Notice of an Application for an Amendment to a Planning Permit

Cardinia

The land affected by the application is located at:	L2 TP83436 10 McDonalds Track, Lang Lang VIC 3984
The application is to:	Amendments to Planning Permit T190126-1 (issued for Staged multi-lot subdivision, fencing within the Land Subject to Inundation Overlay, creation of access to a Road Zone Category 1 and creation of reserves) to amend what the permit allows (include earthworks exceeding 1 metre) and submit plans to comply with Conditions 2, 16, 26, 35 and 48 of the permit

APPLICATION DETAILS	
The applicant for the amendment to the permit is:	Navy Blue Planning Pty Ltd
Application number:	T190126 - 2

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 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:	27 March 2026

WHAT ARE MY OPTIONS?

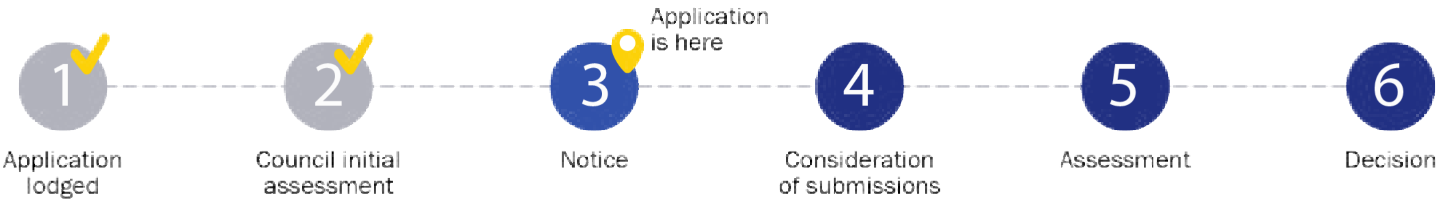
Any person who may be affected by the proposed amendment to permit may object or make other submissions to the responsible authority.

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.



Cardinia

Planning Enquiries
Phone: 1300 787 624
Web: www.cardinia.vic.gov.au

Office Use Only Application No.: Date Lodged: / /

Application to
AMEND 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.

This form cannot be used to:

- amend a permit or part of a permit if the Victorian Civil and Administrative Tribunal (VCAT) has directed under section 85 of the Act that the responsible authority must not amend that permit or that part of the permit (as the case requires); or
- amend a permit issued by the Minister under Division 6 of Part 4 of the Act (these applications must be made to the Minister under section 97I of the Act).

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

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.: 10 | St. Name: McDonalds Track
Suburb/Locality: Land Lang | Postcode:

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 Lot No.: | ◯ Lodged Plan ◯ Title Plan ◯ Plan of Subdivision | No.:

OR

B Crown Allotment No.: | Section No.:
Parish/Township Name:

Planning Permit Details i

What permit is being amended?*

Planning Permit No.: T190126 - 1

The Amended Proposal i

You must give full details of the amendment being applied for. Insufficient or unclear information will delay your application

What is the amendment being applied for?*

- Indicate the type of changes proposed to the permit.
- List details of the proposed changes.

If the space provided is insufficient, attach a separate sheet.

This application seeks to amend:

- [X] What the permit allows
- [X] Plans endorsed under the permit
- [ ] Current conditions of the permit
- [ ] Other documents endorsed under the permit

Details: Amend the permit preamble to include the filling of the site in excess of 1 metre.

Submit plans to comply with conditions 2,16,26,35 of the permit.

Cardinia
ADVERTISED MATERIAL
Planning Application: T190126-2
Date Prepared: 11 March 2026
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.

Provide plans clearly identifying all proposed changes to the endorsed plans, together with: any information required by the planning scheme, requested by Council or outlined in a Council checklist; and if required, include a description of the likely effect of the proposal.

Development Cost

Estimate cost of development*

If the permit allows ***development***, estimate the cost difference between the development allowed by the permit and the development to be allowed by the amended permit.

Cost of proposed amended development:		Cost of the permitted development:		Cost difference (+ or –):
$ 0	–	$ 0	=	$ 0

Insert 'NA' if no development is proposed by the permit.

You may be required to verify this estimate.

Existing Conditions

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.

Have the conditions of the land changed since the time of the original permit application? ☐ Yes ☒ No

If yes, please provide details of the existing conditions.

Provide a plan of the existing conditions if the conditions have changed since the time of the original permit application. Photos are also helpful.

Title Information

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

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

Applicant *

The person who wants the permit.

Please provide at least one contact phone number *

[redacted]

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*

Same as applicant

Name:

Title:

First Name:

Surname:

Organisation (if applicable):

Postal Address:

If it is a P.O. Box, enter the details here:

Unit No.:

St. No.:

St. Name:

Suburb/Locality:

State:

Postcode:

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.

Same as applicant

Name:

Title:

First Name:

Surname:

[redacted]

day / month / year

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; that all the information in this application is true and correct; that all changes to the permit and plan have been listed as part of the amended proposal and that the owner (if not myself) has been notified of the permit application.

Signature: [redacted]

Date: 30/10/2023

day / month / year

Need help with the Application?

If you need help to complete this form, read More Information at the end of this form or contact Council's planning department. General information about the planning process is available at planning.vic.gov.au

Contact Council's planning department to discuss the specific requirements for his application and obtain a 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 [redacted]

Date: 17/10/23

day / month / year

Checklist

Have you:

- [X] Filled in the form completely?
- [ ] Paid or included the application fee?
- [X] Attached all necessary supporting information and documents?
- [X] Completed the relevant council planning permit checklist?
- [X] Signed the declaration above?

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

Lodgement

Lodge the completed and signed form 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
Fax: (03) 5941 3784
Email: mail@cardinia.vic.gov.au
DX: 81006

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

Cardinia Shire Council

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.:	T190126 - 1
Address of the Land:	10 McDonalds Track Lang Lang

APPLICANT DETAILS

Name:	[redacted]
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 **before** notice:	☐
Section 50A - Amendment to application at request of responsible authority **before** notice:	☐
Section 57A – Amendment to application **after** 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.
Amend the permit preamble to include the filling of the site in excess of 1 metre.
Submit plans to comply with conditions 2,16,26,35 of the permit.

Specify the estimated cost of any development for which the permit is required:

Not applicable ☐	Unchanged ☑	New amount $

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.	
Name:	[redacted]
Signature:	
Date:	3.11.25

LODGEMENT

Please submit this form, including all amended plans/documents, to 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*.

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

VOLUME 12459 FOLIO 795

Security no : 124110137567G
Produced 30/10/2023 01:50 PM

LAND DESCRIPTION

Lot A on Plan of Subdivision 915932W.
PARENT TITLE Volume 12258 Folio 159
Created by instrument PS915932W 16/03/2023

REGISTERED PROPRIETOR

[redacted]

ENCUMBRANCES, CAVEATS AND NOTICES

[redacted]

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 PS915932W 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: 10 MCDONALDS TRACK LANG LANG VIC 3984

ADMINISTRATIVE NOTICES

NIL

[redacted]

DOCUMENT END

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

VOLUME 12459 FOLIO 794

Security no : 124110137716U
Produced 30/10/2023 01:53 PM

LAND DESCRIPTION

Reserve 1 on Plan of Subdivision 915932W.
PARENT TITLE Volume 12258 Folio 159
Created by instrument PS915932W 16/03/2023

REGISTERED PROPRIETOR

[redacted]

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 PS915932W 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: 10 MCDONALDS TRACK LANG LANG VIC 3984

ADMINISTRATIVE NOTICES

NIL

eCT Control 19681P ARGYLE CONVEYANCING SERVICES
Effective from 16/03/2023

DOCUMENT END

Imaged Document Cover Sheet

The document following this cover sheet is an imaged document supplied by LANDATA®, Secure Electronic Registries Victoria.

Document Type	**Plan**
Document Identification	**PS915932W**
Number of Pages (excluding this cover sheet)	**2**
Document Assembled	**30/10/2023 13:56**

PLAN OF SUBDIVISION

EDITION 1

PS 915932W

LOCATION OF LAND

PARISH:	LANG LANG
TOWNSHIP:	
SECTION:	
CROWN ALLOTMENT:	7 (PT)
CROWN PORTION:	
TITLE REFERENCE:	VOL 12258 FOL 159
LAST PLAN REFERENCE:	LOT 2 ON TP83436F
POSTAL ADDRESS (at time of subdivision):	10 MCDONALDS TRACK LANG LANG VIC 3984
MGA CO-ORDINATES: (of approx centre of land in plan)	E 373 350 N 5 764 200 ZONE 55

Council Name: Cardinia Shire Council

Council Reference Number: S23-177
Planning Permit Reference: T190126-1
SPEAR Reference Number: S205970E

Certification

This plan is certified under section 6 of the Subdivision Act 1988

Statement of Compliance

This is a statement of compliance issued under section 21 of the Subdivision Act 1988

Public Open Space

A requirement for public open space under section 18 or 18A of the Subdivision Act 1988 has not been made

Digitally signed by: [illegible] for Cardinia Shire Council on [illegible]

VESTING OF ROADS AND/OR RESERVES

IDENTIFIER	COUNCIL/BODY/PERSON
RESERVE No.1	MELBOURNE WATER CORPORATION

NOTATIONS

DEPTH LIMITATION: NIL

SURVEY:
This plan is based on survey

STAGING:
This is not a staged subdivision

NOTATIONS

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	WATER SUPPLY & RIGHTS IN CONNECTION THEREWITH SET OUT IN AA1353	20	LAND ACQUISITION & COMPENSATION ACT 1986 AND SECTION 130 WATER ACT 1989 SEE NOTIFICATION AG833856K	MELBOURNE WATER CORPORATION

COUNTRY COVE ESTATE - 1
RESERVE AND BALANCE LOT A

LICENSED SURVEYOR: ANDREW J. REAY

Lyssna Group Pty Ltd
ABN [illegible]
Tel: +61 3 [illegible]
PO Box [illegible], South Melbourne [illegible]
Suite 5, 102 [illegible] Street
Southbank VIC 3006 Australia
LyssnaGroup.com

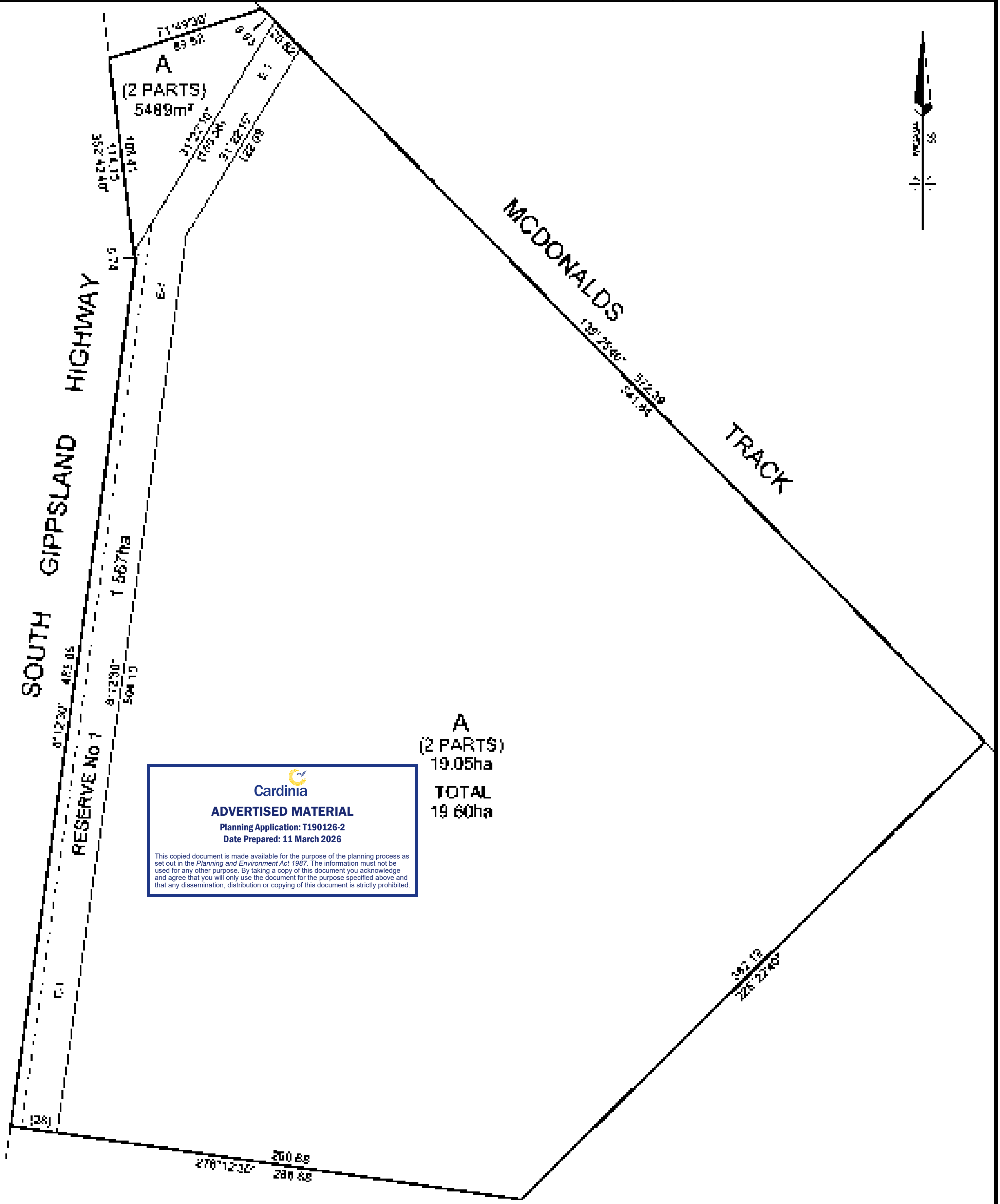
DATE:	20/01/23	REFERENCE:	AA6085	ORIGINAL SHEET SIZE: A3
DRAWING:	SUB1B3	DRAWN BY:	EA	SHEET 1 OF 2

Digitally signed by: Andrew Reay, Licensed Surveyor,
Surveyor's Plan Version (1),
23/01/2023, SPEAR Ref: S205970E

PLAN REGISTERED
TIME 9:48 AM DATE 16/03/2023
YL
Assistant Registrar of Titles

PLAN OF SUBDIVISION

PS 915932W



COUNTRY COVE ESTATE - 1	LICENSED SURVEYOR ANDREW J. REAY	SCALE 1:2000	0 20 40 60 80 LENGTHS ARE IN METRES
Lyssna Group Pty Ltd	DATE: 20/01/23 REFERENCE AA0005 DRAWING: SUB1B3 DRAWN BY EA		ORIGINAL SHEET SIZE: A3 SHEET 2
	Digitally signed by Andrew Reay, Licensed Surveyor, Surveyor's Plan Version ..., SPEAR Ref: S205970E	Digitally signed by Cardinia Shire Council, SPEAR Ref: S205970E	

30 October 2023

[redacted]
Principal Statutory Planner
Cardinia Shire Council
PO Box 7
Pakenham VIC 3810

Sent [redacted]

Dea[redacted]

Re: Request for S72 Amendment to Planning Permit: T190126 - 1
Request to endorse plans to satisfy Condition's 2, 16, 26, 35
10 McDonalds Track Lang Lang (Country Cove Estate)

1. Introduction

[redacted] in relation to land at 10 McDonalds Track, Lang Lang (Country Cove Estate). We make this application under Section 72 of the *Planning & Environment Act* to amend permit T190126 - 1. We also request that plans be endorsed to comply with Conditions 2, 16, 26, and 35 of the permit.

No changes are proposed to plans endorsed by Council under Condition 1 dated 20 January 2023 are proposed.

Please refer proposal *below* and *attached* for documentation in support of this request.

2. Background

2.1 The Subject land

The subject land is located at 10 McDonalds Track, Lang Lang and is referred to as the Country Cove Estate. The land was formerly addressed 35 McDonalds Track, Lang Lang.

2.2 Existing Planning approvals

A planning permit was granted by Council on 23 January 2020. VCAT later directed Council to issue an amended permit on 8 December 2022. Plans were endorsed on 29 January 2023 to comply with Condition 1 of the permit.

3.0 This proposal

Since approval of the permit, site engineering plans have been further developed. This has included the preparation Stormwater Management Plans and Site Filling Plans (refer Attachments 2 and 3).

In accordance with the instructions of servicing authorities, it has been determined the site must be drained towards the north-east of the site. Drainage towards the south-west as originally intended will not be permitted by servicing authorities.

The site is to be shaped to enable the site to be drained to the north-east. This requires fill to be placed on the site in excess of 1 metre in some areas.

3.1 Application for Amendment under Section 72

Design and Development Overlay - Schedule 1 (DDO1) includes a requirement for a planning permit to construct a building or construct or carry out works (unless a Schedule to this Overlay specifically states that a permit is not required). Schedule 1 of the DDO states that a permit is not required to construct a building or construct or carry out works provided all of the following requirements are met:

- *The works must not involve the excavation of land exceeding 1 metre or filling of land exceeding 1 metre and any disturbed area must be stabilised by engineering works or revegetation to prevent erosion.*

A Stormwater Management Plan and Level Change Plan have now been developed and have confirmed that filling would exceed one metre in some areas across the site. As earthworks exceed one metre in fill, the above exemption in the Schedule to the DOO is not be met and a planning permit is required.

It is possible to amend the approved permit in this instance to address the permit trigger and include “filling in excess of 1 metre” within the permit preamble. No other changes to the permit are proposed.

The LSIO applies to a small section to the north of the site. Works are occurring in the land subject to the LSIO and would trigger a permit.

We submit that changes to the permit to be made under Section 72 are confined to an adjustment to the permit preamble. No changes are required to plans endorsed under this permit.

3.2 Request to endorse plans under Conditions 2,16, 26, and 35

The Stormwater Management Plan and Level Range Plan have been developed in accordance with the plan endorsed under Condition 1 of the permit. These plans have been prepared to satisfy Conditions 2,16, 26, 35 of the permit and are submitted for Council’s consideration accordingly.

Plans have been developed following detailed liaison with third party referral authorities both through, and subsequent to the VCAT process. Through these negotiations it has been determined that the site must be drained to the north-east to avoid third party assets to the south-west.

Typical of most urban development sites, the site must be filled and levels adjusted. In this instance, the use of additional fill and retaining walls is required in order to properly engineer the site and drain it to the north-east, as required by third party referral authorities. The proposed Level Change Plan provides context as to how the site needs to be adjusted.

Each of these factors has influenced the proposed plans presented for Council’s consideration. In this instance, no other drainage options are available. Please refer Attachments 2 and 3.

4.0 Planning Provisions

The relevant planning provisions applicable to the site are:

- Low Density Residential Zone – Schedule 3. The Zone establishes minimum subdivision area of 0.2ha.
- The Design and Development Overlay – Schedule 1 applies to the land. The schedule apples design requirements and guidelines to the subject land.
- A small portion of the site to the north is included within the Land Subject to Inundation Overlay.
- The site is identified as a Designated Bushire Prone Area.

The approved permit has previously been assessed to comply with the applicable planning framework. No substantiative changes to the applicable planning framework have occurred since the approval of the permit.

4. Assessment and Strategic justification for the proposal

The proposed request to amend the permit under Section 72 of the *Planning & Environment Act 1987* is confined to a change to the permit preamble of Planning Permit T190126. The changes proposed are required to include filling of the site in excess of one metre within the permit preamble. We submit that the proposed S72 Amendment is appropriate in this instance as:

- No transformative change to the planning permit is proposed. Applying the principles established in Addicoat v Fox (No 2) [1979] VR 347 and confirmed in *Coles Property Group v Boroondara CC [2014] (P2419/2013)* ('Coles'), the application properly constitutes an amendment and not a 'transformation' of the proposal. In Coles at paragraph 23, the Member stated that "*where the permit is not transformed but retains significant elements of its previous content, and simply adds to, expands or alters what has been previously allowed, I consider that amending a permit, rather than always having to apply for a new permit, is now clearly contemplated by the provisions in the Act".* In this instance the changes to the proposal are within the scope of an amendment. Thus, use of Section 72 of the *Planning and Environment Act 1987* is considered appropriate because the amendment will retain significant elements of the previous content and simply clarifies what has previously allowed.
- The proposal maintains consistency with the Planning Policy Framework, Planning provisions, and Particular Provisions contained within the Cardinia Planning Scheme.
- The proposed amendment remains broadly consistent with the existing approvals affecting the site:
- No changes are proposed to the plan already endorsed under Condition 1.

Plans submitted under Condition submitted to satisfy Condition's 2, 16, 26, and 25 of the permit are appropriate for Council's consideration as:

- Changes proposed have been discussed with Council. Whilst it is acknowledged that the proposed drainage solution is neither Council's nor our client's preferred solution, it is the only solution possible in this instance given the requirements of third-party referral authorities. The proposed drainage to the north-east of the site has been agreed (in-principle) with relevant third-party referral authorities.
- The proposal does not preclude future development of surrounding landholdings. In the event that landholdings to the south were to be developed in future, they too will be required to drain to the east in the same manner. They will not be permitted to drain to the west. This proposal does not alter nor preclude this outcome.
- An appropriate design solution has been reached through the use of filling and retaining walls. This comes at additional cost to our client. These costs will be met entirely on site. There is no obligation on adjacent landowners, nor will there be any adverse impact on adjoining land.
- Future road / pedestrian connectivity to adjacent land will be maintained, should this be required in future.
- Considering the site constraints and authority requirements, the proposed plans present the best possible drainage and development solution for the site and satisfactorily address the requirements of Conditions 2, 16, 26, and 35.

5. Conclusion

We make this application under Section 72 of the *Planning & Environment Act* to amend permit TP T190126 - 1. We also request that plans be endorsed to comply with Conditions 2, 16, 26, and 35 of the permit. Once approved, the proposal will enable certification of plans and development of the site to be commenced. This is important given the contribution that the site will make to the creation of new housing supply amidst the current and well publicised housing shortages which exist within Victoria. We look forward to Council's consideration.

6. Contact

Should you have any questions, please don't hesitate to contact me on [redacted]

Director – Navy Blue Planning

Navy Blue Planning
Urban and Regional Planning Specialists

Att: 1. *Endorsed Plan Version X*
2. *Stormwater Management Plan*
3. *Level Range Plan*

3 November 2025

[redacted]
Coordinator Statutory Planning
Cardinia Shire Council
PO Box 7
Pakenham VIC 3810
[redacted]

Dea[redacted]

Re: Request for S72 Amendment to Planning Permit: T190126 - 1
Request to endorse plans to satisfy Condition's 2, 16, 26, 35
10 McDonalds Track Lang Lang (Country Cove Estate)

1. Introduction

[redacted]

2. Background

In 2023, an application was made under Section 72 of the *Planning & Environment Act* to amend permit T190126 - 1. Plans and reports were also submitted to be endorsed to comply with Conditions 2, 16, 26, and 35 of the permit.

Following advertising and referral of the application, additional information was requested to support the request. We have since worked with Council and the relevant agencies to coordinate, review and prepare the required documentation.

Please refer proposal below and attached for documentation in support of this request.

2.1 The Subject land

The subject land is located at 10 McDonalds Track, Lang Lang and is referred to as the Country Cove Estate. The land was formerly addressed 35 McDonalds Track, Lang Lang.

2.2 Existing Planning approvals

A planning permit was granted by Council on 23 January 2020. VCAT later directed Council to issue an amended permit on 8 December 2022. Plans were endorsed on 29 January 2023.

3. This proposal

We seek to update documentation submitted to Council in 2023 in support of a request under Section 72 of the *Planning & Environment Act* to amend permit T190126 - 1. Plans, reports, and supporting documentation also submitted to be endorsed to comply with Conditions 2, 16, 26, and 35 of the permit. Pease refer:

Item	Plan/Report	Version	Date	Author
1	Masterplan	Z	13/08/25	Lyssna Group
2	Building Envelope Plan	Z	13/08/25	Lyssna Group
3	Desalination Easement Reserve & Lot Cross Section	UD00CE	18/08/25	Lyssna Group
4	Stormwater Management Strategy	G	Oct 2025	Colliers
5	Level Range Plan	F	30/10/25	Colliers
6	Road Traffic Noise Assessment	Rp 001 20241161	8.10.25	Marshall Day Acoustics

3.1 Application for Amendment under Section 72

In accordance with the instructions of servicing authorities, it has been determined the site must be drained towards the north-east of the site. Drainage towards the south-west as originally intended will not be permitted by servicing authorities. The site is to be shaped to enable the site to be drained to the north-east. This requires fill to be placed on the site in excess of 1 metre in some areas.

Design and Development Overlay - Schedule 1 (DDO1) includes a requirement for a planning permit to construct a building or construct or carry out works (unless a Schedule to this Overlay specifically states that a permit is not required). Schedule 1 of the DDO states that a permit is not required to construct a building or construct or carry out works provided all of the following requirements are met:

- *The works must not involve the excavation of land exceeding 1 metre or filling of land exceeding 1 metre and any disturbed area must be stabilised by engineering works or revegetation to prevent erosion.*

A Stormwater Management Plan and Level Change Plan have now been developed and have confirmed that filling would exceed one metre in some areas across the site. As earthworks exceed one metre in fill, the above exemption in the Schedule to the DOO is not be met and a planning permit is required.

It is possible to amend the approved permit in this instance to address the permit trigger and include "filling in excess of 1 metre" within the permit preamble. No other changes to the permit are proposed.

The LSIO applies to a small section to the north of the site. Works are occurring in the land subject to the LSIO and would trigger a permit.

We submit that changes to the permit to be made under Section 72 are confined to an adjustment to the permit preamble. No changes are required to plans endorsed under this permit.

3.2 Request to endorse plans under Conditions 2,16, 26, and 35

The Stormwater Management Plan and Level Range Plan have been developed in accordance with the updated masterplan – Version Z. These plans have been prepared to satisfy Conditions 2,16, 26, 35 of the permit and are submitted for Council's consideration accordingly.

Typical of most urban development sites, the site must be filled and levels adjusted. In this instance, the use of additional fill and retaining walls is required in order to properly engineer the site and drain it to the north-east, as required by third party referral authorities. The proposed Level Change Plan provides context as to how the site needs to be adjusted. Each of these factors has influenced the proposed plans presented for Council's consideration. In this instance, no other drainage options are available.

The Stormwater Management Strategy details the proposed solution. In summary:

The site will discharge towards the north west at the Legal Point of Discharge via a dedicated free draining outlet. Prior to discharge, flows will enter a wetland retarding basin to treat and control flows.

To restrict post-developed flows to that of pre-developed conditions, a retarding basin with a storage volume of 5600m³ (including freeboard) is proposed to be constructed at the north-west corner of the Site in the area designated as drainage reserve. Rainwater tanks (3kL) will be required to be constructed on each residential lot, required under a Section 173 Agreement for detention and water re-use purposes.

The Site currently falls within the extent of the 1% AEP flooding for the area. It is therefore proposed that the residential lots be filled in order to provide 300mm of clearance above the flood level of 6.80mAHD. A Section 173 Agreement is also proposed in order to set floor levels a minimum additional 300mm above the flood level (600mm in total). The Water Technology flood impact assessment confirmed no impacts to the Desalination Pipeline reserve which has been accepted by Melbourne Water.

The minor drainage system will be designed to convey the 20% AEP event safely below ground. Underground drainage pipes will be upsized where required to ensure sufficient freeboard requirements are being met. Flows from storm events exceeding the 20% AEP event, and up to the 1% AEP storm event will flow overland within the proposed road networks with upsized underground drainage pipes to be used when there is insufficient capacity.

4.0 Planning Provisions

The relevant planning provisions applicable to the site are:

- Low Density Residential Zone – Schedule 3. The Zone establishes minimum subdivision area of 0.2ha.
- The Design and Development Overlay – Schedule 1 applies to the land. The schedule apples design requirements and guidelines to the subject land.
- A small portion of the site to the north is included within the Land Subject to Inundation Overlay.
- The site is identified as a Designated Bushire Prone Area.

The approved permit has previously been assessed to comply with the applicable planning framework. No substantiative changes to the applicable planning framework have occurred since the approval of the permit.

5. Assessment and Strategic justification for the proposal

The proposed request to amend the permit under Section 72 of the *Planning & Environment Act 1987* is confined to a change to the permit preamble of Planning Permit T190126. The changes proposed are required to include filling of the site in excess of one metre within the permit preamble. We submit that the proposed S72 Amendment is appropriate in this instance as:

- No transformative change to the planning permit is proposed. Applying the principles established in Addicoat v Fox (No 2) [1979] VR 347 and confirmed in *Coles Property Group v Boroondara CC [2014] (P2419/2013)* ('Coles'), the application properly constitutes an amendment and not a 'transformation' of the proposal. In Coles at paragraph 23, the Member stated that "*where the permit is not transformed but retains significant elements of its previous content, and simply adds to, expands or alters what has been previously allowed, I consider that amending a permit, rather than always having to apply for a new permit, is now clearly contemplated by the provisions in the Act".* In this instance the changes to the proposal are within the scope of an amendment. Thus, use of Section 72 of the *Planning and Environment Act 1987* is considered appropriate because the amendment will retain significant elements of the previous content and simply clarifies what has previously allowed.

- The proposal maintains consistency with the Planning Policy Framework, Planning provisions, and Particular Provisions contained within the Cardinia Planning Scheme.
- The proposed amendment remains broadly consistent with the existing approvals affecting the site:
- No changes are proposed to the plan already endorsed under Condition 1.

Plans submitted under Condition submitted to satisfy Condition's 2, 16, 26, and 25 of the permit are appropriate for Council's consideration as:

- Changes proposed have been discussed with Council. Whilst it is acknowledged that the proposed drainage solution is neither Council's nor our client's preferred solution, it is the only solution possible in this instance given the requirements of third-party referral authorities. The proposed drainage to the north-east of the site has been agreed (in-principle) with relevant third-party referral authorities.
- Detailed modelling has been undertaken in the form of an updated Stormwater Management Strategy. The strategy is based upon extensive Flood Impact Assessment works undertaken by Water Technology to address Melbourne Water and DEECA flood impact requirements for the adjacent Desalination Pipeline easement. The Site will discharge towards the north west at the Legal Point of Discharge via a dedicated free draining outlet. Prior to discharge, flows will enter a wetland retarding basin to treat and control flows.
- An appropriate design solution has been reached through the use of filling and retaining walls. This comes at additional cost to our client. These costs will be met entirely on site. There is no obligation on adjacent landowners. An alternate, battered solution was discussed, but not preferred by the neighbour to the south.
- Future road / pedestrian connectivity to adjacent land will be maintained, should this be required in future.
- Considering the site constraints and authority requirements, the proposed plans present the best possible drainage and development solution for the site and satisfactorily address the requirements of Conditions 2, 16, 26, and 35.

4. Conclusion

We make this application under Section 72 of the *Planning & Environment Act* to amend permit TP T190126 - 1. We also request that plans be endorsed to comply with Conditions 2, 16, 26, and 35 of the permit. Once approved, the proposal will enable certification of plans and development of the site to be commenced. This is important given the contribution that the site will make to the creation of new housing supply amidst the current and well publicised housing shortages which exist within Victoria. We look forward to Council's consideration.

5. Contact

[redacted]

Managing Director – Navy Blue Planning

Navy Blue Planning
Urban and Regional Planning Specialists

12 February 2026

[redacted]
Principal Statutory Planner
Cardinia Shire Council
PO Box 7
Pakenham VIC 3810
[redacted]

Dear [redacted]

Re: Response to request for further information - Application: T190126 - 2
10 McDonalds Track Lang Lang (Country Cove Estate)

1. Introduction

[redacted]

2. Response to RFI Items

A response to the matters identified in Council's Request for Further Information is provided in the table below. Supporting documentation has also been updated and is attached.

Item	Council request	Response
1	Please provide written confirmation detailing if approval of the submitted Road Traffic Noise Assessment (prepared by Marshall Day Acoustics, dated 8 October 2025) is sought, and the relevant permit condition(s) sought to be satisfied.	To clarify – The Road Traffic Noise Assessment (prepared by Marshall Day Acoustics, dated 8 October was prepared at the request of external referral authorities. We would be pleased for Council to consider the assessment to satisfy Condition 48.
2	Please provide written confirmation if the proposed building envelopes shown on the Indicative Building Envelope Plan (Drawing UD00BZ, dated 13/08/2025) or similar are proposed to be applied and enforced to each lot within Stage 2.	To clarify – The purpose of submitting the building envelope plan is to demonstrate that each lot can sustain a dwelling: • We would be pleased for building envelopes to be formally applied to lots 1-18 to ensure that no building occurs within the desalination easement. • We would be pleased for building envelopes to be formally applied to lots 43-54 adjacent to the southern boundary to ensure that the recommendations of the bushfire assessment can be achieved and maintained. Lots within the balance of the estate are large enough to accommodate a dwelling without such encumbrance. We submit that building envelopes should not be applied to these lots.
3	Should Building Envelopes be proposed, provide a written response: a. To Clause 13.02 Bushfire, including bushfire risk and any appropriate bushfire protection measures that are to be implemented via building envelopes or other measure. b. Detailing why a large southern	A Bushfire Assessment has been prepared by Euca Planning. This has required minor adjustments to the layout and building envelope plans to address Clause 13.02.

	setback have been provided to the building envelope on Lot 1.	To clarify, the large southern setback on Lot 1 is required to avoid land subject to inundation. This can be seen through the flood modelling prepared for the site. Two lots in the south-west corner were consolidated in order to provide a suitable building envelope.
4	The Bulk Earthworks Plan (prepared by Colliers, drawings 118500FSR01, 118500FSR02 & 118500FSR03, dated 30.10.2025) revised to clearly show: a. Additional cross sections at additional points through the full width/length of the subdivision showing natural surface and finished surface, including sections taken through (but not limited to): i. Showing property boundaries of the subject site ii. Road connections to McDonalds Track. iii. All road connections to the boundary of 80 McDonalds Track. iv. Drainage reserve. v. Through Lot 18, drainage reserve and edge of McDonalds Track. vi. Super lot. vii. Public Open Space. b. Finished Surface Range Plans to notate heights of retaining walls. c. Typical Sections – Retaining Walls to detail proposed material, finish and colours of all retaining walls proposed. d. Confirmation of the extent of earthworks within the McDonalds Track road reserve (extending beyond access points) and if this impacts existing vegetation. 	Please refer updated SWMS including bulk earthworks drawing addressing RFI comments. A response to Council's comments is provided below: a. Additional cross sections at additional points through the full width/length of the subdivision showing natural surface and finished surface, including sections taken through (but not limited to): i. Showing property boundaries of the subject site **Shown on sections E-I** ii. Road connections to McDonalds Track. **Shown on sections G, H, I** iii. All road connections to the boundary of 80 McDonalds Track. **This was already shown on section C** iv. Drainage reserve. **Shown on E & F** v. Through Lot 18, drainage reserve and edge of McDonalds Track. **Refer section F** vi. Super lot. **Refer section E** vii. Public Open Space. **Refer section I** b. Finished Surface Range Plans to notate heights of retaining walls. **Retaining wall heights are now shown** c. Typical Sections – Retaining Walls to detail proposed material, finish and colours of all retaining walls proposed. **Concrete sleeper retaining walls shown.** d. Confirmation of the extent of earthworks within the McDonalds Track road reserve (extending beyond access points) and if this impacts existing vegetation. **Cut fill heatmap now includes McDonalds Track noting that the cut/fill of +/-0.2m on the existing road should be treated as no works occurring, just a regrading of topsoil. (just a sensitivity issue with the heatmap). It does however show the extent of earthworks in road reserve outside of the existing pavement.**

Response to Council concerns and comments

Item	Council request	Response
A	Bulk Earthworks - Please be advised that Council currently has some concerns regarding the extent of earthworks, particularly regarding the consequential interfaces proposed to the southern and south-eastern boundaries and the creation of potential prejudice or unreasonable constraints to any future development on adjoining land. This will be further reviewed upon receipt of detailed bulk earthworks plans and cross sections.	Prior to submission of the request for amendment, discussions were held with the neighbour to the south to discuss the interface treatment. It was noted that site levels on our site needed to be raised so as to not compromise the desalination pipeline easement. The prospect of matching levels into their site was discussed as our preferred outcome, however their position remains the same as the earlier VCAT hearing on this matter advising that they will not allow works (batters) within or on their land. We again highlight that land to the south remains in the Farming Zone and is constrained by flooding. Despite this, every attempt has been made to provide for an appropriate interface and future connections to the

		south should the zoning be changed in future. Level differences between the lots cannot be avoided in this instance.
B	Building Envelopes - The proposed building envelopes shown on Building Envelope Plan (Drawing UD00BZ, dated 13/08/2025) vary the setbacks prescribed by Schedule 1 of the Design and Development Overlay (such as reduced setbacks to rear boundaries and side streets). Per Schedule 1 of the Design and Development Overlay, the required setbacks of future dwellings can be varied in accordance with an approved building envelope. Should these variations be sought for future dwellings via building envelopes, the building envelopes will be assessed by Council and if acceptable, will be enforced by a condition on a permit requiring building envelope restrictions.	In response to Council's comments, please note as follows: • The response to items 2 and 3 above. • Building Envelopes shown provide for a 30m setback from McDonalds Track, 10m from all other roads, and 5m from side boundaries. • The only aspect that would require variation from the requirements of the DDO1 is the rear setback which is proposed to be 3m rather than 5m. This is our preference, however if Council was of the view that a variation could not be supported, then we could potentially reduce the size of the building envelope. This however would significantly restrict the potential size of dwellings on the lot. We would encourage Council to consider this variaton. • We again note that with the exception of lots 1-18 and 43-54 we are not proposing to introduce formal building envelopes.
C	Defendable Space - It is noted that Clause 13.02 Bushfire applies to applications for subdivision of more than 10 lots. It is strongly recommended for any building envelopes sought to consider appropriate bushfire protection measures for future dwellings, such as enforcing defendable space setbacks (particularly to south and south eastern boundaries of the subject site). Alternative bushfire mitigation measures can be considered.	Please refer attached Bushfire Assessment prepared by Euca Planning. This has resulted in minor alterations to lots adjoining the southern boundary which require a 19m setback to boundary.
D	Impacts to vegetation - Please be advised that Council strongly encourages for earthworks to be minimised where existing vegetation could be impacted, including potential Southern Brown Bandicoot habitat (including understorey).	Noted. Earthworks to be minimised, where practical.
E	Outfall Drainage - Please be advised that additional Planning Permit approvals may be required to create the proposed outfall to Lang Lang River, such as creation of easements and/or the removal of native vegetation. It is recommended for any required approvals to be investigated and possibly applied for concurrently with this amendment application.	Noted. At this point, we await final approval from Melbourne Water and DEECA. Once this is confirmed, we will confirm any additional planning permit requirements for the outfall drainage.
F	Please be aware that the Council has forwarded the application to the relevant departments and agencies for their comments. At the date of this letter, we have not yet received their feedback. This feedback may result in further clarification on issues or documentation not mentioned in this letter. We will advise you should any such matters arise.	Noted.

Further to documentation submitted to support our request for amendment dated 3 November 2025, please find attached updated documentation as follows

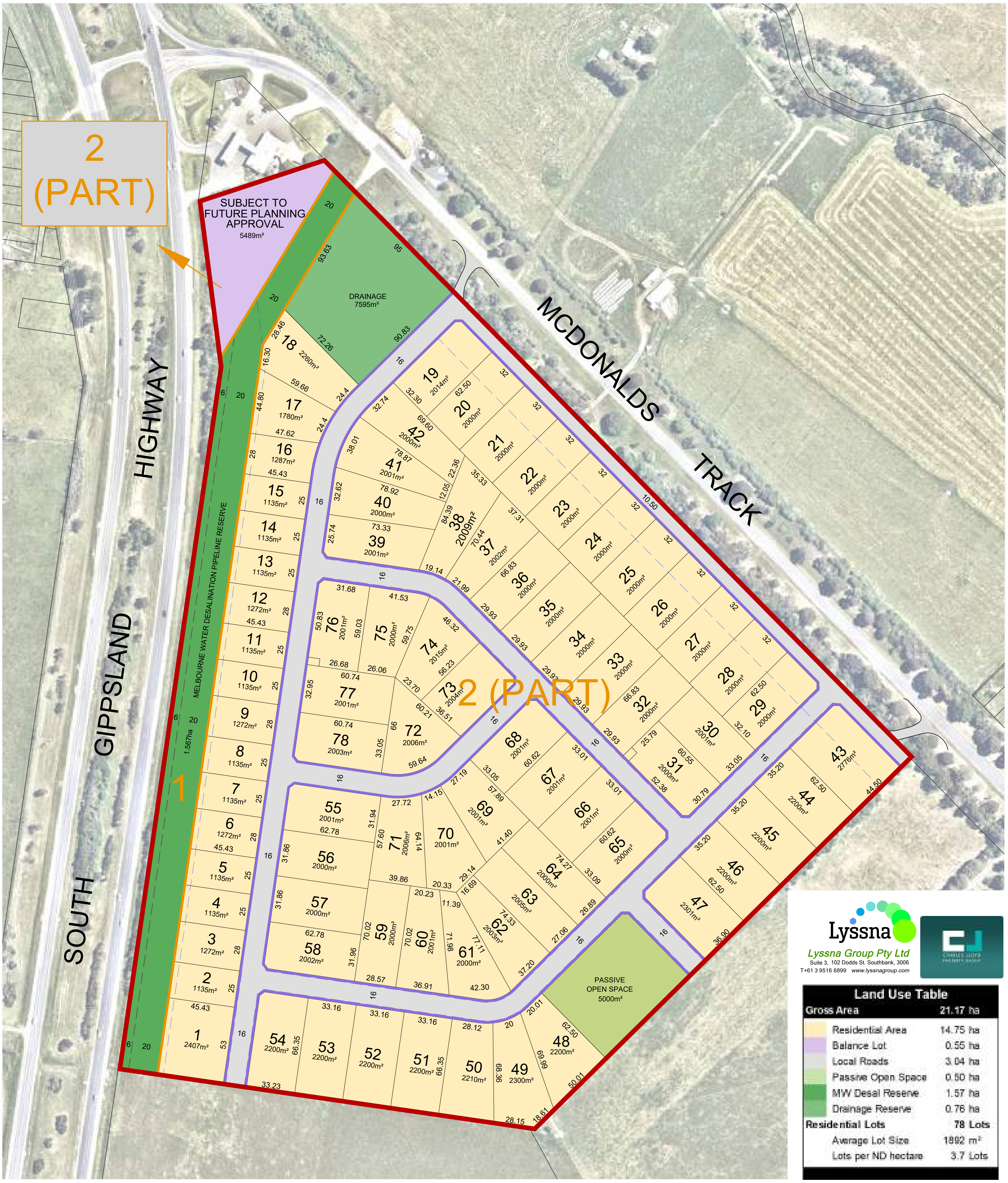
Item	Plan/Report	Version	Date	Author
1	Updated Layout Plan	BZB	2.2.26	Lyssna Group
2	Updated Building Envelope Plan	BZB	2.2.26	Lyssna Group
3	Updated Stormwater Management Strategy, including Level Range Plan showing bulk earthworks.	I	Jan 26	Colliers
4	Bushfire Planning Assessment.		12.02.26	Euca Planning

[redacted]

Kind Regards,

[redacted]

Managing Director – Navy Blue Planning



Lyssna Group Pty Ltd
Suite 3, 102 Dodds St. Southbank, 3006
T+61 3 9516 6899 www.lyssnagroup.com

Land Use Table	
Gross Area	21.17 ha
Residential Area	14.75 ha
Balance Lot	0.55 ha
Local Roads	3.04 ha
Passive Open Space	0.50 ha
MW Desal Reserve	1.57 ha
Drainage Reserve	0.76 ha
Residential Lots	78 Lots
Average Lot Size	1892 m²
Lots per ND hectare	3.7 Lots

NOTE: Site is in a low residential zone. Minimum lot area is 0.2ha (excepting for lots 1-18 which excise land required for a utility instillation). Buildings must have a front setback of 10m and a side setback of 5m and no front fences.

NOTE: Retention of vegetation in the McDonalds Track Road Reservation will be carried out where practical and as demonstrated by a suitable qualified person.

NOTE: All future road connections are to be vested to council.

NOTE: MW Desal Reserve shown is to be vested to Melbourne Water.

LEGEND

- Site Boundary
- Stage Boundary & Fencing location. (Specifications of fencing to be to the satisfaction of Melbourne Water in consultation with Department of Environment, Land, Water & Planning (DELWP))
- 1 Stage Number
- Title Easement
- Category 1 Road Offset (30m)
- Footpath (Concrete Construction)
- Balance Lot

This plan and information shown must only be used by the client for its intended purpose. This plan is subject to approval from Referral Authorities and engineering design. Boundary dimensions and areas are subject to survey.

Scale 1:2500 0 25 50 75

MCDONALDS TRACK, LANG LANG

MASTERPLAN

Drawing Date	02/02/26
Job Number	AA0085
Drawing Number	UD0BZB
Drawn By	BA

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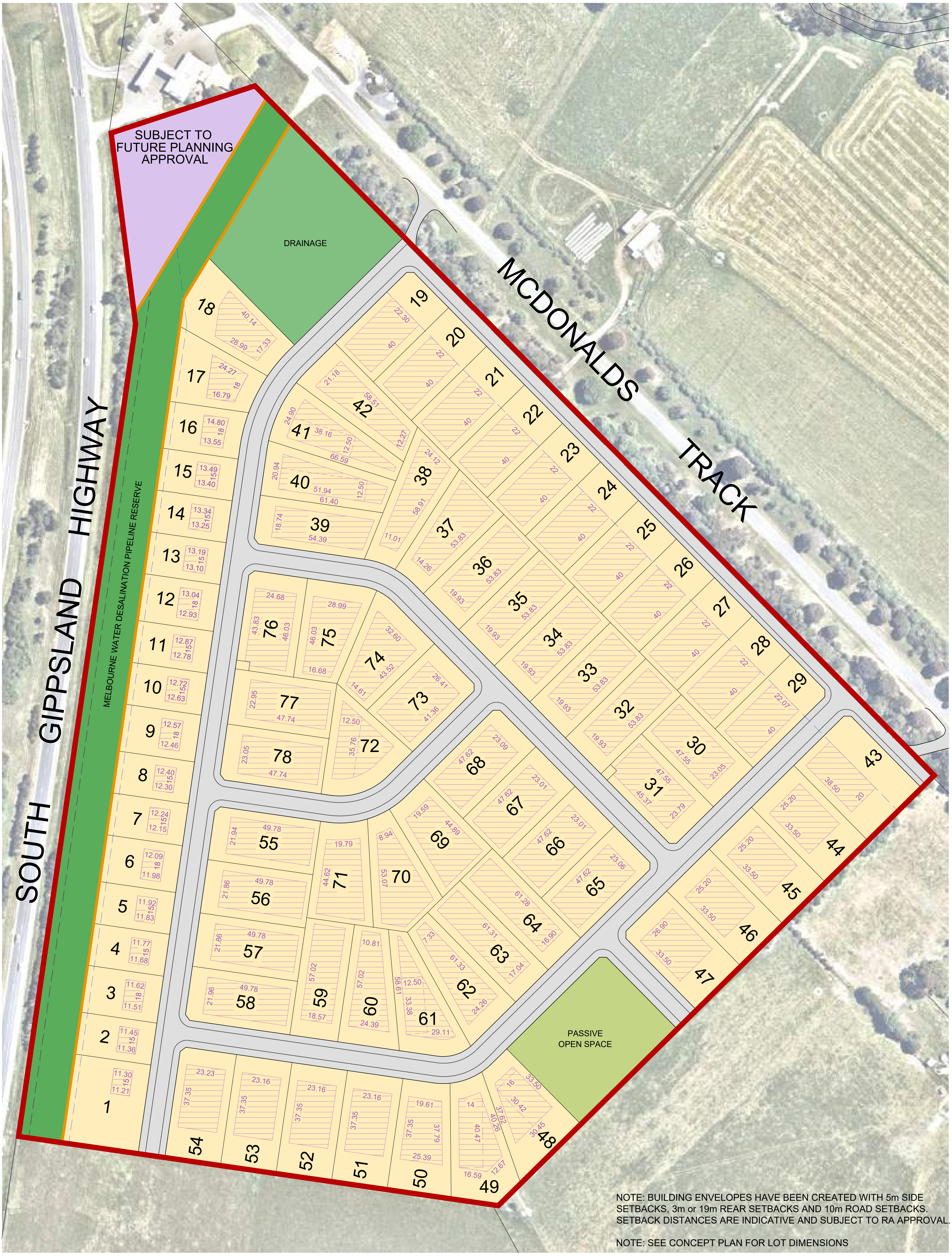
MGA



MCDONALDS TRACK, LANG LANG

INDICATIVE BUILDING ENVELOPE PLAN

LEGEND
- Site Boundary
- Title Easement
- Category 1 Road Offset (30m)
- Balance Lot
- Indicative Building Envelope

Scale 1:2000 — 0 20 40 60

Drawing Date	02/02/26
Job Number	AA0085
Drawing Number	UD0BZB
Drawn By	BA

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MGA

MARSHALL DAY Acoustics

10 MCDONALDS TRACK, LANG LANG
ROAD TRAFFIC NOISE ASSESSMENT

Rp 001 20241161 | 8 October 2025

MARSHALL DAY Acoustics

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Project: **10 MCDONALDS TRACK, LANG LANG**

Prepared for: [redacted]

Attention: [redacted]

Report No.: **Rp 001 20241161**

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Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
Final	-	Issued as complete	8 Oct 2025	[redacted]	

MARSHALL DAY Acoustics

TABLE OF CONTENTS

1.0 INTRODUCTION

Charles Lloyd Property Group are developing a residential subdivision on McDonalds Track, in Lang Lang. The residential subdivision is adjacent the South Gippsland Highway and a planning condition requires an acoustic report be prepared for the development to the satisfaction of the Department of Transport and Planning (DTP) and the Responsible Authority.

Marshall Day Acoustics (MDA) previously provided an assessment of road traffic noise in relation to the development detailed in report, *Rp 001 20200500 35 McDonalds Track, Lang Lang – Road Traffic Noise Assessment,* dated 29 July 2020 (2020 MDA report). Since the report was issued, Melbourne Water have constructed a 2.0 m high timber paling fence between the development site and South Gippsland Highway along a desalination easement.

Further, an amended planning permit was since granted by the Responsible Authority and describes conditions relating to the assessment of noise from the South Gippsland Highway across the development site.

Charles Lloyd Property Group has engaged MDA to undertake an updated road traffic noise assessment in accordance with the amended planning permit and to determine the extent of acoustic treatment that may be required to address traffic noise at the future dwellings.

Therefore, the scope of this report is to outline an assessment of road traffic noise and residual acoustic treatment requirements to achieve DTP's guidelines and address the conditions of the planning permit, where they relate to noise.

A glossary of acoustic terminology used throughout this report is provided in Appendix A.

2.0 PROJECT OVERVIEW

2.1 Project site

The new residential subdivision is to be developed on land at 10 McDonalds Track, Lang Lang. The proposed site is bounded by the following:

- McDonalds Track to the east
- South Gippsland Highway to the west
- Existing service station to the north
- Vacant undeveloped land to the south.

The proposed development site is shown in Figure 1. The indicative building envelope plan of the subdivision is provided in Appendix B.

2.2 Nearby roads to the development site

Roads that have been identified in the immediate vicinity of the development site are contained in Table 1, along with their classification according to DTP.

Table 1: Roads in the immediate vicinity of the development site

Road name	Road classification	Location	Responsible road authority
South Gippsland Highway	Arterial (named highway)	Western boundary of development site	DTP
McDonalds Track	Arterial	Eastern boundary of development site	DTP Council (service roads, pathways, roadside)

Figure 1: Proposed development site (Source: Metromap)

3.0 ASSESSMENT FRAMEWORK

3.1 Planning requirements

An amended planning permit for the development was issued by the Responsible Authority (ref. *T190126 – 1 APP,* dated 9 December 2022), with an acoustic report required in accordance with condition 48 as outlined below:

Department of Transport Conditions:

48. Unless otherwise agreed in writing by the Head, Transport for Victoria, prior to the certification of the Plan of Subdivision for Stage 2, the following must be completed:

a) The developer shall, engage a pre-qualified acoustic engineering consultant to prepare an acoustic report to the satisfaction of and at no cost to the Head, Transport for Victoria and the Responsible Authority. The acoustic report must include (but not be necessarily limited to):

i. Predictions of the future traffic noise level generated from South Gippsland Highway at least 10 years after the anticipated occupation of the last lot.

ii. Noise attenuation measures required to comply with a noise level of 63 dB (A) L10 (18 hour) or less, as measured 1 metre out from the façade of any dwelling located within the subdivision for the period of at least 10 years after the anticipated occupation of the last lot;

iii. Recommendations, including plans and drawings showing the location, layout and structure and architectural design of any noise attenuation measures required to comply with VicRoads Traffic Noise Reduction Policy.

iv. Design of any required noise attenuation measures with at least a 40 years design life.

v. Should the noise attenuation measures consist of the installation of an acoustic barrier, such barriers must be provided to an equivalent architectural standard (form and material type) as approved by the Head, Transport for Victoria.

3.2 Road traffic noise policies and guidelines

A range of policies and guidelines are used in Victoria to assess and control road traffic noise. Table 2 provides an overview of the key documents that are applicable to the development site.

Further details on the of key documents referenced are provided in Appendix C.

Table 2: Relevant guidelines used in Victoria to assess and control road traffic noise

Reference	Overview
VicRoads' (DTP) *Traffic Noise Reduction Policy* VicRoads' (DTP) *Requirements of Developers – Noise Sensitive Uses* VicRoads' (DTP) *A Guide to the Reduction of Traffic Noise* VicRoads' (DTP) *Road Design Note 06-01 - Interpretation and application of VicRoads Traffic Noise Reduction Policy* (RDN 06-01)	DTP has developed guidelines for noise mitigation at residential developments near major roads, which is the source of the 63 dB $L_{A10,18h}$ noise level referenced in the planning permit.
Australian/New Zealand Standard AS/NZS 2107:2016 *Acoustics - Recommended design sound levels and reverberation times for building interiors* (AS 2107)	Provides recommended design sound levels for "houses and apartments in inner city areas or entertainment districts or near major roads", which is considered to be applicable to the development site.

3.3 DTP road traffic noise publications

The VicRoads' (DTP) document *Traffic Noise Reduction Policy*, recommends design objectives for road traffic noise in Victoria. However, the performance standards only apply to DTP-controlled roads when there is a new road or existing road upgrade near existing noise sensitive land use. The policy does not apply where new buildings or subdivisions are proposed next to existing roads.

Where new noise sensitive developments are planned close to existing major traffic routes, the developer must take responsibility for noise mitigation. DTP is a referral authority, and so has the right to seek to impose requirements on residential developers seeking planning approvals for land adjacent to VicRoads-controlled roads.

DTP has developed guidelines for noise mitigation at residential developments near major roads, namely *Requirements of Developers – Noise Sensitive Uses* and *A Guide to the Reduction of Traffic Noise*. These guidelines recommend developers undertake some combination of the following:

- Erect traffic noise barriers of sufficient height and suitable construction to reduce external noise levels to 63 dB $L_{A10,18h}$ or less at the ground floor level of the worst-affected dwellings
- Utilise strategic dwelling layout design:
  - Use the dwelling to shield outdoor living areas.
  - The building layout should have less sensitive areas (laundry, bathroom, garage, etc.) facing the freeway whilst the noise sensitive uses (bedrooms, living areas, etc,) are located away from the freeway.
  - Provide sound insulation treatment to dwellings sufficient to achieve the recommended internal noise levels specified in Australian Standard 2107-2016 *Acoustics - Recommended design sound levels and reverberation times for building interiors.*
  - For exposed facades, window and door openings should be of a minimum size.
- Reporting by a qualified acoustic engineer outlining the necessary noise control measures to achieve the above strategies and post-completion noise level measurements demonstrating noise criteria are satisfied.

Where the developer decides in consultation with DTP and Council that it is not desirable to erect high noise barriers, then the guidelines recommend permit conditions are applied that ensure the above strategies are implemented.

An extract of the permit conditions recommended by *Requirements of Developers* is provided in Appendix C.

3.4 Internal noise levels

Australian Standard 2107-2016 *Acoustics - Recommended design sound levels and reverberation times for building interiors* (AS 2107) provides recommendations for acceptable internal noise levels. Table 3 shows the recommended internal design sound levels stated in AS 2107 for *houses and apartments in inner city areas or entertainment districts or near major roads*, which is applicable to the residential subdivision.

Table 3: AS 2107 recommended internal noise levels

Area	Recommended indoor design sound level range, dB L_{Aeq}
Living, work areas	35 to 45
Sleeping areas	35 to 40

4.0 ASSESSMENT

Planning permit condition 48 requires noise levels to be assessed based on the traffic volumes for the period of at least 10 years after the anticipated occupation of the last lot.

We are advised that the civil works are expected to commence by late 2025 and the anticipated completion of the last lot is December 2028. Therefore, this assessment considers a design year of 2038 as per planning permit condition *48.a.i* and accounts for future traffic growth along the South Gippsland Highway and McDonalds Track.

A noise model has been developed to assess road traffic noise levels from the South Gippsland Highway on the development site in accordance with the planning permit. The model provides a practical way of enabling a controlled like-for-like comparison of scenarios, such as assessing a change in traffic flow, vehicle composition or the implementation of noise barriers.

4.1 Noise model

Noise modelling was undertaken in accordance with the *Calculation of Road Traffic Noise* (CoRTN) method implemented in SoundPLANnoise v9.1 environmental noise modelling software.

The CoRTN method is the DTP's preferred model[1] for the evaluation of road traffic noise.

4.1.1 Propagation conditions

The noise model includes the following parameters:

- 50% soft ground was assumed for ground effect attenuation
- A facade correction of +2.5 dB was applied to the predicted future noise levels
- Intervening shielding afforded by the Shell service station approximate building envelope.

Future dwellings or other structures as part of the development were not considered as part of the initial modelling. This means the effect of shielding by intervening buildings has not been accounted for and the actual noise levels at dwellings within the subdivision are likely to be lower than the predicted noise levels, for example those beyond the first row of dwellings adjacent the South Gippsland Highway.

Terrain data obtained from publicly available data (VicMap) was used in combination with future site-specific terrain data provided by the project team on 5 December 2024.

Noise mitigation afforded by the 2.0 m high Melbourne Water fence spanning the east boundary of the desalination easement has been checked against future site terrain and proposed lot layouts.

It was found that the proposed raised elevations of dwellings relative to the South Gippsland Highway and Melbourne Water fence means that the existing fence is predicted by the noise model to provide negligible acoustic shielding of road traffic noise for future dwellings.

The Melbourne Water fence has therefore been omitted from the noise model predictions provided in this report, noting that this may make for a slightly conservative assessment.

[1] *Road Design Note Interpretation and Application of VicRoads Traffic Noise Reduction Policy 2005* (RDN 06-01, July 2010)

4.1.2 Traffic composition

Table 4 summarises the existing annual average daily traffic (AADT) volumes obtained from the Department of Transport[2].

Table 4: Existing (2020) AADT volumes and composition

Item	South Gippsland Highway northbound	South Gippsland Highway southbound	McDonalds Track (2-way)
All vehicles	11000	9800	1900
Trucks	1650	1470	266
% Heavy Vehicles	15	15	14
Annual growth rate %	2.2	2.1	1.4

Based on the growth rate in Table 4, future daily traffic volumes for the model year, 2038 were determined as summarised in Table 5. It has been assumed that the proportion of commercial vehicles (% Heavy Vehicles) would remain unchanged.

Table 5: Future (2038) AADT volumes and composition

Item	South Gippsland Highway northbound	South Gippsland Highway southbound	McDonalds Track (2-way)
All vehicles	16275	14246	2440
Trucks	2441	2137	342
% Heavy Vehicles	15	15	14

The 18-hour volumes used for the purpose of modelling were set to 95% of the AADT volumes detailed in Table 4 and Table 5.

4.1.3 Road conditions

The speed limit on this section of the South Gippsland highway is 90 km/h and for the section of McDonalds Track on the east site boundary, the speed limit is 80 km/h.

The road surface type is assumed dense graded asphalt pavement, and therefore no correction to the predicted noise levels has been included for this element.

4.1.4 Scenarios

A total of 3 scenarios have been modelled:

- Existing road traffic conditions (2020) used for the purpose of validating the noise model (refer Section 4.1.5)
- Forecast 2038 - no noise mitigation
- Forecast 2038 - including road noise barriers extents to satisfy the DTP condition of an external road traffic noise level of 63 dB $L_{A10,18h}$ at all allotments at ground level.

[2] https://vicroadsopendata-vicroadsmaps.opendata.arcgis.com/datasets accessed 17 December 2024

4.1.5 Model validation

Noise monitoring of existing road traffic noise levels was undertaken between Tuesday 9 June and Thursday 18 June 2020, at 3 locations on the site. Details of the measurements are provided in Appendix D, reproduced from the 2020 MDA report.

The monitoring locations were entered into the noise model and the existing road traffic noise levels modelled based on the traffic data detailed in Table 4. The noise model outputs were compared to the measured road traffic noise levels to assess the accuracy of the model.

Table 6 shows a comparison of the modelled and measured road traffic noise levels.

Table 6: Modelled and measured road traffic noise levels (existing traffic data), dB $L_{A10,18h}$

Description	Noise monitoring location (refer Appendix D)		
	1	2	3
Modelled [1]	65	65	59
Measured	64	65	58
Difference	+1	0	+1

Note: (1) to enable direct comparison with the measured free-field noise level, the modelled values do not include the standard CoRTN facade correction

The modelled noise levels were marginally above the measured noise level at all locations, and therefore no adjustment to the modelled noise levels for local conditions has been considered necessary.

Noise modelling of future traffic volumes for the 2038 scenario allows for increased future traffic volumes as per Table 5 and associated higher road traffic noise.

4.2 Predicted road traffic noise levels

Road traffic noise levels for the forecast year, 2038 have been predicted based on the noise model parameters and traffic flow data detailed in Section 4.1.

4.2.1 No noise mitigation

The predicted 2038 road traffic noise levels provided in Appendix E1 do not include any noise barriers to mitigate road traffic noise. As described in Section 4.1.1, the Melbourne Water fence was calculated to provide negligible shielding of road traffic noise to future lot layouts. This fence has been omitted from noise model scenarios described within this report.

The results indicate up to approximately half of the site may be exposed to road traffic noise levels above the the DTP's condition requirement of 63 dB $L_{A10,18h}$ by 2038. Note that the effect of shielding provided by the Shell service station building to the north has been included in calculations.

Noise mitigation measures need to be considered to address traffic noise at residential lots.

4.2.2 Noise barriers to meet 63 dB $L_{A10,18h}$ at all allotments

The predicted 2038 road traffic noise levels provided in Appendix E2 includes a noise barrier to the boundary of the development site, and acoustic fencing (e.g. timber paling) at Lot 18 to mitigate road traffic noise to the DTP's condition requirement of 63 dB $L_{A10,18h}$ at all allotments.

We note the small area of 63 dB $L_{A10,18h}$ contour on Lot 1 has been reviewed and the modelling does not indicate a noise level of 64 dB $L_{A10,18h}$ or higher.

DTP's preference with other residential development projects adjacent to freeways has been for the noise barrier to be in the road reserve for ease of access and maintenance. In this instance, a barrier is required along the full extent of the northwest residential section and western site boundaries and extending approximately 90 m beyond the southwest site corner, parallel to the South Gippsland Highway.

The minimum required barrier heights are as follows:

- West and northwest site boundary: 5.5 m
- Southwest extents: 5.0 m
- Lot 18 acoustic fencing 2.4 m

The noise barrier and acoustic fencing alignment is shown in Appendix E2.

4.3 Noise barrier and acoustic fence design

Any noise barrier is to be constructed of materials achieving a surface density of 20 kg/m^2 in accordance with DTP's requirements and is to have a design life of not less than 40 years. Example materials are listed below:

- 3 mm thick steel
- 40 mm thick timber
- 10 mm thick glass
- 18 mm thick Perspex or polycarbonate
- 75 mm brick or concrete.

Given the Lot 18 fence is only required to reduce traffic noise by 3 dB or less to allow the DTP criterion to be achieved within the lot, a fence of lower surface density such as 12 – 14 kg/m² is expected to be acceptable.

It is recommended that the base of the barrier and fence is buried to a depth of 10-20 cm and critically the noise barriers should be well sealed and free of any holes or gaps. There must be no gap at the base of the barrier or fence.

However, we understand the roadside barrier cannot impede drainage and stormwater requirements.

From discussion with the project team, the barrier can meet the drainage and acoustic requirements by including overlapping sections that create controlled breaks in the barrier.

This design approach will maintain necessary shielding of road traffic noise and afford water level drainage as required.

Mark-ups of the overlapping barrier sections are shown in Figure 3 to Figure 6, Appendix E2. The openings are approximately 3 to 4 m wide allowing for vehicle access. Generally, the length of the overlap should be at least 3 times greater than the width of the opening to afford suitable acoustic shielding.

4.4 Building design to protect outdoor and indoor noise sensitive areas

4.4.1 Upper levels

The Scenario 3 noise modelling described in Section 4.2.2 and shown in Appendix E2 demonstrates the DTP requirement of 63 dB $L_{A10,18h}$ can be achieved at all allotments across the subject site at ground floor.

Where external traffic noise levels achieve the DTP criteria, modern energy-efficient building envelope constructions are expected to provide sufficient reduction in traffic noise to meet the AS 2107 internal noise level criteria (described in Section 3.4), provided windows and doors are closed.

The allotments will be sold to individual owners and the design of future dwellings may be either single or double storey. It is noted that the barrier design intends to achieve the DTP criteria at ground level. This is as per DTP guidance that noise receptor points are to be assessed at the lowest habitable level of a building (typically ground floor). Noise levels at any upper level outdoor areas at first row dwellings that face the highway may be exposed to higher noise levels.

However, there is a practical limitation to achieving the DTP criteria at upper levels, as this would require noise barriers in the range of 6 m to 8 m in height. Such barriers would incur more onerous engineering requirements to adequately support wind loading considerations, be more difficult and expensive to build and maintain, and may compromise other urban design principals such as visual amenity and overshadowing issues.

Noise levels to outdoor areas at upper levels can otherwise be reduced by locating and facing them away from the South Gippsland Highway, where they may benefit from shielding provided by the built form of the dwelling.

Once first row dwellings along the western site boundary are constructed, dwellings situated further east will benefit from intervening shielding provided by the built form, further reducing road traffic noise levels.

4.4.2 Dwelling layouts

The VicRoads' *Guide to the reduction of traffic noise* provides dwelling layout advice, which is recommended to be incorporated as part of the development design. Some design and layout examples to reduce road traffic noise include the following:

- Locate the house as far away from the road corridor as possible.
- Locate sheds or garages so that they shield the house from noise. Use the house and other buildings (e.g. sheds) to shield outdoor living areas such as courtyards or barbecue area.
- Locate noise-sensitive rooms such as bedrooms at the front of the house or as far as possible from the road.
- If designing a two-storey house, the ground floor is easier to protect from noise than the upper floor. Noise-sensitive rooms like bedrooms will generally be quieter if located downstairs.
- Heavy, non-porous facade materials such as brick provide better noise insulation relative to lightweight materials.
- Provide solid core doors with acoustic seals on the side(s) of the house exposed to noise.
- Provide thick laminate glass or double glazing for windows or glass doors exposed to the road.

It should be acknowledged that some of the above strategies may be in conflict with other dwelling design principles.

Further, cooling systems that require external windows or doors to be open (e.g. evaporative cooling) are not recommended, as the need for windows to remain open will be significantly detrimental to traffic noise sound insulation.

5.0 SUMMARY

Charles Lloyd Property Group are developing a residential subdivision on McDonalds Track, Lang Lang.

The residential subdivision is adjacent the South Gippsland Highway and an amended planning condition requires an acoustic report be prepared for the development to the satisfaction of the Department of Transport and Planning (DTP), and the Responsible Authority.

MDA has undertaken an updated assessment in accordance with relevant DTP's guidelines for the control of road traffic noise.

Key outcomes are as follows:

- Noise modelling demonstrates that future traffic noise levels on the subject site can be mitigated to achieve the planning permit conditions' outdoor noise objective of 63 dB $L_{A10,18h.}$ This would require the construction of a noise barrier along the full extent of the northern and western site boundaries, and extending beyond the south and west boundary corner, parallel to the South Gippsland Highway. The noise barrier extents are described in Section 4.2.1 with an aerial image of the indicative barrier alignment provided in Appendix E2.
- The noise barrier is to be constructed of materials achieving a minimum surface density of 20 kg/m^2 in accordance with DTP's requirements and is to have a design life of not less than 40 years. Example materials are provided in Section 4.3.
- The noise barrier should be well sealed and free of any holes or gaps, including at the base of the barrier. It is recommended that the base of the barrier is buried to a depth of 10-20 cm.
- Where there are overlapping sections along the noise barrier for drainage purposes, the length of the overlap should be at a minimum 3 times greater than the width of the opening to afford suitable acoustical shielding. It is suggested the opening is at least 3 m wide to allowable for service vehicle access.
- Upper level outdoor areas constructed at first row allotments (lots 1 to 18) should be faced away from the South Gippsland Highway. Further guidance on dwelling layouts that interface road corridors is provided in Section 4.4.
- Once first row dwellings along the western site boundary are constructed, dwellings situated further east will benefit from intervening shielding provided by the built form, further reducing road traffic noise levels.

APPENDIX A GLOSSARY OF TERMINOLOGY

A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
dB	Decibel. The unit of sound level.
L_{A10}	The A-weighted noise level equalled or exceeded for 10% of the measurement period.
$L_{A10,18h}$	The arithmetic average of the 18 one-hour L_{A10} values between 6 am and midnight (0600-0000hrs). This is the primary descriptor used in Victoria for road traffic noise.
$L_{Aeq,T}$	The equivalent continuous A-weighted sound level. Commonly referred to as the average sound level and measured over a time period, T.
R_w	Weighted Sound Reduction Index A single number rating of the sound insulation performance of a specific building element. R_w is measured in a laboratory and is commonly used by manufacturers to describe the sound insulation performance of building elements such as plasterboard and concrete.
Sound Insulation	When sound hits a surface, some of the sound energy travels through the material. 'Sound insulation' refers to ability of a material to stop sound travelling through it.

APPENDIX B INDICATIVE BUILDING ENVELOPE PLAN

APPENDIX C VICROADS' REQUIREMENTS OF DEVELOPERS - EXTRACT

3.1. Multi Unit Low Level Developments

Where it is a practical option to erect a noise barrier to protect a large number of buildings in a sub-division, then the developments should be subject to the following noise requirements:

1. *No new allotment should be created such that there is insufficient space at the 75 dB(A) noise contour, to erect a house or other noise sensitive development, (that is, the area of the allotment at the 75 dB(A) contour or lesser noise level, must be of a sufficient size to build a dwelling).*
2. *The developer shall attenuate traffic noise from a Freeway to a level of 63 dB(A) or less, at the most exposed façade of the noise sensitive building.*
3. *The noise sensitive buildings adjacent to the Freeway should also be designed and constructed to protect internal noise sensitive areas. That is, the building layout should have the service areas (laundry, bathroom, garage, etc,) facing the freeway whilst the noise sensitive uses (bedrooms, living areas, etc,) are located away from the freeway side of the building. Furthermore, for the exposed façade, window and door openings should be of a minimum size.*
4. *Council should request the developer to provide a report by a qualified acoustic consultant outlining the necessary noise control measures to achieve the preferred actions outlined above.*
5. *The adopted noise attenuation requirements will be met for 10 years after finalization of the development or, where relevant, for each stage of the development.*
6. *The noise fence shall have a design life of not less than 50 years.*
7. *After the installation of noise barriers erected to satisfy the requirement of (2) above, noise measurements shall be taken at several suitable locations that have been agreed to by all relevant parties. The results of the measurements will be distributed to these parties. It should be noted that the measurements should demonstrate that the noise barrier would perform as required in (6) above.*

8. *Should the performance of the barrier not comply with the objective, then the Council shall require the developer to modify the barrier to achieve the objective.*

Where the developer decides, in consultation with VicRoads and Council that it is not desirable to erect high noise barriers then the following conditions should apply to the permits.

9. *The noise sensitive buildings adjacent to the Freeway must be designed and constructed to meet the desirable acoustic standards set out in AS 2107-2000 "Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors". It should be recognized that AS2107-2000 does not adequately consider peak noise levels. Due regard should also be given to the requirements set out in AS 3671-1989 "Acoustics – Road Traffic Noise Intrusion – Building Siting and Construction".*
10. *The building layout requirements in part 3, above, will apply.*
11. *The developer must provide a fence that visually screens the traffic from the view at the lowest habitable level of the development. This screen would be expected to screen out vehicles that are up to 3.5 metres high.*
12. *Council should request the developer to provide a report by a qualified acoustic consultant outlining the necessary noise control measures to achieve the preferred actions outlined above.*
13. *After the development has been completed a survey of the internal noise levels should be undertaken within several suitable buildings to demonstrate that the internal noise levels have been achieved. The results of the measurements will be distributed to the relevant parties.*
14. *Should the internal noise levels not comply with the AS 2107-2000 objectives, then the Council should require the developer to undertake works rectifying the situation.*

3.2. For a Single Unit Developments

The requirements should be specified as for the multi unit development above, parts (1) to (3). However, if it demonstrated that it is ineffective or impractical to erect a noise barrier to protect a single building, then the developments should be subject to parts (10) to (11). The permit should recognize that a small development may have limited resources and it may be impractical to request compliance checks. If this is the case, Council should inspect the building to check that the basic requirements have been complied with.

APPENDIX D MEASURED ROAD TRAFFIC NOISE LEVELS

Noise levels were continuously measured in general accordance with Appendix C of the *Road Design Note Interpretation and Application of VicRoads Traffic Noise Reduction Policy 2005* (reference RDN 06-01, dated July 2010).

Noise monitoring was undertaken between Tuesday 9 June and Thursday 18 June 2020, at the 3 locations shown in Figure 2.

Figure 2: Noise monitoring locations

A summary of the measurement data is presented in Table 7.

Table 7: Summary of measure road traffic noise levels, dB $L_{A10,18hr}$

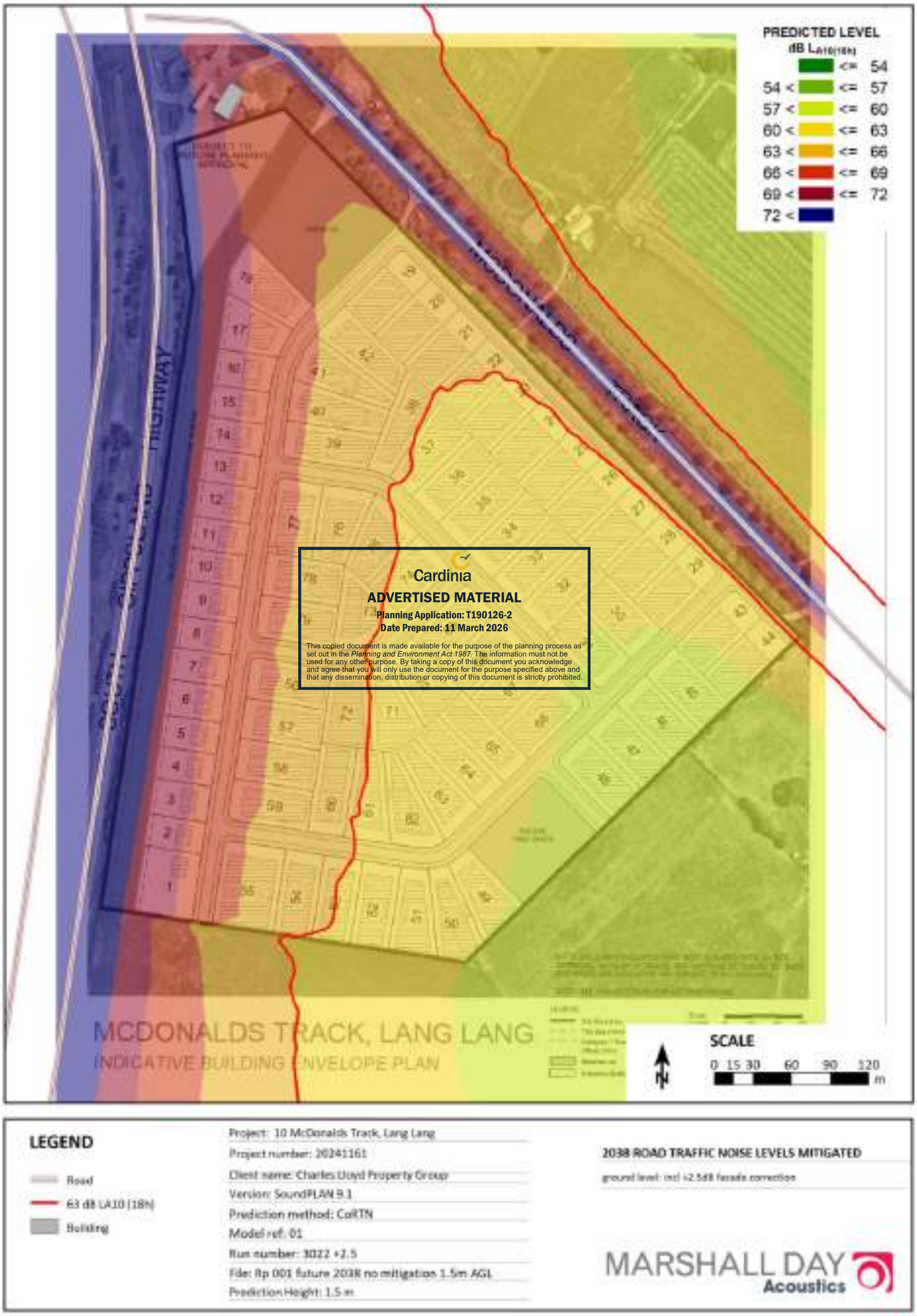
Date	Noise monitoring location			Notes
	1	2	3	
Tuesday, 9 June 2020	65	66	60	
Wednesday, 10 June 2020	65	65	59	
Thursday, 11 June 2020	65	66	61	
Friday, 12 June 2020	65	66	59	
Saturday, 13 June 2020	63	65	58	
Sunday, 14 June 2020	67	68	62	Wind, rain affected
Monday, 15 June 2020	68	68	63	Wind, rain affected
Tuesday, 16 June 2020	68	69	64	Wind, rain affected
Wednesday, 17 June 2020	63	63	56	
Thursday, 18 June 2020	61	61	54	
Average (weekdays, valid weather)	**64**	**65**	**58**	

APPENDIX E PREDICTED ROAD TRAFFIC NOISE LEVELS

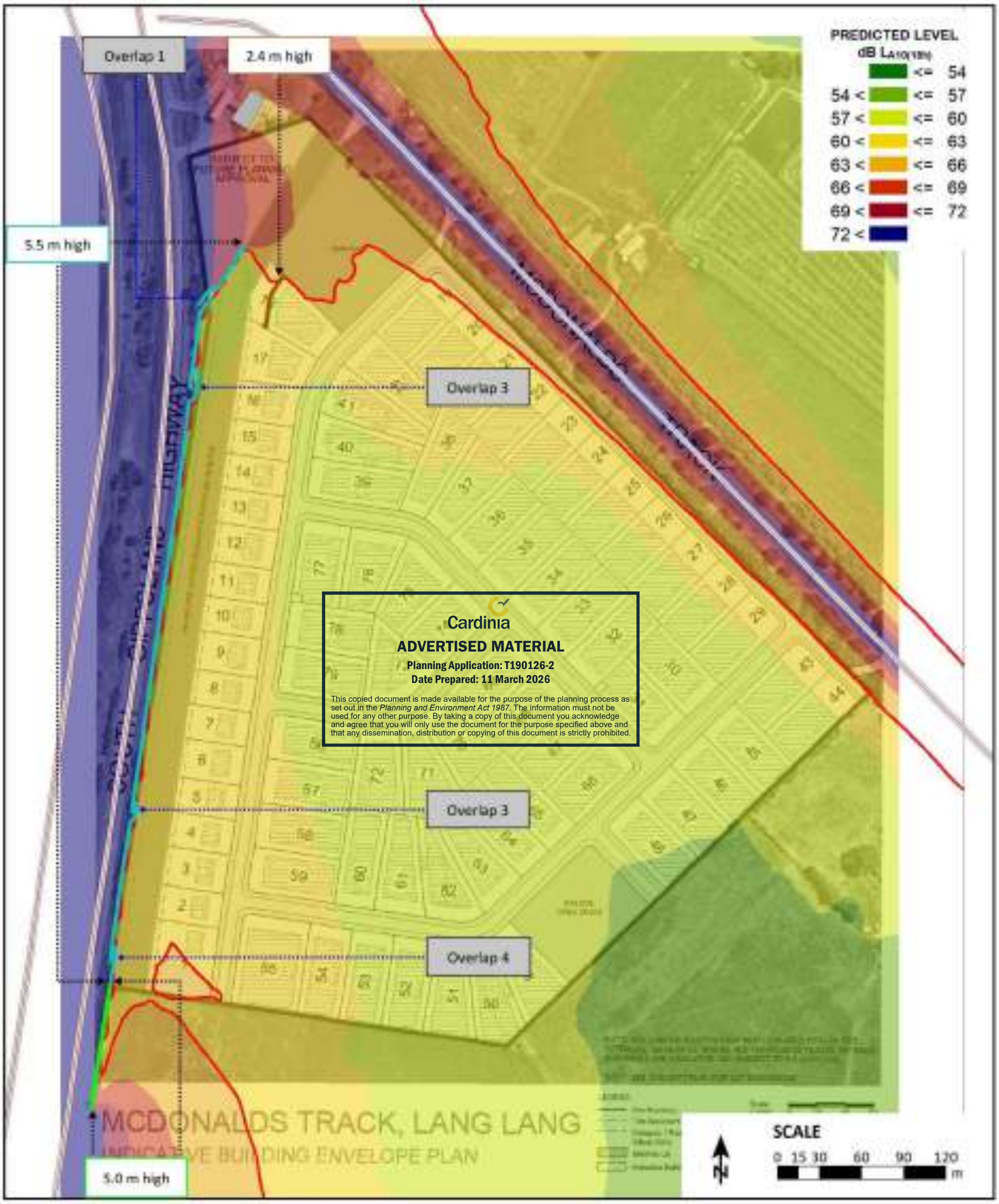
The predicted road traffic noise contours maps are shown in the following sections and include a standard +2.5 dB facade correction.

MARSHALL DAY Acoustics

E1 2038 no traffic noise mitigation – ground floor



E2 2038 including barrier extents to achieve DTP conditions requirements – ground floor



LEGEND

- Road
- 63 dB LA10 (18h)
- Noise barrier
- Building

Project: 10 McDonalds Track, Lang Lang
Project number: 20241161
Client name: Charles Lloyd Property Group
Version: SoundPLAN 9.1
Prediction method: CoRTN
Model ref: 01
Run number: 3022 +2.5
File: Rp 001 future 2038 barrier extents 1.5m AGL
Prediction Height: 1.5 m

2038 ROAD TRAFFIC NOISE LEVELS MITIGATED

ground level: incl +2.5dB facade correction

MARSHALL DAY Acoustics

Figure 3 to Figure 6 shows a detailed view of the modelled barrier overlapping sections. We note minor variations in barrier footprint locations (in the order of 1 to 2 m, for example) are unlikely to impact noise modelling outcomes significantly.

Figure 3: Barrier overlap 1

Figure 4: Barrier overlap 2

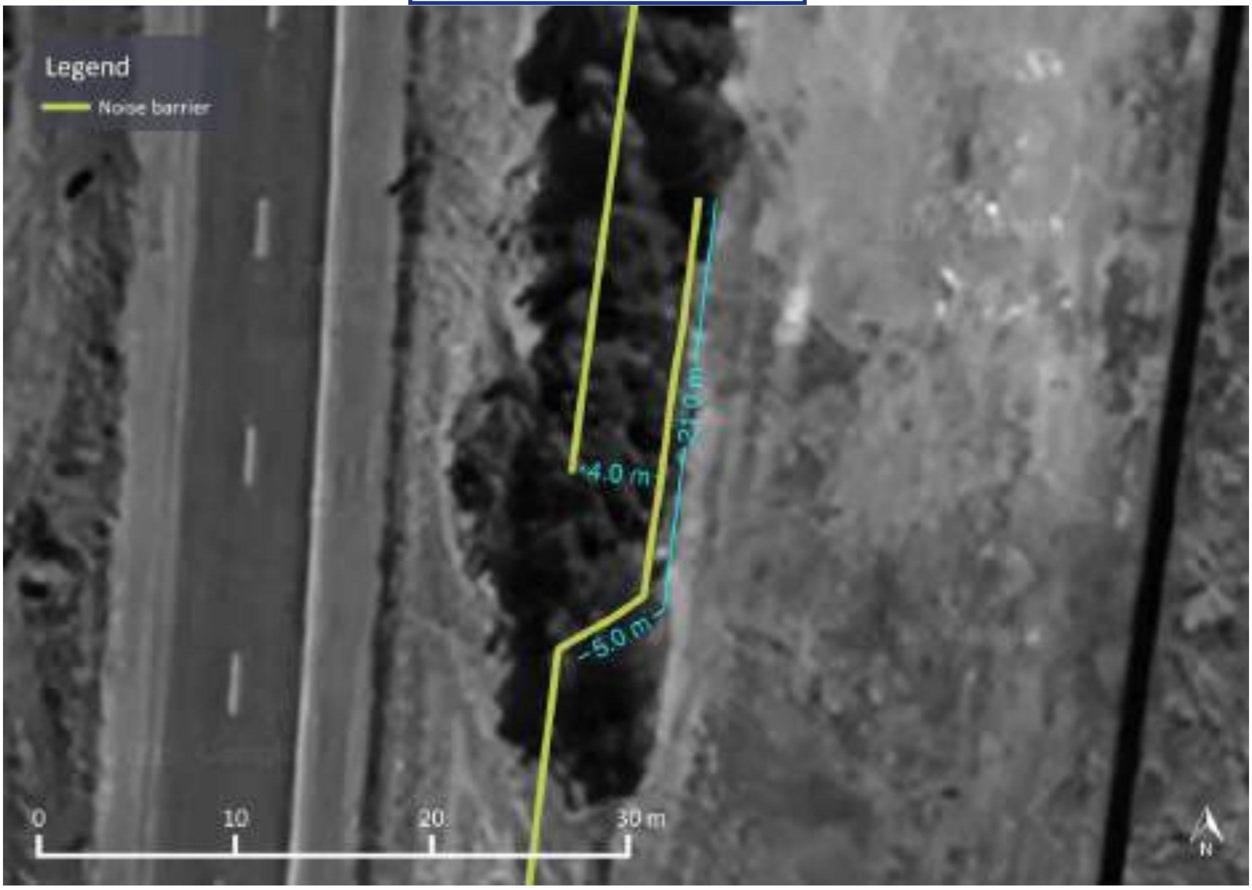
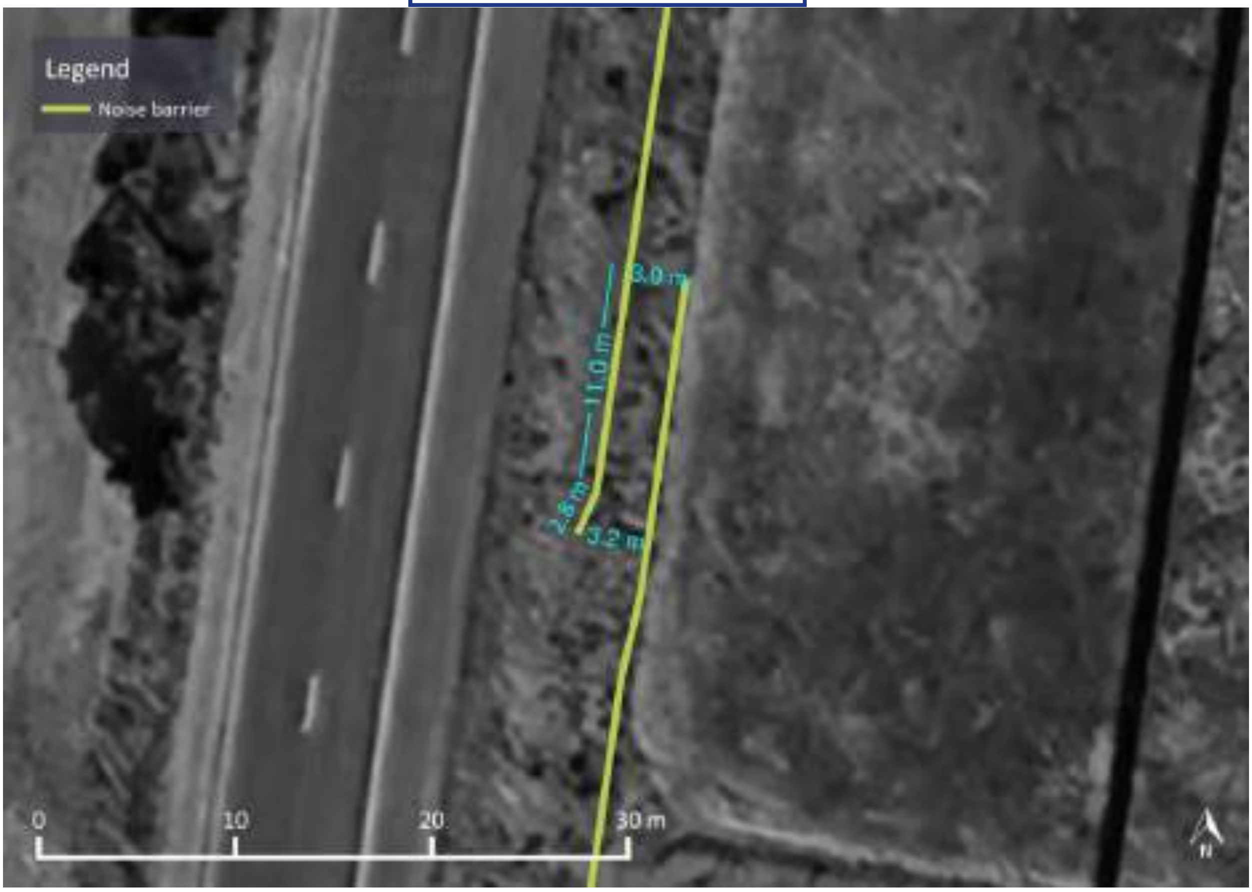


Figure 5: Barrier overlap 3

Figure 6: Barrier overlap 4



Project 26009
Report Date: 12/02/2026

Bushfire Planning Assessment (Basic)

Address: 10 McDonalds Track Lang Lang
Site Inspection: 11/02/2026

This report has been prepared b[redacted] Director of Euca Planning Pty Ltd, to consider the bushfire risk relating to the proposed subdivision at 10 McDonalds Track Lang Lang.

The author has inspected the subject site and its surrounds and has reviewed the proposal with reference to the Cardinia Planning Scheme and application of *AS3959-2018 Construction of Buildings in Bushfire Prone Areas*.

The report provides a basic demonstration that the lots have siting opportunities where a future dwelling would not be exposed to a radiant heat flux of 12.5kW/m² or greater, as demonstrated to the right.

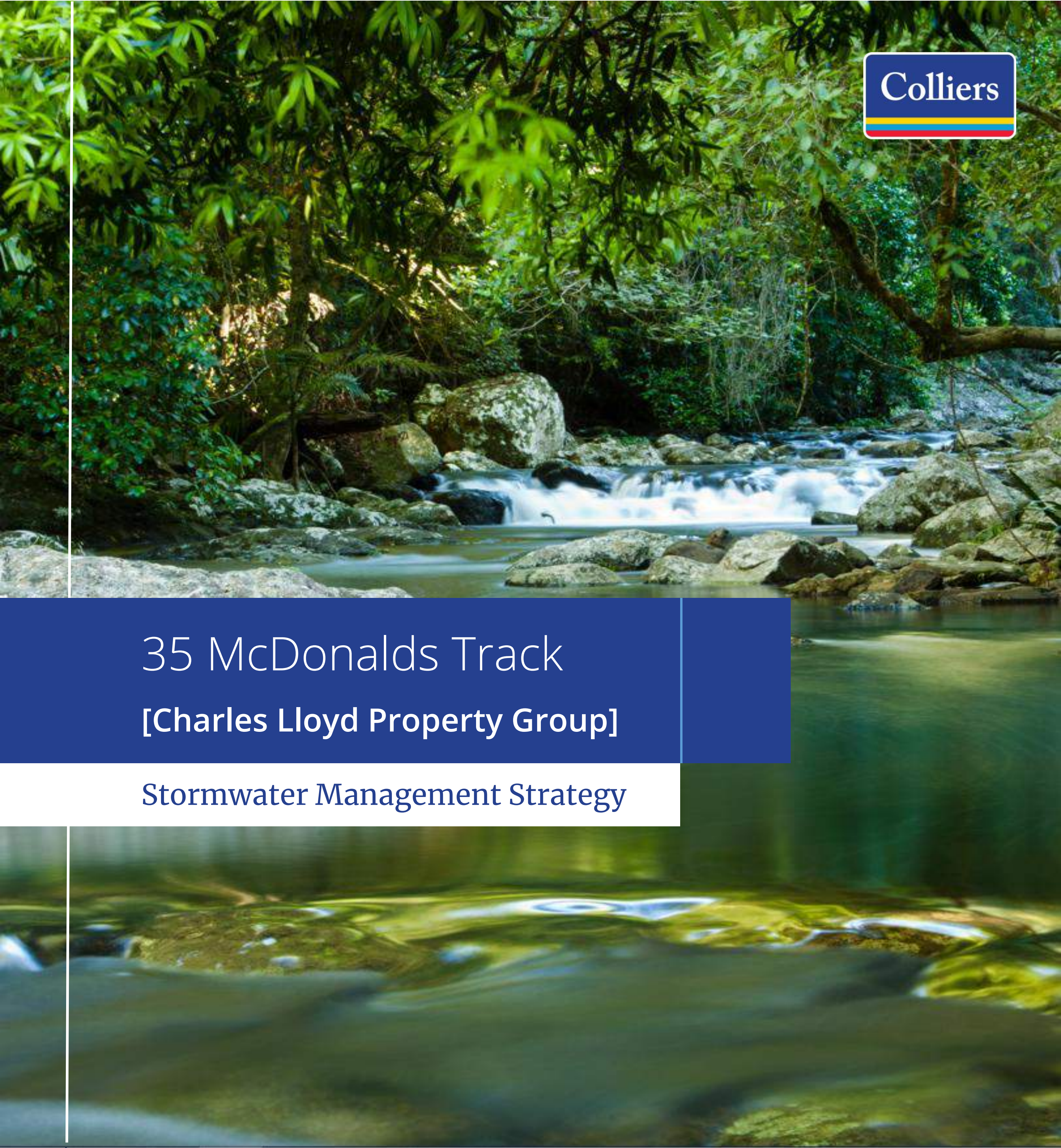
In summary, it is concluded:

- The site has a low vulnerability to bushfire events.
- The topography and extent of grassland vegetation near the development presents a low risk of bushfire.
- There is minimal fire history in the area.

The proposed subdivision is a sound basis for development consistent with the intent of the Cardinia Planning Scheme. The proposed development can adequately respond to the bushfire risk of the locality and does not increase the risk of bushfire to the Lang Lang settlement.

All lots have siting opportunities where a future dwelling would not be exposed to a radiant heat flux of 12.5kW/m2 or greater.

Non-combustible fencing is an appropriate alternative to a perimeter road in this landscape considering the existing permit. Additionally, non-combustible fencing is acceptable for the lots abutting the Melbourne Water easement as this would be a fire of reduced fire intensity.



Colliers

35 McDonalds Track

[Charles Lloyd Property Group]

Stormwater Management Strategy

Report Revision: v1

Report Date: Jan 2026

Accelerating success.

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Report Contact:

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Document Control

Version	Date	Details	Prepared	Checked	Approved
A	Feb 2019	Preliminary Issue (LD Eng)	[redacted]		
B	Jun 2019	Updated Report			
C	Sep 2019	Updated Report			
D	Jun 2022	Updated Report (PEAKURBAN)			
E	Feb 2023	Updated Report			
F	Oct 2023	Updated Report			
G	Oct 2025	Updated Report			
H	Dec 2025	Updated Report			
I	Jan 2026	Final Issue			

EXECUTIVE SUMMARY

Colliers Engineering & Design (formerly PEAKURBAN and LD Eng) have been engaged by Charles Lloyd Property Group to prepare a Stormwater Management Strategy (SWMS) in support of a development application to Cardinia Shire Council over land located at 35 McDonalds Track, Lang Lang, VIC, 3984, Australia (Council Property no. 4557150100). This development application seeks a development permit for a Reconfiguration a Lot (ROL) to 79 create residential lots.

This latest version builds upon the extensive Flood Impact Assessment works undertaken by Water Technology to address Melbourne Water and DEECA flood impact requirements for the adjacent Desalination Pipeline easement.

The site covers an area of 21.17ha and is consistent with a rural farm land use with most of the Site cleared. The Site is accessed by McDonalds Track along the northern boundary and is bounded by private allotments to the east and south. Natural topography data indicates, the Site has one internal catchment conveying overland flows to the western boundary.

Discussions with Council indicate the intended outfall location for the Site is at the northwest corner via a free draining outlet. A drainage outfall will be constructed along McDonalds Track external to the Site discharging to the Lang Lang River downstream. Both minor and major flows are to be conveyed via the Site's internal drainage and road network towards the legal point of discharge. A wetland retarding basin will be constructed near the Site's outfall location to restrict flows to pre developed conditions. The on-Site retarding basin will have a storage volume of 5600m^3 (including 300mm Freeboard) and surface area of 6400m^2. Rainwater tanks will be constructed on each residential lot for water re-use and detention purposes.

As the Site is to be developed into a residential subdivision, the underground drainage network will need to cater for the 20% AEP storm event while flows greater than the 20% AEP and up to and including the 1% AEP event are to be conveyed through the Site utilising the road network. Minor flows pipes may be upsized if there is insufficient road reserve capacity to convey flows while adhering to DWELP flood safety criteria.

Environmental Best Management Practices are proposed for treatment of stormwater flowing from the Site. Water quality treatment is provided in the form of rainwater tanks, a sediment basin and constructed wetland which is incorporated into the retarding basin.

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1. Introduction

Colliers Engineering & Design (formerly PEAKURBAN and LD Eng) was engaged to formulate a Stormwater Management Strategy for a parcel of land (referred to within this document as “the Site”) located at 35 McDonalds Track, Lang Lang, VIC, 3984, Australia, south east of Melbourne in the municipality of Cardinia Shire Council.

The plan will outline any potential stormwater quantity and quality measures required within the Site to comply with Melbourne Water and Council requirements. We propose to develop a stormwater strategy that reflects the demands and needs of the Site and its surrounding parcels that contribute to the same catchment.

This latest version builds upon the extensive Flood Impact Assessment works undertaken by Water Technology to address Melbourne Water and DEECA flood impact requirements for the adjacent Desalination Pipeline easement.

1.1. Scope of the Plan

The Site is located in Lang Lang, 70km south east of Melbourne. It is adjacent to South Gippsland Hwy and McDonalds Track and has an area of 21.17 hectares (ha). Refer to Figure 1.

Figure 1. Site Locality

In existing conditions, the Site is bare and is considered highly permeable. The Site falls to the west towards the South Gippsland Hwy and Lang Lang River, see Figure 5. Natural topography data indicates a minor ridge running east to west. There is approximately 3m of fall across the Site to the western boundary, from 8.7m AHD at high point along the eastern boundary to 5.7m AHD at the north west corner, see Figure 2.

The Site has a gentle grade with an average slope of less than 2.5%, see Figure 3.

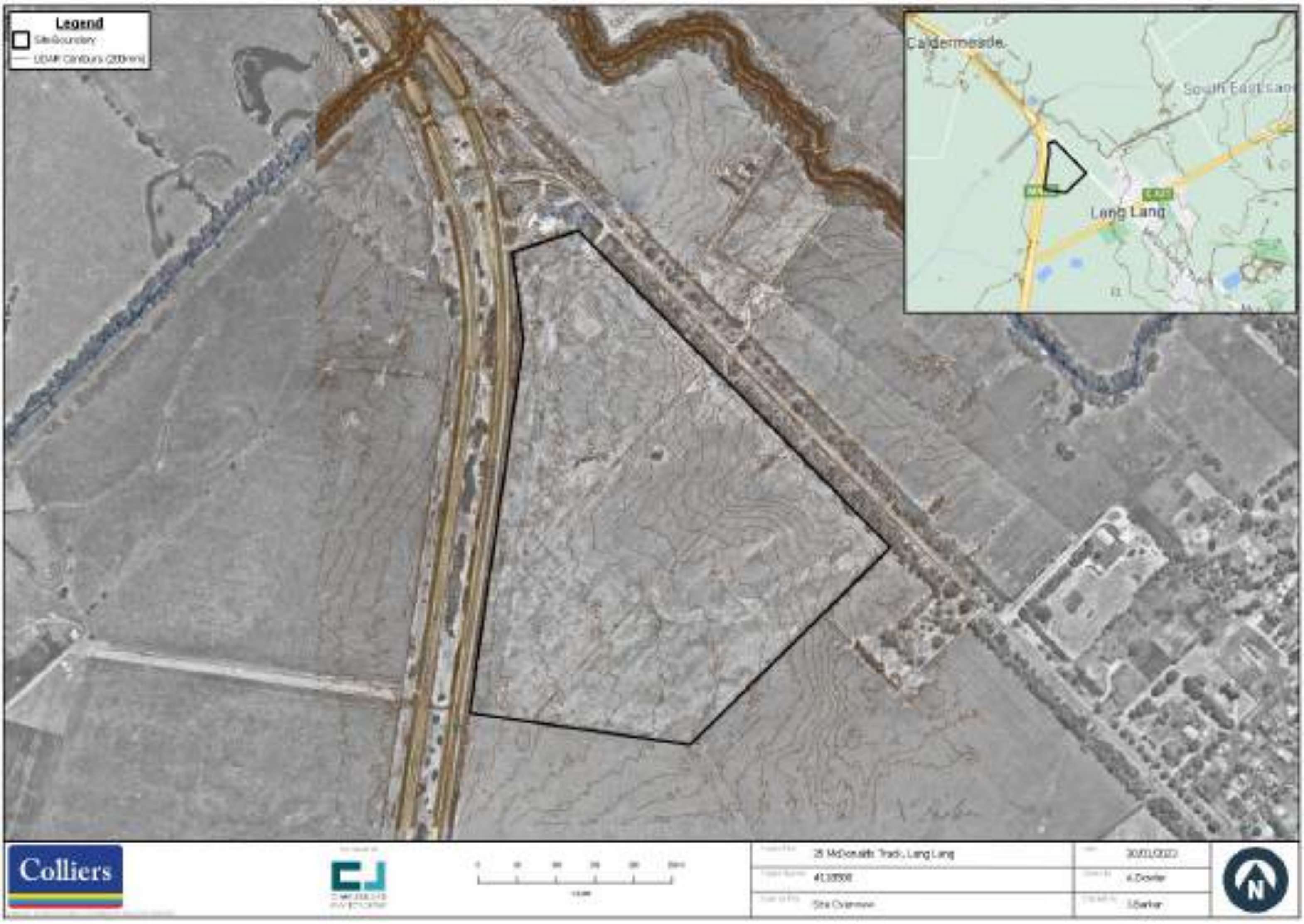


Figure 2. The Site

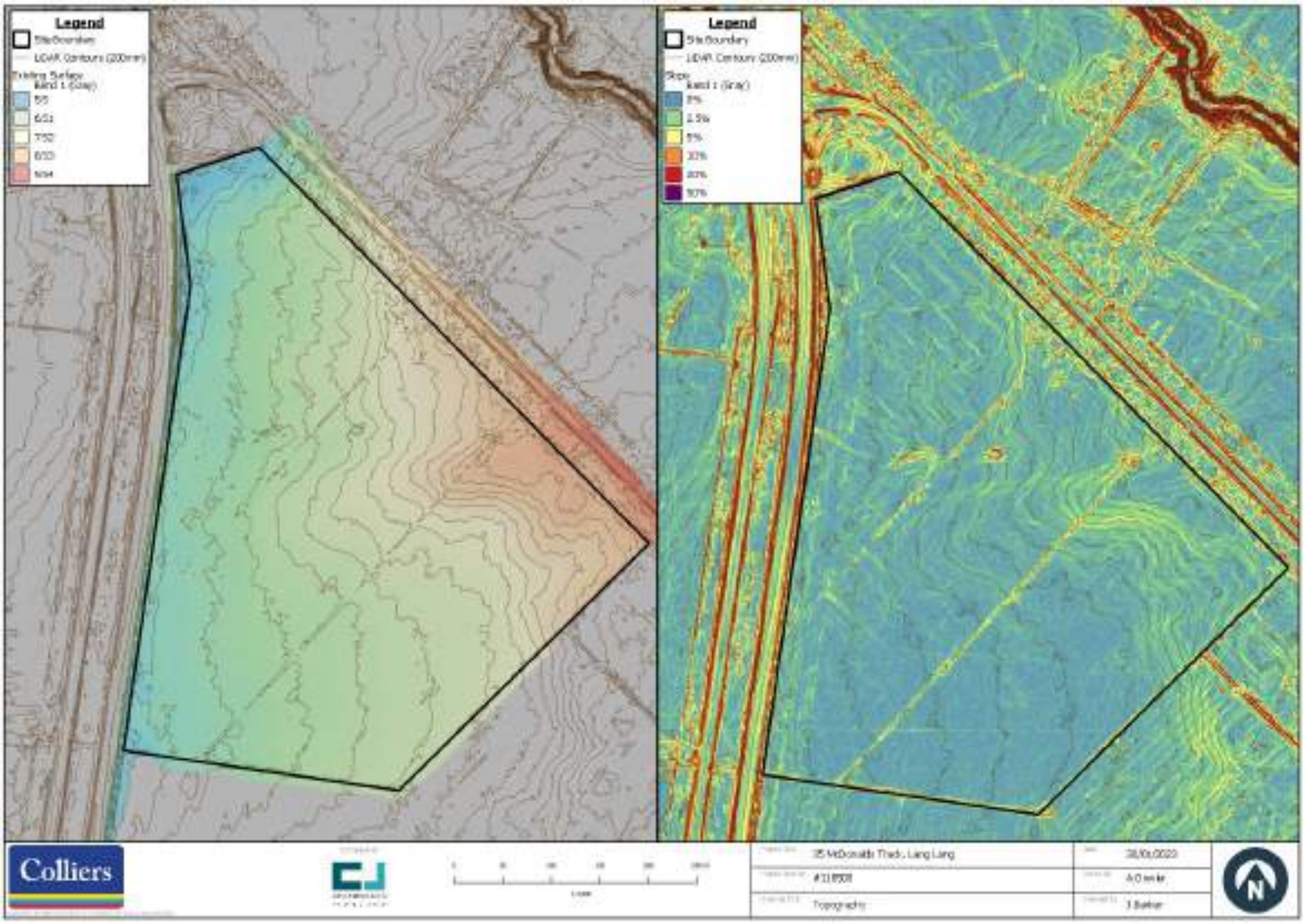


Figure 3. Topography

The Site does not reside within a Precinct Structure Plan (PSP) or a Melbourne Water Drainage Scheme.

1.2. Assumptions and Constraints

The Site is to comply with Cardinia Shire Council requirements.

Based on the current draft plan the Site will yield 79 residential allotments composed of conventional lot housing, see Figure 4.

The northern portion of the property will be subject to a future planning approval and not considered as part of this development within the strategy.

Figure 4. Proposed Development Plan

2. COUNCIL REQUIREMENTS

Cardinia Shire Council, as the responsible drainage Authority, has adopted guidelines setting out drainage design rules and conditions for developments within the municipality.

Council requires developers to consider on-site detention as an option for controlling the stormwater discharge increase that results from development.

Council permit conditions require adherence to Clause 56.07 of the Victorian Planning Provisions, which sets out stormwater management objectives that developments must meet. Developments are to achieve 'best practice' through a series of treatments to remove gross pollutants, sediment, nitrogen and phosphorus before they reach waterways.

3. SITE CHARACTERISTICS

Under existing conditions, the Site has one internal catchment falling towards the western boundary. Calculations within this report are based on the assumption that all flows will discharge to the Council designated Legal Point of Discharge (LPOD). This is now towards the north for direct discharge into Lang Lang River.

Under existing conditions, there is a 6.73 ha external catchment earmarked to be conveyed through the Site from the south east, see Figure 5.

Figure 5. Flow Direction

4. STORMWATER QUANTITY

4.1. Pre-Developed / Existing Conditions

The existing Site has a substantially cleared landscape, see Figure 6. The Site is considered highly permeable with the full catchment breakdown in Table 1. Land-use fraction imperviousness values have been based on Melbourne Water MUSIC Guidelines (2018).

Figure 6. Existing Conditions

Table 1. Pre-Developed Catchment Break-Up

Land Use	Fraction Impervious	Area (ha)
Rural	0.10	21.172
Total	0.10	21.172

Using the Kinematic Wave equation to determine the Time of Concentration (TC) for each storm event, the following pre-developed peak flow rates were determined using the Rational Method.

Table 2. Existing Peak Flow Rates

Pre-Developed Catchment Modelling						
AEP	Area Ha	Cy	Tc min	I mm/hr	∑ Ae Ha	Q m^3/s
63.20%	21.172	0.188	99.3	11.44	3.981	0.13
50%	21.172	0.200	93.0	13.49	4.230	0.16
20%	21.172	0.223	78.2	20.81	4.728	0.27
10%	21.172	0.235	71.0	26.53	4.977	0.37
5%	21.172	0.247	65.3	32.66	5.226	0.47
2%	21.172	0.270	59.4	41.32	5.723	0.66
1%	21.172	0.282	55.7	48.66	5.972	0.81

4.2. Developed Conditions

The Site is to be developed into a residential subdivision. The developed conditions Layout Plan is represented in Figure 7. This proposed development will increase the imperviousness of the Site resulting in higher (site derived) peak flow rates and stormwater pollutant loads.

Figure 7. Developed Conditions

Fraction Impervious levels for each land-use type have been determined from Melbourne Water MUSIC Guidelines (2018), with the associated land-use break-up summarized in Table 3.

The portion of the Site designated as 'Commercial*' is subject to future planning approval. It is expected that this area will have its own on-Site detention and water treatment options. Considering this, Fraction Impervious for this area is considered the same as pre-development conditions.

Table 3. Post-Developed Catchment Break-Up

Land Use	Fraction Impervious	Area (ha)
Lots (1000-1999m²)	0.40	1.952
Lots (>2000m²)	0.30	12.802
Commercial	0.10	0.549
Road Reserve	0.60	3.043
Open Space	0.10	2.067
Drainage Reserve	0.10	0.760
Total	0.32	21.172

4.3. RORB Modelling

4.3.1. Existing Conditions

The existing conditions model for the Site has been adopted by applying a sub-catchment area breakdown using fraction impervious values previously stated. In order to calibrate the model, the Kc factor has been adjusted in order to mimic pre-developed flows determined earlier.

The pre-developed model layout and parameters are highlighted below in Figure 8, Table 4, Table 5 and Table 6. Given the Site in existing conditions has a dispersed discharge along the western boundary, the flow rate has been determined through the use of dummy reaches to measure the combined flow rate.

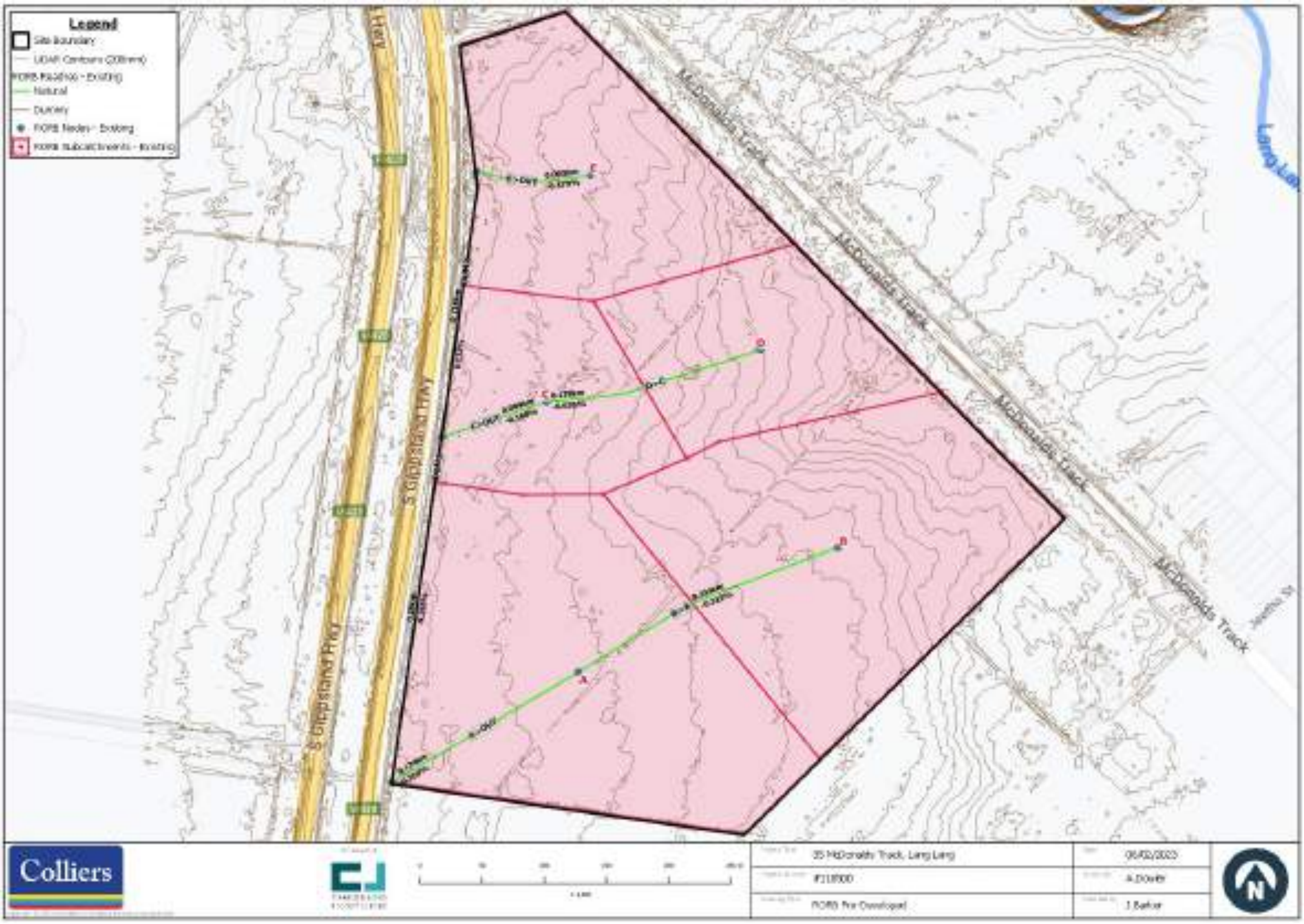


Figure 8. Pre-Developed Conditions RORB Model Configuration

Table 4. RORB Existing Conditions Details

Catchment	Area (km²)	Fraction Impervious
A	0.064145	0.10
B	0.057632	0.10
C	0.024528	0.10
D	0.026707	0.10
E	0.038729	0.10

Reach Name	Reach Type	Length (km)
A>OUT	Natural	0.174
D>C	Natural	0.178
DUM2	Dummy	0.216
B>A	Natural	0.234
DUM1	Dummy	0.28
C>OUT	Natural	0.089
E>OUT	Natural	0.093

Table 5. RORB Pre-Developed Model Parameters

Parameter	Value
Kc	1.18
m	0.80
IL	27.5mm/h
cL	3.1mm/h

Australian Rainfall and Runoff 2016 (ARR 2016) data hub provided rainfall depths, temporal patterns (10-minutes to 168-hours) and areal factors have been utilized within the model.

Table 6. ARR 2016 Data Hub Co-Ordinates

Parameter	Value
Latitude	-38.26215
Longitude	145.552386
Zone	55
Date Accessed	07/02/2019

As per ARR19 guidelines, an ensemble simulation incorporating 10 temporal patters for each duration and AEP were modelled within RORB. Kc calibration was undertaken to match the existing conditions flow outlined in Table 2. As recommended, the peak flow from the hydrograph associated with the temporal pattern closest to and above the median flow from the ensemble simulation was determined.

The 1% AEP pre-developed flow has been determined at 0.81m³/s (1.5-hour critical duration, temporal pattern 27).

4.3.2. Developed Conditions

The Site's developed conditions parameters have been adopted by applying the fraction imperviousness stated above in addition to reaches updated to reflect overland flows within the road reserves. Figure 9 highlights the RORB catchments that have been updated to include developed conditions with the full developed conditions RORB details represented in Table 7.

Catchments west of the desalination pipeline easement (I & J) have been modelled to discharge west as earthworks and pipeline construction is not permitted over the easement. Therefore, as the remainder of the Site will be in fill, these catchments will naturally discharge west. Dummy reaches have been used to establish the total post developed Site flows including flows discharging from the linear reserve, the future commercial development and the retarding basin.

Table 8 highlights model parameters utilized for developed conditions. Kc calibration has been adjusted to reflect the following relationship.

$$PreDev\frac{Kc}{Dav} = PostDev\frac{Kc}{Dav}$$

Figure 9. Developed Conditions RORB Model Configuration

Table 7. RORB Developed Conditions Details

Catchment	Area (km²)	Total Fraction Impervious	Directly Connected FI	Indirectly Connected FI
A	0.0313	0.31	0.18	0.12
B	0.0183	0.40	0.24	0.16
C	0.0274	0.39	0.23	0.16
D	0.0179	0.33	0.20	0.13
E	0.0259	0.32	0.19	0.13
F	0.0326	0.34	0.21	0.14
G	0.0199	0.36	0.21	0.14
H	0.0174	0.32	0.19	0.13
I	0.0157	0.10	0.06	0.04
J	0.0055	0.10	0.06	0.04

Reach Name	Reach Type	Length (km)	Slope (%)
E>D	3. Lined channel or pipe	0.143	0.167
D>C	3. Lined channel or pipe	0.166	0.167
G>JUN A	3. Lined channel or pipe	0.136	0.167
JUN B>A	3. Lined channel or pipe	0.126	0.167
RB>OUT	4. Drowned	0.102	0.167
H>JUN B	3. Lined channel or pipe	0.190	0.167
J>OUT	1. Natural	0.045	0.167
I>OUT	1. Natural	0.018	0.167
A>RB	3. Lined channel or pipe	0.068	0.167
B>JUN B	3. Lined channel or pipe	0.055	0.167
F>E	3. Lined channel or pipe	0.202	0.167
C>JUN A	3. Lined channel or pipe	0.098	0.167
JUN A>B	3. Lined channel or pipe	0.086	0.167
DUM 1	5. Dummy	0.296	0.167
DUM 2	5. Dummy	0.127	0.167

Table 8. RORB Post-Developed Model Parameters

Parameter	Value
Kc	2.90
m	0.80
IL	16.5mm/h
cL	2mm/h

The 1% AEP developed flow has been determined at <u>1.33m³/s</u> (2-hour duration, temporal pattern 25). This is an increase of 0.52m³/s from the pre-developed conditions.

4.3.3. On Site Detention

In order to reduce developed conditions flows back to levels of pre-developed conditions, lot-scale rainwater tanks and a retarding basin are proposed to be constructed.

Rainwater tanks (3kL) are to be installed on each residential lot (82 in total). Half of the storage volume will be considered as on-site detention. In order to represent the effectiveness of the distributed storages within the RORB model, a reduction in fraction imperviousness (FI) for the connected residential lots has been included. For lots greater than 2000m² FI has been reduced from 0.4 to 0.3 and for lots between 1000m²-1999m² FI has been reduced from 0.5 to 0.4. Rainwater tanks will be stipulated under Section 173 Agreements.

Through the end of line retarding basin, 1% AEP developed flows were restricted to that of below pre-developed conditions. Table 9 highlights the volumes required to detain flows with full calculations highlighted in Appendix C.

Table 9. Detention Basin Parameters

Restricted Outflows	0.52m³/s
Peak Inflows	1.12m³/s
Freeboard (FB)	300mm
Storage Volume (inc. FB)	5600m³
Approx. Area Required	6400m²
Basin Depth to Invert (ex WL EDD)	1.0m
Pipe Outlet	2x 450mm @ 0.4%

The retarding basin will be constructed in the area designated as drainage reserve near the legal point of discharge (north-west corner of the site). Advice from the desalination pipe authority places restrictions on works in the area, thereby not allowing any cut or fill in the area designated as desalination reserve.

It is proposed that the Site be lifted 300mm above the 1% AEP flood level external to the Site. The basin will be constructed below this level (6.6m AHD) to allow for overland flows from the road network to enter the basin.

Calculations for the outlet arrangement of the proposed retarding basin are highlighted in Table 10. This height/storage/discharge relationship was modelled within RORB. Outflows from the basin will be restricted using a controlled outlet. The maximum outflows are restricted to that of below pre-developed conditions (0.52m³/s) at the freeboard elevation (6.3m AHD).

Table 10. Retarding Basin Height/Storage/Discharge Relationship

Height (m AHD)	Storage (m³)	Height (m AHD)	Storage (m³)
5.6	0	6.15	3242
5.65	291	6.2	3516
5.7	600	6.25	3788
5.75	904	6.3	4056
5.8	1206	6.35	4320
5.85	1504	6.4	4582
5.9	1799	6.45	4840
5.95	2090	6.5	5096
6	2378	6.55	5348
6.05	2662	6.6	5597
6.1	2964		

The inclusion of the proposed retarding basin results in the 1% AEP developed flow being throttled back to below pre-development levels of 0.52m³/s (4.5-hour duration, temporal pattern 22). Figure 10 highlights the hydrograph of the basin, direct catchments (H & I) combining in the total outflows from the Site.

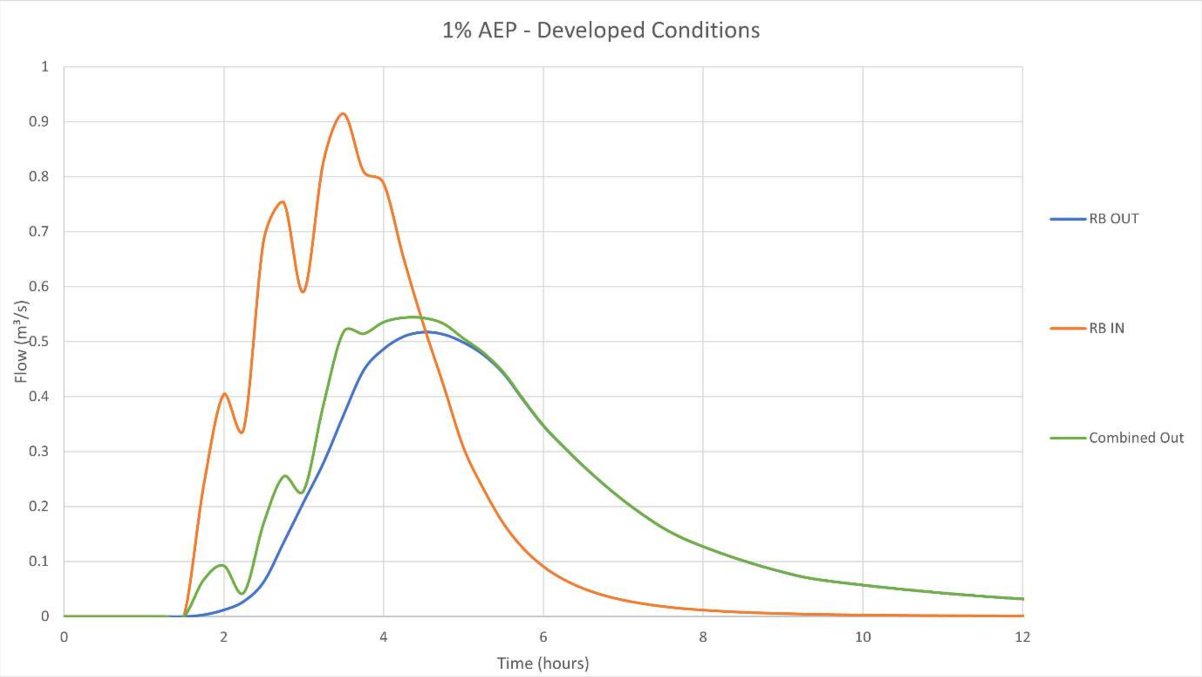


Figure 10. Retarding Basin 1% AEP Hydrograph

This peak discharge from the basin occurs at an elevation of 6.3m AHD which allows for 300mm of freeboard within the structure. The storage required to retard these flows is 4030m³ (5600m³ including freeboard). The outlet structure will consist of an equivalent orifice diameter of 2x450mm at the top of the wetland EDD (5.6mAHD).

4.4. Approved Point of Discharge

Correspondence from Council indicates that there is no underground drainage in the area. A dedicated drainage outfall will need to be constructed external to the Site, ultimately connecting to the Lang Lang River.

A retarding basin will be included at the north west corner of the Site to control outflows to below pre-developed levels before outfall to McDonalds Track. Figure 11 highlights the location of the Site's point of discharge and outfall.

The drainage outfall into Lang Lang River will be to the satisfaction of Melbourne Water and as per Melbourne Water's Standard Drawing 7251/08/103. Details of the outfall will be confirmed at Detailed Design.

Figure 11. Site Legal Point of Discharge and Drainage outfall

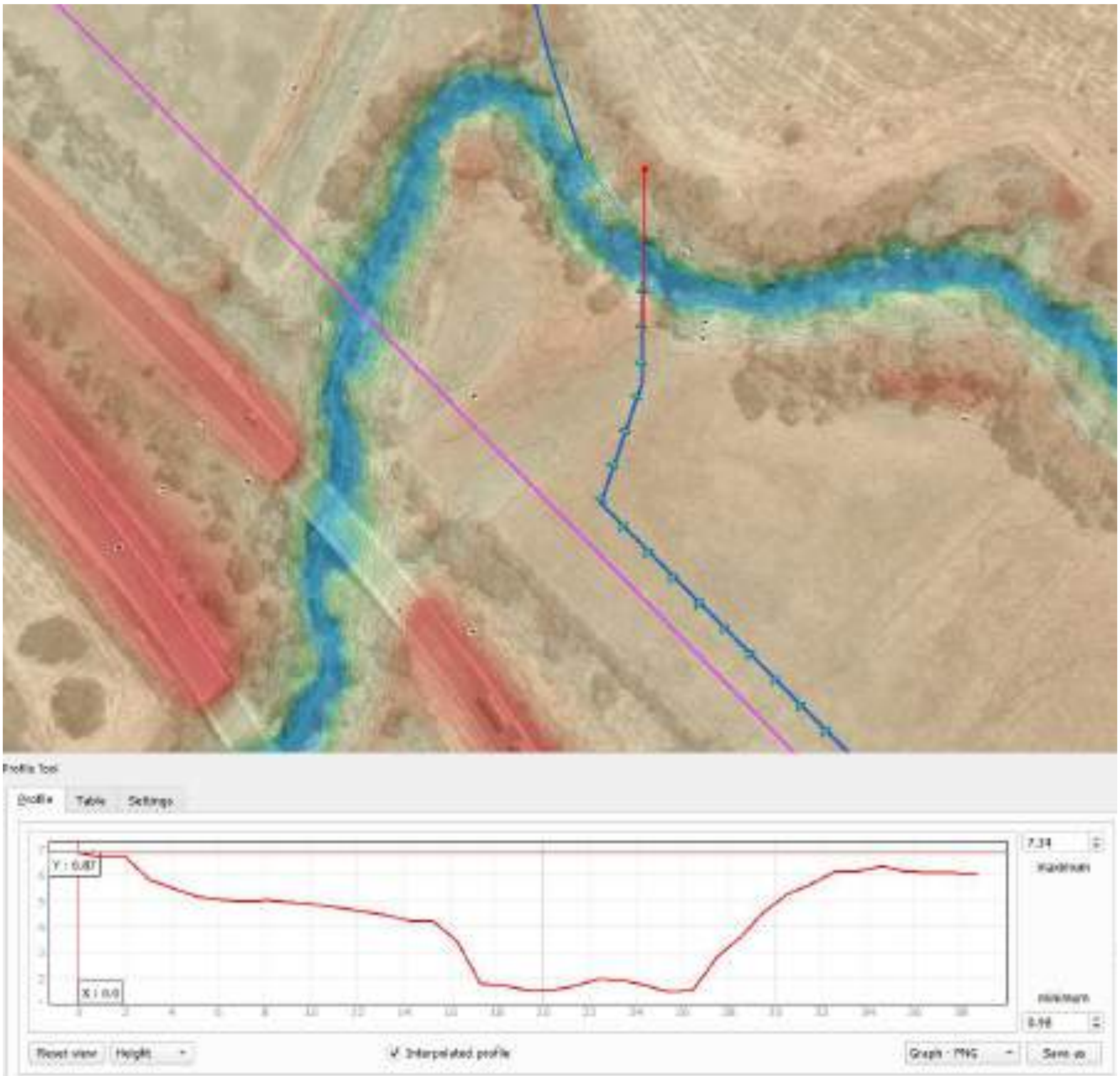


Figure 12. Drainage Outfall Surface

4.5. Minor Flows

Internal underground drainage will be designed in accordance with Council standards, which is to capture and convey up to and including the 20% AEP storm event plus any gap flow up to the 1% AEP event if it is unsafe to convey this along the road network. If there is insufficient road capacity to convey overland flows, underground drainage may be upsized to convey larger storm events and meet freeboard requirements.

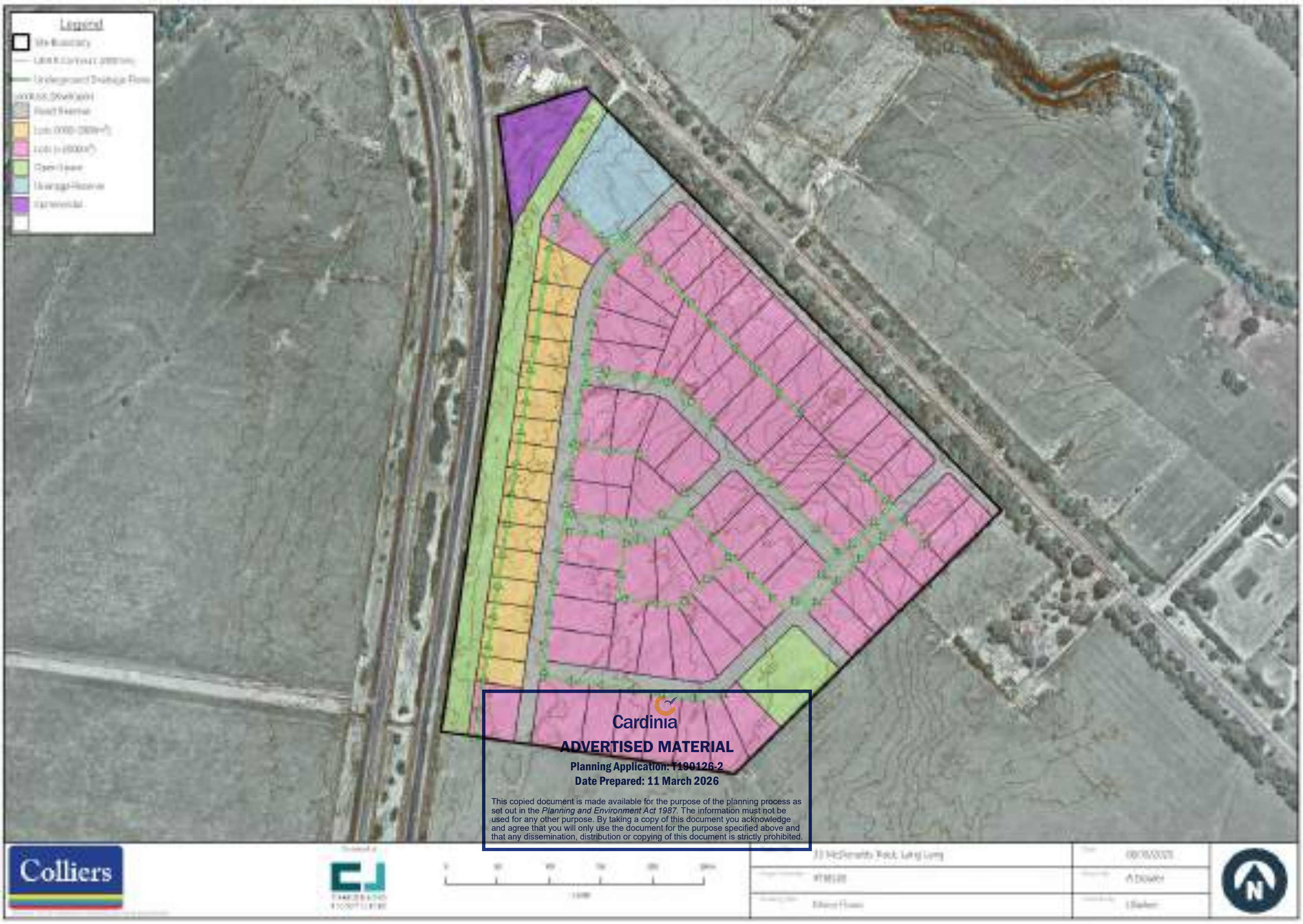


Figure 13. Minor Flows

4.6. Overland Flows

Flows greater than the 20% AEP and up to and including the 1% AEP design event are to be conveyed through the Site utilising the road network as urbanised floodways. The road reserves will be designed in order to convey these flows whilst ensuring DEWLP's floodway safety criteria (Dmax ≤ 0.3m, Vmax ≤ 2.0m/s and VDmax ≤ 0.3m^2/s). Figure 14 highlights the proposed overland flows that will impact on the Site.

PC Convey at the critical location was completed in order to determine the road reserve capacity. Figure 14 highlights the critical overland flow section and contributing catchment. Table 11 summarizes the overland flow calculations undertaken.

Roads with insufficient capacity will have larger flows conveyed through the underground drainage network. Figure 15 shows sufficient freeboard for the Site's critical section with a reduced gap flow. Current modelling indicates the Site will require pipes capable of conveying the 5% AEP storm event to be able to retain sufficient freeboard at the critical section. Full pipe sizing will be confirmed at the detailed design stage.

Figure 14. Overland Flows

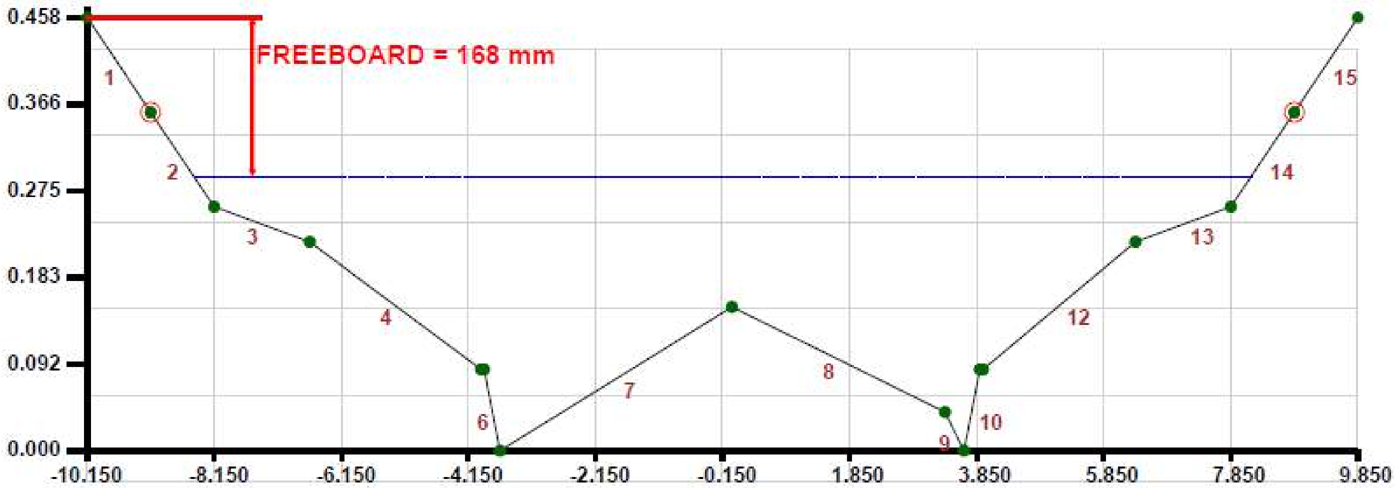
Table 11. Overland Flow Calculation

Catchment	Area (Ha)	Tc (mins)	C1%	I1% (mm/hr)	Q1% (m^3/s)	C5%	I5% (mm/hr)	Q5% (m^3/s)	$Q_{overland}$ (m3/s)
A	18.701	12.9	0.511	117.49	3.12	0.447	84.57	1.97	1.16

Figure 15 highlights that the water surface elevation within the critical section of the Site provides sufficient freeboard. The remaining freeboard requirements will be made up within 2m into the property setback (see Figure 15). Additional modelling of all road reserves within the development will be completed as part of the detailed design in order to satisfy this condition.

PROJECT: McDonalds Track Lang lang (16m Road Reserve)_v3
Print-out date: 03/02/2023 - Time: 10:54
Data File: McDonalds Track Lang lang (16m Road Reserve)_v3.dat

1. CROSS-SECTION



2. DISCHARGE INFORMATION

5% AEP storm event
Design discharge after construction of retarding basin

Required overland / channel / watercourse discharge = 1.16 cumecs

3. RESULTS Water surface elevation = 0.290 m

High Flow Channel grade = 1 in 600, Main Channel / Low Flow Channel grade = 1 in 600.

	LEFT OVERBANK	MAIN CHANNEL	RIGHT OVERBANK	TOTAL CROSS-SECTION
Discharge (cumecs):	0.000	1.216	0.000	1.216
D(Max) = Max. Depth (m):	0.000	0.290	0.000	0.290
D(Ave) = Ave. Depth (m):	0.000	0.151	0.000	0.151
V = Ave. Velocity (m/s):	0.000	0.484	0.000	0.484
D(Max) x V (cumecs/m):	0.000	0.140	0.000	0.140
D(Ave) x V (cumecs/m):	0.000	0.073	0.000	0.073
Froude Number:	0.000	0.398	0.000	0.398
Area (m^2):	0.000	2.512	0.000	2.512
Wetted Perimeter (m):	0.000	16.688	0.000	16.688
Flow Width (m):	0.000	16.640	0.000	16.640
Hydraulic Radius (m):	0.000	0.151	0.000	0.151
Composite Manning's n:	0.000	0.024	0.000	0.024
Split Flow?	-	-	-	No

Figure 15. Critical Section PC Convey Calculation

4.7. Existing flooding

Pre-development advice from Melbourne Water stipulates that there is currently flooding which affects the Site. The 1% AEP flood height is 6.80mAHD, see below.

All lots will be filled to a minimum of 300mm above the 1% AEP flood height. The building envelopes within each lot will be filled to a minimum of 600mm above the 1% AEP flood height.

All flows that cannot be safely conveyed via underground drainage up to and including the major of 1% AEP will be conveyed across the Site within the road network. The road reserves will be designed in order to convey these flows in addition to abiding by DELWP floodway safety criteria (Vav.dav ≤ 0.35 m^2/s, and dav ≤ 0.30m).

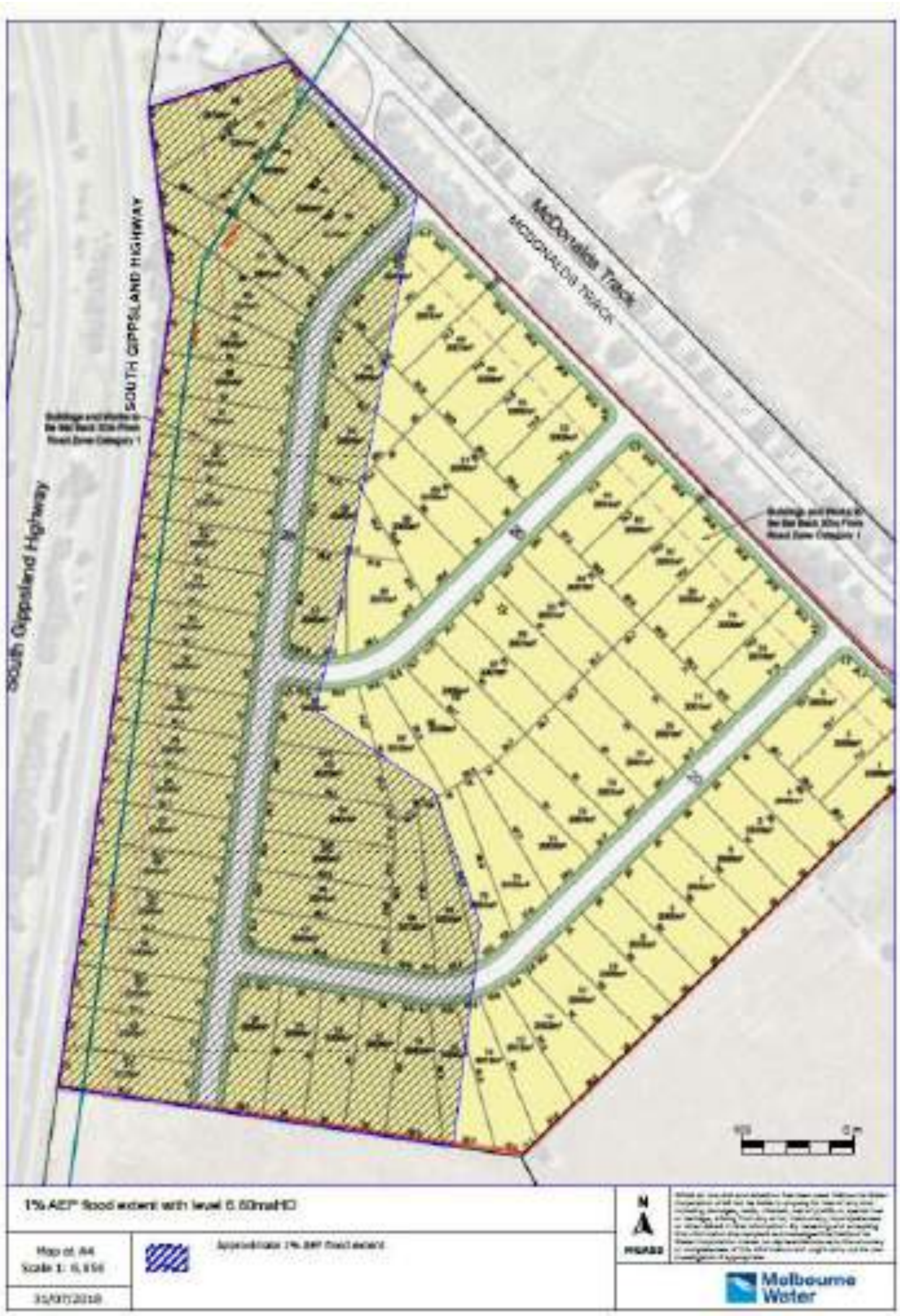


Figure 16. Flood Mapping – 1% AEP Extent

4.7.1. Flood Impact Assessment (Water Technology)

Following the previous SWMS versions, Melbourne Water and DEECA required a flood impact assessment be undertaken to ensure no impact to the surrounding area, notably the Desalination Pipeline Easement due to development of the site. This detailed study was undertaken by Water Technology, refer Appendix D, and has been accepted by Melbourne Water. No filling is permitted within the Melbourne Water Desalination Pipeline Reserve including 5m offset, refer Figure 17.

Figure 17. Desalination Fill Offset Requirements

5. STORMWATER QUALITY

To satisfy the environmental values expected, a series of treatments throughout the Site are proposed. It is expected that these assets would be designed to ensure they satisfy best practice targets set out in the Best Practice Environmental Management Guidelines (BPEMG), which are:

- 45% reduction in Total Nitrogen (TN) from typical urban loads;
- 45% reduction in Total Phosphorus (TP) from typical urban loads;
- 80% reduction in Total Suspended Solids (TSS) from typical urban loads; and
- 70% reduction in Litter from typical urban loads.

In order to determine the required levels of water quality treatment for the Site, a MUSIC model was created. Using Melbourne Water's *MUSIC Guidelines (2024)*, the Site falls within the "Dandenong" Rainfall distribution as shown in Figure 18.

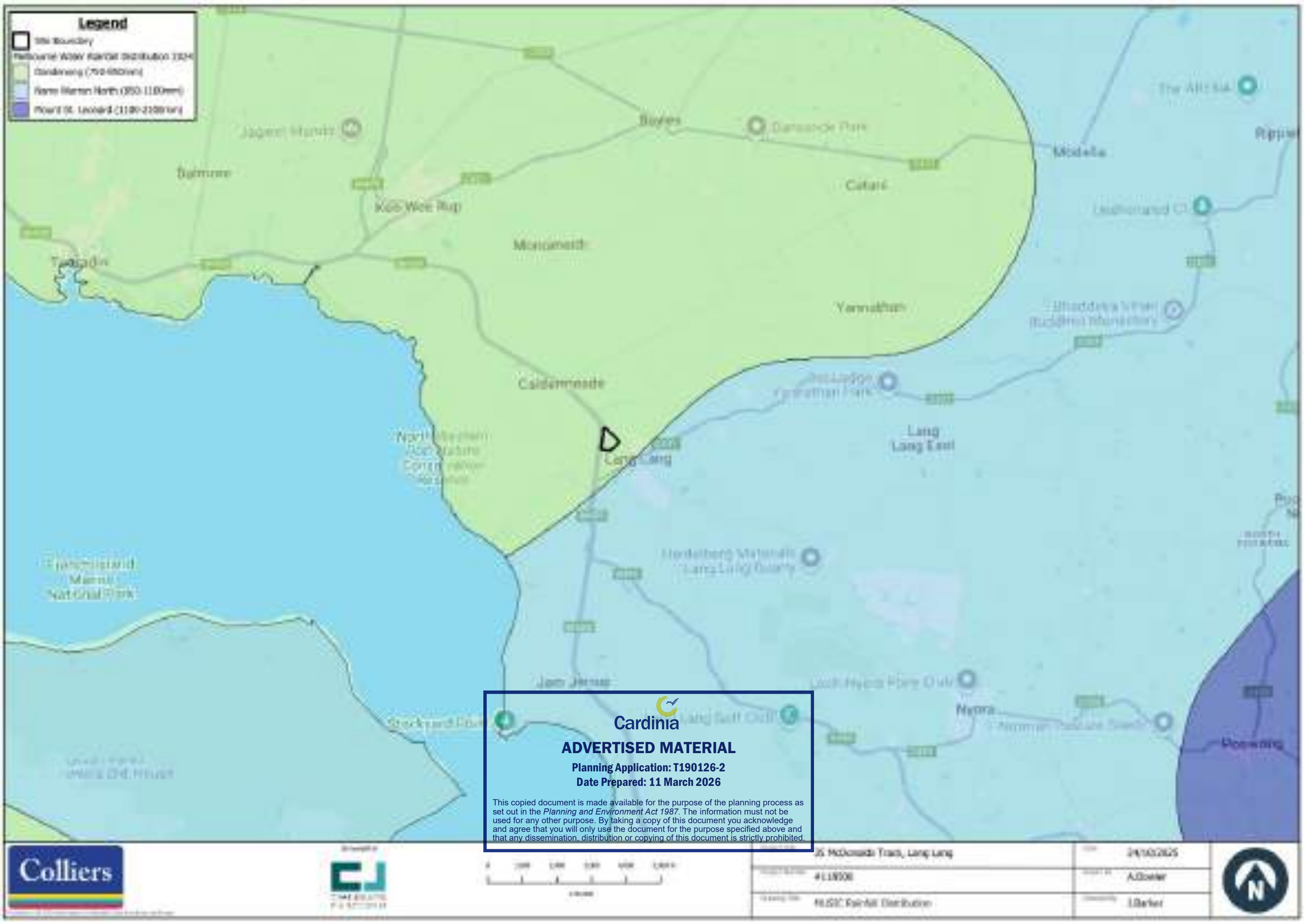


Figure 18. Melbourne Water's MUSIC Guideline Rainfall Distribution Definition for The Site

Table 12. MUSIC Model Parameters

Rainfall Parameters		Runoff Parameters	
Rainfall Station	086224 - Dandenong	Soil Storage Capacity	120mm
Date	1967 - 1976	Initial Storage	25mm
Time Step	6 Minutes	Field Capacity	50mm

The Site has been broken down in various catchments in order to represent the various land-uses, as represented in Table 14. Pollutant concentration data has been adjusted in accordance with MUSIC Guidelines (2018), see Table 13.

The area designated as Commercial has been excluded from the model. This area will form part of a future commercial development which will require independent stormwater quality measures, enforced under a separate planning permit. Area designated as Open Space over the Desalination pipeline is expected to flow west towards South Gippsland Hwy and has also been excluded from this model.

Table 13. Pollutant Concentration Data

Pollutant	Surface Type	Storm Flow		Base Flow	
		Mean (log mg/L)	SD (log mg/L)	Mean (log mg/L)	SD (log mg/L)
SS	Roof	1.301	0.333	n/a	n/a
	Road & Paved	2.431	0.333	n/a	n/a
	Non-Roof & Paved	1.900	0.333	0.960	0.401
TP	Roof	-0.866	0.242	n/a	n/a
	Road & Paved	-0.301	0.242	n/a	n/a
	Non-Roof & Paved	-0.700	0.242	-0.731	0.360
TN	Roof	0.301	0.205	n/a	n/a
	Road & Paved	0.342	0.205	n/a	n/a
	Non-Roof & Paved	0.243	0.182	0.455	0.363

Table 14. MUSIC Model Catchment Details

Land Use	Fraction Impervious	Area (ha)
Lots [Roof to Tanks]	1.00	2.264
Lots [Remaining]	0.19	12.489
Road Reserve	0.60	3.043
Open Space	0.10	2.067
Drainage Reserve	0.10	0.760

Water quality objectives will be achieved on Site using an integrated approach to stormwater management, incorporating a variety of naturalistic and water saving measures. Rainwater tanks are to be utilised on all lots. End of line treatment to achieve Best Practice will consist of a wetland system.

Water Appliance Stock Survey and Usage Pattern Melbourne (Smart Water Fund, 2013) provides guidance on average Melbourne household potable water consumption. Figure 19 highlights the strong linear correlation between the number of people within a household and the daily water consumption.

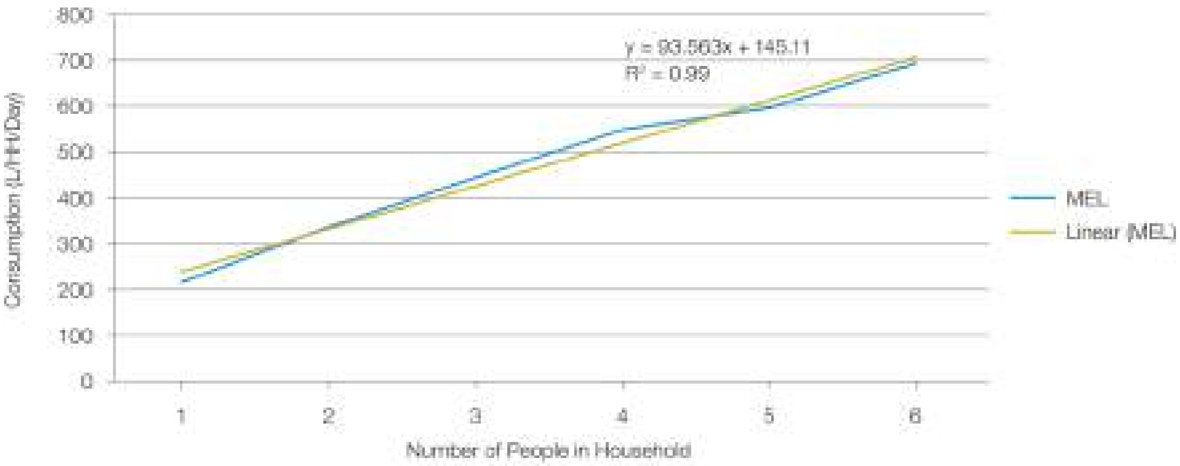


Figure 19. Average Household Water Consumption

Australian Bureau of Statistics (2021) highlights that the average people per household for Lang Lang is 2.7. The water retailer for Lang Lang is South East Water Corporation, Figure 20 highlights the relevant end user usage of water.

Table 15. Development Site Potable Water Parameters

Parameter	Value
Project Location	Lang Lang
Water Retailer	South East Water Corporation
Residents per Household	2.7
Residential Lots	198
Consumption (L/Household/day)	398

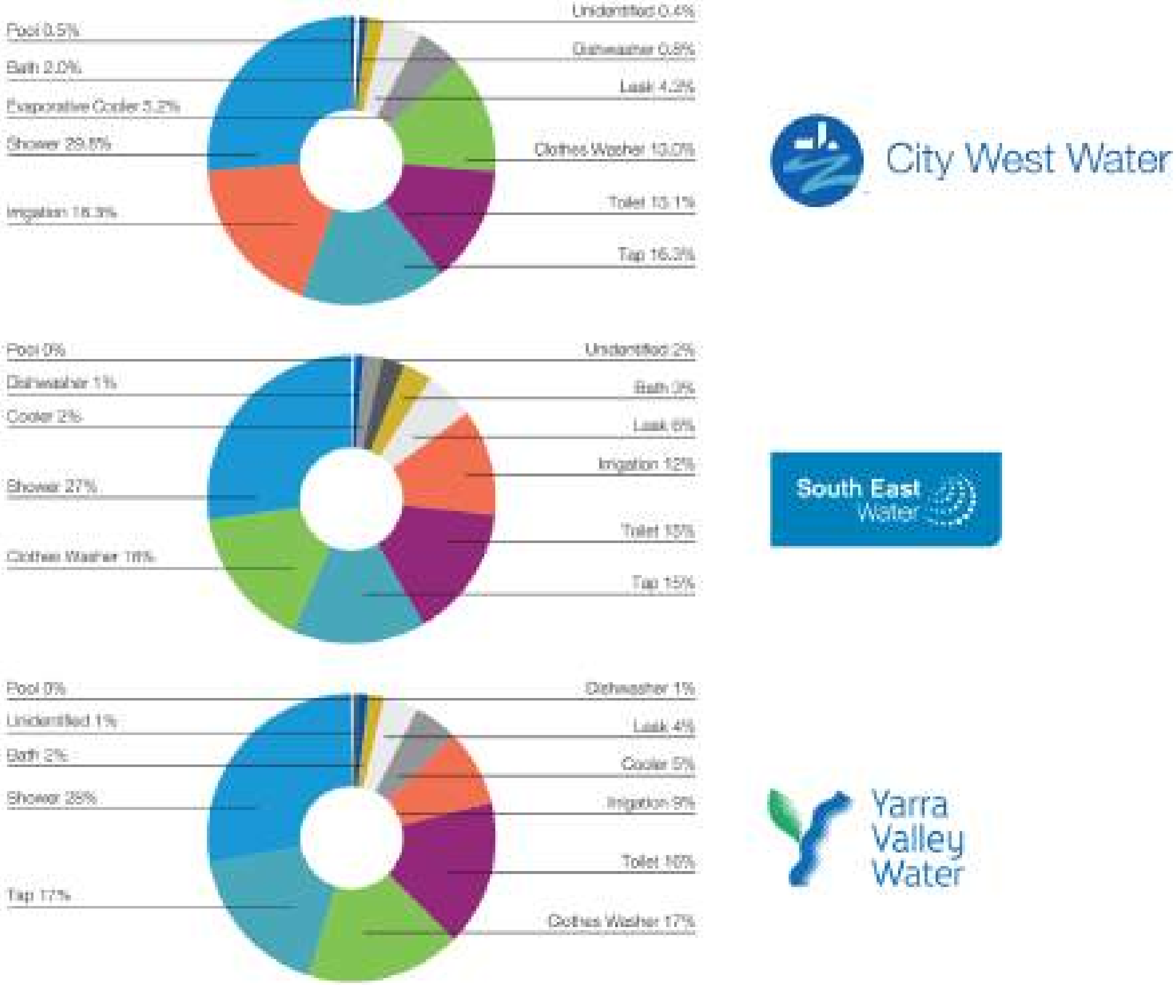


Figure 20. Residential End Use Demand Breakdown for Each Retailer

Melbourne Residential Water End Users Study (Smart Water Fund, 2013) highlights the usage patterns for potable water for each water retailer surrounding Melbourne, represented in Figure 20.

It is assumed the tanks will be connected to toilets for flushing and outdoor use. The following table outlines the maximum possible impact of the tanks from a high-level analysis:

Table 16. Re-Use Water Demand

Usage	Household Usage (L/day)	Site Usage (kL/day)	Site Usage (ML/yr)
Shower	0	0.000	0.000
Irrigation	48	4.080	1.489
Taps	0	0.000	0.000
Toilet	60	4.578	1.671
Clothes Washer	0	0.000	0.000
Cooler	0	0.000	0.000
Leak	0	0.000	0.000
Bath	0	0.000	0.000
Dishwasher	0	0.000	0.000
Unidentified	0	0.000	0.000
Pool	0	0.000	0.000
Total	108	8.658	3.160

The MUSIC model configuration for the Site can be seen in Figure 21. The full development was modelled in MUSIC to ensure Best Practice is being achieved where the model configuration and overall performance of the system is shown in Figure 23. The treatment properties of the wetland are represented in Figure 22.

Figure 21. MUSIC Model Configuration

Using the treatment train highlighted below, the stormwater quality objectives for the Site have been achieved. Provision for the future commercial area treatment will need to be considered within its future permit application.

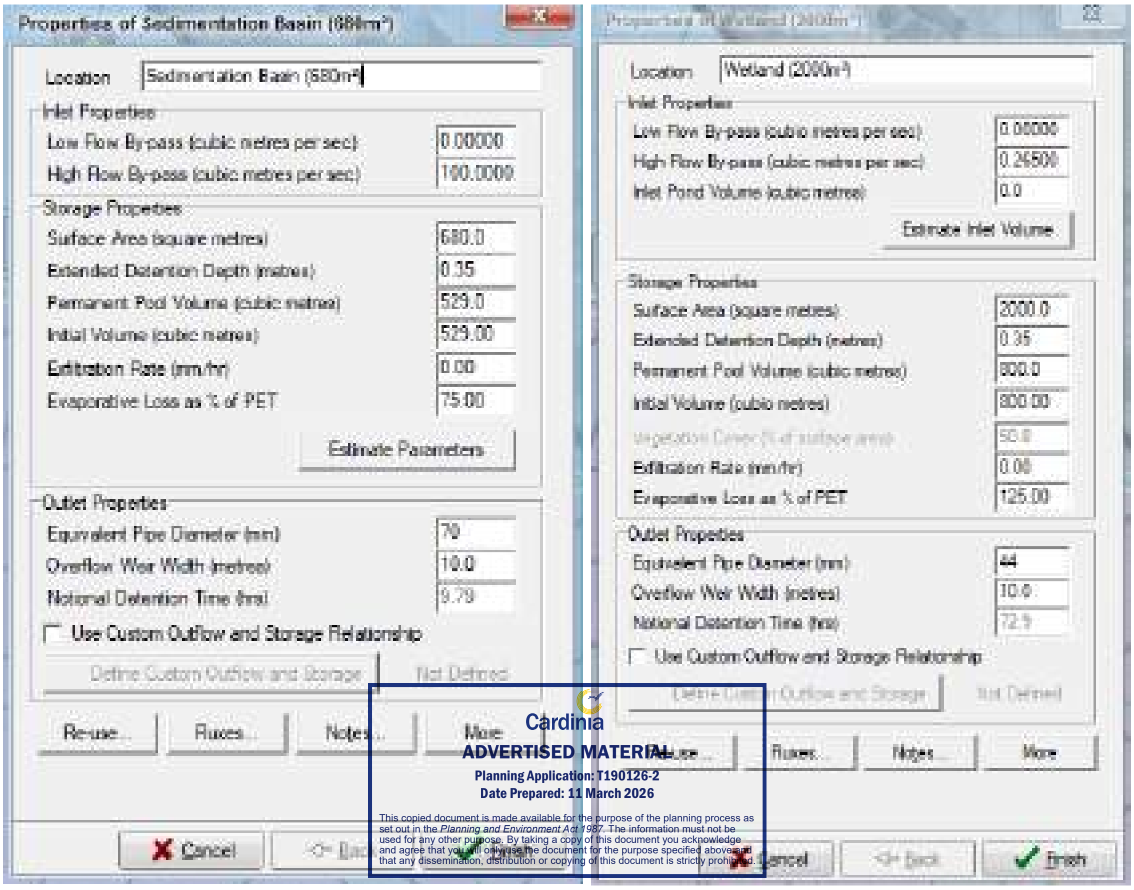


Figure 22. MUSIC Model Treatment Train Attributes

Using the treatment train highlighted above, the stormwater quality objectives for the Site have been achieved. Provision for the future commercial area will need to be considered under its future planning permit via on-site treatment.

Treatment Train Effectiveness - EPod

	Sources	Residual Load	% Reduction
Flow (ML/yr)	66.8	60.8	8.9
Total Suspended Solids (kg/yr)	5090	1010	80.1
Total Phosphorus (kg/yr)	17	5.78	65.9
Total Nitrogen (kg/yr)	184	87.4	52.4
Gross Pollutants (kg/yr)	1960	0	100

Figure 23. MUSIC Model Treatment Train Effectiveness

The drainage reserve area which encompasses the wetland retarding basin and drainage outfall will be owned and maintained by Council.

Figure 24. Water Quality Concept

Table 17. Sedimentation Basin Parameters

Particle Size Target	125µm
Particle Settling Velocity	0.011m/s
Capture Rate	98%
Basin Surface Area	680m²
Extended Detention Depth	0.35m
Permanent Pool Depth	1.50m
Turbulence Parameter	1.12
Clean Out Frequency	5-year
Sediment Loading	1.6m³/ha/yr
Gross Pollutant Loading	0.4m³/ha/yr
Sediment Storage Volume Required	208m³
Dry Out Area Required (500mm depth)	414m²

Table 18. Wetland Parameters

Surface Area	2000m²
Design Flow	0.265m³/s (3-month)
Extended Detention Depth	0.35m
Notational Detention Time	72hrs

6. SUMMARY

Colliers Engineering & Design (formerly PEAKURBAN and LD Eng) was engaged to undertake an Stormwater Management Strategy for 35 McDonalds Track, Lang Lang, VIC, 3984, Australia, ensuring that the estate adheres to the expectations of Cardinia Shire Council and other regulatory guidelines from a more holistic perspective.

This latest version builds upon the extensive Flood Impact Assessment works undertaken by Water Technology to address Melbourne Water and DEECA flood impact requirements for the adjacent Desalination Pipeline easement.

The Site has a total area of 21.17ha with a cleared landscape and is currently being used as farmland consisting of a single large paddock. In existing conditions, the Site Falls towards the western boundary with a minor ridge running east to west. The Site is to be developed into 79 residential lots with the inclusion a park, future commercial and a drainage reserve.

The Site is located within the Cardinia Shire Council municipal boundary and does not fall within a Melbourne Water DS.

The Site will discharge towards the north west at the Legal Point of Discharge via a dedicated free draining outlet. Prior to discharge, flows will enter a wetland retarding basin to treat and control flows.

To restrict post-developed flows to that of pre-developed conditions, a retarding basin with a storage volume of 5600m^3 (including freeboard) is proposed to be constructed at the north-west corner of the Site in the area designated as drainage reserve. Rainwater tanks (3kL) will be required to be constructed on each residential lot, required under a Section 173 Agreement for detention and water re-use purposes.

The Site currently falls within the extent of the 1% AEP flooding for the area. The 1% AEP flood height is 6.80mAHD. All lots will be filled to a minimum of 300mm above the 1% AEP flood height. The building envelopes within each lot will be filled to a minimum of 600mm above the 1% AEP flood height. The Water Technology flood impact assessment confirmed no impacts to the Desalination Pipeline reserve which has been accepted by Melbourne Water.

The minor drainage system will be designed to convey the 20% AEP event safely below ground. Underground drainage pipes will be upsized where required to ensure sufficient freeboard requirements are being met. Flows from storm events exceeding the 20% AEP event, and up to the 1% AEP storm event will flow overland within the proposed road networks with upsized underground drainage pipes to be used when there is insufficient capacity.

Water quality requirements for the Site are achieved through a combination of rainwater tanks and sediment basin and wetland. The future commercial lot will require independent water quality measures to be undertaken.

Figure 25. SWMS Concept

Cardinia
ADVERTISED MATERIAL
Planning Application: T190126-2
Date Prepared: 11 March 2026

7. RFI Response

Melbourne Water RFI Response

Comments Received: 6.11.25 (MWA-1310214)

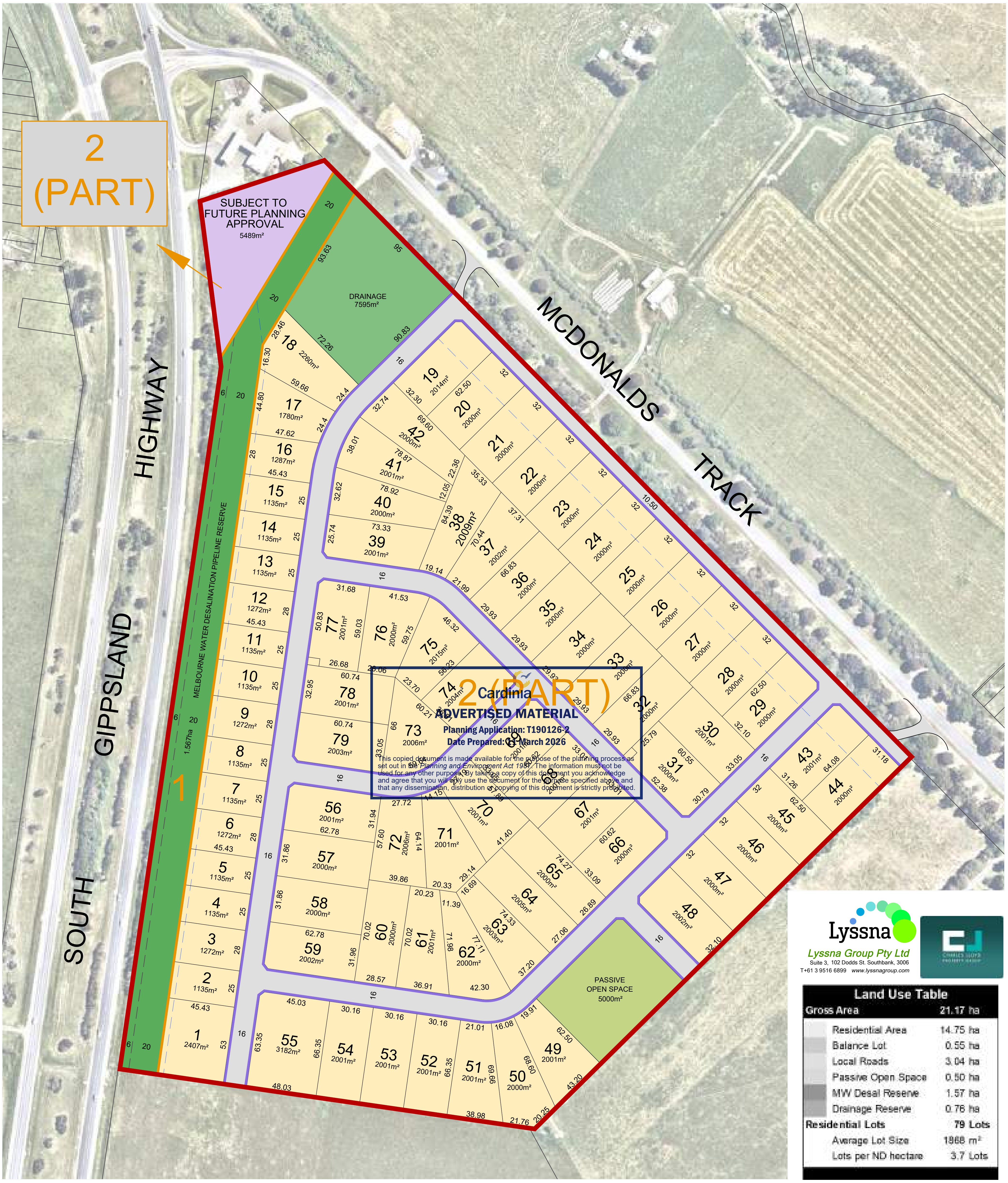
#	Summarized Melbourne Water RFI and Colliers Response
1	Update reference on page 15 to remove mention of Melbourne Water standards for internal underground drainage. Updated
2	Update reference on page 19 to use DELWP Guidelines for floodway safety criteria instead of Melbourne Water's criteria. Updated
3	Report does not clearly demonstrate compliance with condition 26(d)(iii), (iv), and (v) of the planning permit. Refer Water Technology Assessment (Appendix D): Approved by Melbourne Water
4	Condition 26(d)(iii): Demonstrate safe conveyance of 1% AEP flood flows through roadways/easements/reserves, especially at interface with VDP reserve. Refer Water Technology Assessment (Appendix D): Approved by Melbourne Water
5	Condition 26(d)(iv): Show conveyance of external catchment flows through site without detrimental impact on other properties; requires hydraulic modelling. Refer Water Technology Assessment (Appendix D): Approved by Melbourne Water
6	Condition 26(d)(v): Demonstrate stormwater connections/outfalls meet authority standards; address outlet to Lang Lang River with: • Detailed drawing per Melbourne Water standard 7251/08/103 Updated, refer Section 4.4 • Survey plan and cross-section LiDAR of outfall location provided, refer Figure 12 • Geomorphological study and erosion risk assessment Streamology assessment added, refer Appendix E • Relevant technical reports (heritage, flora/fauna, geotechnical). CHMP and Flora/Fauna reports attached in submission
7	Report unclear on compliance with condition 35(b), (c), and (d) of the planning permit. Refer Water Technology Assessment (Appendix D): Approved by Melbourne Water Wetland will be clay lined, therefore no increase in groundwater. Refer Water Technology Assessment (Appendix D): Approved by Melbourne Water
8	No details provided for proposed retarding basin, including its form and position relative to VDP reserve. Retarding basin is highlighted within drainage reserve adjacent to but not impacting the VDP reserve. See Figure 24 and Appendix A.
9	Cross section between proposed fill and VDP reserve does not meet condition 35(f); batter must be set back at least 2.4 m from reserve. Refer Water Tech Table 6-2 highlighting this is met. Updated Level Range Plan (Figure 17) to address, refer Appendix F. 5m offset to VDP reserve provided.

8. REFERENCES

- Australian Bureau of Statistics (2021), *Census 2021 Data by Geography*, http://www.abs.gov.au/websitedbs/D3310114.nsf/Home/census, last updated Jan 2022
- *Australian Rainfall and Runoff 2016*
- Melbourne Water (2018), MUSIC Guidelines: *Recommended Input Parameters and Modelling Approaches for MUSIC Users*
- Victorian Stormwater Committee (1999), *Urban Stormwater Best Practice Environmental Management Guidelines*
- Growth Areas Authority (2011), *Engineering Design and Construction Manual for Subdivision in Growth Areas*
- Melbourne Water (2013), Waterway Corridors – *Guidelines for greenfield development areas within Port Phillip and Westernport Region*
- DEWLP (2019), *Guidelines for Development in Flood Affected Areas*

APPENDICES

Appendix A Development Plan



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Land Use Table

Gross Area	21.17 ha
Residential Area	14.75 ha
Balance Lot	0.55 ha
Local Roads	3.04 ha
Passive Open Space	0.50 ha
MW Desal Reserve	1.57 ha
Drainage Reserve	0.76 ha
Residential Lots	**79 Lots**
Average Lot Size	1868 m²
Lots per ND hectare	3.7 Lots

NOTE: Site is in a low residential zone. Minimum lot area is 0.2ha (excepting for lots 1-18 which excise land required for a utility instillation). Buildings must have a front setback of 10m and a side setback of 5m and no front fences.

NOTE: Retention of vegetation in the McDonalds Track Road Reservation will be carried out where practical and as demonstrated by a suitable qualified person.

NOTE: All future road connections are to be vested to council.

NOTE: MW Desal Reserve shown is to be vested to Melbourne Water.

LEGEND

- Site Boundary
- Stage Boundary & Fencing location.
  (Specifications of fencing to be to the satisfaction of Melbourne Water in consultation with Department of Environment, Land, Water & Planning (DELWP))
- 1 Stage Number
- Title Easement
- Category 1 Road Offset (30m)
- Footpath (Concrete Construction)
- Balance Lot

This plan and information shown must only be used by the client for its intended purpose. This plan is subject to approval from Referral Authorities and engineering design. Boundary dimensions and areas are subject to survey.

MCDONALDS TRACK, LANG LANG

MASTERPLAN

Scale 1:2500 — 0 25 50 75

Drawing Date	13/08/25
Job Number	AA0085
Drawing Number	UD00BZ
Drawn By	BA

N
MGA

Appendix B SWMS Concept

Colliers

On behalf of

CHARLESLLOYD PROPERTY GROUP

Project Title	35 McDonalds Track, Lang Lang	Date	24/10/2025
Project Number	#118500	[redacted]	
Drawing Title	SWMS Concept		

Disclaimer: All GIS information is indicative and should be confirmed

Appendix C Calculations

Project Name:	Country Cove Estate
Project No.:	[redacted]
Author:	[redacted]
Date:	30/09/2025

Description: **Interim Sediment Basin**

Fair and Geyer Equation – Equ 10.3 WSUD Stormwater Technical Manual (2004)

$$R = 1 - \left[1 + \frac{1}{n} \cdot \frac{v_s}{Q/A} \cdot \frac{(d_e + d_p)}{(d_e + d^*)} \right]^{-n} \qquad \lambda = 1 - 1/n; \quad n = \frac{1}{1-\lambda}$$

R	= fraction of Initial Solids Removed = 80 - 90 % typ.
d_p	= Depth of permanent pool
d_e	= Extended detention depth above permanent pool
d^*	= depth below permanent pool sufficient to retain particles (lower of 1.0m or d_p)
Q	= design flow (Typically 3 month, 6 month or 1 year flow)
A	= Basin Surface Area
n	= turbulence parameter (see above) = 1 for significant short circuiting and turbulence; = 5 for insignificant short circuiting and turbulence
v_s	= settling velocity for particles

Table 7.2 Settling velocities under ideal conditions (Maryland Department of Environment, 1987)

Classification of Particle size range	Particle diameter (µm)	Settling velocities (mm/s)
Very coarse sand	2000	200
Coarse sand	1000	100
Medium sand	500	53
Fine sand	250	26
Very fine sand	125	11
Coarse silt	62	2.5
Medium silt	31	0.66
Fine silt	16	0.16
Very fine silt	8	0.04
Clay	4	0.011

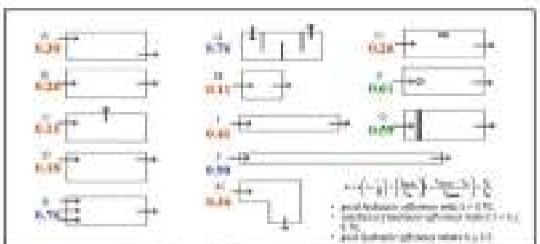


Figure 10.9 Hydraulic Efficiency – A Variety of Flow Hydrodynamic Conditions in Constructed Wetlands and Ponds. Range is from 0 to 1, with 1 representing the best hydrodynamic conditions for stormwater treatment (Source: Australian Runoff Quality 2005)

Source: WSUD Engineering Procedures: Stormwater Technical Manual DRAFT 2004

Calculations

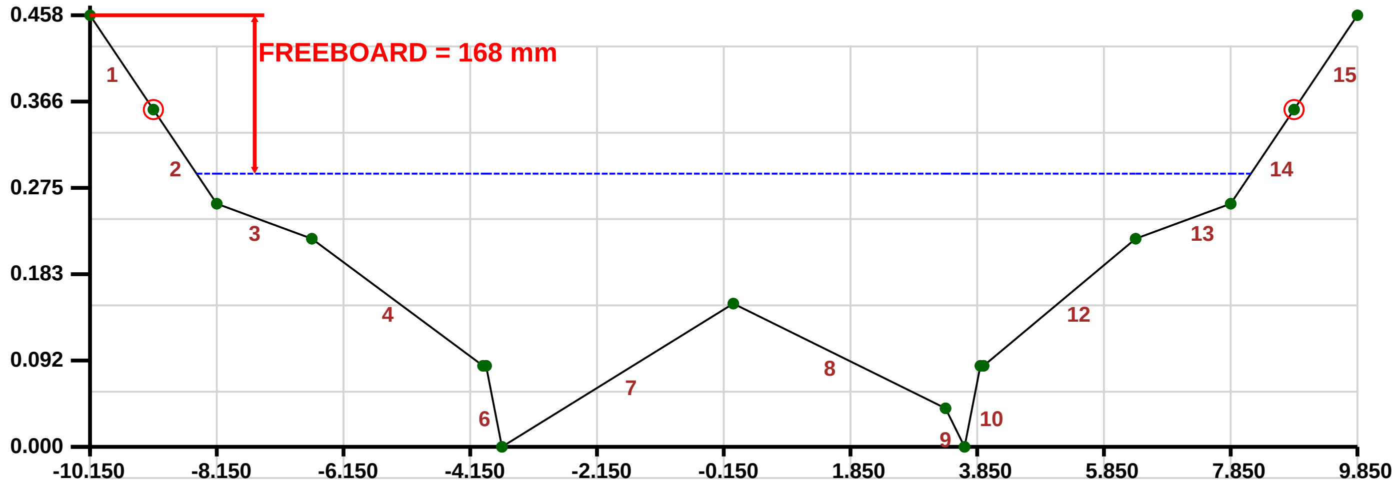
Target = very fine sand			**Notes**
Vs =	0.011	m/s	
d_e =	0.35	m	
d_p =	1.50	m	
d^* =	1.00	m	1.0 or dp - whichever is smaller
(d_e+d_p) / (d_e+d^*) =	1.4		
Q =	0.265	m^3/s	4EY
A =	680.0	m^2	NWL Surface Area
V_s / Q/A =	28.26		
λ =	0.11		Pond Shape Assumption
n =	1.12		
Fraction of Initial Solids Removed			
R =	90%		
Usage	Standard		
C_a =	21.173	ha	
L_{ost} =	1.6	m^3/ha/yr	
L_{ps} =	0.4	m^3/ha/yr	
L_{total} =	2	m^3/ha/yr	
F_r =	5	years	
Storage Volume Required			
S_r =	208	m^3	
S_a =	278	m^3	Storage Achieved
PPvol	520	m^3	Perm Pool Volume
Frequency of Desilting			
F_d =	6.68	years	
Desilting Area			
Depth	500	mm	Max = 500mm
Area Req	416	m^2	

Treatment Train Effectiveness - LPoD

	Sources	Residual Load	% Reduction
Flow (ML/yr)	66.8	60.8	8.9
Total Suspended Solids (kg/yr)	5090	1010	80.1
Total Phosphorus (kg/yr)	17	5.78	65.9
Total Nitrogen (kg/yr)	184	87.4	52.4
Gross Pollutants (kg/yr)	1960	0	100

PROJECT: McDonalds Track Lang lang (16m Road Reserve)_v3
Print-out date: 03/02/2023 - Time: 10:54
Data File: McDonalds Track Lang lang (16m Road Reserve)_v3.dat

1. CROSS-SECTION



2. DISCHARGE INFORMATION

5% AEP storm event
Design discharge after construction of retarding basin

Required overland / channel / watercourse discharge = 1.16 cumecs

3. RESULTS Water surface elevation = 0.290 m

High Flow Channel grade = 1 in 600, Main Channel / Low Flow Channel grade = 1 in 600.

	LEFT OVERBANK	MAIN CHANNEL	RIGHT OVERBANK	TOTAL CROSS-SECTION
Discharge (cumecs):	0.000	1.216	0.000	1.216
D(Max) = Max. Depth (m):	0.000	0.290	0.000	0.290
D(Ave) = Ave. Depth (m):	0.000	0.151	0.000	0.151
V = Ave. Velocity (m/s):	0.000	0.484	0.000	0.484
D(Max) x V (cumecs/m):	0.000	0.140	0.000	0.140
D(Ave) x V (cumecs/m):	0.000	0.073	0.000	0.073
Froude Number:	0.000	0.398	0.000	0.398
Area (m^2):	0.000	2.512	0.000	2.512
Wetted Perimeter (m):	0.000	16.688	0.000	16.688
Flow Width (m):	0.000	16.640	0.000	16.640
Hydraulic Radius (m):	0.000	0.151	0.000	0.151
Composite Manning's n:	0.000	0.024	0.000	0.024
Split Flow?	-	-	-	No

4. CROSS-SECTION DATA

	LEFT HAND POINT		RIGHT HAND POINT		
SEGMENT NO.	CHAINAGE (m)	R.L. (m)	CHAINAGE (m)	R.L. (m)	MANNING'S N
1	-10.150	0.458	-9.150	0.358	0.035
2	-9.150	0.358	-8.150	0.258	0.035
3	-8.150	0.258	-6.650	0.221	0.015
4	-6.650	0.221	-3.950	0.086	0.035
5	-3.950	0.086	-3.900	0.086	0.015
6	-3.900	0.086	-3.650	0.000	0.015
7	-3.650	0.000	0.000	0.152	0.015
8	0.000	0.152	3.350	0.041	0.015
9	3.350	0.041	3.650	0.000	0.015
10	3.650	0.000	3.900	0.086	0.015
11	3.900	0.086	3.950	0.086	0.015
12	3.950	0.086	6.350	0.221	0.035
13	6.350	0.221	7.850	0.258	0.015
14	7.850	0.258	8.850	0.358	0.035

4 CROSS-SECTION DATA (continued)

	LEFT HAND POINT		RIGHT HAND POINT		
SEGMENT NO.	CHAINAGE (m)	R.L. (m)	CHAINAGE (m)	R.L. (m)	MANNING'S N
15	8.850	0.358	9.850	0.458	0.035

```
RORBWin Output File
*******************

Program version 6.52 (last updated 1st June 2023)
Copyright Monash University and Hydrology and Risk Consulting

Date run: 23 Oct 2025 22:11

Vector file       : C:\12dS_WorkSpace\data\AUMELSQL01\118500_397\PM02 DESIGN\G03 CALCULATIONS\RORB_v4\118500 - Country Cove, Lang Lang\ARR2019\Mitigated\Catchment\Mitigated_Oct25.catg
Storm file        : C:\12dS_WorkSpace\data\AUMELSQL01\118500_397\PM02 DESIGN\G03 CALCULATIONS\RORB_v4\118500 - Country Cove, Lang Lang\ARR2019\Mitigated\Outputs\Q1%\Mitigated_Oct25_ aep1_du4_5hourtp22.stm
Output information: Flows & all input data


Data checks:
************
Next data to be read & checked:

Catchment name & reach type flag
Control vector & storage data
Code no.  16    16.0
Code no.  23     7.0 Location read as
Sub-area areas
Impervious flag
Fractions impervious
Initial storm data
Rainfall burst times
Pluviograph 1
Sub-area rainfalls

Data check completed



Data:
****

LnagLang_developed_Feb23


Time data, in increments from initial time
LnagLang_developed_Feb23: 4.5 hour 1% Design Storm No.* Temporal Pat
Time increment (hours)=  0.25

                  Start   Finish
Rainfall times:     0       18


End of hyeto/hydrographs:   18
Duration of calculations:  200



Pluviograph data (time in incs, rainfall in mm, in
                  increment following time shown)

        1:Temporal pattern (% of depth
  Time     1
    0     3.10
    1     7.22
    2     0.63
    3     7.79
    4     5.39
    5     5.49
    6    18.48
    7     0.13
```

```
     8      1.13
     9     16.41
    10      0.93
    11      0.14
    12     15.96
    13      5.56
    14      3.42
    15      3.64
    16      1.70
    17      2.88

  Total 100.0
```



```
DESIGN run control vector

Step  Code              Description
  1     1      Add sub-area 'A' inflow & route thru normal storage    1
  2     2      Add sub-area 'B' inflow & route thru normal storage    2
  3     2      Add sub-area 'C' inflow & route thru normal storage    3
  4     2      Add sub-area 'D' inflow & route thru normal storage    4
  5     3      Store hydrograph from step    4; reset hydrograph to zero
  6     1      Add sub-area 'E' inflow & route thru normal storage    5
  7     4      Add h-graph ex step    5 to h-graph ex step    6
  8     5      Route hydrograph thru normal storage    6
  9     2      Add sub-area 'F' inflow & route thru normal storage    7
 10     3      Store hydrograph from step    9; reset hydrograph to zero
 11     1      Add sub-area 'G' inflow & route thru normal storage    8
 12     4      Add h-graph ex step   10 to h-graph ex step   11
 13     5      Route hydrograph thru normal storage    9
 14     2      Add sub-area 'H' inflow & route thru normal storage   10
 15     5      Route hydrograph thru normal storage   11
 16   16.0     Route thru existing storage, RB
 17     3      Store hydrograph from step   16; reset hydrograph to zero
 18     1      Add sub-area 'I' inflow & route thru normal storage   12
 19     3      Store hydrograph from step   18; reset hydrograph to zero
 20     1      Add sub-area 'J' inflow & route thru normal storage   13
 21     4      Add h-graph ex step   19 to h-graph ex step   20
 22     4      Add h-graph ex step   17 to h-graph ex step   21
 23    7.0     Print hydrograph,
 24     0      **********End of control vector**********



Sub-area data

Sub-     Area     Dist.    Fraction
area      km²      km*     impervious

  A    3.26E-02  1.04E+00     0.20
  B    2.59E-02  8.42E-01     0.19
  C    1.79E-02  6.99E-01     0.20
  D    2.74E-02  5.35E-01     0.23
  E    1.99E-02  5.73E-01     0.22
  F    1.82E-02  3.51E-01     0.24
  G    1.74E-02  4.86E-01     0.19
  H    3.13E-02  1.70E-01     0.19
  I    1.57E-02  1.80E-02     0.06
  J    5.49E-03  4.50E-02     0.06

Total 2.117E-01

For whole catchment     ; Av. Dist., km* =       0.54
For interstation area  1; Av. Dist., km* =       0.54; ISA Factor =   1.000

* or other function of reach properties related to travel time
```

Normal storage data

Storage no.	Length km*	Rel. delay time	Type	Slope percent
1	0.2	0.101	Lined	0.167
2	0.1	0.072	Lined	0.167
3	0.2	0.082	Lined	0.167
4	0.1	0.049	Lined	0.167
5	0.1	0.068	Lined	0.167
6	0.1	0.043	Lined	0.167
7	0.1	0.028	Lined	0.167
8	0.2	0.095	Lined	0.167
9	0.1	0.063	Lined	0.167
10	0.1	0.034	Lined	0.167
11	0.1	0.000	Drowned	
12	0.0	0.033	Natural	
13	0.0	0.083	Natural	

* or other function of reach properties related to travel time

Special storage data

Storage: RB
Initial water level at cease to flow elevation
Spillway data:
Elevation(m)= 6.30 Length(m)= 10.0
Weir coeff. = 1.70
Pipe outlet data:
Entrance loss coeff.= 0.500 Bend loss coeff.= 0.000
Length(m)= 70. Gradient(%)= 0.400 U/S invert el.(m)= 5.60
No. of pipes= 2. Diameter (m)= 0.450
Elevation (m) - Storage (m³) table

Elevation (m)	Storage (m³)
5.60	0.000E+00
5.65	2.910E+02
5.70	6.000E+02
5.75	9.040E+02
5.80	1.206E+03
5.85	1.504E+03
5.90	1.799E+03
5.95	2.090E+03
6.00	2.378E+03
6.05	2.662E+03
6.10	2.964E+03
6.15	3.242E+03
6.20	3.516E+03
6.25	3.788E+03
6.30	4.056E+03
6.35	4.320E+03
6.40	4.582E+03
6.45	4.840E+03
6.50	5.096E+03
6.55	5.348E+03
6.60	5.597E+03

Input of parameters:
****

LnagLang_developed_Feb23
DESIGN Run
LnagLang_developed_Feb23: 4.5 hour 1% Design Storm No.* Temporal Pat
Time increment = 0.25 hours

Constant loss model selected

Rainfall, mm, in time inc. following time shown

Time Incs	Catch ment	Sub-Area A	B	C	D	E	F	G	H	I	J
0	2.2	2	2	2	2	2	2	2	2	2	2
1	5.1	5	5	5	5	5	5	5	5	5	5
2	0.4	0	0	0	0	0	0	0	0	0	0
3	5.5	5	5	5	5	5	5	5	5	5	5
4	3.8	4	4	4	4	4	4	4	4	4	4
5	3.9	4	4	4	4	4	4	4	4	4	4
6	13.0	13	13	13	13	13	13	13	13	13	13
7	0.1	0	0	0	0	0	0	0	0	0	0
8	0.8	1	1	1	1	1	1	1	1	1	1
9	11.6	12	12	12	12	12	12	12	12	12	12
10	0.7	1	1	1	1	1	1	1	1	1	1
11	0.1	0	0	0	0	0	0	0	0	0	0
12	11.3	11	11	11	11	11	11	11	11	11	11
13	3.9	4	4	4	4	4	4	4	4	4	4
14	2.4	2	2	2	2	2	2	2	2	2	2
15	2.6	3	3	3	3	3	3	3	3	3	3
16	1.2	1	1	1	1	1	1	1	1	1	1
17	2.0	2	2	2	2	2	2	2	2	2	2
Tot.	70.5	71	71	71	71	71	71	71	71	71	71
Pluvi. ref. no.		1	1	1	1	1	1	1	1	1	1

Rainfall-excess, mm, in time inc. following time shown

Time Incs	Catch ment	Sub-Area A	B	C	D	E	F	G	H	I	J
0	0.0	0	0	0	0	0	0	0	0	0	0
1	0.0	0	0	0	0	0	0	0	0	0	0
2	0.0	0	0	0	0	0	0	0	0	0	0
3	0.0	0	0	0	0	0	0	0	0	0	0
4	0.0	0	0	0	0	0	0	0	0	0	0
5	0.1	0	0	0	1	0	1	0	0	0	0
6	11.8	12	12	12	12	12	12	12	12	8	8
7	0.0	0	0	0	0	0	0	0	0	0	0
8	0.2	0	0	0	0	0	0	0	0	0	0
9	11.0	11	11	11	11	11	11	11	11	11	11
10	0.1	0	0	0	0	0	0	0	0	0	0
11	0.0	0	0	0	0	0	0	0	0	0	0
12	10.6	11	11	11	11	11	11	11	11	11	11
13	3.3	3	3	3	3	3	3	3	3	3	3
14	1.8	2	2	2	2	2	2	2	2	2	2
15	2.0	2	2	2	2	2	2	2	2	2	2
16	0.6	1	1	1	1	1	1	1	1	0	0
17	1.4	1	1	1	1	1	1	1	1	1	1
Tot.	42.9	43	43	43	44	44	45	43	43	38	38

Routing results:
****
LnagLang_developed_Feb23
LnagLang_developed_Feb23: 4.5 hour 1% Design Storm No.* Temporal Pat
DESIGN run no. 1

Parameters: kc = 2.90 m = 0.80

```
Loss parameters     Initial loss  (mm)   Cont. loss  (mm/h)
          Pervious area   27.50              3.10
 Directly connected imp    2.00              0.00
Indirectly connected imp  16.50              2.50

Results of routing through special storage RB
 Peak elevation=     6.29 m
 Peak outflow =      0.52 m³/s  (pipe flow)
 Peak storage =      4.03E+03 m³



*** Special storage :    RB

                               Hydrograph
                            Outflow    Inflow
Peak discharge,m³/s         0.5170    0.9145
Time to peak,h                4.50      3.50
Volume,m³                 8.26E+03  8.27E+03
Time to centroid,h            6.91      3.71
Lag (c.m. to c.m.),h          4.28      1.07
Lag to peak,h                 1.87      0.87



*** Calculated hydrograph,

                               Hydrograph
                              Calc.
Peak discharge,m³/s         0.5436
Time to peak,h                4.25
Volume,m³                 9.05E+03
Time to centroid,h            6.58
Lag (c.m. to c.m.),h          3.94
Lag to peak,h                 1.61


Hydrograph summary
******************

Site  Description
  01  Special storage :    RB - Outflow
  02  Special storage :    RB - Inflow
  03  Calculated hydrograph,

Inc    Time   Hyd0001   Hyd0002   Hyd0003
  0    0.00    0.0000    0.0000    0.0000
  1    0.25    0.0000    0.0000    0.0000
  2    0.50    0.0000    0.0000    0.0000
  3    0.75    0.0000    0.0000    0.0000
  4    1.00    0.0000    0.0000    0.0000
  5    1.25    0.0000    0.0000    0.0000
  6    1.50    0.0000    0.0002    0.0000
  7    1.75    0.0033    0.2390    0.0672
  8    2.00    0.0120    0.4039    0.0925
  9    2.25    0.0276    0.3409    0.0434
 10    2.50    0.0629    0.6838    0.1700
 11    2.75    0.1347    0.7529    0.2548
 12    3.00    0.2080    0.5905    0.2291
 13    3.25    0.2799    0.8287    0.3865
 14    3.50    0.3663    0.9145    0.5179
 15    3.75    0.4473    0.8094    0.5143
 16    4.00    0.4861    0.7881    0.5355
 17    4.25    0.5089    0.6526    0.5436
 18    4.50    0.5170    0.5307    0.5432
 19    4.75    0.5130    0.4208    0.5328
 20    5.00    0.4984    0.3077    0.5060
 21    5.25    0.4759    0.2323    0.4800
```

342	22	5.50	0.4421	0.1694	0.4446
343	23	5.75	0.3935	0.1237	0.3952
344	24	6.00	0.3469	0.0909	0.3480
345	25	6.25	0.3090	0.0677	0.3098
346	26	6.50	0.2737	0.0509	0.2743
347	27	6.75	0.2412	0.0386	0.2416
348	28	7.00	0.2114	0.0297	0.2117
349	29	7.25	0.1847	0.0231	0.1850
350	30	7.50	0.1610	0.0181	0.1613
351	31	7.75	0.1422	0.0143	0.1424
352	32	8.00	0.1273	0.0115	0.1275
353	33	8.25	0.1139	0.0093	0.1140
354	34	8.50	0.1017	0.0075	0.1018
355	35	8.75	0.0907	0.0062	0.0908
356	36	9.00	0.0809	0.0051	0.0809
357	37	9.25	0.0721	0.0043	0.0721
358	38	9.50	0.0661	0.0036	0.0661
359	39	9.75	0.0615	0.0030	0.0616
360	40	10.00	0.0573	0.0025	0.0573
361	41	10.25	0.0533	0.0022	0.0533
362	42	10.50	0.0496	0.0019	0.0496
363	43	10.75	0.0461	0.0016	0.0461
364	44	11.00	0.0428	0.0014	0.0429
365	45	11.25	0.0398	0.0012	0.0398
366	46	11.50	0.0370	0.0010	0.0370
367	47	11.75	0.0344	0.0009	0.0344
368	48	12.00	0.0320	0.0008	0.0320
369	49	12.25	0.0297	0.0007	0.0297
370	50	12.50	0.0276	0.0006	0.0276
371	51	12.75	0.0256	0.0006	0.0256
372	52	13.00	0.0238	0.0005	0.0238
373	53	13.25	0.0221	0.0004	0.0221
374	54	13.50	0.0205	0.0004	0.0205
375	55	13.75	0.0190	0.0003	0.0190
376	56	14.00	0.0182	0.0003	0.0182
377	57	14.25	0.0177	0.0003	0.0177
378	58	14.50	0.0172	0.0003	0.0173
379	59	14.75	0.0168	0.0002	0.0168
380	60	15.00	0.0163	0.0002	0.0163
381	61	15.25	0.0159	0.0002	0.0159
382	62	15.50	0.0155	0.0002	0.0155
383	63	15.75	0.0150	0.0002	0.0150
384	64	16.00	0.0146	0.0001	0.0146
385	65	16.25	0.0142	0.0001	0.0142
386	66	16.50	0.0138	0.0001	0.0138
387	67	16.75	0.0135	0.0001	0.0135
388	68	17.00	0.0131	0.0001	0.0131
389	69	17.25	0.0127	0.0001	0.0127
390	70	17.50	0.0124	0.0001	0.0124
391	71	17.75	0.0120	0.0001	0.0121
392	72	18.00	0.0117	0.0001	0.0117
393	73	18.25	0.0114	0.0001	0.0114
394	74	18.50	0.0111	0.0001	0.0111
395	75	18.75	0.0108	0.0001	0.0108
396	76	19.00	0.0105	0.0001	0.0105
397	77	19.25	0.0102	0.0000	0.0102
398	78	19.50	0.0099	0.0000	0.0099
399	79	19.75	0.0097	0.0000	0.0097
400	80	20.00	0.0094	0.0000	0.0094
401	81	20.25	0.0091	0.0000	0.0091
402	82	20.50	0.0089	0.0000	0.0089
403	83	20.75	0.0086	0.0000	0.0086
404	84	21.00	0.0084	0.0000	0.0084
405	85	21.25	0.0082	0.0000	0.0082
406	86	21.50	0.0079	0.0000	0.0079
407	87	21.75	0.0077	0.0000	0.0077
408	88	22.00	0.0075	0.0000	0.0075
409	89	22.25	0.0073	0.0000	0.0073
410	90	22.50	0.0071	0.0000	0.0071

411	91	22.75	0.0069	0.0000	0.0069
412	92	23.00	0.0067	0.0000	0.0067
413	93	23.25	0.0065	0.0000	0.0065
414	94	23.50	0.0064	0.0000	0.0064
415	95	23.75	0.0062	0.0000	0.0062
416	96	24.00	0.0060	0.0000	0.0060
417	97	24.25	0.0059	0.0000	0.0059
418	98	24.50	0.0057	0.0000	0.0057
419	99	24.75	0.0055	0.0000	0.0055
420	100	25.00	0.0054	0.0000	0.0054
421	101	25.25	0.0052	0.0000	0.0052
422	102	25.50	0.0051	0.0000	0.0051
423	103	25.75	0.0050	0.0000	0.0050
424	104	26.00	0.0048	0.0000	0.0048
425	105	26.25	0.0047	0.0000	0.0047
426	106	26.50	0.0046	0.0000	0.0046
427	107	26.75	0.0044	0.0000	0.0044
428	108	27.00	0.0043	0.0000	0.0043
429	109	27.25	0.0042	0.0000	0.0042
430	110	27.50	0.0041	0.0000	0.0041
431	111	27.75	0.0040	0.0000	0.0040
432	112	28.00	0.0039	0.0000	0.0039
433	113	28.25	0.0038	0.0000	0.0038
434	114	28.50	0.0036	0.0000	0.0036
435	115	28.75	0.0035	0.0000	0.0035
436	116	29.00	0.0035	0.0000	0.0035
437	117	29.25	0.0034	0.0000	0.0034
438	118	29.50	0.0033	0.0000	0.0033
439	119	29.75	0.0032	0.0000	0.0032
440	120	30.00	0.0031	0.0000	0.0031
441	121	30.25	0.0030	0.0000	0.0030
442	122	30.50	0.0029	0.0000	0.0029
443	123	30.75	0.0028	0.0000	0.0028
444	124	31.00	0.0028	0.0000	0.0028
445	125	31.25	0.0027	0.0000	0.0027
446	126	31.50	0.0026	0.0000	0.0026
447	127	31.75	0.0025	0.0000	0.0025
448	128	32.00	0.0025	0.0000	0.0025
449	129	32.25	0.0024	0.0000	0.0024
450	130	32.50	0.0023	0.0000	0.0023
451	131	32.75	0.0023	0.0000	0.0023
452	132	33.00	0.0022	0.0000	0.0022
453	133	33.25	0.0021	0.0000	0.0021
454	134	33.50	0.0021	0.0000	0.0021
455	135	33.75	0.0020	0.0000	0.0020
456	136	34.00	0.0020	0.0000	0.0020
457	137	34.25	0.0019	0.0000	0.0019
458	138	34.50	0.0019	0.0000	0.0019
459	139	34.75	0.0018	0.0000	0.0018
460	140	35.00	0.0018	0.0000	0.0018
461	141	35.25	0.0017	0.0000	0.0017
462	142	35.50	0.0017	0.0000	0.0017
463	143	35.75	0.0016	0.0000	0.0016
464	144	36.00	0.0016	0.0000	0.0016
465	145	36.25	0.0015	0.0000	0.0015
466	146	36.50	0.0015	0.0000	0.0015
467	147	36.75	0.0015	0.0000	0.0015
468	148	37.00	0.0014	0.0000	0.0014
469	149	37.25	0.0014	0.0000	0.0014
470	150	37.50	0.0013	0.0000	0.0013
471	151	37.75	0.0013	0.0000	0.0013
472	152	38.00	0.0013	0.0000	0.0013
473	153	38.25	0.0012	0.0000	0.0012
474	154	38.50	0.0012	0.0000	0.0012
475	155	38.75	0.0012	0.0000	0.0012
476	156	39.00	0.0011	0.0000	0.0011
477	157	39.25	0.0011	0.0000	0.0011
478	158	39.50	0.0011	0.0000	0.0011
479	159	39.75	0.0010	0.0000	0.0010

160	40.00	0.0010	0.0000	0.0010
161	40.25	0.0010	0.0000	0.0010
162	40.50	0.0010	0.0000	0.0010
163	40.75	0.0009	0.0000	0.0009
164	41.00	0.0009	0.0000	0.0009
165	41.25	0.0009	0.0000	0.0009
166	41.50	0.0009	0.0000	0.0009
167	41.75	0.0008	0.0000	0.0008
168	42.00	0.0008	0.0000	0.0008
169	42.25	0.0008	0.0000	0.0008
170	42.50	0.0008	0.0000	0.0008
171	42.75	0.0007	0.0000	0.0007
172	43.00	0.0007	0.0000	0.0007
173	43.25	0.0007	0.0000	0.0007
174	43.50	0.0007	0.0000	0.0007
175	43.75	0.0007	0.0000	0.0007
176	44.00	0.0006	0.0000	0.0006
177	44.25	0.0006	0.0000	0.0006
178	44.50	0.0006	0.0000	0.0006
179	44.75	0.0006	0.0000	0.0006
180	45.00	0.0006	0.0000	0.0006
181	45.25	0.0006	0.0000	0.0006
182	45.50	0.0005	0.0000	0.0005
183	45.75	0.0005	0.0000	0.0005
184	46.00	0.0005	0.0000	0.0005
185	46.25	0.0005	0.0000	0.0005
186	46.50	0.0005	0.0000	0.0005
187	46.75	0.0005	0.0000	0.0005
188	47.00	0.0005	0.0000	0.0005
189	47.25	0.0005	0.0000	0.0005
190	47.50	0.0004	0.0000	0.0004
191	47.75	0.0004	0.0000	0.0004
192	48.00	0.0004	0.0000	0.0004
193	48.25	0.0004	0.0000	0.0004
194	48.50	0.0004	0.0000	0.0004
195	48.75	0.0004	0.0000	0.0004
196	49.00	0.0004	0.0000	0.0004
197	49.25	0.0004	0.0000	0.0004
198	49.50	0.0004	0.0000	0.0004
199	49.75	0.0003	0.0000	0.0003
200	50.00	0.0003	0.0000	0.0003

Appendix D Water Technology Flood Impact Assessment

Report

10 McDonald's Track, Lang Lang – Flood Impact Assessment

Charles Lloyd Property Group

4 July 2025

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

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1 INTRODUCTION

This report details the findings of a Flood Impact Assessment (FIA) for the property at 10 McDonald's Track in Lang Lang (referred to as the 'Subject Site'). This flood study is required to address Melbourne Water's request for further information (RFI – **Council Reference: T190126-2**) for a proposed multi-lot subdivision at the Subject Site.

The following report presents the methodology and results of the hydraulic modelling undertaken to understand flood risk in the area, including flood depths, water surface elevations, flood velocities and flood hazards for pre-developed and developed cases (under current climate and future climate change conditions).

1.1 Objectives

The objectives of the FIA are to demonstrate that:

- The proposed development complies with the flood criteria detailed in the *Guidelines for Development in Flood Affected Areas* (DELWP, 2019);
    - Planning Permit **T190126 - 1 AP** Condition 26(d): Demonstrate how surface water, including stormwater runoff from the subdivision and external catchment flows, will be managed to achieve flood risk management standards in accordance with the DELWP Guidelines for Development in Flood Affected Areas, relevant floodway safety criteria and to the satisfaction of Melbourne Water;
- There is no detrimental impact on the assets within the Victorian Desalination Project (VDP) Corridor, considering Condition 35 of Planning Permit **T190126 - 1 AP**, especially Condition 35(e) whereby:
    - Notwithstanding conditions 35(b), (c) and (d), the developer may seek that Melbourne Water approve (which approval can only be provided in consultation with the Department of Environment, Land, Water and Planning):

        i. Works which result in an increase in flooding onto, under, through, over or along any part of the VDP Corridor as a result of filling the land; or

        ii. A retarding basin which changes the water table or groundwater level or flows in the vicinity of the VDP Corridor;
    - if the increase (or the change) is negligible and it is demonstrated that this increase (or the change) will have no detrimental impact on the assets within the VDP Corridor. Any application for approval under this sub-clause must be supported by a report from a suitably qualified hydrology expert to the satisfaction of Melbourne Water.

The term 'negligible' in this report, with respect to flow levels, depths, velocities or differences in those parameters (between existing and developed conditions), is defined as the magnitude at which no discernible or measurable impact could be reasonably made. It is typically at a level where the modelling outputs are of a magnitude that is less than the error bounds of the computation.

1.2 Background

The Subject Site is located at 10 McDonald's Track, Lang Lang, as outlined in pink on Figure 1-1. Access to the Subject Site is via McDonald's Track on the eastern boundary. The Subject Site covers approximately 21.2 ha and currently comprises rural grazing land with grassed vegetation. Onsite terrain elevations vary from approximately 9 m AHD (eastern region) to 6 m AHD (western region), as shown in Figure 1-2.

The Subject Site is zoned Low Density Residential and covered by a Design and Development Overlay Schedule 1 (DDO1) and a Land Subject to Inundation Overlay (LSIO). The LISO shown in Figure 1-3 indicates that the northern tip of the Subject Site is prone to flooding, as discussed in the following section. The Subject Site is within the Lang Lang River floodplain, with the Lang Lang River located to the north (flowing east to west). The 1% AEP design flood level for the Subject Site (under current climate and future climate change conditions) is understood to be 6.80 m Australian Height Datum (AHD) on the advice of Melbourne Water, with the approximate flood extent shown in Figure 1-4.

Figure 1-1 Subject Site Location

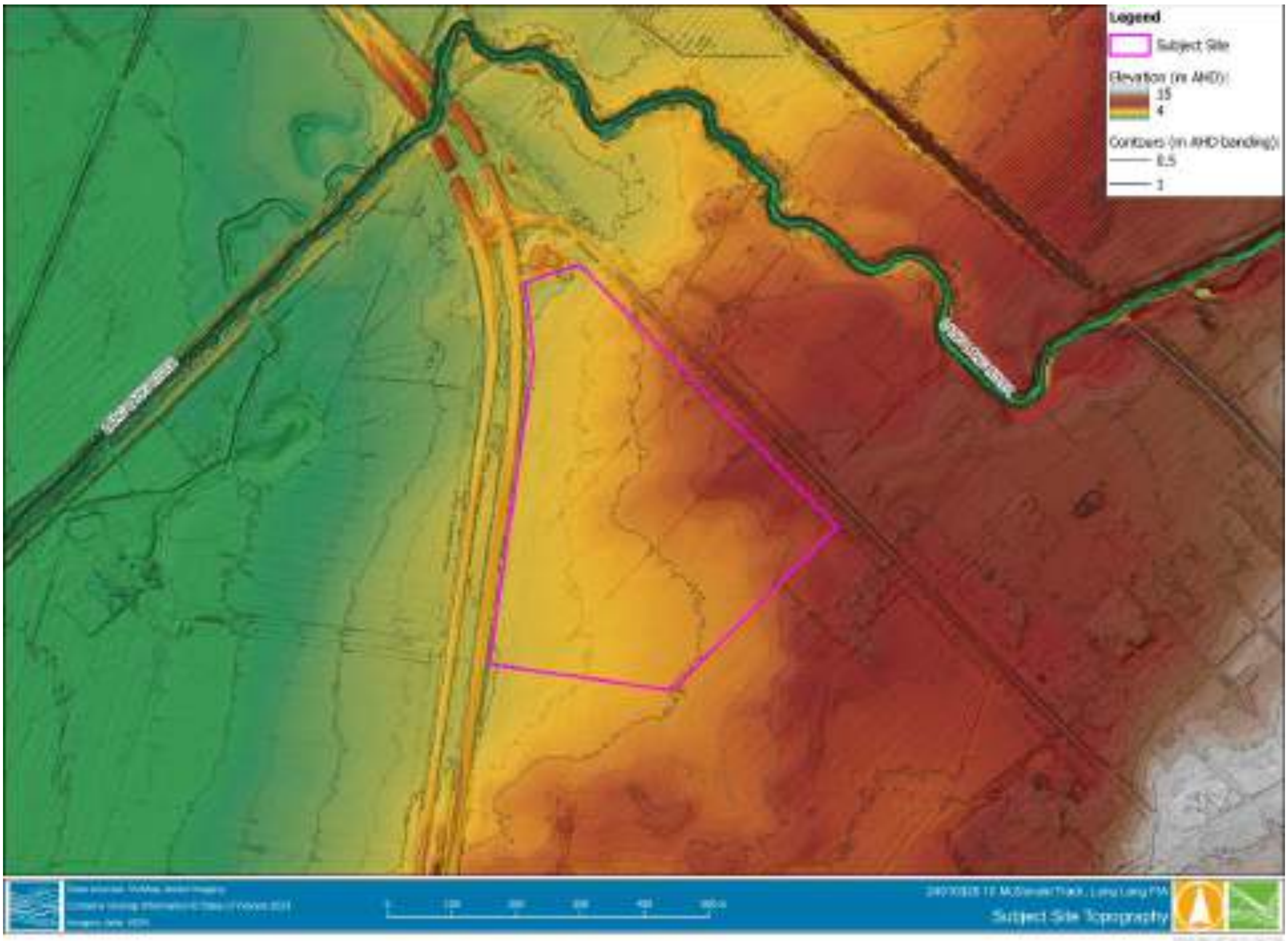


Figure 1-2 Subject Site Topography

Figure 1-3 Land Subject to Inundation Overlay near the Subject Site (DEWLP, 2024)

Figure 1-4 1% AEP Flood Extent based on 6.8 m AHD Flood Levels

Council has issued a planning permit (Application No. T190126 - 1 APP; dated 9 December 2022) for a staged multi-lot subdivision, for which the Condition(s) of the Permit must be complied with before development. Stage 1 of the subdivision occurred in March 2023, which created two lots – one for the VDP and one for the balance of the Subject Site. The proponent is proposing to subdivide the balance of the Subject Site into residential lots, as Stage 2 (detailed in Section 1.3) of the subdivision approved under the permit.

1.3 Proposed Development

The proponent is proposing a multi-lot subdivision at the Subject Site. This involves earthworks, including up to approximately 1 m depth to fill across parts of the site, required to meet the permit conditions related to drainage of the land away from the service easement adjacent to the South Gippsland Highway. The layout of the proposed development is shown in Figure 1-5.

79 residential lots are planned to be developed within the balance of the Subject Site. Immediately north of the proposed residential sub-division is a commercial zone that is subject to future planning approval. The proposed development design will maintain the Melbourne Water (MW) Drainage Reserve and the VDP corridor along its western boundary, noting that Lots 19, 20 and 58 will not be developed at this time.

There are two access points to the development along its eastern boundary. Both originate from McDonalds Track in which one of them is located northeast of the proposed development and the other to the east.

In order to comply with the planning permit conditions (refer to Section 1.1), several terrain modifications are necessary. These improvements are listed as follows and depicted in Figure 1-6:

1. Approximately 200 mm of topsoil removal in two locations:
    i. North-west Superlot (subject to future planning approval) adjacent to the existing petrol station, and
    ii. Drainage between the VDP corridor and the lot boundary with a batter slope installed. There will be no modification of the VDP easement.
2. Removing the drainage lot, lots 19, 20, and 58
    i. Minor terrain modifications are to be provided for these lots, to provide offset floodplain storage.

With the implementation of the recommended improvements, 79 residential lots will be developed within the balance of the Subject Site instead of the original 82 lots to meet the DELWP Guidelines for Development in Flood Affected Areas.

A proposed design for the noise wall is also modelled with gaps as designed. The alignment of the noise wall is presented in Figure 1-6.

Figure 1-5 Proposed multi-lot subdivision development layout

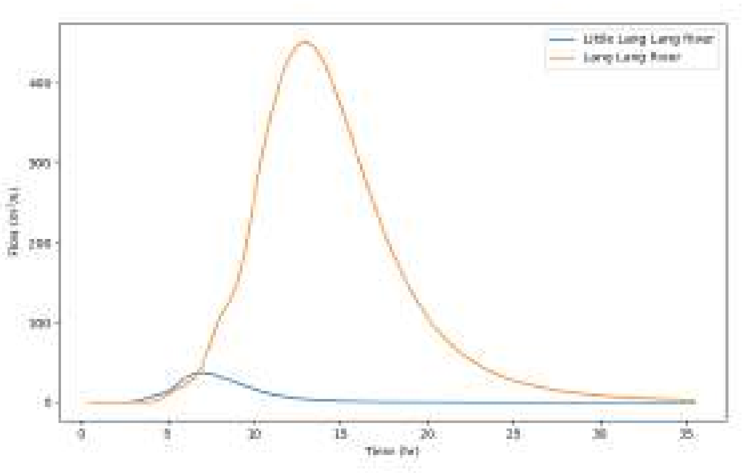
Figure 1-6 Proposed change in layout for the development

2 HYDRAULIC MODELLING METHOD

A new one-dimensional and two-dimensional (1D and 2D) hydraulic model (using TUFLOW) was developed to model the Subject Site and surrounding area to establish existing (baseline) conditions for the 1% AEP design flood for both the current climate and future climate change conditions. A developed conditions model was also produced to assess the same 1% AEP design flood cases as the existing conditions model.

The model setup and the key details are summarised in Table 2-1 and Figure 2-1.

Table 2-1 Key Modelling Information

Terrain data	<u>Existing Conditions:</u> Existing surface terrain based on LiDAR (2017/18 dataset) The Digital Elevation Model (DEM) has been adjusted (raised) to represent existing building footprints in the model topography. <u>Developed Conditions</u>: the level strategy of the proposed development (provided by Colliers) was applied on top of the existing conditions DEM. The levels were then adjusted such that the easement is setback by 5 m to allow for more flood storage and conveyance. See Figure 2-2 for a terrain comparison between the Existing and Developed Conditions.
Model type	TUFLOW 2D, Direct Inflow Approach, HPC
Model build	**TUFLOW_2023-03-AC-iSP-w64**
Inflow type	Inflow hydrographs (overland peak flows) were applied for the Lang Lang River and Little Lang Lang River (using two 2d_sa polygons in TUFLOW). The peak flows for these two boundaries were based on previous design hydrographs provided by Melbourne Water (November 2022) as shown in the graph below.  Projected climate change conditions were modelled by uniformly scaling up the current climate conditions inflow hydrographs by 18.5%.

Downstream boundary	A head-discharge boundary with a 1% slope was applied to allow overland flow to leave the model domain.
1D Elements	Lyssna Group conducted a survey of pipes and culverts around the Subject Site and along the Lang Lang and Little Lang Lang Rivers. Details of the pipes/culverts such as the pipe diameter and inverts were entered into the 1D component of the TUFLOW model. The survey can be found in Appendix A.
Bridges	Lyssna Group conducted a survey of bridges along the Lang Lang River and Little Lang Lang River. Details of the bridges such as the inverts and soffit are modelled directly in the 2D component of the TUFLOW model.
Roughness parameters	Surface roughness (materials in TUFLOW) files were developed based on current land use for the existing conditions model and updated in accordance with the proposed development land use. The following Manning's "n" roughness values were applied: ■ Urban Residential (higher density) – 0.35 ■ Rural Residential (lower density) – 0.05 ■ Industrial/Commercial or large building on site – 0.30 ■ Open space (minimal vegetation - grassed) – 0.035 ■ Waterway (moderate vegetation) – 0.06 ■ Waterway (heavy vegetation) – 0.09 ■ Carpark/pavement/wide driveways/roads – 0.020 ■ Railway line – 0.125 These values are consistent with industry practice including the Melbourne Water technical specifications.
Model timestep (2D)	HPC with 2D timestep of 0.5s
Model grid resolution	2 m grid
Critical Durations[1]	■ 9hr for Little Lang Lang River; and ■ 12hr for Lang Lang River

[1] As provided by Melbourne Water

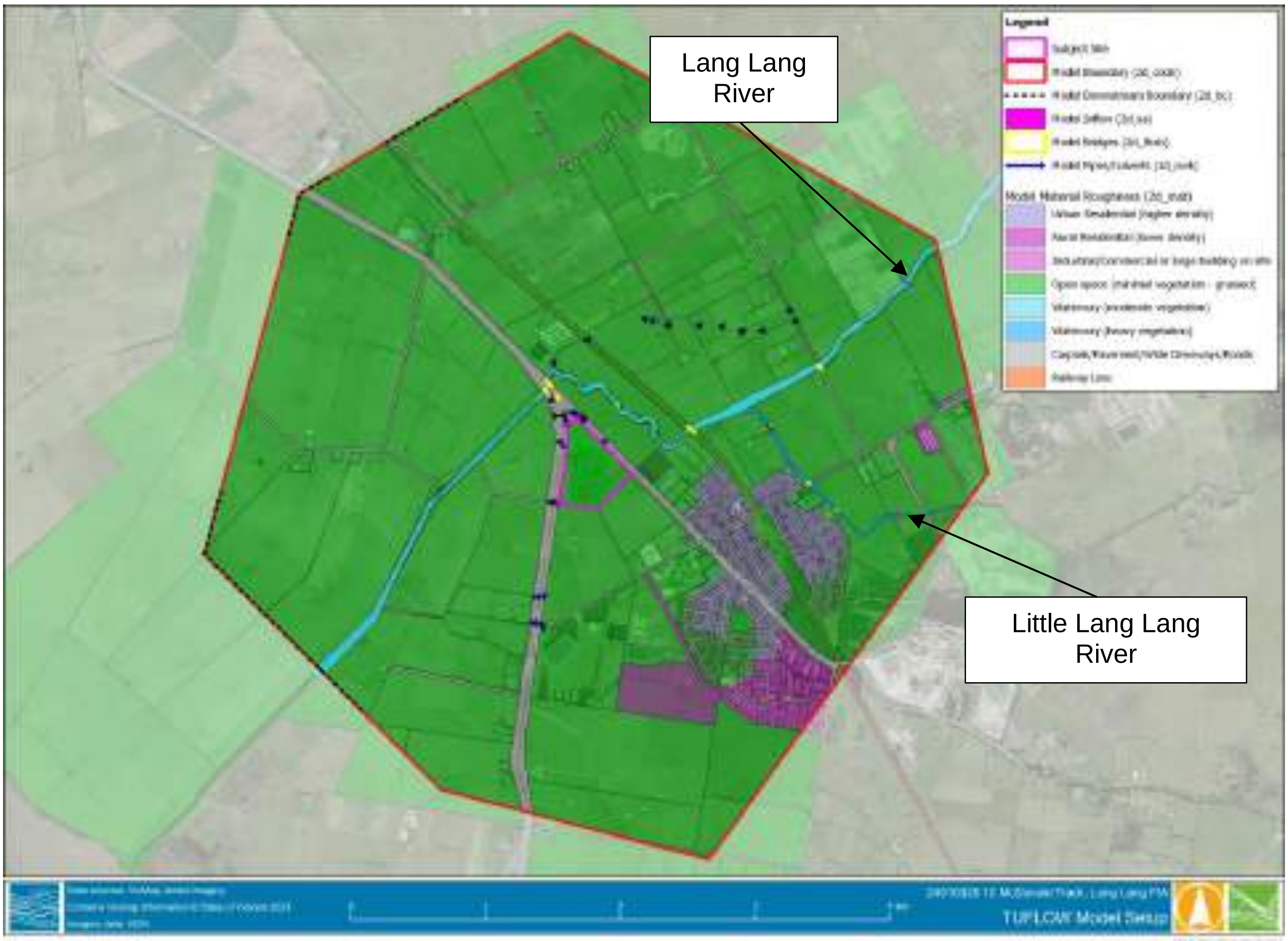


Figure 2-1 TUFLOW Model Setup

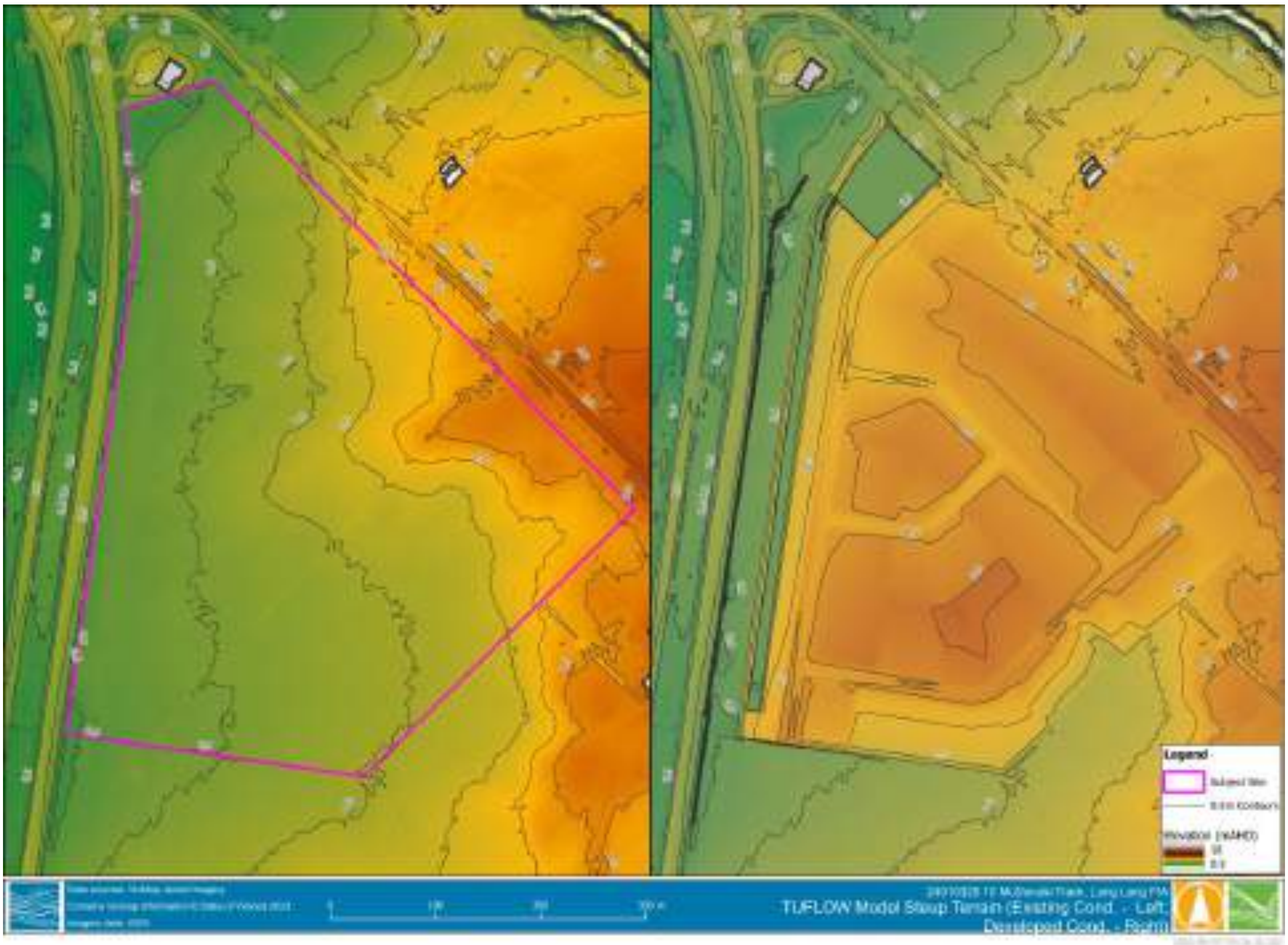


Figure 2-2 TUFLOW Model Steup Terrain: Existing Conditions (Left) and Developed Conditions (Right)

3 RESULTS

3.1 Existing Conditions

3.1.1 Current Climate Conditions

The peak 1% AEP design flood depths (with flood level contours), flood velocity, and flood hazard plots under existing conditions (current climate) are shown in Figure 3-1, Figure 3-2, and Figure 3-3, respectively. The Subject Site is susceptible to flooding as a result of the Lang Lang River breaking its bank and the South Gippsland Highway bridges acting as hydraulic constraints. Effectively, the site floods as a result of backwater, with existing culverts below the highway (to the west of the site) providing additional outlets for floodwater to be conveyed westwards.

The model suggests that the Subject Site is partially affected by overland flooding entering from McDonald's Track (Figure 3-1) with the extent generally matching the Melbourne Water flood extent, as presented in Figure 1-4. The 1% AEP design flood level at the Subject Site is approximately 6.79 m AHD, which is consistent with Melbourne Water's applicable flood level (6.8 m AHD).

The Subject Site 1% AEP design flood flow velocities typically range up to 0.6 m/s, with a few small spots of higher velocity up to 0.75 m/s along the western boundary and the VDP corridor. Peak 1% AEP design flood velocities over the broader model area are located along parts of Lang Lang River and South Gippsland Highway (Figure 3-2).

The 1% AEP design flood hazard along the northern and western boundaries of the Subject Site is classified as H3 "Unsafe for vehicles, children and the elderly" (Figure 3-3). Within the Subject Site, the design flood hazard ranges between H1 to H3. The classification used in the flood hazard map (Figure 3-3) is based on the flood hazard curves outlined in ARR 2019.

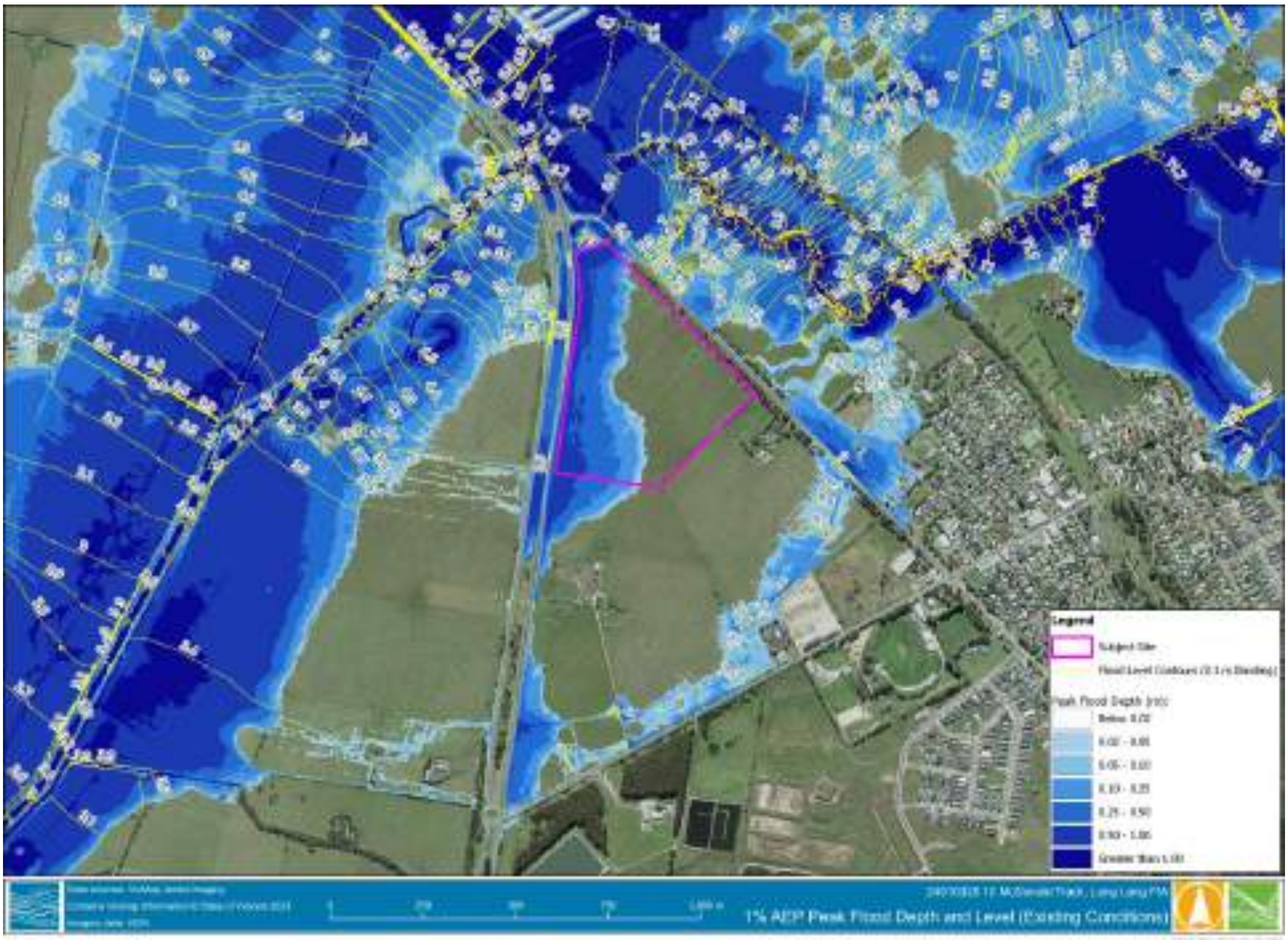


Figure 3-1 1% AEP Maximum Flood Depth and Flood Level Contours – Existing Conditions

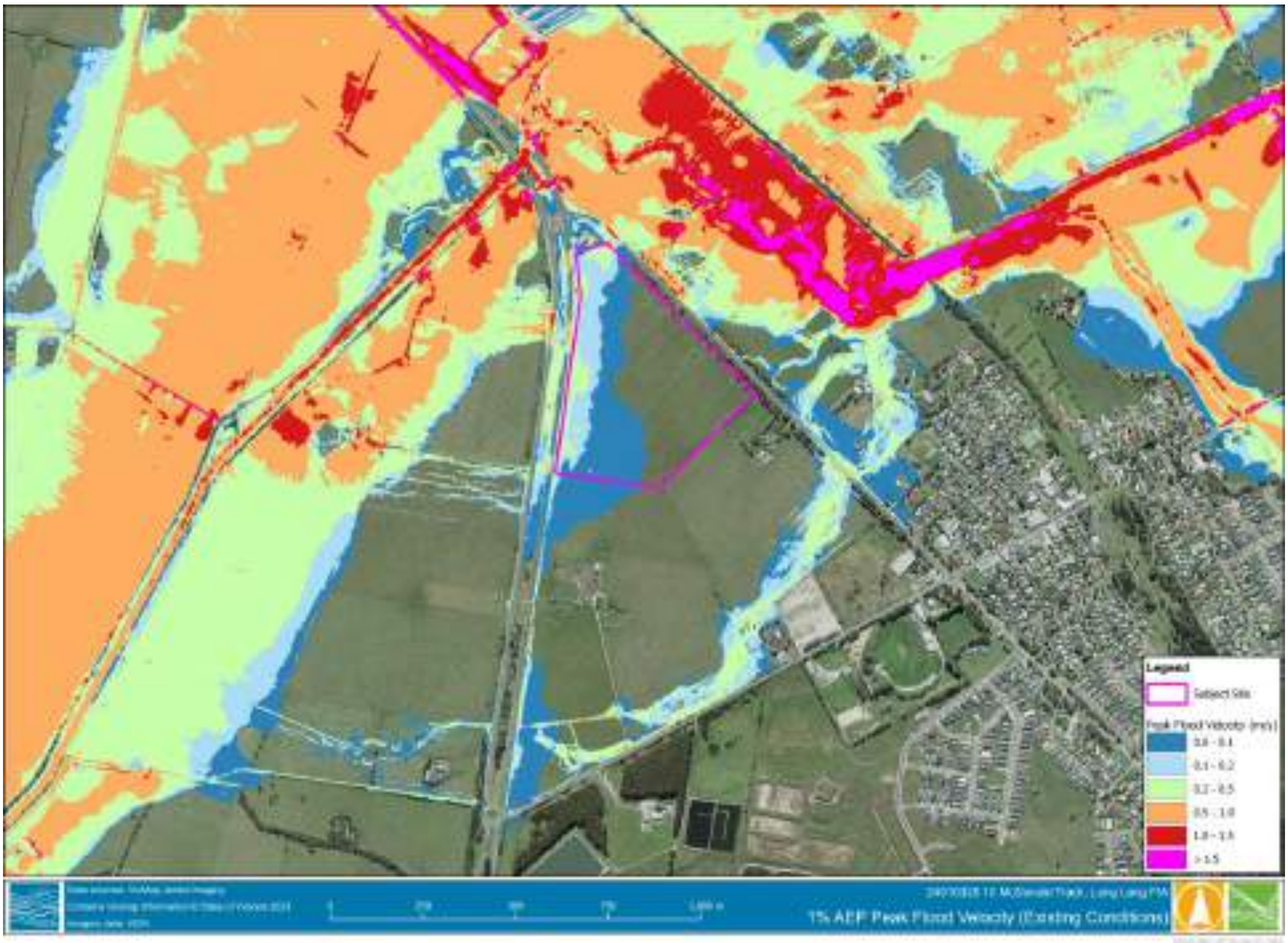


Figure 3-2 1% AEP Maximum Flood Velocity – Existing Conditions

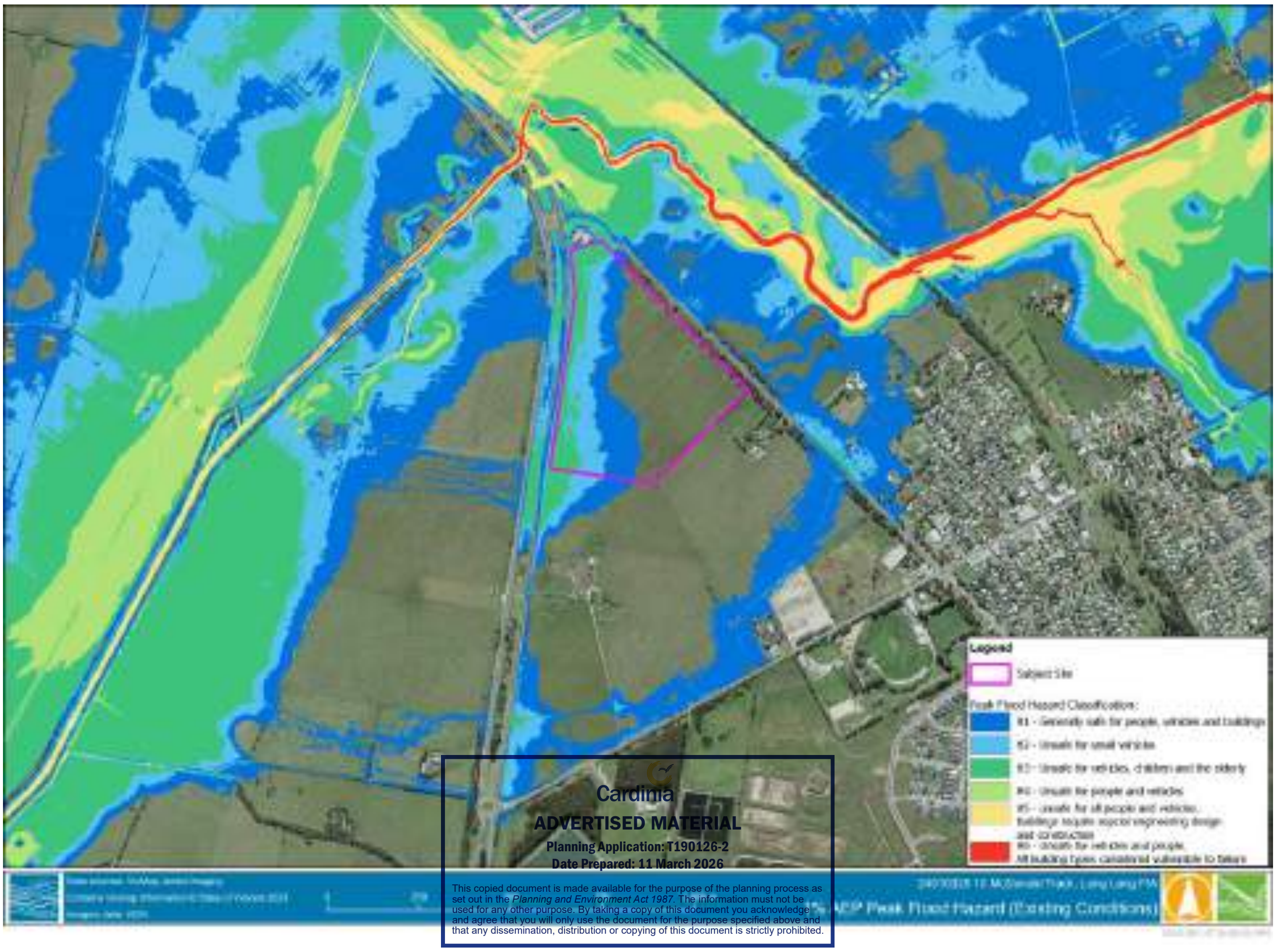


Figure 3-3 1% AEP Maximum Flood Hazard – Existing Conditions

3.1.2 Climate Change Conditions

The peak 1% AEP Climate Change (CC) design flood depth (with flood level contours), flood velocity, and flood hazard plots for existing conditions are shown in Figure 3-4, Figure 3-5, and Figure 3-6, respectively.

Similar to current climate conditions, the model suggests the Subject Site is partially affected by overland flooding entering from McDonald's Track (Figure 3-4). The 1% AEP design CC flood level at the site is approximately 6.82 m AHD (only marginally higher than current conditions).

The Subject Site 1% AEP design flood flow velocities typically range up to 0.5 m/s; with a few small spots of higher velocity up to 0.8 m/s at the northeast corner of the Subject Site and along the western boundary (Figure 3-5). Peak 1% AEP flood velocities are located along parts of Lang Lang River and South Gippsland Highway

The 1% AEP design flood hazard along the northern and western boundaries of the site is categorised as H3 "Unsafe for vehicles, children and the elderly" (Figure 3-6). Within the Subject Site, the 1% AEP design flood hazard ranges between H1 to H3.

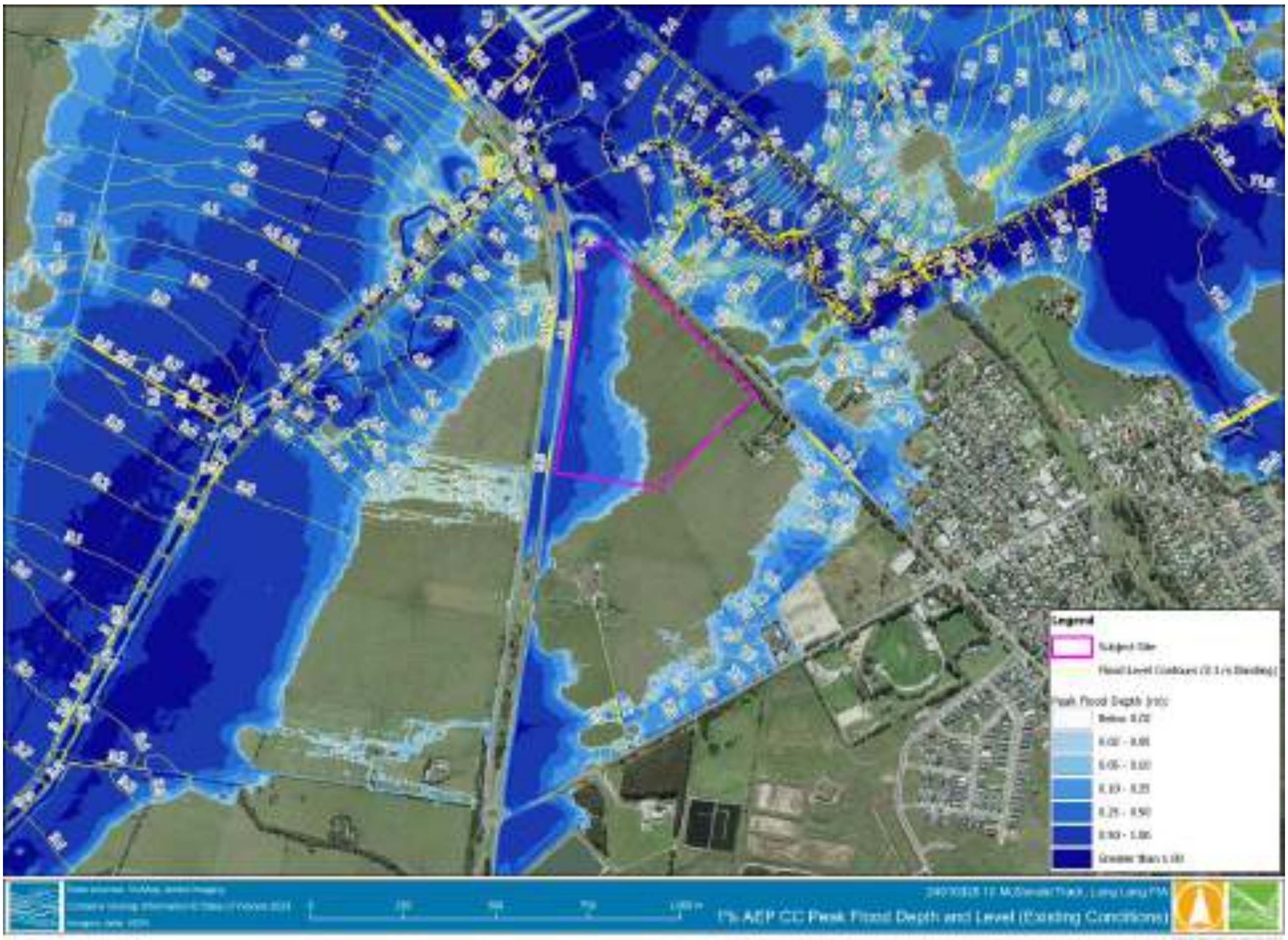


Figure 3-4 1% AEP Climate Change Maximum Flood Depth and Flood Level Contours – Existing Conditions

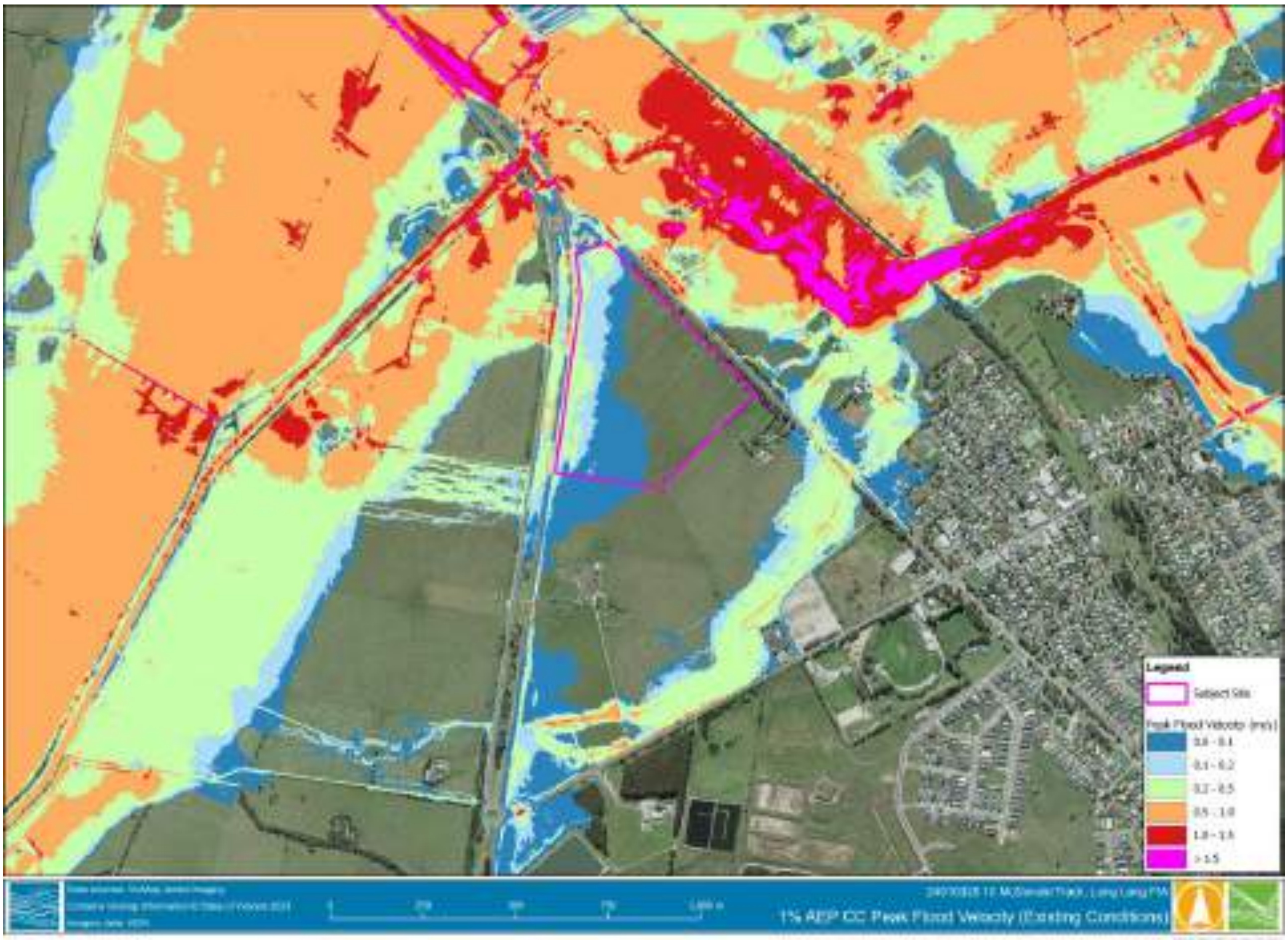


Figure 3-5 1% AEP Climate Change Maximum Flood Velocity – Existing Conditions

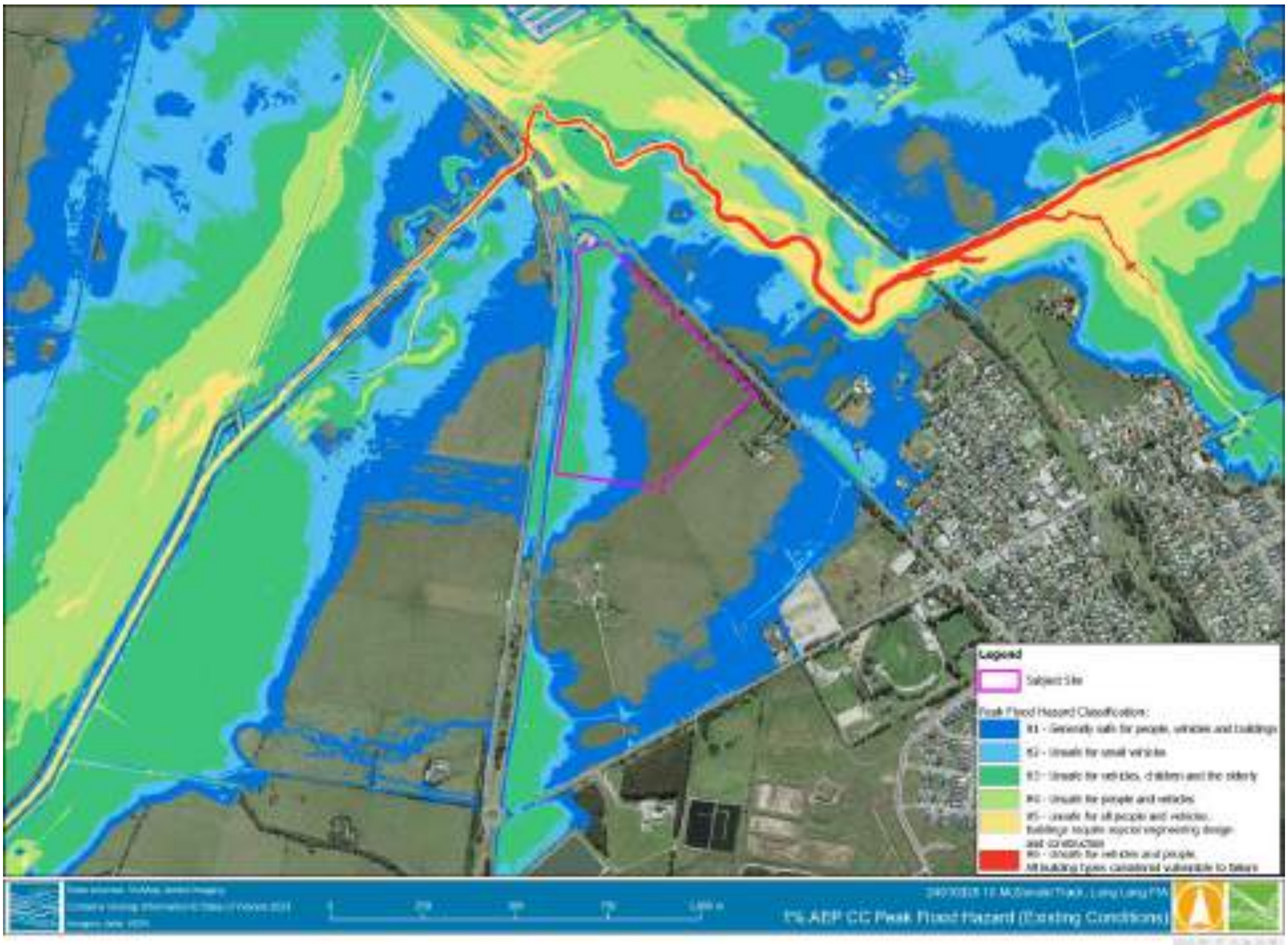


Figure 3-6 1% AEP Climate Change Maximum Flood Hazard – Existing Conditions

3.2 Developed Conditions

3.2.1 Current Climate Conditions

The peak 1% AEP design flood depth (with flood level contours), flood velocity, and flood hazard plots under developed conditions (current climate) are shown in Figure 3-7, Figure 3-8, and Figure 3-9, respectively.

The model suggests the proposed development area in the Subject Site is not affected by overland flooding entering from McDonald's Track. As shown in Figure 3-7, the proposed residential lots are filled above the post-development flood levels. The 1% AEP design flood level at the subject site remains about 6.8 m AHD.

The Subject Site 1% AEP design flood flow velocities typically range up to 0.6 m/s (Figure 3-8). Peak 1% AEP design flood velocities are located along parts of Lang Lang River and South Gippsland Highway.

The flood hazard along the northern and western boundaries of the site is in the H3 category, "Unsafe for vehicles, children and the elderly" (Figure 3-9).

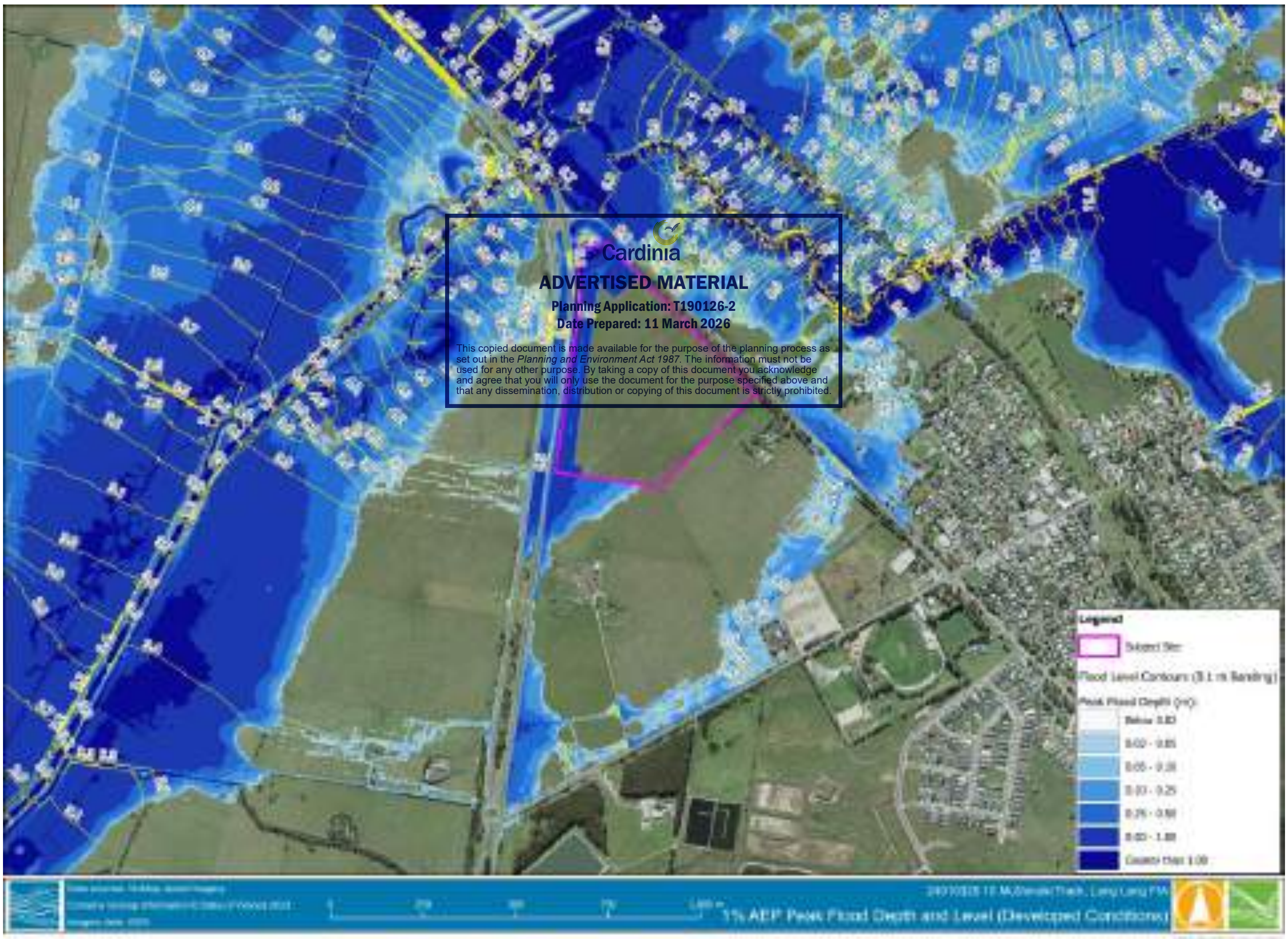


Figure 3-7 1% AEP Maximum Flood Depth and Flood Level Contours – Developed Conditions

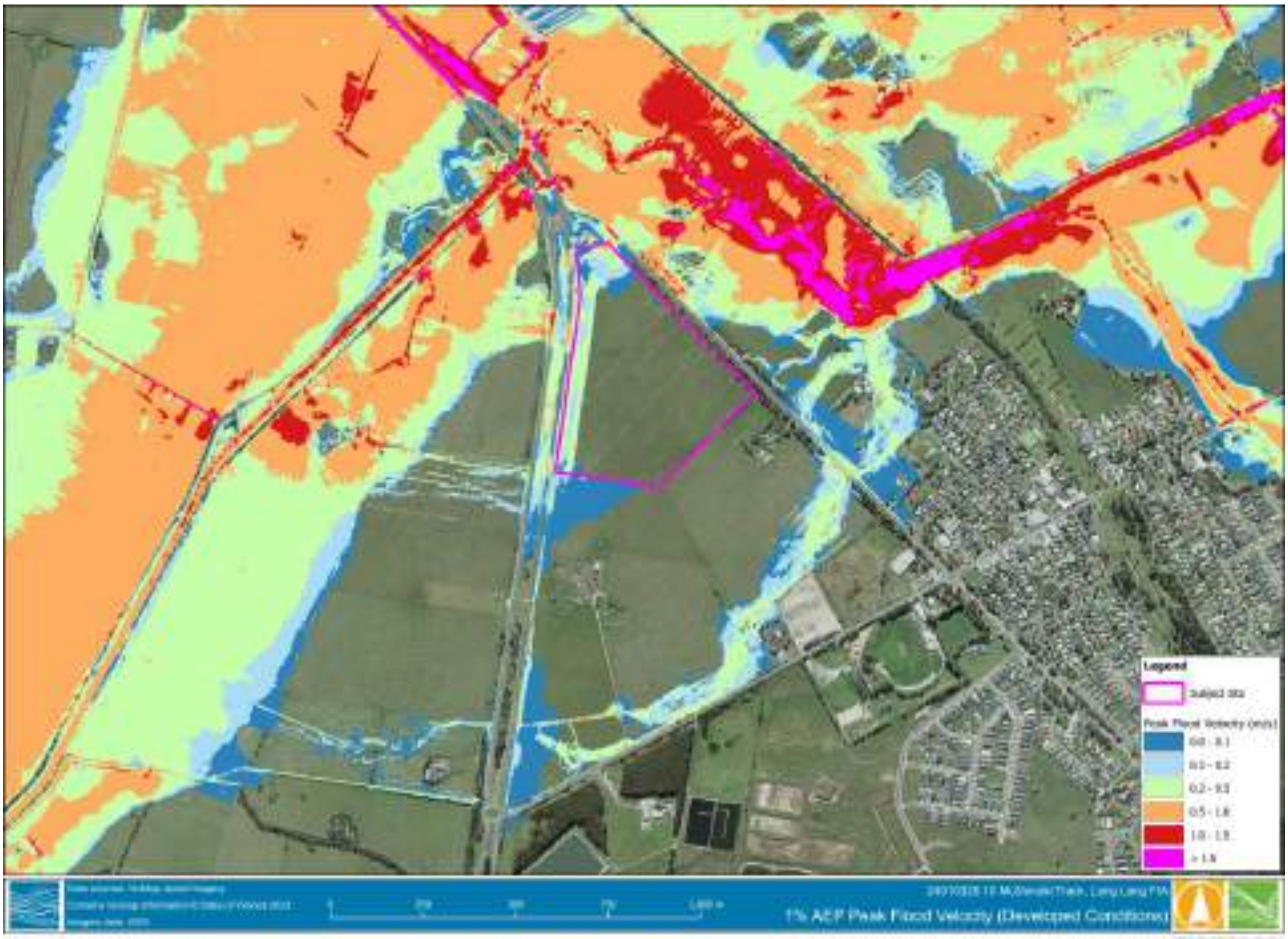


Figure 3-8 1% AEP Maximum Flood Velocity – Developed Conditions

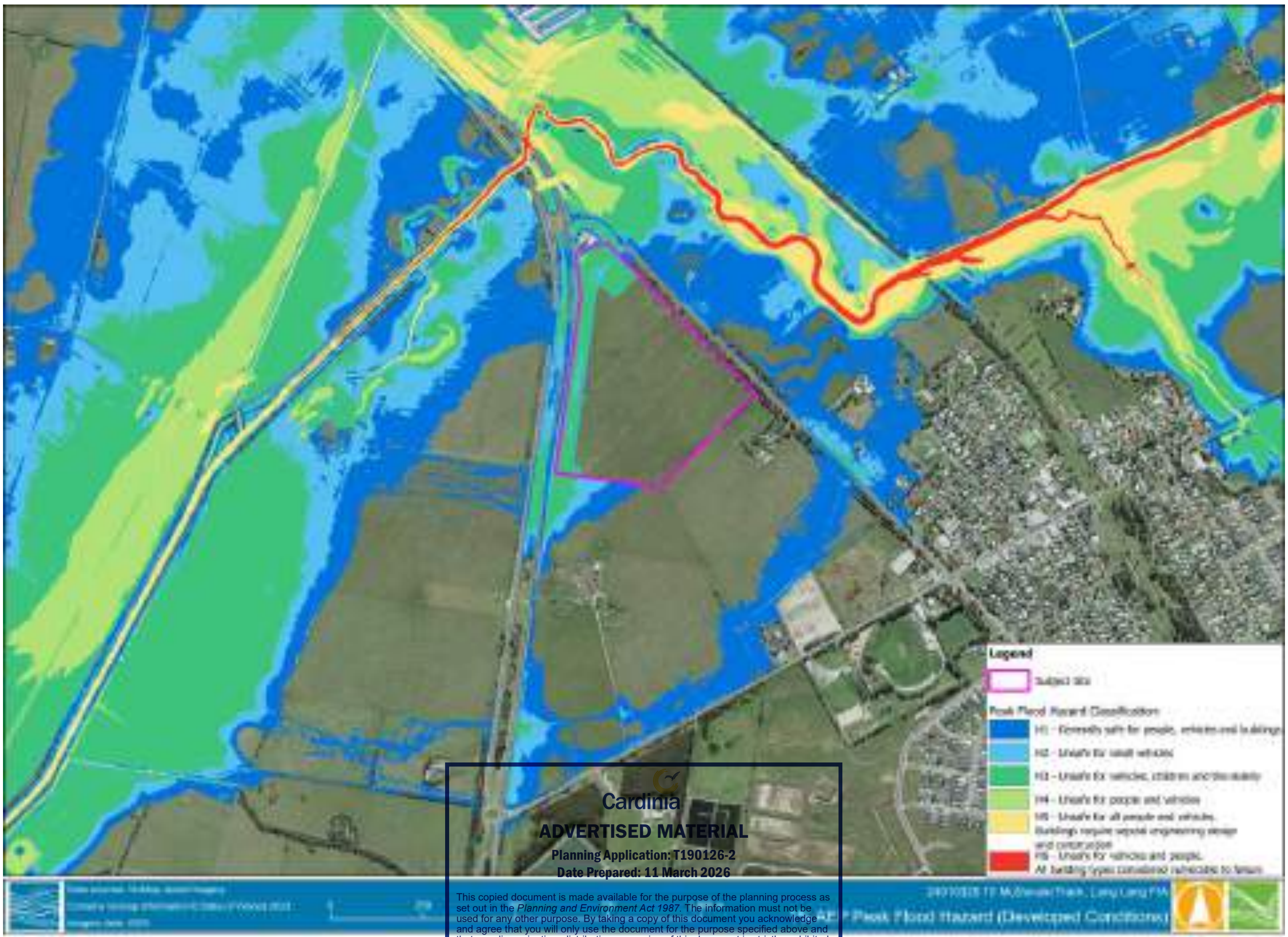


Figure 3-9 1% AEP Maximum Flood Hazard – Developed Conditions

3.2.2 Climate Change Conditions

The peak 1% AEP Climate Change (CC) flood depth (with flood level contours), flood velocity, and flood hazard plots under developed conditions are shown in Figure 3-10, Figure 3-11, and Figure 3-12, respectively.

Similar to current climate conditions, modelling suggests the proposed development area within the subject site is not affected by overland flooding entering from McDonald's Track (Figure 3-10). The 1% AEP Climate Change design flood level at the Subject Site is approximately 6.83 m AHD.

The Subject Site 1% AEP design flood flow velocities typically range up to 0.65 m/s; with peak 1% AEP design flood velocities within the broader hydraulic model area located along parts of Lang Lang River and South Gippsland Highway (Figure 3-11). As shown in Figure 4-12, there are increases in peak 1% AEP design flood velocities from the pre-developed to post-developed scenario, up to about 0.3 m/s in and around the site.

The 1% AEP design flood hazard along the northern and western boundaries of the site is H3 "Unsafe for vehicles, children and the elderly" (Figure 3-12).

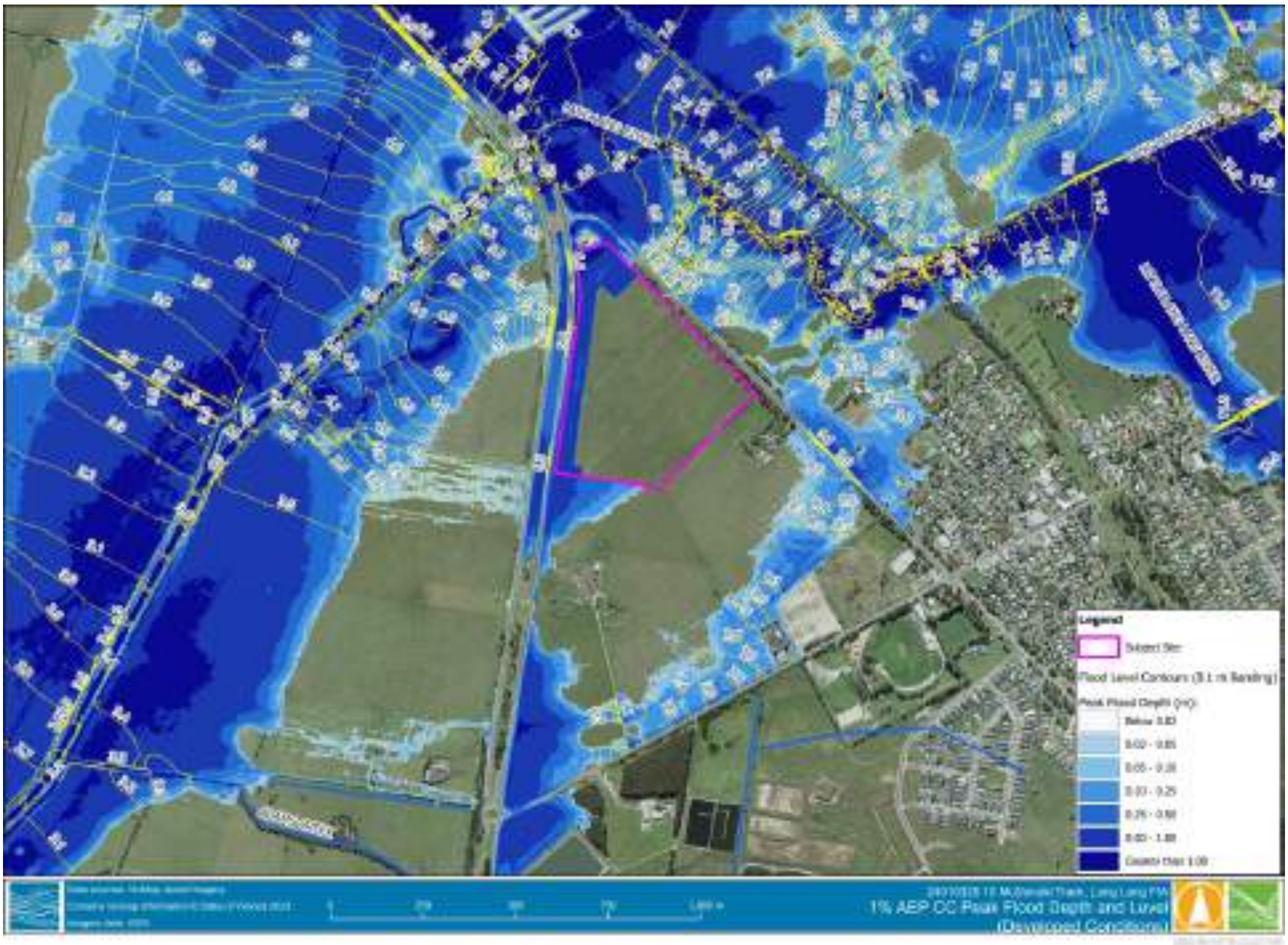


Figure 3-10 1% AEP CC Maximum Flood Depth and Flood Level Contours – Developed Conditions

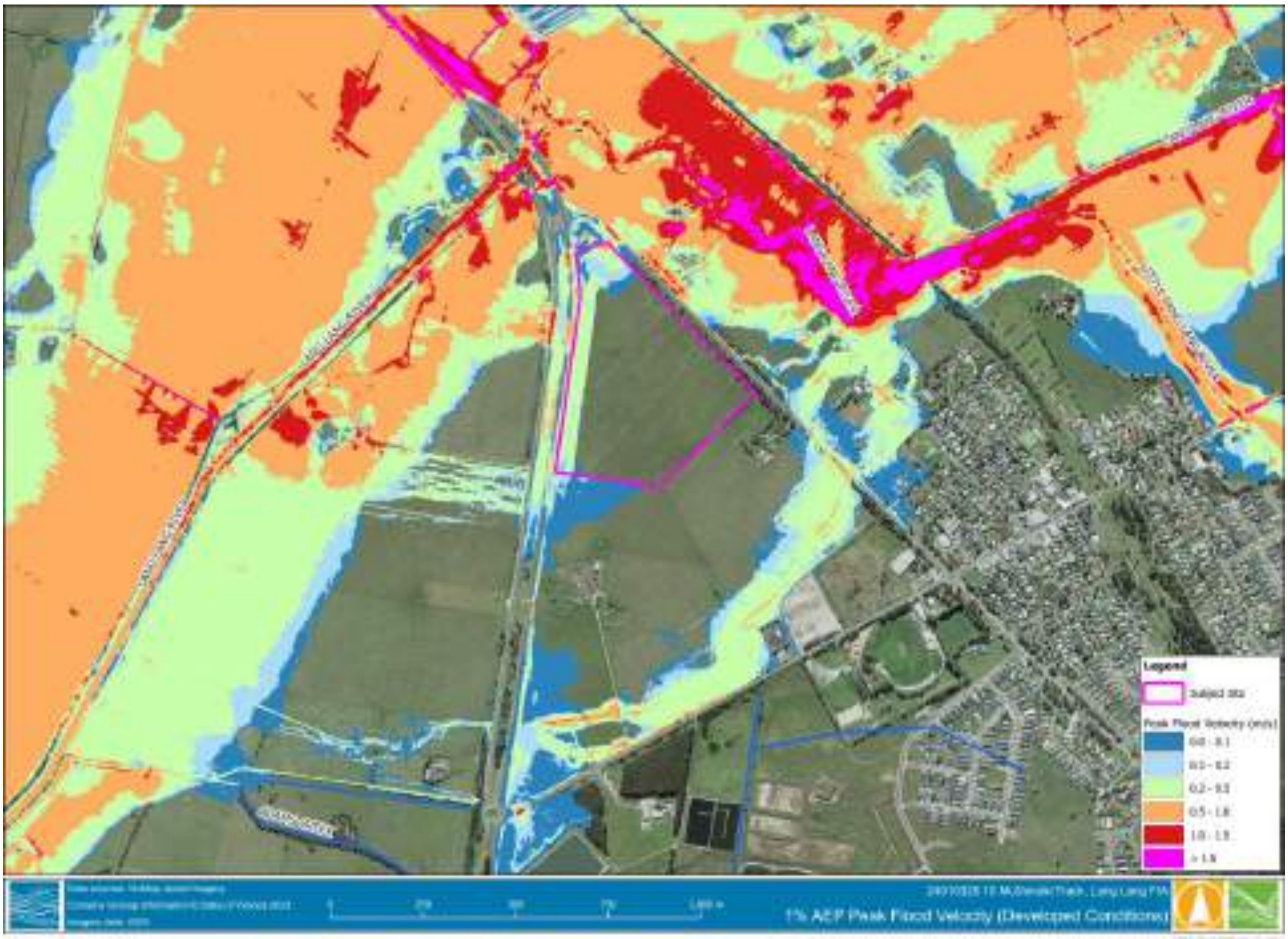


Figure 3-11 1% AEP CC Maximum Flood Velocity – Developed Conditions

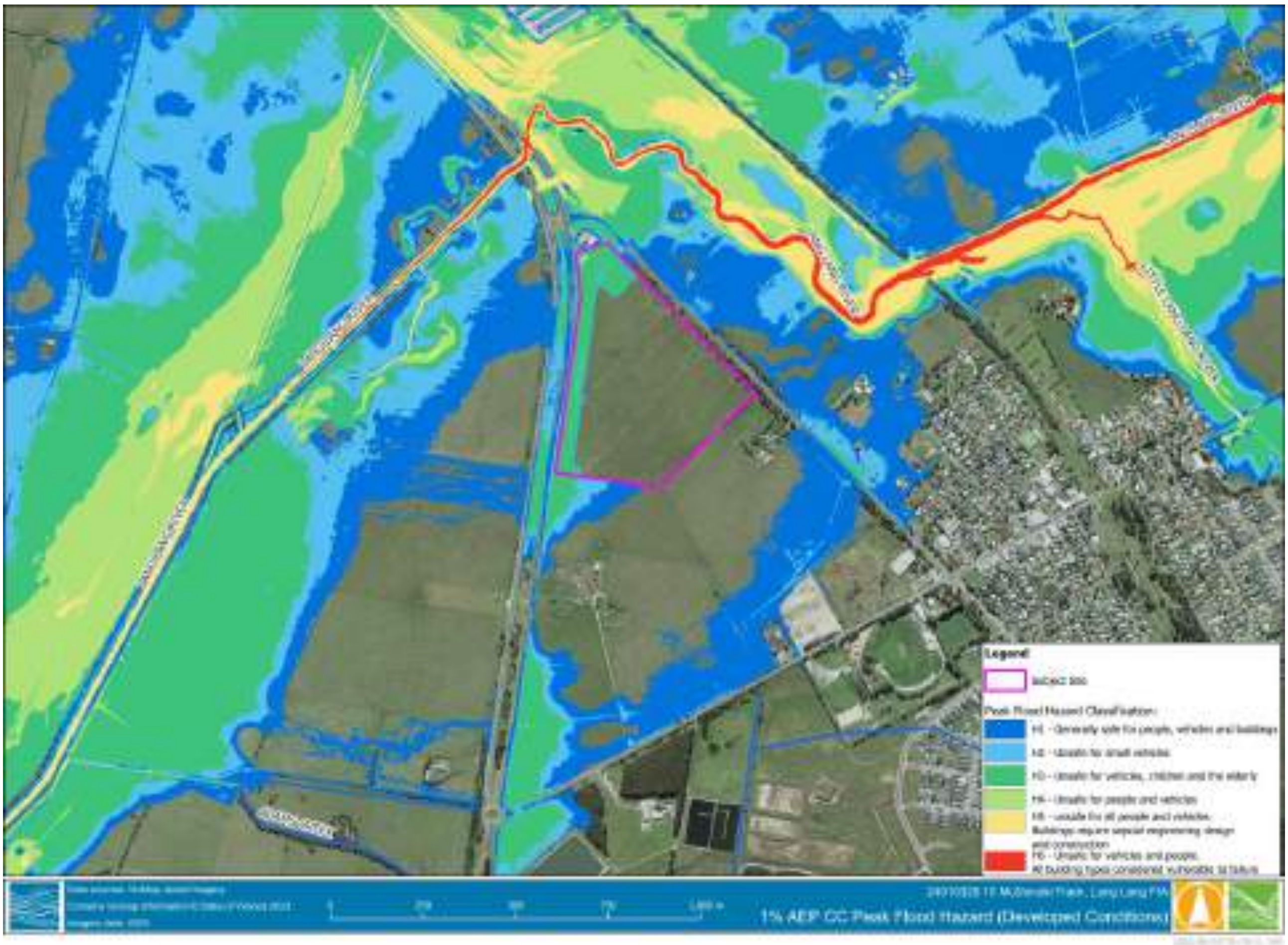


Figure 3-12 1% AEP CC Maximum Flood Hazard – Developed Conditions

4 FLOOD IMPACT ASSESSMENT

In Victoria, development applications located in flood prone areas are assessed in accordance with the *Guidelines for Development in Flood Affected Areas* (DELWP now DEECA, 2019) against the following four key objectives;

- **Flood safety**: to protect human life/health and provide safety from flood hazard.
- **Flood damage**: to minimise flood damage to property and associated infrastructure, a range of freeboard typically 300 mm to 600 mm, depending on the flood behaviour assessment.
- **Flood impacts**: to maintain free passage and temporary storage of floodwaters.
- **Waterway and floodplain protection**: to protect and enhance the environmental features of waterways and floodplains.

These key objectives are discussed further below with reference to how the proposed development responds to flood risk under 1% AEP design flood conditions, with and without climate change.

4.1.1 Flood Safety

The relevant guiding principles for this objective are:

- Site and access safety must not be compromised
- Development must be located on sites of lowest overall hazard

Flood safety criteria are expressed in relation to flood depth, velocity and hazard, with thresholds varying depending on the type of development being proposed. The proposed land subdivision at the Subject Site should meet the safety criteria presented in Table 4-1.

Table 4-1 Safety criteria for subdivision of land

Type	Maximum depth (D), velocity (V) and product (VD)			Applicable to
	D max metres	V max metres/second	VD max metres2/sec	
Greenfield residential	0.3	2.0	0.3	Entrance to lots and accessway
Other residential	0.3	2.0	0.3	Lots (including entrance) and accessway
Commercial or industrial	0.5	2.0	0.4	Lots (including entrance) and accessway
Agricultural, if it involves a proposal to construct a new dwelling	0.5	2.0	0.4	Entrance to lots

4.1.1.1 Current Climate Conditions

As mentioned in Section 1.3, there are two access points to the proposed development. Under 1% AEP design flood conditions, these access points are not within the flood extent under the developed scenario, as shown in Figure 4-1. Safe access/egress can be achieved by exiting the development at either access point towards McDonald's Track, where a H1 flood hazard category ("Generally safe for people, vehicles and buildings") exists to the southeast and northwest along the road. Site and access safety are therefore satisfactory for the proposed subdivision.

The land where development will take place will be filled, so future dwellings and internal roads would all be flood safe in a 1% AEP design storm (see Figure 4-1).

Based on the modelling results described above, the flood safety objective is satisfied.

Figure 4-1 1% AEP Maximum Flood Hazard – Developed Conditions (Zoomed In)

4.1.1.2 Climate Change Conditions

Similar model results for safe access/egress under current climate conditions were observed for the climate change conditions, as shown in Figure 3-12. This shows that safe access/egress can be achieved by exiting the development at either access point towards McDonald's Track, where a maximum H1 flood hazard category is defined over the road. Hence, site and access safety are satisfactory.

The land where development will take place will be filled, so future dwellings and internal roads would all be flood safe in a 1% AEP plus CC design storm (see Figure 3-12).

The model results show that the flood safety objective is satisfied under climate change conditions.

4.1.2 Flood Damage

4.1.2.1 Overview

The guiding principles for this objective are listed below. Being a new subdivision, most of these are not relevant in the sense they will be addressed through the subdivision design, and hence will not need to be incorporated into individual building design. The guiding principles are:

- Buildings must not interfere with existing or proposed water, sewer, or drainage services.

- Buildings must be designed to avoid significant financial impacts of flood damage.
- The basements of any new buildings must not flood.
- Those parts of buildings affected by flooding must be able to withstand the effects of inundation.
- Services to a building must be capable of functioning during and after a flood.

4.1.2.2 Current Climate Conditions

The VDP corridor is located along the western boundary of the Subject Site, as described in Section 1.3. The proposed development has an easement/batter that is setback by 5 m from the VDP corridor. Therefore, any future dwellings will not interfere with existing water, sewer, or drainage services.

Finished Floor Levels (FFL) must be raised above applicable flood levels, to mitigate against potential flood damage. Freeboard must be added to the applicable 1% AEP design flood level to provide reasonable certainty of a desired level of service. The proposed development plans note that the Finished Floor Level (FFL) will be above the applicable 1% AEP design flood level of 6.8 m AHD plus freeboard.

Future dwellings will meet the Nominal Flood Protection Level. Applicable 1% AEP design flood levels will be in accordance with Melbourne Water with minimum FFLs, conditioned in the planning permit.

4.1.2.3 Climate Change Conditions

As for current climate conditions, the existing water services are not interfered with, as the proposed development easement/batter is 5 m from the VDP corridor.

Under climate change conditions, the proposed development areas are not affected by flooding as the site is raised sufficiently to protect dwellings from the 1% AEP plus CC design flood level, as shown in Figure 3-12. An increase of 18.5% in flows only results in an increase in peak flood levels of about 20 mm, suggesting the typical 600 mm freeboard applied within LSIO may not be warranted. By doubling the climate change 1% AEP design flow, the maximum increase in water surface level is only 70 mm, which suggests that 600 mm freeboard is overly conservative. As such, we are of the opinion that freeboard could be reduced to 350 mm and still provide over 300 mm freeboard for the future climate scenario. The full 600 mm freeboard is applied to waterways typically where there is uncertainty in the design flood level and the ability in confined valleys for large floods to produce much higher flood peaks. In this instance, 600 mm freeboard is not warranted and does not achieve a practical development and flood risk management outcome.

Based on the results of the modelling and the provisions in the development design, it is considered that the flood damage objective can be met by the development under existing and future climate change conditions.

4.1.3 Flood Impacts

The guiding principle for this objective states that '***The natural function of floodplains and overland flow paths to convey and store floodwater must not be compromised***'.

4.1.3.1 Current Climate Conditions

The hydraulic modelling results are presented in Figure 4-2 and Figure 4-4 which show peak 1% AEP design flood water surface elevation and velocity differences respectively (differences represented as developed minus existing modelled cases). These show the model predicts some minor changes to peak water levels on the property to the west of the South Gippsland Highway, as well as the South Gippsland Highway road reserve. These changes are considered negligible as the water level differences are generally less than 10 mm, with peak changes of up to 15 mm limited to road reserves. The flood level increase predicted within the road reserve of the South Gippsland Highway is not over the highway pavement area. The flood hazard classification remains H1 on the highway (see Figure 3-9). The flood level increase on the private property to the west of the highway is also within an area with a flood hazard classification of H1.

The modelled 1% AEP design flood velocity differences show there are no material increases in flood velocity, with velocities remaining below 1 m/s under the developed scenario. A feature of interest for flood velocities is the VDP easement. The developed conditions velocities are below 0.6 m/s along the VDP easement (see Figure 3-8). The resulting product between flood depth and velocity (VD max) is well below 0.3 m^2/s. Thus, it is considered that any potential changes to erosion risk are negligible.

The developed conditions velocity is generally below 0.6 m/s at the property to the south of the subject site (see Figure 3-8). The resulting VD max is well below 0.3 m^2/s. It is considered that any predicted changes to the erosion risk in this area are not material. This is because the velocities are well below the published thresholds for initiation of erosion on well grassed areas. For example, the Western Australian Department for Agriculture[2] suggests that maximum velocities on sandy-loam soils with medium grass cover (considered a conservative assumption) is 1.2 m/s, which well above the velocities experienced in the vicinity of the Subject Site.

The peak 1% AEP design flood storage volumes for the Existing and Developed Conditions are presented in Table 4-2. The total floodplain storage change (loss) over the model extent is insignificant (8,995 m^3). This represents less than 0.5% of the total floodplain volume in the model (which in turn does not cover all the regional flood storage area). Given the proximity of the Subject Site to Western Port, there is limited option for cumulative impacts on land downstream (to the west of the South Gippsland Highway).

Table 4-2 Flood Storage Calculations

Location	Existing Conditions Flood Volume (m^3)	Developed Conditions Flood Volume (m^3)	Percentage Change (%)
Model Extent	5,077,913	5,071,896	0.12

[2] https://www.agric.wa.gov.au/water-management/suggested-maximum-velocities-surface-water-flow, Table 1.

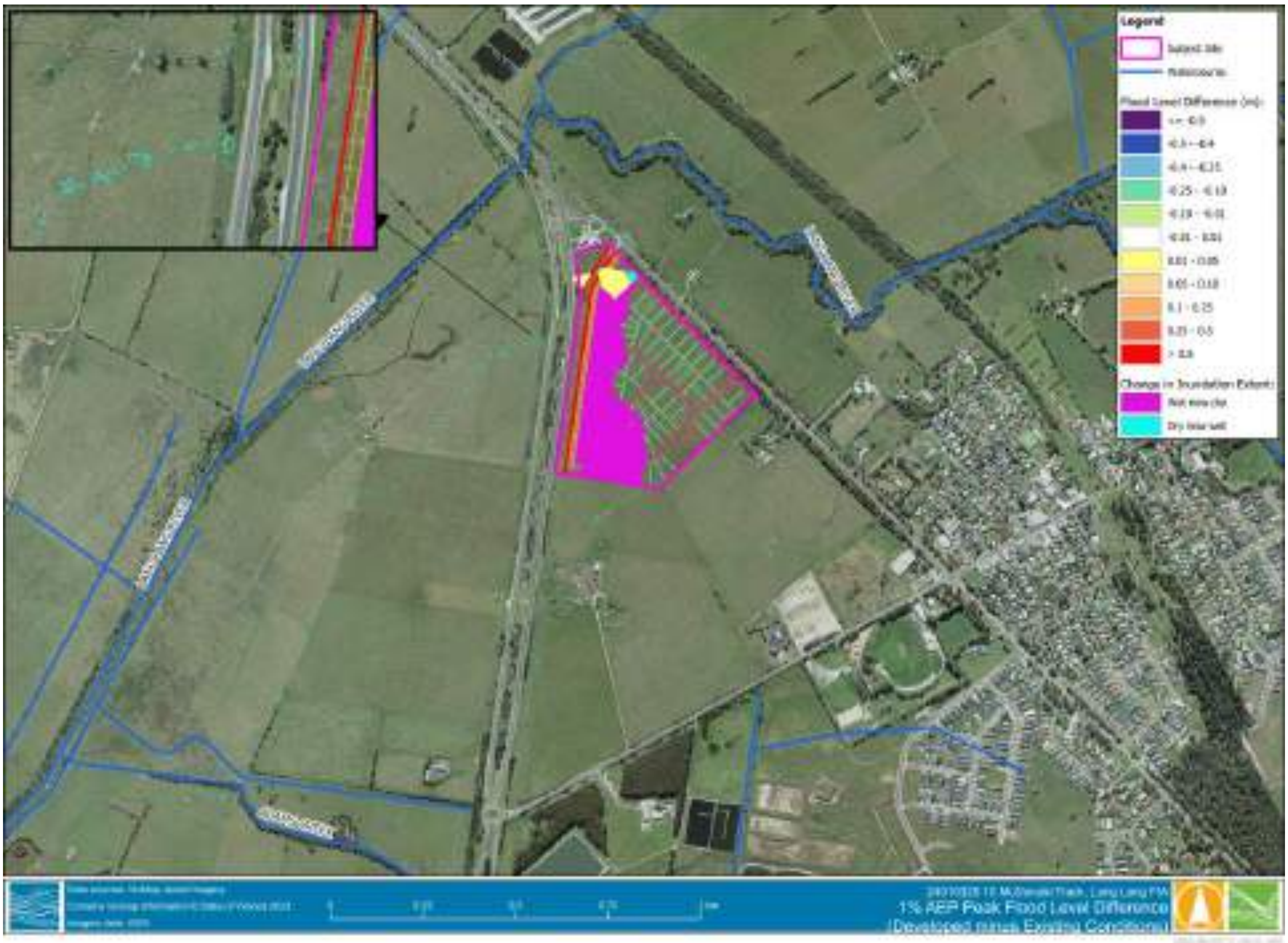


Figure 4-2 1% AEP Peak Flood Level Difference (Developed minus Existing Conditions)

Figure 4-3 1% AEP Peak Flood Level Difference in percentage (Developed minus Existing Conditions)

Figure 4-4 1% AEP Peak Flood Velocity Difference (Developed minus Existing Conditions)

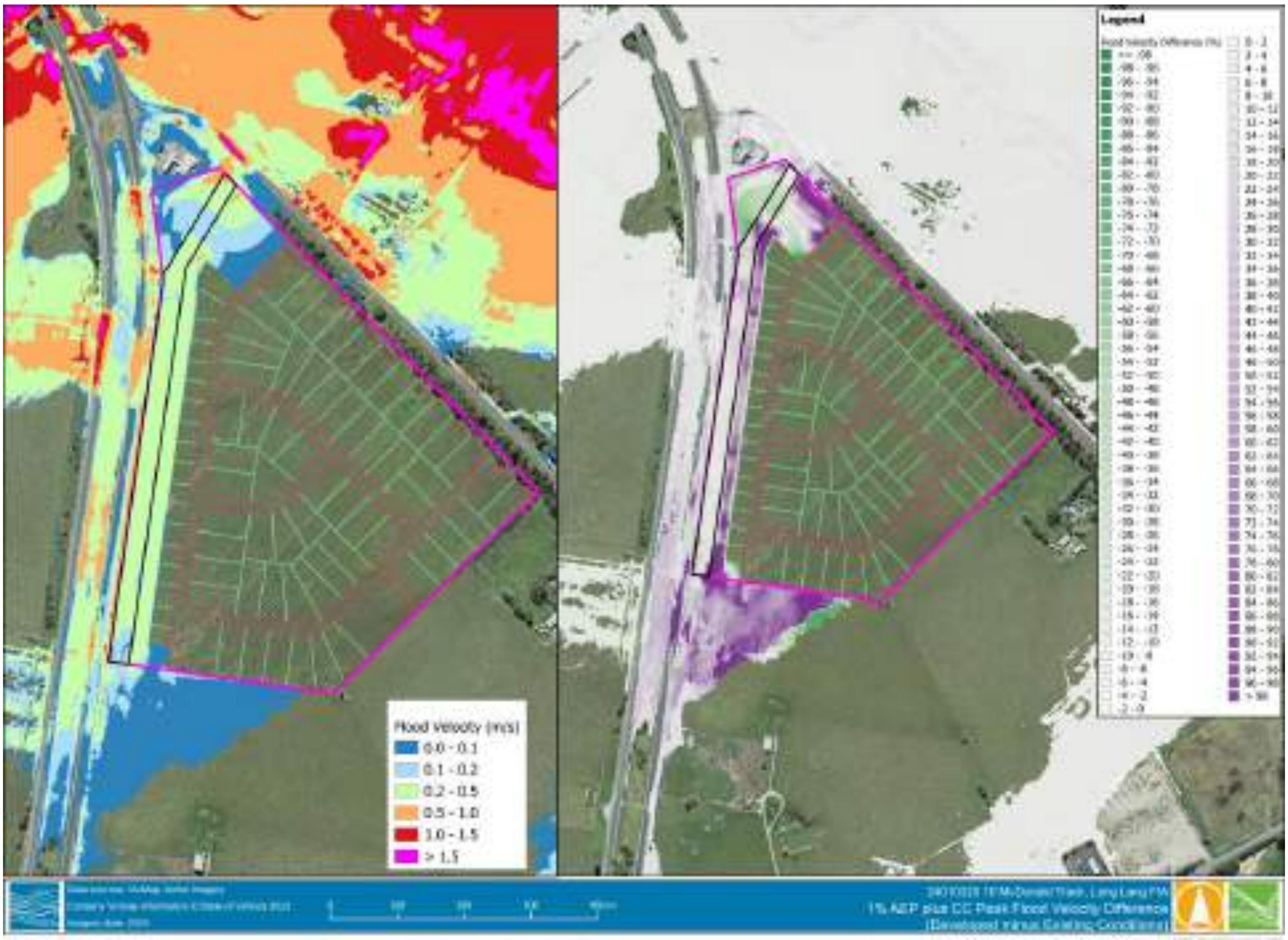


Figure 4-5 1% AEP plus Peak Flood Velocity Difference in percentage (Developed minus Existing Conditions) alongside Flood Velocity Mapping on the left

The hydrograph for flow, flood velocity, and flood levels at the proposed noise wall and VDP easement is presented in Figure 4-7, Figure 4-8, and Figure 4-9. The location where the hydrographs were captured is shown in Figure 4-6. The presented hydrographs in this section show only for the location at Noise Wall 1. The hydrographs for the other locations are presented in 6Appendix B.

At Noise Wall 1, flows in the developed condition are generally comparable to the existing condition, with a difference at peaks between 0.1 and 1.1 m^3/s. Flood velocities are also comparable, albeit occasionally greater. The water surface level for the developed condition is comparable to existing conditions, with only minute difference in timing of the peaks.

These differences are not considered material:

- The velocities are very low (<0.5m/s) and will not materially change the risk of erosion. Scouting risk is negligible under both existing and post-development conditions;
  - Similar conclusions can be reached for the climate change scenarios.
- The differences in flood levels are of a magnitude that is less than the error bounds of the computation.
  - Similar conclusions can be reached for the climate change scenarios.

- Impacts associated with changes in flows (including peak flows) will be negligible in light of changes in velocities and levels:
  - The difference in flood volume above the area remains comparable in both scenarios;
  - Additionally, the majority of stormwater runoff from the development will be re-directed around the VDP easement, effectively reducing frequency of overland flowpaths above the VDP easement.

Based on the above, it is considered that the development will have no material impact on the VDP easement.

Figure 4-6 Hydrograph Locations

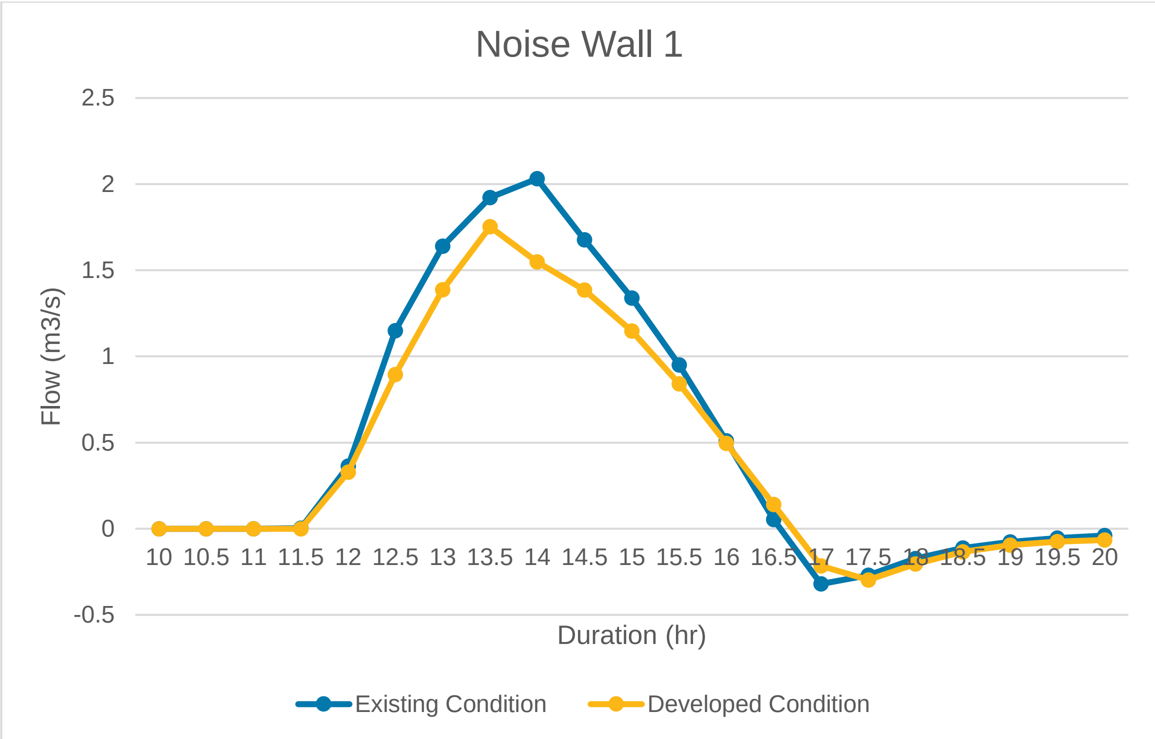


Figure 4-7 1% AEP flow hydrograph at Noise Wall 1

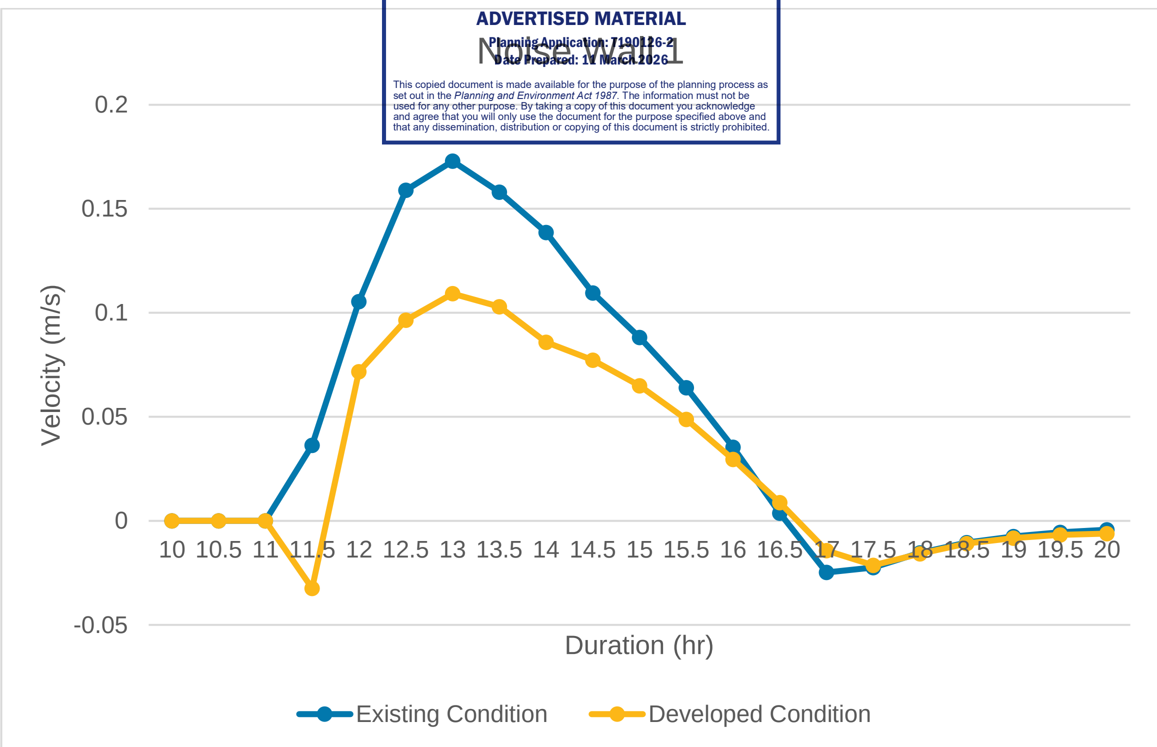


Figure 4-8 1% AEP velocity hydrograph at Noise Wall 1

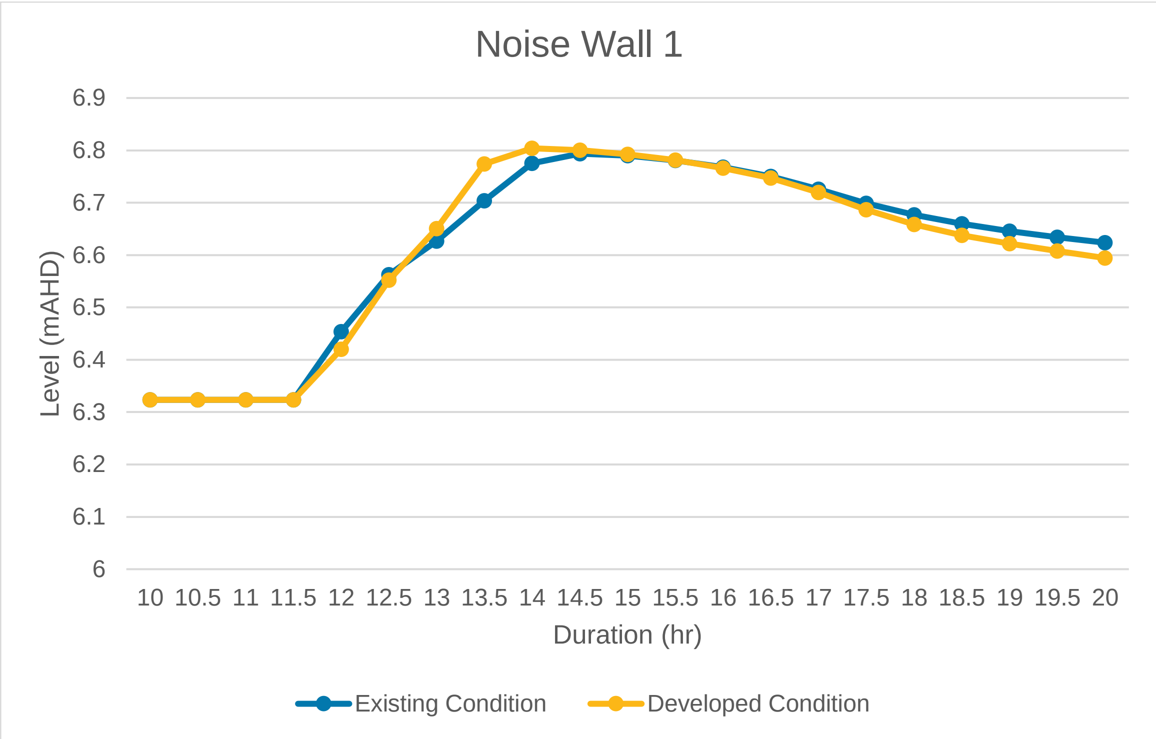


Figure 4-9 1% AEP water surface level hydrograph at Noise Wall 1

4.1.3.2 Climate Change Conditions

The results of modelling for the 1% AEP design flood conditions including Climate Change are shown in Figure 4-10 and Figure 4-12 for water level and velocity differences respectively. These results show there are negligible offsite flood impacts under climate change conditions. There are two small, localised areas of predicted flood level increases of up to 0.05 m along McDonald's Track which are considered negligible. It is noted that the flood hazard in this area is H1 (see Figure 3-12).

The flood velocity changes from Existing to Developed Conditions are shown in Figure 4-12. There are no material increases in flood velocity that would cause the peak velocity to be above 1 m/s under the developed scenario. A feature of interest for flood velocities is the VDP easement. The developed conditions velocities are below 0.6 m/s along the VDP easement (see Figure 3-8). The resulting product between flood depth and velocity (VD max) is well below 0.3 m^2/s. It is considered that any changes to erosion risk as a result of the proposed development would not be material. This is because the post-development velocities are well below the threshold for initiation of erosion.

The developed conditions velocities are generally below 0.6 m/s at the property to the south of the subject site (see Figure 3-11), and the resulting VD max is well below 0.3 m^2/s. Based on these results, the erosion risk at the property to the south of the Subject Site can be considered very low.

The flood storage volumes between the Existing Conditions and Developed Conditions under climate change conditions are presented in Table 4-3. The total floodplain storage loss for the model extent is insignificant as the volume loss is estimated to be 18,870 m^3, which is less than 0.5% of the total modelled floodplain volume. It is considered negligible in the context of the overall floodplain and the location at the downstream end of the Lang Lang River catchment.

It is considered that the flood impact objective is satisfied under climate change conditions.

Table 4-3 Flood Storage Calculations

Location	Existing Conditions Volume (m^3)	Developed Conditions Volume (m^3)	Percentage Change (%)
Model Extent	5,790,173	5,771,303	0.33

Figure 4-10 1% AEP plus CC Peak Flood Level Difference (Developed minus Existing Conditions)

Figure 4-11 1% AEP plus CC Peak Flood Level Difference in percentage (Developed minus Existing Conditions)

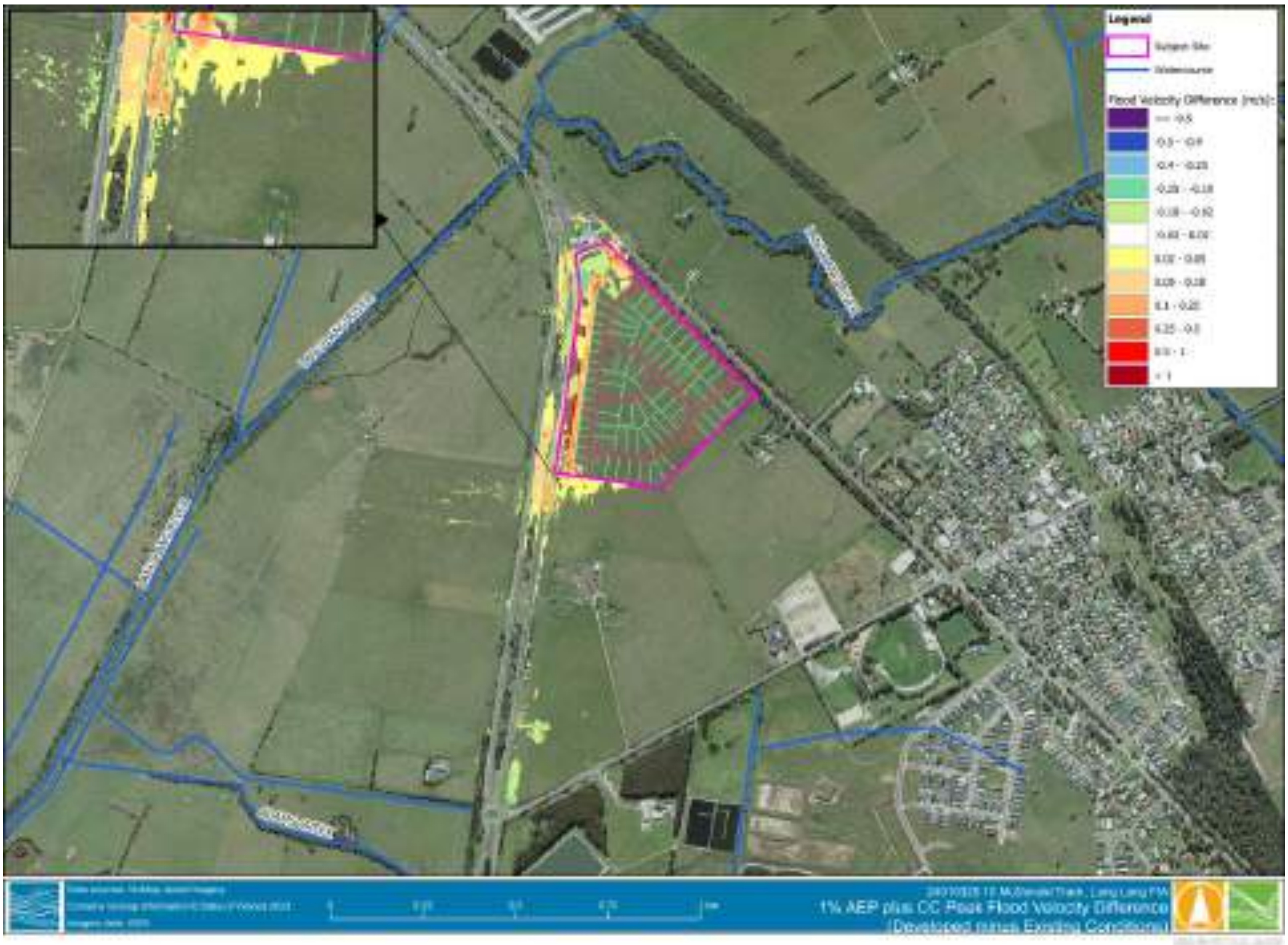


Figure 4-12 1% AEP plus CC Peak Flood Velocity Difference (Developed minus Existing Conditions)

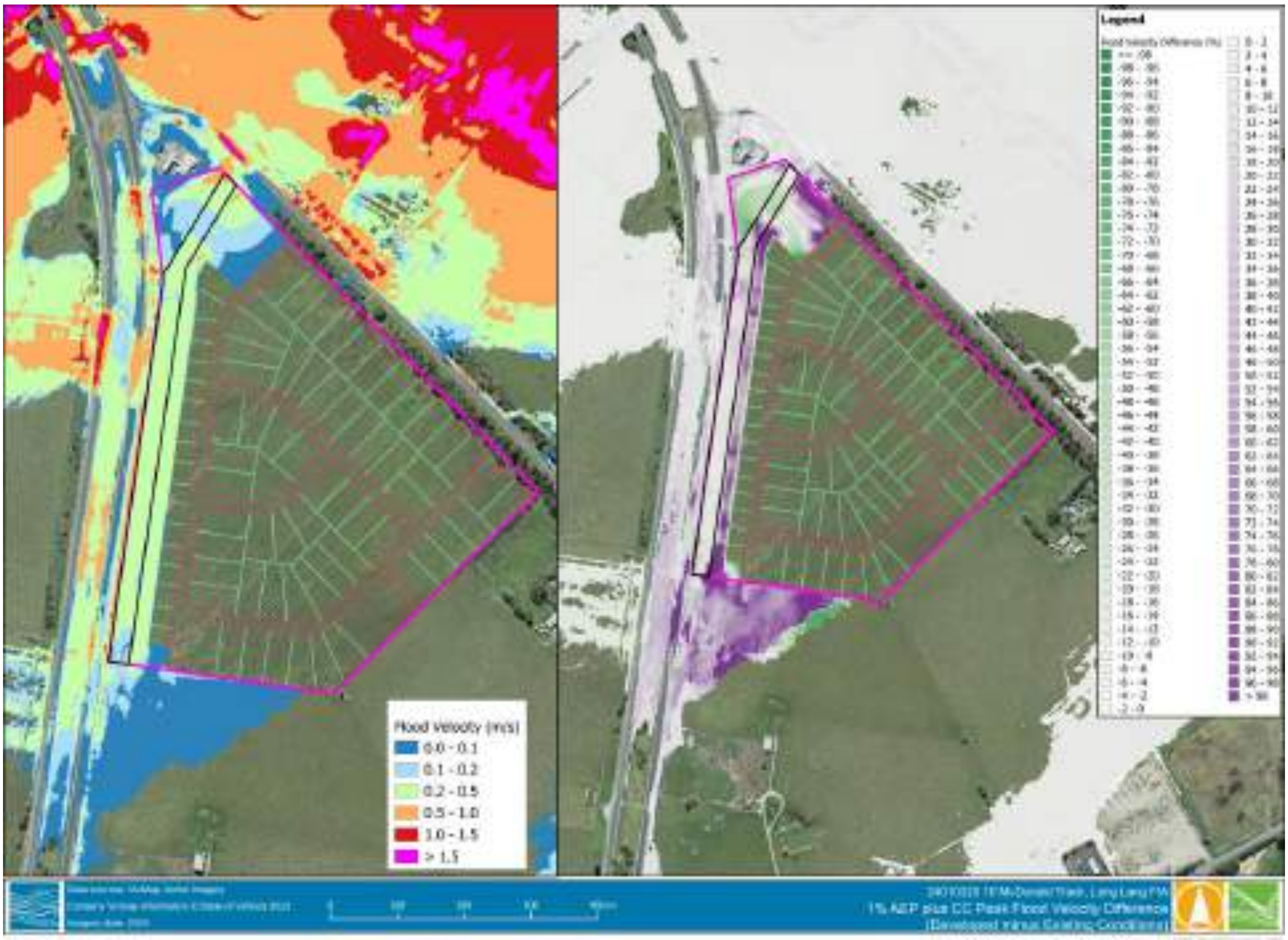


Figure 4-13 1% AEP plus CC Peak Flood Velocity Difference in percentage (Developed minus Existing Conditions) alongside Flood Velocity Mapping on the left

The hydrograph for flow, flood velocity, and flood levels at the proposed noise wall and VDP easement is presented in Figure 4-14, Figure 4-15, and Figure 4-16. The location where the hydrographs were captured is shown in Figure 4-6. The presented hydrographs in this section show only for the location at Noise Wall 1. The hydrograph for the other location is presented in 6Appendix B.

At Noise Wall 1, the flow and flood velocity in the developed condition is generally lower than the existing condition, with a difference at peak of 0.6 m^3/s and 0.07 m/s, respectively. The water surface level for the developed condition at peak is approximately 0.03 m higher than the existing condition.

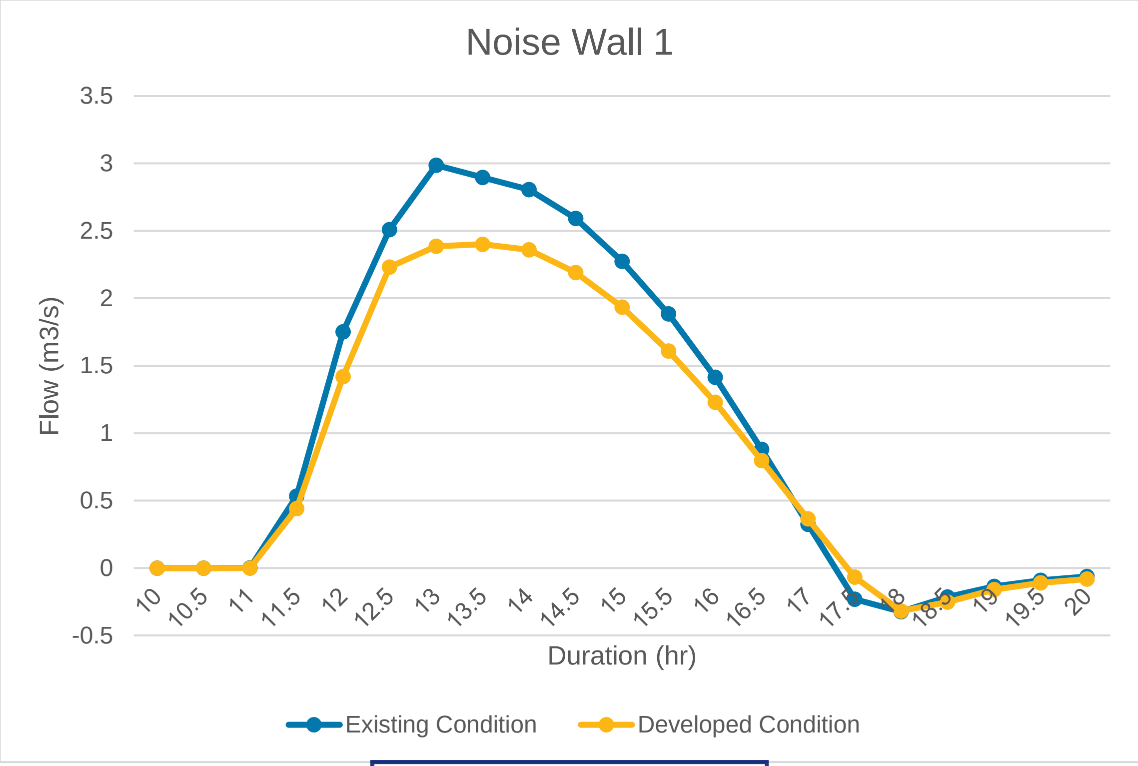


Figure 4-14 1% AEP plus CC flow hydrograph at Noise Wall 1

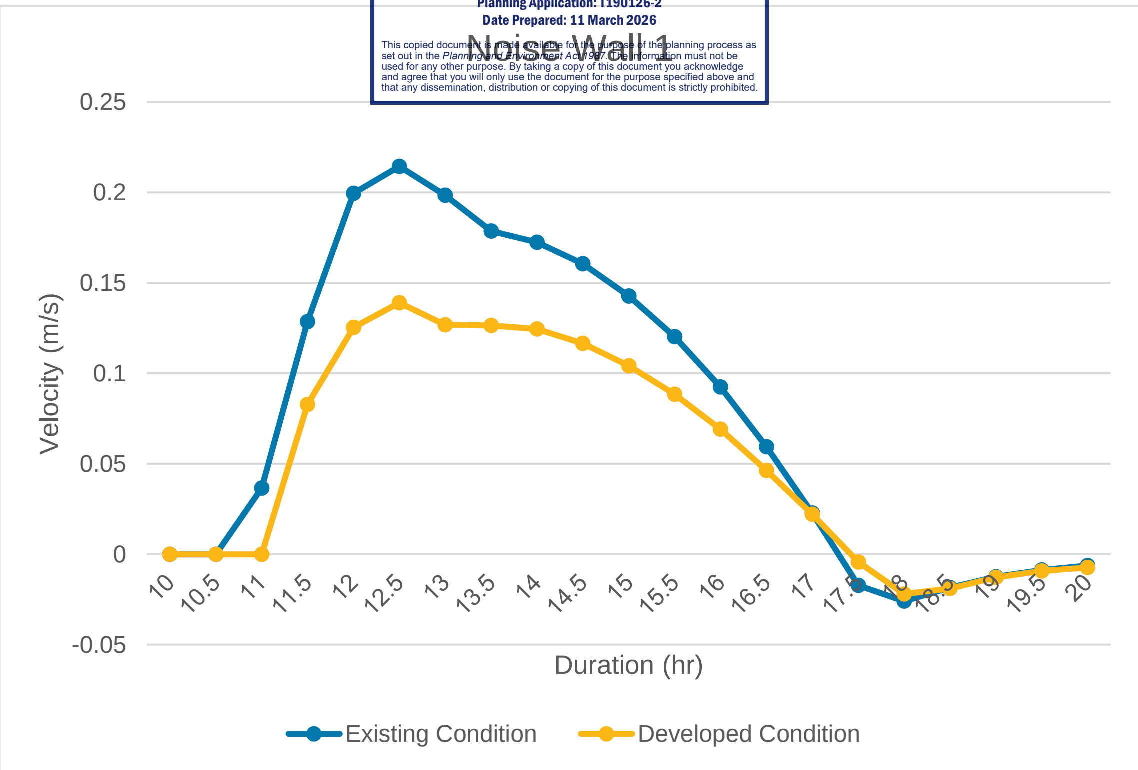


Figure 4-15 1% AEP plus CC velocity hydrograph at Noise Wall 1

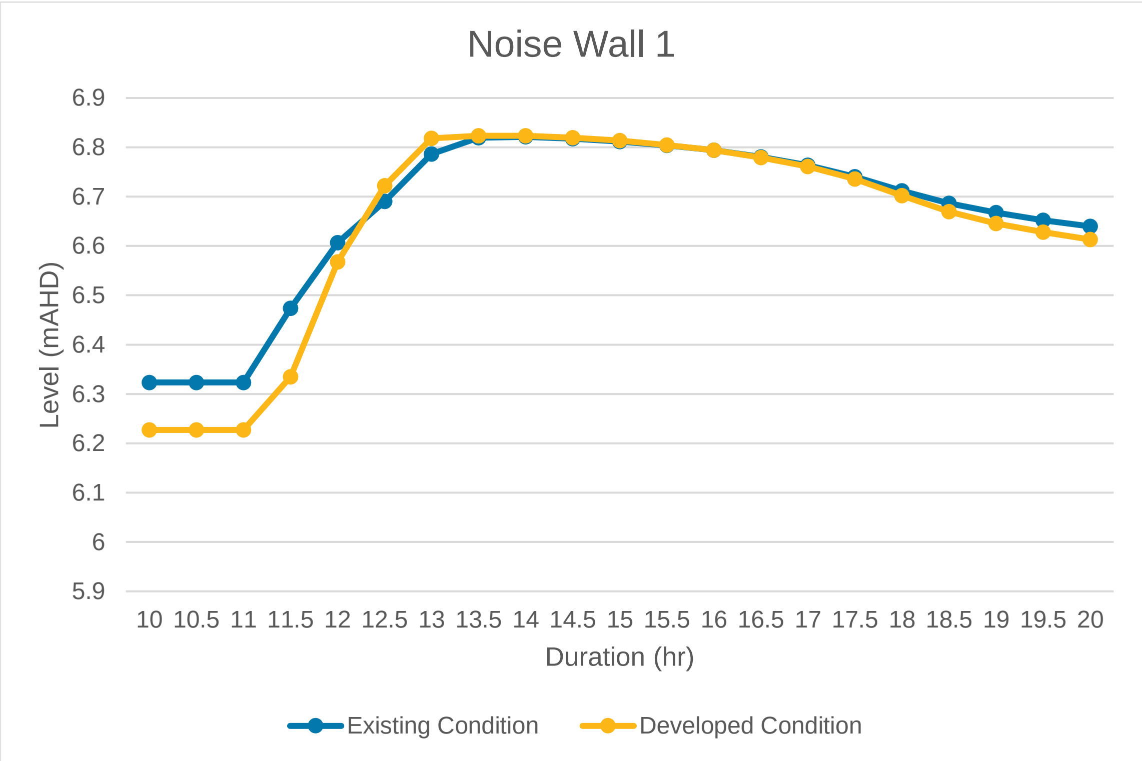


Figure 4-16 1% AEP plus CC water surface level hydrograph at Noise Wall 1

5 SENSITIVITY SCENARIO

The flood impact results show that the offsite flood level and velocity increases under the 1% AEP design flood and the 1% AEP plus CC design flood are negligible.

A sensitivity analysis was also conducted to assess flood impacts under higher (more frequent floods). This was done by reducing the 1% AEP design flows from MW by a factor of 50% (i.e. multiplying the flows by 0.5)

The modelling of this scenario shows there are no notable offsite flood impacts in terms of flood levels, as shown in Figure 5-1. There are also no material flood velocity increases.

It is considered that the flood impact objective is satisfied under 50% reduced flows of the 1% AEP event and the climate change scenario.

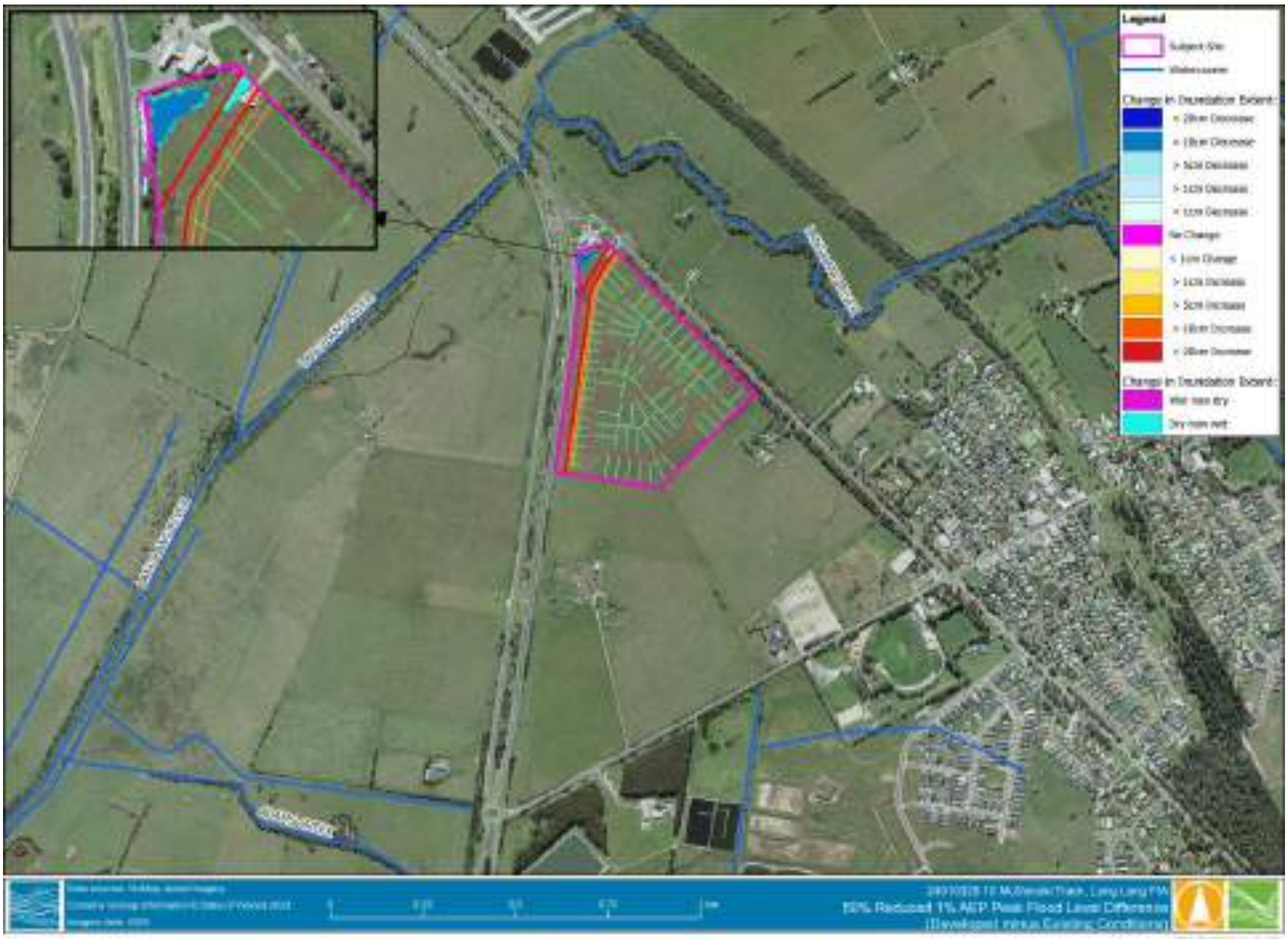


Figure 5-1 50% Reduced 1% AEP Peak Flood Level Difference (Developed minus Existing Conditions)

6 SUMMARY AND CONCLUSION

This Flood Impact Assessment (FIA) has considered the current and proposed 1% AEP design flood conditions, as well as the 1% AEP plus CC design flood at the Subject Site, 10 McDonald's Track, Lang Lang.

Supported by flood modelling, the FIA demonstrates that:

- The proposed development has satisfied Objective 1 – Flood Safety as:
  - The Subject Site access is not compromised for the proposed development for both the 1% AEP and 1% AEP plus CC design flood conditions.
  - Safe access/egress can be achieved by exiting the development towards McDonald's Track in both design cases.
  - The site's internal flood safety requirements would be met under both the 1% AEP and 1% AEP plus CC flood conditions, as the site will be filled to an appropriate height to provide protection from flooding.
- The proposed development has satisfied Objective 2 – Flood Damage as:
  - The development's FFLs will be set above the applicable flood levels with freeboard as a design requirement under both the 1% AEP and 1% AEP plus CC flood conditions.
  - The proposed development does not impact existing water services assets, including the VDP Corridor.
- The proposed development has satisfied Objective 3 – Flood Impacts as:
  - Offsite impacts of flood level and velocity increases under both the 1% AEP and 1% AEP plus CC flood conditions are negligible and do not change the flood hazard/risk.
  - There is no change in erosion risk along the VDP corridor or on other adjoining land.

A summary of whether Condition 26 (d) and Condition 35 of Planning Permit **T190126 - 1 AP** are met is shown in Table 6-1 and Table 6-2 respectively. Based on the above, I consider the development will have no material impact on the VDP easement nor adjacent properties.

Table 6-1 Planning Permit T190126 - 1 AP – Condition 26 (d)

Condition 26 (d)	Conditions Met
i. post development 1% AEP Design Flood peak flows must be controlled to not exceed pre-development conditions with appropriate stormwater infrastructure which is to be owned and managed by Council as the relevant drainage authority (except as otherwise provided for under condition 26(e));	N/A – A retardation basin will be designed to cater for runoff from the development and retard it to the permissible site discharge.
ii. proposed drainage system must be designed and built to the satisfaction of the relevant drainage authority (being Council);	N/A – a drainage system will be designed and built to the satisfaction of the relevant drainage authority

Condition 26 (d)	Conditions Met
iii. provision for safe conveyance of 1% AEP flood flows, through roadways and/or easements/reserves (or as otherwise agreed by Melbourne Water);	Met
iv. provision for the conveyance of flows from external catchment areas through the site with no detrimental impact on other properties (including flood levels or velocities); and	Met
v. any stormwater connections and outfalls must be designed and built to the satisfaction of relevant authorities;	N/A - stormwater runoff from the development will bypass the VDP easement entirely, discharging north of the site into the Lang Lang River

Table 6-2 Planning Permit T190126 - 1 AP – Condition 35

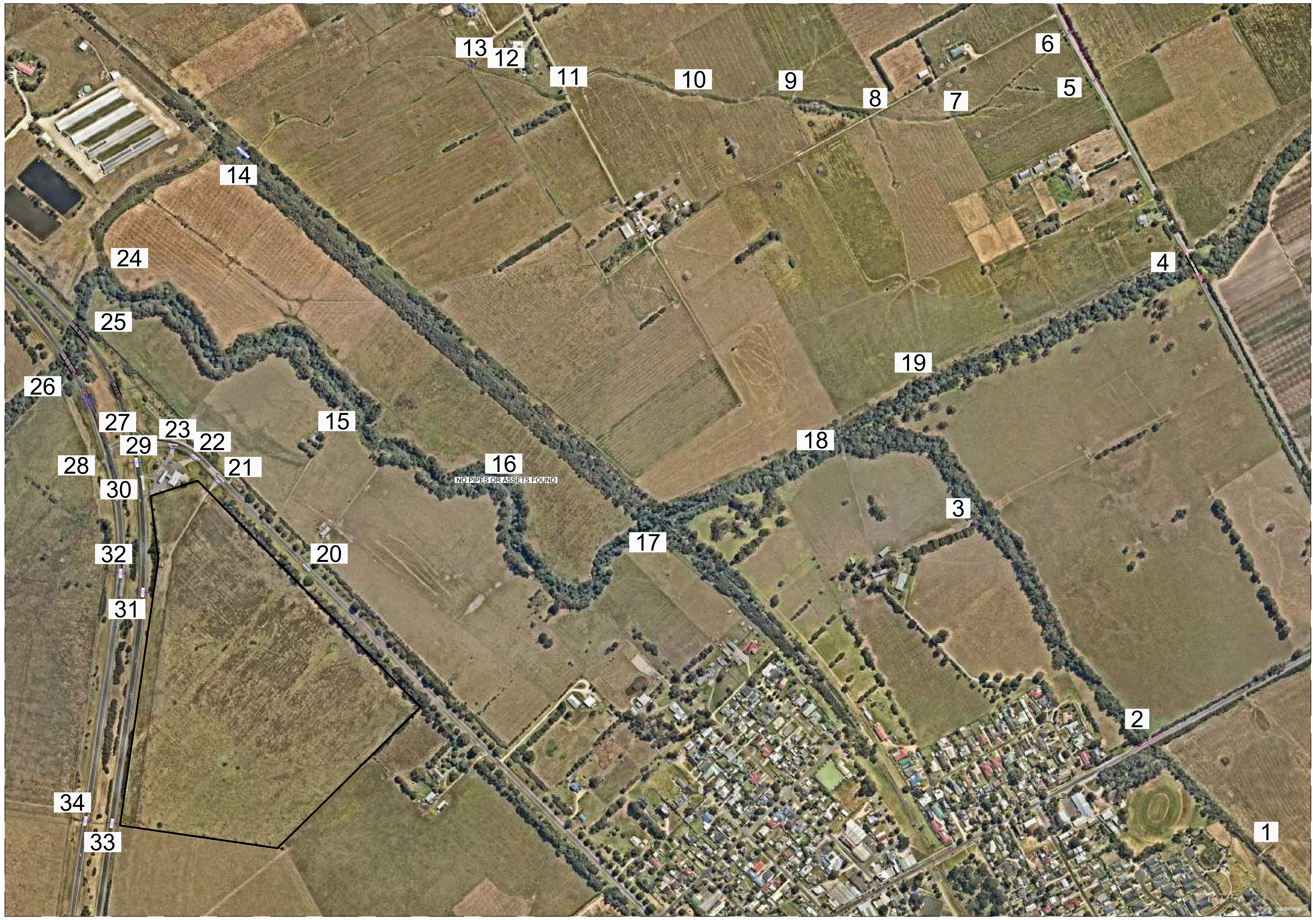
Condition 35	Conditions Met
a) No drainage infrastructure for the subdivision is to be located on, in or under the VDP Corridor.	Met
b) Subject to 35(e), no increase in stormwater or outflow or drainage from the subdivision is to cross onto, under, through, over or along the VDP Corridor.	Met – stormwater runoff from the development will bypass the VDP easement entirely, discharging north of the site into the Lang Lang River
c) Subject to 35(e), any retarding basin developed on the land must be designed and constructed so as to avoid changes to the water table or groundwater levels or flows in the vicinity of the VDP Corridor.	N/A – water quality and retardation assets will be lined, to minimise seepage
d) Subject to condition 35(e), any works associated with the development of the site (including any filling of the land and other works that result in increased stormwater runoff) must not result in any increase (whether by volume, frequency, flow or otherwise) in: i. the discharge of water; or ii. ii. stormwater, overland or floodwater flows- iii. iii. onto, under, through, over or along any part of the VDP Corridor. Suitable works must be provided on the land (outside the VDP Corridor) as required to comply with this condition	Met

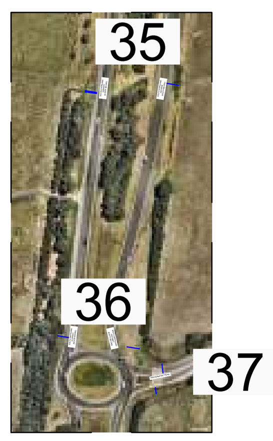
Condition 35	Conditions Met
e) Notwithstanding conditions 35(b), (c) and (d), the developer may seek that Melbourne Water approve (which approval can only be provided in consultation with the Department of Environment, Land, Water and Planning): i. Works which result in an increase in flooding onto, under, through, over or along any part of the VDP Corridor as a result of filling the land; or ii. A retarding basin which changes the water table or groundwater level or flows in the vicinity of the VDP Corridor; if the increase (or the change) is negligible and it is demonstrated that this increase (or the change) will have no detrimental impact on the assets within the VDP Corridor. Any application for approval under this sub-clause must be supported by a report from a suitably qualified hydrology expert to the satisfaction of Melbourne Water.	Met
f) No infrastructure in connection with the subdivision (including fill but excluding any boundary fence on the Reserve referred to in Condition 27 and excluding any acoustic barrier referred to in condition 36) is to be constructed within 2.4 metres of the VDP Corridor, and the fill is to be battered back in accordance with the plan by Lyssna Group Pty Ltd entitled Desalination Easement/Reserve & Lot Cross Section, Country Cove Estate, McDonalds Track, Lang Lang Job No AA0085 Drawing No UD00CB dated 23 November 2022, unless varied as necessary to comply with Condition 26 and subject to agreement between Melbourne Water and DELWP.	Met
g) No fill material in connection with the subdivision is to be placed on the VDP Corridor.	Met
h) No buildings or works in connection with the subdivision are to occur in the VDP Corridor	Met
i) No access ways or works in connection with entry and exit points to the subdivision are to be constructed across or within the VDP Corridor.	Met

Condition 35	Conditions Met
j) Prior to the certification of Stage 2 of the Plan of Subdivision, the developer must, at its cost, engage a suitably qualified expert in drainage and flood management to prepare a report demonstrating (including through plans, computations and modelling, as necessary), to the satisfaction of Melbourne Water, the Responsible Authority and the Department of Environment, Land, Water and Planning, how compliance with conditions 35 (b), (c), (d) and (f) will be achieved.	Met

APPENDIX A
LYSSNA GROUP PIPES & CULVERTS SURVEY

NUMBERS REFER TO ENLARGEMENTS ON SHEETS 2-4





N
MGA

Lyssna

CLIENT

Charles Lloyd Property Group

PROJECT

Address
McDonalds Track
Lang Lang
Certificate of Title
Volume 9547 Folio 926 (Part)

SURVEY

Lang Lang River & Tributaries Bridge & Culvert Feature & Level Survey

SCALE 1:5000 (0 50 100 150 200 300)

Date of Survey	29/4-30/5/24 & 30/7/24
Job Number	AA0085
Drawing Number	FLBB
Drawing Issue Date	30/07/24
Drawn By	CD
Original Page Size	A1

NOTATIONS

This plan and information shown must only be used by the client for its intended purpose. Lyssna Group does not warrant the use of the plan or information shown for any other purpose. All third parties are responsible for verifying information and its suitability for their purposes.

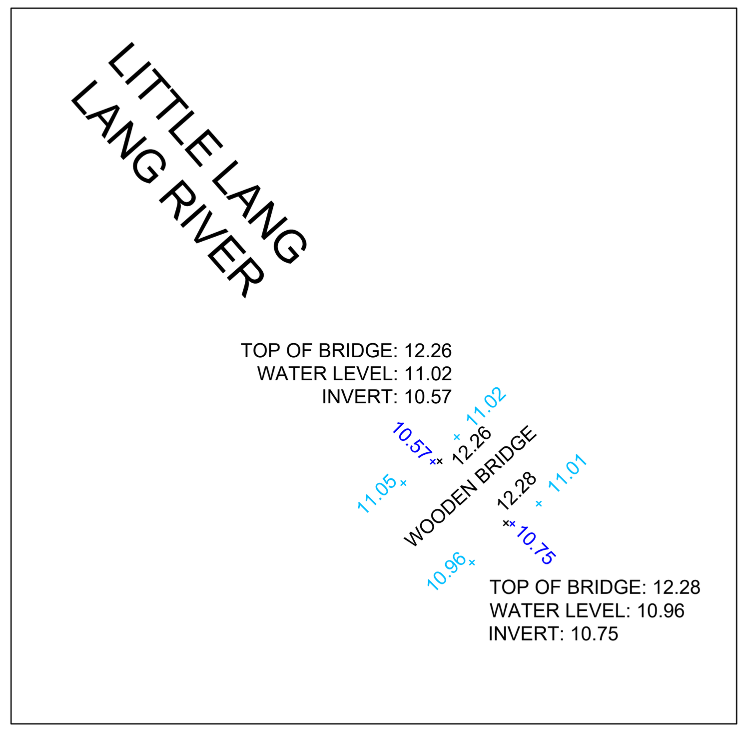
Numbers shown on Sheet 1 refer to enlargements on Sheets 2-4.
Number 16 does not refer to an enlargement, no pipes or assets were found in this location and therefore no measurements recorded.

Levels shown 12.34 have been reduced to the Australian Height Datum (AHD) based on LANG LANG PM 16 [Registered Value : 13.396 metres AHD] and confirmed with LANG LANG PM 8 [Registered Value : 14.500 metres AHD] and YALLOCK PM 80 [Registered Value : 5.854 metres AHD]

LEGEND

102	TOP OF BANK
103	TOE OF BANK
104	EXISTING SURFACE
105	WATER LEVEL
305	CULVERT
307	WING WALL
317	OBVERT
321	INVERT LEVEL
403	BITUMEN
419	CONCRETE
501	GUARDRAIL
610	PIERS
632	SOFFITS
651	TOP OF BRIDGE
801	RAILWAY LINE
903	FENCE

Lyssna Group Pty Ltd
ABN 18 616 811 191
PO Box 1098, South Melbourne 3205
Suite 3, 102 Dodds Street
Southbank VIC 3006 Australia
LyssnaGroup.com



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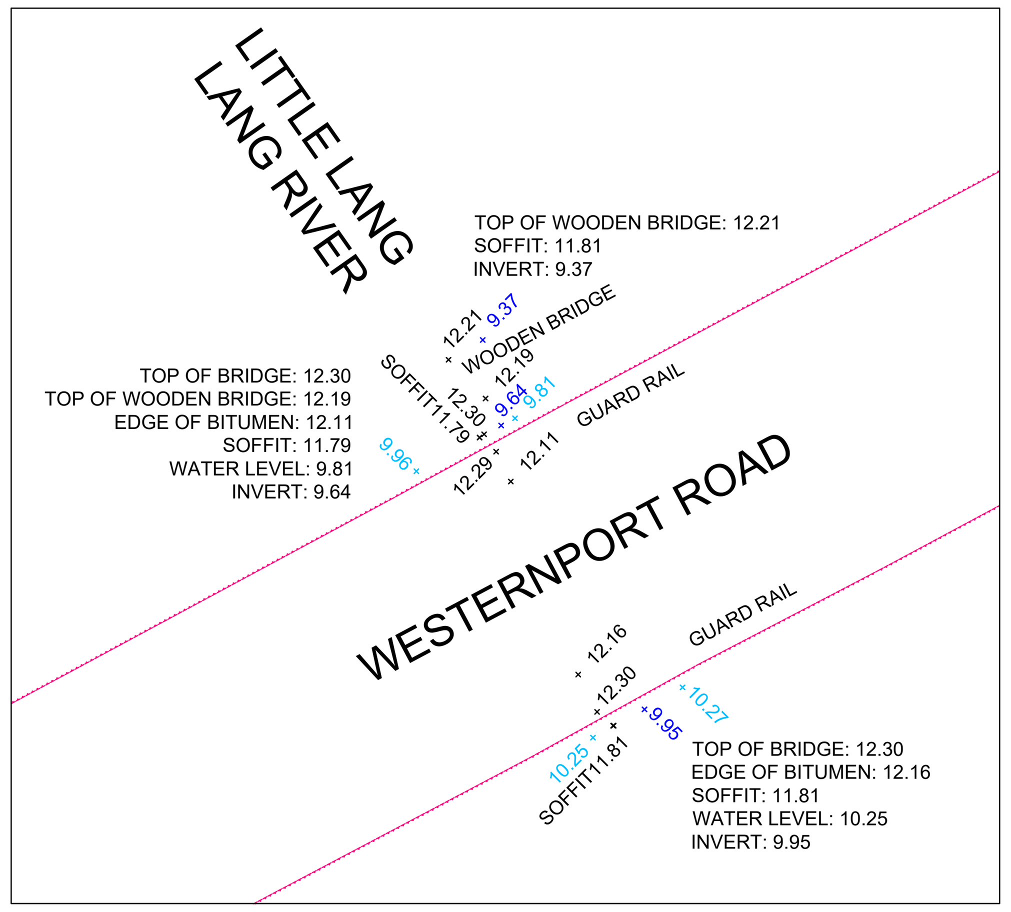

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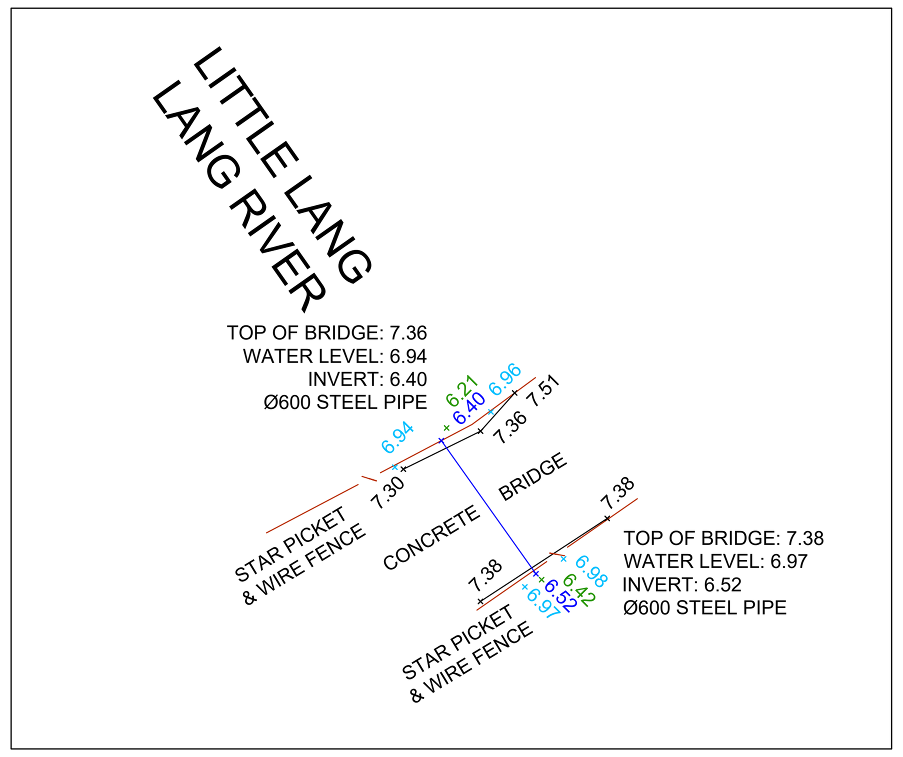

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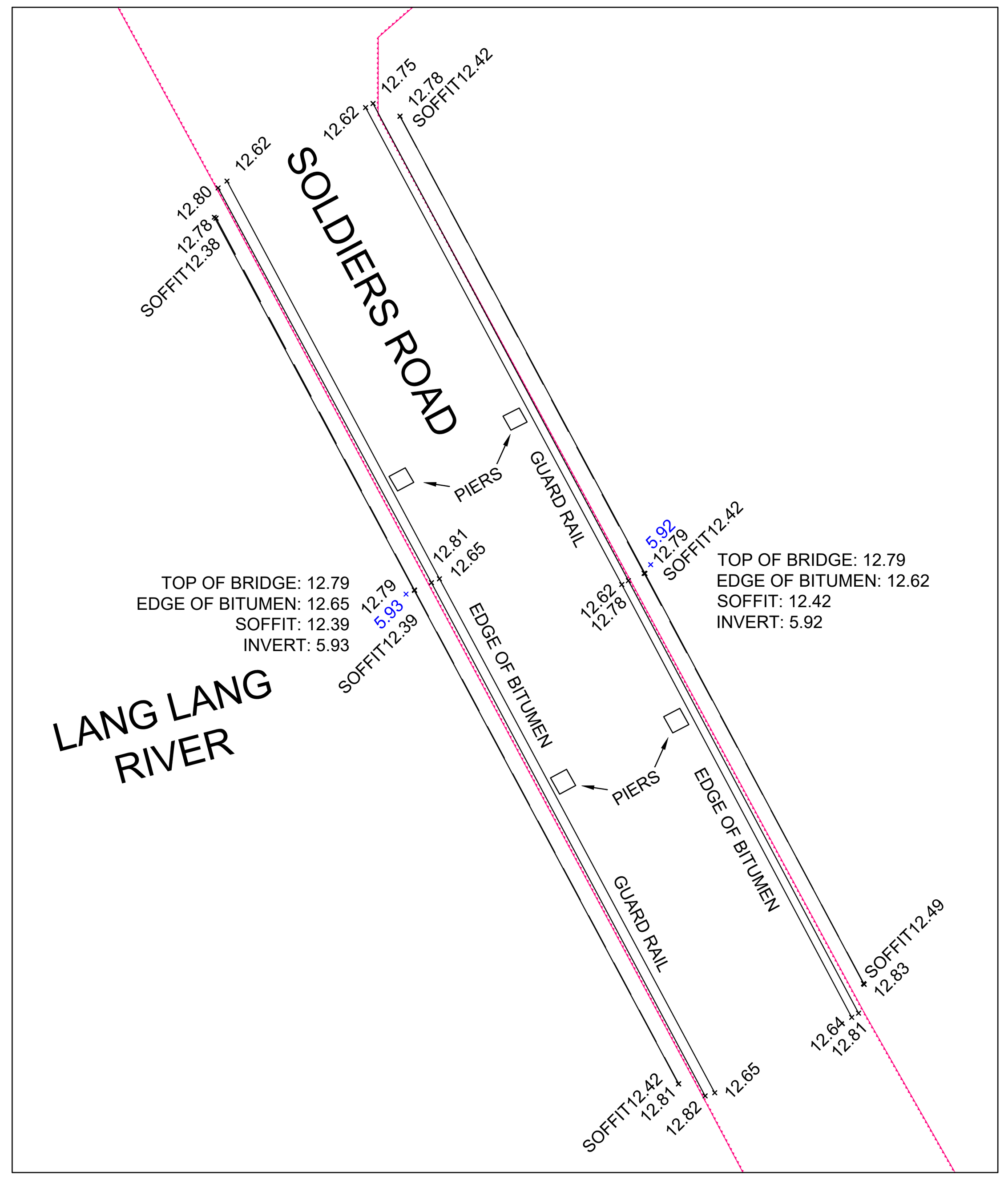

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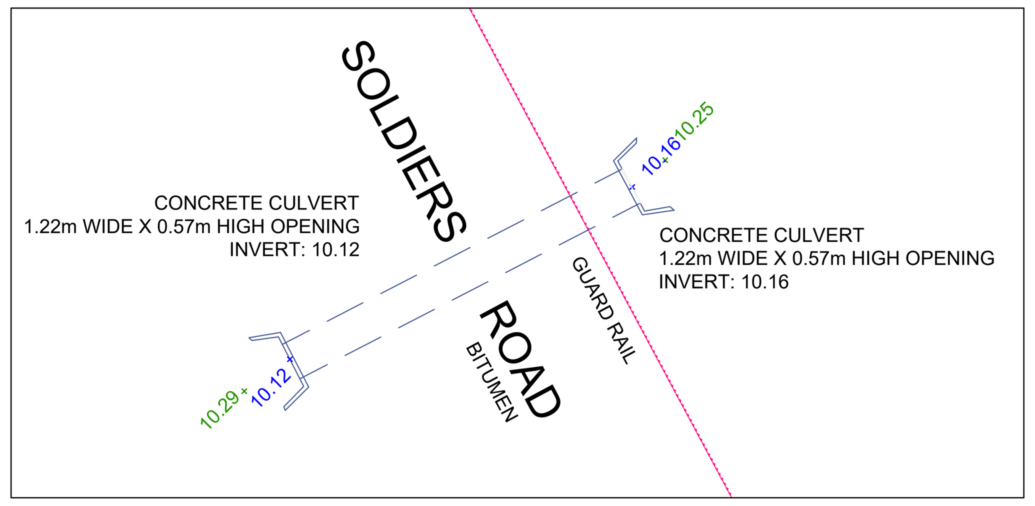

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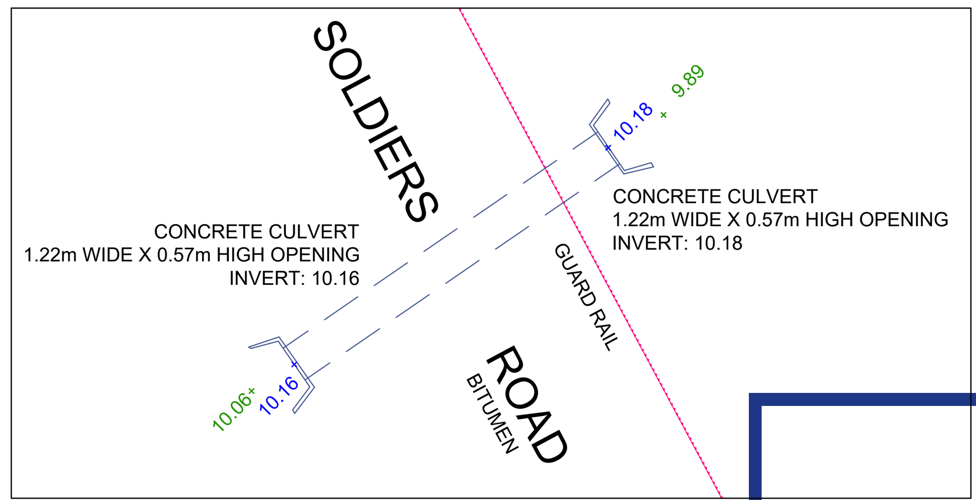

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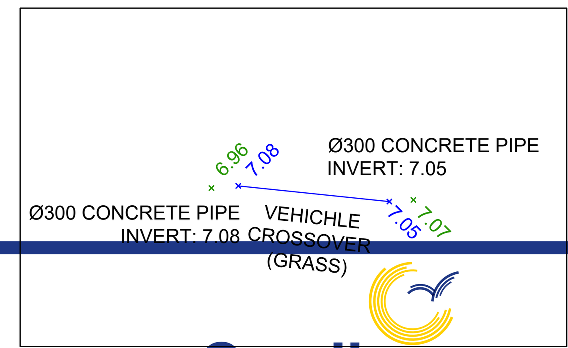

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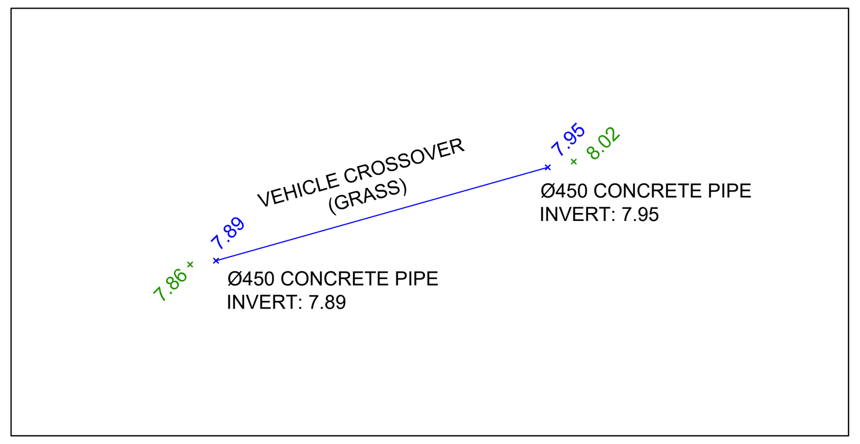

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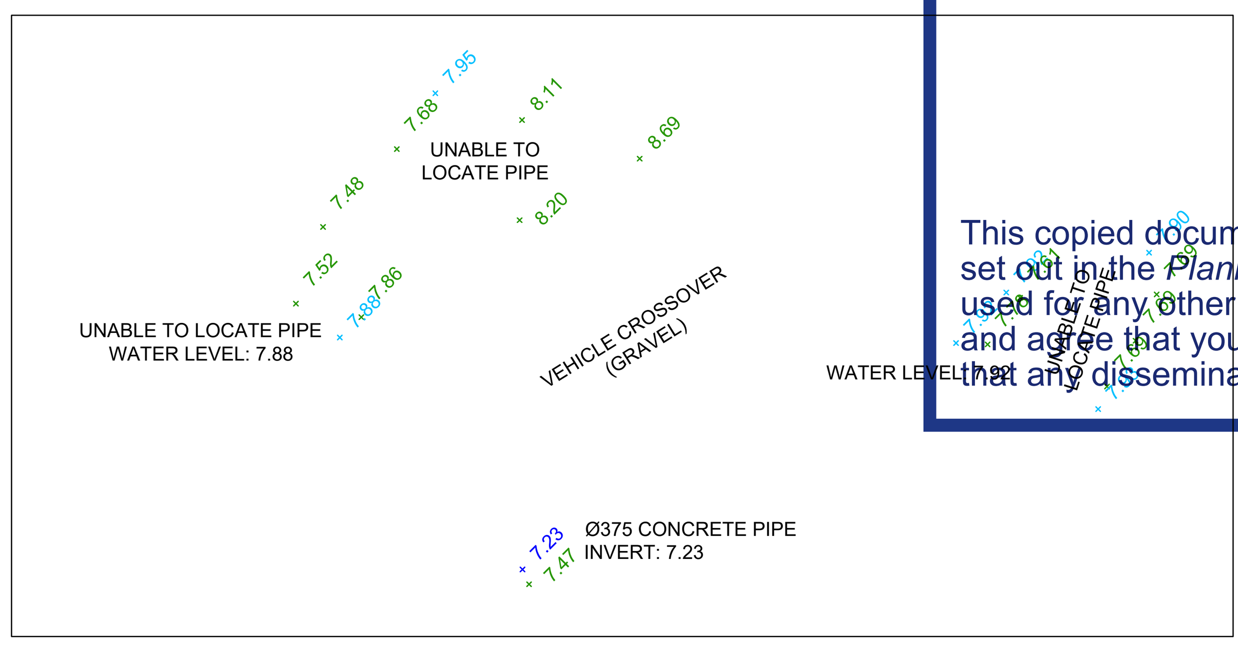

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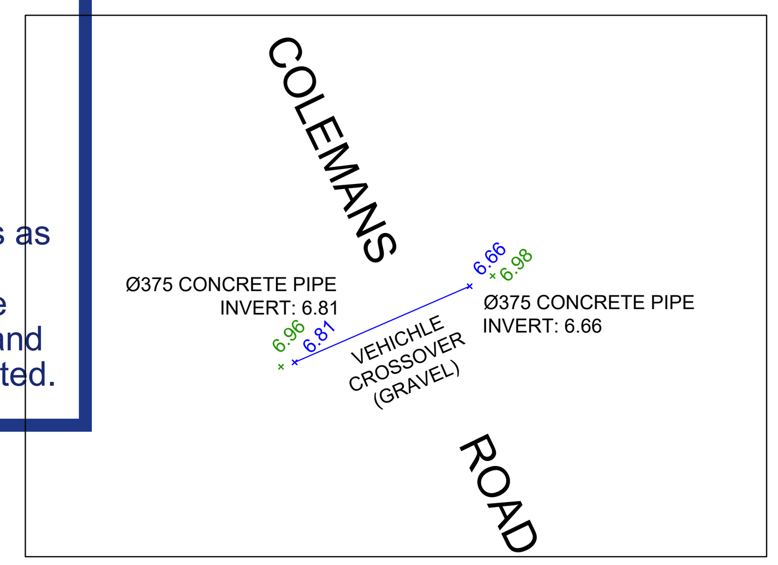

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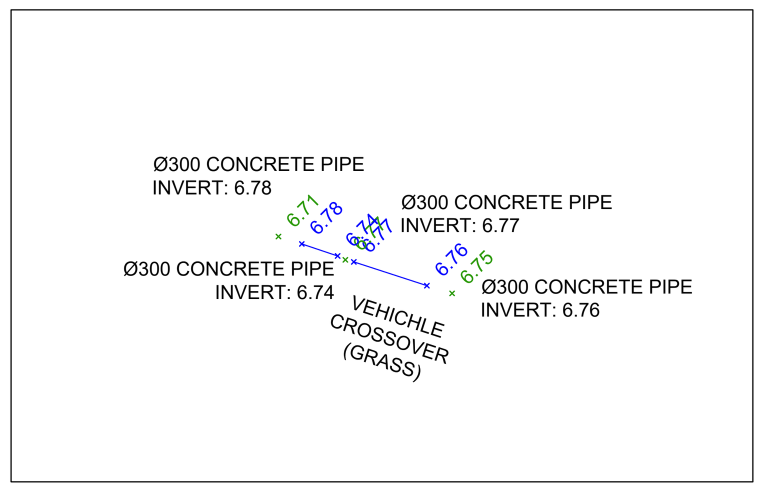

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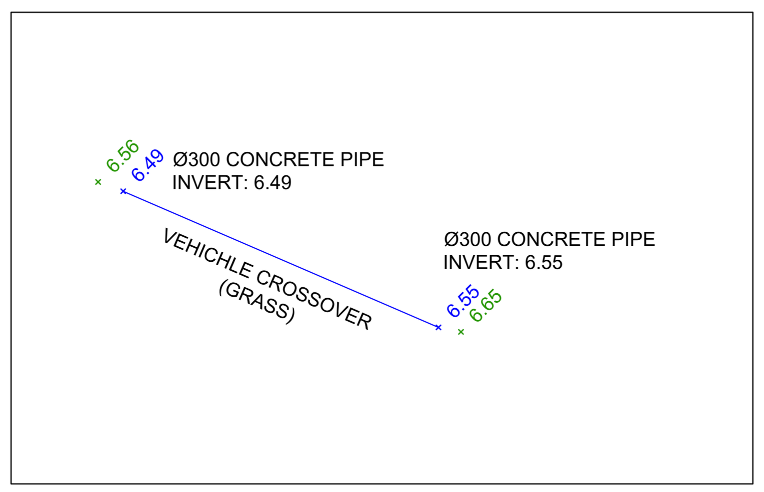

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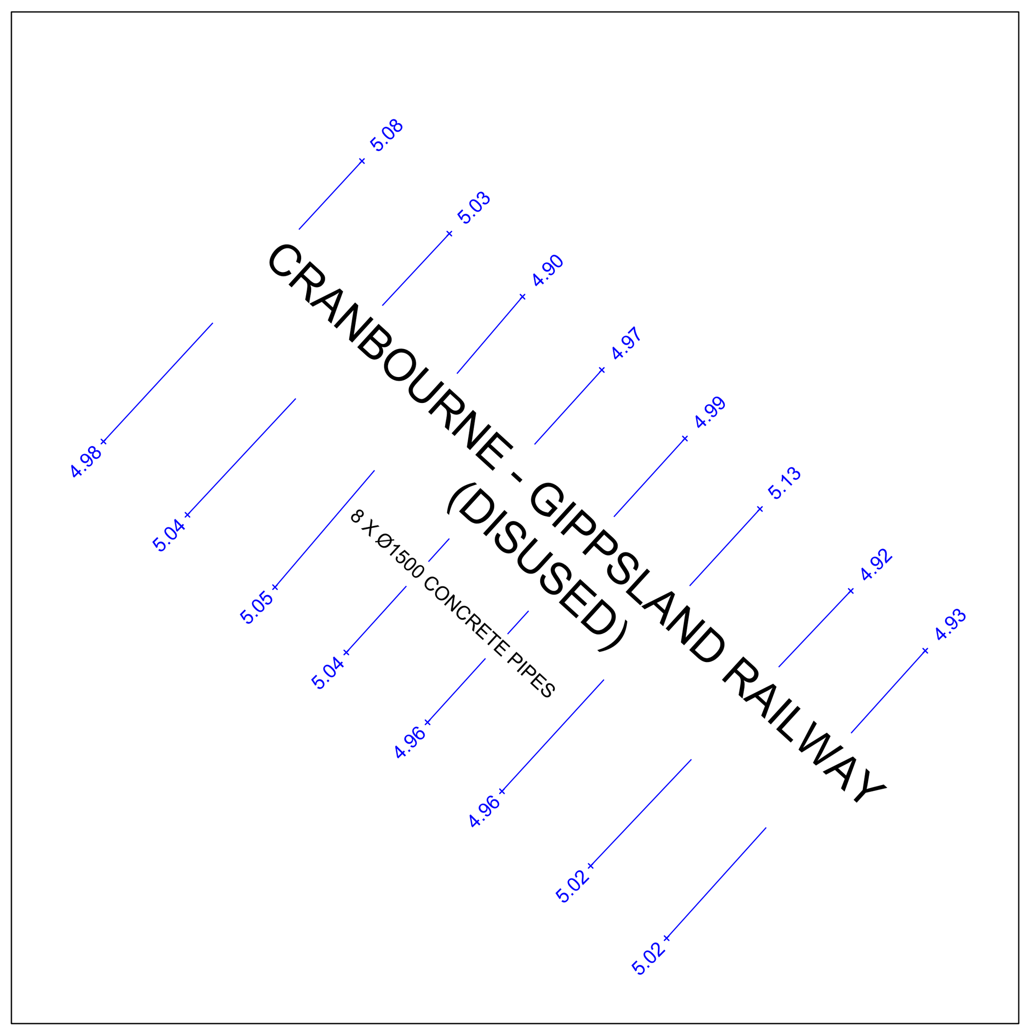

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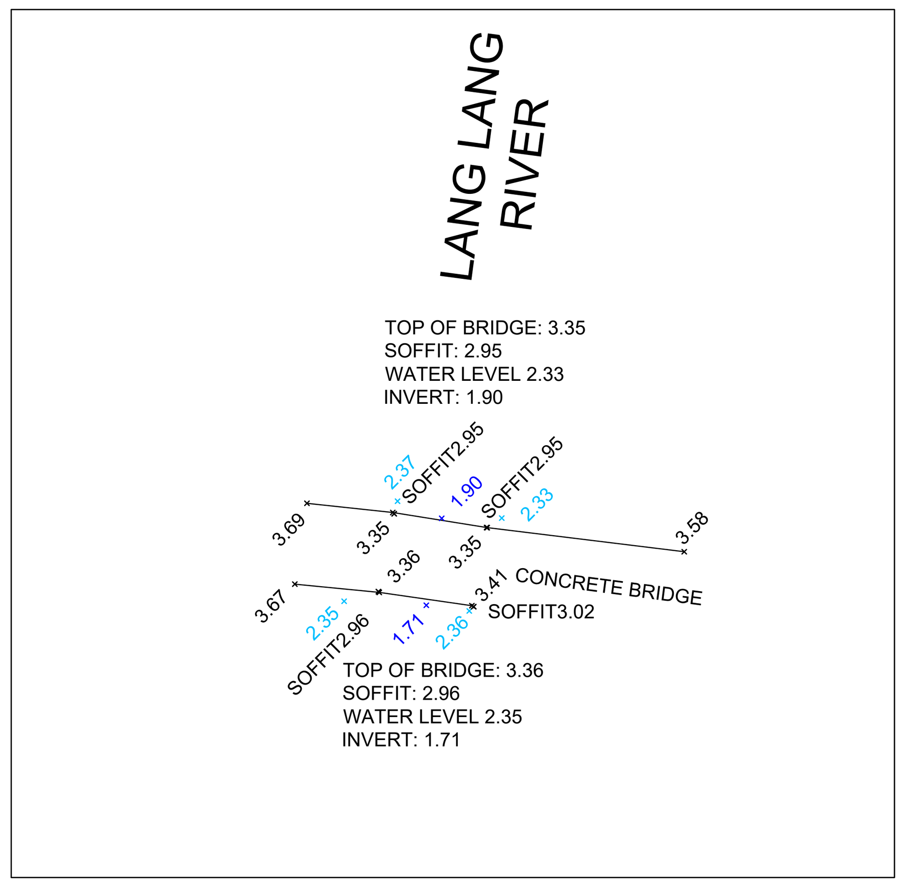

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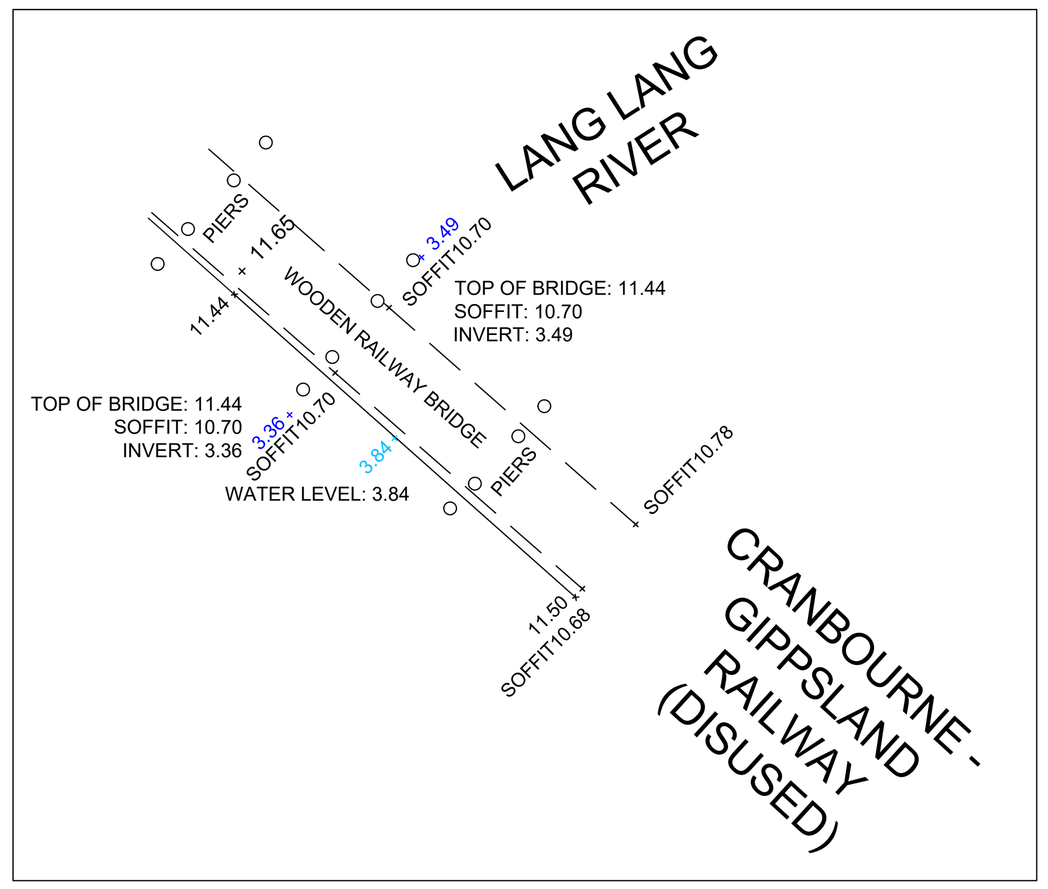

17.

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PROJECT

Address
McDonalds Track
Lang Lang
Certificate of Title
Volume 9547 Folio 926 (Part)

SURVEY

Lang Lang River & Tributaries Bridge & Culvert Feature & Level Survey

SCALE 1:200
0 2 4 6 8 12

Date of Survey	29/4-30/5/24 & 30/7/24
Job Number	AA0085
Drawing Number	FLBB
Drawing Issue Date	30/07/24
Drawn By	CD
Original Page Size	A1

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LEGEND

102	TOP OF BANK
103	TOE OF BANK
104	EXISTING SURFACE
105	WATER LEVEL
305	CULVERT
307	WING WALL
317	OBVERT
321	INVERT LEVEL
403	BITUMEN
419	CONCRETE
501	GUARDRAIL
610	PIERS
632	SOFFITS
651	TOP OF BRIDGE
801	RAILWAY LINE
903	FENCE

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Southbank VIC 3006 Australia
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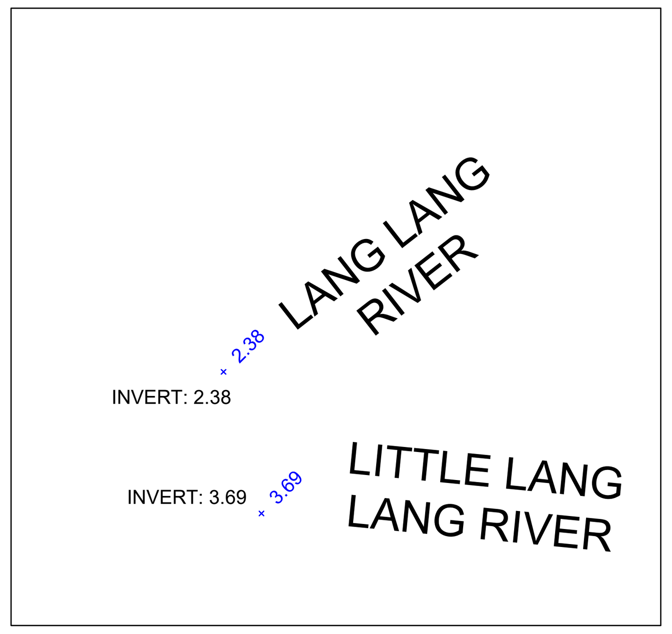

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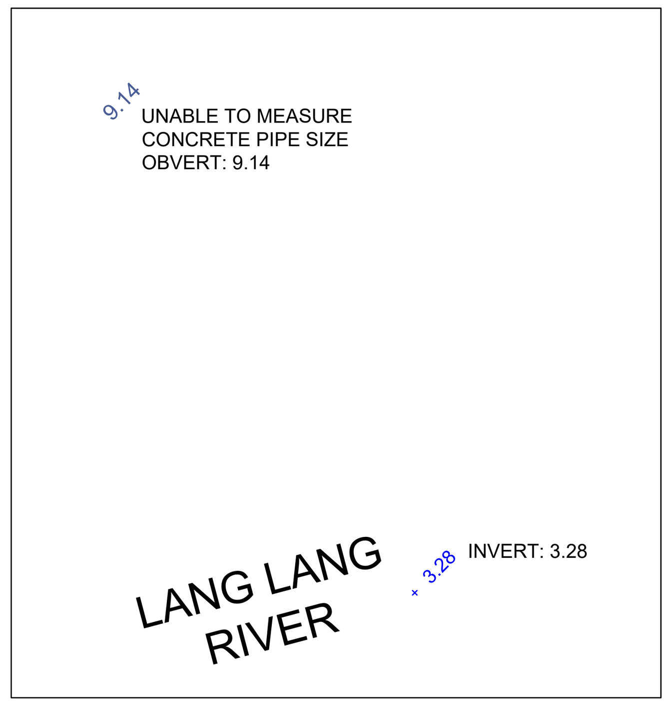

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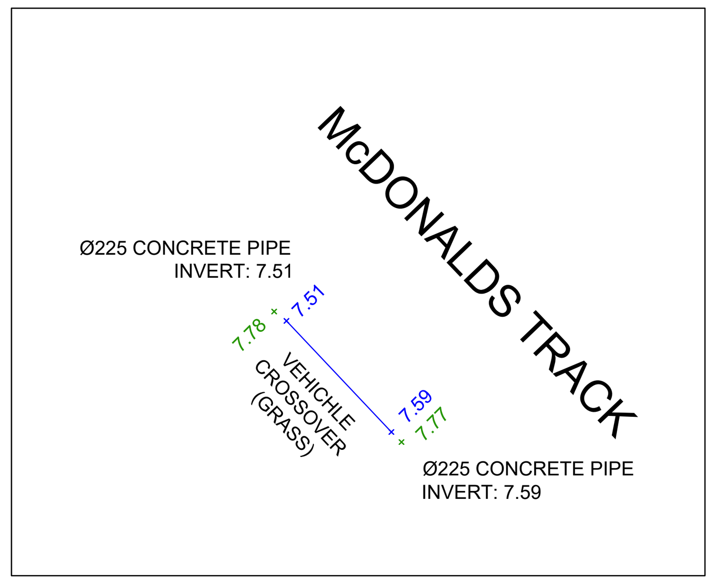

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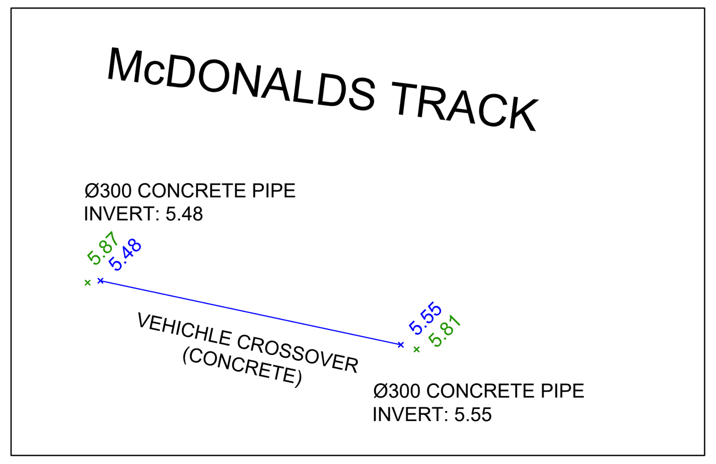

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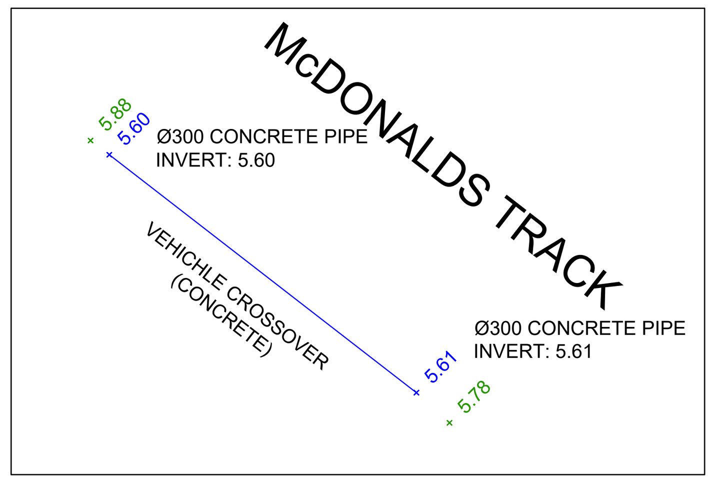

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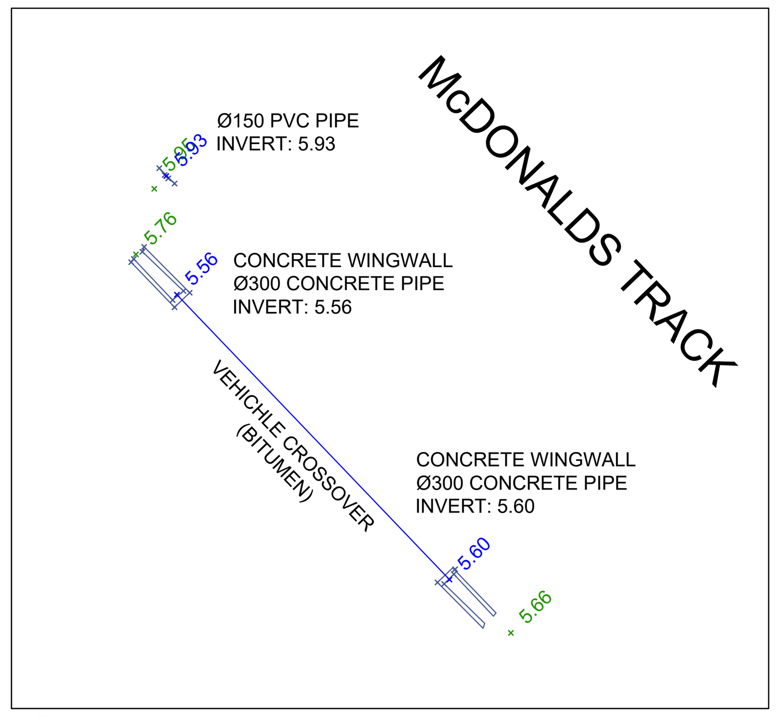

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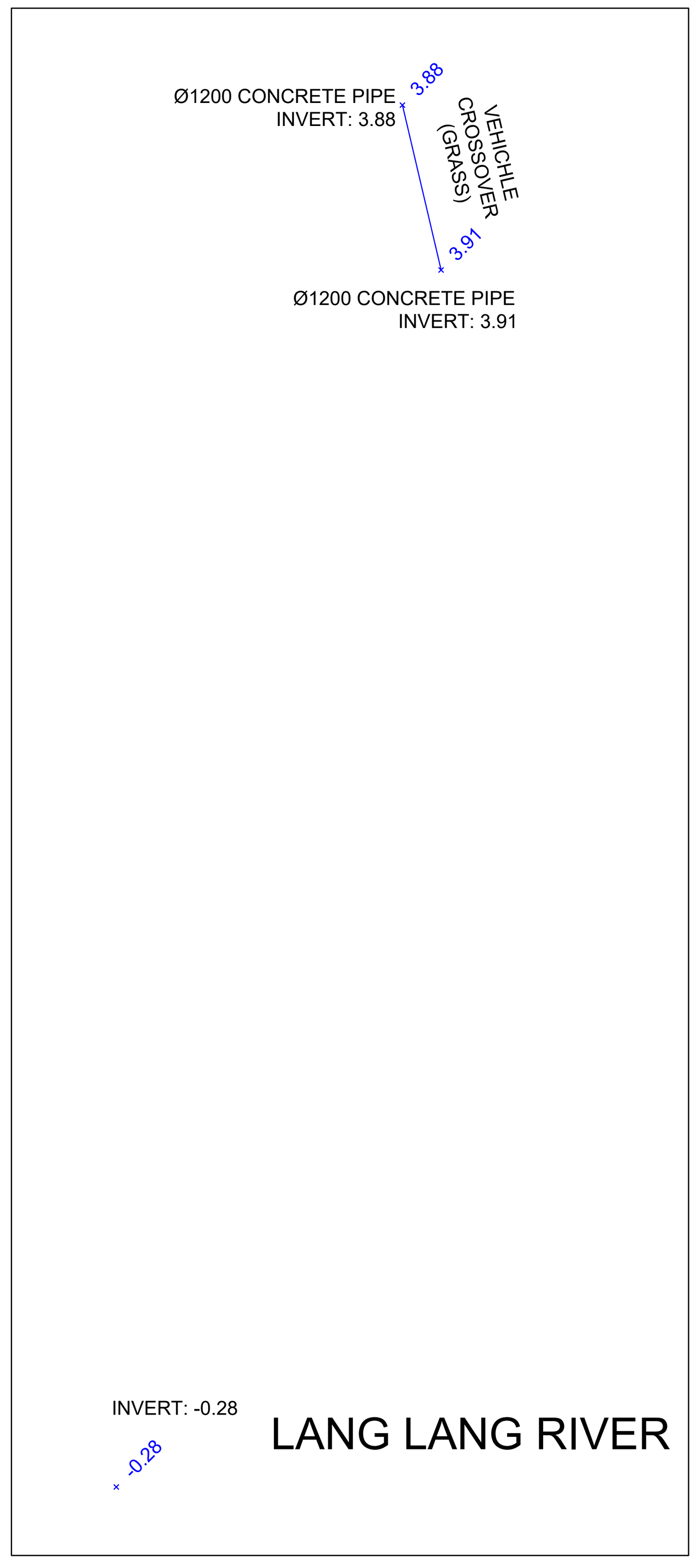

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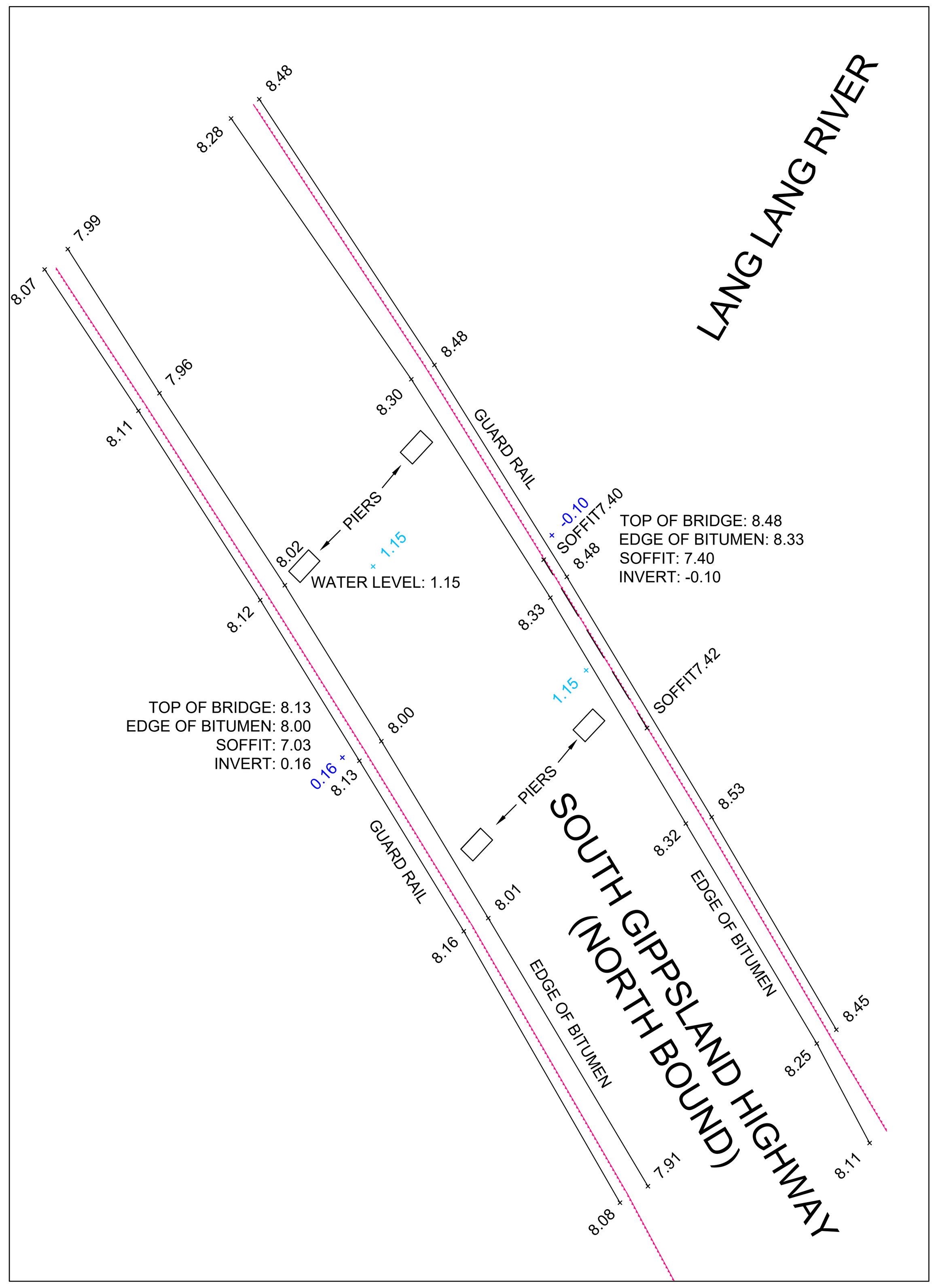

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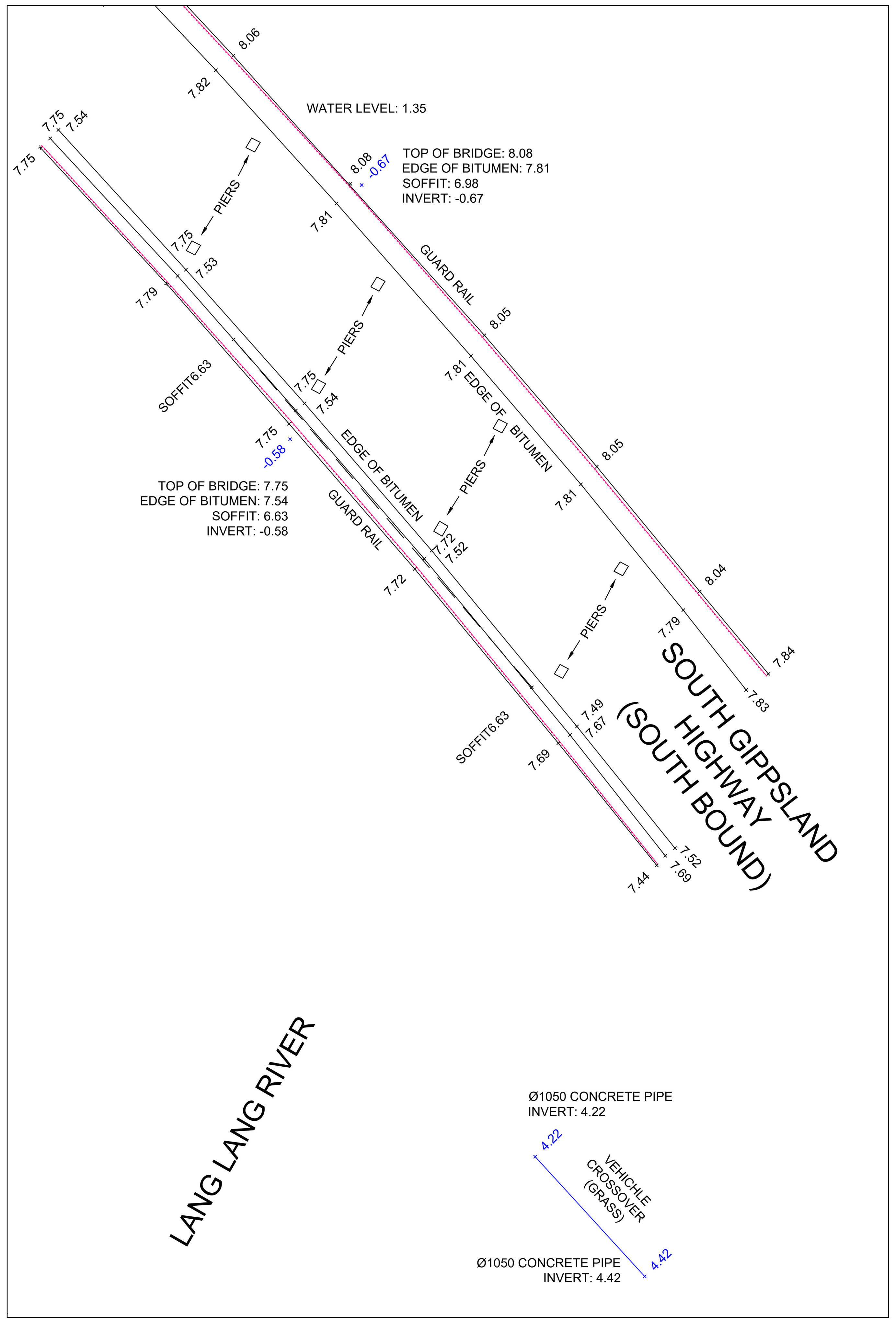

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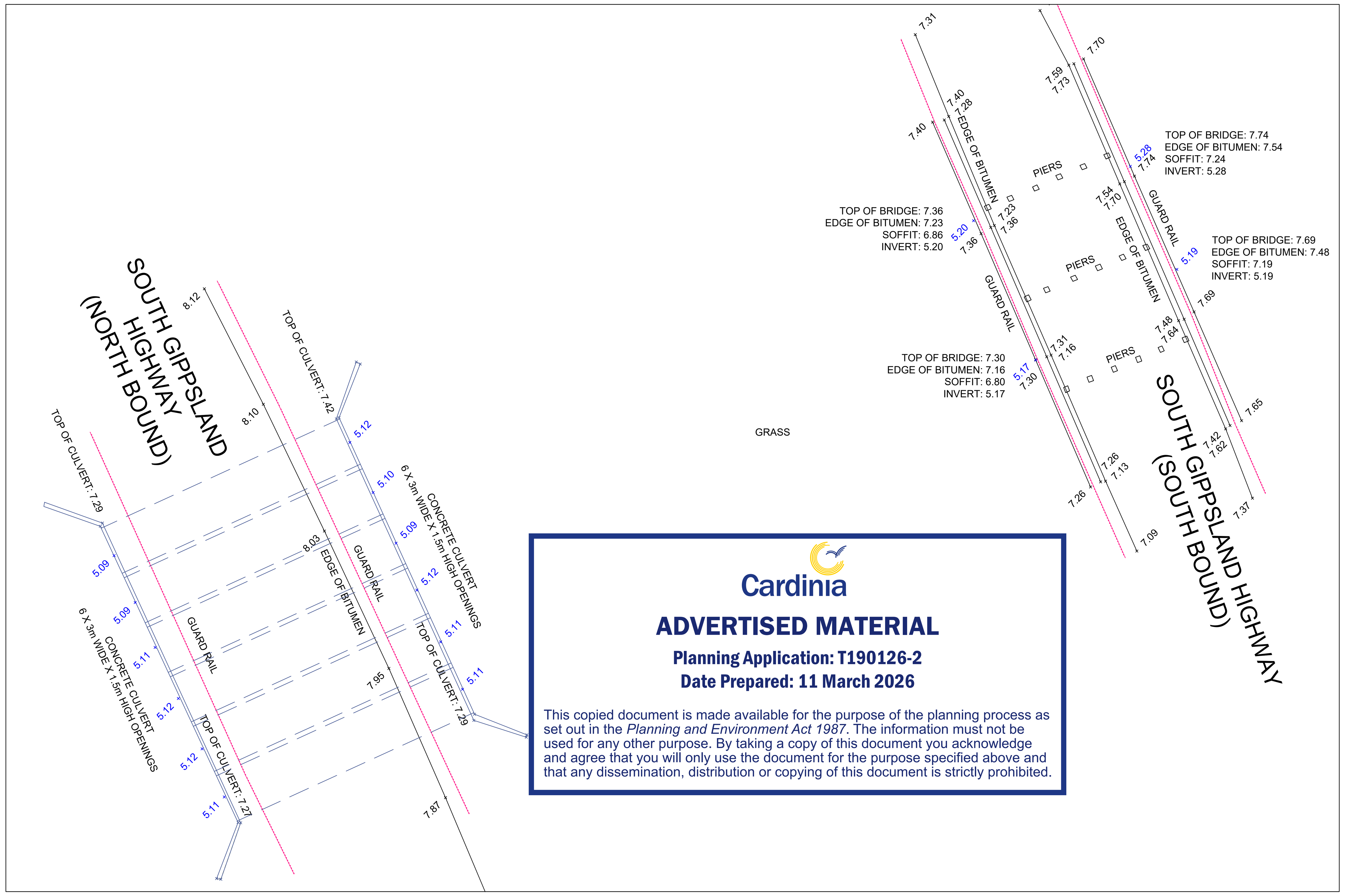

27.

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SURVEY

Lang Lang River & Tributaries Bridge & Culvert Feature & Level Survey

SCALE 1:200 — 0 2 4 6 8 12

Date of Survey	29/4-30/5/24 & 30/7/24
Job Number	AA0085
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Drawn By	CD
Original Page Size	A1

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LEGEND

102	TOP OF BANK	X
103	TOE OF BANK	X
104	EXISTING SURFACE	X
105	WATER LEVEL	X
305	CULVERT	
307	WING WALL	X
317	OBVERT	
321	INVERT LEVEL	X
403	BITUMEN	X
419	CONCRETE	X
501	GUARDRAIL	
610	PIERS	
632	SOFFITS	X
651	TOP OF BRIDGE	X
801	RAILWAY LINE	X
903	FENCE	

SHEET 3 OF 4

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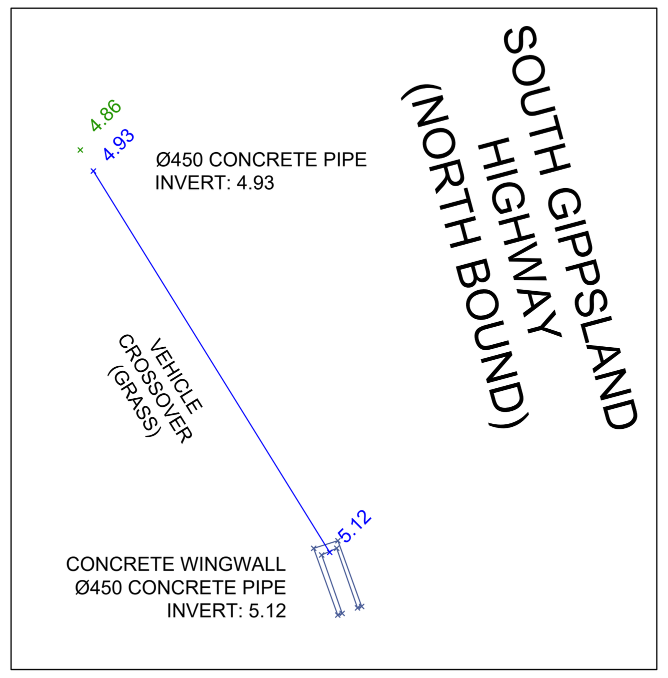

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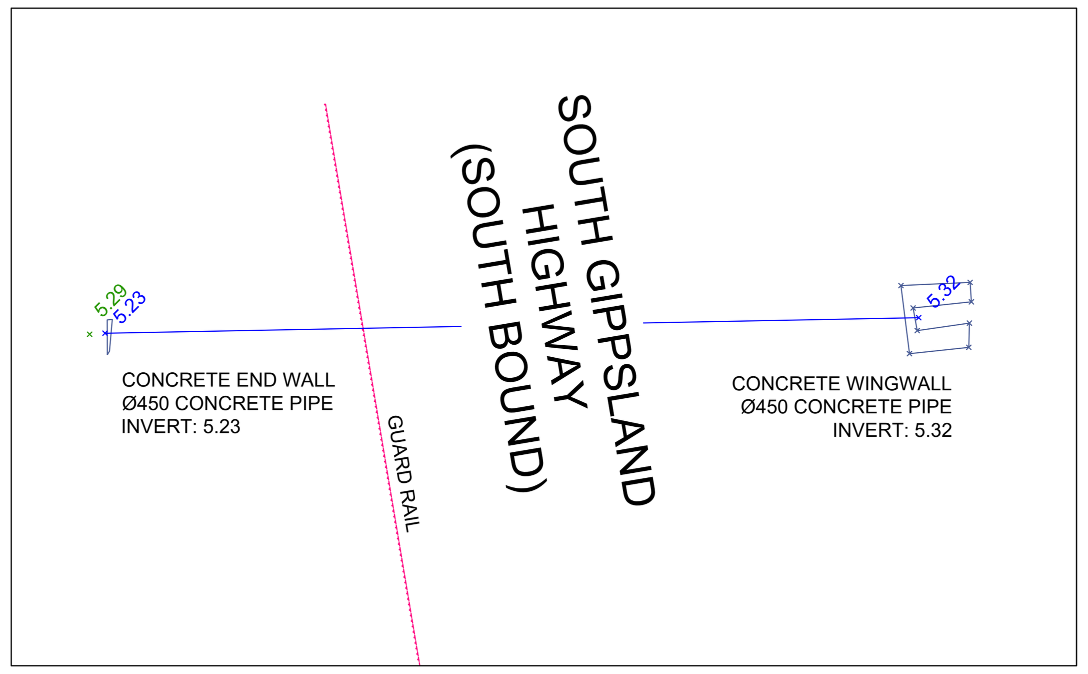

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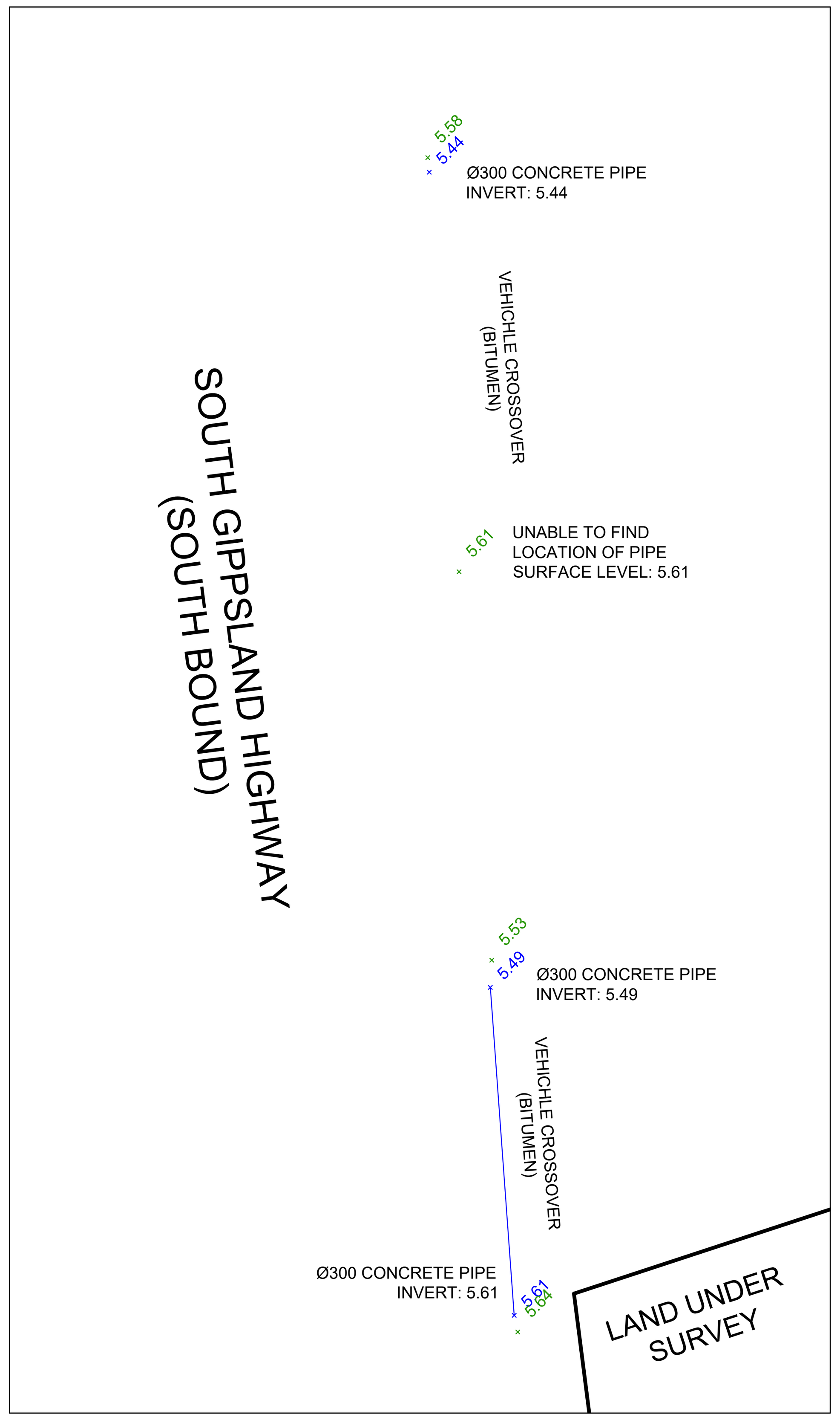

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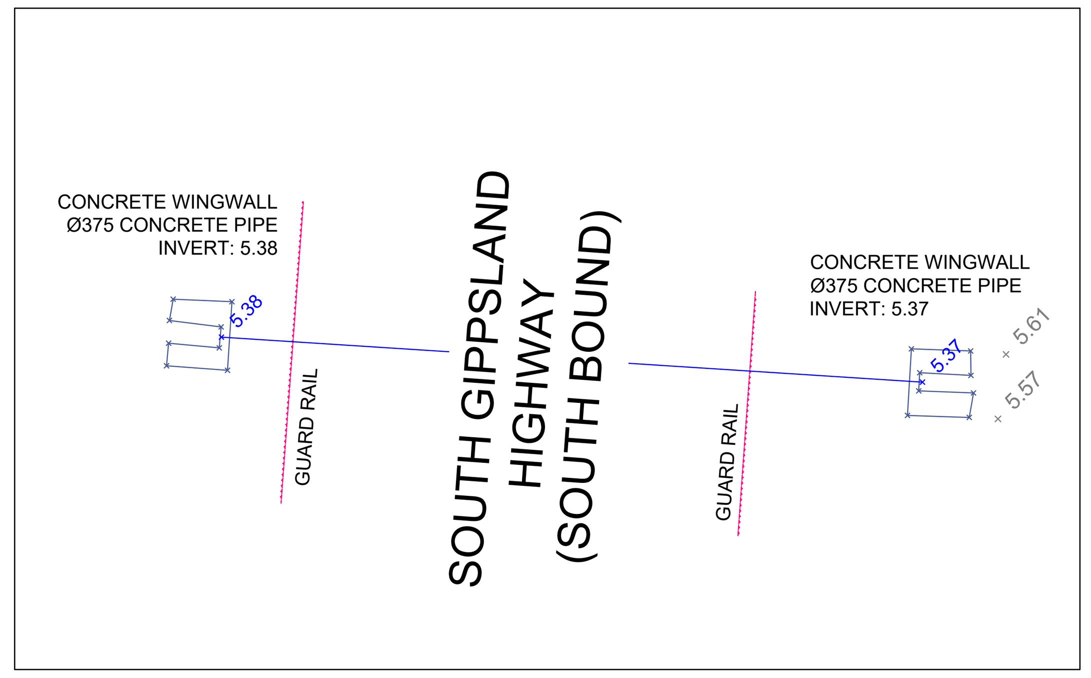

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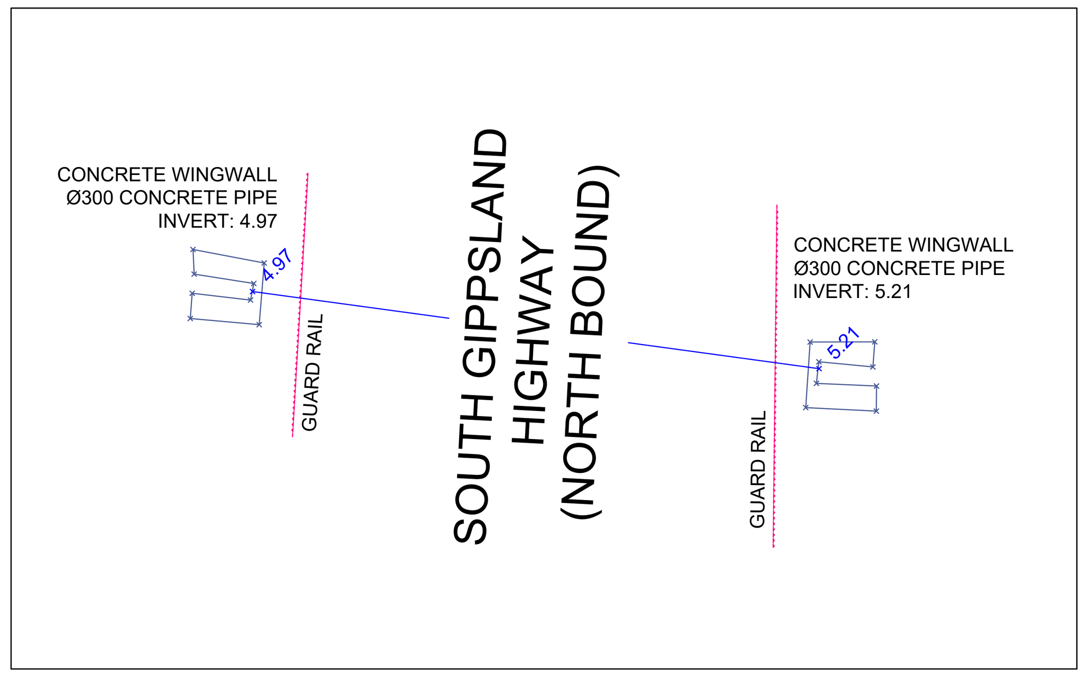

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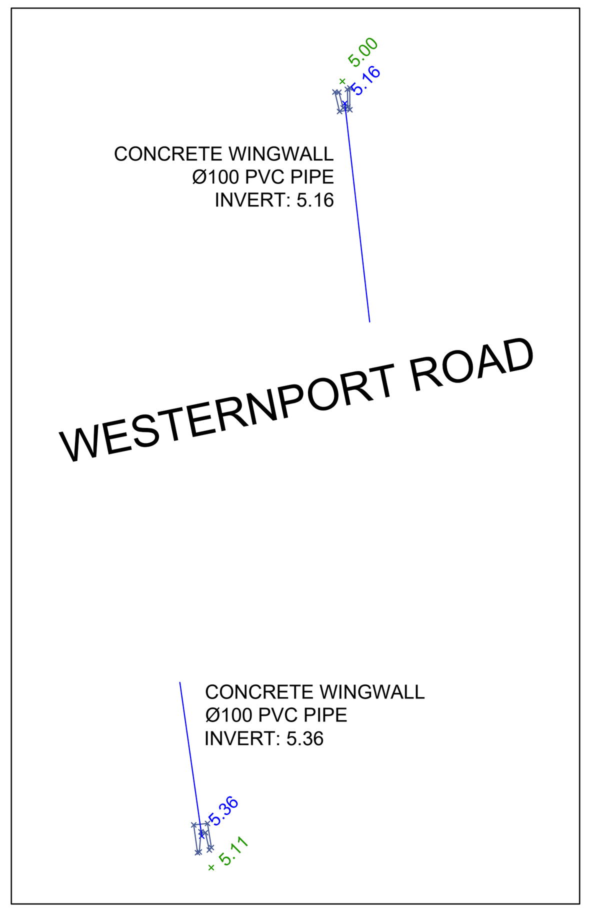

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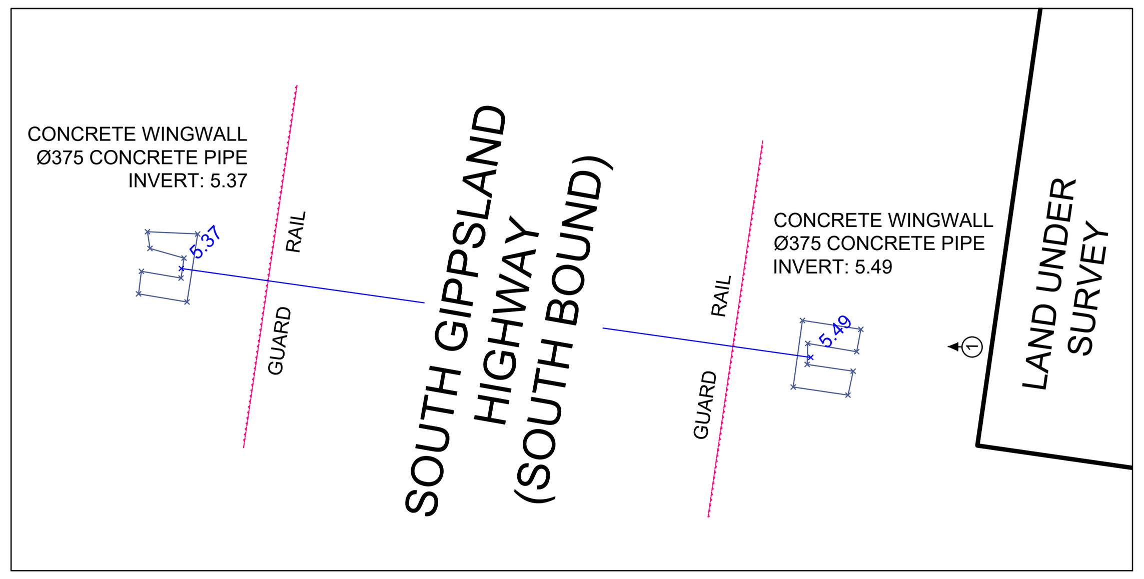

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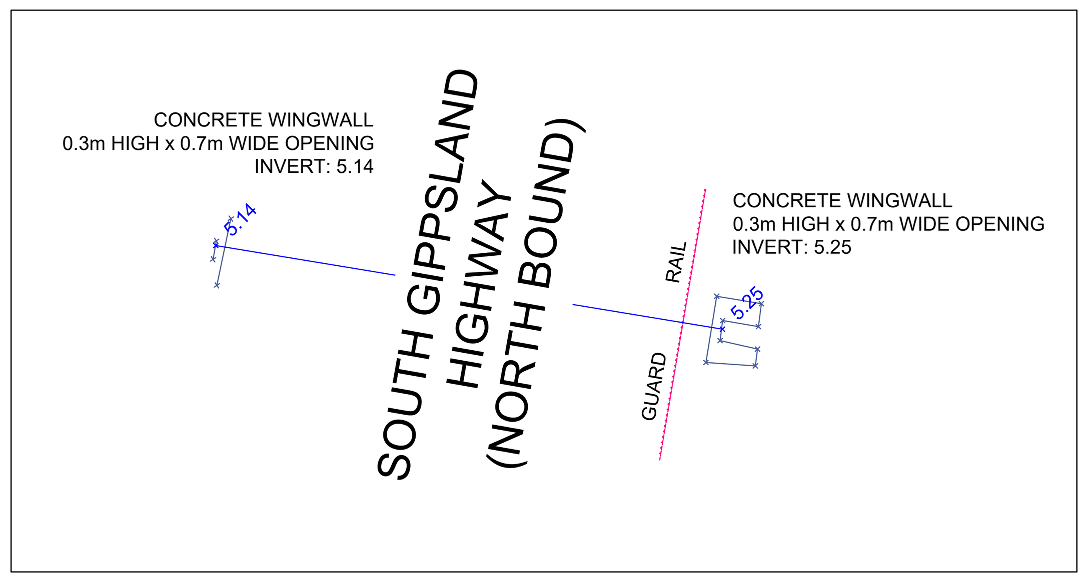

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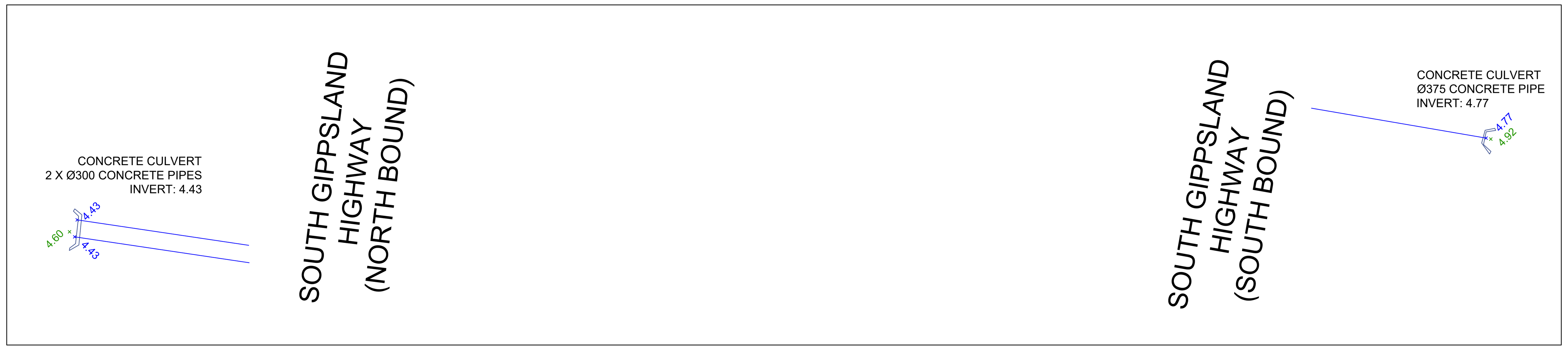

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Date Prepared: 11 March 2026

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SURVEY

Lang Lang River & Tributaries Bridge & Culvert Feature & Level Survey

SCALE 1:200 — 0 2 4 6 8 12

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LEGEND

102	TOP OF BANK	×
103	TOE OF BANK	×
104	EXISTING SURFACE	×
105	WATER LEVEL	×
305	CULVERT	
307	WING WALL	×
317	OBVERT	
321	INVERT LEVEL	×
403	BITUMEN	×
419	CONCRETE	×
501	GUARDRAIL	
610	PIERS	
632	SOFFITS	×
651	TOP OF BRIDGE	×
801	RAILWAY LINE	×
903	FENCE	

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APPENDIX B
HYDROGRAPHS AT NOISE WALLS

Current Climate Conditions

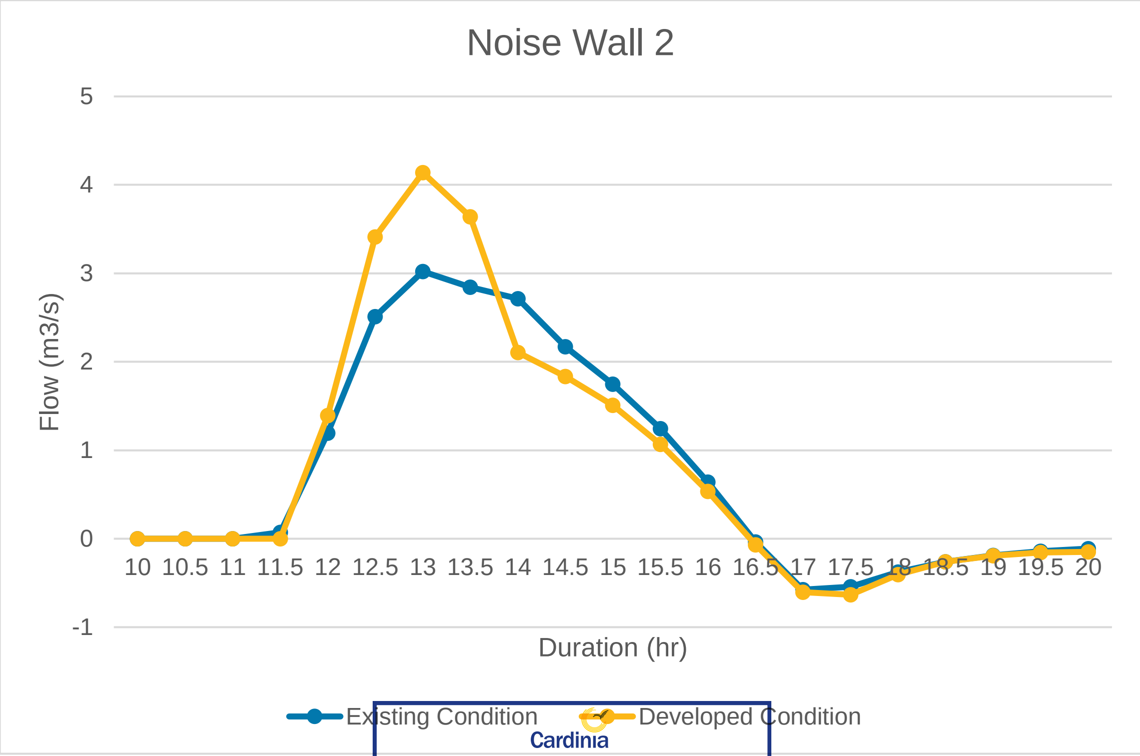

Figure B-1 1% AEP flow hydrograph at Noise Wall 2

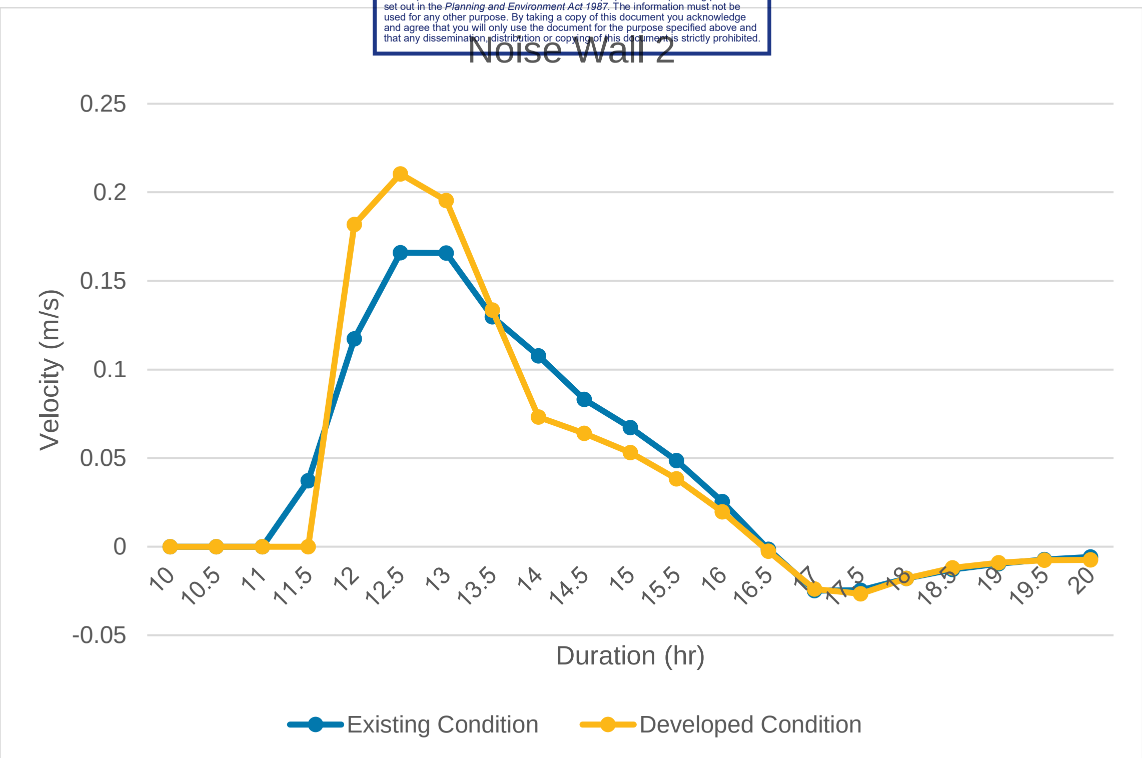

Figure B-2 1% AEP velocity hydrograph at Noise Wall 2

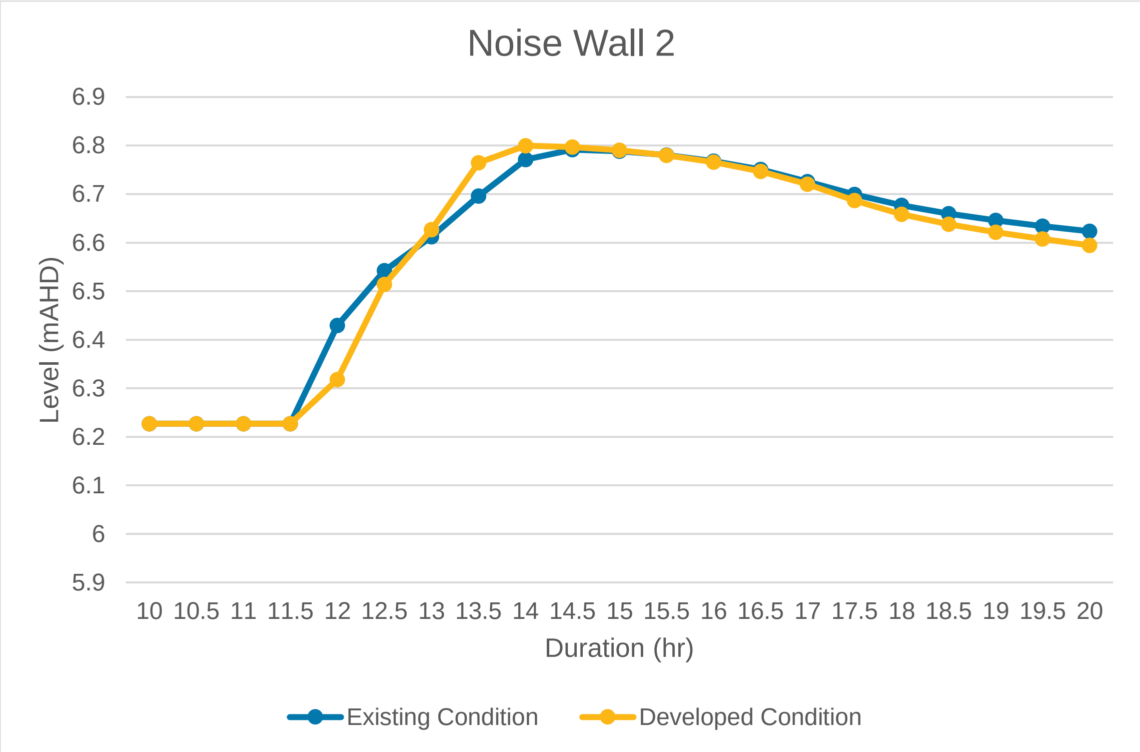

Figure B-3 1% AEP water surface level hydrograph at Noise Wall 2

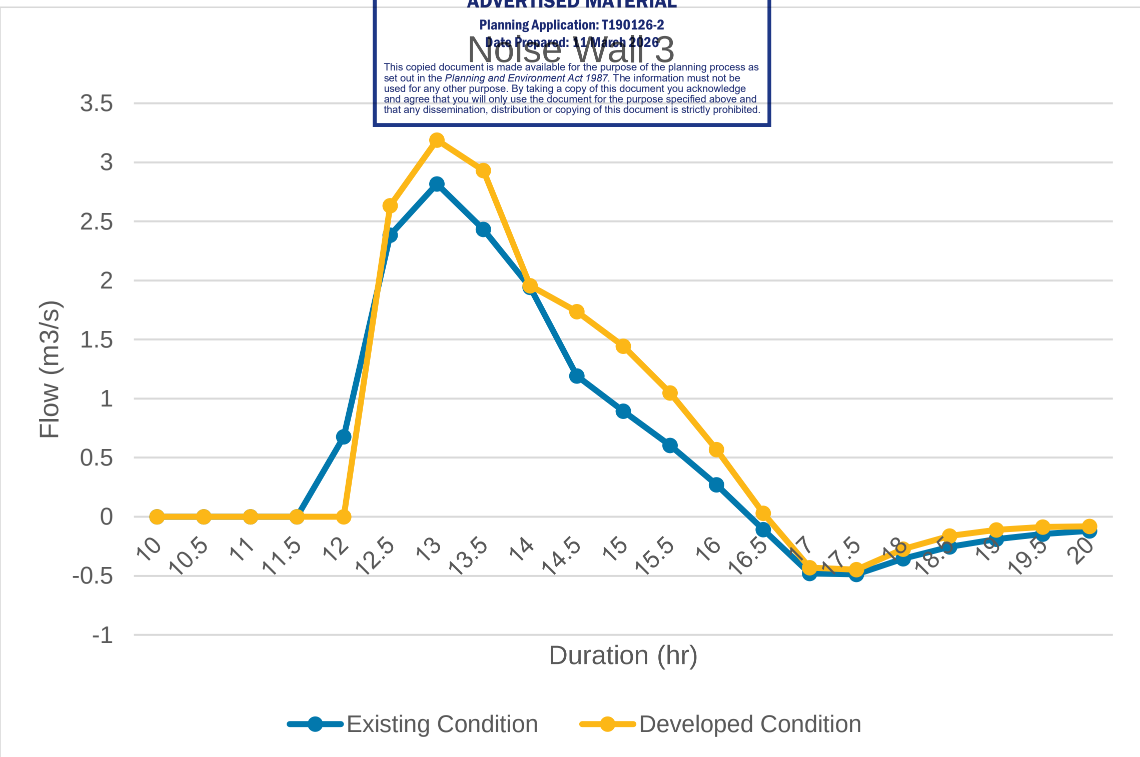

Figure B-4 1% AEP flow hydrograph at Noise Wall 3

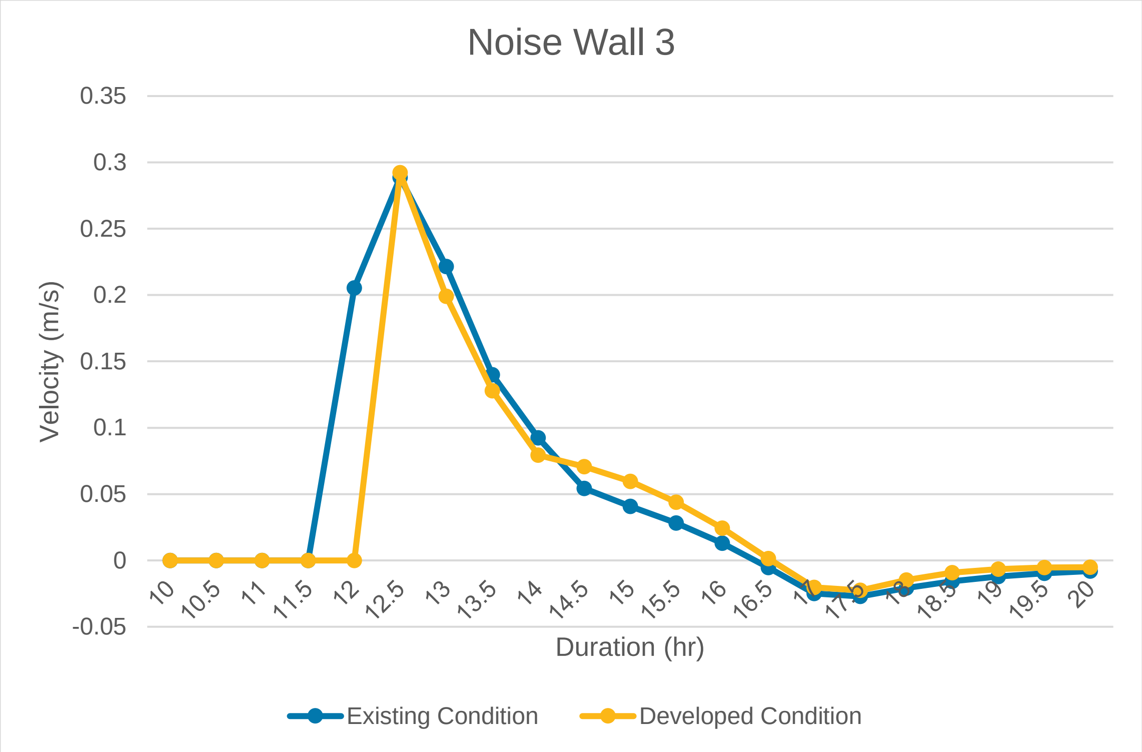

Figure B-5 1% AEP velocity hydrograph at Noise Wall 3

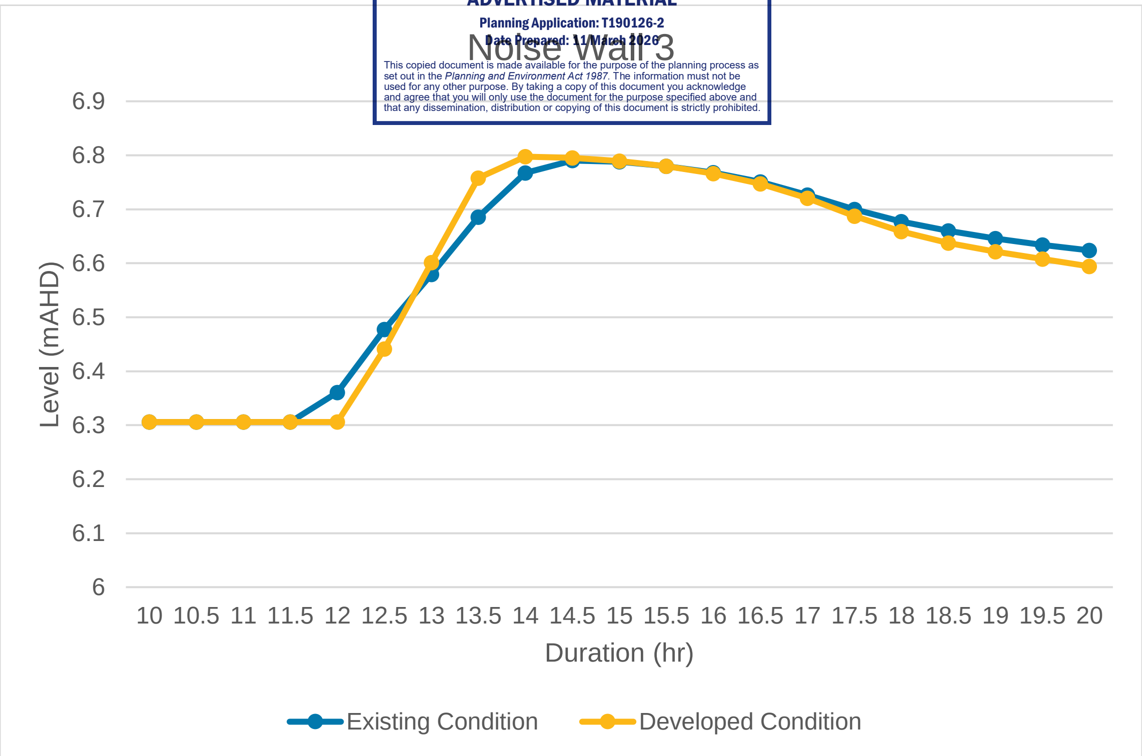

Figure B-6 1% AEP water surface level hydrograph at Noise Wall 3

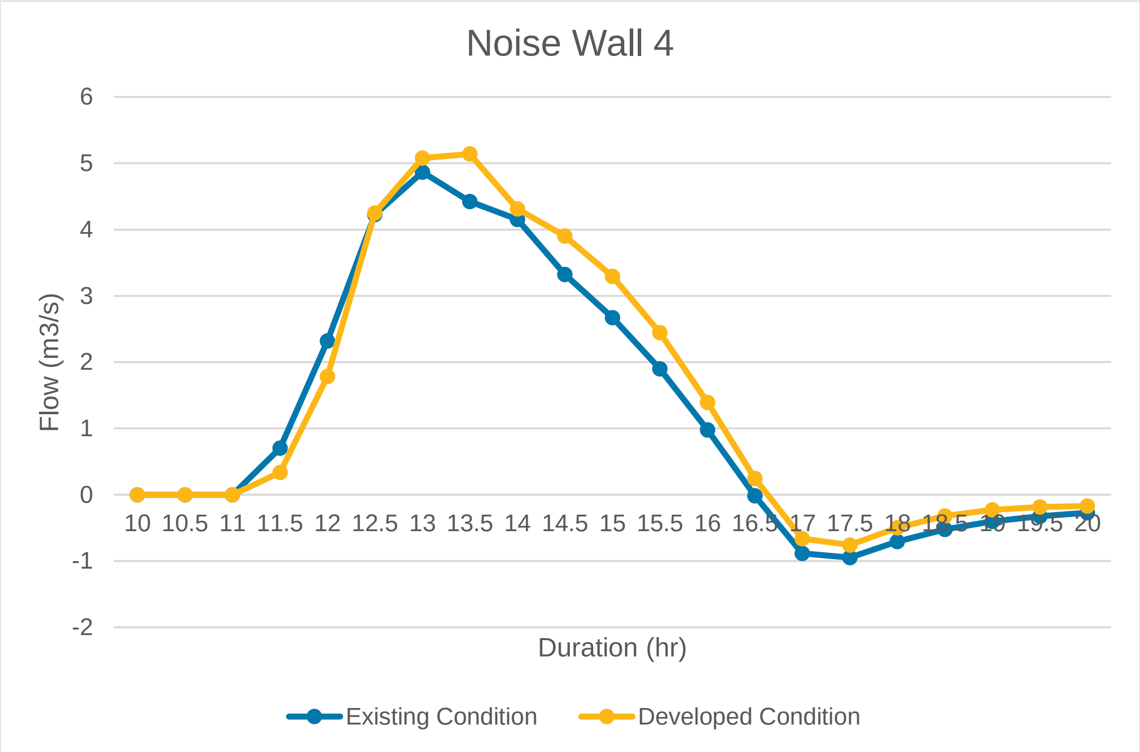

Figure B-7 1% AEP flow hydrograph at Noise Wall 4

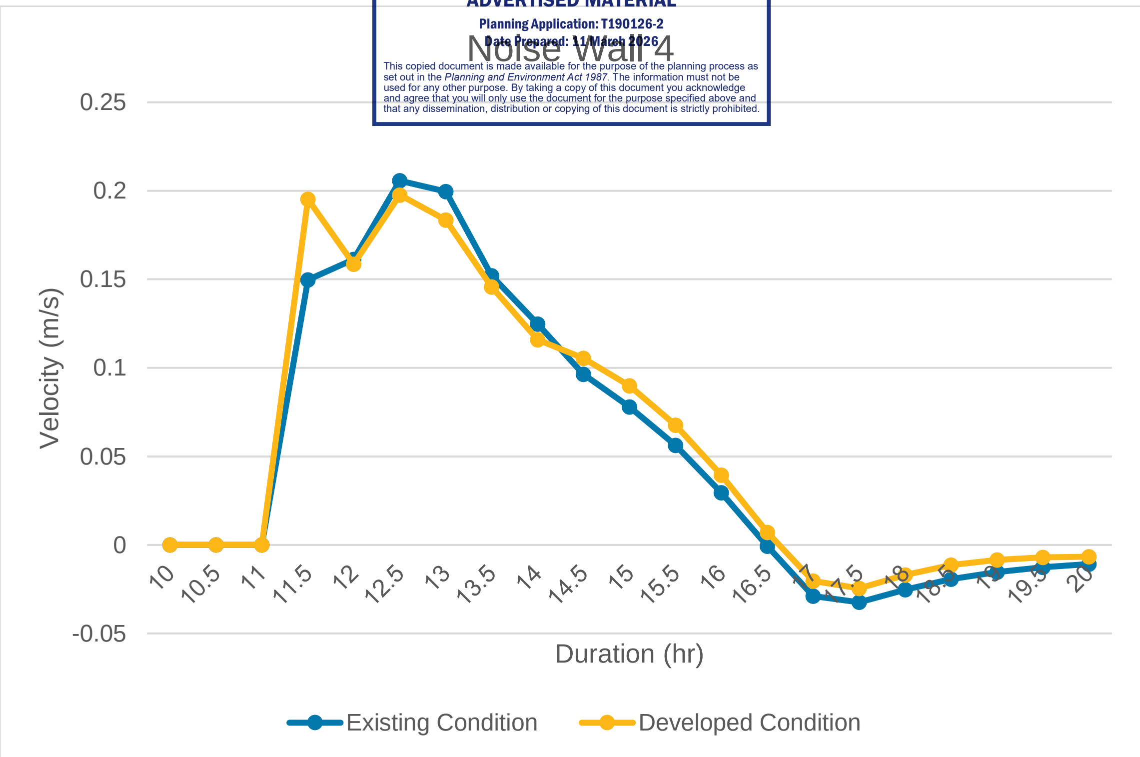

Figure B-8 1% AEP velocity hydrograph at Noise Wall 4

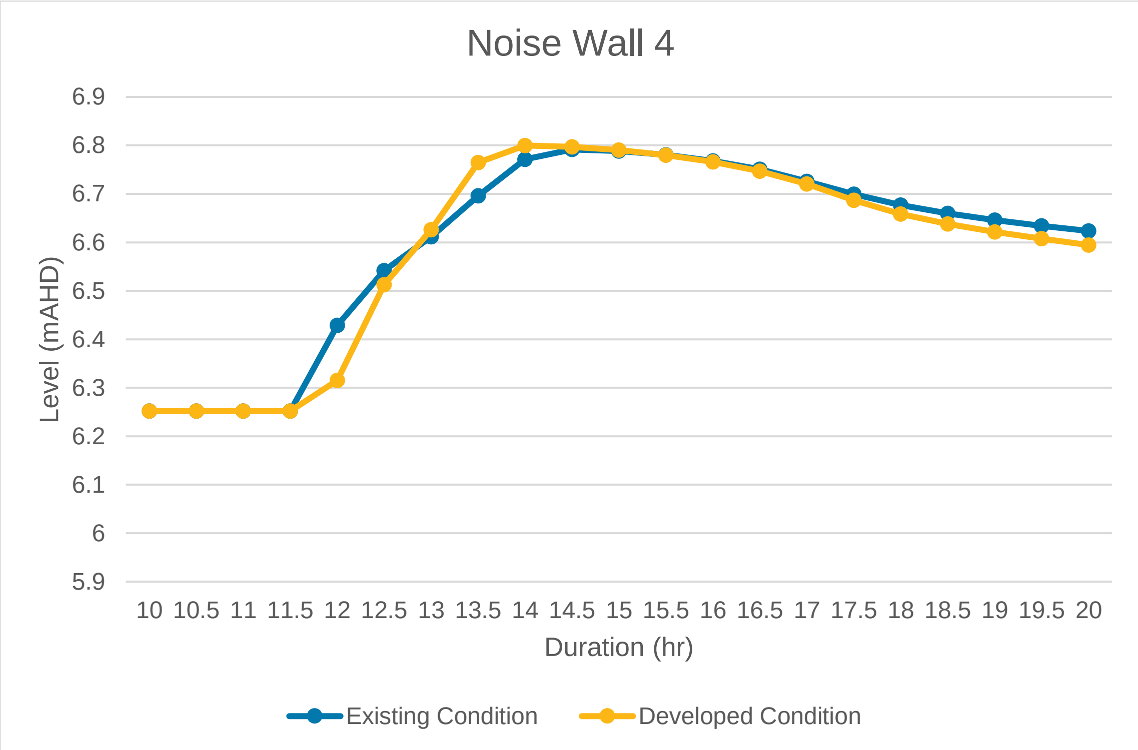

Figure B-9 1% AEP water surface level hydrograph at Noise Wall 4

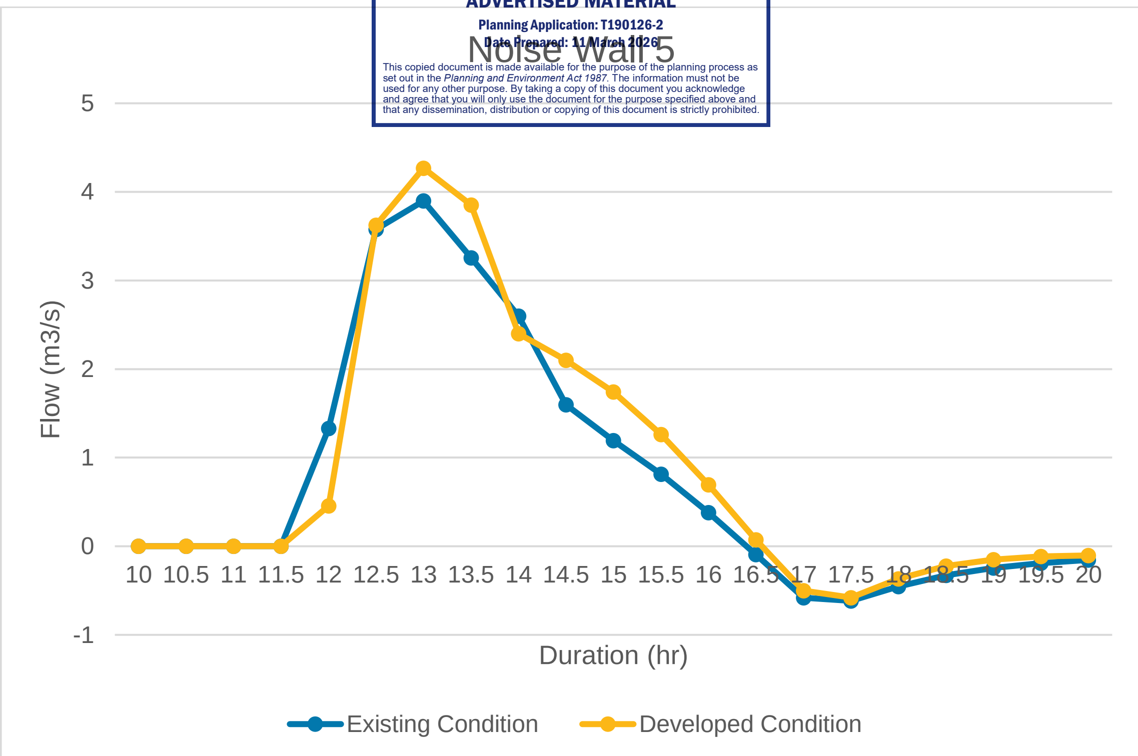

Figure B-10 1% AEP flow hydrograph at Noise Wall 5

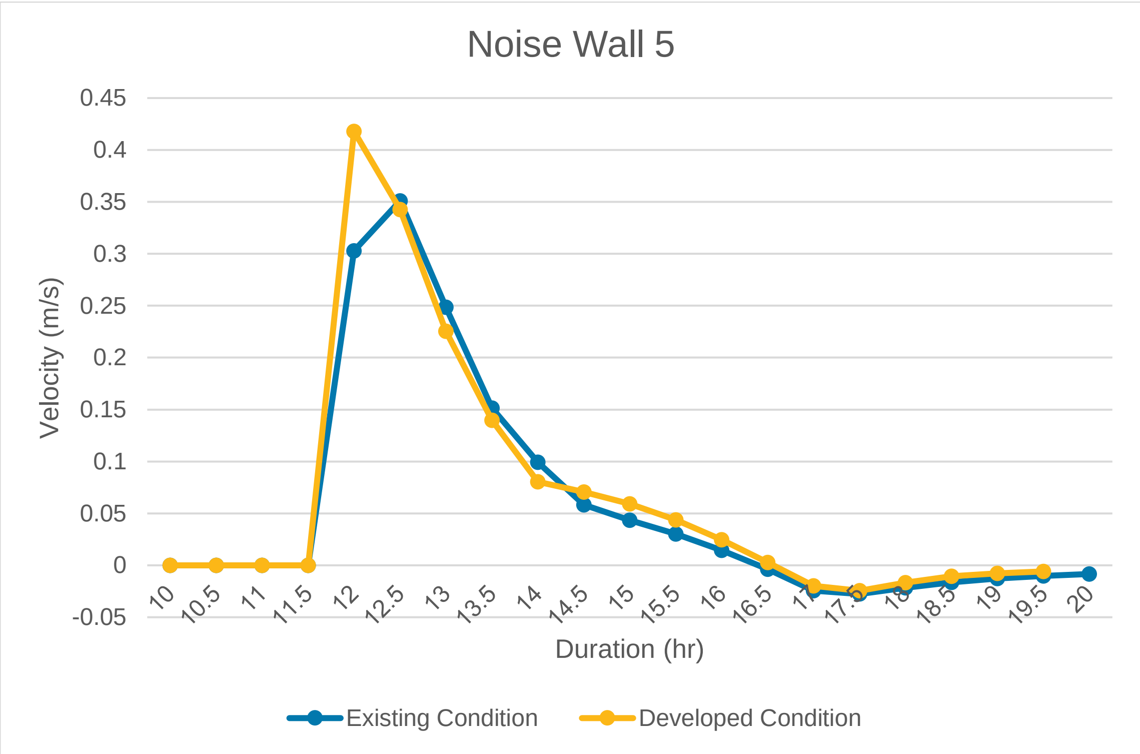

Figure B-11 1% AEP velocity hydrograph at Noise Wall 5

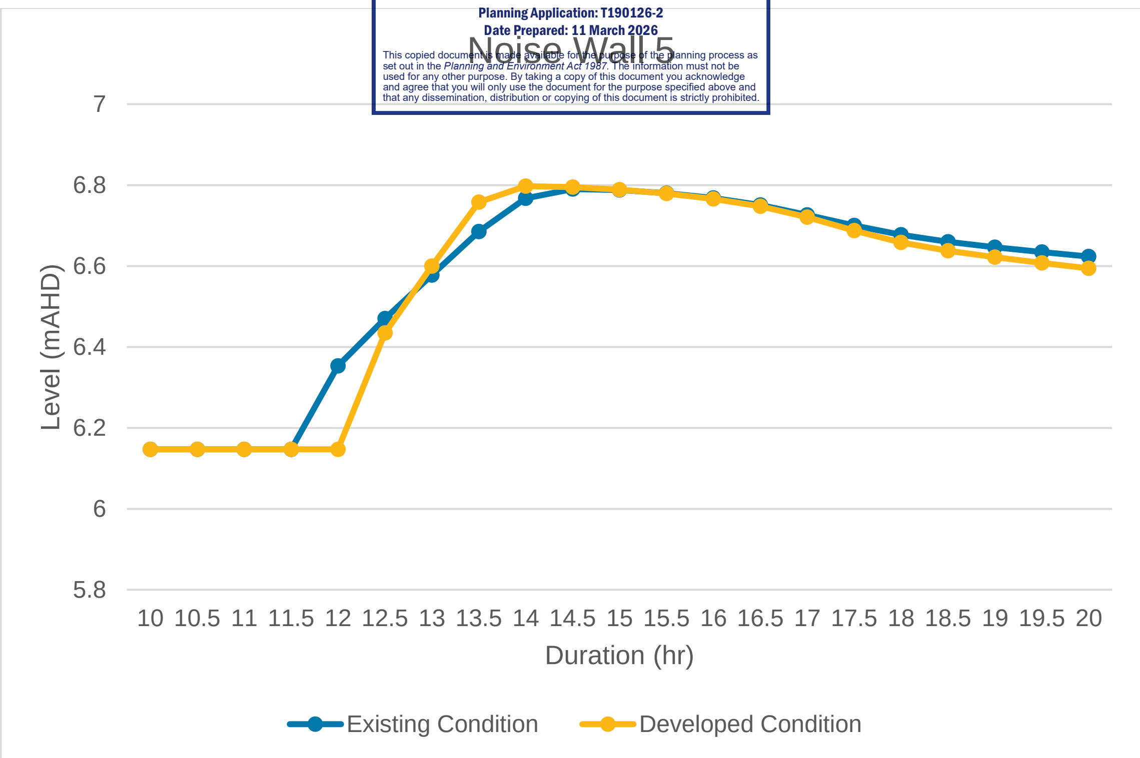

Figure B-12 1% AEP water surface level hydrograph at Noise Wall 5

Climate Change Conditions

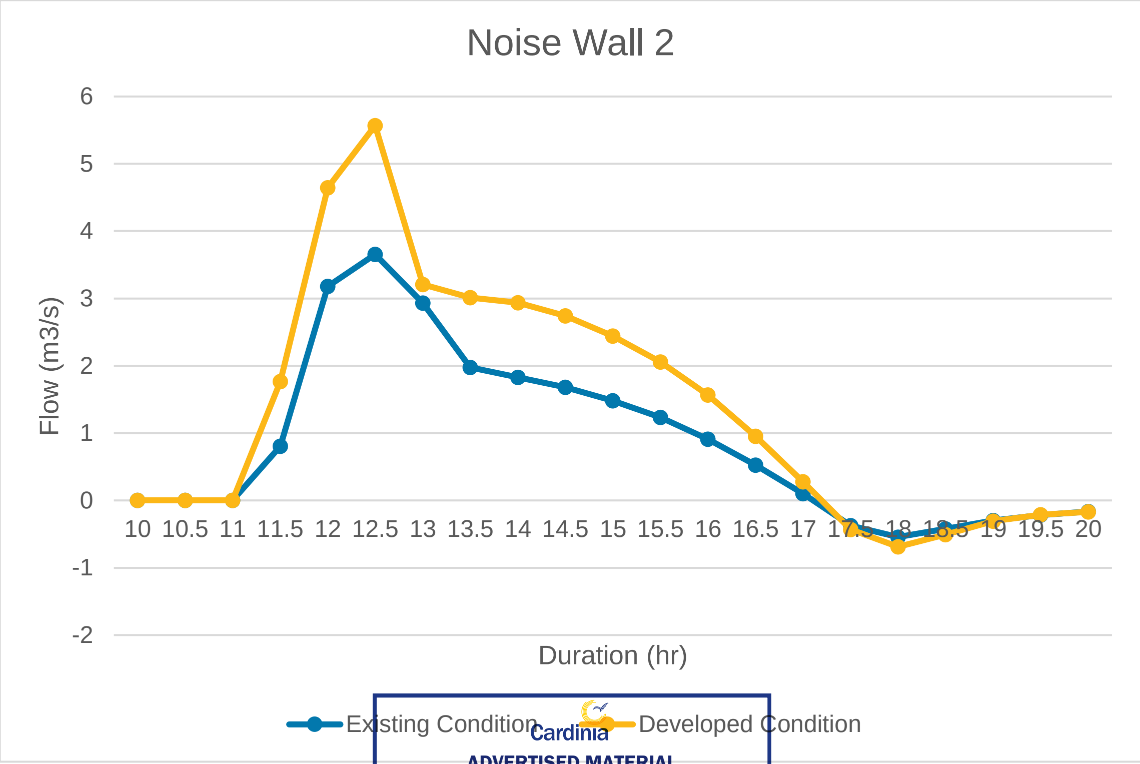

Figure B-13 1% AEP plus CC flow hydrograph at Noise Wall 2

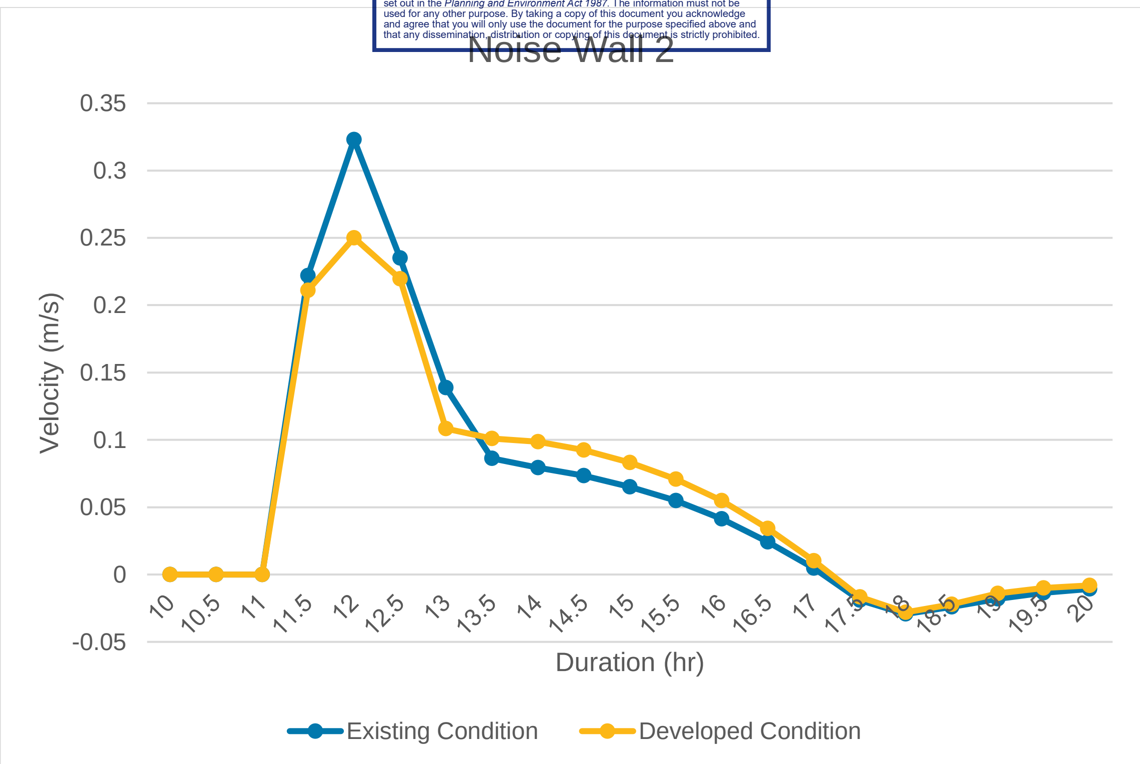

Figure B-14 1% AEP plus CC velocity hydrograph at Noise Wall 2

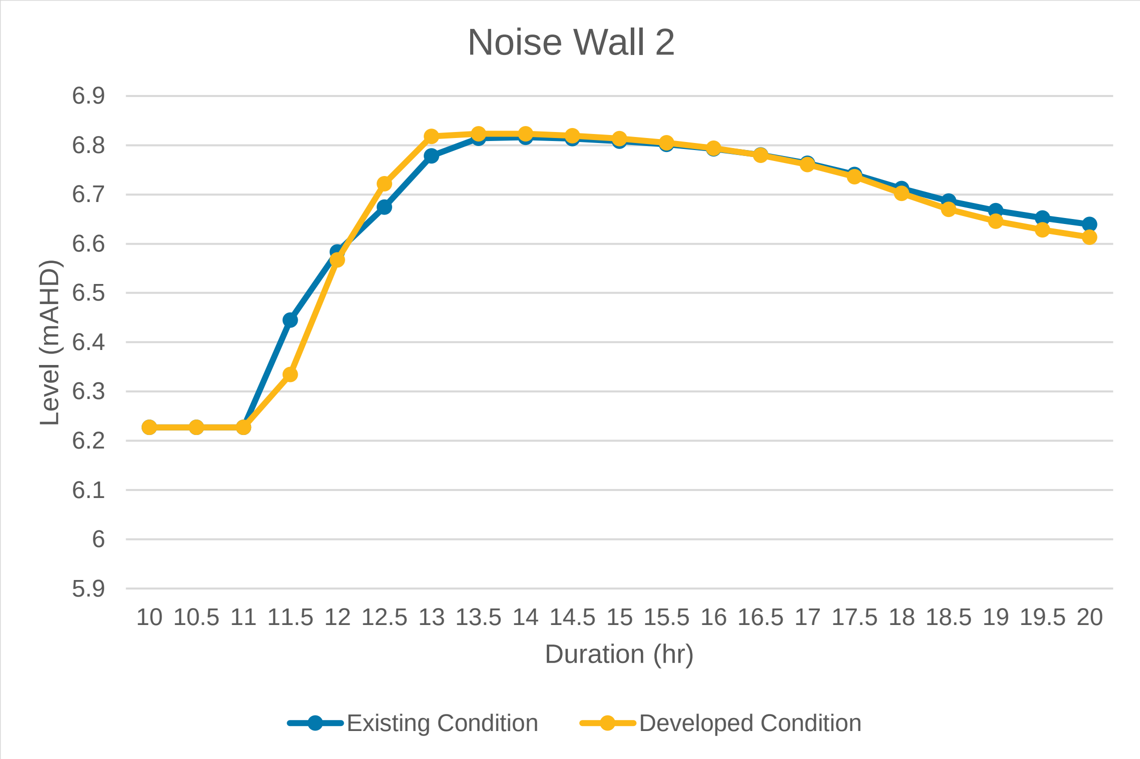

Figure B-15 1% AEP plus CC water surface level hydrograph at Noise Wall 2

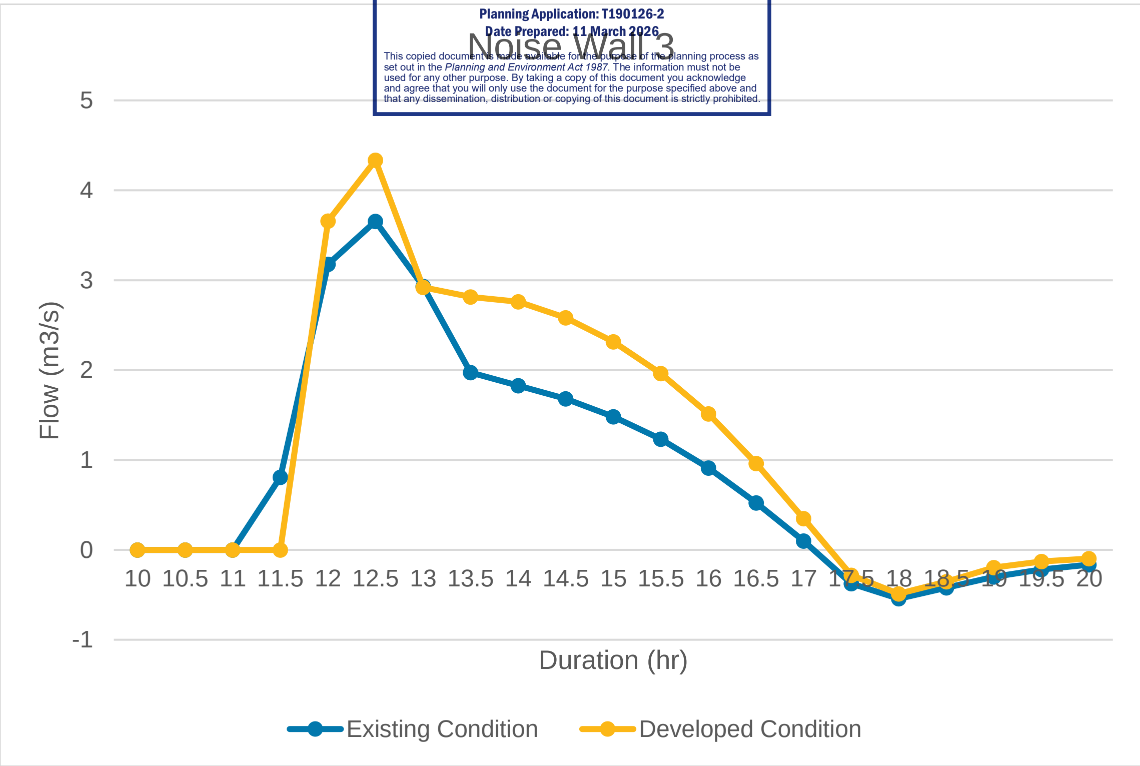

Figure B-16 1% AEP plus CC flow hydrograph at Noise Wall 3

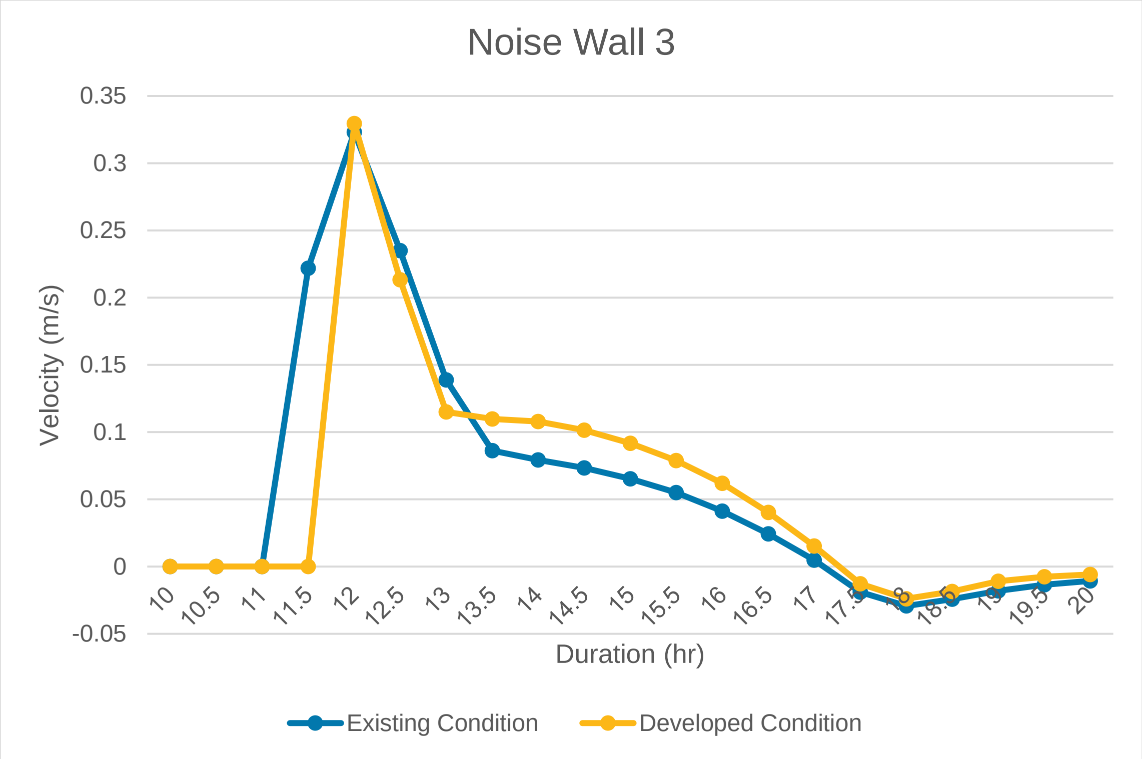

Figure B-17 1% AEP plus CC velocity hydrograph at Noise Wall 3

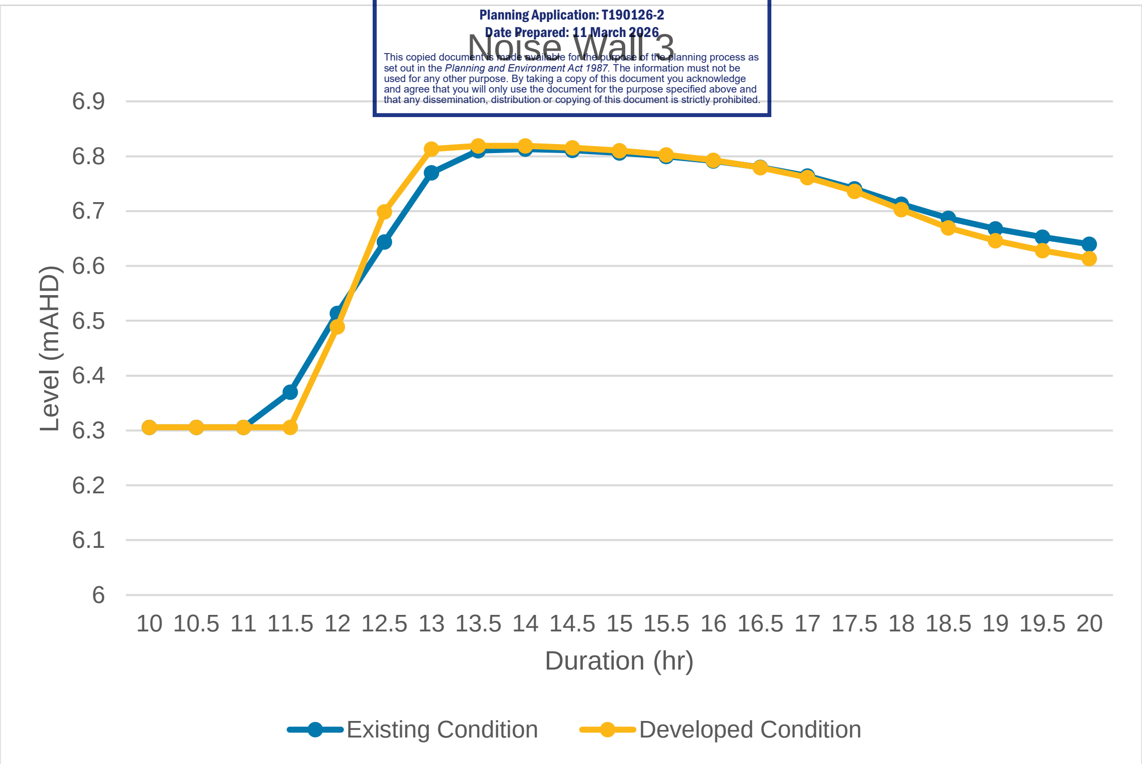

Figure B-18 1% AEP plus CC water surface level hydrograph at Noise Wall 3

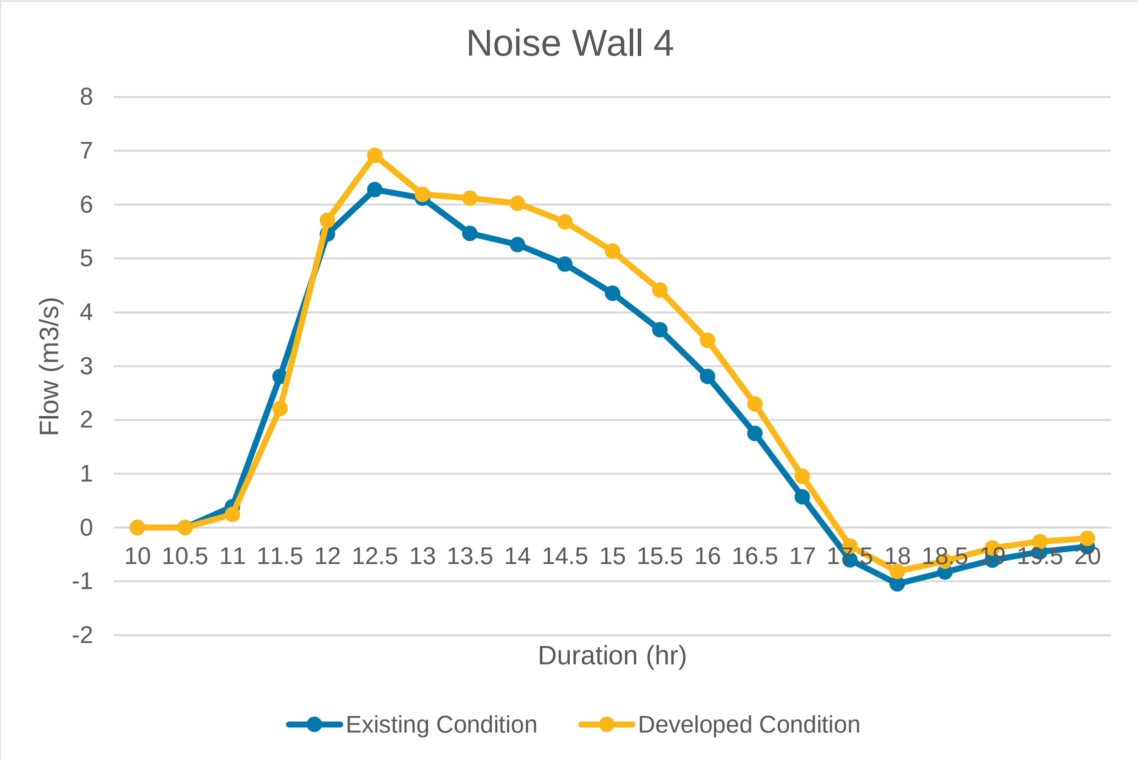

Figure B-19 1% AEP plus CC flow hydrograph at Noise Wall 4

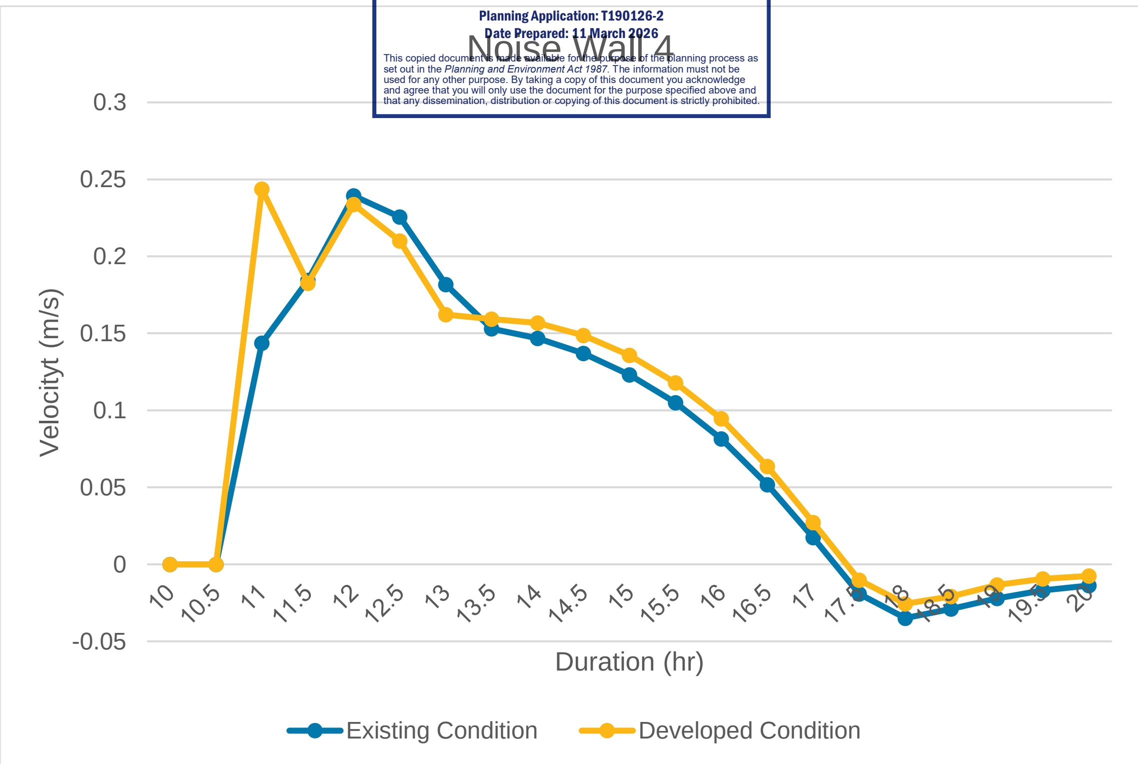

Figure B-20 1% AEP plus CC velocity hydrograph at Noise Wall 4

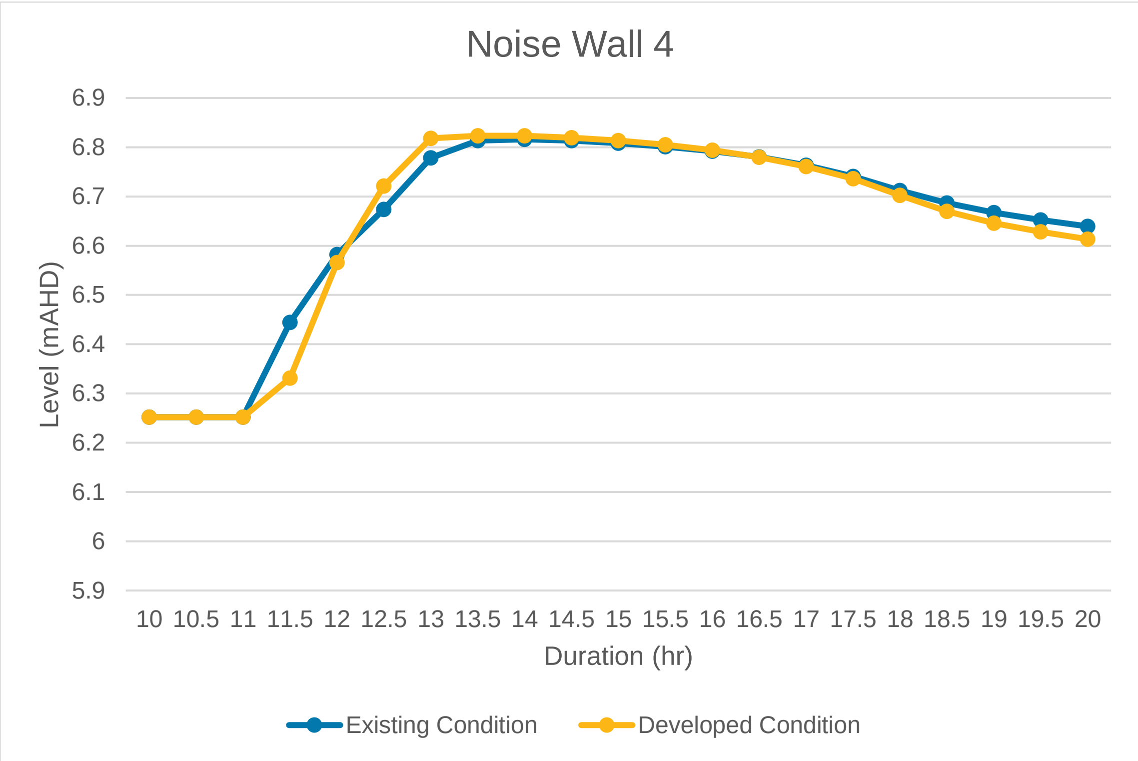

Figure B-21 1% AEP plus CC water surface level hydrograph at Noise Wall 4

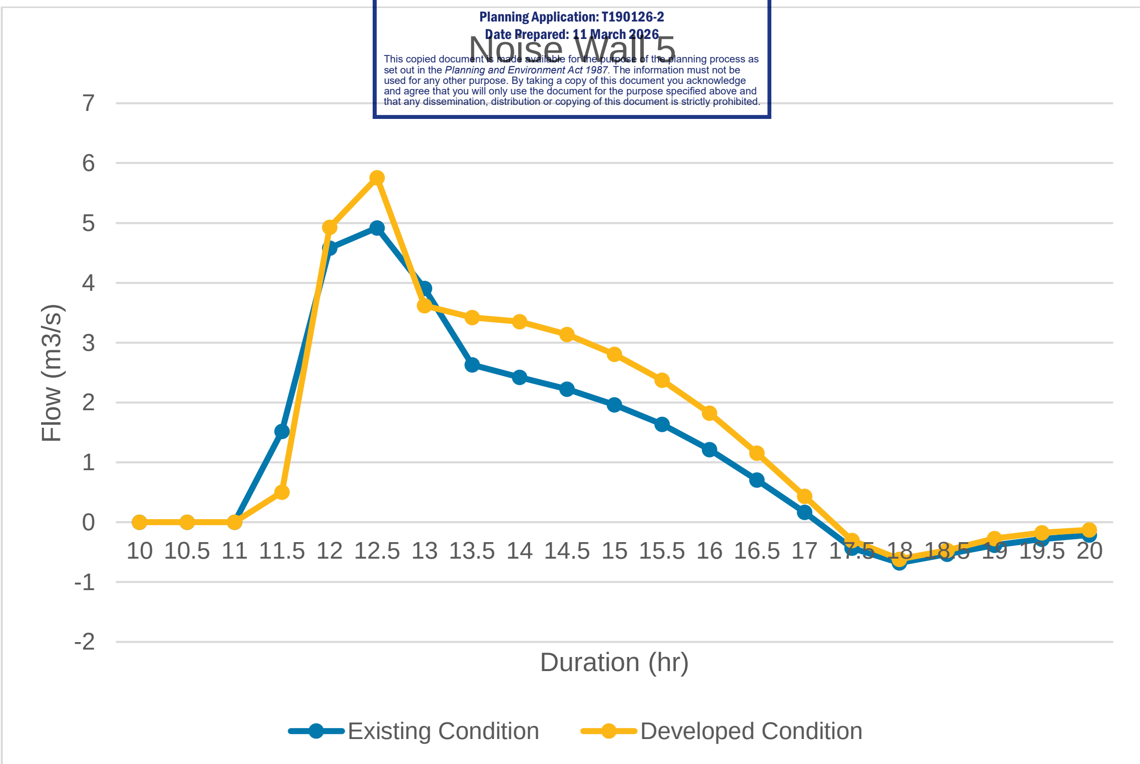

Figure B-22 1% AEP plus CC flow hydrograph at Noise Wall 5

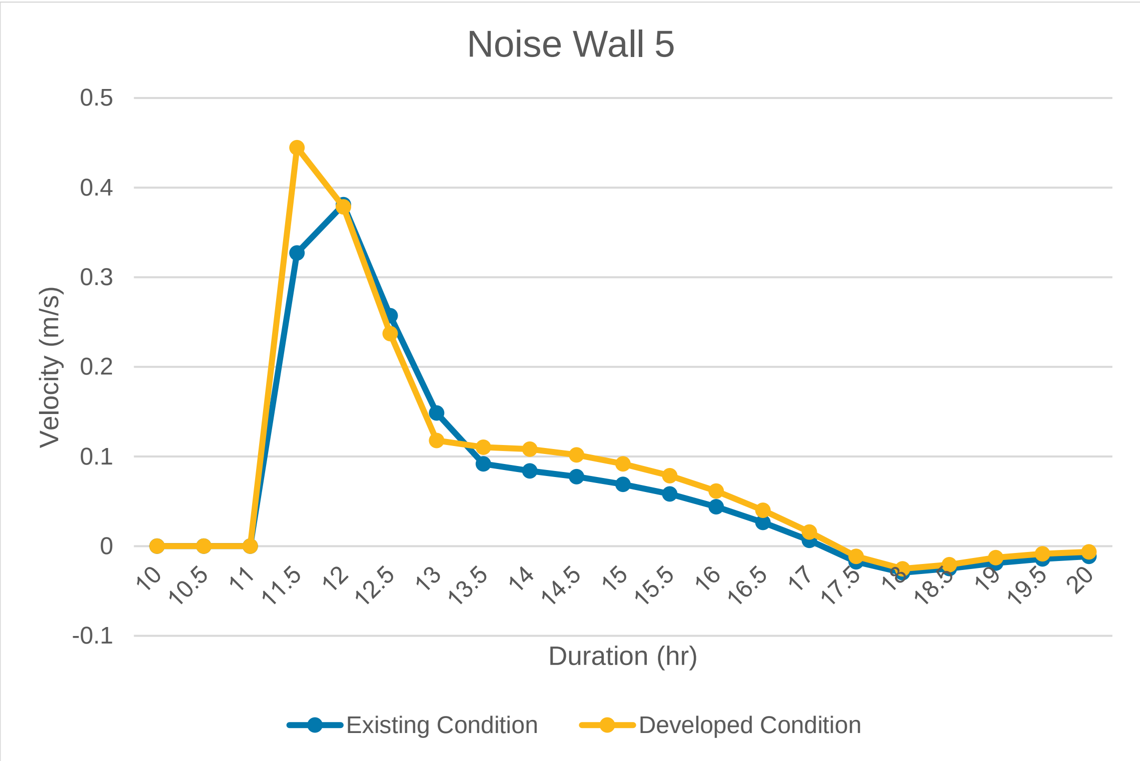

Figure B-23 1% AEP plus CC velocity hydrograph at Noise Wall 5

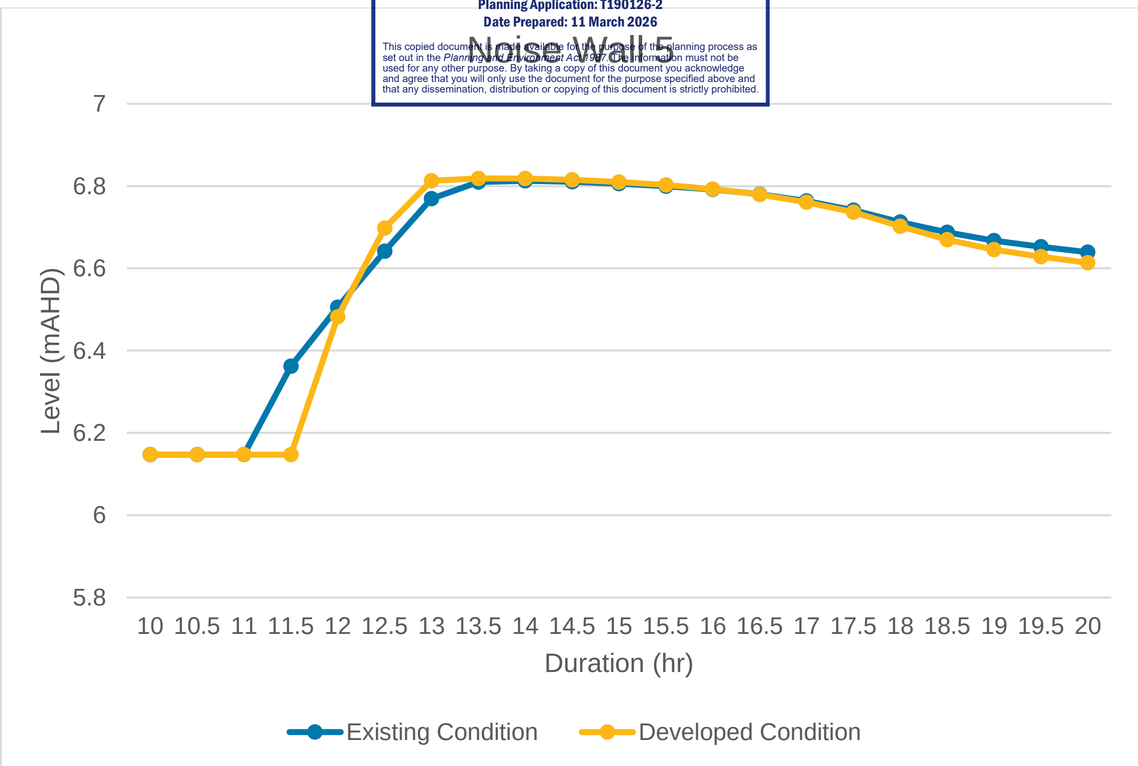

Figure B-24 1% AEP plus CC water surface level hydrograph at Noise Wall 5

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Appendix E Streamology Geomorphological Assessment

DRAFT REPORT:

COUNTRY COVE ESTATE GEOMORPHIC ASSESSMENT

December 2023

streamology
waterway science and management

Client	Charles Lloyd Property Group
Contact:	[redacted]
Project:	Country Cove Estate Geomorphic Assessment
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Document control

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Contents

1 Introduction

Streamology have been engaged by Charles Lloyd Property Group to undertake a geomorphic assessment of a reach of the lower Lang Lang River. The aim of the project is to develop an understanding of the current geomorphic condition and potential geomorphic risks associated with the location of the proposed drainage outfall from the 35 McDonalds Track development site, Lang Lang.

The development comprises a residential subdivision that includes flood storage measures as part of a lot-scale stormwater management strategy to reduce developed conditions flows to pre-developed conditions. Flows from a retarding basin located in the northern section of the site result in the 1% AEP developed flows being reduced to pre-development levels of 0.81 m^3/s. A drainage outfall will be constructed external to the site ultimately connecting to the Lang Lang River via an underground 900 mm diameter pipe.

Drawings provided by Colliers for this assessment (Drawing number 118500GE01) show rock beaching at the outlet to the Lang Lang River referencing the Melbourne Water Standard Drawing 7251/08/103).

The outfall alignment and location are shown in Figure 1.

1.1 Location

The assessment reach is located ~1.5 km northwest of the township of Lang Lang which lies approximately 70 km southeast of Melbourne's CBD. The reach assessed includes 400 m of the Lang Lang River upstream of the South Gippsland Highway bridge.

The headwaters of the Lang Lang River begin in the Strzelecki Ranges near Poowong. The river initially flows north from here until its confluence with Omahony Creek where it then flows west before entering Western Port near the township of Lang Lang, 4.8 km downstream of the assessment reach.

Figure 1. Location of the study site.

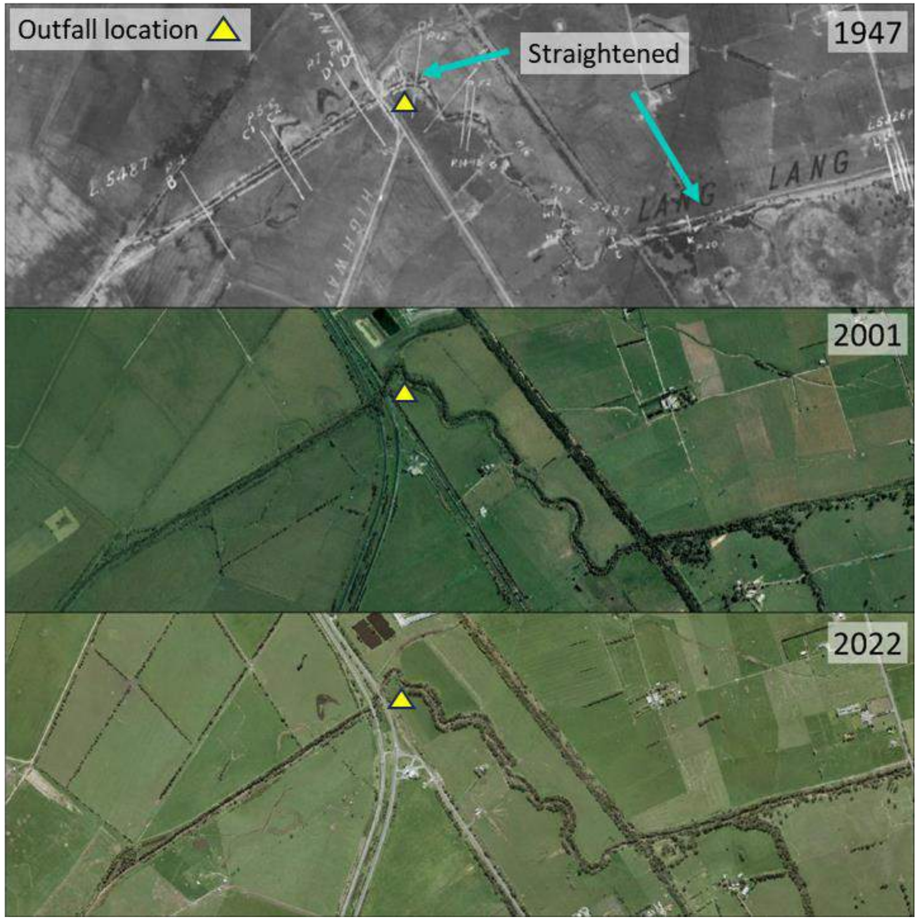

Figure 2. Aerial imagery comparison of the Lang Lang river near the study site.

The Lang Lang River in the area of interest has been subject to significant anthropogenic changes, including channelisation, since the 1870s (Bird, 1981). The river currently follows an artificial alignment and has been straightened upstream and downstream from the assessment reach.

From the aerial comparison presented in Figure 2, minor channel movement has occurred since 1947. The bend directly downstream from the outfall location (and upstream from the South Gippsland Highway bridge) appears to have been straightened prior to the 1947 image and then the waterway has been adjusting its planform over time through the process of lateral migration as seen in the 2001 and 2022 images.

Upstream at the outfall location, the planform has remained relatively stable and negligible lateral migration is observed.

2 Background

2.1 Geology

The surface geology within the assessment site is alluvium (Qa1) dating from the Holocene (Figure 3). This geologic unit comprises generally unconsolidated pebbly gravel, sand and minor thin sandy silt beds. To the South-east of the study site the surface geology is Brighton Group (Nb). This also consists of alluvial gravel, sand and silt.

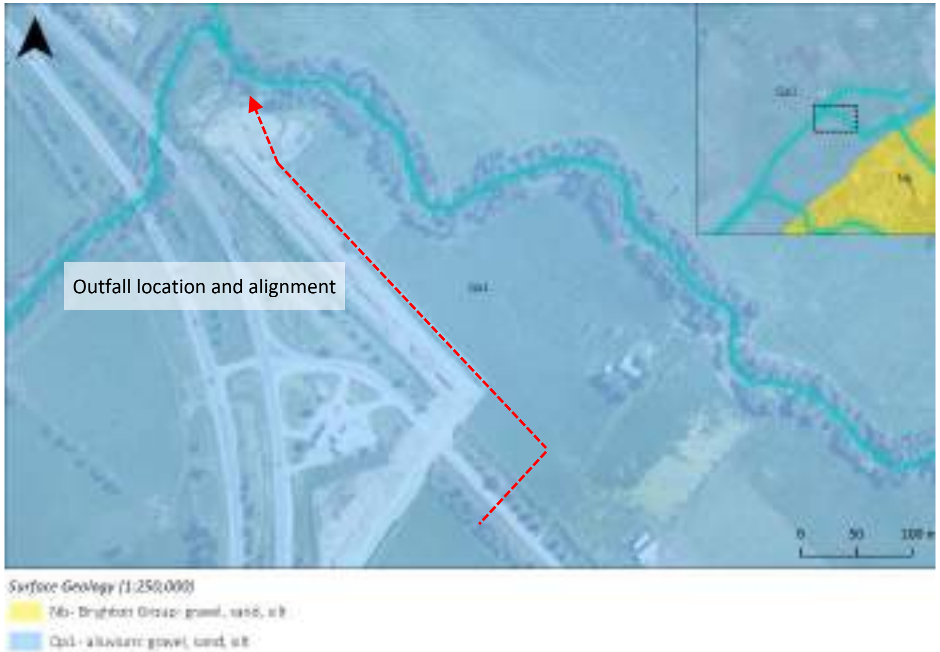

Figure 3. Surface geology types surrounding the study site.

2.2 Soil

The soil type mapped within the study reach is sodosol (SOAB) (Figure 4). Sodosols are a very common soil type throughout Australia and have a strong texture contrast between the upper A horizons and the lower sodic B horizons, which are not strongly acid (CSIRO, 2016). Sodosols have subsoils which can be dispersive and tunnel erosion and gullying are common when these subsoils have been disturbed.

Figure 4 shows the approximate location of the Victorian Desalination Pipeline (VDP) which was constructed in 2010 and runs along the proposed alignment location. For the pipeline construction several borelogs were taken close to the outfall alignment.

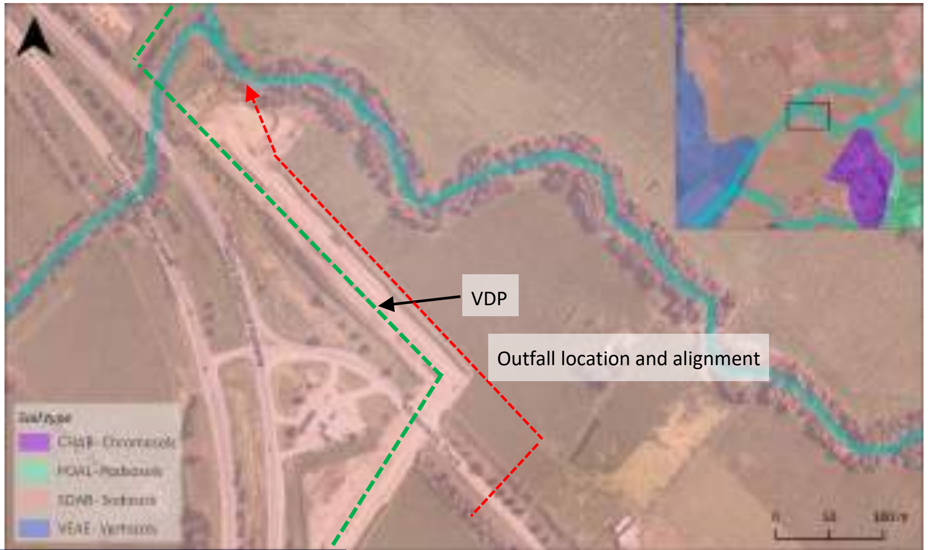

Figure 4. Soil types covering study site.

Analysis of the borelogs and geotechnical testing did not indicate the presence of any dispersive soils at the assessment site (GHD, 2008).

As part of the investigation works for the McDonalds Track development site (NSP Geotechnics Pty Ltd, 2019 12 boreholes were drilled to depths ranging from 1.5 to 3.0 meters along the proposed alignment. The presence of dispersive soils was not noted. The topsoil was characterised as clayey silt, with low plasticity silts, brown and grey, dry, still and extending to depths of 0.3 to 0.8 meters. The overlying soil was silty clay, with high plasticity, grey and brown, stiff to very stiff and extending to the borehole termination depth. Sodic soils were not encountered.

No signs of soil dispersiveness were observed on site during the field investigation, see Section 3.

Overall, although broad-scale soils mapping indicates sodic soils could be present, the available geotechnical data and field observations suggest that disperse soils are unlikely to be present at the outfall or along the pipeline alignment. In-field dispersion tests during the construction should confirm this.

2.3 Geomorphology

The Victorian Geomorphological Framework (VRO, 2007) places the assessment site within the geomorphological management unit 7.2.2. (Figure 5).

7.2.2 Eastern Plains; South eastern riverine plains; Prior stream plains (Agnes, Yarram, Yinnar, Tinamba, Clydebank)

This geomorphological management unit is characterised by riverine plains that are higher than present floodplains and are on alluvium deposited by meandering streams that were active before the Last Glacial period. As they flooded, levees were formed on either side of the streambed, with floodplains further away. These levees formed sinuous ridges above the general level of floodplains (VRO, 2007).

The following two geomorphical management units surrounding the study site:

7.1.1 Coastal plains of the Eastern Plains central sunklands

This geomorphological unit is typified by a series of northwest trending dune ridges, parallel to the current coastline which are thought to represent former coastlines or Neogene dune ridges.

3.3.3 Southern Uplands; very low relief, hills and low hills

This geomorphological management unit comprises hills and low hills of very low relief which are described as gently undulating rises to undulating low hills with widely spaces and weakly incised drainage lines. The topography within this unit is low relief (< 100 m) and very gentle to gentle slopes (1−10%) (VRO, 2007).

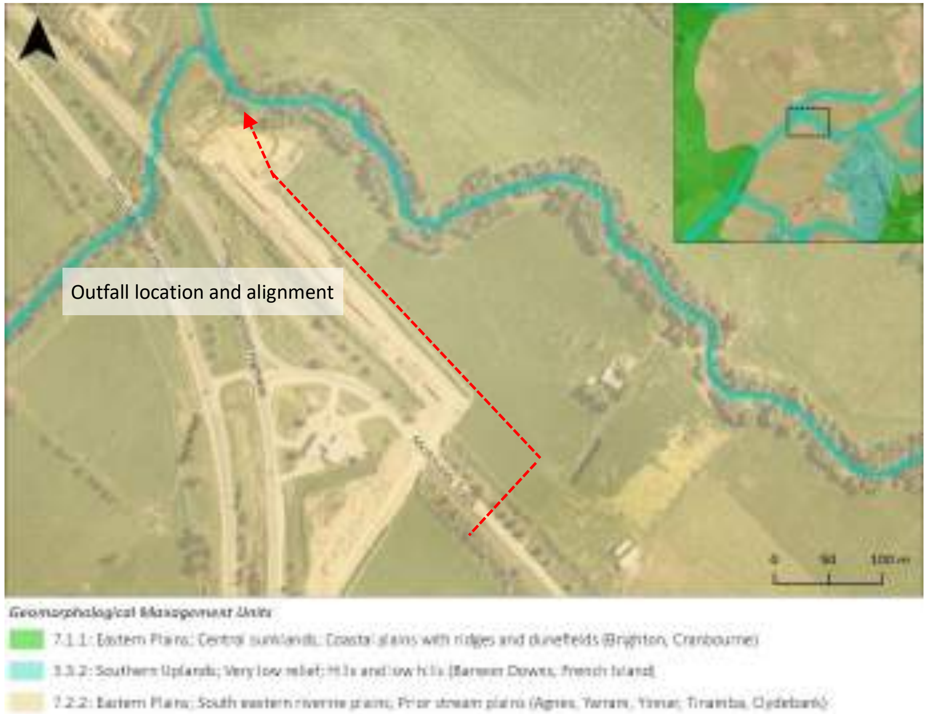

Figure 5. Geomorphological Management Unit 7.2.2 covers entirety of the study site.

Upstream from the site, approximately 5 km NE of Lang Lang, previous investigations by Bird (1981) describe the nature of the Lang Lang River prior to the drainage works in the 1870s. An incision of the alluvium overlaying Heath Hill Silts following drainage works was identified. The river now follows an artificial straightened alignment that occupies a trench over six meters deep. The incision was initiated as a shallow ditch and has become incised since by river scour. The channel floor is cut into consolidated sand, forming a temporary basement to further incision cycles.

3 Site observations

A site inspection of the proposed outfall location on the Lang Lang River was undertaken by Paulina Elizalde and Sam Davidson from Streamology on 19 October 2023. The purpose of the site inspection was to understand the current waterway characteristics and evaluate its physical form attributes and condition. The aim being to build upon the desktop assessment to identify any potential risks of waterway realignment at the site.

Limited site access meant the inspection was carried out by drone. Figure 6 shows an overview of the area with the outfall on the Lang Lang River and the pipe alignment for the 35 McDonalds Track development site.

Figure 6. Overview of the assessment site.

2.4 Channel

The study reach of the Lang Lang River comprises a single thread, continuous, and well-defined meandering channel with a thin riparian zone. Upstream and downstream the channel has been artificially straightened.

The channel dimensions are relatively consistent with a channel depth of ~4.5 m and a bankfull width of ~30 m (Figure 7).

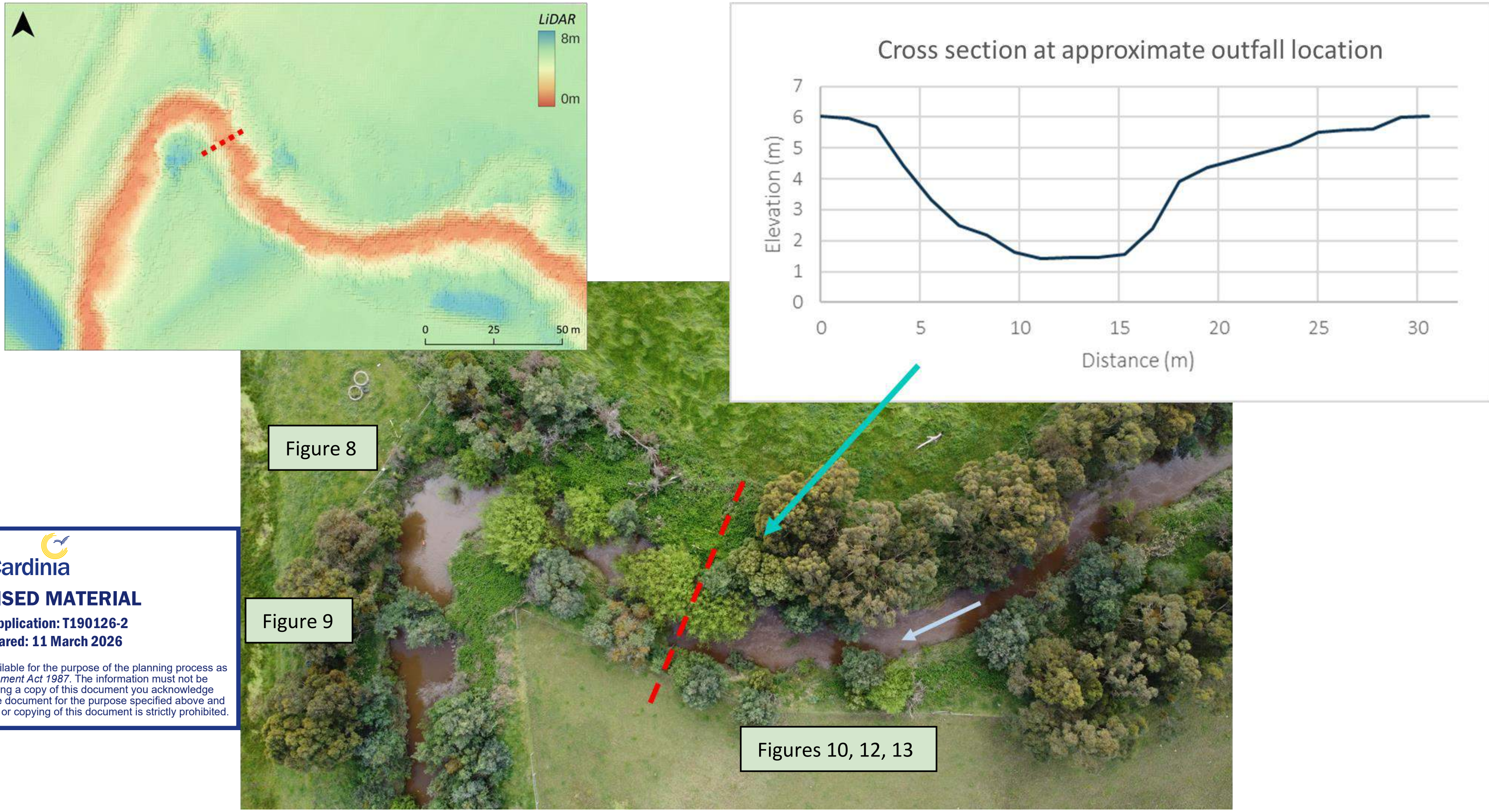

Figure 7. Channel cross section near proposed outfall location and following Figures locations.

2.5 Banks and bed

The banks are moderately steep and mostly well vegetated. There are signs of minor erosion and widening along the study reach. Minor undercutting is visible along with sections of bare bank with minimal vegetation on the outside of bends (Figures 8 and 10). In general, the toe of both banks appears to be stable.

The bed gradient is gentle, and there are also signs of aggradation and vegetation encroachment close to where the outlet will be located (**Error! Reference source not found.**). This indicates that sediment is moving through the system and high suspended sediment loads where observed in the water during the site visit.

Figure 8. Tight bend downstream of proposed outfall location with a partially bare outside bank.

Figure 9. Shallow bed gradient and signs of aggradation and vegetation encroachment (i.e., reeds) at the proposed outfall location.

Figure 10. Undercutting present along a section of right bank.

2.6 Adjoining land use

There are pasture paddocks for cattle either side of the study reach and the area surrounding the assessment site consists of cleared agricultural land (Figure 11). Nearby is a piggery and a service station along the South Gippsland Highway (Shell).

Figure 11. Paddocks surrounding the study reach.

2.7 Riparian vegetation

The study reach has a thin but well-vegetated riparian corridor, which is fenced off on both sides (Figure 12). It includes a mix of native and introduced species with an overstory of tall eucalypts and wattles. A number of native/introduced saplings, shrubs, grasses, and weeds (i.e., blackberries) make up the understory and ground cover. The right bank is more vegetated and continuous than the left bank at the outfall location.

Figure 12. Thin riparian corridor along the study reach.

Figure 13. Instream vegetation visible above the water level along the bed near the outfall location. Reeds are also present along the toe of the right bank.

2.8 Instream vegetation

Minimal instream vegetation was observable due to the high-water level and turbidity at the time of the site visit. There were grasses and reeds present along the toe of both banks and saplings/shrubs along the bed (Figure 13).

2.9 Ecological value

The study reach has limited habitat value due to the narrow and partially connected riparian corridor, lack of large woody debris and presence of exotic weeds and bushes.

3 Geomorphic risk assessment

3.1 Geomorphic condition and sensitivity

Based on the outcomes of the desktop and field assessments, the geomorphic condition of the study reach in the Lang Lang River is that of a highly modified stream that has experienced change due to long-term anthropogenic drainage and channelisation works in the Koo Wee Rup area. There is evidence of past incision cycles and the lateral migration of the channel bend downstream of the outfall location is indicative of the channel adjusting to these channelisation works. However, limited change has occurred over the last 20 years and the meandering channel is generally stable with only minor localised erosion along the banks near the outfall location.

Applying the Channel Evolution Model (CEM) approach (Figure 14), we can see that the channel has generally transitioned from a CEM type III to IV, with previous widening occurring and on-going aggradation as dominant processes. This suggests this river reach has **low sensitivity** to geomorphic changes as a result of changes to the hydrologic regime.

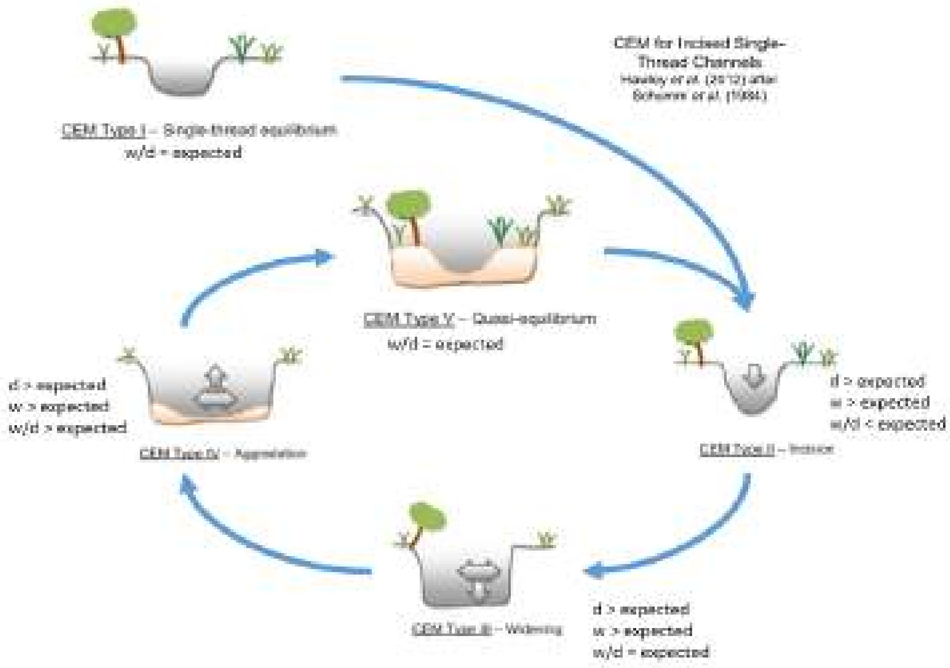

Figure 14. Channel Evolution Model (Hawley et al. 2012 after Schumm et al. 1984).

3.2 Flow changes and geomorphic impacts

For the development of a residential subdivision, it is proposed that the stormwater flows from a retarding basin are piped along an external drainage alignment and discharged into the Lang Lang River at the outfall location discussed previously (Figure 1). The proposed outfall comprises an underground 900 mm diameter pipe that runs alongside the existing VDP pipeline to a maximum depth of 2.5 m with the final 9m to be bored until reaching the Lang Lang River.

Flows from the proposed outlet are estimated to be around 0.81 m^3/s (70 ML/d). Assuming a 900 mm diameter outlet this equates to a flow velocity of 1.3 m/s. The maximum permissible velocity for alluvial silts is 0.6 m/s (clear water conditions) and up to 1.5 m/s (for water carrying fines).

These permissible velocities relate to conditions where the outlet is discharging flows into an empty channel. The Lang Lang River flows at the Yannathan gauge (gauge number 220209B, gauge period 1980-2023) show that over the months of January, February, and March the mean river flow is effectively zero and therefore the permissible velocities noted above apply.

The maximum flow velocity of the outlet should be assessed in the detailed design to ensure it is below the relevant erosion threshold.

Potential geomorphic impacts from the proposed alignment, outfall and increased flows include:

- High velocities (> 0.6 m/s) discharging from the pipe outlet into the waterway have the potential to trigger erosion along the bank adjacent to the outlet or the opposite bank depending on the flow conditions in the waterway.

Revegetation of the bank opposite the outlet would reduce the erosion potential. Recommendations to manage potential geomorphic impacts are discussed in the following section.

3.3 Other considerations

No evidence of soil dispersiveness was observed during the field inspection or in the available geotechnical information. However, field checks for soil dispersiveness should be undertaken during construction.

Although the ecological values along the waterway are limited the riparian vegetation corridor should be maintained and ideally enhanced.

4 Recommendations

The study reach of the Lang Lang River has low geomorphic sensitivity at the outlet location. Increased flows from the development are likely to be small relative to the flows in the river. However, localised erosion could occur at the outlet due to high outlet flow velocities.

To manage potential erosion impacts the following recommendations are made:

- The outlet velocity is required to be kept below 1.5 m/s, and preferably below 0.6 m/s. This may require additional energy dissipation at the outlet.
- The outlet should direct flows in a downstream direction at a maximum 45-degree angle.
- The outlet design and construction are required to be in accordance with Melbourne Water stormwater connection approval requirements and standard drawing 7251/08/103 (included in Appendix 1).

- Rockwork protection is required for the bed and banks from the end of the pipe to the base of the channel in accordance with standard drawing 7251/08/103.
- Revegetation of the bank opposite the outlet location is recommended.
- Areas disturbed during construction should be revegetated, particularly within the riparian corridor.
- If sodic soils are identified during construction, a sodic soil management plan is required.

5 References

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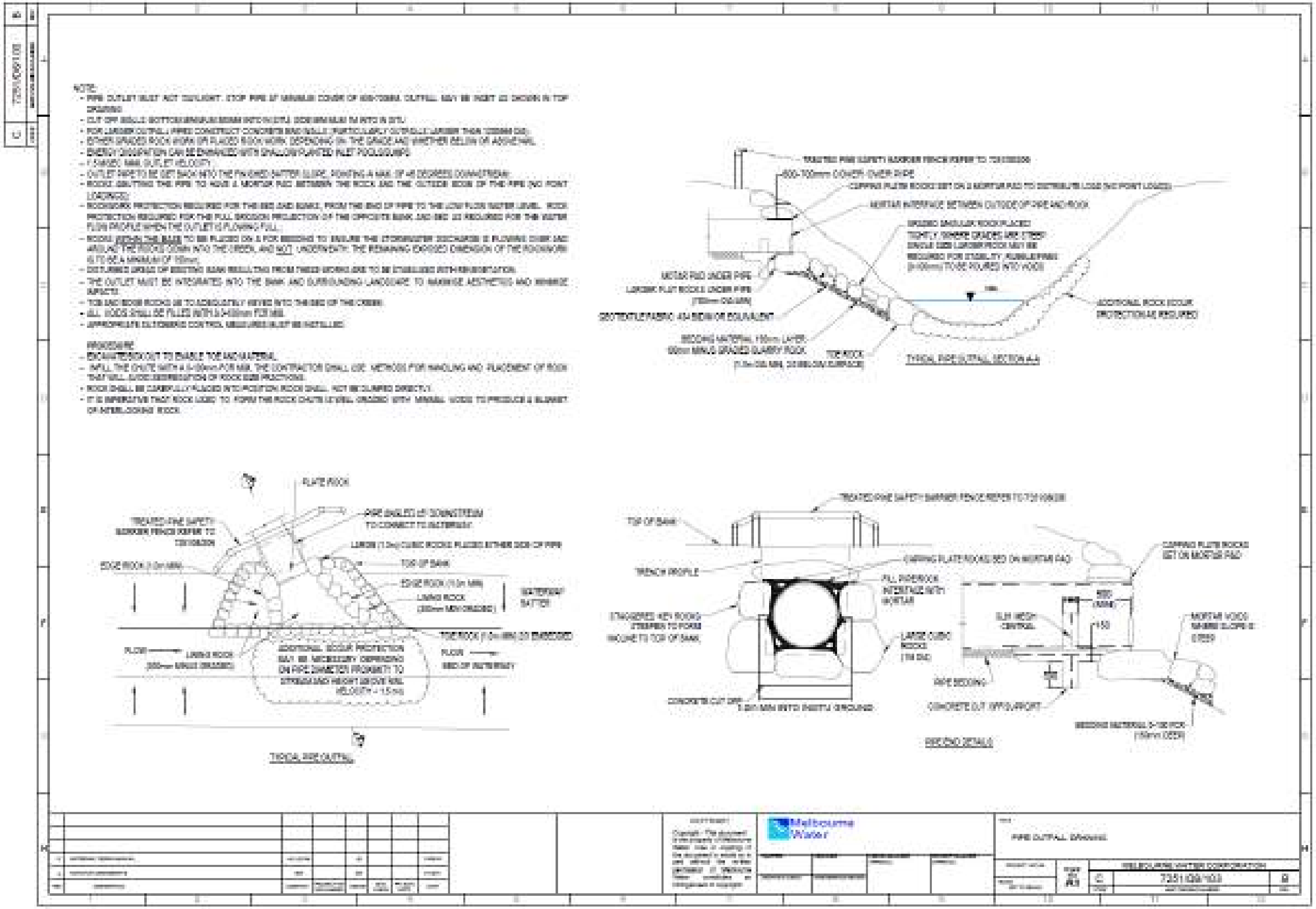
Appendix 1 – Standard drawing 7251/08/103



Appendix F Level Range Plan

FOR CONTINUATION REFER 118500FSR02

LEGEND:

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-0.2	to	-0.5	m	
-0.5	to	-1	m	
-1	to	-1.5	m	
-1.5	to	-2	m	
-2	to	-3	m	
-3	to	-5	m	
0	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1	m	
01	to	1.5	m	
1.5	to	2	m	
2	to	3	m	

PROPOSED RETAINING WALL
PROPOSED EASEMENT
3m D & S E — PROPOSED DRAINAGE AND SEWER EASEMENT
RWHx.xxm — PROPOSED RETAINING WALL HEIGHT

Cardinia

ADVERTISED MATERIAL

Planning Application: T190126-2
Date Prepared: 11 March 2026

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NOTE:
DEPTH RANGE CRITERIA BASED ON:
- COLLIERS 12D DESIGN 18/10/2023,
DEPTH BETWEEN "existing surface" TIN AND "boxing surface super" TIN
-"existing surface" TIN: SURVEY BY LYSSNA ON 10/12/2018, 31/05/2019 & 29/11/2019
-"boxing surface super" TIN: FINISHED SURFACE IN LOTS, BOXING SURFACE IN ROAD RESERVES. NOTE: ANOMALIES MAY BE PRESENT WITH INTERSECTIONS SHOWING FINISHED SURFACE
-NO ALLOWANCE FOR STRIPPING
-ALLOWED FOR 730mm DEPTH BOXING/PAVEMENT THICKNESS AS PER GEOTECHNICAL INVESTIGATION BY NSP GEOTECHNICS PTY LTD 7 MARCH 2019

REV.	AMENDMENTS	APP'D	DATE
G	ISSUED TO CLIENT	K.ROGERS	18.12.2025
F	ISSUED TO CLIENT	K.ROGERS	30.10.2025
E	ISSUED TO CLIENT	K.ROGERS	25.10.2023
D	ISSUED TO CLIENT	K.ROGERS	18.10.2023
C	ISSUED TO CLIENT	K.ROGERS	8.07.2021
B	ISSUED TO CLIENT	K.ROGERS	25.06.2021
A	ISSUED TO CLIENT	K.ROGERS	07.06.2021

WARNING
FINISHED SUFACE LEVELS
SUBJECT TO CHANGE PENDING DETAILED
DESIGN AND COUNCIL APPROVAL

WARNING
BEWARE OF UNDERGROUND/OVERHEAD SERVICES
THE LOCATION OF SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN. SPECIAL CONSIDERATION SHOULD BE GIVEN TO CONSTRUCTION PROCEDURES UNDER OVERHEAD ELECTRICITY TRANSMISSION LINES.

COUNTRY COVE ESTATE

Colliers

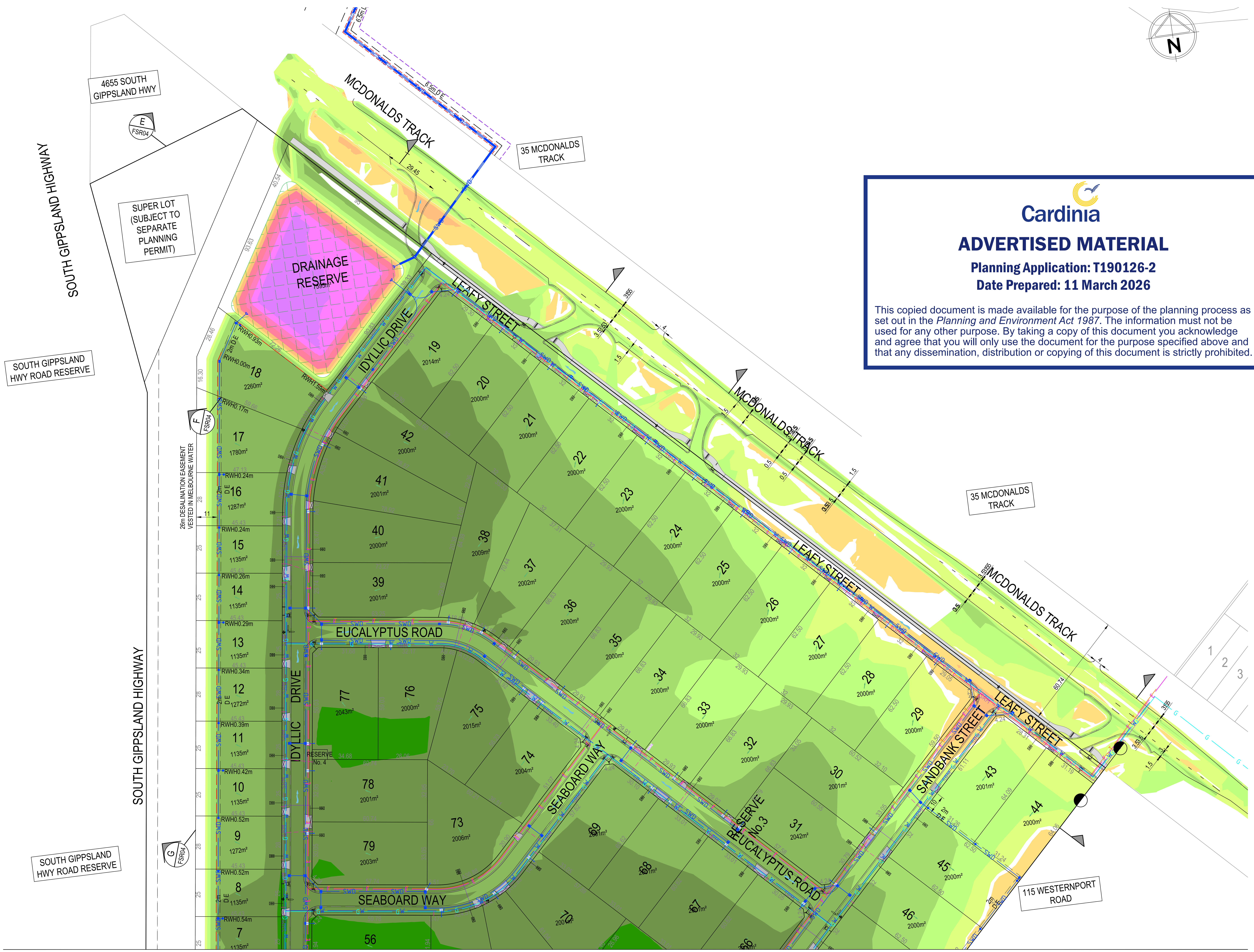
Scale 1:1000,A1 — Horizontal 0 10 20 30 40 50 — Vertical 0 10 20 30 40 50

PM	K.ROGERS
DESIGNED	25.11.2020 L.CLAREY
CHECKED	18.12.2025 K.ROGERS
AUTHORISED	18.12.2025 K.ROGERS
MELWAYS:	18 Q18
POS No.:	PS 829539D

MCDONALDS TRACK 35
OVERALL

CARDINIA SHIRE COUNCIL
FINISHED SURFACE RANGE LEVEL PLAN - 1

STATUS: PRELIMINARY | 118500FSR01 | SHEET No. 1 OF 4 | REV. G



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-0.2	to	-0.5	m	
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0.5	to	1	m	
01	to	1.5	m	
1.5	to	2	m	
2	to	3	m	

PROPOSED RETAINING WALL
PROPOSED EASEMENT
3m D & S E — PROPOSED DRAINAGE AND SEWER EASEMENT

NOTE:
DEPTH RANGE CRITERIA BASED ON:
-COLLIERS 12D DESIGN 18/10/2023,
DEPTH BETWEEN "existing surface" TIN AND "boxing surface super" TIN
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E	ISSUED TO CLIENT	K.ROGERS	25.10.2023
D	ISSUED TO CLIENT	K.ROGERS	18.10.2023
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WARNING
FINISHED SUFACE LEVELS
SUBJECT TO CHANGE PENDING DETAILED DESIGN AND COUNCIL APPROVAL

WARNING
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COUNTRY COVE ESTATE

Colliers

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CHECKED	18.12.2025 K.ROGERS
AUTHORISED	18.12.2025 K.ROGERS
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POS No.:	PS 829639D
STATUS:	PRELIMINARY

MCDONALDS TRACK 35
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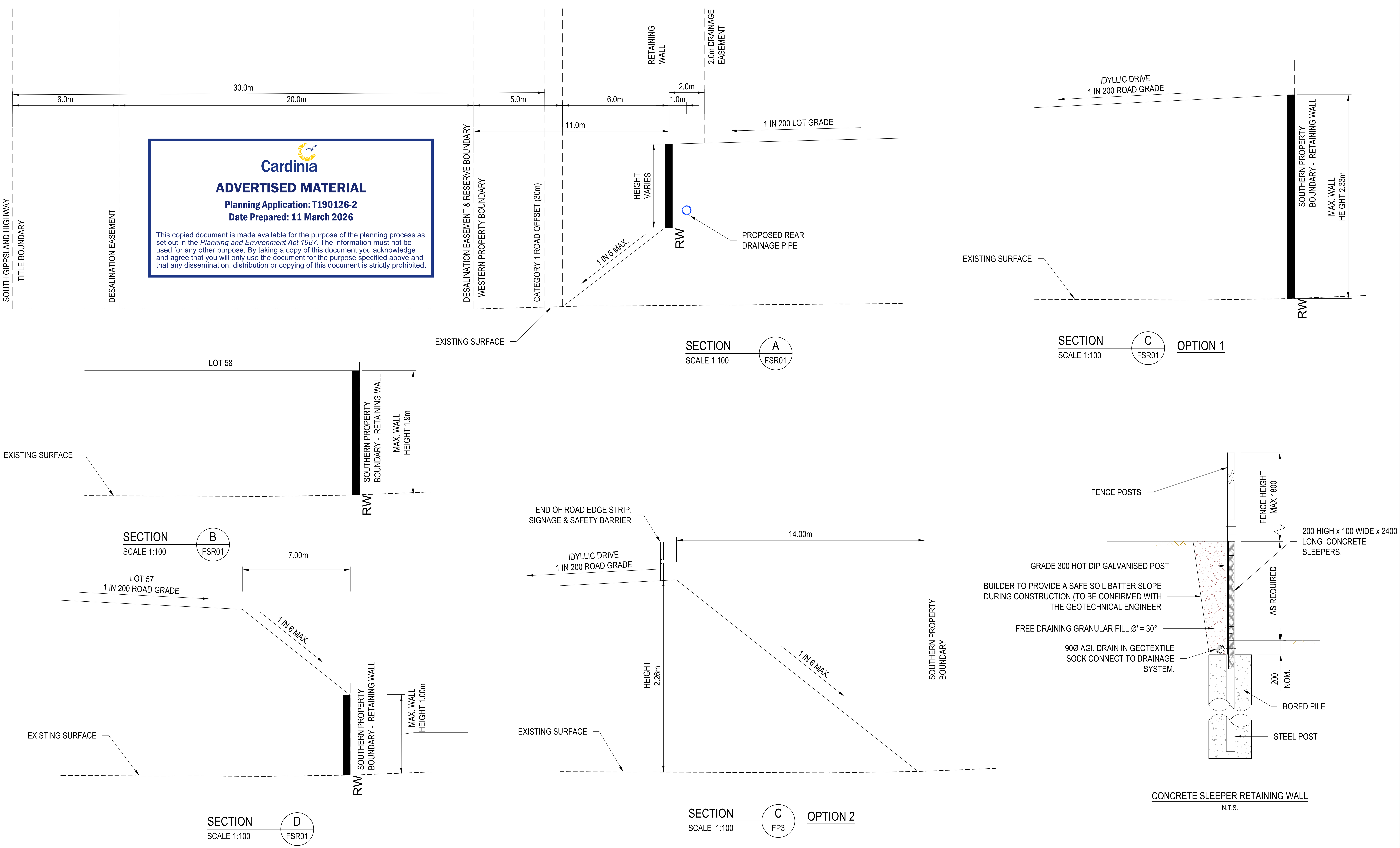
CARDINIA SHIRE COUNCIL
FINISHED SURFACE RANGE LEVEL PLAN - 2

118500FSR01 — SHEET No. 2 OF 4 — REV. G



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COUNTRY COVE ESTATE

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MCDONALDS TRACK 35
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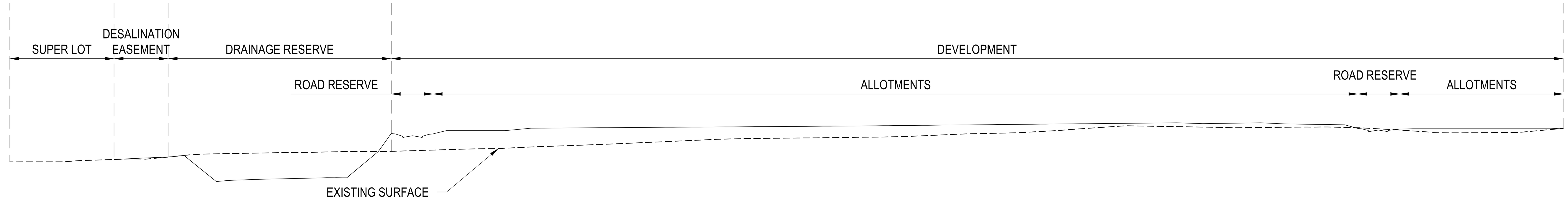
CARDINIA SHIRE COUNCIL
TYPICAL SECTIONS - RETAINING WALL

STATUS: PRELIMINARY

118500FSR03

SHEET No. 3 OF 3

REV. F



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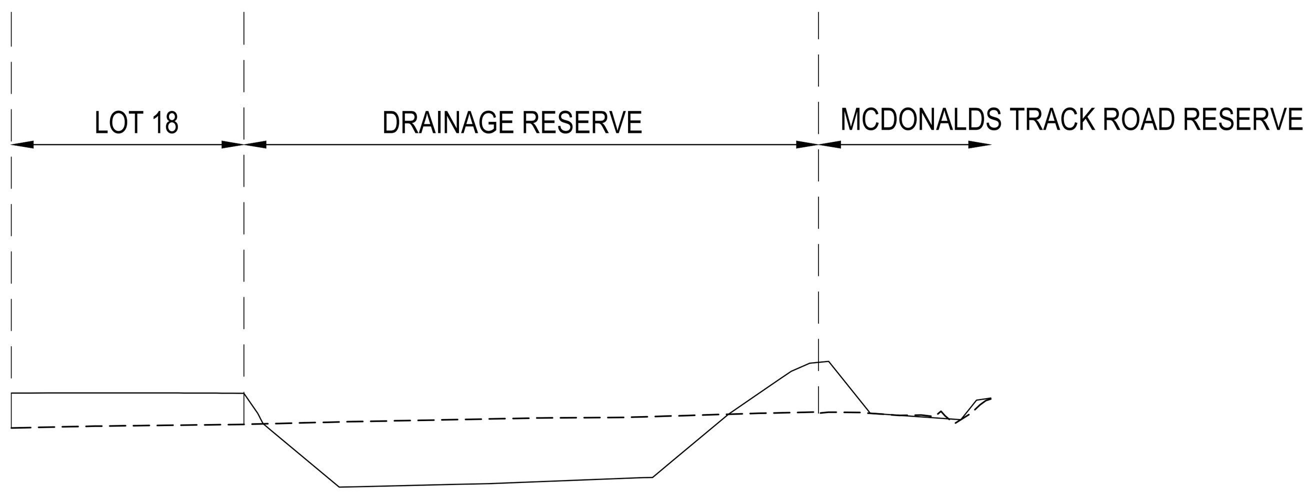

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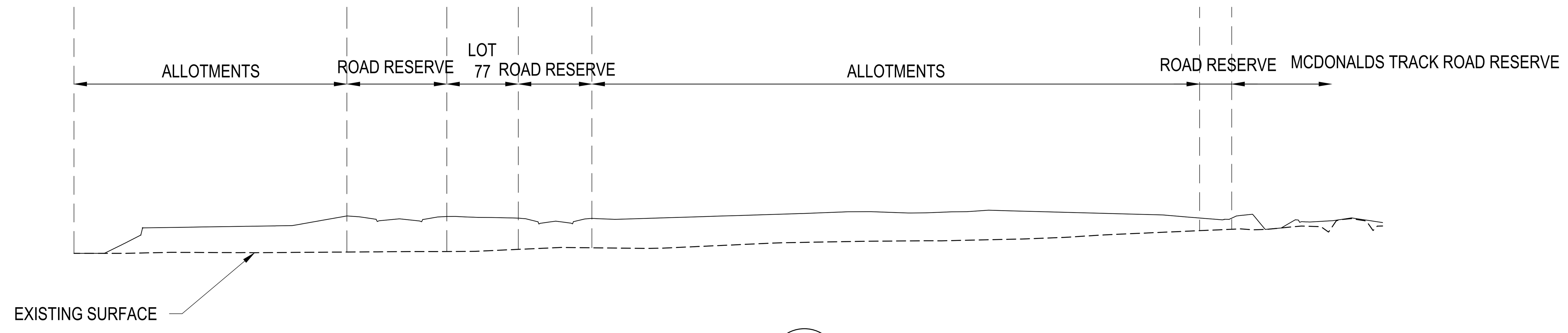

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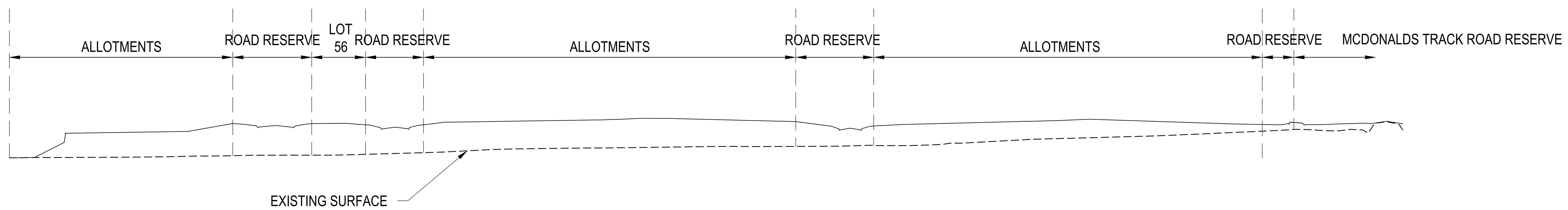

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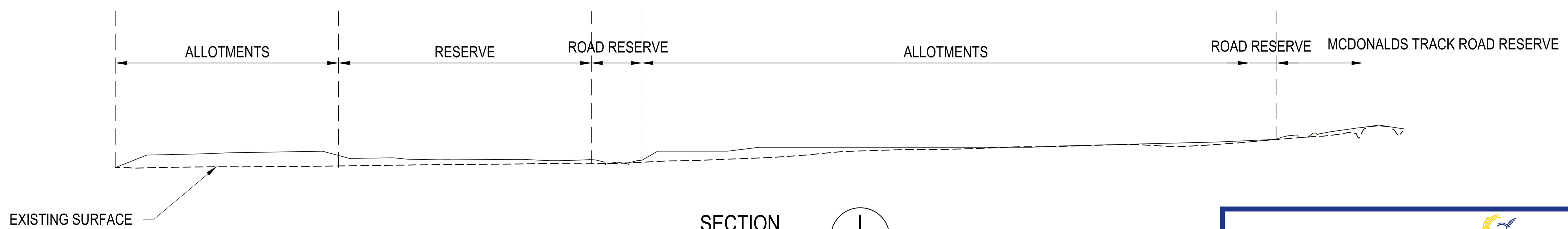

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SCALE 1:1000

REV.	AMENDMENTS	APP'D	DATE
G	ISSUED TO CLIENT	K.ROGERS	18.12.2025
F	ISSUED TO CLIENT	K.ROGERS	30.10.2025
E	ISSUED TO CLIENT	K.ROGERS	25.10.2023
D	ISSUED TO CLIENT	K.ROGERS	18.10.2023
C	ISSUED TO CLIENT	K.ROGERS	8.07.2021
B	ISSUED TO CLIENT	K.ROGERS	25.06.2021
A	ISSUED TO CLIENT	K.ROGERS	07.06.2021

FILE: C:\12d\5_WorkSpace\data\AUMELSQL01\118500_397\PM02 DESIGN\G01 DESIGN\ACAD\118500FLR00.dwg LAYOUT: FLR-04 PLOTTED BY: McClure, Jack PLOT DATE: 18/12/2025 3:45 PM

COUNTRYCOVE ESTATE

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Scale 1:100,A1 Horizontal 0 1 2 3 4 5 Vertical 0 1 2 3 4 5

PM	K.ROGERS
DESIGNED	25.11.2020 L.CLAREY
CHECKED	18.12.2025 K.ROGERS
AUTHORISED	18.12.2025 K.ROGERS
MELWAYS	18 Q18
POS No.	PS 829539D

MCDONALDS TRACK 35
OVERALL

CARDINIA SHIRE COUNCIL
TYPICAL SECTIONS - DEVELOPMENT

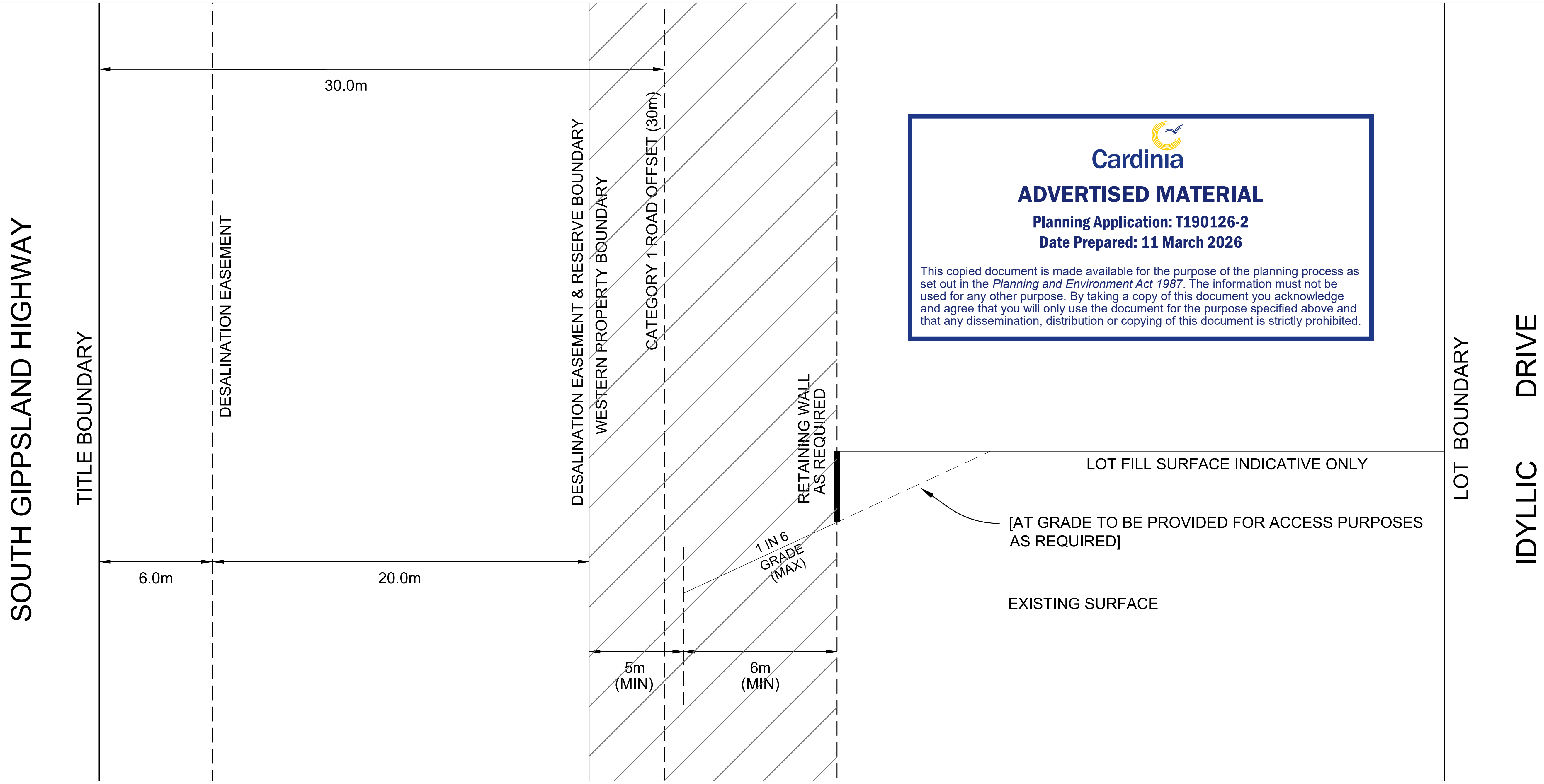
STATUS: PRELIMINARY

118500FSR01

SHEET No. 4 OF 4

REV. G

COUNTRY COVE ESTATE
McDONALDS TRACK, LANG LANG



DESALINATION EASEMENT/RESERVE & LOT CROSS SECTION

NOTE:
Lot Building Envelope setback from Desalination Easement and Reserve applies to Lots 1 to 18 (all inclusive).

LEGEND:

Drainage Easement to convey overland flooding

DRAWING NOT TO SCALE

Drawing Date	17/12/25
Job Number	AA0085
Drawing Number	UD00CF
Drawn By	AR

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