychlorinated Biphenyls - Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)	Melbourne	Dec 05, 2022	28 Days
Phenols (Halogenated) - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Melbourne	Dec 05, 2022	14 Days
Phenols (non-Halogenated) - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Melbourne	Dec 05, 2022	14 Days
Chromium (hexavalent) - Method: LTM-INO-4100 Hexavalent Chromium by Spectrometric detection - Method: LTM-INO-4230 Hexavalent Chromium by UV-Vis	Melbourne	Dec 05, 2022	28 Days
Cyanide (total) - Method: LTM-INO-4020 Total Free WAD Cyanide by CFA	Melbourne	Dec 05, 2022	14 Days
Fluoride - Method: LTM-INO-4150 Determination of Total Fluoride PART A – CIC	Melbourne	Dec 06, 2022	28 Days
pH (1:5 Aqueous extract at 25 °C as rec.) - Method: LTM-GEN-7090 pH in soil by ISE	Melbourne	Dec 05, 2022	7 Days
Metals IWRG 621 : Metals M12 - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Melbourne	Dec 05, 2022	28 Days
% Moisture - Method: LTM-GEN-7080 Moisture	Melbourne	Dec 05, 2022	14 Days
Eurofins Suite B7			
Metals M8 - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Melbourne	Dec 05, 2022	28 Days
BTEX - Method: LTM-ORG-2010 BTEX and Volatile TRH	Melbourne	Dec 05, 2022	14 Days

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**Company Name:** L R Pardo & Associates  
**Address:** 2 Alex Avenue  
 Moorabbin  
 VIC 3189  
  
**Project Name:** 92 ENTERPRISE RD/2  
**Project ID:** 222843

**Order No.:**  
**Report #:** 947162  
**Phone:** 03 9555 8995  
**Fax:** 03 9553 1394

**Received:** Dec 5, 2022 3:38 PM  
**Due:** Dec 6, 2022  
**Priority:** 1 Day  
**Contact Name:**

Eurofins Analytical Services Manager

## Sample Detail

pH (1:5 Aqueous extract at 25 °C as req.)  
 Metals MB  
 Moisture Set  
 Eurofins Suite B7  
 Vic EPA 1626.2 Table 3 (Solids)

## Melbourne Laboratory - NATA # 1261 Site # 1254

## External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID				
1	S1 0.41m	Dec 02, 2022		Soil	M22-De0006498			X	X
2	S2 0.27m	Dec 02, 2022		Soil	M22-De0006499	X		X	X
3	S3 0.52m	Dec 02, 2022		Soil	M22-De0006500			X	X
4	S4 0.35m	Dec 02, 2022		Soil	M22-De0006501	X		X	X
5	S5-1 0.41m	Dec 02, 2022		Soil	M22-De0006502			X	X
6	S5-2 0-0.1m	Dec 02, 2022		Soil	M22-De0006503			X	X
7	S7 0.28m	Dec 02, 2022		Soil	M22-De0006504	X	X	X	
8	S8 0.58m	Dec 02, 2022		Soil	M22-De0006505			X	X
9	S11 0-0.2m	Dec 02, 2022		Soil	M22-De0006506	X		X	X
10	TP13 1.0m	Dec 01, 2022		Soil	M22-De0006507			X	X
11	TP18 1.5m	Nov 30, 2022		Soil	M22-De0006508	X	X	X	
12	TP21 2.0m	Dec 01, 2022		Soil	M22-De0006509	X		X	X
13	TP33 1.0m	Nov 30, 2022		Soil	M22-De0006510			X	X

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Eurofins Analytical Services Manager

Sample Detail						pH (1:5 Aqueous extract at 25 °C as req.)	Metals MB	Moisture Set	Eurofins Suite B7	Vic EPA 1626.2 Table 3 (Solids)
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>						X	X	X	X	X
14	TP34 1.5m	Nov 30, 2022		Soil	M22-De0008511	X	X	X		
15	TP37 0.50m	Dec 02, 2022		Soil	M22-De0008512			X		X
16	TP40 1.5m	Dec 02, 2022		Soil	M22-De0008513	X	X	X		
17	TP43 1.0m	Not Provided		Soil	M22-De0008514	X	X	X		
18	TP9 1.0m	Dec 01, 2022		Soil	M22-De0008515			X		X
19	S6 0.40m	Dec 02, 2022		Soil	M22-De0008516	X	X	X		
<b>Test Counts</b>						10	8	19	4	9

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## Internal Quality Control Review and Glossary

### General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

### Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

### Units

<b>mg/kg:</b> milligrams per kilogram	<b>mg/L:</b> milligrams per litre	<b>µg/L:</b> micrograms per litre
<b>ppm:</b> parts per million	<b>ppb:</b> parts per billion	<b>%:</b> Percentage
<b>org/100 mL:</b> Organisms per 100 millilitres	<b>NTU:</b> Nephelometric Turbidity Units	<b>MPN/100 mL:</b> Most Probable Number of organisms per 100 millilitres
<b>CFU:</b> Colony forming unit		

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPaA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

### QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

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### Quality Control Results

Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>						
<b>Total Recoverable Hydrocarbons</b>						
TRH C6-C9	mg/kg	< 20		20	Pass	
TRH C10-C14	mg/kg	< 20		20	Pass	
TRH C15-C28	mg/kg	< 50		50	Pass	
TRH C29-C36	mg/kg	< 50		50	Pass	
Naphthalene	mg/kg	< 0.5		0.5	Pass	
TRH C6-C10	mg/kg	< 20		20	Pass	
TRH >C10-C16	mg/kg	< 50		50	Pass	
TRH >C16-C34	mg/kg	< 100		100	Pass	
TRH >C34-C40	mg/kg	< 100		100	Pass	
<b>Method Blank</b>						
<b>Volatile Organics</b>						
1.1-Dichloroethane	mg/kg	< 0.5		0.5	Pass	
1.2.4-Trichlorobenzene	mg/kg	< 0.5		0.5	Pass	
Hexachlorobutadiene	mg/kg	< 0.5		0.5	Pass	
1.1-Dichloroethene	mg/kg	< 0.5		0.5	Pass	
1.1.1-Trichloroethane	mg/kg	< 0.5		0.5	Pass	
1.1.1.2-Tetrachloroethane	mg/kg	< 0.5		0.5	Pass	
1.1.2-Trichloroethane	mg/kg	< 0.5		0.5	Pass	
1.1.2.2-Tetrachloroethane	mg/kg	< 0.5		0.5	Pass	
1.2-Dibromoethane	mg/kg	< 0.5		0.5	Pass	
1.2-Dichlorobenzene	mg/kg	< 0.5		0.5	Pass	
1.2-Dichloroethane	mg/kg	< 0.5		0.5	Pass	
1.2-Dichloropropane	mg/kg	< 0.5		0.5	Pass	
1.2.3-Trichloropropane	mg/kg	< 0.5		0.5	Pass	
1.2.4-Trimethylbenzene	mg/kg	< 0.5		0.5	Pass	
1.3-Dichlorobenzene	mg/kg	< 0.5		0.5	Pass	
1.3-Dichloropropane	mg/kg	< 0.5		0.5	Pass	
1.3.5-Trimethylbenzene	mg/kg	< 0.5		0.5	Pass	
1.4-Dichlorobenzene	mg/kg	< 0.5		0.5	Pass	
2-Butanone (MEK)	mg/kg	< 0.5		0.5	Pass	
2-Propanone (Acetone)	mg/kg	< 0.5		0.5	Pass	
4-Chlorotoluene	mg/kg	< 0.5		0.5	Pass	
4-Methyl-2-pentanone (MIBK)	mg/kg	< 0.5		0.5	Pass	
Allyl chloride	mg/kg	< 0.5		0.5	Pass	
Benzene	mg/kg	< 0.1		0.1	Pass	
Bromobenzene	mg/kg	< 0.5		0.5	Pass	
Bromochloromethane	mg/kg	< 0.5		0.5	Pass	
Bromodichloromethane	mg/kg	< 0.5		0.5	Pass	
Bromoform	mg/kg	< 0.5		0.5	Pass	
Bromomethane	mg/kg	< 0.5		0.5	Pass	
Carbon disulfide	mg/kg	< 0.5		0.5	Pass	
Carbon Tetrachloride	mg/kg	< 0.5		0.5	Pass	
Chlorobenzene	mg/kg	< 0.5		0.5	Pass	
Chloroethane	mg/kg	< 0.5		0.5	Pass	
Chloroform	mg/kg	< 0.5		0.5	Pass	
Chloromethane	mg/kg	< 0.5		0.5	Pass	
cis-1.2-Dichloroethene	mg/kg	< 0.5		0.5	Pass	
cis-1.3-Dichloropropene	mg/kg	< 0.5		0.5	Pass	
Dibromochloromethane	mg/kg	< 0.5		0.5	Pass	
Dibromomethane	mg/kg	< 0.5		0.5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Dichlorodifluoromethane	mg/kg	< 0.5			0.5	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
Iodomethane	mg/kg	< 0.5			0.5	Pass	
Isopropyl benzene (Cumene)	mg/kg	< 0.5			0.5	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
Methylene Chloride	mg/kg	< 0.5			0.5	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Styrene	mg/kg	< 0.5			0.5	Pass	
Tetrachloroethene	mg/kg	< 0.5			0.5	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
trans-1,2-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
trans-1,3-Dichloropropene	mg/kg	< 0.5			0.5	Pass	
Trichloroethene	mg/kg	< 0.5			0.5	Pass	
Trichlorofluoromethane	mg/kg	< 0.5			0.5	Pass	
Vinyl chloride	mg/kg	< 0.5			0.5	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
<b>Method Blank</b>							
<b>Polycyclic Aromatic Hydrocarbons</b>							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g,h,i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a,h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
<b>Method Blank</b>							
<b>Organochlorine Pesticides</b>							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4,4'-DDD	mg/kg	< 0.05			0.05	Pass	
4,4'-DDE	mg/kg	< 0.05			0.05	Pass	
4,4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-HCH	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-HCH	mg/kg	< 0.05			0.05	Pass	
d-HCH	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-HCH (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.05			0.05	Pass	
Toxaphene	mg/kg	< 0.5			0.5	Pass	
<b>Method Blank</b>							
<b>Polychlorinated Biphenyls</b>							
Aroclor-1016	mg/kg	< 0.1			0.1	Pass	
Aroclor-1221	mg/kg	< 0.1			0.1	Pass	
Aroclor-1232	mg/kg	< 0.1			0.1	Pass	
Aroclor-1242	mg/kg	< 0.1			0.1	Pass	
Aroclor-1248	mg/kg	< 0.1			0.1	Pass	
Aroclor-1254	mg/kg	< 0.1			0.1	Pass	
Aroclor-1260	mg/kg	< 0.1			0.1	Pass	
Total PCB*	mg/kg	< 0.1			0.1	Pass	
<b>Method Blank</b>							
<b>Phenols (Halogenated)</b>							
2-Chlorophenol	mg/kg	< 0.5			0.5	Pass	
2,4-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
2,4,5-Trichlorophenol	mg/kg	< 1			1	Pass	
2,4,6-Trichlorophenol	mg/kg	< 1			1	Pass	
2,6-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
4-Chloro-3-methylphenol	mg/kg	< 1			1	Pass	
Pentachlorophenol	mg/kg	< 1			1	Pass	
Tetrachlorophenols - Total	mg/kg	< 10			10	Pass	
<b>Method Blank</b>							
<b>Phenols (non-Halogenated)</b>							
2-Cyclohexyl-4,6-dinitrophenol	mg/kg	< 20			20	Pass	
2-Methyl-4,6-dinitrophenol	mg/kg	< 5			5	Pass	
2-Nitrophenol	mg/kg	< 1			1.0	Pass	
2,4-Dimethylphenol	mg/kg	< 0.5			0.5	Pass	
2,4-Dinitrophenol	mg/kg	< 5			5	Pass	
2-Methylphenol (o-Cresol)	mg/kg	< 0.2			0.2	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/kg	< 0.4			0.4	Pass	
4-Nitrophenol	mg/kg	< 5			5	Pass	
Dinoseb	mg/kg	< 20			20	Pass	
Phenol	mg/kg	< 0.5			0.5	Pass	
<b>Method Blank</b>							
Chromium (hexavalent)	mg/kg	< 1			1	Pass	
Cyanide (total)	mg/kg	< 5			5	Pass	
Fluoride	mg/kg	< 100			100	Pass	
<b>Method Blank</b>							
<b>Heavy Metals</b>							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Molybdenum	mg/kg	< 5			5	Pass	
Nickel	mg/kg	< 5			5	Pass	
Selenium	mg/kg	< 2			2	Pass	
Silver	mg/kg	< 2			2	Pass	
Tin	mg/kg	< 10			10	Pass	
Zinc	mg/kg	< 5			5	Pass	
<b>LCS - % Recovery</b>							



Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Total Recoverable Hydrocarbons</b>							
TRH C6-C9	%	117			70-130	Pass	
TRH C10-C14	%	110			70-130	Pass	
Naphthalene	%	75			70-130	Pass	
TRH C6-C10	%	108			70-130	Pass	
TRH >C10-C16	%	105			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Volatile Organics</b>							
1.1-Dichloroethene	%	80			70-130	Pass	
1.1.1-Trichloroethane	%	87			70-130	Pass	
1.2-Dichlorobenzene	%	100			70-130	Pass	
1.2-Dichloroethane	%	100			70-130	Pass	
Benzene	%	92			70-130	Pass	
Ethylbenzene	%	93			70-130	Pass	
m&p-Xylenes	%	98			70-130	Pass	
Toluene	%	93			70-130	Pass	
Trichloroethene	%	90			70-130	Pass	
Xylenes - Total*	%	99			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Polycyclic Aromatic Hydrocarbons</b>							
Acenaphthene	%	86			70-130	Pass	
Acenaphthylene	%	90			70-130	Pass	
Anthracene	%	96			70-130	Pass	
Benz(a)anthracene	%	118			70-130	Pass	
Benzo(a)pyrene	%	84			70-130	Pass	
Benzo(b&j)fluoranthene	%	111			70-130	Pass	
Benzo(g,h,i)perylene	%	129			70-130	Pass	
Benzo(k)fluoranthene	%	119			70-130	Pass	
Chrysene	%	90			70-130	Pass	
Dibenz(a,h)anthracene	%	116			70-130	Pass	
Fluoranthene	%	114			70-130	Pass	
Fluorene	%	86			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	99			70-130	Pass	
Naphthalene	%	91			70-130	Pass	
Phenanthrene	%	109			70-130	Pass	
Pyrene	%	111			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Organochlorine Pesticides</b>							
Chlordanes - Total	%	83			70-130	Pass	
4,4'-DDD	%	91			70-130	Pass	
4,4'-DDE	%	99			70-130	Pass	
4,4'-DDT	%	86			70-130	Pass	
a-HCH	%	106			70-130	Pass	
Aldrin	%	117			70-130	Pass	
b-HCH	%	98			70-130	Pass	
d-HCH	%	108			70-130	Pass	
Dieldrin	%	130			70-130	Pass	
Endosulfan I	%	93			70-130	Pass	
Endosulfan II	%	112			70-130	Pass	
Endosulfan sulphate	%	75			70-130	Pass	
Endrin	%	78			70-130	Pass	
Endrin aldehyde	%	95			70-130	Pass	
Endrin ketone	%	82			70-130	Pass	
g-HCH (Lindane)	%	118			70-130	Pass	

Test	Units	Result 1	Acceptance Limits	Pass Limits	Qualifying Code		
Heptachlor	%	72	70-130	Pass			
Heptachlor epoxide	%	75	70-130	Pass			
Hexachlorobenzene	%	124	70-130	Pass			
Methoxychlor	%	100	70-130	Pass			
<b>LCS - % Recovery</b>							
<b>Polychlorinated Biphenyls</b>							
Aroclor-1260	%	98	70-130	Pass			
<b>LCS - % Recovery</b>							
<b>Phenols (Halogenated)</b>							
2-Chlorophenol	%	120	25-140	Pass			
2,4-Dichlorophenol	%	76	25-140	Pass			
2,4,5-Trichlorophenol	%	52	25-140	Pass			
2,4,6-Trichlorophenol	%	72	25-140	Pass			
2,6-Dichlorophenol	%	38	25-140	Pass			
4-Chloro-3-methylphenol	%	62	25-140	Pass			
Pentachlorophenol	%	64	25-140	Pass			
Tetrachlorophenols - Total	%	111	25-140	Pass			
<b>LCS - % Recovery</b>							
<b>Phenols (non-Halogenated)</b>							
2-Cyclohexyl-4,6-dinitrophenol	%	95	25-140	Pass			
2-Methyl-4,6-dinitrophenol	%	90	25-140	Pass			
2-Nitrophenol	%	67	25-140	Pass			
2,4-Dimethylphenol	%	33	25-140	Pass			
2,4-Dinitrophenol	%	42	25-140	Pass			
2-Methylphenol (o-Cresol)	%	77	25-140	Pass			
3&4-Methylphenol (m&p-Cresol)	%	48	25-140	Pass			
4-Nitrophenol	%	84	25-140	Pass			
Dinoseb	%	94	25-140	Pass			
Phenol	%	34	25-140	Pass			
<b>LCS - % Recovery</b>							
Chromium (hexavalent)	%	86	70-130	Pass			
Cyanide (total)	%	88	70-130	Pass			
Fluoride	%	93	70-130	Pass			
<b>LCS - % Recovery</b>							
<b>Heavy Metals</b>							
Arsenic	%	104	80-120	Pass			
Cadmium	%	107	80-120	Pass			
Chromium	%	105	80-120	Pass			
Copper	%	105	80-120	Pass			
Lead	%	106	80-120	Pass			
Mercury	%	97	80-120	Pass			
Molybdenum	%	104	80-120	Pass			
Nickel	%	103	80-120	Pass			
Selenium	%	101	80-120	Pass			
Silver	%	109	80-120	Pass			
Tin	%	101	80-120	Pass			
Zinc	%	104	80-120	Pass			
Test	Lab Sample ID	QA Source	Units	Result 1	Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>							
<b>Total Recoverable Hydrocarbons</b>				Result 1			
TRH C6-C9	M22-De0007710	NCP	%	90	70-130	Pass	
TRH C10-C14	M22-De0008408	NCP	%	117	70-130	Pass	
Naphthalene	M22-De0007820	NCP	%	77	70-130	Pass	
TRH C6-C10	M22-De0007710	NCP	%	83	70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
TRH >C10-C16	M22-De0008408	NCP	%	110		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Volatile Organics</b>				Result 1				
1.1-Dichloroethene	M22-De0007710	NCP	%	79		70-130	Pass	
1.1.1-Trichloroethane	M22-De0007710	NCP	%	74		70-130	Pass	
1.2-Dichlorobenzene	M22-De0007710	NCP	%	77		70-130	Pass	
1.2-Dichloroethane	M22-De0007710	NCP	%	79		70-130	Pass	
Benzene	M22-De0007710	NCP	%	74		70-130	Pass	
Ethylbenzene	M22-De0007710	NCP	%	72		70-130	Pass	
m&p-Xylenes	M22-De0007710	NCP	%	78		70-130	Pass	
o-Xylene	M22-De0007710	NCP	%	77		70-130	Pass	
Toluene	M22-De0007710	NCP	%	75		70-130	Pass	
Trichloroethene	M22-De0007710	NCP	%	72		70-130	Pass	
Xylenes - Total*	M22-De0007710	NCP	%	78		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Polycyclic Aromatic Hydrocarbons</b>				Result 1				
Acenaphthene	M22-De0006192	NCP	%	86		70-130	Pass	
Acenaphthylene	M22-De0006192	NCP	%	120		70-130	Pass	
Anthracene	M22-De0006192	NCP	%	102		70-130	Pass	
Benz(a)anthracene	M22-De0006192	NCP	%	129		70-130	Pass	
Benzo(a)pyrene	M22-De0006192	NCP	%	103		70-130	Pass	
Benzo(b&j)fluoranthene	M22-De0006192	NCP	%	105		70-130	Pass	
Benzo(g,h,i)perylene	M22-De0006192	NCP	%	123		70-130	Pass	
Benzo(k)fluoranthene	M22-De0006192	NCP	%	129		70-130	Pass	
Chrysene	M22-De0006192	NCP	%	94		70-130	Pass	
Dibenz(a,h)anthracene	M22-De0006192	NCP	%	117		70-130	Pass	
Fluoranthene	M22-De0006192	NCP	%	100		70-130	Pass	
Fluorene	M22-De0006192	NCP	%	109		70-130	Pass	
Indeno(1,2,3-cd)pyrene	M22-De0006192	NCP	%	114		70-130	Pass	
Naphthalene	M22-De0006192	NCP	%	72		70-130	Pass	
Phenanthrene	M22-De0006192	NCP	%	115		70-130	Pass	
Pyrene	M22-De0006192	NCP	%	105		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Phenols (Halogenated)</b>				Result 1				
2-Chlorophenol	M22-De0006192	NCP	%	62		30-130	Pass	
2,4-Dichlorophenol	M22-De0006192	NCP	%	78		30-130	Pass	
2,4,5-Trichlorophenol	M22-De0006192	NCP	%	34		30-130	Pass	
2,4,6-Trichlorophenol	M22-De0006192	NCP	%	61		30-130	Pass	
2,6-Dichlorophenol	M22-De0006192	NCP	%	50		30-130	Pass	
4-Chloro-3-methylphenol	M22-De0006192	NCP	%	72		30-130	Pass	
Pentachlorophenol	M22-De0002870	NCP	%	101		30-130	Pass	
Tetrachlorophenols - Total	M22-De0006192	NCP	%	55		30-130	Pass	
<b>Spike - % Recovery</b>								
<b>Phenols (non-Halogenated)</b>				Result 1				
2-Cyclohexyl-4,6-dinitrophenol	M22-De0006192	NCP	%	42		30-130	Pass	
2-Methyl-4,6-dinitrophenol	M22-De0006192	NCP	%	43		30-130	Pass	
2-Nitrophenol	M22-De0006192	NCP	%	79		30-130	Pass	
2,4-Dimethylphenol	M22-De0006192	NCP	%	124		30-130	Pass	
2,4-Dinitrophenol	M22-De0006192	NCP	%	64		30-130	Pass	
2-Methylphenol (o-Cresol)	M22-De0006192	NCP	%	45		30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	M22-De0006192	NCP	%	129		30-130	Pass	
4-Nitrophenol	M22-De0006192	NCP	%	97		30-130	Pass	
Dinoseb	M22-De0006192	NCP	%	38		30-130	Pass	
Phenol	M22-De0006192	NCP	%	73		30-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>									
				Result 1					
Chromium (hexavalent)	M22-De0007709	NCP	%	120			70-130	Pass	
Cyanide (total)	M22-De0006744	NCP	%	122			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Heavy Metals</b>									
				Result 1					
Arsenic	M22-De0007820	NCP	%	95			75-125	Pass	
Cadmium	M22-De0007820	NCP	%	103			75-125	Pass	
Chromium	M22-De0007820	NCP	%	97			75-125	Pass	
Copper	M22-De0007820	NCP	%	109			75-125	Pass	
Lead	M22-De0007820	NCP	%	93			75-125	Pass	
Mercury	M22-De0007820	NCP	%	103			75-125	Pass	
Molybdenum	M22-De0007820	NCP	%	102			75-125	Pass	
Nickel	M22-De0007820	NCP	%	103			75-125	Pass	
Selenium	M22-De0007820	NCP	%	96			75-125	Pass	
Silver	M22-De0007820	NCP	%	103			75-125	Pass	
Tin	M22-De0007820	NCP	%	101			75-125	Pass	
Zinc	M22-De0007820	NCP	%	108			75-125	Pass	
<b>Spike - % Recovery</b>									
<b>Organochlorine Pesticides</b>									
				Result 1					
Chlordanes - Total	B22-No0073681	NCP	%	84			70-130	Pass	
4,4'-DDD	B22-No0073681	NCP	%	104			70-130	Pass	
4,4'-DDE	B22-No0073681	NCP	%	90			70-130	Pass	
4,4'-DDT	B22-No0073681	NCP	%	129			70-130	Pass	
a-HCH	B22-No0073681	NCP	%	87			70-130	Pass	
Aldrin	B22-No0073681	NCP	%	74			70-130	Pass	
b-HCH	B22-No0073681	NCP	%	111			70-130	Pass	
d-HCH	B22-No0073681	NCP	%	81			70-130	Pass	
Dieldrin	B22-No0073681	NCP	%	117			70-130	Pass	
Endosulfan I	B22-No0073681	NCP	%	88			70-130	Pass	
Endosulfan II	B22-No0073681	NCP	%	88			70-130	Pass	
Endosulfan sulphate	B22-No0073681	NCP	%	78			70-130	Pass	
Endrin	B22-No0073681	NCP	%	117			70-130	Pass	
Endrin aldehyde	M22-De0001541	NCP	%	80			70-130	Pass	
Endrin ketone	B22-No0073681	NCP	%	84			70-130	Pass	
g-HCH (Lindane)	B22-No0073681	NCP	%	70			70-130	Pass	
Heptachlor	B22-No0073681	NCP	%	102			70-130	Pass	
Heptachlor epoxide	B22-No0073681	NCP	%	84			70-130	Pass	
Hexachlorobenzene	B22-No0073681	NCP	%	91			70-130	Pass	
Methoxychlor	B22-No0073681	NCP	%	98			70-130	Pass	
<b>Spike - % Recovery</b>									
				Result 1					
Fluoride	M22-De0007673	NCP	%	94			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Total Recoverable Hydrocarbons</b>									
				Result 1	Result 2	RPD			
TRH C6-C9	M22-De0001334	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	M22-De0008147	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	M22-De0008147	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	M22-De0008147	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Naphthalene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	M22-De0001334	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	M22-De0008147	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	M22-De0008147	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	M22-De0008147	NCP	mg/kg	< 100	< 100	<1	30%	Pass	

Duplicate								
Volatile Organics				Result 1	Result 2	RPD		
1.1-Dichloroethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
1.2.4-Trichlorobenzene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Hexachlorobutadiene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
1.1-Dichloroethene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
1.1.1-Trichloroethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
1.1.1.2-Tetrachloroethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
1.1.2-Trichloroethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
1.1.2.2-Tetrachloroethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
1.2-Dibromoethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
1.2-Dichlorobenzene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
1.2-Dichloroethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
1.2-Dichloropropane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
1.2.3-Trichloropropane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
1.2.4-Trimethylbenzene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
1.3-Dichlorobenzene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
1.3-Dichloropropane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
1.3.5-Trimethylbenzene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
1.4-Dichlorobenzene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
2-Butanone (MEK)	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
2-Propanone (Acetone)	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
4-Chlorotoluene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
4-Methyl-2-pentanone (MIBK)	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Allyl chloride	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzene	M22-De0001334	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Bromobenzene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Bromochloromethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Bromodichloromethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Bromoform	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Bromomethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Carbon disulfide	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Carbon Tetrachloride	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Chlorobenzene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Chloroethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Chloroform	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Chloromethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
cis-1.2-Dichloroethene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
cis-1.3-Dichloropropene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Dibromochloromethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Dibromomethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Dichlorodifluoromethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Ethylbenzene	M22-De0001334	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Iodomethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Isopropyl benzene (Cumene)	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
m&p-Xylenes	M22-De0001334	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Methylene Chloride	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
o-Xylene	M22-De0001334	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Styrene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Tetrachloroethene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Toluene	M22-De0001334	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
trans-1.2-Dichloroethene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
trans-1.3-Dichloropropene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Trichloroethene	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Trichlorofluoromethane	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Vinyl chloride	M22-De0001334	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Xylenes - Total*	M22-De0001334	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass



<b>Duplicate</b>									
<b>Polycyclic Aromatic Hydrocarbons</b>					Result 1	Result 2	RPD		
Acenaphthene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)anthracene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g,h,i)perylene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a,h)anthracene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1,2,3-cd)pyrene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
<b>Duplicate</b>									
<b>Organochlorine Pesticides</b>					Result 1	Result 2	RPD		
Chlordanes - Total	M22-De0005847	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4,4'-DDD	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4,4'-DDE	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4,4'-DDT	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-HCH	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-HCH	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-HCH	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-HCH (Lindane)	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	M22-De0005847	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
<b>Duplicate</b>									
<b>Polychlorinated Biphenyls</b>					Result 1	Result 2	RPD		
Aroclor-1016	M22-De0005847	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1221	M22-De0005847	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1232	M22-De0005847	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1242	M22-De0005847	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1248	M22-De0005847	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1254	M22-De0005847	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1260	M22-De0005847	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Total PCB*	M22-De0005847	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	

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Duplicate								
Phenols (Halogenated)				Result 1	Result 2	RPD		
2-Chlorophenol	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
2,4-Dichlorophenol	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
2,4,5-Trichlorophenol	M22-De0005847	NCP	mg/kg	< 1	< 1	<1	30%	Pass
2,4,6-Trichlorophenol	M22-De0005847	NCP	mg/kg	< 1	< 1	<1	30%	Pass
2,6-Dichlorophenol	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
4-Chloro-3-methylphenol	M22-De0005847	NCP	mg/kg	< 1	< 1	<1	30%	Pass
Pentachlorophenol	M22-De0005847	NCP	mg/kg	< 1	< 1	<1	30%	Pass
Tetrachlorophenols - Total	M22-De0005847	NCP	mg/kg	< 10	< 10	<1	30%	Pass
Duplicate								
Phenols (non-Halogenated)				Result 1	Result 2	RPD		
2-Cyclohexyl-4,6-dinitrophenol	M22-De0005847	NCP	mg/kg	< 20	< 20	<1	30%	Pass
2-Methyl-4,6-dinitrophenol	M22-De0005847	NCP	mg/kg	< 5	< 5	<1	30%	Pass
2-Nitrophenol	M22-De0005847	NCP	mg/kg	< 1	< 1	<1	30%	Pass
2,4-Dimethylphenol	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
2,4-Dinitrophenol	M22-De0005847	NCP	mg/kg	< 5	< 5	<1	30%	Pass
2-Methylphenol (o-Cresol)	M22-De0005847	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
3&4-Methylphenol (m&p-Cresol)	M22-De0005847	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass
4-Nitrophenol	M22-De0005847	NCP	mg/kg	< 5	< 5	<1	30%	Pass
Dinoseb	M22-De0005847	NCP	mg/kg	< 20	< 20	<1	30%	Pass
Phenol	M22-De0005847	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Chromium (hexavalent)	M22-De0007740	NCP	mg/kg	< 1	< 1	<1	30%	Pass
Cyanide (total)	M22-De0006742	NCP	mg/kg	< 5	< 5	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	M22-De0007820	NCP	mg/kg	7.4	7.7	3.5	30%	Pass
Cadmium	M22-De0007820	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass
Chromium	M22-De0007820	NCP	mg/kg	34	36	5.5	30%	Pass
Copper	M22-De0007820	NCP	mg/kg	13	13	4.1	30%	Pass
Lead	M22-De0007820	NCP	mg/kg	26	27	3.6	30%	Pass
Mercury	M22-De0007820	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Molybdenum	M22-De0007820	NCP	mg/kg	< 5	< 5	<1	30%	Pass
Nickel	M22-De0007820	NCP	mg/kg	20	21	5.0	30%	Pass
Selenium	M22-De0007820	NCP	mg/kg	< 2	< 2	<1	30%	Pass
Silver	M22-De0007820	NCP	mg/kg	< 2	< 2	<1	30%	Pass
Tin	M22-De0007820	NCP	mg/kg	< 10	< 10	<1	30%	Pass
Zinc	M22-De0007820	NCP	mg/kg	38	40	4.2	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
pH (1:5 Aqueous extract at 25 °C as rec.)	M22-De0008502	CP	pH Units	7.6	7.4	pass	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
% Moisture	M22-De0008505	CP	%	14	11	23	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Fluoride	M22-De0008512	CP	mg/kg	110	130	10	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
% Moisture	M22-De0008515	CP	%	15	15	<1	30%	Pass

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**Comments**
**Sample Integrity**

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

**Qualifier Codes/Comments**

Code	Description
I12	Where sampling data has not been provided, Eurofins   Environment Testing is not able to determine whether analysis has been performed within recommended holding times.
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the "C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (DCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QA/QC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C8-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C8-C10" value is obtained by quantifying against a standard of mixed aromatic/aliphatic analytes.
N07	Please note - These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEC) apply specifically to the total of the two co-eluting PAHs

**Authorised by:**


- Analytical Services Manager
- Senior Analyst-Organic
- Senior Analyst-Organic
- Senior Analyst-Volatile
- Senior Analyst-Sample Properties
- Senior Analyst-Inorganic
- Senior Analyst-Inorganic
- Senior Analyst-Metal
- Senior Analyst-Volatile

**General Manager**

Final Report – this report replaces any previously issued Report.

- Indicates Not Requested

\* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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**L R Pardo & Associates**  
**2 Alex Avenue**  
**Moorabbin**  
**VIC 3189**



**NATA Accredited**  
**Accreditation Number 1281**  
**Site Number 1254**

Accredited for compliance with ISO/IEC 17025 – Testing  
 NATA is a signatory to the ILAC Mutual Recognition  
 Arrangement for the mutual recognition of the  
 equivalence of testing, medical testing, calibration,  
 inspection, proficiency testing scheme providers and  
 reference materials producers reports and certificates.

**Attention:**



**Report** 948009-S  
**Project name** 92 ENTERPRISE RD/2  
**Project ID** 222643  
**Received Date** Dec 07, 2022

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Client Sample ID			S5-1_0.05-0.10	S2_0.84	TP38_1.0
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M22-De0014671	M22-De0014672	M22-De0014673
Date Sampled			Dec 02, 2022	Dec 02, 2022	Dec 02, 2022
Test/Reference	LOR	Unit			
<b>Total Recoverable Hydrocarbons</b>					
TRH C6-C9	20	mg/kg	< 20	-	-
TRH C10-C14	20	mg/kg	< 20	-	-
TRH C15-C28	50	mg/kg	150	-	-
TRH C29-C38	50	mg/kg	320	-	-
TRH C10-C38 (Total)	50	mg/kg	470	-	-
Naphthalene <sup>M02</sup>	0.5	mg/kg	< 0.5	-	-
TRH C6-C10	20	mg/kg	< 20	-	-
TRH C6-C10 less BTEX (F1) <sup>M04</sup>	20	mg/kg	< 20	-	-
TRH >C10-C18	50	mg/kg	< 50	-	-
TRH >C10-C18 less Naphthalene (F2) <sup>M01</sup>	50	mg/kg	< 50	-	-
TRH >C18-C34	100	mg/kg	350	-	-
TRH >C34-C40	100	mg/kg	320	-	-
TRH >C10-C40 (total)*	100	mg/kg	670	-	-
<b>BTEX</b>					
Benzene	0.1	mg/kg	< 0.1	-	-
Toluene	0.1	mg/kg	< 0.1	-	-
Ethylbenzene	0.1	mg/kg	< 0.1	-	-
m&p-Xylenes	0.2	mg/kg	< 0.2	-	-
o-Xylene	0.1	mg/kg	< 0.1	-	-
Xylenes - Total*	0.3	mg/kg	< 0.3	-	-
4-Bromofluorobenzene (surr.)	1	%	76	-	-
<b>Polycyclic Aromatic Hydrocarbons</b>					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	-	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	-	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	-	-
Acenaphthene	0.5	mg/kg	< 0.5	-	-
Acenaphthylene	0.5	mg/kg	< 0.5	-	-
Anthracene	0.5	mg/kg	< 0.5	-	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	-	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	-	-
Benzo(b&j)fluoranthene <sup>M07</sup>	0.5	mg/kg	< 0.5	-	-
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	-	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	-	-
Chrysene	0.5	mg/kg	< 0.5	-	-
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	-	-

Client Sample ID			S5-1_0.05-0.10	S2_0.64	TP38_1.0
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M22-De0014671	M22-De0014672	M22-De0014673
Date Sampled			Dec 02, 2022	Dec 02, 2022	Dec 02, 2022
Test/Reference	LOR	Unit			
<b>Polycyclic Aromatic Hydrocarbons</b>					
Fluoranthene	0.5	mg/kg	< 0.5	-	-
Fluorene	0.5	mg/kg	< 0.5	-	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	-	-
Naphthalene	0.5	mg/kg	< 0.5	-	-
Phenanthrene	0.5	mg/kg	< 0.5	-	-
Pyrene	0.5	mg/kg	< 0.5	-	-
Total PAH*	0.5	mg/kg	< 0.5	-	-
2-Fluorobiphenyl (surr.)	1	%	86	-	-
p-Terphenyl-d14 (surr.)	1	%	79	-	-
<b>Heavy Metals</b>					
pH (1:5 Aqueous extract at 25 °C as rec.)	0.1	pH Units	7.2	8.5	8.8
% Moisture	1	%	6.8	18	15
Arsenic	2	mg/kg	3.1	2.1	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	30	26	15
Copper	5	mg/kg	78	13	5.3
Lead	5	mg/kg	6.8	11	6.0
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	54	8.1	5.2
Zinc	5	mg/kg	63	11	5.7

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**Sample History**

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B7			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 07, 2022	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 07, 2022	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 07, 2022	14 Days
BTEX - Method: LTM-ORG-2010 BTEX and Volatile TRH	Melbourne	Dec 07, 2022	14 Days
Polycyclic Aromatic Hydrocarbons - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Melbourne	Dec 07, 2022	14 Days
Metals M8 - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Melbourne	Dec 07, 2022	28 Days
pH (1:5 Aqueous extract at 25 °C as rec.) - Method: LTM-GEN-7090 pH in soil by ISE	Melbourne	Dec 07, 2022	7 Days
% Moisture - Method: LTM-GEN-7080 Moisture	Melbourne	Dec 07, 2022	14 Days

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**Company Name:** L R Pardo & Associates  
**Address:** 2 Alex Avenue  
 Moorabbin  
 VIC 3189  
**Project Name:** 92 ENTERPRISE RD/2  
**Project ID:** 222843

**Order No.:**  
**Report #:** 948009  
**Phone:** 03 9555 8995  
**Fax:** 03 9553 1394

**Received:** Dec 7, 2022 11:08 AM  
**Due:** Dec 8, 2022  
**Priority:** 1 Day  
**Contact Name:** [REDACTED]

Eurofins Analytical Services Manager [REDACTED]

Sample Detail						Arsenic	Lead	pH (1:5 Aqueous extract at 25 °C as rec.)	Zinc	AUS Leaching Procedure	Metals (M)	Moisture Set	Eurofins Suite 07
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X
External Laboratory													
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID								
1	S5-2	Dec 02, 2022		AUS Leachate	M22-De0014670	X	X		X	X			
2	S5-1	Dec 02, 2022		Soil	M22-De0014671			X				X	X
3	S2	Dec 02, 2022		Soil	M22-De0014672			X			X	X	
4	TP38	Dec 02, 2022		Soil	M22-De0014673			X			X	X	
<b>Test Counts</b>						1	1	3	1	1	2	3	1

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## Internal Quality Control Review and Glossary

### General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

### Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

### Units

**mg/kg:** milligrams per kilogram

**mg/L:** milligrams per litre

**µg/L:** micrograms per litre

**ppm:** parts per million

**ppb:** parts per billion

**%:** Percentage

**org/100 mL:** Organisms per 100 millilitres

**NTU:** Nephelometric Turbidity Units

**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres

**CFU:** Colony forming unit

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPaA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

### QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

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## Quality Control Results

Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>						
<b>Total Recoverable Hydrocarbons</b>						
TRH C6-C9	mg/kg	< 20		20	Pass	
TRH C10-C14	mg/kg	< 20		20	Pass	
TRH C15-C28	mg/kg	< 50		50	Pass	
TRH C29-C36	mg/kg	< 50		50	Pass	
Naphthalene	mg/kg	< 0.5		0.5	Pass	
TRH C6-C10	mg/kg	< 20		20	Pass	
TRH >C10-C16	mg/kg	< 50		50	Pass	
TRH >C16-C34	mg/kg	< 100		100	Pass	
TRH >C34-C40	mg/kg	< 100		100	Pass	
<b>Method Blank</b>						
<b>BTEX</b>						
Benzene	mg/kg	< 0.1		0.1	Pass	
Toluene	mg/kg	< 0.1		0.1	Pass	
Ethylbenzene	mg/kg	< 0.1		0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2		0.2	Pass	
o-Xylene	mg/kg	< 0.1		0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3		0.3	Pass	
<b>Method Blank</b>						
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	mg/kg	< 0.5		0.5	Pass	
Acenaphthylene	mg/kg	< 0.5		0.5	Pass	
Anthracene	mg/kg	< 0.5		0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5		0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5		0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5		0.5	Pass	
Benzo(g,h,i)perylene	mg/kg	< 0.5		0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5		0.5	Pass	
Chrysene	mg/kg	< 0.5		0.5	Pass	
Dibenz(a,h)anthracene	mg/kg	< 0.5		0.5	Pass	
Fluoranthene	mg/kg	< 0.5		0.5	Pass	
Fluorene	mg/kg	< 0.5		0.5	Pass	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.5		0.5	Pass	
Naphthalene	mg/kg	< 0.5		0.5	Pass	
Phenanthrene	mg/kg	< 0.5		0.5	Pass	
Pyrene	mg/kg	< 0.5		0.5	Pass	
<b>Method Blank</b>						
<b>Heavy Metals</b>						
Arsenic	mg/kg	< 2		2	Pass	
Cadmium	mg/kg	< 0.4		0.4	Pass	
Chromium	mg/kg	< 5		5	Pass	
Copper	mg/kg	< 5		5	Pass	
Lead	mg/kg	< 5		5	Pass	
Mercury	mg/kg	< 0.1		0.1	Pass	
Nickel	mg/kg	< 5		5	Pass	
Zinc	mg/kg	< 5		5	Pass	
<b>LCS - % Recovery</b>						
<b>Total Recoverable Hydrocarbons</b>						
TRH C6-C9	%	94		70-130	Pass	
TRH C10-C14	%	111		70-130	Pass	
Naphthalene	%	73		70-130	Pass	

Test	Units	Result 1	Acceptance Limits	Pass Limits	Qualifying Code		
TRH C6-C10	%	90	70-130	Pass			
TRH >C10-C16	%	112	70-130	Pass			
<b>LCS - % Recovery</b>							
<b>BTEX</b>							
Benzene	%	96	70-130	Pass			
Toluene	%	90	70-130	Pass			
Ethylbenzene	%	84	70-130	Pass			
m&p-Xylenes	%	83	70-130	Pass			
Xylenes - Total*	%	84	70-130	Pass			
<b>LCS - % Recovery</b>							
<b>Polycyclic Aromatic Hydrocarbons</b>							
Acenaphthene	%	85	70-130	Pass			
Acenaphthylene	%	82	70-130	Pass			
Anthracene	%	99	70-130	Pass			
Benz(a)anthracene	%	98	70-130	Pass			
Benzo(a)pyrene	%	83	70-130	Pass			
Benzo(b&j)fluoranthene	%	115	70-130	Pass			
Benzo(g,h,i)perylene	%	117	70-130	Pass			
Benzo(k)fluoranthene	%	72	70-130	Pass			
Chrysene	%	105	70-130	Pass			
Dibenz(a,h)anthracene	%	116	70-130	Pass			
Fluoranthene	%	79	70-130	Pass			
Fluorene	%	74	70-130	Pass			
Indeno(1,2,3-cd)pyrene	%	88	70-130	Pass			
Naphthalene	%	78	70-130	Pass			
Phenanthrene	%	78	70-130	Pass			
Pyrene	%	82	70-130	Pass			
<b>LCS - % Recovery</b>							
<b>Heavy Metals</b>							
Arsenic	%	109	80-120	Pass			
Cadmium	%	106	80-120	Pass			
Chromium	%	111	80-120	Pass			
Copper	%	111	80-120	Pass			
Lead	%	111	80-120	Pass			
Mercury	%	100	80-120	Pass			
Nickel	%	110	80-120	Pass			
Zinc	%	108	80-120	Pass			
Test	Lab Sample ID	QA Source	Units	Result 1	Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>							
<b>Total Recoverable Hydrocarbons</b>				Result 1			
TRH C6-C9	M22-De0014855	NCP	%	93	70-130	Pass	
TRH C10-C14	M22-De0014987	NCP	%	89	70-130	Pass	
Naphthalene	M22-De0014855	NCP	%	84	70-130	Pass	
TRH C6-C10	M22-De0014855	NCP	%	99	70-130	Pass	
TRH >C10-C16	M22-De0014987	NCP	%	91	70-130	Pass	
<b>Spike - % Recovery</b>							
<b>BTEX</b>				Result 1			
Benzene	M22-De0014855	NCP	%	74	70-130	Pass	
Toluene	M22-De0014855	NCP	%	76	70-130	Pass	
Ethylbenzene	M22-De0014855	NCP	%	81	70-130	Pass	
m&p-Xylenes	M22-De0014855	NCP	%	84	70-130	Pass	
o-Xylene	M22-De0014855	NCP	%	72	70-130	Pass	
Xylenes - Total*	M22-De0014855	NCP	%	80	70-130	Pass	
<b>Spike - % Recovery</b>							



Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Polycyclic Aromatic Hydrocarbons</b>				Result 1					
Acenaphthene	M22-De0001490	NCP	%	85			70-130	Pass	
Acenaphthylene	M22-De0001490	NCP	%	80			70-130	Pass	
Anthracene	M22-De0001490	NCP	%	81			70-130	Pass	
Benz(a)anthracene	M22-De0001490	NCP	%	94			70-130	Pass	
Benzo(a)pyrene	M22-De0001490	NCP	%	75			70-130	Pass	
Benzo(b&j)fluoranthene	M22-De0001490	NCP	%	77			70-130	Pass	
Benzo(g,h,i)perylene	M22-De0001490	NCP	%	82			70-130	Pass	
Benzo(k)fluoranthene	M22-De0001490	NCP	%	82			70-130	Pass	
Chrysene	M22-De0001490	NCP	%	103			70-130	Pass	
Dibenz(a,h)anthracene	M22-De0001490	NCP	%	76			70-130	Pass	
Fluoranthene	M22-De0001490	NCP	%	86			70-130	Pass	
Fluorene	M22-De0001490	NCP	%	71			70-130	Pass	
Indeno(1,2,3-cd)pyrene	M22-De0001490	NCP	%	84			70-130	Pass	
Naphthalene	M22-De0001490	NCP	%	78			70-130	Pass	
Phenanthrene	M22-De0001490	NCP	%	87			70-130	Pass	
Pyrene	M22-De0001490	NCP	%	90			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Heavy Metals</b>				Result 1					
Arsenic	M22-De0014673	CP	%	97			75-125	Pass	
Cadmium	M22-De0014673	CP	%	97			75-125	Pass	
Chromium	M22-De0014673	CP	%	98			75-125	Pass	
Copper	M22-De0014673	CP	%	103			75-125	Pass	
Lead	M22-De0014673	CP	%	101			75-125	Pass	
Mercury	M22-De0014673	CP	%	101			75-125	Pass	
Nickel	M22-De0014673	CP	%	101			75-125	Pass	
Zinc	M22-De0014673	CP	%	99			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Total Recoverable Hydrocarbons</b>				Result 1	Result 2	RPD			
TRH C6-C9	M22-De0014812	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	M22-De0014974	NCP	mg/kg	100	120	11	30%	Pass	
TRH C15-C28	M22-De0014974	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	M22-De0014974	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Naphthalene	M22-De0014812	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	M22-De0014812	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	M22-De0014974	NCP	mg/kg	120	140	11	30%	Pass	
TRH >C16-C34	M22-De0014974	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	M22-De0014974	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
<b>Duplicate</b>									
<b>BTEX</b>				Result 1	Result 2	RPD			
Benzene	M22-De0014812	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	M22-De0014812	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	M22-De0014812	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	M22-De0014812	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	M22-De0014812	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	M22-De0014812	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
<b>Duplicate</b>									
<b>Polycyclic Aromatic Hydrocarbons</b>				Result 1	Result 2	RPD			
Acenaphthene	M22-De0015222	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M22-De0015222	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M22-De0015222	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M22-De0015222	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M22-De0015222	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

<b>Duplicate</b>				Result 1	Result 2	RPD		
<b>Polycyclic Aromatic Hydrocarbons</b>				Result 1	Result 2	RPD		
Benzo(b&i)fluoranthene	M22-De0015222	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(g,h,i)perylene	M22-De0015222	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(k)fluoranthene	M22-De0015222	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Chrysene	M22-De0015222	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Dibenz(a,h)anthracene	M22-De0015222	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Fluoranthene	M22-De0015222	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Fluorene	M22-De0015222	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Indeno(1,2,3-cd)pyrene	M22-De0015222	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Naphthalene	M22-De0015222	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Phenanthrene	M22-De0015222	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Pyrene	M22-De0015222	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
<b>Duplicate</b>				Result 1	Result 2	RPD		
pH (1:5 Aqueous extract at 25 °C as rec.)	M22-De0014143	NCP	pH Units	8.1	8.3	pass	30%	Pass
% Moisture	M22-De0014671	CP	%	6.8	6.9	1.4	30%	Pass
<b>Duplicate</b>				Result 1	Result 2	RPD		
<b>Heavy Metals</b>				Result 1	Result 2	RPD		
Arsenic	M22-De0014673	CP	mg/kg	< 2	< 2	<1	30%	Pass
Cadmium	M22-De0014673	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass
Chromium	M22-De0014673	CP	mg/kg	15	15	<1	30%	Pass
Copper	M22-De0014673	CP	mg/kg	5.3	5.3	<1	30%	Pass
Lead	M22-De0014673	CP	mg/kg	6.0	6.0	<1	30%	Pass
Mercury	M22-De0014673	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Nickel	M22-De0014673	CP	mg/kg	5.2	5.0	3.7	30%	Pass
Zinc	M22-De0014673	CP	mg/kg	5.7	5.7	<1	30%	Pass

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**Comments**
**Sample Integrity**

Custody Seals Intact (if used)	N/A
Attempt to CNH was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

**Qualifier Codes/Comments**

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semi-volatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QA/QC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs.

**Authorised by:**

Analytical Services Manager  
 Senior Analyst-Organic  
 Senior Analyst-Volatile  
 Senior Analyst-Sample Properties  
 Senior Analyst-Inorganic  
 Senior Analyst-Metal

**General Manager**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

\* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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**L R Pardo & Associates**  
**2 Alex Avenue**  
**Moorabbin**  
**VIC 3189**



**NATA Accredited**  
**Accreditation Number 1281**  
**Site Number 1254**

Accredited for compliance with ISO/IEC 17025 – Testing  
 NATA is a signatory to the ILAC Mutual Recognition  
 Arrangement for the mutual recognition of the  
 equivalence of testing, medical testing, calibration,  
 inspection, proficiency testing scheme providers and  
 reference materials producers reports and certificates.

**Attention:**



**Report** 948009-L  
**Project name** 92 ENTERPRISE RD/2  
**Project ID** 222643  
**Received Date** Dec 07, 2022

<b>Client Sample ID</b>			<b>S5-2_0.0-0.1</b>
<b>Sample Matrix</b>			<b>AUS Leachate</b>
<b>Eurofins Sample No.</b>			<b>M22- De0014670</b>
<b>Date Sampled</b>			<b>Dec 02, 2022</b>
<b>Test/Reference</b>	LOR	Unit	
<b>Heavy Metals</b>			
Arsenic	0.01	mg/L	0.18
Lead	0.01	mg/L	< 0.01
Zinc	0.01	mg/L	0.31
<b>AUS Leaching Procedure</b>			
Leachate Fluid <sup>001</sup>		comment	1.0
pH (initial)	0.1	pH Units	7.7
pH (Leachate fluid)	0.1	pH Units	5.1
pH (off)	0.1	pH Units	5.6

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**Sample History**

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Melbourne	Dec 07, 2022	28 Days
AUS Leaching Procedure			
pH (initial) - Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes	Melbourne	Dec 07, 2022	0 Days
pH (Leachate fluid) - Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes	Melbourne	Dec 07, 2022	0 Days
pH (off) - Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes	Melbourne	Dec 07, 2022	0 Days

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**Company Name:** L R Pardo & Associates  
**Address:** 2 Alex Avenue  
 Moorabbin  
 VIC 3189  
**Project Name:** 92 ENTERPRISE RD/2  
**Project ID:** 222843

**Order No.:**  
**Report #:** 948009  
**Phone:** 03 9555 8995  
**Fax:** 03 9553 1394

**Received:** Dec 7, 2022 11:08 AM  
**Due:** Dec 8, 2022  
**Priority:** 1 Day  
**Contact Name:** [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail						Arsenic	Lead	pH (1:5 Aqueous extract at 25 °C as rec.)	Zinc	AUS Leaching Procedure	Metals (M)	Moisture Set	Eurofins Suite 07
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X
External Laboratory													
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID								
1	S5-2	Dec 02, 2022		AUS Leachate	M22-De0014670	X	X		X	X			
2	S5-1	Dec 02, 2022		Soil	M22-De0014671			X				X	X
3	S2	Dec 02, 2022		Soil	M22-De0014672			X			X	X	
4	TP38	Dec 02, 2022		Soil	M22-De0014673			X			X	X	
<b>Test Counts</b>						1	1	3	1	1	2	3	1

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## Internal Quality Control Review and Glossary

### General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

### Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

### Units

<b>mg/kg:</b> milligrams per kilogram	<b>mg/L:</b> milligrams per litre	<b>µg/L:</b> micrograms per litre
<b>ppm:</b> parts per million	<b>ppb:</b> parts per billion	<b>%:</b> Percentage
<b>org/100 mL:</b> Organisms per 100 millilitres	<b>NTU:</b> Nephelometric Turbidity Units	<b>MPN/100 mL:</b> Most Probable Number of organisms per 100 millilitres
<b>CFU:</b> Colony forming unit		

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPaA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

### QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code	
<b>Method Blank</b>									
<b>Heavy Metals</b>									
Arsenic		mg/L	< 0.01			0.01	Pass		
Lead		mg/L	< 0.01			0.01	Pass		
Zinc		mg/L	< 0.01			0.01	Pass		
<b>LCS - % Recovery</b>									
<b>Heavy Metals</b>									
Arsenic		%	92			80-120	Pass		
Lead		%	93			80-120	Pass		
Zinc		%	95			80-120	Pass		
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>									
<b>Heavy Metals</b>									
				Result 1					
Arsenic		M22-De0013407	NCP	%	89		75-125	Pass	
Lead		M22-De0013407	NCP	%	88		75-125	Pass	
Zinc		M22-De0013407	NCP	%	91		75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Heavy Metals</b>									
				Result 1	Result 2	RPD			
Arsenic		M22-De0013407	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Lead		M22-De0013407	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Zinc		M22-De0013407	NCP	mg/L	0.13	0.13	<1	30%	Pass

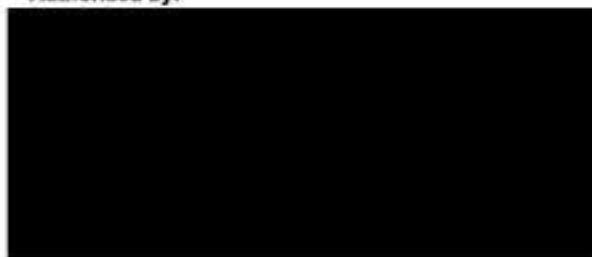
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**Comments**
**Sample Integrity**

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

**Qualifier Codes/Comments**

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

**Authorised by:**

**General Manager**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

\* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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**L R Pardo & Associates**  
**2 Alex Avenue**  
**Moorabbin**  
**VIC 3189**



**NATA Accredited**  
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 Arrangement for the mutual recognition of the  
 equivalence of testing, medical testing, calibration,  
 inspection, proficiency testing scheme providers and  
 reference materials producers reports and certificates.

**Attention:**



**Report** 949241-W  
**Project name**  
**Project ID** 222643  
**Received Date** Dec 12, 2022

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Client Sample ID			GW1	GW2	GW3
Sample Matrix			Water	Water	Water
Eurofins Sample No.			M22- De0025048	M22- De0025049	M22- De0025050
Date Sampled			Dec 09, 2022	Dec 09, 2022	Dec 09, 2022
Test/Reference	LOR	Unit			
<b>Total Recoverable Hydrocarbons</b>					
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1
TRH C29-C38	0.1	mg/L	< 0.1	< 0.1	< 0.1
TRH C10-C38 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) <sup>M04</sup>	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2) <sup>M01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1
<b>Volatile Organics</b>					
1,1-Dichloroethane	0.001	mg/L	< 0.001	< 0.001	< 0.001
1,2,4-Trichlorobenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Hexachlorobutadiene	0.001	mg/L	< 0.001	< 0.001	< 0.001
1,1-Dichloroethane	0.001	mg/L	< 0.001	< 0.001	< 0.001
1,1,1-Trichloroethane	0.001	mg/L	< 0.001	< 0.001	< 0.001
1,1,1,2-Tetrachloroethane	0.001	mg/L	< 0.001	< 0.001	< 0.001
1,1,2-Trichloroethane	0.001	mg/L	< 0.001	< 0.001	< 0.001
1,1,2,2-Tetrachloroethane	0.001	mg/L	< 0.001	< 0.001	< 0.001
1,2-Dibromoethane	0.001	mg/L	< 0.001	< 0.001	< 0.001
1,2-Dichlorobenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
1,2-Dichloroethane	0.001	mg/L	< 0.001	< 0.001	< 0.001
1,2-Dichloropropane	0.001	mg/L	< 0.001	< 0.001	< 0.001
1,2,3-Trichloropropane	0.001	mg/L	< 0.001	< 0.001	< 0.001
1,2,4-Trimethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
1,3-Dichlorobenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
1,3-Dichloropropane	0.001	mg/L	< 0.001	< 0.001	< 0.001
1,3,5-Trimethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
1,4-Dichlorobenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
2-Butanone (MEK)	0.005	mg/L	< 0.005	< 0.005	< 0.005
2-Propanone (Acetone)	0.005	mg/L	< 0.005	< 0.005	< 0.005
4-Chlorotoluene	0.001	mg/L	< 0.001	< 0.001	< 0.001
4-Methyl-2-pentanone (MIBK)	0.005	mg/L	< 0.005	< 0.005	< 0.005



Client Sample ID			GW1	GW2	GW3
Sample Matrix			Water	Water	Water
Eurofins Sample No.			M22-De0025048	M22-De0025049	M22-De0025050
Date Sampled			Dec 09, 2022	Dec 09, 2022	Dec 09, 2022
Test/Reference	LOR	Unit			
<b>Volatile Organics</b>					
Allyl chloride	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Bromobenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Bromochloromethane	0.001	mg/L	< 0.001	< 0.001	< 0.001
Bromodichloromethane	0.001	mg/L	< 0.001	< 0.001	< 0.001
Bromoform	0.001	mg/L	< 0.001	< 0.001	< 0.001
Bromomethane	0.005	mg/L	< 0.005	< 0.005	< 0.005
Carbon disulfide	0.001	mg/L	< 0.001	< 0.001	< 0.001
Carbon Tetrachloride	0.001	mg/L	< 0.001	< 0.001	< 0.001
Chlorobenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Chloroethane	0.005	mg/L	< 0.005	< 0.005	< 0.005
Chloroform	0.005	mg/L	< 0.005	< 0.005	< 0.005
Chloromethane	0.005	mg/L	< 0.005	< 0.005	< 0.005
cis-1,2-Dichloroethene	0.001	mg/L	< 0.001	< 0.001	< 0.001
cis-1,3-Dichloropropene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Dibromochloromethane	0.001	mg/L	< 0.001	< 0.001	< 0.001
Dibromomethane	0.001	mg/L	< 0.001	< 0.001	< 0.001
Dichlorodifluoromethane	0.005	mg/L	< 0.005	< 0.005	< 0.005
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Iodomethane	0.001	mg/L	< 0.001	< 0.001	< 0.001
Isopropyl benzene (Cumene)	0.001	mg/L	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002
Methylene Chloride	0.005	mg/L	< 0.005	< 0.005	< 0.005
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Styrene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Tetrachloroethene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001
trans-1,2-Dichloroethene	0.001	mg/L	< 0.001	< 0.001	< 0.001
trans-1,3-Dichloropropene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Trichloroethene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Trichlorofluoromethane	0.005	mg/L	< 0.005	< 0.005	< 0.005
Vinyl chloride	0.005	mg/L	< 0.005	< 0.005	< 0.005
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003
Total MAH*	0.003	mg/L	< 0.003	< 0.003	< 0.003
Vic EPA IWRG 621 CHC (Total)*	0.005	mg/L	< 0.005	< 0.005	< 0.005
Vic EPA IWRG 621 Other CHC (Total)*	0.005	mg/L	< 0.005	< 0.005	< 0.005
4-Bromofluorobenzene (surr.)	1	%	132	127	125
Toluene-d8 (surr.)	1	%	106	103	101
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>					
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01
<b>Polycyclic Aromatic Hydrocarbons</b>					
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001

Client Sample ID			GW1	GW2	GW3
Sample Matrix			Water	Water	Water
Eurofins Sample No.			M22-De0025048	M22-De0025049	M22-De0025050
Date Sampled			Dec 09, 2022	Dec 09, 2022	Dec 09, 2022
Test/Reference	LOR	Unit			
<b>Polycyclic Aromatic Hydrocarbons</b>					
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	67	72	52
p-Terphenyl-d14 (surr.)	1	%	78	90	65
<b>Organochlorine Pesticides</b>					
Chlordanes - Total	0.002	mg/L	< 0.002	< 0.002	< 0.002
4.4'-DDD	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
4.4'-DDE	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
4.4'-DDT	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
a-HCH	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Aldrin	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
b-HCH	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
d-HCH	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Dieldrin	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Endosulfan I	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Endosulfan II	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Endosulfan sulphate	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Endrin	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Endrin aldehyde	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Endrin ketone	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
g-HCH (Lindane)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Heptachlor	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Heptachlor epoxide	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Hexachlorobenzene	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Methoxychlor	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Toxaphene	0.005	mg/L	< 0.005	< 0.005	< 0.005
Aldrin and Dieldrin (Total)*	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
DDT + DDE + DDD (Total)*	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Vic EPA IWRG 621 OCP (Total)*	0.002	mg/L	< 0.002	< 0.002	< 0.002
Vic EPA IWRG 621 Other OCP (Total)*	0.002	mg/L	< 0.002	< 0.002	< 0.002
Dibutylchloroendate (surr.)	1	%	117	66	85
Tetrachloro-m-xylene (surr.)	1	%	98	95	70
<b>Polychlorinated Biphenyls</b>					
Aroclor-1016	0.005	mg/L	< 0.005	< 0.005	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005	< 0.005	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005	< 0.005	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005	< 0.005	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005	< 0.005	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005	< 0.005	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005	< 0.005	< 0.005
Total PCB*	0.005	mg/L	< 0.005	< 0.005	< 0.005
Dibutylchloroendate (surr.)	1	%	117	66	85
Tetrachloro-m-xylene (surr.)	1	%	98	95	70

Client Sample ID			GW1	GW2	GW3
Sample Matrix			Water	Water	Water
Eurofins Sample No.			M22-De0025048	M22-De0025049	M22-De0025050
Date Sampled			Dec 09, 2022	Dec 09, 2022	Dec 09, 2022
Test/Reference	LOR	Unit			
<b>Phenols (Halogenated)</b>					
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003
2,4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01
2,6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01
<b>Phenols (non-Halogenated)</b>					
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01
2,4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003
2,4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003
Phenol-d6 (surr.)	1	%	59	51	101
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1
<b>Chromium (hexavalent)</b>					
Chromium (hexavalent)	0.005	mg/L	< 0.005	< 0.005	< 0.005
<b>Cyanide (total)</b>					
Cyanide (total)	0.005	mg/L	< 0.005	< 0.005	< 0.005
<b>Fluoride</b>					
Fluoride	0.5	mg/L	0.9	< 0.5	< 0.5
<b>pH (at 25 °C)</b>					
pH (at 25 °C)	0.1	pH Units	7.0	6.6	6.7
<b>Total Dissolved Solids Dried at 180 °C ± 2 °C</b>					
Total Dissolved Solids Dried at 180 °C ± 2 °C	10	mg/L	3900	4800	4200
<b>Ammonia (as N)</b>					
Ammonia (as N)	0.01	mg/L	-	-	0.08
<b>Chloride</b>					
Chloride	1	mg/L	-	-	2500
<b>Nitrate (as N)</b>					
Nitrate (as N)	0.02	mg/L	-	-	4.0
<b>Heavy Metals</b>					
Arsenic	0.001	mg/L	0.003	< 0.001	< 0.001
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Chromium	0.001	mg/L	0.015	0.003	0.001
Copper	0.001	mg/L	0.009	0.006	0.003
Lead	0.001	mg/L	0.008	0.002	0.001
Mercury	0.0001	mg/L	0.0002	0.0001	< 0.0001
Molybdenum	0.005	mg/L	< 0.005	< 0.005	< 0.005
Nickel	0.001	mg/L	0.031	0.019	0.011
Selenium	0.001	mg/L	0.002	< 0.001	< 0.001
Silver	0.005	mg/L	< 0.005	< 0.005	< 0.005
Tin	0.005	mg/L	< 0.005	< 0.005	< 0.005
Zinc	0.005	mg/L	0.057	0.073	0.093

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**Sample History**

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 12, 2022	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 12, 2022	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 12, 2022	7 Days
Volatile Organics - Method: LTM-ORG-2150 VOCs in Soils Liquid and other Aqueous Matrices (USEPA 8260)	Melbourne	Dec 12, 2022	7 Days
Polycyclic Aromatic Hydrocarbons - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Melbourne	Dec 12, 2022	7 Days
Organochlorine Pesticides - Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8270)	Melbourne	Dec 12, 2022	7 Days
Polychlorinated Biphenyls - Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)	Melbourne	Dec 12, 2022	7 Days
Phenols (Halogenated) - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Melbourne	Dec 12, 2022	7 Days
Phenols (non-Halogenated) - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Melbourne	Dec 12, 2022	7 Days
Chromium (hexavalent) - Method: LTM-INO-4100 Hexavalent Chromium by Spectrometric detection	Melbourne	Dec 12, 2022	28 Days
Cyanide (total) - Method: LTM-INO-4020 Total Free WAD Cyanide by CFA	Melbourne	Dec 12, 2022	14 Days
Fluoride - Method: in-house method LTM-INO-4390 Fluoride by Discrete Analyser	Melbourne	Dec 12, 2022	28 Days
pH (at 25 °C) - Method: LTM-GEN-7090 pH in water by ISE	Melbourne	Dec 12, 2022	0 Hours
Metals IWRG 621 : Metals M12 - Method:	Melbourne	Dec 12, 2022	28 Days
Total Dissolved Solids Dried at 180 °C ± 2 °C - Method: LTM-INO-4170 Total Dissolved Solids in Water	Melbourne	Dec 12, 2022	28 Days
Ammonia (as N) - Method: APHA 4500-NH3 Ammonia Nitrogen by FIA	Melbourne	Dec 12, 2022	28 Days
Chloride - Method: LTM-INO-4090 Chloride by Discrete Analyser	Melbourne	Dec 12, 2022	28 Days
Nitrate (as N) - Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA	Melbourne	Dec 12, 2022	28 Days

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**Company Name:** L R Pardo & Associates  
**Address:** 2 Alex Avenue  
 Moorabbin  
 VIC 3189

**Order No.:**  
**Report #:** 949241  
**Phone:** 03 9555 8995  
**Fax:** 03 9553 1394

**Received:** Dec 12, 2022 9:48 AM  
**Due:** Dec 13, 2022  
**Priority:** 1 Day  
**Contact Name:** [REDACTED]

**Project Name:**  
**Project ID:** 222843

**Eurofins Analytical Services Manager:** [REDACTED]

Sample Detail						Ammonia (as N)	Chloride	Nitrate (as N)	Vic EPA (WRIG 621 (Total metals))	Total Dissolved Solids Dried at 180 °C ± 2 °C
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X
External Laboratory										
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID					
1	GW1	Dec 09, 2022		Water	M22-De0025048				X	X
2	GW2	Dec 09, 2022		Water	M22-De0025049				X	X
3	GW3	Dec 09, 2022		Water	M22-De0025050	X	X	X	X	X
<b>Test Counts</b>						1	1	1	3	3

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## Internal Quality Control Review and Glossary

### General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

### Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

### Units

<b>mg/kg:</b> milligrams per kilogram	<b>mg/L:</b> milligrams per litre	<b>µg/L:</b> micrograms per litre
<b>ppm:</b> parts per million	<b>ppb:</b> parts per billion	<b>%:</b> Percentage
<b>org/100 mL:</b> Organisms per 100 millilitres	<b>NTU:</b> Nephelometric Turbidity Units	<b>MPN/100 mL:</b> Most Probable Number of organisms per 100 millilitres
<b>CFU:</b> Colony forming unit		

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPaA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

### QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

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**Quality Control Results**

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons</b>							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
<b>Method Blank</b>							
<b>Volatile Organics</b>							
1.1-Dichloroethane	mg/L	< 0.001			0.001	Pass	
1.2.4-Trichlorobenzene	mg/L	< 0.001			0.001	Pass	
Hexachlorobutadiene	mg/L	< 0.001			0.001	Pass	
1.1-Dichloroethene	mg/L	< 0.001			0.001	Pass	
1.1.1-Trichloroethane	mg/L	< 0.001			0.001	Pass	
1.1.1.2-Tetrachloroethane	mg/L	< 0.001			0.001	Pass	
1.1.2-Trichloroethane	mg/L	< 0.001			0.001	Pass	
1.1.2.2-Tetrachloroethane	mg/L	< 0.001			0.001	Pass	
1.2-Dibromoethane	mg/L	< 0.001			0.001	Pass	
1.2-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.2-Dichloroethane	mg/L	< 0.001			0.001	Pass	
1.2-Dichloropropane	mg/L	< 0.001			0.001	Pass	
1.2.3-Trichloropropane	mg/L	< 0.001			0.001	Pass	
1.2.4-Trimethylbenzene	mg/L	< 0.001			0.001	Pass	
1.3-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.3-Dichloropropane	mg/L	< 0.001			0.001	Pass	
1.3.5-Trimethylbenzene	mg/L	< 0.001			0.001	Pass	
1.4-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
2-Butanone (MEK)	mg/L	< 0.005			0.005	Pass	
2-Propanone (Acetone)	mg/L	< 0.005			0.005	Pass	
4-Chlorotoluene	mg/L	< 0.001			0.001	Pass	
4-Methyl-2-pentanone (MIBK)	mg/L	< 0.005			0.005	Pass	
Allyl chloride	mg/L	< 0.001			0.001	Pass	
Benzene	mg/L	< 0.001			0.001	Pass	
Bromobenzene	mg/L	< 0.001			0.001	Pass	
Bromochloromethane	mg/L	< 0.001			0.001	Pass	
Bromodichloromethane	mg/L	< 0.001			0.001	Pass	
Bromoform	mg/L	< 0.001			0.001	Pass	
Bromomethane	mg/L	< 0.005			0.005	Pass	
Carbon disulfide	mg/L	< 0.001			0.001	Pass	
Carbon Tetrachloride	mg/L	< 0.001			0.001	Pass	
Chlorobenzene	mg/L	< 0.001			0.001	Pass	
Chloroethane	mg/L	< 0.005			0.005	Pass	
Chloroform	mg/L	< 0.005			0.005	Pass	
Chloromethane	mg/L	< 0.005			0.005	Pass	
cis-1.2-Dichloroethene	mg/L	< 0.001			0.001	Pass	
cis-1.3-Dichloropropene	mg/L	< 0.001			0.001	Pass	
Dibromochloromethane	mg/L	< 0.001			0.001	Pass	
Dibromomethane	mg/L	< 0.001			0.001	Pass	
Dichlorodifluoromethane	mg/L	< 0.005			0.005	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
Iodomethane	mg/L	< 0.001			0.001	Pass	
Isopropyl benzene (Cumene)	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
Methylene Chloride	mg/L	< 0.005			0.005	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Styrene	mg/L	< 0.001			0.001	Pass	
Tetrachloroethene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
trans-1,2-Dichloroethene	mg/L	< 0.001			0.001	Pass	
trans-1,3-Dichloropropene	mg/L	< 0.001			0.001	Pass	
Trichloroethene	mg/L	< 0.001			0.001	Pass	
Trichlorofluoromethane	mg/L	< 0.005			0.005	Pass	
Vinyl chloride	mg/L	< 0.005			0.005	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
Naphthalene	mg/L	< 0.01			0.01	Pass	
<b>Method Blank</b>							
<b>Polycyclic Aromatic Hydrocarbons</b>							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g,h,i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a,h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1,2,3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
<b>Method Blank</b>							
<b>Organochlorine Pesticides</b>							
Chlordanes - Total	mg/L	< 0.002			0.002	Pass	
4,4'-DDD	mg/L	< 0.0002			0.0002	Pass	
4,4'-DDE	mg/L	< 0.0002			0.0002	Pass	
4,4'-DDT	mg/L	< 0.0002			0.0002	Pass	
a-HCH	mg/L	< 0.0002			0.0002	Pass	
Aldrin	mg/L	< 0.0002			0.0002	Pass	
b-HCH	mg/L	< 0.0002			0.0002	Pass	
d-HCH	mg/L	< 0.0002			0.0002	Pass	
Dieldrin	mg/L	< 0.0002			0.0002	Pass	
Endosulfan I	mg/L	< 0.0002			0.0002	Pass	
Endosulfan II	mg/L	< 0.0002			0.0002	Pass	
Endosulfan sulphate	mg/L	< 0.0002			0.0002	Pass	
Endrin	mg/L	< 0.0002			0.0002	Pass	
Endrin aldehyde	mg/L	< 0.0002			0.0002	Pass	
Endrin ketone	mg/L	< 0.0002			0.0002	Pass	
g-HCH (Lindane)	mg/L	< 0.0002			0.0002	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Heptachlor	mg/L	< 0.0002			0.0002	Pass	
Heptachlor epoxide	mg/L	< 0.0002			0.0002	Pass	
Hexachlorobenzene	mg/L	< 0.0002			0.0002	Pass	
Methoxychlor	mg/L	< 0.0002			0.0002	Pass	
Toxaphene	mg/L	< 0.005			0.005	Pass	
<b>Method Blank</b>							
<b>Polychlorinated Biphenyls</b>							
Aroclor-1016	mg/L	< 0.005			0.005	Pass	
Aroclor-1221	mg/L	< 0.005			0.005	Pass	
Aroclor-1232	mg/L	< 0.005			0.005	Pass	
Aroclor-1242	mg/L	< 0.005			0.005	Pass	
Aroclor-1248	mg/L	< 0.005			0.005	Pass	
Aroclor-1254	mg/L	< 0.005			0.005	Pass	
Aroclor-1260	mg/L	< 0.005			0.005	Pass	
Total PCB*	mg/L	< 0.005			0.005	Pass	
<b>Method Blank</b>							
<b>Phenols (Halogenated)</b>							
2-Chlorophenol	mg/L	< 0.003			0.003	Pass	
2,4-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
2,4,5-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2,4,6-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2,6-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
4-Chloro-3-methylphenol	mg/L	< 0.01			0.01	Pass	
Pentachlorophenol	mg/L	< 0.01			0.01	Pass	
Tetrachlorophenols - Total	mg/L	< 0.03			0.03	Pass	
<b>Method Blank</b>							
<b>Phenols (non-Halogenated)</b>							
2-Cyclohexyl-4,6-dinitrophenol	mg/L	< 0.1			0.1	Pass	
2-Methyl-4,6-dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Nitrophenol	mg/L	< 0.01			0.01	Pass	
2,4-Dimethylphenol	mg/L	< 0.003			0.003	Pass	
2,4-Dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Methylphenol (o-Cresol)	mg/L	< 0.003			0.003	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/L	< 0.006			0.006	Pass	
4-Nitrophenol	mg/L	< 0.03			0.03	Pass	
Dinoseb	mg/L	< 0.1			0.1	Pass	
Phenol	mg/L	< 0.003			0.003	Pass	
<b>Method Blank</b>							
Chromium (hexavalent)	mg/L	< 0.005			0.005	Pass	
Cyanide (total)	mg/L	< 0.005			0.005	Pass	
Fluoride	mg/L	< 0.5			0.5	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	mg/L	< 10			10	Pass	
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
<b>Method Blank</b>							
<b>Heavy Metals</b>							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Molybdenum	mg/L	< 0.005			0.005	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	

Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Selenium	mg/L	< 0.001		0.001	Pass	
Silver	mg/L	< 0.005		0.005	Pass	
Tin	mg/L	< 0.005		0.005	Pass	
Zinc	mg/L	< 0.005		0.005	Pass	
<b>LCS - % Recovery</b>						
<b>Total Recoverable Hydrocarbons</b>						
TRH C6-C9	%	116		70-130	Pass	
TRH C10-C14	%	115		70-130	Pass	
TRH C6-C10	%	119		70-130	Pass	
TRH >C10-C16	%	116		70-130	Pass	
<b>LCS - % Recovery</b>						
<b>Volatile Organics</b>						
1.1-Dichloroethene	%	78		70-130	Pass	
1.1.1-Trichloroethane	%	73		70-130	Pass	
1.2-Dichlorobenzene	%	110		70-130	Pass	
1.2-Dichloroethane	%	97		70-130	Pass	
Benzene	%	95		70-130	Pass	
Ethylbenzene	%	113		70-130	Pass	
m&p-Xylenes	%	115		70-130	Pass	
Toluene	%	95		70-130	Pass	
Trichloroethene	%	85		70-130	Pass	
Xylenes - Total*	%	115		70-130	Pass	
<b>LCS - % Recovery</b>						
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene	%	122		70-130	Pass	
<b>LCS - % Recovery</b>						
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	%	89		70-130	Pass	
Acenaphthylene	%	117		70-130	Pass	
Anthracene	%	74		70-130	Pass	
Benz(a)anthracene	%	89		70-130	Pass	
Benzo(a)pyrene	%	94		70-130	Pass	
Benzo(b&j)fluoranthene	%	97		70-130	Pass	
Benzo(g,h,i)perylene	%	127		70-130	Pass	
Benzo(k)fluoranthene	%	111		70-130	Pass	
Chrysene	%	104		70-130	Pass	
Dibenz(a,h)anthracene	%	83		70-130	Pass	
Fluoranthene	%	102		70-130	Pass	
Fluorene	%	95		70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	80		70-130	Pass	
Phenanthrene	%	93		70-130	Pass	
Pyrene	%	83		70-130	Pass	
<b>LCS - % Recovery</b>						
<b>Organochlorine Pesticides</b>						
Chlordanes - Total	%	112		70-130	Pass	
4,4'-DDD	%	108		70-130	Pass	
4,4'-DDE	%	104		70-130	Pass	
4,4'-DDT	%	91		70-130	Pass	
a-HCH	%	121		70-130	Pass	
Aldrin	%	91		70-130	Pass	
b-HCH	%	112		70-130	Pass	
d-HCH	%	116		70-130	Pass	
Dieldrin	%	119		70-130	Pass	
Endosulfan I	%	98		70-130	Pass	



Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endosulfan II	%	108			70-130	Pass	
Endosulfan sulphate	%	95			70-130	Pass	
Endrin	%	104			70-130	Pass	
Endrin aldehyde	%	106			70-130	Pass	
Endrin ketone	%	89			70-130	Pass	
g-HCH (Lindane)	%	121			70-130	Pass	
Heptachlor	%	115			70-130	Pass	
Heptachlor epoxide	%	94			70-130	Pass	
Hexachlorobenzene	%	101			70-130	Pass	
Methoxychlor	%	87			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Polychlorinated Biphenyls</b>							
Aroclor-1260	%	115			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Phenols (Halogenated)</b>							
2-Chlorophenol	%	88			25-140	Pass	
2,4-Dichlorophenol	%	77			25-140	Pass	
2,4,5-Trichlorophenol	%	125			25-140	Pass	
2,4,6-Trichlorophenol	%	91			25-140	Pass	
2,6-Dichlorophenol	%	103			25-140	Pass	
4-Chloro-3-methylphenol	%	99			25-140	Pass	
Pentachlorophenol	%	95			25-140	Pass	
Tetrachlorophenols - Total	%	91			25-140	Pass	
<b>LCS - % Recovery</b>							
<b>Phenols (non-Halogenated)</b>							
2-Cyclohexyl-4,6-dinitrophenol	%	94			25-140	Pass	
2-Methyl-4,6-dinitrophenol	%	123			25-140	Pass	
2-Nitrophenol	%	110			25-140	Pass	
2,4-Dimethylphenol	%	89			25-140	Pass	
2,4-Dinitrophenol	%	92			25-140	Pass	
2-Methylphenol (o-Cresol)	%	35			25-140	Pass	
3&4-Methylphenol (m&p-Cresol)	%	55			25-140	Pass	
4-Nitrophenol	%	43			25-140	Pass	
Dinoseb	%	96			25-140	Pass	
Phenol	%	30			25-140	Pass	
<b>LCS - % Recovery</b>							
Chromium (hexavalent)	%	87			70-130	Pass	
Cyanide (total)	%	123			70-130	Pass	
Fluoride	%	103			70-130	Pass	
Total Dissolved Solids Dried at 180 °C ± 2 °C	%	91			70-130	Pass	
Ammonia (as N)	%	123			70-130	Pass	
Chloride	%	110			70-130	Pass	
Nitrate (as N)	%	119			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Heavy Metals</b>							
Arsenic	%	93			80-120	Pass	
Cadmium	%	92			80-120	Pass	
Chromium	%	93			80-120	Pass	
Copper	%	94			80-120	Pass	
Lead	%	94			80-120	Pass	
Mercury	%	80			80-120	Pass	
Molybdenum	%	90			80-120	Pass	
Nickel	%	93			80-120	Pass	
Selenium	%	89			80-120	Pass	

Test			Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Silver			%	88		80-120	Pass	
Tin			%	90		80-120	Pass	
Zinc			%	94		80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>								
<b>Total Recoverable Hydrocarbons</b>				Result 1				
TRH C10-C14	M22-De0023476	NCP	%	116		70-130	Pass	
TRH >C10-C16	M22-De0023476	NCP	%	113		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Polycyclic Aromatic Hydrocarbons</b>				Result 1				
Acenaphthene	N22-De0007281	NCP	%	100		70-130	Pass	
Acenaphthylene	N22-De0007281	NCP	%	96		70-130	Pass	
Anthracene	N22-De0007281	NCP	%	98		70-130	Pass	
Benz(a)anthracene	N22-De0007281	NCP	%	92		70-130	Pass	
Benzo(a)pyrene	N22-De0007281	NCP	%	91		70-130	Pass	
Benzo(b&i)fluoranthene	N22-De0007281	NCP	%	82		70-130	Pass	
Benzo(g,h,i)perylene	N22-De0007281	NCP	%	83		70-130	Pass	
Benzo(k)fluoranthene	N22-De0007281	NCP	%	92		70-130	Pass	
Chrysene	N22-De0007281	NCP	%	98		70-130	Pass	
Dibenz(a,h)anthracene	N22-De0007281	NCP	%	95		70-130	Pass	
Fluoranthene	N22-De0007281	NCP	%	117		70-130	Pass	
Fluorene	N22-De0007281	NCP	%	104		70-130	Pass	
Indeno(1,2,3-cd)pyrene	N22-De0007281	NCP	%	101		70-130	Pass	
Naphthalene	N22-De0007281	NCP	%	90		70-130	Pass	
Phenanthrene	N22-De0007281	NCP	%	100		70-130	Pass	
Pyrene	N22-De0007281	NCP	%	120		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Organochlorine Pesticides</b>				Result 1				
Chlordanes - Total	N22-De0007281	NCP	%	75		70-130	Pass	
4,4'-DDD	N22-De0007281	NCP	%	74		70-130	Pass	
4,4'-DDE	N22-De0007281	NCP	%	86		70-130	Pass	
4,4'-DDT	N22-De0007281	NCP	%	79		70-130	Pass	
a-HCH	N22-De0007281	NCP	%	82		70-130	Pass	
Aldrin	N22-De0007281	NCP	%	81		70-130	Pass	
b-HCH	N22-De0007281	NCP	%	82		70-130	Pass	
d-HCH	N22-De0007281	NCP	%	82		70-130	Pass	
Dieldrin	N22-De0007281	NCP	%	92		70-130	Pass	
Endosulfan I	N22-De0007281	NCP	%	77		70-130	Pass	
Endosulfan II	N22-De0007281	NCP	%	75		70-130	Pass	
Endosulfan sulphate	N22-De0007281	NCP	%	76		70-130	Pass	
Endrin	N22-De0007281	NCP	%	89		70-130	Pass	
Endrin aldehyde	N22-De0007281	NCP	%	91		70-130	Pass	
Endrin ketone	N22-De0007281	NCP	%	85		70-130	Pass	
g-HCH (Lindane)	N22-De0007281	NCP	%	94		70-130	Pass	
Heptachlor	N22-De0007281	NCP	%	94		70-130	Pass	
Heptachlor epoxide	N22-De0007281	NCP	%	79		70-130	Pass	
Hexachlorobenzene	N22-De0007281	NCP	%	82		70-130	Pass	
Methoxychlor	N22-De0007281	NCP	%	87		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Polychlorinated Biphenyls</b>				Result 1				
Aroclor-1016	N22-De0007281	NCP	%	80		70-130	Pass	
Aroclor-1260	N22-De0007281	NCP	%	87		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Phenols (Halogenated)</b>				Result 1				

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2-Chlorophenol	N22-De0007281	NCP	%	46			30-130	Pass	
2,4-Dichlorophenol	N22-De0007281	NCP	%	48			30-130	Pass	
2,4,5-Trichlorophenol	N22-De0007281	NCP	%	50			30-130	Pass	
2,4,6-Trichlorophenol	N22-De0007281	NCP	%	47			30-130	Pass	
2,6-Dichlorophenol	N22-De0007281	NCP	%	49			30-130	Pass	
4-Chloro-3-methylphenol	N22-De0007281	NCP	%	48			30-130	Pass	
Pentachlorophenol	N22-De0007281	NCP	%	46			30-130	Pass	
Tetrachlorophenols - Total	N22-De0007281	NCP	%	38			30-130	Pass	
<b>Spike - % Recovery</b>									
<b>Phenols (non-Halogenated)</b>				Result 1					
2-Cyclohexyl-4,6-dinitrophenol	N22-De0007281	NCP	%	130			30-130	Pass	
2-Methyl-4,6-dinitrophenol	N22-De0007281	NCP	%	64			30-130	Pass	
2-Nitrophenol	N22-De0007281	NCP	%	43			30-130	Pass	
2,4-Dimethylphenol	N22-De0007281	NCP	%	57			30-130	Pass	
2,4-Dinitrophenol	N22-De0007281	NCP	%	62			30-130	Pass	
2-Methylphenol (o-Cresol)	N22-De0007281	NCP	%	45			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	N22-De0007281	NCP	%	51			30-130	Pass	
4-Nitrophenol	N22-De0007281	NCP	%	53			30-130	Pass	
Dinoseb	N22-De0007281	NCP	%	70			30-130	Pass	
Phenol	N22-De0007281	NCP	%	55			30-130	Pass	
<b>Spike - % Recovery</b>									
				Result 1					
Cyanide (total)	M22-De0022765	NCP	%	89			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Heavy Metals</b>				Result 1					
Arsenic	M22-De0019969	NCP	%	97			75-125	Pass	
Cadmium	M22-De0019969	NCP	%	88			75-125	Pass	
Chromium	M22-De0019969	NCP	%	95			75-125	Pass	
Copper	M22-De0019969	NCP	%	93			75-125	Pass	
Molybdenum	M22-De0019969	NCP	%	79			75-125	Pass	
Nickel	M22-De0019969	NCP	%	93			75-125	Pass	
Selenium	M22-De0019969	NCP	%	92			75-125	Pass	
Silver	M22-De0019969	NCP	%	85			75-125	Pass	
Tin	M22-De0019969	NCP	%	80			75-125	Pass	
Zinc	M22-De0019969	NCP	%	99			75-125	Pass	
<b>Spike - % Recovery</b>									
				Result 1					
Ammonia (as N)	B22-De0011750	NCP	%	109			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Heavy Metals</b>				Result 1					
Lead	M22-De0019969	NCP	%	90			75-125	Pass	
Mercury	M22-De0019969	NCP	%	88			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Total Recoverable Hydrocarbons</b>				Result 1	Result 2	RPD			
TRH C10-C14	M22-De0025708	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	M22-De0025708	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	M22-De0025708	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C10-C16	M22-De0025708	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	M22-De0025708	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	M22-De0025708	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	

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Duplicate								
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD		
Acenaphthene	B22-De0010216	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Acenaphthylene	B22-De0010216	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Anthracene	B22-De0010216	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(a)anthracene	B22-De0010216	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(a)pyrene	B22-De0010216	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(b&j)fluoranthene	B22-De0010216	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(g,h,i)perylene	B22-De0010216	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(k)fluoranthene	B22-De0010216	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Chrysene	B22-De0010216	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Dibenz(a,h)anthracene	B22-De0010216	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Fluoranthene	B22-De0010216	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Fluorene	B22-De0010216	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Indeno(1,2,3-cd)pyrene	B22-De0010216	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Naphthalene	B22-De0010216	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Phenanthrene	B22-De0010216	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Pyrene	B22-De0010216	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Duplicate								
Organochlorine Pesticides				Result 1	Result 2	RPD		
Chlordanes - Total	B22-De0010216	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass
4,4'-DDD	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
4,4'-DDE	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
4,4'-DDT	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
a-HCH	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Aldrin	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
b-HCH	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
d-HCH	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Dieldrin	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Endosulfan I	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Endosulfan II	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Endosulfan sulphate	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Endrin	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Endrin aldehyde	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Endrin ketone	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
g-HCH (Lindane)	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Heptachlor	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Heptachlor epoxide	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Hexachlorobenzene	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Methoxychlor	B22-De0010216	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Toxaphene	B22-De0010216	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Polychlorinated Biphenyls				Result 1	Result 2	RPD		
Aroclor-1016	B22-De0010216	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1221	B22-De0010216	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1232	B22-De0010216	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1242	B22-De0010216	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1248	B22-De0010216	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1254	B22-De0010216	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1260	B22-De0010216	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Total PCB*	B22-De0010216	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass

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Duplicate								
Phenols (Halogenated)				Result 1	Result 2	RPD		
2-Chlorophenol	B22-De0010216	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2,4-Dichlorophenol	B22-De0010216	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2,4,5-Trichlorophenol	B22-De0010216	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
2,4,6-Trichlorophenol	B22-De0010216	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
2,6-Dichlorophenol	B22-De0010216	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
4-Chloro-3-methylphenol	B22-De0010216	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Pentachlorophenol	B22-De0010216	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Tetrachlorophenols - Total	B22-De0010216	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass
Duplicate								
Phenols (non-Halogenated)				Result 1	Result 2	RPD		
2-Cyclohexyl-4,6-dinitrophenol	B22-De0010216	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
2-Methyl-4,6-dinitrophenol	B22-De0010216	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass
2-Nitrophenol	B22-De0010216	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
2,4-Dimethylphenol	B22-De0010216	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2,4-Dinitrophenol	B22-De0010216	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass
2-Methylphenol (o-Cresol)	B22-De0010216	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
3&4-Methylphenol (m&p-Cresol)	B22-De0010216	NCP	mg/L	< 0.006	< 0.006	<1	30%	Pass
4-Nitrophenol	B22-De0010216	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass
Dinoseb	B22-De0010216	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Phenol	B22-De0010216	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Chromium (hexavalent)	N22-De0013453	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Cyanide (total)	M22-De0021802	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Fluoride	M22-De0018356	NCP	mg/L	< 0.5	< 0.5	<1	30%	Pass
pH (at 25 °C)	M22-De0023022	NCP	pH Units	7.5	7.6	pass	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	M22-De0019969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cadmium	M22-De0019969	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium	M22-De0019969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper	M22-De0019969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Molybdenum	M22-De0019969	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Nickel	M22-De0019969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Selenium	M22-De0019969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Silver	M22-De0019969	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Tin	M22-De0019969	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Zinc	M22-De0019969	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Total Dissolved Solids Dried at 180 °C ± 2 °C	M22-De0025049	CP	mg/L	4800	4600	5.3	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Ammonia (as N)	B22-De0011748	NCP	mg/L	0.19	0.19	1.6	30%	Pass
Chloride	M22-De0015102	NCP	mg/L	26	22	17	30%	Pass
Nitrate (as N)	B22-De0011748	NCP	mg/L	0.12	0.12	5.1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Lead	M22-De0019969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Mercury	M22-De0019969	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass

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**Comments**
**Sample Integrity**

Custody Seals Intact (if used)	N/A
Attempt to CNH was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

**Qualifier Codes/Comments**

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semi-volatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QA/QC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantifying against a standard of mixed aromatic/aliphatic analytes.
N07	Please note- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs.

**Authorised by:**


Final Report – this report replaces any previously issued Report

- Indicates Not Requested

\* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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## EQUIPMENT QUALITY REPORT

### Interface Meter

**Equipment Code: MIM-7585      Serial Number: 267585**

The following equipment has been issued as follows:

- Equipment is clean and mechanically undamaged.

Calibration Results		
Parameter	Standard	Result
Water	Intermittent beeping	✓
Oil	Consistent beep	✓
Battery	9.0V	9.6V

Date: 08/12/2022

Calibrated by: \_\_\_\_\_

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Please check that the following items are received and all items are returned. Please clean equipment before returning. **A minimum \$20 service/repair charge applies to any unclean or damaged items.**

Photo Ref.	Item (See photo at the back of the form)	HT Id No.	Sent	Returned
1	Carry Case	N/A	✓	
2	Interface Meter	MIM-7585	✓	
3	Tape Guide	N/A	✓	
4	Spare 9V battery. Qty 1 Voltage      9.0 v	N/A	✓	
-	Instruction leaflet	N/A	✓	

Date: 08/12/2022

Calibrated by: \_\_\_\_\_

HT JOB NO:      20348

CLIENTS REF: P/O No:      TBC

RETURN DATE: / /	TIME:	CONDITION ON RETURN:
------------------	-------	----------------------



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## EQUIPMENT QUALITY REPORT

### Water Quality Meter:

**Equipment Code: MWQ-2993      Serial Number: 18B102993**

The following equipment has been issued as follows:

- Equipment is clean
  Impeller and probe check

Calibration Results						
Parameter	Solution Description (Brand, batch # and expire date)	Standard		Error Range	Result	
Temperature (°C)	-	25°C		-	25°C	
pH	HC04424075, Exp: Nov 23 HC14519277, Exp: Feb 24	7.01	4.00	± 0.2	7.01	4.00
Sp. Conductivity (µS/cm)	374826, Exp: Nov 23	12880		± 20	12879	
DO (%)	11171, Exp: Sep 22	0%	100%	± 3	-0.8%	100.3%
Redox (mV)	A 362917, Exp: Sep 22 B 362918, Exp: Sep 22	229		± 10	229	

Date: 08/12/2022

Calibrated by: [REDACTED]

Please check that the following items are received and all items are returned. Please clean equipment before returning. **A minimum \$20 service/repair charge applies to any unclean or damaged items.**

Item	HT Id No.	Sent	Returned
Water Quality Meter	<b>MWQ-2993</b>	✓	
Manual	N/A	✓	
Probe Cluster	N/A	✓	
In situ monitoring cage	N/A	✓	
Storage cup	N/A	✓	
Flow through Cell	N/A	✓	
Calibration cup and lid	N/A	✓	
Spare Batteries / Screwdriver	N/A	✓	
Test and Tag	N/A	✓	

- Equipment voltage
  Pre-Delivery Calibration Confirmation Test

Date: 08/12/2022

Calibrated by: [REDACTED]

HT JOB NO: 20348

CLIENTS REF: P/O No: TBC

RETURN DATE: / /	TIME:	CONDITION ON RETURN:
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## Appendix D

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Site Plan

Site Inspection Photographs

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## Site Plan (26A Enterprise Road)



This drawing shall be read in conjunction with LRP&A Report No. 222643 92 Enterprise Road/2

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 Truganina: 18/4 Network Drive, Truganina VIC 3029  
 Geelong: 7 Fairlie Street, Hamlyn Heights VIC 3215  
 Tel: 1300 922 964  
 www.pardoengineering.com.au

Source: Nearmap

NOT TO SCALE

**Title** Site Plan (26A Enterprise Road)  
**Locality** 26A and 92 Enterprise Road  
 Pakenham, Victoria

**Dwg. No** 222643/2 TP  
**Prepared** DM 16/12/2022  
**Checked** YC 16/12/2022

### Geo-environmental Investigation

Investigation date: 01/12-02/12/2022

Project: 222643 92 Enterprise Road/2

**Sheet No** Site plan

**File** 222643-2 Site Plan.xlsm



## Site Plan (92 Enterprise Road)



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This drawing shall be read in conjunction with LRP&A Report No. 222643 92 Enterprise Road/2

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Source: Nearmap

NOT TO SCALE

**Title** Site Plan (92 Enterprise Road)

**Locality** 26A and 92 Enterprise Road  
 Pakenham, Victoria

**Dwg. No** 222643/2 TP

**Prepared** DM 16/12/2022

**Checked** YC 16/12/2022

**Geo-environmental Investigation**

Investigation date: 01/12-02/12/2022

**Project:** 222643 92 Enterprise Road/2

**Sheet No** Site plan

**File** 222643-2 Site Plan.xlsm



## Geo-environmental Investigation - 26A and 92 Enterprise Rd



Photo 1: Driveway entry to 92 Enterprise Road.



Photo 2: View of residence and shed at 92 Enterprise Road.



Photo 3: View of second residence at 92 Enterprise Road



Photo 4: View inside of shed at 92 Enterprise Road.

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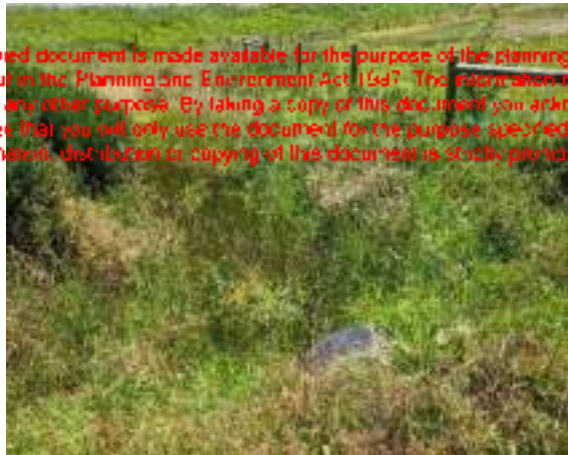


Photo 5: Stormwater agi pipe discharging into vegetated swale at 92 Enterprise Road.



Photo 6: Small pond/dam north of former dam.

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**Title** Photographs  
**Locality** 26A and 92 Enterprise Rd  
 Craigieburn, Victoria

**Dwg. No** 222643/2 Photos

**Prepared by** AT 15/12/2022  
**Checked by** YC 15/12/2022

**Geo-environmental Investigation**

Investigation date: 1/12-2/12/2022

Project: 222643 92 Enterprise Rd/2

**Sheet No** Photo 1

**File** 222643-2 Photos.xlsm



## Geo-environmental Investigation - 26A and 92 Enterprise Rd



Photo 7: Location of samples S1 and S2.



Photo 8: Sand FILL excavated from S1



Photo 9: PID reading taken from sample S1.



Photo 10: Location of sample S3.

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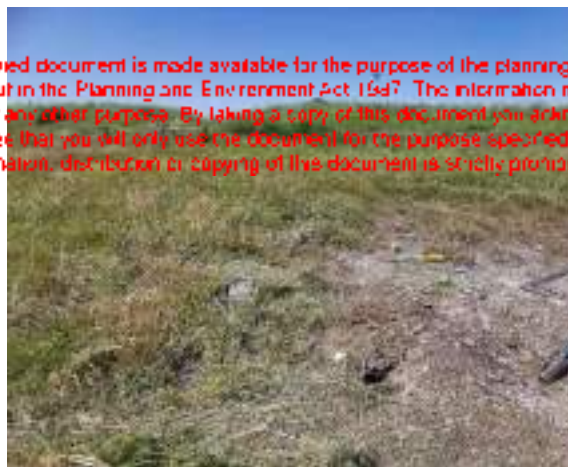


Photo 11: Location of sample S4.



Photo 12: Incinerated material stockpile and location of samples S5-1.

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**Title** Photographs

**Locality** 26A and 92 Enterprise Rd  
Craigieburn, Victoria

**Dwg. No** 222643/2 Photos

**Prepared by** AT 15/12/2022

**Checked by** YC 15/12/2022

**Geo-environmental Investigation**

Investigation date: 1/12-2/12/2022

Project: 222643 92 Enterprise Rd/2

**Sheet No** Photo 2

**File** 222643-2 Photos.xlsm



## Geo-environmental Investigation - 26A and 92 Enterprise Rd



Photo 13: Collection of sample S5-2 from incinerated stockpile.



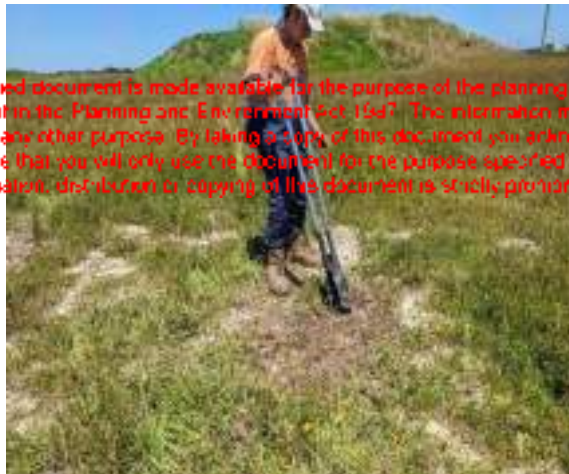
Photo 14: Stockpiles to northwest of residence at 92 Enterprise Road.



Photo 15: Location of samples S6 and S7 over elevated area near stockpiles.



Photo 16: Large stockpile in former dam south of the property at 92 Enterprise Road.



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Photo 17: Location of sample S11 around former dam area (92 Enterprise Road).



Photo 18: View of boundary between 92 and 26A Enterprise Road (inside 26A).

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**Title** Photographs

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Craigieburn, Victoria

**Dwg. No** 222643/2 Photos

**Prepared by** AT 15/12/2022

**Checked by** YC 15/12/2022

**Geo-environmental Investigation**

Investigation date: 1/12-2/12/2022

**Project:** 222643 92 Enterprise Rd/2

**Sheet No** Photo 3

**File** 222643-2 Photos.xlsm



## Geo-environmental Investigation - 26A and 92 Enterprise Rd



Photo 19: Cardinia Road Drain running in NE to SW direction across 26 Enterprise Rd.



Photo 20: Location of sample S8 at 26 Enterprise Road.



Photo 21: Location of samples S9 (at the back) and S10 at 26 Enterprise Road.



Photo 22: Water ingress in hand augered test pit at 26 Enterprise Rd.

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Photo 23: Stockpile of debris (roof sheeting) at 26 Enterprise Road.



Photo 24: Additional stockpiles of soil and debris at rear of property at 26A Enterprise Rd.

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**Title** Photographs

**Locality** 26A and 92 Enterprise Rd  
Craigieburn, Victoria

**Dwg. No** 222643/2 Photos

**Prepared by** AT 15/12/2022

**Checked by** YC 15/12/2022

**Geo-environmental Investigation**

Investigation date: 1/12-2/12/2022

**Project:** 222643 92 Enterprise Rd/2

**Sheet No** Photo 4

**File** 222643-2 Photos.xlsm



## Geo-environmental Investigation - 26A and 92 Enterprise Rd



Photo 31: Groundwater sampling at location of GW1 (92 Enterprise Rd).



Photo 32: Groundwater testing at GW1.



Photo 33: Groundwater sampling at location of GW2 (92 Enterprise Rd).



Photo 34: Groundwater from GW2.

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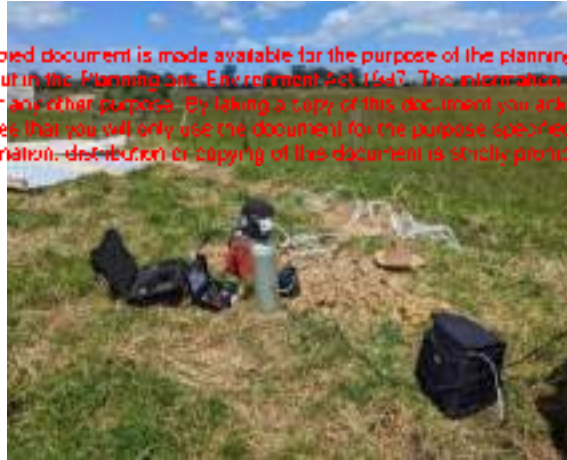


Photo 35: Groundwater sampling at location of GW3 (26A Enterprise Rd).



Photo 36: Groundwater from GW2.

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**Title** Photographs  
**Locality** 26A and 92 Enterprise Rd  
 Craigieburn, Victoria

**Dwg. No** 222643/2 Photos

**Prepared by** AT 15/12/2022  
**Checked by** YC 15/12/2022

**Geo-environmental Investigation**

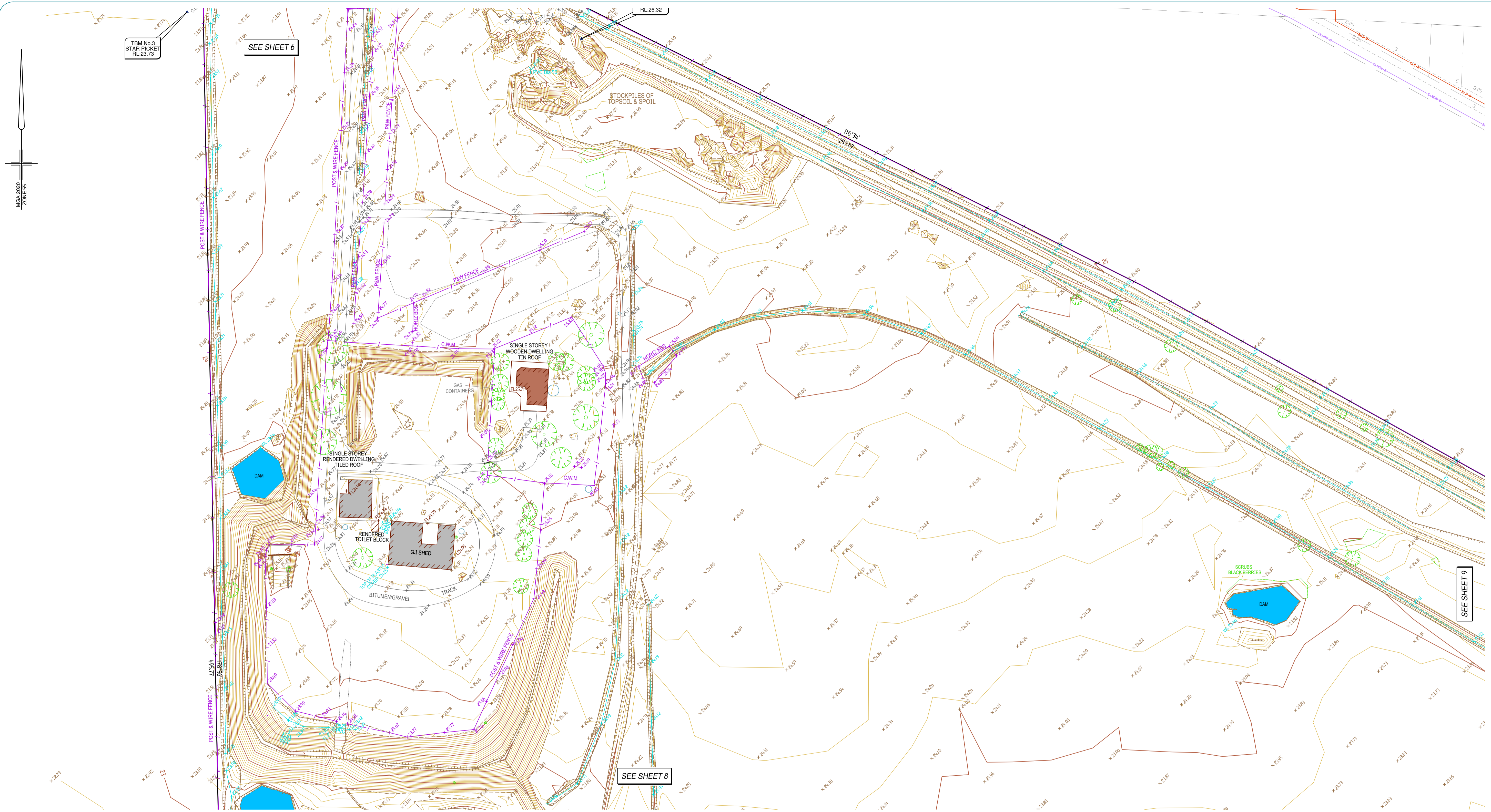
Investigation date: 1/12-2/12/2022

Project: 222643 92 Enterprise Rd/2

**Sheet No** Photo 5

**File** 222643-2 Photos.xlsm





MGA 2020  
ZONE 55

TBM No.3  
STAR PICKET  
RL:23.73

SEE SHEET 6

RL:26.32

SEE SHEET 9

SEE SHEET 8

**IMPORTANT NOTE**

This plan/digital information is prepared for ESR from a combination of field survey and existing records for the purpose of designing and developing the land and should not be used for any other purpose.

No underground service investigation has been completed. Caution should be applied.

In all instances, it is essential that the position of underground services (whether or not shown on this plan) be verified on site and abutting sites prior to any critical design or commencement of works. This should be done in consultation with all relevant service authorities.

All dimensions and survey marks shown on this Plan should be verified/confirmed by all contractors and consultants prior to any future construction and site works.

Any reproduction of this information in other plans requires the authorship of KLM Spatial to be noted on that plan and a statement that the information has not been altered.

This note is an integral part of this plan.  
This plan must not be passed on to any third party or reproduced in any documentation without the written approval of KLM Spatial.

**UNDERGROUND SERVICES**  
Underground utility services shown hereon have been identified in accordance with Australian Standard 5488-2013 and summarised below.

QL-D is very low accuracy with an unspecified horizontal and vertical accuracy. QL-D information does not involve any field verification or direct measurements and as such can only be considered to be a broad indication of the location and type of utility.

QL-C is low accuracy with a specified horizontal accuracy of ±300mm and an unspecified vertical accuracy. QL-C is compiled from field measurements or direct observations of the utility at a specific location. The location of the utility between the observed location can only be considered to be a broad indication of the location and type of utility.

QL-B is medium accuracy with a specified horizontal accuracy of ±300mm and vertical accuracy of ±500mm. QL-B is obtained via tracing/electromagnetic detection and the utility has not been directly observed. No Non-Destructive Digging has occurred to validate the location or type of the utility.

QL-A is high accuracy with a specified horizontal and vertical accuracy of ±50mm. QL-A refers to verifying the asset from direct observation, but may not identify the internal structure or content of the asset.

The survey date provided in this plan represents the last day a KLM Spatial surveyor was on site to perform field measurements. Any additional servicing works completed after this date cannot be represented on this plan.

**DATE OF SURVEY:**  
The fieldwork for this survey was started on 22.11.2022 and completed on 8.03.2024

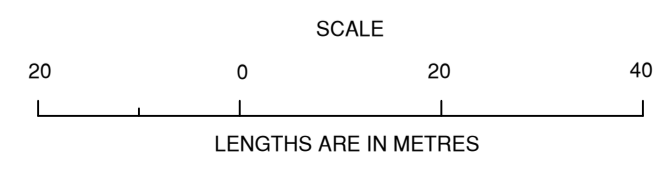
**TITLE:**  
The Title boundaries shown hereon have been re-established by field survey vide numerous marks found. The Title boundaries shown hereon were not marked by the author at the time of survey due to future works. A Boundary Plan will be lodged in support of the future subdivision.

**LICENSED SURVEYORS CERTIFICATION:**  
I, Damien Marc Rivalland of Suite 1, Building 2, 3 Ordish Road Dandenong South certify that this plan has been prepared from a survey made under my direction and supervision in accordance with the Surveying Act 2004 and completed on 22.11.2022, that this plan is accurate and correctly represents the adopted boundaries and that the survey accuracy accords with that required by regulation 7(1) of the Surveying (Cadastral Surveys) Regulations 2015.

Date: 24.01.2024  
Licensed Surveyor  
Surveying Act 2004

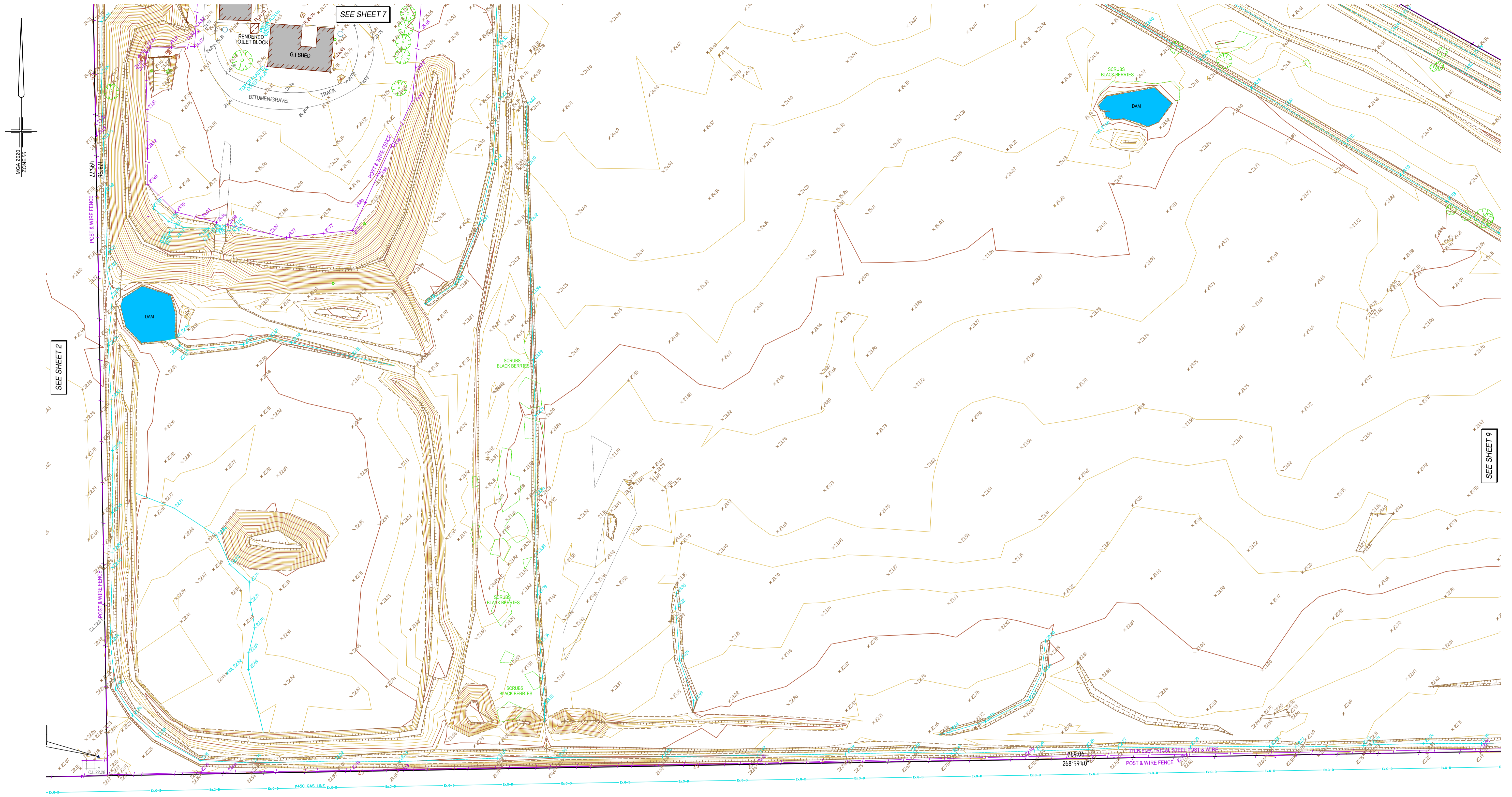
**DATUM NOTATION:**  
**HORIZONTAL DATUM**  
Co-ordinates are plane co-ordinates computed from the following:  
*Orientation:*  
This survey was connected to MGA2020 Zone 55 using GNSS observations corrected by the Melbourne Network, MGA2020 Zone 55 orientation has been fixed using observation to traverse stations.  
*Origin of Co-ordinates:*  
MELBpos observations have been verified by comparison with SMES values at PM144 and by comparison with E.D.M. traverse distances.  
**HEIGHT DATUM**  
Heights are to the Australian Height Datum, derived from the following:  
Origin of AHD Levels from PSM 144 with RL 17.384.  
SMES Nominated Vertical Order Accuracy: 3rd Order  
Confirmed by: Veris Feature & Level Plan Ref 332268-AD adopted AHD PM186 with a stated Value of RL22+19 Height Difference: 0.01  
Contour Interval is 0.2 metres.

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Client:  
**ESR**  
Title Details: V.10559 F.139  
Lot 2 on PS436220E & V.9622  
F.089 Lot 1 on TP99673B  
Reference: 8889 ESR DE01  
Plan Date: 15.03.2024  
Version: 7  
Scale: 1:750  
Sheet: 7 of 10  
Sheet Size: A1





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No underground service investigation has been completed. Caution should be applied.

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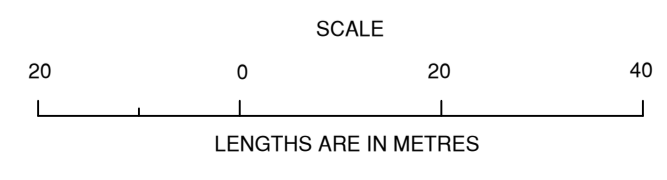
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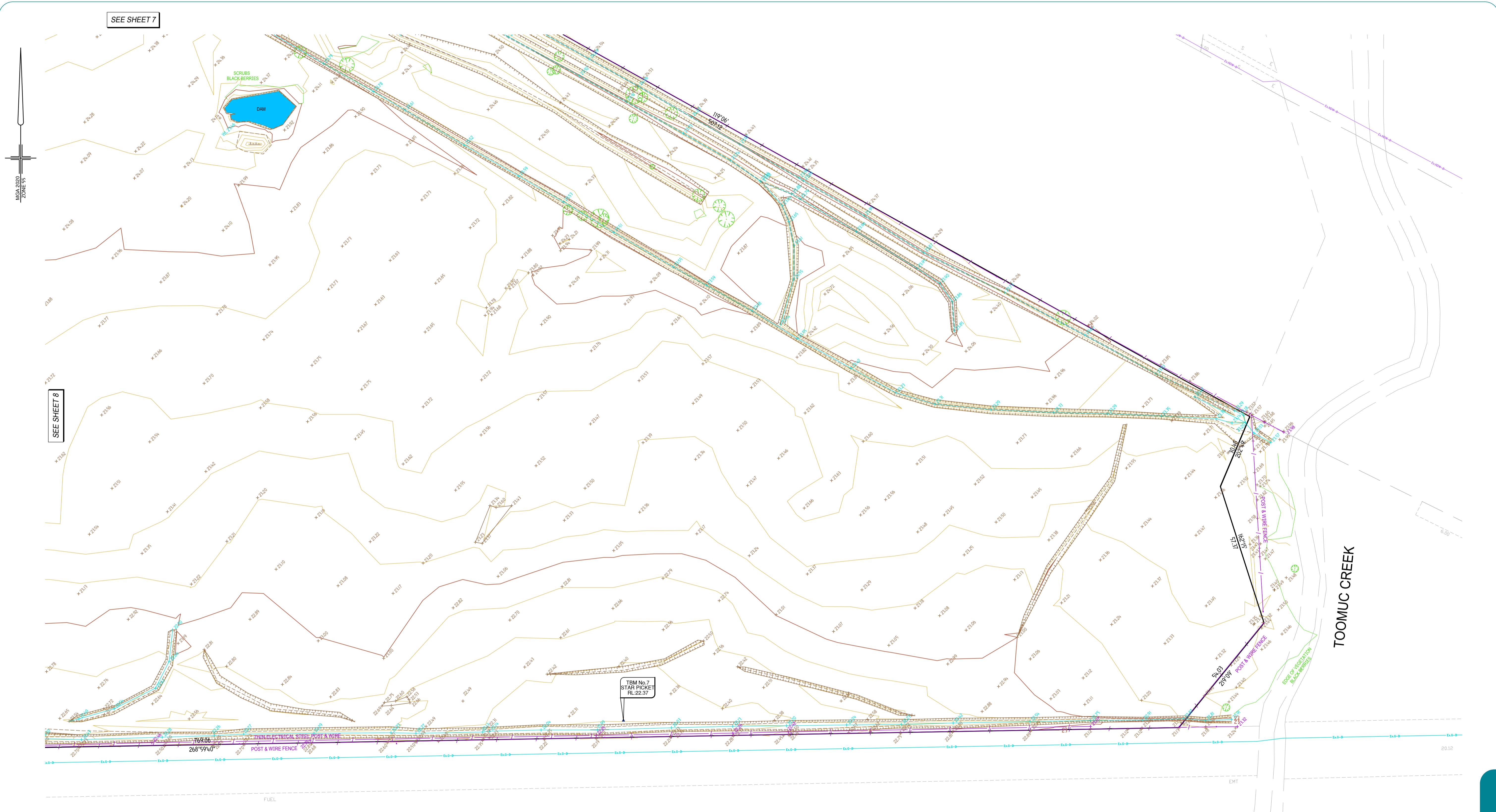
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F.089 Lot 1 on TP99673B  
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Plan Date: 15.03.2024  
Version: 7  
Scale: 1:750  
Sheet: 8 of 10  
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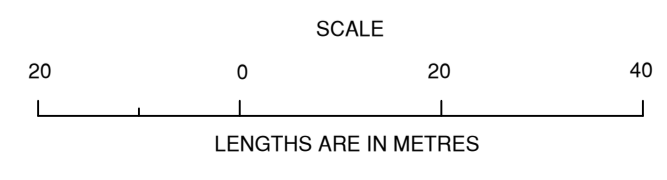
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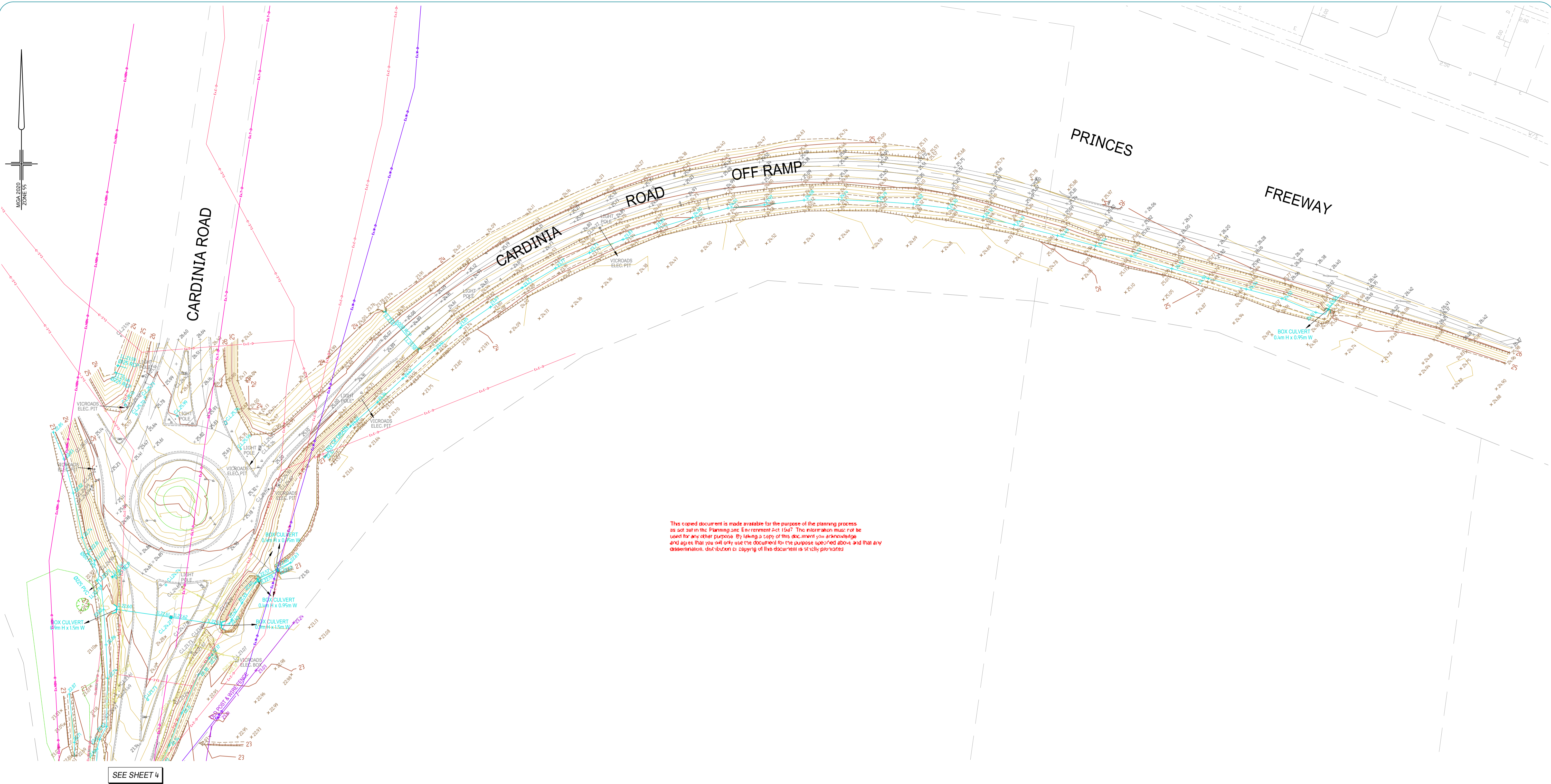
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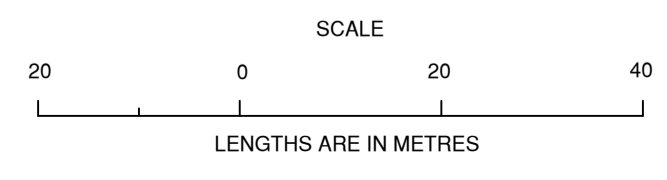
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Final Report

# Biodiversity Assessment for Toomuc Creek at 92 Enterprise Road, Pakenham, Victoria

Prepared for

Dalton Consulting Engineers Pty Ltd

October 2024



Ecology and Heritage Partners Pty Ltd

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Other EHP staff	[REDACTED]
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Bioregion	Gippsland Plain
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## **SUMMARY OF CLAUSE 52.17 APPLICATION REQUIREMENTS**

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Clause 52.17 Native Vegetation outlines the requirements for a permit to remove, destroy or lop native vegetation, including dead vegetation, under the Victoria Planning Provisions. The application requirements are not applicable as no native vegetation is proposed to be removed. As such, there are no offset requirements associated with this project.

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# 1 INTRODUCTION

## 1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by Dalton Consulting Engineers Pty Ltd to undertake a Biodiversity Assessment along Toomuc Creek at 92 Enterprise Road, Pakenham, Victoria.

We understand that Dalton Consulting Engineers Pty Ltd are proposing to submit a planning application in order to facilitate the future construction of a pipe outlet connecting to Toomuc Creek. The pipe outlet is proposed to connect to an interim drainage pond which is being constructed within the adjacent property parcel (92 Enterprise Road).

The Biodiversity Assessment was undertaken along the creek reserve adjacent to 92 Enterprise Road to guide the location of a temporary pipeline outfall. The pipe is a temporary outfall arrangement until the downstream Melbourne Water Drainage Scheme is constructed. Melbourne Water is in agreement with the temporary outfall arrangement, and the Melbourne Water Drainage Scheme may incorporate this outfall as part of the ultimate outfall arrangement. This is pending further scheme review by Melbourne Water.

The study area occurs within the Melbourne Strategic Assessment (MSA) area, and occurs adjacent to the Cardinia Road Employment Precinct Structure Plan (PSP) and the incorporated Cardinia Road Employment Precinct Native Vegetation Precinct Plan (NVPP); however, the study area does not occur within the area covered by the PSP or NVPP (Plate 1). While the study area occurs within the MSA, there are no MSA levy requirements for this land parcel (Plate 2). As that the study area occurs outside the area covered by the MSA Levy, and outside the Cardinia Road Employment PSP and NVPP, an assessment under Clause 52.17 (native vegetation) was deemed to be required.



**Plate 1.** Indication of the study area (red), location of the Cardinia Road Employment PSP area (in purple) and the MSA area (yellow) (VPA Greenfields 2024).



**Plate 2.** Indication of the study area (red polygon) and the MSA Levy area (orange) (MSA Mapshare 2024).

The purpose of this assessment was to identify the extent and type of native vegetation present within the study area and to determine the likely presence of significant flora and fauna species and/or ecological

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communities. This report presents the results of the assessment and discusses the potential ecological and legislative implications associated with the proposed action.

## 1.2 Study Area

The study area is located along Toomuc Creek at 92 Enterprise Road, Pakenham and is approximately 55 kilometres south-east of Melbourne's CBD (Figure 1). The study area covers approximately 0.45 hectares and is bound by Princes Freeway to the north, Toomuc Creek and agricultural land to the east, and undeveloped agricultural land to the south and west.

The study area is currently vacant, occurring adjacent Toomuc Creek. The study area is generally flat; however, it slopes downward (~45 degrees) along the banks of Toomuc Creek. No ridges or crests occur within or immediately adjacent to the site.

According to the Victorian Department of Energy, Environment and Climate Action (DEECA) NatureKit Map (DEECA 2024a), the study area is located within the Gippsland Plain bioregion, Melbourne Water Catchment Management Authority (CMA) and Cardinia Shire Council municipality.

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## 2 METHODS

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### 2.1 Desktop Assessment

Relevant literature, online-resources and databases were reviewed to provide an assessment of flora and fauna values associated with the study area. The following information sources were reviewed:

- The DEECA NatureKit Map (DEECA 2024a) and Native Vegetation Regulation (NVR) Map (DEECA 2024b) for:
  - Modelled data for location risk, native vegetation patches, scattered trees and habitat for rare or threatened species; and,
  - The extent of historic and current Ecological Vegetation Classes (EVCs).
- EVC benchmarks (DEECA 2024c) for descriptions of EVCs within the relevant bioregion;
- The Victorian Biodiversity Atlas (VBA) for previously documented flora and fauna records within the project locality (DEECA 2024d);
- The Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool (PMST) for matters of National Environmental Significance (NES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DCCEEW 2024);
- Relevant listings under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), including the latest Threatened (DEECA 2024e) and Declared Protected Flora (DEECA 2024f) Lists;
- The online VicPlan Map (Department of Transport and Planning [DTP] 2024) to ascertain current zoning and environmental overlays in the study area; and,
- Aerial photography of the study area.

### 2.2 Field Assessment

A field assessment was undertaken by a habitat hectare assessor, who is accredited by DEECA in the habitat hectare assessment methodology, on 5 September 2024 to obtain information on flora and fauna values within the study area. The study area was walked, with all commonly observed vascular flora and fauna species recorded, significant records mapped, and the overall condition of vegetation and habitats noted. EVCs were determined with reference to DEECA pre-1750 and extant EVC mapping (DEECA 2024a) and their published descriptions (DEECA 2024c).

Where native vegetation was identified a habitat hectare assessment was undertaken following the methodology described in the Vegetation Quality Assessment Manual (Department of Sustainability and Environment [DSE] 2004).

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## 2.3 Removal, Destruction or Lopping of Native Vegetation (the Guidelines)

Under the *Planning and Environment Act 1987*, Clause 52.17 of the Cardinia Planning Scheme requires a planning permit to remove, destroy or lop any native vegetation, including dead vegetation. The assessment process for the clearing of vegetation follows the *Guidelines for the removal, destruction or lopping of native vegetation* (the Guidelines) (DELWP 2017).

## 2.4 Assessment Qualifications and Limitations

This report has been written based on the quality and extent of the ecological values and habitat considered to be present or absent at the time of the desktop and/or field assessments being undertaken.

The 'snapshot' nature of a standard biodiversity assessment, meant that migratory, transitory or uncommon fauna species may have been absent from typically occupied habitats at the time of the field assessment. In addition, annual or cryptic flora species such as those that persist via underground tubers may also be absent.

A comprehensive list of all terrestrial flora and fauna present within the study area was not undertaken as this was not the objective of the assessment. Rather a list of commonly observed species was recorded to inform the habitat hectare assessment and assist in determining the broader biodiversity values present within the study area.

Ecological values identified within the study area were recorded using a hand-held GPS or tablet with an accuracy of +/-3 metres. This level of accuracy is considered to provide an accurate assessment of the ecological values present within the study area; however, this data should not be used for detailed surveying purposes.

The terrestrial flora and fauna data collected during the field assessment and information obtained from relevant desktop sources is considered to inform an accurate assessment of the ecological values present within the study area.

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## 3 RESULTS

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### 3.1 Vegetation Condition

Several patches of native vegetation were recorded within the study area, adjacent to Toomuc Creek. The remainder of the study area comprised introduced vegetation, present as pasture grass and patches of noxious weeds.

Twenty-five (25) flora species were observed within the study area, including five indigenous and 20 non-indigenous species. A list of all flora species recorded during the field assessment are provided in Appendix 1.1. Specific details relating to observed EVCs are provided below.

#### 3.1.1 Patches of Native Vegetation

Native vegetation in the study area is representative of one EVC: Swampy Riparian Woodland (EVC 83). The presence of this EVC is generally consistent with the modelled extent (2005) native vegetation mapping (DEECA 2024a).

The results of the habitat hectare assessment are provided in Appendix 1.2.

#### Swampy Riparian Woodland (EVC 83)

Swampy Riparian Woodland is characterised by a woodlands typically reaching a height of 15 meters, commonly found along low-energy streams in the foothills and plains. In these areas, the lower vegetation layers are often dominated by a mix of large and medium shrub species on the stream levees, along with large tussock grasses and sedges in the ground layer (DEECA 2024c).

Several small, highly modified patches of Swampy Riparian Woodland (SRW) were scattered along Toomuc Creek. Patches of SRW were of low quality, and lacking a canopy layer. The majority of patches (i.e. SRF1 – SRF4 on Figure 2) contained occurrences of Silver Wattle *Acacia dealbata*, Black Wattle *Acacia mearnsii* and Swamp Paperbark *Melaleuca ericifolia* in the mid-layer with no native vegetation in the ground layer (Plate 3 –Plate 5). The understorey in the south and central portions of the study area was dominated by Couch *Cynodon dactylon* var. *dactylon*, Paspalum *Paspalum dasyleurum*, Toowoomba Canary-grass *Phalaris aquatica*, Blackberry *Rubus fruticosus* spp. agg. and Gorse *Ulex europaeus*.

A patch in the north of the study area (i.e. SRF5 on Figure 2) contained Black Wattle in the mid-layer and a dense thicket of Common Reed *Phragmites australis* and Rush *Juncus* spp. in the understorey (Plate 6).

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**Plate 3.** A patch of Swampy Riparian Woodland (SRF1 on Figure 2), comprising a fallen Silver Wattle (Ecology and Heritage Partners Pty Ltd 05/09/2024).



**Plate 4.** A patch of Swampy Riparian Woodland (SRF2 on Figure 2), comprising Swamp Paperbark (Ecology and Heritage Partners Pty Ltd 05/09/2024).



**Plate 5.** A patch of Swampy Riparian Woodland (SRF4 on Figure 2), comprising Black Wattle and Swamp Paperbark (Ecology and Heritage Partners Pty Ltd 05/09/2024).



**Plate 6.** A patch of Swampy Riparian Woodland (SRF5 on Figure 2), comprising Black Wattle and Common Reed (Ecology and Heritage Partners Pty Ltd 05/09/2024).

### 3.1.2 Large Trees in Patches and Scattered Trees

No Large Trees in patches or scattered trees were identified within the study area.

### 3.1.3 Introduced and Planted Vegetation

Areas not supporting native vegetation had a high cover (>99%) of exotic grass species, many of which were direct-seeded for use as pasture (Plate 7). Scattered native grasses were generally absent from the study area, likely due to the degree of weed invasion from exotic grasses and noxious weeds.

Non-native areas were dominated by environmental weeds such as Toowoomba Canary-grass, Couch, Paspalum, Drain Flat-sedge *Cyperus eragrostis*, Marsh Yellow-cress *Rorippa palustris*, Nipplewort *Lapsana communis* subsp. *communis*, Ribwort *Plantago lanceolata*, Flatweed *Hypochaeris radicata*, Rough Corn

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Bedstraw *Galium tricornutum*, Common Sow-thistle *Sonchus oleraceus*, Blackthorn *Prunus spinosa*, and Cherry Plum *Prunus cerasifera*.

Noxious weeds, as defined under the *Catchment and Land Protection Act 1994* (CaLP Act), were present within the study area, including Weeping Willow *Salix babylonica*, Bulbil Watsonia *Watsonia meriana* var. *bulbillifera* (Plate 8), Flax-leaf Broom *Genista linifolia* (Plate 9), Gorse (Plate 10), Blackberry (Plate 10), St John's Wort *Hypericum perforatum* subsp. *veronense*, Spear Thistle *Cirsium vulgare*, Bridal Creeper *Asparagus asparagoides*, Angled Onion *Allium triquetrum* and Soursob *Oxalis pes-caprae*. Flax-leaf Broom, Gorse, Blackberry and Bridal Creeper are also listed as Weeds of National Significance (WoNS).



**Plate 7.** Exotic pasture grasses occurring across the majority of the study area (Ecology and Heritage Partners Pty Ltd 05/09/2024).



**Plate 8.** Watsonia identified within scrub adjacent to Toomuc Creek (Ecology and Heritage Partners Pty Ltd 05/09/2024).



**Plate 9.** Flax-leaf Broom identified in the south of the study area (Ecology and Heritage Partners Pty Ltd 05/09/2024).



**Plate 10.** Large patch of Gorse and Blackberry identified within the study area (Ecology and Heritage Partners Pty Ltd 05/09/2024).

### 3.2 Fauna Habitat

Toomuc Creek flows through the eastern portion of the study area, which runs north-south through Cardinia, and may provide habitat for a range of aquatic fauna species, common wetland bird species and common frog

species. Toomuc Creek in the east of the study area was quite degraded at the time of the assessment, with large areas of weed invasions from Blackberry, Gorse and Flax-leaf Broom. Growling Grass Frog *Litoria raniformis* were previously known to occur in Cardinia; however, previous surveys suggest that the species is practically absent from the area (Ecology and Heritage Partners 2015).

### 3.3 Significance Assessment

#### 3.3.1 Flora

The VBA contains records of four nationally significant (i.e. under the EPBC Act) and 27 State significant (i.e. under the FFG Act) flora species previously recorded within 10 kilometres of the study area (DEECA 2024d) (Figure 3). The PMST nominated an additional 14 nationally significant species which have not been previously recorded but have the potential to occur in the locality (DCCEEW 2024) (Appendix 1.4).

No national (i.e. under the EPBC Act) or State significant (i.e. under the FFG Act) flora were recorded during the site assessment and, based on the modified nature of the study area (i.e. high degree of weed invasion), landscape context and the proximity of previous records, the small impact footprint and the measures that have been undertaken to micro-site the pipe outlet outside of native vegetation, significant flora species are considered unlikely to occur within the study area due to the and high levels of disturbance and absence of suitable habitat.

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#### 3.3.2 Fauna

The VBA contains records of 17 nationally significant (i.e. under the EPBC Act) and 16 State significant (i.e. under the FFG Act) fauna species previously recorded within 10 kilometres of the study area (DEECA 2024d) (Figure 4). The PMST nominated an additional 28 nationally significant species which have not been previously recorded but have the potential to occur in the locality (DCCEEW 2024) (Appendix 2.1).

Targeted Growling Grass Frog surveys were previously conducted in accordance with the requirements outlined in the Cardinia Road Employment Precinct Conservation Management Plan for Growling Grass Frog (Ecology Partners 2010). Targeted surveys were recommended to be undertaken on an annual basis by Cardinia Shire Council for a 10-year period across the entirety of the precinct. Targeted Growling Grass Frog survey efforts were undertaken across the Cardinia Road Employment Precinct, from 2007 to 2009 and in 2015. During these combined survey efforts, Growling Grass Frog was recorded at three locations during the 2007/08 breeding season and at six locations during the 2008/09 breeding season. However, surveys were not undertaken for the species between 2009 and 2014. Additional targeted surveys for Growling Grass Frog were undertaken in 2014/2015 breeding season; however, Growling Grass Frog was not identified in the precinct (Ecology and Heritage Partners 2015). As per discussions with DEECA (James Walsh Pers. Comms. 2022), Growling Grass Frog may not be present within Cardinia Road Precinct.

No national (i.e. under the EPBC Act) or State significant (i.e. under the FFG Act) fauna were recorded during the site assessment, and based on the modified nature of the study area, landscape context and the proximity of previous records, significant fauna species are considered unlikely to rely on habitat within the study area for foraging or breeding purposes due to the lack of suitable and/or important habitat features. Additionally, based on the small impact footprint of the proposed pipe outlet, it's considered unlikely that the proposed

implementation of the pipe outlet will significantly impact the creekline or impact any associated habitat for national or State significant species.

### 3.3.3 *Ecological Communities*

Two nationally listed ecological communities are predicted to occur within 10 kilometres of the study area (DCCEEW 2024):

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland; and,
- Natural Damp Grassland of the Victorian Coastal Plains

However, vegetation within the study area did not meet the condition thresholds that define any national or State-significant communities due to the absence of key indicator species, the low diversity of native flora and high cover of exotic vegetation.

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## 4 REMOVAL, DESTRUCTION OR LOPPING OF NATIVE VEGETATION (THE GUIDELINES)

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### 4.1 Avoid and Minimise Statement

The study area is located along Toomuc Creek, adjacent to 92 Enterprise Road, Pakenham. The proponent is intending to submit a planning permit application to accommodate the development of a pipe outlet connecting to Toomuc. The proposed pipe outlet will connect from a drainage pond which is being constructed within the property boundary of 92 Enterprise Road. The proposed drainage pond is located within the Cardinia Road Employment PSP and associated NVPP and, as such, is subject to the requirements of Clause 52.16 of the Cardinia Planning Scheme. As the pipe outlet occurs outside the area covered by the Cardinia Road Employment PSP and NVPP, the pipe outlet is being assessed under Clause 52.17 of the Cardinia Planning Scheme.

The proponent adopted the three-step approach of avoid, minimise and offset, and incorporated these principles into the final design. The proponent has micro-sited the proposed pipe outlet to avoid impacts to native vegetation entirely (Figure 2). As such, there are no limiting permit requirements or offset requirements for the removal of native vegetation within the study area.

### 4.2 Residual Impacts to Native Vegetation

Based on the development plan provided by the proponent on the 18 September 2024, there are no impacts to native vegetation. As such, there are no offset requirements associated with this project.

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## 5 LEGISLATIVE AND POLICY IMPLICATIONS

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### 5.1 *Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)*

The proposed action is highly unlikely to have a significant impact on any matter of NES. As such, a referral to the Commonwealth Environment Minister is unlikely to be required regarding matters listed under the EPBC Act.

### 5.2 *Flora and Fauna Guarantee Act 1988 (Victoria)*

There are no confirmed records of species or ecological communities listed as Threatened or Protected under the FFG Act being within the study area.

### 5.3 *Planning and Environment Act 1987 (Victoria)*

#### 5.3.1 *Local Planning Scheme*

The study area is located within the Cardinia Shire Council. The following zoning and overlays apply (DTP 2024):

- Public Conservation and Resource Zone (PCRZ); and,
- Floodway Overlay (FO).

#### 5.3.2 *The Guidelines*

The State Planning Policy Framework and the decision guidelines at Clause 12.01 Biodiversity and Clause 52.17 Native Vegetation require Planning and Responsible Authorities to have regard for the Guidelines (DELWP 2017).

#### 5.3.3 *Implications*

No native vegetation of any description (including scattered native grasses) was observed within the impact area. As such, a planning permit under Clause 52.17 from the Cardinia Shire Council is not required.

A permit is required under Clause 36.03 of the Cardinia Planning Scheme to construct a building or construct or carry out works within the Public Conservation and Resource Zone (PCRZ).

### 5.4 *Catchment and Land Protection Act 1994 (Victoria)*

Ten weeds listed as noxious under the CaLP Act were recorded during the assessment (Weeping Willow, Bulbil Watsonia, Flax-leaf Broom, Gorse, Blackberry, St John's Wort, Spear Thistle, Bridal Creeper, Angled Onion and Soursob).

Listed noxious weeds and pests should be appropriately controlled throughout the study area

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## 5.5 **Water Act 1989 (Victoria)**

A 'works on waterways' permit from the Melbourne Water CMA is likely to be required where any action impacts on waterways within the study area (i.e. Toomuc Creek). Additionally, where structures are installed within or across waterways that potentially interfere with the passage of fish or the quality of aquatic habitat, these activities should be referred to DEECA with the Melbourne Water CMA included for comment.

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## 6 MITIGATION MEASURES

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Recommended measures to mitigate impacts upon terrestrial and aquatic values present within the study area include:

- Minimise impacts to native vegetation and habitats through construction and micro-siting techniques, including fencing retained areas of native vegetation during construction. If indeed necessary, trees should be lopped or trimmed rather than removed. Similarly, soil disturbance and sedimentation adjacent to Toomuc Creek should be avoided or kept to a minimum, to avoid, or minimise impacts to fauna habitats;
- All contractors should be aware of ecologically sensitive areas to minimise the likelihood of inadvertent disturbance to areas marked for retention. Native vegetation (areas of sensitivity) should be included as a mapping overlay on any construction plans;
- Where possible, construction stockpiles, machinery, roads, and other infrastructure should be placed away from areas supporting native vegetation, Large Trees, creeklines and/or wetlands;
- Ensure that best practice sedimentation and pollution control measures are undertaken at all times, in accordance with Environment Protection Authority (EPA) guidelines (EPA 2020a; EPA 2020b; Victorian Stormwater Committee 1999) to prevent offsite impacts to waterways and wetlands; and,
- As indigenous flora provides valuable habitat for indigenous fauna, it is recommended that any landscape plantings that are undertaken as part of the proposed works are conducted using indigenous species sourced from a local provenance, rather than exotic deciduous trees and shrubs.

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## 7 SUMMARY OF PLANNING IMPLICATIONS

Further requirements associated with development of the study area, as well as additional studies or reporting that may be required, are provided in Table 1.

**Table 1.** Further requirements associated with development of the study area.

Relevant Legislation	Implications	Further Action
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	The proposed action is highly unlikely to have a significant impact on any matter of NES. As such, a referral to the Commonwealth Environment Minister is unlikely to be required regarding matters listed under the EPBC Act.	No further action required.
<i>Flora and Fauna Guarantee Act 1988</i>	There are no confirmed records of species or ecological communities listed as Threatened or Protected under the FFG Act being within the study area.	No further action required.
<i>Planning and Environment Act 1987</i>	No native vegetation of any description was observed within the impact area. As such, a planning permit under Clause 52.17 from the Cardinia Shire Council is not required. A permit is required under Clause 36.03 of the Cardinia Planning Scheme to construct a building or construct or carry out works within the Public Conservation and Resource Zone (PCRZ).	No further action required under Clause 52.17. A permit is required under the Public Conservation and Resource Zone (Clause 36.03).
<i>Catchment and Land Protection Act 1994</i>	Ten weeds listed as noxious under the CaLP Act were recorded during the assessment (Weeping Willow, Bulbil Watsonia, Flax-leaf Broom, Gorse, Blackberry, St John's Wort, Spear Thistle, Bridal Creeper, Angled Onion and Soursob).	Listed noxious weeds should be appropriately controlled throughout the study area
<i>Water Act 1989</i>	A 'works on waterways' permit is likely to be required from the Melbourne Water CMA where any action impacts on waterways within the study area (i.e. Toomuc Creek)	Obtain a 'works on waterways' permit from the Melbourne Water CMA.

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## REFERENCES

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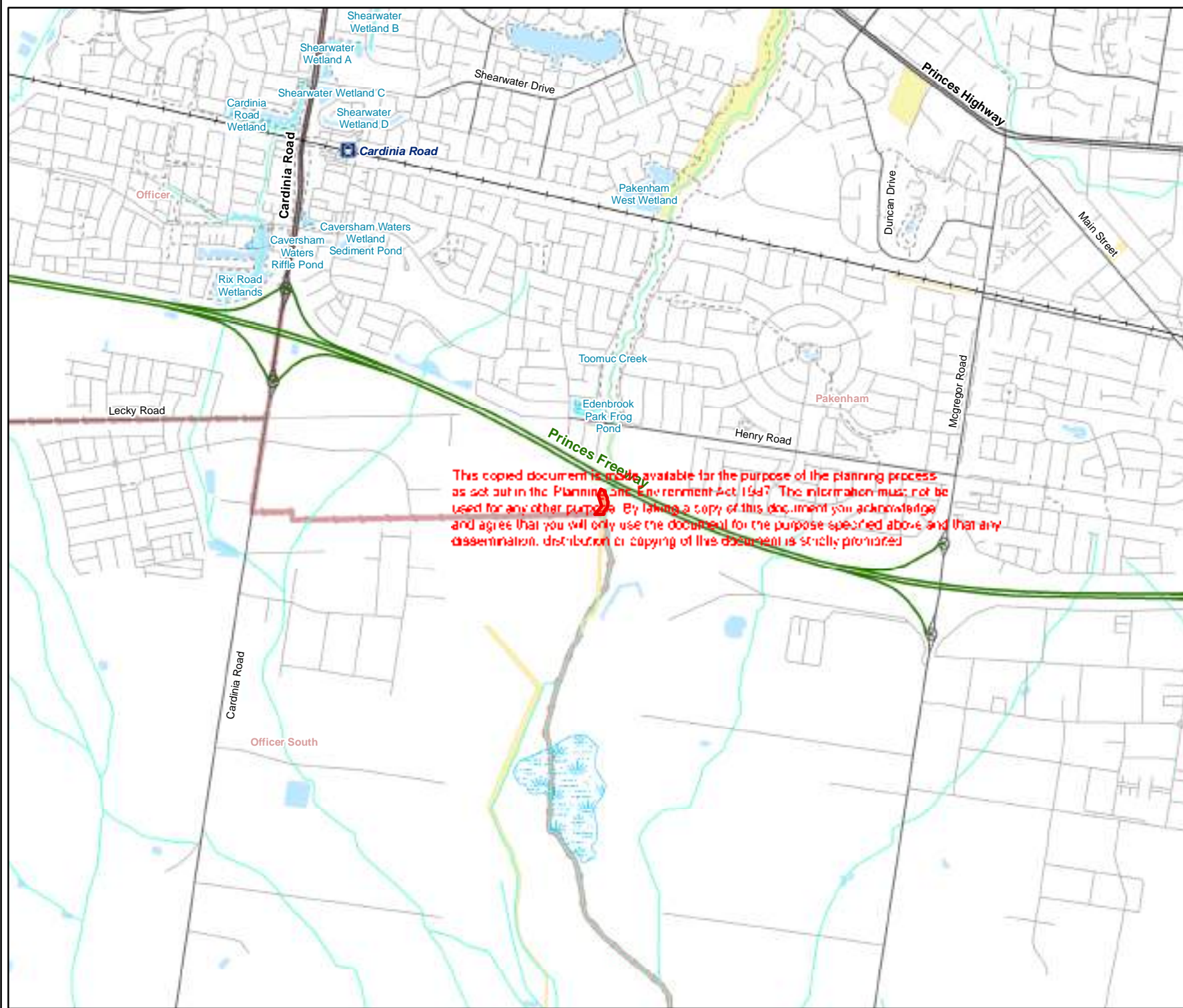
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## FIGURES

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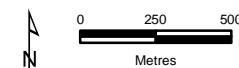
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**Legend**

- Study Area
- Railway
- Freeway
- Major Road
- Collector Road
- Minor Road
- Proposed Road
- Minor Watercourse
- Permanent Waterbody
- Wetland/Swamp
- Crown Land
- Localities



**Figure 1**  
**Location of the study area**  
*Biodiversity Assessment for a Proposed Drainage Outlet at 92 Enterprise Road, Pakenham*

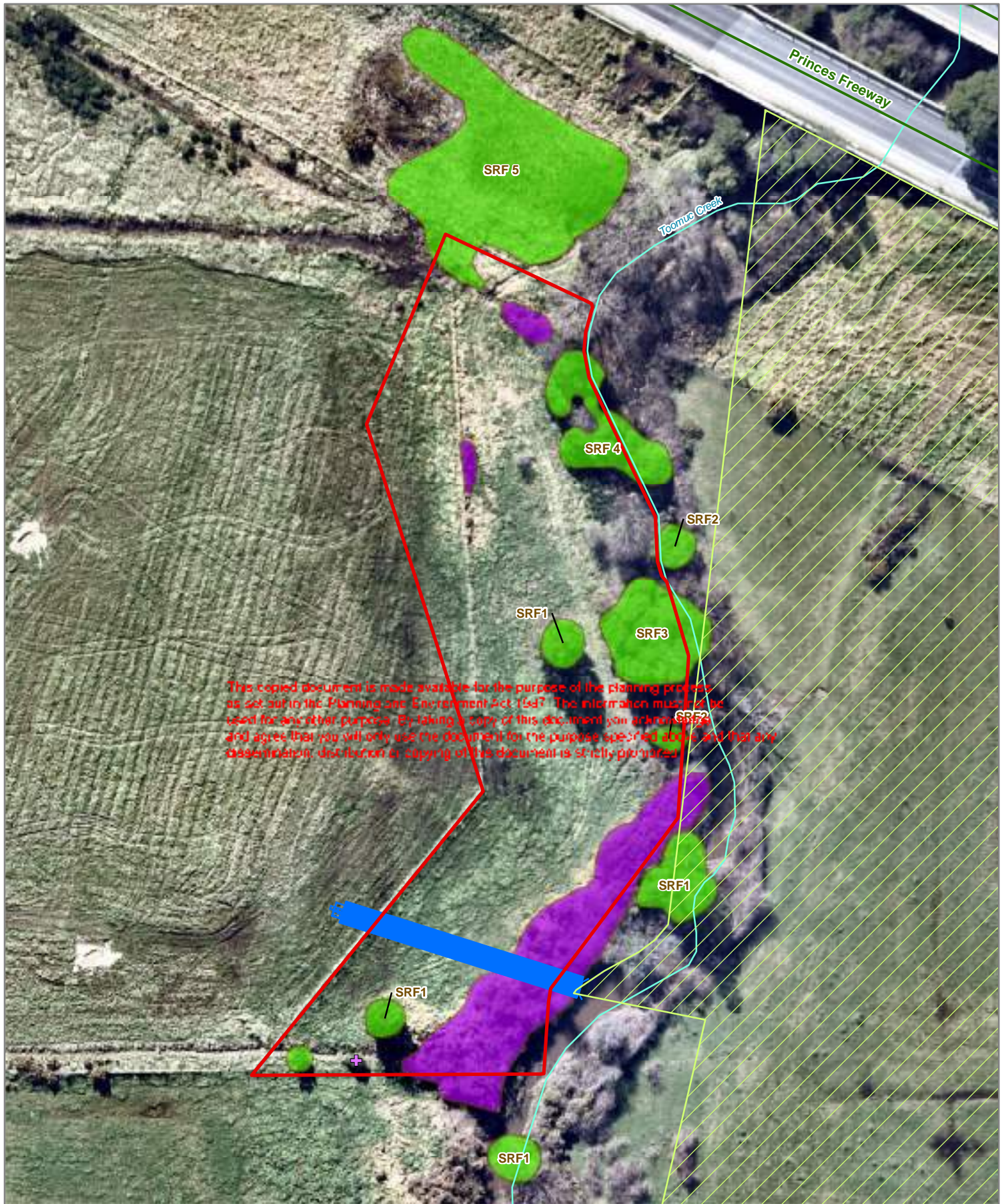


Map Scale: 1:25,000 @ A4  
 Coordinate System: GDA2020 MGA Zone 55



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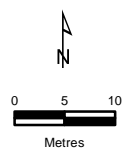
**Figure 2**  
**Ecological features**  
 Biodiversity Assessment  
 for a Proposed Drainage  
 Outlet at 92 Enterprise  
 Road, Pakenham

**Legend**

- Study Area
- Conservation Area 36E
- + Noxious weed
- Noxious weed patch
- Ecological Vegetation Classes**
- Swamy Riparian Woodland (EVC 83)

**Development plan**

- Drainage and pipe works

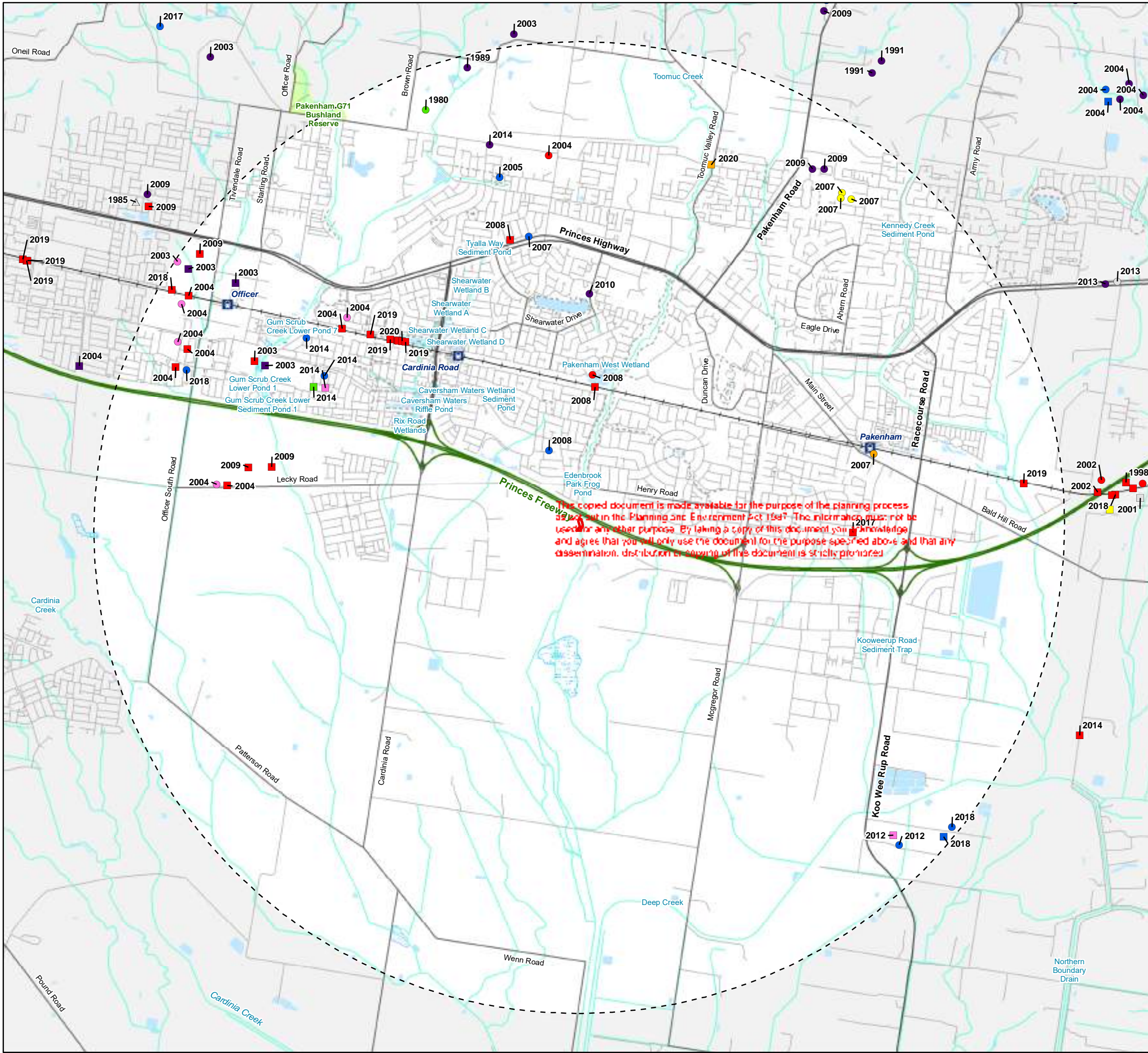


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 Coordinate System:  
 GDA2020 MGA Zone 55

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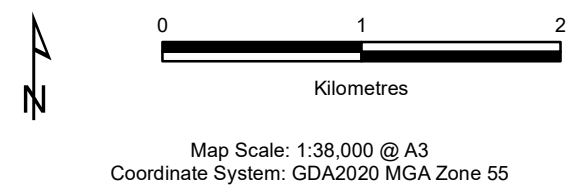
**Legend**

- Study Area
- Arching Flax-lily
- Austral Crane's-bill
- Buxton Gum
- Cobra Greenhood
- Forest Sedge
- Giant Honey-myrtle
- Glaucous Flax-lily
- Green Scentbark
- Grey Billy-buttons
- Matted Flax-lily
- Mugga
- Purple Blown-grass
- Rough-barked Apple
- Southern Blue-gum
- Spotted Gum
- Veined Spear-grass
- △ Wine-lipped Spider-orchid



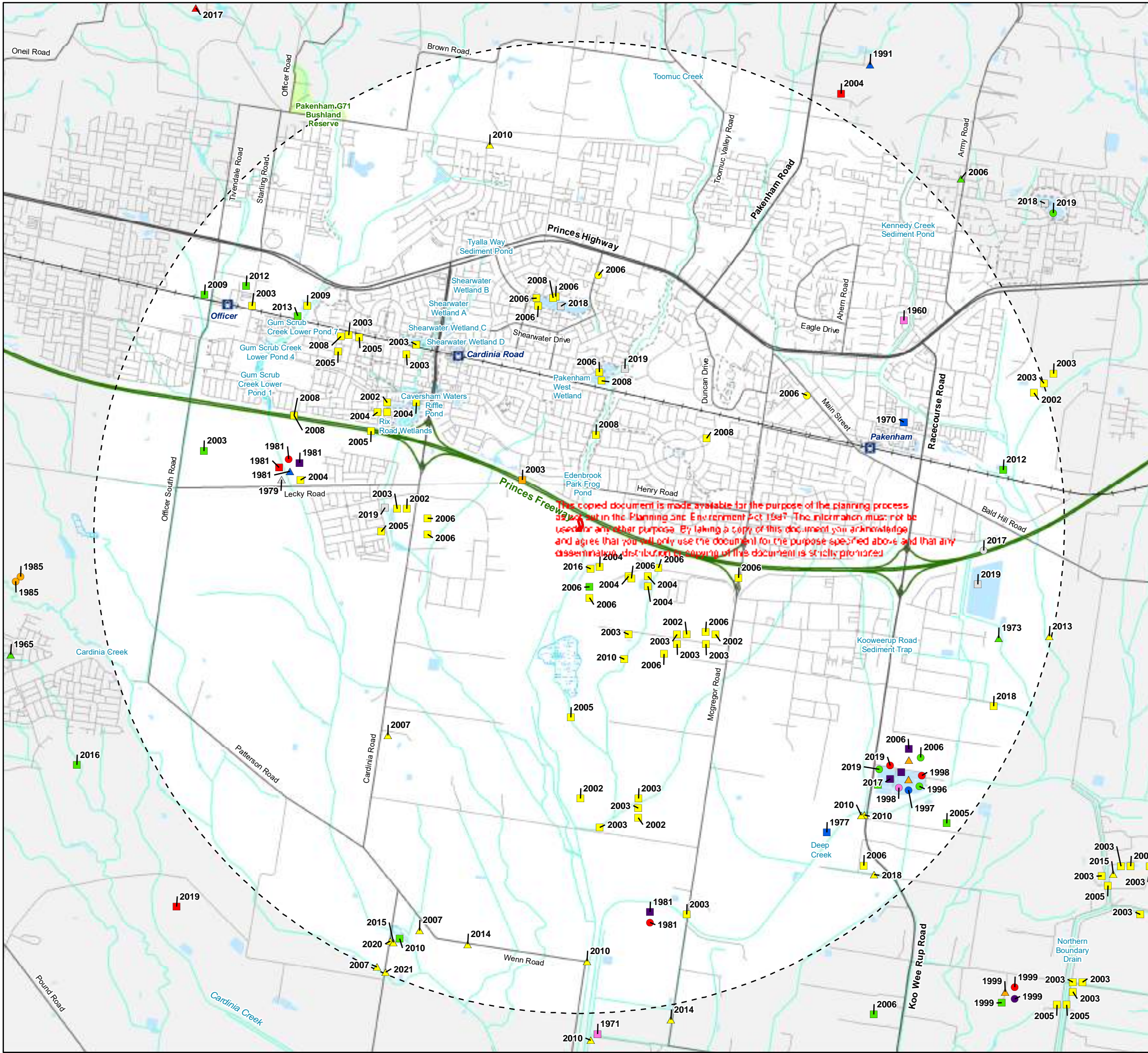
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**Figure 3**  
**Previously documented significant flora within 5km of the study area**  
*Biodiversity Assessment for a Proposed Drainage Outlet at 92 Enterprise Road, Pakenham*



Victorian Biodiversity Atlas (VBA). Sourced from: 'VBA\_FLORA25', 'VBA\_FLORA100', 'VBA\_FAUNA25' and 'VBA\_FAUNA100'. Updated June 2024 © The State of Victoria, Department of Energy, Environment and Climate Action. Records prior to 1949 not shown. // Base data source: Victoria State Government. Disclaimer: the State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.





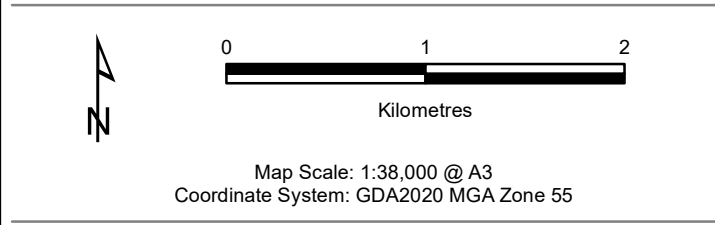
**Legend**

- Study Area
- Significant fauna**
- Australasian Bittern
- Australasian Shoveler
- Australian Grayling
- Australian Little Bittern
- Blue-billed Duck
- Caspian Tern
- Common Sandpiper
- Curlew Sandpiper
- Eastern Great Egret
- Gang-gang Cockatoo
- Grey-headed Flying-fox
- Growling Grass Frog
- Latham's Snipe
- Macquarie Perch
- Murray Cod
- Musk Duck
- ▲ Pilotbird
- ▲ Powerful Owl
- ▲ Sharp-tailed Sandpiper
- ▲ Southern Brown Bandicoot
- ▲ Southern Toadlet
- ▲ White-throated Needletail



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**Figure 4**  
**Previously documented significant fauna within 5km of the study area**  
*Biodiversity Assessment for a Proposed Drainage Outlet at 92 Enterprise Road, Pakenham*



Victorian Biodiversity Atlas (VBA). Sourced from: 'VBA\_FLORA25', 'VBA\_FLORA100', 'VBA\_FAUNA25' and 'VBA\_FAUNA100'. Updated June 2024 © The State of Victoria, Department of Energy, Environment and Climate Action. Records prior to 1949 not shown. // Base data source: Victoria State Government. Disclaimer: the State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.



## APPENDIX 1 FLORA

### Appendix 1.1 Flora Results

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#### Legend:

^ Naturally growing (i.e. non-planted) indigenous species to the study area

c Listed as a noxious weed under the CaLP Act

w Weed of National Significance

**Table A1.1.** Flora within the study area.

Scientific Name	Common Name	Notes
<b>INDIGENOUS SPECIES</b>		
<i>Acacia dealbata</i>	Silver Wattle	^
<i>Acacia mearnsii</i>	Black Wattle	^
<i>Juncus</i> spp.	Rush	^
<i>Melaleuca ericifolia</i>	Swamp Paperbark	^
<i>Phragmites australis</i>	Common Reed	^
<b>NON-INDIGENOUS OR INTRODUCED SPECIES</b>		
<i>Allium triquetrum</i>	Angled Onion	w
<i>Asparagus asparagoides</i>	Bridal Creeper	w
<i>Cirsium vulgare</i>	Spear Thistle	c
<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch	-
<i>Cyperus eragrostis</i>	Drain Flat-sedge	-
<i>Galium tricornerutum</i>	Rough Corn Bedstraw	-
<i>Genista linifolia</i>	Flax-leaf Broom	w
<i>Hypericum perforatum</i> subsp. <i>veronense</i>	St John's Wort	c
<i>Hypochaeris radicata</i>	Flatweed	-
<i>Lapsana communis</i> subsp. <i>communis</i>	Nipplewort	-
<i>Oxalis pes-caprae</i>	Soursob	w
<i>Paspalum dasypleurum</i>	Paspalum	-
<i>Phalaris aquatica</i>	Toowoomba Canary-grass	-
<i>Plantago lanceolata</i>	Ribwort	-
<i>Prunus cerasifera</i>	Cherry Plum	-
<i>Prunus spinosa</i>	Blackthorn	-
<i>Rorippa palustris</i>	Marsh Yellow-cress	-
<i>Rubus fruticosus</i> spp. agg.	Blackberry	w

Scientific Name	Common Name	Notes
<i>Salix babylonica</i> s.l.	Weeping Willow	<b>c</b>
<i>Sonchus oleraceus</i>	Common Sow-thistle	-
<i>Ulex europaeus</i>	Gorse	<b>w</b>
<i>Watsonia meriana</i> var. <i>bulbillifera</i>	Bulbil Watsonia	<b>c</b>

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## Appendix 1.2 Habitat Hectare Assessment

**Table A1.2.** Habitat Hectare Assessment Table.

Vegetation Zone		SRW <sub>1</sub>	SRW <sub>2</sub>	SRW <sub>3</sub>	SRW <sub>4</sub>	SRW <sub>5</sub>
Bioregion		GP	GP	GP	GP	GP
EVC		SRW	SRW	SRW	SRW	SRW
EVC Number		83	83	83	83	83
EVC Conservation Status		En	En	En	En	En
Site Condition /75	Large Trees /10	0	0	0	0	0
	Tree Canopy Cover /5	0	0	0	0	0
	Lack of Weeds /15	0	4	0	4	7
	Understorey /25	5	5	5	5	5
	Recruitment /10	0	0	3	0	0
	Organic Matter /5	2	4	2	2	4
	Logs /5	0	0	0	0	0
	Treeless EVC Multiplier	1.00	1.00	1.00	1.00	1.00
	Subtotal =	7.00	13.00	10.00	11.00	16.00
Landscape Context /25	Patch Size /10	1	1	1	1	1
	Neighbourhood /10	0	0	0	0	0
	Distance to Core Area /5	0	0	0	0	0
	Subtotal =	1	1	1	1	1
Habitat Points /100		8	14	11	12	17
<b>Habitat Score</b>		<b>0.08</b>	<b>0.14</b>	<b>0.11</b>	<b>0.12</b>	<b>0.17</b>

**Note:** SRW = Swampy Riparian Woodland; GP = Gippsland Plain; En = Endangered.

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Final Report v3

# Environmental Management Plan for Stage 2 for 92 Enterprise Road, Pakenham, Victoria

Prepared for

**Dalton Consulting Engineers Pty Ltd**

October 2024



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## GLOSSARY

Acronym	Description
CaLP Act	<i>Catchment and Land Protection Act 1994</i>
CEMP	Construction Environmental Management Plan
CFA	Country Fire Authority
CMA	Catchment Management Authority
DEECA	Department of Energy, Environment and Climate Action
EPA	Environment Protection Agency
EVC	Ecological Vegetation Class
TPZ	Tree Protection Zone
CREPCMPGGF	Cardinia Road Employment Precinct, Conservation Management Plan for Growling Grass Frog <i>Litoria raniformis</i> (Ecology Partners 2010)
PSP	Precinct Structure Plan
NVPP	Native Vegetation Precinct Plan

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## SUMMARY

This Environmental Management Plan outlines the pre-construction, during construction and post-construction management obligations for the development at 92 Enterprise Road, Pakenham, Victoria. As per discussions with DEECA (James Walsh Pers. Comms. 2022), Growling Grass Frog *Litoria raniformis major* may not be present within the study site at the time of implementation, and therefore, the measures outlined in this EMP are reflective of this. A summary of the obligations of the EMP are outlined in Table 1.

**Table 1.** Summary of Management Obligations for 92 Enterprise Road, Pakenham.

Environmental Management Plan objectives		Section
Introduction (Section 1)	Background	Section 1.1
	The Study Area	Section 1.2
	Regulatory Context	Section 1.3
Growling Grass Frog (Section 2)	<p><b>Growling Grass Frog Ecology</b></p> <ul style="list-style-type: none"> <li>This section outlines Growling Grass Frog Ecology, including conservation status, species description, species distribution, habitat requirements and previous Growling Grass Frog surveys which have occurred in the precinct.</li> </ul>	Section 2.1 – 2.5
Environmental Management Plan (Section 3)	<p><b>Overview</b></p> <ul style="list-style-type: none"> <li>Outlines the general themes and operational requirements of the EMP.</li> </ul>	Section 3.1
	<p><b>Environmental Site inductions</b></p> <ul style="list-style-type: none"> <li>All staff will attend an environmental site induction prior to commencing work on site, which will inform contractors of all the requirements associated with this EMP.</li> <li>The environmental site induction is to be conducted by competent personnel. All main contractors undertaking construction works will be provided a copy of the EMP and this must be kept on site at times as a point of reference to site personnel.</li> <li>Following the induction, all personnel working on site will be required to sign the induction form and a register will be kept recording all staff that have completed the environmental site induction. All construction personnel will hold appropriate competencies/qualifications for their intended role.</li> </ul>	Section 3.2

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Environmental Management Plan objectives		Section
<p><b>Growling Grass Frog Management</b></p> <ul style="list-style-type: none"> <li>• Outlines the basic requirements of all construction staff in relation to their obligations towards Growling Grass Frog for pre-construction, during construction and post-construction stages.</li> <li>• A site induction for construction staff prior to the removal of habitat will be required to brief them on an overview of Growling Grass Frog, the risks posed by development and legislative requirements to be followed regarding this species.</li> <li>• The following measures will be implemented during the pre-construction phase:               <ul style="list-style-type: none"> <li>○ Prior to the decommissioning of any dams and prior to the commencement of any works, all construction staff are to be made aware of Growling Grass Frog obligations and requirements;</li> <li>○ All staff are to be made aware of Growling Grass Frog and have access to a photo to aid in identification (Appendix 1);</li> <li>○ If any Growling Grass Frog are identified within the construction area, works in the immediate area must cease until the frog is relocated to a suitable site within in the same conservation area (i.e. moved to a nearby dam or river in the vicinity). Single use gloves and or single use lightweight plastic bags must be used when handling frogs; and,</li> <li>○ Any identified frogs are to be reported to DEECA including the site which they were relocated to.</li> </ul> </li> <li>• Sections 3.3.1 – 3.3.4 outline general obligations regarding the decommissioning of existing waterbodies, pond and drainage corridor design and construction, and habitat maintenance requirements.</li> </ul>		Section 3.3
<p><b>Fencing and No-Go Zones</b></p> <ul style="list-style-type: none"> <li>• Temporary protective fencing will be in the form of 1.8-metre high, chain-link material, or other materials which are easy to supply, install, maintain and uninstall. Protective fencing must be erected and maintained at a maximum distance of five (5) metres from the work zone. This is to ensure impacts on water courses which are to be retained are appropriately mitigated (i.e. Toomuc Creek). The base of fencing must contain silt control measures, to limit the movement of frogs into development areas and reduce the impacts of sedimentation on Drainage Corridors.</li> <li>• The base of fencing must contain silt control measures, to limit the movement of frogs into development areas and reduce the impacts of sedimentation on Drainage Corridors (i.e. Toomuc Creek). The following must be adhered to:               <ul style="list-style-type: none"> <li>○ Silt Fencing must be erected along the boundary of the Special Use Zone (SUZ) land, other than when approved works are occurring within the waterway (i.e. the drainage outlet), in which case fencing must be installed along the boundary of the works area for this asset; and,</li> <li>○ Post construction silt fencing is to be maintained at regular intervals along Toomuc Creek until vegetation has re-</li> </ul> </li> </ul>		Section 3.4

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Environmental Management Plan objectives		Section
	<p>established or landscaping has been undertaken in accordance with the approved Landscape Plan.</p> <ul style="list-style-type: none"> <li>• Toomuc Creek is identified as a No-go Zone. As such, temporary exclusion fencing and silt fencing must be erected along the eastern boundary of the interim drainage pond and SUZ land until construction of this asset is completed (Phase 1).</li> <li>• Temporary exclusion fencing and silt fencing must be erected along the works area of the pipe outlet connecting to Toomuc Creek to ensure that active development does not negatively impact the creekline (Phase 2).</li> <li>• No works are to be undertaken within No-Go areas, except for construction of the drainage outlet connecting to Toomuc Creek as well as to facilitate the construction of the drainage pond within the site. Temporary exclusion fencing and silt fencing must be erected along the boundary of the works area for this asset (i.e. pipe outlet). Fences should not be moved during the entire construction period (unless absolutely necessary). Fences will not be removed until all works have been completed to the satisfaction of Council and Melbourne Water.</li> </ul>	
	<p><b>Vegetation Clearance and Native Fauna Salvage</b></p> <ul style="list-style-type: none"> <li>• Appropriate mitigation measures will be implemented during vegetation clearance to reduce the risk of injury and mortality to any local native fauna that may be present. While no native vegetation to be protected or removed was identified within the study area, as per the Gardiner Road Employment Precinct NVRP, vegetation clearance may be required along Toomuc Creek to service the implementation of the drainage outlet. Salvage and translocation of fauna species must be undertaken during vegetation clearance to the satisfaction of the Secretary of DEECA.</li> </ul>	Section 3.5
	<p><b>Weed Management Plan</b></p> <p>This section outlines Weed Management obligations for the developer for pre-construction, during construction and post-construction stages, and outlines weed management control and management approaches.</p> <p>During the construction and post-construction phases, on-going weed management within the broader study area and along Toomuc Creek must be undertaken to ensure that construction activities do not exacerbate the spread of weeds.</p> <p>The following measures will be implemented during the <b>Pre-construction phase</b>:</p> <ul style="list-style-type: none"> <li>• The plant disease and pest plant management protocols will be covered during the environmental site inductions;</li> <li>• The site supervisor should have good pest plant identification skills, and should have knowledge of the most appropriate methods of control for any exotic species that are present; and,</li> <li>• If required, pest plant control contractors with demonstrated experience working in ecologically sensitive environments will be engaged to undertake pest plant control.</li> </ul> <p>The following measures will be implemented <b>during construction</b>:</p> <ul style="list-style-type: none"> <li>• Ongoing pest plant control will be carried out by qualified pest plant control contractors. The site supervisor will continue to monitor the site to identify the establishment of new weeds and implement</li> </ul>	Section 3.6

Environmental Management Plan objectives		Section
	<p>control actions accordingly. Pest plant control must be undertaken during the whole development period across the broader study area, and any weeds within the waterway corridor (i.e. Toomuc Creek) must be controlled; and,</p> <ul style="list-style-type: none"> <li>• All declared noxious weeds must be controlled (see Section 3.6.4 for management options);</li> <li>• All vehicles, machinery and equipment need to be checked, cleaned of excess mud in a wash down area on a weekly basis;</li> <li>• All vehicles, machinery and equipment will be washed down using disinfectant spray at the wash-down area on a weekly basis; and,</li> <li>• A log-book of weekly vehicle, machinery and equipment checks needs to be recorded.</li> </ul> <p>The following measures will be implemented during the <b>post-construction phase</b>:</p> <ul style="list-style-type: none"> <li>• Any new landscaping within the site should ideally use indigenous species, and must not include any environmental weeds;</li> <li>• Ongoing pest plant control will be carried out by qualified pest plant control contractors. The site supervisor will continue to monitor the site to identify the establishment of new weeds and implement control actions accordingly. Pest plant control must be undertaken during the whole development period across the broader study area, and any weeds within the waterway corridor (i.e. Toomuc Creek) must be controlled; and,</li> </ul>	
	<p><b>Revegetation Requirements</b></p> <ul style="list-style-type: none"> <li>• Native vegetation will be re-established along Toomuc Creek where significant weed control or removal results in areas of bare ground or erosion, or if assets are decommissioned (i.e. interim drainage pond). The aim of the revegetation and vegetation management is to establish vegetation communities along the creek that are of a similar structure and floristic composition to natural communities within the local region.</li> <li>• The primary outcome of revegetation activities is to provide suitable Growling Grass Frog terrestrial habitat. As such, revegetation must be undertaken in accordance with the Growling Grass Frog Habitat Design Standards (DELWP 2017), and where possible, revegetation should aim to meet these requirements by incorporating locally indigenous species specific to the Swampy Riparian Woodland EVC, which is modelled to occur along Toomuc Creek.</li> <li>• A qualified land management contractor will be able to make appropriate decisions on the proposed provenance, densities and frequency of revegetation activities.</li> <li>• Monitor the effectiveness of revegetation and plantings. If survivorship of plantings is low, then additional plantings may be required. It is the contractor’s responsibility to ensure that the revegetation activities are appropriately undertaken to mitigate erosion risk along Toomuc Creek.</li> </ul>	Section 3.7
	<p><b>Erosion and Sediment Control</b></p> <ul style="list-style-type: none"> <li>• There is moderate risk of sediment runoff entering Toomuc Creek. As such, sediment fencing must be installed along the eastern boundary of the study area, adjacent to Toomuc Creek, to reduce the risk of</li> </ul>	Section 3.8

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Environmental Management Plan objectives		Section
	<p>onsite erosion and sedimentation. This may be implemented at the base of temporary exclusion fencing (See Section 3.4), which is to be implemented along the eastern boundary of the SUZ land (Figure 2a).</p> <ul style="list-style-type: none"> <li>• A pipe outlet is proposed to connect the interim drainage pond and Toomuc Creek (Phase 2). There is a moderate to high risk of sediment runoff entering Toomuc Creek, and as such, sediment fencing must be implemented at the base of temporary exclusion fencing, adjacent to the pipe outlet area of works.</li> <li>• All sediment controls implemented will be checked on a weekly basis and before, during and after any major rain or extreme wind events, to ensure controls are working effectively.</li> </ul>	
	<p><b>Water Quality Monitoring</b></p> <ul style="list-style-type: none"> <li>• During Phase 1 and Phase 2, the implementation of bulk earthworks, and construction of the interim drainage pond and pipe outlet may inadvertently impact water quality along Toomuc Creek. Water quality monitoring should be conducted pre-construction, during construction and post-construction stages to monitor the water quality along Toomuc Creek, and to ensure that construction activities are not negatively impacting the water quality or increasing sedimentation. Water quality monitoring must be completed at two dedicated points along Toomuc Creek, one upstream and one downstream of the study area.</li> </ul> <p><i>This copied document is made available for the purposes of the planning process as set out in the Planning and Environment Act 1987. The information must not be used for any other purpose. By taking a copy of this document you acknowledge and agree to follow up water quality testing will be compared to the benchmark value. Dissemination of this document is strictly prohibited.</i></p> <ul style="list-style-type: none"> <li>• Water quality testing must be undertaken prior to commencement of construction activities. The initial water quality testing will set a benchmark. Follow up water quality testing will be compared to the benchmark value.</li> <li>• Water quality monitoring is to be undertaken prior to commencement of construction, weekly during construction, and monthly for one year following completion of construction. Water quality monitoring is also required as soon as practicable (ideally within 24 hours) after significant rainfall events during construction and within the one-year post-construction monitoring period.</li> <li>• In the event that water quality monitoring identifies high sediment levels in Toomuc Creek, adaptive management measures in response to water quality results must be implemented, including reviewing and updating sediment controls to address any performance issues.</li> </ul>	Section 3.9
	<p><b>Stockpile Management</b></p> <ul style="list-style-type: none"> <li>• Stockpile management will ensure that slopes of stockpile batters are to be no greater than 2:1, stockpiles must be placed more than 30 metres away from waterways and outside the SUZ land., stockpile number and size should be kept to a minimum, must have silt fence downslope and a catch drain upslope.</li> </ul>	Section 3.10
	<p><b>Incidents and Complaints</b></p> <ul style="list-style-type: none"> <li>• An Incident and Complaints register will be established and maintained by the head contractor. Any incidents of non-compliance with the EMP will be recorded and Council will be notified (and relevant environmental regulator if necessary) as soon as possible.</li> </ul>	Section 3.11
	<p><b>Pollution and Hard Rubbish Management</b></p> <p>Due to the inherent nature of an Industrial subdivision, there is the potential for the generation of litter and the subsequent illegal dumping of hard rubbish which impact open space, wildlife, conservation reserves and waterways. A</p>	Section 3.12

Environmental Management Plan objectives		Section
	<p>range of pollution and hard rubbish management measures are outlined in this section, including:</p> <ul style="list-style-type: none"> <li>• Limit vehicle access throughout the study area to reduce dumping of hard rubbish into Toomuc Creek;</li> <li>• Erect signs along the eastern boundary of the study area, adjacent to Toomuc Creek, stating fines will be allocated if hard rubbish is dumped within the development area;</li> <li>• Regularly monitor areas within the study area for litter and hard rubbish and remove as soon as possible;</li> <li>• Fences will be constructed with minimal impact to remnant native vegetation along Toomuc Creek (i.e. no soil/material stock piling);</li> <li>• Litter levels will be kept low within the study area; and,</li> <li>• There will be no hard rubbish dumped throughout the study area.</li> </ul>	
	<p><b>Monitoring, Auditing and Adaptive Management</b></p> <ul style="list-style-type: none"> <li>• There will be ongoing monitoring of the site by a representative of the head contractor who is aware of the prescriptions of the EMP. The head contractor may also sub-contract aspects of monitoring including specific tasks, if there is no available expertise within their organisation.</li> </ul>	Section 3.13

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# 1 INTRODUCTION

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## 1.1 Background

Ecology and Heritage Partners Pty Ltd was engaged by Dalton Consulting Engineers Pty Ltd to prepare an Environmental Management Plan (EMP) for Stage 2 of works at 92 Enterprise Road, Pakenham, Victoria. This EMP provides management actions to be implemented during the pre-construction, construction and post-construction phases of the proposed bulk earthworks in the central portions of the study area, interim drainage pond in the east of the study area and the pipe outlet connecting the drainage pond to Toomuc Creek. The EMP aims to avoid and minimise environmental impacts on the site, as well as manage any potential risks to the health and amenity of surrounding residents. The EMP has been prepared with reference to best practice and industry guidelines in order to satisfy the requirements of an EMP for Cardinia Shire Council.

The EMP has been prepared to inform management actions described within this document in a clear and accessible format to those who will be responsible for implementing and monitoring the performance of the EMP. The individuals or responsible proponents implementing this plan are expected to have a suitable level of experience with respect to dealing with environmental management systems.

## 1.2 Study Area

The study area is located in the east of 92 Enterprise Road, Pakenham, approximately 60 kilometres south-east of Melbourne's CBD (Figure 1). The study area is approximately 21 hectares and is identified as Property 17 in the Cardinia Road Employment Precinct Structure Plan (PSP) (Plate 1). The wider property is bound by agricultural/farmland to the south and west, Princes Freeway to the north, and Toomuc Creek to the east.

The majority of the property consists of open grassland, with three residential buildings and some scattered trees situated on the western portion of the study area. There is one small dam located in the north-east of the study area. There is potential for remnant native vegetation to occur along the eastern boundary of the property which adjoins Toomuc Creek.

The project will be delivered in two phases, including:

- Phase 1 – Bulk earthworks for the entirety of Stage 2 including excavation of the interim drainage pond; and,
- Phase 2 – Delivery and construction of the road infrastructure. Construction of the pond drainage and drainage pond pipe outlet, if approved by the responsible authority (connecting to Toomuc Creek).

Bulk earthworks in Phase 1 are being performed to ensure that the Stage 2 area (i.e. the study area) is above the flood level, for the future implementation of the industrial subdivision. The interim drainage pond is proposed to be constructed in the east of the property for the purpose of a waterway drainage corridor, and excavation for this component will also be completed in Phase 1. Phase 2 will involve the delivery and construction of road infrastructure, and include the construction of the drainage pond, and subsequently, a pipe outlet connecting the interim drainage pond to Toomuc Creek. Construction of the drainage pond and pipe outlet is proposed to occur within the Special Use Zone (SUZ) in the east of the study area and will only occur if the drainage pond is endorsed by the responsible authority. If endorsed, the drainage pond will

eventually form part of a larger asset which stretches south as part of a permanent waterway drainage corridor.

According to the Victorian Department of Energy, Environment and Climate Action (DEECA) NatureKit Map (DEECA 2024), Pre-1750's modelled native vegetation within the study area is representative of Plains Grassland/Plains Grassy Woodland Mosaic Ecological Vegetation Class (EVC 897). The study area is located within the Gippsland Plain bioregion (DEECA 2024a), Melbourne Water Catchment Management Authority and Cardinia Shire Council municipality. As per the Cardinia Road Employment NVPP, no native vegetation was identified within the study area.

### 1.3 Regulatory Context

The EMP has been prepared in accordance with Section 4.5.6 of the Cardinia Road Employment Precinct Structure Plan and the management actions within this EMP have been prepared with reference to the following environmental legislation, policies, and management plans:

- Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999*;
- Victorian *Planning and Environment Act 1987*;
- Victorian *Flora and Fauna Guarantee Act 1988*;
- Victorian *Catchment and Land Protection Act 1994* (CaLP Act);
- Victorian *Wildlife Act 1975*;
- Victorian *Prevention of Cruelty to Animals Act 1986*;
- Environment Protection Authority (EPA);
- State Environmental Planning Policies (SEPPs);
- Cardinia Shire Council Planning Scheme provisions; and,
- Cardinia Road Employment Precinct, Conservation Management Plan for Growling Grass Frog (CREPCMPGGF) *Litoria raniformis*.

This EMP also references a range of construction management guidelines including the EPA's *Civil construction, building and demolition guide* (EPA 2023).

The CREPCMPGGF is currently being reviewed by Cardinia Shire in Consultation with Melbourne Water and DEECA, noting that Growling Grass Frog recommendations are likely to change.

#### 1.3.1 Approval Conditions

An EMP approved by DEECA is required for the subdivision of the land, works and removal of waterbodies. As such, the Planning Permit states that an EMP must be prepared which specifically addresses significant flora and fauna, where buildings or works are within:

- a. 50 metres of any native vegetation to be retained in the Cardinia Road Employment Precinct Native Vegetation Precinct Plan; and/or

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- b. 200 metres from any waterbody (including creeks, drains, dams and wetlands) under the provisions of the Cardinia Road Employment Precinct Conservation Management Plan for Growling Grass Frog.

The Environmental Management Plan must:

- c. Address all requirements specified in section 4.5.6 of the Cardinia Road Employment Precinct Structure Plan (September 2010).
- d. Include a photo of a Growling Grass Frog to aid identification.
- e. State, if any Growling Grass Frogs are encountered during works:
  - I. Works in the immediate area must cease until the frog is relocated to a suitable site within 100 metres in the same conservation area. Single use gloves and or single use lightweight plastic bags must be used when handling frogs.
  - II. Any identified frogs are reported to DEECA.
- f. Be to the satisfaction of the Department of Sustainability and Environment and the Responsible Authority.

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## 2 GROWLING GRASS FROG

### 2.1 Conservation Status

Although formerly widely distributed across south-eastern Australia, including Tasmania (Littlejohn 1963, 1982; Hero *et al.* 1991), the species has declined markedly across most of its former range. The decline has been most evident over the past two decades and in many areas, particularly in south and central Victoria, populations have experienced apparent declines and local extinctions (Mahoney 1999).

### 2.2 Species Description

Growling Grass Frog is one of the largest frog species in Australia. It reaches up to 104 mm in length, with females usually larger (60-104 mm) than males (55-65mm) (Barker *et al.* 1995). The species varies in colour and pattern but in general are olive to bright emerald green, with irregular gold, brown, black or bronze spotting. Their backs are warty and usually have a pale green mid-dorsal stripe. The eardrum is pronounced (DAWE 2020a).



**Plate 4.** Growling Grass Frog (Source: Ecology and Heritage Partners Pty Ltd)

Growling Grass Frog generally breed between November and March, following local flooding and a marked rise in water levels (from rain or other sources) which triggers calling in breeding males. The species feeds mainly on terrestrial invertebrates such as beetles, termites, cockroaches, moths, butterflies and various insect larvae. They sometimes prey on other frogs, including younger frogs of their own species and may also feed on vertebrates such as lizards, snakes and small fish (DAWE 2020a).

### 2.3 Species Distribution

Although formerly widely distributed across south-eastern Australia, including Tasmania (Littlejohn 1963, 1982; Hero *et al.* 1991), Growling Grass Frog has declined markedly across much of its former range. This has been most evident over the past two decades and in many areas, particularly in south and central Victoria where populations have experienced apparent declines and local extinctions.

### 2.4 Habitat Requirements

Growling Grass Frog is largely associated with permanent or semi-permanent still or slow flowing water bodies (i.e. streams, lagoons, farm dams and old quarry sites) (Hero *et al.* 1991; Barker *et al.* 1995; Cogger 1996; Ashworth 1998). Frogs also use temporarily inundated water bodies for breeding purposes, provided they contain water over the breeding season.

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There is a strong correlation between the presence of the species and key habitat attributes at a given water body. For example, the species is typically associated with water bodies supporting extensive cover of emergent, submerged and floating vegetation (Robertson *et al.* 2002). Emergent vegetation provides basking sites for frogs and protection from predators, whilst floating vegetation provides suitable calling stages for adult males, and breeding and oviposition (egg deposition) sites. Terrestrial vegetation (grasses, sedges), rocks and other ground debris around wetland perimeters also provide foraging, dispersal and over-wintering sites for frogs.

Waterbodies supporting the above-mentioned habitat characteristics and those that are located within at least 500 metres of each other, are more likely to support a population of Growling Grass Frog, compared to isolated sites lacking important habitat features. Indeed, studies have revealed that the spatial orientation of waterbodies across the landscape is one of the most important habitat determinants influencing the presence of the species at a given site (Robertson *et al.* 2002; Heard *et al.* 2004a, 2004b).

For example, studies have shown there is a positive correlation between the presence of the species and the distance of freestanding water bodies to another occupied site. This is comparable to the spatial dynamics of many amphibian populations, including the closely related Green and Golden Bell Frog *Litoria aurea* (Hamer *et al.* 2002).

## 2.5 Previous Growling Grass Frog Surveys

In accordance with the requirements outlined in the CREPGGFCMP (Ecology Partners 2010), targeted surveys were recommended to be undertaken on an annual basis by Cardinia Shire Council for a 10-year period across the entirety of the precinct. Despite targeted Growling Grass Frog surveys being undertaken over seven breeding seasons, the species was not detected within the precinct over that time (Ecology and Heritage Partners 2015). As such, it is likely that a resident population of the species does not persist within the study area and broader precinct.

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## 3 ENVIRONMENTAL MANAGEMENT PLAN

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### 3.1 Overview

The operational implementation section of this EMP is provided in the sub-sections below. Management actions, including implementation and monitoring requirements, are provided in the sub-headings below and cover the following themes:

- Environmental Site inductions;
- Growling Grass Frog Management;
- Fencing and No-Go Zones;
- Vegetation Clearance and Native Fauna Management;
- Weed Management Plan;
- Revegetation Requirements;
- Erosion and Sediment Control;
- Water Quality Monitoring;
- Stockpile Management;
- Incidents and Complaints; and,
- Monitoring, Auditing and Adaptive Management.

It will be the responsibility of the site contractor to ensure the implementation of the EMP, monitor compliance, and ensure site inductions include reference to this document and how it relates to individual tasks.

Site contractors will ensure they are familiar with the following documents:

- EPA 2023. Civil construction building and demolition guide. Publication 1834.1. Published document prepared by the Victorian Environmental Protection Authority (EPA);
- EPA 2020. Erosion, sediment and dust: Treatment train. Publication 1893. Published document prepared by the Victorian Environment Protection Authority (EPA); and,
- EPA 2021. Waste disposal categories – characteristics and thresholds. Publication 1828.2. Published document prepared by the Victorian Environmental Protection Authority (EPA).

Referral and regulatory authorities which are concerned with the performance of this EMP include:

- DEECA;
- EPA; and
- Cardinia Shire Council.

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## 3.2 Environmental Site Induction

All construction staff on site (i.e. the area of construction), including all contractors and subcontractors, will be made aware of their responsibilities regarding environmental management. All staff will attend an environmental site induction prior to commencing work on site, which will inform contractors of all the requirements associated with this EMP. The environmental site induction is to be conducted by competent personnel. All main contractors undertaking construction works will be provided a copy of the EMP and this must be kept on site at times as a point of reference to site personnel.

Following the induction, all personnel working on site will be required to sign the induction form and a register will be kept recording all staff that have completed the environmental site induction. All construction personnel will hold appropriate competencies/qualifications for their intended role.

Toolbox meetings will be conducted regularly to maintain and improve awareness of Occupational Health and Safety (OH&S) and environmental issues. This is particularly important if a component of the EMP has been updated or adjusted during the course of the project.

### 3.2.1 *Monitoring and reporting*

A register will be kept for all staff that have completed the environmental site induction which outlines the requirements of this EMP and their responsibilities associated with the project to adhere to relevant environmental legislation and policies.

## 3.3 Growling Grass Frog Management

The requirements outlined in this EMP are to provide guidance to ensure that potential Growling Grass Frog habitat is protected during pre-construction, during construction and post-construction stages. Priority areas for Growling Grass Frog management have been identified within the study area, which includes the construction and management of the interim drainage pond and pipe outlet connecting to Toomuc Creek.

All construction staff are to be made aware of Growling Grass Frog obligations if they are encountered during works. The following sections outline pre-construction, during construction and post-construction management measures. The primary objectives of this EMP are to outline Growling Grass Frog specific measures, including:

- To ensure the construction of the proposed interim drainage pond and pipe outlet has a negligible impact current or future Growling Grass Frog populations;
- To identify areas and specific obligations where Growling Grass Frog habitat is to be retained, enhanced or removed; and,
- To ensure the ongoing survival or habitation of current or future populations of Growling Grass Frog within the study area.

### 3.3.1 *Pre-construction and During Construction*

Information pertaining to Growling Grass frog management will be included in inductions for all staff working on the project (Appendix 1). This should include a basic overview of Growling Grass Frog identification, an

understanding of their conservation status and the risks posed by the development, staff responsibilities and reporting requirements.

A site induction for construction staff prior to the removal of habitat will be required to brief them on an overview of Growling Grass Frog identification, an understanding of their conservation status, the risks posed by development and legislative requirements to be followed regarding this species.

The following measures will be implemented during the pre-construction phase:

- Prior to the commencement of any works, all construction staff are to be made aware of Growling Grass Frog obligations and requirements;
- All staff are to be made aware of Growling Grass Frog and have access to a photo to aid in identification (Appendix 1);
- If any Growling Grass Frog are identified within the construction area, works in the immediate area must cease until the frog is relocated to a suitable site within in the same conservation area (i.e. moved to a nearby dam or river in the vicinity). Single use gloves and or single use lightweight plastic bags must be used when handling frogs; and,
- Any identified frogs are to be reported to DEECA including the site which they were relocated to.

Clear signage describing the appearance of the species (including photographs) and protocol to be followed if Growling Grass Frog are found on site will be displayed in clearly visible locations around the site.

Implicit works will be occurring within or proximity of Toomuc Creek, the contractor is to ensure:

- Unobstructed passage is maintained at all times for water to pass through the site; and,
- Sediment controls are put in place to avoid any sediments generated on site from being distributed downstream.

In discussions with DEECA, it was advised that Salvage and Translocation for the Growling Grass Frog is no longer required during the pre-construction and construction stages of the development because Growling Grass Frogs are unlikely to be present within the study site at the time of implementation (James Walsh Pers. Comms. 2022).

The CREPCMPGGF outlines the design and construction requirements and mitigation measures for Growling Grass Frog related components, including the decommissioning of existing waterbodies, frog pond design and construction, stormwater wetland design and construction, drainage corridor design and construction, and road watercourse crossing design requirements. The proposed works as part of Stage 2 are not being conducted for these purposes, and as such, there are no limiting design or construction requirements that need to be adhered to. Should works be conducted for these purposes, the most up to date DEECA guidelines should be adhered to, including the *Growling Grass Frog Habitat Design Standards* (DELWP 2017a) and the *Growling Grass Frog Crossing Design Standards* (DELWP 2017b).

### 3.3.2 Pond and Drainage Corridor Design and Construction

During Phase 1, bulk earthworks will occur for the interim drainage pond located in the SUZ corridor in the east of the site. The drainage pond will be interim until detailed design, at which point it will be formalized, lined and planted with appropriate species to Melbourne Water requirements. The construction and

implementation of this asset is proposed to occur as part of Phase 2. If the interim drainage pond forms part of the final approved Cardinia Industrial Drainage Scheme, it will be a permanent fixture which will form part of a drainage corridor asset, adjacent to Toomuc Creek. The drainage pond is being constructed with the intention of managing stormwater throughout the site. The drainage pond will include a drainage outlet connecting the drainage pond to Toomuc Creek, which will also be delivered in Phase 2. The interim drainage pond is proposed to be constructed with the intention of serving as flood conveyance and stormwater treatment as per the proposed Stormwater Management Strategy (Afflux Consulting 2023).

The interim drainage pond should incorporate the principles of Water Sensitive Urban Design, aiming to maximise efficient water use, stormwater quality and viability of vegetation. Where possible, the drainage pond should be designed to maximise use of water run-off within open space areas, rather than divert it to drains.

The interim drainage pond is not intended for the purpose of creating additional Growling Grass Frog habitat, nor is it outlined in the Cardinia Road Employment PSP for this purpose. A works specific Construction Environmental Management Plan (CEMP) must be prepared and implemented for works within the Toomuc Creek corridor. The works specific CEMP must be endorsed by DEECA, and include environmental controls and measures consistent with this EMP.

### 3.3.3 *Decommissioning of Existing Waterbodies*

No waterbodies were identified within the study area which were proposed to be removed as per the CREPGGFCMP. One dam occurs in the north-east of the study area, which was not previously identified as *to be retained* or *to be removed* in the CREPGGFCMP. Additionally, an interim drainage pond is proposed to be constructed in the east of the study area (Figure 2); however, this asset is yet to be approved by the responsible authority. Whilst it is being constructed with the intention of providing flood conveyance and stormwater treatment, if this asset is not approved, consideration must be given to the decommissioning of this asset.

Both the existing dam and interim drainage pond may need to be decommissioned, and as such, it is recommended that these assets first be drained and left without water for at least one month prior to any further disturbance. This will allow for any remaining Growling Grass Frog or other frog species to disperse and recolonise adjacent habitat. Dams should be drained using filter on pump intakes to reduce frog mortality. This must be implemented for all dams or ponds within the study area which are proposed to be removed or decommissioned. This acts as a precautionary approach for other frog species that are likely to occupy the waterbodies and allows them to freely disperse once the waterbodies have been drained.

### 3.3.4 *Habitat Maintenance Requirements*

The ongoing maintenance and management of drainage ponds, wetlands and drainage lines is not proposed to be managed as part of this planning application. The interim drainage pond is not intended for the purpose of creating additional Growling Grass Frog habitat, and as such, there are no limiting habitat maintenance requirements. However, the drainage corridor must be managed to avoid degradation of existing Growling Grass Frog habitat along Toomuc Creek. As the drainage pond is proposed to be constructed in the SUZ corridor in the east of the study area in proximity to Toomuc Creek, there is the inherent risk that construction activities may inadvertently impact existing habitat through erosion, sedimentation, spreading plant diseases and pest

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plants, and reduction in water quality. To limit impacts to existing ecological values and Growling Grass Frog habitat, several mechanisms are proposed to be implemented as part of this plan, including:

- Fencing and No-Go Zones (Section 3.4);
- Weed Management (Section 3.6);
- Revegetation (Section 3.7);
- Erosion and Sedimentation (Section 3.8);
- Water Quality Monitoring (Section 3.9); and,
- Stockpile Management (Section 3.10).

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These sections outline the proposed measures to mitigate impacts to existing ecological values within the study area and along Toomuc Creek during pre-construction, during construction and post-construction phases.

A detailed landscape and revegetation plan, including maintenance requirements, is to be submitted to DEECA for approval once Melbourne Water approves the Storm Water Management Strategy for the site.

#### **Rehabilitation of Interim Drainage Pond Habitat**

As the interim drainage pond is yet to be confirmed as part of the ultimate Drainage Scheme Strategy, this asset may need to be decommissioned. If the interim drainage pond is decommissioned, then the habitat in the location of this asset must be re-instated. A detailed landscape and revegetation plan, including maintenance requirements, is to be submitted to DEECA for approval. Additionally, revegetation requirements are also outlined in Section 3.7, which is relevant for the reinstatement of habitat values in proximity of Toomuc Creek.

### **3.4 Fencing and No-Go Zones**

Without active management and appropriate fencing, unrestricted access into areas where Growling Grass Frog habitat (i.e. Toomuc Creek) is to be retained may result in loss of important habitat features, soil disturbance and compaction, and weed facilitation.

A suitably qualified surveyor will set out the boundary of the designated native vegetation in accordance with the detailed plans prior to construction. Temporary protective fencing will be in the form of 1.8-metre high, chain-link material, or other materials which are easy to supply, install, maintain and uninstall (Plate 1; Plate 3) Temporary protective fencing must be erected and maintained at a maximum distance of five (5) metres from the work zone. This is to ensure impacts on water courses which are to be retained (i.e. Toomuc Creek) are appropriately mitigated (Figure 2), when construction activities are within 100 metres of their edge, to protect these areas from inadvertent damage. Exclusion fencing must be erected prior to any works commencing. Fencing requirements for these areas are relevant for the construction of the interim drainage pond (bulk earthworks; Phase 1) and the pipe outlet which will connect to Toomuc Creek (Phase 2), or where works are occurring within 100 metres of Toomuc Creek (Figure 2).

Works will be occurring within proximity of Toomuc Creek and the SUZ corridor and as such, the following silt fencing (Plate 2; Plate 4) measures are to be implemented:

- Silt Fencing must be erected along the eastern boundary of the Special Use Zone (SUZ) land, other than when approved works are occurring within the waterway (i.e. the drainage outlet), in which case fencing must be installed along the boundary of the works area for this asset;
- Post construction silt fencing is to be maintained at regular intervals along Toomuc Creek until vegetation has re-established or landscaping has been undertaken in accordance with an approved Landscape Plan.

Toomuc Creek is identified as a No-go Zone (Figure 2). As a component of Phase 1, temporary exclusion fencing and silt fencing must be erected along the eastern boundary of the interim drainage pond and the SUZ until construction of this asset is completed.

As a component of Phase 2, the pipe outlet connecting the drainage pond to Toomuc Creek is proposed to be constructed. As this will be occurring within the No-Go Zone corridor, temporary exclusion fencing and silt fencing must be erected along the boundary of the works area for this asset to ensure that active development does not negatively impact the creekline.

Temporary exclusion fencing will be maintained during all stages of construction. The exclusion fencing will include the following minimum requirements relating to fencing and No-Go Zones:

- Temporary exclusion fencing must be installed to the satisfaction of the Responsible Authority (Council). A suitably qualified Zoologist can inspect the fencing during and after installation;
- The temporary exclusion fence must remain in place until all works are completed to the satisfaction of the responsible authority (Council);
- The temporary exclusion fence will be highly visible at height of 1-metres mounted on vertical steel pipes at three metre intervals. The base of the fencing will contain silt fencing to restrict the movement of frogs and to stop any sediment runoff;
- Exclusion fencing along the eastern boundary of the interim drainage pond should state 'Conservation Area-NO GO ZONE'. This is to be consistent with council requirements;
- Be in place for the entire construction period; and,
- No works are to be undertaken within No-Go areas, except for construction of the drainage outlet connecting to Toomuc Creek as well as to facilitate the construction of the drainage pond within the site. Temporary exclusion fencing and silt fencing must be erected along the boundary of the works area for this asset (i.e. pipe outlet). Fences should not be moved during the entire construction period (unless absolutely necessary). Fences will not be removed until all works have been completed to the satisfaction of Council and Melbourne Water.

No patches of native vegetation were identified within the study area, and as such, fencing is only required to satisfy the protection of Growling Grass Frog drainage lines (i.e. Toomuc Creek).

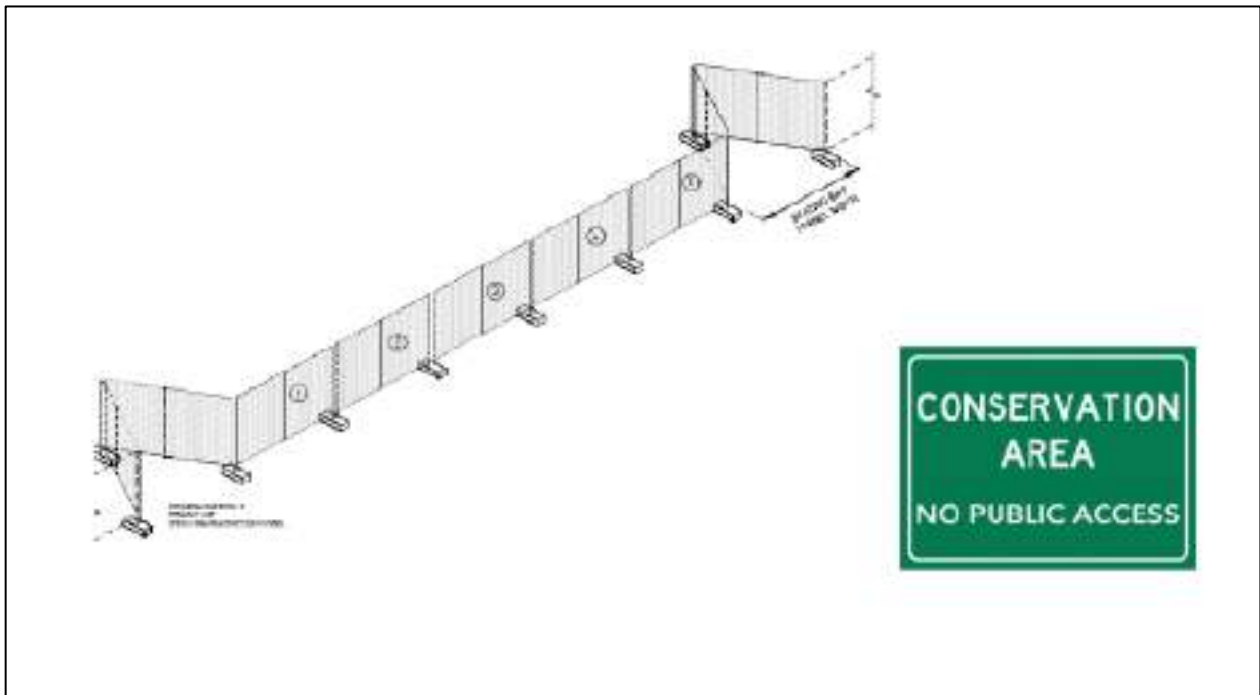
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**Plate 1.** Example of suitable temporary protective fencing.

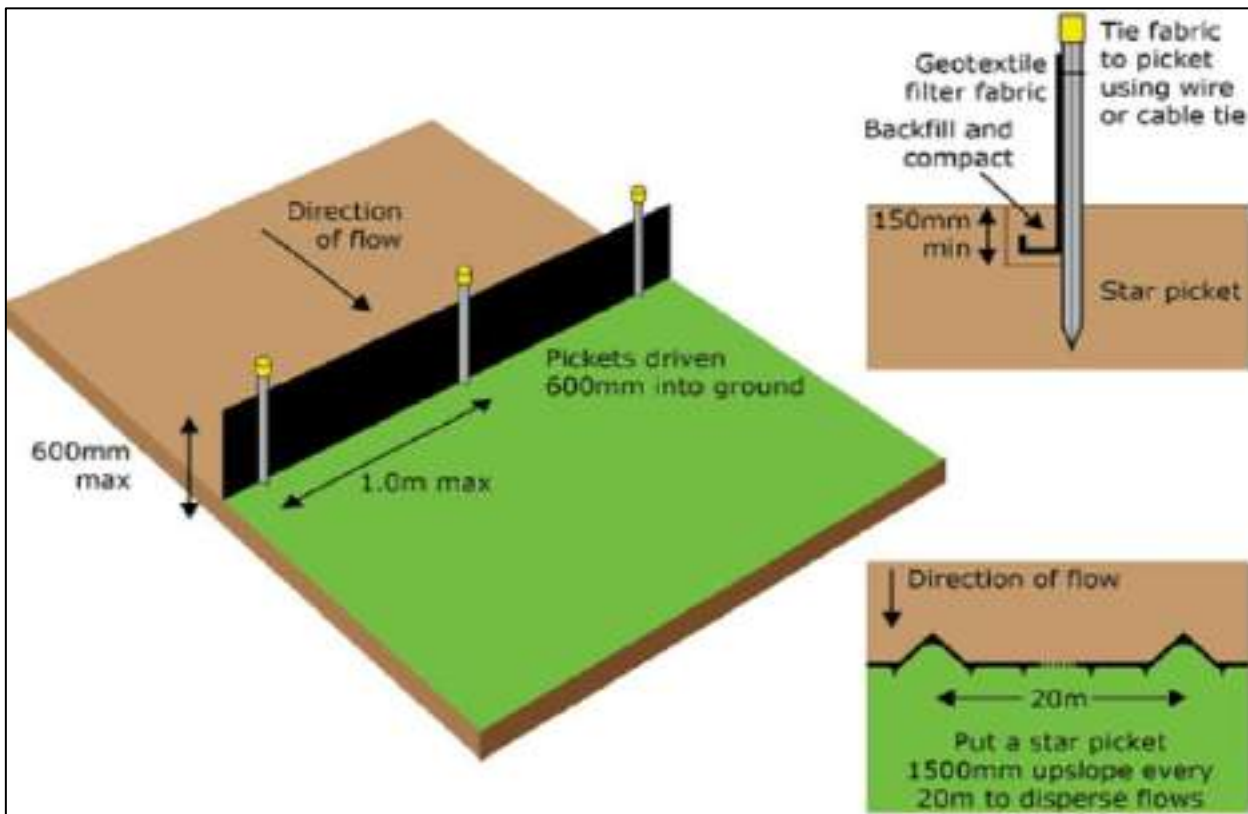


**Plate 2.** Example of suitable frog silt fencing.



**Plate 3.** Proposed Temporary Exclusion fencing as per the CEMP.

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**Plate 4.** Proposed silt fencing as per the CEMP.

#### 3.4.1 Monitoring and reporting

Temporary fences and signs are to be checked on a weekly basis to ensure they remain in place and are effective. Silt fencing is to be checked on a weekly basis, and immediately after significant rainfall events basis to ensure they remain in place and are effective. Damage to temporary fences will be repaired immediately upon discovery (i.e. preferably within 24-48 hours).

### 3.5 Vegetation Clearance and Native Fauna Salvage and Management

Appropriate mitigation measures will be implemented during vegetation clearance to reduce the risk of injury and mortality to any local native fauna that may be present. Salvage and translocation of fauna species must be undertaken during vegetation clearance to the satisfaction of the Secretary of the DEECA (Condition 52). While no native vegetation *to be protected or removed* was identified within the study area, as per the Cardinia Road Employment Precinct NVPP, vegetation clearance may be required along Toomuc Creek to service the implementation of the drainage outlet. These measures will be undertaken during the pre-construction.

#### 3.5.1 Pre-construction

The following measures will be implemented during the pre-construction phase:

- Engagement of vegetation removal contractors with demonstrated experience working in ecologically sensitive areas and on projects that have had a fauna salvage requirement;

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- A suitably qualified wildlife handler will carry out pre-construction habitat assessments to identify key habitat areas;
- A suitably qualified wildlife handler will be present for habitat removal, to undertake pre-clearance searches, guide contractors in best-practice and to minimise the risk of injury or mortality of fauna, and if necessary, capture and relocate fauna out of harm's way into suitable adjacent habitats;
- For the removal of trees and large shrubs, the aforementioned will specifically include the following:
  - A suitably qualified wildlife handler carrying out pre-clearance searches for nests or signs that fauna may be harbouring in hollows, spouts or fissures;
  - A suitably qualified wildlife handler communicating with the contractors about how to best remove trees and large shrubs to avoid injury to native fauna. For large trees, the most effective way to achieve this is to use an excavator to gently dig into the ground at the base of the tree and then use the excavator claw or bucket to gently uproot and push the tree over. Where feasible, the excavator claw can also be used to gently lower the tree to the ground. By using this method, the tree may be levered out of the ground and gently lowered, as opposed to felling the tree with a chainsaw which usually results in the tree crashing heavily to the ground, damaging hollows and other refugia as well as fauna within them;
  - If fauna cannot be captured (e.g. possums shelter deep in a hollow and cannot be removed without injury to the possum and/or the wildlife handler), if possible, the portion of the tree within which the animal is harbouring will be relocated out of harm's way into suitable vegetation nearby that is identified for retention. This allows the animal to emerge unassisted in the evening and relocate itself. If this is not possible, the entire tree will be left *in-situ* for a minimum of one night to allow the animal to emerge unassisted in the evening and relocate itself. Prior to any removal of the felled habitat tree (i.e. the next morning) the wildlife handler will inspect and ensure the animal is no longer present;
  - Once the tree/shrub is on the ground, the wildlife handler will inspect it for fauna and if possible, capture and release the fauna into suitable habitat offsite; and,
  - At any time during the removal of habitat, the wildlife handler will request work to pause if:
    - An animal is at risk of direct injury or mortality;
    - An animal requires capture and relocation; or,
    - An animal is injured and requires medical attention.
- Instances where trees are to be removed (i.e. outside the protected areas), animals found may need to be taken to a wildlife shelter if relocation is not possible.

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### 3.6 Weed Management Plan

Earthworks and construction associated with the development will involve the removal and transportation of plant material and soil, including the use of various machineries, vehicles, and equipment. This means that there is an innate risk of spreading plant diseases and pest plants to and from the site (particular risk to



remnant vegetation) and areas adjacent to the site. Several measures are required to reduce the risk of spreading plant disease and pest plants, and these will include the following.

During the construction and post-construction phases, on-going weed management within the broader study area and along Toomuc Creek must be undertaken to ensure that construction activities do not exacerbate the spread of weeds.

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### 3.6.1 *Pre-construction*

The following measures will be implemented during the pre-construction phase:

- The plant disease and pest plant management protocols will be covered during the environmental site inductions;
- The site supervisor should have good pest plant identification skills, and should have knowledge of the most appropriate methods of control for any exotic species that are present; and,
- If required, pest plant control contractors with demonstrated experience working in ecologically sensitive environments will be engaged to undertake pest plant control.

Actions to limit the spread of diseases and pest plant species will follow best-practice protocols developed elsewhere, specifically the Tasmanian 'Keeping it Clean' manual (NRM South 2010).

### 3.6.2 *During -Construction*

The following measures will be implemented during construction:

- Ongoing pest plant control will be carried out by qualified pest plant control contractors. The site supervisor will continue to monitor the site to identify the establishment of new weeds and implement control actions accordingly. Pest plant control must be undertaken during the whole development period across the broader study area, and any weeds within the waterway corridor (i.e. Toomuc Creek) must be controlled; and,
- All declared noxious weeds must be controlled (see Section 3.6.4 for management options);
- All vehicles, machinery and equipment need to be checked, cleaned of excess mud in a wash down area on a weekly basis;
- All vehicles, machinery and equipment will be washed down using disinfectant spray at the wash-down area on a weekly basis; and,
- A log-book of weekly vehicle, machinery and equipment checks needs to be recorded.

### 3.6.3 *Post-construction*

The following measures will be implemented during the post-construction phase:

- Any new landscaping within the site should ideally use indigenous species, and must not include any environmental weeds;
- Ongoing pest plant control will be carried out by qualified pest plant control contractors. The site supervisor will continue to monitor the site to identify the establishment of new weeds and implement

control actions accordingly. Pest plant control must be undertaken during the whole development period across the broader study area, and any weeds within the waterway corridor (i.e. Toomuc Creek) must be controlled; and,

- All declared noxious weeds must be controlled (see Section 3.6.4 for management options).

### 3.6.4 Weed Management Controls

The following section outlines the broad objectives for weed control within the study area. Eradication of the highest threat weeds are to be the focus of the weed management, with best practice control measures to be advised by the contractor (Figure 2). General principles and targets for weed control will include:

- Weed control should begin as soon as possible;
- Weed control should be conducted relatively intensively over the initial construction and post construction periods. The final number of visits will need to be negotiated with the responsible contractors;
- Eliminate all noxious or CaLP Act listed environmental weeds (cover reduced to <1% if possible) throughout the study area;
- All remaining herbaceous and graminoid weed species are to be controlled;
- Weed control should be conducted in a manner that minimises soil disturbance;
- Where herbicide application is employed, non-residual and frog safe herbicides are to be used;
- Pest plants that reproduce sexually (by seed) are best controlled before seed set, e.g. Artichoke Thistle, Paterson's Curse, Horehound and Variegated Thistle;
- Weed control works should be monitored regularly to assess their effectiveness, perform follow up works and evaluate the feasibility of management objectives; and,
- Revegetation should be undertaken if weed control/removal results in areas of bare ground/erosion risks (Section 3.7).

In consultation with the ecologist responsible for monitoring and reporting, the nominated contractor undertaking weed control works will make appropriate decisions on which technique to use based on site specific considerations. It is likely that several control methods will be required, including spraying, physical removal, hand pulling, and cutting and painting. General Weed Control information is outlined in Appendix 2.

Weed management measures have been developed to comply with regulations outlined in the CaLP Act for noxious weeds and the FFG Act for environmental weeds. Proper implementation of the weed control measures outlined here will ensure compliance with responsibilities under the CaLP Act.

### 3.6.5 Management Approaches

Depending on the type of weed being controlled on the site, the main approach to management will either be eradication or containment (CRC 2004). Eradication of certain weeds may be unrealistic due to the nature of the weed itself (i.e. highly dispersive) or the level of infestation (dominant throughout the landscape).

Eradication may be achieved where:

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- The weed occupies only a small area and will not reinvade from adjoining areas;
- The infested area is known and at low density;
- The control method used kills all plants before maturity; and
- The weed seed does not remain dormant on the soil, or the infestation is detected before seeds are released (Weeds CRC 2004).

Containment of weed species is likely to be a more realistic management approach when dealing with widespread, well-established species. Containment is aimed at reducing new weed infestations and the need for future control by limiting the extent and intensity of infestations. The key to containment is to focus on treating isolated infestations, rather than core infestations, with the objective of preventing weed populations extending beyond the perimeter of the core infestation (CRC 2004). Weed mitigation measures are outlined in Table 2.

**Table 2.** Summary of weed mitigation measures

Mitigation Measure	Action	Location	Responsibility
<b>Control of significant weed infestations</b>	Priority weed species will be controlled by a licensed contractor	Throughout the study area	Site/Project Manager
<b>Vehicle and equipment hygiene</b>	A vehicle wash down area should be established on site for vehicles entering the site for the first time and for periodic cleaning	Designated vehicle wash down area	Site/Project Manager
<b>Weed management/ Vehicle and equipment hygiene</b>	Vehicles should enter and leave the site via defined entry points and use internal access roads to minimise potential weed spread	Areas impacted by any landscaping activities	Site/Project Manager
<b>Topsoil management</b>	Disturbed areas should be revegetated as soon as practicable to minimise the area of exposed soil as potential for weed establishment and spread. Direct seeding is recommended within these areas.	All areas directly impacted by landscaping activities	Site/Project Manager

### 3.6.6 Monitoring and reporting

Vehicles and machinery are to be checked on a weekly basis to ensure they remain clean of excess soil and organic matter and to ensure that vehicles and machinery are being disinfected on a weekly basis. A log of the weekly checks will be kept by the site manager.

Monitor the effectiveness of weed management activities. The intensity of weed management activities may need to vary to ensure that weeds are adequately managed. It will be the site managers responsibility engage a relevantly qualified land management contractor to ensure that weeds are appropriately managed. A log of weed management will be kept by the site manager and an annual report will be provided to the responsible authority.

The site manager will be responsible for the implementation of all weed monitoring and reporting.

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### 3.7 Revegetation Requirements

Native vegetation will be re-established along Toomuc Creek where significant weed control or removal results in areas of bare ground or erosion, or if assets are decommissioned (i.e. interim drainage pond). The aim of the revegetation and vegetation management is to establish vegetation communities along the creek that are of a similar structure and floristic composition to natural communities within the local region. A primary outcome of revegetation in the creek corridor is to provide suitable Growling Grass Frog terrestrial habitat. Growling Grass Frog prefer relatively open terrestrial habitat to facilitate foraging and movement (DELWP 2017). Revegetation should aim to provide an open, short grassy structure with some patches of native tussocky vegetation. Revegetation should be undertaken with locally indigenous species specific to the Swampy Riparian Woodland EVC, which is modelled to occur along Toomuc Creek; however, as the primary aim of revegetation is to provide habitat for Growling Grass Frog, revegetation activities must adhere to the following standards (DELWP 2017):

- Approximately 50 per cent of the area within 10-metres of the wetland's normal water level must be designed to be maintained as low, grassy vegetation up to 10-centimetres in height;
- Within 10-metres of the normal water level, tussock forming grasses and sedge should allow for no greater than 20 percent cover when mature;
- Shrubs must not be planted within 10-metres of the normal water level;
- It's recommended that the area between 10-metres and up to 100-metres from the creekline should be designated to be maintained primarily as short, mown grass with an open structure (i.e. 20 percent cover);
- Tree cover within 100-metres of Toomuc Creek should not exceed 10 percent;
- Shrub cover within 100-metres of Toomuc Creek should not exceed 10 percent;
- A patchy arrangement of denser plantings of tussock-forming species is encouraged to maintain some potential terrestrial shelter sites. (i.e. Tussock Grass *Poa* spp., Wallaby Grass *Rytidosperma* spp., Spear Grass *Austrostipa* spp., Kangaroo Grass *Themeda triandra* [Appendix 3]);
- Mulch must not be used within 50-metres of the Toomuc Creek; and,
- Invasive plant species must be used anywhere within the terrestrial habitat zone.

A qualified land management contractor will be able to make appropriate decisions on the proposed provenance, densities and frequency of revegetation activities.

A list of flora species' characteristic of the Swampy Riparian Woodland EVC is provided in Appendix 3; however, revegetation must be undertaken in accordance with the Growling Grass Frog habitat design standards (DELWP 2017).

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#### 3.7.1 Monitoring and reporting

Monitor the effectiveness of revegetation and plantings. If survivorship of plantings is low, then additional plantings may be required. It is the contractor's responsibility to ensure that the revegetation activities are appropriately undertaken to mitigate erosion risk along Toomuc Creek.

A log of all revegetation activities will be kept by the site manager, and an annual report will be provided to the responsible authority.

### 3.8 Erosion and Sedimentation

Construction activities (e.g. soil excavation, vehicle storage and movement) may increase the potential for erosion and sedimentation and can pose a significant risk to water quality and site ecological values. Bulk earthworks (i.e. Phase 1) will be occurring to ensure that the new lots for Stage 2 are above the flood level, as required by Cardinia Shire Council and Melbourne Water. Additionally, the construction of the interim drainage pond has the potential to increase erosion and sedimentation, posing a risk to Toomuc Creek. There is moderate risk of sediment runoff entering Toomuc Creek. As such, sediment fencing must be installed along the eastern boundary of the study area, adjacent to Toomuc Creek, to reduce the risk of onsite erosion and sedimentation. This may be implemented at the base of temporary exclusion fencing (See Section 3.4), which is to be implemented along the eastern boundary of the SUZ land (Figure 2a).

As a component of this development, a pipe outlet is proposed to connect the interim drainage pond and Toomuc Creek (Phase 2). There is a moderate to high risk of sediment runoff entering Toomuc Creek, and as such, sediment fencing must be implemented at the base of temporary exclusion fencing, adjacent to the pipe outlet area of works (Figure 2b).

Measures employed for dust suppression are also effective as erosion and sedimentation controls. the following measures may be appropriate to reduce erosion and sedimentation (EPA 2020a):

- Install sediment retention structures to divert flow away from exposed soils and prevent contaminated stormwater from accessing waterways. Such structures will include either or a combination of silt fences, sandbags, coir logs, rock or gravel, catch drains, earth banks, slopes or batters and rock bunds. A wide range of sediment retention structures are described in detail in EPA (2020a);
- Ongoing sediment and erosion control - permanent stormwater protection through 'water-sensitive urban design' principles will be incorporated within the detailed design phase of the development;
- Construction stockpiles, machinery and equipment are located at least **30 metres** from waterways and outside the SUZ corridor, to limit the potential for direct impacts associated with vehicle storage, sediment and erosion;
- The use of gravel sausages at pit entries and silt fences upstream, of drainage outlets;
- Sediment runoff controls and drainage around all construction must be established prior to commencement of works;
- All sediment control measures must be maintained and intact for the duration of the works and inspected regularly, including prior to and after rain events to ensure they are working properly;
- Where water is of suitable quality it should be reused on site by releasing onto vegetated areas or using for dust suppression. Water must be treated if necessary, before discharging.

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### 3.8.1 *Monitoring and reporting*

All sediment controls implemented will be checked on a weekly basis and before, during and after any major rain or extreme wind events, to ensure controls are working effectively. Any issues identified with sediment controls will be rectified within 24 hours. The site contractor will be responsible for implementation of erosion and sediment controls including monitoring and reporting of their effectiveness.

## 3.9 Water Quality Monitoring

During Phase 1 and Phase 2, the implementation of bulk earthworks, and construction of the interim drainage pond and pipe outlet may inadvertently impact water quality along Toomuc Creek. Water quality monitoring should be conducted pre-construction, during construction and post-construction stages to monitor the water quality along Toomuc Creek, and to ensure that construction activities are not negatively impacting the water quality or increasing sedimentation. Water quality monitoring must be completed at two dedicated points along Toomuc Creek, one upstream and one downstream of the study area.

Once the pipe outlet is constructed, the drainage pond will discharge water into Toomuc Creek. The required standard is that any stormwater will be managed to ensure sediment laden water does not flow into conservation areas. Discharged water must have turbidity as less than or equal to the receiving waters or otherwise  $\leq 30$ NTU (Nephelometric Turbidity Unit), whichever measure lower.

Water quality testing must be undertaken prior to commencement of construction activities. The initial water quality testing will set a benchmark. Follow-up water quality testing will be compared to the benchmark value. The goal of water quality monitoring is to ensure there is no reduction in water quality following completion of construction. On-going water quality testing until completion of construction, and for one year following completion of construction.

### 3.9.1 *Monitoring and reporting*

Water quality monitoring is to be undertaken prior to commencement of construction, weekly during construction, and monthly for one year following completion of construction. Water quality monitoring is also required as soon as practicable (ideally within 24 hours) after significant rainfall events during construction and within the one-year post-construction monitoring period. The site contractor will be responsible for implementation of water quality monitoring including monitoring and reporting of their effectiveness. The site manager will maintain a log of all water quality monitoring results. An annual water quality report must be submitted to the responsible authority.

In the event that water quality monitoring identifies high sediment levels in Toomuc Creek, adaptive management measures in response to water quality results must be implemented, including reviewing and updating sediment controls to address any performance issues (Section 3.13.2).

## 3.10 Stockpile Management

Stockpiles are to be placed at a nominated position prior to the commencement of works:

- Slopes of stockpile batters are to be no greater than 2:1;

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- Stockpiles must be placed more than 30 metres away from waterways and outside the SUZ corridor;
- Stockpile number and size should be kept to a minimum;
- Stockpiles must have silt fence downslope and a catch drain upslope;
- Stockpiles left in place for more than 28 days must be stabilised with a sterile rye grass.

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### 3.11 Incidents and Complaints

An Incident and Complaints register will be established and maintained by the head contractor. Any incidents of non-compliance with the EMP will be recorded and Council will be notified (and relevant environmental regulator if necessary) as soon as possible.

Any complaints received will be recorded in the same register. The head contractor will notify Council of any complaints received as soon as possible, and Council will be responsible to provide a response. The register will include a record of when the complaint was received, the nature of the complaint, when it was responded to, by whom and how.

### 3.12 Pollution and Hard Rubbish Management

Due to the inherent nature of construction activities, there is the potential for the generation of litter and the subsequent illegal dumping of hard rubbish which impact open space, wildlife, conservation reserves and waterways. The following management actions will be adopted within these areas:

- Limit vehicle access throughout the study area to reduce dumping of hard rubbish into Toomuc Creek;
- Erect signs along the eastern boundary of the study area, adjacent to Toomuc Creek, stating fines will be allocated if hard rubbish is dumped within the development area;
- Regularly monitor areas within the study area for litter and hard rubbish and remove as soon as possible;
- Fences will be constructed with minimal impact to remnant native vegetation along Toomuc Creek (i.e. no soil/material stock piling);
- Litter levels will be kept low within the study area; and,
- There will be no hard rubbish dumped throughout the study area.

### 3.13 Monitoring, auditing and adaptive management

#### 3.13.1 *Monitoring responsibility*

Monitoring of all activities will be suitably recorded to assess compliance with the EMP and that the magnitude of impacts are within the approved limits.

There will be ongoing monitoring of the site by a representative of the head contractor who is aware of the prescriptions of the EMP. The head contractor may also sub-contract aspects of monitoring including specific tasks, if there is no available expertise within their organisation.

### 3.13.2 Adaptive Management

Mitigation and avoidance measures have been developed as part of this EMP that are intended to reduce the risk of the project impacting the environment. In the unlikely event that the monitoring shows that the impact has exceeded the performance indicator, the proposed management actions would need to be revised. Any changes to environmental management will be proposed as part of the annual EMP report and will be developed in conjunction with the head contractor, and in consultation with Council as required. Any updates to the EMP will be sent to DEECA for approval. Changes to environmental management will only be proposed if the performance indicators outlined in the EMP are exceeded within the twelve-month reporting.

Any approved changes to environmental management will be incorporated into a revised EMP.

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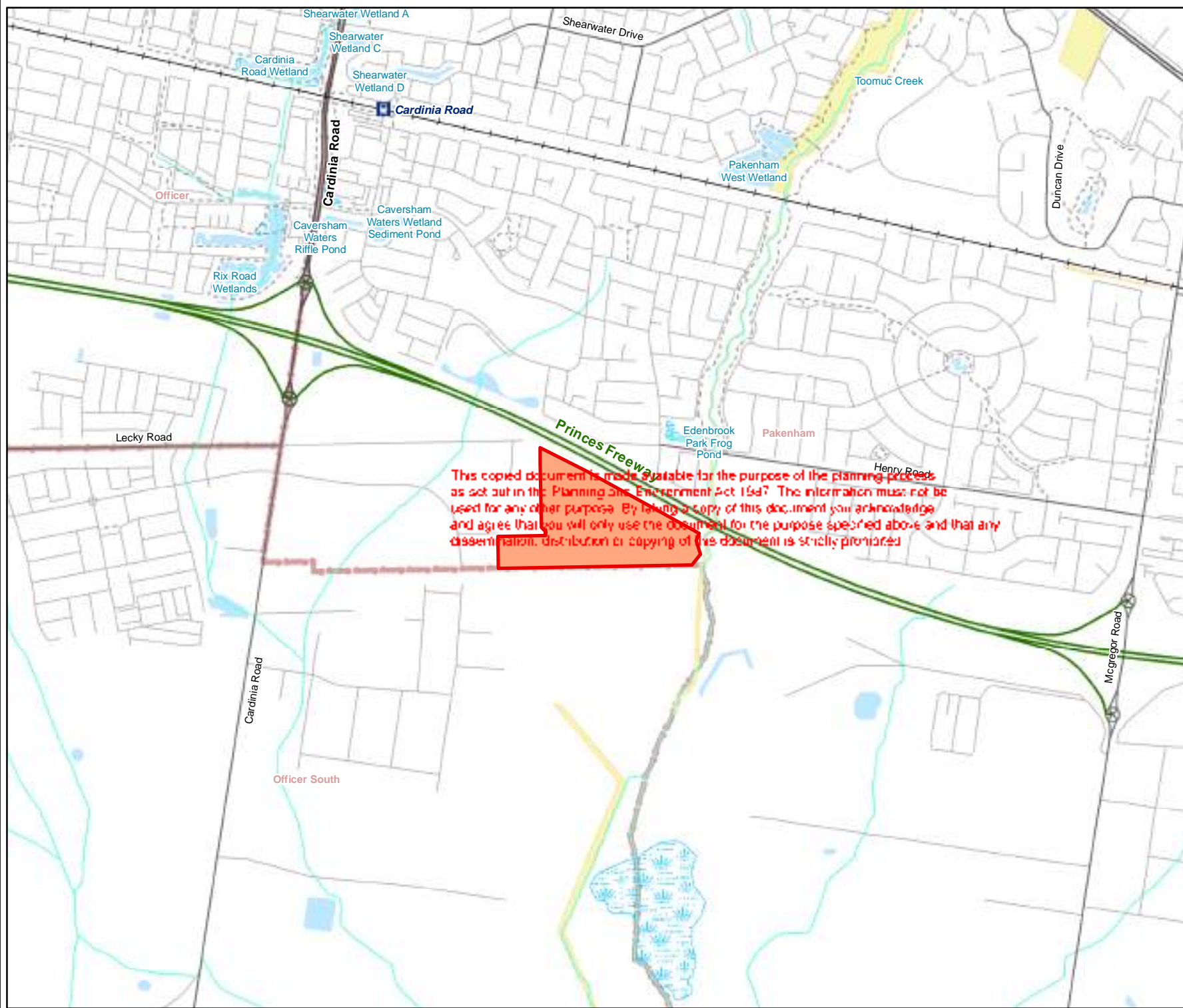
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## FIGURES

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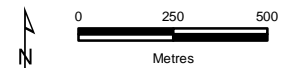


### Legend

- Study Area
- Railway
- Freeway
- Major Road
- Collector Road
- Minor Road
- Proposed Road
- Minor Watercourse
- Permanent Waterbody
- Wetland/Swamp
- Crown Land
- Localities



**Figure 1**  
**Location of the study area**  
*Environmental Management Plan - Stage 2: 92 Enterprise Road, Pakenham*

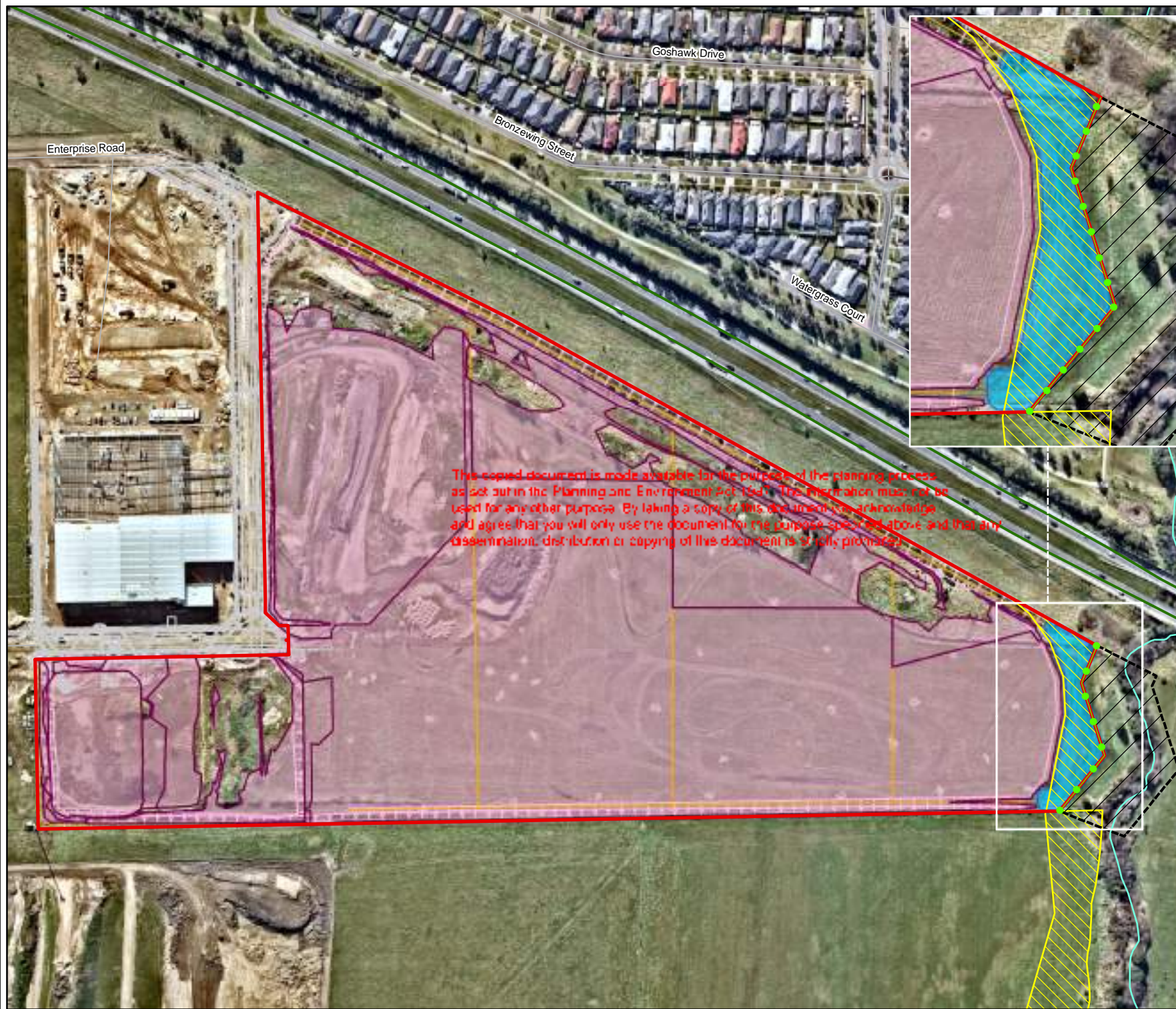


Map Scale: 1:20,000 @ A4  
 Coordinate System: GDA2020 MGA Zone 55



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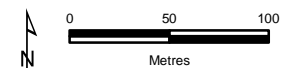




- Legend**
- Study Area
  - No-Go Zone
  - Bulk earthworks area
  - Interim drainage pond earthworks
  - Batters
  - Road
  - Earth drain
  - Temporary exclusion fencing and silt fencing
- Planning Zone**
- Special Use Zone - Schedule 4



**Figure 2a**  
**Phase 1 bulk earthworks site plan**  
*Environmental Management Plan - Stage 2: 92 Enterprise Road, Pakenham*



Map Scale: 1:3,800 @ A4  
 Coordinate System: GDA2020 MGA Zone 55



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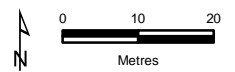




- Legend**
- Study Area
  - No-Go Zone
  - Drainage pond implementation
  - Pipe outlet
  - Temporary exclusion fencing and silt fencing
- Planning Zone**
- Special Use Zone - Schedule 4



**Figure 2b**  
**Phase 2 subdivision**  
**drainage pond outlet plan**  
*Environmental Management Plan - Stage 2: 92 Enterprise Road, Pakenham*



Map Scale: 1:1,000 @ A4  
 Coordinate System: GDA2020 MGA Zone 55



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## APPENDIX 1 – WILDLIFE MANAGEMENT INFORMATION SHEET: GROWLING GRASS FROG

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## Wildlife Management Information: Growling Grass Frog

In accordance with the requirements of the Cardinia Road Employment Precinct Conservation Management Plan for Growling Grass Frog, if any Growling Grass Frog are identified within the construction area, works in the immediate area must cease until the frog is relocated to a suitable site within in the same conservation area (i.e. moved to a nearby dam or river in the vicinity).

The following information relates to Growling Grass Frog Ecology to aid in identification of Growling Grass Frog, what to do if a Growling Grass Frog is encountered during works, and who to contact should Growling Grass Frog be identified.

### Growling Grass Frog Ecology

The Growling Grass Frog is commonly known by several other names; Warty Bell Frog, Southern Bell Frog, Warty Swamp Frog and Green and Golden Frog. The species is listed as endangered in Victoria and vulnerable nationally. It is also listed as a threatened taxon under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the Victorian *Flora and Fauna Guarantee Act 1988*. Overall the species is of national conservation significance.

This species is largely associated with permanent or semi-permanent still or slow flowing waterbodies (i.e. streams, lagoons, farm dams and old quarry sites). Frogs can also use temporarily inundated waterbodies for breeding purposes providing they contain water over the breeding season.

Growling Grass Frog is a bright emerald to dull olive green, with brown and/or gold blotches on a warty back, approximately 55-100 mm in length. Its call is a growling call similar to a far-off motorcycle – Crawark-crawark-crok-crok.



Growling Grass Frog *Litoria raniformis*  
(© Ecology Partners Pty. Ltd.)



Growling Grass Frog *Litoria raniformis* (juvenile)  
(© [www.frogs.org.au](http://www.frogs.org.au).)

## Who is responsible?

Specific measures have been put in place to protect the Growling Grass Frog during construction. The proponent has responsibilities to ensure that the specific measures are implemented fully and appropriately.

The following government departments may scrutinise the works to ensure that the specific measures are implemented fully and appropriately:

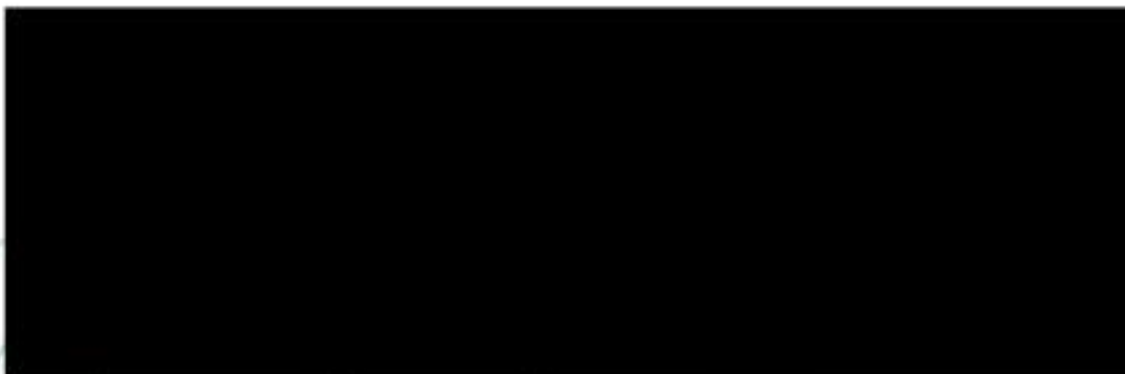
- Victorian Department of Energy, Environment and Climate Action (DEECA); and,
- Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW).

## What to do if you find a Growling Grass Frog

If a Growling Grass Frog is detected during pre-clearing and/or construction works, works are to be suspended in that area until a herpetologist/zoologist is contacted to remove and relocate the animal(s) in accordance with the guidelines outlined in the Cardinia Road Employment Precinct Growling Grass Frog Conservation Management Plan.

After the animal has been removed, construction activities may recommence under supervision of a zoologist/ecologist.

## Contacts at Ecology and Heritage Partners Pty Ltd:



## APPENDIX 2 - GENERAL WEED CONTROL INFORMATION

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Weed control measures that may be appropriate to control weed within the study area are described in detail below. Weed control measures (including type of herbicide) should follow the guidance of an experienced contractor for the control of the weed species.

### Herbicides

- ***Spot Spraying and Rig Spraying***

The application of herbicides is an effective and efficient control technique for a range of woody, herbaceous and grass weeds. The correct use and application of herbicides can provide targeted control of a range of species; however, it must be stressed all use of herbicides must be used in accordance with the manufacturer's specifications and occupational health and safety policies.

Application methods for herbicides include spot spraying with a knapsack for small or sensitive areas, or for targeted species. Rig spraying is best used in larger areas which are not sensitive to high volume application of herbicide and there is limited potential for off-target damage. Dabbing of species with foam tipped application device, with the herbicide applied from an attached bottle, should be used in sensitive areas or in areas where weed control is targeted to a small number of plants, especially bulbs or tuberous plants.

Given that weed management around waterbodies will occur it is recommended that spraying is minimised/avoided where possible to avoid any potential contamination and transportation of harmful chemicals. Any herbicide used within, or adjacent to waterways (which includes all areas of Estuarine Scrub and Damp Sand Herb-rich Woodland)(Figure 2), must contain an 'aquatic approved' surfactant (e.g. Roundup Biactive®). Failing to do so may have negative impacts on flora and fauna species occupying aquatic habitats.

Timing of intervals, plant age and growth seasons, plant stress levels and climatic factors all need to be considered when develop methodologies for the application of herbicides to ensure successful outcomes. Problems exist with ongoing unsuccessful herbicide treatments, which may result in weeds developing herbicide resistance, or the build-up of chemicals in the soil. Surrounding plants' susceptibility to herbicides and ongoing uses of the treated areas should also be considered when choosing the right herbicide to be used in a weed control program, as some herbicides are residual and may persist within the soil for varying durations.

- ***Drill and Fill***

Drill and fill, also known as direct injection, is a method where the selected herbicide (usually Glyphosate) is injected through a device into a hole that has been made into the targeted plant (i.e. woody species). The hole is usually made through the use of a drill but sometimes a tomahawk or saw may be used to put small nicks into the targeted plant. It is essential that the hole or nick must always be lower than the first branch containing foliage (i.e. ideally, the lowest possible point on the plant) and also the herbicide is applied into the hole as quick as possible. The general rule of thumb is that the herbicide must be applied within 30 seconds. Holes are scattered around the main trunk at 50-millimetre intervals, depending on the diameter of the trunk and also branches or angle of the trunk. It is essential that a complete ring around the trunk of the plant be made of this herbicide filled holes to ensure plant death, as large gaps may allow sections of the target tree to survive.

Generally, the holes or nicks do not need to be deeper than 20 millimetres but do need to be deep enough to penetrate the outer cambium layer of the tree. This allows the phloem to carry the herbicide into the roots, which will kill the plant over several weeks, depending on conditions.

The benefits of this method include: the retention of standing material for habitat, no costs for the removal of the plant from the site; no dragging of material across sensitive areas; and, speed, as the method is fast to execute (i.e. drill and fill, and move on). The drawbacks of this method are that if it is not executed correctly, trees may re-grow, particularly as accessing the base of the trunk of spiny plants such as Hawthorn and African Boxthorn can be difficult. However, if the application is successful, dead standing vegetation can become a fire hazard and look aesthetically displeasing to the community.

#### Cut and Paint

The cut and paint method of control requires the cutting of the target species at the very base, under any foliage, and the immediate application of herbicide (usually a glyphosate, dependent on the target species). The application can be done through a 'dabber' bottle or paint brush. Care should be undertaken during application, to avoid splash of herbicide causing non-target damage. Once cut down, the biomass of the target species may sometimes be left on the ground, but usually requires removal. This is particularly necessary if it bears fertile seeds or has the potential to re-shoot from contact with moist ground (e.g. willows) or covers native vegetation. Many herbicides are available that are very effective in the control of woody weed species. Typically, these herbicides are applied to the stem, trunk or roots of the target plant by 'drill and fill', 'cut and paint' or 'frilling' methods of application. These herbicides can be more effective than manual removal alone, as the chance of the plant re-sprouting is significantly reduced.

#### Mechanical Removal

Mechanical removal by machine may include grooming of woody weed infestations by a tractor-mounted groomer (slasher/mulcher), which is quite effective on Gorse, African Boxthorn and Hawthorn infestations.

#### Ring-barking

Ring-barking is a viable technique for use when eradicating large woody shrubs and trees. The technique involves the use of a large knife, tomahawk or axe to make a continuous cut around the trunk of the plant. The cut should be 5-10 centimetres wide and deep enough to penetrate the heartwood (Muyt 2001). This technique should not be used when removing species which can reproduce by suckering.

#### Mowing

While it has been found that mowing may enhance the survival of many weed species, in some instances mowing can be used to control their spread. Areas located in close proximity (500 metres – one kilometre) to sites of ecological significance that are currently mown, should undergo an intensive mowing regime (every week), particularly in spring. This method of weed control is only effective against species which are prevalent within mown areas. It will prove most effective in controlling the spread of grass species such as Chilean Needle-grass, Serrated Tussock and Toowoomba Canary-grass.

## Mulching

It is advised that mulching be used in areas of revegetation which were previously dominated by exotic vegetation. Mulching can be a very effective technique in suppressing species which may invade, particularly from mown areas. In areas of remnant vegetation, mulch should be used very carefully. Only people who have an in-depth knowledge and long history of the specific site should advise the use of mulch in these areas to ensure native species (particularly rare and threatened species) are not affected by using mulch.

## Soil Scraping

Soil scalping involves the removal of a thin layer of topsoil in areas of extremely high weed cover abundance. Care must be taken in order to ensure that enough soil is removed to eliminate the possibility of re-colonisation from the soil seedbank. If soil scraping is to be undertaken, a minimum of depth of 10 centimetres of soil needs to be removed to be effective. Soil scalping cannot be undertaken in areas of native vegetation nominated for retention and protection.

It is important that this process is directly followed by high density revegetation and mulching in order to reduce the migration of other weeds into these areas. This process is only favoured in areas that are considered a major source population for weed species of high threat to agriculture, heritage or areas of conservation significance.

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## APPENDIX 3 - EVC FLORA SPECIES REPLANTING LIST

Table A3.1. Species suitable for replanting within Swampy Riparian Woodland Complex (EVC 83)(DEECA 2024c).

Scientific Name	Common Name	EVC and Benchmark Cover (%)
		SRW
<b>Canopy Trees and Immature Canopy Trees</b>		5%
<i>Eucalyptus ovata</i>	Swamp Gum	
<i>Eucalyptus viminalis</i>	Manna Gum	
<b>Understorey tree or large shrub</b>		30%
<i>Acacia mearnsii</i>	Black Wattle	
<i>Acacia melanoxylon</i>	Blackwood	
<i>Acacia dealbata</i>	Silver Wattle	
<i>Acacia implexa</i>	Lightwood	
<i>Leptospermum lanigerum</i>	Woolly Tea-tree	
<i>Melaleuca ericifolia</i>	Swamp Paperbark	
<i>Leptospermum lanigerum</i>	Woolly Tea-tree	
<i>Exocarpos cupressiformis</i>	Cherry Ballart	
<i>Bursaria spinosa</i>	Sweet Bursaria	
<b>Medium shrub</b>		20%
<i>Epacris impressa</i>	Common Heath	
<i>Leptospermum continentale</i>	Prickly Tea-tree	
<i>Coprosma quadrifida</i>	Prickly Currant-bush	
<i>Goodenia ovata</i>	Hop Goodenia	
<i>Bursaria spinosa</i>	Sweet Bursaria	
<i>Ozothamnus ferrugineus</i>	Tree Everlasting	
<i>Cassinia aculeata</i>	Common Cassinia	
<b>Small Shrub</b>		1%
<i>Leucopogon virgatus</i>	Common Beard-heath	
<i>Dillwynia glaberrima</i>	Smooth Parrot-pea	
<i>Amperea xiphioclada</i> var. <i>xiphioclada</i>	Broom Spurge	
<b>Prostrate Shrub</b>		1%
<i>Astroloma humifusum</i>	Cranberry Heath	
<b>Large tufted graminoid</b>		15%
<i>Juncus procerus</i>	Tall Rush	
<i>Carex appressa</i>	Tall Sedge	
<i>Cyperus lucidus</i>	Leafy Flat-sedge	

Scientific Name	Common Name	EVC and Benchmark Cover (%)
		SRW
<i>Lepidosperma elatius</i>	Tall Sword-sedge	
<i>Austrostipa mollis</i>	Supple Spear-grass	
<b>Large non-tufted graminoid</b>		5%
<i>Phragmites australis</i>	Common Reed	
<i>Tetrarrhena juncea</i>	Forest Wire-grass	
<b>Medium to small tufted graminoid</b>		10%
<i>Triglochin procerum</i> s.l.	Water Ribbons	
<i>Dianella revoluta</i> s.l.	Black-anther Flax-lily	
<i>Dianella brevicaulis</i>	Small-flower Flax-lily	
<i>Poa sieberiana</i>	Grey Tussock-grass	
<i>Themeda triandra</i>	Kangaroo Grass	
<i>Lomandra filiformis</i>	Wattle Mat-rush	
<i>Rhytidosperra spp.</i>	Wallaby Grass	
<i>Poa labillardierei</i>	Common Tussock-grass	
<b>Medium to tiny non-tufted graminoid</b>		10%
<i>Eleocharis acuta</i>	Common Spike-sedge	
<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass	
<b>Large herb</b>		5%
<i>Lycopus australis</i>	Australian Gipsywort	
<i>Senecio minimus</i>	Shrubby Fireweed	
<b>Medium herb</b>		10%
<i>Hydrocotyle pterocarpa</i>	Wing Pennywort	
<i>Stellaria angustifolia</i>	Swamp Starwort	
<i>Gonocarpus tetragynus</i>	Common Raspwort	
<i>Geranium solanderi</i> s.l.	Austral Cranesbill	
<i>Hydrocotyle hirta</i>	Hairy Pennywort	
<i>Acaena novae-zelandiae</i>	Bidgee-widgee	
<b>Small or prostrate herb</b>		5%
<i>Crassula helmsi</i>	Swamp Crassula	
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort	
<i>Dichondra repens</i>	Kidney-weed	
<i>Poranthera microphylla</i>	Small Poranthera	
<b>Ground fern</b>		10%
<i>Blechnum cartilagineum</i>	Gristle Fern	

Scientific Name	Common Name	EVC and Benchmark Cover (%)
		SRW
<i>Pteridium esculentum</i>	Austral Bracken	
<b>Scrambler/Climbers</b>		5%
<i>Clematis microphylla</i>	Small-leaved Clematis	
<i>Glycine clandestina</i>	Twining Glycine	

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**From:** [REDACTED]  
**Sent:** Wednesday, 23 October 2024 11:32 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** RE: OFFICIAL: RE: GGF CEMP 92 Enterprise Rd T230644 T23044 8889.esr.02

**Categories:** State Government - Authority

Hi [REDACTED]

Confirming DEECA endorsement of the '*Environmental Management Plan for Stage 2 for 92 Enterprise Road, Pakenham, Victoria*' prepared by Ecology and Heritage Partners on behalf of Dalton Consulting Engineers Pty Ltd (Ver. Final V3, Dated 17<sup>th</sup> Oct 2024).

Please ensure all works and development are undertaken in accordance with the endorsed plan. Any amendments to the endorsed plan will require DEECA approval.

Please don't hesitate to contact me if you have any questions.

Cheers,

[REDACTED]  
**Senior Planning Policy Officer | MSA Conservation Planning**  
Biodiversity Division | Department of Energy, Environment and Climate Action



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We acknowledge Victorian Traditional Owners and their Elders past and present as the original custodians of Victoria's land and waters and commit to genuinely partnering with them and Victoria's Aboriginal community to progress their aspirations.



Please consider the environment before printing this email

OFFICIAL

<b>Site Environmental Management Plan – Drainage Outfall Works</b>	<b>Key Requirements and Site Map</b>	<b>Environmental Representative Approval</b>	
Project Name: 92 ENTERPRISE ROAD STAGE 2 – Drainage Outfall	Contractor: Winslow Constructors	Winslow Signature: 	DCE Signature:
Project No. 19298	CEMP Author: 	Date: 27/02/2025	

## Scope

The purpose of the site environmental management plan (SEMP) is to comply with the 92 Enterprise Road Stage 2 Drainage Outfall Works environmental requirements. This SEMF shall apply to all personnel on site and will include all activities undertaken by this Project. This is a live document and will be reviewed as work progresses with new works to be reflected here as required. The SEMF must be distributed, agreed and approved in accordance with the required Construction requirements. The activities occurring on site are:

- Earthworks, vegetation removal

This SEMF is to be displayed on the Notice Boards within the site compound area and project office. This EMP is to be enforced in conjunction with the *Environmental Management Plan for Stage 2 for 92 Enterprise Road, Pakenham, Victoria* by Ecology and Heritage Partners Pty Ltd dated October 2024. These EMP will always be kept on site for reference.

### Project Environmental Requirements

Legislative requirements are outlined in the SEMF.

A site-specific induction is performed for all new workers.

### Key Worksite Environmental Emergency Contacts

Position	Name	Contact Number
Project Manager	Lucky Tupai	0437 669 851
Project Foreman	Clinton Norman	0498 108 349
Project HSEQ Representative	Bernadette Carlyle	0436 279 469
Environmental Organisations		Contact Number
EPA Victoria		1300 372 842
Wildlife Victoria		(03) 8400 7300

### Incident Management and Emergency Response

- In the event of an Environmental Incident or emergency, the WBHO Environmental Incident/Emergency Response Protocol will be followed.

### Training & Environmental Site Inductions

- All staff and contractors are to be trained on environmental issues and location of sensitive areas via site specific induction, regular environmental toolbox talks and daily prestart.
- SEMFs to be included in inductions of all staff and contractors. Daily prestart/toolbox meetings to include this SEMF.
- Environmental site inductions will be completed prior to the commencement of works to provide an overview of the Growing Grass Frog and risks posed by development, and correct procedures in the event of an encounter.
- Regular toolbox meetings will be conducted highlighting this EMP. This EMP will form part of the daily pre-starts.
- The Project Manager and Project Engineer must have 'Site Environmental Management Level 2' accreditation for any works adjoining the drainage corridor.

### Worksite Inspection, Auditing and Monitoring

- Site Environmental and Sustainability Inspections and audits are to be undertaken by the Site Environmental Representative, Engineers, and Supervisors. Daily inspections completed by the Site foreman. Weekly audits completed by Project Manager/Engineers/HSE Team. Any issues identified during the inspections/audits to be rectified within 24 hrs, any new risks addressed with suitable environmental controls.
- Traffic checklists to be completed weekly – including the inspection of adjacent Council Roads used by construction traffic.
- All trenches/excavations shall be checked for fauna each morning prior to work commencing.
- Any non-conformances, incidents and complaints will be recorded and archived on site in a Non-Conformance Register.
- A CHMP induction register will be kept on site to keep record of all those completed a CHMP induction.
- An environmental register will be kept on site to record all those completed the environmental induction with specific reference to *Environmental Management Plan* by Ecology and Heritage Partners Pty Ltd dated October 2024.

## Environmental Impacts & Risks

### Dust/Air Quality

- Dust generation must be minimised to ensure there is no health risk or loss of amenity.
- Dust emissions from works and stockpiles will be controlled through wetting down using suitable method for works – this will include water cart, fine mist spray or hose, and stabilisation of surfaces (non-potable water will be used where required in accordance with Project EIP for Non-Potable Water Use).
- All vehicle and machinery movements during construction are restricted to designated areas (Haul Road) and adhere to the specified site speed limit.
- All site vehicles and machinery to be switched off or throttled down to a minimum when not in use.
- Crushed rock/recycled concrete to be used on all access roads includes haul roads and site compound, in accordance to VicRoads Technical Note 107 (2011).
- Weather conditions shall be monitored routinely.
- Loads in all trucks transporting aggregate or other dust generating material to and from site shall be kept within load limits and covered.
- All works will halt at the site if dust becomes an issue until such time as either the dust levels reduce, or suitable measures are put in place to reduce the generation of dust.

LIKELIHOOD: POSSIBLE	CONSEQUENCE: MAJOR	RISK: MEDIUM
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### Contaminated Soil and Materials

- Stop work immediately and contact the Project Environmental Representative if any of the following are found:
  - o buried structures such as underground storage tanks and the associated pipe work
  - o visible contaminants
  - o asbestos.
- All contaminated material transported off-site must have an EPA waste transport certificate
- A site contamination assessment will be undertaken by a contamination soil consultant. The Project HSEQ Representative will communicate report findings to all site engineers overseeing works onsite.

LIKELIHOOD: POSSIBLE	CONSEQUENCE: MAJOR	RISK: LOW
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### Noise and Vibration

- All works will be completed in compliance with EPA noise regulatory requirements.
- All out of hours works require approval from the Project Environmental Representative via a Permit to work Out-of-Hours (58519-ENV-FRM-00-00005).
- Any out of hours works require Council approval.
- Standard working hours during construction:
  - o 7:00am – 6:00pm Monday to Friday and;
  - o 7:00am to 1:00pm Saturdays
- Use plant and equipment fitted with manually adjusting back up alarms or broadband beepers.
- Any excessive noise emissions will be handled by the site Foreman and the Project Environmental Representative.
- The project management team will consult with local business regarding expected hours of work. All stakeholders shall be notified 14 days prior to any Out of Hours Work commencing.

LIKELIHOOD: LIKELY	CONSEQUENCE: MINOR	RISK: MEDIUM
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Prepared By:	Environmental Manager-Projects	Date Revised: 17/02/2023	None	Document No:	WINBMS-SP-11-E
Approved By:	Manager - Systems	Date Approved:	16/04/2020	Date First Issued:	16/04/2020
Document Name:	Worksite Environmental Management Plan			Revision No. 2	Page 1 of 5

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<b>Site Environmental Management Plan – Drainage Outfall Works</b>	<b>Key Requirements and Site Map</b>	<b>Environmental Representative Approval</b>	
Project Name: 92 ENTERPRISE ROAD STAGE 2 – Drainage Outfall	Contractor: Winslow Constructors	Winslow Signature: 	DCE Signature:
Project No. 19298	CEMP Author: 	Date: 27/02/2025	

**Access Management & Prevention of Dumping Materials**

- Access to the site will be limited to a singular entry/exit point off Enterprise Road to limit access from public roads.
- All Council Roads will be reinstated to the condition they were in prior to the commencement of works at the cost of the permit holder.
- Fencing will be erected on the eastern side along Toomac Creek to prevent the dumping of hard rubbish.
- Agreed processes and practices for the protection and maintenance of the existing roads surface along all Council Roads proposed to be used during the works for works related activities.
- The site will be adequately fenced and entrance to be locked at the end of the workday to prevent afterhours access and the dumping of materials.
- There will be a security camera at the entrance of the site for additional security.

**Stockpile, Erosion and Sediment Control**

- Erosion and sediment controls as depicted on this EMP are to be installed across the work areas. Once work begins onsite, it may be found that further sediment and erosion controls may be found, in which case the CEMP will be updated, and controls implemented onsite.
- Gravel rock or rumble grids are to be installed at designated site exits to limit potential material being track onto public roads.
- Any area that is disturbed to be topsoiled and seeded within a maximum of one month exposure.
- Additional erosion and sediment controls to be implemented during wet weather event as required. Stockpiles are to be temporary and disposed as soon as practically possible.
- Silt fencing to be installed 30m from Toomac Creek and additional sediment control measures as appropriate.
- Stockpiles, machinery and equipment to be placed at min. 30m away from Toomac Creek, with batters no greater than 2:1. Stockpiles number and size to be kept at a minimum. Stockpiles to have silt fencing at down slope and catch drain upslope. Stockpiles left more than 28 days to be stabilised with sterile rye grass.
- All sediment control measures to be maintained and intact for the duration of works and inspected regularly, including prior and after rain events to ensure they are working properly. Any issues to be rectified within 24 hours.
- Water quality monitoring of Toomac Creek at 2 specified locations, to be monitored weekly and sediment control to be adjusted as required. During construction quality will be monitored weekly.
- Where disturbed areas are topsoiled and seeded, aggressive rhizomatic species (e.g. kikuyu, couch and buffalo grass) must not be used within the Toomac Creek drainage corridor.
- Sediment laden water must not flow into the drainage corridor or waterway, Discharged water must have turbidity of less than or equal to the receiving waters or otherwise ≤30NTU, whichever measure is lower.

<b>LIKELIHOOD: LIKELY</b>	<b>CONSEQUENCE: MODERATE</b>	<b>RISK: MEDIUM-HIGH</b>
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**Weed Management**

- Sweeper trucks to be utilised to sweep public roads as necessary.
- Work vehicles/plant to be maintained as clean as possible and follow designated haul routes to minimise collection of mud/soil in tyres.
- Wheel wash station and disinfectant station will be employed at site exit location. All vehicles leaving site to be cleaned and checked. A logbook will be in place to record of vehicle/machinery/equipment wash checks.
- Weed control to be implemented as per Environmental Management Plan by Ecology and Heritage Partners Pty Ltd dated October 2024.
- Disturbed areas to be revegetated as soon as practical to minimize potential for weed establishment via direct seeding.

<b>LIKELIHOOD: POSSIBLE</b>	<b>CONSEQUENCE: MINOR</b>	<b>RISK: MEDIUM</b>
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**Flora and Fauna (including Growling Grass Frog Management)**

- All significant flora and fauna on an adjacent to the site must be protected. The works will be within 200m of Toomac Creek which is under the Cardinia Road Employment Precinct Conservation Management Plan for Growling Grass Frog.
- As per the *Environmental Management Plan for 92 Enterprise Road, Pakenham, Victoria* prepared by Ecology & Heritage Partners dated October 2024 the below control measures will be implemented to protect the Growling Grass Frog:
  - Site induction to include environmental induction specifically noting this EMP and the presence of the Growling Grass Frog. Photo identification will be on site at all times.
  - No Go Zones will be placed on the eastern end of Toomac Creek. A suitably qualified surveyor will set out the boundary of the temporary fencing, and a suitably qualified zoologist will inspect fencing during and after installation. No go zone will be implemented 5m from the work zone via temporary fencing to prohibit access. Exclusion fencing (e.g. chain link or welded mesh) to a height of 1.8 metres mounted on vertical steel pipes at 3 metre intervals driven 0.7 metres into the ground. Signs stating, 'Conservation Area – NO GO ZONE' consistent with council requirements and securely affixed to fencing at 30 metre intervals and at a height of 1.5 metres. Construction, works, vehicle traffic, or placement or storage of structures or materials are not permitted within the No-Go Zone.
  - If Growling Grass Frogs are encountered, works will cease immediately until the frog is safely relocated. Single use gloves or lightweight plastic bag will be used when handling the frogs.
  - Any relocated frogs will be reported to DEECA.
- All excavations/trenches shall be visually checked for fauna prior to backfilling
- A procedure for working in the waterways and management of EPBC species, can be referenced to WINBMS-EP-11 Waterways and Floodplains.
- Only trees identified for removal in the Arborist Report and within the project boundary are to be removed, where possible tree removal is to be minimised. All vegetation will be removed by a contractor with demonstrated experience working in ecologically sensitive areas. A suitably qualified wildlife handler will carry out pre-construction habitat assessments and will be present of habitat removal and pre-clearance searches.
- If any Growling Grass Frogs are encountered during works, then:
  - works in the immediate area must cease until the frog is relocated to a suitable site within 100 metres in the same conservation area. Single use gloves and or single use lightweight plastic bags must be used when handling frogs;
  - any identified frogs should be reported to DEECA.

<b>LIKELIHOOD: POSSIBLE</b>	<b>CONSEQUENCE: MAJOR</b>	<b>RISK: MEDIUM</b>
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<b>Prepared By:</b>	Environmental Manager-Projects	<b>Date Revised:</b> 17/02/2023	None	<b>Document No:</b>	WINBMS-SP-11-E
<b>Approved By:</b>	Manager - Systems	<b>Date Approved:</b>	16/04/2020	<b>Date First Issued:</b>	16/04/2020
<b>Document Name:</b>	Worksite Environmental Management Plan			<b>Revision No. 2</b>	Page 2 of 5

<b>Site Environmental Management Plan – Drainage Outfall Works</b>	<b>Key Requirements and Site Map</b>	<b>Environmental Representative Approval</b>	
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Project No. 19298	CEMP Author: 	Date: 27/02/2025	

#### Waste

- Utter and waste must be contained on site before disposal in a responsible manner. Waste generation must be minimised and monitored daily.
- Waste to be placed within skip bins and covered prior to recycling or disposal offsite by a licensed contractor.
- Waste bins to be easily accessible for removal by contractor as required.
- Wastewater generated from construction activities will be stored in tanks and will be taken off-site for treatment and disposal or treated on-site using treatment system (if available).
- No burning of any waste material is to be undertaken at the site without prior written approval from council.

LIKELIHOOD: POSSIBLE	CONSEQUENCE: MINOR	RISK: MEDIUM
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#### Chemical/Hazardous Materials

- Storage and spill management practices must be implemented to ensure that no environmental damage can result from the escape or spillage of chemicals or fuels.
- Any chemicals brought onto site must be verified and registered in an SDS register and copies of SDSs must be kept on site.
- All chemicals or hazardous materials are to be stored in the locations identified in this EMP and in accordance with EPA Bulletin Guideline 347.1- bunding guidelines
- Spill kits are to be provided at the site compound and across the site at nominated high risk locations (i.e. near drainage works, concrete wash out or waterway). Spill kits being used near water need to be specific for used around water (i.e. marine grade).
- Refuelling is to be undertaken using suitable measure to prevent contamination – this should include the use of absorbent pads and spill trays to prevent splash back spills.
- Refuelling and plant maintenance is not permitted to refuel within 20m of a waterway and/or stormwater drainage pit.

LIKELIHOOD: UNLIKELY	CONSEQUENCE: MODERATE	RISK: MEDIUM
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#### Bushfire Management

- Site is currently located in a designated Bushfire Prone Area (BPA) as per Bushfire Development Report prepared by TerraMatrix.
- Grassland within the site boundary to be maintained (mowed/slashed) per the recommendations, this includes maintaining the grassland within the site boundaries on undeveloped parts of 92 Enterprise Road at less than 100mm in height during the declared Fire Danger Period.

LIKELIHOOD: UNLIKELY	CONSEQUENCE: MAJOR	RISK: LOW-MEDIUM
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**GROWLING GRASS FROG**

#### Heritage/Archaeological

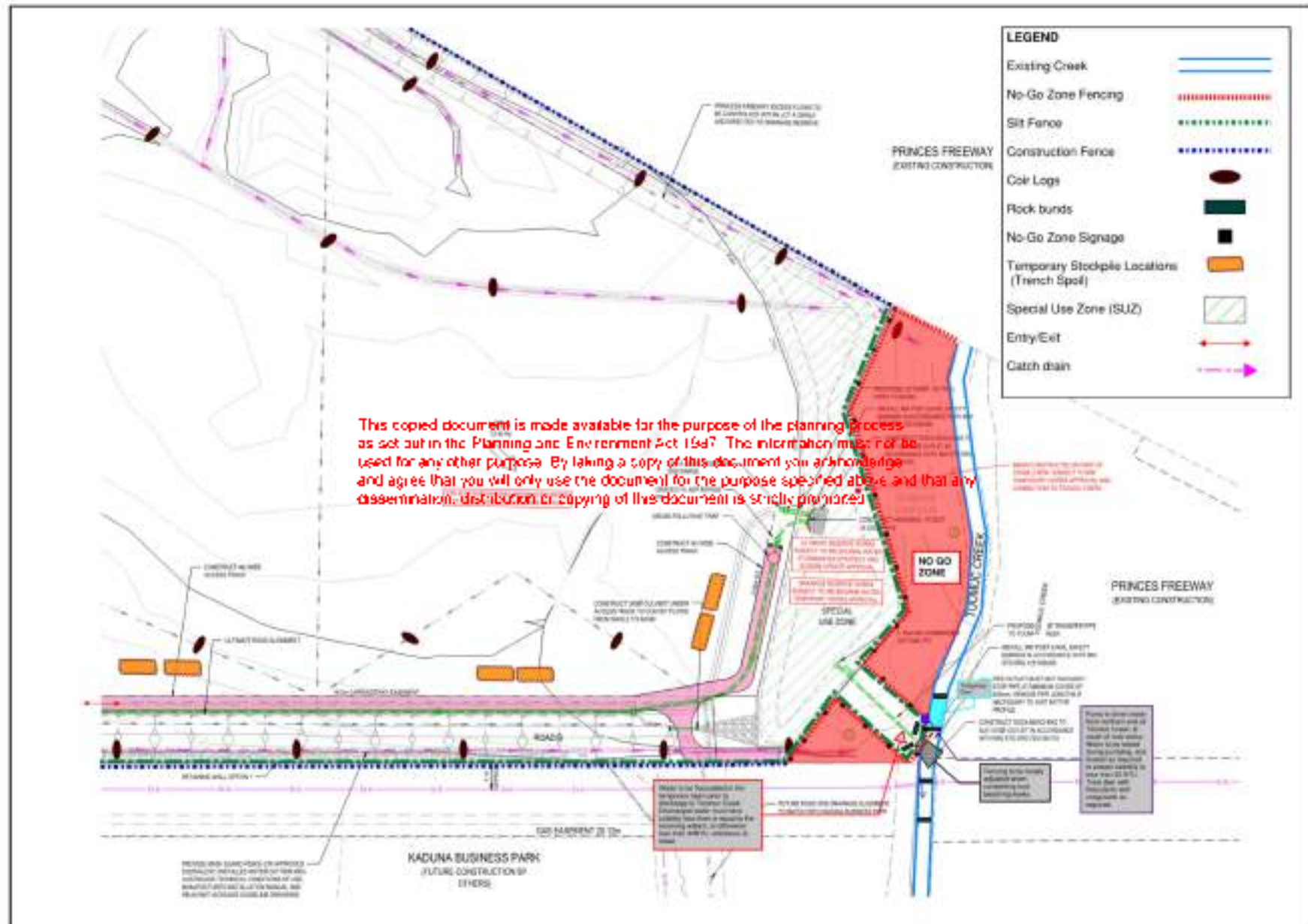
- Adherence to conditions and compliance outlined in CHMP 10556 – including conducting a cultural heritage induction as required for those involved in ground disturbance before development begins.
- If intact subsurface elements are uncovered during the works all work in the vicinity of the find must cease, and the Project Environmental Representative and Netflow Environmental Representative are to be notified immediately. Appropriate advice would be sought from heritage consultants/Advisors. Works in the vicinity of the find are not to re-start until clearance has been received.
- If previously unidentified Indigenous heritage items are uncovered during the work, all work in the vicinity of the find must cease and appropriate advice would be sought from heritage consultants. Work in the vicinity of the find would not re-start until clearance has been received.
- No-Go Zone to be established around finds identified on site and kept in place until approval is given by a qualified heritage advisor for the worksite recommence in the affected area.

LIKELIHOOD: UNLIKELY	CONSEQUENCE: MODERATE	RISK: MEDIUM
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Prepared By:	Environmental Manager-Projects	Date Revised: 17/02/2023	None	Document No:	WINBMS-SP-11-E
Approved By:	Manager - Systems	Date Approved:	16/04/2020	Date First Issued:	16/04/2020
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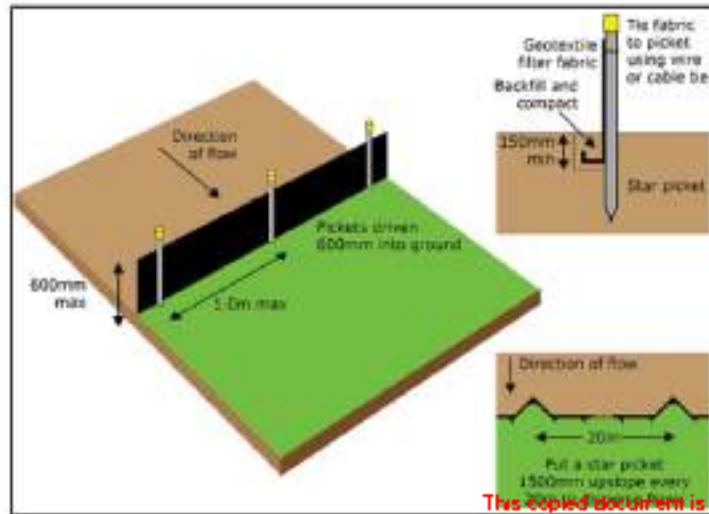


<b>Site Environmental Management Plan – Drainage Outfall Works</b>	<b>Key Requirements and Site Map</b>	<b>Environmental Representative Approval</b>	
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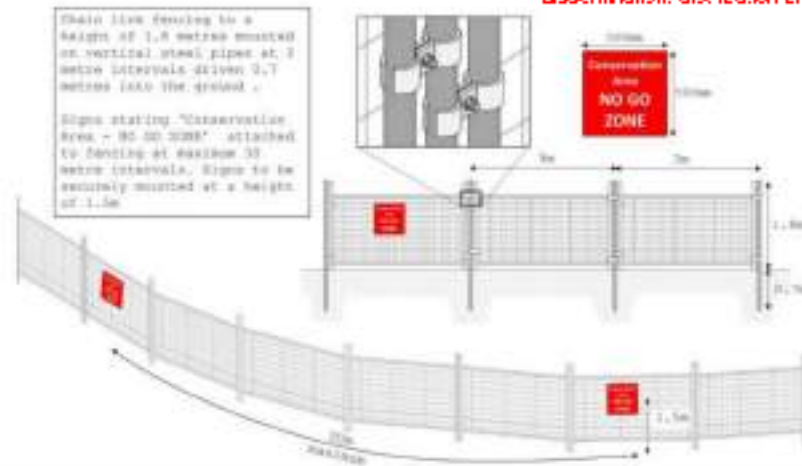
Prepared By:	Environmental Manager-Projects	Date Revised:	17/02/2023	None	Document No:	WINBMS-SP-11-E
Approved By:	Manager - Systems	Date Approved:		16/04/2020	Date First issued:	16/04/2020
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<b>Site Environmental Management Plan – Drainage Outfall Works</b>	<b>Key Requirements and Site Map</b>	<b>Environmental Representative Approval</b>	
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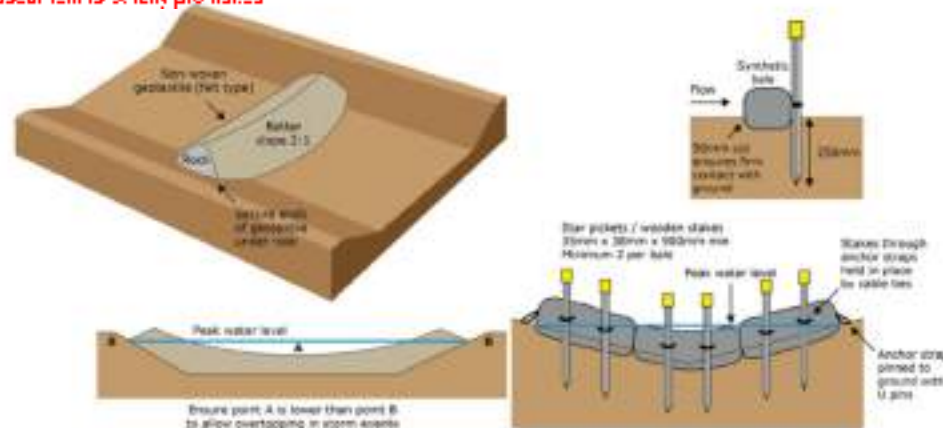
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**SILT FENCING**



**TEMPORARY FENCING AND NO-GO ZONE SIGNAGE**

**WHEEL WASH STATION**



**SEDIMENT CONTROL - ROCK FILTERS/COIR LOGS**

Prepared By:	Environmental Manager-Projects	Date Revised: 17/02/2023	None	Document No:	WINBMS-SP-11-E
Approved By:	Manager - Systems	Date Approved:	16/04/2020	Date First issued:	16/04/2020
Document Name:	Worksite Environmental Management Plan			Revision No. 2	Page 5 of 5

# CULTURAL HERITAGE MANAGEMENT PLAN

**Project:**

Sediment Pond and Outlet  
Pipe to Toomuc Creek

**Project Address:**

92 Enterprise Road  
Pakenham 3810

**Sponsored By:**

ESR Investment  
Management 1 (Australia)  
Pty Ltd as trustee for  
Pakenham Enterprise Road  
Property Trust  
(ABN 61 962 531 815)

14th August 2024

**Heritage Advisor:**

Roland Weatherseed

**Authors:**

**Tardis Archaeology**  
Heritage Advisors

ABN 29 639 085 948

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Port Melbourne: 03 9676 9009

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15 August 2024

To whom it may concern,

**Approval Notice for Cultural Heritage Management Plan 19535 – Sediment Pond and Outlet Pipe to Toomuc Creek 92 Enterprise Road Pakenham. Cover date: 14 August 2024.**

We refer to your application to the Bunurong Land Council Aboriginal Corporation requesting approval of the above cultural heritage management plan (CHMP).

With reference to section 63(1)(a)(i) of the *Aboriginal Heritage Act 2006 (Act)*, the Bunurong Land Council Aboriginal Corporation as the Registered Aboriginal Party (RAP), have evaluated and approved this CHMP. The conditions set out in this CHMP are now compliance requirements.

Kind regards,



Acting Cultural Heritage Manager  
[David.tutchener@bunuronglc.org.au](mailto:David.tutchener@bunuronglc.org.au)

\*This notice of approval must be inserted after the title page and bound with the body of the CHMP

**STATEMENT OF ACKNOWLEDGEMENT**

Our community culturally and spiritually acknowledge our ancestors who have provided our community today with the opportunity to continue to practice our culture and be a representative voice for our land, waters and community. We value and acknowledge the relationships we have with all practitioners on Bunurong country to facilitate and nurture the protection and preservation of our shared culture, Bunurong culture.

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# SEDIMENT POND AND OUTLET PIPE TO TOOMUC CREEK 92 ENTERPRISE ROAD PAKENHAM

## CULTURAL HERITAGE MANAGEMENT PLAN

### 19535

Activity Size	Small <i>(r.81 Aboriginal Heritage Regulations 2018)</i>
Assessment Type	Complex
Sponsor	ESR Investment Management 1 (Australia) Pty Ltd as trustee for Pakenham Enterprise Road Property Trust (ABN 61 962 531 815)
Heritage Advisor	Tardis Archaeology Pty Ltd <small>This copied document is made available for the purpose of the planning process as set out in the Planning and Environment Act 1987. The information must not be used for any other purpose. By taking a copy of this document you acknowledge and agree that you will only use the document for the purpose specified above and that any dissemination, distribution or copying of this document is strictly prohibited.</small>
Authors	[REDACTED]
Completed	14 <sup>th</sup> August 2024

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## EXECUTIVE SUMMARY

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Compliance requirements are set out in Part [1] of the Cultural Heritage Management Plan.

### The Activity and Activity Area Location

The activity is a sediment pond and outlet pipe to Toomuc Creek. The activity area comprises approximately 0.388ha. The activity area is located at 92 Enterprise Road, Pakenham, approximately 62km southeast of Melbourne. This CHMP is required by the *Aboriginal heritage Regulations 2018*.

### Assessment

The desktop assessment reviewed the relevant geographic region (**Section 7.2**); registered Aboriginal places (**Section 7.4**); reports in the relevant geographic region (**Section 7.5**); history and ethnohistory (**Section 7.6**); landforms and geomorphology (**Section 7.7**); land use history (**Section 7.8**) and strategic values (**Section 7.9**). The relevant evidence was used to produce a site prediction model for the activity area (**Section 7.11**). The model predicted that the most likely place-types in the activity area were artefact scatters and Low Density Artefact Distributions (LDADs) (see **Table 10**).

The desktop assessment concluded the following in relation to the activity area:

1. There are no registered Aboriginal places within the activity area.
2. There are no registered Aboriginal places within 50m of the activity area.
3. Elevated land and floodplains adjacent to waterways are areas of cultural heritage sensitivity.
4. It is reasonably possible that Aboriginal cultural heritage is present.
5. There is potential for the activity to impact Aboriginal cultural heritage.

The standard assessment demonstrated the following in relation to the activity area:

1. No Aboriginal cultural heritage was identified during the standard assessment.
2. Ground surface visibility was very poor and effective survey coverage was <5%.
3. The northern and southern most ends of the activity area have been subject to a high level of disturbance via the creation of drainage channels leading into Toomuc Creek.
4. Due to the lack of ground surface visibility, it was not possible to accurately determine the presence or absence of Aboriginal cultural heritage.
5. A complex assessment is required pursuant to Regulation 64(1) of the Aboriginal Heritage Regulations 2018.

The complex assessment concluded to following in relation to the activity area:

1. The complex assessment consisted of twelve 1x1m test pits.
2. No Aboriginal cultural heritage was identified.
3. The prediction as a result of the desktop and standard assessment suggesting the likelihood of low levels of Aboriginal stone artefacts were not upheld.
4. There are no areas within the activity area that are considered likely to contain Aboriginal cultural heritage.

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## ACKNOWLEDGEMENTS

Tardis Archaeology Pty Ltd would like to thank the following people for their assistance:

## ABBREVIATIONS

ACHRIS	Aboriginal Cultural Heritage Register and Information Services
AF	Approved Form under clause 64(a) of the Aboriginal Heritage Regulations 2007, specifying the required format of CHMPs
ASL	Metres Above Sea Level
AMS	Accelerator Mass Spectrometry (Dating)
ASN	Australian Stratigraphic Names Database
ASTT	Australian Small Tool Tradition
BLCAC	Bunurong Land Council Aboriginal Corporation
BP	Years Before Present (1950)
C14	Carbon 14
CHMP	Cultural Heritage Management Plan
CHP	Cultural Heritage Permit
dGPS	Differential Global Positioning System
DPC	Department of Premier and Cabinet
DPCD	Department of Planning and Community Development
DSE	Department of Sustainability and Environment
EVC	Ecological Vegetation Classes
FPSR	First Peoples State Relations
GDA	Geocentric Datum of Australia
GPS	Global Positioning System
GSV	Ground Surface Visibility
Ka	Thousand years ago
LGM	Last Glacial Maximum
LV	Land Victoria
Ma	Million years ago
MGA	Map Grid of Australia
MUZ	Mixed Use Zone
NoI	Notice of Intent to Prepare a Cultural Heritage Management Plan
OSL	Optically Stimulated Luminescence
PGC	Primary Grid Coordinate
RAP	Registered Aboriginal Party
SU	Survey Unit
SLV	State Library of Victoria
TA	Tardis Archaeology
TP	Test Pit
VAHC	Victorian Aboriginal Heritage Council
VAHR	Victorian Aboriginal Heritage Registry

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*\*Throughout this report several technical terms are used that may not be familiar to some readers. An extensive glossary has been included as Appendix 2 and should be referenced for an explanation of terms.*

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## **PART 1 – CULTURAL HERITAGE MANAGEMENT CONDITIONS & CONTINGENCIES**

*These conditions become compliance requirements once the Cultural Heritage Management Plan (CHMP) is approved. Failure to comply with a condition is an offence under section 67A of the Aboriginal Heritage Act 2006.*

*The Cultural Heritage Management Plan must be readily accessible to the Sponsor and their employees and contractors when carrying out the activity.*

### **1 CULTURAL HERITAGE MANAGEMENT CONDITIONS**

#### **1.1 Condition 1 Adherence to the Cultural Heritage Management Plan (CHMP) Before, During and After the Activity**

1. A hard copy of the approved CHMP must always be available and present onsite for the duration of the activity.
2. The Sponsor, site supervisor and all relevant personnel must be aware of the compliance requirements of the CHMP.
3. The Sponsor or site supervisor is responsible for ensuring that all personnel onsite are aware of the management conditions and contingency plans, and of the onsite location of the hard copy of the approved CHMP.
4. The Sponsor, site supervisor and all relevant personnel are responsible for implementing the management conditions contained within the CHMP.
5. The Sponsor or site supervisor is responsible for ensuring that the activity adheres to the activity description as detailed in Section 4 of the CHMP. Any change to the activity area, the activity description or the approved management conditions may require either an amendment to the CHMP or the preparation of a new CHMP.

#### **1.2 Condition 2 Cultural Heritage Induction to be Undertaken Before the Activity**

1. A cultural heritage induction must be undertaken prior to the commencement of any ground disturbance works within the activity area.
2. The Sponsor or site contractor must submit a booking request to the BLCAC at least two weeks before the cultural heritage induction is required.
3. The cultural heritage induction must be conducted by the BLCAC Heritage Unit.
4. The cultural heritage induction must include the Sponsor or their representative/project manager and where possible, the site supervisor and all relevant personnel directly involved in ground disturbing works within the activity area.
5. The cost of the cultural heritage induction must be met by the Sponsor or site contractor.
6. The Sponsor or site contractor must indicate during the induction both the commencement date of the activity and the likely completion date of the activity.

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**1.3 Condition 3 Protocol for Handling Sensitive Information Before, During and After the Activity**

1. Apart from publicly available information there shall be no communication or public release of information concerning Aboriginal cultural heritage without the written permission of the BLCAC.
2. No photographs of onsite cultural heritage, or information concerning Aboriginal cultural heritage is to be circulated to the media or via public media without the written permission of the BLCAC.

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**2 CONTINGENCY PLAN**

**2.1 Contingency 1 Proposed Changes to the Activity**

The contingency plans presented in this section are specific to the activity area and the activity described within this CHMP. If, following the approval of this CHMP, changes to the activity or the activity area requiring statutory authorisation or which require any changes to the management conditions contained within the approved CHMP occur, the Sponsor may either apply to amend the approved CHMP or prepare a new CHMP which incorporates any changes.

**2.2 Contingency 2 Matters Referred to in Section 61 of the Act**

If Aboriginal cultural heritage is unexpectedly discovered during the activity, the Sponsor, where possible, must prioritise harm avoidance or harm minimisation to the Aboriginal cultural heritage. Harm avoidance or harm minimisation strategies must be implemented by the Sponsor or the relevant representative of the Sponsor in consultation with the BLCAC.

**2.3 Contingency 3 Dispute Resolution Process**

Procedures for dispute resolution aim to ensure that all parties are fully aware of their rights and obligations, that full and open communication between parties occurs and that those parties conduct themselves in good faith.

If a dispute arises that may affect the conduct of the activity, resolution between the parties using the following dispute resolution procedure is required:

1. All disputes will be jointly investigated and documented by both the BLCAC and the Sponsor.
2. Where a breach of the CHMP conditions has been identified, and there is no agreement between the parties as to how that breach is to be remedied, the BLCAC and the Sponsor must meet within one week of the initial notification of the breach to seek agreement as to a suitably appropriate remedial measure.
3. The Sponsor and the BLCAC must arrange for authorised representatives to be present at the meeting.
4. At the meeting, the authorised representatives of both the BLCAC and the Sponsor must state their understanding of the issue(s) in dispute and ensure each party is aware of their position. If requested by either the BLCAC or the Sponsor, third party mediation may be held during the meeting.



5. If the authorised representatives of the parties reach agreement, the agreed corrective method for the breach must be recorded in writing and signed by both parties (Agreed Method Statement). If the authorised representatives of the parties do not reach agreement, the parties will participate in third party mediation of the dispute by an agreed mediator within two weeks. Any costs of the mediation are to be met equally by the parties. Any agreed outcome of the mediation must be recorded in writing and signed by both parties (Agreed Method Statement).
6. The Sponsor, site supervisor, contractor and any relevant personnel will not undertake any correction or remedial activities except in accordance with the Agreed Method Statement. Any correction or remedial activities required must:
  - a. Be recorded in writing and signed off by the authorised representatives of the BLCAC and Sponsor.
  - b. Be supervised by a BLCAC representative.
  - c. Occur in accordance with the instructions of the BLCAC, providing they are consistent with the agreed correction activities.
  - d. The BLCAC will strive to minimise delays to work schedules while not compromising Aboriginal cultural heritage, places or values.

Issues related exclusively to cultural heritage management, which do not have an impact on the conduct of the activity, will be handled through the following dispute resolution mechanism:

1. Within one week of notification to each party that a breach is deemed to exist, authorised representatives of the BLCAC and the Sponsor must attempt to negotiate a resolution to any dispute related to the cultural heritage management of the activity area within two working days.
2. If the authorised representatives of the BLCAC and the Sponsor do not reach agreement, the parties will participate in third party mediation of the dispute by an agreed mediator within two weeks. Any costs of the mediation are to be met equally by both parties. Any agreed outcome of the mediation must be recorded in writing and signed by both parties (Agreed Method Statement).

Regardless of the category of dispute, the dispute resolution process does not preclude:

1. The parties seeking advice from First Peoples – State Relations Group (FP-SR) to assist in resolution of the dispute; and
2. Any legal recourse open to the parties being taken; however, the parties must agree that the above resolution mechanism will be implemented before such recourse is made.

## **2.4 Contingency 4 Management of Aboriginal Cultural Heritage Found During the Activity**

### **2.4.1 Discovery of Human Remains**

If any suspected human remains are found during any activity, works must cease. The Victoria Police and the State Coroner's Office must be notified immediately. If there are reasonable grounds to believe the remains are Aboriginal, the Coronial Admissions and Enquiries hotline must be contacted immediately on 1300 309 519. This advice has been

developed further and is described in the following 5-step contingency plan. Any such discovery at the activity area must follow these steps.

1. Discovery:
  - a. If suspected human remains are discovered, all activity must stop.
  - b. The remains must be left in place and protected from harm or damage.
  - c. Do not contact the media; do not take any photographs of the remains other than those requested by the relevant authorities below.
2. Notification:
  - a. If suspected human remains have been found, the State Coroner's Office and the Victoria Police must be notified immediately.
  - b. If there are reasonable grounds to believe the remains are Aboriginal Ancestral Remains, the Coronial Admissions and Enquiries hotline must be immediately notified on 1300 309 519.
  - c. All details of the location and nature of the human remains must be provided to the relevant authorities.
  - d. If it is confirmed by State Coroner's Office that the discovered remains are Aboriginal Ancestral Remains, the person responsible for the activity must report the existence of them to the Victorian Aboriginal Heritage Council in accordance with Section 17 of the *Aboriginal Heritage Act 2006*.
3. Impact Mitigation or Salvage
  - a. The Victorian Aboriginal Heritage Council, after taking reasonable steps to consult with any Aboriginal person or body with an interest in the Aboriginal Ancestral Remains, will determine the appropriate course of action as required by Section 18(2)(b) of the *Aboriginal Heritage Act 2006*.
  - b. An appropriate impact mitigation or salvage strategy as determined by the Victorian Aboriginal Heritage Council must be implemented by the Sponsor. All costs associated with this will be the responsibility of the Sponsor.
4. Curation and Further Analysis
  - a. The treatment of salvaged Aboriginal Ancestral Remains must be in accordance with the direction of the Victorian Aboriginal Heritage Council.
5. Reburial
  - a. Any reburial site(s) must be fully documented by an experienced and qualified archaeologist and all relevant details provided to the Registrar.
  - b. Appropriate management measures must be implemented to ensure the Aboriginal Ancestral Remains are not disturbed in the future.

#### ***2.4.2 Discovery of Low Density Artefact Distributions***

If a low density artefact distribution (10 or fewer stone artefacts within a 10 m x 10 m area) is discovered during the activity, the following measures must be undertaken:

1. The person in charge of the activity must notify both the BLCAC and a Heritage Advisor of the suspected Aboriginal cultural heritage within one business day of the discovery. The person in charge of the works at the time of the discovery is deemed to be the person who discovered the Aboriginal cultural heritage place or object(s).

2. All works must cease within 10 m of the discovery area, and all personnel contracted to undertake the activity must be notified of the suspected discovery.
3. The suspected Aboriginal cultural heritage must be cordoned off by a suitable barrier (e.g. safety barrier mesh, temporary fencing, or flagging tape) and remain in place until it has been assessed by the BLCAC and a Heritage Advisor.
4. A Heritage Advisor must facilitate the participation of the BLCAC in the assessment of the Aboriginal cultural heritage.
5. A Heritage Advisor and a BLCAC representative must inspect the suspected Aboriginal cultural heritage as soon as practicable and within a maximum of five business days of the notification of the discovery.
6. A Heritage Advisor, in consultation with the BLCAC, must identify the extent, nature and significance of the Aboriginal cultural heritage material in the activity area.
7. The Sponsor, a Heritage Advisor and the BLCAC must discuss opportunities of avoiding and minimising harm to the Aboriginal cultural heritage. The Sponsor must attempt to avoid or minimise harm to the Aboriginal cultural heritage as the first priority.
8. Where harm cannot be avoided or minimised, a qualified archaeologist in consultation with the BLCAC must salvage the Aboriginal cultural heritage material. The salvage must involve the recording, collection (labelled and packaged according to provenance), and analysis of the Aboriginal cultural heritage. The Aboriginal cultural heritage must be recorded with the use of a DGPS (with <1 m accuracy).
9. A Heritage Advisor within three weeks of the salvage and associated analysis must submit any required VAHR place record edits or new place registrations.
10. All costs associated with the procedures specified in this contingency must be organised and paid for by the Sponsor.
11. The activity may recommence within the 10 m exclusion area once:
  - a. All the procedures specified above have been followed; and
  - b. No dispute occurs as to the course of action(s) required.

#### ***2.4.3 Discovery of Artefact Scatters, Stratified Deposits and/or Cultural Features***

If artefact scatters, stratified deposits, and/or other cultural heritage features are discovered during the activity, then the following measures must be undertaken:

1. The person in charge of the activity must notify both the BLCAC and a Heritage Advisor of the suspected Aboriginal cultural heritage within one business day of its discovery. The person in charge of the works at the time of the discovery is deemed to be the person who discovered the Aboriginal cultural heritage place or object(s).
2. All works must cease within 10 m of the discovery area, and all personnel contracted to undertake the activity must be notified of the suspected discovery.
3. The suspected Aboriginal cultural heritage must be cordoned by a suitable barrier (e.g. safety barrier mesh, temporary fencing, or flagging tape) and remain in place until it has been assessed by the BLCAC and a Heritage Advisor.
4. A Heritage Advisor must facilitate the participation of the BLCAC in the assessment of the Aboriginal cultural heritage.
5. A Heritage Advisor and a BLCAC representative must inspect the suspected Aboriginal cultural heritage as soon as practicable and within a maximum of five business days of the notification of the discovery.
6. A Heritage Advisor, in consultation with the BLCAC, must identify the extent, nature and significance of the Aboriginal cultural heritage material in the activity area.

7. The Sponsor, a Heritage Advisor and the BLCAC must discuss opportunities of avoiding and minimising harm to the Aboriginal cultural heritage. The Sponsor must avoid or minimise harm to the Aboriginal cultural heritage as the first priority.
8. Where harm cannot be avoided or minimised, and the identified Aboriginal cultural heritage is suitable for salvage excavation, then this must be undertaken by a qualified archaeologist in consultation with the BLCAC. The purpose of the salvage is to establish the extent, nature, and significance of the Aboriginal Place. A DGPS (with <1 m accuracy) must be used when mapping the cultural material and features. Any salvage methodology must be approved by the BLCAC. The objectives of the salvage must establish, but are not limited to:
  - a. The stratigraphy, with an emphasis of where the Aboriginal cultural heritage material was found (e.g. the context of the stratigraphic layer);
  - b. The chronological sequence (if possible) of the Aboriginal cultural heritage material, features, and/or remains;
  - c. The composition and characteristics of the Aboriginal cultural heritage; and
  - d. Whether there is any spatial variability or patterning of the Aboriginal cultural heritage investigated.
9. If the Aboriginal archaeological remains are assessed as being in-situ, appropriate age determinations to establish the age of the Aboriginal heritage must include Optically Stimulated Luminescence (OSL) when sufficient organic samples cannot be obtained for radiocarbon analysis (Carbon 14 dating). All Aboriginal cultural heritage material recovered from the activity area must be stored by a Heritage Advisor until the salvage excavation has been concluded.
10. A Heritage Advisor within three weeks of the salvage and associated analysis must submit any required VAHR place records or new place registrations.
11. The salvage excavation must be supervised by a person appropriately qualified in archaeology and be undertaken in accordance with Regulation 65(3-7) of the *Aboriginal Heritage Regulations 2018*, and the FP-SR Practice Note on Salvage Excavations.
12. A Heritage Advisor must lodge the final salvage report to the BLCAC and the VAHR no later than six months after the completion of the salvage excavation and analysis.
13. All costs associated with the procedures specified in this contingency must be organised and paid for by the Sponsor.
14. The activity may recommence within the 10 m exclusion area once:
  - a. All the procedures specified above have been followed; and
  - b. No dispute occurs as to the course of action(s) required.

## **2.5 Contingency 5 Removal, Custody, Curation and Management of Aboriginal Cultural Heritage During the Activity**

A Heritage Advisor must ensure that all Aboriginal cultural heritage (other than Aboriginal Ancestral Remains) recovered from the activity area either during the assessment phase of the CHMP or during subsequent salvage processes are managed in the following way:

1. A Heritage Advisor must fully document, package, and securely store all recovered cultural material until it is repatriated to the BLCAC.
2. A Heritage Advisor must submit all relevant documentation to the VAHR.
3. A Heritage Advisor may initially retain custody of the recovered cultural material for scientific analysis for a period of up to six months from the completion of the activity.

4. Within six months after the completion of the activity a Heritage Advisor must contact the BLCAC to arrange the repatriation of all cultural material recovered within the activity area.

Upon completion of the activity, a Heritage Advisor must repatriate all recovered cultural material to the BLCAC. The repatriation process must occur as follows:

1. All cultural material must be appropriately packaged in a durable container and sorted by archaeological context from which it was recovered.
2. The packaged cultural material must be accompanied by the relevant artefact catalogue as well as the nature, extent and significance statement for the associated place.
3. All relevant recording and documentation, including VAHR place record edits must be undertaken by a Heritage Advisor.
4. All costs associated with the repatriation must be met by the Sponsor.

Following the repatriation of the recovered cultural material to the BLCAC, should the BLCAC wish to rebury the recovered cultural material the following must occur:

1. Available space within the activity area must be set aside which is protected from future development or disturbance.
2. The location of the reburial area must be negotiated and agreed upon between the Sponsor and the BLCAC.
3. All cultural material must be appropriately packaged in a durable container and sorted by archaeological context from which it was recovered.
4. The packaged cultural material must be accompanied by the relevant artefact catalogue as well as the nature, extent and significance statement for the associated place.
5. The reburial of the cultural material must be conducted by the BLCAC Heritage Unit.
6. A smoking ceremony must be undertaken by a BLCAC representative during the reburial.
7. All relevant recording and documentation, including VAHR place record edits must be undertaken by a Heritage Advisor.
8. All costs associated with the reburial must be met by the Sponsor.

## **2.6 Contingency 6 Subdivision**

If the proposed activity is a subdivision as referred to in Regulation 49 of the *Aboriginal Heritage Regulations 2018*, any future activities undertaken within each lot created by the subdivision of the activity area must comply with the conditions and contingencies contained in this CHMP. Any future activities must be in accordance with the use and development of each lot permitted by the relevant planning scheme (see relevant appendix).

## **2.7 Contingency 7 Reviewing Compliance and Mechanisms for Remediating Non-compliance with the CHMP**

The Sponsor or nominated representative is responsible for remedying non-compliance with this CHMP. In the event that the conditions or contingencies set out in this CHMP are not adhered to, all works must cease, and the BLCAC contacted immediately. A record of the breach must be documented, and immediate action taken to remedy the breach, under the



direction of the BLCAC. The record of the breach must include the reasons for non-compliance. The Sponsor or nominated representative must take immediate action to remedy non-compliance in accordance with the relevant condition or contingency. All acts of non-compliance must be reported to both the BLCAC and FP-SR, which may result in an investigation by an Authorised Officer or Aboriginal Heritage Officer. A record of CHMP compliance must also be maintained by the Sponsor or nominated representative at all times and must be available for inspection by either an Authorised Officer or Aboriginal Heritage Officer under the *Aboriginal Heritage Act 2006* or any other representative of the BLCAC or FP-SR.

**Table 1 Compliance Checklist**

Conditions	Yes / No	If No...
<b>Ensuring Compliance</b>		
Have all the conditions in Section 1 of the approved Cultural Heritage Management Plan been met?		All works must immediately cease and the BLCAC contacted immediately. Refer to Section 1.
<b>Contingency Plans for Discovery of Aboriginal Heritage During Works</b>		
If suspected human remains have been identified, have all works immediately ceased and the Victoria Police, Coroner, the VAHC and the BLCAC been contacted as per the 5-step contingency plan in Contingency 4?		All works must immediately cease and the BLCAC and authorities contacted immediately. Refer to Contingency 4.
If a low density artefact distribution has been discovered, has the correct procedure been followed as per Contingency 4?		All works must immediately cease within a 10m buffer of the suspected heritage and the BLCAC contacted immediately. Refer to Contingency 4.
If an artefact scatter, stratified deposit and/or cultural feature has been discovered, has the correct procedure been followed as per Contingency 4?		All works must immediately cease and the BLCAC contacted immediately. Refer to Contingency 4.
<b>Removal, Custody, Curation and Management of Aboriginal Cultural Heritage During the Activity</b>		
Has the procedure been followed for the removal, custody, curation and management of Aboriginal cultural heritage discovered during works?		The BLCAC must be contacted immediately. Refer to Contingency 5.

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## PART 2 - ASSESSMENT

### 3 INTRODUCTION

This Cultural Heritage Management Plan (CHMP) has been commissioned by ESR Investment Management 1 (Australia) Pty Ltd as trustee for Pakenham Enterprise Road Property Trust (ABN 61 962 531 815). The activity is located at 92 Enterprise Road, Pakenham (**Map 1**). The proposed activity is the construction of a sediment pond and outlet pipe to Toomuc Creek.

#### 3.1 Reasons for Preparing this CHMP

This CHMP is required by the *Aboriginal Heritage Regulations 2018*. The activity area is an area of cultural heritage sensitivity (waterways, r.26 [1][2]) and the activity is a high impact activity (a utility installation, r.46 [1][a][b][xxvii][D]). The installation of a sediment pond and outlet pipe is a high impact activity (r. 46 *Aboriginal Heritage Regulations 2018*):

#### 3.2 Notice of Intent to Prepare a Cultural Heritage Management Plan (NoI)

A *Notice of Intent to Prepare a Cultural Heritage Management Plan* (NoI) was submitted to First Peoples - State Relations (FP-SR) by Tardis Archaeology Pty Ltd (TA) on the 1<sup>st</sup> of May 2023. The Sponsor and BLCAC was notified that the CHMP has been allocated CHMP No 19535. Cardinia Shire Council was also notified that a CHMP was being prepared (**Appendix 1**).

#### 3.3 Location of the Activity Area and Cadastre

The activity area is located at 92 Enterprise Road, Pakenham, approximately 62km southeast of Melbourne's CBD and comprises 0.388 ha (**Map 1**). The activity area cadastre is presented in **Table 2**.

**Table 2 Activity Area Cadastre & Landowner/Occupier**

Landowner/Occupier	Address	Parcel	Parish
N/A	92 Enterprise Road Pakenham 3810	RES1/LP98925	Cardinia

#### 3.4 Sponsor

The Sponsor is ESR Investment Management 1 (Australia) Pty Ltd as trustee for Pakenham Enterprise Road Property Trust (ABN 61 962 531 815).

#### 3.5 Heritage Advisor

Roland Weatherseed from Tardis Archaeology Pty Ltd (TA) is the Heritage Advisor and author of this CHMP. Dr Herman Kiriyama contributed to **Section 7.6**, Lucy Garland and Nicholas Arnold contributed to **Section 7.4**. For summary CVs see **Appendix 4**.

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### **3.6 Owners and Occupiers**

The owners and occupiers are shown in Table 2 (Section 3.3).

### **3.7 Registered Aboriginal Party (RAP)**

The Bunurong Land Council Aboriginal Corporation (BLCAC) is the Registered Aboriginal Party for the activity area.

### **3.8 Activity Advisory Group**

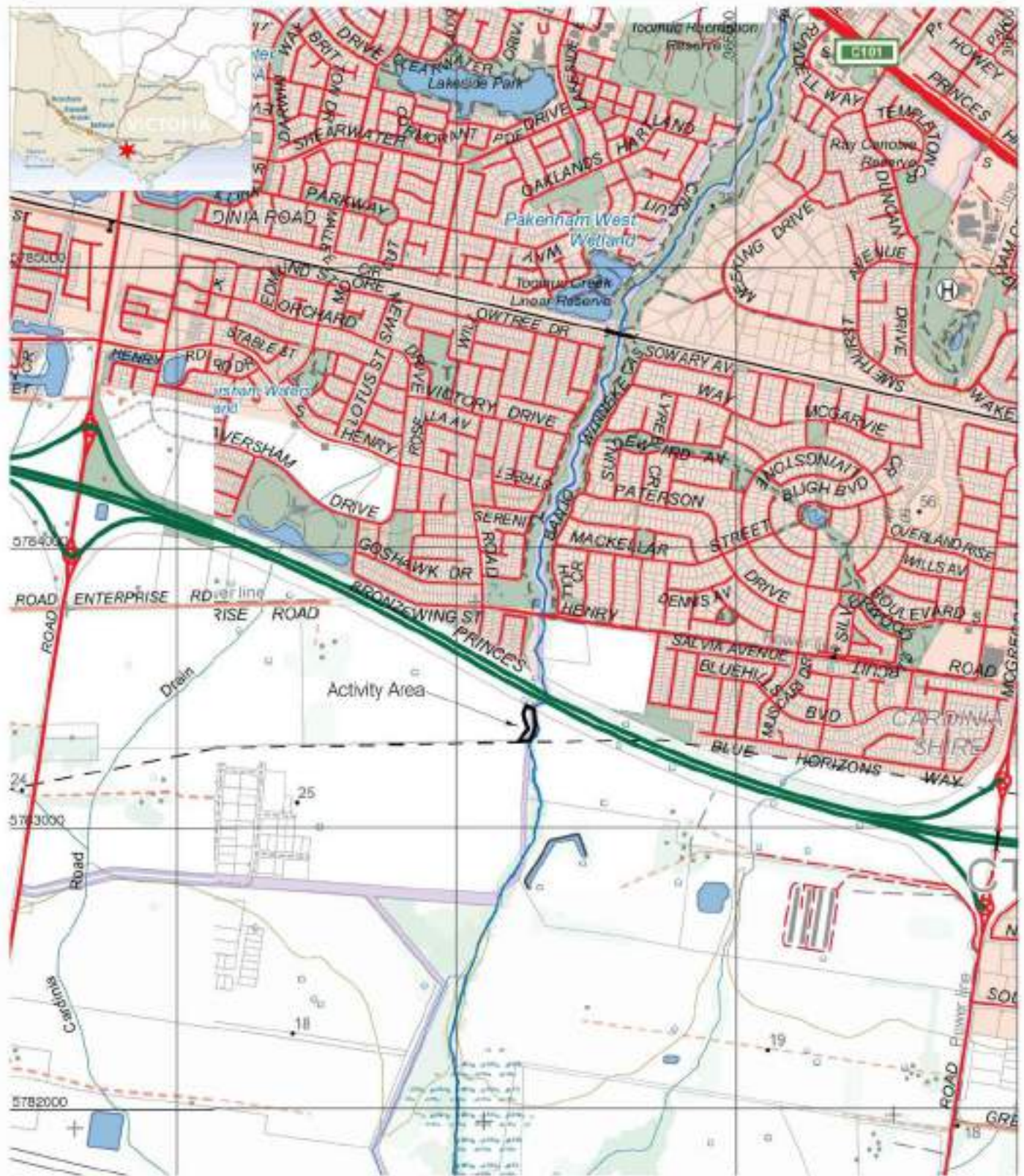
No Activity Advisory Group was appointed for this CHMP.

### **3.9 CHMP Evaluation**

The Bunurong Land Council Aboriginal Corporation (BLCAC) will evaluate the CHMP.


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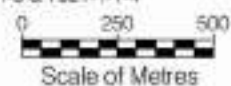


Topographic map used for Location Plan: 1:30,000 Number 7921-1-1-1, 7921-1-1-2, 7921-1-1-3 & 7921-1-1-4

**Legend:**

 Activity Area Boundary  
0.39 hectares (approx)

Parish: Pakenham  
LGA: Cardinia



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**Map 1 Activity Area Location**

#### 4 ACTIVITY DESCRIPTION

The activity is the construction of drainage infrastructure and earthworks to assist in managing water flows and water levels within the area. This shall include but is not limited to the following:

- Pipes
- Sediment basins
- Retention ponds
- Wetlands

These will involve but is not limited to:

- Excavation, trenching and filling works
- Supply and installation of drainage pipes
- Pits/end walls and associated rock beaching
- Access tracks and footpaths
- Filling may occur above existing levels as battering will be required
- The sediment pond may extend the entire length of the site frontage

Expected depths of impact:

- The maximum pipe depth up to 2.4m
- Pipe trench width of up to 1.2m
- The retention pond maximum depth up to 2m

While the use of the activity area is known, the exact footprint has yet to be determined, Therefore, the entire activity area is considered to be subject to significant ground disturbance.

Any ground disturbance will impact the present land surface and any buried former land surfaces, and any Aboriginal cultural heritage will be harmed by the activity. This assessment assumes that subsurface deposits (A-horizon) with any potential for Aboriginal cultural heritage within the activity area (that is, geological deposits formed within 50Ka during the period of inferred human occupation of southeast Australia) will be harmed by this activity.

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## 5 EXTENT OF THE ACTIVITY AREA

The activity area is located in Pakenham, approximately 62km southeast of Melbourne's CBD. The cadastral information is provided in **Table 2 (Section 3.3)**. The activity area comprises one parcel of land, located at 92 Enterprise Road, abutting Toomuc Creek to the west. The activity area is approximately 0.388 hectares in size.

92 Enterprise Road, Pakenham is currently zoned under the Urban Growth Zone (UGZ2). The activity area is bound to the north by the Princes Freeway, to the East by Toomuc Creek, to the south by 295 Cardinia Road, and by 92 Enterprise Road to the west.

The activity area resides within the Eastern Plains, Central Sunklands geomorphic unit of Victoria predominantly consisting of alluvial plains. The use of land and salient prominent structures and works in, and natural features of, the activity area:

### Natural Features

- Level Flood Plain land.
- Young indigenous bushes and trees.
- Invasive weeds.

### Structures and Works

- Fencing.
- Disturbance caused by east-west running drainage channels located at the northern and southern most boundaries of the activity area.

### 5.1 Relevant Local Municipality

The relevant local municipality is the Cardinia Shire (**Map 1**).


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Aerial Photograph: Courtesy of DPI Website



**Legend:**

 Activity Area Boundary  
0.388 hectares (approx)

Parish: Pakenham  
LGA: Cardinia

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**Map 2 Extent of Activity Area**

## 6 DOCUMENTATION OF CONSULTATION

### 6.1 RAP Representation & Participation

BLCAC appointed the following representatives (Table 3):

**Table 3 RAP Representation & Participation**

Name	Activity	Function
Casey Sweetman, Wayne Pepper.	Standard Assessment	Cultural Heritage Officers
Daniel Black, Issac Sainty, George Adidi, Nathan Kelly, Minta Franks, Natesha Austin, James Hughes, Michael Kelly, Graham Norris, Casey Sweetman, James Hume.	Complex Assessment	Cultural Heritage Officers
Renee McAlister, Steven Pepper.	Inception Meeting	Heritage Advisor Cultural Heritage Officer
Renee McAlister, Michael Heyenga.	Post-Standard Meeting	Heritage Advisors
Steven Pepper, Michael Heyenga.	Post-Complex Meeting	Cultural Heritage Officer Heritage Advisor

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### 6.2 RAP Meetings and Consultation

Meetings and consultation were conducted as follows (Table 4):

**Table 4 Meetings & Consultation**

Date	Meeting/Consultation	Discussion & Outcomes
08.06.2023	<b>Inception Meeting</b> Renee McAlister (BLCAC), Steven Pepper (BLCAC), James Cappellari (Dalton Consulting Engineers (DCE)), Chintan Jajal (ESR).	The plans for the proposed water drainage infrastructure were outlined. The results of the desktop assessment were discussed. A standard assessment was required to be undertaken.
08.08.2023	<b>Email</b> Roland Weatherseed (TA) to BLCAC and VAHR.	Roland Weatherseed emailed the BLCAC and VAHR advising the activity area has been changed from the original NOI. Location and extent maps, and new spatial data was sent to reflect the update. Email in <b>Appendix 1</b> .
16.08.2023	<b>Standard Assessment Results Meeting</b>	A meeting was held following the standard assessment to discuss the results, the extent

Date	Meeting/Consultation	Discussion & Outcomes
	Renee McAlister (BLCAC), Michael Heyenga (BLCAC), Nick McBain (ESR), Andrea Murphy (TA), Roland Weatherseed (TA), James Cappellari (DCE).	of disturbance and the potential for Aboriginal cultural heritage located in the activity area. It was decided that due to poor ground visibility, the potential for subsurface Aboriginal cultural heritage could not be properly assessed, and therefore a complex assessment was required.
11.04.2024	<b>Complex Assessment Results Meeting</b> Steven Pepper (BLCAC), Michael Heyenga (BLCAC), Nick McBain (ESR), Jonathon Chapman (ESR), Kithsiri Amarakoon (ESR), Roland Weatherseed (TA), Andrea Murphy (TA).	A meeting was held following the complex assessment to discuss the results. Because no Aboriginal cultural heritage was found, BLCAC requested standard conditions and contingencies. BLCAC were requested to provide a statement of significance for the activity area.
13.08.2024	<b>Email</b> Roland Weatherseed (TA) to BLCAC.	Roland Weatherseed emailed BLCAC to notify them that the sponsor details and ABN had been changed from what was originally within the NOI. Email in <b>Appendix 1</b> .

### 6.3 Summary of Consultation Outcomes

The consultation outcomes are:

1. BLCAC was consulted about the standard and complex assessment methodology.
2. BLCAC fieldwork representatives participated in and were consulted throughout the assessment.
3. BLCAC was requested to provide knowledge of oral tradition or cultural heritage specific to the activity area for inclusion in the CHMP.
4. BLCAC was consulted regarding the Conditions.
5. All relevant stakeholders and databases were consulted and reviewed.

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## 7 DESKTOP ASSESSMENT

### 7.1 Victorian Aboriginal Heritage Registry Access and Search

The Aboriginal Cultural Heritage Register and Information System (ACHRIS) was accessed by for reports and places on the 1<sup>st</sup> of May 2023 by Lucy Garland and 21<sup>st</sup> May 2024 by Roland Weatherseed.

### 7.2 Relevant Geographic Region

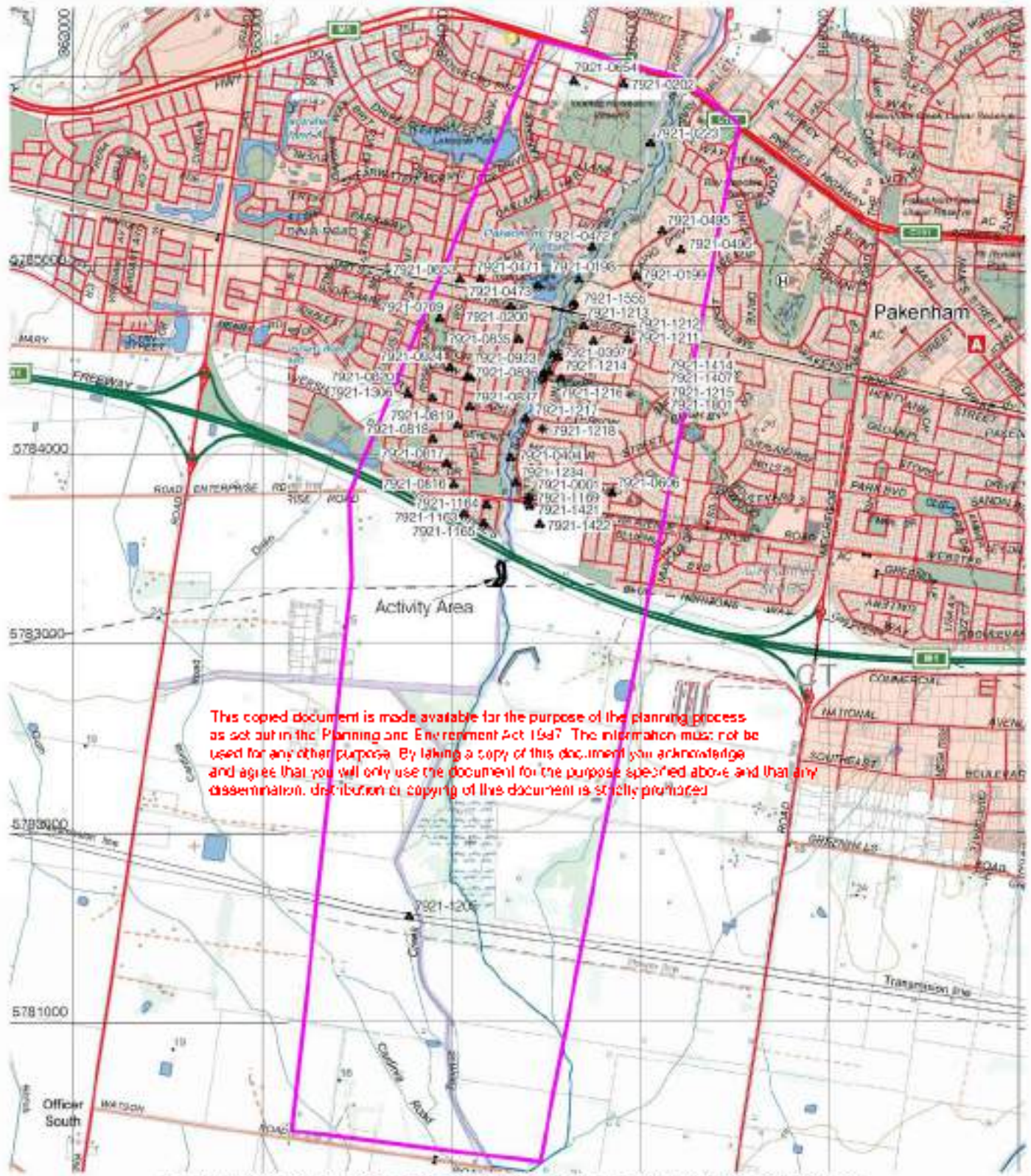
The geographic region relevant to this investigation is land within 1km of Toomuc Creek (**Map 3**). This land comprises a range of landforms including the alluvial floodplains associated with the former Koo Wee Rup Swamp and the banks of Toomuc Creek. This area is considered to contain a large enough sample of landforms, features and associated cultural heritage to formulate a site prediction model for the activity area.

### 7.3 Map of the Relevant Geographic Region

The boundary of the geographic region is shown in **Map 3**.

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Topographic map used for Location Plan: 1:30,000 Number 7921-1-1-1, 7921-1-1-2, 7921-1-1-3 & 7921-1-1-4

**Legend:**

- Activity Area Boundary  
0.39 hectares (approx)
- Geographic Region Boundary
- Artefact Scatter
- Object Collection
- Low Density Artefact Distribution

**Map 3 Geographic Region**

## 7.4 Registered Aboriginal Places in the Relevant Geographic Region

ACHRIS shows there are no Aboriginal cultural heritage (Aboriginal places) within the activity area or within 200m of the activity area boundary.

### Place Types

There are 48 previously registered Aboriginal places within the geographic region (**Table 5, Appendix 3, Map 3**). Places are dominated by stone artefact scatters (n=46, 95.8%), followed by low density artefact distributions LDADs (n=2, 4.2%).

**Appendix 3** lists all previously registered sites within the geographic region

**Table 5 Place Types within the Relevant Geographic Region**

Place-Type	Number	Percentage
Stone Artefact Scatter	46	95.8%
LDAD	2	4.2%
<b>Total</b>	<b>48</b>	<b>100%</b>

### Places Subject to Dating

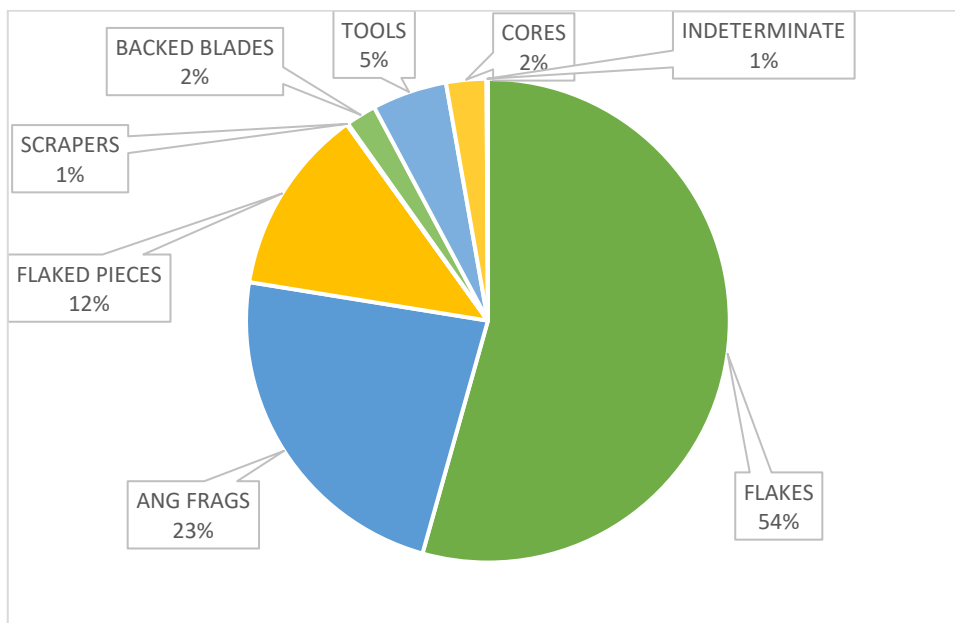
There are no sites in the geographic region that have been subject to dating. No organics suitable for dating have been identified within any sites within the geographic region.

### Stone Artefact Primary Form

The primary form of the geographic region assemblage is dominated by flakes (n=586, 54%), followed by angular fragments (n=250, 23%), flaked pieces (n=135, 12%), tools (n=54, 5%), cores (n=29, 2%), backed blades (n=22, 2%), and followed by scrapers (n=1, 1%) and indeterminate (n=1, 1%) (**Chart 1**).

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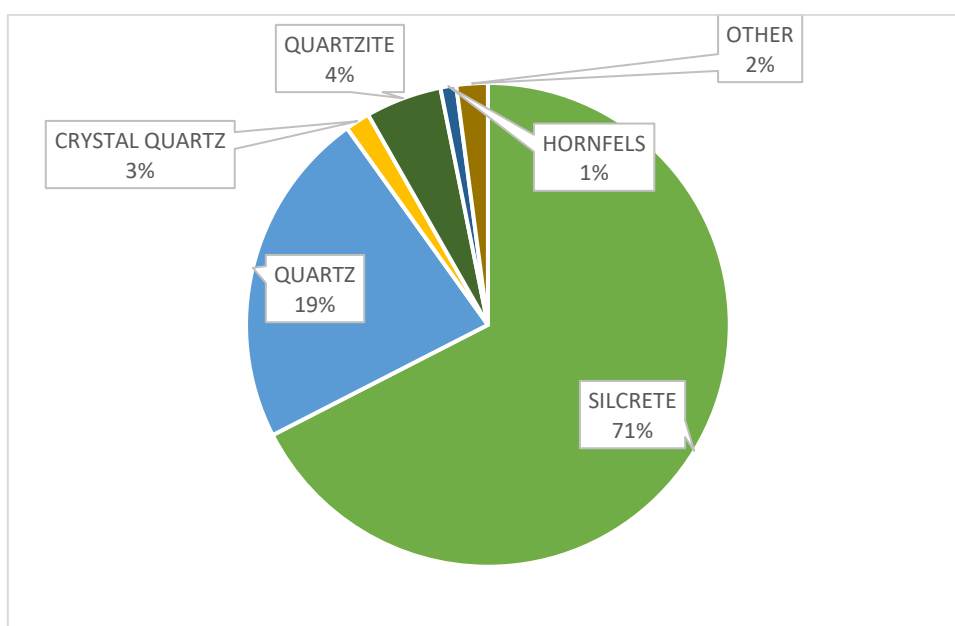
**Chart 1 Stone Artefact Primary Forms**



**Stone Artefact Raw Materials**

Raw material type in the geographic region assemblage is dominated silcrete which comprises 71% (n=667) of the assemblage, followed by quartz which comprises 19% (n=184) of the assemblage. Smaller quantities of quartzite (n=39, 4%) and crystal quartz (n=29, 3%) are present, and a small amount of hornfels (n=7, 1%). Other raw materials (n=14, 2%) have also been recorded (Chart 2).

**Chart 2 Stone Artefact Raw Materials**



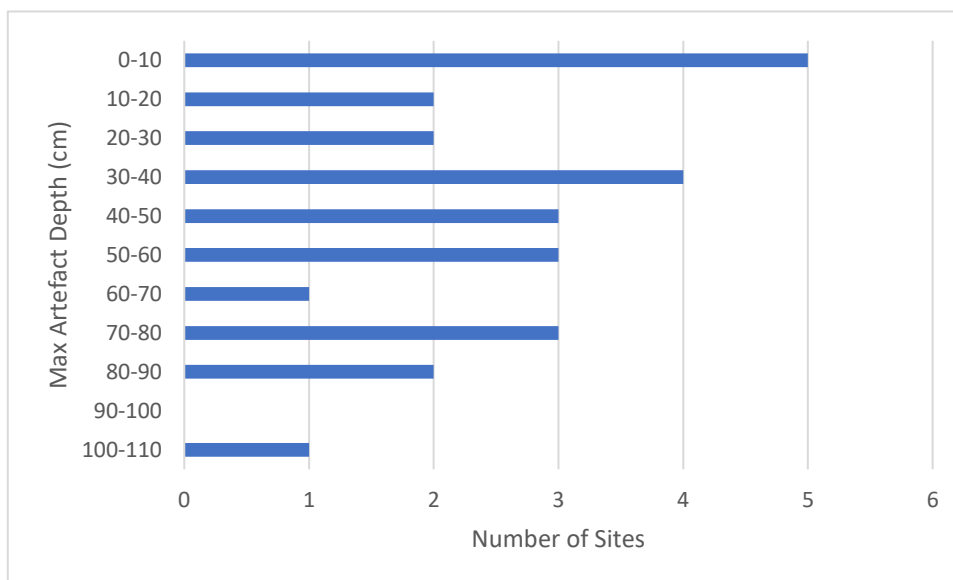
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## Artefact Depth

Subsurface artefacts were recorded at all but one place. Stone artefacts (38%) were most commonly recorded as being between 30 and 60cm depth in alluvial terraces or floodplains. Common soil profiles consisted of dark brown silty sediment over clay. The maximum depth stone artefacts were recorded at was 110cm at VAHR 7921-1422 in an alluvial terrace along Toomuc Creek.

**Chart 3 Maximum Artefact Depths**



## Landform

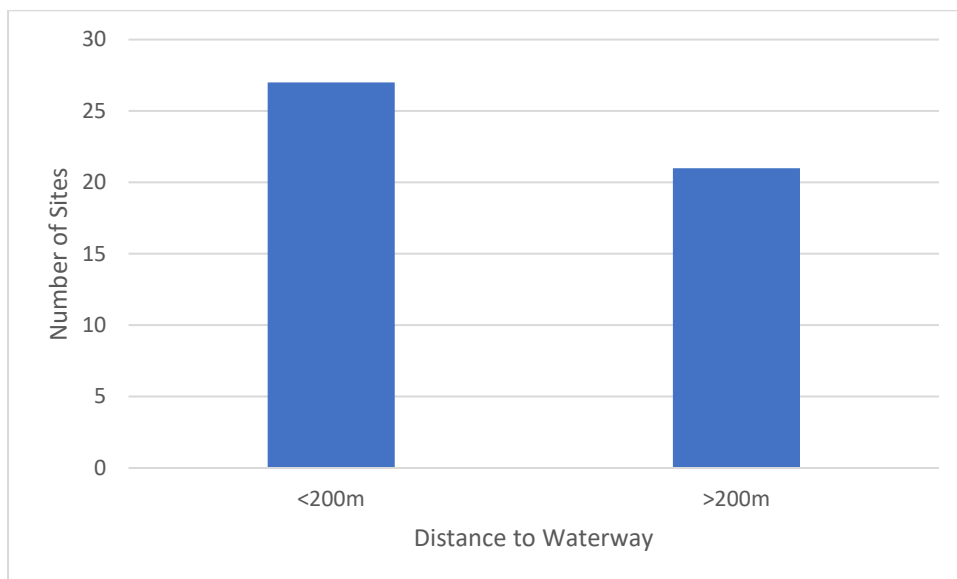
Aboriginal places are predominately found on floodplains (n=16, 33%) and alluvial terraces (n=12, 25%), followed by plains (n=8, 16%), levee/banks (n=7, 14%), creek lines (n=3, 8%), undulating slope (n=1, 2%), and rise (n=1, 2%).

## Distance from Waterways

There is a strong correlation between stone artefact scatters and distance from waterways. The majority (56%) of stone artefact scatters are located within 200m of a waterway, with 35% located within 100m of a waterway. Only four places (8.3%) are located 500m or more from a water source. The major waterway in the geographic region is Toomuc Creek, which is the closest water source for all places (**Chart 4**).

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**Chart 4 Site Distances from Waterways**



**Artefact Density**

The average density of stone artefact scatters is low being 2.47 per m<sup>2</sup>. The highest density of stone artefacts was recorded at 5.5 per m<sup>2</sup>. Measurements of density were only captured in the data from sixteen (33%) Aboriginal places. Three outliers in the data are sites VAHR 7921-0924, VAHR 7921-1211 and VAHR 7921-0654 whose estimated artefact density is 5.5 artefacts per m<sup>2</sup>, 5 artefacts per m<sup>2</sup> and 2.1 artefacts per m<sup>2</sup> respectively.

**Site Condition**

The condition of stone artefact scatters in the geographic region was recorded as being very poor to poor (n=21, 43.8%) or fair to excellent (n=14, 29.2%). The condition of thirteen Aboriginal places (27%) was not recorded (Chart 5).

**Chart 5 Site Condition**





## Summary

The stone artefact assemblage suggests that Aboriginal places are most likely to be found on both floodplains and alluvial terraces in proximity to a waterway. These are most likely to contain flakes, angular fragments, and tools. Silcrete and quartz are the most likely raw materials to be found. It is indicated that they are likely to be found in both surface and subsurface contexts, up to 110cm deep but more commonly at a depth of 30 to 60cm.

A summary of place attributes in the geographic region is found in **Table 6**.

**Table 6 Summary of Stone Artefact Sites Attributes in the Geographic Region**

Attribute	Details
Place type	Stone Artefact Scatter (n=45, 93.8%), LDAD (n=1, 4.2%).
Artefact Primary Forms	Flakes (n=586, 54%), angular fragments (n=250, 23%), flaked pieces (n=135, 12%), tools (n=54, 5%), cores (n=29, 2%), backed blades (n=22, 2%), scrapers (n=1, 1%) and indeterminate (n=1, 1%).
Artefact raw materials	Silcrete (71%), quartz (20%), quartzite (4%), crystal quartz (3%) are present. A small amount of Hornfels (1%), basalt (<1%), chert (<1%), and indeterminate (1%) have also been recorded.
Artefact density	Average artefact density = 2.47/m <sup>2</sup>
Landform	Floodplains (n=16, 33%), alluvial terrace (n=12, 25%), levee/bank (n=7, 14%), flat and (n=5, 10%), creek lines and plains (n=3, 6%), and rises and undulating slopes (n=1, 2%).
Distance from waterways	27 Aboriginal Places located within 200m of a waterway. 21 Aboriginal Places located more than 200m of a waterway.
Site Condition	Poor (n=17), fair (n=9), good (n=4), very poor (n=4), and excellent (n=1). Thirteen places did not record site condition.

## 7.5 Reports in the Relevant Geographic Region

### Regional Investigations

ACHRIS shows there are several regional or large-scale investigations that include the current activity area (Smith 1991; du Cros and Rhodes 1998; Luebbers 2001; Murphy 2006; Murphy and Rymer 2007a; Murphy and Rymer 2007b).

Smith (1991) undertook an archaeological assessment of the Berwick – Pakenham corridor, extending either side of the Princes Highway between Dandenong and Bunyip, including the activity area. Selected locations within four landscape types (undulating hills, lowland plains, floodplains and Cranbourne Sands) were surveyed and a total of 62 new Aboriginal places were identified, including fifteen scarred trees and 47 artefact scatters. Scarred trees mainly occurred near creeks and rivers, and artefact scatters are situated in all landscape units. The site prediction model noted places would likely occur within 100 and 200m of creeks and waterways, and in marshy areas sites would likely be found on high ground or

risers. Artefact scatters were predicted as the most common site type, and quartz as the most likely materials found.

**du Cros and Rhodes (1998)** undertook a desktop assessment of the waterways and floodplains of greater Melbourne. Waterways and floodplains were given a system of classification based on their potential Aboriginal archaeological sensitivity, as having high, low, multiple, or as having unknown potential or integrity. Watercourses including Toomuc Creek were considered to have high archaeological sensitivity. It was recommended that waterways identified as having high or unknown potential Aboriginal archaeological sensitivity undergo detailed assessment by archaeologists and the Aboriginal community groups in that area.

**Luebbers (2001)** undertook a desktop assessment, archaeological survey, and sub-surface testing for 6.2 kilometres of land along Toomuc Creek, Henry Road and private land, Pakenham. The desktop assessment identified land along Toomuc Creek as being sensitive for Aboriginal places. During the pedestrian survey two new Aboriginal places were identified: VAHR 7921-0397 [Toomuc Creek 8], a mudstone scraper, and VAHR 7921-0404 [Toomuc Creek 9] comprising five small quartz flakes on an embankment. Sub-surface testing within the activity area involved mechanical scrapes along 200 metres of the creek alignment to a maximum depth of 80cm. No new Aboriginal places were uncovered during the sub-surface testing, however, four additional artefacts associated with VAHR 7921-0404 [Toomuc Creek 9] were located after heavy rains fell over the activity area.

### Small Scale Investigations

ACHRIS shows there are numerous local investigations in the geographic region. The majority of these were conducted prior to the introduction of the *Aboriginal Heritage Act 2006*. These investigations have the following characteristics:

- The majority are desktop or paper or due diligence or other (n=9) followed by survey and test excavation (n=8), salvage excavation made up the least (n=3).
- Nineteen investigations discovered Aboriginal places.
- Stone artefact scatters and low density artefact scatters were the most common site type to occur.
- Landforms within the geographic region considered to have the highest archaeological potential are creeks, alluvial plains or terraces, and undulating hills, particularly if nearby/overlooking a watercourse. Cultural Heritage Management Plans.

### Cultural Heritage Management Plans

ACHRIS shows that several CHMPs have been prepared within the geographic region (Clagget 2021; Burch & Evans 2020; Murphy *et al* 2018; Green & Verduci 2016; Albretch 2015; Matthews & Albretch 2013; Murphy & Morris 2012; Cummins *et al* 2012; Toscano *et al* 2011; Young & Rhodes 2010; Murphy & Rymer 2010; Rhodes *et al* 2010; Lane *et al* 2010; Patterson 2009; Murphy & Rymer 2008). These reports are summarised in the following table.

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**Table 7 Summary of Previous CHMPs within the Geographic Region**

CHMP No, Location & Activity	Project Extent & Distance from Activity Area	Areas of Sensitivity in Desktop or Standard Assessment	Relevant Assessment	Sites in the Activity Area & Scientific Significance
10161 (Murphy & Rymer 2008a) Lot A & Lot 1 Henry Road, Pakenham; Residential Subdivision	60ha; 500m NE	Land within 200m of a waterway	CA excavated 33m <sup>2</sup> , ACH found	VAHR 7921-0200 [Low] VAHR 7921-0769 [High] VAHR 7921-0816 [Very Low] VAHR 7921-0817 [Very Low] VAHR 7921-0818 [Very Low] VAHR 7921-0819 [Very Low] VAHR 7921-0820 [Very Low] VAHR 7921-0835 [Very Low] VAHR 7921-0836 [Very Low] VAHR 7921-0837 [Very Low] VAHR 7921-0923 [Very Low] VAHR 7921-0924 [Very Low]
10636 (Jenkins & Paterson 2009) Officer South Road, Mary Street, Pakenham Bypass, Mcgregor Road, and Greens Road; Sewerage Pipeline Construction	27ha; 1.8km SE	Land within 50m of a previously registered site; Land within 200m of a waterway; Land within 200m of a prior waterway	CA excavated 20.5m <sup>2</sup> , ACH found	VAHR 7921-0601 [Moderate]

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CHMP No, Location & Activity	Project Extent & Distance from Activity Area	Areas of Sensitivity in Desktop or Standard Assessment	Relevant Assessment	Sites in the Activity Area & Scientific Significance
10961 (Lane et al 2010) Lyrebird Avenue, Pakenham; Residential Subdivision	17.7ha, 600m NE	Land within 50m of a previously Registered site; Land within 200m of a waterway	CA excavated 84.5m <sup>2</sup> , ACH found	VAHR 7921-0397 [Low] VAHR 7921-0404 [Low] VAHR 7921-1211 [Moderate] VAHR 7921-1212 [Low] VAHR 7921-1213 [Low-Moderate] VAHR 7921-1214 [Low] VAHR 7921-1215 [Low] VAHR 7921-1216 [Low] VAHR 7921-1217 [Low] VAHR 7921-1218 [Low]
11081 (Rhodes et al 2010) Henry Road, Pakenham; Residential Subdivision	5.44ha, 400m NE	Land within 200m of a waterway	CA excavated 17.02m <sup>2</sup> , ACH found	VAHR 7921-0001 [High] VAHR 7921-1234 [Low]
11042 (Murphy & Rymer 2010) Henry Road to Cardinia Road; Road Construction	21ha, 200m NE	Land within 50m of a previously registered site; Land within 200m of a waterway	CA excavated 15m <sup>2</sup> , No ACH found	VAHR 7921-1169 [Low]
10916 (Young and Rhodes 2010) Lot 1 Henry Road, Pakenham; Residential Subdivision	3.941ha, 150m NW	Land within 200m of a waterway	CA excavated 281m <sup>2</sup> , ACH found	VAHR 7921-1163 [Moderate] VAHR 7921-1164 [Low] VAHR 7921-1165 [Moderate]
11555 (Toscano et al 2011) Intersection of Cardinia Road & the Princess Freeway; Residential Subdivision	52.74ha, 150m N	Land within 200m of a waterway	CA excavated 33.6m <sup>2</sup> , ACH found	VAHR 7921-1306 [Low] VAHR 7921-1307 [Low]

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CHMP No, Location & Activity	Project Extent & Distance from Activity Area	Areas of Sensitivity in Desktop or Standard Assessment	Relevant Assessment	Sites in the Activity Area & Scientific Significance
12135 (Cummins et al 2012) 56-165 Henry Road, Pakenham; Athletics and Soccer Recreation Reserve	10ha, 120m E	Land within 50m of a previously registered site; Land within 200m of a waterway	CA excavated 35.8m <sup>2</sup> , ACH found	VAHR 7921-1421 [Moderate] VAHR 7921-1422 [Moderate]
12795 (Mathews & Albretch 2013) Watergrass Estate, Pakenham; Outfall Pipe.	0.108ha, 122m E	Land within 200m of a waterway	CA excavated 5m <sup>2</sup> , no ACH found	N/A
13274 (Albretch 2015) Cranbourne to Pakenham rail corridor; Rail upgrade	47.7km length, 1.3km N	Land near waterways, dunes, sand sheets and the Koo Wee Rup Plain; Land within 50m of a previously registered site	CA excavated 57.4m <sup>2</sup> , ACH found	VAHR 7921-1390 [Low] VAHR 7921-1553 [Low] VAHR 7921-1554 [Low]
14164 (Green 2016) Caulfield to Dandenong rail corridor; Rail Upgrade	68.3km length, 1.3km N	Land near waterways, Dunes, Sand sheets, and the Koo Wee Rup Plain; Land within 50m of a registered site	CA excavated 5m <sup>2</sup> , no ACH found	VAHR 12.4-25 [Low] VAHR 7921-1552 [Low] VAHR 7921-1553 [Low] VAHR 7921-1554 [Low] VAHR 7922-0205 [Moderate] VAHR 7922-1390 [Low] VAHR 7921-0238 [Moderate] VAHR 7921-0928 [None] VAHR 7921-1451 [Low]

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CHMP No, Location & Activity	Project Extent & Distance from Activity Area	Areas of Sensitivity in Desktop or Standard Assessment	Relevant Assessment	Sites in the Activity Area & Scientific Significance
15789 (Murphy, Skelly and Stammers 2018) 900 Princes Highway, Pakenham; Retail Shopping Village	2.2ha, 2.5km N	Land within 50m of a registered site	CA excavated 13.6m <sup>2</sup> , no ACH found	N/A
16877 (Burch & Evans 2020) Toomuc Creek, bounded by Growler Street and Winneke Way; Footbridge	0.099ha, 900m NE	Land within 200m of a waterway	CA excavated 5m <sup>2</sup> , ACH found	VAHR 7921-1801 [Low]
17580 (Clagget 2021) Rail Corridor between Toomuc Creek and Oakview Lane; Level Crossing Removal	145ha, 1.3km NE	Land within 50m of a registered site; Land within 200m of a waterway	CA excavated 13m <sup>2</sup> , ACH found	VAHR 8021-0385 [Low] VAHR 8021-0379 [Low] VAHR 8021-0163 [Low] VAHR 8021-0186 [Low] VAHR 8021-0460 [High] VAHR 8021-0467 [Low] VAHR 8021-0468 [Moderate] VAHR 8021-0469 [Low]

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## Investigations Adjacent to the Activity Area

**Murphy and Morris (2012)** carried out a CHMP (10656) for the Cardinia Road Employment Precinct (CREP) situated south of the Pakenham Bypass and immediately abutting the western edge of the current activity area. The desktop assessment indicated that the activity area was likely to contain Aboriginal cultural heritage. The standard assessment found two surface artefacts. The complex assessment comprised five 1m x 1m and eight 0.4m x 0.4m test pits. A total of one stone artefact was recovered from 1 of 62 test holes and two transects. The results of the desktop, standard and complex assessment confirmed that the activity area has a low potential to contain low density (<30/m<sup>2</sup>) stone artefact scatters. Two new Aboriginal cultural heritage places (stone artefact scatters VAHR 7921-1204 & 1205) were located within the activity area. Both these places were located on floodplains associated with the margins of the Koo Wee Rup Swamp. Both places were attributed low scientific significance, and harm was permitted to both places.

## 7.6 History and Ethnohistory in the Relevant Geographic Region

Historic and ethnohistorical information of Aboriginal occupation of the geographic region referred to in Section 3 (r.61(1)(d) *Aboriginal Heritage Regulations 2018*) is used to establish pre-settlement Aboriginal spatial organisation. Apart from archaeological and ethnohistorical evidence, the majority of information regarding Aboriginal peoples and their lifeways comes from observations made by Europeans during the initial period of contact and subsequent settlement of the activity area. Early historical accounts of Aboriginal land use within and surrounding the activity area are scant, with most information provided by Assistant Aboriginal Protector Thomas (Thomas Journals 1840-1843) and early European landowners of the area. It was William Thomas who saw the need to provide a settled life for the Aborigines and established protectorate stations, first at Arthur's Seat (1839-40) and then at Narre Warren (1840-43).

The activity area lies within the traditional lands of the Bunurong/Boon wurrung tribe. The Bunurong/Boon wurrung (Western Port) tribe belonged to the inter-marriage network and language ties group known as the *Kulin* that inhabited areas around Melbourne. The *Kulin* were a confederation of five language groups; the *Bunurong/Boon wurrung*, *Woiworung*, *Jajowrong*, *Taunguon* and *Wathaurong* (Presland 1994: 40). that shared mutual economic and social relationships. They shared religious beliefs, having common creation legends and dreamtime ancestors. These religious beliefs formed the basis for social organisation and management of land and resources. *Kulin* people were affiliated with either one of two religious groups named after dreamtime ancestors (*Bunjil* – Eaglehawk, *Waa* – crow). Affiliation was determined by birth and established marriage relationships (Clark 1990).

The *Bunurong/Boon wurrung* clan whose estate included the activity area were the *Mayone buluk* meaning people of the swamp (Clan 2, Map 7). Their territory is thought to have been 'Carrum Swamp, the coastal strip at the head of Western Port, and the upper portion of the Mornington Peninsular' (Barwick 1984: 177). The clan was patrilineal and belonged to the *bunjil* moiety system. Clan leaders were known as *arweet*, and the leader at the time of European contact was *Mortrungo* (1797/8 – 1848), his heir was *Buggup* (1820 – 1848), who was a corporal in the Native Police Corps. A Dr Bailey also recorded much ethnographic information during the 1840s cites clan member *Manmangenur* (ca 1821 – 1845) as a recognised authority within this group (Barwick 1984: 117).

There is little ethnographic information of the lifestyles of the *Mayone buluk* clan at the time of European settlement. The few instances and recollections cited by early residents make no reference to clans or clan estates, movements, or names. However, information cited within local histories can be assumed to be that of Mayone buluk clan members.

Thomas was appointed Assistant Protector in 1839, in charge of the welfare of Aboriginal people in the Western Port and Gippsland districts. From 1839 to 1841 Thomas worked from a hut near Arthur's Seat. Thomas saw the demise of the Aboriginal people once they moved to Melbourne and made concerted efforts to encourage them to settle in agricultural areas. However, this attempt to keep Aboriginal people out of Melbourne was a failure, and by 1843 Thomas was totally preoccupied with keeping order in the Aboriginal camps around Melbourne and visiting Aboriginal people in jail. In 1850, the Protectorate system was abolished (**Sullivan 1981: 15**).

The journals Thomas kept during his period at Arthur's Seat are of particular interest as the Aboriginal people in this area were then still practising aspects of their traditional lifestyle. In 1839, European settlement had already severely affected the Aboriginal population as Thomas counted only 83 members of the Bunurong/Boon wurrung tribe remaining (**Sullivan 1981: 17**). As a result of granting grazing licenses, Aboriginal people became dispossessed of their land and were forced to rely on handouts of food from Thomas and other settlers.

Recorded Aboriginal activity appears to focus on a large waterhole on Cardinia Creek (northern end of Akoonah Park, Berwick) where they speared fish and would use these to barter for other food from local settlers such as Robert Henry. Fish were both plentiful and larger than the milk dish in which they were carted by the Aboriginals (**Beaumont et al 1979: 13**).

The Bunurong/Boon wurrung was one of the first groups of Aboriginal people to feel the full impact of European settlement. Aboriginal population numbers decreased rapidly after European settlement of the Mornington Peninsula due to dispossession of land and associated resources, and the spread of diseases brought into the area by European settlers. Thomas notes that their mortality rates were dramatic, with numbers declining to 28 in 1850 (**Sullivan 1981: 18**). Several hostilities occurred during the early period of European contact and contributed to the decline in Bunurong/Boon wurrung population. The Bunurong/Boon wurrung were last seen on the southern Peninsula in 1856 (**Byrne 1932: 183**). The remaining mainland members then moved to a small reserve at Mordialloc. By 1856, the remaining Bunurong/Boon wurrung lived mostly at 'Moody Yallock' (Mordialloc), exploiting the resources of the swamp and adjacent coastline.

By the 1860s the traditional Aboriginal owners had been dispossessed of their land and food resources. The dense scrub that characterised the low-lying area for much of its early settlement period would have hampered both European and Aboriginal movement. There are no recorded Aboriginal pathways through this region; however, it can be assumed that at least some of the present-day roads through the area may have originally followed narrow tracks established and maintained by local Aboriginal people. Most early settlers initially followed the tracks of explorers McMillan (1839) and Strzelecki (1840) that kept to the lower foothills (**BPHS 1982: 30**). It is possible that these explorers were following pre-existing Aboriginal pathways.

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Thomas and early settlers in the Western Port region have recorded aspects of the seasonal movements by the Bunurong/Boon wurrung through their territory. Gaughwin (1981: 75) considers that the Bunurong/Boon wurrung continued their seasonal exploitation in a circular pattern from Melbourne to the Mornington Peninsula. This trip was thought to take about one month with an average stay of one to two nights at each campsite while the resources within a 10-kilometre radius were exploited (Sullivan 1981: 37). It appears from Thomas' descriptions that larger base camps utilised during this route were located roughly 5 kilometres inland, suggesting that coastal, wetland and hinterland forest could be readily exploited from these base camps. Base camps consisted of six to eight huts made from a lean-to of bark sheets.

## 7.7 Landform and Geomorphology in the Activity Area

### Geology

*Geological unit:* Alluvium (Qa1)

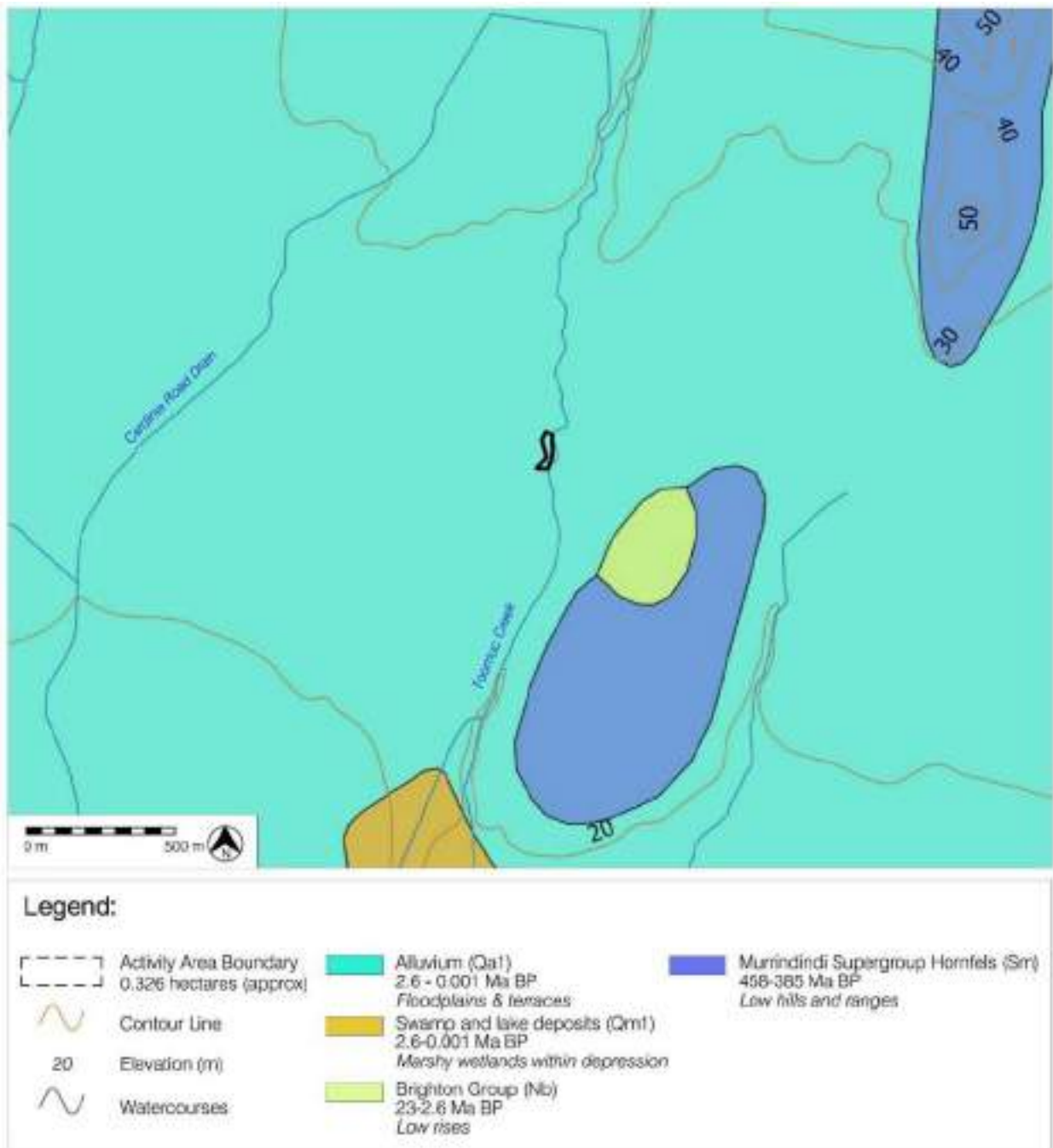
*Age:* Pleistocene - Holocene (2.6-0.001 Ma BP)

The activity area lies on Pleistocene to Holocene (2.6-0.001 Ma BP) alluvium which forms low-gradient alluvial fans which are fed by south-flowing streams and creeks (Figure 1) (Welch et al 2011). The sediments form levee banks, overbank deposits, and back swamps consisting of interbedded shoestring sands, silt, clay, and gravel.

This unit is primarily derived from weathering and erosion of Palaeozoic bedrock, particularly fine-grained sedimentary rocks, to the north. The eroded sediments have been transported by south-flowing streams in periods of high flow output such as periodic flooding and/or increased precipitation over a substantial period of time, and can reach depths of up to 60m (Hills 1942; Welch et al 2011). Grain size of the sediments typically decreases further away from the source areas and stream channels, as water velocity and carrying capacity decreases the further flood waters get from where the river broke its bank.

The expected natural soil profile consists of mid brown silt topsoil overlying finely laminated grey and brown sandy silt flood sediments, which is underlain by mottled grey and orange clay (Figure 2). Depths of the sterile clay can range between 30cm and 1.5m from the surface.

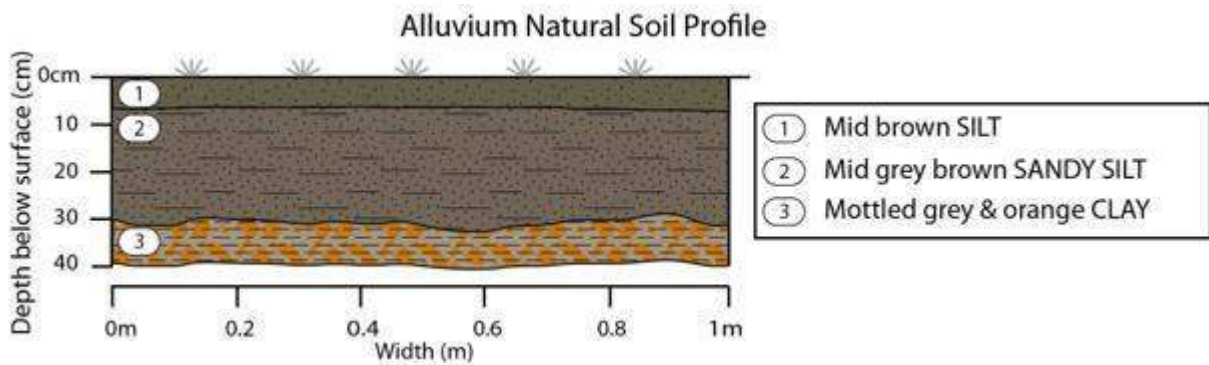
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**Figure 1 Landscape & Geology of the Activity Area & Surround Region (Welch *et al.* 2011)**

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**Figure 2 Soil Profile of the Activity Area Sediments (Northcote *et al.* 1975; Jackson *et al.* 1972)**

### Geomorphology & Landform

The activity area resides within the Eastern Plains, Central Sunkslands geomorphic unit of Victoria and a third-tier classification of alluvial plains (GMU 7.1.2) (Figure 3) (Joyce *et al* 2003). These landscapes are characterised by plains dissected by streams in response to past drops in sea level, forming gently undulating hills, floodplains, and stream terraces (Joyce *et al* 2003).

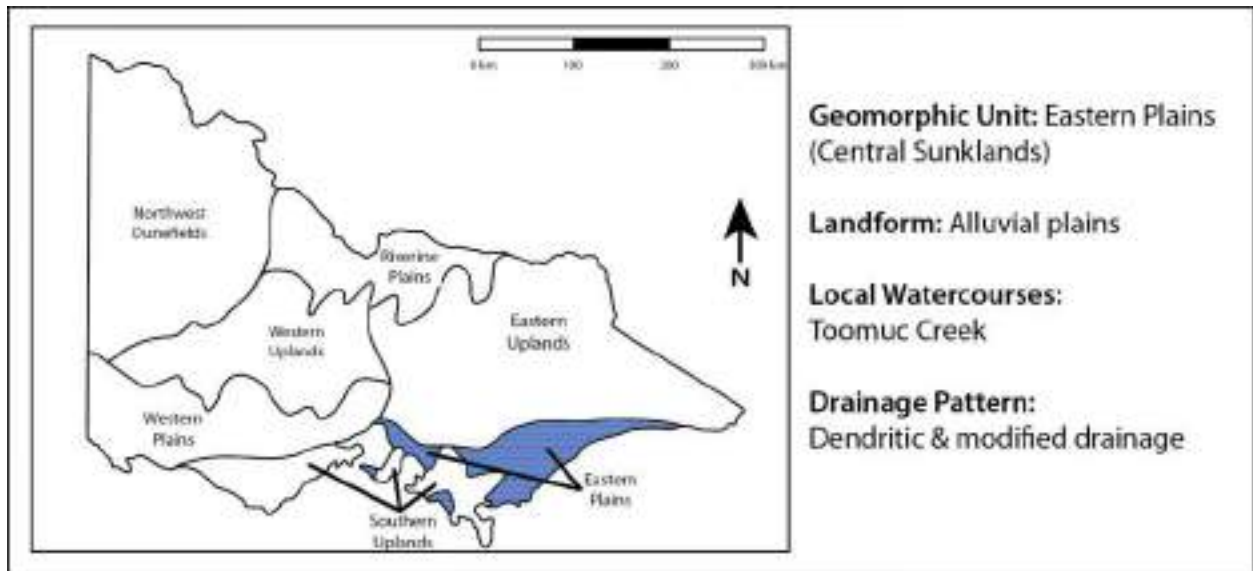
Due to the dissected nature of the plain, there is a distinct gradient of soil age from the upper slopes to the base of the valleys, decreasing in age towards the base of the valleys. This is caused by the constant movement of weathered material from the slopes, resulting in a low residence time of surface material. The local streams have entrenched themselves into a dendritic drainage pattern, particularly on Toomuc Creek as it flows along the edge of the activity area (Figure 1).

During periods of heavy rainfall, low-lying floodplains (elevation 20 – 40 m above sea level) would have also been inundated at regular intervals causing the stream to break its shallow banks and extend out over the adjacent plain. Over time, this would have created a low-elevation, low-relief floodplain with natural levee banks containing deposits of fine textured and unconsolidated deposits. The underlying alluvium are fluvial deposits by multiple tributaries flowing from the dissected Eastern Uplands to the north (Welch *et al* 2011).

Most watercourses in the area have been excavated to drain the landscape for agricultural use, and it is likely that a large proportion of these streams were once natural ephemeral watercourses that fed the prior swamp. Upon draining of these watercourses, the base level of the landscape was lowered, resulting in the formation of an erosive fluvial environment.

The closest named stream to the activity area is Toomuc Creek, which lies approximately 100 m to the west and 30 m to the east. Other notable creeks include the Lower Gum Scrub Creek approximately 2.2 km west, Deep Creek approximately 4.7 km east, and Cardinia Creek approximately 5.8 km northwest (Welch *et al* 2011).

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**Figure 1 Geomorphological Information Regarding the Activity Area's Framework (Joyce et al. 2003)**

### Geomorphological History

**Table 8 Geomorphological History for the Activity Area (Hills 1942; White & Mitchell 2003; Joyce et al 2003; Cupper et al 2003; Dodson & Mooney 2002)**

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Time Period	Geological Event	Effect
Late Ordovician Mid Devonian (461-385 Ma BP)	Deep sea conditions	Most of Victoria was under deep ocean, and subjected to underwater slope failures and turbidite fan formation, creating massive interbedded siltstone and sandstone sequences.
Miocene - Pliocene (23-2.6 Ma BP)	- Sea level fluctuations	Initial increase in sea level in Early Miocene promotes continental fluvial deposition of lower Red Bluff Sandstone strata. Further increases in sea level in Late Miocene – Early Pliocene allow for marginal marine sequences of Red Bluff Sandstone to be deposited in the landscape. Sea level retreat in the Mid-Late Pliocene promoted weathering and ferruginisation of surface rock strata.
Late Pleistocene (128 Ma – 16ka BP)	- Sea level retreat - Last Glacial Period	Sea levels retreat from the Last Interglacial High (3-4m above current levels) in the lead up to the Last Glacial Maximum. Climates became cool & dry. Vegetation cover decreased, allowing for an increased river discharge and erosion. Sea level ~100m lower than present.
Early – Mid Holocene (10-6ka BP)	- Holocene Climatic Optimum (HCO)	Sea levels increased to 1-3m above present levels & climates became warmer and wetter than the present. Increased sedimentation due to the increase in base-level. Swamps expanded in size. After HCO, the sea level dropped & climates cooled. Incision of streams increased after HCO in response to base-level drop.

Time Period	Geological Event	Effect
Middle-Late Holocene (5-0.02ka BP)	- Arid expansion	Aridification of the environment increased, with a concomitant lowering of sea level. Erosion and river incision increased in response to climatic and sea-level processes.
Recent (0.02ka BP-Present)	- European settlement	Erosion and coupled sedimentation in response to land clearing has increased dramatically compared to pre-European levels. Fire regimes, drainage patterns & soil organic content has also changed dramatically as agriculture expanded across the landscape.

## Stone Sources

Common stone sources available for lithic tool production in the region include; quartz, silcrete and hornfels (**Table 9**). Quartz and hornfels sources are derived from the Uplands regions to the north and northeast of the activity area due to regional tectonism and igneous intrusion before widespread landscape denudation exposed the source-bearing rocks. Silcrete is typically formed beneath basalt in response to the mobilisation of silica, and can be found beneath Miocene-Pliocene basalt capping the nearby hills (**Webb & Golding 1998; Welch et al 2011**).

**Table 9 Stone Sources – Original Locations & Geological Units (VandenBerg et al 2000; Welch et al 2011)**

Stone source	Geological unit	Location in relation to activity area
Quartz (vein quartz & crystal quartz)	Palaeozoic metasedimentary units and granitic bodies	400m+ to E & SE activity area; Eastern Uplands region Pakenham area East Officer area
Silcrete	Sub-basaltic sediments	3km+ E, N & W activity area; Eastern Uplands and Central Sunlands region Nar Nar Goon area Pakenham Upper area Berwick area
Hornfels	Palaeozoic age granitic metamorphic aureoles	400m+ to E & SE activity area; Eastern Uplands region Pakenham area East Officer area

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## 7.8 European Land Use History of the Geographic Region

The following historical information is presented in support of land use changes in the historic past. This section provides a brief overview to assess historic disturbance to the activity area.

### Historical Background

European settlement of the Pakenham area began in the late 1830s and early 1840s when grazing licences were taken up in the Port Phillip district at the cost of £10 per year. In 1837 Ghin Ghin Bean run was taken up by John Fowler Turnbull. Comprising 7000 acres it incorporated the present activity area. In 1845 James Lecky took over the run. Under Lecky, the run became famous for raising fine horses (**Beaumont *et al* 1979: 123**). After 1848 new regulations were gazetted allowing squatters to purchase pre-emptive rights to their household blocks. James Lecky took up pre-emptive right for this run, choosing their 640-acre allotment on the east bank of Cardinia Creek and west of Officer South Road.

Most of the blocks were considered suitable for agricultural produce, however those with 'swamp fringe' soils were only suitable for livestock. Most pre-1750 trees were cleared to make way for farming purposes. When the Gippsland Railway was constructed between 1877 and 1878, the settlement in the district rapidly increased and sheep and dairy farming became the dominant industries in the district.

In 1875 the Koo-Wee-Rup Swamp Drainage Committee was formed, and a few drainage channels were dug. However, heavy rains rendered these channels obsolete. A swamp-wide strategy was needed. Between 1889 and 1893 the Koo Wee Rup swamp was drained opening up thousands of hectares for settlement and agriculture. Further floods in 1911 and 1934 saw the construction of additional outfall drains and the enlarging of existing drains.

### The Activity Area

In 1878 Agnes Waddell was the owner of land along Toomuc Creek which includes the current activity area (**Figure 4**). At this time Toomuc Creek was prone to flooding and land abutting the creek was unlikely to have been used for farming. The land within the activity area was described as "bog and tea tree" (**Figure 5**) and likely remained as bog until the draining of the Koo Wee Rup swamp between the early 1890s and 1930s.

By the 1940s Waddell's property had been subdivided and the land including the activity area came under the ownership of T.P. Mansell (**Figure 6**). The land has been further subdivided since but has continued to be used for farming.

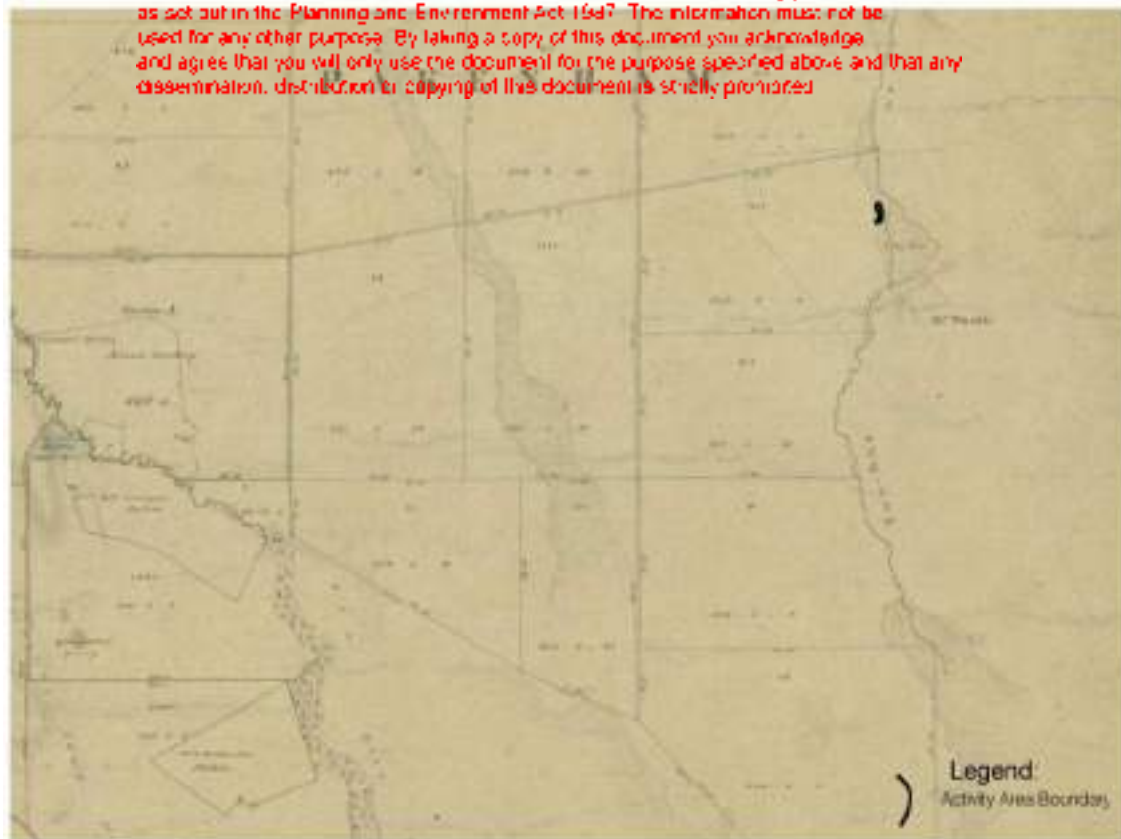
In recent years the Princes Freeway Pakenham bypass was constructed abutting the activity area to the north.

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**Figure 4 County Lots, Parish of Pakenham, County of Mornington, 1876 (Public Record Office Victoria)**

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**Figure 5 Roll Plan 25, Circa 1870 (Public Record Office Victoria)**





**Figure 6 County Lots, Parish of Pakenham, County of Mornington, Circa 1960 (Public Record Office Victoria)**

## 7.9 Strategic Values

A discussion of strategic values in the activity area and surrounding region is important because variations in strategic values likely influenced Aboriginal cultural heritage place location and visitation frequency (Walsh 1987). Strategic values include important resources such as sources of water, flora and fauna, and stone. In general, Aboriginal people would have noted these strategic values and chose campsite locations close to areas of diverse resources. Information about strategic values provides insight into Aboriginal cultural heritage place patterning and informs directly on identifying the areas of archaeological potential presented in Section 7.11.

### Hydrology

Toomuc Creek runs along the eastern edge of the activity area and is the main watercourse in the geographic region. Prior to the draining of the Koo Wee Rup swamp Toomuc Creek would have had a higher water level, and provided permanent water, flora and fauna resources for Aboriginal people. The floodplain associated with Toomuc Creek would have been inundated seasonally and during periods of heavy rainfall. Campsite locations are likely to be on elevated landforms in close proximity to this creek.

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**Figure 7 Pre-1750 Ecological Vegetation Classes (EVC) Relevant to the Activity Area**

## Flora and Fauna

The activity area lies within the Gippsland Plain Bioregion. Prior to 1750 the activity area primarily comprised the Swampy Riparian Woodland EVC 83 which featured woodland to 15m tall, dominated by Swamp Gum (*Eucalyptus ovata*) and Narrow-leaf Peppermint (*Eucalyptus radiata*). Lower storey populations were dominated by large and medium shrubs in combination with large tussock grasses and sedges.

Aboriginal groups generally would have chosen long-term campsites close to the richest and most diverse resources in close proximity to permanent potable water such as stream confluences, large waterholes along watercourses, permanent springs, swamps and lakes.

The activity area would have contained a variety of fauna species associated with wetlands and waterways prior to European settlement. With the demise of native habitat, the number and range of species that once existed has been greatly reduced. Within the wetlands and waterways, species such as black swan, ducks, ibis, fish and crustaceans would have been present.

## Summary of Strategic Values

In summary, the main resource potentially available to Aboriginal people in the geographic region is Toomuc Creek which contains the potential for the exploitation of a variety of bird and aquatic species.

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## 7.10 Site Prediction Model and Areas of Archaeological Potential

The relevant desktop information is summarised below and is used to identify areas of archaeological potential within the activity area (Table 10):

1. There are no registered Aboriginal places within the activity area boundary or within 200m of the activity area boundary.
2. Toomuc Creek runs in a north/south orientation along the eastern boundary of the activity area.
3. Toomuc Creek is the dominant resource value within the geographic region.
4. The activity area has been subject to disturbance by vegetation clearance, agriculture stock grazing, and creation of drainage channels.
5. In the geographic region, the alluvial plain on the margins of Toomuc Creek have been identified as having archaeological sensitivity for stone artefact sites.
6. No potential for Scarred Trees due to past clearing practices.
7. The activity area is a floodplain of low – moderate archaeological potential.
8. The most likely Aboriginal place types to be found in the activity area are stone artefact scatters and LDADs.
9. If stone artefact sites are found during the assessment, they can be expected to have the following attributes:
  - a. Raw material: dominated by silcrete followed by quartz, then quartzite, and small components of other materials such as hornfels and chert;
  - b. Primary forms: dominated by flakes, followed by tools and cores.
  - c. Artefacts are likely to be found on the ground surface or up to a depth of 30cm in sandy silt.

**Table 10 Desktop Assessment areas of Archaeological Potential**

Landform/ Location	Archaeological Potential/Type	Details
Alluvial Plain and Toomuc Creek	Low – Moderate Stone Artefacts	Stone artefact scatters and LDADs are likely to occur on alluvial plains landforms along Toomuc Creek.

## 7.11 Summary

The desktop assessment has concluded that:

1. There are no previously registered Aboriginal places within the activity area.
2. The activity area is an area of low – moderate archaeological potential.
3. Due to historic land use, it is unlikely that any archaeological deposits will retain any significant spatial or temporal integrity.
4. It is reasonably possible that Aboriginal cultural heritage is present.
5. A standard assessment is required pursuant to Regulation 62(1) *Aboriginal Heritage Regulations 2018*.


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Map Courtesy of DPI Website

**Legend:**

 Activity Area Boundary  
0.39 hectares (approx)

 Area of Archaeological Potential



Parish: Pakenham  
LGA: Cardinia

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**Map 4 Desktop Assessment Area of Archaeological Potential**

## 8 STANDARD ASSESSMENT

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### 8.1 Aims

The aims of the standard assessment were:

- To identify any surface Aboriginal cultural heritage.
- To identify landforms with archaeological potential.
- Use the results of the standard assessment to clarify areas of archaeological potential (Section 7.11).

### 8.2 Standard Assessment Methodology

A pedestrian ground survey was conducted across the activity area. Survey participants could only access 20% of the activity area due to flooding affecting the other 80%, and an opportunistic approach was taken. All accessible landforms and elements were comprehensively surveyed. The land surface was examined to determine areas of good ground surface visibility and/or landforms with potential archaeological sensitivity. Landforms assessed as having above low potential for Aboriginal cultural heritage are considered likely to contain Aboriginal cultural heritage while those assessed as having low potential are considered unlikely to contain Aboriginal cultural heritage. This assessment of potential is then used to determine whether or not a complex assessment is required pursuant to Regulation 64 of the *Aboriginal Heritage Regulations 2018*.

Detailed notes were taken, including a description of landform elements, ground surface visibility, ground surface disturbance, geology, geomorphology, vegetation, water sources, and areas of archaeological potential. Photographs were also taken. A single auger was taken to gain an understanding expected subsurface profile and depths.

### 8.3 Survey Units, Ground Surface Visibility and Effective Survey Coverage

The entire activity area comprised a single survey unit.

Effective survey coverage was estimated by taking into consideration archaeological visibility. Archaeological visibility refers to the amount of ground surface that is clearly visible for inspection. The greater the ground surface visibility, the more effective are surface surveys. Examples of high surface visibility are vehicular and pedestrian tracks, sand dune blow outs (100% per m<sup>2</sup>); and examples of poor visibility are areas of heavy vegetation cover (0-10% per m<sup>2</sup>). Unfortunately, it is often the case that highly visible Aboriginal cultural heritage places are also often highly disturbed. High ground surface visibility is therefore often related to the amount of disturbance that has occurred. This disturbance may be manmade (such as drainage lines, or vehicle tracks), caused by stock (overgrazing, tracks), or due to natural processes (erosion by wind or water). The level of ground surface visibility is typically assessed as follows:

0%	No visible ground surface
0 – 10%	Very poor
10 – 30%	Poor
30 – 50%	Fair



50 – 70%	Good
70 – 90%	Very good
90 – 100%	Excellent

Ground surface visibility was very poor, with the ground surface covered by thick paddock grass and groundwater. Native sedges and invasive thorn bushes covered much of the activity area and made it impossible to access. These areas had 0% ground surface visibility. The overall effective survey coverage 0-10% per m<sup>2</sup>.

#### **8.4 Map Showing Survey Area and Effective Survey Coverage**

Survey area and estimates of effective survey coverage are shown on **Map 5**.

#### **8.5 Ground Surface, Mature Trees, Caves, Rock Shelters and Cave Entrances**

The survey examined the ground surface. No mature trees, caves, rock shelters or cave entrances were identified during the assessment.

#### **8.6 Fieldwork Participants**

The standard assessment was undertaken on 23<sup>rd</sup> June 2023 by Roland Weatherseed and Andrea Murphy of Tardis Archaeology, and Casey Sweetman and Wayne Pepper of BLCAC.

#### **8.7 Obstacles**


Major obstacles were encountered preventing access to 80% of the activity area. Flooding caused by wet weather and overgrown vegetation restricted access to some areas within the activity area (**Map 6**). Furthermore, fencing running through the middle of the activity area along with a gate that could not be moved prevented all but one survey participant access to half the activity area. Poor ground surface visibility constrained the effectiveness of the survey and potentially obscured any surface stone artefacts that may have been present. The obstacles did not prevent landform identification or areas of archaeological potential.

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Map Courtesy of DPI Website

**Legend:**

 Activity Area Boundary and Survey Area  
0.39 hectares (approx)

 Survey Unit 1  
ESC : <5%

 A1 Auger Location



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
**Map 5 Survey Areas, Aboriginal Places and Effective Survey Coverage**





Map Courtesy of DPI Website

**Legend:**

 Activity Area Boundary and Survey Area  
0.39 hectares (approx)

 Water Logged Area



Scale of Metres

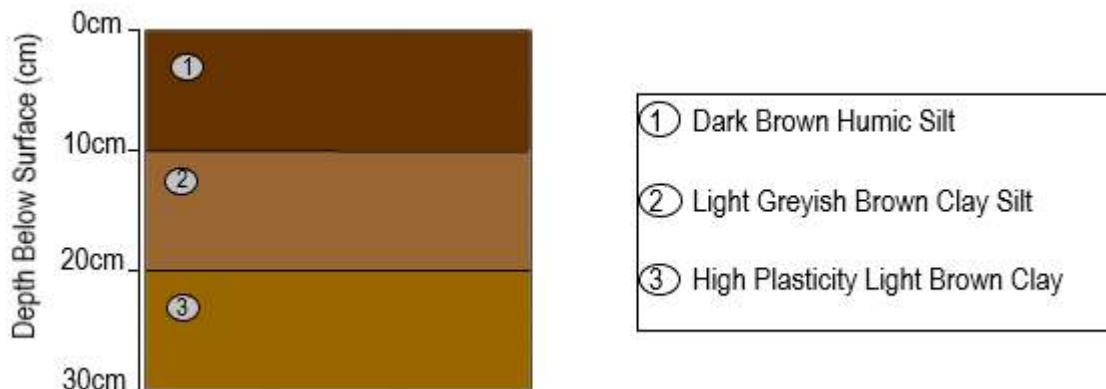


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**Map 6 Waterlogged Sections of the Activity Area**

## 8.8 Auger Results

A single auger sample was taken (**Map 5**) to understand the general sediment profile within the activity area. The auger was 30cm in depth and 8cm in width. The auger results are presented in **Figure 8**.



**Figure 8 Auger Sample Sediment Profile**

The auger results present a slightly different soil profile than the expected as identified in **Section 7.7** of the desktop assessment. The first auger layer is consistent with the expected soil profile identified by the desktop, and consists of brown silt to 10cm depth. The second layer between 10cm and 20cm differs and consists of clayey silt rather than sandy silt as identified in the desktop. Basal clay is also shallower in the auger sample than was expected at 20cm rather than 30cm.

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## 8.9 Results and Discussion

The standard assessment survey was effectively conducted for only 20% of the activity area and the results are as follows:

- Obstacles included dense grass cover (**Photo 1**), large invasive weeds (**Photo 2 & 3**) and flooding (**Photo 4**) preventing access to 80% of the activity area.
- Ground surface visibility was very poor (0-10%).
- Effective survey coverage was <5%.
- Land modification include:
  - Fencing along the north, south and west borders of the activity area.
  - Drainage channels leading to Toomuc Creek run along the north and south borders of the activity area (**Photo 5 & 6**).
  - A large spoil mound located at the south border immediately adjacent to the drainage channel (**Photo 7**). Likely contains sediments excavated to create the drainage channels.
- The auger indicated a shallow sediment profile with clay expected at 30cm depth
- No Aboriginal cultural heritage was identified.

The standard assessment demonstrated that the activity area is a modified landscape that has been drained. Prior to modification it is likely to have been frequently inundated with water. There were no elevated landforms suitable for camping identified within the activity area, therefore the activity area was identified as having low archaeological potential.





**Photo 1**

Facing north, dense grass covers the majority of the activity area.

Very poor GSV (0%).



**Photo 2**

Facing south, large sedge bushes and dense grass cover within the activity area.

Very poor GSV (0%).



**Photo 3**

Facing northeast, large invasive thorn bushes covering the centre of the activity area.

Very poor GSV (0%).

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**Photo 4**

Facing south, flooded ground and vehicle tracks along the western border of the activity area. Very poor GSV (0%).



**Photo 5**

Facing east, drainage channel along the south border of the activity area (running top to bottom in photo). Dense grass cover and sedge bushes. Very poor GSV (0%).



**Photo 6**

Facing north, drainage channel along the north border of the activity area (running left to right in photo). Dense grass cover. Very poor GSV (0%).

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**Photo 7**

Facing south, grass covered spoil mound at the south edge of the activity area. Very poor GSV (0%).



**Photo 8**

Flood water on top of vehicle tracks. Very poor GSV (5%).



**Photo 9**

The three sediment samples from the auger. Left = 0-10cm, middle = 10-20cm, right = 20-30cm.

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## 8.10 Ground Disturbance in the Activity Area

The activity area has undergone the following disturbances:

- Installation of fencing along the north, south and west border of the activity area.
- Excavation of two water drainage channels located along the north and south border of the activity area.

## 8.11 Site Prediction Model and Areas of Archaeological Potential

Based on the desktop and standard assessments (Sections 7 & 8), the activity area has been assessed as having the following areas of archaeological potential:

**Table 11 Standard Assessment Areas of Archaeological Potential (Map 9)**

Landform	Archaeological Potential	Details
Entire Activity Area	Low Stone artefacts	Stone tools made from silcrete and quartz

## 8.12 Summary and Conclusions

The standard assessment has demonstrated the following in relation to the activity area:

1. Ground surface visibility overall was very poor (0-10%).
2. Effective survey coverage was <5%, which constrained the effectiveness of the standard assessment (Map 6).
3. No Aboriginal cultural heritage was found during the standard assessment.
4. Previous ground disturbance includes creation of water channels and implementation of fencing.
5. There is low potential for small numbers of stone artefacts to be present in a subsurface context.
6. It is possible that Aboriginal cultural heritage is present.
7. Since it is possible that Aboriginal cultural heritage is present, a complex assessment is required pursuant to Regulation 64(1) of the *Aboriginal Heritage Regulations 2018*.

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Map Courtesy of DPI Website

**Legend:**



Activity Area Boundary and Survey Area  
0.39 hectares (approx)



Area of Low Archaeological Potential



Scale of Metres



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**Map 7 Standard Assessment Area of Archaeological Potential**

## 9 COMPLEX ASSESSMENT

### 9.1 Aims and Methodology

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#### Aims

The aims of subsurface testing were:

1. To test the site prediction model generated for the activity area.
2. To determine the stratigraphy and general subsurface nature of the activity area.
3. To determine the presence or absence of Aboriginal cultural heritage.

#### Methodology

The complex assessment methodology was formulated based on the results of the standard assessment. Due to the small size of the activity area and at the request of BLCAC, the complex assessment utilised an arbitrary grid method.

Test pits (TPs) were recorded with a dGPS using GDA94 MGA coordinates and marked onto an activity area plan. Detailed notes were recorded for each test pit, including stratigraphy, sediment descriptions, disturbance, and presence (or absence) of archaeological materials (**Appendix 5**). Photos were taken of each excavation including detailed views of stratigraphic profiles using standard range poles marked with 20cm intervals. **Map 7** illustrates the location of all test pits excavated within the activity area.

Excavation ceased once a sterile layer was identified which is known to have no archaeological potential.

#### Manual Excavation

- 1x1m TPs were placed at 20m intervals within a 50m grid placed over the activity area.
- TPs were moved to avoid obstacles in the activity area only after consultation and in agreement with BLCAC fieldwork representatives.
- Manual excavation was conducted in 5cm spits.
- Manual excavation was conducted using shovels, crowbars, and trowels where appropriate.
- Completed TPs were photographed, and recorded in detail using both Tardis standard recording forms and BLCAC standard recording forms.
- TPs were backfilled once recorded.

### 9.2 Fieldwork Participants

The complex assessment was conducted on 5 to 6 November, and 13 November 2023, 3 January, and 1 to 2 February, 26 to 29 February 202. Fieldwork participants of the complex assessment for 92 Enterprise Road, Pakenham are Roland Weatherseed, Zali Boyd, Andrew Morcom Jane Trotta, Max Symons (TA), Danial Black, Issac Sainty, George Adidi, Nathan Kelly, Minta Franks, Natesha Austin, James Hughes, Michael Kelly, Graham Norris, Casey Sweetman and James Hume (BLCAC).



Zali Boyd and Andrew Morcom were the supervising archaeologists during the complex assessment.

### 9.3 Map showing Excavation Locations

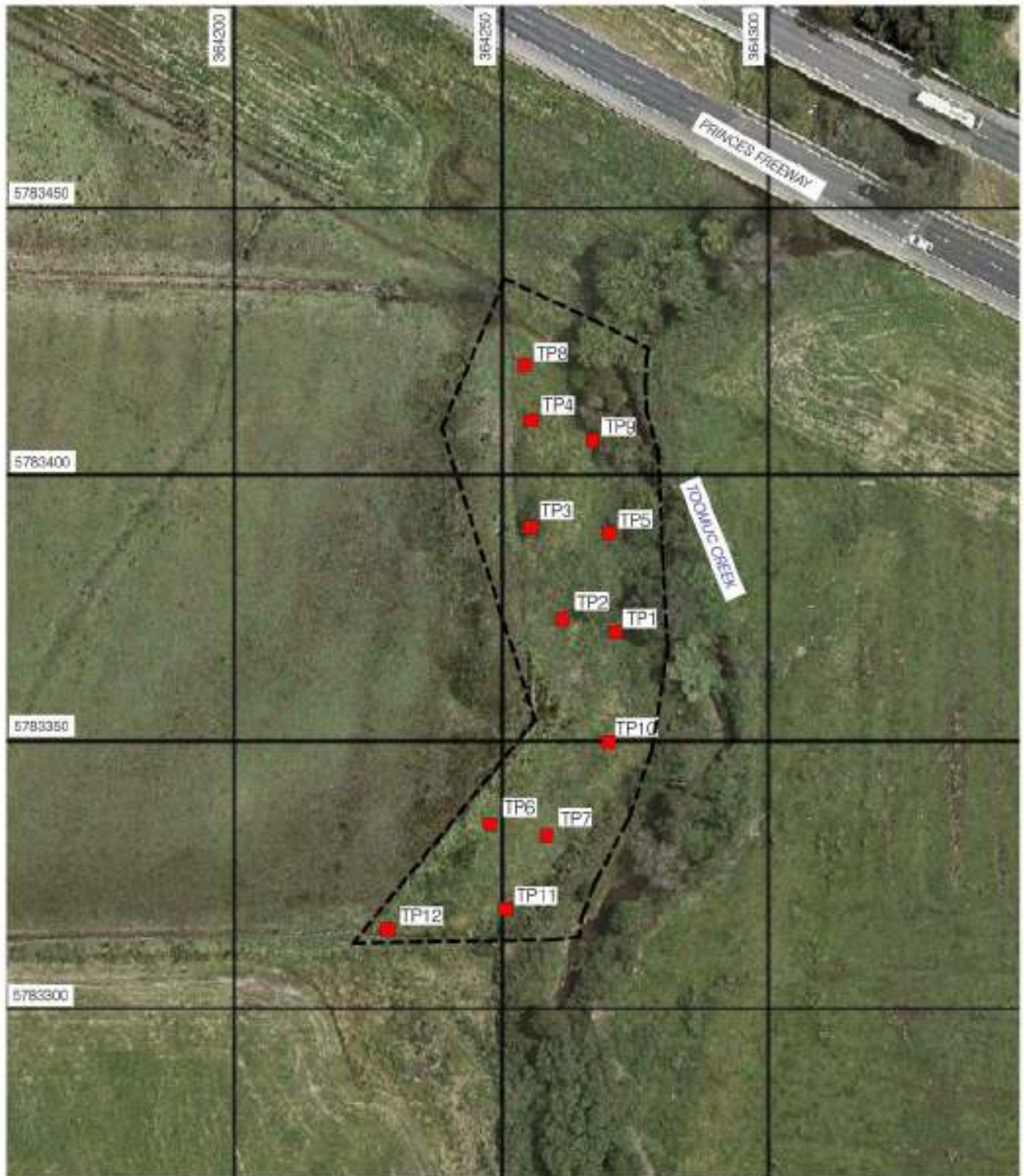
The excavation locations are shown on **Map 7**.

### 9.4 Excavation Details

Excavation details are as follows:


- A total of 12 TPs were excavated comprising a total area of 12m<sup>2</sup>.
- Excavation continued into the subsurface clays which were culturally sterile. Excavations were only ceased after consultation with the BLCAC fieldwork representatives.
- No Aboriginal cultural heritage was found in any of the 12 TPs.
- Excavation details are presented in **Appendix 5**, including the coordinates of all excavation locations.


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Map Courtesy of DPI Website

**Legend:**

 Activity Area Boundary and Survey Area  
0.39 hectares (approx)

 Test Pit 1x1m: No Artefact  
x = test pit number



Scale of Metres



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**Map 8 Test Pit Locations**

## 9.5 Stratigraphy and Subsurface Nature of the Activity Area

The activity area lies within an alluvial floodplain with Toomuc Creek bordering the eastern edge of the activity area. There was a noticeable increase in depth along the margins of Toomuc Creek compared to the furthest west extent of the activity area as demonstrated by TP1 and TP2.

### Test Pit 1

TP1 illustrates the stratigraphy and general subsurface nature of the activity area located along the edge of Toomuc Creek (**Photos 10 and 11**), and consisted of the following profile:

- Unit 1: 0-6cm weak light brown silt with minor grass roots.
- Unit 2: 6-15cm weak light brown silty clay, minor roots, thin layer of clay.
- Unit 3: 15-52cm weak light yellow silty sand.
- Unit 4: 52-60cm dark mottled clayey sandy silt.
- Unit 5: 60cm+ firm dark greyish clay.

No artefacts were found in TP1.



**Photo 10**

Test Pit 1,  
facing south.

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**Photo 11**

Test Pit 1  
profile view,  
facing south.

## Test Pit 2

TP2 illustrates the stratigraphy and general subsurface nature of the western half of the activity area (**Photo 12 and 13**) and consisted of the following profile:

- Unit 1: 0-7cm weak light brown silt with grass roots.
- Unit 2: 7-15cm weak light brown clayey silt.
- Unit 3: 15-22cm firm brown silty clay.
- Unit 4: 22cm+ firm brown clay.

No artefacts were recovered from TP2.

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**Photo 12**

Test Pit 2,  
facing west.



**Photo 13**

Test Pit 2  
profile view,  
facing west.

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## 9.6 Obstacles

No significant obstacles affected the complex assessment. Test pits were moved as dense vegetation necessitated.

## 9.7 Results

No Aboriginal cultural heritage was discovered during the complex assessment. Test pit profiles remained relatively consistent throughout the activity area with only minor differences in maximum depths and inclusions. In general, test pits closest to Toomuc Creek were deeper and possessed a higher sand content than those further away, and is representative of more concentrated alluvial deposits.



## 9.8 Conclusions from the Subsurface Testing

The complex assessment has demonstrated the following:

- A total of 12m<sup>2</sup> was excavated across the activity area.
- No Aboriginal cultural heritage was identified.
- The prediction as a result of the desktop and standard assessment suggesting the likelihood of low levels of Aboriginal stone artefacts were not upheld.
- There are no areas within the activity area that are considered likely to contain Aboriginal cultural heritage.

## 10 CONSIDERATION OF SECTION 61 MATTERS – IMPACT ASSESSMENT

The current assessment found no Aboriginal cultural heritage or areas likely to contain Aboriginal cultural heritage; therefore, consideration of avoidance, minimisation or management of Aboriginal cultural heritage places is unnecessary. The activity is considered unlikely to harm any other Aboriginal cultural heritage.

### 10.1 Contingency Plan

A Contingency Plan is required to manage potential issues including:

- Specific measures in the unlikely event that any Aboriginal cultural heritage will be unexpectedly discovered during the activity.
- Any disputes, delays and other obstacles that may affect the conduct of the activity.
- Reviewing compliance with the cultural heritage management plan and mechanisms for remedying non-compliance.
- The notification of the discovery of Aboriginal cultural heritage during the carrying out of the activity; and requirements relating to the custody and management of any Aboriginal cultural heritage found during the course of the activity.

The Contingency Plan is presented in **Part 1, Section 2**.

### 10.2 Cumulative Impact

The Aboriginal cultural heritage in the geographic region in being impacted by recent residential and commercial development. Although CHMPs have been discovering Aboriginal places, these places are often destroyed by development permitted by CHMP conditions even though this is mitigated to a degree by archaeological salvage. In some cases, Aboriginal places have been protected from harm, in particular, in open space along waterway corridors.

Since no Aboriginal cultural heritage and no areas of archaeological sensitivity were found during the present investigation, it is considered unlikely that tangible Aboriginal cultural heritage will be impacted by the activity. This means there is no known cumulative impact if the activity proceeds.

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## **APPENDIX 1 – CHMP DOCUMENTATION**



Premier  
and Cabinet

## Notice of Intent to prepare a Cultural Heritage Management Plan for the purposes of the *Aboriginal Heritage Act 2006*

This form can be used by the Sponsor of a Cultural Heritage Management Plan to complete the notification provisions pursuant to s.54 of the *Aboriginal Heritage Act 2006* (the "Act").

For clarification on any of the following please contact Victorian Aboriginal Heritage Register (VAHR) enquiries on 1800-726-003.

### SECTION 1 - Sponsor information

Sponsor: Dalton Consulting Engineers Pty Ltd  
 ABN/ACN: 78 429 221 049  
 Contact Name: TK Charlie  
 Postal Address: Level 3, 678 Victoria Street  
Richmond VIC 3121  
 Business Number: 03 9813 7443 Mobile: \_\_\_\_\_  
 Email Address: tkc@dceng.com.au

### Sponsor's agent (if relevant)

Company: \_\_\_\_\_  
 Contact Name: \_\_\_\_\_  
 Postal Address: \_\_\_\_\_  
 Business Number: \_\_\_\_\_ Mobile: \_\_\_\_\_  
 Email Address: \_\_\_\_\_

### SECTION 2 - Description of proposed activity and location

Project Name: 92 Enterprise Road, Pakenham  
 Municipal district: Cardinia Shire Council

Clearly identify the proposed activity for which the cultural heritage management plan is to be prepared (ie. Mining, road construction, housing subdivision)

Utility installation (not telco)

### SECTION 3 - Cultural Heritage Advisor

Lucy Garland Tardis Archaeology Pty Ltd lucyg@tardisenterprises.com.au  
 Name Company Email address

### SECTION 4 - Expected start and finish date for the cultural heritage management plan

Start Date: 01-May-2023 Finish Date: 01-May-2024

Submitted on: 01 May 2023

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Premier  
and Cabinet

### SECTION 5 - Why are you preparing this cultural heritage management plan?

- A cultural heritage management plan is required by the Aboriginal Heritage Regulations 2007  
*What is the high Impact Activity as it is listed in the regulations?*

Is any part of the activity an area of cultural heritage sensitivity, as listed in the regulations? 1

- Other Reasons (Voluntary)  
 An Environment Effects Statement is required  
 A Cultural Heritage Management Plan is required by the Minister for Aboriginal Affairs.  
 An Impact Management Plan or Comprehensive Impact Statement is required for the activity

### SECTION 6 - List the relevant registered Aboriginal parties (if any)

*This section is to be completed where there are registered Aboriginal parties in relation to the management plan.*

BUNURONG LAND COUNCIL ABORIGINAL CORPORATION

### SECTION 7A - List the relevant Aboriginal groups or Aboriginal people with whom the Sponsor intends to consult (if any)

*This section is to be completed only if the proposed activity in the management plan is to be carried out in an area where there is no Registered Aboriginal Party.*

Bunurong Land Council Aboriginal Corporation

### SECTION 7B - Describe the intended consultation process (if any)

*This section is to be completed only if the proposed activity in the management plan is to be carried out in an area where there is no Registered Aboriginal Party.*

Standard consultation throughout the CHMP process.

### SECTION 8 – State who will be evaluating this plan (mandatory)

*The plan is to be evaluated by:*

- Joint - Registered Aboriginal Party AND The Secretary  
 A Registered Aboriginal Party  
*if checked, list the relevant Registered Aboriginal Party Evaluating:*  
 The Secretary  
 Victorian Aboriginal Heritage Council

### SECTION 9 – Preliminary Aboriginal Heritage Tests (PAHTs)

*List the Reference Number(s) of any PAHTs conducted in relation to the proposed activity:*

### SECTION 10 - Notification checklist

Submitted on: 01 May 2023

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Ensure that any relevant registered Aboriginal parties is also notified. A copy of this notice with a map attached may be used for this purpose. (A registered Aboriginal party is allowed up to 14 days to provide a written response to a notification specifying whether or not it intends to evaluate the management plan.)

In addition to notifying the Deputy Director and any relevant registered Aboriginal parties, a Sponsor must also notify any owner and/or occupier of any land within the area to which the management plan relates. A copy of this notice with a map attached may be used for this purpose.

Ensure any municipal council, whose municipal district includes an area to which the cultural heritage management plan relates, is also notified. A copy of this notice, with a map attached, may also be used for this purpose.

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Submitted on: 01 May 2023



**Map 1 Activity Area Location**

Tardis Archaeology Pty Ltd. heritage advisors

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01/05/2023, 15:20

Tardis Archaeology Mail - Notice Of Intention of CHMP 19535, 92 Enterprise Rd, Pakenham



**Notice Of Intention of CHMP 19535, 92 Enterprise Rd, Pakenham**

2 messages



to whom it may concern

Please find attached a Notice of Intent to prepare a Cultural Heritage Management Plan within the Bururong RAP area. The NOI and a map of the activity area are attached below. This notice is being provided to you under Section 54 of the Aboriginal Heritage Act 2006.

If you have any queries please contact our office.

Kind Regards



**Tardis Archaeology**  
Heritage Advisors

T: 03 7065 6894 E: [rolandw@tardisenterprise.com.au](mailto:rolandw@tardisenterprise.com.au) W: [www.tardisarc.com.au](http://www.tardisarc.com.au)

BEAUFIELD  
Suite 4, 46-50 Old Princes Highway  
Beaufield Victoria 3607  
03 9766 7765

PORT MELBOURNE  
A3, 8 Rogers Street  
Port Melbourne Victoria 3207  
03 9676 9009

POSTAL ADDRESS  
PO Box 776  
Beaufield Victoria 3607

Monday to Wednesday 9am - 5pm

**2 attachments**



Activity Area location.jpg  
41.4K

herNoticeOfIntentForm\_01May2023-014129.pdf  
157K



Thank you for submitting the NOI to prepare a CHMP for 19535. Please see attached the intention to evaluate this CHMP.

Please note the attached updated 2023 BLDAC Cultural Heritage Officer booking form and request for invoicing form.

<https://mail.google.com/mail/u/0/?ui=30477615&ik=ViewPDF&search=af6perm%20defined&as=191222200696551036&simlimg&as=1436387738...> 1/2

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01/05/2023, 15:38

Tardis Archaeology Mail - Notice Of Intention of CHMP 19535, 92 Enterprise Rd, Pakenham

Once completed please send any requests for meetings or fieldwork to [bookings@bunuronglc.org.au](mailto:bookings@bunuronglc.org.au) and request for invoice can be sent to [accounts@bunuronglc.org.au](mailto:accounts@bunuronglc.org.au)

Regards


Submissions | Bunurong Land Council Aboriginal Corporation



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[Quoted text hidden]

3 attachments

-  CHMP 19535 Notice to Evaluate.pdf  
185K
-  Invoice Request Form.docx  
62K
-  BLCAC CHO Booking Form Jan 2023.docx  
77K

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ABN: 66 128 413 297 ICN:3630  
336-340 Nepean Hwy, Frankston VIC 3199  
PO Box 11219, Frankston VIC 3199  
Ph: (03) 9770 1273  
[www.bunuronglc.org](http://www.bunuronglc.org)

1 May 2023

To whom it may concern,

**Notice to Evaluate Cultural Heritage Management Plan 19535 – Proposed Utility Installation, 92 Enterprise Road, Pakenham.**

Your notification has been accepted and the Bunurong Land Council Aboriginal Corporation (BLCAC) advises that it intends to evaluate this plan when complete, in accordance with Division 4, Section 55 of the *Aboriginal Heritage Act 2006*. We also advise that during the preparation of this plan, the BLCAC wishes to:

- Consult with you in relation to the assessment of the area for the purposes of the plan.
- Participate in the conduct of the assessment.
- Consult with the sponsor in relation to the conditions to be included in the plan.

Please note that before any fieldwork program commences it will be necessary for your heritage advisor to participate in a Project Inception Meeting to discuss the project. It is preferable for the project sponsor to attend the Project Inception Meeting. As the Project Inception Meeting provides an opportunity for all parties to clarify the aims of the CHMP and methodology for any fieldwork program, it is helpful if you and/or your heritage advisor can bring along the following information to expedite these discussions:

- A clear map of the Activity Area.
- Aboriginal site location data within the geographic region.
- Site cards of any sites already recorded in the Activity Area.
- Any geotechnical reports undertaken for the Activity Area.

To organise an Inception Meeting please contact our bookings team at [bookings@bunuronglc.org.au](mailto:bookings@bunuronglc.org.au) or call (03) 9770 1273.

Please note that when submitting this CHMP to BLCAC for evaluation it must be accompanied with proof of payment of the evaluation fee. Failure to do so will mean the evaluation period will not commence.

If you require any additional information about the BLCAC CHMP submissions and evaluation process, please contact the Heritage Team at [submissions@bunuronglc.org.au](mailto:submissions@bunuronglc.org.au). Enquiries about payment of invoices can be directed to Angela Thompson on 0425 308 256.

We look forward to meeting with you soon to discuss the project.



Steven Pepper  
Cultural Heritage Manager  
[steven.pepper@bunuronglc.org.au](mailto:steven.pepper@bunuronglc.org.au)

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23/07/2024, 09:28

Tardis Archaeology Mail - Activity Area Update for CHMP 19535, 92 Enterprise Rd, Pakenham



Activity Area Update for CHMP 19535, 92 Enterprise Rd, Pakenham



8 August 2023 at 13:31

Please see attached the spatial data and location and extent maps.

If you have any queries please contact our office.

Kind Regards



**Tardis Archaeology**  
Heritage Advisors

T 03 7045 6294

E [rolandw@tardisheritage.com.au](mailto:rolandw@tardisheritage.com.au)

W [www.tardisarc.com.au](http://www.tardisarc.com.au)

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A1, 8 Rogers Street  
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3 attachments

4940activity (2).zip  
2K

map\_location.pdf  
300K

Map\_Extent.pdf  
2374K

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13/08/2024, 11:40

Tardis Archaeology Mail - CHMP 19535 - Sponsor ABN has changed from the listed one on the NOI



**CHMP 19535 - Sponsor ABN has changed from the listed one on the NOI**

1 message



13 August 2024 at 11:40

To whom it may concern,

This is to formally notify BLCAG that the sponsor details and ABN was updated from the original NOI on 2nd May 2023.

The correct sponsor details are:

ESR Investment Management 1 (Australia) Pty Ltd as trustee for Pakenham Enterprise Road Property Trust (ABN 61 962 531 815).

If you have any queries please contact our office.

Kind Regards,



**Tardis Archaeology**  
Heritage Advisors

T: 03 7045 6894    E: [rolandw@tardisenterprise.com.au](mailto:rolandw@tardisenterprise.com.au)    W: [www.tardisarc.com.au](http://www.tardisarc.com.au)

BEACONSFIELD  
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## APPENDIX 2 – GLOSSARY

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- Aeolian Sediments:** Wind-borne, wind-blown or wind-deposited material, usually sand, but also silt and clay.
- Alluvium:** Sedimentary unconsolidated deposits laid down through the action of running water. Usually found in or near rivers and floodplains. It is usually applied to coarser sediments such as sands and gravels, but sometimes to finer particles such as silt and clay.
- Anvil:** A portable flat stone, usually a river pebble, which has been used as a base for working stone. Anvils that have been used frequently have a small circular depression in the centre where cores were held while being struck. An anvil is often a multifunctional tool used also as a grindstone and hammer stone.
- Archaeological Site:** A place/location of either Aboriginal or non-Aboriginal origin. Aboriginal archaeological sites have been formed prior to the European settlement of Australia and may be in any of the forms outlined above.
- Artefact:** Any product made by human hands or caused to be made through human actions.
- Artefact Horizon:** A discernible horizontal distribution of artefacts within a natural soil horizon. An artefact horizon has generally suffered a degree of post depositional disturbance that has affected the spatial and temporal integrity of the deposits and associated artefact assemblage.
- Artefact Scatter:** A scatter of cultural material, most commonly stone artefacts. Artefact scatters are often the only physical remains of places where Aboriginal people have camped, prepared and eaten meals and worked stone material.
- Basalt:** Fine-grained, hard, but easily weathered dark-grey igneous rock formed by the cooling of lava.
- Bedrock:** Solid rock at the surface or rock at depth that has been undisturbed by weathering.
- Blade:** A long parallel sided flake from a specially prepared core. Blade flakes are twice as long as they are wide.
- Bipolar:** A core or a flake, which, presumably, has been struck on an anvil. That is, the core from which the flake has been struck has been rotated before the flake has been struck off. Bifacial platforms tend to indicate that the flake has come off a heavily worked core.
- Broken Flake:** Defined by the part of the flake remaining, i.e., proximal (where the platform is present), medial (where neither the platform nor termination is present), or distal (where the termination is present).
- Calcareous:** A sediment containing calcium carbonate in concentrations of up to 50%.
- Coffee Rock:** A term used to describe a hardened iron- and organic-rich cemented deposit that when wet, resembles coffee grains. It is usually found in sandy soils that have a source of iron and organic matter.
- Colluvium:** An unconsolidated mixture of weathered material (gravel, sand, silt and clay) transported downslope by the force of gravity.
- Complete Flake:** An artefact exhibiting a ventral surface (where the flake was originally connected to the core), dorsal surface (the surface that used to be part of the exterior of the core, platform and/or flake scar).
- Core:** An artefact from which flakes have been detached using a hammer stone. Core types include blade, single platform, multiplatform and bipolar forms. These artefacts exhibit a series of negative flake scars, each of which represents the removal of a flake. Core types are as follows:
- Unidirectional cores* - These cores have scars originating from a single platform, and all the flakes struck from the core have been struck in the same direction from that platform.
  - Bidirectional cores* - These cores have two platforms, one opposite the other; flakes have been struck from each of the platforms, and thus from opposite directions.
  - Bifacial cores* - These kinds of core have a single platform, but the flakes struck from it have been detached from two core faces.
  - Multidirectional cores* - These cores have two or more platforms and there is no clear pattern, either in the orientation of the platforms or in the orientation of the scars resulting from the striking of flakes from those platforms.
- Bipolar core** - Nodules or cobbles that are flaked using an anvil. The resulting artefacts exhibit crushing on their proximal, distal and often their lateral margins, where they have been rotated.
- Cultural Heritage:** Something that is inherited or passed down because it is appreciated and cherished. Categories of cultural heritage include; built structures and their surrounds, gardens, trees; cultural landscapes; sites; areas; precincts; cemeteries; ruins and archaeological sites; shipwrecks; sites of important events; commemorative sites; contents of buildings and significant relics, objects artefacts and collections of objects.
- Burials:** Burial places may occur in association with campsites, in mounds or shell middens or in specific burial grounds that lack any other cultural material. Softer ground was chosen for burials, and any sandy area can be expected to contain burials. Burial places can contain one or a number of individuals. Burial places and cemeteries are a common archaeological place type in the sand country adjoining the Murray River, though are a rare feature in the southern part of Victoria.
- Contact Place:** These are places relating to the period of first contact between Aboriginal and European people. These places may be associated with conflict between Aboriginal people and settlers, mission stations

or reserves, or historic camping places. The artefact assemblage of contact places will often include artefacts manufactured from glass.

**Dune:** A mound or ridge of wind-blown granular material (usually sand) that is partially, fully or bare of vegetation, and capable of being moved from one location to another while still retaining its characteristic shape.

**Effective Survey Coverage (ESC):** a measure of ground surveyed during the study and the type of archaeological visibility present within that surveyed area. Survey coverage variables provide a measure with which to assess the effectiveness of the survey so as to provide an informed basis for the formulation of management strategies.

**Ferruginous:** Rocks or soils containing a large percentage of iron.

**Ferruginisation:** The process by which iron minerals move in the sediment and/or regolith, staining and cementing the substrate to form a hard, iron-rich layer.

**Fluvial:** Referring to rivers and their processes. E.g. stream erosion and deposition.

**Gilgai:** An undulating surface of mounds and depressions resulting from the uneven shrinking and swelling of the soil. Usually present on basalt soils, but also on alluvial soils.

**Granite:** A coarse-grained intrusive igneous rock, usually comprised of quartz, feldspar and micas.

**Groundwater:** Water that lies within the saturated zone of rock and soil. It moves between pore spaces, cavities and fractures in the sediment and rock under the influence of gravity. Groundwater can transport trace minerals and elements dissolved in the water.

**Hearth:** Usually a subsurface feature found eroding out of a river or creek bank or in a sand dune - it indicates a place where Aboriginal people cooked food. The remains of a hearth are usually identifiable by the presence of charcoal and sometimes clay balls (like brick fragments) and hearth stones. Remains of burnt bone or shell are sometimes preserved within a hearth.

**High Integrity Occupation Deposit:** The laying down of deposits by human activities that bury artefacts to form distinct stratigraphic entities such as layers (e.g., dense lens of stone artefacts & bone between environmental deposits, stratified shell deposits) or features (hearths, occupation mounds). High integrity occupation deposits have a high degree of spatial and temporal integrity.

**Holocene Period:** The time from the end of the Pleistocene Ice Age (c 10,300 BP) to the present day.

**Hydrothermal Quartz:** Also known as milky quartz. Formed by the intrusion of hydrothermal water containing dissolved silica and other minerals into folded bedrock (commonly metasediments). The hydrothermal water reaches a natural trap, such as an anticline fold or a fault, before cooling, allowing the silica to precipitate into quartz.

**Igneous:** Rocks that have formed through the crystallisation of magma.

**Intrusion:** The act of an intrusive igneous rock rising up through the Earth's crust and breaking through the lower levels of the bedrock.

**Iron Staining:** Where a crust of iron oxide enriched clay coating precipitates on the surfaces of individual sediment grains, giving an orange-red-yellow stain to the sediment or soil as a whole.

**Last Glacial Maximum:** A period of cold, dry conditions on Earth when the ice caps on the polar regions were at their largest extent. This period lasted between approximately 18-24 ka BP.

**Lava:** Molten material extruded from a volcano or fissure in the Earth's surface.

**Lithic:** Anything made of stone.

**Metamorphism:** The process by which rocks are transformed by recrystallisation due to increased heat and/or pressure in the Earth's crust. Metamorphism can be either on a regional scale or on a contact scale.

**Middens:** Midden is a term borrowed from the Danish. It originally applied to the accumulations of shell and other food remains left by Mesolithic man. Australian middens are an accumulation of hearth and food debris, which has built up a deposit over a length of time. Middens are generally comprised of charcoal and either freshwater or coastal shell species, depending on the place's location. Middens may also contain stone artefacts, and the food refuse of other native animals such as small mammals. The thick deposit of burnt shells and dark grey/black deposit can distinguish middens within the landscape. Coastal shell middens are often found in close association with rock platforms. Freshwater shell middens are found in close proximity to areas with freshwater mussels.

**Mounds:** Mounds are accumulation of hearth (fireplace) debris, which has over time built a thick deposit on the ground's surface. Mounds are generally comprised of charcoal; burnt clay balls and burnt food refuse (e.g., native animal bones). Mounds may also contain stone artefacts. On rare occasions mounds may also contain human burial remains. Mounds can be distinguished in the landscape by their characteristic dark grey/black deposit and height above surrounding land. Mounds that have been utilised over long periods can obtain dimensions of over 100 metres in length and 1 metre in height. Mounds are generally situated close to major streams, and large water bodies. In times of flood, mounds are often become marooned, and provide dry land points from which surrounding resources could have been exploited.



**Occupation Surface:** A distinct layer or interface between depositional strata upon which human activities were carried out and artefacts/features deposited. Most commonly this may be a prior land surface (e.g., soil horizon) that has been subsequently buried by later environmental deposits (e.g. dune deposits).

**Pisolith:** Hard, iron-cemented spherical particles of sediment (usually sand). These range in size from 3mm to 6mm.

**Pleistocene:** The geological period corresponding with the last or Great Ice Age. The onset of the Pleistocene is marked by an increasingly cold climate. The date for the start of the Pleistocene is not well established, and estimates vary from 3.5 to 1.3 million years ago. The period ends with the final but gradual retreat of the ice sheets, which reached their present conditions around 10,300 BP.

**Raw Material:** Organic or inorganic matter that has not been processed by people.

**Regolith:** An incoherent mantle of varying thickness that lies above fresh rock. This is usually the decomposed, weathered and broken up derivative of the fresh bedrock. The soil profile lies above this layer.

**Sand Sheet:** A thin, continuous deposit of sand with no large topographic features on the surface.

**Scarred Tree:** Scars on trees may be the result of removal of strips of bark by Aboriginal people for the manufacture of utensils, canoes or for shelter; or resulting from small notches chopped into the bark to provide toe and hand holds to climber after possums, koalas and/or views of the surrounding area. A scar made by humans as opposed to naturally made by branches falling off, *etc.* is distinguished by the following criteria: symmetry and rounded ends, scar does not extend to the ground, some re-growth has occurred around the edges of the scar, and no holes or knots present in the heartwood.

**Scoria:** Pyroclastic volcanic rock containing numerous gas pockets and spaces. Colour ranges from red-brown to black.

**Sensitivity:** Based on collated existing data and place inspection an area or specific place may contain sensitivity for extant or archaeological deposits. Background research will present the most likely place types, contents and state of preservation.

**Siliceous:** Rocks and sediments that contain an abundance of silica.

**Stony Rise:** Irregular, hummocky and stony ground formed on younger lava flows. Caused by uneven cooling and slumping of basalt flows.

**Swale:** A linear depression that runs between two ridges. This is usually applied to dune environments where the swale is located between two dune ridges and is occupied by a swampy environment.

**Terrace:** A gently sloping or flat step-like structure usually associated with a fluvial environment and bounded by steeper slopes on the outer margins. Streams commonly flow along terraces. Terraces can be paired or unpaired according to the depositional environment.

**Uplift:** Upward surface movement attributed to faulting or movement of the continental plates.

**Visibility:** Refers to the degree to which the surface of the ground can be observed. It is generally expressed in terms of the percentage of the ground's surface visible for an observer on foot (Bird 1993). For example, 10% visibility equates to 10cm<sup>2</sup> per 1 m<sup>2</sup> of ground surface that is not covered by vegetation or soil deposit. The following applies to descriptions of ground surface visibility within this report.

0%	No visible ground surface	50 – 70%	Good
0 – 10%	Very Poor	70 – 90%	Very Good
10 – 30%	Poor	90 – 100%	Excellent
30 – 50%	Fair		

**Weathering:** The process by which fresh rock degrades/breaks down at or near the surface. This process modifies rock chemically, organically, and/or physically, whereby a mantle of waste known as regolith will remain *in situ* until it is eroded away.

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### **APPENDIX 3 – PREVIOUSLY REGISTERED PLACES WITHIN THE GEOGRAPHIC REGION**

VAHR NO	PLACE NAME	PLACE TYPE
	HERITAGE SPRINGS SOUTH ARTEFACT	
7921-0001	SCATTER 1	Artefact Scatter
7921-0198	TOOMUC CREEK 1	Artefact Scatter
7921-0199	TOOMUC CREEK 2	Artefact Scatter
7921-0200	HENRY ROAD SS7	Artefact Scatter
7921-0202	TOOMUC CREEK 3	Artefact Scatter
7921-0223	TOOMUC CREEK 7	Artefact Scatter
7921-0397	TOOMUC CREEK 8	Artefact Scatter
7921-0404	TOOMUC CREEK 9	Artefact Scatter
7921-0471	LAKESIDE SITE 3	Artefact Scatter
7921-0472	LAKESIDE SITE 2	Artefact Scatter
7921-0473	LAKESIDE SITE 1	Artefact Scatter
7921-0495	DELFIN 1	Artefact Scatter
7921-0496	DELFIN 2	Artefact Scatter
7921-0606	WYEE-LING	Artefact Scatter
7921-0653	PAKENHAM LAKESIDE 4/5	Artefact Scatter
7921-0654	TOOMUK YALLUK	Artefact Scatter
7921-0769	HENRY ROAD	Artefact Scatter
7921-0816	HENRY ROAD SS1	Artefact Scatter
7921-0817	HENRY ROAD SS2	Artefact Scatter
7921-0818	HENRY ROAD SS3	Artefact Scatter
7921-0819	HENRY ROAD SS4	Artefact Scatter
7921-0820	HENRY ROAD SS5	Artefact Scatter
7921-0835	HENRY ROAD SS8	Artefact Scatter
7921-0836	HENRY ROAD SS9	Artefact Scatter
7921-0837	HENRY ROAD SS10	Artefact Scatter
7921-0923	HENRY ROAD SS11	Artefact Scatter
7921-0924	HENRY ROAD SS12	Artefact Scatter
	HENRY RD SUB-SURFACE ARTEFACT	Artefact Scatter
7921-1163	DEPOSIT 1	
	HENRY RD SUB-SURFACE ARTEFACT	Artefact Scatter
7921-1164	DEPOSIT 2	
	HENRY RD SUB-SURFACE ARTEFACT	Artefact Scatter
7921-1165	DEPOSIT 3	
7921-1169	HENRY ROAD TOOMUC CREEK	Artefact Scatter
	CARDINIA ROAD EMPLOYMENT PRECINCT	Artefact Scatter
7921-1205	(CREP) 2	
7921-1211	HERITAGE SPRINGS 9	Artefact Scatter
7921-1212	HERITAGE SPRINGS 10	Artefact Scatter
7921-1213	HERITAGE SPRINGS 11	Artefact Scatter
7921-1214	HERITAGE SPRINGS 4	Artefact Scatter
7921-1215	HERITAGE SPRINGS 5	Artefact Scatter
7921-1216	HERITAGE SPRINGS 6	Artefact Scatter
7921-1217	HERITAGE SPRINGS 7	Artefact Scatter
7921-1218	HERITAGE SPRINGS 8	Object Collection
7921-1234	HERITAGE SPRINGS SOUTH 2	Artefact Scatter
7921-1306	EDENBROOK 2	Artefact Scatter
7921-1407	TOOMUC CREEK ISOLATED ARTEFACT 2	Artefact Scatter

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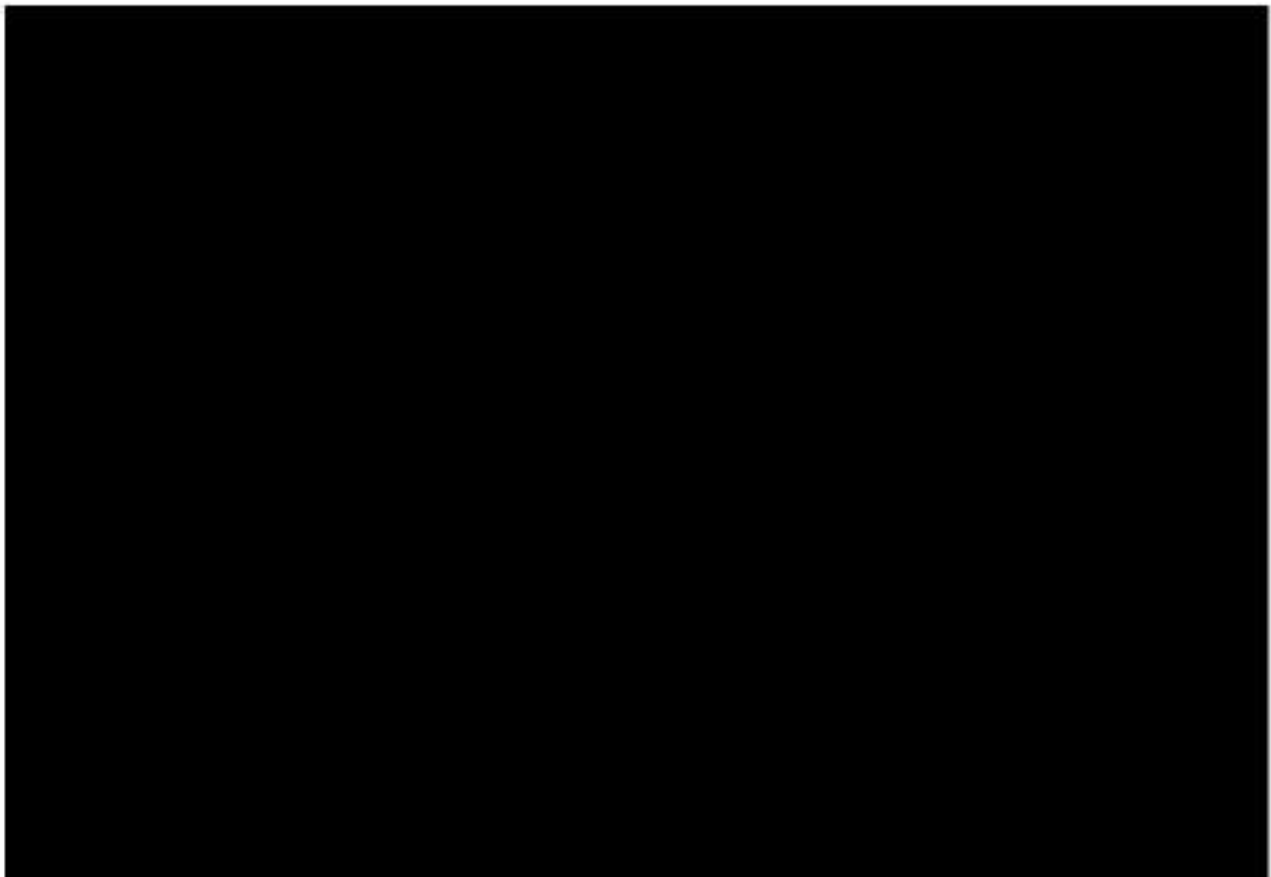
VAHR NO	PLACE NAME	PLACE TYPE
7921-1414	TOOMUC CREEK ISOLATED ARTEFACT 1	Artefact Scatter
7921-1421	HENRY ROAD RECREATION RESERVE 1	Artefact Scatter
7921-1422	HENRY ROAD RECREATION RESERVE 2	Artefact Scatter
7921-1555	BARR COURT PAKENHAM LDAD 1	Low Density Artefact Distribution
7921-1801	TOOMUC CREEK LDAD	Low Density Artefact Distribution

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## APPENDIX 4 – SUMMARY CVs

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Roland Weathersseed is a project archaeologist with a Bachelor of Arts majoring in history and archaeology and a Master of Professional Archaeology both from La Trobe University. He has volunteered on archaeological sites in Peru and has excavated a convict site in Tasmania with University of Tasmania.

### Relevant Experience

#### Internship (2021)

Student Internship through La Trobe University. Responsibilities included artefact cleaning, analysis and photographing, aiding professionals with CHMPs and heritage statements, and fieldwork.

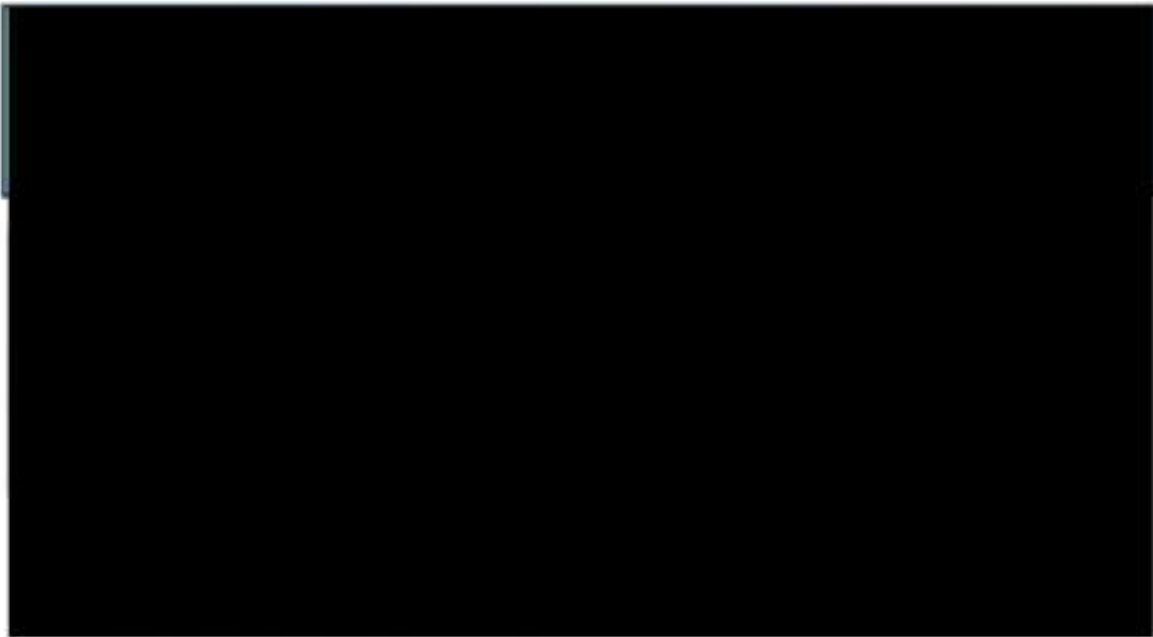
#### Kempton Road Station (2020)

Student Archaeologist working on an historical excavation. Responsibilities included hand excavation, site recording, paperwork, artefact cleaning and analysis, developing community exhibition of the excavation results.

#### Project Abroad Peru (2018)

Volunteer based in Cuzco region. Responsibilities included maintenance of historic sites and attractions, surveying and GPS recording of Incan and Pre-Incan sites, preparation of future excavation sites, artefact cleaning and analysis.

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**Role Responsibilities** Senior Archaeologist  
Resource Management  
Client Liaison  
Management & Reporting for Aboriginal and Historic Cultural Heritage requirements

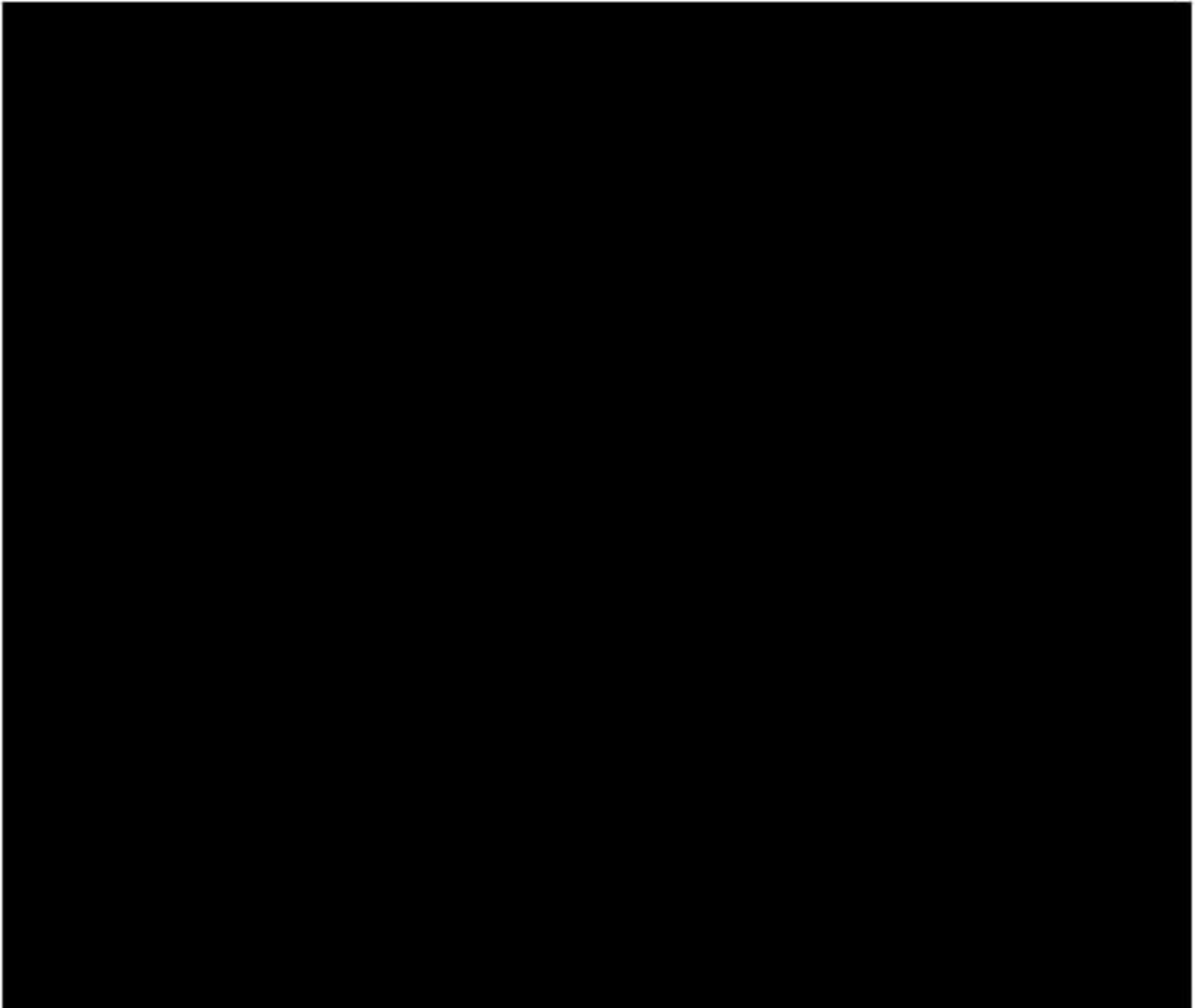
#### **Career Summary**

Herman is a Principal Archaeologist with over 20 years' experience in Australian and African cultural heritage resource management. Herman has expertise working with first nations and indigenous people in Australia and in Africa in the preservation of their cultural heritage places and resources. Herman has long experience in conducting and supervising archaeological surveys and excavations; research, artefact analysis and the production and editing of technical and academic reports.

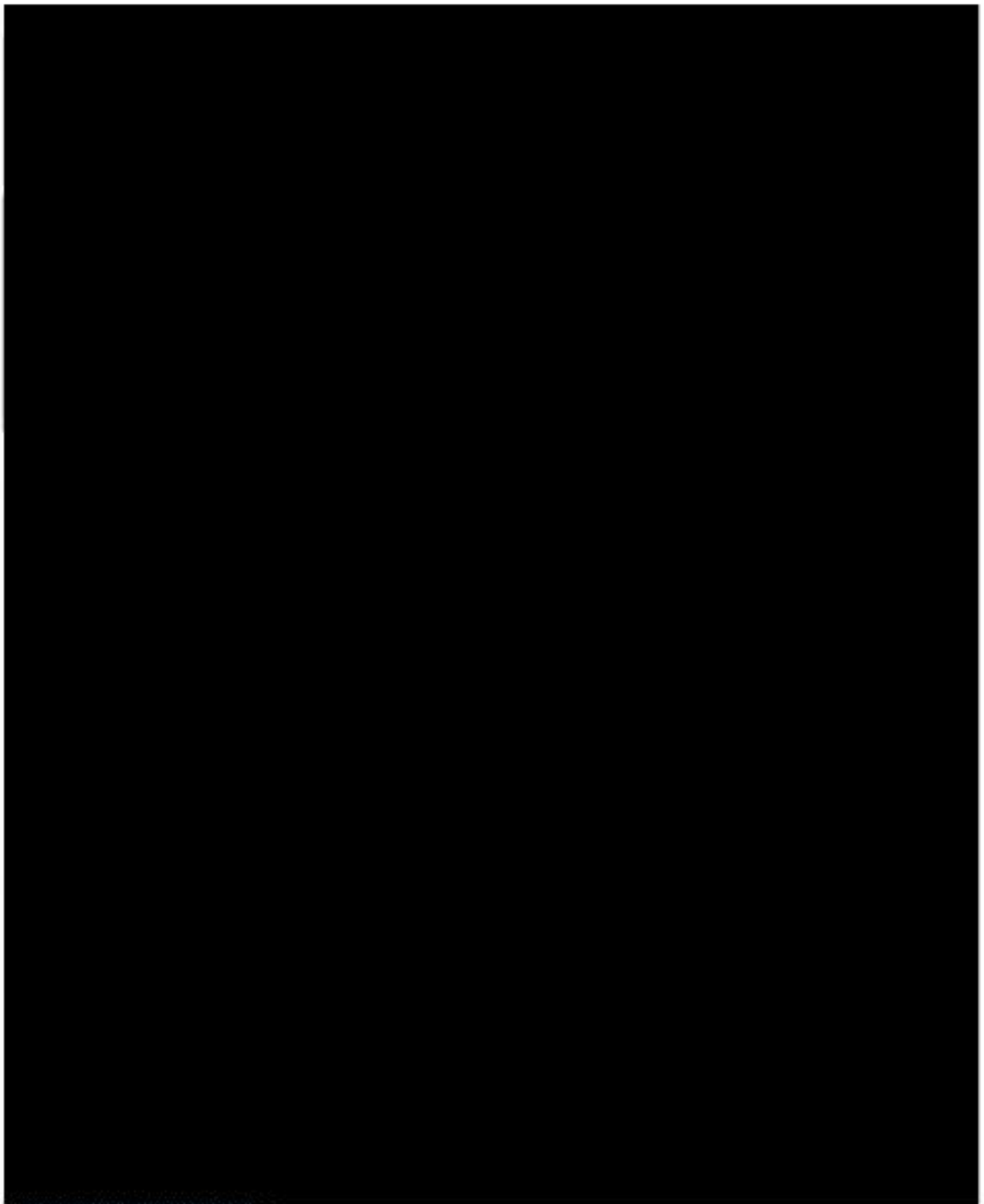
Herman has over 20 years of experience in heritage consultancy both as a Project Team Leader and Project Director in Victoria, WA, Kenya, Tanzania and the Seychelles. These projects range from mining and oil operations, infrastructure projects such as roads and railways, and residential infrastructural developments. These projects have involved liaising closely with Aboriginal, Indigenous, Non-governmental and government stakeholders to ensure that cultural heritage reports and other statutory obligations are delivered and met within the set timelines in order to ensure optimal outcomes for cultural heritage.

Herman's areas of expertise include all aspects of cultural heritage such as the management of large fieldwork teams, artefact analysis, giving sound cultural heritage recommendations, and reporting. Major projects include the Ararat to Ballarat Bypass, Kens Bore Haul Road (Additional Areas) and Stockpile and Central Processing Facility (Additional Areas), Pilbara, Western Australia; the proposed construction of a honey processing shed, 630 Cranbourne-Frankston Road (Victoria, Australia), The Turkana Wind Farm Power Project; The Kwale Sugar Processing project; Cultural Heritage Impact Assessment of Lokichar South Area for Africa Oil; The Standard Gauge Railway Assessment on behalf of Kenya.

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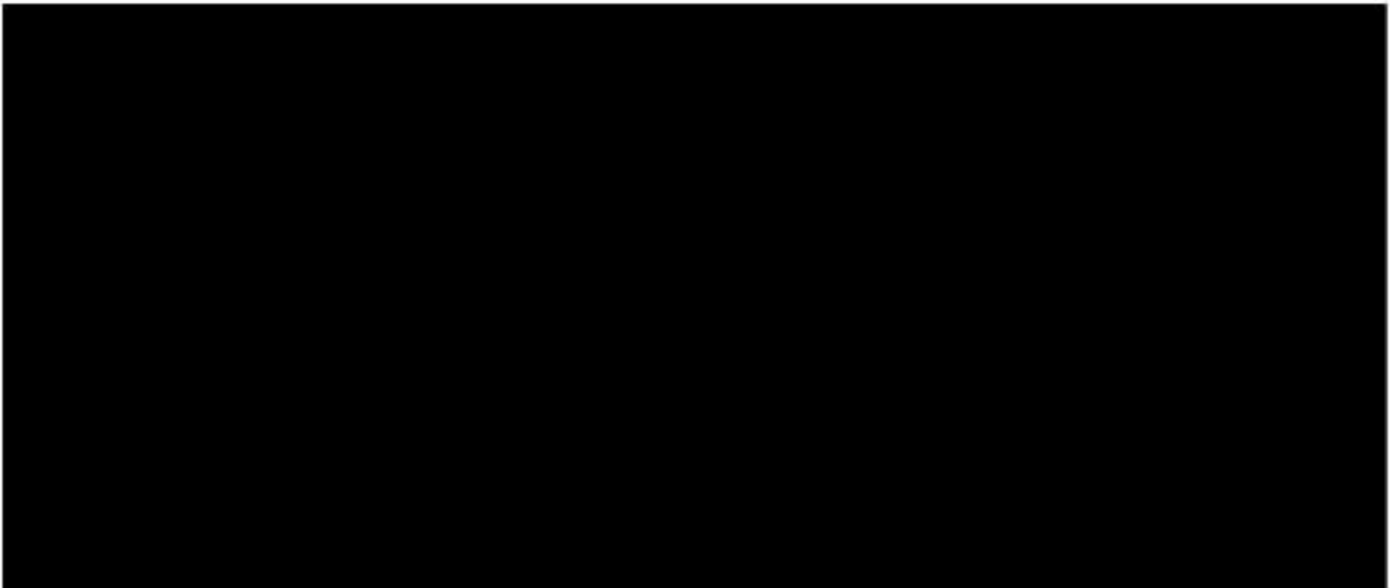


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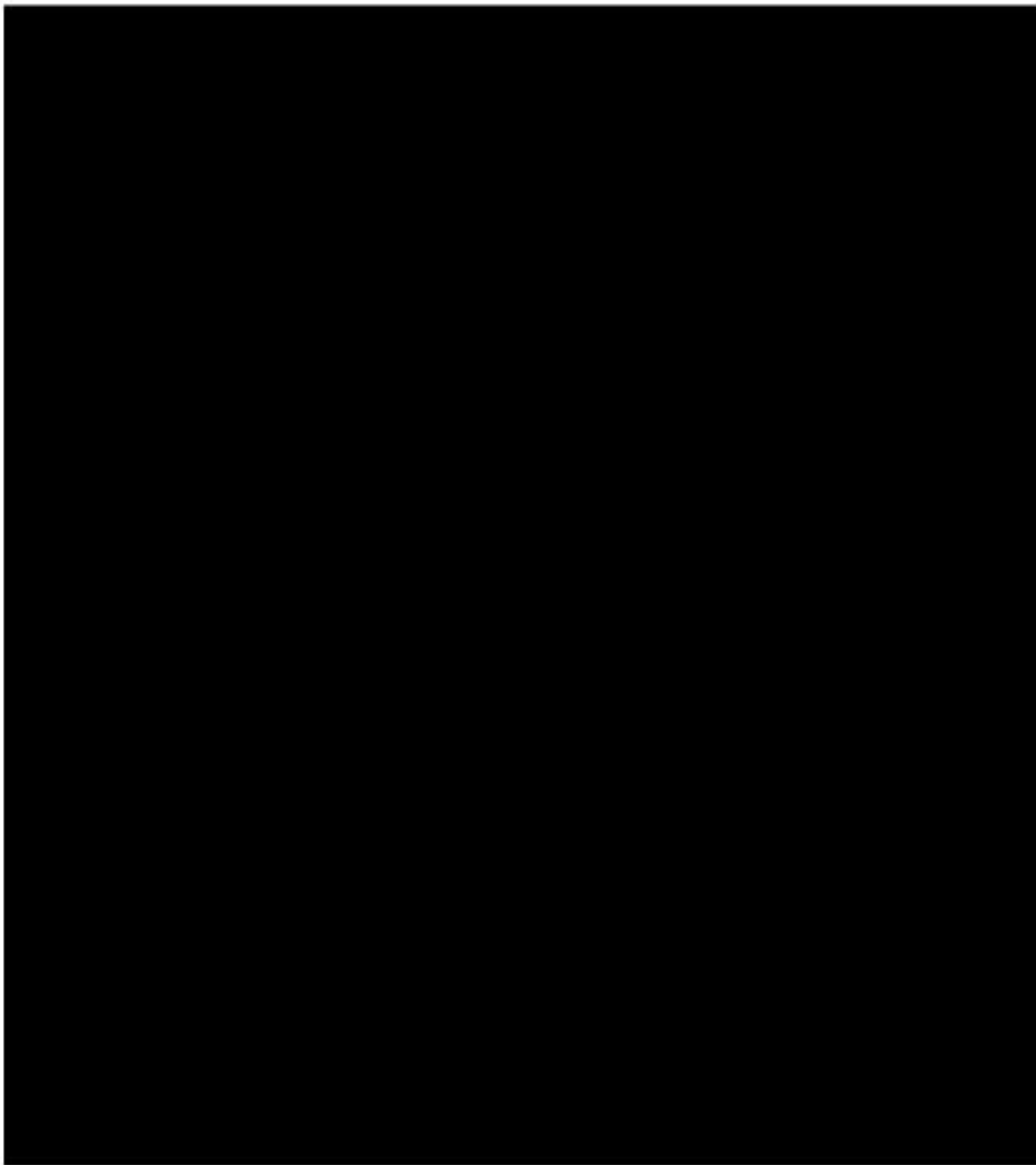
Various Heritage Statements (2022)  
Heritage Advisor writing Heritage Statements for clients.

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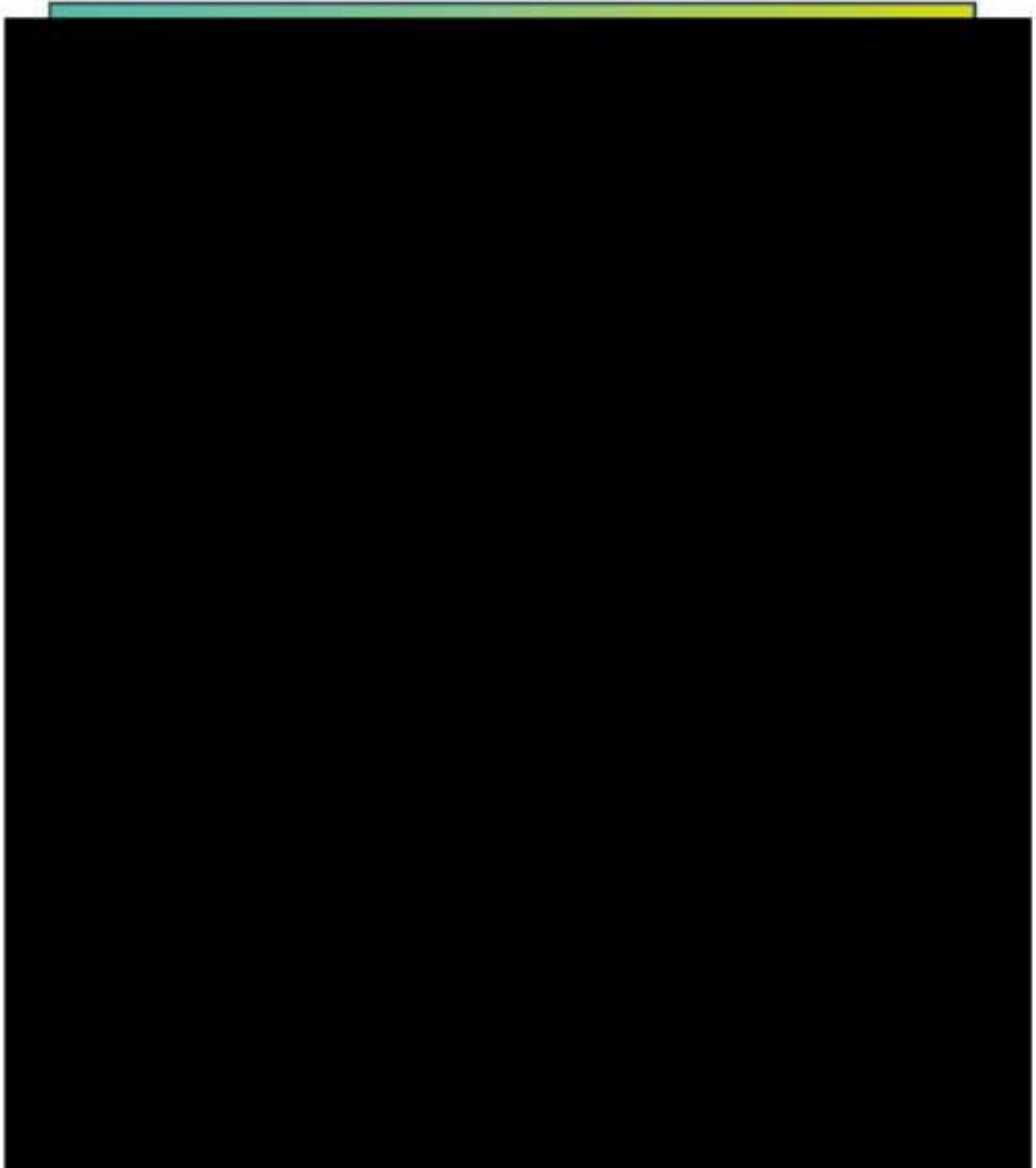


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## **APPENDIX 5 – EXCAVATION LOG**

Excavation ID: TP1; Coordinates: 364271.4E, 5783371N; Date: 5 November 2023; Landform: Floodplain; Disturbance: None

Context No.	Soil Horizon	Depth (mm)	Munsell Colour	pH	Texture	Moisture	Structure	Consistency	Inclusions	Boundary	Artefacts
[1]	A1	0-60	-	5.5	Silt	Dry	Single grain	Weak	Grass roots	Smooth Clear	None
[2]	A1	60-150	-	6	Silty clay	Dry	Single grain	Weak	Thin layer of alluvial clay	Smooth Clear	None
[3]	A2	150-520	-	6	Silty sand	Dry	Single grain	Weak	-	Smooth Clear	None
[4]	A2	520-600	-	6	Clayey sandy silt	Dry	Massive	Weak	-	Smooth Clear	None
[5]	B1	600+	-	6	Clay	Dry	Massive	Firm	-	-	-

Excavation ID: TP2; Coordinates: 364261.5E, 5783373N; Date: 6 November 2023; Landform: Floodplain; Disturbance: None

Context No.	Soil Horizon	Depth (mm)	Munsell Colour	pH	Texture	Moisture	Structure	Consistency	Inclusions	Boundary	Artefacts
[1]	A1	0-70	-	5.5	Silt	Dry	Single grain	Weak	Grass roots	Smooth Clear	None
[2]	A1	70-150	-	6	Clayey silt	Dry	Single grain	Weak	-	Smooth Clear	None
[3]	A2	150-220	-	6	Silty clay	Dry	Single grain	Firm	-	Smooth Clear	None
[4]	B1	220+	-	6	Clay	Dry	Massive	Firm	-	-	-

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Excavation ID: TP3; Coordinates: 364255.6E, 5783390N; Date: 6 November 2023; Landform: Floodplain; Disturbance: None

Context No.	Soil Horizon	Depth (mm)	Munsell Colour	pH	Texture	Moisture	Structure	Consistency	Inclusions	Boundary	Artefacts
[1]	A1	0-60	-	5.5	Silt	Dry	Single grain Massive	Weak	Grass roots and mottled iron stone	Smooth Clear	None
[2]	A1	60-200	-	6	Clayey silt	Dry	Single grain Massive	Weak	Charcoal and ironstone	Smooth Clear	None
[3]	A2	200-260	-	6	Silty clay	Dry	Single grain Massive	Firm	Charcoal and ironstone	Smooth Clear	None
[4]	B1	260+	-	6	Clay	Dry	Massive	Firm	-	-	-

Excavation ID: TP4; Coordinates: 364255.6E, 5783410N; Date: 6 November 2023; Landform: Floodplain; Disturbance: None

Context No.	Soil Horizon	Depth (mm)	Munsell Colour	pH	Texture	Moisture	Structure	Consistency	Inclusions	Boundary	Artefacts
[1]	A1	0-100	-	6	Clayey silt	Dry	Single grain	Firm	Grass roots	Mottled	None
[2]	A1	100-160	-	6	Clayey silty sand	Dry	Single grain	Firm	-	Smooth Clear	None
[3]	B2	160+	-	6	Clay	Dry	Massive	Firm	-	Smooth Clear	None

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Excavation ID: TP5; Coordinates: 364270.2E, 5783389N; Date: 25 February 2024; Landform: Floodplain; Disturbance: None

Context No.	Soil Horizon	Depth (mm)	Munsell Colour	pH	Texture	Moisture	Structure	Consistency	Inclusions	Boundary	Artefacts
[1]	A1	0-80	-	6	Sandy silt	Dry	Single grain	Weak	Grass roots	Smooth Clear	None
[2]	A1	80-220	-	6	Sandy silt	Dry	Single grain	Weak	Minor roots, charcoal	Smooth Clear	None
[3]	A2	220-410	-	6	Sandy silt	Dry	Single grain	Weak	-	Smooth Clear	None
[4]	A3	410-600	-	6	Clayey sand	Dry	Massive	Weak	-	Smooth Clear	None
[5]	B1	600+	-	6	Clay	Dry	Massive	Firm	-	-	-

Excavation ID: TP6; Coordinates: 364250E, 5783333N; Date: 2 February 2024; Landform: Floodplain; Disturbance: None

Context No.	Soil Horizon	Depth (mm)	Munsell Colour	pH	Texture	Moisture	Structure	Consistency	Inclusions	Boundary	Artefacts
[1]	A1	0-100	-	6	Silt	Dry	Single grain	Very strong	Grass roots	Smooth Clear	None
[2]	A1	100-180	-	6	Sandy silt	Dry	Single grain	Firm	-	Smooth Clear	None
[3]	A2	180-280	-	6	Silty sand	Dry	Single grain	Firm	-	Smooth Clear	None
[4]	A3	280-450	-	6	Sandy clay	Dry	Massive	Very firm	-	Smooth Clear	None
[5]	B1	450+	-	6	Clay	Dry	Massive	Firm	-	-	-

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Excavation ID: TP7; Coordinates: 364259.5E, 5783331N; Date: 2 February 2024; Landform: Floodplain; Disturbance: None

Context No.	Soil Horizon	Depth (mm)	Munsell Colour	pH	Texture	Moisture	Structure	Consistency	Inclusions	Boundary	Artefacts
[1]	A1	0-90	-	6	Silt	Dry	Single grain Massive	Very firm	Grass roots	Smooth Clear	None
[2]	A1	90-150	-	6	Sandy silt	Dry	Single grain	Firm	Rodent bones	Smooth Clear	None
[3]	A2	150-280	-	6	Silty sandy clay	Dry	Single grain massive	Strong	-	Smooth Clear	None
[4]	B1	280+	-	6	Clay	Dry	Massive	Firm	-	-	-

Excavation ID: TP8; Coordinates: 364254.4E, 5783421N; Date: 26 February 2024; Landform: Floodplain; Disturbance: None

Context No.	Soil Horizon	Depth (mm)	Munsell Colour	pH	Texture	Moisture	Structure	Consistency	Inclusions	Boundary	Artefacts
[1]	A1	0-100	-	6	Silt	Dry	Single grain Massive	Firm	Grass roots and charcoal	Smooth Clear	None
[2]	A1	100-260	-	6	Sandy silt	Dry	Single grain	Firm	Burnt clay and charcoal	Smooth Clear	None
[3]	A2	260-380	-	6	Sandy silt	Dry	Single grain massive	Weak	-	Smooth Clear	None
[4]	B1	380+	-	6	Clay	Dry	Massive	Firm	-	-	-

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Excavation ID: TP9; Coordinates: 364267.1E, 5783407N; Date: 26 February 2024; Landform: Floodplain; Disturbance: None

Context No.	Soil Horizon	Depth (mm)	Munsell Colour	pH	Texture	Moisture	Structure	Consistency	Inclusions	Boundary	Artefacts
[1]	A1	0-100	-	5.5	Silt	Dry	Single grain	Loose	Grass roots	Smooth Clear	None
[2]	A1	100-180	-	6	Sandy silt	Dry	Single grain	Firm	-	Smooth Clear	None
[3]	A2	180-400	-	6	Sandy silt	Dry	Single grain	Weak	-	Smooth Clear	None
[4]	A3	400-600	-	6	Sandy clay	Dry	Massive	Weak	-	Smooth Clear	None
[5]	B1	600+	-	6	Clay	Dry	Massive	Firm	-	-	-

Excavation ID: TP10; Coordinates: 364270.2E, 5783350N; Date: 27 February 2024; Landform: Floodplain; Disturbance: None

Context No.	Soil Horizon	Depth (mm)	Munsell Colour	pH	Texture	Moisture	Structure	Consistency	Inclusions	Boundary	Artefacts
[1]	A1	0-120	-	6	Sandy silt	Dry	Single grain	Loose	Grass roots	Smooth Clear	None
[2]	A1	120-300	-	6	Sandy silt	Dry	Single grain	Firm	-	Smooth Clear	None
[3]	A2	300-380	-	6	Sandy silt	Dry	Single grain	Firm	-	Smooth Clear	None
[4]	B1	380+	-	6	Clay	Dry	Massive	Very firm	-	-	-

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Excavation ID: TP11; Coordinates: 364250.9E, 5783319N; Date: 28 February 2024; Landform: Floodplain; Disturbance: None

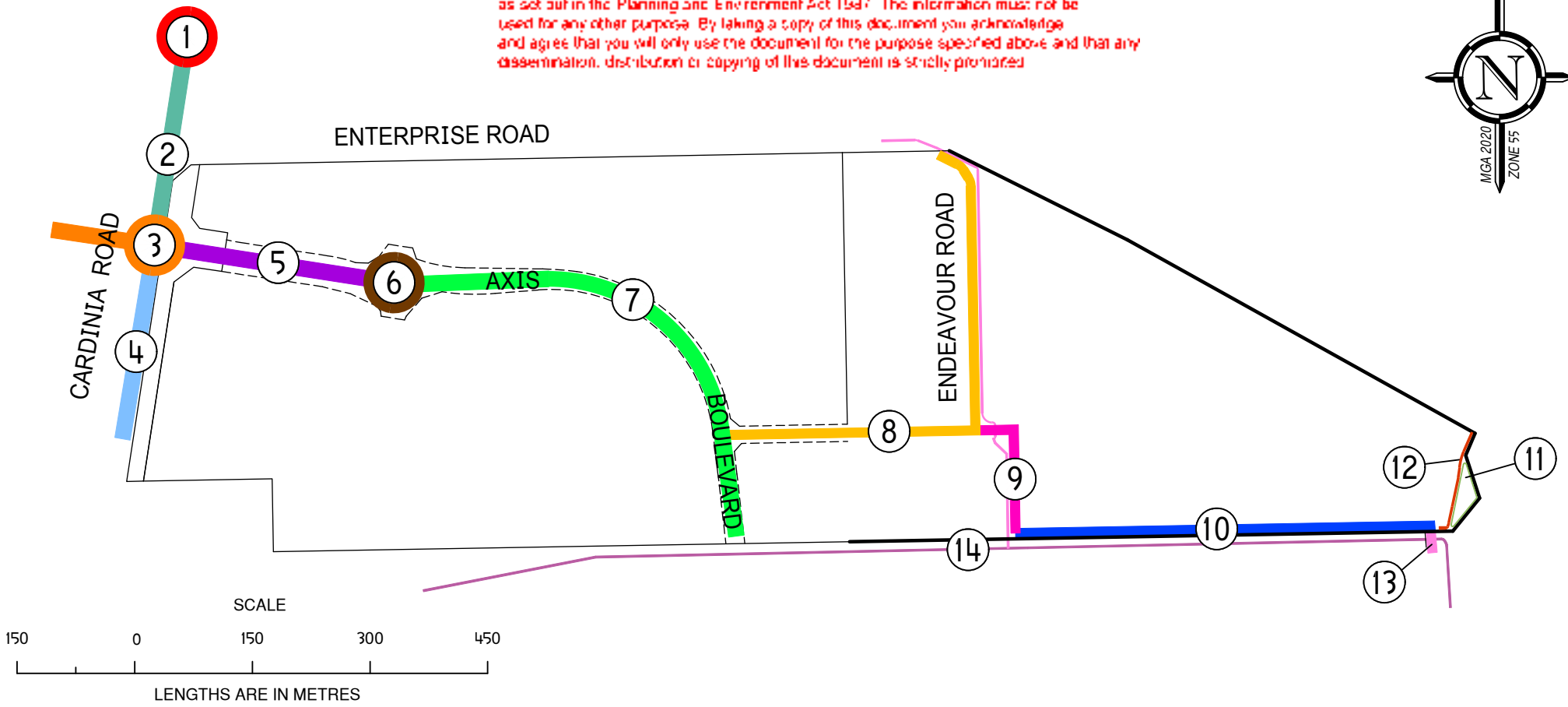
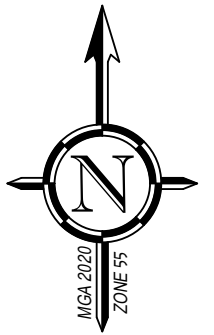
Context No.	Soil Horizon	Depth (mm)	Munsell Colour	pH	Texture	Moisture	Structure	Consistency	Inclusions	Boundary	Artefacts
[1]	A1	0-100	-	5.5	Sandy silt	Dry	Single grain	Loose	Grass roots	Smooth Clear	None
[2]	A1	100-350	-	6	Sandy silt	Dry	Single grain	Firm	-	Smooth Clear	None
[3]	A2	350-500	-	6	Sandy silt	Dry	Single grain	Firm	Minor charcoal	Smooth Clear	None
[4]	B1	500+	-	6	Clay	Dry	Massive	Strong	-	-	-

Excavation ID: TP12; Coordinates: 364228.7E, 5783315N; Date: 28 February 2024; Landform: Floodplain; Disturbance: None

Context No.	Soil Horizon	Depth (mm)	Munsell Colour	pH	Texture	Moisture	Structure	Consistency	Inclusions	Boundary	Artefacts
[1]	A1	0-70	-	5.5	Sandy silt	Dry	Single grain	Loose	Grass roots	Smooth Clear	None
[2]	A1	70-200	-	6	Sandy silt	Dry	Single grain	Firm	-	Smooth Clear	None
[3]	A2	200-300	-	6	Sandy silt	Dry	Single grain	Firm	Minor charcoal	Smooth Clear	None
[4]	B1	300+	-	6	Clay	Dry	Massive	Strong	-	-	-

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ITEMS	DESCRIPTION	DEVELOPER WORKS (NON-DCP ITEMS)	WORKS OR LAND PROVISION IN LIEU (OF DCP PAYMENTS)*	DCP REFERENCE	RESPONSIBILITY FOR CONSTRUCTION (OR ACQUISITION)*	EXPECTED YEAR FOR DELIVERY **
1	Construction of Cardinia Road Southern Freeway Interchange - Initial (roundabout upgrade: addition of second lane; left over works)	No	Yes	DI_IN_01 OFB Part	Developer unless delivered by others**	2025
	Construction of Cardinia Road Southern Freeway Interchange - Interim (roundabout upgrade: freeway exit lane and bridge ramp works; left over works).	No	Yes	DI_IN_01 UP Part	Developer unless delivered by others**	2025
	Construction of Cardinia Road Southern Freeway Interchange - Ultimate (signalisation (potential future) and provision of second bridge over Freeway).	No	No	N/A	Others (DTP)	N/A
2	Provision of land for Cardinia Road Duplication (southern freeway interchange to intersection with Eastern and Western Arterial) (50m road reserve).	No	No	DI_LA_01	Others	2024
	Construction of Cardinia Road Duplication (southern freeway interchange to intersection with Eastern and Western Arterial), four lane divided road with widened median - Ultimate.	No	Yes	DI_RD_01	Developer unless delivered by others**	2025
	Construction of Streetscape Cardinia Road (Pakenham Bypass to Western Arterial) (central median planting) - Ultimate.	No	Yes	DI_OS_14	Developer unless delivered by others**	2025
3	Construction of Cardinia Road/Eastern and Western Arterial Roundabout.	No	Yes	DI_IN_02 OFB	Developer	2025
	Construction of Cardinia Road/Eastern and Western Arterial Roundabout.	No	Yes	DI_IN_02 UP	Developer	2025
	Construction of Cardinia Road/Eastern and Western Arterial Roundabout - Ultimate (potential future signalised intersection).	No	No	N/A	Others (DTP)	N/A
4	Construction of Cardinia Road Interim Works (Delivery of Interim Southern approach to intersection with Eastern & Western Arterial) - tapering four urban lanes into existing two rural lanes only.	No	Yes	DI_RD_02 OFB	Developer unless delivered by others**	2025
	Construction of Cardinia Road Duplication (From intersection with Eastern and Western Arterial to Kaduna Park Intersection).	No	Yes	DI_RD_02 UP	Developer unless delivered by others**	2026
	Construction of Streetscape: Cardinia Road (from intersection with Eastern & Western Arterial to Kaduna Park intersection).	No	Yes	DI_OS_14a	Others	2028
5	Provision of land for Eastern Arterial Duplication from Cardinia Road to Activity Centre Ring Road.	No	Yes	DI_LA_05	Others	2024
	Construction of Streetscape: Cardinia Road (from Cardinia Road to Activity Centre Ring Road).	No	Yes	DI_OS_15	Others	2026
	Construction of Eastern Arterial (From Cardinia Road to Activity Centre Ring Road)	No	Yes	DI_RD_05	Developer	2024
6	Construction of Eastern Arterial and Activity Centre Ring Road Roundabout	No	Yes	DI_IN_05 Part	Developer	2024
	Construction of Eastern Arterial from Activity Centre to Ring Road roundabout to southern property boundary of 26 Enterprise Road	Yes	No	N/A	Developer	2024
8	Construction of east - west Industrial Access Street extending from Eastern Arterial Road to the north-south industrial access street	Yes	No	N/A	Developer	2024
	Construction of north - south Industrial Access Street, for the length that abuts the proposed development, including the truck turning area.	Yes	No	N/A	Developer	2024
9	Construction of Industrial Access street extending from Endeavour Road to the southern boundary, including a truck turning area	Yes	No	N/A	Developer	2025
10	Construction of Industrial Access street extending along southern boundary, including a truck turning area	Yes	No	N/A	Others	2026
11	Provision of land for encumbered open space (drainage reserve)	No	No	N/A	Others	2026
12	Shared path along Toomuc Creek encumbered open space corridor	No	No	DI_TN_03	Others	2026
13	Road crossing of Gas Easement	Yes	No	N/A	Others	2026
14	Construction of shared trail - Gas Easement	Yes	No	N/A	Others	2025/2026

**NOTES:**

- \* Where the PIP is for land in the Cardinia Road Employment PSP area, the provision of land or extent of works to be credited (Value and/or %) to be determined as part of the related Section 173 Agreement.
- \*\* Or as agreed by the Responsible Authority or in a related Section 173 Agreement registered on-title.

The Cardinia Road Employment PSP and Cardinia Planning Scheme requires a 1.62% contribution towards Public Open Space.

Open Space equalisation in accordance with the Cardinia Road Employment PSP to be addressed as part of a Section 173 Agreement Registered on title.

Optic fibre conduits to be installed to the satisfaction of the Responsible Authority.



Client:  
 Title Details:  
 Vol. 9622 Fol. 089  
 Lot 1 on TP99673B  
 Reference: 8889.ESR PIP01  
 Plan Date: 06-01-2025  
 Version: 3  
 Scale: 1:7500  
 Sheet 1 of 1  
 Sheet Size: A3



**Stage 2 - 92 Enterprise Road, Pakenham**

**Public Infrastructure Plan**



# 92 ENTERPRISE ROAD, PAKENHAM

## GAS EASEMENT WORKS

### 92 ENTERPRISE ROAD, PAKENHAM

### CARDINIA SHIRE COUNCIL

FOR



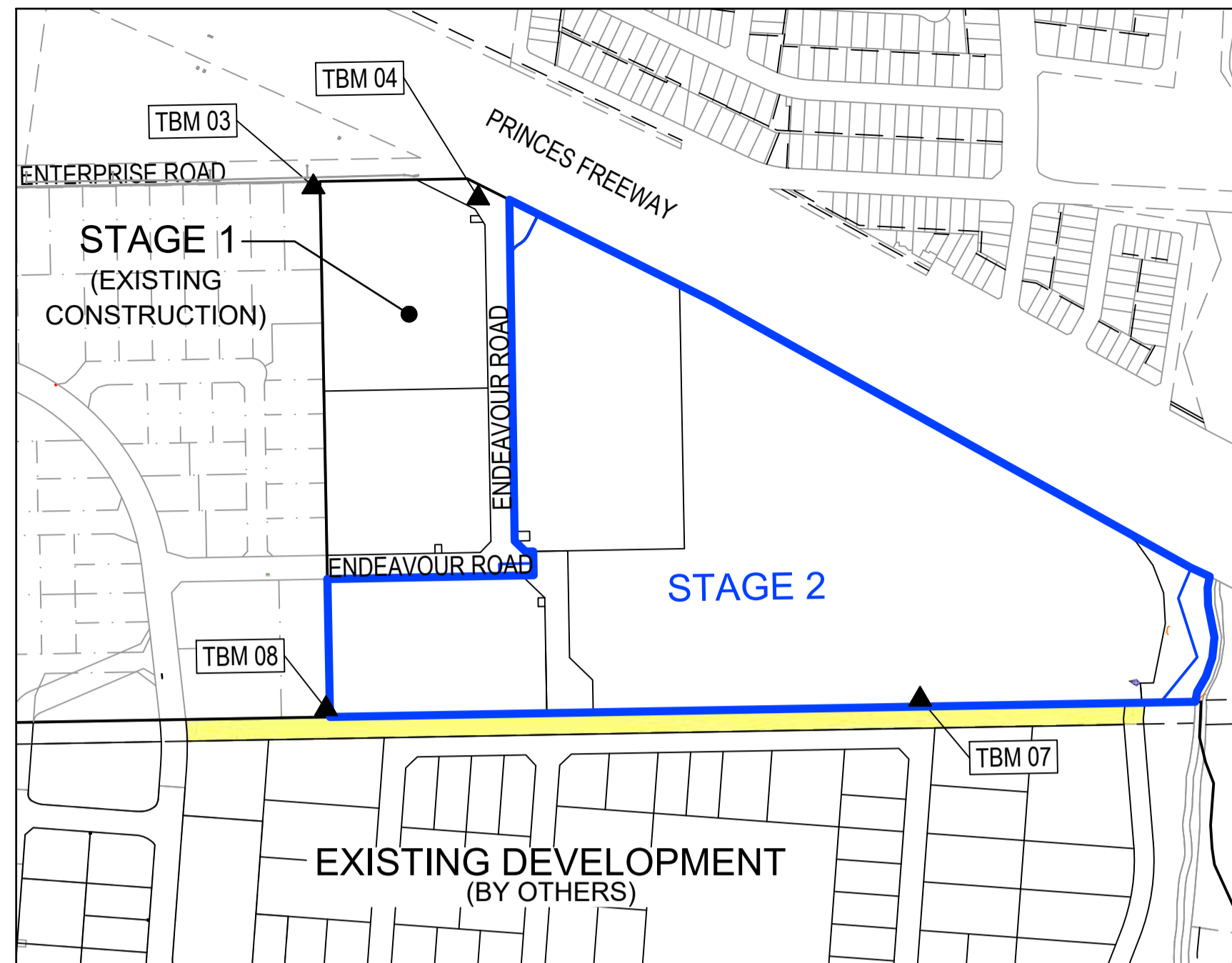
## CIVIL DRAWINGS

## GAS EASEMENT WORKS

DCE REF: 22084.2SE  
MELWAY REF: 215 J11

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**TBM & LOCALITY PLAN**  
SCALE @ A1: 1:5000

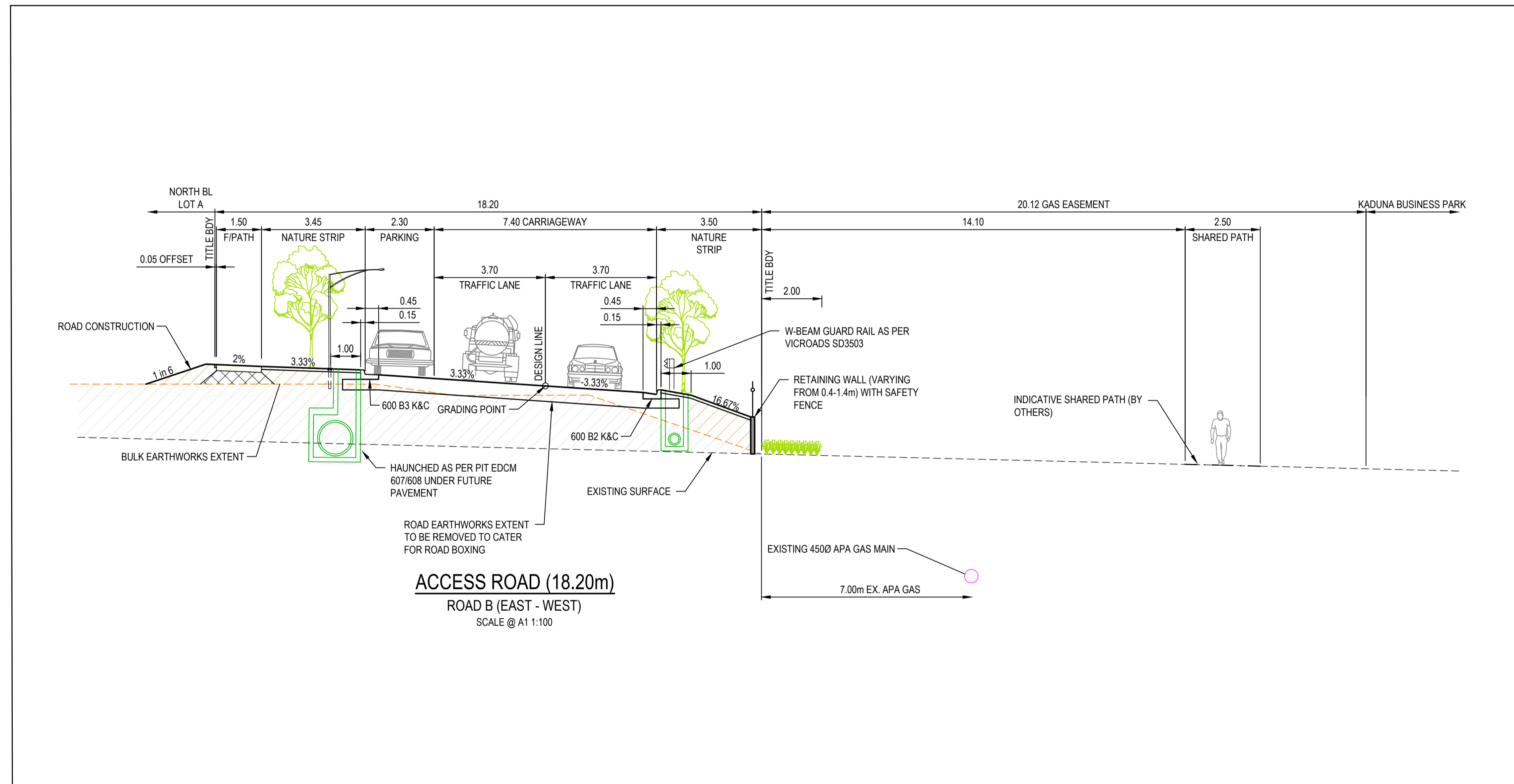
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**DRAWING INDEX**

SHEET No.	DWG No.	DESCRIPTION
01-02	22084.2SETD01-02	LOCALITY PLAN, DRAWING INDEX AND TYPICAL SECTIONS SHEETS 01 TO 02
03	22084.2SELP01	LAYOUT PLAN
04-05	22084.2SEDP01-02	DETAIL PLAN, SHEETS 01 TO 02
06-10	22084.2SEX01-X5	CROSS SECTIONS, SHEETS 01 TO 05

**TBM SCHEDULE**

I.D.	TYPE	EASTING	NORTHING	LEVEL
01	STAR PICKET	362837.077	5783778.334	22.23
02	STAR PICKET	362989.876	5783783.798	23.27
03	STAR PICKET	363437.913	5783789.448	23.73
04	STAR PICKET	363590.570	5783779.168	26.32
07	STAR PICKET	363999.736	5783315.216	22.37
08	STAR PICKET	363449.652	5783306.380	22.35
09	STAR PICKET	362729.501	5783383.010	20.55
10	STAR PICKET	362724.855	5783292.171	20.41
11	STAR PICKET	362543.784	5783379.552	20.98
12	STAR PICKET	362606.418	5783769.024	22.75



**DANGER!**  
HIGH VOLTAGE UNDERGROUND ELECTRICAL. CONTRACTOR TO EXERCISE EXTREME CAUTION WHEN OPERATING IN THE VICINITY OF THESE CABLES.

**CAUTION!**  
ALL EXISTING SERVICES IN THE VICINITY OF WORKS SHALL BE PROTECTED AND KEPT IN FUNCTIONAL STATE AT ALL TIMES DURING WORKS.

**BEWARE!**  
NBN OPTIC FIBRE CABLES IN THE VICINITY OF WORKS. TEL: 1800 687 626.

**BEWARE!**  
TELSTRA OPTIC FIBRE CABLES IN THE VICINITY OF WORKS. TEL: 9253 8263.

**BEWARE!**  
TELSTRA MAJOR CABLES ARE IN THE VICINITY OF WORKS.

**WARNING!**  
NO DRAINAGE WORKS SHALL COMMENCE UNTIL THE CONTRACTOR CONFIRMS THE I.L. OF ALL EXISTING DRAINS, AND CONFIRMS IN WRITING WITH THE ENGINEERING SUPERVISOR.

**DANGER!**  
OVERHEAD ELECTRICITY TRANSMISSION LINES. CONTRACTOR TO EXERCISE EXTREME CAUTION WHEN OPERATING IN THE VICINITY OF THESE LINES. THE CONTRACTOR MUST ADHERE TO ALL "NO GO ZONE" REQUIREMENTS OF THE POWER AUTHORITY.

**WARNING!**  
THE LOCATION OF EXISTING SERVICES SHOWN ON THESE PLANS MUST BE PROVEN ON SITE. THE APPROPRIATE AUTHORITY MUST BE CONTACTED AND THE SERVICES LOCATED PRIOR TO COMMENCEMENT OF ANY WORKS.

**WARNING!**  
**BEWARE OF ASBESTOS!**  
SOME UNDERGROUND SERVICES MAY BE CONSTRUCTED FROM ASBESTOS CONTAINING MATERIAL. CONTACT THE SUPERINTENDENT FOR INSTRUCTIONS ON HOW TO MANAGE ANY POTENTIAL ASBESTOS HAZARD.

**92 ENTERPRISE ROAD, PAKENHAM**  
GAS EASEMENT WORKS  
LOCALITY PLAN & TYPICAL SECTIONS

DCE REF 22084.2SETD01  
DRAWN BY K. BOUPHASAVANH  
REVISION H  
REV DATE 03/12/24



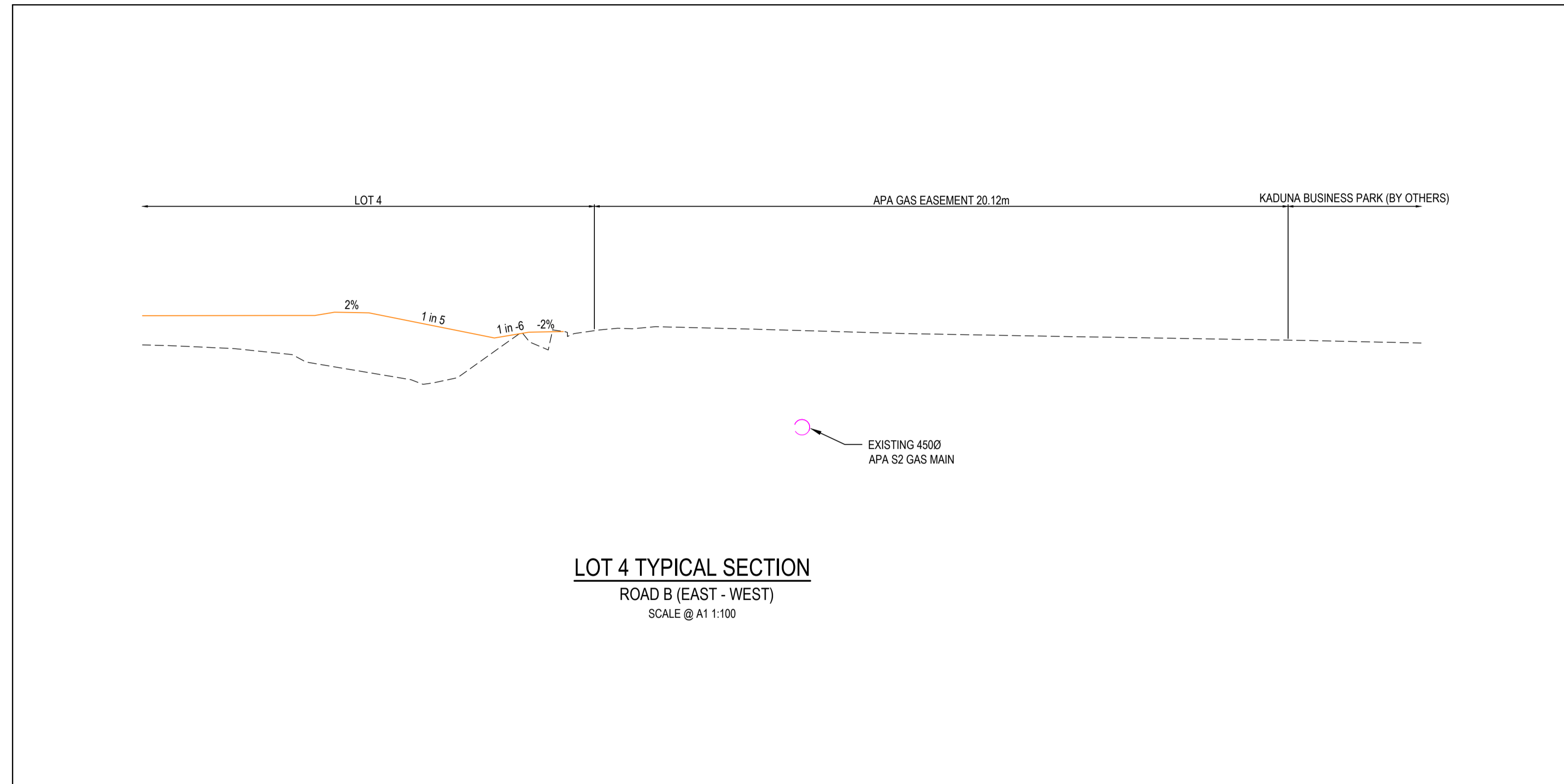
**LEGEND**  
— STAGE BOUNDARY  
— CURRENT STAGE

Scale @ A1/A3 As Shown



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dceng.com.au E info@dceng.com.au

**FOR DISCUSSION**



**LOT 4 TYPICAL SECTION**  
 ROAD B (EAST - WEST)  
 SCALE @ A1 1:100

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**92 ENTERPRISE ROAD, PAKENHAM**  
 GAS EASEMENT WORKS  
 TYPICAL SECTIONS

DCE REF 22084.2SETD02  
 DRAWN BY K. BOUPHASAVANH  
 REVISION H  
 REV DATE 03/12/24



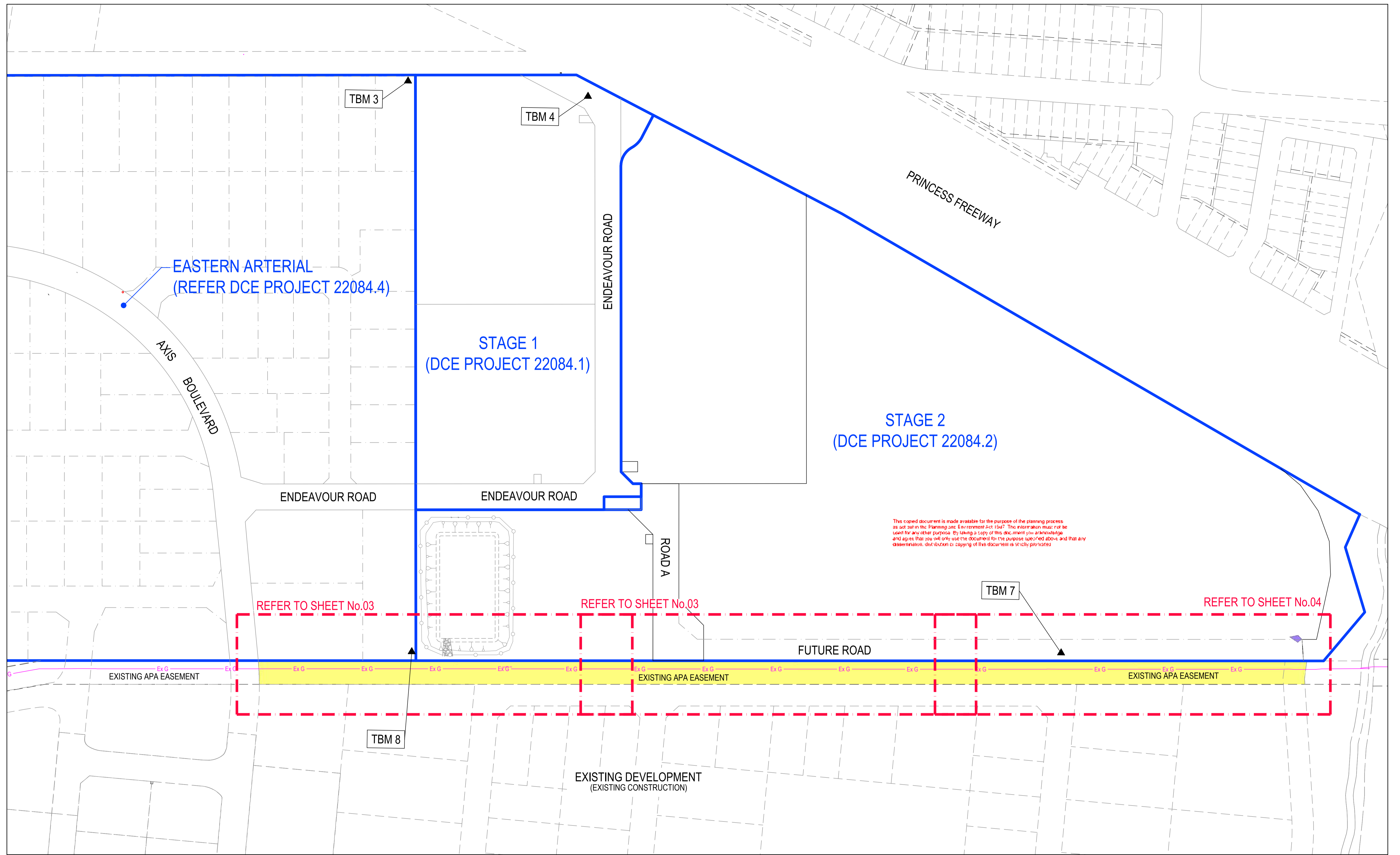
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 V 0m 1m 2m 4m 6m  
 Scale @ A1/A3 H1:100/200 V1:100/200



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**92 ENTERPRISE ROAD, PAKENHAM  
GAS EASEMENT WORKS  
LAYOUT PLAN**

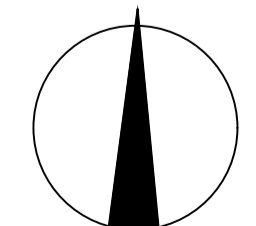
DCE REF 22084.2SELP01  
DRAWN BY K. BOUPHASAVANH  
REVISION H  
REV DATE 03/12/24



0m 5m 10m 20m 30m  
Scale @ A1/A3 1:500 / 1:1000

**LEGEND**

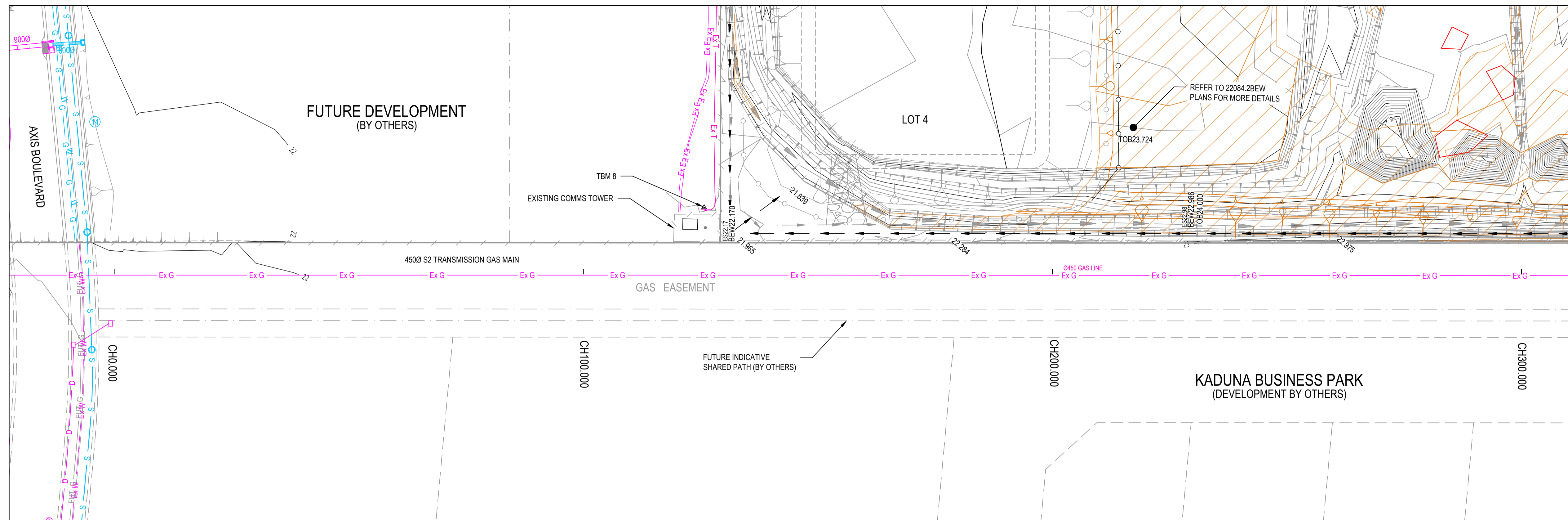
	STAGE BOUNDARY		EXISTING GAS MAIN
	DETAIL PLAN BOUNDARY		
	CURRENT STAGE		
	PSM   TBM		



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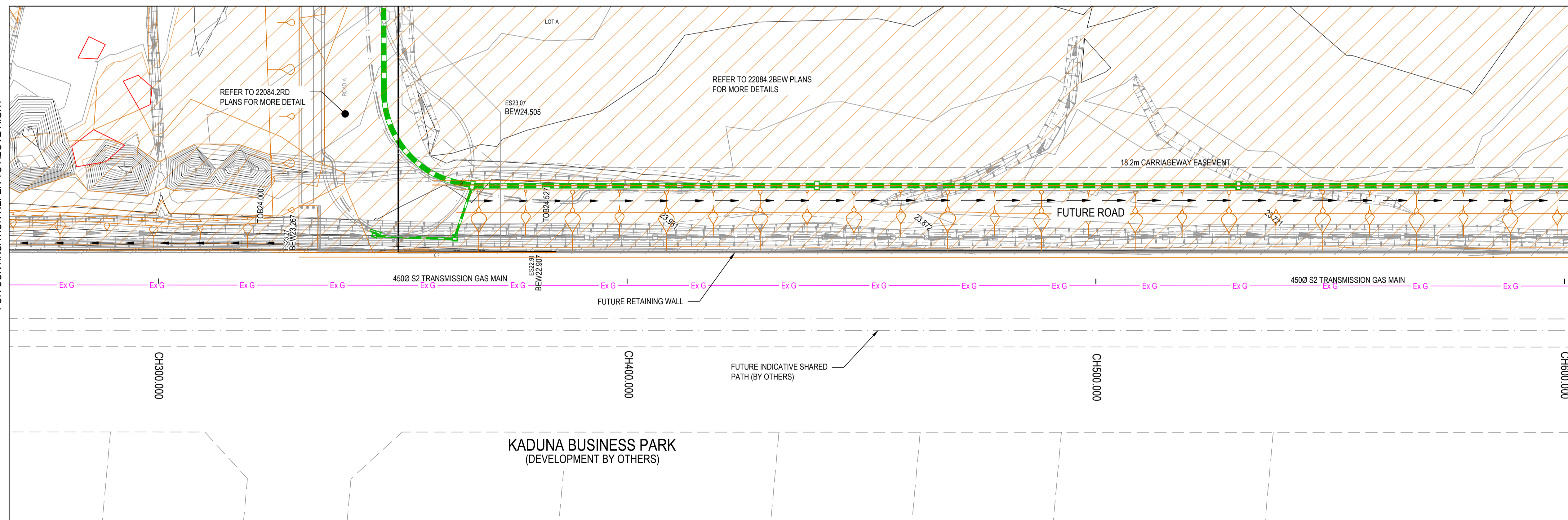
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FOR CONTINUATION REFER TO SHEET No.05

**CAUTION!**  
EXISTING HIGH PRESSURE GAS AND OIL MAINS. NO WORKS ARE PERMITTED WITHIN THE EXISTING GAS EASEMENT WITHOUT THE APPROVAL OF APA AND THE SUPER INTENDENT.

**NOTE: END OF PAVEMENT WORKS**  
CONCRETE EDGE STRIP AND AG DRAIN TO BE INSTALLED TO THE END OF ALL PAVEMENT WORKS.

**NOTE: EXISTING SERVICES**  
ALL EXISTING SERVICES UNDER NEW AND PROPOSED ROAD PAVEMENT, FOOTPATH AND DRIVEWAYS TO BE FOR BACKFILLED.

**NOTE: EXISTING STRUCTURES**  
ALL EXISTING DRAINAGE PITS AND SEWER STRUCTURES WITHIN NEW WORKS ARE TO BE ADJUSTED TO MATCH NEW FINISHED SURFACE LEVELS.

**NOTE: TACTILE PAVING**  
TACTILE GROUND SURFACE INDICATORS (TGSIS) ARE SHOWN INDICATIVELY AND SHOULD BE CONSTRUCTED IN ACCORDANCE WITH AS/NZS 1428.4.1:2009.

**92 ENTERPRISE ROAD, PAKENHAM  
GAS EASEMENT WORKS  
DETAIL PLAN  
SHEET 01 OF 02**

DCE REF 22084.2SEDP01  
DRAWN BY K. BOUPHASAVANH  
REVISION H  
REV DATE 03/12/24



Scale @ A1/A3 1:500 / 1:1000

**LEGEND**

SW DRAIN & PIT	BATTER	FUTURE ROAD LINEWORK
SEWER MAIN & MANHOLE	OPEN EARTH DRAIN	EXISTING FENCE
GAS	ES20.06 FINISHED SURFACE LEVEL	EX. GAS MAIN
WATER	FS21.650 TOP OF BATTER LEVEL	RET. WALL
RECYCLED WATER	TOB21.650 TOE OF BATTER LEVEL	GUARD RAIL
DRAIN/WIGAS CONDUITS	TOE21.650	TREE TO BE REMOVED
ELECTRICITY	FILLING OVER 300mm	BERM
TELECOMMUNICATIONS		

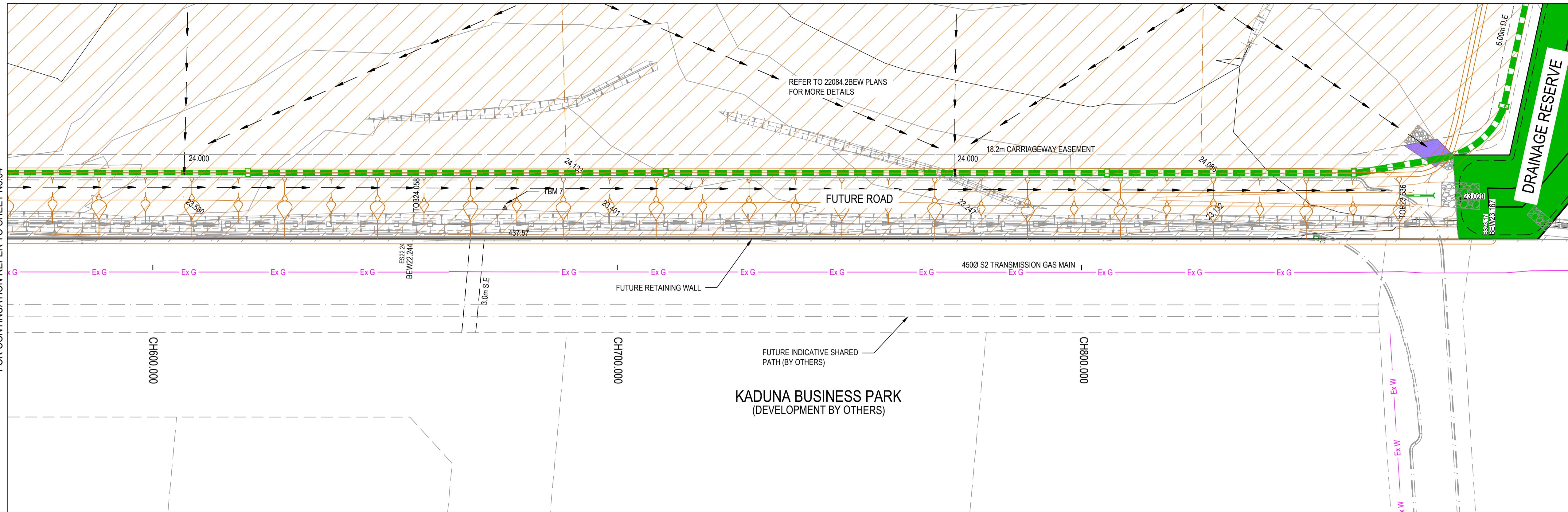


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**NOTE: EXISTING SERVICES**  
 ALL EXISTING SERVICES UNDER NEW AND PROPOSED ROAD  
 PAVEMENT, FOOTPATH AND DRIVEWAYS TO BE FOR BACKFILLED.

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**92 ENTERPRISE ROAD, PAKENHAM**  
**GAS EASEMENT WORKS**  
**DETAIL PLAN**  
**SHEET 02 OF 02**

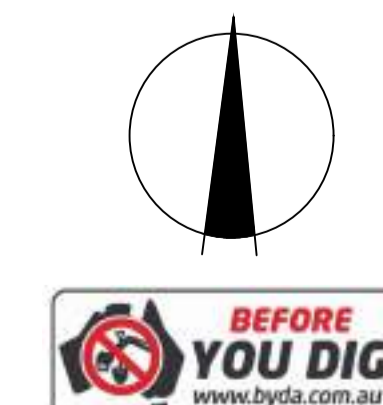
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 DRAWN BY K. BOUPHASAVANH  
 REVISION H  
 REV DATE 03/12/24



Scale @ A1/A3 1:500 / 1:1000

**LEGEND**

- |   |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li>— SW DRAIN &amp; PIT</li> <li>— S — SEWER MAIN &amp; MANHOLE</li> <li>— G — GAS</li> <li>— W — WATER</li> <li>— RW — RECYCLED WATER</li> <li>— GC — D/WINDWIGAS CONDUITS</li> <li>— E — ELECTRICITY</li> <li>— T — TELECOMMUNICATIONS</li> </ul> | <ul style="list-style-type: none"> <li>— ES20.06 EX. SURFACE LEVEL</li> <li>— FS21.650 FINISHED SURFACE LEVEL</li> <li>— TOB21.650 TOP OF BATTER LEVEL</li> <li>— TOE21.650 TOE OF BATTER LEVEL</li> <li>— (T) TREE TO BE REMOVED</li> <li>— FILLING OVER 300mm</li> <li>— BERM</li> </ul> | <ul style="list-style-type: none"> <li>— BATTER</li> <li>— OPEN EARTH DRAIN</li> <li>— FUTURE ROAD LINESWORK</li> <li>— EXISTING FENCE</li> <li>— Ex G EX. GAS MAIN</li> <li>— RET. WALL</li> <li>— GUARD RAIL</li> </ul> |
|---|--|---|



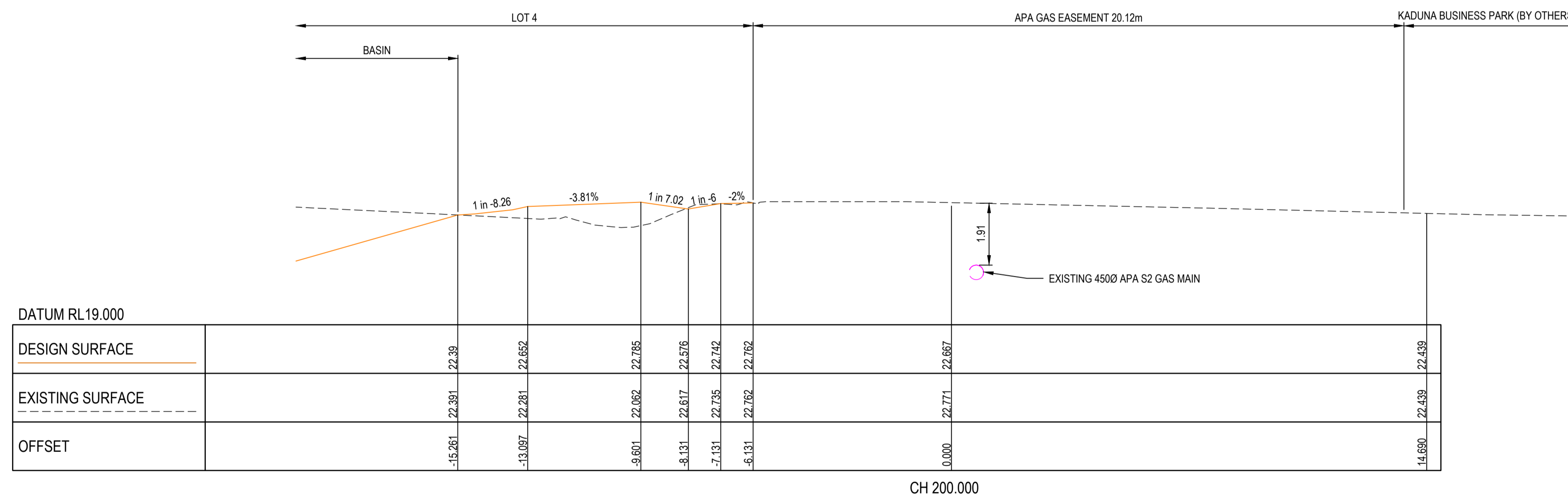
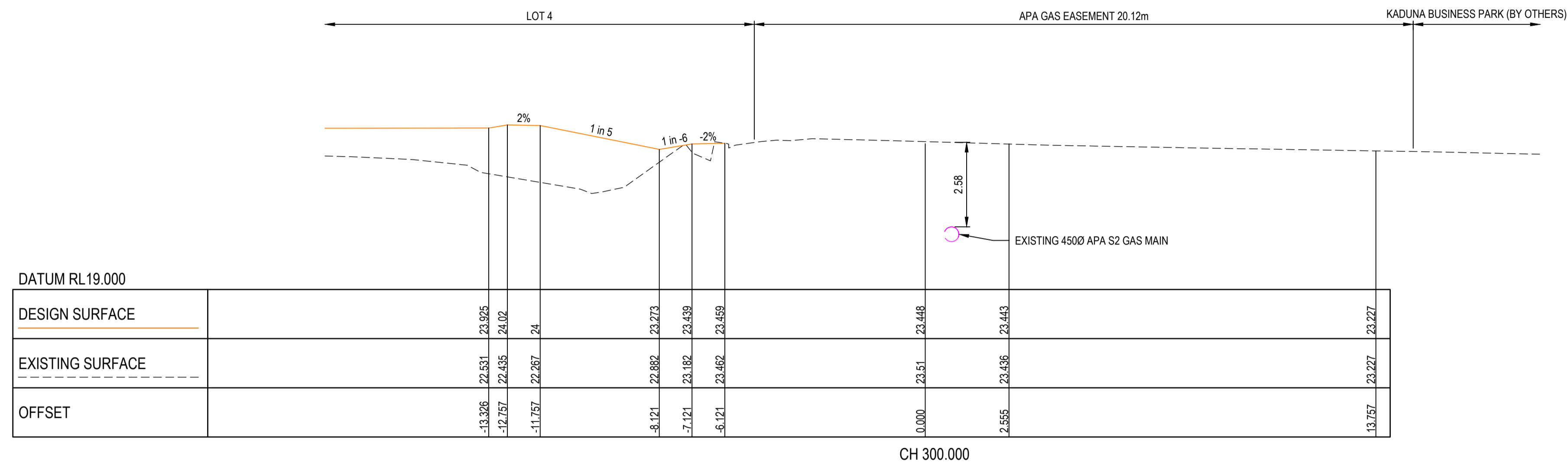
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**FOR DISCUSSION**





**NOTE: TYPE A STRUCTURAL FILL**  
 TYPE A STRUCTURAL FILL MATERIAL IN ACCORDANCE WITH THE REQUIREMENTS OF TABLE 204.041 OF THE VICROADS SPECIFICATION SECTION 204 FOR EARTHWORKS AND SHALL BE FREE OF TOPSOIL, DELETERIOUS MATERIAL AND PERISHABLE MATTER. ALL FILL AREAS MUST ENSURE LEVEL 1 SUPERVISION IS MAINTAINED PER AS3798-2007



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**EXISTING GAS EASEMENT**

**92 ENTERPRISE ROAD, PAKENHAM**  
**GAS EASEMENT WORKS**  
**INTERFACE CROSS SECTIONS**  
**SHEET 02 OF 05**

DCE REF 22084.2SECS02  
 DRAWN BY K. BOUPHASAVANH  
 REVISION H  
 REV DATE 03/12/24



H 0m 1m 2m 4m 6m  
 V 0m 1m 2m 4m 6m  
 Scale @ A1/A3 H1:100/200 V1:100/200

- LEGEND**
- EXISTING SURFACE
  - FINISHED SURFACE
  - BULK EARTHWORKS SURFACE
  - FUTURE ROAD SURFACE
  - EX GAS MAIN
  - PROPOSED DRAINAGE

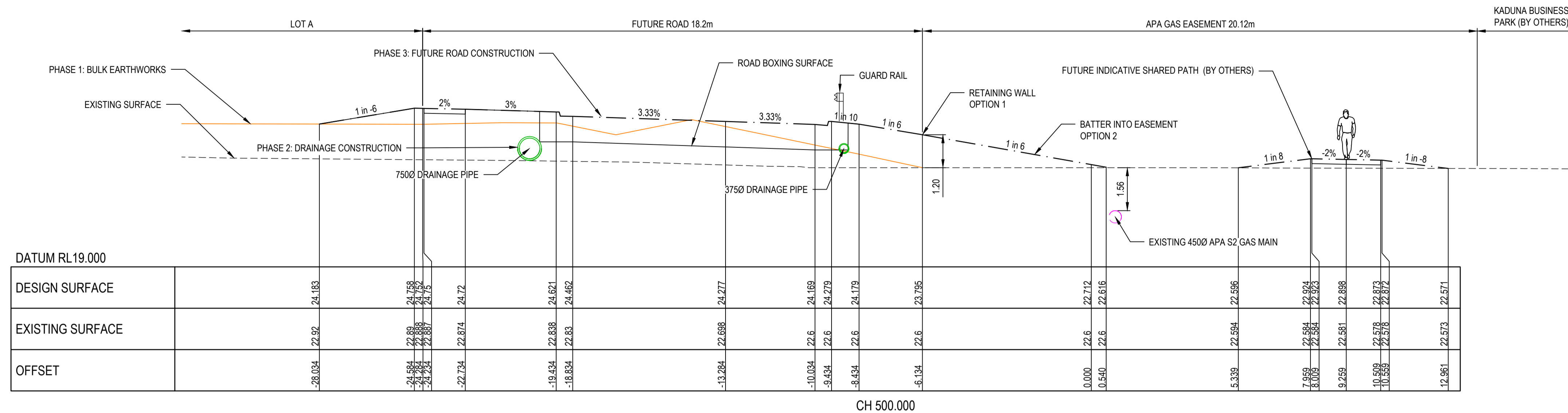
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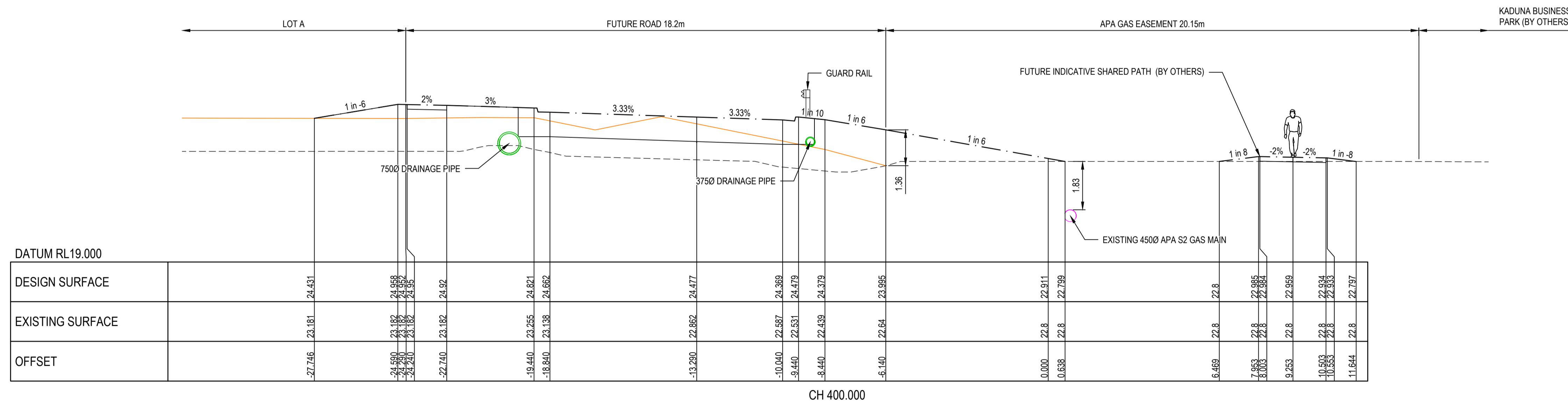
**FOR DISCUSSION**



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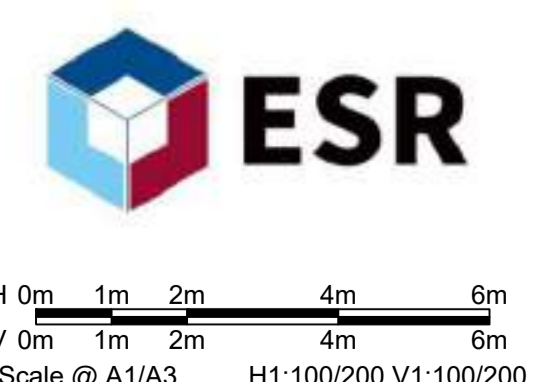


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EXISTING GAS EASEMENT

**92 ENTERPRISE ROAD, PAKENHAM**  
 GAS EASEMENT WORKS  
 INTERFACE CROSS SECTIONS  
 SHEET 03 OF 05  
 DCE REF 22084.2SECS03  
 DRAWN BY K. BOUPHASAVANH  
 REVISION H  
 REV DATE 03/12/24



- LEGEND**
- EXISTING SURFACE
  - FINISHED SURFACE
  - BULK EARTHWORKS SURFACE
  - FUTURE ROAD SURFACE
  - EX GAS MAIN
  - PROPOSED DRAINAGE

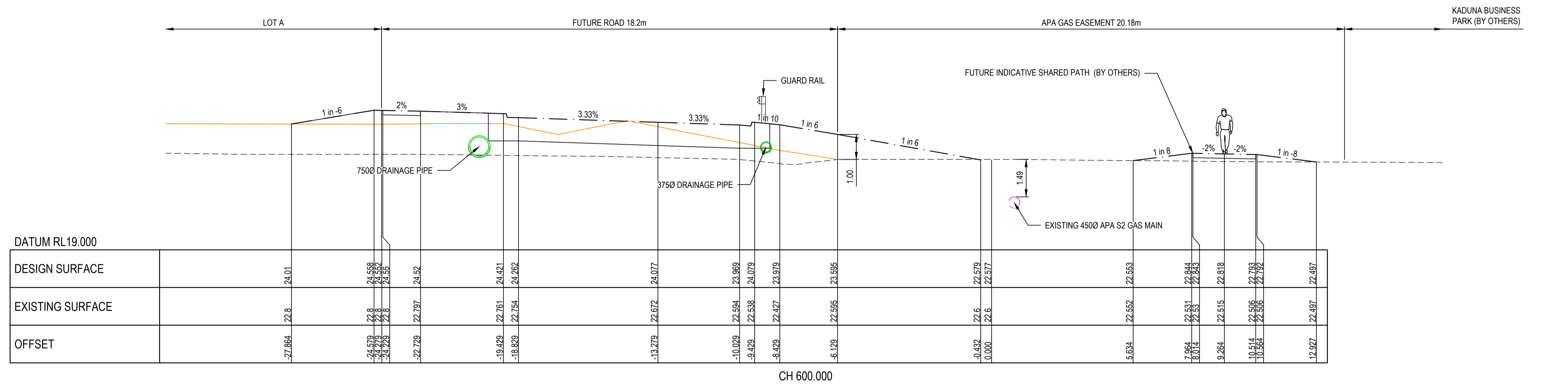
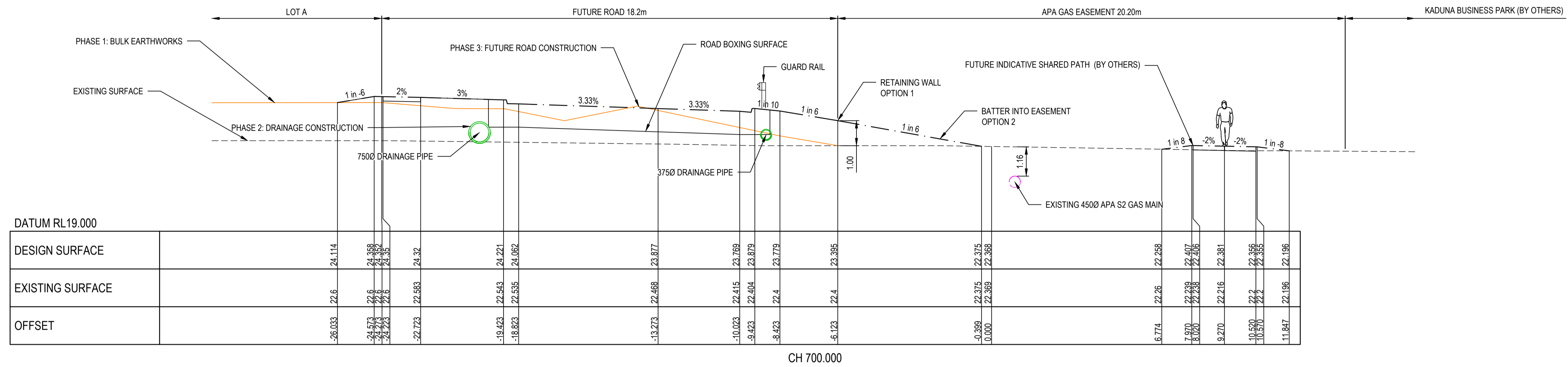
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**FOR DISCUSSION**

**NOTE: TYPE A STRUCTURAL FILL**  
 TYPE A STRUCTURAL FILL MATERIAL IN ACCORDANCE WITH THE REQUIREMENTS OF TABLE 204.041 OF THE VICROADS SPECIFICATION SECTION 204 FOR EARTHWORKS AND SHALL BE FREE OF TOPSOIL, DELETERIOUS MATERIAL AND PERISHABLE MATTER. ALL FILL AREAS MUST ENSURE LEVEL 1 SUPERVISION IS MAINTAINED PER AS3798-2007

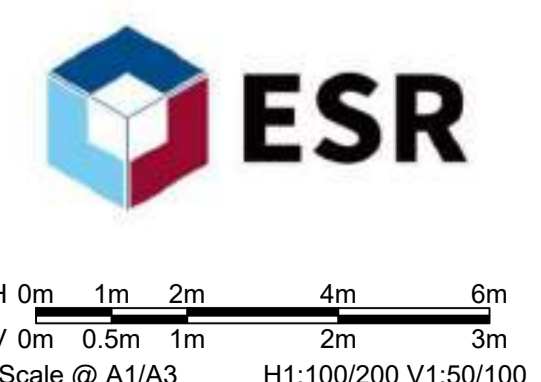
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**EXISTING GAS EASEMENT**

**92 ENTERPRISE ROAD, PAKENHAM**  
**GAS EASEMENT WORKS**  
**INTERFACE CROSS SECTIONS**  
**SHEET 04 OF 05**

DCE REF 22084.2SECS04  
 DRAWN BY K. BOUPHASAVANH  
 REVISION H  
 REV DATE 03/12/24



- LEGEND**
- EXISTING SURFACE
  - FINISHED SURFACE
  - BULK EARTHWORKS SURFACE
  - FUTURE ROAD SURFACE
  - EX GAS MAIN
  - PROPOSED DRAINAGE

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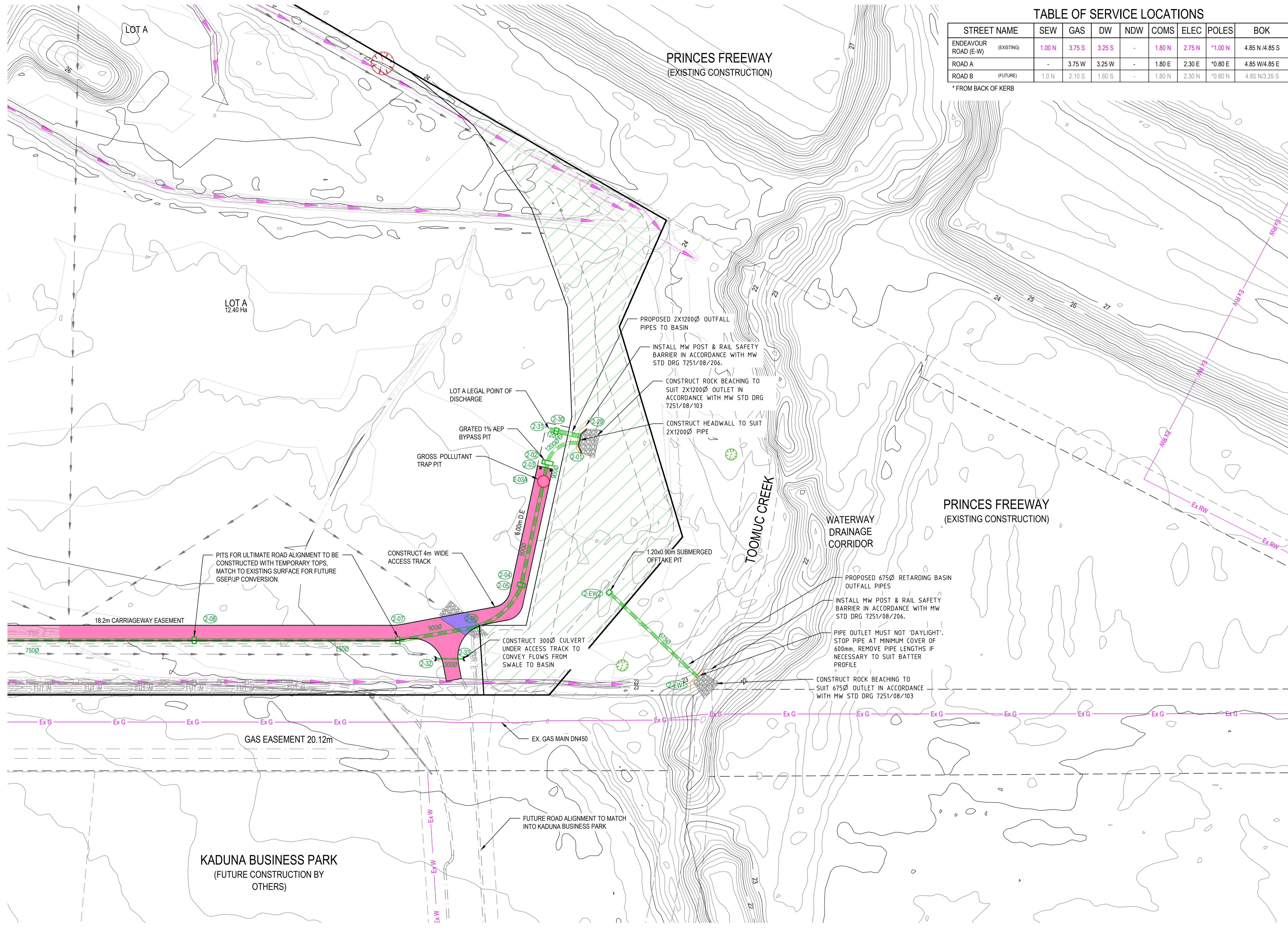


**FOR DISCUSSION**





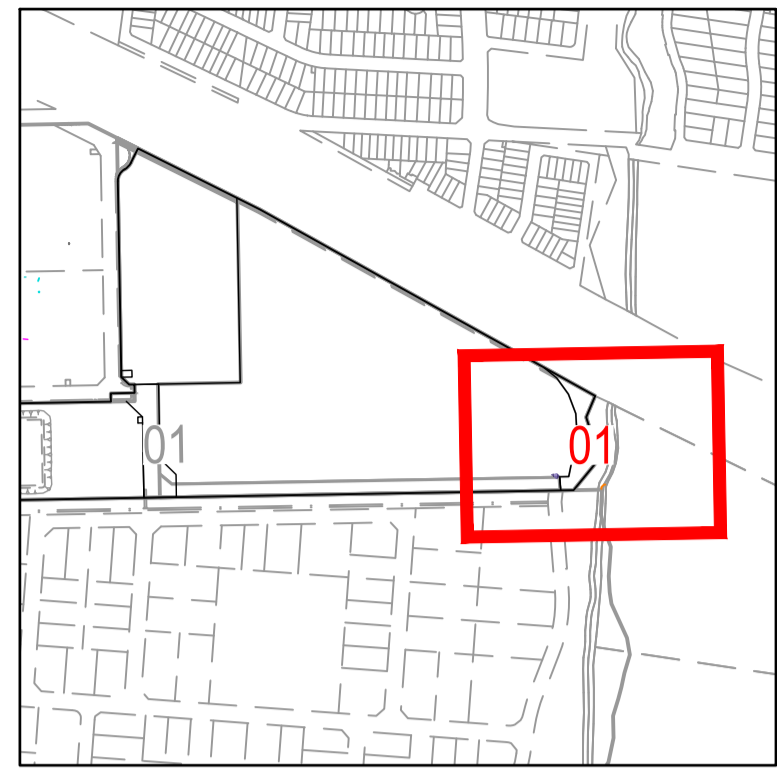




**TABLE OF SERVICE LOCATIONS**

STREET NAME	SEW	GAS	DW	NDW	COMS	ELEC	POLES	BOK
ENDEAVOUR ROAD (E-W) (EXISTING)	1.00 N	3.75 S	3.25 S	-	1.80 N	2.75 N	*1.00 N	4.85 N/4.85 S
ROAD A (FUTURE)	-	3.75 W	3.25 W	-	1.80 E	2.30 E	*0.80 E	4.85 W/4.85 E
ROAD B (FUTURE)	1.0 N	2.10 S	1.60 S	-	1.80 N	2.30 N	*0.80 N	4.85 N/3.35 S

\* FROM BACK OF KERB



**ROCKWORK DETAILS**  
TOOMUC CREEK PIPE OUTLET ROCKWORK

TYPE	DETAILS
LINING ROCKS	D <sub>50</sub> = 100; WELL INTERLOCKED, MINIMISE GAPS BETWEEN ROCKS
TOE ROCKS	NOMINAL DIAMETER = 1000
EDGE ROCKS	NOMINAL DIAMETER = 1000
EMBEDMENT LAYER	D <sub>50</sub> = 100; 100mm THICK GRANULAR LAYER
STANDARD DRAWING	MW7251/08/103; MW ROCKWORK CONSTRUCTION GUIDELINES (LDM)

**WARNING!**  
THE LOCATION OF EXISTING SERVICES SHOWN ON THESE PLANS MUST BE PROVEN ON SITE. THE APPROPRIATE AUTHORITY MUST BE CONTACTED AND THE SERVICES LOCATED PRIOR TO COMMENCEMENT OF ANY WORKS.

**CAUTION!**  
EXISTING HIGH PRESSURE GAS AND OIL MAINS. NO WORKS ARE PERMITTED WITHIN THE EXISTING GAS EASEMENT WITHOUT THE APPROVAL OF APA AND THE SUPER-INTENDENT.

**TBM SCHEDULE**

I.D.	TYPE	EASTING	NORTHING	LEVEL
01	STAR PICKET	362837.077	5783778.334	23.23
02	STAR PICKET	362989.876	5783783.798	23.27
03	STAR PICKET	363437.913	5783789.448	23.73
04	STAR PICKET	363590.570	5783779.168	26.32
07	STAR PICKET	363999.736	5783315.216	22.37
08	STAR PICKET	363449.652	5783306.380	22.35
09	STAR PICKET	362729.501	5783383.010	20.51
10	STAR PICKET	362724.855	5783292.171	20.41
11	STAR PICKET	362543.784	5783379.552	20.98
12	STAR PICKET	362606.418	5783769.024	22.75
20	STAR PICKET	362991.079	5783285.537	21.04

**NOTE: TBMS**  
TBMS SHOWN AS \* IN THE TABLE ABOVE ARE OUTSIDE OF THE SCOPE OF THIS DRAWING. REFER TO SHEET 01 FOR LOCATION OF TBMS IN RELATION TO STAGE 92 ENTERPRISE ROAD WORKS.

**NOTE: END OF PAVEMENT WORKS**  
CONCRETE EDGE STRIP AND AG DRAIN TO BE INSTALLED TO THE END OF ALL PAVEMENT WORKS.

**NOTE: EXISTING SERVICES**  
ALL EXISTING SERVICES UNDER NEW AND PROPOSED ROAD PAVEMENT, FOOTPATH AND DRIVEWAYS TO BE FOR BACKFILLED.

**NOTE: EXISTING STRUCTURES**  
ALL EXISTING DRAINAGE PITS AND SEWER STRUCTURES WITHIN NEW WORKS ARE TO BE ADJUSTED TO MATCH NEW FINISHED SURFACE LEVELS.

**NOT TO BE USED FOR CONSTRUCTION**

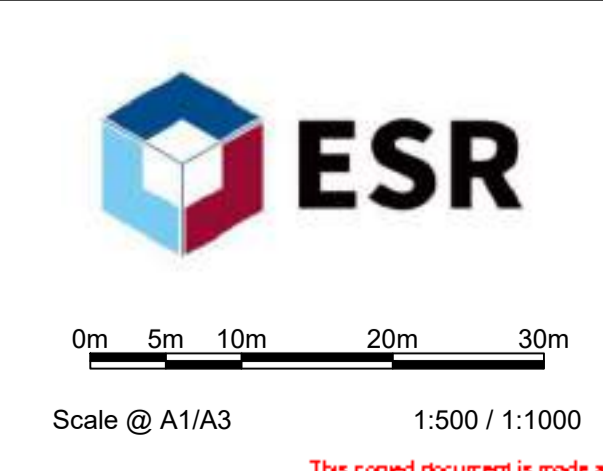
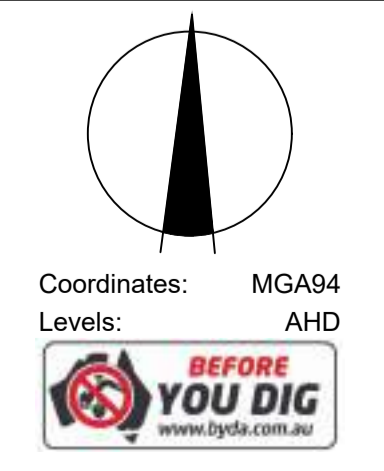
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B	MINOR AMENDMENTS	13/12/24	AJM	AJM
A	INITIAL ISSUE	01/11/24	KB	AJM

Drawn Date AN  
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Designed Date AN  
A.MARCONI 13/12/24  
Checked Date AN  
Date AN  
Reg. Eng. Date  
01/11/24 KB AJM  
Date  
Reg. No.  
Date

**LEGEND**

EXISTING DEV.	CURRENT STAGE	DESIGN IN PROGRESS	SW DRAIN & PIT
Ex S	G	S	SEWER MAIN & MANHOLE
Ex G	W	W	GAS
Ex W	RW	RW	WATER
Ex RW	GC	GC	RECYCLED WATER
Ex GC	E	E	DWINDWIGS CONDUITS
Ex E	T	T	ELECTRICITY
Ex T			TELECOMMUNICATIONS
			OVERHEAD ELECTRICITY

ASPHALT PAVEMENT	SPECIAL USE ZONE (SUZ)
CONCRETE PATH (DWAY)	EX. TREE / EX. TREE TO BE REMOVED
CONCRETE SHARED PATH	EX. BEW SUZ BENCHING
HEAVY DUTY CROSSOVER	LIMIT OF WORKS
ROCK BEACHING	PROPOSED RET. WALL
EX. 3m GAS CORRIDOR (SEE PLAN NOTE FOR DETAILS)	RET. WALL (BY OTHERS)
ULTIMATE ROAD ALIGNMENT	FUTURE RET. WALL
BATTER	EX. BEW OED (SURVEY OED)
PSM / TBM	EX. BEW DRAINAGE
▲ SIGNAGE	
□ GUARD FENCE	



**INDUSTRIAL DEVELOPMENT**  
STAGE 2  
92 ENTERPRISE ROAD, PAKENHAM  
CARDINIA SHIRE COUNCIL  
DETAIL PLAN

Drawing No: 22084.2DP01  
Revision: B  
Sheet No: 01 of 03

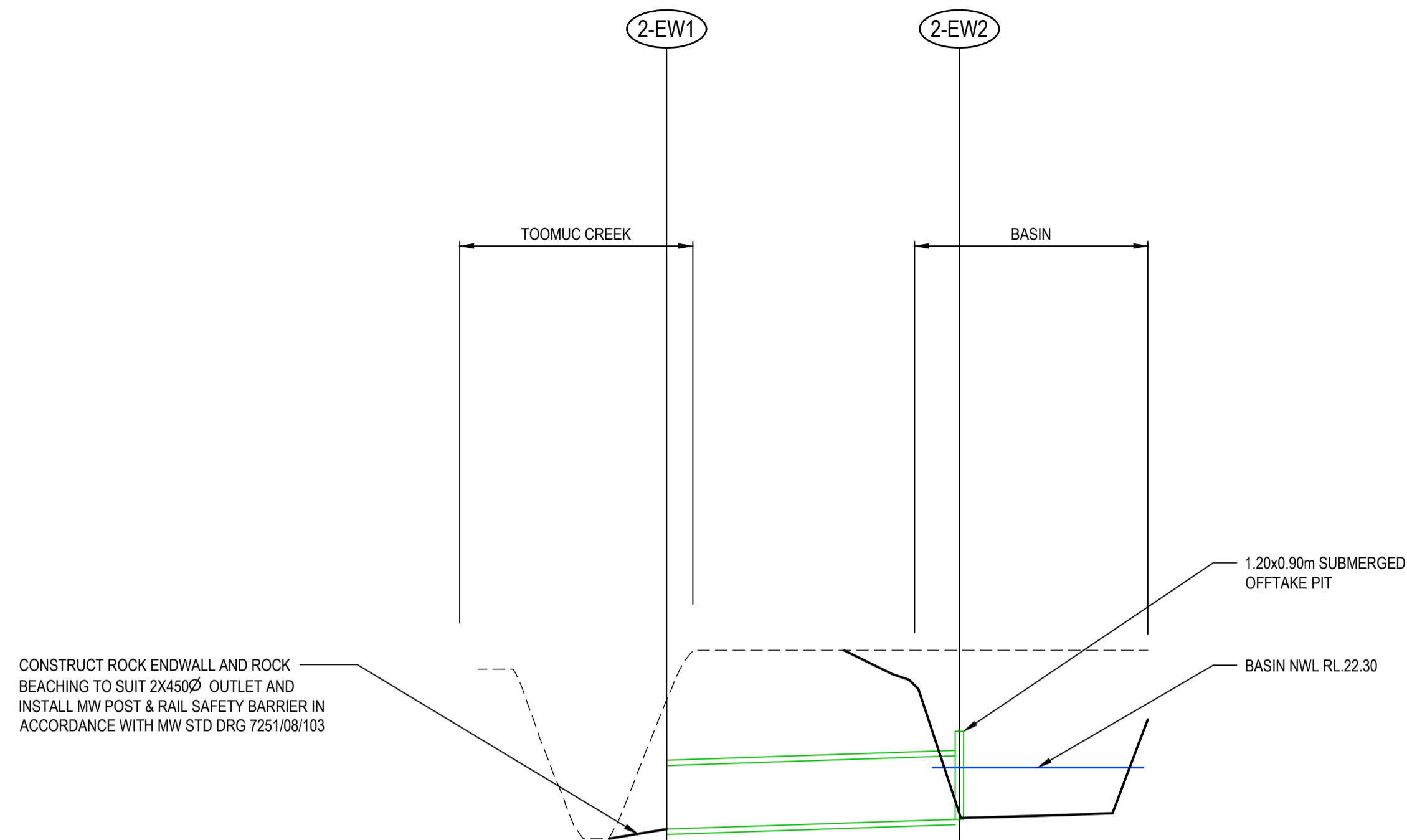
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VELOCITY (m/s)	0.000	
PIPE GRADE VELOCITY	1.356	
PIPE GRADE %	0.333%	
PIPE FLOW (m3/s)	0.000	
PIPE CAPACITY AT GRADE	0.485	
PIPE SIZE (mm)	675	
DATUM	12.000	
DEPTH TO INVERT	1.372 1.372	0.935
INVERT LEVEL	21.701 21.701	21.805
DESIGN SURFACE LEVEL	23.074	22.740
EXISTING SURFACE LEVEL	23.074	23.600
CHAINAGE	0.000 31.092	31.092

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AN  
Designed A.MARCONI  
Date 13/12/24  
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Checked AN  
Date AN  
Reg. Eng. AN  
Date AN  
Reg. No. AN

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B	MINOR AMENDMENTS	13/12/24	AJM	AJM
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Written dimensions to take precedence over scale. Contractor shall check and verify all dimensions on site. Discrepancies to be brought to the attention of the Superintendent.  
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Levels: AHD  
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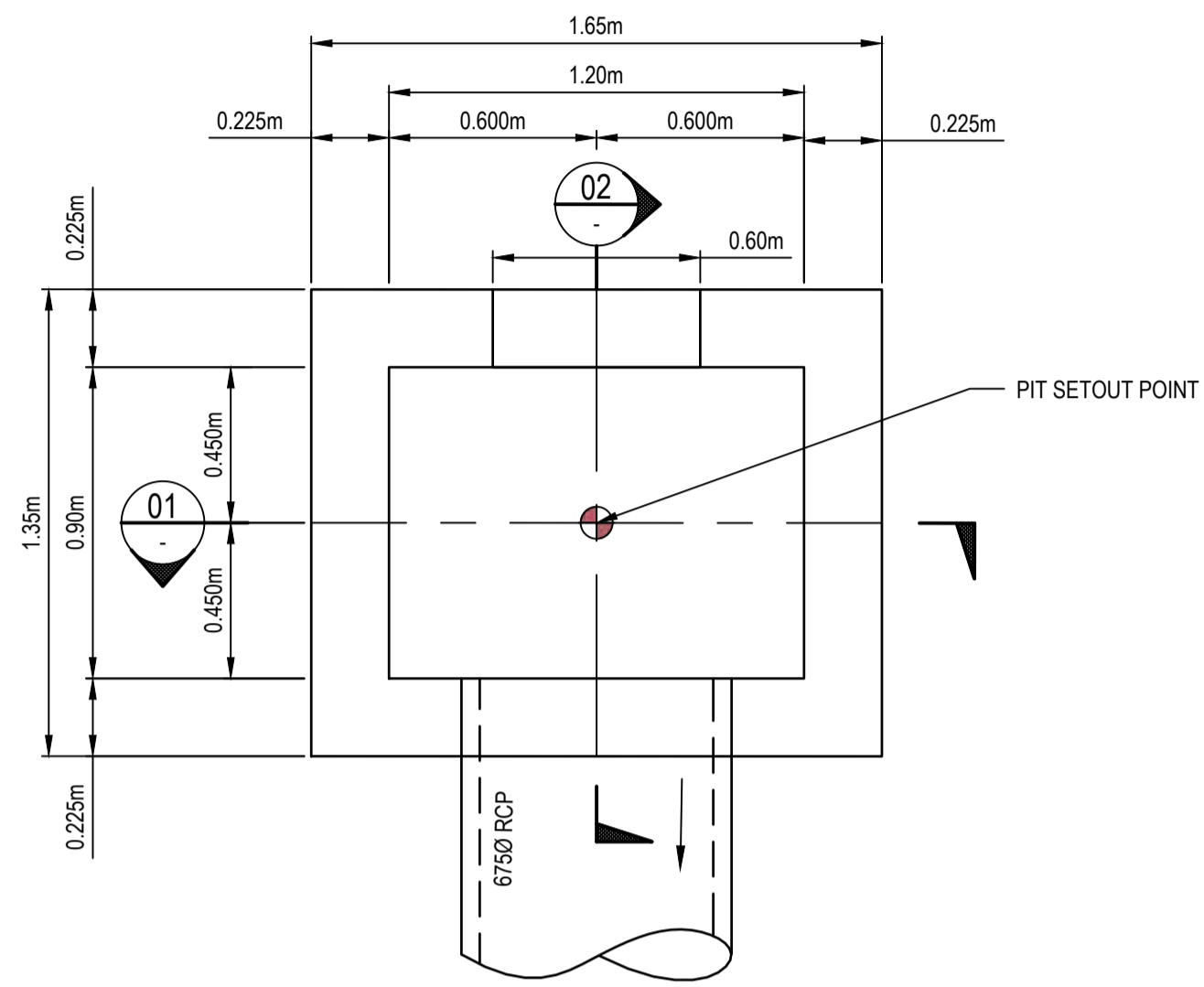
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**INDUSTRIAL DEVELOPMENT**  
STAGE 2  
92 ENTERPRISE ROAD, PAKENHAM  
CARDINIA SHIRE COUNCIL  
DRAINAGE LONG SECTION

Drawing No: 22084.2DLS01  
Revision: B Sheet No: 02 of 03

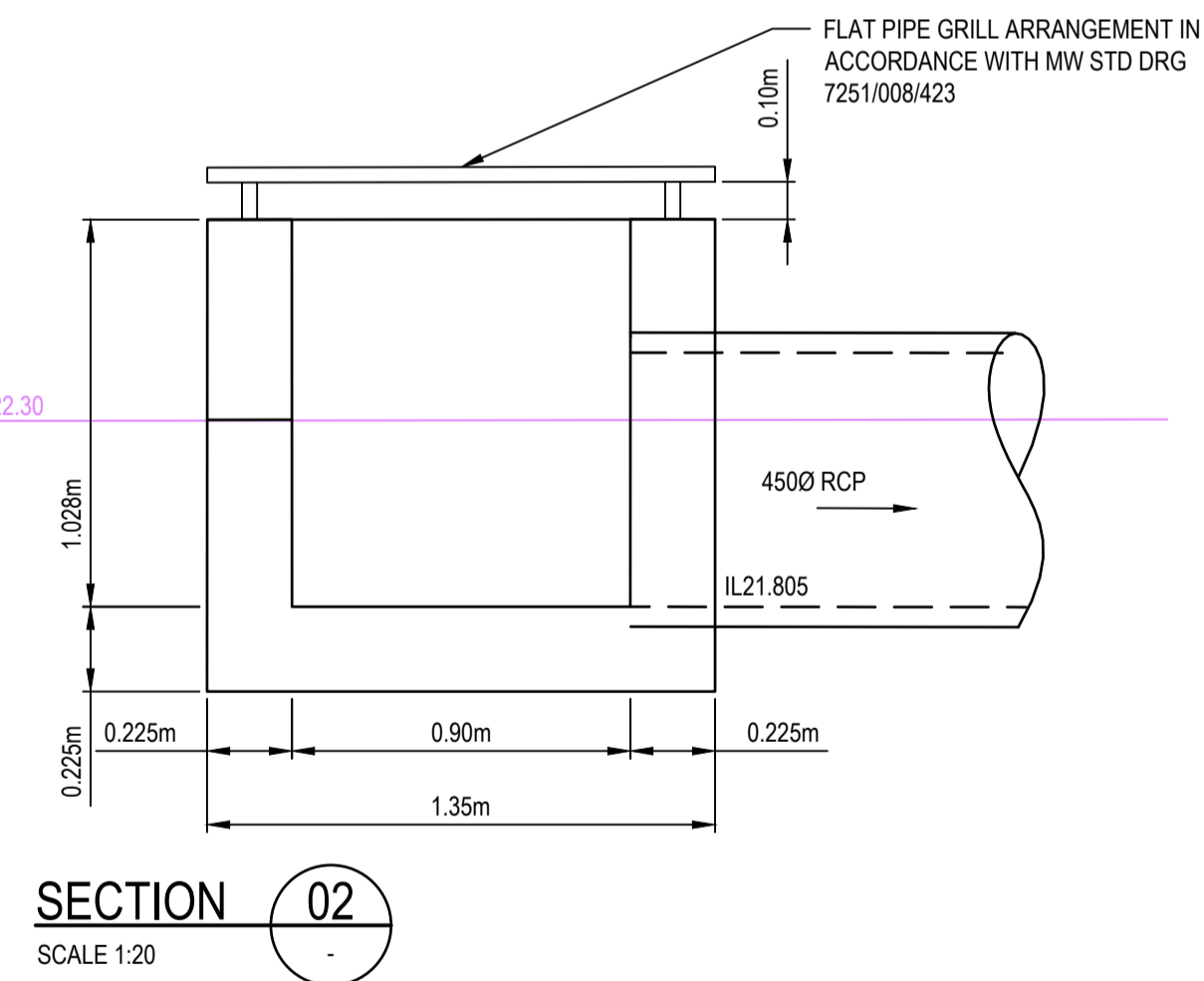
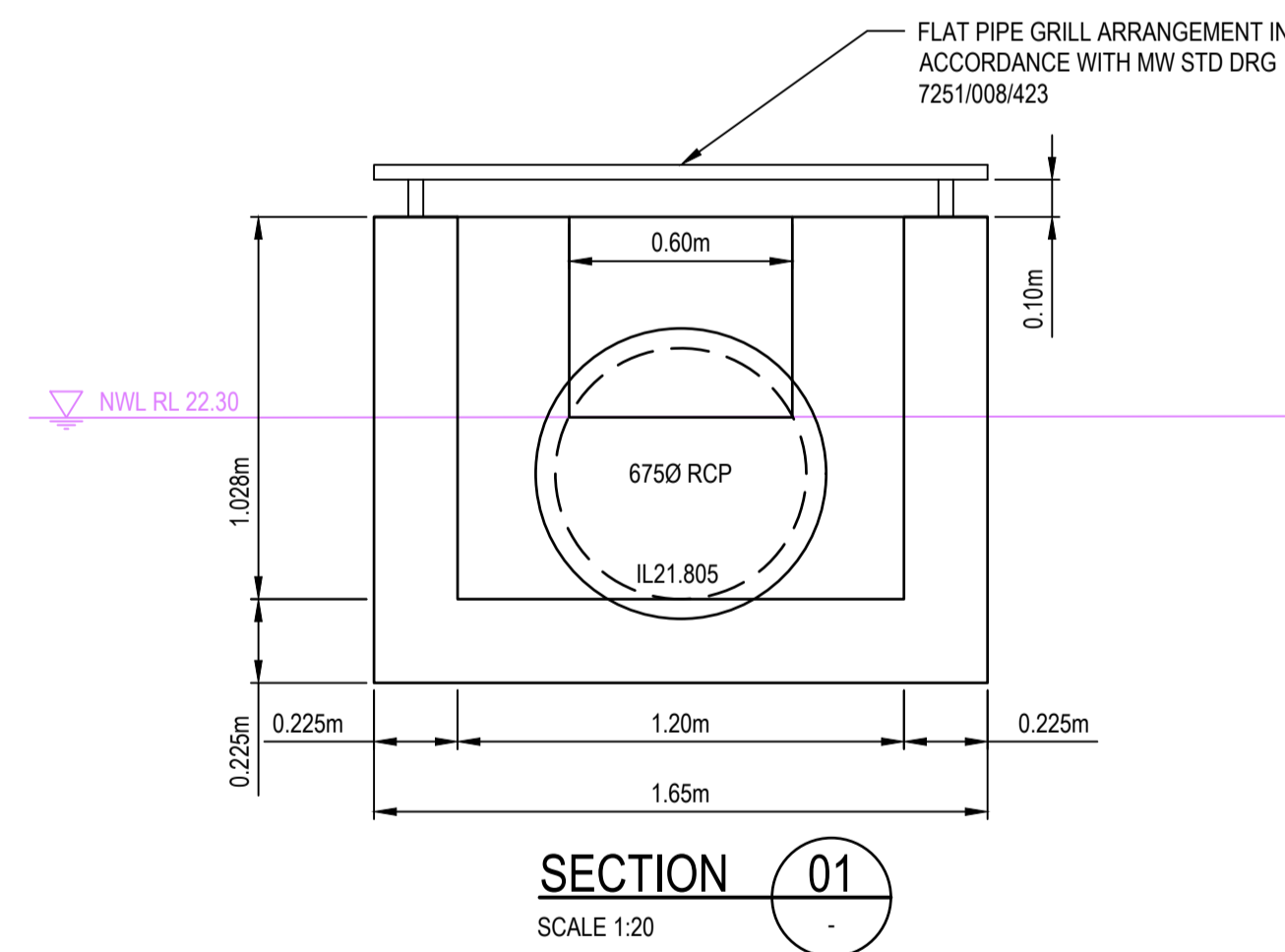
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**PLAN**  
**BASIN TRANSFER PIT (PIT EW2)**  
 IN ACCORDANCE WITH MW STD DRG 7251/12/008  
 SCALE: 1:20

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 Levels: AHD



Scale @ A1/A3 1:500 / 1:1000

**INDUSTRIAL DEVELOPMENT**  
 STAGE 2  
 92 ENTERPRISE ROAD, PAKENHAM  
 CARDINIA SHIRE COUNCIL  
 PIT DETAILS

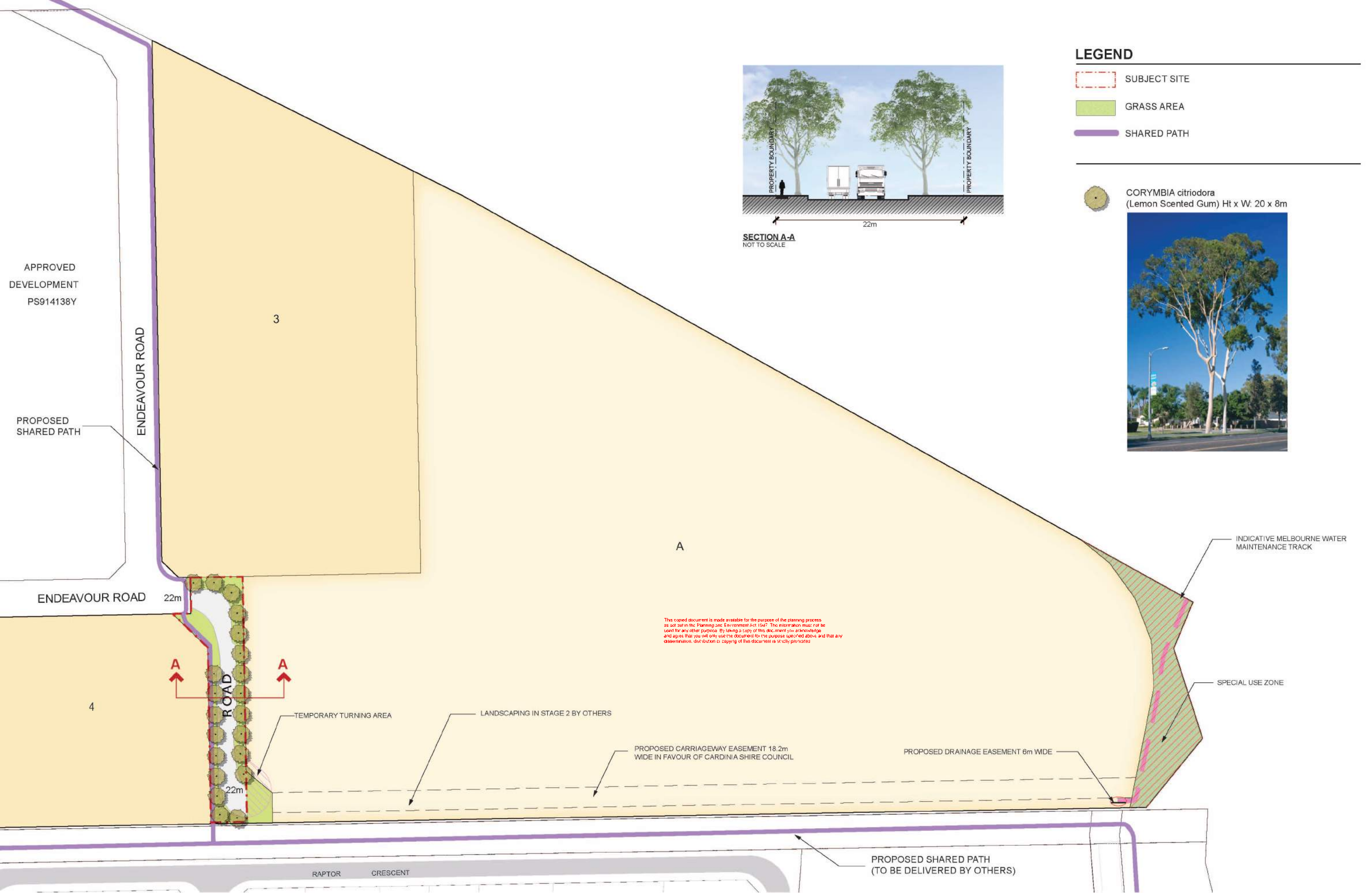
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REV.	DESCRIPTION	BY	DATE
A	ISSUED FOR REVIEW	ZM	20/05/2024
A.02	ISSUED FOR REVIEW	ZM	22/05/2024
A.03	ISSUED FOR REVIEW	ZM	30/05/2024
B	ISSUED FOR REVIEW	ZM	01/10/2024

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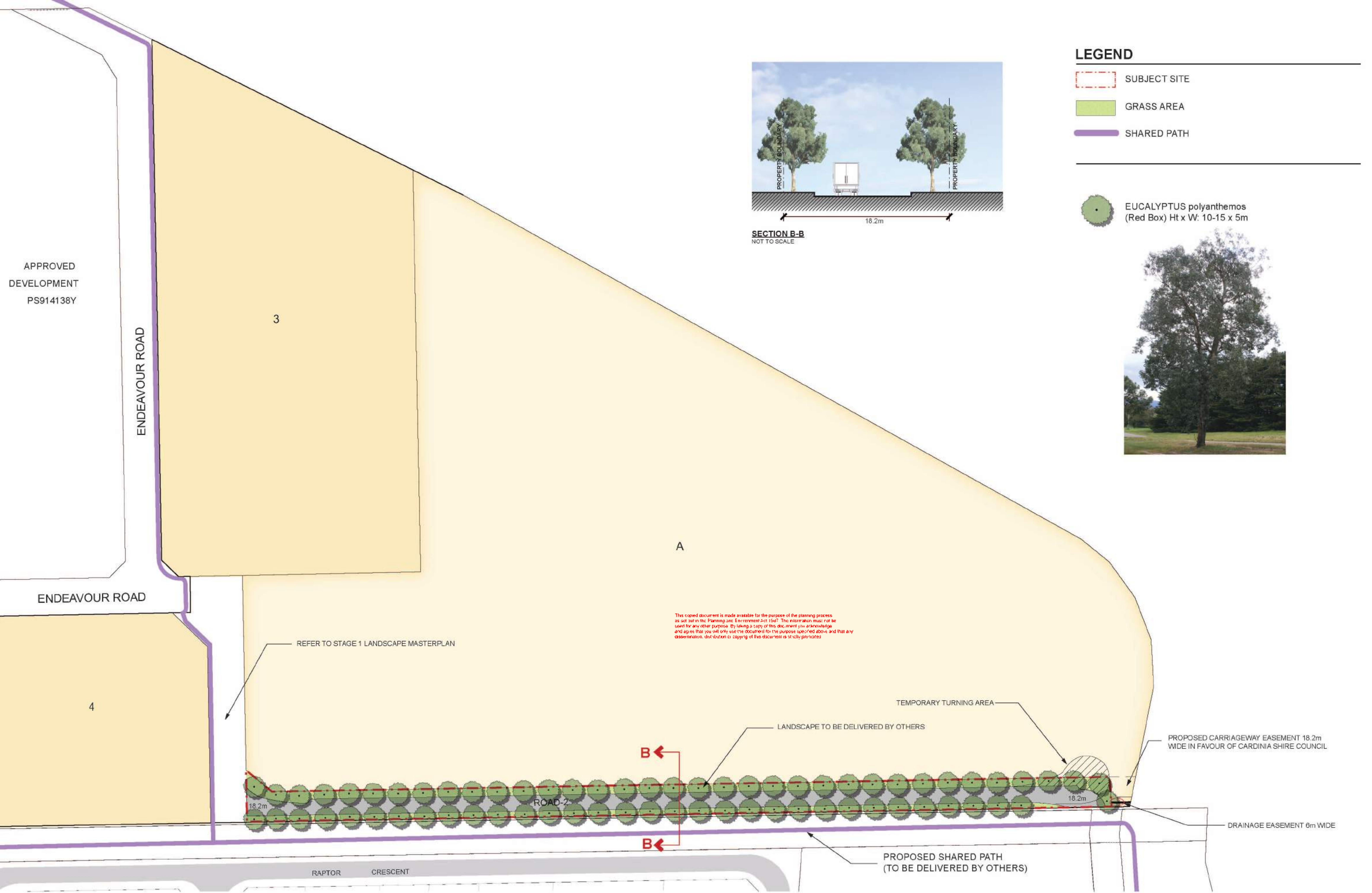
**PROJECT**  
**SUBDIVISION STAGE 1, 92 ENTERPRISE ROAD, PAKENHAM**

**DRAWING:** LANDSCAPE MASTERPLAN      **CLIENT:** ESR

**SCALE:** 1:1000 @ A1    **DRAWN:** ZM    **JOB NUMBER:** 22-058    **Drw No.:** TP-01    **REVISION:** B







REVISIONS			
REV.	DESCRIPTION	BY	DATE
A	ISSUED FOR REVIEW	ZM	20/05/2024
A.02	ISSUED FOR REVIEW	ZM	22/05/2024
A.03	ISSUED FOR REVIEW	ZM	30/05/2024
B	ISSUED FOR REVIEW	ZM	01/10/2024

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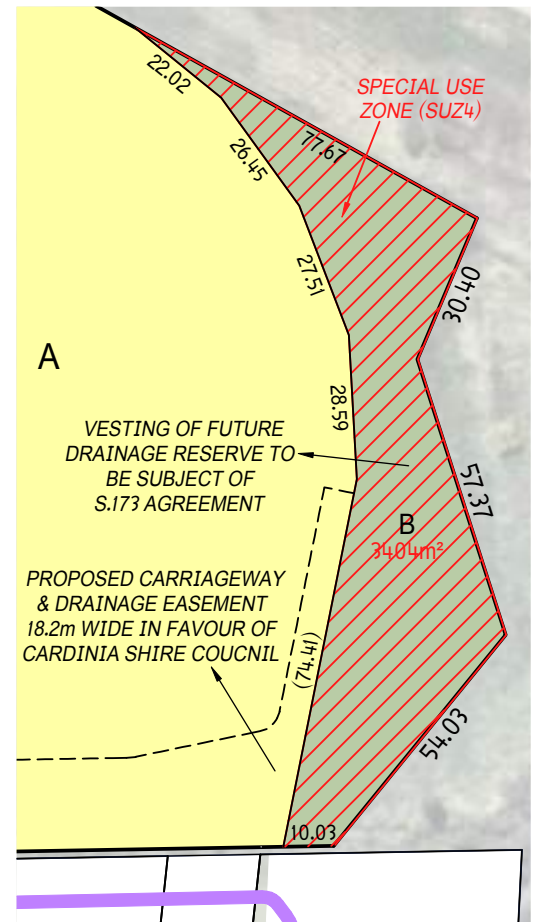
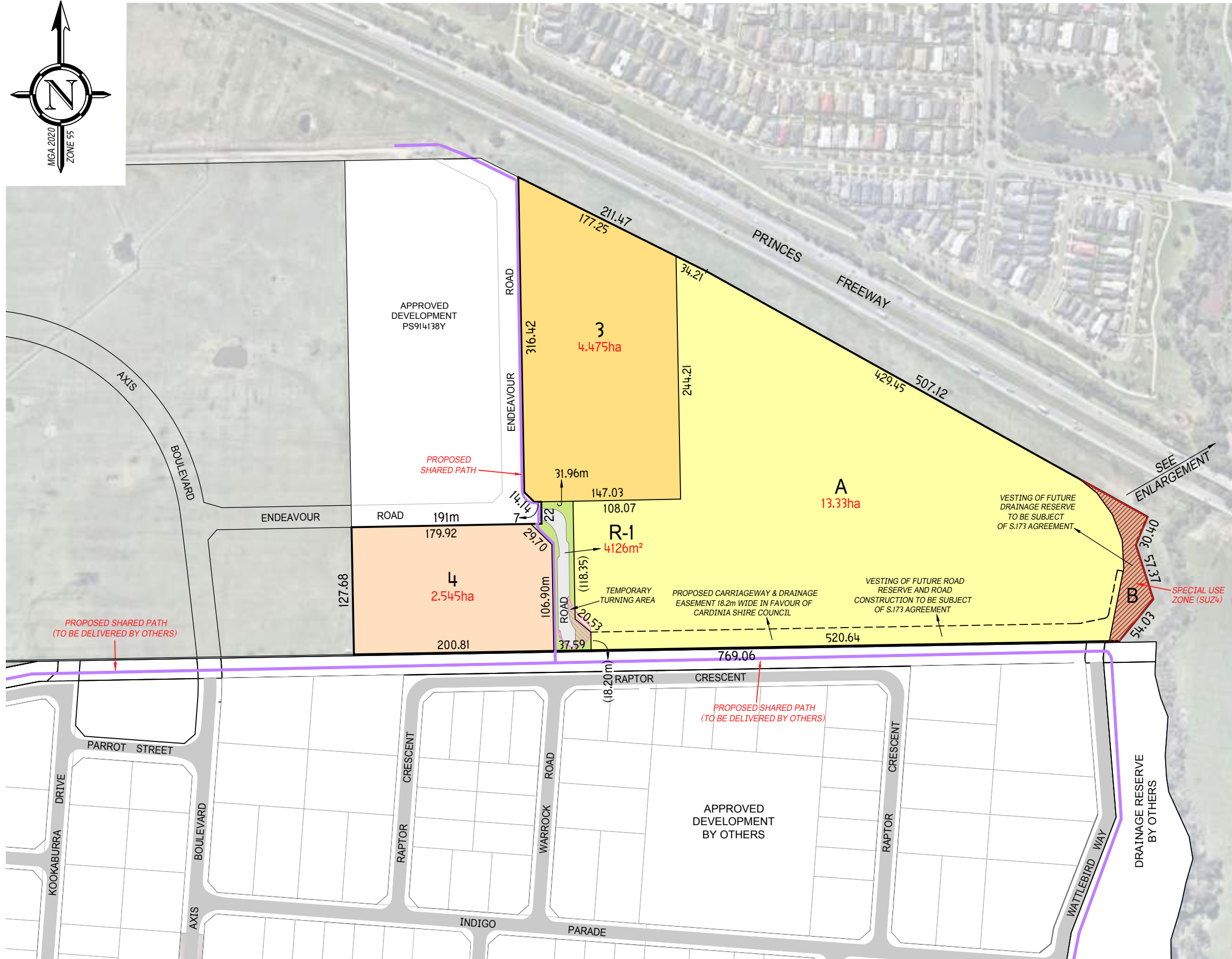
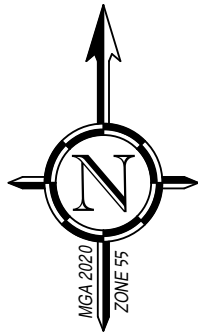
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DRAWING: LANDSCAPE MASTERPLAN CLIENT: ESR

SCALE: 1:1000 @ A1 DRAWN: ZM JOB NUMBER: 22-058 Drw No.: TP-02 REVISION: B







**IMPORTANT NOTE**

This plan was prepared for ESR as a proposed subdivision to accompany a subdivision application to Cardinia Shire Council and should not be used for any other purpose.

The dimensions, areas and total number of lots shown hereon are subject to field survey and also to the requirements of Council and any other authority which may have requirements under any relevant legislation that could cause a change to this plan.

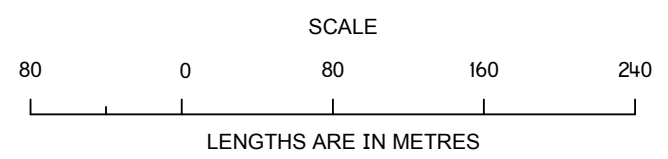
The Title boundaries shown hereon have been derived from PS914138Y. Refer to the Plan for further details.

KLM Spatial can therefore accept no responsibility for reliance on this plan for any financial dealings involving the land.

This note is an integral part of this plan.

Nearmap  
Photomap Flow: 14-09-2022

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Client: ESR

Reference: 8889.ESR PP15

Plan Date: 01-11-2024

Version: 3

Scale: 1:4000

Sheet 1 of 1

Sheet Size: A3



92 Enterprise Road, Pakenham  
Proposed Subdivision

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