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STORMWATER MANAGEMENT PLAN FOR PROPOSED DEVELOPMENT AT 1 VENO STREET, HEATHCOTE NSW 2233

Job Ref: 240079

Date: July 2024

Revision: A

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1.0 INTRODUCTION

Richmond and Ross Pty Ltd, Consulting Engineers, have been engaged to prepare a Stormwater Management Plan for the proposed development at 1 Veno Street, Heathcote NSW 2233. No responsibility to third parties under the law of contract, tort or otherwise for any loss or damage is accepted.

The purpose of this assessment is to provide advice with respect to stormwater management for the proposed development. The results of this study are limited to this scope.

This assessment has been prepared by reviewing published topographic maps, physical land survey, hydraulic and hydrological calculations, available Ariel photography of the site and in accordance with Sutherland Shire Council Policy below:

- Sutherland Shire Council DCP – Chapter 39: Stormwater and Groundwater Management (2015)
- Sutherland Shire Environmental Specification – Stormwater Management (2009)

2.0 SITE LOCATION AND DESCRIPTION

The subject site is located at 1 Veno Street, Heathcote NSW 2233 and covers 7 existing lots. The total area of the site is approximately 0.73Ha (7,250m^2). The lot generally slopes towards the Northern extent of the site towards Strickland Street. The current site is an existing hotel with accommodation, restaurant and bottle shop with impervious parking area surrounding the building.

Figure 1. Proposed Development Satellite View (Extract from NearMap)

3.0 DEVELOPMENT PROPOSAL

The plan is to develop the whole site into a multi-storey building complex for mixed residential and commercial use with designated basement parking and surrounding landscaped area in two separate stages (S1 and S2). Stage 1 (S1) of development accounts for roughly 2,460m² of the total development area, 500m² of which is to be fully pervious landscaping, 670m² impervious pavement and the remaining 1,290m² will be roofed/communal open spaced area. Stage 2 (S2) of the development accounts for the remaining 4790 m² of the development area, 1200m² of which will be landscaping, 510m² to be fully impervious pavement and the remaining 3,080m² will be roofed or balcony areas.

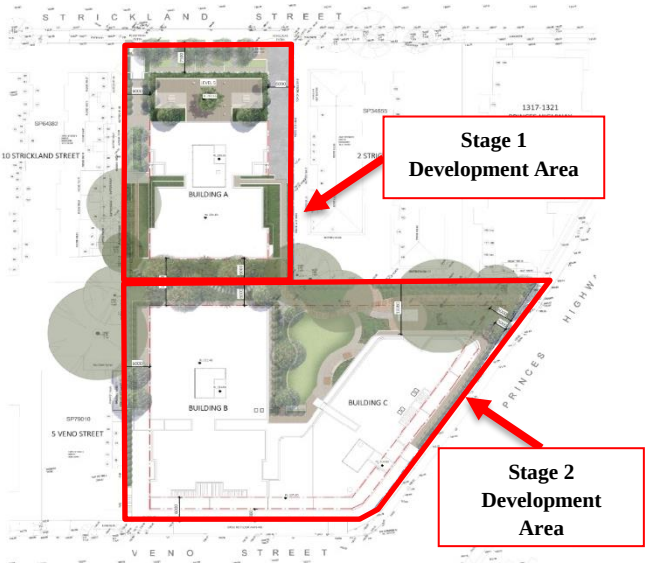


Figure 2. Proposed Development Plan (Extract from Architectural Plan)

4.0 EXISTING STORMWATER NETWORK

The site currently drains via the current stormwater system and exits the site towards the Northern extent into the existing council street stormwater drainage network along Strickland Street.

5.0 PROPOSED STORMWATER NETWORK

It is proposed to construct a new stormwater network to convey stormwater from the site on the following principles:

- A new network of pits and pipes is proposed to convey the runoff from the site to a stormwater treatment train prior to exiting the site at the existing Sutherland Shire Council drainage pit. The underground network has been sized for 100yr storm.
- A system consisting of Rainwater tanks and StormFilter cartridges withing buffer chambers is proposed to treat the stormwater runoff prior to discharge from the site. Analysis from MUSIC indicates the treatment targets are achieved by the proposed treatment train. See stormwater quality management in section 7 for more details.
- A separate stormwater system has been provided for each stage to allow for future subdivisions. Each system is compliant with council policies by itself.
- An 8.5kL (7.5kL with 10% sludge/air zone) Rainwater tank is proposed for each stage as required by the BASIX report for reuse for landscape irrigation.

6.0 STORMWATER QUANTITY MANAGEMENT

As per section 1.3 of Sutherland Shire Council DCP – Chapter 39: Stormwater and Groundwater Management, the post development rate of stormwater runoff (both piped and overland) from the site shall not exceed the rate of flow of runoff from the site that would exist prior to the subject development occurring. Based on calculations of landscaped areas pre vs post-development, the proposed post-development scenario shows an increase in pervious landscape area (Approx. 1,700m² total) compared to the existing pre-development scenario prior to the proposed development occurring (Approx. 600m² total). This increase in pervious landscaped area correlates to reduction in peak stormwater runoff rates from the subject site and therefore stormwater detention for the proposed development is not required.

7.0 STORMWATER QUALITY MANAGEMENT

The proposed development is subject to WSUD requirements in line with Section 6 – Water Quality Control of Sutherland Shire Council DCP – Chapter 39: Stormwater and Groundwater Management. The following reduction percentage targets were used in the MUSIC Model. Total Suspended Solids (TSS): 80%, Total Phosphorus (TP): 40% and Total Nitrogen (TN): 40%. A stormwater treatment train is proposed comprising of the following components.

7.1. Rainwater Tanks

Referring to Section 3.3 of Sutherland Shire Council DCP – Chapter 39: Stormwater and groundwater management, Rainwater shall be sized based on section 3.6.1 of Sutherland Shire Environmental Specification – Stormwater Management. As the proposed development is subject to BASIX, this section is not applicable to the development and therefore the Rainwater Tank for this development is required to be sized based on BASIX requirements. As per the provided BASIX requirements, 15kl of rainwater re-use capacity is required for 1,260 m² of landscape irrigation across the whole site (Both Stage 1 and 2).

A system is proposed using a total of 17 kL of Rainwater Tanks for landscape irrigation spilt into 2 x 8.5 kL (7.5kL + 10% sludge/air zone) Belowground Rainwater Tanks for Stages 1 and 2. Reuse from the tank is proportioned based on the landscape area in each stage.

7.2. Filter Cartridges

The StormFilter, used on site, is a stormwater treatment system using rechargeable, self-cleaning, media-filled cartridges to absorb and retain required level of pollutants from stormwater runoff including total suspended solids, hydrocarbons, nutrients, soluble heavy metals, and other common pollutants. The filter cartridges clean stormwater through a passive filtration system and removes pollutants.

A system is proposed using a total of 18 x 690mm high PSorb StormFilter Cartridges split into two separate StormFilter Chambers. The stage 1 (S1) system consists of 6 x Cartridges installed within an 8m² Chamber and the stage 2 (S2) consists of 12 x 690mm high Cartridges installed within a 15m² Chamber.

7.3. Water Quality Outcome – MUSIC Model

A MUSIC model was prepared for the proposed treatment train.. See figure 4 below for treatment train as modelled in MUSIC and shown in Appendix A for more details. The meteorological data utilised in the modelling was extracted from the Pluviograph Rainfall data toolkit from eWater (software manufacturer) at the closest rainfall station detailed as follows:
Station No.: 066037
Station Name: Sydney Airport AMO

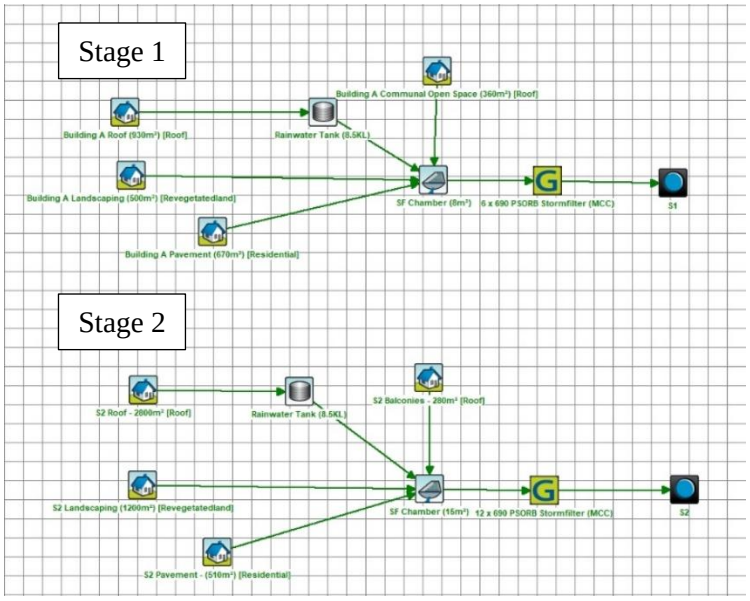


Figure 3. Treatment train and pollution removal as modelled in MUSIC

Stage 1

	Sources	Residual Load	% Reduction
Flow (ML/yr)	1.96	1.86	5.2
Total Suspended Solids (kg/yr)	155	28.8	81.4
Total Phosphorus (kg/yr)	0.389	0.0943	75.7
Total Nitrogen (kg/yr)	4.22	2.02	52.1
Gross Pollutants (kg/yr)	47.8	0	100

Stage 2

	Sources	Residual Load	% Reduction
Flow (ML/yr)	3.67	3.48	5.1
Total Suspended Solids (kg/yr)	182	33.4	81.7
Total Phosphorus (kg/yr)	0.629	0.151	76
Total Nitrogen (kg/yr)	7.86	3.77	52
Gross Pollutants (kg/yr)	87.6	0	100

Figure 4. Treatment train effectiveness as modelled in MUSIC (Stage 1 and 2)

The overall pollutant removal for the site has been summarised in Table 2.1 and 2.2 below. An improvement in discharged water quality can be expected by installing the proposed treatment train.

Table 1.1 Treatment levels for the site (Stage 1)

STAGE 1	SOURCES	RESIDUAL LOAD	% REDUCTION	
			Target	*Actual*
Total Suspended Solids [TSS] (kg/yr)	155	28.8	80.0	81.4
Total Phosphorus [TP] (kg/yr)	0.389	0.0943	40.0	75.7
Total Nitrogen [TN] (kg/yr)	4.22	2.02	40.0	52.1
Gross Pollutants [GP] (kg/yr)	47.8	0	90.0	100.0

Table 2.2 Treatment levels for the site (Stage 2)

STAGE 2	SOURCES	RESIDUAL LOAD	% REDUCTION	
			Target	*Actual*
Total Suspended Solids [TSS] (kg/yr)	182	33.4	80.0	81.7
Total Phosphorus [TP] (kg/yr)	0.629	0.151	40.0	76.0
Total Nitrogen [TN] (kg/yr)	7.86	3.77	40.0	52.0
Gross Pollutants [GP] (kg/yr)	87.6	0	90.0	100.0

8.0 OVERLAND FLOW PATHS

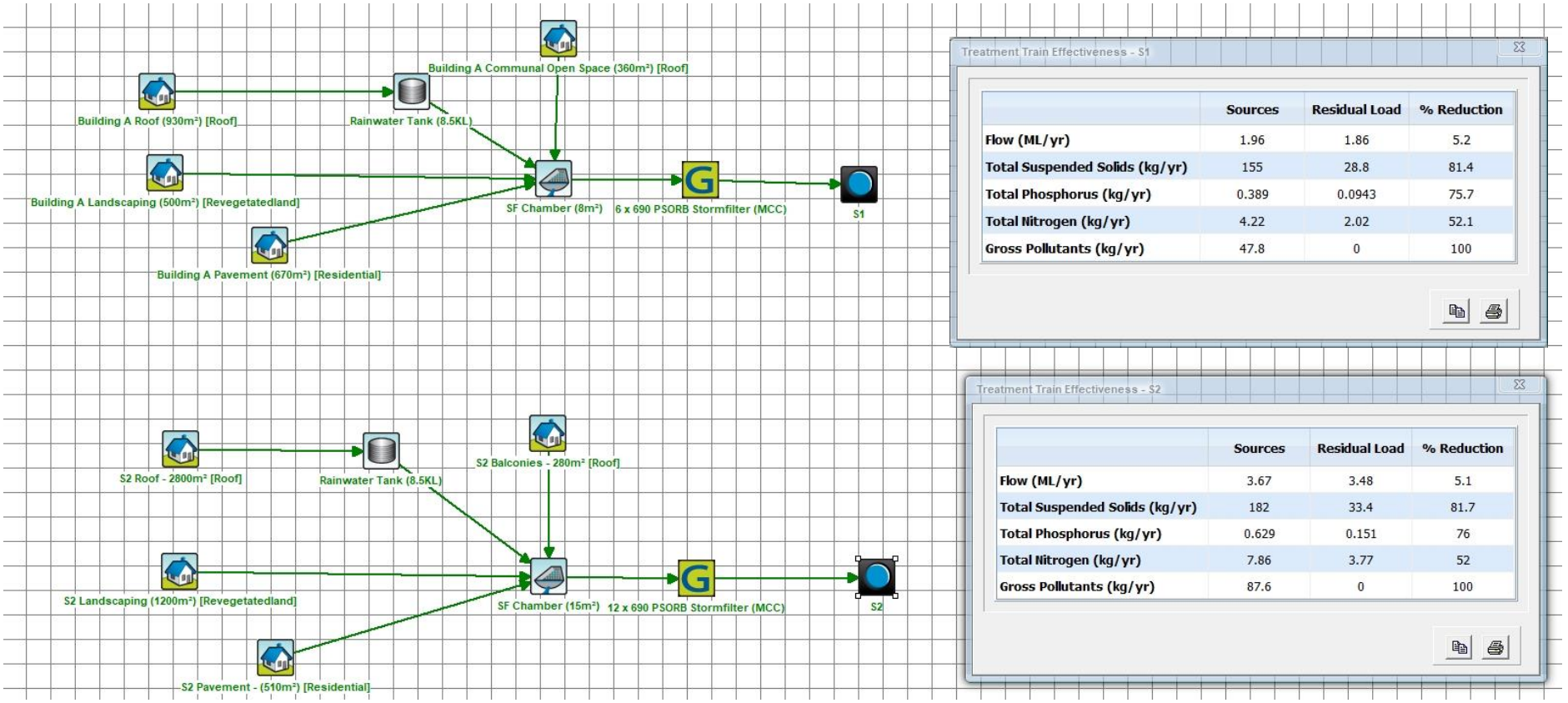
If storms higher than the design storm occur, the site is graded to allow an overland flow path to form which protects the buildings. Overland flows will exit the site northbound via Strickland Street towards the existing council stormwater network.

9.0 CONCLUSION

A system has been proposed for the control of stormwater on the subject site, which considers the requirements for water pollution control and water sensitive urban design.

The proposed system will result in adequate environment protection and reduction in water pollutant loads based on modelling. We believe the system satisfies the requirements of Sutherland Shire Council.

APPENDIX A – MUSIC MODEL



Treatment Train Effectiveness - S1

	Sources	Residual Load	% Reduction
Flow (ML/yr)	1.96	1.86	5.2
Total Suspended Solids (kg/yr)	155	28.8	81.4
Total Phosphorus (kg/yr)	0.389	0.0943	75.7
Total Nitrogen (kg/yr)	4.22	2.02	52.1
Gross Pollutants (kg/yr)	47.8	0	100

Treatment Train Effectiveness - S2

	Sources	Residual Load	% Reduction
Flow (ML/yr)	3.67	3.48	5.1
Total Suspended Solids (kg/yr)	182	33.4	81.7
Total Phosphorus (kg/yr)	0.629	0.151	76
Total Nitrogen (kg/yr)	7.86	3.77	52
Gross Pollutants (kg/yr)	87.6	0	100