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26 November 2020

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PLANS AND DOCUMENTS referred to in the PDA DEVELOPMENT APPROVAL

Approval no: DEV2020/1160

Date: 26 August 2021

Queensland Government

Attention: Jason Augustine

Dear Jason,

RE: EVERLEIGH ROL05 – STORMWATER DETENTION AND WATER QUALITY MEMORANDUM

This letter serves the purpose of outlining the water quantity and quality requirements for the Reconfiguration of Lot (ROL) 5 submission for the Everleigh development.

Everleigh is subject of a whole of site Everleigh Stormwater Masterplan (Engeny, 2020) (**WOS SWMP**) which demonstrates how stormwater quality and quantity is to be managed by multiple infrastructure items working in concert. This letter should be read in conjunction with the WOS SWMP.

No permanent water quality or quantity infrastructure is proposed within the ROL05 Precinct 9 boundary. Detention will be provided by the D2 detention basin identified in the Stormwater Masterplan (Engeny, 2020, DEV2016/768) to be constructed under ROL06 (DEV2020/1131). Water quality treatment will be provided by the B1 bioretention basin already constructed under ROL01 (DEV2016/768), and W2 wetland and HP2 harvesting pond as identified in the Stormwater Masterplan (Engeny, 2020, DEV2016/768) which will be constructed under ROL06 (DEV2020/1131).

The stormwater quantity and quality infrastructure identified above is applicable for not only treating Precinct 9 of ROL05, but also:

- Precinct 1.
- Precinct 2.
- Approximately half of Precinct 3.
- Minor portions of Precinct 7, Precinct 8 and Precinct 10.
- Precinct 9.
- Precinct 12.

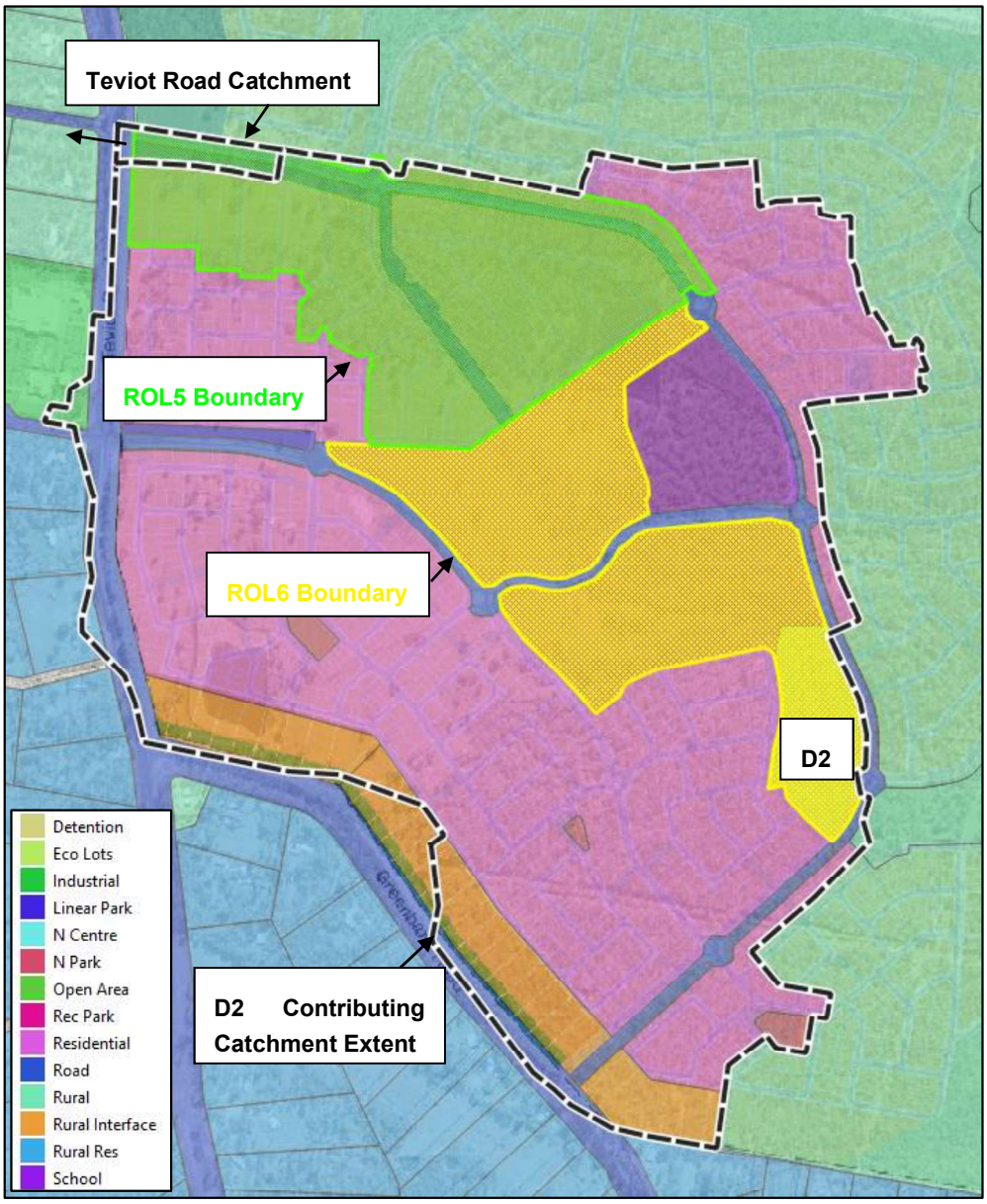
This letter outlines:

- The stormwater quantity management strategy for ROL05.
- The stormwater quality management strategy for ROL05.

STORMWATER QUANTITY STRATEGY

Stormwater detention for ROL05 will be provided in D2, as per the Stormwater Masterplan and the ROL06 stormwater detention and water quality analysis (DEV/2020/1131). The ROL06 stormwater analysis represented a scenario utilising the latest concept design for D2 and catchment extent proposed to report to D2, with the remaining development areas beyond this extent represented as undeveloped. ROL05 falls almost wholly within the D2 contributing catchment as shown in Figure 1. A small catchment discharges directly to Teviot Road, for which a separate peak discharge analysis was undertaken.

Figure 1: D2 Detention Basin Contributing Catchment and Land Use



The stormwater mitigation analysis results for D2 are summarised in the ROL06 (DEV/2020/1131) stormwater analysis documentation.

Catchment Discharging to Teviot Road

A separate analysis has been undertaken for the small catchment that discharges to Teviot Road which is consistent with the one undertaken and summarised in the WOS SMP. Pre-development and post-development discharges are summarised in Table 1. As the area of catchment discharging to this location will be reduced following development, peak flows are expected to reduce to below pre-development conditions.

Table 1: Peak Flow Reporting – Teviot Road

Storm Event	Existing Peak Flow (m^3/s)	Post-Development Peak Flow (m^3/s)	Difference (%)
100 year ARI	1.95	0.69	-64%
50 year ARI	1.67	0.60	-64%
20 year ARI	1.08	0.52	-52%
10 year ARI	0.84	0.42	-50%
5 year ARI	0.62	0.36	-42%
2 year ARI	0.38	0.28	-25%

STORMWATER QUALITY STRATEGY

Stormwater treatment for ROL05 will be provided in SB1, B1, HP2 and W2, as per the Stormwater Masterplan and the ROL06 stormwater analysis.

Scenario A: SB1, B1 (constructed) and W2, HP2 Preliminary Design

The ROL06 stormwater analysis represented a scenario to assess how basins the SB1, B1, W2, HP2 treatment train would perform if:

- Its catchment was fully developed; and
- Catchments beyond catchments 1 and 2 are not developed; and
- Balance stormwater quantity infrastructure under the WOS SWMP is not constructed.

ROL05 falls almost wholly within the SB1, B1, W2, HP2 contributing catchment as shown in Figure 1 A small portion of ROL 5 discharges directly to Teviot Road, which has been replicated in the MUSIC model as an untreated (Bypass) catchment. The MUSIC model layout and water quality results are provided in Figure 2 and Table 2.

The results from the MUSIC model show the treatment train falls just short of meeting the load-based water quality objectives when assessed in isolation. It must be noted that the ROL05 treatment train when combined with other stormwater quality assets as proposed in the approved stormwater masterplan does meet the water quality objectives for the entire site. This is due to bioretention systems in other areas of the Site being sized to overtreat their catchments to compensate for the slight inadequacy of the ROL06 treatment train.

Figure 2: MUSIC Model Layout

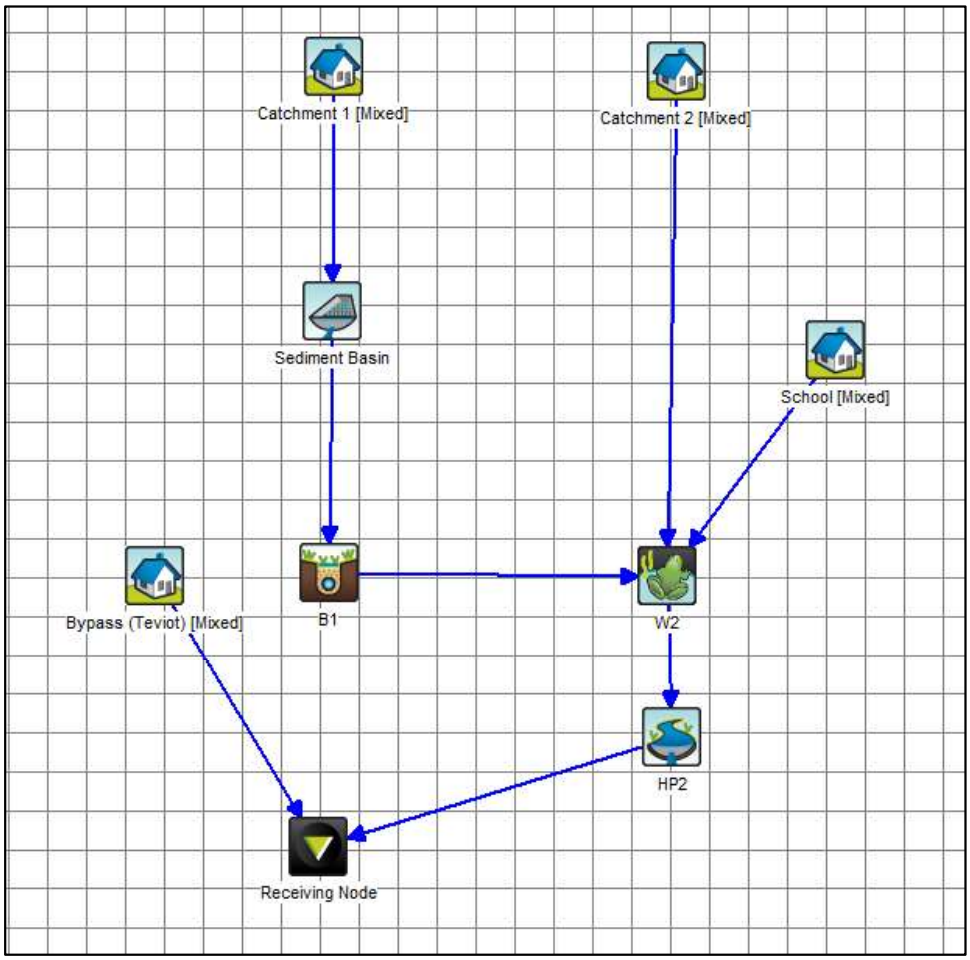


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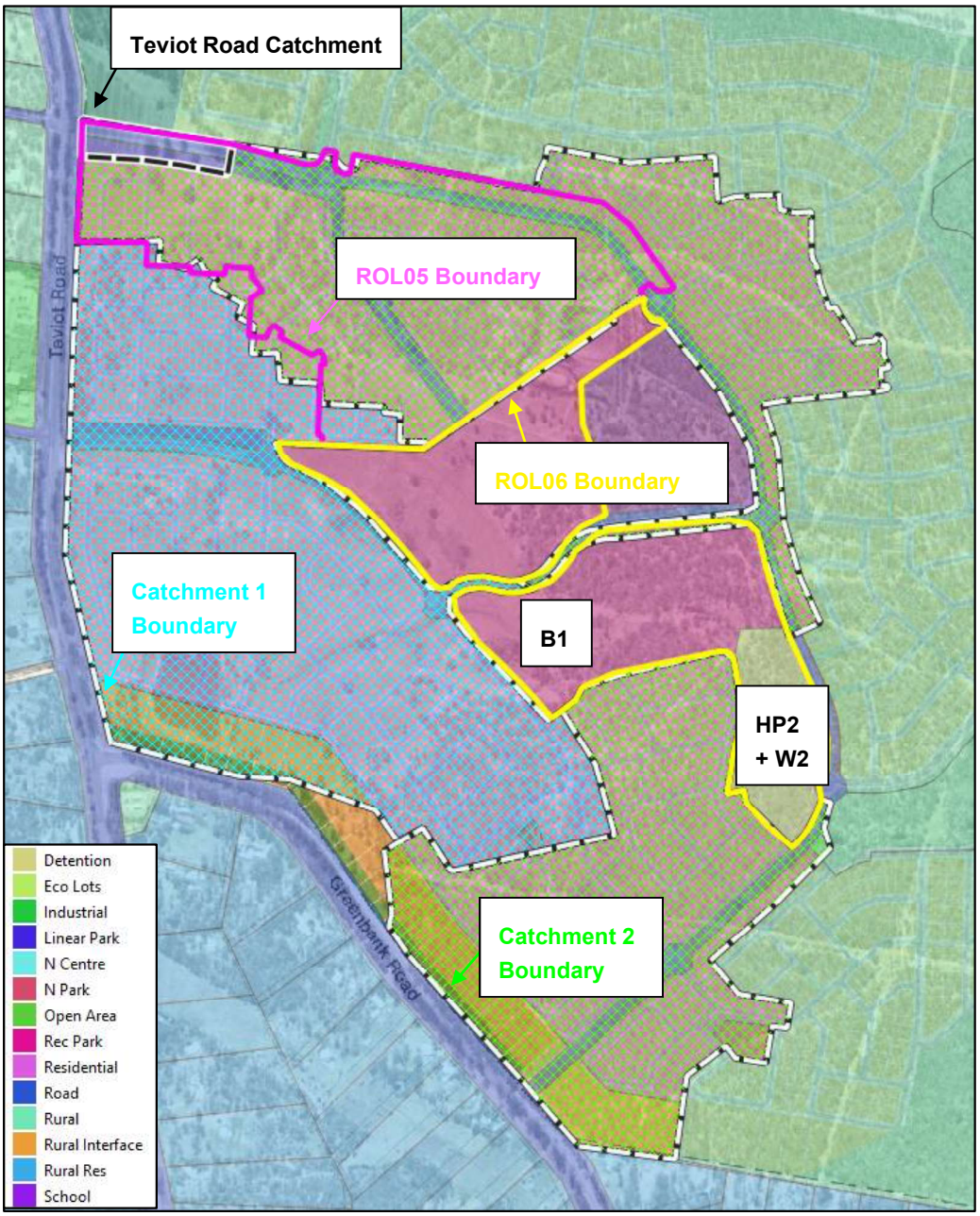
Figure 3: B1, HP2 and W2 Contributing Catchments



The stormwater quality analysis results for B1, HP2 and W2, inclusive of bypass of the Teviot Road catchment, are summarised in Table 2.

Table 2: Water Quality Results

Pollutant	Load Based Reduction Target (%)	Modelled Reduction (%)
TSS	80	76.7
TP	60	66.0

Pollutant	Load Based Reduction Target (%)	Modelled Reduction (%)
TN	45	40.5
GP	90	99.1

Scenario B: SB1, B1 (constructed) and W2, HP2 Preliminary Design (plus waterway enhancement)

Scenario B assumes:

- Constructed SB1 and SB2 are retained.
- W2 and HP2 are constructed in accordance with the ROL06 Stormwater Report (DEV2020/1311);
- Scenario conditions above are applied (i.e. ROL05 treatment train performance assessed in isolation); and
- 1,200 m² of waterway enhancement works are undertaken to achieve quality targets with this treatment train in isolation.

In the scenario that future stages of development do not proceed it is proposed that waterway enhancement works will be undertaken within the drainage line downstream of the water quality treatment train to offset any deficiency in water quality objectives. To determine the waterway enhancement area required the ROL05 MUSIC model was modified to include a 300 m^2 bioretention system downstream of the harvesting pond. In alignment with the masterplan water quality strategy this equates to 1200 m^2 of waterway enhancement. The layout of the MUSIC model and water quality results including the waterway enhancement works are show in Figure 4 and Table 3.

Figure 4: MUSIC Model Layout Including Waterway Enhancement

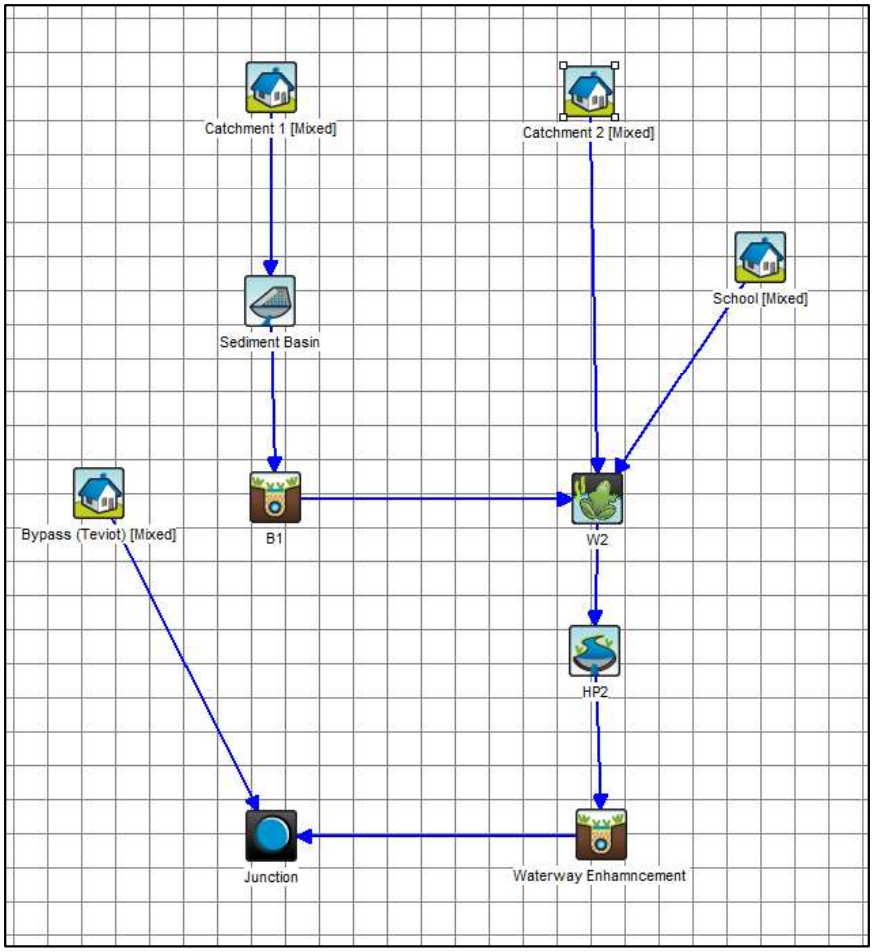


Table 3: Water Quality Results Including Waterway Enhancement

Pollutant	Load Based Reduction Target (%)	Modelled Reduction (%)
TSS	80	80
TP	60	69.7
TN	45	45.0
GP	90	99.1

CONCLUSION

This memorandum summarises the stormwater quality and quantity management strategy for the Reconfiguration of Lot 5 submission for the Everleigh development. No stormwater quality or quantity infrastructure will be provided within the ROL05 footprint. A small portion of the ROL05 footprint falls within an un-detained and untreated bypass catchment in accordance with the Stormwater Masterplan (Engeny, 2020, DEV2016/768). The majority of ROL05 falls within catchments to be managed by stormwater quality and quantity infrastructure constructed within ROL6 (DEV2020/1131). The ROL06 stormwater report concluded:

- The preliminary D2 design:
  - meets the requirements of the WOS SWMP.
  - meets the required peak flow mitigation and freeboard targets for the full contributing catchment in isolation with a temporary 50% blockage of one of the low flow culverts.
- The ROL06 quality treatment train (SB1, B1 (constructed) and W2, HP2 preliminary design):
  - Meets the requirements of the WOS SWMP.
  - Meets the required stormwater quality targets for the full contributing catchment in isolation with an additional 1,200 m² of waterway enhancement works.

The proposed stormwater infrastructure meets stormwater quality and quantity requirements.

Yours faithfully,

David Sexton

Principal, RPEQ No. 20884

DISCLAIMER