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Stormwater Management Report

9 Albert & 31 O'Connell Street, North Parramatta

Prepared For
Ceerose Pty Ltd

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Issue A February 2024

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Disclaimer

The advice and information contained within this report relies on the quality of the records and other data provided by the Client, site inspections along with the time and budgetary constraints imposed.

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1 INTRODUCTION

1.1 Overview

Telford Consulting has been commissioned to prepare this Stormwater Management Report for the proposed development at 9 Albert & 31 O'Connell Street, North Parramatta.

This report will form part of the Planning Proposal which will be submitted to City of Parramatta Council as supporting documentation for the Planning approval process.

It is proposed to construct a Mixed Used Development and the associated works which will cover the whole site. The total site area is approximately 8910m^2.

1.2 Available Information

Architectural drawings prepared by DKO Architecture

1.3 The Proposal

The proposed development site is located at 9 Albert & 31 O'Connell Street, North Parramatta. The location of the site is shown in Figure 1.3.1 Locality Map below.

Figure 1.3.1: Locality Map

1.4 Scope of this report

The aim of this report is to provide a Concept Water Management plan and calculations outlining methods of containing stormwater run-off at the proposed site and disposing of it during and after a storm event to a legal point of discharge ensuring no adverse flooding or nuisance impacts caused by the development.

This report is compiled in co-ordination with the stormwater quality objectives, addressing the need for water quality control measures. The stormwater treatment train is designed using MUSIC modelling tool to achieve pollution reduction targets which identified in City of Parramatta Council DCP.

2 SITE CHARACTERISTICS

2.1 Site Description

The subject site comprises 2 existing lots known as 9 Albert Street, North Parramatta legally described as Lot 1 DP 1143431, & 31 O'Connell Street, North Parramatta legally described as Lot 1 DP 998240.

2.2 Existing Land Use

The site is currently vacant, with demolition of existing structures carried out in 2022 (DA/1047/2017)

3 STORMWATER QUANTITY ASSESSMENT

City of Parramatta Council's DCP states that all developments are required to demonstrate that stormwater runoff from the site is collected and conveyed to a legal point of discharge without adversely impacting adjoining or downstream properties in accordance with its guidelines and all systems shall be designed with consideration to the major/minor system design principle in Australian Rainfall & Runoff allowing for overflows of the piped system and flows in excess of the piped system capacity to be discharged in a controlled manner in the same direction as the pipe to a legal point of discharge.

Given that the site falls under Commercial developments, On Site Detention is required.

The point of discharge for the proposed development is an existing stormwater gully pit at the intersection of Fleet Street and Fennell Street. The site will discharge into a proposed new butterfly pit in front of 2 Fleet Street, North Parramatta which will connect to the existing stormwater gully pit.

The OSD is designed on the basis that the total discharge of stormwater from the site is 10% less than that from the site before it was developed (in a natural state).

To mitigate the increased post-development runoff, it has been proposed to install one (1) underground OSD tank prior to the discharge point.

DRAINS ILSAX model was used to analyse the detention requirements for a range of storm events. The following table details the preliminary detention storage requirements for the proposed OSD tank.

Table 3.1 – Preliminary Detention Basin Properties

Name	Volume (m^3)	Area (m^2)	Average Depth (m)
OSD Tank	121	39.80	3.04

Table below summarises the peak discharge from the site in the pre-development and post-development scenario at all Outlets.

Table 3.2 – Summary of peak discharge

Outlet	Scenario	STORM EVENT (ARI)				
		5YR	10YR	20YR	50YR	100YR
Site	Pre-dev	155	197	239	296	347
	Post-dev	138	159	215	262	296

The table indicates that with the proposed detention basin, the development will successfully attenuate all post-development peak discharges from the proposed development, for all investigated return periods.
In addition, the total discharge of stormwater from the site is 10% less than that from the site before it was developed (in a natural state).

Refer to the Stormwater Drainage Plans are attached in Appendix A for further details.

4 FLOOD RISK

In reference to City of Parramatta Council Flood Smart Service, the subject site is not flood affected up to and including the PMF storm event.

Figure 2 below shows the flood risk map relative to the subject site extracted from City of Parramatta Flood Warning Areas.

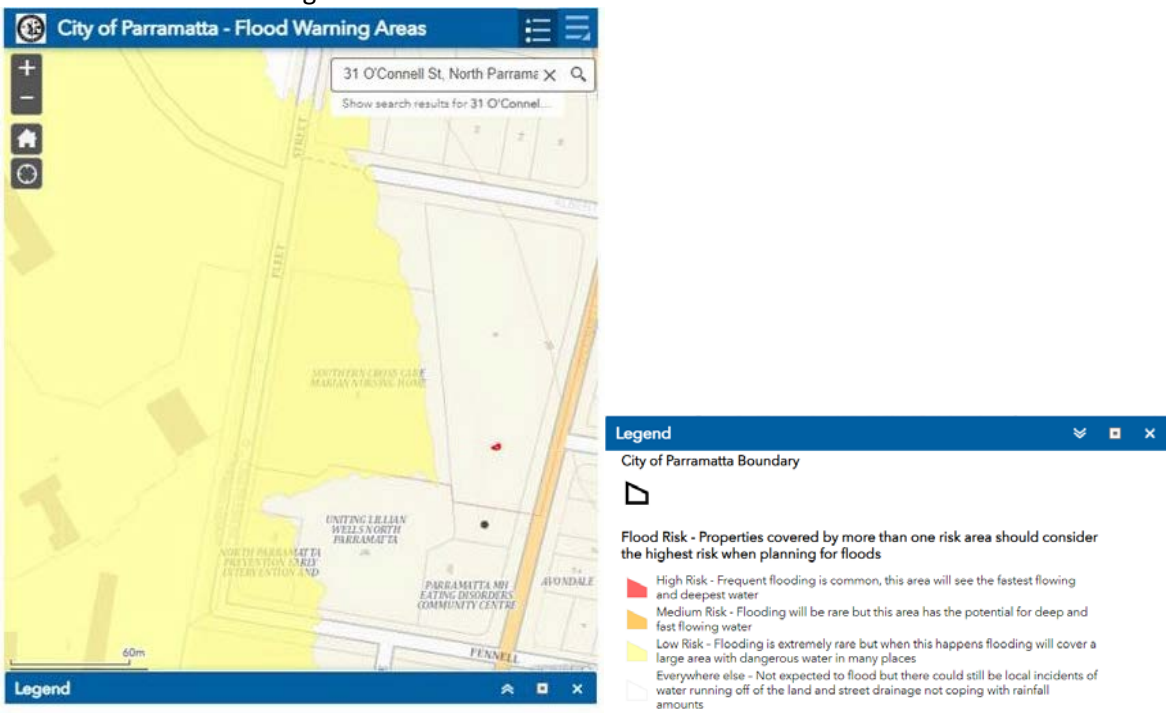


Figure 4.1: Flood Risk Map

The proposed development will not impose any additional risks to the occupants or neighboring properties as it will cause no loss in flood storage or water diversion up to the PMF storm event.

The proposed development complies with Council's requirements and therefore a flood impact and risk assessment report are not deemed to be required.

5 STORMWATER QUALITY ASSESSMENT

5.1 Aims and Objectives

City of Parramatta Council's DCP states that all developments will be required to implement the principles of Water Sensitive Urban Design (WSUD).

Given that the site falls under Commercial developments, a WSUD strategy is required to ensure that water quality being discharged from the site is achieved to a level that will satisfy Council's performance target reduction loads.

The stormwater Treatment Targets for Development are listed below.

Table 5.1.1 – Stormwater Treatment Targets.

Pollutant	% Post Development Average Annual Load Reduction
Gross Pollutants	90%
Total Suspended Solids	85%
Total Phosphorus	60%
Total Nitrogen	45%

5.2 Site Analysis and Design Strategy

The proposed development offers the opportunity to provide stormwater quality treatment where none exists at present.

The proposed solution is to use bio-retention basins and rainwater tanks (or approved equivalent) to treat and remove nutrient pollutants and gross from the stormwater drainage cycle from roof, hard surface and landscape.

Bio-retention systems are vegetated areas where stormwater is passed through densely planted filter media (loamy sand) allowing the plants to absorb the collected and stored nutrients. Bio retention basins utilize temporary ponding above the vegetated surface to increase the volume of stored water for treatment. Bio-retention systems can take a number of forms but all have common features including the extended detention depth above the media surface, the filter media and a low level drainage media and subsoil system. These are shown in the figure below.

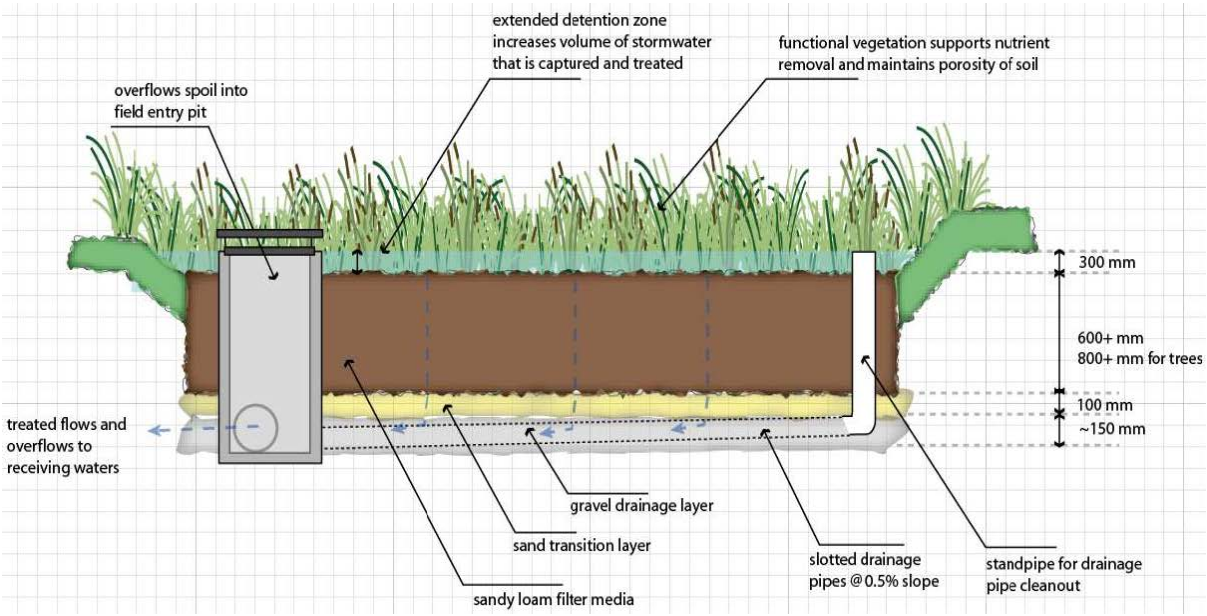
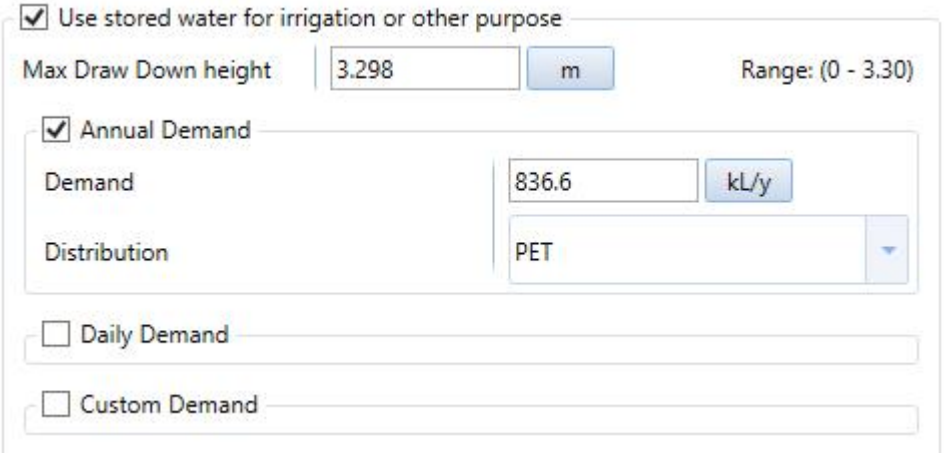


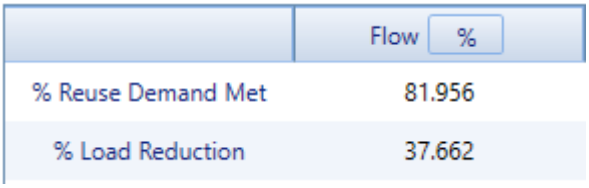
Figure 5.2.1: Typical Section of a generic Bio-Detention system (Source: Water by Design)

A 25m^2 bio-retention system has been proposed to be installed for the water quality treatment. MUSICx software was used to assess pollutant generation and the performance of stormwater treatment measures for the proposed development. Figure below presents the MUSIC model and results.

Water conservation measures are also applied to the development. A 59.2m^3 rainwater tank is proposed to treat the entirety of the roof runoff to be re-used for irrigation. For irrigation of landscaped areas, we allowed a value of 0.2 kL/year/m2 as PET-Rain for sprinkler systems.



Screenshot above showing the rainwater tank inputs into the music model.



Screenshot above showing the rainwater tank node water balance and the achieved re-use target.

6 MUSIC MODELLING

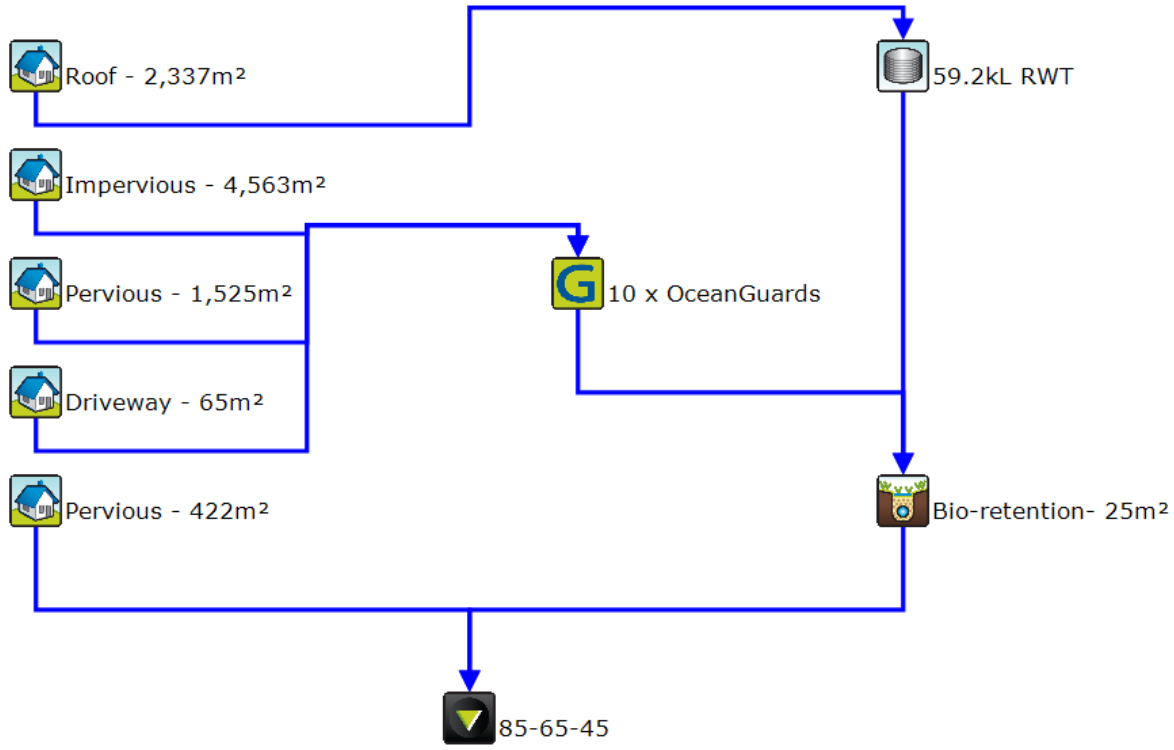
The water quality model adopted for this project is the MUSICX.

MUSIC can model a wide range of treatment devices to identify the best way to capture and reuse stormwater runoff, remove its contaminants, as well as reduce runoff frequency, to achieve WSUD and integrated water cycle management (IWCM) goals.

The MUSIC model was generated using the rainfall data and Stormfilter nodes prepared by Ocean Protect.

Catchment characteristics were defined using a combination of catchments with varying imperviousness ratios to replicate the catchment for the development condition.

Figure below presents the MUSIC model and results.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	5.789	5.043	12.88
Total Suspended Solids (kg/yr)	850.6	98.46	88.43
Total Phosphorus (kg/yr)	1.92	0.6556	65.85
Total Nitrogen (kg/yr)	15.3	7.609	50.28
Gross Pollutants (kg/yr)	143	0	100

Figure 6.1: music model and results

The MUSIC model layout is shown in Appendix A of this report.

7 CONCLUSIONS

This proposed Site Based Stormwater Management Plan has been prepared for the proposed Mixed Used Development at 9 Albert & 31 O'Connell Street, North Parramatta. This report has demonstrated that the site will be able to manage site-based stormwater quantity and quality requirements for the design storms up to and including the 1% AEP event.

The proposed site-based stormwater management measures are as below:

The Lawful Point of Discharge has been maintained for the proposed development in the location where the natural pre development overland flow from the site discharges.

An underground detention tank will provide non-worsening of post-development discharge from the proposed development by reducing the total discharge of stormwater from the site by 10% less than that from the site before it was developped.

A bio-retention system will be incorporated to provide stormwater quality treatment for the runoff from the proposed development.

A rainwater tank will be incorporated to meet 80% irrigation demands.

The conclusion of this site-based stormwater management plan is that by implementing the proposed stormwater quantity and quality management measures, the proposed development will ensure no worsening effects downstream of the proposed development and conforms to best engineering practices.

8 References

1- Parramatta Development Control Plan 2011

2- Development Engineering Design Guidelines.

APPENDIX A

Stormwater Plans

PIPES NOTE:
Ø65 PVC @ MIN 1.0%
Ø90 PVC @ MIN 1.0%
Ø100 PVC @ MIN 1.0%
Ø150 PVC @ MIN 1.0%
Ø225 PVC @ MIN 0.5%
Ø300 PVC @ MIN 0.4%
UNLESS NOTED OTHERWISE

NOTE:
ALL STORMWATER DRAINAGE PIPES ARE Ø100 PVC AT MIN 1.0% SLOPE U.N.O.

NOTE:
1. CONTRACTOR IS TO PROVIDE OVERFLOW OUTLETS & EMERGENCY OVERFLOW SPITTERS TO ALL TRAPPED AREAS.
2. DP/VD ARE Ø100 PIPES U.N.O.
3. ALL TRANSFERRING PIPES ARE SUSPENDED U.N.O.
4. BALCONIES PIPES ARE Ø50mm HDPE OR PVC CAST IN SLAB AT MIN 1.0% SLOPE.

NOTE:
IT IS CONTRACTOR'S RESPONSIBILITY TO ENSURE MINIMUM PONDING IS ACHIEVED OVER THE FLOOR WASTES BY GRADING CATCHMENTS' SURFACES AT MINIMUM 1.0% FALL.

NOTE:
ALL REDUNDANT PIPELINES WITHIN FOOTPATH AREA MUST BE REMOVED AND FOOTPATH/KERB REINSTATED.

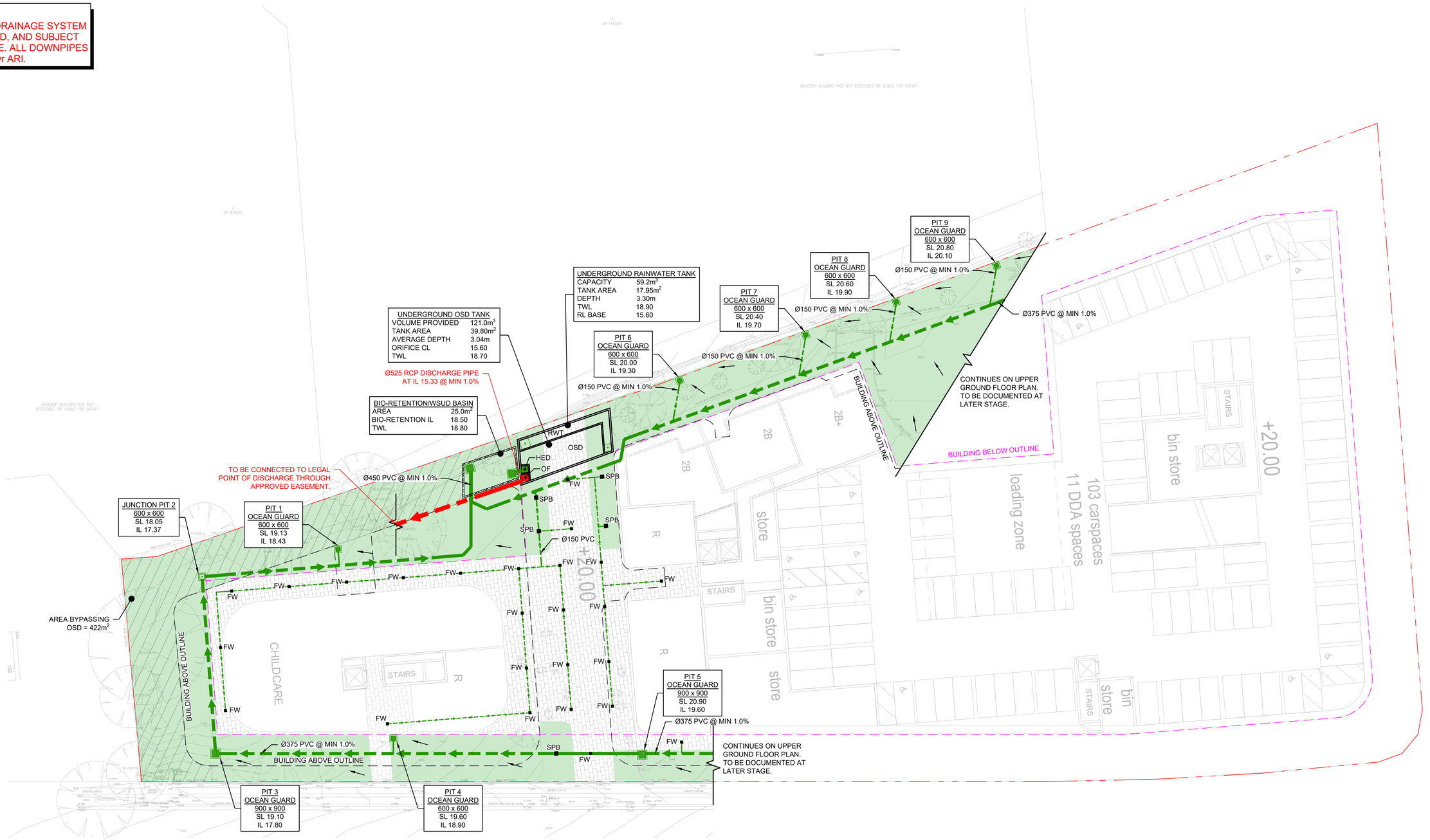
NOTE:
ALL GRATES WITHIN FOOTWAY AREAS TO BE HEEL GUARD & BIKE SAFE.

NOTE:
PITS DEEPER THAN 1.0m TO BE FITTED WITH STEP IRONS.

NOTE:
ALL LINEAR GRATED DRAINS TO BE MIN. 100mm DEEP.

NOTE:
REFER ARCHITECTURAL DRAWINGS FOR FINAL SET-OUT LEVELS.

NOTE:
ROOF AND UPPER LEVELS DRAINAGE SYSTEM TO BE CONNECTED TO WSUD, AND SUBJECT TO DETAILED DESIGN STAGE. ALL DOWNPIPES TO CATER FOR THE 1 in 100yr ARI.



LOWER GROUND PLAN
SCALE 1:250

NOT FOR CONSTRUCTION

Issue	Description	Date	Design	Checked
A	ISSUE FOR PLANNING PROPOSAL	23/01/2024	MJT	SBF

1cm at full size 10cm 20cm

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Scale
0 2 4 6 8 10 12 m
SCALE 1:250 @ A1

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Project
9 ALBERT & 31 O'CONNELL STREET, NORTH PARRAMATTA
PROPOSED MIXED USE DEVELOPMENT
STORMWATER CONCEPT PLANS
PLANNING PROPOSAL

Drawing Title
STORMWATER CONCEPT PLAN
LOWER GROUND

Scale	Project No.	Dwg. No.	Issue
1:250 A1	22454	101	A

CATCHMENT LEGEND

ROOF AREA TO RWT THEN TO BIO-RETENTION = 2,337m^2

IMPERVIOUS AREA TO BIO-RETENTION = 4,563m^2

PERVIOUS AREA TO BIO-RETENTION = 1,525m^2

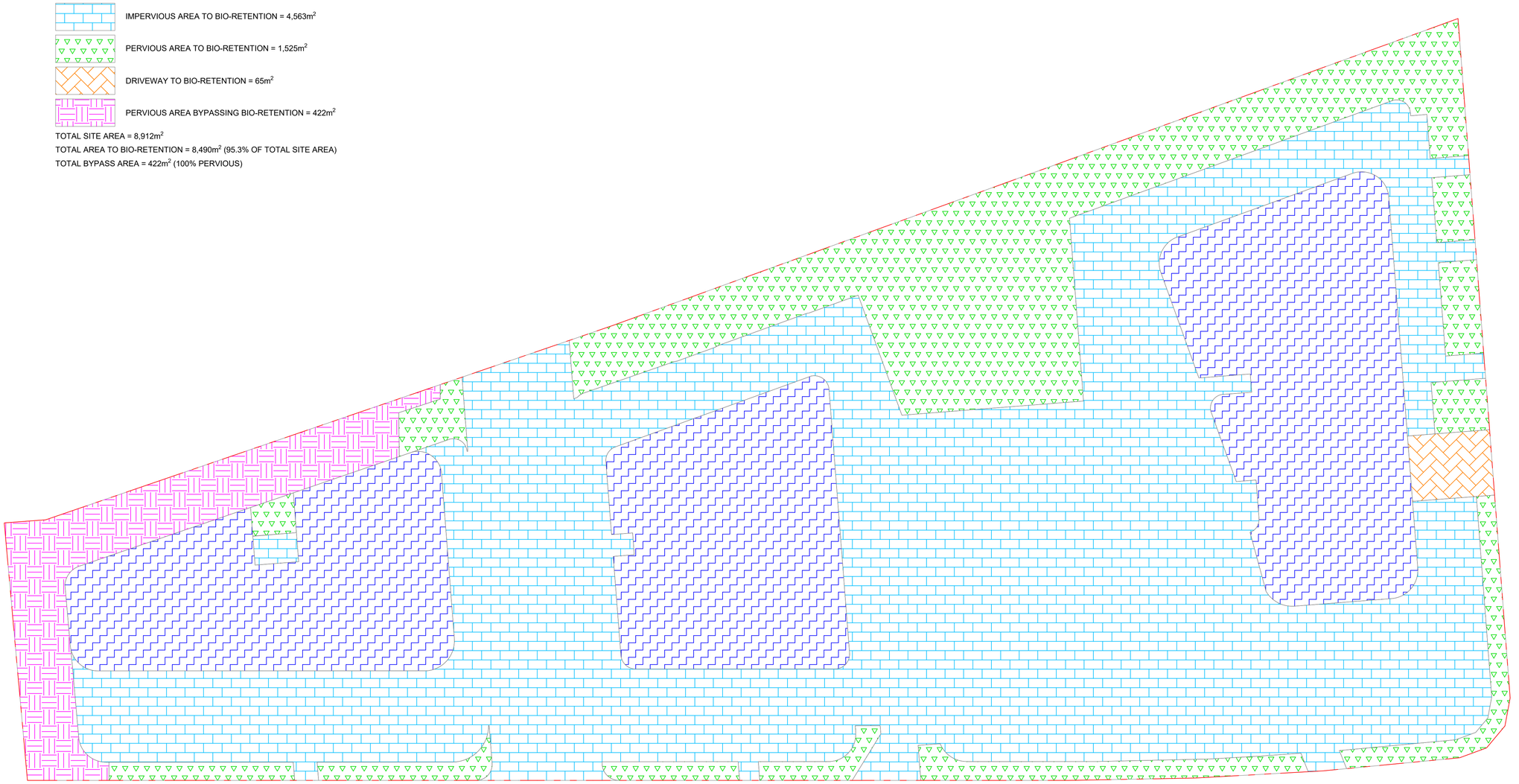
DRIVEWAY TO BIO-RETENTION = 65m^2

PERVIOUS AREA BYPASSING BIO-RETENTION = 422m^2

TOTAL SITE AREA = 8,912m^2

TOTAL AREA TO BIO-RETENTION = 8,490m^2 (95.3% OF TOTAL SITE AREA)

TOTAL BYPASS AREA = 422m^2 (100% PERVIOUS)



CATCHMENT PLAN

SCALE 1:250

NOT FOR CONSTRUCTION

Issue	Description	Date	Design	Checked
A	ISSUE FOR PLANNING PROPOSAL	23/01/2024	MJT	SBF

10m at full size

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Scale
0 2 4 6 8 10 12 m
SCALE 1:250 @ A1

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Project
9 ALBERT & 31 O'CONNELL STREET, NORTH PARRAMATTA
PROPOSED MIXED USE DEVELOPMENT
STORMWATER CONCEPT PLANS
PLANNING PROPOSAL

Drawing Title
WSUD CATCHMENT PLAN

Scale A1	Project No.	Dwg. No.	Issue
As Shown	22454	102	A