

Flood Emergency Response Plan

6-8 Julius Avenue, North Ryde

Prepared for ISPT / 25 June 2025

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Rev	Date	Prepared By	Approved By	Remarks
1	25/06/2025	RC	MK	For SSDA

1.0 Introduction

This Flood Emergency Response Plan (FERP) has been prepared to support detailed State Significant Development Application (SSDA) for the proposed Julius Avenue Data Centre at 6–8 Julius Avenue, North Ryde (SSD-80018208). The application seeks approval for the construction and operation of a data centre, including site preparation works, bulk earthworks, infrastructure, building construction, ancillary facilities, and associated site works. The application also includes the delivery of one internal road.

The purpose of this FERP 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 completed during a flood event. The details of this report are based on currently available information and correspondence undertaken at the time of writing.

This report has been prepared in response to the Secretary's Environmental Assessment Requirements (SEARs) dated 20 February 2025, issued for the State Significant Development Application (**SSD-80018208**). Specifically, this FERP addresses part of Item 15 'Flood Risk'. Refer to the Flood Impact and Risk Assessment (FIRA) report prepared by TTW (dated 20 June 2025) for more information on flood risk management measures and flood planning levels.

1.1 Guidance Documents

The following documents have been reviewed and referenced in preparing this report:

- Australian Institute of Disaster Resilience (AIDR) Guideline 7-3: Flood Hazard (2017)
- Considering Flooding in Land Use Planning Guideline DPE 2021
- Department of Planning and Environment (2021) Considering Flooding in Land Use Planning Guideline;
- Department of Planning and Environment (2023) Flood Impact and Risk Assessment – Flood Risk Management Guide LU01
- 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 and Environment (2023) Flood Risk Management Manual <https://www.environment.nsw.gov.au/topics/water/floodplains/floodplain-manual>;
- NSW Department of Planning and Environment (2023) Support for Emergency Management Planning – Flood Risk Management Guideline EM01; and
- NSW Department of Planning and Environment (2025) Shelter-in-place guideline for flash flooding (<https://pp.planningportal.nsw.gov.au/draftplans/made-and-finalised/shelter-place-guideline-flash-flooding>)
- NSW Planning Portal Spatial Viewer ([Spatial Collaboration Portal - Map Viewers \(nsw.gov.au\)](https://pp.planningportal.nsw.gov.au)).
- Bewsher Consulting Pty Ltd (2010) Macquarie Park Floodplain Risk Management Study & Plan
- WMAwater (2023) City of Ryde Draft Flood Study
- WMAwater (2025) City of Ryde Draft Floodplain Risk Management Study and Plan

1.2 Site Description

The subject site is located at 6–8 Julius Avenue, North Ryde, within the City of Ryde Local Government Area (LGA). The site is situated between Rivett Road and Richardson Place, within the Macquarie Park Corridor—an established employment precinct recognised for its focus on innovation and technology-based industries. An aerial image of the site is provided in Figure 1.

Vehicle access is currently provided via an existing easement along the western boundary of the site, connecting to Julius Avenue. This easement is shared with the adjoining Lot 10 in DP 876736. Additional vehicle access is available via the eastern cul-de-sac located within Lot 12 in DP 876736. This access road is

an extension of Richardson Place and is subject to an access easement (DP 1003588), which nominates the City of Ryde Council as a beneficiary, thereby permitting access for public use.

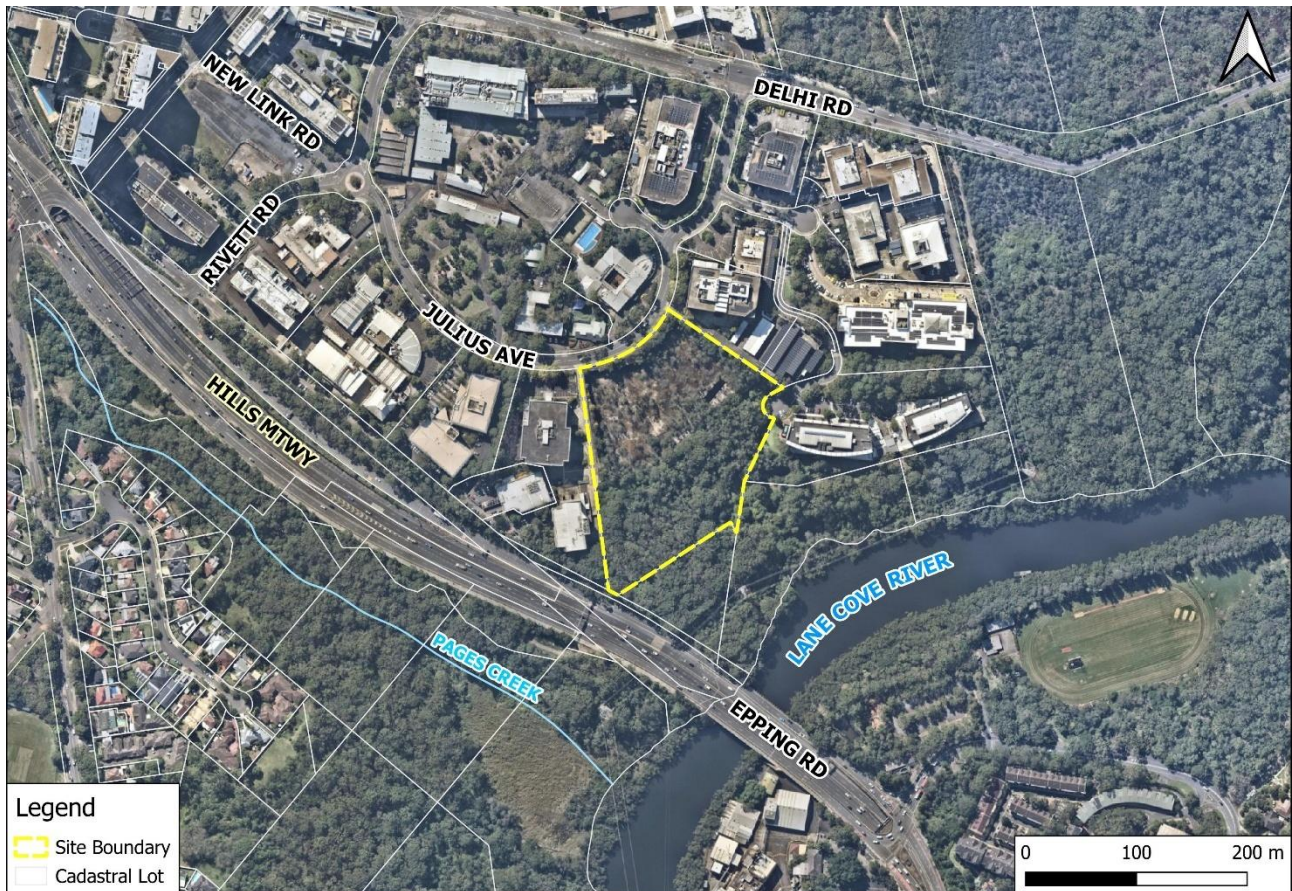


Figure 1: Site location and surrounding area (Source: Nearmap, dated April 2025).

1.3 Proposed Development

The proposed development will comprise basement car parking and tank rooms, two data halls, an electricity generation gantry designed to accommodate 12 generator units, a loading dock, associated landscaping, an access road connecting the existing road to the west with Richardson Place cul-de-sac to the east, and a separate Ausgrid Sub-Transmission Switching Station (STSS) along with a main switchboard room.

The proposed site layout is shown in Figure 2.



Figure 2: Site Plan (Source: Greenbox)

2.0 Flood Behaviour

2.1 Mainstream Flooding

The latest flood information available for the site is the Draft City of Ryde Flood Study.

The Macquarie Park Floodplain Risk Management Study and Plan was conducted by Bewsher Consulting on behalf of the City of Ryde. The study was published in 2010 and focused on catchments in the Macquarie Park Corridor. In 2023, an updated flood study of the entire LGA was conducted by WMA Water, which is currently available as a draft report. The City of Ryde Draft Flood Study (2023) updated the 2010 DRAINS hydrologic model and TUFLOW hydraulic model in accordance with the updated edition of Australian Rainfall and Runoff (ARR) 2019. In comparison to Bewsher (2010), the draft study uses updated software, more recent elevation data, updated hydraulic structures information, and a finer cell grid (2m in comparison to Bewsher's 3m). It should be noted that as this is still a draft report, these results are still subject to change.

The PMF levels and depths in the Draft City of Ryde Flood Study is shown below in Figure 3. While the site is located approximately 100m north of Lane Cove River, both studies indicate that the site lies outside of the mainstream PMF extent of the Lane Cove River and the wider Parramatta River PMF extent. The proposed access road to the south of the site is set at approximately 29m AHD (i.e. the lowest point of the proposed works), while Lane Cove River PMF levels south of the site reach 7.5m AHD. The site and its surrounding access roads are therefore primarily impacted by overland flooding.

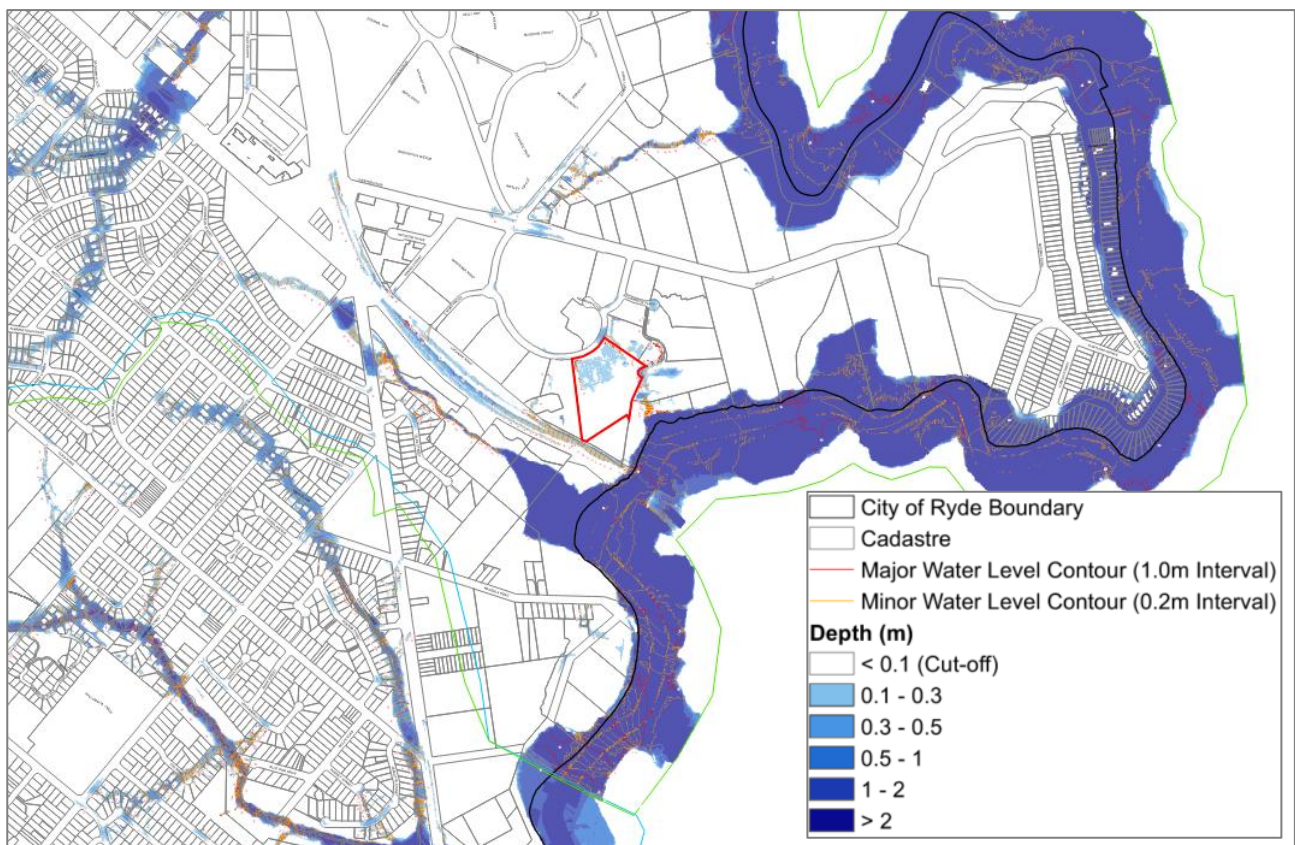


Figure 3: Flood levels and depths in the PMF event. Source: Draft City of Ryde Flood Study, 2023

2.2 Overland Flooding

To assess the susceptibility of the site to overland flooding, TTW obtained the Macquarie Park Floodplain Risk Management Study and Plan (2010) TUFLOW model for this assessment. The results for the 1% AEP (Annual Exceedance Probability) and PMF (Probable Maximum Flood) events are discussed in the following sections. The modelling methodology and the flood impact associated with the development are described in detail in

the FIRA Report prepared by TTW (dated 20 June 2025).

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 4, 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 1 outlines the threshold limits for each hazard category.

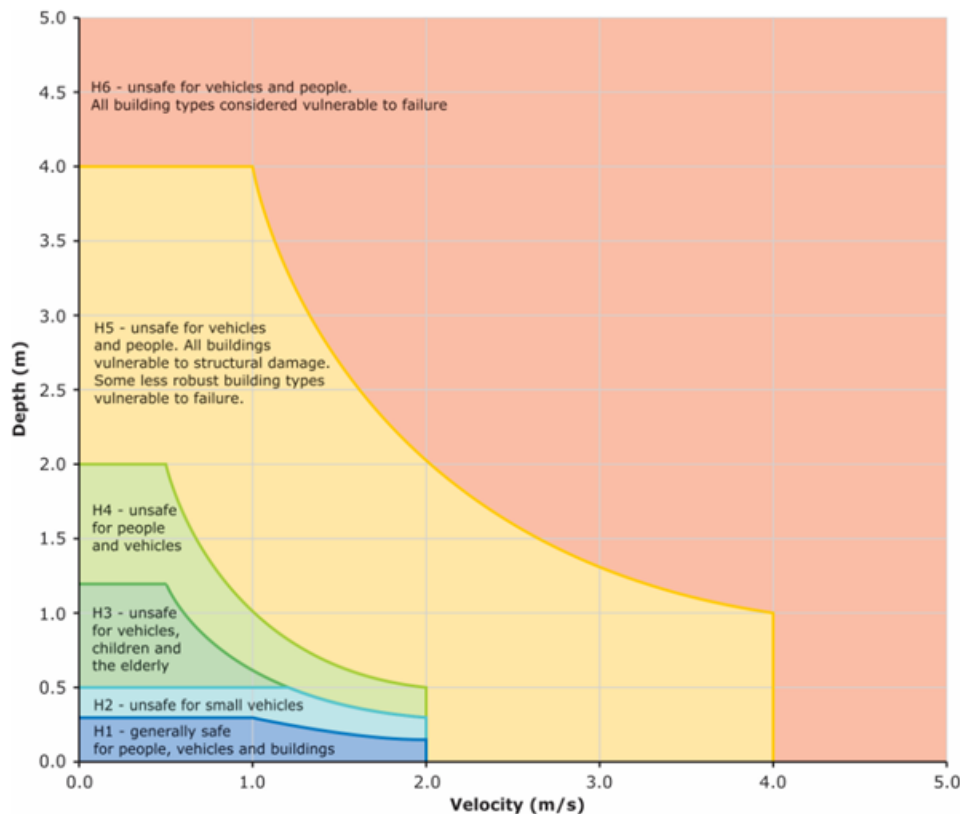


Figure 4: Flood hazard vulnerability curve (Source: Flood Risk Management Guide FB03 - Flood Hazard, NSW Department of Planning and Environment, 2022)

Table 1: 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

2.3 Post-Development Flood Behaviour

Post-development flood behaviour at the site is described in detail in the FIRA.

The peak flood levels and depths during the 1% AEP event are shown in Figure 5, while the peak flood hazard is depicted in Figure 6.

In the 1% AEP, flood depths along Julius Avenue peak at approximately 375mm at the sag point to the northeast of the site, close to the access driveway of the adjacent property 4 Julius Avenue. Hazard here reaches H2 (unsafe for small vehicles). Within the site, flows are mostly H1 (Generally safe for people, vehicles and buildings).

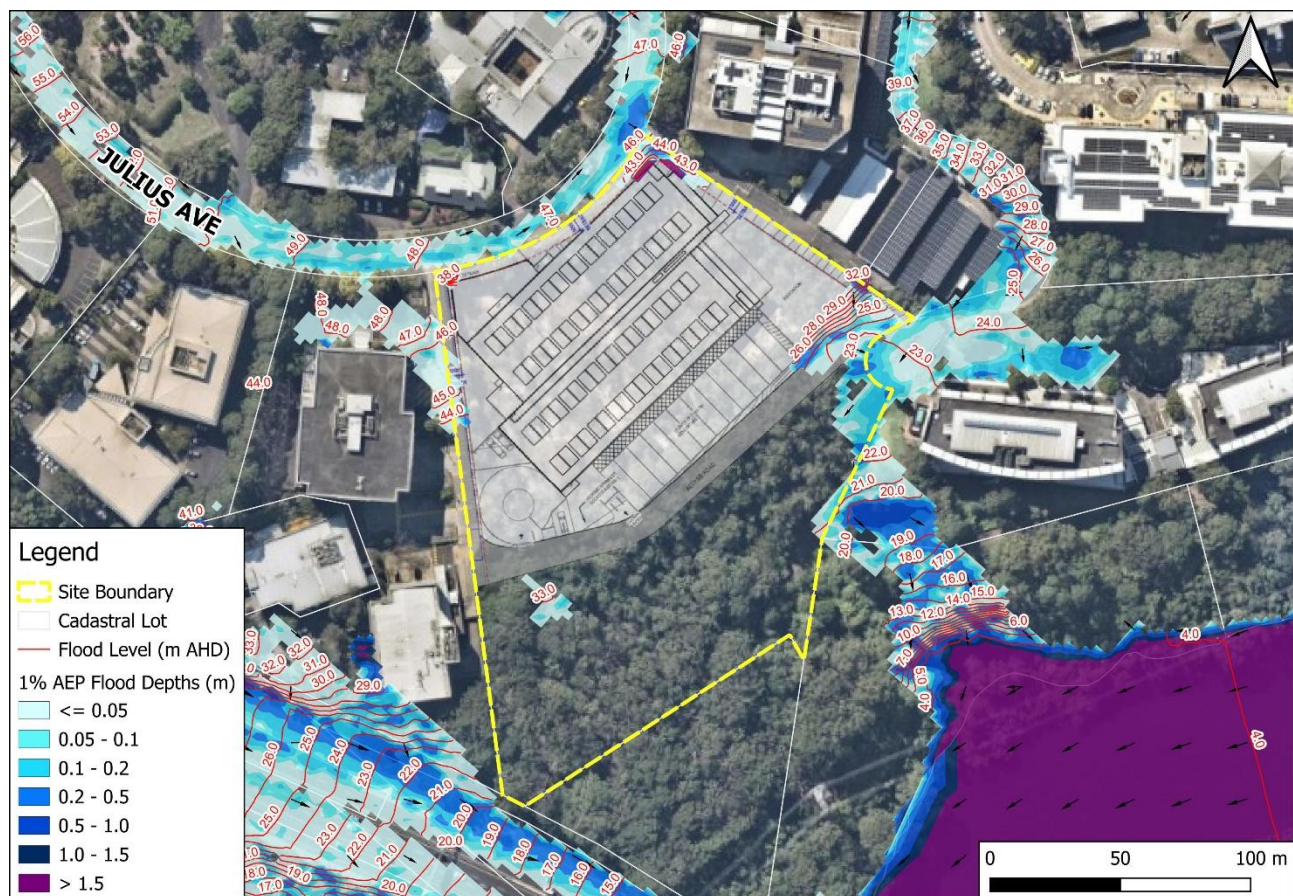


Figure 5: Flood levels and depths (1% AEP event) – Post Development Conditions

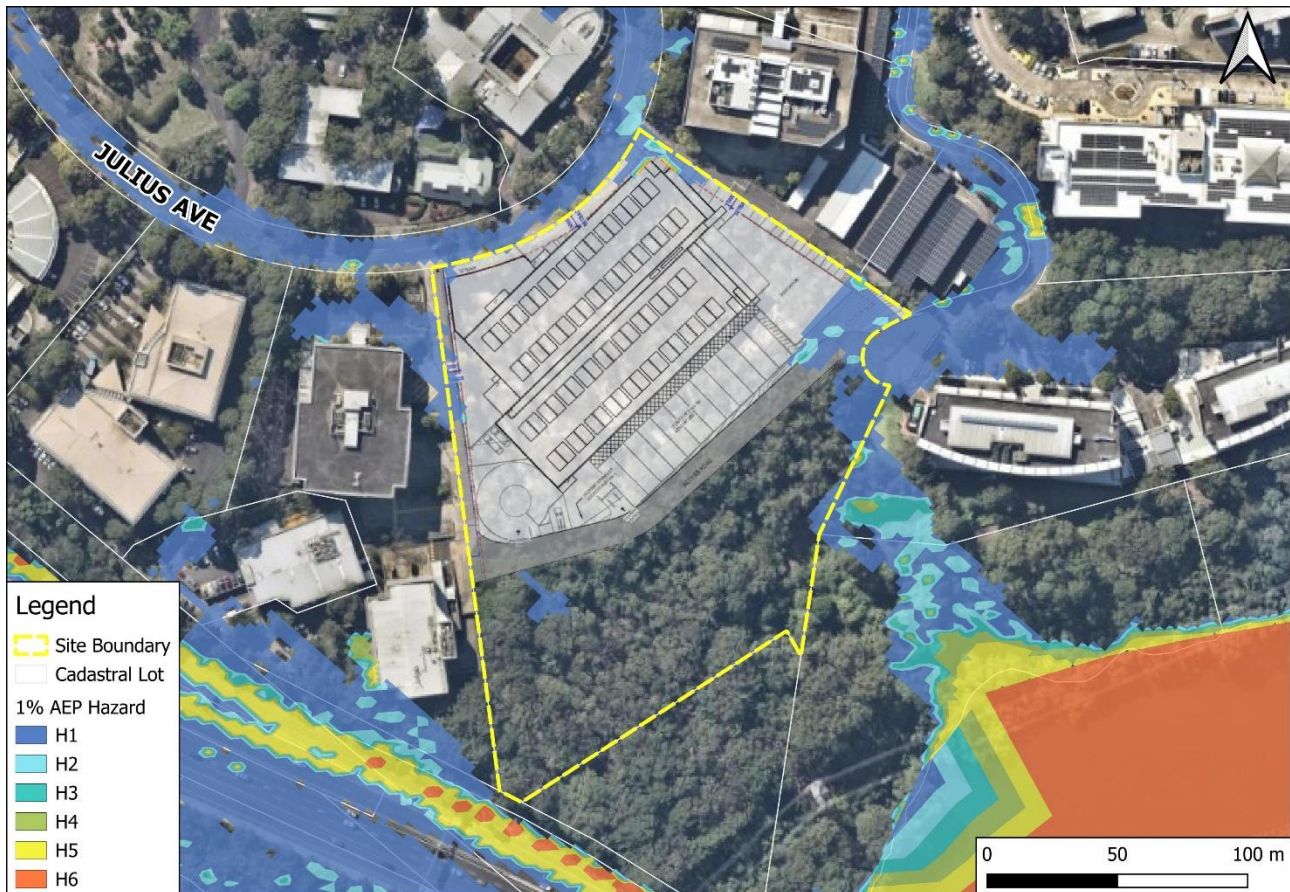


Figure 6: Flood hazards (1% AEP event) – Post Development Conditions

The peak flood levels and depths during the PMF event are shown in Figure 7, while the peak flood hazards are depicted in Figure 8.

The flood depths and hazard around the site area in the PMF is generally consistent with the 1% AEP, with H2 hazard at the Julius Avenue sag point. While the proportion of H6 hazard within the Lane Cove floodplain has increased south of the site, the site itself is unimpacted. The eastern cul-de-sac located within Lot 12 in DP 876736 which connects to Richardson Place is impacted by an area of localised ponding at the driveway entrance to the site, and there are continued instances of H5 hazard along this route before it joins onto Julius Avenue northeast of the site. This impacts the ability to use this route for access and egress in major flood events.

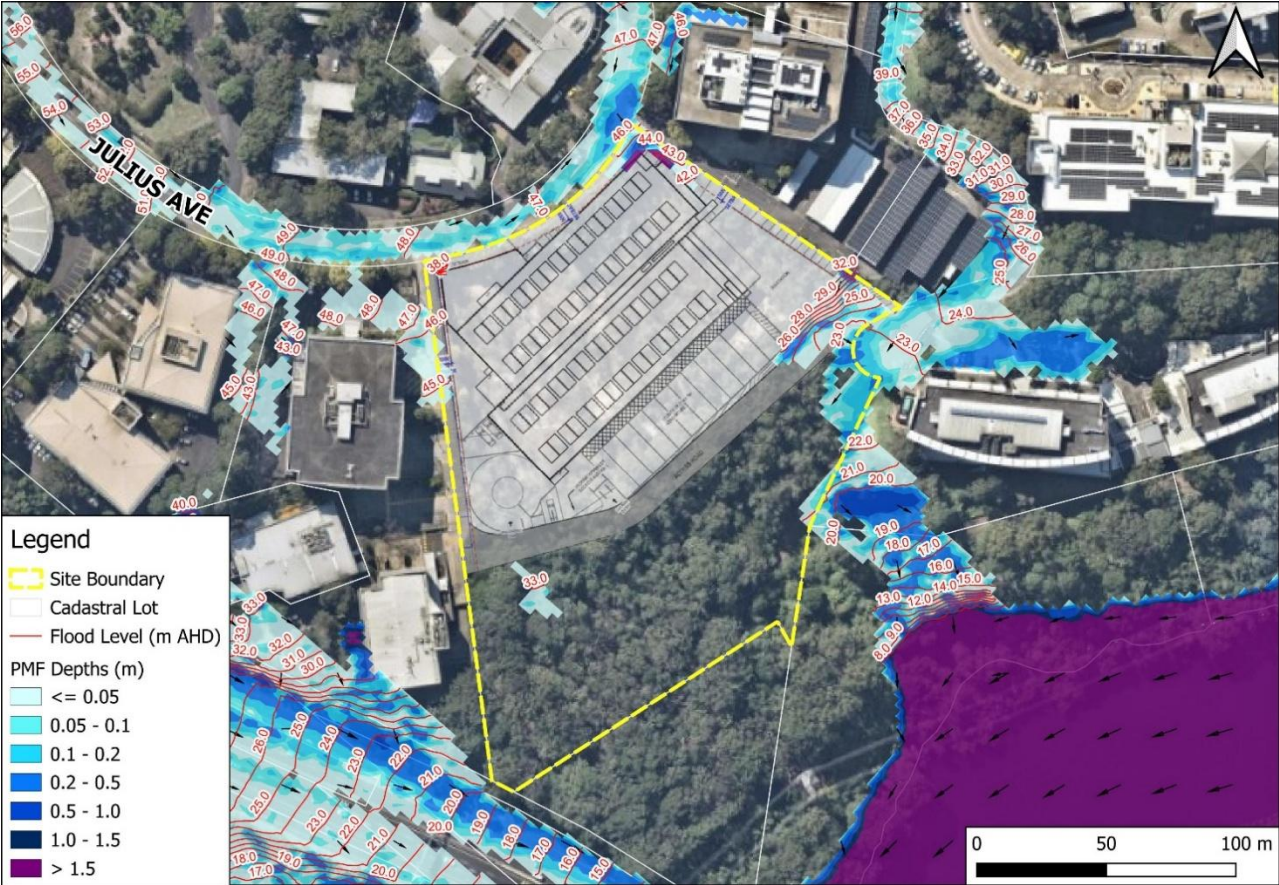


Figure 7: Peak flood levels and depths (PMF event) – Post Development Conditions

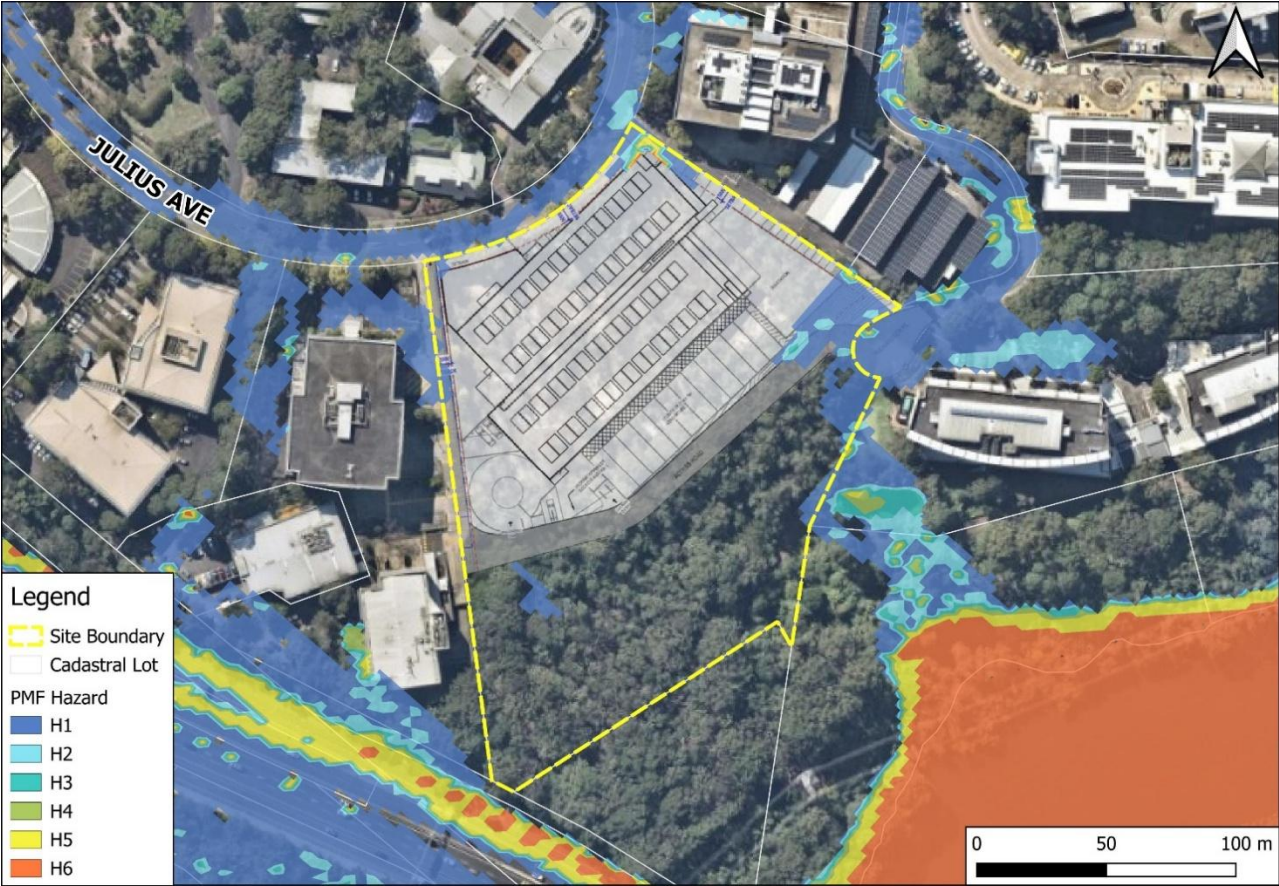


Figure 8: Peak flood hazards (PMF event) – Post Development Conditions

2.4 Inundation and Recession Times

The TUFLOW model provided by Council contained only two critical storm durations for the PMF event – a 15-minute PMF storm, and the 3-hour storm. Therefore, only these two storms have been assessed.

Table 2 presents a summary of the inundation and recession times for the available PMF storm durations in order to consider the range of warning time and isolation periods. 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.

Table 2: Time to inundation and recession at the site in PMF storm events

PMF Storm Duration	Time to Inundation (minutes)	Recession Time
15-minute	Julius Av – not safe less than 5 minutes from the onset of the storm Delhi Road at Lane Cove River crossing area – not safe about 1 hour from the onset of the storm Epping Road upstream of Lane Cove River bridge crossing – not safe about 5 minutes from the onset of the storm Epping Road to the north-west of the site (i.e. near the intersection with Ryrie Street) – not safe about 5 minutes from onset of storm Hills Motorway (toll road) to the north – not safe about 5 minutes from onset of storm	Julius Av – back to safe conditions about 30 minutes from onset of storm Delhi Road at Lane Cove River crossing area – back to safe conditions about 3 hours from onset of storm Epping Road upstream of Lane Cove River bridge Crossing – back to safe conditions about 45 minutes from onset of storm Epping Road to the north-west of the site (i.e. near the intersection with Ryrie Street) – back to safe conditions about 1 hours 30 minutes from onset of storm Hills Motorway (toll road) to the north – back to safe conditions about 1 hours 15 minutes from onset of storm
3-hour	Julius Avenue (i.e. section to the north-east and north-west of the site) will be inundated less than 10 minutes from the onset of the storm, and a section of this road to the east (and north) will become unsafe for small vehicles (i.e. H2 hazard) about 15 minutes from the onset of the storm. Although access via Julius Avenue to the east remains safe (i.e. this section of Julius Avenue only experiencing H1 hazard), surrounding connecting roads will be deemed unsafe for traffic. In particular, Delhi Road at the Lane Cove River crossing area (north-east of site) will be inundated by more than 2m in depth with the crossing approaches experiencing H5 hazard or higher, approximately 1 hour after the onset of the storm. The south-bound lanes of Epping Road upstream of the Lane Cover River bridge crossing (i.e. south of site) will be unsafe for traffic about 15 minutes from the onset of the storm with H5-H6 hazard observed.	Delhi Road at the Lane Cove River crossing area will be safe for traffic again approximately 6.5 hours after the onset of the storm. Epping Road upstream of the Lane Cove River bridge crossing will return to safe (i.e. for traffic) conditions approximately 3.5 hours after the onset of the storm. Epping Road to the north-west of the site (i.e. near the intersection with Ryrie Street) will return to safe (i.e. for traffic) conditions approximately 4 hours after the onset of the storm. Hills Motorway (toll road) to the north will return to safe (i.e. for traffic) conditions approximately 4 hours after the onset of the storm.

	A section of Epping Road to the north-west of the site (i.e. near the intersection with Ryrie Street) will also be deemed unsafe for traffic approximately 15 minutes from the onset of the storm with flood hazard of H3-H5 observed in this storm event. Similarly, some sections of the Hills Motorway (toll road) to the north will also become unsafe for traffic approximately 10 minutes from the onset of the storm (i.e. hazard H3-H5).	
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Figure 9 shows the flood hazard categorisation within the entire model during the critical PMF storm event. This indicates that there is no way in or out of the site in the critical PMF event that does not go through high or medium hazard waters, though floodwaters quickly recede.

Assessment of the two PMF storms indicates that the warning time for the site is short, with less than 5 minutes until the Julius Avenue sag point experiences H2 flooding in the 15-minute PMF event. While egress is still possible by travelling west on Julius Avenue, further travel west on Epping Road is inhibited by H4 flooding adjacent to Ryrie Street, and travel north and south on the M2 Motorway is impacted by H5-H6 floodwaters with little warning time.

Though the M2 Motorway bridge over Lane Cove River is shown to be inundated in the mapping, the bridge is elevated well above the PMF level at this location (around 7m AHD), with the bridge set at approximately 10.5m AHD. The bridge has not been incorporated into the DEM. Despite this, egress south is impacted by H6 hazard along the southbound lane of the M2, though this returns to a trafficable condition after 3.5 hours in the 3-hour PMF event.

Based on the above and TTW's previous similar project experience, and the fact that the subject site area is mainly affected by overland flow flooding, it is therefore anticipated that the total isolation time of the site will likely be less than 6 hours.

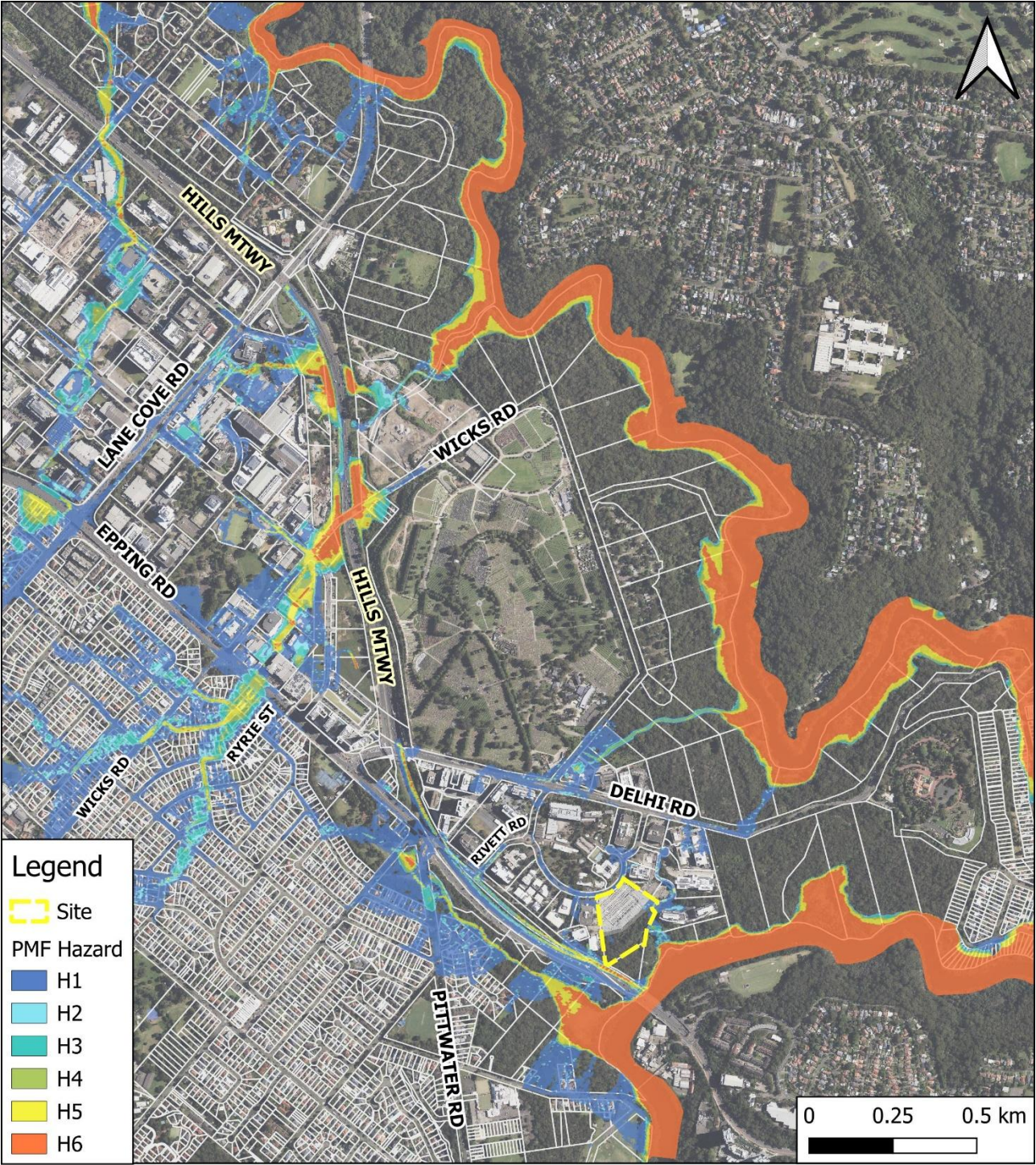


Figure 9: Peak flood hazard categorisation for the site and its surrounding area during the critical PMF storm event.

3.0 Flood Response Strategy

3.1 Mainstream Flooding

Though the site itself is located outside of the Parramatta River and Lane Cove River PMF flood extent, surrounding roads may be cut off for extended periods of time. Section 5.8.3 of the Ryde Hunters Hill Flood Emergency Sub Plan highlights pre-emptive evacuation as a potential flood emergency strategy in Ryde. Pre-emptive closure of the site is the preferred flood emergency strategy for the site if there is notification of a Parramatta River flood event.

In the event of river flooding, there will be sufficient flood warnings and notifications to allow for pre-emptive closure of the site. During the operational phase, the site should be closed in advance of the flood event so site users do not have to drive through roads that could become hazardous. An SMS must be sent to any anticipated site users at the earliest opportunity (once the flood warning is issued by BoM) to ensure no site users enter dangerous road conditions.

3.2 Flash Flooding

3.2.1 Pre-Emptive Closure

Section 1.6.2 and 5.8.1 of the Ryde Hunters Hill Local Flood Emergency Sub Plan states that evacuation is the primary response strategy for people impacted by flooding. Section 5.8.3 similarly highlights pre-emptive evacuation as a potential flood emergency strategy in Ryde. Pre-emptive closure of the site is the preferred flood emergency strategy for the site 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 commencement of flooding, the site should be closed in advance of the flood event so site users do not have to drive through roads that could become hazardous.

An SMS must be sent to staff 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.

3.2.2 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 entirely. Flash flood events are usually characterised by minimal warning times, therefore pre-emptive closure of the site may not be able to accomplish.

Shelter-in-place (SIP) guidance published by the NSW Department of Planning and Environment (DPE) 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 outlines the varying factors that must be considered when proposing SIP, and how this site meets the recommendations.

Table 3: Department of Planning and Environment 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?	The main flood mechanism impacting the immediate area around the site is flash flooding via overland flow. 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 Ryde Hunters

	Hill Local Flood Emergency Sub Plan (Section 5.8.3 of the sub plan). However, flash flood events are characterised by minimal warning times and therefore there may not be sufficient warning time 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 5 minutes from the onset of the 15-minute PMF storm until inundation of the adjoining roads of the proposed site (refer Table 2), there is little warning time to implement pre-emptive closure of the site. As evident in Figure 9, there is no way in or out of the site that does not go through high or medium hazard 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?	No, the site is proposed as a data centre.
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 5 minutes from the onset of the 15-minute PMF storm until inundation of the adjoining roads. 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 5 minutes from the onset of the critical PMF storm until inundation of the adjoining roads for the proposed site (refer Table 2), there is little warning time to implement evacuation off-site.

	As evident in Figure 9, there is no way in or out of the site that does not go through high or medium hazard 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, DCCEEW, 2023.	Consideration of climate change has been made in Section 5.0 of the Flood Impact and Risk Assessment (FIRA) submitted alongside this FERP, which found only a minor increase in flood depth and extent close to the site, with an increase in flood level of generally less than 30mm. However, the PMF event has been used to assess flood emergency management within this FERP. The PMF event represents the largest flood event that could conceivably occur at a particular location (based on the most extreme possible combination of meteorological and hydrological conditions). This represents a more conservative flood level than that of the 1% AEP with climate change, and provides the most conservative indication of flood hazard in emergency response planning. a) The site is impacted by flash flooding derived from rainfall runoff (i.e. overland flow flooding). The site is not impacted by mainstream flooding. b) There is less than 5 minutes from the onset of the critical PMF storm until inundation of the adjoining roads for the proposed site. The duration of isolation is short due to the flashy nature of flooding in the area. In the 3-hour PMF event, travel south via Epping Road/M2 Motorway is possible 3.5 hours after the storm. Other routes including Delhi Road are cutoff for longer (6.5 hours in the 3-hour PMF event), but isolation is still less than 12 hours (Section 2.4). c) The development itself and the roads immediately adjacent are not subject to H5 or H6 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 FIRA produced by TTW notes that the Finished Floor Level (FFL) of the main building is set to 48.0m AHD and is outside of the PMF extent, therefore catering to all potential occupants. The FIRA states that the site is located above

	the 1% AEP + 300mm flood planning level of 47.90m AHD, which is higher than the PMF level. The site is therefore adequately protected. 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 FIRA produced by TTW notes that the Finished Floor Level (FFL) of the main building is set to 48.0m AHD and is outside of the PMF extent, therefore catering to all potential occupants. The FIRA states that the site is located above the 1% AEP + 300mm flood planning level of 47.90m AHD, which is higher than the PMF level. The site is therefore adequately protected above the PMF.
ii. structural soundness for conditions in a PMF event, considering flood and debris forces, be verified by a suitably qualified structural engineer, and	Any buildings in the PMF zone will be structurally designed with flood compatible building materials.
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	This 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 spaces across the site for refuge, including meeting rooms and office spaces.
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 Section 6.3 for this recommendation.

iii.	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 be sufficient spaces available to refuge, including meeting rooms and office spaces.
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	Access to the substation is 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 site 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 should a severe flash flood event begin without sufficient warning, any decision to shelter-in-place must be accompanied by alternative plans for evacuation in the event of a secondary emergency (e.g. medical or fire) or if some site users refuse to shelter-in-place.

While all site users 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 first route to return to trafficable conditions in the critical PMF event is outlined below:

- Egress from site via northern driveway onto Julius Avenue
- Turn left onto Rivett Road
- Join onto Epping Road slip road for travel southeast on M2.

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.

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 flood warnings are described in Figure 10.



Figure 10: 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' and 'monitor conditions' at the Advice level, to 'stay indoors' 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 specific 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

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 above may not be available or occur with advanced warning.

To ensure adequate response time, alternative triggers should be monitored, including 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.

4.4 Site Emergency Communication System

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 and any anticipated site users to inform them of any severe weather or flood warnings covering the site.

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

Table 4: Staff Flood Responsibilities

Role	Responsibilities
Site Manager	- Decide if pre-emptive closure can occur if warnings are received with several hours' notice - Monitor flood warnings and notifications from BoM and AWS - Monitor BoM and weather in the area of the site - Inform staff and any anticipated site users 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 have been listed in Table 5 below.

Table 5: Key Contact Numbers

<u>IMPORTANT TELEPHONE NUMBERS</u>	
Site Manager	tba
Deputy Manager	tba
Safety/First Aid Officer	tba
Centre Staff	tba
<u>External Contacts</u>	
Police/Ambulance (for life-threatening emergencies)	000
NSW State Emergency Services (SES)	132 500
Fire & Rescue NSW – Ryde Fire Station	02 9493 1042
Ryde Police Station	02 9808 7401
Macquarie Hospital	02 9887 5500

6.0 Preparation for Flood Response

6.1 Education and Signage

As part of the preparation for a flood event, all staff must be made aware and advised of the flood risks present on site and the flood protocols & 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 in 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, to ensure it is up to date.

It is recommended that frequent users of the site are educated on the potential flood risk and actions that will be undertaken during a flood event.

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:

- 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.

As noted in the SIP guidance published by the DPE in January 2025, items for self-sufficiency should include 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). These must be stored in a waterproof container in an accessible location above the PMF. It is the responsibility of the First Aid Officer to make sure that this kit is maintained and regularly updated, and is readily available during an emergency.

7.0 Flood Response Actions

The flood response actions are outlined in Table 6.

Table 6: Flood Emergency Response Actions for the site

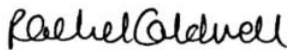
Flood Emergency Response Plan	
Flood Warning and Notification Procedures	Evacuation and Refuge Protocols
1) Weather forecast predicts significant rainfall event in the area or BoM issues a FLOOD WATCH or NSW SES issue a yellow “ADVICE” warning 	The following actions must be undertaken by the Site Manager: 1) Notify all staff, site users and any anticipated site visitors 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 (alongside First Aid Officer) 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.).
2) Flash flooding is reported in the media / via visual observation or BoM issues a FLOOD WARNING or NSW SES issue an amber “WATCH AND ACT” or red “ACT NOW” warning 	If flood event is anticipated to impact the site, the Site Manager must undertake the following actions: • For life-threatening emergencies phone 000 immediately. Where several hours of notice has been given: • Implement pre-emptive closure of site. Send SMS to staff and any anticipated site visitors to inform them and advise them of closure. Where warning time is deemed insufficient: • An alert and warning message should be broadcast over the PA system confirming a significant flood event, notifying all staff and site users to begin shelter-in-place procedures. • Ensure no one is outdoors. • Send SMS to staff and any anticipated site visitors, advising them of SIP strategy and asking them not to travel to site. • 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.
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 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 staff and 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 flood response 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, 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. This is the responsibility of the owner or management entity of the site throughout the operational phase of the site.

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