18 November 2024

Northern Beaches Council
PO Box 82
Manly NSW 1655

Dear Sir/Madame

RE: FLOOD RISK MANAGEMENT REPORT
2A ALLEN AVENUE, BILGOLA BEACH NSW 2107

Partridge have been instructed to undertake a Flood Risk Assessment for the above property. The following sections provide an overview of the assessment and set out the site and proposal context.

1. INTRODUCTION

The residential property at the above address is located within the Pittwater Region. As part of the DA application process, a Flood Risk Management Report is requested by the Northern Beaches Council to support the new proposed development.

Partridge have assessed the subject site in relation with the available flood information. This document reviews the impact of flooding, based on: catchment character, flood water extent, velocities and depths, and other relevant elements as per available studies prepared by Northern Beaches Council.

2. REFERENCE DOCUMENTS

- Preliminary DA Plans by Ursino Architects, Ref DA0-00 Rev A, dated 25.10.2024;
- Site Survey by John Lowe and Associated Pty Ltd, Job No 99541 #38524, dated 19.03.2021;
- Northern Beaches Council Water Management for Development Policy 2020;
- 'Pittwater Overland Flow Mapping and Flood Study' by Cardno in 2013;
- 'Avalon To Palm Beach Floodplain Risk Management Study and Plan' by Manly Hydraulics Laboratory in 2017;
- NSW Floodplain Development Manual.

3. SITE DESCRIPTION

The proposed site consists of: a three-storey brick house, above-ground swimming pool, basement garage, concrete driveway, front tennis court and associated landscape areas. Pedestrian and vehicular access are from Allen Avenue (front of the property). Total area of this development is 850.3m². The site is front falling and graded steeply towards Allen Avenue located to the east. The highest surveyed ground level within the site is 16.53m AHD, located near the north-western corner of the site. The lowest surveyed level within

the site is 5.74m AHD, located in the south-eastern corner of the site (along Allen Avenue). Furthermore, Allen Avenue slopes towards the south. Refer to Figure 1 below for the site location and Appendix A for site survey.

Figure 1 – Site Location Map (Six Maps Extract)

4. EXISTING FLOOD BEHAVIOUR

The site is located within the Local Government Area of Northern Beaches Council. Furthermore, it is part of the Pittwater Catchment which spans between Bilgola Beach and Avalon Beach. There are two flood studies covering the subject catchment:

- Pittwater Overland Flow Mapping and Flood Study 2013 by Cardno
- Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017 by Manly Hydraulics Laboratory

Both studies have been assessed and the findings are as follows:

Pittwater Overland Flow Mapping and Flood Study 2013 by Cardno

A flood study for the Pittwater Catchment was prepared by Cardno in 2013, with relevant flood modelling and mapping available as part of this assessment.

The Pittwater catchments is a fully developed urban area, with predominantly single residential dwellings with some local public open grounds and parks. The subject site is located on land zoned as environmental living.

This flood study shows that Allen Avenue is subject to flooding. The extent of flood waters is contained within the width of the road. Modelled depth of flooding does not exceed 300mm above the existing ground level for a 100-year ARI flood.

Existing Surveyed Road Level:	5.47m AHD
Expected Flood Depth for 100-year ARI:	0.30m
Expected Flood Level for 100-year ARI:	5.77m AHD

The subject site is located on Allen Avenue and outside of the flood extent.

Extract of the published flood maps, showing peak floodwater depths for the 100-year Annual Recurrence Interval (ARI) floods and flood affected properties, are presented in Figures 2 and 3 below and Appendix B.

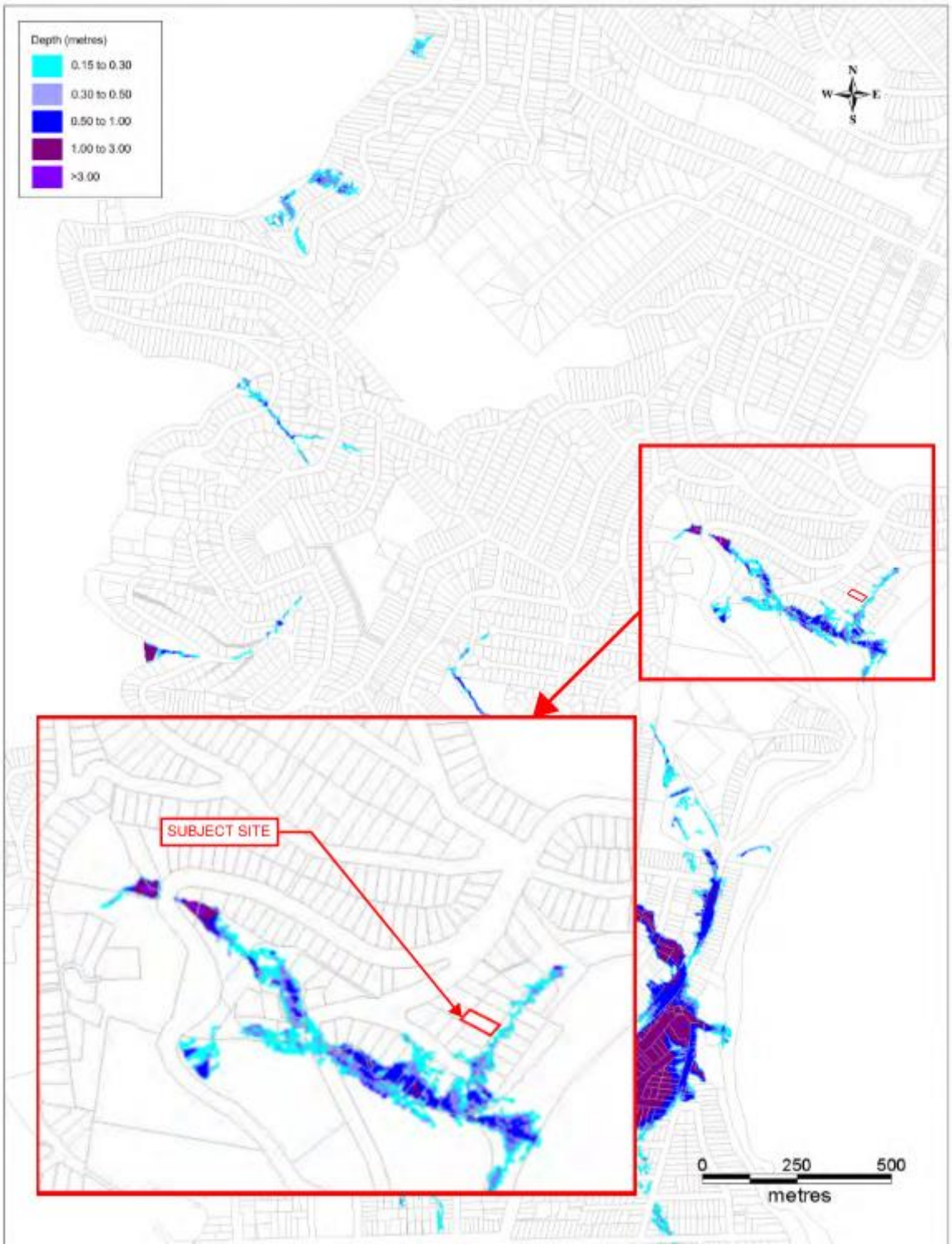


Figure 2 – 100-year ARI Peak Flood Depths (2013 Flood Study Extract)

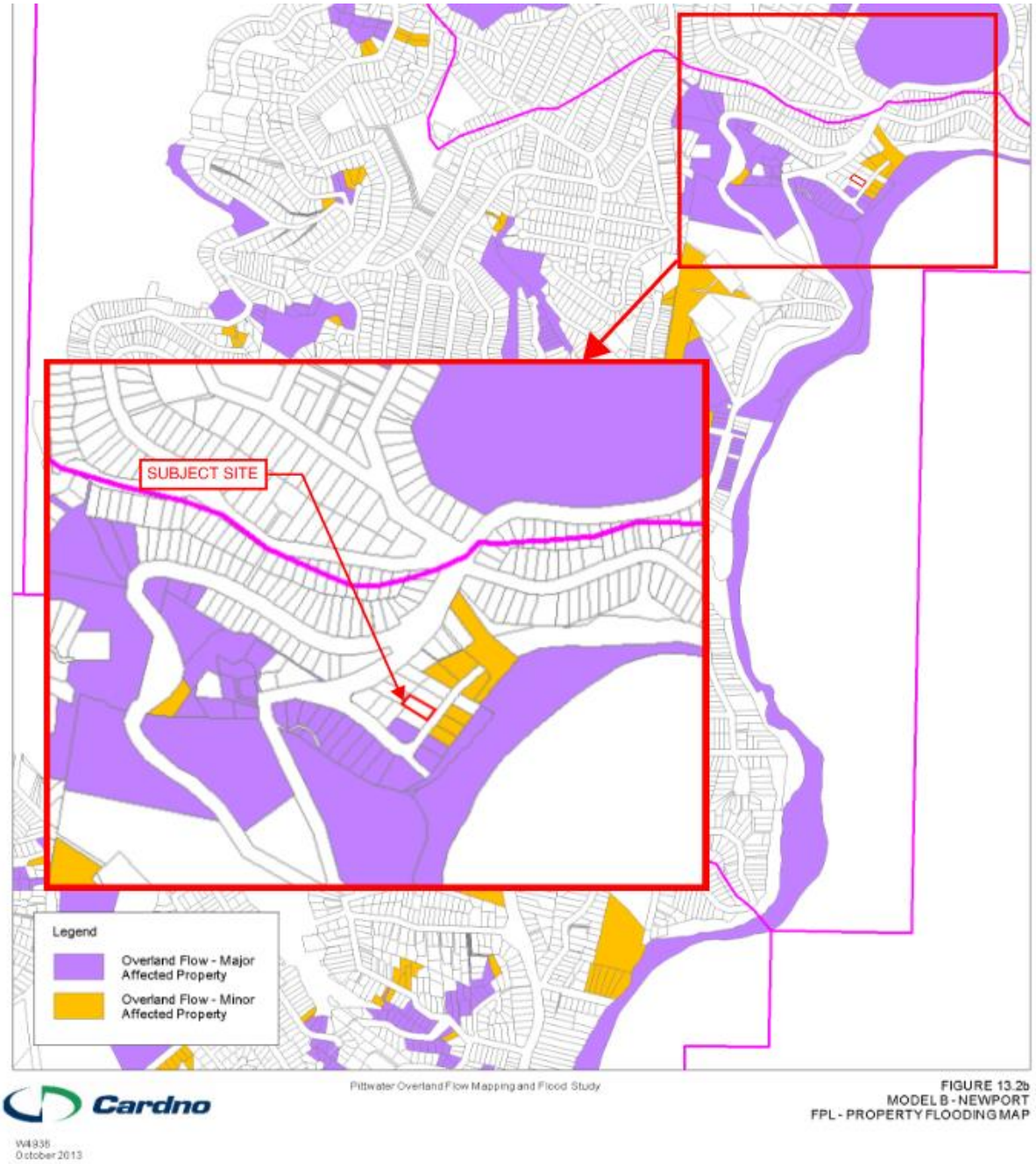


Figure 3 – Property Flooding Map (2013 Flood Study Extract)

Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017 by Manly Hydraulics Laboratory

A flood study for the Avalon to Palm Beach Sub-Catchment was prepared by Manly Hydraulics Laboratory in 2017.

This study indicates, similar to the 2013 report done by Cardno, presence of flood waters with estimated depths of 0.05m-0.15m along Allen Avenue and the subject site boundary.

Existing Surveyed Road Level:	5.47m AHD
Expected Maximum Flood Depth for 100-year ARI:	0.15m
Expected Flood Level for 100-year ARI:	5.62m AHD

The flood maps also show presence of flood waters within the subject site. However, they do not indicate overland flow paths from upstream properties through the subject site. This suggests that flood waters within the site as shown are most likely caused by water backing up from Allen Avenue.

Review of contours of the surrounding catchment, and the site itself, suggests that the results of flood modelling may not be fully accurate. Based on the survey information, the surrounding developments share similar topography and fall steeply towards Allen Avenue. As such, it would be expected that adjacent developments would also experience similar level of flooding, which is not observed on the study maps.

The flood study does not indicate that the adjacent properties along Allen Avenue (#2 and #4B Allen Avenue) experience any inundation. Based on the above, it is possible that a localised error in input data for the flood model has occurred.

Extract of the published flood maps, showing peak floodwater depths for the 100-year Annual Recurrence Interval (ARI) floods and an overlayed contour plan, are presented in Figures 4 and 5 below and Appendix B.

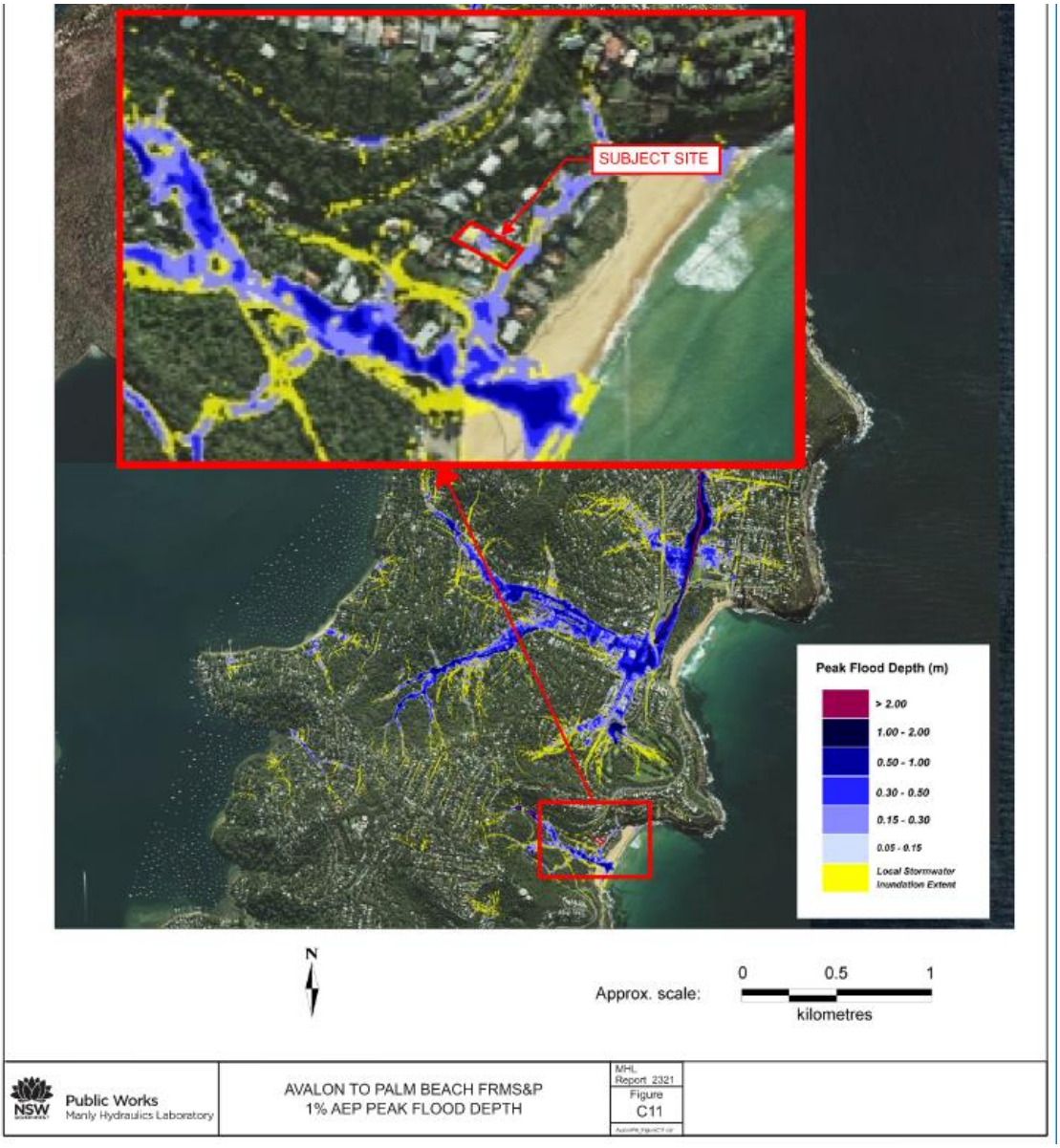


Figure 4 – 100-year ARI Peak Flood Depths (2017 Flood Study Extract)

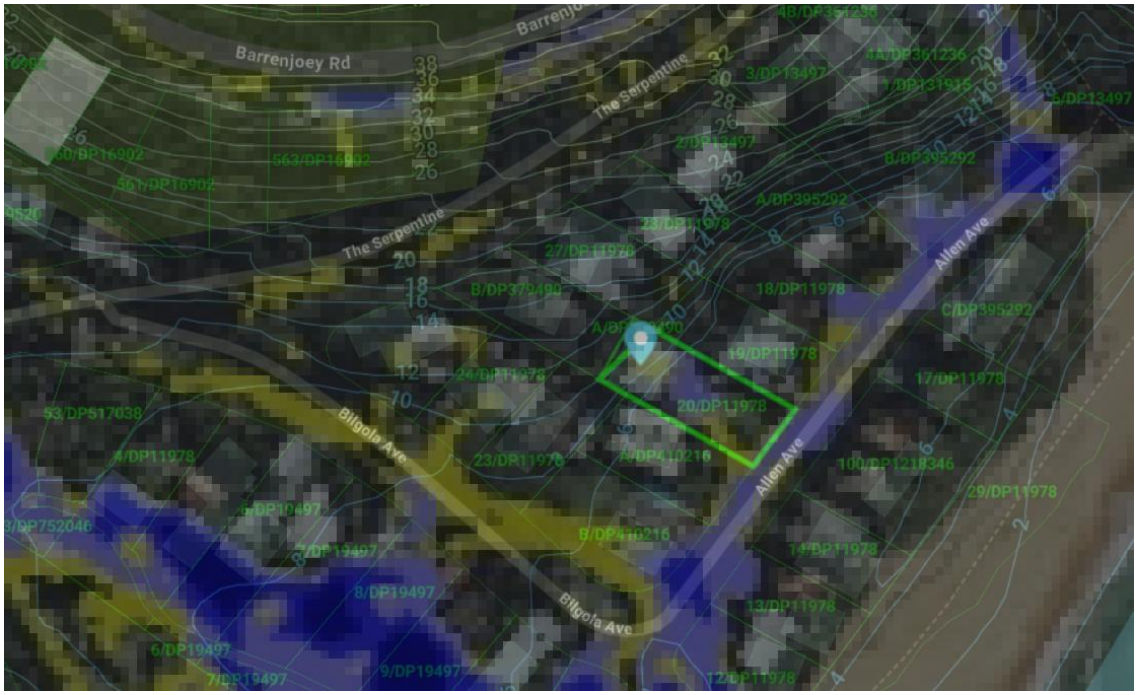


Figure 5 – 100-year ARI Peak Flood Depths with Contours (Extract from 2017 Flood Study with Contour Overlay)

5. PROPOSED DEVELOPMENT

The proposed development of the residential property includes the following:

- Demolition of the existing house and front concrete driveway
- Construction of a three-storey house
- Construction of a new suspended pool and associated landscaping areas
- Existing tennis court to be retained
- New basement with lift access and car parking

Refer to Section 6 for risk management of flooding for the basement level.

6. RISK ANALYSIS AND INTERPRETATION

Based on available flood maps, the expected maximum flood depth for the 100-year ARI is estimated to be 0.3m above existing road level. The gutter on Allen Avenue adjacent to the south-western corner of the subject site, has an existing level of RL 5.47m AHD. Therefore, the maximum peak 100-year ARI flood level is expected to be 5.77m AHD.

Development Type	Minimum Finish Levels
Ground Floor Level (Habitable)	6.985m AHD
Basement Level (Non-Habitable)	3.04m AHD*

The proposed ground floor level (habitable area) is to be a minimum FFL 6.985m AHD which is significantly above the modelled 100-year ARI flood level of 5.77m plus 500mm freeboard (worst case scenario taken from 2013 flood study). Based on the above, no impacts from inundation waters into the new development is expected.

The proposed garage level (non-habitable area) is at FFL 3.04m AHD, which his below the existing road level along Allen Avenue. While the assessment above indicates that the subject site does not likely experience flooding or overland flows, to provide a level of protection against potential inundation, the proposed driveway levels can be reviewed and amended to suit (introduction of a crest to the maximum expected flood level plus 300mm freeboard), subject to Council's advice.

I trust the above summary clarifies Council's query. However, do not hesitate to contact the undersigned if further discussion is required.

Yours faithfully,

Partridge Hydraulic Pty Ltd

Andy Hughes
BSc MSc CEng MICE (Civil)
Associate

APPENDIX A

SURVEY AND PROPOSED DEVELOPMENT PLANS

NOTE: LOT A & LOT 20 WILL NEED TO BE CONSOLIDATED INTO ONE LOT AS SOON AS POSSIBLE TO ALLOW ANY DEVELOPMENT OF THE SITE TO TAKE PLACE.

M.G.A.

RIDGE RL 25.45
MAX RIDGE 26.875
GUTTER 24.05
GUTTER 23.8
DECK RL 21.54
DECKING

MAX RIDGE 23.88
RIDGE RL 21.5
GUTTER 21.34
DECKING TOPRAIL
DECKING RL 18.55

RIDGE 14.11
TWO STOREY WB RESIDENCE METAL ROOF No.4B
HSE No 4B
RIDGE 12.58
WINDOW TOP 11.22 SILL 10.38
WINDOW TOP 11.22 SILL 10.38
WINDOW TOP 11.22 SILL 10.36
WINDOW TOP 11.22 SILL 10.38
GUTTER 11.53
WINDOW TOP 9.5 SILL 7.3
DOOR TOP 8.5
GUTTER 9.24
WINDOW TOP 8.15 SILL 7.3
GUTTER 8.82
GROUND LEVEL 5.95
GUTTER 8.84

118° 28' 00"
5.362
42.671
118° 28' 00"
BRICK & CONCRETE RETAINING WALL
TELSTRA PIT
STREET SIGN
FENCE
METAL SHEET WALL
TIMBER DECK
FFL 9.51
UPPER DECK RL 12.12
METAL AWNING
UPPER DECK RL 12.12
LOWER DECK RL 9.41
LOT A DP 379490 48.63m²
MAX ROOF HT RL16.23
44° 56' 00"
18.917
STEPS
RIDGE 17.15
RIDGE 17.88
TIMBER DECK
TWO STOREY RENDERED RESIDENCE TILE ROOF No.2A
LOWER WALL
EDGE OF DECK
STEPS
TOW 8.81
BRICK & CONCRETE RETAINING WALL + TENNIS COURT FENCE
TREE G 0.4 HT 10.0 SR 2.0
LOT 20 DP 11978 801.75m²
EXISTING TENNIS COURT
TENNIS COURT FENCE
GARDEN
RENDERED BRICK
TREE G 0.6 HT 10.0 SR 2.0
EDGE OF BITUMEN
GFFL 8.54
BALCONY FFL 12.03
TENNIS COURT FENCE
CONCRETE DRIVEWAY
STORM WATER PIT
BM D.H & W RL = 5.47 AHD
FACE OF CONCRETE RETAINING WALL
BRUCH FENCE
ADJOINING SHED
45.72
298° 28' 00"
CHAIN WIRE MESH FENCE
TREE G 0.5 HT 10.0 SR 2.0
GUTTER 11.47
EAVE 11.31
WINDOWS
TOP 8.53 SILL 7.63
TOP 8.55 SILL 7.65
TOP 11.06 SILL 10.33
TOP 11.05 SILL 10.23
TOP 11.3 SILL 10.74
TOP 11.05 SILL 10.31
TOP 11.04 SILL 10.3
GUTTER 11.45
SAFETY RAIL FENCE
GUTTER 8.87
GROUND LEVEL 5.98
HSE No 2
RIDGE 13.62
TWO STOREY RESIDENCE RENDERED + SANDSTONE FFL 8.44 No.2
GROUND LEVEL 5.77

AVENUE
ALLEN

ROOF RL 14.82
ROOF LINE OF HOUSE
ROOF RL 11.94
ROOF RL 11.94
ROOF LINE OF HOUSE

LEGEND:
FFL - FINISH FLOOR LEVEL
RL - REDUCED LEVEL
TOW - TOP OF WALL

TREE:
G - GIRTH
HT - HEIGHT
SR - SPREAD RADIUS

NOTE-DO NOT SCALE OFF THIS PLAN
ALL LEVELS SHOULD BE TAKEN FROM THE BENCHMARK SHOWN ON PLAN
NO BOUNDARY DEFINITION HAS BEEN MADE - THIS PLAN HAS BEEN PREPARED UNDER cl9 OF THE S&S.I. REGULATION 2017.
THE LOCATION OF ANY BUILDINGS OR IMPROVEMENTS SHOWN ARE APPROX ONLY
ONLY VISABLE SERVICES HAVE BEEN LOCATED. NO ATTEMPT HAS BEEN MADE TO LOCATE UNDERGROUND SERVICES

DIAL BEFORE YOU DIG 1100

JOB No : 98789 #38524
CLIENT : WALLHOUSE HOLDINGS
LOCATION : BIGGOLA BEACH
SCALE : 1:150 A1 SHEET

PLOT DATE : 30 APRIL 2020
DATE OF SURVEY : 30 APRIL 2020
DATUM : AHD PM61800 (CLASS E)
DRAWN BY : J.L. & P.S.

2A ALLEN AVENUE
DETAIL SURVEY
LOT A DP 379490
LOT 20 DP 11978

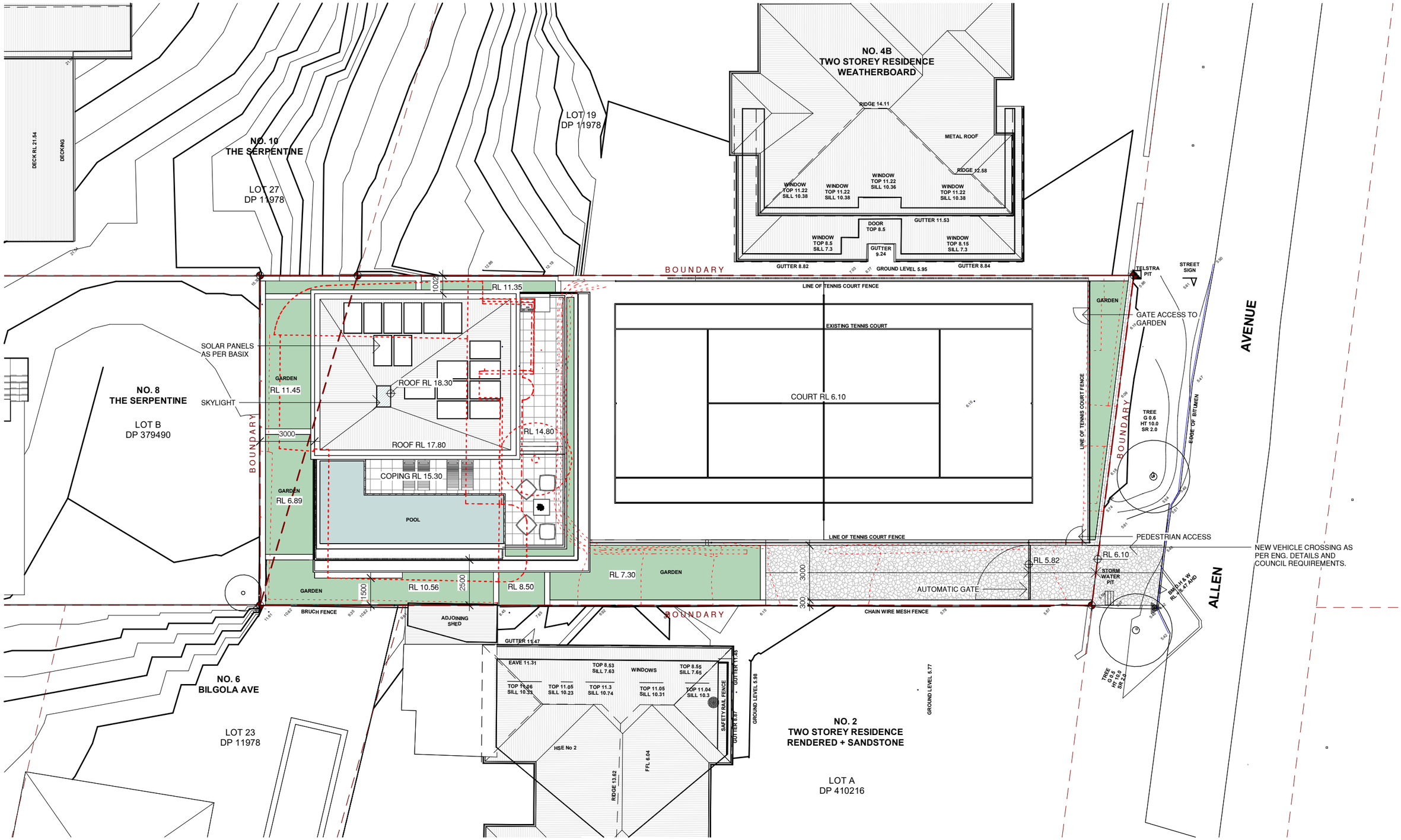
CHECKED BY JOHN LOWE/CANDICE LOWE
REGISTERED SURVEYOR UNDER THE SURVEYING ACT 2002

JOHN LOWE AND ASSOCIATES PTY LTD
CONSULTING LAND AND ENGINEERING SURVEYORS

NARELLAN
1/4 GRAHAMS HILL RD, NARELLAN
PHONE : 9602-4582, 9602-40104
PO BOX 409 NARELLAN NSW 2567
candice@jlsurveys.com.au

TAHMOOR
146 LYREBIRD RD, PHEASANTS NEST
PHONE : 4684-3227
john@jlsurveys.com.au

A.B.N. 76 071 037 959



1 SITE PLAN
1 : 200

Revision:	Revision Description:	Date:	Notes:
A	DA ISSUE - NOT FOR CONSTRUCTION	25.10.2024	Do not scale from this drawing, contractor to check all dimensions on site prior to work commencing. Any discrepancies to be reported to designer. Subcontractors to verify all dimesnions on site before making shop drawings or commencing manufacture

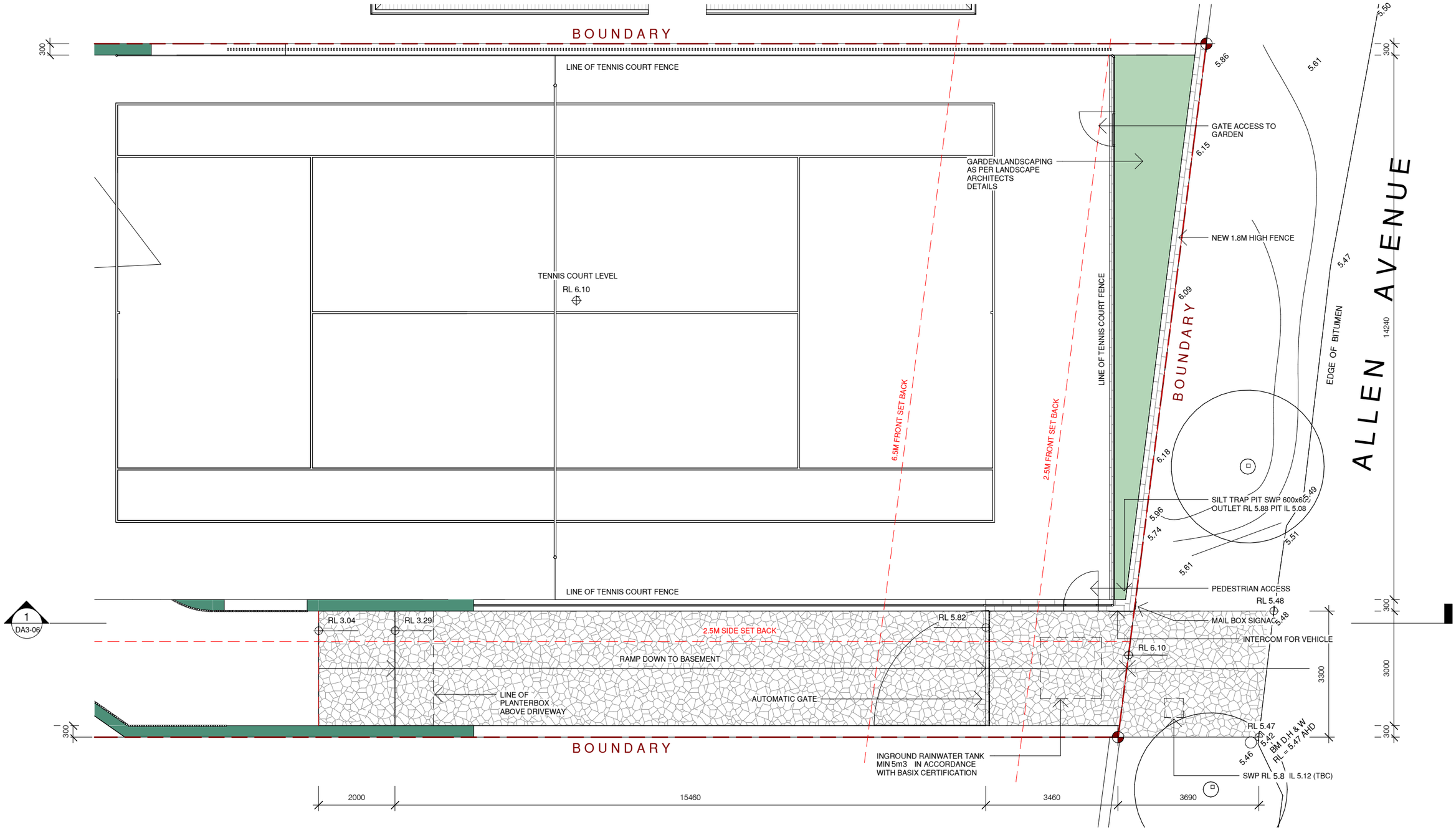
DEVELOPMENT APPLICATION ISSUE
-NOT FOR CONSTRUCTION-

URSINO ARCHITECTS
46 / 99 Moore St
Leichhardt NSW 2040
T 02 8970 2421
E info@ursino.com.au
NOM. ARCHITECT
Robert Ursino 10565

SAOTA
109 Hatfield Street
Gardens, Cape town 8001
T +27 (0)21 468 4400

Project Address: 2A Allen Avenue Bilgola Beach NSW 2107
Project: Wimbledon House
Client: Wimbledon 1963 Pty Ltd

DEVELOPMENT APPLICATION ISSUE
Drawing No: DA0-02
Title: Site Plan
Rev: A



1 DRIVEWAY PLAN

1 : 100

Revision:	Revision Description:	Date:	Notes:
A	DA ISSUE - NOT FOR CONSTRUCTION	25.10.2024	Do not scale from this drawing, contractor to check all dimensions on site prior to work commencing. Any discrepancies to be reported to designer. Subcontractors to verify all dimesnions on site before making shop drawings or commencing manufacture

DEVELOPMENT APPLICATION ISSUE

-NOT FOR CONSTRUCTION-

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46 / 99 Moore St
Leichhardt NSW 2040
T 02 8970 2421
E info@ursino.com.au
NOM. ARCHITECT
Robert Ursino 10565

SAOTA
109 Hatfield Street
Gardens, Cape town 8001
T +27 (0)21 468 4400

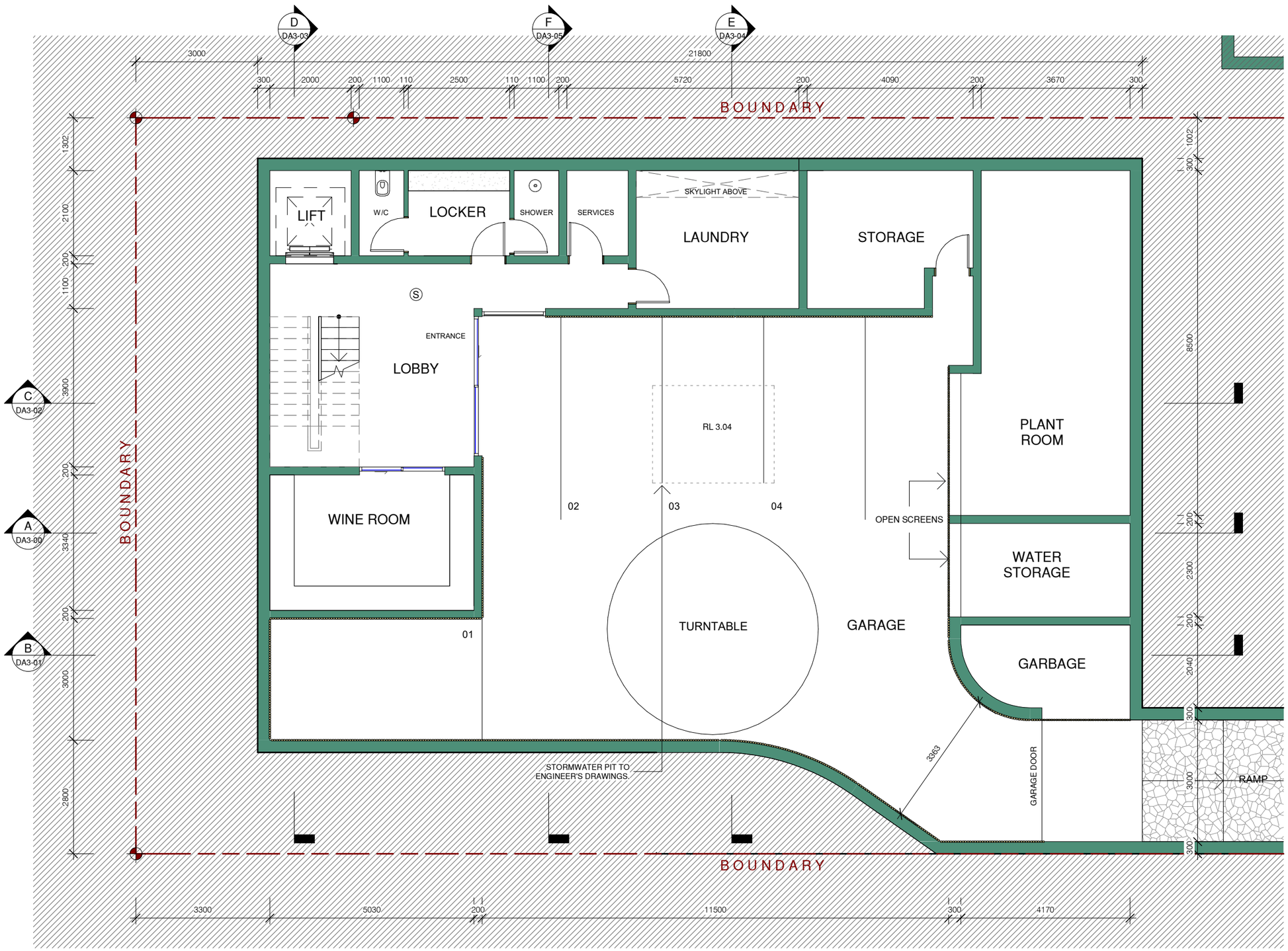
Project Address:	2A Allen Avenue Bilgola Beach NSW 2107
Project:	Wimbledon House
Client:	Wimbledon 1963 Pty Ltd

DEVELOPMENT APPLICATION ISSUE

Drawing No: DA1-01

Title: Driveway Plan

Rev: **A**



1 BASEMENT FLOOR PLAN

1 : 100

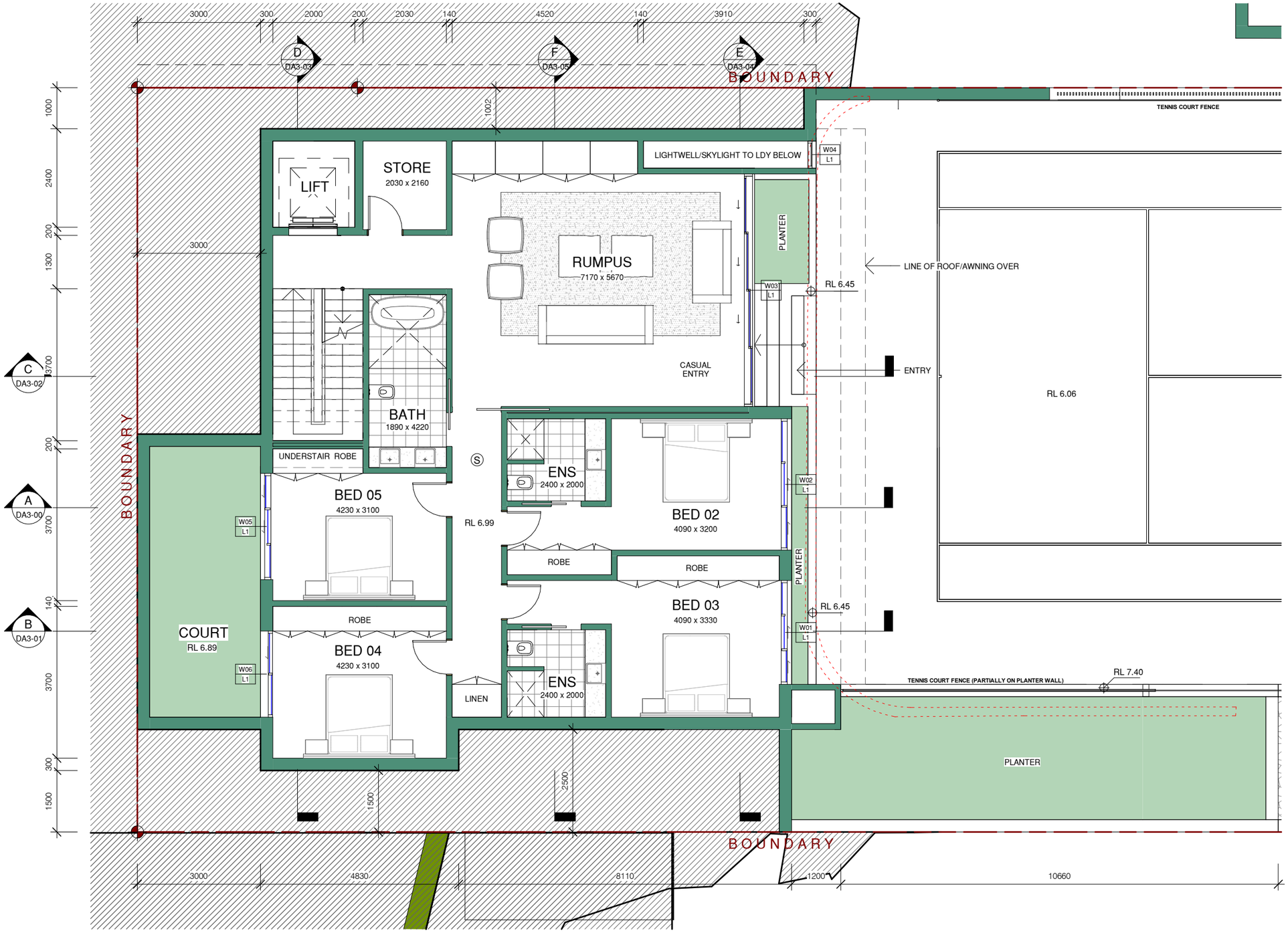
Revision:	Revision Description:	Date:	Notes:				
A	DA ISSUE - NOT FOR CONSTRUCTION	25.10.2024	Do not scale from this drawing, contractor to check all dimensions on site prior to work commencing. Any discrepancies to be reported to designer. Subcontractors to verify all dimesnions on site before making shop drawings or commencing manufacture	DEVELOPMENT APPLICATION ISSUE -NOT FOR CONSTRUCTION-	URSINO ARCHITECTS / SAOTA	46 / 99 Moore St Leichhardt NSW 2040 T 02 8970 2421 E info@ursino.com.au NOM. ARCHITECT Robert Ursino 10565 / 109 Hatfield Street Gardens, Cape town 8001 T +27 (0)21 468 4400	Project Address: 2A Allen Avenue Bilgola Beach NSW 2107 Project: Wimbledon House Client: Wimbledon 1963 Pty Ltd

DEVELOPMENT APPLICATION ISSUE

Drawing No: DA1-02

Title: Basement Plan

Rev: A



1 LEVEL 1 FLOOR PLAN

1 : 100

Revision:	Revision Description:	Date:
A	DA ISSUE - NOT FOR CONSTRUCTION	25.10.2024

Notes:
Do not scale from this drawing, contractor to check all dimensions on site prior to work commencing. Any discrepancies to be reported to designer. Subcontractors to verify all dimesnions on site before making shop drawings or commencing manufacture

DEVELOPMENT APPLICATION ISSUE

-NOT FOR CONSTRUCTION-

URSINO ARCHITECTS
46 / 99 Moore St
Leichhardt NSW 2040
T 02 8970 2421
E info@ursino.com.au
NOM. ARCHITECT
Robert Ursino 10565

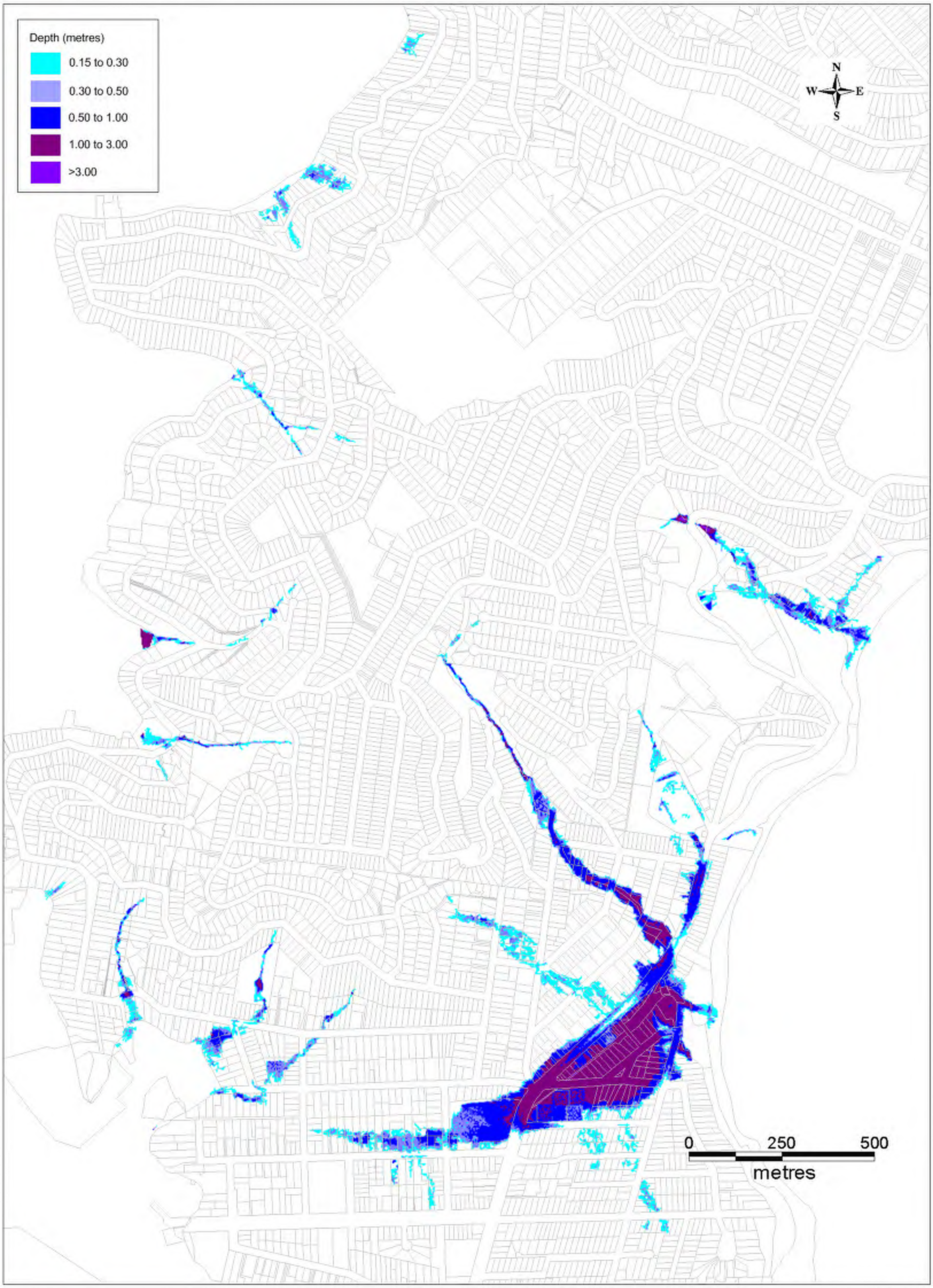
SAOTA
109 Hatfield Street
Gardens, Cape town 8001
T +27 (0)21 468 4400

Project Address: 2A Allen Avenue Bilgola Beach NSW 2107
Project: Wimbledon House
Client: Wimbledon 1963 Pty Ltd

DEVELOPMENT APPLICATION ISSUE
Drawing No: DA1-03
Title: Level 1 Plan
Rev: A

APPENDIX B

CATCHMENT AND ADDITIONAL FLOOD INFORMATION



Cardno

Pittwater Overland Flow Flood Study and Mapping

FIGURE - 7.2b
100yr PEAK DEPTHS - MODEL B (NEWPORT)

W4936
October 2013

N
W E
S

Legend

Overland Flow - Major Affected Property

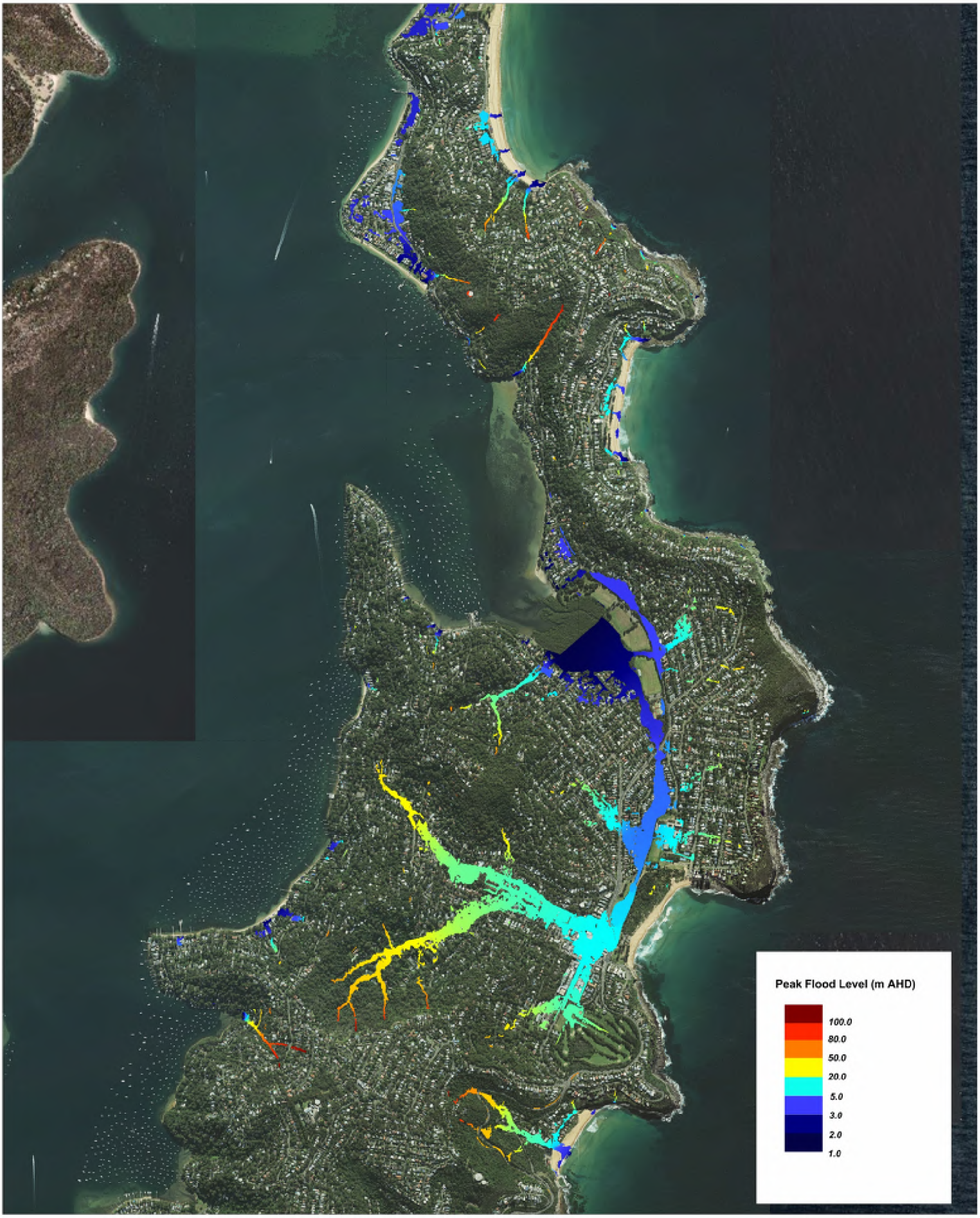
Overland Flow - Minor Affected Property

Pittwater Overland Flow Mapping and Flood Study

FIGURE 13.2b
MODEL B - NEWPORT
FPL - PROPERTY FLOODING MAP

Cardno

W4936
October 2013



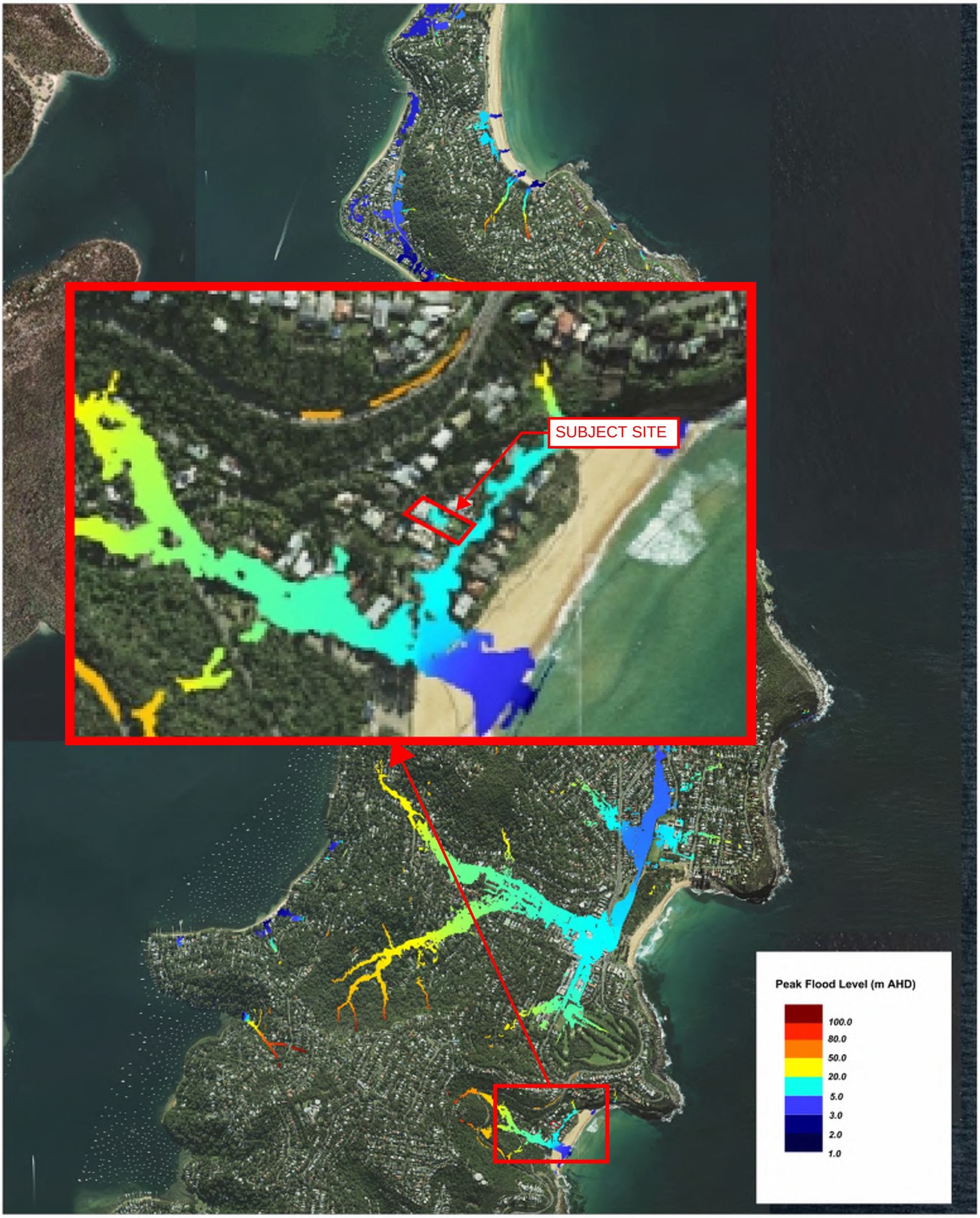
Public Works
Manly Hydraulics Laboratory

AVALON TO PALM BEACH FRMS&P
1% AEP PEAK FLOOD LEVEL

MHL Report 2321

Figure C10

AvalonPB_FigureC10.cdr



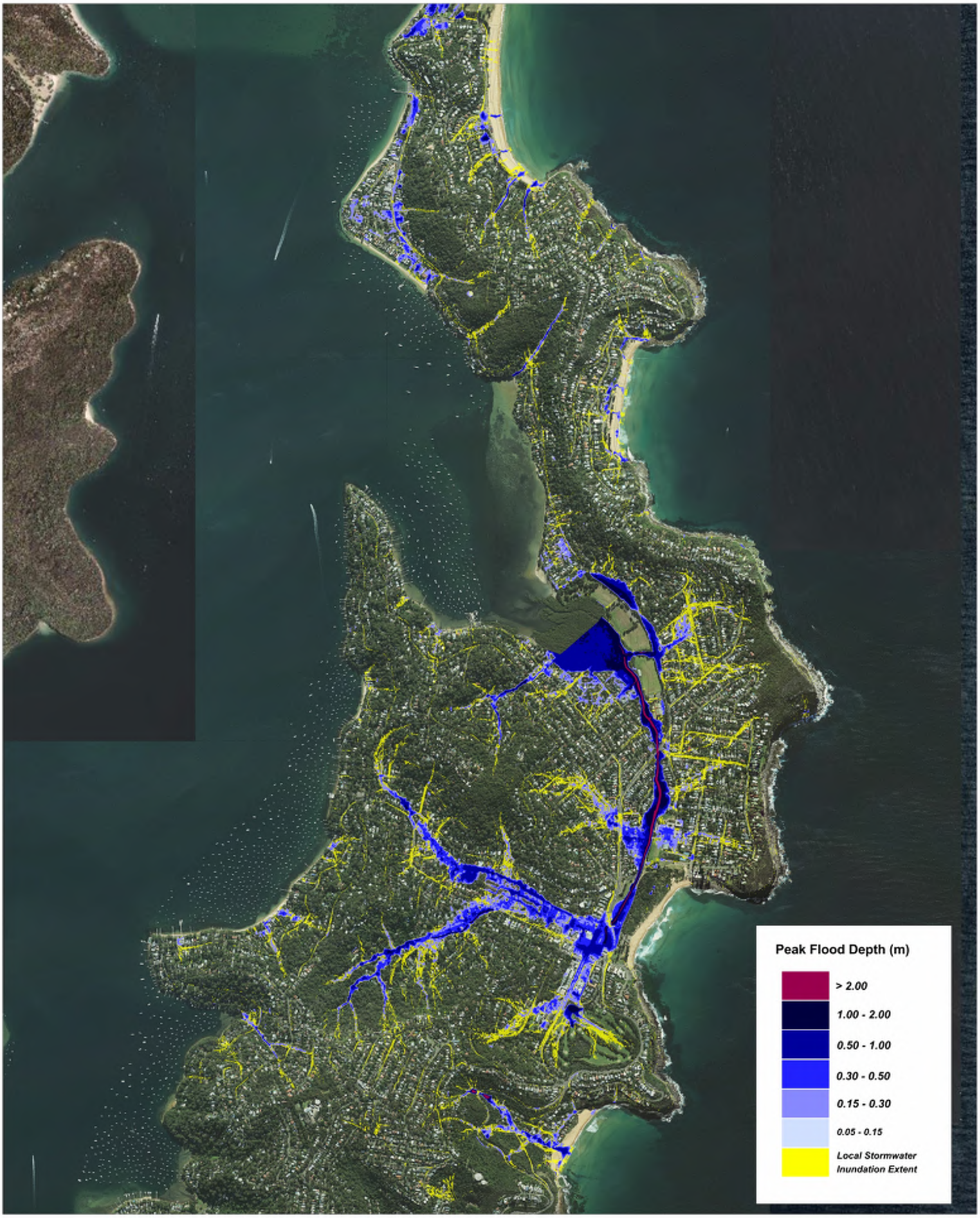
Public Works
Manly Hydraulics Laboratory

AVALON TO PALM BEACH FRMS&P
1% AEP PEAK FLOOD LEVEL

MHL Report 2321

Figure C10

AvalonPB_FigureC10.cdr



Public Works
Manly Hydraulics Laboratory

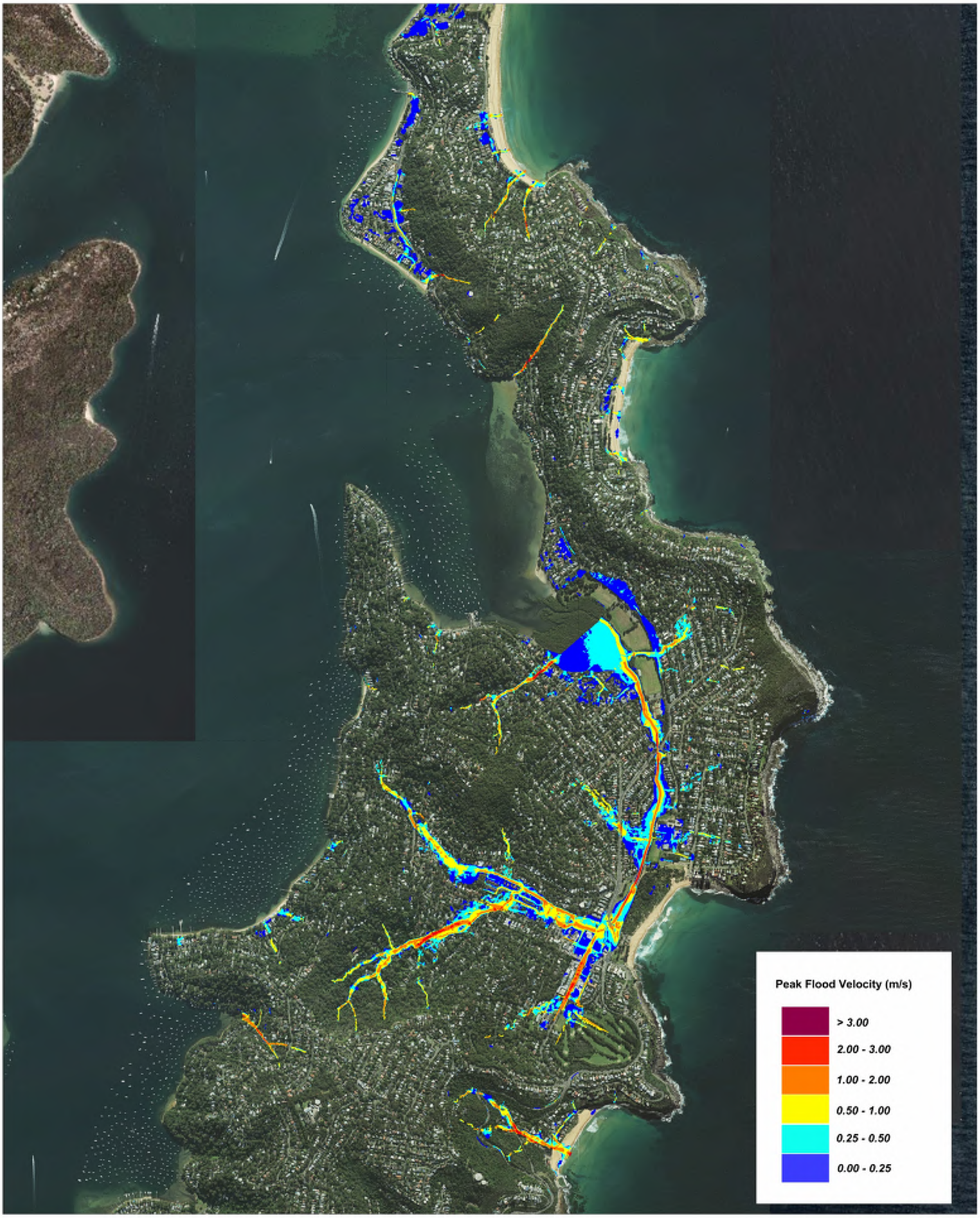
AVALON TO PALM BEACH FRMS&P
1% AEP PEAK FLOOD DEPTH

MHL Report 2321

Figure C11

AvalonPB_FigureC11.cdr

Public Works, Manly Hydraulics Laboratory	AVALON TO PALM BEACH FRMS&P 1% AEP PEAK FLOOD DEPTH	MHL Report 2321 Figure C11 AvalonPB_FigureC11.cdr



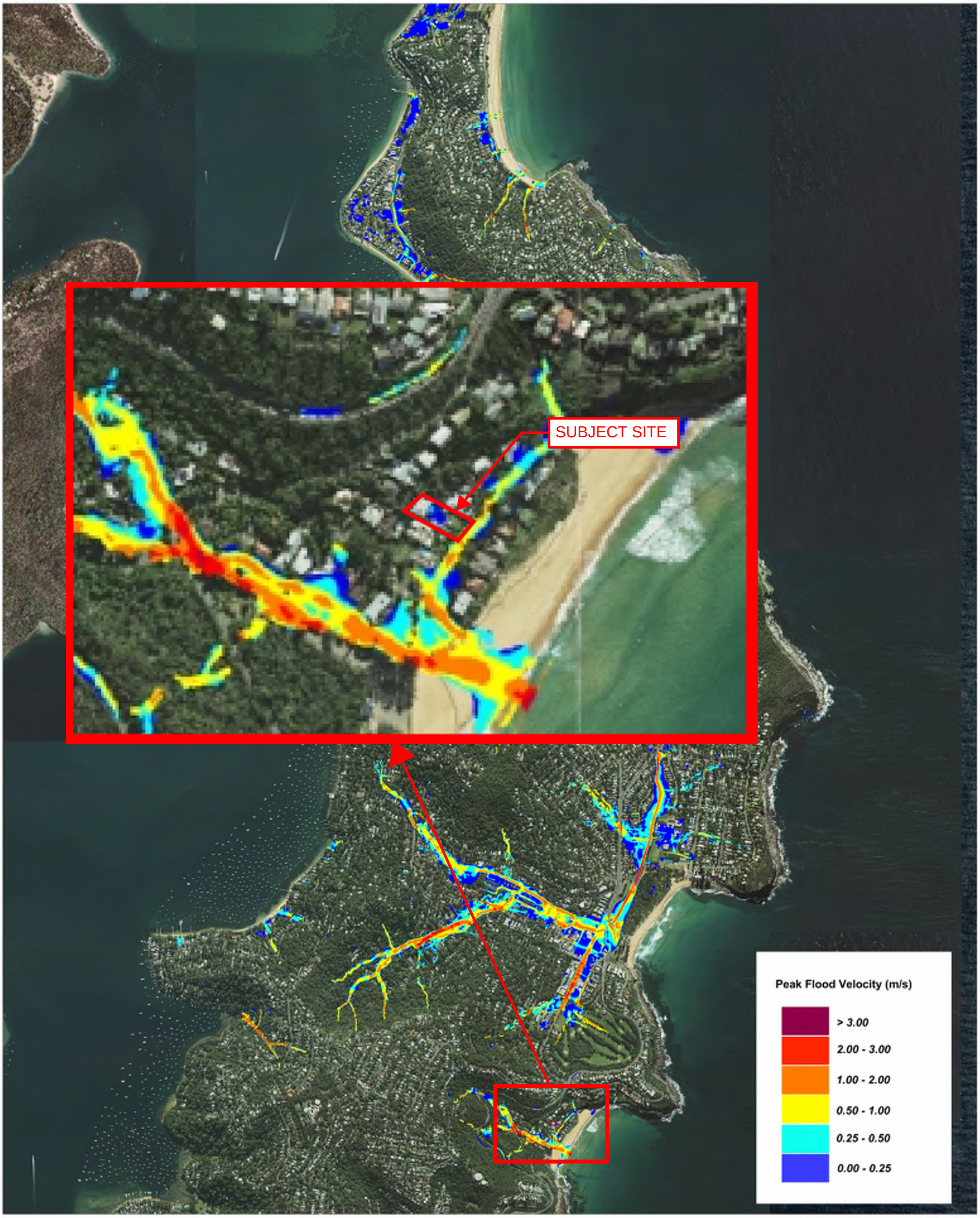
Public Works
Manly Hydraulics Laboratory

AVALON TO PALM BEACH FRMS&P
1% AEP PEAK FLOOD VELOCITY

MHL Report 2321

Figure C12

AvalonPB_FigureC12.cdr



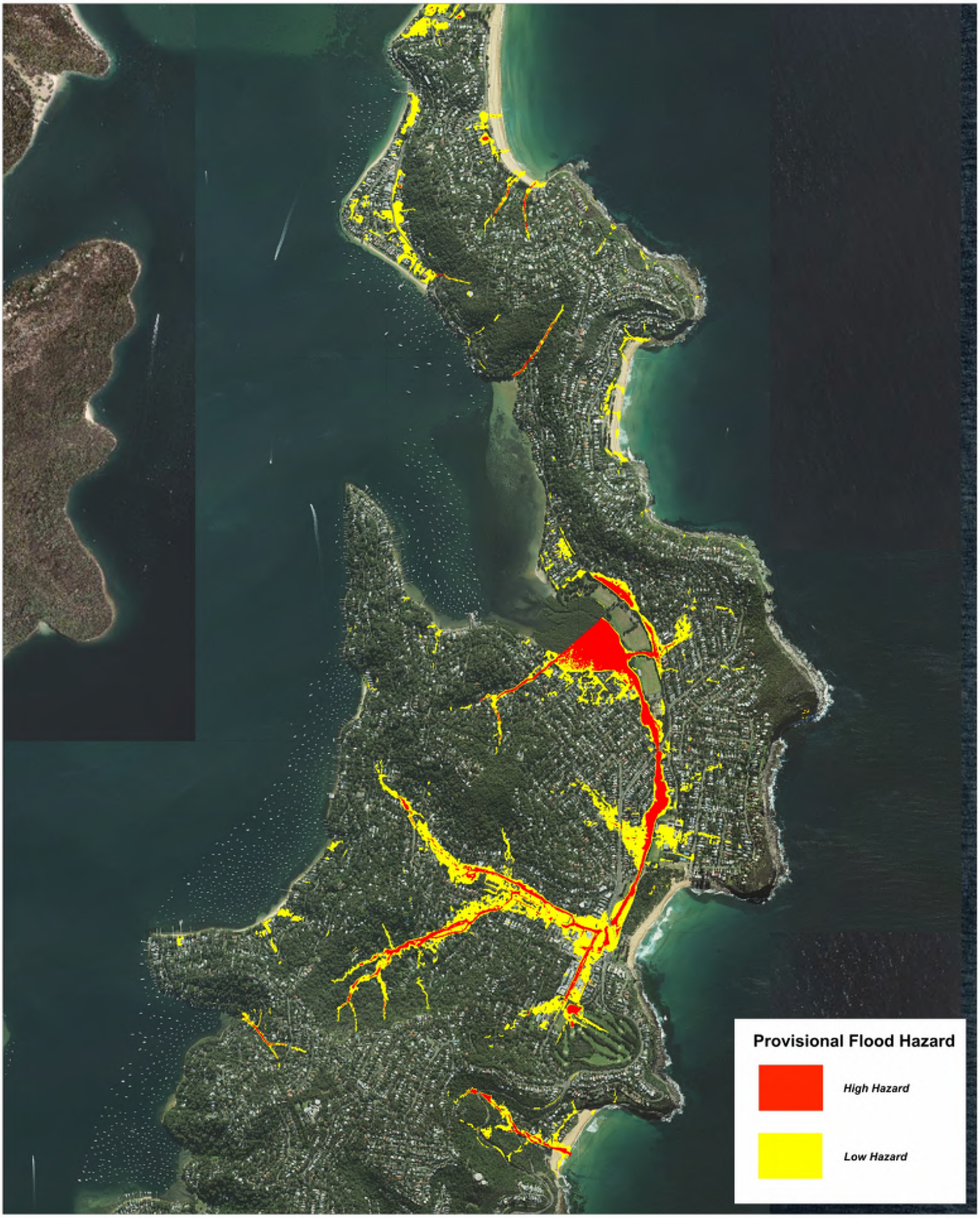
Public Works
Manly Hydraulics Laboratory

AVALON TO PALM BEACH FRMS&P
1% AEP PEAK FLOOD VELOCITY

MHL Report 2321

Figure C12

AvalonPB_FigureC12.cdr



NSW GOVERNMENT Public Works Manly Hydraulics Laboratory	AVALON TO PALM BEACH FRMS&P 1% AEP PROVISIONAL FLOOD HAZARD	MHL Report 2321 Figure C13 AvalonPB_FigureC13.cdr

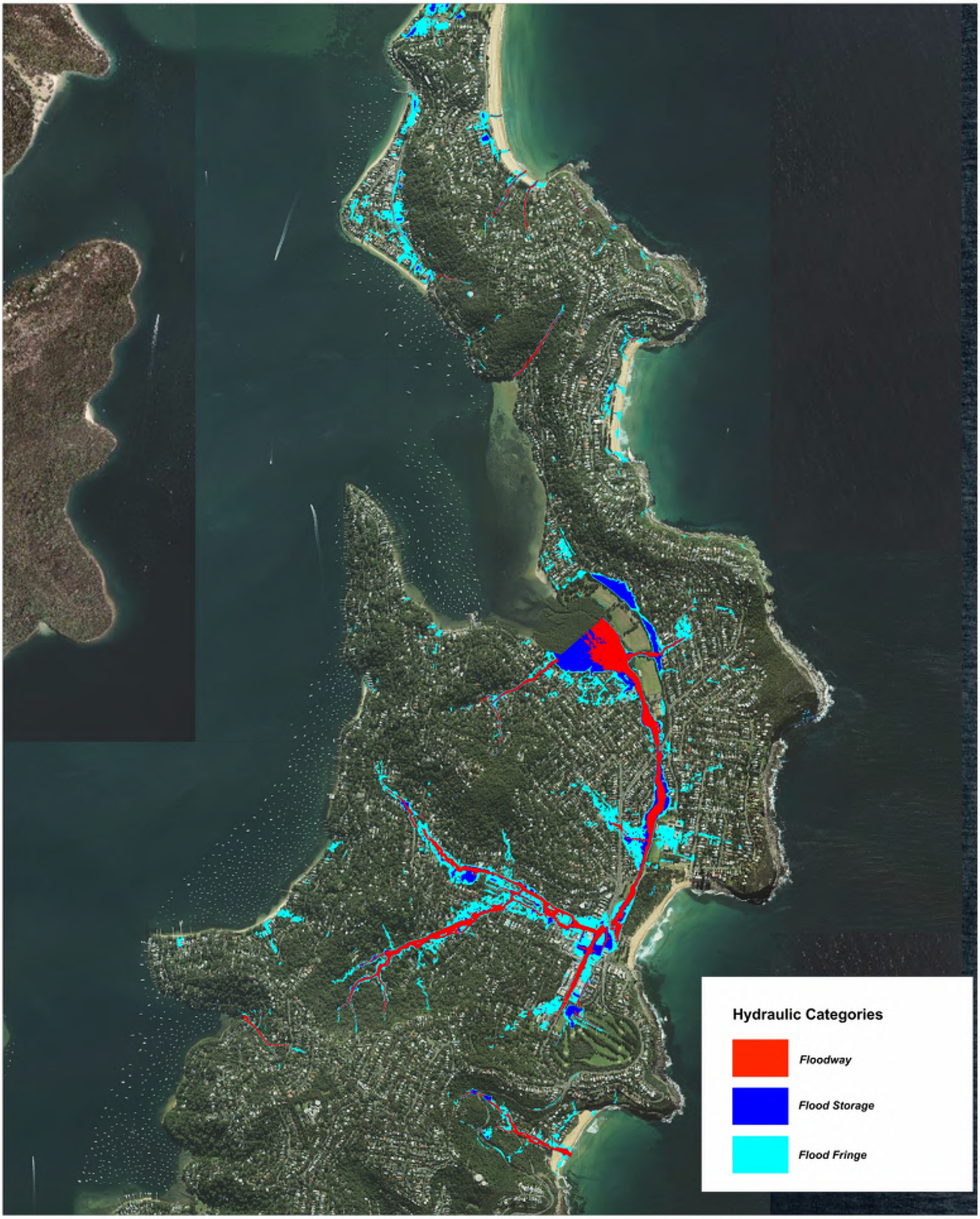
Public Works
Manly Hydraulics Laboratory

AVALON TO PALM BEACH FRMS&P
1% AEP PROVISIONAL FLOOD HAZARD

MHL Report 2321

Figure C13

AvalonPB_FigureC13.cdr



Public Works
Manly Hydraulics Laboratory

AVALON TO PALM BEACH FRMS&P
1% AEP HYDRAULIC CATEGORIES

MHL Report 2321

Figure C14

AvalonPB_FigureC14.cdr

Public Works
Manly Hydraulics Laboratory

AVALON TO PALM BEACH FRMS&P
1% AEP HYDRAULIC CATEGORIES

MHL Report 2321

Figure C14

AvalonPB_FigureC14.cdr