# Flood Statement

## Melrose Park Public School

**Prepared for NSW Department of Education** / 1 April 2025

CFAA 231931

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Your Partner in Engineering

## Contents



| Rev | Date | Prepared By | Approved By | Remarks |
|---|---|---|---|---|
| 1 | 24/11/2023 | LC | PM | Due Diligence |
| 2 | 06/11/2024 | LC | JM | Added new arch plan |
| 3 | 05/03/2025 | LC | EC | Updated to REF |

# 1.0 Introduction

This Flood Statement has been prepared to accompany a Review of Environmental Factors (REF) for an activity proposed by the Department of Education under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and *State Environmental Planning Policy (Transport and Infrastructure) 2021* (SEPP TI).

This document has been prepared in accordance with the *Guidelines for Division 5.1 assessments* (the Guidelines) by the Department of Planning, Housing and Infrastructure.

This report examines and takes into account the relevant environmental factors in the Guidelines and *Environmental Planning and Assessment Regulations 2021* under Section 170, Section 171 and Section 171A of the EP&A Regulation as outlined in Table 1.

*Table 1: Summary of Relevant Section of the Part 5 Guidelines and EP&A Regulation*

| Regulation / Guideline Section | Requirement | Response | Report Section |
|---|---|---|---|
| Guidelines for Division 5.1 (DPHI) Section 3.0 | When considering the likely impact of an activity on the environment, the proponent and determining authority must take into account any risk to the safety of the environment | As the site is located above the extent of flood-prone land, the proposed activity at the site will not adversely impact on the flood behaviour in the area nor will it increase risk to the safety of the environment. | 5.3.1, 5.3.2 |
| Guidelines for Division 5.1 (DPHI) Section 4.0 | The proponent will gather and record relevant information on potential environmental impacts including any episodic risks | As above | 5.3.1, 5.3.2 |
| Section 171.2 (a), (b), (j) EP&A Regulations | The determining authority must take into account the environmental impact on the community, the transformation of the locality, risk to the safety of the environment | As above | 5.3.1, 5.3.2 |

## 1.1 Reference 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)
- City of Parramatta (2024) Parramatta River Flood Study – Full Report, Available at: https://www.cityofparramatta.nsw.gov.au/flooding/2024-parramatta-river-flood-study/full-report
- City of Parramatta Development Control Plan (DCP) 2023 Section 5.11
- City of Parramatta Local Environmental Plan 2023 (https://legislation.nsw.gov.au/view/html/inforce/current/epi-2023-0117#)
- Considering Flooding in Land Use Planning Guideline DPE 2021
- NSW Department of Environment and Heritage – Flood Risk Management Guideline LU01, June 2023
- 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 Planning Portal Spatial Viewer – https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address
- Stantec (2023) Final Draft Flood Study Report 59916074 / 304600102, City of Parramatta
- WMAWater (2023) Flood Harmonisation Study – Flood Study Update, Draft Report. City of Ryde Council.

## 1.2 Activity Description

The activity is for upgrades to Melrose Park Public School within a one to three-storey built form, including:

- Demolition of existing school buildings;
- Site preparation works including tree removal;
- Construction of the following buildings:
  - Block A: One (1) storey building comprising:
    - universal pre-school;
    - outdoor play area for the UPS; and
    - detached storeroom;
  - Block B1: Two (2) storey building comprising:
    - staff and administration areas;
    - library;
    - 4 special programs rooms;
    - Pedestrian bridge to Block B2;
  - Block B2: Three (3) storey building comprising:
    - 24 classrooms;
    - amenities/services cores; and
    - pedestrian bridge to Block B3;
  - Block B3: Three (3) storey building comprising:
    - 10 classrooms; and
    - amenities/services cores;
  - Block C: One (1) storey building comprising:
    - hall;
    - amenities;
    - canteen;
    - OSHC; and
    - COLA;
- Construction of two (2) car parking areas; and
- Landscaping works.

## 1.3 Activity Site

Melrose Park Public School is located at 110 Wharf Road, Melrose Park and is legally known as Lot 3 in DP 535298 with an approximate site area of 2.5 hectares. The site has a frontage to Wharf Road (east), Mary Street (south), and Waratah Street (west). The site is adjoined by 2-3 storey light industrial development to the north, 1-2 storey industrial and commercial developments to the south, residential dwellings to the east and industrial and commercial development to the west.

An aerial photograph of the site is provided in Figure 1 below.


*Figure 1: Aerial Photograph*

# 2.0 Site Characteristics

## 2.1 Location

Figure 2 presents the Melrose Park Public School (MPPS) site in relation to the wider surrounding area. The site has a total area of approximately 2.5 hectares and is zoned SP2 – Infrastructure (Educational Establishment) under Parramatta Local Environmental Plan 2023. There is a large former light industrial site to the north being redeveloped as part of the (Masterplanned) Melrose Park Village, which extends up to Victoria Road and will provide a 'Smart' community with apartment living, retail and commercial spaces, parks and recreational facilities. The proposed development is anticipated to provide 5,500 dwellings.

As shown in the inset map in Figure 3, the site is approximately 300m north of Parramatta River and Ermington Bay, in a low-lying region. In addition to Parramatta River, there are a number of local creeks that increase flash flood risks. The flood behaviour in the region is outlined in more detail in Section 5.0.


*Figure 2: Melrose Park Public School site location and surrounding area*

## 2.2 Topography

Elevation data for the site and surrounding area was obtained from Elevation Information System (ELVIS), dated May 2020, with a spatial resolution of 1 metre. The ground surface within the site boundary varies between 8.20–16.50m AHD, depicted in the Digital Elevation Model (DEM) of the site in Figure 3. The site slopes from Wharf Road in the east towards the Waratah Street frontage in the west.

Elevation falls by approximately 7.4m over a 210m distance from the northeast corner of the site to the southwest corner, with an estimated gradient of 3.5%. The slope is presented in the cross-sectional profile of the site in Figure 4.

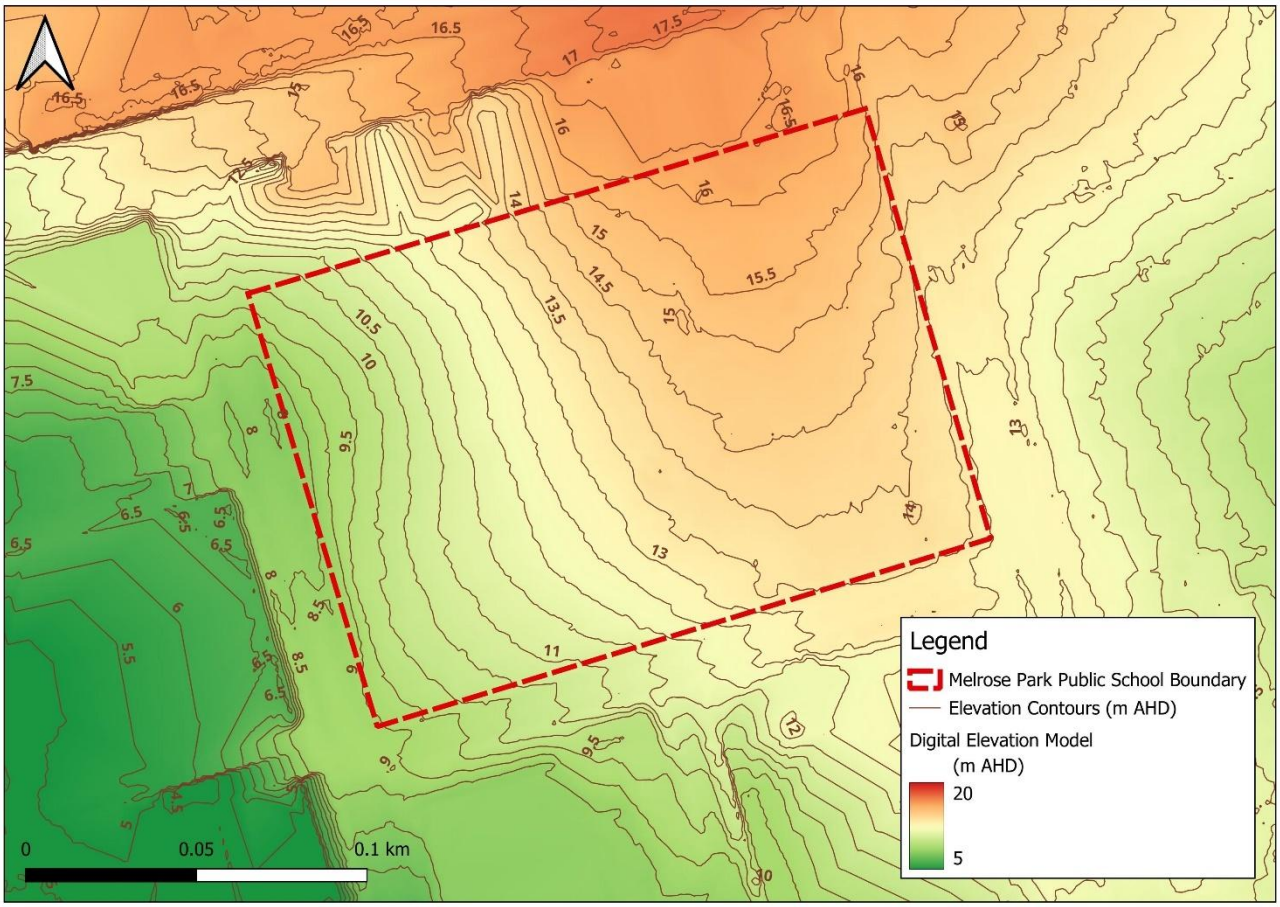



*Figure 3: Topography of the site and surrounding area (Source: ELVIS, 2020)*

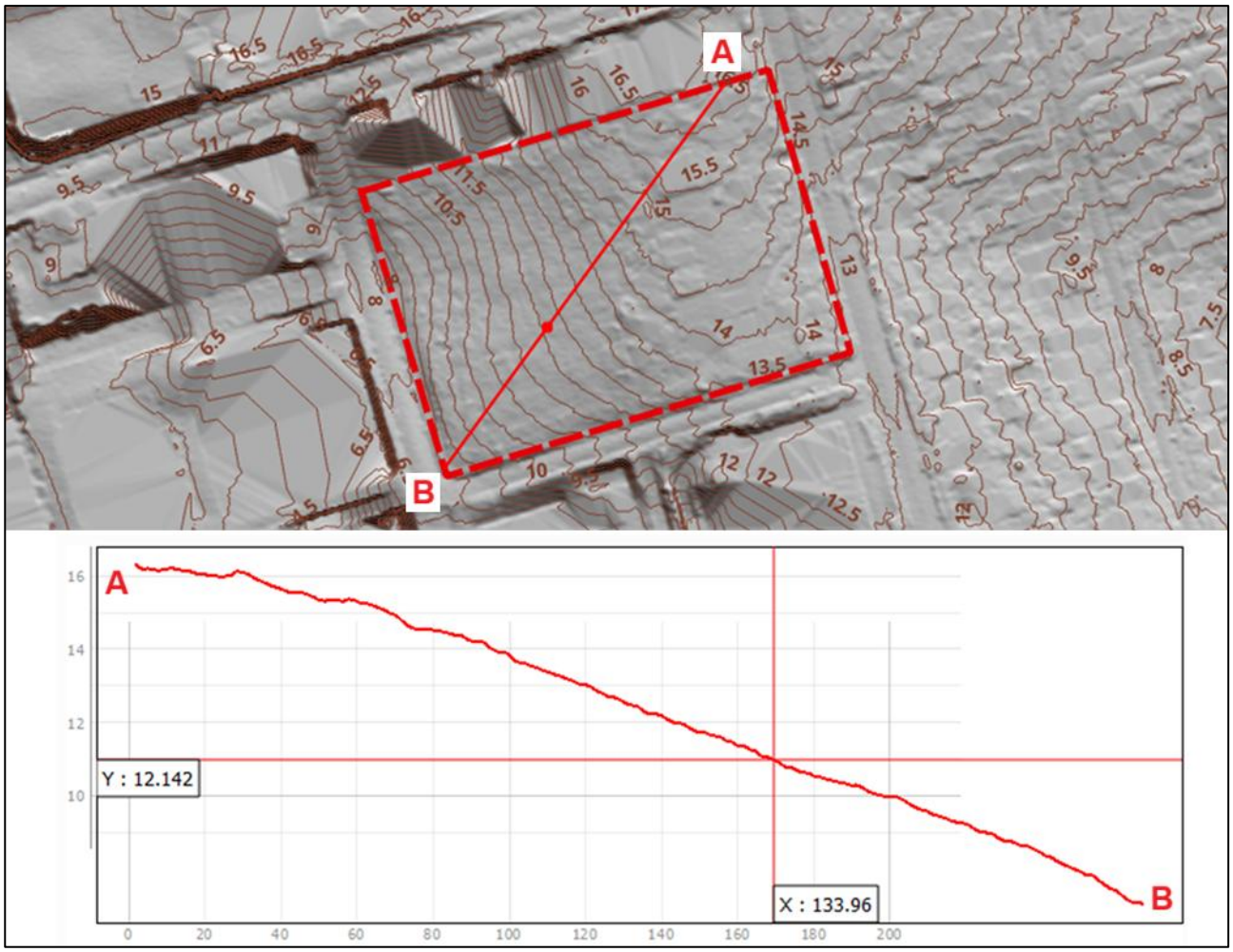



*Figure 4: Cross-sectional profile through the school boundary*

# 3.0 Flood Planning Requirements

The current Development Control Plan (DCP) in place in the City of Parramatta was published in 2023, providing additional planning and design guidelines to support the aims and objectives of the Local Environment Plan (LEP). DCPs provide detailed controls and standards for addressing development issues at a local level and cover various development types, including residential, commercial and industrial.

Under Section 4.15 of the Environmental Planning and Assessment Act 1979, the consent authority is required to take into consideration the relevant provisions of the DCP in determining a development application. Section 5.11 of the City of Parramatta's DCP provides a risk-based approach to planning and development in the flood prone lands of the LGA. The New South Wales State Government flood prone land policy is to reduce the impact of flooding and flood liability on individual owners and occupiers of flood prone property, and to reduce private and public losses resulting from floods, utilising ecologically positive methods wherever possible.

The objectives of the City of Parramatta's DCP in relation to flooding are:

- Manage the floodplain in an economically, environmentally, and socially sustainable manner.
- Allow development in the floodplain that is appropriate to the flood hazard and risk at a particular location.
- Ensure that development minimises the risk to life and property from flooding and its impacts.
- Deliver a risk-based approach to floodplain development and mitigation of potential harm based on a merit assessment consistent with the current Floodplain Development Manual.
- Ensure the proponents of development and the community in general are aware of the potential flood hazard and consequent risk associated with the use and development within the floodplain.
- Ensure that the proposed development does not expose existing development to unacceptable risks or impacts associated with flooding.
- Require hazard, risk and safety assessments to demonstrate how risk and potential for harm to people, property, buildings, and the environment from floodwaters will be adequately mitigated.
- Ensure development does not adversely increase the potential flood affectation on other development or properties, either individually or in combination with similar developments that are likely to occur within the same catchment.
- Ensure development on flood prone land does not result in unreasonable impacts upon the amenity or ecology of an area.
- Ensure buildings and uses are compatible with the identified flood risk. Development with a lower sensitivity to the flood hazard may be considered for location within the floodplain subject to appropriate design and siting controls provided that the potential risks and consequences that could still arise from flooding remain acceptable.
- Ensure early site planning and consideration of flood conditions to achieve an integrated flood response that manages flood risk and provides optimum development design outcomes to provide adequate amenity on and off site, and interface with the public domain.
- Avoid intensification of development and land use within high flood risk or floodways.
- Achieve adequate, safe flood conveyance and management of floodwaters while providing for the rehabilitation, conservation, embellishment, naturalisation of floodways and other flood affected lands where appropriate.
- Ensure the risks associated with car park basements in flood prone areas are adequately mitigated.
- Prevent any changes to landform that would adversely impact flood behaviour or the course of its natural conveyance.

The stringency of development controls is dependent on the land use type of the development alongside the Flood Risk Precinct the site is located in. The Flood Risk Precincts are outlined in Table 2.

*Table 2: City of Parramatta Council Flood Risk Precincts (adapted from Stantec, 2023)*

| Flood Risk Precinct | Description |
|---|---|
| High Flood Risk | Includes 1% AEP high hazard area, defined as H4 and above (hazards that are unsafe for all people and vehicles – refer to Section 5.3.2, Figure 9 for discussion of hazard classifications). These are areas where high flood damages, potential risk to life, or evacuation difficulties are anticipated, or development would significantly and adversely affect flood behaviour. Most development is restricted within these areas. |
| Medium Flood Risk | Includes medium and low hazard areas within the 1% AEP extent. These are areas where there is still a significant risk of flood damage or safety concerns, but where this risk can be minimised by the application of appropriate development controls. |
| Low Flood Risk | Includes the remaining area within the PMF extent that is not identified as either High Flood Risk or Medium Flood Risk Precinct. The risk of flood damage in these areas is low and most land uses would be permitted. |
| Everywhere Else | Areas outside the PMF. There may still be isolated impacts from local overland flow. |

As an educational establishment, MPPS is categorised under “Sensitive uses and facilities” in the DCP and consequently must be located outside of the Low, Medium and High Flood Risk Precincts – i.e., the site must be located above the extent of flood prone land.

The available flood information for the site is summarised in Section 5.0, and the compliance of the proposed activity with the above flood planning controls is reviewed in Section 6.0.

# 4.0 Stormwater and Overland Flow

Given the high-density urban environment of the wider Parramatta region alongside the expanding development around the Melrose Park area, it is necessary to review the risks associated with stormwater and overland flow within the site.

## 4.1 Contributing Catchment

The catchment contributing to runoff flows within the site boundary is shown in blue hatching in Figure 5. The northern boundary is marked by the crown of Hope Street, with the total contributing area estimated as 3.3 hectares.

Archer Creek, a second order creek, is situated approximately 320m east of the site, running in a southerly direction through the Ryde Parramatta Golf Club before discharging into the Parramatta River. Overland flow is conveyed towards this creek, illustrated in the DEM and contours in Figure 5, with a notable portion of flow from the north and east of the school site redirected in a south-easterly direction towards this creek, away from the site. Despite this, some overland flow is expected to run across the school boundary, primarily in a south-westerly direction towards Ermington Bay in the Parramatta River, which is located approximately 200m southeast of the school.

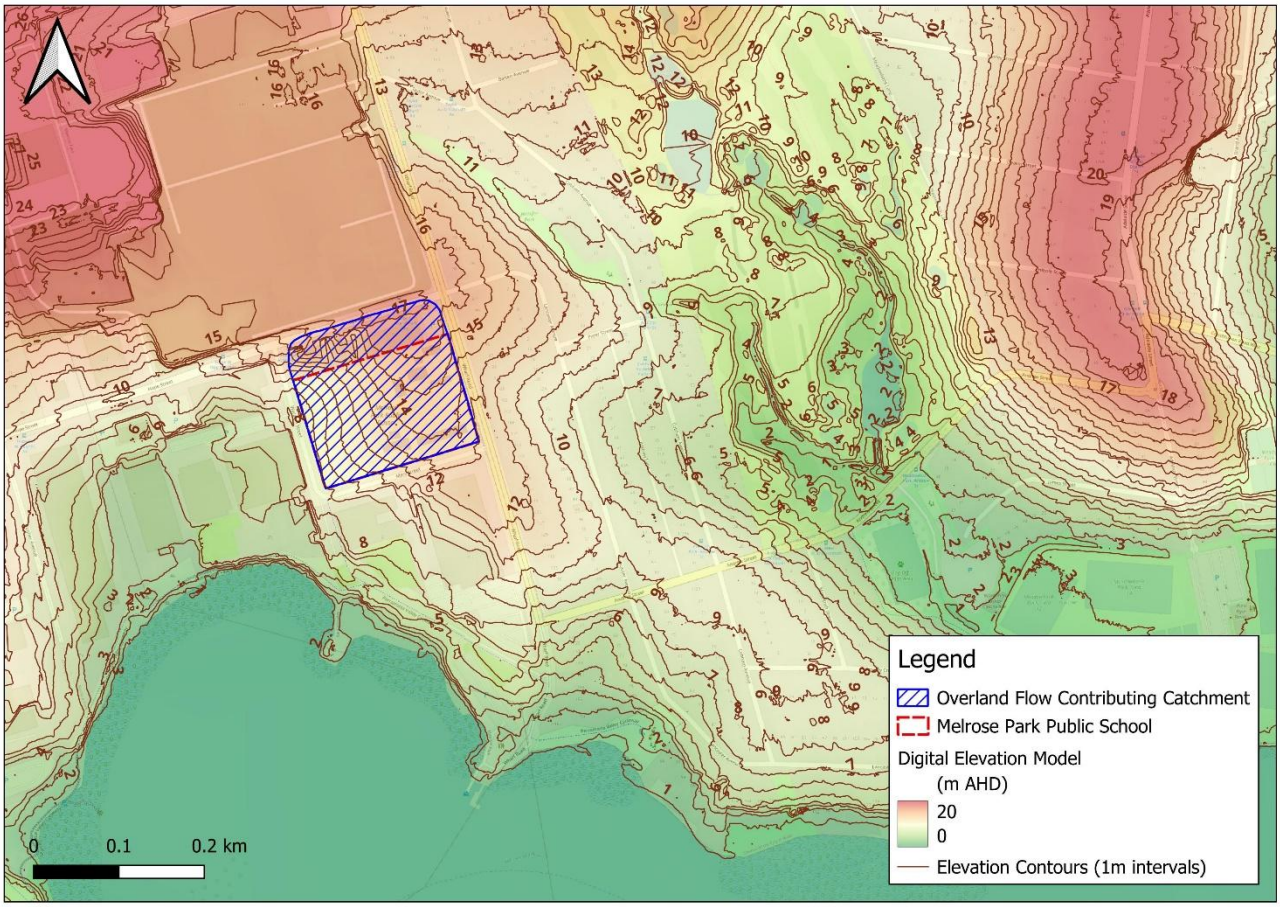



*Figure 5: Catchment contributing to overland flow within the Melrose Park Public School boundary*

## 4.2 Rainfall Runoff Peak Flows – Rational Method

Preliminary calculations can be used to estimate overland flow across the catchment using the Rational Method. The overland flow travel time was calculated using the Friend equation:

$$t_o = 107 = \frac{n\ x\ L^{0.333}}{S^{0.2}}$$

Where:

$t_o$ = overland flow travel time (mins)

L = flow path length (m)

n = Manning's n roughness

S = slope of surface (%)

The overland flow travel time was calculated at approximately 15 minutes. This then informed the rainfall-runoff equation to calculate flow for the 1% 15-min duration storm. The rainfall-runoff equation is as follows:

$$Q = CiA$$

Where:

C = the runoff coefficient (in this case, estimated as 0.66);

i = the rainfall intensity (in this case, 150 mm/hr for the 1% 15-min storm, taken from the BOM website);

A = the area of the contributing catchment (3.3 hectares)

$$Q = 0.66\ x\ 150\ x\ 3.3/360$$

$$Q = 0.91\ m^3/s$$

It is assumed that most of the smaller event runoff would be diverted into the pit and pipe system located on Hope Street. It should be noted that these preliminary calculations are provisional approximations of the conditions onsite.

Hydraulic modelling provides a more robust indication of overland flow paths and overall flood risk. The 2024 Parramatta River Flood Study provides an assessment of local catchment flooding and is reviewed in more detail in Section 5.3 of this report.

# 5.0 Available Flood Information

## 5.1 Flood Study Data

### 5.1.1 Parramatta River Flood Study (2024)

Parramatta is a low-lying catchment area fed by 39 tributary creeks, any of which can cause flooding. Due to changes in the catchment and advances in modelling software, Council commissioned Stantec to produce an updated Flood Study to assist in floodplain management, development control and emergency management. The study models mainstream flooding from rivers and creeks and also includes overland flooding from stormwater drains and the local overland catchment, marking the most significant update to the City's flood data in 20 years. Following public exhibition and modifications, the 2024 Parramatta River Flood Study was presented to Council and adopted at its meeting on 11 June 2024.

The flood study involved the development of an XP-RAFTS hydrologic model, with model flows calculated in accordance with the Australian Rainfall & Runoff 2019 (ARR2019) Guidelines. The XP-RAFTS model was calibrated and validated to historic flood events that occurred in April 1988, April 2015, and June 2016. The XP-RAFTS hydrographs for various design events then provided input data for the TUFLOW hydraulic model, which covers an area of 51 $km^2$.

Council's flood study area is split into seven separate TUFLOW models. The site and surrounding area are within the Darling Mills, The Ponds, Subiaco, Vineyard and Brickfield Creeks catchment model. TTW obtained this model, alongside the Parramatta River and Toongabbie Creek model, which focuses on mainstream flooding.

No changes were made to Council's model, given that the proposed development will have no impact on flood behaviour. It should be noted that there is some redevelopment to the north of the MPPS site that is currently ongoing and is not captured within Council's model. However, this is not expected to have any impact on flood risk at the MPPS site.

### 5.1.2 City of Ryde Draft Flood Harmonisation Study (2024)

Given that Wharf Road marks the LGA boundary with the City of Ryde, flood modelling from the City of Ryde's Draft Flood Harmonisation Study (2023), undertaken by WMAWater, was also included in the review process in order to assess flood behaviour across key roads further east of the site.

As the study is still in draft form, the results are subject to change. Despite this, the study has been used as the main reference point in this report for the Ryde LGA given that it is based on the current industry standard methods and guidelines and in accordance with the Australian Rainfall & Runoff 2019 (AR&R 2019).

## 5.2 Mainstream Flooding

Review of the Parramatta River and Toongabbie Creek model outputs demonstrates that the site is unaffected by mainstream flooding from the Parramatta River. Both Wharf Road and Waratah Street rise steeply, with floodwaters terminating at the junction between these two roads, 275 metres southeast of the school site, as depicted in Figure 6, which presents flood depths and levels in the 4-hour event.

The maximum flood level surrounding the site is 5m AHD at the southern extent of Wharf Road. The site itself is situated on land a minimum of 4m above this, with no risk of mainstream flooding.

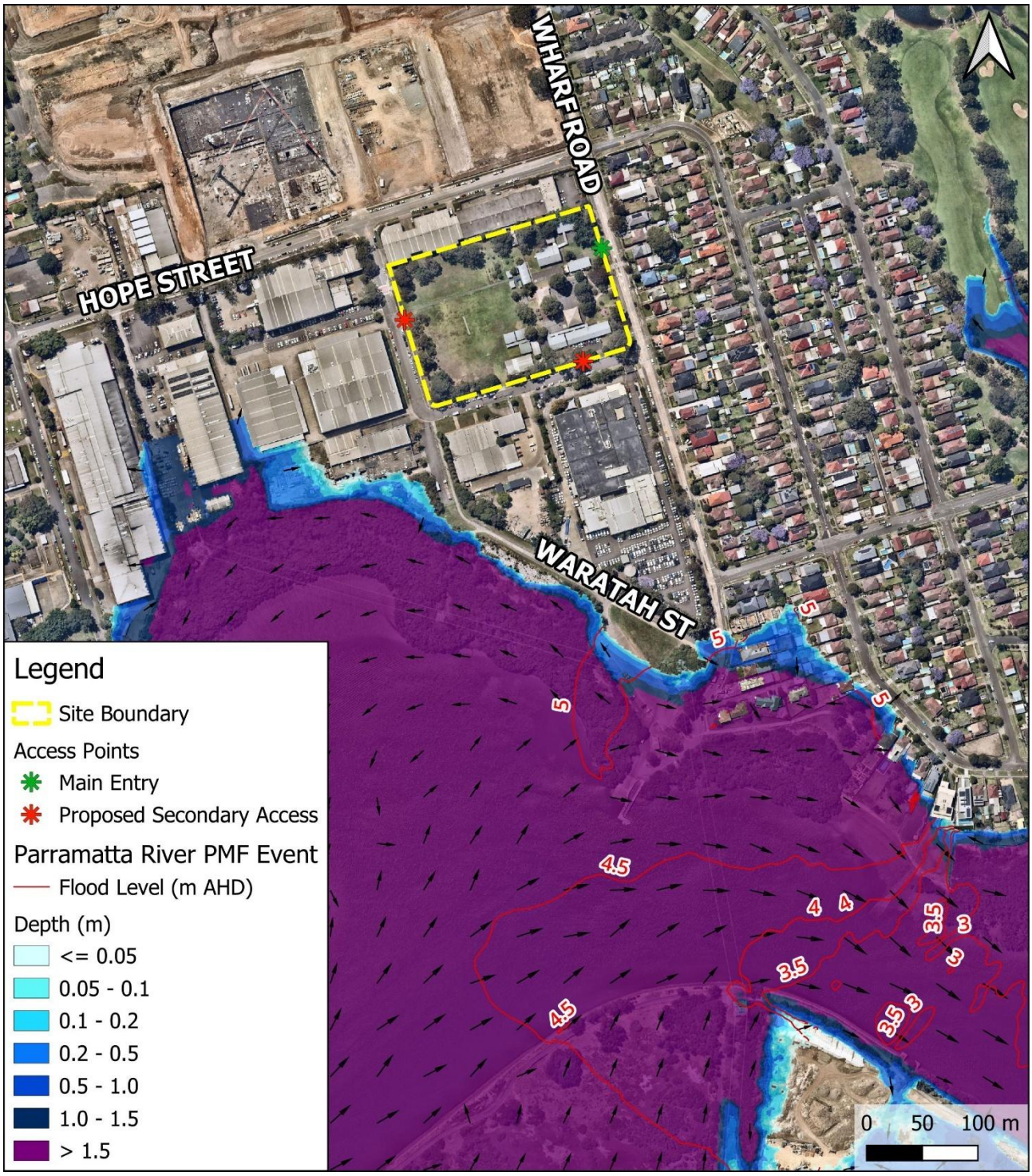



*Figure 6: Parramatta River – Depths and levels in the PMF event (4-hour duration)*

## 5.3 Overland Flooding

Overland flood risk in the City of Parramatta LGA has been assessed via the Darling Mills, The Ponds, Subiaco, Vineyard and Brickfield Creeks catchment model.

### 5.3.1 Flood Depths and Levels

Figure 7 and Figure 8 present flood depths and levels surrounding the MPPS site in the 1% AEP and PMF events, respectively. Review of model outputs demonstrate that the site itself is flood-free in all modelled events, up to and including the PMF event. Surrounding access roads are affected by overland flows, including

Waratah Street, Hope Street, and Wharf Road. Depths at the sag point on Waratah Street (west of the site) reach a maximum of 300mm in the 1% AEP event, and 540mm in the PMF event.

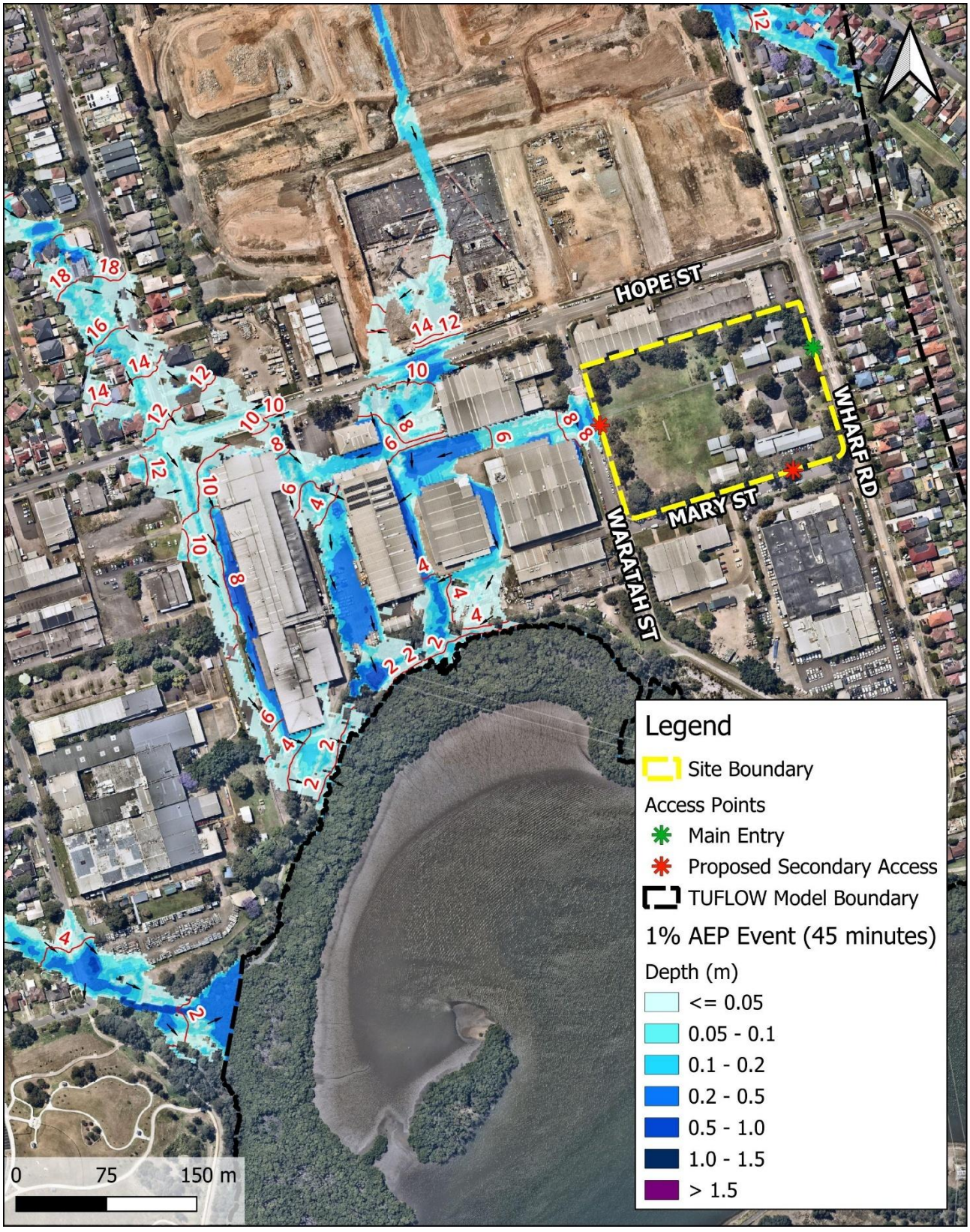



*Figure 7: Flood depths and levels surrounding the MPPS site in the 1% AEP event (45-minute duration)*

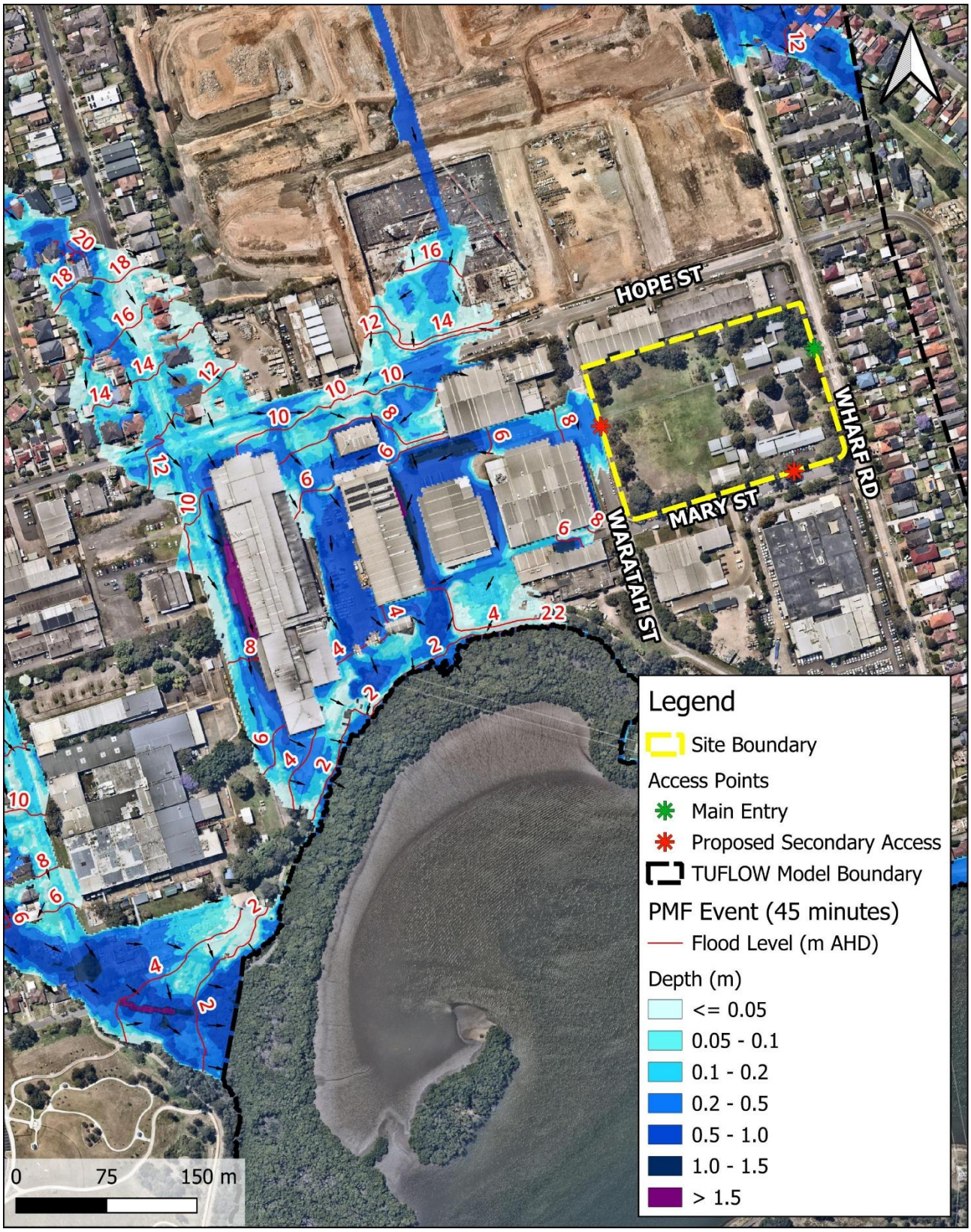



*Figure 8: Flood depths and levels surrounding the MPPS site in the PMF event (45-minute duration)*

### 5.3.2 Site Access and Flood Hazard

The risk to life and potential damages to buildings during floods varies both in time and place across the floodplain. To understand the effects of flooding on development and people, it is necessary to review the flood hazard. Flood hazard is determined through the relationship between the depth and velocity of floodwaters.

'*Handbook 7 – Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia*', part of the Australian Disaster Resilience Handbook Collection (2017) presents a set of hazard curves which assess the vulnerability of people, vehicles and buildings to flooding based on the velocity and depth of flood flows. This flood hazard vulnerability curve is shown in Figure 9, with 6 classes ranging from a level of H1 (generally safe for people, vehicles and buildings) to H6 (unsafe for vehicles and people, with all buildings considered vulnerable to failure).

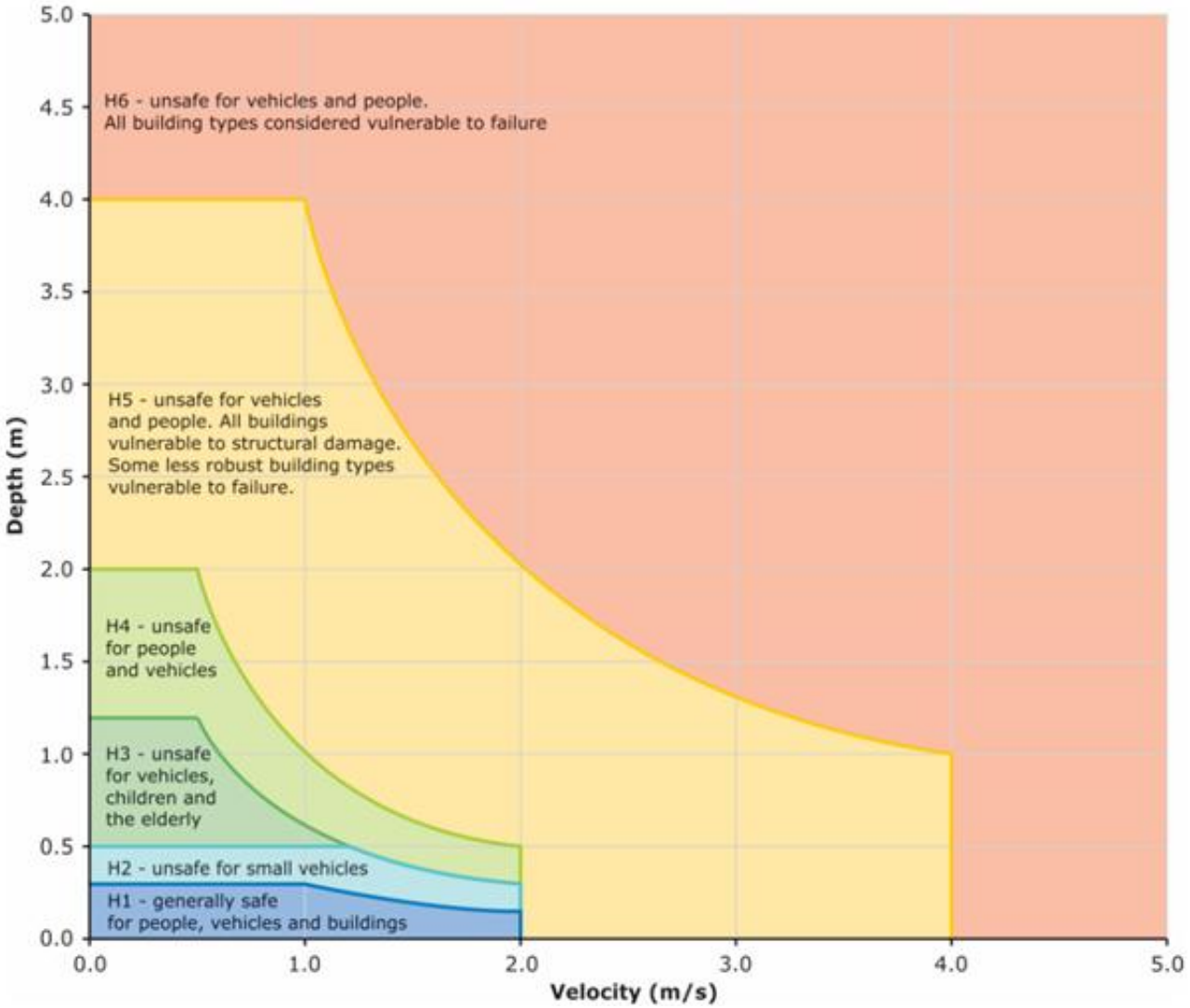



*Figure 9: Flood hazard vulnerability curve*

Both flood studies for the City of Parramatta and City of Ryde LGAs provide updated hazard mapping based on these classifications. Figure 10 and Figure 11 present the MPPS site within the hazard maps for the 1% AEP and PMF events, respectively.

- In the 1% AEP event, surrounding access roads are typically affected by low hazard (H1) flows, with the exception of Andrew Street, which is impacted by high hazard flows at the Archers Creek crossing.
- In the PMF event, although the sections of road immediately adjacent to the site are generally low hazard, the Hope Street roundabout (approx. 400 m from the site) is categorised as H5 (unsafe for vehicles and people). Similarly, the northern extent of Wharf Road (300 m from the site) is categorised as H5. Travel further east is also limited, with flows at the creek crossing on Andrew Street categorised as H5-H6 hazard.

A Flood Emergency Response Plan has been prepared by TTW (dated 22 January 2025) that includes further detail on site access constraints in severe flood events, including an assessment of the time to inundation and recession, and identification of the most appropriate flood response strategy for the school.

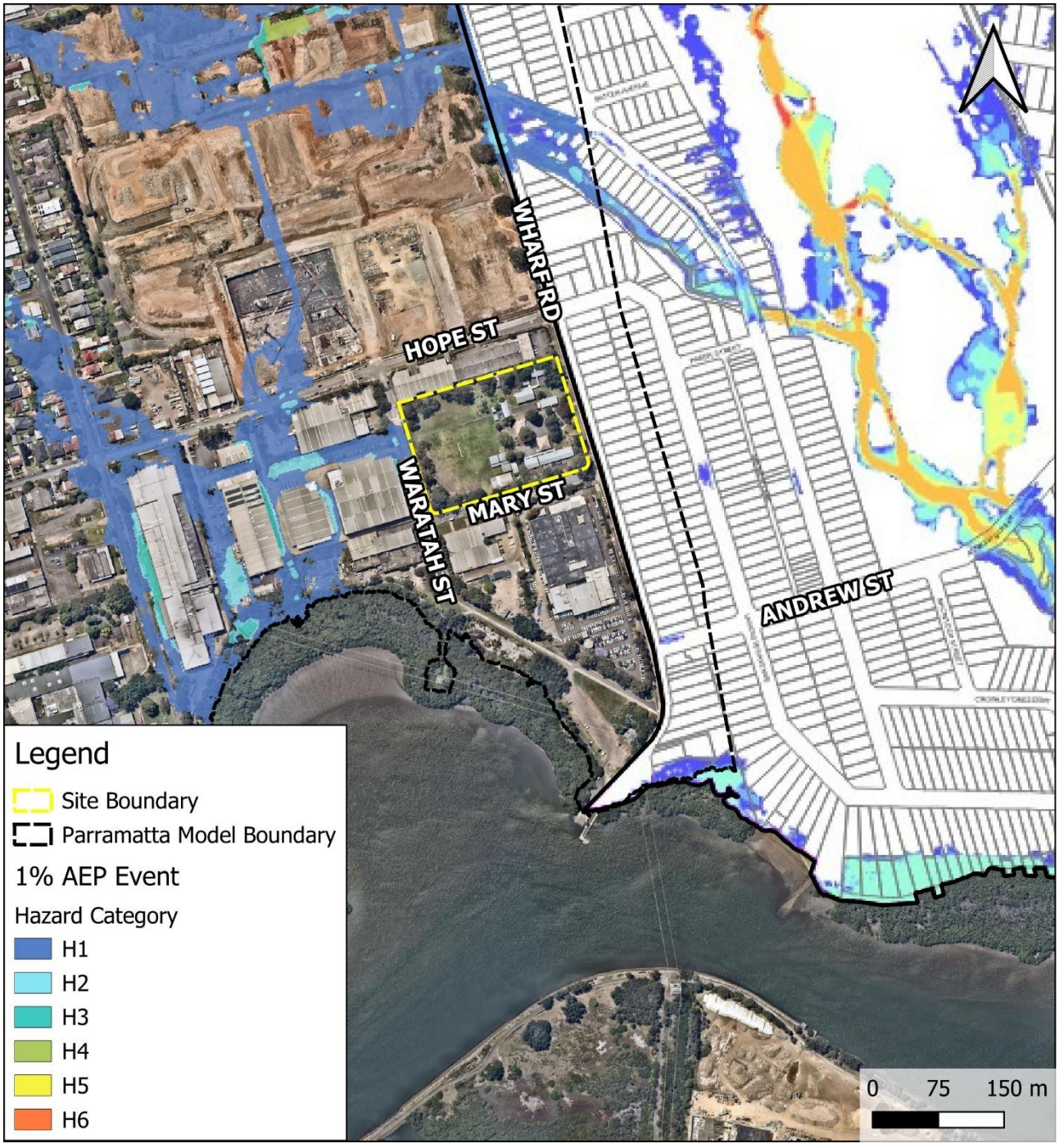



*Figure 10: Melrose Park Public School in relation to the updated 1% AEP flood hazard maps (Source: City of Parramatta, 2024, City of Ryde, 2023)*

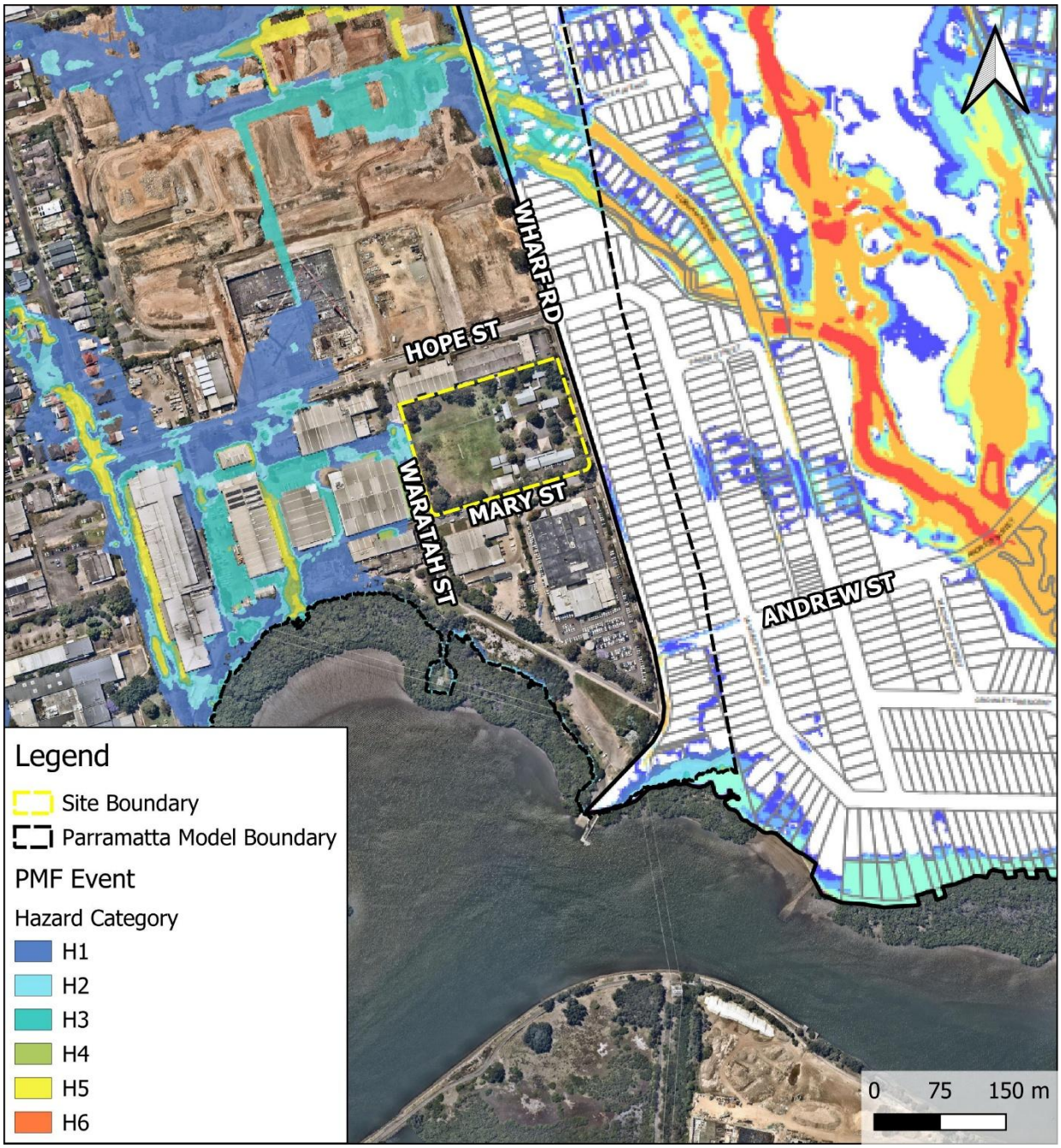



*Figure 11: Melrose Park Public School in relation to the updated PMF hazard maps (Source: City of Parramatta, 2024, City of Ryde, 2023)*

### 5.3.3 Climate Change

The Department of Planning, Housing and Infrastructure (DPHI)'s updated planning circular (released March 2024) highlighted the importance of taking a more proactive, risk-based approach to flooding in planning decisions, including greater consideration of the potential impact of climate change on future flood frequency and levels. Climate change projections in NSW are generated by the NSW and ACT Regional Climate Modelling (NARCliM) project. The NARCliM projections for extreme rainfall are that both rainfall intensities and the frequency of extreme events will increase.

The Parramatta River Flood Study included an assessment of eight separate climate change scenarios, which were applied to the 1% AEP event. The worst-case scenario tested is the Representative Concentration Pathway (RCP) 8.5 in 2150, which corresponds to a 28.5% AEP increase in rainfall intensity. This scenario resulted in significantly increased flows (approx. 20%), with large flood extent increases in the mainstream

channels. However, despite a minor increase in flood extent along Waratah Street, the school remains unaffected by flooding in the 1% AEP event under RCP8.5 in 2150, as shown in Figure 12. Flood levels on Waratah Street are expected to increase by between 10-50mm in this scenario.

As a result, any development within the site is protected against future climate change.


*Figure 12: Impact of climate change (RCP8.5 in 2150) on flood levels and extents (Source: City of Parramatta, 2024)*

# 6.0 Compliance Assessment

As stated in Council's DCP, schools are regarded as sensitive land use types and should be situated outside of all Flood Risk Precincts (i.e. outside the PMF extent).

Figure 13 presents a cross-sectional profile through the sag point on Waratah Street and across the western site boundary, demonstrating the ground levels (taken from 2020 LIDAR from ELVIS) and the PMF level. While there is some minor intrusion of floodwaters onto western extent of the site, the ground level rises steeply in existing conditions, with flows largely contained within the road reserve and footpath.

As shown in the current ground floor site plan presented in Figure 14, the proposed activity includes a new car park to the west of the site, adjacent to the sag point on Waratah Street. However, a review of the PMF level (which reaches 8.7m AHD at the Waratah Street sag point) and current design levels for this car park indicate that the site will remain flood free. As presented in the markup of the ground floor site plan, the western extent of the car park is set at 8.86m AHD (160mm above the flood level), and the proposed buildings are situated within the central and eastern portions of the Lot, several metres above this. As such, the site is expected to remain flood-free in post-development conditions, and no flood controls will apply.

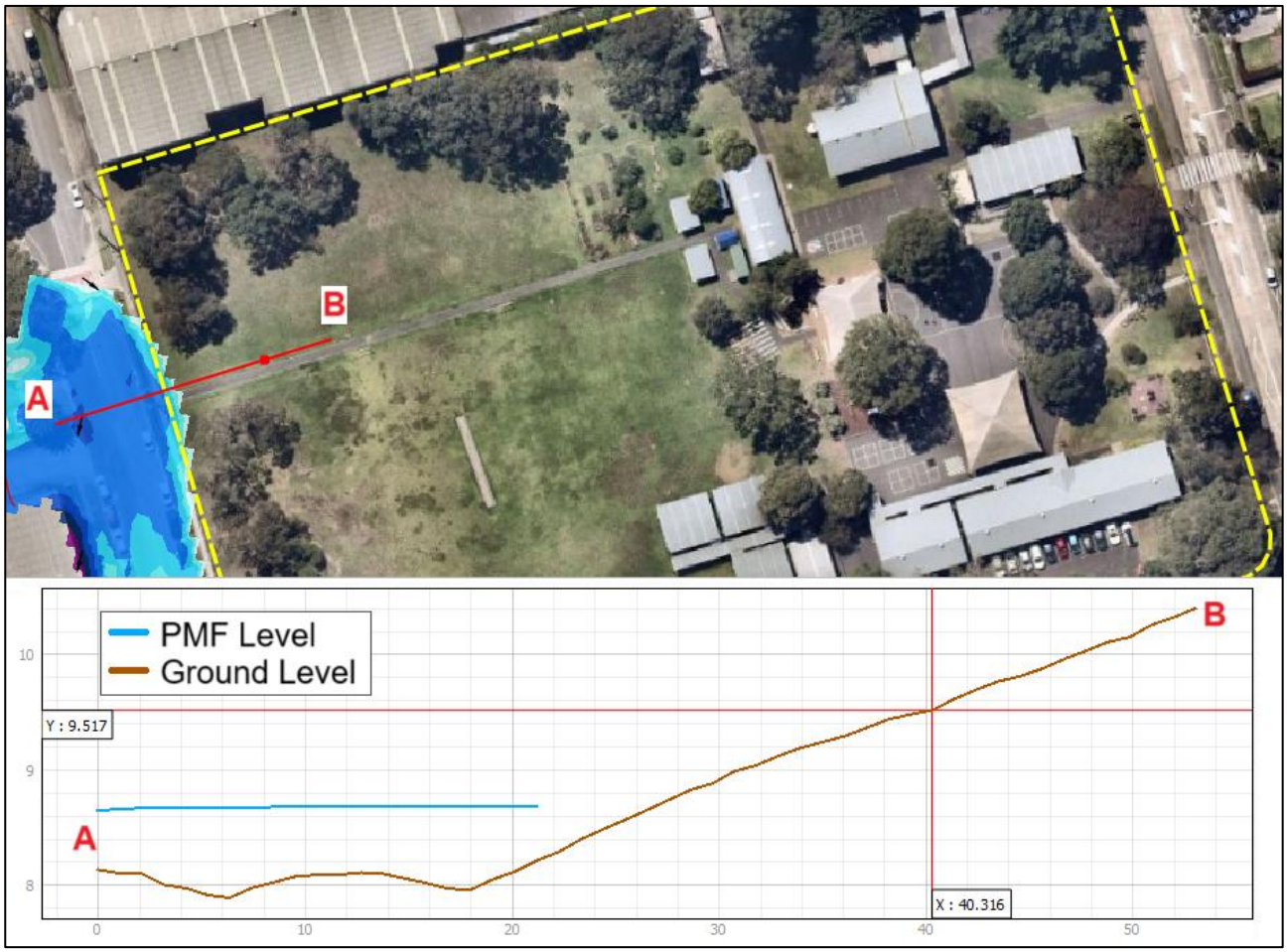



*Figure 13: Cross-sectional profile showing ground levels and PMF levels across Waratah Street into the Melrose Park Public School site (Source: elevation data obtained from ELVIS, 2020, PMF levels obtained from 2024 Parramatta River Flood Study model)*

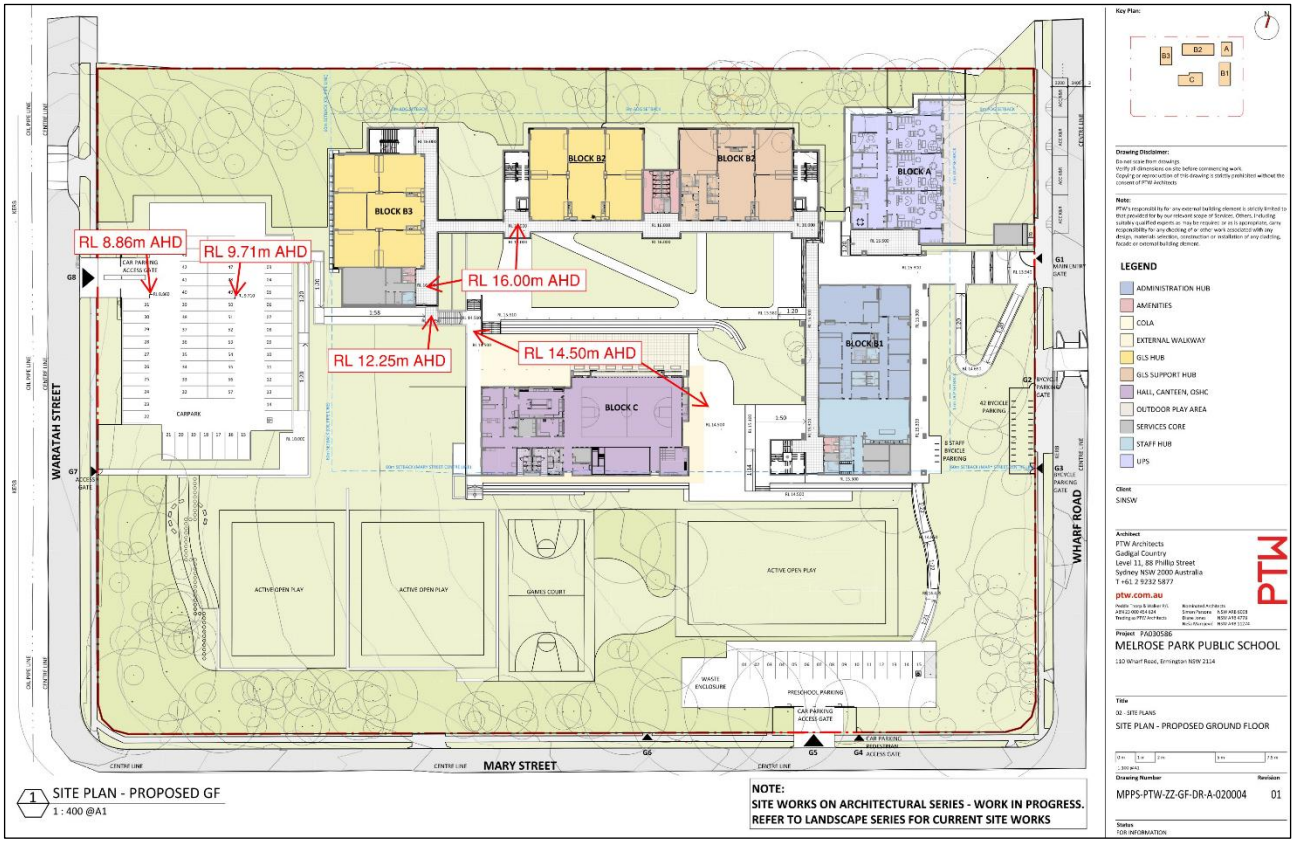



*Figure 14: Design levels in ground floor site plan (Source: PTW Architects, dated 20th December 2024)*

# 7.0 Conclusions and Recommendations

Review of hydraulic outputs from both the Parramatta River Flood Study (City of Parramatta, 2024) and the City of Ryde's Draft Flood Harmonisation Study (WMAWater, 2023) demonstrate that the MPPS site is unaffected by both mainstream flooding from Parramatta River and local catchment flooding. The following observations have been made:

- The Parramatta River flood level in the vicinity of the site peaks at 5.0m AHD at the southern extent of Wharf Road in the PMF event. This road rises steeply, with the site safely elevated approximately 4 metres above the riverine floodplain.
- While the MPPS site itself is unaffected by overland flooding from the local upstream catchment, two of the site's road frontages are impacted, alongside surrounding access roads. Site access constraints have been assessed in more detail in TTW's Flood Emergency Response Plan (FERP) for the site, dated 22 January 2025.
- The topography of the site (which slopes relatively steeply towards the low point on Waratah Street) ensures flows are largely contained within the road reserve and public footpath, including within the PMF. In the proposed design, the car park level is set at 8.86m AHD, 160mm above the PMF level on Waratah Road. The buildings themselves are situated several metres above this, elevated well above the peak PMF level. As such, the site will remain flood-free in post-development conditions.
- The impact of future climate change has been considered, with an increase of 10-50mm along Waratah Street in the worst-case 1% AEP RCP8.5 2100 scenario, resulting in a minor increase in flood extent along this street. However, these flows will still be contained within the road reserve, with no risk of inundation into the school site.
- The proposed activity is compliant with the conditions set out in Section 5.11 of the Parramatta DCP (2023) and will have no adverse impact on flood behaviour in the region.

**Mitigation Measures**

Mitigation measures identified as necessary are outlined in Table 3.

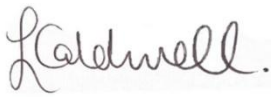
*Table 3: Mitigation measures*

| Mitigation Name | Phase | Mitigation Measure | Reason |
|---|---|---|---|
| Flood Emergency Response Plan (FERP) | Operational Phase | The FERP prepared by TTW (22 January 2025) should be reviewed following the detailed design stage and updated if necessary to reflect the final design features of the proposed activity, prior to the site becoming operational. | To provide emergency response guidance in the event of a flood event and further reduce flood risks associated with the activity during operational phase. |

**Evaluation of Environmental Impacts**

Given that the site is situated above the extent of flood-prone land, the proposed activity will have no adverse impact on flood storage, risks, or behaviour in the area, nor will it significantly impact the locality, community and/or the environment.

Prepared by
**TTW (NSW) PTY LTD**



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# Flood Emergency Response Plan

## Melrose Park Public School

**Prepared for NSW Department of Education** / 1 April 2025

231931 CFAB

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Your Partner in Engineering

## Contents

| Rev | Date | Prepared By | Approved By | Remarks |
|---|---|---|---|---|
| 1 | 22/01/2025 | LC | EC | Issued as draft |
| 2 | 01/04/2025 | LC | EC | Final |

# 1.0 Introduction

This Flood Emergency Response Plan (FERP) has been prepared to accompany a Review of Environmental Factors (REF) for an activity proposed by the Department of Education under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and *State Environmental Planning Policy (Transport and Infrastructure) 2021* (SEPP TI).

This document has been prepared in accordance with the Guidelines for Division 5.1 assessments (the Guidelines) by the Department of Planning, Housing and Infrastructure.

This report examines and takes into account the relevant environmental factors in the Guidelines and Environmental Planning and Assessment Regulations 2021 under Section 170, Section 171 and Section 171A of the EP&A Regulation as outlined in Table 1.

*Table 1: Summary of Relevant Section of the Part 5 Guidelines and EP&A Regulation*

| Regulation / Guideline Section | Requirement | Response | Report Section |
|---|---|---|---|
| Guidelines for Division 5.1 (DPHI) Section 3.0 | When considering the likely impact of an activity on the environment, the proponent and determining authority must take into account any risk to the safety of the environment | As the site is located above the extent of flood-prone land, the proposed activity at the site will not adversely impact on the flood behaviour in the area nor will it increase risk to the safety of the environment. | 2.0 |
| Guidelines for Division 5.1 (DPHI) Section 4.0 | The proponent will gather and record relevant information on potential environmental impacts including any episodic risks | As above | 2.0 |
| Section 171.2 (a), (b), (j) EP&A Regulations | The determining authority must take into account the environmental impact on the community, the transformation of the locality, risk to the safety of the environment | As above | 2.0 |

## 1.1 Reference Documents

The FERP has been prepared with reference to the following:

- Australian Institute of Disaster Resilience (AIDR) Guideline 7-3: Flood Hazard (2017);
- City of Parramatta Council (2023) Development Control Plan, Section 5.11
- City of Parramatta Council (2024) Parramatta River Flood Study
- FloodSafe guidelines and the relative FloodSafe Tool Kits;
- 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 (2025) Shelter-in-place guideline for flash flooding (https://pp.planningportal.nsw.gov.au/draftplans/made-and-finalised/shelter-place-guideline-flash-flooding)
- NSW Department of Planning, Housing and Infrastructure – Planning Circular PS 24-001, Update on addressing flood risk in planning decisions, 1st March 2024;
- NSW State Emergency Service (SES) Guidelines;
- TTW (2024) Due Diligence Report for Melrose Park Public School, dated 6 November 2024
- WMAWater (2023) Flood Harmonisation Study – Flood Study Update, Draft Report for the City of Ryde Council

## 1.2 Activity Description

The activity is for upgrades to Melrose Park Public School within a one to three-storey built form, including:

- Demolition of existing school buildings;
- Site preparation works including tree removal;
- Construction of the following buildings:
  - Block A: One (1) storey building comprising:
    - universal pre-school;
    - outdoor play area for the UPS; and
    - detached storeroom;
  - Block B1: Two (2) storey building comprising:
    - staff and administration areas;
    - library;
    - 4 special programs rooms;
    - Pedestrian bridge to Block B2;
  - Block B2: Three (3) storey building comprising:
    - 24 classrooms;
    - amenities/services cores; and
    - pedestrian bridge to Block B3;
  - Block B3: Three (3) storey building comprising:
    - 10 classrooms; and
    - amenities/services cores;
  - Block C: One (1) storey building comprising:
    - hall;
    - amenities;
    - canteen;
    - OSHC; and
    - COLA;
- Construction of two (2) car parking areas; and
- Landscaping works.

## 1.3 Activity Site

Melrose Park Public School is located at 110 Wharf Road, Melrose Park and is legally known as Lot 3 in DP 535298 with an approximate site area of 2.5 hectares. The site has a frontage to Wharf Road (east), Mary Street (south), and Waratah Street (west). The site is adjoined by 2-3 storey light industrial development to the north, 1-2 storey industrial and commercial developments to the south, residential dwellings to the east and industrial and commercial development to the west.

An aerial photograph of the site is provided in Figure 1 below.


*Figure 1: Aerial Photograph*

# 2.0 Flood Behaviour

## 2.1 Methodology

### 2.1.1 Hydraulic Modelling – Parramatta River Flood Study (2024)

MPPS is situated within the wider Parramatta River catchment, which stretches for over 212km$^2$ in area, with more than 20 major adjoining creek tributaries linking to the Parramatta River.

TTW obtained the City of Parramatta Council TUFLOW model developed by Stantec for the Parramatta River Flood Study (2024) in order to determine the flood behaviour in the area. Council's flood study area is split into seven separate TUFLOW models. The site and surrounding area are within the Darling Mills, The Ponds, Subiaco, Vineyard and Brickfield Creeks catchment model. TTW obtained this model, alongside the Parramatta River and Toongabbie Creek model, which focuses on mainstream flooding.

No changes were made to Council's model, given that the proposed development will have no impact on flood behaviour. It should be noted that there is some redevelopment to the north of the MPPS site that is currently ongoing and is not captured within Council's model. However, this is not expected to have any impact on flood risk at the MPPS site. For the Probable Maximum Flood (PMF), a range of storm durations from the 15-minute storm up to the 360-minute storm were run. Although the 45-minute storm is critical for the site (in terms of local catchment flows), this FERP includes an analysis of longer duration events to determine the maximum potential impact time for the site.

### 2.1.2 Desktop Review – City of Ryde's Draft Flood Harmonisation Study (2023)

It should be noted that the MPPS site is situated at the eastern perimeter of the flood study area, and the residential properties along Wharf Road (the site's eastern frontage) mark the eastern extent of the model. Roads beyond this point are consequently excluded from the 2D model domain.

To assess flood behaviour over other potential access routes further east, the City of Ryde's Draft Flood Harmonisation Study (2023) was also included in the review process. As the study is still in draft form, the results are subject to change, and it was not possible to obtain the model files for more detailed assessment of inundation and recession times. According to the City of Ryde Draft Flood Study, the critical duration over Wharf Rd varies between 30-45 mins in the 1% AEP event.

## 2.2 Flood Type

Review of the Parramatta River and Toongabbie Creek model outputs demonstrates that the site and key access roads to the site are largely unaffected by mainstream flooding from the Parramatta River. Both Wharf Road and Waratah Street rise steeply, with floodwaters terminating at the junction between these two roads, 275 metres southeast of the school site. The site frontages are flood-free, with no immediate access constraints in any modelled event, up to and including the PMF, as depicted in Figure 2, which presents flood depths and levels in the 4-hour event.

The maximum flood level surrounding the site is 5m AHD at the southern extent of Wharf Road. The site itself is situated on land a minimum of 4m above this, with no risk of mainstream flooding. Although the school ground is not flooded, safe travel arrangements for students to go home may be disrupted by flooding and/or road closures further west of the site.

Overland flood risk has been assessed via the Darling Mills, The Ponds, Subiaco, Vineyard and Brickfield Creeks catchment model. Although the school itself is unaffected by runoff from the local upstream catchment, key access roads are impacted, with potential access and evacuation constraints in significant storm events.

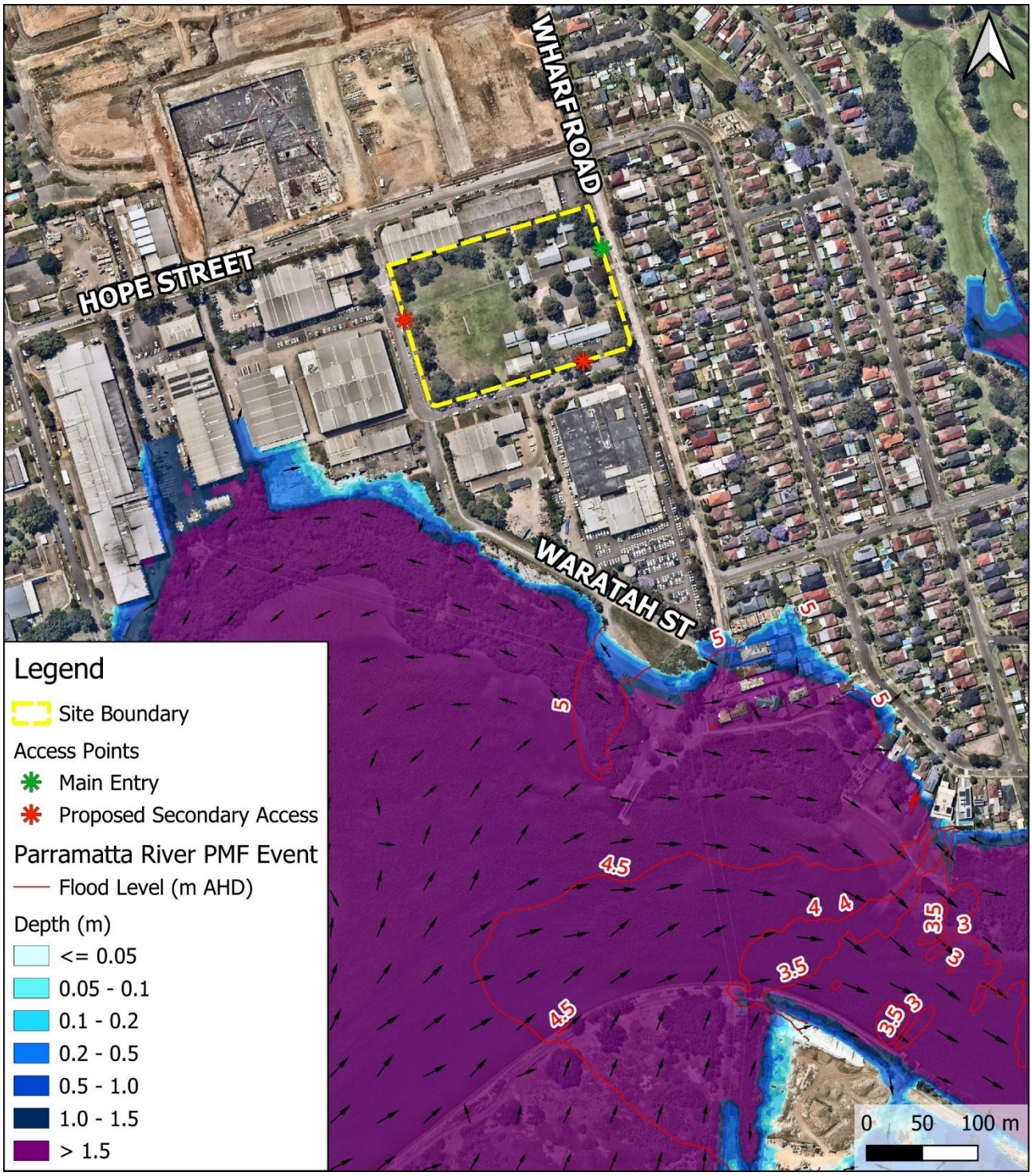



*Figure 2: Parramatta River - Depths and levels in the PMF event (4-hour duration)*

## 2.3 Overland Flooding – Depths and Levels

Figure 3 and Figure 4 present flood depths surrounding the MPPS site in the critical duration 1% AEP and PMF events, respectively.

In the 1% AEP event, depths at the sag point on Waratah Street reach a maximum of 300mm in the 1% AEP event, and 540mm in the PMF event.

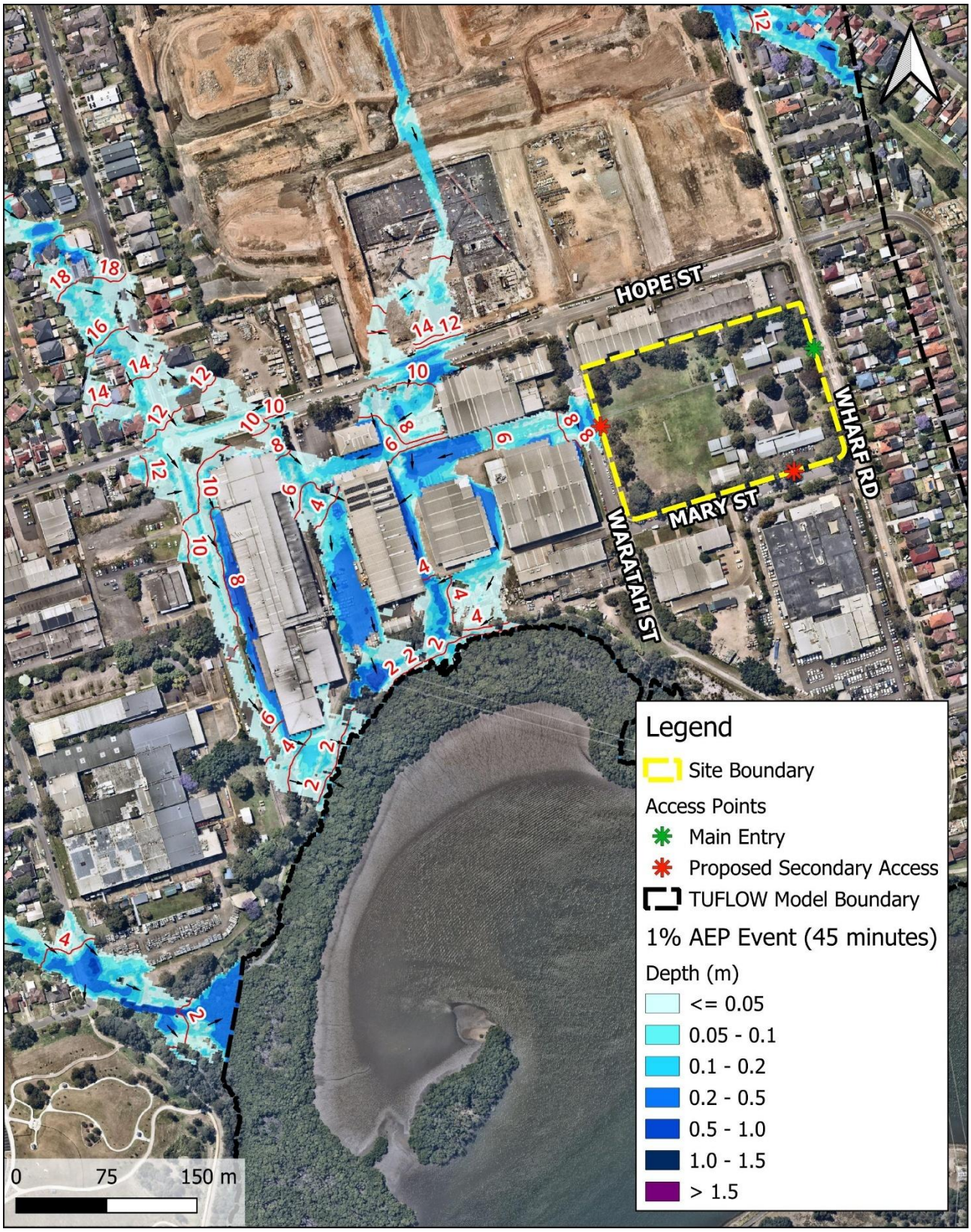



*Figure 3: Flood depths and levels surrounding the MPPS site in the 1% AEP event (45-minute duration)*

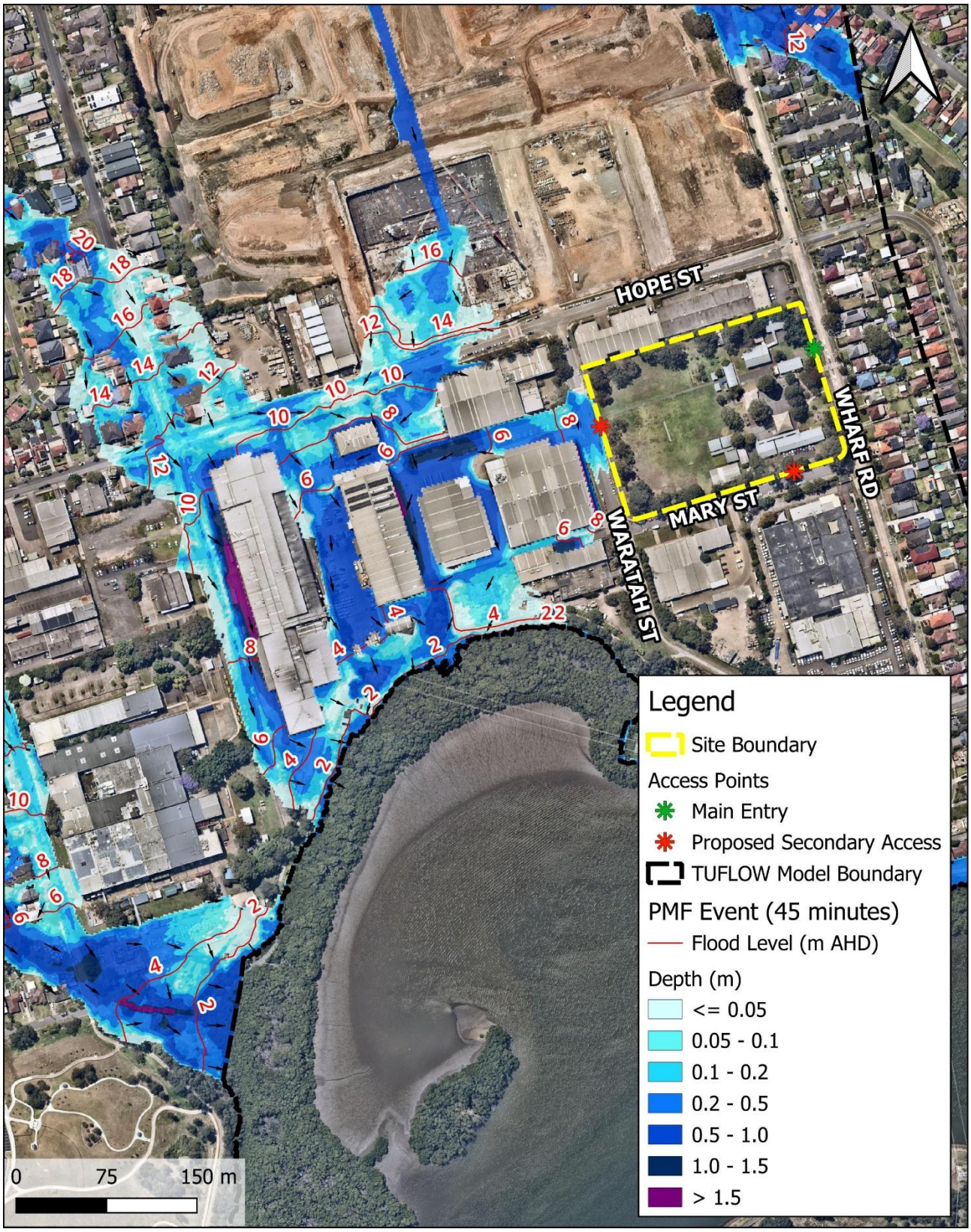



*Figure 4: Flood depths and levels surrounding the MPPS site in the PMF event (45-minute duration)*

## 2.4 Overland Flooding – Hazard

A hazard assessment was conducted using the flood hazard vulnerability curves set out in 'Handbook 7 – Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia' of the Australian Disaster Resilience Handbook Collection (2017).

These curves assess the vulnerability of people, vehicles and buildings to flooding based on the velocity and depth of flood flows. The flood hazard categories are outlined in Figure 5, ranging from a level of H1 (generally safe for people, vehicles and buildings) to H6 (unsafe for vehicles and people, with all buildings considered vulnerable to failure). Table 2 outlines the threshold limits for each hazard category.

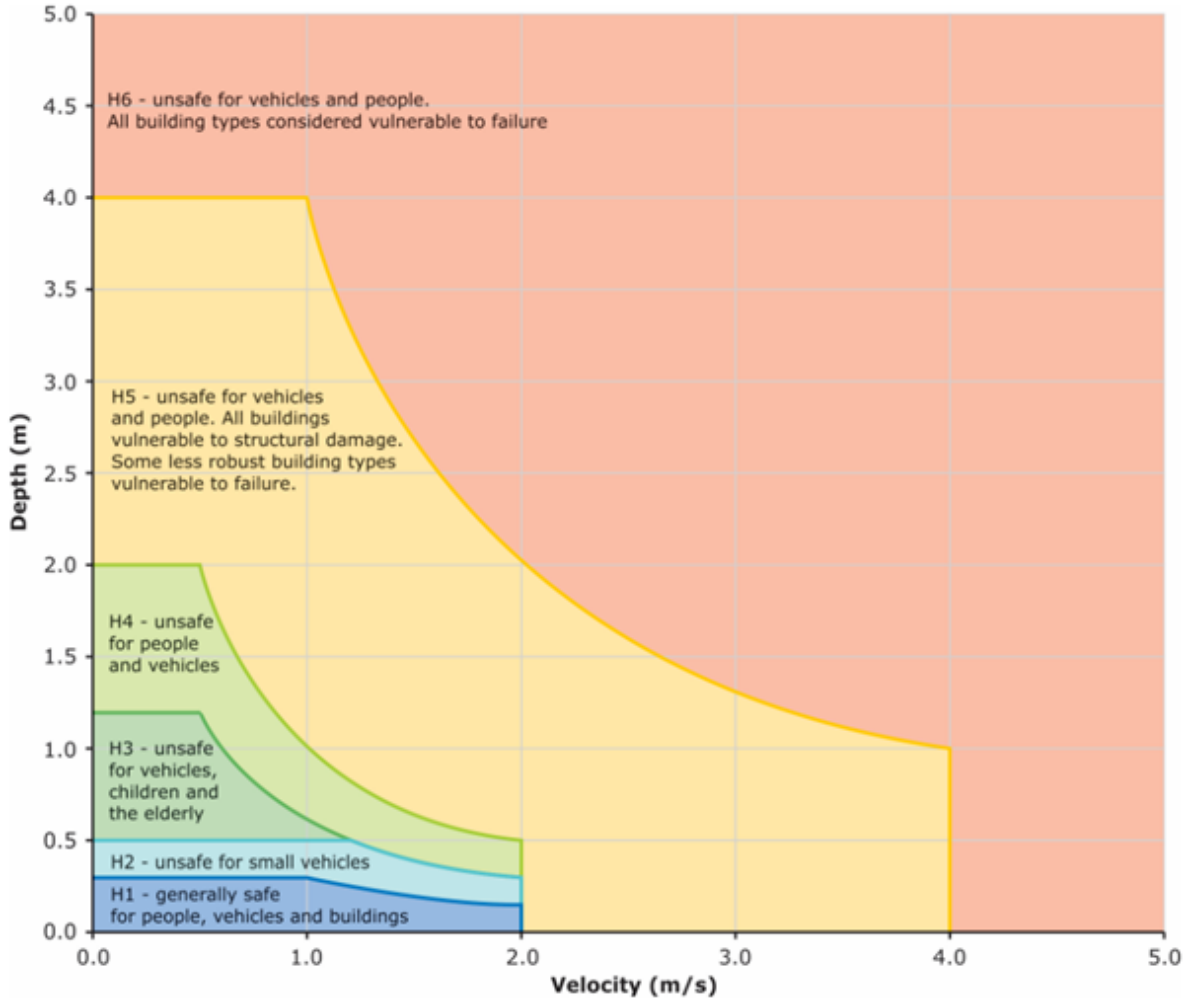



*Figure 5: Flood hazard vulnerability curve (Source: Flood Risk Management Guide FB03 - Flood Hazard, NSW Department of Planning and Environment, 2022)*

*Table 2: Hazard vulnerability threshold limits*

| Hazard | Description | Classification Limit (m2/s) | Limiting still water depth (D) (m) | Limiting velocity (V) (m/s) |
|---|---|---|---|---|
| **H1** | Generally safe for people, vehicles and buildings | D x V ≤ 0.3 | 0.3 | 2.0 |
| **H2** | Unsafe for small vehicles | D x V ≤ 0.6 | 0.5 | 2.0 |
| **H3** | Unsafe for vehicles, children and the elderly | D x V ≤ 0.6 | 1.2 | 2.0 |

| | | | | |
|---|---|---|---|---|
| **H4** | Unsafe for people and vehicles | D x V ≤ 1.0 | 2.0 | 2.0 |
| **H5** | Unsafe for people and vehicles. All buildings vulnerable to structural damage. | D x V ≤ 4.0 | 4.0 | 4.0 |
| **H6** | Unsafe for people and vehicles. All building types considered vulnerable to failure. | D x V > 4.0 | No Limit | No Limit |

Figure 6 and Figure 7 present the flood hazard categorisation around the site in post-development conditions in the 1% AEP and PMF events, respectively. In the 1% AEP event, flows over the surrounding access roads have a maximum hazard level of H1 (peaking at H2 within the gutter), which is regarded as trafficable (per Table 2). There is a low hazard route onto Victoria Road.

In the PMF event, the Waratah Street egress point from the site is impacted by high hazard flows within the kerb and gutter system. Although the proposed Mary Street vehicular access point is not flood affected, onward travel is restricted:

- Flows become hazardous (H5) over the western extent of Hope Street (345m west of the site), at the junction with Hughes Avenue.
- Wharf Road (280m northeast of the site) is similarly impacted by high hazard flows (H5) in the critical duration PMF event.

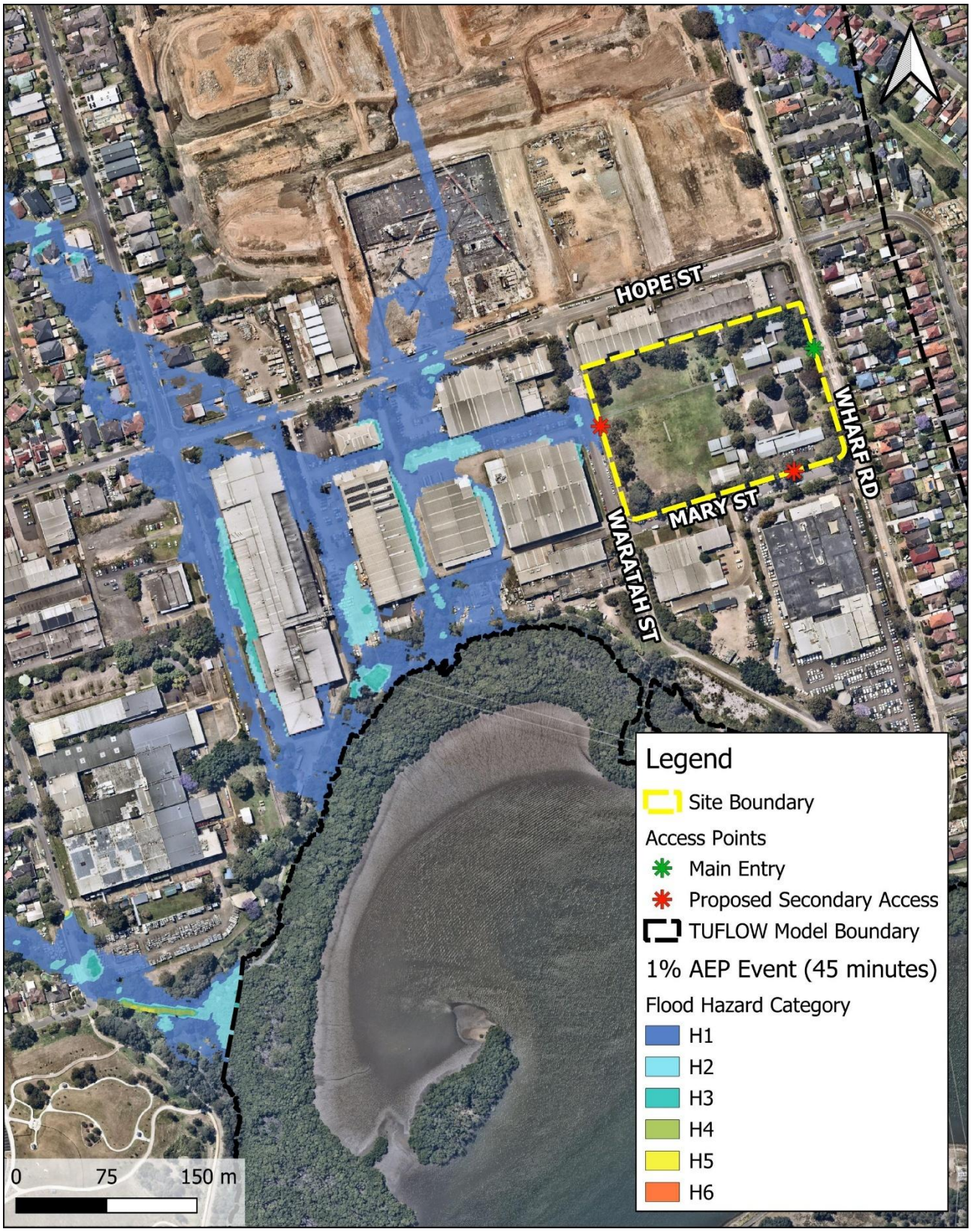



*Figure 6: Flood hazard categorisation of flows surrounding MPPS site in the 1% AEP event*

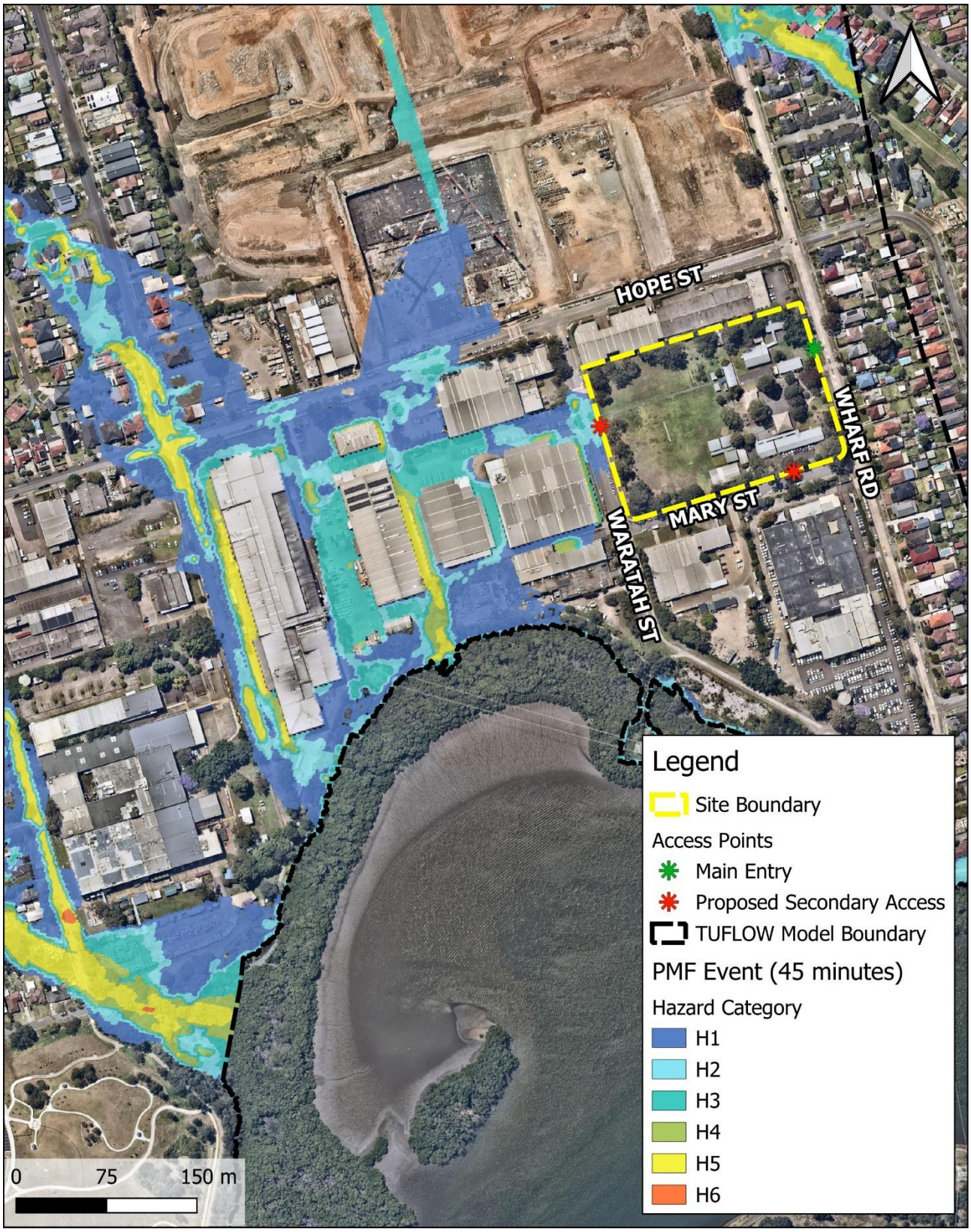



*Figure 7: Flood hazard categorisation of flows surrounding MPPS site in the PMF event*

## 2.5 Inundation and Recession Times

Table 3 presents a summary of the inundation and recession times for a range of different storm events and durations. For the purpose of this assessment, the recession time is regarded as the time taken for a trafficable, low hazard route from the site to become available.

Figure 8 shows the flood hazard categorisation across the wider model during the 45-minute 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. Review of model outputs suggest that the 3-hour PMF event is critical in terms of site accessibility, with Hope Street impacted by flows with a H2 hazard classification (unsafe for small vehicles) for a total period of 1hr 45 minutes.

Review of map outputs from the Draft Flood Harmonisation Study (City of Ryde, 2023) indicate that Andrew Street, the key access route to the east of Archer Creek, is cut off by depths exceeding 300mm (i.e. with a hazard classification of H2 or higher) as frequently as the 50% AEP event and should be avoided. Similarly, the portion of Victoria Road over Archers Creek (between Bush Road and Darvall Road) is cut off in the 20% AEP event. Alternative access further east is possible via Marsden Road and Rutledge Street, which are accessible in events up to and including the 0.2% AEP event.

Given that the study is still in draft form, it is not known how long roads within the City of Ryde are cut off for.

*Table 3: Time to inundation and recession at the site storm events*

| Event + Duration | Time to Inundation (minutes) | Recession Time |
|---|---|---|
| 1% AEP 45 minutes | 2 hours until Waratah Street, Hope Street and Wharf Street are impacted by low hazard flows (H1) | Low hazard (H1) access onto Victoria Rd is available for the duration of this event, with onward travel possible to both the east and west for the duration of this event.<br><br>To the east, onward travel beyond the Archers Creek crossing is not possible on Victoria Rd. Alternative access to the east is available via Marsden Road and Rutledge Street.<br><br>To the west, onward travel beyond the Vineyard Creek crossing of Victoria Rd is not possible, which is cut off by hazardous (H5) flows). |
| 0.2% AEP 45 minutes | <20 minutes until Waratah Street and Hope Street become impacted by isolated areas of low hazard (H1) flows at the sag points on these roads.<br><br>2 hrs 5 minutes until Wharf Road becomes impacted by low hazard (H1) flows. 2 hrs 20 minutes until they reach H2 hazard (unsafe for small vehicles). | Maximum hazard level over Wharf Road is H2, which is largely confined to the gutter.<br><br>Egress from the site via Mary Street, Wharf Road and onto Hope Street is possible for the duration of this event, with a maximum hazard level of H1. |
| PMF 45 minutes (Critical duration) | <5 mins until the sag points on Waratah Street and Hope Street become impacted by H1-H2 flows<br><br>15-20 minutes after the onset of the storm, flows over these roads become hazardous (up to H5). | 1hr after the onset of the storm, a low hazard (H1) route out of the site and onto Victoria Road becomes available.<br><br>Egress from site via Mary St or Wharf Rd access point onto Hope Street, drive west and turn onto Atkins Road, which connects onto Victoria Rd (A40). Travel on Victoria Rd beyond Euston Street is not possible as the road is cut off by |

| | | |
|---|---|---|
| | | floodwaters from both the Ponds and Subiaco Creek and the Vineyard Creek. To the east, onward travel beyond the Archers Creek crossing is not possible on Victoria Rd. Alternative access to the east is available via Marsden Road and Rutledge Street. |
| PMF 3 hrs | 15 minutes until the sag points on Hope Street, Waratah Street and Wharf Road become impacted by H1 flows.<br><br>35 minutes until flows over Hope Street and Wharf Road reach H2 hazard, unsafe for small vehicles. | Flows over Hope Street return to low hazard (H1) conditions approximately 2hrs 20 minutes following the onset of the storm event. |
| PMF 6 hrs | 25 mins until sag points on Waratah Street and Hope Street are impacted by low hazard flows (H1)<br><br>1hr 5 minutes until flows over Wharf Road reach H2 hazard, unsafe for small vehicles. | Low hazard (H1) access onto Hope Street is possible for the duration of this event. As with all PMF events, travel west on Victoria Road is eventually cut off past Euston Street at the crossings over the Ponds and Subiaco Creek and Vineyard Creek. |

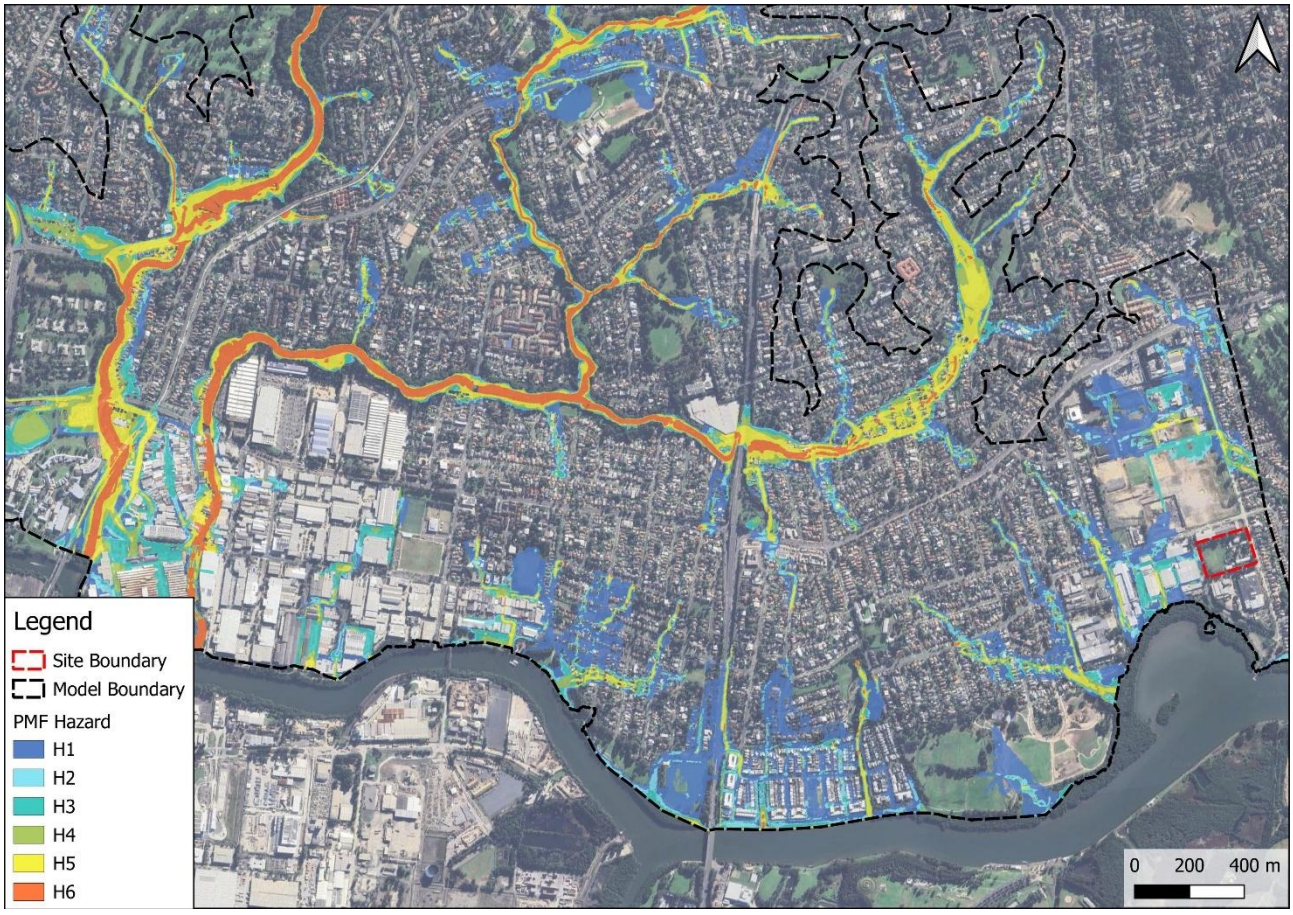



*Figure 8: Flood hazard categorisation in the wider area in the critical duration PMF event*

# 3.0 Flood Response Strategy

## 3.1 Pre-Emptive Closure

Section 1.6.2 of the Parramatta LGA 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 the Parramatta LGA. Pre-emptive closure of the school is the preferred flood emergency strategy for the school site if advanced warning is received outside of school 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. Where there is enough warning prior to school opening hours, the school should be closed in advance of the flood event so children can be safe at home and parents do not have to drive though roads that could become hazardous. The Parramatta LGA Flood Emergency Sub Plan states that school administration offices (Government and Private) will coordinate the evacuation of schools in consultation with the NSW SES and Welfare Services, if not already closed.

An SMS should be sent to parents at the earliest opportunity (once the flood or severe weather warning is issued by BOM) to advise of the school closure.

## 3.2 Shelter-in-Place

Shelter-in-place (SIP) guidance published by the NSW Department of Planning, Housing and Infrastructure (DPHI, 2025) states that SIP is an appropriate emergency management strategy for development proposed in flash flood environments when the flood warning time and flood duration are both less than six hours. In the critical duration PMF event, there is less than 20 minutes from the onset of the storm until flows at the Waratah Street and Hope Street sag points become hazardous. The immediate surrounding access roads return to a trafficable state after approximately 1-hour. The maximum isolation period is approximately 1hr 45 minutes in the 3-hour PMF event, due to H2 hazard flows on Hope Street.

In the longer duration 6-hour PMF event, the overall risk to the site is lower, given that overland flows over the surrounding access roads are categorised as low hazard (H1) and trafficable for the duration of the storm.

Where there is not advanced notice of severe weather, the primary flood management strategy for the site is therefore to shelter-in-place. It should be noted that all proposed buildings are outside the PMF extent and will not experience above-floor inundation. As a result, all buildings are safe to shelter in from the ground floor and upwards, and have adequate facilities to support SIP, including ambulant toilets and staff and student toilets, as per the design criteria outlined in the DPHI's SIP guideline. During the shelter-in-place orders, all staff and students are to remain indoors. The Chief Warden should ensure that there are no site users outdoors, including within the car park area.

The proposed school will increase to 720 students and 50 staff. The DPHI's shelter-in-place guideline recommends a minimum floor space of $2m^2$ per person. With a maximum occupancy of 770 people, a floor area of $1,540m^2$ is required for shelter.

## 3.3 Secondary Risks

Although shelter-in-place is the preferred emergency response strategy should a severe event begin without sufficient warning, any decision to shelter-in-place must consider secondary risks, including medical emergencies and building fire. The Ryde Hospital is located to the east of Archers Creek, with implications for site access during significant flood events given the impact to both the Victoria Road and Andrew Street Bridges in events as frequent as 50-20% AEP.

While there is no passage to the east of Archers Creek that is flood-free or low hazard in all events (up to the PMF), Figure 9 presents an alternative route from the site to the hospital that avoids Andrew Street and the eastern extent of Victoria Road. This is shown against the flood hazard categorisation in the 0.2% AEP event in the City of Parramatta LGA, and the 1% AEP event in the City of Ryde LGA.

It should be noted that **this route is not flood-free, is cut off by high hazard flows in the PMF event, and should only be used by emergency personnel** in the event of a secondary emergency.

Caution must be taken when driving across Hope Street and Rutledge Street. In the PMF event, these roads are cut off by depths exceeding 300mm. The full route is as follows:

- Egress from site using proposed secondary access onto Mary Street, turning left;
- Turn left onto Wharf Road, travelling north until the junction with Hope Street;
- Turn left onto Hope Street, continuing east for approximately 740m, before turning right onto Atkins Road.
- At the junction onto Victoria Road, turn right. Continue west on this road for 780m, then turn left onto Marsden Road.
- Travel north on Marsden Road for 1670m, before turning right onto Lawson Street.
- At the junction, turn right onto Brush Road;
- Continue on Brush Road for approximately 300m, before turning left onto Rutledge Street. Follow the road ahead onto First Avenue;
- Turn right onto Ryedale Road. After approximately 75m, turn left onto Denistone Road.
- Turn right into Ryde Hospital.

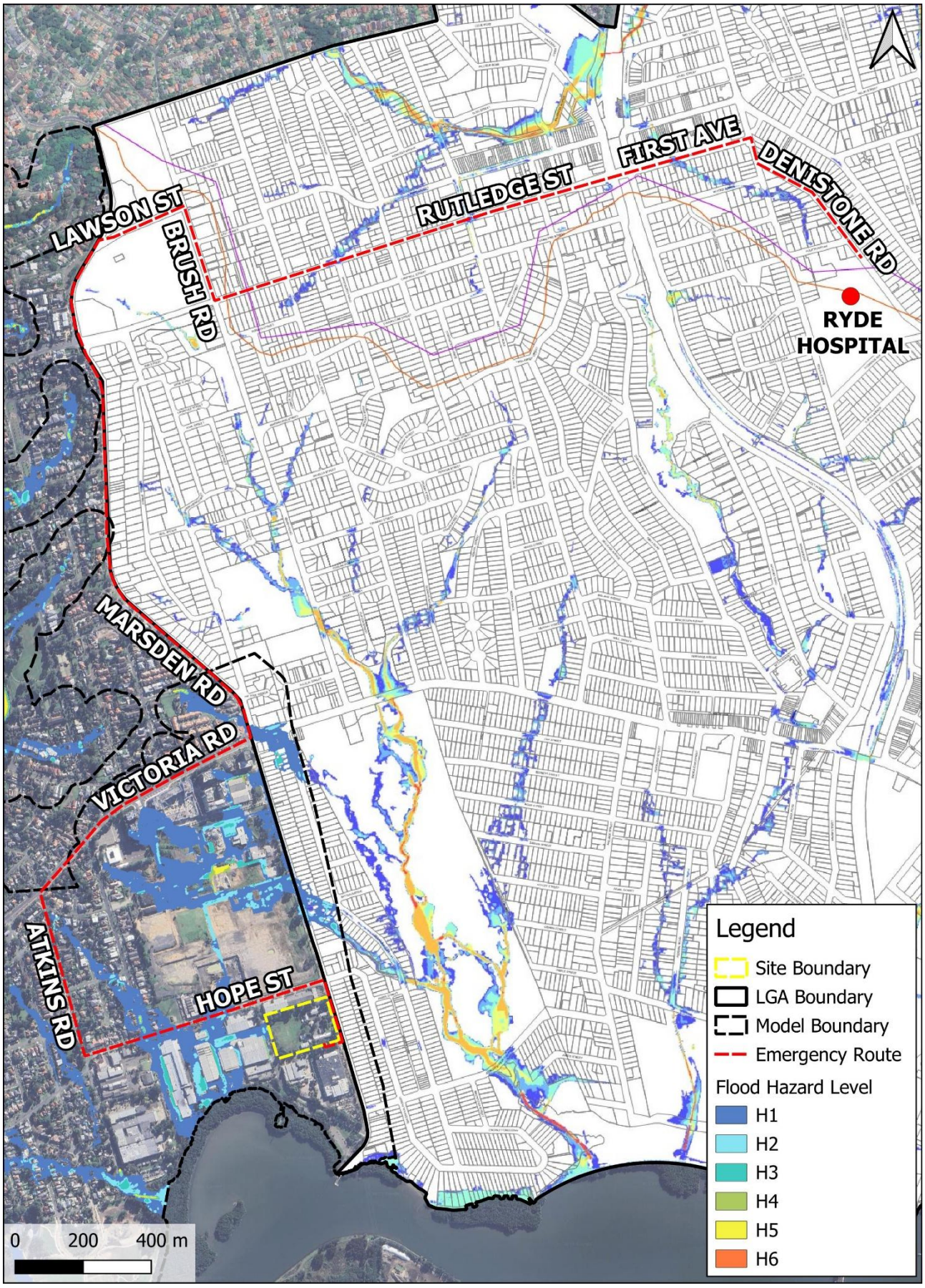



*Figure 9: Route for emergency personnel in the event of a secondary emergency*

# 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 severe storm 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 ‘stay informed’ at the Advice level, to ‘prepare to evacuate’ at the Watch and Act level, to ‘evacuate 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.

## 4.3 Parramatta River Flood Warning System

Although the immediate access roads to the school are unaffected by Parramatta River flooding, road closures may impact safe travel arrangements for staff and students. FloodSmart Parramatta offers a free flood warning service that provides early warning messages to residents and businesses.

There are ten warning areas that cover different communities in the City of Parramatta, including the Subiaco and Ponds Creek area. Flooding in this area restricts westward travel on Victoria Road. The Chief Warden should monitor these warnings, and staff should be encouraged to sign up for alerts. Free sign up is available at: https://www1.ewn.com.au/parramatta/register.aspx.

## 4.4 Triggers

It should be noted that the nature of flash 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 evacuation warnings and flood notifications with sufficient lead time.

Alternative triggers are required for the school to ensure adequate response time, primarily involving continued monitoring of severe weather warnings, media updates via local radio stations and social media alongside visual observation of flows across the site and in the surrounding area. While the Chief Warden is responsible for monitoring information from the AWS, NSW SES recommend that all site users (namely, all staff members and wardens) refer to the HazardWatch website and the Hazards Near Me app.

## 4.5 Emergency Signals

The site should have a Public Announcement (PA) system that can be used by the Chief Warden 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 parents 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 storm, 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 |
|---|---|
| Department of Education | ▪ Liaise with Transport for NSW for buses resources allocation and arrangement for the school during/post flood event<br>▪ Pass information to school bus drivers/companies on expected or actual impacts of flooding<br>▪ Liaise with NSW SES to determine instances for the early release of students whose travel arrangements may be disrupted by flooding<br>▪ Liaise with NSW SES to determine instances for temporary closure of school |
| Chief Warden | ▪ Decide if pre-emptive closure can occur if warnings are received prior to school opening hours or with several hours' notice<br>▪ Monitor flood warnings and notifications from BoM and AWS<br>▪ Monitor BoM weather in the area of the site<br>▪ Inform staff and students/parents of flood risk<br>▪ Coordinate flood SIP drills |
| First Aid Officer | ▪ Coordinate assistance for less able students and staff during flood response<br>▪ 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 | ▪ Assist Floor Wardens in evacuation/redirection of students<br>▪ Report missing students to Floor Wardens |

## 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*

| **IMPORTANT TELEPHONE NUMBERS** | |
|---|---|
| Chief Warden | tba |
| Deputy Principal | tba |
| Safety/First Aid Officer | tba |
| **External Contacts** | |
| Police/Ambulance | 000 |
| NSW State Emergency Services (SES) | 132 500 |
| Fire & Rescue NSW – Rydalmere | 02 9493 1065 |
| Ermington Police Station | 02 9898 8299 |
| Ryde Hospital | 02 9767 5000 |

# 6.0 Preparation for Flood Response

## 6.1 Education

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

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

## 6.2 Signage

It is important that the site has adequate signage for flood warning, similar to those in Figure 11. Flood warning signs should be positioned around the site to identify areas affected by Category H3 hazard and higher in the critical PMF event, in accordance with the Flood Hazard Flood Risk Management Guide FB03 (NSW Department of Planning and Environment, 2023). As the site itself is not flood affected, there are no areas of H3 hazard onsite. As an alternative, temporary signage can be implemented at vehicular exits if time permits, informing users of flood risk on Waratah Rd (this exit should not be used, and must be closed off), Hope St, and the northern extent of Wharf Rd.

A copy of a detailed FERP which includes emergency response procedures will be made available at communal areas within the site as well as the main office.


*Figure 11: Signage and Gauges*

## 6.3 Flood Drills

To reduce human behaviour risks, this plan should be regularly exercised, in a similar manner to that of fire

evacuation drills. It is recommended that flood drills be held annually to ensure all staff are familiar with the sound of the alert and their subsequent flood response actions. It is the responsibility of the Chief Warden to ensure that shelter-in-place drills are organised and that any issues with these drills are attended to, and if necessary, procedures adjusted, and drills rerun.

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

## 6.4 Flood Emergency Kit

A Flood Emergency Kit should be prepared prior to a flood event taking place and regularly checked to ensure that supplies within the kit are sufficient and in working condition. This check could occur after the flood 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;
- 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 First Aid Officer to make sure that this kit is maintained and available during an emergency.

Other items for self-sufficiency should be stored, maintained and regularly updated in an accessible location within the proposed building in the event that shelter-in-place actions are deemed necessary. This would include sufficient drinking water and food as well as fire extinguishers.

# 7.0 Flood Response Actions

| Flood Emergency Response Plan | |
|---|---|
| **Flood Warning and Notification Procedures** | **Protocols** |
| | The following actions must be undertaken:<br>1) Ensure the emergency kit is ready to use, and there is sufficient drinking water and food in an accessible location within the proposed building.<br>2) Listen to the local radio station for updates on forecasted rainfall intensity, flood heights and timings. If onsite, Chief Warden is to conduct visual assessment of conditions onsite and at the Waratah St driveway. 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.<br>3) Call NSW SES or local police for an update and advice.<br>4) Notify all staff and students of the potential for flash flooding and confirm availability of staff to assist with emergency actions if required.<br>5) Ensure staff are familiar with the flood emergency strategy<br><br>If a significant storm is forecast with advanced warning (>6 hrs), the **Chief Warden** should pre-emptively close the school. Notify parents and staff via SMS and email |
| 1) Weather forecast predicts significant rainfall event in the area<br><br>or BoM issues a **FLOOD WATCH**<br><br>or NSW SES issue a yellow "**ADVICE**" warning<br>  | |
| 2) Flash flooding is reported in the media / via visual observation<br><br>or BoM issues a **FLOOD WARNING**<br>or NSW SES issue an amber "**WATCH AND ACT**" or red "**ACT NOW**" warning<br>  | If the flood event is not anticipated to impact the site, the **Chief Warden** is to continue hourly check-ins and postpone high risk activities (e.g. outdoor activities).<br><br>If flood event is anticipated to impact the site, the **Chief Warden** must undertake the following actions:<br><br>**Outside of School Hours:**<br><br>Close down the school. If the flood is expected to continue into school hours, notify students and staff of the temporary closure of the school via SMS and email.<br><br>**During School Hours**:<br>• **For life-threatening emergencies phone 000 immediately.**<br>• Contact NSW SES on 132500 to confirm response strategy.<br>• A warning message should be broadcast over the PA system confirming a significant storm event. Occupants within the proposed building will be advised to remain where they are, and not to leave the building. Within classrooms, teachers should conduct a headcount to ensure all students are accounted for.<br>• The Chief Warden should ensure that no one is outdoors. Once everyone is indoors, access outside should be closed off with temporary signage advising site users of the flood risk.<br>• Close off access to Waratah Street entry.<br>• Send SMS to parents to inform them of shelter-in-place procedures. The SMS should remind parents not to drive through floodwaters or to try to collect their children.<br>• If time permits, the Chief Warden should coordinate asset protection, including power shutdown and relocation of assets, prior to the onset of the storm.<br>• The Chief Warden is to follow any action statements provided via the AWS or NSW SES.<br><br>**NOTE: Avoid driving or walking through floodwaters. These are the main causes of death during flooding. Although the school ground may not be flooded, safe travel arrangements for students to go home may be disrupted by flooding and/or road closures.** |
| 3) Visual observation shows flood is receding or the alert has been downgraded by the relevant authorities. | Once it has been confirmed that the water levels over key access roads have reduced to a suitable level, and if determined safe, the **Chief Warden** may announce that classes can resume as normal.<br><br>An additional SMS should be sent to parents advising them that they may collect their children if preferred. Staff must review a hard copy of the class list and record student release. |

# 8.0 Limitations and Revision of the Flood Emergency Response Plan

This FERP only addresses the shelter-in-place strategies during extreme flooding events for students and staff within the site itself and is considered a guide only. It does not cover students and staff 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 (e.g. site visitors), such as choosing not to remain isolated in a building on a floor above the PMF for an extended flood duration 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 reviewed prior to the site becoming operational. Flood Emergency Response Plans are 'living documents' which need to be regularly reviewed once the school 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 the NSW Department of Education & Communities' responsibility to ensure this FERP is current and updated as necessary to be in line with relevant standards, directorate, legislation, and the Regional's State Emergency Management Plan to ensure the health, safety and welfare of all staff, students and others.

# 9.0 Conclusion

**Mitigation Measures**

Mitigation measures identified as necessary are outlined in Table 6.

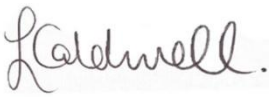
*Table 6: Mitigation Measures*

| Mitigation Name | Phase | Mitigation Measure | Reason |
|---|---|---|---|
| Preparation for Flood Response | Operational Phase | Delegate staff responsibilities | To ensure all staff are aware of their specific roles and flood reponse actions |
| | | Flood drills | To ensure staff and students are familiar with the sound of the alert and their flood reponse actions |
| | | Flood emergency kit should be prepared and regularly checked | To ensure that supplies are in working condition |
| Education | | Education and signage | To ensure all staff and students are aware of the flood risks present onsite and the flood protocols and procedures via signage |

**Evaluation of Environmental Impacts**

Given that the site is situated above the extent of flood-prone land, the proposed activity will have no adverse impact on flood storage, risks, or behaviour in the area, nor will it significantly impact the locality, community and/or the environment.

Prepared by
**TTW (NSW) PTY LTD**



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Civil Flood Modeller

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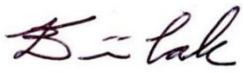

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