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STORMWATER MANAGEMENT REPORT

For WYEE MARKET PLACE HOLDINGS PTY LTD

Proposed Market Place at

1496 Hue Hue Road and 106 Wyee Road WYEE NSW 2259

26 January 2024

Issue	Description	Date	Author	Checked	Approved
A	DRAFT – FOR REVIEW	8/12/2023	N. Evans	K. Ng	
B	COORDINATED REVIEW	18/12/2023	N. Evans	K. Ng	
C	FINAL	26/1/2024	N. Evans	K. Ng	

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APPENDIX

1. Introduction

This Stormwater Management / Overland Flows and Flooding Review and WSUD Repor has been prepared to support a Planning Proposal to amend the provisions of the Lake Macquarie Local Environmental Plan 2014 (LMLEP) to rezone the site at 106 Wyee Road and 1496 Hue Hue Road, Wyee NSW 2259. The site is comprised of two lots legally described as Lot 281 in DP 659927 and Lot 282 in DP 755242 respectively, and has an area of approximately 1.4 hectares. The proponent seeks to rezone the site E1 Local Centre from RU4 Primary Production Small Lots to allow for a commercial development on the site. The proposed development would comprise a full-line supermarket, with ancillary specialty retail uses and other business and commercial uses.

Refer to Figure 1 for location of the proposed development.

ING Consulting Engineers P/L been engaged by Wyee Market Place Holding Pty Ltd to prepare a Flood Impact Assessment / Stormwater Management and WSUD Report to support the proposed application for rezoning of the Lots, which are currently zoned RU4 – Primary Production Small Lots to E1 – Local Centre.

This report is written to comply with Lake Macquarie City Council's Development Control Plan (DCP) 2014, and Lake Macquarie Local Environmental Plan requirements.

Figure 1 – Site Location (Source SIX Maps & SJB Planning)

The site is approximately 1.377 Ha in area and is within Lake Macquarie City Council (LMCC) Local Government Area (LGA). The existing site consists of 2 Lots, each with a single storey dwelling and ancillary structures. This submission is for the rezoning of the site from a RU4 – Primary Production Small Lots to E1 Local Centre.

2. Project Description

The proposal is for the rezoning of the site from RU4 to E1, and involves the development for a single storey market place with a full-line supermarket, with ancillary specialty retail uses and other business and commercial uses.

Refer to Figure 2 for architectural site layout.

Figure 2 - Proposed Development Layout

2.1 Scope of Report

This report outlines the design criteria for the future development :

- Stormwater infrastructure;
- How stormwater is managed across the site; and
- Water quality

Refer to Appendix B for the Stormwater management drawings.

This report has been prepared to satisfy the requirements and conditions of the following documents:

- Lake Macquarie City Council's Development Control Plan (2014).

This report includes the following:

- Stormwater Management;
- Overland Flows and Flooding; and
- Water Sensitive Urban Design (WSUD).

3. Stormwater Management

3.1. Proposed Site Stormwater Drainage

All proposed stormwater drainage from the development will be designed in accordance with Lake Macquarie City Council requirements.

All stormwater is proposed to connect into the 'existing open channel' Stormwater generated within the proposed site will be "detained" to Lake Macquarie City Council's OSD requirements.

Refer to the Stormwater Management Drawings in Appendix B for layout and conceptual details of the proposed stormwater network across the site.

Stormwater generated within the proposed site will be treated to Council's DCP water treatment rates using proprietary treatment device.

3.2. Hydrology

- Pipe drainage shall be designed to accommodate the 20-year AEP storm event in accordance with Lake Macquarie City Council's requirements;
- The combined piped and overland flow paths shall be designed to accommodate the 100-year AEP storm event.
- Where trapped low points are unavoidable and potential for flooding private property is a concern, an overland flow path capable of carrying the total 100-year AEP storm event shall be provided. Alternatively, the pipe and inlet system may be upgraded to accommodate the 100-year AEP storm event;
- Rainfall intensities shall be as per the Intensity-Frequency-Duration table in accordance with BOM rainfall data;
- Times of concentration for each sub catchment shall be determined using the kinematic wave equation. Minimum time of concentration is 5 minutes and the maximum are 20 mins. Runoff coefficients shall be calculated in accordance with AR&R. The fraction impervious shall be determined from analysis of the sub catchments;
- Runoff coefficients shall be calculated in accordance with the ARR&R. The fraction impervious shall be determined from analysis of the sub-catchments;
- Velocity depth ratios shall not exceed 0.4 for all storms up to and including the 100-year ARI event; and
- All pits deeper than 1.8m to be reinforced.
- Pits deeper than 1.2m shall contain step irons at 300 mm centres.

3.3. Modelling Software

DRAINS software for the OSD tank.

MUSIC modelling software has been used to evaluate pollutant loads from the developed lot. MUSIC data files and output results are attached in Appendix C.

3.4 OSD Requirement

As discussed within Section 3.2, OSD is required within the development to ensure the development does not increase the risk of downstream flooding of roads and properties, or erosion of unstable waterways.

As per the requirements of Council's DCP, the following requirements apply for this proposal development :

- The maximum discharge from the post-development site shall not exceed the pre-development flows for all storms up to and including the 5% AEP and shall not be concentrated.

Total site contributing to the size of the OSD basin is as per Table 3 below :

Rainfall component	Area (Ha)
Site Area To OSD (Impervious areas)	0.9915
Bypass (pervious)	0.3855
Site Area	1.377

Table 1 - OSD Rainfall Components

These rates are applied for the OSD requirements for the site.

It should be noted the area used to determine the PSD and SSR includes the entire site area which will contribute runoff to the detention storage facility during a 20-year AEP storm event.

3.5. Proposed OSD Tank Details

The proposed OSD tank will be constructed within the landscaping area with the proposed WSUD constructed inside the OSD tank. The outlet pipe from the basin will discharge into the existing open channel abutting Wyee Road via a headwall. Refer to Appendix B and C for details :

On Site Detention (OSD)	Catchment to Tank (Ha)	OSD Volume (Min.) (m^3)	Primary Outlet
Tank	0.9915	375	209mm Orifice

Table 2 - OSD Tank Volumes

3.6 Overland Flows and Flooding

A tabletop review was carried out for the recently completed report – "Flood Studies for Eight Residual Lake Macquarie Waterway Tributary Catchments" by WMA in October 2021. The study would indicate peak flood levels for the various storm events, right up to the PMF event. Please refer to Table 3 below.

The levels of particular concern are the 1% AEP, and PMF levels both upstream and downstream of Wyee Road at Swampy Creek, which are RL11.12m AHD and RL10.24m AHD respectively for the 1% AEP event, and RL12.03m AHD and RL12.01m AHD respectively for the PMF event. The proposed future market place is located south of Swampy Creek, and the proposed finished levels are RL16.00m AHD at the lowest point within the site. The site therefore not flood affected.

Sections of Wyee Road downstream of the site, will however be inundated with flood waters. This is captured in Table 4.

ID Figure 2h	Location	Peak flood level (m AHD)								
		50%	20%	10%	5%	2%	1%	0.5%	0.2%	PMF
MSWC1	Mannering Creek @ Upstream M1	25.53	26.32	27.06	27.44	28.07	28.52	28.97	29.27	29.95
MSWC2	Swampy creek @ Upstream M1	21.49	21.51	21.54	21.57	21.82	21.91	22.15	22.49	24.91
MSWC3	Wyee Creek @ Upstream M1	16.71	17.15	17.57	17.81	18.20	18.47	18.68	19.00	20.76
MSWC4	northern creek @ Upstream M1	21.44	21.60	21.80	21.91	22.27	22.50	22.70	22.93	23.72
MSWC5	Swampy creek @ UPSTREAM WYEE Road	10.17	10.32	10.51	10.64	10.93	11.12	11.30	11.57	12.03
MSWC6	Swampy creek @ Downstream WYEE Road	9.53	9.75	9.82	9.95	10.10	10.24	10.35	10.49	12.01
MSWC7	Swampy creek @ Downstream M1	20.44	20.47	20.50	20.54	20.59	20.60	20.60	20.63	20.73
MSWC8	Wyee Creek @ Downstream M1	-	16.31	16.59	16.77	17.01	17.15	17.24	17.38	18.25
MSWC9	northern creek @ Downstream M1	21.06	21.13	21.20	21.24	21.31	21.33	21.35	21.37	21.42
MSWC10	Mannering Creek @ Downstream M1	24.44	24.64	24.77	24.87	24.97	25.01	25.04	25.19	25.76
MSWC11	Downstream M1 180 m south of Mannering Creek	-	-	-	-	-	-	-	26.92	27.53
MSWC12	Mannering Creek @ Upstream WYEE Road	17.12	17.95	18.40	18.47	18.61	18.67	18.71	18.88	20.01
MSWC13	Mannering Creek @ Downstream WYEE Road	13.67	13.94	14.16	14.30	14.71	14.91	15.05	15.64	18.04
MSWC14	Wyee Channel	11.03	11.38	11.59	11.78	12.18	12.45	12.70	13.04	15.99
MSWC15	Wyee Creek @ Upstream WYEE Road	12.81	13.18	13.56	13.68	13.77	13.82	13.86	13.91	14.38
MSWC16	Wyee Creek @ Downstream WYEE Road	12.61	12.81	12.95	13.03	13.11	13.17	13.21	13.26	13.78
MSWC17	Wyee Creek @ Upstream Railway	8.46	8.86	9.15	9.41	9.68	9.85	9.97	10.13	11.68
MSWC18	Downstream Wyee Channel	3.06	3.59	3.86	4.10	4.47	4.68	4.83	5.03	6.67
MSWC19	Wyee Creek Upstream Mannering Bay	1.07	1.33	1.55	1.79	2.24	2.42	2.52	2.64	3.65
MSWC20	Mannering Bay	1.04	1.27	1.47	1.71	2.18	2.35	2.43	2.52	3.09
MSWC22	Mannering Inlet	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	1.01

Table 3 - Peak Flood Levels – source WMA Flood Studies for 8 Residual Lake Macquarie Waterway Tributary Catchments (October 2021)

ID (Figure 15)	Location	Road Crest Level (m AHD)	Peak flood depth to crest (m) - Negative indicates road is not overtopped								
			50%	20%	10%	5%	2%	1%	0.5%	0.2%	PMF
1	Wyee Road South	18.35	-	0.02	0.09	0.13	0.20	0.32	0.39	0.50	1.10
2	Gorokan Road	15.75	2.24	2.68	2.77	2.83	2.95	3.15	3.27	3.47	4.66
3	Pacific Motorway North	20.20	-3.45	-3.00	-2.57	-2.33	-1.91	-1.63	-1.41	-1.07	0.66
4	Pacific Motorway South	29.00	-	-1.66	-1.11	-0.60	0.15	0.28	0.38	0.47	0.96
5	Wyee Road	11.70	-1.44	-1.19	-0.90	-0.71	-0.38	-0.18	0.00	0.11	0.34
6	Wyee Road North	13.60	-0.59	-0.07	0.11	0.16	0.24	0.28	0.30	0.34	0.80
7	Access Road	21.45	0.23	0.33	0.38	0.43	0.59	0.71	0.79	0.88	1.61
8	Ruttleys Road	1.90	-0.83	-0.60	-0.38	-0.13	0.30	0.46	0.53	0.60	1.05
16	Railway bridge	11.50	-3.07	-2.68	-2.34	-2.09	-1.82	-1.67	-1.57	-1.45	-0.26

Table 4 - Road Overtopping depths at key locations – source WMA Flood Studies for 8 Residual Lake Macquarie Waterway Tributary Catchments (October 2021)

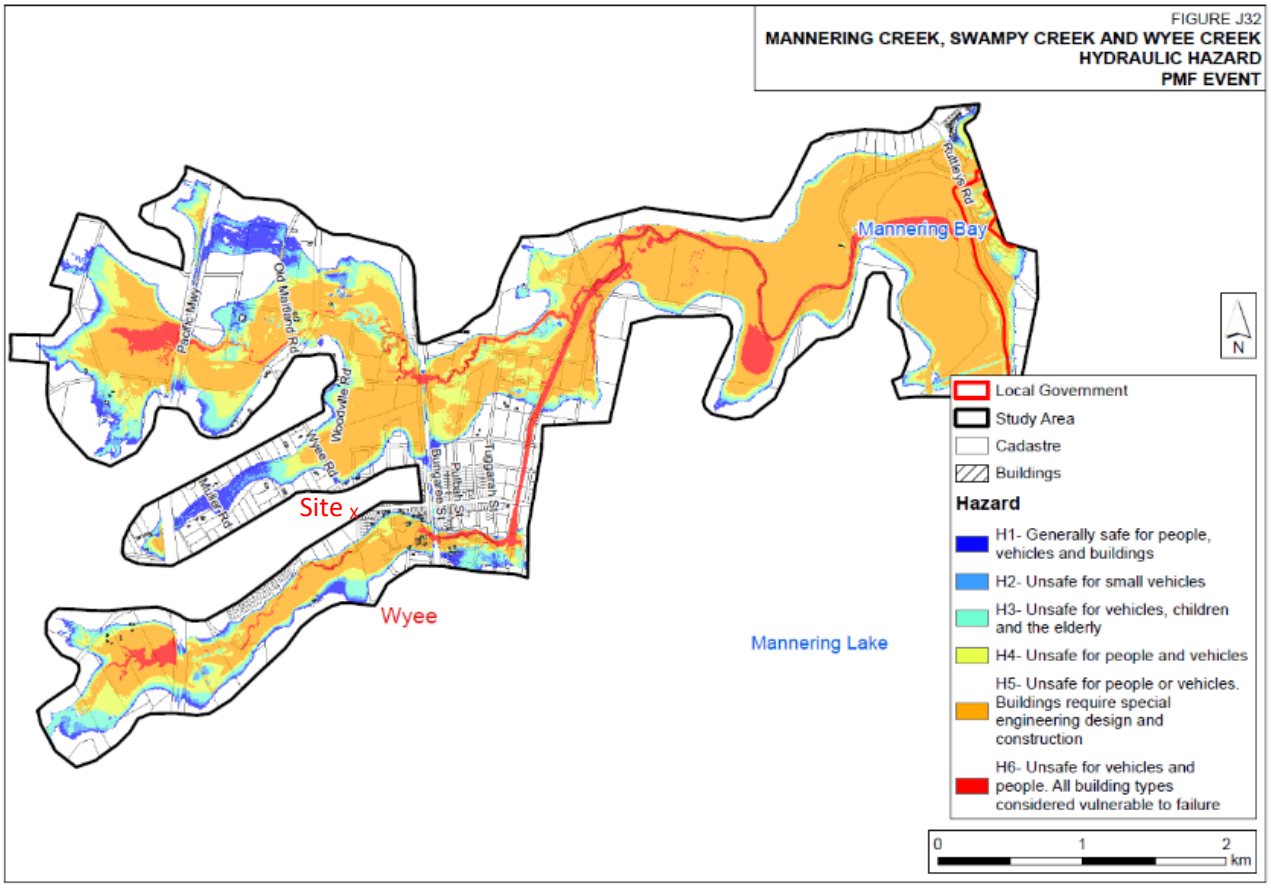


Figure 3 - Hydraulic Hazard Map – PMF Event (WMA - October 2021)

As severe storm event, particularly the 1% and PMF events will result in extensive overtopping of Wyee Road downstream of the site, thus making it hazardous for pedestrian and vehicular movements. Refer to Figure 3 for Hydraulic Hazard Mapping. The lowest point of subject site is at RL16.00m AHD, and is upstream and more than 4 metres above the crest of Wyee Road at RL11.70m AHD at the lowest point. Rezoning of the site into an E1 Local Centre will therefore allow additional areas for local residents to seek shelter in place and sit out these storm events.

3.7 Water Sensitive Urban Design (WSUD)

Water Sensitive Urban Design (WSUD) encompasses all aspects of urban water cycle management, including water supply, wastewater and stormwater management. WSUD is intended to minimize the impacts of development upon the water cycle and to achieve more sustainable forms of urban development.

All stormwater runoff from the buildings and hardstand areas will be directed into water quality measures, excluding bypass areas.

Proprietary treatment devices will treat the water to satisfy Council's water quality requirements. These devices have been modelled using Ocean Protect Stormfilters, and Ocean Protect Oeanguards. By utilizing these treatment devices, stormwater draining from the development will meet the required Lake Macquarie City Council's Water Cycle Management Guidelines (June 2013) water quality targets before discharge into the existing stormwater network / watercourse.

A summary of the required number and position of the treatment devices is indicated within the stormwater drainage drawings within Appendix B. Refer also to Appendix C for a summary of the MUSIC model and report.

3.8 WSUD Modelling - MUSIC Model and Report

The MUSIC Model for Urban Stormwater Improvement Conceptualisation (MUSIC, Version 6.3.0) was used to evaluate pollutants loads from the site.

A conceptual view of the MUSIC model used in this report can be found in Appendix C.

3.8.1 Catchment Areas and Music Parameters

MUSIC model input parameters for this site included rainfall-runoff, base-flow concentration and storm-flow concentration parameters. The parameters used for the catchment area(s) can be seen in Table 5 & 6.

Parameter	Unit	Figure
Rainfall Threshold	mm/day	1.00
Soil Storage Capacity	mm	170.00
Initial Storage	% of Capacity	30.00

Parameter	Unit	Figure
Field Capacity	mm	70.00
Infiltration Capacity Coefficient	a	210.00
Infiltration Capacity Coefficient	b	4.70
Initial Depth (Ground Water)	mm	10.00
Daily Recharge Rate	%	50.00
Daily Baseflow Rate	%	5.00
Daily Seepage Rate	%	0.00

Table 5 - Rainfall-Runoff Parameters - Roof Catchment Areas

Parameter	Unit	Figure
Rainfall Threshold	mm/day	1.00
Soil Storage Capacity	mm	170.00
Initial Storage	% of Capacity	30.00
Field Capacity	mm	70.00
Infiltration Capacity Coefficient	a	210.00
Infiltration Capacity Coefficient	b	4.70
Initial Depth (Ground Water)	mm	10.00
Daily Recharge Rate	%	50.00
Daily Baseflow Rate	%	5.00
Daily Seepage Rate	%	0.00

Table 6 - Rainfall-Runoff Parameters – Mixed Catchment Areas

3.8.2 Results

MUSIC modelling results for each stage are presented as mean annual loads at the receiving node indicate that adopted target reductions (as per Turner Road DCP) are

achieved, as shown in Table 7. MUSIC Link results are contained within Appendix C.

	Sources	Residual Load	% Reduction
Flow (ML/yr)	12.6	12.4	2.1
Total Suspended Solids (kg/yr)	1900	264	86.1
Total Phosphorus (kg/yr)	3.89	1.3	66.6
Total Nitrogen (kg/yr)	28.3	15.5	45.2
Gross Pollutants (kg/yr)	319	0	100

Table 7 – Overall Site Pollutant Loads

3.9 Ocean Protect Device Maintenance

The maintenance frequency of the Ocean Protect Oceanguard / Stormfilters is dependent upon several factors:

- Catchment area;
- Surrounding land use;
- Vegetation type;
- Traffic loading; and
- Rainfall patterns.

It is recommended that during the first year of operation the units should be monitored monthly, with maintenance as required.

To ensure that the unit performs optimally, the material collected via the filter bag should be emptied when the level of material is no more than approximately half to two thirds of the total bag depth or when there is evidence of material overflow.

Additional monitoring should be conducted following moderate to extreme rainfall events when preceding months have had little to no rainfall. This monitoring is considered necessary to accommodate for higher volumes of runoff generated during major rainfall events. It is anticipated greater accumulation of surface contamination during low rainfall periods and to ensure that the units have been damage due to high pipe velocities.

Upon completion of Oceanguard maintenance the monitoring/maintenance checklist is to be completed and kept for records, as per Ocean Protect manufacturers guidelines.

Unit	Inspection/Minor Maintenance (Months)	Major Maintenance (Times/Year)
Oceanguard	Monthly (and after major storms)	2 to 6 (expect in case of a spill)

Table 8 – Oceanguard Maintenance

Unit	Inspection/Minor Maintenance (Months)	Major Maintenance (Times/Year)
Stormfilter	6 monthly (and after major storms)	As required

Table 9 – Stormfilter Maintenance

4. Conclusion

The stormwater management plan (water quantity & quality) will ensure that the best management practice will be applied to the development site following successful rezoning from RU4 to E1 – Local Centre. A more detailed concept design will be carried out with the Development Application in due course.

The detailed review of the current Flood Studies carried out by WMA would indicate that the site is not flood affected. A more detailed Flood Risk Management Plan can be prepared should Council request for one at the Development Application stage.

From a stormwater management and flooding perspective, we do not anticipate major issues in line with the future development proposal for the commercial development,

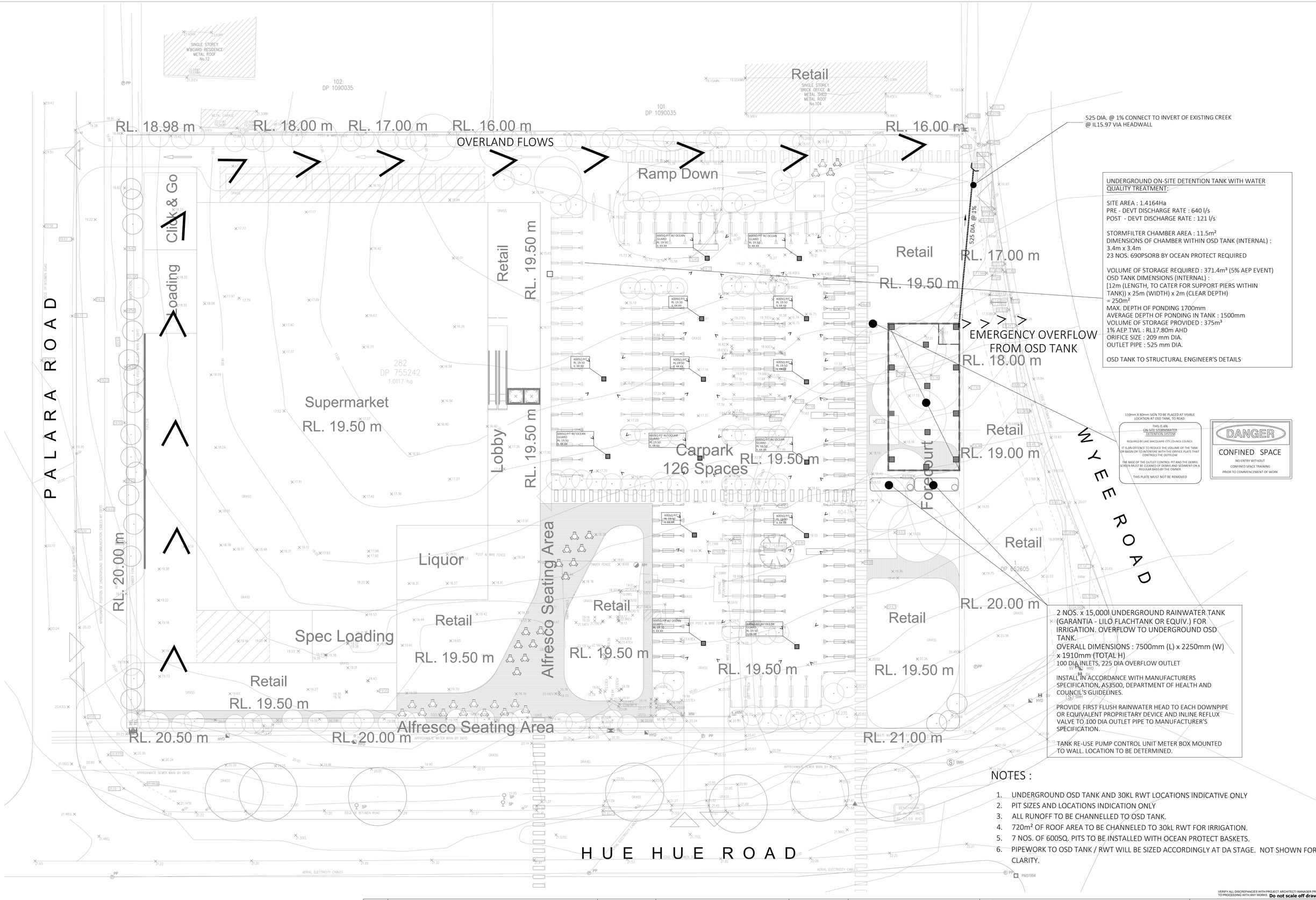
Appendix A

Detailed Site Survey

Redacted

Appendix B

Stormwater Management Plans



UNDERGROUND ON-SITE DETENTION TANK WITH WATER QUALITY TREATMENT:

SITE AREA : 1.4164Ha
PRE - DEVT DISCHARGE RATE : 640 l/s
POST - DEVT DISCHARGE RATE : 121 l/s

STORMFILTER CHAMBER AREA : 11.5m²
DIMENSIONS OF CHAMBER WITHIN OSD TANK (INTERNAL) :
3.4m x 3.4m
23 NOS. 690PSORB BY OCEAN PROTECT REQUIRED

VOLUME OF STORAGE REQUIRED : 371.4m³ (5% AEP EVENT)
OSD TANK DIMENSIONS (INTERNAL) :
[12m (LENGTH, TO CATER FOR SUPPORT PIERS WITHIN TANK)) x 25m (WIDTH) x 2m (CLEAR DEPTH)
= 250m²
MAX. DEPTH OF PONDING 1700mm
AVERAGE DEPTH OF PONDING IN TANK : 1500mm
VOLUME OF STORAGE PROVIDED : 375m³
1% AEP TWL : RL17.80m AHD
ORIFICE SIZE : 209 mm DIA.
OUTLET PIPE : 525 mm DIA.

OSD TANK TO STRUCTURAL ENGINEER'S DETAILS

110mm X 80mm SIGN TO BE PLACED AT VISIBLE LOCATION AT OSD TANK, TO READ:

THIS IS AN
ON-SITE STORMWATER
DETENTION SYSTEM

REQUIRED BY LAKE MACQUARIE CITY COUNCIL COUNCIL

IT IS AN OFFENCE TO REDUCE THE VOLUME OF THE TANK OR BASIN OR TO INTERFERE WITH THE ORIFICE PLATE THAT CONTROLS THE OUTFLOW

THE BASE OF THE OUTLET CONTROL PIT AND THE DEBRIS SCREEN MUST BE CLEANED OF DEBRIS AND SEDIMENT ON A REGULAR BASIS BY THE OWNER

THIS PLATE MUST NOT BE REMOVED

DANGER

CONFINED SPACE

NO ENTRY WITHOUT
CONFINED SPACE TRAINING
PRIOR TO COMMENCEMENT OF WORK

2 NOS. x 15,000l UNDERGROUND RAINWATER TANK (GARANTIA - LILO FLACHTANK OR EQUIV.) FOR IRRIGATION. OVERFLOW TO UNDERGROUND OSD TANK.
OVERALL DIMENSIONS : 7500mm (L) x 2250mm (W) x 1910mm (TOTAL H)
100 DIA INLETS, 225 DIA OVERFLOW OUTLET

INSTALL IN ACCORDANCE WITH MANUFACTURERS SPECIFICATION, AS3500, DEPARTMENT OF HEALTH AND COUNCIL'S GUIDELINES.

PROVIDE FIRST FLUSH RAINWATER HEAD TO EACH DOWNPIPE OR EQUIVALENT PROPRIETARY DEVICE AND INLINE REFLUX VALVE TO 100 DIA OUTLET PIPE TO MANUFACTURER'S SPECIFICATION.

TANK RE-USE PUMP CONTROL UNIT METER BOX MOUNTED TO WALL. LOCATION TO BE DETERMINED.

NOTES :

1. UNDERGROUND OSD TANK AND 30KL RWT LOCATIONS INDICATIVE ONLY
2. PIT SIZES AND LOCATIONS INDICATION ONLY
3. ALL RUNOFF TO BE CHANNELLED TO OSD TANK.
4. 720m² OF ROOF AREA TO BE CHANNELED TO 30kL RWT FOR IRRIGATION.
5. 7 NOS. OF 600SQ. PITS TO BE INSTALLED WITH OCEAN PROTECT BASKETS.
6. PIPEWORK TO OSD TANK / RWT WILL BE SIZED ACCORDINGLY AT DA STAGE. NOT SHOWN FOR CLARITY.

Issue	Description	Date of Drawing
A	Zoning Application	28 Nov. 2023

Drawn & Designed By : K. Koh
Checked By : N. Evans
Approved By : Kenneth T. NG
MIEAust CPEng NER APEC Engineer
IntPE(Aus) (Reg. No. 2206352) RPEQ RPEng
Registered Certifier (Hydraulic (stormwater), Road & Drainage and Stormwater) (Reg. No. BDC0827)
Registered Design Practitioner (Drainage & Civil Engineering) (Reg. No. DEP0000692)
& Professional Engineer (Civil) (Reg. No. DEP0000630)
NSW Fair Trading

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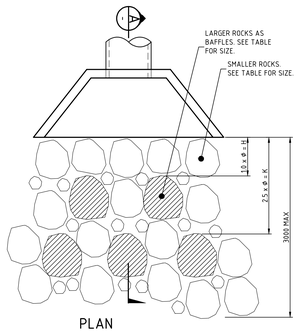
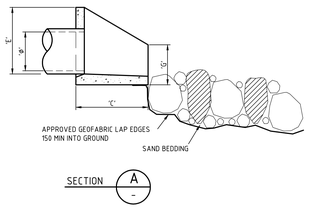
VERIFY ALL DISCREPANCIES WITH PROJECT ARCHITECT/ MANAGER PRIOR TO PROCEEDING WITH ANY WORKS. **Do not scale off drawings.**

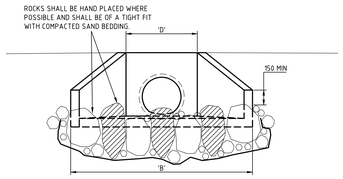
Project	Proposed Wyee Marketplace
At	1496 Hue Hue Road & 106 Wyee Road Wyee NSW 2259
Client	
Drawing Title	Site Plan
Date	November 2023
Scale	1 : 200 @ A0
Project No.	425102023MP
Drawing & Sheet No./ Issue	42510-01/2 / A



PLAN



NOM. PIPE SIZE Φ	MASS KGS	NOMINAL DIMENSIONS							
		B	C	D	E	G	H	K	AV. ROCK SIZE
300	600	1680	690	780	880	780	300	750	300-600
375	640	1680	690	780	1080	780	375	940	375-750
450	640	1680	690	780	1080	780	450	1120	450-900
525	620	1680	690	780	1080	780	525	1310	525-1050
600	620	1680	690	780	1080	780	600	1500	600-200
750	590	1680	690	780	1080	780	750	1870	750-1500



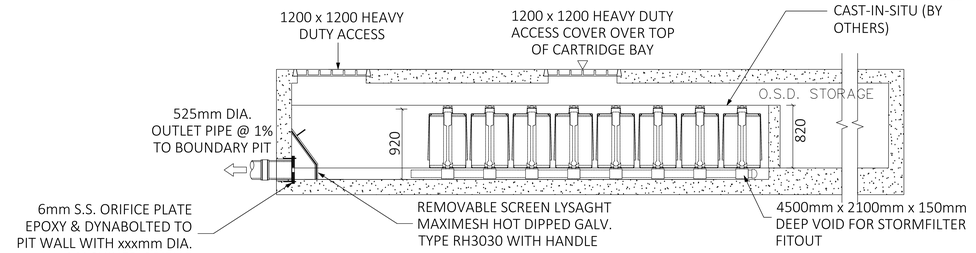
ELEVATION

NOTES:

1. HEADWALL THICKNESS 100mm TYPICAL
2. ROCKS SHALL BE HAND PLACED WHERE POSSIBLE AND SHALL BE OF A TIGHT FIT WITH COMPACTED SAND BEDDING.
3. ROCK BAFFLES SHALL HAVE 2/3 EMBEDDED WITH 1/3 ABOVE HEADWALL BASE.
4. 50% OF ROCK WEIGHT MUST BE WITHIN AVERAGE ROCK SIZE RANGE.
5. DO NOT USE THIS STANDARD FOR PIPES LARGER THAN 900mm OR VELOCITIES GREATER THAN 2m/s.
6. ROCK SPILLWAY BASED ON 'GUIDELINES FOR STABILISING WATER WAYS' 1993 BY THE STANDING COMMITTEE ON RIVERS AND CATCHMENTS FIG 4 P11, FIG 6 P13, FIG 11 P19

HEADWALL DETAIL

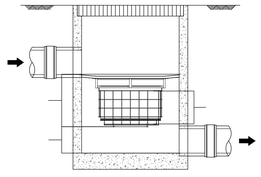
NOT TO SCALE



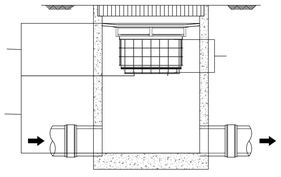
SECTION B - B

OCEAN PROTECT - STORMFILTER SYSTEM DETENTION TANK ARRANGEMENT (FIRST FLUSH GENERAL ARRANGEMENT)

NOT TO SCALE



PIPE FLOW CONFIGURATION

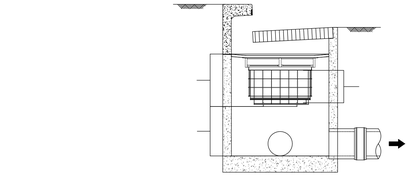


SURFACE FLOW CONFIGURATION

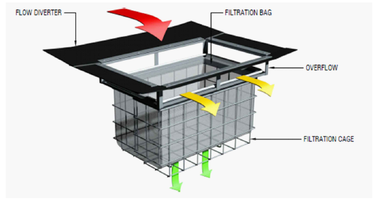
PLAN ID	MAXIMUM PIT PLAN DIMENSIONS
S	450mm x 450mm
M	600mm x 600mm
L	900mm x 900mm
XL	1200mm x 1200mm

1	170	270
2	300	450
3	600	700

		DEPTH ID		
PLAN ID	S	▪		
	M	▪	▪	
	L	▪	▪	▪
	XL	▪	▪	▪

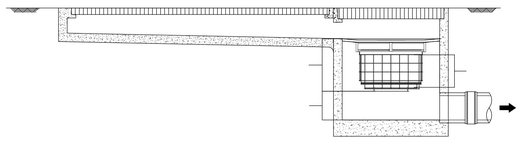


SURFACE FLOW CONFIGURATION



GENERAL NOTES

1. THE MINIMUM CLEARANCE DEPENDS ON THE CONFIGURATION (SEE NOTE 2) AND THE LOCAL COUNCIL REQUIREMENTS.
2. CLEARANCE FOR ANY PIT WITHOUT AN INLET PIPE (ONLY USED FOR SURFACE FLOW) CAN BE AS LOW AS 50mm. FOR OTHER PITS, THE RECOMMENDED CLEARANCE SHOULD BE GREATER OR EQUAL TO THE PIPE OBVERT SO AS NOT TO INHIBIT HYDRAULIC CAPACITY.
3. OCEAN PROTECT PROVIDES TWO FILTRATION BAG TYPES:- 200 MICRON BAGS FOR HIGHER WATER QUALITY FILTERING AND A COARSE BAG FOR TARGETING GROSS POLLUTANTS.
4. DRAWINGS NOT TO SCALE.



GRATED STRIP DRAIN CONFIGURATION

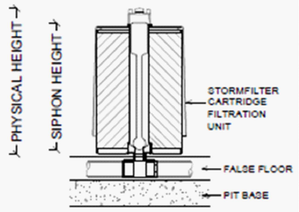
OCEAN PROTECT - OCEAN GUARD - TYPICAL ARRANGEMENTS

NOT TO SCALE

STORMFILTER DESIGN TABLE

- STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED.
- THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CERTIFYING ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S).
- FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF-CLEANING. RADIAL MEDIA DEPTH SHALL BE 178mm.

CARTRIDGE NAME / SIPHON HEIGHT (mm)	690	460	310
CARTRIDGE PHYSICAL HEIGHT (mm)	840	600	600
TYPICAL WEIR HEIGHT [H] (mm)	820	690	440
CARTRIDGE FLOW RATE FOR ZPG MEDIA (L/s)	1.6	1.1	0.7
CARTRIDGE FLOW RATE FOR PSORB MEDIA (L/s)	0.9	0.46	0.39



STORMFILTER CARTRIDGE DETAIL

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	[ ]
NUMBER OF CARTRIDGES REQ'D	[ ]
SIPHON HEIGHT (310 / 460 / 690)	[ ]
MEDIA TYPE (ZPG / PSORB)	[ ]
WATER QUALITY FLOW RATE (L/S)	[ ]
HYDRAULIC CAPACITY (L/S)	[ ]

PIPE DATA:	I.L.	MATERIAL	DIAMETER
INLET PIPE #1	[ ]	[ ]	[ ]
INLET PIPE #2	[ ]	[ ]	[ ]
INLET PIPE #3	[ ]	[ ]	[ ]
OUTLET PIPE	[ ]	[ ]	[ ]

PRECAST PIT WEIGHT	TBA
LID WEIGHT	TBA

GENERAL NOTES

1. PRECAST STRUCTURE SUPPLIED WITH CORE HOLES TO SUIT OUTER DIAMETER OF NOMINATED PIPE SIZE / MATERIAL.
2. PRECAST STRUCTURE SHALL MEET W80 WHEEL LOAD RATING ASSUMING A MAXIMUM EARTH COVER OF 2.0m AND A GROUND WATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. CERTIFYING ENGINEER TO CONFIRM ACTUAL GROUNDWATER ELEVATION. PRECAST STRUCTURE SHALL BE IN ACCORDANCE WITH AS3600.
3. IF THE PEAK FLOW RATE, AS DETERMINED BY THE SITE CERTIFYING ENGINEER, EXCEEDS THE PEAK HYDRAULIC CAPACITY OF THE SYSTEM, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.
4. ALL WATER QUALITY TREATMENT DEVICES REQUIRE PERIODIC MAINTENANCE. REFER TO OPERATION AND MAINTENANCE MANUAL FOR GUIDELINES AND ACCESS REQUIREMENTS.
5. SITE SPECIFIC PRODUCTION DRAWING WILL BE PROVIDED ON PLACEMENT OF ORDER.
6. DRAWING NOT TO SCALE.

INSTALLATION NOTES

1. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY CERTIFYING ENGINEER.
2. CONTRACTOR TO PROVIDE ALL EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE (LIFTING DETAIL PROVIDED SEPARATELY).
3. CONTRACTOR TO APPLY SEALANT TO ALL JOINTS AND TO PROVIDE, INSTALL AND GROUT INLET AND OUTLET PIPES.

OCEAN PROTECT
PHONE: 1300 354 722 www.oceanprotect.com.au

OCEAN PROTECT
4 CARTRIDGE STORMFILTER SYSTEM
8 SQUARE METRE CHAMBER
SPECIFICATION DRAWING

Issue	Description	Date of Drawing
A	Zoning Application	28 Nov. 2023

Drawn & Designed By : K. Koh
Checked By : N. Evans
Approved By : Kenneth T. NG
MIEAust CPEng NER APEC Engineer IntPE(Aus) (Reg. No. 2206352) RPEQ RPEng Registered Certifier (Hydraulic (stormwater), Road & Drainage and Stormwater) (Reg. No. BDC0827) Registered Design Practitioner (Drainage & Civil Engineering) (Reg. No. DEP0000692) & Professional Engineer (Civil) (Reg. No. DEP0000630) NSW Fair Trading

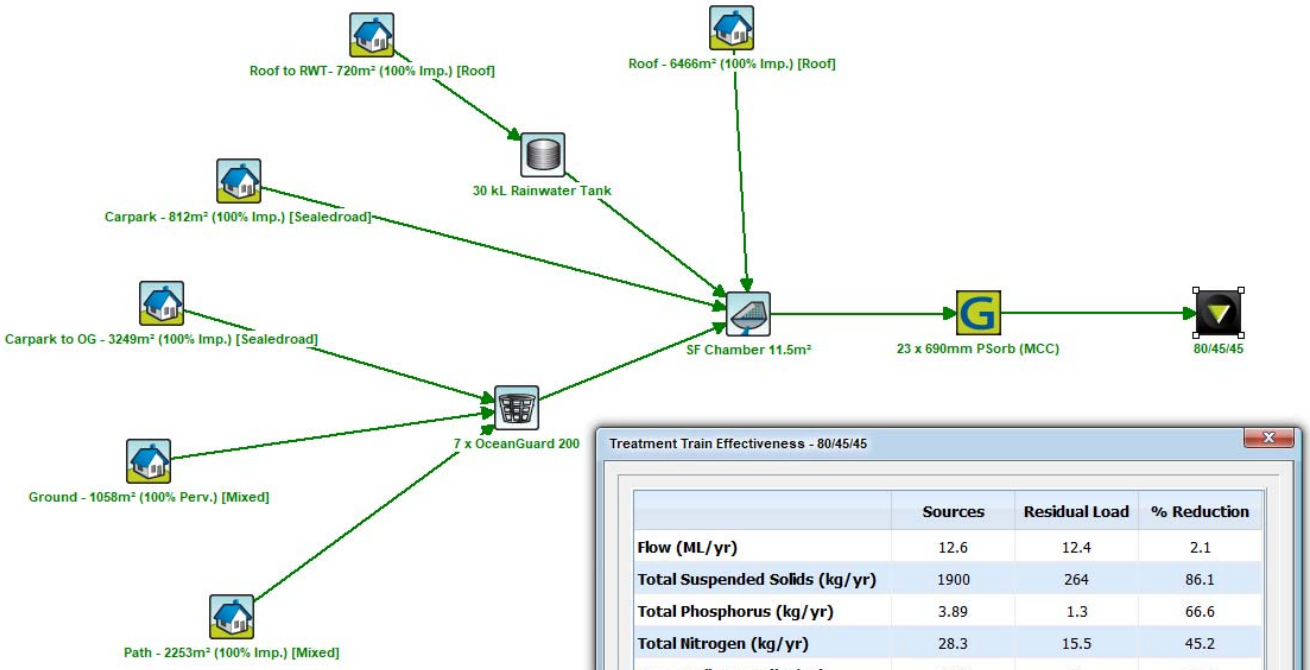
ING CONSULTING ENGINEERS PTY LTD
P. O BOX 1543
BAULKHAM HILLS NSW 1755
F : (02) 8807 5656
M: 0433 778 109
E : ken@ingengineers.com.au

Project	Proposed Wyee Marketplace	Drawing Title	Notes & Details
At	1496 Hue Hue Road & 106 Wyee Road Wyee NSW 2259	Date	November 2023
		Scale	As Shown @ A0
Client		Project No.	425102023MP
		Drawing & Sheet No./ Issue	42510-02/2 / A

Appendix C

MUSIC Model and MUSIC Link Report

MUSIC Model



Treatment Train Effectiveness - 80/45/45

	Sources	Residual Load	% Reduction
Flow (ML/yr)	12.6	12.4	2.1
Total Suspended Solids (kg/yr)	1900	264	86.1
Total Phosphorus (kg/yr)	3.89	1.3	66.6
Total Nitrogen (kg/yr)	28.3	15.5	45.2
Gross Pollutants (kg/yr)	319	0	100

LAKE MACQUARIE CITY COUNCIL

MUSIC-*link* Report

Project Details		Company Details	
Project:	21802 - 106 Wyee Rd, WYEE	**Company:**	ING CONSULTING ENGINEERS PTY LTD
Report Export Date:	4/12/2023	**Contact:**	Kenneth Ng
Catchment Name:	21802 - 106 Wyee Rd	**Address:**	106 Wyee Rd, WYEE
Catchment Area:	1.456ha	**Phone:**	0433 778 109
Impervious Area*:	92.71%	**Email:**	ken@ingengineers.com.au>
Rainfall Station:			
Modelling Time-step:	6 Minutes		
Modelling Period:	1/01/1999 - 31/12/2008 11:54:00 PM		
Mean Annual Rainfall:	1015mm		
Evapotranspiration:	1425mm		
MUSIC Version:	6.3.0		
MUSIC-link data Version:	6.34		
Study Area:	South Region		
Scenario:	South Region		

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node: 80/45/45	**Reduction**	**Node Type**	**Number**	**Node Type**	**Number**
Flow	2.12%	Sedimentation Basin Node	1	Urban Source Node	6
TSS	86.3%	Rain Water Tank Node	1		
TP	66.5%	Generic Node	1		
TN	45%	GPT Node	1		
GP	100%				

Comments

The 'SF Chamber' node has been modified to represent the below ground filtration chamber. Default 'K' values have been manually adjusted to 1 to eliminate any performance from the actual tank, which would already be accounted for in the Filter Generic Node Target Elements. Not doing this would represent a duplication of the chamber attenuation effect. For any questions, please contact Ocean Protect on 1300 354 722.

Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
GPT	7 x OceanGuard 200	Hi-flow bypass rate (cum/sec)	None	None	0.14
Receiving	80/45/45	% Load Reduction	None	None	2.12
Receiving	80/45/45	GP % Load Reduction	70	None	100
Receiving	80/45/45	TN % Load Reduction	45	None	45
Receiving	80/45/45	TP % Load Reduction	45	None	66.5
Receiving	80/45/45	TSS % Load Reduction	80	None	86.3
Sedimentation	SF Chamber 11.5m	% Reuse Demand Met	None	None	0
Sedimentation	SF Chamber 11.5m	High Flow Bypass Out (ML/yr)	None	None	0
Urban	Carpark - 812m| (100% Imp.)	Area Impervious (ha)	None	None	0.081
Urban	Carpark - 812m| (100% Imp.)	Area Pervious (ha)	None	None	0
Urban	Carpark - 812m| (100% Imp.)	Total Area (ha)	None	None	0.081
Urban	Carpark to OG - 3249m| (100% Imp.)	Area Impervious (ha)	None	None	0.325
Urban	Carpark to OG - 3249m| (100% Imp.)	Area Pervious (ha)	None	None	0
Urban	Carpark to OG - 3249m| (100% Imp.)	Total Area (ha)	None	None	0.325
Urban	Ground - 1058m| (100% Perv.)	Area Impervious (ha)	None	None	0
Urban	Ground - 1058m| (100% Perv.)	Area Pervious (ha)	None	None	0.106
Urban	Ground - 1058m| (100% Perv.)	Total Area (ha)	None	None	0.106
Urban	Path - 2253m| (100% Imp.)	Area Impervious (ha)	None	None	0.225
Urban	Path - 2253m| (100% Imp.)	Area Pervious (ha)	None	None	0
Urban	Path - 2253m| (100% Imp.)	Total Area (ha)	None	None	0.225
Urban	Roof - 6466m| (100% Imp.)	Area Impervious (ha)	None	None	0.647
Urban	Roof - 6466m| (100% Imp.)	Area Pervious (ha)	None	None	0
Urban	Roof - 6466m| (100% Imp.)	Total Area (ha)	None	None	0.647
Urban	Roof to RWT- 720m| (100% Imp.)	Area Impervious (ha)	None	None	0.072
Urban	Roof to RWT- 720m| (100% Imp.)	Area Pervious (ha)	None	None	0
Urban	Roof to RWT- 720m| (100% Imp.)	Total Area (ha)	None	None	0.072

Only certain parameters are reported when they pass validation

Failing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Rain	30 kL Rainwater Tank	% Reuse Demand Met	80	None	78.69
Rain	30 kL Rainwater Tank	Total Nitrogen - C** (mg/L)	0	0	1.4
Rain	30 kL Rainwater Tank	Total Phosphorus - C** (mg/L)	0	0	0.13
Rain	30 kL Rainwater Tank	Total Suspended Solids - C** (mg/L)	0	0	12
Sedimentation	SF Chamber 11.5m	Notional Detention Time (hrs)	8	12	0.0606
Sedimentation	SF Chamber 11.5m	Total Nitrogen - k (m/yr)	500	500	1
Sedimentation	SF Chamber 11.5m	Total Phosphorus - k (m/yr)	6000	6000	1
Sedimentation	SF Chamber 11.5m	Total Suspended Solids - k (m/yr)	8000	8000	1

Only certain parameters are reported when they pass validation