Consulting Engineers

STRUCTURAL - CIVIL - STORMWATER - REMEDIAL

... STRUCTURALLY SOUND

Overland Flow Assessment Report

49 Careel Head Road, Avalon

Job no. 200808

Issue A

20 April 2022

Prepared for: Sarah & Dan Morely

Prepared by: Hannah Stubley

Contents

Figures

1. Summary

1.1 Site Characteristics

The 1,346m^2 residential site is located on the upper southern side of Careel Head Road in Avalon. The development site is bounded by residential buildings on the southern, eastern and western boundaries and naturally falls in a north-western trajectory towards Careel Head Road. There exists two localised sag points within Whale Beach Road above. Two grated kerb inlet pits are located at these sag points which form part of Council's stormwater drainage infrastructure. The two pits are the primary stormwater runoff collection points on the upper and lower side of Whale Beach Road which convey collected stormwater runoff towards Careel Creek (refer figure 2 for further detail).

1.2 Proposed Development Works

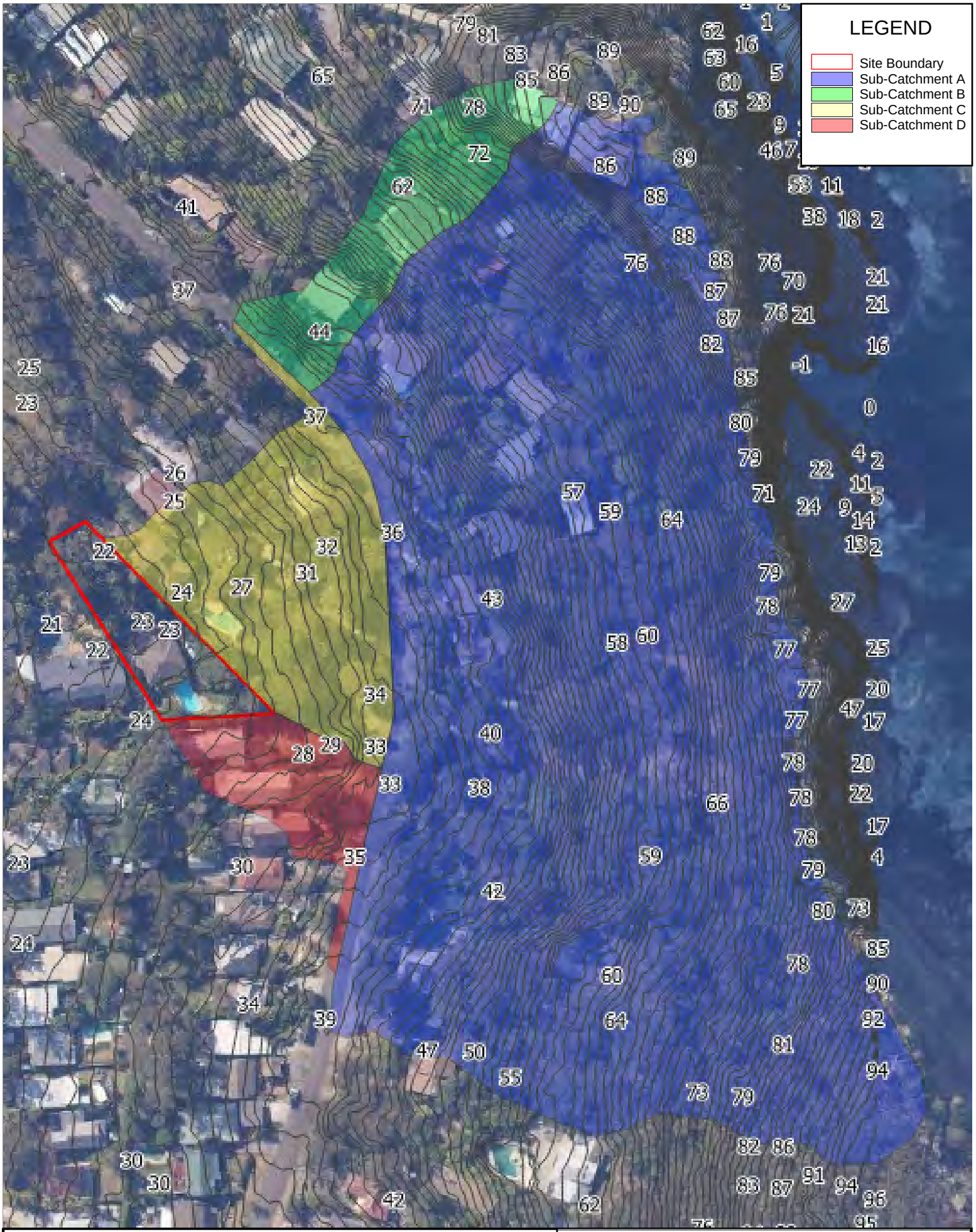
The proposed development works as detailed on the architectural plans prepared by Map Architecture & Interiors (dated September 2021) detail a proposed first floor addition and minor extensions to the ground floor level (refer appendix C).

1.3 Catchment Summary

The total contributing catchment, comprised of four sub-catchments, affecting the subject site was measured in the computer program QGIS 3.4.7 using LiDAR data and is approximately 4.3 Ha. Refer figure 1. Refer figure 2 for Council's drainage infrastructure and overview of overland flow drainage regime.

Table 1 - Sub-Catchment summary

Sub-Catchment	Area	Description
A	3.4 Ha	Sub-Catchment A consists largely of densely vegetated bushland, some low-density residential sites and roadside pavement on Whale Beach Road.
B	0.26 Ha	Sub-Catchment B consists primarily of low-density residential sites, mildly vegetated bushland and roadside pavement on Whale Beach Road.
C	0.49 Ha	Sub-Catchment C consists of mildly vegetate bushland, low-density residential sites and roadside pavement on Whale Beach Road.
D	0.18 Ha	Sub-Catchment D Consists primarily of low-density residential sites, some mildly vegetated bushlands and roadside pavement on Whale Beach Road.

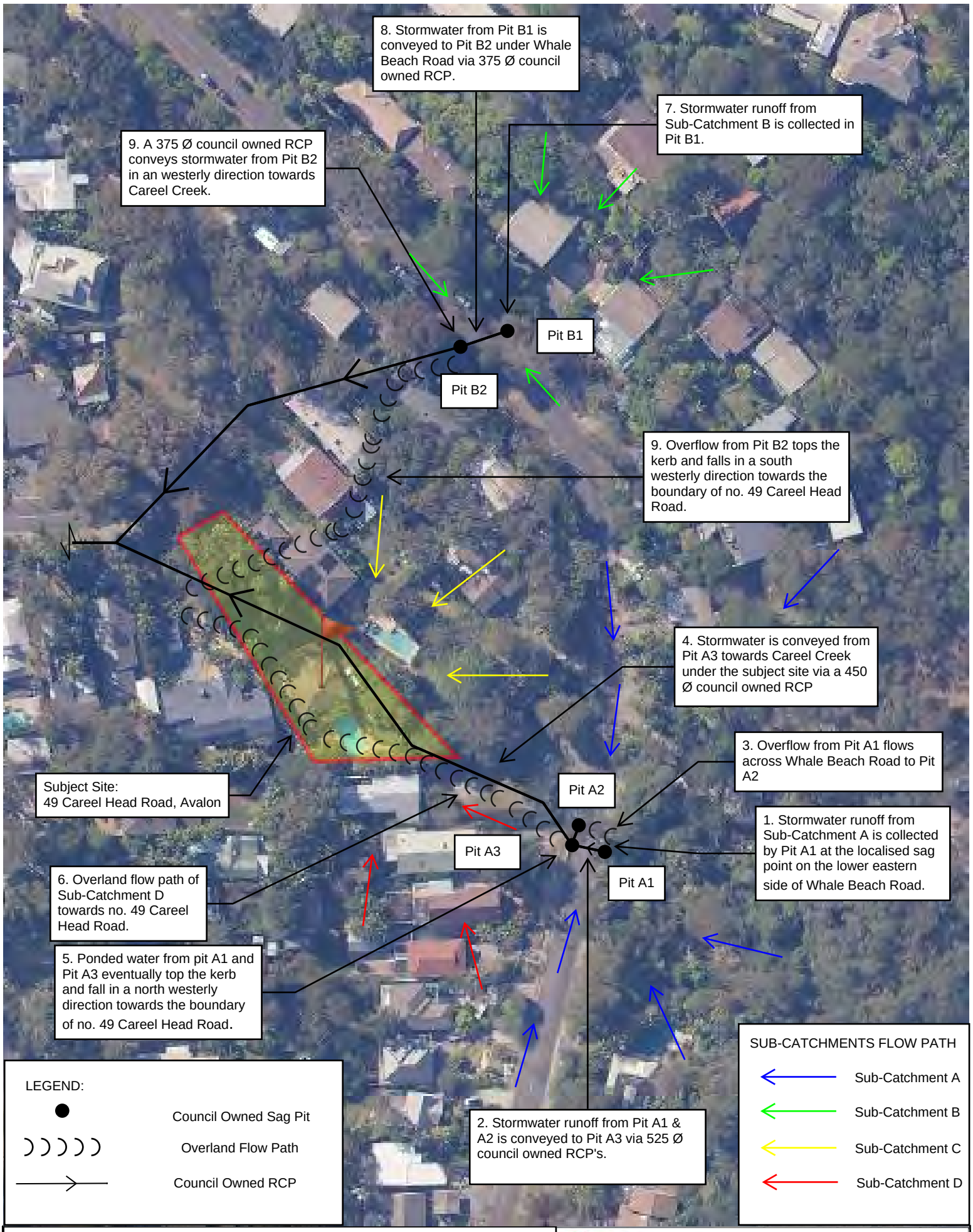


TITLE: **Contributing Sub-Catchments**

FIGURE: 1

ISSUE: A

Consulting Engineers
STRUCTURAL - CIVIL - STORMWATER - REMEDIAL
... STRUCTURALLY SOUND



TITLE:

Northern Beaches Council Stormwater Pit and Pipe Maps.

FIGURE:	ISSUE:
2	A

Consulting Engineers
STRUCTURAL - CIVIL - STORMWATER - REMEDIAL
... STRUCTURALLY SOUND

2. Analysis & Results

2.1 Peak Flow Results

A DRAINS computation analysis was completed to determine the anticipated runoff within the contributing sub-catchments and to design a piped drainage system to convey any overland flows encroaching the subject site. The peak runoff rates for the 1% AEP storm event were computed, and are shown in Table 1 below:

Table 2 - Catchment Flow Rates for the 1% AEP Storm Event

AEP	Sub-Catchment	Area (Ha)	Piped Flow (m^3/s)	Overflow (m^3/s)
1%	A	3.412	0.008	1.530
1%	B	0.264	0.037	0.113
1%	C	0.496	0.000	0.231
1%	D	0.177	0.000	1.580

For further detail refer Appendix B.

Table 3 - Inlet Flow Conditions for the 1% AEP Storm Event

AEP	Inlet Condition	Inlet Flow (m^3/s)
1%	A	1.580
1%	B	0.113
1%	C	0.231

For further detail refer Appendix B

2.1.1 2D Hec-Ras Results

Modelled results from a DRAINS analysis have been used to estimate the peak flow hydrographs for the 1% AEP storm event. This flow hydrograph was used to estimate the flood levels in HEC-RAS 5.0.7.

Table 4 - Roughness Parameters used for HEC-RAS analysis

Surface Type	Manning's Roughness (n)
Road / Paving	0.015
Grass	0.05

The 2D HEC-RAS analysis demonstrated that the subject site is affected by overland flows in the 1% AEP storm event. Refer table 5 below for the predicted maximum 1% AEP level, depth and velocity within the subject site.

2.2 Site Flooding Extent

The 1% AEP water surface profile for the overland flow path has been estimated using HEC-RAS 5.0.7, consisting of a 2D hydrodynamic flow model.

2.2.1 Unsteady State Flow Analysis

An unsteady state flow analysis was used in the assessment to determine flow behaviour through the subject site. A mixed flow computation was used to simulate the effects of each storm event and account for variation of subcritical and supercritical flows through the site. The water surface elevation levels were computed at various cross sections through the channel for each storm event.

Utilising this type of model enabled a detailed analysis of the anticipated flood behaviour expected to occur through the subject site, accounting for varying flows throughout the modelled storm events. This generally provides greater accuracy in results as it simulates more realistic flow conditions.

2.2.2 2D Hydrodynamic Flow Analysis

2D hydrodynamic flood models provide numerical solutions based on depth-averaging equations. The model setup consisted of a 2D computational mesh or grid construction which represents the underlying topography using connected cells. In contrast to a 1D flood model, the 2D model requires continuous topographical data which covers the entire area being modelled in the 2D analysis. LiDAR (Light Detection and Ranging) survey information has been used to represent the underlying topography. Utilising this type of model enabled a detailed analysis of the anticipated flood behaviour expected to occur through the subject site, simulating complex flow patterns on the floodplain and calculating the resulting velocity and water surface elevations. This modelling approach combines both LiDAR data and surface roughness into a velocity field, generating results which are reflective of the anticipated flood behaviour through the site.

A Digital Elevation Model (DEM) was constructed using the software QGIS 3.4.7 to construct a surface roughness profile of the surrounding terrain. This required constructing elevated polygons to represent the surrounding buildings which have been modelled as impermeable blockages in the model. The modelled building polygons were created based on aerial imagery from online mapping services. The building polygons were superimposed onto the LiDAR data to create a complete Digital Surface Model (DSM). Furthermore, break lines have been used in the model to force an alignment of computational cell faces along elevation barriers, such as between the terrain and surrounding buildings.

The upstream boundary conditions used flow hydrographs representing the overland flow paths for the 1% AEP peak storm event which were computed in DRAINS. A normal depth condition has been assumed for the downstream boundary condition.

2.3 2D HEC-RAS Results

2.3.1 Critical Overland Flow Paths

A 2D HEC-RAS analysis demonstrated that the subject site is affected by overland flows in the 1% AEP storm event. There exists one primary overland flow path which emerges from the western boundary of the development site and forms two separate overland flow paths within the subject site. This overland flow path emerges when the capacity of the surrounding stormwater drainage infrastructure is exceeded. The predicted Maximum flood Depths and Velocities and critical points within the subject site can be found in table 5. Note: flood depths below 0.01m have been excluded from all diagrams as they are considered negligible. Refer figure 3 for Flood ID locations.

ID	Natural Ground Level (m AHD)	1% AEP Max WL (m AHD)	1% AEP Max Depth (m)	1% AEP Max Velocity (m/s)	Flood Hazard
1	24.60	25.15	0.43	3.00	High
2	25.35	25.54	0.19	0.70	Low
3	22.93	23.18	0.25	0.50	Low
4	22.87	23.10	0.20	3.50	High*
5	22.80	22.90	0.10	2.00	Low
6	22.20	22.40	0.30	3.80	High*

Table 5 - 1% AEP Flood Depths and Velocities

*Model discrepancies may account for high flood hazard.

N

0 40 80 120m

Approx. Scale

TITLE: **1% AEP Flood ID Points**

FIGURE: 3

ISSUE: A

Consulting Engineers

STRUCTURAL - CIVIL - STORMWATER - REMEDIAL

... STRUCTURALLY SOUND

2.4 Flood Velocity Hazard

The flood velocity hazard criterion considered for the development is in accordance with the *NSW Floodplain Development Manual (2005)* guidelines and is detailed in Figure 6 below.

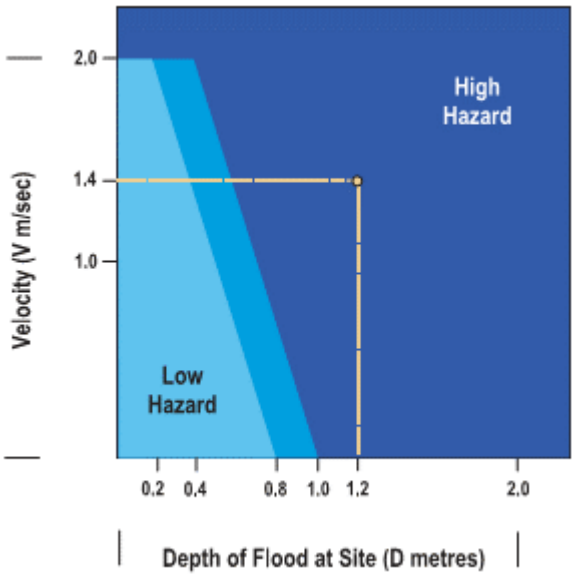


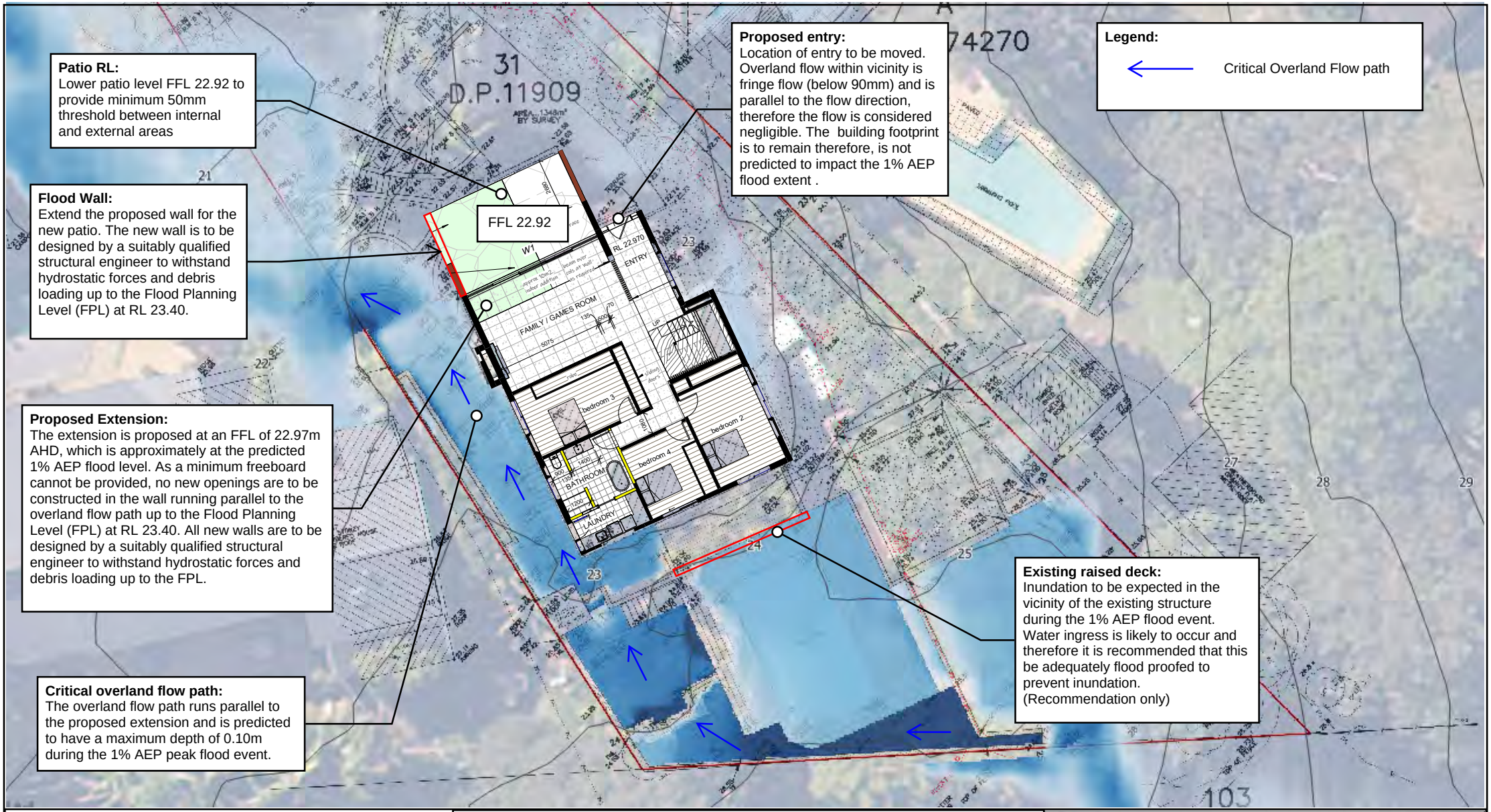
Figure 4 - Provisional Hydraulic Hazard Categories. Source: NSW Floodplain Development Manual (2005)

The substantial floodwaters encroaching upon the subject site enter through the western boundary of the property. Using the maximum velocities and depths from table 5, the provisional flood hazard can be found at each point. The flood hazard of the overland flows can be found in table 5. The critical flood hazard at point 5 has a maximum flow depth along of approximately 0.10m and a maximum velocity of 2.0 m/s which classifies the flood hazard adjacent to the proposed extension as Low, based on Figure 4. The flood hazard is not materially increased as a result of the development and therefore, no additional flood hazard measures are recommended beyond the recommendations in this report. The northern and southern overland flow pathways are low hazard and low-risk zones which do not have the potential to cause significant risk to life.

3. Recommendations

The critical flooding encroaches the site from the southern boundary when the capacity of the surrounding stormwater drainage infrastructure is exceeded. To safeguard the proposed development from flooding effects, the following is recommended and must be constructed (refer figure 5 for further detail):

1. **Flood Wall:** Extend proposed wall for the new patio (as per Figure 5 below) to protect internal and external areas from inundation. The new wall is to be designed by a suitably qualified structural engineer to withstand hydrostatic forces and debris loading up to the Flood Planning Level (FPL) at RL 23.40m AHD.
2. **Proposed Patio Extension:** The proposed patio extension is not envisaged to impact the 1% AEP flood extent. The proposed patio must have a minimum finished flood level (FFL) of 22.92m AHD to provide a minimum 50mm threshold between internal and external areas.
3. **Proposed Family Room Extension:** The extension is proposed within the existing building footprint and is not envisaged to impact the 1% AEP flood extent. Since a minimum freeboard cannot be achieved for the proposed extension, all new walls running parallel to the critical overland flow path are to be designed by a suitably qualified structural engineer to withstand hydrostatic forces and debris loading up to the Flood Planning Level (FPL) at RL 23.40m AHD.
4. **New entryway:** The entryway is proposed to move from the eastern side of the dwelling to the northern side of the dwelling (refer appendix C for further details). Since a minimum freeboard cannot be achieved at the new entryway, a minimum 300mm heigh wall is to be constructed to protect the entryway from potential inundation (refer Figure 5 below for location).



N

0 5 10 15 m

Approx. Scale

TITLE:

1% AEP Flood Map with Recommendations

FIGURE: 5

ISSUE: A

NB Consulting Engineers

STRUCTURAL - CIVIL - STORMWATER - REMEDIAL

... STRUCTURALLY SOUND

4. Conclusion

The overland flow profile surrounding the subject site has been modelled in HEC-RAS, with the results demonstrating the existing overland flow regime will generally remain unaffected as a result of the proposed development provided the recommendations of this report are adhered to.

In accordance with accepted engineering practice, NBCE has undertaken a flood study of the stormwater drainage system at 49 Careel Head Road in Avalon and can confirm the accuracy of the calculated results based on the HEC-RAS modelling. Please contact the author if further clarification is required.

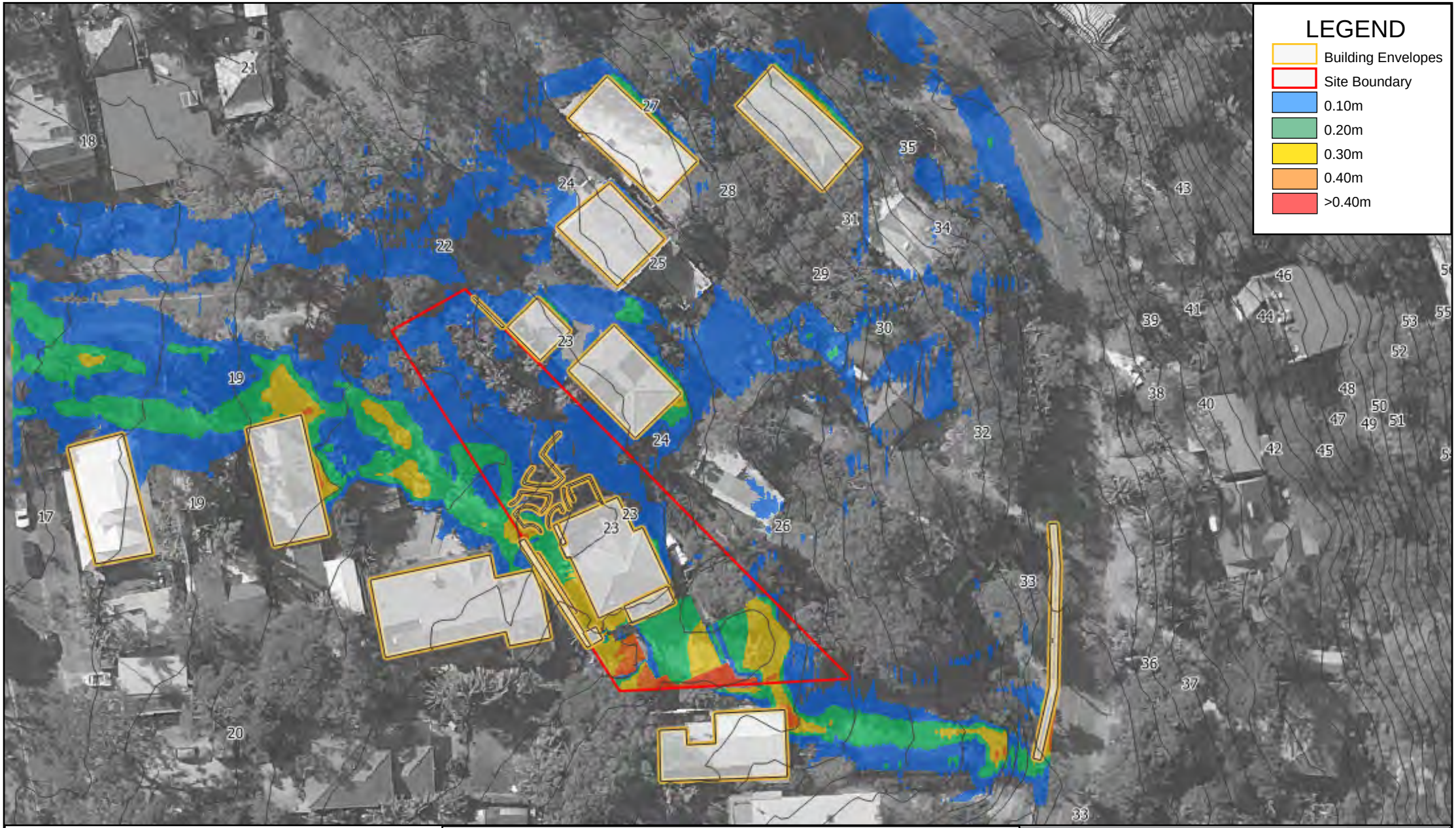
NORTHERN BEACHES CONSULTING ENGINEERS P/L

Michael Wachjo
BE(Civil) MIEAust

\\NBADS\Company\Synergy\Projects\200808 49 CAREEL HEAD ROAD, AVALON\ENG Design\Flood Study\REPORT\Report\200808 Overland Flow Report 2022-04-07.docx

APPENDIX A

HEC-RAS Results



N

0 10 20 30m

Approx. Scale

TITLE:

Pre-Development Case: 1% AEP Depth Map

FIGURE:

6

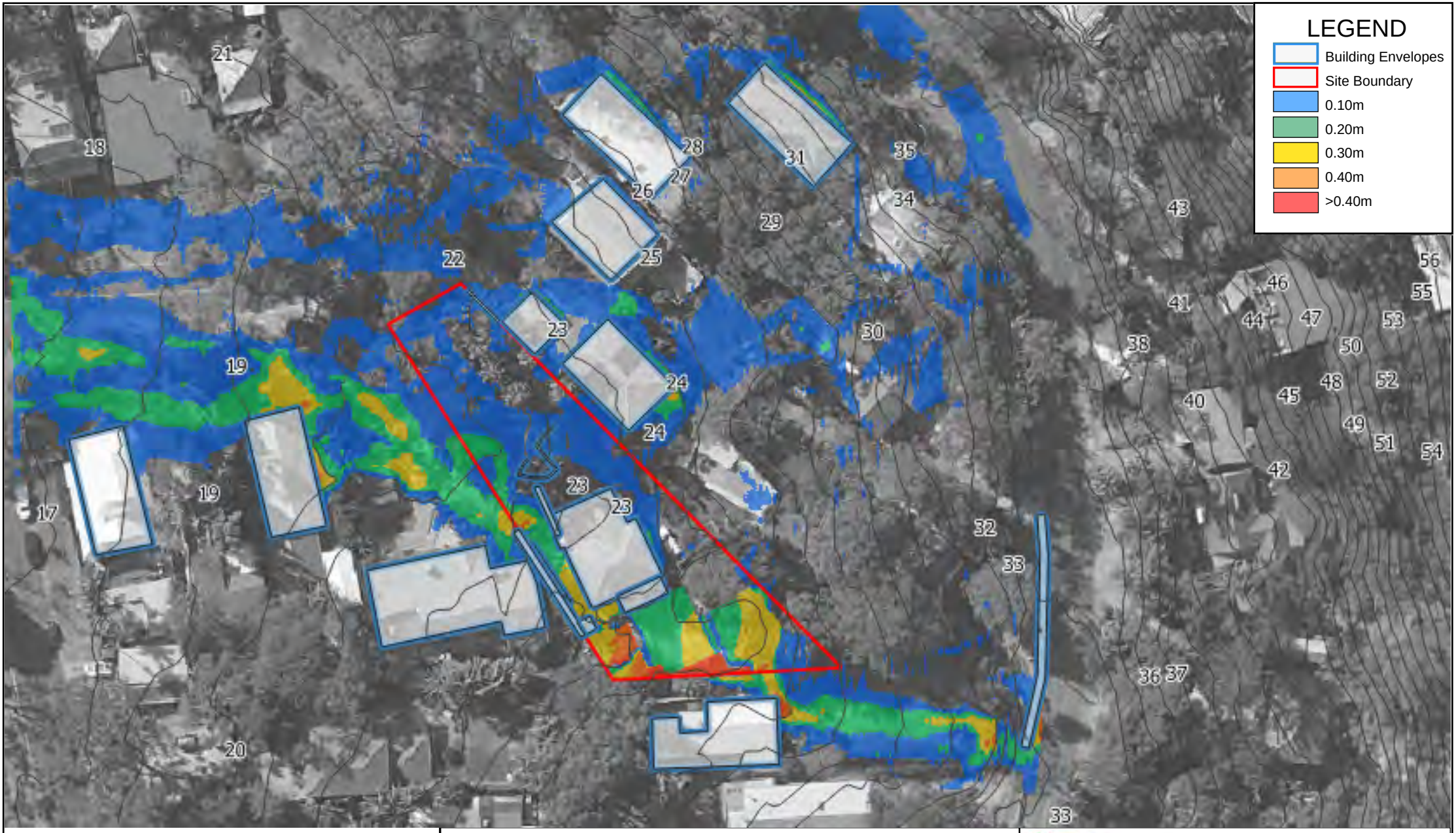
ISSUE:

A

Consulting Engineers

STRUCTURAL - CIVIL - STORMWATER - REMEDIAL

... STRUCTURALLY SOUND



N

0 10 20 30m

Approx. Scale

TITLE:

Post-Development Case: 1% AEP Depth Map

FIGURE:

7

ISSUE:

A

Consulting Engineers

STRUCTURAL - CIVIL - STORMWATER - REMEDIAL

... STRUCTURALLY SOUND

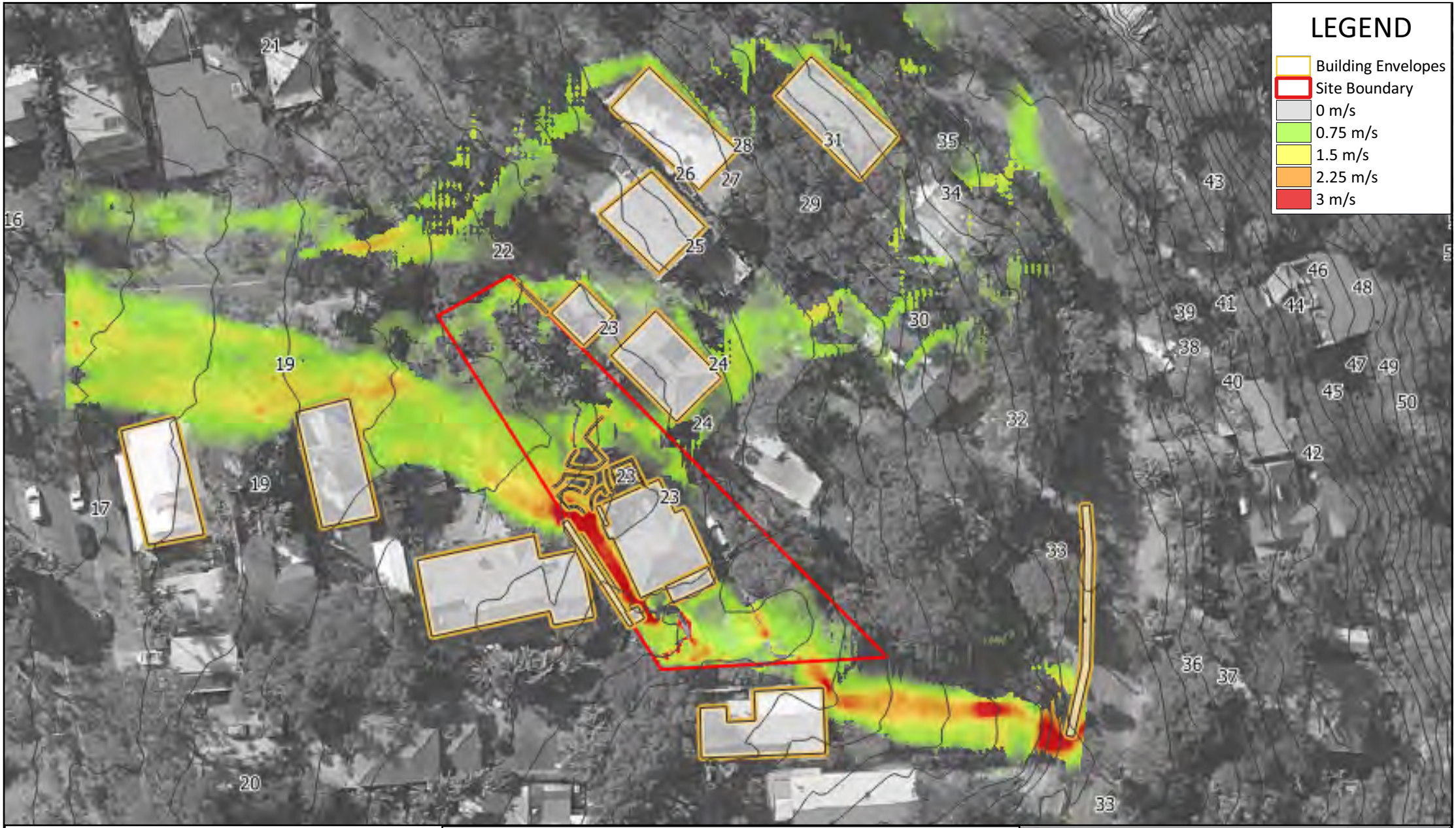
TITLE:

Difference Map: 1% AEP Depth

FIGURE: 8

ISSUE: A

Consulting Engineers
STRUCTURAL - CIVIL - STORMWATER - REMEDIAL
... STRUCTURALLY SOUND



N

0 10 20 30m

Approx. Scale

TITLE:

Pre-Development Case: 1% AEP Velocity Map

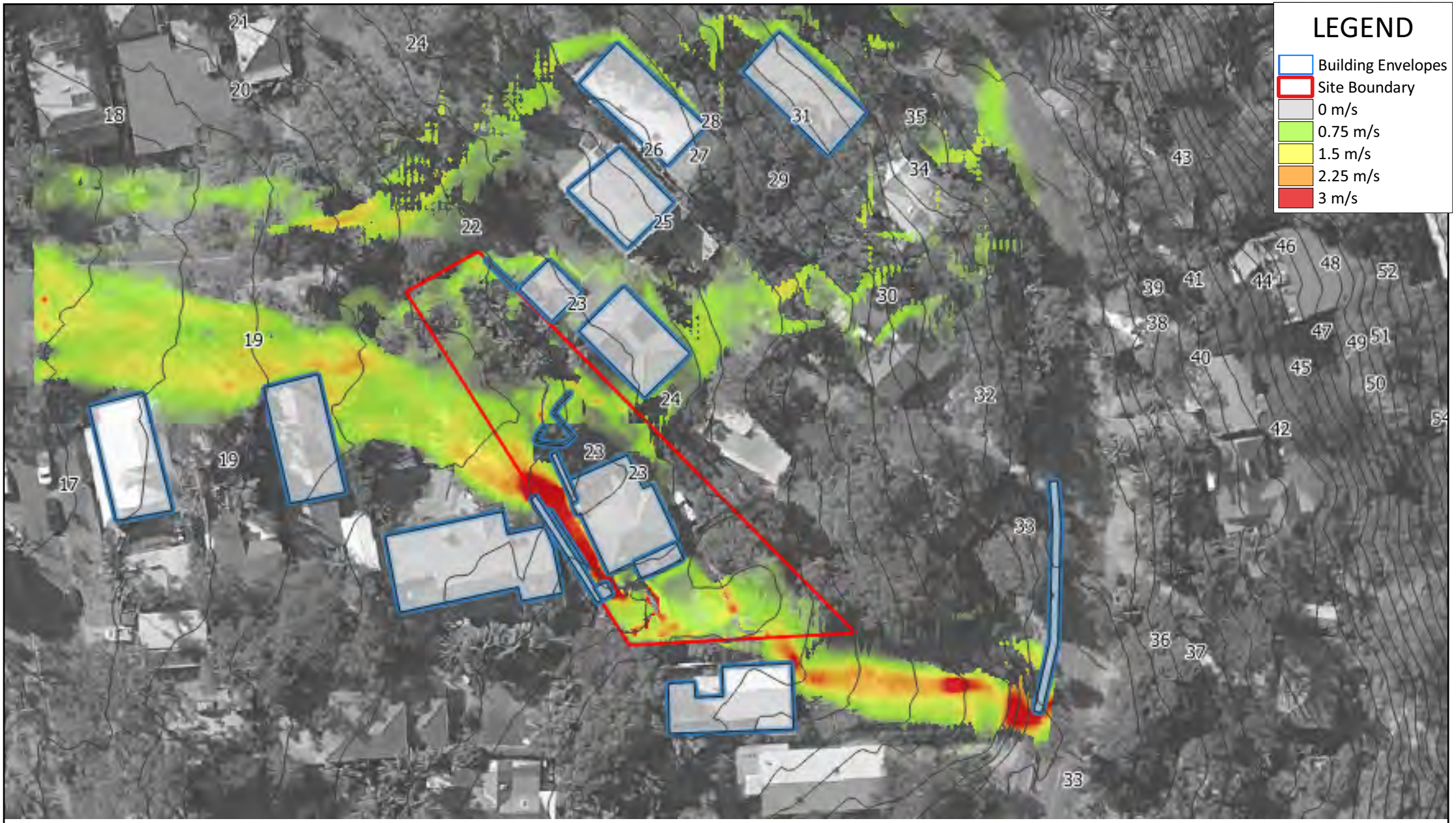
FIGURE: 9

ISSUE: A

Consulting Engineers

STRUCTURAL - CIVIL - STORMWATER - REMEDIAL

... STRUCTURALLY SOUND



N

0 10 20 30m

Approx. Scale

TITLE:

Post-Development Case: 1% AEP Velocity Map

FIGURE: 10

ISSUE: A

Consulting Engineers

STRUCTURAL - CIVIL - STORMWATER - REMEDIAL

... STRUCTURALLY SOUND

TITLE:

Difference Map: 1% AEP Velocity

FIGURE:

11

ISSUE:

A

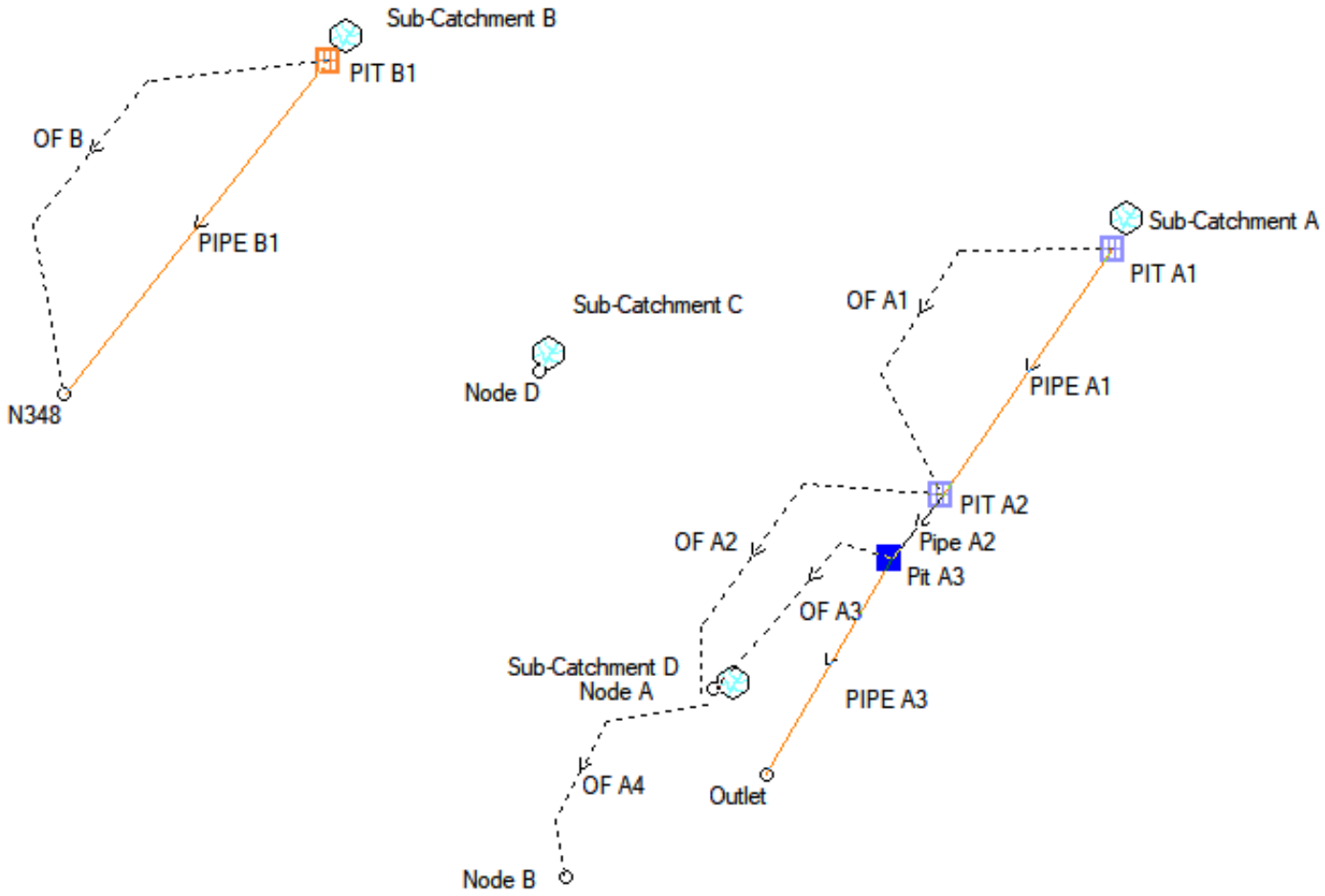
Consulting Engineers

STRUCTURAL - CIVIL - STORMWATER - REMEDIAL

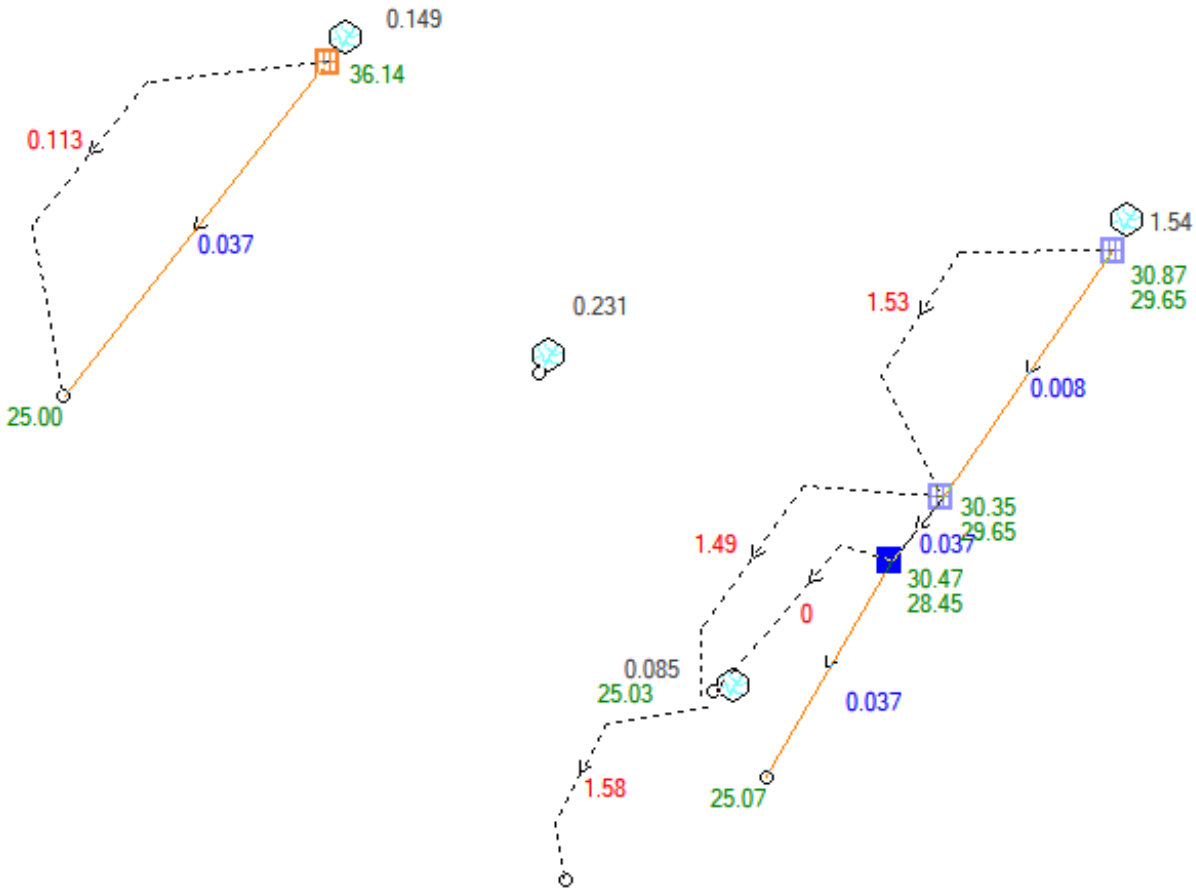
... STRUCTURALLY SOUND

APPENDIX B

DRAINS Results



TITLE: **DRAINS Catchment Model Layout**	Consulting Engineers STRUCTURAL - CIVIL - STORMWATER - REMEDIAL ... STRUCTURALLY SOUND
FIGURE: 12	ISSUE: A



TITLE: **DRAINS Catchment Model Results**	Consulting Engineers STRUCTURAL - CIVIL - STORMWATER - REMEDIAL ... STRUCTURALLY SOUND
FIGURE: 13	ISSUE: A

APPENDIX C

Site Survey Plan & Architectural Plan

LEGEND:

- TWL .. TOP OF WALL
- TF .. TOP OF FENCE
- (S) .. DENOTES BOUNDARY DIMENSION BY SURVEY
- (T) .. DENOTES BOUNDARY DIMENSION BY TITLE
- —— SW —— INDICATIVE POSITION OF SEWER MAIN BY DBYD (NOT VISIBIBLE). POSITION TO BE CONFIRMED BY SYDNEY WATER.
- —— SW —— INDICATIVE POSITION OF STORM WATER MAIN BY DBYD (NOT VISIBIBLE). POSITION TO BE CONFIRMED BY OTHERS.
- WINDOW, RIDGE & GUTTER HEIGHTS HAVE BEEN OBTAINED BY INDIRECT METHOD AND ARE ACCURATE TO ± 0.05m.
- INDICATIVE TREE SPREAD AND TRUNK DIAMETERS

SPREAD

NOTES:

- BOUNDARY SURVEY HAS BEEN UNDERTAKEN. SURVEY MARKS SHOULD BE PLACED IF EXCAVATION, CONSTRUCTION OR STRUCTURES ARE TO BE ERECTED ON OR NEAR THE BOUNDARIES.
- EXCEPT WHERE SHOWN BY DIMENSIONS LOCATION OF DETAIL WITH RESPECT TO BOUNDARIES IS INDICATIVE ONLY.
- TREE SPREADS & HEIGHTS ARE INDICATIVE ONLY.
- ONLY VISIBLE SERVICES HAVE BEEN SHOWN. UNDERGROUND SERVICES HAVE NOT BEEN LOCATED. NOTIFICATION OF ALL RELEVANT AUTHORITIES SHOULD BE UNDERTAKEN BEFORE CARRYING OUT ANY CONSTRUCTION ACTIVITY IN OR NEAR THE SURVEYED AREA. DIAL BEFORE YOU DIG SERVICES (ph1100) SHOULD BE CONTACTED.
- CONTOUR INTERVAL – 1 METRE. CONTOURS ARE INDICATIVE ONLY. SPOT LEVELS SHOULD BE ADOPTED FOR DESIGN AND CALCULATION PURPOSES. CRITICAL SPOT LEVELS SHOULD BE CONFIRMED WITH SURVEYOR.
- DO NOT SCALE FROM THIS PLAN. DIMENSIONS SHOULD BE USED.
- NO PART OF THIS SURVEY MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM, WITHOUT THE WRITTEN PERMISSION OF THE COPYRIGHT OWNER EXCEPT AS PERMITTED BY THE COPYRIGHT ACT 1968.
- ANY PERMITTED DOWNLOADING, ELECTRONIC STORAGE, DISPLAY, PRINT, COPY OR REPRODUCTION OF THIS SURVEY SHOULD CONTAIN NO ALTERATION OR ADDITION TO THE ORIGINAL SURVEY.
- THIS NOTICE MUST NOT BE ERASED.
- ORIGIN OF LEVELS: S.S.M.40963 R.L48.78 A.H.D. (SCIMS)
- COPYRIGHT © ADAM CLERKE SURVEYORS PTY LTD 2020
- THIS PLAN HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF SARAH & DANIEL MORLEY
- PLAN PREPARED BY REGISTERED SURVEYOR FOR DEVELOPMENT APPLICATION PURPOSES ONLY.

A Clerke

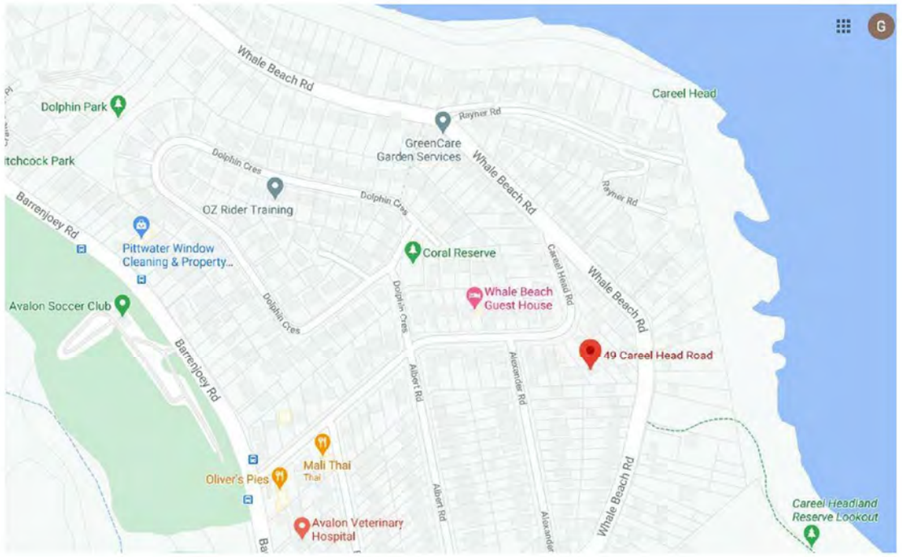
Adam Clerke
Registered surveyor No: 8490

ADAM CLERKE SURVEYORS PTY LTD
Incorporating PAUL KEEN & COMPANY
LAND & ENGINEERING SURVEYORS
P.O. BOX 175 NEWPORT NSW 2106
TEL..9918 4111 E..adam@adamclerkesurveyor.com.au

DETAILS AND LEVELS OVER
LOT 31 IN D.P.11909

49 CAREEL HEAD ROAD, AVALON BEACH

DATE... 17/12/20 REF... 11598
SCALE...1:100(A0) DATUM...A.H.D



Sheet List			
Sheet Number	Current Revision	Sheet Name	Current Revision Date
DA-001	A	COVER SHEET	20/09/2021
DA-002	A	SITE PLAN	20/09/2021
DA-003	A	SITE ANALYSIS PLAN	20/09/2021
DA-004	A	DEMOLITION PLANS	20/09/2021
DA-005	A	PLAN - LANDSCAPE AREAS	20/09/2021
DA-101	A	FIRST FLOOR	20/09/2021
DA-102	A	ROOF PLANS	20/09/2021
DA-201	A	ELEVATIONS - NORTH & SOUTH	20/09/2021
DA-202	A	ELEVATIONS - EAST & WEST	20/09/2021
DA-203	A	HEIGHT PLANES AND SETBACKS	20/09/2021
DA-301	A	TYPICAL SECTIONS	20/09/2021
DA-401	A	WINDOW SCHEDULE	20/09/2021
DA-501	A	SHADOWS - 9AM SEPT 22nd	20/09/2021
DA-502	A	SHADOWS - 12 NOON SEPT 22nd	20/09/2021
DA-503	A	SHADOWS - 3PM SEPT 22nd	20/09/2021
DA-601	A	FINISHES	20/09/2021

PROPOSED ALTERATIONS AND ADDITIONS
49 CAREEL HEAD ROAD AVALON BEACH
FOR DAN AND SARAH MORLEY

1 PROPOSED VIEW FROM DRIVEWAY

EXISTING HOUSE FROM DRIVEWAY

23/09/2021 2:10:21 PM

map architecture+interiors
PO BOX 699 AVALON BEACH NSW 2107
M +61 400 044 277 info@mapai.com.au

PROJECT
PROPOSED HOUSE ALTERATIONS AND ADDITIONS

DAN AND SARAH MORLEY

DWG NO. **DA-001**

REVISION **A**

DATE Issue Date

SCALE

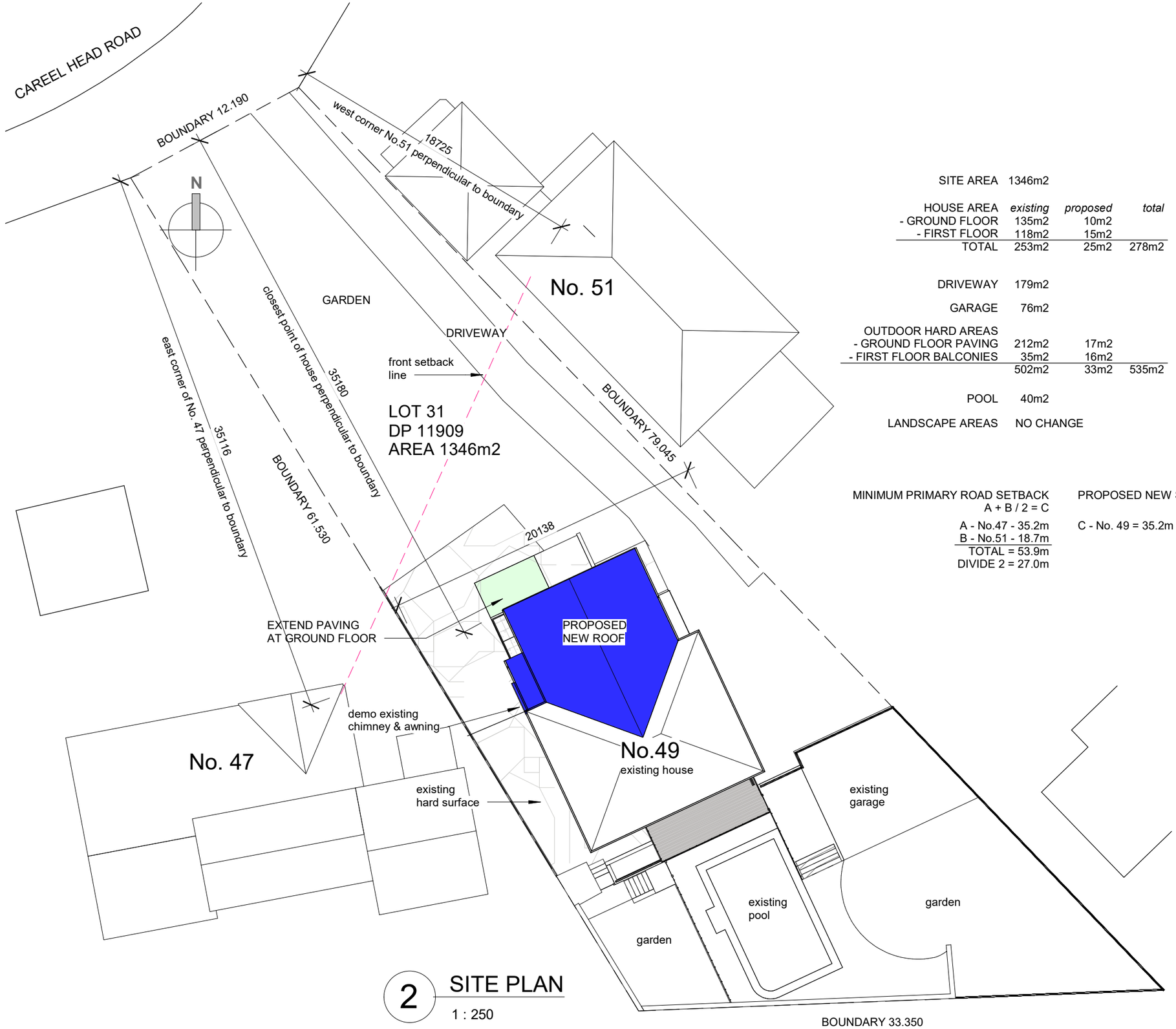
DRAWN BY Author

CHECKED BY Checker

ADDRESS
49 CAREEL HEAD ROAD AVALON BEACH

COVER SHEET

REVISION
A 20/09/2021 ISSUE FOR DA
PRELIMINARY



2 SITE PLAN

1 : 250

SITE AREA	1346m2		
HOUSE AREA	*existing*	*proposed*	*total*
- GROUND FLOOR	135m2	10m2	
- FIRST FLOOR	118m2	15m2	
TOTAL	253m2	25m2	278m2
DRIVEWAY	179m2		
GARAGE	76m2		
OUTDOOR HARD AREAS			
- GROUND FLOOR PAVING	212m2	17m2	
- FIRST FLOOR BALCONIES	35m2	16m2	
	502m2	33m2	535m2
POOL	40m2		
LANDSCAPE AREAS	NO CHANGE		

MINIMUM PRIMARY ROAD SETBACK
A + B / 2 = C

A - No.47 - 35.2m
B - No.51 - 18.7m
TOTAL = 53.9m
DIVIDE 2 = 27.0m

PROPOSED NEW SETBACK

C - No. 49 = 35.2m

23/09/2021 2:10:22 PM

map architecture+interiors
PO BOX 699 AVALON BEACH NSW 2107
M +61 400 044 277 info@mapai.com.au

PROJECT
PROPOSED HOUSE ALTERATIONS AND ADDITIONS

DAN AND SARAH MORLEY

DWG NO.
DA-002

REVISION
A

ADDRESS
49 CAREEL HEAD ROAD AVALON BEACH

SITE PLAN

DATE Issue Date
SCALE 1 : 250
DRAWN BY Author
CHECKED BY Checker

REVISION
A 20/09/2021 ISSUE FOR DA
PRELIMINARY

1 SITE ANALYSIS PLAN

1 : 500

23/09/2021 2:10:23 PM

map architecture + interiors
PO BOX 699 AVALON BEACH NSW 2107
M +61 400 044 277 info@mapai.com.au

PROJECT
PROPOSED HOUSE ALTERATIONS AND ADDITIONS

DAN AND SARAH MORLEY

DWG NO. **DA-003**

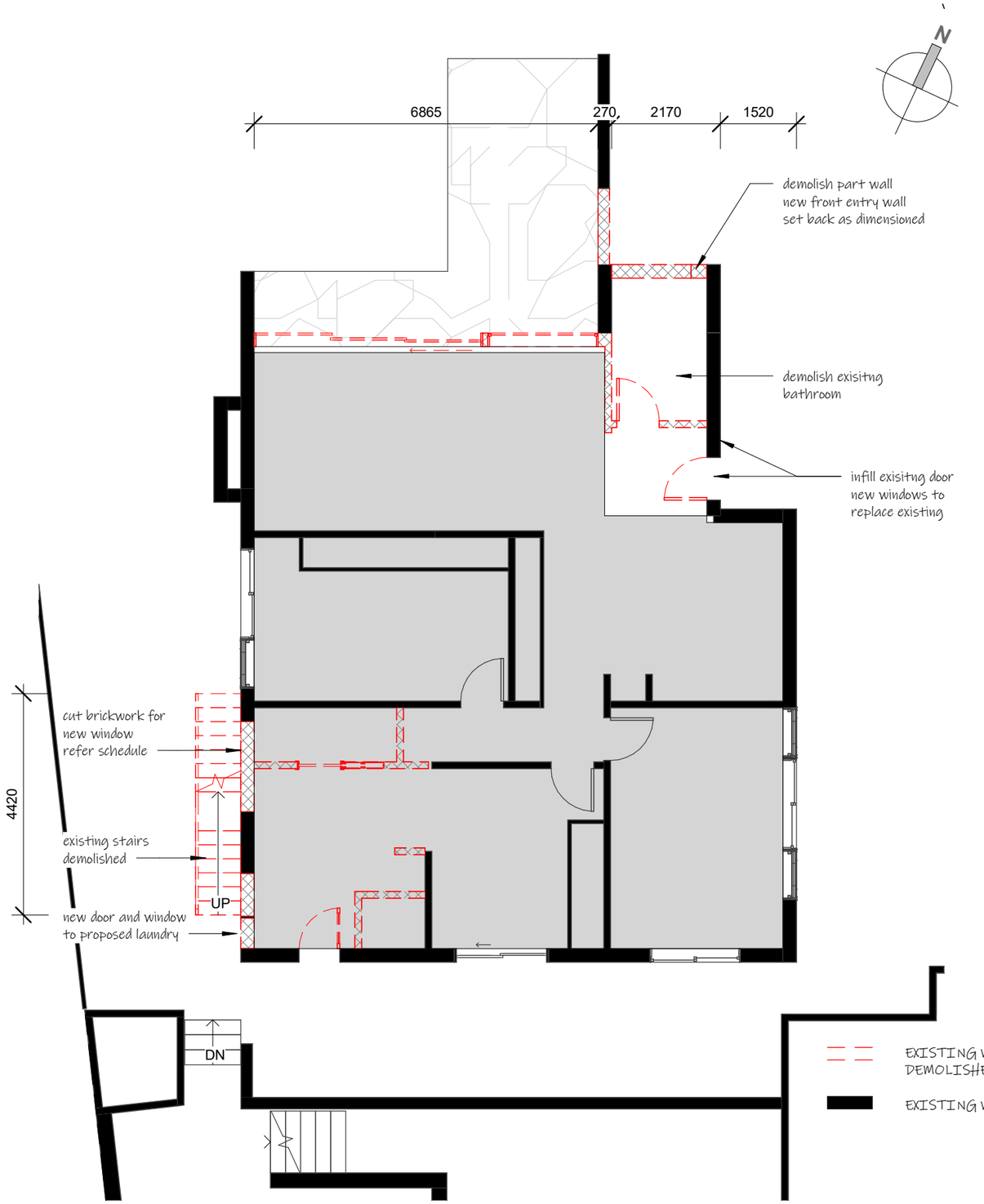
REVISION **A**

DATE Issue Date
SCALE 1 : 500
DRAWN BY Author
CHECKED BY Checker

ADDRESS
49 CAREEL HEAD ROAD AVALON BEACH

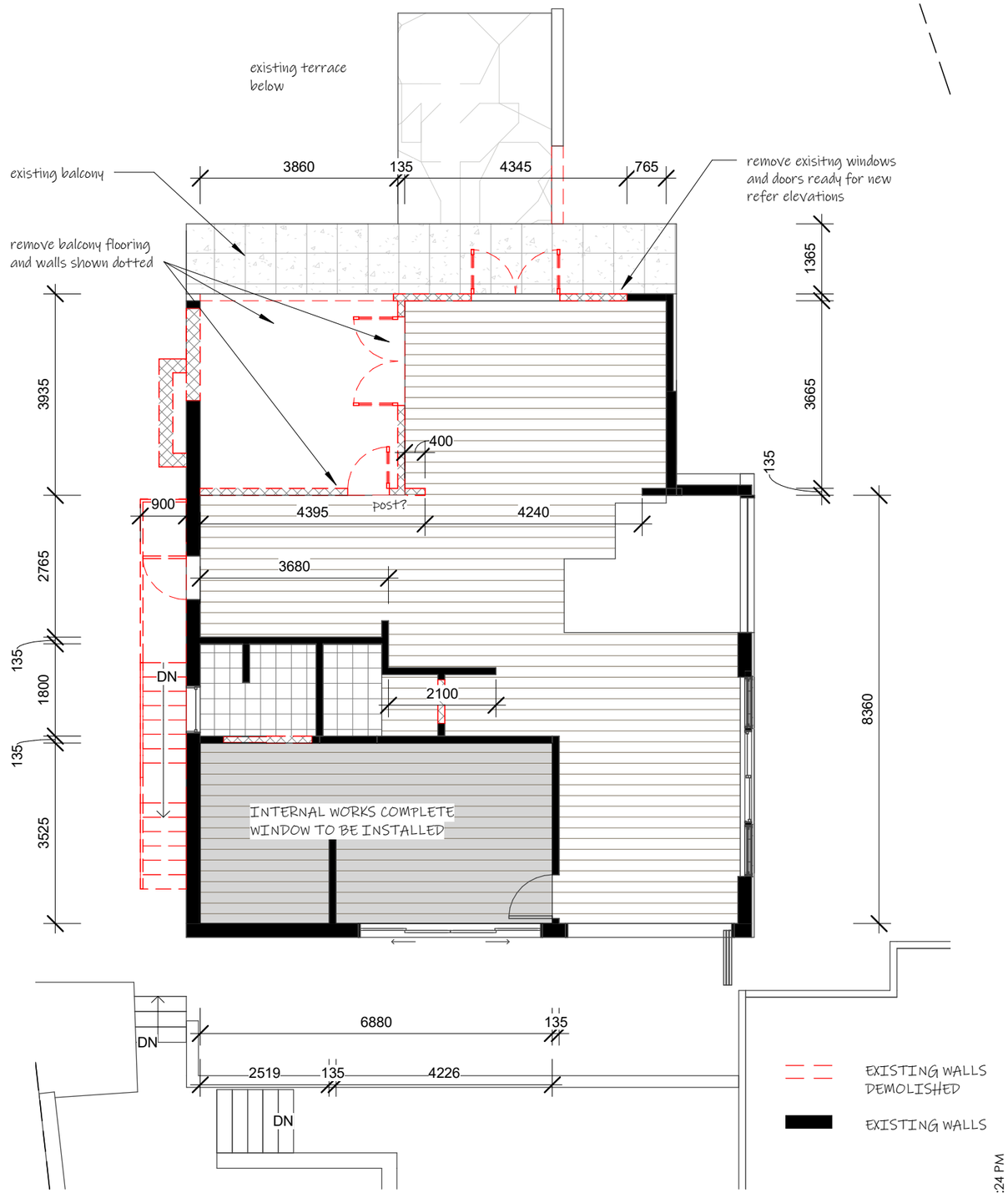
SITE ANALYSIS PLAN

REVISION
A 20/09/2021 ISSUE FOR DA



1 Ground Floor - DEMOLITION PLAN

1 : 100



2 Level 1 - DEMOLITION PLAN

1 : 100

23/09/2021 2:10:24 PM

map architecture + interiors
PO BOX 699 AVALON BEACH NSW 2107
M +61 400 044 277 info@mapai.com.au

PROJECT
PROPOSED HOUSE ALTERATIONS AND ADDITIONS

DAN AND SARAH MORLEY

DWG NO.
DA-004

REVISION
A

ADDRESS
49 CAREEL HEAD ROAD AVALON BEACH

DEMOLITION PLANS

DATE Issue Date
SCALE 1 : 100
DRAWN BY Author
CHECKED BY Checker

REVISION
A 20/09/2021 ISSUE FOR DA

PRELIMINARY

	SITE AREA	1346m2	
	EXISTING GARDEN	570m2	
	EXISTING PEEBLES	46m2	
		616m2	45.8%
	DEEPSOIL PLANTING	500m2	37%
	EXISTING DRIVEWAY	179m2	
	EXISTING PAVING	129m2	
	EXISTING POOL	40m2	

NOTE:
NO CHANGE TO LANDSCAPED AREAS

1 LANDSCAPE PLAN
1 : 250

23/09/2021 2:10:25 PM

map architecture+interiors
PO BOX 699 AVALON BEACH NSW 2107
M +61 400 044 277 info@mapai.com.au

PROJECT
PROPOSED HOUSE ALTERATIONS AND ADDITIONS

DAN AND SARAH MORLEY

DWG NO. **DA-005**

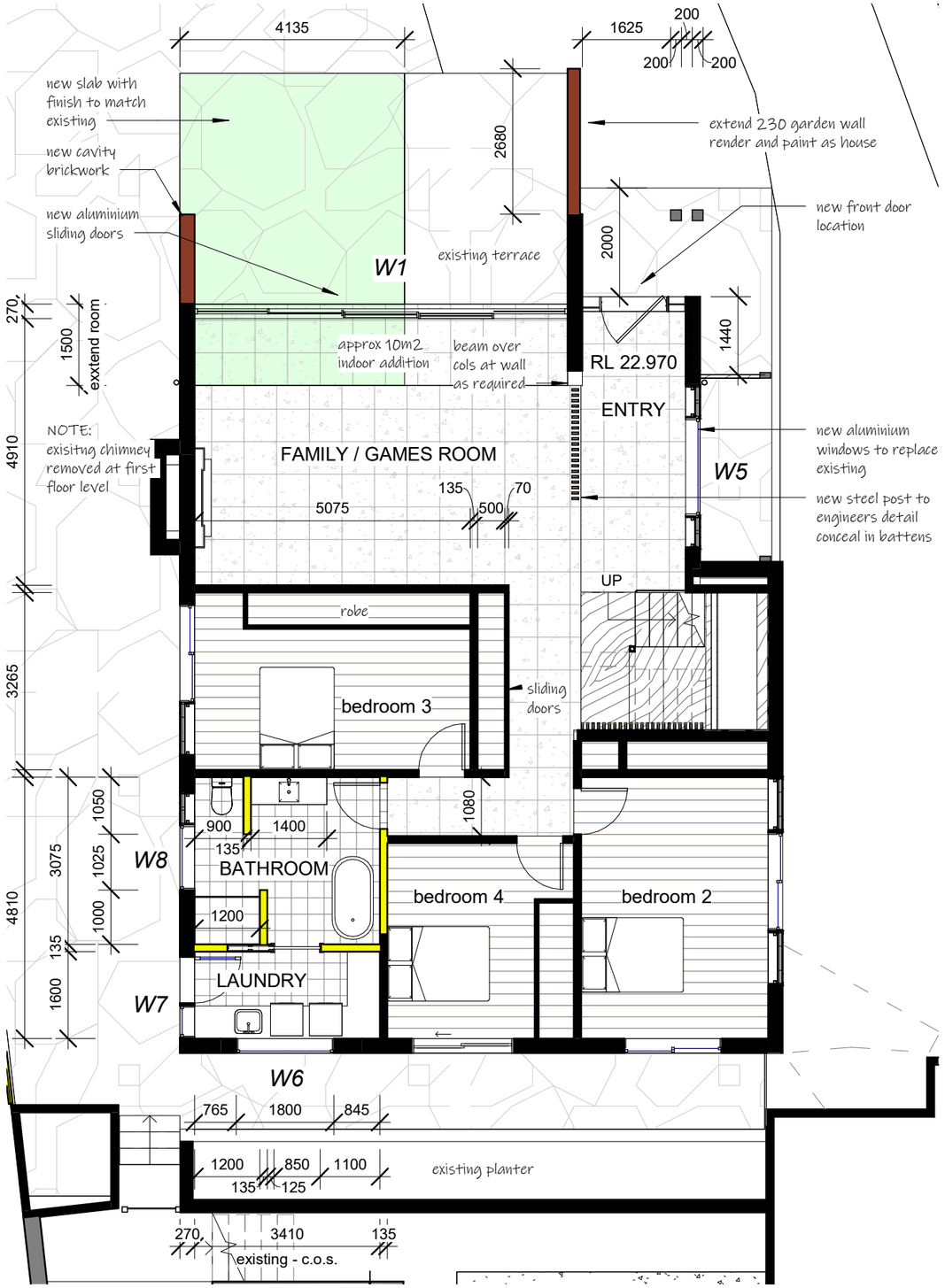
REVISION **A**

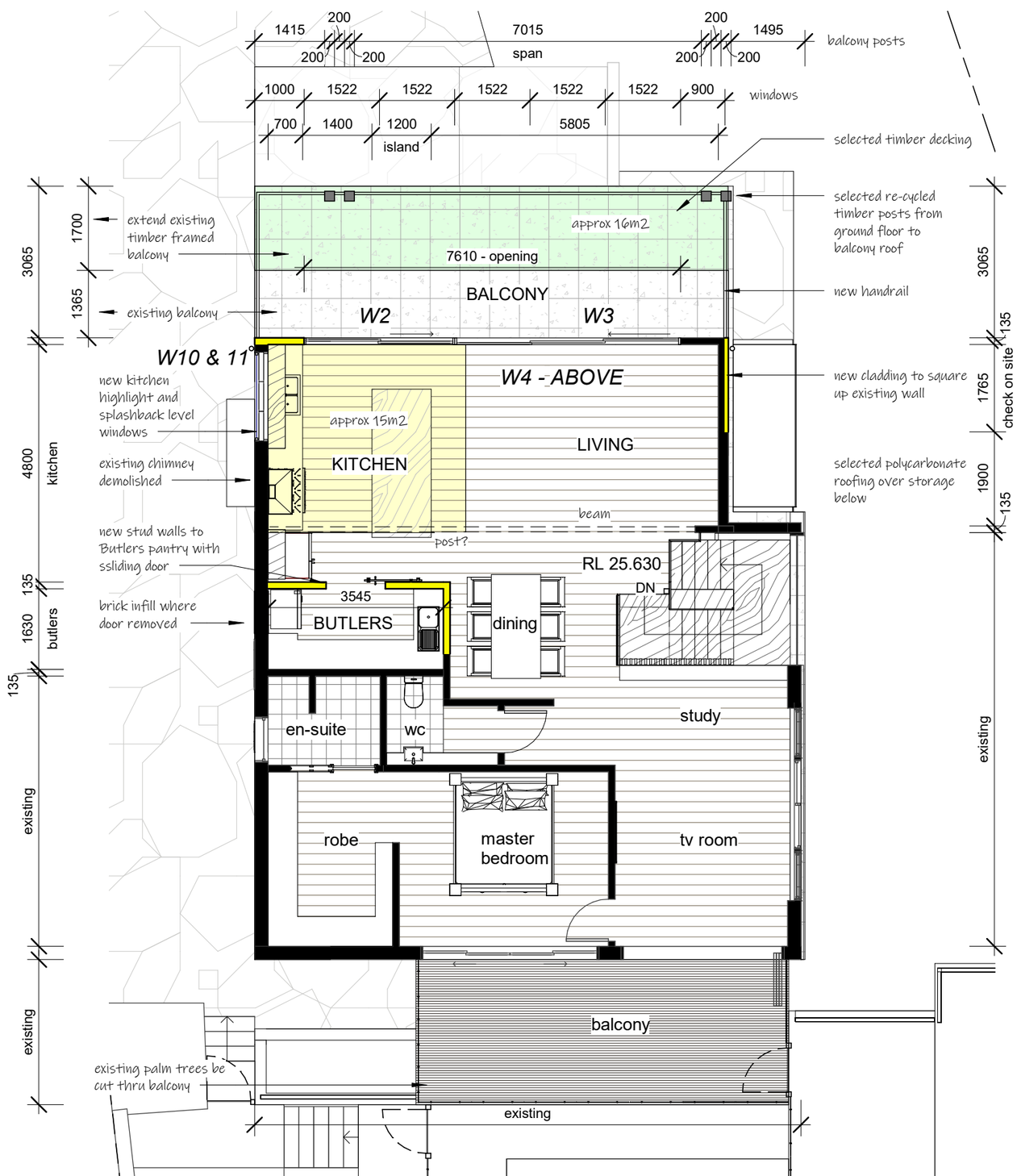
DATE Issue Date
SCALE 1 : 250
DRAWN BY Author
CHECKED BY Checker

ADDRESS
49 CAREEL HEAD ROAD AVALON BEACH

PLAN - LANDSCAPE AREAS

REVISION
A 20/09/2021 ISSUE FOR DA
P R E L I M I N A R Y





1 ground floor plan

1 : 100

2 first floor plan

1 : 100

map architecture + interiors
LEVEL 1
255-259 PACIFIC HIGHWAY
NORTH SYDNEY NSW 2060
M +61 400 044 277
info@mapai.com.au

PROJECT

PROPOSED HOUSE ALTERATIONS AND ADDITIONS

DAN AND SARAH MORLEY

DWG NO. **DA-101**

REVISION **A**

N

DATE Issue Date

SCALE 1 : 100

DRAWN BY Author

CHECKED BY Checker

ADDRESS

49 CAREEL HEAD ROAD AVALON BEACH

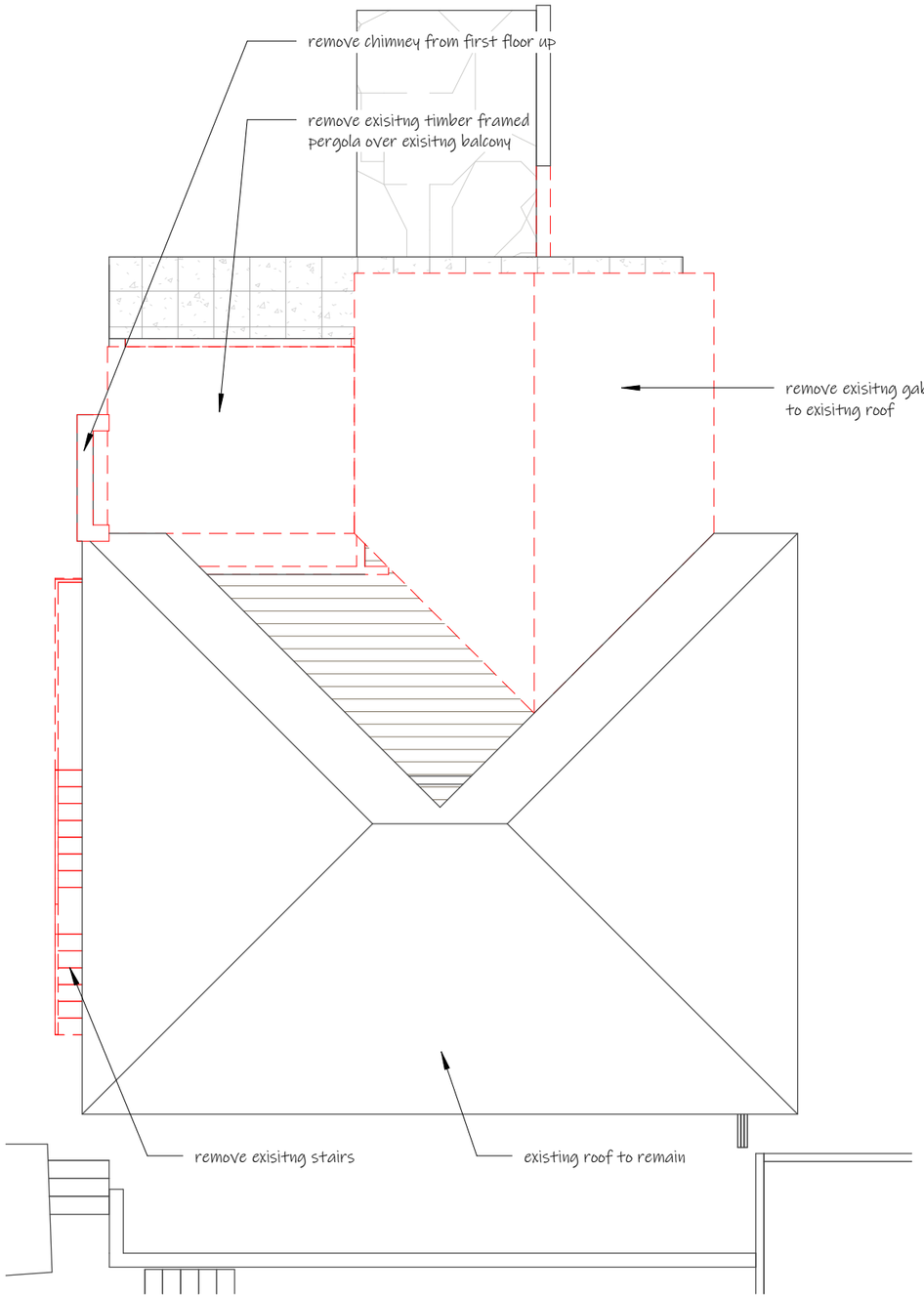
FIRST FLOOR

REVISION

A 20/09/2021 ISSUE FOR DA

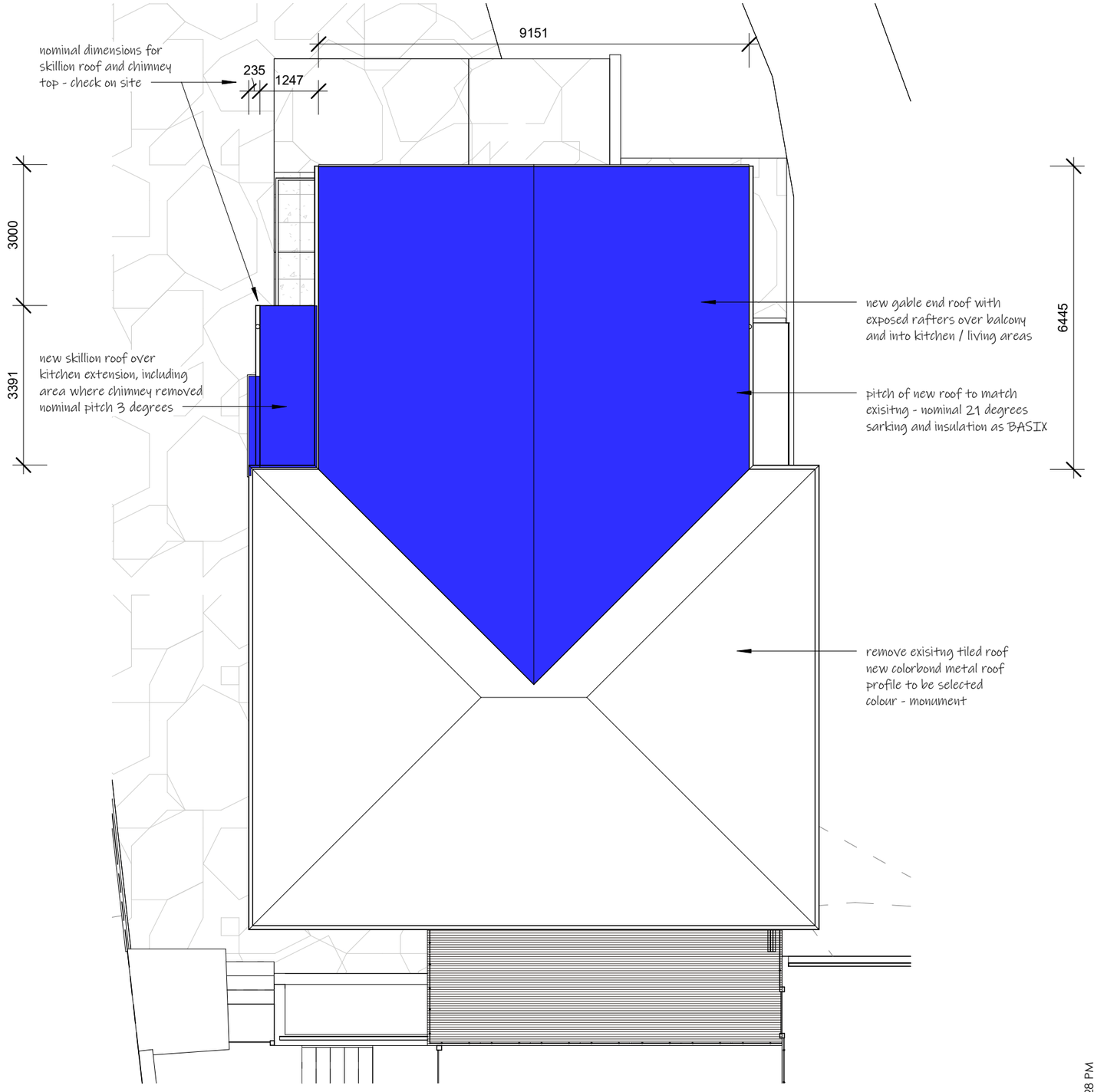
PRELIMINARY

23/09/2021 2:10:27 PM



2 Roof - DEMOLITION PLAN

1 : 100



1 Roof - CONCEPT PLAN

1 : 100

23/09/2021 2:10:28 PM

map architecture + interiors
PO BOX 699 AVALON BEACH NSW 2107
M +61 400 044 277 info@mapai.com.au

PROJECT
PROPOSED HOUSE ALTERATIONS AND ADDITIONS

DAN AND SARAH MORLEY

DWG NO. **DA-102**

REVISION **A**

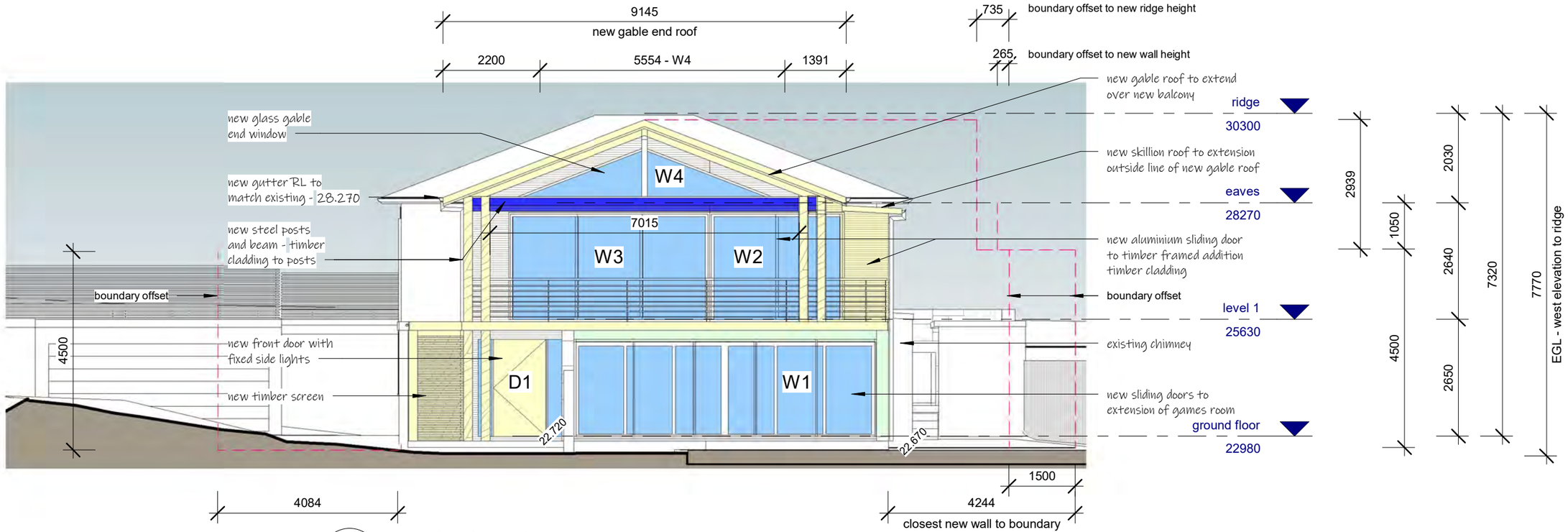
DATE Issue Date
SCALE 1 : 100
DRAWN BY Author
CHECKED BY Checker

ADDRESS
49 CAREEL HEAD ROAD AVALON BEACH

ROOF PLANS

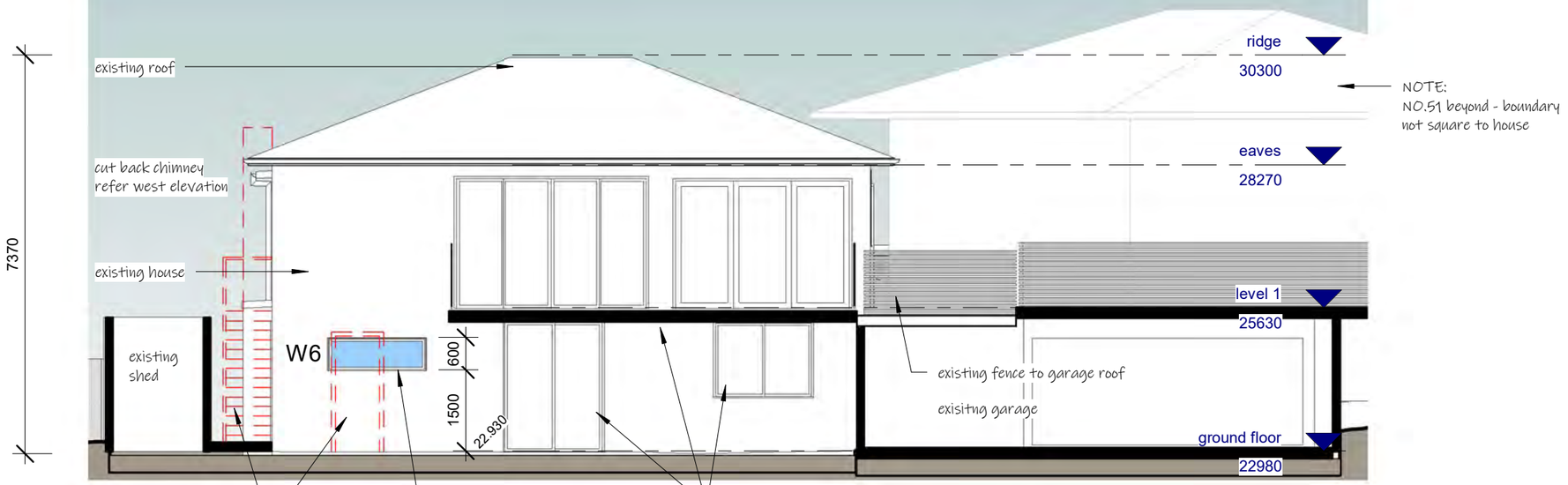
REVISION
A 20/09/2021 ISSUE FOR DA

PRELIMINARY



1 north elevation

1 : 100



2 south elevation

1 : 100

map architecture + interiors
LEVEL 1
255-259 PACIFIC HIGHWAY
NORTH SYDNEY NSW 2060
M +61 400 044 277
info@mapai.com.au

PROJECT
PROPOSED HOUSE ALTERATIONS AND ADDITIONS

DAN AND SARAH MORLEY

DWG NO.
DA-201

REVISION
A

N

DATE Issue Date
SCALE 1 : 100
DRAWN BY Author
CHECKED BY Checker

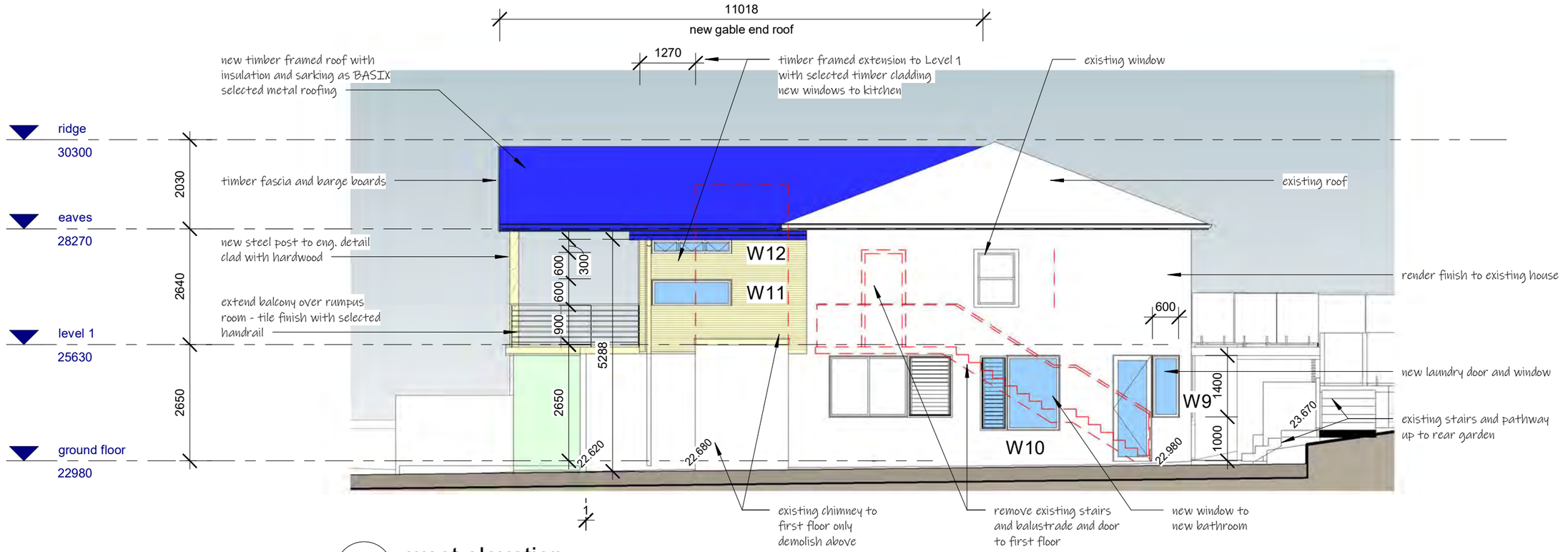
ADDRESS
49 CAREEL HEAD ROAD AVALON BEACH

ELEVATIONS - NORTH & SOUTH

REVISION
A 20/09/2021 ISSUE FOR DA

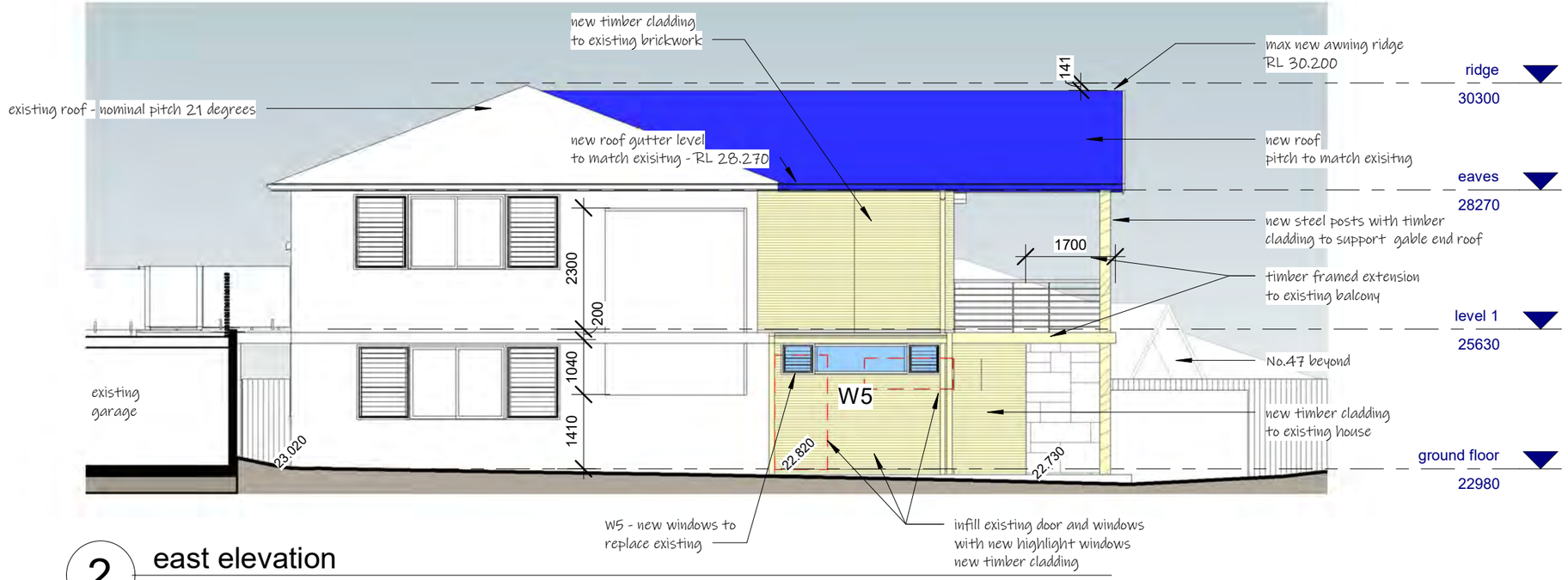
PRELIMINARY

23/09/2021 2:10:29 PM



1 west elevation

1 : 100



2 east elevation

1 : 100

map architecture+interiors
LEVEL 1
255-259 PACIFIC HIGHWAY
NORTH SYDNEY NSW 2060
M +61 400 044 277
info@mapai.com.au

PROJECT

PROPOSED HOUSE ALTERATIONS AND ADDITIONS

DAN AND SARAH MORLEY

DWG NO.

DA-202

REVISION

A

ADDRESS

49 CAREEL HEAD ROAD AVALON BEACH

ELEVATIONS - EAST & WEST

N

DATE Issue Date

SCALE 1 : 100

DRAWN BY Author

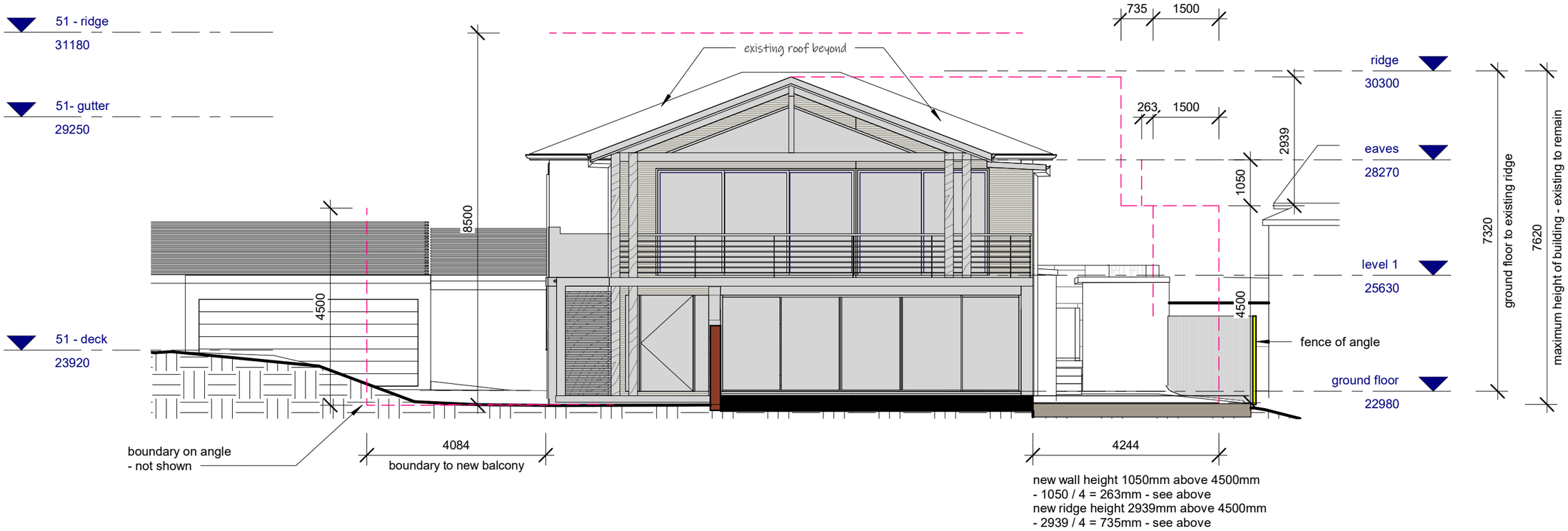
CHECKED BY Checker

REVISION

A 20/09/2021 ISSUE FOR DA

PRELIMINARY

23/09/2021 2:10:31 PM



1 Section - SIDE SETBACK AND HEIGHT PLANES

1 : 100

23/09/2021 2:10:32 PM

map architecture+interiors
PO BOX 699 AVALON BEACH NSW 2107
M +61 400 044 277 info@mapai.com.au

PROJECT
PROPOSED HOUSE ALTERATIONS AND ADDITIONS

DAN AND SARAH MORLEY

DWG NO. **DA-203**

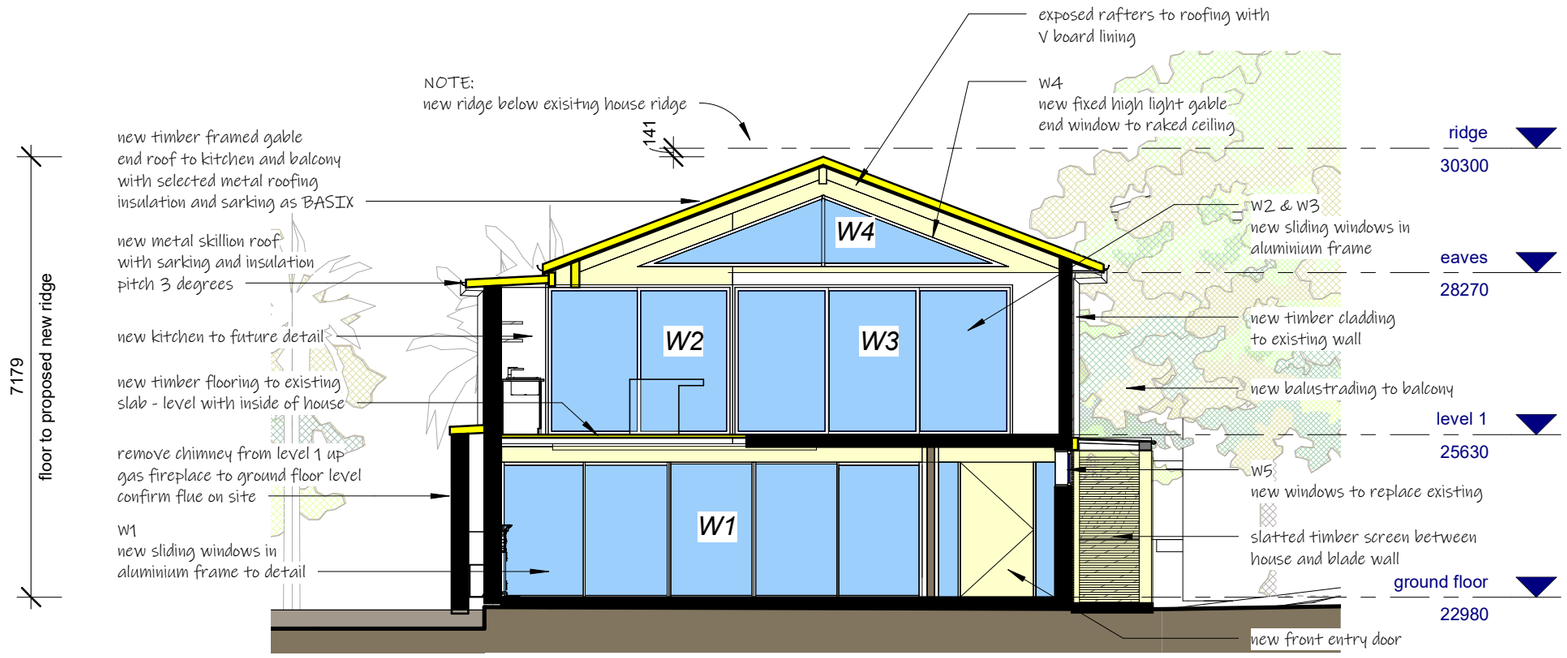
REVISION **A**

DATE Issue Date
SCALE 1 : 100
DRAWN BY Author
CHECKED BY Checker

ADDRESS
49 CAREEL HEAD ROAD AVALON BEACH

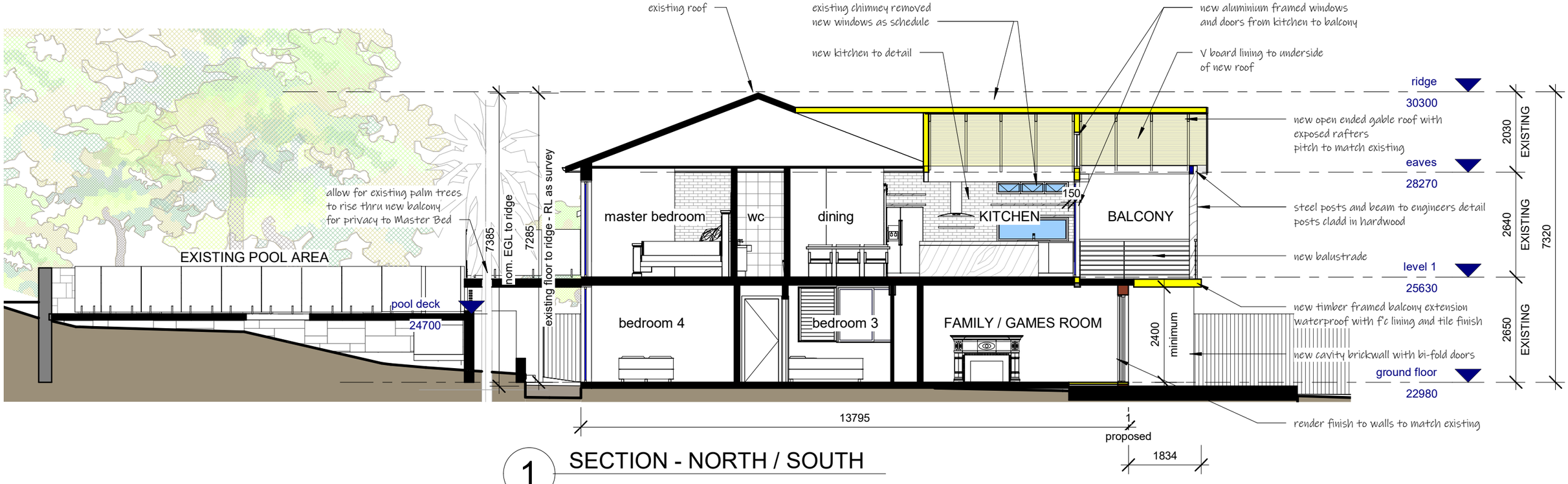
HEIGHT PLANES AND SETBACKS

REVISION
A 20/09/2021 ISSUE FOR DA
PRELIMINARY



2 SECTION - EAST / WEST

1 : 100



1 SECTION - NORTH / SOUTH

1 : 100

map architecture+interiors
LEVEL 1
255-259 PACIFIC HIGHWAY
NORTH SYDNEY NSW 2060
M +61 400 044 277
info@mapai.com.au

PROJECT
PROPOSED HOUSE ALTERATIONS AND ADDITIONS

DAN AND SARAH MORLEY

DWG NO.
DA-301

REVISION
A

ADDRESS
49 CAREEL HEAD ROAD AVALON BEACH

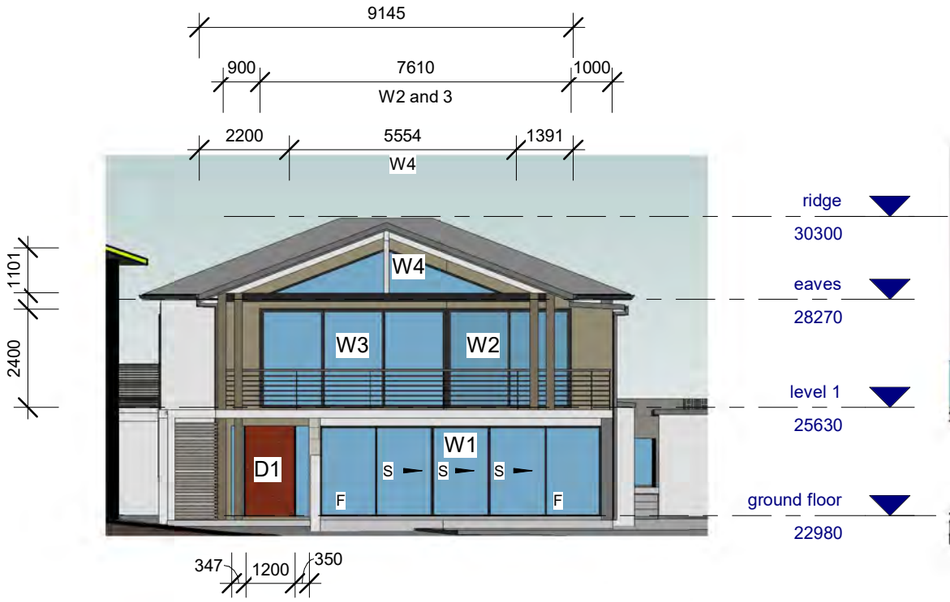
TYPICAL SECTIONS

N

DATE Issue Date
SCALE 1 : 100
DRAWN BY Author
CHECKED BY Checker

REVISION
A 20/09/2021 ISSUE FOR DA
PRELIMINARY

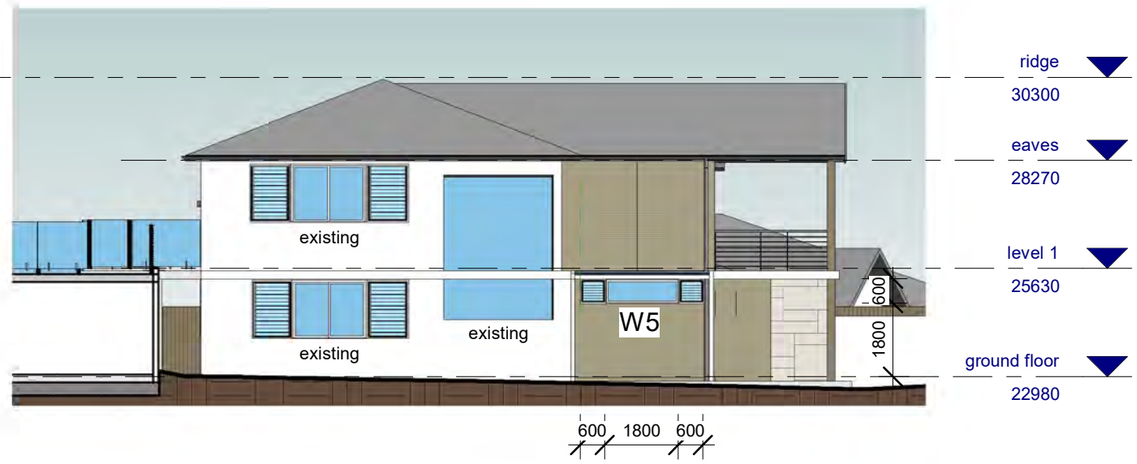
23/09/2021 2:10:34 PM



W1 6750 x 2100 3 x sliding / 2 x fixed
W2 4500 x 2400 2 x sliding / 1 x fixed
W3 3000 x 2400 1 x sliding / 1 x fixed
W4 4745 x 1125 fixed glass panel / shaped to roof line
D1 1200 x 2200 pivot timber door with fixed side light
425 x 2200

1 north elevation - windows

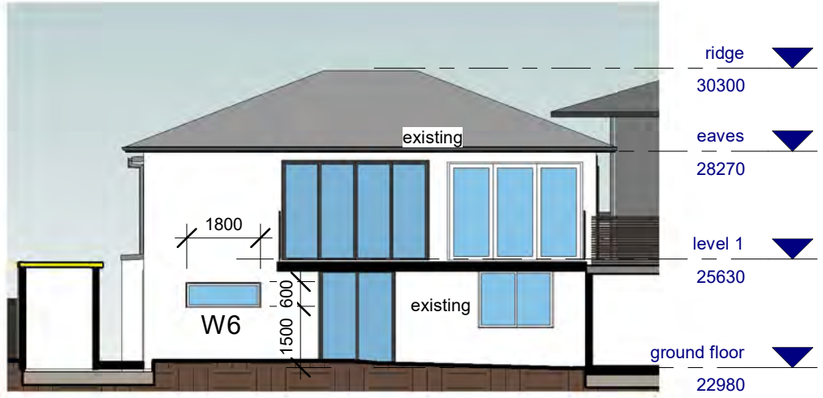
1 : 150



W5 600 x 600 glass louvres - 3 off
600 x 1900 fixed glass panel

2 east elevation - windows

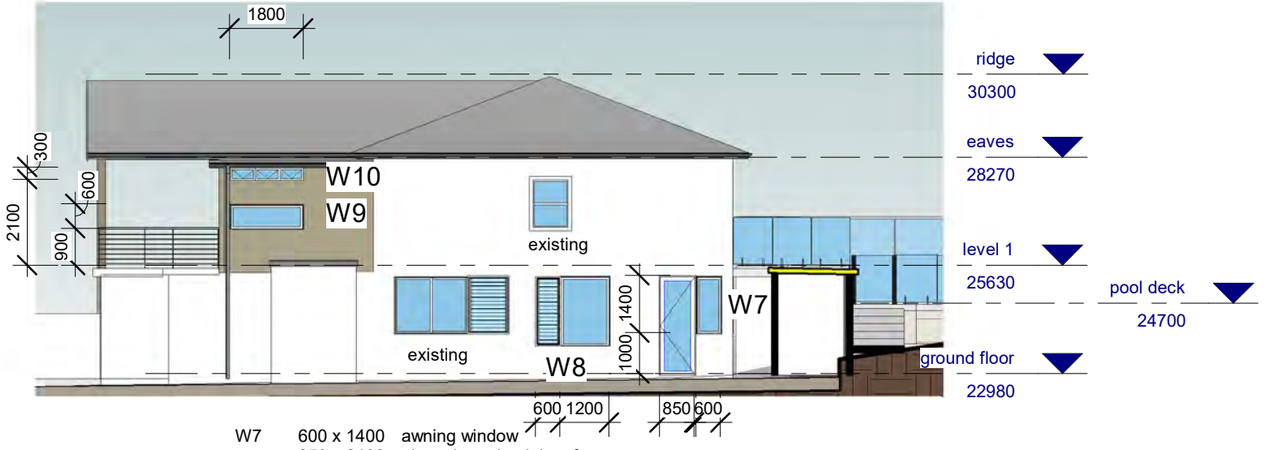
1 : 150



W6 1800 x 600 awning

3 south elevation - windows

1 : 150



W7 600 x 1400 awning window
850 x 2400 glass door aluminium frame
W8 1200 x 1700 fixed window
600 x 1700 glass louvres
W9 1800 x 600 fixed window
W10 1800 x 300 awning window

4 west elevation - windows

1 : 150

map architecture + interiors
LEVEL 1
255-259 PACIFIC HIGHWAY
NORTH SYDNEY NSW 2060
M +61 400 044 277
info@mapai.com.au

PROJECT
PROPOSED HOUSE ALTERATIONS AND ADDITIONS

DAN AND SARAH MORLEY

DWG NO.
DA-401

REVISION
A

N

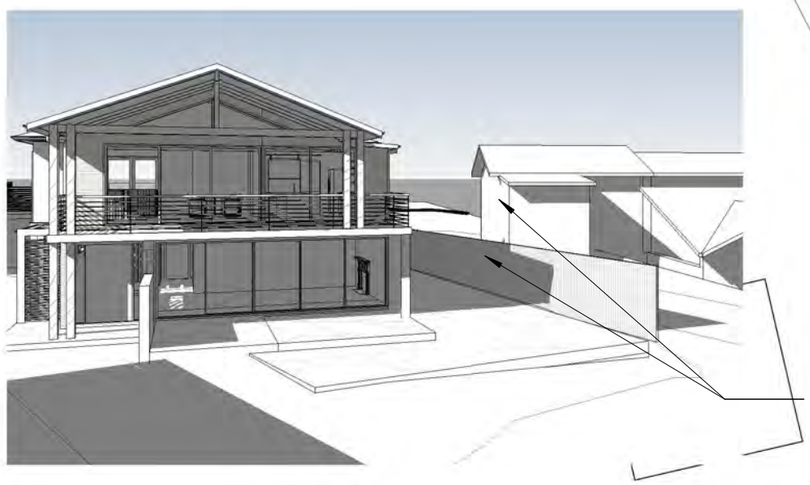
DATE Issue Date
SCALE 1 : 150
DRAWN BY Author
CHECKED BY Checker

ADDRESS
49 CAREEL HEAD ROAD AVALON BEACH

WINDOW SCHEDULE

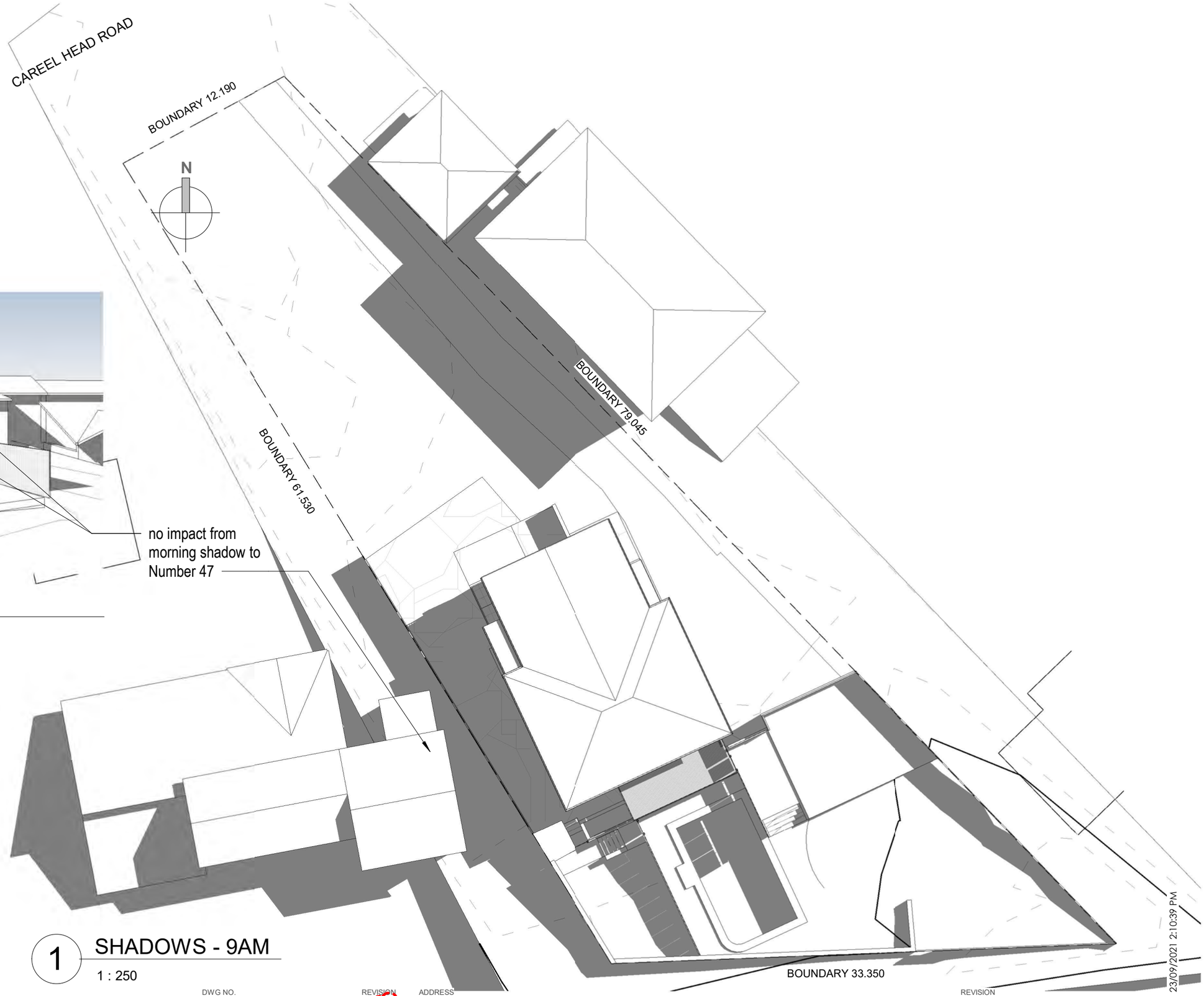
REVISION
A 20/09/2021 ISSUE FOR DA

23/09/2021 2:10:37 PM



no impact from
morning shadow to
Number 47

2 3D View - 9AM



1 SHADOWS - 9AM

1 : 250

23/09/2021 2:10:39 PM

map architecture+interiors
PO BOX 699 AVALON BEACH NSW 2107
M +61 400 044 277 info@mapai.com.au

PROJECT
PROPOSED HOUSE ALTERATIONS AND ADDITIONS

DAN AND SARAH MORLEY

DWG NO.
DA-501

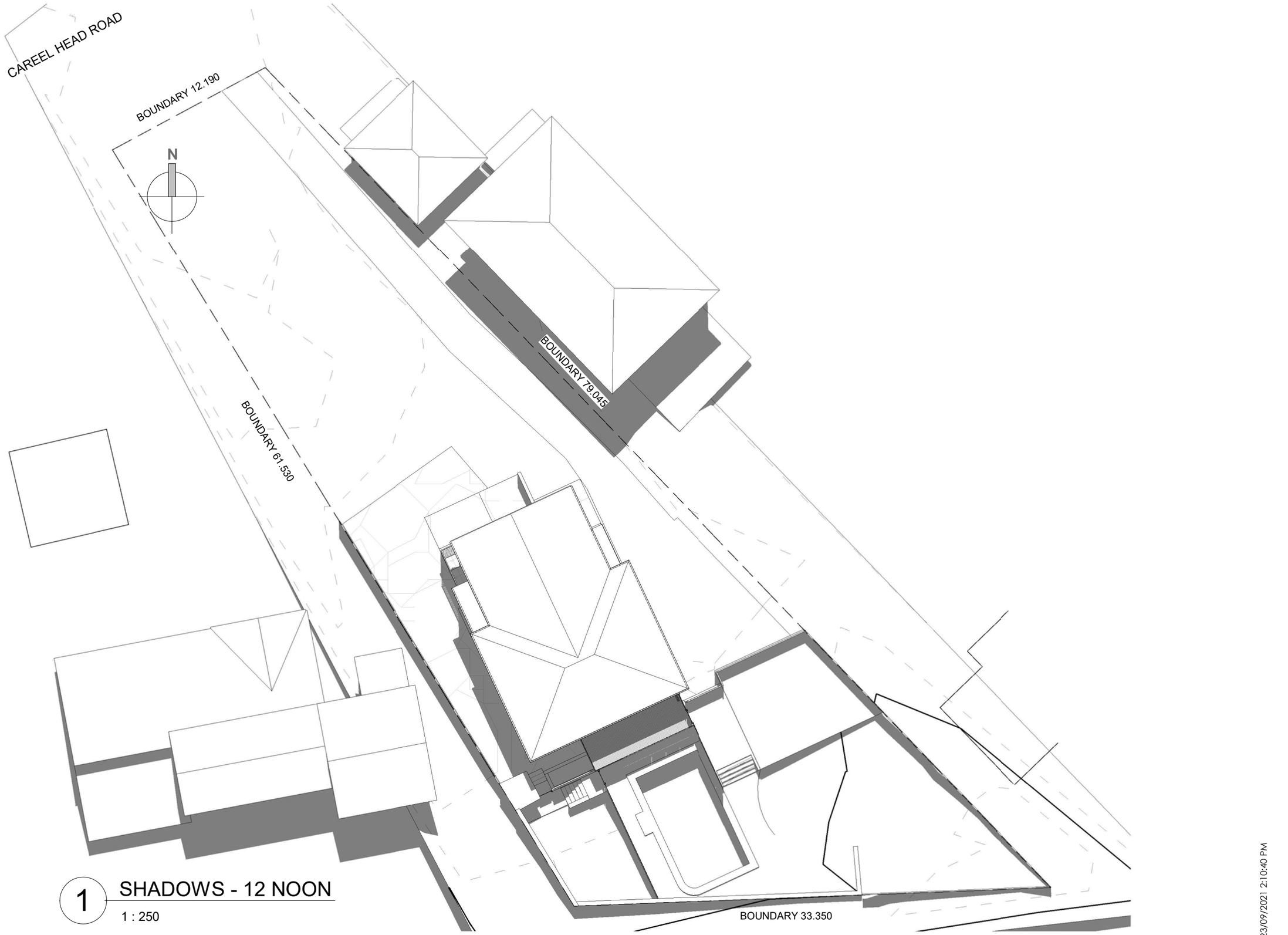
REVISION
A

ADDRESS
49 CAREEL HEAD ROAD AVALON BEACH

SHADOWS - 9AM SEPT 22nd

DATE Issue Date
SCALE 1 : 250
DRAWN BY Author
CHECKED BY Checker

REVISION
A 20/09/2021 ISSUE FOR DA



1 SHADOWS - 12 NOON

1 : 250

23/09/2021 2:10:40 PM

map architecture + interiors
PO BOX 699 AVALON BEACH NSW 2107
M +61 400 044 277 info@mapai.com.au

PROJECT
PROPOSED HOUSE ALTERATIONS AND ADDITIONS

DAN AND SARAH MORLEY

DWG NO.
DA-502

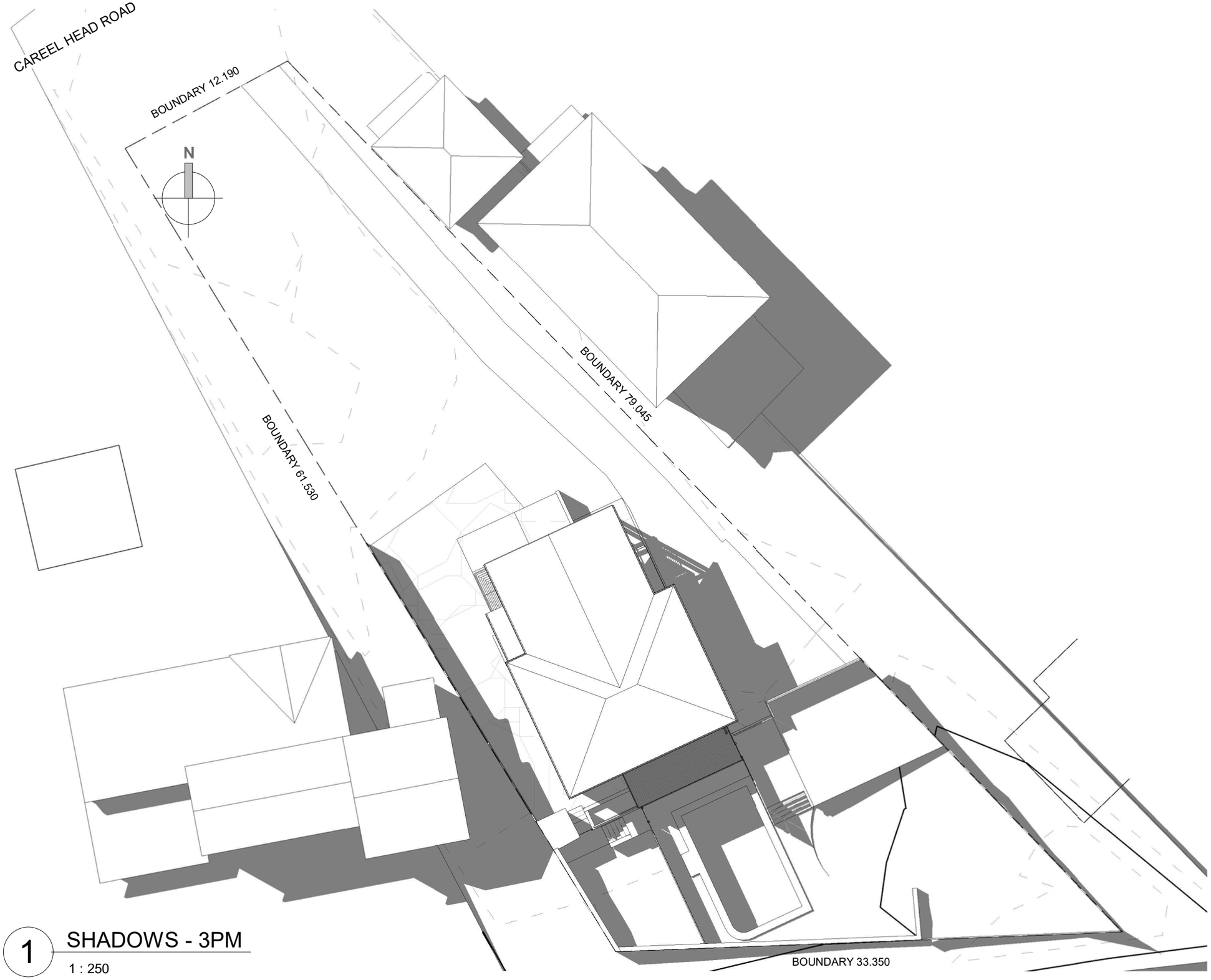
REVISION
A

DATE Issue Date
SCALE 1 : 250
DRAWN BY Author
CHECKED BY Checker

ADDRESS
49 CAREEL HEAD ROAD AVALON BEACH

SHADOWS - 12 NOON SEPT 22nd

REVISION
A 20/09/2021 ISSUE FOR DA



1 SHADOWS - 3PM

1 : 250

23/09/2021 2:10:41 PM

map architecture + interiors
PO BOX 699 AVALON BEACH NSW 2107
M +61 400 044 277 info@mapai.com.au

PROJECT
PROPOSED HOUSE ALTERATIONS AND ADDITIONS

DAN AND SARAH MORLEY

DWG NO.
DA-503

REVISION
A

ADDRESS
49 CAREEL HEAD ROAD AVALON BEACH

SHADOWS - 3PM SEPT 22nd

DATE Issue Date
SCALE 1 : 250
DRAWN BY Author
CHECKED BY Checker

REVISION
A 20/09/2021 ISSUE FOR DA

roof colour

roof profile

black aluminium window frames

wall cladding

timber slat screen

feature door

stone clad entry wall

render colour

steel colour

balcony tile

hardwood timber posts

1 PROPOSED ALTERATION

23/09/2021 2:10:50 PM

map architecture+interiors
PO BOX 699 AVALON BEACH NSW 2107
M +61 400 044 277 info@mapai.com.au

PROJECT
PROPOSED HOUSE ALTERATIONS AND ADDITIONS

DAN AND SARAH MORLEY

DWG NO. **DA-601**

REVISION **A**

DATE Issue Date

SCALE

DRAWN BY Author

CHECKED BY Checker

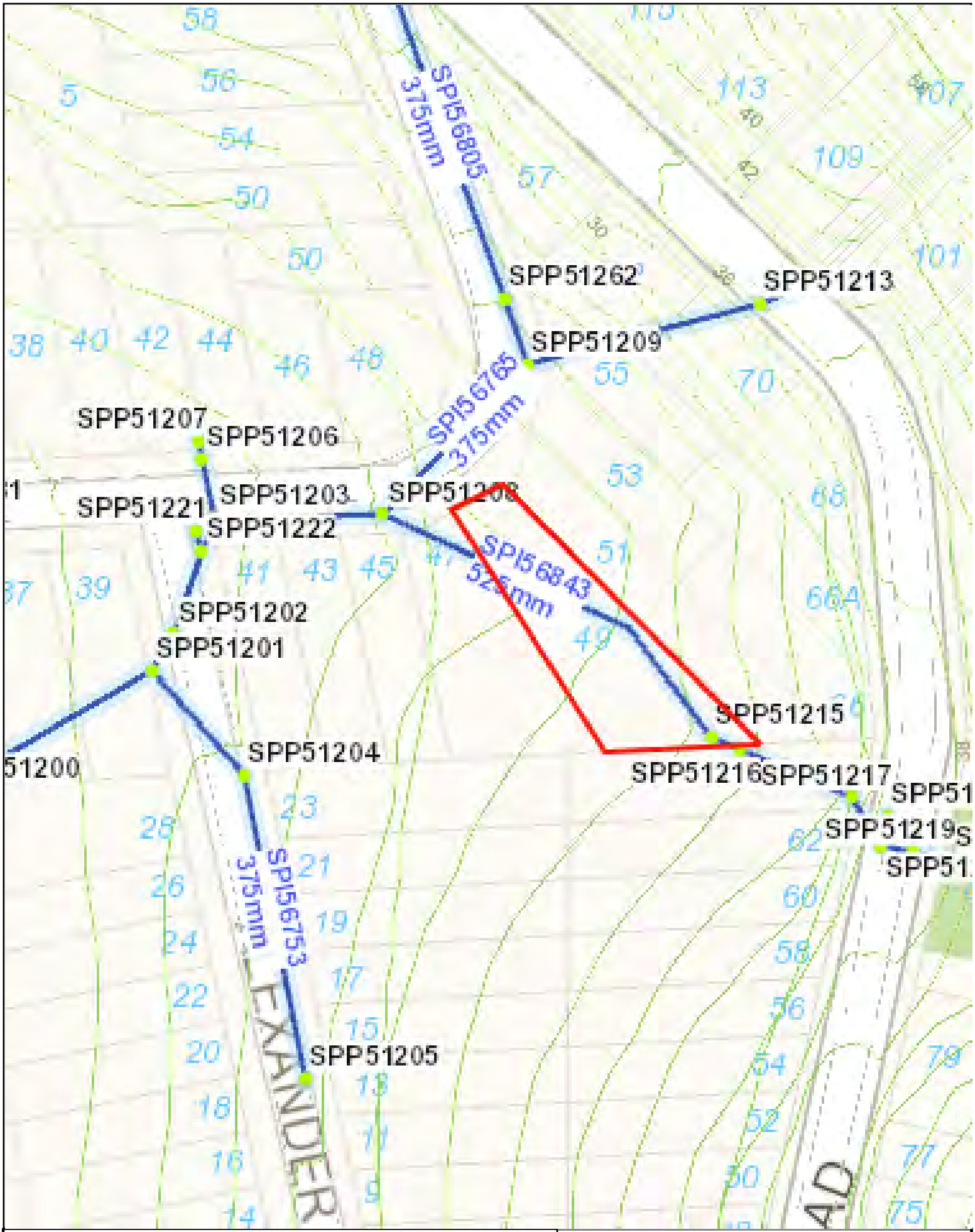
ADDRESS
49 CAREEL HEAD ROAD AVALON BEACH

FINISHES

REVISION
A 20/09/2021 ISSUE FOR DA

APPENDIX D

Northern Beaches Council Stormwater Drainage Map



TITLE: **Northern Beaches Council Drainage Map**	Consulting Engineers STRUCTURAL - CIVIL - STORMWATER - REMEDIAL ... STRUCTURALLY SOUND
FIGURE: 14	ISSUE: A