

28-32 BOURKE ROAD ALEXANDRIA

CIVIL ENGINEERING FLOOD REPORT



Prepared for: Alexandria Property Development
By: enstruct group pty ltd
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ISSUE AUTHORISATION

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Project No: 6691

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F	14/12/23	For SSDA	Tim Henderson CPEng, NER	Phillip Lambley CPEng, NER	Phillip Lambley CPEng, NER
G	2/02/24	For SSDA	Tim Henderson CPEng, NER	Phillip Lambley CPEng, NER	Phillip Lambley CPEng, NER
H	3/06/24	Respond to authority submissions	Tim Henderson CPEng, NER	Phillip Lambley CPEng, NER	Phillip Lambley CPEng, NER

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Executive Summary

enstruct have been engaged by Alexandria Property Development to provide civil engineering flooding advice for the proposed “Alexandria Health Centre” comprising medical centre uses and anchored by a mental health hospital, located at 28-32 Bourke Road, Alexandria (the site). This report has been updated following the authority submissions received in April 2024. This report meets the requirements of a Flood Impact and Risk Assessment – Flood Risk Management Guide LU01 (NSW Department of Planning and Environment), and relates to the flooding characteristics relevant to the site, as well as the concept grading of the future laneway network between Bourke Road and O’Riordan Street. It considers the flood impact of the future laneways in order to consider any likely cumulative impacts from surrounding development. It also addresses flood risk management.

The TUFLOW model indicates that the proposed hospital site is subject to flooding. The PMF level of 10.40 mAHD on Bourke Road informs the flood planning level of 10.40 mAHD on the site. The 1% AEP flood level of 8.80 mAHD is indicated in the same location. To mitigate the flood planning levels, the ground floor is above the flood planning level, and the basement protected from flooding during a PMF, with all basement entries above the PMF level.

The proposed development does not have any impact on flooding in a 1% AEP event.

In response to previous comments by the City of Sydney (CoS), the future flooding conditions, specifically including the surrounding laneway concept grading, was modelled in TUFLOW and shows the laneways are generally flood free during a PMF event. This outcome is beneficial to all properties in the precinct, and considers the cumulative impact of surrounding developments.

This report includes long duration PMF events, and shows that the site may be isolated for a period of less than 12 hours during a long duration PMF, and approximately 20 minutes during the peak of a 1% AEP event. During a medium and long duration 5% AEP events, the site is not isolated with access via Bowden Street. A separate Operation Flood Emergency Management Plan has been prepared.

Extensive flood mapping is provided in Appendix B and Appendix C showing existing and proposed conditions based on the 2023 Alexandra Canal Model prepared by WMAwater and modified for this report.

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1 Introduction

This Flood Report is a Flood Impact and Risk Assessment (FIRA) that has been prepared by enstruct for the proposed “Alexandria Health Centre” development located at 28-32 Bourke Road, Alexandria (the site).

1.1 Site Description

The land to which this flood management report relates to is known as 28-32 Bourke Road, Sydney. The site is situated on the southern side of Bourke Road.

The site occupies two land allotments and is legally described as follows:

- Lot 1-3 DP324707.

The site has a regular rectangular shape allotment with a frontage to Bourke Road of approximately 40.6 metres and an overall depth of approximately 73 metres, yielding a total site area of approximately 2,972 sqm.

Bourke Road forms a low point east of the subject site and is a two-way and two lane carriage way road.

A Location Plan including the site is provided in Figure 1



Figure 1 Location Plan (Source: Six Maps)

The site is currently occupied by a single storey rendered industrial building focusing on car tyre repairs. There are two driveways along the northern western boundary of the site.

The surface level is approximately 8.41 mAHD on the Bourke Road frontage.

1.2 Development Consent Conditions

The development has been granted conditional approval (SSD-38600121). This report addresses the following conditions:

Consent Condition	Response
B8. Future development applications(s) must address the following: (a) the location of any lifts adjoining the public domain must comply with the City’s Interim Floodplain Management Policy. (b) the concept grading for the laneways must be in accordance with the requirements of the City’s Interim Floodplain Management Policy (regarding impact on the new development and the adjoining buildings), Public Domain Manual, Sydney Streets Technical Specifications & Standard Drawings and the SDCP’s public domain design for the entire precinct.	(a) Lift wells adjoining the public domain open above the PMF level (refer to section 4.1) (b) The concept grading is included in Appendix A
B17. Prior to the submission of any subsequent development application, the Applicant must consult with Council to finalise the grading and levels of the surrounding future laneway network.	Draft grading was provided to council in previous versions of this report. The grading is shown in Appendix A
B29. Future development application(s) must be accompanied by a detailed Flood Impact Assessment (FIA), prepared by a suitably qualified Engineer (who is included in the National Professional Engineers Register, administered by the Institution of Engineers Australia), including management and mitigation measures and emergency response plan(s). The FIA, including the recommended PMF level must: (a) be prepared in accordance with the NSW Floodplain Development Manual, existing Council and Government studies and guidance; (b) identify and assess pre and post development scenarios for the most critical flood behaviour such as peak flood depth, velocity, flood hazards and rate of rise, including flood constraints and risks on the site, new streets and adjoining properties and the potential impacts of climate change for the full range of events, up to and including the PMF;	(a) This report constitutes an FIA prepared by a suitably qualified engineer, and prepared in accordance with the Floodplain Development manual, Flood Impact and Risk Assessment – Flood Risk Management Guide LU01, Council and Government studies and guidance. (b) Sections 4 and 5.4 provide this information. Flood maps are included in Appendix B and C for existing and proposed conditions.

(c) propose management and mitigation measures including emergency management and evacuation; and (d) include a preliminary detailed Operational Flood Emergency Management Plan prepared in accordance with the Floodplain Development Manual (FDM) to manage the risk to life and property damage during the full range of flood events, emergency evacuation to the nearest hospital and procedures for site isolation.	(c) Refer to sections 5.2, 5.4, 5.5, and 6 (d) Refer to the separately prepared Operational Flood Emergency Management Plan (OFEMP)
B30. Future development application(s) must demonstrate that the development has been designed to incorporate the following requirements: (a) no habitable hospital or medical facility floorspace (including lifts and relevant electrical equipment) is provided below the PMF level; (b) all entrance levels to the basement, including the vehicle ramp, stairwells, ventilation, lifts, and fire exits etc are protected from flooding during a PMF event; (c) all entrances to the building are equal to or higher than the PMF; (d) any structure located below the PMF comprises flood compatible materials; and (e) essential services infrastructure is located above the flood planning level.	(a) refer to section 4.1 (b) refer to section 4.1 (c) refer to section 4.1 (d) refer to the structural design report (e) refer to section 6
B31 A preliminary detailed Operational Flood Emergency Management Plan must be submitted	Refer to the separately prepared Operational Flood Emergency Management Plan (OFEMP)

2 Proposed Development

Development consent is sought for the 'Alexandria Health Centre' comprising medical centre uses and anchored by a mental health hospital. The application seeks consent for the following in accordance with the Concept SSDA approval:

- Site establishment including earthworks.
- Construction of the Alexandria Health Centre:
 - o Total GFA of 11,436sqm
 - o Maximum FSR of 3.85:1
 - o Maximum height of 34.95m, Max RL. 45.4
- Ancillary development including:
 - o Car parking – 77 car parking spaces distributed across basement, ground, and ground mezzanine levels.
 - o Utility infrastructure and services connections.
 - o Building identification signage and wayfinding signage.
 - o Stormwater management
 - o Landscaping
- Laneway for vehicle and pedestrian access along with western boundary of the site
- Operation of the Alexandria Health Centre as a mental health hospital and medical centre with ancillary uses.

This report has been updated following Response to Submissions from

- Department of Planning, Housing and Infrastructure (8 April 2004)
- City of Sydney (3 April 2004, ref: R/2024/1)
- Department of Climate Change, Energy, the Environment and Water including comments from the Biodiversity, Conservation and Science Group (BCS) (5 April 2024, ref: DOC24/176883); and
- NSW State Emergency Service (SES) (2 April 2024, ref: ID2338)



Figure 2 Proposed Basement and Ground Floor Plan (Source: Warren and Mahoney Architects)

3 City of Sydney proposed laneways

A network of laneways is proposed between Bourke Road, O'Riordan Street and the Ashmore Connector. The following extract from the DCP2012 Section 5 (figure 5.200) (Figure 3) includes laneways on the south and east boundaries of the site.

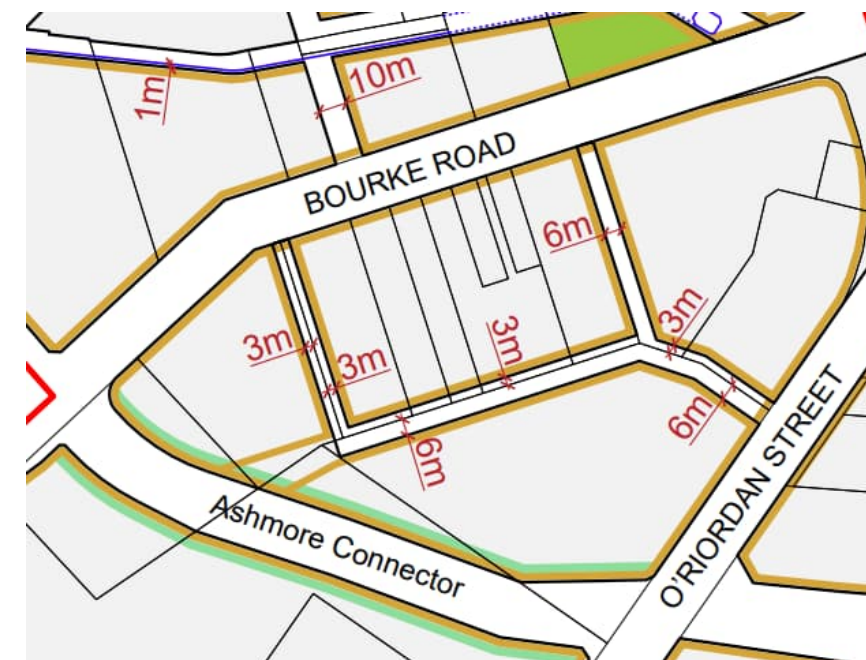


Figure 3 Proposed laneway network

As part of the proposed development, 3m along the west and south boundaries will be dedicated to Council.

A site-specific Flood Study and master grading is required to be undertaken prior to the development of the design, as the flood study may fundamentally affect the design of the future building and the laneway.

The following section of this report addresses the impact of opening the laneway network with respect to flooding.

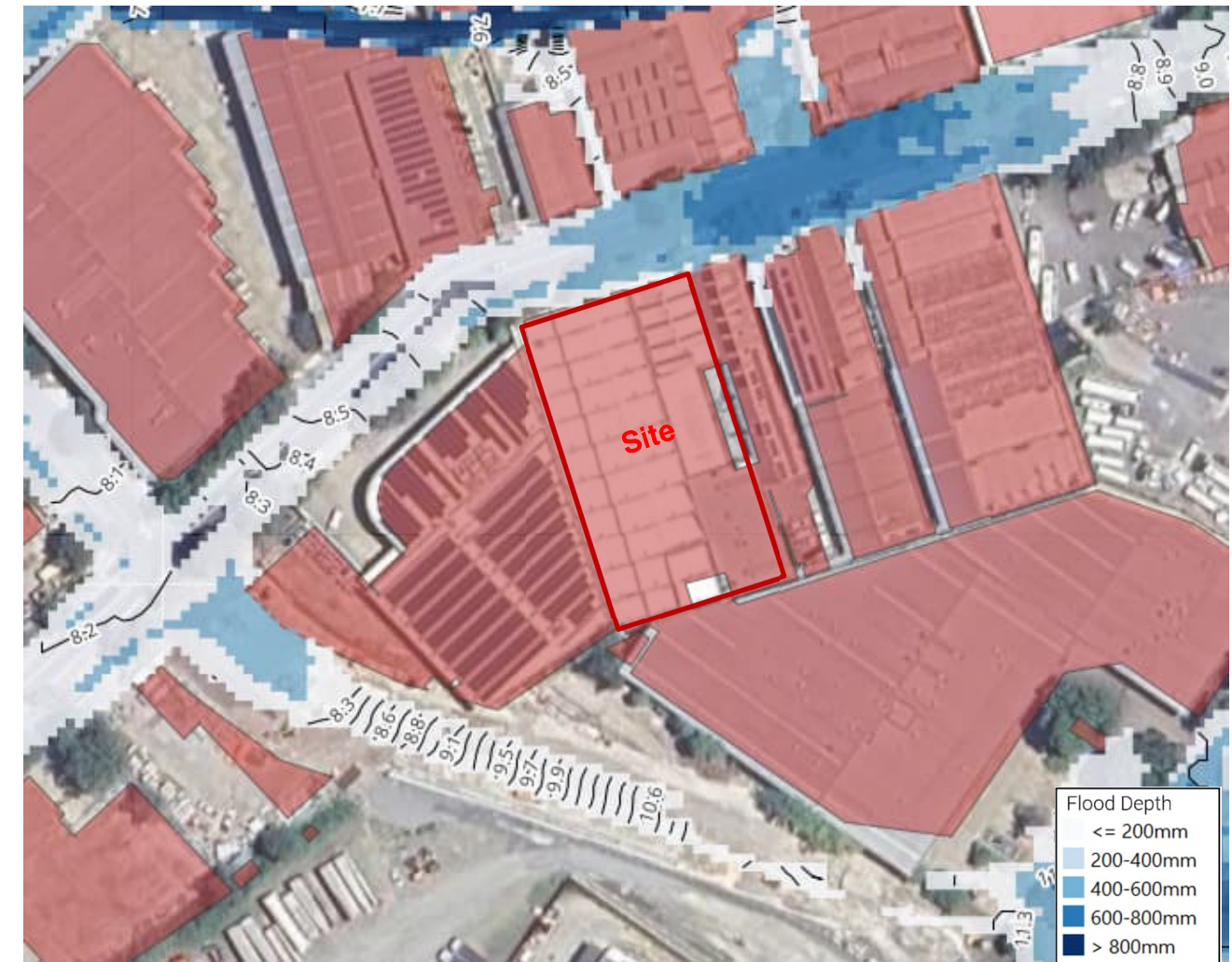
4 Flood Planning

4.1 Flood Conditions and Requirements

enstruct has obtained a copy of TUFLOW model from the Alexandra Canal Model Conversion 2020 by WMAwater Pty Ltd under a data access agreement with Council. Following Council's submission to the SSDA, enstruct has received the updated 2023 version of this flood model from Council. The information and mapping in this report reflects the updated model. Extensive flood maps for the project area are include in Appendix B and Appendix C, while the following sections contain extracts from the flood maps to highlight the detail in these maps.

The “ultimate development” scenario included in the model has been used, which includes some stormwater works not complete at the time of writing of this report (Joynton Avenue Trunk Drain and Erskineville Flood Safe Works). It is assumed that the projects will be complete before or shortly after the completion of the proposed development of the subject site. Further information on the model including a summary of the model updated compared to the 2020 model are highlighted in WMAwater’s memorandum included in Appendix D.

The site is located near a sag point on Bourke Road and is located in a high flood risk zone with major overland flow expected at or near the site. After investigating the Council flood model results, it was found that the 1% AEP flood level at the site was at 8.8 mAHD, while the Probable Maximum Flood (PMF) level varies from 10.3 mAHD to 10.4 mAHD.



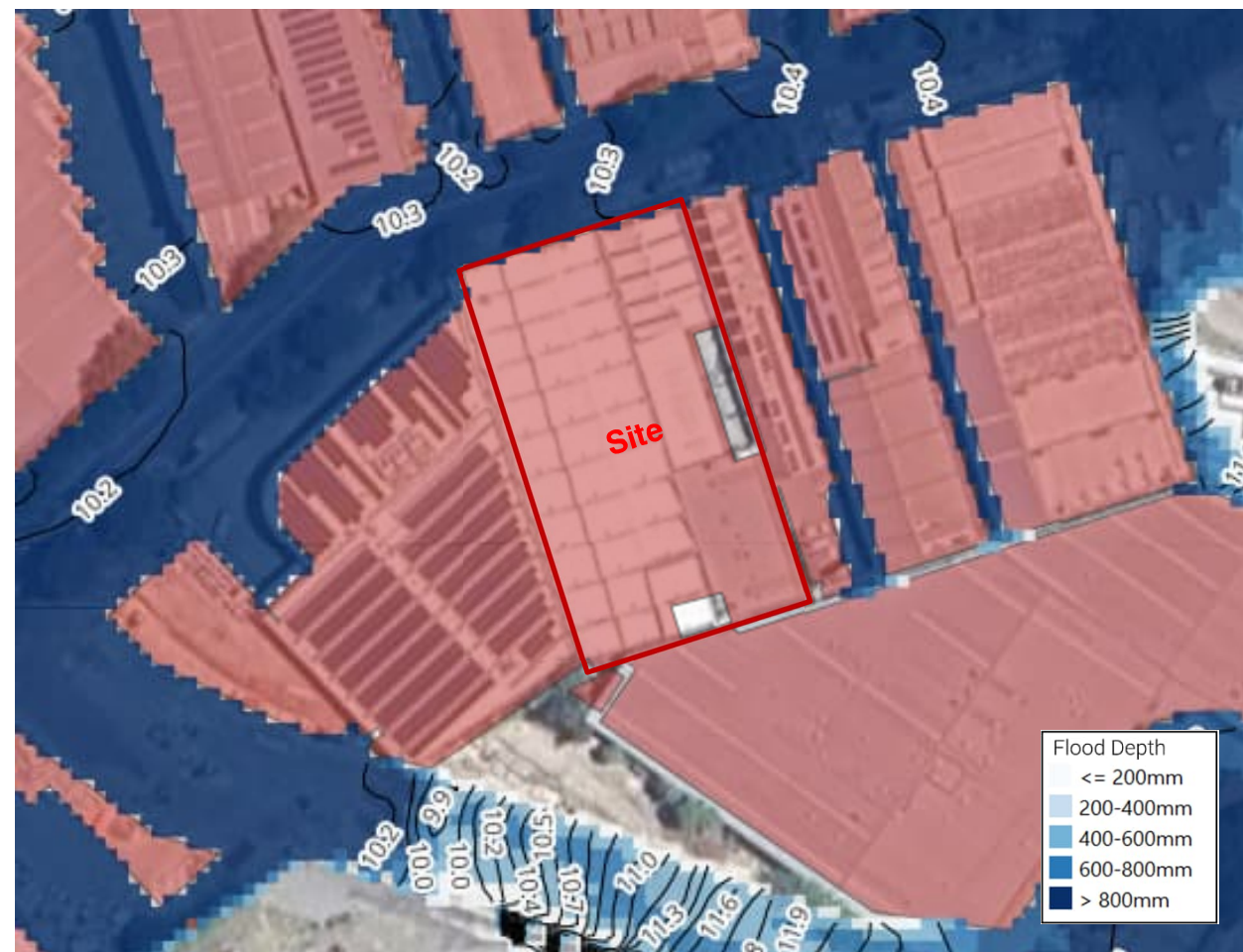


Figure 5 Probable Maximum Flood Map

Given the proposed use of the site is a hospital, the building is classified as a critical facility within the City of Sydney Interim Floodplain Management Policy and hence all habitable floor levels require to be at least at the PMF level (10.4mAHD). This is generally in line with the NSW Floodplain Development Manual.

The development is proposed to have a basement level. All entrance levels to the basement, including the vehicle ramp, stairwells, ventilation, lifts, etc will be designed to be protected from flooding during a PMF event.

4.2 Future Laneways

In order to assess the impact of flooding on the site with respect to the future laneways, a concept master grading has been established and added to the TUFLOW flood model.

The laneway grading in accordance with the requirements of the City's Interim Floodplain Management Policy has been informed by flood planning levels and is based on the following principals:

- Connections at Bourke Road, O’Riordan Street and the Ashmore Connector are smooth and trafficable (ie, proposed levels match the existing levels at these points).
- It is desirable to keep the laneways flood-free.

- Minimise any impact on surrounding properties as a result of opening the laneway network.
- Longitudinal gradients should be accessible for pedestrians, with a maximum grade of 1:20.

By designing a laneway network that prevents flood water flowing through the network, the possible impact of flood water conveyed from O'Riordon Street through to Bourke Road is eliminated. If flood planning is not considered in the laneway network, opening the network up to overland flows will have a negative impact on properties on Bourke Road with additional flood water arriving at Bourke Road from O'Riordan Street.

It is desirable for the precinct to have a flood free laneway network. By providing protection from the PMF, a flood free laneway network enables the surrounding future developments, including the subject site, to have basement entries accessed via the laneways. This can also assist in providing a local refuge in the event of an extreme flood event.

The laneway concept grading as included in the flood model is presented below, with proposed levels labelled. This has been presented in previous versions of this report provided to CoS. A larger view is available in Appendix A.

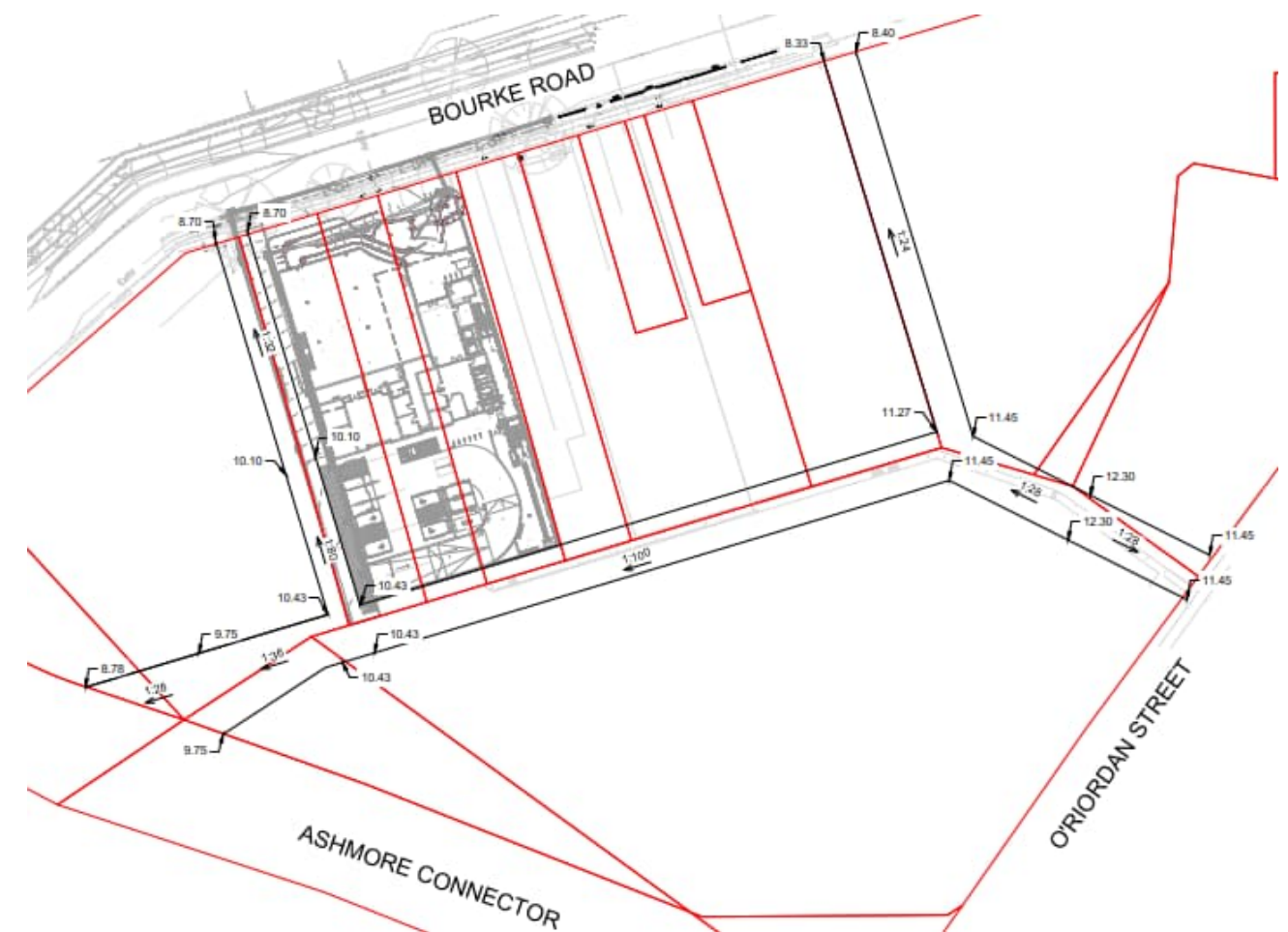


Figure 6 Laneway Concept Grading

To achieve the above outcomes, the proposed lane from O'Riordan Street grades up to a level of 12.30 mAHD to prevent flood ingress up to a PMF level, before ramping down towards Bourke Road. The maximum grade along this section is 1:24. The remainder of the network grades at a gentle slope towards the Ashmore Connector and Bourke Road. The grades vary from 1:100 to 1:33.

Ultimately, the laneway network road design is not the responsibility of the proposed Alexandria Health Centre development. It is understood that the City of Sydney Strategic Planning and Urban Design team has been provided with the concept grading for review, with flooding being one of the factors affecting design levels. Without a formal response on this, this report has adopted the concept grading which is based on sound engineering principles and judgement as discussed above.

4.3 Future Laneways flood results

The proposed laneway network geometry, coordinated with the civil design, was added to the flood model to confirm the design meets the flooding requirements and achieves flood-free laneways during a PMF for the future laneway network. In addition, the model demonstrates there is no adverse impact on surrounding properties.

The image below indicates that the new laneways are generally not flood affected during a PMF event. The proposed laneway off Bourke Rd is appropriately graded from the existing street level to the PMF level (RL 10.4), which is indicated by the gradual reduction in flood water depth along the laneway, indicated in Figure 7.

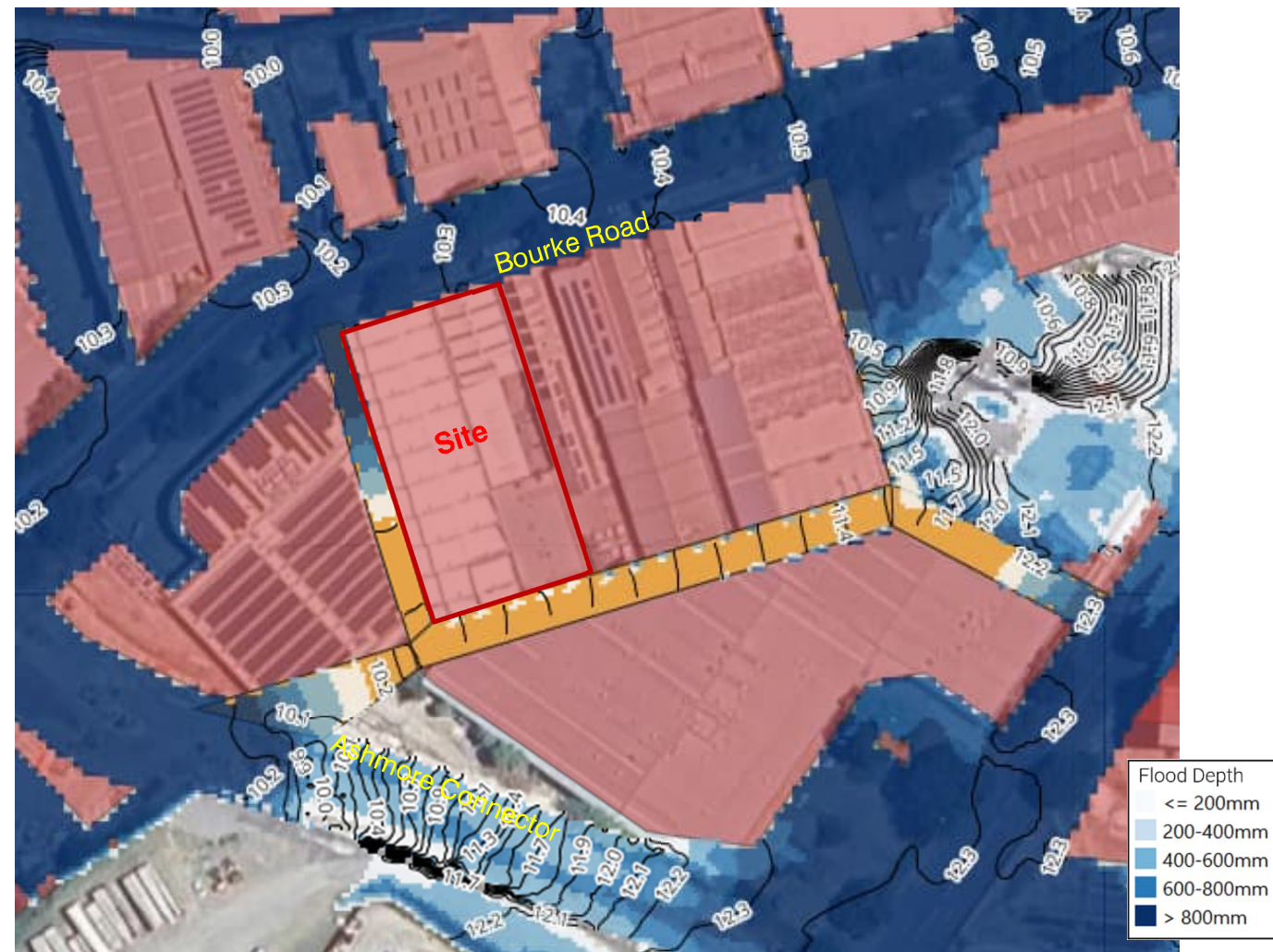


Figure 7 Flood Model Results - PMF - future conditions

The 1% AEP flood event was re-run to show the impact of the development on flooding. The impact was found to be negligible. This is true for flood levels, and also the rate of rise of floodwaters, duration of inundation, frequency of flooding, velocity of flood waters and flood hazard. A comparison between the existing and future conditions is made between Figures 4 & 8, and other flood events and variables when comparing the results shown in Appendix B and Appendix C.

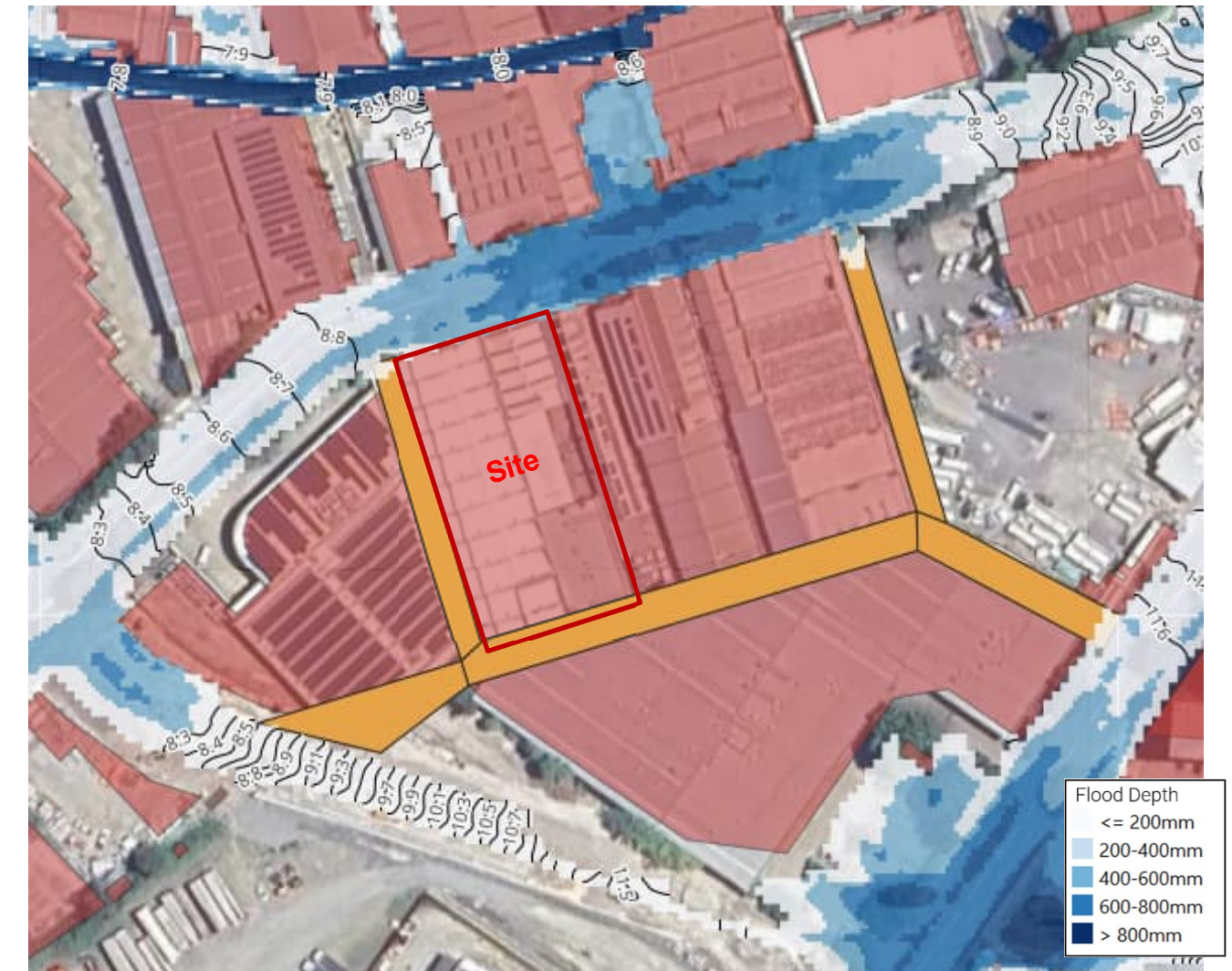


Figure 8 1% AEP flood model results - future conditions

4.4 Climate Change

The proposed development has adopted flood planning levels based on the PMF as required by Council's flood policy. Climate change is not considered when determining PMF, so there are no changes to the site planning in this respect.

When considering climate change, this report has adopted a Representative Concentration Pathway climate change scenario of 8.5 W/m², often referred to as RCP8.5. This represents a 'worst case' climate outcome where greenhouse gas emissions continue to rise throughout the 21st century. This is now considered an unlikely scenario, however with uncertainty over the complex climate models it

has been adopted for this report as a conservative approach. The impact of RCP8.5 is a 19.7% increase rainfall intensity in 2090.

The flood modelling has included the climate change flood event of the 1% AEP storm with an increase in rainfall intensity of 20%. This rainfall event was included in the models provided to enstruct. Under this modelling scenario, the flood level on Bourke Road is 8.9mAHD, 100mm higher than the 1% AEP flood level.

The site is resilient to increased rainfall intensity due to climate change given the flood planning level for the site is based on the PMF level.

5 Flood Risk: Access, Egress and Isolation

5.1 Site Use

It is noted that the proposed hospital is not for surgeries and high-acuity care, and the model of care is primarily targeted at privately insured patients aged 18+ with mood disorders, anxiety disorders, and those with comorbid drug and alcohol disorders.

The facility will be run 24/7 for inpatient services on the 2 upper levels (56 beds total), with the lower levels to be used for outpatient services – i.e. consultations, small group therapy sessions etc with people who are not staying within the facility overnight.

The proposed mental health hospital and medical centre is likely to cater for:

- Short stay (average 1-2 weeks), intensive inpatient hospital admission focused on assessment, treatment initiation and stabilisation or detox, and discharge planning.
- Step-down outpatient day group programs delivered either in a group setting or via telehealth
- Case management and in-home care provided by a multidisciplinary team.
- Telehealth, digital and peer support programs to provide ongoing support.

No procedures involving anaesthesia are currently planned by the private hospital component. Should future tenants seek the ability to undertake procedures involving anaesthesia, this would be subject to a separate approval.

In situations where storm events are anticipated, admissions and procedures can be rescheduled, and in-patients evacuated, to reduce the number of in-patients on the site. The majority of inpatients will be ambulant for evacuation purposes, however the vulnerable nature of mental hospital patients needs to be considered with respect to any evacuation plans.

5.2 Site Access and Egress

Site access and egress is complicated by the sag point on Bourke Road, approximately 40m east of the site, and an additional sag point on Bourke Road 350m southwest of the site. Hazard outputs indicate that during the peak of a critical duration 5% AEP storm event, both these points are unsafe for small vehicles as per hazard curves presented in ARR (Figure 11). During these events, the access

and egress route is via Bowden Street, then north towards Redfern or south towards Sydney Park (Figure 13)

The centre of Bowden Street is trafficable during the 5% AEP event (H1 category) with some spots of H2 category within the kerb and gutter where flood depths and velocities are higher. During a 10% AEP event, the full width of Bowden Street is considered to be H1 category, while the centre of Bourke Road is also trafficable with an H1 category.

The Bowden Street sag point is unsafe for small vehicles (H2 category) for a period of approximately 20 minutes during the peak of the critical duration 1% AEP storm. Analysis of longer duration events up to six hours shows both Bourke Road and Bowden Street are trafficable by all vehicles (H1 category) during a 1% AEP storm with duration of six hours, while during a 0.2% AEP (500-year ARI) event six hour event, Bowden Street is trafficable but Bourke Road is not trafficable for a period of 15 minutes (Figure 12). The risk of site isolation due to flooding is discussed further in Section 5.5 of this report.

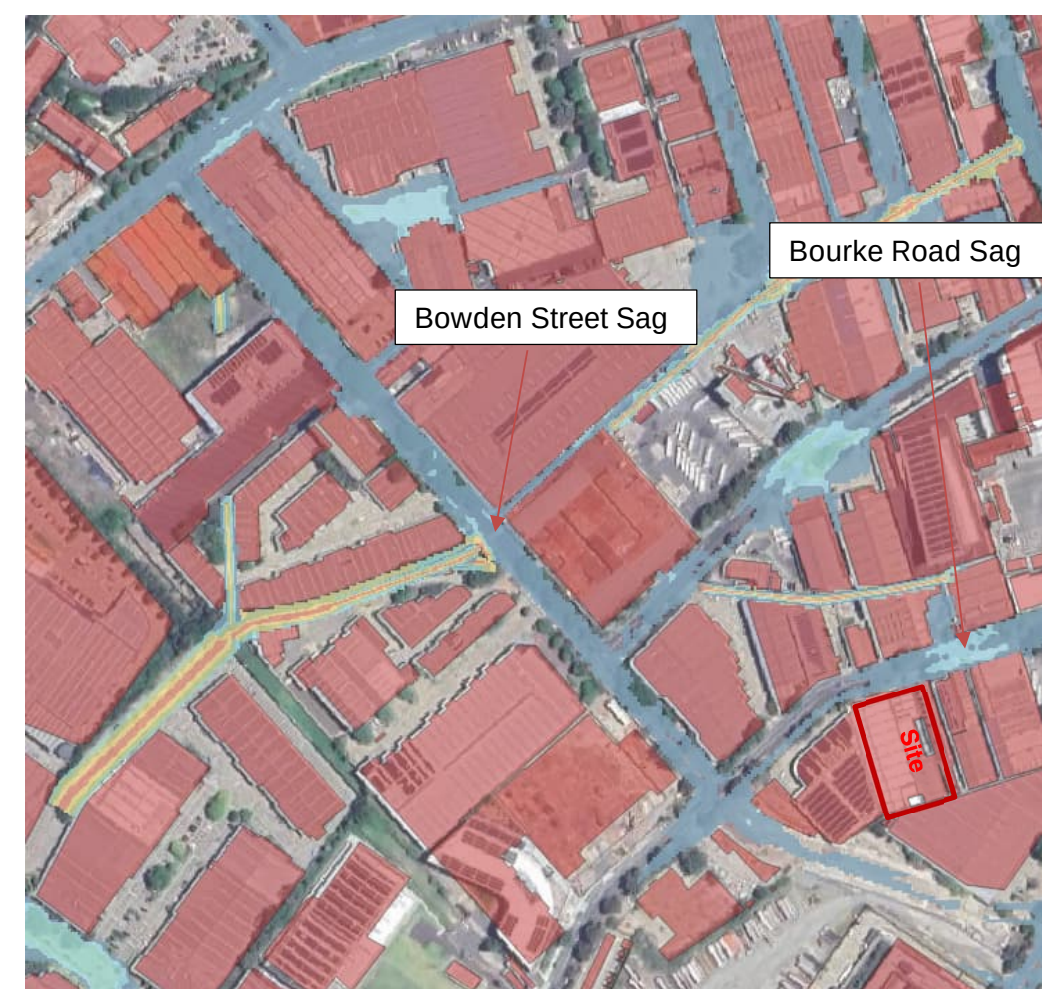


Figure 9 5% AEP flood hazard plot showing Bowden Street trafficable along the centre



Figure 10 10% AEP flood hazard plot showing Bowden Street trafficable, and the centre of Bourke Road trafficable

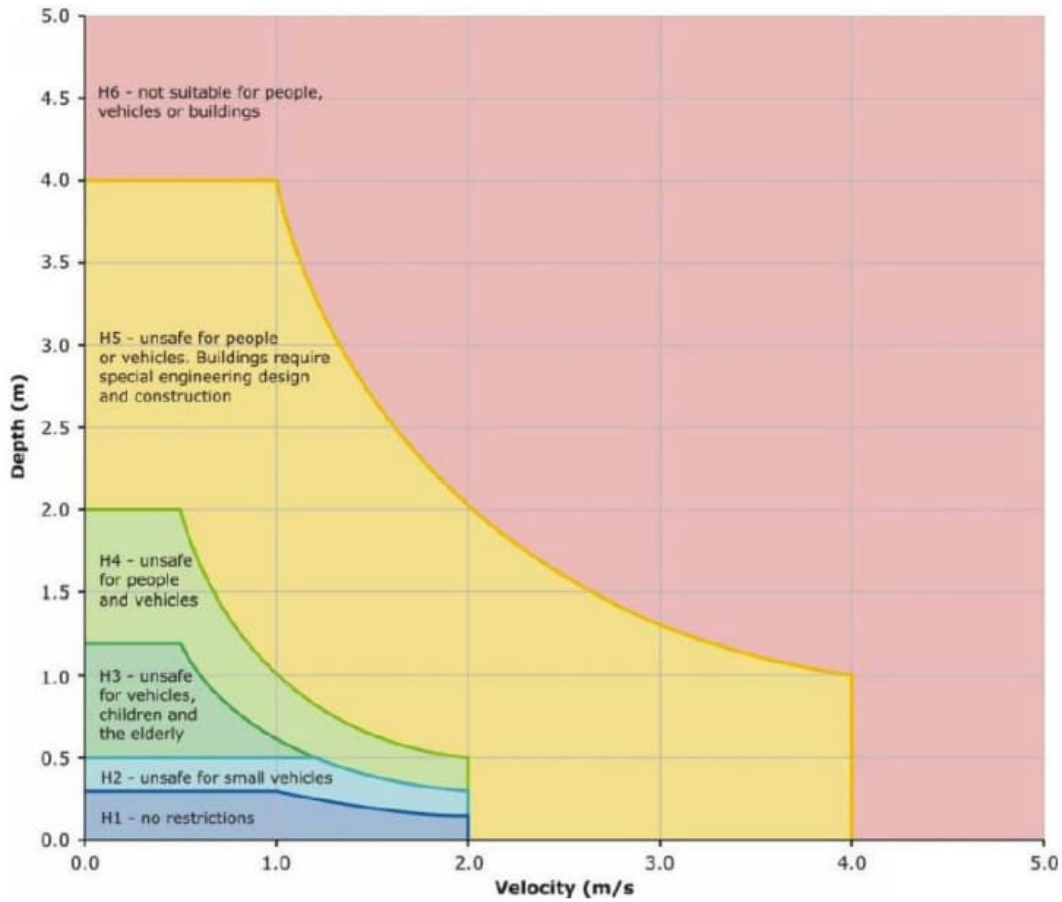


Figure 11 Flood hazard categories

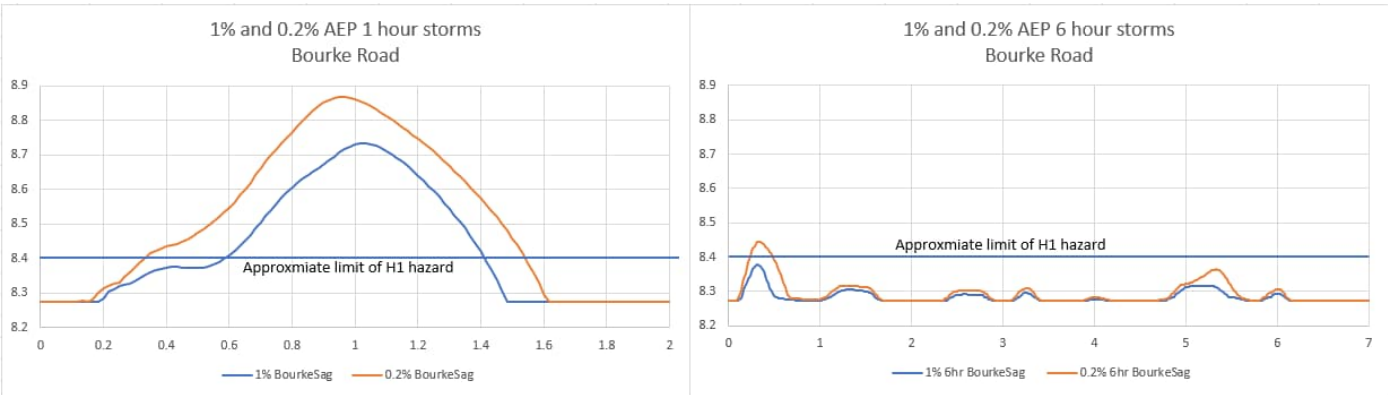


Figure 12 Bourke Street flood level for short and long duration 1% and 0.2% AEP storms

Under the future development scenario where the laneway network is complete, additional access and egress will be available via the laneway network to O’Riordan Street and then north-east to Bourke Street (Figure 13). The route is trafficable for all events up to and including the critical duration 1 in 500 (0.2%) AEP, however O’Riordan Street is not safe during a PMF. Note that this route will not be available until surrounding properties are developed and the DCP enacted to enable the laneway network, and the proposed development of the subject site does not rely on this access/egress route.

It is noted that the cumulative impact of development in the local area around the laneway network will improve the ability for the community to respond to flood emergencies. An additional evacuation route from Bourke Road via the proposed laneways up to O’Riordan Street gives the community an evacuation route that is currently unavailable.



Figure 13 Access/egress routes

5.3 PMF

Following discussions with the Department of Planning and Environment (DPE) and the State Emergency Service (SES) regarding potential isolation periods for the site, it was requested that enstruct undertake additional flood modelling to include long duration PMF events to establish flood inundation during for the access/egress roads around the site.

The CoS flood model includes PMF storms up to a 5-hour duration, with the 90 minute duration PMF providing highest local flood levels, making this the critical duration storm. Longer duration storms produce lower peak flood levels, but a longer period of inundation. These longer duration events may result in the more challenging conditions for the site from a flood planning and emergency response perspective.

In order to model the long duration events, the PMF storms were estimated using the Generalised Southeast Australia Method (GSAM). The DRAINS hydrological models provided with the flood model were updated to include the long duration events. The results were exported for use in the hydraulic (TUFLOW) model.

12-, 24- and 36-hour storms were run in addition to the previous 90 minute and 5 hours storms in order to review a broad spectrum of storm durations and determine periods of isolation. Each of these runs was undertaken using the proposed geometry discussed in section 4.3 of this report.

5.4 Isolation During PMF Events

During a PMF, the site is isolated. While the ground floor and basement entries have been designed to be above the peak PMF level, access and egress from the site is not possible.

Long duration storm event analysis provides the duration of isolation for various durations of PMF events reviewing critical points on the access/egress routes. Figure 14, Figure 15, and Table 1 provides a summary of the flood results at key locations for access and egress.

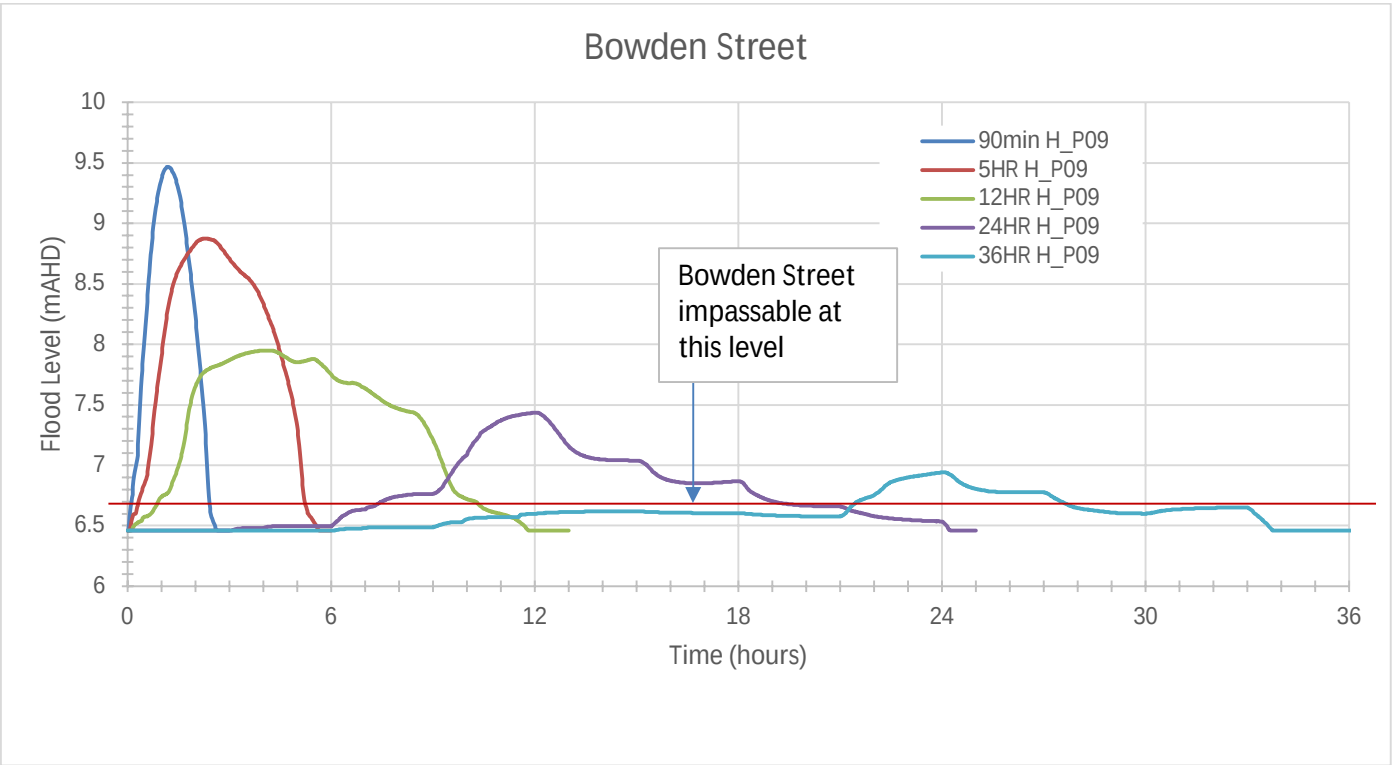


Figure 14 Bowden Street sag point PMF levels

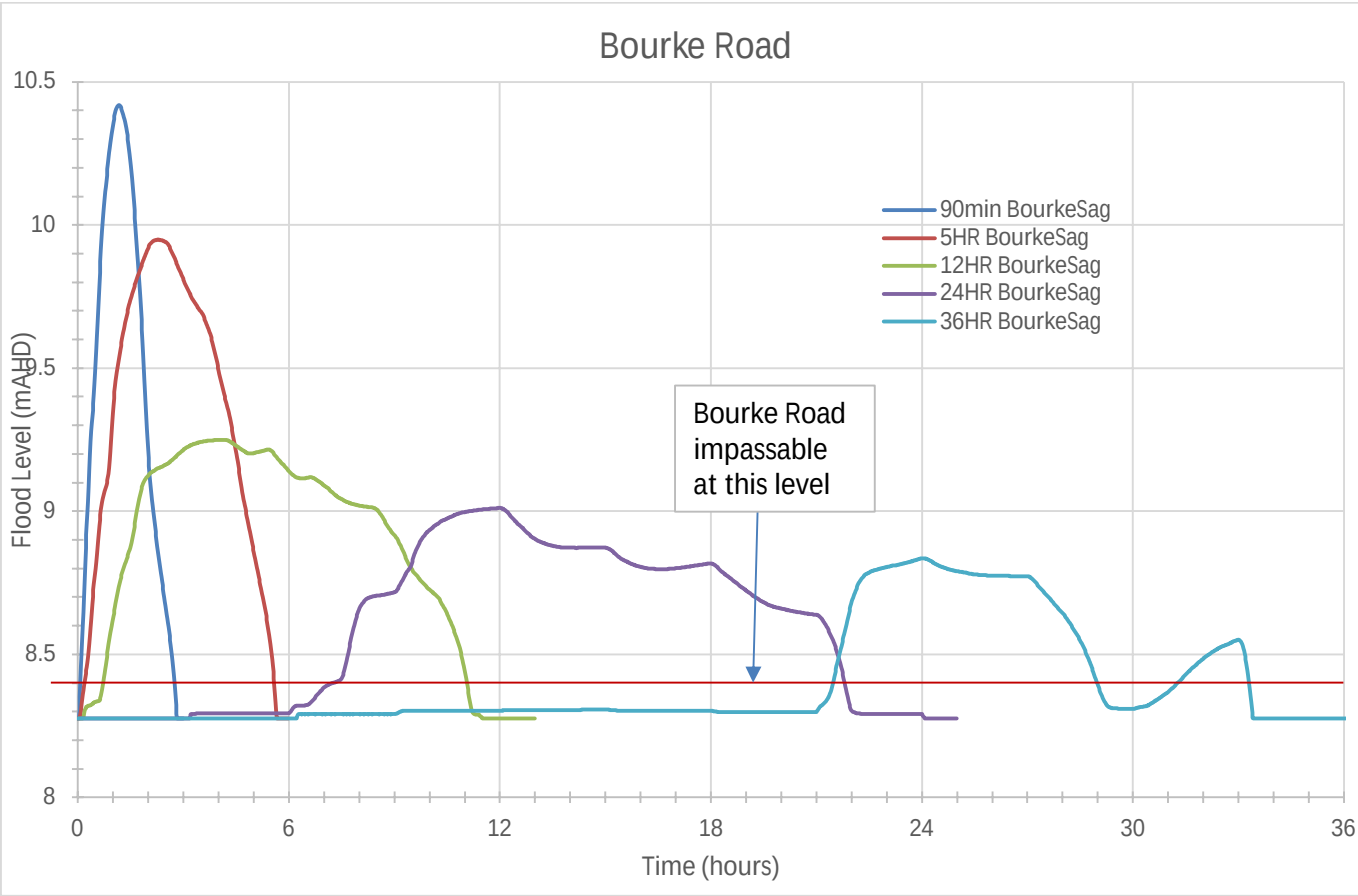


Figure 15 Bourke Road sag point PMF levels

Table 1 PMF peak levels and isolation duration

	Bourke Road (un-trafficable flood level 8.4mAHD)		Bowden Street (un-trafficable flood level 6.7mAHD)	
PMF Storm duration	Peak level (mAHD)	Un-trafficable duration (hours)	Peak level (mAHD)	Un-trafficable duration (hours)
90 minutes	10.42	2.7	9.46	2.3
5 hours	9.95	5.4	8.87	4.9
12 hours	9.25	10.4	7.95	9.3
24 hours	9.01	14.55	7.43	11.5
36 hours	8.84	11.87	6.94	6.3

Table 1 shows that the maximum period of isolation for the site is 11.5 hours during a 24 hour PMF event where access via Bowden Street is unsafe for this period. Table 2 summarises the isolation periods for the various storm events studied.

Table 2 Potential periods of isolation for various storm events

Storm event	5% AEP	1% AEP	0.2% AEP	PMF
Short duration (60-90 minutes)	Nil	20 minutes	50 minutes	2.3 hours
Medium duration (5-6 hours)	Nil	Nil	Nil	4.9 hours
Long duration (12-48 hours)	Nil	Nil	Nil	11.5 hours

5.5 Isolation management

During 1% AEP storm event, site may be isolated for a period of approximately 20 minutes. This is considered an inconvenience to site users (patients and staff) and should be managed similarly to other occurrences such as bad traffic, public transport delays and the like.

During a PMF event, the isolation period has shown to vary up to approximately 12 hours. As per the Flood Risk Management Guideline EM01 (NSW Department of Planning and Environment), there is no “safe” period of isolation. When considering flood emergency management in redevelopment or infill development such as the subject site, the self sufficiency of occupants is a factor in determining the risk factor for the development.

In the event that the site becomes isolated due to flooding, staff and patients, as well as any visitors will remain on site for the duration of the flood event. This may include other itinerant population such as pedestrians in the local area. The proposed hospital has an on site kitchen, which will have adequate supplies of food and water (3L per person to be stored on site) for the isolation period. There will be reserve supplies of linen and consumables. The site can remain self sufficient for the period of flooding.

Any procedures should be postponed to minimise the risk of medical emergencies on site. The scope and risk of such procedures should be assessed by the responsible medical team.

Refer to the separately prepared Operational Flood Emergency Management Plan (OFEMP) for additional information on emergency and isolation management.

It is worth noting that a PMF event has a likelihood in the order of 1 in 1,000,000 years.

6 2022 Flood Inquiry

NSW experienced major flooding in February, March and, most recently, July 2022. In March 2022, the NSW Premier established a Flood Inquiry. The 2022 Flood Inquiry was published on 29 July 2022.

Relevant findings and recommendations of the Inquiry are presented below:

W. Finding – essential services and floodplain infrastructure

- Essential services disruption in the floods was exacerbated by critical infrastructure being situated in low-lying areas and consequently being flooded.
- Many hospitals, medical centres, nursing homes, aged care facilities and police stations are situated below the flood planning level. Several of these were affected in the recent floods.
- Some detrimental impacts of floods come from built structures which are supposed to provide flood mitigation not being maintained and consequently malfunctioning after heavy rain, making floods worse at a local level. Many are the responsibility of several agencies and are maintained by none.

28. Recommendation – essential services and floodplain infrastructure

That, to minimise disruption to essential services (power, communications, water, sewerage) and to ensure flood infrastructure is fully serviceable before flooding, Government ensure:

- essential services infrastructure (communications, water, power and sewerage) is situated as much as possible above the flood planning level. And to minimise disruption to medical services, aged care services and the police, Government ensure hospitals, medical centres, nursing homes, aged care facilities and police stations are situated above the probable maximum flood level
- floodplain infrastructure (drains, levees, flood gates) items are all assigned to an appropriate lead agency which has responsibility for ensuring they are fully maintained and functioning especially when floods are likely.

The proposed site responds to these findings. The local sewerage system is typically designed to overflow to the stormwater system in the event this is inundated by flooding, and not back up into properties. Water supply will continue to operate during flood events. The proposed development has diesel generator backup system to supply electricity in the event the local distribution network is not operating due to flooding, with substation and backup generators located above the PMF.

GHD has prepared a memorandum (Included as Appendix E) “Proposed development 28 – 32 Bourke Rd, Alexandria Reticulated sewer network performance during dry and wet weather operation” (17/02/2023), concluding:

It is expected that the proposed development wastewater services will continue to operate effectively during wet weather events. This is based on engineering design principals for sewer network design and the that the FFL of the proposed development is at 10.4 mAHD (6 m higher than the recorded overflow weir level of 4.26 mAHD)

Sydney Water's drinking water system is designed to meet system demand and can be reasonably expected to continue to operate effectively during wet weather events.

7 Conclusion

This report has identified and analysed the impact of the proposed development, the risks to the development and its users, and outlined how these risks can be managed. Thus it meets the requirements of a Flood Impact and Risk Assessment (FIRA) as outlined in the Flood Impact and Risk Assessment – Flood Risk Management Guide LU01.

The TUFLOW model indicates that the proposed hospital site is subject to flooding. The PMF level of 10.40 mAHD on Bourke Road informs the flood planning level of 10.40 mAHD. The 1% AEP flood level of 8.80 mAHD in the same location. This is the primary mitigation measure against the impact of flooding at the site.

The proposed development does not have any impact on flooding with respect to flood depths and levels, velocity, hazard, rate of rise of floodwater, flood frequency, or duration of inundation for events up to the PMF.

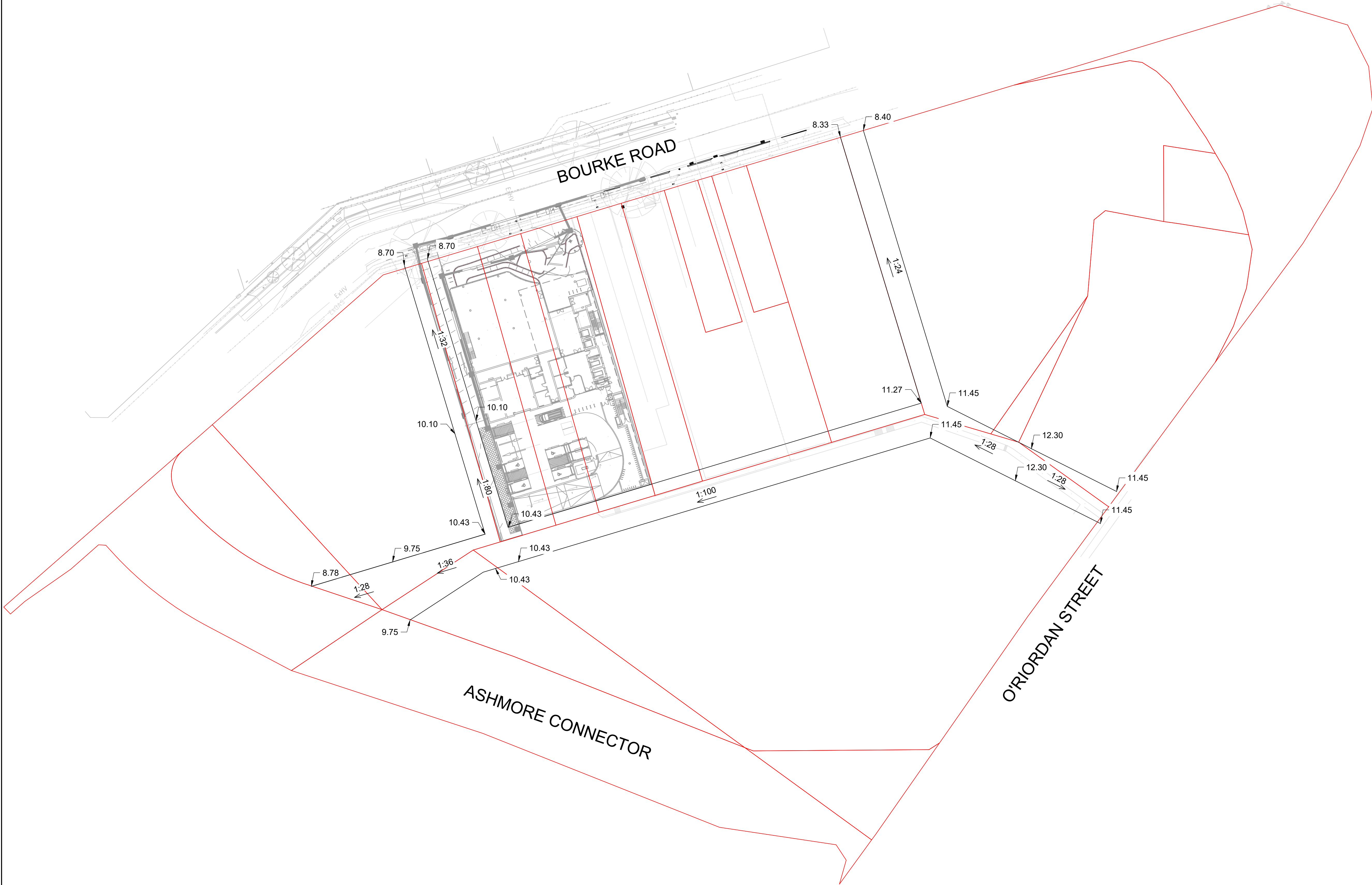
In direct response to Section 3.1 of the City of Sydney (CoS) letter [Ref: R/2022/2/B] dated 10/11/22, the future flooding conditions, specifically including the surrounding laneway concept grading, was modelled in TUFLOW and shows the laneways are generally flood free during a PMF event. This outcome is beneficial to all properties in the precinct, and considers future impacts from surrounding developments. The laneway networks also enables future egress via the laneway network to O’Riordan Street, creating a positive cumulative impact of development on the ability of the community to respond to a flood event.

Site access and egress is limited during the peak of short, intense storms larger than a 5% AEP event. The site is accessible during long duration storm events of more than 6 hours when local roads remain trafficable. Site access and egress is closed for a period of less than 12 hours during a long duration PMF events. A separate Operation Flood Emergency Management Plan has been prepared.

APPENDIX A

EXTERNAL PATHWAY GRADING SKETCH

enstruct



TO BE PRINTED IN FULL COLOUR

NOT FOR CONSTRUCTION

01	11/12/23	FOR INFORMATION	MZV	TAH	
rev	date	description	dwn	ch/k	

rev	date	description	dwn	ch/k	



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project	ALEXANDRIA HEALTH CENTRE EARLY WORKS 28-32 BOURKE ROAD ALEXANDRIA
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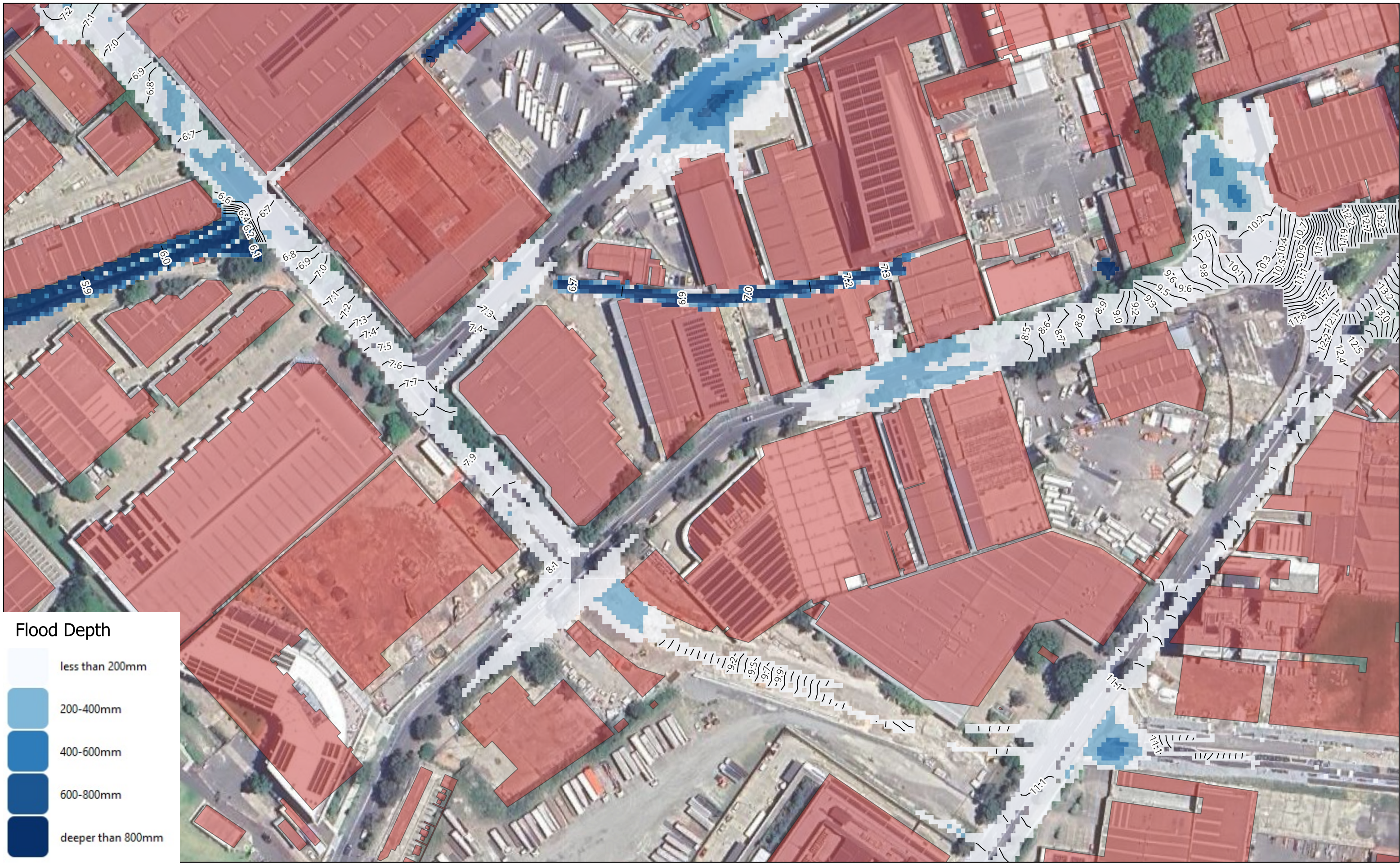
drawing title	EXTERNAL PATHWAY GRADING SKETCH
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status				SKETCH	
scale at A1 1:400		drawn MZV	checked TAH	approved TAH	
project no. 6691		sheet CV-SK-001		rev. 01	

APPENDIX B

EXISTING CONTIDITIONS FLOOD RESULTS

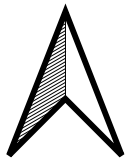
enstruct



Flood Depth

- less than 200mm
- 200-400mm
- 400-600mm
- 600-800mm
- deeper than 800mm

10% AEP Flood Level/Depth:
Existing Conditions

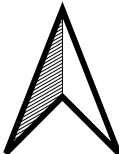




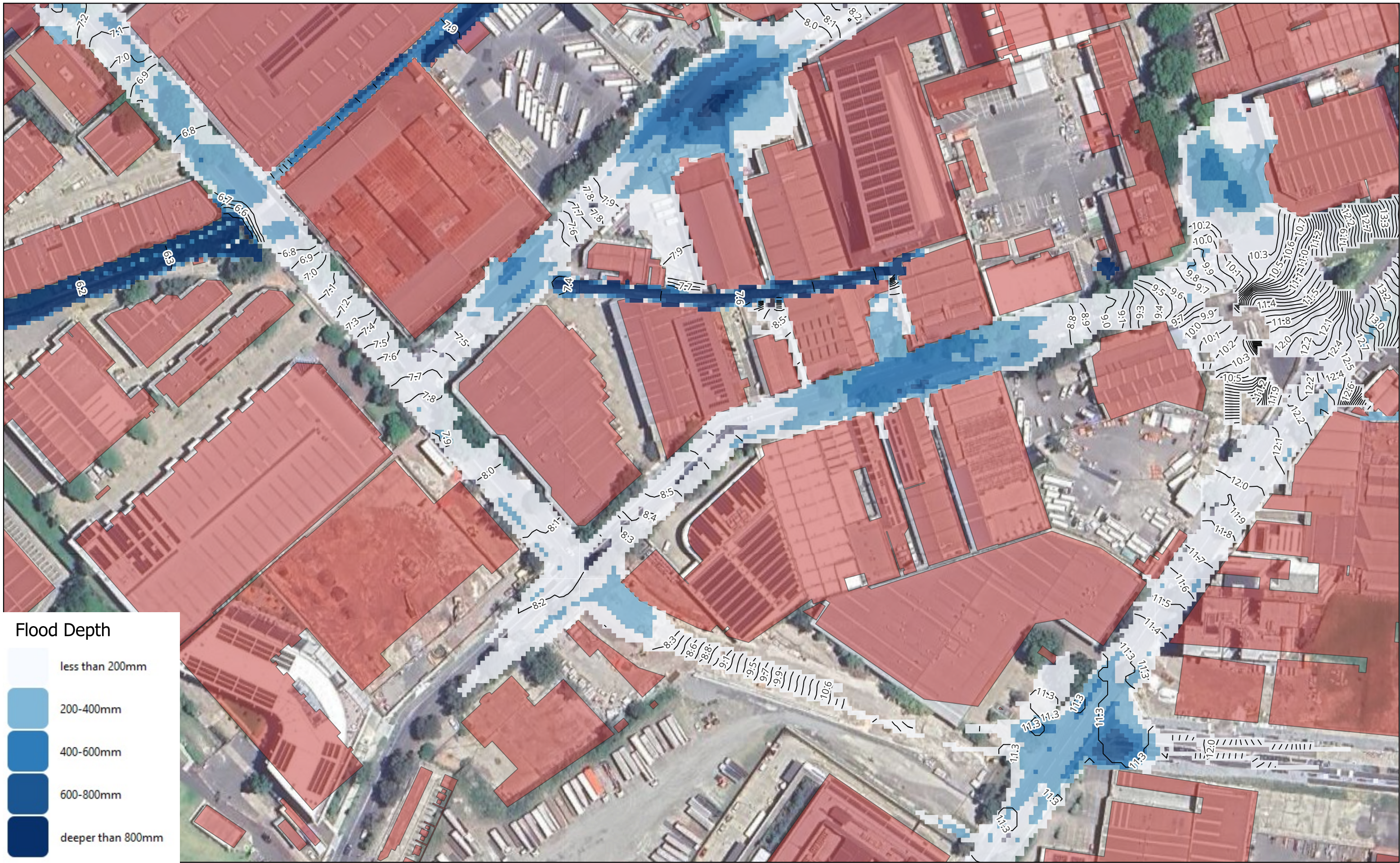
5% AEP Flood Level/Depth:
Existing Conditions

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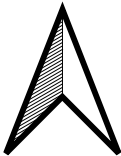
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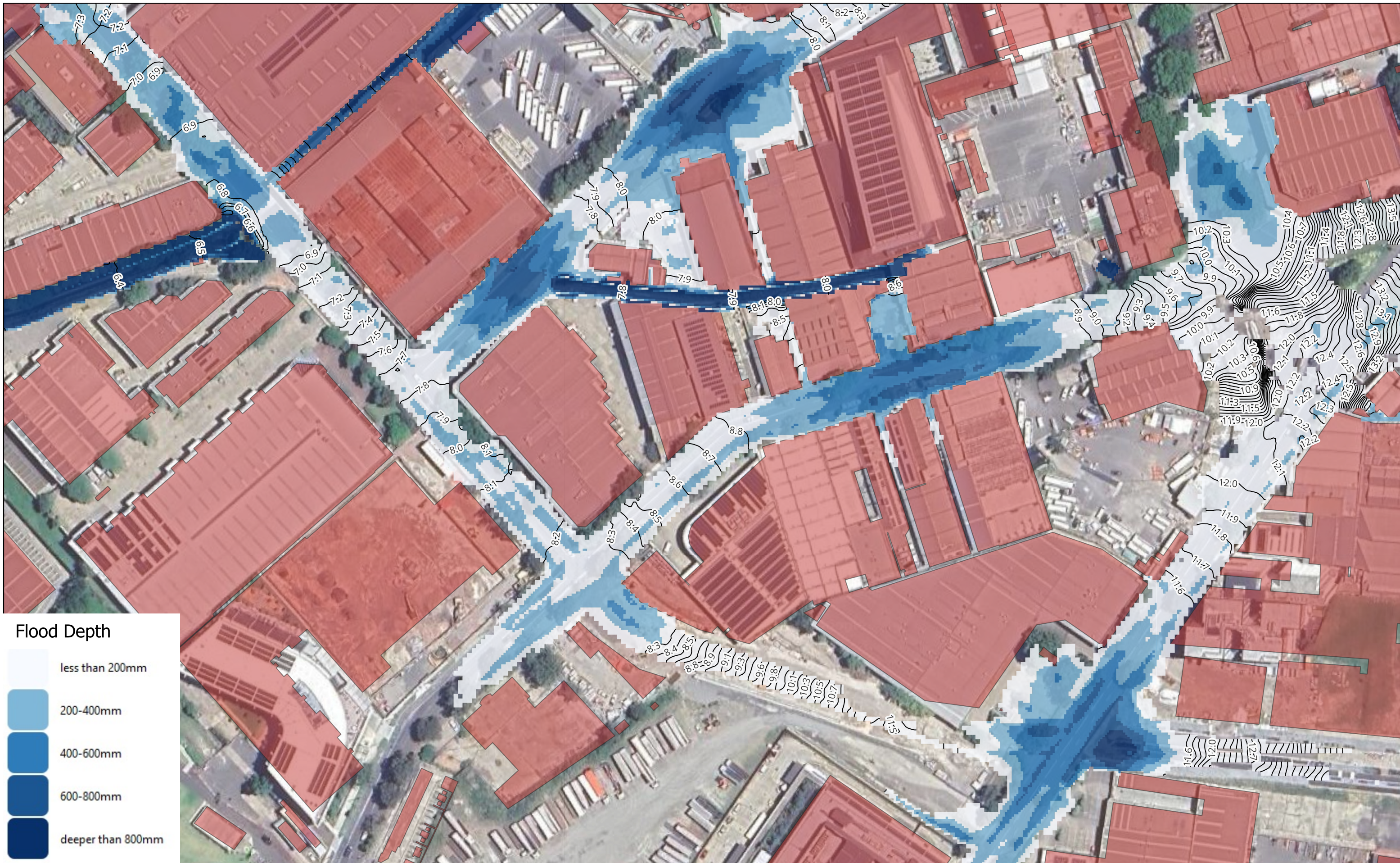


31/05/2024



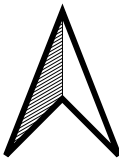
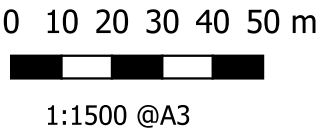
1% AEP Flood Level/Depth:
Existing Conditions



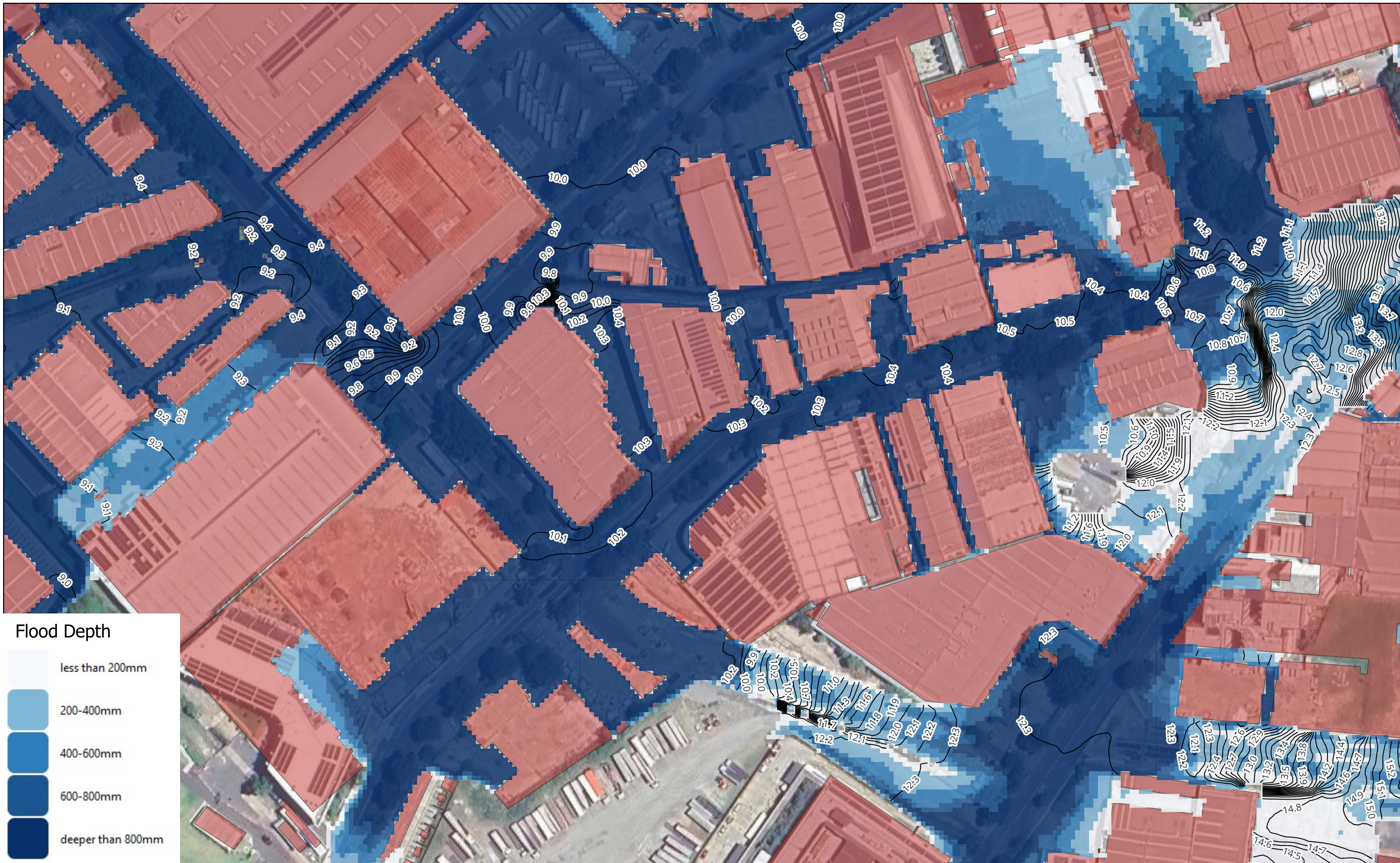


1% AEP + Climate Change
Flood Level/Depth: Existing
Conditions

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MEMBER OF WSP

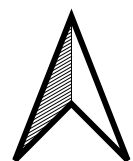
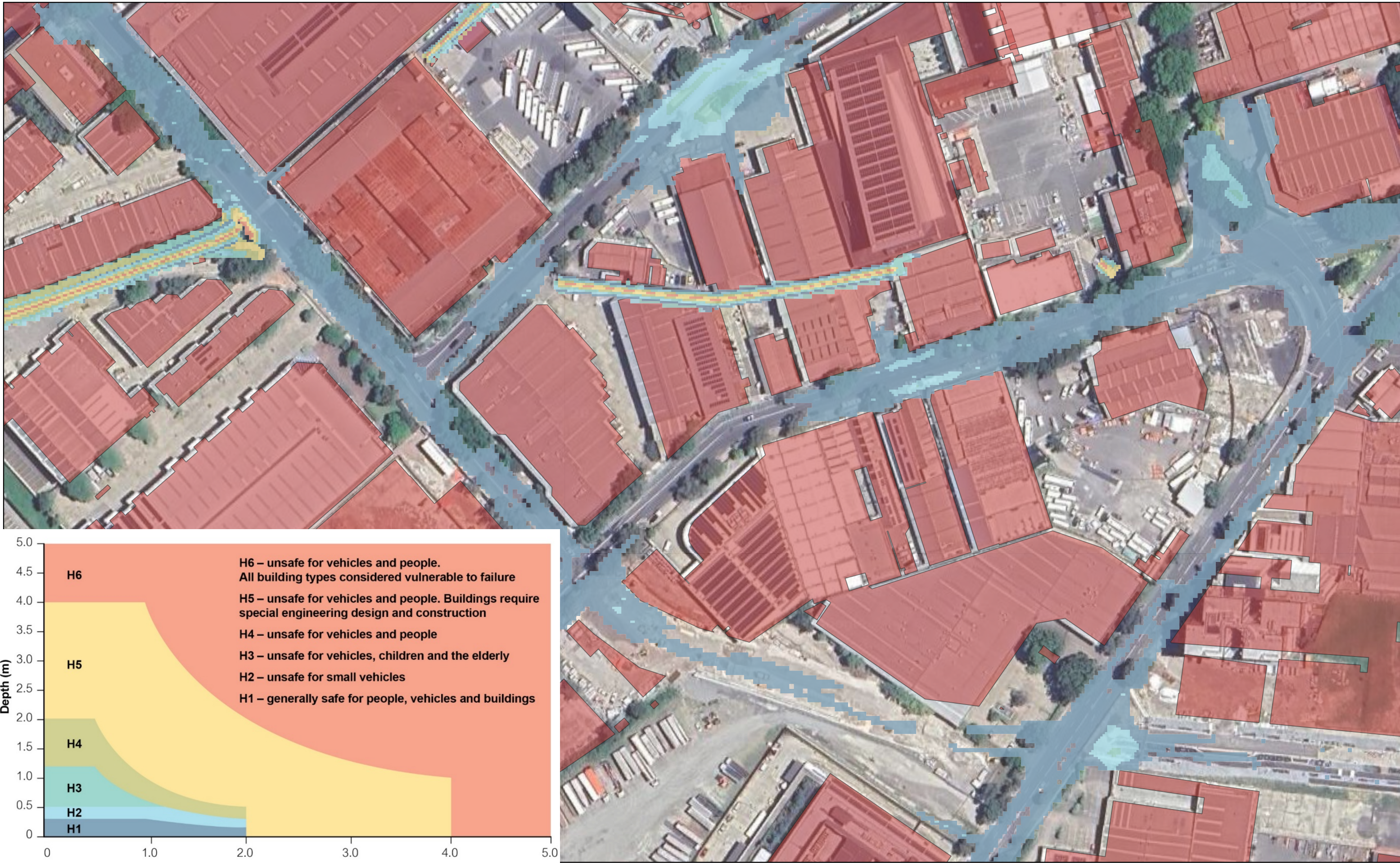


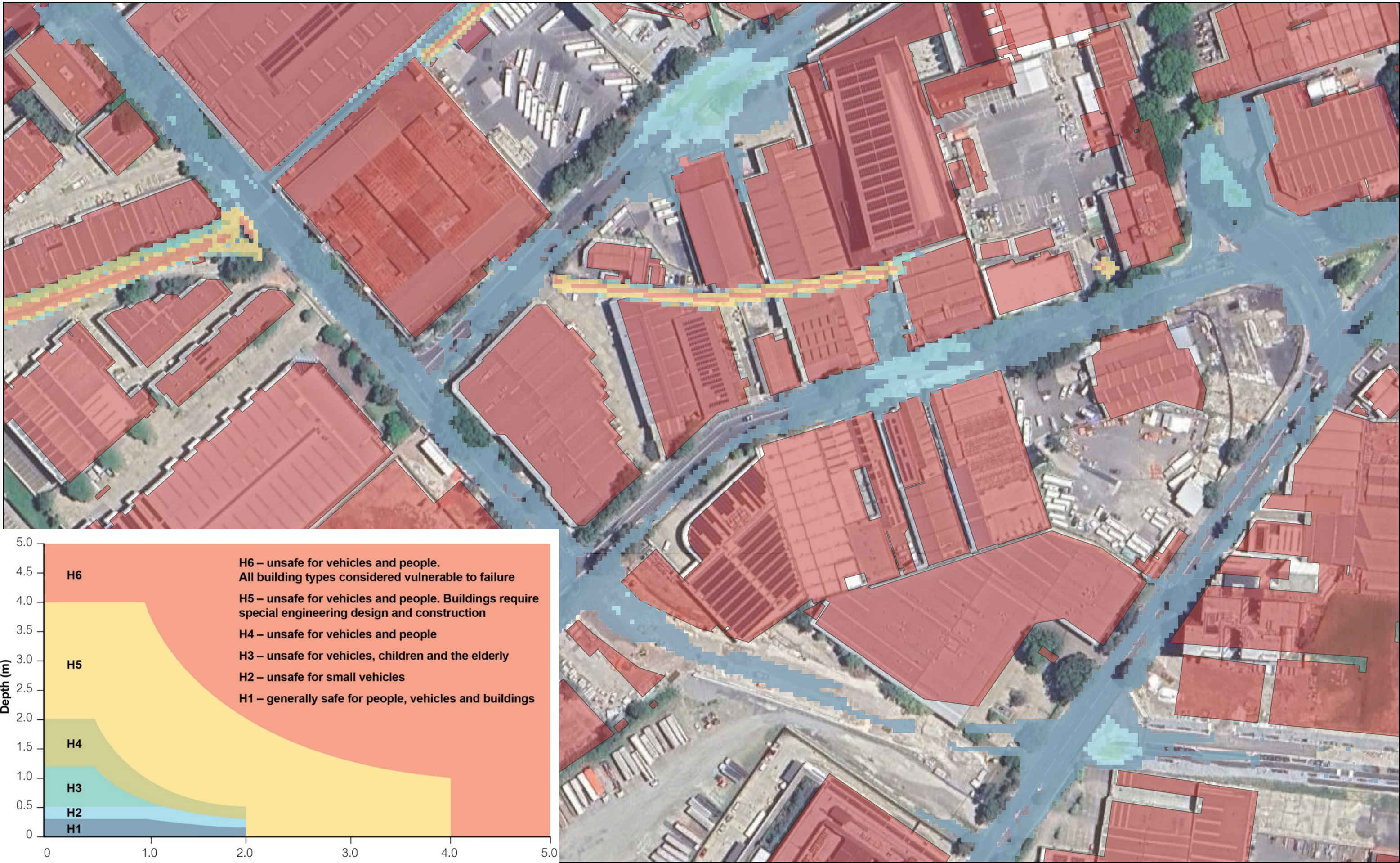
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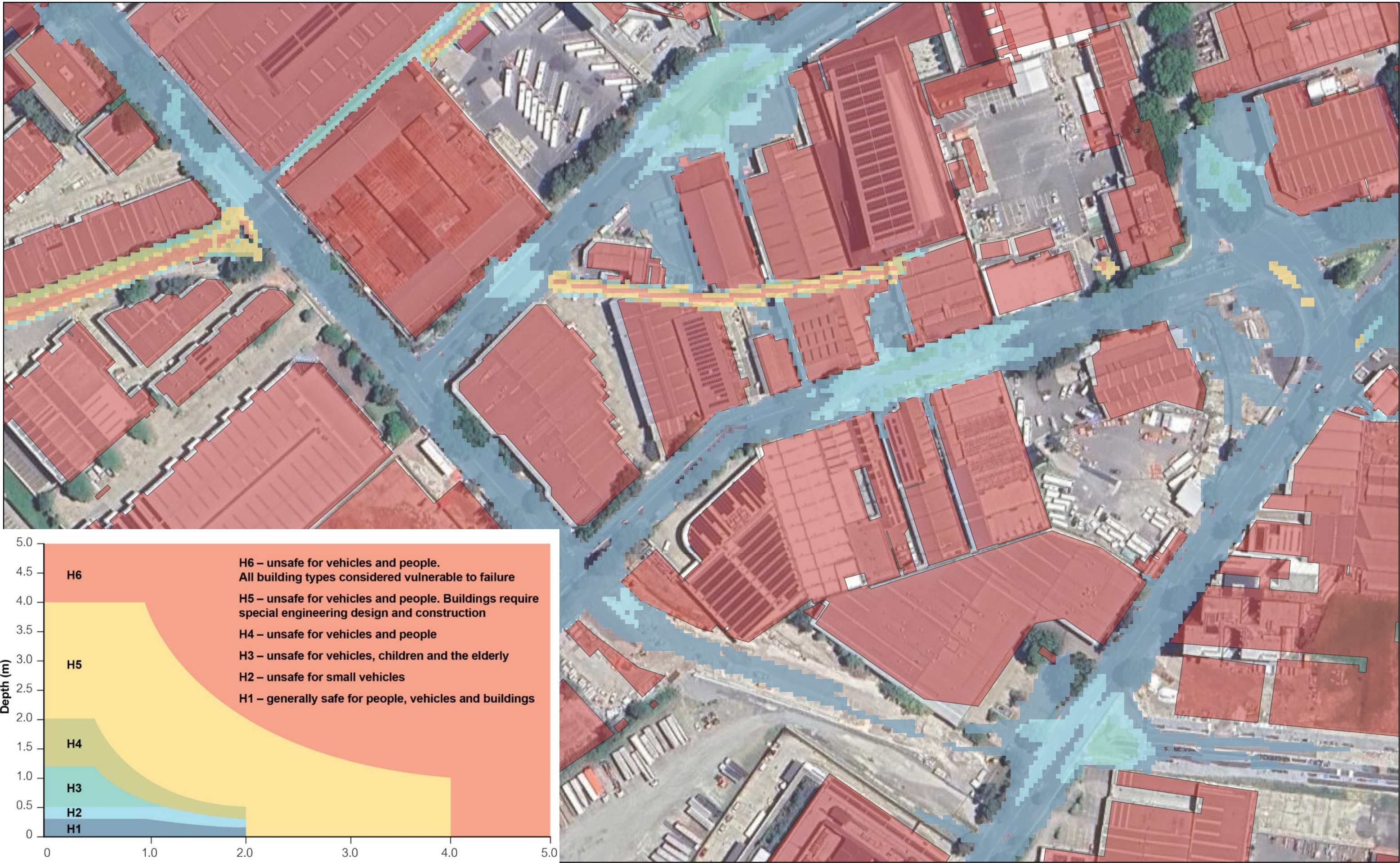


PMF Flood Level/Depth:
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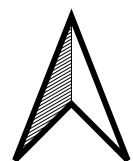
enstruct
MEMBER OF WSP

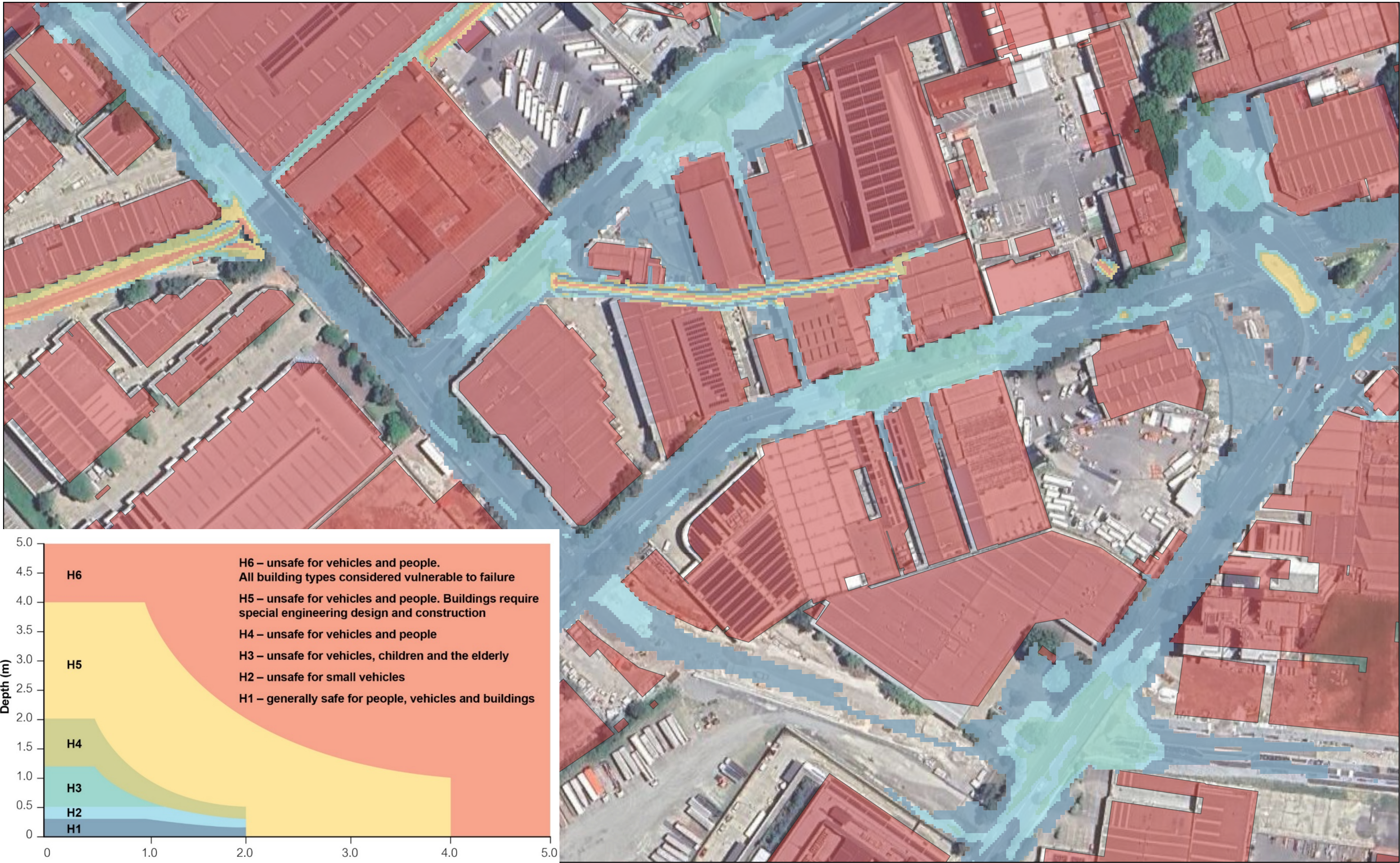




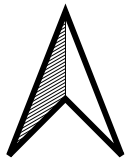


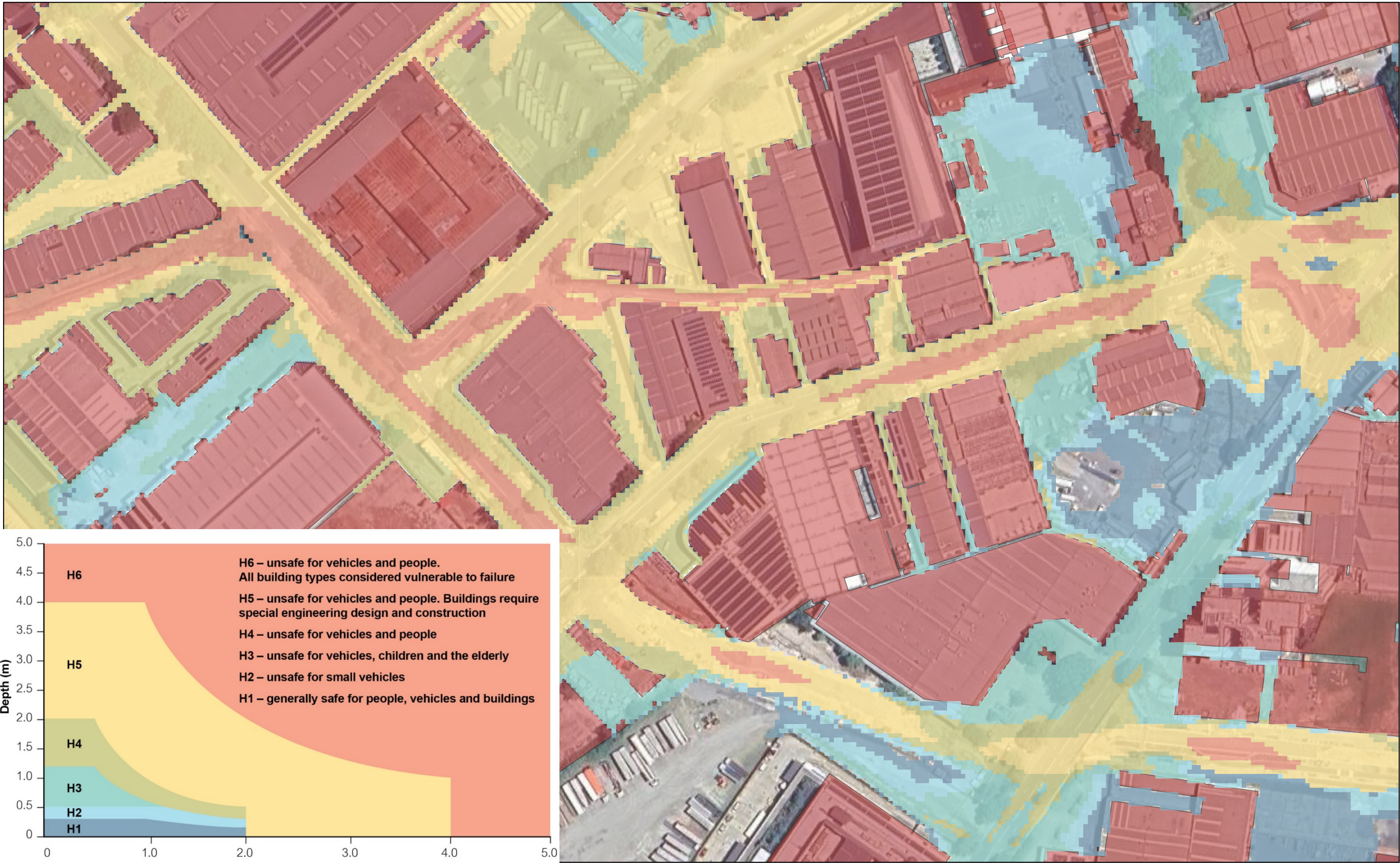
1% AEP Flood Hazard: Existing Conditions

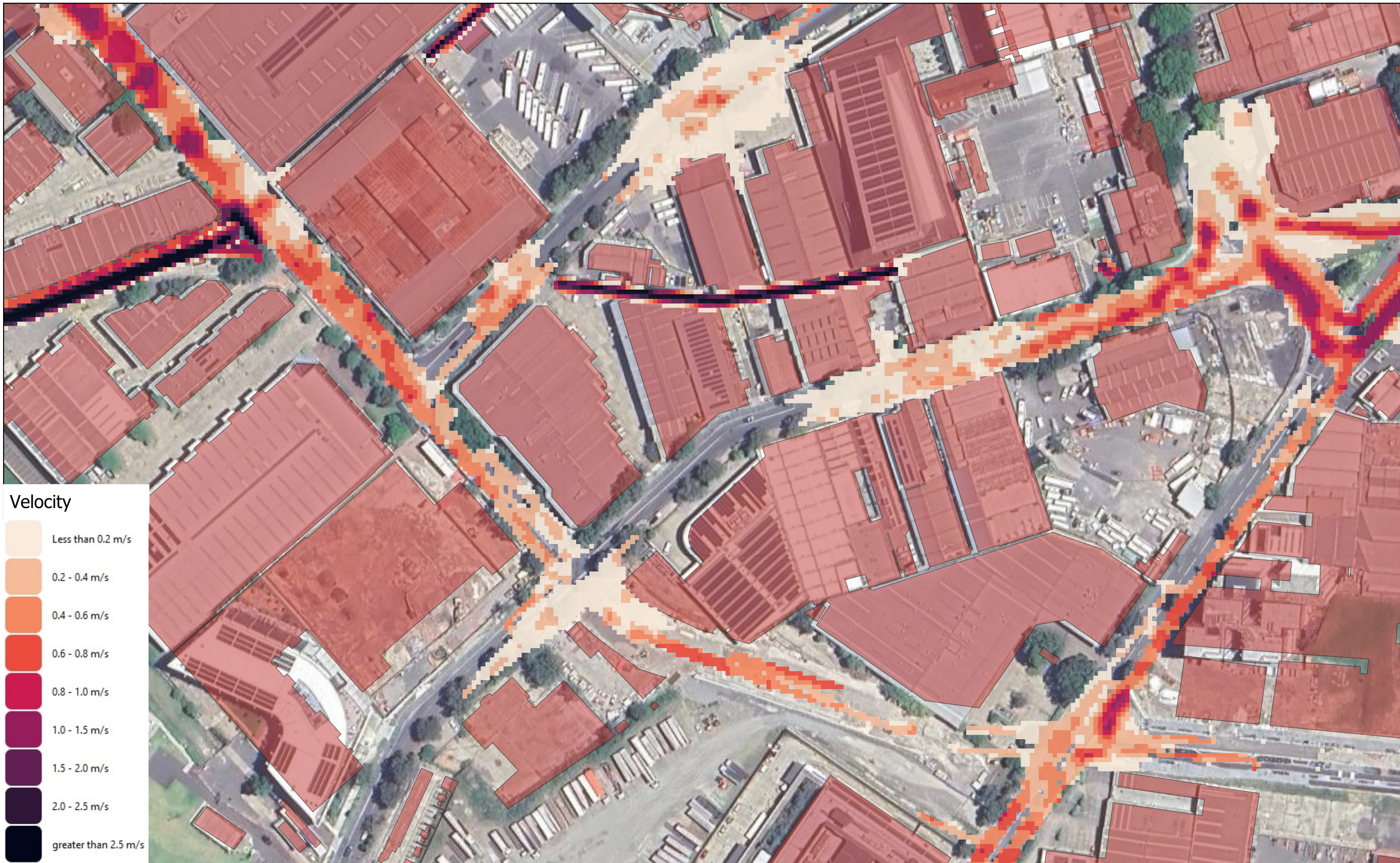




1% AEP + Climate Change
Flood Hazard: Existing
Conditions



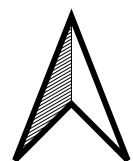




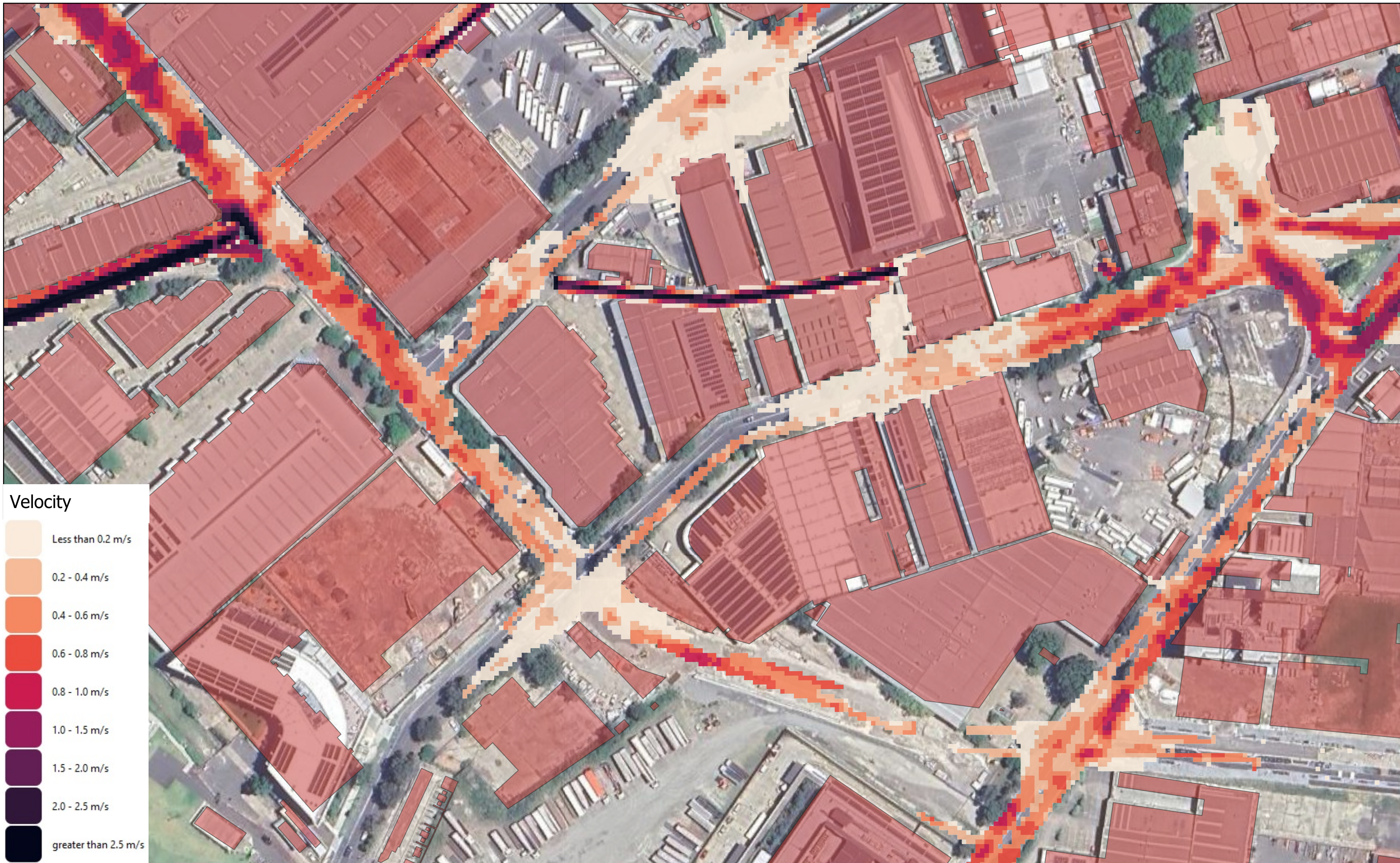
10% AEP Flood Velocity:
Existing Conditions

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MEMBER OF WSP

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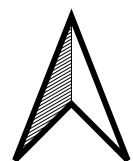
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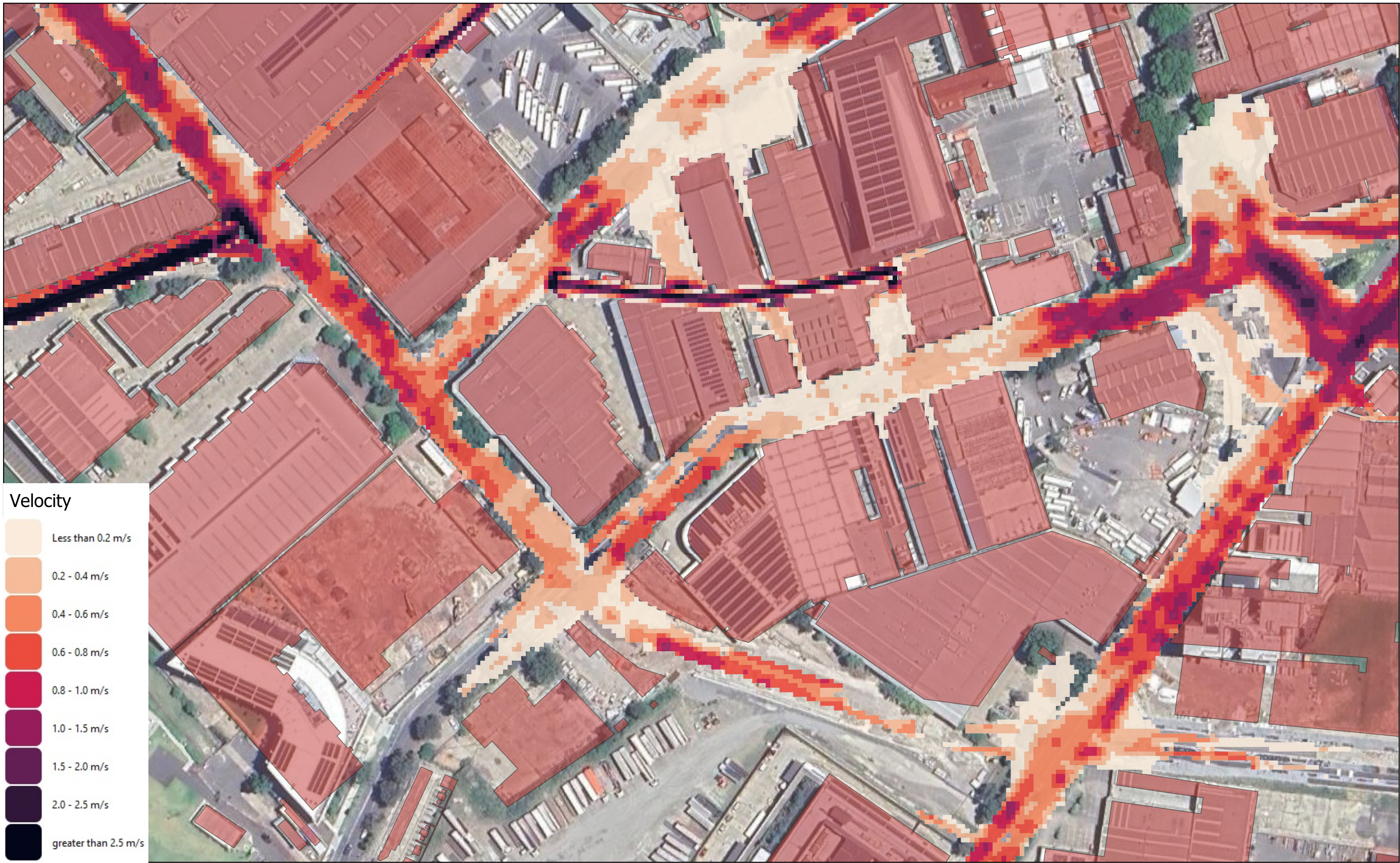
5% AEP Flood Velocity:
Existing Conditions

enstruct
MEMBER OF WSP

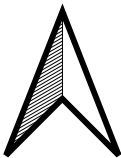
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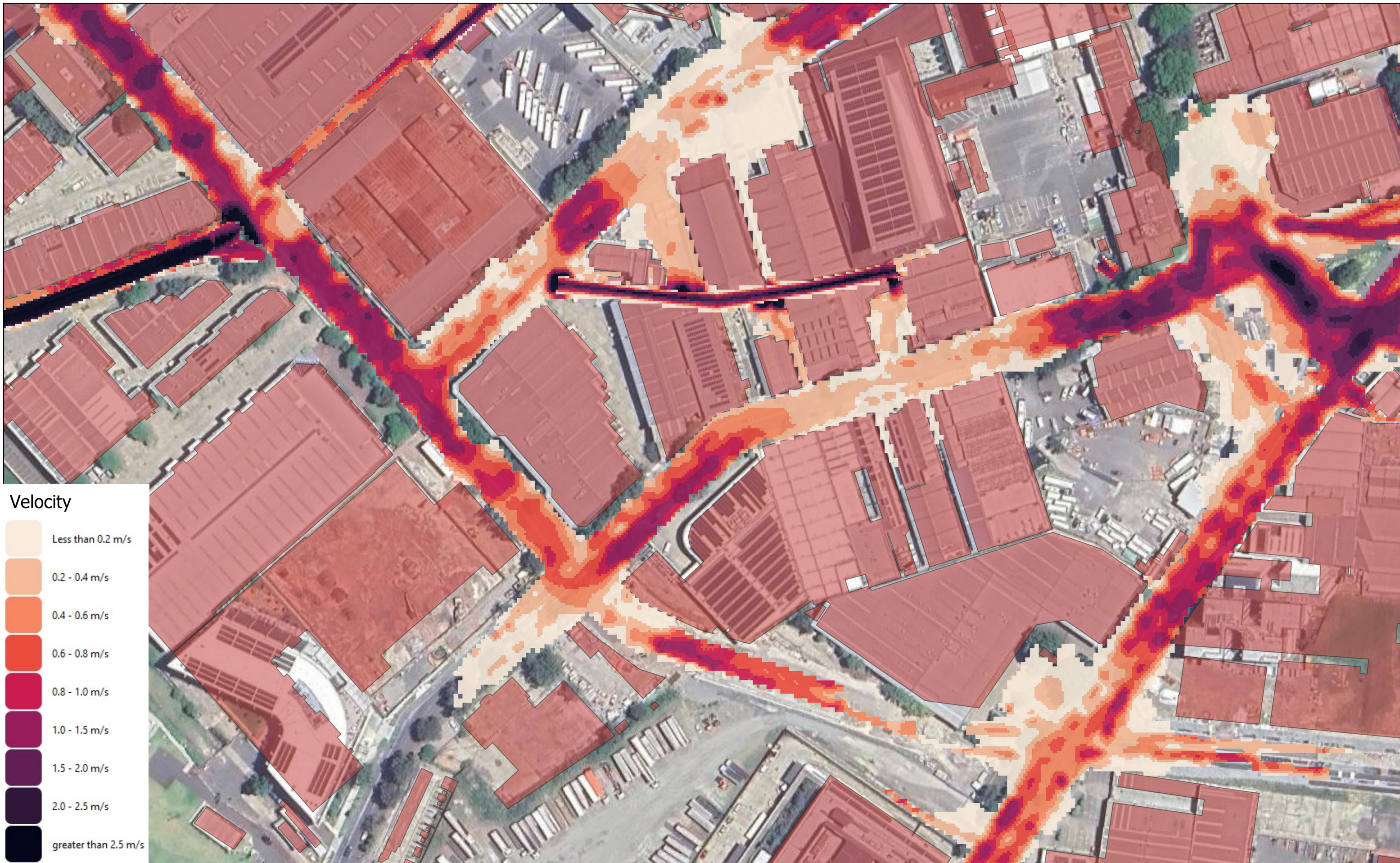


31/05/2024



1% AEP Flood Velocity:
Existing Conditions

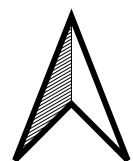




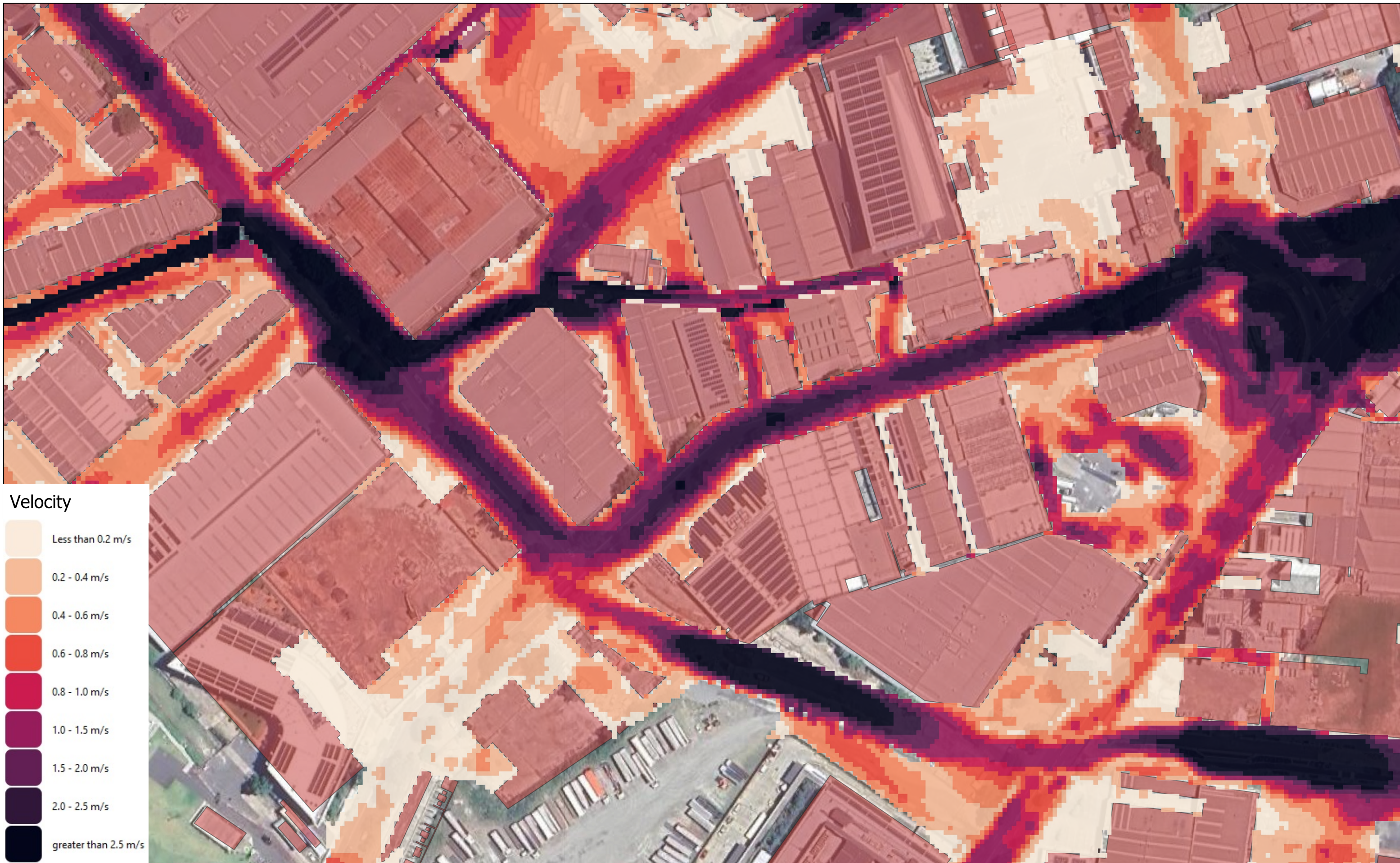
1% AEP + Climate Change
Flood Velocity: Existing
Conditions

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MEMBER OF WSP

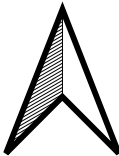
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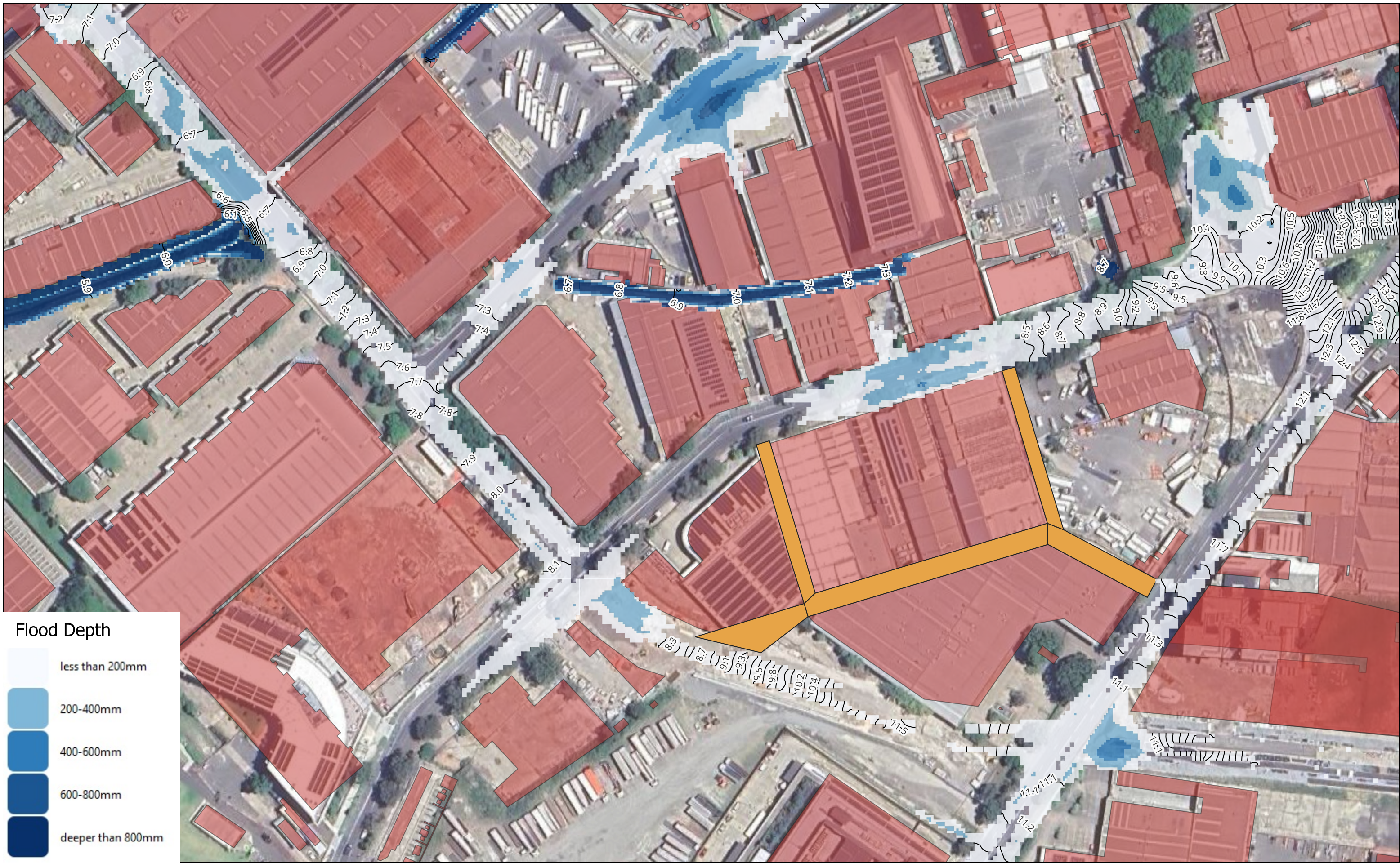
PMF Flood Velocity: Existing
Conditions



APPENDIX C

PROPOSED CONDITIONS FLOOD RESULTS

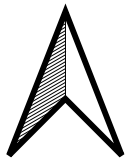
enstruct

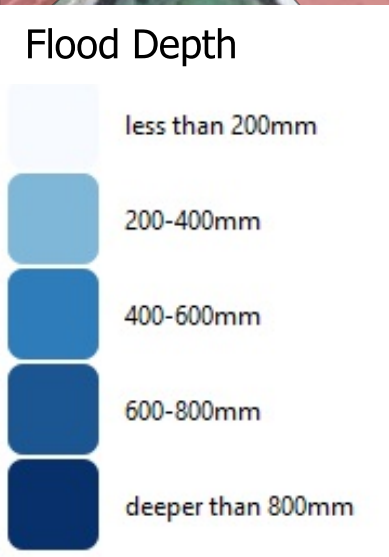


Flood Depth

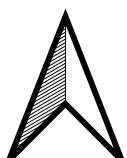
- less than 200mm
- 200-400mm
- 400-600mm
- 600-800mm
- deeper than 800mm

10% AEP Flood Level/Depth:
Proposed Conditions





enstruct
MEMBER OF WSP

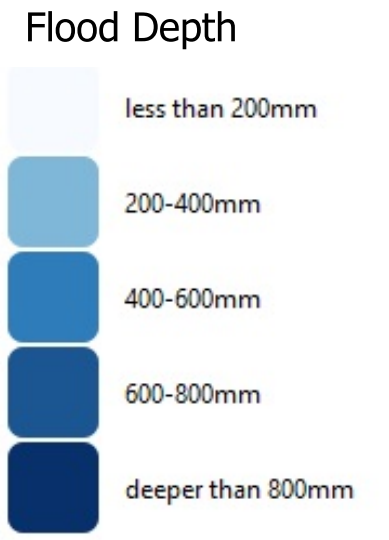


31/05/2024



1% AEP Flood Level/Depth:
Proposed Conditions

enstruct
MEMBER OF WSP



enstruct
MEMBER OF WSP

31/05/2024

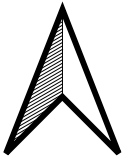


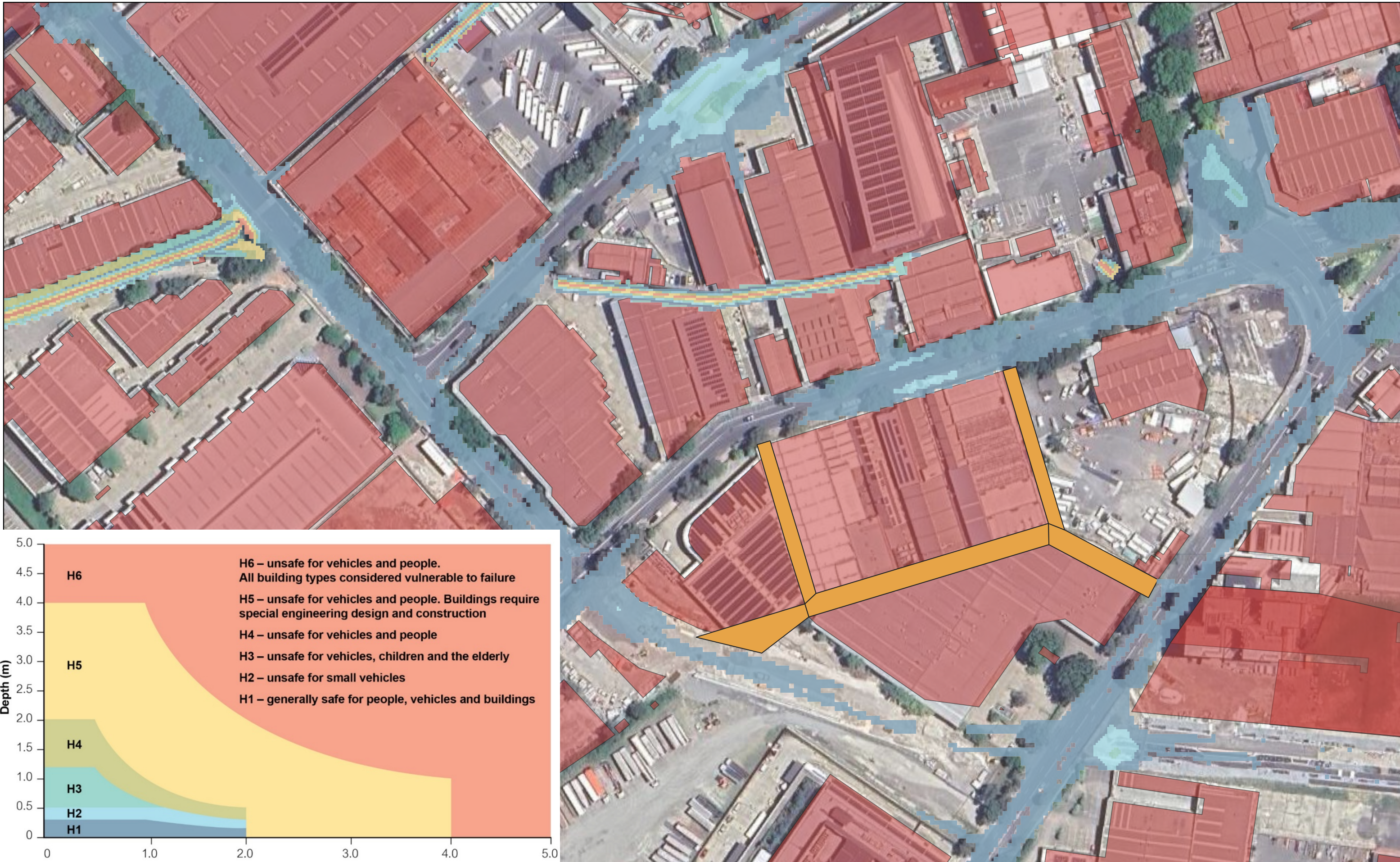
0.2% AEP Flood Level/Depth:
Proposed Conditions

enstruct
MEMBER OF WSP



PMF Flood Level/Depth:
Proposed Conditions

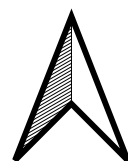




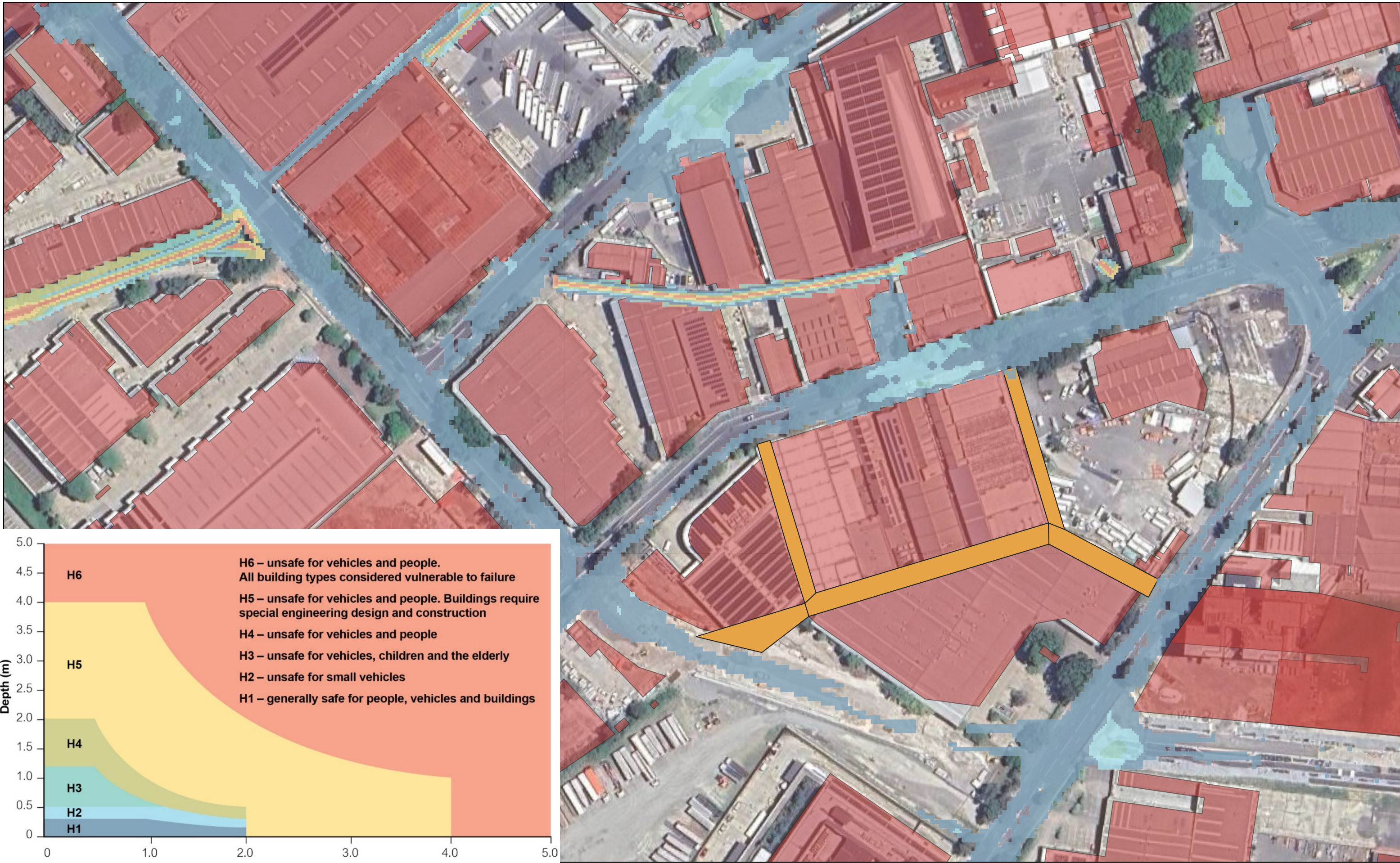
10% AEP Flood Hazard:
Proposed Conditions

enstruct
MEMBER OF WSP

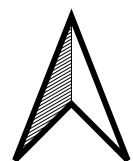
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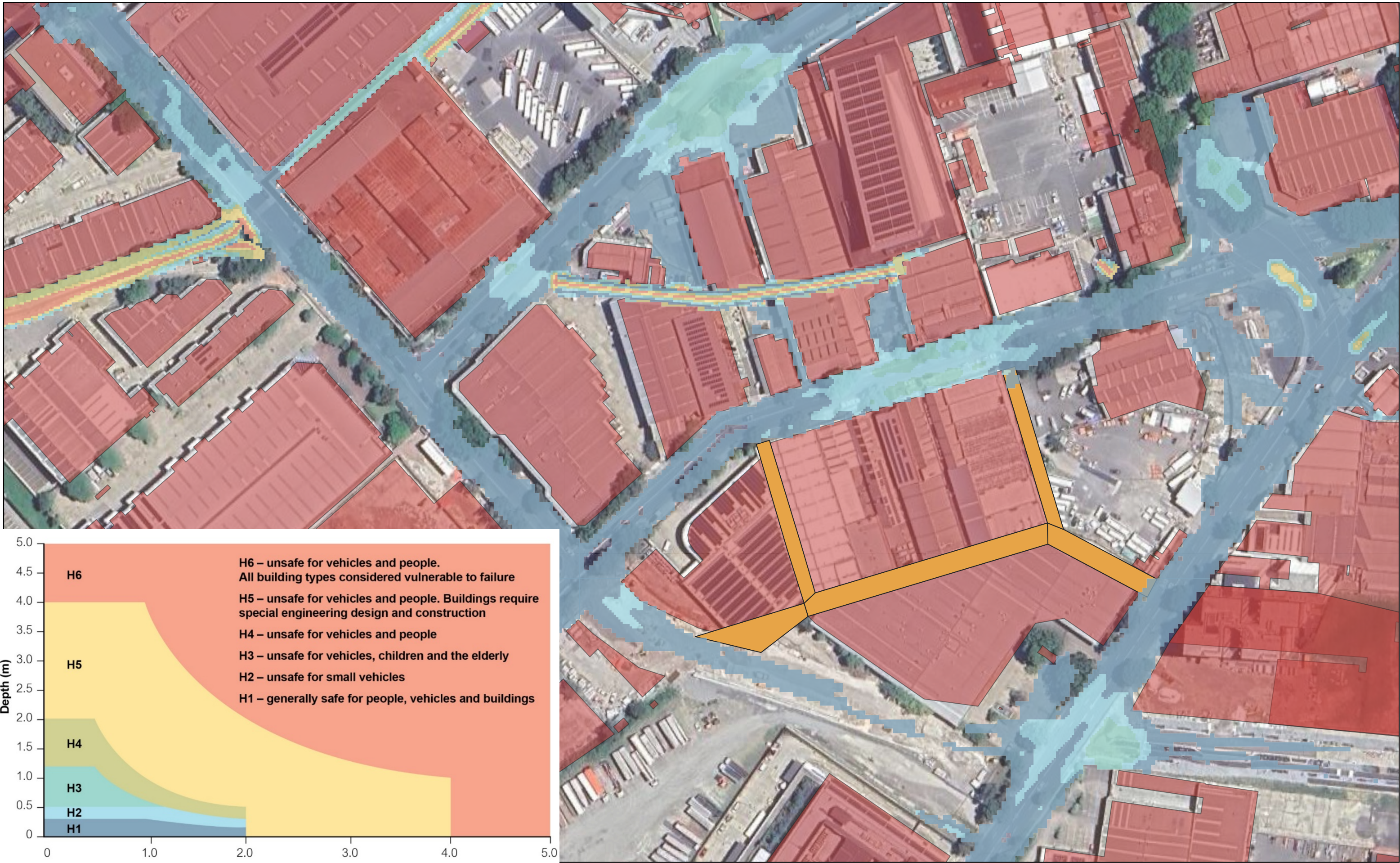


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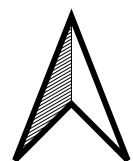


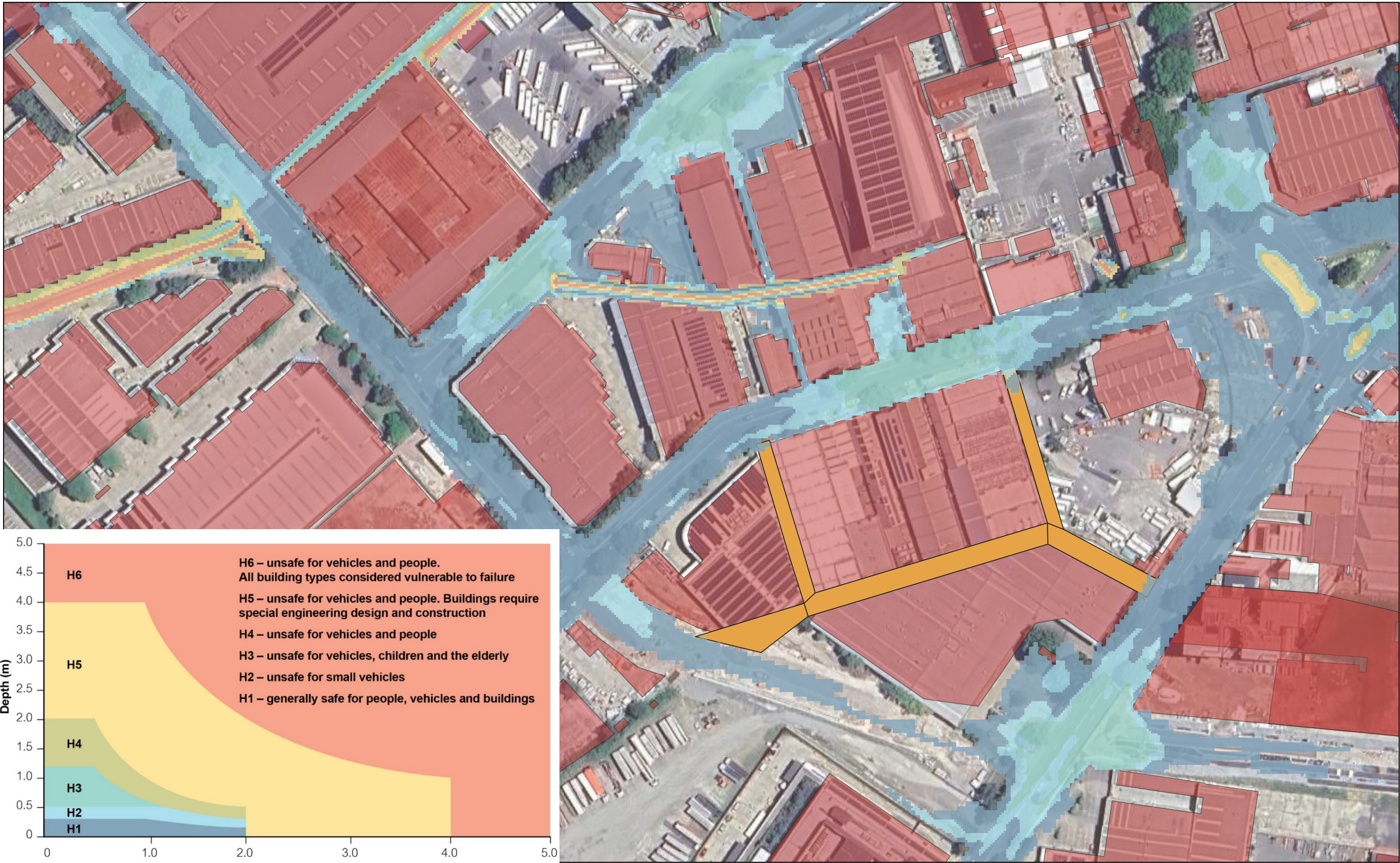
5% AEP Flood Hazard:
Proposed Conditions

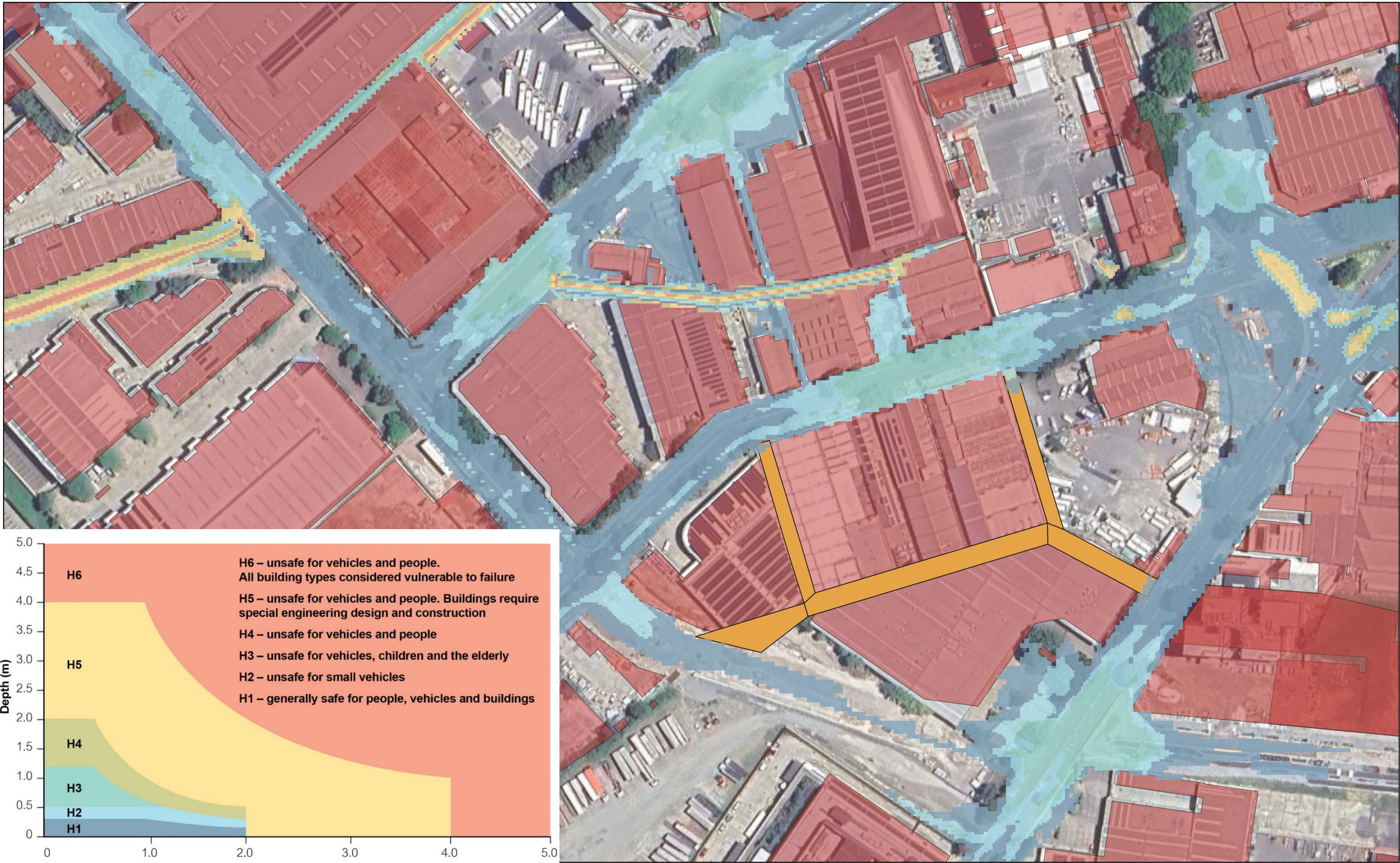


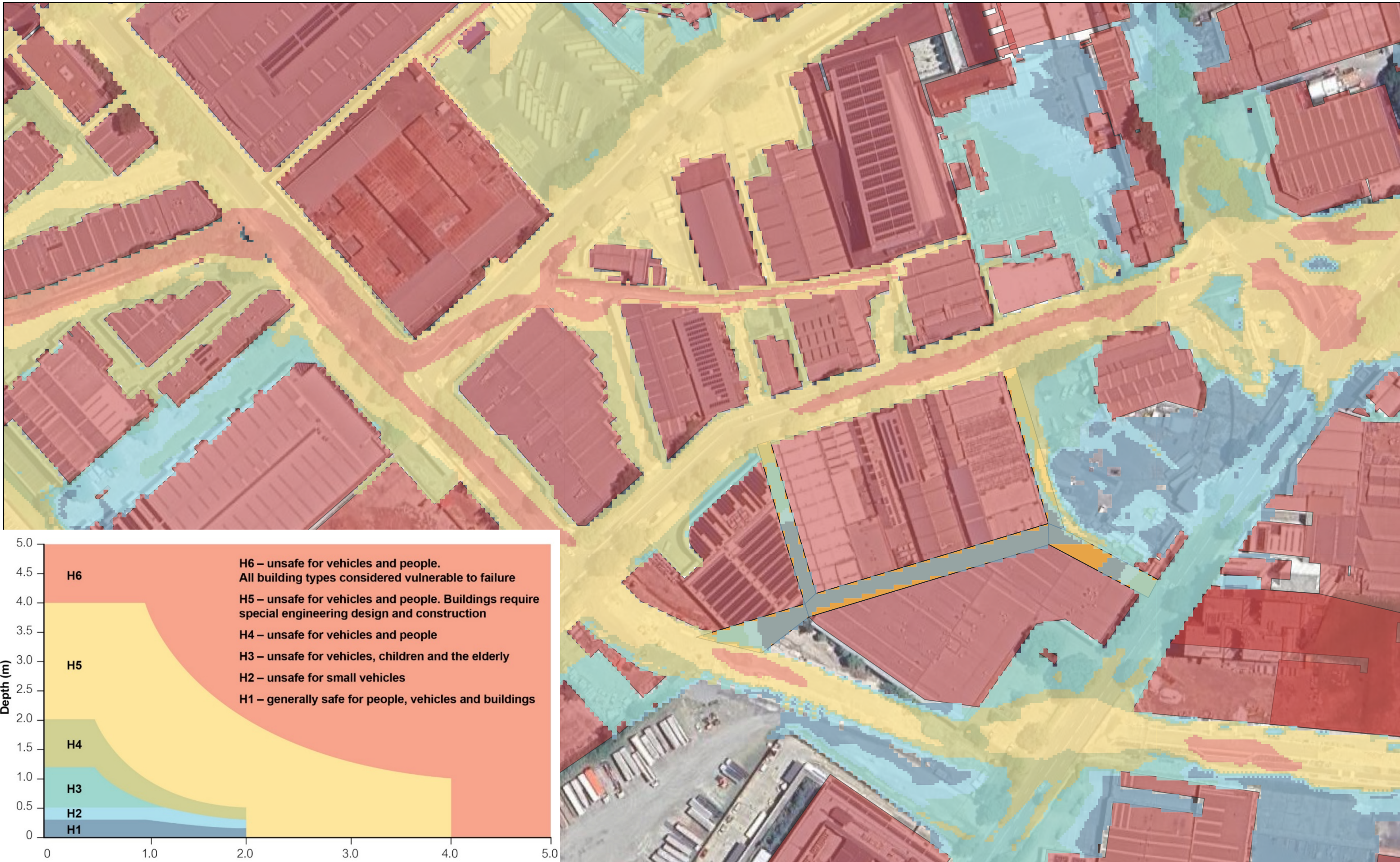


1% AEP Flood Hazard:
Proposed Conditions

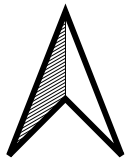


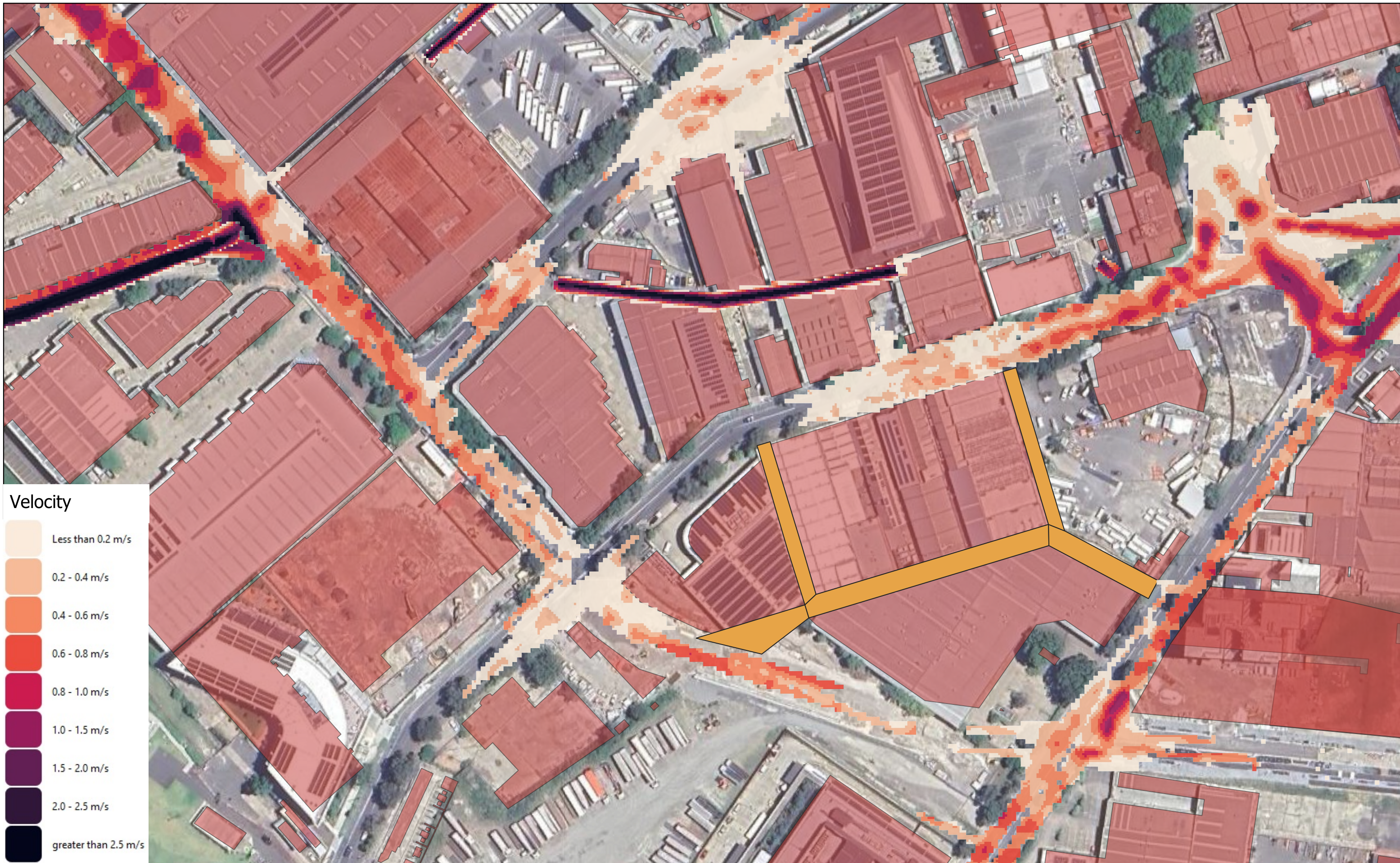






PMF Flood Hazard: Proposed Conditions

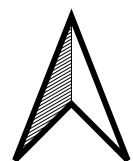




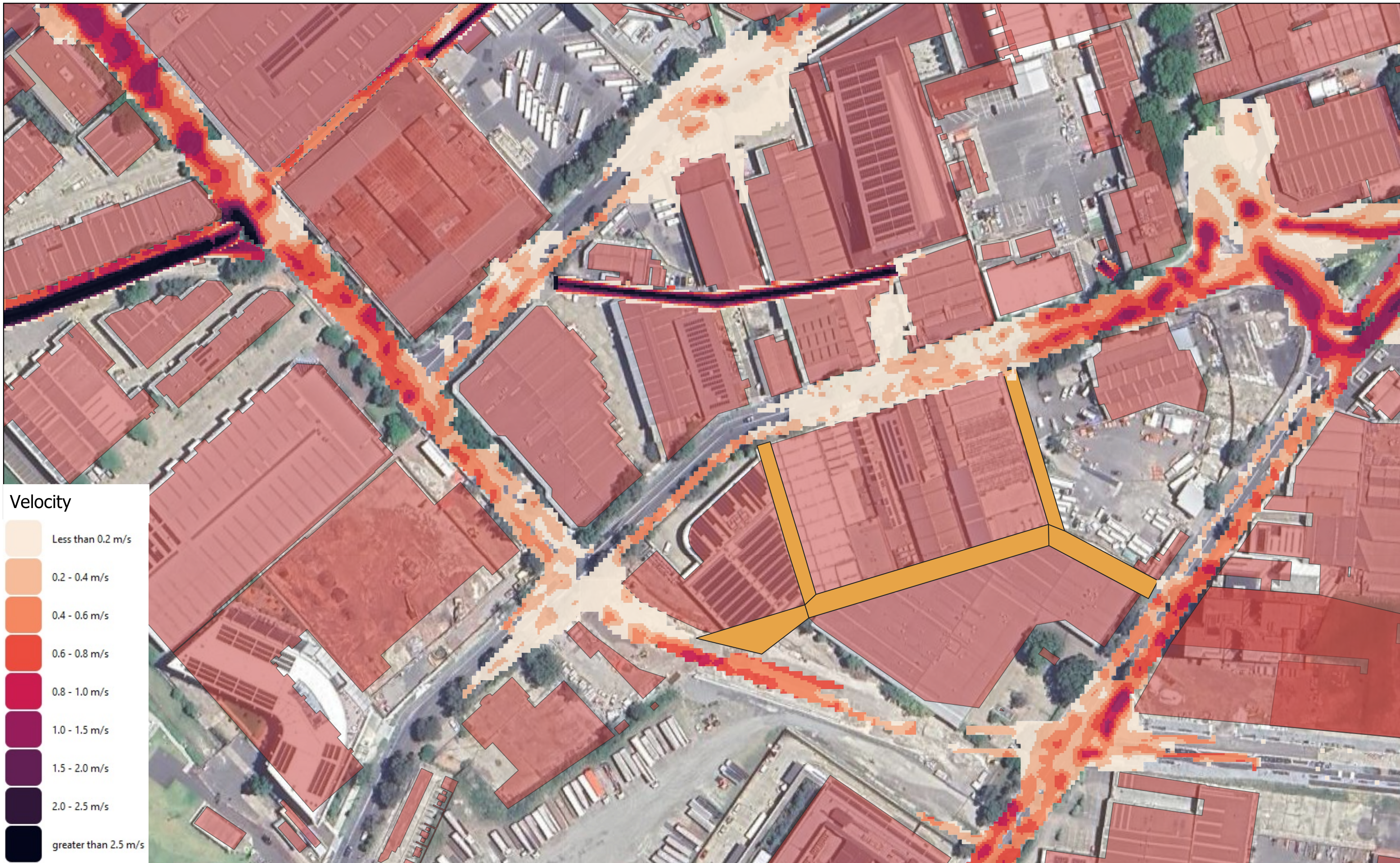
10% AEP Flood Velocity:
Proposed Conditions

enstruct
MEMBER OF WSP

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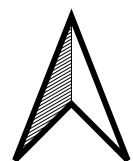
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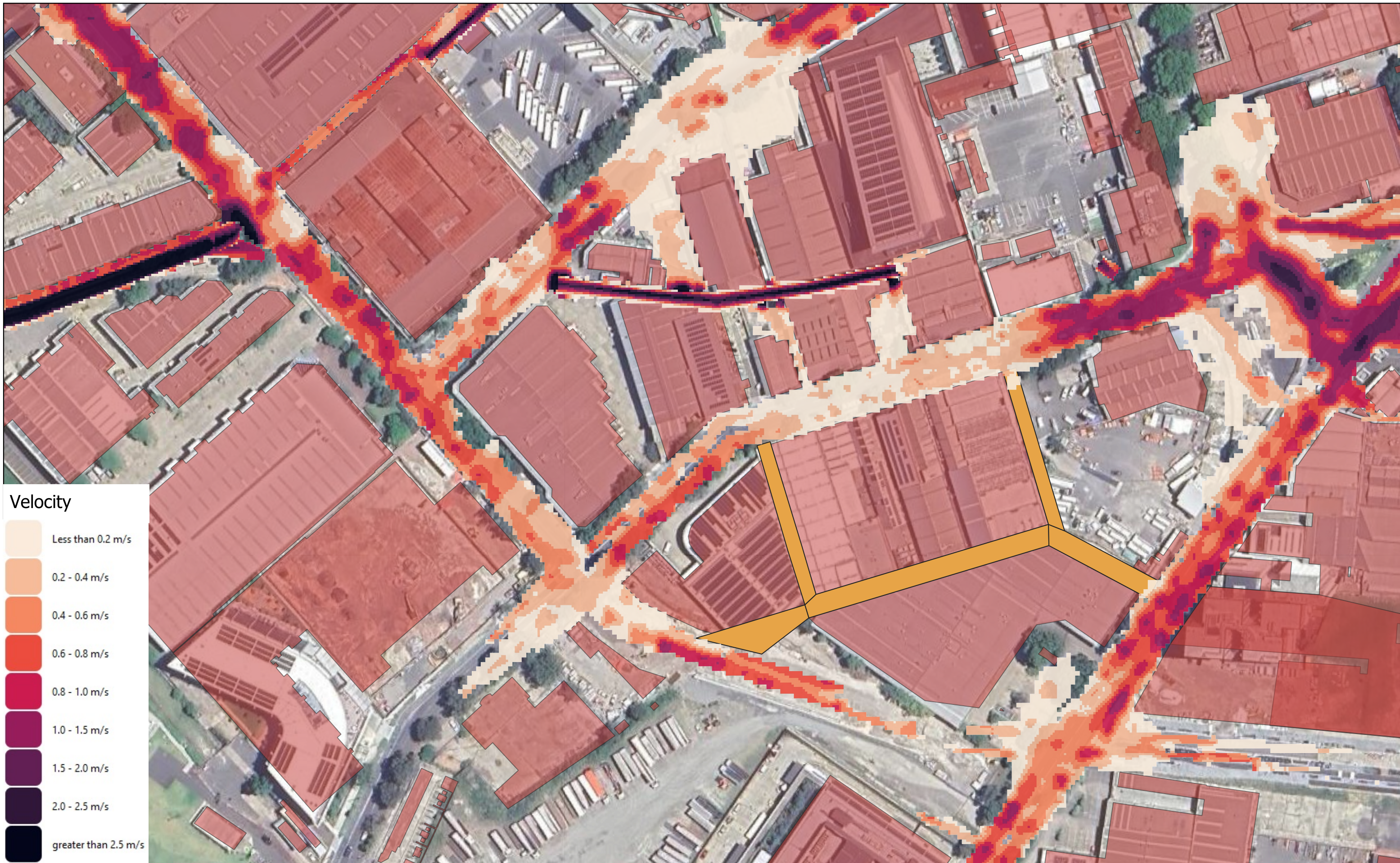
5% AEP Flood Velocity:
Proposed Conditions

enstruct
MEMBER OF WSP

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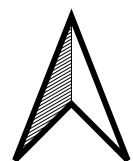
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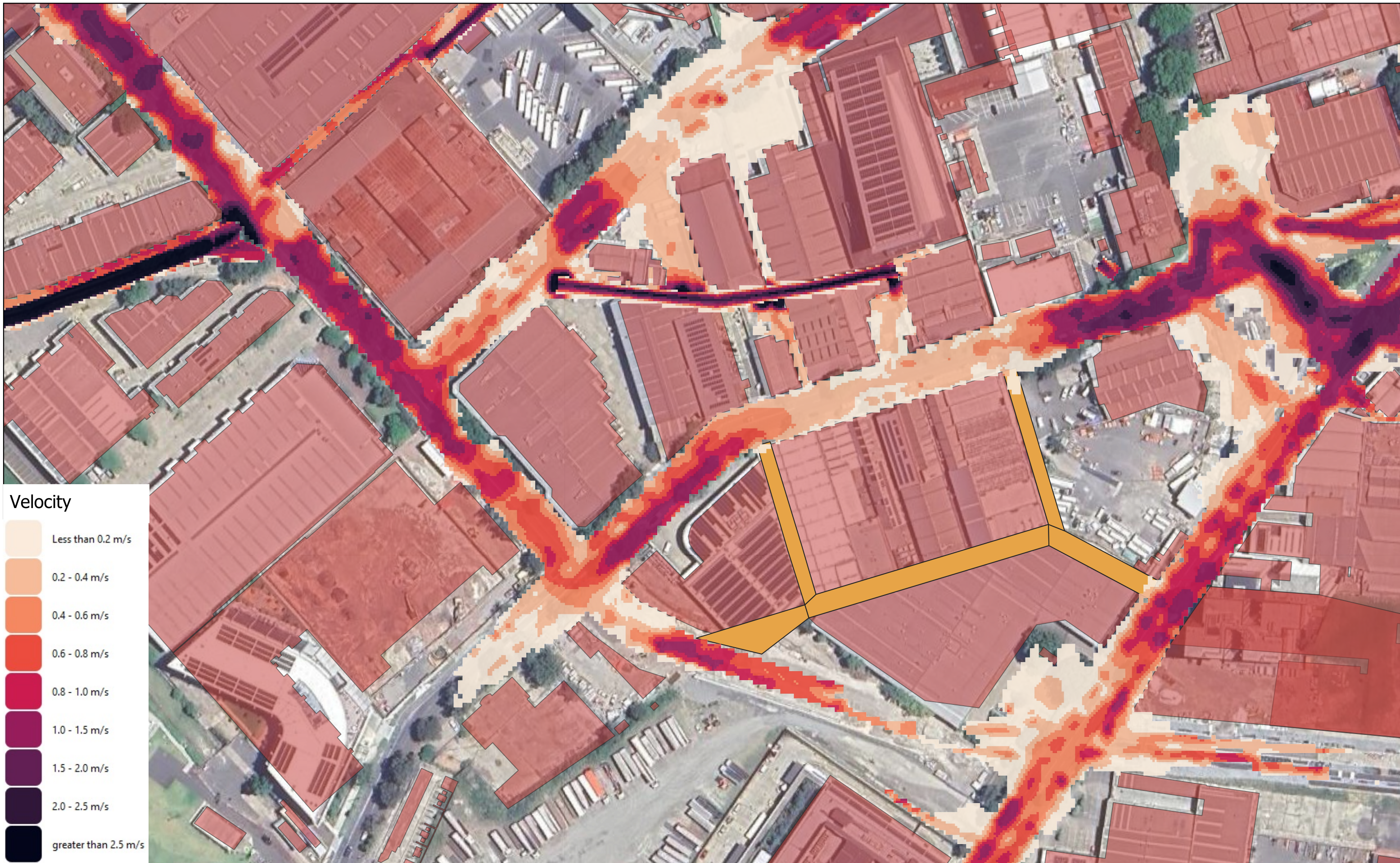
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Proposed Conditions

enstruct
MEMBER OF WSP

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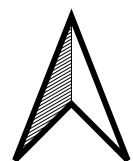
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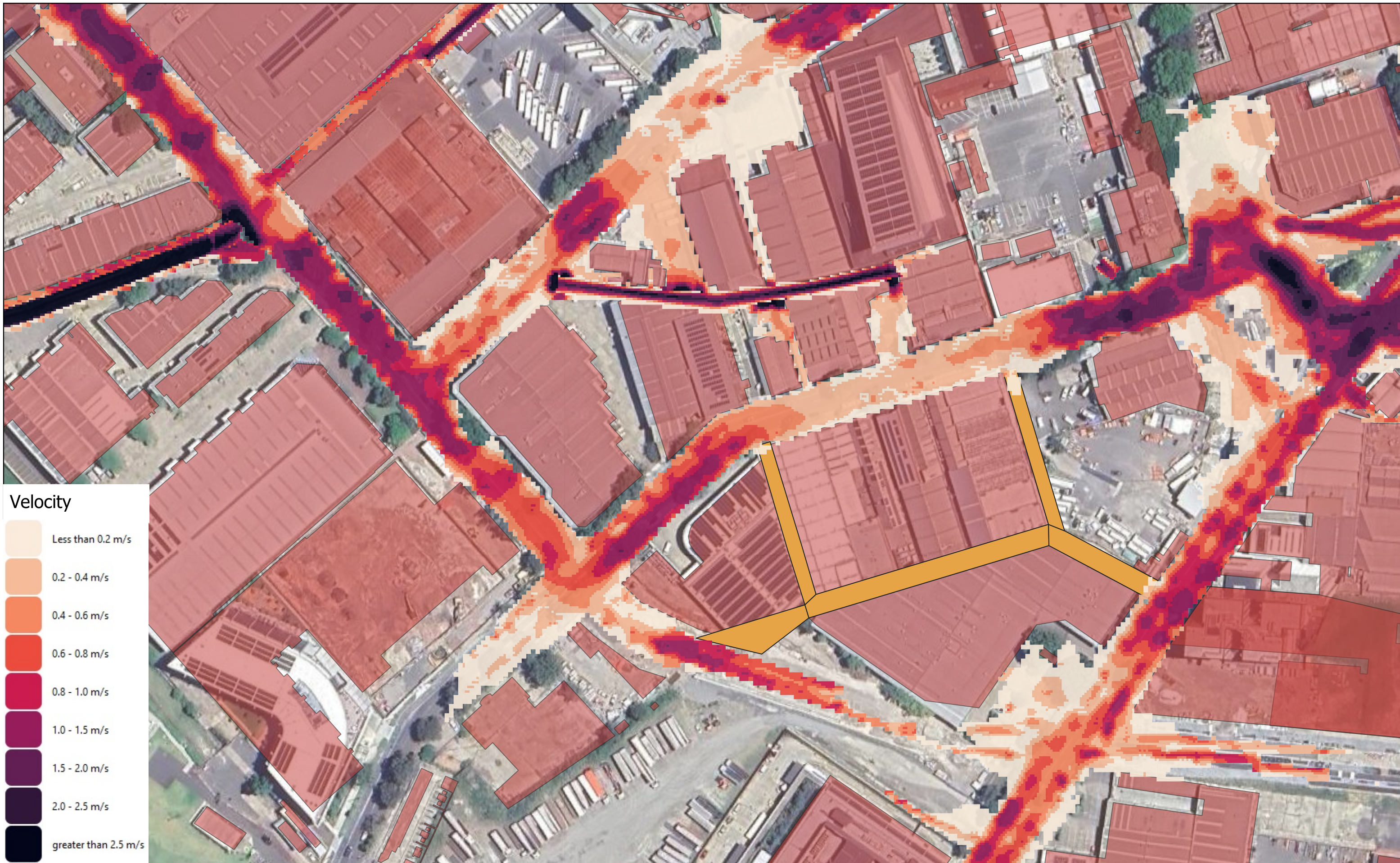
1% AEP + Climate Change
Flood Velocity: Proposed
Conditions

enstruct
MEMBER OF WSP

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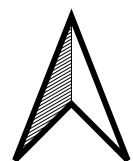
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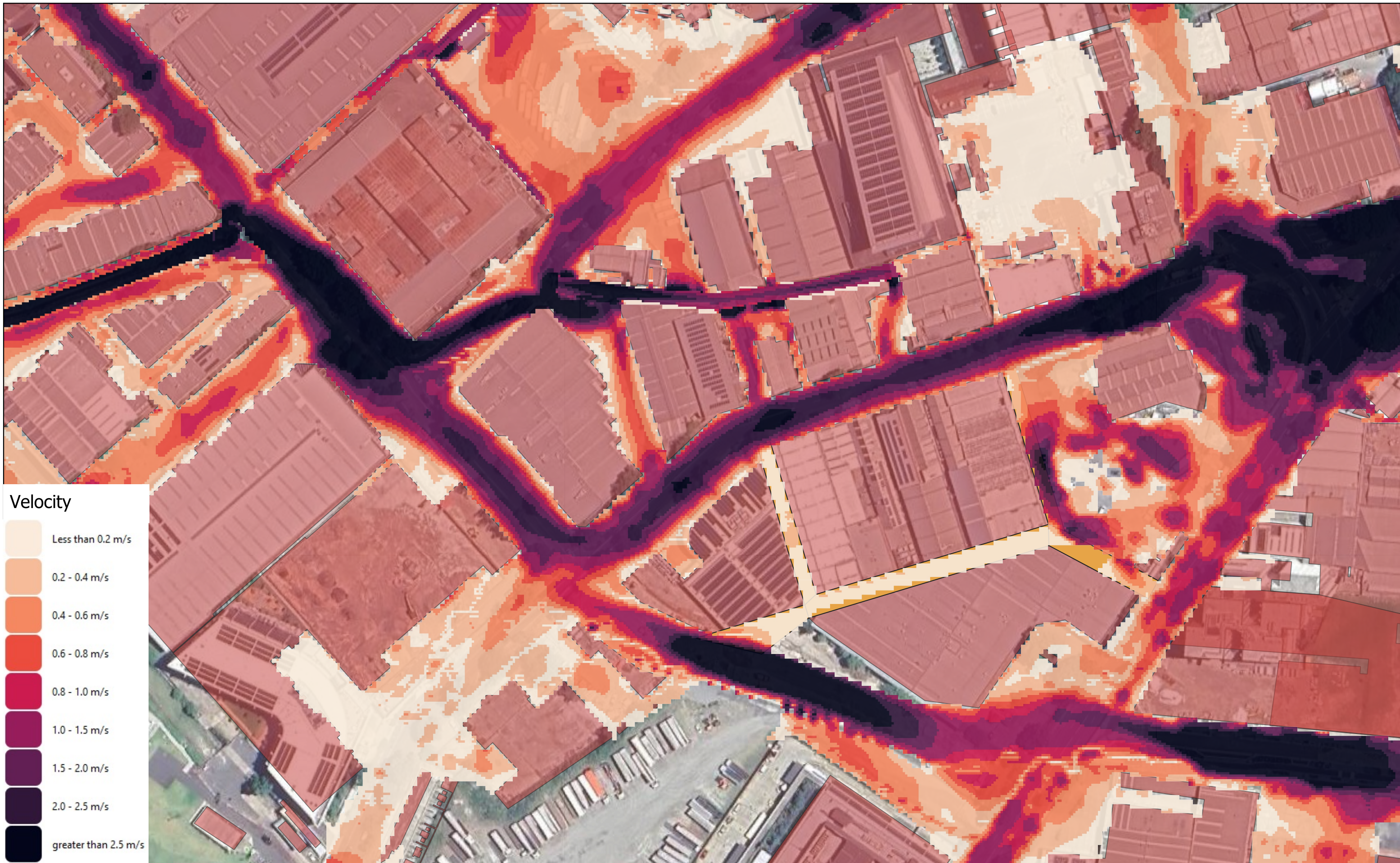
0.2% AEP Flood Velocity:
Proposed Conditions

enstruct
MEMBER OF WSP

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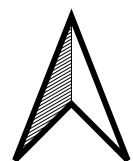
31/05/2024



PMF Flood Velocity: Proposed
Conditions

enstruct
MEMBER OF WSP

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31/05/2024

APPENDIX D

MEMORANDUM:
Alexandra Canal Flood Model Update
WMAwater

Memorandum



TO: Stuart McTaggart
FROM: Michael Reeves
DATE: 3 August 2023
SUBJECT: Alexandra Canal Flood Model Update
PROJECT NUMBER: 117049-04 / 122001

1. INTRODUCTION

The Alexandra Canal catchment has been subject to extensive development in recent years, and there are several new residential and commercial precincts at various stages of development. City of Sydney (CoS) has undertaken a number of flood studies for the Alexandra Canal catchment in the past, with each progressive model update incorporating the most up-to-date information to establish current flood conditions, and also provide a realistic scenario against which to assess the flood impacts of future developments.

Updated flood modelling for the Alexandra Canal catchment has been undertaken utilising the flood model developed for the “Alexandra Canal Catchment Flood Study Model Update – ARR2019 Hydrology” report (WMAwater, September 2020). A ‘2019 Ultimate Development’ scenario was modelled and details of the model development can be found in that report. This scenario has now been updated to the ‘2023 Ultimate Development’ scenario. In addition to this, a ‘2023 Current Day’ scenario has also been modelled.

This model update does not constitute a full Flood Study update, but rather minor updates to the model to ensure that the flood model represents existing conditions and that future developments consider the flood risk appropriately. The existing hydrology (DRAINS modelling) has been retained, including the adopted critical durations and temporal patterns. No calibration has been undertaken or sensitivity analyses.

2. MODEL UPDATES

The model updates applied to the “Alexandra Canal Catchment Flood Study Model Update – ARR2019 Hydrology” (WMAwater, September 2020) model are outlined in Table 1. In addition to this, some changes to the control file structure have been made to simplify the scenarios and files in the model.

Table 1: 2023 'Ultimate Development' scenario model updates

Development	Topography		Stormwater		Buildings	Roughness
	Updated?	Source/comments	Updated?	Source/comments		
Drying Green	✓	Terrain digitised from PDF: <i>20020_004 Overall Layout and Grading.pdf</i>		No change		✓
Gunyama Park Aquatic and Recreation Centre (GPARC)	✓	Terrain digitised from PDF: <i>GPARC WAC.pdf</i>	✓	Stormwater digitised from PDF: <i>DOC3571-v1-TSS WAE 200907 GP-CJA-DWG-CV-1001001 (SW Asbuilt).RevZZ.pdf</i> <i>DOC3572-v1-TSS WAE 200907 GP-CJA-DWG-CV-1001002 (SW Asbuilt).RevZZ.pdf</i>	✓	✓
Green Square to Ashmore Connector (GS2AC)	✓	Design TINs used: <i>60592217-MOD-00-1000-CIV-12D_20210817.12daz</i> <i>60592217-MOD-00-2000-CIV-12D_20210817.12daz</i>		No change. Previous stormwater design in the 2019 'Ultimate Development' scenario adopted.		✓
GSTD SP1		No change	✓	Minor changes to GSTD based on DWG and markup documents from CoS: <i>Proposed Trunk Drain.dwg</i> Note that de-scoped SP1 portion of GSTD (upstream of Rose Valley Way) was included on advice from CoS to model the Epsom Precinct and GSTD in this location. The existing open channel was replaced by 2 x 1.8 m diameter pipes and 2 x 1.85 m x 1.45 m box culverts.		
Joynton Ave and Zetland Ave		Updated as part of GSTC Local Roads.	✓	Stormwater digitised from PDF: <i>6. IFC DRAWING SET - Package 4A GSTC - 24.09.2020 (2).PDF</i> Sheets <i>60300384-SHT-02-4A-G-0702</i> to <i>60300384-SHT-02-4A-G-0711</i> , and <i>60300384-SHT-02-4A-G-0720</i>		
Green Square Library Plaza	✓	Terrain digitised from PDF: <i>AR-C-2170[E].pdf</i>		No change. Drainage within the Plaza not included.		
Portman Street		Updated as part of GSTC Local Roads.	✓	Stormwater included from DXF: <i>2A Drainage Plan Plot 20220627.dxf</i>		

Development	Topography		Stormwater		Buildings	Roughness
	Updated?	Source/comments	Updated?	Source/comments		
Epsom Park	✓	TIN generated from contour information in DWG: <i>100% GA Plan v2.dwg</i>	✓	Stormwater included from DWG: <i>Drainage v2.dwg</i>	✓	✓
Green Square Town Centre (GSTC) Local Roads	✓	The following roads were updated in the model: GSTC Package 1 from design TIN: <i>60300384-MOD-C-02-01-DESIGN-140908.12da</i> GSTC Package 2A (Portman Street) from design TIN: <i>Green Square Package 2A_20211207.12da</i> GSTC Package 2B from design TIN: <i>60300384-MOD-C-02-2B-DES.12da</i> GSTC Package 3A was retained from the Concept Design in the 2019 'Ultimate Development' scenario, which ties in with the other updated GSTC road design files. GSTC Package 3B from design TIN: <i>60300384-REF-C-02-3B-DES_CONT_PLAN.dwg</i> GSTC Package 4A (Joynton Ave and Zetland Ave from WAE survey points): <i>210703 Joynton ave Top AC20 waex.12daz</i> <i>210705 Zetland ave Top Ac20 waex.12daz</i> GSTC Package 4B from design TIN: <i>60300384-MOD-C-02-4B-DES_TIN.dwg</i> GSTC Package 4C from design TIN: <i>60300384-MOD-C-02-4C-DES_TIN.dwg</i>		No change. Previous stormwater design in the 2019 'Ultimate Development' scenario adopted.		
13 Joynton Avenue	✓	Terrain updated from LiDAR data: <i>Sydney202005-LID1-AHD_3346246_56_0002_0002_1m.asc</i>	✓	Stormwater digitised from PDF: <i>13 Joynton Ave Stormwater Drainage WAC.pdf</i>		✓
Joynton Avenue Stormwater		No change.	✓	Update stormwater invert levels based on utility survey information: <i>82114 QMC Joynton Ave_Zetlands_V3.dwg</i> Updated the Joynton Avenue Trunk Drain to design version 10:		

Development	Topography		Stormwater		Buildings	Roughness
	Updated?	Source/comments	Updated?	Source/comments		
				<i>1. Joynton Avenue Trunk Drain Preliminary Design Drawings - rev 10.PDF</i>		
Erskineville Flood Safe Works		No change.	✓	Addition of an 8 m wide kerb inlet at the Coulson Street sag point into the Sydney Water trunk drain, a new transition structure at the junction of the new Ashmore precinct drainage and existing trunk drain, and non-return valves on the Burrows Road local drainage outlets to the Munni Street open channel drain. Based on preliminary design presented in <i>Erskineville Flood Safe – Value Engineering Flood Assessment</i> (WMAwater, Oct 2020)		

Note that these are updates from the “Alexandra Canal Catchment Flood Study Model Update – ARR2019 Hydrology” (WMAwater, September 2020) model

For the 2023 'Current Day' scenario, the changes made to the 2023 'Ultimate Development' scenario are outlined in Table 2. This comprises removal of elements from the 2023 'Ultimate Development' scenario where works have not yet been constructed.

Table 2: 2023 'Current Day' scenario model changes

Development	Details
Joynton Avenue Trunk Drain	Removal of the Joynton Avenue Trunk Drain, including: • Removal of the proposed eastern line (1 x 1.8 m diameter pipe from O'Dea Avenue to Gadigal Avenue). • Removal of the proposed connection from the existing western box culvert (1 x 3.0 m x 1.5 m) crossing Joynton Avenue to the eastern trunk line. • Removal of the proposed twin trunk lines (2 x 1.8 m) that carry combined flow from the proposed eastern and western lines, from Gadigal Avenue to Zetland Avenue. • Capping of one of the O'Dea Avenue 1.5 m diameter pipes north of Joynton Avenue. • The other O'Dea Avenue 1.5 m pipe is connected to the existing Joynton Avenue 1.3 m x 1.0 m box culvert via a 1.35 m diameter pipe. • Connection of the existing 3.0 m x 1.5 m box culvert on the western side of Joynton Avenue to the existing 600 mm diameter pipe near Tilford Street. This line continues south to just upstream of Elizabeth Street. From here it crosses Joynton Avenue and connects to the downstream end of the 2 x 1.35 m pipes from Gadigal Avenue. • The Gadigal Avenue 2 x 1.35 m pipes and the 600 mm pipe are connected to a single 1.5 m pipe. • The eastern Joynton Avenue box culvert (1.3 m x 1.0 m) and 1.5 m pipe mentioned above are connected to a 2.25 m pipe just north of Zetland Avenue. • At Zetland Avenue, the 2.25 m pipe discharges into 2 x 1.8 m diameter pipes that run west. This is part of the trunk upgrades that has been constructed and remains as per the 'Ultimate Development' downstream of Zetland Avenue.
Erskineville Flood Safe Works	Removal of the Erskineville Flood Safe Works. This includes the removal of the Coulson Street inlet, the transition structure at the junction of the new Ashmore precinct drainage and existing trunk drain, and non-return valves on the Burrows Road local drainage outlets to the Munni Street open channel (as described in Table 1). This also includes removal of the Munni Street Drain culvert transition structure crossing under Euston Road to be undertaken as part of the WestConnex works. This was included as part of the 2019 'Ultimate Development' scenario, and hence not listed as an 'update' in Table 1. It has been removed for the 'Current Day' scenario.

Note that these are changes to the 2023 'Ultimate Development' scenario as described above

3. RUNNING THE MODEL

The model was developed using TUFLOW software. The model has been set up using the standard TUFLOW format. The base TCF is AC19.tcf. This can be renamed with relevant events (~e1~) and scenarios (~s1~) if required. The model should be run in version 2018-03-AD_iSP, as per the previous model. For each design event, two durations should be run (30 minute and 60 minute), with the envelope of both durations taken as the final design flood behaviour for that event. The only exception is the PMF event, which adopts the 90 minute storm. A set tailwater condition and blockage scenario has also been adopted for each event. The model can be run for the 'Current Day' scenario or 'Ultimate Development' scenario. Both scenarios should be run, and the one resulting in highest flood levels in the study area should be adopted for flood assessments. The events and scenarios for each model run are outlined in Table 3. Batch files have been included with the setup of these runs.

Table 3: Design flood simulation events and scenarios

Design Storm Event	Storm Event -e1	Duration -e2	Temporal Pattern -e3	Tailwater -e4	Hydrology -s1	Blockage -s2	Development Scenario -s3
50% AEP	002yr	030m	S08	TW002YR	AR16	G020S050	CurDay or RevUltim
	002yr	060m	S03	TW002YR	AR16	G020S050	
20% AEP	005yr	030m	S08	TW005YR	AR16	G020S050	
	005yr	060m	S03	TW005YR	AR16	G020S050	
10% AEP	010yr	030m	S04	TW010YR	AR16	G020S050	
	005yr	060m	S10	TW010YR	AR16	G020S050	
5% AEP	020yr	030m	S04	TW020YR	AR16	G020S050	
	020yr	060m	S10	TW020YR	AR16	G020S050	
2% AEP	050yr	030m	S05	TW050YR	AR16	G020S050	
	050yr	060m	S08	TW050YR	AR16	G020S050	
1% AEP	100yr	030m	S05	TW100YR	AR16	G020S050	
	100yr	060m	S08	TW100YR	AR16	G020S050	
0.5% AEP	200yr	030m	S05	TW100YR	AR16	G020S050	
	200yr	060m	S08	TW100YR	AR16	G020S050	
0.2% AEP	500yr	030m	S05	TW100YR	AR16	G020S050	
	500yr	060m	S08	TW100YR	AR16	G020S050	
PMF	PMP	090m		TW100YR		G020S050	

Note: A blank cell means that no input for this event or scenario is required

APPENDIX E

MEMORANDUM:

Proposed development 28 – 32 Bourke Rd,
Alexandria Reticulated sewer network performance
during dry and wet weather operation.

GHD

Technical Memorandum

February 17, 2023

To	Mr Jonathan Moss		
Copy to	Ricky Bligh, Dale Lovett		
From	Ruan Wolfaardt	Tel	+61 2 9239 7209
Subject	Proposed development 28 – 32 Bourke Rd, Alexandria Reticulated sewer network performance during dry and wet weather operation	Project no.	12603487

1. Introduction

Alexandria Property Development Pty Ltd are proposing to develop a multi-purpose health facility at Lot 1 DP324707 28-32 Bourke Rd, Alexandria NSW. It is understood the facility will include a mental health facility and medical centre.

Johnstaff Projects (NSW) Pty Ltd has engaged GHD Pty Ltd to assist with informing stakeholders on the expected operation of wastewater services for the proposed development during design flood events.

A Sydney Water Notice of Requirements (NOR) dated 28 November 2022 (Attachment 1), has been received by the developer for the proposed development, in accordance with the requirement of the Section 73 Subdivider/Compliance Certificate (Sydney Water Act 1994). The notice provides conditions by which the proposed development can connect to the existing Sydney Water reticulated sewer network.

Based on information provided by consultants performing stormwater investigations for the development, it is understood that the proposed development site may have high water levels in an adjacent roadway during a 1% AEP flood event, as shown in Figure 1.

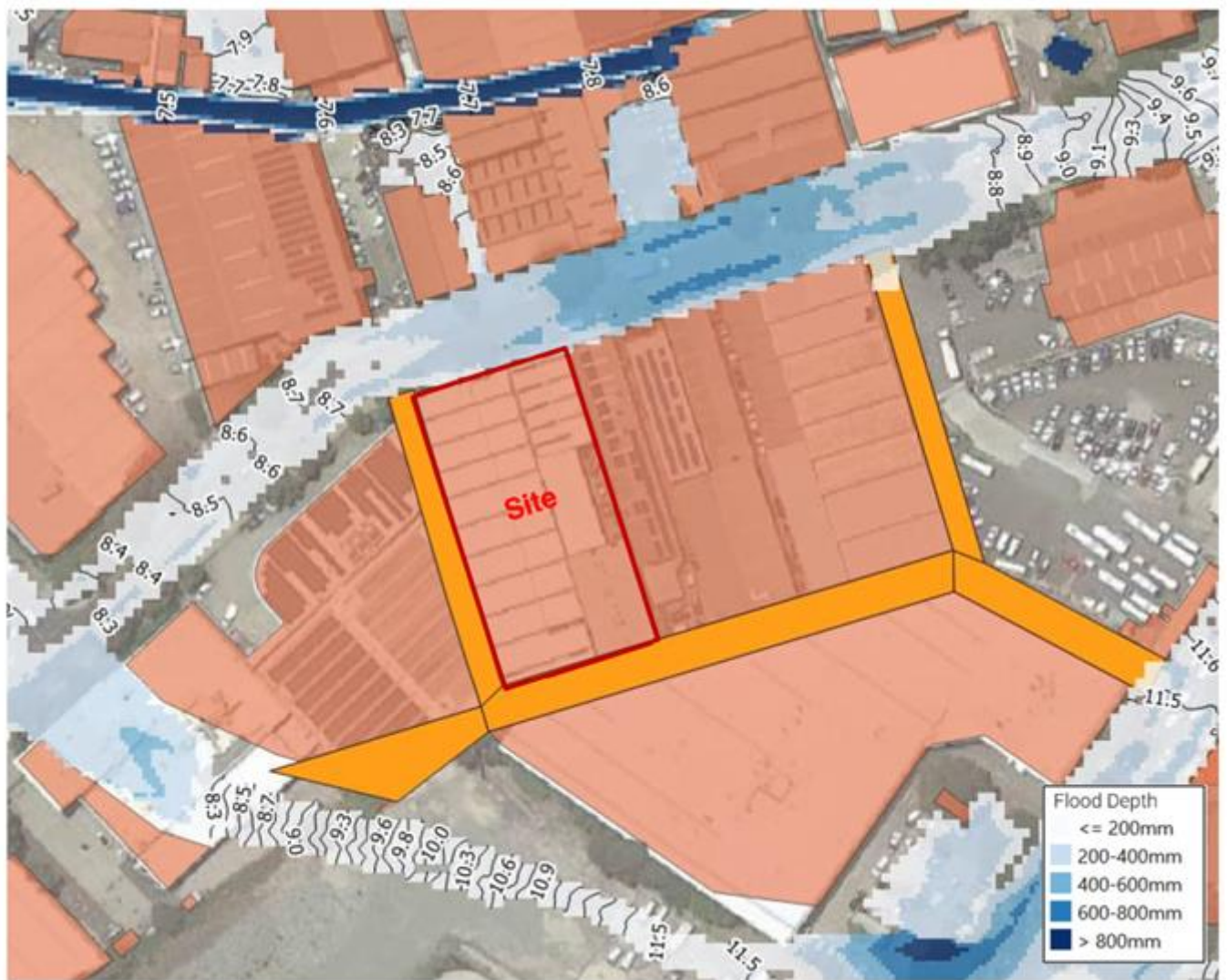


Figure 1 Modelled flood depth for 1% AEP event around proposed development site

1.1 Purpose of this Memorandum

The purpose of this Technical Memorandum (Tech Memo) is to inform the reader on the typical design and operation of wastewater services (building services and reticulated sewers) during wet weather events and how it relates to the Sydney region, and proposed development in Alexandria. This Tech Memo documents:

1. Review of the Sydney Water Notice of Requirements (NOR) for Sewer Connection for the proposed development.
2. High level comment on:
 - Typical reticulated sewer network operation.
 - Typical building services regarding wastewater servicing.
 - Relevant standards and guidelines used in engineering design.

The client also requested high level comment on drinking water supply to the proposed development during wet weather events. This Tech Memo documents:

3. Review of the Sydney Water Notice of Requirements (NOR) for Water Connection for the proposed development.
4. High level comment on:
 - Typical reticulated drinking water network operation.
 - Typical building services regarding drinking water servicing.
 - Relevant standards and guidelines used in engineering design.

1.2 Scope and limitations

This memorandum has been prepared by GHD for Johnstaff Projects (NSW) Pty Ltd based on relevant standards and guidelines for connection to reticulated sewer services in Sydney and an overview on typical sewer design.

This memorandum is limited to only providing the reader insight into typical sewer design and operation including in wet weather events. No engineering design was undertaken.

This memorandum: has been prepared by GHD for Johnstaff Projects (NSW) Pty Ltd and may only be used and relied on by Johnstaff Projects (NSW) Pty Ltd for the purpose agreed between GHD and Johnstaff Projects (NSW) Pty Ltd as set out in section of this memorandum.

GHD otherwise disclaims responsibility to any person other than Johnstaff Projects (NSW) Pty Ltd arising in connection with this memorandum. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this memorandum were limited to those specifically detailed in the memorandum and are subject to the scope limitations set out in the memorandum.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the memorandum. GHD has no responsibility or obligation to update this memorandum to account for events or changes occurring subsequent to the date that the memorandum was prepared.

The opinions, conclusions and any recommendations in this memorandum are based on assumptions made by GHD described in this memorandum (refer section(s) 1.2). GHD disclaims liability arising from any of the assumptions being incorrect.

2. Wastewater and drinking water servicing

Sanitary wastewater systems in Australia are separate from the stormwater system. They are designed to convey wastewater (typically bathroom, laundry, kitchen etc) from the building via sanitary plumbing (refer to Section 2.1 for typical building services details) to the relevant water authority's reticulated sewer network (see Figure 2). Rainfall and stormwater runoff is conveyed via a separate stormwater system.

The authority responsible for sewer services for the proposed development is Sydney Water, under the Sydney Water Act 1994 (see Section 3 for details of sewer network planning and design).

The authority responsible for drinking water services for the proposed development is Sydney Water, under the Sydney Water Act 1994 (see Section 4 for details of reticulated water network planning and design).

The Sydney Water Customer Contract (Operating Licence Schedule 4) sets out the rights and obligations of customers and sets out the minimum standards of customer service that can be expected.

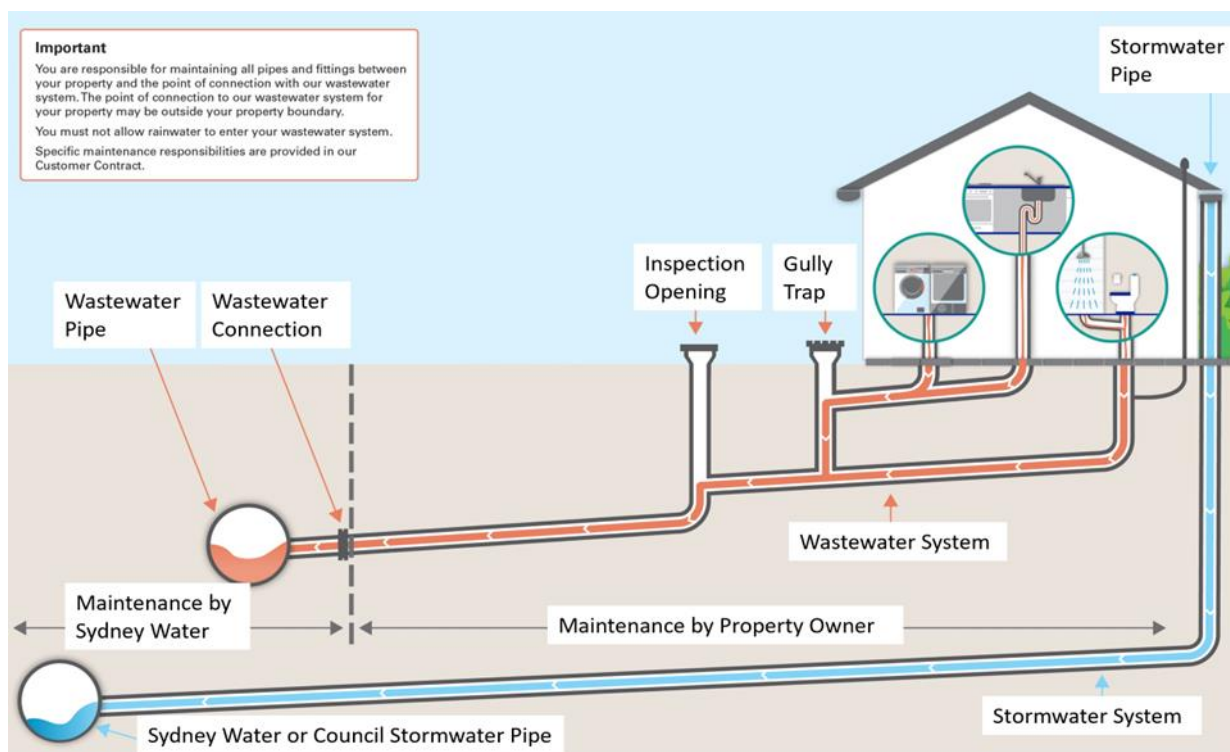


Figure 2 Typical connection of building wastewater services to authority sewer system (Sydney Water 2022)

2.1 Building services

Wastewater

The in ground sewer system located within the confines of the property boundary is known as 'Sanitary Drainage'. The property sanitary drainage system collects wastewater from ablution, laundry, kitchen and treated trade waste areas and generally discharges to a single connection point to the utility sewer network. For Alexandria, this is the Sydney Water network.

Sanitary drainage connected to the Sydney Water network is required to be designed and installed to the requirements of the National Construction Code (NCC) Volume 3 – The Plumbing Code of Australia, AS/NZS 3500.2 and any Sydney Water requirements.

To protect the building from a sewer surcharge in the event of blockage or overloading, possibly caused by excess stormwater ingress in a flood event, every sanitary drainage system is required to be fitted with an overflow relief gully. The top of the overflow gully should be located externally to the building and at least 150mm below the ground floor level of the building, thereby preventing sewage from surcharging within the building.

Sometimes it is not possible to install an overflow relief gully. This would occur most often in inner city or built-up areas where buildings are built up to the property boundary. There are alternative provisions nominated in AS/NZS 3500.2, where these cannot be met, ground floor fixtures only may discharge through a reflux/non-return valve to the sewer by gravitation.

In designated flood affected areas, the top of the overflow gully riser is required to be finished at a level not less than 150 mm above the declared flood level or sealed with a removable watertight cover with a vent of the same size as the gully, terminating at a level not less than the declared flood level. Where either of these requirements cannot be achieved, no sanitary drain may gravitate to the network utility operator's sewer.

Where buildings have floor levels located below ground, the sanitary drainage from these fixtures will normally discharge to a pump well. The contents are then pumped to the ground level sanitary drainage system for gravitational discharge to the network sewer. Discharge to the sewer network is normally limited by the utility operator to approximately 2 L/s.

In older Sydney Water administered areas a boundary trap is required before the connection to the sewer network. This is a below ground gully trap to prevent sewer gases entering the sanitary drainage system.

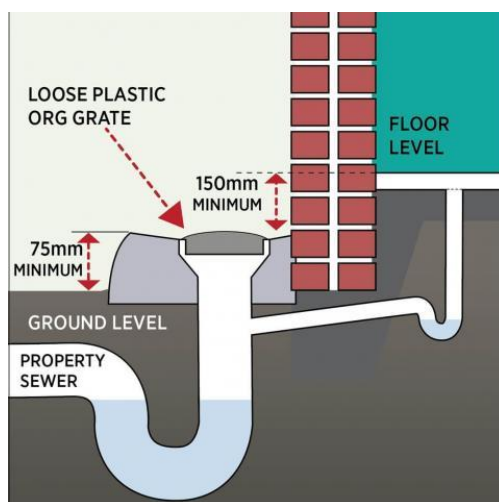


Figure 3 Typical overflow relief gully location and clearance dimensions (QBCC 2020)

Freshwater

The building will be supplied by a metered freshwater connection to the Sydney Water main with appropriate backflow mitigation.

The building reticulated water system is required to be designed and installed to the requirements of the National Construction Code (NCC) Volume 3 – The Plumbing Code of Australia, AS/NZS 3500.1 and any Sydney Water requirements.

Where the available pressure within the town main is insufficient to meet the desired residual pressure at the hydraulically most remote point of the system, a pressure boost pump set will be required.

The pressure boost pumps are powered by electric motors and controlled by an adjacent switchboard. The pumps and associated electrical equipment are at risk of failure in a flood event if located at a level below the flood line. Water supply may still be maintained at levels within the building that the residual town main pressure has capacity to reach. The pressure experienced at upper floor levels may be reduced or non-existent without the assistance of the pumps.

3. Planning and design of sewer networks in Sydney

Reticulated sewer networks are designed to convey wastewater from the property connection point to the treatment plant (see Figure 4). The Water Services Association of Australia Gravity Sewerage Code states that the “overall objective is to provide a functional system that meets Water Agency obligations under applicable legislation, acts and/or regulations, its operating licence, and its customer contract for provision of sewerage services.”

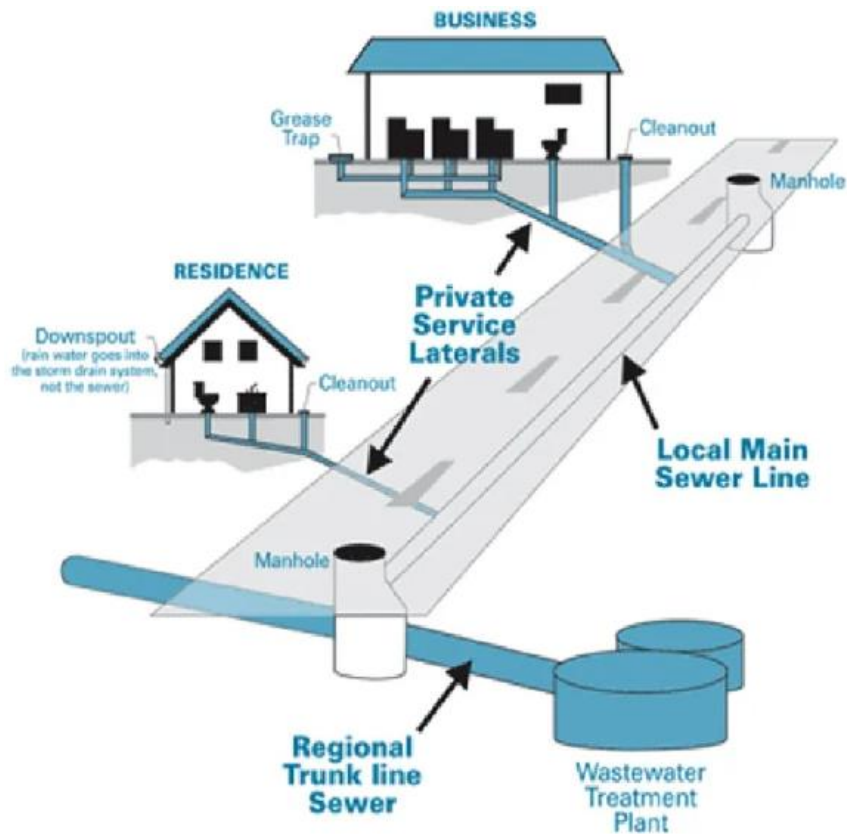


Figure 4 Typical sewer system design (extracted from: Design of Sewer System – Civil Engineers PK)

The typical wastewater system conveys sewage towards a wastewater treatment plant under gravity, where the difference from high to low elevation naturally facilitates flow. When a gravity-based alignment is not possible, it is common for wastewater to be forced uphill through a sewage pumping station (see Figure 5).

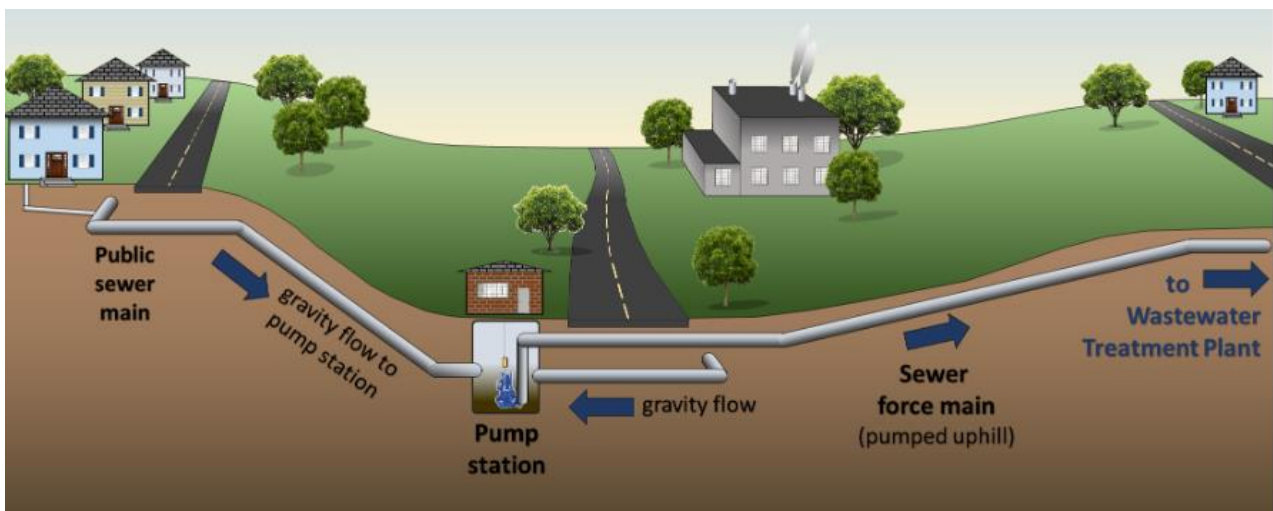


Figure 5 Typical wastewater system overview (extracted from Des Moines Metropolitan Wastewater Reclamation Authority)

Gravity sewer systems in Sydney are designed in accordance with the Water Services Association of Australia Gravity Sewerage Code of Australia (WSA 02-2014 V 3.1) and applicable Sydney Water codes, standards and guidelines. Where pump stations are required, they are to be designed to the Sewage Pumping Station Code of Australia (WSA 04-2005 V 2.1) and applicable Sydney Water codes, standards and guidelines.

As detailed in WSA Gravity Sewerage Code, the total sewer system is made up of transport, treatment, and disposal / reuse. The transportation process consists of three functional elements, namely trunk, branch, and reticulation subsystems (see Figure 6). Each of these subsystems may comprise a network of sewers, storage structures and sewage pump stations (SPSs) that collect and transport sewage from households, businesses, and industries to a sewage treatment plant for treatment and disposal of effluent and other by-products.

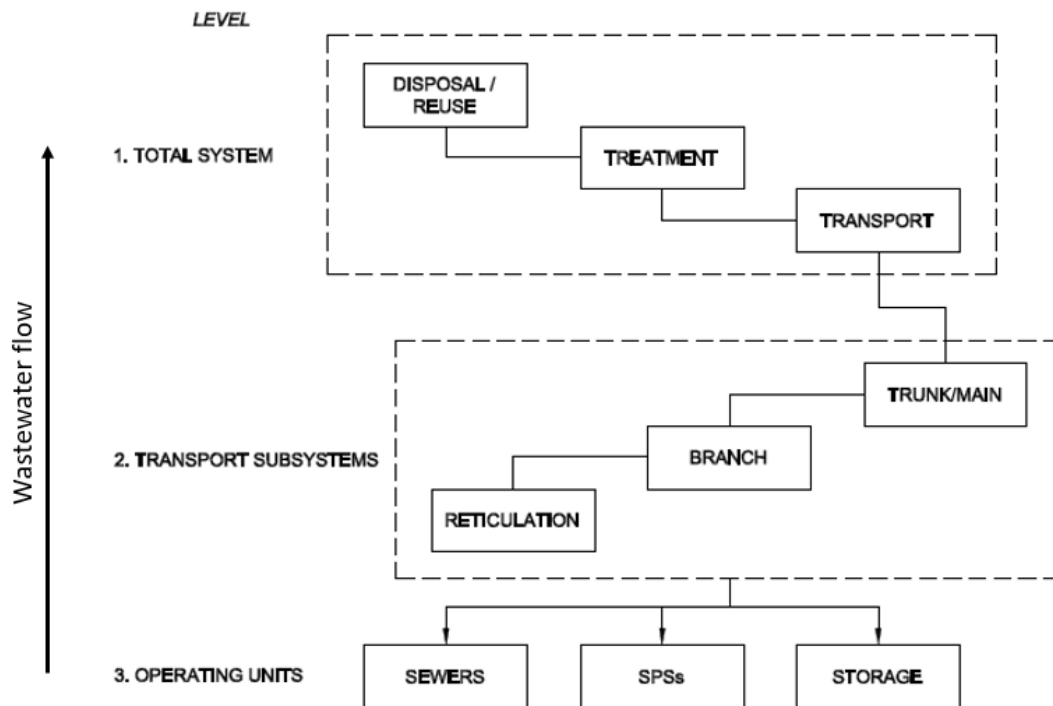


Figure 6 Disaggregation model for transportation subsystems (extracted from WSA 02-2014 V 3.1)

Each sewer is comprised of pipes and any associated fittings, ventilation, and maintenance structures. Reticulation sewer pipes, including property connection sewers, transfer sewage away from residential, commercial, and industrial properties. Reticulation pipes within a reticulation area are then connected by branch sewers, which are typically of larger diameter. The sewage then reaches a treatment facility through even larger trunk sewers.

Overflow or emergency relief structures (ERSs) within the sewer network allow controlled overflow from the wastewater system. This protects public health by reducing the risk of raw sewage being discharged from maintenance holes, gully traps and internal fittings such as floor wastes, sinks and toilets. ERSs aid in allowing continuous operation of sewer infrastructure including the use of toilets etc during wet weather.

Sewer systems are designed to operate separately from any stormwater system, and ideally no rainwater should enter the system. However, sewers can over time develop faults, such as cracks and separated joints. These faults and intrusions may allow rainwater and groundwater to enter, or infiltrate, during and following wet weather. Given this, sewer infrastructure is typically designed to accommodate additional wet weather flow (design wet weather flow).

Therefore, a sewerage transport network (reticulated sewer) is designed to transfer Design Flow i.e., all dry weather flows and design wet weather flows (includes additional flows generated by inflow and infiltration (I/I)), as shown in Figure 7).

$$\text{Design flow} = \text{PDWF} + \text{GWI} + \text{RDI}$$

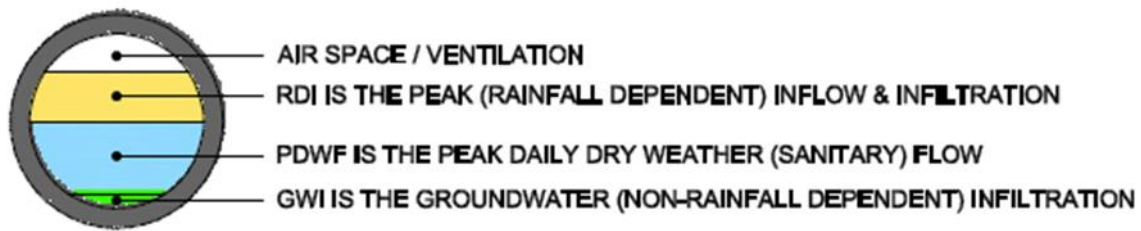


Figure 7 Flow components in a gravity system (extracted from WSA WSA 02-2014 V 3.1)

Rainfall derived infiltration and inflow (RDII) models are commonly used in characterising wet weather responses in the reticulated sewer system. The components of flow in sewers in response to wet weather events is generally accepted as comprising of the following, as represented in Figure 8 below:

- groundwater infiltration (GWI) component related to antecedent moisture conditions preceding wet weather events,
- a base wastewater flow (BWF), otherwise known as dry weather flow, component, and
- rainfall derived infiltration and inflow (RDII).

It is noted that there is often a time difference between the peak in rainfall event/flooding event and the peak of wet weather flow in the sewer system, depending on where storm event has occurred and the characteristics of the individual sewer network.

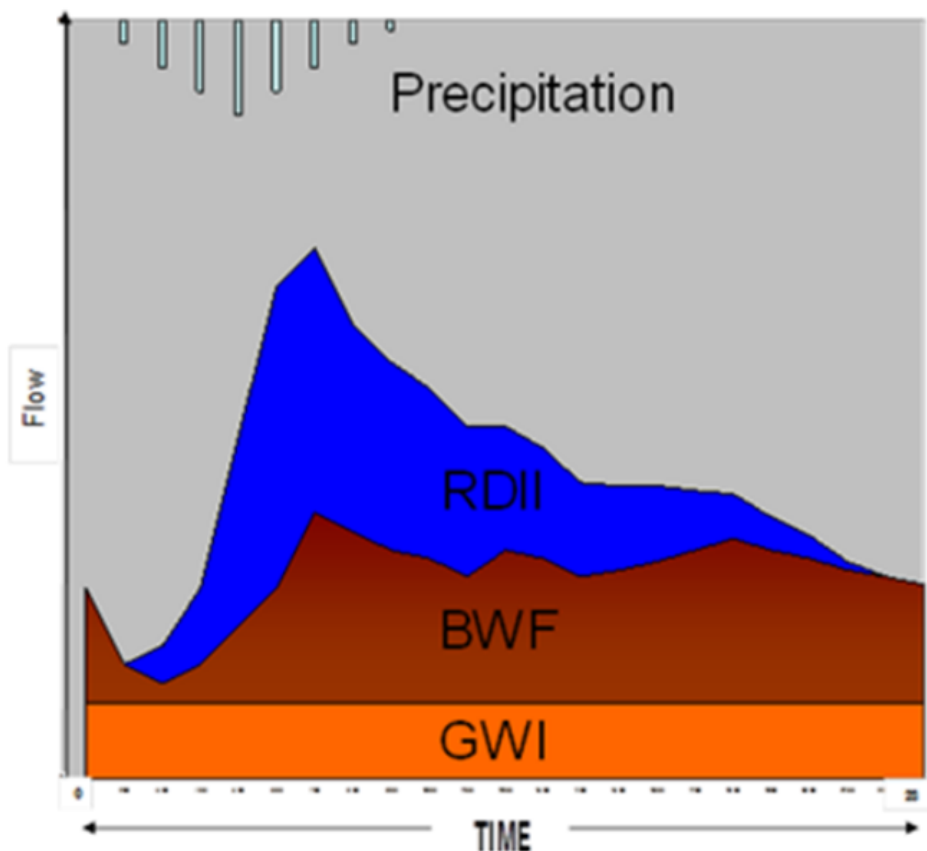


Figure 8 Components of wet-weather wastewater flow during a rainfall event (US EPA, 2007)

Sewer networks are designed so that if flows exceed the design capacity there are points in the network where the sewage is discharged at controlled points (ERS's) rather than backing up in the system and causing uncontrolled wastewater overflows.

Sydney Water's wastewater system is designed to have additional capacity to contain the extra flows entering the system during and after heavy rainfall. Though in extreme wet weather events, wastewater flows can exceed the system's capacity. As a safety measure ERS's are used to help prevent wastewater overflows from being released through maintenance holes or private plumbing connections.

3.1 Connection of proposed development to Sydney Water sewer

The Sydney Water NOR for the proposed development (Section 3.2) states that the Section 73 application had been assessed "... and found that:

- *The existing 225 mm CL sewer main will serve the development.*
- *You must construct a waste water main extension to serve your development...."*

It is understood from the information provided in email on behalf of Johnstaff Projects, dated 03 February 2023, that the proposed ground floor of the building finished floor level (FFL) is 10.40 mAHD (to be above the PMF flood event), with a basement below which is protected from flooding up to 10.40 mAHD. The provided survey plan of detail (Attachment 2) indicates that ground level along Bourke Road is around 8.50 mAHD.

Based on available GIS information the Sydney Water 225 mm gravity sewer main fronts the proposed development site in Bourke Road and is part of the Malabar Wastewater System (refer to Figure 9 and Figure 10). The available information shows that the 225 mm gravity reticulation sewer connects to a 375 mm branch gravity sewer, with downstream surface levels as shown in Figure 10. The gravity branch sewer conveys the wastewater to sewerage pump station SP0039 (5.23 mAHD), where it is then forced under pressure into a large trunk main.

An overflow weir (ERS) located towards the end of the 375 mm branch sewer (upstream of SP0039) is recorded as having an overflow level of 4.26 mAHD and provides an overflow point to Sheas Creek.

Based on sewer network design principals, the available levels of the proposed development and Sydney Water overflow point (ERS), it is expected that the proposed development wastewater services would continue to operate effectively during wet weather events.

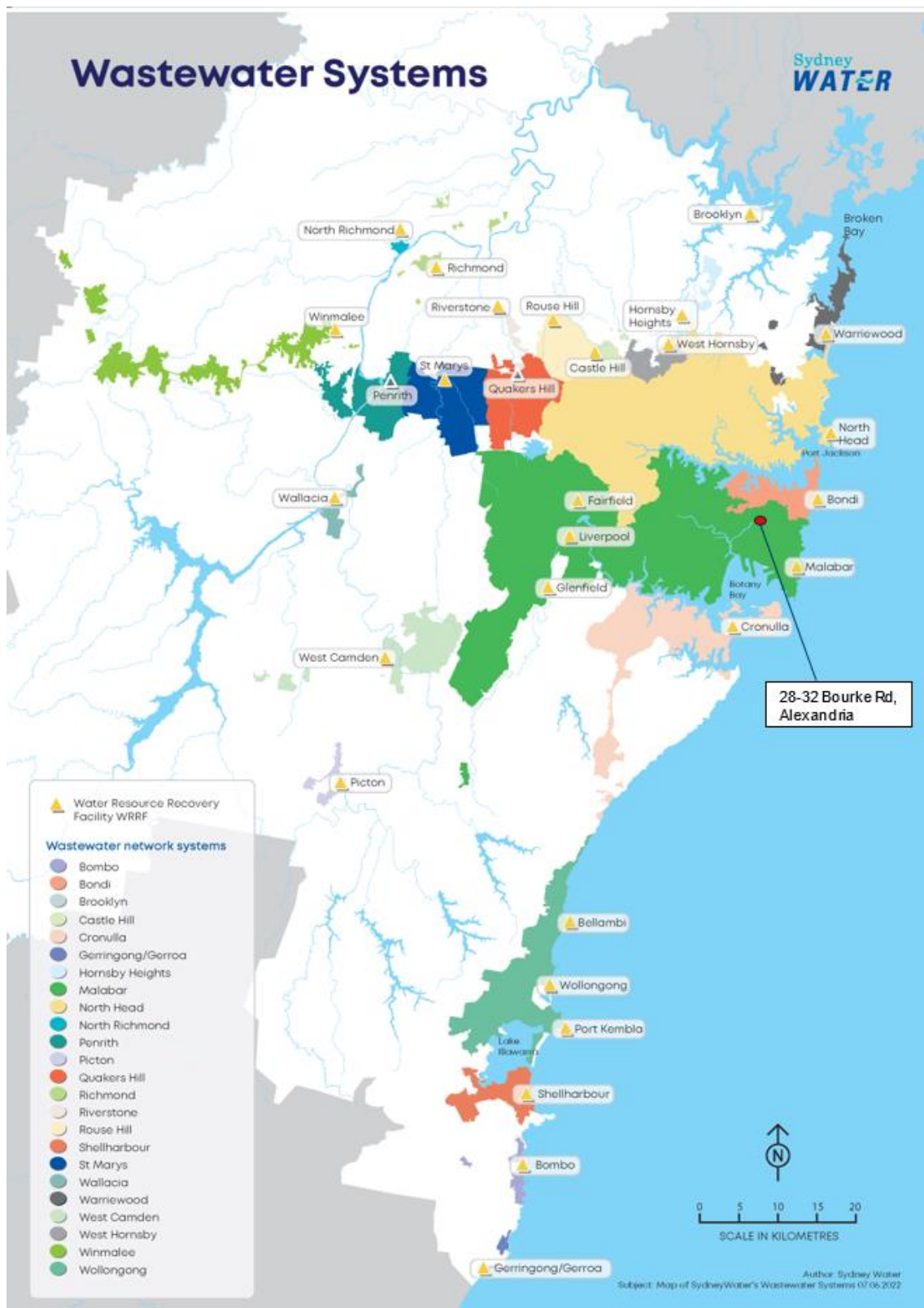


Figure 9 Sydney Water wastewater systems

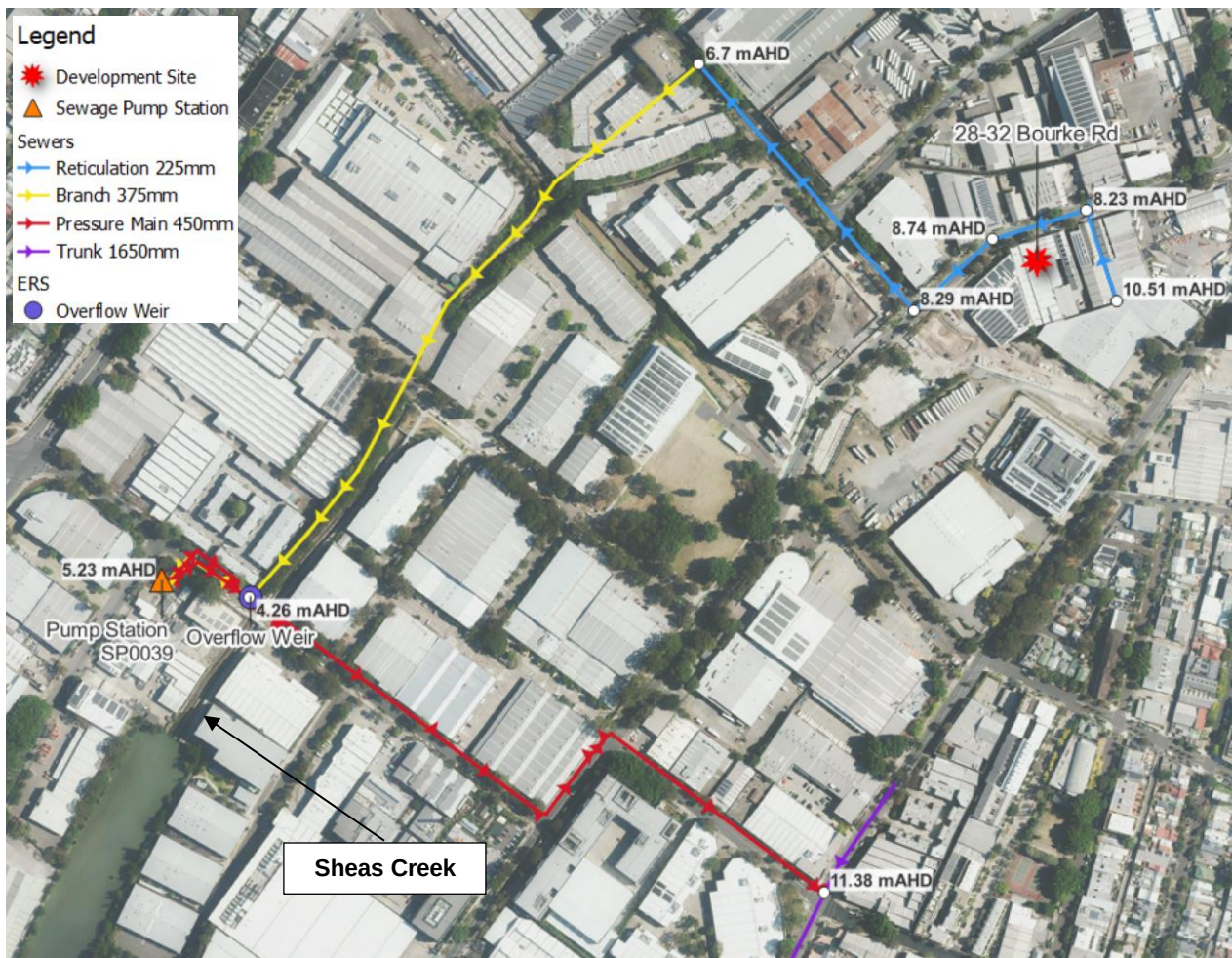


Figure 10 Available existing sewer network servicing proposed development site details

4. Planning and design of reticulated drinking water systems in Sydney

Drinking water networks are designed to transfer potable water safely from treatment plants/service reservoirs to customer connections (see Figure 11). The Water Services Association of Australia Water Supply Code states the overall objective as “... a water supply system that meets the Water Agency’s obligations under its operating licence and customer contract for water quality, continuity of supply and pressure at the draw-off point.”

The Sydney Water Customer Contract sets out conditions and minimum service standards for the supply of water:

- Drinking water quality (CI 3.1.2)
 - To comply with the health related guidelines provided in the Australian Drinking Water Guidelines except to the extent otherwise specified by NSW Health, as required by the Operating Licence.
- Drinking water pressure (CI 3.1.4)
 - Minimum of 15 metres head of pressure at the point of connection to Sydney Water’s water system (recognised as suitable for residential customers and non-residential customers).

The Sydney Water Drinking Water Manual is the overarching manual for the Drinking Water Quality Management System required under Sydney Water’s Operating Licence, and describes the method for assuring the quality and quantity of drinking water supplied to customers.

Drinking water systems in Sydney are designed in accordance with the Water Services Association of Australia Water Supply Code of Australia (WSA 03-2011 V 3.1 Sydney Water Edition 2014) and applicable Sydney Water codes, standards and guidelines.

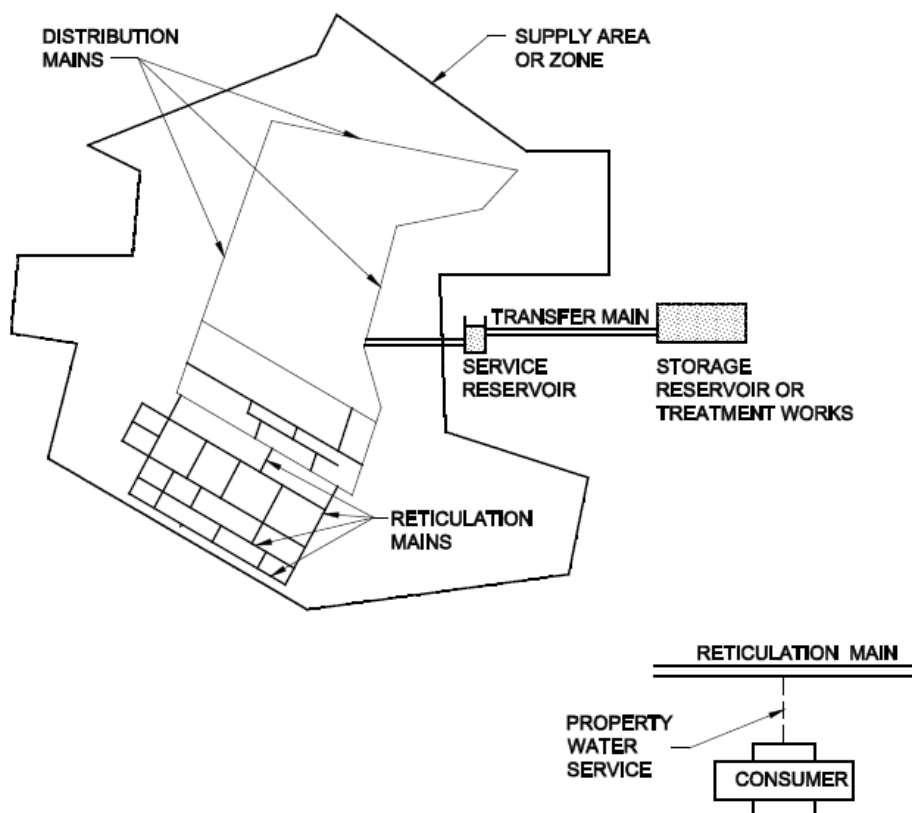


Figure 11 Typical water supply system (extracted from WSA 03-2011 V 3.1 – Sydney Water Edition 2014)

Drinking water systems are generally designed to reticulate from a service reservoir to customer connection points within a water supply zone. Some areas are pressure boosted as and when required. The network is

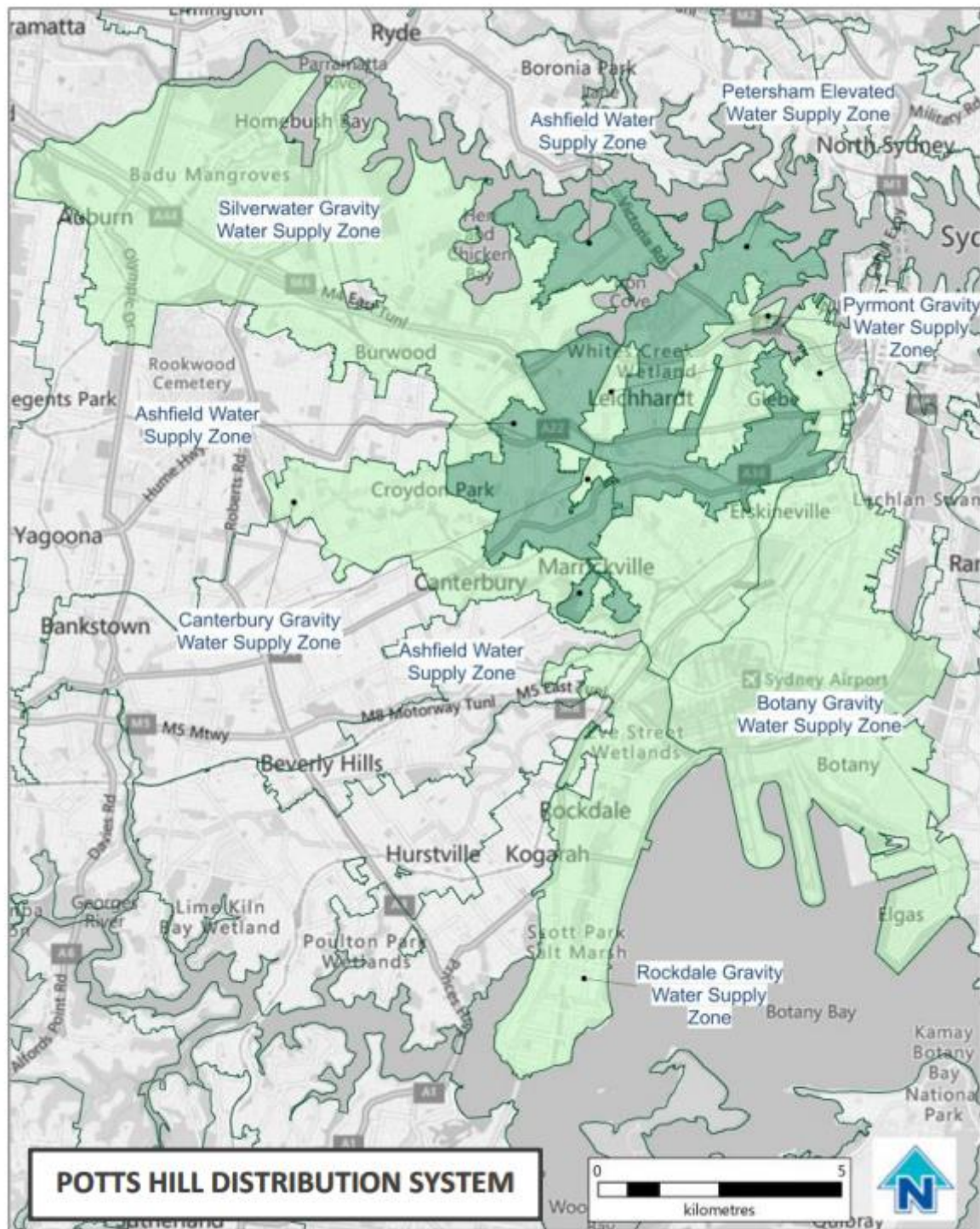


Figure 13 Potts Hill Water Distribution System (extracted from: Sydney Water Potts Hill Water Distribution Network Capacity Report)

Based on available information it is understood the proposed development is within the area supplied by the Petersham and Crown Street Reservoirs (refer to Figure 14). As previously stated, it is understood from the information provided that the proposed ground floor of the building finished floor level (FFL) is 10.40 mAHd.

Predicted actual network pressure for the proposed development during a designated design demand period would need to be checked using Sydney Water hydraulic network models. It is noted that water systems are designed for peak demand, which are not normally expected to occur during wet weather events.

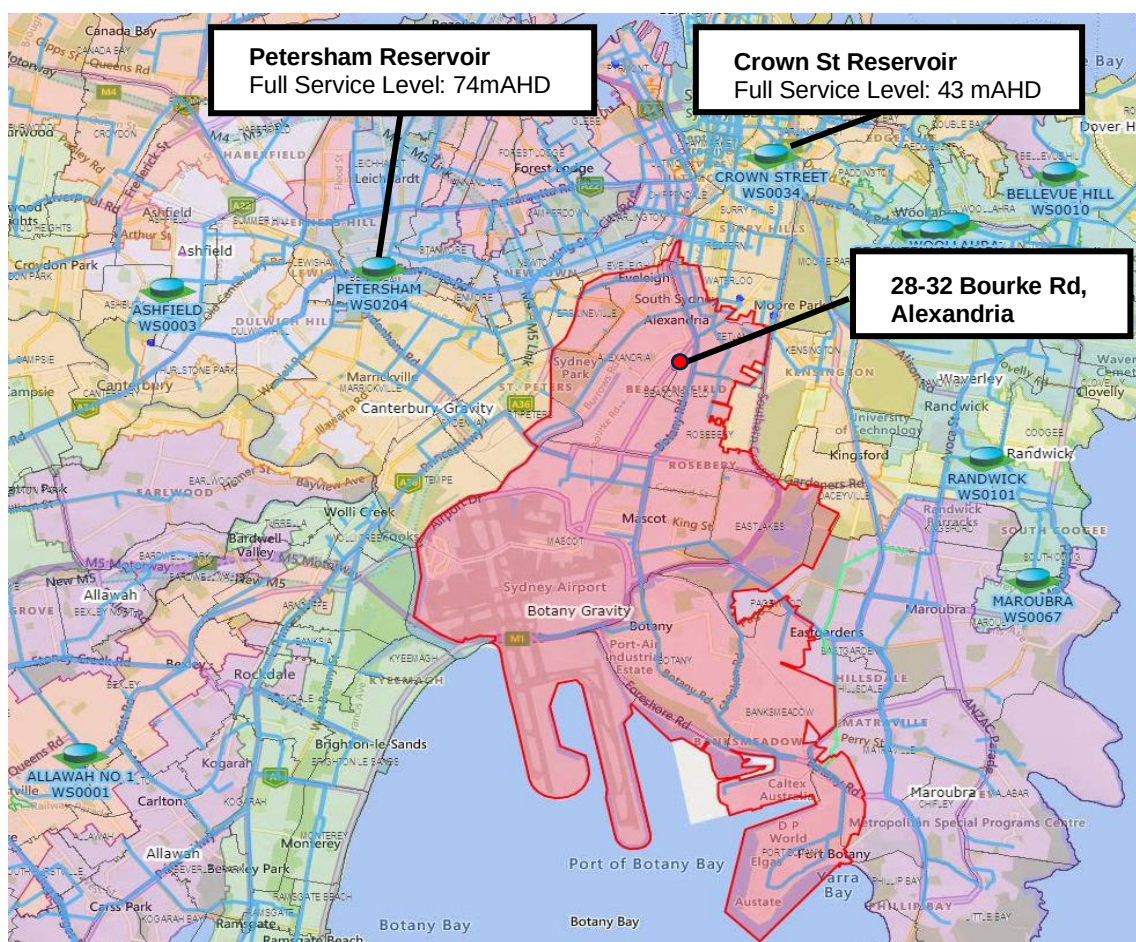


Figure 14 Botany Gravity Water Supply Zone with Reservoirs understood to supply the proposed development site

5. Summary

Wastewater servicing of the development is designed to safely convey wastewater from building fixtures to the water authority sewer network. Reticulated sewer networks are designed to transport wastewater away for treatment and disposal.

Sydney Water's wastewater system is designed to have additional capacity to contain the extra flows entering the system during and after heavy rainfall. Though in unlikely extreme wet weather events, wastewater flows can exceed the system's capacity. ERSs are used to help prevent wastewater overflows from being released through maintenance holes or private plumbing connections.

It is expected that the proposed development wastewater services will continue to operate effectively during wet weather events. This is based on engineering design principals for sewer network design and the that the FFL of the proposed development is at 10.4 mAHD (6 m higher than the recorded overflow weir level of 4.26 mAHD).

Hydraulic modelling using Sydney Water sewer system models would be required for detailed prediction as to how the sewer network may be impacted by a designated design rainfall event.

Sydney Water's drinking water system is designed to meet system demand and can be reasonably expected to continue to operate effectively during wet weather events.

Regards

Ruan Wolfaardt
Senior Civil Engineer

Attachments

Attachment 1

Sydney Water Notice of requirements

Case number 202367

November 28, 2022

Alexandria Property Development Pty Ltd

c/ - WARREN SMITH & PARTNERS PTY LTD

Notice of requirements

SECTION 73 SUBDIVIDER/COMPLIANCE CERTIFICATE

(Sydney Water Act 1994, Part 6, Division 9)

Developer:	Alexandria Property Development Pty Ltd
Your reference:	7515000
Development:	Lot 1 DP324707 28-32 BOURKE RD, Alexandria
Development Description:	Concept proposal for a multi-purpose health facility including a mental health hospital and medical centre space to be occupied by allied health providers.
Council Consent No:	by Dept of Planning and Infrastructure of
Your application date:	November 1, 2022

Dear Applicant

We've assessed your application for a Section 73 Compliance Certificate for the development shown above. Before we can issue the Certificate you must meet our requirements set in this notice.

You have until **November 28, 2023** to accept our requirements, have your deeds executed, design endorsed and have a construction commencement notice (CCN) submitted. If you don't you'll have to reapply and pay another application fee and you'll receive another notice. The notice may change, and you may have new requirements.

Your Water Servicing Coordinator (WSC) will be your point of contact with us. They can answer questions you might have on our developer process and charges, or you can visit our websites [Plumbing, building & developing](#) page. We also have a [Developer application progress](#) so you can see the status of your application, just enter your case number and your email address, you'll receive a response right away.

What you need to do to get your Section 73 Certificate

Summary

You'll need to do the following:

1. Engage a Water Servicing Coordinator (WSC) before you sign the enclosed Developer Works Deed.
2. Sign both the original copies of the enclosed Developer Works Deed.
3. After you have signed the Deeds, build the required sewer works at your cost.
4. Meet any ancillary requirements detailed in section 4.
5. Have your building plans approved because what you are building may be over or near our pipes and we need to check your property building plans. Excavation and building works cannot commence until you have approval. Your WSC can tell you more about this and help with the approval
6. Complete any special requirements from Section 6.

Other things you might have to do:

There may be other things you might need to do but are not a requirement of the Certificate. You must read these requirements to see if any of them are required as a result of your development. They're detailed at the end of this notice.

Your requirements in detail

1. Water Servicing Coordinator (WSC)

You need to engage your current or another authorised WSC to manage and construct the works that you are required to service your development. If you choose to engage another WSC you need to let us know in **writing**.

You'll find a list of WSC's at [Listed providers](#) page on our website.

Your WSC will give you a quote and information about our costs for services, works and our costs.

2. Developer Works Deed

After you engage a WSC, you must engage other Developer Infrastructure Providers (Providers) to carry out, where needed, the design and construction of the works. They must all have the appropriate capability. Your WSC can assist you.

You and your Providers will need to enter into an agreement with us. To do this you need to sign and lodge **both originals** of the enclosed Developer Works Deed (Deed) with your nominated WSC. You will then need to work with your WSC to have the other Providers sign the Deed.

Before signing the Deed, each party must also read and understand the conditions of the agreement that are set out in the Developer Works Deed – Schedule 1: Standard Terms document. That document as well as information about it are available at Developer deeds and standard terms (sydneywater.com.au) where you can find more about Developer deeds & standard terms.

The Deed and the Standard Terms set out for this development all parties' roles and responsibilities as well as other information.

You must do all the things that we ask you to do in the Deed. This is because your development does not have sewer services and you must construct and pay for the following works extensions under this Deed to provide these services.

3. Water and sewer works

3.1 Water

Your development must have a frontage to a water main that is the right size and can be used for connection.

We've assessed your application and found that:

- The existing 200 mm CICL has capacity to service this development.
- Refer to Large water service connection

3.2 Sewer

Your development must have a sewer main that is the right size and can be used for connection. That sewer must also have a connection point within your development's boundaries.

We've assessed your application and found that:

- The existing 225 mm CL sewer main will serve the development.
- **You must construct a waste water main extension to serve your development.**
The terms of the Deed define this extension as 'Minor Works', which means that they are designed and constructed under a simpler process. Your WSC will be able to provide further advice about this.

4. Ancillary matters

4.1 Flow Management and Isolation of our assets

The above works are constructed with a connection/cut-in to our water, wastewater, or stormwater assets. To ensure it complies with Occupational and Safety and Environment legislation, you can talk to your WSC about the timely submission to us of a request for flow management and asset isolation requirements.

4.2 Asset adjustments

After we've issued this Notice (and more detailed designs are available), we might require the watermain/sewer main/stormwater located in the footway/your property be adjusted/deviated. If this happens, you'll need to do this work as well as the extension we have detailed above at your cost. The work must meet the conditions of this Notice and you will need to complete it **before we can issue the Certificate.**

We need to see the completed designs for the work, and you'll have to lodge a security. The security will be refunded once the work is completed.

4.3 Entry onto neighbouring property

If you need to enter a neighbouring property, you must have written permission from all relevant property owners and tenants. You'll have to use our **Permission to enter' form(s)** for this. You can get copies of these from your WSC. They can also negotiate on your behalf to obtain permission. Please address all items on the form(s) including payment of compensation and whether there are other ways of designing and constructing that could avoid or reduce impacts on neighbouring properties. You're responsible for all costs of mediation involved in resolving any disputes that may occur. You need to allow enough time in case there are entry issues that need to be resolved.

4.4 Costs

Construction of these works means you'll have to pay project management, survey, design and construction costs directly to your providers. Additional costs payable to us might include:

- Design and construction audit fees
- Contract administration, operational area charge (Cut-In, Connection and Chlorination costs can average \$2,800 for each service) and customer redress before you finalise the development
- Creation or alteration of easements
- Additional fees for re-issuing a Notice of Requirements or Advice letter, or for updating the requirements where you have provided additional or amended information regarding your development
- Additional fees for reviewing alternate servicing option(s) for Minor or Major works
- If we engaged or will engage specialist consultants to review your proposal, we will pass that direct cost back to you as part of the Contract Administration costs. E.g. costs incurred from our Engineering Panel

Note: Payment of any goods and services including customer redress provided by us will be required prior to the issue of the Certificate or applicable a bank guarantee or cash bond.

Your WSC can talk you about these costs.

5. Approval of your Building Plans

You must have your building plans approved by a WSC **before the Certificate can be issued. In any case, building construction work MUST NOT commence until we have granted approval.** Approval is needed because construction/building works may affect our assets (e.g. water, sewer, and stormwater mains). If our stormwater channel, pipe, or culvert is located within ten (10) metres of your development site your WSC must refer your building plans to us for a detailed review.

Your WSC can tell you about the approval process including:

- Your provision, if required, of a “Services Protection Report” (also known as a “pegout”). This is needed to check whether the building and engineering plans show accurately where our assets are located in relation to your proposed building work. Your WSC will then either approve the plans or make requirements to protect those assets before approving the plans
- Possible requirements
- Their Costs
- Timeframes.

If your building plans need to be referred to us for detailed review you’ll be required to pay us for the costs associated with the detailed review.

You can also find information about this process (including technical specifications) on our [Plumbing, building & developing](#) page on our website or call us on 13 20 92.

Notes:

- **The Certificate will not be issued until the plans have been approved and, if required, our assets are altered or deviated**
- **You can only remove, deviate, or replace any of our pipes using temporary pipework if you have written approval from us. You must engage your WSC to arrange this approval**
- **You must obtain our written approval before you do any work on our systems. We’ll take action to have work stopped on the site if you do not have that approval. We will apply Section 44 of the *Sydney Water Act 1994*.**

6. Special Requirements

The Final Development Consent

This application is based on the development and consent shown on Page 1. You must give us the **final** Development Consent before we issue the Certificate so we can make sure that the development is the same.

If the development is the same and all the requirements of this Notice have been met, we will issue the Certificate. If the development is NOT the same you must reapply (and pay another application fee) and we will issue another Notice. The requirements and charges may change in that Notice.

Other things you need to do

The requirements in this Notice relate only to your development and are not a requirement for the Certificate. There could be other requirements we ask from you. You must read them before you go any further.

Disused Sewerage Service Sealing

Please do not forget that you must pay to disconnect all disused private sewerage services and seal them at the point of connection to our sewer main. This work must meet our standards in the Plumbing Code of Australia (the Code) and be done by a licensed drainer. The licensed drainer must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Soffit Requirements

Please be aware that floor levels must be able to meet our soffit requirements for property connection and drainage.

Requirements for Business Customers for Commercial and Industrial Property Developments

If this property is to be developed for Industrial or Commercial operations, it may need to meet the following requirements:

Trade Wastewater Requirements

If this development is going to generate trade wastewater, the property owner must submit an application requesting permission to discharge trade wastewater to Sydney Water's sewerage system. You must wait for approval of this permit before any business activities can commence.

The permit application should be emailed to Sydney Water's Business Customer Services at businesscustomers@sydneywater.com.au

It is illegal to discharge Trade Wastewater into the Sydney Water sewerage system without permission.

A **Boundary Trap** is required for all developments that discharge trade wastewater where arrestors and special units are installed for trade wastewater pre-treatment.

If the property development is for Industrial operations, the wastewater may discharge into a sewerage area that is subject to wastewater reuse. Find out from Business Customer Services if this is applicable to your development.

Backflow Prevention Requirements

Backflow is when there is unintentional flow of water in the wrong direction from a potentially polluted source into the drinking water supply.

All properties connected to Sydney Water's supply must install a testable **Backflow Prevention Containment Device** appropriate to the property's hazard rating. Property with a high or medium hazard rating must have the backflow prevention containment device tested annually. Properties identified as having a low hazard rating must install a non-testable device, as a minimum.

Separate hydrant and sprinkler fire services on non-residential properties, require the installation of a testable double check detector assembly. The device is to be located at the boundary of the property.

Before you install a backflow prevention device:

1. Get your hydraulic consultant or plumber to check the available water pressure versus the property's required pressure and flow requirements.

2. Conduct a site assessment to confirm the hazard rating of the property and its services.
Contact PIAS at NSW Fair Trading on **1300 889 099**.

For installation you will need to engage a licensed plumber with backflow accreditation who can be found on the Sydney Water website:

<http://www.sydneywater.com.au/Plumbing/BackflowPrevention/>

Water Efficiency Recommendations

Water is our most precious resource and every customer can play a role in its conservation. By working together with Sydney Water, business customers are able to reduce their water consumption. This will help your business save money, improve productivity and protect the environment.

Some water efficiency measures that can be easily implemented in your business are:

- Install water efficiency fixtures to help increase your water efficiency, refer to WELS (Water Efficiency Labelling and Standards (WELS) Scheme, <http://www.waterrating.gov.au/>
- Consider installing rainwater tanks to capture rainwater runoff, and reusing it, where cost effective. Refer to <http://www.sydneywater.com.au/Water4Life/InYourBusiness/RWTCalculator.cfm>
- Install water-monitoring devices on your meter to identify water usage patterns and leaks.
- Develop a water efficiency plan for your business.

It is cheaper to install water efficiency appliances while you are developing than retrofitting them later.

Contingency Plan Recommendations

Under Sydney Water's [customer contract](#) Sydney Water aims to provide Business Customers with a continuous supply of clean water at a minimum pressure of 15meters head at the main tap. This is equivalent to 146.8kpa or 21.29psi to meet reasonable business usage needs.

Sometimes Sydney Water may need to interrupt, postpone or limit the supply of water services to your property for maintenance or other reasons. These interruptions can be planned or unplanned.

Water supply is critical to some businesses and Sydney Water will treat vulnerable customers, such as hospitals, as a high priority.

Have you thought about a **contingency plan** for your business? Your Business Customer Representative will help you to develop a plan that is tailored to your business and minimises productivity losses in the event of a water service disruption.

For further information please visit the Sydney Water website at:

<http://www.sydneywater.com.au/OurSystemsandOperations/TradeWaste/> or contact Business Customer Services on **1300 985 227** or businesscustomers@sydneywater.com.au

Fire Fighting

Definition of fire fighting systems is the responsibility of the developer and is not part of the Section 73 process. It is recommended that a consultant should advise the developer regarding the fire fighting flow of the development and the ability of our system to provide that flow in an emergency. Sydney Water's Operating Licence directs that our mains are only required to provide domestic supply at a minimum pressure of 15 m head.

A report supplying modelled pressures called the Statement of Available pressure can be purchased through [Sydney Water Tap in](#)™ and may be of some assistance when defining the fire fighting system. The Statement of Available pressure may advise flow limits that relate to system capacity or diameter of the main and pressure limits according to pressure management initiatives. If mains are required for fire fighting purposes, the mains shall be arranged through the water main extension process and not the Section 73 process.

Large Water Service Connection

A water main are available to provide your development with a domestic supply. The size of your development means that you will need a connection larger than the standard domestic 20 mm size.

To get approval for your connection, you will need to lodge an application with [Sydney Water Tap in](#)™. You, or your hydraulic consultant, may need to supply the following:

- a plan of the hydraulic layout
- a list of all the fixtures/fittings within the property
- a copy of the fireflow pressure inquiry issued by us
- a pump application form (if a pump is required)
- all pump details (if a pump is required).

You'll have to pay an application fee.

We don't consider whether a water main is adequate for fire fighting purposes for your development. We can't guarantee that this water supply will meet your Council's fire fighting requirements. The Council and your hydraulic consultant can help.

Disused Water Service Sealing

You must pay to disconnect all disused private water services and seal them at the point of connection to our water main. This work must meet our standards in the Plumbing Code of Australia (the Code) and be done by a licensed plumber. The licensed plumber must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Other fees and requirements

We may be involved in other aspects of your development and there will be other fees and requirements. These include:

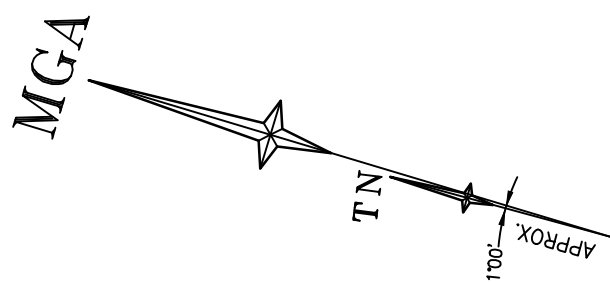
- the installation of backflow prevention devices, your plumber will advise you about this,
- trade waste requirements

- large water connections and
- Council firefighting requirements (it will help you if you know what the firefighting requirements are for your development as soon as possible, your hydraulic consultant can help you with this).

END OF NOTICE

Attachment 2

**Plan of Detail and Levels over Lots 1, 2
& 3 in DP324707 known as 28-32
Bourke Road, Alexandria**

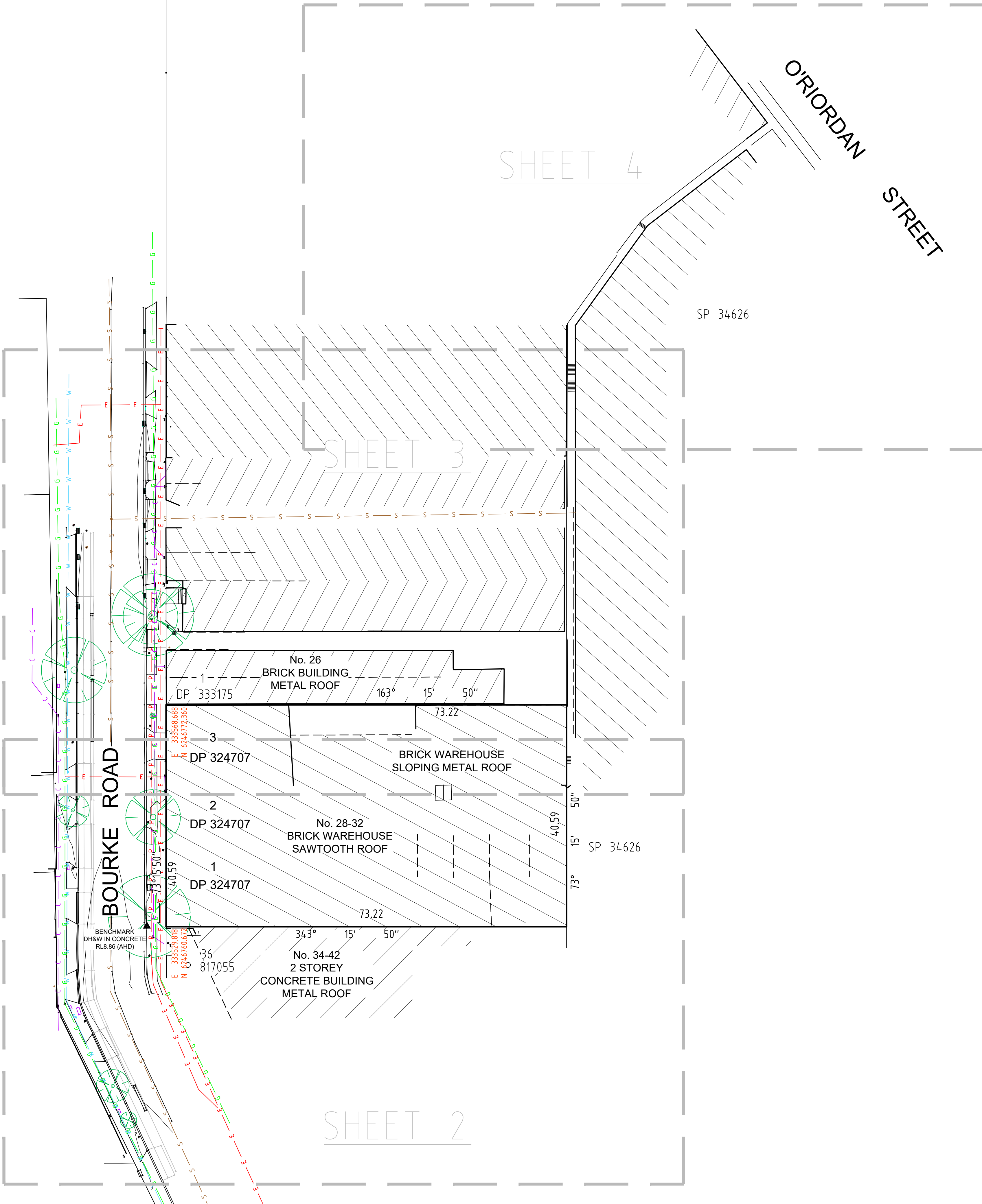


LEGEND

BENCH MARK	▲
COMMS PIT	COM
ELECTRIC LIGHT POLE	ELP
STREET SIGN	SS
HYDRANT	HYD
WATER METER	WM
GAS VALVE	GAS
PIT WITH METAL LID	MLID
BOLLARD	BOL
GRADED INLET PIT	GIP
KERB INLET PIT	KIP
STOP VALVE	SV
SEWER INSPECTION POINT	SIP
SEWER MANHOLE	SMH
GATE	Gate
VEHICLE CROSSING	(VC)
GAS (DBYD)	G
COMMUNICATIONS (DBYD)	C
WATER (DBYD)	W
SEWER (DBYD)	S
ELECTRICITY (OVERHEAD)	P

NOTES

1. THE BOUNDARIES HAVE NOT BEEN MARKED ON GROUND
2. ALL AREAS AND DIMENSIONS HAVE BEEN COMPILED FROM PLANS MADE AVAILABLE BY NSW LAND REGISTRY SERVICES AND ARE SUBJECT TO FINAL SURVEY
3. ORIGIN OF LEVELS ON A.H.D. IS TAKEN FROM SSM24974 R.L. 8.337 (A.H.D.) IN BOURKE ROAD
4. CONTOUR INTERVAL 0.5 m
5. CONTOURS ARE INDICATIVE ONLY. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION
6. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION
7. KERB LEVELS ARE TO THE TOP OF KERB UNLESS SHOWN OTHERWISE
8. FLOOR LEVELS SHOWN ARE THRESHOLD LEVELS. NO INVESTIGATION OF INTERNAL FLOOR LEVELS HAS BEEN UNDERTAKEN
9. NO INVESTIGATION OF UNDERGROUND SERVICES HAS BEEN MADE. SERVICES HAVE BEEN PLOTTED FROM RELEVANT AUTHORITIES INFORMATION AND HAVE NOT BEEN SURVEYED. ALL RELEVANT AUTHORITIES SHOULD BE NOTIFIED PRIOR TO ANY EXCAVATION ON OR NEAR THE SITE
10. 8/4/7 DENOTES TREE SPREAD OF 8m, TRUNK DIAMETER OF 0.4m & APPROX HEIGHT OF 7m
11. BEARINGS SHOWN ARE MGA (MAP GRID OF AUSTRALIA) ADD APPROX. 1°00' FOR TRUE NORTH



H	00/00/00	—	00
G	00/00/00	—	00
F	00/00/00	—	00
E	00/00/00	—	00
Revision	Date	Description	Reference

D	00/00/00	—	00
C	20/07/22	MGA COORDINATES ADDED	002
B	13/05/22	ADDITIONAL DETAIL ADDED	002
A	08/03/22	ADDITIONAL DETAIL ADDED	001
Revision	Date	Description	Reference



THIS IS THE PLAN REFERRED TO IN MY LETTER DATED:
Matthew Silk
Registered Surveyor NSW
ID: 8650

Client JOHNSTAFF
Drawing title
PLAN OF DETAIL AND LEVELS OVER LOTS 1,2&3 IN DP324707
KNOWN AS 28-32 BOURKE ROAD, ALEXANDRIA

datum AHD
site Area 2972m²
LGA SYDNEY
reference number 51596 001DT
scale 1:400
date of survey 02/12/2021
SHEET 1 OF 4



H	00/00/00	—	00
G	00/00/00	—	00
F	00/00/00	—	00
E	00/00/00	—	00
Revision	Date	Description	Reference

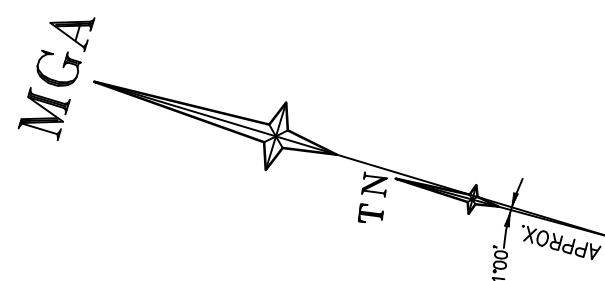
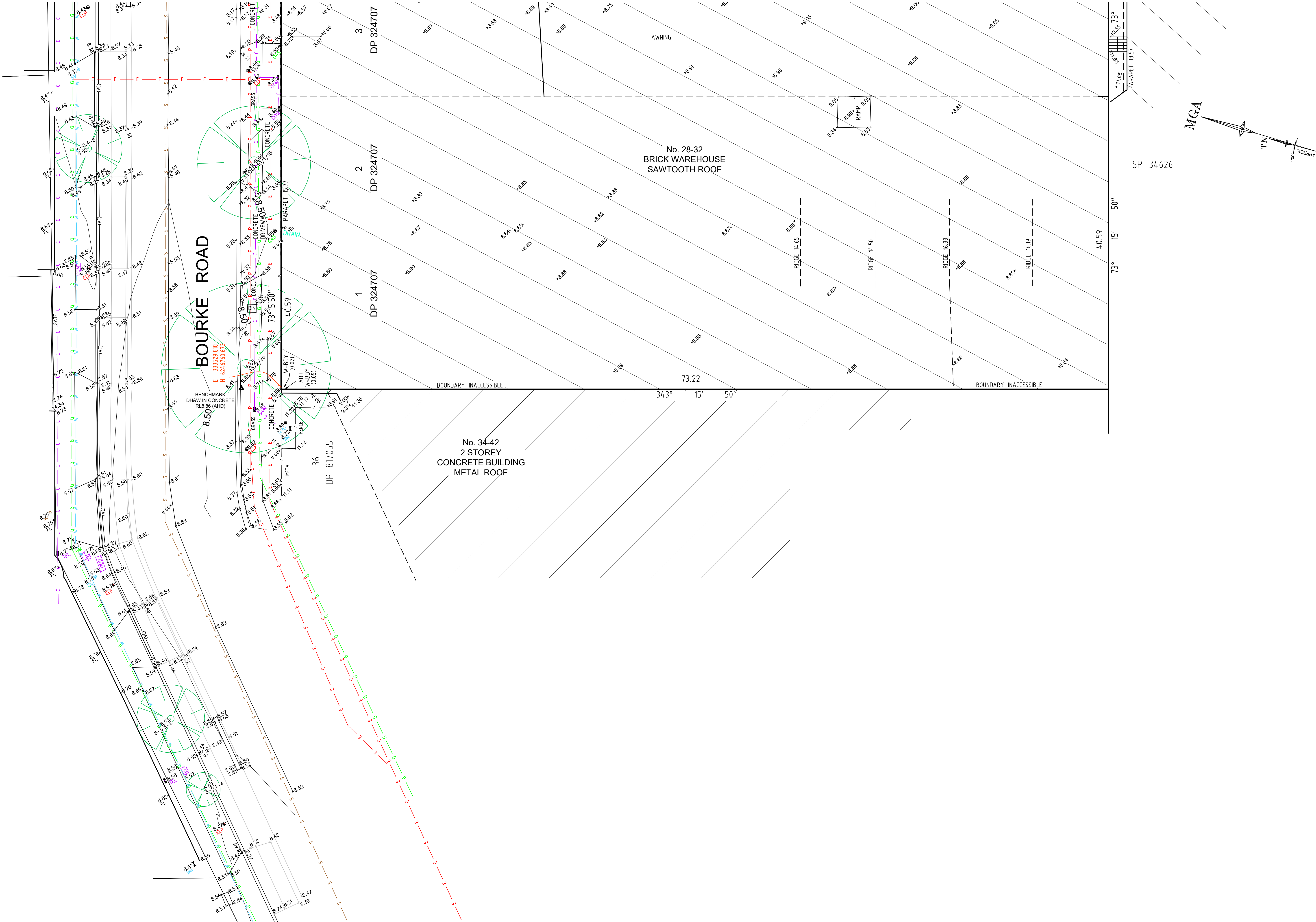
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C	20/07/22	MGA COORDINATES ADDED	002
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Revision	Date	Description	Reference



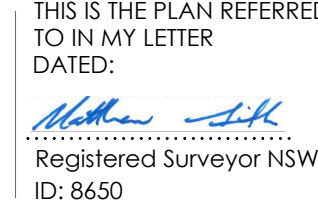
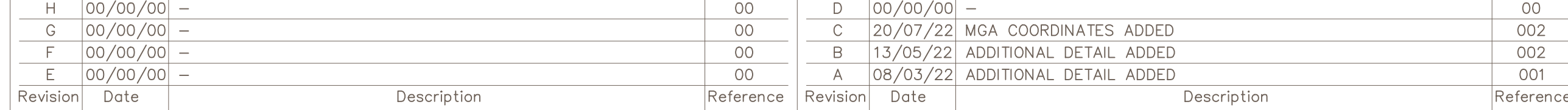
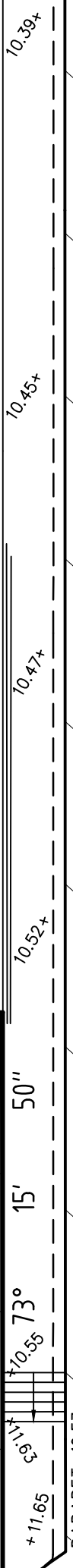
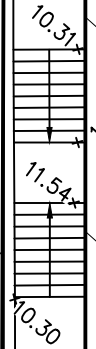
THIS IS THE PLAN REFERRED TO IN MY LETTER DATED:
Matthew Smith
Registered Surveyor NSW
ID: 8450

Client JOHNSTAFF
Drawing title
PLAN OF DETAIL AND LEVELS OVER LOTS 1.2&3 IN DP324707
KNOWN AS 28-32 BOURKE ROAD, ALEXANDRIA

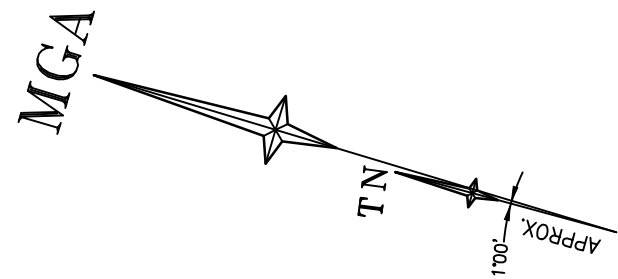
datum	AHD	reference number	51596 001DT
site Area	2972m ²	scale	1:150 @A1
LGA	SYDNEY	date of survey	02/12/2021
		SHEET	2
		OF	4



SP 34626



datum	reference	51596 001D
AHD	number	
site Area	scale	date of survey
2972m ²	1:150	@A1 02/12/202
LGA	SHEET	
SYDNEY	OF 4	3



O'RIORDAN STREET

TOP

CONCRETE

OF

11.40

11.38

11.45

FOOTPATH

KERB

+11.37

+11.31

+11.31

+11.29

+11.20

+11.11

10.83

+10.44

+10.25

+10.25

10.31

11.53

11.54

10.30

SP 34626



Revision	Date	Description	Reference
H	00/00/00	—	00
G	00/00/00	—	00
F	00/00/00	—	00
E	00/00/00	—	00

Revision	Date	Description	Reference
D	00/00/00	—	00
C	20/07/22	MGA COORDINATES ADDED	002
B	13/05/22	ADDITIONAL DETAIL ADDED	002
A	08/03/22	ADDITIONAL DETAIL ADDED	001



THIS IS THE PLAN REFERRED TO IN MY LETTER DATED:
Matthew J. Hill
Registered Surveyor NSW
ID: 8450

Client JOHNSTAFF
Drawing title
PLAN OF DETAIL AND LEVELS OVER LOTS 1,2&3 IN DP324707
KNOWN AS 28-32 BOURKE ROAD, ALEXANDRIA

datum
AHD
site Area
2972m²
LGA
SYDNEY
reference number
51596 001DT
scale
1:150 @A1
date of survey
02/12/2021
SHEET
OF 4
4

