Flood Emergency Response Plan

Randwick High School

Prepared for NSW Department for Education / 31 July 2025

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Contents

Rev	Date	Prepared By	Approved By	Remarks
1	10/07/2025	LC	EC	Draft
2	31/07/2025	LC	TM	REF Submission

1.0 Introduction

This Flood Emergency Response Plan (FERP) has been prepared to support the Review of Environmental Factors (REF) being prepared on behalf of the NSW Department of Education (DoE) for the proposed Administration Building at Randwick High School (the activity).

The purpose of the REF is to assess the potential environmental impacts of the activity prescribed by State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP) as "development permitted without consent" on land carried out by or on behalf of a public authority (NSW DoE) under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The activity is to be undertaken pursuant to Chapter 3, Part 3.4, Clause 3.37 of the T&I SEPP.

The purpose of this report is to summarise the flood risks associated with the site, identify preparation measures that should be undertaken to mitigate such risks, and provide an action plan with steps to be carried out during a flood event. The details of this report are based on currently available information and correspondence undertaken at the time of writing.

1.1 Reference Documents

- Australian Institute of Disaster Resilience (AIDR) Guideline 7-3: Flood Hazard (2017)
- FloodSafe guidelines and the relative FloodSafe Tool Kits
- NSW Department of Planning and Environment – 'Flood Impact and Risk Assessment', Flood Risk Management Guideline LU01, June 2023
- NSW Department of Planning and Environment – 'Support for Emergency Management Planning', Flood Risk Management Guideline EM01, June 2023
- NSW Department of Planning and Environment (2021) Considering Flooding in Land Use Planning Guideline
- NSW Department of Planning and Environment (2023) Flood Risk Management Manual https://www.environment.nsw.gov.au/topics/water/floodplains/floodplain-manual
- NSW Department of Planning, Housing and Infrastructure – Planning Circular PS 24-001, Update on addressing flood risk in planning decisions, 1st March 2024
- NSW Department of Planning, Housing and Infrastructure (2025) Shelter in place guideline for flash flooding
- NSW Planning Portal Spatial Viewer – https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address
- Randwick City Council (2018) Birds Gully and Bunnerong Road Flood Study – Volume 1 and Volume 2.
- Randwick City Council Development Control Plan (DCP, 2013)
- Randwick Local Environmental Plan (LEP, 2012);

1.2 Site Description

Randwick High School is located at Avoca Street, Randwick. The school comprises two addresses; 298 Avoca Street, Randwick and Part 90-98E Rainbow Street, Randwick. The real property descriptions are Lot 1 DP 121453 and Part Lot 1738 DP48455.

The site is largely rectangular in shape with vehicular access provided from Rainbow Street in the south and Barker Street in the north. Pedestrian access is provided from the abovementioned roads, Avoca Street to the east and Fennelly Street to the west.

The site is zoned SP2 Educational Establishment in accordance with Randwick Local Environmental Plan

2012. An aerial image of the site is provided in Figure 1.

Figure 1: Aerial image of the site

1.3 Proposed Activity Description

The proposed activity includes the following:

- Tree removal;
- Demolition of ground slab associated with Block A;
- Reconfiguration of existing staff carparks;
- Construction of a combined administration (ground floor) and permanent classroom building (first floor);
- Construction of a lecture theatre;
- New pedestrian pathway connections providing access to Block C and H;
- Service connections; and
- Site landscaping works.

An extract of the proposed Site Plan is provided at Figure 2.

Figure 2: Extract of proposed Site Plan (Bennett and Trimble, 2025)

2.0 Flood Behaviour

TTW obtained Randwick City Council's DRAINS and TUFLOW model (developed by WMA Water) for the Birds Gully and Bunnerong Road Flood Study (2018) in order to determine the flood behaviour in the area. The model was updated to incorporate detailed site survey information alongside the post-development design levels. As part of TTW's Flood Impact and Risk Assessment (FIRA), flood behaviour has been modelled for the 10% Annual Exceedance Probability (AEP), 5% AEP, 1% AEP, 0.5% AEP and the PMF events in both existing and post-development conditions.

The wider Randwick High School site is significantly impacted by overland flows, which primarily overtop into the site via Avoca Street, the eastern frontage of the site. Based on the modelled flood events (which include the 10%, 5%, 1% and 0.5% AEP events, and the PMF event), the proposed buildings are flood-free in events up to and including the 0.5% AEP (200-year ARI). The proposed buildings consequently provide a higher level of protection than most existing buildings onsite.

For the Probable Maximum Flood (PMF), a range of storm durations from the 30-minute storm up to the 180-minute storm were run. Although the 30-minute storm is critical for the site, this FERP includes an analysis of longer duration events to determine the maximum potential impact time for the site. Refer to TTW's FIRA report submitted alongside this FERP for more detailed information on flood behaviour at the site and the mitigation measures incorporated into the design to reduce the overall flood risk at the school.

2.1 Flood Depths and Levels

Flood depths and levels in the 1% AEP and PMF events are presented in Figure 3 and Figure 4, respectively. The flood behaviour at the site can be summarised as follows:

- With the implementation of various mitigation measures, the proposed buildings are both flood-free in the 1% AEP event, with no above-floor inundation. Overflows from Avoca Street are largely contained within the open field and basketball court, away from the existing building cluster to the southwest of the site.
- In the critical duration 30-minute PMF event, the bunding across the open field and the proposed wall to the east of the admin building are both overtopped. The ground floor levels of the new buildings are potentially subject to depths of up to 350mm in the lecture theatre, and 410mm in the administrative building. Depths at the sag point on Rainbow Street (adjacent to the southwest corner of the site) exceed 1 metre.

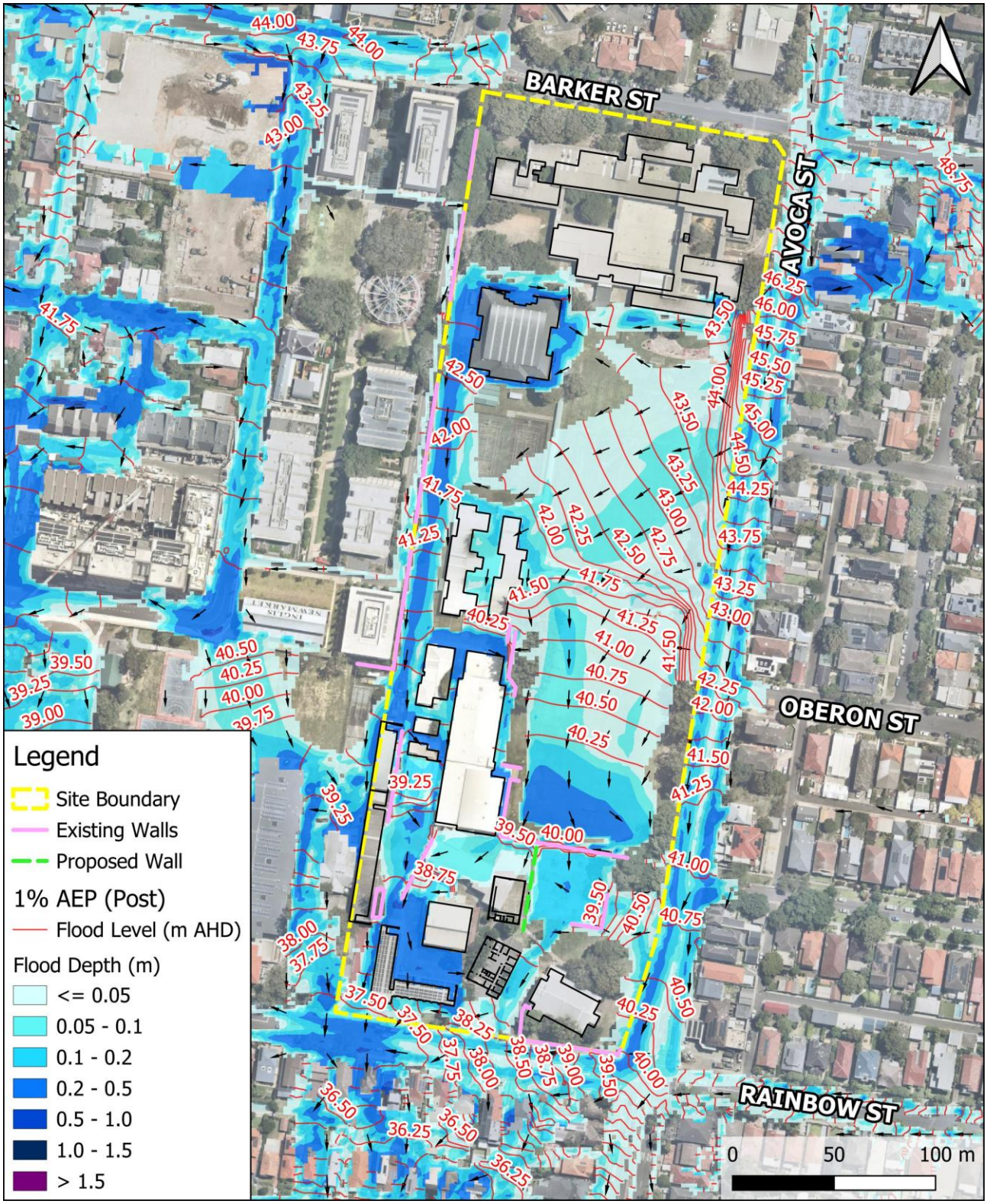

Figure 3: 1% AEP flood depths and levels at the Randwick High School site under post-development conditions (with mitigation)

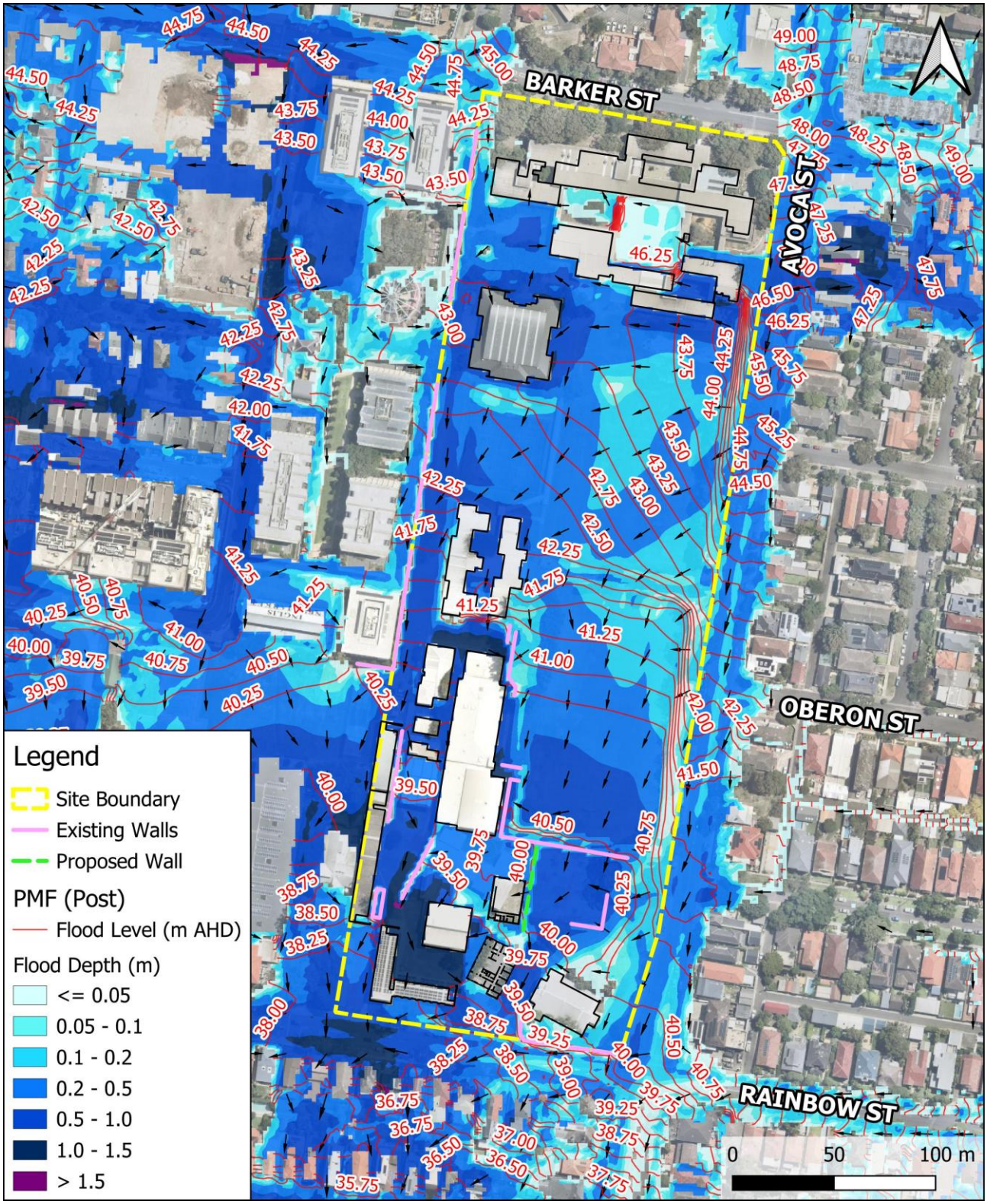

Figure 4: PMF depths and levels at the Randwick High School site under post-development conditions (with mitigation)

2.2 Flood Hazard

A hazard assessment was conducted using the flood hazard vulnerability curves set out in 'Handbook 7 – Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia' of the Australian Disaster Resilience Handbook Collection (2017). These curves assess the vulnerability of people, vehicles and buildings to flooding based on the velocity and depth of flood flows. The flood hazard categories are outlined in Figure 5, ranging from a level of H1 (generally safe for people, vehicles and buildings) to H6 (unsafe for vehicles and people, with all buildings considered vulnerable to failure).

Figure 6 and Figure 7 present the flood hazard categorisation around the site in post-development conditions in the 1% AEP and PMF events, respectively.

- In the 1% AEP event, flows in the immediate vicinity of the proposed buildings are low hazard (H1), regarded as generally safe for people, vehicles and buildings. Offsite, flows at the corner of Rainbow Street and Avoca Street reach a maximum hazard level of H5, which is unsafe for people and vehicles.
- In the PMF event, hazard level onsite peaks at H5 over the southern car park, and the internal road adjacent to the site's western boundary. All surrounding road frontages are impacted by H5 hazard flows, temporarily cutting off access to and from the site. The new eastern entry to Block B (which includes a staircase to the lower ground floor) is impacted by flooding with a hazard level of H3 (unsafe for children). It should be noted that this area is not flood affected in the 0.5% AEP event, and the overall risk is low, given that there is internal access to upper levels above the PMF.

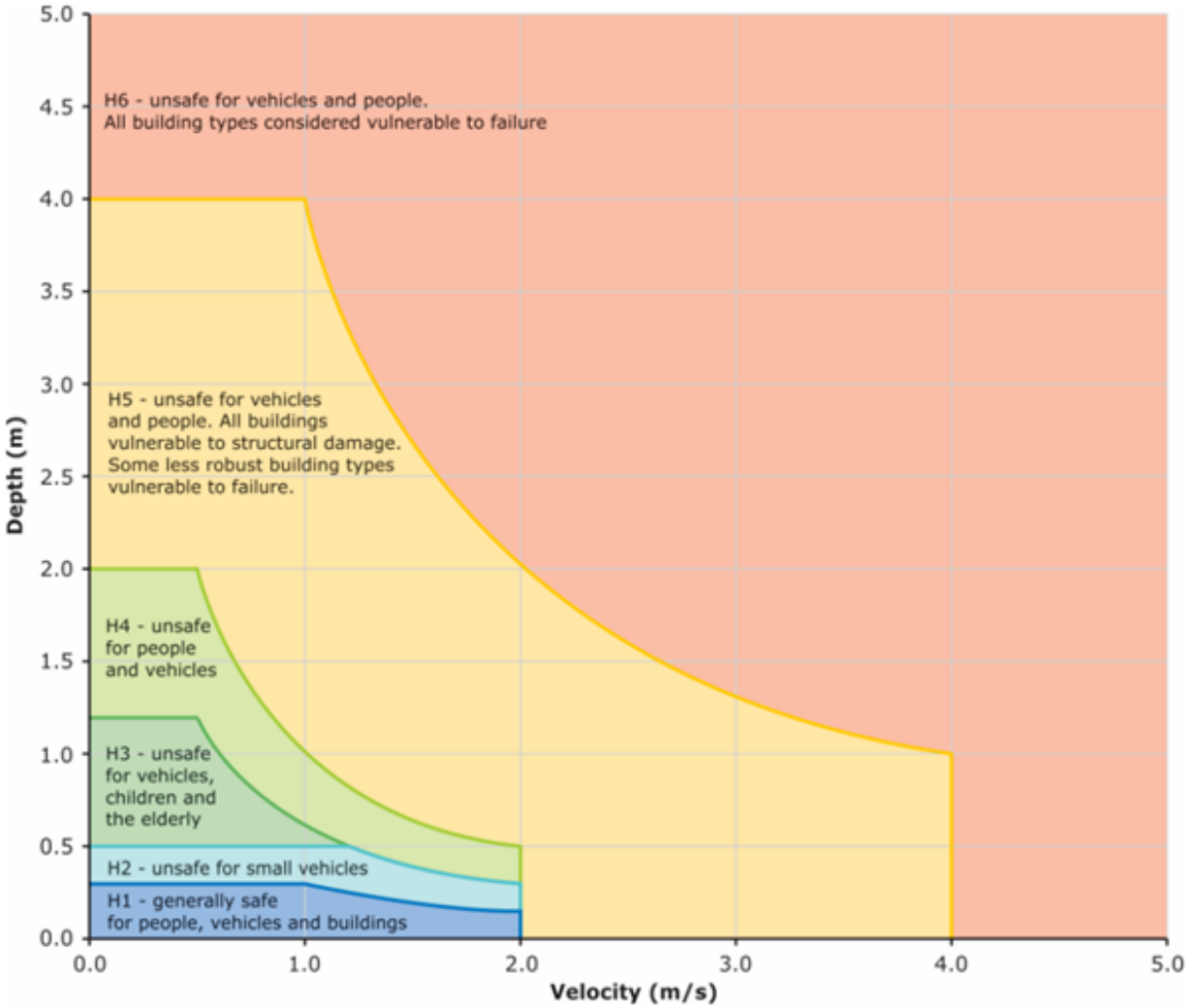

Figure 5: Flood hazard vulnerability curve (Source: Flood Risk Management Guide FB03 - Flood Hazard, NSW Department of Planning and Environment, 2022)

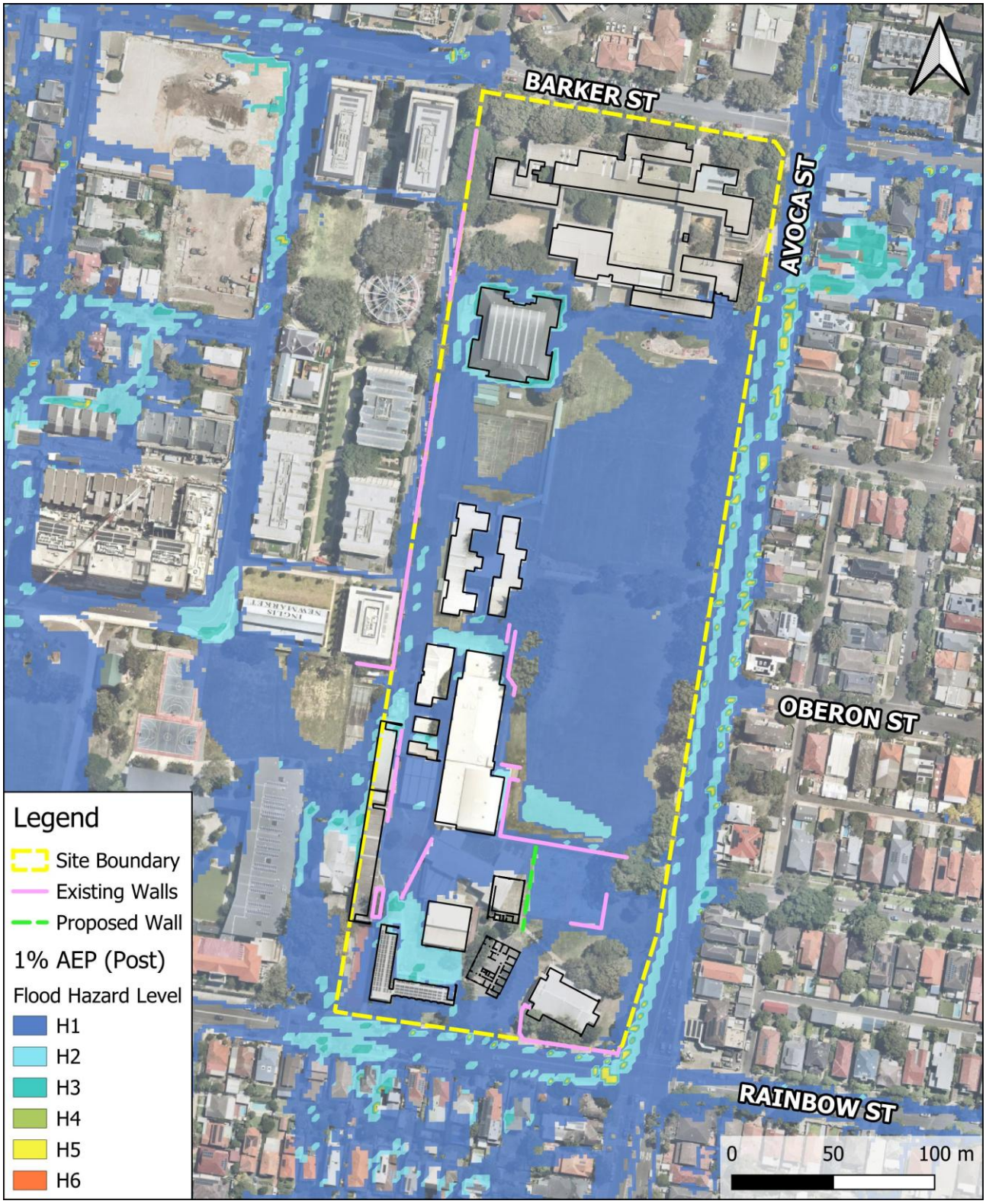

Figure 6: 1% AEP flood hazard level at the Randwick High School site under post-development conditions (with mitigation)

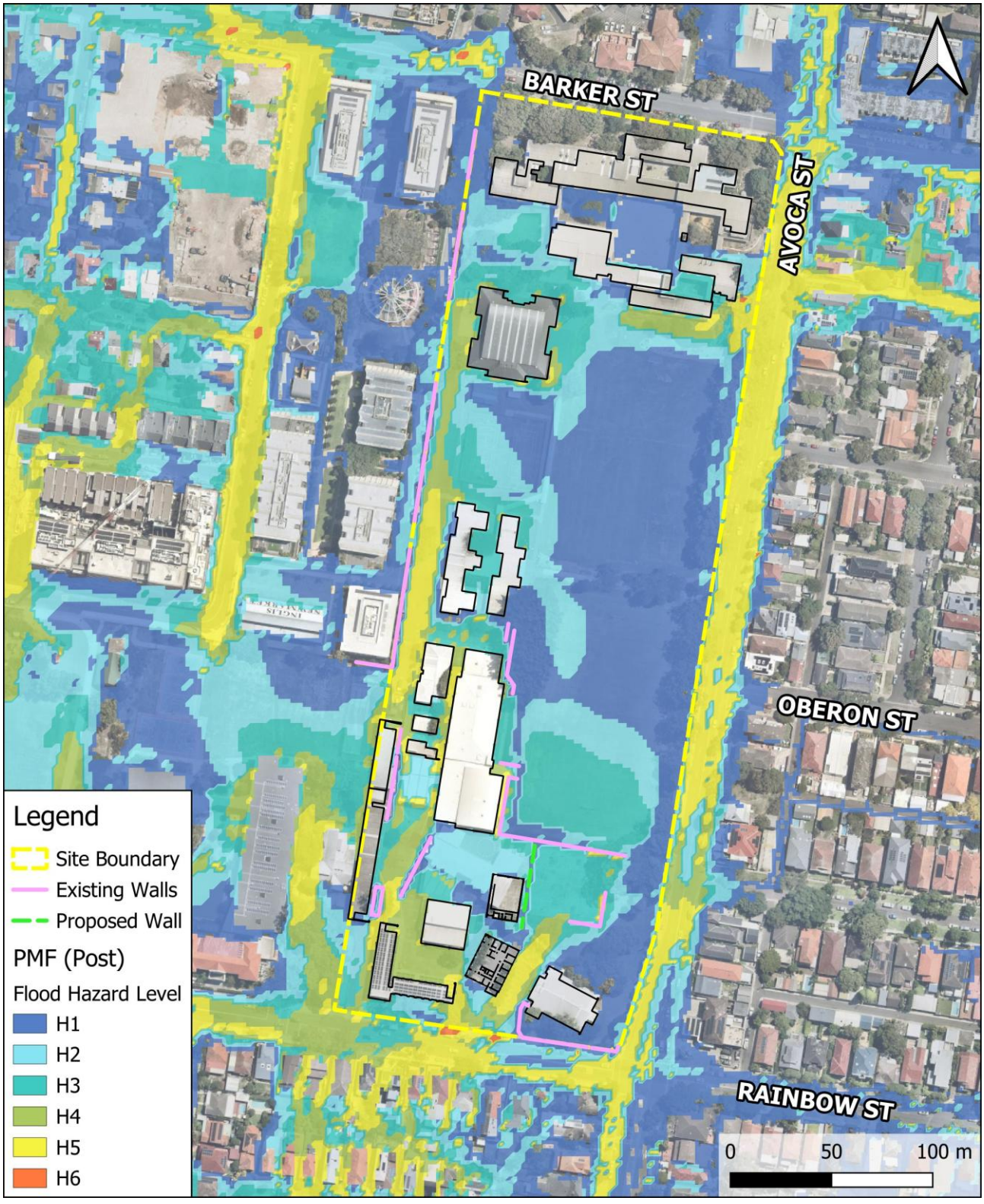

Figure 7: PMF hazard level at the Randwick High School site under post-development conditions (with mitigation)

2.3 Inundation and Recession Times

Table 1 presents a summary of the inundation and recession times at the site in two PMF events of varying durations to consider the range of possible warning time and isolation periods.

The 30-minute storm event is critical due to its flood impact and the rapid onset of inundation, with vehicular access to the site cut off within just 10 minutes. Although the proposed buildings remain flood-free during the longer-duration 3-hour PMF event, this storm is considered critical from an isolation perspective, as access to the car park is not restored until 3 hours after the onset of rainfall.

In the event of a significant storm event, egress from the site should be directed along the eastbound lanes of Rainbow Street until ponding at the sag point (southwest of the site) has cleared.

Table 1: Time to inundation and recession at the site in the critical PMF storm event

PMF Storm Duration	Time to Inundation	Recession Time
PMF 30 minutes	< 10 minutes until flows across Avoca Street and Rainbow Street reach H5 hazard, cutting off access to the vehicular entrance to the site. Flows overtop both the flood wall and the bunding within the southern field 15-20 minutes after the onset of the storm, with depths exceeding 300mm around the proposed buildings.	Flows across the roadways begin to recede within 30 minutes of the onset of the storm. Flows across Avoca Street return to low hazard conditions (H1) after 40 minutes of the onset of the storm, and flood-free after 45 minutes. The sag point on Rainbow Street (immediately southwest of the site) remains hazardous for a longer period due to ponding here. This area returns to low hazard (H1) conditions after 1 hour and is flood-free after 1 hour 20 minutes. Within the site, a route from the proposed buildings to the south of the car park (with further onward travel via Rainbow Street) becomes available 1 hour following the onset of the storm, with depths receding to less than 100mm here.
PMF 3 hours	< 30 minutes until flows across Avoca Street and Rainbow Street reach H5 hazard, cutting off access to the vehicular entrance to the site. The proposed buildings are not flood affected in the 3-hour PMF storm. Flows to the north of the lecture theatre peak at less than 100mm depth, regarded as low (H1) hazard. Overflows from the basketball court into the car park reach H3-H4 hazard 45 minutes after the onset of the storm.	Within the site, a route from the proposed buildings to the south of the car park (with further onward travel via Rainbow Street) becomes available 3 hours following the onset of the storm, with depths of less than 120mm across the pedestrian pathway and less than 200mm within the southern portion of the car park. Onward travel is possible at this point via Rainbow Street heading east. Westward travel on this road should be avoided given depths exceeding 350mm at the sag point. The roads (including the Rainbow St sag point) return to flood-free conditions 3 hours 35 minutes following the onset of the storm.

3.0 Flood Response Strategy

3.1 Pre-Emptive Closure

Pre-emptive closure of the site is the preferred flood emergency strategy for the site if advanced warning of a major storm event is received outside of opening hours, or where a severe event is forecast several hours in advance.

Although flash flood events are characterised by minimal warning times, there would be advanced notice of the extreme rainfall experienced in a 1% AEP–PMF event. During the operational phase, where there is enough warning prior to the site's opening hours, the site should be closed in advance of the flood event so students and staff can be safe at home and do not have to drive though roads that could become hazardous.

An SMS must be sent to staff and parents where possible at the earliest opportunity (once the severe thunderstorm warning is issued by BOM) to advise of the school closure and ensure no site users enter dangerous road conditions. Any expected visitors of the site should also be informed via SMS if there is a risk of flooding to minimise the risk of people entering floodwaters.

3.2 Shelter-in-Place

While there is often advanced warning time of extreme rainfall events such as those endured in a 1% AEP-PMF event, this cannot be relied upon. Flash flood events are usually characterised by minimal warning times, and pre-emptive closure of the site may not always be possible.

Shelter-in-place (SIP) guidance published by the NSW Department of Planning, Housing and Infrastructure (DPHI) in January 2025 provides considerations that can inform whether SIP is an appropriate response strategy in a flash flood environment, alongside design considerations that should be met. Table 2 outlines the varying factors that must be considered when proposing SIP, alongside a review of whether the proposed buildings meet these requirements.

Table 2: DPHI SIP Guidelines

SIP Guideline	Response
Initial assessment	
1. Does shelter in place align with existing emergency management strategies for the area, as determined through the flood risk management process and by the NSW SES?	Pre-emptive closure of the site is recommended when there is advanced warning of a major storm event, which is consistent with the flood response strategy discussed in the Randwick City Council Local Flood Emergency Sub Plan (Section 5.8.3 of the sub plan). However, the main flood mechanism impacting the immediate area around the site is flash flooding via overland flow. Flash flood events are characterised by minimal warning times and therefore there may not be sufficient warning time available to achieve evacuation at the site, as discussed below.
2. Has evacuation off-site (the primary emergency management strategy) been investigated and determined to be unachievable?	With less than 10 minutes from the onset of the shorter duration (30-minute) PMF storm until inundation of the adjoining roads of the proposed site (refer Table 1), there is little warning time to implement evacuation off-site. As evident in Figure 7, there is no way in or out of the site that does not go through hazardous floodwaters during the critical duration PMF event. NSW SES state that evacuation of a site must not require people to drive or walk through floodwater.

	It is therefore recommended that the site is prepared for a shelter-in-place strategy.
3. Does the development include medical centres, emergency service and community facilities, and sensitive and hazardous land uses, some of which may not be suitable for shelter in place?	While the site is an educational facility, it is deemed more hazardous to attempt to evacuate the site once a severe storm event has already commenced, as this would involve moving vulnerable site users from a safe environment onto roads of high to medium hazard.
4. Shelter in place for greenfield development is not supported	N/A
5. Whether there is existing government developed flood warning systems that give advanced detailed forecasts of flash flooding to allow sufficient time to evacuate to the proposed refuge locations[2] [2] Flash flood warning systems are not failsafe and should not be the only mechanism to get people to shelter in place.	There is less than 10 minutes from the onset of the 30-minute PMF storm until flows across Avoca Street and Rainbow Street reach H5 hazard level, cutting off access to the vehicular entrance to the site. While there are flood warnings issued by the Bureau of Meteorology and the Australian Warning System, the flash nature of flooding at the site (and the inherently limited warning time associated with this type of flooding) limits the capacity of NSW SES to issue flood notifications and action statements with sufficient lead time. It is important to note that the warnings outlined in Section 4.0 may not be available or occur with advanced warning. Severe Thunderstorm Warnings will be the primary trigger at the site.
6. Can the community effectively be informed of the risks associated with the emergency management strategy?	Section 6.1 of this FERP outlines the importance of education and signage in informing site users of the flood risks present on site and the flood protocols and procedures involved in the SIP strategy.
Following satisfaction of the above, the following must be assessed:	
7. Detailed assessment of evacuation off-site (the primary emergency management strategy) to determine that evacuation off-site is not achievable	With less than 10 minutes from the onset of the 30-minute PMF storm until inundation of the adjoining roads, there is little warning time to implement evacuation off-site once the storm event begins. As evident in Figure 7, there is no vehicular route in or out of the site that does not go through hazardous floodwaters during the critical duration PMF event. NSW SES state that evacuation of a site must not require people to drive or walk through flood water. It is therefore recommended that the site is prepared for a shelter-in-place strategy.
8. The flood behaviour at the site, with consideration of climate change and assessment of the potential maximum duration of isolation up to and including the PMF to identify that: a) flash flooding is the only flood risk present at the site, whether it be from overland flooding, local creek or riverine flooding, and b) the flooding occurs within less than 6 hours from the commencement of causative rain	Consideration of climate change has been made in Section 7.0 of the Flood Impact and Risk Assessment (FIRA) submitted alongside this FERP. The 2090 SSP 2-4.5 scenario was tested, with a 40% uplift in rainfall intensity. While analysis found that there is an increase in 1% AEP flood level of up to 179mm, flows do not overtop the bunding across the southern field, nor the proposed wall to the west of the basketball court. The proposed buildings remain flood-free under future climate change.

and the duration of shelter in place due to isolation by floodwaters is less than 12 hours from the commencement of rainfall, and c) the development is not subject to high hazard flooding (e.g. floodways, high hazard H5 or H6 areas) or surrounding roadways are not subject to high hazard flooding.[3] [3] Flood Risk Management Guideline FB03 Flood Hazard, DCCEEW, 2023.	a) Section 2.0 of this FERP outlines the flood behaviour at the site and notes that flash flooding is the only flood risk present at the site. b) There is less than 10 minutes from the onset of the 30-minute PMF storm until inundation of Rainbow Street and Avoca Street. The duration of isolation is short due to the flash nature of flooding in the area, with the site only cut off from access roads for approximately 1 hour in the critical PMF event. c) All road frontages are subject to high hazard flooding (up to H5) in the PMF event. Despite this, it is deemed more hazardous to attempt to evacuate the site once a severe storm event has already commenced, as this would involve moving vulnerable site users from safe refuge into roads of high hazard.
9. How shelter in place will be: a) used as part of the site's emergency management response, including actions before, during and after sheltering in place, and b) communicated to occupants and visitors of the building and how this communication will be maintained for the life of the development.	a) Section 7.0 of this FERP outlines how SIP will be implemented at the site, including actions before, during and after the event. b) Sections 4.4 and 6.0 outline how this will be communicated to the site users and how this will be maintained.
10. a) An understanding of the secondary risks and how the proponent proposes they will be managed is outlined in the FIRA. Secondary risks include medical emergencies, building fire, health and wellbeing. b) Table 12 of EM01 should be used to consider whether the risks could be effectively managed.	a) Secondary emergencies are considered in Section 3.3. b) Table 12 of the EM01 notes that a risk management consideration is limiting exposure of people to floodwaters. The EM01 document suggests that this can be aided by providing sufficient readily accessible habitable areas above the PMF to cater for potential occupants, staff, and visitors. • The ground floor level FFL is 39.00m AHD for the admin building, and 39.60m AHD for the lecture theatre. • During a shelter-in-place protocol, site users will be directed to move to the first-floor level, which is set well above the PMF (42.72-42.75m AHD). There is adequate space within the first floor in which site users can shelter (GLS, learning commons and lecture theatre seating), making the site safe for refuge. Table 12 of the EM01 also notes that to reduce human behaviour risks, "*Where facilities, such as businesses, schools and childcare centres have site emergency plans that consider flooding these plans should by regularly exercised similar to building fire evacuation drills.*" Flood drills have been recommended in Section 6.3 of this FERP. Table 12 also states "*Consider developing a PA system to communicate evacuation directions and safety messages to the population in the lead-up to and during a flood to assist in improving the safety of the community*." A PA system has been recommended in Section 4.4 of this FERP.

Design criteria for consideration	
i. the floor level of the shelter in place part of the development be above the PMF, and	The 'shelter in place part of the development' is the first-floor level. This is currently proposed to be set to 42.72-42.75m AHD and is therefore well above the PMF flood level.
ii. structural soundness for conditions in a PMF event, considering flood and debris forces, be verified by a suitably qualified structural engineer, and	The proposed buildings are not vulnerable to failure during a flood event. Level 1 of both buildings will be unaffected by flooding in events up to and including the PMF as the suspended structure is founded on concrete columns sitting on a pile foundation. This is isolated from the ground floor structure, which is designed as slab on ground. The façade elements may be damaged in rare flood events (of a larger magnitude than the 0.5% AEP (200-year ARI) event) and require repair or reconstruction. Refer to BG&E's structural documentation for further information.
iii. area and access to the area does not rely on access to electricity, is self-directing, and have clearly marked internal access for all people on site, including consideration of access for potential occupants and/or visitors	As an educational facility, access and clearly marked internal access will be achieved.
iv. protection from weather and appropriate heating and cooling	As an educational facility, this will be achieved.
v. access to personal hygiene facilities such as a toilet	Toilets are available on the ground floor of the admin building, which is flood-free in events up to and including the 0.5% AEP (200-year ARI) event. If the ground floor is subject to above flood inundation, site users will be sheltering-in-place on Level 1, which has covered walkway connections to Block B, C and D, with toilet facilities available in the upper levels of these existing buildings.
vi. a minimum floor space of 2 m² per person	Based on the Schedule of Accommodation for the proposed buildings (dated 22 May 2025, refer to Bennett and Trimble documentation), Level 1 of the admin building has a floor area of 539m^2, with capacity for 269 site users to shelter in. Level 1 of the lecture theatre has a floor area of 315m^2, with capacity for 157 people. Overall, the proposed buildings have capacity for 426 people to shelter on Level 1.
vii. items for self-sufficiency that are stored, maintained and are regularly updated in an accessible location above the PMF, including sufficient drinking water and food for occupants, fire extinguishers, radios and torches with spare batteries, and a first aid kit with an automated external defibrillator (AED)	As an educational facility, this will be achieved. Refer Section 6.4 for this recommendation.

viii.	centralised communal shelters may be considered but must be freely accessible internally at all times and externally accessible during events	This will not be required. There will also be communal spaces available to refuge, including the learning commons.
ix.	access is provided to onsite systems that generate power of the shelter in place location during and after the event for a full range of flood events up to the PMF	Based on site survey the existing substation is located south of Building D, with less than 50mm depths in 1% AEP, but depths exceeding 500mm in the PMF event. A backup generator should be considered to ensure power is available during shelter-in-place procedures.
x.	detail how these requirements will be maintained and enforced for the life of the development.	Flood Emergency Response Plans are 'living documents' which need to be regularly reviewed once the site is operational to ensure they remain appropriate to address the risk to the site, can be practically implemented, and consider changing information and lessons learnt from any floods since the last review. It is recommended that the FERP is reviewed following staff changes, flood drills as well as flood events to ensure that the details remain relevant.

3.3 Secondary Emergency

Although shelter-in-place is the emergency response strategy if a severe flash flood event begins without sufficient warning, any decision to shelter-in-place must be accompanied by alternative plans in the event of a secondary emergency (e.g. medical or fire).

While site users should be advised to stay in place (at least until the magnitude of the flood is clearer), if there is a secondary emergency during a flash flood event, the Hazards Near Me app should monitored by site users to keep informed on which routes can be taken following a flood event.

The following items should be considered to ensure sufficient preparedness in the event of a secondary emergency:

- **FIRE**: Ensure adequate access to fire extinguishers and internal fire suppression systems (e.g. sprinklers).
- **FIRE**: Check that they are not reliant on mains pressure that may fail.
- **MEDICAL**: Designate trained personnel and maintain a flood-resilient first aid station with supplies sufficient for prolonged isolation.
- **MEDICAL**: Nominate a safe, elevated, easily accessible area for care of injured or ill persons until external assistance can arrive.
- **MEDICAL**: Consider evacuation aids including stretchers, wheelchairs, or other aids for internal transfer if ambulance access is limited.
- **POWER:** Install and maintain flood-resilient generators or battery systems for critical power (lighting, communications, medical equipment)

4.0 Flood Warnings and Notifications

4.1 Bureau of Meteorology

Severe weather and thunderstorm warnings are issued by the Bureau of Meteorology (BoM). These warnings are continually updated with descriptions of the likely conditions, including predicted extreme rainfall depths. Flood warnings are issued by the BoM when flooding is occurring or is expected to occur in an area. Warnings may include specific predictions of flood depths dependent on real-time rainfall and river level data. Given that the site is impacted by overland flows due to flash flood events, there is unlikely to be any flood warnings issued for the site with advanced notice. Triggers should consequently focus on severe weather and thunderstorm warnings.

These warnings are distributed by BoM to Councils, Police and the relevant local SES, as well as being available on the BoM website.

- A ***Severe Weather Warning*** is issued by the BoM when severe weather is occurring or expected to develop, that is the direct consequence of a thunderstorm. For broad severe weather such as east coast lows or vigorous cold fronts, Severe Weather Warnings are aimed to be issued 24-36 hours ahead of the expected onset. This warning time may be reduced particularly for more localised severe weather. Once a severe weather warning is issued it is routinely updated every six hours until the threat has passed but may be updated more frequently for rapidly evolving situations.
- A ***Severe Thunderstorm Warning*** is issued by the BoM whenever there is sufficient meteorological evidence to suggest that severe thunderstorm development is likely, or when a severe thunderstorm has been directly reported or observed. Regional warnings are provided for one or more forecast areas and aim to give 3 hours warning before thunderstorms develop. Detailed thunderstorm warnings are provided for capital cities (including this site) and aim to give 60 minutes warning before severe thunderstorms develop. Warnings are updated routinely every 30-60 minutes until the threat has passed or more frequently if required.

4.2 NSW SES Australian Warning System

NSW SES has recently implemented the Australian Warning System (AWS) which replaces their previous evacuation orders and warnings system. The AWS is a new national approach to information and 'Calls to Actions' for hazards including flooding. The System uses a nationally consistent set of icons, with three warning levels: Advice, Watch and Act, and Emergency Warning. The storm warnings are described in Figure 8.

Figure 8: Australian Warning System – Three Warning Levels

The NSW SES utilises a range of sources to build detailed flood intelligence within local communities, including information from flood studies and historical flood data. As part of the transition to the Australian Warning System, the NSW SES has increased flexibility to tailor warnings at the community level, based on the expected consequences of severe weather events.

The Chief Warden is responsible for monitoring information from the AWS. Impacted communities will continue to receive warnings through the NSW SES website, NSW SES social media channels and by listening to local ABC radio stations. The NSW SES has also developed an all-hazards warning platform, Hazard Watch, to provide an additional channel for communities to access important warning information.

Each warning has three components:

1) **Location and hazard**: The location and the type of hazard impacting the community.
2) **Action statement**: For each warning level there are a range of action statements to guide protective action by the community. These statements evolve as the warning levels increase in severity. Statements range from 'prepare now' at the Advice level, to 'avoid the area' at the Watch and Act level, to 'seek shelter now' in the Emergency Warning level. As the situation changes and the threat is reduced, the level of warning will decrease accordingly.
3) **The warning level**: The severity of the natural hazard event based on the consequence to the community.

As the site is affected by flash flooding, little to no warning time is likely to be available, with Severe Storm Warnings and Severe Thunderstorm Warnings likely to be the only warnings available. It is also important to acknowledge that neither the NSW SES nor the Bureau of Meteorology can provide special individual flood warning services for each affected property. The more specific the warning requirement for individuals and sites becomes, the more difficult it is for the NSW SES to deliver warnings in the short time frames that often apply. Site operators must be weather aware and act early on publicly broadcast severe weather and flood warnings.

4.3 Triggers

4.3.1 Pre-Emptive Closure

It should be noted that the flash nature of flooding at the site (and the inherently limited warning time associated with this type of flooding) limits the capacity of both the BoM and NSW SES to issue warnings and flood notifications with sufficient lead time. The warnings outlined above may not be available, or occur, with sufficient advanced warning.

Alternative triggers are required for the site to ensure adequate response time, primarily involving continued monitoring of Severe Weather Warnings (particularly those that are expected to result in flooding), media updates via local radio stations and social media. Although the Chief Warden is responsible for monitoring information from the AWS, NSW SES recommend that all site users (namely, all staff members and wardens) refer to the HazardWatch website and the Hazards Near Me app.

4.3.2 Shelter-in-Place

Although the school is very likely to be pre-emptively closed during a flood event of 1% AEP magnitude or greater, it is possible that a significant flood event may occur without adequate warning. In this case, visual observation of flows within the informal basin and the basketball court will be the primary trigger to begin shelter-in-place procedures in the new buildings.

Given that the new buildings are flood free in all events up to and including the 0.5% AEP event, it is not necessary to move all site users to Level 1 unless above-floor inundation is expected. Once flows have almost reached the top of the bunding within the open field, or the top of the wall along the west of the basketball court, the Chief Warden must instigate SIP orders and direct all staff and students to Level 1. Visual observation is intended as a last resort where there is no pre-warning. In some cases, this will represent the earliest opportunity to trigger SIP actions.

4.4 Emergency Signals

The site should have a Public Announcement (PA) system that can be used by the Chief Warden to inform all

staff and students of the chosen response strategy in the event of a flood emergency. This ensures that staff with key responsibilities in the Plan can begin to fulfil their duties without delay. The PA system should be used alongside SMS and email updates to staff, parents and guardians to inform them of any severe weather or thunderstorm warnings covering the site or key access routes. It should also be used to direct all site users to the first floor in the event of any above floor inundation.

5.0 Flood Response Team

5.1 Staff Responsibilities

In the event of a severe flood, various staff members will be responsible for specific tasks as detailed in Table 3. Before the site is in operation, these roles must be delegated to specific staff members.

Table 3: Staff Flood Responsibilities

Role	Responsibilities
Chief Warden	- Decide if pre-emptive closure can occur if warnings are received prior to opening hours or with several hours' notice - Monitor warnings and notifications from BoM and AWS - Monitor BoM weather in the area of the site - Inform staff of flood risk - Coordinate flood SIP drills
First Aid Officer	- Coordinate assistance for less able students or staff members - Prepare a Flood Emergency Kit that includes a portable radio, torch, spare batteries, first aid materials, emergency contact numbers, candles, waterproof matches, waterproof bags and required medications
Staff	- Check visitor log and student registers so all site users can be accounted for - Report missing students or site visitors to the Chief Warden

5.2 Key Contact Details

In the event of a severe flood, key telephone numbers applicable to the site have been listed in Table 4 below.

Table 4: Key Contact Numbers

IMPORTANT TELEPHONE NUMBERS	
Chief Warden	tba
Deputy Principal	tba
Safety/First Aid Officer	tba
External Contacts	
Police/Ambulance (for life-threatening emergencies)	000
NSW State Emergency Services (SES)	132 500
Fire & Rescue NSW – Randwick Hills Fire Station	02 9493 1039
Randwick Police Station	02 9697 1099
Prince of Wales Hospital	02 9382 2222

6.0 Preparation for Flood Response

6.1 Education

As part of the preparation for a flood event, all staff and students must be made aware and advised of the flood risks present on site and the flood protocols and procedures via signage. All staff must be made aware of their management responsibilities via briefing. This will form part of the mandatory site inductions that all staff must undertake prior to commencing work. A copy of this FERP, which includes emergency response procedures, will be made available at communal areas within the site as well as the main office. This FERP must be regularly reviewed by the Chief Warden, or in the event of any staff restructure or other significant change, to ensure it is up to date.

It is recommended that students and frequent users of the site are educated on the potential flood risk and actions that will be undertaken during a flood event. Lessons should also be held that address flood risks and highlight dangerous behaviour during a flood event. Materials available on the NSW SES website have been tailored for students of various ages.

6.2 Signage

It is important that the site has adequate signage for flood warning, similar to those in Figure 9. Flood warning signs should be positioned around the site to identify areas affected by Category H3 hazard and higher in the critical 1% AEP event, in accordance with the Flood Hazard Flood Risk Management Guide FB03, NSW Department of Planning and Environment. Refer to Figure 6 for hazard categorisation of flows in this event.

Signage should also be placed at the driveway onto Rainbow Street, highlighting the flood risk to users travelling on this road, and on Avoca Street.

Figure 9: Signage and Gauges

6.3 Flood Drills

To reduce human behaviour risks, this plan should be regularly exercised, in a similar manner to that of fire evacuation drills. It is recommended that flood drills be held by staff annually to ensure all staff workers are familiar with the sound of the alert and their subsequent flood response actions. It is the responsibility of the

Chief Warden to ensure that evacuation drills are organised and that any issues with these drills are attended to, and if necessary, procedures adjusted, and drills rerun.

These drills are required to test the suitability of the plan, identify gaps and to provide staff the opportunity to put into practice their specific responsibilities. If issues arise, this plan should be reviewed and updated. The Chief Warden will also ensure that all site drills are recorded in an appropriate records book and any non-conformities reported and responded to.

6.4 Flood Emergency Kit

A Flood Emergency Kit should be prepared prior to a flood event taking place and regularly checked to ensure that supplies within the kit are sufficient and in working condition. This check could occur after the evacuation drill takes place to provide a regular schedule. The Kit should include:

- Radio with spare batteries;
- Torch with spare batteries;
- First aid kit and other medicines;
- Candles and waterproof matches;
- Waterproof bags;
- A copy of the Site Emergency Management Plan; and
- Emergency contact numbers.

This Emergency Kit should be stored in a waterproof container, and it is the responsibility of the Chief Warden and First Aid Officer to make sure that this kit is maintained and available during an emergency.

The NSW Shelter-in-place guideline recommends items for self-sufficiency that are stored, maintained and are regularly updated in an accessible location (above the PMF level), including sufficient drinking water and food for occupants, fire extinguishers, radios and torches with spare batteries, and a first aid kit with consideration of an automated external defibrillator (AED).

7.0 Flood Response Actions

Flood Emergency Response Plan	
Flood Notification	**Protocols**
1) Weather forecast predicts significant rainfall event in the area or BoM issues a **Severe Weather Warning** or NSW SES issue a yellow "**ADVICE**" warning 	The following actions must be undertaken by the Chief Warden: 1) Notify all staff of the flood watch via SMS and email and confirm availability of relevant staff to assist with emergency actions if required. 2) Ensure the emergency kit is ready to use with sufficient drinking water and food in an accessible location within the proposed buildings 3) Listen to the local radio station for updates on forecasted flood areas and timings. Monitor updates on social media and NSW SES platform Hazard Watch. Chief Warden is to conduct visual assessment of conditions onsite, particularly at the informal basin and basketball court. 4) Ensure staff are familiar with their responsibilities. If a significant storm is forecast with advanced warning (>6 hrs), the **Chief Warden** should pre-emptively close the school. Notify parents and staff via SMS and email
	If the flood event is not anticipated to impact the site, the **Chief Warden** is to continue hourly check-ins and postpone high risk activities (e.g. outdoor activities etc.).
2) Flash flooding is reported in the media / via visual observation or BoM issues a **Severe Thunderstorm Warning** or NSW SES issue an amber "**WATCH AND ACT**" or red "**EMERGENCY**" warning 	If flood event is anticipated to impact the site, the **Chief Warden** must undertake the following actions: **<u>Outside of School Hours / Several Hours' Notice</u>***:* Close the school. If the flood is expected to continue into school hours, notify parents, guardians and staff of the temporary closure of the school via SMS and email. **<u>During School Hours / Insufficient Warning</u>***:* • **For life-threatening emergencies phone 000 immediately.** • An alert and warning message should be broadcast over the PA system confirming a significant flood event, notifying all site users to begin **shelter-in-place** procedures. Occupants within the proposed building will be advised to remain where they are, and not to leave the building. • Teachers should conduct a headcount to ensure all students are accounted for. • The Chief Warden should ensure that no one is outdoors. Once everyone is indoors, access outside should be closed off with temporary signage advising site users of the flood risk. • Send SMS to staff and where possible, any anticipated site users, advising them of SIP strategy and asking them not to travel to site. • Send SMS to parents to inform them of SIP procedures. Advise parents not to drive through floodwaters or to try to collect their children. • If visual observation of flows within the basin and basketball court indicate that flows may overtop into the development area, all site users are to be directed to Level 1. • If time permits, the Chief Warden should coordinate asset protection, including relocation of assets, prior to the onset of the storm. • The **Chief Warden** is to follow any action statements provided via the AWS. **<u>NOTE</u>: Avoid driving or walking through floodwaters. These are the main causes of death during flooding.**
3) Visual observation shows flood is receding or the alert has been downgraded by the relevant authorities and any flood event that occurred has passed.	• The **Chief Warden** is to confirm floodwater has subsided below the ground level and identify any areas of ponding within the site. • Flooded areas are to remain off limits until ponding has cleared. Once it has been confirmed that the water level has reduced to a safe level, the **Chief Warden** may announce that site users no longer need to shelter-in-place. • An additional SMS should be sent to parents advising them that they may collect their children if preferred. Staff must review a hard copy of the class list and record student release.

8.0 Mitigation Measures

Mitigation measures identified as necessary are outlined in Table 5.

Table 5: Mitigation Measures

Project Stage	Mitigation Measures	Reason for Mitigation
Design	This FERP must be reviewed (and if necessary, updated) following the detailed design stage, prior to the site becoming operational.	To ensure the information in this FERP is still relevant
Operation	Delegate staff responsibilities	To ensure all staff are aware of their specific roles and flood reponse actions.
Operation	Education and signage. Depth markers can also be implemented on external building walls to demonstate the estimated 1% AEP and PMF depths so site users are aware of the potential risks of flooding at the site.	To ensure all staff and students are aware of the flood risks present onsite and the flood protocols and procedures via signage.
Operation	Flood drills	To ensure staff and students are familiar with the sound of the alert and their flood reponse actions.
Operation	Flood emergency kit should be prepared and regularly checked	To ensure that supplies are in working condition

9.0 Evaluation of Environmental Impacts

Based on an assessment of the nature and extent of the impacts of the proposed development, it is determined that:

- The proposed development is considered to result in low flood risks to people present at the school during a flood event and will not have significant adverse effects on the locality, community or environment (refer to TTW's Flood Impact and Risk Assessment report for Randwick High School submitted alongside this report)
- The construction of the proposed buildings reduces flood risk to site users by providing additional safe space above the PMF level for temporary shelter. In addition, the proposed buildings are connected to Block B, C and D via external covered walkways on Level 1, offering more efficient egress for the existing buildings (which are more significantly flood impacted) and limiting exposure of staff and students to potentially hazardous flows
- Potential impacts can be mitigated and/or managed to ensure that there is minimal impact on the locality, community and/or the environment.

10.0 Limitations and Revision of the Flood Emergency Response Plan

This FERP only addresses the shelter-in-place strategies during extreme flooding events for staff and site users within the site itself and is considered a guide only. It does not cover staff and site visitors' individual safe travel arrangements to the site, or when their safe travel arrangements may be disrupted by flooding and/or road closures. This FERP also cannot account for the behaviour of individuals, such as choosing not to remain isolated in a building on a floor above the PMF for the duration of a flood event or attempting to enter dangerous areas during a flood.

In addition, this FERP is based on the currently available information for the proposed site, and must be updated following the detailed design stage, prior to the site becoming operational. Flood Emergency Response Plans are 'living documents' which need to be regularly reviewed once the site is operational to ensure they remain appropriate to address the risk to the site, can be practically implemented, and consider changing information and lessons learnt from any floods since the last review.

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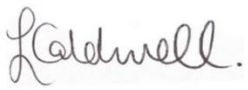

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