

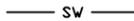
NEW WARRINGAH GOLF & COMMUNITY CLUB CLUBHOUSE

STORMWATER MANAGEMENT PLAN

DRAWING INDEX:

- DR-000 LEGEND
- DR-001 PIPE LAYOUT & CATCHMENTS PLAN
- DR-002 ROOF LAYOUT
- DR-003 DETAILS
- SD-100 EROSION & SEDIMENT CONTROL PLAN
- LT-200 SW & WSUD DESIGN STATEMENT

LEGEND:

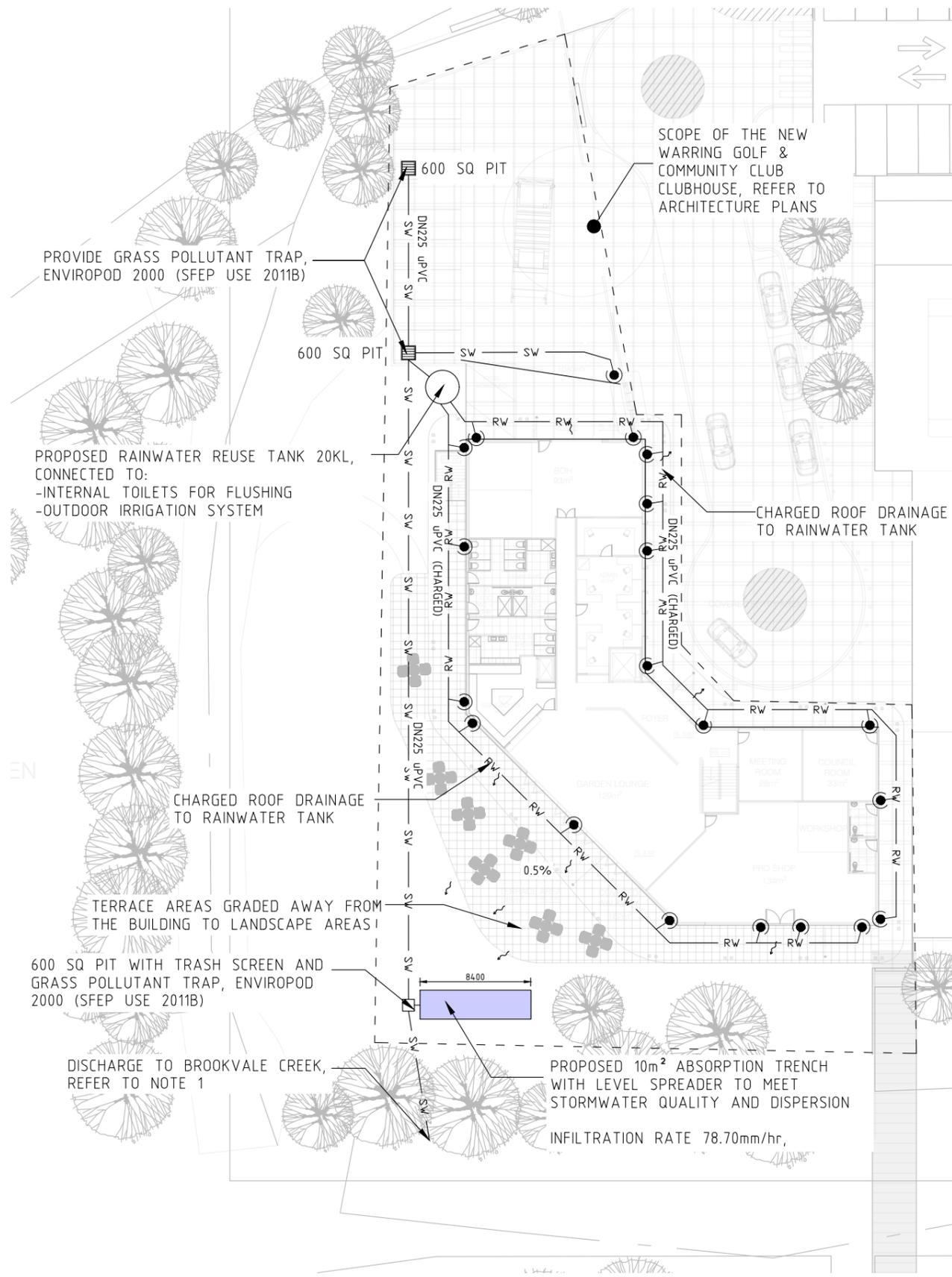
-  DOWNPIPE
-  SW STORMWATER PIPE
-  RW RAINWATER PIPE
-  DRAINAGE PIT

NOTES:

1. ALL DIMENSIONS TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION.
2. SITE LAYOUT BASED ON ARCHITECTURAL PLANS BY GROUP ARCHITECTS (12/10/2021).
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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SCOPE OF THE NEW WARRING GOLF & COMMUNITY CLUB CLUBHOUSE, REFER TO ARCHITECTURE PLANS

PROVIDE GRASS POLLUTANT TRAP, ENVIROPOD 2000 (SFEP USE 2011B)

600 SQ PIT

PROPOSED RAINWATER REUSE TANK 20KL, CONNECTED TO:
-INTERNAL TOILETS FOR FLUSHING
-OUTDOOR IRRIGATION SYSTEM

CHARGED ROOF DRAINAGE TO RAINWATER TANK

CHARGED ROOF DRAINAGE TO RAINWATER TANK

TERRACE AREAS GRADED AWAY FROM THE BUILDING TO LANDSCAPE AREAS

600 SQ PIT WITH TRASH SCREEN AND GRASS POLLUTANT TRAP, ENVIROPOD 2000 (SFEP USE 2011B)

DISCHARGE TO BROOKVALE CREEK, REFER TO NOTE 1

PROPOSED 10m² ABSORPTION TRENCH WITH LEVEL SPREADER TO MEET STORMWATER QUALITY AND DISPERSION INFILTRATION RATE 78.70mm/hr,

PLAN 1
PLAN PIPE LAYOUT
1:400

NOTES

1. PROVIDE SANDSTONE ROCK ARMOURING IN CREEK AT PROPOSED OUTLET IN ACCORDANCE WITH NSW OFFICE OF WATER GUIDELINES AND COUNCIL'S PROTECTION OF WATERWAYS AND RIPARIAN LAND POLICY
2. ALL PITS SHOULD 600x600mm SQUARE, LOAD CLASS C UNLESS NOTED OTHERWISE WITH GRASS POLLUTANT TRAP, ENVIROPOD 2000 (SFEP USE 2011B)
3. THE DEVELOPMENT IS LOCATED WITHIN A COUNCIL ESTABLISHED 1% AEP FLOOD PLAIN, THEREFORE PROVISION OF OSD/ABSORPTION SYSTEM TO CONTROL THE RUNOFF IS NOT REQUIRED.
4. ABSORPTION TRENCH DESIGNED BASED ON THE ACTUAL RATE 78.70 mm/hr TO MEET STORMWATER QUALITY REQUIREMENT AND DISPERSION, AS OPPOSED TO ABSORPTION REQUIRED TO CONTROL THE RUNOFF.

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REVISIONS	No.	BY	DATE	DESCRIPTION	APPD
	2	YYA	22/08/2023	ISSUED FOR NBC DA	YYA
	1	YYA	21/10/2022	ISSUED FOR NBC DA	LES
	0	NTM	30/09/2022	ISSUED FOR DA	YYA
	A	NTM	23/09/2022	ISSUED FOR DA DRAFT	YYA

Scale
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APPROVED	LES	DATE	21/10/2022



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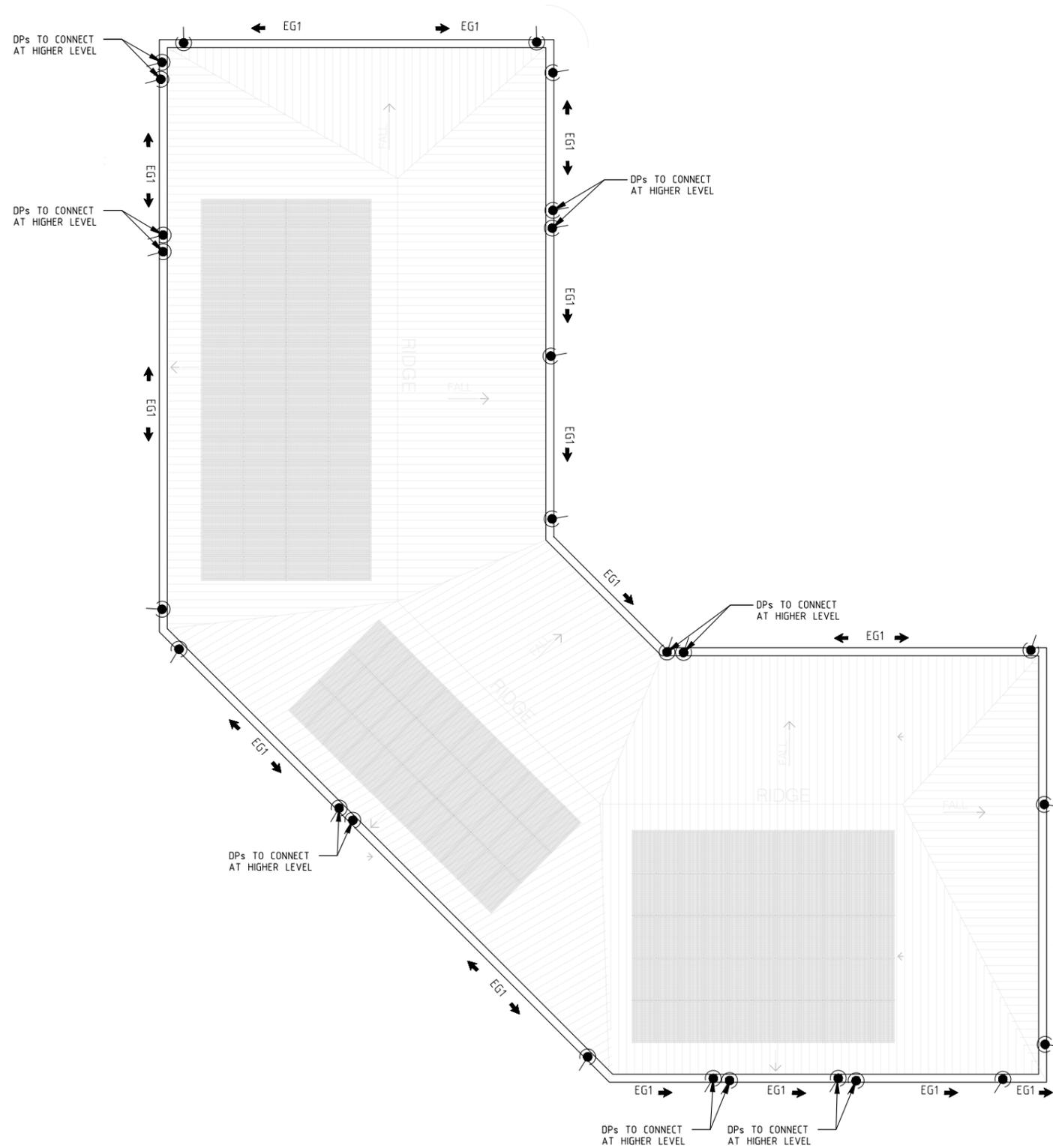
ABN 15 000 085 601

NEW WARRINGAH GOLF & COMMUNITY CLUB			
PIPE LAYOUT & CATCHMENTS PLAN			
Size A3	Status APPROVED FOR DA SUBMISSION	Drwg No. DR-001	Rev. 2

NOMENCLATURE
 DP - NEW DOWNPIPE
 EG - EAVES GUTTER
 Q20 - 20YR 5 MINUTE ARI FLOW RATE

GUTTER SIZING
 EAVE GUTTER DESIGNED TO ARI (20YR:215mm/hr)
 EG - MIN CSA 10,400 mm²

LEGEND
 → DIRECTION OF FALL



PLAN 2
ROOF LAYOUT
 1:200
 1. ALL DOWNPIPES TO BE DN100

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APPROVED	LES	DATE	21/10/2022



Stellen Consulting ABN 61 149 095 189

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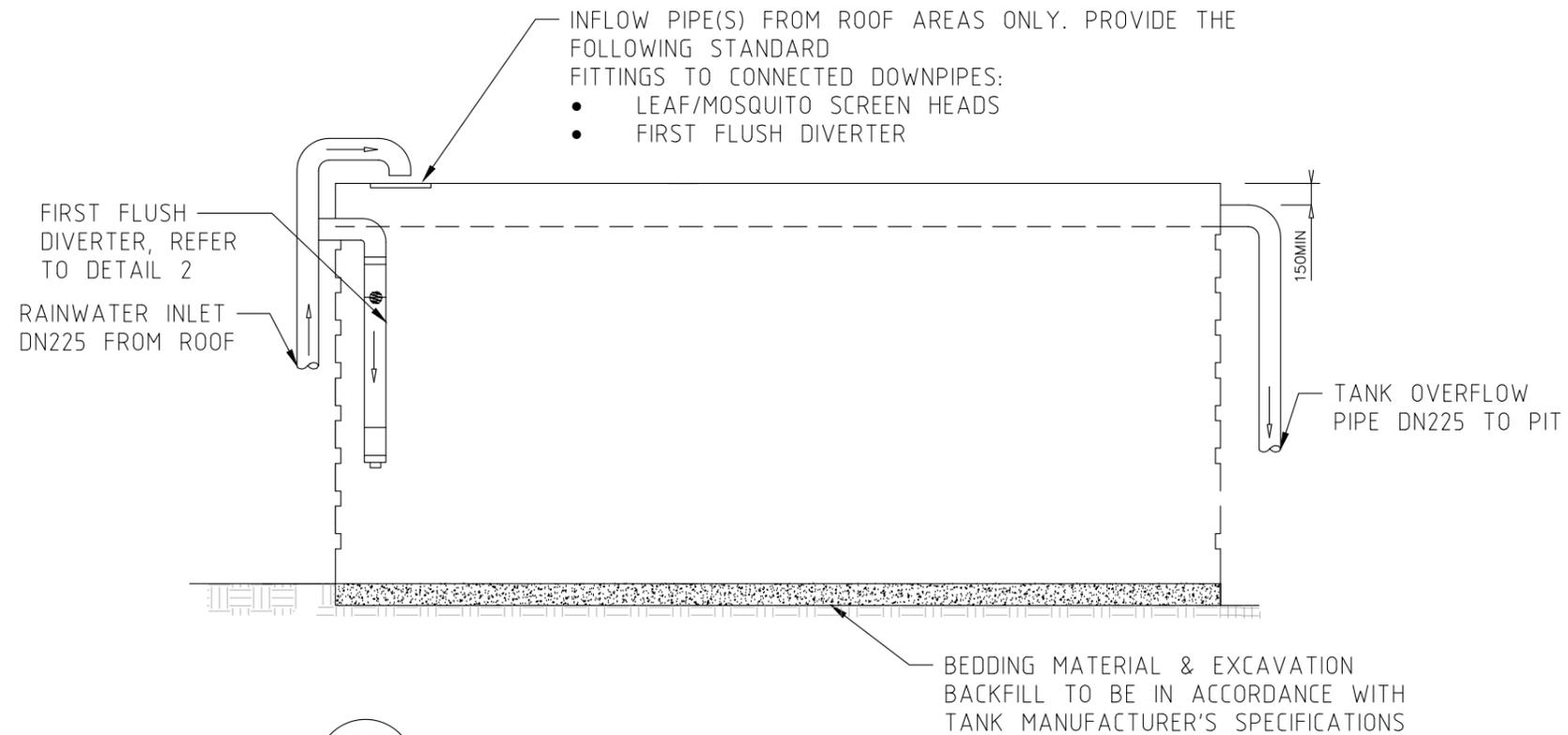


ABN 15 000 085 601

NEW WARRINGAH GOLF & COMMUNITY CLUB

ROOF LAYOUT

Size A3	Status APPROVED FOR DA SUBMISSION	Dwg No. DR-002	Rev. 1
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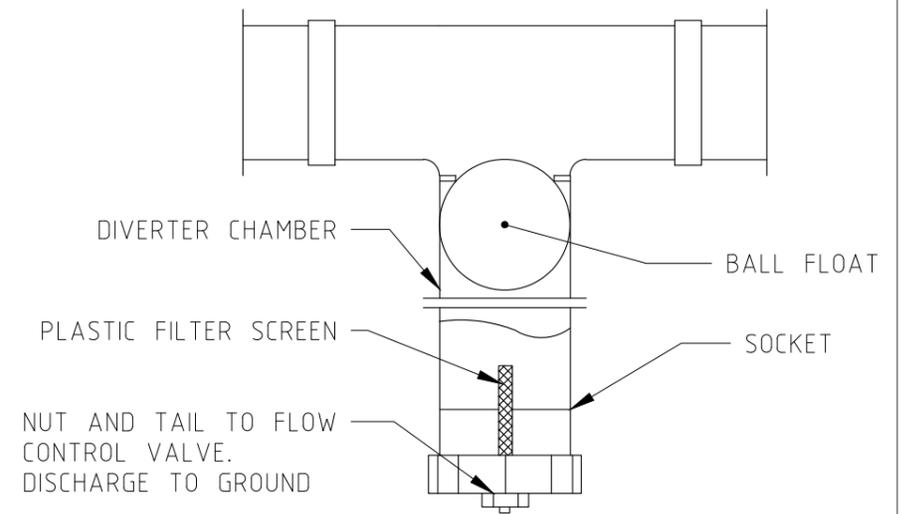


DETAIL 1

20KL RAINWATER REUSE TANK
NOT TO SCALE

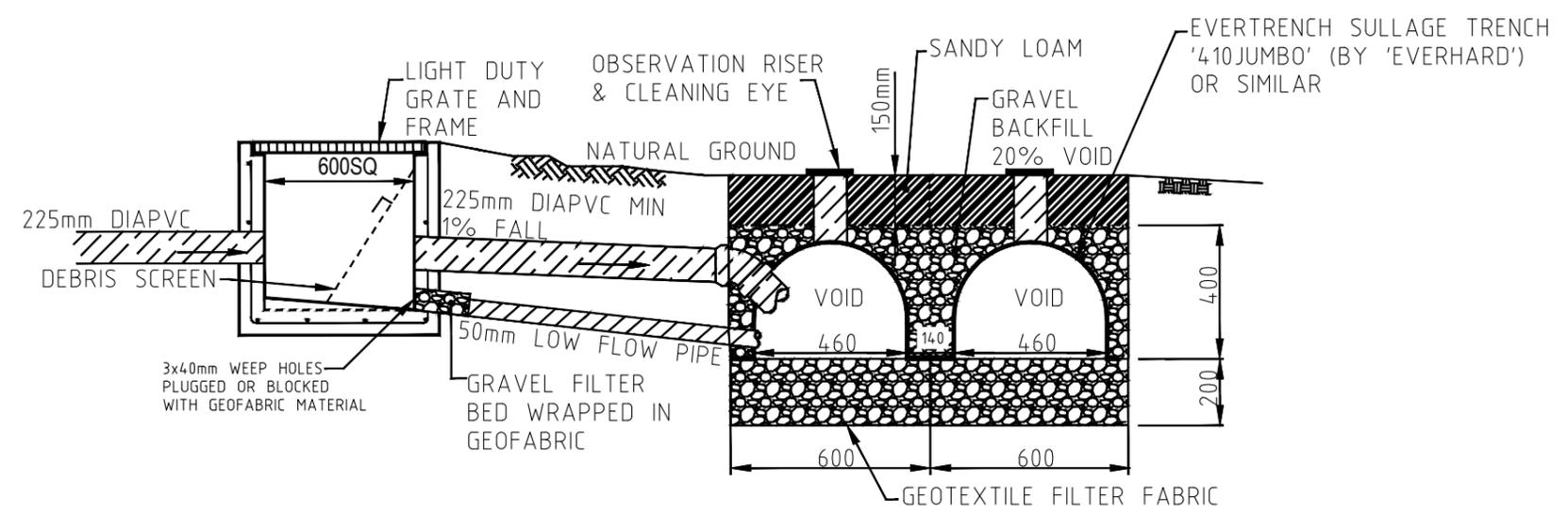
NOTES:

1. RAINWATER TANK TO BE CONNECTED TO:
 - INTERNAL TOILETS FOR FLUSHING
 - OUTDOOR IRRIGATION SYSTEM
2. RAINWATER TANK MUST MEET, AND BE INSTALLED IN ACCORDANCE WITH, THE REQUIREMENTS OF ALL APPLICABLE REGULATORY AUTHORITIES.



DETAIL 2

FIRST FLUSH DIVERTER
NOT TO SCALE



DETAIL 3

ABSORPTION TRENCH (TYPICAL)
NOT TO SCALE

NOT FOR CONSTRUCTION

REVISIONS				
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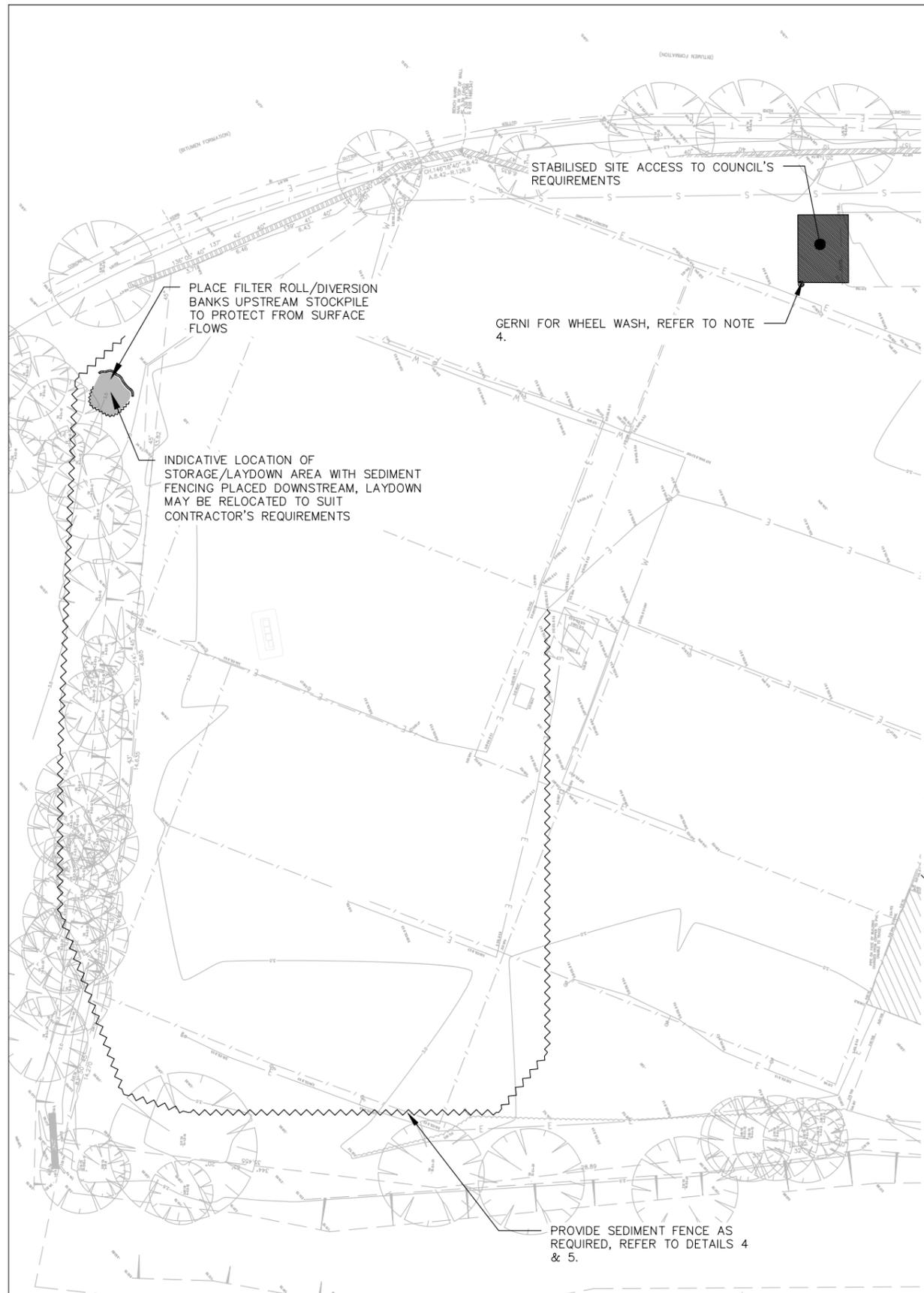
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CLIENT **WARRINGAH GOLF CLUB LTD**

NEW WARRINGAH GOLF & COMMUNITY CLUB
DETAILS
Size A3 Status APPROVED FOR DA SUBMISSION Dwg No. DR-003 Rev. 1



PLAN 4
SEDIMENT & EROSION CONTROL PLAN
 1:200

GENERAL REQUIREMENTS

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).

SITE ESTABLISHMENT

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

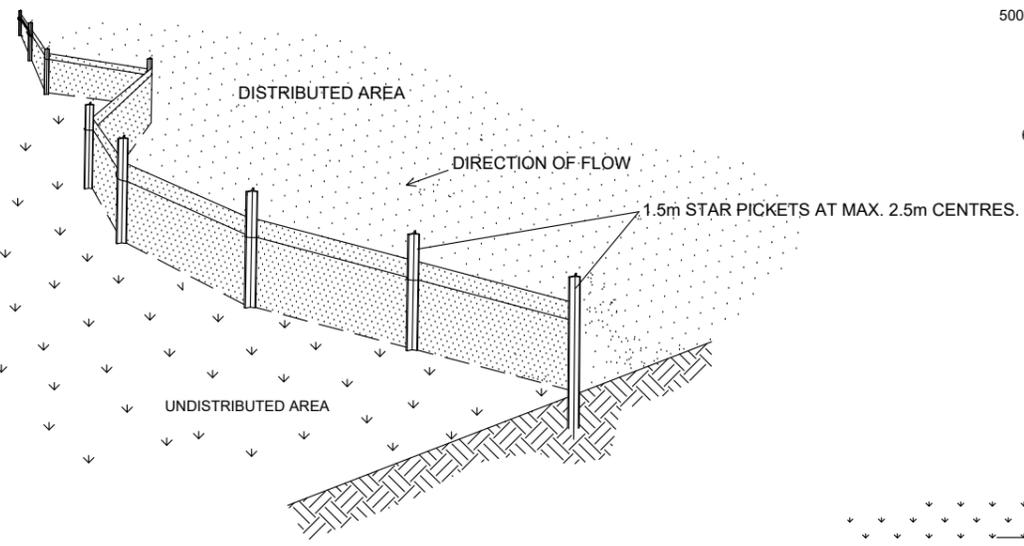
1. ERECT SAFETY FENCING WITH SIGNAGE CLEARLY INDICATING THAT THE SITE IS A CONSTRUCTION ZONE AND ACCESS IS RESTRICTED AS DEEMED NECESSARY.
2. ERECT CLEARLY VISIBLE BARRIER FENCING AT LOCATIONS SHOWN OR IF NOT SHOWN AT THE DISCRETION OF THE SITE SUPERINTENDENT TO ENSURE TRAFFIC IS CONTROLLED AND TO PROHIBIT 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'.

CONSTRUCTION

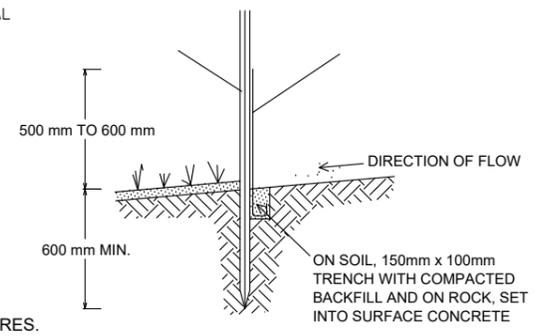
6. USE SANDBAGS, HAY BALES AND/OR GRAVEL FILLED GEOTEXTILE SOCKS TO FILTER AND CONVEY STORMWATER RUNOFF WITHIN THE SITE.
7. ALL DRAINAGE WORKS SHALL BE CONSTRUCTED AND STABILISED AS EARLY AS POSSIBLE DURING DEVELOPMENT.
8. INLET FILTERS SHALL BE INSTALLED WHERE SHOWN TO PREVENT WATER FROM DIRECTLY ENTERING 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.

MAINTENANCE

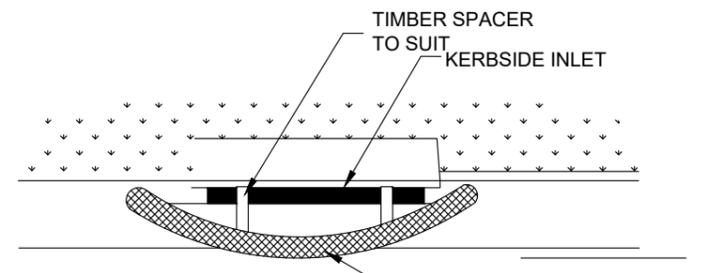
14. ALL DEDICATED SEDIMENT STORAGE ZONES WITHIN TRAPS SHALL BE CLEANED WHEN A MAXIMUM OF 60% FULL OF SOLID MATERIALS AND DISPOSED OF IN A MANNER THAT PREVENTS FURTHER POLLUTION OF THE SITE.
15. TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES WILL BE RETAINED UNTIL EARTHWORK ACTIVITIES ARE COMPLETED AND 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.



DETAIL 4
TYPICAL SEDIMENT FENCE
 NOT TO SCALE



DETAIL 5
SECTION DETAIL
 NOT TO SCALE



FILTER ROLL DETAIL
 NTS

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SEDIMENT & EROSION CONTROL PLAN									
Size	A3	Status	APPROVED FOR DA SUBMISSION	Drw No.	SD-001	Rev.	0		

1.0 Stormwater Management

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

DR-000	Revision 1	Legend
DR-001	Revision 2	Pipe Layout & Catchments plan
DR-002	Revision 1	Roof Layout
DR-003	Revision 1	Details
SD-001	Revision 0	Erosion and Sediment Control Plan
LT-001	Revision 1	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.
- Northern Beaches Council - Water Management for Development Policy (2021)

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.

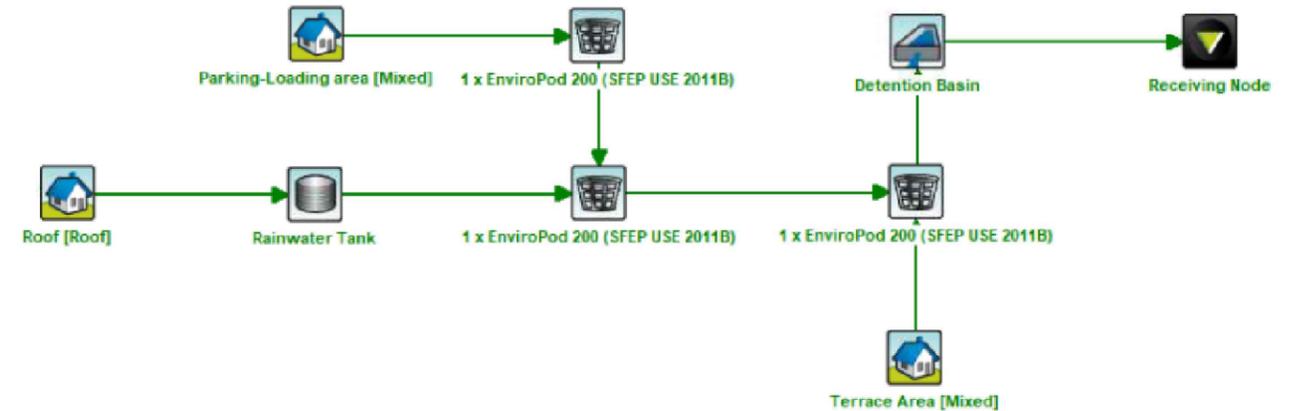
A number of Water-sensitive urban design (WSUD) measures are proposed to manage runoff from the site including:

- Rainwater tank with volume of 20kL
- Grass pollutant trap, ENVIROPOD 2000 (SFEP USE 2011B)
- 10m² absorption trench with level spreader based on 78.70mm/hr infiltration rate.

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 3 summarises the WSUD catchments plan and areas.

The Water Quality Management Strategy design is required to meet the requirements of the Northern Beaches Council Development Control Plan 2020 Revision 1, part: 4.1.1 - Part: 8.2 Stormwater Quality Requirements outlined in Table 1 below. 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.



MODEL 1 WATER QUALITY MANAGEMENT MUSIC MODEL CONFIGURATION
NOT TO SCALE



PLAN 3 CATCHMENTS PLAN
1:1000

POLLUTANT	POLLUTANT REDUCTION TARGET (DCP)
TOTAL SUSPENDED SOLIDS (TSS)	85%
TOTAL PHOSPHORUS (TP)	65%
TOTAL NITROGEN (TN)	45%
GROSS POLLUTANTS	90%

	Sources	Residual Load	% Reduction
Flow (ML/yr)	2.29	1.58	31.1
Total Suspended Solids (kg/yr)	214	20.3	90.5
Total Phosphorus (kg/yr)	0.559	0.196	65
Total Nitrogen (kg/yr)	5.63	2.4	57.4
Gross Pollutants (kg/yr)	46.8	0.0389	99.9

REDUCTION ACHIEVED

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