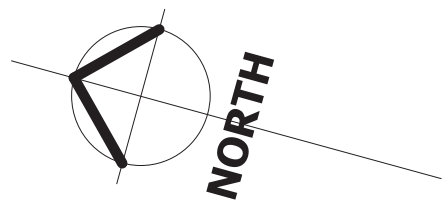


SITE PLAN



PARISH OF AVOCA  
 COUNTY OF GLADSTONE  
 SECTION A  
 CROWN ALLOTMENT 6B(PART)  
 LOT 2 OF SUBDIVISION LP 18834  
 VOL. 07322 FOL. 256  
 4,310M<sup>2</sup>

<b>AVOCA</b> PROPOSED 6 LOT RESIDENTIAL SUBDIVISION AT 19 ASTBURY STREET AVOCA 3467	SHEET NO: A01 DESIGNED: B. DOUGLAS DP-AD1401 REVISIONS: <table border="1"> <thead> <tr> <th>Date</th> <th>Description</th> <th>Issue</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	Date	Description	Issue																SCALE: 1:500 PROJECT NO: Z381
		Date	Description	Issue																
SITE	DRAWN: NBD DATE: 4/07/2023 12:44:30 AM <b>B.F. &amp; R. DOUGLAS</b> BUILDING CONSULTANTS REGISTERED BUILDING PRACTITIONER 98 HIGH ST MARYBOROUGH VIC 3465 Tel:0354611220 Fax:0354611208 Email:bfdouglas@outlook.com																			



AERIAL VIEW FROM SOUTH EAST

**PROJECT:** [REDACTED]  
PROPOSED 6 LOT RESIDENTIAL  
SUBDIVISION AT  
19 ASTBURY STREET AVOCA 3467

**DRAWN:** NBD  
**PROJECT NO:** Z381  
**DATE:** 10/12/20224 11:20:56 PM

**B.F. & R. DOUGLAS**  
BUILDING CONSULTANTS  
REGISTERED BUILDING PRACTITIONER  
98 HIGH ST MARYBOROUGH VIC 3465  
Tel:0354611220 Fax:0354611208  
Email:douglas1@netconnect.com.au

## RESCODE REQUIREMENTS

### NEIGHBOURHOOD CHARACTER

A1. NEIGHBOURHOOD CHARACTER.  
THE EXISTING NEIGHBOURHOOD CONSISTS OF DWELLINGS OF VARYING AGE AND CHARACTER, WHICH WILL BE PRESERVED AND UPHOLD BY THIS DEVELOPMENT.

A2. INTEGRATION WITH STREET  
THE EXISTING DWELLING IS ORIENTED TO THE ASTBURY ST, ADDITIONAL DWELLINGS WITH NO DIRECT FRONTAGE

### SITE LAYOUT AND BUILDING MASSING

A3. STREET SETBACK.  
THE PROPOSED ADDITIONAL DWELLINGS ARE ALL SETBACK FURTHER THAN THE FRONT OF THE EXISTING DWELLING, WHICH IS TO BE RETAINED

A4. BUILDING HEIGHTS  
MAXIMUM BUILDING HEIGHT WILL BE 5075MM FOR BOTH DWELLINGS ON BOTH LOT 3 AND LOT 5, WHICH IS 200 MM HIGHER THAN THE MAXIMUM HEIGHT OF THE EXISTING DWELLING

A5. SITE COVERAGE  
-OF EXISTING & PROPOSED DWELLINGS & OUTBUILDINGS 1,297M<sup>2</sup>  
TOTAL SITE AREA: 4,310M<sup>2</sup>  
% OF SITE BUILT UP: 30.1% (MAX. ALLOWABLE 60%)

A6. PERMEABILITY  
AT LEAST 20% OF SITE IS NOT TO BE COVERED BY IMPERVIOUS SURFACES  
TOTAL SITE AREA: 4,310M<sup>2</sup>  
TOTAL IMPERVIOUS AREAS: 2,307M<sup>2</sup>  
REMAINING NON IMPERVIOUS SPACE: 2,003M<sup>2</sup> (46.7%)

A7. ENERGY EFFICIENCY PROTECTION  
- LIVING AREAS AND PRIVATE OPEN SPACES ARE ALL ORIENTED TO THE NORTH ON ALL PROPOSED DWELLINGS. EXISTING DWELLING ON LOT 1 HAS PRIVATE OPEN SPACE WITH A NORTHERLY ASPECT  
- MINIMAL (IF ANY) IMPACT ON ENERGY EFFICIENCY OF ADJOINING BUILDINGS

A8. SIGNIFICANT TREES  
NO SIGNIFICANT TREES ARE PRESENT ON SITE OR ALONG THE ASTBURY ST NATURE STRIP

A9. PARKING  
TWO DESIGNATED CAR PARKING SPACES HAVE BEEN PROVIDED FOR EACH DWELLING PLUS ONE VISITOR PARKING SPACE

### AMENITY IMPACTS

A10. SIDE & REAR SETBACKS  
PROPOSED DWELLINGS ARE ALL SET BACK MORE THAN 1M FROM SIDE AND REAR BOUNDARIES. PROPOSED SHED AT LOT 1 IS LOCATED 1.0M FROM THE SIDE BOUNDARY

A11. WALLS ON BOUNDARIES  
THE EASTERN WALL OF LOT 6 DWELLING IS WITHIN 300MM OF THE SIDE BOUNDARY. AVERAGE WALL HEIGHT IS LESS THAN 3200MM, MAX. WALL HEIGHT IS LESS THAN 3600MM, WALL LENGTH IS LESS THAN 10.0M PLUS 25% OF REMAINING BOUNDARY LENGTH

A12. DAYLIGHT TO EXISTING WINDOWS  
THERE ARE NO INSTANCES WHERE THE PROPOSED BUILDINGS IMPINGE ON WINDOWS OF HABITABLE ROOMS IN NEIGHBOURING DWELLINGS IN TERMS OF ALLOWANCE OF ADEQUATE DAYLIGHT

A13. NORTH FACING WINDOWS  
NO NORTH FACING WINDOWS ARE PRESENT IN NEIGHBOURING DWELLINGS WITHIN 3.0M OF THE ABUTTING LOT BOUNDARY

A14. OVERSHADOWING OPEN SPACE  
NO SUNLIGHT TO PRIVATE OPEN SPACE OF AN EXISTING DWELLING WILL BE REDUCED BY THE PROPOSED DWELLING.

A15. OVERLOOKING.  
NO DIRECT VIEWS INTO PRIVATE OPEN SPACE OR HABITABLE ROOM WINDOWS OF AN EXISTING DWELLING ARE RESULTANT FROM THE PROPOSED DESIGN

### ON SITE AMENITY & FACILITIES

A16. DAYLIGHT TO NEW WINDOWS.  
ALL HABITABLE ROOM WINDOWS ARE LOCATED TO FACE EITHER:  
-AN OUTDOOR SPACE WITH A MIN. AREA OF 3M<sup>2</sup> AND MINIMUM DIMENSION OF 1 M CLEAR TO THE SKY  
-A VERANDAH WITH AT LEAST 1 THIRD OF ITS PERIMETER OPEN  
-A CARPORT WITH 2 OR MORE OPEN SIDES AND IS OPEN FOR AT LEAST 1 THIRD OF ITS PERIMETER

A17. PRIVATE OPEN SPACE  
-AT LEAST 95M<sup>2</sup> HAS BEEN PROVIDED AT THE REAR OR SIDE OF EACH DWELLING ON THE NORTHERN SIDE WHICH IS AT LEAST 80M<sup>2</sup> OR 20% OF THE AREA OF THE LOT, WHICHEVER IS LESS, BUT NOT LESS THAN 40M<sup>2</sup>.  
- ONE PART OF THE OPEN SPACE IS AT LEAST 25M<sup>2</sup> WITH A MIN. 3M AT THE SIDE OR REAR OF THE DWELLING WITH CONVENIENT ACCESS FROM A LIVING ROOM, AS REQUIRED

A18. SOLAR ACCESS TO OPEN SPACE  
THE PRIVATE OPEN SPACE IS LOCATED ON THE SOUTH EASTERN SIDE OF THE DWELLING, WHICH IS NOT IDEAL, BUT IT IS A FUNCTION OF THE EXISTING SITE LAYOUT

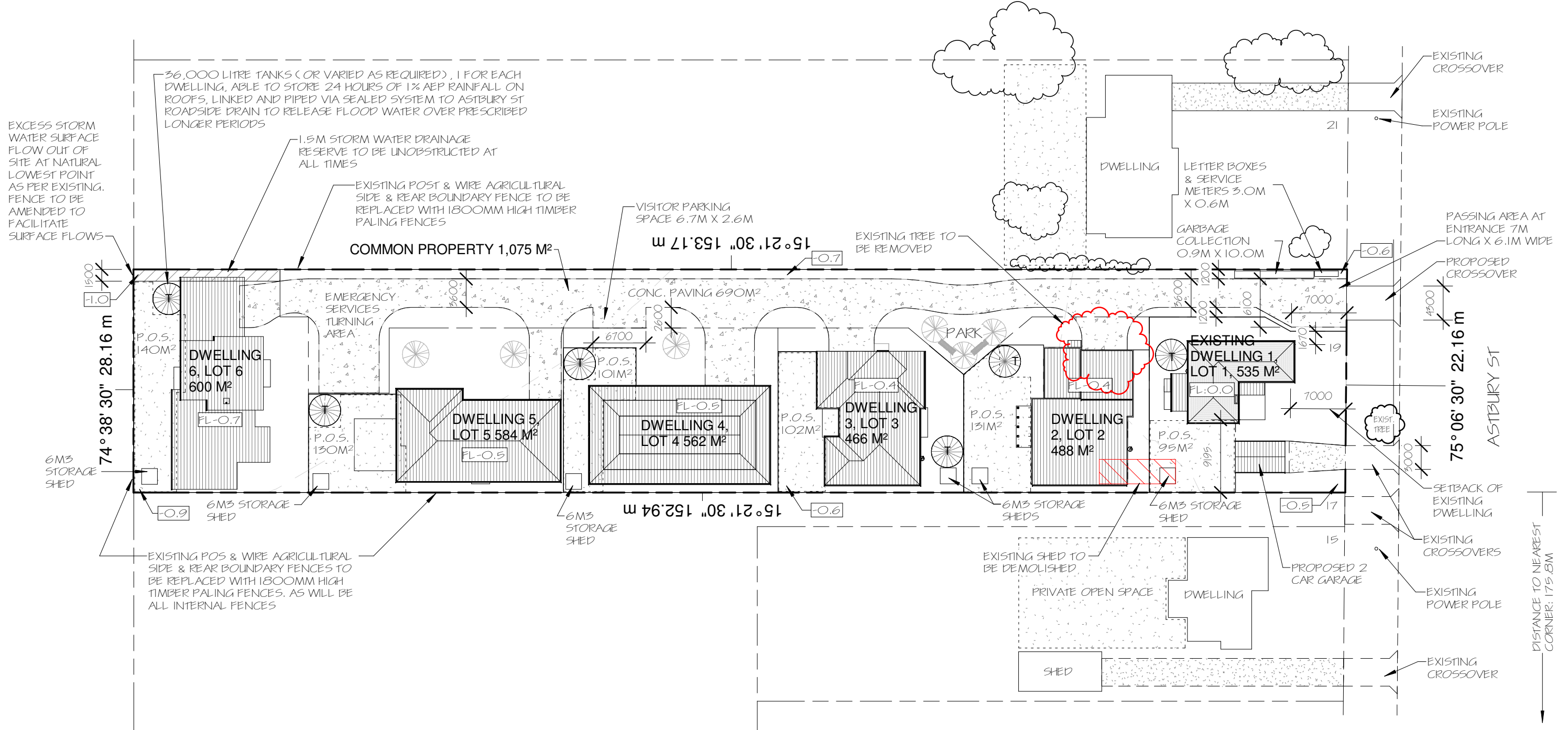
### DETAILED DESIGN

A19. DESIGN DETAIL  
PREFERRED NEIGHBOURHOOD CHARACTER  
THE PROPOSED BUILDINGS ARE DESIGNED TO APPEAR IN SYMPATHY WITH THE STYLE OF THE EXISTING ONSITE DWELLING.

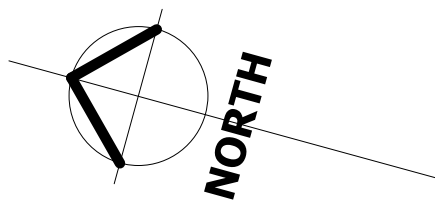
A20. FRONT FENCE  
THERE IS NO EXISTING FRONT FENCE AND NONE WILL BE PROVIDED

GARDEN AREA: 1,972M<sup>2</sup> (45.7%) OF THE SITE AREA IS GARDEN AREA, WHICH IS MORE THAN THE 35% REQUIREMENT

<p>PROPOSED 6 LOT RESIDENTIAL SUBDIVISION AT 19 ASTBURY STREET AVOCA 3467</p>	<p>RESCODE SUMMARY</p>	SHEET NO: 102	SCALE: N/A	PROJECT NO: Z381															
		DESIGNED: B. DOUGLAS DP-AD1401	DRAWN: NBD	DATE: 10/12/2022 11:20:56 PM															
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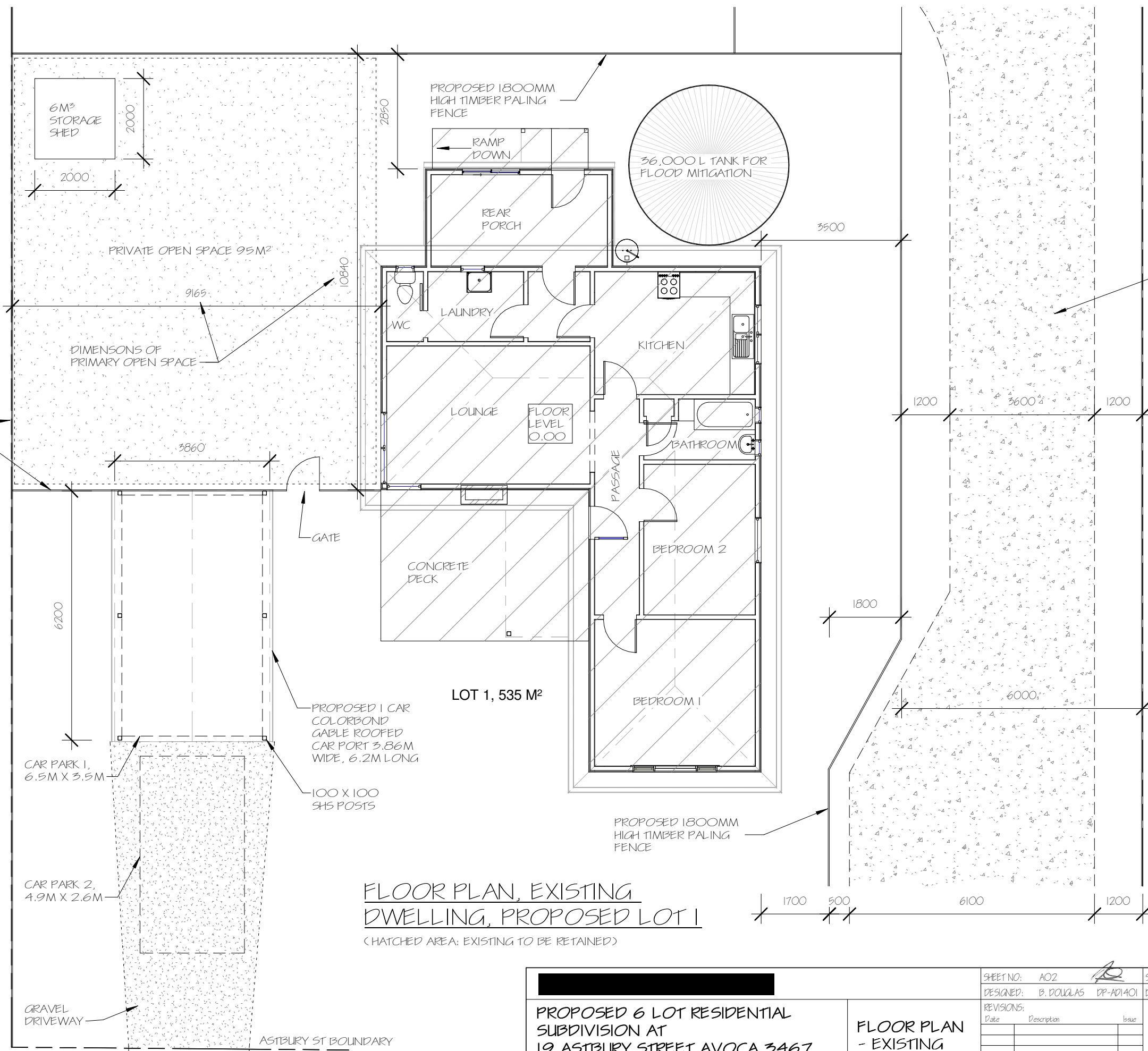
SITE PLAN



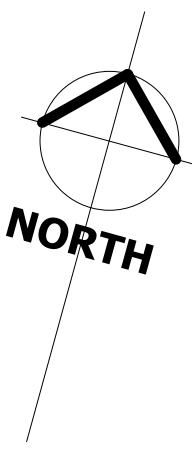
PARISH OF AVOCA  
 COUNTY OF GLADSTONE  
 SECTION A  
 CROWN ALLOTMENT 6B (PART)  
 LOT 2 OF SUBDIVISION LP 18834  
 VOL. 07322 FOL. 256  
 4,310M<sup>2</sup>

[REDACTED] PROPOSED 6 LOT RESIDENTIAL SUBDIVISION AT 19 ASTBURY STREET AVOCA 3467	SHEET NO: AOI DESIGNED: B. DOUGLAS DP-AD1401 REVISIONS: <table border="1"> <thead> <tr> <th>Date</th> <th>Description</th> <th>Issue</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	Date	Description	Issue													SCALE: 1:500 DRAWN: NBD DATE: 10/12/2022 11:20:57 PM	PROJECT NO: Z381 <b>B.F. &amp; R. DOUGLAS</b> BUILDING CONSULTANTS REGISTERED BUILDING PRACTITIONER 98 HIGH ST MARYBOROUGH VIC 3465 Tel: 0354611220 Fax: 0354611208 Email: bfdouglas@outlook.com
		Date	Description	Issue														
SITE	DISTANCE TO NEAREST CORNER: 175.8M																	





COMMON PROPERTY WITH 3500 WIDE CONC. PAVED DRIVEWAY

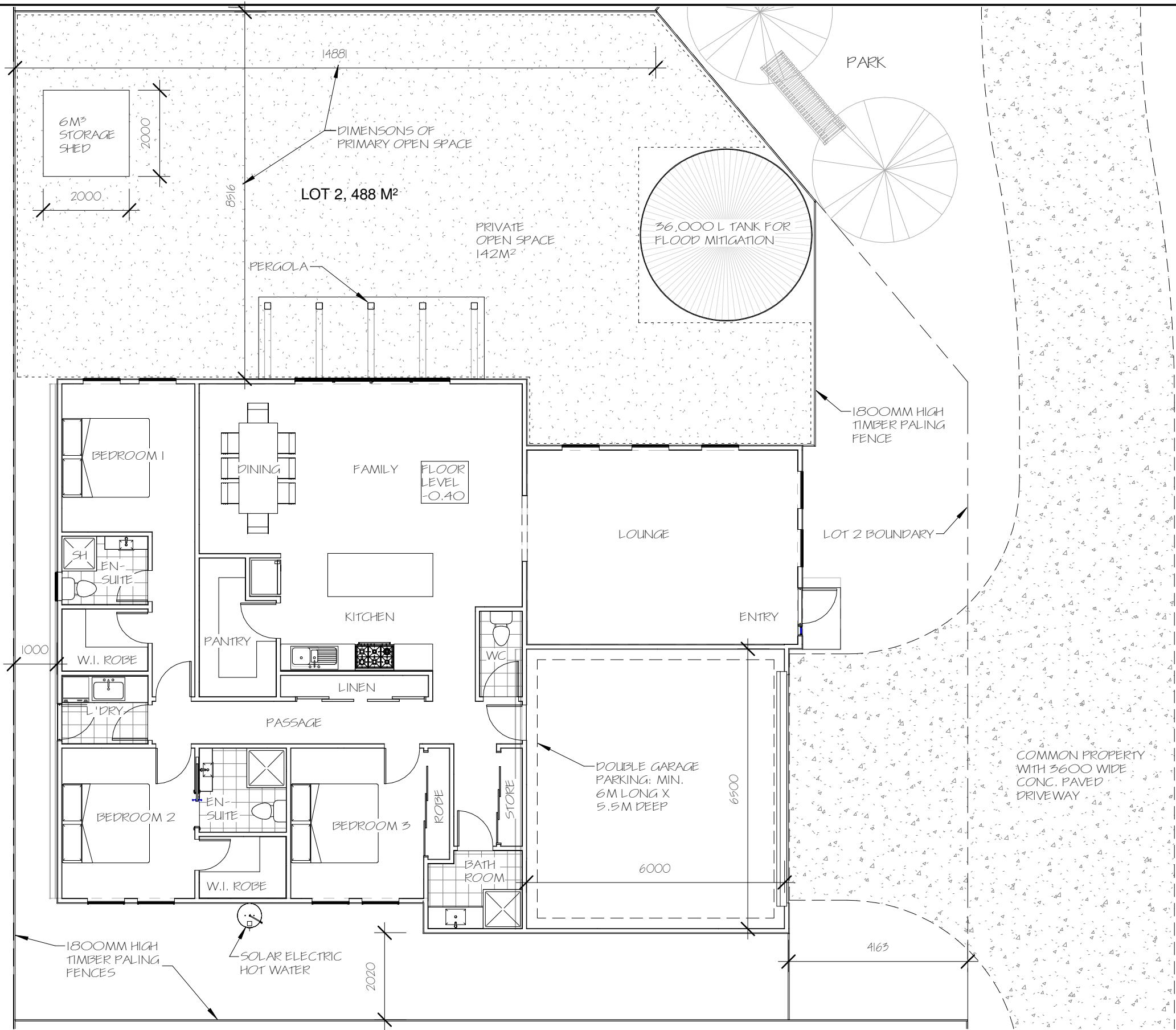


**FLOOR PLAN, EXISTING DWELLING, PROPOSED LOT 1**  
(HATCHED AREA: EXISTING TO BE RETAINED)

**SUMMARY OF AREAS**  
 PRIVATE OPEN SPACE: 95M<sup>2</sup>  
 SITE AREA: 535M<sup>2</sup>  
 FLOOR AREA: 92M<sup>2</sup>  
 CAR PORT: 24M<sup>2</sup>  
 SITE COVERAGE: 133M<sup>2</sup> (25%)  
 PERMEABLE AREA: 349M<sup>2</sup> (65%)  
 GARDEN AREA: 343M<sup>2</sup> (64%)

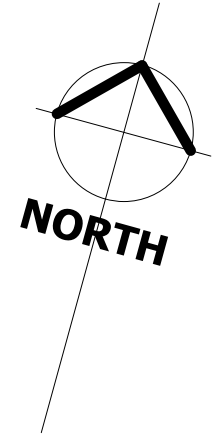
<b>PROPOSED 6 LOT RESIDENTIAL SUBDIVISION AT 19 ASTBURY STREET AVOCA 3467</b>	<b>FLOOR PLAN - EXISTING DWELLING LOT 1</b>	SHEET NO: AO2	SCALE: 1:100	PROJECT NO: Z381															
		DESIGNED: B. DOUGLAS DP-AD1401	DRAWN: NBD	DATE: 10/12/2022 11:20:58 PM															
<b>REVISIONS:</b>		<b>B.F. &amp; R. DOUGLAS</b> BUILDING CONSULTANTS REGISTERED BUILDING PRACTITIONER 98 HIGH ST MARYBOROUGH VIC 3465 Tel: 0354611220 Fax: 0354611208 Email: bfdouglas@outlook.com																	
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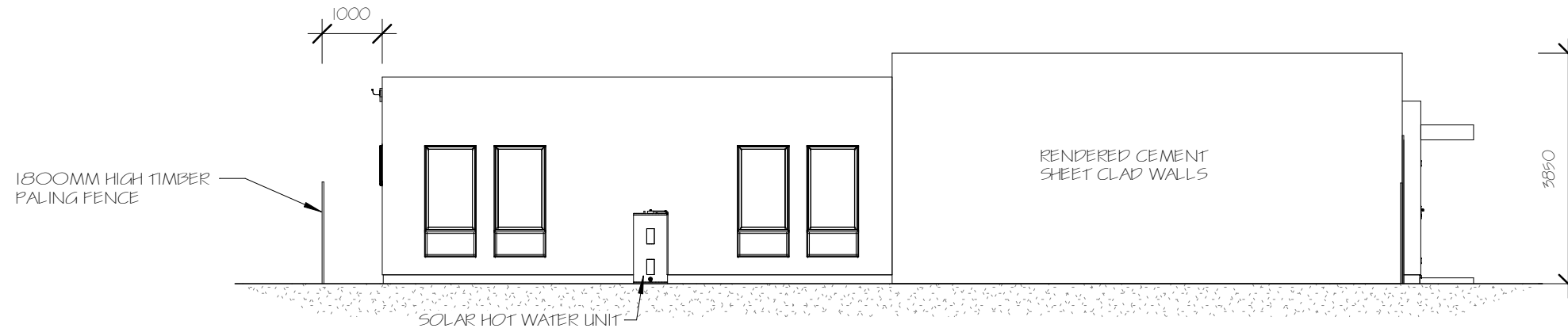


FLOOR PLAN, PROPOSED LOT 2

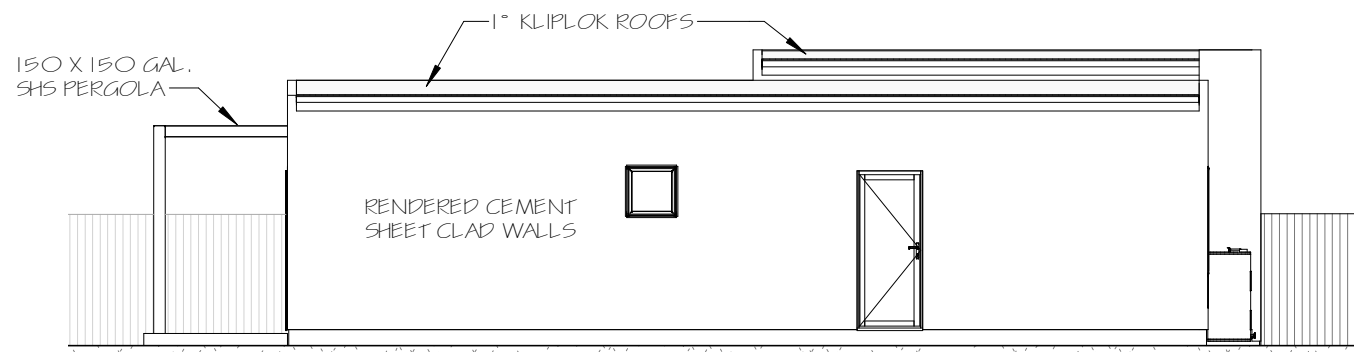
SUMMARY OF AREAS  
 PRIVATE OPEN SPACE: 142M<sup>2</sup>  
 SITE AREA: 488M<sup>2</sup>  
 FLOOR AREA: 164M<sup>2</sup>  
 GARAGE: 40M<sup>2</sup>  
 SITE COVERAGE: 211M<sup>2</sup> (28%)  
 PERMEABLE AREA: 229M<sup>2</sup> (46%)  
 GARDEN AREA: 225M<sup>2</sup> (46%)



<p>PROPOSED 6 LOT RESIDENTIAL SUBDIVISION AT 19 ASTBURY STREET AVOCA 3467</p>	<p>FLOOR PLAN - LOT 2 DWELLING</p>	<p>SHEET NO: A04</p>	<p>SCALE: 1:100</p>	<p>PROJECT NO: Z381</p>															
		<p>DESIGNED: B. DOUGLAS DP-AD1401</p>	<p>DRAWN: NBD</p>	<p>DATE: 10/12/2022 11:21:01 PM</p>															
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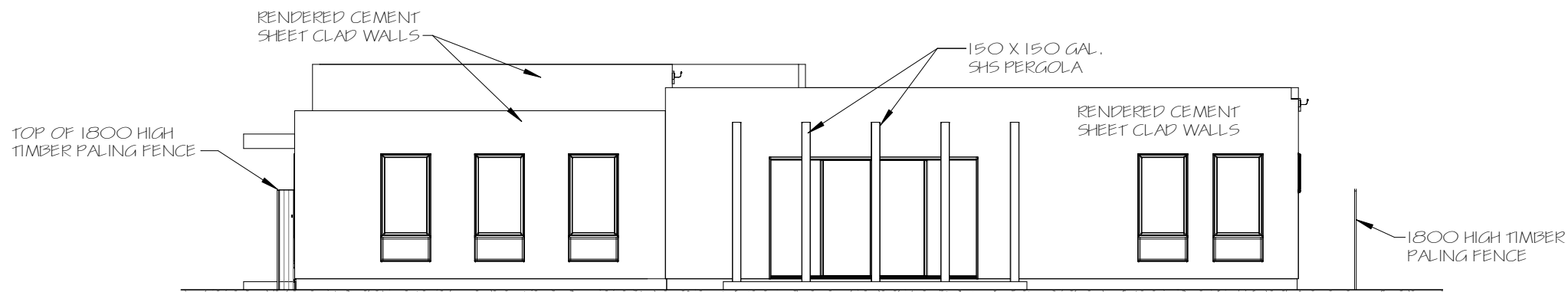
SOUTH ELEVATION



WEST ELEVATION



EAST ELEVATION

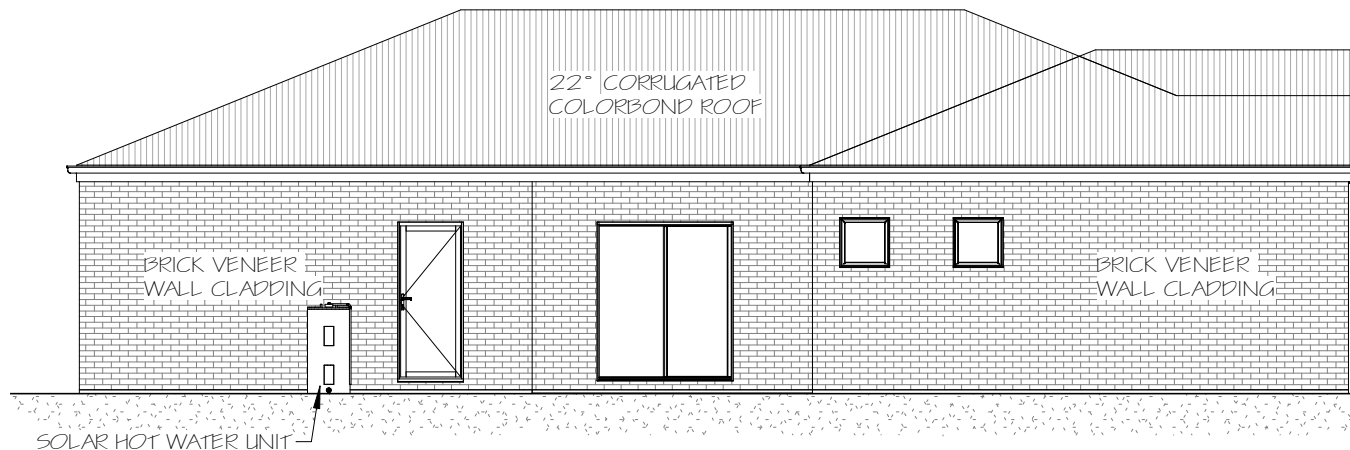


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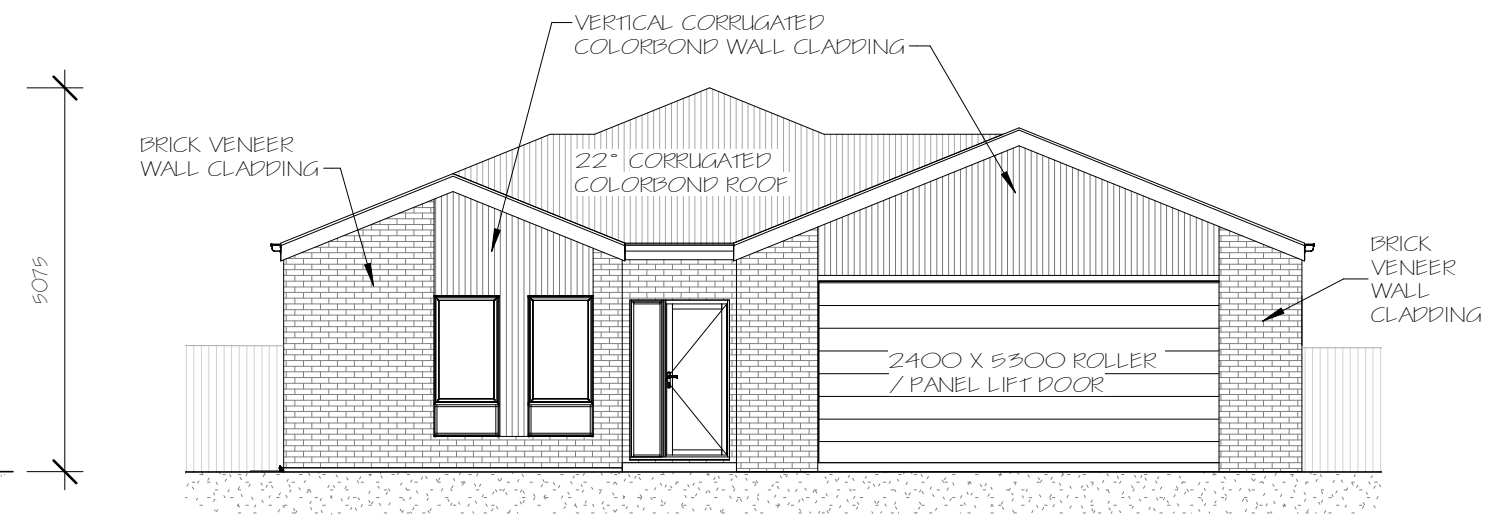
<p>PROPOSED 6 LOT RESIDENTIAL SUBDIVISION AT 19 ASTBURY STREET AVOCA 3467</p>	<p>ELEVATIONS - LOT 2 DWELLING</p>	<p>SHEET NO: A05</p>	<p>SCALE: 1:100</p>	<p>PROJECT NO: Z381</p>															
		<p>DESIGNED: B. DOUGLAS DP-AD1401</p>	<p>DRAWN: NBD</p>	<p>DATE: 10/12/2022 11:21:05 PM</p>															
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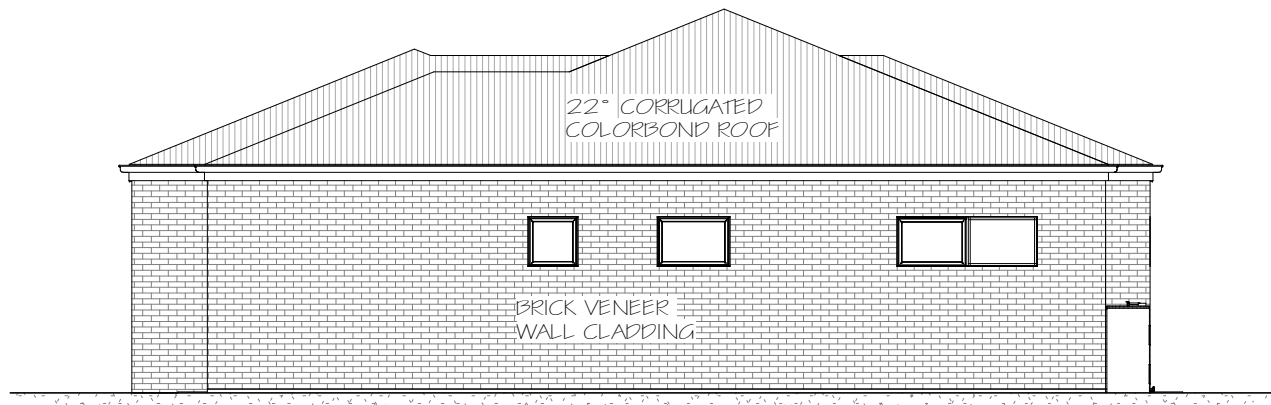




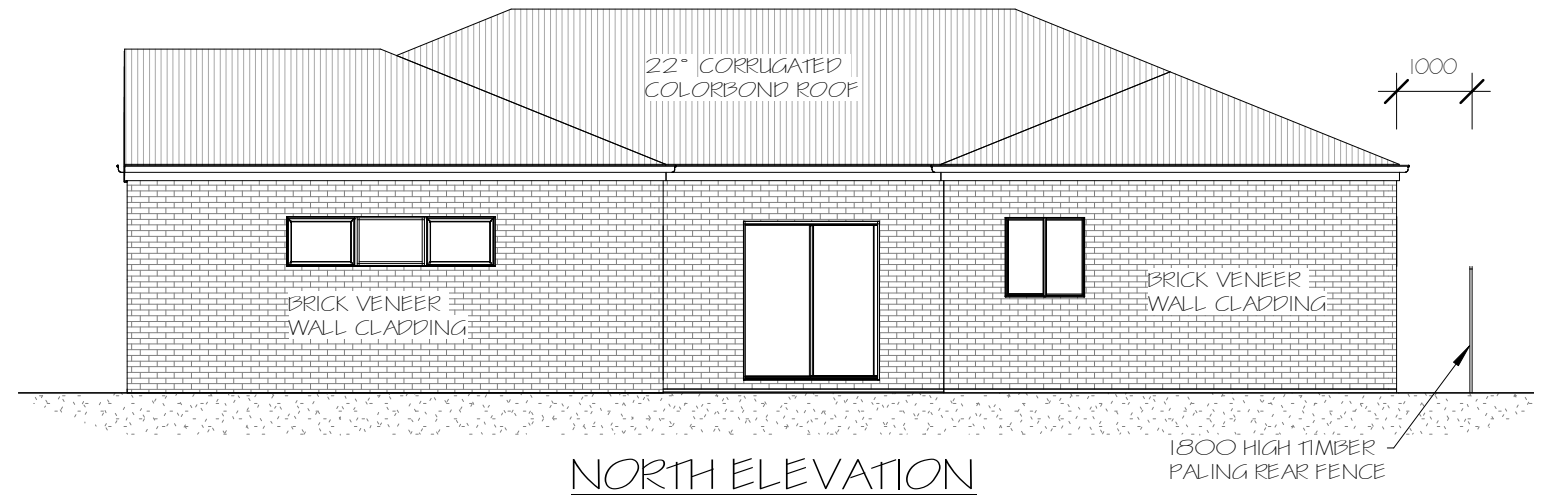
SOUTH ELEVATION



EAST ELEVATION

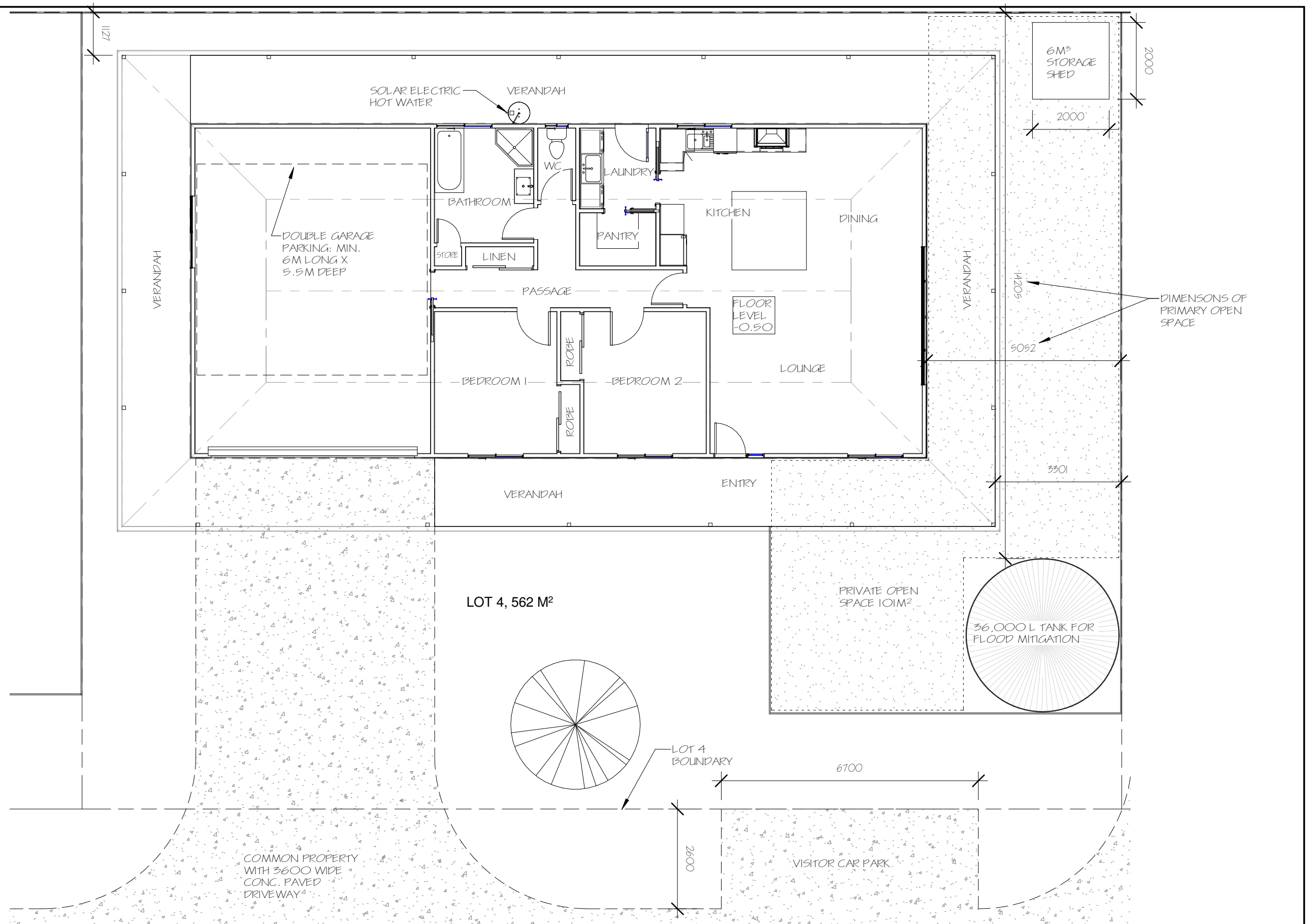


WEST ELEVATION

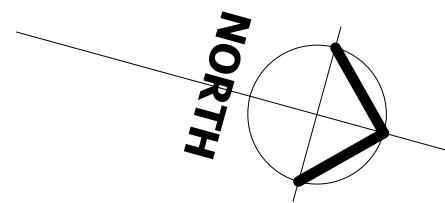


NORTH ELEVATION

<p>PROPOSED 6 LOT RESIDENTIAL SUBDIVISION AT 19 ASTBURY STREET AVOCA 3467</p>	<p>ELEVATIONS - LOT 3 DWELLING</p>	<p>SHEET NO: A07</p>	<p>SCALE: 1:100</p>	<p>PROJECT NO: Z381</p>																		
		<p>DESIGNED: B. DOUGLAS DP-AD1401</p>	<p>DRAWN: NBD</p>	<p>DATE: 10/12/2022 11:21:09 PM</p>																		
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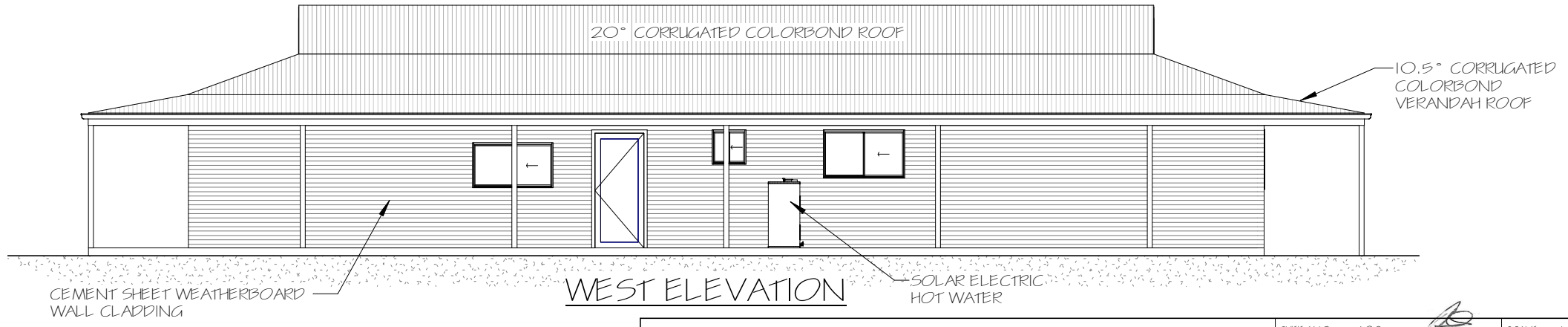
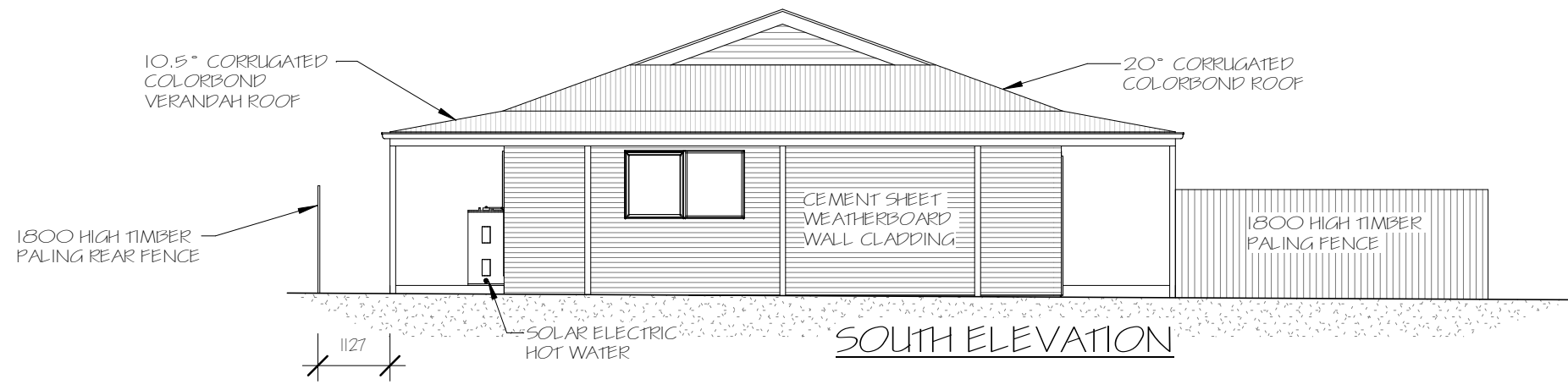
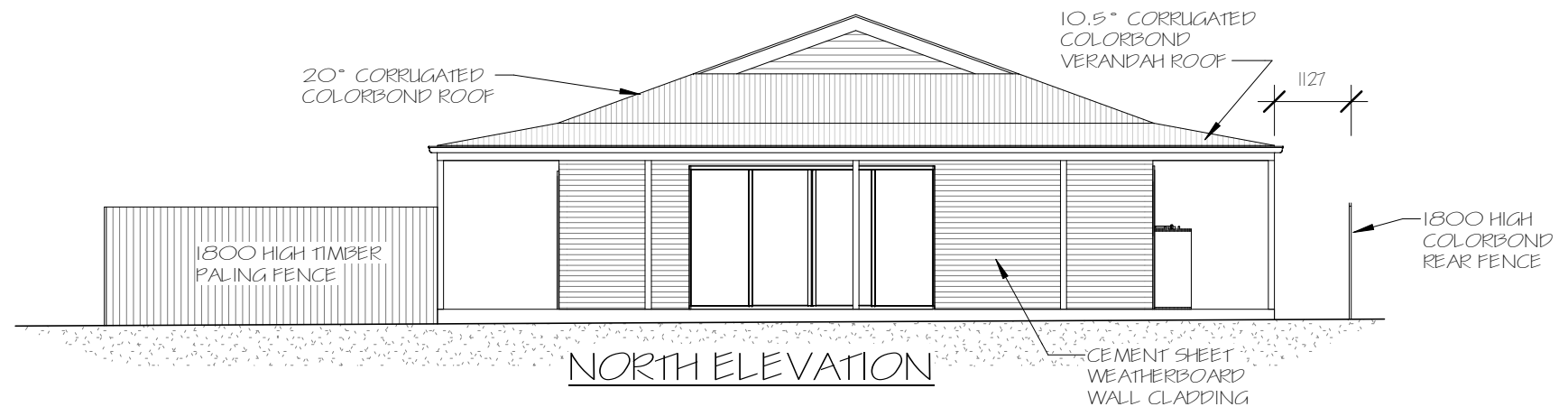
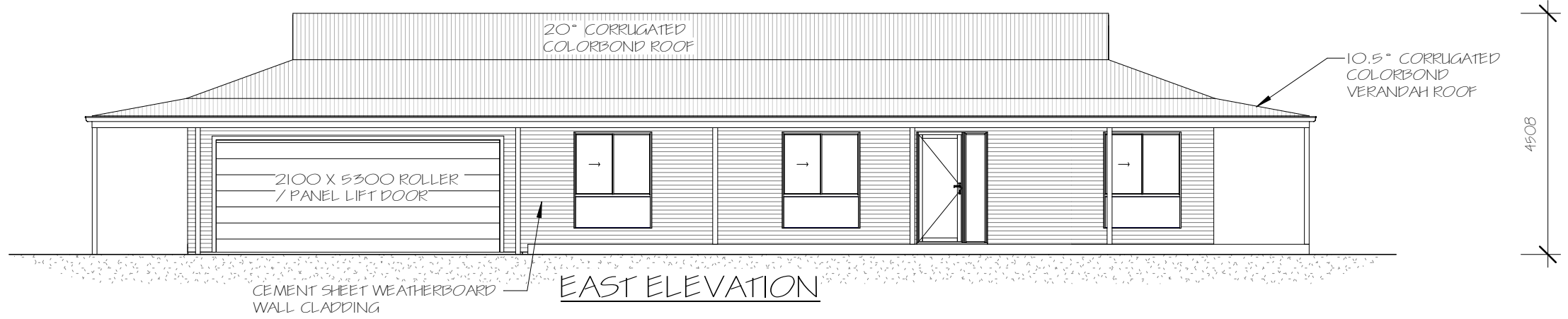


SUMMARY OF AREAS  
 PRIVATE OPEN SPACE: 101M<sup>2</sup>  
 SITE AREA: 562.3M<sup>2</sup>  
 FLOOR AREA: 112M<sup>2</sup>  
 GARAGE: 54M<sup>2</sup>  
 SITE COVERAGE: 292M<sup>2</sup> (52%)  
 PERMEABLE AREA: 212M<sup>2</sup> (38%)  
 GARDEN AREA: 209M<sup>2</sup> (37%)



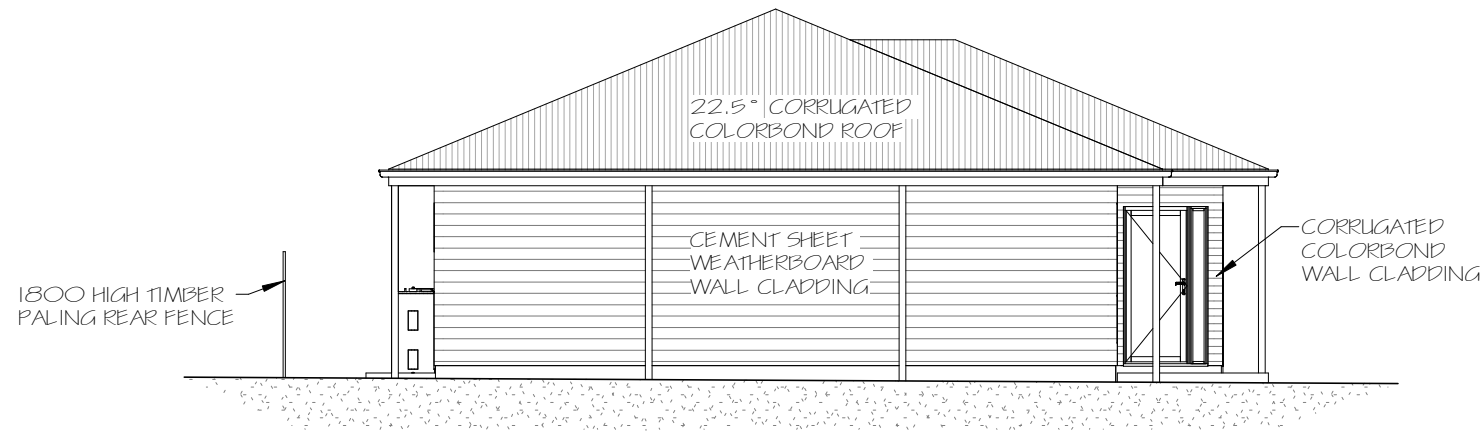
FLOOR PLAN, PROPOSED LOT 4

[REDACTED] PROPOSED 6 LOT RESIDENTIAL SUBDIVISION AT 19 ASTBURY STREET AVOCA 3467	FLOOR PLAN - LOT 4 DWELLING	SHEET NO: AOB	SCALE: 1:100	PROJECT NO: Z381																		
		DESIGNED: B. DOUGLAS DP-AD1401	DRAWN: NBD	DATE: 10/12/2022 11:21:10 PM																		
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Date	Description	Issue																				



<p>PROPOSED 6 LOT RESIDENTIAL SUBDIVISION AT 19 ASTBURY STREET AVOCA 3467</p> <p>ELEVATIONS - LOT 4 DWELLING</p>	<p>SHEET NO: A09</p> <p>DESIGNED: B. DOUGLAS DP-AD1401</p> <p>REVISIONS:</p> <table border="1"> <thead> <tr> <th>Date</th> <th>Description</th> <th>Issue</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	Date	Description	Issue																<p>SCALE: 1:100</p> <p>DRAWN: NBD DATE: 10/12/2022 11:21:11 PM</p>	<p>PROJECT NO: Z381</p> <p><b>B.F. &amp; R. DOUGLAS</b>          BUILDING CONSULTANTS          REGISTERED BUILDING PRACTITIONER          98 HIGH ST MARYBOROUGH VIC 3465          Tel: 0354611220 Fax: 0354611208          Email: bfdouglas@outlook.com</p>
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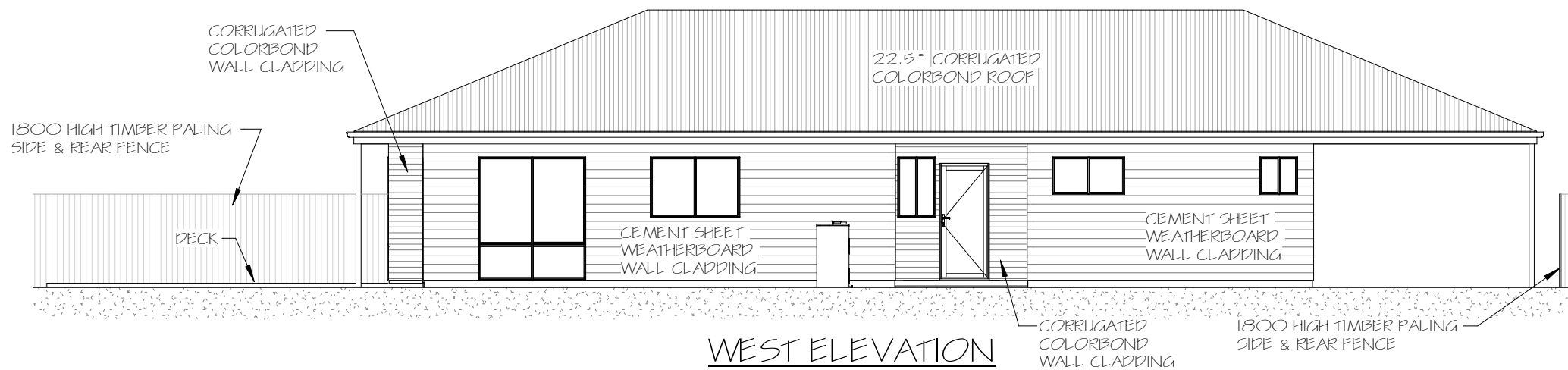
SOUTH ELEVATION



NORTH ELEVATION



EAST ELEVATION



WEST ELEVATION

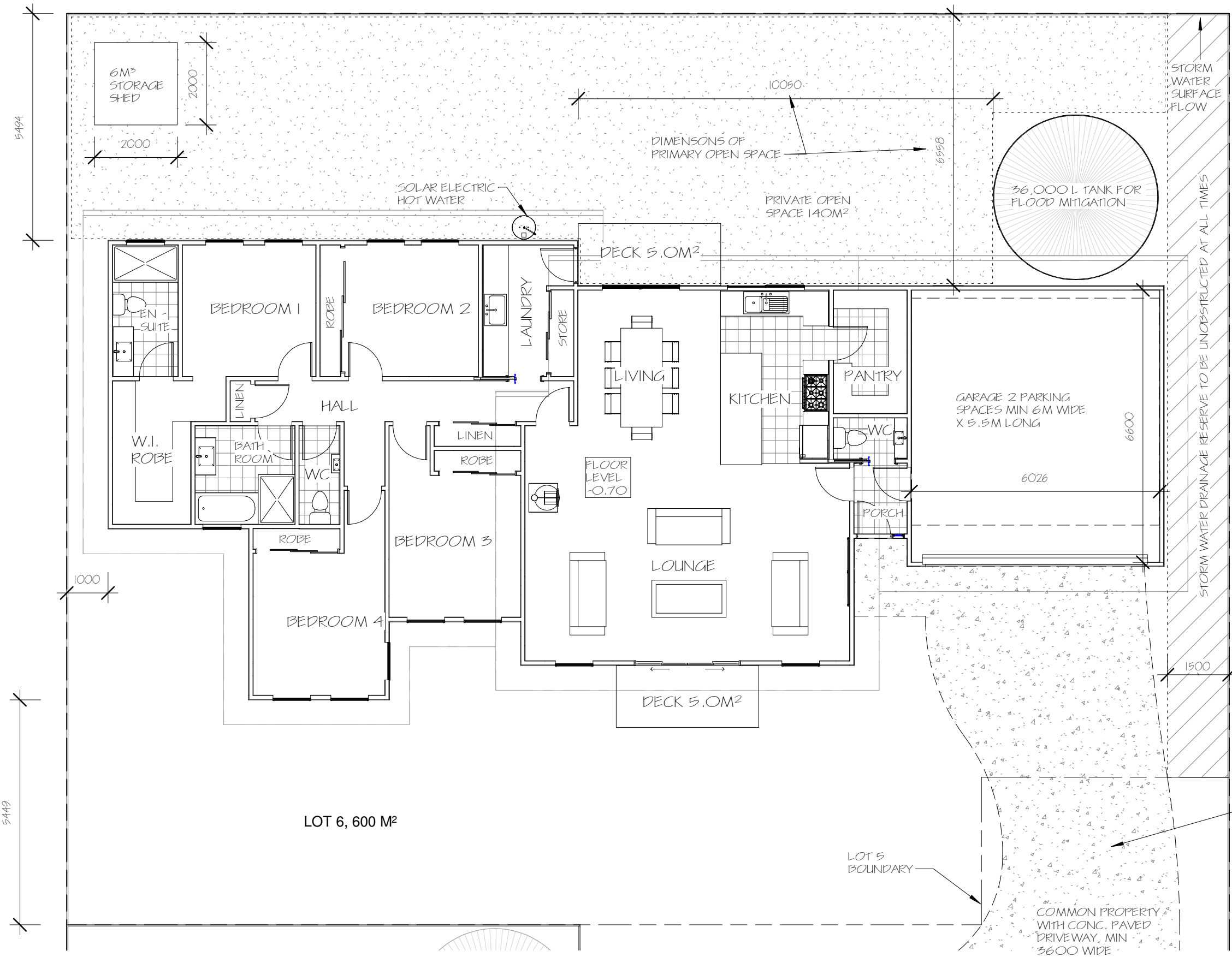
[REDACTED]  
 PROPOSED 6 LOT RESIDENTIAL  
 SUBDIVISION AT  
 19 ASTBURY STREET AVOCA 3467

ELEVATIONS  
 - LOT 5  
 DWELLING

SHEET NO:	All	SCALE:	1:100	PROJECT NO:	Z381
DESIGNED:	B. DOUGLAS DP-AD1401	DRAWN:	NBD	DATE:	10/12/2022 11:21:18 PM
REVISIONS:					
Date	Description	Issue			

**B.F. & R. DOUGLAS**  
 BUILDING CONSULTANTS  
 REGISTERED BUILDING PRACTITIONER  
 98 HIGH ST MARYBOROUGH VIC 3465  
 Tel: 0354611220 Fax: 0354611208  
 Email: bfdouglas@outlook.com





**SUMMARY OF AREAS**  
 PRIVATE OPEN SPACE: 140M<sup>2</sup>  
 SITE AREA: 600.2M<sup>2</sup>  
 FLOOR AREA: 175M<sup>2</sup>  
 GARAGE: 41M<sup>2</sup>  
 SITE COVERAGE: 221M<sup>2</sup> (37%)  
 PERMEABLE AREA: 332M<sup>2</sup> (55%)  
 GARDEN AREA: 327M<sup>2</sup> (55%)

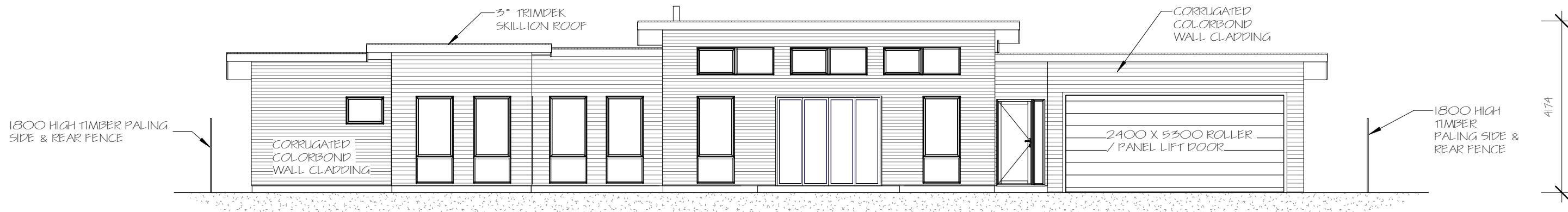
**FLOOR PLAN, PROPOSED LOT 6**

<b>PROPOSED 6 LOT RESIDENTIAL SUBDIVISION AT 19 ASTBURY STREET AVOCA 3467</b>	<b>FLOOR PLAN - LOT 6 DWELLING</b>	SHEET NO: A12	SCALE: 1:100	PROJECT NO: Z381															
		DESIGNED: B. DOUGLAS DP-AD1401	DRAWN: NBD	DATE: 10/12/2022 11:21:19 PM															
<b>B.F. &amp; R. DOUGLAS</b> BUILDING CONSULTANTS REGISTERED BUILDING PRACTITIONER 98 HIGH ST MARYBOROUGH VIC 3465 Tel: 0354611220 Fax: 0354611208 Email: bfdouglas@outlook.com		REVISIONS: <table border="1"> <thead> <tr> <th>Date</th> <th>Description</th> <th>Issue</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>			Date	Description	Issue												
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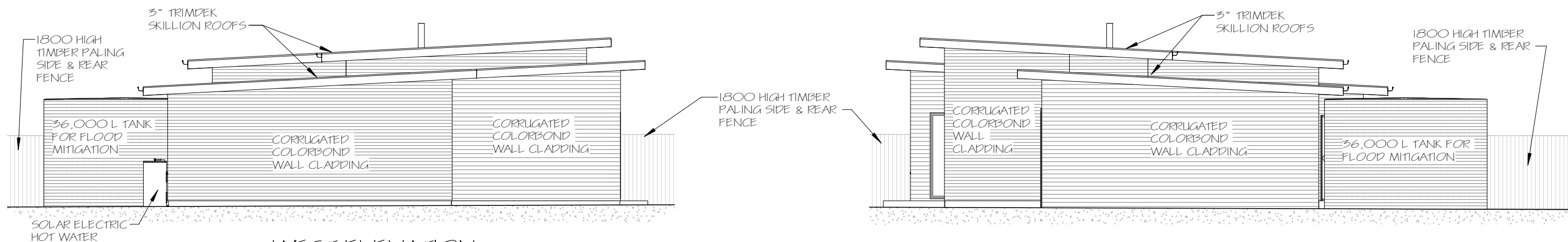


EMERGENCY VEHICLE TURNING AREA AS PER CFA GUIDELINES (AREA TO BE KEPT CLEAR AT ALL TIMES)

COMMON PROPERTY WITH CONC. PAVED DRIVEWAY, MIN 3600 WIDE

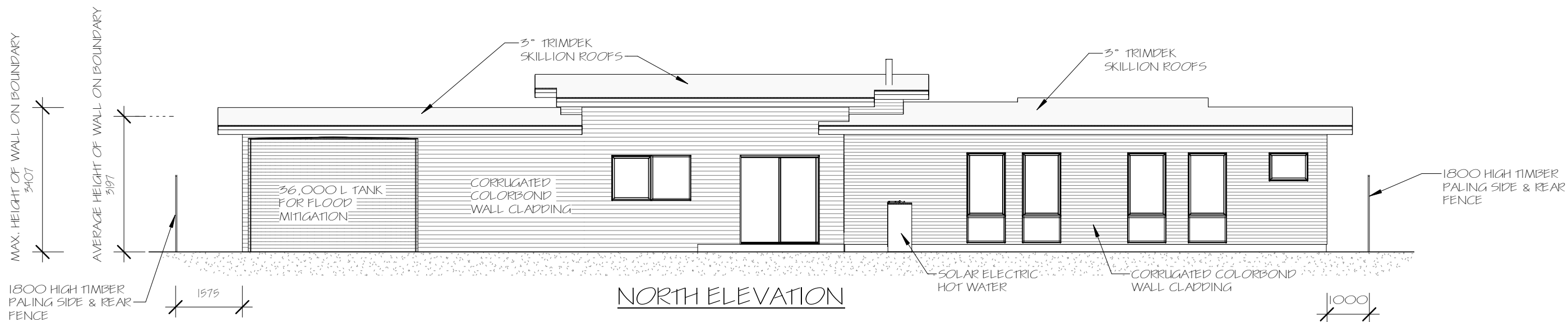


SOUTH ELEVATION



WEST ELEVATION

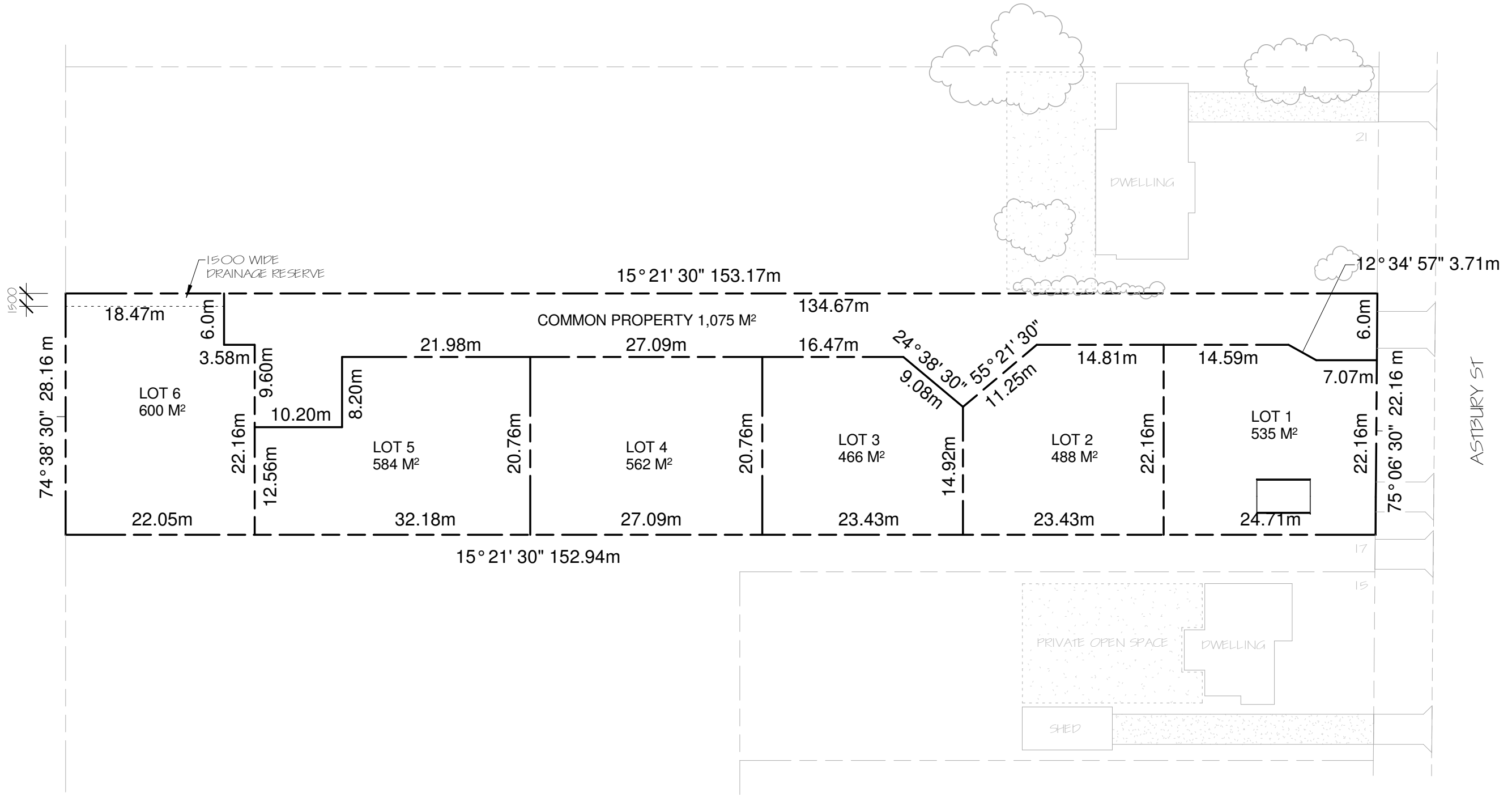
EAST ELEVATION



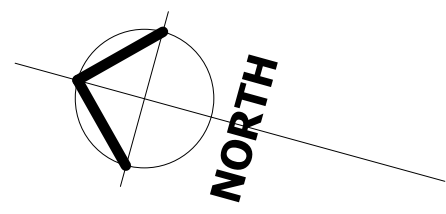
NORTH ELEVATION

<p>PROPOSED 6 LOT RESIDENTIAL SUBDIVISION AT 19 ASTBURY STREET AVOCA 3467</p>	<p>ELEVATIONS - LOT 6 DWELLING</p>	<p>SHEET NO: A15</p>	<p>SCALE: 1:100</p>	<p>PROJECT NO: Z381</p>													
		<p>DESIGNED: B. DOUGLAS DP-AD1401</p>	<p>DRAWN: NBD</p>	<p>DATE: 10/12/2022 11:21:25 PM</p>													
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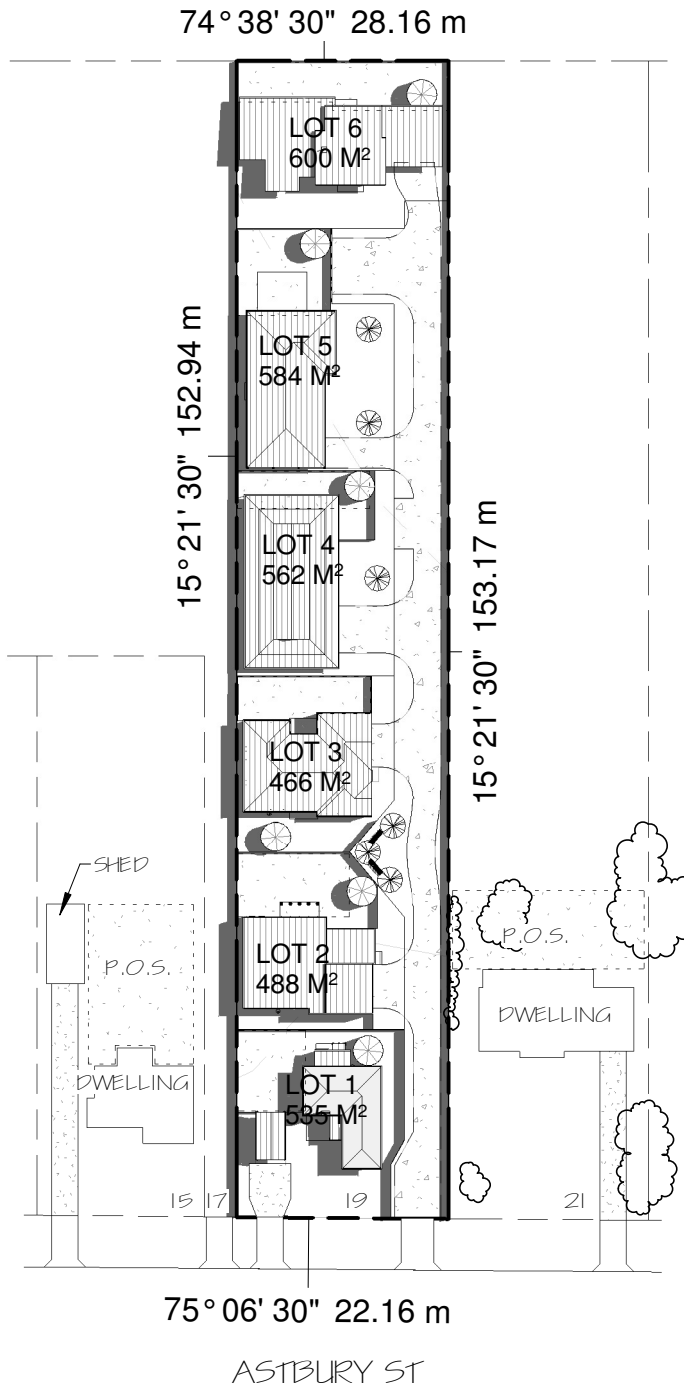


SUBDIVISION LAYOUT PLAN

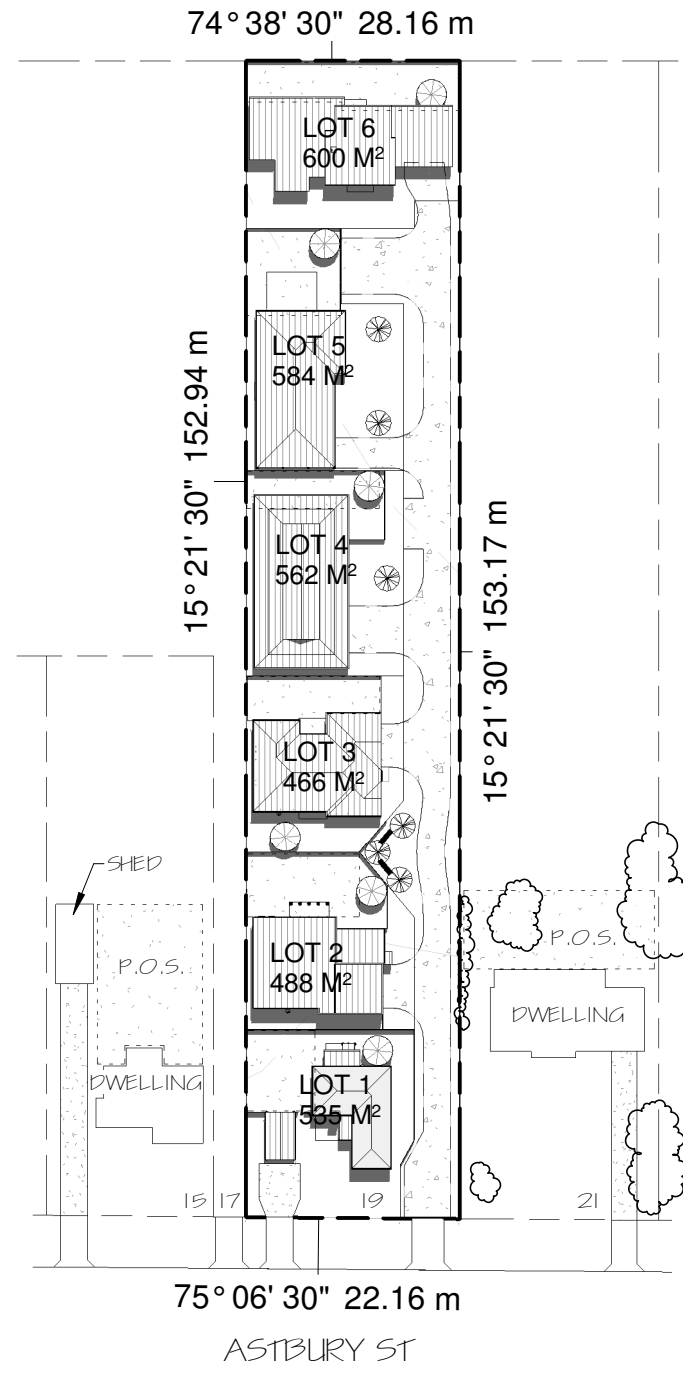
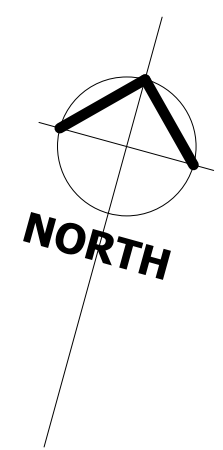


PARISH OF AVOCA  
 COUNTY OF GLADSTONE  
 SECTION A  
 CROWN ALLOTMENT 6B(C PART)  
 LOT 2 OF SUBDIVISION LP 18834  
 VOL. 07322 FOL. 256  
 4,310M<sup>2</sup>

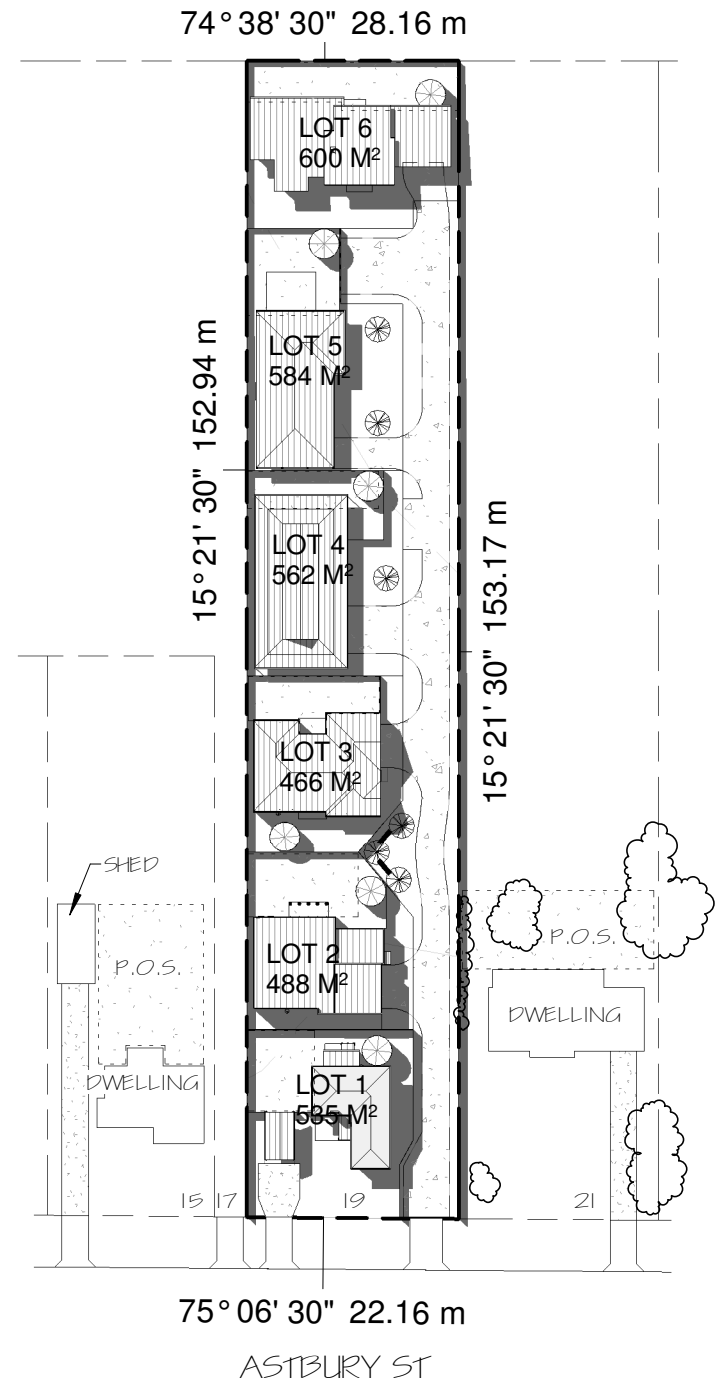
[REDACTED] PROPOSED 6 LOT RESIDENTIAL SUBDIVISION AT 19 ASTBURY STREET AVOCA 3467	SUBDIVISION LAYOUT PLAN	SHEET NO: A15	SCALE: 1:500	PROJECT NO: Z381															
		DESIGNED: B. DOUGLAS DP-AD1401	DRAWN: NBD	DATE: 10/12/2022 11:21:24 PM															
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Date	Description	Issue																	



22ND SEPT 9AM



22ND SEPT 12 MIDDAY



22ND SEPT 3PM

<p>PROPOSED 6 LOT RESIDENTIAL SUBDIVISION AT 19 ASTBURY STREET AVOCA 3467</p>	<p>SHADING PLAN</p>	<p>SHEET NO: A16</p>	<p>SCALE: 1:1000</p>	<p>PROJECT NO: Z381</p>															
		<p>DESIGNED: B. DOUGLAS DP-AD1401</p>	<p>DRAWN: NBD</p>	<p>DATE: 10/12/2022 11:21:29 PM</p>															
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Date	Description	Issue																	





**Office Use Only**

VicSmart: **No**  
Specify class of VicSmart application:  
Application No: **REFPA20230105**  
Date Lodged: **4/07/2023**

# Application for Planning Permit

If you need help to complete this form, read [How to complete the Application for Planning Permit 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 concerns, please contact Council's planning department.

 **Questions marked with an asterisk (\*) are mandatory and must be completed.**

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

## Application type

Is this a VicSmart Application?\*

No  
If yes, please specify which VicSmart class or classes:  
 If the application falls into one of the classes listed under Clause 92 or the schedule to Clause 94, it is a VicSmart application

## Pre-application meeting

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

True   
 day / month / year

## The Land


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

Street Address\*

Unit No:	St. No: <b>19</b>	St. Name: <b>Astbury</b>
Suburb/Locality: <b>Avoca</b>		Postcode: <b>3467</b>

Formal Land Description\*

Complete either A or B

 This information can be found on the certificate of title.


**A**   Lodged Plan  Title Plan  Plan of Subdivision

**OR**

**B**


If this application relates to more than one address, please attach details.

## The Proposal

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


**① For what use, development or other matter do you require a permit?\***

6 lot subdivision and 6 dwellings on a lot

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

**① Estimated cost of development for which the permit is required\***

Cost **\$1,500,000.00**

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


Insert '0' if no development is proposed (eg. change of use, subdivision, removal of covenant, liquor licence)

## Existing Conditions

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

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

single dwelling

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


## Title Information

**Encumbrances on title\***

If you need help about the title, read: [How to complete the Application for Planning Permit form](#)

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' eg restrictive covenants.)

## Applicant and Owner Details

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

**Applicant \***

The person who wants the permit

Name:		
Title:	First Name: <b>Nigel</b>	Surname: <b>Douglas</b>
Organisation (if applicable): <b>B.F. &amp; R Douglas Building Consultants</b>		
Postal Address		If it is a PO Box, enter the details here:
Unit No:	St. No: <b>98</b>	St. Name: <b>High St</b>
Suburb/Locality: <b>Maryborough</b>		State: <b>VIC</b>
		Postcode: <b>3465</b>

## Information Requirements

Is the required information provided?


Contact Council's planning department to discuss the specific requirements for this application and obtain a planning permit checklist.

Yes

No

## Declaration

This form must be signed by the applicant\*

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

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

Signature:



Date: 4 July 2023

day / month / year

---

## Checklist

Have you:

<input type="checkbox"/>	Filled in the form completely?	 Most applications require a fee to be paid. Contact Council to determine the appropriate fee.
<input type="checkbox"/>	Paid or included the application fee?	
	Provided all necessary supporting information and document?	
<input type="checkbox"/>	A full and current copy of the information for each individual parcel of land forming the subject site.	
<input type="checkbox"/>	A plan of existing conditions.	
<input type="checkbox"/>	Plans showing the layout and details of the proposal.	
<input type="checkbox"/>	Any information required by the planning scheme, requested by council or outlined in a council planning permit checklist.	
<input type="checkbox"/>	If required, a description of the likely effect of the proposal (eg traffic, noise, environmental impacts).	

---

## Lodgement

Lodge the completed and signed form and all documents with:

Pyrenees Shire Council  
5 Lawrence Street BEAUFORT Vic 3373

Telephone: (03) 5349 1100

**Contact information:**

Telephone: (03) 5349 1100

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

# B.F. & R DOUGLAS BUILDING CONSULTANTS

ABN: 44 808 018 147

98 HIGH ST MARYBOROUGH VIC 3465

TEL: 0354611220 EMAIL: bfdouglas@outlook.com

Date: 8<sup>th</sup> February 2024

The Planning Department  
Pyrenees Shire Council

Dear Sir/Madam

**Re.Planning permit application for 6 dwellings on a lot and 6 lot subdivision at 19 Astbury st Avoca Vic 3467**

The proposal is to retain the existing weatherboard dwelling located near the front of the site and add 5 dwellings on the vacant land behind, and also to subdivide the site, such that the existing dwelling will be on one allotment and the 5 proposed dwellings will be on their own titles.

Please see below the Neighborhood and site Description and well as the Design Response for the above mentioned application

**A) Neighborhood and site Description**

This section of Astbury st sees a mixture of building types and styles.

Number 19, the property which is the subject of this application, is located centrally along this stretch of Astbury st, and is a vinyl weatherboard clad example of a double fronted dwelling likely built in the mid 20<sup>th</sup> century.

The dwelling is set on a 4,310m<sup>2</sup> block situated on the northern side of the street and which slopes slightly downward from the street to the rear north eastern corner by less than 0.5 metres over its length. The dwelling is set back from the front boundary by 7 metres, a similar setback to each of its immediate neighbors, one of which is a timber clad dwelling 20-30 years of age, the other a newly developed brick veneer.

The Eastern side of the dwelling is situated 9.5m off the site boundary, while the western side has a clearance of 9.2m There is a distance of 131m to the rear boundary.

This rear yard, which as mentioned slopes slightly down to the north east aspect, is 20.12 metres wide and approximately 128 metres long (allowing for rear yard space for the existing dwelling) . It is proposed to be the location of the 5 extra dwellings, accessible via the above mentioned 9.2 metre eastern clearance.

**B) Design Response (Refer sheets A01 –A16 of design drawings)**

This planning permit submission deals with the proposed construction of four 3 bedroom dwellings along the north east side of the site and one 4 bedroom dwelling at the rear of the site, as well as minor alterations and additions to the existing weatherboard dwelling located on the front of the site at 19 Astbury st Avoca. The details are as follows:

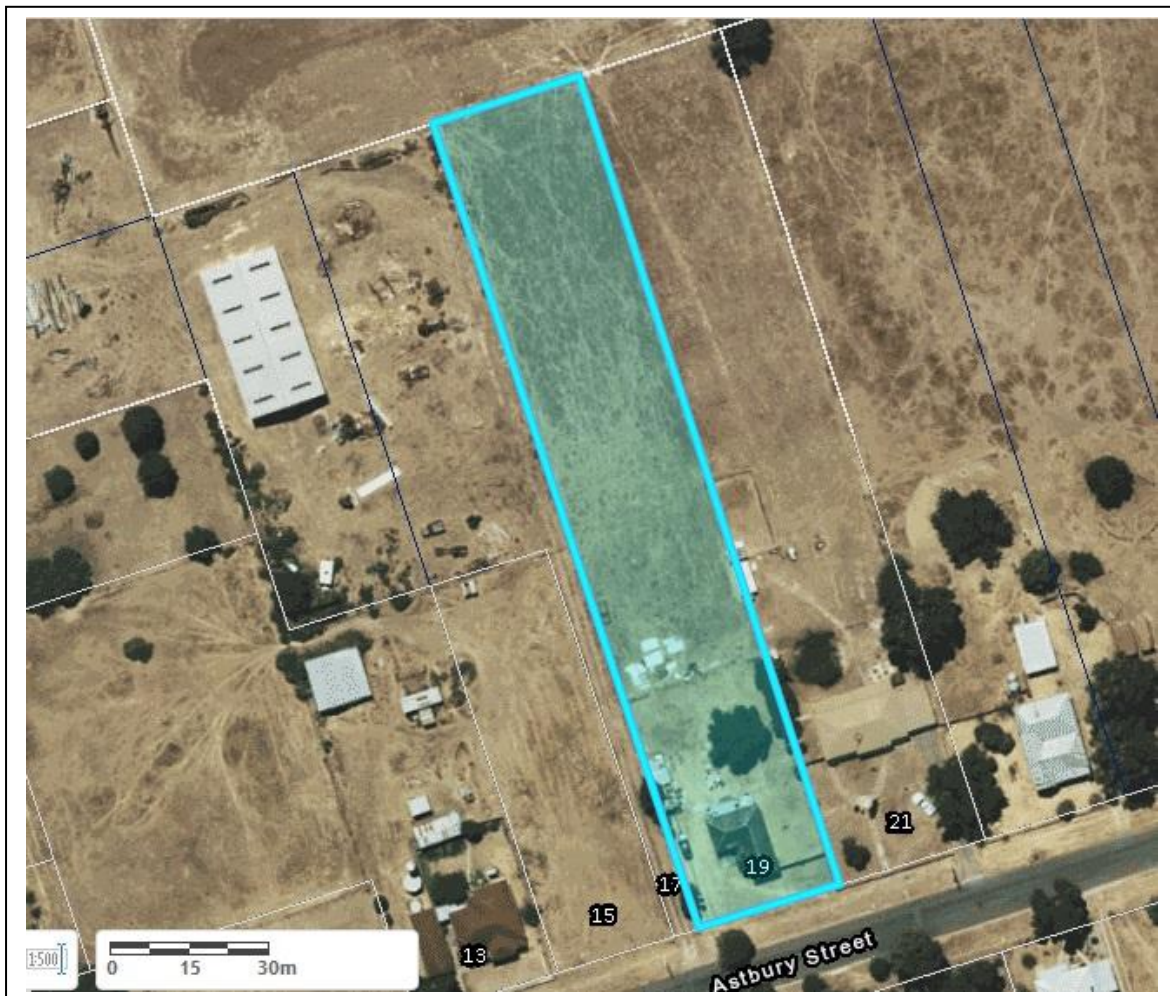


## 1. The site

The site is located on a relatively flat section of Astbury st, within 200 metres of the High st intersection. The site has a fall of approximately 0.5 metres from front to back. As well as the existing weatherboard clad, tiled roofed dwelling, there is a ramshackle iron clad shed structure which will be demolished as a part of this proposal. There is one mature tree onsite behind the dwelling, but it is not a native and since it cannot be incorporated into the design, it will be removed and replaced.

The site borders no's 17 and 21 Astbury st, and farmland at the rear, however, none of the private open space areas of these properties are impacted by the proposed development. In any case, the proposed development will incorporate 1800mm high timber paling fences along the site boundaries to guard against any overlooking issues.

In all instances there are no overlooking or overshadowing issues.



Aerial photograph with site boundary in blue – note that new dwelling on 15 Astbury st is not shown (latest available image from mapshare.vic.gov.au)



Rear of dwelling with shed to be demolished



View towards rear of site

## 2. Existing outbuilding on site

The site contains a corrugated iron shed 4 metres wide and 10 metres long, which will be demolished.

## 3. Streetscape

This section of Astbury St contains dwellings of several different eras,. This proposal is designed to maintain the feel of the current street at the very least and hopefully enhance it in a low key manner, by making the existing dwelling at no.19 more presentable. Note that the immediate neighbor to the west side is actually a laneway accessing a block of land at the rear of the new brick veneer dwelling which is no 15 Astbury st



Neighbor – West side



Proposed site – looking North



Neighbor – East side

## 4. The design concept.

The design approach for each dwelling is as follows

### i) Renovations to existing dwelling

In order to make the existing dwelling more livable, the ramshackle garage on the west side of the site will be demolished and replaced by a gable roofed single car carport able to house 1 car under cover and a 2<sup>nd</sup> car behind it. It will be located with a similar setback to the existing dwelling, thereby providing for a large private open space area on the northern side of the front site.

The proposed car port will be accessible via the existing crossover in this location.

As required, a 6m<sup>3</sup> external storage shed will be constructed on the north west corner of the front block, behind the garage.

The footprint area for existing dwelling 1 will remain at 92m<sup>2</sup>, with 2 bedrooms

#### ii) 3 bedroom dwelling no.s 2, 3, 4 & 5.

Proposed lots 2, 3, 4 and 5 will each house a 3 bedroom dwelling, and these dwellings will each be of quite differing styles (as are all the proposed dwellings of the development, in order to promote the spacious and variable styles that predominate around the Avoca township). This is in order to maintain the variation of a small town, rather than tending towards the monotonous similarity of most multi-dwelling developments in the bigger towns and cities.

In Avoca, we are blessed with more space than the bigger cities and towns and as such, our design response attempts to create more diversity in design, rather than conformity.

There are however a few similarities between all the proposed dwellings, which are as follows:

- a) Secure, 2-car garages directly linked to the dwellings on all except dwelling 4, which has a large carport for 2 cars, one behind the other, and dwelling 1 which will have a single car carport with a 2<sup>nd</sup> space behind.
- b) Private open space located on the north side of each dwelling and accessible directly from living spaces that are also located with a northerly aspect in all cases.

Dwelling 2. Floor area of 164m<sup>2</sup>, is a flat roofed dwelling clad with a cement rendered finish with a very modern look.

Dwelling 3. Floor area of 142m<sup>2</sup>, is the only brick veneer on the development, and has a 22 degree roof, a combination consistent with many modern day developments.

Dwelling 4. Floor area of 112m<sup>2</sup>, is an example of a country style house, colorbond clad walls and perimeter verandah.

Dwelling 5. Floor area 150m<sup>2</sup>, is a more contemporary version of the country style home, with cement sheet weatherboard wall cladding, hip roof and a sizeable deck on the north side

#### iii) 4 bedroom dwellings no. 6

Dwelling 6. Floor area 175m<sup>2</sup>, is a skillion roofed colorbond wall clad dwelling with multiple roof planes and frontages. The dwelling is oriented on a north-south aspect to take advantage of the allotment at the end of the site.

### **5. Common Property**

Lot 7, an area of 1075m<sup>2</sup> consists of the access road of 3.6m width with 6.1m x 7.0m widening for passing at the entrance as well as landscape area of 1.25m either side of the concrete paved access road, which are to be planted with native, low maintenance shrubs and grasses.

This allotment also includes a triangular area that will be landscaped with shrubs, trees and 2



steel park benches that can be accessed by all residents. There will also be a slight bend in the access road at this location, which will serve as a traffic calming device as well as a visual feature to add something extra to the design.

An oversized parallel parking style visitor car park has been provided in the common area to the north east of dwelling 4.

The northern end of this vehicular access pavement will be planned in accordance with CFA guidelines to provide an acceptable turning area for emergency vehicles. The dimensions of this turning space is noted on sheet A10 of the design drawings

## 6. Rescode

The design complies to all current rescode guidelines; refer summary on sheet no. 102 and individual details of each lot on floor plans A02, A04, A06, A08 A10 & A12

## 7. Storm water strategy

Although the site is not subject to any flood overlays and the likelihood of actual flooding of the site is very low, there is a desire for all development to be executed in such a way that extra stress is not put on the general flood situation, especially to the north of the Avoca township, where flood water do tend to back up during prolonged wet periods.

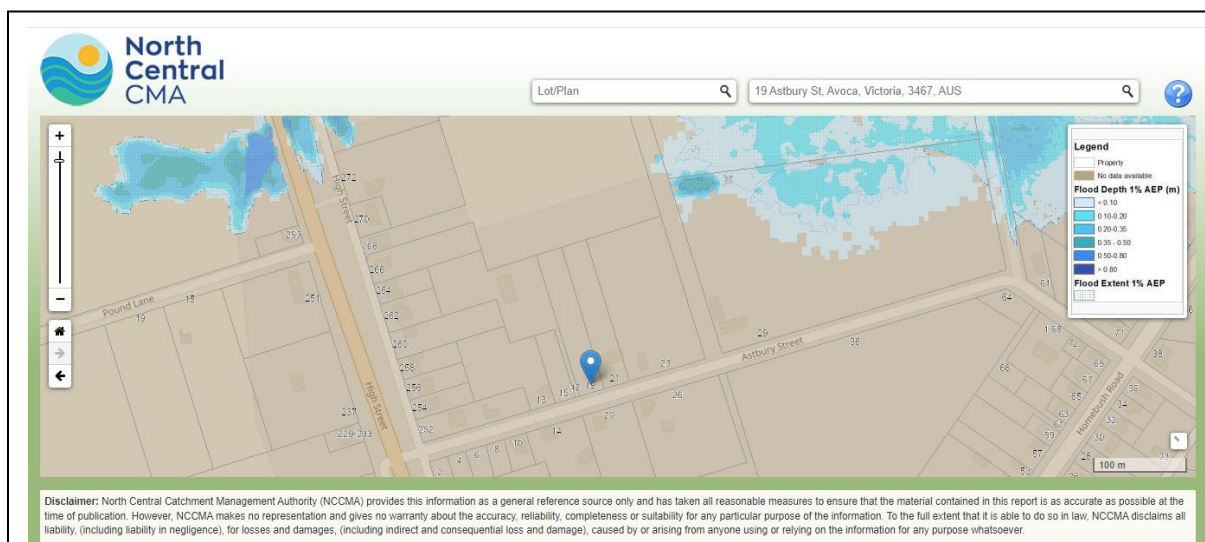


Figure 7.1 screen shot from NCCMA indicating no direct flood danger

In order to mitigate this, Each dwelling is provided with a storm water retention tank that is able to capture and store at least 24 hours of rain collected on roofs in a 1% AEP event. These tanks will be connected to the roadside drainage system on Astbury st via a sealed underground drainage system, calibrated to release the water at a designated slow rate, to help reduce backup of floodwater further downstream.

In addition, native, low maintenance garden beds along the side of the paved access way in the common property will be constructed to slow and absorb surface flows, and with 46.7% of the site remaining pervious, a large proportion of flood water will be absorbed by grass areas and garden beds.

Remaining surface flows will be channeled offsite via a designated flow route at the north east corner of the site, as per current natural flows. It is envisaged that the above measures will reduce the incidence of such excess flows offsite to levels at or below the current undeveloped rates.

## **8. Fire**

The proposed developments complies with CFA requirements as detailed in “Vehicle Access and Water Supply Requirements in Residential Developments” published by the CFA in August 2022

## **9. Planning overlays**

The site does not have any planning overlays.

Nigel Douglas  
B.F. & R Douglas Building Consultants

19 Astbury st Avoca  
Vic 3465

## Assessment Table - Two or More Dwellings on a Lot and Residential Buildings (Clause 55)

### Neighbourhood Character & Infrastructure

Clause 55.02-1 to 02-5

Objective	Standard (Summarised)	Complies / Does Not Comply / Variation Required
<p><b>B1</b> <b>Neighbourhood Character</b> To ensure that the design respects the existing neighbourhood character or contributes to a preferred neighbourhood character.</p> <p>To ensure that development responds to the features of the site and the surrounding area.</p>	<p>The design response must be appropriate to the neighbourhood and the site</p>	<p>Complies. Existing neighbourhood character will be maintained and enhanced by repairing a run-down dwelling in its original style. Proposed dwellings not visible from road frontage</p>
	<p>The proposed design must respect the existing or preferred neighbourhood character and respond to the features of the site.</p>	<p>Complies, no change</p>
<p><b>B2</b> <b>Residential Policy</b> To ensure that residential development is provided in accordance with any policy for housing in the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.</p> <p>To support medium densities in areas where development can take advantage of public transport and community infrastructure and services.</p>	<p>An application must be accompanied by a written statement to the satisfaction of the responsible authority that describes how the development is consistent with any relevant policy for housing in the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.</p>	<p>Refer design response</p>
<p><b>B3</b> <b>Dwelling Diversity</b> To encourage a range of dwelling sizes and types in developments of ten or more dwellings.</p>	<p>Developments of ten or more dwellings should provide a range of dwelling sizes and types, including:</p> <ul style="list-style-type: none"> <li>▪ Dwellings with a different number of bedrooms.</li> <li>▪ At least one dwelling that contains a kitchen, bath or shower, and a toilet and wash basin at ground floor level.</li> </ul>	<p>Proposed development contains:</p> <ul style="list-style-type: none"> <li>- Existing 2 bedroom weatherboard dwelling,</li> <li>- proposed 3 bedroom dwellings (4 units)</li> <li>- 4 bedroom dwellings (1 units)</li> </ul>
<p><b>B4</b> <b>Infrastructure</b> To ensure development is provided with appropriate utility services and infrastructure.</p> <p>To ensure development does not unreasonably overload the capacity of utility services and infrastructure.</p>	<p>Development should be connected to reticulated services, including reticulated sewerage, drainage, electricity and gas, if available.</p>	<p>All existing</p>
	<p>Development should not unreasonably exceed the capacity of utility services and infrastructure, including reticulated services and roads.</p>	<p>All existing</p>
	<p>In areas where utility services or infrastructure have little or no spare capacity, developments should provide for the upgrading of or mitigation of the impact on services or infrastructure.</p>	<p>All existing</p>

Objective	Standard (Summarised)	Complies / Does Not Comply / Variation Required
<b>B5</b> <b>Integration with the Street</b> To integrate the layout of development with the street.	Developments should provide adequate vehicle and pedestrian links that maintain or enhance local accessibility.	complies
	Development should be oriented to front existing and proposed streets.	complies
	High fencing in front of dwellings should be avoided if practicable.	complies
	Development next to existing public open space should be laid out to complement the open space.	N/A

## Site Layout and Building Massing

## Clause 55.03-1 to 03-10

Title & Objective	Standard			Complies / Does Not Comply / Variation Required
<b>B6</b> <b>Street Setback</b> To ensure that the setbacks of buildings from a street respect the existing or preferred neighbourhood character and make efficient use of the site.	Walls of buildings should be set back from streets:  At least the distance specified in a schedule to the zone, or  If no distance is specified, the distance in Table B1.  <i>Porches, pergolas and verandahs that are less than 3.6m high and eaves may encroach not more than 2.5m into the setbacks of this standard</i>			Complies, no change
	Table B1 Development context There is an existing building on both the abutting allotments facing the same street, and the site is not on a corner.	Minimum setback from <b>front</b> street (meters) The average distance of the setbacks of the front walls of the existing buildings on the abutting allotments facing the front street or 9 metres, whichever is the lesser.	Minimum setback from <b>side</b> street (meters)  N/A	
	There is an existing building on one abutting allotment facing the same street and no existing building on the other abutting allotment facing the same street, and the site is not on a corner.	The same distance as the setback of the front wall of the existing building on the abutting allotment facing the front street or 9 metres, whichever is the lesser.	N/A	

Title & Objective	Standard			Complies / Does Not Comply / Variation Required
	There is no existing building on either of the abutting allotments facing the same street, and the site is not on a corner.	6 metres for streets in a Road Zone, Category 1, and 4 metres for other streets.	N/A	N/A



Title & Objective	Standard			Complies / Does Not Comply / Variation Required
	<p>The site is on a corner.</p>	<p>If there is a building on the abutting allotment facing the front street, the same distance as the setback of the front wall of the existing building on the abutting allotment facing the front street or 9 metres, whichever is the lesser.</p> <p>If there is no building on the abutting allotment facing the front street, 6 metres for streets in a Road Zone, Category 1, and 4 metres for other streets.</p>	<p>Minimum setback from <b>side</b> street (meters)</p> <p>Front walls of new development fronting the side street of a corner site should be setback at least the same distance as the setback of the front wall of any existing building on the abutting allotment facing the side street or 3 metres, whichever is the lesser.</p> <p>Side walls of new development on a corner site should be setback the same distance as the setback of the front wall of any existing building on the abutting allotment facing the side street or 2 metres, whichever is the less wall of any existing building on the abutting allotment facing the side street or 2 metres, whichever is the lesser</p>	<p>N/A</p>

Title & Objective	Standard	Complies / Does Not Comply / Variation Required
<p><b>B7</b> <b>Building Height</b> To ensure that the height of buildings respects the existing or preferred neighbourhood character.</p>	<p>The maximum building height should not exceed the maximum height specified in the zone, schedule to the zone or an overlay that applies to the land.</p> <p>If no maximum height is specified in the zone, schedule to the zone or an overlay, the maximum building height should not exceed 9 metres, unless the slope of the natural ground level at any cross section wider than 8 metres of the site of the building is 2.5 degrees or more, in which case the maximum building height should not exceed 10 metres.</p> <p>Changes of building height between existing buildings and new buildings should be graduated.</p>	Complies
	Changes of building height between existing buildings and new buildings should be graduated.	Complies, Heights are consistent, with site having minimal fall
<p><b>B8</b> <b>Site Coverage</b> To ensure that the site coverage respects the existing or preferred neighbourhood character and responds to the features of the site.</p>	<p>The maximum site coverage specified in a schedule to the zone, or</p> <p>If no maximum site coverage is specified in a schedule, 60%.</p>	Complies, proposed site coverage is 30.6%
<p><b>B9</b> <b>Permeability</b> To reduce the impact of increased stormwater run-off on the drainage system.</p> <p>To facilitate on-site stormwater infiltration.</p>	<p>The minimum area specified in a schedule to the zone, or</p> <p>If no minimum is specified in a schedule to the zone, at least 20% of the site.</p>	Complies, proposed permeable area is 46.7% of site area
<p><b>B10</b> <b>Energy Efficiency</b> To achieve and protect energy efficient dwellings and residential buildings.</p> <p>To ensure the orientation and layout of development reduce fossil fuel energy use and make appropriate use of daylight and solar energy.</p>	<p>Buildings should be:</p> <ul style="list-style-type: none"> <li>▪ Oriented to make appropriate use of solar energy.</li> <li>▪ Sited and designed to ensure that the energy efficiency of existing dwellings on adjoining lots is not unreasonably reduced.</li> </ul> <p>Living areas and private open space should be located on the north side of the development, if practicable.</p> <p>Developments should be designed so that solar access to north-facing windows is maximised.</p>	Complies, northern aspect optimised in all instances
<p><b>B11</b> <b>Open Space</b> To integrate the layout of development with any public and communal open space provided in or adjacent to the development.</p>	<p>If any public or communal open space is provided on site, it should:</p> <ul style="list-style-type: none"> <li>▪ Be substantially fronted by dwellings, where appropriate.</li> <li>▪ Provide outlook for as many dwellings as practicable.</li> <li>▪ Be designed to protect any natural features on the site.</li> <li>▪ Be accessible and usable.</li> </ul>	Complies. A small common park has been provided, situated for easy access by all residents and with a north easterly aspect
<p><b>B12</b> <b>Safety</b> To ensure the layout of development provides for the safety and security of residents and property.</p>	Entrances to dwellings and residential buildings should not be obscured or isolated from the street and internal accessways.	Complies
	Planting which creates unsafe spaces along streets and accessways should be avoided.	Complies
	Developments should be designed to provide good lighting, visibility and surveillance of car parks and internal accessways.	Complies

Title & Objective	Standard	Complies / Does Not Comply / Variation Required
	Private spaces within developments should be protected from inappropriate use as public thoroughfares.	Complies
<p><b>B13</b> <b>Landscaping</b> To encourage development that respects the landscape character of the neighbourhood.</p> <p>To encourage development that maintains and enhances habitat for plants and animals in locations of habitat importance.</p> <p>To provide appropriate landscaping.</p> <p>To encourage the retention of mature vegetation on the site.</p>	<p>The landscape layout and design should:</p> <ul style="list-style-type: none"> <li>▪ Protect any predominant landscape features of the neighbourhood.</li> <li>▪ Take into account the soil type and drainage patterns of the site.</li> <li>▪ Allow for intended vegetation growth and structural protection of buildings.</li> <li>▪ In locations of habitat importance, maintain existing habitat and provide for new habitat for plants and animals.</li> <li>▪ Provide a safe, attractive and functional environment for residents.</li> </ul> <p>Development should provide for the retention or planting of trees, where these are part of the character of the neighbourhood.</p> <p>Development should provide for the replacement of any significant trees that have been removed in the 12 months prior to the application being made.</p> <p>The landscape design should specify landscape themes, vegetation (location and species), paving and lighting.</p> <p>Development should meet any additional landscape requirements specified in a schedule to the zone.</p>	<p>Complies. All proposed planting to be native species specific to the local area</p> <p>One mature non native tree to be removed, and will be replaced with an additional 6 native trees</p> <p>Complies, all landscape locations specified and are according to local indigenous theme</p>
<p><b>B14</b> <b>Access</b> To ensure the number and design of vehicle crossovers respects the neighbourhood character.</p>	<p>The width of accessways or car spaces should not exceed:</p> <ul style="list-style-type: none"> <li>▪ 33% of the street frontage; or</li> <li>▪ If the width of the street frontage is less than 20 metres, 40% of the street frontage.</li> </ul> <p>No more than one single-width crossover should be provided for each dwelling fronting a street.</p> <p>The location of crossovers should maximise the retention of on-street car parking spaces.</p> <p>The number of access points to a road in a Road Zone should be minimised.</p> <p>Developments must provide for access for service, emergency and delivery vehicles.</p>	<p>Complies. Combined total width of 2 accessways is 7.3 metres, with a total frontage of 22.16 metres, which is 32.9%</p> <p>Complies</p> <p>Complies</p> <p>Complies</p> <p>Complies, turning arrangement as per CFA guidelines</p>
<p><b>B15</b> <b>Parking Location</b> To provide convenient parking for resident and visitor vehicles.</p> <p>To protect residents from vehicular noise within developments.</p>	<p>Car parking facilities should:</p> <ul style="list-style-type: none"> <li>▪ Be reasonably close and convenient to dwellings and residential buildings.</li> <li>▪ Be secure.</li> <li>▪ Be well ventilated if enclosed.</li> </ul> <p>Shared accessways or car parks of other dwellings and residential buildings should be located at least 1.5 metres from the windows of habitable rooms. This setback may be reduced to 1 metre where there is a fence at least 1.5 metres high or where window sills are at least 1.4 metres above the accessway.</p>	<p>Complies, 2 secure parking spaces provided for each dwelling</p> <p>Complies</p>
<p><b>B16</b> <b>Parking Provision</b></p>	<p>-one space for each 1 or 2 bedroom dwelling - 2 spaces for each 2/3 bedroom (1 under cover).</p>	<p>Complies, 2 parking spaces provided for each dwelling</p>

## Amenity Impacts

## Clause 55.04-1 to 04-8

Title & Objective	Standard	Complies / Does Not Comply / Variation Required
<p><b>B17</b>  <b>Side and Rear Setbacks</b>                      To ensure that the height and setback of a building from a boundary respects the existing or preferred neighbourhood character and limits the impact on the amenity of existing dwellings.</p>	<p>A new building not on or within 200mm of a boundary should be set back from side or rear boundaries:</p> <p>At least the distance specified in a schedule to the zone, or</p> <ul style="list-style-type: none"> <li>▪ 1 metre, plus 0.3 metres for every metre of height over 3.6 metres up to 6.9 metres, plus 1 metre for every metre of height over 6.9 metres.</li> </ul> <p>Sunblinds, verandahs, porches, eaves, fascias, gutters, masonry chimneys, flues, pipes, domestic fuel or water tanks, and heating or cooling equipment or other services may encroach not more than 0.5 metres into the setbacks of this standard.</p> <p>Landings having an area of not more than 2 square metres and less than 1 metre high, stairways, ramps, pergolas, shade sails and carports may encroach into the setbacks of this standard.</p>	<p>Complies</p>

Title & Objective	Standard	Complies / Does Not Comply / Variation Required
<p><b>B18</b>  <b>Walls on Boundaries</b>            To ensure that the location, length and height of a wall on a boundary respects the existing or preferred neighbourhood character and limits the impact on the amenity of existing dwellings.</p>	<p>A new wall constructed on or within 200mm of a side or rear boundary of a lot or a carport constructed on or within 1 metre of a side or rear boundary of lot should not abut the lot boundary:</p> <ul style="list-style-type: none"> <li>▪ For a length of more than the distance specified in a schedule to the zone; or</li> <li>▪ If no distance is specified in a schedule to the zone, for a length of more than:</li> <li>▪ 10 metres plus 25 per cent of the remaining length of the boundary of an adjoining lot, or</li> <li>▪ Where the existing or simultaneously constructed walls or carports abutting the boundary on an abutting lot, the length of the existing or simultaneously constructed walls or carports, whichever is the greater.</li> </ul> <p>A new wall or carport may fully abut a side or rear boundary where slope and retaining walls or fences would result in the effective height of the wall or carport being less than 2 metres on the abutting property boundary.</p> <p>A building on a boundary includes a building set back up to 200mm from a boundary.</p> <p>The height of a new wall constructed on or within 200mm of a side or rear boundary or a carport constructed on or within 1 metre of a side or rear boundary should not exceed an average of 3.2 metres with no part higher than 3.6 metres unless abutting a higher existing or simultaneously constructed wall.</p>	<p>Complies. No walls on outer boundaries.</p>
<p><b>B19</b>  <b>Daylight to Existing Windows</b>            To allow adequate daylight into existing habitable room windows.</p>	<p>Buildings opposite an existing habitable room window should provide for a light court to the existing window that has a minimum area of 3 square metres and minimum dimension of 1 metre clear to the sky. The calculation of the area may include land on the abutting lot.</p> <p>Walls or carports more than 3 metres in height opposite an existing habitable room window should be set back from the window at least 50 per cent of the height of the new wall if the wall is within a 55 degree arc from the centre of the existing window. The arc may be swung to within 35 degrees of the plane of the wall containing the existing window.</p> <p>Where the existing window is above ground floor level, the wall height is measured from the floor level of the room containing the window.</p>	<p>Complies</p> <p>Complies</p>

Title & Objective	Standard	Complies / Does Not Comply / Variation Required
<p><b>B20</b> <b>North Facing Windows</b> To allow adequate solar access to existing north-facing habitable room windows.</p>	<p>If a north-facing habitable room window of an existing dwelling is within 3 metres of a boundary on an abutting lot, a building should be setback from the boundary 1 metre, plus 0.6 metres for every metre of height over 3.6 metres up to 6.9 metres, plus 1 metre for every metre of height over 6.9 metres, for a distance of 3 metres from the edge of each side of the window. A north-facing window is a window with an axis perpendicular to its surface oriented north 20 degrees west north 30 degrees east.</p>	<p>Complies</p>
<p><b>B21</b> <b>Overshadowing Open Space</b> To ensure buildings do not significantly overshadow existing secluded private open space.</p>	<p>Where sunlight to the secluded private open space of an existing dwelling is reduced, at least 75 per cent, or 40 square metres with minimum dimension of 3 metres, whichever is the lesser area, of the secluded private open space should receive a minimum of five hours of sunlight between 9 am and 3 pm on 22 September.</p> <p>If existing sunlight to the secluded private open space of an existing dwelling is less than the requirements of this standard, the amount of sunlight should not be further reduced.</p>	<p>N/A</p>
<p><b>B22</b> <b>Overlooking</b> To limit views into existing secluded private open space and habitable room windows.</p>	<p>A habitable room window, balcony, terrace, deck or patio should be located and designed to avoid direct views into the <u>secluded private open space</u> or <u>habitable room window</u> of an existing dwelling (horizontal 9m rule and from a height of 1.7m above ffl).</p> <p>A habitable room window, balcony, terrace, deck or patio with a direct view should be either:</p> <ul style="list-style-type: none"> <li>▪ Offset a minimum of 1.5 metres from the edge of one window to the edge of the other.</li> <li>▪ Have sill heights of at least 1.7 metres above floor level.</li> <li>▪ Have fixed, obscure glazing in any part of the window below 1.7 metre above floor level.</li> <li>▪ Have permanently fixed external screens to at least 1.7 metres above floor level and be no more than 25 per cent transparent.</li> </ul>	<p>Complies</p>
	<p>Obscure glazing in any part of the window below 1.7 metres above floor level may be operable provided that there are no direct views as specified in this standard.</p>	<p>Complies</p>
	<p>Screens used to obscure a view should be:</p> <ul style="list-style-type: none"> <li>▪ Perforated panels or trellis with a maximum of 25 per cent openings or solid translucent panels.</li> <li>▪ Permanent, fixed and durable.</li> <li>▪ Designed and coloured to blend in with the development.</li> </ul> <p>This standard does not apply to a new habitable room window, balcony, terrace, deck or patio which faces a property boundary where there is a visual barrier at least 1.8 metres high and the floor level of the habitable room, balcony, terrace, deck or patio is less than 0.8 metres above ground level at the boundary.</p>	<p>N/A</p>

Title & Objective	Standard	Complies / Does Not Comply / Variation Required
<b>B23</b> <b>Internal Views</b> To limit views into the secluded private open space and habitable room windows of dwellings and residential buildings within a development.	Windows and balconies should be designed to prevent overlooking of more than 50 per cent of the secluded private open space of a lower-level dwelling or residential building directly below and within the same development.	N/A
<b>B24</b> <b>Noise Impacts</b> To contain noise sources in developments that may affect existing dwellings.  To protect residents from external noise.	Noise sources, such as mechanical plant, should not be located near bedrooms of immediately adjacent existing dwellings.	N/A
	Noise sensitive rooms and secluded private open spaces of new dwellings and residential buildings should take account of noise sources on immediately adjacent properties.	Complies
	Dwellings and residential buildings close to busy roads, railway lines or industry should be designed to limit noise levels in habitable rooms.	Complies

### On-Site Amenity and Facilities

### Clause 55.05-1 to 05-6

Title & Objective	Standard	Complies / Does Not Comply / Variation Required
<b>B25</b> <b>Accessibility</b> To encourage the consideration of the needs of people with limited mobility in the design of developments.	The dwelling entries of the ground floor of dwellings and residential buildings should be accessible or able to be easily made accessible to people with limited mobility.	Complies
<b>B26</b> <b>Dwelling Entry</b> To provide each dwelling or residential building with its own sense of identity.	Entries to dwellings and residential buildings should: <ul style="list-style-type: none"> <li>▪ Be visible and easily identifiable from streets and other public areas.</li> <li>▪ Provide shelter, a sense of personal address and a transitional space around the entry.</li> </ul>	Complies
<b>B27</b> <b>Daylight to New Windows</b> To allow adequate daylight into new habitable room windows.	A window in a habitable room should be located to face: <ul style="list-style-type: none"> <li>▪ An outdoor space clear to the sky or a light court with a minimum area of 3 square metres and minimum dimension of 1 metre clear to the sky, not including land on an abutting lot, or</li> <li>▪ A verandah provided it is open for at least one third of its perimeter, or</li> <li>▪ A carport provided it has two or more open sides and is open for at least one third of its perimeter.</li> </ul>	Complies in all instances

Title & Objective	Standard	Complies / Does Not Comply / Variation Required
<p><b>B28</b>  <b>Private Open Space</b>            To provide adequate private open space for the reasonable recreation and service needs of residents.</p>	<p>A dwelling or residential building should have private open space of an area and dimensions specified in a schedule to the zone.</p> <p>If no area or dimensions are specified in a schedule to the zone, a dwelling or residential Building should have private open space consisting of:</p> <ul style="list-style-type: none"> <li>▪ An area of 40 square metres, with one part of the private open space to consist of secluded private open space at the side or rear of the dwelling or residential building with a minimum area of 25 square metres, a minimum dimension of 3 metres and convenient access from a living room, or</li> <li>▪ A balcony of 8 square metres with a minimum width of 1.6 metres and convenient access from a living room, or</li> <li>▪ A roof-top area of 10 square metres, minimum width of 2 metres and convenient access from a living room.</li> </ul>	<p>Complies, each dwelling has been provided with a minimum of 95m<sup>2</sup> of private open space</p>
<p><b>B29</b>  <b>Solar Access to Open Space</b>            To allow solar access into the secluded private open space of new dwellings and residential buildings.</p>	<p>The private open space should be located on the north side of the dwelling or residential building, if appropriate.</p>	<p>Complies in all instances</p>
	<p>The southern boundary of secluded private open space should be set back from any wall on the north of the space at least (2+0.9h) metres, where 'h' is the height of the wall.</p>	<p>Complies</p>
<p><b>B30</b>  <b>Storage</b>            To provide adequate storage facilities for each dwelling.</p>	<p>Each dwelling should have convenient access to at least 6 cubic metres of externally accessible, secure storage space.</p>	<p>Complies, each dwelling to be provided with 2m x 2m x 2m external storage shed</p>

### Detailed Design

### Clause 55.06-1 to 06-4

Title & Objective	Standard	Complies / Does Not Comply / Variation Required
<p><b>B31</b>  <b>Design Detail</b>            To encourage design detail that respects the existing or preferred neighbourhood character.</p>	<p>The design of buildings, including:</p> <ul style="list-style-type: none"> <li>▪ Facade articulation and detailing,</li> <li>▪ Window and door proportions,</li> <li>▪ Roof form, and</li> <li>▪ Verandahs, eaves and parapets,</li> <li>▪ Should respect the existing or preferred neighbourhood character.</li> </ul>	<p>Complies, proposed dwellings of varying styles on accordance to the existing neighborhood</p>
	<p>Garages and carports should be visually compatible with the development and the existing or preferred neighbourhood character.</p>	<p>Complies</p>
<p><b>B32</b>  <b>Front Fences</b>            To encourage front fence design that</p>	<p>The design of front fences should complement the design of the dwelling or residential building and any front fences on adjoining properties.</p>	<p>N/A</p>



Title & Objective	Standard	Complies / Does Not Comply / Variation Required
respects the existing or preferred neighbourhood character.	<p>A front fence within 3 metres of a street should not exceed:</p> <p>The maximum height specified in a schedule to the zone, or</p> <p>If no maximum height is specified in a schedule to the zone, the maximum height specified in Table B3;</p> <ul style="list-style-type: none"> <li>▪ 2m if abutting a Road Zone, Category 1.</li> <li>▪ 1.5m in any other streets.</li> </ul>	N/A
<p><b>B33</b> <b>Common Property</b> To ensure that communal open space, car parking, access areas and site facilities are practical, attractive and easily maintained.</p> <p>To avoid future management difficulties in areas of common ownership.</p>	<p>Developments should clearly delineate public, communal and private areas.</p> <p>Common property, where provided, should be functional and capable of efficient management.</p>	Complies
<p><b>B34</b> <b>Site Services</b> To ensure that site services can be installed and easily maintained.</p> <p>To ensure that site facilities are accessible, adequate and attractive.</p>	<p>The design and layout of dwellings and residential buildings should provide sufficient space (including easements where required) and facilities for services to be installed and maintained efficiently and economically.</p> <p>Bin and recycling enclosures, mailboxes and other site facilities should be accessible, adequate in size, durable, waterproof and blend in with the development.</p> <p>Mailboxes should be provided and located for convenient access as required by Australia Post.</p>	<p>Complies</p> <p>Complies, bins area provided near Astbury st boundary in landscape area</p> <p>Complies, mailboxes &amp; meter boxes provided close to Astbury st boundary</p>

# ResCode Clause 56

## Residential Subdivision

### Planning Report – 19 Astbury st Avoca Vic 3467

#### APPLICATION

- These provisions apply to an application to subdivide land in the Residential 1 Zone, Residential 2 Zone, Residential 3 Zone, Mixed Use Zone or Township Zone and any Comprehensive Development Zone or Priority Development Zone that provides for residential development.
- These provisions do not apply to an application to subdivide land into lots each containing an existing dwelling or car parking space.
- Please refer to the **Application of Clause 56 Objectives to Zoning and Subdivision Sizes Table** (following).

#### CLAUSE 56.01 SUBDIVISION SITE AND CONTEXT DESCRIPTION AND DESIGN RESPONSE

##### CLAUSE 56.01-1

##### SUBDIVISION SITE AND CONTEXT DESCRIPTION

The site and context description may use a site plan, photographs or other techniques and must accurately describe:

##### • In relation to the site:

- Site shape, dimensions and size.
- Orientation and contours.
- Trees and other significant vegetation.
- The siting and use of existing buildings on the site.
- Street frontage features such as poles, street trees and kerb crossovers.
- Access points.
- Drainage and infrastructure connections.
- Easements.
- Any significant natural features of the site, including drainage lines, watercourses, significant habitat and habitat corridors for the movement of fauna.
- Significant views to and from the site.
- Noise and odor sources or other external influences.
- Soil conditions, including any land affected by contamination, salinity or fill.
- Any other notable features or characteristics of the site.

##### • In relation to the surrounding area:

- The pattern of subdivision of the surrounding area.
- Existing land uses.
- The siting and use of existing buildings on adjacent properties.
- The location and type of significant vegetation.
- Street and footpath widths, materials and detailing.
- Location distances and characteristics of any nearby public open space.
- Direction, distances and to existing neighbourhood, town and regional activity centres and major employment areas and their catchments.
- Existing Transport routes, including freeways, arterial and sub-arterial roads and major roads connecting neighbourhoods.
- Local street network.
- Traffic Volumes and movements on adjacent roads.
- Pedestrian and bicycle paths.
- Any places of natural or cultural significance.

✓ **Complies**

##### Comments

**Site.** The site is rectangular in shape, approximately 153m long and 22m wide, with an existing weatherboard dwelling set back 7.0m from Astbury st, 9.5m from the eastern boundary and 9.2m from the western boundary. The vacant land to the rear of the existing dwelling slopes slightly away from Astbury st, by approximately 500mm along its 153m length. Vehicular access for the existing dwelling is proposed on the southern end of the Astbury st frontage as per existing, while vehicular access to the proposed 5 extra dwellings to the rear will be via a proposed crossover to the northern end of the Astbury st frontage, as will be all drainage and infrastructure connections to these proposed dwellings. There are no other significant trees, features or encumbrances

##### Surrounding area

The proposed subdivision has very little impact on the streetscape, aside from the proposed additional crossover. It is in line with the general pattern of subdivision of the surrounding area. On this block of Astbury st, there are several properties of varying ages, ranging from no. 19, which is probably one of the oldest, to no. 15 which is a brand new brick veneer dwelling. The existing streetscape will effectively be maintained by preserving the original dwelling at no. 19 whilst also utilising the vacant land in a sustainable manner. Minimal impact is envisaged with regard to loads for traffic volumes and services.

<p><b>CLAUSE 56.01-2</b> <b>SUBDIVISION DESIGN RESPONSE</b></p> <p>The design response must explain how the proposed design:</p> <ul style="list-style-type: none"> <li>• Derives from and responds to the site and context description.</li> <li>• Meets the objectives of Clause 56.</li> <li>• Responds to any site and context features for the area identified in a local planning policy or a Neighbourhood Character Overlay.</li> <li>• The design response must include correctly proportioned plan showing the subdivision in context with the adjacent area.</li> </ul>	<p>✓ <b>Complies</b></p> <p><b>Comments</b> A separate design response document is attached with the submission. Also refer sheets A01 &amp; A14, A15 &amp; A16 of the design drawings.</p>
<p><b>CLAUSE 56.02</b> <b>POLICY IMPLEMENTATION</b></p>	
<p><b>CLAUSE 56.02-1</b> <b>STRATEGIC IMPLEMENTATION</b></p> <p><b>Objective</b> To ensure that the layout and design of a subdivision is consistent with and implements any objective, policy, strategy or plan for the area set out in this scheme.</p> <p><b>Standard C1</b></p> <ul style="list-style-type: none"> <li>• An application must be accompanied by a written statement that describes how the subdivision is consistent with and implements any relevant growth area, activity centre, housing, access and mobility, community facilities, open space and recreation, landscape (including any native vegetation precinct plan) and urban design objective, policy, strategy or plan for the area set out in this scheme.</li> </ul>	<p>✓ <b>Complies</b></p> <p>The proposed subdivision supports the local planning objectives by helping to address shortages of this type of housing that exist in this location.</p>
<p><b>CLAUSE 56.03</b> <b>LIVABLE AND SUSTAINABLE COMMUNITIES</b></p>	
<p><b>CLAUSE 56.03-1</b> <b>COMPACT AND WALKABLE NEIGHBOURHOODS</b></p> <p><b>Objectives</b> To create compact neighbourhoods that are oriented around easy walking distances to activity centres, schools and community facilities, public open space and public transport.</p> <p>To allow easy movement through and between neighbourhoods for all people.</p> <p><b>Standard C2</b></p> <ul style="list-style-type: none"> <li>• A subdivision should implement any relevant growth area or any approved land-use and</li> <li>• development strategy, plan or policy for the area set out in this scheme.</li> <li>• An application for subdivision must include a plan of the layout of the subdivision that:</li> <li>• Meets the objectives (if relevant to the class of subdivision specified in the zone) of: <ul style="list-style-type: none"> <li>· Clause 56.03-2 Activity centres</li> <li>· Clause 56.03-3 Planning for community facilities</li> <li>· Clause 56.04-1 Lot diversity and distribution</li> <li>· Clause 56.06-2 Walking and cycling network</li> <li>· Clause 56.06-3 Public transport network</li> <li>· Clause 56.06-4 Neighbourhood street network</li> </ul> </li> <li>• Shows the 400 metre street walking distance around each existing or proposed bus stop, 600 metres street walking distance around each existing or proposed tram stop and 800 metres street walking distance around each existing or proposed railway station and shows the estimated number of dwellings within those distances.</li> <li>• Shows the layout of the subdivision in relation to the surrounding area.</li> <li>• Is designed to be accessible for people with disabilities.</li> </ul>	<p>✓ <b>Complies</b></p> <p>The subdivision is centrally located and within 15 minutes walking distances to the main school precinct (1.2km) and the High st shopping area (1km). Paved footpaths of less than 5% gradient exist for the majority of those access routes.</p>

<p><b>CLAUSE 56.03-2</b> <b>ACTIVITY CENTRE</b></p> <p><b>Objective</b> To provide for mixed-use activity centres, including neighbourhood activity centres, of appropriate area and location.</p> <p><b>Standard C3</b></p> <ul style="list-style-type: none"> <li>• A subdivision should implement any relevant activity centre strategy, plan or policy for the area set out in this scheme.</li> <li>• Subdivision should be supported by activity centres that are: <ul style="list-style-type: none"> <li>- Accessible by neighbourhood and regional walking and cycling networks.</li> <li>- Served by public transport that is connected to the regional public transport network.</li> <li>- Located at public transport interchange points for the convenience of passengers and easy connections between public transport services.</li> <li>- Located on arterial roads or connector streets.</li> <li>- Of appropriate size to accommodate a mix of uses that meet local community needs.</li> <li>- Oriented to support active street frontages, support street-based community interaction and pedestrian safety.</li> </ul> </li> </ul>	<p>✓ <b>Not Applicable</b></p>
<p><b>CLAUSE 56.03-3</b> <b>PLANNING FOR COMMUNITY FACILITIES</b></p> <p><b>Objective</b> To provide appropriately located sites for community facilities including schools, libraries, preschools and childcare, health services, police and fire stations, recreation and sports facilities.</p> <p><b>Standard C4</b></p> <ul style="list-style-type: none"> <li>• A subdivision should: <ul style="list-style-type: none"> <li>- Implement any relevant regional and local community facility strategy, plan or policy for the area set out in this scheme.</li> <li>- Locate community facilities on sites that are in or near activity centres and public transport.</li> </ul> </li> <li>• School sites should: <ul style="list-style-type: none"> <li>- Be integrated with the neighbourhood and located near activity centres.</li> <li>- Be located on walking and cycling networks.</li> <li>- Have a bus stop located along the school site boundary.</li> <li>- Have student drop-off zones, bus parking and on-street parking in addition to other street functions in abutting streets.</li> <li>- Adjoin the public open space network and community sporting and other recreation facilities.</li> <li>- Be integrated with community facilities.</li> <li>- Be located on land that is not affected by physical, environmental or other constraints.</li> </ul> </li> <li>• Schools should be accessible by the Principal Public Transport Network in Metropolitan Melbourne and on the regional public transport network outside Metropolitan Melbourne.</li> <li>• Primary schools should be located on connector streets and not on arterial roads.</li> <li>• New State Government school sites must meet the requirements of the Department of Education and Training and abut at least two streets with sufficient widths to provide student drop-off zones, bus parking and on-street parking in addition to other street functions.</li> </ul>	<p>✓ <b>Not Applicable</b></p>
<p><b>CLAUSE 56.03-4</b> <b>BUILT ENVIRONMENT</b></p> <p><b>Objective</b></p>	<p>✓ <b>Complies</b></p>

<p>To create urban places with identity and character.</p> <p><b>Standard C5</b></p> <ul style="list-style-type: none"> <li>The built environment should: <ul style="list-style-type: none"> <li>Implement any relevant urban design strategy, plan or policy for the area set out in this scheme.</li> <li>Provide living and working environments that are functional, safe and attractive.</li> <li>Provide an integrated layout, built form and urban landscape.</li> <li>Contribute to a sense of place and cultural identity.</li> </ul> </li> <li>An application should describe the identity and character to be achieved and the elements that contribute to that identity and character.</li> </ul>	<p>The built environment incorporates an attractive but low maintenance construction type (brick, colorbond &amp; cement sheet walls &amp; colorbond roofs) and well sited dwellings that utilise the northerly aspect for living areas. The access ways incorporate numerous garden zones that will utilise low maintenance and low water use native shrubs and grasses. A wide access way will provide good visibility and a safe environment.</p>
<p><b>CLAUSE 56.03-5</b> <b>NEIGHBOURHOOD CHARACTER</b></p> <p><b>Objective</b> To design subdivisions that respond to neighbourhood character.</p> <p><b>Standard C6</b></p> <ul style="list-style-type: none"> <li>Subdivision should: <ul style="list-style-type: none"> <li>Respect the existing neighbourhood character or achieve a preferred neighbourhood character consistent with any relevant neighbourhood character objective, policy or statement set out in this scheme.</li> <li>Respond to and integrate with the surrounding urban environment.</li> <li>Protect significant vegetation and site features.</li> </ul> </li> </ul>	<p>✓ <b>Complies</b></p> <p>Neighborhood character will be preserved by retaining and repairing the existing dwelling whilst incorporating a fairly low key development behind this dwelling that will only be partially visible from Astbury st.</p>
<p><b>CLAUSE 56.04</b> <b>LOT DESIGN</b></p>	
<p><b>CLAUSE 56.04-1</b> <b>LOT DIVERSITY AND DISTRIBUTION</b></p> <p><b>Objectives</b> To achieve housing densities that support compact and walkable neighbourhoods and the efficient provision of public transport services.</p> <p>To provide higher housing densities within walking distance of activity centres.</p> <p>To achieve increased housing densities in designated growth areas.</p> <p>To provide a range of lot sizes to suit a variety of dwelling and household types.</p> <p><b>Standard C7</b></p> <ul style="list-style-type: none"> <li>A subdivision should implement any relevant housing strategy, plan or policy for the area set out in this scheme.</li> <li>Lot sizes and mix should achieve the average net residential density specified in any zone or overlay that applies to the land or in any relevant policy for the area set out in this scheme.</li> <li>A range and mix of lot sizes should be provided including lots suitable for the development of: <ul style="list-style-type: none"> <li>Single dwellings.</li> <li>Two dwellings or more.</li> <li>Higher density housing.</li> <li>Residential buildings and Retirement villages.</li> </ul> </li> <li>Unless the site is constrained by topography or other site conditions, lot distribution should provide for 95 per cent of dwellings to be located no more than 400 metre street walking distance from the nearest existing or proposed bus stop, 600 metres street walking distance from the nearest existing or proposed tram stop and 800 metres street walking distance from the nearest existing or proposed railway station.</li> <li>Lots of 300 square metres or less in area, lots suitable for the development of two dwellings or more, lots suitable for higher density housing and lots suitable for Residential buildings</li> </ul>	<p>✓ <b>Complies</b></p> <p>Proposed subdivision allows for the retention of the existing 2 bedroom dwelling as well as the development of 4 x 3 bedroom dwellings and 1 x 4 bedroom dwellings.</p> <p>The subdivision is located in an established residential area and as such is able to take advantage of existing transport opportunities.</p>

<ul style="list-style-type: none"> <li>• and Retirement villages should be located in and within 400 metres street walking distance of an activity centre.</li> </ul>	
<p><b>CLAUSE 56.04-2</b> <b>LOT AREA AND BUILDING ENVELOPES</b></p> <p><b>Objective</b> To provide lots with areas and dimensions that enable the appropriate siting and construction of a dwelling, solar access, private open space, vehicle access and parking, water management, easements and the retention of significant vegetation and site features.</p> <p><b>Standard C8</b></p> <ul style="list-style-type: none"> <li>• An application to subdivide land that creates lots of less than 300 square metres should be accompanied by information that shows: <ul style="list-style-type: none"> <li>- That the lots are consistent or contain building envelope that is consistent with a development approved under this scheme, or</li> <li>- That a dwelling may be constructed on each lot in accordance with the requirements of this scheme.</li> </ul> </li> <li>• Lots of between 300 square metres and 500 square metres should: <ul style="list-style-type: none"> <li>- Contain a building envelope that is consistent with a development of the lot approved under this scheme, or</li> <li>- If no development of the lot has been approved under this scheme, contain a building envelope and be able to contain a rectangle measuring 10 metres by 15 metres, or 9 metres by 15 metres if a boundary wall is nominated as part of the building envelope.</li> </ul> </li> <li>• If lots of between 300 square metres and 500 square metres are proposed to contain dwellings that are built to the boundary, the long axis of the lots should be within 30 degrees east and 20 degrees west of north unless there are significant physical constraints that make this difficult to achieve.</li> <li>• Lots greater than 500 square metres should be able to contain a rectangle measuring 10 metres by 15 metres, and may contain a building envelope.</li> <li>• A building envelope may specify or incorporate any relevant siting and design requirement.</li> <li>• Any requirement should meet the relevant standards of Clause 54, unless: <ul style="list-style-type: none"> <li>- The objectives of the relevant standards are met, and</li> <li>- The building envelope is shown as a restriction on a plan of subdivision registered under the Subdivision Act 1988, or is specified as a covenant in an agreement under Section 173 of the Act.</li> </ul> </li> <li>• Where a lot with a building envelope adjoins a lot that is not on the same plan of subdivision or is not subject to the same agreement relating to the relevant building envelope: <ul style="list-style-type: none"> <li>- The building envelope must meet Standards A10 and A11 of Clause 54 in relation to the adjoining lot, and</li> <li>- The building envelope must not regulate siting matters covered by Standards A12 to A15 (inclusive) of Clause 54 in relation to the adjoining lot. This should be specified in the relevant plan of subdivision or agreement.</li> </ul> </li> <li>• Lot dimensions and building envelopes should protect: <ul style="list-style-type: none"> <li>- Solar access for future dwellings and support the siting and design of dwellings that achieve the energy rating requirements of the Building Regulations.</li> <li>- Existing or proposed easements on lots.</li> <li>- Significant vegetation and site features.</li> </ul> </li> </ul>	<p>✓ <b>Complies</b></p> <p>All lots are above 466m<sup>2</sup> in size. Refer sheet A15 of the design drawings.</p>
<p><b>CLAUSE 56.04-3</b> <b>SOLAR ORIENTATION OF LOTS</b></p> <p><b>Objective</b> To provide good solar orientation of lots and solar access for future dwellings.</p>	<p>✓ <b>Complies</b></p>

<p><b>Standard C9</b></p> <ul style="list-style-type: none"> <li>• Unless the site is constrained by topography or other site conditions, at least 70 percent of lots should have appropriate solar orientation.</li> <li>• Lots have appropriate solar orientation when: <ul style="list-style-type: none"> <li>- The long axis of lots are within the range north 20 degrees west to north 30 degrees east, or east 20 degrees north to east 30 degrees south.</li> </ul> </li> <li>• Lots between 300 square metres and 500 square metres are proposed to contain dwellings that are built to the boundary, the long axis of the lots should be within 30 degrees east and 20 degrees west of north.</li> <li>• Dimensions of lots are adequate to protect solar access to the lot, taking into account likely dwelling size and the relationship of each lot to the street.</li> </ul>	<p>All lots allow for good solar access for the dwellings proposed</p>
<p><b>CLAUSE 56.04-4 STREET ORIENTATION</b></p> <p><b>Objective</b> To provide a lot layout that contributes to community social interaction, personal safety and property security.</p> <p><b>Standard C10</b></p> <ul style="list-style-type: none"> <li>• Subdivision should increase visibility and surveillance by: <ul style="list-style-type: none"> <li>- Ensuring lots front all roads and streets and avoid the side or rear of lots being oriented to connector streets and arterial roads.</li> <li>- Providing lots of 300 square metres or less in area and lots for 2 or more dwellings around activity centres and public open space.</li> <li>- Ensuring streets and houses look onto public open space and avoiding sides and rears of lots along public open space boundaries.</li> <li>- Providing roads and streets along public open space boundaries.</li> </ul> </li> </ul>	<p>✓ <b>Not Applicable</b></p> <p>Street orientation of existing dwelling will be maintained.</p>
<p><b>CLAUSE 56.04-5 COMMON AREA</b></p> <p><b>Objectives</b> To identify common areas and the purpose for which the area is commonly held.</p> <p>To ensure the provision of common area is appropriate and that necessary management arrangements are in place.</p> <p>To maintain direct public access throughout the neighbourhood street network.</p> <p><b>Standard C11</b></p> <ul style="list-style-type: none"> <li>• An application to subdivide land that creates common land must be accompanied by a plan and a report identifying: <ul style="list-style-type: none"> <li>- The common area to be owned by the body corporate, including any streets and open space.</li> <li>- The reasons why the area should be commonly held.</li> <li>- Lots participating in the body corporate.</li> <li>- The proposed management arrangements including maintenance standards for streets and open spaces to be commonly held.</li> </ul> </li> </ul>	<p>✓ <b>Not Applicable</b></p> <p>Common area is prescribed under this proposed subdivision, consisting of vehicular and emergency access, as well as landscape areas and park with small seating area. Refer design response as to why this is required.</p>
<p><b>CLAUSE 56.05 URBAN LANDSCAPE</b></p>	
<p><b>CLAUSE 56.05-1 INTEGRATED URBAN LANDSCAPE</b></p> <p><b>Objectives</b> To provide attractive and continuous landscaping in streets and public open spaces that contribute to the character and identity of new neighbourhoods and urban places or to existing or preferred neighbourhood character in existing urban areas.</p>	<p>✓ <b>Complies</b></p>



To incorporate natural and cultural features in the design of streets and public open space where appropriate.

To protect and enhance native habitat and discourage the planting and spread of noxious weeds.

To provide for integrated water management systems and contribute to drinking water conservation.

### Standard C12

- An application for subdivision that creates streets or public open space should be accompanied by a landscape design.
- The landscape design should:
  - Implement any relevant streetscape, landscape, urban design or native vegetation precinct plan, strategy or policy for the area set out in this scheme.
  - Create attractive landscapes that visually emphasise streets and public open spaces.
  - Respond to the site and context description for the site and surrounding area.
  - Maintain significant vegetation where possible within an urban context.
  - Take account of the physical features of the land including landform, soil and climate.
  - Protect and enhance any significant natural and cultural features.
  - Protect and link areas of significant local habitat where appropriate.
  - Support integrated water management systems with appropriate landscape design techniques for managing urban run-off including wetlands and other water sensitive urban design features in streets and public open space.
  - Promote the use of drought tolerant and low maintenance plants and avoid species that are likely to spread into the surrounding environment.
  - Ensure landscaping supports surveillance and provides shade in streets, parks and public open space.
  - Develop appropriate landscapes for the intended use of public open space including areas for passive and active recreation, the exercising of pets, playgrounds and shaded areas.
  - Provide for walking and cycling networks that link with community facilities.
  - Provide appropriate pathways, signage, fencing, public lighting and street furniture.
  - Create low maintenance, durable landscapes that are capable of a long life.
  - The landscape design must include a maintenance plan that sets out maintenance responsibilities, requirements and costs.

Refer Landscape design sheet A14 of design drawings, which incorporates drought tolerant and low maintenance local species, as well as 2 park benches in an easily and centrally accessible park

### CLAUSE 56.05-2

#### PUBLIC OPEN SPACE PROVISION

##### Objectives

To provide a variety of open spaces with links to other open spaces and regional parks where possible.

To ensure that public open space of appropriate quality and quantity is provided in convenient locations to meet the recreational and social needs of the community.

To support active and healthy communities.

##### Standard C13

- The provision of public open space should:
  - Implement any relevant open space plan, strategy or policy for the area set out in this scheme.
  - Provide a network of well-distributed regional and local open space that includes:

✓ **Not Applicable**

<ul style="list-style-type: none"> <li>- Regional public open space where appropriate, including along foreshores, streams and permanent water bodies.</li> <li>- Regional parks of at least 3 hectares, combining passive and active use, within 2 kilometres of all dwellings.</li> <li>- Large local parks of at least 1 hectare for active and passive use, within 500 metres safe walking distance from all dwellings.</li> <li>- Small local parks within 150 metres to 300 metres safe walking distance of all dwellings, where appropriate.</li> <li>- Include land used for drainage control or stream and floodway purposes if generally available for recreational use.</li> <li>- Be integrated with urban water management systems including watercourses and water bodies.</li> <li>- Incorporate natural and cultural features where appropriate.</li> <li>- Encourage shared use of active open space.</li> <li>- Adjoin schools and other community facilities where practical.</li> <li>- Meet the social, cultural, recreational and sporting needs of the community including different age groups and abilities.</li> <li>- Be linked to existing or proposed future public open spaces where appropriate.</li> <li>- Include publicly owned plazas or parks in activity centres where appropriate.</li> <li>• Land provided for public open space should be: <ul style="list-style-type: none"> <li>- Of a quality, quantity and character that makes it fit for its potential functions.</li> <li>- Located so that every lot in the subdivision is within 500 metres street walking distance of existing or proposed public open space.</li> <li>- Related to the street and lot layout in a manner that promotes personal safety and surveillance of users of the public open space from streets along public open space boundaries.</li> <li>- Of an area and dimensions to allow easy adaptation to different uses in response to changing community sport and recreational preferences.</li> </ul> </li> </ul>	
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**CLAUSE 56.06  
ACCESS AND MOBILITY MANAGEMENT**

<p><b>CLAUSE 56.06-1 INTEGRATED MOBILITY</b></p> <p><b>Objectives</b> To achieve an urban structure where compact and walkable neighbourhoods are clustered to support larger activity centres on the Principal Public Transport Network in Metropolitan Melbourne and on the regional public transport network outside Metropolitan Melbourne.</p> <p>To provide for walking (including persons with impaired mobility), cycling, public transport and other motor vehicles in an integrated manner.</p> <p>To contribute to reduced car dependence, improved energy efficiency, reduced greenhouse gas emissions and reduced air pollution.</p> <p><b>Standard C14</b></p> <ul style="list-style-type: none"> <li>• An application for a subdivision must include a plan of the layout of the neighbourhood that meets the objectives of: <ul style="list-style-type: none"> <li>- Clause 56.06-2 Walking and cycling network.</li> <li>- Clause 56.06-3 Public transport network.</li> <li>- Clause 56.06-4 Neighbourhood street network.</li> </ul> </li> </ul>	<p>✓ <b>Not Applicable</b></p> <p>The subdivision is located in an established residential area and as such is able to take advantage of existing transport opportunities.</p>
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<p><b>CLAUSE 56.06-2 WALKING AND CYCLING NETWORK</b></p> <p><b>Objectives</b> To contribute to community health and well being by encouraging walking and cycling as part of the daily lives of residents, employees and visitors.</p> <p>To provide safe and direct movement through and between neighbourhoods by pedestrians and cyclists.</p>	<p>✓ <b>Not Applicable</b></p>
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<p>To reduce car use, greenhouse gas emissions and air pollution.</p> <p><b>Standard C15</b></p> <ul style="list-style-type: none"> <li>• The walking and cycling network should be designed to: <ul style="list-style-type: none"> <li>- Implement any relevant regional and local walking and cycling strategy, plan or policy for the area set out in this scheme.</li> <li>- Link to any existing pedestrian and cycling networks.</li> <li>- Provide safe walkable distances to activity centres, community facilities, public transport stops and public open spaces.</li> <li>- Provide an interconnected and continuous network of safe, efficient and convenient footpaths, shared paths, cycle paths and cycle lanes based primarily on the network of arterial roads, neighbourhood streets and regional public open spaces.</li> <li>- Provide direct cycling routes for regional journeys to major activity centres, community facilities, public transport and other regional activities and for regional recreational cycling.</li> <li>- Ensure safe street and road crossings including the provision of traffic controls where required.</li> <li>- Provide an appropriate level of priority for pedestrians and cyclists.</li> <li>- Have natural surveillance along streets and from abutting dwellings and be designed for personal safety and security particularly at night.</li> <li>- Be accessible to people with disabilities.</li> </ul> </li> </ul>	<p>The subdivision is located in an established residential area and as such is able to take advantage of existing walking &amp; cycling opportunities.</p>
<p><b>CLAUSE 56.06-3</b> <b>PUBLIC TRANSPORT NETWORK</b></p> <p><b>Objectives</b> To provide an arterial road and neighbourhood street network that supports a direct, efficient and safe public transport system.</p> <p>To encourage maximum use of public transport.</p> <p><b>Standard C16</b></p> <ul style="list-style-type: none"> <li>• The public transport network should be designed to: <ul style="list-style-type: none"> <li>- Implement any relevant public transport strategy, plan or policy for the area set out in this scheme.</li> <li>- Connect new public transport routes to existing and proposed routes to the satisfaction of the relevant public transport authority.</li> <li>- Provide for public transport links between activity centres and other locations that attract people using the Principal Public Transport Network in Metropolitan Melbourne and the regional public transport network outside Metropolitan Melbourne.</li> <li>- Locate regional bus routes principally on arterial roads and locate local bus services principally on connector streets to provide: <ul style="list-style-type: none"> <li>- Safe and direct movement between activity centres without complicated turning manoeuvres.</li> <li>- Direct travel between neighbourhoods and neighbourhood activity centres.</li> <li>- A short and safe walk to a public transport stop from most dwellings.</li> </ul> </li> </ul> </li> </ul>	<p>✓ <b>Complies</b></p> <p>The subdivision is located in an established residential area and as such is able to take advantage of existing transport opportunities.</p>
<p><b>CLAUSE 56.06-4</b> <b>NEIGHBOURHOOD STREET NETWORK</b></p> <p><b>Objective</b> To provide for direct, safe and easy movement through and between neighbourhoods for pedestrians, cyclists, public transport and other motor vehicles using the neighbourhood street network.</p> <p><b>Standard C17</b></p> <ul style="list-style-type: none"> <li>• The neighbourhood street network must: <ul style="list-style-type: none"> <li>- Take account of the existing mobility network of arterial roads, neighbourhood streets, cycle paths, cycle paths, footpaths and public transport routes.</li> </ul> </li> </ul>	<p>✓ <b>Not Applicable</b></p>

<ul style="list-style-type: none"> <li>- Provide clear physical distinctions between arterial roads and neighbourhood street types.</li> <li>- Comply with the Roads Corporation's arterial road access management policies.</li> <li>- Provide an appropriate speed environment and movement priority for the safe and easy movement of pedestrians and cyclists and for accessing public transport.</li> <li>- Provide safe and efficient access to activity centres for commercial and freight vehicles.</li> <li>- Provide safe and efficient access to all lots for service and emergency vehicles.</li> <li>- Provide safe movement for all vehicles.</li> <li>- Incorporate any necessary traffic control measures and traffic management infrastructure.</li> <li>• The neighbourhood street network should be designed to: <ul style="list-style-type: none"> <li>- Implement any relevant transport strategy, plan or policy for the area set out in this scheme.</li> <li>- Include arterial roads at intervals of approximately 1.6 kilometres that have adequate reservation widths to accommodate long term movement demand.</li> <li>- Include connector streets approximately halfway between arterial roads and provide adequate reservation widths to accommodate long term movement demand.</li> <li>- Ensure connector streets align between neighbourhoods for direct and efficient movement of pedestrians, cyclists, public transport and other motor vehicles.</li> <li>- Provide an interconnected and continuous network of streets within and between neighbourhoods for use by pedestrians, cyclists, public transport and other vehicles.</li> <li>- Provide an appropriate level of local traffic dispersal.</li> <li>- Indicate the appropriate street type.</li> <li>- Provide a speed environment that is appropriate to the street type.</li> <li>- Provide a street environment that appropriately manages movement demand (volume, type and mix of pedestrians, cyclists, public transport and other motor vehicles).</li> <li>- Encourage appropriate and safe pedestrian, cyclist and driver behaviour.</li> <li>- Provide safe sharing of access lanes and access places by pedestrians, cyclists and vehicles.</li> <li>- Minimise the provision of culs-de-sac.</li> <li>- Provide for service and emergency vehicles to safely turn at the end of a dead-end street.</li> <li>- Facilitate solar orientation of lots.</li> <li>- Facilitate the provision of the walking and cycling network, integrated water management systems, utilities and planting of trees.</li> <li>- Contribute to the area's character and identity.</li> <li>- Take account of any identified significant features.</li> </ul> </li> </ul>	
<p><b>CLAUSE 56.06-5</b>  <b>WALKING AND CYCLING NETWORK DETAIL</b></p> <p><b>Objectives</b>  To design and construct footpaths, shared path and cycle path networks that are safe, comfortable, well constructed and accessible for people with disabilities.</p> <p>To design footpaths to accommodate wheelchairs, prams, scooters and other footpath bound vehicles.</p> <p><b>Standard C18</b></p> <ul style="list-style-type: none"> <li>• Footpaths, shared paths, cycle paths and cycle lanes should be designed to: <ul style="list-style-type: none"> <li>- Be part of a comprehensive design of the road or street reservation.</li> <li>- Be continuous and connect.</li> <li>- Provide for public transport stops, street crossings for pedestrians and cyclists and kerb crossovers for access to lots.</li> <li>- Accommodate projected user volumes and mix.</li> </ul> </li> </ul>	<p>✓ <b>Not Applicable</b></p>

<ul style="list-style-type: none"> <li>- Meet the requirements of Table C1.</li> <li>- Provide pavement edge, kerb, channel and crossover details that support safe travel for pedestrians, footpath bound vehicles and cyclists, perform required drainage functions and are structurally sound.</li> <li>- Provide appropriate signage.</li> <li>- Be constructed to allow access to lots without damage to the footpath or shared path surfaces.</li> <li>- Be constructed with a durable, non-skid surface.</li> <li>- Be of a quality and durability to ensure: <ul style="list-style-type: none"> <li>- Safe passage for pedestrians, cyclists, footpath bound vehicles and vehicles.</li> <li>- Discharge of urban run-off.</li> <li>- Preservation of all-weather access.</li> <li>- Maintenance of a reasonable, comfortable riding quality.</li> <li>- A minimum 20 year life span.</li> </ul> </li> <li>- Be accessible to people with disabilities and include tactile ground surface indicators, audible signals and kerb ramps required for the movement of people with disabilities.</li> </ul>	
<p><b>CLAUSE 56.06-6</b> <b>PUBLIC TRANSPORT NETWORK DETAIL</b></p> <p><b>Objectives</b> To provide for the safe, efficient operation of public transport and the comfort and convenience of public transport users.</p> <p>To provide public transport stops that are accessible to people with disabilities.</p> <p><b>Standard C19</b></p> <ul style="list-style-type: none"> <li>• Bus priority measures must be provided along arterial roads forming part of the existing or proposed Principal Public Transport Network in Metropolitan Melbourne and the regional public transport network outside Metropolitan Melbourne to the requirements of the relevant roads authority.</li> <li>• Road alignment and geometry along bus routes should provide for the efficient, unimpeded movement of buses and the safety and comfort of passengers.</li> <li>• The design of public transport stops should not impede the movement of pedestrians.</li> <li>• Bus and tram stops should have: <ul style="list-style-type: none"> <li>- Surveillance from streets and adjacent lots.</li> <li>- Safe street crossing conditions for pedestrians and cyclists.</li> <li>- Safe pedestrian crossings on arterial roads and at schools including the provision of traffic controls as required by the roads authority.</li> <li>- Continuous hard pavement from the footpath to the kerb.</li> <li>- Sufficient lighting and paved, sheltered waiting areas for forecast user volume at neighbourhood centres, schools and other locations with expected high patronage.</li> <li>- Appropriate signage.</li> </ul> </li> <li>• Public transport stops and associated waiting areas should be accessible to people with disabilities and include tactile ground surface indicators, audible signals and kerb ramps</li> <li>• required for the movement of people with physical disabilities.</li> </ul>	<p>✓ <b>Not Applicable</b></p>
<p><b>CLAUSE 56.06-7</b> <b>NEIGHBOURHOOD STREET NETWORK DETAIL</b></p> <p><b>Objective</b> To design and construct street carriageways and verges so that the street geometry and traffic speeds provide an accessible and safe neighbourhood street system for all users.</p> <p><b>Standard C20</b></p> <ul style="list-style-type: none"> <li>• The design of streets and roads should:</li> </ul>	<p>✓ <b>Not Applicable</b></p>

<ul style="list-style-type: none"> <li>- Meet the requirements of Table C1. Where the widths of access lanes, access places, and access streets do not comply with the requirements of Table C1, the requirements of the relevant fire authority and roads authority must be met.</li> <li>- Provide street blocks that are generally between 120 metres and 240 metres in length and generally between 60 metres to 120 metres in width to facilitate pedestrian movement and control traffic speed.</li> <li>- Have verges of sufficient width to accommodate footpaths, shared paths, cycle paths, integrated water management, street tree planting, lighting and utility needs.</li> <li>- Have street geometry appropriate to the street type and function, the physical land characteristics and achieve a safe environment for all users.</li> <li>- Provide a low-speed environment while allowing all road users to proceed without unreasonable inconvenience or delay.</li> <li>- Provide a safe environment for all street users applying speed control measures where appropriate.</li> <li>- Ensure intersection layouts clearly indicate the travel path and priority of movement for pedestrians, cyclists and vehicles.</li> <li>- Provide a minimum 5 metre by 5 metre corner splay at junctions with arterial roads and a minimum 3 metre by 3 metre corner splay at other junctions unless site conditions justify a variation to achieve safe sight lines across corners.</li> <li>• Ensure streets are of sufficient strength to: <ul style="list-style-type: none"> <li>- Enable the carriage of vehicles.</li> <li>- Avoid damage by construction vehicles and equipment.</li> </ul> </li> <li>• Ensure street pavements are of sufficient quality and durability for the: <ul style="list-style-type: none"> <li>- Safe passage of pedestrians, cyclists and vehicles.</li> <li>- Discharge of urban run-off.</li> <li>- Preservation of all-weather access and maintenance of a reasonable, comfortable riding quality.</li> </ul> </li> <li>• Ensure carriageways of planned arterial roads are designed to the requirements of the relevant road authority.</li> <li>• Ensure carriageways of neighbourhood streets are designed for a minimum 20 year life span.</li> <li>• Provide pavement edges, kerbs, channel and crossover details designed to: <ul style="list-style-type: none"> <li>- Perform the required integrated water management functions.</li> <li>- Delineate the edge of the carriageway for all street users.</li> <li>- Provide efficient and comfortable access to abutting lots at appropriate locations.</li> <li>- Contribute to streetscape design.</li> <li>- Provide for the safe and efficient collection of waste and recycling materials from lots.</li> <li>- Be accessible to people with disabilities.</li> </ul> </li> <li>• A street detail plan should be prepared that shows, as appropriate: <ul style="list-style-type: none"> <li>- The street hierarchy and typical cross-sections for all street types.</li> <li>- Location of carriageway pavement, parking, bus stops, kerbs, crossovers, footpaths, tactile surface indicators, cycle paths and speed control and traffic management devices.</li> <li>- Water sensitive urban design features.</li> <li>- Location and species of proposed street trees and other vegetation.</li> <li>- Location of existing vegetation to be retained and proposed treatment to ensure its health.</li> <li>- Any relevant details for the design and location of street furniture, lighting, seats, bus stops, telephone boxes and mailboxes.</li> </ul> </li> </ul>	
<p><b>CLAUSE 56.06-8</b> <b>LOT ACCESS</b></p> <p><b>Objective</b> To provide for safe vehicle access between roads and lots.</p> <p><b>Standard C21</b></p> <ul style="list-style-type: none"> <li>• Vehicle access to lots abutting arterial roads should be provided from</li> </ul>	<p>✓ <b>Complies</b></p> <p>Direct access to each lot via Astbury st is provided</p>

service roads, side or rear access lanes, access places or access streets where appropriate and in accordance with the access management requirements of the relevant roads authority.

- Vehicle access to lots of 300 square metres or less in area and lots with a frontage of 7.5 metres or less should be provided via rear or side access lanes, places or streets.
- The design and construction of a crossover should meet the requirements of the relevant road authority.

## Table C1 Design of Roads and Neighbourhood Streets

### Access Lane

A side or rear lane principally providing access to parking on lots with another street frontage.

- **Traffic volume<sup>1</sup>:** 300vpd
- **Target speed<sup>2</sup>:** 10kph
- **Carriageway width<sup>3</sup> & parking provision within street reservation:** 5.5m<sup>6</sup> wide with no parking spaces to be provided. Appropriately signed.
- **Verge width<sup>4</sup>:** No verge required.
- **Kerbing<sup>5</sup>**
- **Footpath provision:** None. Carriageway designed as a shared zone and appropriately signed.
- **Cycle path provision:** None

### Access Place

A minor street providing local residential access with shared traffic, pedestrian and recreation use, but with pedestrian priority.

- **Traffic volume<sup>1</sup>:** 300vpd to 1000vpd
- **Target speed<sup>2</sup>:** 15kph
- **Carriageway width<sup>3</sup> & parking provision within street reservation:** 5.5m wide with 1 hard standing verge parking space per 2 lots **or** 5.5m wide with parking on carriageway - one side. Appropriately signed.
- **Verge width<sup>4</sup>:** 7.5m minimum total width. For services provide a minimum of 3.5m on one side and a minimum of 2.5m on the other.
- **Kerbing<sup>5</sup>:** Semi-mountable rollover or flush and swale or other water sensitive urban design treatment area.
- **Footpath provision:** Not required if serving 5 dwellings or less and the carriageway is designed as a shared zone and appropriately signed **or** 1.5m wide footpath offset a minimum distance of 1m from the kerb.
- **Cycle path provision:** None

### Access Street - Level 1

A street providing local residential access where traffic is subservient, speed and volume are low and pedestrian and bicycle movements are facilitated.

- **Traffic volume<sup>1</sup>:** 000vpd to 2000vpd
- **Target speed<sup>2</sup>:** 30kph
- **Carriageway width<sup>3</sup> & parking provision within street reservation:** 5.5m wide with 1 hard standing verge parking space per 2 lots.
- **Verge width<sup>4</sup>:** 4m minimum each side
- **Kerbing<sup>5</sup>:** Semi-mountable rollover or flush and swale or other water sensitive urban design treatment area.
- **Footpath provision:** 1.5m wide footpaths on both sides. Footpaths should be widened to 2.0m in vicinity of a school, shop or other activity centre. Be offset a minimum distance of 1m from the kerb.
- **Cycle path provision:** Carriageway designed as a shared zone and appropriately signed.

### Access Street - Level 2

A street providing local residential access where traffic is subservient, speed and volume are low and pedestrian and bicycle movements are



facilitated.

- **Traffic volume<sup>1</sup>:** 2000vpd to 3000vpd
- **Target speed<sup>2</sup>:** 40kph
- **Carriageway width<sup>3</sup> & parking provision within street reservation:** 7m-7.5m wide with parking on both sides of carriageway
- **Verge width<sup>4</sup>:** 4.5m minimum each side
- **Kerbing<sup>5</sup>:** Semi-mountable rollover or flush and swale or other water sensitive urban design treatment area.
- **Footpath provision:** 1.5m wide footpaths on both sides. Footpaths should be widened to 2.0m in vicinity of a school, shop or other activity centre. Be offset a minimum distance of 1m from the kerb.
- **Cycle path provision:** Carriageway designed as a shared zone and appropriately signed.

### Connector Street - Level 1

A street that carries higher volumes of traffic. It connects access places and access streets through and between neighbourhoods.

- **Traffic volume<sup>1</sup>:** 3000vpd
- **Target speed<sup>2</sup>:** 50kph<sup>8</sup> reduced to 40kph at schools and 20kph at pedestrian and cycle crossing points.
- **Carriageway width<sup>3</sup> & parking provision within street reservation:** 6m-6.5m wide with indented parking on both sides on a bus route **or** 7m-7.5m wide with indented parking on one side and kerbside parking opposite on a bus route **or** 7.2m-7.5m wide with parking on both sides of carriageway.
- **Verge width<sup>4</sup>:** 4.5m minimum each side with adequate road reserve width for widening for future bus route if required.
- **Kerbing<sup>5</sup>:** Layback or flush and swale or other water sensitive urban design treatment area.
- **Footpath & cycle path provision:** 2.5m wide shared path on each side **or** 1.5m wide footpath on each side and 1-1.5m cycle lane marked on carriageway on each side.

### Connector Street - Level 2

A street that carries higher volumes of traffic. It connects access places and access streets through and between neighbourhoods.

- **Traffic volume<sup>1</sup>:** 3000vpd to 7000vpd
- **Target speed<sup>2</sup>:** 60kph<sup>9</sup>
- **Carriageway width<sup>3</sup> & parking provision within street reservation:** 2 x 5.5m wide carriageways with central median. Parallel parking should be provided in locations that allow cars to exit in a forward direction **or** 7.2m-7.5m wide carriageway with indented parking on both sides and turning lanes at intersections with other Level 2 connector Streets and Arterial Roads. Bus bays to be indented.
- **Verge width<sup>4</sup>:** 6m minimum each side (plus central median).
- **Kerbing<sup>5</sup>:** Layback or flush and swale or other water sensitive urban design treatment area.
- **Footpath & cycle path provision:** 2.5m wide shared path on each side **or** 1.5m wide footpath on each side and 1-1.5m cycle lane marked on carriageway on each side appropriately signed.

### Arterial Road

- **Traffic volume<sup>1</sup>:** Greater than 7000vpd
- **Target speed<sup>2</sup>:** Arterial road design as required by the relevant roads authority.
- **Carriageway width<sup>3</sup> & parking provision within street reservation:** Arterial road design as required by the relevant roads authority.
- **Verge width<sup>4</sup>:** Arterial road design as required by the relevant roads authority.
- **Kerbing<sup>5</sup>:** Arterial road design as required by the relevant roads authority.
- **Footpath & cycle path provision:** 2.5m wide shared path on each side or as otherwise required by the relevant roads authority.

<p><b>Key to Table C1:</b></p> <ol style="list-style-type: none"> <li>1. Indicative maximum traffic volume for 24-hour period. These volumes depend upon location. Generation rates may vary between existing and newly developing areas.</li> <li>2. Target speed is the desired speed at which motorists should travel. This is not necessarily the design speed and is not greater than the marked legal speed limit.</li> <li>3. The maximum width within the range should be used when bus use is anticipated or when upright kerbs are used. Width is measured from kerb invert to kerb invert. Widening may be required at bends to allow for wider vehicle paths using appropriate Australian Standards for on street and off-street parking but should not negate the function of bends serving as slow points.</li> <li>4. Verge width includes footpaths. Additional width may be required to accommodate a bicycle path.</li> <li>5. Where drainage is not required a flush pavement edge treatment can be used. Layback kerbs are preferred for safety reasons. Upright kerbs may be considered for drainage purposes or in locations where on-street parking should be clearly defined and parking within the verge is not desired.</li> <li>6. Turning requirements to access and egress parking on abutting lots may require additional carriageway width. The recommended carriageway width of 5.5m will provide adequate access to a standard 3.5m wide single garage built to the property line.</li> <li>7. 7m-7.5m widths should be used when parking is required on each side.</li> <li>8. 50kph is the default urban speed limit in Victoria.</li> <li>9. Target speed must not exceed the legal speed limit.</li> </ol>	
<p><b>CLAUSE 56.07 INTEGRATED WATER MANAGEMENT</b></p>	
<p><b>CLAUSE 56.07-1 DRINKING WATER SUPPLY</b></p> <p><b>Objectives</b> To reduce the use of drinking water.</p> <p>To provide an adequate, cost-effective supply of drinking water.</p> <p><b>Standard C22</b></p> <ul style="list-style-type: none"> <li>• The supply of drinking water must be: <ul style="list-style-type: none"> <li>- Designed and constructed in accordance with the requirements and to the satisfaction of the relevant water authority.</li> <li>- Provided to the boundary of all lots in the subdivision to the satisfaction of the relevant water authority.</li> </ul> </li> </ul>	<p>✓ <b>Not Applicable</b></p>
<p><b>CLAUSE 56.07-2 REUSED AND RECYCLED WATER</b></p> <p><b>Objective</b> To provide for the substitution of drinking water for non-drinking purposes with reused and recycled water.</p> <p><b>Standard C23</b></p> <ul style="list-style-type: none"> <li>• Reused and recycled water supply systems must be: <ul style="list-style-type: none"> <li>- Designed, constructed and managed in accordance with the requirements and to the satisfaction of the relevant water authority, Environment Protection Authority and Department of Human Services.</li> <li>- Provided to the boundary of all lots in the subdivision where required by the relevant water authority.</li> </ul> </li> </ul>	<p>✓ <b>Not Applicable</b></p>
<p><b>CLAUSE 56.07-3 WASTE WATER MANAGEMENT</b></p>	<p>✓ <b>Complies</b></p>

<p><b>Objective</b> To provide a waste water system that is adequate for the maintenance of public health and the management of effluent in an environmentally friendly manner.</p> <p><b>Standard C24</b></p> <ul style="list-style-type: none"> <li>• Waste water systems must be: <ul style="list-style-type: none"> <li>- Designed, constructed and managed in accordance with the requirements and to the satisfaction of the relevant water authority and the Environment Protection Authority.</li> <li>- Consistent with any relevant approved domestic waste water management plan.</li> </ul> </li> <li>• Reticulated waste water systems must be provided to the boundary of all lots in the subdivision where required by the relevant water authority.</li> </ul>	<p>Each lot of the Subdivision will have provision for a connection point the waste water services located at Astbury st.</p>
<p><b>CLAUSE 56.07-4</b> <b>URBAN RUN-OFF MANAGEMENT</b></p> <p><b>Objectives</b> To minimise damage to properties and inconvenience to residents from urban run-off.</p> <p>To ensure that the street operates adequately during major storm events and provides for public safety.</p> <p>To minimise increases in stormwater run-off and protect the environmental values and physical characteristics of receiving waters from degradation by urban run-off.</p> <p><b>Standard C25</b></p> <ul style="list-style-type: none"> <li>• The urban stormwater management system must be: <ul style="list-style-type: none"> <li>- Designed and managed in accordance with the requirements and to the satisfaction of the relevant drainage authority.</li> <li>- Designed and managed in accordance with the requirements and to the satisfaction of the water authority where reuse of urban run-off is proposed.</li> <li>- Designed to meet the current best practice performance objectives for stormwater quality as contained in the Urban Stormwater – Best Practice Environmental Management Guidelines (Victorian Stormwater Committee 1999) as amended.</li> <li>- Designed to ensure that flows downstream of the subdivision site are restricted to predevelopment levels unless increased flows are approved by the relevant drainage authority and there are no detrimental downstream impacts.</li> </ul> </li> <li>• The stormwater management system should be integrated with the overall development plan including the street and public open space networks and landscape design.</li> <li>• For all storm events up to and including the 20% Average Exceedence Probability (AEP) standard: <ul style="list-style-type: none"> <li>- Stormwater flows should be contained within the drainage system to the requirements of the relevant authority.</li> <li>- Ponding on roads should not occur for longer than 1 hour after the cessation of rainfall.</li> </ul> </li> <li>• For storm events greater than 20% AEP and up to and including 1% AEP standard: <ul style="list-style-type: none"> <li>- Provision must be made for the safe and effective passage of stormwater flows.</li> <li>- All new lots should be free from inundation or to a lesser standard of flood protection where agreed by the relevant floodplain management authority.</li> <li>- Ensure that streets, footpaths and cycle paths that are subject to flooding meet the safety criteria <math>da Vave &lt; 0.35 \text{ m}^2/\text{s}</math> (where, <math>da</math> = average depth in metres and <math>Vave</math> = average velocity in metres per second).</li> </ul> </li> <li>• The design of the local drainage network should: <ul style="list-style-type: none"> <li>- Ensure run-off is retarded to a standard required by the responsible</li> </ul> </li> </ul>	<p>✓ <b>Complies</b></p> <p>Subdivision allows for incorporation of storm water drainage system to meet the standards of the local authority. Each dwelling is provided with a storm water retention tank that is able to capture and store at least 24 hours of rain collected on roofs in a 1%AEP event. These tanks will be connected to the roadside drainage system on Astbury st via sealed underground drainage system, calibrate to release the water at a designated slow rate, to help reduce backup of floodwater further downstream.</p> <p>Native, low maintenance garden beds along the side of the paved access way in the common property will be constructed to slow and absorb surface flows, and with 46.7% of the site remaining impervious, a large proportion of flood water will be absorbed. Remaining surface flows will be channeled offsite via a designated flow route at the north east corner of the site, as per current natural flows. It is envisaged that the above measures will reduce the incidence of such excess flows to levels at or below the current undeveloped rates.</p>

<p>drainage authority.</p> <ul style="list-style-type: none"> <li>- Ensure every lot is provided with drainage to a standard acceptable to the relevant drainage authority. Wherever possible, run-off should be directed to the front of the lot and discharged into the street drainage system or legal point of discharge.</li> <li>- Ensure that inlet and outlet structures take into account the effects of obstructions and debris build up. Any surcharge drainage pit should discharge into an overland flow in a safe and predetermined manner.</li> <li>- Include water sensitive urban design features to manage run-off in streets and public open space. Where such features are provided, an application must describe maintenance responsibilities, requirements and costs.</li> </ul> <ul style="list-style-type: none"> <li>• Any flood mitigation works must be designed and constructed in accordance with the requirements of the relevant floodplain management authority.</li> </ul>	
<p><b>CLAUSE 56.08 SITE MANAGEMENT</b></p>	
<p><b>CLAUSE 56.08-1 SITE MANAGEMENT</b></p> <p><b>Objectives</b> To protect drainage infrastructure and receiving waters from sedimentation and contamination.</p> <p>To protect the site and surrounding area from environmental degradation or nuisance prior to and during construction of subdivision works.</p> <p>To encourage the re-use of materials from the site and recycled materials in the construction of subdivisions where practicable.</p> <p><b>Standard C26</b></p> <ul style="list-style-type: none"> <li>• A subdivision application must describe how the site will be managed prior to and during the construction period and may set out requirements for managing: <ul style="list-style-type: none"> <li>- Erosion and sediment.</li> <li>- Dust.</li> <li>- Run-off.</li> <li>- Litter, concrete and other construction wastes.</li> <li>- Chemical contamination.</li> <li>- Vegetation and natural features planned for retention.</li> </ul> </li> <li>• Recycled material should be used for the construction of streets, shared paths and other infrastructure where practicable.</li> </ul>	<p>✓ <b>Complies</b></p> <p>Adequate scope is provided for this to be adhered to during detailed design and construction. Perimtr fences will be erected to limit views and contain waste and to assist in security during construction. There is ample space beside the proposed dwellings for construction of levees and silt traps to prevent escape of silt during construction</p>
<p><b>CLAUSE 56.09 UTILITIES</b></p>	
<p><b>CLAUSE 56.09-1 SHARED TRENCHING</b></p> <p><b>Objectives</b> To maximise the opportunities for shared trenching.</p> <p>To minimise constraints on landscaping within street reserves.</p> <p><b>Standard C27</b></p> <ul style="list-style-type: none"> <li>• Reticulated services for water, gas, electricity and telecommunications should be provided in shared trenching to minimise construction costs and land allocation for underground services.</li> </ul>	<p>✓ <b>Complies</b></p> <p>Adequate scope is provided for this to be adhered to during detailed design and construction. A minimum of 1.0m of width is provided either side of paved access.</p>
<p><b>CLAUSE 56.09-2 ELECTRICITY, TELECOMMUNICATIONS AND GAS</b></p> <p><b>Objectives</b></p>	<p>✓ <b>Complies</b></p>

<p>To provide public utilities to each lot in a timely, efficient and cost effective manner.</p> <p>To reduce greenhouse gas emissions by supporting generation and use of electricity from renewable sources.</p> <p><b>Standard C28</b></p> <ul style="list-style-type: none"> <li>• The electricity supply system must be designed in accordance with the requirements of the relevant electricity supply agency and be provided to the boundary of all lots in the subdivision to the satisfaction of the relevant electricity authority.</li> <li>• Arrangements that support the generation or use of renewable energy at a lot or neighbourhood level are encouraged.</li> <li>• The telecommunication system must be designed in accordance with the requirements of the relevant telecommunications servicing agency and should be consistent with any approved strategy, policy or plan for the provision of advanced telecommunications infrastructure, including fibre optic technology. The telecommunications system must be provided to the boundary of all lots in the subdivision to the satisfaction of the relevant telecommunications servicing authority.</li> <li>• Where available, the reticulated gas supply system must be designed in accordance with the requirements of the relevant gas supply agency and be provided to the boundary of all lots in the subdivision to the satisfaction of the relevant gas supply agency.</li> </ul>	<p>Adequate scope is provided for this to be adhered to during detailed design and construction.</p>
<p><b>CLAUSE 56.09-3 FIRE HYDRANTS</b></p> <p><b>Objective</b> To provide fire hydrants and fire plugs in positions that enable fire fighters to access water safely, effectively and efficiently.</p> <p><b>Standard C29</b></p> <ul style="list-style-type: none"> <li>• Fire hydrants should be provided: <ul style="list-style-type: none"> <li>- A maximum distance of 120 metres from the rear of the each lot.</li> <li>- No more than 200 metres apart.</li> </ul> </li> <li>• Hydrants and fire plugs must be compatible with the relevant fire service equipment.</li> </ul>	<p>✓ <b>Not Applicable</b></p>
<p><b>CLAUSE 56.09-4 PUBLIC LIGHTING</b></p> <p><b>Objectives</b> To provide public lighting to ensure the safety of pedestrians, cyclists and vehicles.</p> <p>To provide pedestrians with a sense of personal safety at night.</p> <p>To contribute to reducing greenhouse gas emissions and to saving energy.</p> <p><b>Standard C30</b></p> <ul style="list-style-type: none"> <li>• Public lighting should be provided to streets, footpaths, public telephones, public transport stops and to major pedestrian and cycle paths including public open spaces that are likely to be well used at night to assist in providing safe passage for pedestrians, cyclists and vehicles.</li> <li>• Public lighting should be designed in accordance with the relevant Australian Standards.</li> <li>• Public lighting should be consistent with any strategy, policy or plan for the use of renewable energy and energy efficient fittings.</li> </ul>	<p>✓ <b>Not Applicable</b></p>



Design Requirements

# Vehicle Access and Water Supply Requirements in Residential Developments

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## Introduction

The Country Fire Authority is responsible for the protection of life and property from the adverse effects of fire in country area of Victoria. Loss of life and property in building fires, particularly in dwellings, is a major concern. To reduce the risk, multi-lot residential developments must be designed and located to provide ready access by fire trucks to structures and water supplies.

This guideline is a planning tool for developers, councils and consultants involved in the design and approval of lower rise residential developments. Those are areas where residential buildings do not exceed 3 storeys in height.

The document outlines objectives, how to achieve those objectives and CFA's preferred requirements.

Proposed development should be designed to meet CFA's preferred requirements. Explicit indication of compliance with the CFA preferred requirements on an application will assist in reducing the time required to process the application.

While it is anticipated that most multi-lot residential developments will meet the CFA preferred requirements, an applicant may achieve the objectives in new or innovative other ways. If it can be demonstrated to the satisfaction of CFA that the development will achieve the objectives for both access and water supply. Each case will be considered on its merits. This assessment process may take longer than one that meets the CFA preferred requirements.

We look forward to working closely with our communities and building designers to ensure that we can effectively meet our legislative obligations to prevent and suppress fires, and to protect our communities.



**Jason Heffernan**  
**Chief Officer**

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## How to use this document

All new residential developments should be provided with:

- appropriate vehicle access in accordance with **Part A** of this document.
- an appropriate source of water for firefighting purposes in accordance with **Part B** of this document.

## Variations

Where requirements in this document are unable to be complied with for heritage, functional or any other exceptional reason, then details of the proposed development design should be provided to:

### **Country Fire Authority**

Fire Risk, Research & Community Preparedness  
8 Lakeside Drive, Burwood East  
PO Box 701, Mt Waverley VIC, 3149

[firesafetyreferrals@cfa.vic.gov.au](mailto:firesafetyreferrals@cfa.vic.gov.au)

(03) 9262 8444

# Part A – Vehicle access requirements

## Objective

To provide safe and efficient emergency vehicle access to all properties.

## How to achieve the objective

A residential development needs to be designed to allow a fire truck to travel to and be positioned close to each property to allow for an effective emergency response.

The requirements on the following pages outline CFA's expectations on how this should be achieved.

## Maximum distances from a hardstand

A fire truck needs to be able to travel to and park close to every property. The maximum distance from where a fire truck is able to park (known as a hardstand) to the rear of every building, property boundary or building envelope should not exceed 60 m.



A hardstand is an all-weather location where an appliance can park safely, and firefighters can then conduct operations from, which may include a road.

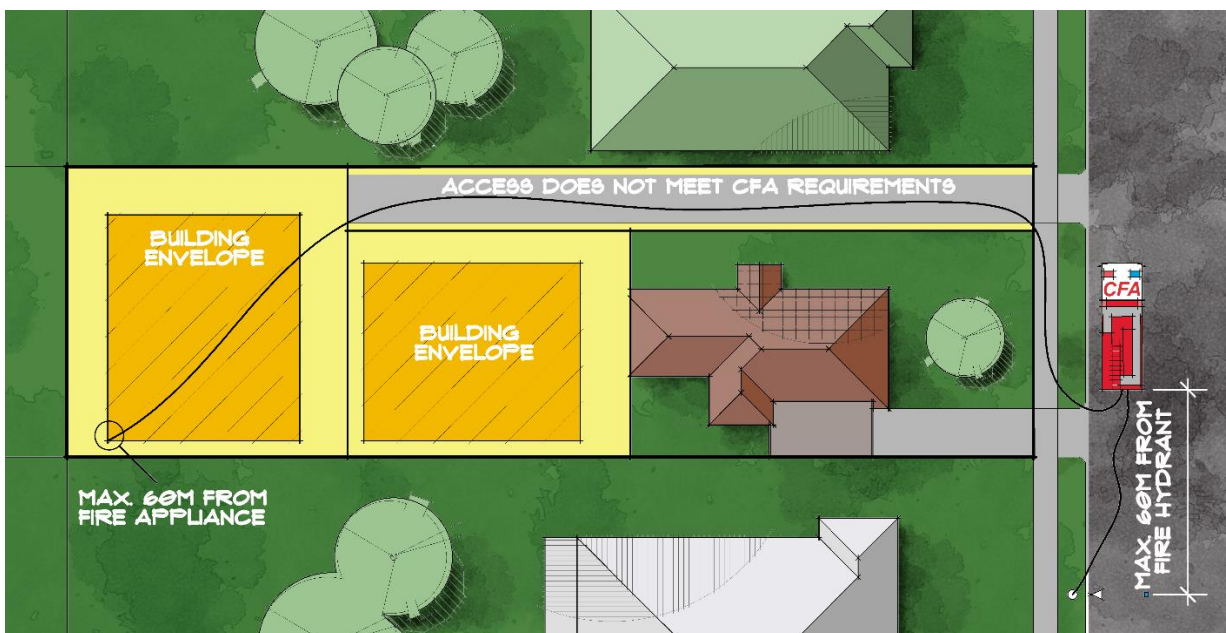


Figure 1: Road as the hardstand.

In Figure 1, the fire truck is unable to access the property. In this instance, the fire truck would need to be parked on the road, and the 60m maximum distance would be

measured from the closest point a fire truck could park to the rear of the property or building envelope. See Part B for details on hydrant coverage.

### Minimum widths

In areas where residential development is less than 3 storeys, then the minimum trafficable width for fire truck access to a hardstand must be:

- **3.5 m, with no parking on either side** (with appropriate signage restricting parking on both sides), or;
- **5.5 m with parking on one side** (with appropriate signage restricting parking on one side), or;
- **7.3 m with parking on both sides.**

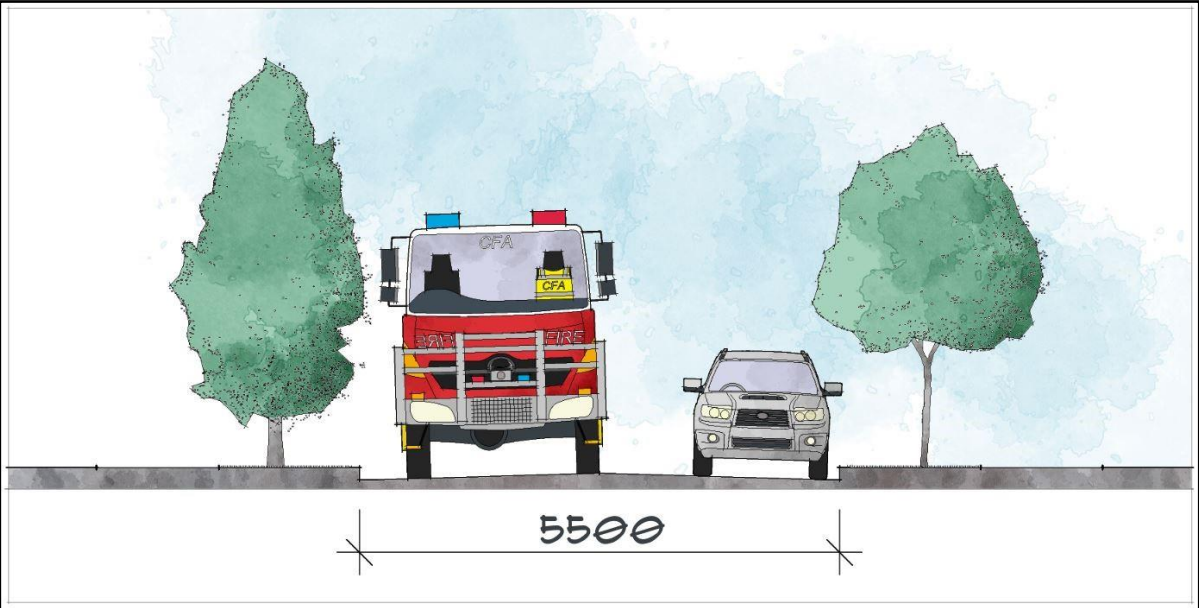


Figure 2: Parking on one side of the street.

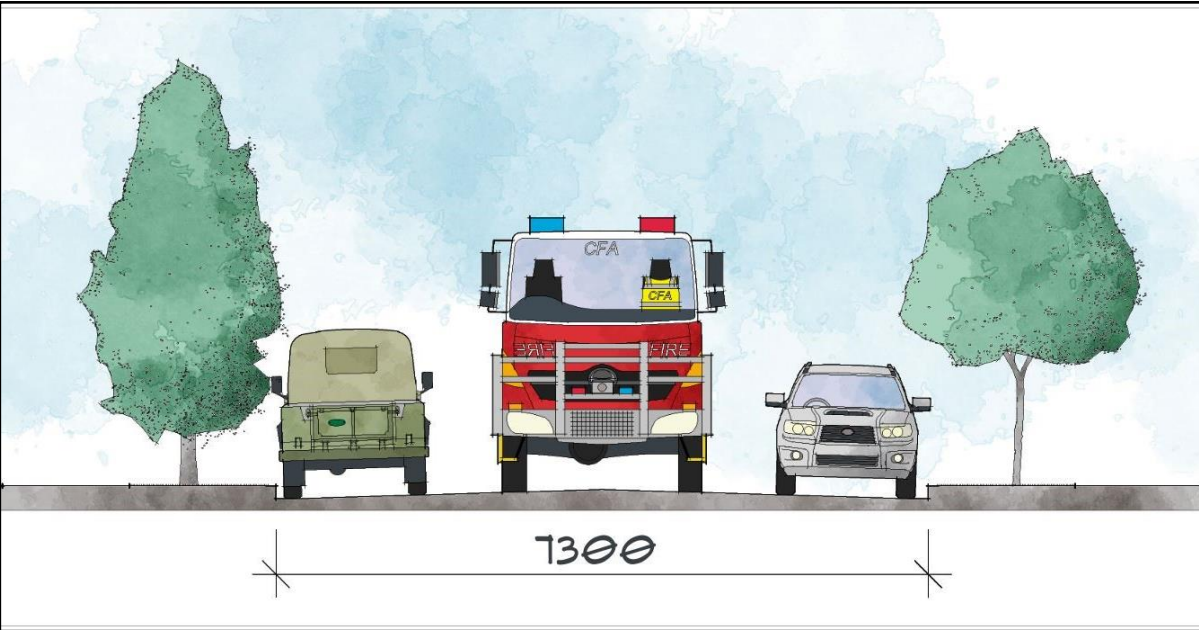
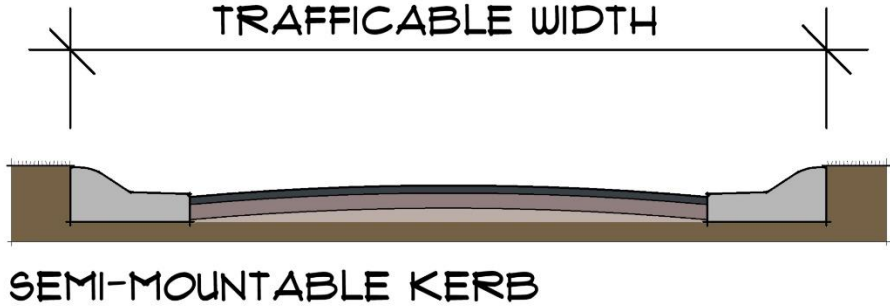
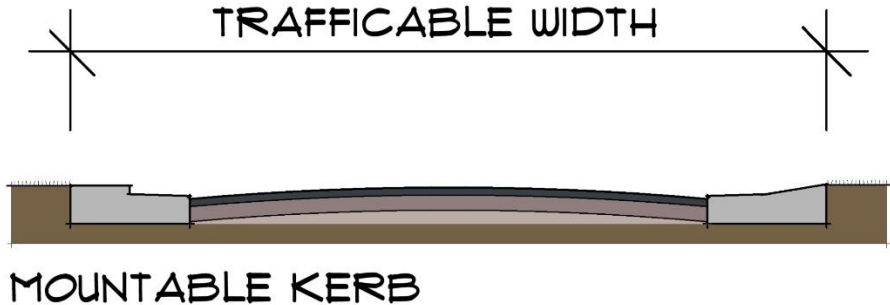
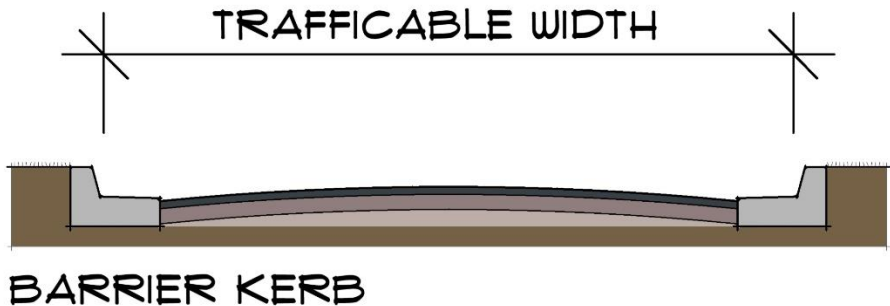


Figure 3: Parking on both sides of the street.

The trafficable width must only include that part of a roadway a fire truck can safely traverse. The trafficable width should not include barrier kerbs such as vertical gutters or traffic calming devices but may include mountable or semi-mountable kerbs.



**Figure 4:** Measuring trafficable width.



# Minimum clearances

All areas of vehicle access to a hardstand must be clear of encroachments for at least 0.5 m either side and 4 m vertically.

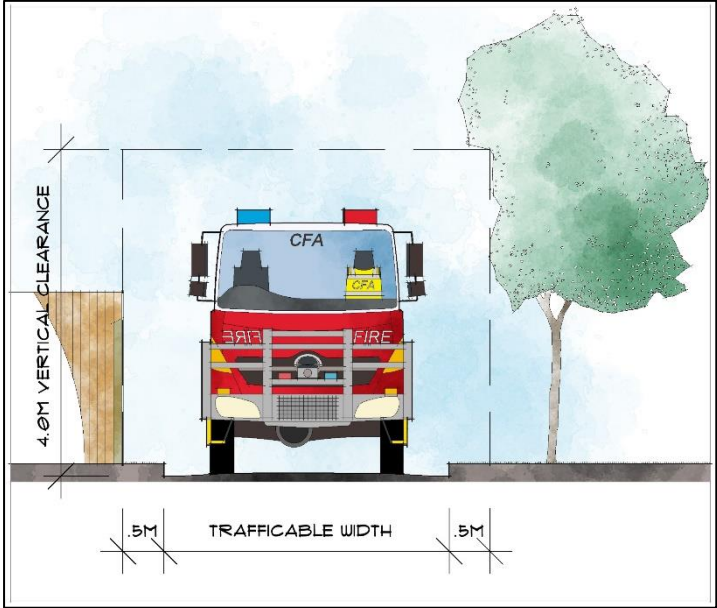


Figure 4.1: Clearance envelope example.

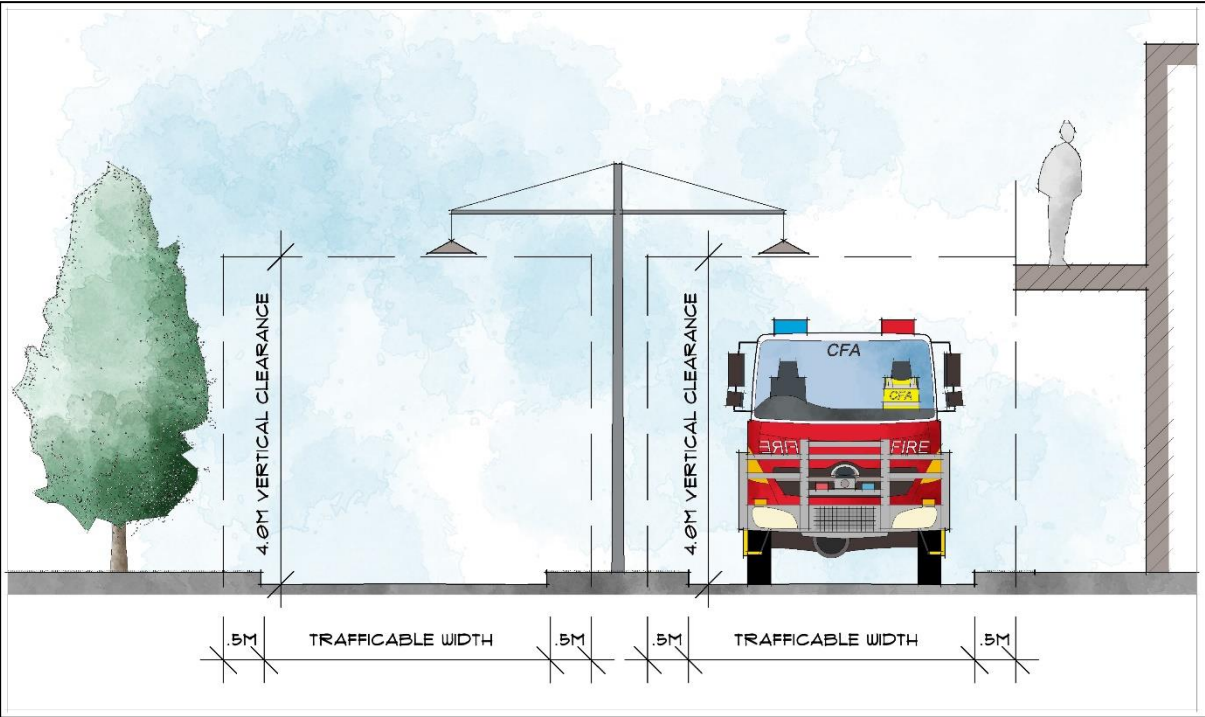


Figure 4.2: Clearance envelope example.

## Turning provisions

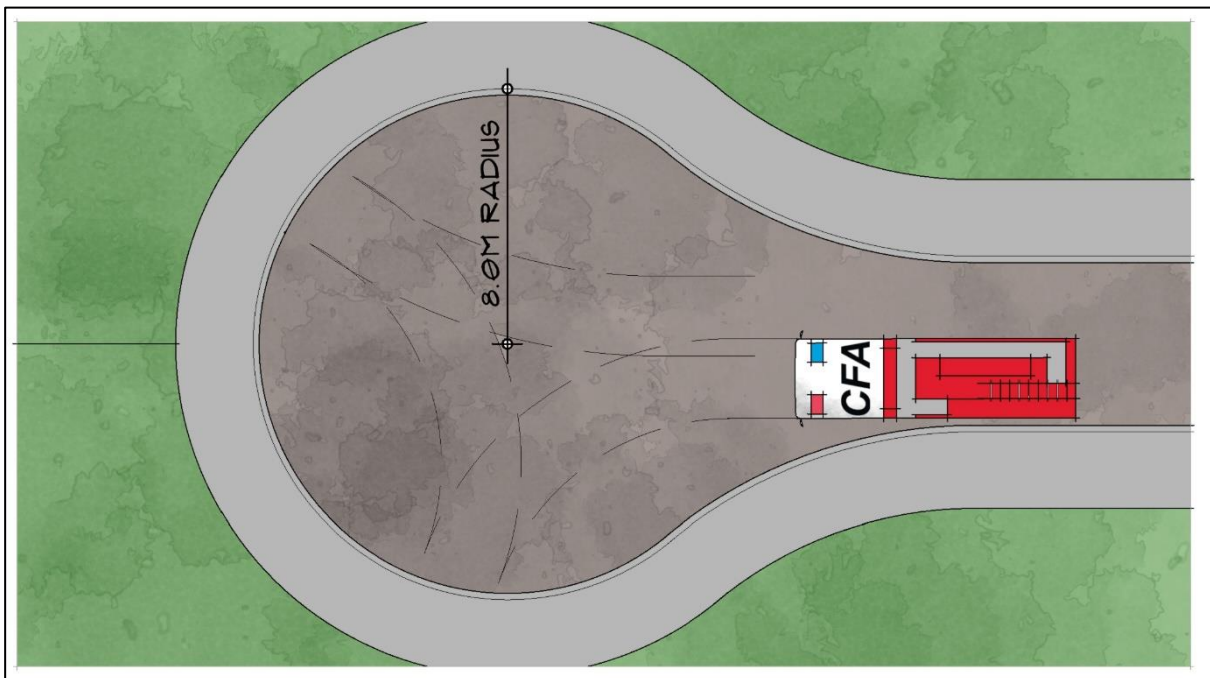
Vehicle access to a hardstand should be designed to allow for a fire truck to leave the hardstand in a forward direction. This can be achieved with loop roads, perimeter roads and the like. Where this cannot be achieved, then the maximum distance that a fire truck can be expected to reverse safely is 60 m.

Where vehicle access to a hardstand is greater than 60 m, such as dead-end roads or a single access, a turning area complying with one of the following options should be provided. No parking is permitted in the turning area at any time (appropriate signage should be provided).

Where vehicle access to a hardstand is greater than 60 m but is to be continued in the future, for example, in a staged subdivision, temporary turning provisions must still be provided to enable safe access and egress during an emergency.

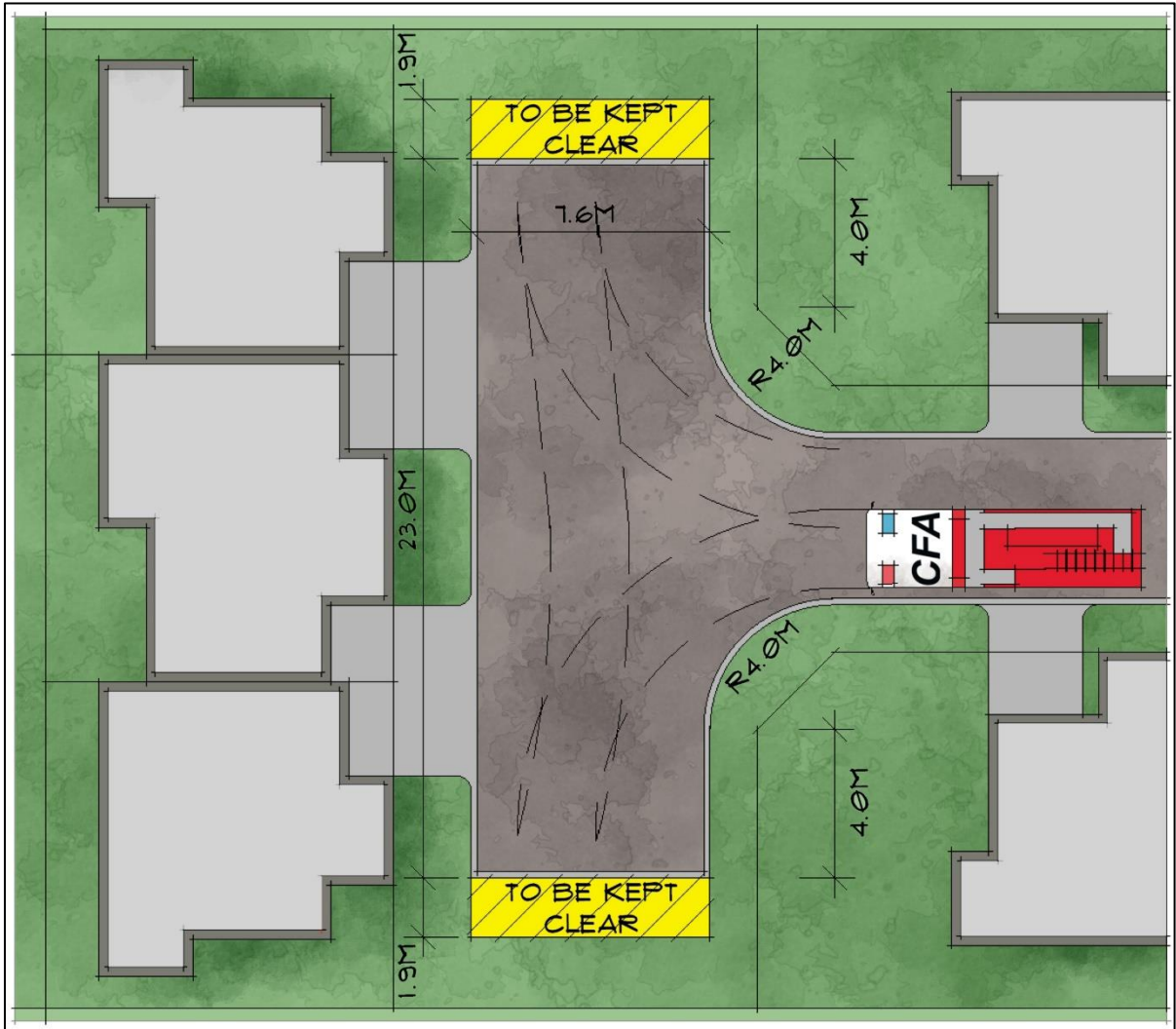


If the local government has adopted the Infrastructure Design Manual, or there are specific requirements outlined in a Structure Plan or the like, turning provisions or court bowls should be provided to the relevant requirements. Roads designed to Austroads standards for an 8.8m service vehicle will meet CFA's requirements.

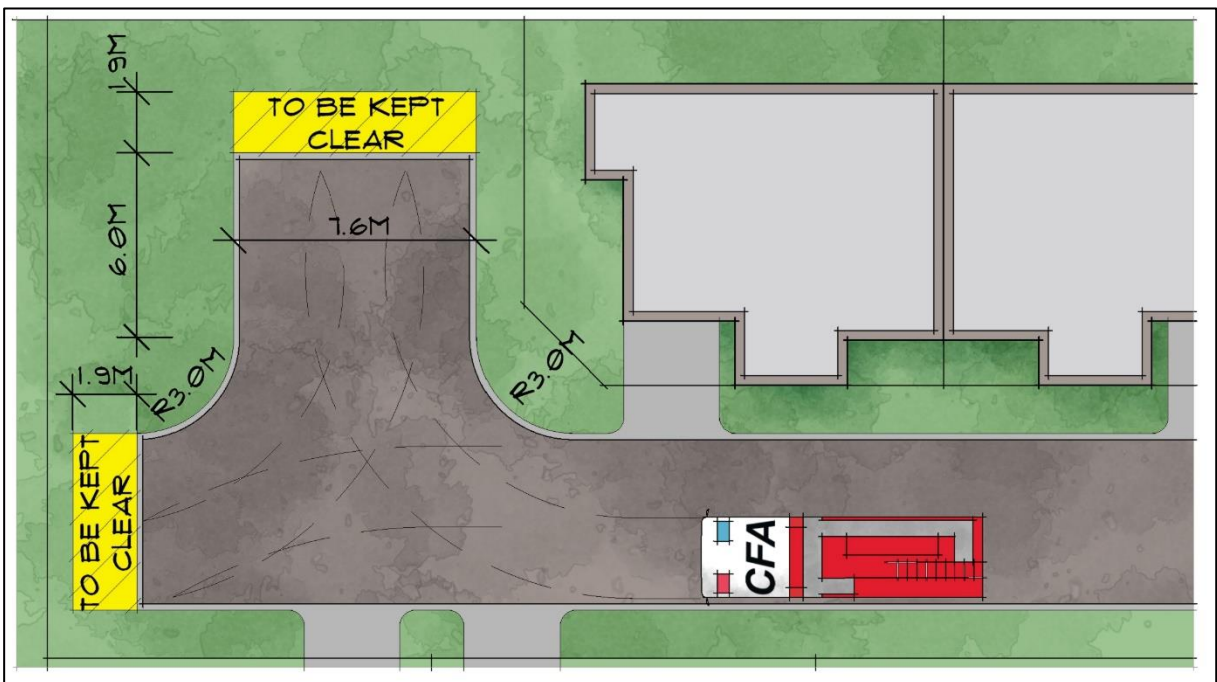


**Figure 5:** Court bowl example.





**Figure 6:** A 'T' head example.



**Figure 7:** A side turning bay example.

# Maximum gradients

Vehicle access gradients must not exceed 11.3 degrees (1 in 5 or 20%) for no more than 50 m and the average grade must be no more than 8.1 degrees (1 in 7 or 14.4%).

Any dedicated turning area must not have a gradient that exceeds 3 degrees (1 in 19.3 or 5.25%) cross fall.

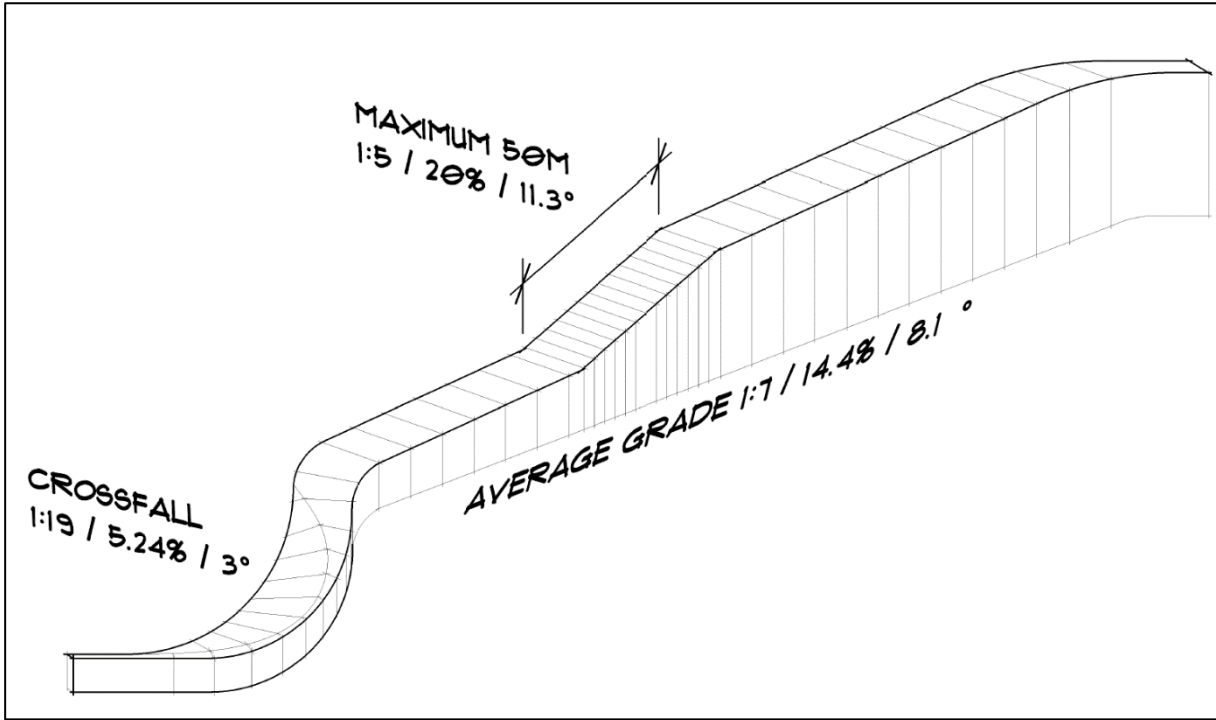


Figure 8: Maximum gradients for vehicle access.

## Part B - Water supply requirements

### Objective

To provide fire fighters with efficient access to an appropriate water source for firefighting purposes.

### How to achieve the objective

Fire hydrants should be provided in areas of reticulated water.

Dedicated firefighting water tanks should be provided in areas without reticulated water.

The following requirements outline CFA's expectations on how this should be achieved.

### Areas with reticulated water

A fire hydrant needs to be located within 120 metres from the rear of all buildings, building envelopes or lots.

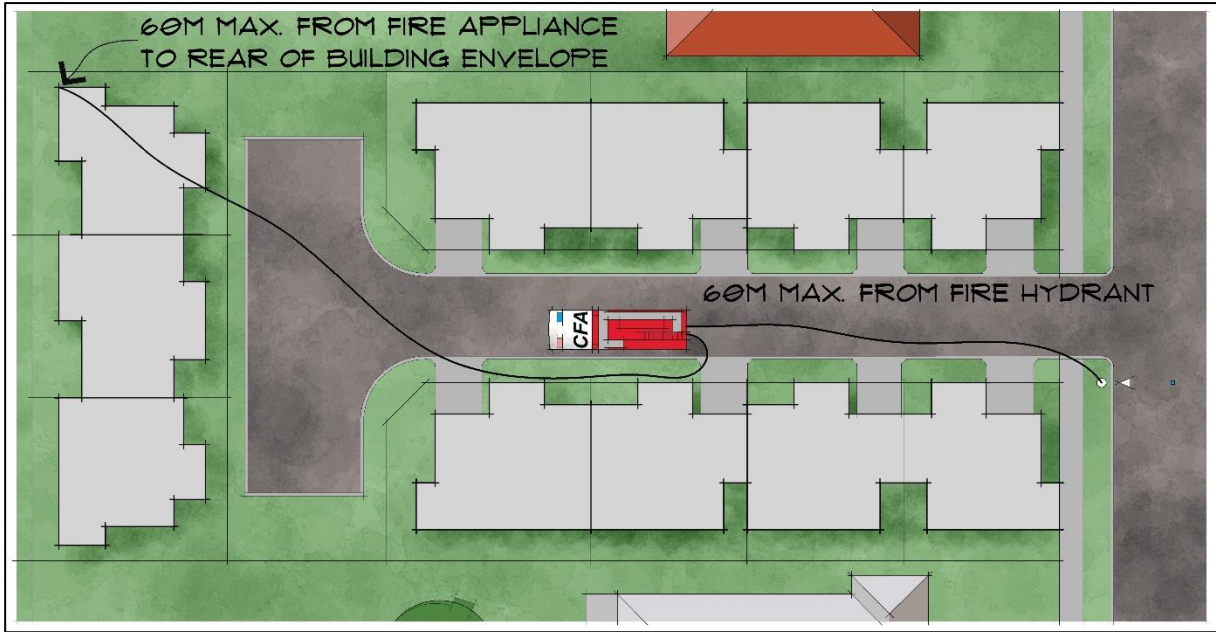
This distance is derived by adding 60 m from the hydrant to the hardstand, plus 60 m from the appliance to the rear of the allotment or building envelope.

This distance must be measured as a hose would be laid. That is along the ground and around fences and the like.

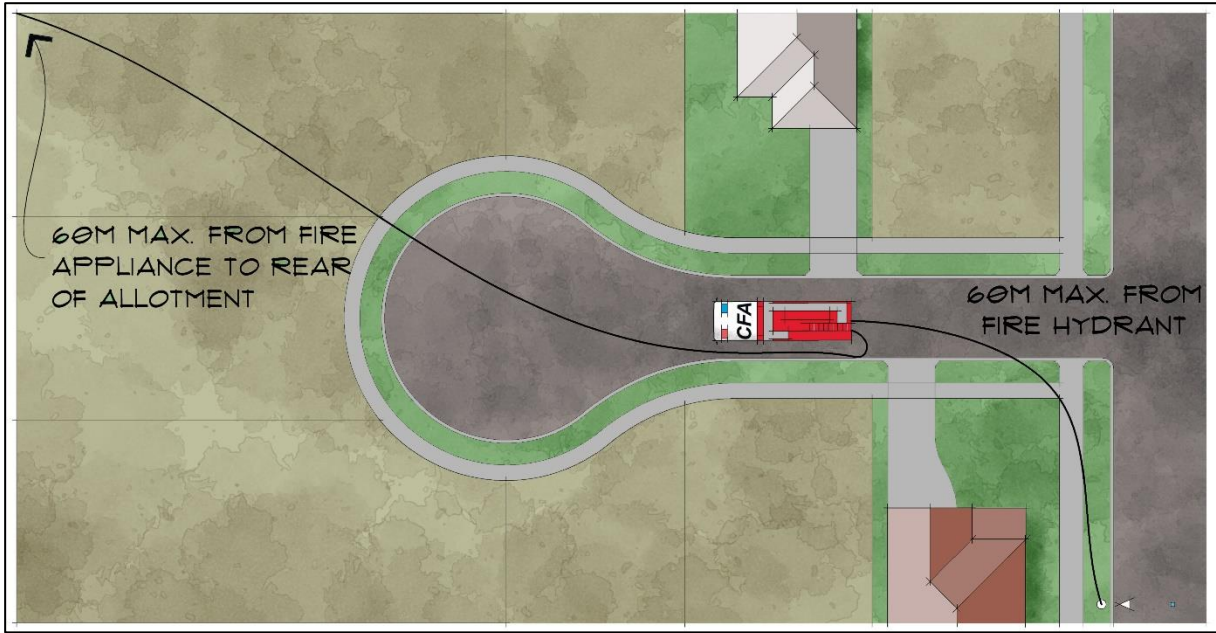


**Firefighting operations are restricted by hydraulics and beyond 60 m efficiency and effectiveness begins to deteriorate significantly. This also considers operational requirements and firefighter safety.**

Fire hydrants need to also be located so that they are no more than 200 metres apart and reasonable clearance is provided around them from obstructions (gardens, fences, bollards and the like).

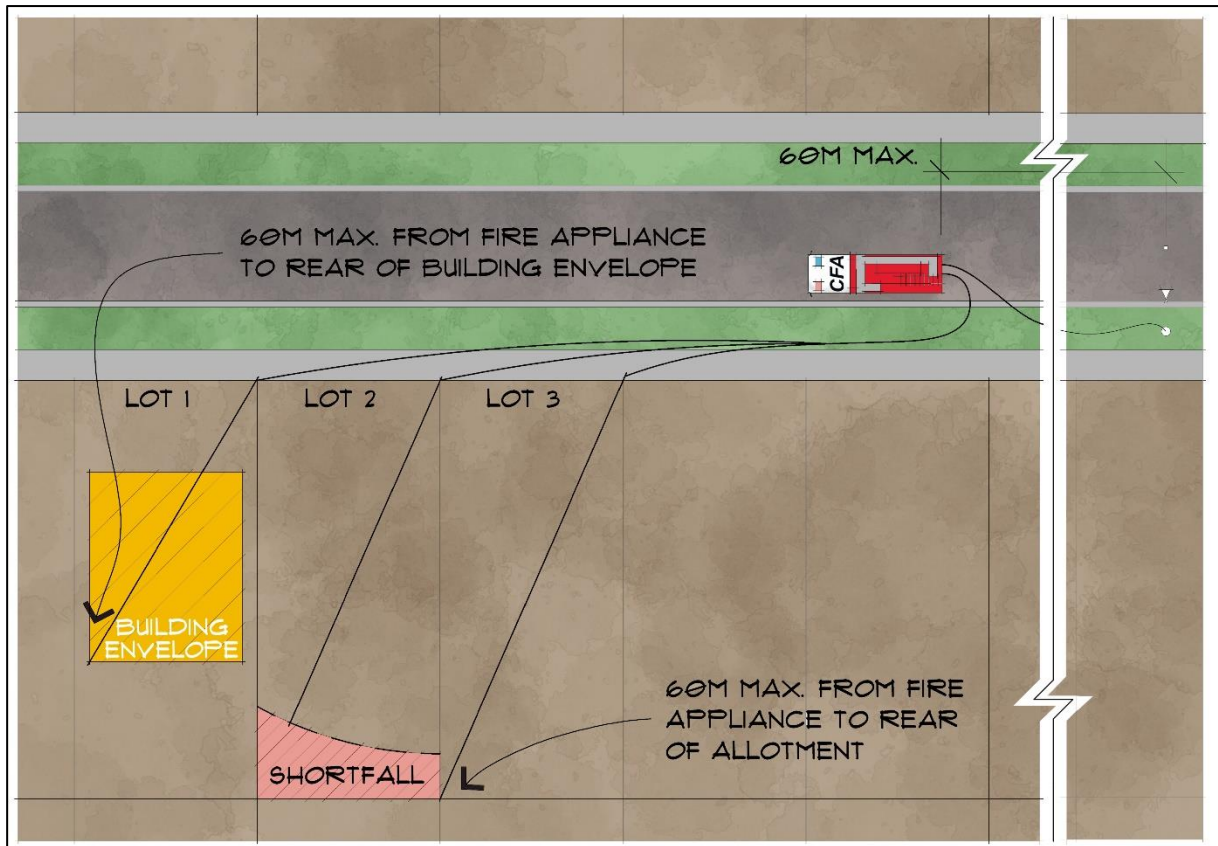


**Figure 9:** If building envelopes (or buildings) are provided.



**Figure 10:** Hydrant coverage the rear of the allotment.





**Figure 11:** Hydrant coverage scenarios.

Figure 11 shows three common scenarios:

- As the rear of the allotment is not within 120 m of the hydrant, Lot 1 achieves hydrant coverage by having a building envelope that **is** within 120 m of the hydrant.
- Lot 2 **does not** achieve hydrant coverage. A solution may be to provide a building envelope or install a closer street hydrant to provide compliant coverage.
- The rear boundary of Lot 3 is within 120 m of the street hydrant and achieves coverage.

Care should be taken at the design stage to ensure that the proposed lot layout will enable hydrant coverage to be achieved.

Fire hydrants must be identified as specified in the CFA publication titled “Identification of street Hydrants for Firefighting Purposes” (available at <http://www.cfa.vic.gov.au>).



### **Areas without reticulated water**

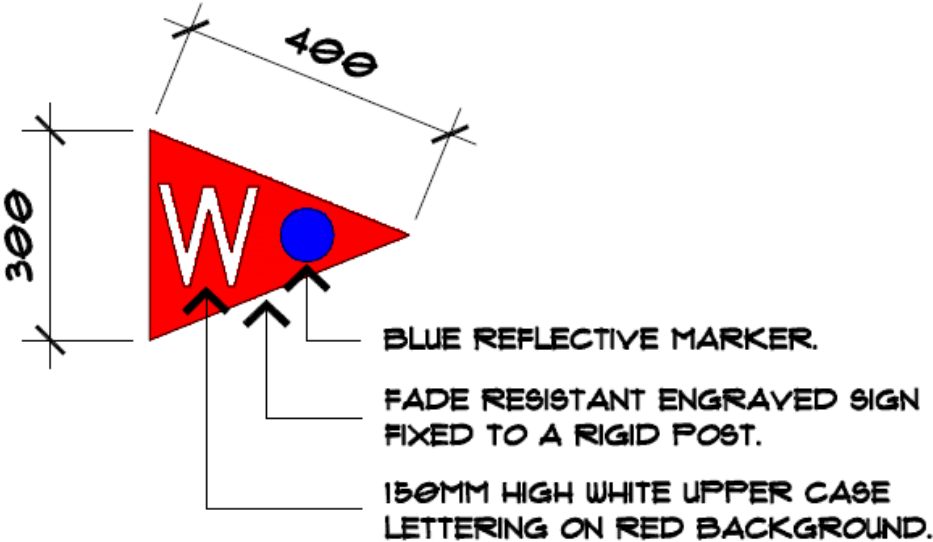
A water tank should be provided within 60 m from the rear of all buildings, building envelopes or lots. The minimum requirement under the Bushfire Management Overlay and other parts of the Victoria Planning Provisions is a 10,000-litre (per dwelling) water supply for firefighting purposes, stored in an above ground water tank constructed of concrete or metal.

Water is the primary fire suppression tool and critical to support search and rescue. In areas without reticulated water it may be difficult to secure water, so it is important that an adequate water supply is readily available for firefighting purposes. While 10,000 litres may be sufficient to suppress embers around an individual house from a bushfire, it may not allow firefighters to conduct search and rescue operations or contain a structure fire.

CFA recommends a minimum capacity of 20,000 litres should be provided for structural firefighting purposes where a hydrant is not available. This would give firefighters approximately 30 minutes of water supply to begin search and rescue and firefighting operations (based on two branches/hoses operating) and provide enough time to respond with extra appliances to supply additional water.

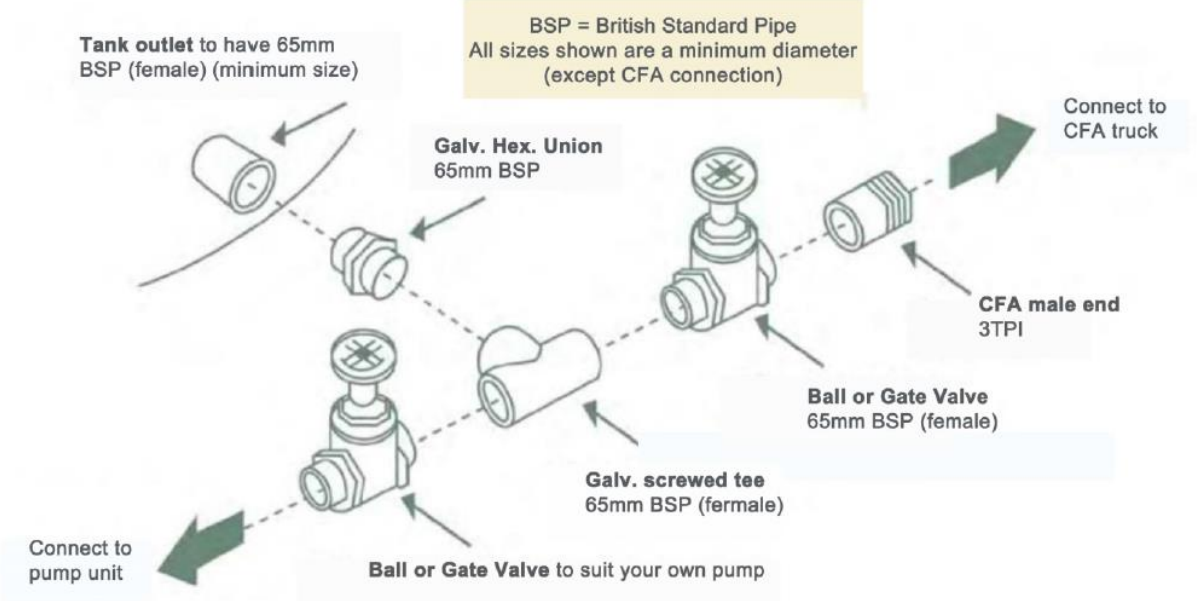
Firefighting water can be stored within the same tank as domestic water. However, the outlet for domestic use should be located above the firefighting outlet to ensure the effective capacity of dedicated water for firefighting purposes is provided.

The location of the water tank should be visible from the direction of vehicle approach to the property, or the following signage must be provided pointing to its location.



The fire water tank should include a ball or gate valve and a CFA male 64 mm 3 thread per inch fitting.

**!** It is also recommended that a separate outlet for firefighting for the use of the occupants of the building. This is particularly important in areas which may be at risk from bushfire.

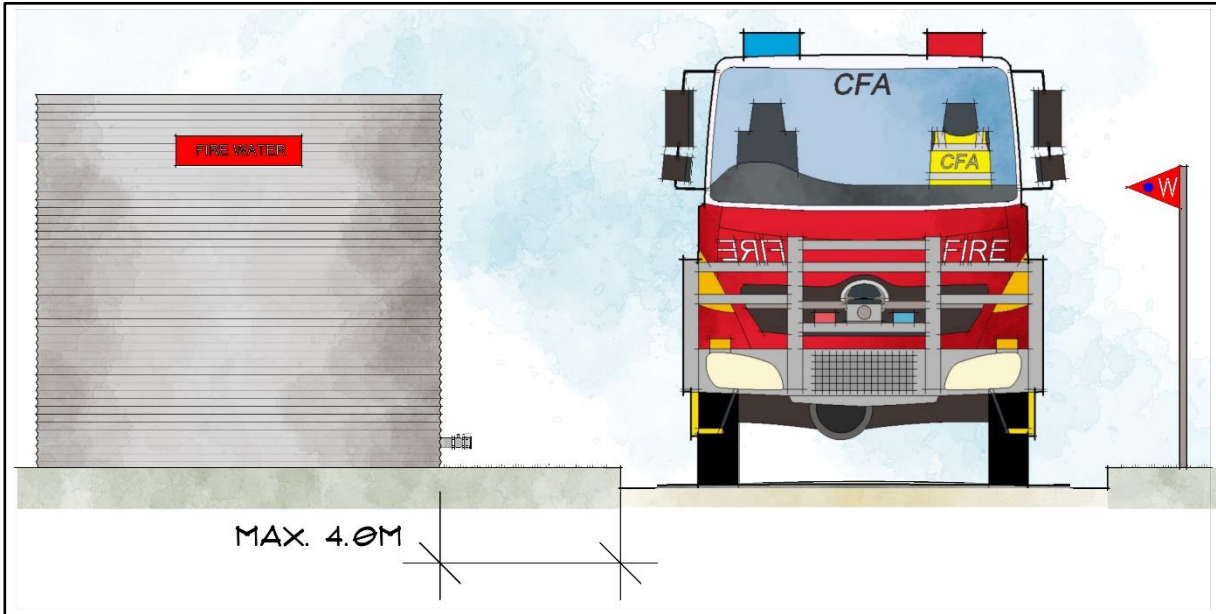


The water tank should include signage on it stating “FIRE WATER” in a colour that contrasts with the tank with lettering that is at least 50 mm in height.



A fire truck must be able to park at a hardstand that is within 4 m of the CFA outlet connected to the water tank (**please refer to Part A for access requirements**).

The distance from the hardstand to the water tank outlet must be measured across the ground as a hose would be laid.



**Figure 12:** Maximum distance from hardstand to outlet.


### Remote outlets

Sometimes a fire truck cannot get within 4 m of the outlet for a variety of reasons including siting constraints, site slope, existing buildings and the like. In these circumstances a remote outlet might be a suitable option.

Further guidance on the design and installation of a remote outlet can be found in the CFA publication titled “Guidelines for remote outlets on water tanks in the Bushfire Management Overlay” (available at <http://www.cfa.vic.gov.au>).



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## Upper Avoca River Flood Investigation Flood Warning Feasibility Assessment Report

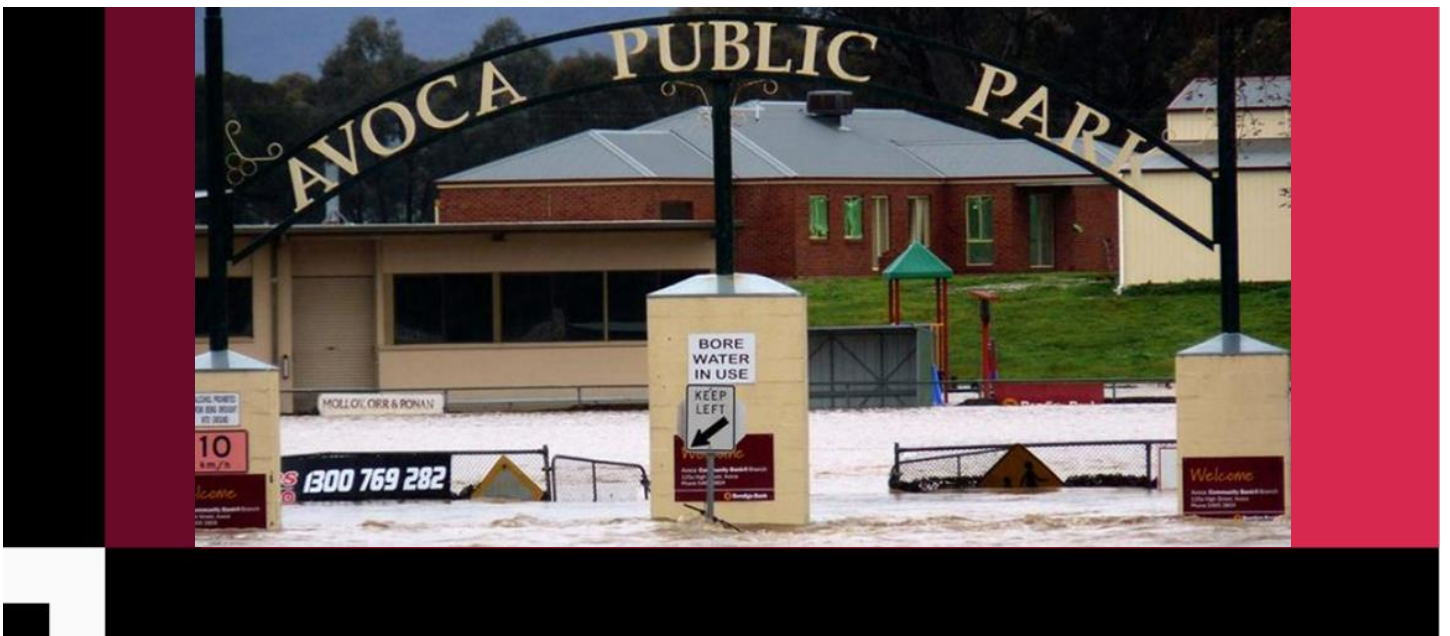
IS297900-RPT-006-Warning-RevB

14 May 2021

Pyrenees Shire Council



PYRENEES  
SHIRE



Cover image courtesy of ABC (2010), Avoca River floods in Victoria, <https://www.abc.net.au/news/2010-09-04/avoca-river-floods-in-victoria/2248938>

## Upper Avoca River Flood Investigation

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## Definitions

<b>Annual Exceedance Probability (AEP)</b>	The chance of a flood of a given size (or larger) occurring in any one year, usually expressed as a percentage. For example, if a peak flood discharge of 500 cubic metres per second has an AEP of five per cent, it means that there is a five per cent chance (i.e. a 1 in 20 chance) of a peak discharge of 500 cubic metres per second being equalled or exceeded in any one year (also see average recurrence interval).
<b>Australian Height Datum (AHD)</b>	National survey datum corresponding to about mean sea level.
<b>Average Annual Damages (AAD)</b>	The average annual damage is the average cost in dollars per year that would occur in a particular area from flooding over a long period of time.
<b>Average Recurrence Interval (ARI)</b>	The long-term average number of years between the occurrence of a flood as big as or larger than the selected event. For example, flood with a discharge as great as or greater than the 20 year ARI flood event will occur on average once every 20 years. ARI is another way of expressing the likelihood of occurrence of a flood event.
<b>Benefit-cost ratio</b>	Measure used to assess the economic viability of a mitigation measure.
<b>Catchment</b>	The catchment at a particular point is the area of land that drains to that point.
<b>Design flood</b>	A theoretical flood representing a specific likelihood of occurrence (for example the 1% AEP flood).
<b>Flash flood</b>	Flooding within 6 hours of causal rain.
<b>Flood behaviour</b>	The pattern / characteristics / nature of a flood.
<b>Flood depth</b>	The height or elevation of floodwaters above ground level.
<b>Flood level</b>	The height or elevation of floodwaters relative to a datum (typically the Australian Height Datum).
<b>Hydraulics</b>	The term given to the study of water flow in rivers, estuaries and coastal systems.
<b>Hydrograph</b>	A graph showing how a river or creek's discharge changes with time.
<b>Hydrology</b>	The term given to the study of the rainfall-runoff process in catchments.
<b>LiDAR</b>	Remote (airplane) sensing method that uses light in the form of a pulsed laser to measure distance to the Earth. This is used to generate detailed 3D topographical information across an area.
<b>Peak flood level, flow or velocity</b>	The maximum flood level, flow or velocity occurring during a flood event at a particular location.
<b>RORB</b>	Runoff routing computer model for hydrologic analysis of catchment runoff.
<b>Total Flood Warning System (TFWS)</b>	A flood warning system made up of the following components; Data, Forecast, Modelling, Alert and Response (as defined by the Victorian Floodplain Management Strategy).
<b>TUFLOW</b>	Fully two-dimensional and one-dimensional unsteady flow hydraulic computer modelling software.
<b>Velocity</b>	The speed at which the floodwaters are moving. Typically, modelled velocities in a river or creek are quoted as the depth and width averaged

velocity, i.e. the average velocity across the whole river or creek section if a one-dimensional solution is used; and depth average if a two-dimensional solution is used.

## Abbreviations

<b>AAD</b>	Average Annual Damages
<b>ARR 2019</b>	2019 release of Australian Rainfall & Runoff
<b>BCR</b>	Benefit-cost ratio
<b>BoM</b>	Bureau of Meteorology
<b>Council</b>	Pyrenees Shire Council
<b>CMA</b>	Catchment Management Authority
<b>DELWP</b>	Department of Environment, Land, Water and Planning
<b>DEM</b>	Digital Elevation Model
<b>DTM</b>	Digital Terrain Model
<b>EIA</b>	Effective Impervious Area
<b>EMV</b>	Emergency Management Victoria
<b>ERTS</b>	Event-Reporting Radio Telemetry System
<b>GSAM</b>	Generalised Southeast Australia Storm Method
<b>GSDM</b>	Generalised Short-Duration Method
<b>m AHD</b>	meters Australian Height Datum
<b>FFA</b>	At-Site Flood Frequency Analysis
<b>FFWS</b>	Flash Flood Warning System
<b>LiDAR</b>	Light Detection and Ranging
<b>LGA</b>	Local Government Area
<b>m/s</b>	Metres per second (a measure of speed / velocity).
<b>m<sup>3</sup>/s</b>	Cubic metres per second (a measure of flow).
<b>MFEP</b>	Municipal Flood Emergency Plan
<b>NCCMA</b>	North Central Catchment Management Authority
<b>NDRGS</b>	Natural Disaster Resilience Grant Scheme
<b>PALS</b>	Portable Automated Logger System
<b>PMF</b>	Probable Maximum Flood
<b>PMP</b>	Probable Maximum Precipitation
<b>PRG</b>	Project Reference Group
<b>RCP</b>	Representative Concentration Pathway
<b>RFFE</b>	Regional Flood Frequency Estimate
<b>RRV</b>	Regional Roads Victoria
<b>The Investigation</b>	Upper Avoca River Flood Investigation
<b>The Catchment</b>	Upper Avoca River catchment to the Investigation downstream boundary
<b>TIA</b>	Total Impervious Area



**TFWS**                      Total Flood Warning System

# 1. Introduction

A flood warning or alerting system does not currently exist for the Upper Avoca River other than in a very generalised form. For example, all communities in the area receive the Bureau of Meteorology's Flood Watch and Severe Weather warnings, as well as messaging from VICSES. While these warnings and messages are important, they have been described as too broad and not very useful for the Investigation area.

As an input to development of the North Central Regional Floodplain Management Strategy 2018-2028 (NCCMA 2018), the service level of the Total Flood Warning System (TFWS) in place for upper Avoca communities (i.e. Amphitheatre, Avoca and Natte Yallock) was evaluated for adequacy against the assessed flood risk level. It was determined that the service levels for these communities was lower than appropriate for the flood risk but that development of detailed flood maps that were then disseminated to the relevant communities, and the collation of flood intelligence (e.g. consequences and likelihoods) would be the most effective response to address the gap.

Some of the essential building blocks (elements) of a TFWS have been delivered by other outputs from the Upper Avoca River Flood Investigation (The Investigation). These include:

- Flood inundation and related mapping
- Updated Municipal Flood Emergency Plans (MFEPs) for the Pyrenees Shire Council (and Central Goldfields Shire Council) with flood consequence information for the Upper Avoca River
- Indicative flood guidance tools
- Information suitable for inclusion in Local Flood Guides (LFGs)

This Flood Warning Feasibility Assessment Report details flood warning feasibility assessment for the Upper Avoca River and more particularly for the three main townships of Amphitheatre, Avoca and Natte Yallock. It identifies feasible options for improving local capability to act in a timely manner and improving future response to impending floods in the upper catchment, thereby potentially reducing future flood risk through the reduction of consequences. It identifies feasible options for improving local capability to act in a timely manner as well as improving future response to impending floods in the upper catchment, thereby potentially reducing the costs (and consequences) of future flooding. The identified options range from making better use of existing rainfall information in conjunction with deliverables from the Upper Avoca River Flood Investigation (i.e. no / low cost options) through to investment in a monitoring and messaging system with automated system elements outcomes (i.e. an option requiring more substantial investment of time and money to setup and maintain), that if implemented, could lead to more reliable and substantive outcomes. Guidance is provided as to how such a system may operate.

This report builds on the project inception and site visit, data review and validation, and existing conditions flood modelling and mapping tasks of the Investigation as documented in:

- Data Review Report (Jacobs 2020a)
- Flood Modelling Report (Jacobs 2020b)
- Flood Mapping Report (Jacobs 2020c)

## 1.1 Investigation background

The Upper Avoca River area has a long history of flooding, including experiencing three significant flood events in the recent past: 2010, 2011 and 2016. However, to date, there has not been a detailed flood assessment completed for this area. To address this a flood study of the Upper Avoca River to inform flood intelligence and planning scheme maps for Amphitheatre, Avoca and Natte Yallock and the rural areas in between was identified as a high regional priority in the North Central Regional Floodplain Management Strategy 2018-2028 (NCCMA 2018).

In response the Pyrenees Shire Council (Council) has received funding from the Victorian and Commonwealth Governments through the Natural Disaster Resilience Grants Scheme (NDGRS), and in partnership with the North Central Catchment Management Authority (NCCMA) have engaged Jacobs to undertake the Upper Avoca River Flood Investigation.

The focus of this Investigation is to assess riverine flooding in the Upper Avoca River catchment with the main objectives to:

- Define flood related controls in the Pyrenees Shire Council Planning Scheme
- Develop flood intelligence products and inform emergency response planning
- Investigate opportunities for flood mitigation works and activities
- Assist in the preparation of community flood awareness and education products
- Assess feasibility for improved flood warning arrangements – the focus of this report
- Support the assessment of flood risk for insurance purposes

## 1.2 Catchment and investigation area description

The Investigation area (Figure 1.1) is located in the upper reaches of the Avoca River where it flows from the hills of the Great Dividing Range ranges onto the Avoca River floodplain where it remains relatively confined until it breaks out into the wider floodplain north of Charlton. To Archdale Junction (the downstream limit of the Investigation), there is contributing catchment of approximately 1,000 km<sup>2</sup>.

The Avoca River is the primary waterway in the catchment area, forming in the hills south of Amphitheatre and flowing north, with several tributaries that join it prior to Archdale Junction, including:

- |                     |                    |                      |
|---------------------|--------------------|----------------------|
| ▪ Homebush Creek    | ▪ Wild Dog Creek   | ▪ Rutherford Creek   |
| ▪ Brown Hill Creek  | ▪ Sardine Gully    | ▪ Green-hill Creek   |
| ▪ Cherry Tree Creek | ▪ Fiddlers Creek   | ▪ Forrest Creek      |
| ▪ Middle Creek      | ▪ Number One Creek | ▪ Glenlogie Creek    |
| ▪ Redbank Creek     | ▪ Number Two Creek | ▪ Amphitheatre Creek |
| ▪ Mountain Creek    | ▪ Sugarloaf Creek  |                      |

In total the Investigation covers an area of approximately 300 km<sup>2</sup> from upstream of Amphitheatre to Archdale Junction, covering the townships of Amphitheatre, Avoca and Natte Yallock as shown in Figure 1.1. These towns have populations of 248, 1,193 and 188 respectively as of the 2016 census. High-resolution modelling was undertaken for the townships (which are referred to as town models), with coarser modelling adopted for the broader area (which is referred to as the regional model).



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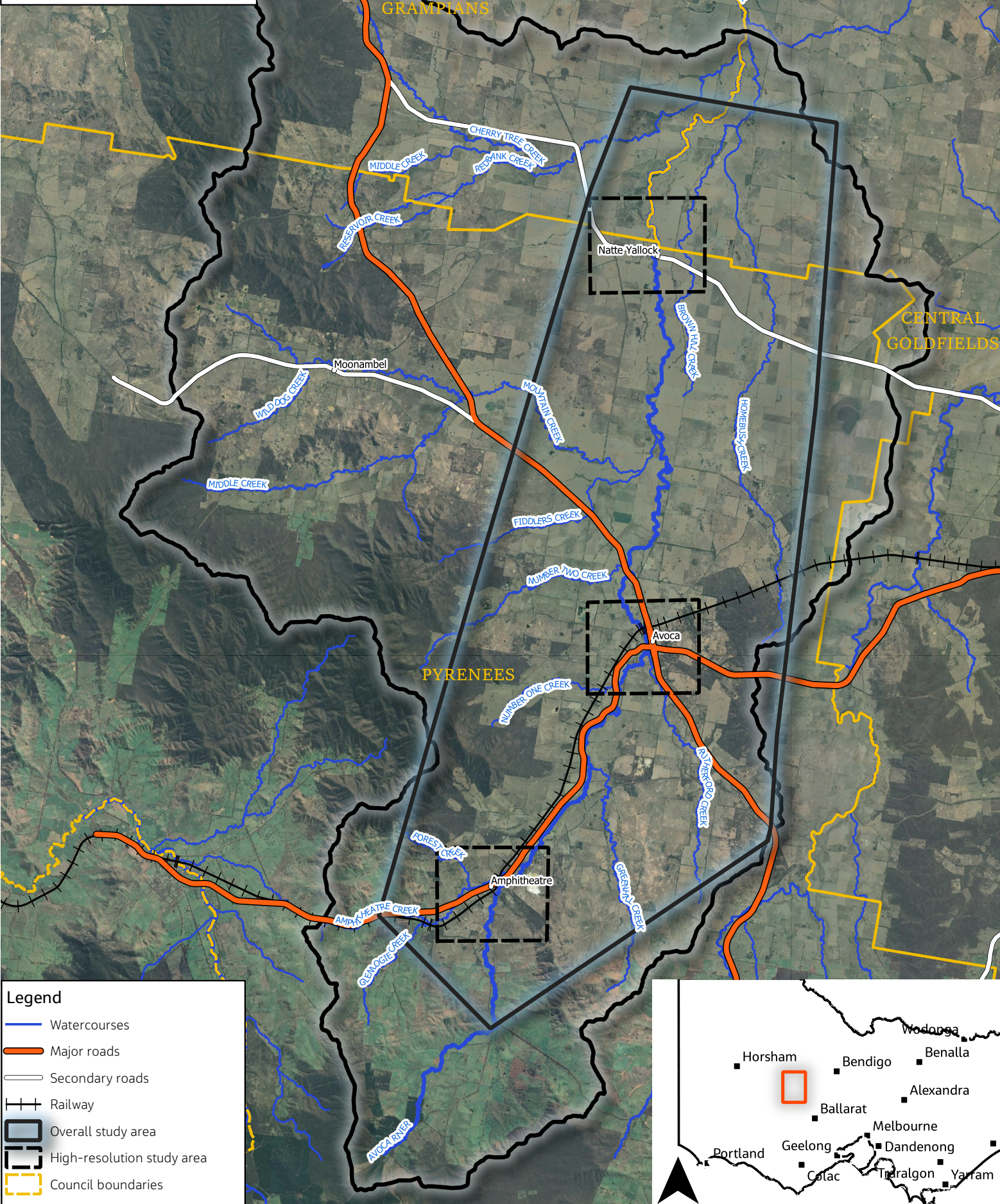
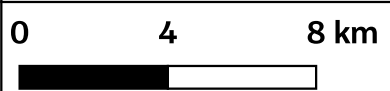


Figure 1.1: Upper Avoca Flood Investigation Overview



## 2. Estimated effective flood warning time

How quickly a catchment responds to rain and thus how much flood warning time is available varies significantly for individual flood events as a result of several factors including:

- Storm characteristics - the time distribution of rainfall within a storm and the location of a storm within a catchment noting also that flooding from intense short duration storms is likely to develop more quickly than from longer less intense storms
- Catchment and watercourse antecedent conditions - floods tend to develop quicker on wetter catchments and generally travel quicker on a "wet" watercourse than on a 'dry' watercourse (e.g. the first flood after a dry period will usually develop and travel more slowly than the second flood in a series of floods due to the filling of soil stores, off-stream storage and related factors)
- Size of flood - big floods tend to travel faster than small floods due in part to greater stream energy

Having regard for the above, it is suggested in the Flood Modelling Report (Jacobs, 2020b) that the response time for a major flood at Amphitheatre and Avoca is estimated at around 5 to 7 hours and around 10 to 13 hours at Natte Yallock. Response times are estimated to be a few hours longer for smaller flood events. This places Amphitheatre and Avoca close to the flash flood category as per Bureau of Meteorology (BoM) definitions in BoM (1996) and as discussed in VFWCC (2001) and BoM (2020).

Under severe flood conditions and having regard for the current consequences of flooding in the upper catchment, the effective flood warning time for the Upper Avoca River communities is currently estimated to be around 2 to 4 hours as in effect there are no flood warning system elements in place.

With the benefit of the indicative flood guidance tools provided in Appendix C4 of the Pyrenees Municipal Flood Emergency Plan (MFEP) in concert with the flood intelligence and mapping delivered by this study, it is estimated that effective flood warning time could be extended by at least 4 hours for Upper Avoca River communities. The indicative flood guidance tools are included herein as Figure 5.1 through to Figure 5.4.

In view of the estimated effective flood warning time, emergency services driven flood response actions across the Upper Avoca River in the lead up to flooding are currently likely to be severely limited. There is insufficient time available to mobilise emergency services, for roads to be closed and for buildings most at risk of being flooded over-floor to be prepared (e.g. relocate or lift valuables and other items, sandbag openings, etc). Even with the benefit of the deliverables and additional available time that could result from this study, it is suggested that with due regard for other regional flooding issues and the need to prioritise calls for assistance, there would be limited opportunity to mobilise emergency services to assist local flood response (i.e. damage reducing) activities. Residents however, armed with the indicative flood guidance tools and ready access to rain and water level data, may be able to undertake appropriate actions aimed at reducing damage and risk to life. Key to this is awareness of the flood risk, recognition of the likelihood and scale of imminent flooding, and knowing what to do to reduce damage and risk.

While not canvassed with VICSES, Emergency Management Victoria (EMV) or BoM, it is suggested that there may also be future opportunities, in the context of successful proof-of-concept trials at Natimuk (see Section 4.1), for a VicEmergency warning of likely flooding to be issued for the Upper Avoca River communities during severe rain events. However, those opportunities are unlikely to be available until after successful implementation of protocols and after some adjustments to how data from local rain and river gauges is managed. The VicEmergency warning could be augmented by an Emergency Alert if it was assessed that there was a risk to life.

### **3. Flood warning systems**

Flood warning is an effective and credible non-structural flood mitigation or flood risk reduction measure. Successful system implementation requires attention to all system elements as well as the striking of a balance between each of those elements appropriate for the community it will serve. A “one size fits all” or standard approach is not appropriate. What works for one community may not necessarily be appropriate for another.

In relation to the Upper Avoca River, any system established must meet the needs of the at-risk community with appropriate emphasis on the various system elements while also accounting for the constraints imposed by the effective flood warning time. Consideration of the benefit to cost ratio is also important. This is because to secure funding, the benefits of establishing a flood warning system would ideally outweigh the costs.

#### **3.1 Aim and function**

Put simply, flood warning systems provide:

- A means of gathering information about impending floods
- Communicating that information to those who need it (those at risk)
- Facilitating an effective and timely response

Thus, flood warning systems aim to enable and persuade people and organisations to take timely action to increase personal safety and to reduce the damage caused by flooding. Key to this for those at risk is:

- The availability of information about flood risk
- Easy access to relevant and timely real time rainfall and water level data/information
- Knowing what needs to be done in the lead up to and during a flood event

Flood warning systems (and investments in their implementation) that over-emphasise the collection of input data and/or the production of (highly accurate) flood forecasts relative to the attention given to other elements, often fail to fully meet the needs of the at-risk communities they have been set up to serve. Put another way, it is essential that those parts of the flood warning system that work to build resilience within a community while also increasing warning lead time are given due emphasis and attention.

#### **3.2 The Total Flood Warning System concept**

In 1995 the Australian Emergency Management Institute published a best-practice manual entitled Flood Warning: an Australian Guide (AEMI 1995), and in so doing, introduced the concept of the TFWS. While the original manual has been updated and republished as Manual 21 of the Australian Disaster Resilience Handbook Collection (AIDR 2009), the concepts, practices and key messages from the original manual endure.

The Victorian Floodplain Management Strategy (DELWP 2016) also promotes the TFWS concept and provides clarification on roles and responsibilities for system development and operation in Victoria.

#### **3.3 Total Flood Warning System building blocks**

An effective flood warning system is made up of several building blocks depicted in Figure 3.1. Each building block represents an element of the TFWS.



Figure 3.1: Elements of the Total Flood Warning System (DELWP 2016)

An appropriately developed and integrated system considers not only the production of a timely and informative alert of a potential flood, but also the efficient dissemination of that alert to those who need to respond in an appropriate manner, most important of whom are the threatened community. A community that is informed, flood aware and prepared (i.e. flood resilient) is more likely to receive the full benefits of a warning system.

It follows that actions to improve flood response and community flood awareness using technically sound data (such as that produced by the Investigation) will by themselves result in some reduction in flood losses.

### 3.4 FLARE

As identified in Section 2, parts of the Upper Avoca River are subject to flash flooding. While BoM does not currently provide flash flood warning services, it has developed FLARE, the national flash flood warning advisory resource. FLARE acts as a repository of technical information and guidance in relation to flash flood warning systems (FFWS). It provides:

- Historical information on flash flooding
- An overview of some of the systems operating in Australia (i.e. case studies)
- Details of BoM services available to support flash flood warning systems
- Some suggestions on flash flood warning system elements
- Selected advice on relevant standards and guidelines (e.g. on data sensing and measurement, telemetry, data collection systems, metadata management, etc)
- An office hours help line to respond to questions

A guide to flash flood warning system considerations and design is also provided, as a supplement to jurisdictional approaches and methods. The guide steps the user through the use of the FLARE resources as part of system design (refer to Figure 3 2). FLARE was consulted during preparation of this flood warning feasibility assessment.

Step by Step Guidance



The Step by Step Guidance section of FLARE highlights important considerations for the initial planning and decision making of setting up a flash flood warning system (Flash Flood WS).

Figure 3.2: Guide to FFWS design (FLARE)



## 4. Task for the Upper Avoca River

The North Central Regional Floodplain Management Strategy 2018-2028 proposes a strategic direction that articulates the need for community and regional resilience as a key and sustainable response to flood risk. This is consistent with State and Federal Government policy. This report and the suggested approach to flood warning for the Upper Avoca River catchment community is similarly consistent. It is aimed at a system that will provide information to enable individuals to make informed decisions about risk and what they need to do. The emphasis is therefore on “what works best for communities in the Upper Avoca River catchment” with due regard for flood risk, available flood warning and response times, available rain and water level data, and the funding and other responsibilities associated with implementing and maintaining elements of a (flash) flood warning system.

The analyses that underpin the North Central Regional Floodplain Management Strategy 2018-2028, identified the need the Investigation, in part, deliver detailed flood maps and inform flood intelligence. The analyses also had regard for:

- The existing rain and water level data collection network and opportunities for regional improvements
- Access to locally relevant near real-time flood information and improved methods of sharing that information
- Improved local flood awareness as a result of LFGs and ready access to information about local and regional flooding consequences
- Opportunities to update the Planning Scheme to better reflect what is known about flooding across the region

The current study shows that out-of-bank flows and flooding of roads commences during quite frequent floods across the Upper Avoca River catchment. It also shows that over-floor flooding of dwellings is not an issue at Amphitheatre, does not occur until near the 2% AEP flood at Avoca but occurs during floods more frequent than the 20% AEP event at Natte Yallock. Depths and velocities within the main channels of the area’s streams, particularly through Amphitheatre and Avoca, do present as high (or greater) hazard from quite frequent events. Flood depths and velocities within the overbank floodplain (including through the townships) are in general, low hazard. The exception to this is a broad area of high hazard flooding immediately to the west of the main township area of Natte Yallock that becomes wider as flood severity increases.

### 4.1 Policy and strategy considerations

The division of responsibilities associated with the establishment, maintenance and operation of flood warning systems as documented in VFWCC (2001) have been endorsed by the relevant Ministers at both State and Federal level. More recent developments have seen the BoM establish a Service Level Specification (SLS) (BoM, 2020) that details the flood forecast and warning service BoM will provide for specific locations across the State. The SLS is updated as data collection network configurations and designations, and flood forecasting capabilities change. The BoM has established a fee-for-service approach to the development (on a priority basis) of flood forecasting tools for locations not included in the SLS (see below). In relation to flash flood warning services, BoM will continue to provide generalised warnings of weather conditions likely to lead to flash flooding but it is understood that there are no current plans to provide flash flood warnings for specific streams or locations.

The Victorian Floodplain Management Strategy (DELWP 2016) provides clarification on roles and responsibilities for TFWS development and operation in Victoria. Policy 16a is directed at flood warning in general while Policy 16d is directed specifically at flash flooding.

**Victorian Floodplain Management Strategy Policy 16a** (outlines the future arrangements for flood warnings in Victoria):

- BoM will develop new flood prediction services using a cost-recovery model that involves DELWP covering the capital cost of initial model development and BoM the cost of operating, maintaining and continually improving those models.

- Existing flood prediction services will continue to be operated, maintained and improved by BoM.
- Where a flood study identifies the need for new rain or stream monitoring gauges to support a TFWS for a community within Melbourne Water's region, Melbourne Water will cover the capital and maintenance costs of those gauges.
- Where a flood study or regional floodplain management strategy outside Melbourne Water's region identifies the need for a TFWS and that service has community support, the capital costs for new rain or stream monitoring gauges will be shared between the Victorian and Australian Governments. The local community, through its Local Government Area (LGA), will fund ongoing maintenance costs for the gauges.
- Where existing rain and stream monitoring gauges are providing flood warning services, the Victorian Government expects existing cost-sharing arrangements to continue until a regional floodplain management strategy or local flood study assesses the need for a TFWS service.
- Where existing gauges are assessed as being an essential component of a TFWS, the costs of maintaining those gauges will be shared between the LGA and the CMA if it is also used for water quality monitoring, or with a water corporation if it is also used for water resource assessments. In some cases, the costs may be shared between all three agencies.

#### Policy 16d:

- The CMAs and Melbourne Water, with the support of VICSES and LGAs, will progressively identify areas with a history of flash flooding and include them in their Regional Floodplain Management Strategies and implementation plans.
- Cost-sharing arrangements for flash flood warnings will be the same as for riverine flooding (Policy 16a).

A flood warning system established for a stream or location considered to be subject to flash flooding is, in general terms, the responsibility of the LGA. This includes the installation, operation and maintenance of the technical elements. BoM will maintain delivery of existing severe weather and riverine flood warning related services. Delivery on other TFWS elements including alerting / warning, the development and application of flood response plans as well as flood education and awareness programs, is a shared state and local government responsibility.

Looking ahead and as an out-working from the Services Standardisation Project, BoM has been working in Victoria with EMV and VICSES on scoping and trialling an Automated Alerting Project at Natimuk. The project involves BoM systems automatically identifying exceedance of critical levels on data ingested from selected telemetered rain and river gauges and alerting of that exceedance to EMV. It is understood that those alerts then generate warnings of potential or actual river level rises as a push to the VicEmergency website and App and as more formal public issue warnings from VICSES. The work offers exciting potential to alert and warn at-risk communities of developing (flash) flood events. While it is not suggested that the project offers a ready-made solution for Upper Avoca River catchment communities, subject to further development and adoption as outcomes from the proof-of-concept trials with the Natimuk community, the future potential for benefits to communities in the Upper Avoca River catchment and elsewhere is evident.

There are a number of decisions required in relation to how each of the TFWS elements can be developed and implemented for the Upper Avoca River communities. Regardless, the main messages from the 2005 Flood Warning Service Development Plan for Victoria (VFWCC 2005) remain valid. Those applicable to the Upper Avoca River include:

- Making existing data and information / flood intelligence easily accessible to the at-risk community
- Assisting at-risk communities use that data and intelligence (for example, personalised "what does it mean for me" letters, pamphlets and related information)
- Developing and providing tools that add value to or drag value from available data and intelligence (e.g. indicative flood guidance tools)

- Developing a (local) means of providing an indication of likely flooding with some lead time for the many communities for which the BoM does not currently provide a flood warning service
- Driving maximum value from flood mapping and other study outputs for local community benefit
- Focussing on delivering and / or making available those things that will achieve a reduction in damages (i.e. focussing on facilitating the availability of relevant information with some lead-time and a degree of accuracy and consistency)
- Providing the data, information and indicative flood guidance tools to enable at-risk communities build resilience

## **4.2 The challenge for the Upper Avoca River communities**

In view of what TFWS elements have been delivered by the current study (see Section 1), the key issue for the Upper Avoca River communities is how a potential flood will be detected ahead of the onset of flooding and how the at-risk communities of Amphitheatre, Avoca and Natte Yallock will be alerted, ideally with sufficient lead time to enable completion of effective response actions.

A range of systems, equipment and approaches are available. The dilemma is “which of these are appropriate and sufficient” given that the time between the beginning of heavy rain and the start of water level rises is estimated (see Section 2) at around 5 to 7 hours at Amphitheatre and Avoca and at around 10 to 13 hours at Natte Yallock. Flood peaks are estimated to occur around 17, 18 and 24 hours respectively after the start of heavy rain and around 10 to 14 hours after the start of rise. However, roads are inundated, and the first building is flooded over-floor at Natte Yallock well before the peak of a big flood is reached: around 5 to 6 hours after the start of rise. In this situation under current conditions as discussed in Section 2, the effective flood warning time for the Upper Avoca River is estimated to be around 2 to 4 hours.

Allowing time for information to be made available to the community through a flood warning system and for event severity to become evident (say half way through a heavy rain event) plus time required by the community to confirm that information, the time available to respond (i.e. lift furniture and other household goods off the floor, move vehicles and other assets to dry ground, close roads, etc) is estimated to increase to around 6 to 8 hours or more during a large flood and a couple of hours longer for a small flood. With such a short effective warning time and the increase in time estimated to be achievable with a flood warning system, it is apparent that delivery of information to the local community as quickly as possible is paramount.

## **4.3 A TFWS for the Upper Avoca River communities**

Having regard for first level achievements only, gives rise to the following functional requirements:

- Monitoring of rainfall (and perhaps also water levels), possibly for exceedance of triggers that indicate that flooding may occur
- Ready public access to rainfall data
- Alerting the community, VICSES and the Pyrenees and Central Goldfields Shire Councils to potential flooding as quickly as possible
- Ready public access to flood intelligence (i.e. mapping perhaps as soft copies or through an interactive GIS hosted by the Councils and/or NCCMA, flood information card, etc) so that the community can determine likely impacts and individual consequences and initiate appropriate response actions
- Low setup and operating costs with (ideally) a positive benefit-cost ratio
- Acknowledgement and acceptance that a formal flood warning service is unlikely to be provided for the upper catchment communities

Most of the above can be achieved with minimal cost. Opportunities do exist for local governments to seek and secure Commonwealth and State funding to assist with system set up. Operational and ongoing costs do however remain a local government responsibility as outlined in Section 4.2.

## 5. Flood warning system considerations

It is suggested that consideration of a flood warning system for the Amphitheatre, Avoca and Natte Yallock communities should have regard for the:

- Existing rain and water level data collection network
- Potential for rapid development and progress of floods within the upper catchment and the limited lead time available between heavy rain and stream rises
- Character of the flood risk (i.e. rapid onset, roads flooded and impassable, high likelihood of over-floor flooding at Natte Yallock from a little below the 20% AEP flood level)
- Modelling completed as part of the Upper Avoca Flood Investigation which shows that there is minimal benefit in installing water level measuring equipment at Natte Yallock
- Economic metrics (i.e. likely benefit-cost based on consideration of the contribution of avoidable damages to the value of average annual damages)
- Policy drivers and financial implications

The following sections outline how each of the TFWS elements could be addressed to implement an effective, low maintenance, scalable flood warning system that has some utility to the Upper Avoca River communities, at minimal cost.

### 5.1 Data collection and collation

There is a wide range of equipment that will variously collect, collate and/or undertake assessments on rain and/or stream level data and make it available to a single entity or to a group of entities. Data can be pushed either directly from the equipment at site, through a post box or website, or following delivery to a predetermined digital address. The focus here is on what is best for the Upper Avoca River communities.

There are already several permanent and fully operational telemetered rain and stream gauges located in or in close proximity to the Upper Avoca River. There are four stream gauges located in the catchment, and eight relevant rain gauges in or near the catchment. The location of the gauges are shown on Figure 2.4 of the Data Review Report (Jacobs 2020a).

The eight rain gauges are located at:

- Bet Bet Creek @ Lillicur (407288), approx. 10km east of Amphitheatre and approx. 12km south of Avoca
- Doctors Creek @ Lexton Reservoir HG (407326), approx. 17km south-east of Amphitheatre and approx. 22km south of Avoca
- Forrest Creek @ Amphitheatre Reservoir HG (408216), approx. 2km west of Amphitheatre and approx. 13km south-west of Avoca
- Bet Bet Creek @ Norwood (407220), approx. 18km north-east of Avoca and approx. 17km south-east of Natte Yallock
- Bung Bong (408801), approx. 8km south-east of Avoca
- Avoca Water Treatment Plant (408800)
- Avoca (81063), recently brought back online in 2020
- Redbank Creek @ Redbank Reservoir HG (408218), approx. 14km west of Natte Yallock
- Avoca River @ Archdale Junction (408206), approx. 7km north-east of Natte Yallock

The four stream gauges are located at:

- Avoca River @ Amphitheatre (408202)

- Forrest Creek @ Amphitheatre Reservoir HG (408216), approx. 2km west of Amphitheatre and approx. 13km south-west of Avoca (Forrest Creek joins the Avoca River immediately upstream of Amphitheatre)
- Sugarloaf Creek @ Sugarloaf Reservoir HG (408217) (Sugarloaf Creek is a tributary to Number One Creek which joins the Avoca River approx. 1.5km upstream of Avoca)
- Avoca River @ Archdale Junction (408206), approx. 7km north-east (downstream) of Natte Yallock

Data is only publicly available from the BoM website for the following gauges:

- River level at Avoca River @ Archdale Junction at 15 minute intervals
- Rainfall at Bet Bet Creek @ Lillicur, Avoca and Avoca River @ Archdale Junction at 3 hourly intervals
- Rainfall at Bet Bet Creek @ Norwood at 24 hourly intervals

Data from all of the above gauges are available through the Regional Water Monitoring Partnership at 15 minute intervals.

It is suggested that with near real-time access to rainfall data from all eight rain gauges listed above and an indicative flood guidance tool (see Section 5.3) there exists a strong basis exists for a local community-based flood warning system. However, data from those gauges would need to be made publicly available in near real-time (say updated every 15 minutes). The BoM website is an obvious choice to achieve this.

It is suggested that the Pyrenees Shire Council:

- Approach BoM (with support from VICSES, NCCMA, DELWP and the Central Goldfields Shire Council) to request necessary changes to enable near real-time public access to rain data from the above rain gauges and stream gauges via the BoM website (e.g. 15 minute updates).
- Arrange for the installation of a set of staff gauges on the upstream side of the Pyrenees Highway Bridge in Avoca. The staff gauges should be installed such that the gauge boards can be read from the road for small and larger (i.e. 1% AEP) floods so that local residents and emergency services can confirm water levels and rates of rise in the Avoca River.
- As an additional source of information, arrange for the installation of a set of staff gauges on the upstream side of the Sunraysia Highway Bridge downstream from Avoca. The staff gauges should be installed as described in the bullet immediately above.
- Following a successful approach to the BoM regarding data accessibility and in concert with VICSES, consider providing guidance to the upper Avoca communities (through a locally focussed flood awareness brochure or similar) on how to access and interpret data from the various rain and stream gauges together with instruction on the use of that data with the indicative flood guidance tools. Information about other elements of the flood warning system and how it will assist in reducing risk could also be included.
- Consider developing and maintaining a website (and social media) presence for the FWS. As a minimum, this website could contain the indicative flood guidance tools and the associated flood mapping and intelligence outputs from this study.

In addition to the above, consideration was given to installing a set of staff gauges on the upstream side of the Maryborough – St Arnaud Road Bridge. However, the hydraulic modelling undertaken as part of this investigation shows that there is very little difference (approximately 100 mm) in water levels for small and large floods at this bridge. As this difference is too small to allow discrimination between small and large floods and thus facilitate reliable estimates of flood size and likely consequences, there is little value in installing a gauge. The nearest upstream bridge is at the Sunraysia Highway around 3km downstream from the Pyrenees Highway Bridge in Avoca and around 13 km upstream from Natte Yallock but only around 7 km upstream of where breakouts that flow to the west of Natte Yallock begin during large floods. An installation at this bridge has already been included in the suggested list of actions above. An alternative would be to install a new stream gauge station on the approx. 2km section of the Avoca River between where Mountain Creek joins the Avoca River and flood breakouts begin. This would be an expensive undertaking and is unlikely to deliver any

significant additional benefits over a gauge at the Pyrenees Highway Bridge and the indicative flood guidance tools provided in Appendix C4 of the Pyrenees MFEP.

If a greater level of confidence in the likelihood of flooding is required, it is suggested that the Pyrenees Shire Council consider:

- As a first step, purchase of an Event-Reporting Radio Telemetry System (ERTS) river (or rain-river) gauge and its installation on the upstream side of the Pyrenees Highway Bridge in Avoca alongside the staff gauges mentioned above. As above, the Pyrenees Shire Council, with support from VICSES, NCCMA, DELWP and the Central Goldfields Shire Council, would need to approach BoM to provide near real-time public access to data from the gauge via its website.
- As a second step, purchase of an additional ERTS river gauge and its installation on the upstream side of the Sunraysia Highway Bridge downstream from Avoca alongside the staff gauges mentioned in the list above. BoM would need to be approached regarding near real-time public access to the data.
- Alternatively, and instead of ERTS equipment, arranging purchase and installation of different commercially available rain and/or rain-river monitoring equipment (such as DipStik, telemetered cameras) in the locations described in the above bullet. BoM has to date been reluctant to accept such data into their database for website display and archival.
- The addition of “sirens and/or flashing lights” options (triggered by exceedance of pre-set rainfall rates and depths, and river levels and rates of rise) for the automated gauges installed at the bridges as an alternative or additional means of alerting the community to imminent flooding.
- As appropriate and dependent on the monitoring and alerting equipment installed, invite Upper Avoca River residents, along with VICSES, local CFA, Police and Council, to opt-in to receive SMS alert messages direct from installed equipment.
- Provide guidance to the local community (through a locally focussed flood awareness brochure and website) on how to interpret and use available rain and water level data and the indicative flood guidance tools, along with information about the flood warning system and how it will assist in reducing risk.
- Decide whether to establish proposed water level gauges to local datum or to AHD.

Importantly when contemplating the installation of new rain and / or river gauges for flood forecast and warning purposes, current policy on financial contributions and commitments and on ownership, along with the role of the Regional Water Monitoring Partnerships, must be considered. As outlined in Section 4.2, the Victorian Floodplain Management Strategy is clear that capital costs for new rain or stream gauges will be shared between the State and Federal governments but that all ongoing maintenance costs must be met by the local community through the local Council.

While there is the possibility that the two bridge sites identified above could be used as Portable Automated Logger System (PALS) installation sites, catchment response times indicate that in most situations there would be insufficient time to install the equipment ahead of a likely flood. Further, while the PALS would provide useful data for post-event analyses, there are restrictions to public access to the real-time data they provide. Local access to data is key to effective flood warning for the Upper Avoca River. There is also no certainty that PALS would be available when needed as there are a limited number of the units available across the state.

## **5.2 Flood detection and prediction – Indicative Flood Guidance Tools**

### **5.2.1 Capability following completion of this Investigation**

The indicative flood guidance tools provided in Appendix C4 of the Pyrenees MFEP (included here as Figure 5.1 to Figure 5.4) provides some guidance on the likelihood and severity of expected flooding in the Upper Avoca River from upstream of Amphitheatre, through Avoca to downstream of Natte Yallock with an estimated lead time of 6 hours or more during a large flood on a wet catchment.



Rainfall data from the Upper Avoca River and the nearby Bet Bet Creek catchment should be used to drive the rainfall based indicative flood guidance tool at Figure 5.1. However, the tool may not perform to expectations in severe thunderstorm situations, when there are locally heavy falls embedded in more general rain and when the catchment is dry.

River level data from the gauge at Amphitheatre (or from an intermediate location) should be used to drive the water level based indicative flood guidance tools at Figure 5.2, Figure 5.3 and Figure 5.4. It is stressed that these three tools are indicative only. They are underpinned by a number of gross assumptions and tend to be (but will not always be) conservative.

It is suggested that the indicative flood guidance tools are adopted by VICSES, local CFA and Councils for routine use. It is also suggested that the tools and instructions for their use could be shared with the Upper Avoca River communities and key community members instructed on use.

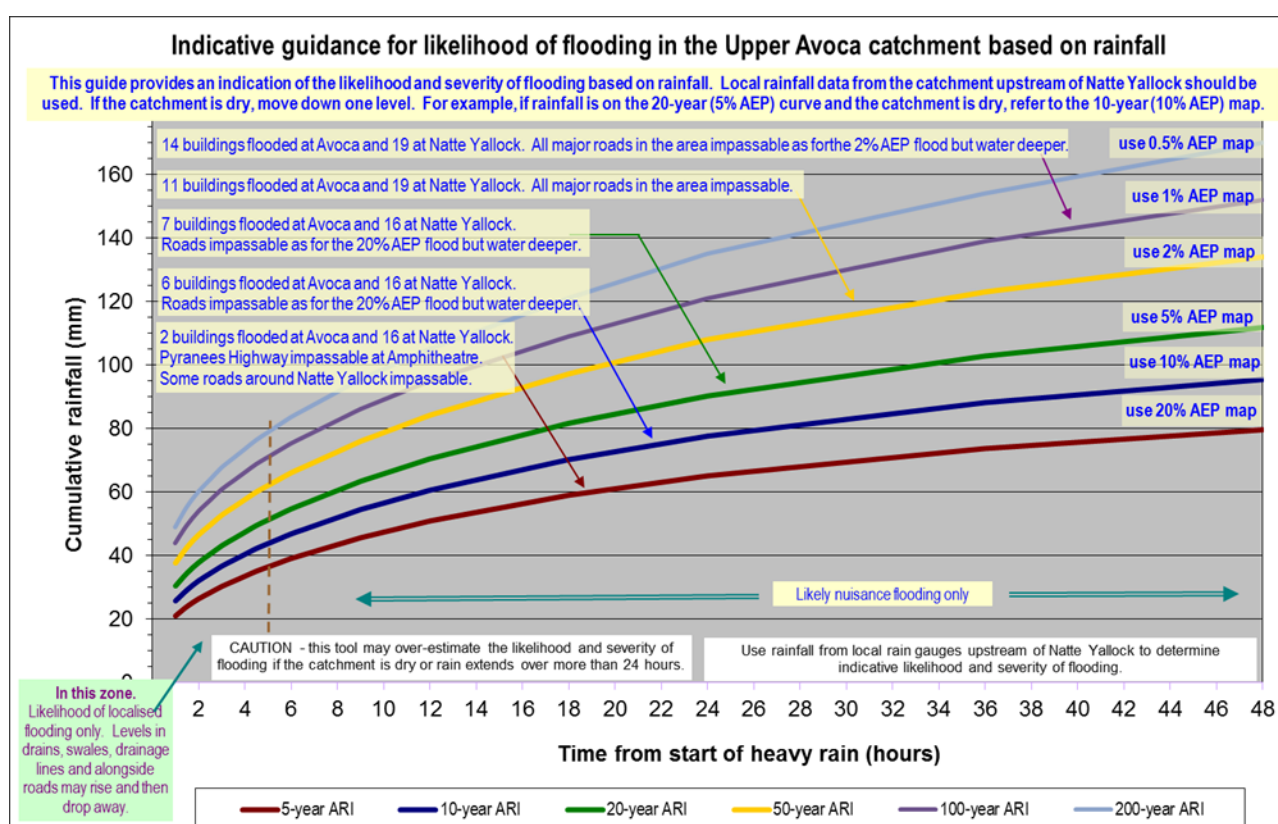


Figure 5.1: Indicative Flood Guidance Tool – likelihood of flooding based on rainfall

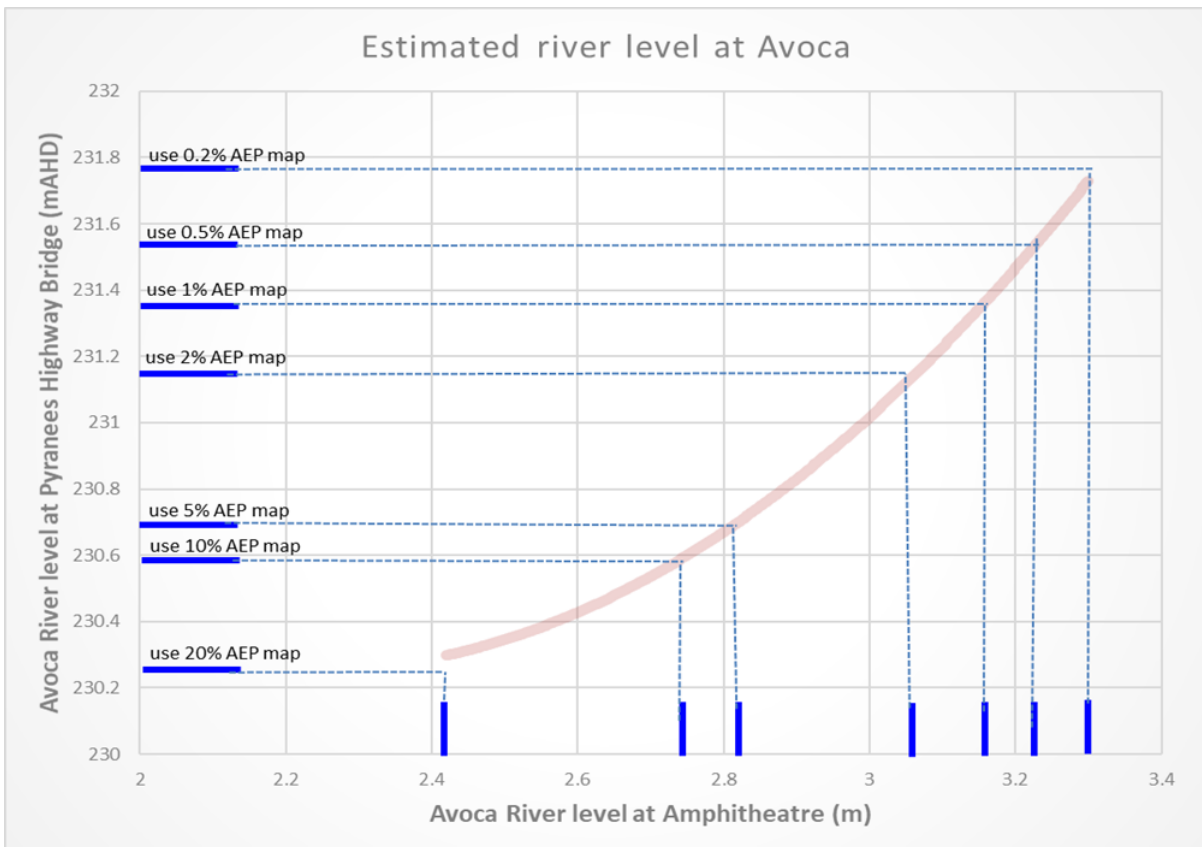


Figure 5.2: Indicative Flood Guidance Tool – likely flood severity at Avoca based on upstream river levels

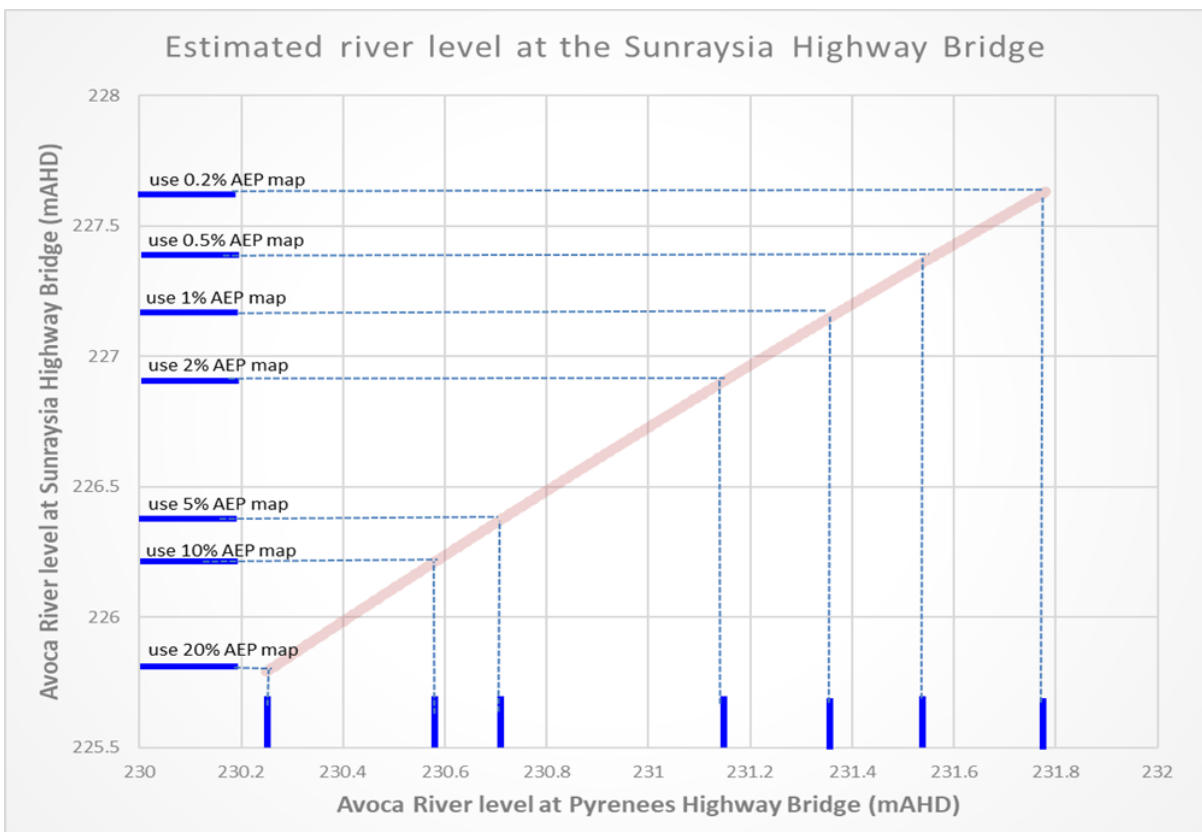


Figure 5.3: Indicative Flood Guidance Tool – likely flood severity Avoca to Natte Yallock based on upstream river levels



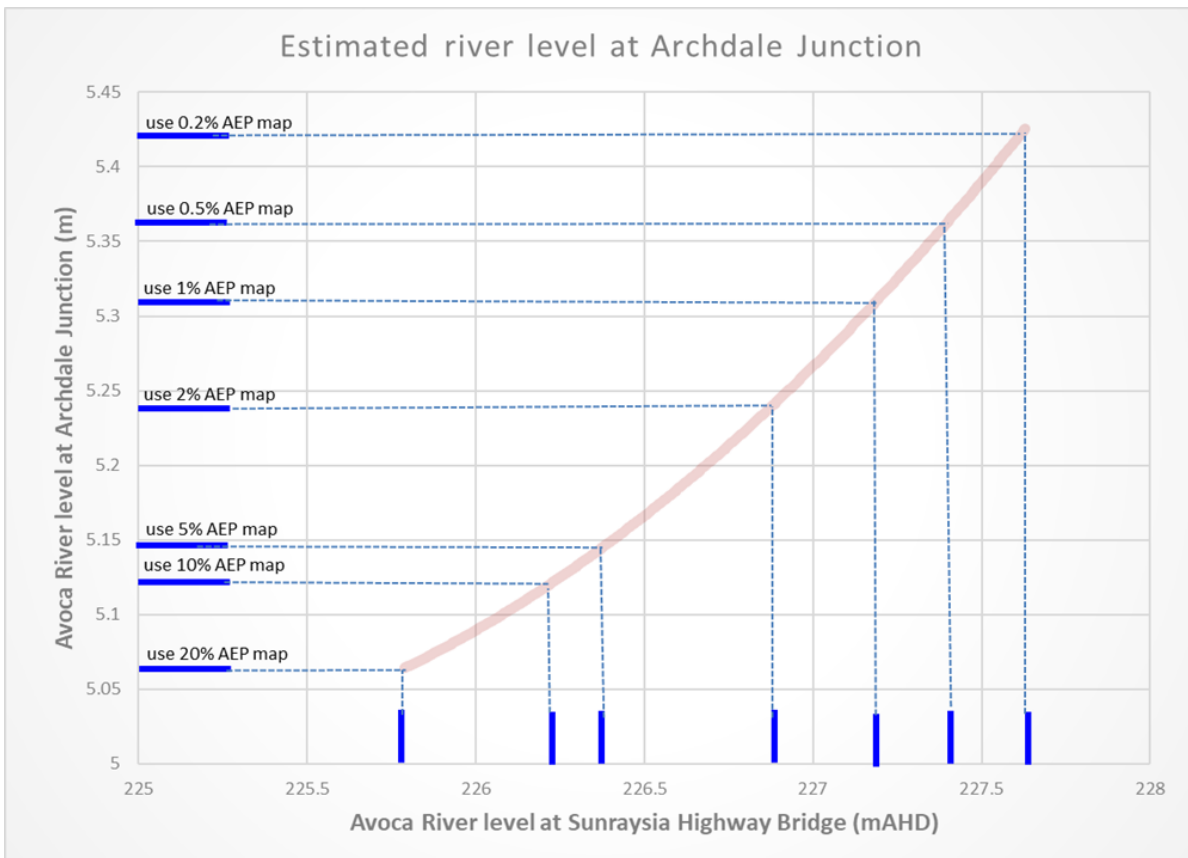


Figure 5.4: Indicative Flood Guidance Tool – likely flood severity around Natte Yallock and downstream based on upstream river levels

### 5.2.2 Potential capability pending investment in improvements

It is suggested that in the context of State-wide and Regional priorities and the relative scale of flood damages across the Upper Avoca River, investment in a more sophisticated and technically demanding forecast tool that would need to be established, operated and maintained by Pyrenees Shire Council (DELWP 2016 and VFWCC 2001) is probably not warranted.

With a view to the longer term and subject to the programming of alerts for exceedance of pre-determined rainfall rates and depths at (a sub-set of) the eight nearby rain gauges and the Amphitheatre river gauge, the Automated Alerting Project (see Section 4.1) appears to offer potential as the basis for a robust initial flood alerting and warning system. It is suggested that Pyrenees Shire Council maintain contact with VICSES on project progress with a view towards implementation for Natte Yallock initially followed by Avoca and Amphitheatre.

### 5.2.3 Flood Class Levels

Flood class levels, determined against standard definitions, are used to establish a degree of consistency in the categorisation of floods. In order to assist the flood warning process and increase awareness of flooding within the community, it is suggested that the Council give consideration to establishing flood class levels for Amphitheatre and at the Pyrenees Highway Bridge at Avoca and the Sunraysia Highway Bridge downstream from Avoca. The process would involve coordination between Council, VICSES, NCCMA and BoM and is relatively straight-forward. Note: can only be established for locations with a permanent water level gauge.

## 5.3 Interpretation

The flood mapping and Pyrenees and Central Goldfields MFEP Appendices developed as part of the Investigation provide the base information to enable the community and stakeholder agencies to determine the

likely effects of a potential flood. This means however that the flood inundation maps and relevant Appendices of the MFEP, and more specifically the flood information cards for the Upper Avoca River, would need to be readily available to the at-risk communities.

#### **5.4 Message construction and dissemination**

There are a number of alerting and notification tools, technologies and service providers available, some of which both alert (make people aware of an imminent hazard) and notify (provide a warning message). A summary of those that might be suitable for the Upper Avoca River has not been included herein as the approach proposed does not include the construction and/or dissemination of formal warning messages, other than as may occur as a result of the Automated Alerting Project (or similar) described in Section 4.3. This is because of the short effective flood warning time in combination with the dependencies between the alerting and notification functional requirements and decisions regarding the data collection network equipment and locations to be instrumented.

If a flood was to occur soon after delivery of the maps and indicative flood guidance tools arising from this study to the Upper Avoca River communities, it is likely that for most residents, the initial alert of likely flooding will be personal (or perhaps from a neighbour within the community) and will come from a combination of environmental indicators (e.g. observance of heavy rain, local runoff, etc) and the resident's consideration of the flood inundation maps in conjunction with the relevant Appendix of the MFEP. If an alternate commercial monitoring system such as DipStik was installed, the initial (or confirming) alert may come from the unit's SMS'ed message and / or siren, as rain and / or stream levels exceeded triggers with the above acting to reinforce and add value to resident's assessments and decision processes. Alternatively, and subject to resolution of VICSES and EMV roles in the initiation and dissemination of (flash) flood warnings, the initial alert may come via electronic and social media.

If a marginally more formal alerting system was deemed appropriate and viable for the upper Avoca communities, regardless of whether additional permanent rain and water level monitoring equipment (e.g. ERTS, DipStik, other) was installed, the communities could be encouraged to be more involved in the TFWS by sharing information about the (likely or actual) on-set of flooding and to then back this up with information about likely consequences (e.g. from the MFEP and local knowledge / observations). Social media provides a suitable vehicle. A Twitter and/or Facebook account could be established for the Upper Avoca River TFWS. This would require the Pyrenees Shire Council (in conjunction with VICSES) to champion the formation of an Upper Avoca River flood action group (or similar). The Landcare Group at Natte Yallock are already established and functional and may be in a position to take on this role.

Members of the (proposed) flood action group could play a key role in local flood warning operations and review. In particular, via social media, they could share information initiated within the community, following application of the indicative flood guidance tools and by VICSES on likely flood severity, impacts and appropriate actions.

#### **5.5 Response**

The Pyrenees and Central Goldfields MFEP Appendices have been populated for the Upper Avoca River as part of the Investigation. Information in the MFEPs includes available intelligence relating to flooding from the upstream catchment along with the indicative flood guidance tools provided in Figure 5.1 to Figure 5.4. Instructions for the tools' use have also been included in the MFEPs. Flood inundation extent and depth maps have been added together with a list of areas and roads likely to be flooded. A table of properties and key infrastructure likely to be flooded along with the likelihood and depth of over-ground and over-floor flooding at each property (where available) is also included along with flood information cards for the area.

The availability of this flood intelligence will improve the situational awareness of the emergency service agencies and the Upper Avoca River communities while also increasing their potential to respond in a more timely and appropriate manner.

Following (or perhaps in concert with) acceptance of the updated MFEPs by the Pyrenees and Central Goldfields Shire Councils and by VICSES, a program to encourage and assist residents and businesses to develop individual flood response plans should be developed and delivered. A package that assists businesses and individuals is available from VICSES and provides an excellent model for community use.

## **5.6 Community flood awareness**

LFGs that draw on the flood intelligence collated to the Pyrenees MFEP should be developed for and made available to the Amphitheatre, Avoca and Natte Yallock communities. LFG development and maintenance are a VICSES responsibility.

Looking further ahead, it is suggested that VICSES, in partnership with Council, develop activities and materials for the Upper Avoca River communities that emphasise personal safety, how available rain and stream level data can be used, what any warnings/alerts mean and what individuals can do to stay safe and protect their property including how to fill and lay sandbags. This should extend to also making relevant parts of the MFEPs publicly available (e.g. Council offices, library, website, etc). Such investments will assist in maintaining and renewing flood awareness within the local community.

## **5.7 Funding opportunities**

Opportunities do exist for local government to seek and secure Commonwealth and State funding to assist with flood warning system set up. Generally, the benefits of establishing the system need to outweigh costs in order to secure funding support. Regardless of the support received, operational and ongoing costs remain a local government responsibility as outlined in Section 4.1.

It is suggested that having determined the desired elements of the flood warning system to be established for the Upper Avoca River communities and a timetable for the establishment of each element, Council (with support from NCCMA and VICSES) should scope and submit an application for funding under the Commonwealth-State National Partnership Agreement on National Disaster Risk Reduction (i.e. the Risk and Resilience Grants Program) or successor funding programs.

## 6. Recommendations

Currently achievable response actions across the Upper Avoca River, as outlined above and without regard for time of day or night, are limited to what residents can achieve.

It is suggested that an “accurate” forecast is not the key to achieving an increase to personal safety and flood damage reduction within the upper catchment communities. Rather it is timely alerting and access to relevant data and easy-to-use indicative tools that, coupled with robust communications systems supported by sound awareness of flooding consequences (i.e. community resilience), provide the information that triggers those at risk to take timely and appropriate actions: to improve local capability and deliver the benefits sought from a flood warning system.

Further to these specific requirements, this assessment identifies feasible options for improving local capability to act in a timely manner and improving future response to impending floods within the Upper Avoca River, thereby potentially reducing future flood risk. The identified options range from making better use of existing rainfall monitoring resources (i.e. no/low cost options) through to investment in improved rain and/or river monitoring in conjunction with automated messaging, that if implemented, could lead to more reliable and substantive outcomes (i.e. an option requiring more substantial investment of time and money to set up and maintain). Guidance is provided as to how such a system may operate.

Adopting and making best use of the immediate deliverables from this investigation (i.e. making the indicative flood tools, flood intelligence and flood mapping available to both the emergency agencies and the Upper Avoca River communities and being able to make better use of rainfall data that will (hopefully) soon be available in near real-time from BoM), will increase flood awareness and the opportunity for residents to recognise imminent flooding and initiate appropriate response actions. This has been assessed as being achievable in the near term with minimum investment.

With some investment, additional water level monitoring equipment could be installed around Avoca and additional measures implemented to increase flood awareness and community engagement. Together, these measures are estimated to give additional confidence in expected flood severity along with an increase in the time available for damage reducing actions by the upper community's residents (i.e. more reliable and substantive outcomes). This has been assessed as being achievable in the mid-term.

Further increased confidence in the expected severity of a developing flood, along with additional time to undertake damage reducing measures could be achieved if there was investment in additional and more sophisticated instrumentation to monitor water levels and the associated systems to alert emergency services and individuals to the exceedance of trigger values (i.e. improved monitoring and messaging system with automated elements). It is estimated that together these measures would achieve a further increase in effective flood warning time. This has been identified as the fully developed option for communities in the Upper Avoca River and assessed as being achievable in the longer term. Implementation would require significant investment.

The above three paragraphs are presented in Table 6.1 in summary form against the TFWS building blocks as suggested actions aimed at securing a flood warning system for the Upper Avoca River. A reworked version of this table presented in terms of what is achievable now, with a greater level of investment and longer term is provided as Table 6.2. The information in the tables is identical.

Discussions during the community engagement stages of this Investigation did contemplate the possibility of a flood warning system for Natte Yallock that was (almost) totally independent of existing gauge infrastructure and systems and very heavily locally driven and managed. The Landcare Group were seen as a key part of such a system. The Group remains a key part of the approach proposed herein. However, the inability to discriminate between small and big floods based on water levels at the Maryborough – St Arnaud Road Bridge demonstrates that a local river gauges have limited benefits. Similarly, the number and distribution of telemetered rain gauges upstream of Natte Yallock that are managed through the Water Partnership suggests that adding more rain gauges (either manual or automated) is not a robust solution. The key is seeking for BoM to make data from those existing rain gauges available through the BoM website at frequent intervals. The rainfall and upstream

water level based indicative flood tools can then be used locally leading to increased flood warning lead time and community resilience, and a reduction in avoidable flood damages. While it is not quite that simple (as outlined in the paragraphs above), the basis already exists for a robust locally driven flood warning system for communities in the Upper Avoca River.

Table 6.1: TFWS Building Blocks and Suggested Actions for the Upper Avoca River with due regard for the EMV, Commonwealth-State arrangements for flood warning service provision VFWCC (2001), AIDR (2009) and DELWP (2016)

TFWS Building Blocks	Potential Improvement actions for the Upper Avoca River
<p>DATA COLLECTION &amp; COLLATION</p>	<p>Pyrenees Shire Council to approach BoM (with support from VICSES, NCCMA, DELWP and Central Goldfields Shire Council) to request necessary changes to enable near real-time (e.g. with 15 minute updates) public access via the BoM website to:</p> <ul style="list-style-type: none"> <li>▪ Rain data from the eight rain gauges located in or in close proximity to the Upper Avoca River and listed in Section 5.1</li> <li>▪ River level data from the four stream gauges within the Upper Avoca River as listed in Section 5.1</li> </ul> <p>Pyrenees Shire Council to arrange for the installation of a set of staff gauges on the upstream side of the Pyrenees Highway Bridge in Avoca and on the upstream side of the Sunraysia Highway Bridge downstream from Avoca. The staff gauges should be installed such that the gauge boards can be read from the road for small and larger (i.e. 1% AEP) floods.</p> <p>If a greater degree of confidence in the likelihood of flooding is required, it is suggested that Pyrenees Shire Council:</p> <ul style="list-style-type: none"> <li>▪ As a first step, arrange purchase and installation of an ERTS river (or rain-river) gauge the upstream side of the Pyrenees Highway Bridge in Avoca. At the same time, Pyrenees Shire Council with support from VICSES, NCCMA, DELWP and Central Goldfields Shire Council to approach BoM to provide near real-time public access to data from that gauge via its website</li> <li>▪ As a second step, arrange installation of an additional ERTS rain (or rain-river) gauge on the upstream side of the Sunraysia Highway Bridge downstream from Avoca. As above, Pyrenees Shire Council with support from VICSES, NCCMA, DELWP and Central Goldfields Shire Council to approach BoM to provide near real-time public access to data from those gauges via its website</li> <li>▪ Alternatively, and instead of ERTS equipment, arrange installation of different commercially available equipment (e.g. DipStik) to monitor (and alert on) rainfall and / or water level in the river at the locations described in the above two bullets</li> <li>▪ As appropriate and depending on the monitoring and alerting equipment installed, invite Upper Avoca River residents, along with VICSES, local CFA and Police, to opt-in to receive SMS alert messages direct from installed equipment</li> <li>▪ Consider the addition of “sirens and/or flashing lights” options (triggered by exceedance of pre-set rainfall rates and depths, and river levels and rates of rise) for the automated gauge installed at the bridges as an alternative or additional means of alerting the community to imminent flooding</li> </ul> <p>As part of all of the above:</p> <ul style="list-style-type: none"> <li>▪ Provide guidance to the local community (through a locally focussed flood awareness brochure and website) on how to interpret and use available rain and river level data and the indicative flood guidance tools, along with information about the flood warning system and how it will assist in reducing risk</li> </ul>

TFWS Building Blocks	Potential Improvement actions for the Upper Avoca River
	<ul style="list-style-type: none"> <li>▪ Develop and maintain a website (and social media) presence for the FWS that includes the above guidance along with (a link to) flood mapping and intelligence outputs from the Upper Avoca River Flood Investigation</li> </ul> <p>Pyrenees Shire Council in consultation with NCCMA to decide on the datum to be used for any new river level gauges: AHD or local.</p>
<p>DETECTION &amp; PREDICTION (i.e. Forecasting)</p>	<p>Pyrenees Shire Council to provide the indicative flood guidance tools and instructions for their use to Council staff, VICSES and local CFA for routine use. Provide training in use as appropriate.</p> <p>Pyrenees Shire Council and VICSES to agree who will maintain the tools and how.</p> <p>Pyrenees Shire Council to lead the determination of flood class levels for Amphitheatre and at the Pyrenees Highway Bridge at Avoca and the Sunraysia Highway Bridge downstream from Avoca. Will involve coordination between Council, VICSES, NCCMA and BoM and is a relatively straight-forward process.</p> <p>Pyrenees Shire Council to maintain contact with VICSES on progress with the Automated Alerting Project with a view to implementation for Upper Avoca River communities.</p>
<p>INTERPRETATION (i.e. an ability to answer the question “what does this mean for me - will I be flooded and to what depth”.</p>	<p>Mapping and intelligence from the Upper Avoca River Flood Investigation has been captured to the MFEPs. The indicative flood guidance tools together with the MFEPs enable those at risk to determine the likely effects of a potential flood with some lead time.</p> <p>Pyrenees Shire Council to ensure flood inundation maps and relevant MFEP Appendices along with the flood information cards for the Upper Avoca River are readily available to the at-risk communities.</p> <p>If local datum has been chosen for water level gauges, Pyrenees Shire Council to lead update of the MFEP and indicative flood guidance tools. This will assist local interpretation and the determination of likely flood impacts during future events.</p>
<p>MESSAGE CONSTRUCTION</p>	<p>The initial alert within the at-risk communities of potential flooding is likely to come from a combination of environmental indicators (e.g. observance of heavy rain) and from consideration of rain data, the flood inundation maps, the indicative flood guidance tools and the flood intelligence in the MFEP and / or from observing a water level rise in local streams.</p> <p>If monitoring equipment with SMS capability is installed, the initial (or confirming) alert may come from the unit’s SMS’ed message as rain and/or river levels exceed triggers with the above acting to reinforce and add value to resident’s assessments and decision processes. Alternatively, and subject to resolution of VICSES and EMV roles in the initiation and dissemination of (flash) flood warnings, the initial alert may come via electronic and social media.</p> <p>If a marginally more formal alerting system is deemed appropriate for the upper Avoca communities, Pyrenees Shire Council in conjunction with VICSES to:</p> <ul style="list-style-type: none"> <li>▪ Champion formation of an Upper Avoca River flood action group (or similar)</li> <li>▪ Lead establishment of a Twitter and / or Facebook account for the Upper Avoca River TFWS so that information can be shared within the community and by VICSES (say, following use of the indicative flood guidance tools) on likely flood severity, impacts and appropriate actions</li> </ul>

TFWS Building Blocks	Potential Improvement actions for the Upper Avoca River
MESSAGE DISSEMINATION (i.e. Communication and Alerting)	<p>Establish a Pyrenees Shire Council championed community flood action group. The Landcare Group at Natte Yallock may be in a position to take on this role.</p> <p>Use social media.</p> <p>A role remains for the Emergency Alert (EA) during a severe flood event.</p> <p>If an SMS enabled gauge is active, Pyrenees Shire Council to identify/nominate key community members (in addition to VICSES and perhaps CFA) to receive SMS or email alerts on exceedance of alarm trigger values.</p> <p>If alternate commercially available water level (and rain) monitoring equipment is installed, Pyrenees Shire Council to establish and maintain an opt-in system that must be heavily community driven.</p>
RESPONSE	<p>Initiate a community engagement program to communicate how the FWS will work.</p> <p>Following (or perhaps in concert with) acceptance of the MFEP by Pyrenees Shire Council and VICSES, encourage and assist residents to develop individual flood response plans. A package that assists businesses and individuals is available from VICSES and provides an excellent model for community use.</p>
REVIEW	<p>Review and update of local flood intelligence (i.e. flood characteristics, impacts, etc), local alerting arrangements, response plans, local flood awareness material, etc (initially) after every flood that triggers a response. Best driven by Pyrenees Shire Council with input from VICSES, NCCMA, CFA and the Council championed community flood action group.</p> <p>Pyrenees Shire Council to develop review and update protocols; who does what when and process to be followed to update material consistently across all parts of the flood warning and response system, including the MFEP.</p>
AWARENESS	<p>VICSES to prepare and print LFGs for the Amphitheatre, Avoca and Natte Yallock communities.</p> <p>Make relevant parts of the MFEP publicly available (e.g. Council offices, library, website).</p> <p>Develop, maintain and renew flood awareness through activities and materials that emphasise personal safety, where rain, river and rain radar data is available, how to interpret and use that data, what any warnings / alerts mean and what individuals should do to stay safe and protect their property including how to fill and lay sandbags.</p> <p>Pyrenees Shire Council and VICSES to:</p> <ul style="list-style-type: none"> <li>▪ Load and maintain material including the MFEP to the Pyrenees Shire Council and VICSES websites with appropriate links to relevant useful sites;</li> <li>▪ Routinely revisit and update awareness material to accommodate lessons learnt, additional or improved material and to reflect advances in good practice; and</li> <li>▪ Routinely repeat distribution of awareness material and consider other measures.</li> </ul>





Table 6.2: TFWS Building Blocks and Staged Suggested Actions for the Upper Avoca River with due regard for Table 6.1

TFWS Building Blocks	Potential Improvement actions for the Upper Avoca River
<b>Achievable in the NEAR term with minimum investment</b>	
DATA COLLECTION & COLLATION	<p>Pyrenees Shire Council to approach BoM (with support from VICSES, NCCMA, DELWP and Central Goldfields Shire Council) to request necessary changes to enable near real-time (e.g. with 15 minute updates) public access via the BoM website to:</p> <ul style="list-style-type: none"> <li>▪ Rain data from the eight rain gauges located in or in close proximity to the Upper Avoca River and listed in Section 5.1</li> <li>▪ River level data from the four stream gauges within the Upper Avoca River as listed in Section 5.1</li> </ul> <p>Provide guidance to the local community (through a locally focussed flood awareness brochure and website) on how to interpret and use available rain and river level data and the indicative flood guidance tools, along with information about the flood warning system and how it will assist in reducing risk.</p>
DETECTION & PREDICTION (i.e. Forecasting)	<p>Pyrenees Shire Council to provide the indicative flood guidance tools and instructions for their use to Council staff, VICSES and local CFA for routine use. Provide training in use as appropriate.</p> <p>Pyrenees Shire Council and VICSES to agree who will maintain the tools and how.</p>
INTERPRETATION (i.e. an ability to answer the question “what does this mean for me - will I be flooded and to what depth”).	<p>Mapping and intelligence from the Upper Avoca River Flood Investigation has been captured to the MFEPs. The indicative flood guidance tools together with the MFEPs enable those at risk to determine the likely effects of a potential flood with some lead time.</p> <p>Pyrenees Shire Council to ensure flood inundation maps and relevant MFEP Appendices along with the flood information cards for the Upper Avoca River are readily available to the at-risk communities.</p>
MESSAGE CONSTRUCTION	<p>The initial alert within the at-risk communities of potential flooding is likely to come from a combination of environmental indicators (e.g. observance of heavy rain) and from consideration of rain data, the flood inundation maps, the indicative flood guidance tools and the flood intelligence in the MFEP and/or from observing a water level rise in local streams.</p>
MESSAGE DISSEMINATION (i.e. Communication and Alerting)	<p>Establish a Pyrenees Shire Council championed community flood action group. The Landcare Group at Natte Yallock may be in a position to take on this role.</p> <p>Use social media.</p> <p>A role remains for the Emergency Alert (EA) during a severe flood event.</p>
RESPONSE	<p>Following (or perhaps in concert with) acceptance of the MFEP by Pyrenees Shire Council and VICSES, encourage and assist residents to develop individual flood response plans. A package that assists businesses and individuals is available from VICSES and provides an excellent model for community use.</p>

TFWS Building Blocks	Potential Improvement actions for the Upper Avoca River
REVIEW	<p>Review and update of local flood intelligence (i.e. flood characteristics, impacts, etc), local alerting arrangements, response plans, local flood awareness material, etc (initially) after every flood that triggers a response. Best driven by Pyrenees Shire Council with input from VICSES, NCCMA, CFA and the Council championed community flood action group.</p> <p>Pyrenees Shire Council to develop review and update protocols =&gt; who does what when and process to be followed to update material consistently across all parts of the flash flood warning and response system, including the MFEP.</p>
AWARENESS	<p>VICSES to prepare and print LFGs for the Amphitheatre, Avoca and Natte Yallock communities.</p> <p>Make relevant parts of the MFEP publicly available (e.g. Council offices, library, website).</p> <p>Pyrenees Shire Council and VICSES to:</p> <ul style="list-style-type: none"> <li>▪ Load and maintain material including the MFEP to the Pyrenees Shire Council and VICSES websites with appropriate links to relevant useful sites</li> <li>▪ Routinely revisit and update awareness material to accommodate lessons learnt, additional or improved material and to reflect advances in good practice</li> <li>▪ Routinely repeat distribution of awareness material and consider other measures</li> </ul>
<b>Achievable in the MID term with a greater level of investment</b>	
DATA COLLECTION & COLLATION	<p>In addition to the above:</p> <ul style="list-style-type: none"> <li>▪ Pyrenees Shire Council to arrange for the installation of a set of staff gauges on the upstream side of the Pyrenees Highway Bridge in Avoca and on the upstream side of the Sunraysia Highway Bridge downstream from Avoca. The staff gauges should be installed such that the gauge boards can be read from the road for small and larger (i.e. 1% AEP) floods</li> <li>▪ Develop and maintain a website (and social media?) presence for the FWS that includes guidance from the previously prepared locally focussed flood awareness brochure (see above) along with (a link to) flood mapping and intelligence outputs from the Upper Avoca River Flood Investigation</li> <li>▪ Pyrenees Shire Council in consultation with NCCMA to decide on the datum to be used for any new river level gauges: AHD or local</li> </ul>
DETECTION & PREDICTION (i.e. Forecasting)	<p>In addition to the above:</p> <ul style="list-style-type: none"> <li>▪ Pyrenees Shire Council to lead the determination of flood class levels for Amphitheatre and at the Pyrenees Highway Bridge at Avoca and the Sunraysia Highway Bridge downstream from Avoca. Will involve coordination between Council, VICSES, NCCMA and BoM and is a relatively straight-forward process</li> <li>▪ Pyrenees Shire Council to maintain contact with VICSES on progress with the Automated Alerting Project with a view to implementation for Upper Avoca River communities</li> </ul>

TFWS Building Blocks	Potential Improvement actions for the Upper Avoca River
<p>INTERPRETATION (i.e. an ability to answer the question “what does this mean for me - will I be flooded and to what depth”.</p>	<p>In addition to the above:</p> <ul style="list-style-type: none"> <li>▪ If local datum has been chosen for river level gauges, Pyrenees Shire Council to lead update of the MFEP and indicative flood guidance tools. This will assist local interpretation and the determination of likely flood impacts during future events</li> </ul>
<p>MESSAGE CONSTRUCTION</p>	<p>In addition to the above:</p> <ul style="list-style-type: none"> <li>▪ If monitoring equipment with SMS capability is installed, the initial (or confirming) alert may come from the unit’s SMS’ed message as rain and / or river levels exceed triggers with the above acting to reinforce and add value to resident’s assessments and decision processes. Alternatively, and subject to resolution of VICSES and EMV roles in the initiation and dissemination of (flash) flood warnings, the initial alert may come via electronic and social media</li> <li>▪ If a marginally more formal alerting system is deemed appropriate for the upper Avoca communities, Pyrenees Shire Council in conjunction with VICSES to: <ul style="list-style-type: none"> <li>Champion formation of an Upper Avoca River flood action group (or similar)</li> <li>Lead establishment of a Twitter and/or Facebook account for the Upper Avoca River TFWS so that information can be shared within the community and by VICSES (say, following use of the indicative flood guidance tools) on likely flood severity, impacts and appropriate actions</li> </ul> </li> </ul>
<p>MESSAGE DISSEMINATION (i.e. Communication and Alerting)</p>	<p>In addition to the above:</p> <ul style="list-style-type: none"> <li>▪ If an SMS enabled gauge is active, Pyrenees Shire Council to identify / nominate key community members (in addition to VICSES and perhaps CFA) to receive SMS or email alerts on exceedance of alarm trigger values</li> </ul>
<p>RESPONSE</p>	<p>In addition to the above:</p> <ul style="list-style-type: none"> <li>▪ Initiate a community engagement program to communicate how the FWS will work</li> </ul>
<p>REVIEW</p>	<p>As above.</p>
<p>AWARENESS</p>	<p>In addition to the above:</p> <ul style="list-style-type: none"> <li>▪ Develop, maintain and renew flood awareness through activities and materials that emphasise personal safety, where rain, river and rain radar data is available, how that interpret and use that data, what any warnings/alerts mean and what individuals should do to stay safe and protect their property including how to fill and lay sandbags</li> </ul>
<p><b>Achievable LONGER term – fully developed option requiring significant investment</b></p>	

TFWS Building Blocks	Potential Improvement actions for the Upper Avoca River
<p>DATA COLLECTION &amp; COLLATION</p>	<p>In addition to the above:</p> <ul style="list-style-type: none"> <li>▪ Pyrenees Shire Council to arrange purchase and installation of an ERTS river (or rain-river) gauge on the upstream side of the Pyrenees Highway Bridge in Avoca. At the same time, Pyrenees Shire Council with support from VICSES, NCCMA, DELWP and Central Goldfields Shire Council to approach BoM to provide near real-time public access to data from that gauge via its website</li> <li>▪ Pyrenees Shire Council to arrange purchase and installation of an ERTS river (or rain-river) gauges on the upstream side of the Sunraysia Highway Bridge downstream from Avoca. As above, Pyrenees Shire Council with support from VICSES, NCCMA, DELWP and Central Goldfields Shire Council to approach BoM to provide near real-time public access to data from those gauges via its website</li> <li>▪ Alternatively and instead of the ERTS equipment, Pyrenees Shire Council to arrange installation of different commercially available equipment (e.g. DipStik) to monitor (and alert on) rainfall and/or water level in the river at the locations described in the above two bullets</li> <li>▪ As appropriate and depending on the monitoring and alerting equipment installed, Pyrenees Shire Council to invite Upper Avoca River residents, along with VICSES, local CFA and Police, to opt-in to receive SMS or other alert messages direct from the installed equipment</li> <li>▪ Pyrenees Shire Council to consider the addition of “sirens and/or flashing lights” options (triggered by exceedance of pre-set rainfall rates and depths, and river levels and rates of rise) for the automated gauge installed at the bridges as an alternative or additional means of alerting the community to imminent flooding</li> </ul>
<p>DETECTION &amp; PREDICTION (i.e. Forecasting)</p>	<p>As above.</p>
<p>INTERPRETATION (i.e. an ability to answer the question “what does this mean for me - will I be flooded and to what depth”).</p>	<p>As above.</p>
<p>MESSAGE CONSTRUCTION</p>	<p>As above.</p>
<p>MESSAGE DISSEMINATION (i.e. Communication and Alerting)</p>	<p>In addition to the above:</p> <ul style="list-style-type: none"> <li>▪ If alternate commercially available water level (and rain) monitoring equipment is installed, Pyrenees Shire Council to establish and maintain an opt-in system that must be heavily community driven</li> </ul>

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<b>TFWS Building Blocks</b>	<b>Potential Improvement actions for the Upper Avoca River</b>
RESPONSE	As above.
REVIEW	As above.
AWARENESS	As above.

## 7. References

(AEMI) Australian Emergency Management Institute (1995), *Flood Warning: An Australian Guide*, Commonwealth of Australia.

(AIDR) Australian Institute for Disaster Resilience (2009), *Manual 21: Flood Warning*, Commonwealth of Australia.

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Jacobs (2020c), *Upper Avoca River Flood Investigation Flood Mapping Report*, Doc. Ref: IS297900-RPT-004-Mapping-RevA.docx, Jacobs.

(VFWCC) Victorian Flood Warning Consultative Committee (2001), *Arrangements for Flood Warning Services in Victoria*, Bureau of Meteorology.



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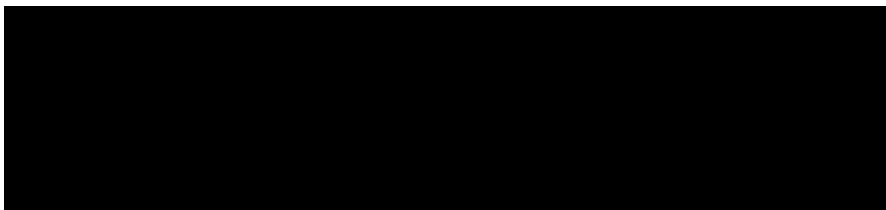
# REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 07322 FOLIO 256

Security no : 124107336496Y  
Produced 03/07/2023 11:44 PM

## LAND DESCRIPTION

Lot 2 on Plan of Subdivision 018834.  
PARENT TITLE Volume 02581 Folio 135  
Created by instrument 2257071 09/08/1949



## ENCUMBRANCES, CAVEATS AND NOTICES

MORTGAGE AW774916N 28/04/2023  
COMMONWEALTH BANK OF AUSTRALIA

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

## DIAGRAM LOCATION

SEE LP018834 FOR FURTHER DETAILS AND BOUNDARIES

## ACTIVITY IN THE LAST 125 DAYS

NUMBER		STATUS	DATE
AW774915Q (E)	DISCHARGE OF MORTGAGE	Registered	28/04/2023
AW774916N (E)	MORTGAGE	Registered	28/04/2023

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

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

Street Address: 19 ASTBURY STREET AVOCA VIC 3467

## ADMINISTRATIVE NOTICES

NIL

eCT Control 15940N COMMONWEALTH BANK OF AUSTRALIA  
Effective from 28/04/2023

DOCUMENT END



# Imaged Document Cover Sheet

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LP 18834

EDITION 1

PLAN MAY BE LODGED 28-2-49

PLAN OF SUBDIVISION

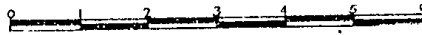
OF PART OF CROWN ALLOTMENT 6<sup>B</sup>

SECTION A

PARISH OF AVOCA

COUNTY OF GLADSTONE

SCALE OF CHAINS



WEIGALL & CROWTHER  
16.0.4.9.59

THIS PLAN IS LODGED

H.M.C. 28-2-49

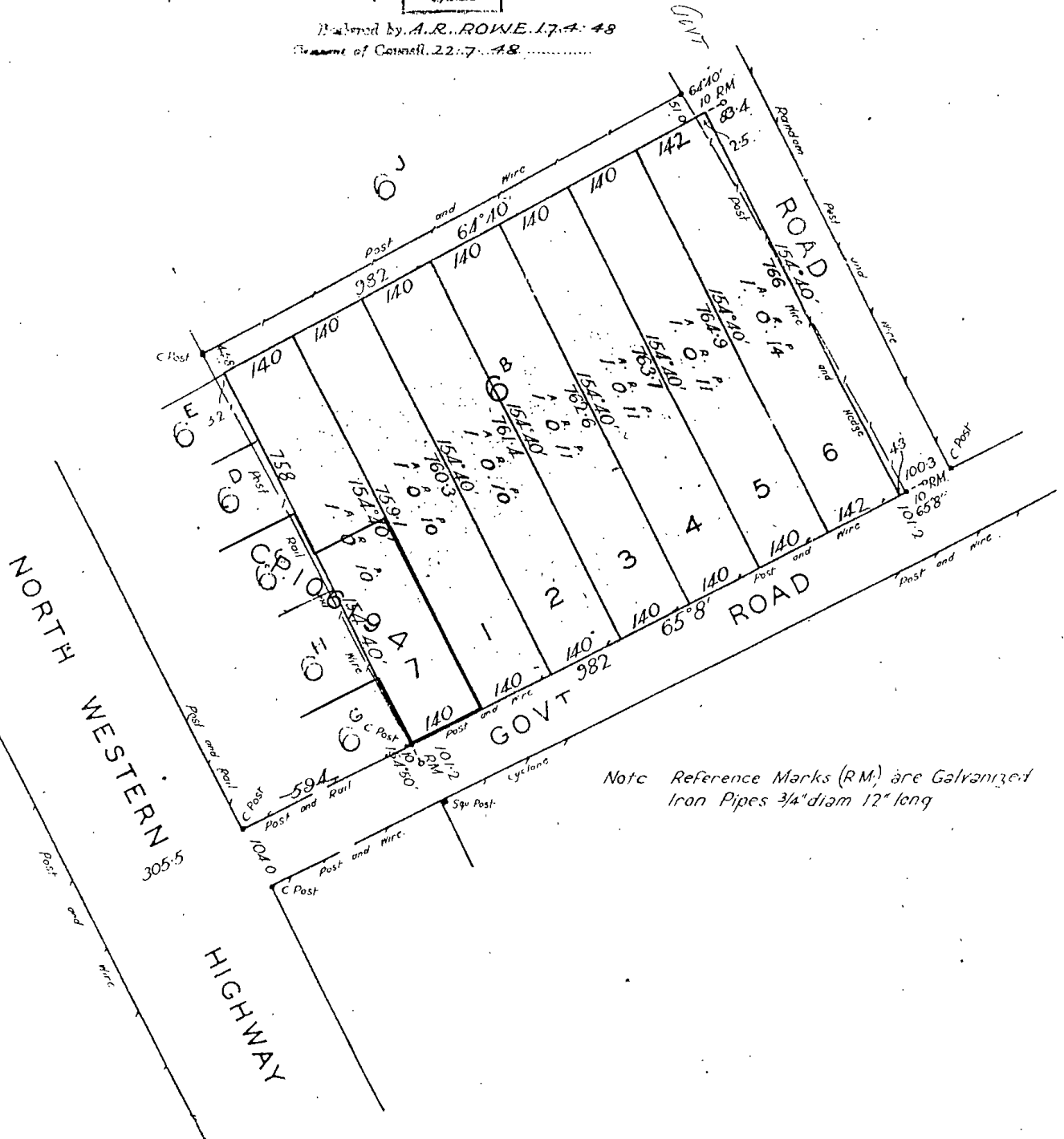
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STRIP  
21.3.49  
11.50

FOL. 516.135

Drawn by A.R. ROWE 17.4.48

Examine of Connell 22.7.48



Note Reference Marks (RM) are Galvanized Iron Pipes 3/4" diam 12" long