



Stormwater Management Report

27-33 Middleton Ave, Castle Hill

Issue A

Prepared For SCION DEV 02 PTY LTD

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1 Executive Summary

This document details the water management statement for the residential apartment development proposed at 27-33 Middleton Ave, Castle Hill. The site plan is illustrated in Figure 1.1 below.

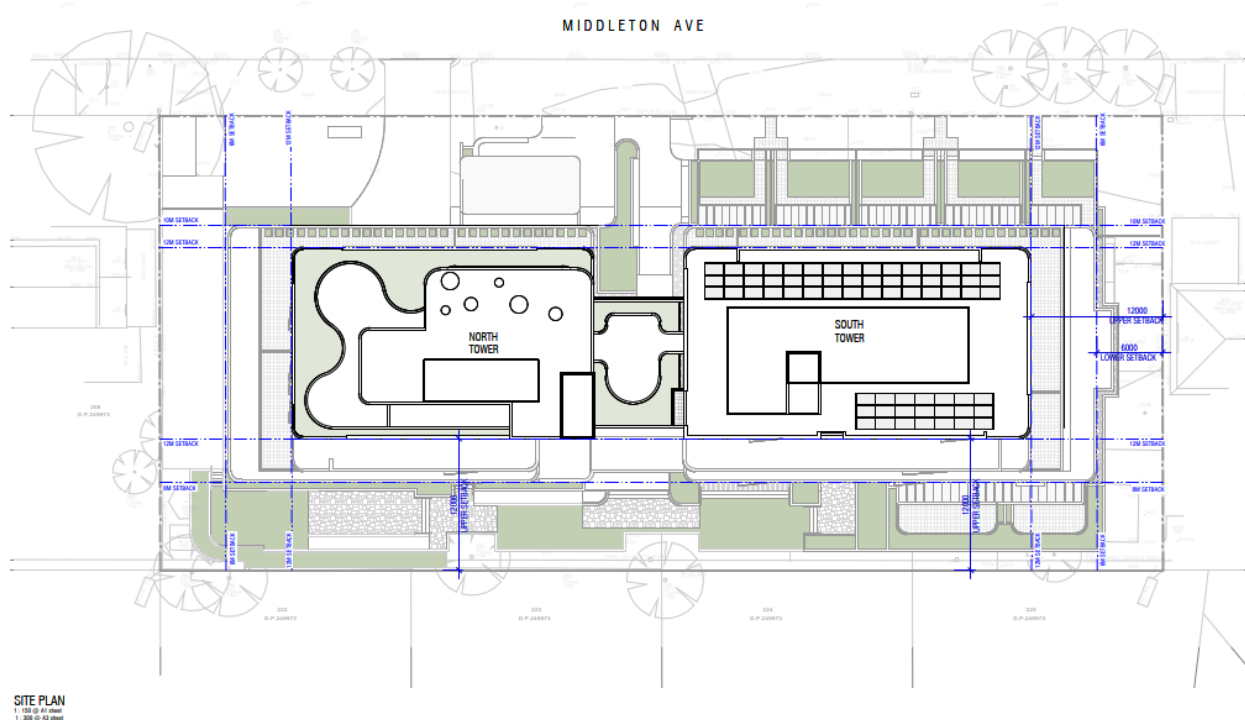


Figure 1.1 Site Plan

This report describes the stormwater quality and quantity measures proposed to address the local Council's requirements for stormwater drainage.

In summary, the following is proposed:

- An OSD system is provided to reduce the site discharge; and
- Water quality devices, including a rainwater tank, Storm Filter Cartridges, and Ocean Guards, are provided to meet the pollutant reduction targets.

1.1 Relevant Issues Identified by SEARs

This Stormwater Management Report has been prepared in response to issue of the Secretary's Environmental Assessment Requirements (SEARs) for the proposed development dated 22 July 2025 for SSD-88215996, and the Guidance for Concurrent Rezoning Report: SSD Housing also dated 22 July 2025.

Specifically, this report has been prepared to respond to issued as identified in the SEARs outlined in Table 1 below.

Table 1-1 Relevant SEARS

Item	Description	Section Reference
19. Flood Risk	Identify the flood planning area and level as set out in the relevant EPI and other supporting documents to determine; - The flood extent and velocity up to the Probable Maximum Flood and risk on-site having regard to adopted flood studies and, floodplain risk management studies and plans - The site access and egress routes - the potential effects of climate change, - any relevant provisions of the NSW Flood Risk Management Manual, and any other relevant guidelines	Subject site is not Flood Affected and hence not applicable
	Where the development is occurring on flood prone land a flood impact and risk assessment (FIRA) must be prepared having regard to the Flood Impact and Risk Assessment – Flood Risk Management Guide LU01. When determining the scope and category of the FIRA the requirements outlined in the FIRA guide must be considered	N/A (No Mainstream Flooding or Overland Flow)
	Detail any flood risk management measures that are to be incorporated as part of the development having regard to relevant guidelines (including any design solutions, flood modification measures, property modification measures, operational procedures or Flood Emergency Response Plan).	N/A (No Mainstream Flooding or Overland Flow)

2 Introduction

2.1 Brief

This Stormwater Management Report prepared by S&G Consultants Pty Ltd on behalf of Scion is submitted to the Department of Planning, Housing and Infrastructure (DPHI) in support of a Concurrent Rezoning Proposal and State Significant Development Application for a mixed-use development at Nos. 27 – 33 Middleton Avenue, Castle Hill, comprising a neighbourhood shop and a 11 & 14 tired storey residential building.

The Concurrent Rezoning and State Significant Development Application (SSDA) seeks approval for:

- Site preparation works, including demolition of all existing improvements, vegetation removal and bulk excavation.
- Construction of two towers (11 and 14 Storey) mixed use development comprising a café / restaurant, residential apartments, communal open space, driveway access from Middleton Avenue, landscaping and public domain improvements, 3 levels of basement car parking, and necessary rooftop plant.

This report should be read in conjunction with the Concurrent Rezoning Report and Environmental Impact Statement prepared by Mecone, the Architectural Drawings prepared by BHK Architects, and other technical documents that form part of the State Significant Development Application.

The following tasks were carried out:

- Supplied documents and previous studies were reviewed;
- A concept stormwater concept design has been prepared including supporting calculations; and
- This report has been compiled.

2.2 Objectives

The purpose of this report is to outline the stormwater strategy for the proposed development and respond to the requirements of the guidelines by the relevant authorities.

The report addresses the following matters:

- On-site stormwater management including:
- Authorities requirements;
- Internal drainage and discharge;

- On-site detention;
- Water quality;
- Overland Flow path Management;
- Soil and water management; and
- Maintenance Strategy.

2.3 Limitations

This report is intended solely for SCION DEV 02 PTY LTD as the Client of SGC and no liability will be accepted for use of the information contained in this report by other parties than this client.

This report is limited to visual observations and to the information including the referenced documents made available at the time when this report was written.

2.4 Reference Documents

The following documents have been referenced in this report:-

1. Site survey prepared by ATS LAND & ENGINEERING SURVEYORS PTY. LTD. dated 12/02/2025;
2. Architectural plans prepared by BHK Architects;
3. The Hills Development Control Plan;
4. Pre-Lodgement Meeting Notes 13 June 2025 - 115/2025/PRE;
5. Stormwater Infrastructure Plan 27-33 Middleton Avenue, Castle Hill Prepared by: rbhuiyan - Co-ordinate: GDA 2020/ MGA ZONE 56;
6. WorkCover Authority of NSW Occupational Health & Safety Act 1983 and Confined Spaces Regulation;
7. Occupational Health & Safety Act 2000;
8. Occupational Health & Safety Regulation 2001; and
9. Workers Compensation Act 1987.

3 Natural & Built Environment

3.1 Existing Site

The site is located at Nos. 27 – 33 Middleton Avenue, Castle Hill, and is legally identified as Lots 209, 210, 211 & 212 DP 249973 (see **Figure 1**). The site is within The Hills Shire local government area (LGA), and is approximately 500 metres walking distance of the entrance to Hills Showground Station.

The site is occupied by four (4) existing dwellings of brick with tile construction and is within an existing low density urban setting characterised by large residential lots supporting single and double storey detached houses, undergoing transition to high density residential, characterised by residential flat buildings and mixed use developments, as part of the emerging Showground Station Priority Precinct.

The site has a 91.44 metre frontage to Middleton Avenue, a depth of 41.455 metres, and an area of 3,791m².

Figure 3.1 Locality Pla shows the location of the site.

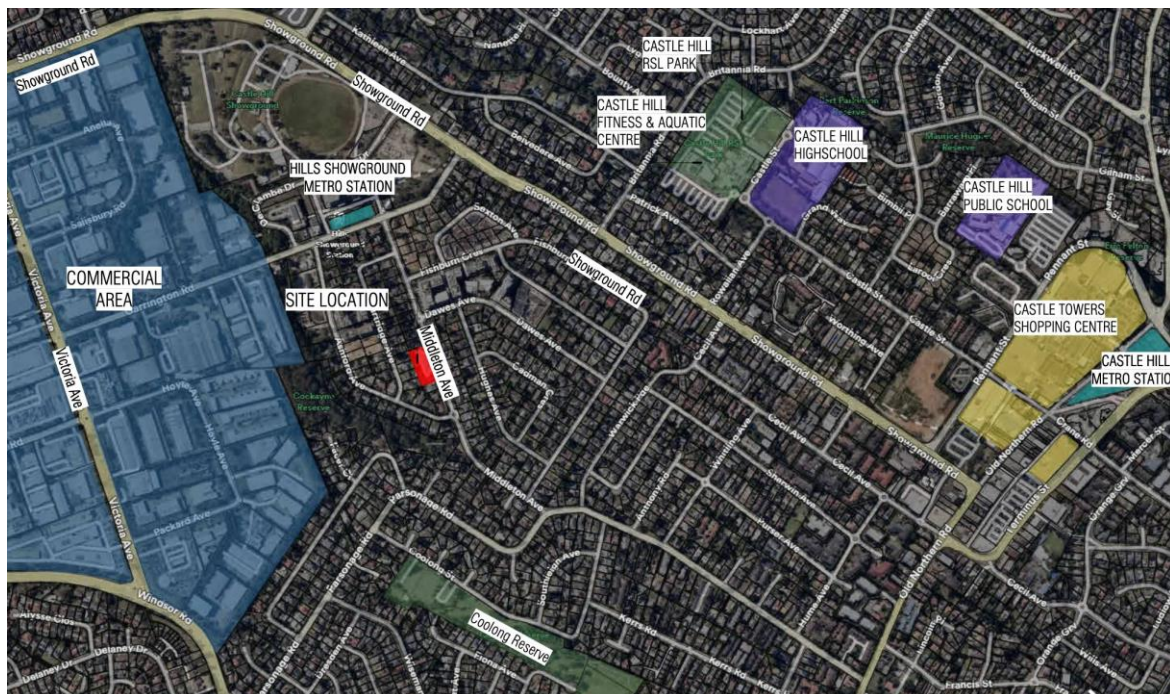


Figure 3.1 Locality Plan

The existing site (extracted from BHK Architects) and Showground Precinct Structure Plan (below) with the subject site shown in blue star (extract Showground Station Precinct DCP)

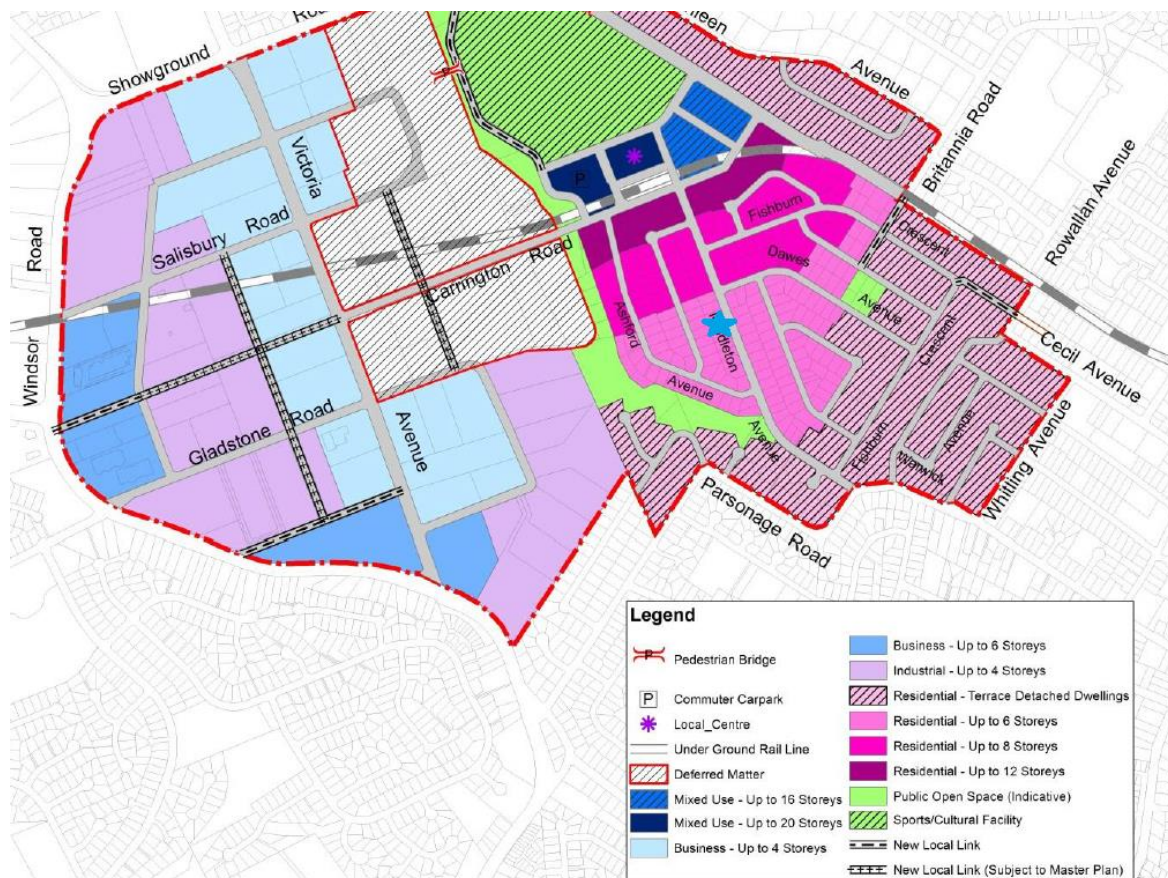


Figure 3.2 Showground Precinct Structure Plan

3.2 Proposed Development

The proposal involves the demolition of existing structures and the construction of a residential flat building comprising two lobes over a communal basement and ground floor, delivering a total of 109 residential units. 5% of the gross floor area is allocated to affordable housing, Ground Floor and Rooftop communal open space is also proposed for residents.

Reference should be made to the 3D architectural drawings by BHK Architects.



Figure 3.3 Proposed 14 and 11 Storeys



Figure 3.4 Neighbouring Site

4 On-Site Water Management

4.1 General

The management of the stormwater on site covers several aspects of the design. It is divided into the following sections:

- Internal drainage design including provision of on-site detention and discharge into Council's infrastructure; and
- Water quality control.

The objectives are to provide for the efficient and environmentally responsible disposal of stormwater from the site in accordance with Council's ESD Objective 3, to control stormwater so that development does not increase downstream drainage flows or adversely affect adjoining or downstream properties, to protect and enhance the integrity of watercourses in line with Council's ESD Objective 4, to provide for on-site stormwater detention, and to encourage the reuse of stormwater.

4.2 Authorities Requirements

Drainage systems are to be designed and constructed in accordance with the guidelines set out in *Australian Rainfall and Runoff 1987* published by the Institution of Engineers Australia. Where required, on-site detention (OSD) systems are to be designed in accordance with these guidelines and the relevant provisions of the Upper Parramatta River Catchment Trust On-site Detention Handbook. Concentrated stormwater flows must be connected to Council's drainage system and may require the creation of drainage easements over downstream properties, in which case written consent from the affected landowners must be submitted with the Development Application. Discharge points are to be appropriately controlled and treated to prevent soil erosion and, where necessary due to steep topography, fitted with energy-dissipating devices in accordance with Council's requirements.

4.3 Internal Drainage

4.3.1 Roof Drainage

The roof drainage system is a conventional rainwater outlet system designed to cater for 20-year ARI storm event. The system is a series of outlets and downpipes to be coordinated with the architectural layout in future detailed design stages.

4.3.2 Surface Drainage

The internal drainage system will be generally designed in accordance with Council's guidelines.

The internal drainage system would generally be designed to cater for 100-year ARI storm.

The runoff from the buildings and the open areas will be directed to the On-Site Detention (OSD) systems and the water quality treatment measures prior to discharging into the receiving pit.

The subsoil discharge and any runoff from the basement car park ramps will be collected in pump-out pits inside the basement. prior to being pumped into the OSD systems. The design of pump out systems will be in accordance with council's and AS3500 guidelines.

4.4 On-Site Detention

On-Site Stormwater Detention is a Council requirement to reduce the peak stormwater flows into the public drainage system and reduce the probability of downstream flooding. As per council's DCP and Pre-Lodgement Meeting Notes, an OSD System is required for this job.

4.4.1 Sizing

On-site detention (OSD) is required for this site in accordance with Upper Parramatta River Catchment Trust (UPRCT) requirements and the relevant OSD parameters. The OSD design for this site has been completed using the attached Excel spreadsheet calculations for the Hawkesbury River Catchment. The completed spreadsheet will be submitted alongside the stormwater plan as part of the SSDA submission documents.

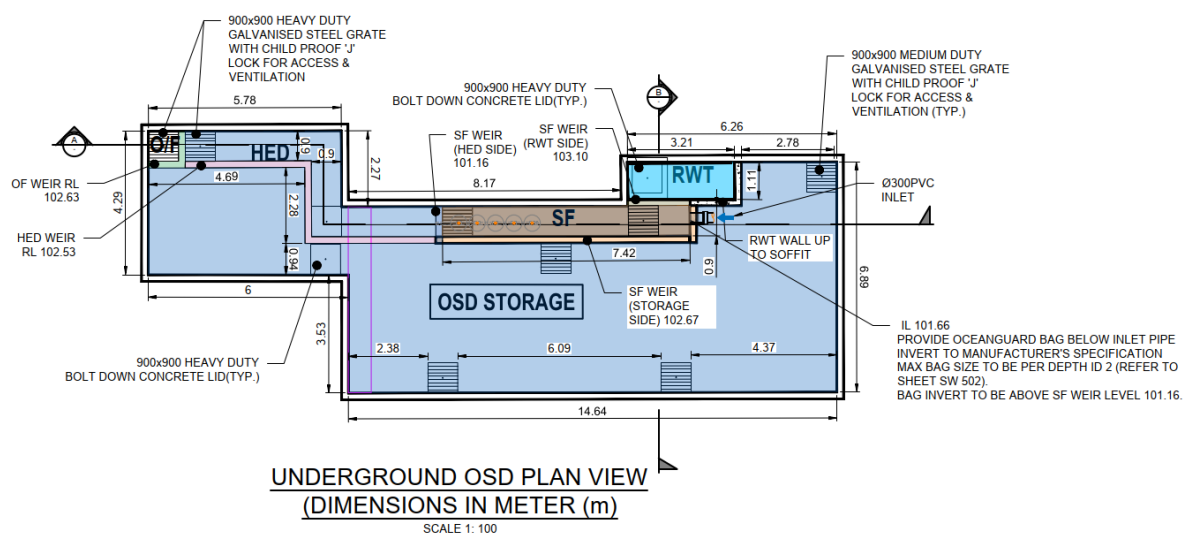


Figure 4.1 OSD Plan View (Reference: S02-SW402)

HAWKESBURY RIVER CATCHMENT				
COUNCIL O.S.D. CHECK SHEET				
Site Address	=	27-33 Middleton Road Castle Hill		
File No.	=	20250030		
Site Area				Drowned Condition
Site Slope				
Site Storage Volume	=	See Chart		
Permissible Discharge	=	See Chart		
Basic Storage Volume	=	[A2] x [A]		
Basic Discharge	=	[A3] x [A]		
Area of Site Drained to Storage				
% of Total Site	=	[D] / [A] x 100		
Storage Per Ha.	=	[B] / [D]		
Permissible Discharge	=	{([F] / 69.21)^{-1.368}} x 1000		
P.S.D.	=	[G] x [D]		
Maximum Head to Orifice Centre				
Selected Orifice Dia.	=	{(0.464x[H]/1000)^{0.5}/[K]^{0.5}}x1000		
Maximum Discharge	=	[H]		
Head for High Early Discharge				
High Early Discharge	=	{[L] x ([M]/[K])^{0.5}}		
Approx. Ave. Discharge	=	{([L] + [N]) / 2}		
Ave. Discharge per Ha.	=	[P] / [D]		
Storage Volume	=	69.21 x ([Q] / 1000)^{-0.731}		
Site Storage Volume	=	[R] x [D]		

OSD CALCULATION SHEET

Figure 4.2 Council OSD Calculation Sheet

Local Government Area	Catchment	Site Slope *BHSC only	PSD (l/s/ha)	SSR (m³/ha)
BHSC	Hawkesbury River	>15%	136	298
BHSC	Hawkesbury River	10% to 15%	115	336
BHSC	Hawkesbury River	6% to 10%	104	362
BHSC	Hawkesbury River	3% to 6%	92	396
BHSC	Hawkesbury River	0% to 3%	87	412
HCC	A'Becketts Creek		140	300
HCC	Duck Creek		140	300
HCC	Prospect Creek		140	300
PCC	A'Becketts and Duck River/Creek		80	470
PCC	Claycliff Creek		235	215
PCC	Devlins Creek		210	250
PCC	Parramatta River – North Side – Charles St to Vineyard Creek		208	235
PCC	Parramatta River – North Side – East of Vineyard Creek		280	190
PCC	Parramatta River –South Side – Ponds/Subiaco Creek		80	470
PCC	Terrys Creek		130	330
PCC	Vineyard Creek		210	250
PCC			160	285

Figure 4.3 Assumed PSD & SSR (Reference: UPRCT Onsite Stormwater Detention Handbook)

Even when care is taken to ensure that outlet pipes are adequately sized, the assumption of free discharge may be invalid if the outlets are drowned by the downstream drainage system. An OSD system is designed to control flows for all storms up to and including the 100-year ARI event, whereas the downstream drainage system often only accommodates smaller storms (typically 5-year or 10-year ARI) without surcharging. In this project, the drowned condition was specifically considered, with the tailwater level assumed at the grate of the proposed inlet kerb on Middleton Avenue.

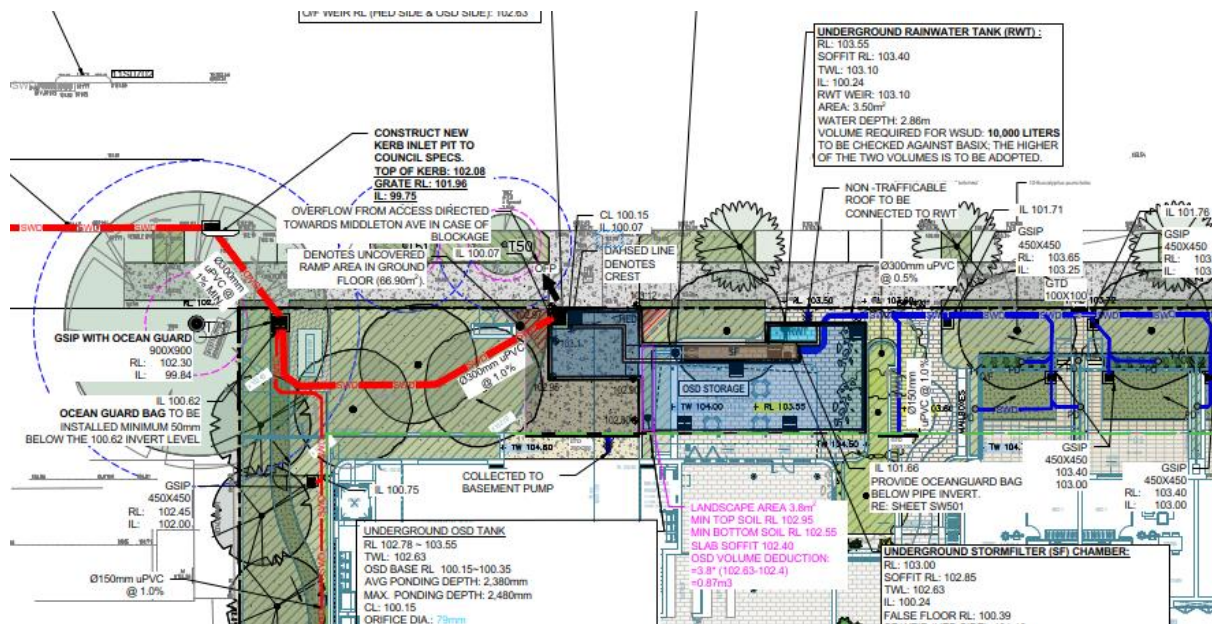


Figure 4.4 Proposed New Kerb Inlet Pit (Reference: S02-SW302)

The proposed kerb inlet pit will be connected to the existing stormwater pit “11S0697” at Middleton Avenue as shown in Figure 4.4 below and on stormwater sheets S02-SW302 & S02-SW303 in the Appendix.

Figure 4.5 Connection of the Proposed New Kerb Inlet Pit (Reference: Stormwater Infrastructure Plan)

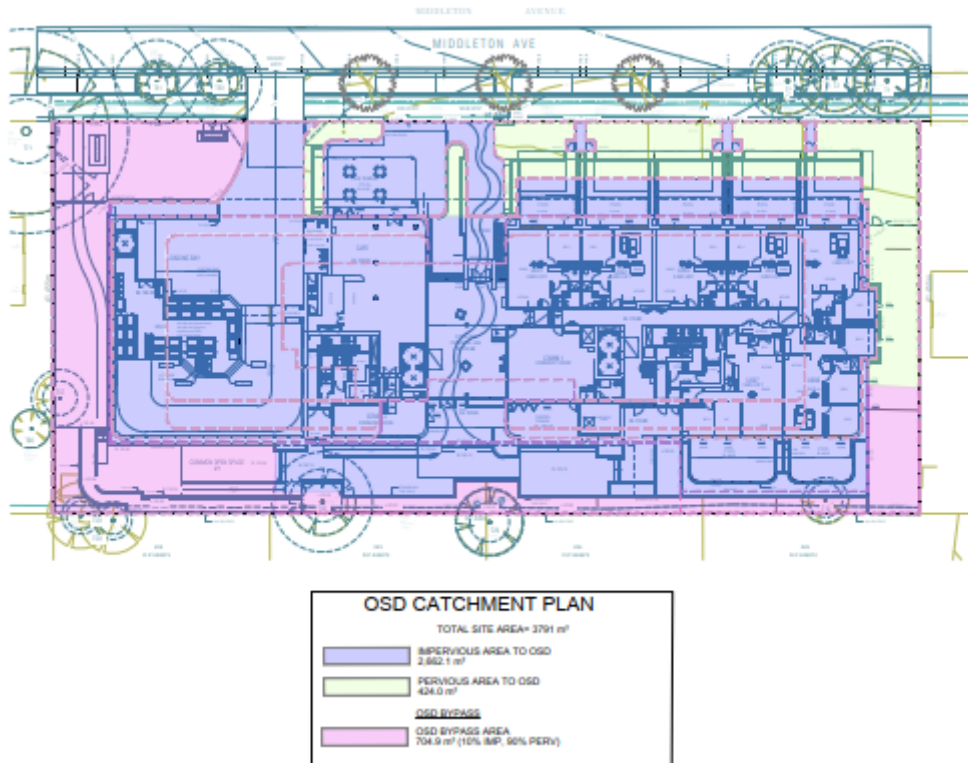


Figure 4.6 OSD Catchment Plan (Reference: S02-SW501)

The OSD Catchment Plan illustrates the distribution of impervious and pervious areas across the site, which has a total area of 3,791 m². The plan identifies 2,662.1 m² (70.2% of the site) as impervious surfaces, which contribute directly to stormwater runoff. Pervious areas connected to the Ocean Guard system (bypass) cover 705 m², representing 18.60% of the site, allowing controlled infiltration and treatment of stormwater. The remaining 424 m² (11.10% of the site) are pervious areas directly contributing to the site's surface flow. The layout also indicates key features of the development, including building footprints, communal open space, access points, and loading areas, showing how stormwater from different parts of the site is directed into the OSD system to ensure efficient detention and management in compliance with DCP requirements.

4.5 Water Quality

4.5.1 Objectives

WSUD measures are required for this development to meet the specified water quality targets, including:

- 90% reduction in the annual average load of gross pollutants
- 85% reduction in the annual average load of total suspended solids
- 65% reduction in the annual average load of total phosphorus
- 45% reduction in the annual average load of total nitrogen

A MUSIC model has been developed to achieve these water quality targets. The results of the modelling are presented in the stormwater (SW) sheets and summarized below.

A 10,000 L rainwater tank has been proposed in accordance with the council's DCP. For water treatment, a Stormfilter chamber with 5 × 690 PSORB Stormfilter cartridges has been proposed. An Ocean Guard basket has been placed at the boundary pit to treat OSD bypass areas and Ocean Guard Basket has been proposed prior to discharging into Stormwater Filter Chamber. The reductions results suit the Council requirements and are documented in the figures below.

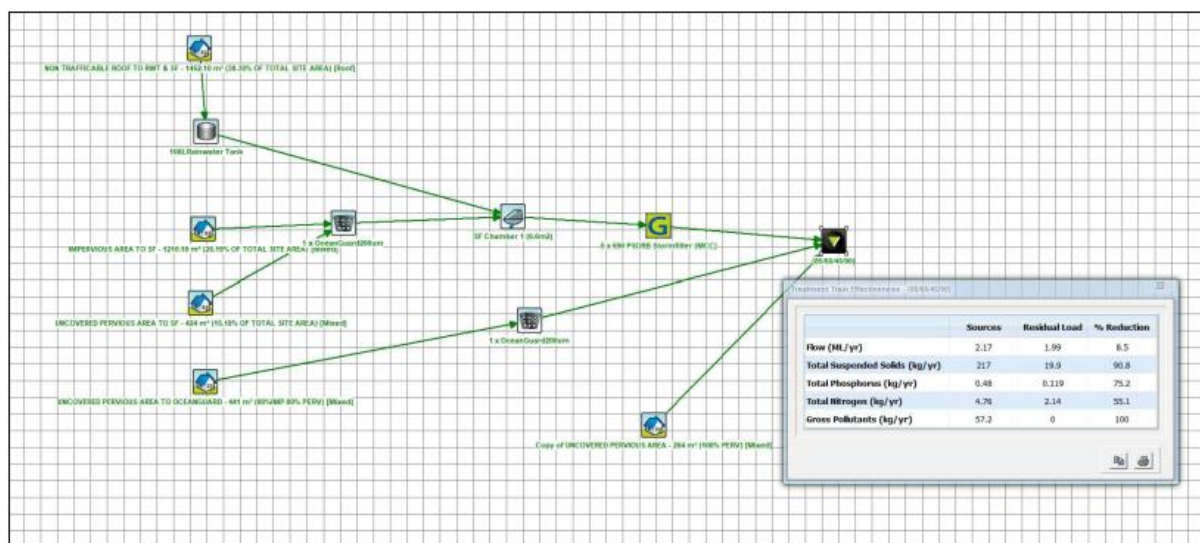
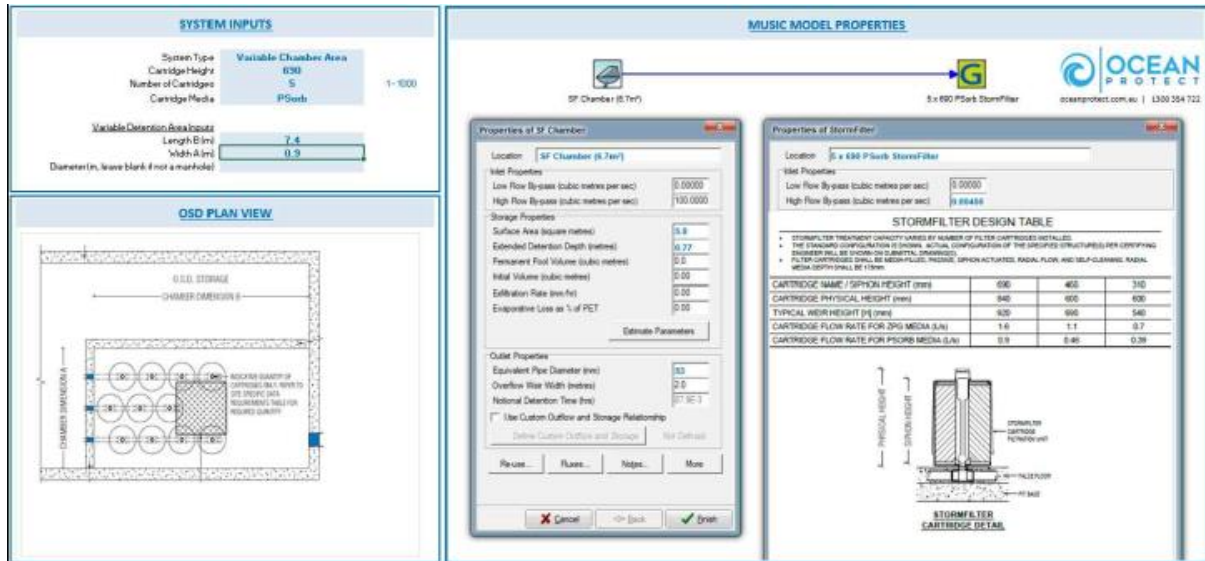


Figure 4.7 Music Model Results



SYSTEM INPUTS

System Type: Variable Chamber Area
 Number of Cartridges: 5
 Cartridge Media: PSorb
 Variable Detention Area (m²):
 Length (m): 7.4
 Width (m): 0.9
 Diameter (m): 0.9

OSD PLAN VIEW

OSD TANK DIMENSIONS: 10.0m x 10.0m
 CHAMBER DIMENSIONS: 10.0m x 10.0m
 ADDITIONAL DIMENSIONS: 10.0m x 10.0m

MUSIC MODEL PROPERTIES

Properties of SF Chamber

Location: 50 Chamber (5.7m)
 Inlet Properties:
 Low Flow Bypass (cubic metres per sec): 0.00000
 High Flow Bypass (cubic metres per sec): 100.00000
 Storage Properties:
 Surface Area (square metres): 0.8
 Extended Detention Depth (metres): 0.77
 Permanent Flood Volume (cubic metres): 0.0
 Initial Volume (cubic metres): 0.0
 Effluent Rate (l/s): 0.0
 Evaporative Loss as % of PET: 0.0
 Outlet Properties:
 Equivalent Pipe Diameter (mm): 100
 Overflow Pipe Width (mm): 100
 Retention Detention Time (s): 0.0
 Use Custom Outflow and Storage Relationship: No (Default)

Properties of Stormfilter

Location: 5 x 600 PSorb StormFilter
 Inlet Properties:
 Low Flow Bypass (cubic metres per sec): 0.00000
 High Flow Bypass (cubic metres per sec): 0.00000

STORMFILTER DESIGN TABLE

CARTRIDGE NAME / SPEECH HEIGHT (mm)	600	400	300
CARTRIDGE PHYSICAL HEIGHT (mm)	600	400	300
TYPICAL WEIR HEIGHT (mm)	600	400	300
CARTRIDGE FLOW RATE FOR PSORB MEDIA (L/s)	1.0	1.1	0.7
CARTRIDGE FLOW RATE FOR PSORB MEDIA (L/s)	0.9	0.85	0.58

STORMFILTER CARTRIDGE DETAIL

Figure 4.8 Music Model Properties

4.5.2 Approach

A treatment train approach is proposed to achieve the water quality targets. The approach is as follows:

- Roof water runoff and surface runoff to be collected and drained to stormfilter chamber inside the OSD tank.
- Water collected in the Stormfilter chamber overtops the Stormfilter weir and flows into the High Early Discharge (HED) unit. The HED unit is designed to temporarily store and release the initial portion of the stormwater runoff at a controlled rate, reducing the impact of first-flush pollutant loads.
- From the HED unit, water then enters the On-Site Detention (OSD) system, which provides additional storage and regulates the outflow to the nominated discharge rate.
- Together, the HED, Overflow Chamber (O/F) and the OSD system manage peak flows, minimize downstream flooding, and help achieve the required water quality targets by ensuring controlled release of stormwater while allowing treatment measures upstream to operate effectively.

4.5.3 Rainwater Tank

A 10,000 L rainwater tank has been proposed as per council's requirement and located on ground floor. The rainwater tank is to collect runoff from non-trafficable roof areas. The volume of the rainwater tank should be checked with BASIX requirements.

The details for the inlet and outlet connection to be carried out at CC stage with proper coordination between different disciplines.

4.6 Overland Flowpath Management

In the event of a blockage or emergency, the On-Site Detention (OSD) system has been designed with an overflow chamber. Due to the site's topography, stormwater cannot flow directly to Middleton Avenue; instead, excess water is safely directed into the overflow chamber with crest in the driveway, which conveys it towards Middleton Avenue. The site levels have been carefully designed and graded to accommodate this overflow path, ensuring controlled and safe discharge under such conditions.

5 Soil & Water Management

5.1 Construction Stage

The development aims to minimize land degradation, water pollution, and damage to infrastructure from accumulated sediment, in accordance with Council's ESD Objective 3. To achieve this, all stages of development will implement consistent and effective erosion and sediment control measures.

A Soil and Water Management Plan (SWMP) has been prepared for the SSDA submission (**S02-SW201 & S02-SW202**). The SWMP has been developed in accordance with the NSW Department of Housing publication *Managing Urban Stormwater: Soils & Construction* (the Blue Book) and Sections 6.3 & 6.4 of Part A of the DCP. It outlines the erosion and sediment control processes for the duration of the project, with emphasis on minimizing erosion first, then preventing sediment movement.

Site clearing leaves the land susceptible to erosion, with eroded particles potentially transported off-site into natural waterways, causing siltation, loss of hydraulic capacity, and environmental stress. The SWMP aims to minimize soil loss, restrict sediment movement, and mitigate environmental impacts.

Key measures include:

- Protection of disturbed ground using temporary vegetation, diversion banks, and sediment fences;
- Early installation and progressive implementation of erosion and sediment controls;
- Construction of permanent drainage structures, culverts, sediment basins, traps, and catch drains at early stages;
- Progressive revegetation of disturbed areas;
- Use of geotextile to stabilize disturbed surfaces during culvert construction;
- Shaping embankments and constructing temporary windrows and batter drains to control runoff;
- Implementation of erosion control measures at associated sites such as access tracks, roads, office/compound sites, and extraction areas;
- Progressive and continual implementation of temporary sediment controls;
- Diversion of runoff from disturbed areas to sediment control structures;
- Management of turbid water in basins after rain through flocculation or extraction for construction or dust suppression;
- Construction of temporary sediment traps at strategic locations;
- Routine maintenance of sediment control devices to ensure full functionality;



- Safe removal and storage of sediment from basins and structures;
- Minimisation of soil transport by vehicles via shakers and wash bays;
- Regular inspections of control measures by trained personnel, conducted weekly and immediately after significant storm events;
- Dust control through progressive revegetation and application of water;
- Ensuring that water is not released from basins until appropriate quality standards are achieved; and
- Compliance with EPA requirements and NSW Blue Book guidelines.

The SWMP provides a robust framework to manage erosion and sediment throughout the development lifecycle, ensuring environmental protection, compliance with council requirements, and minimization of downstream impacts.

6 OSD System Maintenance Strategy

The maintenance strategy relating to the internal drainage system involves inspecting and maintaining the following structures:

- On-Site Detention systems including the orifice plates and the mesh screens;
- Stormfilter Chamber; and
- Rainwater tank.

The corporate body managing the development, or their contractors have the obligation to inspect and maintain these structures.

The following table indicates the minimum requirements for the inspection of the above structures and the maintenance procedures to be adopted.

Table 6.1 OSD & Rainwater tank Maintenance Strategy Requirements

Item	Inspection Frequency	Inspection Check Items	Maintenance Procedures
OSD Tanks	6m	Clogging and blockage of mesh screen. Sediment depth in trap.	Leaves and debris to be removed from screen. Trap flood to be cleaned out
Rainwater Tank	6m-1yr	Clogging and blockage of tank	First flush device and tank to be cleared of any debris.

Table 6.2 Stormfilter Maintenance Strategy Requirements

Item	Inspection Frequency	Inspection Check Items	Maintenance Procedures
Inspection – Minor Maintenance	2 years and after major storms	Maintenance Contractor	Follow recommended procedure set out in Stormwater 360 “Operation and Maintenance Guidelines”
Inspection – Major Maintenance	1 year (except in case of spill)	Maintenance Contractor	Follow recommended procedure set out in Stormwater 360 “Operation and Maintenance Guidelines”

Inspection Frequency Key:

- 1yr one year
6m six monthly
3m three monthly

7 OceanGuard Maintenance Strategy

7.1 Routine Maintenance (Minor Service)

Frequency:

- Between 1 and 6 times per year
- Typically 3–4 times annually depending on pollutant load and inspection results

Activities:

- Inspect filtration bag
- Remove accumulated sediment and debris
- Dispose of collected pollutants according to regulations

7.2 Minor Service – Maintenance Methods

A. Hand Maintenance:

1. Secure the work area
2. Remove access cover or grate
3. Remove filtration bag using lifting hooks
4. Empty contents into disposal container
5. Inspect filtration bag
6. Inspect system components (flow diverter, cage, frame)
7. Clean filtration bag using stiff brush or high-pressure water
8. Reinstall bag and replace cover

B. Vacuum Maintenance:

1. Secure the work area
2. Remove access cover or grate
3. Vacuum pollutants from filtration bag
4. Remove filtration bag
5. Inspect filtration bag
6. Inspect system components
7. Clean filtration bag
8. Reinstall bag and replace cover

7.3 Corrective Maintenance (Major Service)

Frequency:

- As required, based on inspection findings

Activities:

- Replace damaged filtration bags
- Repair or replace damaged structural or internal components

7.4 Special Maintenance Events

Hazardous Spill:

- Inspect all affected units
- Remove and dispose contaminants safely
- Clean or replace filtration bags

Blockage or Flooding:

- Inspect flow diverter
- Perform minor service
- Inspect inlet and outlet pipes

After Major Storms:

- Inspect for damage
- Remove excess sediment
- Replace damaged components if necessary

7.5 Waste Handling and Record Keeping

- Dispose of all waste according to environmental regulations
- Apply special handling for contaminated materials if required
- Record mass, volume, and type of collected pollutants after each service

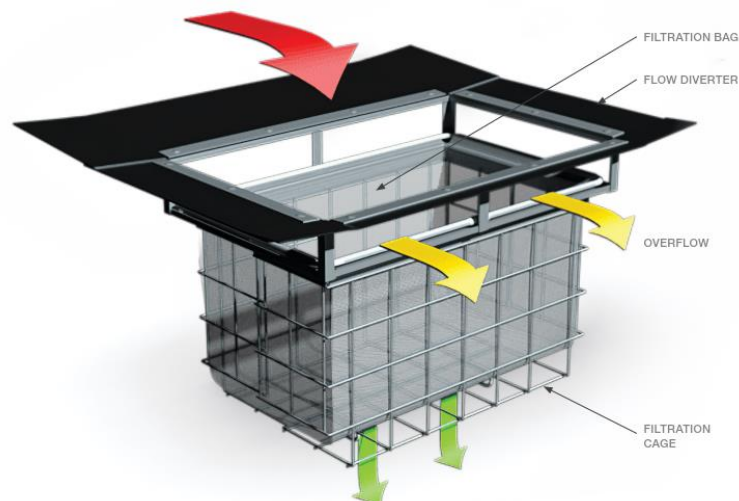


Figure 7.1 OceanGuard Components

8 Conclusion

To summarise, the proposed Stormwater Management Scheme complies with all relevant Council's requirements.

Summary of key recommendations are:

- On-Site Detention (OSD) system and overflow chamber, including the High Early Discharge (HED) unit, to be constructed at correct levels;
- Stormfilter chamber, including 5 × 690 PSORB cartridges, to be installed correctly;
- Ocean Guard basket at the site discharge point to be installed to treat stormwater bypassing the OSD;
- Ensure timely and periodic maintenance of all stormwater and water quality management elements, including the OSD, HED system, Stormfilter chamber, and Ocean Guard basket.

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A2 Appendix 2

Stormwater Design Drawings

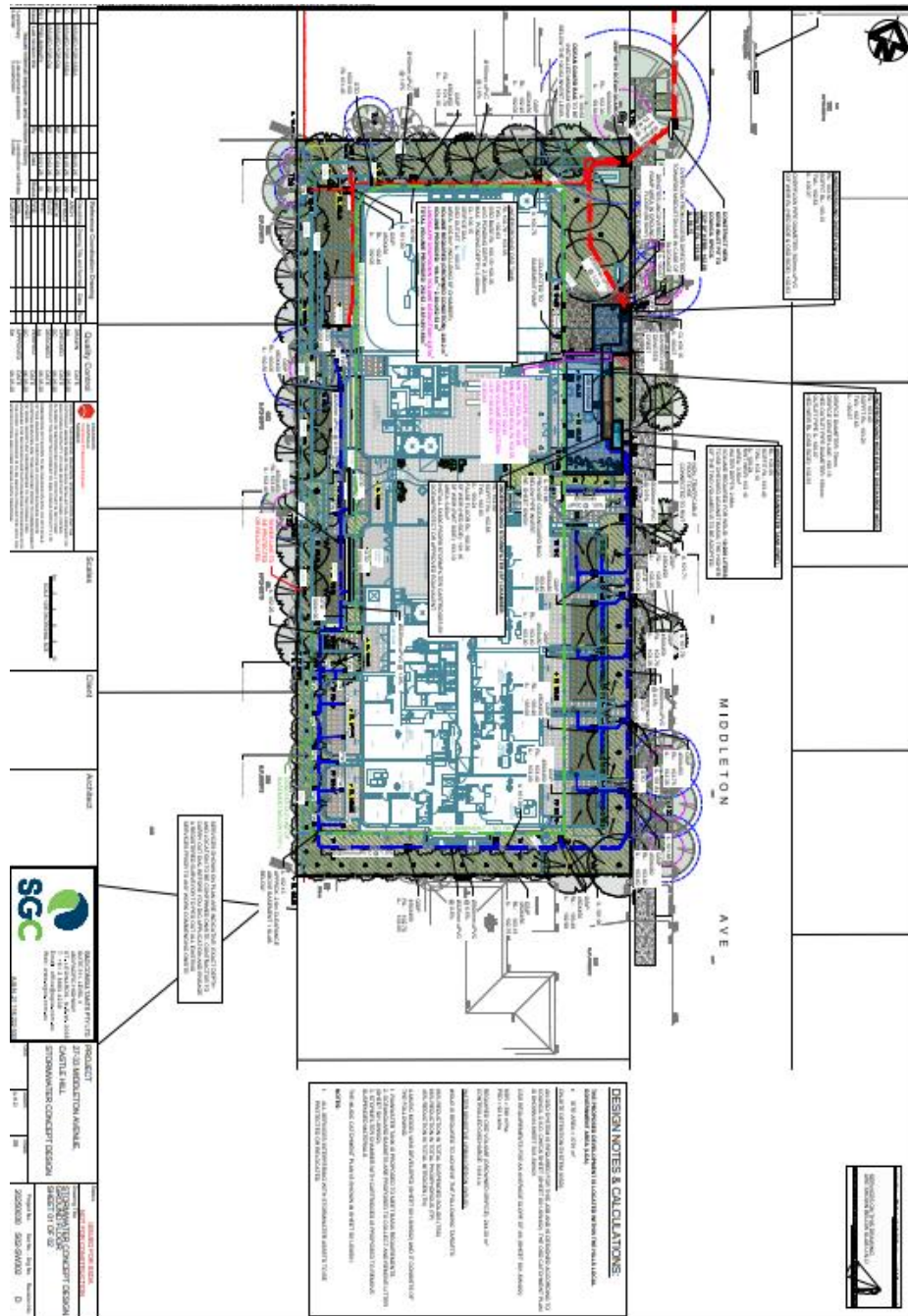


Figure A 2.1 Ground Floor Stormwater Plan (S02-SW302)

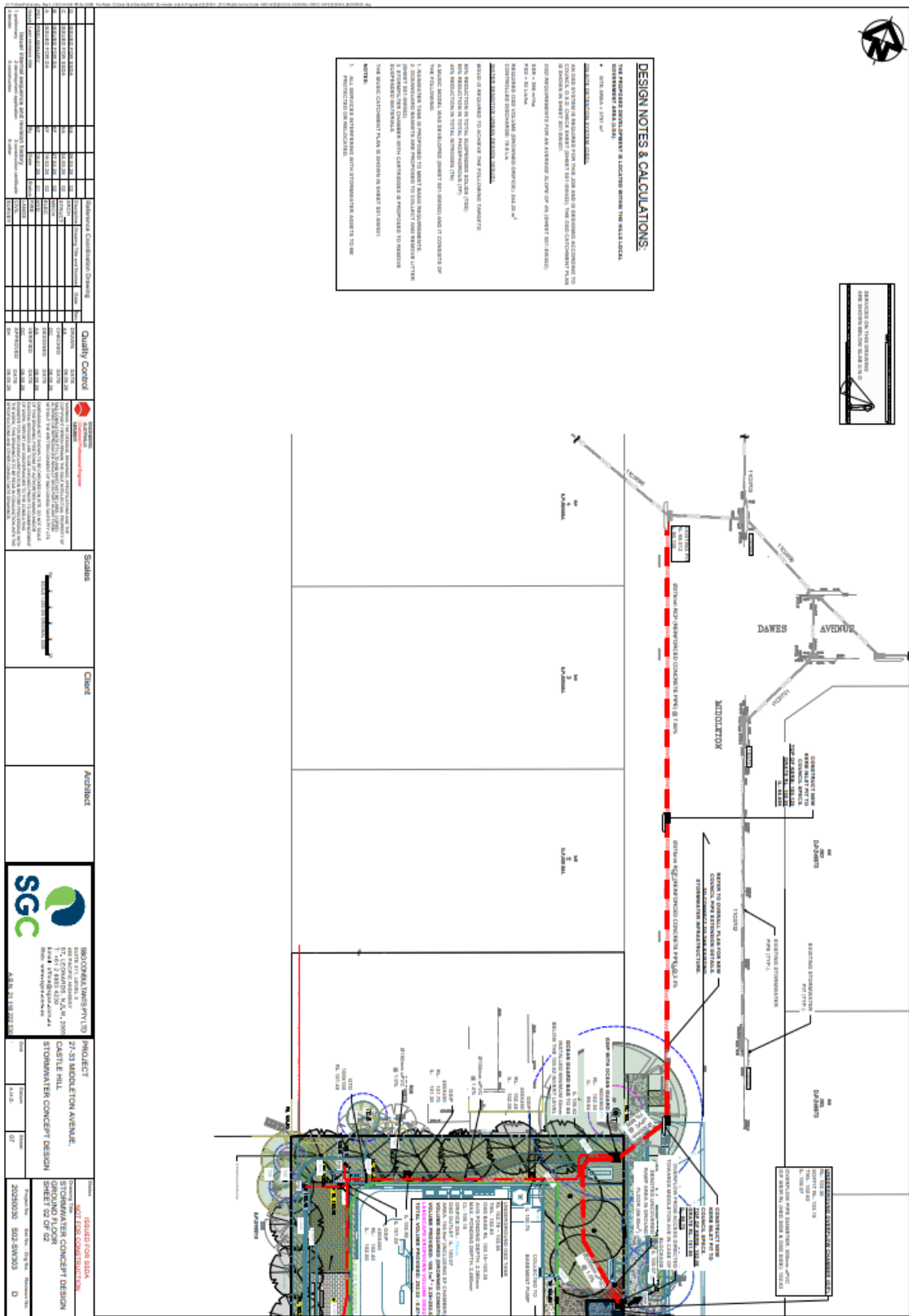


Figure A 2.2 Ground Floor Stormwater Plan (S02-SW302)

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