PROPOSED DEVELOPMENT (No.87-89) IRIS STREET, BEACON HILL STORMWATER MANAGEMENT PLANS

	LEGEND
	DENOTES ON-SITE DETENTION TANK
	DENOTES ON-SITE RETENTION TANK
	DENOTES DWELLING FOOTPRINT
sw	DENOTES 100mm DIA. STORMWATER/SURFACE WATER SYSTEM PIPE AT 1% MIN. GRADE U.N.O.
RW	DENOTES 100mm DIA. FULLY SEALED RAINWATER SYSTEM PIPE U.N.O.
150 RW	DENOTES RAINWATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
<u>150</u>	DENOTES STORMWATER/SURFACE WATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
65 	DENOTES RISING MAIN AND PIPE DIA. U.N.O.
100	DENOTES SUBSOIL DRAINAGE LINE AND DIA. WRAPPED IN GEOFARIC I I N O
DP	DENOTES DOWNPIPE
IO O	DENOTES INSPECTION OPENING WITH SCREW DOWN LID AT FINISHED SURFACE LEVEL
çõ	DENOTES INSPECTION OPENING WITH SCREW DOWN LID AT FINISHED SURFACE LEVEL FOR SYSTEM FLUSHING PURPOSES
\square	STORMWATER PIT - SOLID COVER
	STORMWATER PIT - GRATED INLET
······	DENOTES GRATED DRAIN
	DENOTES ABSORPTION TRENCH
И	NON RETURN VALVE
Ø	PUMP
<i>⊾</i>	STOP VALVE (ISOLATION VALVE)
¥	240v REQUIRED
<u> </u>	DENOTES LEVEL OF INLET /OUTLET OF STORMWATER PIPE. NOTE: UNLESS NOTED OTHERWISE, THE BASE OF THE PIT IS THE SAME AS THE PIPE INLET/OUTLET.

DIAL BEFORE YOU DIG



E YOU DIG

DRE IG may INPORTANT: THE CONTRACTOR IS TO MAINTAIN A CURRENT SET OF "DIAL BEFORE YOU DIG" DRAWINGS ON SITE AT ALL

GENERAL NOTES

- THESE PLANS SHALL BE READ IN CONJUNCTION WITH OTHER RELEVANT CONSULTANTS' PLANS, SPECIFICATIONS, CONDITIONS OF DEVELOPMENT CONSENT AND CONSTRUCTION CERTIFICATE REQUIREMENTS. WHERE DISCREPANCIES ARE FOUND ACOR CONSULTANTS (CC) MUST BE CONTACTED IMMEDIATELY FOR VERIFICATION
 WHERE THESE PLANS ARE NOTED FOR DEVELOPMENT APPLICATION
- 2. WHERE THESE PLANS ARE NOTED FOR DEVELOPMENT APPLICATION PURPOSES ONLY, THEY SHALL NOT BE USED FOR OBTAINING A CONSTRUCTION CERTIFICATE NOR USED FOR CONSTRUCTION PURPOSES
- 3. SUBSOIL DRAINAGE SHALL BE DESIGNED AND DETAILED BY THE STRUCTURAL ENGINEER. SUBSOIL DRAINAGE SHALL NOT BE CONNECTED INTO THE STORMWATER SYSTEM IDENTIFIED ON THESE PLANS UNLESS APPROVED BY ACOR CONSULTANTS (CC)

STORMWATER CONSTRUCTION NOTES

- ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH AS/NZS 3500 (CURRENT EDITION) AND THE REQUIREMENTS OF THE LOCAL COUNCIL'S POLICIES AND CODES
- 2. THE MINIMUM SIZES OF THE STORMWATER DRAINS SHALL NOT BE LESS THAN DN90 FOR CLASS 1 BUILDINGS AND DN100 FOR OTHER CLASSES OF BUILDING OR AS REQUIRED BY THE REGULATORY AUTHORITY
- THE MINIMUM GRADIENT OF STORMWATER DRAINS SHALL BE 1%, UNLESS NOTED OTHERWISE
- 4. COUNCIL'S TREE PRESERVATION ORDER IS TO BE STRICTLY ADHERED TO. NO TREES SHALL BE REMOVED UNTIL PERMIT IS OBTAINED
- 5. PUBLIC UTILITY SERVICES ARE TO BE ADJUSTED AS NECESSARY AT THE CLIENT'S EXPENSE
- 6. ALL PITS TO BE BENCHED AND STREAMLINED. PROVIDE STEP IRONS FOR ALL PITS OVER 1.2m DEEP
- 7. MAKE SMOOTH JUNCTION WITH ALL EXISTING WORK
- 8. VEHICULAR ACCESS AND ALL SERVICES TO BE MAINTAINED AT ALL TIMES TO ADJOINING PROPERTIES AFFECTED BY CONSTRUCTION
- SERVICES SHOWN ON THESE PLANS HAVE BEEN LOCATED FROM INFORMATION SUPPLIED BY THE RELEVANT AUTHORITIES AND FIELD INVESTIGATIONS AND ARE NOT GUARANTEED COMPLETE NOR CORRECT. IT IS THE CLIENT & CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL PRIOR TO CONSTRUCTION
- 10. ANY VARIATION TO THE WORKS AS SHOWN ON THE APPROVED DRAWINGS ARE TO BE CONFIRMED BY ACOR CONSULTANTS (CC) PRIOR TO THEIR COMMENCEMENT

RAINWATER RE-USE SYSTEM NOTES

- 1. RAINWATER SUPPLY PLUMBING TO BE CONNECTED TO OUTLETS WHERE REQUIRED BY BASIX CERTIFICATE (BY OTHERS)
- TOWN WATER CONNECTION TO RAINWATER TANK TO BE TO THE SATISFACTION OF THE REGULATORY AUTHORITY. THIS MAY REQUIRE PROVISION OF:
 - 2.1. PERMANENT AIR GAP
 - 2.2. BACKFLOW PREVENTION DEVICE
- 3. NO DIRECT CONNECTION BETWEEN TOWN WATER SUPPLY AND THE RAIN WATER SUPPLY
- 4. AN APPROVED STOP VALVE AND/OR PRESSURE LIMITING VALVE AT THE RAINWATER TANK
- 5. PROVIDE APPROPRIATE FLOAT VALVES AND/OR SOLENOID VALVES TO CONTROL TOWN WATER SUPPLY INLET TO TANK IN ORDER TO ACHIEVE THE TOP-UP INDICATED ON THE TYPICAL DETAIL
- ALL PLUMBING WORKS ARE TO BE CARRIED OUT BY LICENSED PLUMBERS IN ACCORDANCE WITH AS/NZS3500.1 NATIONAL PLUMBING AND DRAINAGE CODE
- 7. PRESSURE PUMP ELECTRICAL CONNECTION TO BE CARRIED OUT BY A LICENSED ELECTRICIAN
- 8. ONLY ROOF RUN-OFF IS TO BE DIRECTED TO THE RAINWATER TANK . SURFACE WATER INLETS ARE NOT TO BE CONNECTED
- PIPE MATERIALS FOR RAINWATER SUPPLY PLUMBING ARE TO BE APPROVED MATERIALS TO AS/NZS3500 PART 1 SECTION 2 AND TO BE CLEARLY AND PERMANENTLY IDENTIFIED AS 'RAINWATER'. THIS MAY BE ACHIEVED FOR BELOW GROUND PIPES USING IDENTIFICATION TAPE (MADE IN ACCORDANCE WITH AS2648) OR FOR ABOVE GROUND PIPES BY USING ADHESIVE PIPE MARKERS (MADE IN ACCORDANCE WITH AS1345)
- 10. EVERY RAINWATER SUPPLY OUTLET POINT AND THE RAINWATER TANK ARE TO BE LABELED 'RAINWATER' ON A METALLIC SIGN IN ACCORDANCE WITH AS1319
- 11. ALL INLETS AND OUTLETS TO THE RAINWATER TANK ARE TO HAVE SUITABLE MEASURES PROVIDED TO PREVENT MOSQUITO AND VERMIN ENTRY

SHEET INDEX COVER SHEET & NOTES SHEET C1 STORMWATER MANAGEMENT PLAN - BASEMENT SHEET C2 STORMWATER MANAGEMENT PLAN - GROUND SHEET C3 STORMWATER MANAGEMENT PLAN - FIRST SHEET C4 STORMWATER MANAGEMENT PLAN - FIRST SHEET C4 STORMWATER MANAGEMENT DETAILS SHEET No.1 SHEET C5 STORMWATER QUALITY REPORT SHEET 1 OF 2 SHEET C6 STORMWATER QUALITY REPORT SHEET 2 OF 2 SHEET C7

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TIMES





NORTHERN BEACHES COUNCIL (WARRINGAH COUNCIL REQUIREMENTS)

SITE AREA (m) PRE DEVELOPED IMPERVIOUS AR POST DEVELOPED IMPERVIOUS A	
FULL COMPUTATION ME REFER TO DRAINS MODE DRAINS SUMMARY SITE AREA (m ²) IMPERVIOUS PREDEVELOPED F PRE-DEVELOPED DISCHARGE F	THOD ADOPTED USING DRAINS PROGRAM. EL GO190048.dm
5 year API	100 year API
68 L/S	100 L/S
POST DEVELOPED SUMMARY ROOF AREA (m ²) DRIVEWAY AREA + PATH + MISC + 15% ADDITIONAL (m ²) TOTAL IMPERVIOUS AREA (m ²)	
FOR CALCULATION	
OSD CATCHMENT = 1123m ² OSD BYPASS = 200m ²	(roof area 100% impervious) (driveway, paths, landscape 25% impervious)
STORAGE VOLUME REQUIRED =	= 25 m³
MAXIMUM HEADWATER = 1.35m THEREFORE: ADOPT = 167mm C TOP STORED WSL - RL 135.35 INVERT OF OUTLET - IL 133.85 CENTRE LINE OF ORIFICE - RL 1	RIFICE 34.00
DESIGN PREPARED IN ACCORD. STORMWATER DETENTION TEC 3500.	ANCE WITH WARRINGAH COUNCIL "ON SITE HNICAL SPECIFICATION" AR&R & AS/NZS

DEVELOPMENT APPLICATION ISSUE	
NOT FOR CONSTRUCTION	

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PLAYOUST CHURCHER ARCHITECTS (NEWMAN)



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ts (CC) Pty Ltd 2.01, 4 Ilya Avenue NSW 2250, Australia	PROPOSED RESIDENTIAL	Drawing Title STORMWATER MANAGEMENT DETAIL SHEET					
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VELOPMENT CONSULTANTS	IRIS STREET BEACON HILL	Designed BK	CC1900	048	Dwg. No. C5	lssue C	

1 INTRODUCTION

A CATCHMENT BASED WATER QUALITY MODEL WAS DEVELOPED TO ASSESS THE STORMWATER RUNOFF QUALITY IN ACCORDANCE WITH THE REQUIREMENTS OF WARRINGAH COUNCIL PL 850 WATER - WATER MANAGEMENT POLICY PART 8.1 'STORMWATER QUALITY'. IN THIS REGARD WE REFER TO THE PRESCRIBED TARGETS TABLED FOLLOWING:

TABLE 1 - STORMWATER POLUTANT REDUCTION TARGETS (MUSIC v6)

STORMWATER POLLUTANT	REDUCTION TARGETS
GROSS POLLUTANT	90%
TOTAL SUSPENDED SOLIDS (TSS)	85%
TOTAL PHOSPHORUS (TP)	65%
TOTAL NITROGEN (TN)	45%

2 STUDY METHODOLOGY

THE OBJECTIVES OF THIS REPORT ARE TO:

- ASSESS THE RUNOFF QUALITY FOR THE UNTREATED POST DEVELOPED SCENARIO AND IDENTIFY STORMWATER QUALITY CONTROLS LIKELY TO IMPACT ON RUNOFF QUALITY.
- ASSESS THE STORMWATER QUALITY FOR THE POST • DEVELOPED SCENARIO INCLUDING THE MEASURES PROPOSED TO MEET THE POLLUTANT REMOVAL TARGETS .

THE REPORT IS BASED ON THE APPLICATION OF MUSIC SOFTWARE (MODEL FOR URBAN STORMWATER IMPROVEMENT CONCEPTUALISATION). IN THIS REGARD THE MODEL IS DEFINED AS FOLLOWS:

- A STORMWATER QUALITY MODEL TO CONVERT RAINFALL AND EVAPOTRANSPIRATION INTO RUNOFF.
- ESTIMATION OF STORMWATER FLOW AND POLLUTION GENERATION BY SIMULATING THE PERFORMANCE OF STORMWATER TREATMENT DEVICES INDIVIDUALLY AND AS PART OF A TREATMENT TRAIN.

THE MODEL DEFINES WATER QUALITY PROFILES TREATED SCENARIOS. THE TREATED POST DEVELOPED MODEL INCLUDES PARAMETERS WHICH REPRESENT THE WATER QUALITY MEASURES.

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STORMWATER QUALITY REPORT

3 STORMWATER QUALITY MODELLING

3.1 GENERAL

PLAYOUST CHURCHER

ARCHITECTS

(NEWMAN)

THE FOLLOWING PARAMETERS WERE ASSESSED FOR THE HYDROLOGICAL MODELLING ASSOCIATED WITH THE CATCHMENT.

- RAINFALL/RUNOFF AND EVAPOTRANSPIRATION.
- SUB CATCHMENT DIVERSIONS.
- LAND USE (PERVIOUS AND IMPERVIOUS)

3.2 RAINFALL/RUNOFF AND EVAPOTRANSPIRATION

NORTHERN BEACHES COUNCIL'S WSUD & MUSIC MODELING GUIDELINES WERE UTILISED IN THIS STUDY. THEREFORE DAILY RAINFALL DATA WAS OBTAINED FROM THE SYDNEY OBSERVATORY HILL RAINFALL STATION WITH 6 min TIMESTEP, STATION NO. 066062. THE COUNCIL'S DEFAULT MONTHLY AVERAGE POTENTIAL EVAPOTRANSPIRATION DATA WAS ALSO UTILISED IN THIS STUDY.

THE DETAILS ARE SUMMARISED IN TABLE 3.1 AND 3.2

TABLE 3.1 - DETAILS OF DAILY RAINFALL DATA						
STATION	NAME	PERIOD	TIMESTEP			
066062	SYDNEY OBSERVATORY HILL	01/01/1981-31/08/1985	6 min			

TABLE 3.2 - SUMMARY OF POTENTIAL EVAPOTRANSPIRATION (PET)						
JAN	FEB	MAR	APR	MAY	JUN	
180	135	128	85	58	43	
JUL	AUG	SEP	OCT	NOV	DEC	
43	58	88	127	152	163	

3.3 CATCHMENT DEFINITION

IDENTIFIED IN TABLE 3.3.

TABLE 3.3 - POST [

SUB CATCHMENT ID

ROOF
SOUTHERN LANDSCAPED AREA
PATHS AND PLANTERS TO OSD
LANDSCAPE AND PATH BYPASSING OSD
DRIVEWAY BYPASSING OSD

4 MUSIC MODEL

(EMCs).

4.1 WATER QUALITY PARAMETERS

THE ADOPTED VALUES OF VARIOUS MUSIC RAINFALL AND RUNOFF PARAMETERS ARE SUMMARISED IN TABLE 4.1 AS PER THE DEFAULT VALUES WHEN ADOPTING THE NORTHERN BEACHES COUNCIL'S WSUD & MUSIC MODELING GUIDELINES

PARAMETER	VALUE				
IMPERVIOUS AREA PROPER	RTIES				
RAINFALL THRESHOLD (mm/DAY)	0.3 (roof) else 1.5				
PERVIOUS AREA PROPERTIES (SAND	Y CLAY LOAM)				
SOIL STORAGE CAPACITY (mm)	108				
SOIL INITIAL STORAGE (% OF CAPACITY)	30				
FIELD CAPACITY (mm)	73				
INFILTRATION CAPACITY COEFFICIENT - a	250				
INFILTRATION CAPACITY EXPONENT - b	1.3				
GROUNDWATER PROPER	TIES				
INITIAL DEPTH (mm)	10				
DAILY RECHARGE RATE (%)	60				
DAILY BASEFLOW RATE (%)	45				
DAILY DEEP SEEPAGE RATE (%)	0				



BEACON HIL

THE POST DEVELOPED CATCHMENT CHARACTERISTICS ARE

DEVELOPMENT	EVELOPMENT SUB CATCHMENT DETAILS											
SUB CATCHMENT AREA (ha)	% IMPERVIOUS AREA	% PERVIOUS AREA										
0.099	100	0										
0.021	2	98										
0.026	2	98										
0.034	47	53										
0.031	16	84										
0.005	100	0										

THE MUSIC MODEL IS BASED ON A 6 min RAINFALL-RUNOFF MODEL IN CONJUNCTION WITH REPRESENTATIVE BASEFLOW AND STORMFLOW EVENT MEAN CONCENTRATIONS

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4.1 WATER QUALITY PARAMETERS CONT.

STORMWATER QUALITY IS CHARACTERISED USING EVENT MEAN CONCENTRATION (EMCs) UNDER STORM AND BASE FLOW CONDITIONS. THE VALUE OF WATER QUALITY PARAMETERS ADOPTED IN THIS STUDY IS SUMMARISED IN TABLE 4.2

	TABLE 4.2 - ADOPTED MUSIC WATER QUALITY PARAMETERS													
			Log₀TSS	(mg/L)	Log₀TP	(mg/L)	Log₁₀TN (mg/L)							
LAND-USE CA		IEGORY	STORM FLOW	BASE FLOW	E STORM BASE N FLOW FLOW		STORM FLOW	BASE FLOW						
		MEAN	2.15	1.20	-0.60	-0.85	0.30	0.11						
	RESIDENTIAL	STD DEV	0.32	0.17	0.25	0.19	0.19	0.12						
	SEALED	MEAN	2.43	1.20	-0.3	-0.85	0.34	0.11						
ROADS	ROADS	STD DEV	0.32	0.17	0.25	0.19	0.19	0.12						
	50050	MEAN	1.30	1.10	-0.89	-0.82	0.30	0.32						
	RUOFS	STD DEV	0.32	0.17	0.25	0.19	0.19	0.12						

4.2 STORMWATER TREATMENT MEASURES

THE PROPOSED STORMWATER TREATMENT MEASURES INCLUDED

IN THE POST DEVELOPED MODEL ARE AS FOLLOWS:

- 21,000 LITRE OSR TANK
- 25,000 LITRE OSD TANK
- 5 x STORMSACK
- GTP (NIPPPER)

THE SCHEMATIC LAYOUT FOR THE POST DEVELOPED MUSIC

MODEL IS DEPICTED IN FOLLOWING FIGURE 1

VIII SPEL

FIGURE 1 - MUSIC MODEL SCHEMATIC

5 RESULTS & CONCLUSION

BASED ON THE FOREGOING THE PROPOSED STORMWATER QUALITY TREATMENT MEASURES MEET THE REQUIRED TARGETS OF WARRINGAH COUNCIL'S PL 850 WATER - WATER MANAGEMENT POLICY PART 8.1 'STORMWATER QUALITY'.

TABLE 5.1 - TREATMENT TRAIN EFFECTIVENESS

	Sources	Residual Load	% Reduction
Flow (ML/yr)	1.9	1.32	30.9
Total Suspended Solids (kg/yr)	126	18.7	85.1
Total Phosphorus (kg/yr)	0.369	0.128	65.3
Total Nitrogen (kg/yr)	3.96	0.973	75.5
Gross Po <mark>llutants (</mark> kg/yr)	40.9	0.02	100
			Ba As

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DRAWING TRANSMITTAL

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