

Attachment A20

Civil Engineering Report

Civil Engineering Report

383 Kent Street

Prepared for Charter Hall Holdings Pty Ltd / 05 December 2023

221517

Contents

1.0 Introduction 3

1.1 Planning Context 3

1.2 Civil Engineering..... 4

1.3 Proposed Development 4

1.4 Design and Planning Guidelines 6

2.0 Flooding 7

2.1 Existing Council Flood Maps 7

2.2 Flood Planning Levels..... 10

3.0 Stormwater..... 12

3.1 Existing stormwater 12

3.2 Water Quantity..... 13

3.2.1 On-Site Detention Tank 13

3.2.2 Stormwater modelling..... 13

3.3 Water Quality..... 16

4.0 Summary and Next Steps 17

Appendix A 18

1.0 Introduction

1.1 Planning Context

This Civil Report has been prepared by TTW in support of a Planning Proposal to amend the *Sydney Local Environmental Plan 2012* (Sydney LEP). This report has been prepared on behalf of Charter Hall Holdings (the Proponent) and it relates to a single development lot identified as Lot 1 in DP 778342 or 383 Kent Street, Sydney (the site).

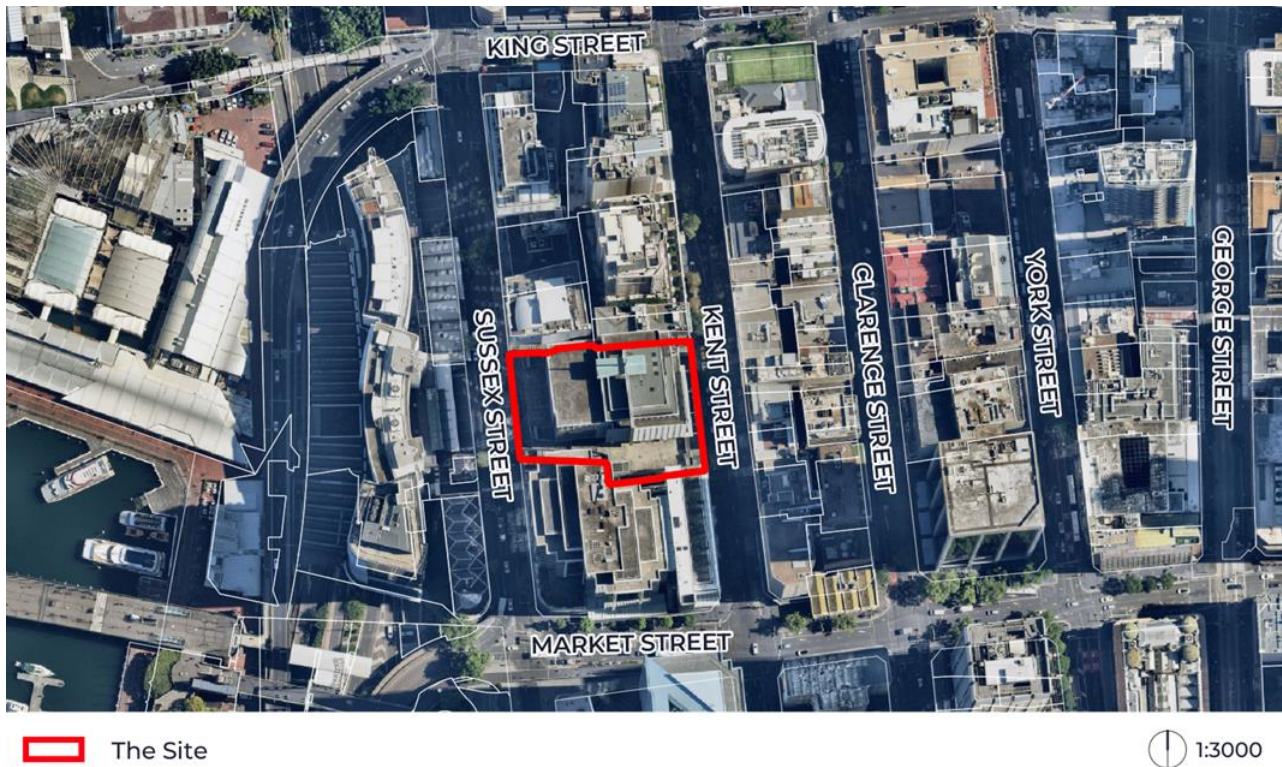


Figure 1 Aerial Map

Source: Nearmap, edits by Ethos Urban

1.2 Civil Engineering

This report outlines the flooding and stormwater requirements to meet the City of Sydney (CoS) Development Control Plan (DCP). The details of this report are based on current available information and correspondence at the time of writing.

1.3 Proposed Development

Architectural concept plans are shown in the figures below, including an east-west section showing podium levels.



Figure 2 – Architectural Ground Floor Plan

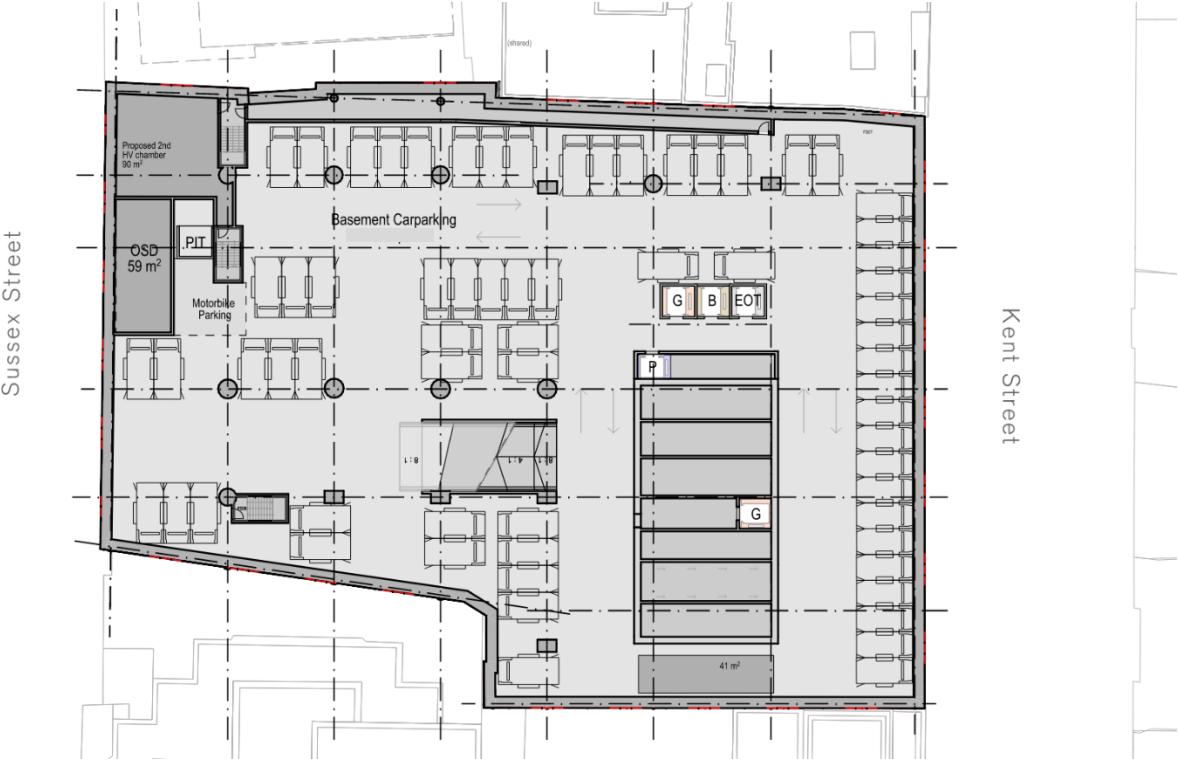


Figure 3 - Architectural Basement 1 Plan



Figure 4 - Architectural East-West section

1.4 Design and Planning Guidelines

Below is a list of relevant design and planning guidelines used to prepare this report:

- City of Sydney Development Control Plan (DCP) 2012
- City of Sydney Local Environment Plan (LEP) 2012
- City Area Catchment Floodplain Risk Management Plan Final Report, September 2016
- Darling Harbour Catchment Floodplain Risk Management Plan Final Report, September 2016
- City of Sydney Interim Floodplain Management Policy 2014
- City of Sydney WSUD Technical Guidelines 2014
- Australian Rainfall and Runoff (ARR) 2019

2.0 Flooding

2.1 Existing Council Flood Maps

The site is located at a crest of Kent Street and Sussex Street. As a result it is split between the City Area Catchment to the west and Darling Harbour Catchment to east. The CoS flood studies and mapping for the City Area Catchment and Darling Harbour Catchment show the following in relation to the site:

1% AEP flood event:

Peak flood depths in the 1% AEP flood event do not exceed 50mm adjacent to the site and will be contained within the kerb and gutter.

PMF flood event:

Peak flood depths in the PMF flood event do not exceed 100mm in Kent Street and 50mm in Sussex Street adjacent to the site and will be contained within the kerb and gutter.

As a result of the above the site is not considered to be impacted by mainstream flooding with only minor gutter flow present in the vicinity of the site.

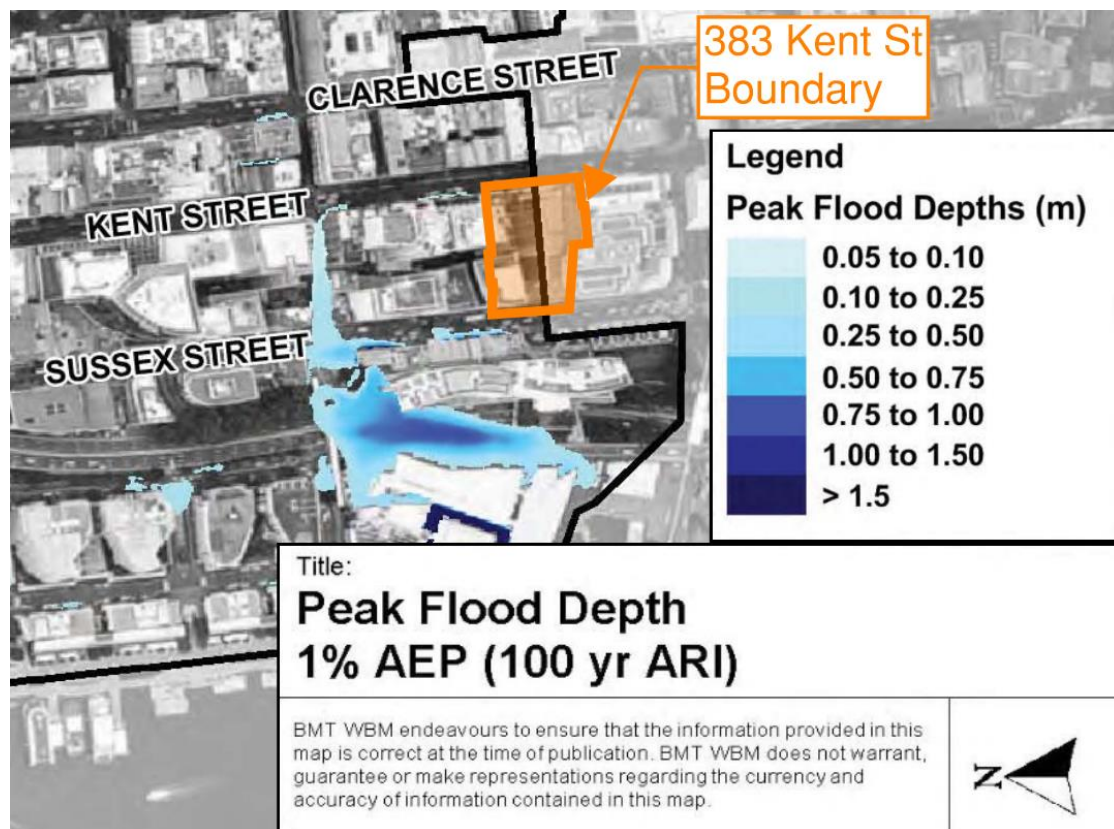


Figure 5 - Peak Flood Depth 1% AEP Appendix A, page 19 City Area Catchment Flood Study Part 2

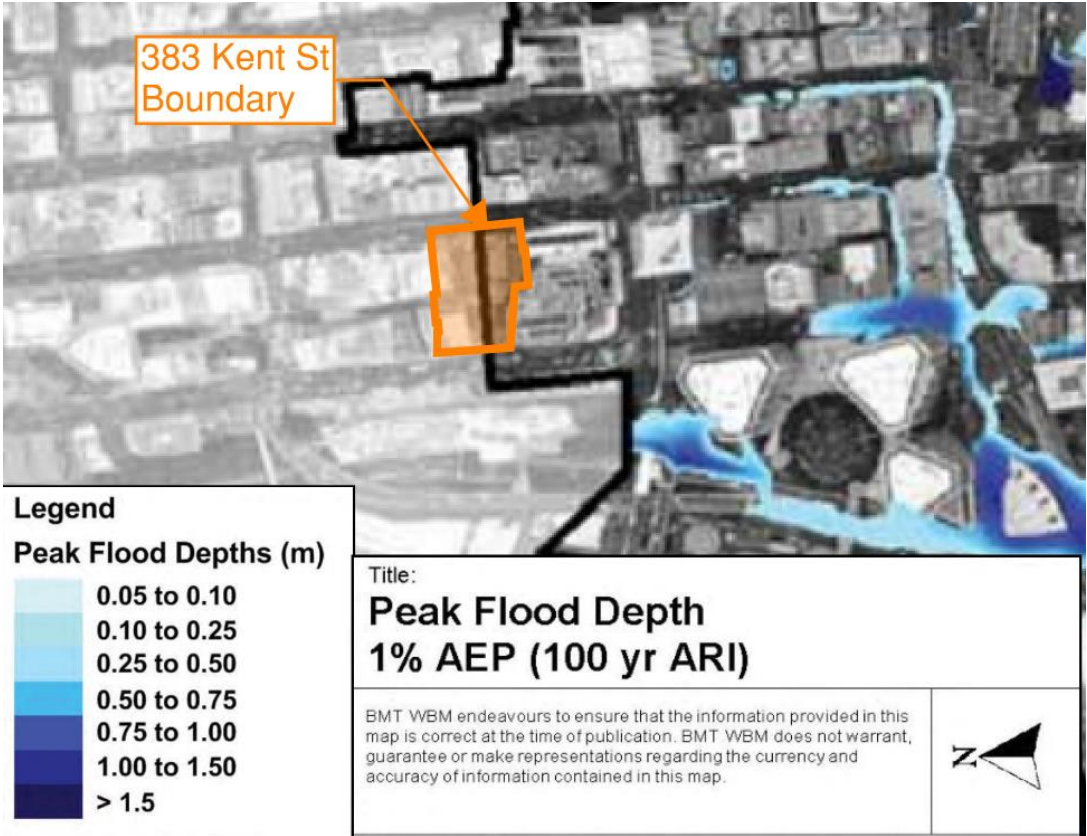


Figure 6 - Peak Flood Depth 1% Appendix A, page 48, Darling Harbour Catchment Flood Study Part 2

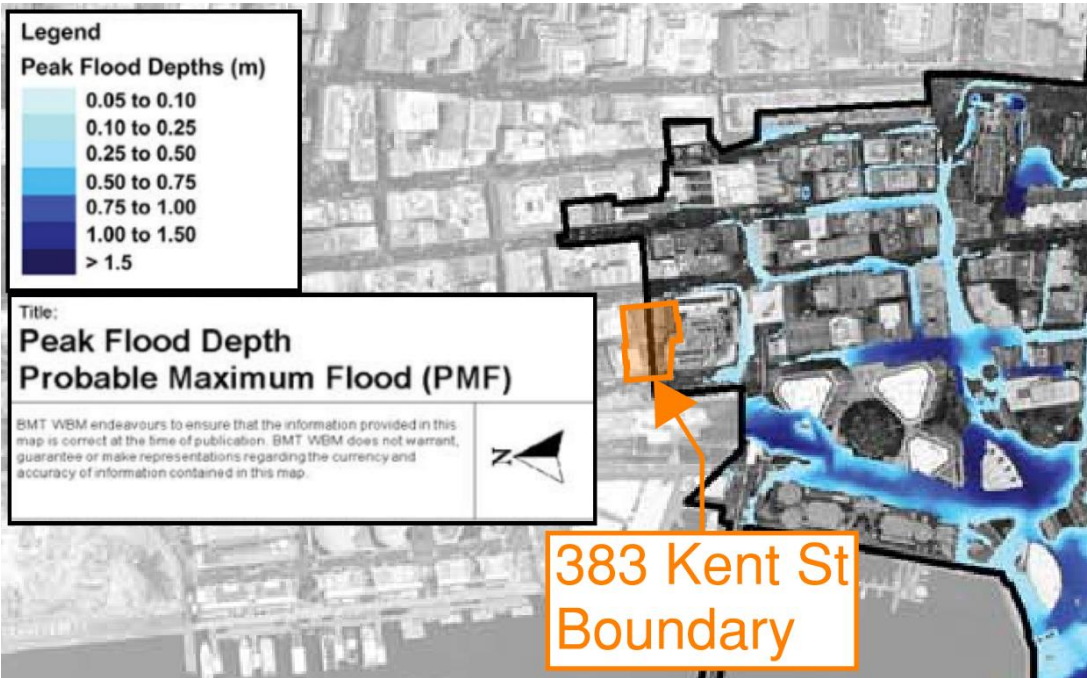


Figure 7 - Peak Flood Depth PMF Appendix A, page 50, Darling Harbour Catchment Flood Study Part 2

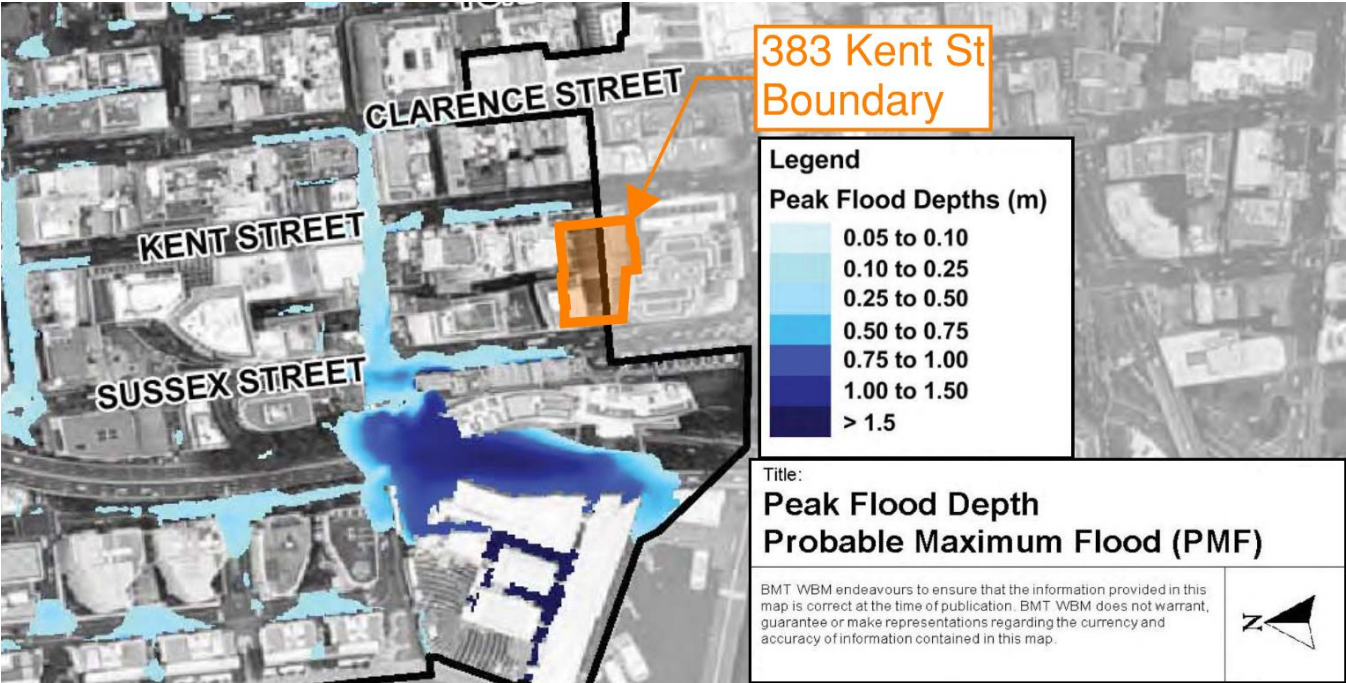


Figure 8 - Peak Flood Depth PMF Appendix A, page 21 City Area Catchment Flood Study Part 2

2.2 Flood Planning Levels

The development must comply with the City of Sydney Interim Floodplain Management policy. As highlighted in Table 1, commercial business developments can adopt a flood planning level of the 1% AEP flood level on a merits-based approach. Given the site is at a crest between two catchments the 1% AEP flood level is considered appropriate in this scenario. Falls need to be provided away from building threshold levels to the existing top of kerb in Kent and Sussex Street. These falls need to achieve min. 1 in 100 and max. 1 in 40 falls for drainage and accessibility compliance respectively. Given the 1% AEP flow is contained with the kerb and gutter the finished floor level (FFL) will meet the flood planning if compliant footpath cross-falls are provided.

Flood planning levels for a below ground car park are more onerous due to the inherent risks of water ingress. These are either the greater of the 1% AEP flood level + 0.5m or the PMF if impacted by flooding, or 300mm above the surrounding surface if outside the floodplain. It is recommended to adopt a crest level of 10.05m to the basement ramp which will satisfy the worst-case flood planning level. Based on the current floor plans this can be achieved by adopting about a 1 in 70 rise from the site boundary to the crest of the basement ramp.

Table 1 - City of Sydney Interim Floodplain Management Policy p.g. 13-14

5 Flood Planning Levels

A Flood Planning Level refers to the permissible minimum building floor levels. For below-ground parking or other forms of below-ground development, the Flood Planning Level refers to the minimum level at each access point. Where more than one flood planning level is applicable the higher of the applicable Flood Planning Levels shall prevail.

Development	Type of flooding	Flood Planning Level
Residential	Habitable rooms	Mainstream flooding 1% AEP flood level + 0.5 m Local drainage flooding (Refer to Note 2) 1% AEP flood level + 0.5 m or Two times the depth of flow with a minimum of 0.3 m above the surrounding surface if the depth of flow in the 1% AEP flood is less than 0.25 m
	Outside floodplain	0.3 m above surrounding ground
	Non-habitable rooms such as a laundry or garage (excluding below-ground car parks)	Mainstream or local drainage flooding 1% AEP flood level
Industrial or Commercial	Business	Mainstream or local drainage flooding Merits approach presented by the applicant with a minimum of the 1% AEP flood level
	Schools and child care facilities	Mainstream or local drainage flooding Merits approach presented by the applicant with a minimum of the 1% AEP flood level + 0.5m
	Residential floors within tourist establishments	Mainstream or local drainage flooding 1% AEP flood level + 0.5 m
	Housing for older people or people with disabilities	Mainstream or local drainage flooding 1% AEP flood level + 0.5 m or a the PMF, whichever is the higher
	On-site sewer management (sewer mining)	Mainstream or local drainage flooding 1% AEP flood level
	Retail Floor Levels	Mainstream or local drainage flooding Merits approach presented by the applicant with a minimum of the 1% AEP flood. The proposal must demonstrate a reasonable balance between flood protection and urban design outcomes for street level activation.
Below-ground garage/ car park	Single property owner with not more than 2 car spaces.	Mainstream or local drainage flooding 1% AEP flood level + 0.5 m
	All other below-ground car parks	Mainstream or local drainage flooding 1% AEP flood level + 0.5 m or the PMF (whichever is the higher) See Note 1
	Below-ground car park outside floodplain	Outside floodplain 0.3 m above the surrounding surface
Above ground car park	Enclosed car parks	Mainstream or local drainage flooding 1% AEP flood level
	Open car parks	Mainstream or local drainage 5% AEP flood level
Critical Facilities	Floor level	Mainstream or local drainage flooding 1% AEP flood level + 0.5m or the PMF (whichever is higher)
	Access to and from critical facility within development site	Mainstream or local drainage flooding 1% AEP flood level

Notes

1) The below ground garage/car park level applies to all possible ingress points to the car park such as vehicle entrances and exits, ventilation ducts, windows, light wells, lift shaft openings, risers and stairwells.

2) Local drainage flooding occurs where:

- The maximum cross sectional depth of flooding in the local overland flow path through and upstream of the site is less than 0.25m for the 1% AEP flood; and
- The development is at least 0.5m above the 1% AEP flood level at the nearest downstream trapped low point; and
- The development does not adjoin the nearest upstream trapped low point; and
- Blockage of an upstream trapped low point is unlikely to increase the depth of flow past the property to greater than 0.25m in the 1% AEP flood.

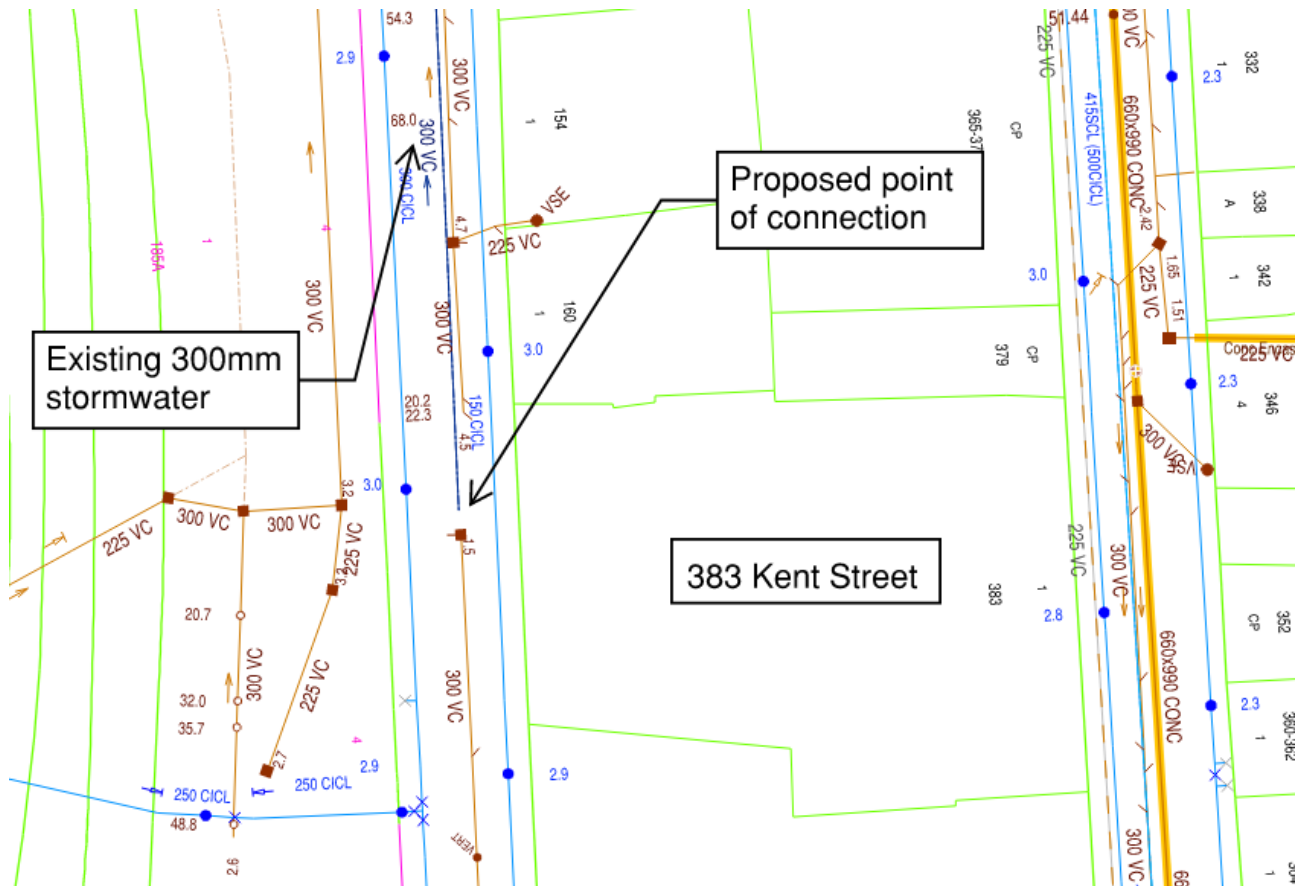
3) Mainstream flooding occurs where the local drainage flooding criteria cannot be satisfied.

4) A property is considered to be outside the floodplain where it is above the mainstream and local drainage flood planning levels including freeboard.

3.0 Stormwater

3.1 Existing stormwater

The Dial Before You Dig (DBYD) plans show an existing 300mm diameter stormwater pipe in Sussex Street. This appears to have a manhole and lateral connection adjacent to the site. Further investigation is required to determine if there is an existing connection from the site and if the proposed stormwater could utilise this.



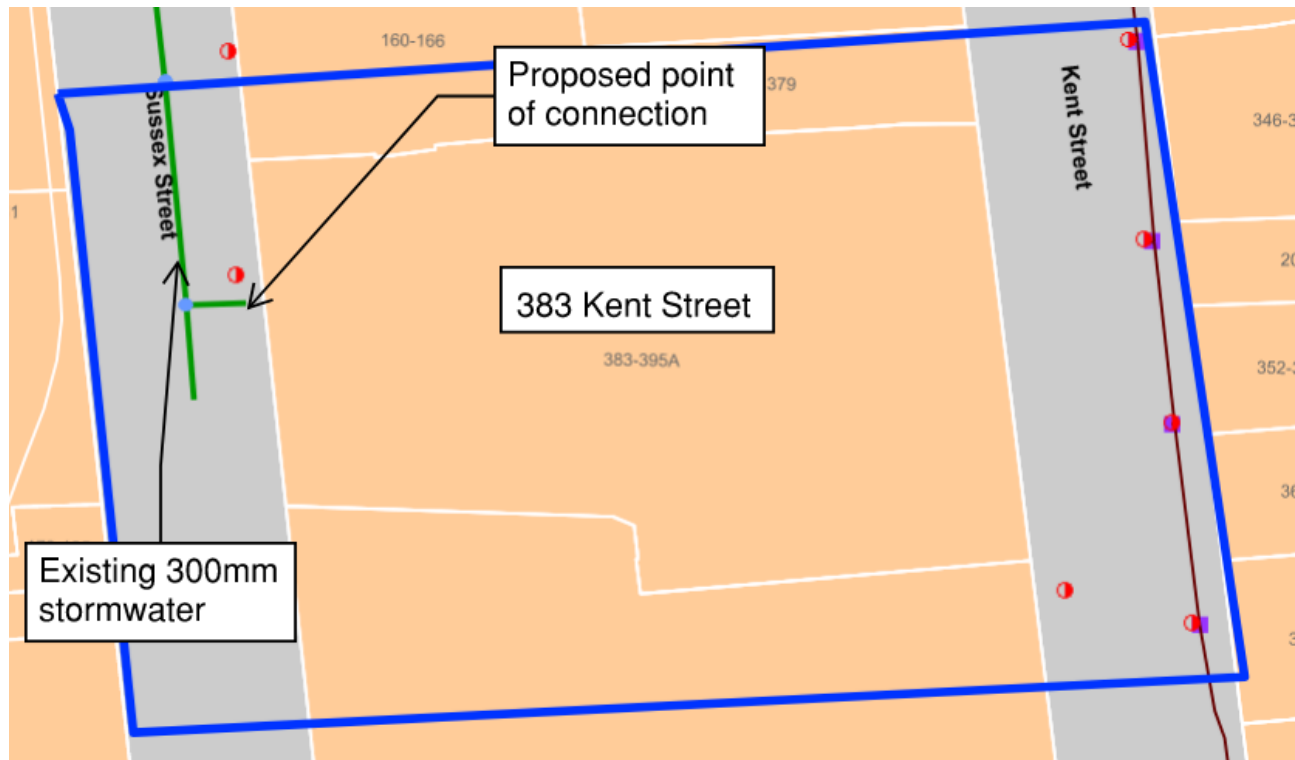


Figure 10 – City of Sydney DBYD

3.2 Water Quantity

3.2.1 On-Site Detention Tank

City of Sydney Council requires developers to meet the OSD requirements set out by Sydney Water. For this development Sydney Water has confirmed the following OSD requirements. A copy of this correspondence is included in Appendix A.

Table 2 - Proposed Development OSD requirements by Sydney Water

Permissible Site Discharge (PSD)	134 L/s
Site Storage Requirement (SSR)	57 m ³

3.2.2 Stormwater modelling

The stormwater modelling is based on connecting to the existing 300mm diameter stormwater in Sussex Street. This will need to be verified through a below ground utilities survey including clearances to other services located in the footpath. Minimum cover of 600mm has been adopted prior to survey information being available. A downstream boundary condition of the pipe invert tailwater level has been adopted in line with City of Sydney A4 Stormwater Drainage Design Technical Specification. Based on this an OSD volume of 115m³ will achieve a PSD of 107 L/s as shown in Figure 11. Depending on the verification of the existing stormwater point of connection and IL it may be possible to increase the PSD closer to the maximum permitted and decrease the OSD volume.

Results for median storm in critical 1% AEP ensembles using Lite hydraulic model.

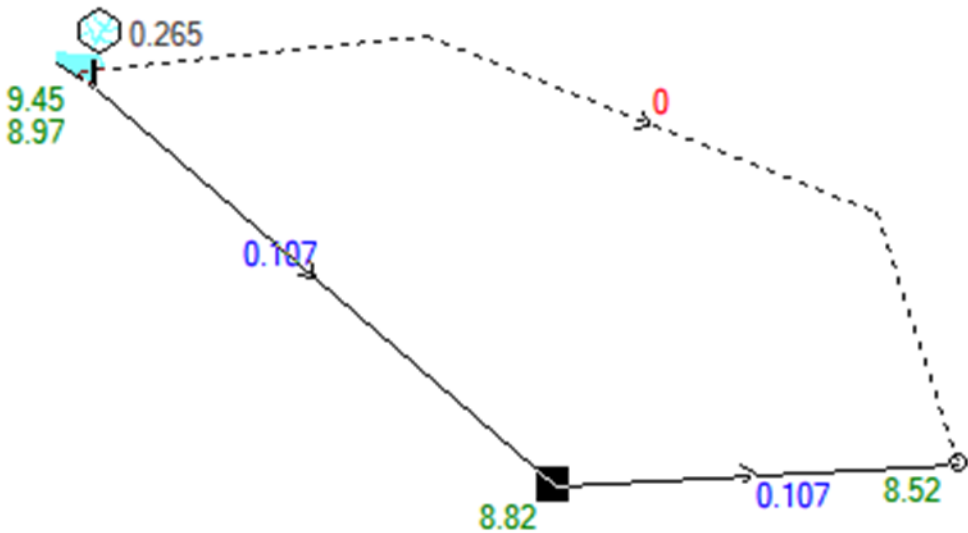


Figure 11 - DRAINS model of OSD to downstream network

[illegible]

The diagram illustrates a cross-section of a stormwater management system. On the left, an 'EXISTING STORMWATER PIT' is shown with an 'IL TO BE CONFIRMED'. A 'Ø270mm ORIFICE' is located at 'IL 8.52'. To the right of the pit is a 'STORMFILTER CHAMBER' with a 'WEIR WALL 0.69m HIGH' and a '50mm FALSE FLOOR'. The chamber contains 'APPROX. 5 x FILTER CARTRIDGES' and a 'TRASH SCREEN'. The 'TOP OF GRATE' is at 'RL 9.90'. The 'BUILDING LINE' is indicated by a dashed line. The 'TOP OF SLAB IL' is at '9.70'. The '9.90 TAILWATER LEVEL (TOP OF KERB LEVEL)' is shown on the right. The 'BOUNDARY LINE' is marked with a dashed line. The '3 x 100mm ELECTRICAL CONDUIT?' is shown near the pit. The '200mm GAS' and '100mm GAS' are also indicated. The 'OSD SLABS AND WALLS TO BE 0.25m THICK UNLESS NOTED OTHERWISE' is noted at the bottom right. The diagram is labeled 'SECTION A' at the bottom center.

Page 15 of 18

3.3 Water Quality

City of Sydney Council's Development Control Plan requires all new developments to install permanent stormwater pollution controls. City of Sydney Council DCP provides specific pollutant reduction targets for new developments. The targets are listed in Table 3.

Table 3 - Required pollutant reduction targets

Pollutant	% post development average annual load reduction
Gross pollutants	90
Total suspended solids	85
Total phosphorous	65
Total nitrogen	45

The site has been modelled in the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) water quality modelling software using City of Sydney Council's MUSIC-Link. Treatment nodes have been designed in line with parameters outlined in the City of Sydney WSUD Technical Guidelines 2014. The following treatments have been included to meet Council water quality targets at the downstream point of connection with Council systems.

- 2 x Oceanguard basket inserts by OceanProtect or equivalent product.
- 5 x 690mm PSorb (MCC) Stormfilter cartridges by OceanProtect or equivalent product.

Refer to Figure 14 and Figure 15 for the relevant MUSIC results and model schematic.

	Sources	Residual Load	% Reduction
Flow (ML/yr)	4.51	4.51	0
Total Suspended Solids (kg/yr)	117	17.1	85.3
Total Phosphorus (kg/yr)	0.682	0.204	70.1
Total Nitrogen (kg/yr)	9.79	4.83	50.6
Gross Pollutants (kg/yr)	112	0	100

Figure 14 - MUSIC results

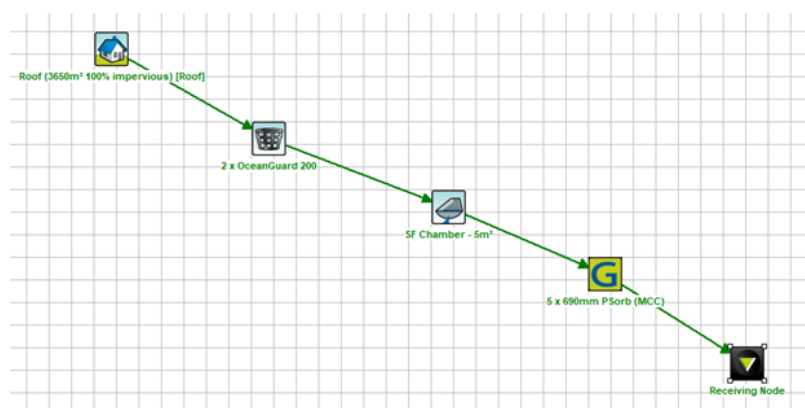


Figure 15 - MUSIC model

4.0 Summary and Next Steps

The following are the key Civil design elements outlined in this report:

- Peak flood depths in the PMF flood event do not exceed 100mm in Kent Street and 50mm in Sussex Street adjacent to the site and will be contained within the kerb and gutter.
- Flood planning levels for the ground floor commercial space must be above the 1% AEP flood level. This will be achieved by default if compliant falls are provided away from the building to the top of kerb
- It is recommended to adopt a crest level of 10.05m to satisfy the flood planning levels for the basement car park.
- OSD is required as confirmed by Sydney Water with a maximum Permissible Site Discharge (PSD) of 134 L/s and a minimum Site Storage Volume (SSV) of 57m³.
- An existing 300mm diameter stormwater pipe is located in Sussex Street which is the proposed point of connection for the site. Based on minimum cover of 600mm a SSV of 115m³ is required as the PSD is restricted by the downstream conditions at the point of connection.
- Water quality treatment is required to meet Council's pollution reduction targets. The following is proposed that will be included within the OSD chamber.
 - 2 x Oceanguard basket inserts by OceanProtect or equivalent product.
 - 5 x 690mm PSorb (MCC) Stormfilter cartridges by OceanProtect or equivalent product.

Next steps required to develop the Civil design are outlined below:

- Undertake below ground utilities survey to verify the existing 300mm diameter stormwater pipe location and invert level.
- Undertake below ground utilities survey of the existing utilities in the Sussex Street footpath to verify clearances for the proposed stormwater connection.
- Detailed coordination of OSD with ground floor and basement layouts based on below ground utilities survey results.

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in its capacity as trustee for the
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TIM MOORE
NSW Civil Manager

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Appendix A

Sydney Water OSD correspondence

From: Stormwater <Stormwater@sydneywater.com.au>
Sent: Thursday, 12 January 2023 10:31 AM
To: Amir Tara
Subject: RE: [External] 383 Kent Street OSD requirements Letter

Follow Up Flag: Follow up
Flag Status: Flagged

[External Email]: Do not click links or open attachments unless you recognize the sender and know the content is safe.

Amir,

The On Site Detention requirements for the 3,650 square meters site at 383 Kent St, Sydney, are as follows:

- On Site Detention 57 cubic meters
- Permissible Site Discharge 134 L/s

The approval for the On Site Detention would only be given as part of the Section 73 application for this development. The On Site Detention is to be designed according to the above values and submitted to Sydney Water for approval with the Section 73 application. The following details are to be included in your submission for On Site Detention approval:

- Location of the On Site Detention in relation to the development
- Location of the On Site Detention in relation to overall stormwater network of the property
- Plan and Elevation of the On Site Detention tank with all dimensions
- Orifice plate calculation

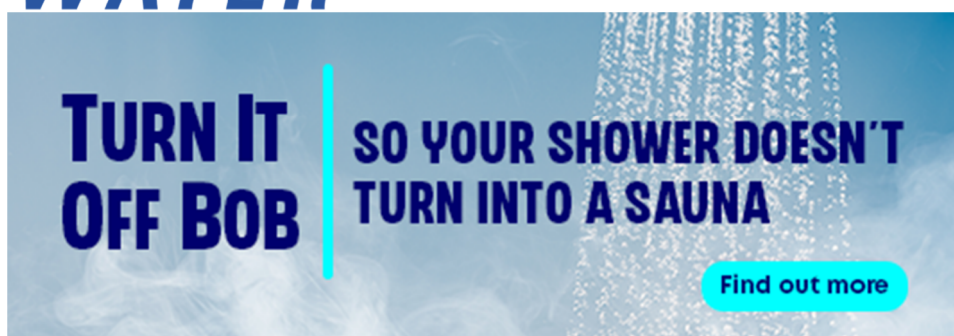
Best Regards

Planning and Technical

Business Development

Sydney Water, Level 13, 1 Smith Street, Parramatta NSW 2150

Sydney
WATER





Sydney Water acknowledges the traditional custodians
of the waters and land on which we work, live and learn.

From: Amir Tara <amir.tara@ttw.com.au>
Sent: Wednesday, 11 January 2023 10:51 AM
To: Stormwater <Stormwater@sydneywater.com.au>
Subject: [External] 383 Kent Street OSD requirements Letter

CAUTION: This email originated from outside the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Hi Sydney Water,

We are working on behalf of our client for a proposed redevelopment at 383 Kent Street, Sydney. As per Sydney Water's requirements can you please confirm if on-site detention is warranted and if so please provide the Permissible Site Discharge and Site Storage Requirements based on the below project details;

- | | |
|------------------------------------|------------------------------|
| - Site Address | 383 Kent St, Sydney 2000 NSW |
| - Total Site Area | 3,650 sqm |
| - Pre-development impervious area | 3,650 sqm |
| - Post-development impervious area | 3,650 sqm |

Please do not hesitate to contact me if you require any further information.

I've attached a photo of the site for reference below.





Amir Tara | Graduate Civil Engineer

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