DEVELOPMENT APPLICATION

PDPLANPMTD-2025/055549

PROPOSAL: Two Lot Subdivision

LOCATION: 15 Douglas Street, Bellerive

RELEVANT PLANNING SCHEME: Tasmanian Planning Scheme - Clarence

ADVERTISING EXPIRY DATE: 15 January 2026

The relevant plans and documents can be inspected at the Council offices, 38 Bligh Street, Rosny Park, during normal office hours until 15 January 2026. In addition to legislative requirements, plans and documents can also be viewed at www.ccc.tas.gov.au during these times.

Any person may make representations about the application to the Chief Executive Officer, by writing to PO Box 96, Rosny Park, 7018 or by electronic mail to clarence@ccc.tas.gov.au. Representations must be received by Council on or before 15 January 2026.

To enable Council to contact you if necessary, would you please also include a day time contact number in any correspondence you may forward.

Any personal information submitted is covered by Council's privacy policy, available at www.ccc.tas.gov.au or at the Council offices.

City of Clarence

City of Clarence
38 Bligh St Rosny Park
PO Box 96
Rosny Park TAS, 7018

03 6217 9500
clarence@ccc.tas.gov.au
ccc.tas.gov.au

Application for Development / Use or Subdivision

Use this form to obtain planning approval for developing or using land, including subdividing it into smaller lots or lot consolidation.

Proposal: Proposed Subdivision

Location: 15 Douglas Street, Bellerive

Personal Information Removed

City of Clarence

City of Clarence
38 Bligh St Rosny Park
PO Box 96
Rosny Park TAS, 7018

03 6217 9500
clarence@ccc.tas.gov.au
ccc.tas.gov.au

Is the property on the Tasmanian Heritage Register? Yes ☐ No ■

If yes, we recommend you discuss your proposal with Heritage Tasmania prior to lodgement as exemptions may apply which may save you time on your proposal.

If you had pre-application discussions with City of Clarence, please provide planner's name:

Current use of site: Residential

Does the proposal involve land administered or owned by the Crown or Council? Yes ☐ No ■

Declaration

- I have read the Certificate of Title and Schedule of Easements for the land and am satisfied that this application is not prevented by any restrictions, easements or covenants.
- I authorise the provision of a copy of any documents relating to this application to any person for the purposes of assessment or public consultation. I agree to arrange for the permission of the copyright owner of any part of this application to be obtained. I have arranged permission for Council's representatives to enter the land to assess this application
- I declare that, in accordance with Section 52 of the Land Use Planning and Approvals Act 1993, that I have notified the owner of the intention to make this application. Where the subject property is owned or controlled by Council or the Crown, their signed consent is attached.
- I declare that the information in this declaration is true and correct.

Acknowledgement

- I acknowledge that the documentation submitted in support of my application will become a public record held by Council and may be reproduced by Council in both electronic and hard copy format in order to facilitate the assessment process; for display purposes during public consultation; and to fulfil its statutory obligations. I further acknowledge that following determination of my application, Council will store documentation relating to my application in electronic format only.

Personal Information Removed

Please refer to the development/use and subdivision checklist on the following pages to determine what documentation must be submitted with your application.

City of Clarence
38 Bligh St Rosny Park
PO Box 96
Rosny Park TAS, 7018

03 6217 9500
clarence@ccc.tas.gov.au
ccc.tas.gov.au

Development/use or subdivision checklist

Mandatory Documents
This information is required for the application to be valid. We are unable to proceed with an application without these documents.

- ☐ Details of the location of the proposed use or development.
- ☐ A copy of the current Certificate of Title, Sealed Plan, Plan or Diagram and Schedule of Easements and other restrictions for each parcel of land on which the use or development is proposed.
- ☐ Full description of the proposed use or development.
- ☐ Description of the proposed operation. May include where appropriate: staff/student/customer numbers; operating hours; truck movements; and loading/unloading requirements; waste generation and disposal; equipment used; pollution, including noise, fumes, smoke or vibration and mitigation/management measures.
- ☐ Declaration the owner has been notified if the applicant is not the owner.
- ☐ Crown or Council consent (if publically-owned land).
- ☐ Any reports, plans or other information required by the relevant zone or code.
- ☐ Fees prescribed by the City of Clarence.

Application fees (please phone 03 6217 9550 to determine what fees apply). An invoice will be emailed upon lodgement.

Additional Documents
In addition to the mandatory information required above, Council may, to enable it to consider an application, request further information it considers necessary to ensure that the proposed use or development will comply with any relevant standards and purpose statements in the zone, codes or specific area plan, applicable to the use or development.

- ☐ Site analysis and site plan, including where relevant:
  - Existing and proposed use(s) on site.
  - Boundaries and dimensions of the site.
  - Topography, including contours showing AHD levels and major site features.
  - Natural drainage lines, watercourses and wetlands on or adjacent to the site.
  - Soil type.
  - Vegetation types and distribution, and trees and vegetation to be removed.

City of Clarence

City of Clarence
38 Bligh St Rosny Park
PO Box 96
Rosny Park TAS, 7018

03 6217 9500
clarence@ccc.tas.gov.au
ccc.tas.gov.au

- Location and capacity of any existing services or easements on/to the site.
- Existing pedestrian and vehicle access to the site.
- Location of existing and proposed buildings on the site.
- Location of existing adjoining properties, adjacent buildings and their uses.
- Any natural hazards that may affect use or development on the site.
- Proposed roads, driveways, car parking areas and footpaths within the site.
- Any proposed open space, communal space, or facilities on the site.
- Main utility service connection points and easements.
- Proposed subdivision lot boundaries.

☐ Where it is proposed to erect buildings, detailed plans with dimensions at a scale of 1:100 or 1:200 showing:

- Internal layout of each building on the site.
- Private open space for each dwelling.
- External storage spaces.
- Car parking space location and layout.
- Major elevations of every building to be erected.
- Shadow diagrams of the proposed buildings and adjacent structures demonstrating the extent of shading of adjacent private open spaces and external windows of buildings on adjacent sites.
- Relationship of the elevations to natural ground level, showing any proposed cut or fill.
- Materials and colours to be used on rooves and external walls.

☐ Where it is proposed to erect buildings, a plan of the proposed landscaping showing:

- Planting concepts.
- Paving materials and drainage treatments and lighting for vehicle areas and footpaths.
- Plantings proposed for screening from adjacent sites or public places.

☐ Any additional reports, plans or other information required by the relevant zone or code.

This list is not comprehensive for all possible situations. If you require further information about what may be required as part of your application documentation, please contact City of Clarence Planning team on (03) 6217 9550.

RESULT OF SEARCH

RECORDER OF TITLES

Issued Pursuant to the Land Titles Act 1980

SEARCH OF TORRENS TITLE

VOLUME	FOLIO
59658	13
EDITION	DATE OF ISSUE
6	25-Feb-2025

SEARCH DATE : 15-Sep-2025
SEARCH TIME : 10.27 AM

DESCRIPTION OF LAND

City of CLARENCE
Lot 13 on Plan 59658 (formerly being P744)
Derivation : Part of 39A-3R-20Ps. Gtd. to T. Ludbey
Prior CT 2209/61

SCHEDULE 1

N237124 TRANSFER to SAMUEL ROBERT FOX and MEGAN ANNE FOX
Registered 25-Feb-2025 at 12.01 PM

SCHEDULE 2

Reservations and conditions in the Crown Grant if any

UNREGISTERED DEALINGS AND NOTATIONS

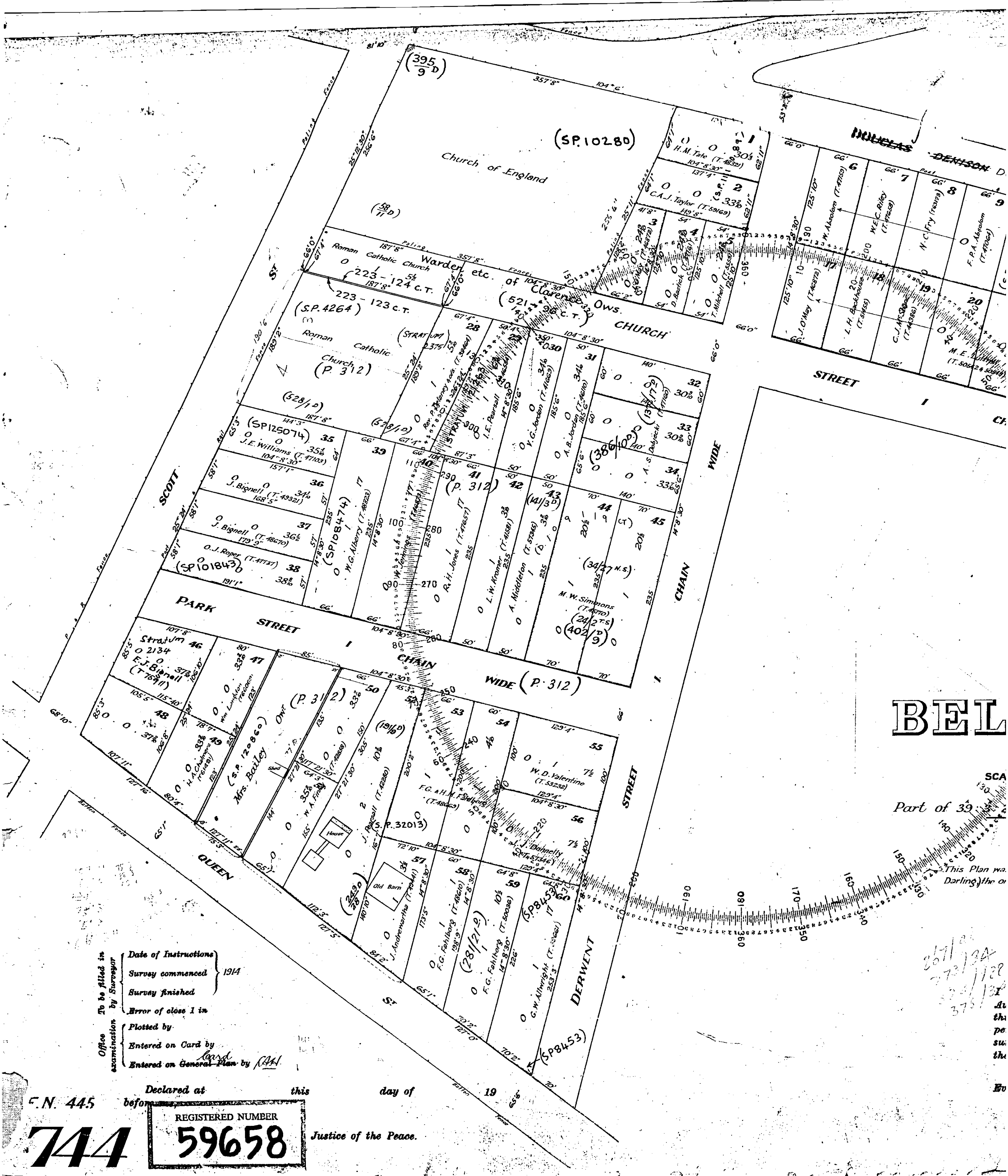
No unregistered dealings or other notations

FOLIO PLAN

RECORDER OF TITLES

Issued Pursuant to the Land Titles Act 1980

Tasmanian Government



F.N. 445
59658
REGISTERED NUMBER
P 740
(SP.10280)
Church of England
DOUGLAS
DENISON
DOUGLAS
ST
CHURCH
STREET
1 CHAIN WIDE
WIDE (P. 312)
1 CHAIN
DERWENT
STREET
BEACH
ST
BELLERIVE
SCALE 80 FT TO AN INCH
Part of 39 : 3 : 20, Granted to Thomas Ludbey.
This Plan was compiled from Field Notes Nº 445 (by Mr. W.F. Darling) the original Plan having been mislaid in Office. 30th May 1923.
I of Authorised Surveyor, of Tasmania, do solemnly and sincerely declare that this plan has been made from surveys executed by me or under my own personal supervision, inspection, and field check, and that both plan and survey are correct, and have been made in accordance with the by-laws of the Surveyor's Board, dated 1st May, 1913.
And I make this solemn declaration by virtue of Section 132 of "The Evidence Act, 1910."
Authorised Surveyor.

ROGERSON & BIRCH SURVEYORS
ABN: 65 117 559 029

UNIT 1, 2 KENNEDY DRIVE
CAMBRIDGE TAS 7170
Phone: (03) 6248 5898
Email: admin@rbsurveyors.com

Our Ref: FOXME01
15th September 2025 /dm

Clarence City Council
PO BOX 96
ROSNY PARK TAS 7018

Dear Sir/Madam

RE: PROPOSED SUBDIVISION – 15 DOUGLAS STREET, BELLERIVE.

Further to our client's instructions, please find enclosed:

1. A copy of the above-named proposed Plan of Subdivision.
2. A copy of the relevant title.
3. Clarence City Council's Development Application form.
4. Flood Hazard Report prepared by Flussig Engineers dated 12/8/2025.

Your advice and tax invoice in relation to the necessary Council fees is requested.

We advise that on receipt of Council's invoice, we will forward same to our client for payment.

This application proposes to subdivide the property as shown on the Plan of Subdivision enclosed.

The land is zoned General Residential under the Tasmanian Planning Scheme, and we make the following comments with respect to the relevant clauses:

8.6.1
A1
Lot 2 complies. See plan.
Lot 1 does not comply given it has an area of less than 450m2. Note Lot 1 can contain a 10m x 15m building area clear of setbacks and easements with a gradient of not steeper than 1 in 5, but perhaps more importantly contains the existing dwelling with reasonable curtilage to the new boundaries. The existing building setbacks to new boundaries comply with the scheme. See comments under P1.

P1 For Lot 1
(a) & (b) Given the lot contains an existing dwelling it is evident that the lot can comply.
(c) The site is essentially level.
(d) The site is subject to the flood prone areas code, see flood report submitted with the application.

Craig Rogerson B.Surv., L.S., M.I.S.
Andrew Birch B.Surv., L.S., M.I.S.
David Miller B.Surv., L.S., M.I.S.

.../2

(e) An area of private open space that satisfies the size and dimension requirements of the scheme is located on the southern side of the dwelling. The area is noted on the Plan of Subdivision.
(f) If the pattern of development in this context is a developed lot that has an area of less than 450m2, then there are nearby examples. See numbers 1/4 and 2/4, and 9 Douglas Street, number 25 Derwent Street, numbers 32 and 32A Church Street. And number 12 Beach Street.

A2
Lot 1 complies.
Lot 2 does not comply see comments under P2.

P2 For Lot 2
(a) The proposal is for lots 1 and 2 to have separate accesses, by creating a new (widened) access for lot 1, see plan. Lot 2 will use the existing crossover and driveway. The driveway will be widened/re-aligned slightly to sit within the lot 2 access strip. The access strip is 4.00m wide.
(b) Lot 2 will be the only lot using the access strip.
(c) The driveway is almost level, with a gentle slope toward the rear of the lot allowing surface water to drain to the existing stormwater connection, see plan. There is no requirement for any major earthworks associated with the access.
(d) The access is existing and has a compliant crossover and transitions. The access affords good sight distance for the low-speed environment of the street.
(e) Lot 2 is vacant and it would be possible for vehicles to enter and leave in a forward direction with future development. Council may condition a future development permit for this requirement, however given the access is only served by one lot this may not be considered to be necessary.
(f) The arrangement for internal lots is evident as a pattern of development of properties in the area. See numbers 1/4, 2/4, and 9A Douglas Street, and numbers 7A and 32A Church Street.

A3
Both lots will have an access that has a compliant crossover and the driveway will have compliant grade and width.

A4
Not applicable as there is no new road.

We consider the objectives of 8.6.1 have been met with the proposal as follows:
(a) The plan demonstrates that residential use and development can be achieved on the lots.
(b) The lots have appropriate access to a road.
(c) While the lots are subject to a flood prone code the flood hazard report demonstrates that development is achievable at a tolerable level of risk.
(d) Lots are orientated to maximise solar access.

8.6.2
A1
Complies. no new roads are proposed.

8.6.3
A1
Complies, see existing and proposed service connections on Plan of Subdivision.

A2
Complies, see existing and proposed service connections on Plan of Subdivision.

A3
Complies, see existing and proposed service connections on Plan of Subdivision.

The land is subject codes under the scheme we make the following comments in relation to the codes;

Parking and Sustainable Transport Code C2.0
C2.5.1
A1 Complies lot 1 has 2 existing car spaces.
C2.6.3
A1 Complies, the number of accesses provided for each frontage is no more than 1.

Road and Railway Assets Code C3.0
C3.7.1
A1 Complies, to our knowledge there is no road or railway attenuation area impacting this site.

Safeguarding of Airports Code C16.0
C16.7.1
A1
Not applicable as the site is not within an airport noise exposure area.

Flood Prone Areas Code C12.0
C12.7.1 See Flood Hazard Report prepared by Flussig Engineers.

Should you have any queries or require any further information, please do not hesitate to contact our office.

We now await your further advice.

Yours faithfully,

David Miller.

ROGERSON & BIRCH SURVEYORS

UNIT 1, 2 KENNEDY DRIVE
CAMBRIDGE 7170
PHONE: (03)6248 5898
EMAIL: admin@rbsurveyors.com
WEB: www.rbsurveyors.com

SHEET 2
VEHICLE TURN PATHS

Denotes new bitumen driveway

Denotes private open space

NOTE THE ENTIRE SITE IS SUBJECT TO THE SAFEGUARDING OF AIRPORTS CODE, AND THE FLOOD PRONE AREAS CODE.

Douglas Street

Stormwater MH
In = 4.65
Out = 4.61

Stormwater MH
Lid = 5.22
In = 4.62
Out = 4.31

S MH
Lid = 5.49
In = 4.51

NBN Pit
Lid = 5.20
Invert of house connection = 4.93

Ex. Water Conn. for Lot 1

New driveway to lot 1 parking

Ex. crossover to be utilised by both lots

Ex. bitumen driveway

New S/W Conn. for Lot 1

DN100 water main

Stormwater MH
Lid = 4.53
In = 3.35

DN600 SW main

1
319m²

(Building footprint = 109m²
Site coverage of dwelling = 34%))

New Water Conn. for Lot 2

Redirect private sewer to new connection for Lot 1

Sewer breather

SW Downpipe

Concrete Slab

(Private open space area = 61m² minimum dimension 4.6m)

2 x jockey car spaces 6m x 2.5m each

Redirect private S/W to new connection for Lot 1

Proposed Right Of Way (to benefit lot 1)

Extend driveway to lot 2 proper

Garage (to be removed)

New Sewer Conn. for Lot 1

New Pipeline & Services Easement 2.50 Wide (to benefit TasWater)

ETBACKS

2
451m²

10 x 15 Building Area

Approx location of sewer pipe To be abandoned

Stormwater pipe locateed by Protech
To be abandoned

Ex. Sewer Conn. to be utilised by Lot 2

S IO
Lid = 4.78
Inv = 3.62

Ex. SW Conn. to be utilised by Lot 2, new I/O to surface

SW pipe PVC obv = 4.10
Inv (assumed to be DN150) = 3.95

S MH (Located by survey)
Lid = 4.23
In = 2.99
Invert of pipe assumed to be inactive under 'In' = 2.59

Stormwater per BYDA plans

Assumed location Sewer per BYDA plans and manhole location

Direction of Sewer IO measured by Protech

S MH (Located by survey)
Lid = 4.42
Out = 3.13

DN150 Sewer main

Assumed location Sewer per BYDA plans and manhole location

Stormwater MH
Lid = 3.17
In = 2.52

0m 5m 10m 15m 20m
1:200

NOTES
1) STORMWATER RUNOFF FROM DRIVEWAYS AND PAKING AREAS ARE TO BE COLLECTED AND DRAINED TO COUNCIL'S EXISTING STORMWATER MAINS IN ACCORDANCE WITH C2.6.1 A1 (b).

REV	AMENDMENTS	DRAWN	DATE	APPR.
E				
D				
C				
B				
A	Note re SW runoff from driveways and parking areas added, access arrangements modified.	DM	19/11/25	DM

OWNER: S.R. & M.A. FOX
TITLE REFERENCE: 59658/13
LOCATION: 15 DOUGLAS STREET, **BELLERIVE**

Proposed Subdivision

Date:	Reference:
3/09/2025	**FOXME01** 16291-01
Scale: 1:200 (A3)	**Municipality:** CLARENCE

ROGERSON & BIRCH SURVEYORS

UNIT 1, 2 KENNEDY DRIVE
CAMBRIDGE 7170
PHONE: (03)6248 5898
EMAIL: admin@rbsurveyors.com
WEB: www.rbsurveyors.com

This plan has been prepared only for the purpose of obtaining preliminary subdivsional approval from the local authority and is subject to that approval.

All measurements and areas are subject to the final survey.

SHEET 1
GENERAL LAYOUT

Denotes new bitumen driveway

Denotes private open space

NOTE THE ENTIRE SITE IS SUBJECT TO THE SAFEGUARDING OF AIRPORTS CODE, AND THE FLOOD PRONE AREAS CODE.

Douglas Street

Stormwater MH
In = 4.65
Out = 4.61

Stormwater MH
Lid = 5.22
In = 4.62
Out = 4.31

S MH
Lid = 5.49
In = 4.51

NBN Pit
Lid = 5.20
Invert of house connection = 4.93

Ex. Water Conn. for Lot 1

New driveway to lot 1 parking

Ex. crossover to be utilised by both lots

Ex. bitumen driveway

DN100 water main

Stormwater MH
Lid = 4.53
In = 3.35

DN600 SW main

New S/W Conn. for Lot 1

1
319m²
(Building footprint = 109m²
Site coverage of dwelling = 34%))

New Water Conn. for Lot 2

Redirect private sewer to new connection for Lot 1

Sewer breather

SW Downpipe

Concrete Slab

(Private open space area = 61m² minimum dimension 4.6m)

(2 x jockey car spaces 6m x 2.5m each)

Redirect private S/W to new connection for Lot 1

Proposed Right Of Way (to benefit lot 1)

Extend driveway to lot 2 proper

Garage (to be removed)

ETBACKS

2
451m²

Approx location of sewer pipe To be abandoned

10 x 15 Building Area

New Sewer Conn. for Lot 1

New Pipeline & Services Easement 2.50 Wide (to benefit TasWater)

Stormwater pipe locateed by Protech
To be abandoned

Ex. Sewer Conn. to be utilised by Lot 2

S IO
Lid = 4.78
Inv = 3.62

Ex. SW Conn. to be utilised by Lot 2, new I/O to surface

SW pipe PVC obv = 4.10
Inv (assumed to be DN150) = 3.95

S MH (Located by survey)
Lid = 4.23
In = 2.99
Invert of pipe assumed to be inactive under 'In' = 2.59

Stormwater per BYDA plans

Assumed location Sewer per BYDA plans and manhole location

Direction of Sewer IO measured by Protech

S MH (Located by survey)
Lid = 4.42
Out = 3.13

DN150 Sewer main

Assumed location Sewer per BYDA plans and manhole location

Stormwater MH
Lid = 3.17
In = 2.52

0m 5m 10m 15m 20m
1:200

NOTES
1) STORMWATER RUNOFF FROM DRIVEWAYS AND PAKING AREAS ARE TO BE COLLECTED AND DRAINED TO COUNCIL'S EXISTING STORMWATER MAINS IN ACCORDANCE WITH C2.6.1 A1 (b).

REV	AMENDMENTS	DRAWN	DATE	APPR.
E				
D				
C				
B				
A	Note re SW runoff from driveways and parking areas added, access arrangements modified.	DM	19/11/25	DM

OWNER: S.R. & M.A. FOX
TITLE REFERENCE: 59658/13
LOCATION: 15 DOUGLAS STREET, **BELLERIVE**

Proposed Subdivision

Date:	Reference:
3/09/2025	**FOXME01** 16291-01
Scale: 1:200 (A3)	**Municipality:** CLARENCE

Prepared for

Megan and Sam Fox

15 Douglas St
Bellerive

FLOOD HAZARD REPORT

FE_25625

12 August 2025

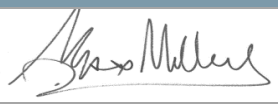
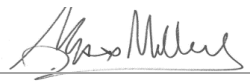
flüssig Engineers

L4/ 116 BATHURST ST
HOBART TASMANIA 7000
ABN: 16 639 276 181

Document Information

Title	Client	Document Number	Project Manager
15 Douglas St, Bellerive Flood Hazard Report	**Megan and Sam Fox**	FE_25625	**Max W. Möller** *BEng, FIEAust, EngExec, CPEng,NER,APEC Engineer, IntPE(Aus.)* *Managing Director / Principal Hydraulic Engineer*

Document Initial Revision

REVISION 00	Staff Name	Signature	Date
Prepared by	Max W. Moller *Principal Hydraulic Engineer*		05/08/2025
Prepared by	Ash Perera *Hydraulic Engineer*		05/08/2025
GIS Mapping	Fraser Cumming ***GIS Specialist***		05/08/2025
Reviewed by	Christine Keane *Water Resources Analyst*		11/08/2025
Reviewed by	John Holmes *Senior Engineer*		11/08/2025
Authorised by	Max W. Möller *Principal Hydraulic Engineer*		12/08/2025

Document Revision History

Rev No.	Description	Reviewed by	Authorised by	Date
01	Figure 6, Sections 3.3, 5 (6) Added and Table 7 (c) Amended	MM	MM	29.09.2025

Contents

List of Tables

List of Figures

Acronyms

AEP: Annual Exceedance Probability
ARR: Australian Rainfall and Runoff
CC: Climate Change
TPS: Tasmanian Planning Scheme
RCP: Representative Concentration Pathway
CFT: Climate Futures Tasmania

1. Introduction

Flüssig Engineers has been engaged by **Megan and Sam Fox,** to undertake a site-specific flood hazard report for the site at 15 Douglas St, Bellerive in the **Clarence City Council** municipality. The purpose of this report is to determine the hydraulic characteristics on the existing and post-development scenarios and the flood hazard for the 1% AEP plus climate change (CC).

1.1 Development

The proposal relates to a proposed subdivision at 15 Douglas St, Bellerive. The site titled CT 59658/13 has an area of approximately 777 m^2 which is intended to be subdivided into 2 lots. There is currently a dwelling on the northern side of the property which is to remain, while and existing garage/ shed is to be demolished. This proposal triggers the inundation code as the development falls within Clarence City Council, flood prone hazard area.

1.2 Objectives and Scope

This flood analysis has been written to meet the standards of the Tasmanian Planning Scheme - Clarence (TPS), with the intent of understanding the development risk with respect to riverine flooding. The objectives of this study are:

- Provide an assessment of the site's flood characteristics under the combined 1% AEP + CC scenario.
- Provide comparison of flooding for pre- and post-development against acceptable and performance criteria.
- Provide flood mitigation recommendations for the development, where appropriate.

1.3 Limitations

This study is limited to the objectives of the engagement by the client, the availability and reliability of data, and including the following:

- The flood model is limited to a 1% AEP + CC worst case temporal design storm.
- All parameters have been derived from best practice manuals and available relevant studies (if applicable) in the area.
- All provided data by the client or government bodies for the purpose of this study is deemed fit for purpose.
- The study is to determine the effects of the new development on flooding behaviour and should not be used as a full flood study into the area without further assessment.

1.4 Relevant Planning Scheme Requirements

Table 1. TPS Planning Scheme Requirements

Planning Scheme Code	Objective
C12.7.1 Subdivision within a flood-prone hazard area	That subdivision within a flood-prone hazard area does not create an opportunity for use or development that cannot achieve tolerable risk from flood
C12.6.1 Building and works within a flood prone area	(a) building and works within a flood-prone hazard area can achieve and maintain a tolerable risk from flood; and (b) buildings and works do not increase the risk from flood to adjacent land and public infrastructure.

2. Model Build

2.1 Overview of Catchment

The contributing catchment for the site at 15 Douglas St, Bellerive is approximately 63 ha. The land use of the catchment is zoned predominantly General Residential, with some areas of Local Business, Utilities and Community Purpose with the specific site being zoned General Residential.

Figure 1 below outlines the approximate contributing catchment for the site at 15 Douglas St, Bellerive.

Figure 1. Contributing Catchment for the site at 15 Douglas St, Bellerive

2.2 Hydrology

The following Table 2 states the adopted hydrological parameters for the RAFTS catchment, derived from best practice documents.

Table 2. Parameters for RAFTS catchment

Catchment Area (ha)	Initial Loss Perv/imp (mm)	Continuing Loss Perv/imp (mm/hr)	Manning's N pervious	Manning's N impervious	Non-linearity factor
63	10/1	1.8/0.0	0.045	0.02	-0.285

2.2.1 Design Rainfall Events

TPS 2021 requires modelling of flood events of 1% AEP (100yr ARI) for the life of the development. Therefore, the design events assessed in this analysis are limited to the 1% AEP + CC design events. Due to the size and grade of the catchment the peak rainfall time was restricted to between 10min – 3hrs.

Figure 2 shows the box and whisker output for the 1% model run. The model shows that the 1% AEP 10-minute storm temporal pattern 7 was the worst-case storm. Therefore, this storm event was used within the hydraulic model.

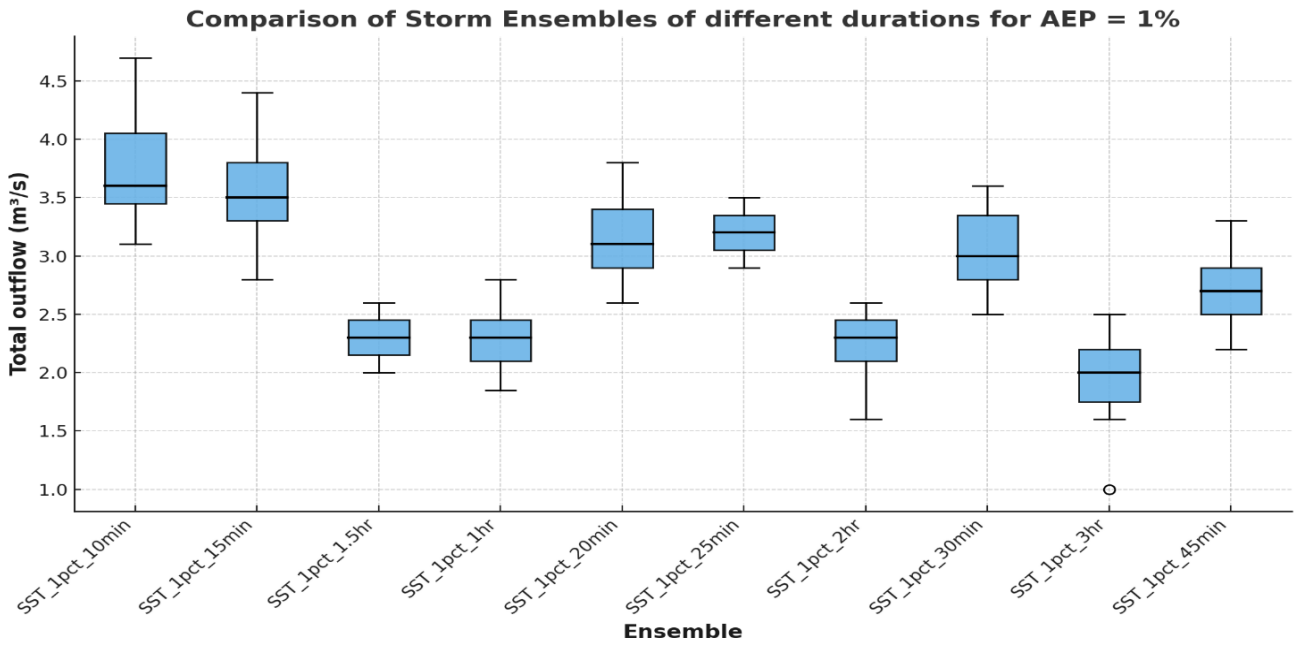


Figure 2. 1% AEP Box and Whisker Plot

2.2.2 Climate Change

As per the ARR 2019 Guide for Flood Estimation (Version 4.2), the recommended approach for estimating increases in rainfall due to climate change projections for the year 2100 scenario.

According to Table 3 of the guide, a multiplication factor of 1.86 is adopted for rainfall durations of less than 1 hour under the SSP5-8.5 at 2100 scenario for the localised catchment. This factor accounts for the anticipated intensification of extreme rainfall events due to climate change impacts.

Table 3. Climate Change Increases

Parameter	Localised Catchment SSP5-8.5 @ 2100
<1 - hour Rainfall Intensity	86% Increase

2.3 Hydraulics

A 1D-2D hydraulic model was created to determine the flood level through the target area.

2.3.1 Extents and topography

The area of concern is situated in the south-west of the catchment. The catchment originates from the Waverley Street to the north, approximately 95 mAHD higher than the site location and the mainstream with an average gradient of approximately 13.6 %.

2.3.2 Calibration/Validation

There is no stream gauge within this immediate catchment to calibrate the model against actual storm events. Likewise, there is limited historical flood data and very few previous flood studies available to validate the modelled flows. To support the rainfall estimates used in the rain-on-grid approach (based on the RAFT parameters in Table 2).

2.3.3 Survey

The 2D surface model was taken from a combination of LiDAR 2019 to create a 1m and cell size DEM. For the purposes of this report, 1m cells are enough to capture accurate flow paths. The DEM with hill shading can be seen below (Figure 3).

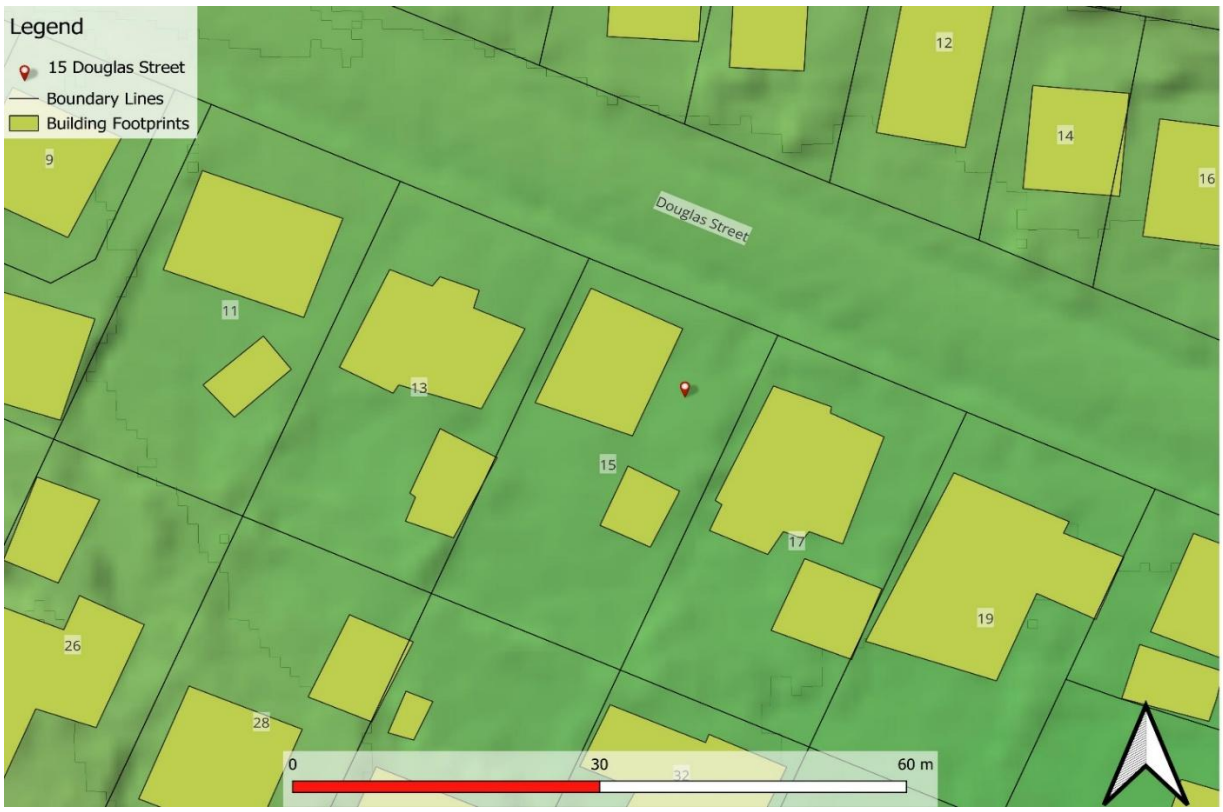


Figure 3. 1m DEM (Hill shade) of proposed subdivision at 15 Douglas St, Bellerive.

2.3.4 Roughness (Manning's n)

Table 4 shows Manning's values used in the model. Values for this layer were derived from the ARR 2019 Guidelines.

Table 4. Manning's Coefficients (ARR 2019)

Land Use	Roads	Open Channel	Rural	Residential	Parks	Buildings	Piped Infrastructure
Manning's n	0.018	0.035	0.04	0.045	0.05	0.3	0.013

2.3.5 Walls

All significant fences and retaining structures were included as 2D linear wall structures within the 2D model. Fences were modelled 300 mm above the ground level.

2.3.6 Buildings

Buildings were represented as mesh polygons with a high Manning's n value within the model. Buildings with unknown floor levels were set with a minimum 300 mm above ground. This method allows for flow through the building if the flood levels/pressure become great enough. The aim is to mimic flow through passageways such as doors, windows, hallways etc.

2.4 Development Runoff

Stormwater runoff from the subdivision site has been assessed under hydraulic model to determine the potential impact the site has on the immediate local flows. For this report, the post development scenario will highlight the depths at various points of the site as there are no proposed buildings until the land titles are approved. The post development scenario in this report will highlight depths at significant points within the proposed subdivision.

3. Model Results

The result of 1% AEP + CC were run through the pre-development scenario to analyse the changes to flooding onsite and to surrounding properties.

3.1 Pre-Development Scenario

The subject site at 15 Douglas St, Bellerive is situated within a mild topographic gradient. Under existing (pre-development) conditions as shown in Figure 4, the site is traversed by a shallow, diffuse overland flow path that conveys local runoff across the lot, predominantly towards the eastern lot boundary and into the adjacent property.

Hydraulic modelling of the 1% Annual Exceedance Probability (AEP) event, including allowances for future climate change (Year 2100), indicates that the site is subject to sheet flow inundation that affects the entirety of the lot. Modelled flood depths under this scenario range generally between 0.02 m and 0.50 m, with spatial variation driven by microtopographic depressions across the site. No evidence of concentrated flow, channelisation, or significant ponding is observed, confirming that the dominant flood mechanism is shallow, distributed surface flow.

Velocity mapping supports this interpretation, with surface flow velocities across the site predominantly ranging between 0.05 m/s and 1.5 m/s. These velocities are consistent with low-intensity, low-energy surface runoff and indicate negligible potential for scour, sediment mobilisation, or hydraulic instability.

Corresponding flood hazard classification mapping categorises a majority of the allotment within the H1 hazard band based on Australian Rainfall and Runoff (ARR) 2019 hazard criteria, with a small area of H2 classified flooding on the western wall of the existing dwelling. This classification confirms that floodwaters are of insufficient depth and velocity to pose a threat to human safety, vehicular passage, or structural integrity.

3.2 Post-Development Scenario

Post-development hydraulic modelling of the 1% AEP + CC (2100) event indicates that the proposed demolition of the shed will retain the existing overland flow path functionality, maintaining the primary surface flow regime through the lot. Local surface runoff will continue to be conveyed towards the eastern lot boundary.

Post-development flood depths, as shown in Figure 5, are predicted to decrease marginally due to the removal of the shed allowing a more dispersed flow. However, maximum flood depths across the developed site remain within the range of 0.02 m to 0.50 m, with the inundation footprint still dominated by sheet flow characteristics.

Surface flow velocities remain consistent with pre-development conditions, with the majority of the site experiencing velocities below 0.20 m/s. This confirms that the proposed development does not introduce high-energy flow conditions or increase the potential for erosion, debris transport, or structural impact.

The flood hazard mapping confirms that the entire site remains within the H1 hazard classification, with the small area of H2 as indicated in the pre-development model, indicating that post-development conditions continue to pose minimal hydraulic risk to life, vehicles, and built infrastructure.

3.3 Potential Building Pad Scenario.

A potential 10m x 15m x 0.35m building pad has been incorporated into the post-development scenario to assess the suitability of the proposed lot layout and the potential to minimise future works. Flood hazard mapping confirms the site remains within the H1 classification, with only a small area of H2 identified to the side and rear of the future building pad. This does not create any adverse effects for vehicles or building users, confirming that post-development conditions pose minimal hydraulic risk to life, vehicles, and infrastructure. If future buildings are constructed on piers, outcomes would be further improved. Refer to Figure 6 and Appendix A for details.

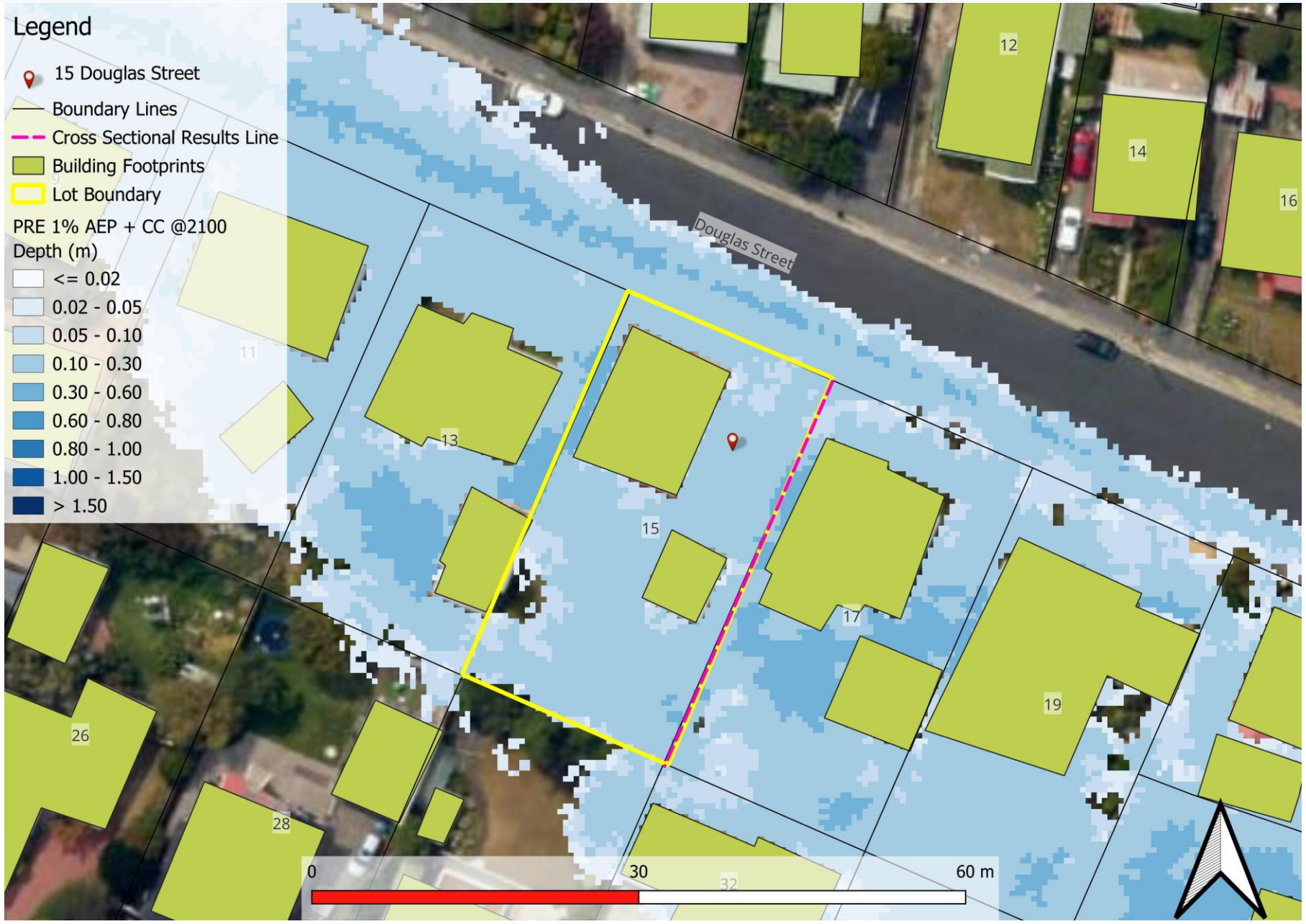


Figure 4. Pre-Development 1%+CC Flood Depths and extents

Figure 5. Post Development 1%+CC Flood Depth and extents

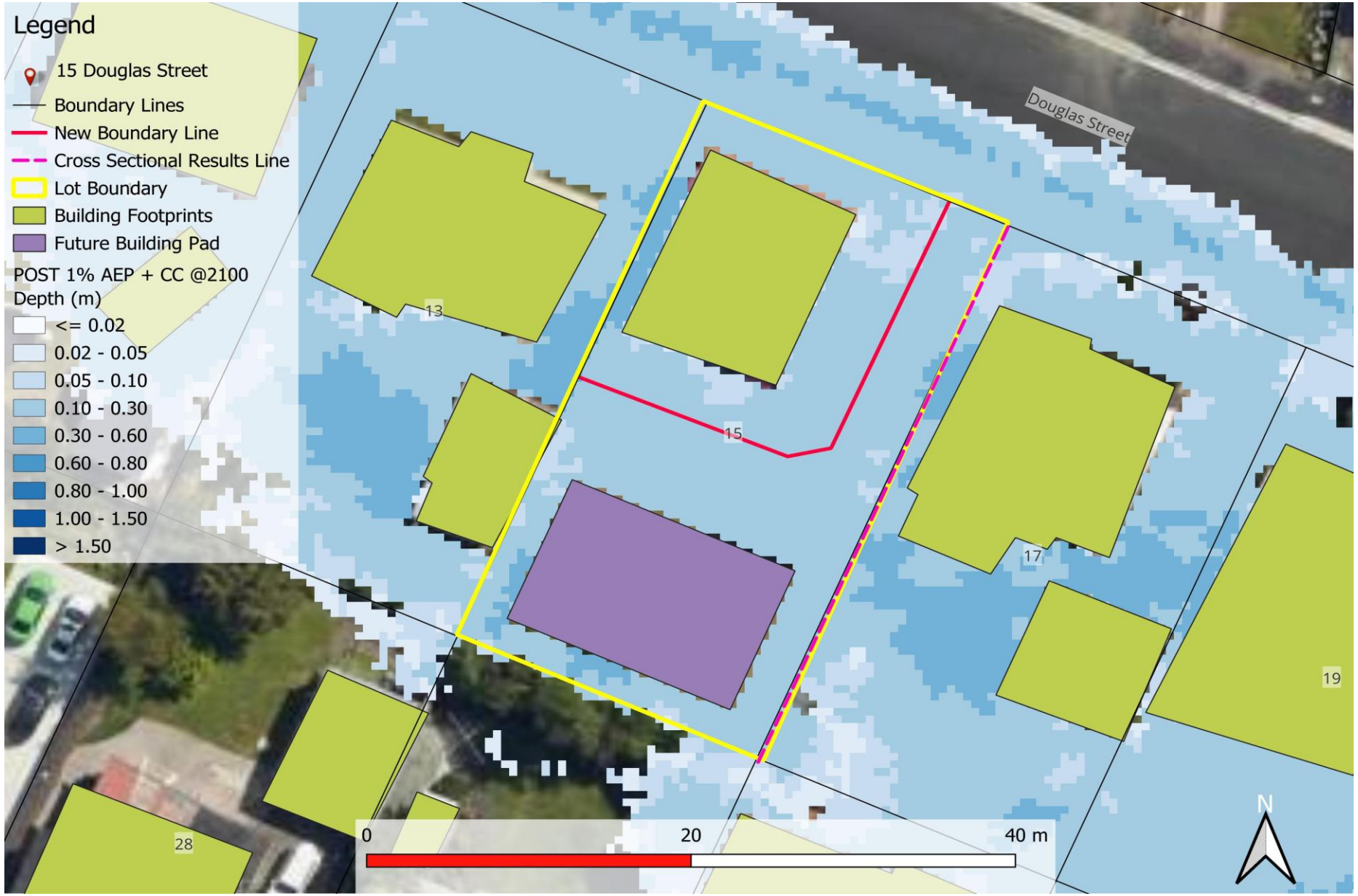


Figure 6. Post Development 1%+CC - Potential Future Building Pad.

3.4 Displacement of Overland Flow on Third Party Property

Figure 5 shows post-development flows that, when compared against pre-development, there is no increase in flood extents outside the lot boundaries. The hazard rating at the properties downstream are at the maximum level of H2 in both pre-development and post-development scenarios with no noticeable change in hazard extent.

It is therefore deemed that the post development model does not adversely affect flood flow through surrounding properties due to overland flow displacement.

3.5 Development Effects on Stormwater Discharge

Figure 7 below shows the discharge hydrograph for the site at 15 Douglas St, Bellerive area only. The graph was captured in the model for the hydraulic model run and illustrated in a graph to demonstrate the net-discharge and velocity. It demonstrates that there is a maximum site discharge of 3.03 m^3/s and maximum velocity of 0.93 m/s in the pre-development model, that both reduce slightly in the post development model to 3.00 m^3/s and 0.73 m/s respectively. It can therefore be stated that the proposed works do not have a detrimental impact on discharge and stormwater infrastructure.

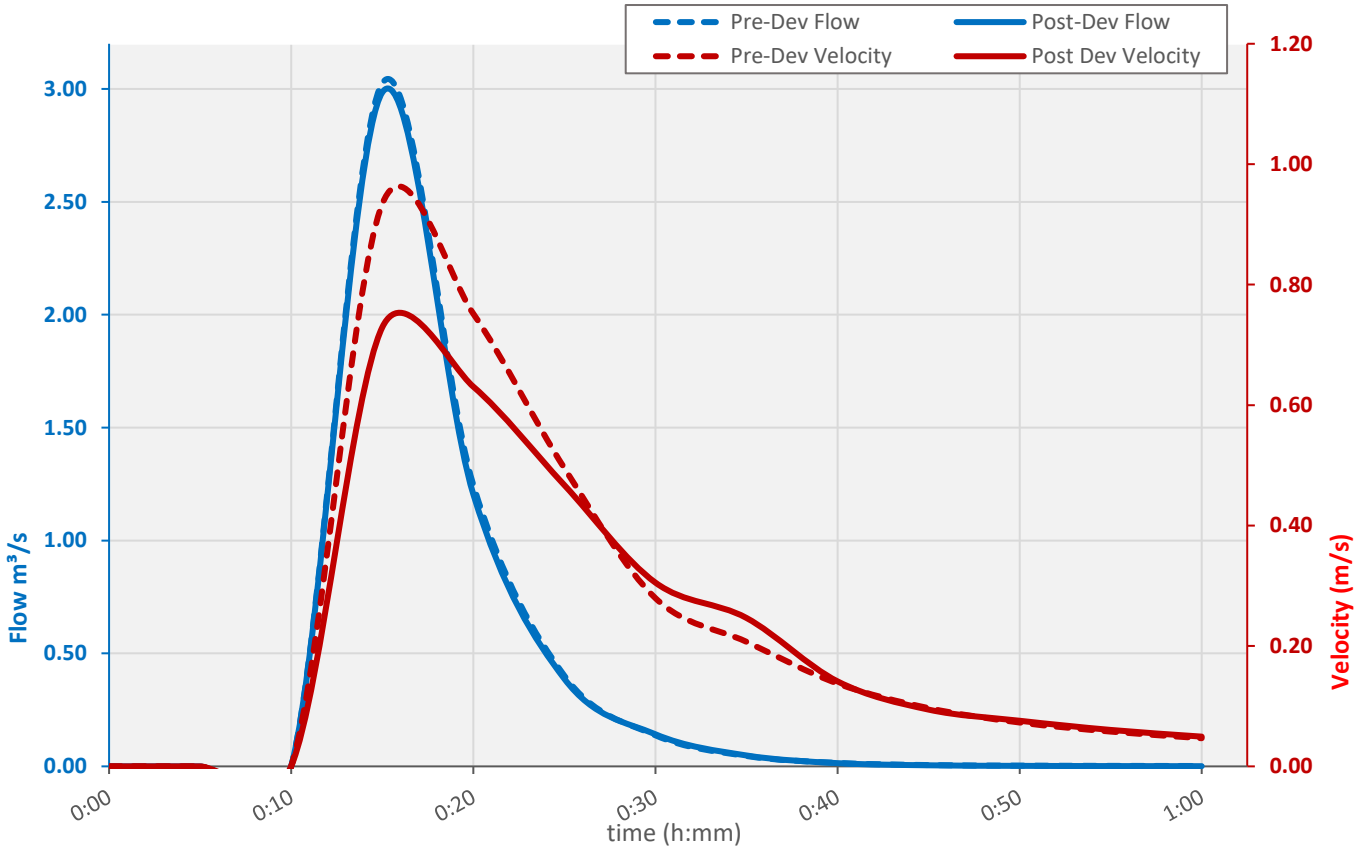


Figure 7. Net Discharge and velocity 1% AEP +CC, proposed subdivision at 15 Douglas St

3.4 Model Summary

Table 5. Results at the cross-sectional line within the lot

	Pre-development	Post-development	change
Depth (m)	0.48	0.44	- 0.04
Velocity (m/s)	0.93	0.73	- 0.20
Discharge (m^3/s)	3.01	3.00	- 0.01

4. Flood Hazard

Appendix A shows the pre and post development hazard maps. In the pre-development scenario, the maximum velocity and depth at the cross-sectional line on the western lot boundary are 0.93 m/s and 0.48 m respectively. This places the hazard rating at **H2 – *Generally safe for people and buildings, unsafe for small vehicles*** as adopted by Australian Flood Resilience and Design Handbook as shown in Figure 8. However, this area is limited to the western lot boundary near the existing dwelling, with minor areas of H2 near the eastern lot boundary. The remainder of the site at 15 Douglas Street is classified at **H1** - ***Generally safe for people, vehicles and buildings***.

Following removal of the shed, the hazard rating does increase, with a majority of the site remaining at H1 hazard. At these flood levels, the proposed subdivision would not provide an opportunity for development that would be considered as not have a tolerable risk to flooding within the lot or on neighbouring lots and public infrastructure, provided that appropriate design methods, such as minimum habitable floor levels, are complied with.

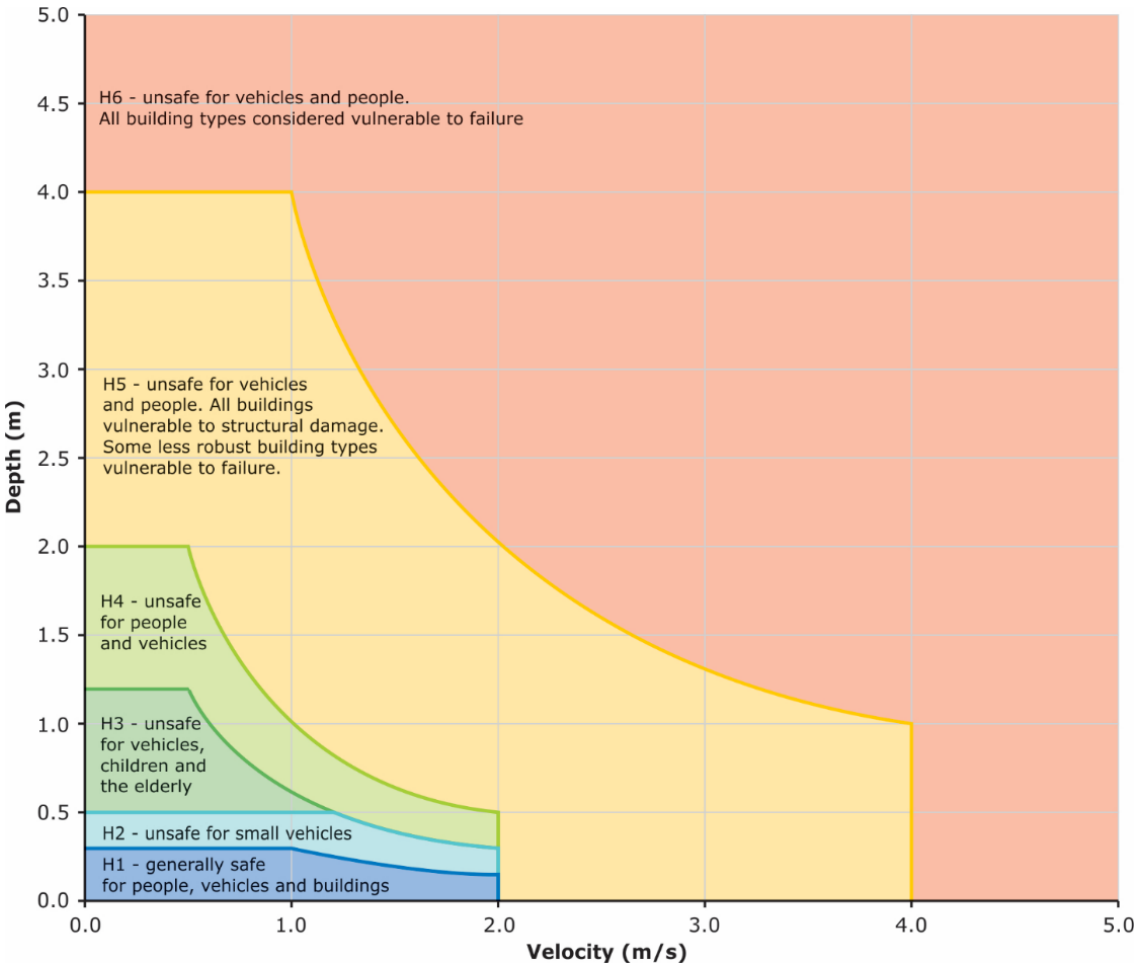


Figure 8. Hazard Categories Australian Disaster and Resilience Handbook

4.1 Tolerable Risk

Flood analysis of the lot at 15 Douglas Street, Bellerive indicates the proposed site is within a shallow overland flow path, with the majority of the surrounding area classified as low hazard (H1) under the 1% AEP plus climate change scenario. This suggests the site is generally safe for all ages and structures.

Although depths and velocities are relatively low, there remains some risk of erosion and debris movement. It is recommended that any future structures be designed to withstand hydrostatic and hydrodynamic forces to ensure long-term suitability.

Table 6. TPS C12.7.1 Subdivision within a flood-prone hazard area

C12.7.1 Subdivision within a flood-prone hazard area			
Objectives: That subdivision within a flood-prone hazard area does not create an opportunity for use or development that cannot achieve a tolerable risk from flood.			
Performance Criteria			
P1		**P1**	
Each lot, or a lot proposed in a plan of subdivision, within a flood-prone hazard area, must not create an opportunity for use or development that cannot achieve a tolerable risk from flood, having regard to:		Response from flood report	
(a)	any increase in risk from flood for adjacent land;	(a)	Proposed subdivision is within a general residential area which would be considered as having tolerable risk of increased flooding on adjacent land if a dwelling and access was constructed in the future.
(b)	the level of risk to use or development arising from an increased reliance on public infrastructure;	(b)	The risk of an increase in reliance on public infrastructure if the subdivided land was developed for residential use would be considered tolerable.
(c)	the need to minimise future remediation works;	(c)	No future remediation measures are proposed, nor are they likely to be required if the proposed lot is developed. Figure 6 shows a potential 10 m x 15 m building pad that would not require any remediation works. If a future building is constructed on piers with an unobstructed overland flow path beneath, the impacts would be even more negligible, further reducing the need for any remediation measures.
(d)	any loss or substantial compromise by flood of access to the lot, on or off site;	(d)	Access to the site is not affected by the flood extents. The maximum hazard rating at access to proposed subdivision is at H1 which is generally safe for vehicles, people, and buildings.
(e)	the need to locate building areas outside the flood-prone hazard area;	(e)	Proposed residential lot is within H1 hazard flooding which can be deemed as having tolerable risk provided appropriate design methods, such as minimum habitable floor levels are adhered to.
(f)	any advice from a state authority, regulated entity or a council; and	(f)	N/A
(g)	the advice contained in a flood hazard report.	(g)	Flood report and recommendations provided within.

Table 7. TPS C12.6.1 Building and works within a flood-prone hazard area

C12.6.1 Building and works within a flood-prone hazard area			
Objective: (a) building and works within a flood-prone hazard area can achieve and maintain a tolerable risk from flood; and (b) buildings and works do not increase the risk from flood to adjacent land and public infrastructure.			
Performance Criteria			
P1.1		**P1.1**	
Buildings and works within a flood-prone hazard area must achieve and maintain a tolerable risk from a flood, having regard to:		Response from flood report	
(a)	the type, form, scale and intended duration of the development;	(a)	Proposed demolition of existing shed.
(b)	whether any increase in the level of risk from flood requires any specific hazard reduction or protection measures;	(b)	No requirement to provide hazard reduction protection measures as risk level remains constant following shed demolition.
(c)	any advice from a state authority, regulated entity or a council; and	(c)	N/A
(d)	the advice contained in a flood hazard report.	(d)	Flood report and recommendations provided within.
Performance Criteria			
P1.2		**P1.2**	
A flood hazard report also demonstrates that the building and works:		Response from Flood Report	
(a)	do not cause or contribute to flood on the site, on adjacent land or public infrastructure; and	(a)	There is no increase in the level of risk within the lot, adjacent land and to surrounding infrastructure.
(b)	can achieve and maintain a tolerable risk from a 1% annual exceedance probability flood event for the intended life of the use without requiring any flood protection measures.	(b)	Can achieve tolerable risk without mitigation measures for a general residential development.

5. Conclusion

The Flood Hazard Report for the proposed subdivision and shed demolition at 15 Douglas St, Bellerive has reviewed the potential flood scenarios.

The following conclusions were derived in this report:

1. Peak flows for the 1% AEP at 2100 were undertaken against the Tasmanian Planning Scheme – Clarence, C12.6.1 and C12.7.1.
2. Maximum flood depth of 0.48 m was seen at the cross-sectional results line on the western lot boundary which reduced by 0.04 m in the post-development scenario following removal of the shed.
3. The maximum peak discharge at the lot boundary was 3.03 m^3/s in the pre-development model, that reduced slightly in the post-development model to 2.98 m^3/s.
4. The maximum velocity at the western lot boundary was 0.93 m/s that reduced by 0.20 m/s in the post-development model to 0.73 m/s.
5. The maximum hazard rating within the proposed new lot is at H1, with only small areas of H2 near the external lot boundaries and on the western side of the existing dwelling.
6. The assessment confirms that the proposed lot can be developed without the need for future remediation works. A suitable building pad is available, and if future structures are elevated on piers to allow overland flow to continue beneath, the requirement for remedial works would be even more negligible.

6. Recommendations

Flussig Engineers therefore recommend the following engineering design be adopted for proposed subdivision to ensure the works meets the Flood Prone Areas Hazard Code:

1. Any future structure located in the inundation area within the subdivision, are to be designed to resist flood forces including debris.
2. Any future buildings on the newly subdivided lot must have a minimum habitable floor level of at least 300mm above the 1% AEP + CC flood level as per Building Regulations 2016 S.54.
3. Future use of the subdivision, to be limited to areas deemed safe under the ARR Disaster manual categories.
4. Recommendations for future buildings will vary based on their specific layout and must be assessed separately to ensure the development can meet C12.5.1 and 12.6.1 of the Tasmanian Planning Scheme.

Under the requirements of Flood Hazard Report, the proposed subdivision and shed demolition will meet current acceptable solutions and performance criteria under the Tasmanian Planning Scheme 2021.

7. Limitations

Flüssig Engineers were engaged by **Megan and Sam Fox,** for the purpose of a site-specific Flood Hazard Report for the proposed subdivision and works at 15 Douglas St, Bellerive as per C12.6.1 and C12.7.1 of the Tasmanian Planning Scheme - Clarence 2021. This study is deemed suitable for purpose at the time of undertaking the study. If the conditions of the development should change, the plan will need to be reviewed against all changes.

This report is to be used in full and may not be used in part to support any other objective other than what has been outlined within, unless specific written approval to do otherwise is granted by Flüssig Engineers.

Flüssig Engineers accepts no responsibility for the accuracy of third-party documents supplied for the purpose of this flood report.

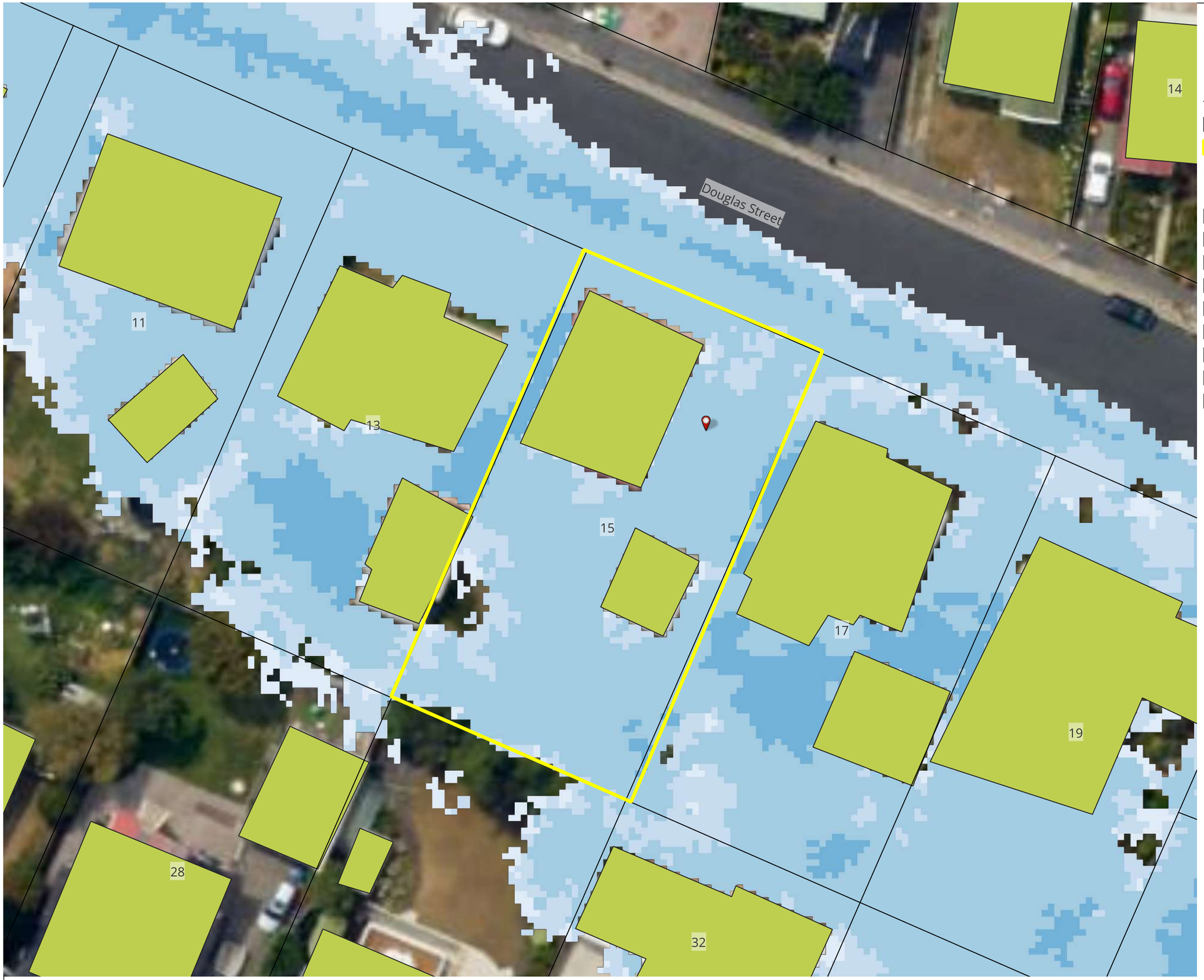
8. References

- Australian Disaster Resilience Guideline 7-3: Technical flood risk management guideline: Flood hazard, 2014, Australian Institute for Disaster Resilience CC BY-NC
- Austroads 2013, Guide to Road Design Part 5: Drainage-General and Hydrology Considerations
- Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors), 2019, Australian Rainfall and Runoff: A Guide to Flood Estimation, Commonwealth of Australia
- Grose, M. R., Barnes-Keoghan, I., Corney, S. P., White, C. J., Holz, G. K., Bennett, J., & Bindoff, N. L. (2010). Climate Futures for Tasmania: General Climate Impacts Technical Report.
- T.A. Remenyi, N. Earl, P.T. Love, D.A. Rollins, R.M.B. Harris, 2020, Climate Change Information for Decision Making –Climate Futures Programme, Discipline of Geography & Spatial Sciences, University of Tasmania.
- Clarence City Council, 2021, Climate Change Impacts and Adaptation Plan 2021–2031, Clarence City Council.

9. Appendices

Appendix A Flood Maps

Pre 1% AEP + CC @2100



Legend:

- 15 Douglas Street
- Boundary Lines
- Building Footprints
- Lot Boundary

PRE 1% AEP + CC @2100
Depth (m)

- <= 0.02
- 0.02 - 0.05
- 0.05 - 0.10
- 0.10 - 0.30
- 0.30 - 0.60
- 0.60 - 0.80
- 0.80 - 1.00
- 1.00 - 1.50
- > 1.50

0 20 40 m

meters

N

flüssig Engineers

admin@flussig.com.au
(03) 6288 7704
www.flussig.com.au
116 Bathurst St, Level 4
Hobart, 7000, TASMANIA

Map CRS: GDA94 / MGA zone 55 EPSG:28355

Pre 1% AEP + CC @2100

Douglas Street

11
13
15
17
19
28
32
14

Legend:

- 15 Douglas Street
- Boundary Lines
- Building Footprints
- Lot Boundary

PRE 1% AEP + CC @2100
Velocity (m/s)

- <= 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- > 2.00

0 20 40 m

meters

N

flüssig Engineers

admin@flussig.com.au
(03) 6288 7704
www.flussig.com.au
116 Bathurst St, Level 4
Hobart, 7000, TASMANIA

Map CRS: GDA94 / MGA zone 55 EPSG:28355

Pre 1% AEP + CC @2100

Douglas Street

11
13
15
17
19
28
32
14

Legend:

- 15 Douglas Street
- Boundary Lines
- Building Footprints
- Lot Boundary

PRE 1% AEP + CC @2100 Hazard

- H1
- H2
- H3
- H4
- H5
- H6

0 20 40 m

meters

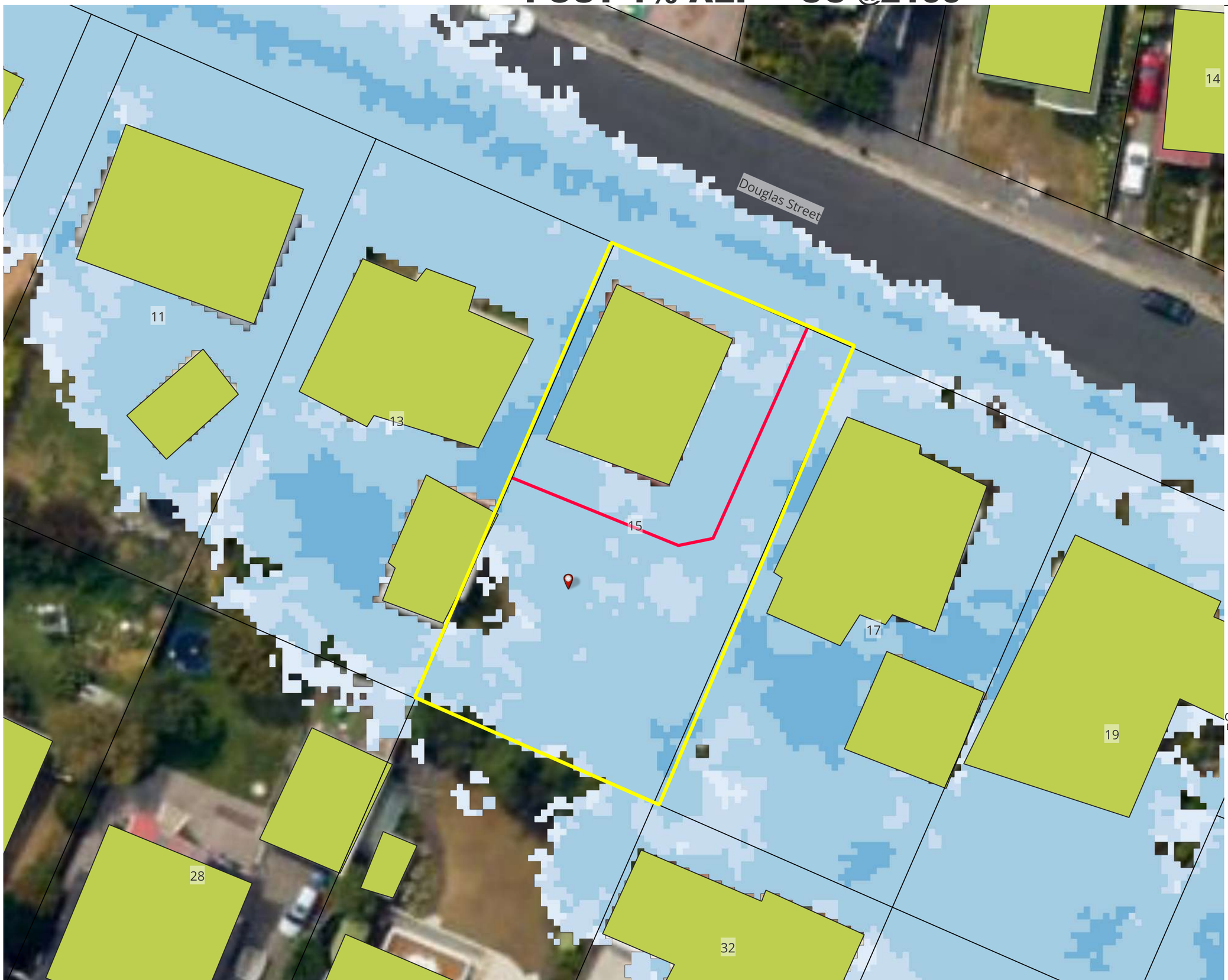
N

flüssig Engineers

admin@flussig.com.au
(03) 6288 7704
www.flussig.com.au
116 Bathurst St, Level 4
Hobart, 7000, TASMANIA

Map CRS: GDA94 / MGA zone 55 EPSG:28355

POST 1% AEP + CC @2100



Legend

- 15 Douglas Street
- Boundary Lines
- New Boundary Line
- Lot Boundary
- Building Footprints

POST 1% AEP + CC @2100
Depth (m)

- <= 0.02
- 0.02 - 0.05
- 0.05 - 0.10
- 0.10 - 0.30
- 0.30 - 0.60
- 0.60 - 0.80
- 0.80 - 1.00
- 1.00 - 1.50
- > 1.50

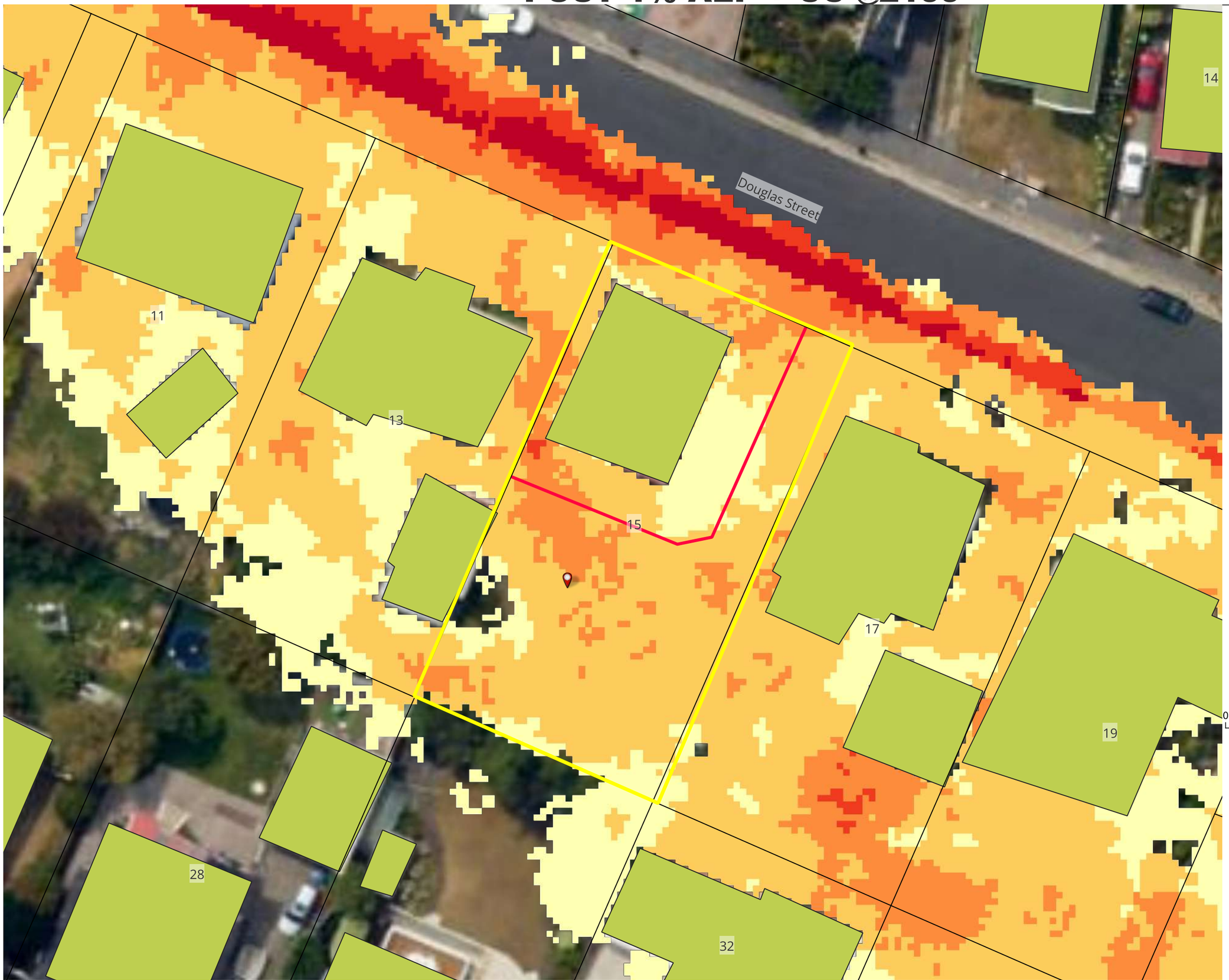
0 20 40 m
meters

N

flüssig Engineers
admin@flussig.com.au
(03) 6288 7704
www.flussig.com.au
116 Bathurst St, Level 4 Hobart, 7000, TASMANIA

Map CRS: GDA94 / MGA zone 55 EPSG:28355

POST 1% AEP + CC @2100



Legend

- 15 Douglas Street
- Boundary Lines
- New Boundary Line
- Lot Boundary
- Building Footprints

POST 1% AEP + CC @2100
Velocity (m/s)

- <= 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- > 2.00

0 20 40 m

meters

N

Map CRS: GDA94 / MGA zone 55 EPSG:28355

flüssig Engineers
admin@flussig.com.au
(03) 6288 7704
www.flussig.com.au
116 Bathurst St, Level 4 Hobart, 7000, TASMANIA

POST 1% AEP + CC @2100

Douglas Street

11
13
15
17
19
14
28
32

Legend

15 Douglas Street
Boundary Lines
New Boundary Line
Lot Boundary
Building Footprints

POST 1% AEP + CC @2100
Hazard
H1
H2
H3
H4
H5
H6

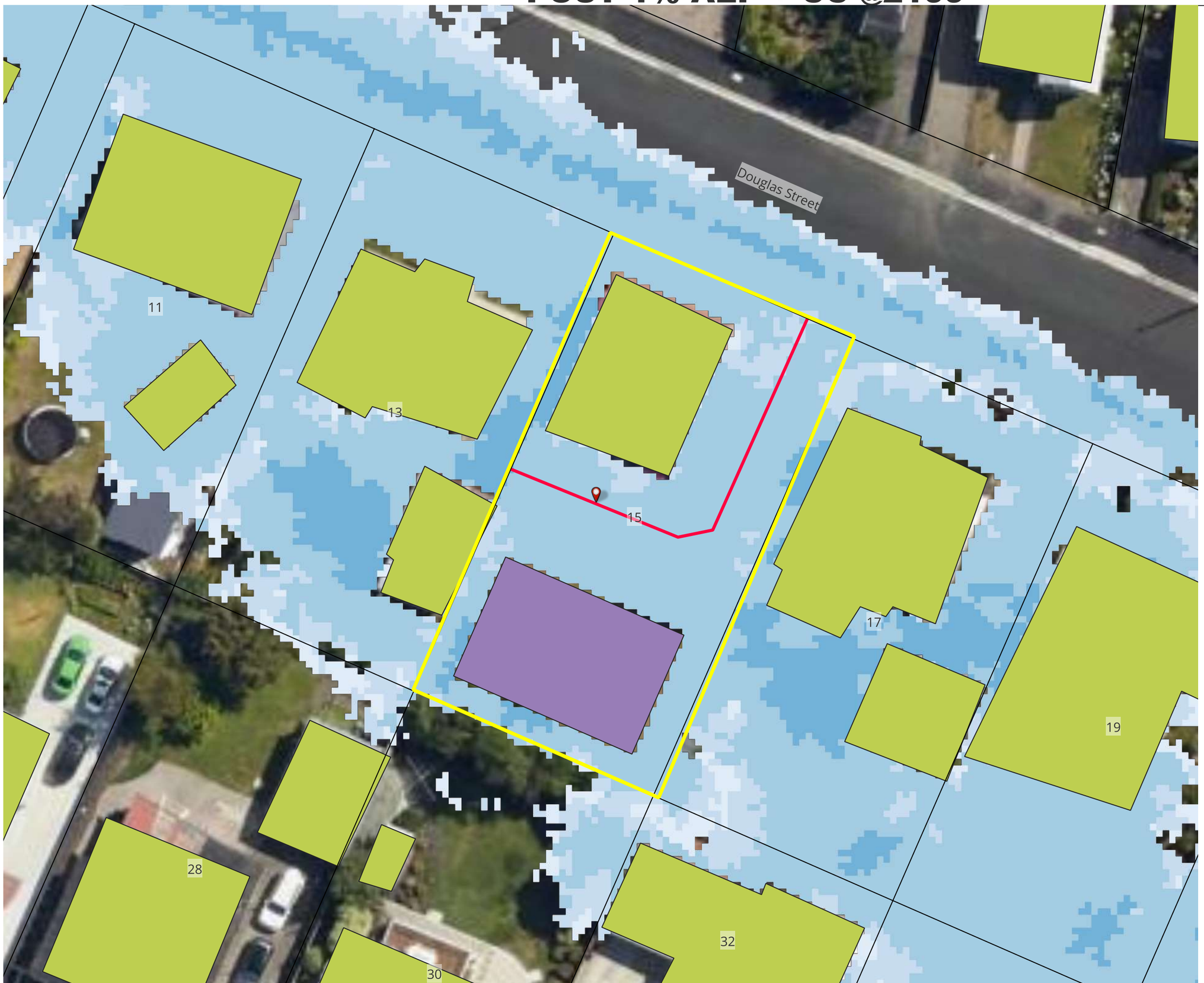
0 20 40 m
meters

N

Map CRS: GDA94 / MGA zone 55 EPSG:28355

flüssig Engineers
admin@flussig.com.au
(03) 6288 7704
www.flussig.com.au
116 Bathurst St, Level 4 Hobart, 7000,
TASMANIA

POST 1% AEP + CC @2100



Legend

- 15 Douglas Street
- Boundary Lines
- New Boundary Line
- Lot Boundary
- Building Footprints
- Future Building Pad

POST 1% AEP + CC @2100
Depth (m)

- <= 0.02
- 0.02 - 0.05
- 0.05 - 0.10
- 0.10 - 0.30
- 0.30 - 0.60
- 0.60 - 0.80
- 0.80 - 1.00
- 1.00 - 1.50
- > 1.50

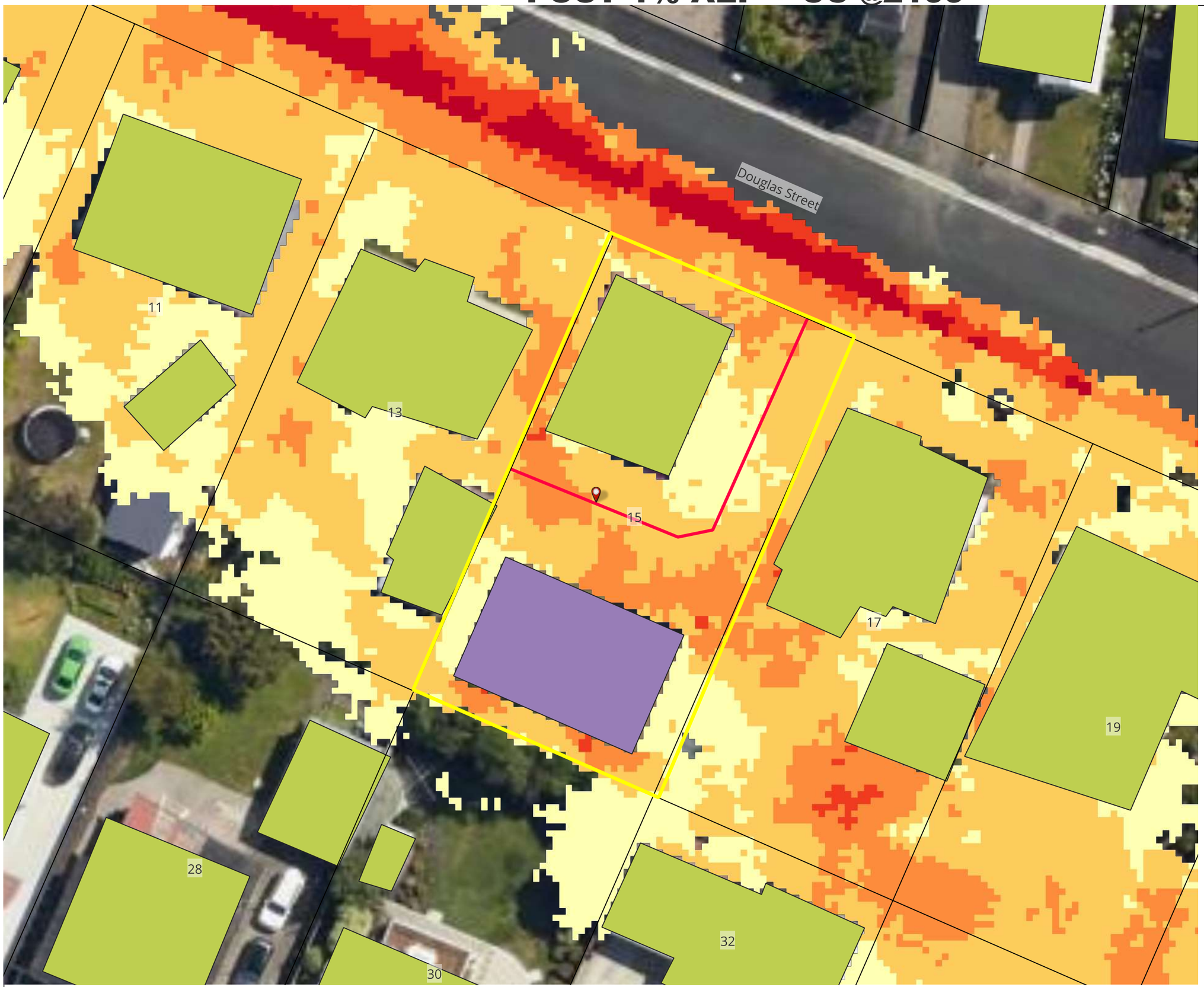
0 20 40 m
meters

N

flüssig Engineers
admin@flussig.com.au
(03) 6288 7704
www.flussig.com.au
116 Bathurst St, Level 4 Hobart, 7000, TASMANIA

Map CRS:

POST 1% AEP + CC @2100



Legend

- 15 Douglas Street
- Boundary Lines
- New Boundary Line
- Lot Boundary
- Building Footprints
- Future Building Pad

POST 1% AEP + CC @2100
Velocity (m/s)

- <= 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- > 2.00

0 20 40 m

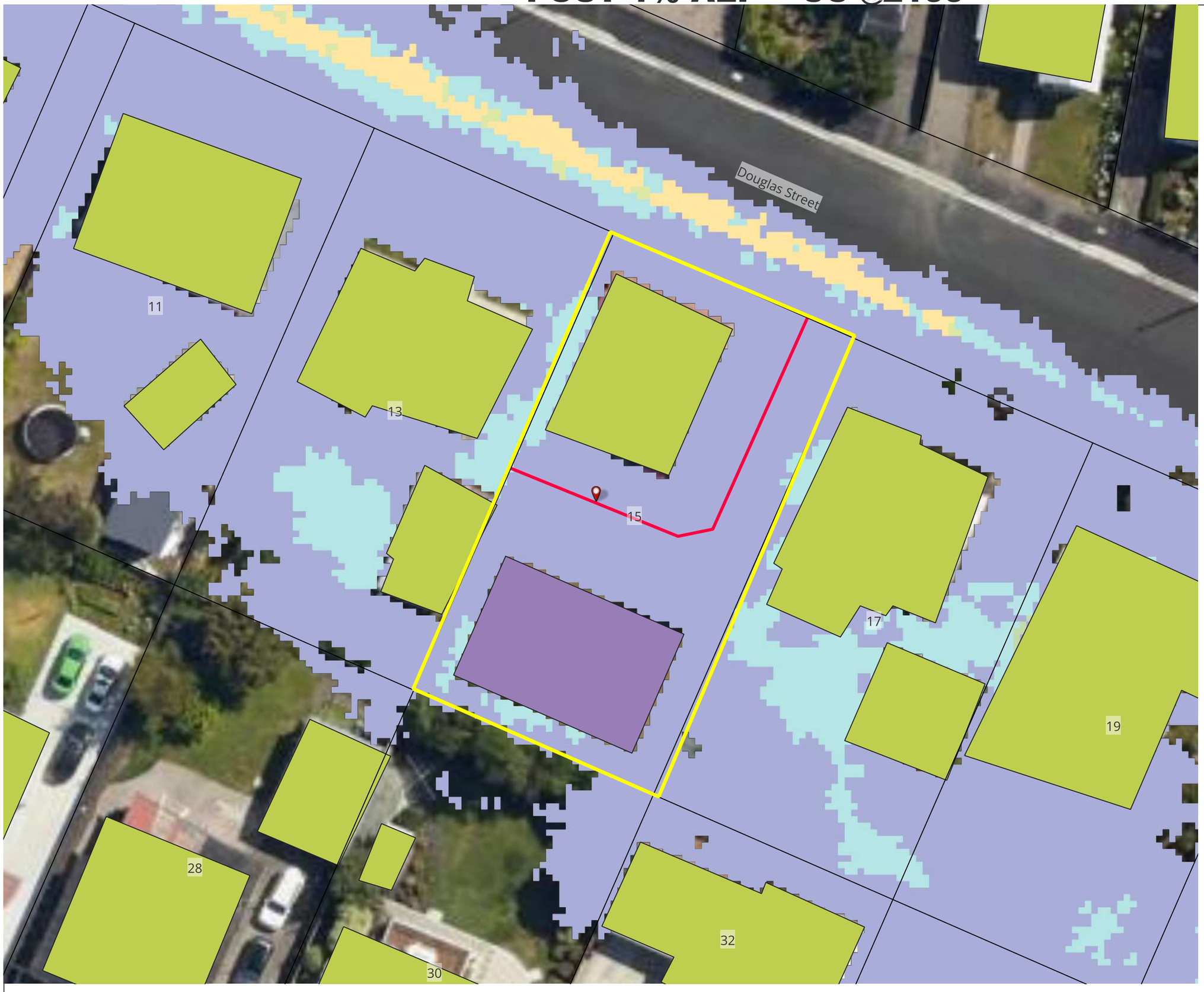
meters

N

flüssig Engineers
admin@flussig.com.au
(03) 6288 7704
www.flussig.com.au
116 Bathurst St, Level 4 Hobart, 7000, TASMANIA

Map CRS:

POST 1% AEP + CC @2100



Legend

- 15 Douglas Street
- Boundary Lines
- New Boundary Line
- Lot Boundary
- Building Footprints
- Future Building Pad

POST 1% AEP + CC @2100

Hazard

- H1
- H2
- H3
- H4
- H5
- H6

0 20 40 m

meters

N

Map CRS:

flüssig Engineers
admin@flussig.com.au
(03) 6288 7704
www.flussig.com.au
116 Bathurst St, Level 4 Hobart, 7000,
TASMANIA

Contact Project Manager: **Max Möller**

P: 03 6288 7704
M: 0431 080 279
E: max@flussig.com.au
W: www.flussig.com.au
A: Level 4, 116 Bathurst Street
Hobart TAS 7000