

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

Approval no: DEV2020/1131

Date: 13 July 2021



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2 December 2020

Mirvac
Level 17, 123 Eagle Street
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Attention: Jason Augustine

Dear Jason,

RE: EVERLEIGH ROL06 – STORMWATER DETENTION AND WATER QUALITY ANALYSIS

This letter outlines the water quantity and quality analysis undertaken in support of the Reconfiguration of Lot (ROL)06 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.

It is proposed that the temporary Area 1 detention basin (P1) will be decommissioned and replaced by a larger detention basin (D2) located further downstream, as identified in the WOS SWMP. Water quality treatment is provided through the incorporation of a wetland (W2) and stormwater harvesting system (HP2) within the D2 detention basin, in addition to the sediment basin (SB1) and bioretention (B1) already constructed, and to be retained, within Precinct 1.

This stormwater quantity and quality strategy is applicable to the following precincts located within the contributing catchment of the proposed stormwater management treatment measures:

- 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:

- Confirms the preliminary design of stormwater infrastructure items within the ROL06 footprint meets the stormwater management objectives set with the WOS SWMP.
- Includes scenario analysis and mitigation strategies (if required) contemplating ROL06 stormwater infrastructure operating in isolation (e.g. resulting from staged or cessation of delivery of other assets).

STORMWATER QUANTITY ANALYSIS

STORMWATER QUANTITY CATCHMENT

Land Use and Catchment Delineation

The XPRAFTS hydrologic model developed by Engeny for the Stormwater Masterplan was utilised for the stormwater quantity analysis. The land use and contributing catchment reflected in XPRAFTS for the ROL06 assessment is shown in Figure 1.

For the purpose of determining whether the stormwater detention infrastructure meets the mitigation requirements, peak flows are reported at two locations; the Site boundary, and downstream at Greenhill Road. These locations are indicated on Figure 2.

Figure 1: D2 Detention Basin Contributing Catchment and Land Use

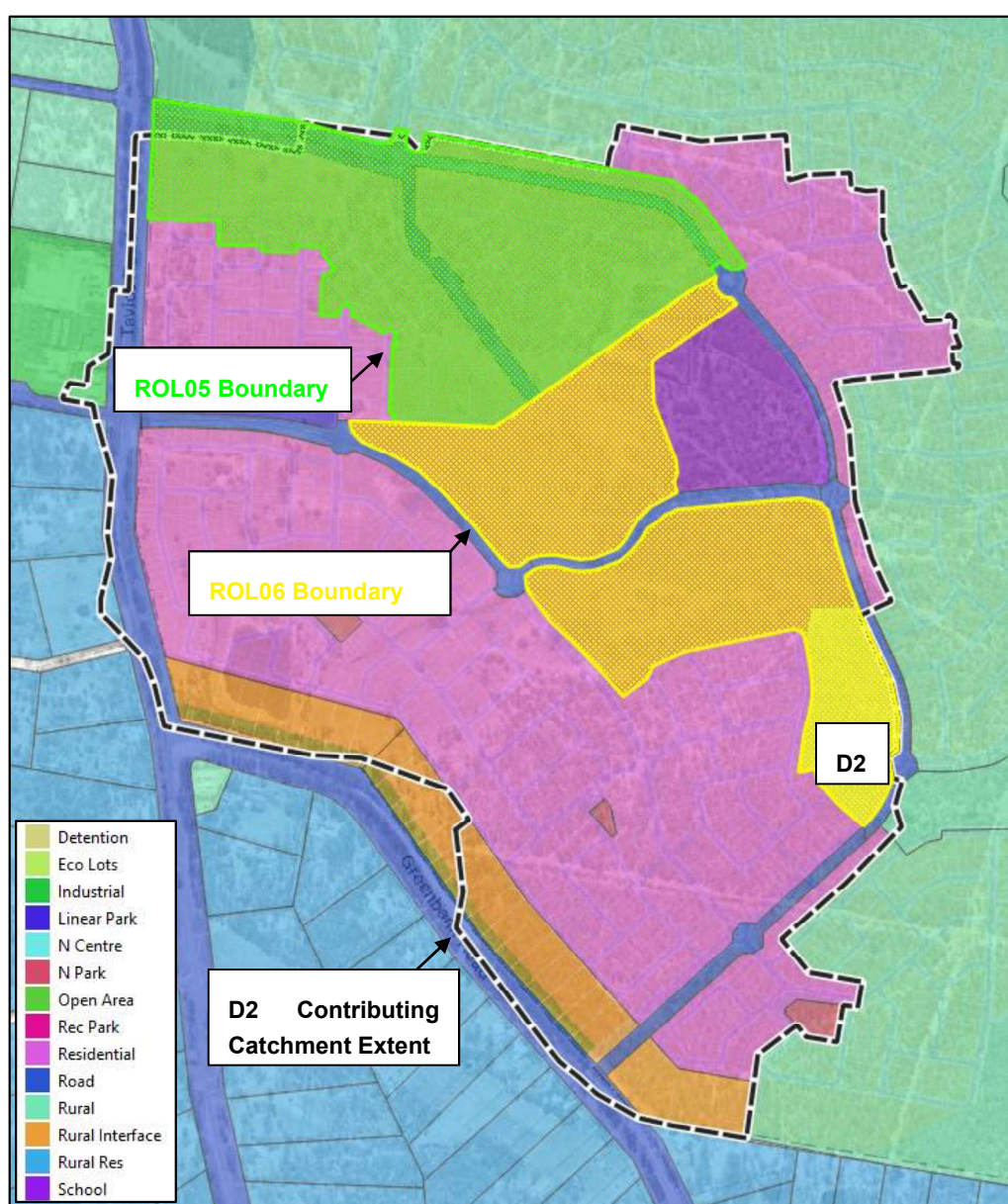
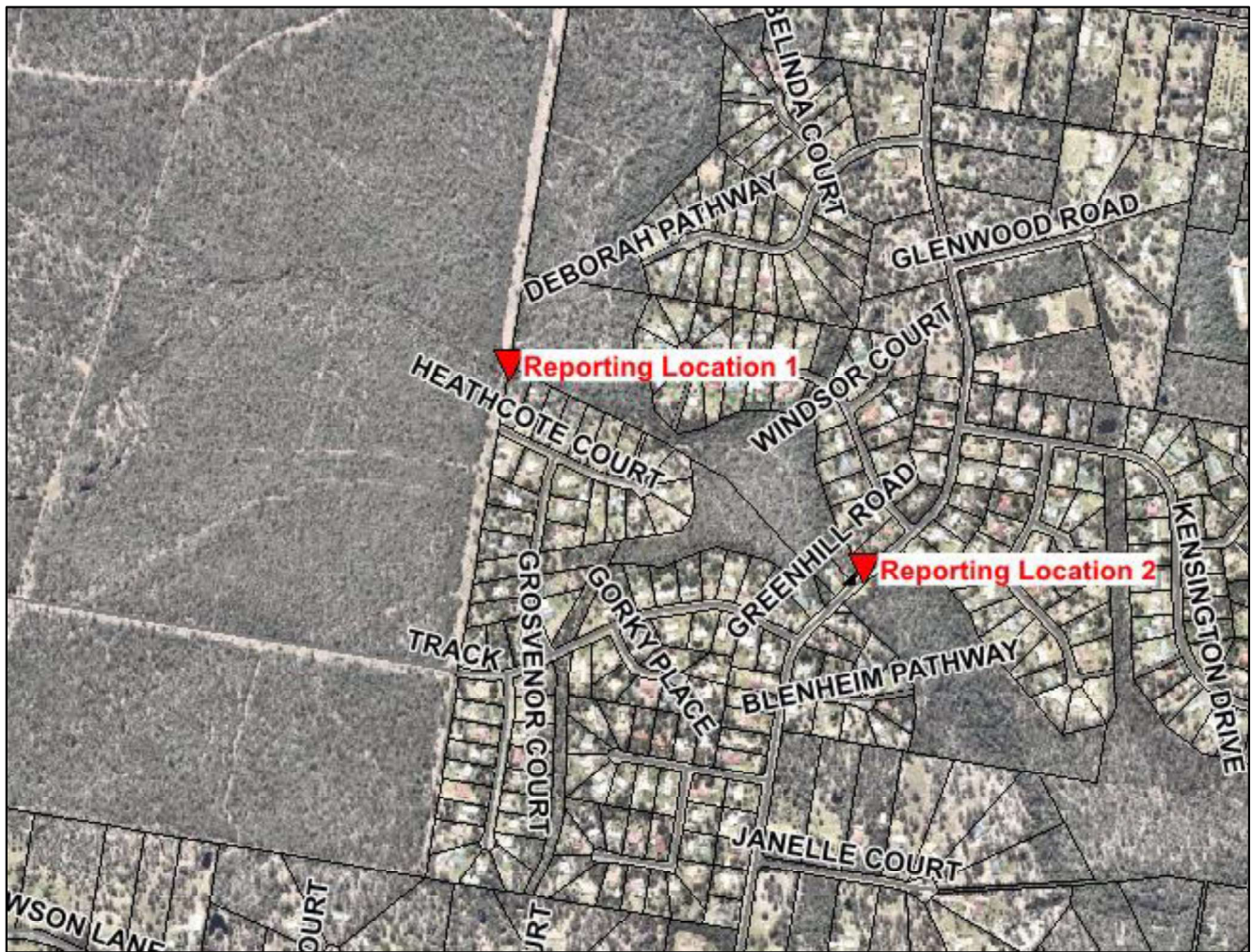


Figure 2: Stormwater Quantity Analysis Reporting Locations



COMPLIANCE WITH WHOLE OF SITE STORMWATER MASTER PLAN

Everleigh Whole of Site Stormwater Master Plan (WOS SWMP)

The WOS SWMP outlines the ultimate stormwater mitigation detention strategy for the Site which includes the specification of numerous detention basins working in conjunction to ensure that ultimate (fully developed) scenario peak flows are mitigated to equal or below pre-development flows. Conceptual design parameters for each of the basins are provided in the WOS SWMP. Detention Basin D2 is located within the ROL06 area and is the subject of this analysis. A summary of the details provided in the WOS SWMP for basin D2 is provided in the *WOS SWMP Concept Design Parameters* column in Table 1.

ROL06 Basin D2 Preliminary Design – Compliance with WOS SWMP

Further refinement of the D2 detention basin design following submission of the masterplan has resulted to slight changes to the basin storage curve adopted in the masterplan. Refer Attachment A for preliminary design of basin D2 and the associated stormwater quality infrastructure. The D2 preliminary design parameters are summarised in the *ROL06 Preliminary Design* column in Table 1. The WOS SWMP model was rerun with the updated ROL06 storage curve to demonstrate that the refined design still meets the objectives of the WOS SMP, refer to Table 2. Updated detention basin peak levels have been utilised to determine the ultimate scenario flood levels informing the open space design plans.

The preliminary D2 design at Attachment A complies with the WOS SWMP as demonstrated in Table 2.

Table 1: D2 Preliminary Design

Storm Event	WOS SWMP Concept Design Parameters	ROL06 Preliminary Design	Variance with WOS SWMP
Catchment 2 Area (ha)	172.6	172.6	No change
Basin Crest/Adjacent Road Elevation	Not specified	38.20 m AHD	N/A
100-year ARI Peak Level (Under Normal Conditions)	Not specified	37.13 m AHD	N/A
Freeboard to top of bund (Under Normal Conditions)	Not specified	1,070 mm	N/A
100-year ARI Stored Volume (m ³) (Under Normal Conditions)	86,700	84,150	Minor change due to refinement of storage curve through ROL06 design
100-year ARI Peak Level (entirety of low-level culverts blocked)	Not specified	38.04 m AHD	N/A
Freeboard Under Blockage Sensitivity Conditions	Not specified	160 mm	N/A
Low Flow Outlet	3/1200x1200 RCBCs at invert	3 / 1200 x 1200 RCBC at basin invert at 34.2 m AHD	No change
High Flow Outlet	5/1500x600 RCBCs at 1.9 m depth	5 / 1500 x 600 RCBC at 36.1 m AHD (1.9 m depth)	No change

Table 2: Peak Flow Reporting – Ultimate Configuration – WOS SMP Development

Storm Event	Reporting Location 1 – Site Boundary			Reporting Location 2 – Greenhill Road		
	Existing Peak Flow (m ³ /s)	Mitigated Peak Flow (m ³ /s)	Difference (%)	Existing Peak Flow (m ³ /s)	Mitigated Peak Flow (m ³ /s)	Difference (%)
100-year ARI	40.97	39.77	-3%	134.60	131.02	-3%
50-year ARI	33.77	32.99	-2%	108.92	105.75	-3%
20-year ARI	25.93	24.87	-4%	86.78	82.27	-5%
10-year ARI	19.95	19.52	-2%	69.30	64.88	-6%
5-year ARI	15.79	15.30	-3%	50.50	48.38	-4%
2-year ARI	9.40	9.02	-4%	33.51	32.20	-4%

SCENARIO ANALYSIS – D2 PERFORMANCE IN ISOLATION (D2 CATCHMENT FULLY DEVELOPED)

The WOS SWMP models the ultimate (fully developed) scenario and assumes all stormwater quantity infrastructure has been constructed. The D2 preliminary design meets the requirements of the WOS SWMP as above.

Scenarios have been modelled to assess how basin D2 would perform if:

- Its catchment was fully developed;
- Catchments beyond the D2 catchment are not developed; and
- Balance stormwater quantity infrastructure under the WOS SWMP is not constructed

For example, due to:

- Staged delivery of the project (temporary performance in isolation); and/or
- Cessation of the project prior to completion of the master plan (considered unlikely).

Scenario A: D2 Preliminary Design

Scenario A assumes the D2 basin is constructed in accordance with the preliminary plans at Attachment A, and scenario conditions above are applied (i.e. D2 performance assessed in isolation).

Hydrologic modelling of this scenario has been undertaken and summarised in Table 3.

Table 3: Peak Flow Reporting – Scenario A

Storm Event	Reporting Location 1 – Site Boundary			Reporting Location 2 – Greenhill Road		
	Existing Peak Flow (m ³ /s)	Mitigated Peak Flow (m ³ /s)	Difference (%)	Existing Peak Flow (m ³ /s)	Mitigated Peak Flow (m ³ /s)	Difference (%)
100-year ARI	40.97	38.28	-7%	134.60	129.22	-4%
50-year ARI	33.77	30.98	-8%	108.92	106.51	-2%
20-year ARI	25.93	23.58	-9%	86.78	84.08	-3%
10-year ARI	19.95	18.64	-7%	69.30	67.49	-3%
5-year ARI	15.79	15.30	-3%	50.50	49.43	-2%
2-year ARI	9.40	9.89	5%	33.51	33.01	-1%

Under Scenario A, basin D2 mitigates peak flows in all events for Reporting Location 2, and all events at Reporting Location 1 other than the 2-year ARI storm event which is subject to a modest 5% increase.

It is unlikely the D2 catchment will be fully developed before additional stormwater quantity infrastructure is constructed under the WOS SWMP. As demonstrated in Table 2 all events will be mitigated at all reporting locations on completion of stormwater quantity infrastructure contemplated by the WOS SWMP.

While no material impact is expected under Scenario A, mechanisms to overcome the slight increase in the 2-year ARI event have been considered in Scenario B.

Scenario B: D2 Preliminary Design (one RCBC 50% blocked)

Scenario B assumes:

- The D2 basin is constructed in accordance with the preliminary plans in Attachment A;
- Scenario conditions above are applied (i.e. D2 performance assessed in isolation); and
- one of the 1200 x 1200 RCBCs 50% blocked temporarily to mitigate peak flows under all events at both Reporting Locations 1 & 2.

Note, blocking one of the RCBCs will increase the storage volume 5% from 84,150 m³ to 88,600 m³ and will result in an immaterial 120 mm increase to the D2 basin flood level in the 100-year ARI event.

D2 design parameters and performance under Scenario B are summarised in Table 4 and Table 6 respectively. Note road topping the culvert has >300 mm freeboard available above the 100-year ARI level and the road is not overtopped under blocked 100-year ARI conditions. All park embellishments also retain appropriate flood immunity under Scenario B.

Detail design of ultimate basin D2 will be undertaken in accordance with Scenario B (unless an alternate approach is approved under a subsequent approved ROL6 stormwater report). The temporary blockage will be removed once balance WOS SWMP assets are operational.

Table 4: D2 Temporary Design Parameters – Scenario B

Storm Event	Result	Change from D2 Ultimate Refined Parameters
Basin Crest/Adjacent Road Elevation	38.20 m AHD	No Change
100-year ARI Peak Level (Under Normal Conditions)	37.25 m AHD	0.12 m increase
Freeboard to top of bund (Under Normal Conditions)	950 mm	0.12 m decrease
100-year ARI Stored Volume (Under Normal Conditions)	88,600	4,450 m ³ increase
100-year ARI Peak Level (entirety of low-level culverts blocked)	38.04 m AHD	No change
Freeboard Under Blockage Sensitivity Conditions	160 mm	No Change
Low Flow Outlet	2 / 1200 x 1200 RCBC and 1 / 600 x 1200 RCBC at 34.2 m AHD	50% vertical blockage of 1 culvert
High Flow Outlet	5 / 1500 x 600 RCBC at 36.1 m AHD	No Change

Table 5: Peak Flow Reporting – Temporary Configuration – Scenario B

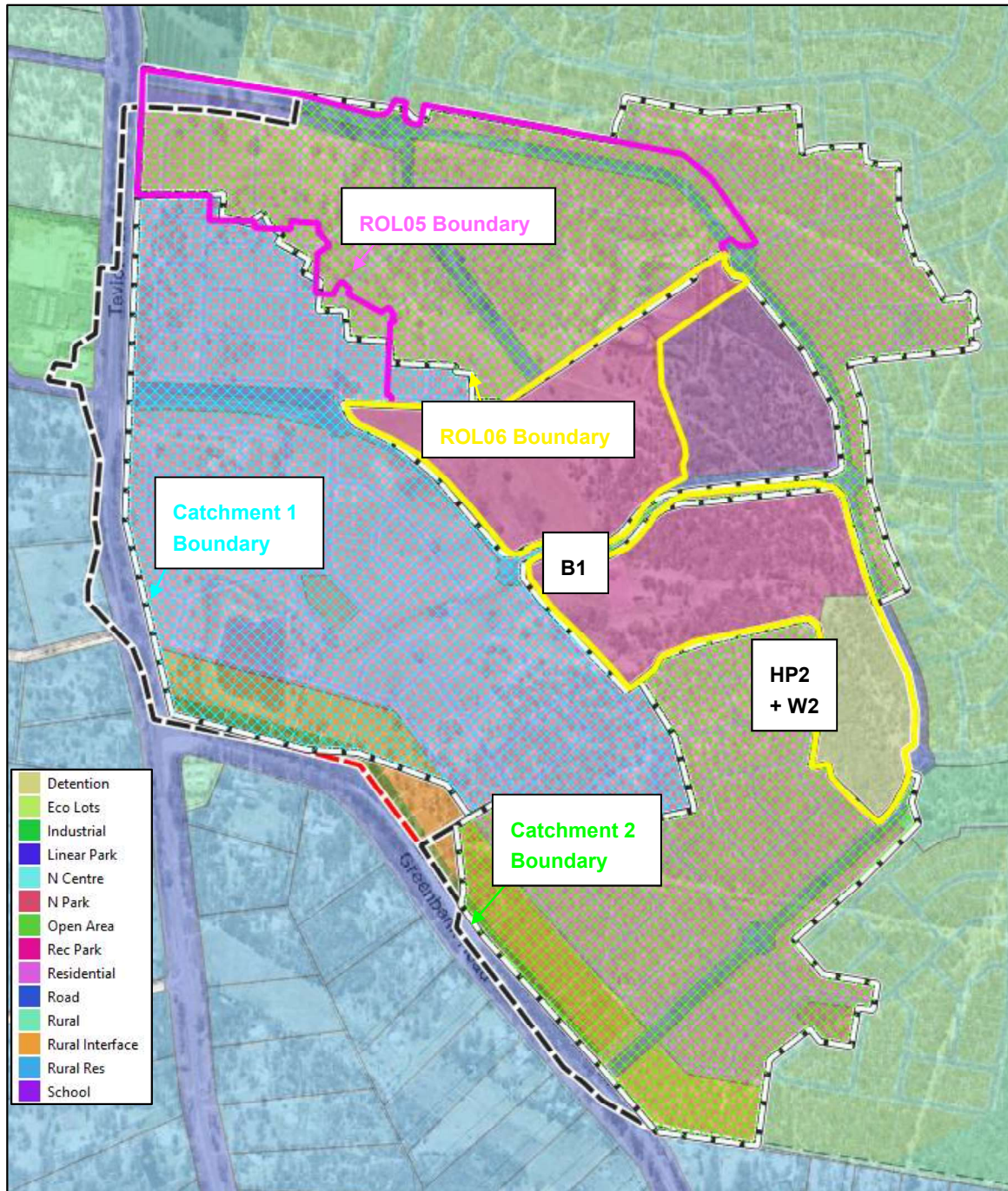
Storm Event	Reporting Location 1 – Site Boundary			Reporting Location 2 – Greenhill Road		
	Existing Peak Flow (m ³ /s)	Mitigated Peak Flow (m ³ /s)	Difference (%)	Existing Peak Flow (m ³ /s)	Mitigated Peak Flow (m ³ /s)	Difference (%)
100-year ARI	40.97	37.64	-8%	134.60	129.22	-4%
50-year ARI	33.77	31.76	-6%	108.92	106.51	-2%
20-year ARI	25.93	23.43	-10%	86.78	84.08	-3%
10-year ARI	19.95	18.17	-9%	69.30	67.49	-3%
5-year ARI	15.79	14.76	-6%	50.50	49.43	-2%
2-year ARI	9.40	9.35	-1%	33.51	33.01	-1%

STORMWATER QUALITY ANALYSIS

STORMWATER QUALITY CATCHMENTS

Figure 3 shows Catchment 1 and Catchment 2 which report to the stormwater quality infrastructure in the ROL06 development footprint.

Figure 3: Stormwater Quality Catchments

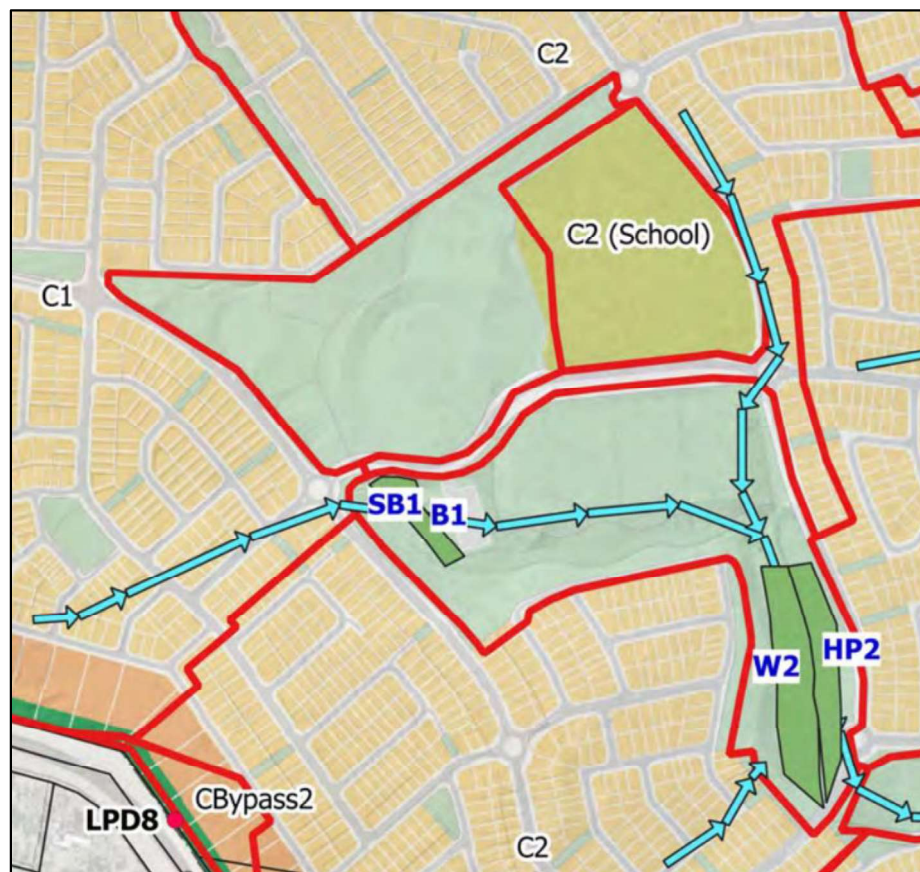


STORMWATER TREATMENT TRAIN

The stormwater treatment train (Figure 4) within ROL06 comprises:

- Sediment Basin (SB1) - constructed
- Bioretention Basins (B1) - constructed
- Wetland (W2)
- Harvesting Pond (HP2)

Figure 4: Extract from WOS SWMP – ROL06 Treatment Train



The harvesting pond is to enable harvesting and reuse of stormwater for the irrigation of sports fields within the sports and recreation park. Council has previously confirmed it has no concerns with stormwater harvesting proposal providing a number of conditions are met, refer attached.

Stormwater enters the treatment system at 3 separate locations:

- A vegetated channel that runs from the Precinct 1 flow split structure and discharges to the wetland sediment basin from the west.
- A grass lined channel that runs on the eastern side of the sports fields and discharges to the northern end of the sediment basin.
- A pipe on the southern end of the wetland.

Flows up to the 3-month ARI storm event are treated by the sediment basin and wetland prior to discharge into the harvesting pond. Larger flows bypass the wetland and discharge straight to the harvesting pond through a high flow weir on the sediment basin to protect wetland vegetation from high velocities. Water draw down from the harvesting pond has been limited to 400 mm

to maintain visual amenity and habitat value of the harvesting pond. Water from the wetland will not be used for stormwater harvesting to maintain water levels within the wetland and enhance drought resilience.

COMPLIANCE WITH WHOLE OF SITE STORMWATER MASTER PLAN

Everleigh Whole of Site Stormwater Master Plan (WOS SWMP)

The WOS SWMP outlines the ultimate stormwater quality strategy for the Site which includes the specification of numerous infrastructure items working in conjunction to ensure ultimate (fully developed) scenario stormwater quality requirements are met. WOS SWMP water quality objectives and modelled reductions are provided in Table 6.

Table 6: Ultimate Water Quality Objectives

Pollutant	Reduction Objectives (%)	Modelled Reduction (%)
Total Suspended Solids	80	80.5
Total Phosphorus	60	71.0
Total Nitrogen	45	45.0
Gross Pollutants > 5mm	90	98.8

Conceptual design parameters for each of the master plan infrastructure items are provided in the WOS SWMP. Stormwater quality items SB1, B1, W2 and HP2 are located within ROL06 and are the subject of this analysis. A summary of the WOS SWMP details for these items is provided in the *WOS SWMP Concept Design Parameters* column in Table 7.

ROL06 Treatment Train SB1, B1, W2 and HP2 Preliminary Design – Compliance with WOS SWMP

Basins SB1 and B1 have already been constructed with Precinct 1 and will be retained.

Refer Attachment A for preliminary design of basins W2 and HP2 and the associated stormwater quantity infrastructure.

The as constructed and preliminary design parameters are summarised in the *ROL06 Preliminary Design* column in Table 7 and will meet the expected requirements of the WOS SWMP.

The preliminary W2 and HP2 design at Attachment A complies with the WOS SWMP as demonstrated in Table 7.

Table 7: SB1 & B1 (constructed) and W2 & HP2 Preliminary Design

Parameter	WOS SWMP Concept Design Parameters ROL06 Preliminary Design Variance with WOS SWMP		
Catchment Area (ha)			
C1	52.67	52.67	No Change
C2	78.53	78.53	No Change
School	6.96	6.96	No Change
SB1 Sediment Basin (constructed)			
Surface Area	1,500 m²	1,500 m²	No Change
Extended detention Depth	Not specified	300 mm	N/A
Permanent Pool Volume	Not specified	2,250 m³	N/A
B1 Bioretention Basin (constructed)			
Extended detention depth	300 mm	300 mm	No Change
Surface Area	2,200 m²	2,200 m²	No Change
Filter depth	600 mm	600 mm	No change
TN Content of Filter Media	600 mg/kg	600 mg/kg	No Change
Orthophosphate Content of Filter Media	3 mg/kg	3 mg/kg	No Change
W2 Wetland			
Extended detention depth	400 mm	400 mm	No Change
Filter media area	14,000 m²	14,000 m²	No Change
Permanent Pool Volume	5,200 m³	5,200 m³	No Change
Notional Detention Time	12 hours	12 hours	No Change
HP2 Harvesting Pond			
Extended detention depth	200 mm	200 mm	No Change
Surface area	8,000 m²	8,000 m²	No Change
Permanent pool Volume	12,000 m³	12,000 m³	No Change
Water Harvesting Demand	63,240 kL/ year	63,240 kL/ year	No Change
Percentage of Harvesting Demand Met	70%	70%	No Change

SCENARIO ANALYSIS – SB1, B1, W2, HP2 TREATMENT TRAIN PERFORMANCE IN ISOLATION (D2 CATCHMENT FULLY DEVELOPED)

The WOS SWMP models the ultimate (fully developed) scenario and assumes all stormwater quantity infrastructure has been constructed. The SB1, B1 constructed and W2, HP2 preliminary design meets the requirements of the WOS SWMP as above.

Scenarios have been modelled 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

for example, due to:

- Staged delivery of the project (temporary performance in isolation); and/or
- Cessation of the project prior to completion of the master plan (considered unlikely).

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

Scenario A assumes constructed SB1 and SB2 are retained, W2 and HP2 are constructed in accordance with the preliminary plans at Attachment A, and scenario conditions above are applied (i.e. ROL06 treatment train performance assessed in isolation).

The MUSIC model layout and water quality results are provided in Figure 5 Figure 5: MUSIC Model Layout and Table 8 respectively.

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 ROL06 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 5: MUSIC Model Layout

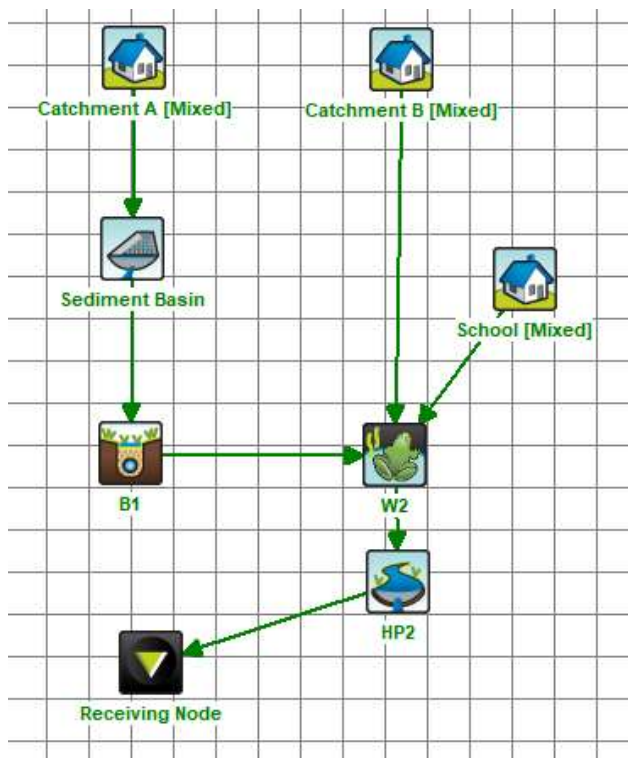


Table 8: Water Quality Results

Pollutant	Load Based Reduction Target (%)	Modelled Reduction (%)
TSS	80	77.1
TP	60	66.9
TN	45	41.3
GP	90	100

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 preliminary plans at Attachment A;
- Scenario conditions above are applied (i.e. ROL06 treatment train performance assessed in isolation); and
- 1,200m² 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 ROL06 treatment train to offset any deficiency in water quality objectives. To determine the waterway enhancement area required the ROL06 MUSIC model was modified to include a 300 m² bioretention system downstream of the harvesting pond. In alignment with the masterplan water quality strategy this equates to 1200 m² of waterway enhancement. The layout of the MUSIC model and water quality results including the waterway enhancement works are shown in Figure 6 and Table 9.

Figure 6: MUSIC Model Layout Including Waterway Enhancement

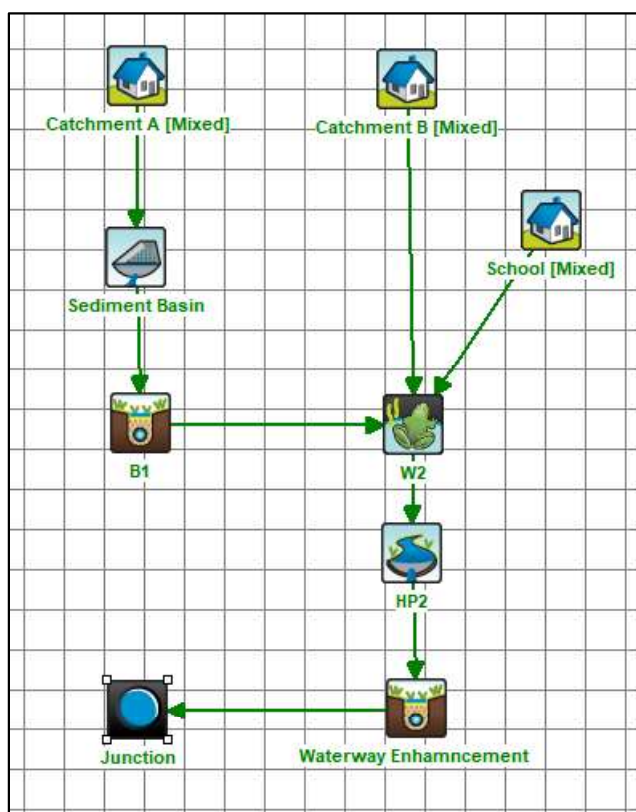


Table 9: Water Quality Results Including Waterway Enhancement

Pollutant	Load Based Reduction Target (%)	Modelled Reduction (%)
TSS	80	80.9
TP	60	70.5
TN	45	45.9
GP	90	100

CONCLUSION

An assessment has been undertaken to confirm stormwater quantity and quality assets proposed in support of the ROL06 submission for the Everleigh development meet quantity and quality requirements. The assessment has indicated the following:

- 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 1,200m² of waterway enhancement works.

The proposed stormwater infrastructure meets stormwater quality and quantity requirements.

Regards,



David Sexton

Principal, RPEQ No. 20884

Enc. Attachment A - Concept Design Drawings (M43000_013 Sk004/05)

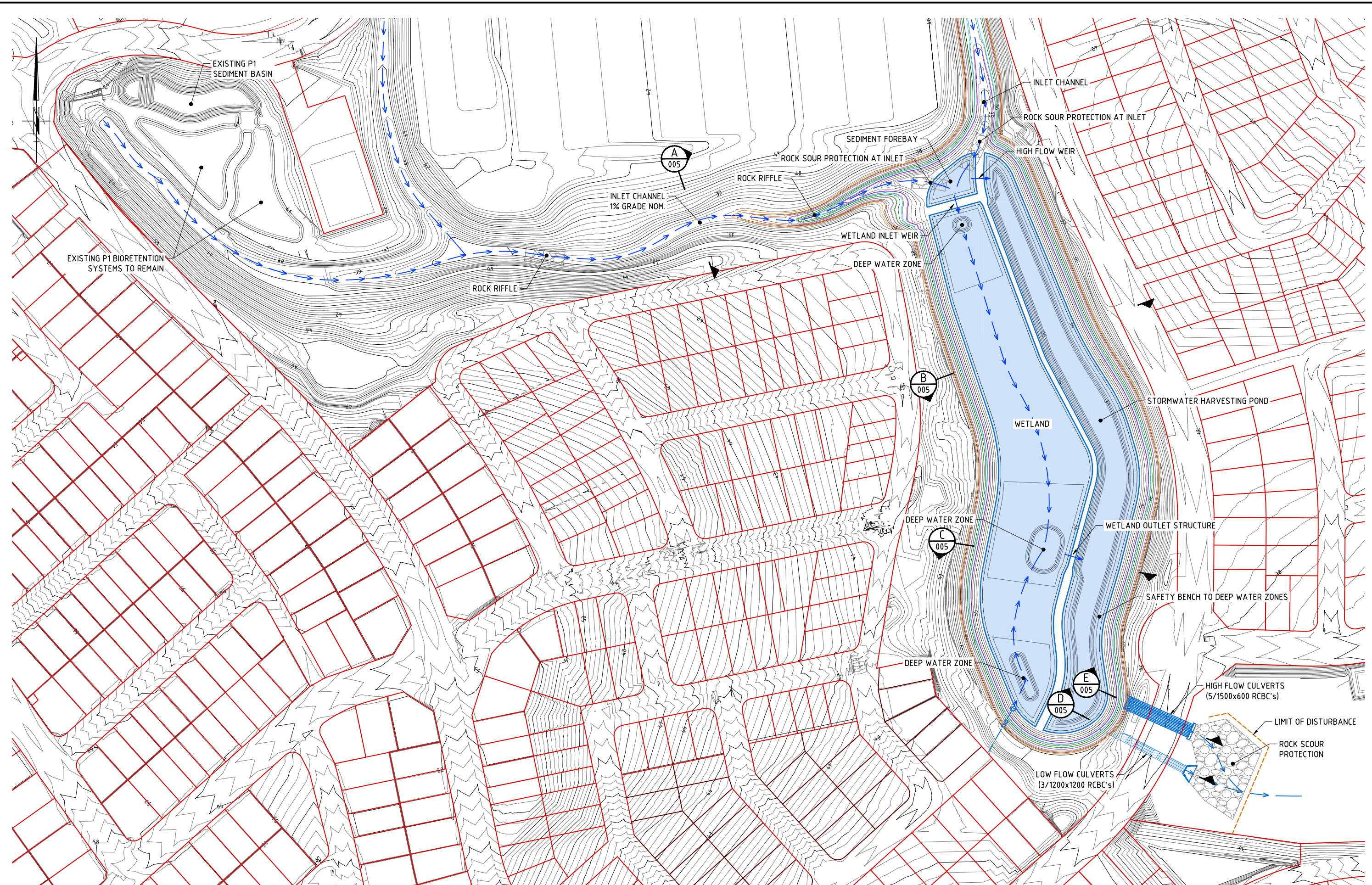
Attachment B - Logan City Council Conditions Stormwater Harvesting

Attachment C - Email correspondence with Logan regarding stormwater harvesting

DISCLAIMER

This letter has been prepared on behalf of and for the exclusive use of Mirvac and is subject to and issued in accordance with Mirvac instruction to Engeny Water Management (Engeny). The content of this letter was based on previous information and studies supplied by Mirvac. Engeny accepts no liability or responsibility whatsoever for it in respect of any use of or reliance upon this letter by any third party. Copying this letter without the permission of Mirvac or Engeny is not permitted.

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FLOOD EVENT LEGEND

- 2Y (RL 35.45)
- 5Y (RL 35.82)
- 10Y (RL 36.22)
- 20Y (RL 36.46)
- 50Y (RL 36.89)
- 100Y (RL 37.13)

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SCALE BEFORE REDUCTION



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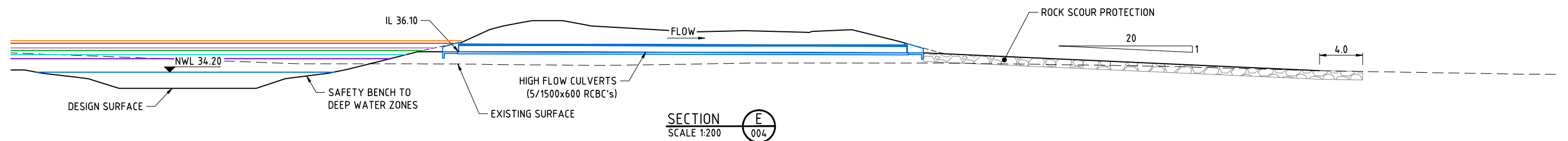
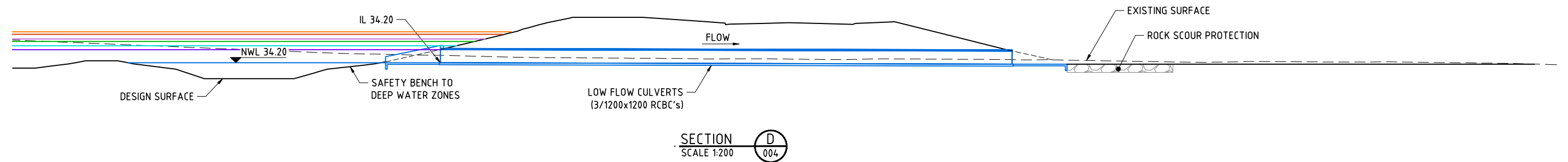
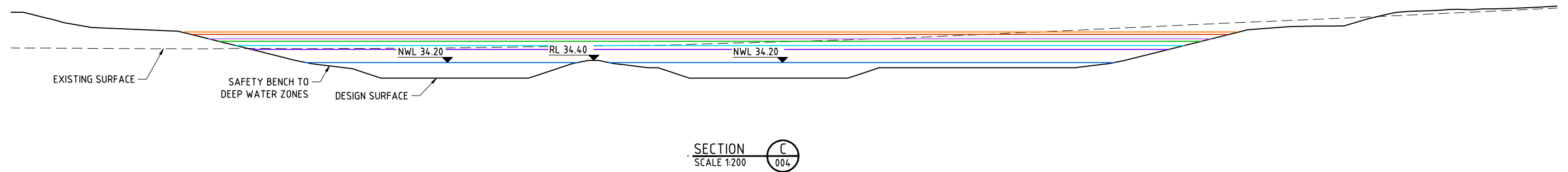
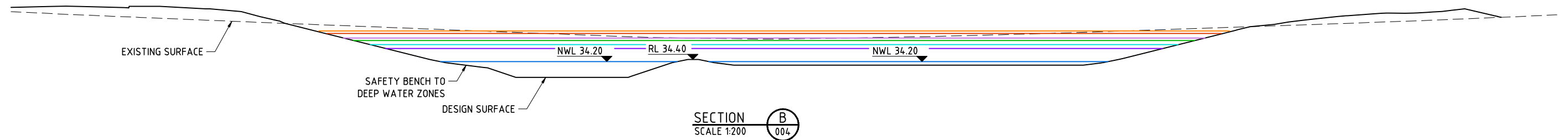
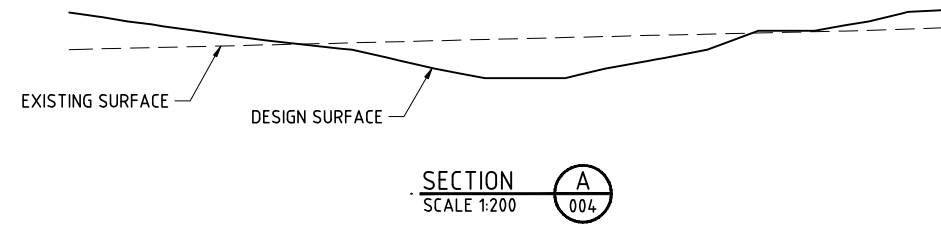
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MIRVAC
WETLAND / HARVESTING POND CONCEPT
**GENERAL ARRANGEMENT PLAN &
ULTIMATE FLOOD EXTENTS**

Original Size	A1	Org No.	M43000-013-SK004
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FLOOD EVENT LEGEND

- 2Y (RL 35.45)
- 5Y (RL 35.82)
- 10Y (RL 36.22)
- 20Y (RL 36.46)
- 50Y (RL 36.89)
- 100Y (RL 37.13)

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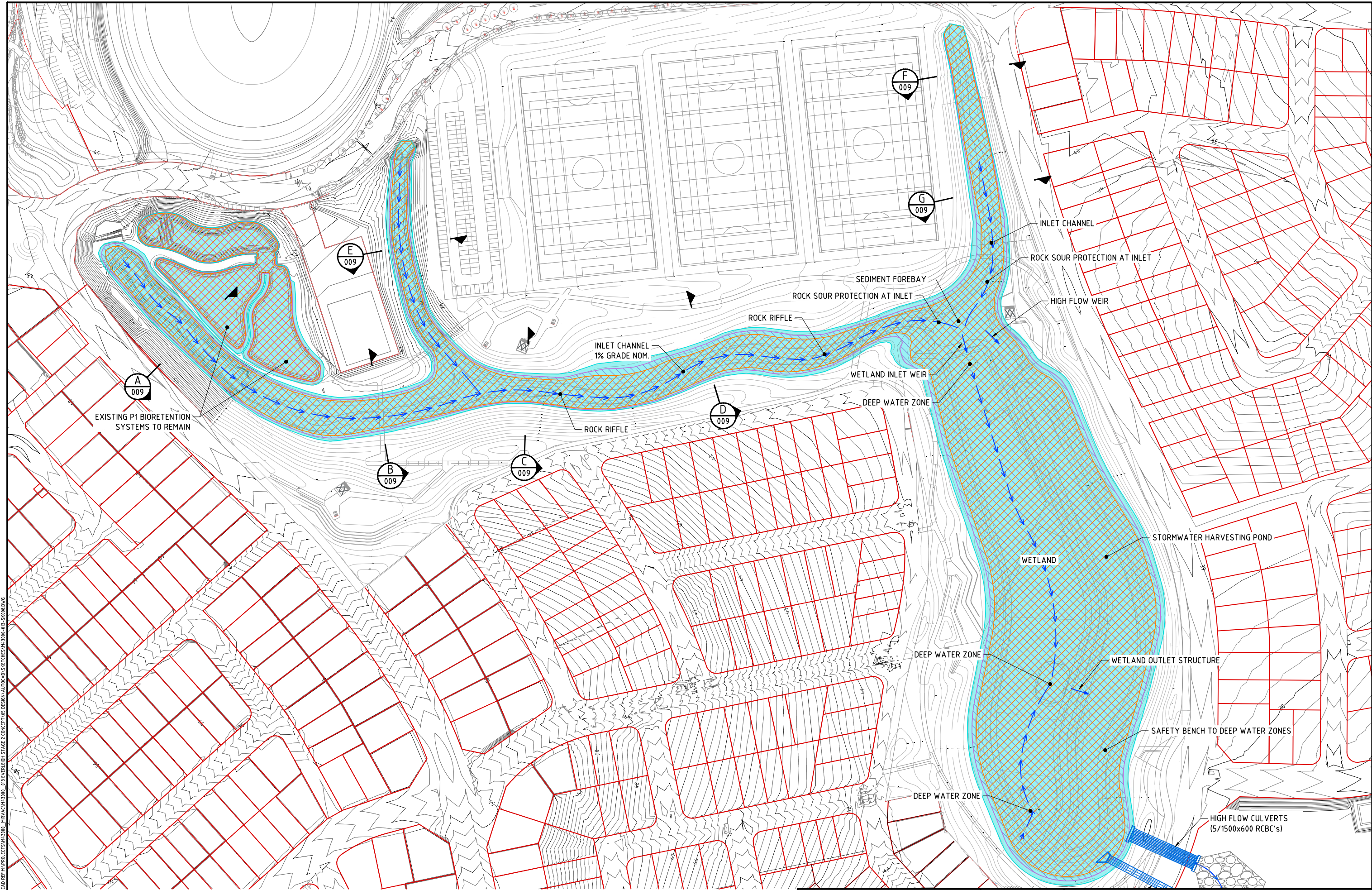
WETLAND / HARVESTING POND CONCEPT
SECTIONS & DETAILS

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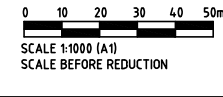
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LEGEND

	100 YEAR ARI (4.83ha)
	20 YEAR ARI (4.44ha)
	5 YEAR ARI (4.10ha)

NOTE
FLOOD EXTENTS INCLUDE OPEN CHANNEL FLOW

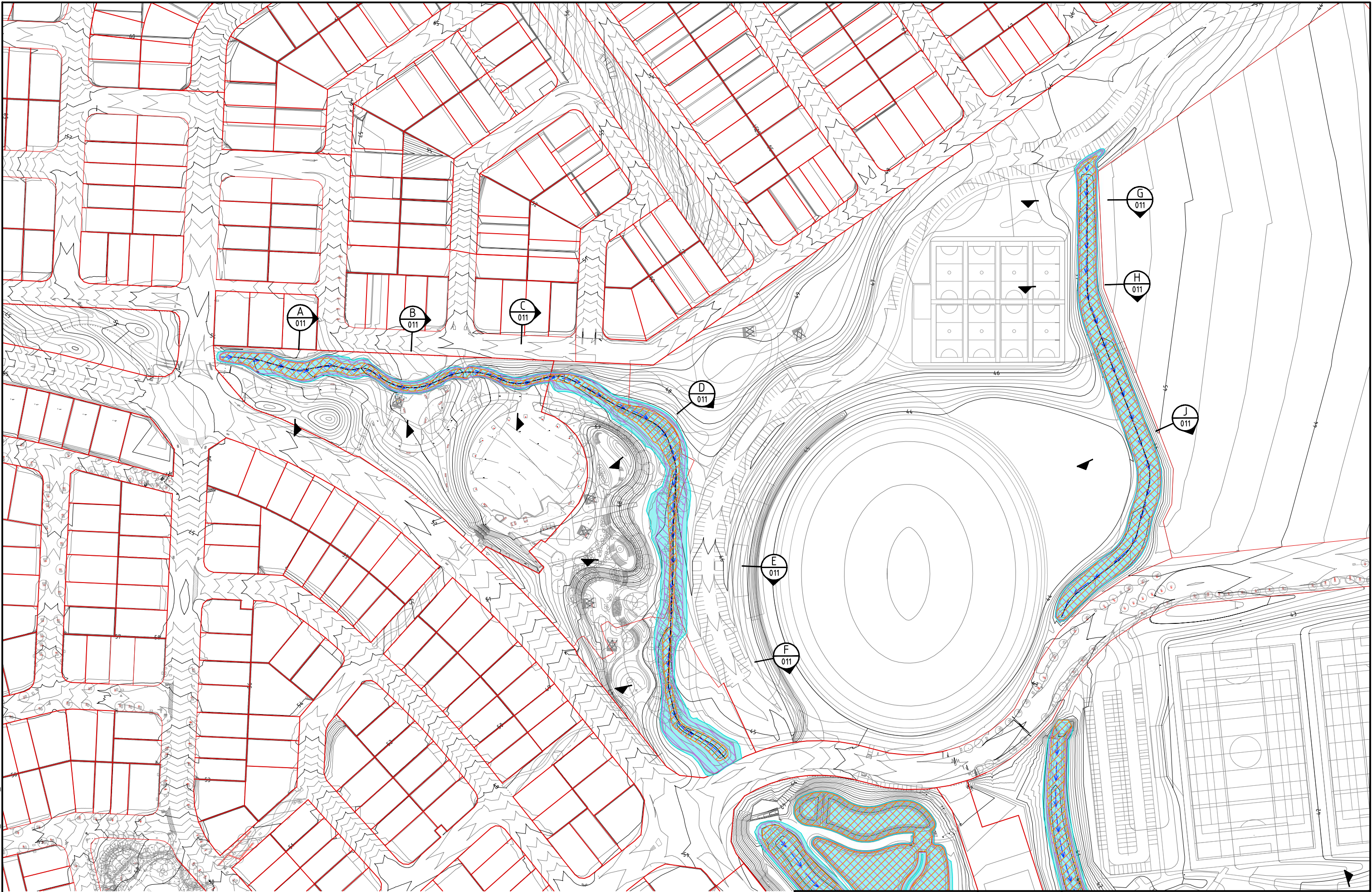


ENGENY
WATER MANAGEMENT
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A1	Original Size
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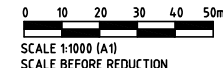
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LEGEND

	100 YEAR ARI (4.83ha)
	20 YEAR ARI (4.44ha)
	5 YEAR ARI (4.10ha)

NOTE
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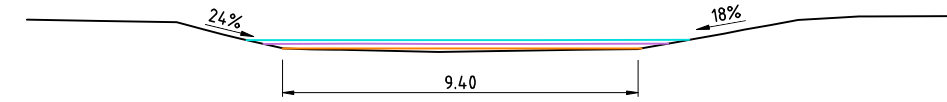
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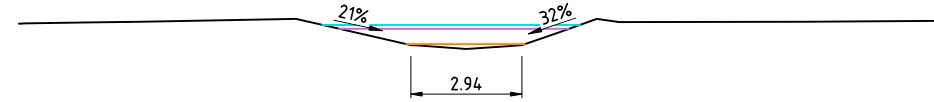
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DATE	19.11.20
DRAWN BY	MT
JOB No.	M43000-013

MIRVAC	
NORTHERN PARKS / CHANNELS CONCEPT GENERAL ARRANGEMENT PLAN & ULTIMATE FLOOD EXTENTS	
Original Size	Draw No.
A1	M43000-013-SK010
Rev.	D

LAST MODIFIED: 06/26/2023 3:09 PM CAD REF: H:\PROJECTS\M43000_MIRVAC\M43000_013\EVERLEIGH_STAGE 2 CONCEPT\US DESIGN\AUTOCAD SKETCHES\M43000-013-SK011.dwg



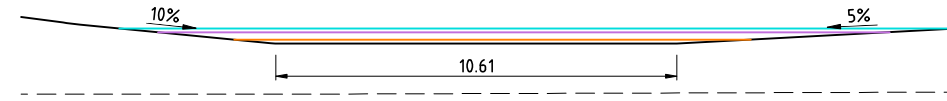
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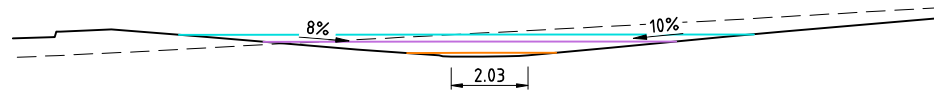
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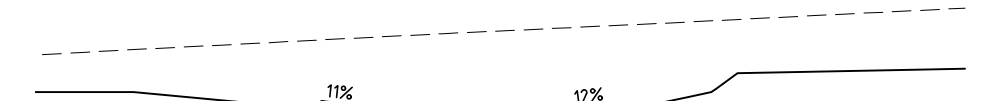
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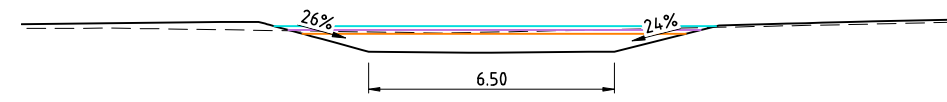
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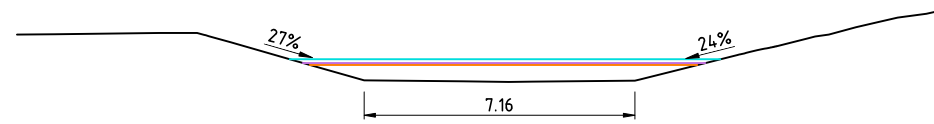
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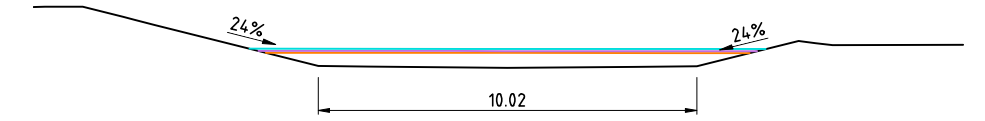
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SECTION G
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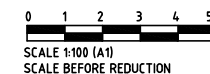
SECTION H
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SECTION J
SCALE 1:100

LEGEND

- 100 YEAR ARI
- 20 YEAR ARI
- 5 YEAR ARI



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DATE 16.11.20

DRAWN BY MT

JOB No. M43000-013

MIRVAC

NORTHERN PARKS / CHANNELS CONCEPT
SECTIONS & DETAILS

Original Size
A1

Orig No.
M43000-013-SK011

Rev.
C

Project: MIRVAC EVERLEIGH
Location: GREATER FLAGSTONE PDA
Subject: LOGAN CITY COUNCIL CONDITIONS – STORMWATER HARVESTING

Background

- Mirvac intends to include stormwater harvesting within its Everleigh community in Greenbank.
- Mirvac and Logan City Council (Council) have met to discuss the proposal
- Council has confirmed it has no concerns with the stormwater harvesting proposal providing a number of conditions are met (refer left hand column below)

Purpose

Mirvac has reviewed Council's conditions and either agrees or agrees in principle with same. Notwithstanding, Mirvac wishes to clarify several aspects of the conditions to ensure that both Council and Mirvac understand expectations going forward. The right-hand column below provides Mirvac's response to Council's conditions and requests Council feedback for some aspects.

Council Conditions & Mirvac Response

Council Advice

Council has no objection to the stormwater harvesting concept proposed for Everleigh provided that the following conditions are met:

1. that the scheme only irrigate sporting fields, noting Council does not irrigate any recreational parks and does not want to be responsible for providing recycled stormwater to education facilities;
2. that an appropriate backup option be maintained should the scheme fail, ensuring sports fields can continue to be irrigated from the potable water supply;

Mirvac Response

Agreed.

Agreed.

3. that the scheme uses an appropriately coloured pipe (noting lilac is proposed) to ensure differentiation from the reticulated potable water supply;
4. that the alignment of the pipeline for the stormwater reticulation be on a different alignment to the potable water supply (1.4 m) and sewer alignments (2.3 m) so that the stormwater reticulation is clearly separate from the potable water supply reticulation – the alignment should maintain a 0.7 metre separation to the potable water supply reticulation;
5. that Council has a preference for UV treatment of stormwater as opposed to chemical treatment, recognising typically lower costs and more practical operational requirements;
6. that the recycled stormwater quality will meet the Australian standards and requirements of the Council asset custodian for use on sporting fields;

Agreed.

Agree in principal.

While every reasonable effort will be made to comply, the final arrangement will be subject to the number and size of the other services. Mirvac commits to consulting with Council to discuss and resolve alternate alignments if the specified alignments cannot be achieved.

Please confirm Council is accepting of potential alternate alignments on this basis.

Agreed in principal.

We understand that neither UV or chemical treatment are mandatory where acceptable water quality outcomes can be achieved without same. The Mirvac proposal will seek to avoid the need for UV or chemical treatment by meeting acceptable water quality outcomes through the treatment train in the stormwater masterplan (i.e. bioretention systems, vegetated swales and wetland). Should acceptable water quality outcomes not be achieved through the stormwater treatment train, Mirvac acknowledges that UV treatment is Council's preferred option.

Please confirm Council is accepting that UV or chemical treatment is not required where acceptable water quality outcomes can be achieved through the stormwater treatment train.

Agree in principal.

We are not aware of a specific Australian Standard applicable to recycled water quality. The *Australian Guidelines for Water Recycling: Managing*

Health and Environmental Risks (Natural Resources Management Ministerial Council, the Environment Protection and Heritage Council, and the National Health and Medical Research Council, 2009) seeks to incorporate the relevant parts of several Australian and international standards. We propose to adopt the risk-based assessment outlined in the guideline above. This provides a practical way for both Mirvac and Council to manage potential public health and environmental risks associated with the reuse of urban stormwater.

Please confirm this approach is acceptable to Council.

7. that the ultimate Council asset custodian, nominated as Sport and Leisure Facilities; be involved in all elements of the detailed design for the scheme and for each subsequent stage of delivery;

Agree in Principal.

Note that the it would be practical to agree gates or hold points for Sport and Leisure Facilities input (e.g. concept design, 70% design development, 100%/approval, prestart, on-maintenance, off-maintenance).

Please confirm this approach is acceptable to Council

8. that the transfer of all scheme assets be subject to Economic Development Queensland's on maintenance / off maintenance processes but with the opportunity for the Council asset custodian to be involved in those processes and that the on-maintenance period be a period of 36 months to allow the developer to demonstrate the successful operation of the scheme over a number of weather seasons and to confirm operational costs; and
9. that there be agreement between the developer and the Council asset custodian regarding asset handover.

Agreed.

Agreed.

Esther Hargrave

From: Mark Clancy
Sent: Sunday, 14 October 2018 10:39 AM
To: Everton, David
Subject: RE: stormwater harvesting

Hi David,

Thanks for your email.

This gives us sufficient comfort to direct our engineering team to progress design of the stormwater treatment train and stormwater harvesting infrastructure.

We support in principle the additional stormwater harvesting maintenance contract between Council and the relevant contractor (under which the contractor is engaged by Council), and would be happy to discuss with Council how this arrangement may work in practice.

Kind Regards,



Mark Clancy

Development Manager
Masterplanned Communities
Residential Development

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From: Everton, David <DavidEverton@logan.qld.gov.au>
Sent: Friday, 5 October 2018 4:29 PM
To: Mark Clancy <mark.clancy@mirvac.com>
Subject: RE: stormwater harvesting

Hi Mark,

Thanks for sending this through, as you would be aware we are still ironing out a real policy on this matter.

Have no issue on any of your responses to conditions, in particular regarding treatment and standards, it would be perhaps more easier to say harvested water should be 'fit for purpose'.

ie. the water must be of a sufficient quality for use 'sporting field' and not requiring excessive non-contact time (4hrs?). How you get to that quality (natural, UV, Chemical) is up to you to define and us accept on balance of ongoing cost etc.

We are also considering ongoing operation of these systems and in addition to the 36-month on maintenance, would like proponents to explore with operator additional 2 and 5 year option where they would be engaged by Council. This would provide Council with a fixed price window to prepare for.

Thanks

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From: Mark Clancy [<mailto:mark.clancy@mirvac.com>]
Sent: Tuesday, 2 October 2018 9:03 AM
To: Everton, David <DavidEverton@logan.qld.gov.au>
Subject: RE: stormwater harvesting

Good Morning David,

Thanks for your time last week and for previously providing Council's conditions for stormwater harvesting.

We are generally amenable to Council's conditions but wish to clarify a number of points to ensure Mirvac and Council understand each other's expectations going forward.

Refer attached for Mirvac's response to Council's conditions. I have also provided an editable copy should you wish to use this for Council's response.

I would be happy to discuss with you once you have had a chance to consider.

Kind Regards,



Mark Clancy

Development Manager
Masterplanned Communities
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From: Everton, David <DavidEverton@logan.qld.gov.au>
Sent: Wednesday, 22 August 2018 9:36 AM
To: Mark Clancy <mark.clancy@mirvac.com>
Subject: stormwater harvesting

Hi Mark,

Just to confirm, that Council currently does not have a policy supporting stormwater harvesting, but has a series of conditions in which such a scheme could be supported. These are:

1. that the scheme only irrigate sporting fields, noting Council does not irrigate any recreational parks and does not want to be responsible for providing recycled stormwater to education facilities;
2. that an appropriate backup option be maintained should the scheme fail, ensuring sports fields can continue to be irrigated from the potable water supply;
3. that the scheme uses an appropriately coloured pipe (noting lilac is proposed) to ensure differentiation from the reticulated potable water supply;

4. that the alignment of the pipeline for the stormwater reticulation be on a different alignment to the potable water supply (1.4 m) and sewer alignments (2.3 m) so that the stormwater reticulation is clearly separate from the potable water supply reticulation – the alignment should maintain a 0.7 metre separation to the potable water supply reticulation;
5. that Council has a preference for UV treatment of stormwater as opposed to chemical treatment, recognising typically lower costs and more practical operational requirements;
6. that the recycled stormwater quality will meet the Australian standards and requirements of the Council asset custodian for use on sporting fields;
7. that the ultimate Council asset custodian, nominated as Sport and Leisure Facilities; be involved in all elements of the detailed design for the scheme and for each subsequent stage of delivery;
8. that the transfer of all scheme assets be subject to Economic Development Queensland's on maintenance / off maintenance processes but with the opportunity for the Council asset custodian to be involved in those processes and that the on maintenance period be a period of 36 months to allow the developer to demonstrate the successful operation of the scheme over a number of weather seasons and to confirm operational costs; and
9. that there be agreement between the developer and the Council asset custodian regarding asset handover.

Following your presentation to Council officers, we have no further concerns with the stormwater harvesting concept proposed for Everleigh provided these conditions are met.

Thanks

David Everton | Place Manager Greater Flagstone | Economic Development and Strategy | **Logan City Council**
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