

FLOOD ASSESSMENT AND RISK MANAGEMENT **REPORT**

Change of Use

Unit 1/380 Pittwater Road, NORTH MANLY NSW

Job No. 191208
Issue A – 23 January 2020

Prepared for: Susie Mills – The Manly Vine

Prepared by: Rhys Mikhail

DOCUMENT INFORMATION PAGE

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Author of Report:	Rhys Mikhail
Qualifications:	BE (Civil) Hons MIEAust NER RPEQ

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Flood Assessment and Risk Management Report at Unit 1/380 Pittwater Road, North Manly NSW Job N° 191208

1.0 INTRODUCTION

At the request of Susie Mills, RTS Civil Consulting Engineers Pty Ltd (RTS Civil) was engaged to provide a flood risk assessment and report for the proposed use of the tenancy as an artisan food and drink industry (winery). RTS Civil has reviewed the site survey and plans at the site address above in reference to potential flooding issues. The proposed development generally meets the intent of section 5.4.3 of the Manly Development Control Plan provided the recommendations of this report are applied. The development is therefore recommended for Council approval.

The architectural plans, topographical survey and Council supplied flood information were used to determine flooding extents and impacts as well as to assess any associated risks. The premises have been assessed in accordance with the requirements of Northern Beaches (Manly) Councils *Specification for Stormwater Drainage 2003* and *Interim Policy – Flood Prone Land 2013*, Council's flood certificate information provided for the Flood Planning Area (FPA), Council engineers advice, Council's prelodgment advice (PLM2019/0211) dated 29 October 2019, the Manly Lagoon Flood Study 2013 (BMT WBM), Council's Water Policy and Technical Specification – *'Building Over or Adjacent to Constructed Drainage Systems and Easements'*, section 5.4.3 of the *Manly Development Control Plan (2013)*, *Reducing the Vulnerability of Buildings to Flood damage: Guidance on Building In Flood Prone Areas* (Prepared for the Hawkesbury Nepean Floodplain management Steering Committee – 2007), the *NSW Government Floodplain Management Manual (2005)* and recent discussions with Council flood engineers and planners (December 2019).

2.0 BACKGROUND

The property at 380 Pittwater Road, North Manly is situated within the vicinity of the flow extents for the Council predicted 1% AEP overland flow path and flood storage area as identified by the Manly Lagoon Flood Study. Northern Beaches Council have provided the predicted flood extent and levels for the property (refer Appendix A). It should be noted that the flood information predicts that the 1% AEP flood extents will inundate approximately 100% of the property to a maximum approximate depth of 1.3m.

Northern Beaches Council have requested a qualified civil engineer be engaged to carry out a flood risk management study prepared in accordance with Council's flood certificate information supplied. Refer Appendix A for details. This report outlines the flood risk management requirements specific to the proposed development.

3.0 FLOOD IMPACT ASSESSMENT SUMMARY

Northern Beaches Council (Manly) have mandatory requirements for properties located on flood affected land specified in section 5.4.3 of the Manly Development Control Plan. This section of the report details these requirements and the recommendations to meet these requirements for the proposed development.

Table 1.0 – Table of Site-Specific Flood Risk Management Information

Flood Category	Flood Storage
Hazard Classification / Level	Medium to High
Maximum Site 100 Year Flood Level (1% AEP)	3.16m AHD
Probable Maximum Flood Level (PMF)	5.66m AHD
Development Flood Planning Level (FPL)	3.66m AHD
Overland Flow Velocities (1% AEP)	0.95 m/s
Overland Flow Depths (1% AEP)	1.31m
Overland Flow Velocities (PMF)	1.19 m/s
Overland Flow Depths (PMF)	3.82m
Degree of inundation (1% AEP)	100%
Impacts of waterborne objects	Medium to High
Buoyancy	Medium to High
Impact on surrounding properties	None envisaged
Flood warning	Signage is recommended
Flood levels	No anticipated increase

4.0 FLOOD EFFECTS CAUSED BY DEVELOPMENT

This section of the report provides comments on the pre and post flood conditions surrounding the proposed development site.

4.1 Existing Flood Regime

Manly Lagoon is a small coastal lagoon with an entrance to the ocean at Queenscliff which is located at the northern end of Manly Beach. The catchment area of Manly Lagoon is approximately 18 square kilometres and the surface area is approximately 8 hectares. Substantial flooding of residential and commercial areas bordering the lagoon has occurred on numerous occasions over many years. Such events have caused considerable loss to property and damage to homes.

Flooding in lower estuarine areas such as Manly Lagoon is caused either by rainfall or elevated ocean levels, or a combination of both. Flood levels in the lagoon are generally determined by the volume and rate of rainfall runoff entering the lagoon and the ocean levels at the time. The lagoon entrance conditions may also affect flood levels. The catchment has a short response time with water levels in the lagoon rising quickly following heavy rainfall over any part of the catchment.

Flood levels upstream of the main lagoon water body are affected by the extent of backwater flooding through the lagoon. Pittwater Road and Queenscliff bridges act as controls in major flood events. Although the reconstruction of Queenscliff Bridge improved flood conditions in the lagoon, both bridges locally restrict the flow of floodwaters generating an impact on flood levels.

Flood levels can result from various combinations of events and conditions. In the Manly Lagoon Flood Study the lagoon entrance was assumed to be open and the following conditions were examined:

- Rainfall flood with heavy rain continuing: This is the most likely form of flooding as the lagoon is mechanically open once water levels reach a pre-determined level. Flooding of this nature would not be as severe as if the lagoon entrance were closed.
- No rainfall with high ocean levels: Ocean flooding occurs when the ocean characteristics are such that water flows into the lagoon. This can be compounded should it occur during spring tides.

- Rainfall flood and elevated ocean levels: Should elevated ocean levels (associated with storm surge) accompany a rainfall event, discharge rates would be reduced due to the backwater effect created. This may result in prolonged flood levels in the lagoon.

Refer Appendix A for Council supplied flood information indicating the predicted localised flood extents within and adjacent the development property.

4.2 Flood Storage Volume

Although the development is located within a defined flood storage area, there are no anticipated or calculated net loss envisaged as a result of the development. The proposed 'flood blockage' areas for the existing and proposed development conditions have been assessed to *minimise* any decreased impact in flood storage volume for the site and surrounding properties. The following is required to ensure onsite flood storage volume reduction is minimised:

- The proposed flood mitigation will mimic the existing overland flow regime.
- Onsite drainage is to be provided in accordance with Northern Beaches Council (Manly) stormwater management and AS3500.3 requirements and are to be prepared by a qualified civil engineer.

5.0 DRAINAGE INFRASTRUCTURE AND CREEK WORKS

The proposed development does not require modification to the existing Council drainage infrastructure or any creek works.

5.1 Existing Council Drainage and Topographical Conditions

There currently exists two Council pipelines of 750mm diameter reinforced concrete pipe (RCP) with an alignment located along the eastern boundary within Rowe Street. These drainage pipelines are draining a large upstream catchment including runoff from road and properties. Based on Council's topographical information provided, the site is located towards the bottom of a natural gully. This natural gully is draining in a southerly direction towards Lakeside Crescent Reserve. Refer Appendix A for details.

5.2 Existing Council Pipeline Requirements

Due to the nature of the development, the existing council pipelines are not required to be located accurately prior to construction in accordance with Council's Policy PAS-PL 130 – *Building Over or Adjacent to Constructed Council Drainage Systems and Easements Policy*.

6.0 BUILDING COMPONENTS AND STRUCTURAL SOUNDNESS

The proposed development consists of a change of use to an artisan food and drink industry (winery) within an existing commercial building.

6.1 Contributing Flood Characteristics

A contributing upstream catchment is partially responsible for the contributing overland flow impacting the development site. While the catchment is urbanised with a buried stormwater pipe network, Council's flood study is concerned with flow along overland flow paths and their impacts when combined with downstream backwater effects.

Refer to Section 4.1 of this report for further explanation of the flood regime.

6.2 Types of Materials to be Used

Any new internal structures may be constructed of concrete, steel, timber and/or brickwork to above the flood levels where possible. Flood compatible wall and ceiling linings include fibro-cement board, brick, concrete (including concrete blocks), stone with waterproof grout, clay tiles glazed with waterproof mortar, glass (including glass blocks), plastic sheeting with waterproof adhesive, steel with waterproof applications, exterior grade plywood, and fully sealed solid wood products. Plasterboard is not a flood compatible material as it requires replacement after extended immersion, however for shallow and short duration floods there may be little damage to plasterboard wall linings. It is recommended that sheet wall linings be installed horizontally with a 20-30 mm gap provided between the bottom wall plate and the base of the wall lining to facilitate ventilation and cleaning of the wall cavity after a flood event. The gap may be covered with skirting board when access to the wall cavity is not required.

Insulation should be closed cell type foam. Nails, bolts, hinges and fittings should be made from nylon, brass, stainless steel or hot dipped galvanised steel. Hinges should be of a removable pin type. Flood compatible doors include solid panel doors with waterproof adhesives, flush doors with marine ply and closed cell foam, metal doors, and aluminium or galvanised steel frame doors. Aluminium frame windows with stainless steel rollers or similar corrosion and water-resistant materials suffer least damage during flood events. Timber framed windows which have been full epoxy sealed before assembly and fitted with stainless steel or brass fittings are also considered flood compatible.

Refer Table 1.1 of this report along with the Guidance on Building in Flood Prone Areas – *Reducing Vulnerability of Buildings to Flood Damage* policy (Hawkesbury-Nepean Floodplain Management Steering Committee) for further details.

Table 1.1 – Table of General Outline for Flood Compatible Materials for Construction

Key components	Suitable materials/construction	Unsuitable materials/construction
Roof	<ul style="list-style-type: none"> • Timber trusses with galvanised connections • Reinforced concrete • Galvanised metal 	<ul style="list-style-type: none"> • Traditional timber roof frame construction • Inaccessible flat roofs • Non-galvanised structural steelwork or connections • Unsecured roof tiles
Bolts, nails, hinges and fittings	<ul style="list-style-type: none"> • Brass • Nylon • Stainless steel • Galvanised steel • Hinges with removable pins 	<ul style="list-style-type: none"> • Mild steel
Windows	<ul style="list-style-type: none"> • Aluminium frames with stainless steel or brass rollers 	<ul style="list-style-type: none"> • Timber with PVA glues • Mild steel fittings
Walls	<ul style="list-style-type: none"> • Concrete walls • Cavity brick walls • Galvanised steel frames • Stainless steel frames • Aluminium frames • Timber frames in areas not subject to forces from fast flowing water • Bracing of galvanised steel or marine grade plywood 	<ul style="list-style-type: none"> • Timber frames in areas that are subject to forces from fast flowing water
Floor, sub-floor structure	<ul style="list-style-type: none"> • Reinforced concrete slab • Suspended timber floor • Masonry walls • Marine grade plywood • Galvanised steel piers/columns • Masonry piers/columns 	<ul style="list-style-type: none"> • Foundation must not be prone to failure due to erosion (located on fill) • Particle board flooring • Standard grade plywood • Engineered timbered products (unless certified by the manufacturer as being resistant to the effects of repeated immersion for periods in excess of one week)

6.3 Recommendations for Structural Design

The velocity verse depth ratio for the site is approximately 1.2 for a flow depth of approximately 1.31m. This is considered a “High Hazard” area outlined in the *“Floodplain Management Manual: the management of flood liable land – January 2001 NSW Government”* (Refer Appendix B).

The existing structures are to be inspected by a suitably qualified structural engineer certifying that the existing structure is adequate to withstand flood forces (overland flow and uplift actions) up to and including the Flood Planning Level. This shall be in accordance with the requirements specified in the NSW Floodplain Development Manual. Buoyancy, floodwater with debris, wave action, the flood compatibility of materials, and waterproofing shall be addressed in accordance with the Manual.

6.4 Waterproofing Methods

All electrical equipment is to be fitted with circuit breakers. Switchboard and main circuit unit must be fitted at or above the Flood Planning Level. Other valuable materials or

possessions are to be stored as above and should be acknowledged by the owner and occupants that a reasonable extent of damage to fittings below the 1% AEP flood levels is to be expected during heavy rainfall events. Electrical wiring and data cable may need to be made suitable for continuous submergence to a depth of 1% AEP flood levels and conduits to be free draining in a flood event to council requirements.

7.0 STORAGE OF GOODS

All stock storage and/or hazardous chemicals are *not* to be stored in areas below the Flood Planning Level and should be acknowledged by the owner.

8.0 FLOOD EMERGENCY RESPONSE PLAN

The velocity verse depth ratio for the site is approximately 1.2 for a flow depth of approximately 1.3m. This is considered a “High Hazard” area outlined in the “*Floodplain Management Manual: the management of flood liable land – January 2001 NSW Government*” (Refer Appendix B). It should be noted that floodwaters may rise rapidly with little warning, inhibiting evacuation of and emergency access to the property. Occupants are to be aware of the risk of floodwaters entering the property. At the first signs of high rainfall events, occupants are to check weather reports for possible forecast warnings issued. If a warning has been issued, this flood risk management plan should be implemented. A copy should remain onsite at all times.

During flood events, many roads may be cut off by floodwaters which may make the escape by vehicle difficult. Travelling through floodwaters on foot or in a vehicle is also dangerous due to hidden obstructions from floodwaters, chance of being swept away (on foot or within vehicle), or risk of polluted and contaminated floodwaters.

8.1 Risk Exposure

Because the internal floor level is located below the Flood Planning Level, it is not recommended that during any flood event that occupants, staff or customers remain within the building. Alcohol would likely have been consumed by customers and require direction from trained staff.

8.2 Local Warnings

Local warnings to trigger action of the Response Plan. During heavy rainfall, assess water levels at the intersection of Pittwater Road and Lakeside Crescent. Should floodwater begin to inundate the intersection, evacuation procedures are to be implemented.

8.3 Roles and Responsibility

It is understood that a maximum of up to 60 people (including 8 staff members) may be present at one time. Below is a general list of roles and corresponding responsibility that are to be assigned to certain staff members in the unlikely event of a flood evacuation *during* operating hours. The tasks and responsibilities outlined are not to be limited solely by this report. These roles and responsibilities outlined in this plan are to be reviewed annually:

Flood Evacuation Coordinator (FEC):

A FEC is to be assigned from the available staff members onsite (manager or owner is recommended) as is responsible for:

- arranging regular staff meetings to provide ongoing training and education for flood emergency requirements
- ensuring that all staff members are educated of flood evacuation requirements
- all required flood warning signage
- providing evacuation instructions
- explanation to all staff members and customers that they are advised *not* to enter floodwaters and if cars have been inundated they are advised *not* to attempt to enter their vehicle and are to leave with a staff member or customer that have cars parked at a higher level
- notifying emergency service when necessary
- ceasing all service of food and alcohol if evacuation is required
- locking entrance and exist during flood evacuation once premises is fully vacated
- implementing flood evacuation procedures
- notifying all staff members and customers present
- being the last to evacuate to ensure everyone present has been accounted for and evacuated safely (in conjunction with the FEA)
- if flood warning triggers occur while the premises is empty and is prior to any bookings, ensuring that the entrance and exit doors are closed, contacting all staff members and customers to notify them the event has been cancelled and they should *not* attend any possible bookings until further notice and ensure no access to the site is allowed.

Flood Evacuation Assistant (FEA):

A FEA is to be assigned to assist the FEC in the unlikely event of a flood evacuation as is responsible for:

- ensuring that sufficient copies of this *Flood Risk Report and Emergency Response Plan* are kept onsite and are to be made available on request
- assisting with maintenance of flood warning signage
- reporting to the FEC during heavy rainfall
- assessing rising floodwaters and notify FEC for instructions
- assisting with notifying all staff members and customers present
- assisting with the evacuation all staff members and customers present
- explaining to staff members and customers that may have cars inundated that they are advised *not* to attempt to enter their vehicle and to leave with a staff member or customer that have cars parked at a higher level
- waiting for the FEC prior to them *both* evacuating the premises.

8.4 Evacuation strategy and Onsite Response Plan

During rainfall events, the FEC is to monitor Northern Beaches Council (Manly Hydraulics Laboratory) Flood Water (<http://www.mhl.nsw.gov.au/users/NBFloodInfo/>) for possible flood warnings. Should a warning be issued or floodwaters begin to rise and encroach within the intersection of Lakeside Crescent and Pittwater Road, all staff members and customers are to be instructed by the FEC. A copy of this risk report is to be kept on the premises at all times. Should floodwaters continue to rise or heavy rainfall commences, evacuation is to take place. The FEC is to identify himself and instruct staff members and customers to follow the FEA for evacuation instructions:

1. all food and alcohol service must cease immediately
2. all staff members and customers are to follow standard evacuation procedures and are to assemble adjacent to the existing driveway roller door
3. the FEC is to contact the State Emergency Services (SES) or police or similar regulating authority and communicate the evacuation instructions
4. all staff members and customers are to be informed that those parked along Pittwater Road are to exit first
5. once safely within vehicles they are to evacuate north along Oliver Street to seek higher ground
6. customers are not to wait for public transport and if evacuation by means of a vehicle is not possible, and shelter-in-place on higher levels of the building is not possible, evacuation on foot must proceed north along Oliver Street

7. all present are to be informed that travelling through floodwaters on foot or in a vehicle is dangerous due to hidden obstructions from floodwaters, chance of being swept away (on foot or within vehicles), or health risks of polluted and contaminated floodwaters.

9.0 CAR PARKING

It is understood that the site is required to have a minimum of 3 onsite parking spaces dedicated to the tenancy. Assuming the existing parking allocation is insufficient to satisfy the proposed use, it is understood that consideration may be given in the case that development relies on the parking spaces available from spaces allocated to other tenancies in the complex after normal business hours as overflow parking.

The velocity verse depth ratio for the driveway is approximately 1.2 for a flow depth of approximately 1.3m. This is considered a “High Hazard” area outlined in the “*Floodplain Management Manual: the management of flood liable land – January 2001 NSW Government*” (Refer Appendix B). As the development is limited to a change of use development, there is no scope to mitigate car parking flood risks. Refer to section 8.0 of this report for the flood emergency response plan and evacuation recommendations.

10.0 PROPOSED FLOOR LEVELS AND FREEBOARD REQUIREMENTS

The existing ground floor level is approximately RL 2.62m AHD. The freeboard requirements outlined by section 5.4.3 of the Manly Development Control Plan are as follows:

1. New habitable Floor areas: 1% AEP storm event plus 500mm freeboard.
2. New non-Habitable Floor areas: No lower than 1% AEP storm event.

Refer to Table 1.2 of this report for minimum freeboard requirements for the proposed development flood levels.

Table 1.2 – Table of Freeboard Levels for Proposed Development

Floor Areas	Required Design Level (AHD)	1% AEP Flood Level (AHD)	Freeboard Level Achieved (mm)
Existing Floor Level	2.62 m	3.16 m	- 540
Driveway Entrance	2.10 m	3.16 m	- 1060

The existing floor levels do not achieve the minimum Council required freeboard levels. As

the development is limited to a change of use development, there is no scope to raise floor levels to meet the freeboard requirements. Refer to Sections 6.0, 7.0, 8.0 and 9.0 of this report for flood mitigation recommendations.

11.0 FENCING

There are no fences proposed for this development.

12.0 POOLS

There are no pools proposed for this development.

13.0 AUTHORS QUALIFICATIONS AND EXPERIENCE

Rhys Mikhail – Over 15 years of professional experience in civil engineering and stormwater hydraulic and flood management. Director and Civil Engineer at RTS Civil Consulting Engineers Pty Ltd with the following qualifications; BE (Civil) Hons MIEAust CPEng (2570082) NER RPEQ (17480). Refer Appendix A for Form A Hydraulic Certification Form.

14.0 CONCLUSION

The proposed development is not envisaged to have an adverse effect on surrounding properties provided the recommendations of this report are applied. This flood impact investigation has been undertaken by RTS Civil based on the information supplied by Northern Beaches Council, the site information observed and proposed plans. As a minimum, the recommendations outlined in this report must be met to ensure compliance with section 5.4.3 of the Manly Development Control Plan. The flood level and extent information provided from Northern Beaches Council has been adopted used for this. Therefore, the proposed development generally meets the intent of the requirements of section 5.4.3 of the Manly Development Control Plan provided the recommendations of this report are applied. The development application is recommended for approval.

We trust that this report meets with Council requirements for flood risk management analysis. Please contact the author if further clarification is required.

RTS CIVIL CONSULTING ENGINEERS PTY LTD



Rhys Mikhail

Director / Civil Engineer

BE (Civil) Hons MIEAust CPEng NER RPEQ

<https://rtscivilce.sharepoint.com/sites/RTSSharedBusiness/Shared Documents/RTS PROJECTS/2019/191208 - 380 Pittwater Road, North Manly/ENG DESIGN/191208 Flood Risk Management Report.doc>

APPENDIX A – COUNCIL FLOOD INFORMATION PROVIDED & CERTIFICATION FORM

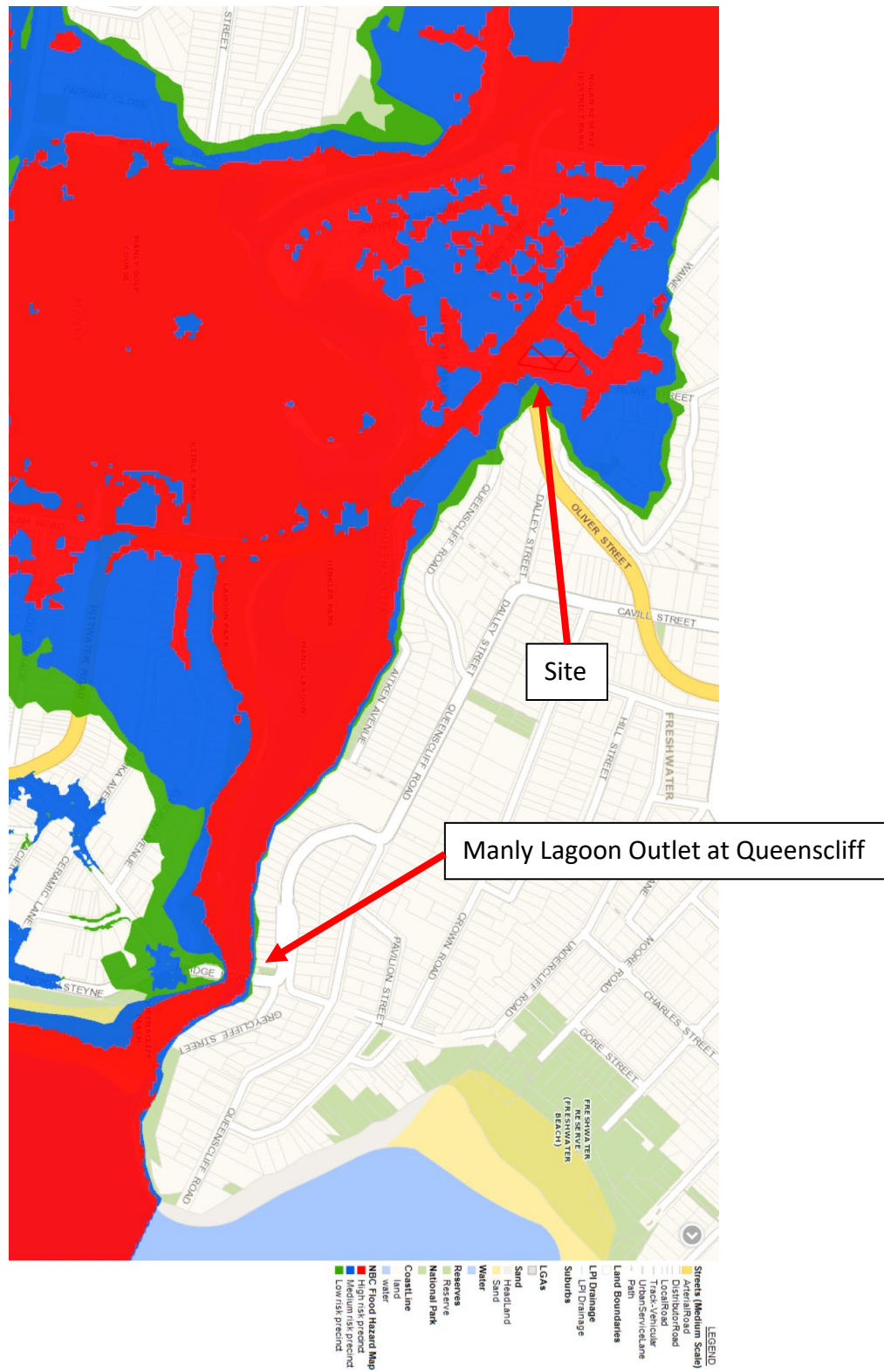


Figure A2 – Northern Beaches Council Flood Mapping Information



FLOOD INFORMATION REQUEST - BASIC

Property: 380 Pittwater Rd, North Manly

Lot DP: Lot 23, DP 5342

Issue Date: 06/01/2020

Flood Study Reference: Manly Lagoon Flood Study 2013, BMT WBM

Flood Information for lot:

Flood Life Hazard Category – See Map A

1% AEP – See Flood Map B

1% AEP Maximum Water Level³: 3.16 m AHD

1% AEP Maximum Peak Depth from natural ground level³: 1.31 m

1% AEP Maximum Velocity: 0.95 m/s

1% AEP Hydraulic Categorisation: Flood storage **See Flood Map E**

Flood Planning Area – See Flood Map C

Flood Planning Level (FPL) ^{1, 2, 3 & 4}: 3.66 m AHD

Probable Maximum Flood (PMF) – See Flood Map D

PMF Maximum Water Level²: 5.66 m AHD

PMF Maximum Depth from natural ground level: 3.82 m

PMF Maximum Velocity: 1.19 m/s

Flood Risk Precinct – See Map F

¹The flood information does not take into account any local overland flow issues nor private stormwater drainage systems.

²Overland flow/mainstream water levels may vary across a sloping site, resulting in variable minimum floor/flood planning levels across the site.

³Intensification of development in the former Pittwater LGA requires the consideration of climate change impacts which may result in higher minimum floor levels than those indicated on this flood advice.

⁴Vulnerable/critical developments require higher minimum floor levels using the higher of the PMF or Flood Planning Level

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.

FLOOD MAP A: FLOOD LIFE HAZARD CATEGORY

****No data available for this property.**

Notes:

- Refer to 'Flood Emergency Response Planning for Development in Pittwater Policy' for additional information on the Flood Life Hazard Categories and Pittwater 21 DCP Control B3.12.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source: NearMap 2014) are indicative only.

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: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source: NearMap 2014) are indicative only.

FLOOD MAP C: FLOOD PLANNING AREA EXTENT



Notes:

- Extent represents the 1% annual Exceedance Probability (AEP) flood event + freeboard.
- Extent does not include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source: NearMap 2014) are indicative only.

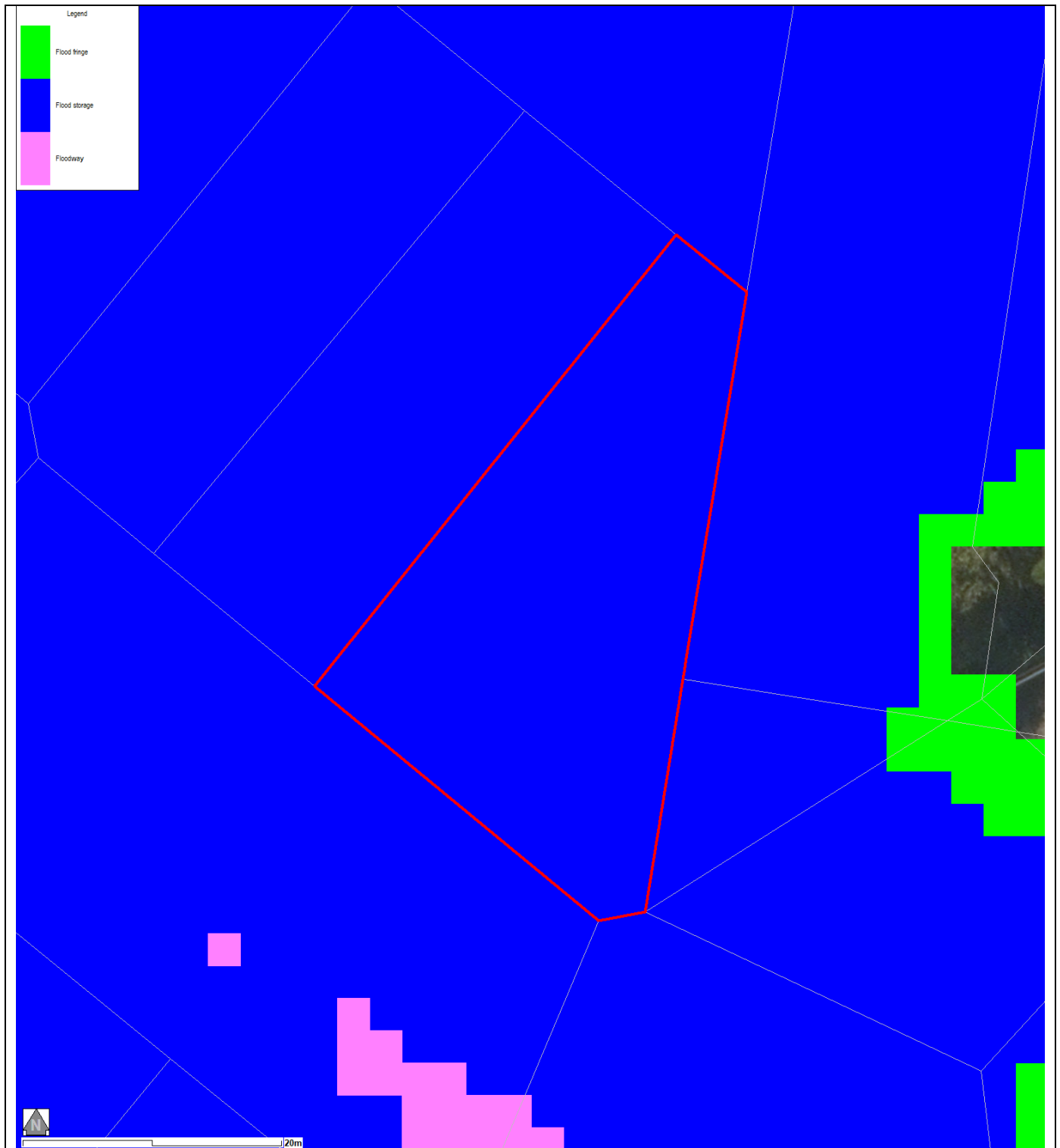
FLOOD MAP D: PROBABLE MAXIMUM FLOOD EXTENT



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: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source: NearMap 2014) are indicative only.

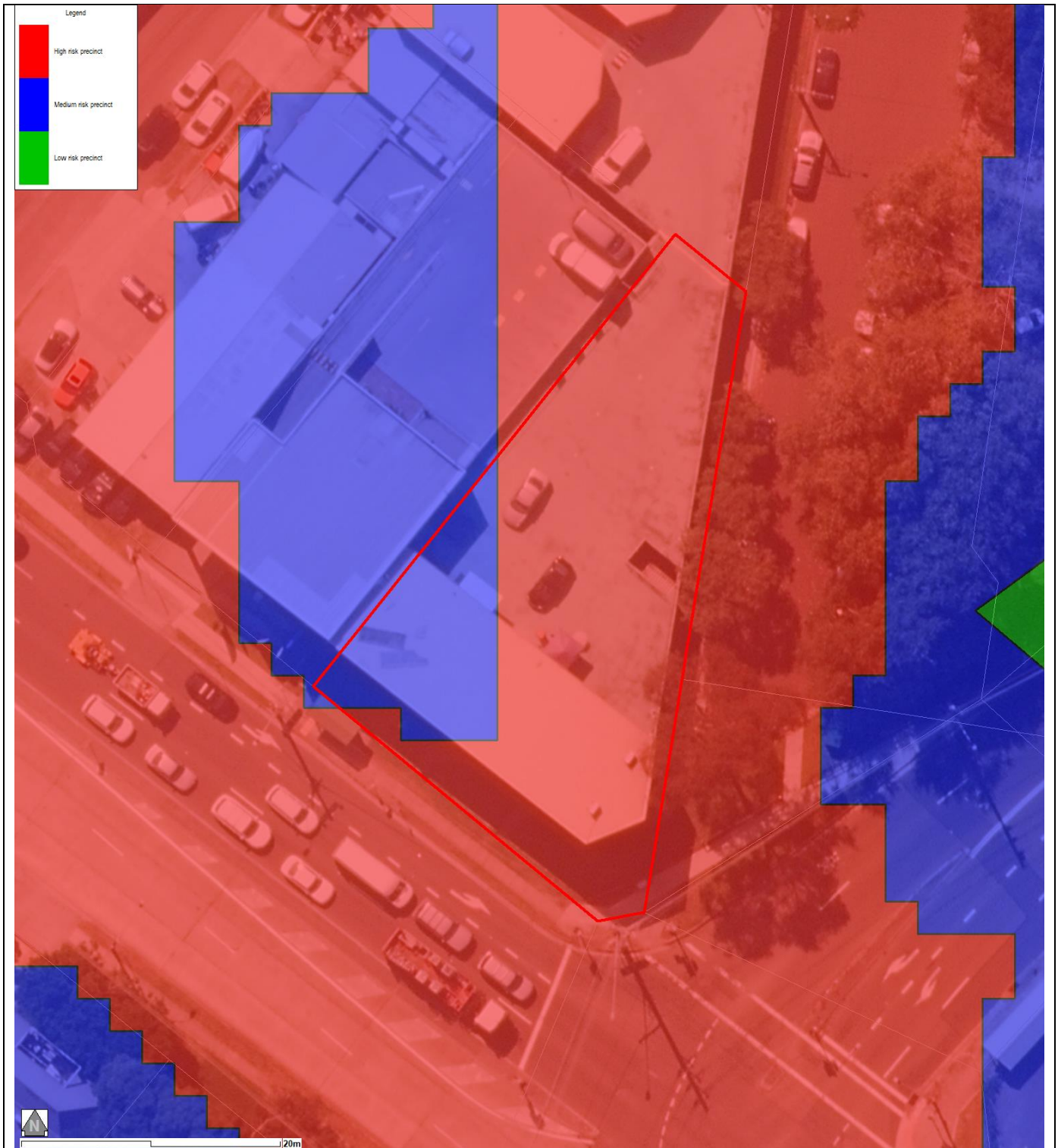
FLOOD MAP E: 1% AEP FLOOD HYDRAULIC CATEGORY EXTENT MAP



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: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source: NearMap 2014) are indicative only.

FLOOD MAP F: FLOOD RISK PRECINCT MAP



Notes:

- **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 and or H6 Life Hazard Classification)

GUIDELINES for Preparing a Flood Management Report

Introduction

These guidelines are intended to provide advice to applicants on preparing a Flood Management Report. The purpose of a Flood Management Report is to help applicants measure and manage the flood risk to life and property on their site.

When is a Flood Management Report required?

A Flood Management Report must be submitted with any Development Application on flood prone land, for Council to consider the potential flood impacts and 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.

Note that the flood extents shown on the mapping are indicative only. It is recommended that flood levels are compared to registered ground survey to more accurately determine the flood extent.

There are some circumstances where a 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 Flood Planning Level 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 in a Flood Management Report?

The aim of a Flood Management Report is to demonstrate how a proposed development will comply with the flood related 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.

Technical requirements of a Flood Management Report

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

1. Description of development

The description of development should identify:

- 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, ie, critical, vulnerable, subdivision, residential, business, industrial, recreational, environmental or concessional

2. Flood analysis

The flood analysis should include:

- Predicted 1 in 100 year flood level
- Flood Planning Level (FPL)
- Probable Maximum Flood (PMF) level
- Flood Risk Precinct, ie High, Medium or Low
- Flood Life Hazard Category (in former Pittwater Council area only)
- Mapping of relevant extents
- Flood characteristics for the site, eg depth, velocity, hazard and hydraulic category, and the impact these have on the proposed development

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

3. Assessment of impacts

The assessment of impacts should address the various elements of the relevant LEP and DCP. A simple compliance table should be provided, similar to the table one below.

	Compliance		
	Not Applicable	Yes	No
A Flood effects caused by Development		YES	
B Drainage Infrastructure & Creek Works	N/A		
C Building Components & Structural		YES	
D Storage of Goods		YES	
E Flood Emergency Response		YES	
F Floor Levels			NO
G Car Parking			NO
H Fencing	N/A		
I Pools	N/A		

Further details of what is required for each of these categories can be found in the *Development Control Plan for Flood Prone Land*.

For any of these categories which are applicable, the assessment should demonstrate how the development complies, or if it doesn't, provide an explanation of why the development should still be considered.

Reporting requirements for a Flood Management Report

The Flood Management Report should include:

- a) Executive summary
- b) Location plan, at an appropriate scale, that includes geographical features, street names and identifies all waterways and Council stormwater pipes, pits and easements
- c) Plan of the proposed development site showing the extent of the predicted 100 year, any high hazard or floodway conditions and the PMF flood event
- d) Development recommendations and construction methodologies
- e) Calculation formulae (particularly for flood storage)
- f) Clear referencing using an accepted academic referencing system (eg. Harvard)
- g) Analysis of development against relevant State Environmental Planning Policies
- h) Analysis of development against relevant Local Environment Plan and Policies
- i) Conclusion detailing key points
- j) Standard Hydraulic Certification (Form A/A1)
- k) Qualifications of author
- l) Any flood advice provided by Council
- m) Any other details which may be relevant

NOTE: 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 Australian Institute of Engineers.

For further information please contact Stormwater and Floodplain Team on 1300 434 434 or via email at floodplain@northernbeaches.nsw.gov.au

Attachment A

NORTHERN BEACHES COUNCIL STANDARD HYDRAULIC CERTIFICATION FORM

FORM A/A1 – To be submitted with Development Application

Development Application for

Address of site: Unit 1/380 Pittwater Road, North Manly

Declaration made by hydraulic engineer or professional consultant specialising in flooding/flood risk management as part of undertaking the Flood Management Report:

I, Rhys Mikhail on behalf of RTS Civil Consulting Engineers Pty Ltd
(Insert Name) (Trading or Business/ Company Name)

on this the 23/01/2020 certify that I am engineer or a
(Date)

professional consultant specialising in flooding and I am authorised by the above organisation/ company to issue this document and to certify that the organisation/ company has a current professional indemnity policy of at least \$2 million.

Flood Management Report Details:

Report Title: Flood Assessment and Risk Management Report

Report Date: 23 January 2020

Author: Rhys Mikhail

Author's Company/Organisation: RTS Civil Consulting Engineers Pty Ltd

I: Rhys Mikhail
(Insert Name)

Please tick all that are applicable (more than one box can be ticked)

have obtained and included flood information from Council (must be less than 12 months old) **(This is mandatory)**

have followed Council's Guidelines for Preparing a Flood Management Report

have requested a variation to one or more of the flood related development controls. Details are provided in the *Flood Management Report*.

Signature 

Name Rhys Mikhail

APPENDIX B – FLOOD HAZARD CURVE RISK LEVEL

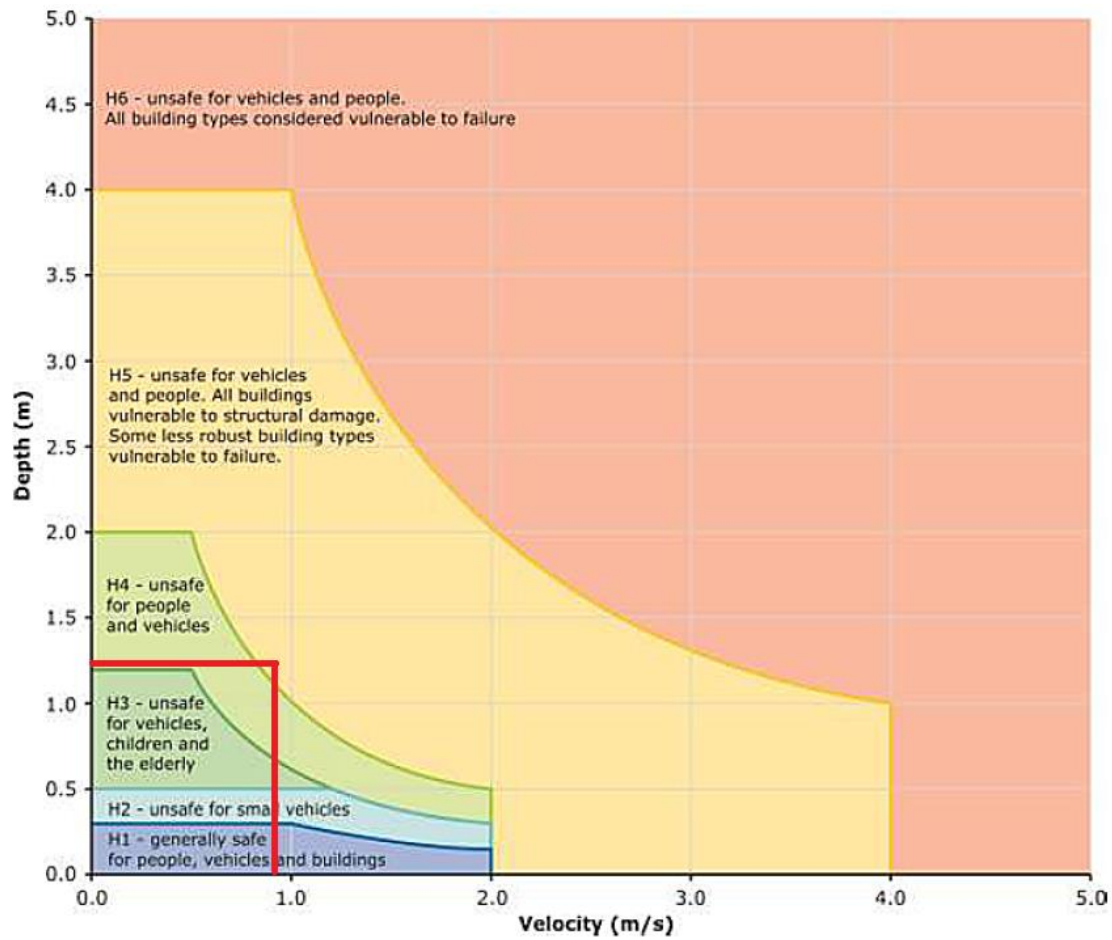


Figure B1 – Flood Hazard Curve Risk Level for the Development

Note: This information is based on the NSW Government Floodplain Management Manual (2005).

PRELIMINARY PLAN

- NOTES:
1. LEVELS SHOWN ARE TO AUSTRALIAN HEIGHT DATUM. ORIGIN OF RL'S; SSM 43667 (DP 1183774) - RL 1.64 (A.H.D.)
 2. BEARINGS ARE ON MGA NORTH AS DERIVED BY DP 1183774
 3. NO BOUNDARY SURVEY HAS BEEN UNDERTAKEN. BEARINGS AND DISTANCES HAVE BEEN COMPILED FROM TITLE AND/OR DEED INFORMATION SUPPLIED BY DEPARTMENT OF LANDS NSW.
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NOTES:

L23132 - PART OF THE LAND ABOVE DESCRIBED SHOWN IN DP 109654 IS PUBLIC ROAD VESTED IN THE COMMISSIONER FOR MAIN ROADS

605201 - COVENANT AFFECTING THE SUBJECT PROPERTY SHOULD BE VERIFIED WITH A SOLICITOR.

**Flood Evacuation
Emergency Assembly
Location**

PROJECT : PLAN SHOWING PARTIAL DETAIL & LEVEL SURVEY OVER PT 23 IN DP 5342. AT NO.380 PITTWATER ROAD, NORTH MANLY

CLIENT : SUSIE MILLS

DATUM : A.H.D. DATE : 12/12/2019

SHEET No. 1 OF 1 SHEETS

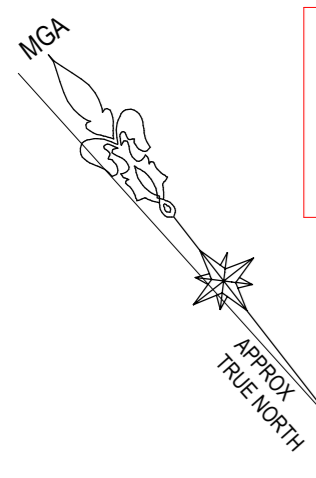
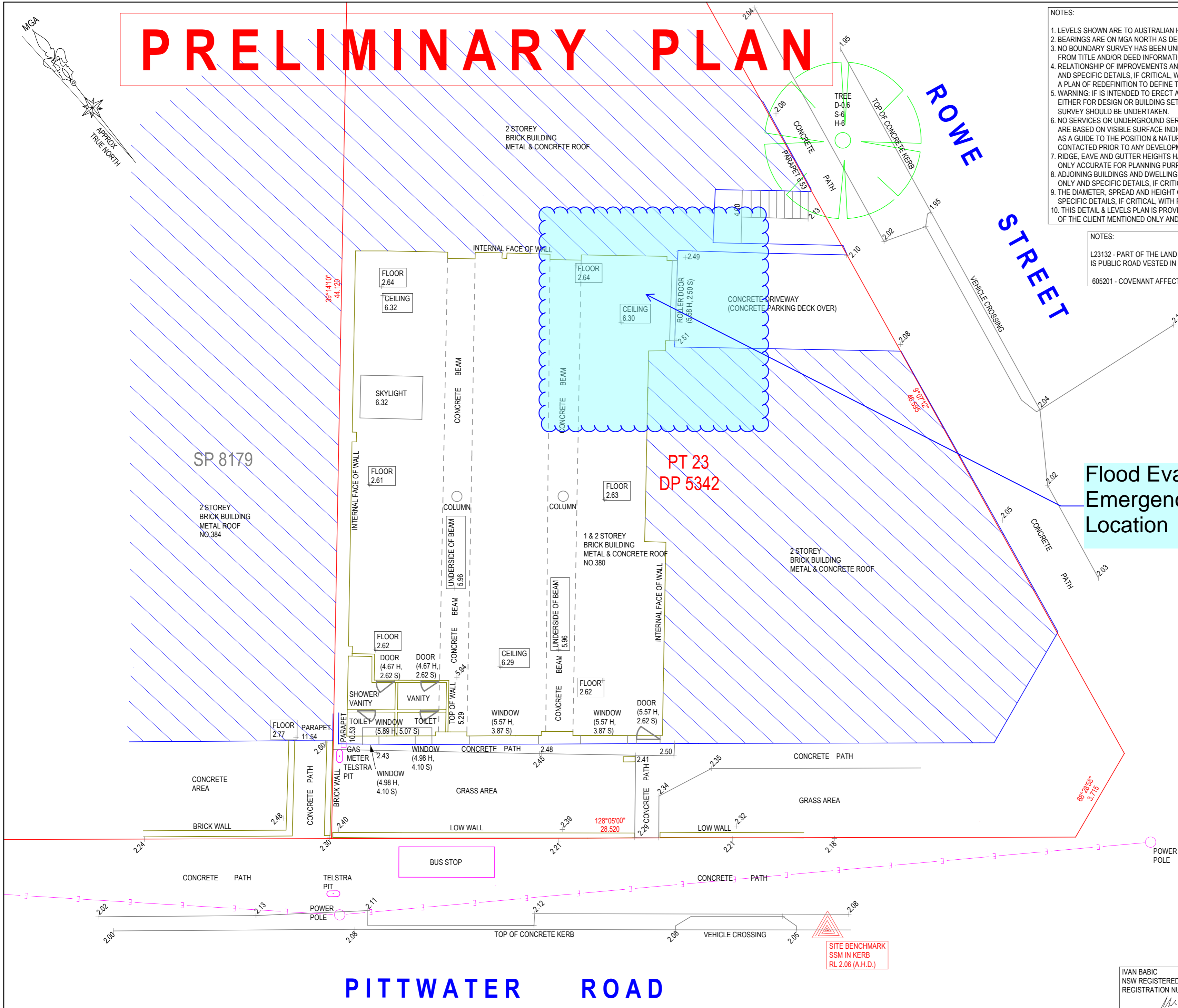
DRAWING No. : 19187PRELIM

JOB REF : 19187 SCALE : 1:100

ALTITUDE SURVEYS
Precision from the ground up
ABN: 50 624 984 747

PHONE: 0450 85 85 00
EMAIL: ALTITUDESURVEYS@OUTLOOK.COM
INTERNET: WWW.ALTITUDESURVEYS.COM.AU

IVAN BABIC
NSW REGISTERED SURVEYOR
REGISTRATION NUMBER - 1604



SITE BENCHMARK
SSM IN KERB
RL 2.06 (A.H.D.)

APPENDIX C – FLOOD RISK DEVELOPMENT MATRIX COMPLIANCE

A. FLOOD EFFECTS CAUSED BY DEVELOPMENT

A1	Development (including earthworks and subdivision) shall not be approved unless it can be demonstrated in a Flood Management Report that it complies with the Flood Prone Land Design Standard found on Council's webpage.	N/A
A2	Certification shall be provided in accordance with Northern Beaches Council's Standard Hydraulic Certification Form (Forms A and A1 of Northern Beaches Council's Guidelines for preparing a Flood Management Report) to the effect that the works have been designed and can be constructed to adequately address flood risk management issues.	Achieved
A3	The applicant shall include in their submission, calculations to illustrate that any fill or other structures that reduce the total flood storage are replaced by Compensatory Works.	N/A
A4	Development (including earthworks and subdivision) shall not be approved unless it can be demonstrated in a Flood Management Report that it been designed and can be constructed so that in a Probable Maximum Flood event: (a) There are no adverse impacts on flood levels and velocities caused by alterations to the flood conveyance; (b) There are no adverse impacts on surrounding properties; and (c) It is sited to minimise exposure to flood hazard. Where relevant certification shall also be provided in Northern Beaches Council's Standard Certification Form (Forms A and A1 of Northern Beaches Council's Guidelines for preparing a Flood Management Report) to this effect.	N/A

B. DRAINAGE INFRASTRUCTURE AND CREEK WORKS

B1	Flood mitigation works or stormwater devices that modify a major drainage system, stormwater system, natural water course, floodway or flood behaviour within or outside the development site may be permitted subject to demonstration through a Flood Management Report that they comply with the Flood Prone Land Design Standard found on Council's webpage.	N/A
B2	A Section 88B notation under the Conveyancing Act 1919 may be required to be placed on the title describing the location and type of flood mitigation works with a requirement for their retention and maintenance.	N/A

C. BUILDING COMPONENTS AND STRUCTURAL SOUNDNESS

C1	All buildings shall be designed and constructed as flood compatible buildings in accordance with Reducing Vulnerability of Buildings to Flood Damage: Guidance on Building in Flood Prone Areas, Hawkesbury-Nepean Floodplain Management Steering Committee (2006).	N/A
C2	All structures must be designed and constructed to ensure structural integrity up to the Flood Planning Level, taking into account the forces of floodwater, wave action, flowing water with debris, buoyancy and immersion. Structural certification shall be provided confirming the above. Where shelter-in-place refuge is to be provided the structural integrity is to be to the Probable Maximum Flood level.	To be actioned by structural engineer.
C3	All new electrical equipment, power points, wiring, fuel lines, sewerage systems or any other service pipes and connections must be waterproofed and/or located above the Flood Planning Level. All existing electrical equipment and power points located below the Flood Planning Level must have residual current devices installed that turn off all electricity supply to the property when flood waters are detected.	Achieved

D. STORAGE OF GOODS

D1	Hazardous or potentially polluting materials shall not be stored below the Flood Planning Level unless adequately protected from floodwaters in accordance with industry standards.	Achieved
D2	Goods, materials or other products which may be highly susceptible to water damage are to be located/stored above the Flood Planning Level.	Achieved

E. FLOOD EMERGENCY RESPONSE

E1	Development shall comply with Council's Flood Emergency Response Planning for Development in Pittwater Policy and the outcomes of any Flood Risk Emergency Assessment Report where it applies to the land.	Achieved
E2	New development must provide an appropriately sized area to safely shelter in place above the Probable Maximum Flood level and appropriate access to this area should be available from all areas within the development.	N/A
E3	Adequate Warning Systems, Signage and Exits shall be installed to allow safe and orderly evacuation without reliance upon the SES or other authorised emergency services personnel.	Achieved
E4	The application shall demonstrate that evacuation/shelter in place in accordance with the requirements of this DCP will be available for any potential development arising from a Torrens title subdivision.	Achieved

F. FLOOR LEVELS

F1	<p>New floor levels within the development shall be at or above, the Flood Planning Level.</p> <p>A reduced Flood Planning Level may be considered only where it is permitted in this Development Control Plan.</p> <p>The structure must be flood proofed (wet or dry) to the Flood Planning Level. This control cannot be applied to critical or vulnerable uses.</p>	N/A
F2	<p>All development structures must be designed and constructed so as not to impede the floodway or flood conveyance on the site, as well as ensuring no loss of flood storage in a 1 % AEP Event.</p> <p>Where the dwelling is located over a flow path it must be elevated on suspended pier/pile footings such that the level of the underside of all floors including balconies and decks within the flood affected area are at or above, or raised to the Flood Planning Level to allow clear passage of the floodwaters under the building. The development must comply with the Flood Prone Land Design Standard.</p>	N/A
F3	Where the lowest floor has been elevated to allow the passage of flood waters, a restriction shall be imposed on the title of the land, pursuant to S88B of the Conveyancing Act confirming that the undercroft area is not to be enclosed.	N/A
F4	<p>A one-off addition or alteration below the Flood Planning Level of less than 30 square metres or an increase of less than 10 percent of the ground floor area (whichever is the lesser) for residential development may be considered only where:</p> <p>(a) it is an extension to an existing room (b) the Flood Planning Level is incompatible with the floor levels of the existing room</p> <p>This control will not be permitted if this provision has previously been utilised since the making of this Plan.</p> <p>The structure must be flood proofed to the Flood Planning Level.</p>	N/A
F5	The applicant must demonstrate that future development following a subdivision proposal can be undertaken in accordance with this Control.	N/A

F6	Any existing floor level may be retained below the Flood Planning Level when undertaking a first floor addition provided that: (a) it is not located within a floodway; (b) there is no increase to the building footprint below the Flood Planning Level; (c) it is flood proofed to the Flood Planning Level;	N/A
F7.	All floor levels within the development shall be at or above the Probable Maximum Flood level or Flood Planning Level whichever is higher.	N/A
F8.	The minimum floor level of any first floor additions shall be at or above the Probable Maximum Flood Level.	N/A
F9.	Foyers - consideration may be given to a minimum floor level of a foyer being set at the 5 percent AEP flood level, provided it can be demonstrated that it complies with the Flood Prone Land Design Standard.	Achieved
F10	Consideration may be given to a minimum floor level for the first 5m from the street front of new development in business zonings below the Flood Planning Level provided it can be demonstrated that it complies with the Flood Prone Land Design Standard.	N/A
F11	A one-off addition or alteration below the Flood Planning Level of less than 100 square metres or an increase of less than 10 percent of the ground floor area (whichever is the lesser) for non-residential development may be considered only where the required floor level cannot be achieved for the following reason: (a) it would be incompatible with floor levels of the existing building This control will not be considered if the existing floor level of the additions/alterations are located within a high hydraulic hazard area. This control will not be permitted if this provision has previously been utilised since the making of this Plan. Any features of the additions or alterations on the floor level must be flood proofed to the Flood Planning Level	N/A

G. CAR PARKING

G1	Open carpark areas and carports shall not be located within a floodway.	N/A
G2	The lowest floor level of open carparks and carports (unroofed or with open sides) shall be constructed no lower than the natural ground levels.	N/A
G3	All enclosed car parks must be protected from inundation up to the relevant flood planning level. For example, basement carparks must be provided with a crest at the entrance, the crest of which is at the relevant Flood Planning Level. All access, ventilation and any other potential water entry points to any enclosed car parking shall be above the relevant Flood Planning Level. Council will not accept any options that rely on electrical, mechanical or manual exclusion of the floodwaters from entering the enclosed carpark	N/A
G4	Vehicle barriers or restraints are to be provided to prevent floating vehicles leaving the site where there is more than 300mm depth of flooding in a 1 percent AEP flood event. The minimum height of the vehicle barriers or restraints must be at or above the Flood planning Level. Vehicle barriers or restraints must comply with the Flood Prone Land Design Standard.	N/A
G5	Enclosed Garages must be located at or above the 1 percent AEP level	N/A
G6	Carports must comply with the Flood Prone Land Design Standard	N/A

G7	Where a driveway is required to be raised it must be demonstrated that there is no loss to flood stage in the 1 percent AEP flood event and no impact on flood conveyance through the site	N/A
G8	Multi Dwelling Housing and Shop Top Housing residential carparking – consideration may be given to a minimum floor level for open or covered carparking being set at the 5 percent AEP flood level, provided it can be demonstrated that it complies with the Flood Prone Land Design Standard.	N/A
G9	All enclosed car parks must be protected from inundation up to the Probable Maximum Flood level or Flood Planning Level whichever is higher. For example, basement carparks must be provided with a crest at the entrance, the crest of which is at the relevant Probable Maximum Flood level or Flood Planning Level whichever is higher. All access, ventilation and any other potential water entry points to any enclosed car parking shall be above the relevant Probable Maximum Flood level or Flood Planning Level whichever is higher.	N/A
G10	Enclosed Garages must be located at or above the Probable Maximum Flood Level or Flood Planning Level whichever is higher.	N/A

H. FENCING

H1	Fencing, including pool fencing, shall be designed so as not to impede the flow of flood waters and not to increase flood affectation on surrounding land. Appropriate fencing must comply with the Flood Prone Land Design Standard in addition to other regulatory requirements of pool fencing.	N/A
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I. POOLS

I1	Pools located within the 1 percent AEP flood extent are to be in-ground, with coping flush with natural ground level. Where it is not possible to have pool coping flush with natural ground level, it must be demonstrated that the development will result in no net loss of flood storage and no impact on flood conveyance on or from the site. All electrical equipment associated with the pool (including pool pumps) is to be waterproofed and/or located at or above the Flood Planning Level. All chemicals associated with the pool are to be stored at or above the flood planning level.	N/A
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APPENDIX D – PROPOSED FLOOR PLANS & SURVEY INFORMATION

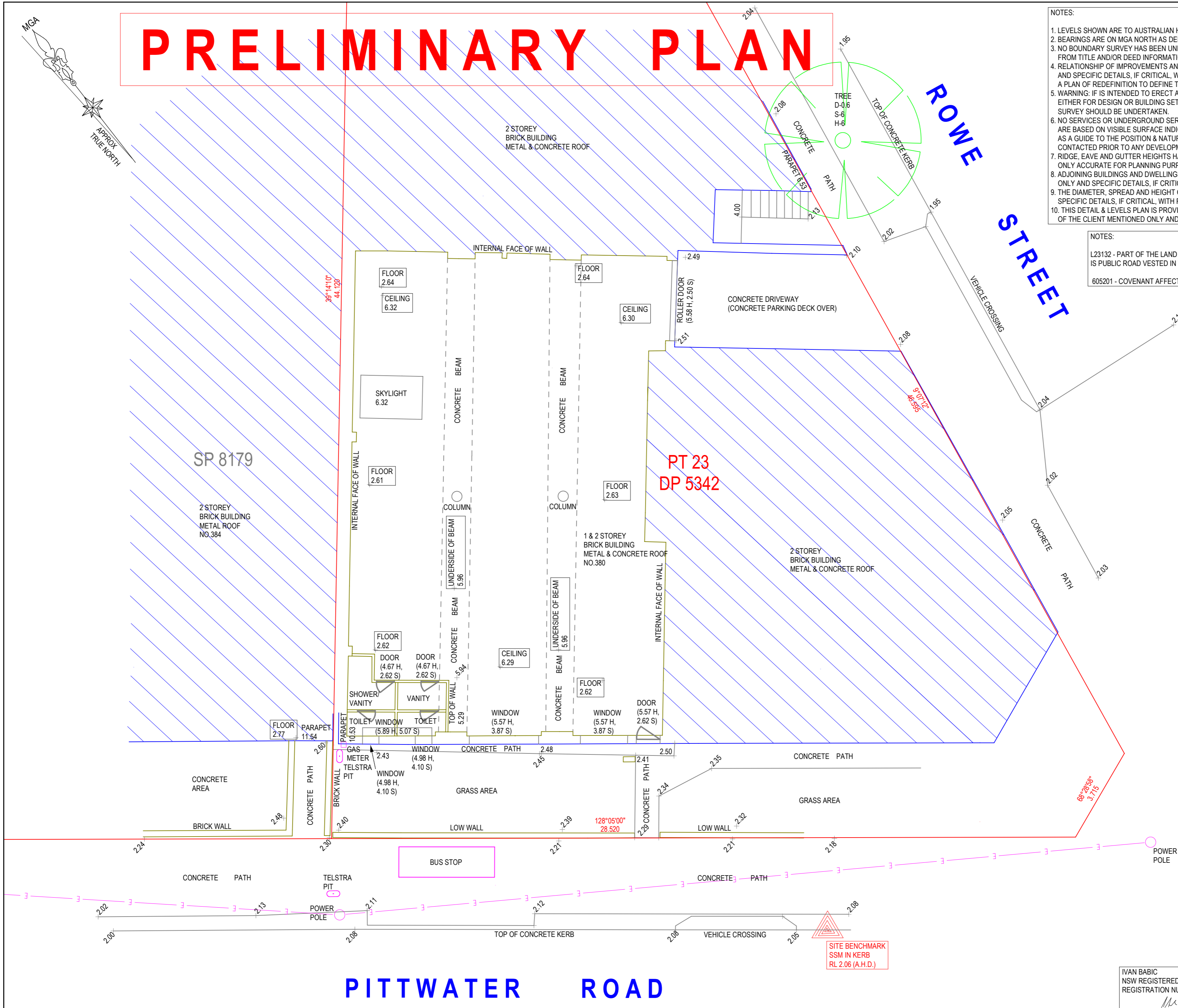
PRELIMINARY PLAN

NOTES:

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PROJECT : PLAN SHOWING PARTIAL DETAIL & LEVEL SURVEY OVER PT 23 IN DP 5342. AT NO.380 PITTWATER ROAD, NORTH MANLY

CLIENT : SUSIE MILLS

DATUM : A.H.D. **DATE :** 12/12/2019

SHEET No. 1 OF 1 SHEETS

DRAWING No. : 19187PRELIM

JOB REF : 19187 **SCALE :** 1:100

ALTITUDE SURVEYS
 Precision from the ground up
 ABN: 50 624 984 747

PHONE: 0450 85 85 00

EMAIL: ALTITUDESURVEYS@OUTLOOK.COM

INTERNET: WWW.ALTITUDESURVEYS.COM.AU

IVAN BABIC
 NSW REGISTERED SURVEYOR
 REGISTRATION NUMBER - 1604

SITE BENCHMARK
 SSM IN KERB
 RL 2.06 (A.H.D.)

PITTWATER ROAD

ROWE STREET

SP 8179

PT 23
 DP 5342

2 STOREY
 BRICK BUILDING
 METAL & CONCRETE ROOF

2 STOREY
 BRICK BUILDING
 METAL ROOF
 NO.384

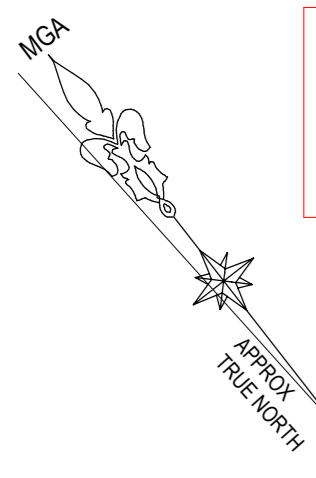
1 & 2 STOREY
 BRICK BUILDING
 METAL & CONCRETE ROOF
 NO.380

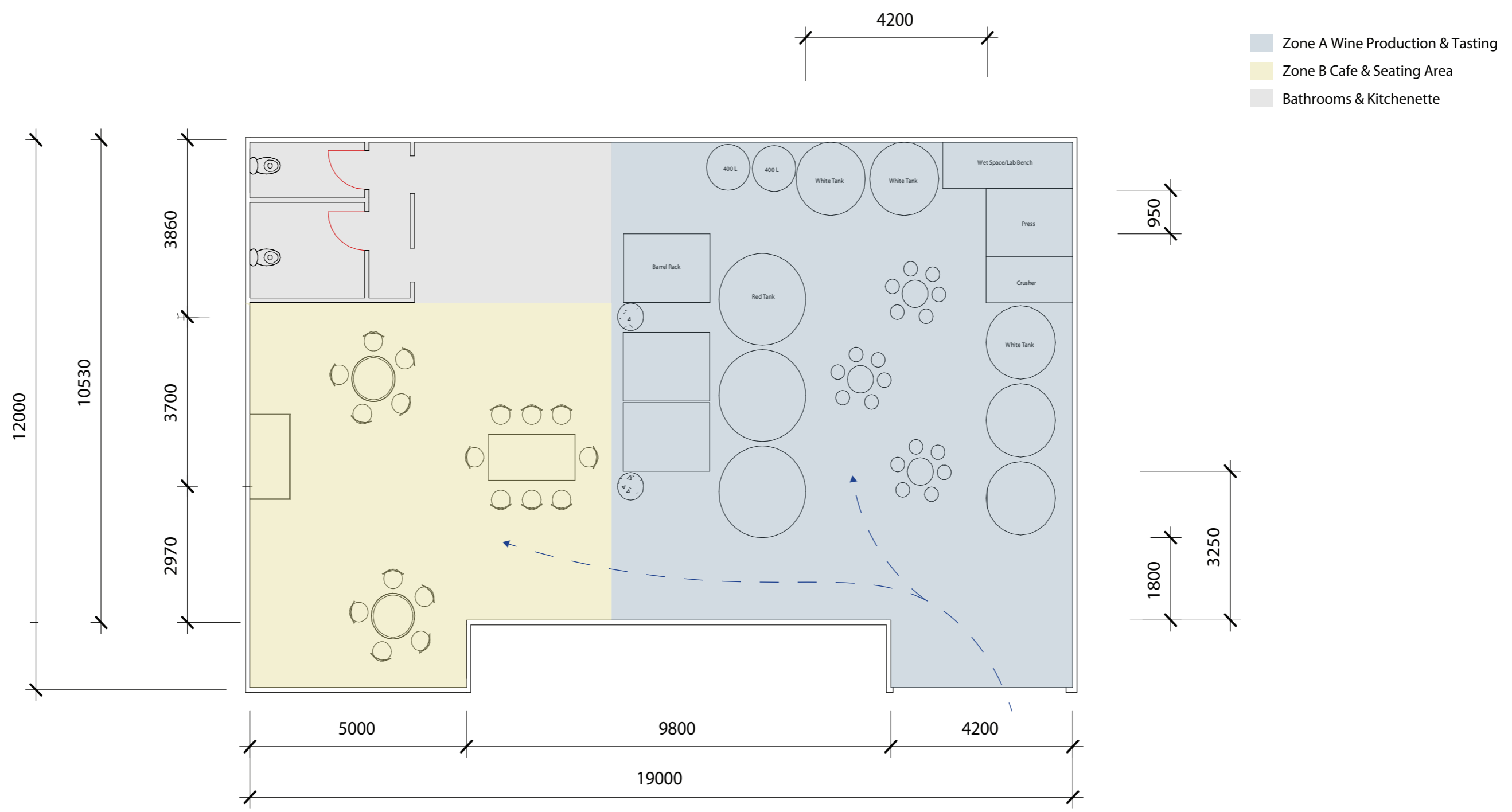
2 STOREY
 BRICK BUILDING
 METAL & CONCRETE ROOF

BUS STOP

TELSTRA PIT

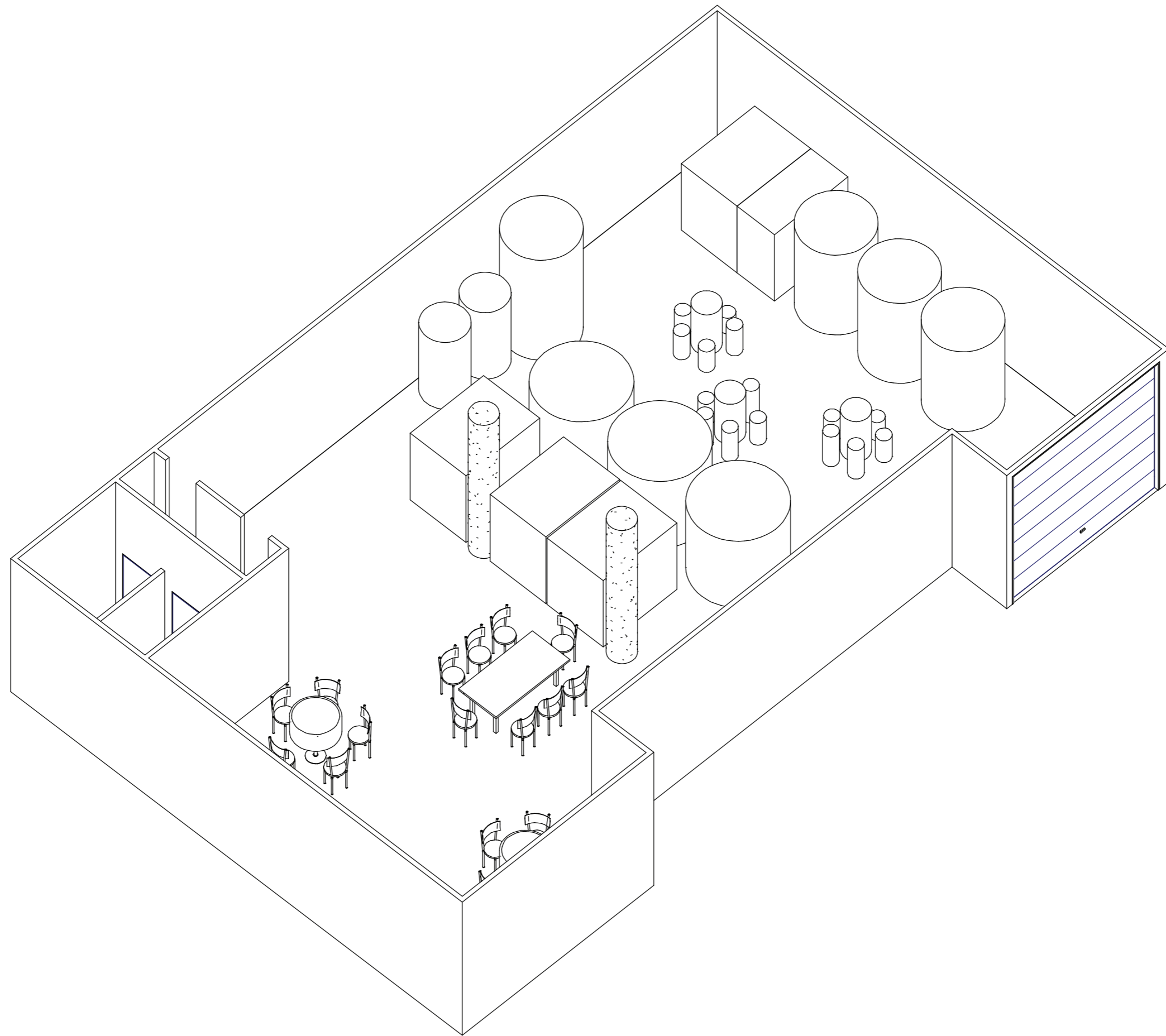
POWER POLE





1 Zone Floor Plan
1 : 100

Status: Concept	Project: Wine Cellar Address: Enter address here	Drawing: Zoning Floor Plan	Drawn Scale: 1 : 100	Date: 28/10/19
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Status:

Concept

Project:

Wine Cellar

Address:

Enter address here

Drawing:

Perspective

Drawn Scale:

1 : 100

Date:

28/10/19