DEVELOPMENT APPLICATION

PDPLANPMTD-2025/051992

PROPOSAL: Demolition & Two Multiple Dwellings

LOCATION: 72 Esplanade, Rose Bay

RELEVANT PLANNING SCHEME: Tasmanian Planning Scheme - Clarence

ADVERTISING EXPIRY DATE: 25 August 2025

The relevant plans and documents can be inspected at the Council offices, 38 Bligh Street, Rosny Park, during normal office hours until 25 August 2025. 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 25 August 2025.

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: 2 units

Location:

72 Esplanade Rosebay

Personal Information Removed

Estimated cost of development: $1.2 million dollars

City of Clarence

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38 Bligh St Rosny Park
PO Box 96
Rosny Park TAS, 7018

03 6217 9500
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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:

Memory Hatendi or Holly Thurston-Doyle

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.

Applica

Personal Information Removed

Date:

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

RESULT OF SEARCH

RECORDER OF TITLES

Issued Pursuant to the Land Titles Act 1980

Tasmanian Government

SEARCH OF TORRENS TITLE

VOLUME	FOLIO
60499	12
EDITION	DATE OF ISSUE
5	08-Sep-2020

SEARCH DATE : 07-May-2025
SEARCH TIME : 04.50 PM

DESCRIPTION OF LAND

City of CLARENCE
Lot 12 on Plan 60499 (formerly being P685)
Derivation : Part of 232 Acres Gtd. to A. Montagu.
Prior CT 2811/80

SCHEDULE 1

M682234 ASSENT to THOMAS KEITH STANTON Registered 04-Jul-2018 at noon

SCHEDULE 2

Reservations and conditions in the Crown Grant if any
BENEFITING EASEMENT: a right of carriage way over the streets and roadways on Plan No. 60499
88048 BOUNDARY FENCES AND OTHER CONDITIONS in Transfer
E232337 MORTGAGE to Australia and New Zealand Banking Group Limited Registered 08-Sep-2020 at noon

UNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

CERTIFICATE OF TITLE

LAND TITLES ACT 1980

TASMANIA

TORRENS TITLE

VOLUME	FOLIO
60499	12
EDITION	**DATE OF ISSUE**
4	04-Jul-2018
Page 1	of 1

I certify that the person described in Schedule 1 is the registered proprietor of an estate in fee simple (or such other estate or interest as is set forth in that Schedule) in the land within described subject to such exceptions, encumbrances, interests and entries specified in Schedule 2 and to any additional entries in the Folio of the Register.

Alice Kawa

Recorder of Titles.

RECORDER OF TITLES TASMANIA

DESCRIPTION OF LAND

City of CLARENCE
Lot 12 on Plan 60499 (formerly being P685)
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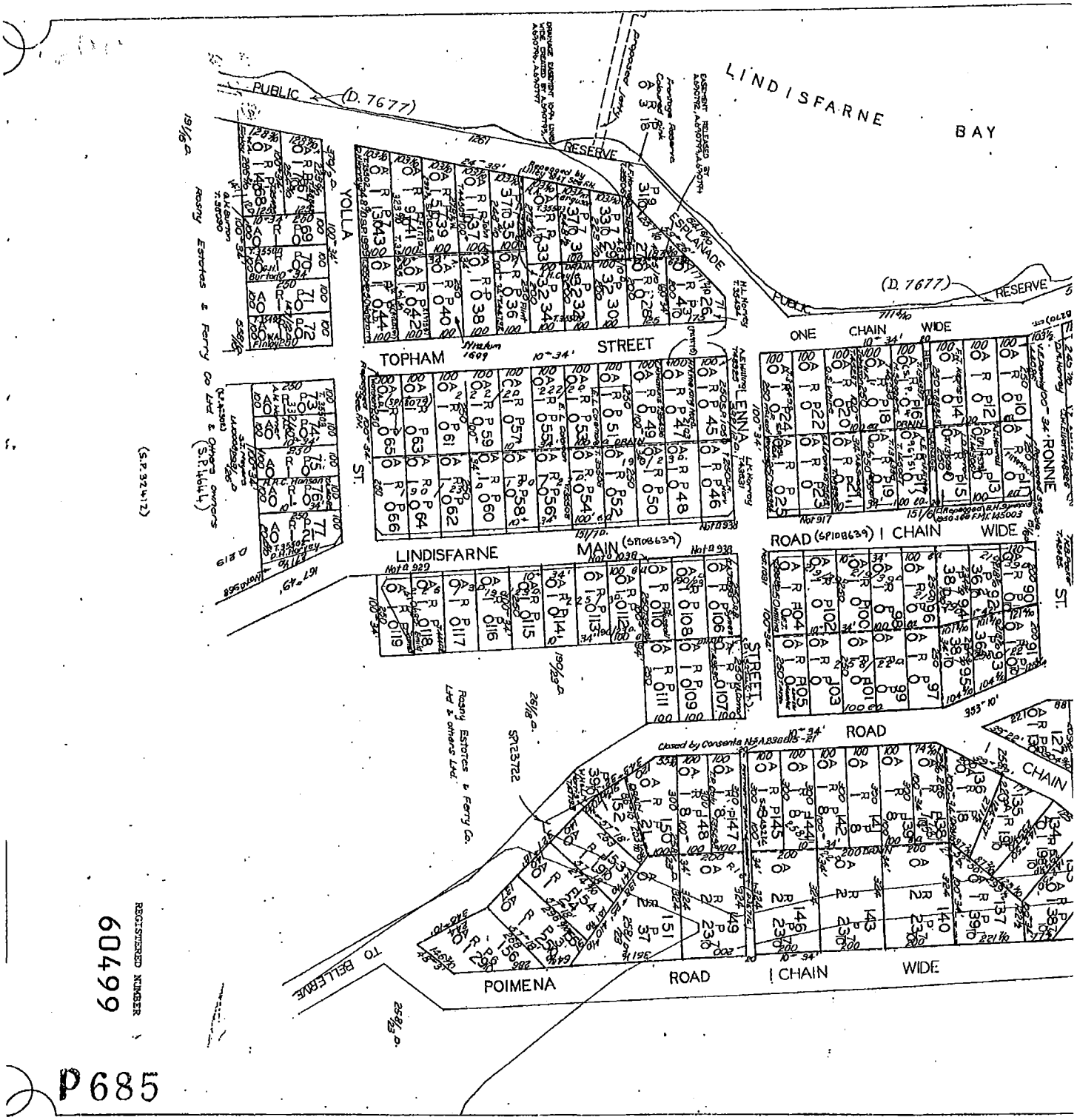
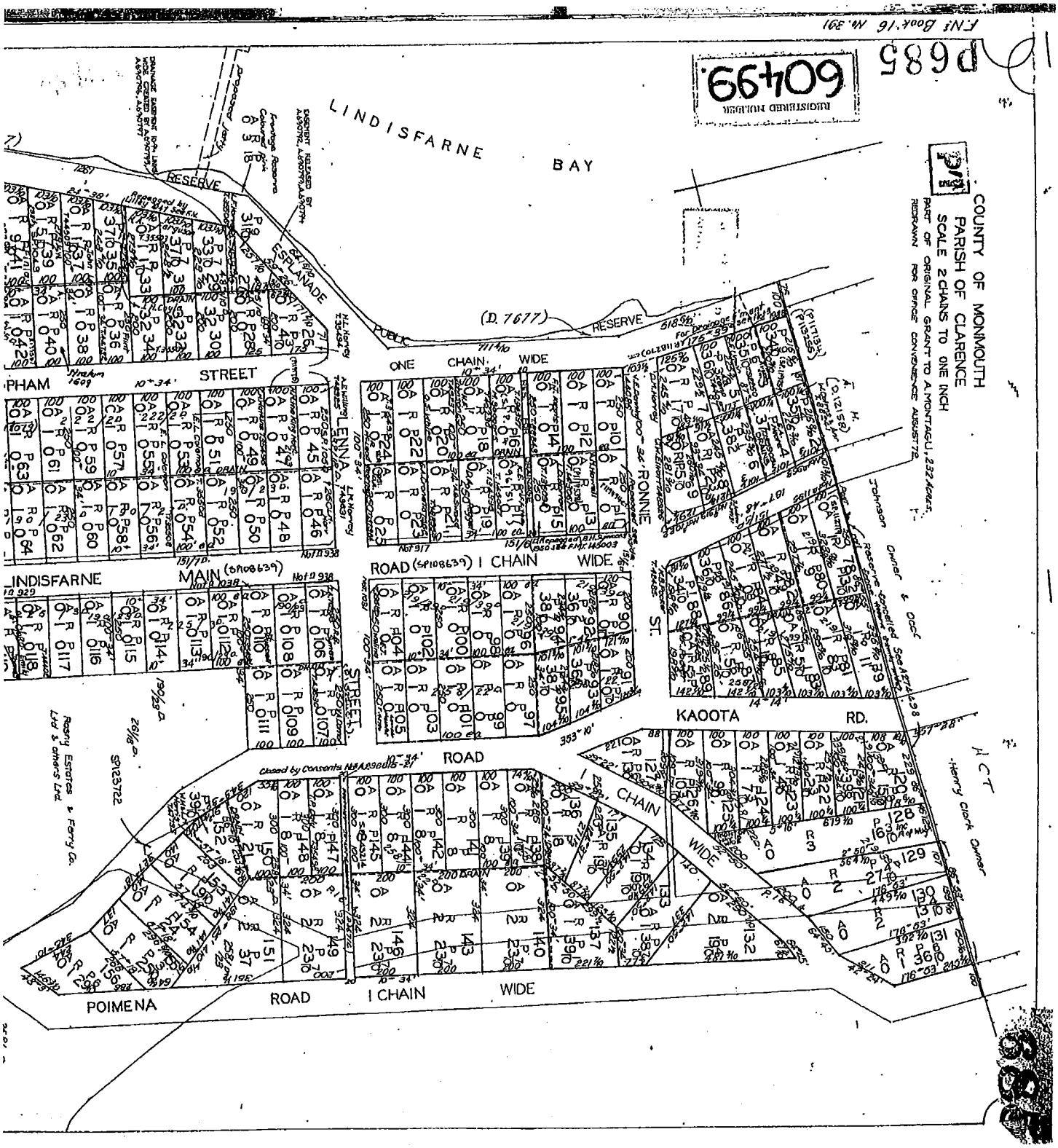
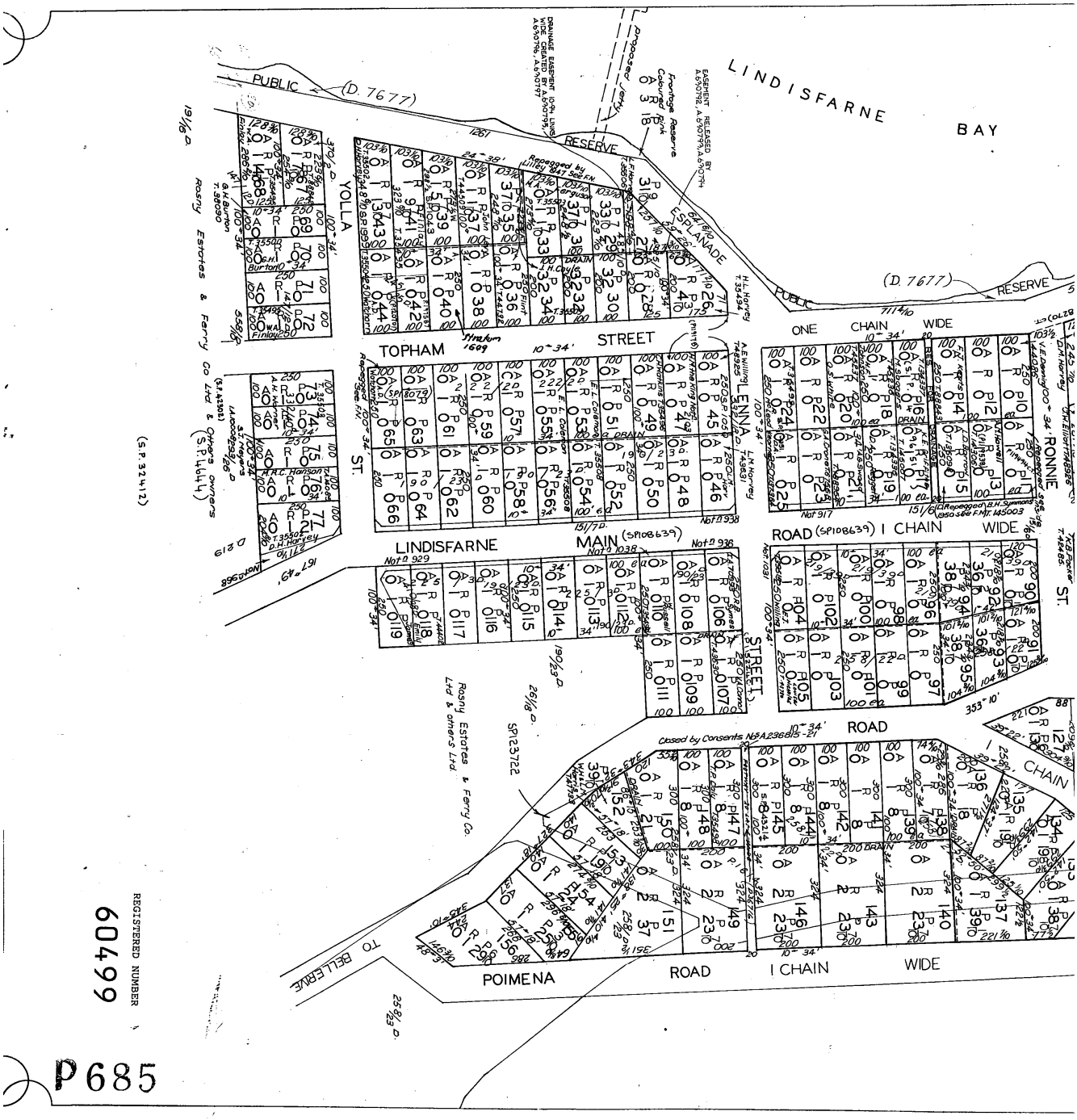
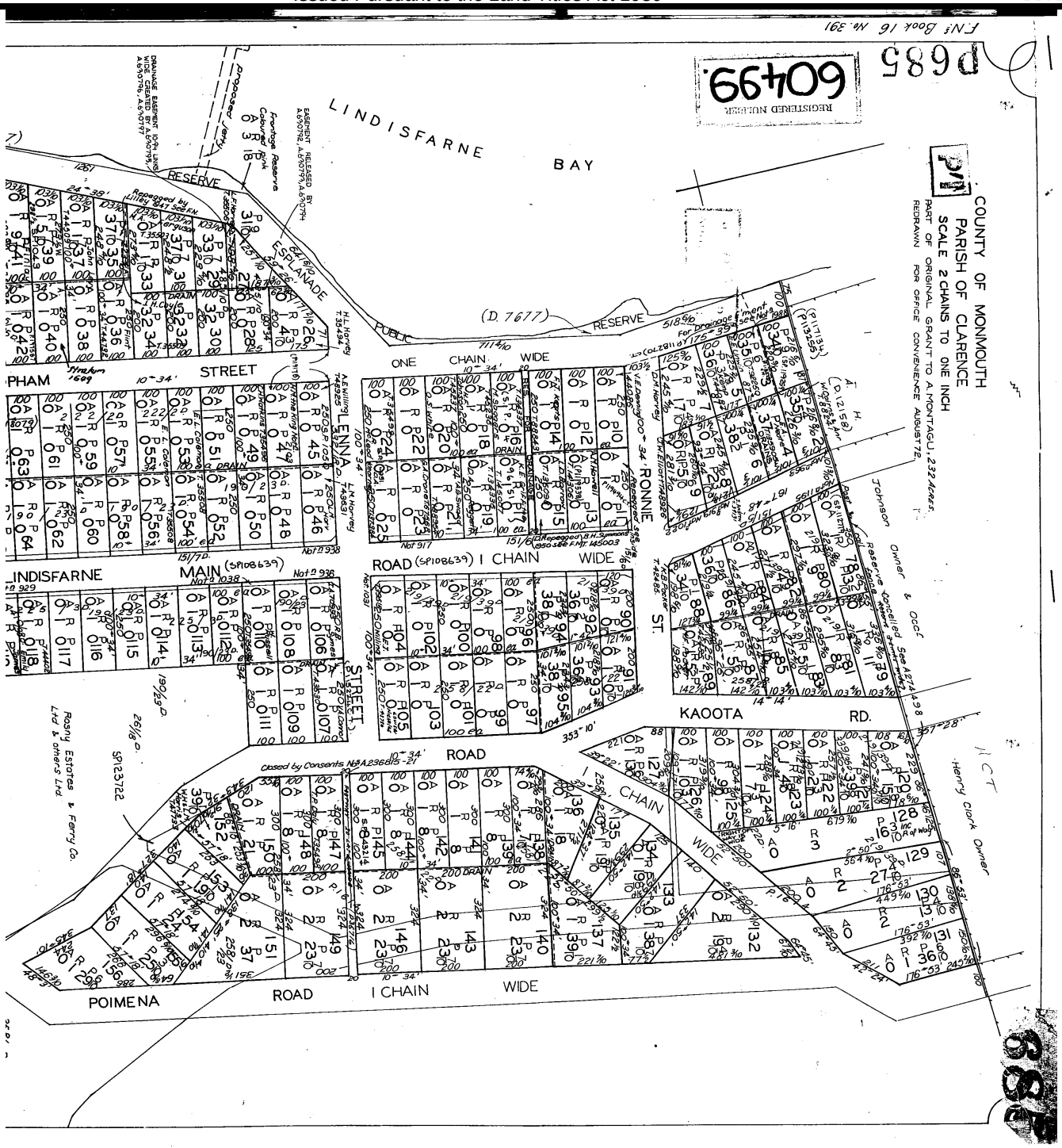








CONTENTS

North
North East
East
South East
South
South West
West
North West

Remove existing residence

Coastal erosion hazard band

Waterway and coastal protection area

190 block retaining wall 0-1500 high

Flood prone hazard area

COMPILED BOUNDARY 50.30m

COMPILED BOUNDARY 20.12m

UNIT 1

UNIT 2

3000

4500

6770

5725

6725

1800

5160

6710

EX S

EX WW

Remove existing residence

Coastal erosion hazard band

Road or Railway attenuation area

General residential zone
Waterway and coastal protection area
High Coastal erosion hazard band
Airport obstacle limitation area (entire site)
Road or railway attenuation area
Flood prone hazard area

DEVELOPMENT DRAWINGS ONLY
NOT FOR CONSTRUCTION

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

SITE PLAN

SCALE 1:200
0 2000 4000

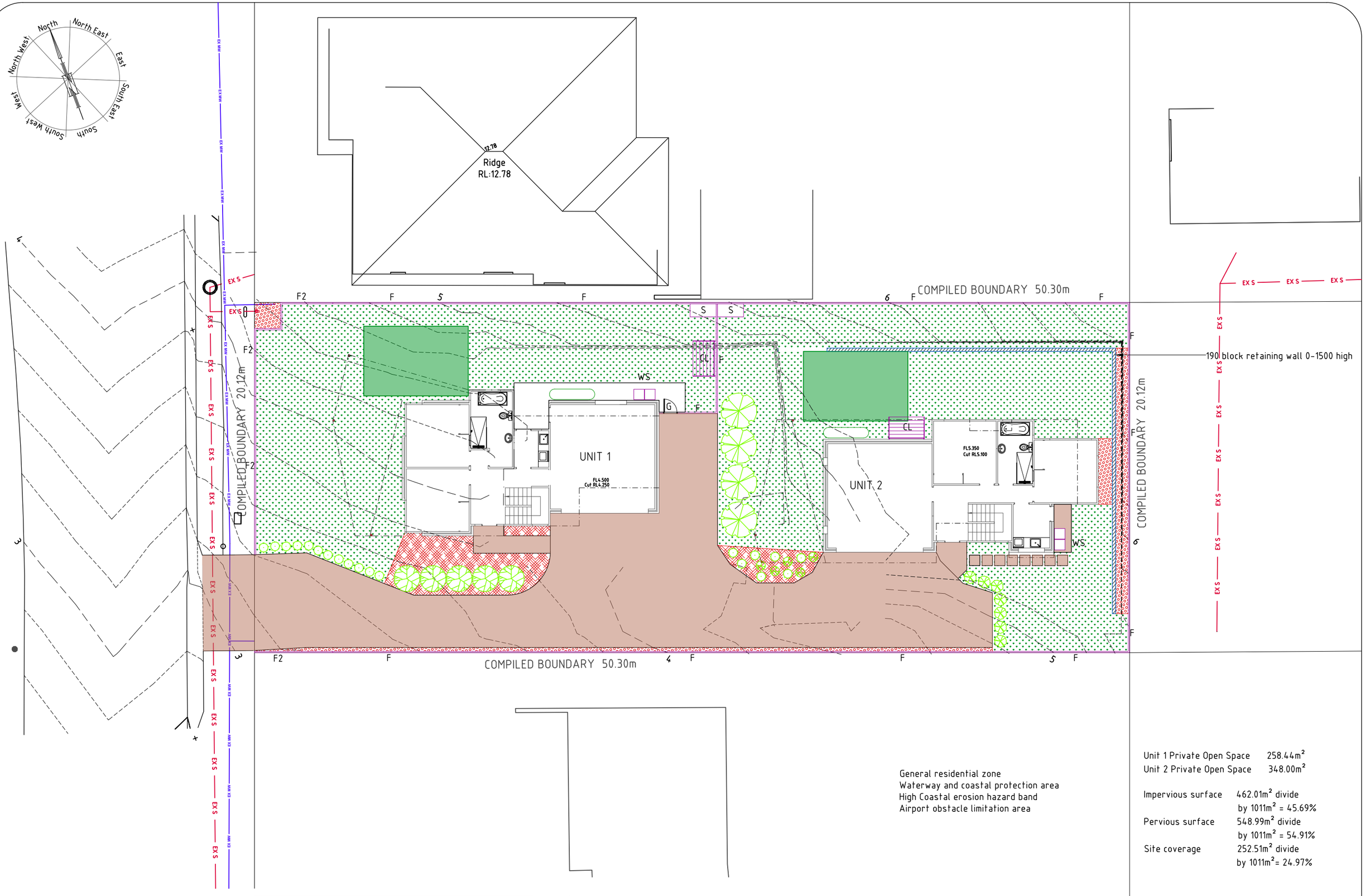
AMENDED
26/03/2025

DATE
03/06/25

DRAWING NO.
01 OF 17

DRAWN BY G Tilley
email: gtilley7@bigpond.com
phone ph 0400 671 582
Accreditation No.CC6201H

bda BUILDING DESIGNERS AUSTRALIA



General residential zone
Waterway and coastal protection area
High Coastal erosion hazard band
Airport obstacle limitation area

Unit 1 Private Open Space	258.44m²
Unit 2 Private Open Space	348.00m²
Impervious surface	462.01m² divide by 1011m² = 45.69%
Pervious surface	548.99m² divide by 1011m² = 54.91%
Site coverage	252.51m² divide by 1011m² = 24.97%

DEVELOPMENT DRAWINGS ONLY
NOT FOR CONSTRUCTION

BUILDING DESIGNERS AUSTRALIA

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

LANDSCAPE PLAN

SCALE 1:200
0 2000 4000

AMENDED
26/03/2025

DATE
03/06/25

DRAWING NO.
02 OF 17

DRAWN BY G Tilley
email: gtilley7@bigpond.com
phone ph 0400 671 582

Accreditation No.CC6201H
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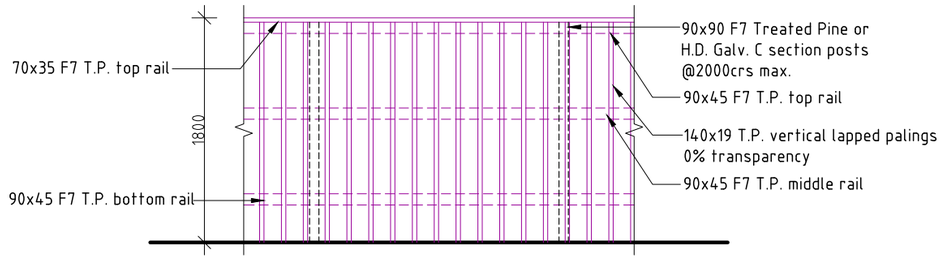
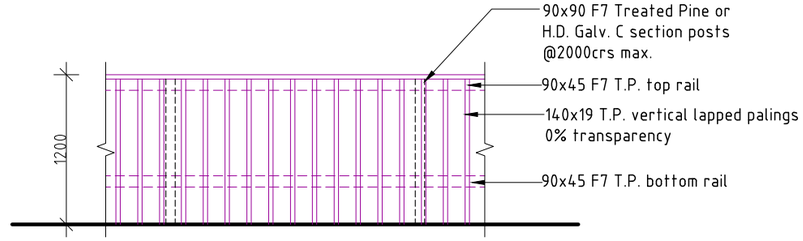
The spacing of plants shown on plan have been derived as a compromise between growth rate, anticipated size, and the ability to provide a good vegetative cover within a reasonable space of time.

SHRUBS AND GROUNDCOVER
Mass planting to assist in building presentation to the streetscape and to provide visual amenity;
Course pine bark mulch to cover ground and minimize moisture loss and to act as a weed suppressant

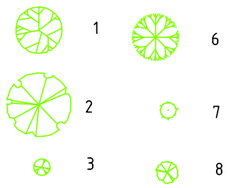


F1 FENCE ELEVATION (Typical)
Scale 1:50



F2 FENCE ELEVATION (Typical)
Scale 1:50

PROPOSED FEATURE PLANTING	COMMON NAME	POT SIZE	SPACING	HEIGHT(m)	WIDTH(M)
1 Leucadendron	Red Gem	200mm	1.5	2.0	1.5
2 Leucadendron	Safari Sunset	200mm	2.0	2.5	2.0
PROPOSED SHRUBS AND GROUNDCOVERS	**COMMON NAME**	**POT SIZE**	**SPACING**	**HEIGHT(m)**	**WIDTH(m)**
3 Dianella revoluta Revelation	Dianella	200mm	0.4	0.5	0.5
6 Scaevola humilis Purple Fusion	Fairy Fan Flower	140mm	1.2	0.2	1.5
7 Westringia Zena	Dwarf rosemary	200mm	0.9	1	1
8 Buxus sempervirens	Box hedge	50mm	0.45	0.6	0.5



1

2

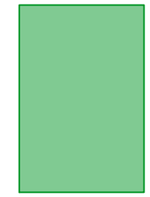
3

7

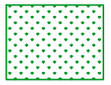
8

NOTE: Plant height stated is matured height apart from the hedge which can be managed to desired height.

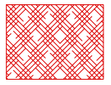
Garden bed not to extend against building, refer to CSIRO report for info



6.0m x 4.0m (24.00m^2)
Private Open Space
Max. 1:10 gradient



Lawn



Mulched garden

Decorative pebbles/gravel

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

LANDSCAPE NOTES

SCALE 1:200

AMENDED

DATE
03/06/25

DRAWING NO.
03 OF 17

DRAWN BY G Tilley
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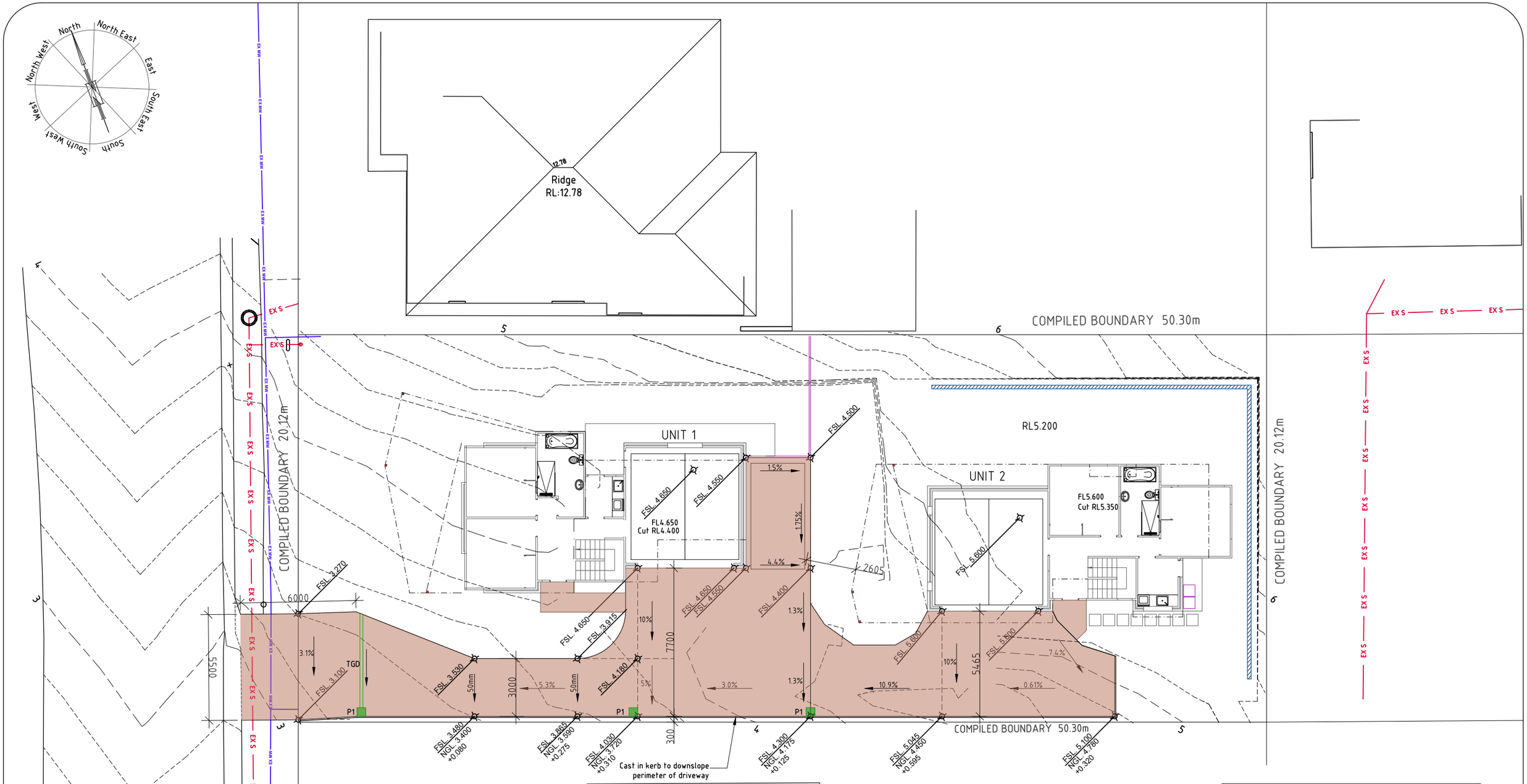
Accreditation No.CC6201H

BUILDING DESIGNERS AUSTRALIA



Sawcut to 25% of slab thickness as soon as able to cut without dragging out the aggregate

120 — 120mm Slab on grade, N25, 100 slump SL82 Central

Natural coloured concrete broom finished paving slab to driveway/access & parking

NOTE: All parking and turning areas to be clearly marked

Carparking and vehicle maneuvering to be of sealed construction and comply with AS2890.1-2004
NO PARKING/KEEP CLEAR signage to be installed for the turning bays so as to remain clear of vehicles at all times.
Visitor parking signs to be installed at visitor parking bays
Signage noting residential parking for all units to be installed for Unit parking spaces.
Parking and vehicle circulation roadways & pedestrian paths to be provided with bollard lighting. Refer to landscape plan for lighting locations.

NOTE: Max 5% gradient to vehicle manouvering areas

DEVELOPMENT DRAWINGS ONLY
NOT FOR CONSTRUCTION

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

DRIVEWAY PLAN

SCALE 1:200
0 2000 4000

AMENDED
26/03/2025
03/06/2025

DATE
03/06/25

DRAWING NO.
04 OF 17

DRAWN BY G Tilley
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phone ph 0400 671 582

Accreditation No.CC620H

BUILDING DESIGNERS AUSTRALIA

Ridge
RL:12.78
12.78

Extent of proposed cut (orange)

COMPILED BOUNDARY 50.30m

19760

Existin retaining wall

UNIT 1

FSL 4.600
FSL 4.350
FSL 4.330
FL4.500
Cut RL4.250
FSL 4.500
FSL 4.400
FSL 4.400
FSL 4.500

Cut RL5.100
Finished RL5.200

UNIT 2

FL5.350
Cut RL5.100
FSL 5.350
FSL 5.380
FSL 5.350

COMPILED BOUNDARY 20.12m

16700

4235

5500

FSL 3.270
FSL 3.100

COMPILED BOUNDARY 50.30m

FSL 4.115
NGL 3720
395mm fill
FSL 5.100
NGL 4.450
650mm fill
FSL 5.150
NGL 4.780
370mm fill

EX S
EX WW
EX GW

DEVELOPMENT DRAWINGS ONLY
NOT FOR CONSTRUCTION

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

APPROXIMATE CUT PLAN

SCALE 1:200
0 2000 4000

AMENDED

DATE
03/06/25

DRAWING NO.
04A OF 17

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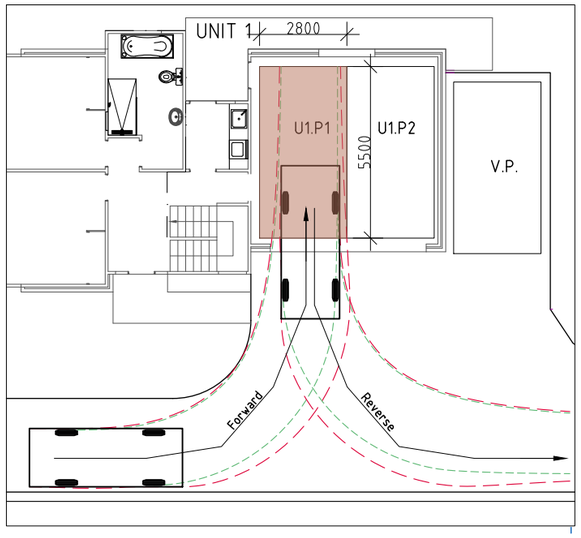
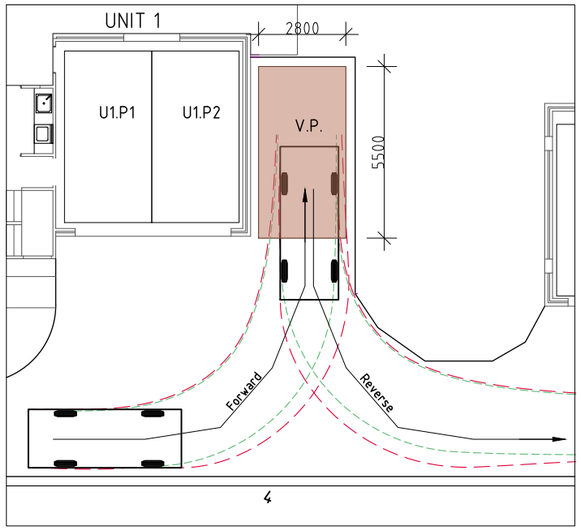
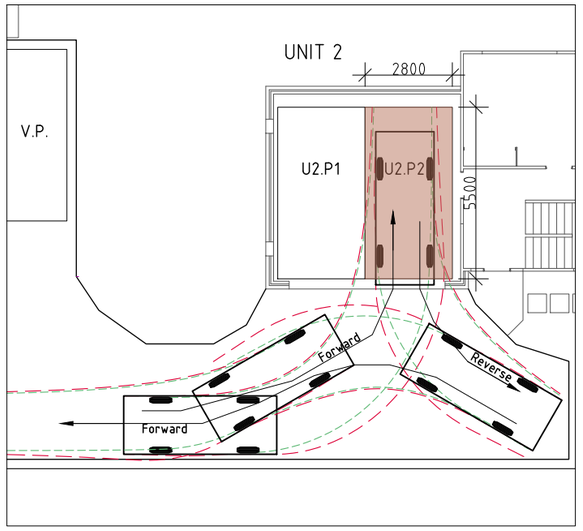
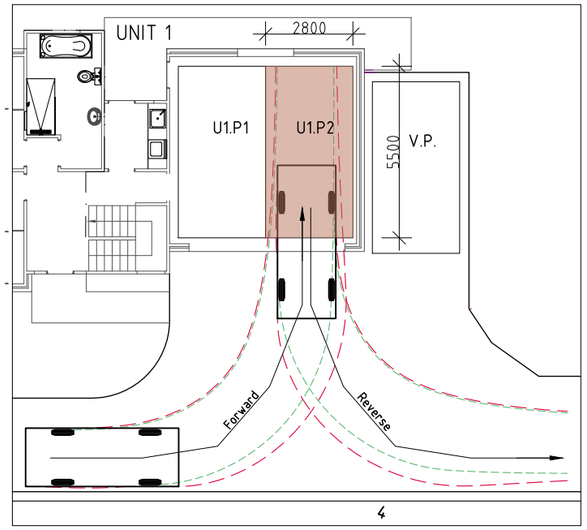
Accreditation No.CC6201H

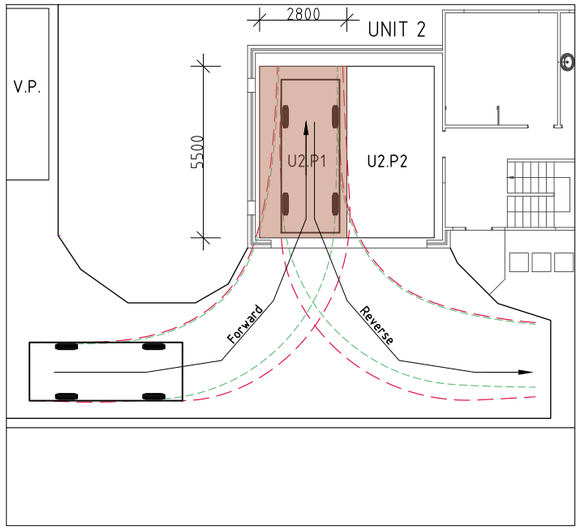
BUILDING DESIGNERS AUSTRALIA

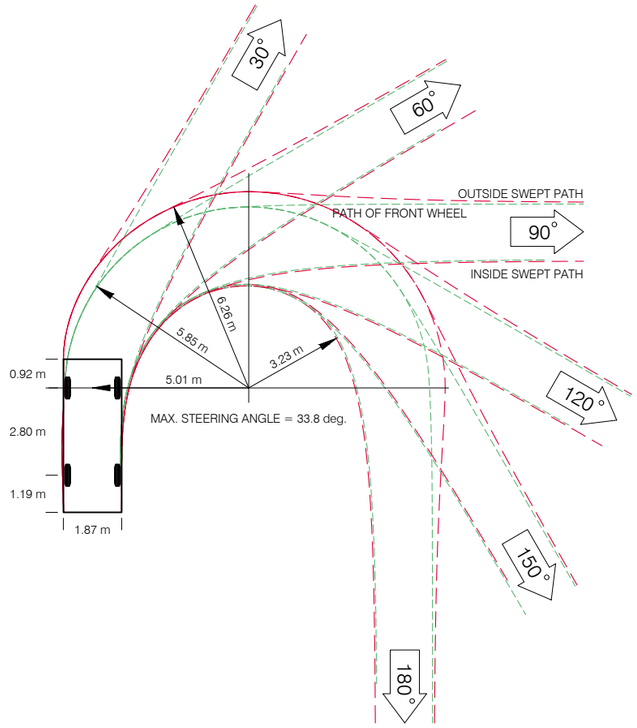


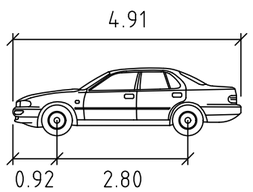


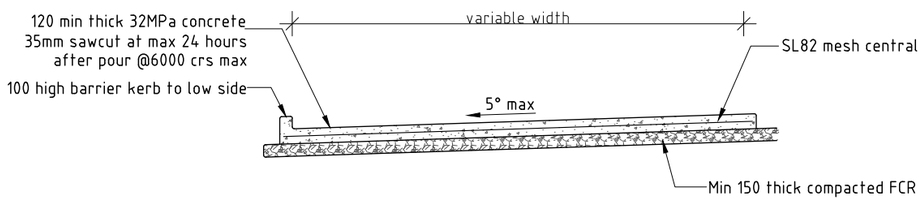












DRIVEWAY CROSS SECTION (TYPICAL)

SCALE 1:50

B85	meters
Width	: 1.87
Track	: 1.77
Lock to Lock Time	: 6.00
Steering Angle	: 34.00

DEVELOPMENT DRAWINGS ONLY
NOT FOR CONSTRUCTION

bda BUILDING DESIGNERS AUSTRALIA

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

VEHICLE TURNING PLANS

DATE 03/06/25

SCALE 1:200
0 2000 4000

AMENDED 26/03/2025

DRAWING NO. 05 OF 17

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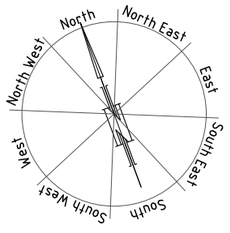
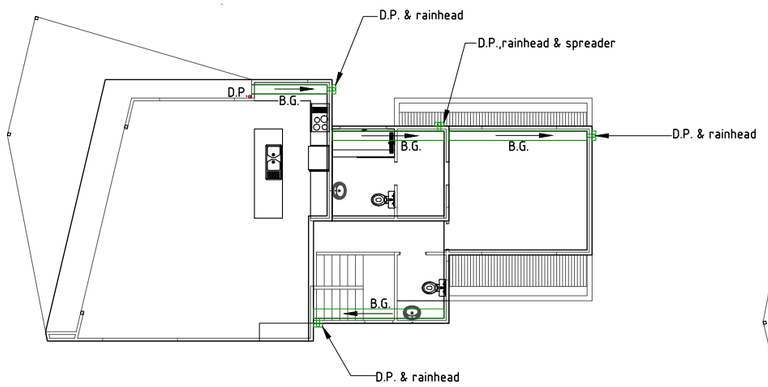
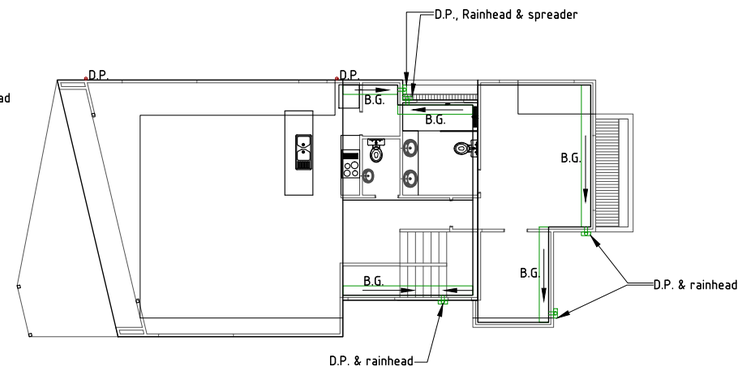
Accreditation No.CC6201H





UNIT 1 Upper Level



UNIT 2 Upper Level

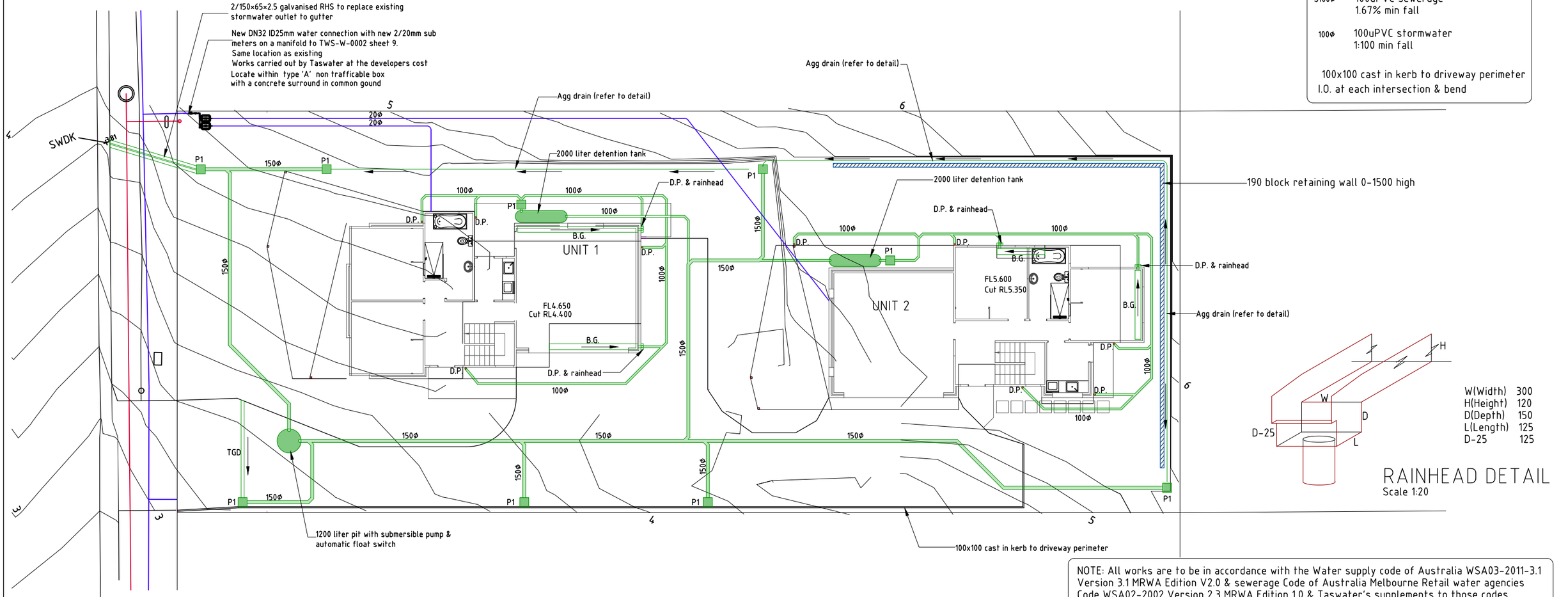
TGD Trafficable grate drain
P1 450x450 Trafficable pit
Each grate pit to be fitted with SPEL Environmental Stormsack water quality improvement device
Designed & installed in accordance with manufacturers instructions
B.G. 300 wide prefolded Colorbond box gutter, 1:100 fall to rainhead

Plumber to confirm the location of existing on-site services prior to commencement of any excavations

Agg drains to be installed prior to slab preparation. Evidence of the agg drainage installation to be supplied to the Engineer

150ø	150uPVC stormwater 1:100 min fall
S100ø	100uPVC sewerage 1.67% min fall
100ø	100uPVC stormwater 1:100 min fall

100x100 cast in kerb to driveway perimeter I.O. at each intersection & bend



W(Width)	300
H(Height)	120
D(Depth)	150
L(Length)	125
D-25	125

RAINHEAD DETAIL
Scale 1:20

NOTE: All works are to be in accordance with the Water supply code of Australia WSA03-2011-3.1 Version 3.1 MRWA Edition V2.0 & sewerage Code of Australia Melbourne Retail water agencies Code WSA02-2002 Version 2.3 MRWA Edition 1.0 & Taswater's supplements to those codes

NOTE: CONCEPT PLAN ONLY

DEVELOPMENT DRAWINGS ONLY
NOT FOR CONSTRUCTION

bda BUILDING DESIGNERS AUSTRALIA

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

STORMWATER CONCEPT PLAN

DATE 03/06/25

DRAWN BY G Tilley
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phone ph 0400 671 582

SCALE 1:200
0 2000 4000

AMENDED
26/03/2025
03/06/2025

DRAWING NO. 06 OF 17

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WET AREAS TO COMPLY WITH NCC VOL. 2 PART H4D2, ABCB HOUSING PROVISIONS PART 10.2 AND AS 3740

WATERPROOFING OF ENCLOSED & UNENCLOSED SHOWERS:
FLOOR: Waterproof entire floor if no preformed shower base provided
WALLS: Waterproof to not less than 1800mm above the floor substrate
WALL JUNCTIONS AND JOINTS: Waterproof internal and external corners and horizontal joints within a height of 1800mm above the floor level with not less than 40mm width either side of the junction
WALL/FLOOR JUNCTIONS: Waterproof internal and external corners and joints
PENETRATIONS: Waterproof all penetrations

AREAS OUTSIDE THE SHOWER ON CONCRETE SLAB OR FC FLOORING:
FLOORS: Entire floor to be water resistant
WALLS/FLOOR JUNCTIONS: Waterproof all wall/floor junctions and where a flashing is used, the horizontal leg must be not less than 40mm

AREAS OUTSIDE THE SHOWER ON TIMBER FLOOR:
FLOORS: Waterproof entire floor
WALL/FLOOR JUNCTIONS: Waterproof all wall/floor junctions and where a flashing is used, the horizontal leg must be not less than 40mm.

AREAS ADJACENT TO NON-FREESTANDING BATHS AND SPAS (without showers):
FLOOR: Water resistant to entire floor on concrete or FC flooring; or Waterproof to entire floor on timber floor.
WALLS: Water resistant walls to a height of not less than 150mm above the vessels, for the full extent, where the vessel is within 75mm of a wall.
WALL JUNCTIONS AND JOINTS:Water resistant within 150mm above the vessel for the extent of the vessel to a width of 40mm either side of the junction
WALL/FLOOR JUNCTIONS: Waterproof for the extent of the vessel

AREAS ADJACENT TO INSERTED BATHS AND SPAS (without showers):
FLOOR: Water resistant to entire floor on concrete or FC flooring; or Waterproof to entire floor on timber floor.
HORIZONTAL SURFACES: Waterproof shelf adjoining bath or spa and include a waterstop under the vessel lip
WALLS: Waterproof walls to not less than 150mm above the lip of the vessel
WALL JUNCTIONS AND JOINTS: Waterproof junctions within 150mm of vessel to a width of 40mm either side of the junction
WALL/FLOOR JUNCTIONS: Waterproof wall/floor junctions 25mm above finished floor level
PENETRATIONS: Waterproof penetrations where they occur in horizontal surfaces, seal penetrations where they occur in vertical surfaces

OTHER AREAS (LAUNDRIES AND WCs):
FLOOR: Water resistant floor to entire room
WALLS: Water resistant wall to a height of not less than 150mm above the vessel for the extent of the vessel, where the vessel is within 75mm of wall
WALL JUNCTIONS AND JOINTS: Waterproof junctions where a vessel is fixed to a wall
WALL/FLOOR JUNCTIONS: Water resistant wall/floor junctions with horizontal leg not less than 40mm where flashing used
PENETRATIONS: Waterproof penetrations where they occur in surfaces required to be waterproof or water resistant.

WATERPROOFING SYSTEMS:
Waterproofing systems to be in accordance with ABCB Housing Provisions Part 10.2.6.

FALLS TO WET AREA FLOORS:
Where a floor waste is installed the continuous fall of a floor plane to the waste must be no less than 1:80 and no more than 1:50.

STEPDOWN SHOWERS:
Where stepdown showers are used, the shower area must be stepped down a minimum of 25mm below the finished floor level outside the shower. Refer to ABCB Housing Provisions Part 10.2.15 & relevant figures for details.

HOB CONSTRUCTION:
Shower hobs are to be constructed in accordance with ABCB Housing Provisions Part 10.2.16.

ENCLOSED SHOWERS WITH LEVEL THRESHOLD:
Enclosed showers with a level threshold must be provided with a waterstop in accordance with ABCB Housing Provisions Part 10.2.17 & relevant figures.

UNENCLOSED SHOWERS:
Unenclosed showers are to have a waterstop min. 1500mm from the shower rose with the vertical leg finishing flush with the top surface of the floor. Waterproof all all joins and junctions. Waterproof entire bathroom floor where unenclosed showers are installed. Refer to ABCB Housing Provisions Part 10.2.18 & relevant figures for details.

PENETRATIONS:
All penetrations in showers and wet areas must be waterproofed in accordance with ABCB Housing Provisions part 10.2.23.

FLASHINGS/JUNCTIONS:
All flashings and junctions in wet areas to be installed in accordance with ABCB Housing Provisions Part 10.2.24 & relevant figures.

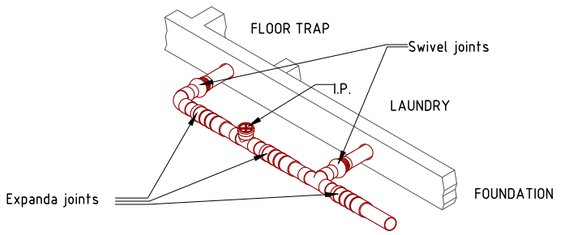
SHOWER SCREENS:
1900H Semi-frameless shower screens to comply with ABCB Housing Provisions Table 8.4.6 & AS 1288:2021. Minimum 6mm toughened safety organic coated glass, labelled to comply with industry standards. Install shower screens in accordance with ABCB Housing Provisions Part 10.2.32.

HYDRAULIC NOTES:
1. All plumbing shall be in accordance with the Tasmanian Plumbing Regulations, AS 3500 and to the local authority approval.
2. The location of the existing services where shown are approximate only and shall be confirmed on site where possible. Determine location of existing power, Telstra, water and drainage services prior to commencing new work.
3. Conceal all pipework in ceiling space, ducts, cavities, wall chases, cupboards etc. unless otherwise approved.
4. Refer to designers drawings and fixture and equipment technical specifications for pipework connections.
5. Make good all disturbed surfaces to match existing.
6. Remove all excess soil and surplus materials from site.
7. All plumbing to be installed by a licensed plumber.

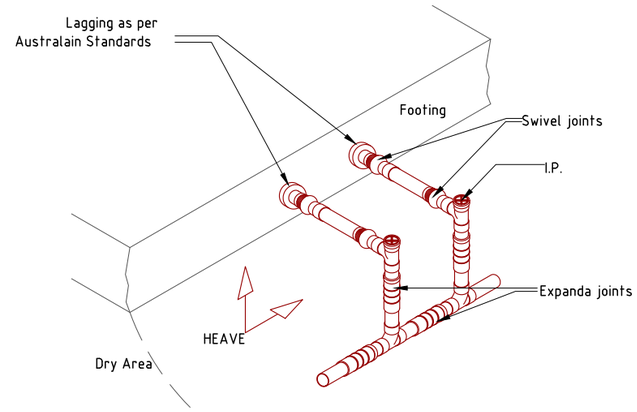
Install inspection openings at major bends for stormwater and all low points of downpipes.
All plumbing & drainage to be in accordance with local Council requirements.
Provide surface drain to back of bulk excavation to drain leveled pad prior to commencing footing excavation.
Stormwater line (100mm uPVC)
Sewer line (100mm uPVC)

SERVICES
The heated water system must be designed & installed with Part B2 of NCC Vol. 3 - Plumbing Code of Australia
Thermal insulation for heated water piping must:
a) be protected against the effects of weather and sunlight; and
b) be able to withstand the temperatures within the piping; and
c) use thermal insulation in accordance with AS/NZS 4859.1

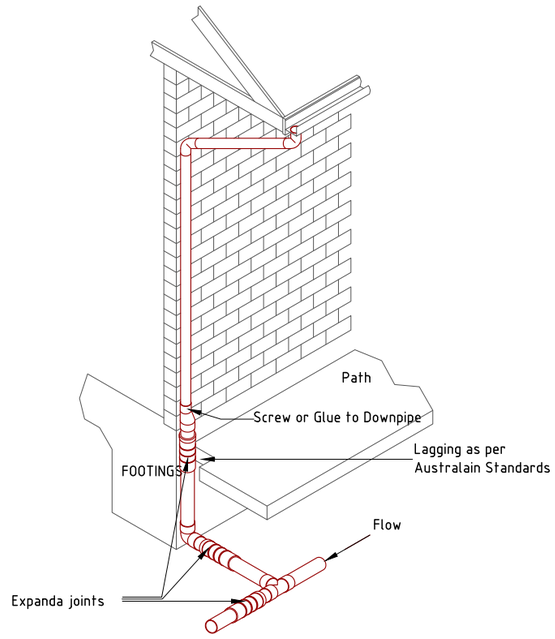
Heated water piping that is not within a conditioned space must be thermally insulated as follows:
1. Internal piping:
   a) All flow and return internal piping that is -
      (i) within an unventilated wall spaces
      (ii) within an internal floor between storeys; or
      (iii) between ceiling and insulation and a ceiling
   Must have a minimum R-value of 0.2 (ie. 9mm of closed cell polymer insulation)
2. Piping located within a ventilated wall space, an enclosed building subfloor or a roof space:
   a) All flow and return piping
   b) Cold water supply piping and Relief valve piping within 500mm of the connection to central water heating system
   Must have a minimum R-value of 0.45 (ie. 19mm of closed cell polymer insulation)
3. Piping located outside the building or in an unenclosed building sub-floor or roof space
   a) All flow and return piping.
   b) Cold water supply piping and Relief valve piping within 500mm of the connection to central water heating system
   Must have a minimum R-value of 0.6 (ie. 25mm of closed cell polymer insulation)
   Piping within an insulated timber framed wall, such as that passing through a wall stud, is considered to comply with the above insulation requirements.



GUIDELINES FOR PVC-U DRAINAGE SYSTEM WITH EXPANSION AND SWIVEL JOINT LOCATIONS FOR REACTIVE SOILS



GUIDELINES FOR PVC-U DRAINAGE SYSTEM WITH EXPANSION AND SWIVEL JOINT LOCATIONS FOR REACTIVE SOILS



GUIDELINES FOR PVC-U DRAINAGE SYSTEM WITH EXPANSION AND SWIVEL JOINT LOCATIONS FOR REACTIVE SOILS

Hot & Cold Water Nominal Diameters	
Branch off takes	Min. DN20
Max. off take length 6m	DN18
Max. off take length 3m	DN15
Max. off take length 1m	DN10

Insulation Schedule		
Heated water pipes Type	Size Range	Insulation
Circulating Line	32-40	25mm Rockwool with foil wrap
Branch Line	20-25	19mm Bradflex
Offtake	18	13mm Bradflex
Cold water pipes exposed Type	Size Range	Insulation
All	>20	13mm Bradflex
Other cold watere pipes Type	Size Range	Insulation
All	All	Not required

NOTE: Water pipes associated directly with plan equipment shall be insulated in accordance with the manufacturers instructions for a typical installation

Surface drainage to conform with NCC Vol. 2 Part H2D2.
NOTE: 50mm fall required over first 1m from building.

IMPORTANT NOTICE FOR ATTENTION OF OWNER:
The owners attention is drawn to the fact that foundations and associated drainage in all sites requires continuing maintenance to assist footing performance. Advice for foundation maintenance is contained in the CSRIO Building Technology File 18 and it is the owners responsibility to maintain the site in accordance with that document.

DEVELOPMENT DRAWINGS ONLY
NOT FOR CONSTRUCTION

BUILDING DESIGNERS AUSTRALIA

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

PLUMBING NOTES

SCALE N/A

AMENDED

DATE
03/06/2025

DRAWING NO.
07 OF 17

DRAWN BY ----
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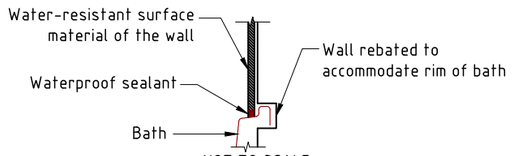
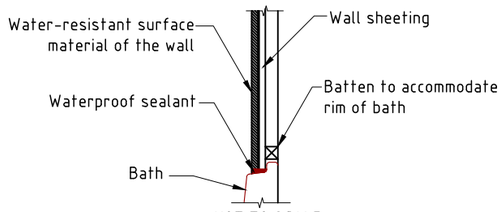
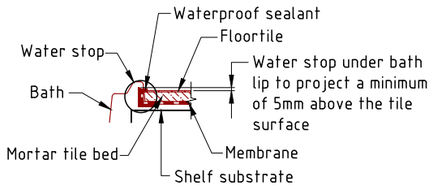
Certified: G. Tilley Accreditation No.CC620H



NOT TO SCALE
BATH/WALL JUNCTION - RECESSED



NOT TO SCALE
BATH/WALL JUNCTION - BATTENED



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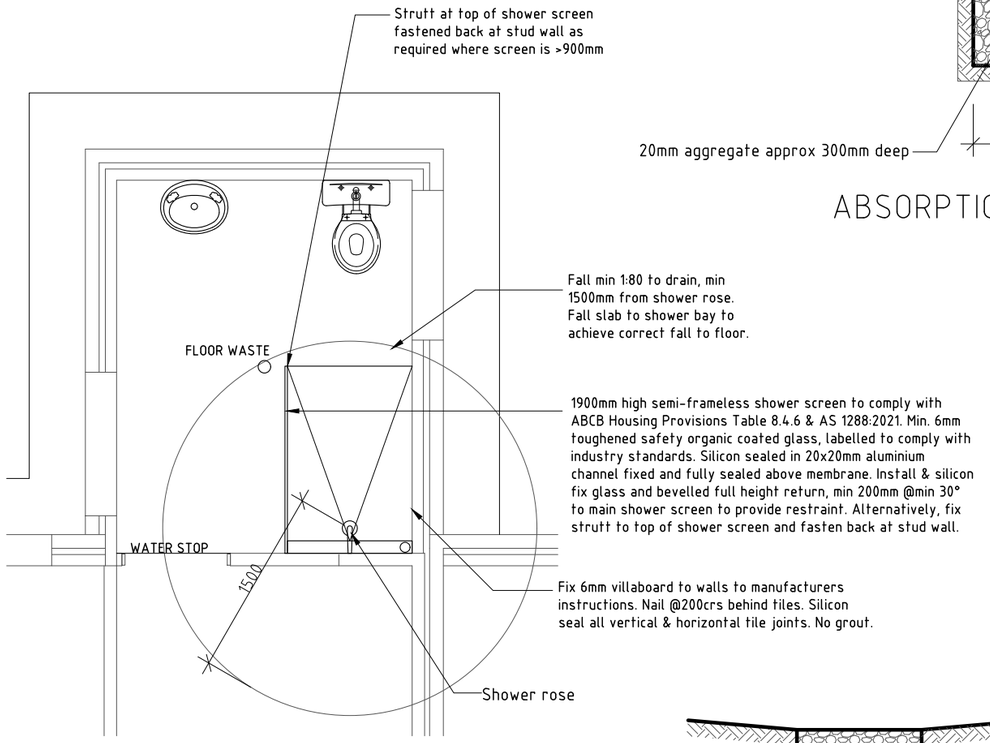
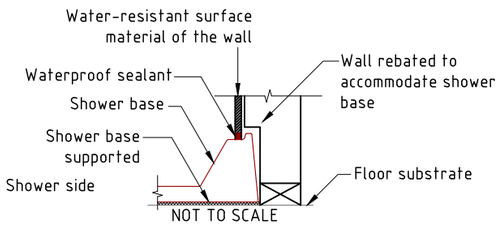
BATH/SHELF JUNCTION



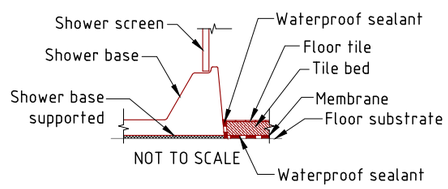
WET AREA DETAIL (TYPICAL)

Scale 1:50

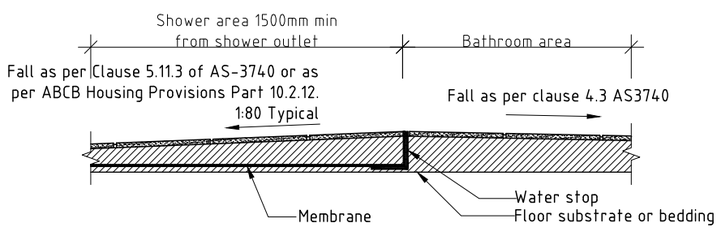
Seal all joints, gaps & wall junctions with PVA sealant - cover floor/wall junctions min R6: 2 coats of approved PVA membrane installed to manufacturers instructions, including coth tape to wall junctions and penetrations. To floor, continue 50mm up vertical surfaces & to shower bay 1800x1500 each way from shower rose or to shower screen. To timber skirting or door architrave to stop <25mm above finished floor level.



TYPICAL PREFORMED SHOWER BASE WALL/FLOOR JUNCTION

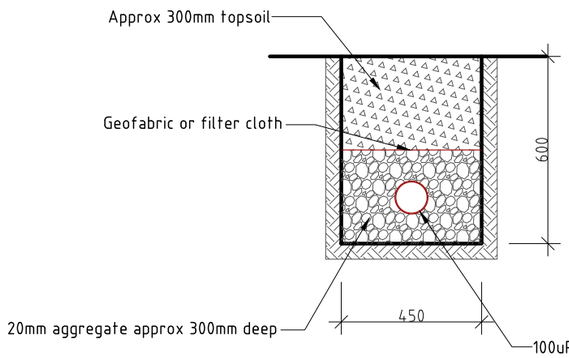


TYPICAL PREFORMED SHOWER BASE/FLOOR JUNCTION ON TIMBER FLOORS, INCLUDING PARTICLEBOARD, PLYWOOD AND OTHER TIMBER MATERIALS

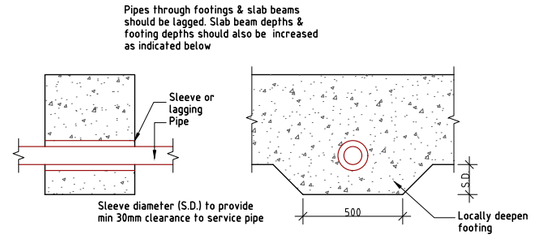


TYPICAL TERMINATION OF MEMBRANE AT EXTENT OF SHOWER AREA

Scale 1:50



ABSORPTION TRENCH (TYPICAL)



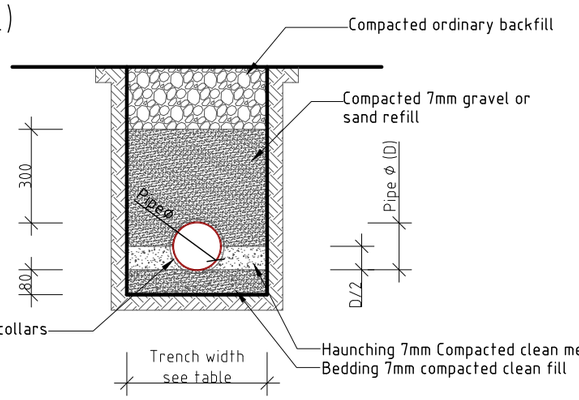
FLEXIBLE CONNECTION FOR SERVICE PIPES PASSING THROUGH FOOTINGS

TYPICAL AGG DRAIN DETAIL

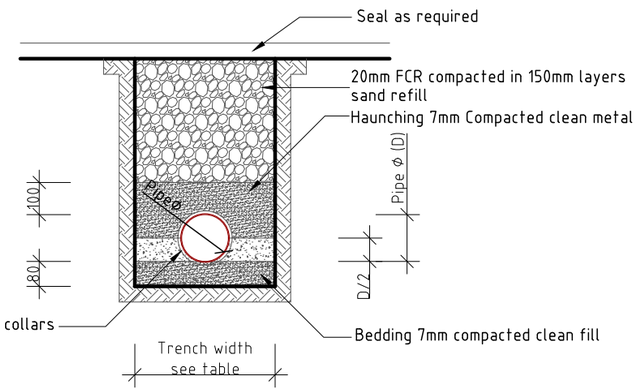
NOTE: All materials and construction to comply with AS3500.3.2021

TRENCH WIDTHS	
Pipe diameter	Min trench width
Less than 50mm	250
75-100mm	450
150-300mm	600
>300mm	Ø plus 300mm

Surface drainage to conform with NCC Vol. 2 Part H2D2.
NOTE: 50mm fall required over first 1m from building.



TYPICAL PIPE TRENCH DETAIL NON-TRAFFICABLE AREAS



TYPICAL PIPE TRENCH DETAIL TRAFFICABLE AREAS

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DEVELOPMENT DRAWINGS ONLY
NOT FOR CONSTRUCTION

BDA BUILDING DESIGNERS AUSTRALIA

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

PLUMBING DETAILS

DATE
03/06/2025

DRAWN BY ----
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phone ph 0400 671 582

SCALE 1:20
0 200 400

AMENDED

DRAWING NO.
08 OF 17

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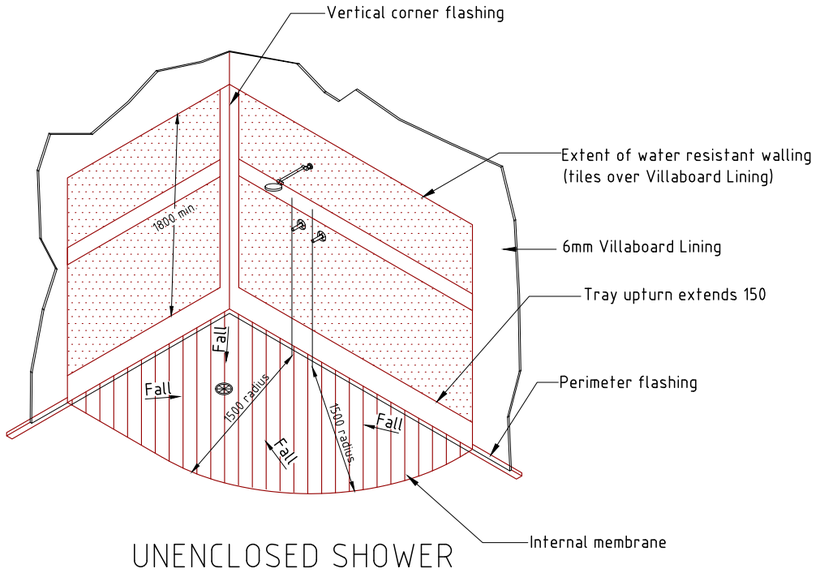
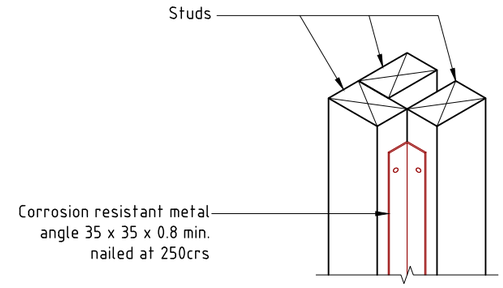


UNENCLOSED SHOWER



ANGLE REINFORCED CORNER
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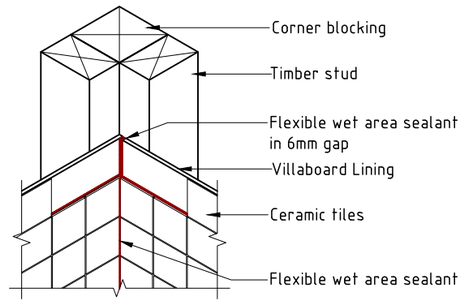

INTERNAL TILED CORNER
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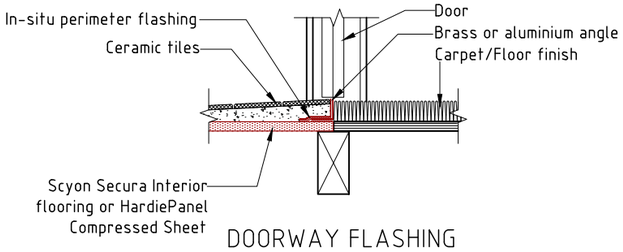

DOORWAY FLASHING
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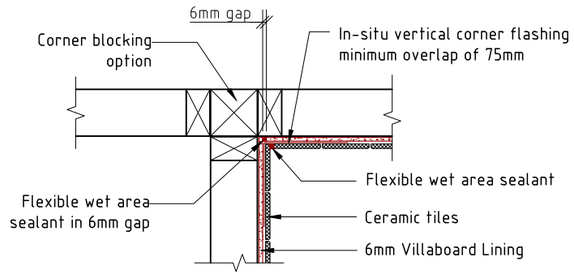
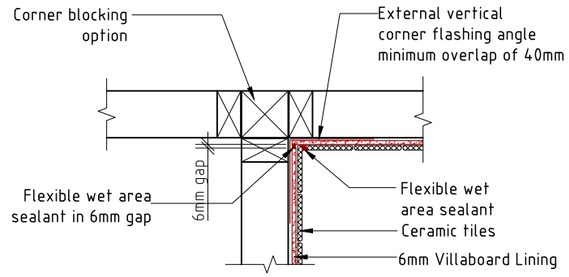
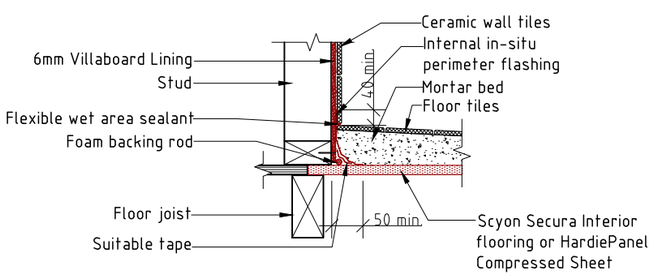


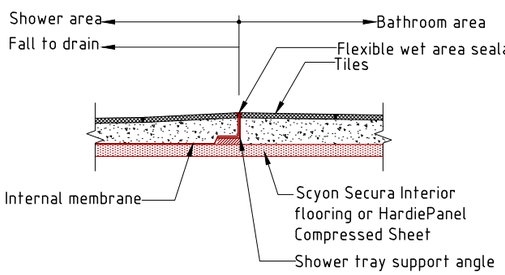
VERTICAL CORNER FLASHING FOR INTERNAL MEMBRANE - SHOWER RECESS
Scale 1:10



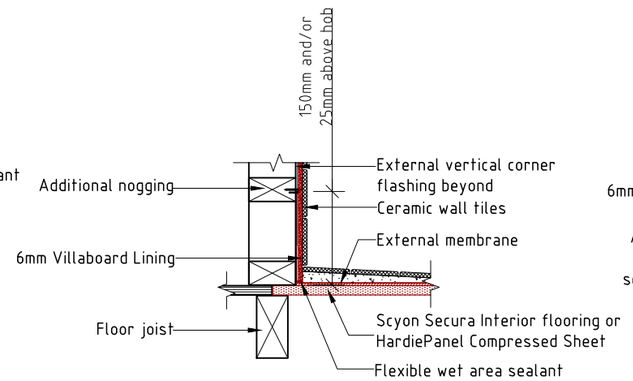
VERTICAL CORNER FLASHING FOR EXTERNAL MEMBRANE- SHOWER RECESS
Scale 1:10



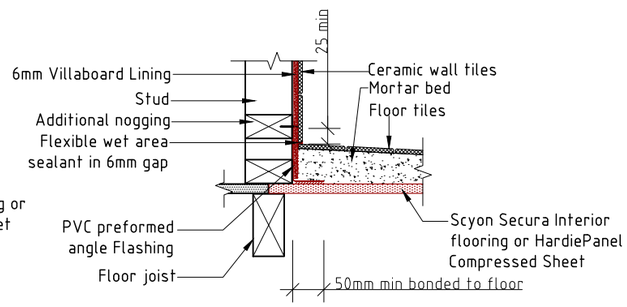
INTERNAL FLASHING
Scale 1:10



UNENCLOSED SHOWER - EDGE FINISHING DETAIL
Scale 1:10



EXTERNAL MEMBRANE - VILLABOARD LINING
Scale 1:10



EXTERNAL FLASHING - VILLABOARD LINING FINISHED WITH TILES
Scale 1:10

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

PLUMBING DETAILS

DATE
03/06/2025

DRAWN BY ----
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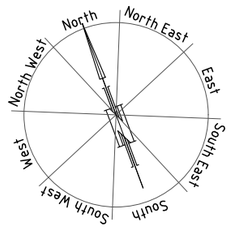

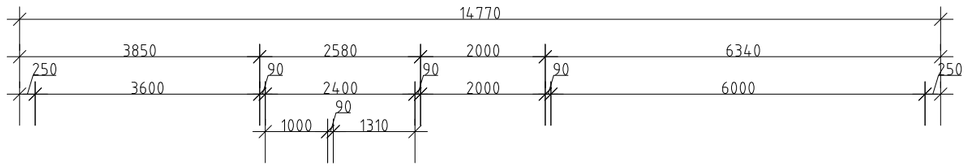

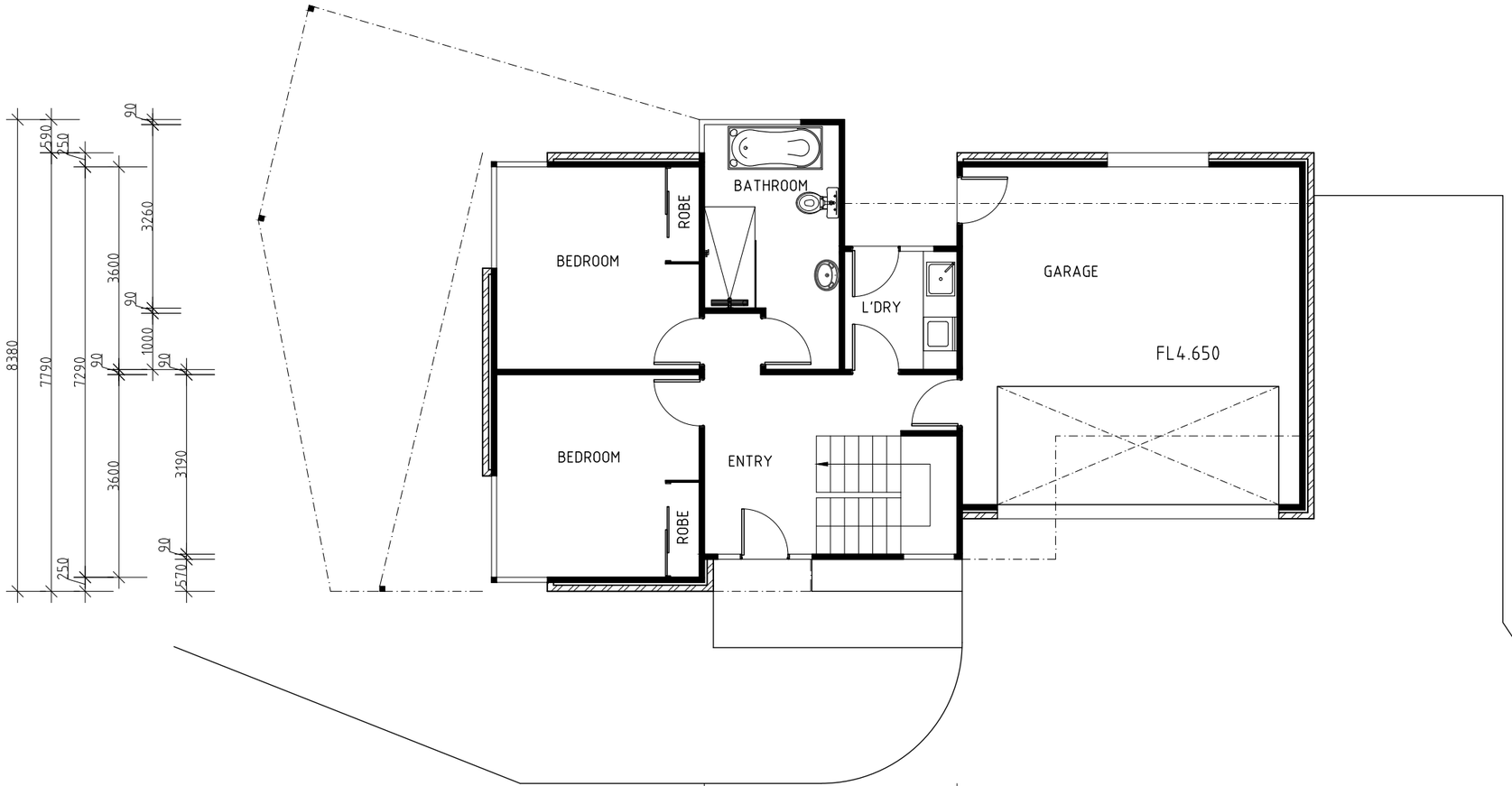

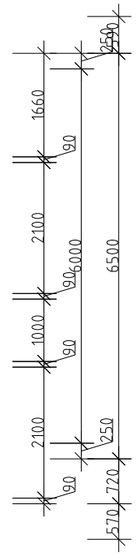

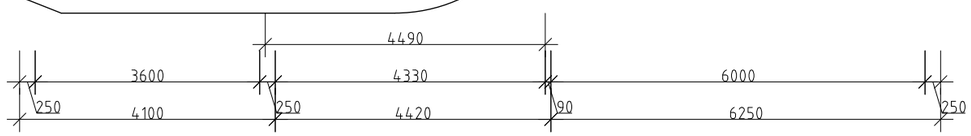

UNIT 1 areas	
Lower level	101.70m²
Upper level	101.12m²
Total	202.82m²
Deck	31.08²

DEVELOPMENT DRAWINGS ONLY
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UNIT 1

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

UNIT 1 PLAN

SCALE 1:100
0 1000 2000

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26/03/2025

DATE
03/06/25

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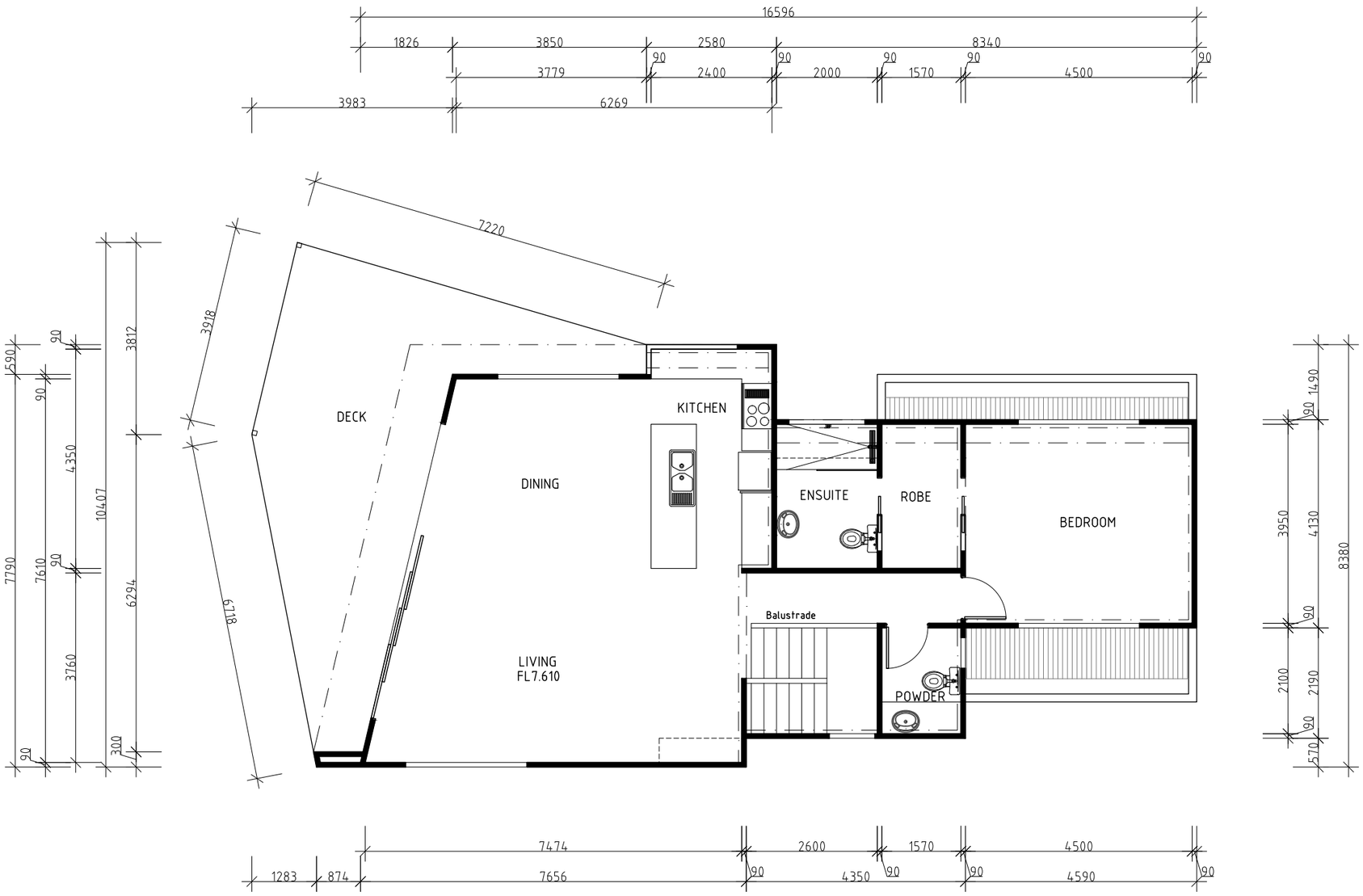

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Lower level	101.70m²
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UNIT 1

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

UNIT 1 PLAN

SCALE 1:100
0 1000 2000

AMENDED
26/03/2025

DATE
03/06/25

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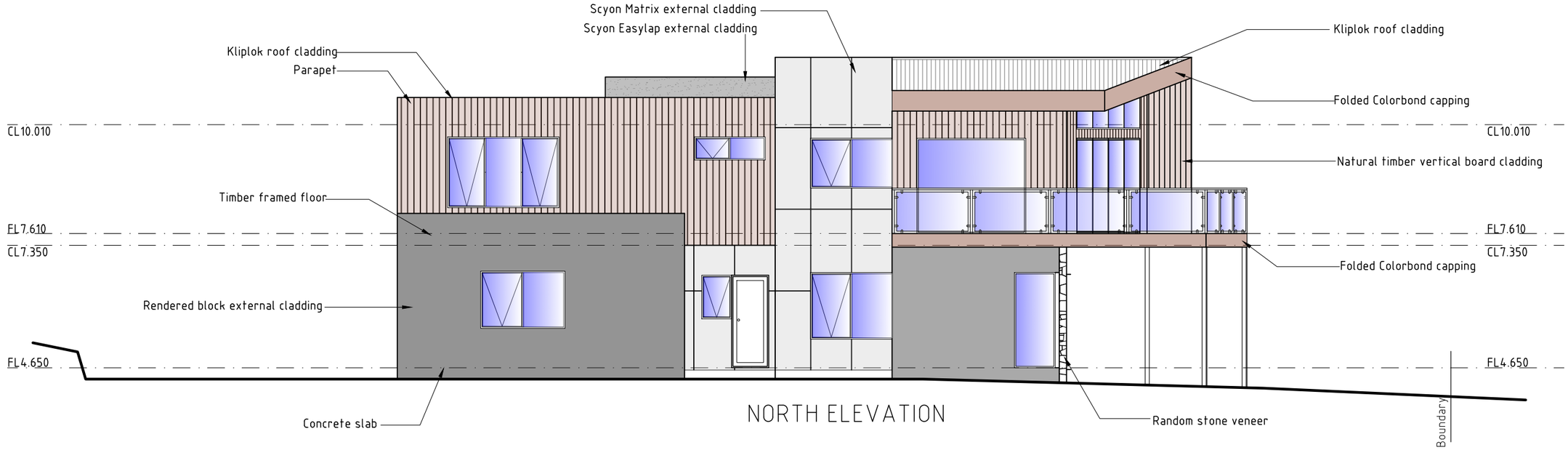
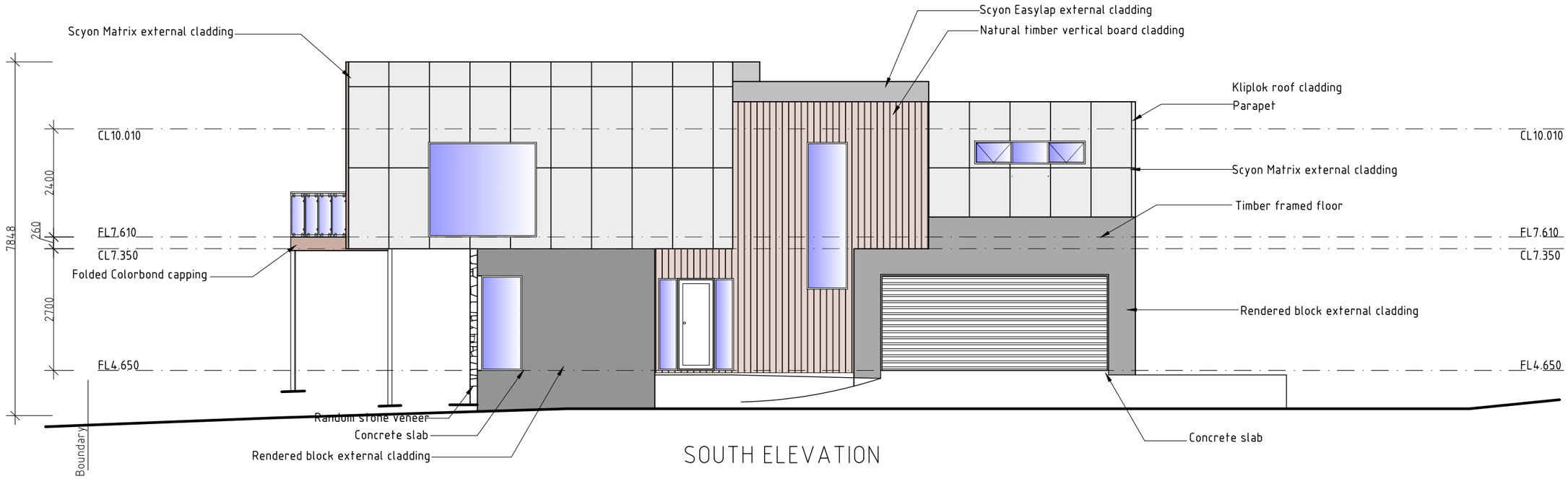


NORTH ELEVATION



SOUTH ELEVATION

DEVELOPMENT DRAWINGS ONLY
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UNIT 1

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

UNIT 1 ELEVATIONS

SCALE 1:100
0 1000 2000

AMENDED
26/03/2025

DATE
03/06/25

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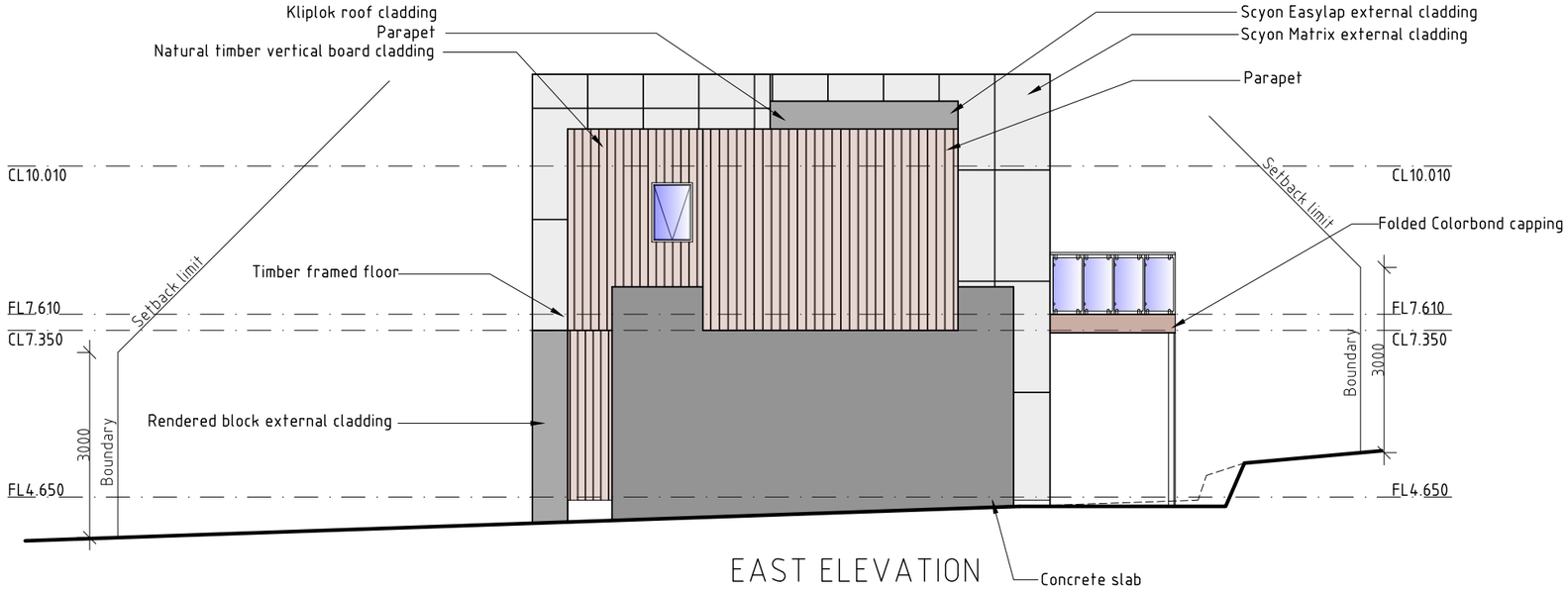
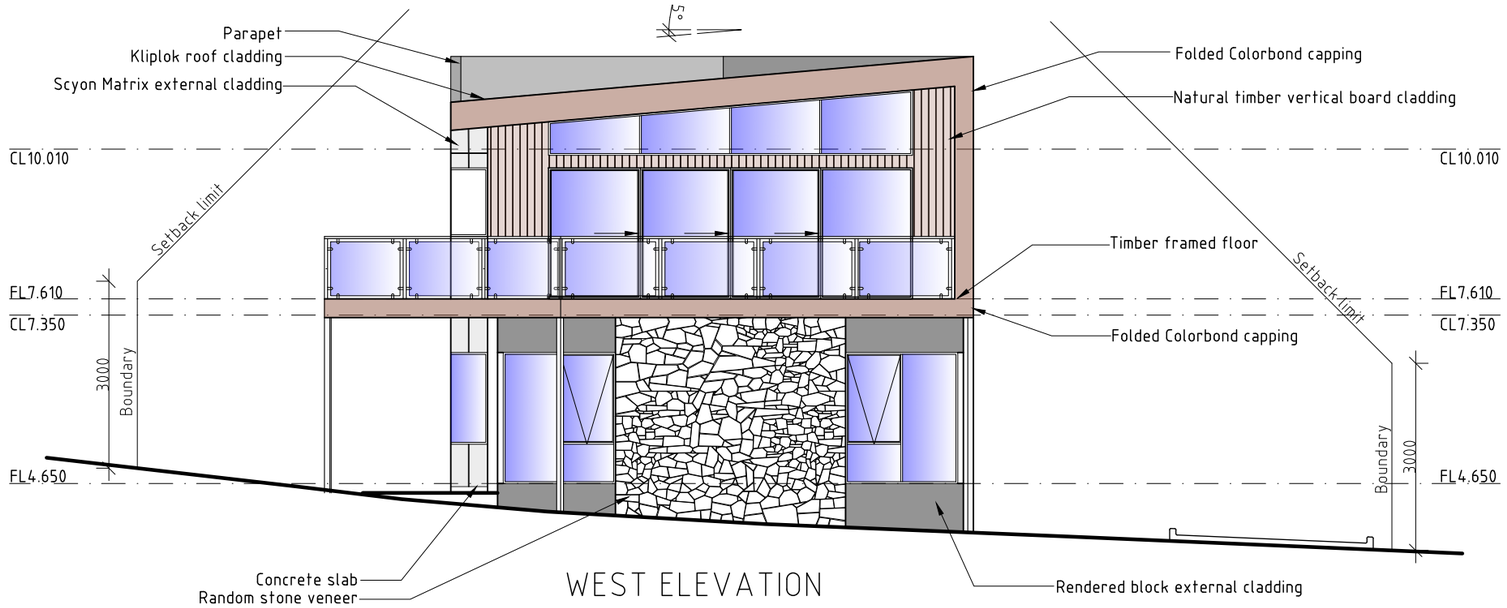


EAST ELEVATION



WEST ELEVATION

DEVELOPMENT DRAWINGS ONLY
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UNIT 1

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

UNIT 1 ELEVATIONS

SCALE 1:100
0 1000 2000

AMENDED
26/03/2025

DATE
03/06/25

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13 OF 17

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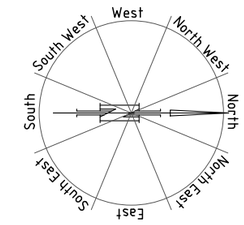
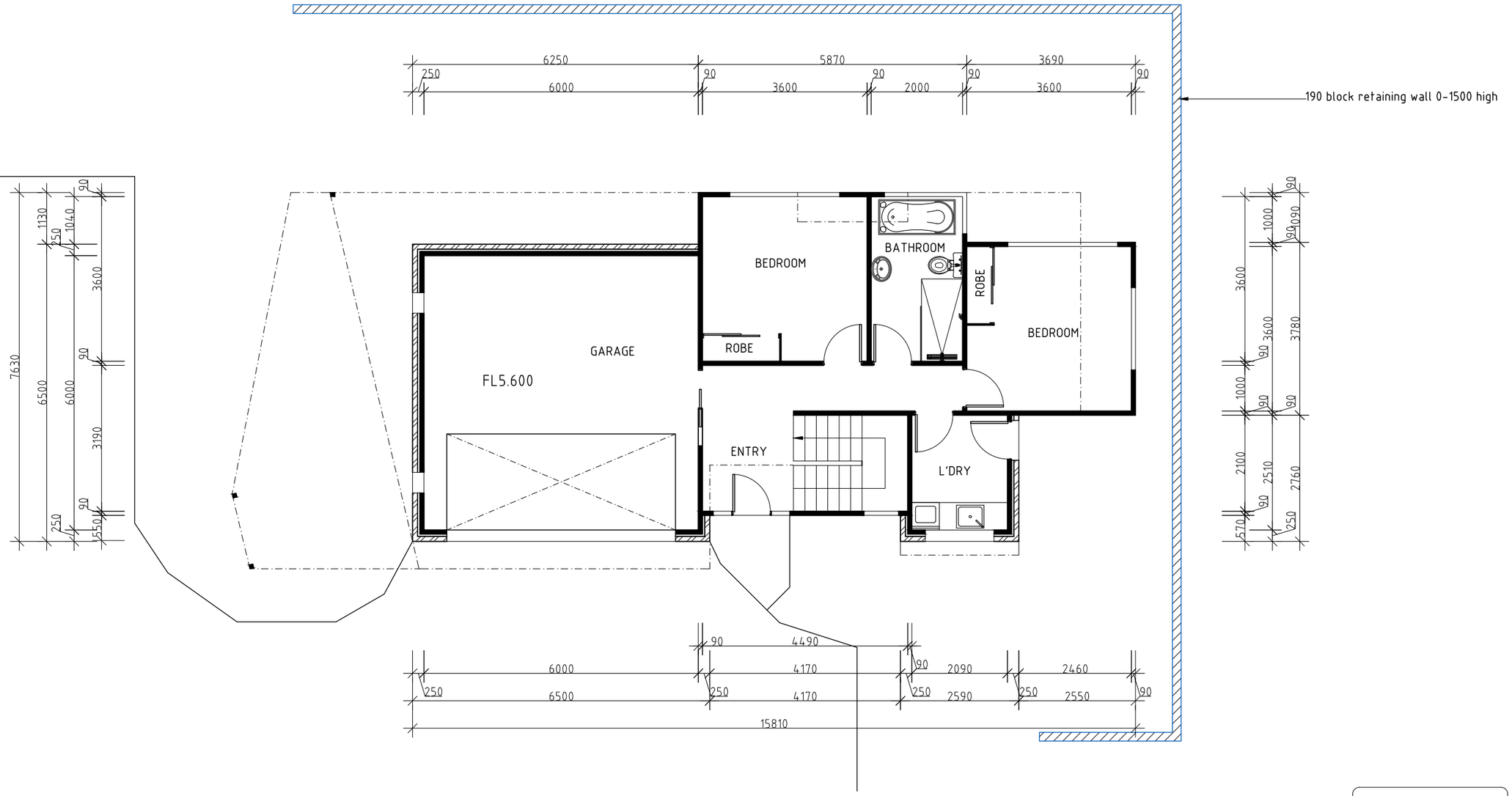




UNIT 1 areas	
Lower level	100.13m²
Upper level	115.36m²
Total	215.49m²
Deck	20.53²

DEVELOPMENT DRAWINGS ONLY
NOT FOR CONSTRUCTION

UNIT 2

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

UNIT 2 PLAN

SCALE 1:100
0 1000 2000

AMENDED
26/03/2025

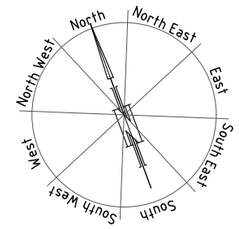
DATE
03/06/25

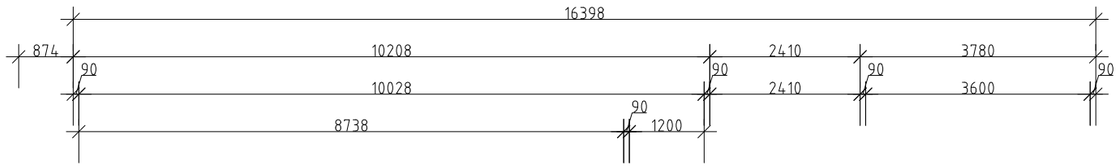
DRAWING NO.
14 OF 17

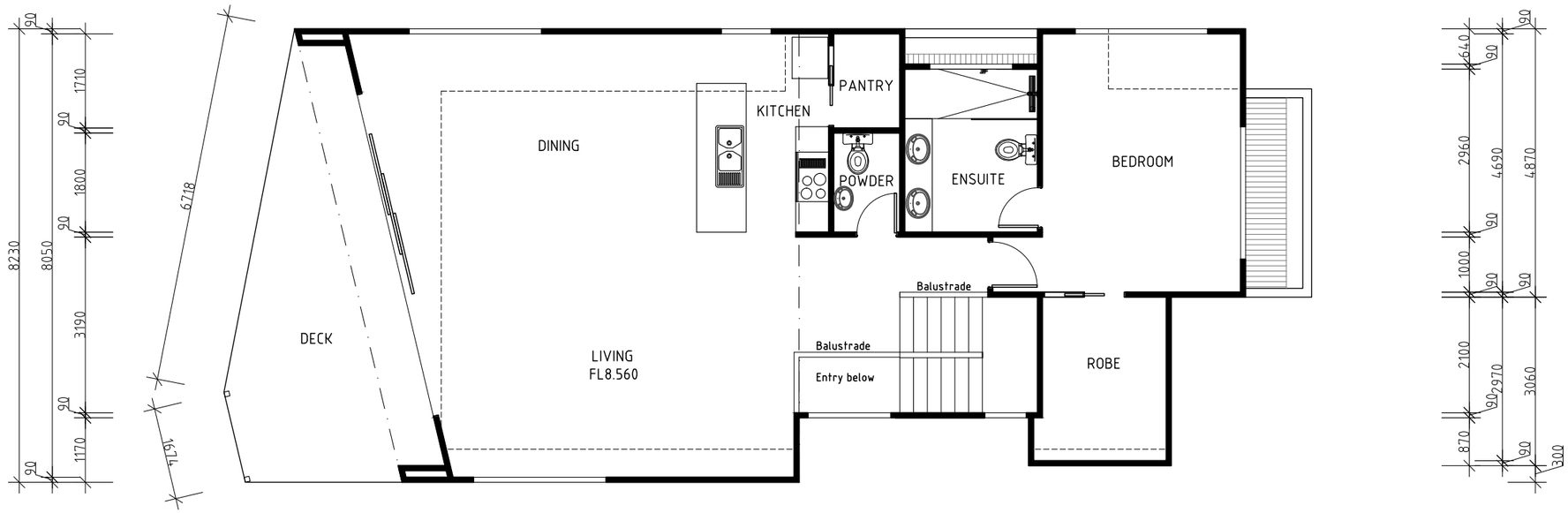
DRAWN BY G Tilley
email: gtilley7@bigpond.com
phone ph 0400 671 582

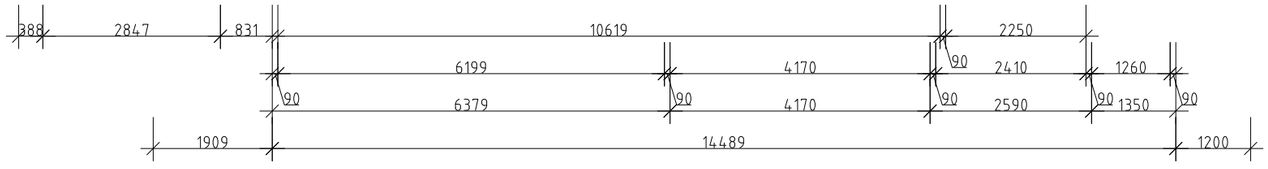
Accreditation No.CC6201H

BUILDING DESIGNERS AUSTRALIA









DEVELOPMENT DRAWINGS ONLY
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UNIT 2

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

UNIT 2 PLAN

SCALE 1:100
0 1000 2000

AMENDED
26/03/2025

DATE
03/06/25

DRAWING NO.
15 OF 17

DRAWN BY G Tilley
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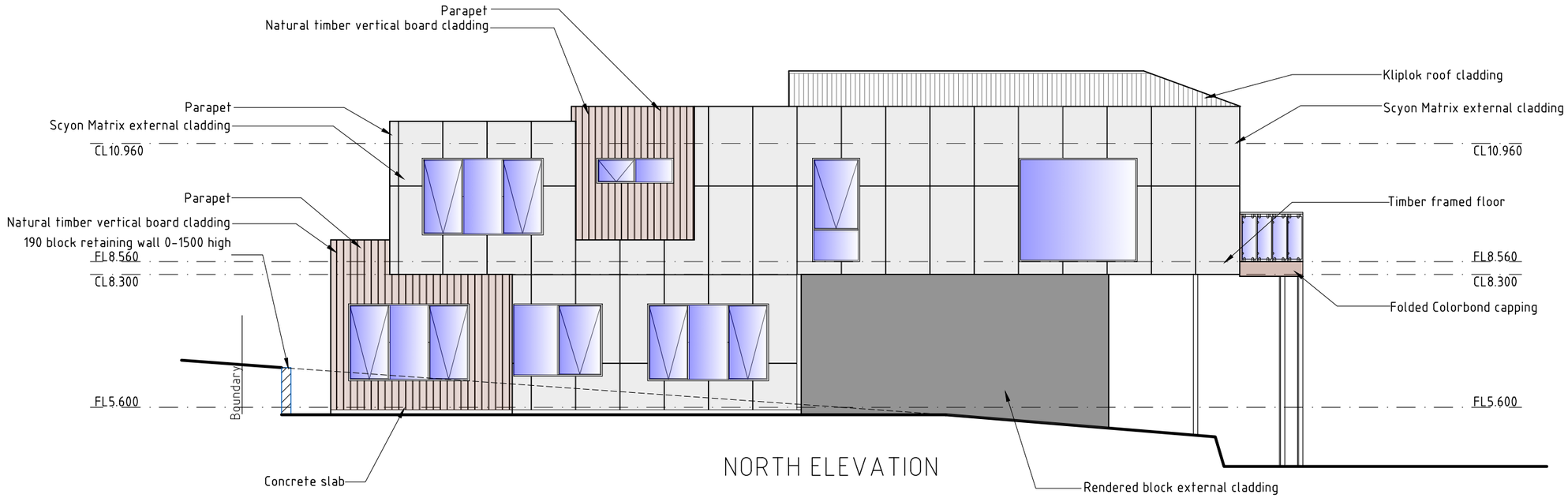
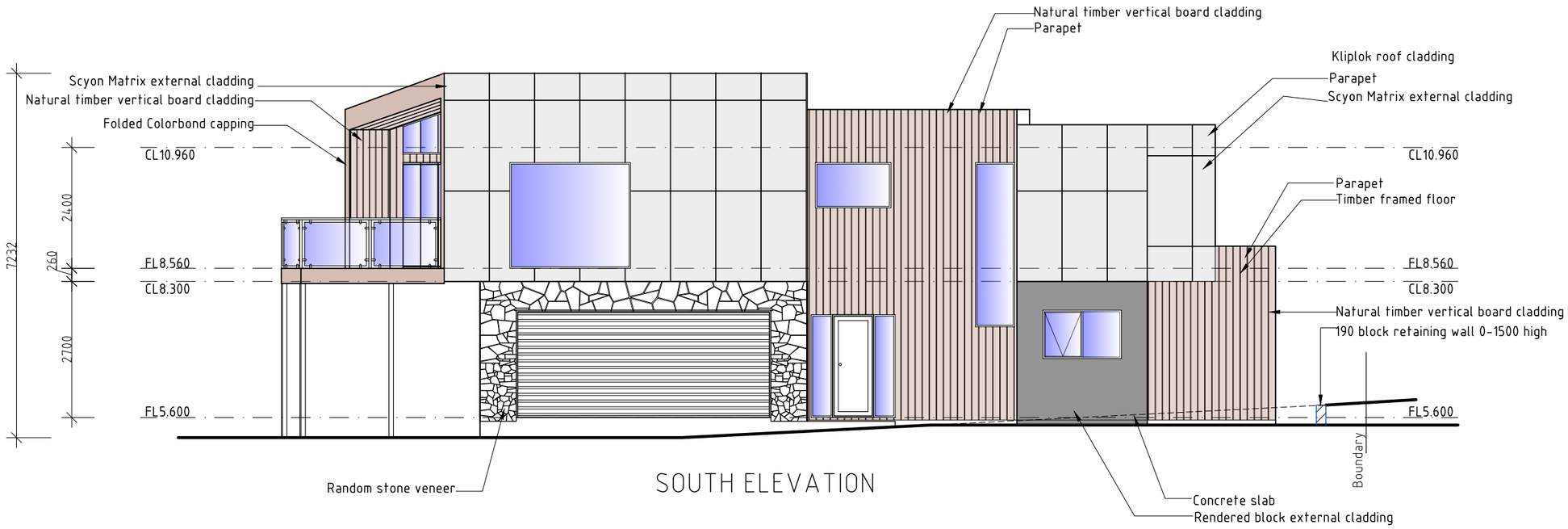
BUILDING DESIGNERS AUSTRALIA



NORTH ELEVATION



SOUTH ELEVATION

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UNIT 2

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

UNIT 2 ELEVATIONS

DATE
03/06/25

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16 OF 17

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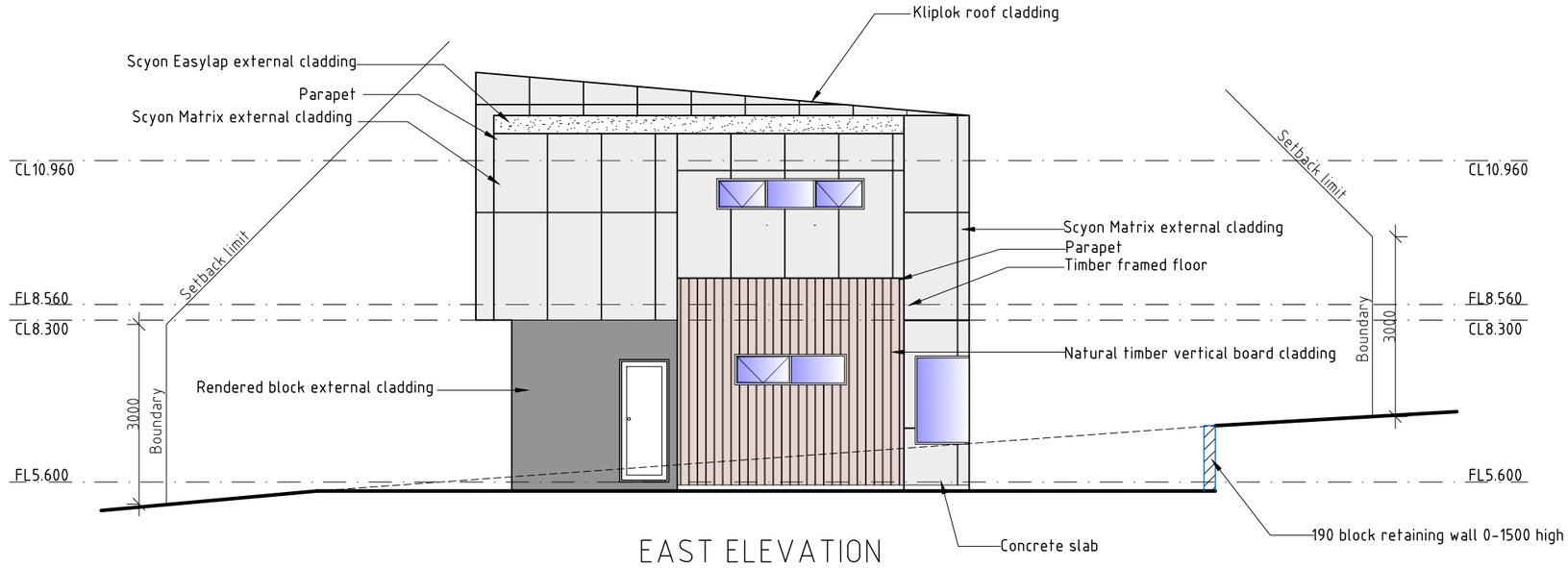
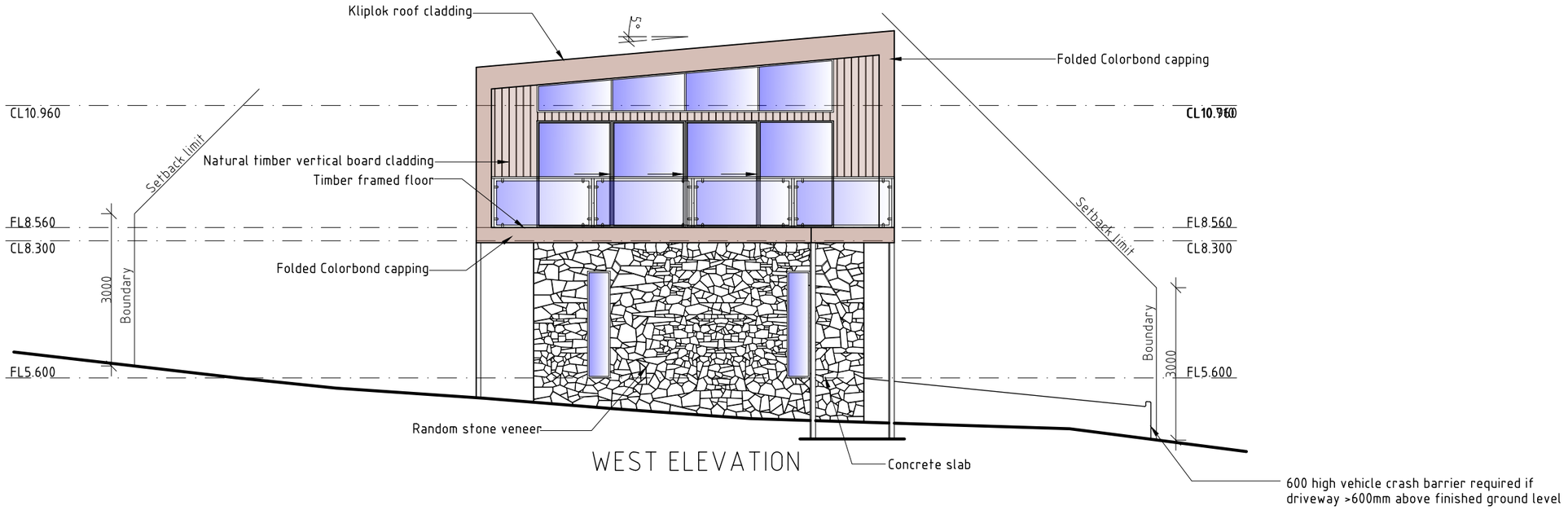
bda BUILDING DESIGNERS AUSTRALIA



EAST ELEVATION



WEST ELEVATION

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UNIT 2

PROPOSED 2 UNIT DEVELOPMENT FOR
MR K COOPEER AT
72 ESPLANADE ROSE BAY

UNIT 2 ELEVATIONS

SCALE 1:100
0 1000 2000

AMENDED
26/03/2025

DATE
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17 OF 17

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Accreditation No.CC6201H

BUILDING DESIGNERS AUSTRALIA

72 Esplanade

Rose Bay, Tas, 7015

SunTracker - Shadow Diagrams

UNit 1 and Unit Private Open Space - Detail

Date: 21st June

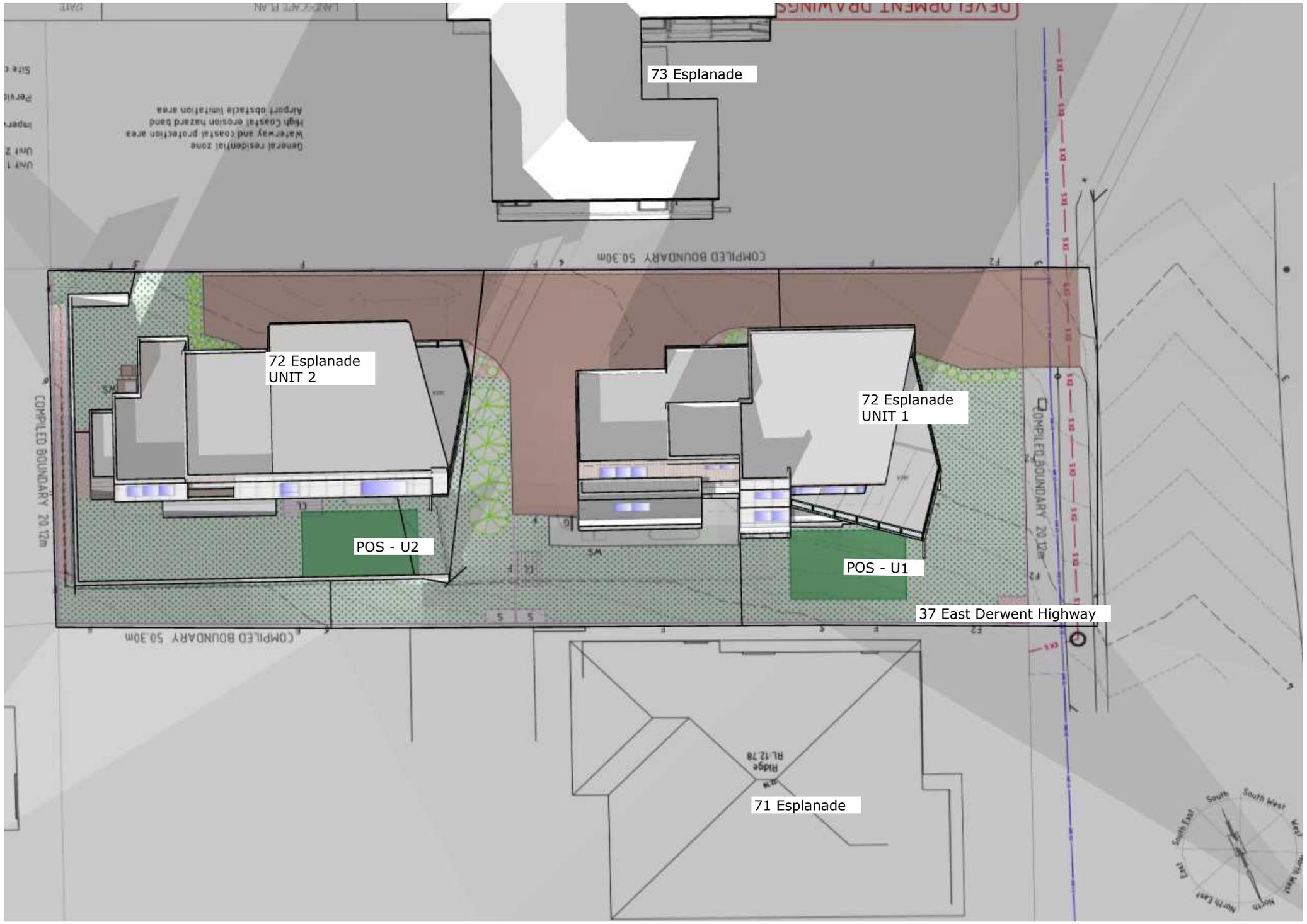
Time Period: 9am to 3pm (0900 to 1500)

scale 1:200

SunTracker - Shadow Diagrams

0900

NORTH



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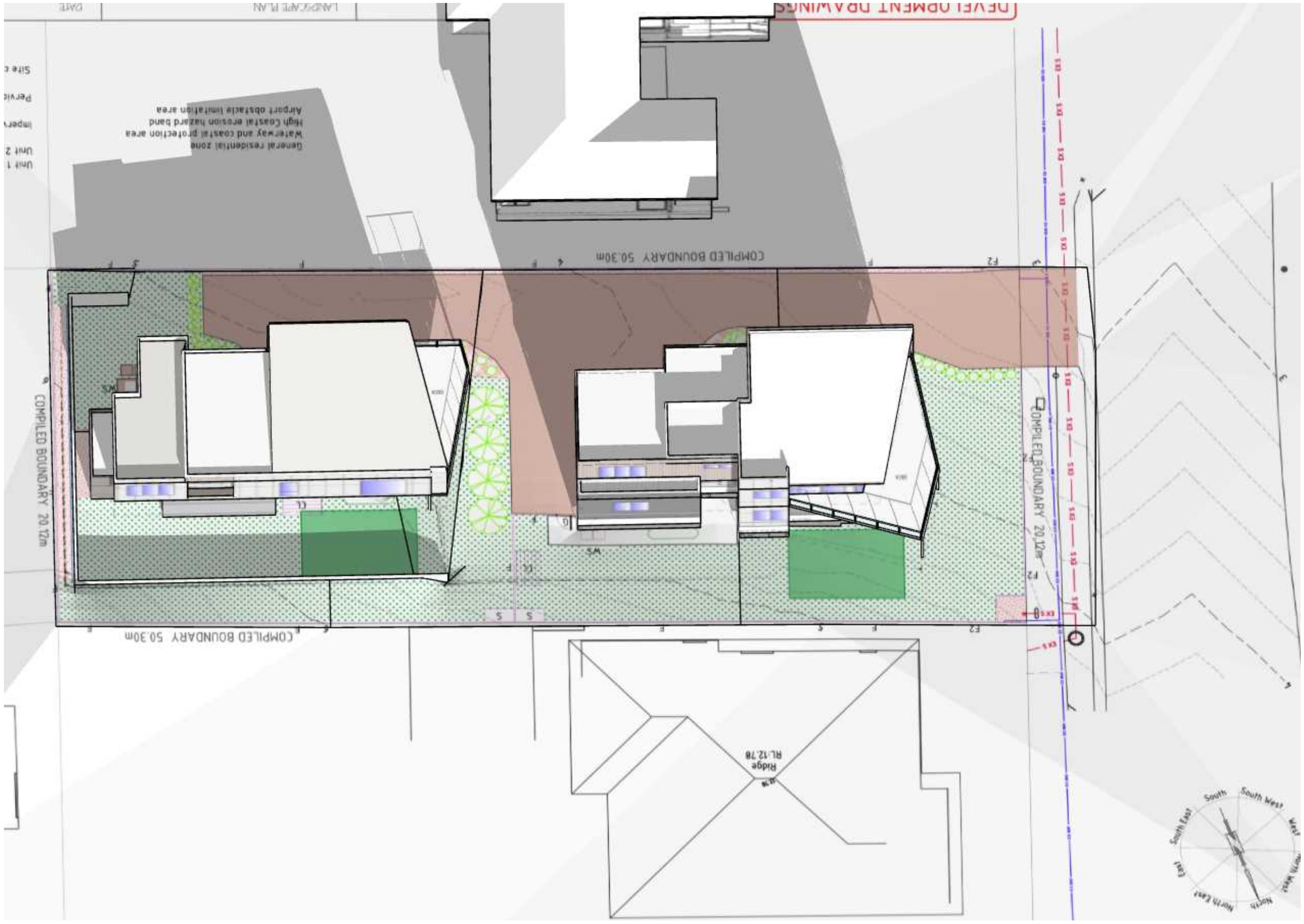
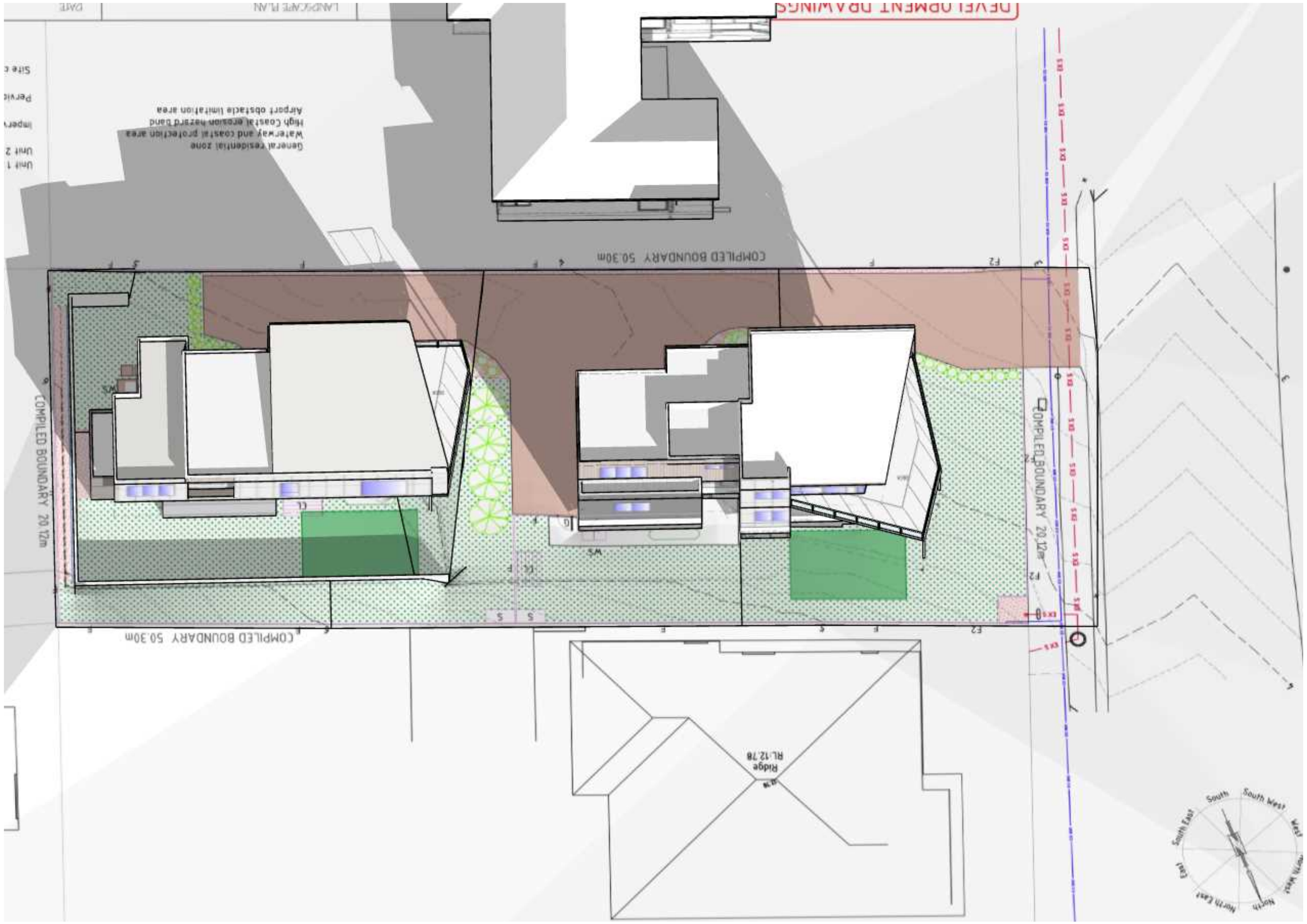
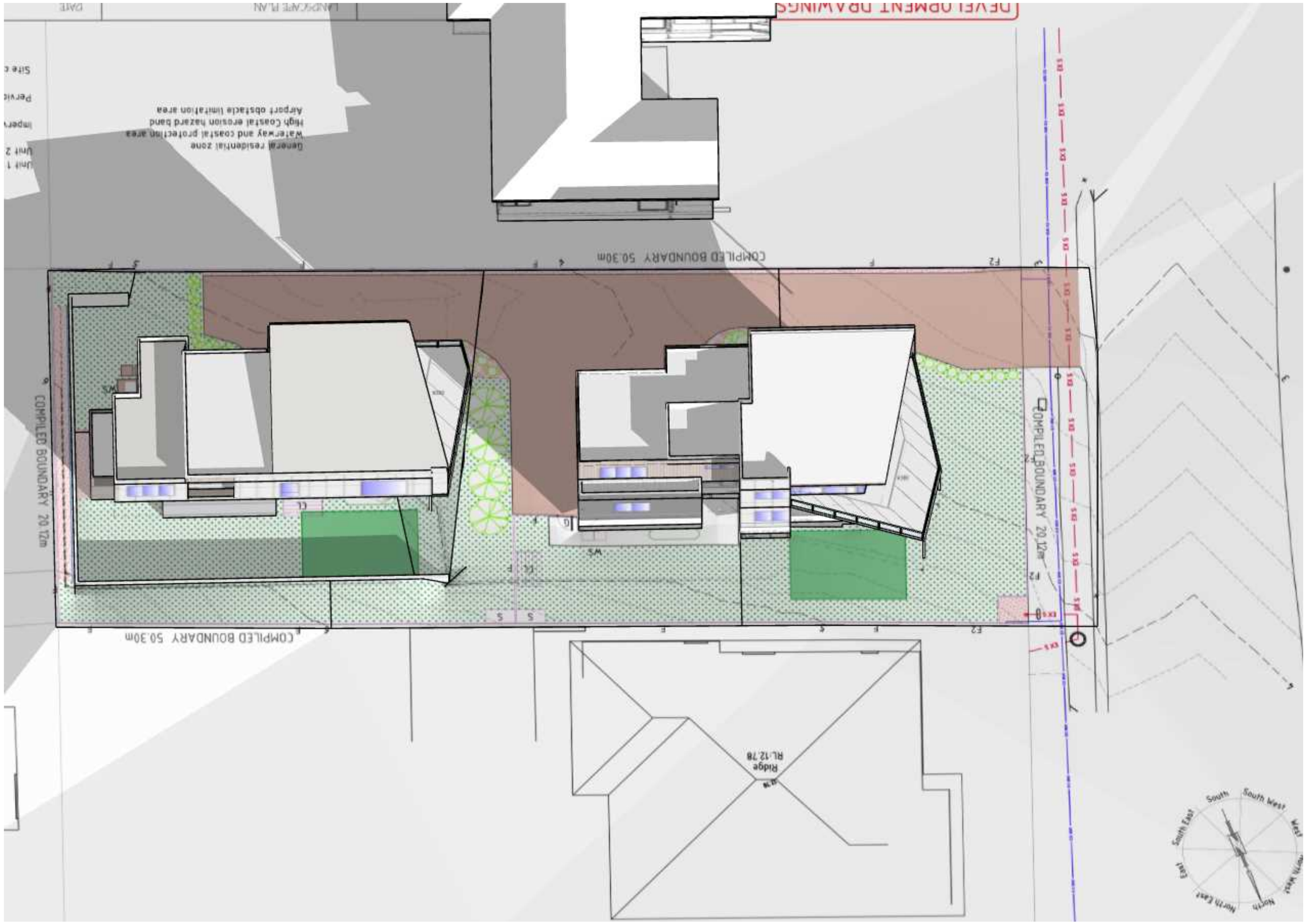
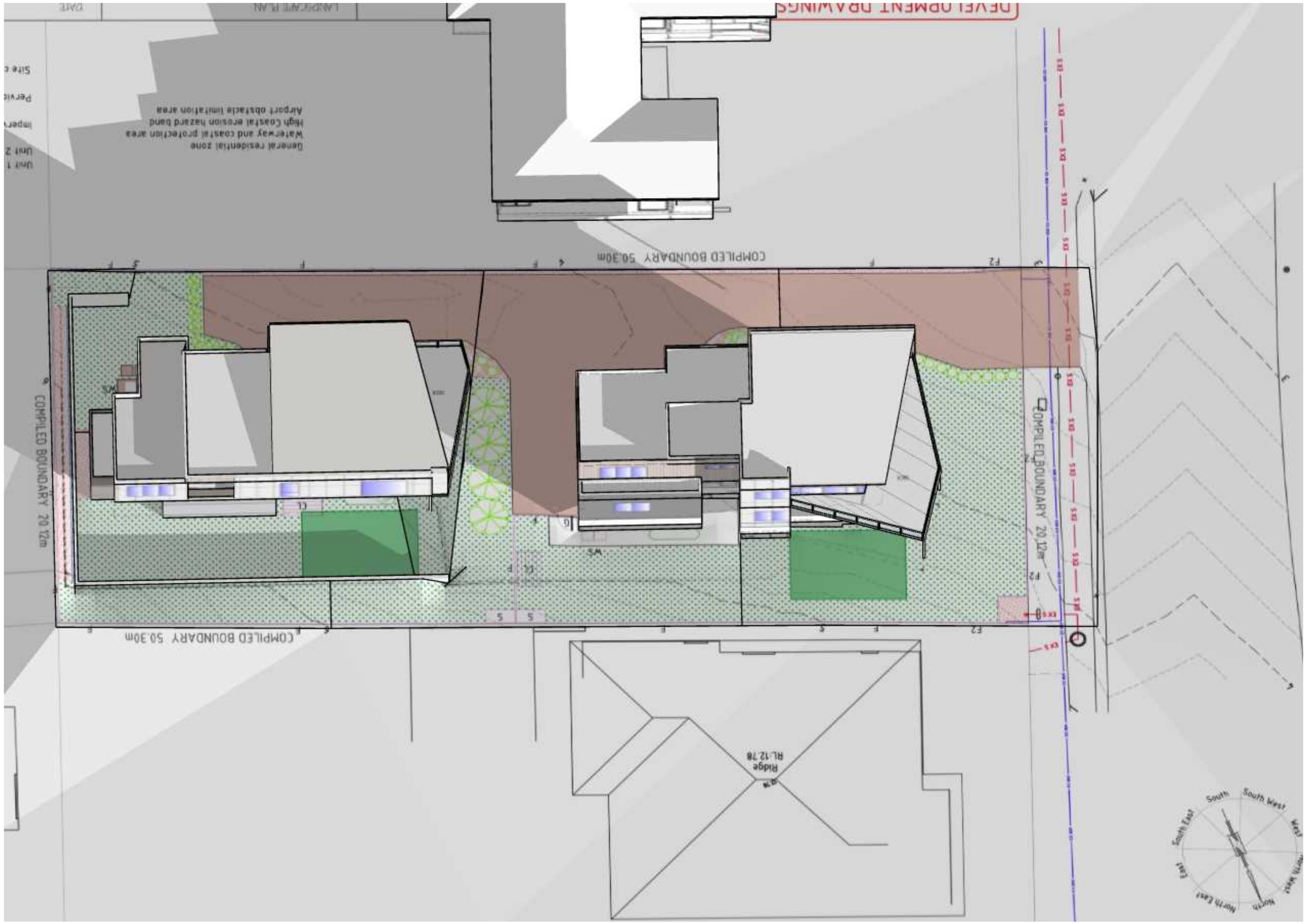
Shadowing by Sergei Nester www.viewbuild.com m: 0458 787 111









72 Esplanade

Rose Bay, Tas, 7015

SunTracker - Shadow Diagrams

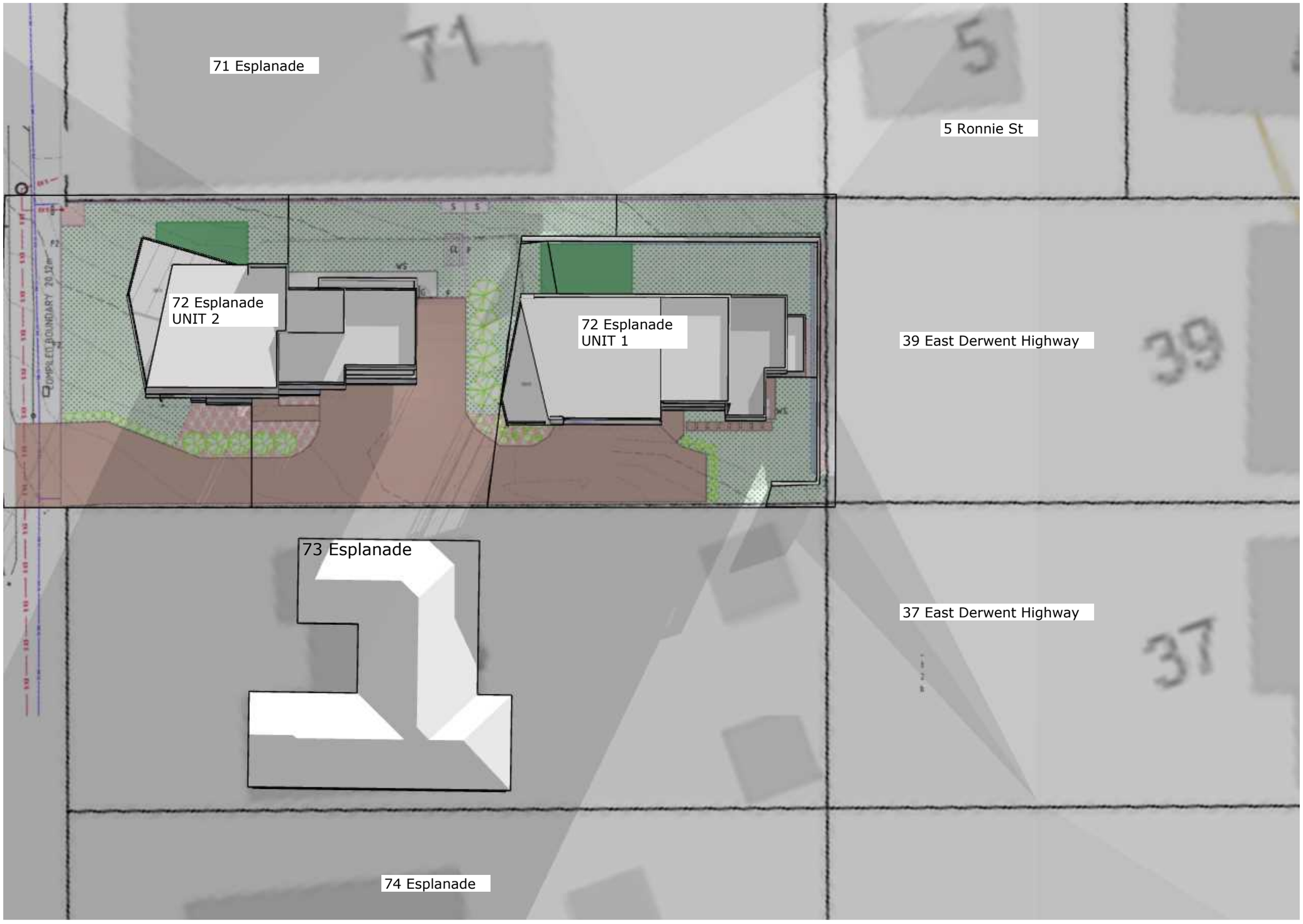
Overshadowing of Neighbouring properties. 71 Esplanade, 73 Esplanade
5, Ronnie Street, 39 East Derwent Highway and 39 East Derwent Highway

Date: 21st June

Time Period: 9am to 3pm (0900 to 1500)

SunTracker - Shadow Diagrams **0900**

NORTH



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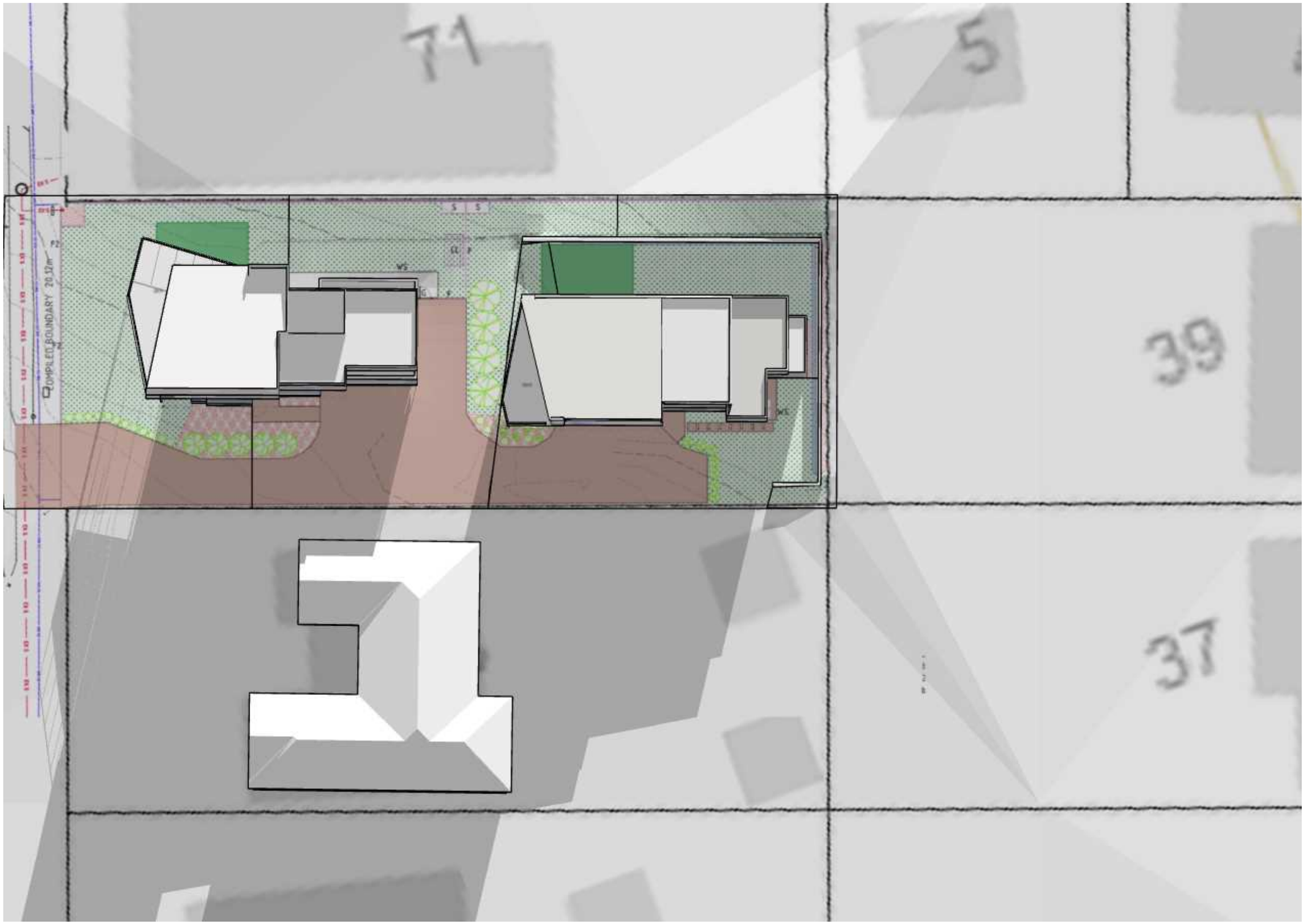

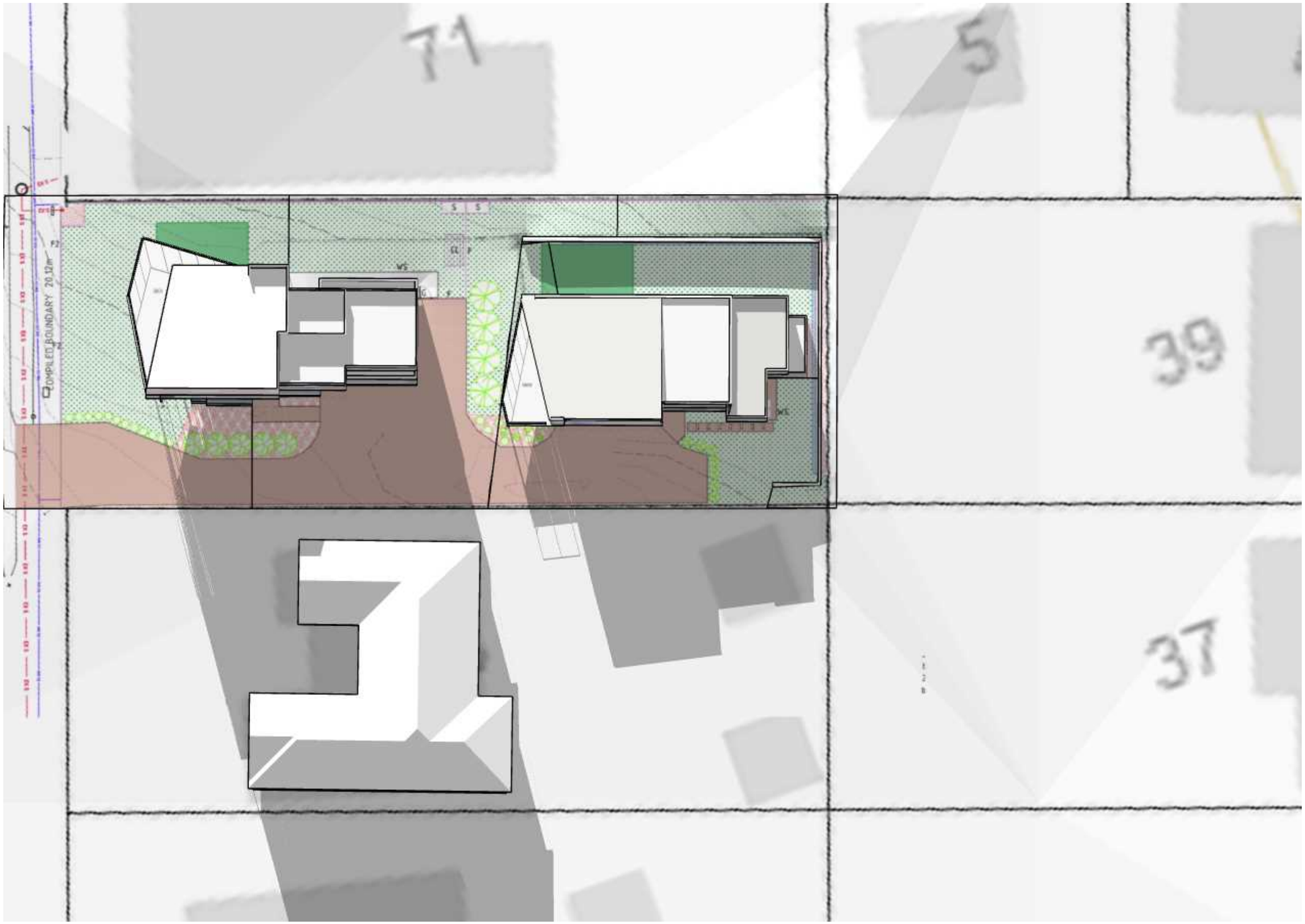

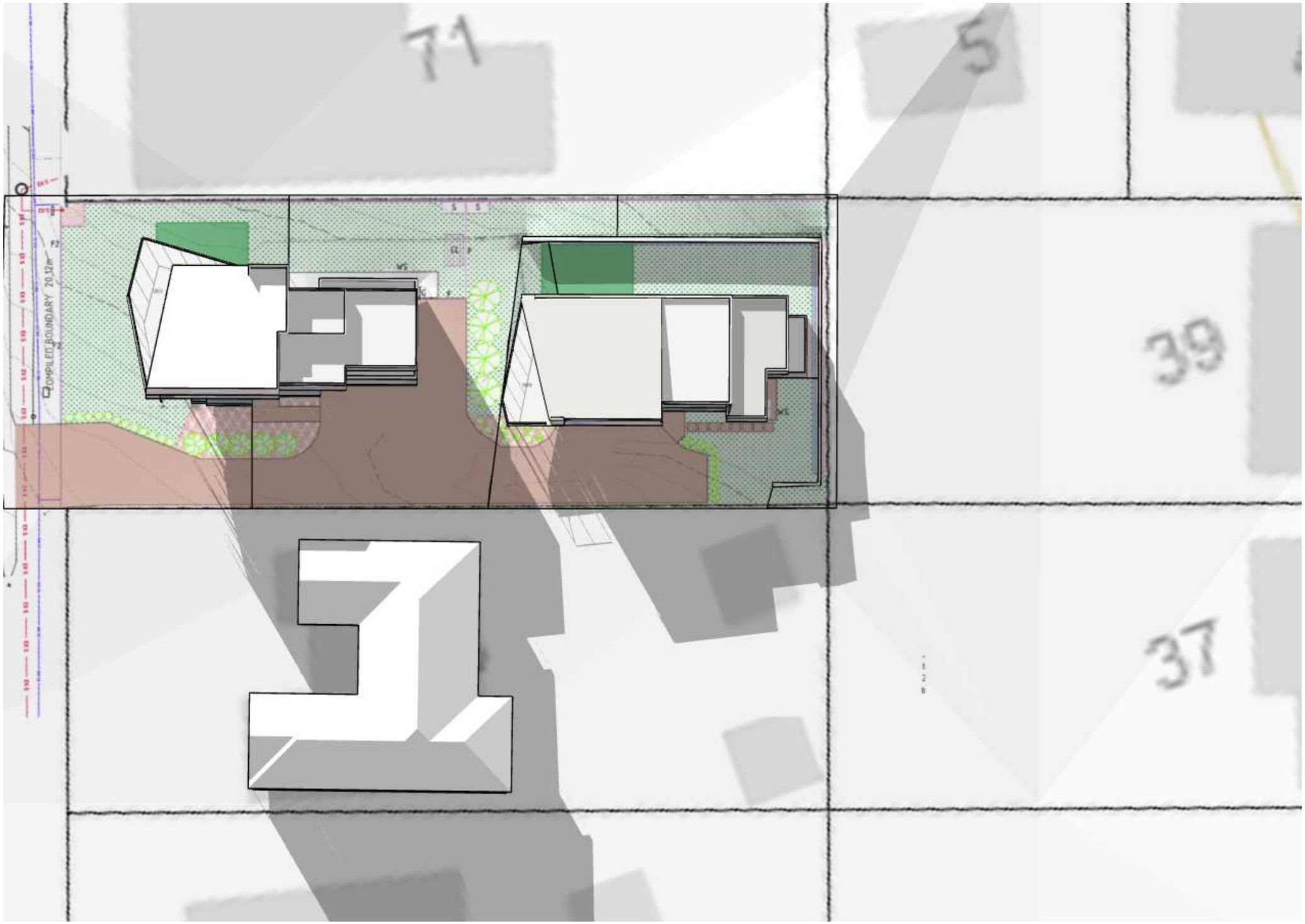

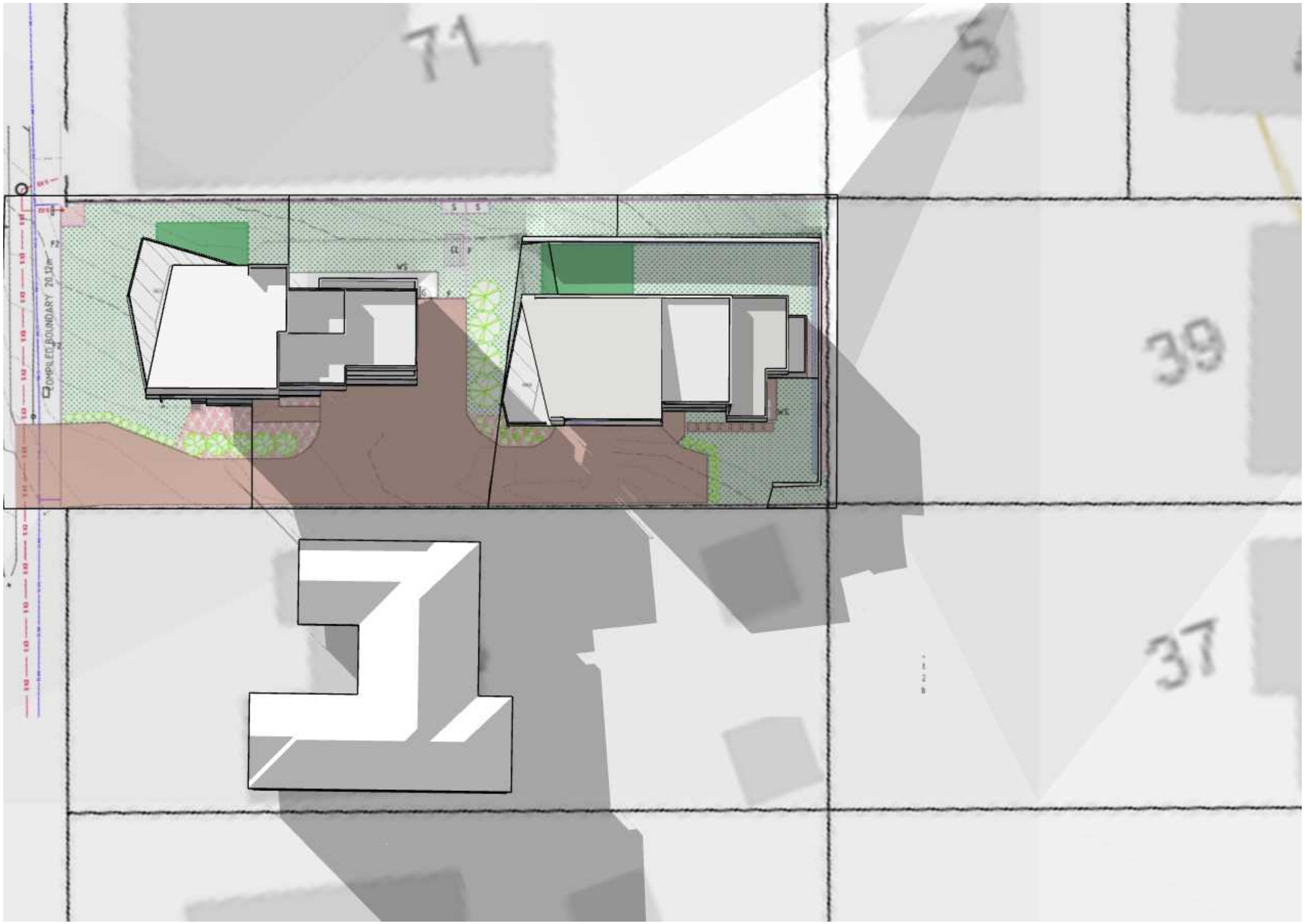

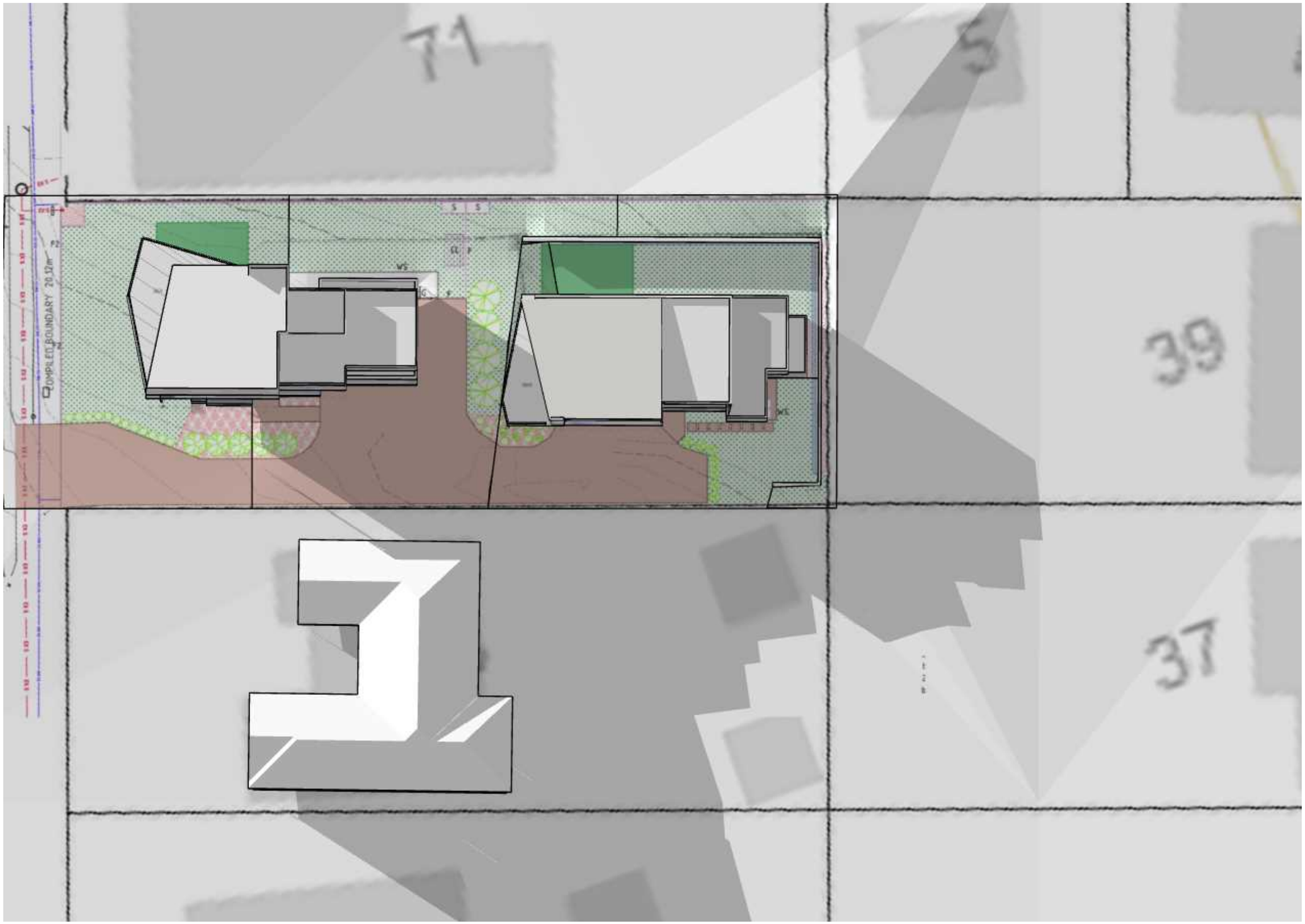

GES

GEO-ENVIRONMENTAL

SOLUTIONS

COASTAL VULNERABILITY ASSESSMENT

PROJECT:

Proposed Units

Site Address:

72 Esplanade,
Rose Bay,
TAS
7015

CLIENT:

Kelvin Cooper

DATE:

23/05/2025

DOCUMENT CONTROL

Document Prepared By:

Geo-Environmental Solutions Pty Ltd

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DOCUMENT CONTROL		
Report Title:	72 Esplanade Rose Bay TAS 70115	
Project Type:	Coastal Vulnerability Assessment	
Client:	Kelvin Cooper	
Project Job Number:	J11507	
Revision Version:	V01	
Date:	23/05/2025	
Approved By:	V. Gupta	
	Signature:	Date
		23/05/2025

FIGURES

TABLE

EXECUTIVE SUMMARY

Geo-Environmental Solutions Pty Ltd (GES) was engaged by Kelvin Cooper to undertake a Coastal Vulnerability Assessment for a proposed units at 72 Esplanade, Rose Bay, Tasmania (CT 60499/12). The assessment was required under the Tasmanian Planning Scheme – Clarence City Council due to the site's partial inclusion in the Coastal Erosion Hazard Code (CEHC) and Waterways and Coastal Protection Overlay (WCPO).

The site is located along the eastern shore of the Derwent River, within a sheltered estuarine environment, protected from direct ocean swell. Coastal processes influencing the site include local westerly wind-generated waves and sea level rise. Offshore wave conditions reach up to 0.9 m in significant wave height, though are considerably attenuated nearshore.

GES conducted a site-specific investigation, incorporating geological mapping, LiDAR analysis, borehole drilling, and a review of Digital Earth Australia (DEA) shoreline data. The site is underlain by Permian sediments, and the site is classified as a Class M moderately reactive site. Investigations identified shallow refusal on rock beneath the site, with minimal susceptibility to foundation instability or significant erosion.

The shoreline consists of sandy beach backed by bedrock, with mixed sediments (pebbles, cobbles, boulders), and a gentle-to-moderate slope (6°–20°), indicating low to moderate erosion risk. DEA shoreline analysis shows the beach has remained stable from 1988 to 2024.

As only the proposed unit 1 deck falls within the High Coastal Erosion Hazard Overlay, it is recommended that the foundation be anchored into the underlying bedrock. Additionally, as the site is located within the Waterways and Coastal Protection Overlay, it is recommended that a Soil and Water Management Plan be prepared for the proposed development. All works should generally be undertaken in accordance with the Wetlands and Waterways Works Manual and the Tasmanian Coastal Works Manual.

If the recommendations are adhered to, the proposed development will meet the requirements for works in the coastal erosion hazard area and it will fulfill the performance solution codes C7 and C10., as outlined in the Tasmanian Planning Scheme - Clarence Council (2021).

1 INTRODUCTION

Geo-Environmental Solutions Pty Ltd (GES) were contracted by Kelvin Cooper to prepare a coastal vulnerability assessment for a proposed works at Rose Bay, Tasmania. The project area consists of a single cadastral title (CT 60499/12) located at 72 Esplanade, Rose Bay, TAS 7015. (The Site).

An application to conduct construction works has triggered the assessment in accordance with the Tasmania Planning Scheme (TPS) – Clarence City Council and following of the Director's Determination for Coastal Erosion and Inundation areas which provides building requirements for building and demolition work in coastal erosion and inundation hazard areas.

GES have undertaken this assessment using available scientific literature and datasets. Estimations are determined by approximation with appropriate regional information applied where appropriate to site specific information. Data collection and site-specific modelling was undertaken in assessment of the site.

2 OBJECTIVES

The objective of the site investigation is to:

- Identify which codes need to be addressed in terms of coastal vulnerability and identify the performance criteria relevant to the project which need addressing;
- Conduct a literature review of all geological, geomorphologic, hydrodynamic information and any erosion or inundation assessments which are relevant to the site;
- Review hydrodynamic assessments of the local area to determine projected sea level rise, storm tides and site-specific hydrodynamic conditions and where applicable, GES's site-specific soil investigation findings;
- Conduct a detailed erosion assessment of site erosion vulnerability in terms of long-term beach recession and short-term storm erosion.
- Conduct a site risk assessment for the proposed development ensuring relevant performance criteria are addressed; and
- Where applicable, provide recommendations on methods and design approach to reduce inundation and erosion impact.

3 SITE DETAILS

3.1 Project Area Land Title

The land studied in this report is defined by the following title reference:

- CT 60499/12

the 'Site' and/or the 'Project Area' in this report.

3.2 Project Area

The project area is located on the Eastern Shore of the River Derwent approximately 4 km directly southeast from Hobart (Figure 1). The site is separated by Clearence Foreshore trail and esplanade from Derwent River.

The site is located in located in sheltered inlet of the Derwent River, which is generally protected from strong ocean swells due to its location within the river estuary.

The site potentially could be impact due to the local winds, sea level rise and boat activities in the river.

Figure 1 - Location of the site

3.2.1 Proposed Works

The project site covers an area of approximately 1,019 square meters and currently contains an existing residential building. The proposed works involve the demolition of the existing building and the construction of two units with a driveway along the western boundary. The proposed units will be two-storey buildings with decks. Plas has been provided to GES by Building Designers Australia (Dated: 23/04/2025. The plan is presented in Figure 2

The site's elevation varies; along the western boundary the site is approx. 3 to 4m AHD (Australian Height Datum) and rising to 6m AHD towards the eastern to northeast side of the site.

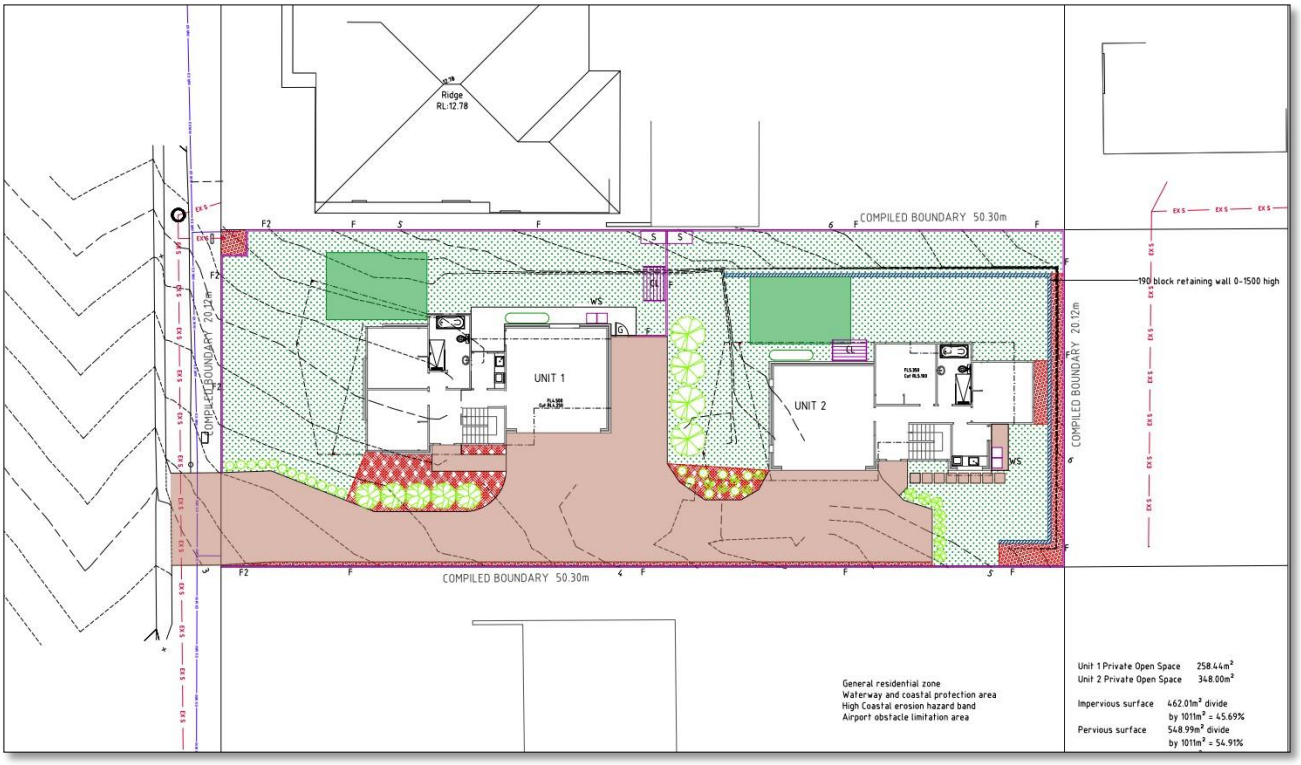

Figure 2 – Plans of the project area

4 PLANNING

4.1 Australian Building Code Board

This report presents a summary of the overall building construction risk to coastal erosion and inundation processes. This assessment has been conducted a 'normal' building design life category based on a 2023 baseline (ABCB 2015).

'The design life of buildings should be taken as 'Normal" for all building importance categories unless otherwise stated.'

As per Table 3-1, the following sub systems are identified for the proposed development:

- Building foundations subsystems are considered not accessible or economical to repair and therefore are to be designed with a 50-year life till 2073; and
- Wastewater subsystems are considered to have moderate ease of access but difficult or costly to replace or repair and are therefore to be designed with a 15-year life till 2038.

Table 3-1 Design life of building and plumbing installations and their components

Building Design Life Category	*Building Design Life (years)*	*Design life for components or sub systems readily accessible and economical to replace or repair (years)*	*Design life for components or sub systems with moderate ease of access but difficult or costly to replace or repair (years)*	*Design life for components or sub systems not accessible or not economical to replace or repair (years)*
Short	1 < dl < 15	5 or dl (if dl<5)	dl	dl
Normal	50	5	15	50
Long	100 or more	10	25	100

Note: Design Life (dl) in years

4.2 The Tasmanian Building Regulations 2016

The Tasmanian Building Regulations are regulated by the Consumer, Building and Occupation Services (CBOS) department and are formed from the Tasmanian Building Act 2016. New state-wide planning and building requirements are being implemented for hazardous areas. These include areas potentially subject to landslip, bushfire, flooding, coastal erosion, & costal inundation. Details of the Tasmanian Building Regulations are presented in Appendix 1.

4.3 Tasmanian Planning Scheme Overlay – Clarence Council (TPS, 2021)

4.4 Development & Works Acceptable Solutions

Where applicable, the need for further performance criteria compliance is outlined in Appendix 1.

4.4.1 Waterways and Coastal Protection Code (WCPO)

C7.7.1 Building and Works

Given that the proposed unit 1 resides in the WCP overlay and there are no acceptable solutions for building and works in a WCPO are,

The following performance criteria need to be addressed:

- C.7.6.1

4.4.2 Coastal Erosion Hazard Code (CEHC)

C10.6.1.P1 Buildings and works.

Given that the proposed unit 1 partially resides in the CEHC Area, and there are no acceptable solutions for buildings and works in a CEHC Area,

The following performance criteria need to be addressed:

- C10.5.1
- C10.6.1 P1.1 and P1.2

4.4.3 Coastal Inundation Hazard Areas Code (CIHC)

C11.6.1.P1 Buildings and works.

The proposed units aren't within the CIHC overlay and no further assessment required

4.4.4 Waterways and Coastal Protection Overlay

The proposed unit 1 falls partially within waterways and coastal protection overlay (Figure 3).

Figure 3 – Waterways and Coastal Protection Overlay (Source: The List)

4.4.5 Coastal Erosion Hazard Code Overlay (CEHC)

The proposed unit 1 fall within close proximity to the High Coastal Erosion Hazard Overlay Figure 4.

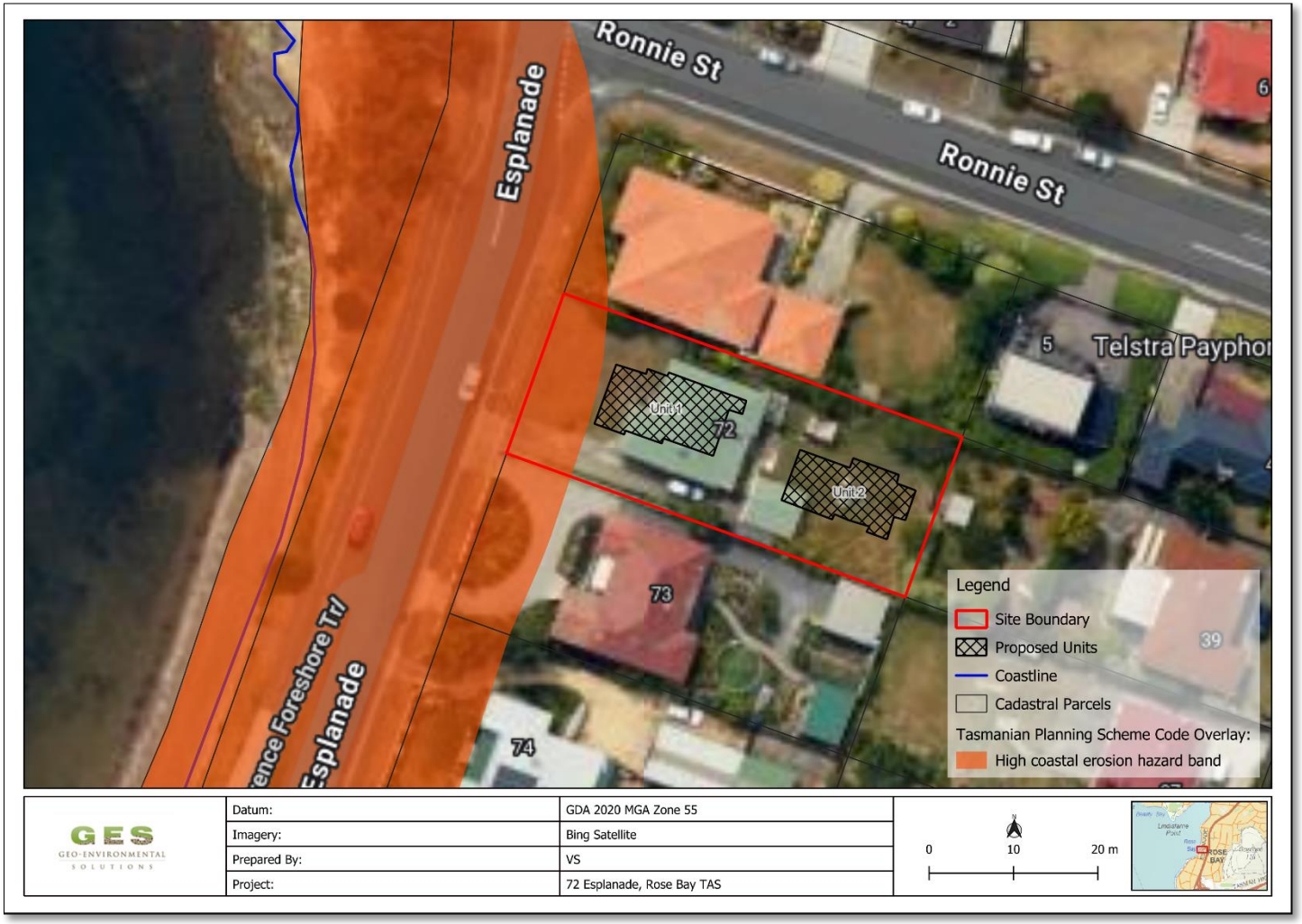

Figure 4 – Coastal Erosion Hazard Overlay (Source: The List)

4.4.6 Coastal Inundation Hazard Code Overlay (CIHC)

The proposed works are not within the Coastal Inundation Overlay (CIHC) Figure 5.

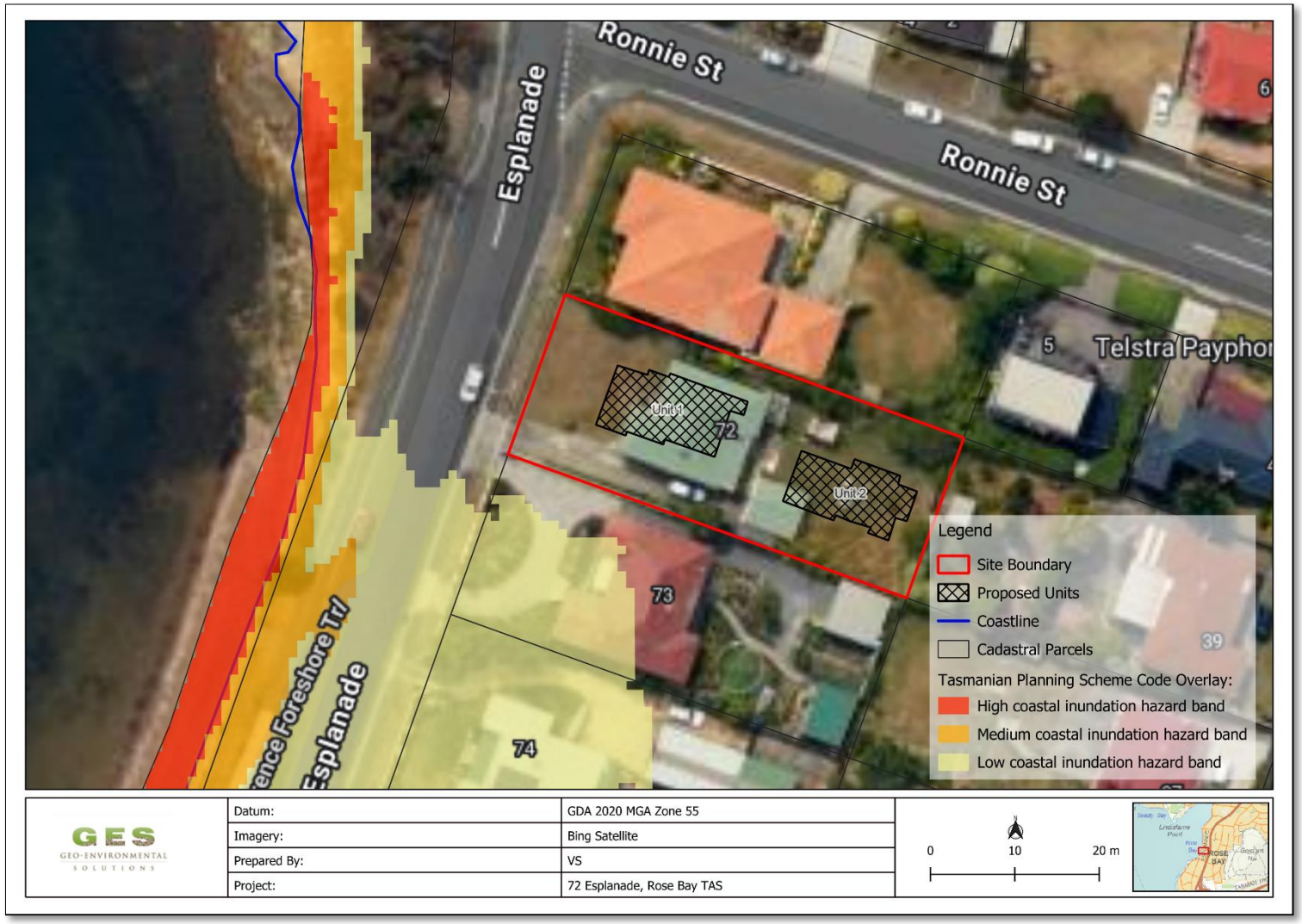

Figure 5 - Coastal Inundation Hazard Overlay (Source: The List)

5 SITE MAPPING

To assist in determination of the vulnerability of the site to erosion from coastal processes, it is important to determine the geological and geomorphological characteristics of the site, Roches Beach.

5.1 Natural Values

The review has been completed based on the site plan. The Integrated Conservation Value for the waterway has been identified as LOW (NVA report run on the 019/05/2025). Appendix 5 associated figures and plan demonstrate compliance with the performance criteria of section C7.6.1 of Tasmanian Planning Scheme – Clarence Council.

5.2 Geological Mapping and Geomorphology

The geological map for the site has been presented in **Error! Reference source not found.**. The site is underlained by Permian sediments. The geology of the site is generally poorly fossiliferous interbedded glaciomarine fine- to medium-grained sandstone, fissile and non-fissile siltstone, lonestones and pebble-rich patches, productid bed at top, basal interval commonly with thick beds of coarse-grained sandstone.

The site's elevation is approximately 3-7m AHD, as determined by QGIS software using Greater Hobart 2013 LiDAR data. The proposed unit 1 is set back approximately 35 m from the 0-meter AHD coastline.

5.3 Site Soil

A number of bore holes were completed to identify the distribution and variation of the soil materials at the site, bore hole locations are indicated on the site plan. See soil profile conditions presented below in Table 1. Tests were conducted across the site to obtain bearing capacities of the material at the time of this investigation. Soils on the site are developing from Permian sediments. The clay fraction is likely to show moderate ground surface movement. The site has been classified as Class M - Moderately reactive clay or silt site, which may experience moderate ground movement from moisture changes. Some variation of subsoil depth and weathering of underlying rock is likely.

Table 1 – Soil Profile of the Site

BH 1 Depth (m)	BH 2 Depth (m)	USCS	Description
0.00-0.30	0.00-0.30	SM	**Silty SAND**: grey, brown, slightly moist, loose,
0.30-1.00	0.30-0.90	CI	**Silty CLAY**: trace of gravel, medium plasticity, dark grey, brown, slightly moist, stiff,
1.00-2.20	0.90-2.00	CL	**Gravelly CLAY**: low to medium plasticity, pale yellow, pale grey, slightly moist, stiff, refusal.

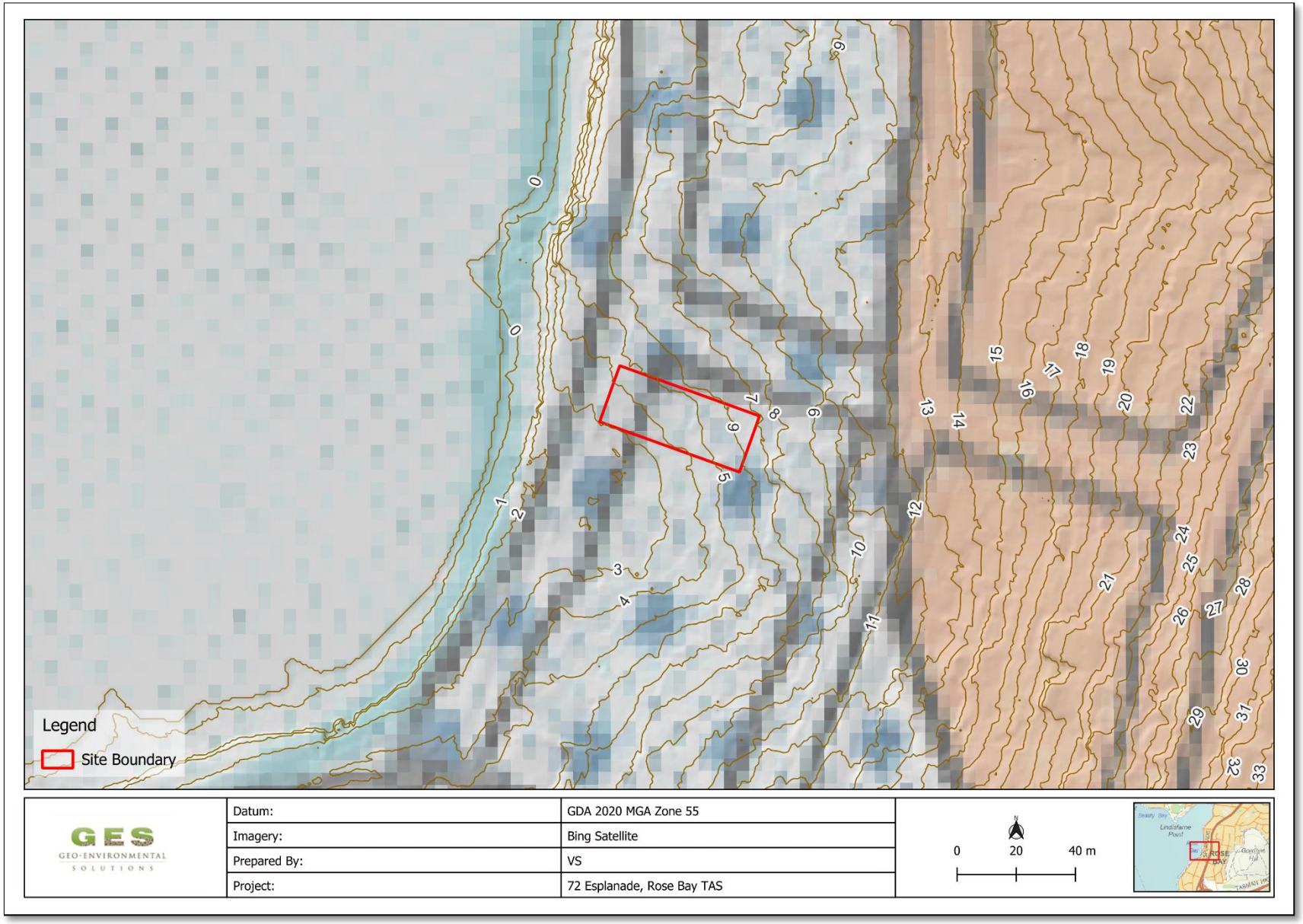

Figure 6 - Local Geology with Hill shade (Map Source: MRT Hobart Engineering Geology Map 50K)

6 COASTAL PROCESS

6.1.1 Storm Tide

Storm tide events may be defined in terms of the culmination of astronomical tide and storm surge events. Maximum storm tide inundation levels have been adopted for the site based on a 1% AEP that an inundation event will occur. GES obtained data for storm tide levels from Canute 3.0. taking in account greenhouse gas emission scenario - very high RCP 8.5, Climate Model Ensemble Percentile Upper (95th), IPCC Version AR6 (Baseline 1995 -2014). (Source: Canute 3.0)

- *The storm tide level adopted for the site is 1.26 m AHD.*

6.2 Sea Level Rise

Storm tide events may be defined in terms of the culmination of astronomical tide and storm surge events. Maximum storm tide inundation levels have been adopted for the site based on a 1% AEP that an inundation event will occur. The TPS - Clarence Council SLR adopted 0.8m rise by 2100. However, the GES has adopted the most recently published following sea level rise estimates-based Canute 3.0, IPCC AR6 projections (very high RCP8.5 climate scenario):

- *1.01m rise by 2100.*

6.1 Stillwater Levels

The effects of storm tide may be combined with sea levels projections to provide baseline water levels (reported in m AHD) which are referred to as still water level. The still-water levels adopted for the site is based on 1% AEP estimates Table 2.

Table 2 Summary of Site Stillwater Levels for 2100 estimates (1% AEP)

Stillwater Elevations	2100 (Canute 3.0)
Sea Level Rise (m, AHD)	1.01
Tidal Influence & Barometric Low Influence (m)	1.26
Wind & Wave Set up (m)	0.16
Summary (m, AHD)	2.43

6.2 Site Wave and Wind Conditions

The site is located along the shore of the Derwent River, a sheltered environment largely protected from ocean swell. The predominant wave activity is generated by westerly winds, producing offshore waves with a significant height of approximately 0.9 m at a water depth of 1.4 m. As these waves approach the nearshore zone, they experience substantial attenuation, resulting in a reduced significant wave height.

Adopted estimates of the southeastern wind and waves for the site:

- R2% Wave Runup Based – 2.50m.

7 COASTAL EROSION

The shoreline near the site is classified as open sandy shores backed by bedrock exhibit potential for beach erosion due to wave action and sediment mobility; however, they generally present lesser vulnerability to long-term shoreline recession owing to the stabilizing influence of the underlying bedrock. Sloping hard rock shores, particularly those with gentle to moderate gradients (6°–20°), show minimal susceptibility to both flooding and erosion, acting as a natural buffer against coastal processes. In areas where the shoreline comprises a mix of sand, pebbles, cobbles, or boulders, the energy dissipation capacity of the coarser materials can offer increased resistance to wave-induced erosion, though localized sediment displacement may still occur during storm events. These geological and morphological characteristics contribute to a generally low-to-moderate erosion hazard classification for such coastal settings.

7.1 Coastal Shoreline

Digital Earth Australia Coastlines (DEA Coastlines) is a continental dataset that includes annual shorelines, and rates of coastal change along the entire Australian coastline from 1988 to the present. The product combines satellite data from Geoscience Australia's Digital Earth Australia program with tidal modelling to map the typical location of the coastline at mean sea-level for each year. The product allows trends of coastal erosion and growth to be examined annually at both a local and continental scale, and for patterns of coastal change to be mapped historically and updated regularly as satellite data continues to be acquired. This allows current rates of coastal change to be compared with that observed in previous years or decades.

The position of means sea level for each year 1988 to 2024 along the beach in front of the site, from the DEA Coastlines, is shown in Figure 5. The beach generally stable since 1988.

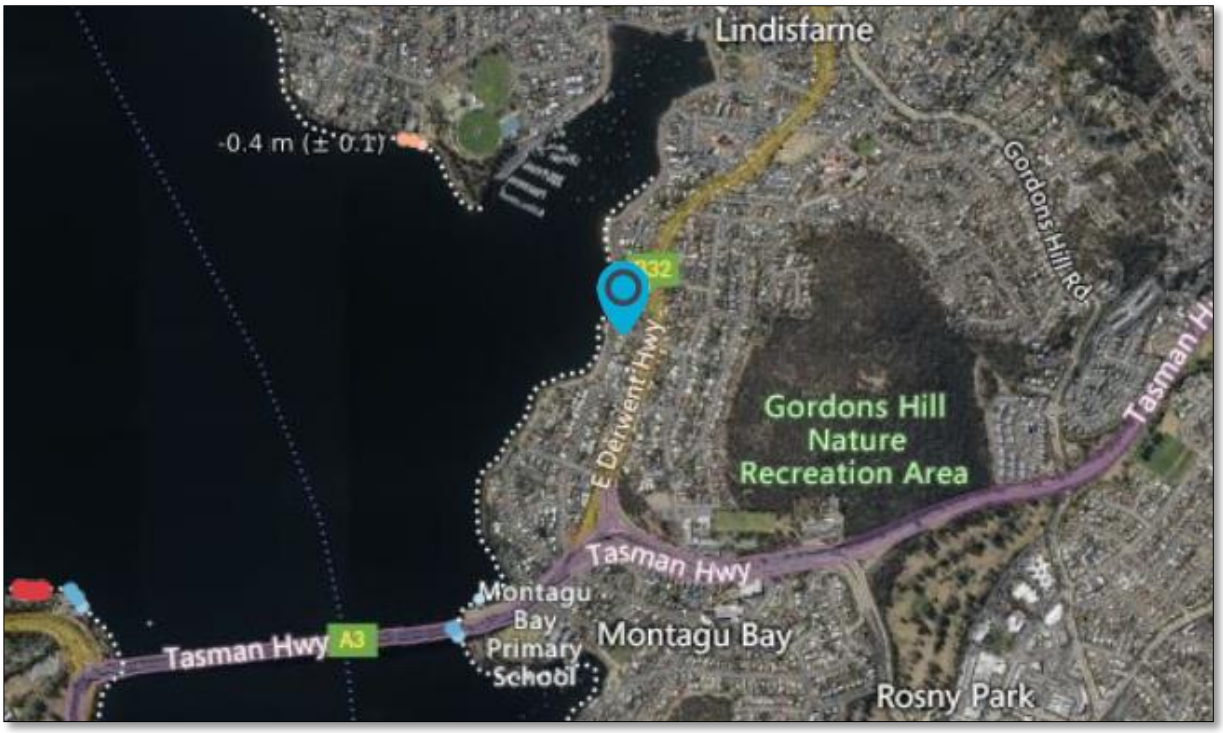

Figure 7 – Position of mean sea level from 1988 to 2024 along Rose Bay shoreline (Source: DEA Coastlines)

7.1.1 Storm Erosion Demand (S1)

Historical imagery has been reviewed to provide a context in which to assess the site in terms of site erosion potential from storms. Storm erosion rates are therefore relatively small. Aside from longer term recession attributed to sea level rise, storm erosion events have the potential to cause beach erosion (storm bite) which is followed by a period of beach rebuilding. The erosion and nourishment cycle is typically, in equilibrium unless longer term recession or progradation is occurring.

GES considers a storm erosion demand of 5 m3/m is applicable for the site.

7.1.2 Beach Rotation and/or medium – term fluctuations in sediment supply (S3)

There site is located on the shoreline of the Derwent River. The beach rotation does not apply for this site.

7.1.3 Reduce Foundation Capacity (to Stable Foundation Zone) (S4)

The proposed works are situated outside the reduced foundation zone. Site ground condition investigations indicated potential refusal at shallow depths due to underlying rock.

7.1.4 Future Recession (Bruun Rule) (S5)

The Bruun Rule has been applied to the site to estimate the response of the shoreline profile to sea-level rise. The Bruun Rule is widely used by government and non-government bodies to determine recession rates on sandy shores which are at risk of inundation. The Bruun Rule states that a typical concave-upward beach profile erodes sand from the beach face and deposits it offshore to maintain constant water depth. There are a few cases where the Bruun rule cannot be applied, which include where longshore drift is predominant, where there is dominant influence of surrounding headlands and in environments where wave activity is minimal. While there are objections to the Bruun Rule in some cases, there are no accepted alternatives.

7.1.5 Bruun Rule Beach Recession Model

The standard Bruun Rule has been applied to the site to determine sea level rise induced recession from the dominant waves active at the site.

The Standard Bruun Rule is typically expressed as R = s(L/(D + h)) or R=SLR*50 and is illustrated in Figure 8

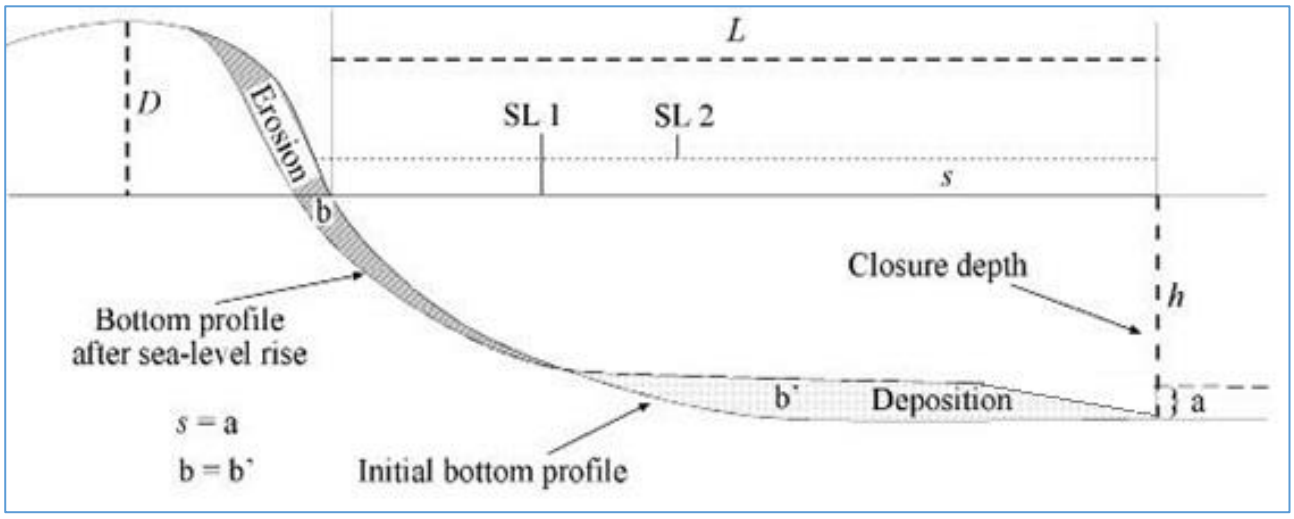

Figure 8 - Summary of standard Bruun Rule for Calculating Beach Recession

- *Adopted future recession due to sea level rise is 5m by 2100.*

The shoreline near the site is composed of rock and pebbles with vegetated slope, which helps protect the area from coastal erosion impact. Additionally, the site is separated by a paved trail and a road. As a result, shoreline recession is expected to be very low. In fact, there have been no noticeable shoreline changes over the past few decades, which could indicate that the shoreline naturally recovers after storms.

7.2 Summary of Erosion Allowance

The total erosion allowance as specified above has been calculated along the Roches Beach shoreline for 2100 is presented below within Table 3.

Table 3 Summary of Design Setbacks at the site

S1 - Erode 2x1% AEP storm (m)	*S2 - Yearly Recede (m, p.a.)*	*S3 - Beach Rotates (m)*	*S4 -Stable Zone (m)*	*S5 - 2100 SLR Recedes (m)*
5	*0*	*0*	*0*	*15*

Allowance for the design setback (DS) is defined as:

$$DS = S1 + N * S2 + S3 + S4 + S5$$

$$DS = 20m$$

8 RISK ASSESSMENT

The qualitative risk assessment criteria have been developed to identify key risks that may arise from building works in areas that are vulnerable to erosion and inundation hazard. The risk assessment based on year 2100, 1.01m AHD high SLR scenario.

Given the current data set and uncertainty over long term responses (more than 75 years) to climate change the calculated long term future risk must be viewed with caution, and adjustments to the risk assessment will need to be made over time. Future data and modelling may calculate a low or higher risk, and it is important to understand that the risk estimations in this report are based upon worst case scenario sea level rise from the current data sets.

The criteria are based on a risk assessment matrix consistent with Australian Standard AS4360 on Risk Management (AS4360). The qualitative assessment of risk severity and likelihood were used to help provide a qualitative risk assessment based upon the coastal vulnerability assessment completed for the site.

A detailed risk assessment addressing the performance criteria is presented in Appendix 4. GES has established from the risk assessment that the level of risk is tolerable for the proposed development works.

9 CONCLUSIONS AND RECOMMENDATIONS

GES recommended the following:

- The proposed deck of the unit 1 should be founded into the underlying bedrock.
- Soil and Water Management Plan be prepared for the proposed development
- All works should generally be undertaken in accordance with the Wetlands and Waterways Works Manual and the Tasmanian Coastal Works Manual.

LIMITATIONS STATEMENT

The following limitations apply to this report:

- Climate Futures Light Detection and Ranging (LIDAR) digital elevation model is used for the site modelling;
- The values estimated in this report provide an order of magnitude for assessing climate change impacts and in particular climate change induced sea level rise impacts. The information is based on a collation of existing information and data, with some site specific modelling for planning purposes.

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APPENDIX 1 – TASMANIAN BUILDING REGULATIONS 2016

Division 4 - Coastal erosion

57. Coastal erosion hazard areas

1) For the purposes of the Act, land is a coastal erosion hazard area if –
    a. the land is shown on a planning scheme overlay map as being land that is within a coastal erosion hazard area; and
    b. the land –
        i. is classified as land within a hazard band of a coastal erosion hazard area; or
        ii. is shown on a planning scheme overlay map as being land in an investigation area for a coastal erosion hazard area and the land has not been subsequently classified as being an acceptable risk.
2) For the purposes of the definition of hazardous area in section 4(1) of the Act –
    a. classification under a coastal erosion determination as being land that is within a hazard band of a coastal erosion hazard area is a prescribed attribute; and
    b. a coastal erosion hazard area is a hazardous area.

58. Works in coastal erosion hazard areas

1) A person must not perform work in a coastal erosion hazard area unless he or she is authorised to do so under the Act.
2) If a person intends to perform work in an investigation area of a coastal erosion hazard area, the person must, before performing the work, ensure that the land is classified in accordance with the coastal erosion determination –
    a. as being an acceptable risk; or
    b. into a hazard band for the coastal erosion hazard area.
3) A responsible person for work being performed in a coastal erosion hazard area must ensure that the work is being performed in accordance with the Act and the coastal erosion determination.
4) A person performing work in a coastal erosion hazard area must ensure that the work complies with the Act and the coastal erosion determination.

APPENDIX 2 - DIRECTORS DETERMINATION & BUILDING REGULATIONS 2016 - COASTAL EROSION HAZARD REPORTING

Coastal Erosion Hazard Assessment

This coastal erosion hazard report has been prepared in general accordance with methodology specified in the Directors Determination – Coastal Erosion Hazard Areas pursuant to section 20(3)(b) of the Building Act 2016 and regulation 51 of the Building Regulations 2016 (Document Version 1.2 Dated 27 September 2021).

This report has been prepared by Jonathon Traynor who has more than 10 years' experience as a professional geologist. Jonathon Traynor has a Bachelor of Science Degree with First Class Honours in Geology. In his role at GES Jonathan prepares geotechncial reports including Site Classification Reports for Construction to AS2870, Geotechnical Site Investigations, Landslip Assessments in Accordance Australian Geomechanics Guidelines (AGS 2007), and Coastal Erosion Reports.

Practices used in this assessment are developed from recent literature, including regional public domain remote sensing, wave, sea level, and storm tide modelling data obtained through various government agencies. This data is refined to a local (site scale) using detailed bathymetry models and methods within the coastal engineering manual (CEM) as well as equations obtained from recent publications to determine wind setup, wave setup, and wave runup which is specific to the coastal setting.

Specific determinations regarding coastal hazard reporting as presented in the Director's Determination - Coastal Erosion Hazard Areas, Division 2, Section 4 'Coastal Hazard Reporting' are presented in the Table below.

Signature

Vinamra Gupta
Senior Geotechnical Engineer

Works in a Coastal Erosion Hazard Area

According to this director's determination, the following regulations are applicable for the works in a coastal erosion hazard area:

(1) The AS 2870 site classification of any land located in a coastal erosion hazard area must be Class P, on the basis that it may be subject to coastal erosion.

(2) A coastal erosion hazard report must be prepared.

(3) The design of the building footing system must be prepared by an engineer-civil.

(4) The building design (including footing system) must take into account the coastal erosion hazard report.

(5) In determining an application for a Certificate of Likely Compliance, the building surveyor must:

(a) take into account the coastal erosion hazard report and any relevant coastal erosion management plan; and

(b) be satisfied that the proposed work will not cause or contribute to coastal erosion on the site or on adjacent land; and

(c) be satisfied that the proposed work can achieve and maintain a tolerable risk for the intended life of the building without requiring any specific coastal erosion protection measures; and

(d) be satisfied that the proposed work will not be located on actively mobile landforms, except where the work relates to protection measures or remediation works to protect land, property or human life.

(6) In determining an application for a permit, the permit authority must take into account the coastal erosion hazard report and any relevant coastal erosion management plan.

Report Determination Criteria	Coastal Erosion Hazard Report Compliance Checklist	Compliance	Specific Comments
4. (1)	Geotechnical practitioner with experience and competence in the preparation of coastal erosion hazard reports	Yes	
4. (1) (a)	Signed Declaration	Yes	Report Author:
4. (1) (b)	A report of a geotechnical site investigation undertaken consistent with AS 1726	Yes	The AS 1726 geotechnical model presented herein is based on deep sand profiles which are mapped at the site. No further information was required in the assessment given the site conditions are known.
4. (1) (c)	Conclusions based on consideration of the proposed work as to:		
4. (1) (c) (i)	whether the work is likely to cause or contribute to coastal erosion on the land or on adjacent land;	Yes	Given the recommendations herein are adhered to, the works will not cause or contribute to coastal erosion on the land or on adjacent land within the proposed building design life.
4. (1) (c) (ii)	whether work is proposed on actively mobile landforms;	Yes	The proposed building site and works area is not regarded as being actively mobile.
4. (1) (c) (iii)	whether the work can achieve and maintain a tolerable risk for the intended life of the building having regard to:		
	• the nature, intensity and duration of the use;	Yes	This assessment has been conducted with measures put in place to ensure that within the building's design life, the risks are tolerable in line with sites typical of residential use and with typical intensity of use. This assessment is based on the intended use as outlined in the development application. Other aspects not considered in this assessment include site or foreshore disturbance as the result of the development of

			vehicle access tracks, unauthorised clearing of vegetation, and unauthorised pedestrian access tracks.
	• the type, form and duration of any development ;	Yes	The proposed development is adequately set back from the beach dune to achieve tolerable risk. The design of the building footing system must be prepared by an engineer-civil. Beyond the design life of the development, it is always recommended that consideration is given to a footing system which will allow for greater ease for any future underpinning works, allowance for building retreat and allowance for future cross bracing if required.
	• the likely change in the risk across the intended life of the building;	Yes	Consideration is given to projected coastline recession based on site specific modelling, regionally specific sea level rise forecasts, and geotechnical foundation considerations consistent with a site-specific slope stability assessment (Neilsen et. al. 1992).
	• the ability to adapt to a change in the risk;	Yes	Additional buffer allowances are accounted for in the assessment.
	• the ability to maintain access to utilities and services;	Yes	The site will retain full access to utilities and services within the design life of the proposed development.
	• the need for specific coastal erosion hazard reduction or protection measures on the site;	Yes	Coastal erosion hazard reduction or protection measures are recommended on the site as part of the site engineering design for civil works and the risk is deemed tolerable
	• the need for coastal erosion hazard reduction or protection measures beyond the boundary of the site; and	NA	Coastal erosion hazard reduction or protection measures are not recommended beyond the boundary of the site based on the projected lifetime of the proposed development.
	• any coastal erosion management plan in place for the site and/or adjacent land.	NA	A coastal erosion management plan is not required to mitigate risks to the site within the lifetime of the proposed development.
4. (2)	protection measures for any hazardous chemical used,	Yes	Overall risks associated with the storage of hazardous chemicals at the site will not be heightened beyond what has been assessed as low risk based on recommendations . No

	handled, generated or stored on the site, taking into consideration the potential risks of the hazardous chemical to human health and safety as a consequence of coastal erosion on the site or adjacent land.		additional protection measures are recommended for the storage of hazardous chemicals at the site.
4. (4)	The declaration format for a coastal erosion hazard report must contain:		
4. (4) (a)	details of, and be signed by, the person who prepared or verified the report;	Yes	
4. (4) (b)	confirmation they have the appropriate qualifications, expertise and level of current indemnity insurance;	Yes	
4. (4) (c)	confirmation that the report has been prepared in accordance with the specified methodology.	Yes	

APPENDIX 3 - QUANTITATIVE RISK ASSESSMENT TABLES

Consequence Index

Consequence	Details - Storm Erosion and Inundation	Details – Waterways and Coastal Protection
Catastrophic	Loss of life, loss of significant environmental values due to a pollution event where there is not likely to be recovery in the foreseeable future.	Very serious environmental effects with impairment of ecosystem function. Long term, widespread effects on significant environment (eg. RAMSAR Wetland)
Major	Extensive injuries. Complete structural failure of development, destruction of significant property and infrastructure, significant environmental damage requiring remediation with a long-term recovery time.	Serious environmental impact effects with some impairment of ecosystem function. Relatively widespread medium-long term impacts.
Moderate	Treatment required, significant building or infrastructure damage i.e. loss of minor outbuildings such as car ports, garages and the like. Replacement of significant property components. linings, hard paved surfaces, cladding, flooring. Moderate environmental damage with a short-term natural or remedial recovery time.	Moderate effects on biological or physical environment (air, water) but not affecting ecosystem function. Moderate short term widespread impacts (e.g. significant spills)
Minor	Medium loss – repair of outbuildings and repair and minor replacement of building components of buildings. Replacement of floor/window coverings, some furniture through seepage (where applicable). Minor environmental damage easily remediated.	Minor effects on biological or physical environment. Minor short-term damage to small area of limited significance.
Insignificant	No injury, low loss – no replacement of habitable building components, some remediation of garden beds, gravel driveways etc. Environment can naturally withstand and recover without remediation. Inundation of the site, but ground based access is still readily available and habitable buildings are not inundated, including incorporated garages.	Limited damage to minimal area of low significance.

Likelihood Index

Level	Descriptor	Description	Guideline
A	Almost Certain	Consequence is expected to occur in most circumstances.	Occurs more than once per month.
B	Likely	Consequence will probably occur in most circumstances.	Occurs once every 1 month – 1 year.
C	Occasionally	Consequence should occur at some time.	Occurs once every 1 year - 10 years.
D	Unlikely	Consequence could occur at some time.	Occurs once every 10 years – 100 years.
E	Rare	Consequence may only occur in exceptional circumstances.	Occurs less than once every 100 years.

Source: AS/NZS 4360:2004 Risk Management

Qualitative Risk Matrix

Likelihood of the Consequence	Maximum Reasonable Consequence				
	(1) Insignificant	(2) Minor	(3) Moderate	(4) Major	(5) Catastrophic
(A) Almost certain	11 High	16 High	20 Extreme	23 Extreme	25 Extreme
(B) Likely	7 Moderate	12 High	17 High	21 Extreme	24 Extreme
(C) Occasionally	4 Low	8 Moderate	13 High	18 Extreme	22 Extreme
(D) Unlikely	2 Low	5 Low	9 Moderate	14 High	19 Extreme
(E) Rare	1 Low	3 Low	6 Moderate	10 High	15 High

Source: AS/NZS 4360:2004 Risk Management

APPENDIX 4 - QUANTATIVE RISK ASSESSMENT

BUILDING AND WORKS WITHIN A COASTAL EROSION HAZARD AREA

Performance Criteria C10.5.1 P1.1 A use within a high coastal erosion hazard band must be for a use which relies upon a coastal location to fulfil its purpose, having regard to:	Relevance	Management Options	Preliminary Risk Assessment (where relevant)			Further Assessment Required
			Consequence	Likelihood	Risk	
a) the need to access a specific resource in a coastal location;	n/a					
b) the need to operate a marine farming shore facility;	n/a					
c) the need to access infrastructure available in a coastal location;	n/a					
d) the need to service a marine or coastal related activity;	n/a					
e) provision of an essential utility or marine infrastructure;	n/a					
f) provision of open space or for marine-related educational, research or recreational facilities;	n/a					
g) any advice from a State authority, regulated entity or a council; and	n/a					
h) the advice obtained in a coastal erosion hazard report.		Refer to recommendations	Minor (2)	Unlikely (D)	Low (5)	No

Performance Criteria C10.6.1 P1.1 Buildings and works, excluding coastal protection works, within a coastal erosion hazard area must have a tolerable risk, having regard to:	Relevance	Management Options	Managed Risk Assessment (where relevant)			Further Assessment Required
			Consequence	Likelihood	Risk	
(a) whether any increase in the level of risk from coastal erosion requires any specific hazard reduction or protection measures	The proposed development will not increase level of the risk	The proposed Unit 1 deck works must be founded within underlying rock	Minor (2)	Unlikely (D)	Low (1)	No
(b) any advice from a State authority, regulated entity or a council; and	N/A					
(c) the advice contained in a coastal erosion hazard report	Refer to recommendations	The proposed Unit 1 deck works must be founded within underlying rock	Minor (2)	Unlikely (D)	Low (1)	No

APPENDIX 5– NATURAL VALUE ASSESSMENT

C7.6.1 Buildings and Works

P1.1 Buildings and works within a waterway and coastal protection area must avoid or minimise adverse impacts on natural assets, having regard to:	
Performance Criteria	Comment / Compliance
(a) impacts caused by erosion, siltation, sedimentation and runoff;	The proposed unit 1 should only be approved with an appropriate, site specific soil and water management plan to reduce the risk of environmental harm and erosion. The site should regularly maintain and progressively stabilised through vegetation and landscaping to reduce the potential for erosion.
(b) impacts on riparian or littoral vegetation;	No riparian or littoral vegetation is present on the site
(c) maintaining natural streambank and streambed condition, where it exists;	No works proposed in stream
(d) impacts on in-stream natural habitat, such as fallen logs, bank overhangs, rocks and trailing vegetation;	The in-stream natural habitat will not be disturbed under the current proposal.
(e) the need to avoid significantly impeding natural flow and drainage;	The watercourse is well defined, the proposed works area is located well away from the watercourse
(f) the need to maintain fish passage, where known to exist;	The property does not have a watercourse on the site
(g) the need to avoid land filling of wetlands;	No wetlands are located at the project area.
(h) the need to group new facilities with existing facilities, where reasonably practical;	New facilities will be grouped with the existing.
(i) minimising cut and fill;	There is only a minimal proposed cut/fill for the site required the proposed units.
(j) building design that responds to the particular size, shape, contours or slope of the land;	The proposed works are strategically positioned at the site.
(k) minimising impacts on coastal processes, including sand movement and wave action;	n/a
(l) minimising the need for future works for the protection of natural assets, infrastructure and property;	No further works required other than regular maintenance.

(m) the environmental best practice guidelines in the Wetlands and Waterways Works Manual; and	All works should be undertaken in compliance with the 'Wetlands and Waterways Works Manual' (DPIWE, 2003).
(n) the guidelines in the Tasmanian Coastal Works Manual.	All proposed works should be following the guidelines of the Tasmania Coastal Works Manual.

A2.

Acceptable Solutions	Comment / Compliance
Building and works within a Future Coastal Refugia Area must be within a building area on a plan of subdivision approved under this planning scheme.	No development will occur within a Future Coastal Refugia Area

A3.

Acceptable Solutions	Comment / Compliance
Development within a waterway and coastal protection area or a future coastal refugia area must not involve a new stormwater point discharge into a watercourse, wetland or lake.	No new stormwater discharge points are proposed to watercourse, wetland or lake. The proposed dwelling will be connected to existing stormwater main.

A4.

Dredging or reclamation must not occur within a waterway and coastal protection area or a future coastal refugia area	
Acceptable Solutions	Comment / Compliance
Dredging or reclamation must not occur within a waterway and coastal protection area or a future coastal refugia area.	There is no proposed dredging or reclamation on the site.

A5.

Coastal protection works or watercourse erosion or inundation protection works must not occur within a waterway and coastal protection area or a future coastal refugia area.	
Acceptable Solutions	Comment / Compliance
Coastal protection works or watercourse erosion or inundation protection works must not occur within a waterway and coastal protection area or a future coastal refugia area.	No coastal protection works, or waterway erosion or inundation protection works are proposed within the Waterway and Coastal Protection Area or a future coastal refugia area. If such activities are to be undertaken, then they must be designed by a suitably qualified person to minimise adverse impacts on natural coastal processes.

AS2870:2011 SITE ASSESSMENT

72 Esplanade

Rose Bay

March 2025

GEO-ENVIRONMENTAL

SOLUTIONS

Investigation Details

Client:	Kelvin Cooper
Site Address:	72 Esplanade, Rose Bay
Date of Inspection:	18/03/2025
Proposed Works:	New Unit(s)
Investigation Method:	Geoprobe 540UD - Direct Push
Inspected by:	C. Cooper

Site Details

Certificate of Title (CT):	60499/12
Title Area:	Approx. 1019m² m²
Applicable Planning Overlays:	Flood-prone Areas, Airport obstacle limitation area
Slope & Aspect:	3° SW facing slope
Vegetation:	Grass & Weeds

Background Information

Geology Map:	MRT
Geological Unit:	Permian Sediments
Climate:	Annual rainfall 600mm
Water Connection:	Mains
Sewer Connection:	Serviced-Mains
Testing and Classification:	AS2870:2011, AS1726:2017 & AS4055:2021

Investigation

A number of bore holes were completed to identify the distribution and variation of the soil materials at the site, bore hole locations are indicated on the site plan. See soil profile conditions presented below. Tests were conducted across the site to obtain bearing capacities of the material at the time of this investigation.

Soil Profile Summary

BH 1 Depth (m)	BH 2 Depth (m)	USCS	Description
0.00-0.30	0.00-0.30	SM	**Silty SAND**: grey, brown, slightly moist, loose,
0.30-1.00	0.30-0.90	CI	**Silty CLAY**: trace of gravel, medium plasticity, dark grey, brown, slightly moist, stiff,
1.00-2.20	0.90-2.00	CL	**Gravelly CLAY**: low to medium plasticity, pale yellow, pale grey, slightly moist, stiff, refusal.

Site Notes

Soils on the site are developing from Permian sediments. The clay fraction is likely to show moderate ground surface movement.

Site Classification

The site has been assessed and classified in accordance with AS2870:2011 *"Residential Slabs and Footings".*

The site has been classified as:

Class M

Y_s range: **20-40mm**

Notes: that is a moderately reactive clay.

Wind Loading Classification

According to *"AS4055:2021 - Wind Loads for Housing"* the house site is classified below:

Wind Classification: N3

Region:	A
Terrain Category:	1.0
Shielding Classification:	NS
Topographic Classification:	T1
Wind Classification:	N3
Design Wind Gust Speed – m/s ($V_{h,u}$):	50

Construction Notes & Recommendations

The site has been classified as **Class M** - Moderately reactive clay or silt site, which may experience moderate ground movement from moisture changes. Some variation of subsoil depth and weathering of underlying rock is likely.

It is recommended that all footings be founded in the natural material with bearing capacities >100kPa.

All earthworks on site must comply with AS3798:2007, and I further recommend that consideration be given to drainage and sediment control on site during and after construction. Care should also be taken to ensure there is adequate drainage in the construction area to avoid the potential for weak bearing and foundation settlement associated with excessive soil moisture.

I also recommend that during construction that I and/or the design engineer be notified of any major variation to the foundation conditions as predicted in this report.

Dr John Paul Cumming B.Agr.Sc (hons) PhD CPSS GAICD

Director

Explanatory Notes

1 Scope of Works

The methods of description and classification of soils used in this report are based largely on Australian Standard 1726 – Geotechnical Site Investigations (AS1726:2017), with reference to Australian Standard 1289 – Methods for testing soils for engineering purposes (AS1289), for eventual Site Classification according to Australian Standard 2870 (AS2870:2011) – Residential Slabs and Footings and Australian Standard 1547 (AS1547:2012) On-site domestic wastewater management.

1.1 Site Classification AS2870:2011

Site classification with reference to the above Australian Standards are based on site reactivity.

Class	Foundation Conditions	Characteristic Surface Movement
A	Most sand and rock sites with little or no ground movement from moisture changes.	**0mm**
S	Slightly reactive clay sites, which may experience only slight ground movement from moisture changes.	**0 – 20mm**
M	Moderately reactive clay or silt sites, which may experience moderate ground movement from moisture changes.	**20 – 40mm**
H-1	Highly reactive clay sites, which may experience high ground movement from moisture changes.	**40 – 60mm**
H-2	Highly reactive clay sites, which may experience very high ground movement from moisture changes.	**60 – 75mm**
E	Extremely reactive sites, which may experience extreme ground movement from moisture changes.	**>75mm**

*Note: Soils where foundation performance may be significantly affected by factors other than reactive soil movement are classified as **Class P**.*

A site is classified as **Class P** when:

- The bearing capacity of the soil profile in the foundation zone is generally less than 100kpa
- If excessive foundation settlement may occur due to loading on the foundation.
- The site contains uncontrolled fill greater than 0.8m in depth for sandy sites and 0.4m in depth for other soil materials.
- The site is subject to mine subsistence, landslip, collapse activity or coastal erosion.
- The site is underlain by highly dispersive soils with significant potential for erosion
- If the site is subject to abnormal moisture conditions which can affect foundation performance

1.2 Soil Characterisation

This information explains the terms of phrase used within the soil description area of the report.

It includes terminology for cohesive and non-cohesive soils and includes information on how the Unified Soil Classification Scheme (USCS) codes are determined.

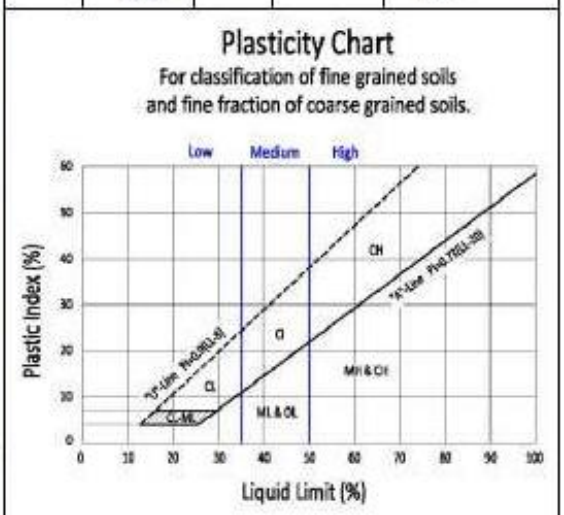
NON COHSIVE – SAND & GRAVEL		
Consistency Description	**Field Test**	**Dynamic Cone Penetrometer blows/100 mm**
Very loose (VL)	Easily penetrated with 13 mm reinforcing rod pushed by hand.	0 - 1
Loose (L)	Easily penetrated with 13 mm reinforcing rod pushed by hand. Can be excavated with a spade; 50 mm wooden peg can be easily driven.	1 - 3
Medium dense (MD)	Penetrated 300 mm with 13 mm reinforcing rod driven with 2 kg hammer, - hard shovelling.	3 - 8
Dense (D)	Penetrated 300 mm with 13 mm reinforcing rod driven with 2 kg hammer, requires pick for excavation: 50 mm wooden peg hard to drive.	8 - 15
Very dense (VD)	Penetrated only 25 - 50 mm with 13 mm reinforcing rod driven with 2 kg hammer.	>15

COHESIVE - SILT & CLAY		
Consistency Description	**Field Test**	**Indicative undrained shear strength** **kPa**
Very soft	Easily penetrated >40 mm by thumb. Exudes between thumb and fingers when squeezed in hand.	<12
Soft	Easily penetrated 10 mm by thumb. Moulded by light finger pressure	>12 and <25
Firm	Impression by thumb with moderate effort. Moulded by strong finger pressure	>25 and <50
Stiff	Slight impression by thumb cannot be moulded with finger.	>50 and <100
Very Stiff	Very tough. Readily indented by thumbnail.	>100 and <200
Hard	Brittle. Indented with difficulty by thumbnail.	>200

1.3 USCS Material Descriptions

Soils for engineering purposes are the unconsolidated materials above bedrock, they can be residual, alluvial, colluvial or aeolian in origin.

Major Divisions		Particle size mm	USCS Group Symbol	Typical Names	Laboratory Classification				
					% < 0.075 mm (2)	Plasticity of fine fraction	$C_u = \frac{D_{60}}{D_{10}}$	$C_c = \frac{(D_{30})^2}{(D_{10})(D_{60})}$	NOTES
COARSE GRAINED SOILS (more than half of material less than 63 mm is larger than 0.075 mm)	BOULDERS	200							
	COBBLES	63							
	GRAVELS (more than half of coarse fraction is larger than 2.36 mm)	coarse 20 medium 6 fine 2.36	GW	Well graded gravels and gravel-sand mixtures, little or no fines	0-5	—	>4	Between 1 and 3	(1) Identify fines by the method given for fine-grained soils. (2) Borderline classifications occur when the percentage of fines (fraction smaller than 0.075 mm size) is greater than 5% and less than 12%. Borderline classifications require the use of SP-SM, GW-GC.
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines, uniform gravels	0-5	—	Fails to comply with above		
			GM	Silty gravels, gravel-sand-silt mixtures (1)	12-50	Below 'A' line or PI<4	—	—	
			GC	Clayey gravels, gravel-sand-clay mixtures (1)	12-50	Above 'A' line and PI>7	—	—	
	SANDS (more than half of coarse fraction is smaller than 2.36 mm)	coarse 0.6 medium 0.2 fine 0.075	SW	Well graded sands and gravelly sands, little or no fines	0-5	—	>6	Between 1 and 3	
			SP	Poorly graded sands and gravelly sands, little or no fines	0-5	—	Fails to comply with above		
			SM	Silty sands, sand silt mixtures (1)	12-50	Below 'A' line or PI<4	—	—	
			SC	Clayey sands, sand-clay mixtures (1)	12-50	Above 'A' line and PI>7	—	—	
FINE GRAINED SOILS (more than half of material less than 63 mm is smaller than 0.075 mm	SILTS & CLAYS (Liquid Limit ≤50%)		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	Use the gradation curve of material passing 63 mm for classification of fractions according to the criteria given in 'Major Divisions'				
			CL CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays					
			OL	Organic silts and clays of low plasticity					
	SILTS & CLAYS (Liquid Limit >50%)		MH	Inorganic silts, mic- aceous or diato-maceous fine sands or silts, elastic silts					
			CH	Inorganic clays of high plasticity, fat clays					
			OH	Organic silts and clays of high plasticity					
	HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils					



Grain size analysis is performed by two processes depending on particle size. Sand silt and clay particles are assessed using a standardised hydrometer test, and coarse sand and larger is assessed through sieving by USCS certified sieves. For more detail see the following section.

Soil Classification	Particle Size
Clay	Less than 0.002mm
Silt	0.002 – 0.06mm
Fine/Medium Sand	0.06 – 2.0mm
Coarse Sand	2.0mm – 4.75mm
Gravel	4.75mm – 60.00mm

1.4 Bearing Capacities and DCP testing.

DCP and PSP weighted penetrometer tests – Dynamic Cone Penetrometer (DCP) and Perth Sand Penetrometer (PSP) tests are carried out by driving a rod into the ground with a falling weight hammer and measuring the blows for successive 100mm increments of penetration. Normally, there is a depth limitation of 1.2m but this may be extended in certain conditions by the use of extension rods. The methods for the two tests are quite similar.

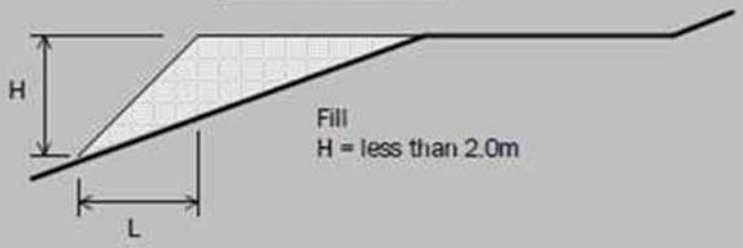
- Dynamic Cone Penetrometer – a 16mm rod with a 20mm diameter cone end is driven with a 9kg hammer dropping 510mm (AS 1289, Test 6.3.2).
- Perth Sand Penetrometer – a 16mm diameter flat-ended rod is driven with a 9kg hammer, dropping 600mm (AS 1289 Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.

Site Anomalies – During construction GES will need to be notified of any major variation to the foundation conditions as predicted in this report.

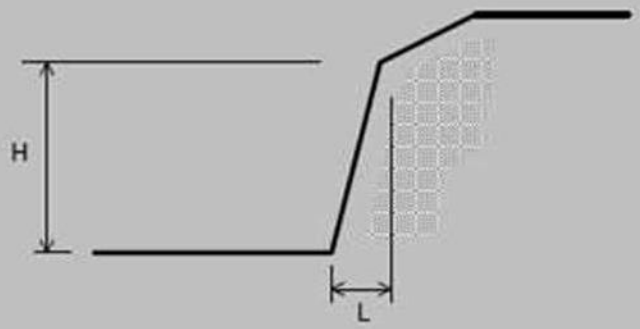
1.5 Batter Angles for Embankments *(Guide Only)*

Note : Retaining walls or other form of soil retaining methods must be adopted where the slope ratio is greater than that indicated in the table below :-

FILL EMBANKMENTS



CUT EMBANKMENTS



MATERIAL TYPE (refer soils report)		EMBANKMENT SLOPES (Height : Length)	
		Compacted Fill	Cutting
Stable Rock (A*)		2 : 3	6 : 1
Sand (A*)		1 : 2	2 : 3
Silt (P*)		1 : 4	1 : 4
Clay	Firm Clay	1 : 2	1 : 1
	Soft Clay	Not Suitable	2 : 3
Soft Soils (P*)		Not Suitable	Not Suitable

Glossary of Terms

Bearing Capacity – Maximum bearing pressure that can be sustained by the foundation from the proposed footing system under service loads which should avoid failure or excessive settlement.

Clay – (Mineral particles less than 0.002mm in diameter). Fine grained cohesive soil with plastic properties when wet. Also includes sandy clays, silty clays, and gravelly clays.

Dynamic Cone Penetrometer (DCP) – Field equipment used to determine underlying soil strength and therefore bearing capacity (kPa) by measuring the penetration of the device into the soil after each hammer blow.

Dispersive soil – A soil that has the ability to pass rapidly into suspension in water.

Footing – Construction which transfers the load from the building to the foundation.

Foundation – Ground which supports the building

Landslip – Foundation condition on a sloping site where downhill foundation movement or failure is a design consideration.

Qualified Engineer – A professional engineer with academic qualifications in geotechnical or structural engineering who also has extensive experience in the design of the footing systems for houses or similar structures.

Reactive Site – Site consisting of clay soil which swells on wetting and shrinks on drying by an amount that can damage buildings on light strip footings or unstiffened slabs. Includes sites classified as S, M, H-1, H-2 & E in accordance with AS2870-2011.

Sand – (Mineral particles greater than 0.02mm in diameter). Granular non-cohesive, non-plastic soil that may contain fines including silt or clay up to 15%.

Services – Means all underground services to the site including but not limited to power, telephone, sewerage, water & storm water.

Silt – (Mineral particles 0.002 – 0.02mm in diameter). Fine grained non-cohesive soil, non-plastic when wet. Often confers a silky smoothness of field texture, regularly includes clay and sand to form clayey silts, sandy silts and gravelly silts.

Site – The site title, as denoted by address, lot number, or Certificate of Title (CT) number, or Property Identification Number (PID).

Surface Movement (Ys) – Design movement (mm) at the surface of a reactive site caused by moisture changes.

Disclaimer

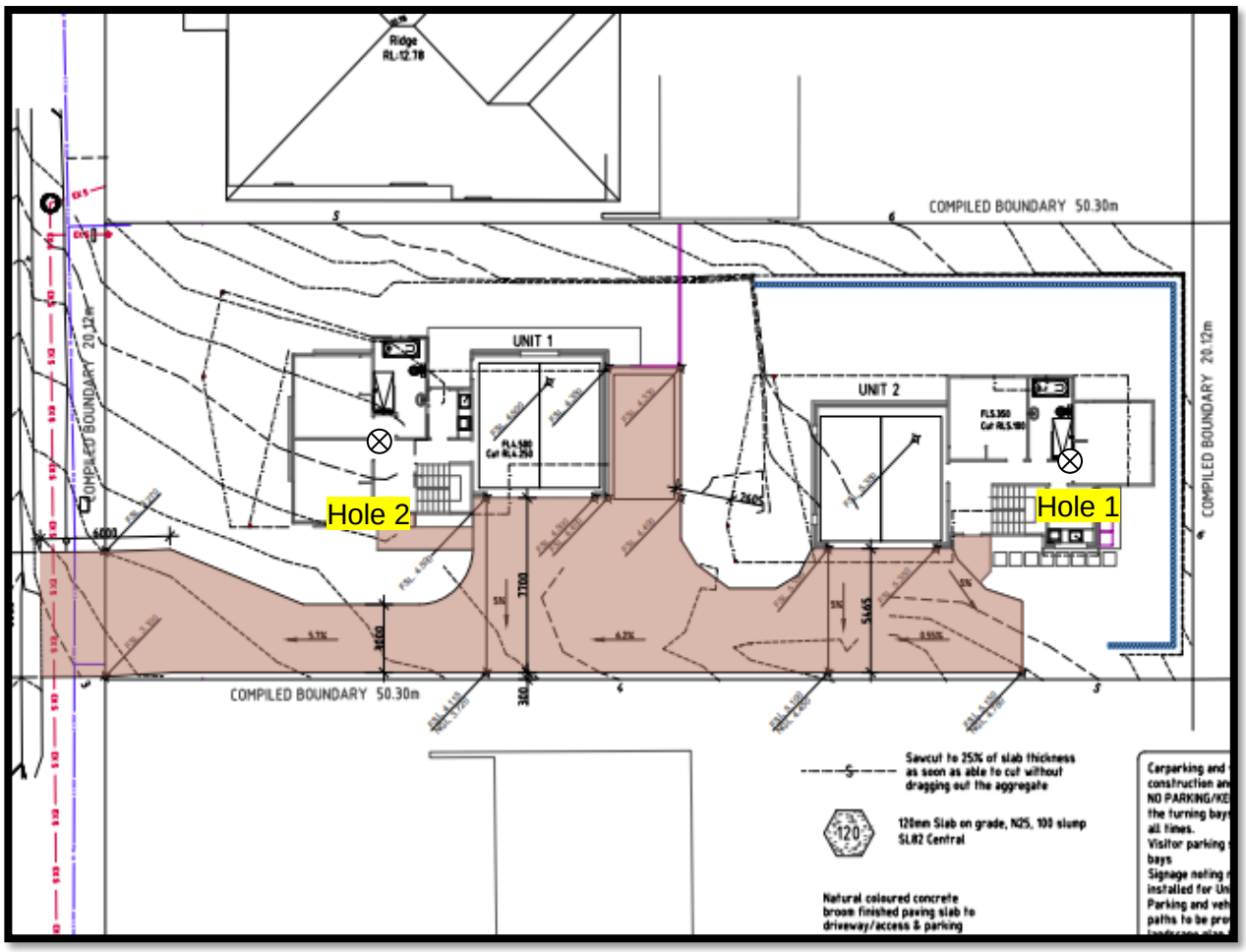
This Report has been prepared in accordance with the scope of services between Geo-Environmental Solutions Pty. Ltd. (GES) and the Client. To the best of GES's knowledge, the information presented herein represents the client's requirements at the time of printing of the Report. However, the passage of time, manifestation of latent conditions or impacts of future events may result in findings differing from that discussed in this Report. In preparing this Report, GES has relied upon data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations referenced herein. Except as otherwise stated in this Report, GES has not verified the accuracy or completeness of such data, surveys, analyses, designs, plans and other information.

The scope of this study does not allow for the review of every possible geotechnical parameter or the soil conditions over the whole area of the site. Soil and rock samples collected from the investigation area are assumed to be representative of the areas from where they were collected and not indicative of the entire site. The conclusions discussed within this report are based on observations and/or testing at these investigation points.

This report does not purport to provide legal advice. Readers of the report should engage professional legal practitioners for this purpose as required.

No responsibility is accepted for use of any part of this report in any other context or for any other purpose by a third party.

Site Plan


Ridge
RL12.78
COMPILED BOUNDARY 50.30m
COMPILED BOUNDARY 20.12m
UNIT 1
UNIT 2
Hole 2
Hole 1
COMPILED BOUNDARY 50.30m
COMPILED BOUNDARY 20.12m
Sawcut to 25% of slab thickness as soon as able to cut without dragging out the aggregate
120
120mm Slab on grade, N25, 100 slump SL82 Central
Natural coloured concrete broom finished paving slab to driveway/access & parking

APPENDIX 1 - DCP Results Table

Dynamic Cone Penetration (DCP) Conversion to Californian Bearing Ratio
(ref: Australian Standard AS 1289.6.3.2 - 1997)

DCP Location BH1

Depth (mm)	DCP (Blows/100mm)	DCP (mm/Blow)	DCP Resistance (mPa)	Allowable Bearing Capacity (kPa)	CBR (Rounded Up)
0-100	5	20.0	1.6	174	10
100-200	12	8.3	3.8	417	27
200-300	12	8.3	3.8	417	27
300-400	11	9.1	3.4	382	25
400-500	8	12.5	2.5	278	17
500-600	7	14.3	2.2	243	15
600-700	7	14.3	2.2	243	15
700-800	8	12.5	2.5	278	17
800-900	8	12.5	2.5	278	17
900-1000	14	7.1	4.4	486	32
1000-1100	18	5.6	5.6	625	43
1100-1200	20	5.0	6.3	694	48
1200-1300	20	5.0	6.3	694	48

CERTIFICATE OF QUALIFIED PERSON – ASSESSABLE ITEM

Section 321

Form 55

To: Kelvin Cooper *Owner /Agent*

72 Esplanade *Address*

Rose Bay 7015 *Suburb/postcode*

Qualified person details:

Qualified person: John-Paul Cumming

Address: 29 Kirksway Place

Battery Point 7004

Phone No: 03 6223 1839

Fax No:

Licence No: AO999

Email address: jcumming@geosolutions.net.au

Qualifications and Insurance details: Certified Professional Soil Scientist (CPSS stage 2)

(description from Column 3 of the Director's Determination - Certificates by Qualified Persons for Assessable Items

Speciality area of expertise: AS2870-2011 Foundation Classification

(description from Column 4 of the Director's Determination - Certificates by Qualified Persons for Assessable Items)

Details of work:

Address: 72 Esplanade

Rose Bay 7015

Lot No:

Certificate of title No: 60499/12

The assessable item related to this certificate: Classification of foundation Conditions according to AS2870-2011

(description of the assessable item being certified)
Assessable item includes –
- *a material;*
- *a design*
- *a form of construction*
- *a document*
- *testing of a component, building system or plumbing system*
- *an inspection, or assessment, performed*

Certificate details:

Certificate type: Foundation Classification

(description from Column 1 of Schedule 1 of the Director's Determination - Certificates by Qualified Persons for Assessable Items n)

This certificate is in relation to the above assessable item, at any stage, as part of - *(tick one)*

building work, plumbing work or plumbing installation or demolition work ☒

or

a building, temporary structure or plumbing installation: ☐

In issuing this certificate the following matters are relevant –

Documents:	The attached soil report for the address detailed above in 'details of work'
Relevant calculations:	Reference the above report.
References:	AS2870:2011 residential slabs and footings AS1726:2017 Geotechnical site investigations CSIRO Building technology file – 18.

Substance of Certificate: (what it is that is being certified)

Site Classification consistent with AS2870-2011.

Scope and/or Limitations

The classification applies to the site as inspected and does not account for future alteration to foundation conditions as a result of earth works, drainage condition changes or variations in site maintenance.

I, John-Paul Cumming certify the matters described in this certificate.

Qualified person:

Signed:

Certificate No: J11507

Date: 21/03/2025

Prepared for:

Kooper Constructions Pty Ltd

72 Esplanade
Rose Bay

FLOOD HAZARD REPORT

FE_25595

13 March 2025

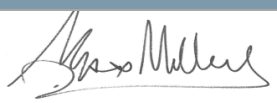
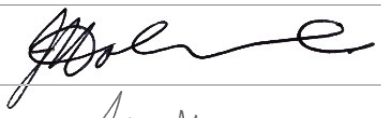
flüssig Engineers

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

Document Information

Title	Client	Document Number	Project Manager
72 Esplanade, Rose Bay Flood Hazard Report	**Kooper Constructions Pty Ltd**	FE_25595	**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***		10/03/2025
Prepared by	Ash Perera ***Hydraulic Engineer***		10/03/2025
Prepared by	Christine Keane ***Water Resources Analyst***		10/03/2025
GIS Mapping	Damon Heather ***GIS Specialist***		12/03/2025
Reviewed by	John Holmes ***Senior Engineer***		13/03/2025
Authorised by	Max W. Möller ***Principal Hydraulic Engineer***		13/03/2025

Document Revision History

Rev No.	Description	Reviewed by	Authorised by	Date

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 **Kooper Constructions Pty Ltd,** to undertake a site-specific flood hazard report for the proposed additions at number 72 Esplanade, Rose Bay 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 proposed development consists of demolition to the existing dwelling and additions of new habitable living areas and deck areas. There are two proposed Units of 462 m^2 of new impervious areas. These additions take place both at the front and rear of the existing dwelling. The site is approximately 1,011 m^2 and contains an existing 141m^2 dwelling and 16m^2 Shed that would be demolished. This development triggers the inundation code as the development falls within Clarence City Council, flood prone area.

1.2 Objectives and Scope

This flood analysis has been written to meet the standards of the Tasmanian Planning Scheme - Clarence (TPS) and S.54 of the Tasmanian Building Act 2000, 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 data provided 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	Document Reference
C12.5.1 Uses within a flood prone area	That a habitable building can achieve and maintain a tolerable risk from flood	Refer Section 4

Planning Scheme Code	Objective	Document Reference
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	Refer Section 4.1
	(b) buildings and works do not increase the risk from flood to adjacent land and public infrastructure.	Refer Section 3.2

2. Model Build

2.1 Overview of Catchment

The contributing catchment for 72 Esplanade is approximately 14 ha. The land use of the catchment is General Residential and Open Space with the specific site being zoned General Residential.

Figure 1 below outlines the approximate contributing catchment for the 72 Esplanade, Rose Bay development site.

Figure 1. Contributing Catchment, 72 Esplanade, Rose Bay

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
14	24/1	3.0/0.0	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 10 min – 4.5 hrs.

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 9 was the worst-case median storm. Therefore, this storm event was used within the hydraulic model.

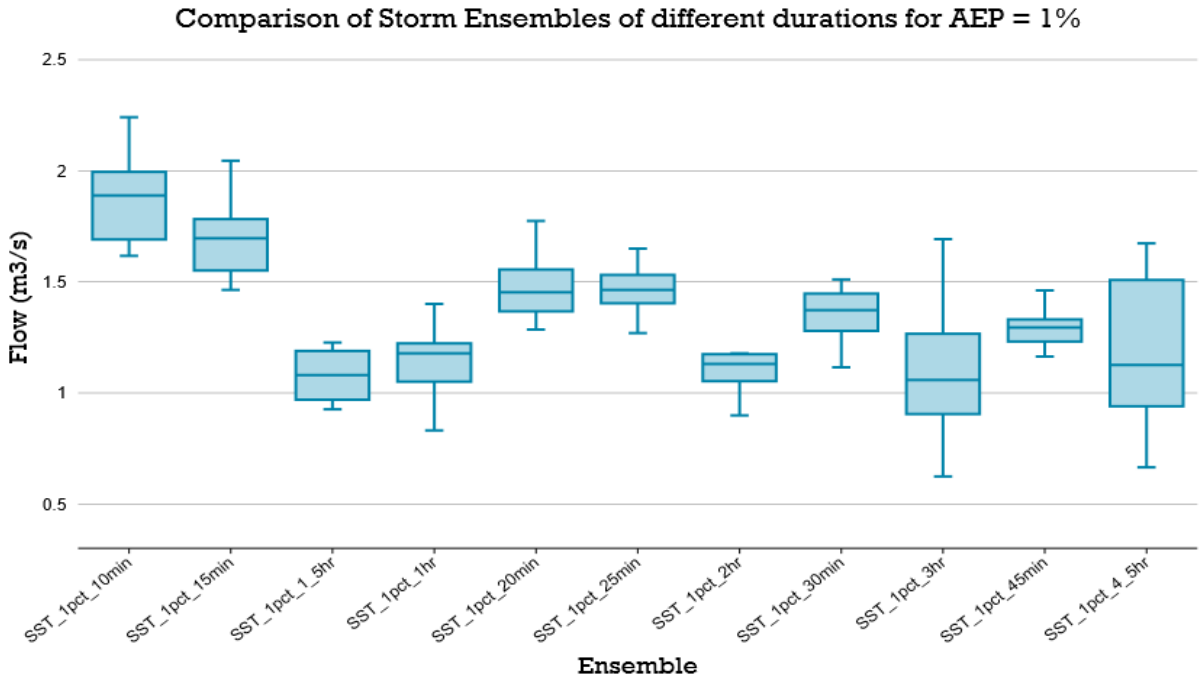


Figure 2. 1% AEP Box and Whisker Plot

2.2.2 Climate Change

As per ARR 2019 Guidelines, for an increase in rainfall due to climate change at 2100, it is recommended the use of RCP 8.5. Table 3 shows the ARR 8.5 increase compared to the revised increase of 14.6%. Therefore, the ARR 8.5 increase of 16.3% was adopted in the model.

Table 3. Climate Change Increases

Climate Zone	CFT increase @ 2100	ARR 8.5 increase @ 2100
South-East Tasmania	14.6 %	16.3 %

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 west of the catchment. The catchment originates from Gordons Hill to the east, approximately 130 mAHD higher than the site location and the mainstream with an average gradient of approximately 15 %. The average gradient around the immediate surrounding of the site location is 6.5 %.

2.3.2 Calibration/Validation

This catchment has no stream gauge to calibrate the model against a real-world storm event. Similarly, there is little historical information available, and no past flood analysis undertaken to validate against the flows obtained in the model.

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).

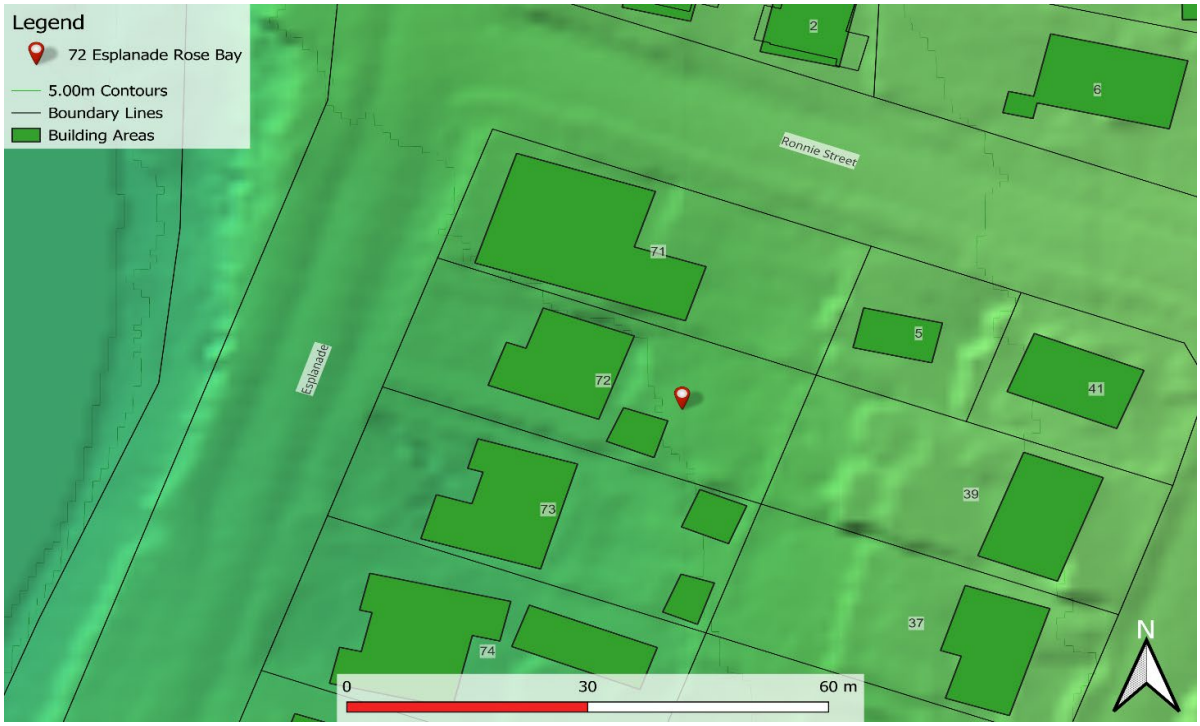


Figure 3. 1m DEM (Hill shade) of Lot Area, 72 Esplanade

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 development site has been assessed under pre- and post-development models to determine the potential impact the development at 72 Esplanade, Rose Bay has on the immediate local flows. As per planning guidelines it is a requirement that this does not have a negative impact from pre to post development.

Site Characteristics for the pre- and post-development model are summarised in Table 5.

Table 5. Site Characteristics

	Pre-Development		Post-Development	
Land Use	**Area (m²)**	**% Total land**	**Area (m²)**	**% Total land**
Pervious	761	75.2	548	54.2
Impervious	250	24.8	462	45.8

3. Model Results

The result of 1% AEP + CC were run through the pre-development and post-development model scenarios to compare the changes to flooding onsite and to surrounding properties.

3.1 Flood depth and extent

Our analysis provides a more refined and site-specific flood assessment compared to the existing overlay maps available on the Council's website and in the List TAS. While the broader-scale mapping generalises flood extents, our modelling integrates critical site-specific elements, including roads, kerb and channel infrastructure, fences, and solid structures. These features play a significant role in influencing local flow behaviour, leading to a more precise representation of flood depths, flow paths, and areas of potential inundation. This enhanced level of detail ensures a more accurate evaluation of flood impacts, highlighting key differences from the existing Council overlay and providing a stronger foundation for flood risk management on the site.

The pre-development hydraulic model results (Figure 4) indicate moderate flooding within the lot boundaries, extending into some surrounding properties. The current site conditions facilitate shallow water accumulation in low-lying areas, contributing to localised ponding. At the marked cross-sectional location, the pre-development flood depth is approximately 0.10 m. In the post-development scenario (Figure 5), this depth decreases to 0.05 m, demonstrating a slight improvement in surface water management due to the proposed modifications.

Across the site, the maximum flood depth ranges from 0.10 m to 0.15 m, with the deepest inundation occurring near the newly excavated area around Unit 2 in the post-development scenario. This suggests that while grading adjustments influence local water levels, the overall flood behaviour remains relatively consistent.

Figure 5 further illustrates the impact of the proposed development on the existing overland flow path. Under pre-development conditions, a shallow, slow-moving flow traverses the lot from the northern boundary to the southern boundary, following the natural contours of the land. Post-development changes result in a slight realignment of this flow path, though it continues to discharge towards the Esplanade. Despite these modifications, the overall drainage function of the site remains intact, with only minor adjustments that do not significantly alter the downstream hydrological regime.

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

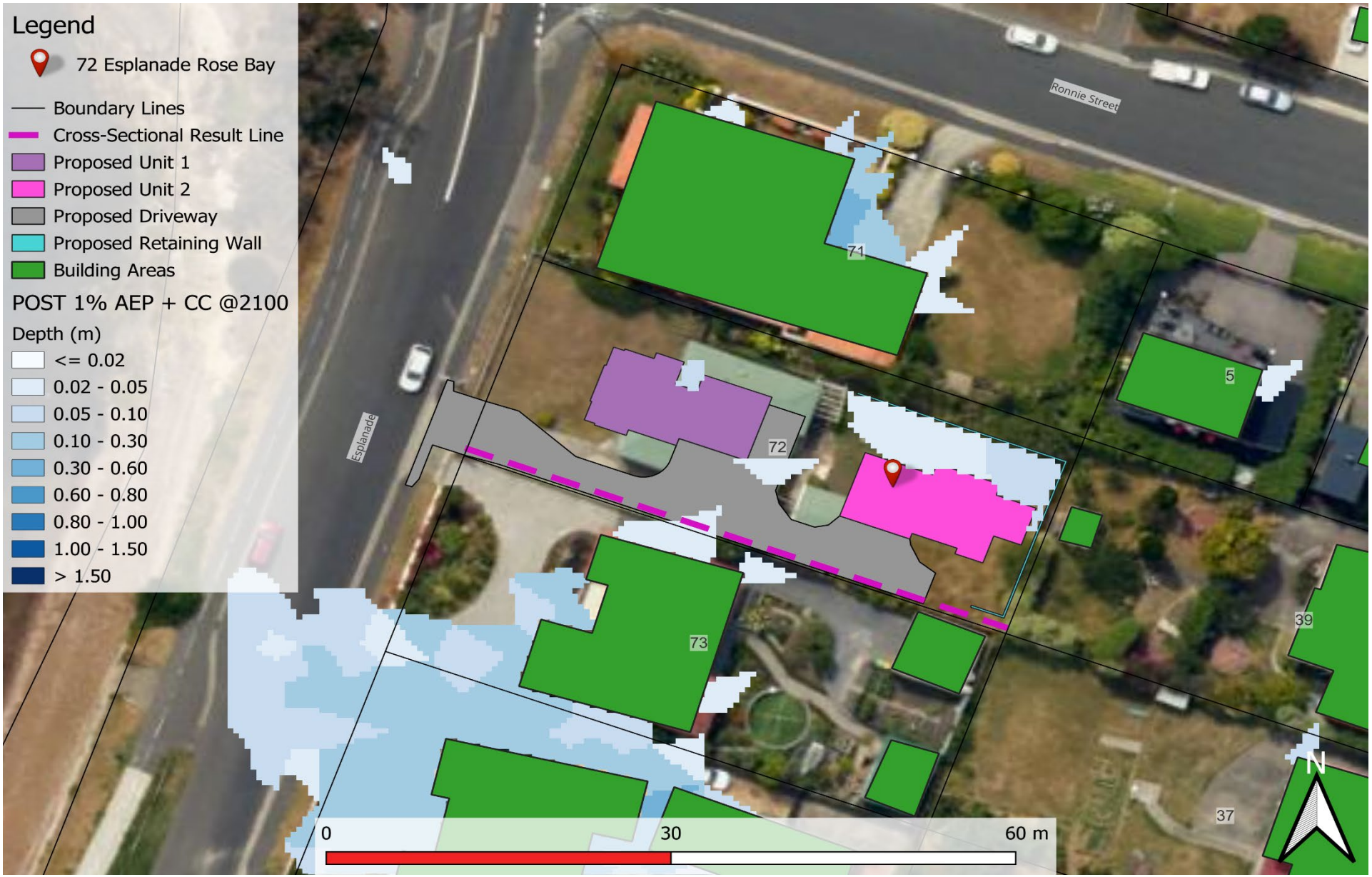


Figure 5. Post Development 1%+CC Flood Depth and extents

3.2 Displacement of Overland Flow on Third Party Property

Figure 5 presents the post-development flow conditions, demonstrating that when compared to pre-development scenarios, there are no significant increases in flood depths or extents on neighbouring properties surrounding 72 Esplanade, Rose Bay. The results indicate that the proposed development does not introduce any measurable changes to off-site flood behaviour, ensuring that adjacent properties remain unaffected by additional stormwater runoff or altered overland flow patterns.

Further analysis, as detailed in Section 4, confirms that the hazard rating on neighbouring properties and surrounding infrastructure remains unchanged at H1, consistent with the pre-development scenario. This classification indicates that flood conditions in these areas remain low risk, posing no additional threats to people, vehicles, or structures following the development.

It is therefore deemed that the post development model does not have an adverse effect on flood depths or extent on surrounding properties.

3.3 Development Effects on Stormwater Discharge

Figure 6 presents the discharge hydrograph for the 72 Esplanade site, illustrating the comparative flow characteristics between pre- and post-development conditions. This graph, derived from hydraulic modelling outputs, captures net discharge variations across both scenarios to assess potential impacts resulting from the proposed development.

The analysis indicates that post-development conditions result in a negligible increase of 0.008 m^3/s in net discharge, suggesting that any additional runoff generated by the new structures and grading adjustments remains minimal and within acceptable limits. Additionally, a slight increase in velocity of 0.02 m/s is observed, though this change is insignificant in influencing overall flow behaviour or presenting an elevated flood hazard. These results confirm that the development has minimal impact on site hydrology, ensuring that overland flow characteristics remain consistent with pre-development conditions.

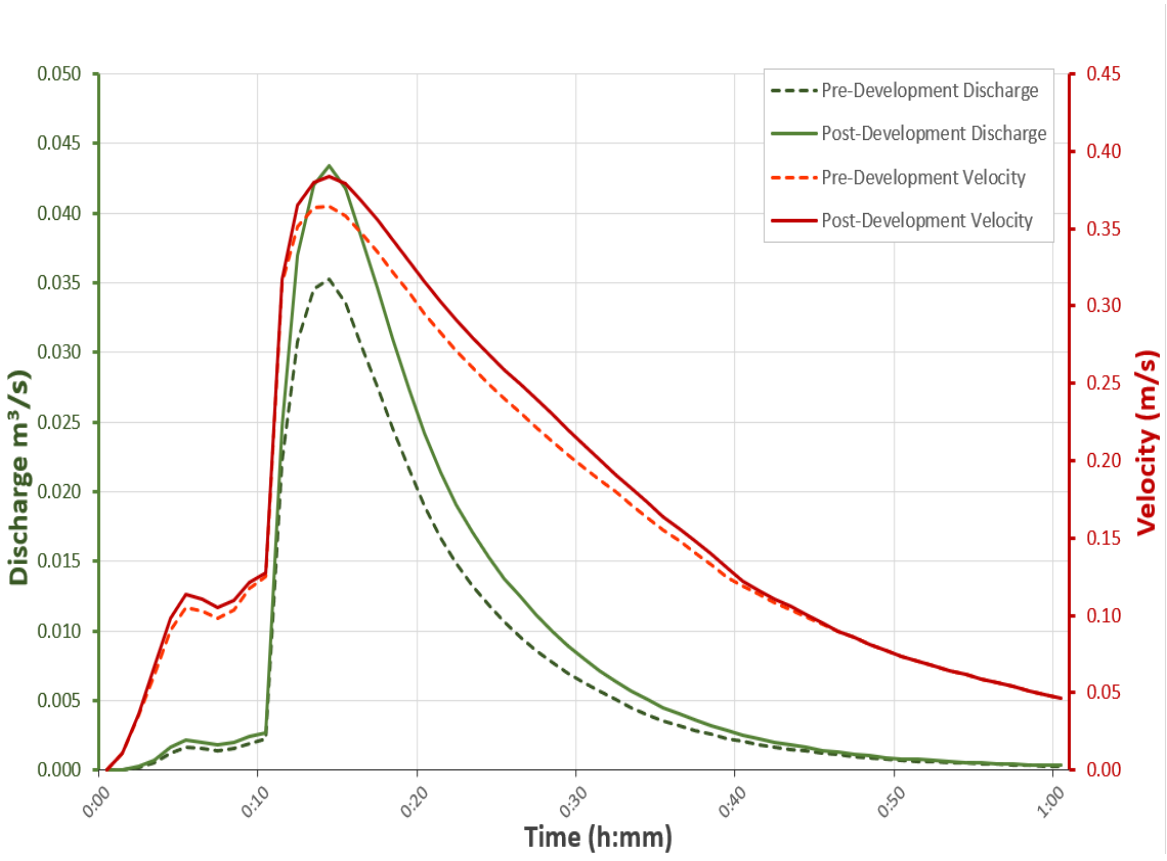


Figure 6. Pre and Post Development Net Discharge 1% AEP +CC, 72 Esplanade

However, the values observed in the post development model do not have a negative impact on stormwater discharge as the changes are relatively small compared to the pre-development model. This is not considered to have any significant impact on receiving infrastructure and is more likely due to the sensitivity of the model.

3.4 Model Summary

Table 6. Pre-development and post-development results at the cross-sectional line within the lot

	Pre-development	Post-development	Net Change
Depth (m)	0.10	0.05	-0.05
Velocity (m/s)	0.35	0.37	0.02
Discharge (m^3/s)	0.035	0.043	0.008

3.5 New Habitable Building

To meet the performance criteria of the Building Regulations 2016 S.54, the construction of a new habitable building is required to have a habitable floor level is greater than 300mm above the 1% AEP + CC flood level. The new development at 72 Esplanade, Rose Bay must meet this regulation as shown in Table 7. (The floor level >1% AEP + CC flood level + 300 mm does not apply for non-habitable areas).

Table 7. Habitable Floor Construction Levels

Habitable Floor	1% AEP +CC flood level (mAHD)	Minimum Floor Level required (mAHD)
Unit 1	4.35	4.65
Unit 2	5.30	5.60

As the proposed plans indicate a finished floor levels for the proposed Units to comply with section 54 of the Building Regulations.

4. Flood Hazard

Appendix A provides a comprehensive assessment of velocity and depth variations along the western lot boundary under both pre- and post-development conditions. In the existing scenario, hydraulic modelling indicates a maximum velocity of 0.38 m/s and a flood depth of 0.10 m at the cross-sectional reference line. According to the Australian Flood Resilience and Design Handbook, this corresponds to a hazard rating of **H1, classified as generally safe for people, vehicles, and buildings**. Figure 7 illustrates this classification, confirming that floodwaters at this location pose minimal risk to occupants and structures.

Following the proposed development, modelling results show a minor velocity increase of 0.02 m/s, while flood depth decreases by 0.05 m. These slight variations indicate that the development does not introduce significant changes to local flood behaviour. Importantly, the maximum hazard rating remains at H1, demonstrating that the site's flood risk remains within acceptable thresholds. Comparative hazard rating maps in Appendix A illustrates these findings.

This study is limited to conditions within the property boundary and does not extend to public access roads. Consequently, external accessibility during flood events has not been assessed, and no conclusions can be drawn regarding evacuation routes or emergency vehicle access beyond the site.

Given these constraints, it is advisable for residents and visitors to remain indoors during flooding unless directed otherwise by emergency services.

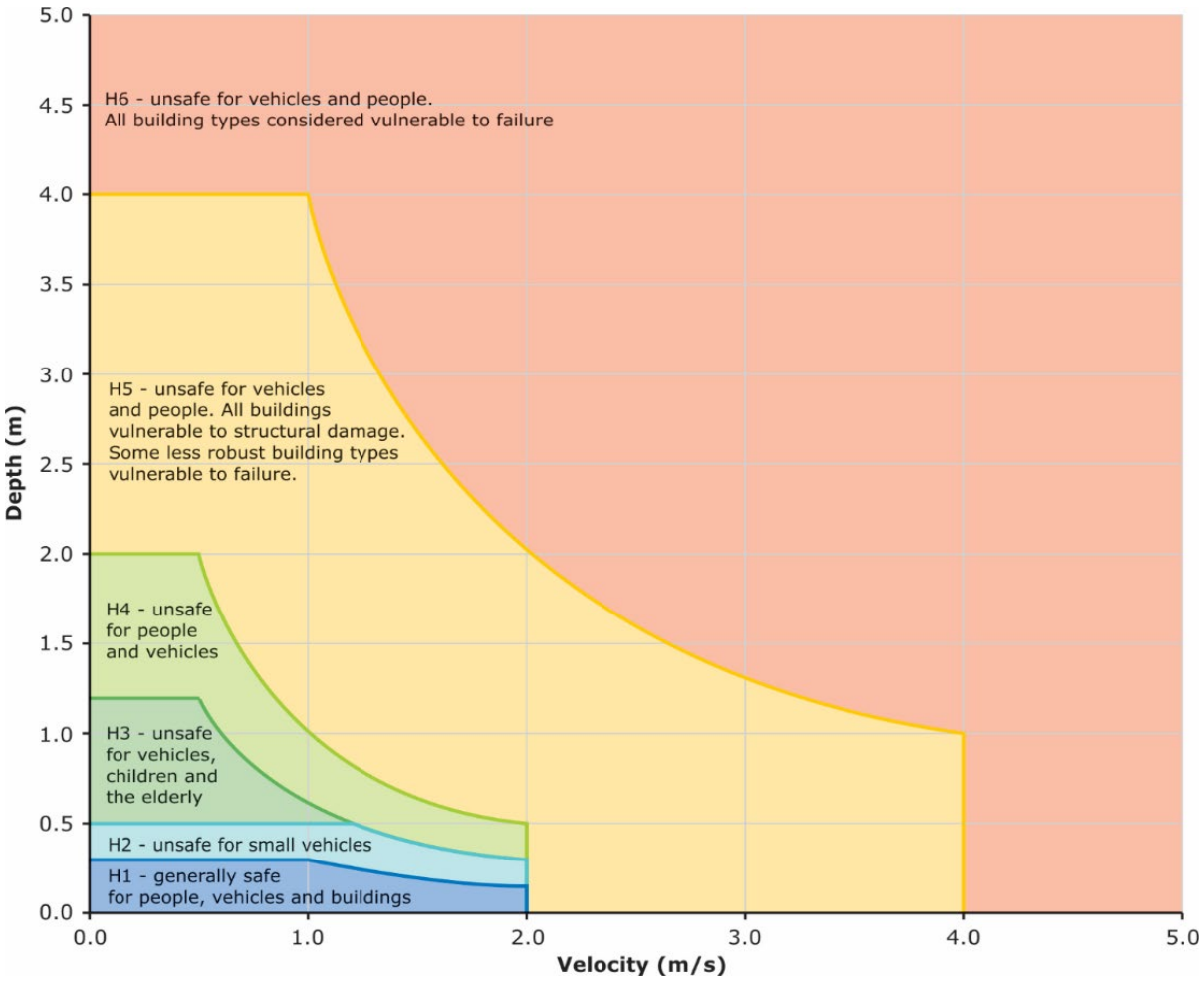


Figure 7. Hazard Categories Australian Disaster and Resilience Handbook

4.1 Tolerable Risk

The flood analysis for the property at 72 Esplanade, Rose Bay indicates that the proposed two-unit development is situated within an overland flow path characterised by shallow flood depths. The majority of the surrounding area has been classified with a low (H1) hazard rating under the 1% AEP plus climate change scenario, signifying that floodwaters in this location are generally safe for people of all ages, vehicles, and buildings. While this classification suggests a manageable flood risk, localised flow conditions must still be carefully considered in the design and construction of the development.

Although flood velocities and depths within the lot are relatively minor, they can still contribute to erosion, sediment transport, and potential debris movement during flood events. To mitigate these risks, all structural elements must be designed to withstand hydrostatic and hydrodynamic forces, ensuring resilience against water pressure, buoyancy, and flow-induced forces. Flood-resistant construction methodologies should be applied, incorporating materials and design strategies that minimise potential damage and maintain structural integrity under expected flood conditions.

Assuming the appropriate structural considerations are integrated into the building design, the proposed units—classified as Class 1a habitable structures under the BCA 2019—can be expected to maintain a tolerable level of flood risk throughout their 50-year asset life. However, achieving this outcome is contingent upon strict adherence to the recommendations outlined in this report, particularly regarding construction standards, site grading, and flood-resilient design measures.

Table 8 TPS C12.5.1 Uses within a flood prone area

C12.5.1 Uses within a flood prone area			
Objectives: That a habitable building can achieve and maintain a tolerable risk from flood			
Performance Criteria			
P1.1		**P1.1**	
A change of use that, converts a non-habitable building to a habitable building, or a use involving a new habitable room within an existing building, within a flood-prone hazard area must have a tolerable risk, having regard to:		Response from flood report	
(a)	the location of the building;	(a)	Proposed new two Units at No72 Esplanade, Rose Bay
(b)	the advice in a flood hazard report;	(b)	Assuming recommendations of this report are implemented along with the recommended finished floor levels, no additional flood protection measures required for the life expectancy of a habitable building.
(c)	any advice from a state authority, regulated entity or a council;	(c)	N/A
P1.2		**P1.2**	
A flood hazard report also demonstrates that:		Response from flood report	
(a)	any increase in the level of risk from flood does not require any specific hazard reduction or protection measures;	(a)	No increase in level of risk from pre-development scenario.
(b)	the use 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)	Maximum hazard rating at the proposed development is at H1.

Table 9. 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 new two Units development.
(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.
(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 provided the minimum floor level recommendations are followed.

5. Conclusion

The Flood Hazard Report for 72 Esplanade, Rose Bay has reviewed the potential pre- vs post-development flood scenarios.

The following conclusions and observations were derived in this report:

1. A comparison of the post-development peak flows for the 1% AEP at 2100 were undertaken against the Tasmanian Planning Scheme – Clarence, C12.5.1 & C12.6.1.
2. Slight decrease of 0.05 m in peak flood depths for the 1% AEP + CC at the cross-sectional line in the post-development model compared to the pre-development model.
3. Building Regulations S.54 requires a floor level of no less than the values stated in Table 7.
4. Peak discharge a negligible increase of 0.008 m^3/s from pre- to post-development, riverine flood scenarios.
5. There is a minor increase of 0.02 m/s in velocity from pre- to post-development along the cross-sectional results line.
6. The pre-development model shows the hazard from flooding in the area is H1 remains unchanged in the post-development scenario.

6. Recommendations

Flussig Engineers therefore recommend the following engineering design be adopted for proposed addition to ensure the works meets the Inundation Code and the Building Regulations:

1. The proposed Units must have a minimum finished floor level as recommended in Table 7.
2. The new finished surface cutoff at Unit 2 must have a minimum slope of 1.5% directing runoff towards Esplanade.
3. All new surface areas surrounding the buildings must be designed to drain away from unit entrances.
4. The new addition must be engineered to withstand flood forces, including debris impact, based on the specified flood conditions.
5. No additional solid structures are to be constructed on the property without a further flood impact assessment.
6. Future use of lot areas must be restricted to zones classified as safe under the ARR Disaster Manual categories.
7. Any future structures within the flood extent that are not included in this report will require a separate assessment of their potential impacts.

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

7. Limitations

Flüssig Engineers were engaged by **Kooper Constructions Pty Ltd,** for the purpose of a site-specific Flood Hazard Report for 72 Esplanade, Rose Bay as per C12.5.1 and C12.6.1 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.

9. Appendices

Appendix A Flood Maps

PRE 1% AEP + CC @2100

Legend

72 Esplanade Rose Bay

Boundary Lines

Existing Building and Shed

Building Areas

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 9 18 m

meters

N

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13-03-2025 Flussig Engineers Map CRS: GDA94 / MGA zone 55 EPSG:28355

PRE 1% AEP + CC @2100

Legend

72 Esplanade Rose Bay

Boundary Lines

Existing Building and Shed

Building Areas

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 9 18 m

meters

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PRE 1% AEP + CC @2100

Legend

72 Esplanade Rose Bay

Boundary Lines

Existing Building and Shed

Building Areas

PRE 1% AEP + CC@2100

Hazard

H1

H2

H3

H4

H5

H6

0 9 18 m

meters

N

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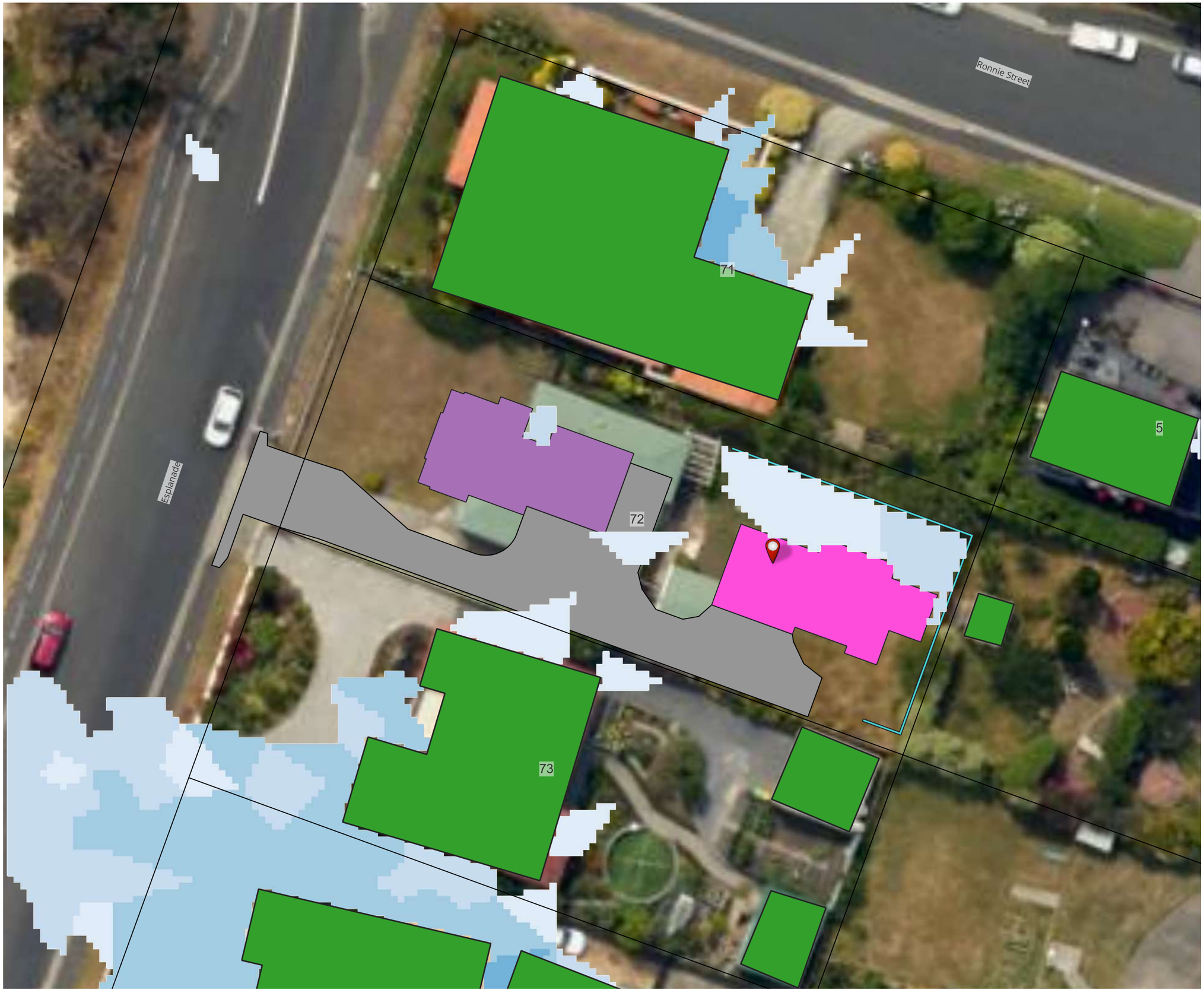
POST 1% AEP + CC @2100



Legend

72 Esplanade Rose Bay

- Boundary Lines
- Proposed Unit 1
- Proposed Unit 2
- Proposed Driveway
- Proposed Retaining Wall
- Building Areas

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 9 18 m

meters

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POST 1% AEP + CC @2100

Legend

72 Esplanade Rose Bay

- Boundary Lines
- Proposed Unit 1
- Proposed Unit 2
- Proposed Driveway
- Proposed Retaining Wall
- Building Areas

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 9 18 m

meters

N

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POST 1% AEP + CC @2100

Legend

72 Esplanade Rose Bay

- Boundary Lines
- Proposed Unit 1
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- Proposed Driveway
- Proposed Retaining Wall
- Building Areas

POST 1% AEP + CC @2100

Hazard

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

0 9 18 m

meters

N

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