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25 March 2024

M&O enterprises Pty Ltd
Attention: Ms Ashley Rasso
3 Fishburn Place
BEACON PLACE NSW 2100

Dear Madam,

Re: Lot 2 DP1174201, Brookvale Rezoning Application
Flood Impact and Risk Review

As requested, we provide this letter in support of a proposed planning application for rezoning of a 98m2 parcel of land, Lot 2 DP1174201, from RE1 Public Recreation to E4 General Industrial. This letter focuses on flooding and flood conditions related to the proposed rezoning.

The change in zoning is proposed to align the isolated parcel of RE1 land to that of the surrounding E4 General Industrial land. There is currently no development proposed on the land as part of the rezoning. Any future development on this land would be subject to a separate detailed development application and associated assessment. The subject site is shown in **Figure 1** below.

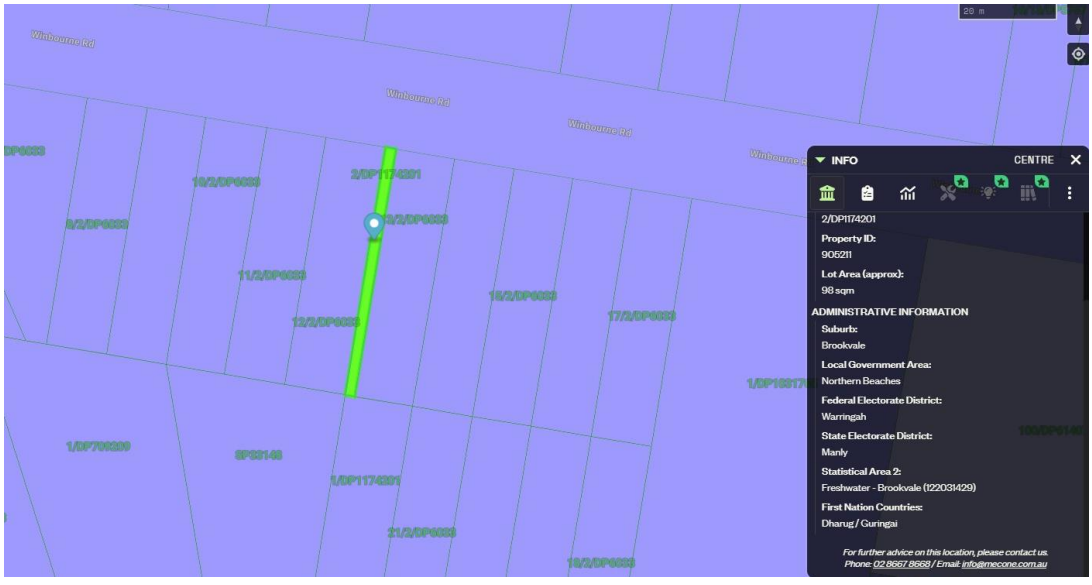


Figure 1. Subject Site & Existing Land Zoning

Existing Site Description

The site is located on the southern side of Winbourne Road, Brookvale. The property is rectangular in shape, being significantly longer than its width (50.28m by 1.83m respectively) as shown in **Figure 2**. The site, although currently owned by Council is being used by the adjoining properties as part of their industrial/ commercial use.

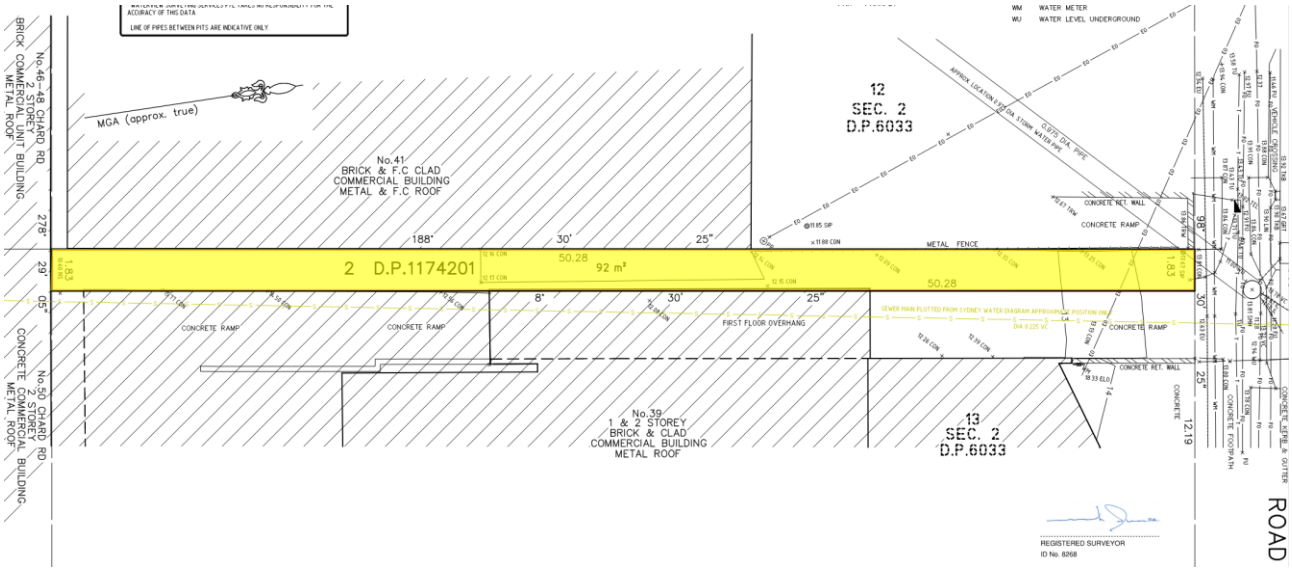


Figure 2. Subject Land Survey (subject site shown highlighted).

The land parcel is noted to fall in a southerly direction away from Winbourne Road. With reference to the detailed survey (Waterview Surveying Services) included in **Enclosure 1** of this letter, and **Figure 3** below, the levels on the norther property boundary (i.e. Winbourne Road verge) is RL 13.86m AHD. The level on the southern boundary is RL 10.6m.

As observed in the highlighted area shown in **Figure 3**, the property is generally concreted and integrated with the adjacent property's driveway and other building improvements. Surface water drainage is collected within existing private drainage systems on adjacent properties. We note that the property continues a further 30-35m beyond the area highlighted and fenced off in **Figure 3**.

Figure 3 shows the parcel of land as photographed from the Winbourne Road footpath.

The site is noted to be slightly encroached by a Council drainage system (925mm RCP on north-east of the site). The council pipe does not have a registered easement over the pipeline system – REFER **Figure 4**. Otherwise, there are no other known services on the land.

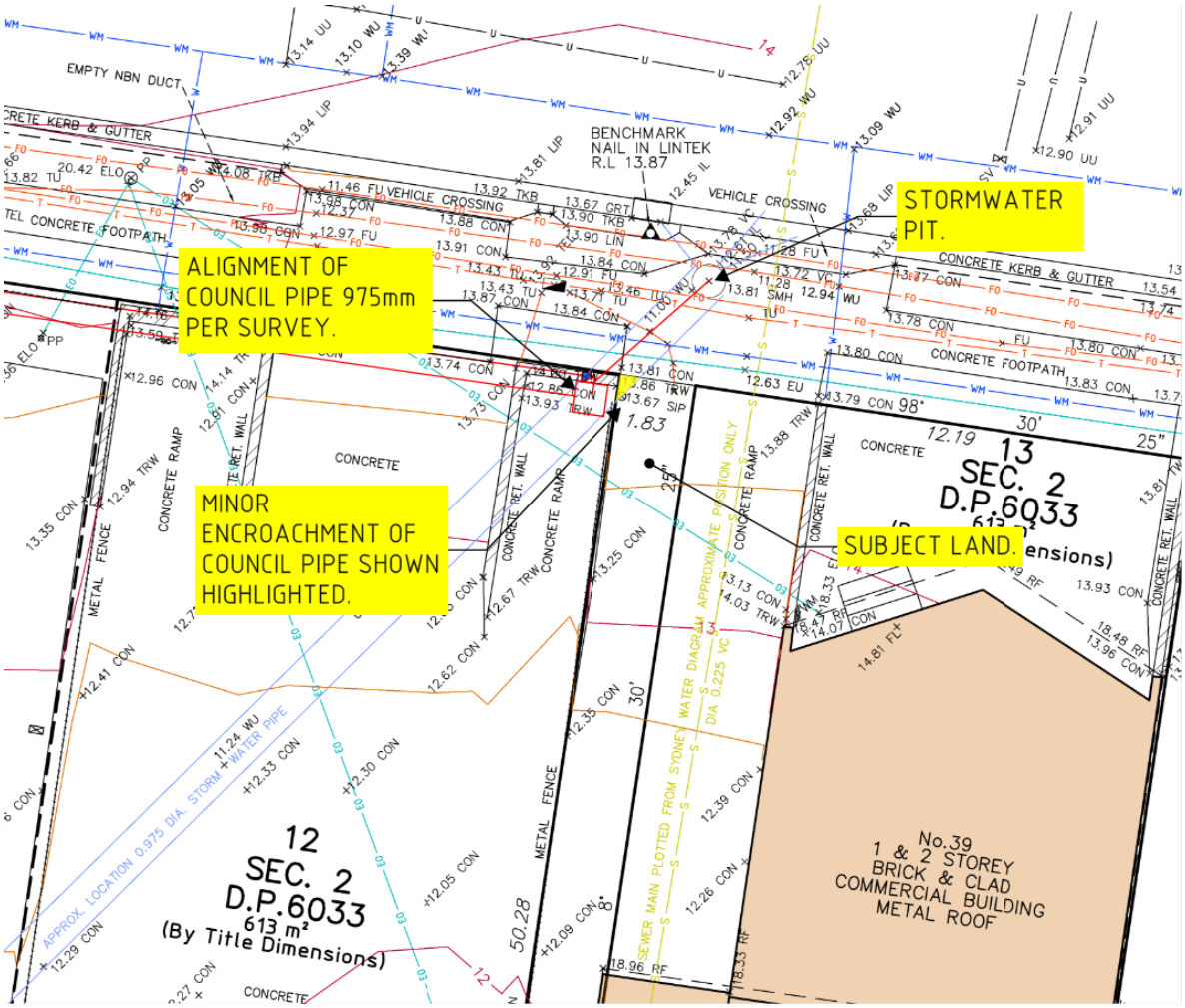


Figure 4. Survey Showing Minor Encroachment of Council Stormwater

Flood Behaviour

The subject site is located within the Greendale Creek Catchment. Northern Beaches recently adopted the *DRAFT Greendale Creek Flood Study 2022* for use in the LGA. The Greendale Creek Study was completed by WMA Water for Northern Beaches Council. Our letter is based on the information included in the noted study, and the flood advise letter dated 14 March 2023 provided by Council and included in **Enclosure 2**.

The site is located in the upper third of the Greendale Creek catchment. Reference to **Enclosure 3** should be made to *Figure D6* of the Greendale Creek Flood Study and approximate location of the subject site and the 1% AEP flood extent and depths for the entire catchment.

Figure 5, derived from the council flood advise in **Enclosure 2,** figuratively shows the 1% AEP flood extent, in addition to tabulated levels and depths for the 5% AEP, the 1% AEP and PMF events. Our interpretation of the flood information shown in **Enclosure 2, 3** and the noted figures, and our site inspection and review of survey show the site is subject to low hazard flooding and overland flows. The flooding on the site is mainly related to overflow from Greendale Creek at the rear of the site, overtopping gutter flows from Winbourne Road at the front and central parts of the site, and likely

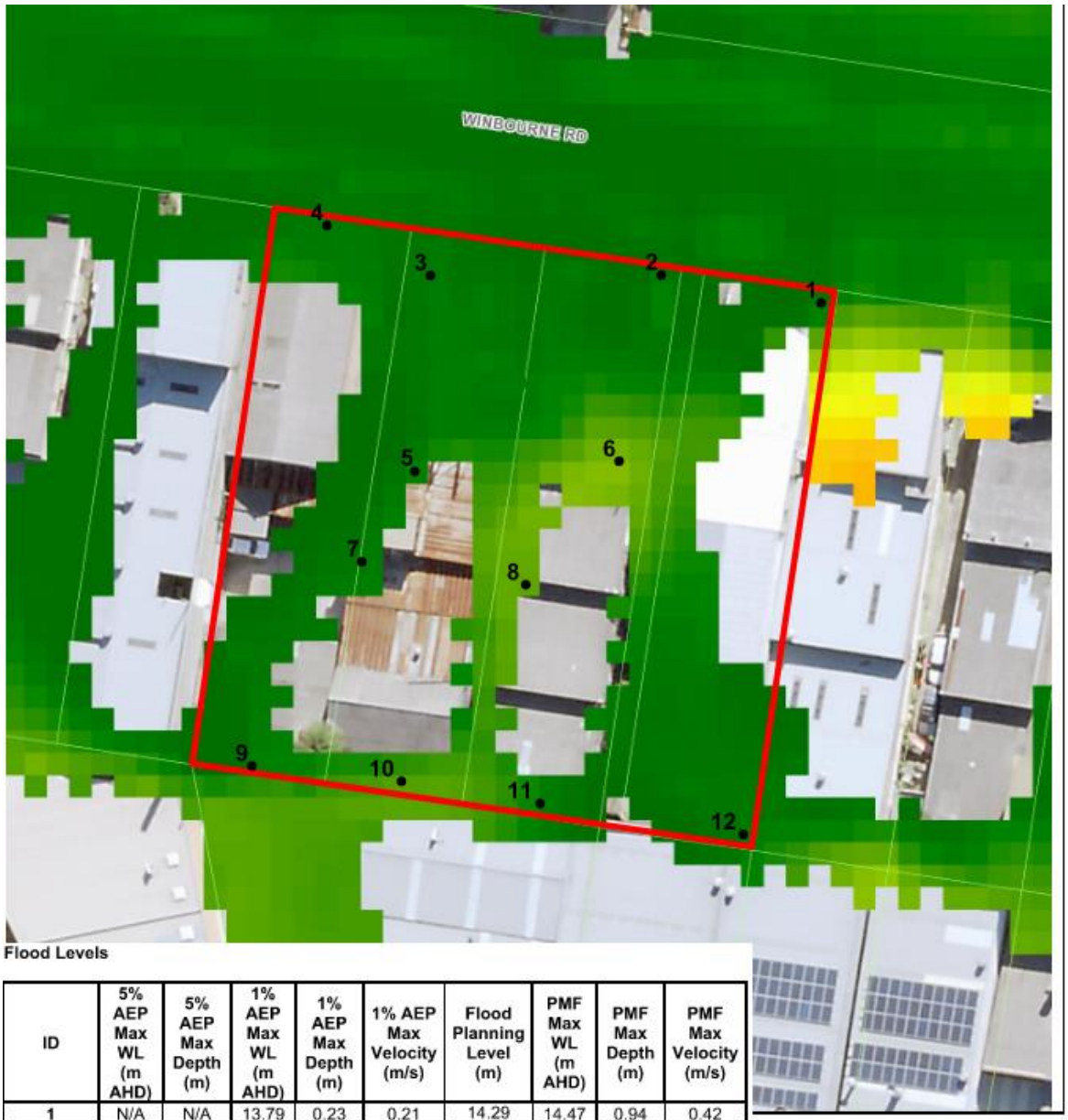
surcharging of inadequate council drainage systems (noting an inter-allotment drainage system is located proximate to the property) also at the front of the property.

Overland flows enter the property from the west and north-west via overtopping flows from Greendale Creek and hydraulic restrictions as the creek crosses Winbourne Road, and then overtopping of the gutter through the site. Further flows enter from the west and south-west along the rear of the property also associated with Greendale Creek.

The tabulated flood information during the 1% AEP event on the property show water depths to be generally in the range of 0.2-0.3m in depth. Locally deeper levels of 0.8m can be seen adjacent to the property at Point 6 which appear to be resultant of hydraulic restrictions around existing building at the base of the local driveway at this point. It would be expected that flood depths on the property nearby to Point 6 would be less than that quoted for Point 6.

Figure 6 shows the flood hazard categorisation for the property. The hazard categorisation shows generally H1 Hazard (safe for small vehicles and pedestrians). There is localised higher categorisation of H2 and H3 which again appear resultant from modelled flows around buildings result in higher high depths and velocity where restricted flow paths are present.

Councils flood risk precinct map (see Map A in **Enclosure 2**) shows the site as being medium risk.



Flood Levels

ID	5% AEP Max WL (m AHD)	5% AEP Max Depth (m)	1% AEP Max WL (m AHD)	1% AEP Max Depth (m)	1% AEP Max Velocity (m/s)	Flood Planning Level (m)	PMF Max WL (m AHD)	PMF Max Depth (m)	PMF Max Velocity (m/s)
1	N/A	N/A	13.79	0.23	0.21	14.29	14.47	0.94	0.42
2	N/A	N/A	13.49	0.22	0.37	13.99	14.02	0.67	1.26
3	N/A	N/A	13.54	0.16	0.47	14.04	13.62	0.39	0.78
4	N/A	N/A	14.13	0.17	0.30	14.63	14.38	0.42	0.42
5	N/A	N/A	12.45	0.23	0.21	12.95	13.44	1.22	0.70
6	N/A	N/A	12.37	0.80	0.22	12.87	13.57	2.00	0.34
7	N/A	N/A	12.35	0.19	0.12	12.85	13.29	1.10	0.55
8	N/A	N/A	12.27	0.58	0.32	12.77	13.41	1.72	0.60
9	N/A	N/A	11.70	0.21	0.19	12.20	13.00	1.45	0.88
10	N/A	N/A	11.63	0.53	0.43	12.13	12.95	1.85	0.50
11	N/A	N/A	11.72	0.28	0.06	12.22	12.95	1.40	0.39
12	N/A	N/A	11.13	0.21	0.34	11.63	12.82	1.90	0.70

s/extents (Source: Draft Greendale
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Figure 5. 1% AEP Flood Extent and Tabulated flood Depths

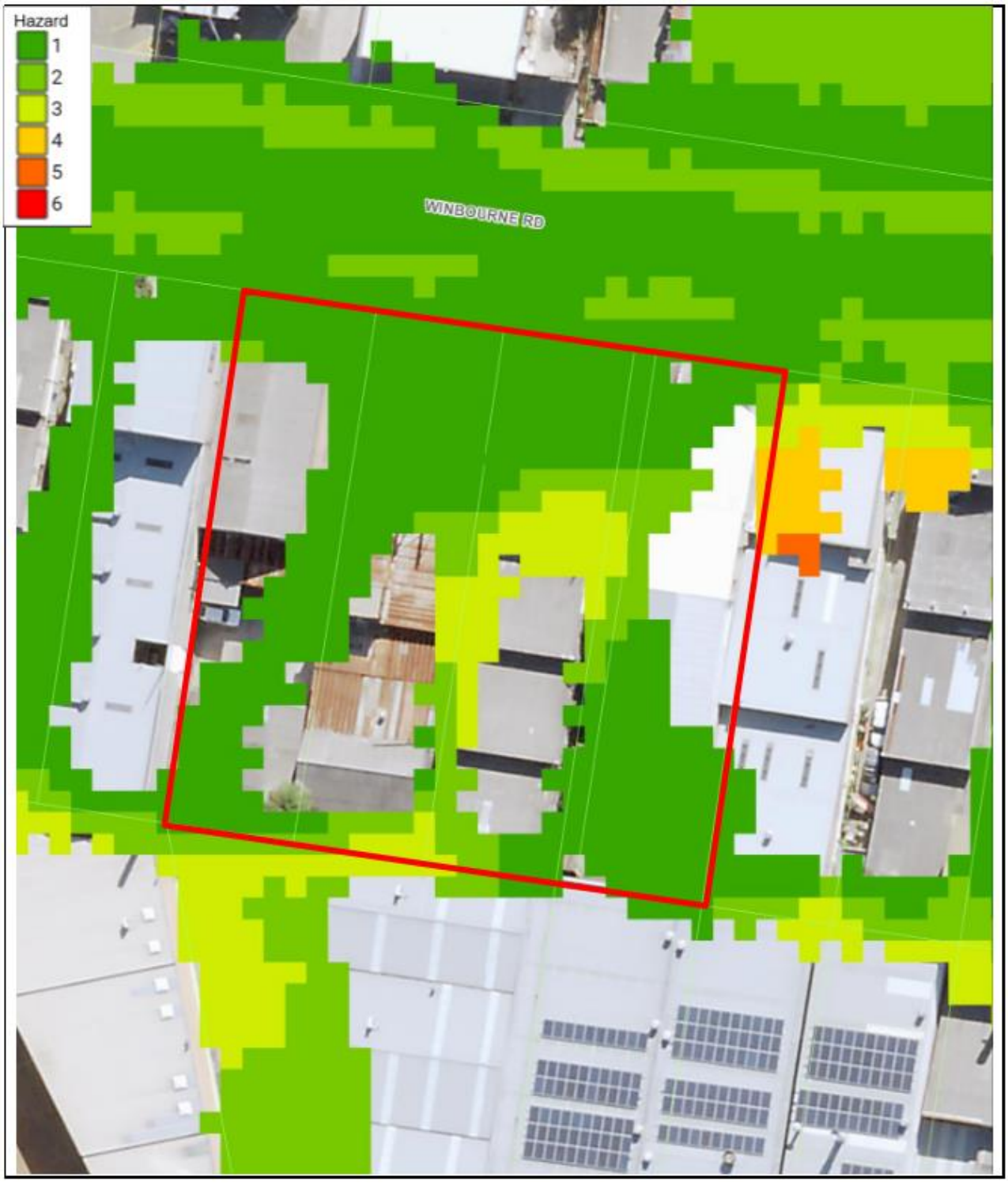


Figure 6. Hazard Categorisation

Impact Assessment and DCP Compliance Summary

The site is noted to fall within the boundaries of the Warringah LEP, and as such the relevant controls relating to flooding are included in the *Warringah DCP2011 – E11 Flood Prone Land*.

A summary of the compliance for each category of the DCP as required of Northern Beaches for a medium risk (per Council flood Map A) and relevant controls included in **Enclosure 4** of this letter.

Table 1. Summary of DCP Categories

	Item & Medium risk Controls	**Comment**	**Compliance (NA/Y/N)**
A	Flood effects caused by Development. A1 & A2	No development is proposed as part of the rezoning. Any future development, post rezoning, would require a detailed FIRA with pre and post development flood modelling to be undertaken which confirm no adverse effect or loss of flood storage.	NA
B	Building Components & Structural Soundness. B1, B2 & B3	No buildings are present or proposed on the land. Any future development, post rezoning, would require construction with flood compatible material which would be able to withstand forces from floodwater and debris in accordance with the DCP requirements for Controls B1 to B3 shown in **Enclosure 4**.	NA
C	Floor Levels C1, C3, C4, C6 & C7	No development or building works are proposed on the land. Any future development, post rezoning, would require building floor levels to be defined based on achieving the flood planning levels in accordance with the DCP requirements for the noted controls.	NA
D	Car parking D1	Car parking is not proposed on the land.	NA

	Item & Medium risk Controls	Comment	Compliance (NA/Y/N)
E	Emergency Response E1	No change to existing conditions, including number of persons on the land, are proposed as part of the rezoning. Any future development which would change the number of persons on the land, post rezoning, would require a detailed flood emergency response plan to be prepared in accordance with the DCP and NSW Floodplain Development Manuel 2023 requirements.	NA
F	Fencing F1	No fencing is proposed as part of the rezoning application.	NA
G	Storage of Goods G1	Storage of goods are not proposed on the land	NA
H	Pools H1	No pools are present or proposed on the subject land.	NA

Conclusion

This letter is provided in support of a planning application for an isolated parcel of land to be rezoned to be consistent with the surrounding land zoning, discussing flood behaviour and flood controls for the land. There is no development being proposed as part of the rezoning of the land.

Review of the relevant flood controls and existing flood risks shows that the land can be rezoned, noting the site is generally subject to low hazard flooding and overland flows, mainly related to overflow from Greendale Creek at the rear of the site, overtopping gutter flows from Winbourne Road, and likely inadequate council drainage systems (noting an inter-allotment drainage system is located proximate to the property).

Any future development of this land would be subject to a development application and development specific FIRA which would need to include detailed flood modelling and confirmation of all the relevant controls in the DCP, as outlined in the Warringah DCP2011 E11.

We trust the information included in this letter meets your current needs. Please contact the undersigned if any further clarification is required.

This letter has been prepared by Costin Roe Consulting, a civil and structural engineering consultancy firm who specialises in stormwater and flood management assessments. Costin Roe Consulting has been an industry recognised specialist for 35years, and the report author has over 20years experience in stormwater and flooding assessments, is a member of the Institute of Engineers Australian and registered on the NER.

Yours faithfully,
COSTIN ROE CONSULTING PTY LTD

MARK WILSON MIEAust CPEng NER
Director

Encl.
1. Site Survey (Waterview Surveying Services 11 March 2024)
2. Council Flood Information Report – Comprehensive dated 14 March 2023
3. Figure D6 of the *Greendale Creek Flood Study 2022*
***4.* DCP E11 Summary and Controls**

ENCLOSURE 1.

SITE SURVEY (WATERVIEW SURVEYING SERVICES 11 March 2024)

SERVICE LINES SHOWN HEREON HAVE BEEN PLOTTED USING A COMBINATION OF ABOVE GROUND SERVICE TRACING METHODS AND SERVICE DIAGRAMS SUPPLIED BY THE RELEVANT SERVICE AUTHORITIES. GIVEN THIS, SHOULD ANY CONSTRUCTION BE CONTEMPLATED IN THE AREA SURVEYED THEN CONFIRMATION OF THESE SERVICE LINES MUST BE UNDERTAKEN BY POTHOLING METHODS PRIOR TO DETAILED DESIGN AND CONSTRUCTION. CONTRACTORS SHOULD UNDERTAKE THEIR OWN SERVICES SEARCH AND CONTACT THE RELEVANT AUTHORITIES PRIOR TO EXCAVATION.

WHILST EVERY EFFORT HAS BEEN UNDERTAKEN TO IDENTIFY THE SERVICE UTILITIES IN THE SURVEYED AREA, DUE TO SOME SERVICES BEING UNTRACEABLE BY ABOVE GROUND METHODS, POTHOLING MUST BE UNDERTAKEN TO IDENTIFY THE EXACT LOCATION OF SERVICES PRIOR TO DETAILED DESIGN AND CONSTRUCTION.

· SERVICES SHOWN WERE LOCATED BY 'SURE SEARCH' AND THIS PLAN SHOULD BE READ IN CONJUNTION WITH SERVICES REPORT - DOCUMENT No. 000365, DATED 25/07/17,ISSUED BY SURE SEARCH.

REDUCED LEVELS SHOWN ARE APPROXIMATE ONLY

· WATERVIEW SURVEYING SERVICES P/L TAKES NO RESPONSIBILITY FOR THE ACCURACY OF THIS DATA

· LINE OF PIPES BETWEEN PITS ARE INDICATIVE ONLY.

LEGEND: (SEE NOTES)

- EO = ELECTRICITY LINES (OVERHEAD)
- EU = ELECTRICITY LINE (UNDERGROUND)
- FO = FIBRE OPTIC LINE (UNDERGROUND)
- S = SEWER LINE (UNDERGROUND)
- SW = STORMWATER LINE (UNDERGROUND)
- T = TELSTRA LINES (UNDERGROUND)
- U = UNKNOWN SERVICE (UNDERGROUND)
- WM = WATER BULK SUPPLY MAIN (UNDERGROUND)

LEGEND

AW	AWNING
CL	CENTERLINE
CON	CONCRETE
DS	DOOR SILL LEVEL
EAVE	EAVE
ELO	ELECTRICITY OVERHEAD
EU	ELECTRICITY LEVEL UNDERGROUND
FL	FLOOR LEVEL
FU	FIBRE OPTIC LEVEL UNDERGROUND
GF	GUTTER FLOW
GRT	GRATE
HYD	HYDRANT
	INVERT LEVEL
LIN	LINTEL
LIP	KERB LIP
PAR	PARAPET
PP	POWER POLE NETWORK
RF	ROOF
RR	ROOF RIDGE
SIP	SEWER INSPECTION PIT
SMH	SEWER MAN HOLE
SV	STOP VALVE
TEL	TELSTRA
TG	TOP OF GUTTER
TKB	TOP OF KERB
TR	TREE-DIA,SPREAD,HEIGHT
TRW	TOP OF RETAINING WALL
TU	TELSTRA LEVEL UNDERGROUND
TW	TOP OF WALL
TXT	TEXTA MARK
UU	UNKNOWN UNDERGROUND
VC	VEHICLE CROSSING
WM	WATER METER
WU	WATER LEVEL UNDERGROUND

MGA (approx. true)

MGA (approx. true)

WINBOURNE ROAD

No.46-48 CHARD RD
2 STOREY
BRICK COMMERCIAL UNIT BUILDING
METAL ROOF

No.41
BRICK & F.C CLAD
COMMERCIAL BUILDING
METAL & F.C ROOF

No.50 CHARD RD
2 STOREY
CONCRETE COMMERCIAL BUILDING
METAL ROOF

No.39
1 & 2 STOREY
BRICK & CLAD
COMMERCIAL BUILDING
METAL ROOF

12
SEC. 2
D.P.6033

13
SEC. 2
D.P.6033

2 D.P.1174201

92 m²

278°
29'
05"
188°
30'
25"
98°
8°
30'
25"

1.83
10.60 NS

50.28

12.16 CON
12.17 CON
12.15 CON
12.14 CON
12.09 CON
12.35 CON
13.25 CON
11.85 SIP
11.88 CON
13.67 SIP
12.77 CON
12.50 CON
12.56 CON
12.08 CON
12.26 CON
12.39 CON
13.13 CON
18.33 ELO

APPROX. LOCATION 0.975 DIA. STORM WATER PIPE

0.975 DIA. PIPE

CONCRETE RET. WALL

CONCRETE RAMP

METAL FENCE

CONCRETE RAMP

CONCRETE RAMP

FIRST FLOOR OVERHANG

SEWER MAIN PLOTTED FROM SYDNEY WATER DIAGRAM APPROXIMATE POSITION ONLY
DIA 0.225 VC

CONCRETE RET. WALL

CONCRETE

12.19

VEHICLE CROSSING

CONCRETE FOOTPATH

CONCRETE KERB & GUTTER

ROAD

REGISTERED SURVEYOR
ID No. 8268

Waterview SURVEYING SERVICES

IA Mona Street Mona Vale NSW 2103
ACN 610 583 572
michael@wvsurveying.com.au
0474 843 180

·A FIELD SURVEY OF THE BOUNDARIES HAS BEEN UNDERTAKEN

· IF CONSTRUCTION ON OR NEAR BOUNDARIES IS REQUIRED IT IS RECOMMENDED THAT THE BOUNDARIES OF THE LAND BE MARKED.

· THIS PLAN HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF M & J RASO ENTERPRISES AND O & P CORPORATION P/L

· RELATIONSHIP OF IMPROVEMENTS TO BOUNDARIES IS DIAGRAMMATIC ONLY. WHERE OFFSETS ARE CRITICAL THEY SHOULD BE CONFIRMED BY FURTHER SURVEY.

· EXCEPT WHERE SHOWN BY DIMENSION LOCATION OF DETAIL WITH RESPECT TO BOUNDARIES IS INDICATIVE ONLY.

· ONLY VISIBLE SERVICES HAVE BEEN LOCATED. UNDERGROUND SERVICES HAVE NOT BEEN LOCATED, DIAL BEFORE YOU DIG SERVICES (ph 1100) SHOULD BE USED AND A FULL UTILITY INVESTIGATION, INCLUDING A UTILITY LOCATION SURVEY, SHOULD BE UNDERTAKEN BEFORE CARRYING OUT ANY CONSTRUCTION ACTIVITY IN OR NEAR THE SURVEYED AREA.

· CRITICAL SPOT LEVELS SHOULD BE CONFIRMED WITH SURVEYOR.

· THIS PLAN IS ONLY TO BE USED FOR THE PURPOSE OF DESIGNING NEW CONSTRUCTIONS.

· CONTOURS SHOWN DEPICT THE TOPOGRAPHY. EXCEPT AT SPOT LEVELS SHOWN, THEY DO NOT REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION.

· CONTOUR INTERVAL - 0.5metre. - SPOT LEVELS SHOULD BE ADOPTED.

· THE INFORMATION IS ONLY TO BE USED AT A SCALE ACCURACY OF 1:100.

· DO NOT SCALE OFF THIS PLAN / FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED READINGS.

· IF ACCURATE TRUE NORTH IS REQUIRED A FURTHER SURVEY WOULD BE NECESSARY.

Vertical Datum

DATUM: AUSTRALIAN HEIGHT DATUM (AHD)
B.M. PM 1491
R.L. 12.205
SOURCE: S.C.I.M.S.

Client Details

M & J RASO ENTERPRISES AND
O & P CORPORATION P/L
C/O GG PROPERTY
PO BOX 951
BALGOWLAH NSW 2093

Drawing Title

DETAIL AND LEVELS OVER
LOT 2 IN DP.1174201
WINBOURNE ROAD
BROOKVALE NSW 2100

PROJECT: 693	PAGE 1 OF 1
Date of survey 26/07/17 & 11/03/24	Drawing No. 693detail 2
Scale 1:100 ON A2	Rev. A

A FIRST ISSUE	08/07/16

ENCLOSURE 2.

COUNCIL FLOOD INFORMATION REPORT – COMPREHENSIVE

DATED 14 MARCH 2023

FLOOD INFORMATION REPORT – COMPREHENSIVE

Property: "39 Winbourne Road BROOKVALE NSW 2100","41 Winbourne Road BROOKVALE NSW 2100","43 Winbourne Road BROOKVALE NSW 2100","45 Winbourne Road BROOKVALE NSW 2100","Lot 2/ Winbourne Road BROOKVALE NSW 2100"
Lot DP: "Lot 10 Sec 2 DP 6033","Lot 11 Sec 2 DP 6033","Lot 12 Sec 2 DP 6033","Lot 13 Sec 2 DP 6033","Part Lot 1 DP 1174201 Lot 2 DP 1174201"
Issue Date: 14/03/2023
Flood Study Reference: Draft Greendale Creek Flood Study 2023

Flood Information for lot [1,2,3,4]:

Flood Risk Precinct – See Map A

Flood Planning Area – See Map A

Maximum Flood Planning Level (FPL) [2, 3, 4]: 14.63 m AHD

1% AEP Flood – See Flood Map B

1% AEP Maximum Water Level [2, 3]: 14.13 m AHD

1% AEP Maximum Depth from natural ground level[3]: 1.88 m

1% AEP Maximum Velocity: 0.59 m/s

1% AEP Hydraulic Categorisation: See Flood Map D

Probable Maximum Flood (PMF) – See Flood Map C

PMF Maximum Water Level [4]: 14.50 m AHD

PMF Maximum Depth from natural ground level: 2.58 m

PMF Maximum Velocity: 1.53 m/s

Flooding with Climate Change

Not Available

Flood Life Hazard Category – See Map E

Indicative Ground Surface Spot Heights – See Map F

[1] The flood information does not take into account any local overland flow issues nor private stormwater drainage systems.
[2] Overland flow/mainstream water levels may vary across a sloping site, resulting in variable minimum floor/ flood planning levels across the site. The maximum Flood Planning Level may be in a different location to the maximum 1% AEP flood level.
[3] Intensification of development in the former Pittwater LGA requires the consideration of climate change impacts which may result in higher minimum floor levels.
[4] Vulnerable/critical developments require higher minimum floor levels using the higher of the PMF or FPL.

General Notes:

- All levels are based on Australian Height Datum (AHD) unless otherwise noted.
- This is currently the best available information on flooding; it may be subject to change in the future.
- Council recommends that you obtain a detailed survey of the above property and surrounds to AHD by a registered surveyor to determine any features that may influence the predicted extent or frequency of flooding. It is recommended you compare the flood level to the ground and floor levels to determine the level of risk the property may experience should flooding occur.
- Development approval is dependent on a range of issues, including compliance with all relevant provisions of Northern Beaches Council's Local Environmental Plans and Development Control Plans.
- Please note that the information contained within this letter is general advice only as a detail survey of the property as well as other information is not available. Council recommends that you engage a suitably experienced consultant to provide site specific flooding advice prior to making any decisions relating to the purchase or development of this property.
- The Flood Studies on which Council's flood information is based are available on Council's website.
- The Flood Planning Area is based on 1% AEP levels with a depth of more than 0.15m.

Property Notes:

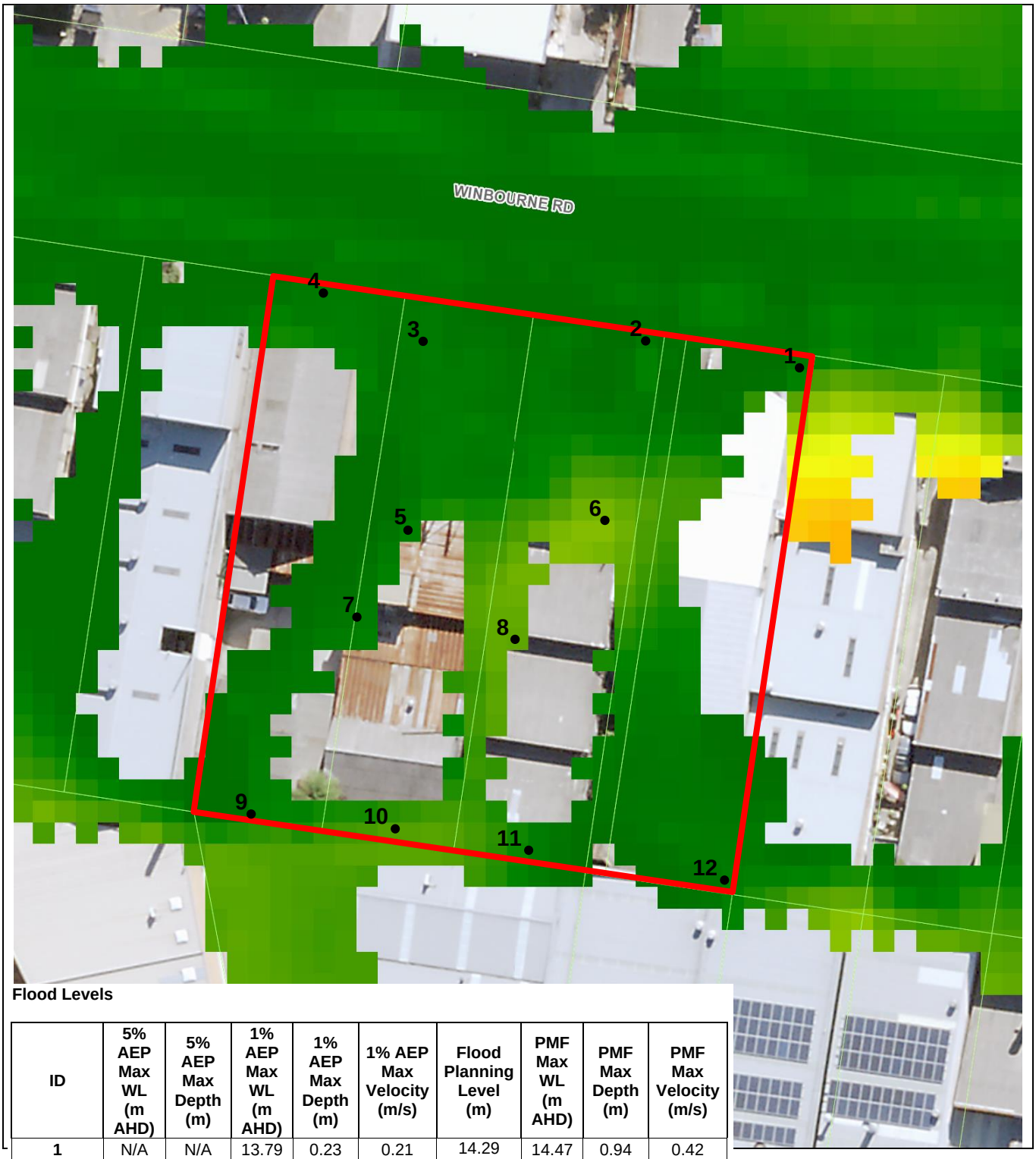
- The results in this report have been taken from the draft Greendale Creek Flood Study which is anticipated to go on public exhibition in late March 2023. It is recommended that council be contacted prior to submission of a DA to confirm flood levels as they may change once the study and results have been finalised and adopted by council.
- The Flooding with Climate Change and Complete Flood Risk Precinct Map Information is not currently available. This information will be available by the time the study is finalised and adopted by council.

FLOOD MAP A: FLOOD RISK PRECINCT MAP

Notes:

- The Low and High-Risk precinct maps are currently not available.
- **Low Flood Risk precinct** means all flood prone land not identified within the High or Medium flood risk precincts.
- **Medium Flood Risk precinct** means all flood prone land that is (a) within the 1% AEP Flood Planning Area; and (b) is not within the high flood risk precinct.
- **High Flood Risk precinct** means all flood prone land (a) within the 1% AEP Flood Planning Area; and (b) is either subject to a high hydraulic hazard, within the floodway or subject to significant evacuation difficulties (H5 or H6 Life Hazard Classification).
- The **Flood Planning Area** extent is equivalent to the Medium Flood Risk Precinct extent, and includes the High Flood Risk Precinct within it. The mapped extent represents the 1% annual Exceedance Probability (AEP) flood event + freeboard.
- The mapped extents don't include climate change

FLOOD LEVEL POINTS



Flood Levels

ID	5% AEP Max WL (m AHD)	5% AEP Max Depth (m)	1% AEP Max WL (m AHD)	1% AEP Max Depth (m)	1% AEP Max Velocity (m/s)	Flood Planning Level (m)	PMF Max WL (m AHD)	PMF Max Depth (m)	PMF Max Velocity (m/s)
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6	N/A	N/A	12.37	0.80	0.22	12.87	13.57	2.00	0.34
7	N/A	N/A	12.35	0.19	0.12	12.85	13.29	1.10	0.55
8	N/A	N/A	12.27	0.58	0.32	12.77	13.41	1.72	0.60
9	N/A	N/A	11.70	0.21	0.19	12.20	13.00	1.45	0.88
10	N/A	N/A	11.63	0.53	0.43	12.13	12.95	1.85	0.50
11	N/A	N/A	11.72	0.28	0.06	12.22	12.95	1.40	0.39
12	N/A	N/A	11.13	0.21	0.34	11.63	12.82	1.90	0.70

Nc
Cr

s/extents (Source: Draft Greendale
/.

Flood Levels

ID	5% AEP Max WL (m AHD)	5% AEP Max Depth (m)	1% AEP Max WL (m AHD)	1% AEP Max Depth (m)	1% AEP Max Velocity (m/s)	Flood Planning Level (m)	PMF Max WL (m AHD)	PMF Max Depth (m)	PMF Max Velocity (m/s)
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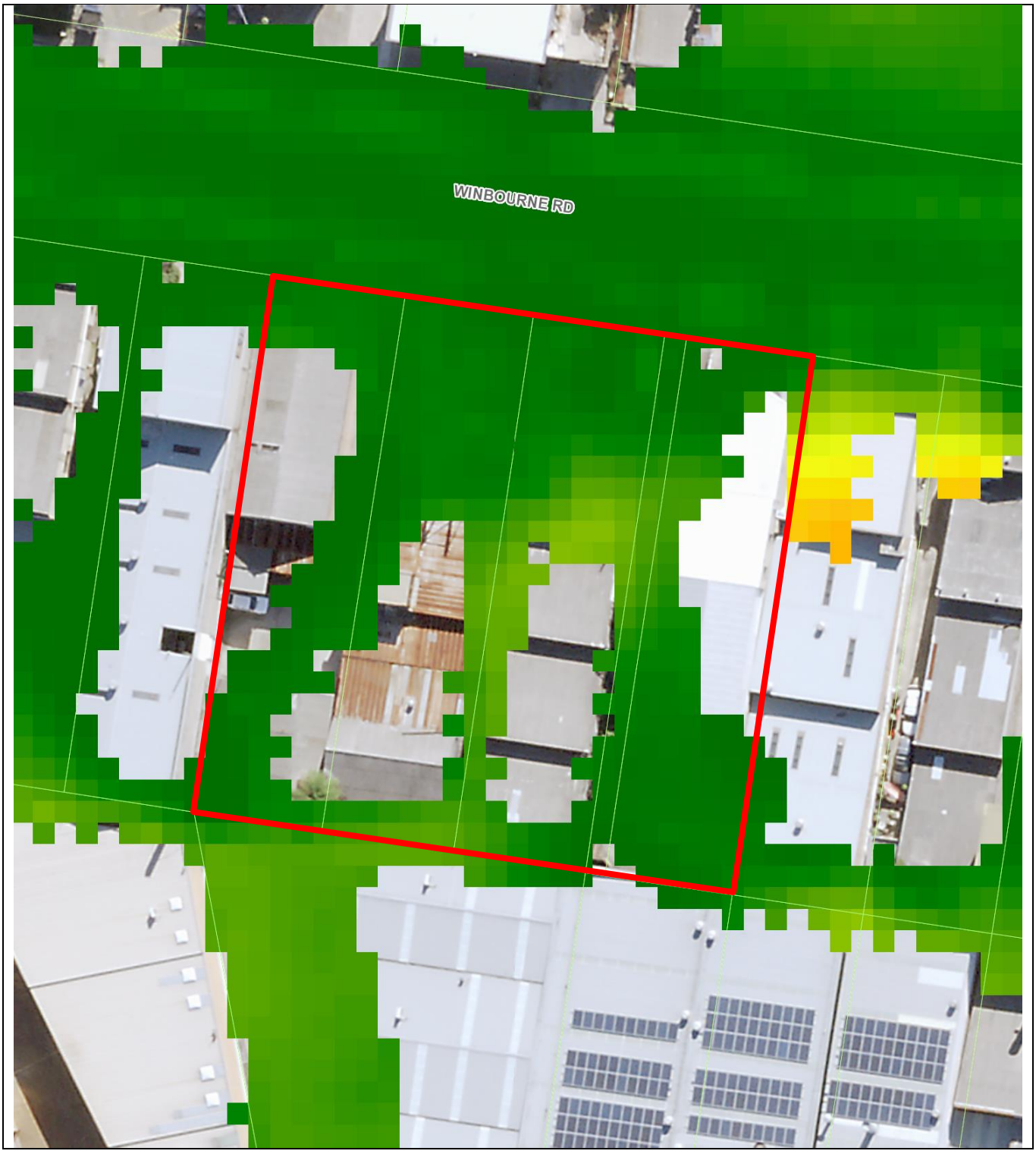
9	N/A	N/A	11.70	0.21	0.19	12.20	13.00	1.45	0.88
10	N/A	N/A	11.63	0.53	0.43	12.13	12.95	1.85	0.50
11	N/A	N/A	11.72	0.28	0.06	12.22	12.95	1.40	0.39
12	N/A	N/A	11.13	0.21	0.34	11.63	12.82	1.90	0.70

WL – Water Level
PMF – Probable Maximum Flood
N/A = Not Available

FLOOD MAP B: FLOODING - 1% AEP EXTENT



Notes:

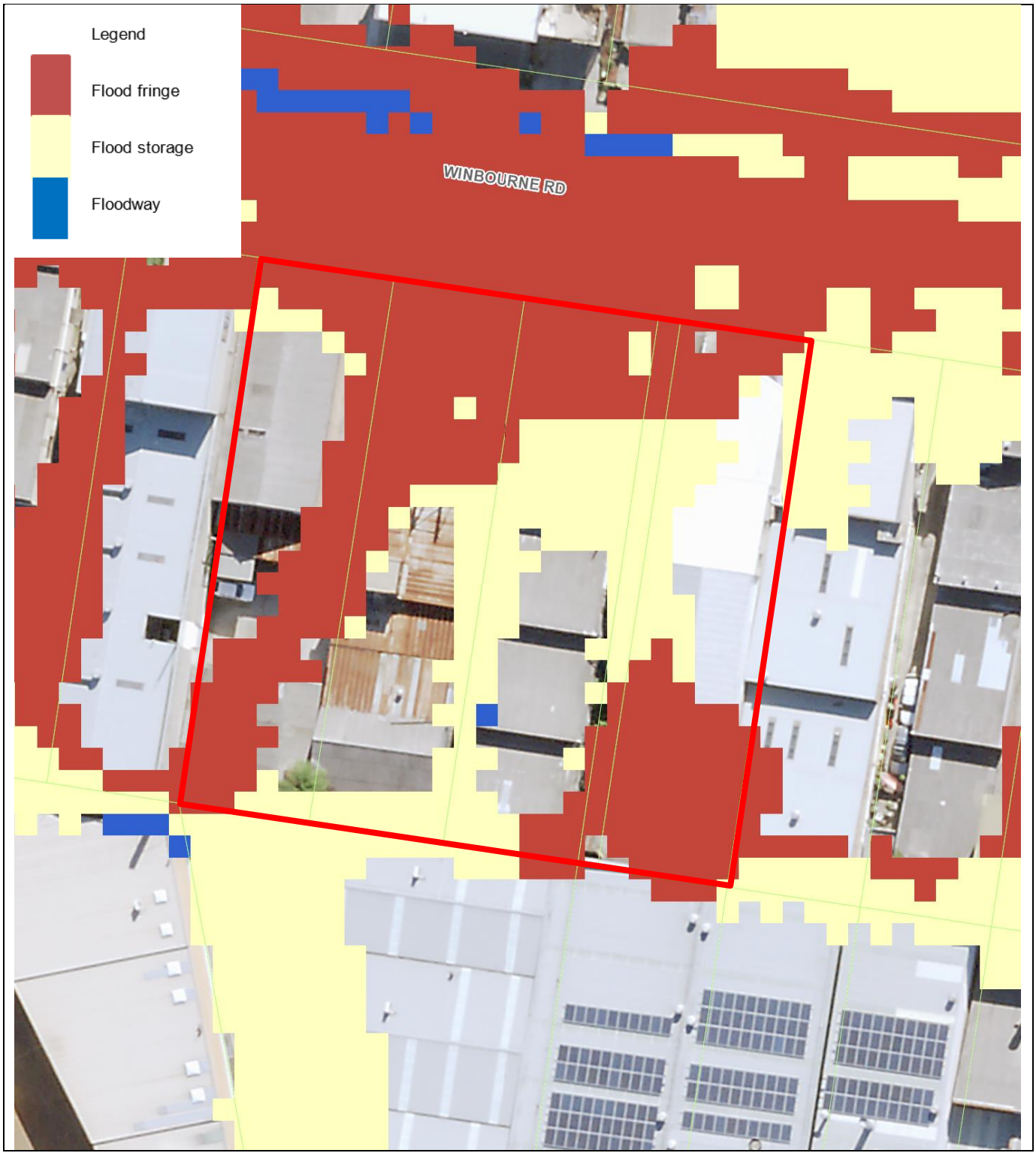
- Extent represents the 1% annual Exceedance Probability (AEP) flood event.
- Flood events exceeding the 1% AEP can occur on this site.
- Extent does not include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Draft Greendale Creek Flood Study 2023) and aerial photography (Source Near Map 2014) are indicative only.

FLOOD MAP C: PMF EXTENT MAP

Notes:

- Extent represents the Probable Maximum Flood (PMF) flood event
- Extent does not include climate change
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Draft Greendale Creek Flood Study 2023) and aerial photography (Source: NearMap 2014) are indicative only

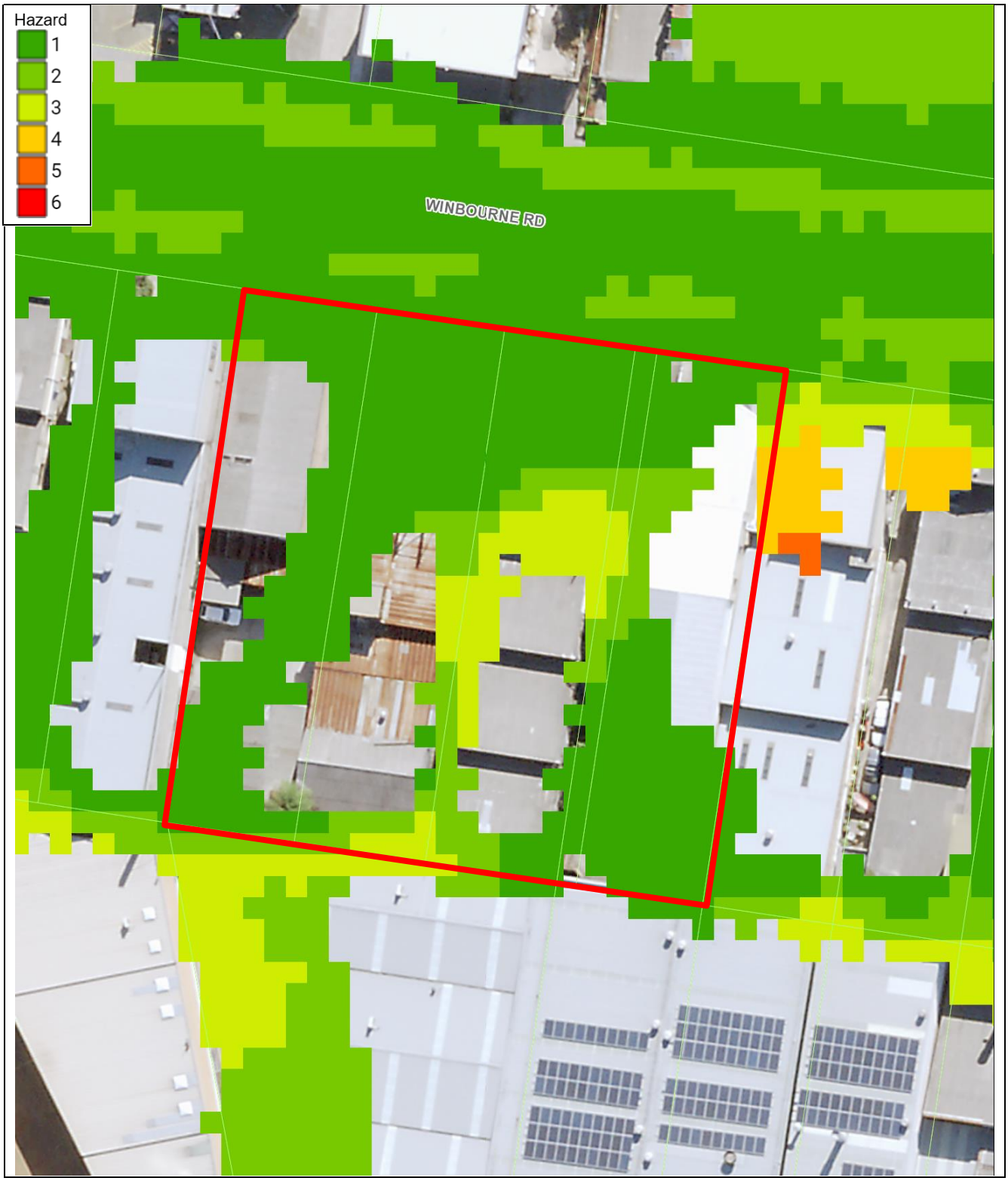
FLOOD MAP D: 1% AEP FLOOD HYDRAULIC CATEGORY EXTENT MAP



Notes:

- Extent represents the 1% annual Exceedance Probability (AEP) flood event
- Extent does not include climate change
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Draft Greendale Creek Flood Study 2023) and aerial photography (Source: NearMap 2014) are indicative only

FLOOD MAP E: FLOOD LIFE HAZARD CATEGORY



Notes:

- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Draft Greendale Creek Flood Study 2023) and aerial photography (Source Near Map 2014) are indicative only.

MAP F: INDICATIVE GROUND SURFACE SPOT HEIGHTS

Notes:

- The surface spot heights shown on this map were derived from Airborne Laser Survey and are indicative only.
- Accuracy is generally within ± 0.2m vertically and ± 0.15m horizontally, and Northern Beaches Council does not warrant that the data does not contain errors.
- If accuracy is required, then survey should be undertaken by a registered surveyor.

Preparation of a Flood Management Report

Introduction

These guidelines are intended to provide advice to applicants on how to determine what rules apply on flood prone land, and how to prepare a Flood Management Report. The purpose of a Flood Management Report is to demonstrate how a proposed development will comply with flood related planning requirements.

Planning Requirements for Flood Prone Land

Development must comply with the requirements for developing flood prone land set out in the relevant Local Environment Plan (LEP) and Development Control Plan (DCP). There are separate LEPs and DCPs for each of the former Local Government Areas (LGAs), although preparation of a LGA-wide LEP and DCP is currently under way.

The clauses specific to flooding in the LEPs and DCPs are as follows:

LEP Clauses	DCP Clauses
Manly LEP (2013) – 6.3 Flood Planning	Manly DCP (2013) – 5.4.3 Flood Prone Land
Warringah LEP (2011) – 6.3 Flood Planning Warringah LEP (2000) – 47 Flood Affected Land *	Warringah DCP (2011) – E11 Flood Prone Land
Pittwater LEP (2014) – 7.3 Flood Planning Pittwater LEP (2014) – 7.4 Flood Risk Management	Pittwater 21 DCP (2014) – B3.11 Flood Prone Land Pittwater 21 DCP (2014) – B3.12 Climate Change

* The Warringah LEP (2000) is relevant only for the “deferred lands” which affects only a very small number of properties, mostly in the Oxford Falls area.

Development on flood prone land must also comply with Council’s Water Management for Development Policy, and if it is in the Warriewood Release Area, with the Warriewood Valley Water Management Specification. Guidelines for Flood Emergency Response Planning are available for addressing emergency response requirements in the DCP. These documents can be found on Council’s website on the Flooding page.

Note that if the property is affected by estuarine flooding or other coastal issues, these need to be addressed separately under the relevant DCP clauses.

When is a Flood Management Report required?

A Flood Management Report must be submitted with any Development Application on flood prone land (with exceptions noted below), for Council to consider the potential flood impacts and applicable controls. For Residential or Commercial development, it is required for development on land identified within the Medium or High Flood Risk Precinct. For Vulnerable or Critical development, it is required if it is within any Flood Risk Precinct.

There are some circumstances where a formal Flood Management Report undertaken by a professional engineer may not be required. However the relevant parts of the DCP and LEP would still need to be addressed, so as to demonstrate compliance. Examples where this may apply include:

- If all proposed works are located outside the relevant Flood Risk Precinct extent
- First floor addition only, where the floor level is above the Probable Maximum Flood level
- Internal works only, where habitable floor areas below the FPL are not being increased

Note that development on flood prone land will still be assessed for compliance with the relevant DCP and LEP, and may still be subject to flood related development controls.

What is the purpose of a Flood Management Report?

The purpose of a Flood Management Report is to demonstrate how a proposed development will comply with flood planning requirements, particularly the development controls outlined in the relevant LEP and DCP clauses. The report must detail the design, measures and controls needed to achieve compliance, following the steps outlined below.

A Flood Management Report should reflect the size, type and location of the development, proportionate to the scope of the works proposed, and considering its relationship to surrounding development. The report should also assess the flood risk to life and property.

Preparation of a Flood Management Report

The technical requirements for a Flood Management Report include (where relevant):

1. Description of development
   - Outline of the proposed development, with plans if necessary for clarity
   - Use of the building, hours of operation, proposed traffic usage or movement
   - Type of use, eg vulnerable, critical, residential, business, industrial, subdivision, etc

2. Flood analysis
   - 1% AEP flood level
   - Flood Planning Level (FPL)
   - Probable Maximum Flood (PMF) level
   - Flood Risk Precinct, ie High, Medium or Low
   - Flood Life Hazard Category
   - Mapping of relevant extents
   - Flood characteristics for the site, eg depth, velocity, hazard and hydraulic category, and the relevance to the proposed development

   If the property is affected by an Estuarine Planning Level (EPL) which is higher than the FPL, then the EPL should be used as the FPL. If the FPL is higher than the PMF level, then the FPL should still be used as the FPL, as it includes freeboard which the PMF does not.

3. Assessment of impacts
- Summary of compliance for each category of the DCP, as per the table below.

	Compliance		
	N/A	Yes	No
A) Flood effects caused by Development			
B) Building Components & Structural Soundness			
C) Floor Levels			
D) Car parking			
E) Emergency Response			
F) Fencing			
G) Storage of Goods			
H) Pools			

- Demonstration of how the development complies with any relevant flood planning requirements from the DCP, LEP, Water Management for Development Policy, and if it is in the Warriewood Valley Urban Land Release Area, with the Warriewood Valley Water Management Specification (2001)
- For any non-compliance, a justification for why the development should still be considered.
- Calculations of available flood storage if compensatory flood storage is proposed
- Plan of the proposed development site showing the predicted 1% AEP and PMF flood extents, as well as any high hazard or floodway affectation
- Development recommendations and construction methodologies
- Qualifications of author - Council requires that the Flood Management Report be prepared by a suitably qualified Engineer with experience in flood design / management who has, or is eligible for, membership to the Institution of Engineers Australia
- Any flood advice provided by Council
- Any other details which may be relevant

Further information and guidelines for development are available on Council's website at:

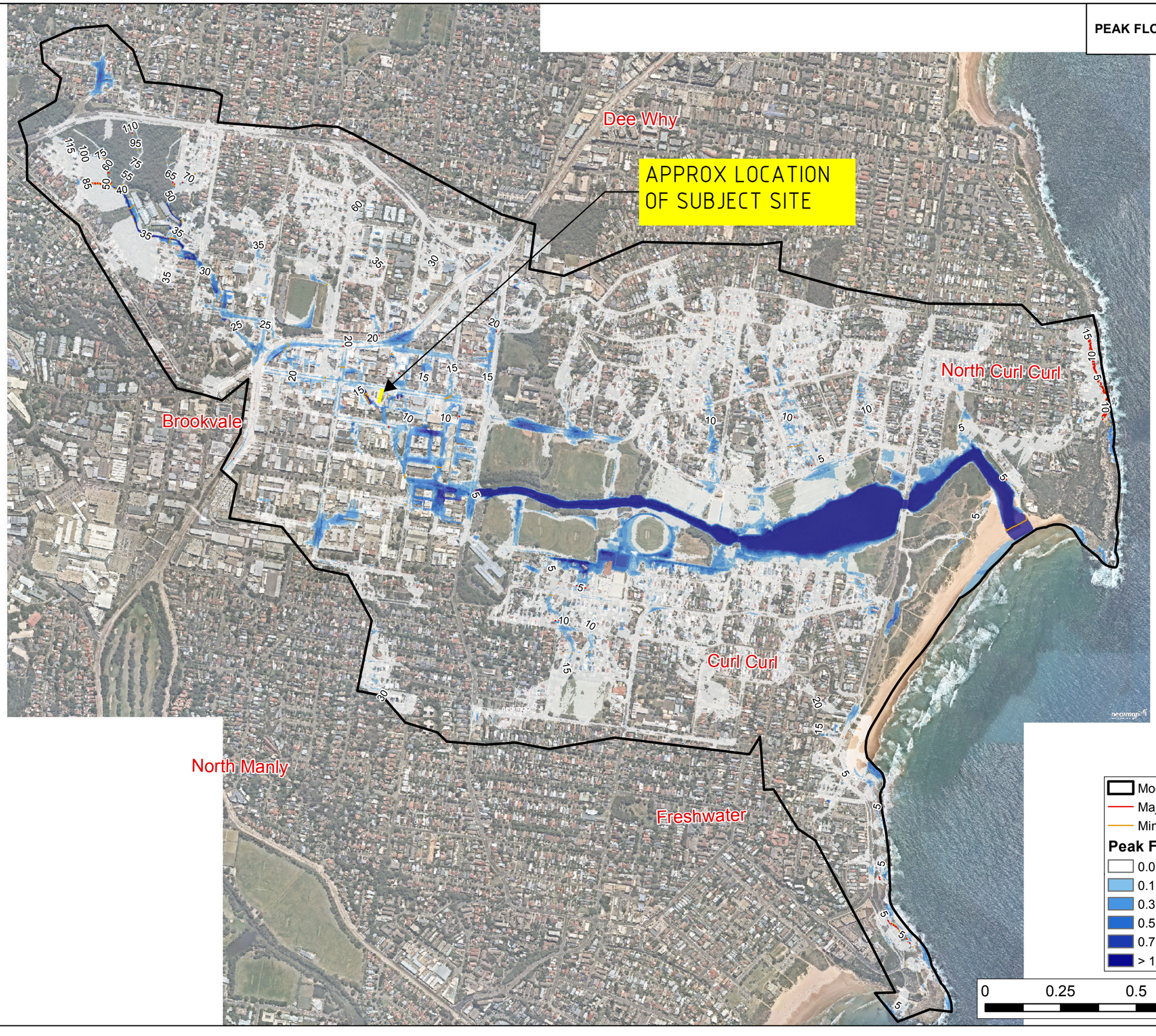
https://www.northernbeaches.nsw.gov.au/planning-and-development/building-and-renovations/development-applications/guidelines-development-flood-prone-land

Council's Flood Team may be contacted on 1300 434 434 or at floodplain@northernbeaches.nsw.gov.au .

ENCLOSURE 3.

FIGURE D6 OF THE *GREENDALE CREEK FLOOD STUDY 2022*

FIGURE D6
PEAK FLOOD DEPTHS AND LEVELS
1% AEP EVENT



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ENCLOSURE *4.*

DCP E11 SUMMARY AND CONTROLS

		Medium Flood Risk Precinct				
		Vulnerable & Critical Use	Residential Use	Business & Industrial Use	Recreational & Environmental Use	Subdivision & Civil Works
A	Flood effects caused by Development	A1 A2	A1 A2	A1 A2	A1 A2	A1 A2
B	Building Components & Structural	B1 B2 B3	B1 B2 B3	B1 B2 B3	B1 B2 B3	
C	Floor Levels	C2 C3	C1 C3 C4 C6	C1 C3 C4 C6 C7	C3	C5
D	Car Parking	D1 D2 D3 D4 D7	D1 D2 D3 D4 D5 D6	D1 D2 D3 D4 D5 D6	D1 D2 D3 D4 D5 D6	D1
E	Emergency Response	E1 E2	E1	E1	E1	E3
F	Fencing	F1	F1	F1	F1	F1
G	Storage of Goods	G1	G1	G1	G1	
H	Pools	H1	H1	H1	H1	H1