

14 March 2022

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(via email)

**PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL**

Approval no: DEV2022/1280

Date: 6 October 2022



Dear Gavin

RE: YARRABILBA PRECINCT 4E STORMWATER MANAGEMENT FOR RECONFIGURING A LOT APPLICATION 4 (ROL4)

This letter is provided to support the stormwater management strategy update associated with Precinct 4E (ROL4). In broad terms, the development of Precinct 4E remains generally in accordance with the approved *Yarrabilba Precinct 5 Stormwater Management Plan – Version 2* (DesignFlow, 2017) (referred to below as SMP-V2). Refinements to the catchments and treatment basins have been necessary to align with current waterway management approaches onsite while complementing existing stormwater layouts. These updates along with revised MUSIC modelling for this portion of Precinct 4 is described below and in attachments. Note that all reference to 'Precinct 5' reports herein relate to current Precinct 4 due solely to a precinct name change since the submission of the original reports.

Stormwater Quality

Precinct 4E falls generally within the former catchment 5D2 from the SMP-V2 with development density consistent with the assumptions of the previous study. Key updates that have occurred as part of the local catchment stormwater management strategy for 4E (and surrounding stages) include:

- Low flow diversion from southern tributary (adjacent to former sediment pond 5E1) removed and no longer relied upon.
- Former Sediment Pond 5D2 replaced with Bioretention Basin 4E1 with contributing catchment adjusted accordingly
- Large scale Sediment Pond/Wetland/Bioretention system 5E1-5E7 reduced in size with contributing catchment adjusted accordingly.
- Renaming of catchments and treatment measures to reflect current sub-precinct numbering (i.e. current Precinct 4 was referred to as Precinct 5 when original SMP was prepared in 2017).

This updated strategy layout is provided in Figure 1 (Attachment 1). An updated MUSIC model representing the above updates has been completed with the findings summarised in Table 1 below with model data and layout provided in Attachment 2.

Table 1: MUSIC Modelling Results (Precinct 4E including associated development areas)

Pollutant	Load Generated (kg/yr)	Load Discharge (kg/yr)	Reduction Achieved (%)	Water Quality Objectives	Complies
Total Suspended Solids	54600	10400	81.0%	80%	✓
Total Phosphorus	114	30.2	73.6%	60%	✓
Total Nitrogen	719	356	50.5%	45%	✓
Gross Pollutants	9000	415	95.4%	90%	✓

Overall, the current design of the southern zone of Precinct 4 (incorporating ROL4 and part of ROL1 area plus future development zones to the north and south) meets the stormwater quality design objectives presented in the approved SMP-V2.

A separate updated stormwater management strategy for the southernmost extent of Precinct 4 CPAS area (i.e. south of 4E contributing catchments in Figure 1, Attachment 1) will be prepared as part of future development application (in conjunction with surrounding catchment beyond Precinct 4) to ensure overall compliance with the stormwater management objectives.

Waterway Stability

The current development layout and revised stormwater quality management strategy above remains consistent with the *Yarrabilba Precinct 5 Stormwater Management Plan – Version 2* (DesignFlow, 2017) by maintaining buffers to waterways and wetlands. Minor instream stabilisation, revegetation and monitoring works are identified along the southern tributary in association with ecological and rehabilitation plans. However, much of this southern tributary is outside the Precinct 4 boundary and will therefore occur progressively with both interface works and future development precinct(s).

Flooding

Precinct 4E is generally in accordance with the *Yarrabilba (Quinzech Creek) Flood Study – Version 1* (DesignFlow, 2017). No flood detention infrastructure is required as part of this precinct as it falls within the regional strategy that is managed by Flood Basin 15 (Fauna Way) (approved previously as part of Precinct 3B). All lot levels in Precinct 4E are above the 100 year ARI flood level with at least 500mm freeboard.

I trust this provides sufficient information to support the current stormwater management approach for Precinct 4E. If have any questions, please contact DesignFlow.

Yours Sincerely

A handwritten signature in blue ink, appearing to read 'Shaun Leinster', with a stylized, cursive script.

Shaun Leinster
Director
RPEQ 15637
DesignFlow

Attachments:

1. Precinct 4E (P4 southern zone) catchment and stormwater treatment layout
2. Updated Precinct 4E (southern zone) MUSIC model assessment

ATTACHMENT 1: PRECINCT 4E (P4 SOUTHERN ZONE) CATCHMENT AND STORMWATER TREATMENT LAYOUT

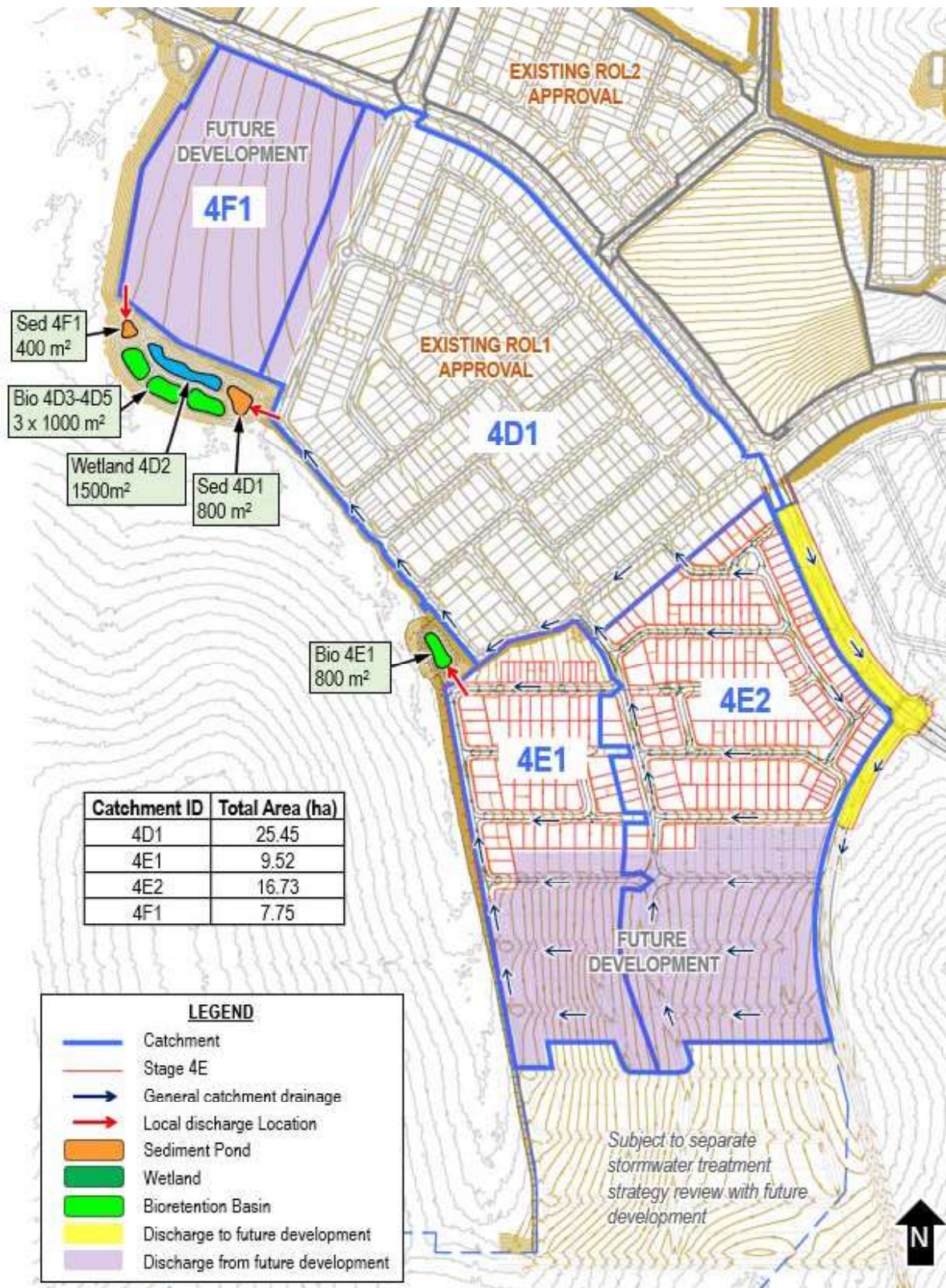


Figure 1: Precinct 4E (P4 south) stormwater management strategy update

ATTACHMENT 2: PRECINCT 4E (P4 SOUTHERN ZONE) MUSIC MODEL VERIFICATION ASSESSMENT

The information provided below represents an update to the stormwater quality modelling documented in the approved *Yarrabilba Precinct 5 Stormwater Management Plan – Version 2* (DesignFlow, 2017) (based on former precinct numbering '5' now '4'), referred to herein as SMP-V2, based on revisions to the catchments and treatment types necessary to align with current waterway management approaches while complementing existing stormwater layouts. Water quality objectives are as per Table 5 of the above referenced report.

Based on the size of treatment systems required in some locations, inlet (sediment) ponds have been incorporated into the conceptual design in order to provide inflow protection/distribution to the bioretention filter media (via wetland) while managing coarse sediment.

The preliminary design reflected in the MUSIC model of each treatment system assumes the following:

- Drainage network discharges directly to bioretention basins (stand-alone systems) or via sediment pond (multi cell system)
- Sediment ponds connects via culvert to constructed wetland (assumed at same water level) with minimal flow restriction (i.e. minimum allowable 0.01m extended detention adopted in MUSIC with large pipe connection)
- Wetland is then connected to multi-cell bioretention basins via overflow weirs at 0.1m above normal water level (i.e. 0.1m extended detention depth in wetland)
- Bioretention basin cells are modelled as combined total surface area (where actual design will split these into multiple cells to ensure flow distribution across filter).
- Bioretention basins have 0.3m extended detention depth before overflowing into pit. Extended detention area is taken as sum of area over bioretention, wetland and sediment pond (see notes regarding extended detention depths assumed above) as bioretention controls rapid drawdown
- Sediment pond high flow bypass directed around wetland/ bioretention basins (secondary link)

Catchment data for split land use nodes is generally in accordance with the MUSIC Modelling Guidelines (Water by Design, 2010). Other modelling assumptions are as per Section 6.3 of the *Yarrabilba Precinct 5 Stormwater Management Plan – Version 2* (DesignFlow, 2017).

Table 1: Catchment data

Catchment ID	Total Area (ha)	% Impervious	Surface Type	Sub-Area (ha)	Impervious %
4D1	25.45	60%	Road	6.36	60%
			Roof	9.54	100%
			Ground	9.54	20%
4E1	9.52	56%	Road	2.22	60%
			Roof	3.33	100%
			Ground	3.33	20%
			Park	0.65	5%
4E2	16.73	60%	Road	4.18	60%
			Roof	6.27	100%
			Ground	6.27	20%
4F1	7.75	67%	Road	2.33	70%
			Roof	2.71	100%
			Ground	2.71	30%

Note: Catchment prefixes have generally been updated to reflect current Precinct numbering that was amended by Lendlease since the original approved Stormwater Management Plan assessment in 2017.

The MUSIC model layout is shown in Figure 1 with the results presented in Table 2.

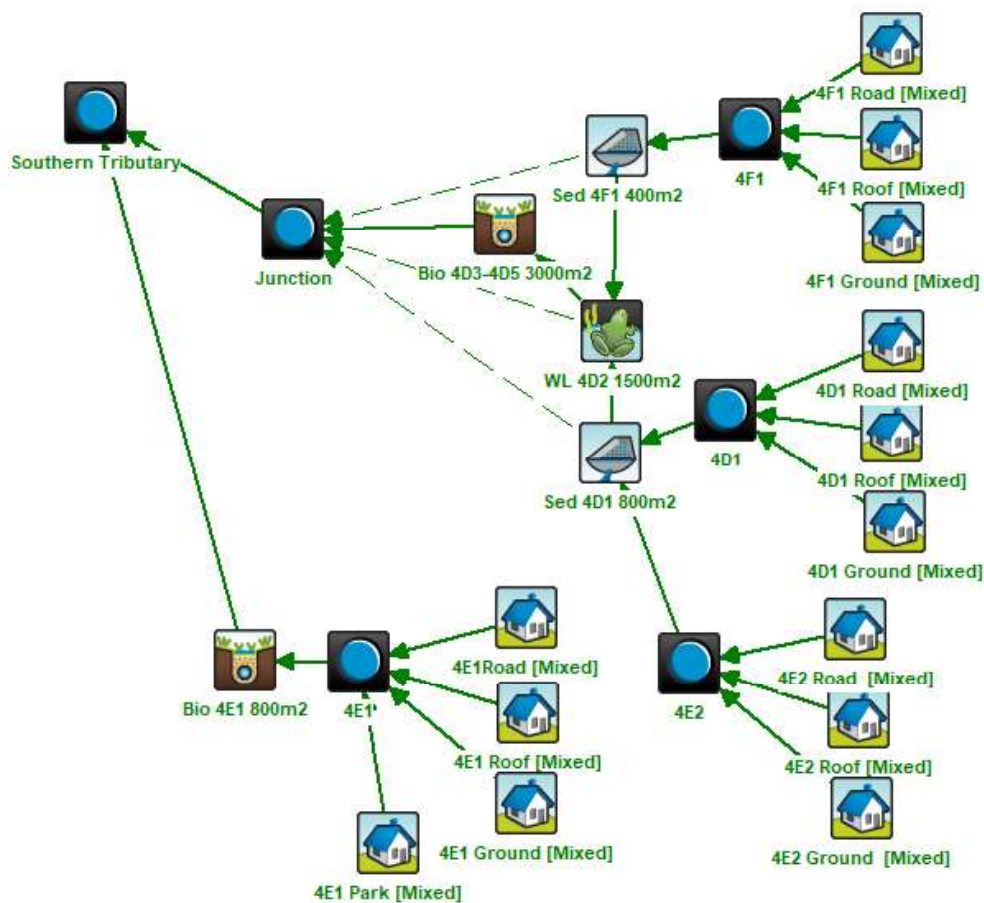


Figure 2: Precinct 4E (P4 south) MUSIC model layout

Table 2: MUSIC modelling Results

Pollutant	Load Generated (kg/yr)	Load Discharge (kg/yr)	Reduction Achieved (%)	Water Quality Objectives	Complies
Total Suspended Solids	54600	10400	81.0%	80%	✓
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Conclusion

The updated MUSIC modelling for Precinct 4E (P4 south) shows that the water quality objectives can be achieved with the updated strategy and remains generally consistent with the approved SMP-V2 prepared under the former precinct numbering '5'.