



Operational Flood Emergency Management Plan

for

16B Honeysuckle Drive, Newcastle

for Hansen Yuncken Pty Ltd

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Report Details

Project: University of Newcastle
16B Honeysuckle Drive, Newcastle

Project Ref: NL172724_E02

File Location: \\incl-fp\job_files1\YEAR 2017 Jobs\NL172724-01 - UON Honeysuckle\E - Reports

Revision History

Revision	Report Status	Prepared	Reviewed	Issue Date
A	Draft for Client Review	R. Jeans	L. Gitzel	02/06/2020
B	For Construction	M. Swan	L. Gitzel	08/07/2020
C	Draft For Client Review	J. Carroll	L. Gitzel	08/03/2021
D	For Occupation	J. Carroll	A. Brien	06/04/2021

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Flood Response Summary

The following provides a summary of the findings of this Operational Flood Emergency Management Plan, including a summary of the flood behaviour, floor levels with respect to the flood behaviour, the recommended flood response actions, and on-site and off-site flood refuge locations.

Flood Behaviour - Site

Table 1 - Summary of Flood Behaviour (Subject Site)

Event	1% AEP	PMF
Flood Level (m AHD)	2.43	3.40
Velocity (m/s)	0.3	2.9
Flood Depth (m)	0.54 (SE Corner)	1.51 (SE Corner)
Hazard Level	-	H5
Risk to Property	P2	-
Risk to Life	-	L5

Flood Depths – Surrounding Roads

Table 2 - Surrounding Roads Flood Depths

Event	1% AEP	PMF
Wright Lane	0.90m	1.87m
Worth Place / Honeysuckle Drive	0.81m	1.62m

Floor Levels

Table 3 - Internal Floor Levels

Floor	Level (m AHD)	Relationship to Flood Levels
Ground Floor Level	2.80	370mm above 1% AEP
Level 1	8.00	4.60m above PMF
Level 2 – Roof	13.10 and above	Min. 9.70m above PMF

Flood Response Actions

Table 4 - Flood Response Actions Summary

WHEN	WHAT	BY WHO
Prior to Flooding	Assemble Emergency Kit	First Aid Officer
	Check Kit every six months	First Aid Officer
	Coordinate Evacuation Drills half-yearly	Business Continuity Officer
	Sign up and maintain Newcastle Alert Service subscription (see Section 4.11)	Business Continuity Officer and Critical Incident Team (CIT)
	Monitor weather situation at 4pm every afternoon	Business Continuity Officer
	Ensure inductions for new staff include flood risk associated with the site and evacuation procedures.	Business Continuity Officer
Evacuation	Text / Email from Newcastle Alert Service with rainfall predicted to be greater than; 137mm or greater in a 3-hour period. 93mm in an hour. 72mm in 30 minutes. 234mm in a 12-hour period. Or a predicted ocean tidal level of 2.0m AHD or higher.	Business Continuity Officer and CIT
	Make decision to Evacuate and Notify Police / SES	CIT
	Sound Alert of PA System and Chief Flood Warden to Emergency Assembly Point	Chief/Deputy-Chief Warden
	Direct facility users and visitors to Emergency Assembly Point	Emergency Wardens
	Call ahead to designated refuge to ensure evacuees can be facilitated.	CIT
	Roll call to make sure everyone is accounted for	Building Warden
	Leave signage notifying any responders attending site that evacuation has been undertaken	Chief/Deputy-Chief Warden
	Return home and wait out the storm	All
	If unable to return home, evacuate to designated refuge	Chief/Deputy-Chief Warden
	On-site Refuge	Warning has been issued triggering evacuation, but RAINFALL HAS STARTED and/or off-site refuge is unavailable.
Communicate decision to remain on-site and organise seating and lighting.		Emergency Wardens
Wait it out at refuge point		All
Maintain regular communication with employees, students, and visitors.		Chief/Deputy-Chief Warden
Do not attempt to drive or walk through floodwaters. If stranded on-site and water inundates floor level, call 000 immediately.		All

Once Risk has Passed / After a Flood	Check all services and structural stability of buildings.	IFS
	Return to operation.	Chief/Deputy-Chief Warden

Key Personnel

Table 5 - Key Personnel Summary

Person	Organisation	Name/s	Number
Business Continuity Officer			
Critical Incident Team			
Chief Warden		Security Manager	(02) 4921 5888
Deputy-Chief Warden		Security Officer	(02) 4921 5888
Building Warden			
First Aid Officer			
SES		-	132 500
Police / Fire / Ambulance		-	000
Newcastle Council Emergency Hotline		-	(02) 4974 6000
NUspace		Precinct Facility Manager / Deputy Director Campus Services	(02) 49216664

Emergency Assembly Point

The **Emergency Assembly Point for Flooding** is the **Student Social Area on Level 1**. This is shown below in Figure 1.

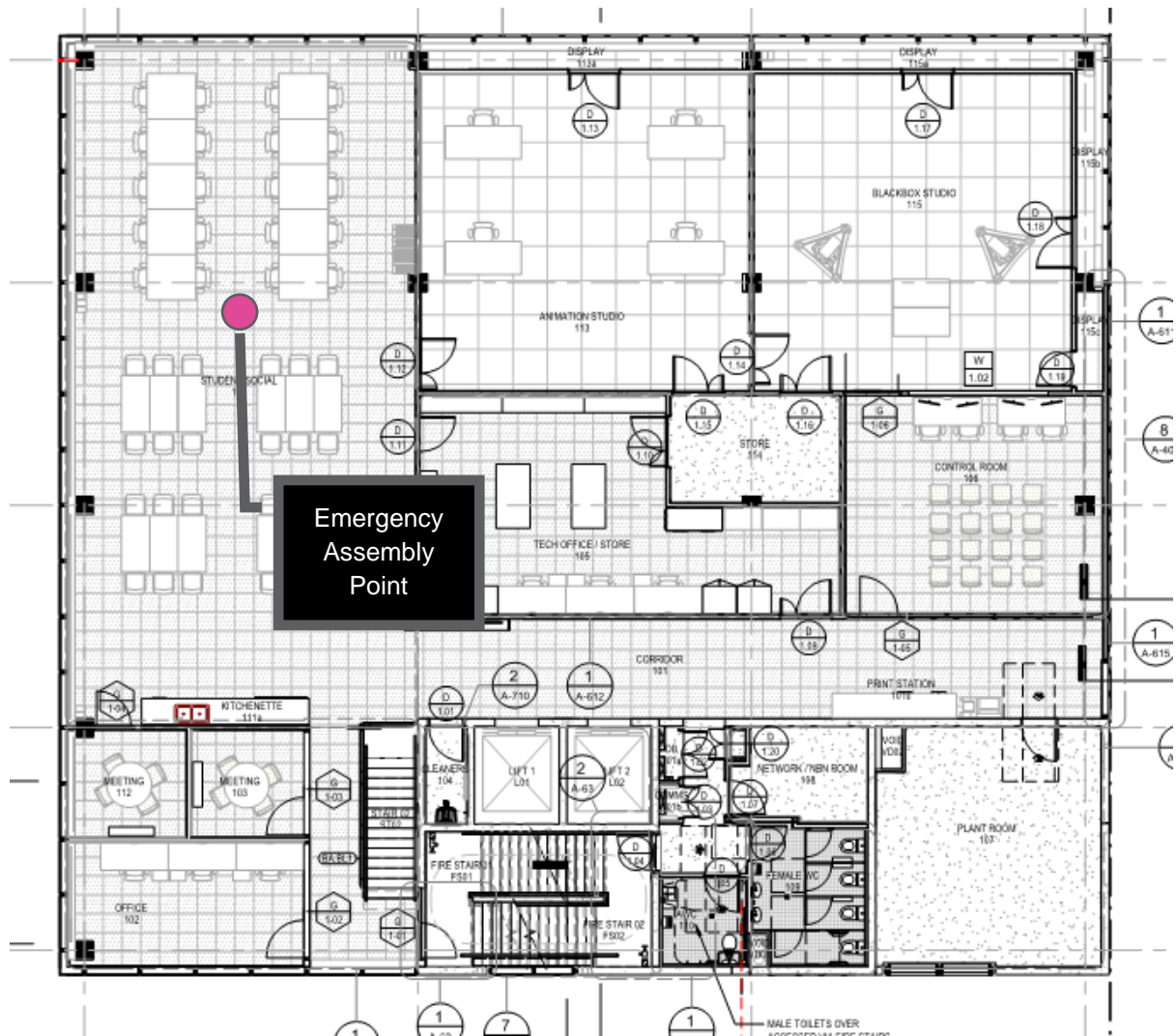


Figure 1 - Flood Emergency Assembly Point

Off-site Refuge Facility – NUspace (Corner of Auckland Street and Hunter Street, Newcastle)



Figure 2 - Evacuation Route to Off-site Refuge Facility (NUspace)

1. Introduction

Northrop Consulting Engineers have been engaged by Hansen Yuncken Pty Ltd to prepare an Operational Flood Emergency Management Plan (OFEMP) for the proposed Building at 16B Honeysuckle Drive, Newcastle (the subject site).

This report has been prepared to comply with Item D24 of the Development Consent SSD9510, dated 21/05/2020. The consent conditions require the following items to be addressed:

- Address the provisions of the *Floodplain Risk Management Guidelines* (EESG).
- Including details of:
 - the flood emergency responses for operational phase of the development;
 - likely flood behaviour and predicted flood levels;
 - flood warning time and flood notification;
 - assembly points and evacuation routes;
 - evacuation and refuge protocols;
 - awareness training for employees and contractors, and students; and
 - how detailed evacuation procedures interface with the Bureau of Meteorology's flood warning system and the local State Emergency Services plan (where appropriate) and include provisions for any third parties likely to be involved.

This report has also been prepared to comply with consent conditions D25 and D26 of the Development Consent mentioned above. These items are stated below.

- D25: The OFEMP shall be effectively updated and maintained by the occupiers.
- D26: Prior to the commencement of the operation a clear warning notice is to be erected and maintained at all points of entry to the site advising that the premises is subject to flooding and that caution should be observed at all times of heavy or prolonged rainfall. Such notice is to also provide advice regarding the availability of further detail in respect of possible flooding, refuge areas and include an appropriate telephone number.

It is the requirement of the occupier to fulfil these consent conditions. See Appendix A for an example of Site Signage.

1.1. Subject Site

The subject site is contained within Lot 1 in DP1163346 and is bounded by existing lots to the east, Worth Place to the west, Wright Lane to the south and Honeysuckle Drive to the north. Building 1A forms the first stage of the University of Newcastle's Honeysuckle City Campus Development (HCCD). The subject site is located within an existing developed area consisting of a number of multi-story buildings used for commercial purposes.

The subject site is located within the Cottage Creek catchment, which drains to the Throsby Basin in Newcastle Harbour via a concrete lined channel and a network of underground storm water pipes. A locality plan is presented below in Figure 3.

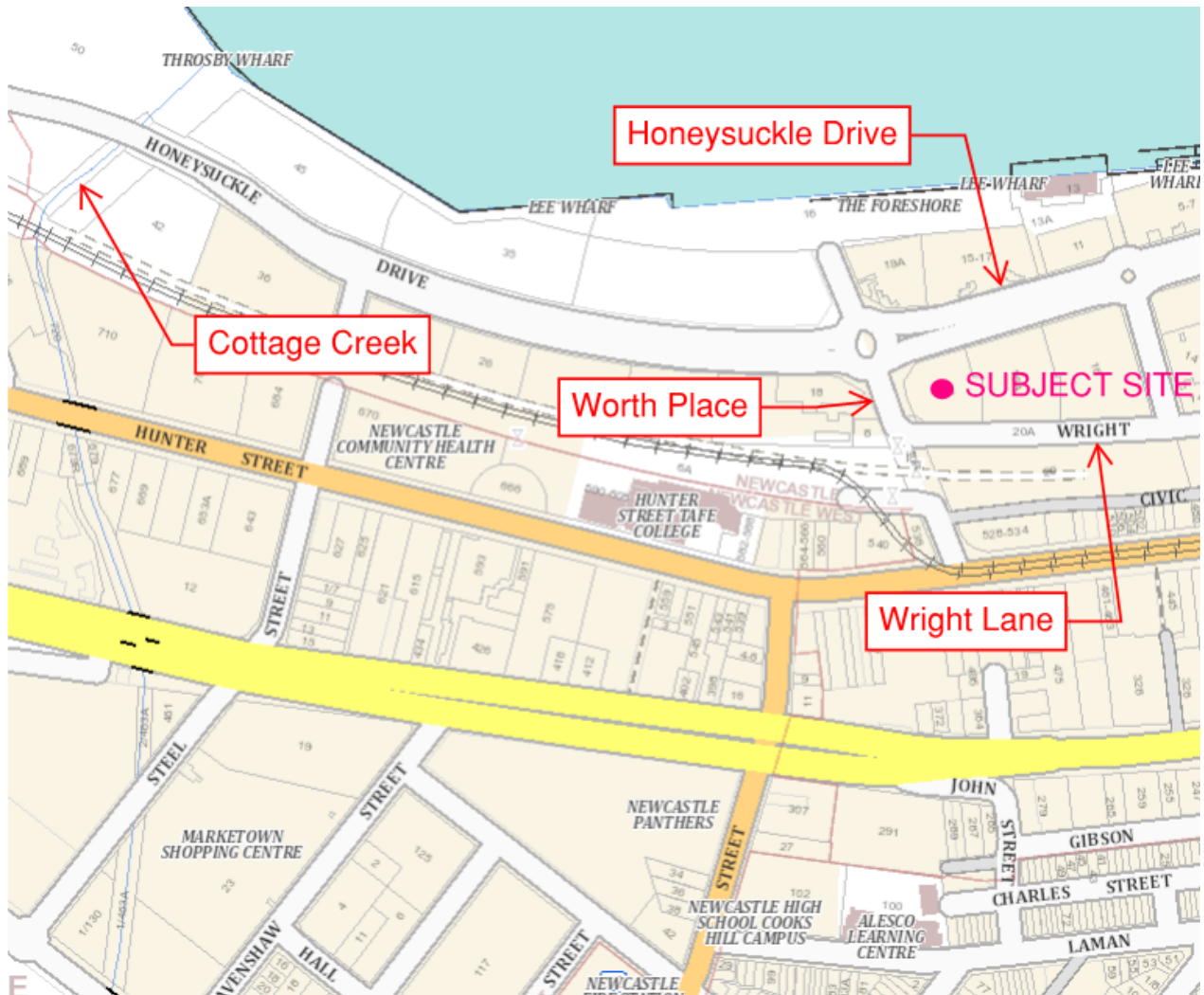


Figure 3 - Locality Plan (obtained from SIX Maps www.maps.six.nsw.gov.au)

Contained herein is a description of the methodology and information used to prepare this report, a summary of the likely flood behaviour, recommendations for flood preparations and recommended response actions during a flood event.

2. Methodology and Available Data

This plan was developed based on flood information provided by The City of Newcastle on the 9th May 2018 in the form of Flood Information Certificate No. FL2018/00123. Extracts from the *Honeysuckle Redevelopment Area Flood Study (March 2018)* have also been used in preparation of this plan. These resources are included in Appendix B and likely flood behaviour is summarised in **Section 3**.

Flood warning time and a review of the Bureau of Meteorology (BoM) and State Emergency Service (SES) guidelines have been undertaken to report on the likely warning types described in **Section 4**.

Consideration has been given to the personnel most likely to be on-site and responsible for flood emergency response. This is outlined in **Section 5**.

Drawings showing the proposed development layout and floor levels have been provided by EJE Architecture. Analysis of the site topography in combination with the likely flood behaviour has informed the assembly points, evacuation routes and on-site refuge points nominated in **Sections 6 and 7**.

Contact numbers for relevant emergency response agencies and the proposed local evacuation centre are noted in **Section 8**.

Finally, a review of the SES City of Newcastle DISPLAN, Flood Emergency Sub-Plan and Emergency Business Continuity Plan reference material has contributed to the recommend preparation and response actions outlined in **Sections 9 and 10**.

3. Flood Behaviour

3.1. Flood Source and Behaviour

Both ocean and local catchment flooding mechanisms are present for the site. Local catchment flooding of the subject site is expected to be derived by local overland flow from the upstream Cottage Creek catchment, which extends up to the suburbs of Merewether and Hamilton. Local catchment flooding is expected to be the more critical flood scenario due to the high velocities present along the travel path and the short response time available. However, the maximum PMF peak flood level for the site is derived from ocean flooding (See Table 6 and FL2018/00123).

It is important to note that the storm events considered as part of this plan are rare to extreme events which are not expected to occur every time it rains. The 1% Annual Exceedance Probability (AEP) is commonly referred to as the “100-year flood event” while, the PMF has a nominal AEP in the order of 1 in 10 million.

The flood behaviour within the subject site and surrounding areas has been obtained via Newcastle City Council’s online interactive flood maps and is reproduced in Figure 4 below.



Figure 4 – Local catchment flood behaviour (The City of Newcastle Online Interactive Flood Maps)

Note that the **Blue** colours shown in Figure 4 have been derived using the 1% AEP design storm event while, the **Green** coloured hatch represents the extent of the floodplain during the PMF design storm event.

Local Catchment Flooding

During major stormwater events, overland flow from the local catchment is expected to come from the south along Worth Place and from the east along Honeysuckle Drive. Flows from Worth Place are diverted down Wright Lane and combine with flows through Honeysuckle Drive before continuing north towards Throsby Creek.

During the 1% Annual Exceedance Probability (AEP) flood event (commonly referred to as the “100-year flood”), the site area is expected to remain largely free of inundation with areas of floodway mostly restricted to the adjacent road reserves of Cottage Creek, Steel Street, Wright Lane and Worth Place. It is important to note that although the majority of the site is free from floodwaters during the 1% AEP event, access and egress from the site will become restricted as floodwaters inundate adjacent roadways.

During a Probable Maximum Flood (PMF) event, Worth Place and Wright Lane are expected to act as major floodways. This results in the majority of the ground floor being inundated and the majority of the site becoming an overland flow path.

Due to the high urbanisation of the upstream catchment, a quick response time is expected following commencement of rainfall. The Throsby, Cottage Creek and CBD Flood Study (BMT WBM, 2008) suggests that the critical duration in the vicinity of the subject area ranges from the two to twelve-hour duration and as such, the peak has the potential to occur within two hours following the commencement of rainfall. Flooding during the local catchment event is not expected to remain for a prolonged period of time.

With limited opportunities for evacuation during the peak of the 1% AEP flood event and inundation during the PMF, the subject site is classified as a low flood island where, anyone left onsite following commencement of rainfall has the potential to become trapped with a significant risk to life in events greater than the 1% AEP. As such, early evacuation, prior to the commencement of rainfall is preferred.

Ocean Flooding

There is also the potential for flooding across the subject site to occur from elevated flood levels in the Hunter River. High flood velocities are not expected during this event, however there is the potential for high depths.

Flooding from Ocean / Hunter River flooding is expected to be the result of a long duration flood combined with high ocean levels. Timing of tidal peaks are well documented, and meteorological factors influencing tide levels are generally observed over timeframes of 12 hours or more. As such, warning times for ocean flooding are expected to be between 6 to 12 hours for ocean flooding events. This provides adequate warning time to evacuate the building prior to the site being inundated.

Flooding across the subject site due to an Ocean / Hunter River event has the potential to remain for a number of days.

3.2. Predicted Flood Levels, Depths and Velocities

Peak flood levels and velocities provided in the Flood Certificate (FL2018/00123) provided by Council and the Honeysuckle Redevelopment Area Flood Study (BMT WBM, 2018) are summarised in Table 6 below. Table 6 also presents the estimated flood depth at the Worth Place frontage based on the peak flood levels and the minimum kerb invert level for the subject site. Review of detailed survey and the civil design drawings suggest the minimum kerb invert levels within the Worth Place frontage to be approximately 1.53m AHD.

Table 6 - Flood Levels Across the Site

Event	Peak Flood Level (m AHD)	Velocity (m/s)	Estimated Depth at Worth Place Frontage (m)
1% AEP	2.43	0.3	0.9
PMF	3.40	2.9	1.87

Peak flood levels for the surrounding area can be seen in Figures 5 and 6 below for the 1% AEP and PMF storm events respectively. Peak flood depths in the surrounding streets occur in Wright Lane and are approximately 0.3m during the 1% event, and exceed 1m during the PMF event. Note that these levels are derived from local catchment flooding only. Flood depths across the subject site during the PMF are governed by the ocean flood event with a flood level of 3.40m AHD.

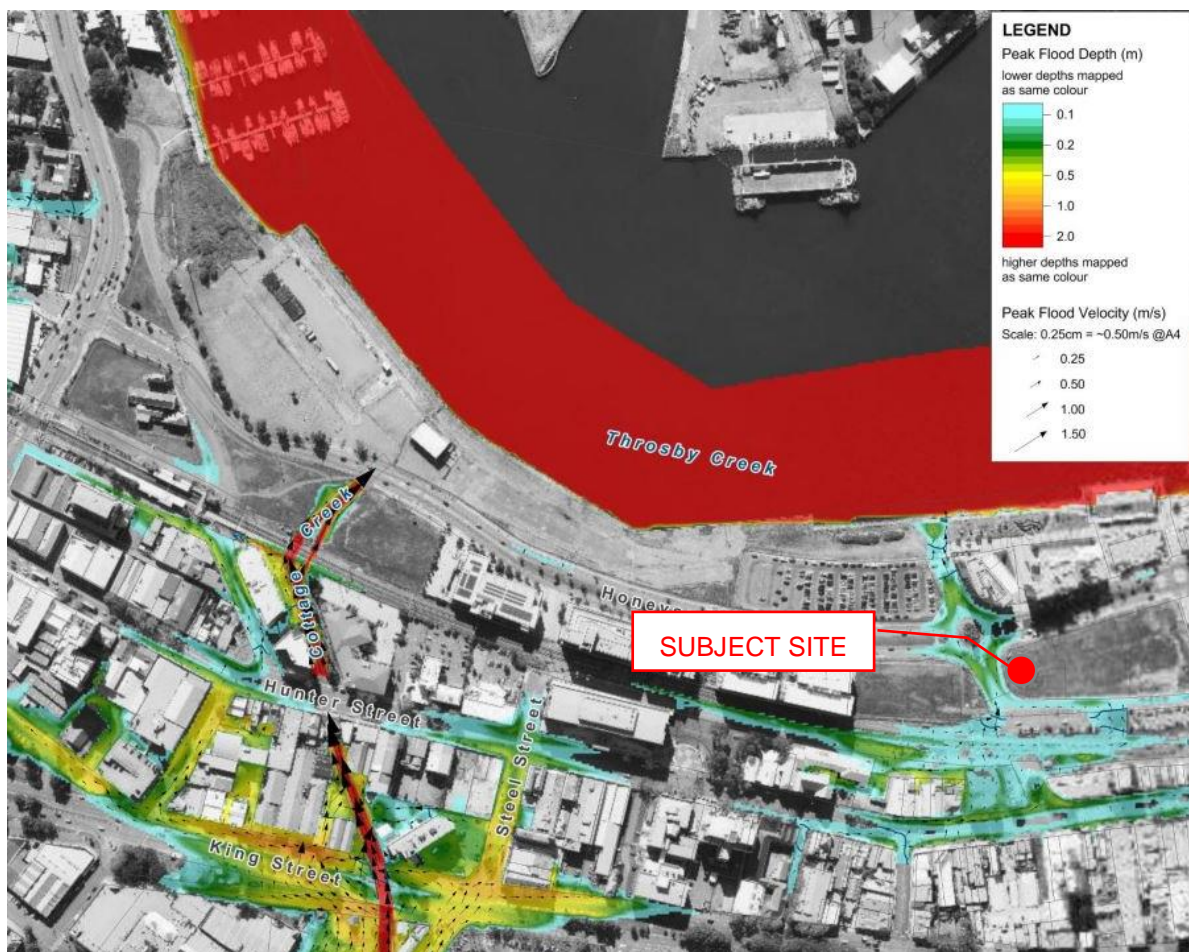


Figure 5 – 1% AEP Existing Flood Conditions (BMT WBM, 2018).

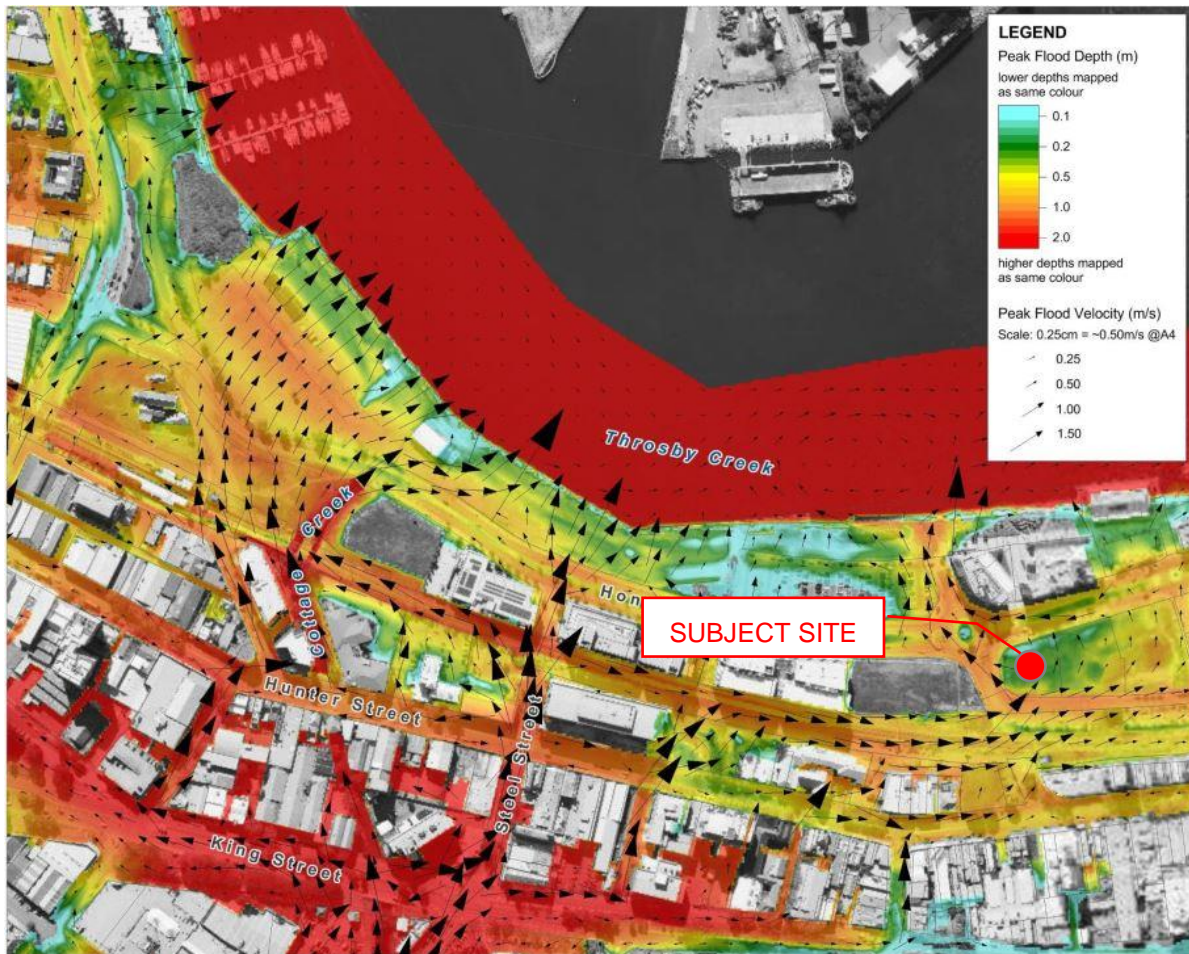


Figure 6 – PMF Existing Flood Conditions (BMT WBM, 2018).

With depths in excess of one meter in Worth Place, evacuation from the subject site should not be attempted during the peak of a major or extreme event.

Note that, the above levels do not account for ocean flooding. Peak ocean levels in the Newcastle Harbour have not risen above 1.40m AHD in recorded history. However, numerical oceanographic modelling has estimated extreme ocean flooding levels in the harbour to reach 3.40m AHD, which includes a sea level rise of 0.9m. As such, 3.40m AHD has been adopted as the peak flood level for the site. This flood level results in a depth in excess of 600mm across the site.

3.3. Flood Hazard and Risk to Property and Life

Flood hazard across the subject site has been assessed in the Honeysuckle Redevelopment Area Flood Study based on the latest Australian Rainfall and Runoff guidelines as presented in the below Figure 7. The majority of the subject site is above the 1% AEP flood level therefore, minimal hazard is expected for people, vehicles, and buildings on site during this event. However, hazard conditions during the 1% AEP in surrounding roadways is H1 with velocities up to approximately 1m/s.

During the PMF, the hydraulic hazard category is defined as H5 across the site with the velocity predicted to be up to 2.9 m/s. This flow behaviour is shown in the below Figure 7 to be un-safe for people, vehicles and buildings require special engineering design and construction.

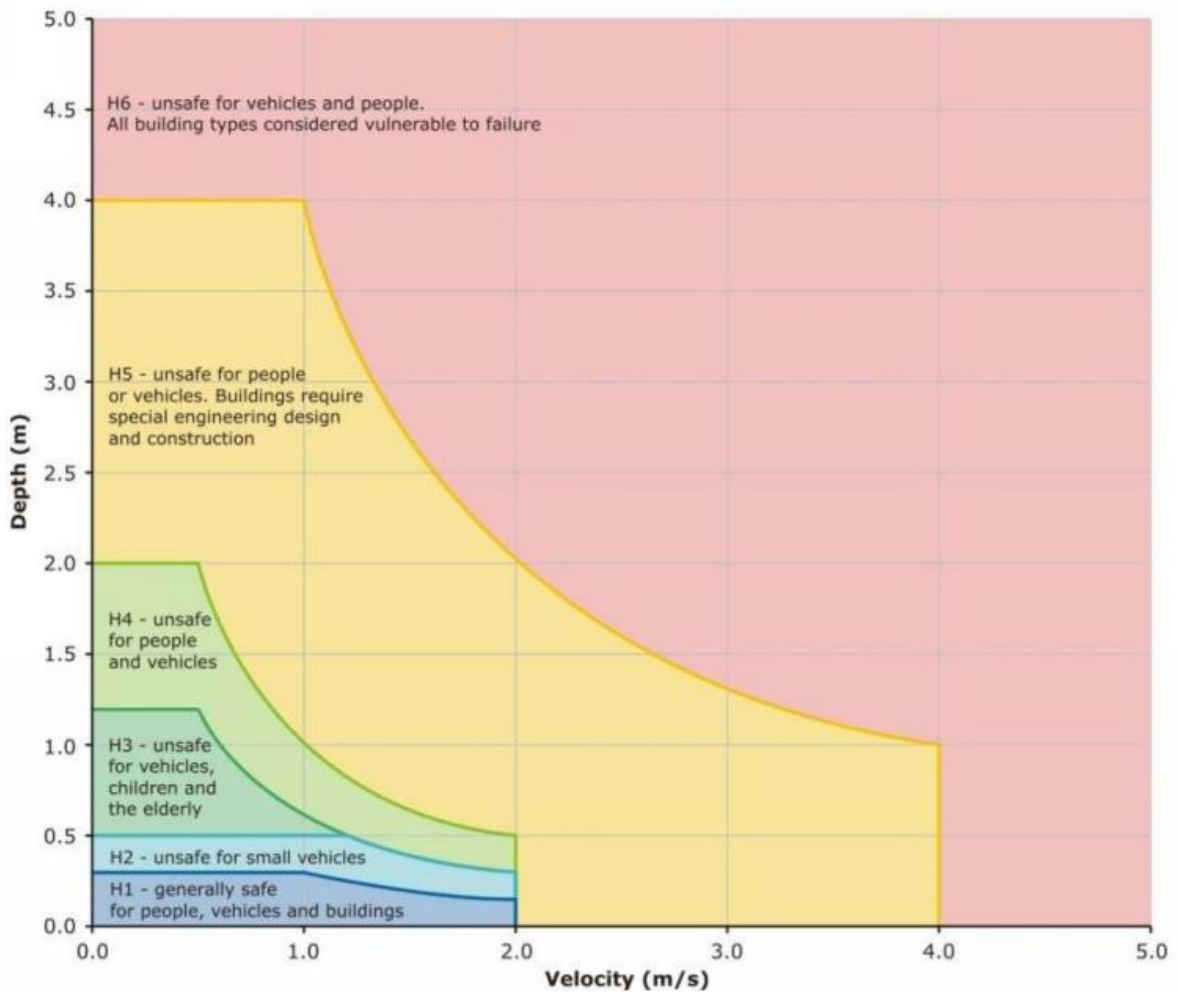


Figure 7 – Hydraulic Hazard as a Function of Depth and Velocity.

The Flood Information Certificate (FLD2018/00123) identifies the subject site to be located in a **L5** risk to life category. The following Figure 8 presents the Risk to Life for the subject site and general vicinity as presented in the Honeysuckle Redevelopment Area Flood Study (BMT WBM, 2018). This confirms Council’s classification of the subject site as L5.

The City of Newcastle Council Development Control Plan (DCP), in particular Section 4.01 – Flood Management defines the L5 risk to life classification as:

“Short duration flash flooding with no warning time and enclosing waters during the PMF have too much energy for normal heavy building construction and therefore it is generally not possible to construct a flood refuge i.e.. hydraulic threshold is H5.

The risk of life is considered extreme and the site is unsuitable for habitation either residential or short stay.”

As per the Flood Information Certificate provided by Council (FLD2018/00123), onsite flood refuge is required, however, evacuation from the subject site to the nominated evacuation centre is also recommended **prior to the commencement of rainfall.**

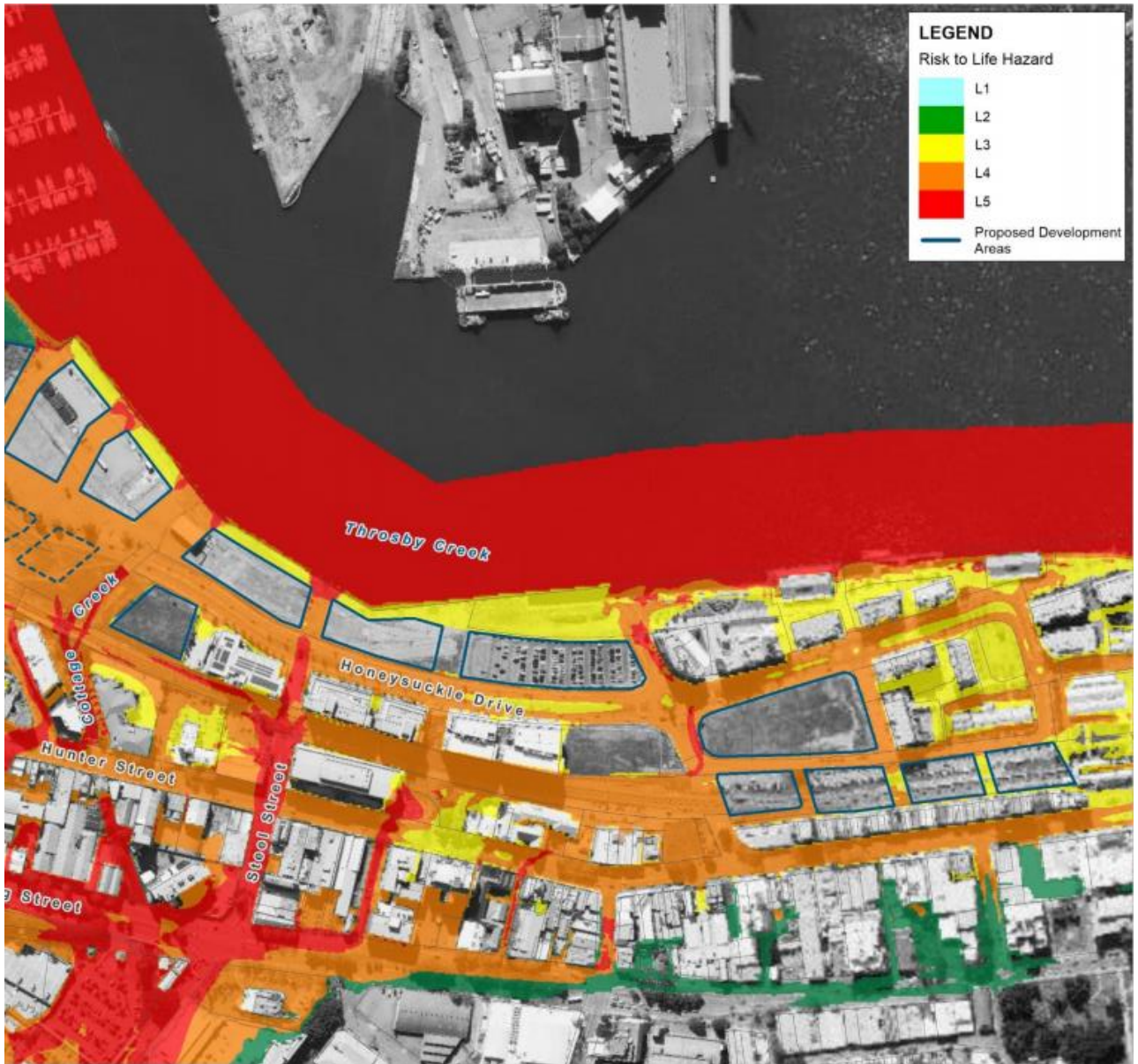


Figure 8 - Risk to Life Categories (Honeysuckle Redevelopment Area Flood Study)

Similarly, The City of Newcastle Council (TCoN) Development Control Plan specifies the risk to property for the subject site and vicinity. Rather than using the PMF, the property hazard classifications are instead defined using the 1% AEP. The TCoN DCP property hazard classifications are presented in Table 7 below.

Table 7 - Risk to Property Classifications (NCC DCP 2012 Sec 4.01 - Flood Management)

P1	Parked or moving cars remain stable i.e. equivalent to areas of H1 at the Flood Planning Event.
P2	Parked or moving heavy vehicles remain stable i.e. equivalent to areas of H2 at the Flood Planning Event.
P3	Suitable for light construction (e.g. timber frame, masonry and brick veneer) i.e. equivalent to areas of H3 at the Flood Planning Event.
P4	Suitable for heavy construction (e.g. steel frame, reinforced concrete) i.e. Equivalent to areas of H4 at the Flood Planning Event.
P5	Hydraulically unsuitable for normal building construction is equivalent to areas of H5 at the Flood Planning Event.

The risk to property classification for the subject site is presented in the Flood Information Certificate as a **P2** classification and can be seen in Figure 9 overleaf. As such, parked or moving heavy vehicles are expected to remain stable and the proposed building is expected to be able to withstand the flood forces during the 1% AEP event.

A review of the building stability has been performed which concluded that the building has the structural capacity to withstand the flood flows during the PMF. During this event, there is the potential for the glazing and windows to fail during an extreme flood event however, this is not expected to impact on the stability of the building.

It is also important to note that although the building may be able to withstand the flood flows during PMF event, flood ingress is expected. Staff, Students and Visitors will not be safe on the lowest level of the building. These areas including the ground floor, should be evacuated and not accessed during a flood event unless advised otherwise by emergency personnel.

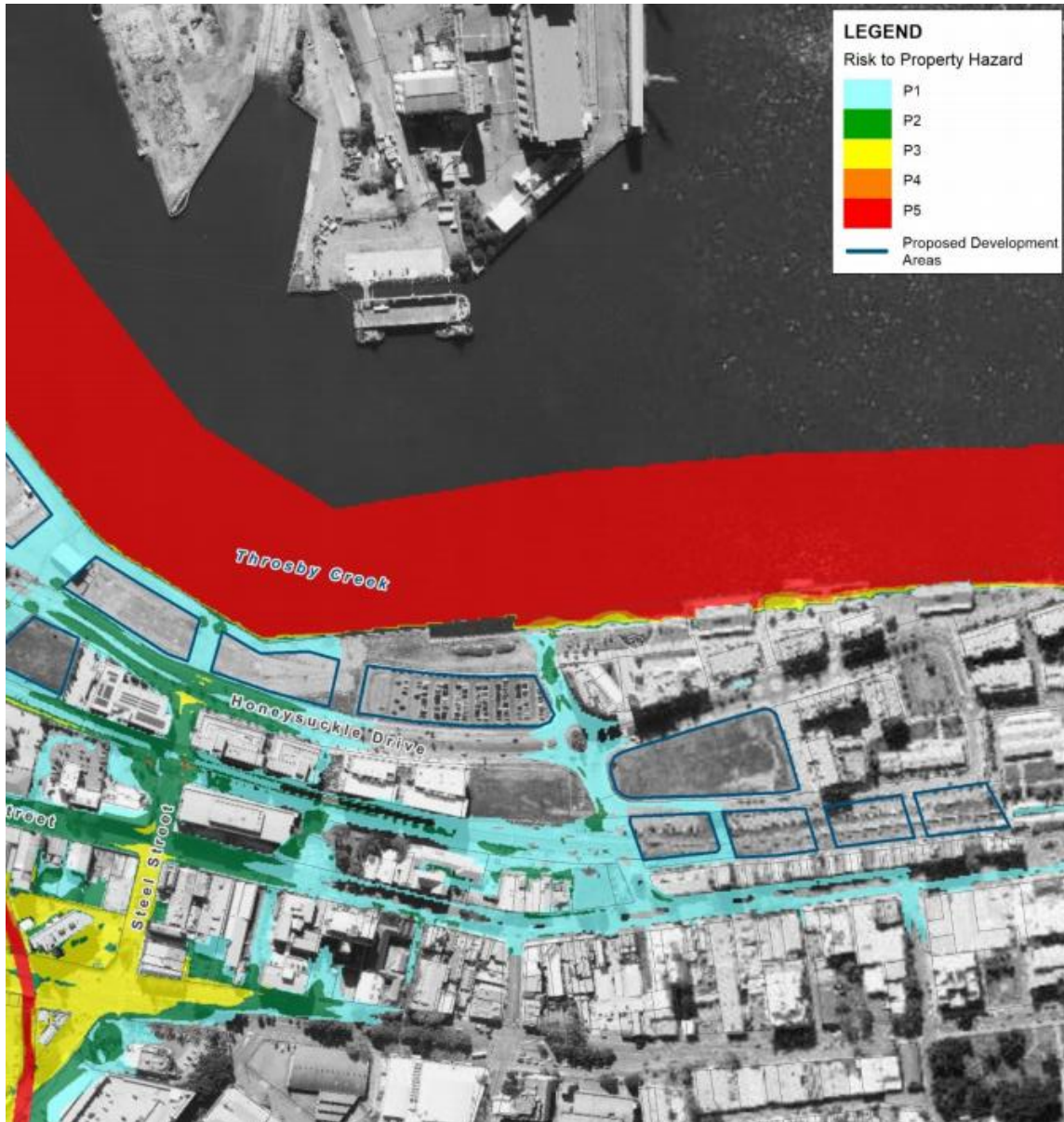


Figure 9 - Risk to Property Hazard Levels (Honeysuckle Redevelopment Area Flood Study)

Do not Drive or Walk through Floodwater.

Remember, If It's Flooded, Forget It!

4. Flood Warning Time and Flood Notifications

4.1. Flood Notifications and Evacuation Warnings

A network of rainfall gauge stations is maintained throughout the greater Newcastle, Hunter and Sydney regions. These provide information to the Bureau of Meteorology as one source of information informing their flood warning system.

The Bureau should issue one of five types of warnings through local radio, television and through their website <http://www.bom.gov.au>. In addition, the SES may issue a flood bulletin, evacuation warning or evacuation order.

Due to the sensitive nature of this location, it is recommended that the Business Continuity Officer and Critical Incident Team (described below) register for automatic text and email notifications from the City of Newcastle Council Flood Alert Service which filters and passes on BoM warnings.

The warning types are as follows:

4.2. Severe Weather Warning

Severe weather warnings are issued by the Bureau for potentially dangerous weather conditions. A description of the threat will be included in the warning along with the time for next issue. It is noted that a severe weather warning does not imply that flooding will eventuate. Warnings are generally updated every six hours, or as the event dictates.

This type of warning should be accompanied with predicted extreme rainfall depth as discussed in Section 10, as well as observed values from around the state.

4.3. Severe Thunderstorm Warning

A severe thunderstorm warning will be issued if there is strong evidence that a severe thunderstorm will develop, or if a severe thunderstorm is reported. Flash flooding may occur during severe thunderstorms. Warnings are generally updated every three hours or shorter as required.

4.4. Flood Alert/ Watch/ Advice

A flood alert/watch/advice will be issued if flood producing rain is expected. This provides an early warning that flooding may occur.

4.5. Generalised Flood Warning

A generalised flood warning is to be issued when flooding is expected to occur in a given area. Three hours warning time is expected from issue of warning to peak flood level as per the "Service Level Specification for Flood Forecasting and Warning Services for New South Wales – Version 3.13" (Bureau of Meteorology, 2013).

This is the most likely warning type for the subject site should evacuation need to occur.

4.6. Minor/ Moderate/ Severe Flood Warning

A more detailed flood warning may be issued based on any additional information available. Three hours warning time is expected from issue of warning to peak flood level.

All warnings will be issued through the website, radio and television. Radio frequencies include ABC Newcastle (1233AM), 2HD (1143AM) Triple J (102.1FM), 2NUR (103.7FM), Hit106.9 (106.9FM), New FM (105.3FM).

All public and commercial television stations should broadcast warnings.

4.7. SES Flood Bulletins

The SES may issue a flood bulletin providing information of the likely flood consequences and recommended actions.

4.8. Evacuation Warning

The SES may issue an evacuation warning which allows time to prepare for evacuation.

4.9. Evacuation Order

The SES will issue an Evacuation Order if evacuation is required. If this occurs evacuation must be undertaken. Broadcast will be via radio/ TV, door knock, automated telephone message or SMS.

4.10. On-site Emergency Communication

An internal PA system is located onsite and can be used to notify all persons onsite that flooding is expected, and all persons must assemble at the nominated emergency assembly point. The PA system must be regularly checked in accordance with the manufacturer's specifications.

4.11. City of Newcastle Flood Alert Service

The City of Newcastle Council have set up an Alert Service which is managed by the Early Warning Network. The Business Continuity Officer and Critical Incident Team are to apply to receive the alerts (via the following website: <http://www.newcastle.nsw.gov.au/floodalert>) and are to notify Staff, Students and Visitors of the situation.

There are three types of warning that may be issued by the Alert Service:

- Minor flood warning is to inform you there is potential for flooding in your area.
- Moderate flood warning is to inform you there is moderate potential for flooding.
- Major flood warning is to inform you there is major potential for flooding.

Alerts are sent by SMS, Email or via a recorded voice message to the landline.

5. Flood Response Personnel

Summarised below in Table 8 are the site personnel, their location and responsibilities in managing flood response.

Table 8 - Flood Response Personnel

	Location	Responsibilities
Business Continuity Officer	On-site	<ul style="list-style-type: none"> • Coordinate flood evacuation drills and induction training. • Monitor weather at 4pm daily for upcoming extreme rainfall events. • Receive notifications from the City of Newcastle Flood Alert Service. • Decide when Cancellation of Activities and evacuation is required. • Communicate decision for Cancellation and Evacuation to Flood Wardens, employees and students.
Chief Flood Warden (Building Manager)	On-site	<ul style="list-style-type: none"> • Sound alert PA system. • Leave signage notifying any responders attending site that evacuation has been undertaken. • Liaison with SES or Emergency Services personnel if they attend site. • Remain calm and direct staff, students and visitors through the evacuation procedures.
First Aid Officer	On-Site	<ul style="list-style-type: none"> • Prepare and maintain Emergency Kit. • Coordinate assistance for staff and students with mobility issues.
Deputy Flood Warden / Building Warden	On-Site	<ul style="list-style-type: none"> • Undertake Chief Warden duties when Chief Warden unavailable. • Leave signage notifying responders that evacuation has been undertaken. • Maintain calm and direct staff, students and visitors through the evacuation procedures. • Communication with Chief Warden. • Communicate decisions for Cancellation and Evacuation to staff and students. • Liaise with SES or Emergency Services personnel if they attend site.
Emergency Wardens	On-Site	<ul style="list-style-type: none"> • Assist Chief and Deputy Flood Wardens with evacuations.
Staff	On-site	<ul style="list-style-type: none"> • Maintain calm and direct students and visitors through evacuation or refuge process.

NUspace

Corner Auckland
and Hunter Street

- Nominated off-site refuge facility.
 - Phone Number: (02) 4921 6664.
-

It is anticipated that the in-house building manager will be nominated as the role of Chief Flood Warden and First Aid Officer. It is expected each section and level of the building will have a nominated Flood Warden to assist the Chief Flood Warden in emergency events.

6. Assembly Point and Evacuation Routes

6.1. Emergency Assembly Point

The following Figure 10 presents the **Flood Emergency Assembly Point** as the **Student Social Space** located on **Level 1**. Staff, students and visitors, following declaration of an emergency should proceed to this location.

It is the responsibility of the Critical Incident Team to activate the evacuation procedure with all staff, students and visitors to evacuate early, prior to rainfall commencing.

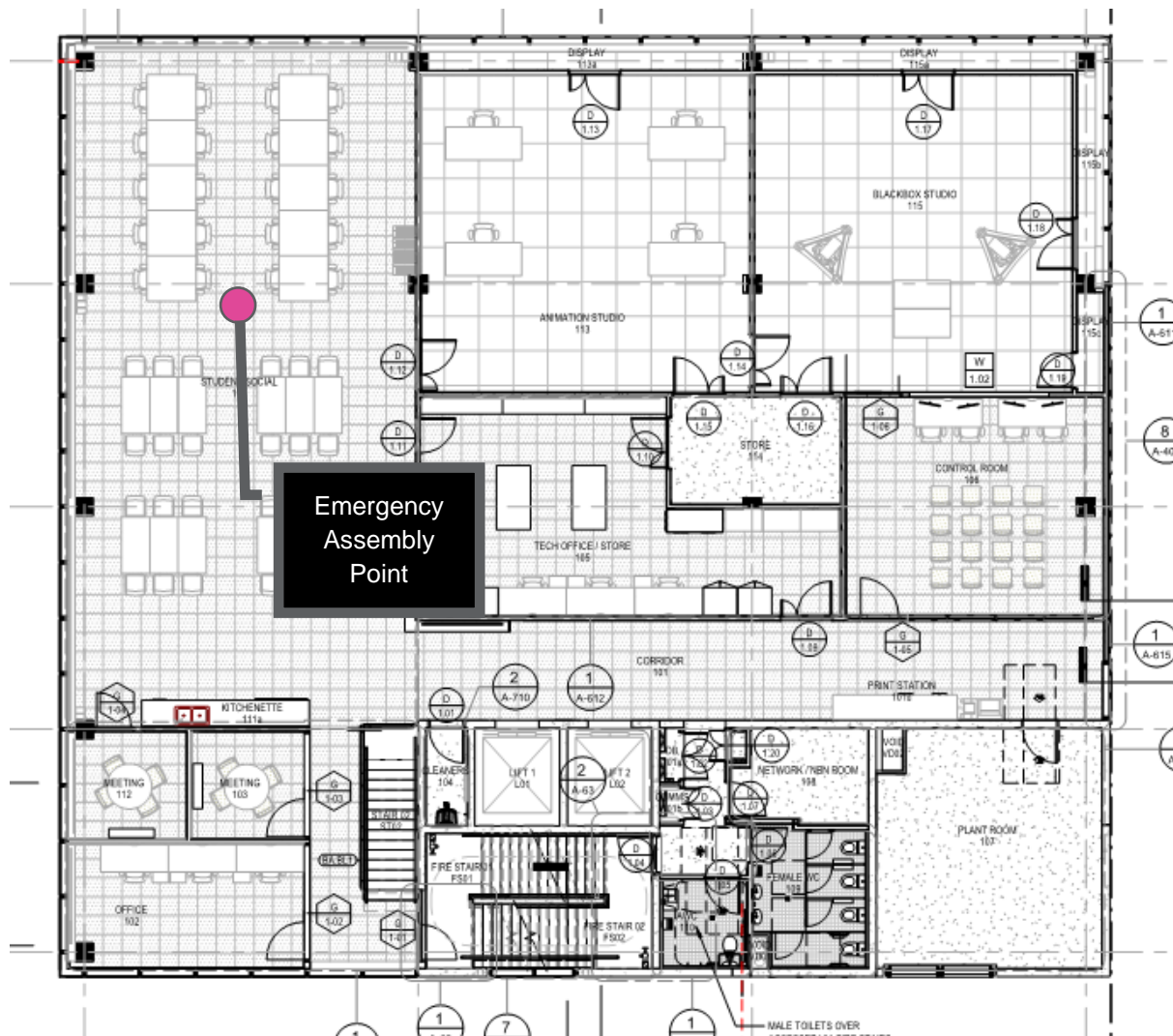


Figure 10 - Flood Emergency Assembly Point

6.2. Evacuation, Refuge and Routes

Self-motivated evacuation reduces the strain on emergency services during a flood event. There is also the potential that the subject site may become isolated for several days following a flood event. As such, evacuation from the subject site to the nominated evacuation centre is recommended prior to the commencement of rainfall and provided the evacuation centre has the capacity to receive any persons requiring refuge.

Staff, students, and visitors are to return home if safe to do so. In the event where staff and visitors are unable to return home, they may also proceed to the nominated evacuation centre.

The nominated off-site evacuation centre is **NUspace**, located at the **Corner of Auckland Street and Hunter Street, Newcastle**. Given the expected short duration of storm event (less than approximately two hours) this facility is expected to enable a temporary safe haven for those within the facility until the storm event passes.

If seeking refuge at **NUspace**, it is recommended that the Critical Incident Team contact the facility to ensure the refuge is available and the facility is capable of receiving them. This may also be an opportunity to obtain some information regarding the conditions along the evacuation route and whether access to the facility is available. Once access to and availability of the evacuation centre is confirmed, evacuation should be undertaken to the nominated Evacuation Centre. Review of the flood information available suggests the path of least resistance to the nominated off-site refuge point as shown in the below Figure 11 (shown as the 5-minute route).

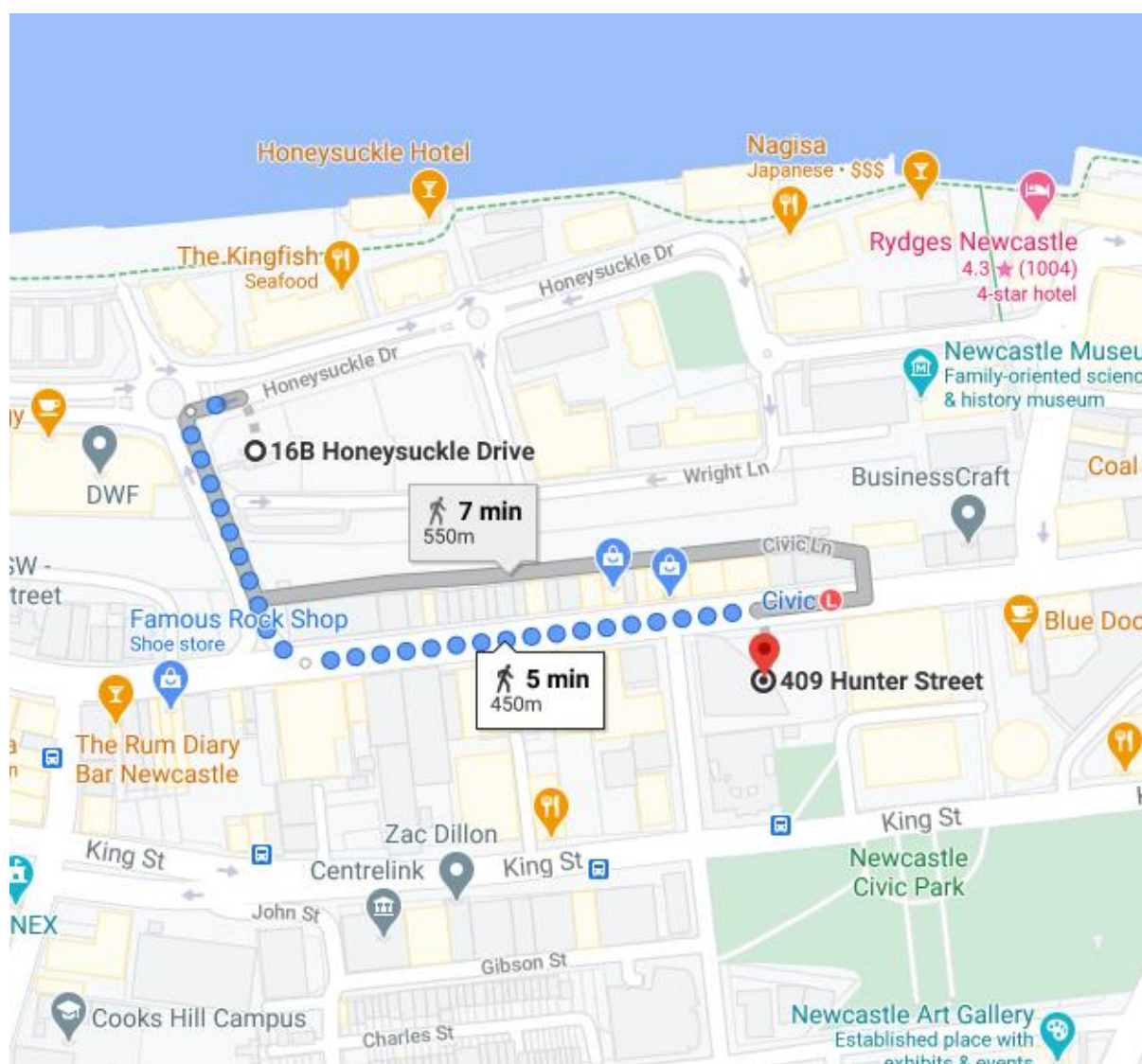


Figure 11 - Flood Emergency Evacuation Route.

If staff, students, or visitors have vehicles parked in the vicinity, it is recommended that they drive outside the flood-prone land. This ensures vehicles do not become floating objects in large storm events. Note that moving vehicles should only occur prior to the commencement of rainfall, upon warning from the City of Newcastle Flood Alert Service.

7. Floor Levels and On-site Refuge

7.1. Floor Levels

The Ground Floor Level is **2.80m AHD** which is 370mm above the maximum 1% AEP flood level of **2.43m AHD** but approximately 600mm below the PMF level of **3.40m AHD**.

Levels One and above are located at a minimum RL of **8.00m AHD** which is at least 4.60m above the PMF level of **3.40m AHD**.

7.2. On-site Refuge

Levels 1 to 3 are considered acceptable for on-site refuge since the floor levels are above the PMF event. In the most extreme events up to the PMF, up to 600mm of water may enter the ground level.

Employees and visitors are recommended to seek refuge in the **student social area** on Level One or above on Levels 2 or 3.

Safe refuge is available within the facility above the PMF. The building is expected to be capable of withstanding the hydrodynamic and hydrostatic forces generated by flooding.

Cancellation of services and evacuation from the facility to NUspace should occur well before rainfall has commenced and is the preferred option as it removes employees, visitors and students from the risk and should be undertaken where possible. If rainfall has commenced, refuge should be sought in the upper levels of the facility.

8. Emergency Contact

For emergency assistance during flood events, please call the **SES** on **132 500**.

If you are in a life-threatening situation please call the **Police, Fire or Ambulance** on **000**.

For road blockages, fallen trees and other local asset issues, please call **The City of Newcastle Council Emergency Hotline** on **(02) 4974 6000**.

Once the decision has been made to evacuate, call **NUspace** on **(02) 4921 6664** to ensure they are ready to accept the subject site population.

9. Flood Response Preparation

It is the responsibility of the Business Continuity Officer to prepare the facility for a flood event. This will be achieved through; induction training, nomination of key personnel, coordination of evacuation drills, education of flood risks and behaviour, and the ensure the preparation and maintenance of a *Floodsafe Emergency Kit* is performed.

The information presented above is a summary of the flood behaviour and considered key to understanding the risks associated with flooding. This should be displayed in conjunction with other emergency information (such as fire, etc.) throughout the site.

9.1. Evacuation Drills and Lessons

Evacuation drills are designed to increase flood awareness within the facility. These drills are to be undertaken half-yearly to familiarise staff and facility users with the procedures when responding to a flood event.

This may be an opportunity to outline expected flood levels and the dangers of entering flood water. Additional resources are available at: <https://www.ses.nsw.gov.au/floodsafe/learn-more-about-floods/know-your-risk/> .

For new staff, it is expected they will be made familiar with the site flooding conditions and made familiar with the emergency procedures and response during the initial site induction.

9.2. Flood Emergency Kit

There is the potential for flood water to remain for a long period of time following completion of rainfall. As such, enough resources should be contained in the Flood Emergency Kit to ensure anyone trapped on-site has enough supplies for a prolonged period. In the event where resources are getting low, the SES may be contacted to provide a re-supply / evacuation from the facility.

Potential items for a flood emergency kit are outlined at: <https://www.ses.nsw.gov.au/floodsafe/prepare-your-home/emergency-kit/> , and are reproduced below:

- A copy of the site emergency management plan.
- Portable radios with spare batteries.
- A torch with spare batteries.
- A first aid kit.
- Candles and waterproof matches.
- Drinking water, medicines and non-perishable food items.
- Waterproof bag for valuables.
- A copy of emergency numbers.

When leaving or evacuating include the sign in book for visitors and contractors.

The kit shall be the responsibility of the First Aid Officer and is to be kept in their possession. The Chief Flood Warden should also keep a kit containing a chemical register, air horn and hand-held loudspeaker in addition to the above listed items.

TRIGGER FOR REVIEW AND EDUCATION; Six monthly checking of the emergency kits to ensure all items are in suitable working order. Half-yearly evacuation drill and reminder of the flood risks.

BY WHO; Business Continuity Officer, Chief Flood Warden, First Aid Officer

9.3. Monitoring of Weather Situation

It is the responsibility of the Business Continuity Officer to monitor the weather situation of be aware if a warning has been issued. As previously mentioned, it is recommended that both the Business Continuity Officer and CIT sign up to the Newcastle Flood Alert Network to receive warnings for upcoming heavy rainfall and flash flooding.

Upcoming flood events can also be reviewed by checking of local radio station and the Bureau of Meteorology website on a daily basis.

TRIGGER FOR MONITORING; Continuous, 4pm daily

BY WHO; CIT, Business Continuity Officer

10. Flood Response Actions

10.1. Evacuation Well in Advance of Rainfall

In order to minimise the risk to life of employees, students, and visitors, it is recommended evacuation and closure of the site be taken any day there is a **Generalised Flood Warning** or **Severe Weather Warning** with nominated rainfall per Table 9 below:

Table 9 - Rainfall triggers for cancellation

Rainfall Depth (mm)	Timescale
137mm	3 hours
93mm	1 hour
72mm	30 minutes
234mm	12 hours
And / Or ocean tidal level expected to exceed 2.0m AHD	

In the event where rainfall depths presented in Table 9 are predicted prior to the commencement of class, classes scheduled within the facility should be cancelled and the facility closed until the event passes.

The Business Continuity Officer is responsible for reviewing the weather forecasts daily and notifying staff of the decision.

When a warning is received, and if time permits, consideration should also be given to:

- Blocking floor wastes and toilets.
- Securing objects that are likely to float and cause damage or relocating them on higher levels within the building.
- Turning off mains power, water, and gas.
- Relocating chemicals above the predicted water level.

Evacuation procedure generally as follows:

- **Sound** internal warning system.
- **Chief Flood Warden** to the **Emergency Assembly Point**.
- **Emergency Wardens** to **direct** all visitors and students to the **Emergency Assembly Point**.
- **Emergency Wardens** clear the building.
- **Call NUspace** to ensure they are ready to accept evacuees, if not already done so.
- **Leave signage undercover** and **notify Police/ SES** that evacuation has occurred, to where, and any persons remaining on site.
- **Control** evacuation from 16B Honeysuckle Drive to NUspace. Students, staff and visitors are recommended to return home if safe to do so or evacuate to NUspace.
- **Wait it out** at the designated evacuation point.

TRIGGERS FOR EVACUATION;

- Generalised Flood Warning or Severe Weather Warning received with forecast of **137mm or more** of rain over **3 hours**, **93mm** of rain over **1 hour**, **72mm** of rain over **30 minutes**, or **234mm** of rain over **12 hours**.
- Ocean tidal level expected to exceed 2.0m AHD or higher.

RESPONSIBLE FOR THE DECISION; Business Continuity Officer, CIT

10.2. Refuge On-Site

It is safe to seek refuge on-site within the upper levels of the facility. Once rainfall has commenced, it is considered impractical to evacuate and refuge should be sought on-site. The procedure for on-site refuge should generally follow the below procedure.

- **Sound** internal warning system;
- **Direct** employees, students, and visitors to the Flood Emergency Assembly Point; and
- **Explain** that refuge is being sought on-site and the measures that are in place to make this safe and to maintain calm.
- **Seek Refuge in Level 1 and above** and **Wait it Out**.

TRIGGERS FOR REFUGE ONSITE

- **Generalised Flood Warning** or **Severe Weather Warning** received with forecast of 137mm or more of rain over **3 hours**, **93mm** of rain over **1 hour**, **72mm** of rain over **30 minutes**, or **234mm** of rain over **12 hours**; or
- **Ocean tidal level expected to exceed 2.0m AHD or higher**; and
- **Rainfall has commenced**.

RESPONSIBLE FOR THE DECISION; Business Continuity Officer, CIT

Do not Drive or Walk through Floodwater.

Remember, If It's Flooded, Forget It!

10.3. Emergency Services Attending Site

There is a possibility that emergency services such as Police, Fire, Ambulance or SES may attend site and take control from the Chief Flood Warden. Once this has occurred, they are in control of the site and response operations must be undertaken in-line with their procedures.

TRIGGERS FOR EMERGENCY SERVICES TAKE CONTROL;

- Police, Fire, Ambulance or SES attending site.

RESPONSIBLE FOR THE DECISION; Chief Flood Warden

10.4. After a Flood

Once a Final Flood Warning or SES “All Clear” has been received:

- A thorough check of services such as electricity, sewer, water, and gas should be undertaken by qualified persons.
- Advice should be sought from a suitably qualified engineer as to the structural integrity of the building prior to use.
- Personal protective equipment should be worn during the clean-up and disinfectant used.

TRIGGER FOR RETURN; All clear given by SES or emergency services and building inspected by representatives appointed by the body corporate.

BY WHO; SES, Emergency services, Business Continuity Officer

11. Revision of the Flood Emergency Management Plan

This plan should be revised if the Honeysuckle Redevelopment Area Flood Study (BMT WBM, 2018), the Cottage Creek Flood Study or City Wide Flood Risk Management Study and Plan (BMT WBM, 2012) are reviewed to capture updated best practice guidelines and changes to the catchment since they were prepared.

Notwithstanding the above, this plan should be **revised every three years**, or when there is a major flood event or operational change occurs within the facility.

Revisions should be undertaken by a suitably qualified flood emergency response consultant.

12. Conclusion

The subject site is affected by flooding from the Local Cottage Creek catchment and Ocean Flooding. A review of the proposed development has been undertaken in conjunction with the expected flood behaviour and it was concluded that:

- The Business Continuity Officer and Critical Incident Team are responsible for flood preparation, monitoring and the decisions commence evacuation.
- Nominated flood wardens will provide adequate direction during flood emergencies.
- Cancellation of operations and/ or evacuation of site is preferable prior to major and extreme events to eliminate exposure to flood hazards.
- If rainfall has commenced for a predicted extreme event, refuge should be sought on-site. During events in up to and in excess of the 1% AEP, refuge can be sought on Levels 1 to 3, which is a minimum 4.60m above the PMF level; and
- Through adoption of this plan, the proposed development adequately minimises the flood risks on-site. The recommendations contained herein assist in managing the risk to life of the employees, students, and visitors to the subject site.

13. References

- SES (2020) *Flood Disaster Website*
accessed from <https://www.ses.nsw.gov.au/disaster-tabs-header/flood/>
04 March 2021
- SES (2020) Emergency Business Continuity Plan accessed from
<http://www.sesemergencyplan.com.au/business/index.php>
04 March 2021
- Bureau of Meteorology (2013) Service Level Specification for Flood Forecasting and Warning Services for New South Wales – Version 3.13
accessed from http://www.bom.gov.au/nsw/NSW_SLS_Current.pdf
04 March 2021
- City of Newcastle/ SES (2013) City of Newcastle Local Flood Plan accessed from
<https://www.ses.nsw.gov.au/media/1714/plan-city-of-newcastle-fesp-june-2013-endorsed.pdf>
04 March 2021
- City of Newcastle (2018) Flood Certificate FL2018/00123
- City of Newcastle (2018) Honeysuckle Redevelopment Area Flood Study March 2018 accessed from
https://www.newcastle.nsw.gov.au/Newcastle/media/Documents/environment/Flooding/Honeysuckle-Redevelopment-Area-Flood-Study_March-2018.pdf
04 March 2021
- City of Newcastle / BMT WBM (2012) Newcastle City-wide Floodplain Risk Management Study and Plan accessed from
<https://www.newcastle.nsw.gov.au/Newcastle/media/Documents/environment/Flooding/R-N2246-001-03.pdf>
04 March 2021

Appendix A – Site Signage

This property is flood prone with predicted depths in adjacent roadways to be greater than **one metre** during the PMF event, as per the Honeysuckle Redevelopment Area Flood Study 2018 (BMT WBM, 2018).

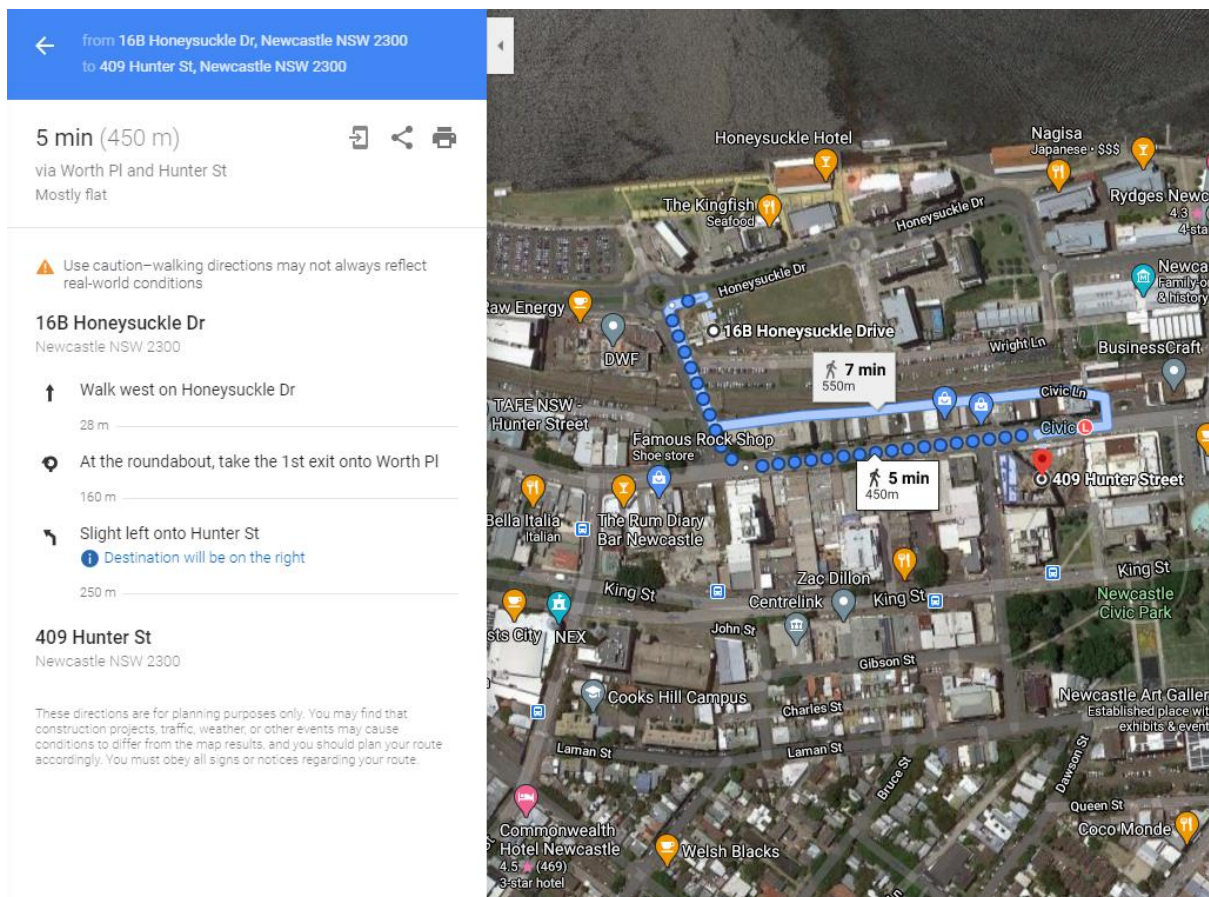
To reduce the load on emergency services, evacuation is recommended prior to rainfall commencing. Staff, Students and visitors are recommended to return home in the event of a predicted major or extreme flood event.

If Staff, Students and visitors are unable to return home, the nominated off-site evacuation site is **NUspace, located on the corner of Auckland Street and Hunter Street, Newcastle.** Prior to evacuating to NUspace, **the ability of the facility to accept evacuees should be confirmed** on (02) 4921 6664.

Once rainfall has commenced or if NUspace does not have the capacity to accept evacuees, **refuge on site is available on Levels 1 to Level 3.** No attempt should be made to evacuate elsewhere through floodwater by foot or vehicle.

For emergency assistance during a flood event, contact the SES on 132 500.

If in a life-threatening situation, call 000.



Appendix B – Flood Information

Flood Information Certificate

REQUEST FOR INFORMATION REGARDING COMPLYING DEVELOPMENT CRITERIA

09 May 2018

Northrop Consulting Engineers
Suite 4, Level 1, 2115 Pacific Highway
CHARLESTOWN NSW 2290



PO Box 489, Newcastle
NSW 2300 Australia
Phone: 4974 2000
Fax: 4974 2222
Email: mail@ncc.nsw.gov.au
www.newcastle.nsw.gov.au

Dear Sir/Madam

Flood Information Certificate No: FL2018/00123

Land: Lot 4 DP 1111305, Lot 1 DP 1163346
Lot 2 DP 1163346, Lot 3 DP 1163346
Lot 21 DP 1165985, Lot 2 DP 1226145

Property Address: 16B Honeysuckle Drive Newcastle NSW 2300
16A Honeysuckle Drive Newcastle NSW 2300
16 Honeysuckle Drive Newcastle NSW 2300
20B Wright Lane Newcastle NSW 2300
20A Wright Lane Newcastle NSW 2300

Thank you for your recent enquiry regarding flood behaviour at the above property. This letter confirms the property is located in a flood prone area.

The flood information comes from the Honeysuckle Redevelopment Area Flood Study prepared by BMT (Revision 8 dated 8/03/18). A copy of this flood study is available on Council's website. The flood information provided is generally for the proposed sites noted as Sites 11-15 on Figure 6-6 of the report (Honeysuckle Central & Sites 1 - 4) and based on the Context Plan submitted with your application

http://www.newcastle.nsw.gov.au/Newcastle/media/Documents/environment/Flooding/Honeysuckle-Redevelopment-Area-Flood-Study_March-2018.pdf

The pertinent features of the flood behaviour are estimated as follows:

Ocean Flooding

Is any part of the site affected by a floodway?	No
Is any part of the site affected by a flood storage area?	No
Estimated 1% Annual Exceedance Probability event level: (equivalent to the "Defined Flood Level" in the Building Code of Australia)	2.3m AHD
Estimated Maximum Flow Velocity of floodwaters (in the "Defined Flood Event" as per the Building Code of Australia)	0.1m/s
Highest Property Hazard Category	P1
Estimated Probable Maximum Flood Level	3.4m AHD

Highest Life Hazard Category	L1
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The above ocean flood level estimates include a sea level rise relative to 1990 mean sea levels of 90cm by 2100, as used in the Newcastle City-wide Floodplain Risk Management Study and Plan (June 2012).

Local Catchment Flooding

Is any part of the site affected by a floodway?	Yes (See Figure D-9) - Wright Lane is A Floodway
Is any part of the site affected by a flood storage area?	Yes (See Figure D-9)
Estimated 1% Annual Exceedance Probability event level: (equivalent to the “ <i>Defined Flood Level</i> ” in the Building Code of Australia)	2.43m AHD (Site 2)
Estimated Maximum Flow Velocity of floodwaters (in the “ <i>Defined Flood Event</i> ” as per the Building Code of Australia)	0.3m/s
Highest Property Hazard Category	P2
Estimated Probable Maximum Flood Level	3.31m AHD (Site 1)
Highest Life Hazard Category	L5 (at Honeysuckle Central)

Note: Flood data taken from Table 6-7 in the BMT *Honeysuckle Redevelopment Area Flood Study (Rev. 8 dated 8/03/18.)* Indicated Local Catchment Flooding Data is for the maximum for the overall site. For Individual sites, See Table 6-7.

The Newcastle Development Control Plan 2012 addresses the issues of flood management for new development. You can view the development control plan at www.newcastle.nsw.gov.au. In summary, the following requirements apply for all future development applications on the site.

Development in a floodway is not generally allowable due to likely redistribution of flood water.	Applicable ¹
Filling of a flood storage area by more than 20% is not generally allowable due to redistribution of flood water.	Applicable ¹
Minimum floor level for occupiable rooms in a new development on this site is: (equivalent to the “ <i>Flood Hazard Level</i> ” in the Building Code of Australia)	2.8m AHD
Is onsite flood refuge required?	Yes

¹ Note: Wright Lane is floodway and part storage - See Figure D-9.

Council holds no information concerning floor levels of existing structures on the site. Site levels and floor levels should be verified by survey based on the Australian Height Datum.

Complying Development Criteria

1.	Is the land identified as a Flood Control Lot?	Yes
2.	Is any part of the land identified as being:	
	a) a flood storage area, or	Yes
	b) a floodway area, or	Yes
	c) a flow path, or	Yes
	d) a high hazard area, or	Yes
	e) a high risk area	Yes

Based on the information contained within the above table the lot does not meet the "development standards for flood control lots", as specified within *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*.

Please note that the information contained in this certificate may alter in the future. The applicant should at all times ensure the currency of this information.

Should you require any further clarification please contact Rajnesh Prakash on 4974 2137.

Yours faithfully

Rajnesh Prakash
SENIOR DEVELOPMENT OFFICER

