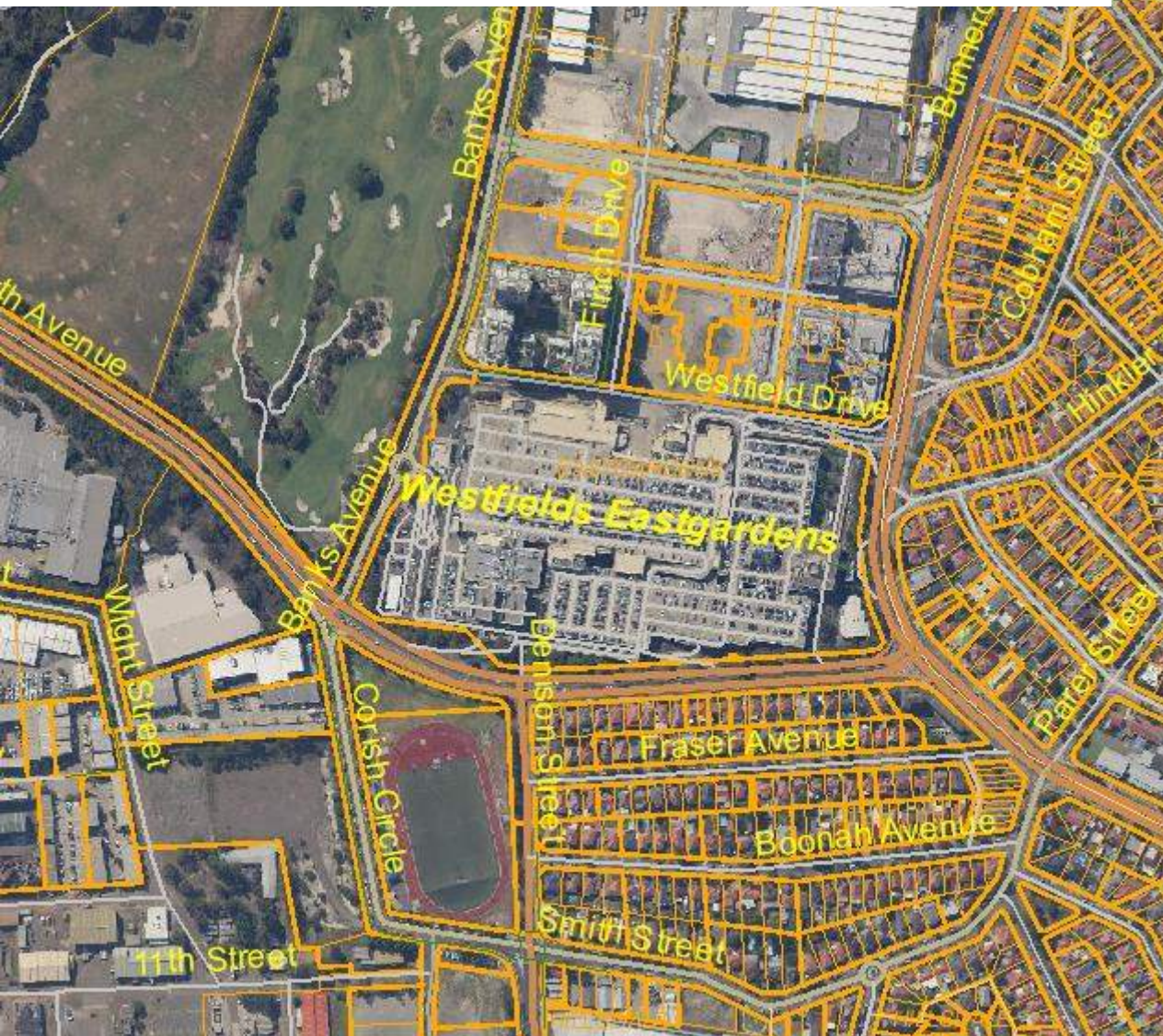




Flood Impact Assessment 152 Bunnerong Road, Eastgardens

Prepared for SCENTRE GROUP

Reference no. 300203939 | 25 February 2024





Flood Impact Assessment 152 Bunnerong Road, Eastgardens

Prepared for SCENTRE GROUP

Reference no. 300203939 | 25 February 2024

Revision	Date	Description	Author	Quality Check	Independent Review
1	2023/12/10	Draft for Client Review	BW	EL	MG
2	2023/12/17	Revised for Client Review	BW	EL	MG
3	2023/12/18	Final for Client Review	BW	EL	MG
4	2024/02/25	Revised Final	BW	EL	MG

This document entitled Flood Impact Assessment 152 Bunnerong Road, Eastgardens was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of SCENTRE GROUP (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by _____

(signature)

Bedilu Wolelo

Reviewed by _____

(signature)

Eric Lin



Approved by _____

(signature)

Martin Griffin

SYDNEY

Level 16, 207 Kent Street

Sydney NSW 2000

p +61 2 9493 9700 www.stantec.com



TABLE OF CONTENTS

1	Introduction	3
2	Background	4
2.1	Study Area	4
2.2	Existing Site	4
2.3	Proposed Development	8
2.3.1	Overview	8
2.3.2	Works Proposed on Ground Floor Level	8
2.4	Objective of Flood Assessment	10
2.5	Scope of Work	10
3	Relevant References	11
3.1	Previous Studies	11
3.2	Guidelines and Legislation	11
3.2.1	2005 Floodplain Development Manual and Policy	11
3.2.2	2021 Flood Prone Land Policy	11
3.2.3	Planning Proposal Requirements	12
3.2.4	Flood Risk Management Manual 2023	12
4	Available Flood Information	13
4.1	Birds Gully and Bunnerong Road Flood Study (2018)	13
4.1.1	Hydrological Modelling from 2018 Flood Study	13
4.1.2	Hydraulic Model from 2018 Flood Study	13
4.2	Bayside Flood Advice Letter for Subject Site	15
5	Flood Assessment	20
5.1	Bayside Council Flood Related Controls	20
5.2	Planning Proposal Flooding Requirements	22
6	Conclusion	24
7	References	25

TABLES

Table 5-1 Review of the Planning Proposal Compared to Ministerial Direction Planning Proposal Requirements	22
------------------------------------------------------------------------------------------------------------------	----

FIGURES

Figure 2-1 The Site Location	4
Figure 2-2 Existing Ground Flood Configuration of the Eastern Side of the Subject Site (Source: GoogleEarth)	5
Figure 2-3 Existing Conditions from North-East Site Entrance Looking West Along Westfield Drive with Commercial Building to the Left of the Image (Source: GoogleEarth)	6
Figure 2-4 Existing Conditions from North-East Site Entrance Looking South Along Bus Terminal Access Road with Commercial Building to the Right, and Elevated Bunnerong Road to the Left (Source: GoogleEarth)	6
Figure 2-5 Existing Conditions from South-East Site Entrance Looking North Along Bus Terminal Access Road with Secondary Commercial Building to the Right, and Covered Carpark Area to the Left with Ramps to Higher Level Parking Along the Eastern Boundary of the Carpark Area (Source: GoogleEarth)	7
Figure 2-6 Proposed Development Layout Including Perspective View (Upper Image) and Elevation Section for Southern Side of Building (Lower Image) (Source: Scentre Group)	9
Figure 2-7 Proposed development for South-East Side of Site for Ground Floor Level (Source: Scentre Group)	10
Figure 4-1 Hydrology Sub-Catchments from Flood Study (Source: WMA flood study report 2018)	13
Figure 4-2 Existing Drainage System (captured from WMA Flood Study 2018)	14
Figure 4-3 Peak Depth of Flooding during the 1% AEP Event	16
Figure 4-4 H1-H6 Hazard Mapping for the 1% AEP Event	17
Figure 4-5 Flood Function Mapping for 1% AEP Event	18
Figure 4-6 Peak Depth of Flooding for the PMF Event	19



1 Introduction

The NSW Department of Planning and Environment has made a gateway determination on a planning proposal to amend the Bayside Local Environmental Plan 2021 to increase the maximum height of building and floor space ratio at 152 Bunnerong Road, Eastgardens (The Eastgardens Westfield Shopping Centre site) pursuant to conditions. This memorandum is prepared to address the following flooding related gateway determination condition:

- Address Ministerial Direction 4.1 Flooding and provide a flood impact assessment taking into consideration the recommendations of the 2022 NSW flood inquiry and the NSW Flood Risk Management Manual 2023.

Post the gateway determination, Stantec Australia Pty Ltd (Stantec) has been engaged by Scentre Group to prepare a flood impact assessment (the Study) and advise on the proposal satisfaction of Ministerial direction requirements to support the planning proposal.

The Site is situated within the upper reaches of the Bunnerong Road Catchment and the Springvale and Floodvale Drain catchments which ultimately drain into Botany Bay. Bayside Council has advised that the site is affected by flooding during the 1% AEP and the Probable Maximum Flood (PMF) storm events. In order to address the gateway determination conditions, this report has adhered to the guidelines and regulations outlined in the following documents:

- > NSW Floodplain Development Manual (2023): This manual provides a set of guidelines and best practices for floodplain management and development in New South Wales. It serves as a valuable resource for assessing flood impacts and implementing effective mitigation measures.
- > Bayside Council Development Control Plan (DCP) (2022): The DCP for Bayside Council outlines specific planning and development guidelines that must be followed within the local government area. These guidelines are crucial in ensuring that developments adhere to floodplain management requirements and mitigations. However, these controls are applicable in Council based assessments for Development Applications (DAs), where this planning proposal is at an earlier and more high-level stage of the development process. Nevertheless, consideration of these DCP controls has been considered with a view to the potential compatibility of the development to Council's requirements. Further analysis in assessing against these controls will be expanded upon in a potential future DA for the site.
- > Bayside Council Local Environmental Plan (LEP) (2021): The LEP sets out the statutory planning controls and zoning provisions for the local government area. It includes provisions related to flood-prone land and assists in determining the suitability of the proposed development in relation to flood impacts.
- > Local Planning directions 2022, NSW Department of Planning and Environment: Section 4.1 directs that a planning proposal should adhere to the NSW Government's flood-prone land policy and the principles of the Floodplain Development Manual 2005 (since replaced by the 2023 Flood Risk Management Manual) and follow up updates.

By following the guidelines and regulations set forth in these documents, the flood impact assessment of the proposed development can be conducted in a comprehensive and compliant manner, taking into account the specific requirements and meeting conditions of determination for the planning proposal process.

The proposal aims at increasing the maximum height of building and floor space ratio. Most of the development will involve no change in the existing development footprint. The proposed alteration of footprint will also not alter overland flowpath. Review of existing flood studies and proposed development layout has informed this qualitative flood impact assessment report. As noted above, this relatively high-level flood assessment is in keeping with the planning proposal phase of the development review. In the future, Council will have the opportunity to review in further detail potential flood impacts as part of the DA process.

It is noted that this report has been revised based on comments received from Bayside Council engineers on a call on 20 February 2024. The updates provide further clarifications as requested during discussions.



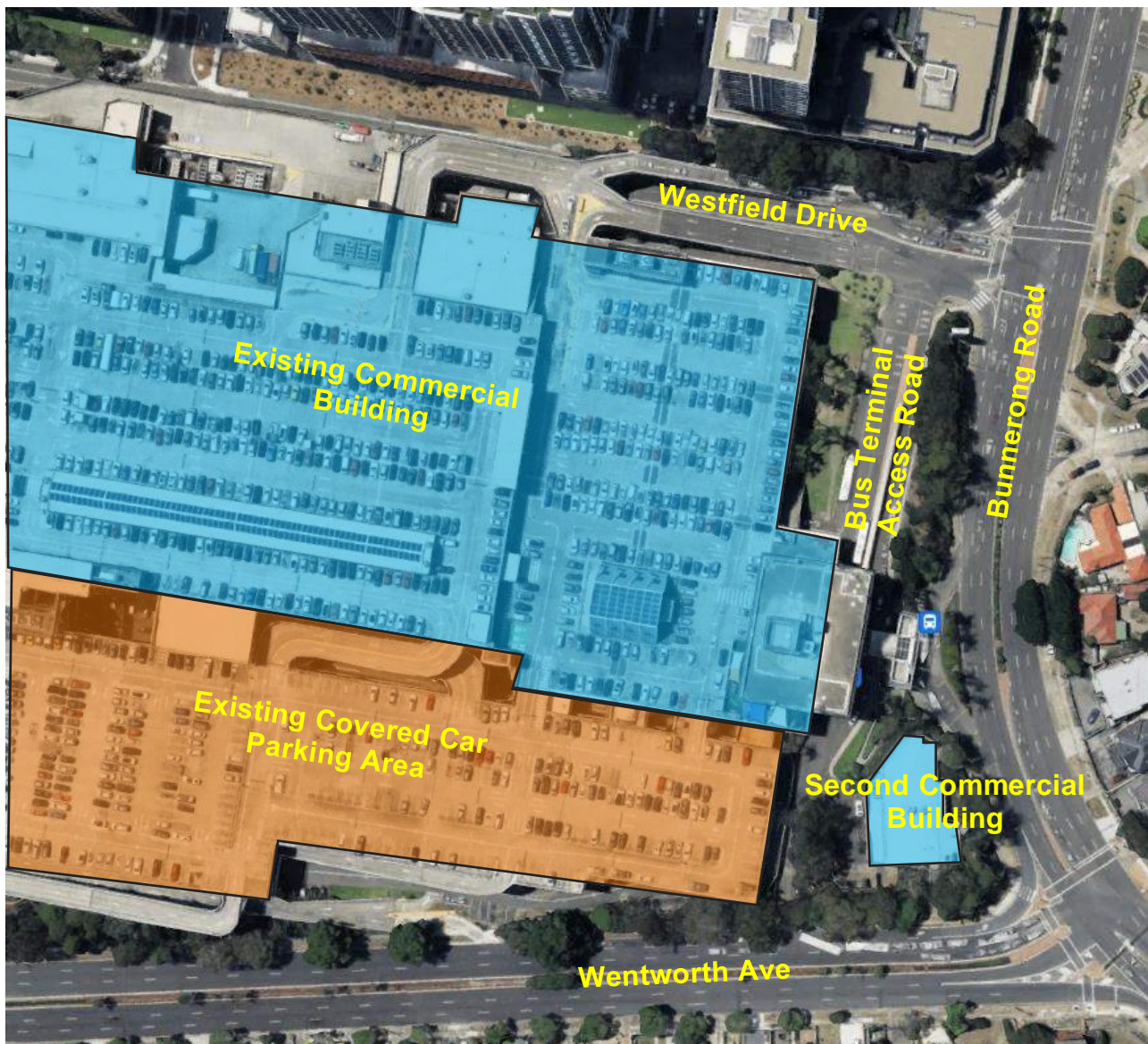


Figure 2-2 Existing Ground Flood Configuration of the Eastern Side of the Subject Site (Source: GoogleEarth)

The eastern side of the site has the following elements:

- > From the north-east site access at the intersection of Bunnerong Road and Westfield Drive, there are two car ramps up to upper levels with low-lying Westfield Drive continuing west at ground level as shown in Google streetview image in **Figure 2-3**.
- > Along the north-east frontage there is a low-lying landscaped area and a bus terminal access road that runs south along the frontage as shown in the Google streetview image in **Figure 2-4**. Bunnerong Road along this frontage is much more elevated than the bus terminal access road, with a building entrance for Bunnerong Road to Level 1 of the building. This area has ground levels between 21.3 – 21.5m AHD.
- > In the south-east corner of the site there is an existing second commercial building. The ground floor level of this existing second commercial building is 20.39m AHD as per survey details.
- > To the south-east, the Bus Terminal Access Road exits the site to Wentworth Ave via an elevated driveway with crest level of 21.68m AHD as shown in **Appendix A**. This elevated driveway crest can be seen in the streetview image shown in **Figure 2-5**.
- > Along the southern side of the commercial building there is a large, covered carpark area for the ground floor. Along the north-east corner of the carpark area is a ramp up to higher levels. As can be seen in the streetview image in **Figure 2-5**, this ramp and concrete walls effectively create a barrier from the Bus Terminal Access Road to the covered parking area on the ground floor.



Figure 2-3 Existing Conditions from North-East Site Entrance Looking West Along Westfield Drive with Commercial Building to the Left of the Image (Source: GoogleEarth)



Figure 2-4 Existing Conditions from North-East Site Entrance Looking South Along Bus Terminal Access Road with Commercial Building to the Right, and Elevated Bunnerong Road to the Left (Source: GoogleEarth)



Figure 2-5 Existing Conditions from South-East Site Entrance Looking North Along Bus Terminal Access Road with Secondary Commercial Building to the Right, and Covered Carpark Area to the Left with Ramps to Higher Level Parking Along the Eastern Boundary of the Carpark Area (Source: GoogleEarth)

2.3 Proposed Development

2.3.1 Overview

Scentre Group proposes to reconfigure existing retail and provide additional retail and commercial space at its existing Eastgardens Westfield shopping centre site. Details of the proposed development have been included in **Appendix B** from a preliminary site design prepared by Scentre Group.

The proposed development layout is shown in **Figure 2-6**, with an elevation section from the south for the proposed development shown in **Figure 2-6**. The proposed works are split into two stages:

- > The current planning proposal (red outline) covers the majority of the site and includes:
 - Three new commercial towers (shown as yellow), Tower A and Tower C will be over the top of the existing Westfield commercial building. Tower B will be located in the south-east corner of the site where the existing second commercial building is located.
 - Existing carparking areas for the higher levels are proposed to be replaced by new retail areas (shown as red)
 - An additional carparking level is proposed above the existing ground floor carparking level (shown as brown).
 - To the west, rooftop garden, and entertainment area is proposed with a proposed cinema expansion (shown as green and orange).
- > Future planning proposal stage (blue outline) includes two new towers in the north-east corner of the site, both east and west of the existing bus terminal access road, with one of the proposed buildings being located in the existing low-lying landscaped area.

This flood assessment only includes the current planning proposal works. Therefore the proposed works in the north-east corner of the site for the future planning proposal stage are not relevant to this assessment.

2.3.2 Works Proposed on Ground Floor Level

The majority of the proposed works for the current planning proposal stage are proposed for the upper levels of the existing development. Therefore these works are not considered relevant to this assessment as they are elevated above the floodplain and will have no associated flood risk or potential flood impacts. This means that Tower A and B, the new retail sections, the new carparking level and the rooftop development on the west side of the building are not relevant to this flood assessment.

The extent of works on the ground floor level then are contained on the south-east side of the site. The proposed development layout is shown in **Figure 2-7**. The relevant works include:

- > It is proposed to maintain the existing bus interchange laneway connecting Westfield Drive with Wentworth Avenue, with upgraded bus interchange layout in front of the existing building entrance. The ground level of this altered bus terminal area is proposed to be lowered to 21.0m AHD (lower than the existing level between 21.3 – 21.5m AHD).
- > There is a proposed Tower A&C loading area proposed in the north-east corner of the existing covered carpark area (location of existing ramp to higher levels).
- > The proposed footprint of Tower B will be altered from the existing second commercial building in this south-east corner (to be removed). The ground floor of Tower B will include a loading area as shown in **Figure 2-7**.
- > The existing Wentworth Ave site access to the south will have a new ramp added from the high level down to this site exit point.



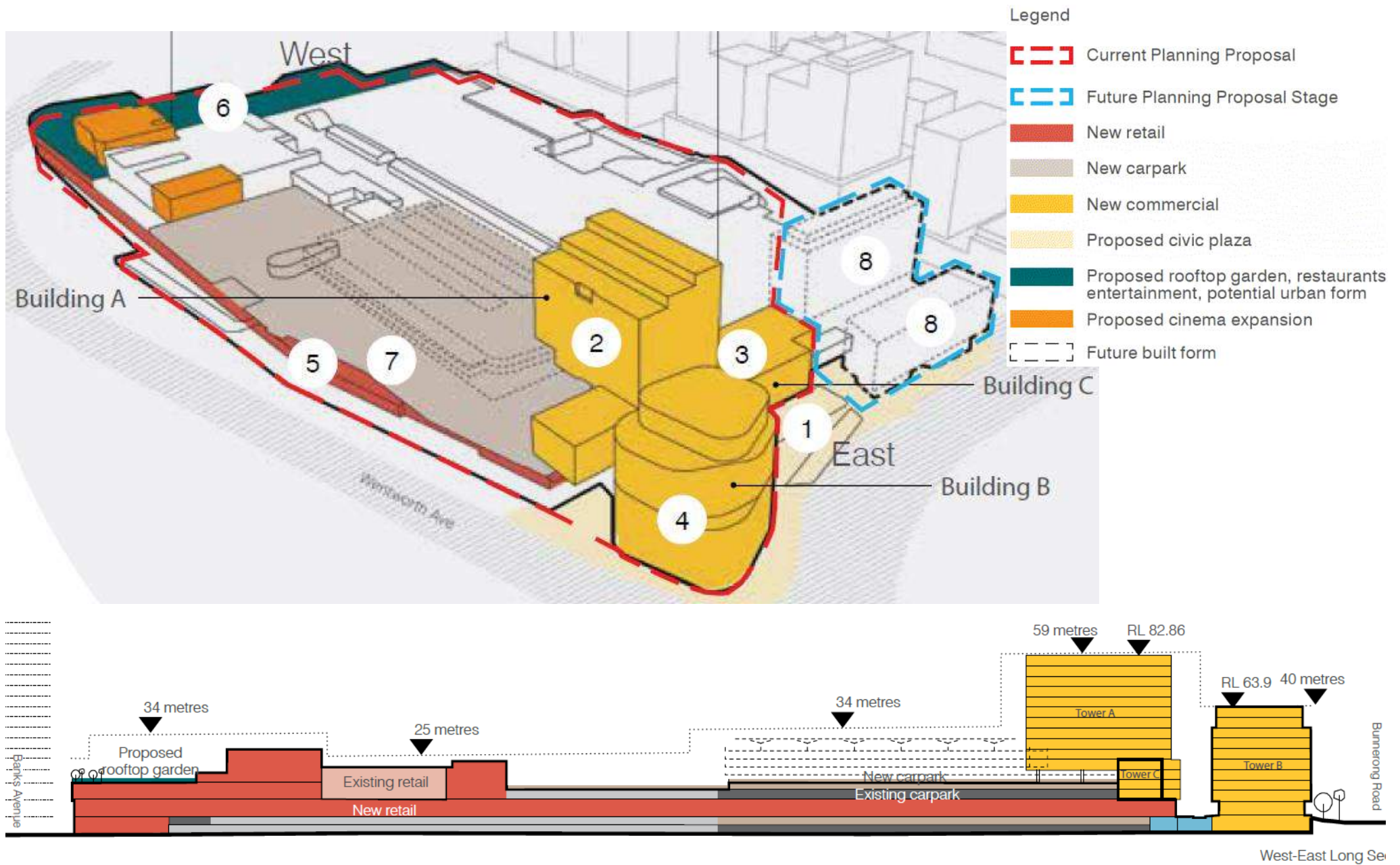


Figure 2-6 Proposed Development Layout Including Perspective View (Upper Image) and Elevation Section for Southern Side of Building (Lower Image) (Source: Scentre Group)

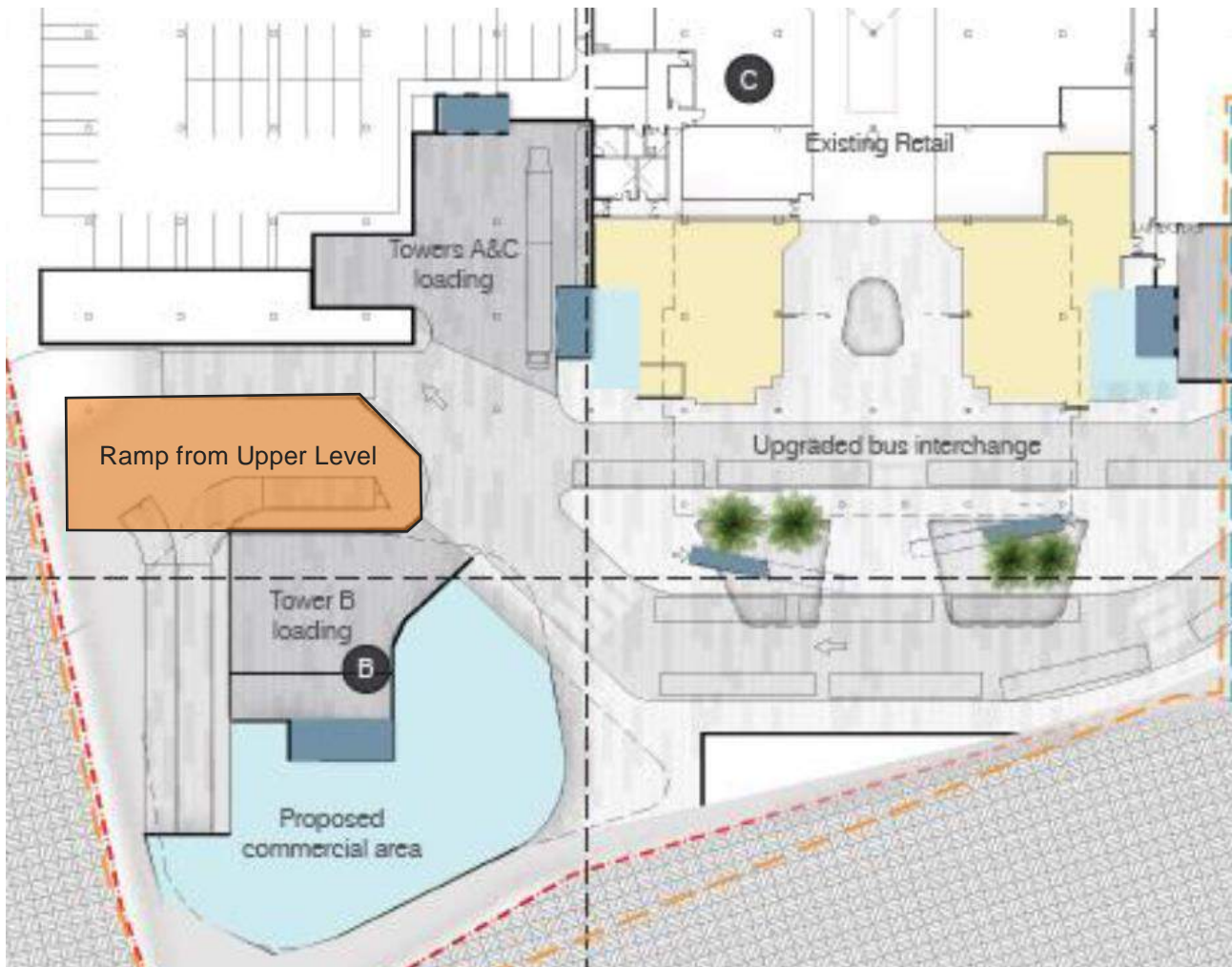


Figure 2-7 Proposed development for South-East Side of Site for Ground Floor Level (Source: Scentre Group)

2.4 Objective of Flood Assessment

The NSW Department of Planning and Environment has made a gateway determination on a planning proposal to amend the Bayside Local Environmental Plan 2021 to increase the maximum height of building and floor space ratio at 152 Bunnerong Road, Eastgardens (The Eastgardens Westfield Shopping Centre site) pursuant to conditions. This study is prepared to address the following flooding related gateway determination condition:

- > Ministerial Direction 4.1 Flooding, and
- > Provide a flood impact assessment taking into consideration the recommendations of the 2022 NSW flood inquiry and the NSW Flood Risk Management Manual 2023.

2.5 Scope of Work

The scope of work can be summarised as:

- > Review the conditions of approval;
- > Review site flood affectation from existing studies; and
- > Prepare this report to inform conformance of the proposal with the conditions of approval.

3 Relevant References

3.1 Previous Studies

Previous flood studies which are covering the Site and applicable to this assessment include:

- > Birds Gully and Bunnerong Road Flood Study (WMA, 2018) - A summary of flood information from this site is included in **Section 4.1**.
- > Springvale Drain and Floodvale Drain Flood Study (BMT, 2014) – Upon review this flood study encompasses the site for the hydrology model set-up, however the subject site is not included within the TUFLOW hydraulic model, and therefore no flood information is available for the subject site from this study.

3.2 Guidelines and Legislation

The following guidelines and planning controls have been considered in preparing this report:

- > Bayside Local Environmental Plan (LEP) 2021
- > Bayside Council Development Control Plan (DCP) 2022
- > 2021 NSW flood prone and policies including the s9.1 Local Planning Direction for Planning Proposal Flood Requirements as discussed below.
- > 2023 Flood Risk Management Manual

3.2.1 2005 Floodplain Development Manual and Policy

The NSW Government Flood Prone Land Policy is directed towards providing solutions to existing flood problems in developed areas and ensuring that new development is compatible with the flood hazard and does not create additional flooding problems in other areas. The policy formed part of the New South Wales (NSW) Floodplain Development Manual (FDM) in 2005. The policy provides that councils are primarily responsible for managing flood risk to reduce the risk to life, property damage and other impacts in their local government areas. It also recognises that flood-prone land may be able to support some types of development.

The policy and manual use a broad risk management hierarchy of avoidance, minimisation and mitigation to:

- > Reduce the social and financial costs from the risks associated with occupying the floodplain;
- > Increase the sustainable benefits of using the floodplain; and,
- > Improve or maintain floodplain ecosystems dependent on flood inundation.

Note: The 2023 Flood Risk Management Manual (Section 3.2.4) was adopted in June 2023 and replaces the FDM 2005, the 2022 Draft FRM Manual and Toolkits and a number of previous technical guides.

3.2.2 2021 Flood Prone Land Policy

The 2021 Flood Prone Land Package was released in July 2021. The Flood Prone Land package includes the following documents:

- > A revised s9.1 local planning direction on flooding (Local Planning Direction, or the Act);
- > A new planning circular: Considering flooding in land use planning: guidance and statutory requirements (Planning Circular);
- > A new guideline: Considering Flooding in Land Use Planning (Guideline);
- > Standard Instrument (Local Environmental Plans) Amendment (Flood Planning) Order 2021: two local environmental plan (LEP) clauses which introduces flood related development controls;
- > An amendment to clause 7A of Schedule 4 to the Environmental Planning and Assessment Regulation 2000 (the Regulation);
- > State Environmental Planning Policy Amendment (Flood Planning) 2021; and,
- > Revocation of the Guideline on Development Controls on Low Flood Risk Areas (2007).

The revised flood-prone land package allows a more contemporary approach to better manage flood risk beyond the 1% Annual Exceedance Probability (AEP), including building greater resilience. The package



reverses the effects of the 2007 Planning Circular and Guideline on Development Controls on Low Flood Risk Areas, Ministerial Direction No. 4.3 which has restricted Councils in NSW from applying residential development controls on land between the 1% AEP flood extent and the Probable Maximum Flood (PMF) extent.

The update package addresses the key concerns over the safety of people, the management of potential damage to property and infrastructure, and the management of the cumulative impacts of development, particularly on evacuation capacity. A summary of the key outcomes from the package is summarised in the following sub-section.

3.2.3 Planning Proposal Requirements

The s9.1 Local Planning Direction applies when an authority prepares a planning proposal that creates, removes or alters a zone or a provision that affects flood prone land. The key requirements of the local planning direction for planning proposals include:

1. A planning proposal must include provisions that give effect to and are consistent with the NSW Flood Prone Land Policy, the principles of the Floodplain Development Manual 2005, the Considering flooding in land use planning guideline 2021 (all now superseded by FRM Manual 2023), and any adopted flood study and/or floodplain risk management plan adopted by the relevant council.
2. A planning proposal must not rezone land within the flood planning area from Recreation, Rural, Special Purpose or Environmental Protection Zones to a Residential, Business, Industrial or Special Purpose Zones.
3. A planning proposal must not contain provisions that apply to the flood planning area which:
 - a. permit development in floodway areas,
 - b. permit development that will result in significant flood impacts to other properties,
 - c. permit development for the purposes of residential accommodation in high hazard areas,
 - d. permit a significant increase in the development and/or dwelling density of that land,
 - e. permit development for the purpose of centre-based childcare facilities, hostels, boarding houses, group homes, hospitals, residential care facilities, respite day care centres and seniors housing in areas where the occupants of the development cannot effectively evacuate,
 - f. permit development to be carried out without development consent except for the purposes of exempt development or agriculture. Dams, drainage canals, levees, still require consent,
 - g. are likely to result in a significantly increased requirement for government spending on emergency management services, flood mitigation and emergency response measures, which can include but are not limited to the provision of road infrastructure, flood mitigation infrastructure and utilities, or
 - h. permit hazardous industries or hazardous storage establishments where hazardous materials cannot be effectively contained during the occurrence of a flood event.
4. A planning proposal must not contain provisions that apply to areas between the flood planning area and probable maximum flood to which Special Flood Considerations apply which include items a), b), d), e), f) from item 3 above. An additional requirement for this area is if a planning proposal is likely to affect the safe occupation of and efficient evacuation of the lot.

For the purposes of preparing a planning proposal, the flood planning area must be consistent with the principles of the Floodplain Development Manual 2005 or as otherwise determined by a Floodplain Risk Management Study or Plan adopted by the relevant council.

3.2.4 Flood Risk Management Manual 2023

The finalised and gazetted Flood Risk Management (FRM) Manual was adopted on 30 June 2023. The 2023 FRM Manual replaces the FDM 2005, the 2022 Draft FRM Manual and Toolkits and a number of previous technical guides. The manual provides advice to local councils on the management of flood risk in their local government areas through the flood risk management framework and flood risk management process. This update builds on the 2005 manual and guides. It considers lessons learnt from floods and the application of the flood risk management process and manual since 2005. It considers a range of work on managing natural hazards across government, including relevant national and international frameworks, strategies and best practice guidance. Accompanying the manual is eight FRM Guidelines that comprise a new toolkit to provide guidance for local councils and their consultants.



4 Available Flood Information

4.1 Birds Gully and Bunnerong Road Flood Study (2018)

The *Birds Gully and Bunnerong Road Flood Study* prepared by WMA in 2018 informed flood characteristics in the vicinity of the site. The flood study is conducted using a flow hydrograph boundary generated using the Drains Software package. The 1d/2d hydraulic model was conducted using TUFLOW software package. This section discusses the data utilised and flood characteristics maps generated in the WMA flood study in the vicinity of the site.

4.1.1 Hydrological Modelling from 2018 Flood Study

The hydrological model for the Birds Gully and Bunnerong Road flood study was conducted using the Drains software package. The catchment size, catchment characteristics, IFD data and loss parameters utilised in the study are captured in the flood study report. The sub-catchments utilised to generate flows in the hydraulic model in the vicinity of the project site are captured in **Figure 4-1**. The site was divided into three different sub-catchments as shown in the figure.

The project site is fully urbanised and approximately 95% impervious. The proposed works will not increase catchment imperviousness. Hydrograph/s generated from each of the sub-catchment/s was assigned to the pits as a flow boundary.



Figure 4-1 Hydrology Sub-Catchments from Flood Study (Source: WMA flood study report 2018)

4.1.2 Hydraulic Model from 2018 Flood Study

The hydraulic model for the Birds Gully and Bunnerong Road flood study was developed using the TUFLOW software package. The model bathymetry was developed from DEM generated from LiDAR data collected in 2011.

Runoff captured from localities north of Westfield Drive is captured by piped drainage system that drains through the easement provided inside the shopping centre complex during frequent storm events. Runoff more than this piped drainage system drains through the bus lane located inside the shopping centre complex towards Wentworth Avenue. The trunk drainage system that drains through the easement inside the shopping centre collects additional runoff from Wentworth Avenue and drains towards the Bunnerong Drain. The layout of existing drainage system in the vicinity of the site is captured in **Figure 4-2**.

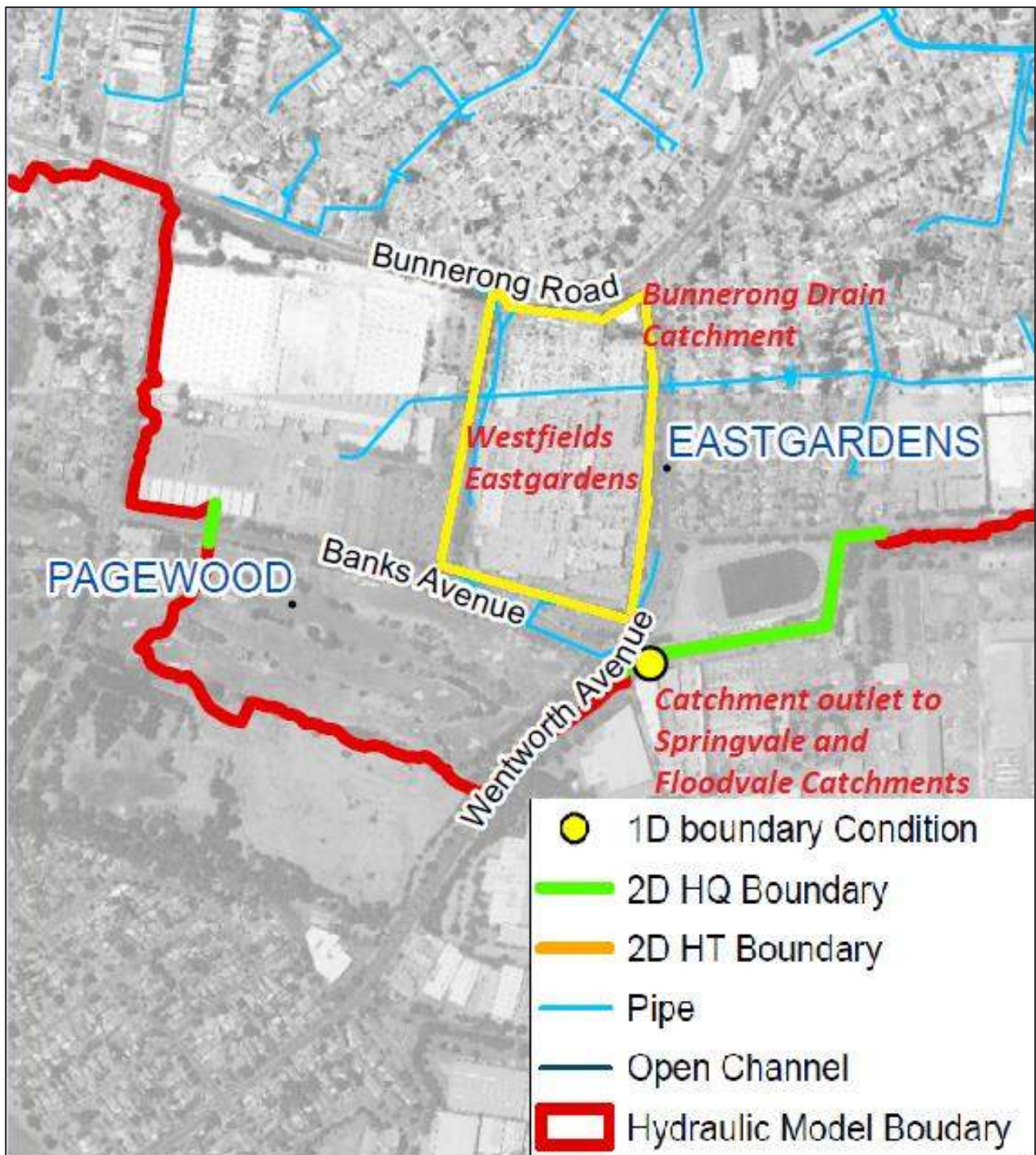


Figure 4-2 Existing Drainage System (captured from WMA Flood Study 2018)

4.2 Bayside Flood Advice Letter for Subject Site

Bayside Council has provided Flood Advice letter for the subject site dated 24 November 2023. The flood advice letter has been attached as **Appendix C** to this report. The flood advice contained the following flood map results, which have been extracted and reproduced as figures within this report:

- > 1% Annual Exceedance Probability (AEP) Peak Flood Depth – **Figure 4-3**
- > 1% AEP H1-H6 Flood Hazard – **Figure 4-4**. The definition of H1-H6 hazard categories is outlined within Section 9.5.2 of the Bayside DCP 2022, and in accordance with the definitions of the 2023 Flood Risk Management Manual.
- > 1% AEP Flood Function (Floodway, Flood Storage and Flood Fringe) – **Figure 4-5**
- > Probable Maximum Flood (PMF) Peak Flood Depth – **Figure 4-6**

The flood advice letter has indicated that the east side of the site is marginally affected by flooding during the 1% AEP and PMF storm events.

The peak flood level results at the eight reference locations (Point A – H) from the flood advice are tabulated in the following table. The reference point locations are shown in **Figure 4-3**, with none located in the south-east side of the site where the proposed works are located. In lieu of recorded flood levels in the south-east corner of the site, analysis is reliant on review of peak depth result ranges shown in **Figure 4-3** and **Figure 4-6**.

Location	1% AEP Level (m AHD)	1% AEP Level + 0.9m sea level rise (m AHD)	1% AEP Level + 20% increase in rainfall intensity (m AHD)	PMF Level (m AHD)
A	20.35	20.35	20.38	20.59
B	20.68	20.68	20.70	21.04
C	21.50	21.50	21.64	22.22
D	21.49	21.49	21.64	22.22
E	23.47	23.47	23.47	23.52
F	19.40	19.40	19.42	19.64
G	19.95	19.95	19.99	20.15
H	19.95	19.95	19.99	20.16

In addition, the flood maps have been marked up with existing and proposed development layouts as included in **Appendix D**. Review of the flooding depth shows that the site is affected by overland flooding at the following locations:

- > Overland flows originating from the development site to the north of the subject site and from the west side of Bunnerong Road accumulate at the low point of Westfield Drive on the northern boundary of the site (near Location D). The peak depth of ponding at this location in the 1% AEP event is 0.30 - 0.50 metres. This is also the location of the trunk drainage alignment with the large culvert conveying flows under the subject site.
- > Excess ponding from Westfield Drive is diverted around the eastern side of the commercial building, through the landscaped area of the north-east side of the site, resulting in minor overland flows in the bus terminal access road:
 - In the 1% AEP, the ponding on the bus terminal access road in the south-east side of the subject site is very minor (0.00 – 0.15 metres). In the southern corner of the site near the existing second commercial building the peak 1% AEP depths are slightly higher (0.15 – 0.30 metres).
 - In the PMF event, the ponding on the bus terminal access road in the south-east side of the subject site is more significant (0.50 – 1.00 metres). In the southern corner of the site near the existing second commercial building the peak 1% AEP depths are higher (1.00 – 2.00 metres).
- > There is no modelled overtopping of the southern site access road to Wentworth Ave, and therefore there is no discharge from the subject site in the 1% AEP from the south-east corner. In the PMF there is minor overtopping to Wentworth Ave that flows to a low point in the road (Location F).
- > There is no modelled flood affectation of the existing covered carpark area for the subject site, flows are fully contained within the bus terminal access driveway.

Based on the above description for the 1% AEP event, the very minor flooding (0.00 – 0.15 metres depth) for the south-east corner of the subject site where works are proposed would best be described as sheet flow or stormwater runoff rather than significant overland flooding.



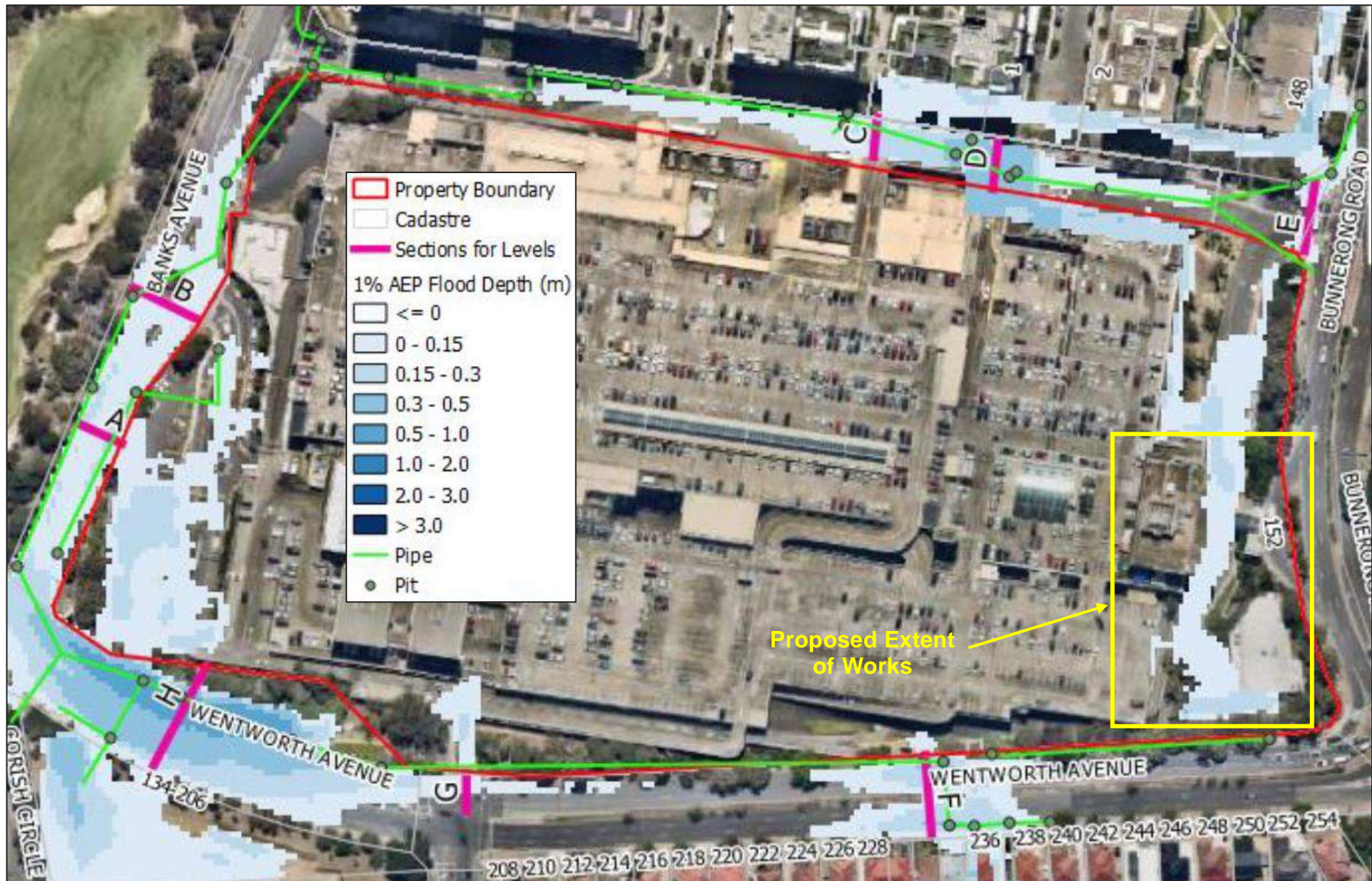


Figure 4-3 Peak Depth of Flooding during the 1% AEP Event

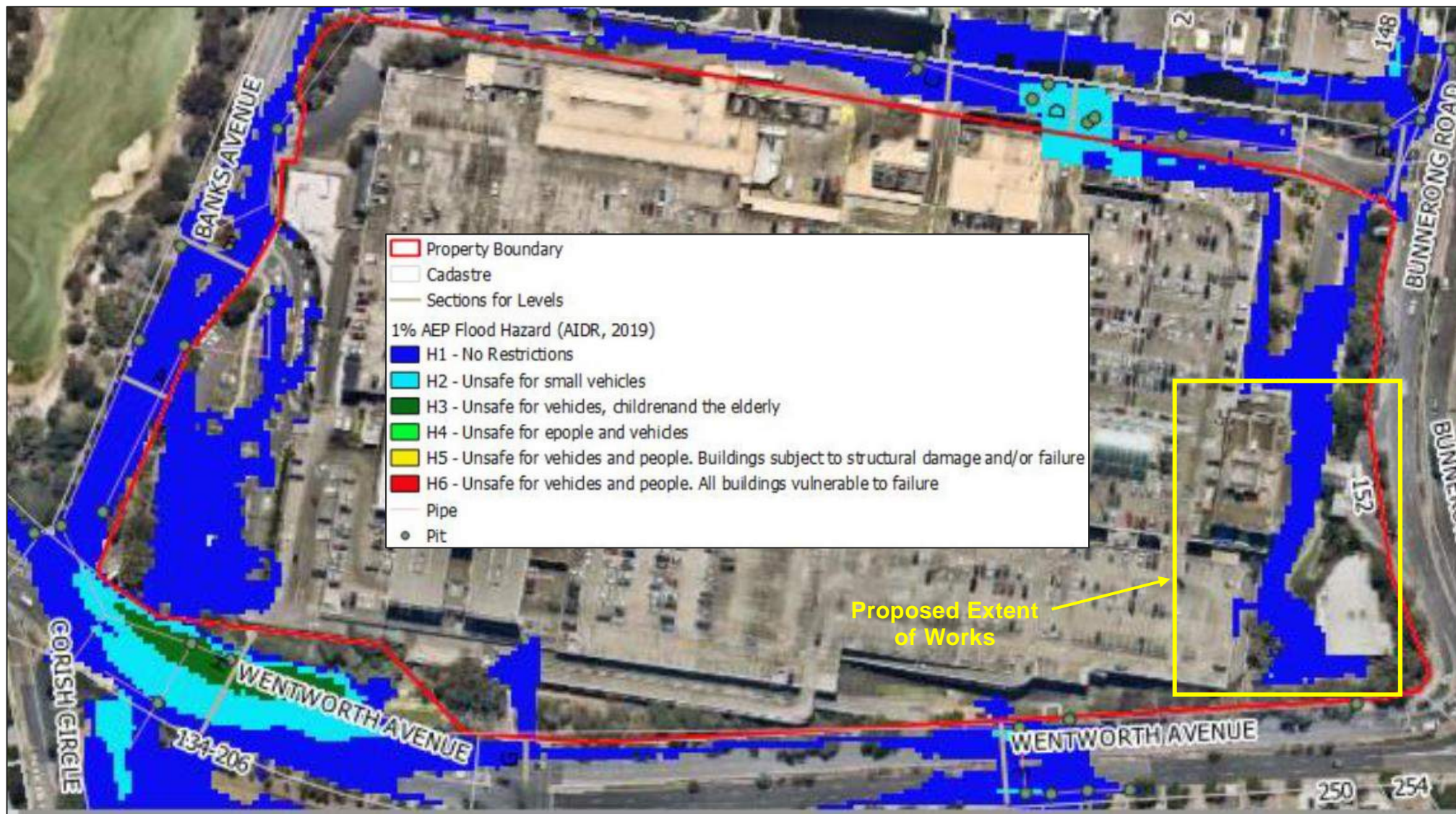


Figure 4-4 H1-H6 Hazard Mapping for the 1% AEP Event

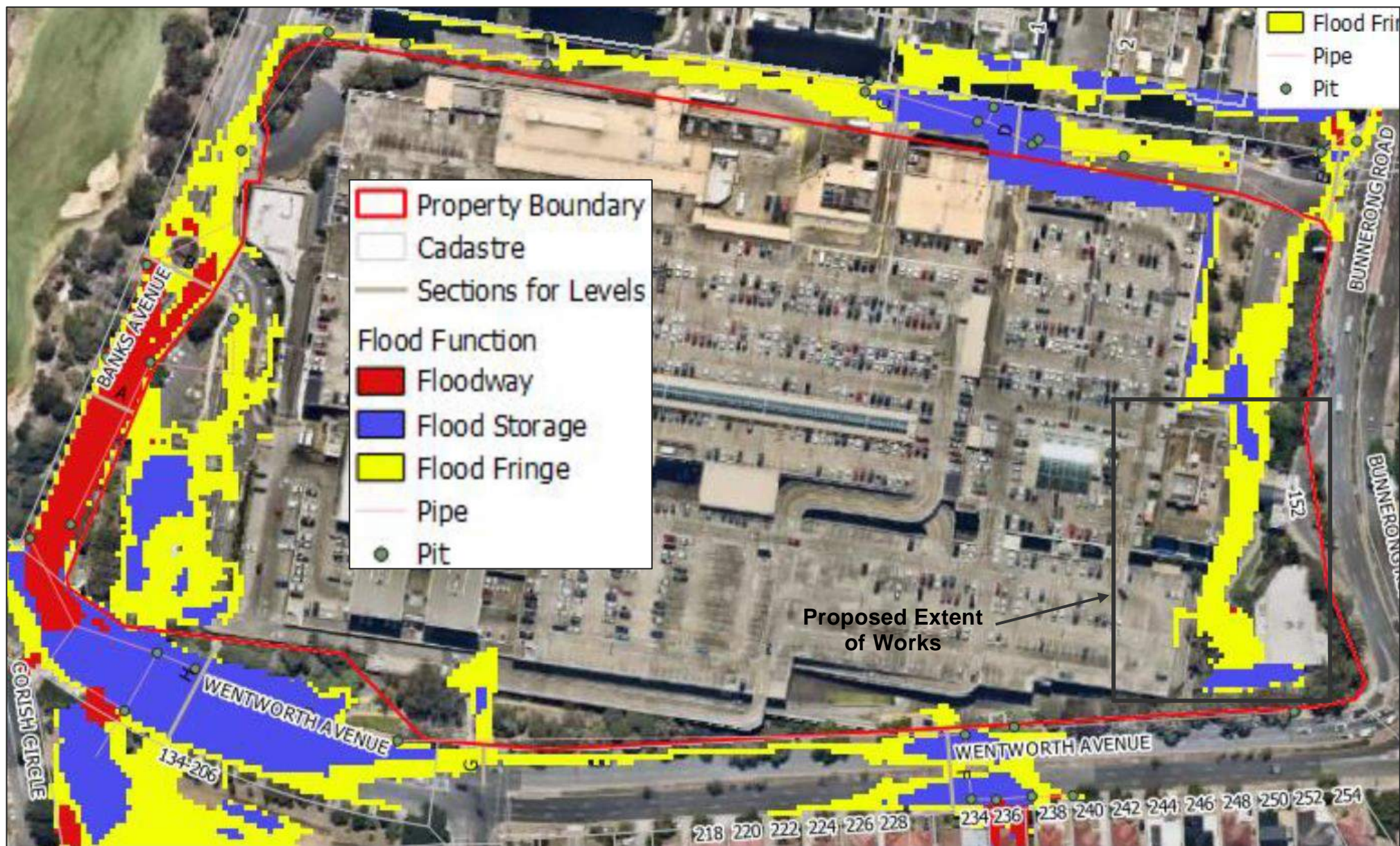


Figure 4-5 Flood Function Mapping for 1% AEP Event

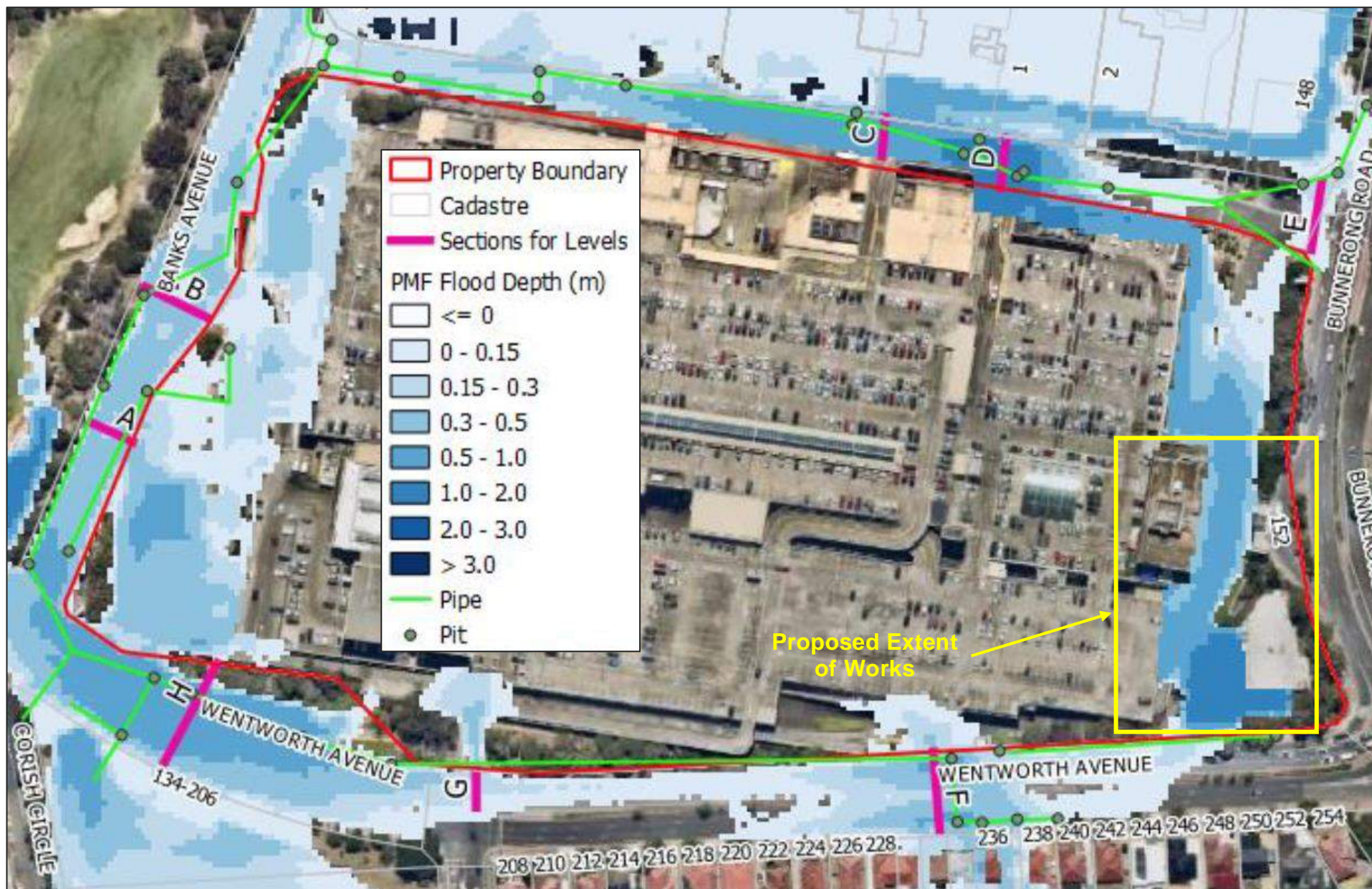


Figure 4-6 Peak Depth of Flooding for the PMF Event

5 Flood Assessment

As noted in Section 2.4, the focus of this flood assessment review is specifically relating to the planning proposal flood assessment requirements outlined in s9.1 Local Planning Direction. A summary of the developments compatibility with these high-level flood planning requirements is summarised in **Section 5.2**.

In addition to this, an initial review of the proposed development compared to the flood-related development controls of the Bayside DCP 2022 has been summarised in **Section 5.1**. These controls are applicable in Council based assessments for Development Applications (DAs), where this planning proposal is at an earlier and more high-level stage of the development process, the planning proposal phase. Nevertheless, the below discussion has been included with a view to the potential compatibility of the development to Council's requirements. Further analysis in assessing against these controls more completely will be expanded upon in a potential future Development Application for the site.

5.1 Bayside Council Flood Related Controls

As stated within the Flood Advice letter provided by Council for the subject site, Bayside DCP 2022 Section 3.10 and Section 9.5 provide detailed information on flood related development controls.

Council's requirements relevant to the subject site are summarised within the Flood Advice letter, and are listed below in italics and underlined with responses based on review of the above flood affectation for the south-east side of the site.

However as noted in the previous section, the outcome of the Flood Advice review is that the 1% AEP affectation of the south-east side of the site (less than 0.15 metres depth) would not be described as either mainstream or overland flooding, but rather stormwater ponding.

It is possible that appropriate stormwater system design for the re-configured bus terminal road surface in future design stages for the project could sufficiently address this minor affectation in the 1% AEP. For example, the 1% AEP flood depths of less than 0.15 metres would not exceed a normal kerb height. Therefore it is concluded that Flood Planning Level, and other considerations are not relevant to this assessment.

Nonetheless, as a worst case scenario the below assessment has been completed to show conformance with Council requirements in the case that affectation in the south-east of the site were considered flooding.

Flood Planning Level

The minimum habitable floor level for residential, commercial and industrial development on this land is the 1% AEP flood level + 0.5m freeboard.

There is only one proposed new commercial habitable floors in the proposed development, for the proposed Tower B ground floor level. In lieu of reported peak flood levels from Council's Flood Advice at this location, an approximate flood planning level for Tower B has been calculated as follows:

- > The proposed ground level in the bus terminal area is 21.0m AHD (refer to **Appendix B**)
- > With a peak existing 1% AEP depth of up to 0.3 metres (this is conservative as it is the upper bound of the depth colour scheme, therefore the peak depth would likely be less than this)
- > With a 0.5 metres freeboard, the minimum floor level requirement would be 21.8m AHD (21.0 plus 0.3m depth plus 0.5m freeboard).

Reviewing the relative depths of ponding in the bus terminal area, the ground levels are proposed to be lowered in front of the existing commercial building entrance from 21.3 – 21.5m AHD down to 21.0m AHD. It is expected that this will reduce flood levels and in turn improve the flood protection of the existing building, though there is no requirement in the DCP to meet FPL requirements for existing buildings, only new buildings.



The minimum non-habitable floor level for residential, commercial and industrial development on this land is the 1% AEP flood level (no freeboard is required).

In the case that Tower A and C loading dock area and Tower B loading dock area were considered 'non-habitable' floors, the approximate level for these areas would be 21.3m AHD based on the above calculation without a freeboard added.

Car Parking & Driveway Access

For above ground level garages, the minimum garage floor level shall be the 1% AEP flood level.

As noted in **Section 2.3.1**, the only new carpark areas proposed in the development are located in elevated levels above the ground floor, therefore will be elevated above the 1% AEP level. These requirements do not apply to the existing carpark areas.

Flood Impact

The development must not result in increased flooding elsewhere in the floodplain or redirect flows onto adjoining properties.

A flood impact assessment report may not be required for small scale development (e.g., alts & adds, single dwellings and dual occupancies) where the flood storage and floodway capacity are retained as part of the development. Some examples of this are the following:

- The building/works are not located in the flood affected area.
- The building is designed to allow the free flow of floodwater under the building (e.g., constructed as a suspended slab on pier and beam foundation with a void below up to the 1% AEP flood level).

As noted in the previous section, the minor flooding is contained within the bus terminal access road. The proposed Tower B should be outside of the flood extent, therefore should be exempt based on the above guidance.

The existing site does not have any discharge from the south-east side of the site in the 1% AEP event. The bus terminal area with some existing ponding is proposed to be lowered by a further 0.3 – 0.5 metres in the proposed case compared to existing ground levels, which will reduce the likelihood of flooding from the site and offsite impacts. As long as the stormwater and civil design retains the crest of the Wentworth Ave as per the existing to keep minor ponding within the subject site then there will be no offsite impacts.

As noted previously, appropriate stormwater system design in later design stages of the project should ensure the minor flows are contained and no offsite impacts caused. Further consideration of flood impacts can be conducted, potentially through pre- and post-development modelling of the site during a potential future DA submission.

Flood Risk Management

A Flood Risk Management Plan prepared by a suitably qualified civil engineer is required to be lodged with the DA which will detail whether evacuation procedures are required and if so, how they will be initiated, warning signs and preservation of flood awareness as owners and/or occupants change through time.

The proposed Tower B commercial development will have direct pedestrian access to the upper floors and Bunnerong Road and there should be negligible PMF affectation of the building above the ground flood level for the proposed loading dock.

If required, any emergency management planning can be developed during a potential future DA submission.



5.2 Planning Proposal Flooding Requirements

The proposed development has been reviewed against the planning proposal requirements of the NSW Flood Prone Land Policy specifically the Ministerial Direction 4.1 Flooding as discussed in **Section 3.2.3**.

A summary of each of the planning proposal requirements is included in **Table 5-1** below.

Table 5-1 Review of the Planning Proposal Compared to Ministerial Direction Planning Proposal Requirements

Direction Provision	Consistent with Direction Provision
A planning proposal must include provisions that give effect to and are consistent with the NSW Flood Prone Land Policy, the principles of the Floodplain Development Manual 2005, the Considering flooding in land use planning guideline 2021, and any adopted flood study and/or floodplain risk management plan adopted by the relevant council	<p>Yes, upon review it appears that the planning proposal adheres to the principles of all of these documents.</p> <p>Via this Impact Assessment and subject to concept and detailed design and associated stormwater design, a planning proposal would give effect and be consistent with these documents.</p>
A planning proposal must not rezone land within the flood planning area from Recreation, Rural, Special Purpose or Environmental Protection Zones to a Residential, Business, Industrial or Special Purpose Zones	It is noted that the planning proposal does not involve rezoning.
A planning proposal must not contain provisions that apply to the flood planning area which:	All of these conditions are considered satisfied as follows:
a) permit development in floodway areas,	a) Review of Council flood advice (Figure 4-5) has indicated that the development site is not designated as a floodway and that the proposed development does not alter local overland flow path.
b) permit development that will result in significant flood impacts to other properties,	b) the proposed development does not alter existing flow paths or increase flow generated from the site as discussed in Section 5.1
c) permit development for the purposes of residential accommodation in high hazard areas,	c) Majority of the site is flood free and a locality in the southwest and bus interchange laneway areas are categorised under H1 being a low hazard. The proposed development will not alter this designation and hence the development is not occurring in a high hazard area. No residential development is proposed.
d) permit a significant increase in the development and/or dwelling density of that land,	d) It is noted that the planning proposal is to increase the floor height and floor space ratio. However, with all of this intensification proposed for levels elevated above the ground floor and above the flood levels this condition is met.
e) permit development for the purpose of centre-based childcare facilities, hostels, boarding houses, group homes, hospitals, residential care facilities, respite day care centres and seniors housing in areas where the occupants of the development cannot effectively evacuate,	e) A high-level review of flood emergency response suggests that evacuation should be feasible for the Site. No sensitive development types are proposed within the planning proposal.
f) permit development to be carried out without development consent except for the purposes of exempt development or agriculture. Dams, drainage canals, levees, still require consent,	f) No development is proposed without consent associated with this submission.



Direction Provision	Consistent with Direction Provision
<p>g) are likely to result in a significantly increased requirement for government spending on emergency management services, flood mitigation and emergency response measures, which can include but are not limited to the provision of road infrastructure, flood mitigation infrastructure and utilities, or</p> <p>h) permit hazardous industries or hazardous storage establishments where hazardous materials cannot be effectively contained during the occurrence of a flood event.</p>	<p>g) A high-level review of flood emergency response suggests that evacuation should be feasible for most of the Site. This should be possible through site specific emergency response plans that do not increase the burden on emergency services or require significant road upgrades to enable evacuation.</p> <p>There are no residential areas proposed in the development. Therefore there should be no flood evacuation requirements for the proposed development as shelter-in-place of flood free lands is a suitable flood emergency response.</p> <p>h) No developments with hazardous materials are proposed as part of this submission in areas below the Flood Planning Level.</p>
<p>A planning proposal must not contain provisions that apply to areas between the flood planning area and probable maximum flood to which Special Flood Considerations apply which include items a), b), d), e), f) from item 3 above. An additional requirement for this area is if a planning proposal is likely to affect the safe occupation of and efficient evacuation of the lot</p>	<p>The same responses as noted in the relevant items above apply to Special Flood Considerations.</p>
<p>For the purposes of preparing a planning proposal, the flood planning area must be consistent with the principles of the Floodplain Development Manual 2005 or as otherwise determined by a Floodplain Risk Management Study or Plan adopted by the relevant council</p>	<p>In accordance with this provision, the planning proposal considers the flood control requirements of Bayside Council as noted in the previous section.</p>

6 Conclusion

Stantec has been engaged by Scentre Group Pty Ltd to address the following flooding related conditions set by the Gateway Determination:

- > Ministerial Direction 4.1 Flooding, and
- > Provide a flood impact assessment taking into consideration the recommendations of the 2022 NSW flood inquiry and the NSW flood risk management Manual 2023.

This study has reviewed existing flood studies, Council flood advice letter, planning proposal flooding requirements, proposed development layout and site survey has concluded that the proposed development will not alter flow direction and/or increase magnitude of flow generated from the development site and hence will not adversely affect on site and off site holdings.

The flood assessment concludes the proposed development is in accordance with the planning proposal flood requirements of the Ministerial Direction 4.1. This relatively high-level flood assessment is in keeping with the planning proposal phase of the development review. In the future, Council will have the opportunity to review in further detail potential flood impacts as part of a potential DA process.



7 References

Bayside Council Development Control Plan 2022

Bayside Council Local Environmental Plan 2021

Bayside Council, Flood advice letter for the property located at 152 Bunnerong Road Eastgardens

BMT WBM Pty Ltd 2014, Springvale Drain and Floodvale Drain Flood Study

NSW Department of Planning, Gateway determination letter for the planning proposal to increase the maximum height of building and floor space ratio at 152 Bunnerong Road, Eastgardens

NSW Department of Planning and Environment, 2021, Considering flooding in land use planning

NSW Department of Planning and Environment, 2022, Local Planning directions 2022

NSW Department of Planning and Environment, 2023, Flood Risk Management Manual

NSW Department of Planning and Environment, 2023, FRM Guide - Flood Impact and Risk Assessment (LU01)





Appendices





Appendix A: Existing Site Survey

C101

C107

C107

WESTFIELD EASTGARDENS SHOPPING CENTRE

C103



Appendix B: Proposed Development Layout

An urban oasis

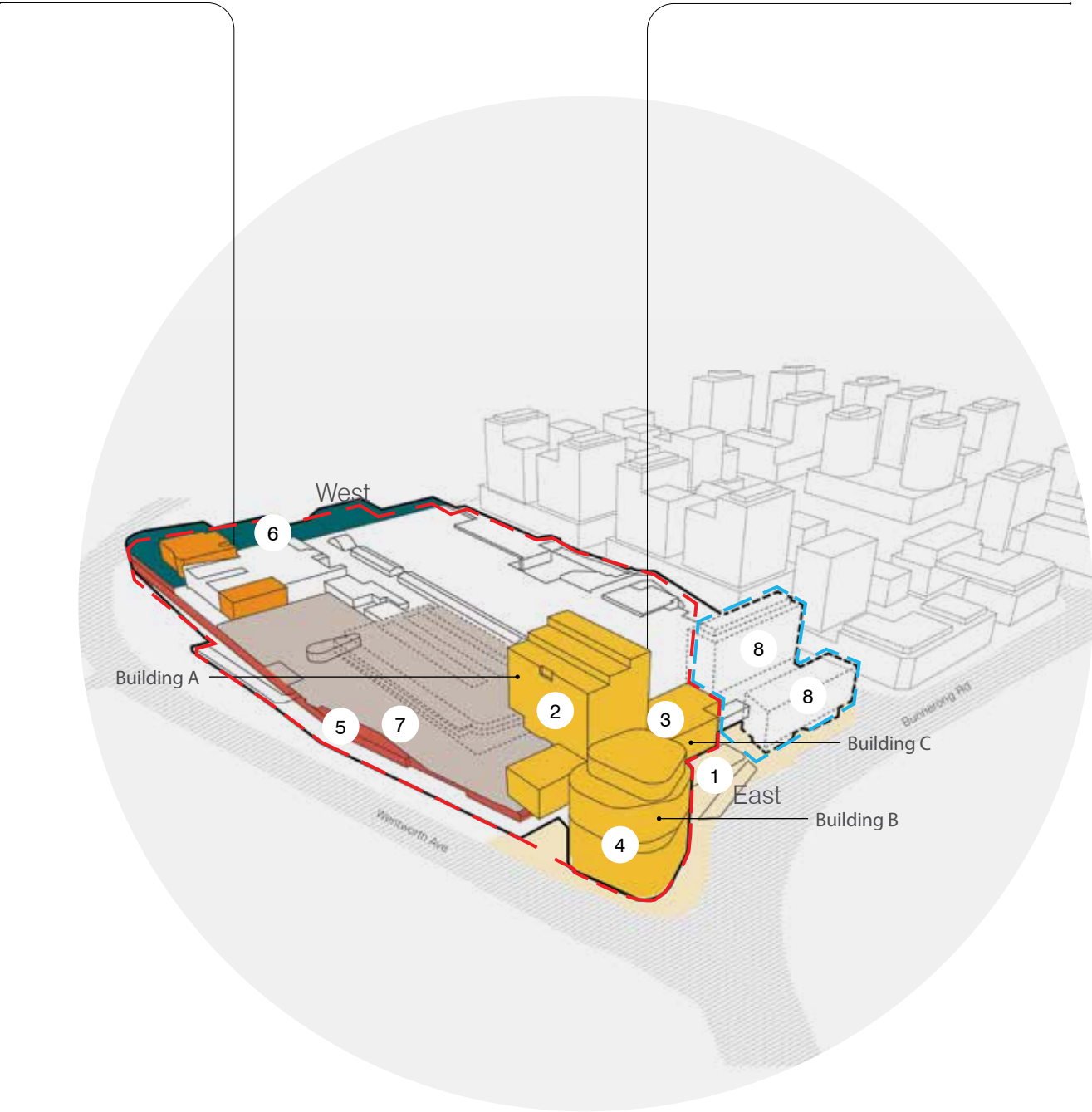
Western address

The western end will be a retail, dining and entertainment destination.

- The existing fresh food offer will be recreated as a vibrant marketplace
- A series of vertically landscaped terraces will offer new restaurants and eateries rising up through the building to an expanded cinema complex that will anchor additional entertainment options. Stairs and escalators from street level will promote a vibrant destination that can trade into the evening for the local community.
- Landscape will be a focus of the precinct, visually connecting with the golf course and providing a variety of interactive green spaces from ground to roof-top for shoppers, diners and movie goers to enjoy.
- The applicant has held an international expression of interest for experienced operators to run an urban farm on the rooftop, and this will be explored in more detail as the design and planning progresses.

Legend

Current Planning Proposal

Future Planning Proposal Stage

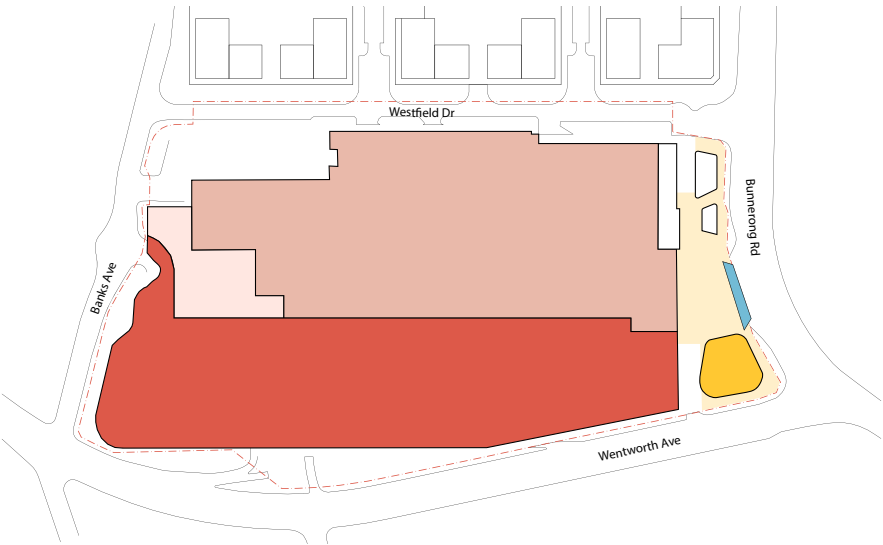
Live, work & play

Eastern address

The focus of the eastern end of the centre is a new commercial office precinct with active streetscape and public domain interfacing with the public transport interchange on Bunnerong Road.

- Fine grain frontages including retail and food and beverage tenancies and building lobbies will transform the centre's address from internalised to an active street frontage which continues the street wall established on the Meriton Pagewood Green development.
- A publicly accessible plaza will be the focus of the eastern entry. Landscaping will provide a buffer from Bunnerong Road traffic, and trees will provide amenity and shade to the space. It will be a vibrant space activated on the edges by food and beverage tenancies, outdoor seating and kiosks which will provide an improved public transport experience.
- The bus interchange is arranged over two levels. North-bound buses will be accessed via a kerb-side stop on Bunnerong Road, while south-bound buses are located below the plaza on L1. Escalators located in landscaped lightwells will provide a visual and physical connection between levels and drop daylight down to the lower level.
- In addition to ground level retail, building uses proposed in this precinct include mixed use commercial, community, health and wellness, and future stage buildings with potential for education, student accommodation or hotel use.

The Master Plan



Level 2 Block Diagram



Level 3M Block Diagram



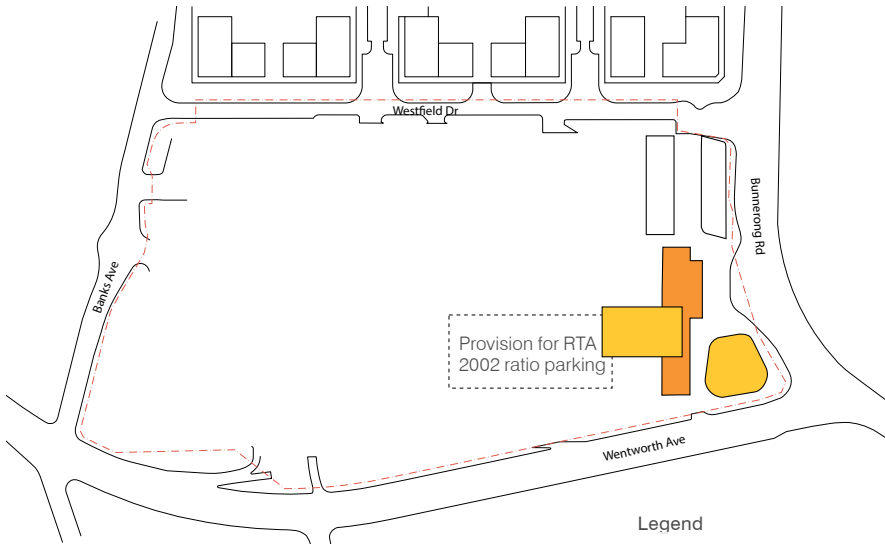
Level 4M Block Diagram



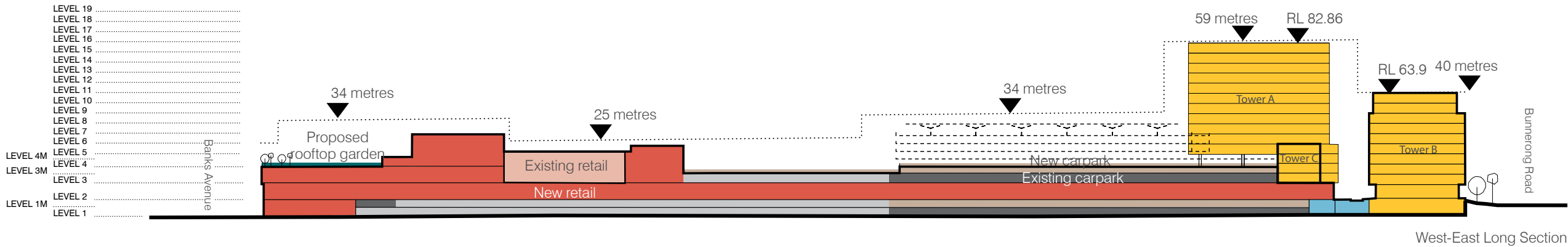
Level 3 Block Diagram



Level 4 Block Diagram



Level 5 Block Diagram



- Legend
- Existing retail
 - Reconfigured retail
 - New retail
 - Existing carpark
 - Existing carpark reconfigured
 - New carpark
 - New commercial
 - Reconfigured commercial
 - Proposed rooftop garden/urban farm
 - Bus terminus
 - Publicly accessible landscaped area
 - Provision for RTA 2002 ratio parking
 - Future built form area (within site)



Appendix C: Bayside City Council Flood Advice Letter

24 November 2023

Our Ref: FA – 2023/210

Scentre Group
85 Castlereagh St
SYDNEY NSW 2000



Dear Sir/Madam

Flood Advice Letter for 152 Bunnerong Road, EASTGARDENS

Council has identified this property as being affected by the 1% AEP flood event and affected the PMF flood event. Refer to attached maps and flood information.

The information contained within this letter is derived from this flood study:

Springvale Drain and Floodvale Drain Flood Study, BMT WBM Pty Ltd, 2014

This letter provides flooding information for the area in the vicinity of the above property. This information can be used to assist in understanding the extent of flooding affecting this property and can be used to assist in preparation of a development application and associated flood reports. It is recommended that the information in this report be interpreted by a suitably qualified professional.

Council considers that this is the best information currently available on flooding in the area, but Council cannot comment on the accuracy of the result. The information is provided in good faith and in accordance with the provisions of s.733 of the Local Government Act.

No accurate information is recorded regarding the impact of tsunamis in the Bayside Local Government area.

Refer to Bayside DCP 2022 section 3.10 and section 9.5 for detailed information on flood related development controls that need to be adhered to.

The location of Council stormwater pits and pipes/culverts in the images are indicative only. The accurate location, dimensions, depth and invert of pipelines need to be verified by a suitably qualified surveyor. Existing pipes/culverts shall be clearly shown on the plans submitted for the application for planning consent (DA or CDC). Requirements for construction over/adjacent to the Council pipe are outlined in Bayside Technical Specification Stormwater Management sections 8.6, 8.7 & 8.8 and must be complied with.

Note Council's flood model does not contain details of flow paths and obstructions to flow within the subject site which will impact flood behaviour and levels. It is recommended that a site-specific study is completed to inform any design and development. The levels contained within this letter should not be used for design purposes.

Should you require any further information, contact Aaron Biffin on 9366 3840.

Yours faithfully

per Neville Naicker
COORDINATOR ASSET PLANNING

1% AEP FLOOD LEVELS

1% AEP Flood Level for multiple points is shown below.

SEA LEVEL RISE AND/OR CLIMATE CHANGE

1% AEP Flood Level including sea level rise of 0.9m (year 2100) and 1% AEP Flood Level including an increase in rainfall intensity due to climate change (20% increase) is shown below.

Location	1% AEP Level (m AHD)	1% AEP Level + 0.9m sea level rise (m AHD)	1% AEP Level + 20% increase in rainfall intensity (m AHD)
A	20.35	20.35	20.38
B	20.68	20.68	20.70
C	21.50	21.50	21.64
D	21.49	21.49	21.64
E	23.47	23.47	23.47
F	19.40	19.40	19.42
G	19.95	19.95	19.99
H	19.95	19.95	19.99



1% AEP Flood Extent Map



1% AEP Flood Hazard Map

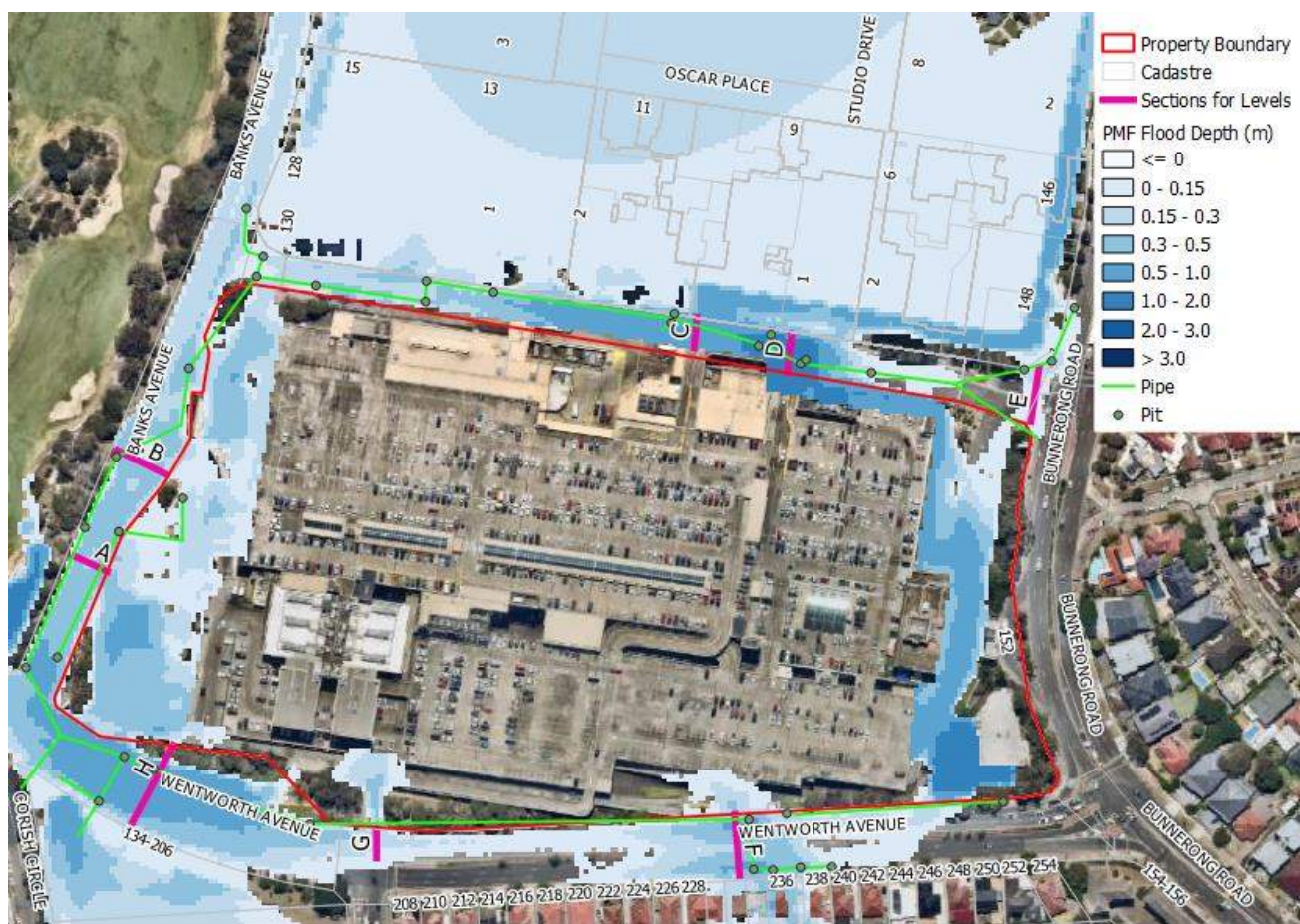


1% AEP Flood Function Map

PMF FLOOD LEVELS

PMF Flood Level for multiple points is shown below.

Location	PMF Level (m AHD)
A	20.59
B	21.04
C	22.22
D	22.22
E	23.52
F	19.64
G	20.15
H	20.16



PMF Flood Extent Map

**COMPLYING
DEVELOPMENT
ON FLOOD
CONTROL LOTS**

Development under the State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 must not be carried out on any part of a flood control lot, other than a part of the lot that the council or a professional engineer who specialise in hydraulic engineering has certified, for the purposes of the issue of the relevant complying development certificate, as not being any of the following:

- a) A flood storage area;
- b) A floodway area;
- c) A flow path;
- d) A high hazard area;
- e) A high risk area.

**FLOOD
PLANNING
LEVEL (FPL)**

The minimum habitable floor level for residential, commercial and industrial development on this land is the **1% AEP flood level + 0.5m freeboard**.

The minimum non-habitable floor level for residential, commercial and industrial development on this land is the 1% AEP flood level (no freeboard is required).

Note: The minimum habitable floor level for critical, sensitive uses & facilities (such as childcare centres, educational establishments, seniors housing etc.) on this land is the 1% AEP flood level + 0.5m freeboard or the PMF flood level, whichever is higher.

**CAR PARKING &
DRIVEWAY
ACCESS**

For above ground level garages, the minimum garage floor level shall be the 1% AEP flood level.

Basements and below ground garages/storage are to be physically protected to the minimum habitable floor level. All access, ventilation, driveway crests and any other potential water entry points shall be set at or above the minimum habitable floor level. Flood gates/barriers are not permitted for new building development.

The minimum level of an open hardstand car parking space or carport is the natural ground level. Carports must be of open design, with at least 2 sides completely open as otherwise, it will be enclosed and considered to be a garage. Open hardstand/carport parking spaces shall not be in a floodway or high hazard floodwaters.

FLOOD IMPACT

The development must not result in increased flooding elsewhere in the floodplain or redirect flows onto adjoining properties.

A hydraulic/flood/civil engineer is to be engaged to prepare a flood impact assessment report (refer to Bayside DCP 2022 section 9.5.4). The impact on the floodplain before and after development is to be assessed using a 2D hydraulic model. A TUFLOW model has been created for Bayside Council for the catchment. The model will be made available to a nominated Consulting Engineer subject to entering into a Model and Data Licence Agreement and payment of the fee as listed in Council's fees and charges.

A flood impact assessment report may not be required for small scale development (e.g., alts & adds, single dwellings and dual occupancies) where the flood storage and floodway capacity are retained as part of the development. Some examples of this are the following:

- The building/works are not located in the flood affected area.
- The building is designed to allow the free flow of floodwater under the building (e.g., constructed as a suspended slab on pier and beam foundation with a void below up to the 1% AEP flood level).

**FLOW THROUGH
FENCING**

Flow through open form fencing (louvres or pool fencing) is required for all new fencing and gates up to the 1% AEP Flood Level to allow flood water flow through.

FLOOD RISK MANAGEMENT

A Flood Risk Management Plan prepared by a suitably qualified civil engineer is required to be lodged with the DA which will detail whether evacuation procedures are required and if so, how they will be initiated, warning signs and preservation of flood awareness as owners and/or occupants change through time. The flood risk management plan is to be in accordance with section 3.10.13 of the Bayside DCP.

DEFINITIONS

1% Annual Exceedance Probability (AEP) Flood: This means there is a 1% chance of a flood of this height, or higher, occurring in any one year.

Probable Maximum Flood (PMF) Flood: This is the largest flood that could conceivably occur at a particular location.

Floodway area: Land that is a pathway taken by major discharges of floodwaters, the partial obstruction of which would cause a significant redistribution of floodwaters, or a significant increase in flood levels. Floodways are often aligned with natural channels, are usually characterised by deep and relatively fast flowing water and have major damage potential.

Flood Storage Area: Those parts of the floodplain that are important for the temporary storage of flood waters. The loss of storage areas may increase the severity of flood impacts by reducing natural flood attenuation.

Flood Fringe Area: The remaining land in the Flood Planning Area after the Floodway area and Flood Storage area have been defined.

Flood Planning Level (FPL): The combination of the flood level from the defined flood event and freeboard selected for flood risk management purposes. Different FPL apply to different types of the development. The FPL is a height used to set floor levels for development in flood prone areas.

Freeboard: is a factor of safety expressed as the height above the design flood level. Freeboard provides a factor of safety to compensate for uncertainties in the estimation of flood levels across the floodplain, such as wave action, localised hydraulic behaviour and impacts that are specific event related, such as levee and embankment settlement, and other effects such as “greenhouse” and climate change.

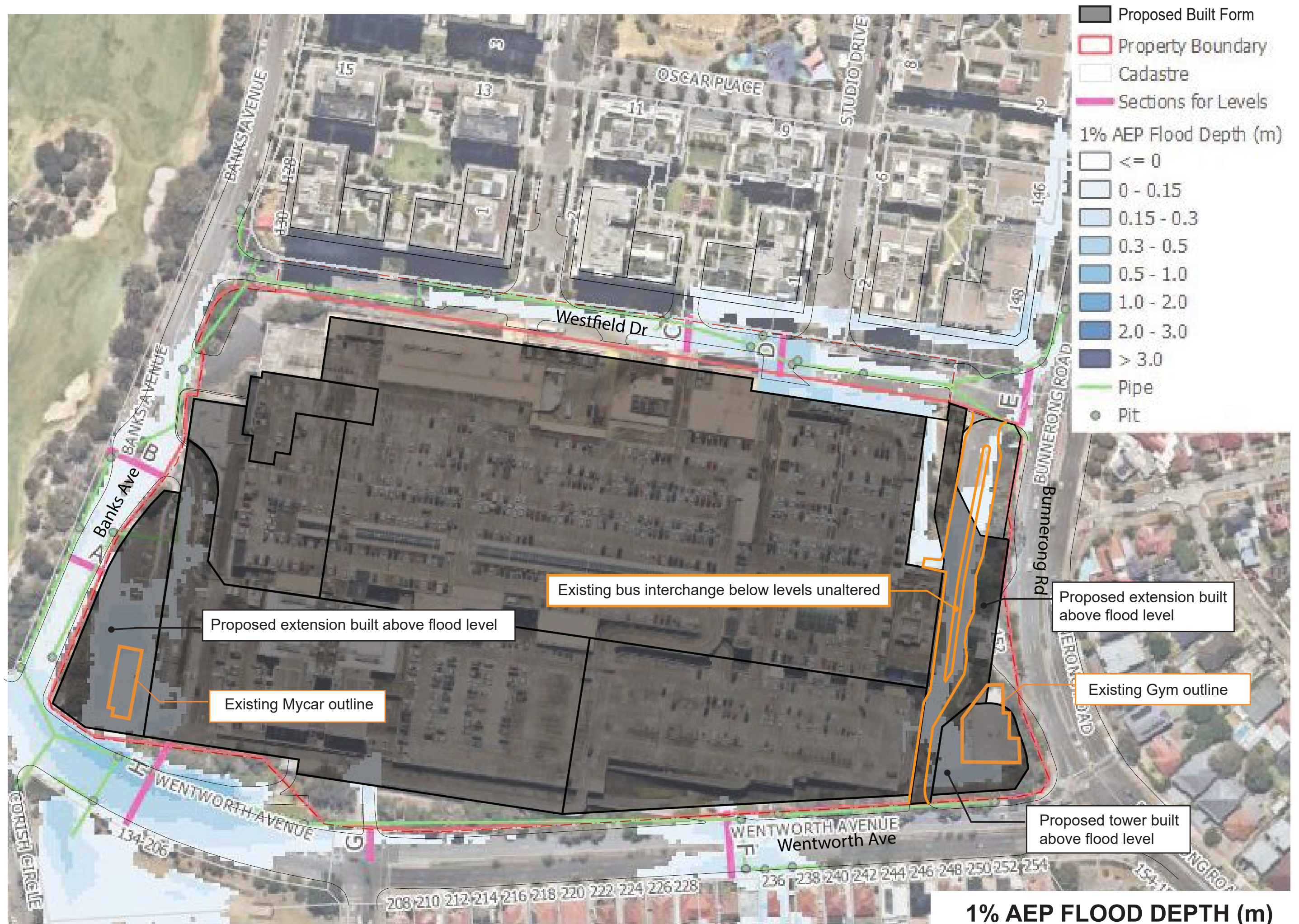
Habitable Floor Area: in a residential situation: a living or working area, such as a lounge room, dining room, rumpus room, kitchen, bedroom or workroom; in an industrial or commercial situation: an area used for offices or to store valuable possessions susceptible to flood damage in the event of a flood.

Non-Habitable Floor Area: Enclosed spaces of a specialised nature occupied neither frequently nor for extended periods (e.g., storage shed, patio, deck)

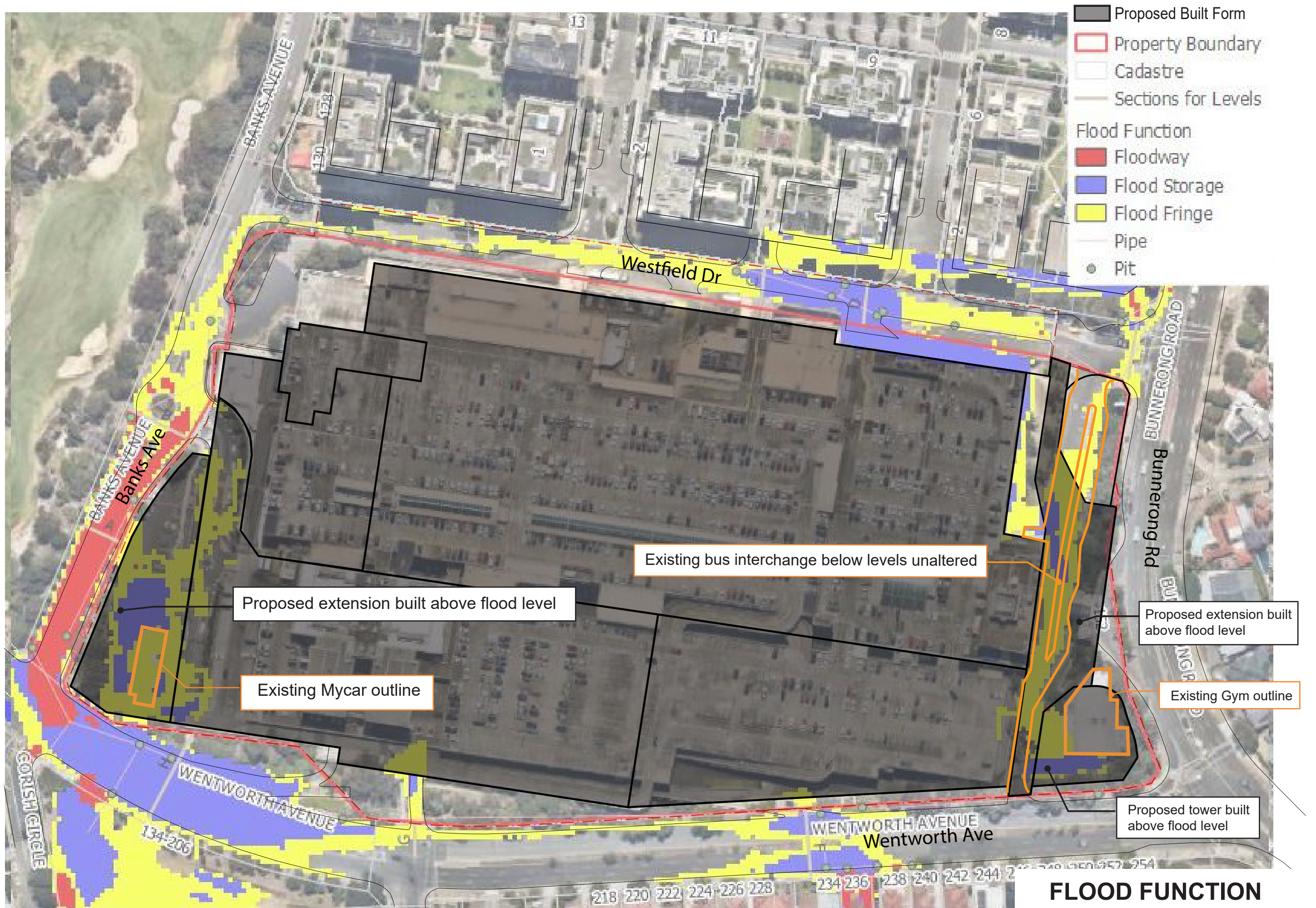
Australian Height Datum (AHD): A common national surface level datum approximately corresponding to mean sea level.



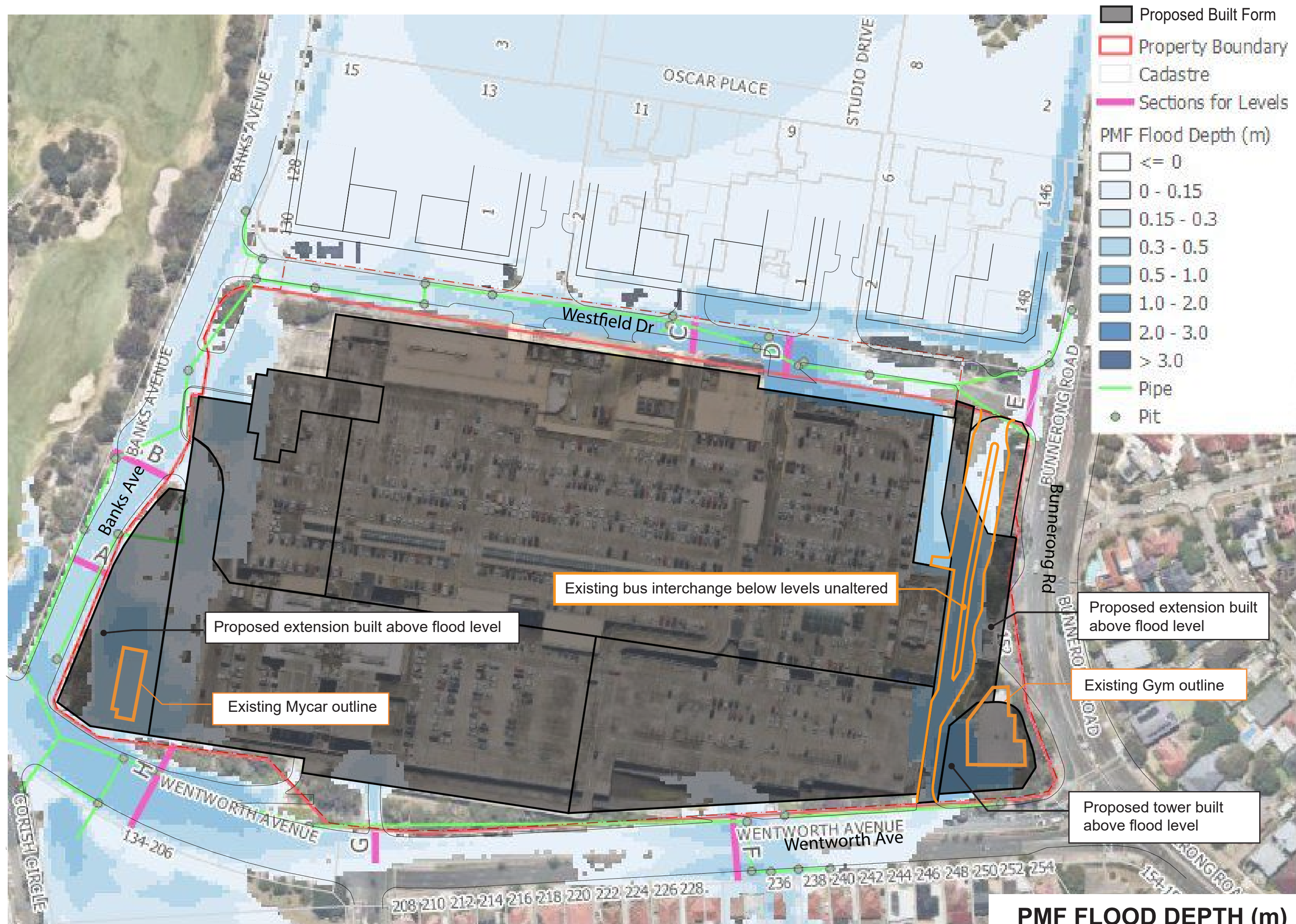
Appendix D: Flood Maps with Existing and Proposed Site Layout Overlaid



1% AEP FLOOD DEPTH (m)







PMF FLOOD DEPTH (m)



Stantec Australia

Level 16, 207 Kent Street
Sydney 2000 NSW

T: +61 2 8448 1800

Communities are fundamental. Whether around the corner or across the globe, they provide a foundation, a sense of place and of belonging. That's why at Stantec, we always design with community in mind.

We care about the communities we serve—because they're our communities too. This allows us to assess what's needed and connect our expertise, to appreciate nuances and envision what's never been considered, to bring together diverse perspectives so we can collaborate toward a shared success.

We're designers, engineers, scientists, and project managers, innovating together at the intersection of community, creativity, and client relationships. Balancing these priorities results in projects that advance the quality of life in communities across the globe.

Stantec trades on the TSX and the NYSE under the symbol STN. Visit us at **stantec.com** or find us on social media.

Design with community in mind