NORTHROP
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10 September 2024

NL223154

Mid Coast Council
PO Box 482
Taree NSW 2430

Dear Mid Coast Council,

Re: Palm Lake Works – Modification to Eastern Precinct Consent 169/2010/DA/C
Engineering Design Report

Introduction

Northrop Consulting Engineers Pty Ltd have been engaged by Palm Lake Works Pty Ltd (PLW) to prepare an amended master plan design, including revised golf course layout, stormwater quality and flood management design for the future Palm Lake Resort developments, herein known as "the Development". The Development is spread across 3 lots, located at 106 Forest Lane and Lot 1 Lewis Street, Old Bar on Lot 1 DP594864, Lot 2 DP1022067, Lot B DP377867 and Lot 1 DP1022067.

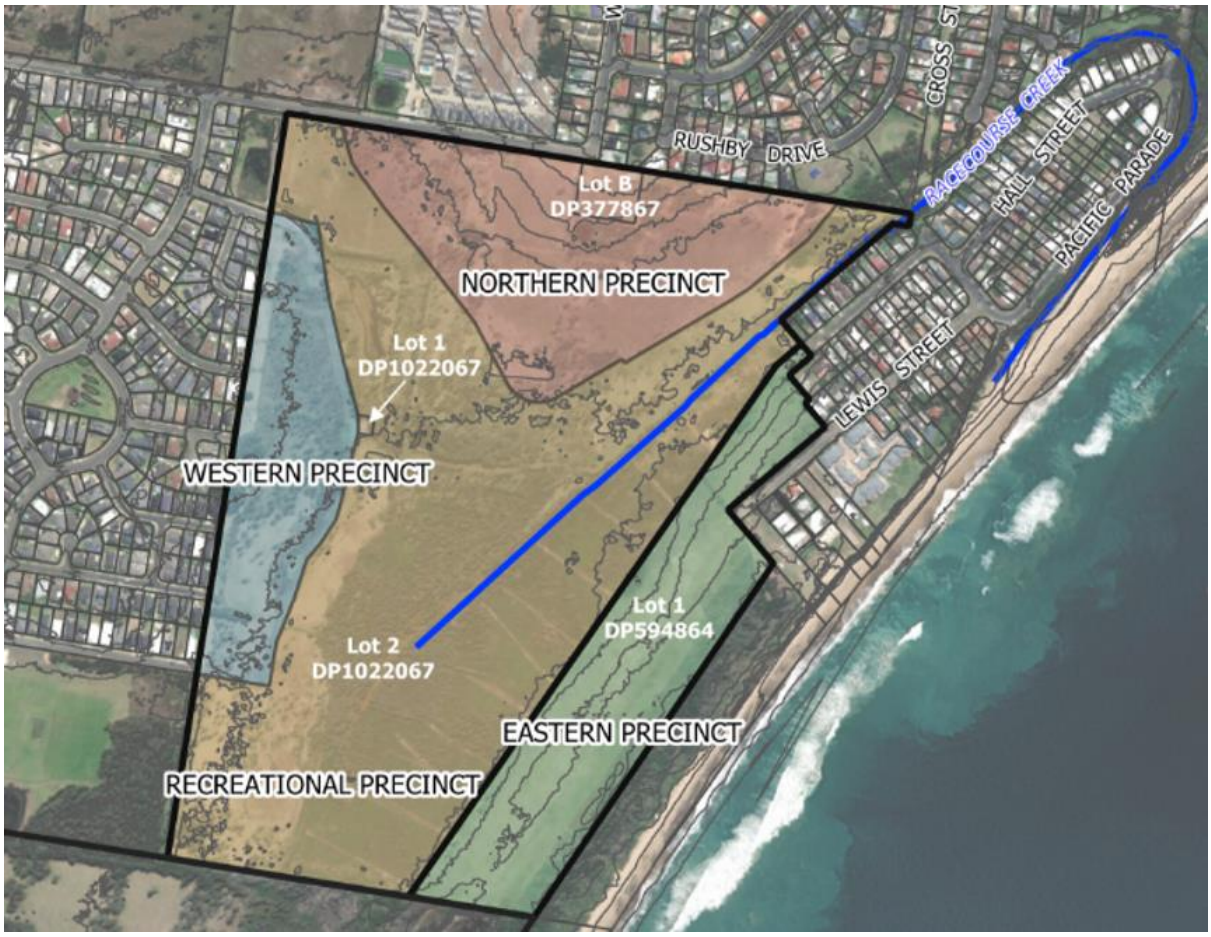

Figure 1 – The Site and Development Area

		Date
Prepared by	CP	10/09/2024
Checked by	RD	10/09/2024
Admin	ZJ	10/09/2024

To date, PLW and Northrop's focus has been amending the design of the Recreational Precinct on Lot 2 DP1022067, which consists of a regional detention and water quality treatment system integrated into a private golf course. The Regional Precinct was previously approved under DA 488/199/DA/A. PLW have recently submitted a modification to reflect the design changes, which is currently being assessed under MOD2023/0226 by Mid Coast Council (MCC). Similarly, the Eastern Precinct has been approved under consent 169/2010/DA/C. To bring the design of the Eastern Precinct into alignment with the Recreational Precinct, PLW also propose to modify existing consent 169/2010/DA/C.

Purpose

The intent of this report is to support PLW's application to modify the existing consent 169/2010/DA/C for a 147 site Manufactured Home Estate to be constructed within Lot 1 DP5994864. The key changes proposed include reconfiguration of the site layout and relocation of the stormwater treatment system into Recreation Precinct in Lot 2 DP1022067, to align with the modification to 488/1999/DA/A currently being assessed by MCC. This report should be read in conjunction with Engineering Design Report prepared by Northrop reference NL223154 E01 [D] dated 5 July 2024 (Northrop E01) submitted as part of modification to 488/1999/DA/A and the design plans included as Appendix A to this report.

Previously Approved Stormwater Management Strategy

The original development application for the Eastern Precinct was supplemented by the Servicing Strategy prepared by Lidbury, Summers and Whiteman (LSW 2018), which describes the proposed stormwater management strategy options. The report proposes the treatment targets referenced in Table 1 below, which have been adopted for the Eastern Precinct and are reflected in Northrop E01.

Table 1: Eastern Precinct - Reduction Targets for Pollutants

Pollutant	Reduction Target
Total Suspended Solids (TSS)	80%
Total Phosphorus (TP)	45%
Total Nitrogen (TN)	45%

LSW 2018 (Option A) proposes pit insets, roadside swales and a proprietary infiltration system contained within Lot 1 DP5994864. LSW 2018 Option B proposes pit inserts and a bio retention basin, also contained within Lot 1.

Proposed Stormwater Management Strategy

The key change proposed by this modification is to treat water quality in a stormwater system integrated into the Recreational Precinct in Lot 2 DP DP1022067, as shown in drawing NL223154 MP-EP06.01[2] included in Appendix A. The intent is to provide a bio retention swale along the eastern boundary of Lot 2 DP1022067. Surface water from the Eastern Precinct is to be drained via pit and pipe network and overland flow into this swale. The Geotechnical Investigation conducted by Coffey Geotechnics in 2008 reference GEOTTUNC01907AA (Coffey 2008) noted the top 5m of soil within the vicinity of the proposed bioretention swale is sand. It is therefore intended that treated water will infiltrate into the substrata. Any overflow is piped towards the regional basin in the Recreational Precinct and will pass through the proposed wetland before discharging into Racecourse Creek. It is noted that the pollutant reduction targets from the Eastern Precinct catchment are achieved with the bio retention swale alone and do not rely on any further treatment which is to be constructed as part of the Recreational Precinct.

Lot 2 DP1022067 will be burdened with easement to drain water, access and to undertake maintenance works in favour of Lot 1 DP594864.

The adopted modelling parameters, treatment train summary and modelling results are included below. For further details please refer to Northrop E01.

MUSIC Parameters

The MUSIC model was developed using recommended parameters presented in MCC's Guidelines for Water Sensitive Design Strategies (2019) and the NSW MUSIC Guidelines (BMT WBM, 2015). The MCC Rainfall Template was used to import rainfall and potential evapotranspiration data.

Based on Coffey 2008 and Figure 4-9 from MCC WSD Guidelines, sand falls within Soil Hydrologic Group A. Pervious area parameters and groundwater properties for Group A were adopted for all source nodes within the Eastern Precinct (see Table 4-2 from MCC WSD Guidelines).

The high flow bypass for each treatment node was set at a flow rate that results in a maximum of 90% of the modelled flow volume passing through the measure. This was determined using a generic treatment node and modifying the high flow bypass rate until 10% of the inflow bypassed the node.

Treatment Train Summary

- Gross Pollutant Trap (GPT) – gross pollutant traps have been proposed at the stormwater outlets of the Eastern Precinct to remove gross pollutants from stormwater before it discharges into the proposed biofiltration swale. A gross pollutant removal efficiency of 85% was adopted for each GPT, which was considered conservative given most gross pollutant traps have GP removal efficiencies of 90% or greater. No TSS, TP or TN removal was performed by the GPT in line with MCC guidelines.
- Biofiltration swale - The biofiltration swale has been modelled as 2m wide, with a filter depth of 0.4m and an extended detention depth of 0.2m. The minimum filter media and surface areas are proposed to be 1340m^2 and 3100m^2, respectively. Parameters for the biofiltration swales were adopted in accordance with the NSW MUSIC Guidelines (BMT WBM, 2015).

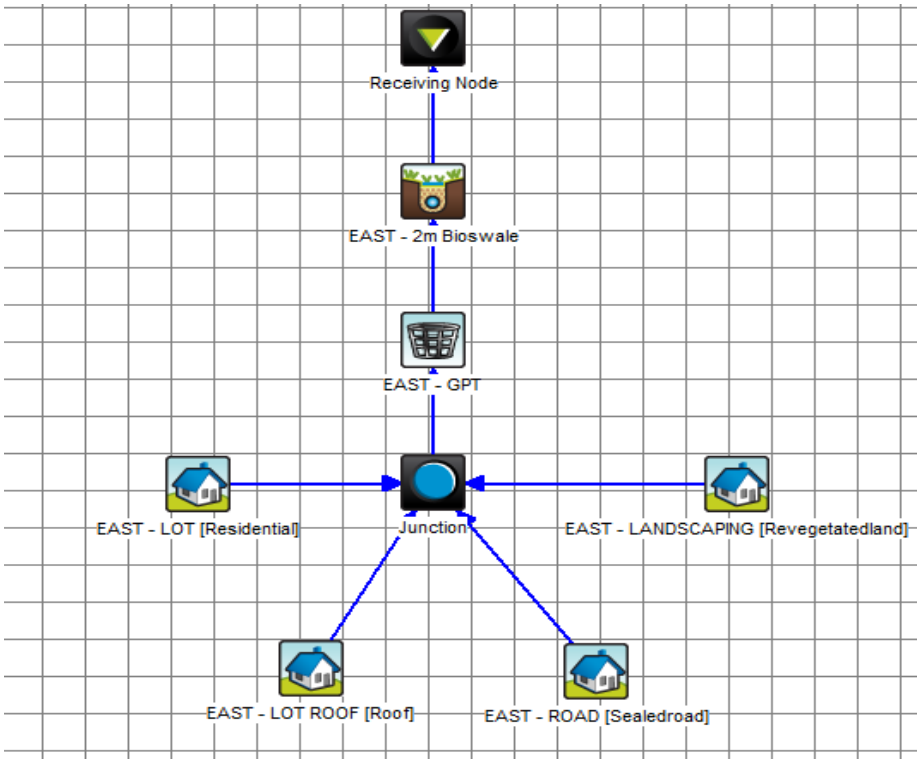

Figure 2 – Eastern Precinct MUSIC Model Layout Schematic

MUSIC Results

The results from the site analysis are shown in Table 2.

Table 2: Eastern Precinct MUSIC results - Post-Development Node

POLLUTANTS	REDUCTION (%)
Total Suspended Solids (TSS)	82.6
Total Phosphorus (TP)	62.3
Total Nitrogen (TN)	55.1
Gross Pollutants (GP)	96.4

Table 2 shows that the proposed bio retention swale will exceed the pollutant reduction targets for the proposed Eastern Precinct catchment. It is therefore reasoned that the proposed stormwater management strategy aligns with the currently approved strategy and therefore the proposed modification will achieve the development requirements. We trust that the above provides sufficient justification for Council to complete their assessment however please do not hesitate to contact me should you require any further clarification.

Yours sincerely,

Chris Piper
Principal | Civil Engineer
BEng (Civil) (Hons) MIEAust CPEng NER (Civil)

Appendix A

Engineering Design Plans

LEGEND

- SITE BOUNDARY LINE
- EXISTING BOUNDARY LINE
- EXTENT OF EASTERN PRECINCT WORKS
- EXISTING CONTOURS – 0.25m INTERVALS
- PROPOSED STORMWATER NETWORK
- PROPOSED BIOFILTRATION SWALE
- STORMWATER PIT
- OUTLET HEADWALL

EXISTING VEGETATION MANAGEMENT AREA

EXISTING VEGETATION MANAGEMENT AREA

RIPARIAN BUFFER 40 METERS

RIPARIAN BUFFER 10 METERS

RIPARIAN BUFFER 10 METERS

RIPARIAN BUFFER 40 METERS

RACECOURSE CREEK

RIPARIAN BUFFER 40 METERS

RIPARIAN BUFFER 10 METERS

RIPARIAN BUFFER 10 METERS

RIPARIAN BUFFER 40 METERS

FUTURE WETLAND TO BE CONSTRUCTED UNDER GOLF COURSE D.A.

CULVERT CROSSING

2
DP1022067

GOLF COURSE SUBJECT TO SEPERATE DA
MOD 2023/0226

EP08.01

118 117 116 115 114 113 112 111 110 109 108 107 106 105 104 99 100 101 102 98 97 96 95 93 92 91 90 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

127 126 125 124 123 122 121 120 119 82 81 80 79 78 77 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 26 25 24

136 135 134 133 132 131 130 129 128 103 89 88 87 86 85 84 83 53 52 51 50 49 48 47 29 27

28

148 147 146 145 144 143 142 141 140 139 138 137 76 75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60 59 58 57 56 55 54

GEORGE ST

LEWIS ST

COMMUNITY FACILITIES

1
DP594864

SITE BOUNDARY

BROWN LAND

DIAL BEFORE YOU DIG www.1100.com.au

NOT FOR CONSTRUCTION

DRAWN: R KENNEDY DESIGNED: T SQUIRES JOB MANAGER: C PIPER VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR APPROVAL	RK		CP	22.07.24
2	ISSUED FOR APPROVAL	RK		CP	10.09.24

CLIENT: Palm Lake Resort

DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED

ARCHITECT: V / A

ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK.
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SCALE 1:1250 @ A1

0 12.5 25 37.5 50 62.5m

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ABN 81 094 433 100

PROJECT: **106 & 142 FOREST LANE & LOT 1 LEWIS STREET**
2 DP1022067, B DP1022067, 1 DP594864

DRAWING TITLE: **D.A. DRAWINGS PACKAGE**
STORMWATER MANAGEMENT SCHEMATIC

JOB NUMBER: **NL223154**
DRAWING NUMBER: **MP-EP06.01**
REVISION: **2**
DRAWING SHEET SIZE = A1

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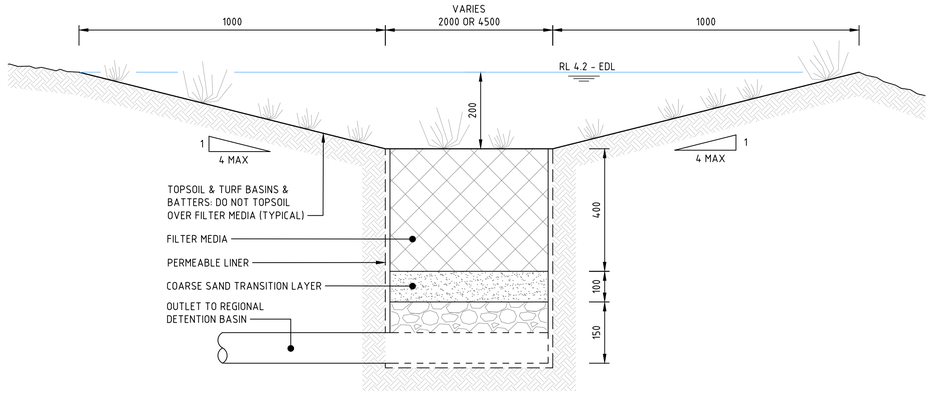
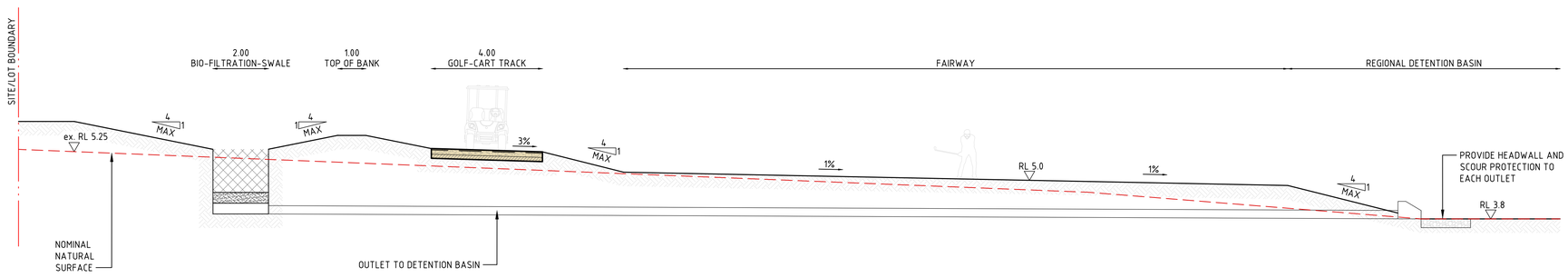


TYPICAL BIOFILTRATION SWALE DETAIL

- BIOFILTRATION MEDIA - 400mm DEPTH COMPRISING A SANDY LOAM WITH A SATURATED
- HYDRAULIC CONDUCTIVITY OF 200mm/hr. THE FILTER MATERIAL MUST HAVE A TN CONTENT OF 733mg/kg, <5% ORGANIC MATERIAL & <54mg/kg OF ORTHOPHOSPHATE CONTENT.
- TRANSITION LAYER - 100mm DEPTH COMPRISING CLEAN WELL GRADED MEDIUM TO COARSE SAND WITH MINIMAL FINES.
- DRAINAGE LAYER - 150mm DEPTH COMPRISING 5mm GRAVEL.
- AN IMPERMEABLE LINER IS TO BE APPLIED TO BOTH SIDES & THE BASE OF THE SWALE MEDIA.
- THE SUBSOIL DRAINAGE IS TO DISCHARGE TO THE PROPOSED PIT & PIPE NETWORK.



SECTION X
SCALE 1:100 EP06.01

DRAWN: R KENNEDY
DESIGNED: T SQUIRES
JOB MANAGER: C PIPER
VERIFIER:

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR APPROVAL	RK		CP	10.09.24

CLIENT

Palm Lake Resort

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ARCHITECT

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PROJECT

106 & 142 FOREST LANE
&
LOT 1 LEWIS STREET

2 DP1022067, B DP1022067, 1 DP594864

DRAWING TITLE

D.A. DRAWINGS PACKAGE

CIVIL DETAILS SHEET 1

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DRAWING NUMBER **MP-EP09.01**

REVISION **1**

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