

Flood Emergency Response Plan

Campbelltown Arts Centre Expansion SSDA

State Significant Development No. 74509208

Prepared for Campbelltown City Council / 24 April 2026

241913

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1.0 Introduction

This Flood Emergency Response Plan (FERP) prepared by TTW on behalf of Campbelltown City Council is submitted to the Department of Planning, Housing and Infrastructure (DPHI) in support of a State Significant Development Application (SSDA) for the expansion of the existing Campbelltown Arts Centre (CAC) on land at 1 Art Gallery Road, Campbelltown (the site).

This SSDA seeks approval for:

- Demolition of parts of the existing buildings and structures on site.
- Expansion and redesign of the existing CAC, including the following elements:
 - Reorientation of the building towards Queen Street in the north to create a more substantial, welcoming and visible connection to the City Centre.
 - Addition of a new 350 seat theatre with back of house facilities.
 - Providing rehearsal spaces, creative and educational workshop areas, and community facilities.
 - Provision of ancillary artists' residences.
 - Provision of commercial spaces including a café/restaurant, retail, and conference facilities.
 - Provision of expanded gallery spaces for the exhibition of artists' collections and dedicated storage for loaned artworks and collections.
- Landscaping works including provision of feature planting and paving.
- Expansion and reconfiguration of at grade car parking.
- Extension and augmentation of services and infrastructure as required.

For a further detailed project description, please refer to the Environmental Impact Statement prepared by Colliers Urban Planning, the Architectural Drawings prepared by fjstudio, and the other accompanying technical documents that form part of the State Significant Development Application.

1.1 The Site

The site is located at 1 Art Gallery Road, Campbelltown and is legally identified as Lot 500 DP777387, Lot B DP157318, Lot 1 DP1038779, Lot 2 DP259807 and Lot 3 DP259807, as illustrated in the Site Aerial at Figure 1. It is situated within the Campbelltown local government area (LGA) immediately southwest of the Campbelltown City Centre and railway station. The existing development on site consists of the current Campbelltown Arts Centre, characterised by a double storey built form with open space and an at-grade carpark.

The site is bounded by Art Gallery Road to the west, Narellan Road to the south, Oxley Street to the east and Camden Road to the north. The northern part of the site is separated from the southern portion by Art Gallery Road as shown in Figure 1. The site comprises a total site area of approximately 18,877 m².



Figure 1: Site aerial (Source: Nearnmap / Colliers Urban Planning)

1.2 Relevant SEAR to This Report

This FERP has been prepared in response to the Secretary's Environmental Assessment Requirements (SEARs) for the proposed development dated 7 August 2024 for SSD-74509208. Specifically, this report has been prepared to respond to those SEARs outlined in Table 1 below.

Table 1: Secretary's Environmental Assessment Requirements relevant to this report

SEAR	SEAR Description	Section this is addressed and summary of response
15. Flood Risk	Identify the flood planning level as set out in the relevant council LEP or SEPP and identify any: - Flood risks on-site having regard to adopted flood studies - The potential effects of climate change - Any relevant provisions of the <i>NSW Flood Risk Management Manual</i>. Where the development is occurring on flood prone land, a Flood Impact and Risk Assessment (FIRA) must be prepared having regard to the <i>Flood Impact and Risk Assessment Guideline – LU01</i> (FIRA guide). When determining the scope and category of the FIRA, the requirements outlined in	Section 2.0 – the site is impacted by local flooding from the upstream catchment and Fishers Ghost Creek, which runs across the northeast of the site. TTW's Flood Impact and Risk Assessment Report provides a more detailed assessment of the flood planning level (FPL) at the site and the impacts of climate change. The proposed finished floor level complies with both the present-day FPL and is also 190mm above the 'future' FPL under projected flood conditions in 2100 (CC2100 Scenario). TTW's Flood Impact and Risk Assessment Report provides a more detailed assessment of the impact of the proposed development. The report concludes that the proposed development has a negligible impact in offsite flood behaviour.

	the FIRA guide must be considered.	
	Detail any flood risk management measures that are to be incorporated as part of the development having regard to the <i>Flood Risk Management Measures Guideline – MM01</i> (including any design solutions, flood modification measures, property modification measures, operational procedures of Flood Emergency Response Plan).	This FERP has been prepared to manage residual flood risks at the site. Preparedness actions are outlined in Section 6.0 (including education of staff, signage, and flood drills), and flood response actions during an active flood event are outlined in Section 7.0.

1.3 Guidance Documents

- Australian Institute of Disaster Resilience (AIDR) Guideline 7-3: Flood Hazard (2017)
- Campbelltown Local Environment Plan (LEP) 2015
- Campbelltown (Sustainable City) Development Control Plan (2015)
- Campbelltown (Sustainable City) Engineering Design for Development (June 2009)
- Engineers Australia (2019) *Australian Rainfall and Runoff: A Guide to Flood Estimation* (4th ed.). Commonwealth of Australia. <https://arr.ga.gov.au>
- FloodSafe guidelines and the relative FloodSafe Tool Kits
- NSW Department of Environment and Heritage – Flood Risk Management Guideline LU01, 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 Department of Planning and Environment (2023) Support for Emergency Management Planning – Flood Risk Management Guideline EM01
- NSW Planning Portal Spatial Viewer – <https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address>

1.4 Proposed Development

Figure 2 presents the latest ground floor plan for the site from FJC Studio. There are two vehicular entrances to the car park and loading dock via Art Gallery Road.

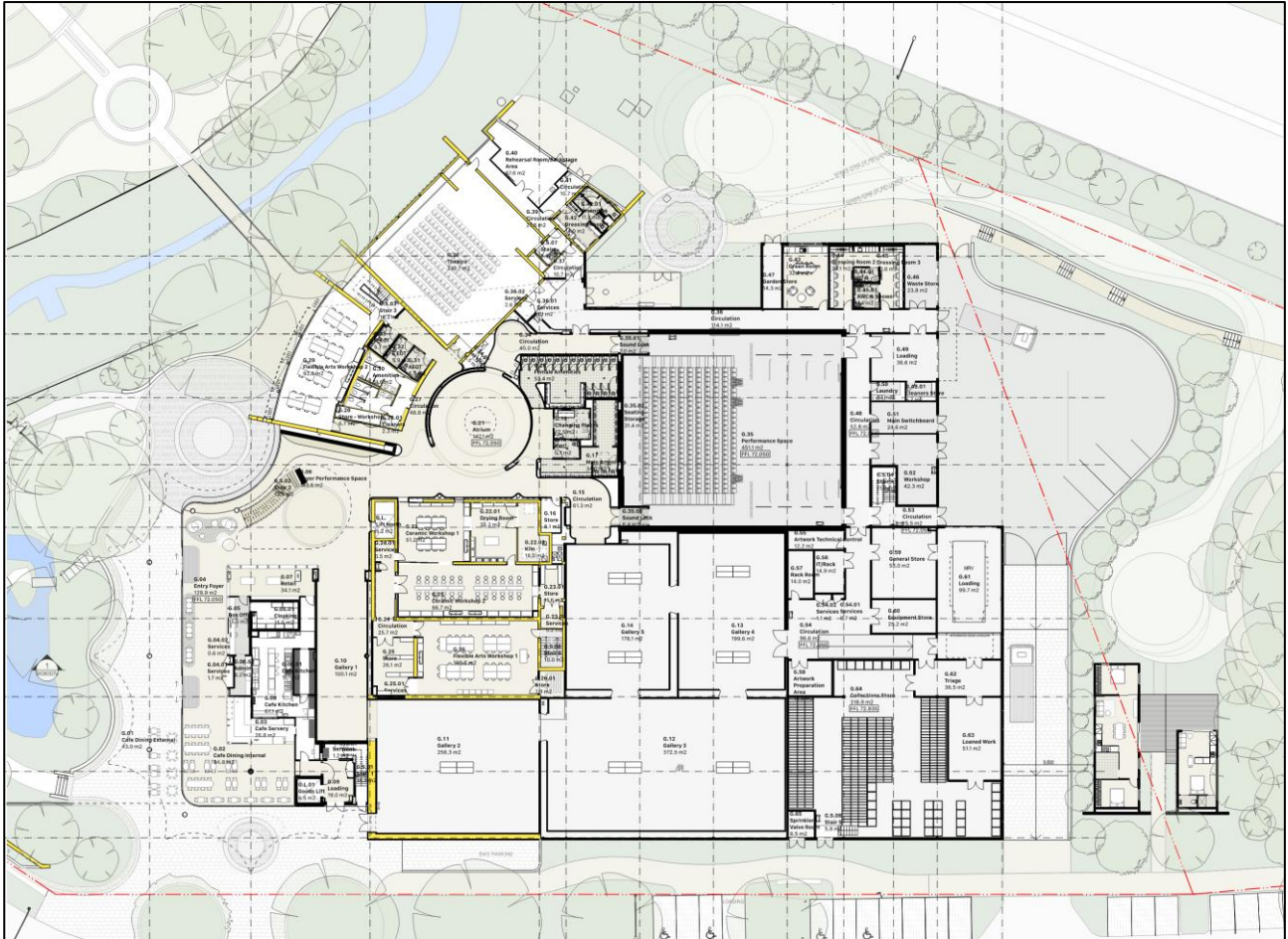


Figure 2: Ground floor plan for the site (Source: FJC Studio, Sheet 2000 Rev 12, dated 16 April 2026)

2.0 Flood Behaviour

2.1 Flood Sources

The site is subject to both mainstream flooding from Fishers Ghost Creek (which runs across the northeast of the site) and overland flooding from the local upstream catchment, which drain towards the creek. To assess flood behaviour at the site, Council's hydraulic model has been modified by TTW and assesses overland flow for the 18.13%, 5%, 1%, 0.2% AEP and PMF events. The modelling methodology and the flood impact associated with the development are described in detail in the Flood Impact and Risk Assessment (FIRA) Report prepared by TTW.

2.2 Post-Development Flood Depths, Levels and Hazard Classifications

A hazard assessment was also 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 3, 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). Table 2 outlines the threshold limits for each hazard category.

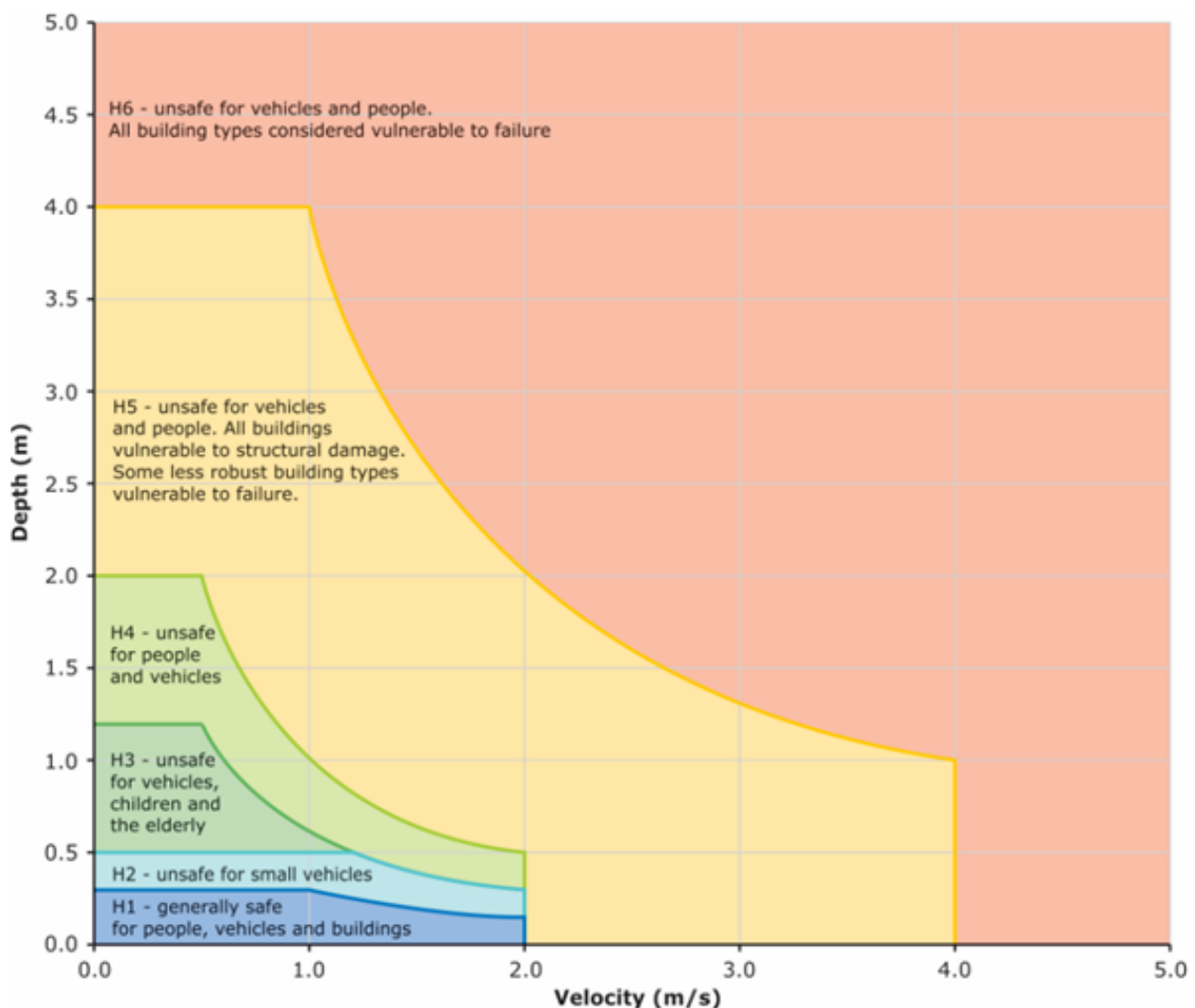


Figure 3: Flood hazard vulnerability curve (Source: Flood Risk Management Guide FB03 - Flood Hazard, NSW Department of Planning and Environment, 2022)

Table 2: Hazard vulnerability threshold limits

Hazard	Description	Classification Limit (m ² /s)	Limiting still water depth (D) (m)	Limiting velocity (V) (m/s)
H1	Generally safe for people, vehicles and buildings	$D \times V \leq 0.3$	0.3	2.0
H2	Unsafe for small vehicles	$D \times V \leq 0.6$	0.5	2.0
H3	Unsafe for vehicles, children and the elderly	$D \times V \leq 0.6$	1.2	2.0
H4	Unsafe for people and vehicles	$D \times V \leq 1.0$	2.0	2.0
H5	Unsafe for people and vehicles. All buildings vulnerable to structural damage.	$D \times V \leq 4.0$	4.0	4.0
H6	Unsafe for people and vehicles. All building types considered vulnerable to failure.	$D \times V > 4.0$	No Limit	No Limit

Post-development flood levels and depths in the 1% AEP event are presented in Figure 4, while Figure 5 depicts the flood hazard categorisation. PMF levels and depths are shown in Figure 6, and PMF hazard is presented in Figure 7. The flood affectation at the site can be summarised as follows:

- The wider site is impacted by flooding as the Fishers Ghost Creek traverses the northeast of the site.
- In the post-development 1% AEP event, flood level within the Fishers Ghost Creek peaks at around 70.95m AHD to the east of the site. While the site is impacted by overland flow northeast of the creek (with peak depths of approximately 600mm), flows within the creek do not breach onto the south of the site.
- Velocities within the creek are generally around 1.5m/s in the 1% AEP event, with mostly H5 hazard (deemed unsafe for people and vehicles, all buildings vulnerable to structural damage) with some areas of H6 (unsafe for people and vehicles, all building types considered vulnerable to failure).
- In the post-development PMF event, flood level within the Fishers Ghost Creek peaks at around 73m AHD to the east of the site, with a significant portion of the site impacted by depths of more than 1m. Close to the existing buildings, peak depths range between 1m to 2.8m at the eastern building. South of the building, flood levels peak at 73.4m AHD at the southwest.
- PMF velocities within the creek are generally upwards of 2.5m/s. There are increased instances of H6 and H5 hazard within the site area, while hazard south of the existing building is generally between H4 (unsafe for people and vehicles) and H5.

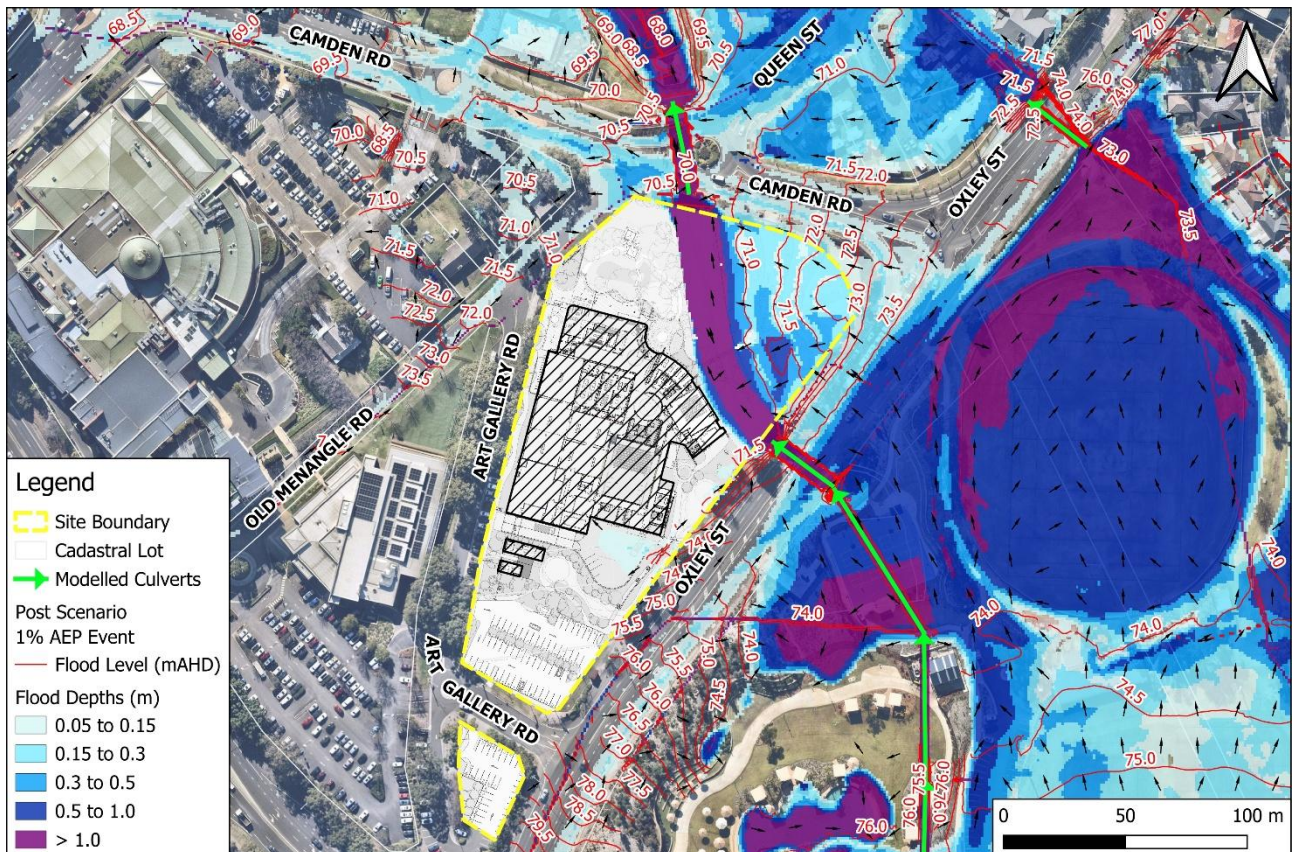


Figure 4: 1% AEP flood depths and levels at the site under post-development conditions

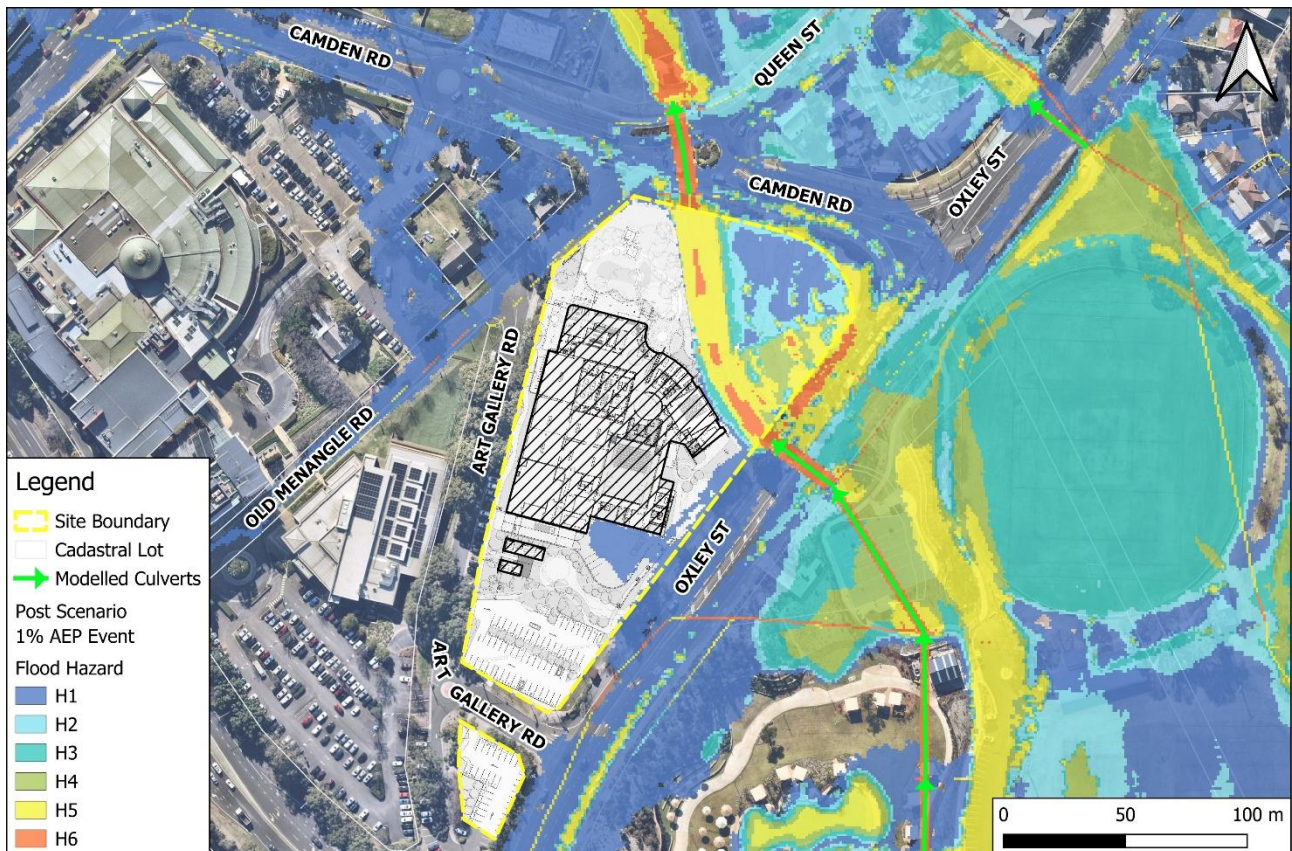


Figure 5: 1% AEP flood hazard categorisation at the site under post-development conditions

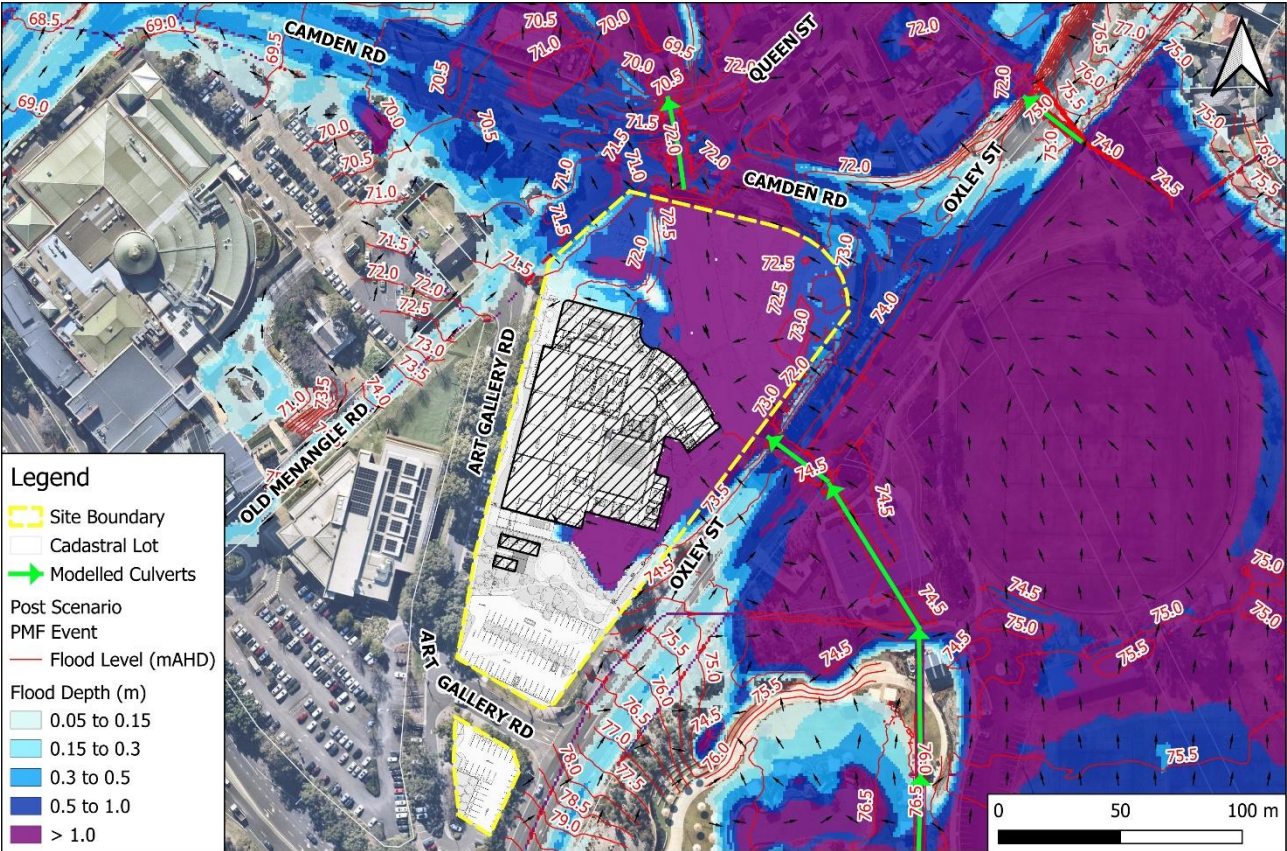


Figure 6: PMF depths and levels at the site under post-development conditions

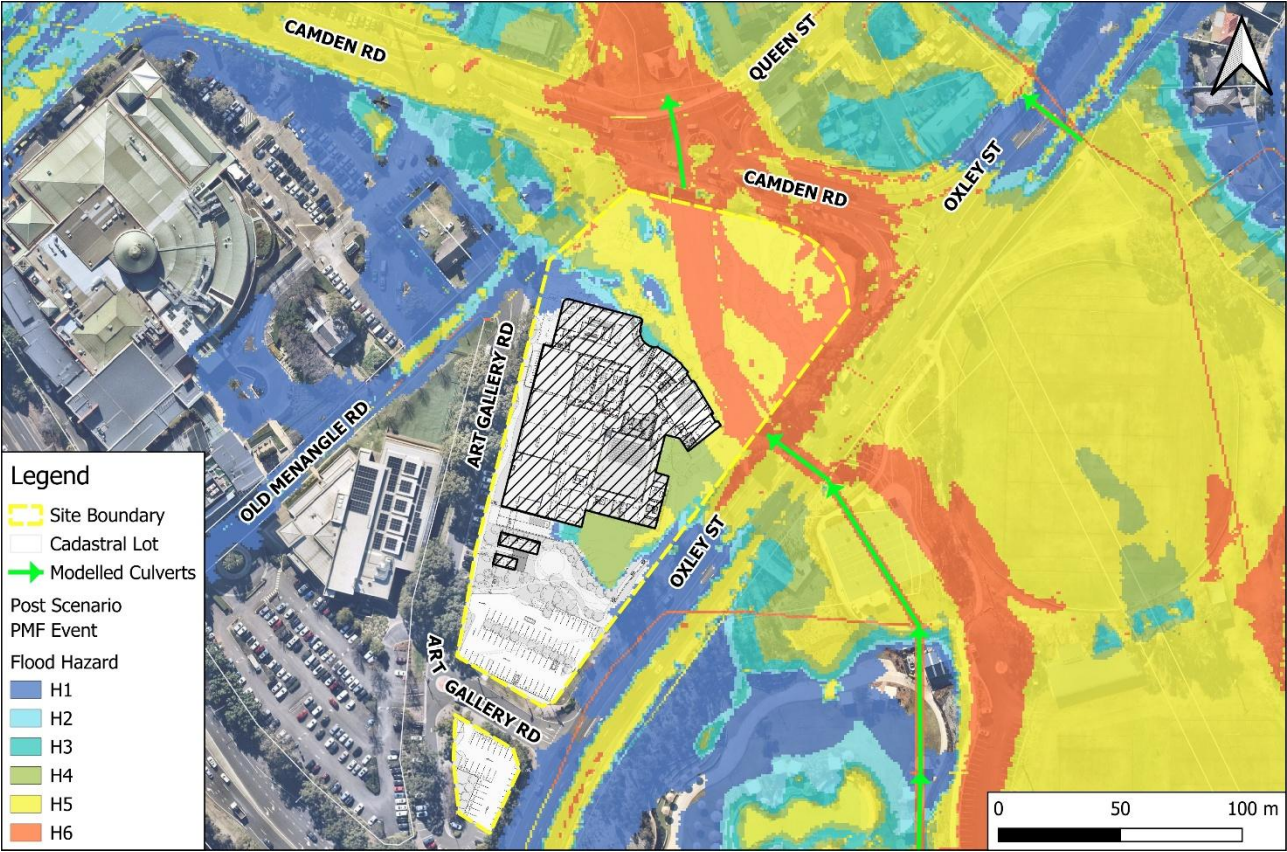


Figure 7: PMF hazard levels at the site under post-development conditions

2.3 Inundation and Recession Times

Flood hazard along this route is primarily related to high velocity flows, which recede more rapidly than large areas of ponding. However, it should be emphasised that this road hazard analysis is based on modelling results. In reality during a flood event, the flood affectation on individual roads may vary from what is described in this FERP. As described in more detail in Section 4.0, flood warnings and the Hazards Near Me app should also be monitored by site users to keep informed on which routes can be taken following a flood event.

Table 3 presents a summary of the inundation and recession times at the site in three PMF events of varying durations to consider the range of possible warning and isolation periods. The 15-minute duration PMF event is critical both in terms of producing the highest flood levels, and the rapid time of inundation with both key access roads cut off by high hazard flows within 15 minutes of the onset of the storm.

To understand the potential isolation time, it is important to consider the flood hazard and whether roads are trafficable. For the purpose of this assessment, the recession time is regarded as the time taken for roads to return to a trafficable, low hazard (H1) state. From a review of these three storm events, the maximum isolation period is approximately 3 hours and 30 minutes during the 240-minute PMF event.

The route that is deemed the first to return to a low hazard, trafficable state involves southbound egress from the proposed car park onto Art Gallery Road. At the roundabout, take the first exit, and at the junction onto Oxley Street, turn right (heading southbound), and continue south on Appin Road, away from main creek crossings. Flood hazard along this route is primarily related to high velocity flows, which recede more rapidly than large areas of ponding. However, it should be emphasised that this road hazard analysis is based on modelling results. In reality during a flood event, the flood affectation on individual roads may vary from what is described in this FERP. As described in more detail in Section 4.0, flood warnings and the Hazards Near Me app should also be monitored by site users to keep informed on which routes can be taken following a flood event.

Table 3: Time to inundation and recession at the site in three PMF storm events

PMF Storm Duration	Time to Inundation (minutes)	Recession Time
15 minutes	< 10 minutes until the southbound lane on Oxley Street is cut off by high (H5) hazard flows. Flows within Fishers Ghost Creek reach H5 hazard. < 15 minutes after the onset of the storm, flows within the creek corridor reach H6 hazard, and overtop their banks. The northeast of the site is inundated by flooding with a hazard classification of H5-H6. Above-floor inundation of the ground floor occurs. All lanes of Oxley Street and Camden Road are cut off by high hazard flows. Northbound travel on Old Menangle Road is cut off at the creek crossing. < 20 minutes until flows around the south of the building, reach a hazard classification of H4 (unsafe for people and vehicles).	25 minutes after the onset of the storm, flows begin to recede. 40 minutes after the onset of the storm, flows surrounding the building have either receded entirely or returned to low hazard (H1) conditions. Northbound travel via Oxley Street and Queen Street is still restricted by medium-high hazard flows (H3-H5). 1-hour 30 minutes after the onset of the storm, the adjacent road frontages are flood-free. The sag point on Queen Street is impacted by low hazard (H1) flows for several hours.
120 minutes	< 20 minutes until creek flows within the site boundary become hazardous (H5). < 30 minutes after the onset of the storm, creek flow overtops the banks, inundating the northeast of the site and creek crossings	1 hour after the onset of the storm, flows begin to recede. 2-hours 10 minutes after the onset of the storm, flows surrounding the building and across both Oxley Street and Camdem

	on Oxley Street and Camden Road with high hazard flows.	Road return flood-free/low hazard (H1) conditions.
240 minutes	<u>< 30 minutes</u> after the onset of the storm, creek flows become hazardous (H5). Flows across the rest of the site and surrounding roads remain low hazard (H1, H2 in gutter). <u>< 50 minutes</u> after the onset of the storm, flows across the northeast of the site become hazardous (H5). Creek crossings on Oxley Street and Camden Road are impacted by high hazard flows (H5-H6).	<u>1-hour 50 minutes</u> after the onset of the storm, flows begin to recede. <u>4 hours</u> after the onset of the storm, Camden Road returns to flood-free/low hazard (H1) conditions, with a total isolation period of <u>3-hours and 30 minutes</u>. Oxley Street returns to flood-free conditions 4-hours and 30 minutes after 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 may 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 site users 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 site users (where possible) at the earliest opportunity (once the severe weather warning is issued by BOM) to 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 in order to minimise the risk of people entering flood water.

3.2 Shelter-in-Place

While there may be 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 short durations. Under these conditions, pre-emptive closure of the site cannot always be accomplished.

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 3 summarises the key factors for consideration and assesses the proposed development against these requirements. Based on this assessment, SIP is considered an appropriate and practical emergency response strategy for the site in the context of flash flood events, where there is insufficient warning to enable pre-emptive closure of the site.

It should be noted that flood modelling indicates that the site would be impacted by above-floor inundation in the PMF event. In the critical 15-minute PMF event, flood levels peak at 73.40m AHD at the southwest of the building, 1.35m above the ground floor FFL of 72.05m AHD. Vertical evacuation of site users to Level 1 will be required if such an extreme event is expected. The specific triggers for initiating shelter-in-place measures are detailed in *Section 4.3*.

Table 4: 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 Campbelltown Local Flood Emergency Sub Plan (Section 5.8.4 of the sub plan). However, the main flood mechanism impacting the immediate area around the site is flash flooding. 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 15 minutes from the onset of the critical (15-minute) PMF storm until inundation of the adjoining roads of the proposed site (refer Table 2), 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 (H2 or higher) waters 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.
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?	N/A
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 locations² 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 15 minutes from the onset of the 15-minute PMF storm until Oxley St and Camden Rd are inundated by hazardous flows (H5). Flood warning systems and flood forecasting is discussed in more detail in Section 4.0. While there are flood warnings issued by the Bureau of Meteorology and the Australian Warning System, the flashy 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.
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 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 15 minutes from the onset of the critical (15-minute) PMF storm until inundation of the adjoining roads of the proposed site (refer Table 3), 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 (H2 or higher) waters 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 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, DCCCEW, 2023.	Consideration of climate change has been made in assessing the flood behaviour of the site. Modelling of current-day flooding has been upscaled to the near-term (year 2030) scenario, in alignment with the Shared Socioeconomic Pathway (SSP) 3-7.0 Scenario, which represents the medium-high Greenhouse Gas Emissions Scenario. Future climate change was also modelled using the ARR2019 climate change upscale factors under the Shared Socioeconomic Pathway (SSP) 2-4.5 Scenario for the year 2100 (CC2100), as described in Section 8.0 of the FIRA. The assessment found that not only does the proposed FFL comply with the present-day 1% AEP +500mm Flood Planning Level, but it is also 190mm above the projected FPL under projected flood conditions in 2100 (CC2100 Scenario). a) Section 2.0 of this FERP outlines the flood behaviour at the site and clarifies that the site is subject to flash flooding from overland/local creek flooding. b) There is less than 15 minutes from the onset of the critical (15-minute) PMF storm until inundation of the adjoining roads of the proposed site. The maximum duration of isolation is 3 hours 30 minutes, in the longer duration 240-minute PMF event (i.e. less than 12 hours from the commencement of rainfall) (refer Table 3). c) The development and adjacent roads are subject to high hazard flooding between H5-H6 to the northeast of the site and along Oxley St and Camden Rd. 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 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. b) Section 6.0 outlines 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, clients, and visitors. The ground floor FFL is 72.05m AHD. During a shelter-in-place protocol, site users will be directed to move to the first-floor level, which is set over 2 metres above the PMF. There is adequate space within the first floor in

	which site users can shelter (library, meeting rooms, offices, etc), making the site safe for refuge. Table 12 of the EM01 also notes that to reduce human behaviour risks, <i>“Where facilities, such as businesses, schools and childcare centres have site emergency plans that consider flooding these plans should be regularly exercised similar to building fire evacuation drills.”</i> Flood drills have been recommended in Section 6.2 of this FERP. Table 12 also states <i>“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.”</i> 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 75.81m AHD, 2.40m above the critical PMF level.
ii. structural soundness for conditions in a PMF event, considering flood and debris forces, be verified by a suitably qualified structural engineer, and	Structural soundness under PMF conditions is subject to verification by the structural engineering team.
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	Access and clearly marked internal access will be achieved.
iv. protection from weather and appropriate heating and cooling	This will be achieved.
v. access to personal hygiene facilities such as a toilet	This will be achieved.
vi. a minimum floor space of 2 m ² per person	Overall, the site will provide refuge space well over 2sqm per person with various communal spaces across the site for refuge on Level 1, including offices, meeting rooms and offices.
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)	Refer to Section 6.3 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 won't be required. There are numerous communal spaces available to refuge on Level 1, including libraries, meeting rooms, and office rooms etc.

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	The substation is located within the southern car park, outside the PMF extent (refer highlighted location below). Access to the substation is therefore retained up to (and including) the PMF event. 
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

Should a severe flash flood event begin 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) or if some site users refuse to shelter-in-place.

While they should be advised to stay in place (at least until the magnitude of the flood is clearer), if they insist on leaving or if there is a secondary emergency during a flash flood event, the Hazards Near Me app should be 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.

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

- A **Flood watch** is issued by the BoM up to four days prior to a flood event. A watch is generally updated daily and may be issued before, during, or after rainfall has occurred.
- **Flood warnings** are issued by the BoM when flooding is occurring or expected to occur in a particular area. Warnings may include specific predictions of flood depths dependent on real-time rainfall and river level data. These warnings are distributed to Council, Police, and the relevant local SES, as well as being available on the BoM website, through telephone weather warnings and radio broadcasts.

For local creeks and flash flooding, however, there is unlikely to be any flood watches or warnings issued for the site given the limited warning time. Triggers should consequently focus on severe weather and thunderstorm warnings. This is outlined in more detail in Section 4.4.

- 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 Site Manager is responsible for monitoring information from the AWS. Impacted communities will continue to receive flood 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' at 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

It should be noted that the flashy 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. It is important to note that 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, media updates via local radio stations and social media. While the Site Manager 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.

Pre-Emptive Closure Trigger – Severe Thunderstorm Warning

The site does not offer essential services and should temporarily cease operations when a significant flood event is forecast to reduce traffic congestion and ensure staff can plan and respond appropriately if they need to evacuate their own homes.

- 1) **TRIGGER 1:** BoM issue Severe Thunderstorm Warning including damaging winds or flash flooding for the local area – Site Manager is to pre-emptively close the site.

Shelter-in-Place Trigger – Visual Observation and Electrical Gauge

- 2) **TRIGGER 2:** In the event that the site is not pre-emptively closed ahead of time, the Site Manager is to commence visual monitoring of flows across the northeast of the site and Fishers Ghost Creek. Once creek flows begin to overtop the banks, initiate shelter-in-place actions.

To ensure no risk to staff, a visual observation can rely on an external camera to allow for remote observation with no requirement for staff to enter potentially dangerous conditions. In addition, it is recommended that an automatic electrical gauge is installed at the creek near the eastern boundary of the site, with a trigger level of approximately 71.20m AHD.

4.4 Emergency Signals

The site should have a Public Announcement (PA) system that can be used by the Site Manager to inform all staff 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 to inform them of any severe weather or flood 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, though it is noted that any above floor inundation will be of shallow depths.

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 5. Before the site is in operation, these roles must be delegated to specific staff members.

Table 5: Staff Flood Responsibilities

Role	Responsibilities
Site Manager	- Decide if pre-emptive closure can occur if warnings are received prior to opening hours or with several hours' notice - Monitor flood 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 staff members or visitors - 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 so all site users can be accounted for - Report missing site visitors to Site Manager

5.2 Key Contact Details

In the event of a severe flood, key telephone numbers applicable to the site have been listed in Table 6 below.

Table 6: Key Contact Numbers

<u>IMPORTANT TELEPHONE NUMBERS</u>	
Site Manager	tba
Safety/First Aid Officer	tba
<u>External Contacts</u>	
Police/Ambulance (for life-threatening emergencies)	000
NSW State Emergency Services (SES)	132 500
Fire & Rescue NSW – Campbelltown Fire Station	02 4634 6088
Campbelltown Police Station	02 4620 1199
Campbelltown Hospital	02 4634 3000

6.0 Preparation for Flood Response

6.1 Education and Signage

As part of the preparation for a flood event, all staff will be made aware and advised of the flood risks present on site and the flood protocols (including their management responsibilities) via briefing and signage. This is also important for any visitors to the site. 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 Site Manager, or in the event of any staff restructure or other significant change or after a flood event, to ensure it is up to date.

6.2 Flood 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 Site Manager to ensure that evacuation drills are organised and that any issues with these drills are attended to, and if necessary, 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 Site Manager will also ensure that all site drills are recorded in an appropriate records book and any non-conformities reported and responded to.

6.3 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 (at a minimum):

- 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 Site Manager 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, 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

The flood response actions are outlined in Table 7.

Table 7: Flood Response Actions

Flood Emergency Response Plan	
Flood Warning and Notification Procedures	Evacuation and Refuge Protocols
1) BoM issues a SEVERE WEATHER WARNING or NSW SES issue a yellow "ADVICE" warning 	The following actions must be undertaken by the Site Manager: 1) Notify all staff, site users and any anticipated site users 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. 3) Listen to the local radio station for updates on forecasted flood heights and timings. Monitor updates on social media and NSW SES platform Hazard Watch. 4) Ensure staff are familiar with their responsibilities. If the flood event is not anticipated to impact the site (either directly or indirectly), the Site Manager is to continue hourly check-ins and postpone high risk activities (e.g. unnecessary deliveries etc.). If flood event is anticipated to impact the site, the Site Manager must undertake the following actions: • For life-threatening emergencies phone 000 immediately. If outside of operational hours or where several hours of notice has been given: • Implement pre-emptive closure of site. Send SMS to staff anticipated site users to inform them and advise them of closure. If during operational hours and warning time is deemed insufficient: • 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. • Ensure no one is outdoors. Access to the northern section of the site, where hazards reach H5-H6, is to be cut off. Close off access to the car park. • Send SMS to staff and where possible, any anticipated site users, advising them of SIP strategy and asking them not to travel to site. • Direct all site users to the first floor to shelter in the available communal areas. • Staff must check any available registers (including sign-in logs, if available) and complete a headcount to ensure all site users are accounted for. • The Site Manager is to follow any action statements provided via the AWS. NOTE: Avoid driving or walking through floodwaters. These are the main causes of death during flooding.
2) Flash flooding is reported in the media / via visual observation or BoM issues a SEVERE THUNDERSTORM WARNING or electrical gauge is triggered or NSW SES issue an amber "WATCH AND ACT" or red "EMERGENCY" warning 	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 Site Manager is to confirm floodwater has subsided below the ground level and that there is no ponding within the site. • Flooded areas are to remain off limits until ponding has cleared. Site is to be inspected by the Site Manager if required. Once it has been confirmed that the water level has reduced to a suitable level, and if determined safe, the Site Manager may announce that site users no longer need to shelter-in-place.

8.0 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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