

10 December 2024
NL223154

Mid Coast Council
PO Box 482
Taree NSW 2430

Dear Mid Coast Council,

Re: Palm Lake Works – Engineering Design Report Updating Established Stormwater Design for the Northern Precinct Multi Dwelling MHE

Introduction

Northrop Consulting Engineers Pty Ltd have been engaged by Palm Lake Works Pty Ltd (PLW) to prepare 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.

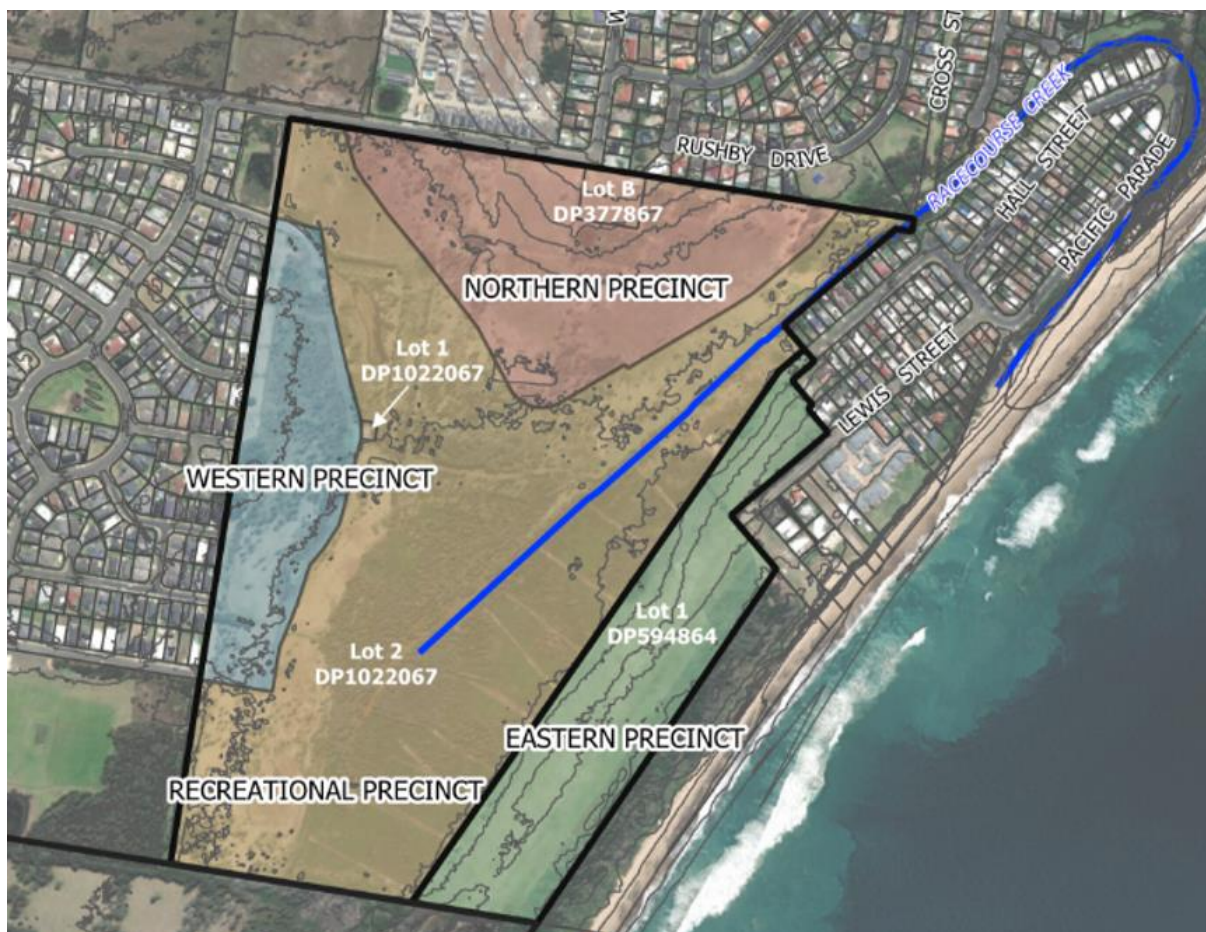


Figure 1 – The Site and Development Area

		Date
Prepared by	EH	10/12/2024
Checked by	CP	10/12/2024
Admin	ZJ	10/12/2024

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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 modified Recreational Precinct consent was recently approved under DA 488/1999/DA modified consent number MOD2023/0226. The Northern Precinct referred to as 'Stone & Jarberg North' and 'Stage 2 & 3' of the Concept Approval (MOD 2021 / 0323) was approved for 131 lots including detached, duplex and multi dwelling sites before being modified to feature 3 main lots all for multi dwelling developments (MOD2022/0277).

This subsequent Engineering Design Report seeks to update preliminary stormwater design established under the Concept Approval MOD2022/0277 to reflect the latest design approved as part of the recent Golf Course modification (MOD2023/0226). To formalise the stormwater intent for the precinct, this letter combines the outcomes of MOD2023/0226 to this Development Application. Furthermore a subsequent amendment to the approved BEW DA (229/2018/DA/A) and subsequent SWC (2022/0749) is being made parallel to this application to update the stormwater strategy across all relevant approvals.

Purpose

The intent of this report is to support PLW's application for Multi Dwelling Housing featuring 244 site Manufactured Home Estate to be constructed within Lot B DP377867 and Lot 2 DP1022067. The key changes proposed include reconfiguration of the site layout and stormwater treatment system within the Recreation Precinct in Lot 2 DP1022067, to align with the modified consent MOD2023/0226 approved 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 MOD2023/0226 and the design plans included as Appendix A to this report.

Previously Approved Stormwater Management Strategy

The Concept Approval for Precinct 3 Old Bar was supplemented by the Stormwater and Flood Management Strategy prepared by J. Wyndham Prince reference 9630 Rpt 1C dated April 2014 (JWP 2014). It is noted that the Northern Precinct is referenced as Jarberg North in JWP 2014. The proposed stormwater treatment train for Jarberg North included gross pollutant traps and linear combined detention and bioretention basin which then outlet into a regional wetland. The modelled treatment train was shown to achieve a Neutral or Beneficial Effect (NorBE) to comply with Greater Taree Council requirements.

Proposed Stormwater Management Strategy

The proposed stormwater management system is generally the same, albeit updated to reflect current best practice guidelines. In particular, the gross pollutant traps have been modelled as treating gross pollutants only, in accordance with current MCC Guidelines. Additionally, the external catchments are now also included in the model.

The stormwater strategy still includes a bio retention swale along the southern extent of the Northern Precinct. Surface water from the Northern Precinct is to be drained via pit and pipe network and overland flow paths into this swale. It is intended that treated water will infiltrate into a drainage layer, to then be outlet into the proposed regional wetland within the recreation precinct before discharging into Racecourse Creek.

Water quantity is managed within the regional detention basin integrated into the Recreational Precinct, as described further in Northrop E01, and therefore on site detention within the Northern Precinct is not proposed.

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.

The Geotechnical Assessment conducted by Regional Geotechnical Solutions in 2022 (Ref: RGS02921.1-AE) noted that the top 1m of soil within the site consists of clays and silty clays. Based on Figure 4-9 from MCC WSD Guidelines, clay and silty clay falls within Soil Hydrologic Group D. Pervious area parameters and groundwater properties for Group D were adopted for all source nodes within the Northern 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 Northern 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 4.5m 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 2750m² and 3440m², respectively. Parameters for the biofiltration swales were adopted in accordance with the NSW MUSIC Guidelines (BMT WBM, 2015).
- Sedimentation basin – an end of line sedimentation basin has been proposed upstream of the constructed wetland to capture and store coarse sediments to protect the downstream macrophyte zone and regulate flow. Parameters for the pond were adopted in accordance with the NSW MUSIC Modelling Guidelines (BMT WBM, 2015) and Wetland Technical Design Guidelines. The basin was modelled with a surface area of 1,000m², permanent pool volume of 1,500m³ and an extended detention depth of 300mm.
- Constructed wetland – a wetland has been proposed to treat runoff from the external catchments and the proposed development. The wetland will be made up of deep water zones and a macrophyte zone. Parameters for the wetland were adopted in accordance with the Wetland Technical Design Guidelines (Water By Design, 2017). The wetland was modelled with a 500m³ inlet pond, macrophyte zone with a surface area of 5,000m², permanent pool volume of 2,750m³ and an extended detention depth of 500mm.

Refer to Northrop E01 report for further details. The MUSIC Model Layouts for the entire catchment are presented in Figures 2 and 3.

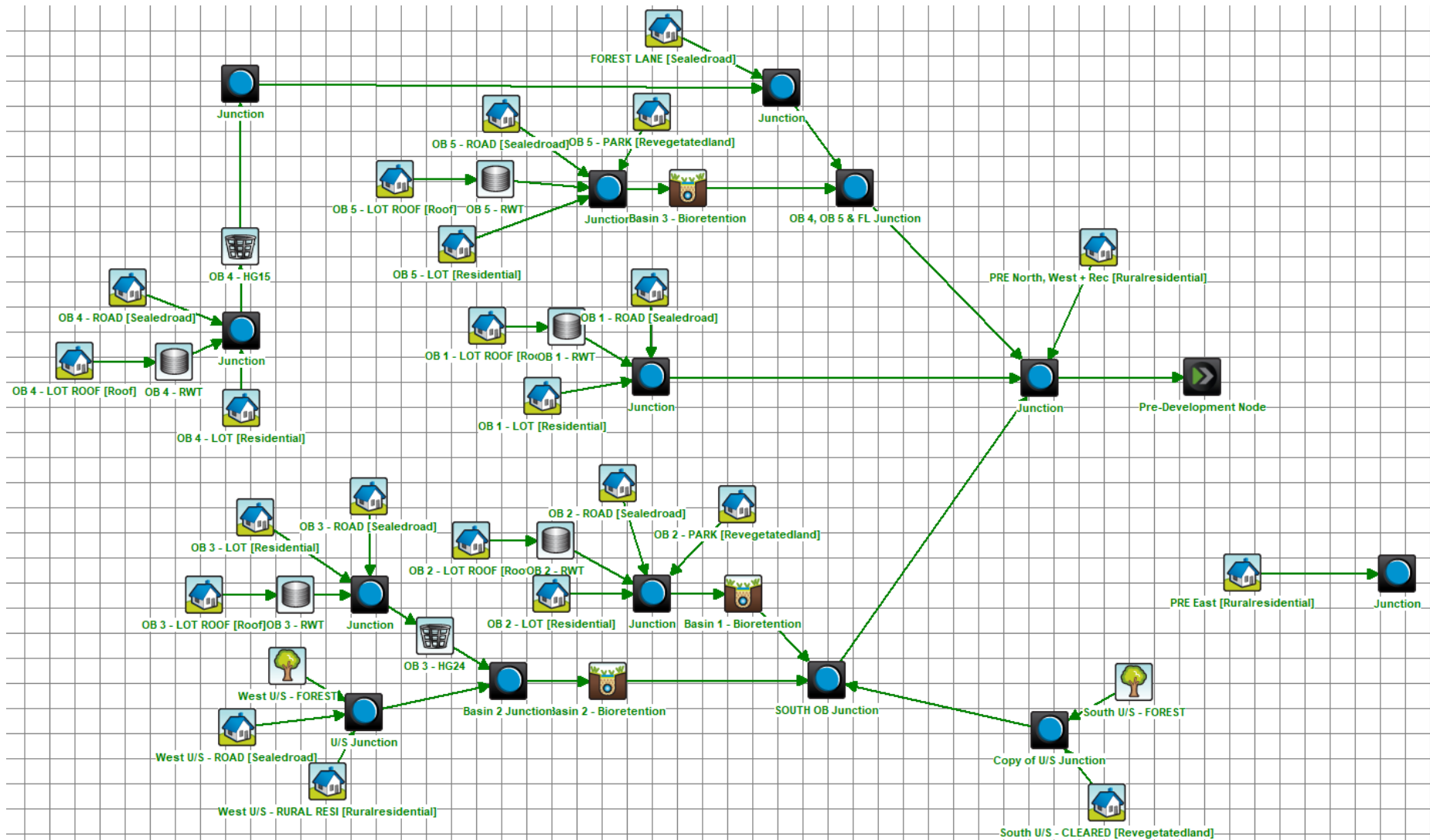


Figure 2 - Pre-Developed MUSIC Model Layout Schematic

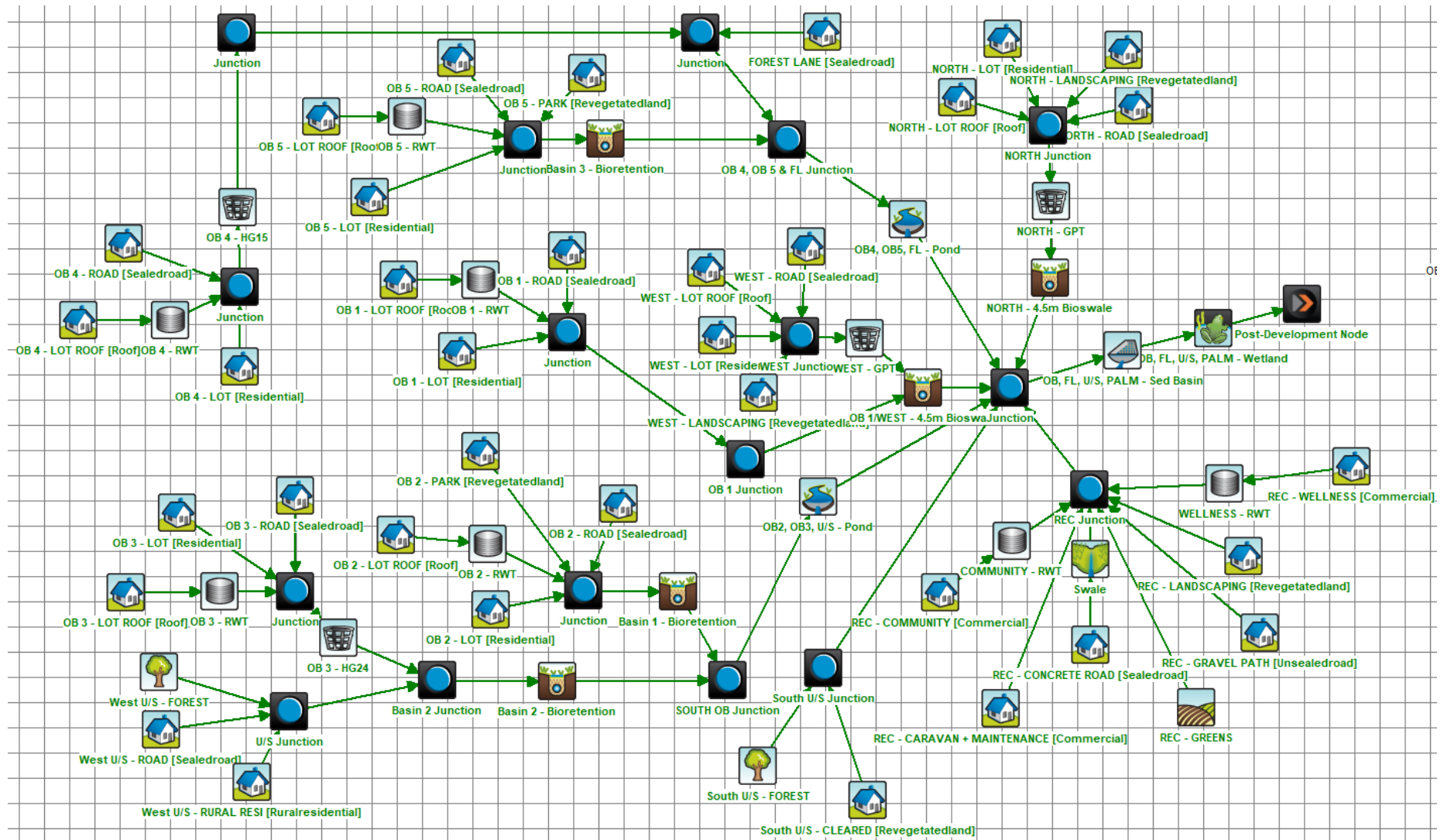


Figure 3 - External & Catchment 1 Post-Developed MUSIC Model Layout Schematic

MUSIC Results

The results from the site analysis are shown in Tables 2 and 3.

Table 2 - External & Catchment 1 MUSIC results

		Pre-Developed		Post Developed	
Pollutants		Sources	Residual load	Sources	Residual load
Total Suspended Solids (TSS)	kg/yr	133000	76300	156000	58100
Total Phosphorus (TP)	kg/yr	274	196	309	175
Total Nitrogen (TN)	kg/yr	2230	1700	2420	1610
Gross Pollutants (GP)	kg/yr	13000	4020	15600	100

Table 3 - North Precinct MUSIC results - Post-Development Node

Pollutants		Sources	Residual load	Reduction (%)
Total Suspended Solids (TSS)	kg/yr	14400	2110	85.3
Total Phosphorus (TP)	kg/yr	30	9.61	68
Total Nitrogen (TN)	kg/yr	244	93.5	61.8
Gross Pollutants (GP)	kg/yr	2630	66	97.5

Conclusion

Table 2 shows that NorBE targets are achieved for the combined area of the golf course, the northern and western precincts, and the external catchments. Additionally, Table 3 shows that Council's pollutant reduction targets are still met when considering the Northern Precinct in isolation. 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)

Limitation Statement

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Appendix A

Engineering Design Plans