

Our Ref: projects/4284

DesignFlow

Kelly Pickering
Lendlease
GPO Box 2777
Brisbane QLD 4001

(via email)

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

Approval no: DEV2020/1145

Date: 6 July 2021



7 September 2020

Dear Kelly

RE: Yarrabilba Precinct 3D Stormwater Management for Reconfiguring a Lot Application 2

This letter provides the certification that Precinct 3D North (ROL Application 2) development is consistent with the current approved reports relating to stormwater, waterway stability and flooding. The following provides the details of each strategy with supporting information where required.

Stormwater Quality

In accordance with Section 4.2.4 of the *Yarrabilba Precinct 3 Stormwater Quality Management Plan - Version 2* (DesignFlow, 2016) (SQMP-V2), conceptual layout and designs for the proposed stormwater treatment strategy for Precinct 3D North have been refined to reflect the latest development layout proposal and preliminary civil design. This letter provides the relevant certification and conceptual design information to support the second Precinct 3D North development application (ROL2). It also provides an indication of how this stormwater strategy will integrate with the existing development area of Precinct 3D (from ROL1) to ensure the ROL2 strategy remains viable.

The stormwater treatment layout presented in Figure 1 (Attachment 1) has been verified to meet the water quality objectives with an updated MUSIC model adopting a split catchment approach. The model layout, data and results are provided in Attachment 2.

Waterway Stability

The current development layout and stormwater management strategy is generally compliant with the *Yarrabilba Precinct 3 – Waterways Stability Assessment - Version 1* (DesignFlow and Hydrobiology 2016), by maintaining buffers to waterways and wetlands. No specific instream waterway stabilisation works are required as part of Precinct 3D North however all general civil design within the precinct must ensure pipe outlets and concentrated overland flow paths are appropriately stabilised with rock and/or vegetation. Ongoing monitoring of waterway stability will occur as part of the staged delivery of Precinct 3D to ensure any issues arising are addressed accordingly.

Flooding

Precinct 3D North 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 (approved previously as part of Precinct 3B). All lot levels in Precinct D are above the 100 year ARI flood level with at least 500mm freeboard.

If you have any questions relating to the information provided above, please contact DesignFlow.

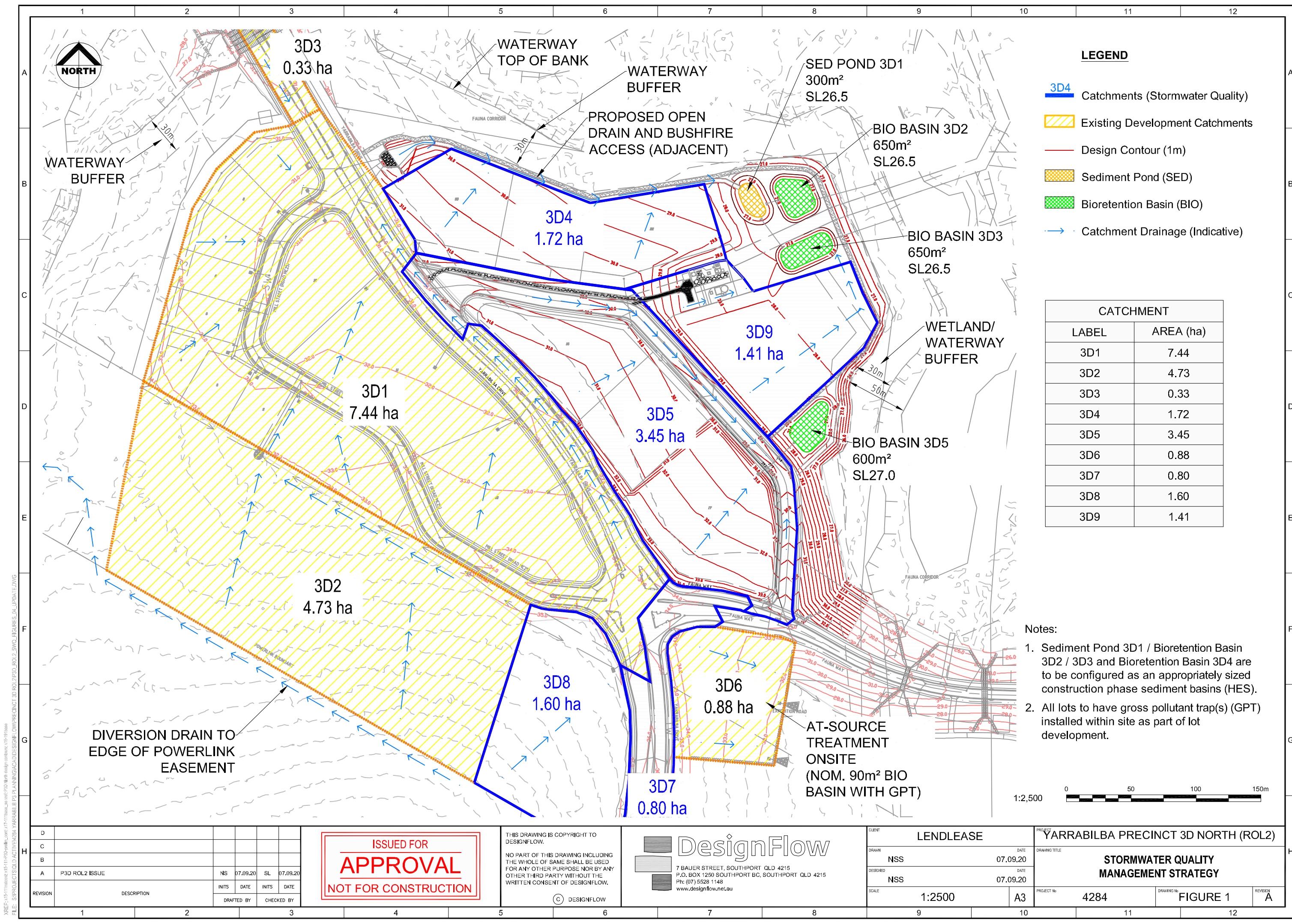
Yours Sincerely

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

Shaun Leinster
RPEQ 15637
DesignFlow

Attachments:

1. Figure 1: Precinct 3D North (ROL2) Stormwater Quality Management Strategy
2. Yarrabilba Precinct 3D North (ROL2) MUSIC Model Validation

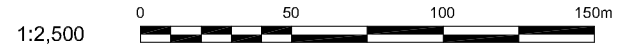


LEGEND

- 3D4 Catchments (Stormwater Quality)
- Existing Development Catchments
- Design Contour (1m)
- Sediment Pond (SED)
- Bioretention Basin (BIO)
- Catchment Drainage (Indicative)

CATCHMENT	
LABEL	AREA (ha)
3D1	7.44
3D2	4.73
3D3	0.33
3D4	1.72
3D5	3.45
3D6	0.88
3D7	0.80
3D8	1.60
3D9	1.41

- Notes:
- Sediment Pond 3D1 / Bioretention Basin 3D2 / 3D3 and Bioretention Basin 3D4 are to be configured as an appropriately sized construction phase sediment basins (HES).
 - All lots to have gross pollutant trap(s) (GPT) installed within site as part of lot development.



D					
C					
B					
A	P3D ROL2 ISSUE	NS	07.09.20	SL	07.09.20
REVISION	DESCRIPTION	INITS	DATE	INITS	DATE
		DRAFTED BY	CHECKED BY		

ISSUED FOR
APPROVAL
NOT FOR CONSTRUCTION

THIS DRAWING IS COPYRIGHT TO DESIGNFLOW.
NO PART OF THIS DRAWING INCLUDING THE WHOLE OF SAME SHALL BE USED FOR ANY OTHER PURPOSE NOR BY ANY OTHER THIRD PARTY WITHOUT THE WRITTEN CONSENT OF DESIGNFLOW.

© DESIGNFLOW

DesignFlow
7 BAUER STREET, SOUTHPORT QLD 4215
P.O. BOX 1250 SOUTHPORT BC, SOUTHPORT QLD 4215
Ph: (07) 5528 1148
www.designflow.net.au

CLIENT	LENDELEASE
DRAWN	NSS
DESIGNED	NSS
SCALE	1:2500

PROJECT	YARRABILBA PRECINCT 3D NORTH (ROL2)
DRAWING TITLE	STORMWATER QUALITY MANAGEMENT STRATEGY
PROJECT No	4284
DRAWING No	FIGURE 1
REVISION	A

Attachment 2:

Yarrabilba Precinct 3D North MUSIC Model Validation

The information provided below represents an update to the stormwater quality modelling documented in the *Yarrabilba Precinct 3 Stormwater Quality Management Plan – Version 2* (DesignFlow, 2016) based on revisions to the urban design of Precinct 3D North (ROL2). Water quality objectives are as per Table 2 of the above referenced report.

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

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

- Drainage network discharges directly to sediment pond
- Sediment pond connects via culvert to bioretention basin (assumed at same level) with minimal flow restriction (i.e. notional detention time <0.1 hrs)
- Bioretention basins are modelled as single 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 (nominally 1m x 1m pits in each bioretention basin)
- Sediment pond has 10m high flow bypass weir at 0.6m above bioretention basin surface (i.e. 0.3m above overflow pit)
- Sediment pond high flow bypass (weir flow) is directed around 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 5.1 of the *Yarrabilba Precinct 3 Stormwater Quality Management Plan – Version 2* (DesignFlow, 2016)

Table 1: Catchment Data

Catchment	Area (ha)	Land Use	Land Use Modelling ⁴	Combined Imperviousness (%)
3D1	7.44	Commercial	Split	89%
3D2	4.73	Undeveloped ¹	Split	0%
3D3	0.33	Road ²	Split	75%
3D4	1.72	Commercial	Split	89%
3D5	3.45	Commercial	Split	89%
3D6	0.88	Commercial	Split	89%
3D7	0.80	Road ²	Split	75%
3D8	1.60	Undeveloped ¹	Split	0%
3D9	1.41	Commercial	Split	89%

Notes:

1. Undeveloped areas represent Powerlink easement modelled as ground level split node
2. Road only catchments (no adjoining lots)
3. Catchments include existing development areas associated with the initial application (ROL1)
4. Split land use comprises road, roof and ground level areas and where applicable.

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

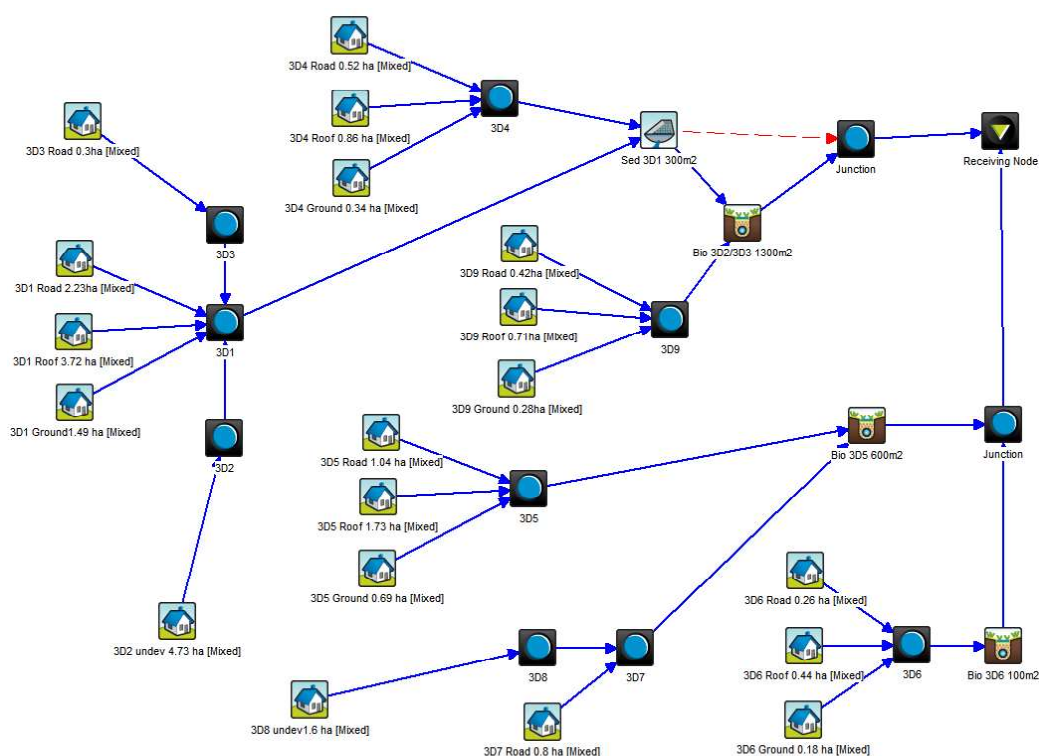


Figure 1: Precinct 3D MUSIC model layout

Table 2: MUSIC modelling Results

Catchments	Treatment ID *	Pollutant*	Inflows (kg/yr)	Outflows (kg/yr)	Reduction (%)
3D1, 3D2, 3D3, 3D4, 3D9	Sed 3D1 & Bio 3D2/3D3	TSS	19300	3710	80.8
		TP	46.3	12.8	72.3
		TN	343	161	53
		GP	2190	0	100
3D5, 3D7, 3D8	Bio 3D5	TSS	8360	1480	82.3
		TP	18.7	4.64	75.1
		TN	129	56.8	56.2
		GP	844	0	100
3D6	Bio 3D6 (at-source)	TSS	1160	223	80.8
		TP	2.76	0.757	72.6
		TN	22.5	10.3	54.3
		GP	177	0	100
Total Precinct 3D (✓denotes compliance with water quality objectives)		TSS	28800	5410	81.2 ✓
		TP	67.7	18.2	73.1 ✓
		TN	495	228	53.9 ✓
		GP	3210	0	100 ✓

* Treatment ID 'Bio' refers to combined sediment pond/bioretention system

TSS = Total Suspended Solids, TP = Total Phosphorus, TN = Total Nitrogen, GP = Gross Pollutants

Conclusion

The updated MUSIC modelling for Precinct 3D North shows that the water quality objectives can be achieved with the current strategy and remains generally consistent with the ROL1 strategy with only minor changes to catchments occurring due to lot boundary adjustments.