


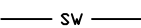



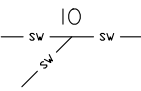


72 PARK AVENUE, KINGSWOOD

STORMWATER MANAGEMENT PLAN

DRAWING INDEX:

SW-000	LEGEND
SW-001	PIPE LAYOUT-SHEET 1
SW-002	PIPE LAYOUT-SHEET 2
SW-003	PIPE LAYOUT-SHEET 3
SW-004	ROOF LAYOUT
SW-100	DETAILS – SHEET 1
SW-101	DETAILS – SHEET 2
SW-200	SITE AREAS
SW-900	EROSION & SEDIMENT CONTROL PLAN
LT-001	SW & WSUD DESIGN STATEMENT

LEGEND:

	DOWNPIPE
	STORMWATER PIPE
	RAINWATER PIPE
	SUBSOIL DRAIN
	DRAINAGE PIT
	INSPECTION OPENING
	RAINWATER OUTLET
	GRATED BOX DRAIN

NOTES:

1. ALL DIMENSIONS TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION.

2. SITE LAYOUT BASED ON ARCHITECTURAL PLANS BY ALTIS ARCHITECTURE (JUNE 2023) AND SURVEY PLANS BY VERTEX SURVEYORS (24/01/2022).

3. LOCATION OF ALL SERVICES MUST BE CONFIRMED ON SITE PRIOR TO COMMENCEMENT OF EXCAVATION WORKS.

4. ALL STORMWATER DRAINAGE PIPES AND ASSOCIATED DEVICES ARE TO BE INSTALLED IN ACCORDANCE WITH THE RELEVANT STANDARDS, THE BUILDING CODE OF AUSTRALIA, MANUFACTURER’S RECOMMENDATIONS, SYDNEY CATCHMENT AUTHORITY RECOMMENDED PRACTICE, AND LOCAL COUNCIL, AS APPLICABLE.

5. ALL INVERT LEVELS PROVIDED ON THIS DRAWING ARE REDUCED TO AHD AND BASED ON INTERPOLATED SURFACE LEVELS AND SYSTEM REQUIREMENTS.
6. WHERE POSSIBLE, PIPEWORK SHALL BE LOCATED EXTERNAL TO THE BUILDING.

7. DOWNPIPES AND STORMWATER LINES TO BE SEALED DN100 uPVC UNLESS OTHERWISE NOTED.


8. STORMWATER PIPES TO BE GRADED AT A MINIMUM 1% UNLESS NOTED OTHERWISE.

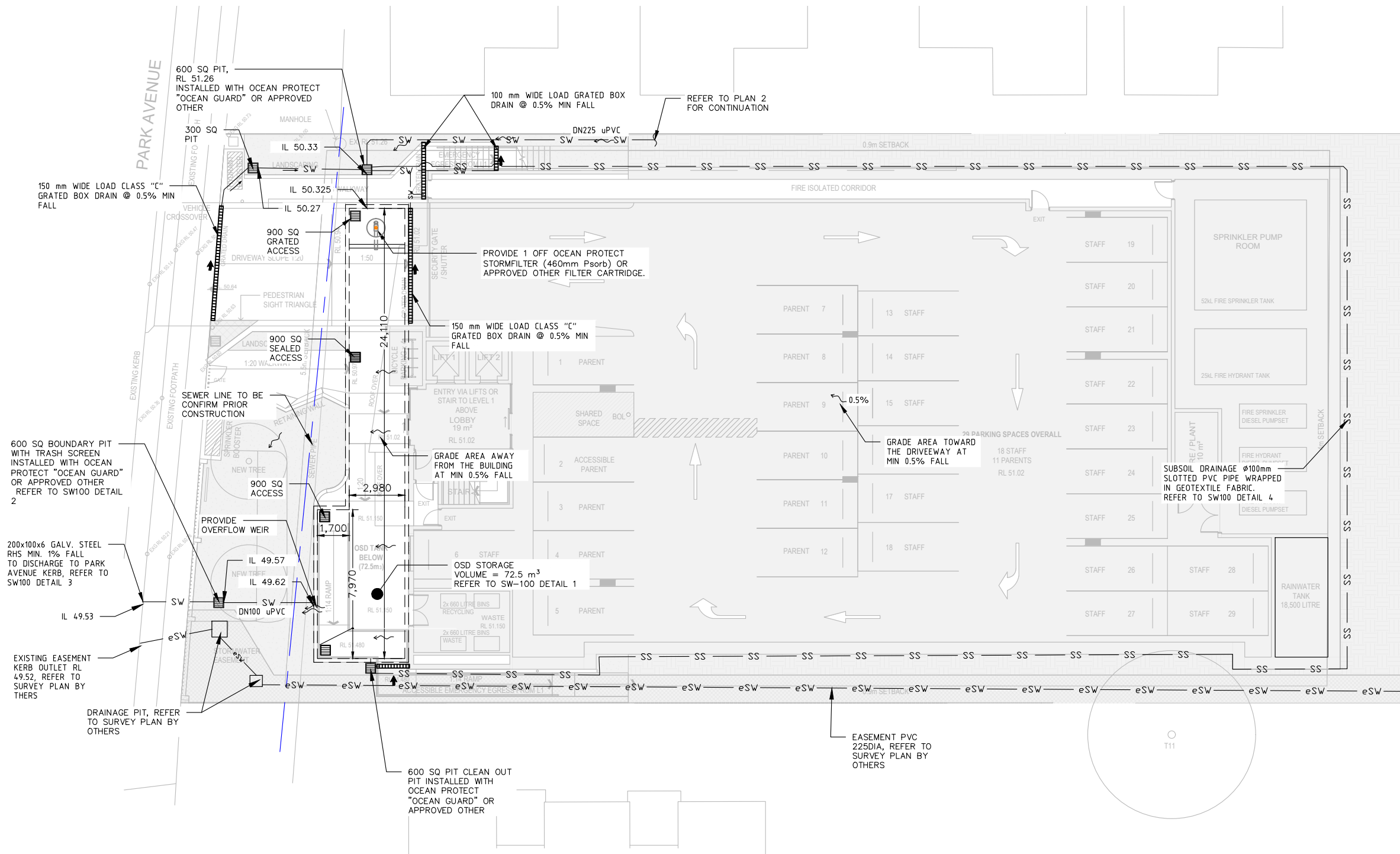
9. ALTERNATIVE GUTTER AND DOWNPIPE CONFIGURATION MAY BE INSTALLED PROVIDED IT COMPLIES WITH AS3500.

10. ALL PIPE AND CONDUITS TO BE MARKED IN ACCORDANCE WITH AS1345 – 1995.

11. TRENCHES AND SERVICE SEPARATIONS IN ACCORDANCE WITH AS/NZS 5601, AS/NZS 3500, AND AS/CA S009.


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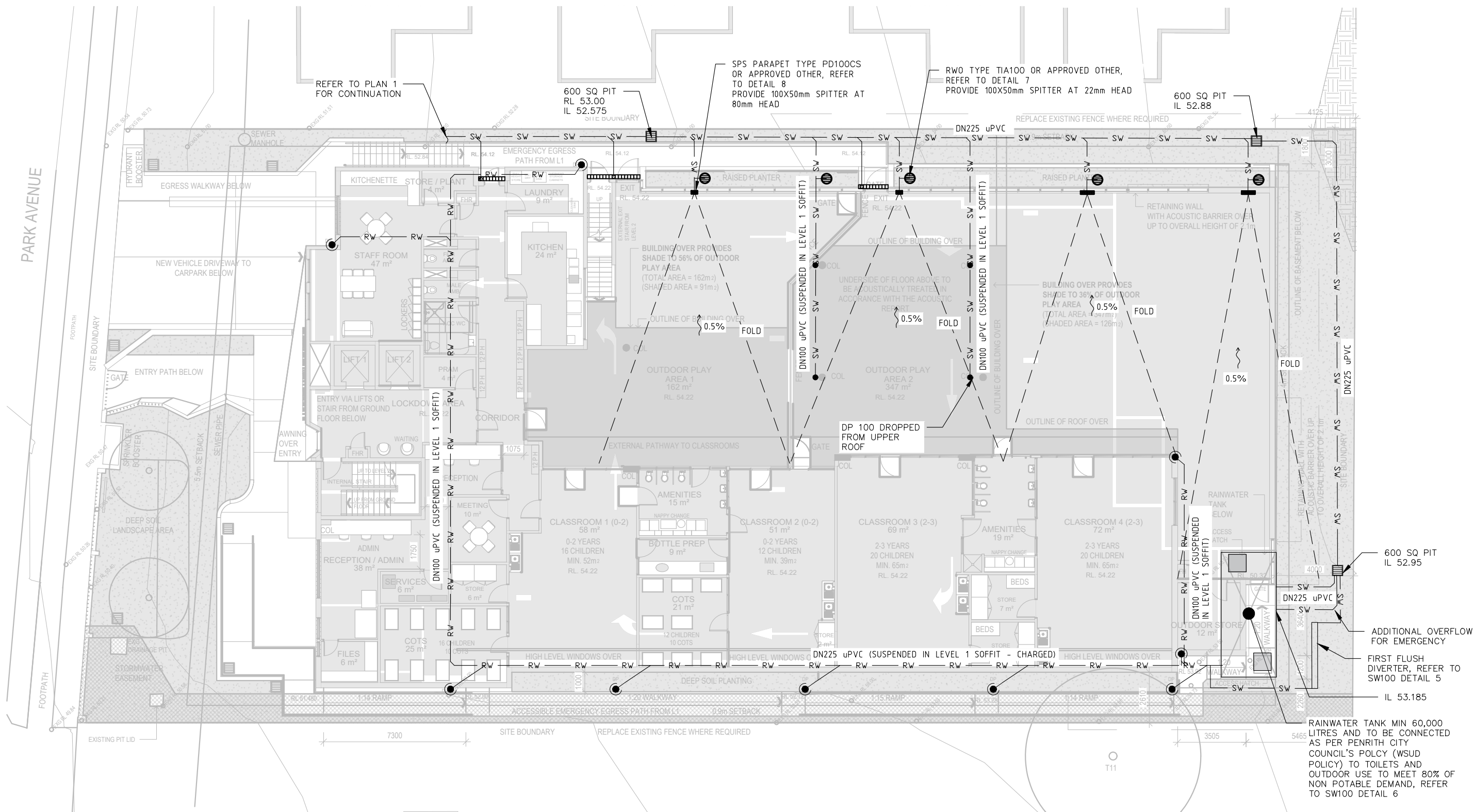
this drawing is confidential and shall only be used for the purposes of this project.						Scale NA DO NOT SCALE. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED	THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE STELLEN QUALITY ASSURANCE SYSTEM				 Stellen Consulting ABN 61 149 095 189	This design complies with: AS3500.3:2021	72 PARK AVENUE, KINGSWOOD			
REVISIONS													LEGEND			
							DESIGNED	YYA	CHECKED	TK						
							DRAWN	YYA	CHECKED	TK						
							APPROVED	LES	DATE	09/12/2022						
1	YYA	21/06/2023	FOR COUNCIL DA RFI				TK									
0	YYA	09/12/2022	APPROVED FOR DA SUBMISSION				LES									
No	BY	DATE	DESCRIPTION				APPD									



PLAN
1
PIPE LAYOUT-GROUND FLOOR
1: 200

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						DESIGNED YYA CHECKED TK										
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0	YYA	09/12/2022	APPROVED FOR DA SUBMISSION		LES											
No.	BY	DATE	DESCRIPTION		APPD							Size A3	Status FOR COUNCIL DA RFI	Dwg No. P171066-DR-SW-001	Rev. 1	



PLAN
2
PIPE LAYOUT- LEVEL 1
1: 200

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0	YYA	09/12/2022	APPROVED FOR DA SUBMISSION	LES

Scale	
1:200	
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DRAWN	YYA	CHECKED	TK
APPROVED	LES	DATE	09/12/2022

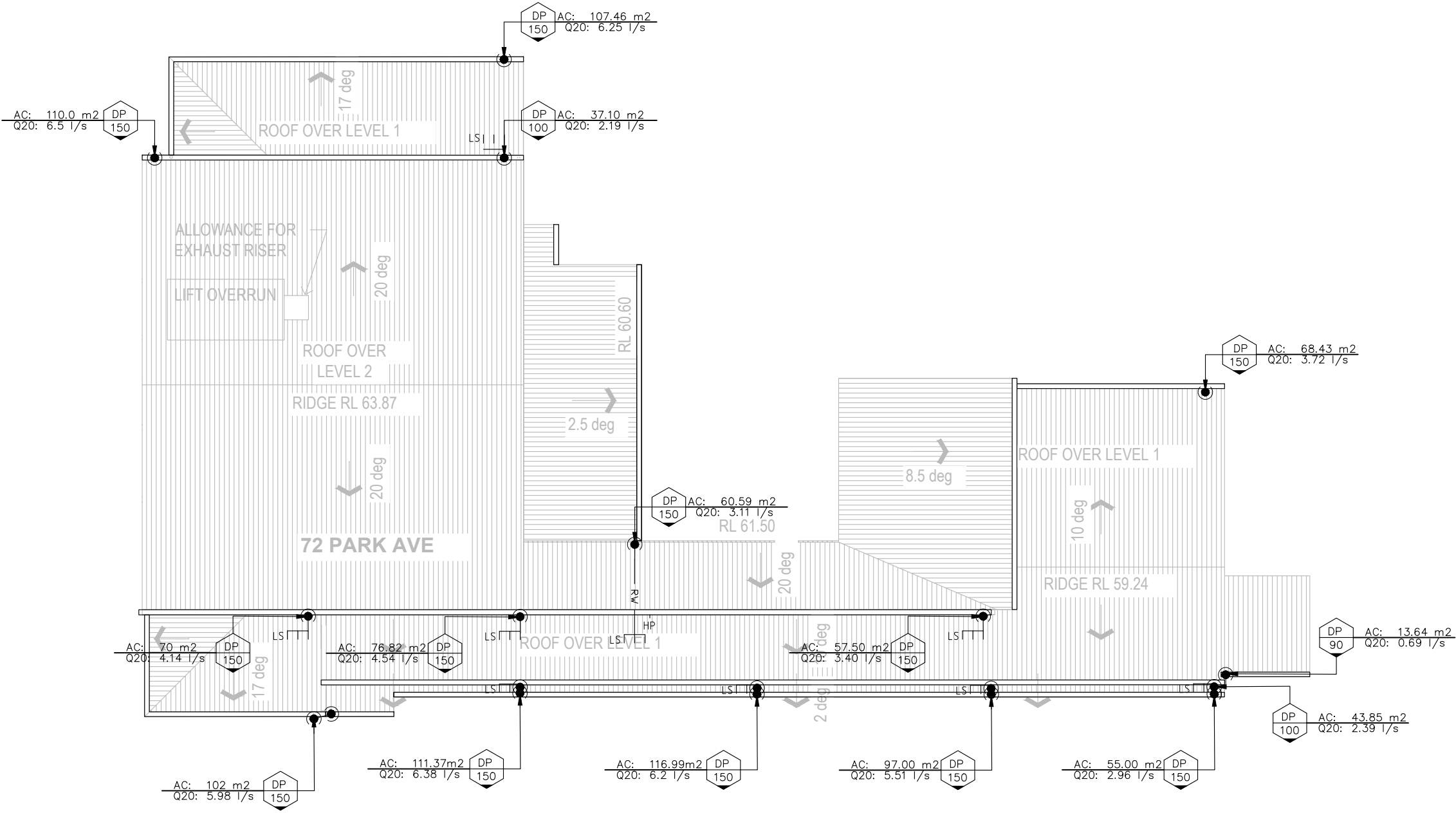


This design complies with: AS3500.3:2021		72 PARK AVENUE, KINGSWOOD	
		PIPE LAYOUT - SHEET 2	
Size A3	Status FOR COUNCIL DA RFI	Org No. P171066-DR-SW-002	Rev. 1

NOMENCLATURE
DP - DOWNPIPE
EG - EAVES GUTTER
LS - LEVEL SPREADER
Ac - PLAN CATCHMENT AREA EXCLUDING ROOF PITCH
Q20 - 20YR 5 MINUTE ARI FLOW RATE
Q100 - 100YR 5 MINUTE ARI FLOW RATE


GUTTER SIZING
RWO DESIGNED TO ARI (100YR:243mm/hr)
EAVE GUTTER DESIGNED TO ARI (20YR:180mm/hr)

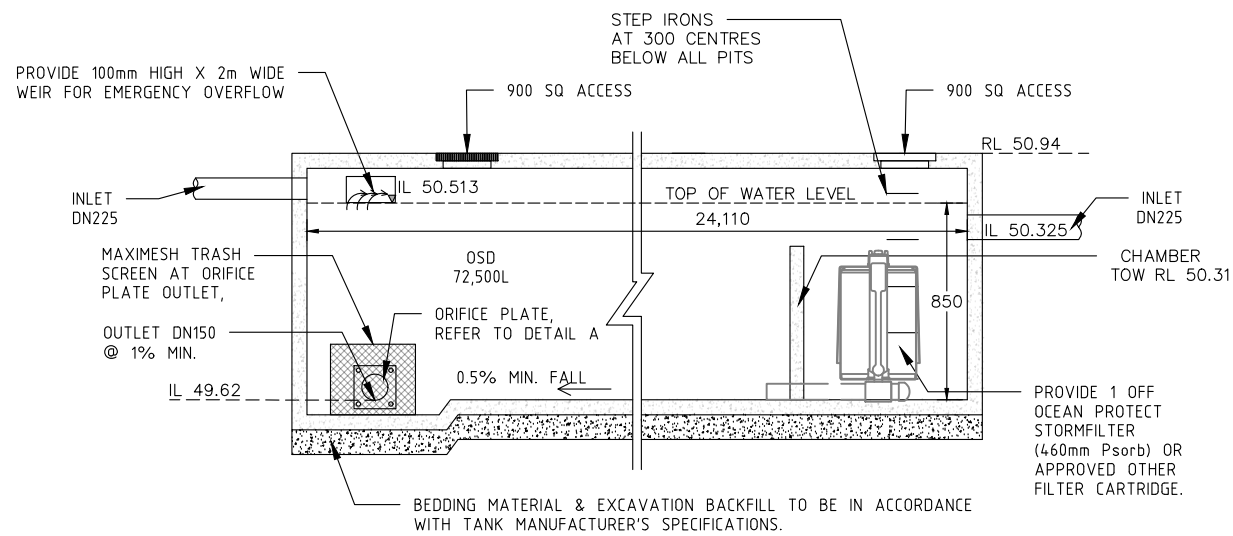
LEGEND
 DOWNPIPE TYPE AND DIAMETER
 DIRECTION OF FALL
 LEVEL SPREADER



PLAN 4
ROOF LAYOUT
1:200

NOT FOR CONSTRUCTION

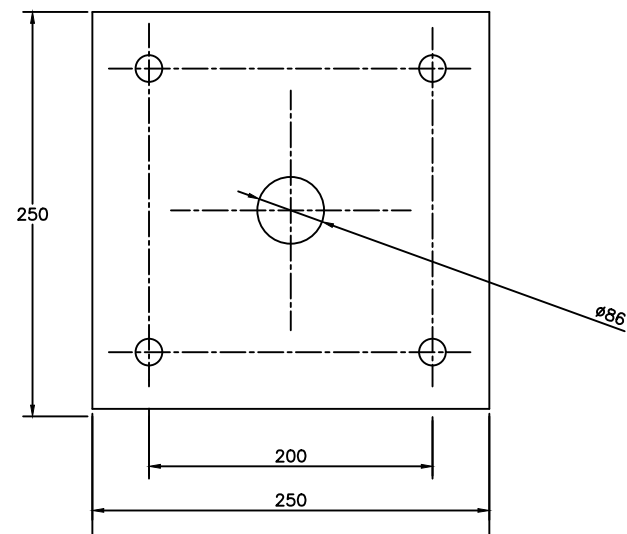
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AS NOTED						DO NOT SCALE. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED				ROOF LAYOUT									
REVISIONS																			
	1	YYA	21/06/2023	FOR COUNCIL DA RFI															
	0	YYA	09/12/2022	APPROVED FOR DA SUBMISSION															
	No.	BY	DATE	DESCRIPTION															



DETAIL 1
OSD TANK SECTION AND SCHEMATIC
NOT TO SCALE

NOTES:

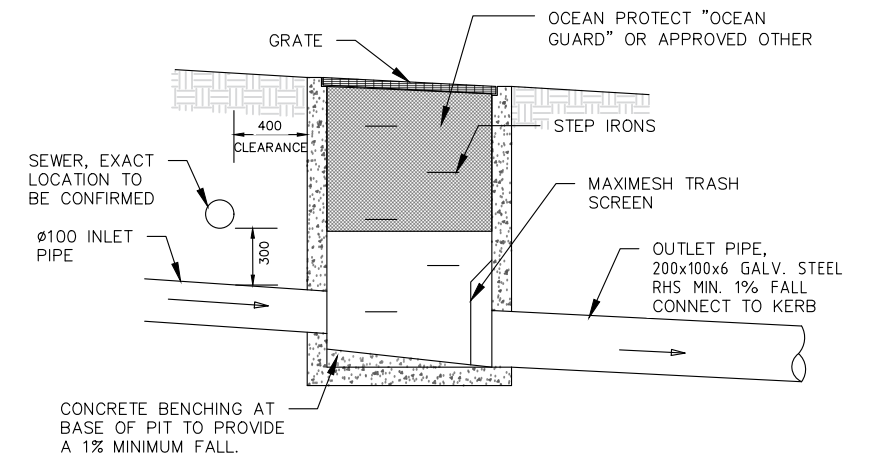
1. PIPES TO THE OSD TANK MUST BE WATER TIGHT TO PREVENT LEAKAGE THAT RESULTS IN SATURATION OF SOILS AND DAMAGE TO STRUCTURES.



DETAIL A
ORIFICE PLATE
NOT TO SCALE

NOTES:

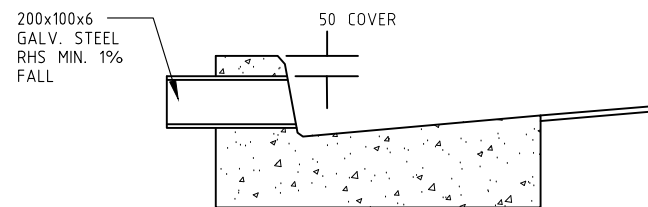
1. ORIFICE PLATE DIAMETER TO BE 89mm



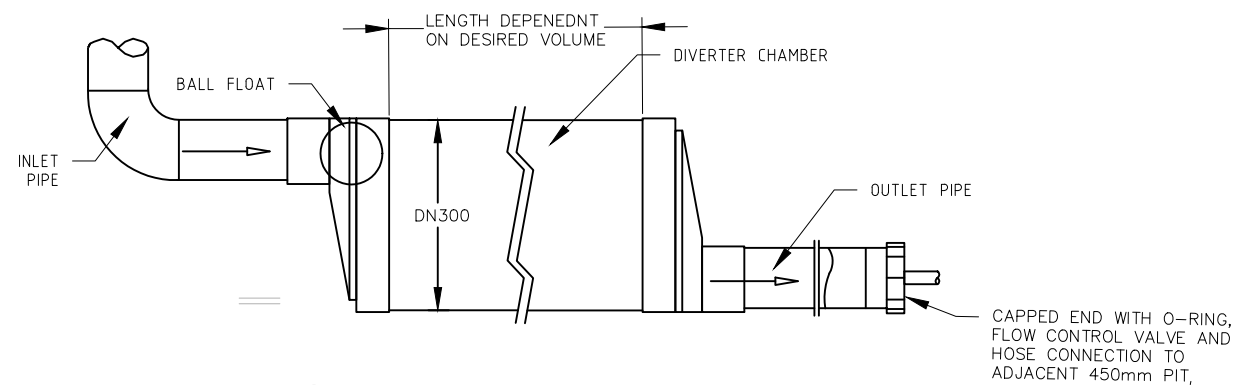
DETAIL 2
600X600 BOUNDARY PIT
NOT TO SCALE

NOTES:

1. 'LYSAGHT' MAXIMESH RH3030 (HOT DIPPED GALVANISED) OR EQUIVALENT.
2. MAXI MESH SCREENS MUST BE PLACED SUCH THAT THE LONG AXIS OF THE OVAL SHAPED HOLES ARE ORIENTATED HORIZONTALLY WITH THE PROTRUDING LIP ANGLED UPWARDS AND FACING TOWARDS THE OUTLET



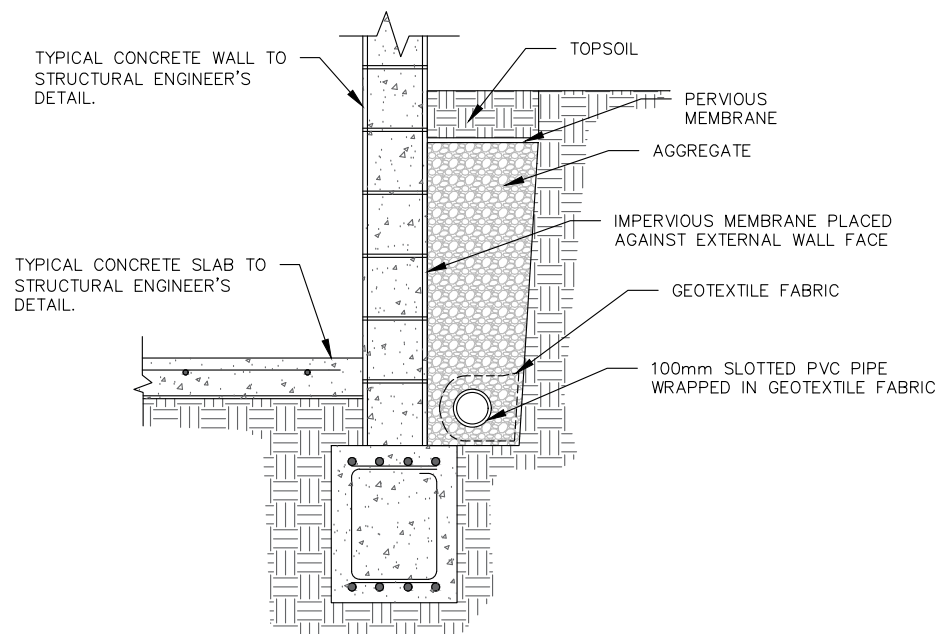
DETAIL 3
TYPICAL KERB CONNECTION
NOT TO SCALE



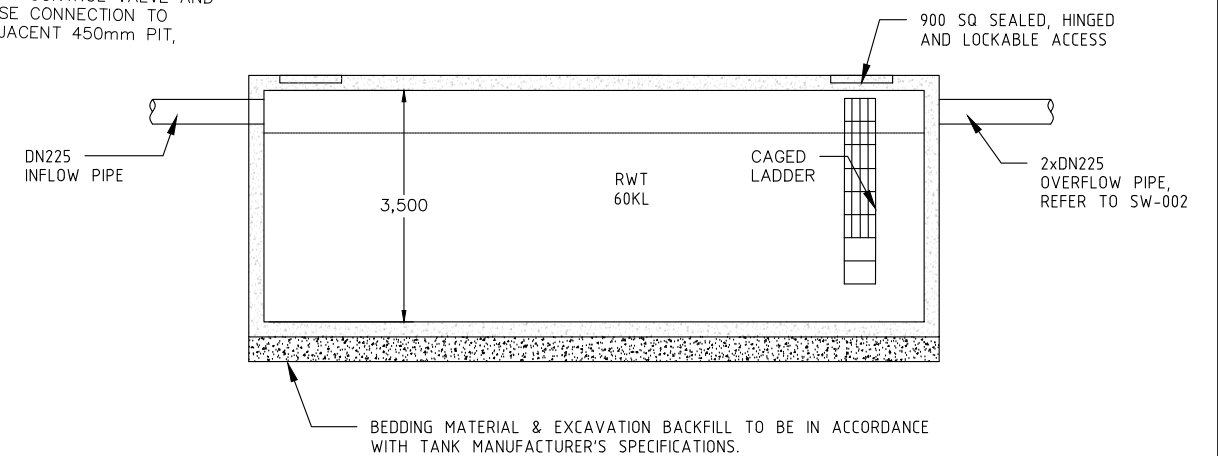
DETAIL 5
IN GROUND FIRST FLUSH DIVERTER
NOT TO SCALE

NOTES:

1. INSTALL WITH MINIMUM 5 DEGREE SLOPE.
2. DIVERTER VOLUME TO BE MIN 200L (2.77m of DN 300).



DETAIL 4
TYPICAL SUBSOIL DRAINAGE DETAIL
NOT TO SCALE



DETAIL 6
TYPICAL RAINWATER REUSE TANK ELEVATION
NOT TO SCALE

NOTES:

1. RAINWATER TANK TO BE AT LEAST 60,000 LITRES.
2. RAINWATER TANK MUST MEET, AND BE INSTALLED IN ACCORDANCE WITH, THE REQUIREMENTS OF ALL APPLICABLE REGULATORY AUTHORITIES.
3. THE APPLICANT MUST CONFIGURE THE RAINWATER TANK TO COLLECT RAINWATER RUNOFF FROM 789.28m² ROOF AREA
4. RAINWATER REUSE SYSTEM TO BE CONNECTED TO THE FOLLOWING FOR REUSE:
 - 4.1. TOILETS FOR FLUSHING
 - 4.2. IRRIGATION SYSTEM
5. RAINWATER REUSE SYSTEM TO BE PROVIDED WITH AUTOMATIC MAINS WATER SWITCHING.

NOT FOR CONSTRUCTION

REVISIONS				
No.	BY	DATE	DESCRIPTION	APPD
1	YYA	21/06/2023	FOR COUNCIL DA RFI	TK
0	YYA	09/12/2022	APPROVED FOR DA SUBMISSION	LES

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DRAWN	YYA	CHECKED	TK
APPROVED	LES	DATE	09/12/2022

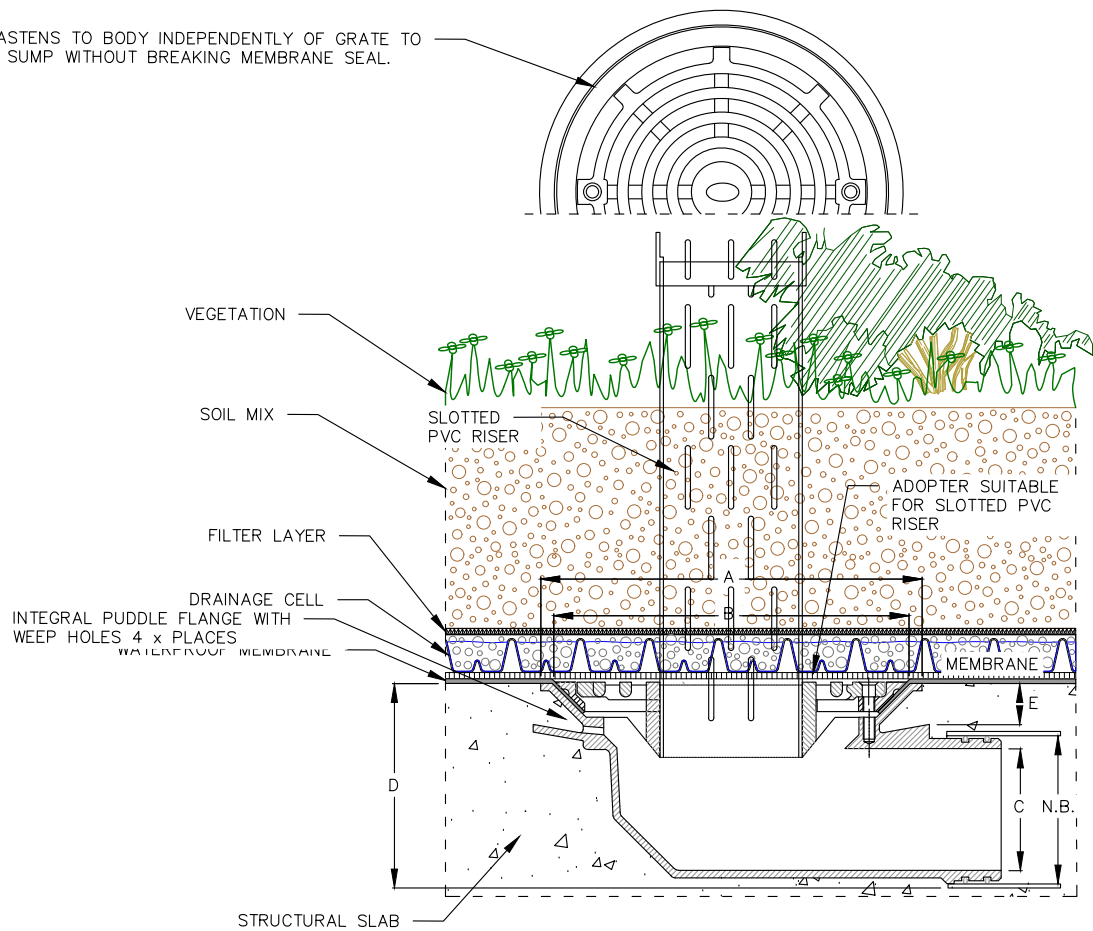
Stellen

Stellen Consulting ABN 61 149 095 189

This design complies with:
AS3500.3:2021

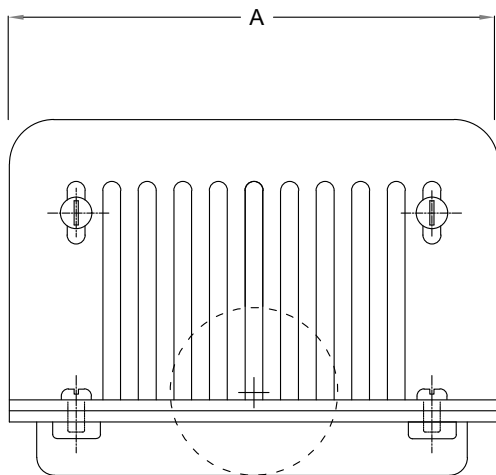
72 PARK AVENUE, KINGSWOOD			
DETAILS - SHEET 1			
Size	A3	Status	FOR COUNCIL DA RFI
Drwg No.	P171066-DR-SW-100	Rev.	1

MEMBRANE RING FASTENS TO BODY INDEPENDENTLY OF GRATE TO ALLOW ACCESS TO SUMP WITHOUT BREAKING MEMBRANE SEAL.

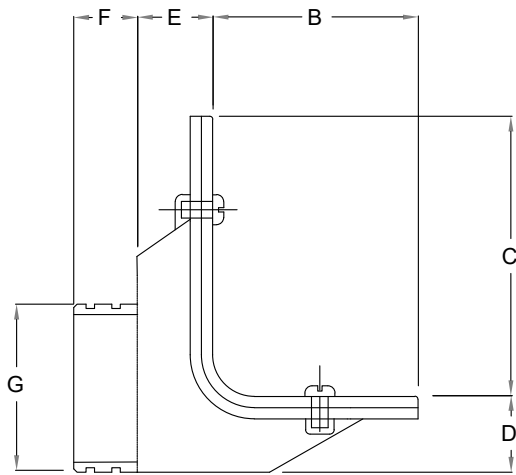


DETAIL
7

TYPICAL ROOF GARDEN & RAINWATER OUTLET
NOT TO SCALE



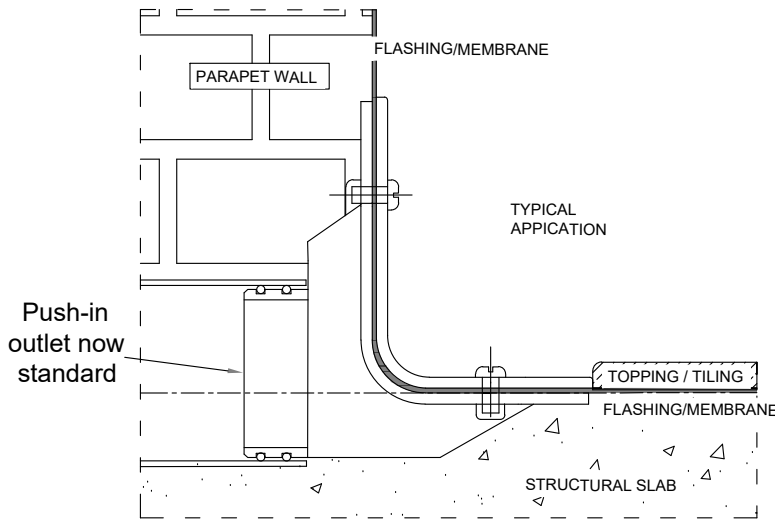
FRONT VIEW



SIDE VIEW

DIMENSIONS (mm)

N.B.	A	B	C	D	E	F	G
100	280	105	153	45	45	37	97




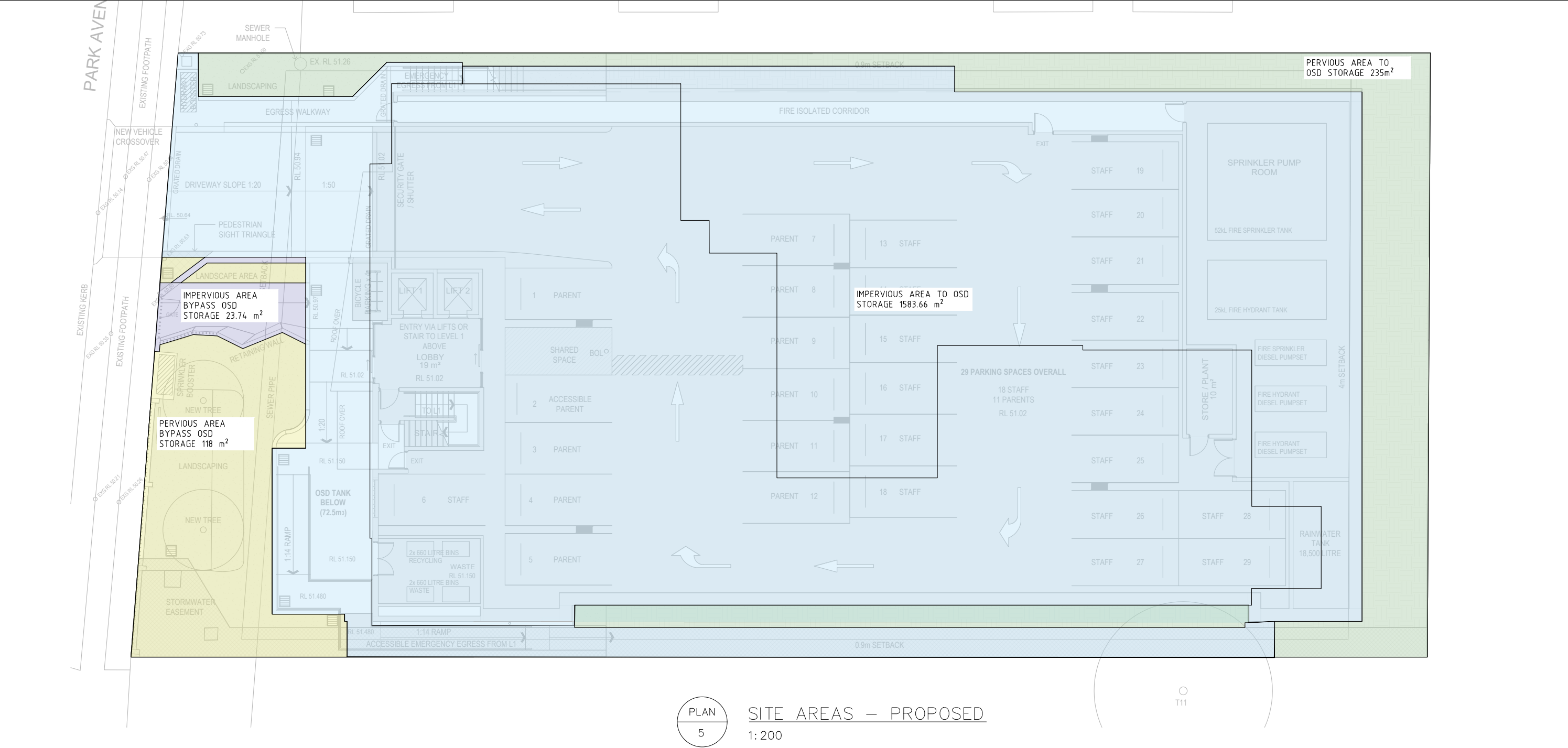
TYPICAL APPLICATION

DETAIL
8

TYPICAL DETAILS FOR SPS SUPPER DRAIN
NOT TO SCALE

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PLAN 5 SITE AREAS – PROPOSED 1:200

SITE AREA CALCULATION FOR OSD DESIGN AND MUSIC MODELING

TOTAL SITE AREA		1960.4 m ²
TOTAL AREA TO OSD		1818.66 m ² (92.77%)
<div></div>	IMPERVIOUS TO OSD	1583.55 m ² (87.07%)
<div></div>	PERVIOUS TO OSD	235 m ² (12.93%)
TOTAL AREA BYPASS OSD		141.74 m ² (7.23%)
<div></div>	IMPERVIOUS BYPASS OSD	23.74 m ² (16.75%)
<div></div>	PERVIOUS BYPASS OSD	118 m ² (83.35%)

OSD CALCULATION


BASED ON COUNCIL’S STORMWATER DRAINAGE SPECIFICATION FOR BUILDING DEVELOPMENTS, PENRITH CITY COUNCIL ES-002 TABLE 8 THE PERMISSIBLE OSD DISCHARGE (P(OSD)D) AND REQUIRED OSD STORAGE IS:

PERCENTAGE OF SITE BYPASSING OSD	= 7.23%
P(OSD)D 76.04 * 0.196078	=14.916 L/s
OSD STORAGE 316.68 * 0.196078	= 62.1 m ³

AND THE OSD SYSTEM ORIFICE OUTLET WAS CALCULATED AS:

ORIFICE SIZE = 89mm

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REVISIONS								DESIGNED	YYA	CHECKED			TK	SITE AREAS							
	2	YYA	16/06/2023	FOR COUNCIL DA RFI	TK	DRAWN	YYA	CHECKED	TK												
	1	TK	14/12/2022	APPROVED FOR DA SUBMISSION	TK	APPROVED	LES	DATE	14/12/2022												
	0	YYA	09/12/2022	APPROVED FOR DA SUBMISSION	LES																
No.	BY	DATE	DESCRIPTION	APPD										Size	A3	Status	FOR COUNCIL DA RFI	Org No.	P171066-DR-SW-200	Rev.	2



THE FOLLOWING EROSION AND SEDIMENT CONTROL PLAN (ESCP) HAS BEEN DEVELOPED IN GENERAL ACCORDANCE WITH LANDCOM (2004) – MANAGING URBAN STORMWATER: SOILS AND CONSTRUCTION, OTHERWISE KNOWN AS "THE BLUE BOOK". THIS PLAN SHOULD ALSO BE READ IN CONJUNCTION WITH MANAGING URBAN STORMWATER – SOILS AND CONSTRUCTION (VOLUME 2A INSTALLATION OF SERVICES).

PRIOR TO THE COMMENCEMENT OF EARTHWORKS ON THE SITE THE FOLLOWING SHALL BE UNDERTAKEN AS A MINIMUM:


1. ERECT SAFETY FENCING WITH SIGNAGE CLEARLY INDICATING THAT THE SITE IS A CONSTRUCTION ZONE AND ACCESS IS RESTRICTED AS DEEMED NECESSARY.
2. ERECT CLEARLY VISIBLE BARRIER FENCING AT LOCATIONS SHOWN OR IF NOT SHOWN AT THE DISCRETION OF THE SITE SUPERINTENDENT TO ENSURE TRAFFIC IS CONTROLLED AND TO PROHIBIT UNNECESSARY SITE DISTURBANCE.
3. WHERE REQUIRED AT THE DISCRETION OF THE SITE SUPERINTENDENT, INSTALL STABILISED SITE ACCESS AT SITE ACCESS POINT TO PREVENT CONSTRUCTION EQUIPMENT FROM CARRYING SEDIMENT OFF THE SITE ONTO SURROUNDING ROADS.
4. PROVIDE GERNI PRESSURE CLEANER AT SITE EXIT POINT FOR TYRE WASH DOWN AT THE DISCRETION OF THE SITE SUPERINTENDENT.
5. INSTALL SEDIMENT AND EROSION CONTROL DEVICES IN ACCORDANCE WITH THE CONSTRUCTION DETAILS SPECIFIED IN THIS DRAWING SET AND/OR THE REQUIREMENTS OF THE 'BLUE BOOK'.

6. USE SANDBAGS, HAY BALES AND/OR GRAVEL FILLED GEOTEXTILE SOCKS TO FILTER AND CONVEY STORMWATER RUNOFF WITHIN THE SITE.
7. ALL DRAINAGE WORKS SHALL BE CONSTRUCTED AND STABILISED AS EARLY AS POSSIBLE DURING DEVELOPMENT.
8. INLET FILTERS SHALL BE INSTALLED WHERE SHOWN TO PREVENT WATER FROM DIRECTLY ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS RELATIVELY SEDIMENT FREE. IF THE LOCATION OF INLET FILTERS ARE NOT SHOWN ON THE PLAN THEIR LOCATION SHALL BE AT THE DISCRETION OF THE SUPERINTENDENT.
9. STAGE WORK AND PROGRAMMING OF CONSTRUCTION ACTIVITIES TO MINIMISE THE EXTENT AND DURATION OF OPEN EXCAVATION. AVOID OPENING TRENCHES WHENEVER THE RISKS OF STORMS ARE HIGH.
10. DIVERT SURFACE WATER AWAY FROM EXCAVATION AREAS WITH SANDBAGS OR EQUIVALENT.
11. FOR DEWATERING OF EXCAVATION AREAS SET UP TEMPORARY DEWATERING PUMP OUT SYSTEM AS REQUIRED AND ENSURE FLOCCULATION IS USED IF WATER IS NOT CLEAR (i.e. SEDIMENT > 50mg/L). FOR RATES AND AGENTS REFER APPENDIX E NSW DEPARTMENT OF HOUSING "MANAGING URBAN STORMWATER SOILS & CONSTRUCTION". DISCHARGE SHALL BE DIRECTLY TO COUNCIL'S PIPED DRAINAGE SYSTEM. DO NOT DISCHARGE TO THE KERB.
12. STOCKPILES SHALL BE LOCATED NO CLOSER THAN 2m (PREFERABLY 5m) FROM CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS. PROTECT STOCKPILES FROM EROSION BY RAIN AND SURFACE FLOWS.
13. ENSURE CHEMICAL AND FUELS ARE STORED WITHIN BUNDED AREAS AND ELEVATED ABOVE POTENTIAL FLOW PATHS.

14. ALL DEDICATED SEDIMENT STORAGE ZONES WITHIN TRAPS SHALL BE CLEANED WHEN A MAXIMUM OF 60% FULL OF SOLID MATERIALS AND DISPOSED OF IN A MANNER THAT PREVENTS FURTHER POLLUTION OF THE SITE.
15. TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES WILL BE RETAINED UNTIL EARTHWORK ACTIVITIES ARE COMPLETED AND THE SITE IS STABILISED.
16. THE CONTRACTOR SHALL INSPECT THE SITE AT LEAST WEEKLY AND AFTER ANY STORM EVENT AND WILL:
 - ENSURE THAT DRAINS OPERATE PROPERLY AND TO EFFECT ANY NECESSARY REPAIRS;
 - REMOVE SPILLED SAND OR OTHER MATERIALS FROM AREAS OF LIKELY CONCENTRATED OR HIGH VELOCITY FLOWS (ESPECIALLY DRAINS AND TEMPORARY FLOW PATHS)
 - REMOVE TRAPPED SEDIMENT WHENEVER LESS THAN DESIGN CAPACITY REMAINS WITHIN THE STRUCTURE;
 - CONSTRUCT ADDITIONAL EROSION AND/OR SEDIMENT CONTROL WORKS AS REQUIRED;
 - MAINTAIN EROSION AND SEDIMENT CONTROL MEASURES IN A FULLY FUNCTIONING CONDITION UNTIL ALL EARTHWORK ACTIVITIES ARE COMPLETED AND THE SITE IS STABILISED; AND
 - REMOVE TEMPORARY EROSION AND SEDIMENT CONTROL STRUCTURES AS THE LAST ACTIVITY IN THE CONSTRUCTION PROGRAM.



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1.0 Stormwater Management

The stormwater management plan design is described in the following Stellen drawings:

SW-000	Revision 1	Legend
SW-001	Revision 1	Pipe Layout - Sheet 1
SW-002	Revision 1	Pipe Layout - Sheet 2
SW-003	Revision 1	Pipe Layout - Sheet 3
SW-004	Revision 1	Roof Layout
SW-100	Revision 1	Details - SHEET 1
SW-101	Revision 0	Details - SHEET 2
SW-200	Revision 2	Site Areas
SW-900	Revision 1	Erosion & Sediment Control Plan
LT-001	Revision 2	SW & WSUD design statement

The proposed stormwater design as described by the drawings is in accordance with the following documents with the noted exceptions:

- Australian Standard AS3500.3 (2021) - Plumbing and Drainage: Part 3 Stormwater Drainage.
- Penrith City Council - Stormwater Drainage Specification for Building Development (2016)

We recommend the stormwater management plan (as described in the drawings) as a safe and practical solution to support the development.

2.0 Stormwater Quality

Conceptual water quality modelling using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Version 6.3 was undertaken to estimate the effectiveness of the proposed stormwater management strategy at removing pollutants, particularly sediment, phosphorous and nitrogen, over the long term.

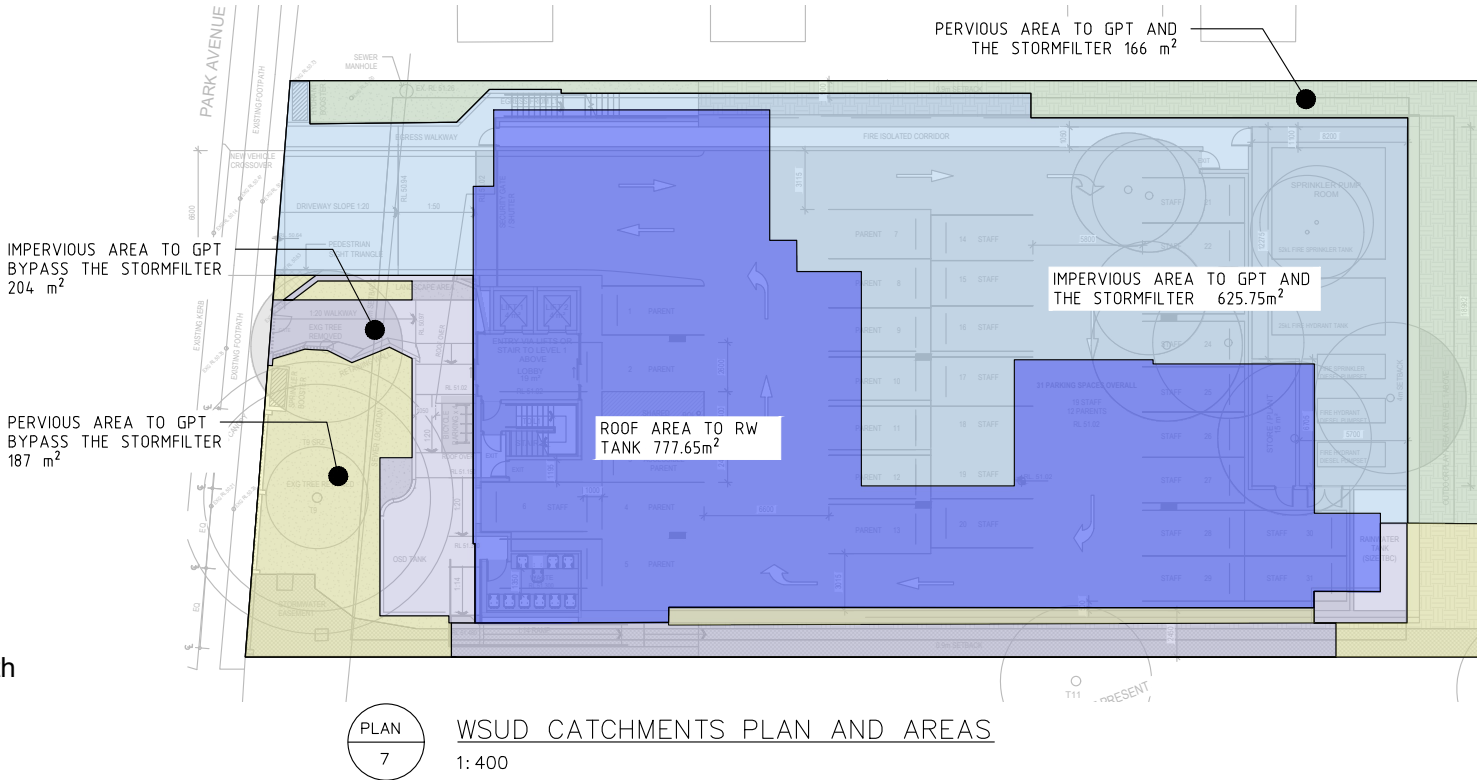
A number of Water-sensitive urban design (WSUD) measures are proposed to manage runoff from the site including:

- 60 KL rainwater tank capturing roof water from 777.65m² connected to toilets and outdoor area for irrigation to meet 80% of the non potable demand based on 12 toilets operates 5 days a week and 336 m² outdoor landscape subsurface irrigation.
- 3x Grass pollutant trap, ENVIROPOD 2000 (SFEP USE 2011B), refer to SW-001 for distribution.
- 1x PSorb (MCC) 460mm Cartridges in the OSD.

The model configuration and proposed treatment train is shown in model 1.

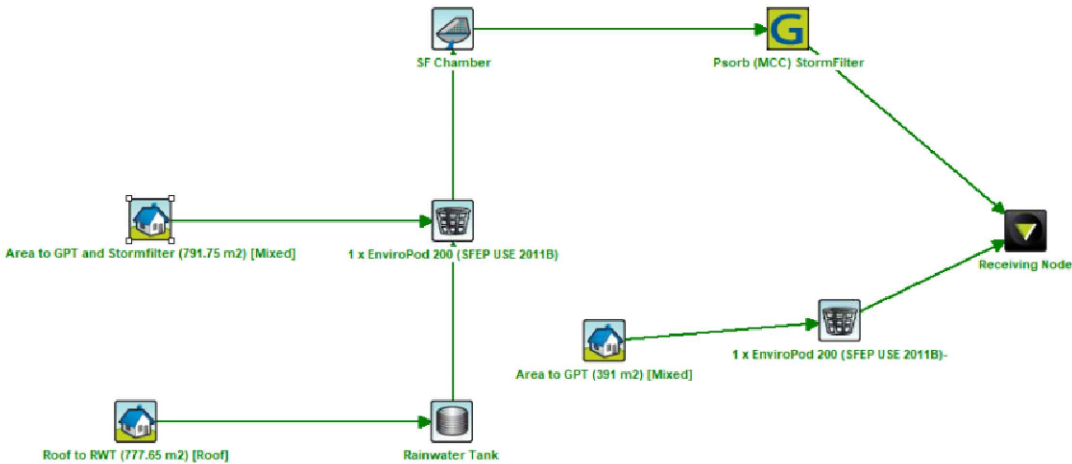
The water quality catchments for roof/rainwater and other areas were estimated based on the proposed architectural drawings. Plan 7 summarises the WSUD catchments plan and areas.

The Water Quality Management Strategy design is required to meet the requirements of the Penrith City Council, Waste Water Urban Design Policy EH003, Part: 3.2 Stormwater Quality outlined in the performance criteria outlined in table 2. Results show that the proposed Water Quality Management Strategy provides a reduction in post-development loads of Total Suspended Solids, Total Phosphorous, Total Nitrogen and Gross Pollutants that meet Council's pollution reduction targets of 85%, 60%, 45% and 90% respectively.



PLAN 7

WSUD CATCHMENTS PLAN AND AREAS
1: 400



MODEL 1

WATER QUALITY MANAGEMENT MUSIC MODEL CONFIGURATION
NOT TO SCALE

Receiving Nodes				
Receiving Node				
REPORT				
% Load Reduction	None	None	33	✓
GP % Load Reduction	90	None	100	✓
TN % Load Reduction	45	None	57.6	✓
TP % Load Reduction	60	None	64.1	✓
TSS % Load Reduction	85	None	87.8	✓

REDUCTION ACHIEVED

Designed by

Yasser Yahya Al-Ashmori

Civil Engineer

STELLEN CONSULTING

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