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DOOLEYS

LIDCOMBE CATHOLIC CLUB

Water Sensitive Urban Design Report

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Reviewer: Stephen Naughton

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Report Amendment Register

Rev. No.	Section & Page No.	Issue/Amendment	Author/Initials	Reviewer/Initials	Date
1		Draft	RB	SN	17/06/16
2		Issue for submission	RB	SN	24/06/16

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APPENDICES

1 Introduction

This report has been prepared by Bonacci Group (NSW) Pty Ltd to describe the water sensitive urban design (WSUD) measures associated with the Development Application (DA) for Dooleys Lidcombe Catholic Club redevelopment which is located on the corner of John Street and Church Street.

This report addresses the water quality strategy adopted for the proposed site. The water quality strategy adopted for the site incorporates best practice measures to comply with the requirement of SEPP (Sydney Drinking Water Catchment) 2011 which necessitates development to have a “Neutral or Beneficial Effect” on water quality .

2 Site Description

2.1 Local and Regional Context

The proposed site is located at the intersection of Olympic Drive and Church Street. The site is located within the LGA (Local Government Area) of Cumberland City Council, which was formerly known as Auburn City Council.

The proposed site sits within Haslams Creek Catchment which is located in the Sydney metropolitan suburbs of Lidcombe, Auburn and Berala. The subject site is bordered by Olympic Drive to the west, Church Street to the south, John Street to the east and Ann Street to the north. Apex reserve is located to the western boundary of the site and forms part of the existing floodplain. The locality sketch of the site is shown in Figure 2.1 below.

The existing residential buildings located on the northern side of the site drain towards Ann Street to Olympic Drive, and eventually drain to Haslams Creek located within Wyatt Park.

Figure 2.1: Locality Sketch [Source: Google Map]

2.2 The Proposed Development

The proposed site will be used for commercial purposes. The proposed redevelopment of the Dooley's – Lidcombe Catholic Club is divided into two Stages.

The redevelopment incorporates the construction of a 12 storey building (proposed for club and hotel tower above the podium with 260 rooms) above a two storey podium (includes club facilities and other facilities associated with the proposed hotel; including conferencing, food and beverage and gym) and two levels of basement car parking located within the existing car park are of the site. This also includes decommission of the existing residential building and construction of a five storey above ground multi deck parking building located north eastern corner of the subject site. This redevelopment also includes internal road access and connection points to surrounding road networks (entrance from Church Street, Olympic Drive and respectively Ann Street) as per Architectural Drawings for access into proposed building.

The Architectural plan for the site is shown in Figure 2.2 below.

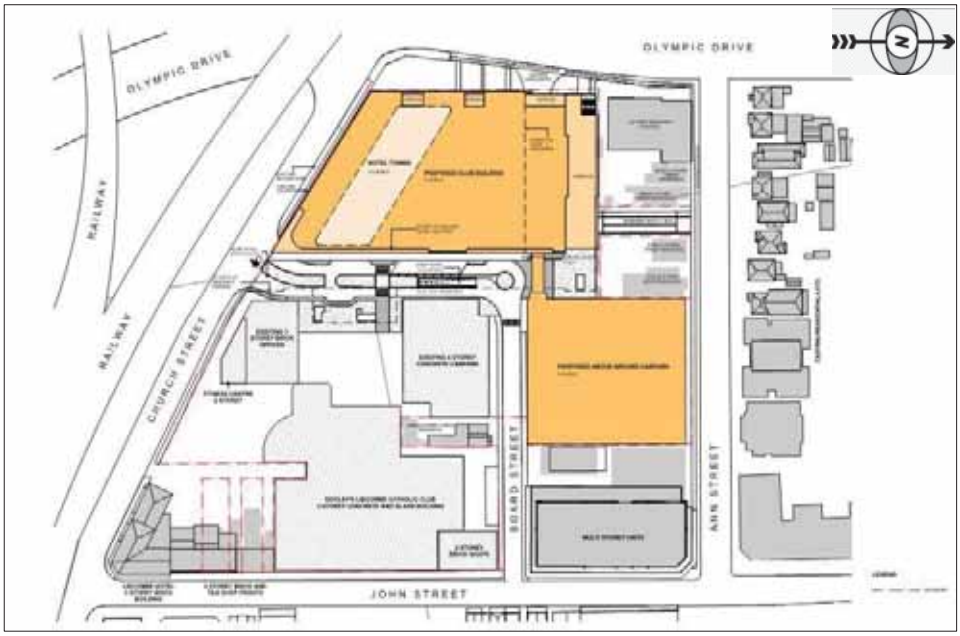


Figure 2.2: Architectural Site Plan (The Proposed Redevelopment for Dooley's Lidcombe Catholic Club)

Architectural ground floor plan for club hotel with internal road is shown in Figure 2.3 below.

Figure 2.3: Architectural Ground Floor Plan for Club Hotel

It appears that the existing residential site does not incorporate any form of stormwater detention, retention or water quality treatment. The existing site includes built structures including car park, residential buildings and portion of Board Street.

There is an existing OSD tank at the low point of the on-grade car park. This connects to the trunk stormwater system on Olympic Drive. New OSD tanks will be provided in accordance with Council's requirements (for the multi-storey car park and for the building)

3 Water Quality

Cumberland City Council (formerly known as Auburn City Council) does not have any specific water quality targets requirements in their Development Control Plans (DCP). The water quality targets which have been adopted for the proposed site are from State Environmental Planning Policy (Sydney Drinking water Catchment) 2011. This requires that the development or redevelopment has a Neutral or Beneficial Effect (NorBE) which is defined as:

- *Has no identifiable potential impact on water quality or*
- *Will contain any water quality impact on the development site and prevent it from reaching any watercourse, waterbody or drainage depression on the site or*
- *Will transfer any water quality impact outside the site where it is treated and disposed of to standards approved by the consent authority.*

Meeting this requirement will reduce pollutant loads generated from the redeveloped site, which will benefit the water quality system of the downstream receiving waters.

3.1 Water Quality Strategy

The water quality treatment measures proposed for the site are provided to ensure the redevelopment has a Neutral or Beneficial Effect (NorBE) on water quality.

The water quality strategy for the proposed development (Stage 1) incorporates a Rainwater tank (RWT) for the roof area of the Club hotel building , on-site detention (OSD) tanks which are allocated to limit peak flows from club hotel building roof area, roofed car park and internal road connection from Church Street to Board Street.

The reuse requirement for the rainwater tank is assumed as 610 kL/yr for irrigation of landscape area (located on podium) and 7.0 kL/day for the cooling system of the proposed building.

The catchment plan for the proposed development is shown below.

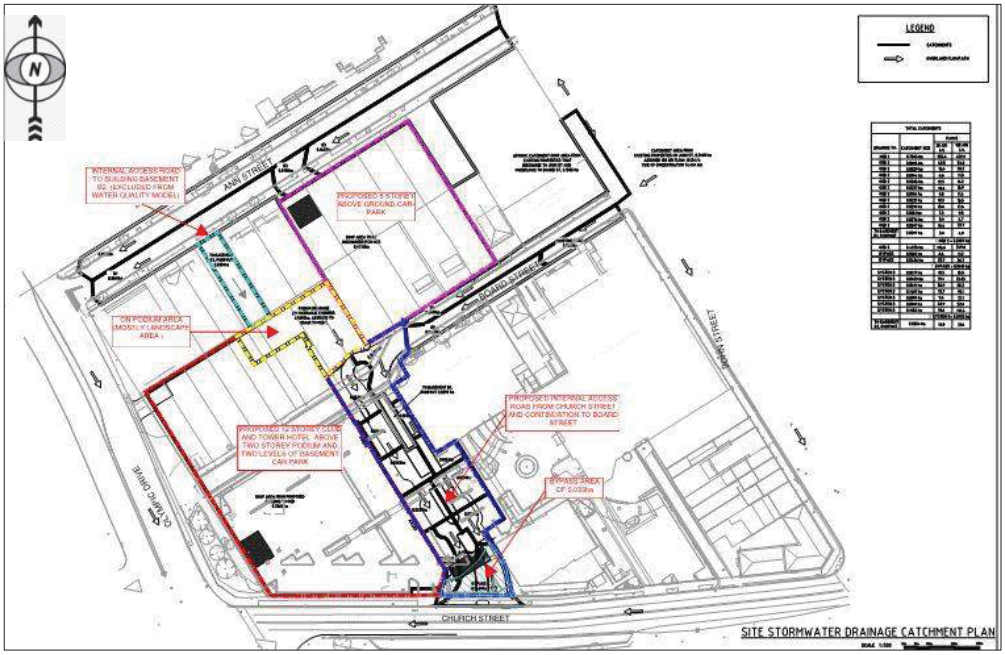


Figure 3.1: Catchment Plan for the Proposed Development (the Redevelopment of Dooley's Lidcombe Catholic Club))

The water quality measures for the proposed development are provided in Section 3.2.

3.2 Water Quality Model

The water quality model for the proposed redevelopment was established using *MUSIC* [Version 6.1].The proposed site is divided into four main catchments. A value of impervious surface area has been calculated from the landscape plan.

The impervious fraction used for the proposed site is summarised in **Table 3.1** below which have been calculated from landscape plan. The Landscape Plans for the proposed development are provided in **Appendix C**.

Table 3.1: Catchment Summary

Catchments	Total Area (ha)	Impervious Fraction (%)
Club Hotel Roof Area	0.707	100
Car Park Roof	0.407	100
On Podium	0.089	35
Internal Access (linking Church Street and Board Street) Road	0.280*	100

Note: * 330 m^2 sealed (vehicular access fronting Church street) surface area bypasses the On-site detention tank as well as water quality measures provided for Internal Access Road.

The soil properties and stormwater quality parameters for the above catchments are in accordance with *Using Music in Sydney's drinking Catchment*, 2012 (Sydney Catchment Authority) which is provided in **Appendix B**.

A rainwater tank (RWT), nominal capacity of 63KL, is provided to harvest roof water from the multi storey building. Podium area is also drains to the RWT.

For the treatment measures of the internal access road, four enviropods fitted within the stormwater pits are provided which eventually drain to proposed OSD tank located at the end of vehicular access ramp from Church Street. 330 square metres of access road (vehicular crossing from Church Street) bypasses the water quality treatment measures as well as OSD tank which is also adopted in water quality (*MUSIC*) model.

The water quality model adopted for the post developed scenario is shown below.

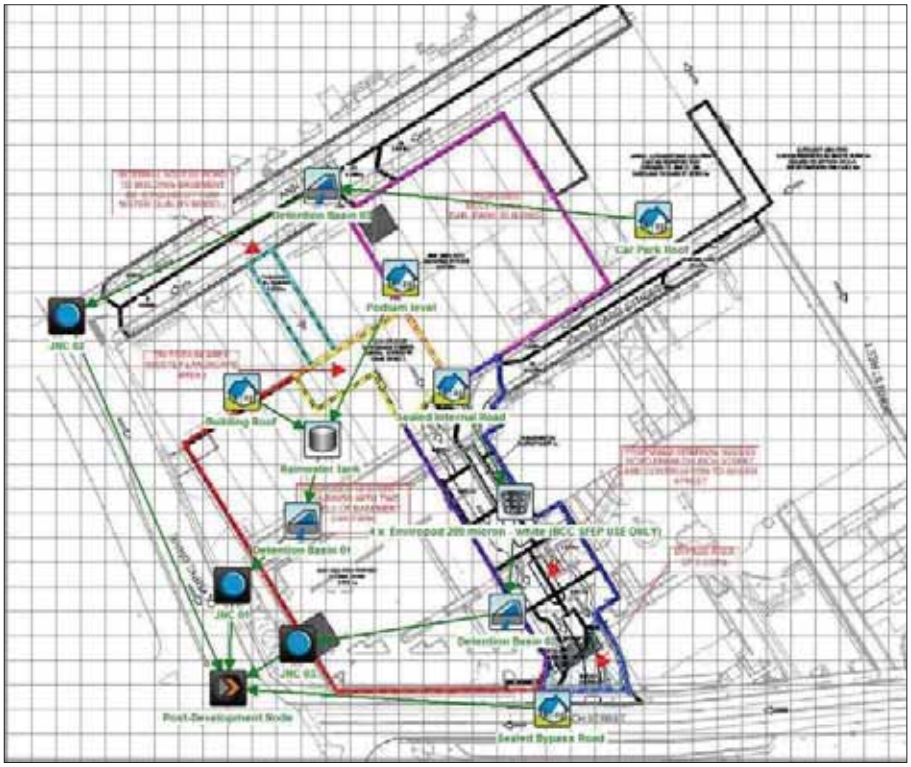


Figure 3.2: Water Quality Model for the Post-development Scenario

The existing car park and partial area of the Board Street which is 0.758 ha (95% Impervious Fraction) in area and 0.724 ha (60% Impervious Fraction) of residential land use area are modelled as shown below:

Figure 3.3: Water Quality Model for the Pre-development Scenario

3.3 Results

The results of MUSIC modelling shows that the mean annual pollutant loads for Stage 1 of Dooley's Catholic Club redevelopment scenario are lower than existing case scenario. It also demonstrates that it improves the existing water quality leaving from the site to downstream Haslams creek. The results from the MUSIC model are tabulated below.

Table 3.2: MUSIC Model Results

Items	Mean Annual Pollutant loads (kg/yr)			Pollutant Reduction/ Removal Rate (%) [pre development to post development)
	Pre-development Case scenario	Post – development without Treatment Train	Post – development with Treatment Train	
Total Suspended Solids	3140.00	1240.00	333.00	89.4
Total phosphorous	5.17	3.23	1.63	68.5
Total Nitrogen	25.90	30.60	18.60	28.2
Gross Pollutants	317.00	353.00	8.07	97.7

The results show that, the proposed treatment measures reduce pollutant loads by more than 10% when compared to the pre-development scenario.

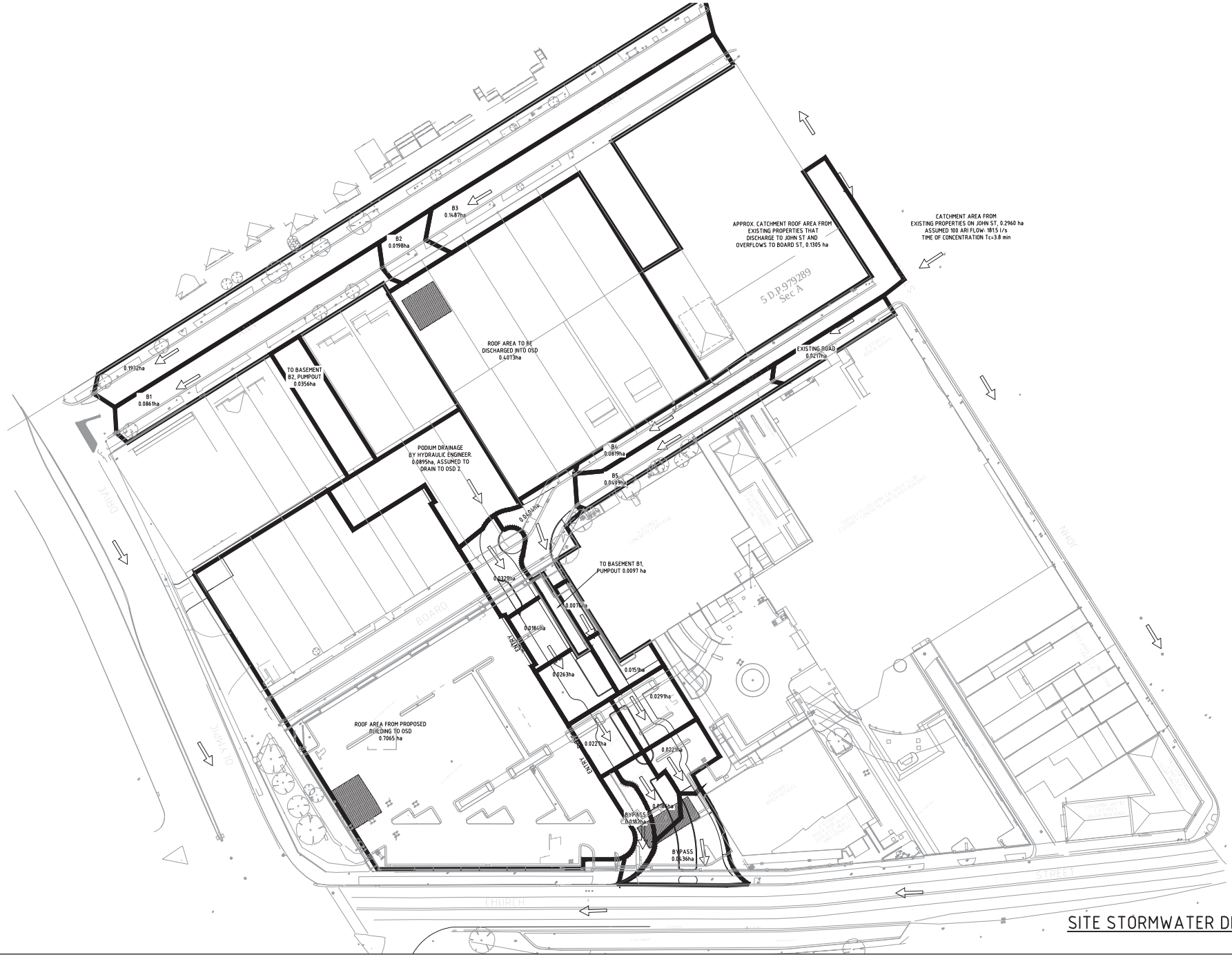
The pollutant concentrations for pre and post development case scenarios are provided in **Appendix B**. It shows that, the pollutant concentration for post-development case scenario has been reduced when compared to the pre-development case scenario.

4 Summary

The proposed redevelopment of the Dooley's Lidcombe Catholic Club incorporates the construction of a 12 storey tower above a two storey podium and two levels of car park. This also includes a five storey multi deck car park and an internal road which connects Church Street to Board Street.

The water quality measures provided for the proposed development in such a way that, it not only reduces the annual pollutant loads by more than 10% but also reduces the pollutant concentrations when compared to the pre development scenario.

Appendix A – Catchment Plan for the Site



LEGEND

CATCHMENTS

OVERLAND FLOWPATH

TOTAL CATCHMENTS			
		FLOWS	
DRAINING TO:	CATCHMENT SIZE	20 ARI l/s	100 ARI l/s
OSD 1	0.7065 ha	335.8	432.9
OSD 2	0.0895 ha	42.5	54.8
OSD 2	0.0329 ha	15.6	20.2
OSD 2	0.0184 ha	8.8	11.3
OSD 2	0.0263 ha	12.5	16.2
OSD 2	0.0227 ha	10.8	13.9
OSD 2	0.0186 ha	8.5	11.4
OSD 2	0.0221 ha	10.5	13.5
OSD 2	0.0291 ha	13.8	17.8
OSD 2	0.0151 ha	7.2	9.3
OSD 2	0.0076 ha	3.6	4.7
OSD 2	0.0387 ha	18.4	23.7
TO BASEMENT B1, PUMPOUT	0.0097 ha	3.8	4.9
		* =OSD 2 = 0.3307 ha	
OSD 3	0.4073 ha	193.6	249.6
BYPASS	0.0182 ha	8.6	11.2
BYPASS	0.0436 ha	20.7	26.7
		* =BYPASS = 0.0618 ha	
SYSTEM B	0.0217 ha	10.3	13.3
SYSTEM B	0.0409 ha	19.4	25.05
SYSTEM B	0.0819 ha	38.9	50.2
SYSTEM B	0.1487 ha	70.7	91.1
SYSTEM B	0.0198 ha	9.4	12.1
SYSTEM B	0.0861 ha	40.9	52.8
SYSTEM B	0.1932 ha	91.8	118.4
		* =SYSTEM B= 0.5923 ha	
TO BASEMENT B2, PUMPOUT	0.0356 ha	16.9	21.8

SITE STORMWATER DRAINAGE CATCHMENT PLAN

SCALE 1:500 0m 5m 10m 20m 30m

Rev	Description	Date	By	App
P3	PRELIMINARY DESIGN	06.04.16	MD	-
P2	PRELIMINARY DESIGN	25.02.16	MD	-
P1	PRELIMINARY DESIGN	17.12.15	MD	-

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Project Name: DOOLEYS LIDCOMBE CATHOLIC CLUB JOHN STREET, LIDCOMBE

Drawing Title: SITE STORMWATER DRAINAGE CATCHMENT PLAN

PRELIMINARY

Designed	SN
Drawn	MD
Scale	1:500
Date	DEC 2015
Sheet	

Project Director Approved Date North

Project Ref: 20 21718 01 Drawing No: C030 Rev: P3

File: G:\Job\2021\21801_Civil\Issued\Dwg\20217180 1_C030-CADPS.dwg Plotted: 08.04.16 at 2:29 PM By: Maja Day

Appendix B

Music Modelling Parameters and Results

Music Model Parameters

Soil Properties for Music Source Nodes:

Table 4.4: Soil storage capacity and field capacity for a 0.5 m root-zone depth (Macleod, 2008)

Dominant soil description	Root zone soil depth (0.5 m)	
	Soil storage capacity (mm)	Field capacity (mm)
Sand	175	74
Loamy sand	139	69
Clayey sand	107	75
Sandy loam	98	70
Loam	97	79
Silty loam	100	87
Sandy clay loam	108	73
Clay loam	119	99
Clay loam, sandy	133	89
Silty clay loam	88	70
Sandy clay	142	94
Silty clay	54	51
Light clay	98	73
Light-medium clay	90	67
Medium clay	94	70
Medium-heavy clay	94	70
Heavy clay	90	58

Table 4.5: Other soil rainfall-runoff parameters for a 0.5 m root-zone depth (adapted from Macleod, 2008)

Dominant soil description	Soil rainfall-runoff parameters[1]				
	Infiltration capacity coefficient-a (mm/d)	Infiltration capacity exponent-b	Daily recharge rate (%)	Daily baseflow rate (%)	Daily seepage rate (%)
Sand, loamy sand	360	0.5	100	50	0
Clayey sand, sandy loam, loam, silty loam, sandy clay loam	250	1.3	60	45	0
Clay loam, sandy clay loam, silty clay loam, sandy clay, silty clay	180	3.0	25	25	0
Light clay, light medium clay, medium clay, medium heavy clay, heavy clay	135	4.0	10	10	0

[1] These parameter estimates are based on soil properties only. There is no allowance for rainfall losses associated with depression storage, mulch, vegetation interception and other non-soil sources of water storage in a catchment.

Stormwater Pollutant Generation Parameters for Music Source Nodes:

Table 4.6: Base flow pollutant concentration parameters[1] (based on Fletcher et al., 2004)

Concentration (mg/L-$\log_{10}$)	Total suspended solids		Total phosphorus		Total nitrogen	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Surface type						
Roofs[2]	-	-	-	-	-	-
Sealed roads[3]	1.20	0.17	-0.85	0.19	0.11	0.12
Unsealed roads[4]	1.20	0.17	-0.85	0.19	0.11	0.12
Eroding gullies[4]			-0.85	0.19	0.11	0.12
Revegetated land[4, 5]			-1.22	0.19	-0.05	0.12
Quarries[4]			-0.85	0.19	0.11	0.12
Land use/zoning						
Residential	1.20	0.17	-0.85	0.19	0.11	0.12
Commercial	1.20	0.17	-0.85	0.19	0.11	0.12
Industrial	1.20	0.17	-0.85	0.19	0.11	0.12
Rural residential	1.15	0.17	-1.22	0.19	-0.05	0.12
Agricultural	1.30	0.13	-1.05	0.13	0.04	0.13
Forest	0.78	0.13	-1.52	0.13	-0.52	0.13

Source Node Parameters Adopted for Site

[1] Derived for NSW.

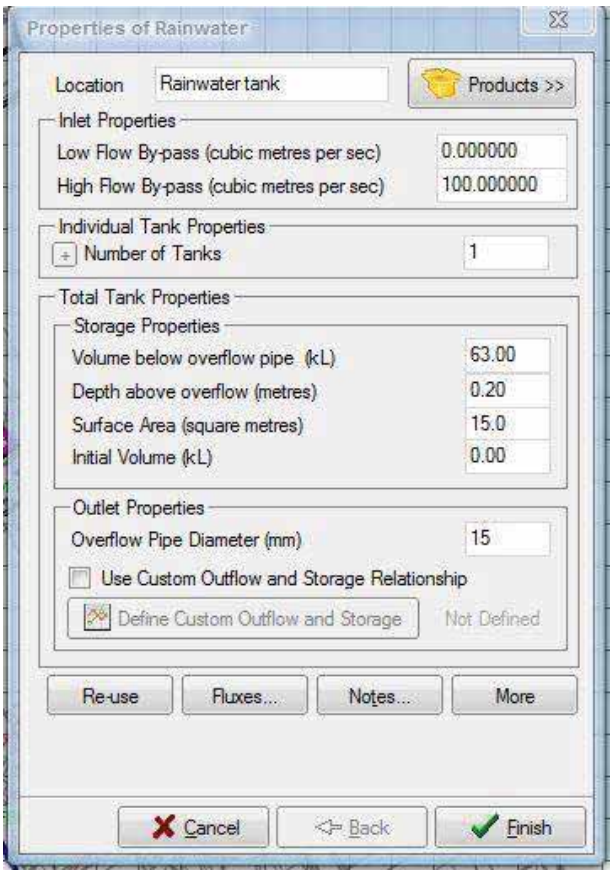
Table 4.7: Storm flow pollutant concentration parameters[1] (based on Fletcher et al., 2004)

Concentration (mg/L-$\log_{10}$)	Total suspended solids		Total phosphorus		Total nitrogen	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Surface type						
Roofs	1.30	0.32	-0.89	0.25	0.30	0.19
Sealed roads	2.43	0.32	-0.30	0.25	0.34	0.19
Unsealed roads[2]			-0.30	0.25	0.34	0.19
Eroding gullies[2]			-0.30	0.25	0.34	0.19
Revegetated land[2, 3]			-0.66	0.25	0.30	0.19
Quarries[2]	3.00	0.32	-0.30	0.25	0.34	0.19
Land use/zoning						
Residential	2.15	0.32	-0.60	0.25	0.30	0.19
Commercial	2.15	0.32	-0.60	0.25	0.30	0.19
Industrial	2.15	0.32	-0.60	0.25	0.30	0.19
Rural residential	1.95	0.32	-0.66	0.25	0.30	0.19
Agricultural	2.15	0.31	-0.22	0.30	0.48	0.26
Forest	1.60	0.20	-1.10	0.22	-0.05	0.24

Source Node Parameters Adopted for Site

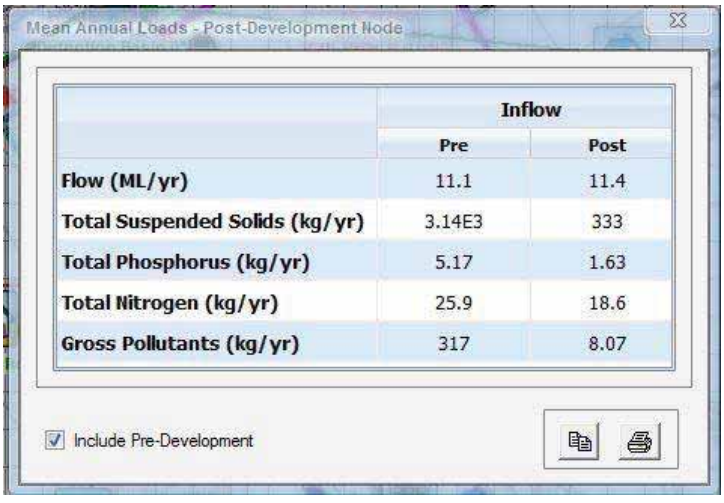
[1] Derived for NSW.
[2] Additional surface types not included in Fletcher et al. (2004).
[3] Revegetated land means cleared land that has been replanted with trees and shrubs and fenced-off.

Properties for Rainwater Tank (RWT):



MUSIC Results at Outlet:

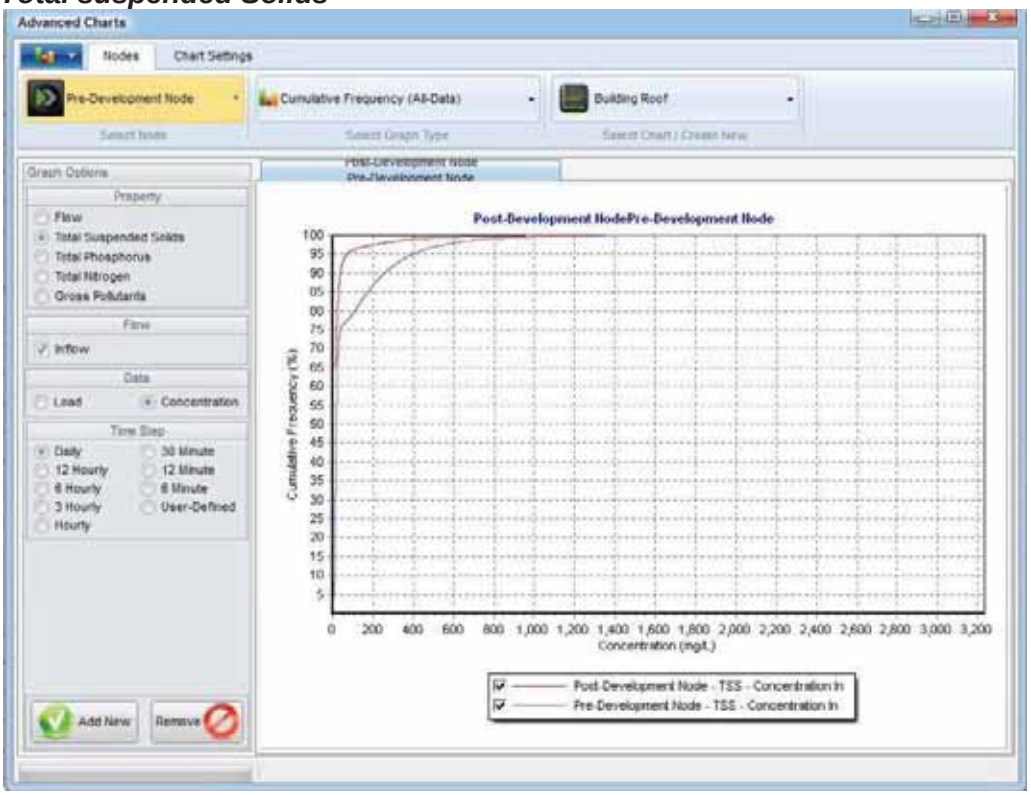
Mean Annual Pollutant Loads



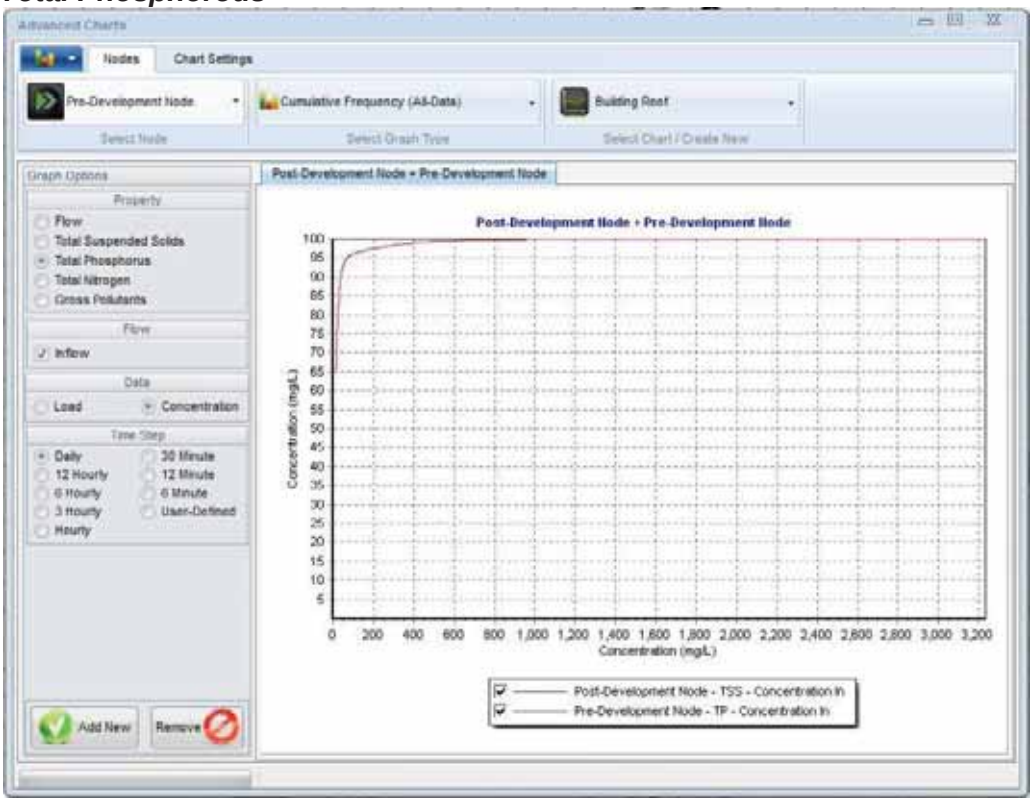
	Inflow	
	Pre	Post
Flow (ML/yr)	11.1	11.4
Total Suspended Solids (kg/yr)	3.14E3	333
Total Phosphorus (kg/yr)	5.17	1.63
Total Nitrogen (kg/yr)	25.9	18.6
Gross Pollutants (kg/yr)	317	8.07

Cumulative Frequency Graphs for Pre and Post Developed Case Scenario

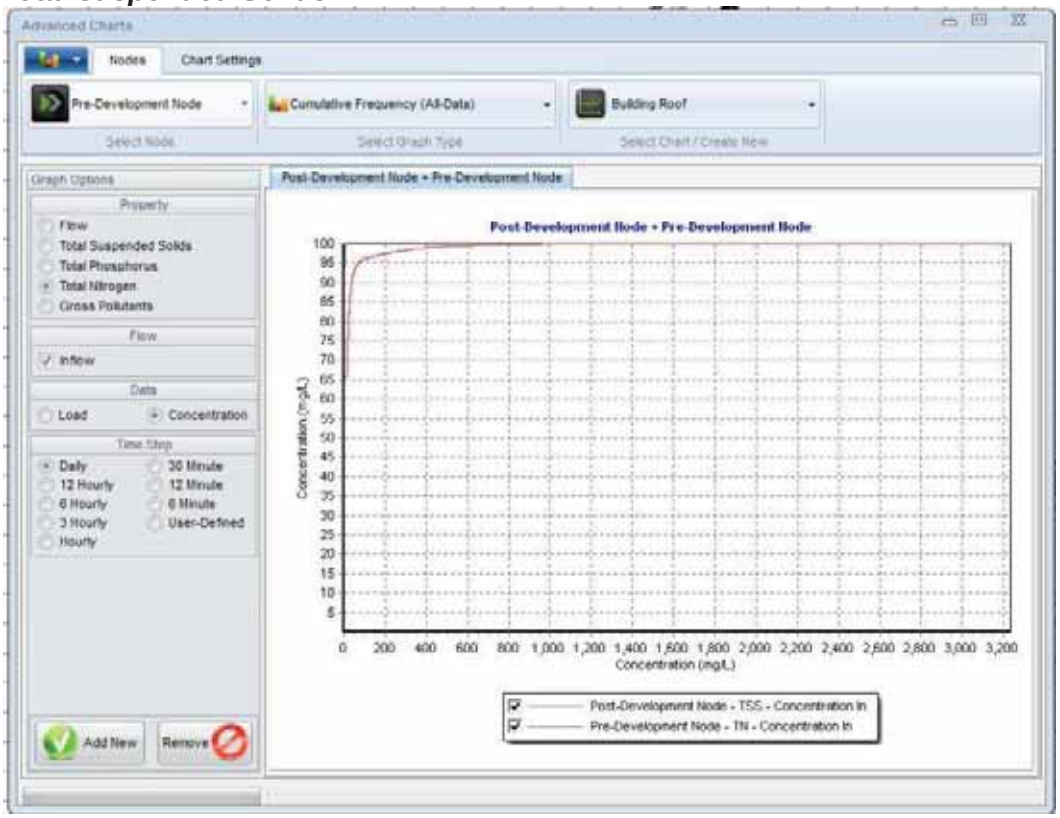
Total suspended Solids



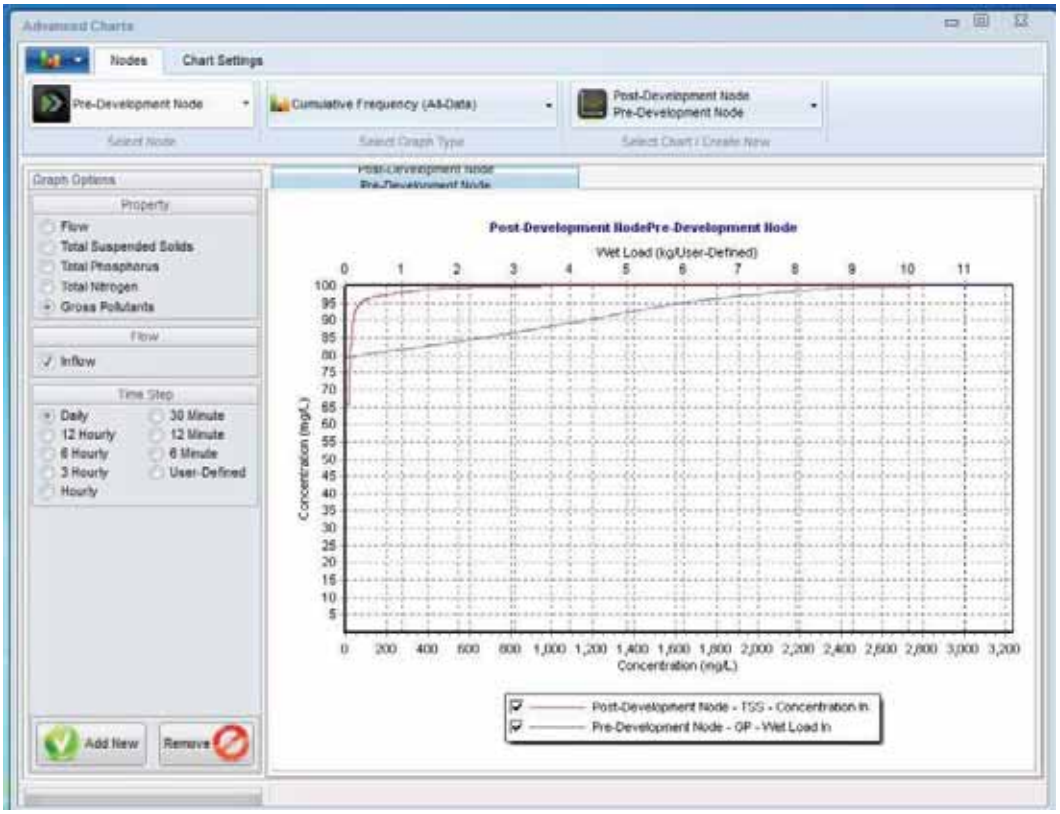
Total Phosphorous



Total suspended Solids



Gross Pollutants



Appendix C
Landscape Plan

- CLUB DRIVEWAY IN STONE SETS
- CLUB STONE PAVERS
- CONCRETE FOOTPATHS AND DRIVEWAYS
- GARDEN SEATS
- EVERGREEN TREES
- DECIDUOUS TREES
- FEATURE FLOWERING TREES
- PALM TREES
- TURF
- BORDER PLANTING
- GARDEN BEDS

Project: DOOLEYS LIDCOMBE CATHOLIC CLUB
JOHN STREET, LIDCOMBE, NSW 2141

Client: DOOLEYS CATHOLIC CLUB

16/06/16

Job No: 2014.019

Dwg No: DA-0020

CONCEPT LANDSCAPE PLAN

1 : 500 @ A1

0 5 10 20 30 50m

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