



Integrated Water Cycle Management Report

79–81 Queens Road & 2–8 Spencer Street, Five Dock

DPG Project 37 Pty Ltd

79-81 Queens Road and 2-8 Spencer Street
Five Dock NSW 2046

Prepared by:

SLR Consulting Australia Pty Ltd

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Basis of Report

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with DPG Project 37 Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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Acronyms and Abbreviations

AEP	Annual Exceedance Probability
AS	Australian Standard
AS 3500.3	Australian Standard – Stormwater Drainage
ARR	Australian Rainfall and Runoff 2019
BASIX	Building and Sustainability Index
CCBC	City of Canada Bay Council
DCP	Development Control Plan
DP	Downpipe
DN	Nominal Diameter (pipe size)
HGL	Hydraulic Grade Line
IL	Invert Level
L/s	Litres per second
m ³ /s	Cubic metres per second
OSD	On-Site Detention
PSD	Permissible Site Discharge
PRCUTS	Parramatta Road Corridor Urban Transformation Strategy
PVC / UPVC	Polyvinyl Chloride / Unplasticised PVC
Q=iA	Rainfall runoff flow equation (flow = intensity × area)
RL	Reduced Level
SSR	Site Storage Requirement
SW	Stormwater



1.0 Introduction

This report outlines the integrated water management measures included in the design of the mixed-use development located at 79-81 Queens Road and 2-8 Spencer Street, Five Dock. The design supports the architectural scheme documented in the State Significant Development Application package.

1.1 Site Description

The site is located at 79-81 Queens Road and 2-8 Spencer Road, shown on **Figure 1**. The land is formally known as:

- Lots 17, 20, 21 and 22, DP 1117 on land in Zone MU1 Mixed Use; and
- Lots 1 and 18, DP 540151 and 651570, respectively, on land in Zone MU1 Mixed Use and RE1 Public Recreation under the Canada Bay Local Environment Plan (Canada Bay LEP) 2013.

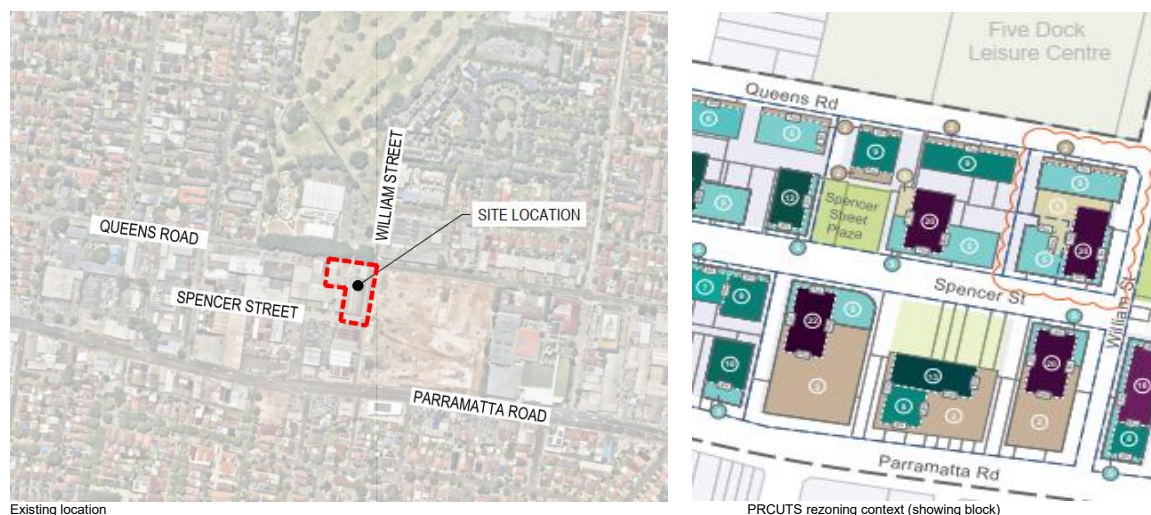


Figure 1: Site Location

The site is bound by Queens Road to the north, William Street to the east, Spencer Street to the south, and adjacent properties to the west.

1.1.1 Project Context (PRCUTS)

The site is located within the NSW Government Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) published in November 2016. This Strategy is the NSW Government's 30 year plan for the renewal of the Parramatta Road Corridor. PRCUTS is an integrated land use planning and transport framework for the transformation of the Corridor. The overall vision for the Parramatta Road Corridor is for high quality multi-use development with improved transport choices, better amenity and balanced growth of housing and jobs.

The site is located within PRCUTS Stage 1 Kings Bay Precinct, rezoned in December 2022 as part of the Parramatta Road Corridor Urban Transformation Implementation Update 2021. The Kings Bay Precinct is located between the established centres of Burwood and Five Dock. The part of this precinct that is controlled by this DCP is located between Parramatta Road and Queens Road and includes parts of Kings Road and stretches from the eastern side of Walker Street to both sides of Harris Street to the east.



A masterplan for Kings Bay was developed to consolidate information presented in the PRCUTS and other studies and plans to guide the future built form and urban environment and to inform amendments to the Canada Bay LEP 2013, DCP and contributions plan

1.1.2 Existing Drainage Infrastructure

The site spans multiple lots bounded by Queens Road, Spencer Street and William Street, as documented in the DA submission. Existing stormwater and sewer infrastructure, including invert levels, pipe alignments and pit locations have been previously verified using the Work-As-Executed survey by Land Partners (March 2024).

Key existing conditions:

- Council stormwater infrastructure is located along Spencer Street and Queens Road.
- Surveyed invert levels at the site boundaries and architectural plans informed all drainage outlet ILs in the design.
- The finished levels proposed in the architectural DA plans establish discharge points.

The site falls naturally toward Spencer Street.

1.2 Project Description

The project comprises a mixed-use development comprising ground level retail and residential land uses, including infill affordable housing. The proposed Site Plan from Plus Architecture is shown on **Figure 2**, from drawing Ground Floor, job number 20830, Revision A, dated 16.01.26.

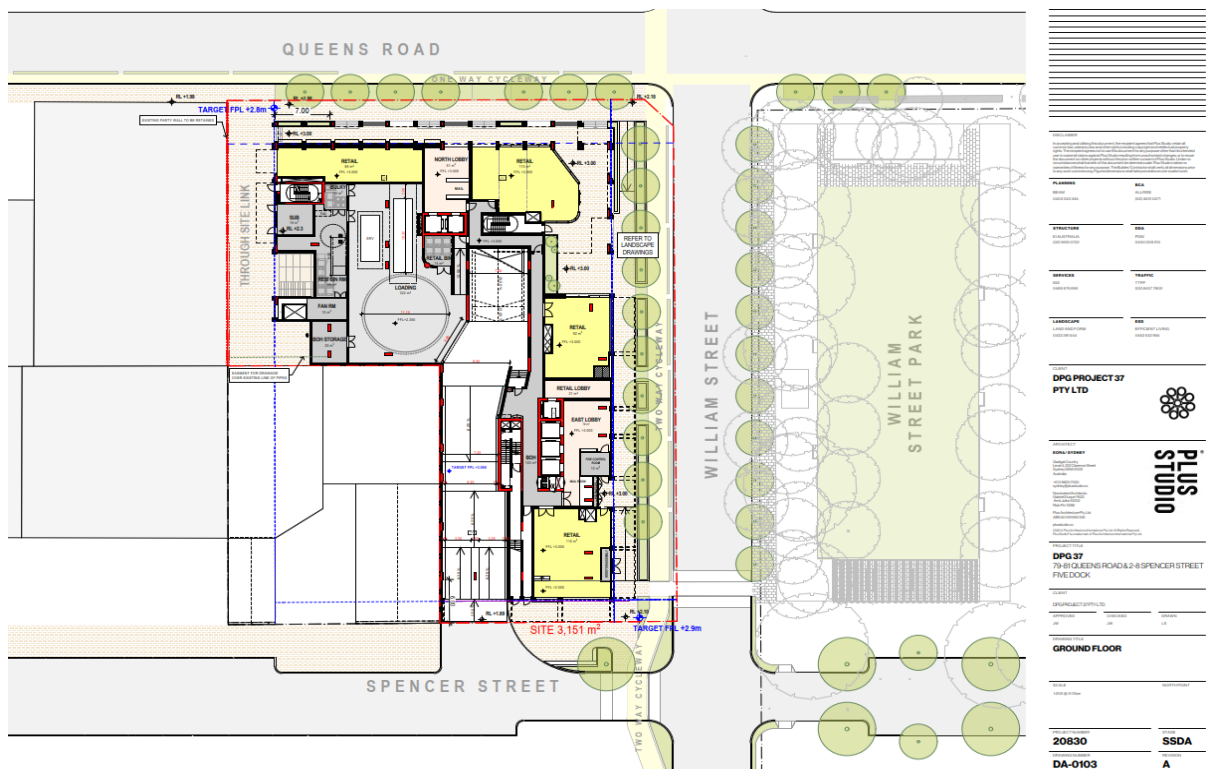


Figure 2: Site Plan



Features of the project include:

- Site preparation works, including demolition and excavation.
- Construction of 2 x shop top housing buildings, including a 5-storey building along Queens Road, and a 26-storey building along William Street, comprising a shared single storey non-residential podium, with 134 dwellings above.
- Construction of a shared basement carpark accessed from Spencer Street.
- Public domain and landscaping upgrades, including landscaped street setbacks to all boundaries, and the provision of part of a shared through site link connecting Queens Road to Spencer Street.
- Associated infrastructure upgrades and diversions.

The proposed stormwater system includes:

- An On Site Detention (OSD) system
- Water quality improvement measures to address the export of pollutants from the site
- Stormwater and rainwater drainage networks from roof, podium, ground planes and basement
- Subsurface seepage drainage to address basement groundwater inflows
- Connection to Council's pit-and-pipe network
- Driveway drainage
- Existing stormwater pipe diversion

All drainage design elements are shown on SLR drawing set 630.032804-CI-1000-1051.

1.3 Purpose of this Document

Based on our review of the site and the information provided by DPG Project 37 Pty Ltd, including the Gateway Determination Report (PP-2025-321) prepared by the NSW Department of Planning, Housing and Infrastructure, we understand that Integrated Water Cycle Management Plan are required to support the State Significant Development Application for the site.

This Integrated Water Cycle Management Plan has been prepared in response to the comments in the Gateway Determination Report.

This document outlines the drainage investigations and designed infrastructure measures required to be submitted to council to support the application.



2.0 Planning and Design Guidelines

2.1 New South Wales Flood Prone Land Policy

The primary objective of the flood prone land policy is to reduce the impact of flooding and flood liability of owners and occupiers of flood prone land. The policy adopts a merit-based approach for development decisions in the floodplain with consideration of social, economic, and ecological factors, as well as flooding considerations.

2.2 Floodplain Risk Management Guidelines

These series of guidelines and other resources complement the Flood Risk Management Manual and provide extra support to City of Canada Bay Council (Council) when they are creating and carrying out floodplain risk management plans.

2.3 Australian Rainfall and Runoff: A Guide to Flood Estimation

Australian Rainfall and Runoff: A Guide to Flood Estimation 2024 (Australian Government and Engineers Australia) (ARR v4.2) is used nationally as a guideline document, data and software suite, providing the information necessary for the estimation of design flood characteristics in Australia. The purpose of ARR is to provide a framework for reliable and robust estimates of flood characteristics to enable the assessment of flooding risk and design of infrastructure. ARR v4.2 also provides procedures for climate change impact estimation.

The procedures and data provided in ARR v4.2 have been adopted in the flood modelling of the study area and assessment of the proposal flooding impacts presented in this document.

2.4 City of Canada Bay – Development Control Plan

The sections of the City of Canada Bay Development Control Plan relating to flooding and drainage are listed below.

Section C7 Flooding Control

This Section establishes Council's approach to flood related development controls for the City of Canada Bay Local Government Area. Council's approach to flooding is based on the requirements of the New South Wales Government's Flood Prone Land Policy and Floodplain Development Manual discussed in Section 3.2.

Section C7 lists objectives, design principles and development controls for development for different development types within areas of varying flood risk. Control C1 Flood Affection states that An Engineer's report is required to demonstrate how and certify that the development will not increase flood affection elsewhere. This control has been addressed by the preparation of this study.

Appendix A2 Sections

The following Stormwater Management sections of the City of Canada Bay Development Control Plan have been addressed as part of this document, including:

- Street trees A27-A32
- Stormwater Management SWM1-SWM9
- On site stormwater detention OSD1-OSD91
- Scouring, Erosion and Water Quality Control SC1-SC14



- Rainwater Re-use RR1- RR11
- Stormwater Drainage Design SW1-SW84
- Stormwater Pollution and Erosion Control SPE1-SPE7
- Water Sensitive Urban Design WSUD1-WSUD5

Water Sensitive Urban Design WSUD1-WSUD5

The City of Canada Bay Development Control Plan (DCP) includes five controls for Water Sensitive Urban Design WSUD1-WSUD5, which list the objectives, aims, design principles, application and requirements for modelling of development.

All developments are encouraged to implement the principles of WSUD in order to minimise the impact of the development on the water cycle and achieve more sustainable forms of urban development.

Control SC4 of the City of Canada Bay DCP, within the Scouring, Erosion and Water Quality Section of Appendix A2, lists the Pollutant Load to be Retained for water quality treatment systems or pollution control devices.

These pollutant removal rates are:

- Total suspended solids (TSS) 80%
- Total phosphorus (TP) 45%
- Total nitrogen (TN) 45%
- Gross litter all litter - 70%
- Gross Pollutant Material (>50mm) - 70%

K20.1 Parramatta Road Corridor Urban Transformation Strategy (PRCUTS)

- This DCP has been prepared to support the implementation of the NSW Government Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) published in November 2016.
- The DCP has been prepared to deliver the desired future character envisaged in PRCUTS, with refinements to achieve better urban design and community outcomes. Objective and Control sections relevant to flooding in the PRCUTS DCP are:
 - O4 To achieve good design and equitable access in flood planning areas.
 - O5 To minimise hazards and property damage from flooding.
 - O6 To create activated frontages on sites that also need to consider flooding impacts
 - C10 b) in flood prone areas where the ground floor is elevated above the footpath or adjoining public open space, street activation is to be created by locating entries at footpath level, and with internal steps. Any elevated areas outside are to form an activated continuation of the interior and are not to create a visual barrier to the interior



2.5 Planning Secretary's Environmental Assessment Requirements

This section provides the department's new industry specific Housing SEARs published on 20 December 2024. These requirements have been included in the SEARs for the project, Application Number SSD-78287462, dated 25 February 2025.

Key issues and supporting documentation

12. Water Management

This section identifies water management considerations regarding proposed development.

- Detail the proposed drainage design and servicing infrastructure to be incorporated as part of the development (stormwater and wastewater).
- Demonstrate how the development complies with council's drainage requirements and identify proposed stormwater treatment and water quality management measures to minimise adverse environmental impacts.



3.0 Proposed Stormwater Drainage

The proposed stormwater system has been designed to maintain separation of roof water, balcony and podium runoff, with prior to management of site discharge by the On-Site Detention (OSD) tank. The system comprises of the following drainage measures:

- Most roof rainwater is directed to the rainwater tank for reuse, with overflow directed to the OSD tank.
- Some roof areas on the southern side of the development no able to be designed to flow to the rainwater tank by gravity as pipe runs would are not able to maintain the required 1% grade. These southern roof areas are therefore routed directly to the OSD tank, to reduce horizontal piping distance and maintain 1% fall
- Balcony, podium and pavement runoff is not suitable for reuse and drains to the OSD system in accordance with Council DCP requirements for internal capture of impervious areas.
- Stormwater treatment has been incorporated into the design by the integration of a cartridge treatment system (modelled as four Ocean Protect StormFilter cartridges, refer to Section **Error! Reference source not found.**)
- The OSD inlet is located above the obvert of the existing council piped network outlet level to allow gravity drainage.
- Surveyed Council invert levels in the WAE plan have been used to develop this outlet level
- Basement seepage is collected through a series of grated drains and pits on each basement level and drains by gravity to the Basement 5 pump out tank.
- The Basement 5 pump out tank sends seepage water up to the OSD tank, keeping subsurface water separate from surface stormwater until the final controlled discharge point.
- Runoff from all sources (roof water (via tank or bypass), balcony/podium runoff, and pumped basement seepage) discharge into the cartridge treatment systems within the OSD tank before entering Council’s stormwater system.

3.1 Design Input

The design complies with the following inputs (Table 1).

Table 1 Design Input Summary

Standard / Source	Design Input / Requirement
AS 3500.3	<ul style="list-style-type: none"> • Hydraulic grades, pipe sizing and pit hydraulics
AEP Design Criteria	<ul style="list-style-type: none"> • Minor System: 5% AEP • Major System: 1% AEP
CCBC DCP Appendix 2	<ul style="list-style-type: none"> • Minimum stormwater pipe grade: 1% (SW12) • Maximum kerb discharge: 25 L/s per outlet (OSD72) • Internal capture of all impervious areas • Requirement for a connection pit before Council’s system



Standard / Source	Design Input / Requirement
ARR 2019	<ul style="list-style-type: none"> Rainfall intensities and AEP selection for $Q = CiA$ calculations
Other Parameters	<ul style="list-style-type: none"> Roof runoff coefficient: $C = 0.95$ Balcony runoff coefficient: $C = 0.95$ Minimum pipe grade: 1% Manning's roughness: $n = 0.013$ for horizontal stormwater pipes

3.2 Roof Drainage

The development adopts a parapet roof drainage system, with all primary roof runoff directed to internal downpipes and all overflow managed through parapet overflow openings as shown on the roof plan. This configuration aligns with AS 3500.3 requirements and provides a controlled and fully internalised drainage pathway for the upper building envelope.

Design calculation summary is provided in Appendix 1.

In accordance with the minimum downpipe requirements in City of Canada Bay Council DCP Appendix 2, all downpipes are sized to equal or more than 90 mm. Larger diameters have been adopted where required by calculated flowrates.

Vertical alignment of downpipes follows the structural grid and the architectural core arrangement.

Downpipes are stacked consistently down the building to maintain gravity flow and to limit horizontal offsets. Final DP positions may be adjusted by the architect for concealment within walls or risers, provided the downpipe stack alignment and catchment pathways shown on the stormwater drawings are maintained.

For balcony and podium stormwater, as the catchment area increases at lower levels, the corresponding downpipe diameters increase to accommodate the cumulative flow. These arrangements are shown on the SLR stormwater plans (630.032804-CI-1000-1053) and summarised in Appendix 1.

This methodology ensures that all roof, balcony and terrace drainage complies with AS 3500.3 capacity requirements, maintains minimum gravity grades, and meets the DCP requirement for internal capture of stormwater from all impervious areas.

3.3 Paved Area Drainage

The stormwater network has been designed to direct paved areas to the OSD tank.

This system has been designed to drain podium pavements, landscaped edges, balcony drainage stacks, selected downpipes. The southern area of roof downpipes connects to this system at the OSD tank.

3.4 OSD Tank Design

The development includes a single On-Site Detention (OSD) tank located on the northeast portion of the site, situated underground but discharging by gravity into the existing council stormwater system at the site frontage.

The tank was located in this area due to site constraints throughout the entire development. An existing stormwater asset crosses the site on its North-South direction, reporting to the gully pit located on the Northern frontage at Queens Street.



While a split tank was considered, for the discharge to be feasible the tank would need to tap into council's stormwater system, as it would be too low for a nominal kerb/gutter discharge. By doing that, the split system would add more water into the existing pipe system, which would need to be upgraded to maintain the current performance due to a slight length increase.

The rationale was then to consolidate the tank downstream of the system, relocate the council system without compromising its performance, and discharge the OSD downstream of the adjusted pipe. Hence the OSD location close to its discharge point.

3.4.1 Hydraulic Control

A circular orifice plate is used to limit discharge to the permissible Council flow rate.

The permissible site discharge (PSD) calculated using the Catchment-Based Method is 56.7 L/s. The orifice plate has been sized to achieve a discharge as close as practical to this limit. Based on the adopted orifice diameter and the available design head, the calculated orifice flow rate is approximately 57 L/s, which is within acceptable rounding tolerance of the prescribed PSD. Minor variation is expected due to sensitivity to small changes in diameter and operating head, and does not affect compliance with the DCP discharge requirement. Details of the orifice calculations are presented in Table 2.

Table 2 Orifice calculation inputs

Parameter	Value
Orifice Diameter	0.156m
Dc (discharge coefficient)	0.62
Head at design condition	1.19m
Flow	57L/s

3.4.2 OSD Sizing

The Catchment-Based Method requires the use of a High Early Discharge (HED) control pit (OSD16). The HED arrangement was not adopted for this development due to site-specific hydraulic constraints including available head, OSD inlet and outlet levels, and insufficient space to accommodate the required HED pit geometry without adversely affecting system performance.

Under OSD17, where a HED configuration is not used, the calculated Site Storage Requirement (SSR) must be increased by 20%. The base SSR for the site is approximately 63 m³, and the required storage volume after applying the 20% adjustment is 75m³.

For sites using the Catchment-Based Method, both the SSR and the Permissible Site Discharge (PSD) must be calculated using the total site area. The development site area is 3,151 m².

Table 3 OSD Volume and Discharge Requirements

DCP Reference	Parameter	Formula	Site Input	Result
SSR	Site Storage Requirement	SSR = 200 m ³ /ha	3,151 m ² × 0.02 × 1.2	≈ 75 m ³
PSD	Permissible Site Discharge	PSD = 180 L/s/ha	3,151 m ² × 0.018	≈ 57 L/s

- SSR (approximately 75 m³) is the minimum detention volume that must be provided.



- PSD (approximately 57 L/s) is the maximum allowable discharge from the OSD tank to Council's stormwater network.

A MUSIC assessment was completed to verify the OSD system performance. The modelling confirms that the proposed OSD arrangement meets the required pollutant reduction targets for the site under the Catchment-Based Method.



4.0 Integrated Water Cycle Management

4.1 Rainwater Tank Design

A rainwater harvesting system is proposed in accordance with the City of Canada Bay Council DCP Appendix 2 requirements for on-site reuse of roof water. A rainwater tank is located on Basement Level 1 and receives runoff from approximately 915.3 m² of roof catchment area, representing approximately 66% of the total roof area (1,376.44 m²).

The total volume of the rainwater tank required by Building and Sustainability Index (BASIX) guidelines published by the NSW Government Department of Planning and Environment is an allowance for 3000 to 6000 litres per unit. An allowance for 3000 litres has been included for each unit, giving a total volume of 390 m³ for to service the 130 units.

The captured roof water is to be reused on site in accordance with the DCP, typically for non-potable demands such as toilet flushing, irrigation and landscape maintenance. The tank also serves as a retention system, with all surplus flows discharging to the OSD tank once the reuse storage is full.

A first-flush device will be installed upstream of the tank inlet to remove initial pollutant-laden runoff from each rainfall event, consistent with typical DCP practice and stormwater quality requirements.

4.1.1 Rainwater tank re-use

Harvested water that has been captured in the rainwater tank will be used internally for non-potable uses such as toilet flushing and irrigation of landscaped areas.

An allowance of 40 litres of rainwater tank re-use per unit per day has been included in the design and modelling. This is the equivalent usage of approximately four toilet flushes per unit.

4.2 Runoff quality measures

Runoff from the roofed and paved areas is directed to four StormFilter® units. These units are proprietary stormwater quality treatment devices produced by Ocean Protect, shown in **Figure 3**.

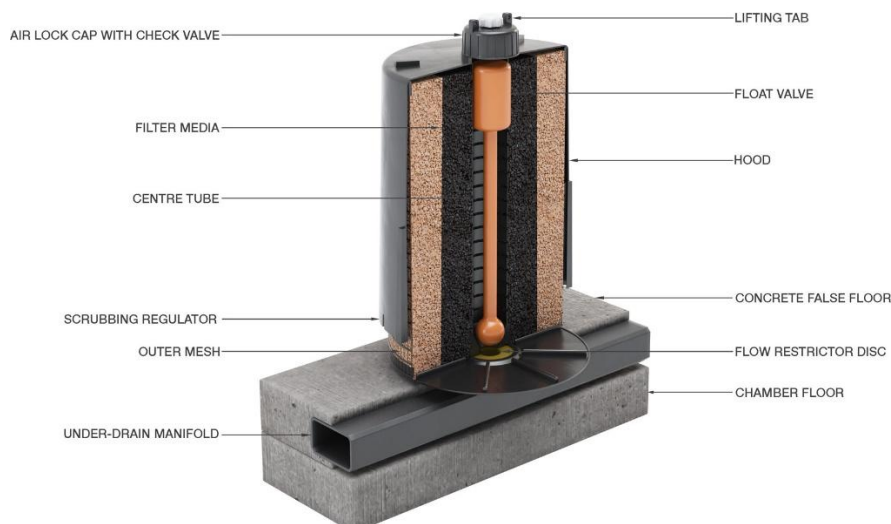


Figure 3: Stormfilter® Unit



The StormFilter® stormwater treatment system uses rechargeable, self-cleaning, media-filled cartridges to absorb and retain pollutants from stormwater runoff including total suspended solids, hydrocarbons, nutrients, soluble heavy metals, and other common pollutants.

4.3 MUSICX Modelling

The rainwater tank has been modelled with a storage volume of 390m³ in accordance with BASIX requirements, and a re-use rate of 5.2 m³/day. Four StormFilter® units have been modelled to receive flow from the roofed, landscaped and paved areas of the site.

The results of the MUSICX modelling are presented in **Table 4**.

Table 4 MUSICX modelling results

Pollutant	Target Removal Rate (%)	Modelled Removal Rate (%)	Compliance
Total suspended solids (TSS)	80	81	Y
Total phosphorus (TP)	45	81	Y
Total nitrogen (TN)	45	74	Y
Gross Pollutant	70	100	Y

The results of the MUSICX modelling in **Table 4** indicate that the integrated water cycle management system shown on the civil plans has been modelled to achieve the pollutant removal targets outlined in the City of Canada Bay DCP.



5.0 Basement Pump Out System

Basement seepage and sub surface water are managed in accordance with the CCBC DCP Appendix 2 (SW77–SW80, MP1, MP3) and AS/NZS 3500.3

5.1 Subsurface Water Definition and Requirements

In the context of this design, subsurface water refers to the groundwater held in soil or rock pores typically occurring behind basement retaining walls (SW77). The subsurface water collected into the pump out tank of this design will discharge into an approved underground public drainage system (SW79–SW80). Discharge to the kerb is not permitted except by separate controlled release approval (MP3).

5.2 Seepage Collection System

- Spoon drains are installed along the walls of each basement level to capture seepage.
- Each spoon drain discharges to local collection points as indicated on SLR plans.
- Seepage is conveyed from each collection point through 90 mm diameter horizontal pipes graded at a minimum 1.0% in accordance with AS 3500.3.
- These lines discharge into a 200 mm wide × 200 mm deep Class D trafficable grated trench drain at designated downpipe collection locations.
- Seepage water then enters dedicated vertical stacks that continue down to Basement 5.
- At Basement 5, the combined flow is conveyed horizontally (minimum 1% fall) to the pump out tank.

5.3 Pump Out Tank Requirements

The seepage sump has been sized in accordance with CCBC DCP Appendix 2 Clause SW83. Based on an effective contributing wet wall area of 1,180 m² and an approximate adjusted seepage rate of 0.0004 L/s/m², a 24-hour storage volume of approximately 40.8 m³ is required. A practical configuration of 6 m (L) × 6 m (W) × 1.5 m (D) is proposed, providing sufficient capacity while remaining feasible within the basement footprint. Equivalent-volume alternative configurations can be adopted if required during detailed design.

Table 5 Pump Out Tank Holding Tank Sizing

Parameter	Value	Notes
Effective Wet Wall Area (A)	1,050 m ²	Adjusted wet wall area around entire perimeter (5 × 210 m × 2.0 m × 0.5)
Seepage rate (q)	0.00045 L/s/m ²	Minimum per SW83 (45% reduction rate to be confirmed by Geotechnical Report)
Flow into sump (Q = A × q)	0.472 L/s	Approximate Steady seepage inflow
Storage duration	24 hours	Required by SW83
Seconds in 24 hours	86,400 s	
Required volume (V = Q × 86,400)	40,780 L	Equivalent to 40.8 m ³

Duty pump run time is equal or more than 1 minute.



Duty pump off time is equal to or more than 3 minutes.

5.4 Pump Out Requirements

A mechanical pump-out system is to be provided to lift subsurface water from the pump out tank to the OSD system.

As per the CCBC DCP;

- Dual pumps arranged to operate alternately, with capability for simultaneous operation if required.
- Pumps controlled by automatic level switches within the pump out tank.
- A rising main designed and installed to the pump manufacturer's specifications.
- A non-return valve installed on the rising main outlet.
- Pumped discharge must enter a stilling sump within the property boundary before pumped flow to the OSD or public drainage system.
- An automatic alarm system, including visual indicator and audible siren.
- A battery-backed alarm to operate during power failure.
- A maintenance schedule documenting required upkeep and inspection frequency.

The required static head between the sump invert (IL -14.795) and the OSD entry level (RL 1.89) is approximately 17 m.



6.0 Existing Stormwater Pipe Diversion

An existing 750 mm Council stormwater pipe traverses the site, connecting between upstream and downstream Council pits. This pipe is identified on the Work-As-Executed survey for the site (LandPartners, March 2024), and its invert levels are fixed and assumed to remain unchanged during the development.

The pipe conflicts with the proposed building footprint, requiring a diversion around the southern and eastern edges of the development.

6.1 Diversion Requirements

- Maintain the existing connection points (Council pit ILs and locations remain unchanged).
- Maintain equivalent hydraulic performance pre- and post-diversion.
- Ensure the diversion works with the building layout while remaining compliant with AS 3500.3 and DCP Appendix 2 (e.g. gravity drainage, pipe grades, hydraulic losses).
- Avoid surcharge at either Council pit under equivalent flow conditions.

6.2 Hydraulic Assessment Approach

Due to limited survey information upstream and downstream of the site, the hydraulic assessment required several reasonable engineering assumptions:

The upstream contributing flows were modelled as a constant baseflow into the upstream pit.

The existing system and proposed diversion were analysed using DRAINS, and results were checked using a simplified manual Hydraulic Grade Line (HGL) analysis.

6.3 Hydraulic Implications of the Diversion

The diversion introduces:

- Greater pipe length, reducing overall grade
- Four new junction pits, each adding local headloss
- Additional friction losses
- The same upstream and downstream invert levels (fixed by Council)

These factors collectively result in a higher HGL in the diverted pipeline than the existing pipeline when using the same 750 mm diameter.

6.4 Required Pipe Upgrade

To restore hydraulic equivalence with the existing system, the diversion pipe is to be upgraded from 750 mm to 900 mm diameter through the diversion (see Figure 4).



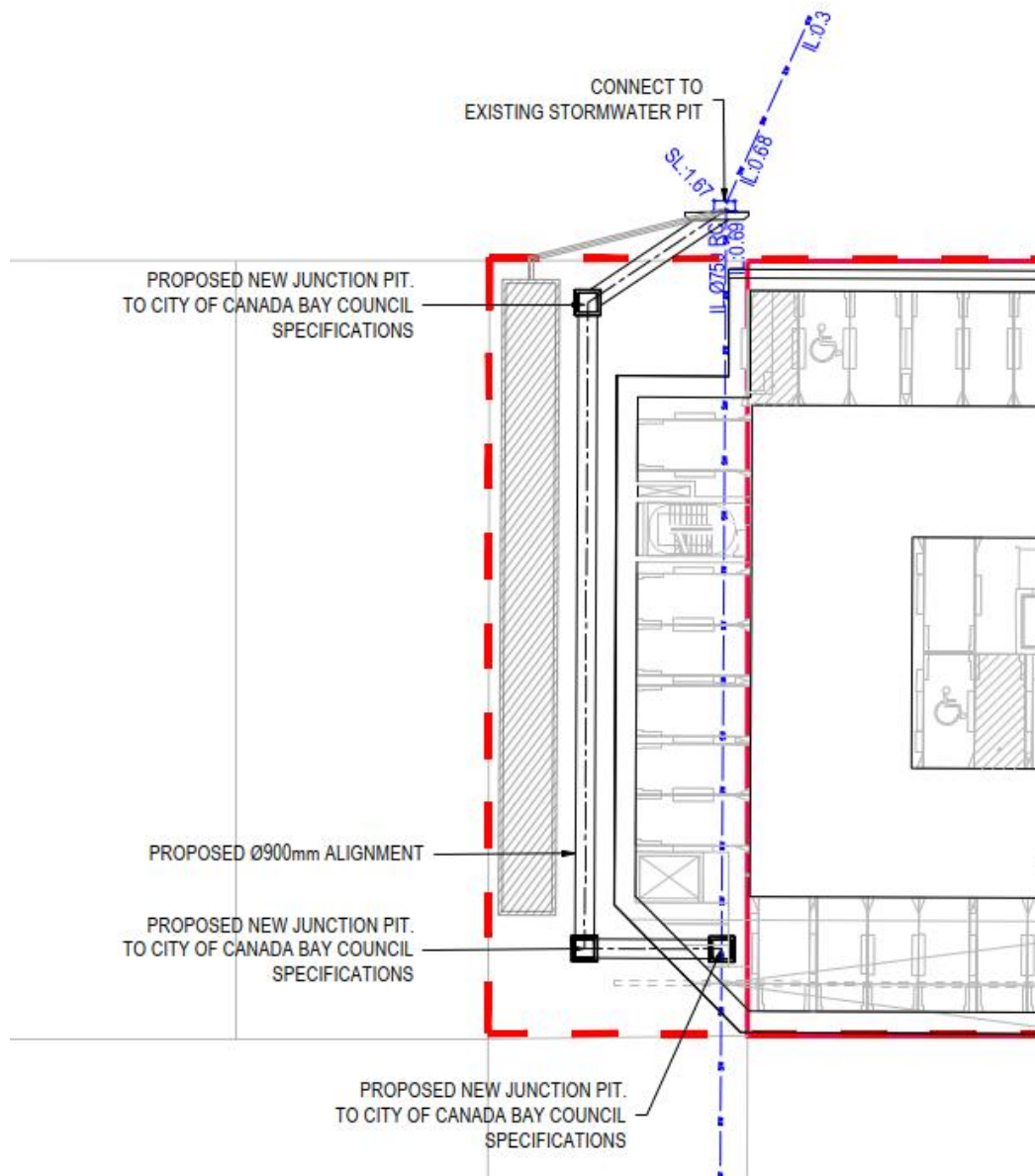


Figure 4 Stormwater Pipe Diversion

This increase in pipe diameter offsets:

- Additional friction due to increased pipe length
- Additional losses from extra pits
- Reduced hydraulic grade

Fixed inlet/outlet ILs that cannot be deepened due to constraints in the WAE survey

The 900 mm pipe achieves:

- Comparable HGL pre- and post-diversion
- No hydraulic worsening at downstream Council pits
- Compliance with Council performance expectations for diverted public drainage assets



Table 6 Summary Table – Stormwater Diversion

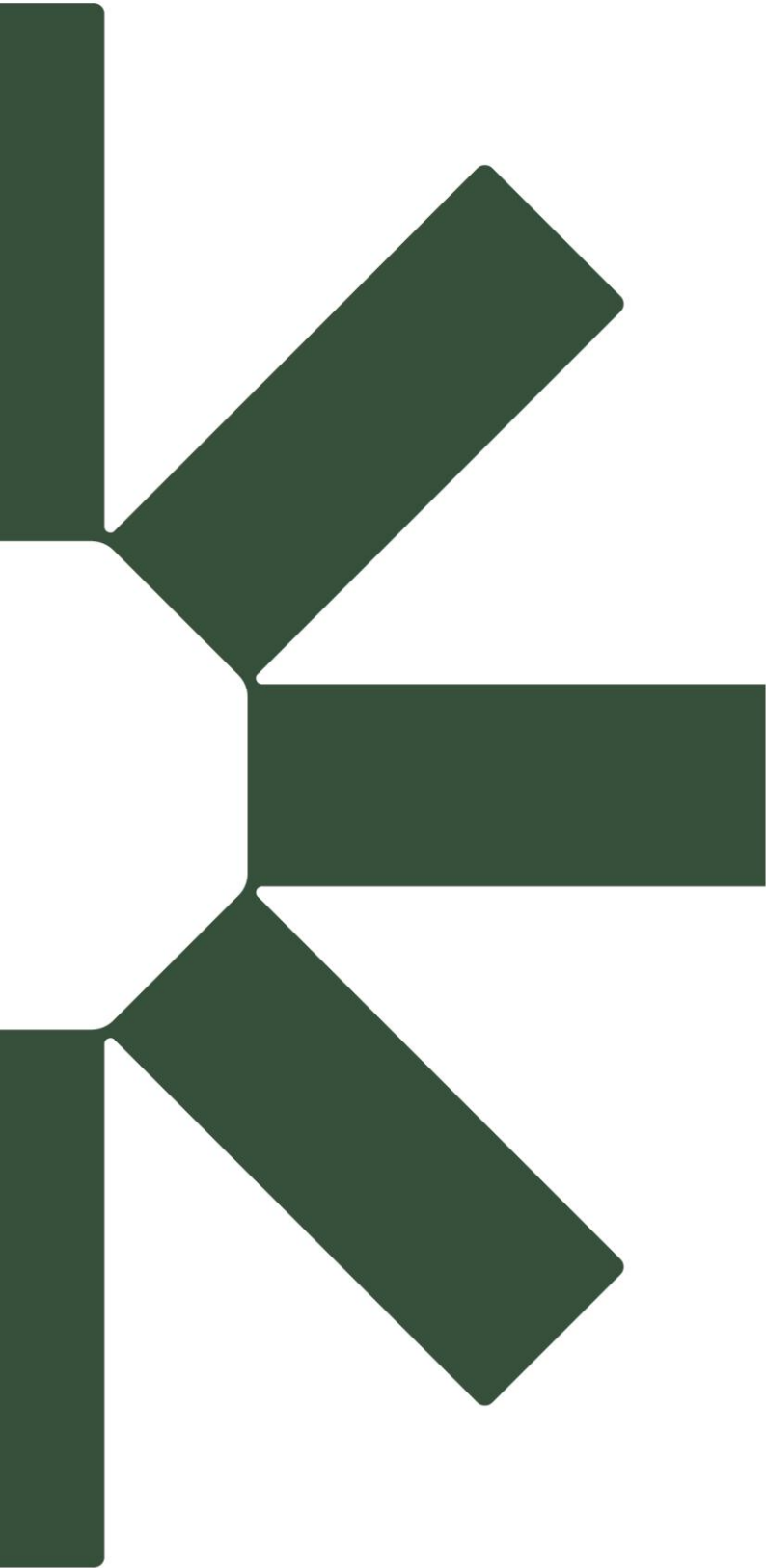
Item	Existing	Proposed	Reason
Pipe diameter	750 mm	900 mm	Required to maintain HGL equivalence
Invert levels	Fixed (Council pits)	Unchanged	WAE survey levels fixed by Council
Pipe alignment	Through building footprint	Rerouted around building	Avoid conflict with structure
Junction pits	Minimal	≥4 new pits	Additional headloss
Hydraulic effect	Baseline HGL	Higher HGL if 750 mm retained	Extra length + pit losses

7.0 Conclusion

The stormwater management design for the development has been prepared in accordance with City of Canada Bay Council DCP Appendix 2 and AS 3500.3 and integrates with the architectural and civil layouts provided in the DA package. All stormwater from roof, balcony, podium, ground and basement areas is internally captured and conveyed to the OSD tank, sized using Council’s Catchment-Based Method.

Overall, the design provides a compliant, robust and integrated stormwater solution suitable for the proposed development.





Making Sustainability Happen