Report

Flood Impact Assessment

277 The Grand Parade, Ramsgate Beach

SCP Ref: S220042-CV-RP-02

Client Bronxx Pty Ltd

Project 277 The Grand Parade, Ramsgate Beach

Date 10 October 2024

Revision table

Rev #	Date	Issue description	Prepared by	Reviewed by	Issued by
A	08/12/23	Re-issued for Development Application	KZ	DY	KZ
B	21/12/23	Report Update	KZ	DY	KZ
C	10/10/24	Report Update	NY	AV	AV

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Contents

Appendices

1 Introduction

SCP Consulting has been engaged by Bronxx Pty Limited to prepare a Flood Impact Assessment for the proposed development at 277 The Grand Parade, Ramsgate Beach. The development involves the demolition of the existing Coles supermarket and car parking and construction of a seven-storey building with an additional two basement levels for car parking.

The study has been undertaken to determine flood behaviour for the 20% and 1% Annual Exceedance Probability (AEP) design floods and the Probable Maximum Flood (PMF). The primary flood characteristics reported for the design events include flood depths, levels and hazard.

The primary objective of the study is to define the existing flood behaviour and to demonstrate that the proposed development does not adversely increase the flood risk to any other properties within the floodplain.

1.1 Development Site

The development site is located at 277 The Grand Parade, Ramsgate Beach and lies within the Bayside Council Local Government Area (LGA). The site is bound by The Grand Parade to the East, a council parking lot to the North, residential buildings to the South and commercial buildings to the West. The site currently accommodates a single-storey Coles supermarket and parking lot. Refer to Figure 1 for an aerial view of the development site boundary.

Figure 1 - Aerial View of Site Boundary (Source: - Bayside Council Intramaps)

2 Flood Modelling

2.1 Existing Scenario

Bayside Council have provided the Sans Souci Catchment TUFLOW model to confirm the existing flood conditions across the site and to determine the impact of the proposed development at 277 The Grand Parade, Ramsgate Beach on flood levels within the area. It is noted that the flood model initially provided to SCP Consulting, undertaken by Cardno and endorsed by Council, encountered errors when running the model. As such, following consultation with Pulak Saha (Bayside Council Strategic Floodplain Engineer), a draft TUFLOW flood model, undertaken by WMAwater, was supplied to SCP Consulting for use in this flood impact assessment. Refer Appendix A for the correspondence with Council.

SCP Consulting have run the flood model undertaken by WMAwater to ensure there is consistency between the flood levels in the new model and the flood levels advised by Bayside Council in their Flood Advice Letter for the development site ((Council Ref: FA-2022/41); refer Appendix B for the letter. The model provided by WMAwater indicates a maximum flood level of RL 2.958mAHD and RL 3.279mAHD occurs within the property in the 1% AEP and PMF storm event, respectively. The flood levels provided in the Flood Advice Letter are RL 3.0m AHD and RL 3.3m AHD in the 1% AEP and PMF storm event, respectively. Thus, the flood model results are generally in agreeance with the Flood Advice Letter. The flood hazard for the site ranges from H1-H2 in the 1% AEP storm event, and H1-H3 in the PMF storm event. Refer to Table 1 for a definition of the hazard classifications.

Table 1: Hazard Classifications

Hazard Classification	Definition
H1	Relatively benign flow conditions. No vulnerability constraints
H2	Unsafe for small vehicles
H3	Unsafe for all vehicles, children and the elderly
H4	Unsafe for all people and all vehicles
H5	Unsafe for all people and all vehicles. Buildings require special engineering design and construction.
H6	Unconditionally dangerous. Not suitable for any type of development or evacuation access. All building types considered vulnerable to failure

The existing flooding extents, as documented in the Flood Study undertaken by Cardno, and in the flooding results provided by WMAwater allow a cutoff depth of 150mm, only showing flood extents where the flood depth exceeds 150mm. A cell size of 2m has been adopted in line with the WMAwater model. Figure 2, Figure 3 and Figure 4 below present the flood depth, level and hazard maps, respectively, in the existing scenario for the 1% Annual Exceedance Probability (AEP) storm event. Figure 5, Figure 6 and Figure 7 below present the flood depth, level and hazard maps, respectively, in the existing scenario for the PMF (Probable Maximum Flood) storm event.

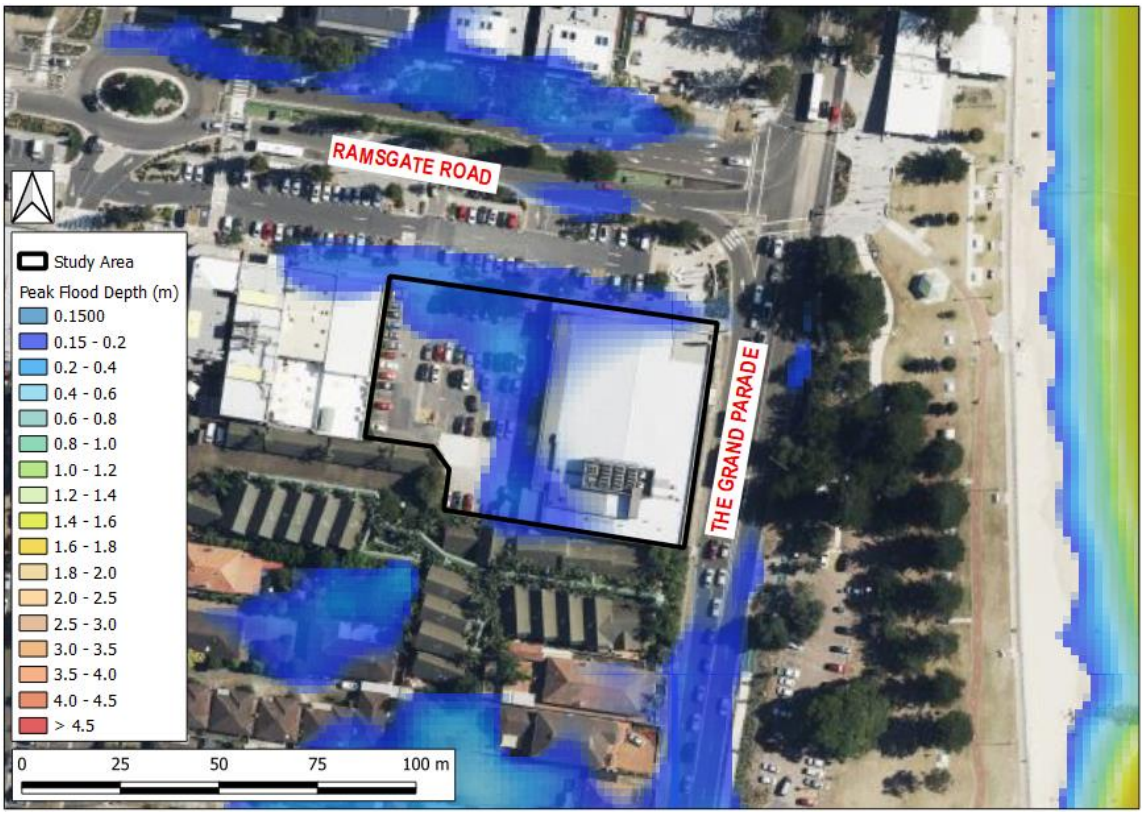

Figure 2: 1% AEP Event Flood Depths (Existing Scenario)

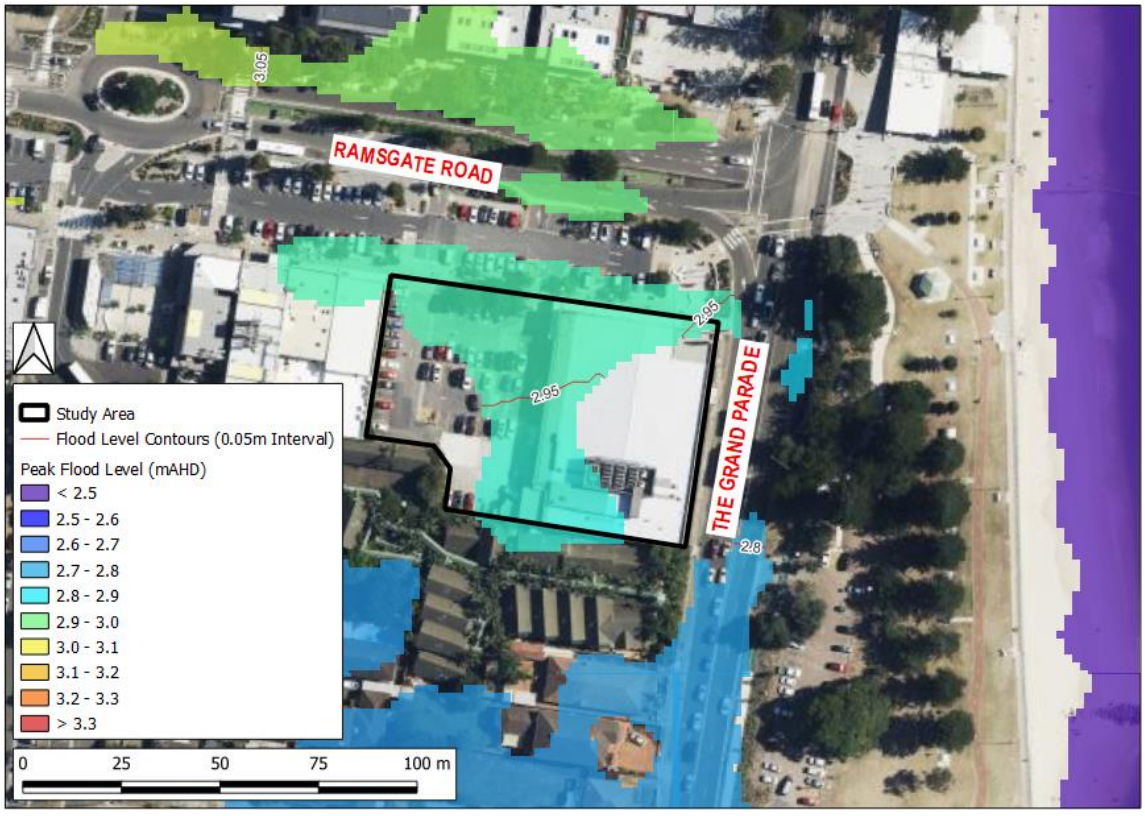

Figure 3: 1% AEP Event Flood Levels (Existing Scenario)

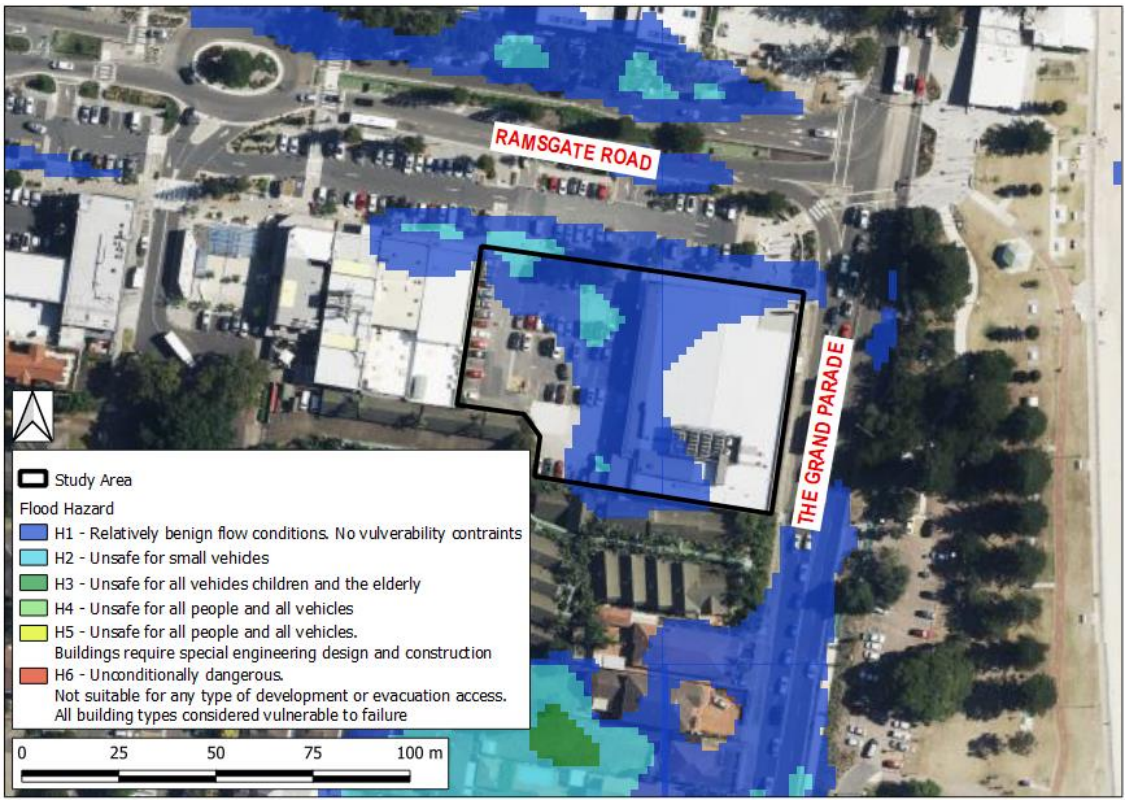

Figure 4: 1% AEP Event Flood Hazard (Existing Scenario)

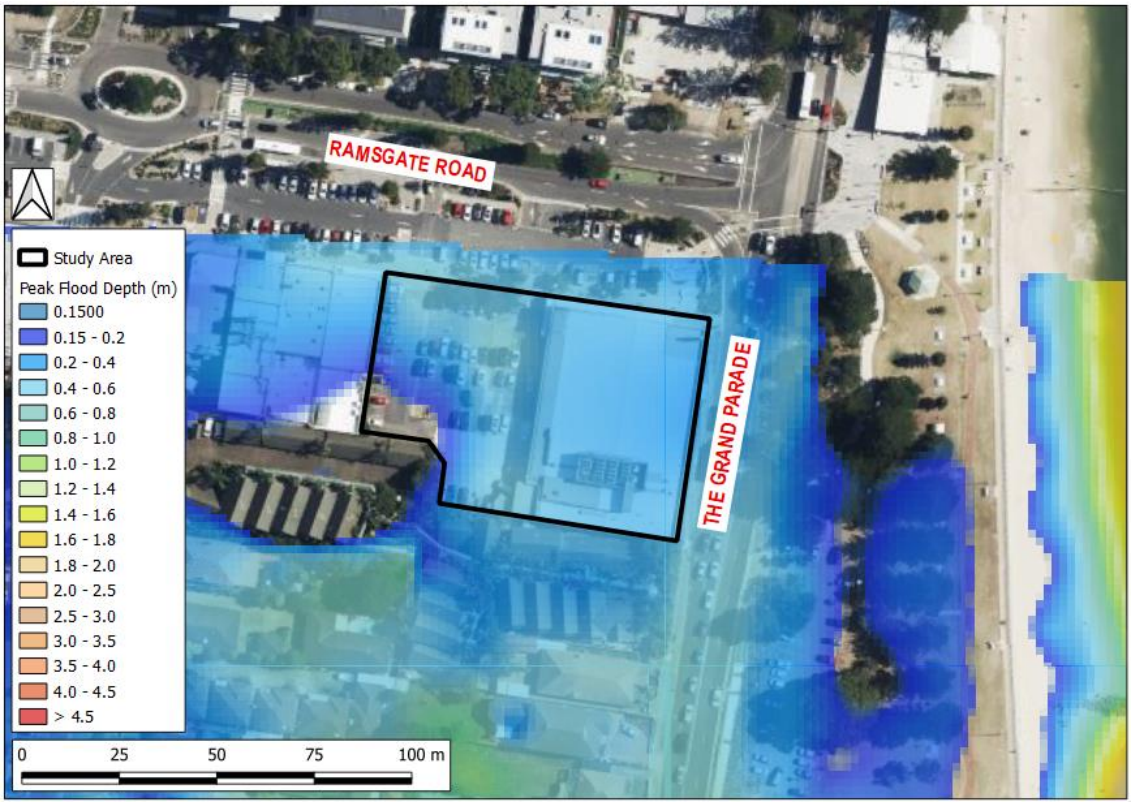

Figure 5: PMF Event Flood Depths (Existing Scenario)

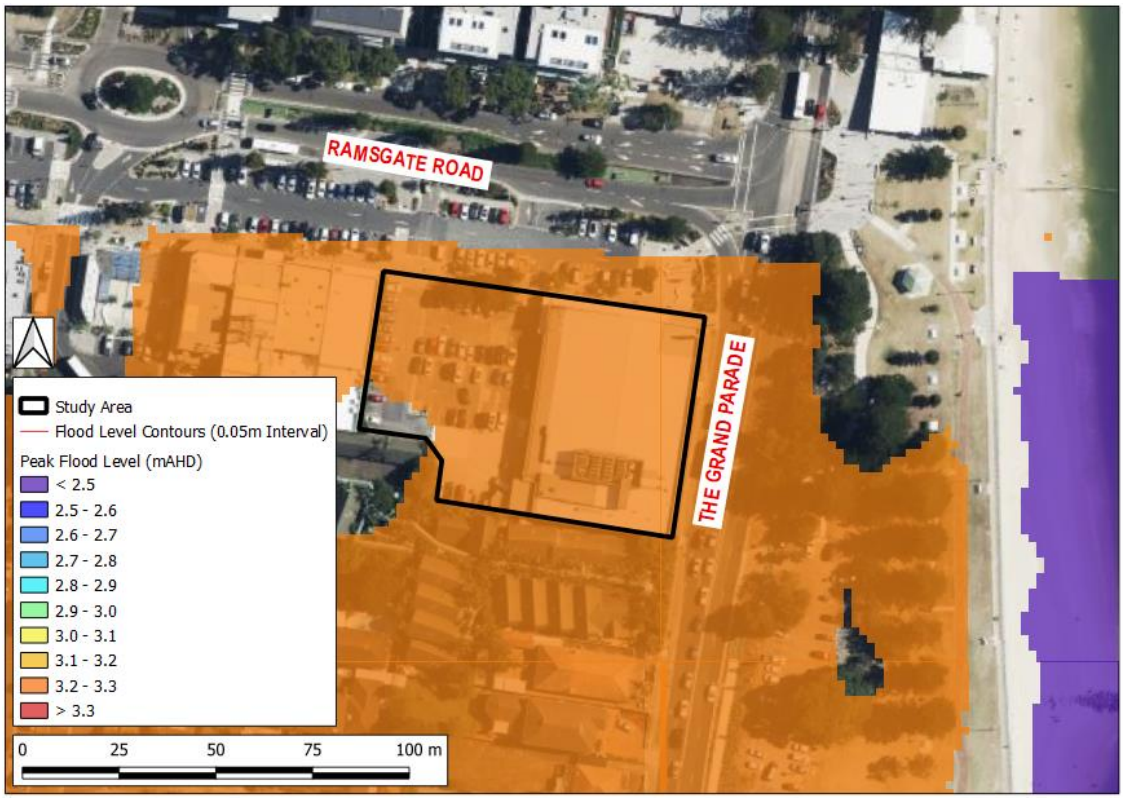

Figure 6: PMF Event Flood Levels (Existing Scenario)

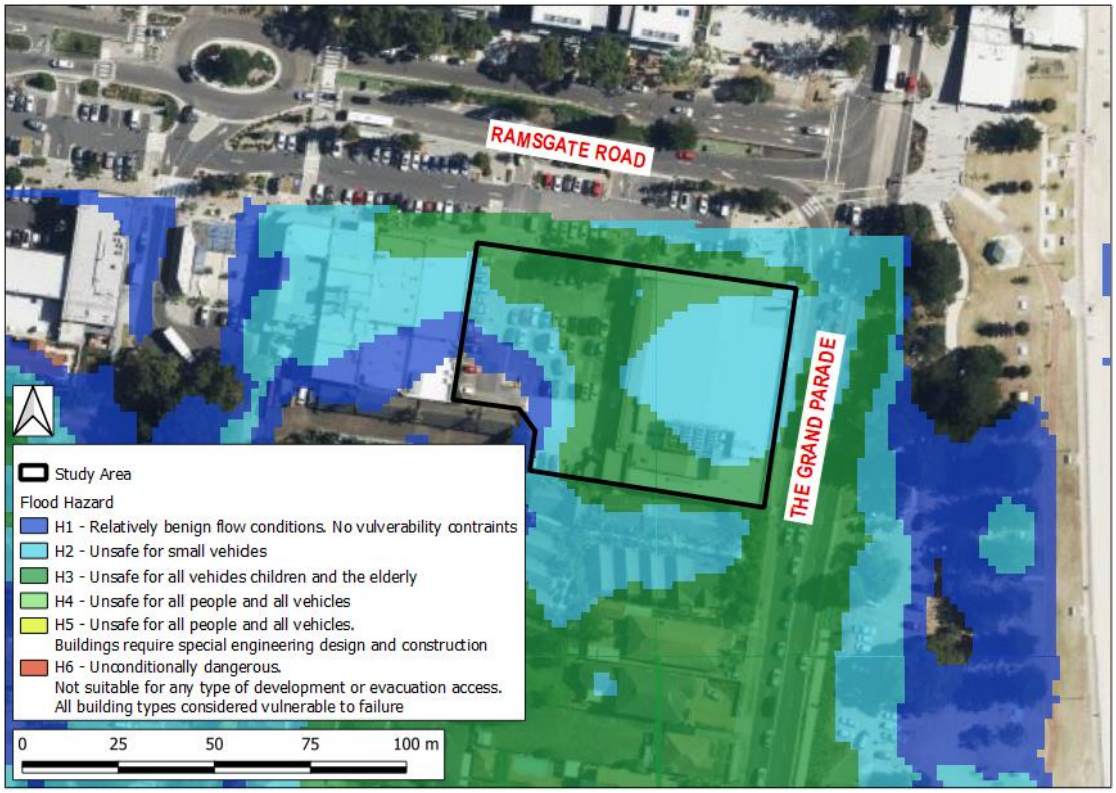

Figure 7: PMF Event Flood Hazard (Existing Scenario)

The primary source of flooding within the existing site in the 1% AEP and PMF storm event is localised ponding within the car park and adjacent to the Coles supermarket due to this area being within a sag point, and not overland flows from upstream catchments. The existing stormwater network is observed to be at capacity in the 1% AEP storm event due to the proximity of the site to Botany Bay (and the tailwater level for Botany Bay incorporated in the model) and the relatively low inverts of the stormwater network. As a result, surcharge from the existing stormwater network will pond within the sag area until flood levels recede and the stormwater is able to discharge via the piped network.

2.2 Post Development Scenario

A post development scenario has been modelled to determine the impact of the proposed building development on existing flood levels and evaluate flood mitigation methods to reduce flood impact to adjacent and downstream properties.

The proposed development involves the demolition of the existing Coles supermarket and adjacent car parking, and construction of a six-storey building with an additional three basement levels for car parking. Primary access to the building will be from Ramsgate Road into the residential lobbies, supermarket and other retail stores. Vehicular access to basement parking and the loading docks will also be provided from Ramsgate Road.

Refer to Figure 8 for the proposed development ground floor layout.

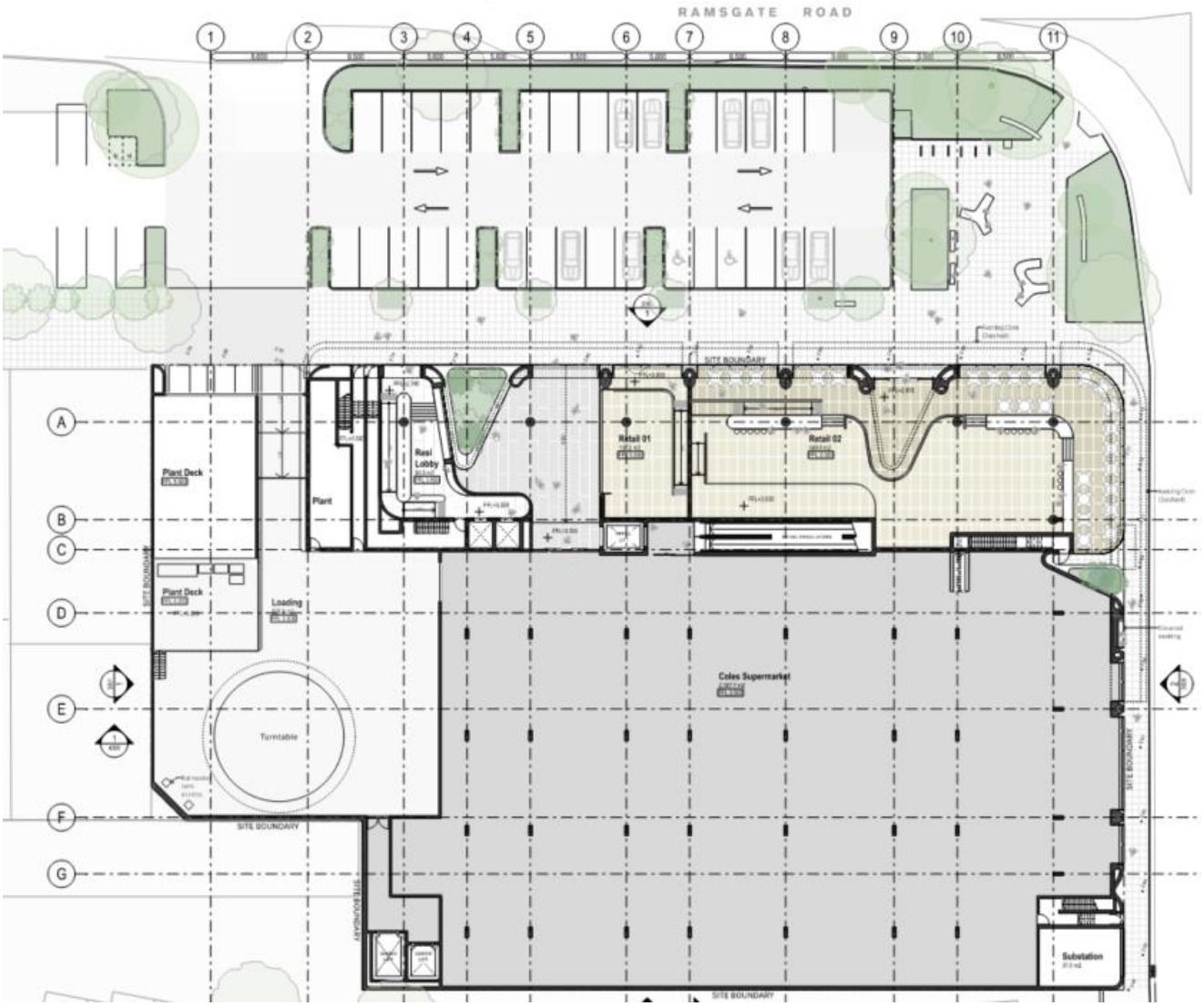

Figure 8 - Proposed Ground Floor Plan (Source: Craft Architecture – A-0203 [04])

A digital elevation model (DEM) was prepared to reflect the post development condition for the site, with the building access routes, via ramps and stairs, modelled in, along with the finished floor level (FFL) of the site to indicate the presence of a boundary to boundary building within the site. This DEM was incorporated into the post development model, and the 1% AEP and PMF storm event run. The material roughness for the site was not altered from the existing condition, maintaining the site as a "residential" zone for modelling purposes. A cell size of 2m was maintained for the post development model to allow for appropriate comparison between the existing and proposed conditions.

3 Results

3.1 1% AEP Flood Event

The flood depths and impacts were assessed to determine the impact of the proposed development. The flood depth, hazard and impact for the 1% AEP storm event are presented in Figure 9, Figure 10 and Figure 11.

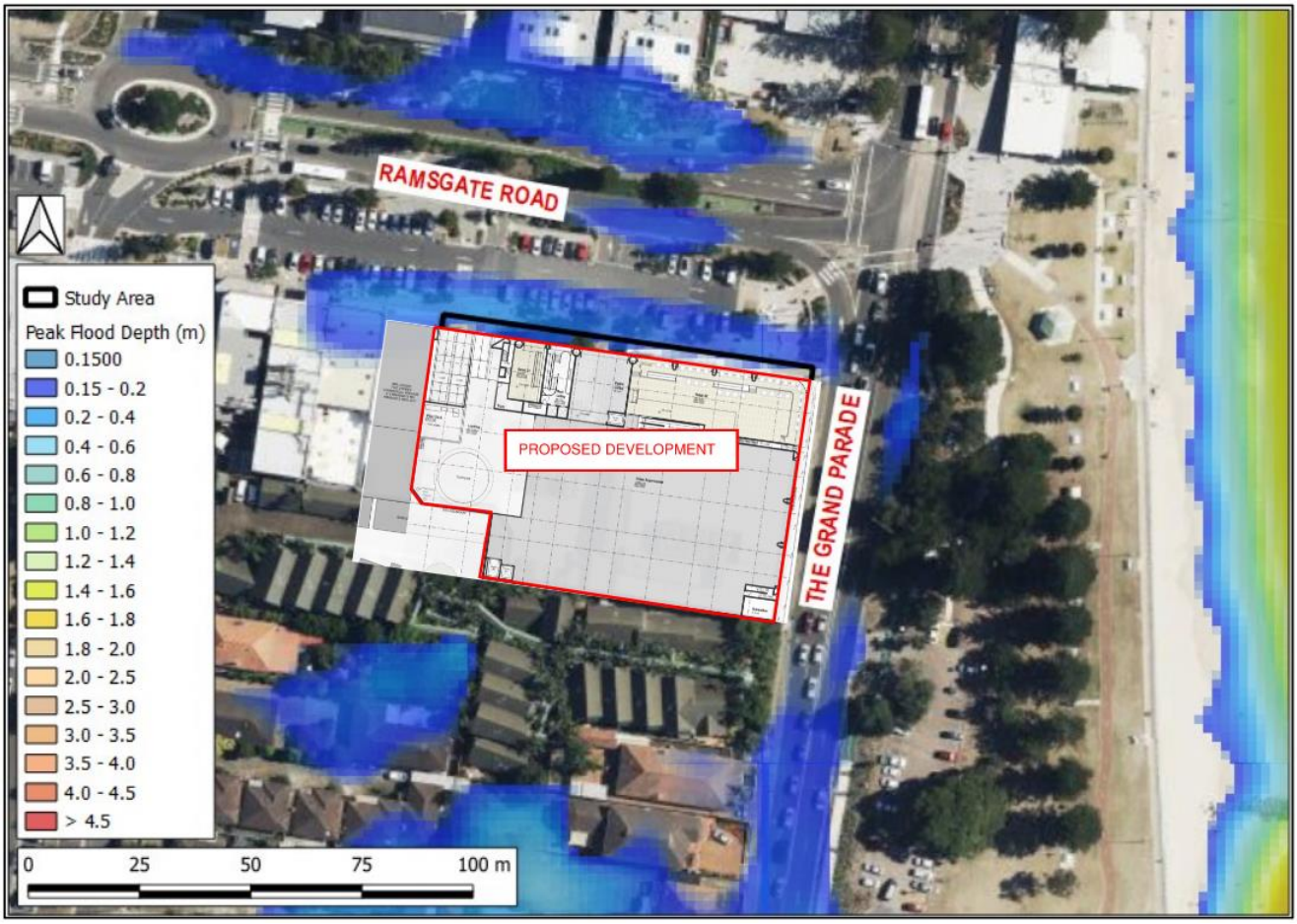

Figure 9: 1% AEP Event Flood Depth (Post Development Scenario)

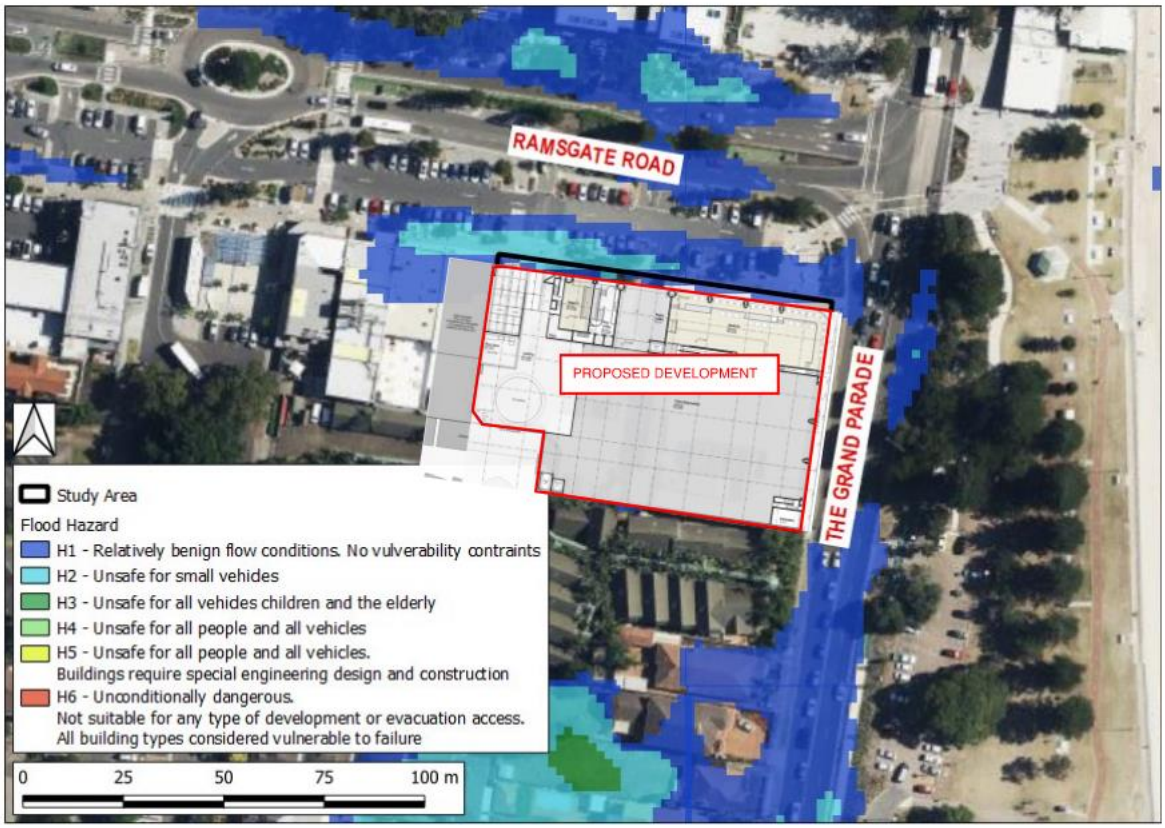

Figure 10: 1% AEP Event Flood Hazard (Post Development Scenario)

Figure 11: 1% AEP Event Flood Level Impact (Post Development Scenario)

As can be seen in Figure 10, the flood hazard within the public domain immediately adjacent to the site boundary observes a minor increase in flood hazard from H1 to H2. An increase in flood level of 40-60mm is observed east to west along the frontage of the site/existing Council car park for a length of approximately 118m, impacting the adjacent commercial developments consisting of a liquor store, pharmacy and café. An impact of greater than 10mm is considered not acceptable, particularly due to the impact to private property outside the development site boundary. The volume of water observed in the flood level increase along the frontage of the site and adjacent property equates to approximately 96m^3 (60mm (max.) over 1600m^2).

An impact of 20mm and 45mm is also observed within the road reserve in Ramsgate Road and The Grand Parade, respectively.

3.2 PMF Flood Event

The flood depth, hazard and impact for the 1% AEP storm event are presented in Figure 12, Figure 13 and Figure 14.

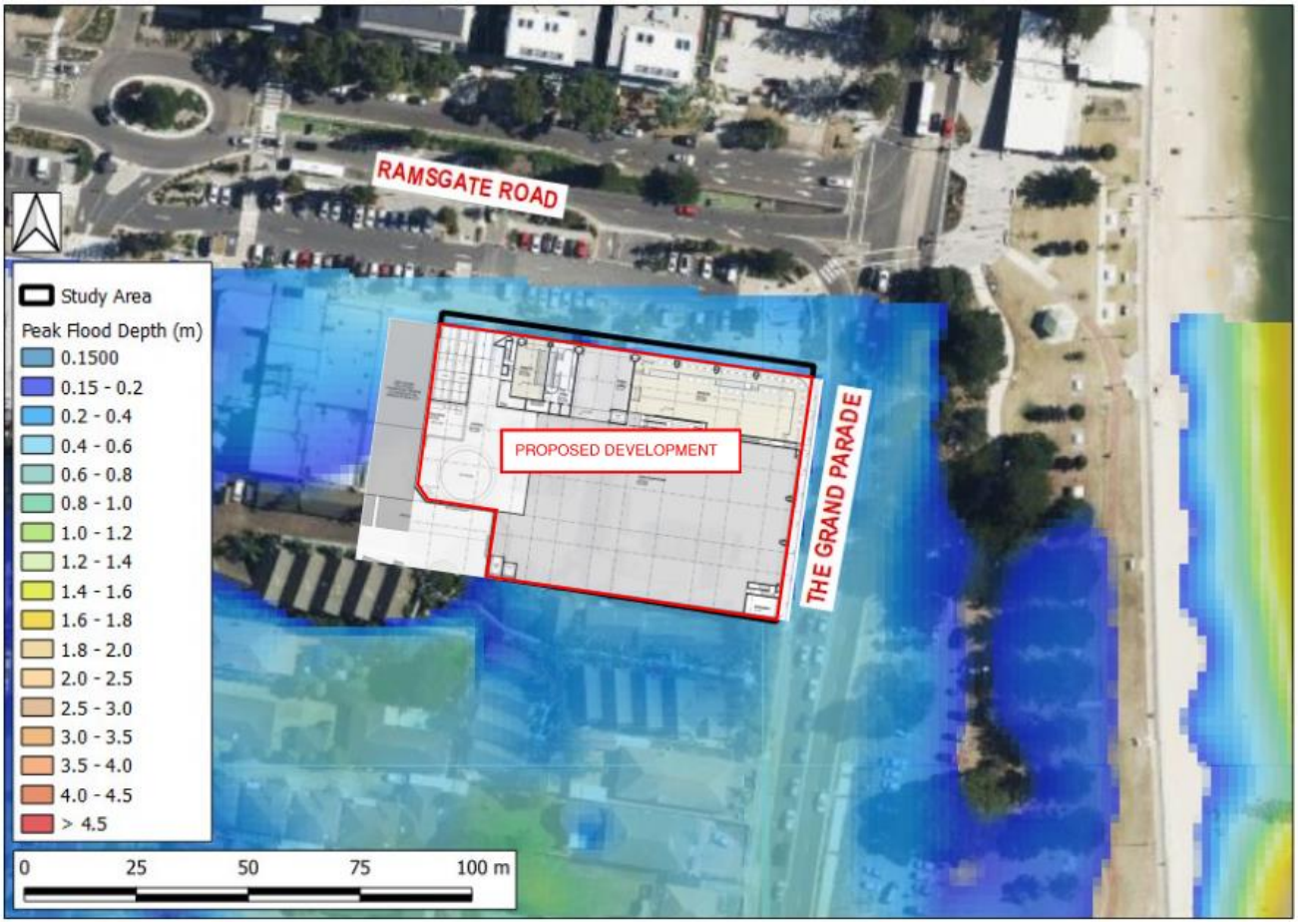

Figure 12: PMF Event Flood Depth (Post Development Scenario)

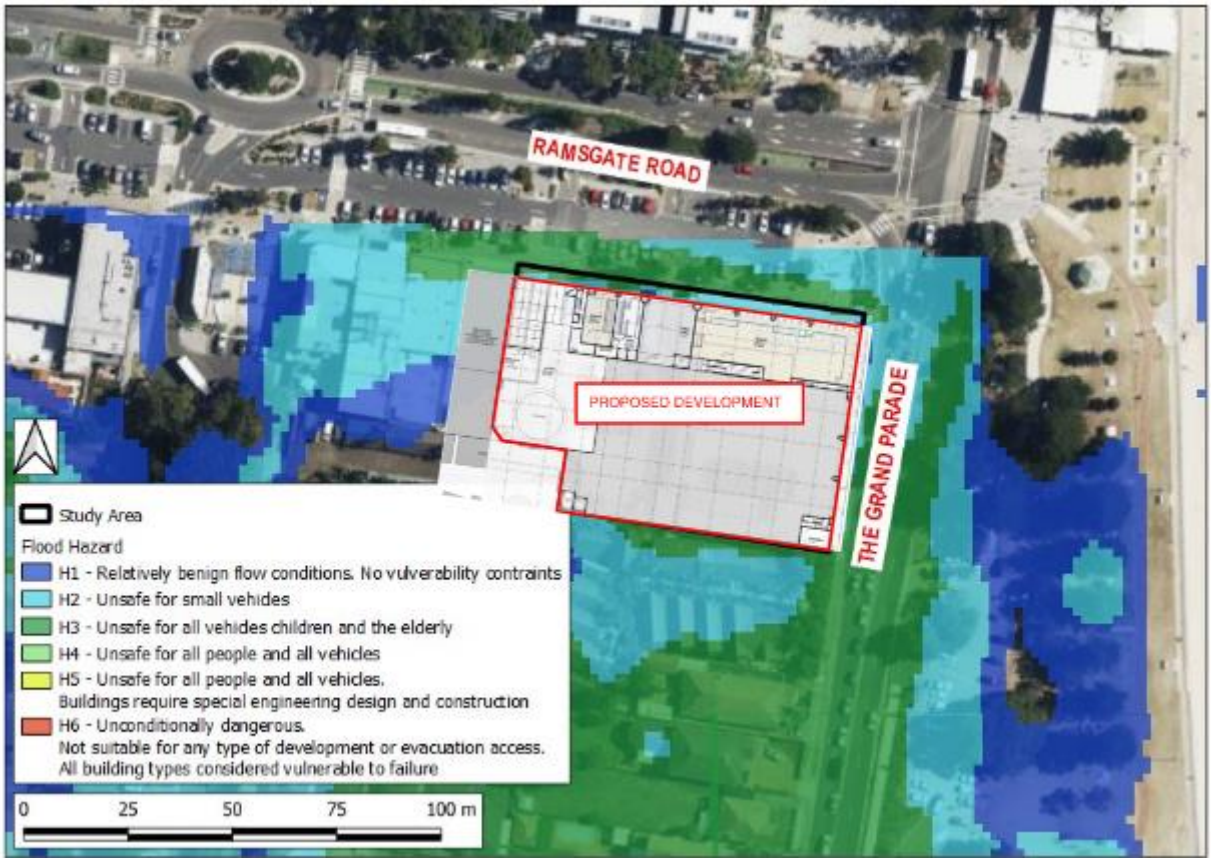

Figure 13: PMF Event Flood Hazard (Post Development Scenario)

Figure 14: PMF Event Flood Level Impact (Post Development Scenario)

As can be seen in Figure 13, no increase in flood hazard is observed internally and externally to the development site. Furthermore, flood level impacts and contained within the site.

4 Recommendation

In order to comply with Council's DCP mitigate the flood impact observed to adjacent properties in the 1% AEP storm event, it is proposed that a 300m^3 flood storage tank be located within basement 1 to act as compensatory flood storage to offset the loss of surface flood storage within the existing private car park.

It is proposed that 300mm wide grated drains are installed at the driveway and drain directly to the Flood Storage tank. The strip drains will only capture wheel runoff from vehicles entering the building. During major storm events where flood water begins to pond, once the ponding level reaches the site boundary alignment level, the grated drains will take in excess ponded water and direct it to the flood storage basin to the east. The purpose of the strip drains is to ensure no additional flood water is pushed upstream to the west and adversely affect the neighbouring properties.

The flood storage tank will hold the balance floodwater until such time that external floodwaters recede, after which flows shall drained by gravity into the existing stormwater network on the Grand Parade. The tank is proposed to be a fully enclosed system, independent of the water storage tank and basement hydraulics. Hence, in a PMF storm event, excess flows shall surcharge via the grated access hatch servicing the flood storage tank located at the north-east portion of the site.

The basement will be tanked. Only stormwater runoff permitted and expected will be from wheel caried water at the basement entry. The basement is protected by a crest at the entry and all penetrations at ground level and will be protected from water ingress at 1% AEP + 500 and PMF.

Refer to Figure 15 and Figure 16 for the proposed location of the flood storage tank and pits to capture external flows exceeding existing conditions.

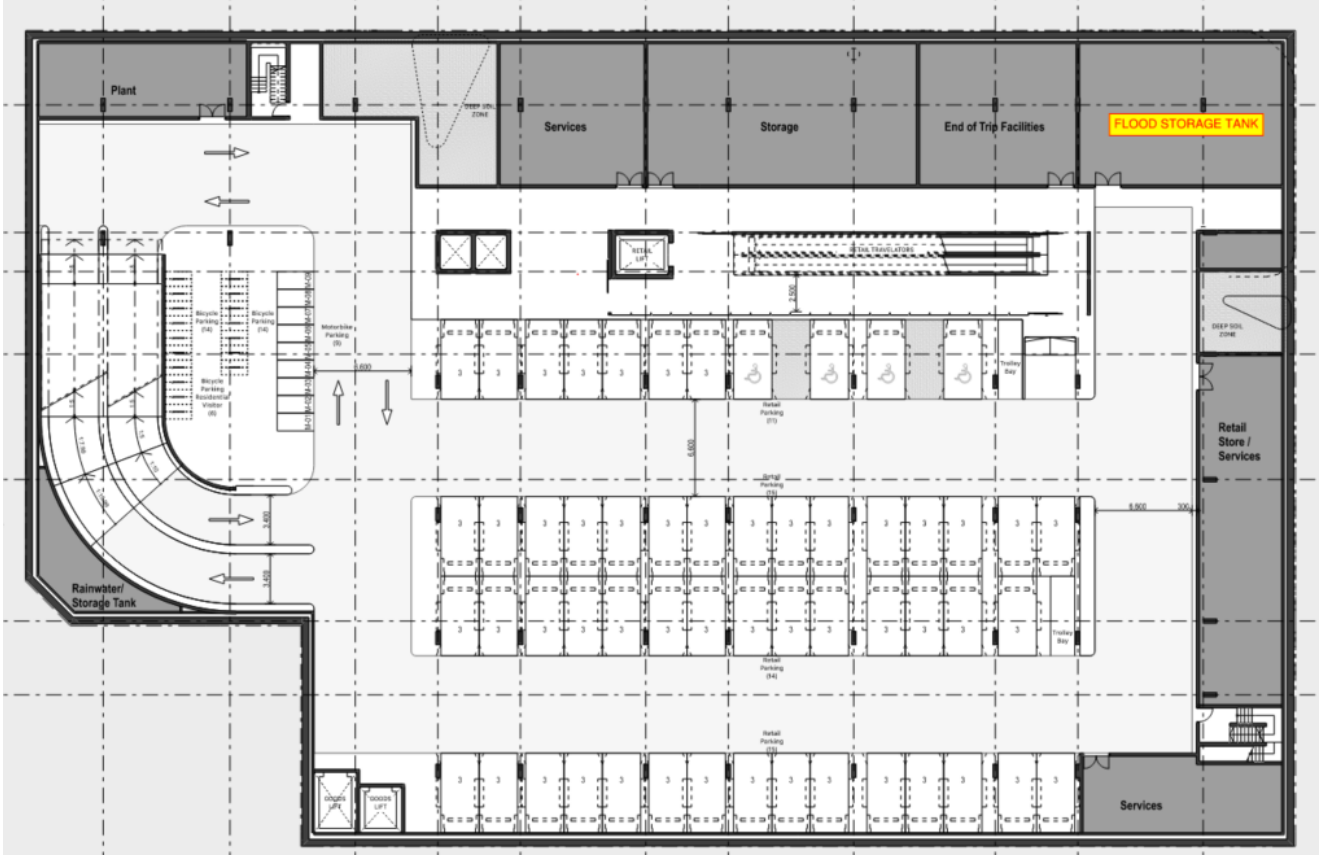

Figure 15: Proposed Location of Flood Storage Tank (Basement Level 1)

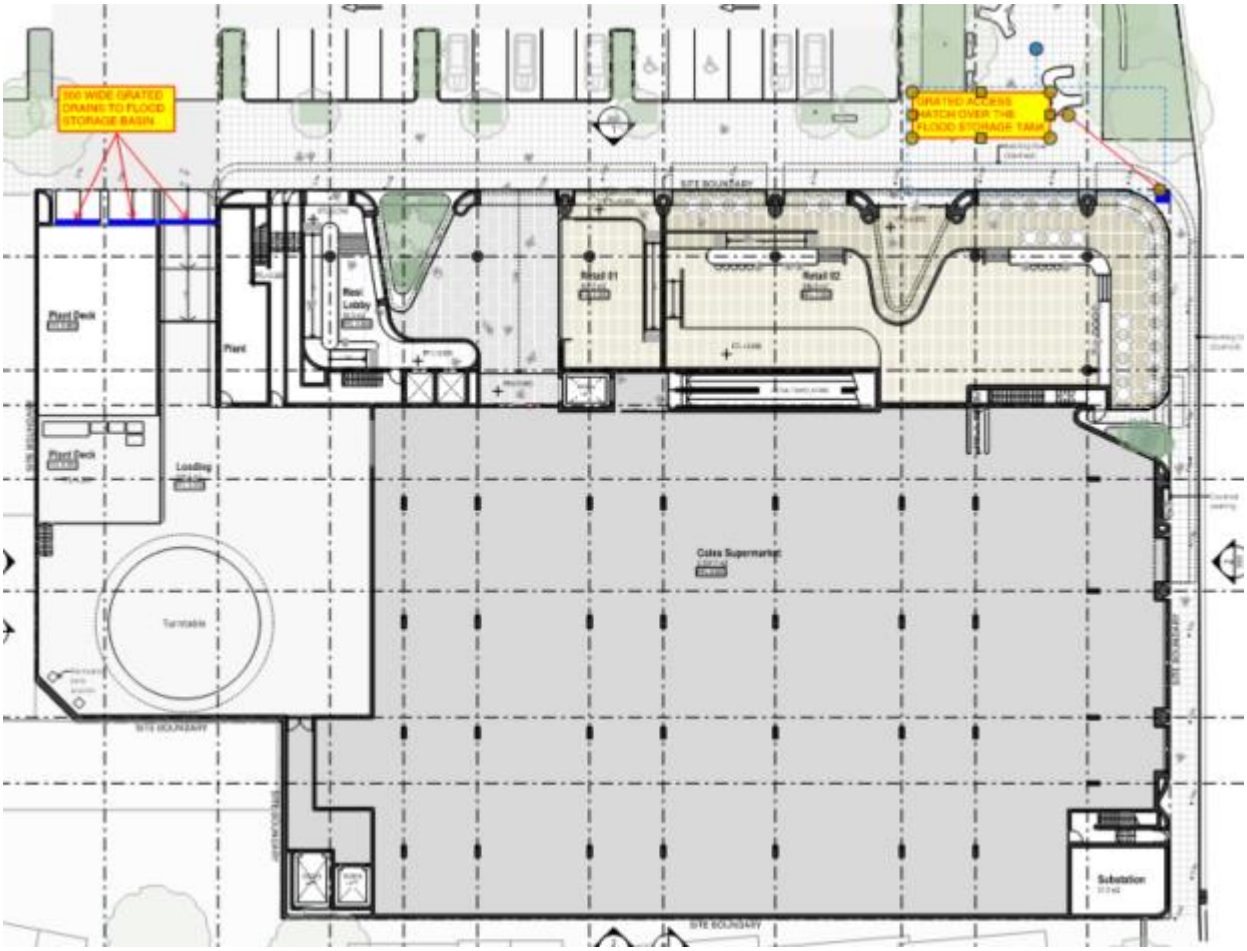

Figure 16: Proposed Location of Inlets for floodwater (Ground Floor)

5 Summary

To proposed compensatory flood storage as documented in this report will ensure that the proposed development works at 277 The Grand Parade, Ramsgate Beach does not adversely affect the neighbouring properties to the west by ensuring the existing flood conditions and flood planning levels are maintained. This is achieved by the installation of grated drains along the north-western property boundary and flows directed to a compensatory flood storage tank located within the site.

Appendix A Council Correspondence

Lovdeep Singh

From: Pulak Saha <Pulak.Saha@bayside.nsw.gov.au>
Sent: Thursday, 21 July 2022 9:52 AM
To: Lovdeep Singh
Subject: RE: 277 The Grand Parade - Sans Souci TUFLOW Model (latest draft)

Hi Lovdeep

Yes, you can use this flood model for this site only.

Thank you

Pulak Saha Strategic Floodplain Engineer
444-446 Princes Highway, Rockdale NSW 2216
T 02 9562 1617
E pulak.saha@bayside.nsw.gov.au **W** www.bayside.nsw.gov.au

From: Lovdeep Singh <Lovdeep.Singh@scpconsult.com.au>
Sent: Thursday, 21 July 2022 9:47 AM
To: Pulak Saha <Pulak.Saha@bayside.nsw.gov.au>
Subject: RE: 277 The Grand Parade - Sans Souci TUFLOW Model (latest draft)

Hi Pulak,

Thanks for sending this through. Can you please confirm Council will approve the use of this flood model to undertake a flood impact assessment for a development?

Regards,

Lovdeep Singh
Senior Civil Engineer

SCP Consulting Pty Ltd
D 02 8358 8745
M 0422 349 492

From: Pulak Saha <Pulak.Saha@bayside.nsw.gov.au>
Sent: Wednesday, 20 July 2022 4:02 PM
To: Lovdeep Singh <Lovdeep.Singh@scpconsult.com.au>
Subject: RE: 277 The Grand Parade - Sans Souci TUFLOW Model (latest draft)

Hi Lovdeep

Please find the link below to download the updated sans souci model (ARR2019).
Please note that this model is yet to be endorsed by Council and it is a draft version. Flood levels for above site might be slightly different from the previous version of the TUFLOW model (2015).

Filename	Filesize	Download link	Valid until
220720_Bayside_Draft_FRMS_TUFLOW_Models.zip	3.94 GB	https://filesender.wmawater.com.au/?vid=59eda1a0-63d6-ca49-2a2d-0000616ef5c8	20-09-2022

Thank you

Pulak Saha Strategic Floodplain Engineer
444-446 Princes Highway, Rockdale NSW 2216
T 02 9562 1617
E pulak.saha@bayside.nsw.gov.au **W** www.bayside.nsw.gov.au

From: Pulak Saha <Pulak.Saha@bayside.nsw.gov.au>
Sent: Friday, 15 July 2022 9:43 AM
To: Lovdeep Singh <Lovdeep.Singh@scpconsult.com.au>
Subject: RE: 277 The Grand Parade - Sans Souci TUFLOW Model (2015, ARR1987)

Hi Lovdeep

I am sorry to hear that you are having issues with the model. Many consultants used the model since 2015 without any major issue with the model.

I do not have TUFLOW software to check the model. I have just sent the modelling issues to Cardno to comment.

I have also sent a request for the latest flood model (ARR2019) prepared by WMA (draft for the latest FRMS study 2022). I will send you the link asap.

Thank you

Pulak Saha Strategic Floodplain Engineer
444-446 Princes Highway, Rockdale NSW 2216
T 02 9562 1617
E pulak.saha@bayside.nsw.gov.au **W** www.bayside.nsw.gov.au

From: Lovdeep Singh <Lovdeep.Singh@scpconsult.com.au>
Sent: Thursday, 14 July 2022 10:00 PM
To: Pulak Saha <Pulak.Saha@bayside.nsw.gov.au>
Subject: RE: 277 The Grand Parade - Request for TUFLOW Model

Hi Pulak,

Hope you are well. I have been trying to run the TUFLOW model you sent me. However, there are a number of errors with the model which do not allow me to run it; please see below.

The first error I received was the below. To fix this, I had to run the .tgc file with a 4m cell size. Can you please confirm the .tgc file named “Sane_Cut_rev” was the model that Council has run as we cannot run it on our end.

```
XY: ERROR 2540 - Exceeded number of cells within 2D boundary region.
Wiki Link: https://wiki.tuflow.com/index.php?title=TUFLOW_Message_2540

Closing any unclosed GIS layers...

Closing GIS Layer 1 [C:\Users\tuflow\Downloads\TUFLOW - Data (1)\TUFLOW - Data\runs\Sar

Closing GIS Layer 2 [C:\Users\tuflow\Downloads\TUFLOW - Data (1)\TUFLOW - Data\model\mi
```

The second error I ran into was a pipe that is apparently snapped to the same upstream and downstream node. Can you please check this and fix the error as I cannot find the pipe it is referring to in the model.

```
XY: ERROR 1628 - 1D channel with ID "SS1.55B.80" is snapped to the same upstream and do
Node ID: "SS155B70P"
Wiki Link: https://wiki.tuflow.com/index.php?title=TUFLOW_Message_1628
...Finished.

NoXY: ERRORS found in 1D input data.
View _messages layer or search through .tlf file.

Closing any unclosed GIS layers...

Closing GIS Layer 1 [C:\Users\tuflow\Downloads\TUFLOW - Data (1)\TUFLOW - Data\runs\San

Closing GIS Layer 2 [C:\Users\tuflow\Downloads\TUFLOW - Data (1)\TUFLOW - Data\results\

Closing GIS Layer 3 [C:\Users\tuflow\Downloads\TUFLOW - Data (1)\TUFLOW - Data\results\

Closing GIS Layer 4 [C:\Users\tuflow\Downloads\TUFLOW - Data (1)\TUFLOW - Data\results\
```

For the time being, I told the model to ignore this pipe to try to get a run (setting the ignore value in the attributes to True). Finally, the model shuts down at the following process; i.e. “Processing TUFLOW “HT” BC with name “dwL”. I have gone through the bc attributes and there are no issues there. Can you advise the error here as to why the model shuts down. I have not been able to get past this point. I have compared this to previous .tlf files and they appear to have run past this point. I’m wondering if there is an error with the documents you sent through?

```
Checking all connection objects are used...
...Finished.

Opening GIS Layer: C:\Users\tuflow\OneDrive - SCP CONSULTING (1)\TUFLOW Projects\277 Th
GIS Layer assigned ID of 7
8 MIF Fields: Name [#/Type]: Type [1/Char(2)]  Flags [2/Char(3)]  Name [3/Char(100)]  f
Number of Input Layers: 1
Input Layer 1: C:\Users\tuflow\OneDrive - SCP CONSULTING (1)\TUFLOW Projects\277 The Gr
...Reading coordinates of any 1D connections from Layer 1
Found     0 1D connections

Processing TUFLOW "HT" BC with name "dwL"...
```

Please feel free to give me a call to discuss.

Kind Regards,

Lovdeep Singh
Senior Civil Engineer

SCP Consulting Pty Ltd
M 0422 349 492

From: Pulak Saha <Pulak.Saha@bayside.nsw.gov.au>
Sent: Friday, 1 July 2022 11:17 AM
To: Lovdeep Singh <Lovdeep.Singh@scpconsult.com.au>
Cc: Matthew Hughes <matthew@bronxx.com.au>
Subject: RE: 277 The Grand Parade - Request for TUFLOW Model

Hi Lovdeep

I just sent you three more links. Can you please check and let me know if you have any issues?

Thank you

Pulak Saha Strategic Floodplain Engineer
444-446 Princes Highway, Rockdale NSW 2216
T 02 9562 1617
E pulak.saha@bayside.nsw.gov.au **W** www.bayside.nsw.gov.au

From: Lovdeep Singh <Lovdeep.Singh@scpconsult.com.au>
Sent: Friday, 1 July 2022 10:43 AM
To: Pulak Saha <Pulak.Saha@bayside.nsw.gov.au>
Cc: Matthew Hughes <matthew@bronxx.com.au>
Subject: RE: 277 The Grand Parade - Request for TUFLOW Model

Hi Pulak,

I am having a lot of problems unzipping this file, can you please send it as smaller files.

Thanks,

Lovdeep Singh
Senior Civil Engineer

SCP Consulting Pty Ltd
M 0422 349 492

From: Pulak Saha <Pulak.Saha@bayside.nsw.gov.au>
Sent: Wednesday, 29 June 2022 1:20 PM
To: Lovdeep Singh <Lovdeep.Singh@scpconsult.com.au>
Cc: Matthew Hughes <matthew@bronxx.com.au>
Subject: RE: 277 The Grand Parade - Request for TUFLOW Model

Hi Lovdeep

Please find the link below to download the TUFLOW flood model for Sans Souci catchment.

Sans Souci FS TUFLOW model
or
https://baysidecouncil-my.sharepoint.com/:f:/g/personal/sahap_bayside_nsw_gov_au/EqBUldTrbhFAq4Pg0taQ87QBCR1l6m4UUupqnWr5qAm6ug?e=5Jq2Oz

A copy of the application is attached here for your future reference.

Thank you

Pulak Saha Strategic Floodplain Engineer
444-446 Princes Highway, Rockdale NSW 2216
T 02 9562 1617
E pulak.saha@bayside.nsw.gov.au **W** www.bayside.nsw.gov.au

From: Lovdeep Singh <Lovdeep.Singh@scpconsult.com.au>
Sent: Monday, 6 June 2022 12:00 PM
To: Bayside Council <Bayside.Council@bayside.nsw.gov.au>
Cc: Matthew Hughes <matthew@bronxx.com.au>; Lovdeep Singh <Lovdeep.Singh@scpconsult.com.au>
Subject: 277 The Grand Parade - Request for TUFLOW Model
Importance: High

To whom it may concern,

Please find attached completed 'Model and Data Licence Agreement' form requesting the Sans Souci TUFLOW flood model.

Please feel free to give me a call if you have any questions.

Kind Regards,

Lovdeep Singh
Senior Civil Engineer

T 1300 SCP ENG (727 364)
M 0422 349 492 D 02 8358 8745
A Level 2, 507 Kent St, Sydney NSW 2000

SCP Consulting Pty Ltd

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Appendix B Flood Advice Letter

Bayside Council
Serving Our Community

9 March 2022

Our Ref: FA-2022/41
Contact: Pulak Saha

Good Time Holdings NSW Pty Ltd
3/13 Box Rd
CARINGBAH NSW 2229

Dear Sir/Madam

Re: Flood Advice Letter for 277 The Grand Parade, RAMSGATE BEACH

When lodging a Development Application, you must enclose a copy of this letter.

FLOOD NOTATION

Council has notated this property as being affected by the 1% Annual Exceedance Probability (AEP) Flood. The 1% AEP Flood means there is a 1% (i.e. a 1 in 100) chance of a flood of this height, or higher occurring in any one year.

Council has notated this property as being affected by a Probable Maximum Flood (PMF) flood. The PMF is the largest flood that could conceivably occur at a particular location.

FLOOD STUDY

The Council Flood Study applicable to the property is:
Sans Souci (2D) Flood Study Review (2015), Cardno

FLOOD LEVELS

1% AEP Flood Level:
3.00m Australian Height Datum (AHD)

Probable Maximum Flood (PMF) Level:
3.30m AHD

FLOOD RISK EXPOSURE

The Flood Risk Exposure of the site has been assessed as

Overland Flooding: Flood Fringe & Flood Storage
Hazard: H1 to H2

FLOOD COMMENTARY

- Refer to Figures 1 & 2 for Flood Extent Maps and Figure 3 for Flood Hazard Map.
- An example of the Flood Risk Management Plan included at the end of this letter. Additional information may be required for larger/complex developments.
- No accurate information is recorded regarding the impact of tsunamis in the Bayside Local Government area.

HAZARD CATEGORY DETAILS	H1 - Generally safe for vehicles, people and buildings. H2 - Unsafe for small vehicles.
FLOOD PLANNING LEVEL (FPL)	The Flood Planning Level (FPL) is a height used to set floor levels for property development in flood prone areas. It is generally defined as the 1% AEP flood level plus an appropriate freeboard. For the design of a new developments on this land the minimum habitable floor level is: 3.50m AHD (includes 0.5m freeboard) The minimum level, for storage shed floor, patio, deck, or garage floor is: 3.00m AHD (no freeboard is required) Basements and below ground garages are to be physically protected to the minimum habitable floor level. All electrical connections, air conditioning units and external power points are to be set above the minimum habitable floor level. As noted these floor levels are minimums, floor levels higher than these are allowable subject to normal planning rules. In order to relate these levels to your property you will need to obtain a survey to determine the ground level to AHD at the site.
OVERLAND FLOW	The development is not to increase the water level or hazard on adjoining properties. Opportunities should be investigated to design a development that is clear of the overland floodway and acts to reduce the impacts of these flows, possibly by removing inappropriate travel paths and/or reducing the hazard. Where a new development may impact on the flood behaviour (e.g. filling within the flood affected area or major obstruction to the flood water flow path) a hydraulic/flood engineer is to be engaged to assess the impacts of the overland flows before and after development using a 2D hydraulic model. A TUFLOW model has been created by Cardno Pty Ltd for Bayside Council reflecting catchment conditions in 2015. The model will be made available to a nominated Consulting Engineer subject to entering a Model and Data Licence Agreement and payment of the required fee as listed in Council's fees and charges — Flood studies/ GIS drainage.
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 RELATED DEVELOPMENT CONTROLS	The following additional flood related development controls apply: 1. Any new portion of the building or structure lower than the applicable Flood Planning Level (FPL) shall be built from flood compatible materials to be specified by a Structural Engineer.

2. All new services associated with the development shall be flood proofed to the habitable floor level.
3. Filling on this land may impact on flood behaviour and may increase the hazard on adjoining properties. A qualified civil/hydraulic engineer is to be engaged to assess the impacts of the filling before and after development using a 2D hydraulic model.
4. A suitably qualified engineer is to certify that the structures up to the habitable floor can withstand the forces of floodwater, debris and buoyancy in a 1% AEP flood event.
5. A Flood Risk Management Plan 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. An example is attached.

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.

Should you require any further information, please contact Council's Strategic Floodplain Engineer, Pulak Saha on 02 95621617.

Yours faithfully

Charlotte Lowe
A/COORDINATOR POLICY & STRATEGY

Figure 1: 1% AEP Flood Extent Map (dark blue indicates greater depth of water and pale blue indicates shallower depth, thick black line indicates approximate location of the existing drainage network)

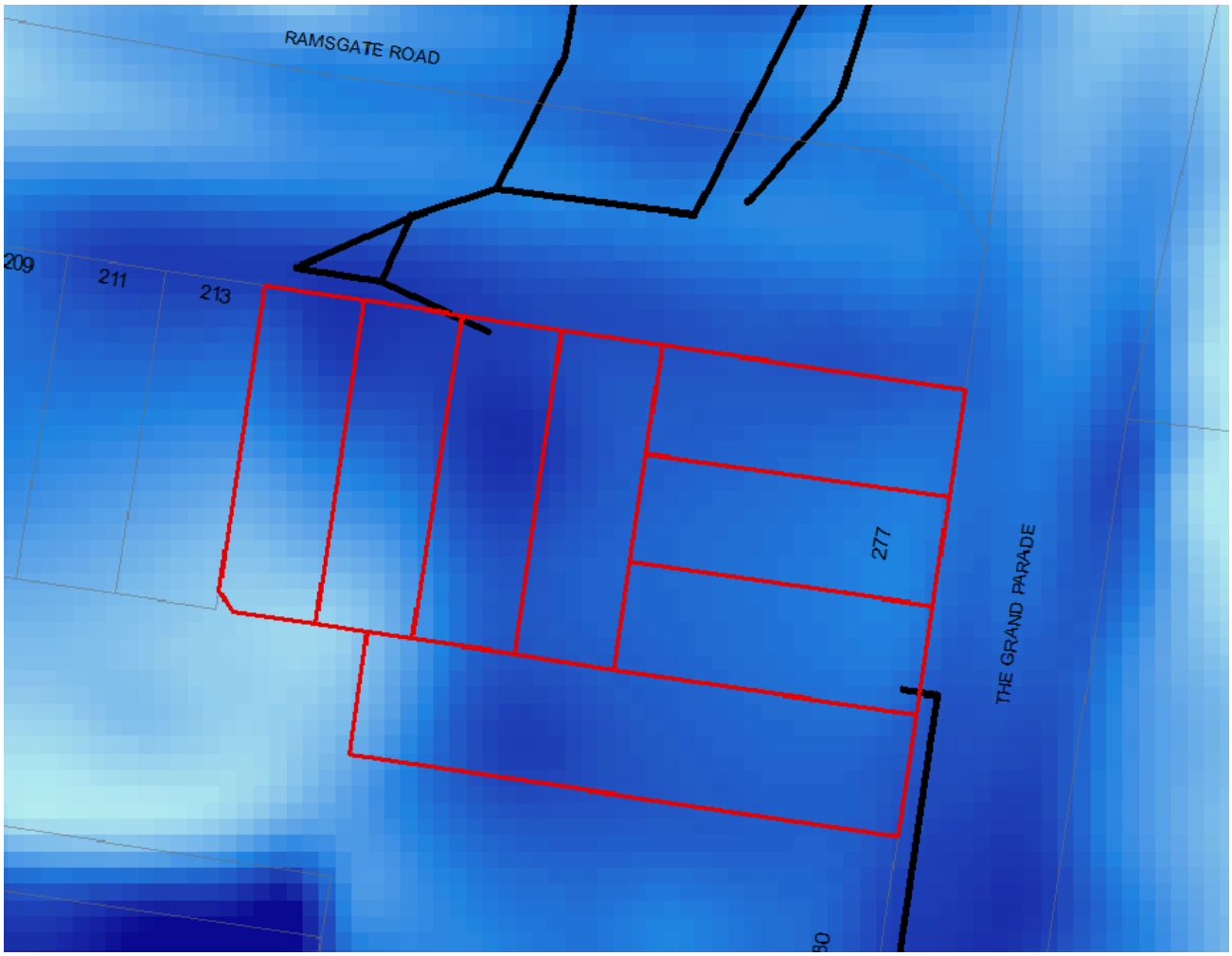
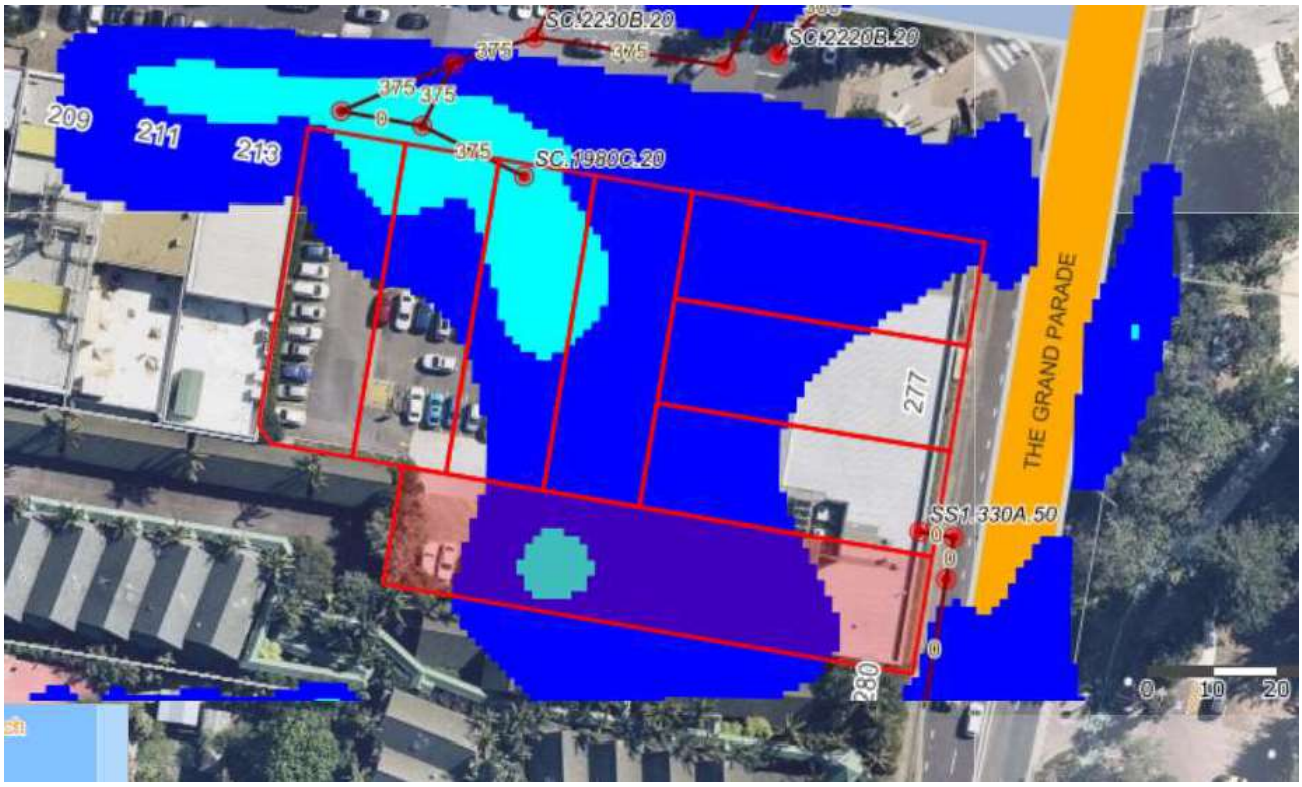


Figure 2: PMF Flood Extent Map (dark blue indicates greater depth of water and pale blue indicates shallower depth, thick black line indicates approximate location of the existing drainage network)



1% AEP Flood Hazard

- H1 - Generally safe for vehicles, people and buildings
- H2 - Unsafe for small vehicles.
- H3 - Unsafe for vehicles, children and the elderly
- H4 - Unsafe for vehicles and people
- H5 - Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure
- H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure

Figure 3: 1% AEP Flood Hazard Map

FLOOD RISK MANAGEMENT PLAN FOR ……..

Background

Council has advised that this property is subject to flooding in a 1% AEP (1 in 100 year AEP) storm event. The Probable Maximum Flood (PMF) is the highest flood level that is ever likely to occur, however, it is extremely rare.

Council has no information regarding Tsunamis in the Bayside Local Government Area.

Relevant levels are: *Complete as appropriate for your property*

1% AEP Flood Level =	m Australian Height Datum (AHD)
Probable Maximum Flood =	m AHD
Garage Floor Level =	m AHD
Driveway Crest Level =	m AHD (below ground garages only)
Habitable Floor Level =	m AHD
Second Floor Level =	m AHD
Front Boundary Level =	m AHD
Lowest Ground Level =	m AHD at ……..

The above levels give an indication of how the various floods will impact this property, and what level of protection is provided. Habitable living areas are designed to be a minimum of 0.5 m above the 1% AEP Flood Level, and staying within the home will provide protection for a wide range of floods.

Procedure

1. Floods in the Bayside Local Government Area are considered as “flash floods”, and no warning system is available. Storms leading to major flooding are typically 2 hours long, however, shorter storms as little as a 30 minutes long can produce significant flooding. Once the storm passes, floodwaters usually disappear rapidly.

2. During floods many local and major streets and roads will be cut by floodwaters. Traveling through floodwaters on foot, or in a vehicle, can be very dangerous as the water may be polluted, obstructions can be hidden under the floodwaters, or you could be swept away. Council recommends staying within the home as much as practical, as this is the safest option. If you need to leave the home do so early in the flood event, before the flood level reaches ……..……*(the trigger location for your property).*

3. Develop your own family flood plan and be prepared if flooding should occur while the kids are coming home from school or when you are returning from work. Talk to the Council to determine the safer travel routes that are less likely to be cut by floodwaters.

4. For below ground garages, do not attempt to save the car if floodwaters start to enter the garage, it is too dangerous as water levels will rise rapidly and you could be trapped.

5. As the flood level approaches the garage floor level (but only if safe to do so) relocate any items that may be damaged by water, or poisons, or wastes to as high a level as possible.

6. As the flood level approaches the habitable floor level:

i) gather medicines, special requirements for babies or the elderly, mobile phones, first aid kit, special papers and any valuables into one location,

ii) put on strong shoes, raise any items within the home that may be damaged by water (e.g. photo albums) to as high a level as possible, with electrical items on top. Turn off and disconnect any large electrical items such as a TV that cannot be raised.

iii) place wet towels across the bottom and lower sides of external doors to slow down the entry of water through the door.

7. In the very rare event that floodwaters may enter the home, collect items from 6.i) above and move to an upper level if possible, or if in a single level dwelling provide a chair in the kitchen to enable access to the kitchen bench preferably adjacent to the window. Ensure window is not locked or key readily available. Do not

evacuate the home unless instructed to do so by the SES or the Police. Remember floodwaters are much deeper and flow much faster outside.

8. In the case of a medical emergency ring 000 as normal, but explain about the flooding.

9. A laminated copy of this flood plan should be permanently attached (glued) on an inside cupboard door in the kitchen and laundry and to the inside of the electrical meter box.

10. This flood management plan should be reviewed every 5 years, particularly with the potential effects of Climate Change with sea level rise, and increased rainfall intensities.

Appendix C Flood Risk Management Plan

Flood Risk Management Plan for 277 The Grand Parade, Ramsgate Beach

Council has advised that this property is subject to flooding in a 1% AEP (1 in 100 year AEP) storm event. The Probable Maximum Flood (PMF) is the highest flood level that is ever likely to occur, however, it is extremely rare.
Council has no information regarding Tsunamis in the Bayside Local Government Area.

Relevant levels are:-

1% AEP Flood Level =	3.0m AHD
Probable Maximum Flood =	3.3m AHD
Garage Floor Level =	0.4m AHD
Driveway Crest Level =	3.5m AHD
Habitable Floor Level =	3.5m AHD
Second Floor Level =	9.5m AHD
Front Boundary Level =	2.7mAHD
Lowest Ground Level =	2.9m AHD

The above levels give an indication of how the various floods will impact this property, and what level of protection is provided. Habitable living areas are designed to be a minimum of 0.5m above the 1% AEP Flood Level, and staying within the home will provide protection for a wide range of floods.

Procedure

1. Floods in the Bayside Local Government Area are considered as “flash floods”, and no warning system is available. Storms leading to major flooding are typically 2 hours long, however, shorter storms as little as 30 minutes long can produce significant flooding. Once the storm passes, floodwaters usually disappear rapidly.
2. During floods, many local and major streets and roads will be cut by floodwaters. Travelling through floodwaters on food, or in a vehicle, can be very dangerous as the water may be polluted, obstructions can be hidden under the floodwaters, or you could be swept away. Council recommends staying within the home as much as practical, as this is the safest option. If you need to leave the home do so early in the flood event, before the flood level reaches 3.0m AHD.
3. Develop your own family flood plan and be prepared if flooding should occur while the kids are coming home from school or when you are returning from work. Talk to the Council to determine the safer travel routes that are less likely to be cut by floodwaters.
4. For below ground garages, do not attempt to save the car if floodwaters start to enter the garage, it is too dangerous as water levels will rise rapidly and you could be trapped.
5. As the flood level approaches the garage floor level (but only if safe to do so) relocate any items that may be damaged by water, or poisons, or wastes to as high a level as possible.
6. As the flood level approaches the habitable floor level:
    i. Gather medicines, special requirements for babies or the elderly, mobile phones, first aid kit, special papers and any valuables into one location,
    ii. Put on strong shoes, raise any items within the home that may be damaged by water (e.g. photo albums) to as high a level as possible, with electrical items on top. Turn off and disconnect any large electrical items such as a TV that cannot be raised.
    iii. Place wet towels across the bottom and lower sides of external doors to slow down the entry of water through the door.

7. In the very rare event that floodwaters may enter the home, collect items from 6.i) above and move to an upper level if possible, or if in a single level dwelling provide a chair in the kitchen to enable access to the kitchen bench preferably adjacent to the window. Ensure window is not locked or key readily available. Do not evacuate the home unless instructed to do so by the SES or the Police. Remember floodwaters are much deeper and flow much faster outside.
8. In the case of a medical emergency ring 000 as normal but explain about the flooding.
9. A laminated copy of this flood plan should be permanently attached (glued) on an inside cupboard door in the kitchen and laundry and to the inside of the electrical meter box.
10. This flood management plan should be reviewed every 5 years, particularly with the potential effects of Climate Change with sea level rise and increased rainfall intensities.