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Smithfield RSL and Surrounds

Flood Impact Assessment Planning Proposal Report

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DOCUMENT CONTROL

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Acknowledgement of Country

Colliers Engineering & Design (NSW) acknowledges the Jerrinja and Wandi Wandian people as the Traditional Custodians of the lands and waterways upon which this project is located. We pay our respects to elders past, present and emerging and to all Aboriginal and Torres Strait Islander Peoples.

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1 Introduction

Colliers Engineering & Design (NSW) Ltd (CED) was engaged by Smithfield RSL Pty Ltd to undertake a Flood Impact Assessment to support the Planning Proposal (PP) submission for the proposed development and surrounding lots at 88 Smithfield Road, Smithfield NSW 2164 (the subject site).

The proposed development covers the following lots:

- 3, 4, 5 & 6 DP26819
- 1 DP542629
- 1, 2, 3 & 4 DP567165
- 20 DP575281
- 1 & 4 DP582485
- 21 DP598459
- 21 & 22 DP605517
- 1 & 2 DP815265
- 1 & 2 DP882031
- 7 DP1037645
- 4 DP1059050
- 1 DP1254549
- 6 DP26819
- 4 DP567165

A full set of concept civil engineering drawings prepared by CED will accompany this report and PP submission, referred to as Drawings 124-23C-PP-0001 to 0902 Revision B.

1.1 Scope of work

- Review available data, guidelines, plans and background for the project;
- Run the hydraulic model for the 1% AEP, 1% AEP with climate change, and Probable Maximum Flood (PMF) storm events utilising Council's Smithfield Overland Flow TUFLOW hydraulic model to gain an understanding of the existing conditions flow regime;
- Build in the proposed development conditions and rerun the model for the same storm events;
- Compare existing and developed conditions to formulate an analysis of the impacts to the flood regime due to development; and
- Prepare a Flood Impact Assessment Report for submission in support of the DA application that includes an outline of approach and methodology, key assumptions, results and recommendations.

It is noted that the flood modelling works was not undertaken by CED. Fairfield Council have a development agreement with a select group of companies to run Council's Flood Model. BMT/WBM were engaged to run and report back on Council's flood model. They also developed a proposed flood model based on Council's flood model and using the proposed design data that CED supplied. Refer to Appendix B for BMT/WBM Flood Impact Modelling Report is attached.

1.2 Study Area

The subject site is located in Smithfield, Sydney within the Local Government Area (LGA) of Fairfield City Council.

The land is currently commercial and residential, eastern portion being and the western portion zoned as R3 (medium density residential) RE2 (Private Recreation). Refer to Figure 1-2 for zoning map.

The subject site falls from the west and north to east. The grade down from western and northern side to Smithfield Road is (to the east) is approximately 3%. Refer to Figure 1-1 for the site locality.



Figure 1-1 Existing Site Layout (Ref: NearMaps)



Figure 1-2 Existing Land Zoning

1.3 Proposed Development Description

The proposed development consists of demolition of existing houses and structures, redevelopment of the existing RSL building and construction of mix-used development. This mixed-use development portion involves age care, child care, commercial space and high-density residential. Refer to Figure 1-3 for the proposed works layout.

The proposed stormwater network includes diversion of the existing Council drainage easement (with the 525 to 600 diameter pipe) and upsized these existing pipes. The proposed works include a new access road and swale to assist with conveying the larger storm events. A flood storage tank (in front of the southern building) is proposed to maintain 1% AEP flood levels along Smithfield Road.

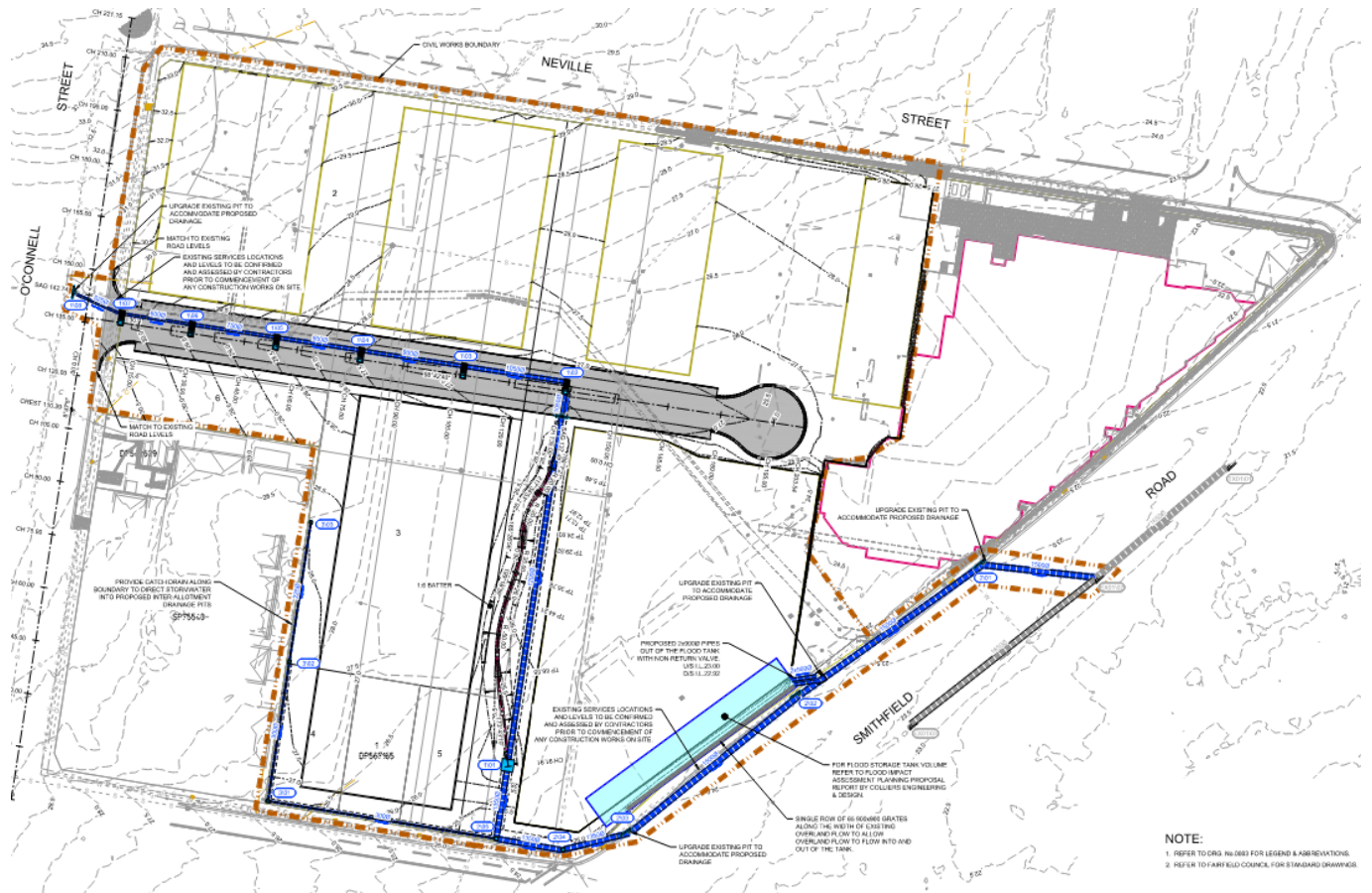


Figure 1-3 Proposed development layout

2 Data Collection and Review

2.1 Guidelines & Reports

- Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors), 2019, Australian Rainfall and Runoff: A Guide to Flood Estimation, Commonwealth of Australia
- Fairfield Citywide Development Control Plan 2013 (amendment 23)
- Fairfield Council Flood Risk Management Policy 2005
- Smithfield Overland Flood Study (2011) prepared by Sinclair Knight Merz & Fairfield Consulting Services
- Specification for Roadworks and Drainage associated with subdivision or other development, Policy Number 4-515 2011

2.2 Data

- Smithfield Overland Flood Study TUFLOW model (supplied to BMT WBM by Fairfield City Council).
- Underground stormwater drainage network for proposed development (CED, 2024)
- Civil design earthworks grading (CED, 2024)
- Detailed Survey (CED 2022)

3 Flood Modelling

This Flood Impact Assessment has adopted the Smithfield Overland Flow Study Model, as provided to BMT WBM by Fairfield Council. This flood model was originally prepared by Sinclair Knight-Merz and Fairfield Consulting Services in 2011. The hydraulic model was built in the industry standard software, TUFLOW.

The model has been approved by Council and is appropriate to adopt for this assessment, therefore, within this report we highlight only the changes that were incorporated into the model to facilitate site-specific modelling and the accompanying report for the Smithfield Overland Flow Study (SKM, 2011), hereafter referred to as the **SOFS**, should be referred to for all other modelling parameters.

3.1 Hydrology Approach

The hydrologic model was included as part of the TUFLOW package provided by Council and was undertaken in DRAINS according to the TUFLOW notes. The original Smithfield Overland Flow TUFLOW model was undertaken using Australian Rainfall & Runoff 1987 (ARR87) methodology. Since then the TUFLOW model was updated to comply with Australian Rainfall & Runoff 2019 (ARR19).

The hydrologic modelling approach adopted within the TUFLOW hydraulic model utilised the rain on grid method following the ARR19 methodology. There was not a requirement to adjust the hydrology for this project, so the provided hydrology was adopted "as-is". The existing conditions modelling results was compared to the original model existing conditions results to ensure consistency across the project.

3.2 Hydraulic Model Development

The flood modelling for this Flood Impact Assessment adopted the SOFS model as mentioned earlier. The storm events simulated for the 1% AEP, 1% AEP with climate change (10%, 20% and 30% increased rainfall), and PMF storm events was adopted based on the storm durations and temporal pattern adopted in the SOFS. A range of storm events was run from 25 minutes to 120 minutes to determine the peak flood depths, levels, velocities and hazards at the site.

Outlined below in Sections 3.2.2 to 3.2.3 are the changes made to the model to facilitate the assessment of the proposed development on site.

3.2.1 Existing Piped Network

The surrounding existing pipe network has been taken into consideration in the model and forms part of Council's TUFLOW and GIS asset database, as per Figure 3-1 below.

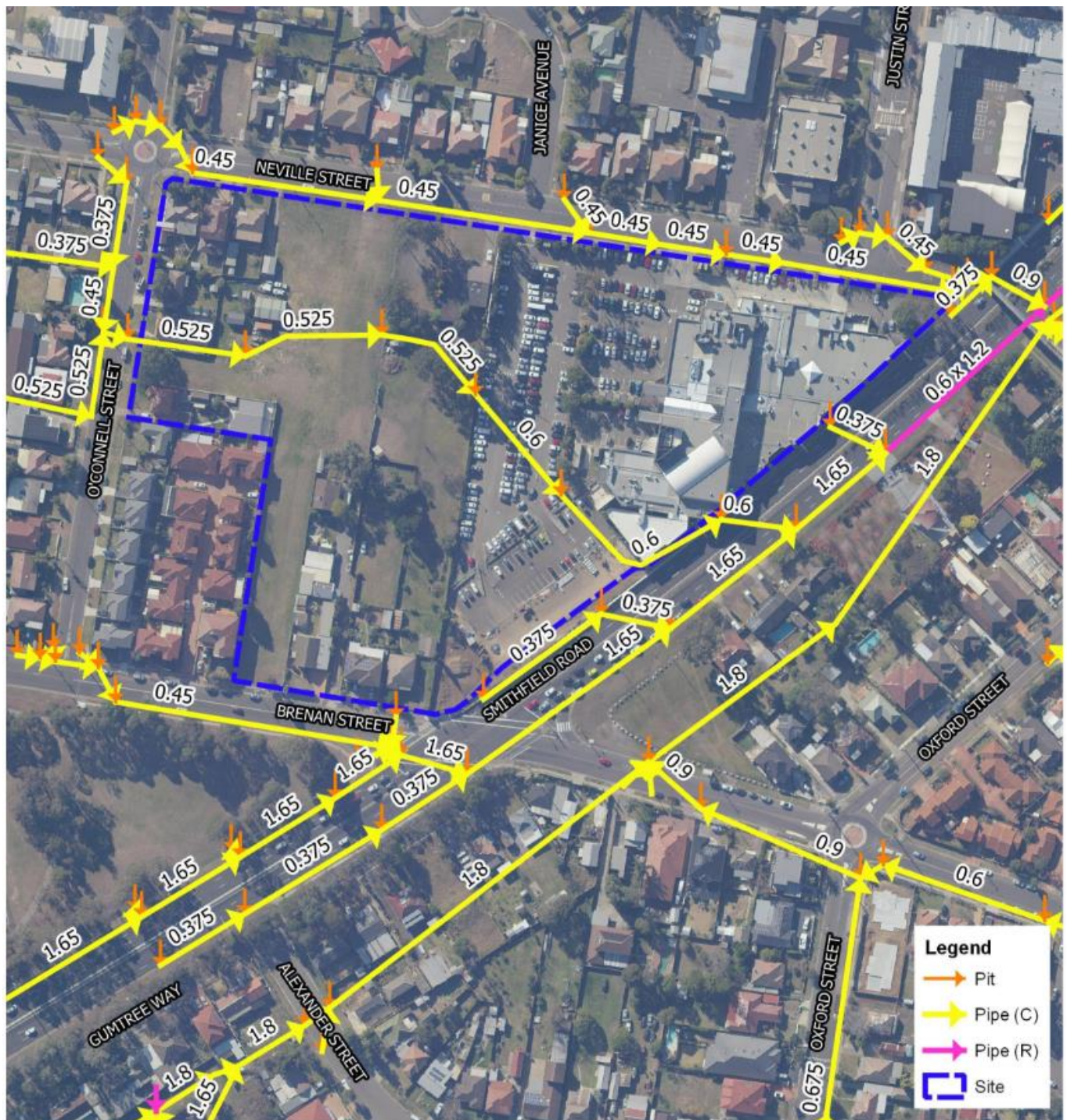


Figure 3-1 Existing Stormwater Network (Council's Smithfield Overland Flow TUFLOW Model)

3.2.2 Existing Model Changes

Changes have been made to the base model to model site-specific details and more accurately reflect the current existing conditions in the area. The existing model scenario is considered to be the subject site in its current pre-development state. The following changes were made to the hydraulic model as part of this assessment:

- The existing conditions scenario in the hydraulic model was updated with detailed survey in the locality of the site to ensure the site topography (prior to any development) is accurately reflected in the model. The survey includes surface levels as well as surveyed drainage culverts on site and in the vicinity.
- All other elements of the model remain unchanged from the base Council model.

3.2.3 Post-Development Scenario

A “developed conditions” scenario was prepared which represents the existing conditions scenario with the proposed development in place on the subject site, including all associated earthworks, roadworks, swales, trunk drainage works, and stormwater works associated with the development as per Figure 1-3 and the accompanying concept civil engineering drawings. The following changes were made to the post-development hydraulic model:

- The design surface digital elevation model (DEM) for the proposed development was read into the model.
- The Manning’s ‘n’ roughness values for the proposed development have been updated accordingly. The most appropriate roughness values have been adopted from the materials file in Council’s base model.
- Proposed building footprints were raised above the floodplain to act as flow obstructions.
- The rainfall over the proposed buildings was applied as source-area (SA) rainfall boundary conditions around the foot of the building.
- All other elements remain unchanged from the existing conditions model.

4 Flood Modelling Results

The results of the existing conditions flood modelling are detailed in Sections 4.1 below. The flood hazard mapping is based on the general flood hazard curves mentioned in ARR 2019 as per Figure 4-1.

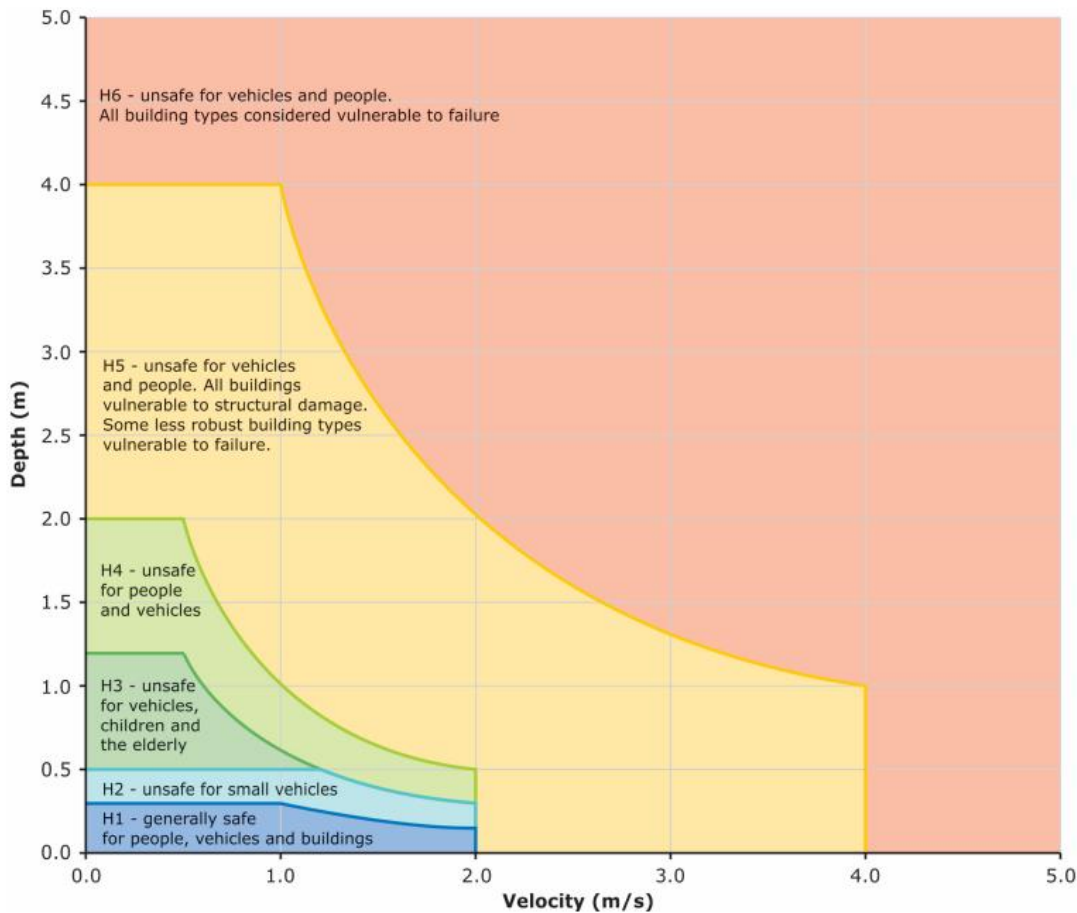


Figure 4-1 Combined Flood Hazard Curves (Smith, 2019)

4.1 Pre-development Flooding Results

The site is situated within the catchment of Prospect Creek, with the primary flooding mechanism being overland flow from upstream catchments to the west and north. The south-eastern corner of the site is also subject to overland flooding from Smithfield Road spilling onto the site.

There is a series of surface depressions through the centre of the site which acts as the existing overland flow path for the upstream catchment and site runoff, which is conveyed in a south-easterly direction towards Smithfield Road. The depth of flooding within this overland flow path reaches up to 0.40m in the 1% AEP event. The flood waters on Smithfield Road also spill into the existing carpark for the Smithfield RSL at the southern corner of the site, with water pooling up to 0.41m.

The existing conditions flood depth results as provided by BMT WBM are illustrated in Figure 4-2.



Figure 4-2 Existing conditions flood depth results (1% AEP) (BMT WBM, 2024)

4.2 Post-development Flooding Results and Discussion

The post development TUFLOW model for the 1% AEP event has been run. The following flood maps (Figure 4-3 & Figure 4-4) show the 1% AEP flood depths and 1% AEP flood afflux. These results are taken from BMT WBM's report. As demonstrated in the 1% AEP flood afflux the proposed stormwater network proposed conveys the 1% AEP and creates generally a net neutral flood afflux across the site.

The peak 1% AEP flood depths are 0.27m located in the engineered swale (running north south) and the proposed entrance road. Although not modelled the landscape design have documented a landscape swale in the middle of the road. This flood depth would be conveyed through this landscape swale. The maximum VD product also in these swale locations are approximately 0.5.

The existing south easterly surface depression (which is the existing lower carpark as described in the previous section) will be converted into a proposed building. From the existing flood model this existing carpark conveys a minor overland flow path. With the proposed building this overland flow path is pushed into Smithfield Road causing minor local flood afflux only in Smithfield Road. The civil engineering drawings document a 500m³ flood storage/conveyance tank along Smithfield building frontage (within the site) which aimed to mimic the existing storage available in the carpark to convey this minor overland flow. BMT WBM's flood results confirm that the 500m³ proposed flood storage tank is effective at maintaining and reducing the flooding on Smithfield Road.

BMT WBM also modelled 30% increase on 1% AEP rainfall to simulate climate change. This scenario was used to test the sensitivity of the existing and proposed flooding on the topology in and around the development. The increase in flood levels were minor resulting in 30-60mm increase.

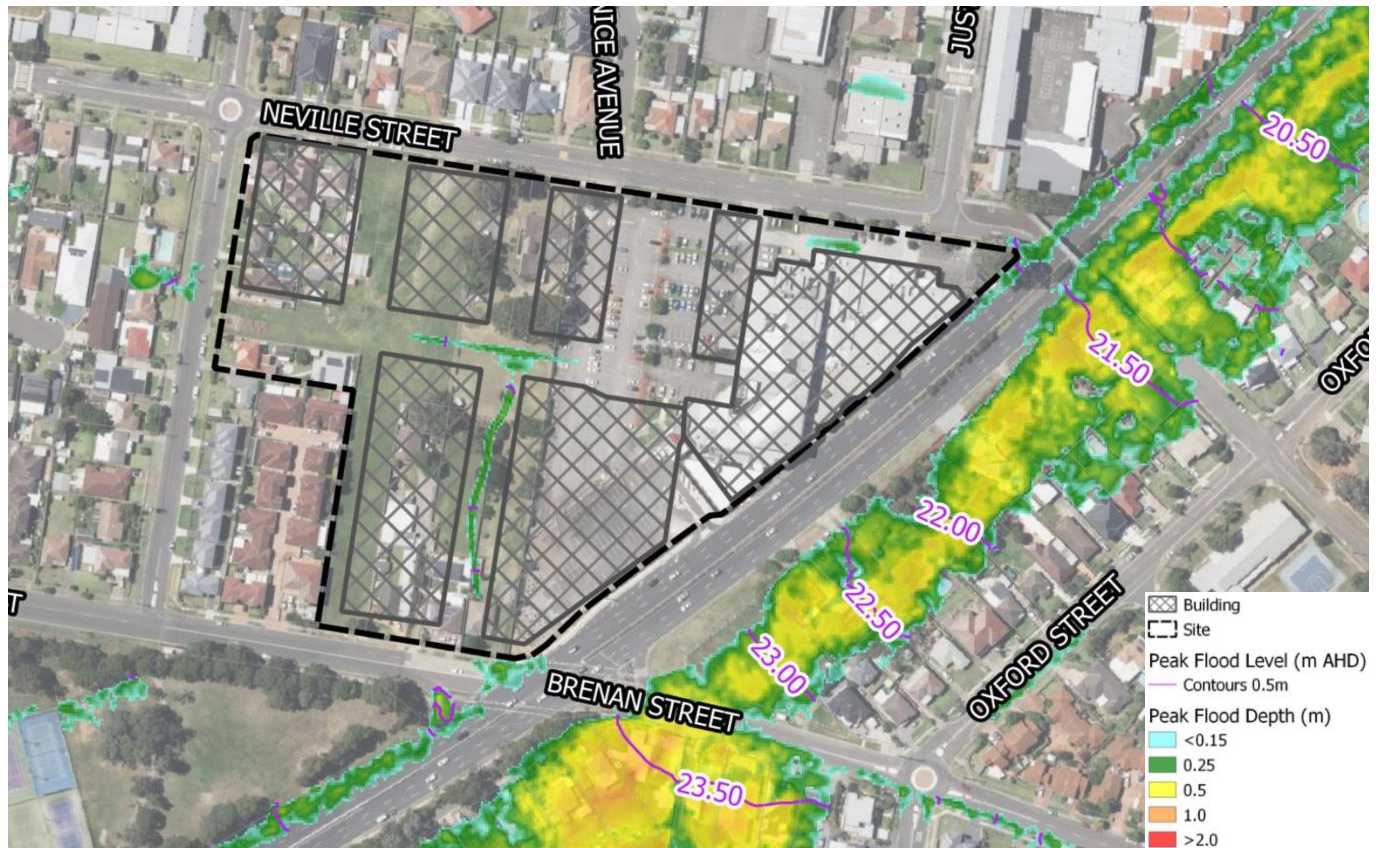


Figure 4-3 Post development conditions flood depth results (1% AEP) (BMT WBM, 2024)



Figure 4-4 Flood Afflux results (1% AEP) (BMT WBM, 2024)

4.3 Flood Risk Management Policy

Flood management controls for areas within flood risk precincts are outlined in Fairfield Council Flood Risk Management Policy 2005.

Other Floodplains (including areas affected by Local Overland Flooding)

Planning & Development Controls

Planning Consideration	Flood Risk Precincts (FRP's)																							
	Low Flood Risk								Medium Flood Risk								High Flood Risk							
	Critical Uses & Facilities	Sensitive Uses & Facilities	Subdivision	Residential	Commercial & Industrial	Tourist Related Development	Recreation & Non-Urban	Concessional Development	Critical Uses & Facilities	Sensitive Uses & Facilities	Subdivision	Residential	Commercial & Industrial	Tourist Related Development	Recreation & Non-Urban	Concessional Development	Critical Uses & Facilities	Sensitive Uses & Facilities	Subdivision	Residential	Commercial & Industrial	Tourist Related Development	Recreation & Non-Urban	Concessional Development
Floor Level		3		2,6,7	5,6,7	2,6,7	1,6	4,7				2,6,7	5,6,7	2,6,7	1,6	4,7							1,6	4,7
Building Components		2		1	1	1	1	1				1	1	1	1	1							1	1
Structural Soundness		3		2	2	2	2	2				2	2	2	2	2							1	1
Flood Effects		2	2	2	2	2	2	2			1	2	2	2	2	2							1	1
Car Parking & Driveway Access		1,3,5,6,7		1,3,5,6,7	1,3,5,6,7	1,3,5,6,7	2,3,4,6,7	6,7,8				1,3,5,6,7	1,3,5,6,7	1,3,5,6,7	2,3,4,6,7	6,7,8							2,3,4,6,7	6,7,8
Evacuation		2,3,4	5	2,3	1 or 2,3	2,3	4,3	2,3			5	2,3	1,3	2,3	4,3	2,3							4,3	2,3
Management & Design		4,5	1		2,3,5	2,3,5	2,3,5	2,3,5			1		2,3,5	2,3,5	2,3,5	2,3,5							2,3,5	2,3,5

COLOUR LEGEND:



Not Relevant



Unsuitable Land Use

Figure 4-5 Flood Risk Planning & Development Controls (Fairfield City Council, 2005)

The proposed development is a mixture of 'Low Flood Risk' and 'Medium Flood Risk' and thus the flood risk is defined as Medium Flood Risk for the site. The land use category is Residential and Commercial.

Applicable controls are:

- Design Floor Level
 - Freeboard equals an additional height of 500mm.
 - Habitable floor levels to be no lower than the 100 year flood level plus freeboard
 - Non-habitable floor levels to be equal to or greater than the 100 year flood level plus freeboard where possible, or otherwise no lower than the 20 year flood level
 - unless justified by site specific assessment.
- Building Components & Method
 - All structures to have flood compatible building components below the 100 year flood level plus freeboard.
 - All structures to have flood compatible building components below the PMF level.
- Structural Soundness
 - Applicant to demonstrate that the structure can withstand the forces of floodwater, debris and buoyancy up to and including a 100 year flood plus freeboard. An engineer's report may be required.

- Car Parking and Driveway Access
 - The minimum surface level of open car parking spaces or carports shall be as high as practical, and not below: (i) the 20 year flood level; or (ii) the level of the crest of the road at the location where the site has access; (which ever is the lower). In the case of garages, the minimum surface level shall be as high as practical, but no lower than the 20 year flood level.
 - Enclosed car parking and car parking areas accommodating more than 3 vehicles with a floor level below the 20 year flood level or more than 0.8m below the 100 year flood level, shall have adequate warning systems, signage and exits.
 - Restraints or vehicle barriers to be provided to prevent floating vehicles leaving a site during a 100 year flood
- Evacuation
 - Reliable access for pedestrians or vehicles is required from the building, commencing at a minimum level equal to the lowest habitable floor level to an area of refuge above the PMF level , or a minimum of 20% of the gross floor area of the dwelling to be above the PMF level.
 - The evacuation requirements of the development are to be considered. An engineers report will be required if circumstances are possible where the evacuation of persons might not be achieved within the effective warning time.
- Management and Design
 - Site Emergency Response Flood Plan required where floor levels are below the design floor level.
 - Applicant to demonstrate that area is available to store goods above the 100 year flood level plus freeboard.
 - No storage of materials below the design floor level which may cause pollution or be potentially hazardous during any flood.

4.4 Flood Planning levels

BMT WBM's report has extracted hydraulic data in several locations around the site to assist with setting flood planning levels for the proposed development.



Figure 4-6 Flood Model reporting Locations (BMT WBM, 2024)

The following table summarises (in m AHD) the 1% AEP and PMF flood levels. 0.5m freeboard is applied to the 1% AEP flood levels and is defined as the flood planning levels. The proposed openings (such as basement entrances, fire stairs, doors and windows) must be set to these flood planning levels. It is worth noting that the 1% AEP + 0.5m freeboard is generally above the PMF flood levels.

Table 4-1 1% AEP, PMF Flood Planning Levels (BMT WBM 2024)

ID	Post Development		
	1% AEP	PMF	1 % AEP + 0.5m Freeboard
A	-	30.76	-
B	-	29.35	-
C	27.19	27.37	27.69
D	26.71	27.17	27.21
E	25.98	26.64	26.48
F	-	25.63	-
G	24.75	24.94	25.25
H	-	27.94	-
I	-	24.17	-
J	-	23.28	-
K	23.91	24.08	24.41
L	30.79	30.93	31.29
M	25.00	25.20	25.50

5 Conclusion

A flood impact assessment has been undertaken for the proposed development at Smithfield RSL and its surrounds located in Smithfield, NSW. The flood impact assessment has been based on BMT WBM's flood modelling works using Fairfield Council's updated TUFLOW hydraulic model which was based on the Smithfield Overland Flood Study (2011) originally prepared by Sinclair Knight Merz and Fairfield Consulting Services. The hydraulic model was updated to include recent site survey data as well as the proposed development features for the post-development scenario. The TUFLOW model was then used to assess the impact of the proposed development on surrounding flood behaviour.

In sections 4.3 and 4.4 of this report have provide flood design advice that the development application design and documentation will adhere to.

Appendix A. Civil Drawings

Appendix B. BMT WBM Flood Impact Modelling Report