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SITE BASED STORMWATER MANAGEMENT REPORT

40-48 Redan Street

Prepared for Mosman Land No.1 Pty Ltd

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Document Information

PROJECT NUMBER:	25000244
PROJECT NAME:	40-48 Redan Street
REPORT TITLE:	Site Based Stormwater Management Report
CLIENT:	Mosman Land No.1 Pty Ltd
REVISION:	3
STATUS:	Issued for SSDA
REVISION DATE:	27 February 2026
DDAUTHOR:	M. Swift
VERIFIER:	J. Gilligan

REVISION	REVIEWER	APPROVER	DATE	COMMENT
1	N. Sutherland	N. Sutherland	20.02.26	Issued for Information
2	J. Gilligan	J. Gilligan	20.02.26	Issued for Information
3	J. Gilligan	J. Gilligan	27.02.26	Issued for SSDA

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1 Introduction

Northrop Consulting Engineers (Northrop) have been engaged by Mosman Land No.1 Pty Ltd to develop a Site Based Stormwater Management Report in support of a State Significant Development Application (SSDA).

The proposed development is located off Redan Street, refer to Figure 1 for site locality plan. The proposed works will deliver a residential tower with two levels of basement parking.

Table 1: Proposed Development Summary

CATEGORY	DESCRIPTION
TOTAL SITE AREA	0.3233 ha
PROPOSED LAND USE	Residential

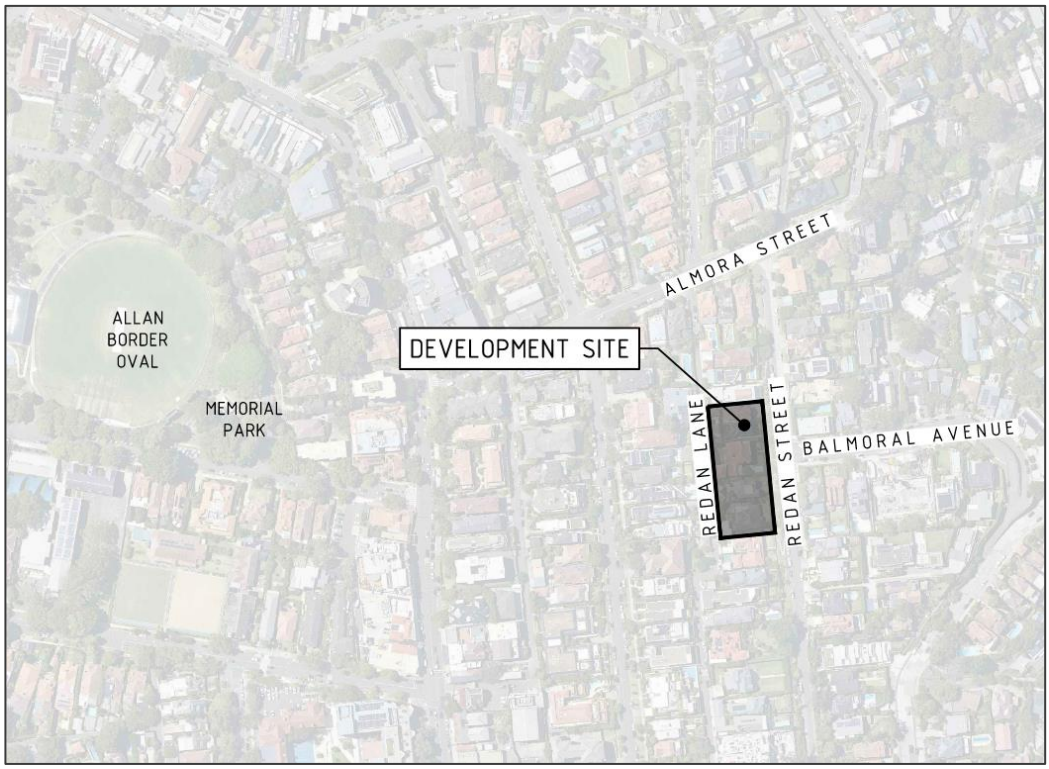

Figure 1: Site Locality Plan (Source: Northrop Civil Engineering Package, ref: C01.01)

This primary objectives of this SBSMR are to define the following:

- Flooding
- Stormwater Quantity Management Strategy
- Stormwater Quality Management Strategy

2 Site Context and Existing Characteristics

The proposed development site is approximately 0.3233 ha and falls generally toward the Southern boundary where there is an existing kerb inlet pit on Redan Street to be utilised as the legal point of discharge. The existing site comprises of five residential lots that will be amalgamated into one.

The site will be prepared with a temporary sediment basin to capture site runoff from the entire disturbed area during construction. The catchment for the basin is 0.3233 ha, with a minimum capacity of 102 m³.

Additionally, the site is bounded to the west by Redan Lane. An existing stormwater easement, containing an approximately 375 mm diameter stormwater pipeline, currently extends from Redan Lane to Redan Street. This easement and associated infrastructure are proposed to be relocated as part of the development works. The existing easement location is shown in Figure 2.

To facilitate the development, a diversion concept was prepared which relocates the existing pipeline along the southern boundary of the site, maintaining connectivity between Redan Lane and Redan Street while rationalising the alignment to suit the proposed building footprint. A concept sketch illustrating the proposed diversion arrangement was prepared and issued to Council on 09/02/2026 for preliminary review and comment.

As part of this early feasibility assessment, high-level hydrological modelling of the upstream contributing catchment (approximately 0.8381 ha) was undertaken to confirm the order of flows to be conveyed through the diverted pipeline. This modelling was intended to verify that the proposed alignment can accommodate the upstream runoff and to inform preliminary sizing considerations ahead of detailed design.

On 11/02/2026, Council responded and confirmed that it would consider the proposed diversion arrangement subject to the submission of a formal, detailed civil and hydraulic design for assessment and approval. The detailed design will further refine pipe sizing, levels, hydraulic capacity, and constructability considerations in accordance with Council's requirements.

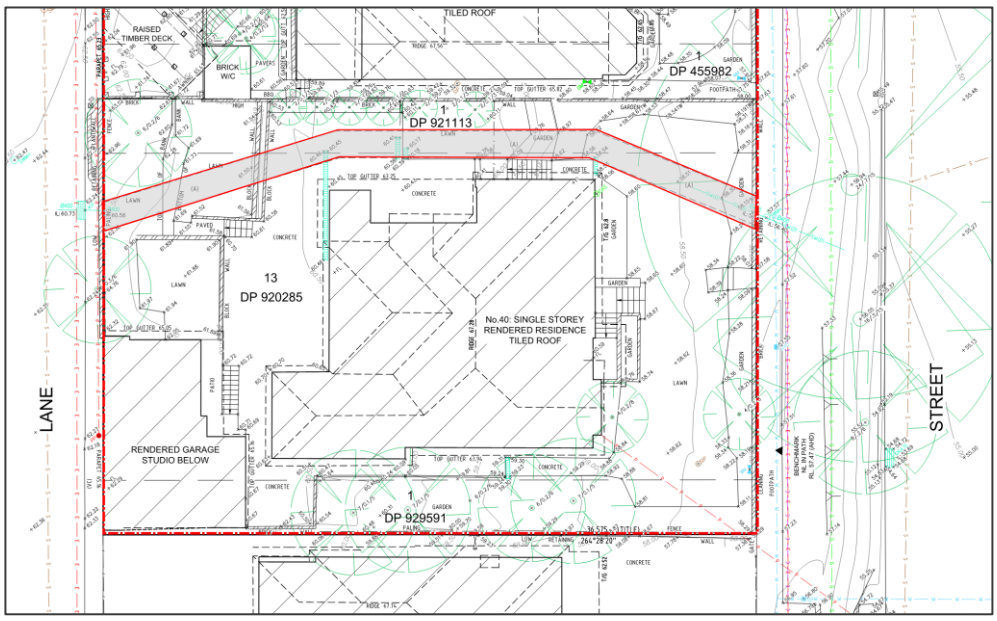

Figure 2: Existing Easement (Source: LTS Surveyor, ref: 52627 001DT)

3 Proposed Development

The proposed development is located off Redan Street, refer to Figure 1 for site locality plan. The proposed works will deliver a residential tower with two levels of basement parking.

The architectural layout for the subject site at ground floor is shown below in Figure 3. Refer to drawings prepared by fjc studio for further information.

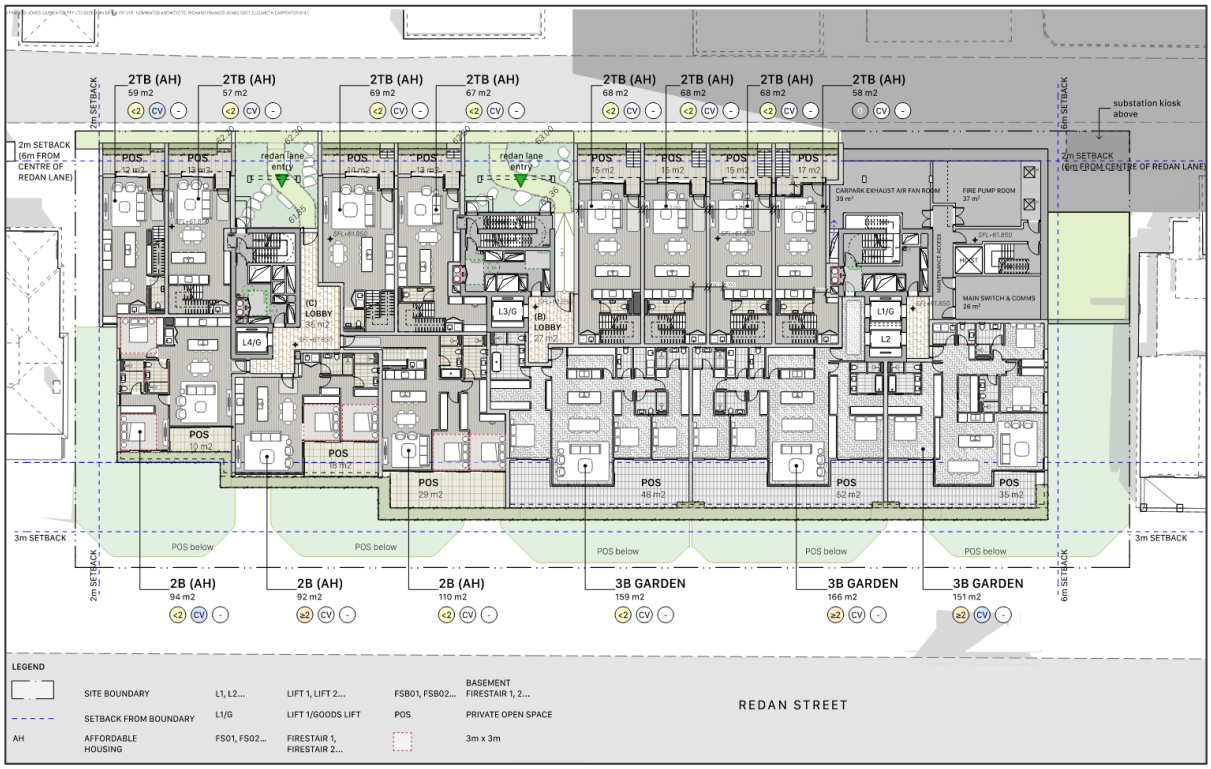

Figure 3: Ground Floor Architectural (Source: fjc studio)

4 Flooding

Refer below preliminary flood planning area extent from Mosman Council.

Figure 4: Preliminary flood planning area extent from Mosman Council

As shown in Figure 4, the proposed site is not located within a mapped overland flow path and is not identified as being flood-affected. A review of the available flood mapping and site survey information confirms that the land sits outside any major overland flow corridor and is not subject to mainstream flooding from the surrounding catchment.

The development will also not block, divert, or concentrate stormwater flows in a way that could impact neighbouring properties. All runoff generated on site will be captured and conveyed through a formal piped drainage system to the nominated lawful point of discharge.

To provide a conservative design approach, a tailwater level of RL 54.83 has been adopted at the downstream discharge point in the hydraulic modelling. This ensures that any potential backwater effects during peak storm events have been accounted for and that the proposed system continues to operate effectively under design conditions.

Given the site is not flood-affected and the proposed works do not introduce any additional flood risk, a separate Flood Impact Risk Assessment is not considered necessary for this development.

5 Stormwater Management Objectives

5.1. Development Control Plan Objectives

Stormwater management for the proposed development has been designed in accordance with the following documents:

- *Mosman Council Residential Development Control Plan (2012)*
- *Mosman Council Policy for Stormwater Management in Mosman (2024)*
- *Mosman LGA Flood Study (2025)*
- *Plumbing and Drainage Code AS3500.3*
- *Australian Rainfall and Runoff Guidelines (ARR 2019)*

Based on Council's DCP the stormwater management objectives / requirements for the development are summarised below:

- The detention storage shall be designed to accommodate stormwater run-off resulting from a storm with an average recurrence interval of (ii) 100 years where overflow paths are through private properties and/or known flooding problems occur.
- The permissible site discharge from a proposed development shall be calculated using the rational method with the values of intensity given in section 2.4. Technical Specifications of Mosman Council Policy for Stormwater Management in Mosman (2024).
- Surface flow paths, including the provision of an emergency overflow to cater for blockage of the system or flows in excess of the 20-year ARI storm flow must be provided. The flow route must be capable of carrying the flows generated by a 5-minute 100-year ARI storm with a freeboard of 300mm.
- All habitable floor levels and power points are to be a minimum of 300 mm and garage floor levels and pedestrian entry egress facilities a minimum of 150 mm above the maximum design storage water surface level and flow path levels.
- Stormwater discharging from the site (post-development) must achieve the annual pollutant load reduction targets specified below in Table 2.

Table 2: Pollutant Load Reduction targets

POLLUTANT	DESCRIPTION
Gross Pollutants (>5mm) (GP)	90 %
Total Suspended Solids (TSS)	85 %
Total Phosphorous (TP)	60 %
Total Nitrogen (TN)	45 %

6 Stormwater Quantity Management

6.1. On-site Stormwater Detention

6.1.1. OSD REQUIREMENTS

On-site Stormwater Detention has been provided for the site. The proposed OSD has been modelled in accordance with the Mosman Council Policy for Stormwater Management in Mosman (2024).

The proposed on-site detention tank should be designed in accordance with the following control standards.

The permissible site discharge from a proposed development shall be calculated using the rational method with the values of intensity given below (Figure 7).

Time of Concentration 't' (Minutes)	Rainfall Intensity 'I' (mm/hr)
7	139.7
8	131.4
9	123.8
10	117.5
11	111.8
12	106.7
15	92.5
20	79.0
25	67.8
30	61.5

Figure 5: Table 1 from Mosman Council Policy for Stormwater Management in Mosman (2024)

The method used for calculating storage volumes have been undertaken using MUSIC that uses Australian Rainfall and Runoff (1987) temporal patterns. Calculations have included a range of storms that clearly show the critical storm has been identified, refer Table 3.

Table 3: Storms measured in model

POLLUTANT	AEP (%)
Major	1
Medium	10
Minor	50

6.1.2. OSD DESIGN

The OSD tank has been located in Basement 01, refer to Figure 8.

Figure 6: Basement 01 Architectural (Source: fjc studio)

It has been placed in located due to the following design constraints:

- Access is to be provided into the OSD tank for maintenance 24 hours a day. By locating it along the Western Edge of the shoring wall, access hatches are able to be provided outside of the Private Open Spaces above.
- Open grate ventilation is also required to reduce the possibility of gas build up within the OSD tank. This has been provided above the water quality chamber to allow aeration.
- This is the most suitable location to retrieve the majority of site runoff to assist with achieving the water quality targets and limiting bypass.

6.1.3. OSD CATCHMENT

The total area being detained within the site boundary is 0.3233 ha. This includes 0.2719 ha of roof and podium, 0.0178 of deep soil pavement and 0.0336 ha of deep soil landscape. Refer to Stormwater Catchment (C04.51) of the Civil Engineering Package for proposed catchment plan.

6.1.4. OSD VOLUME CALCULATION

Figure 5 has been used to calculate the volume and discharge of the tank.

The following values have been adopted:

- Rainfall Intensity (i): 139.70 mm/hr
- Coefficient of Runoff (C): 0.65
- Site Area (A): 0.3233 ha

The calculated Peak Flow (Q) is = 82.20 L/s (0.0822 cu.m/s)

6.1.5. OSD DESIGN

The proposed OSD tank has been designed in accordance with Mosman Council Policy for Stormwater Management in Mosman (2024).

The tank has one orifice plate to store and attenuate the peak discharge in the major, medium and minor storm events.

An 'emergency overflow weir' has been included with an outflow pipe, sized for the 1 in 100-year ARI flow to account for any orifice blockages that may occur.

The key OSD design parameters are presented in Table 3 below.

Table 4: Design Parameters – On-site Detention Tank

ITEM	DESIGN PARAMETERS
Total OSD volume	106.74 cu.m
100-Year Weir (Emergency Overflow)	RL 58.07
100-Year Top of Water Level	RL 57.89
Permissible Site Discharge	82.20 L/s
Base of Tank	RL 55.50
Soffit	RL 58.25
Adopted Downstream Tailwater Level	RL 54.83
Discharge Pipe (Diameter)	300mm

6.2. Hydrological Modelling (DRAINS)

Hydrological modelling was conducted using the software DRAINS and incorporated the integrated ILSAX hydrological model to size each orifice and determine the length of each weir. The adopted model parameters are provided below in 4.

Table 4: Hydrological Model parameters

PARAMETER	VALUE
Hydrologic routing method	ILSAX
Antecedent Moisture Conditions	3
Paved Area Depression Storage	1mm
Supplementary Area Depression Storage	1mm
Grassed Area Depression Storage	5mm
IFD Data	2021 rainfall depths from ARR Data Hub using site coordinates
Time of Concentration	Kinematic Wave Equation using detailed catchment parameters

Refer to Civil Engineering package for more details on the tank arrangement and locality. Refer to Figure 7 below for On-Site Detention tank arrangement.

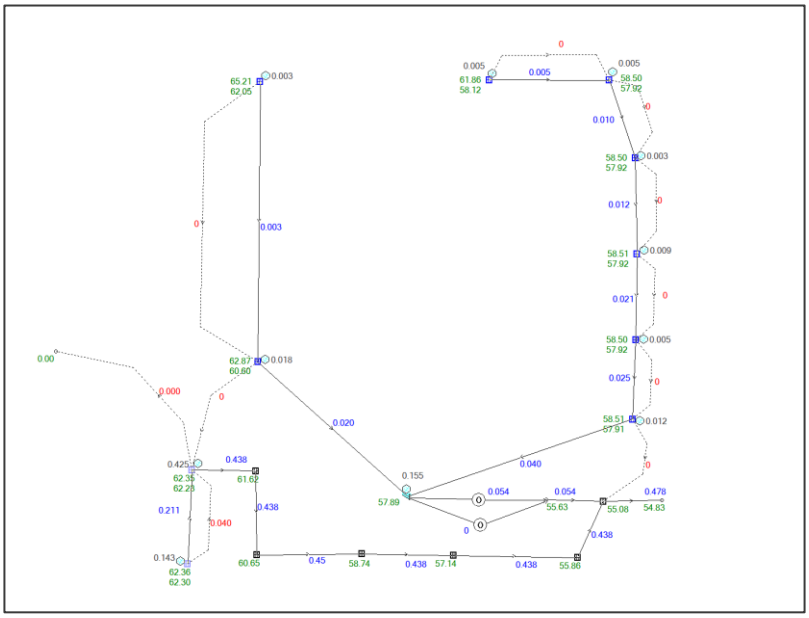

Figure 7: Proposed DRAINS On-Site detention layout 1% AEP (Northrop Consulting Engineers)

6.3. Proposed Legal Point of Discharge

The legal point of discharge for the proposed development site has been adopted from the site survey. Refer to Figure 8 below.

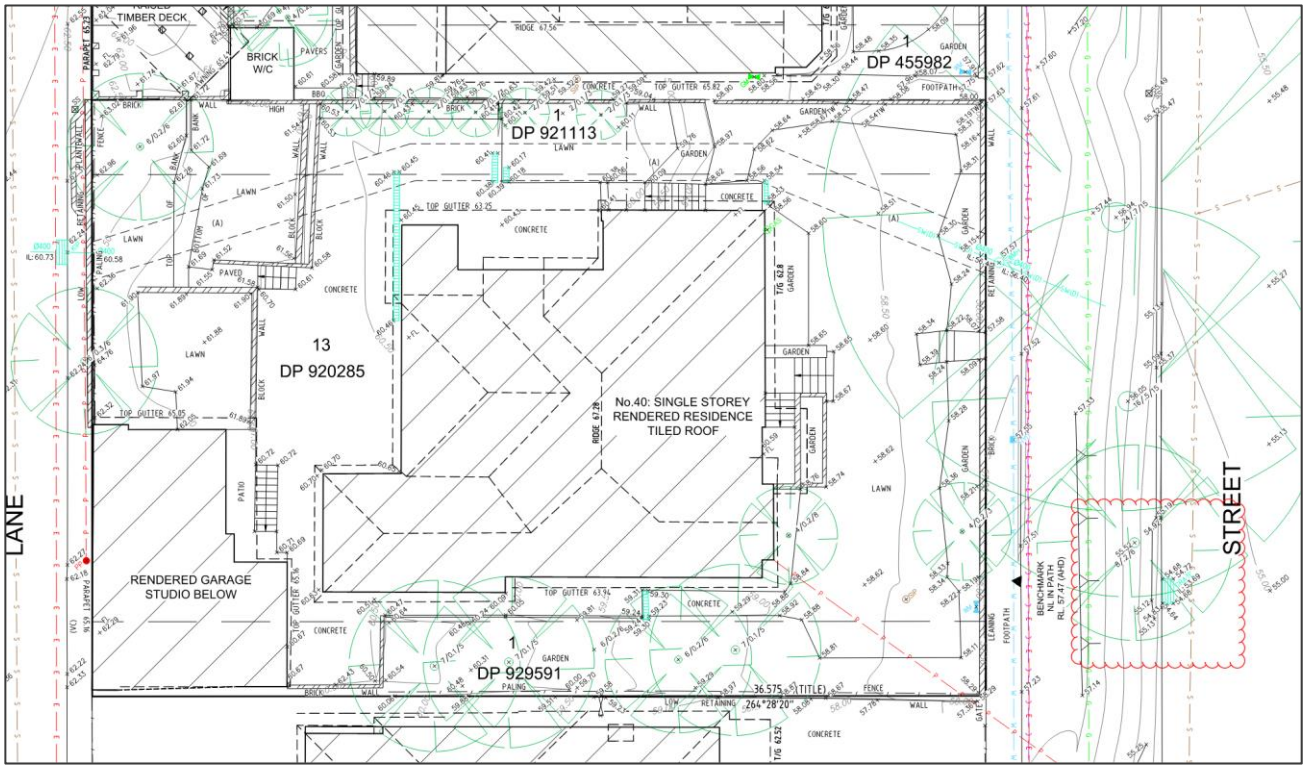

Figure 8: Site Survey (52627 001 DT)

7 Stormwater Quality Management

7.1. Proposed Water Sensitive Urban Design (WSUD's)

The following WSUD measures are proposed to achieve the stormwater quality objectives summarised in Section 7 of this report:

- 5 x 690mm OceanProtect ZPG StormFilter Cartridge
- 3 x OceanGuard Ocean Protect Pit filters
- 30kL Total Rainwater Tank storage

7.1.1. OCEAN PROTECT PSORB STORMFILTER CARTRIDGES

One 690mm OceanProtect ZPG StormFilter Cartridge is to be installed within a treatment chamber situated at the inlet of the proposed OSD tank providing additional treatment for stormwater runoff before entering the proposed water quantity infrastructure.

The Ocean Protect StormFilter Cartridge system absorbs and retains pollutants, including total suspended solids, hydrocarbons, nutrients, soluble heavy metals, and other common pollutants, from stormwater runoff through rechargeable, self-cleaning, media-filled cartridges.

7.1.2. OCEANGUARD OCEAN PROTECT PIT FILTERS

The Ocean Protect OceanGuard Pit Filters are proprietary in-pit filtration units installed within standard stormwater pits. The system consists of a structural support frame fitted with a high-strength filtration bag designed to capture gross pollutants, sediment, and particulate matter from incoming flows. Stormwater passes through the filter media while pollutants are retained within the bag, preventing downstream transport.

The pit filter provides effective source control treatment by removing litter, debris, and sediment at the point of entry into the drainage system. The units are designed to maintain hydraulic capacity during minor storm events, with high-flow bypass functionality to prevent surcharge and minimise head loss during larger rainfall events. Maintenance is facilitated through accessible lift-out filter bags, allowing efficient removal of captured material in accordance with the manufacturer's recommended servicing intervals.

7.1.3. RAINWATER TANK

The Rainwater tank will be re-used for irrigation for the proposed greenroof areas and internal toilet reticulation.

The total irrigation area is approximately 336 sq.m.

Table 5: Proposed Re-use Rates

RE-USE PURPOSE	RATE	RE-USE
Landscape Irrigation	0.4 kL/year/m2 as per Blacktown City Council WSUD developer handbook.	6.72 kL/Year
Internal Re-use	0.125 kL/day (2-bedroom) and 0.180 kL/day (3-bedroom)	1.9 kL/Day

7.2. Stormwater Quality Modelling (MUSIC) Methodology

Stormwater quality modelling for the site was prepared using 'Model for Urban Stormwater Improvement Conceptualisation' (MUSIC) Version 6.3. The model has been built to assess the adequacy of the proposed SQIDs and to ensure that the quality of stormwater meets the WQOs for the proposed development. A diagrammatic layout of the MUSIC Model is presented below in Figure 9.

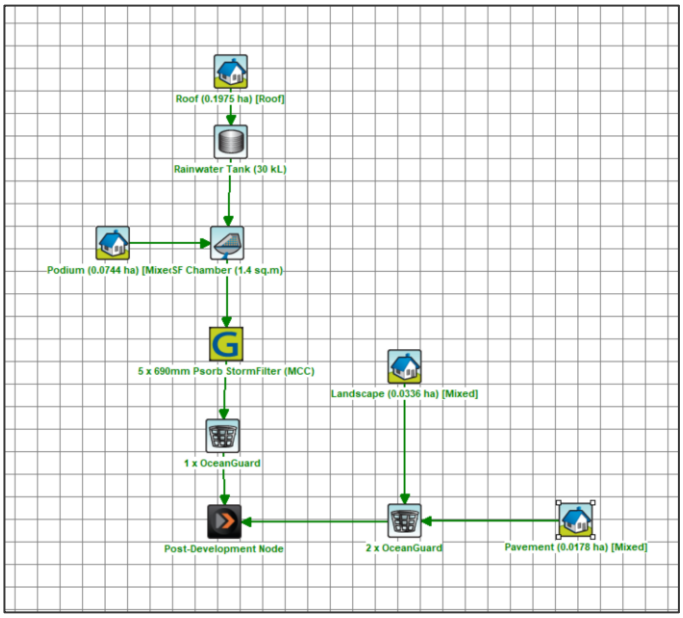

Figure 9: MUSIC Model Schematic (Source: MUSIC)

Urban source nodes and pollutant generation parameters were adopted from Water NSW.

7.2.1. MUSIC RESULTS

The pollutant load reduction results are shown in Table 6.

Table 6: MUSIC Model Post Development Treatment Train Effectiveness

POLLUTANT TYPE	REDUCTION (%)	TARGET (%)
Total Suspended Solids (kg/yr)	85.00	85.00
Total Phosphorus (kg/yr)	71.80	60.00
Total Nitrogen (kg/yr)	59.00	45.00
Gross Pollutants (kg/yr)	100.00	90.00

8 Conclusion

The Site Based Stormwater Management Report for 40-48 Redan Streetoutlines a comprehensive approach to both stormwater quantity and quality management as well as flood mitigation, aligning with the requirements of Mosman Council.

The proposed On-Site Detention (OSD) system has been sized to detain an accumulative volume of 107 cu.m of water in the case of a major storm (100-year ARI).

Additionally, the stormwater quality management strategy integrates treatment measures to manage both the pollutant load reduction targets and mean annual runoff volume. This has been achieved through:

- 5 x 690mm OceanProtect ZPG StormFilter Cartridge
- 3 x OceanGuard Ocean Protect Pit filters
- 30kL Total Rainwater Tank storage

On-site re-use has also been integrated into the design at a rate of 6.72 kL/Year as well as Internal Reticulation at a rate of 1.9 kL/Day in accordance with Water NSW.

The adopted strategy ensures that the development meets both regulatory obligations and broader environmental objectives, facilitating a responsible and future-ready outcome for the proposed development at 40-48 Redan Street.

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