

20 March 2020

PO BOX 2091
Surfers Paradise, QLD 4217
Via Email : lcroft@urbanps.com.au

Arcadis Australia Pacific Pty Limited
Level 7, Seabank Building
12-14 Marine Parade,
PO Box 1653
SOUTHPORT QLD 4215
Tel No: +61 7 5532 3933

Your Ref : MCU/2018/58

RFI RESPONSE MCU/2018/58
202 BAILEYS MOUNTAIN ROAD, UPPER COOMERA (LOT 58 SP191940)

Dear Leanne,

On behalf of our client, Sandson Pty Ltd (the applicant), we hereby provide the following full response to Council's information request dated 9th March 2020.

The following documents are included for the submission to Council in support of this response:

- **Attachment 1 – Updated Engineering Drawings**
- **Attachment 2 - 100% Blockage Event Cross Section**

Council's RFI item is identified in **orange below**, with the applicant's response in black.

Hydraulic Assessment

- a) Provide drainage plan/s clearly showing the outlet pipes of the stormwater management devices including the overflow weir, location & extent of headwalls and associated erosion protection measures in relation to the overland flow corridor/drainage reserve. Please demonstrate that the pipe outlet and associated retaining wall (if any), and erosion protection measures will be located outside the drainage reserve. Please also demonstrate that the retaining wall of basin 1 will have minimum 0.6m separation from the adjoining pedestrian linkage. The applicant is also requested to provide another cross-section of basin 1 along an east – west alignment.

Note: Section 1 - Bioretention / Detention Basin Detail on Sheet DA-00-381 Issue 03 prepared by Arcadis, appears to not be a clear representation of the section line shown on Sheet DA-00-305. This needs to be reviewed and amended to clearly show the detention area and the interface between each element along the section line. It appears the line breaks have been used incorrectly. These should be amended and used where appropriate.

Engineering Drawings, Attachment 1, have been updated to include erosion protection measures and the location of the headwall in relation to the overland flow corridor / drainage reserve. It is not feasible to locate the pipe outlet outside of the drainage reserve. Due to existing site drainage constraints the outlet is currently located at RL23 m AHD and RL25 m AHD for Basin 1 and 2 respectively. If it were to be located outside of the drainage reserve this outlet would be at RL23.75 m AHD and RL25.5 m AHD for Basin 1 and 2 respectively.

It should also be noted that there is no overflow weir proposed for either basin. A 100% blockage on all orifices scenario has been tested and it is noted that the high level pit will provide sufficient capacity to convey stormwater and ensure low flow outlet blockage will not cause inundation of building pads. Flows will be managed via the proposed pit and pipe system, sized to safely discharge to the adjoining overland flow paths.

The retaining wall (including footing and drainage) are located at a minimum 200mm from the reserve boundary in accordance with City Plan Section 6.5.2.3. Refer drawing DA-00-382. A pedestrian fence can be used to mitigate potential fall risk.

Refer to updated engineering drawings which include a cross section of basin 1 along an east-west alignment and updated sections with amended line breaks.

- b) Provide earthworks cut and fill plan associated with representative cross-sections along the overland flow paths clearly showing the retaining walls and other structures. Officers consider that the overland flow corridor along Baileys Mountain Road needs to be dedicated as a drainage reserve; the western and southern conveyance channels need to be dedicated as drainage easement; and the eastern Yaun Creek corridor needs to be dedicated as environmental buffer and open space for pedestrian linkage. In this regard, please clearly identify the widths of these drainage corridors for appropriate conditioning purposes. Please also note that retaining walls are to be located a minimum 600mm from the edge of (outside of) the drainage reserve and drainage easements.

Note: The impact analysis plan (Dwg No. 19111/CD-09/DA1) indicated two dimensions (being 6m and 3m) for the southern conveyance channel, while the proposed site plan (Dwg No. 19111/CD-01/DA1) indicates it to be 6m. Please provide consistent information throughout the submission.

Sk005, Attachment 1, has been updated to include cross-sections along the overland flow path adjacent to the development's entry driveway. Refer to response below for item c) for details pertaining to the width of conveyance channels along the western and southern boundaries.

The overland flow corridor along Baileys Mountain Road varies in width. The average width is approximately 8m.

Retaining walls have been located outside drainage reserve with a minimum offset of 200mm from the 1% AEP water line in accordance with the City Plan Section 6.5.2.3.

- c) Demonstrate that the western and southern drainage channels/overland flow easement are to be designed in accordance with Section 4.4.5 of Council's Land Development Guidelines (LDG). The applicant has indicated that the catchment locations for Ext 2 and Ext 3 are presented in Appendix B while their corresponding on-site clean water diversion channel parameters are presented on Table 10-5.

Please note that Council could not locate the catchments in the drawings in Appendix B.

In accordance with QUDM we are allowing flows to enter the site along the western and southern boundaries and then safely conveying them to the overland flow paths along the northern and eastern boundaries. These drainage channels are proposed to be retained as private asset as it solely benefits the proposed development by allowing use of more land. These future private drainage channels will be managed and maintained by the future site operator to ensure compliance with QUDM. As such, it is not envisioned that these particular drainage channels will be required to be encumbered by easements and be designed in accordance with City Plan Section 6.5.2.3. Please note drawing DA-00-301, Attachment 1, has been updated to show external catchment labels.

- d) For any overflow on top of the proposed driveway, the applicant is requested to demonstrate that the depth of inundation (d) and depth product velocity ($d \cdot v$) will satisfy the flood safety requirements as per QUDM (e.g., $d \leq 250\text{mm}$, $d \cdot v \leq 0.25\text{m}^2/\text{s}$) by considering necessary blockage of the culverts. Please also undertake a sensitivity analyses of the driveway flood safety hazards by considering 100% blockage of the cross-drainage structure.

QUDM Table 10.4.4 suggest blockage factors for culverts are as follows:

- Design Value: 20%
- Severe Storm: 100%

The proposed culverts have been designed to ensure that the design storm (100 year ARI storm) is conveyed through the culvert system entirely with adequate freeboard to the driveway. It is further noted, the design for the culverts assumed a 50% blockage factor which is above the standard as noted in QUDM Table 10.4.4. As there is no flow overtopping the driveway during the design storm there is a depth velocity product of $0.00\text{m}^2/\text{s}$.

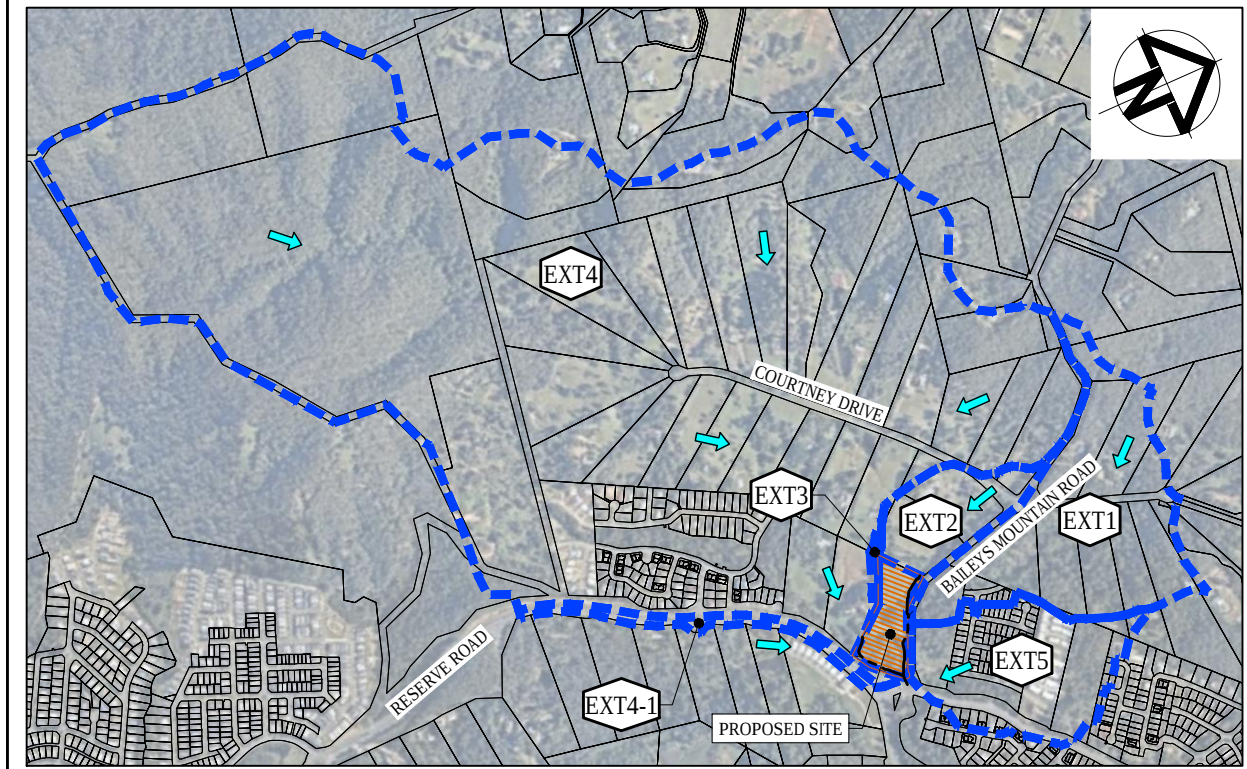
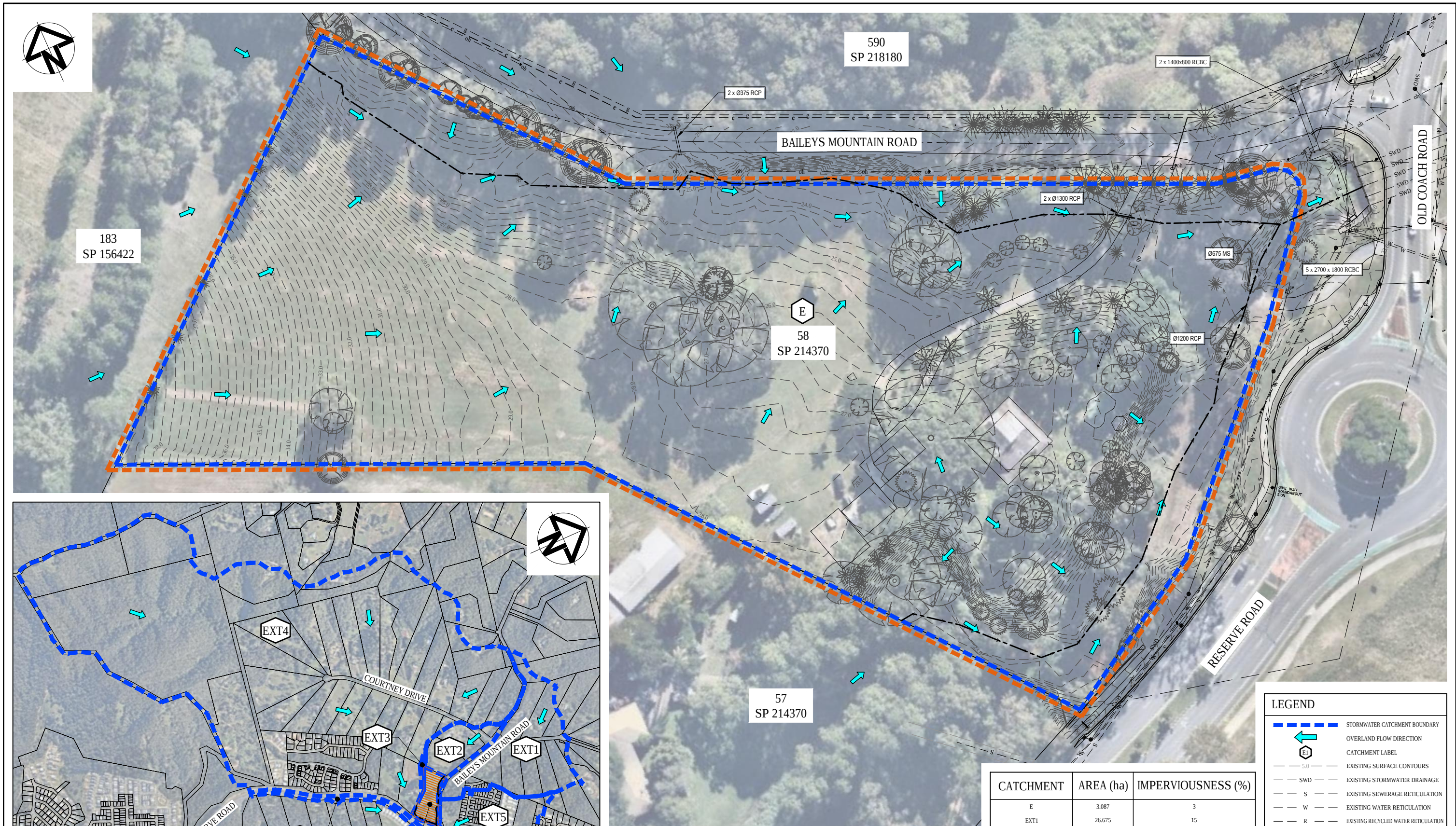
A sensitivity check has been undertaken for 100% blockage of the culvert system based on a severe storm as recommended by QUDM. The depth of flow over the driveways is 0.31m and the velocity is 0.17m/s during a 100% blockage event. This results in a depth velocity product of $0.05\text{m}^2/\text{s}$ during a severe storm. This is considered a low degree of hazard in accordance with Table 8.2.8-5 of Part 8 of the City Plan. It should be noted that a severe storm check is for sensitivity only and not for design. Please refer to Attachment 2 for a cross section of upstream of access driveway during a 100% blockage event.

If there are any queries in relation to, or further actions required for this application, please do not hesitate to contact the undersigned.

Yours sincerely,

Arcadis Australia Pacific Pty Ltd
Ashley Shepherd
Civil Engineer
07 5503 4808 | ashley.shepherd@arcadis.com

Attachment One – Engineering Drawings



EXTERNAL CATCHMENT

SCALE : 1 : 10000

NOTES

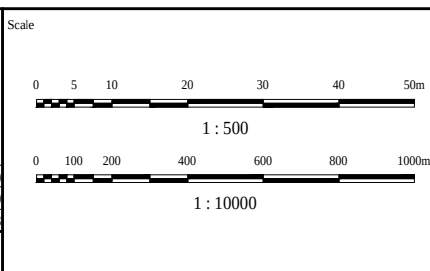
1. AERIAL IMAGERY COURTESY OF NEARMAP.

CATCHMENT	AREA (ha)	IMPERVIOUSNESS (%)
E	3.087	3
EXT1	26.675	15
EXT2	7.758	20
EXT3	0.414	20
EXT4	242.844	15
EXT4-1	2.339	95
EXT5	16.425	60

LEGEND

	STORMWATER CATCHMENT BOUNDARY
	OVERLAND FLOW DIRECTION
	CATCHMENT LABEL
	EXISTING SURFACE CONTOURS
	EXISTING STORMWATER DRAINAGE
	EXISTING SEWERAGE RETICULATION
	EXISTING WATER RETICULATION
	EXISTING RECYCLED WATER RETICULATION
	EXISTING OVERHEAD ELECTRICAL
	EXISTING UNDER GROUND ELECTRICAL
	EXISTING GAS RETICULATION
	SITE BOUNDARY
	EXTERNAL CONVEYANCE PATH

Issue	Description	By	Ckd	RPEQ	Date
03	AMENDED ISSUE FOR RFI	OC	JS		18.03.20
02	AMENDED ISSUE	AS	JS		10.02.20
01	ORIGINAL ISSUE	NF	AS		26.07.18



Surveyor	SCHLENCKER SURVYING
Architect	BDA ARCHITECTURE
Filename	Da00301-10022603-gcd-PreDevStormwaterCatch.dwg

Client	SANDSON PTY LTD
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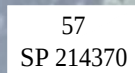
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Approved	R.P.E.Q No :
Scales	1:500 1:10000
Original Size	A1
Height Datum	AHD
Grid	© Copyright reserved

Project	202 BAILEYS MOUNTAIN ROAD, UPPER COOMERA
Title	PRE DEVELOPED STORMWATER CATCHMENT PLAN

 ARCADIS		
Arcadis Australia Pacific Pty Limited P O Box, 1653 Southport QLD 4215 ABN 76 104 485 289 Tel No: +61 7 5532 3933 Fax No: +61 7 5591 4778 www.arcadis.com		
Drawing No.	Project No.	Issue
DA-00-301	10022603	03

NOTES

1. AERIAL IMAGERY COURTESY OF NEARMAP.
2. PROPOSED INFRASTRUCTURE SUBJECT TO DETAILED DESIGN (OPERATIONAL WORKS), COUNCIL APPROVAL AND BUILDING HYDRAULIC DESIGN.
3. REFER TO DA-00-381 FOR BIORETENTION / DETENTION BASIN DETAILS.
4. REFER TO REPORT F0002-10022603-AAR FOR BASIN & TANK DETAILS (OUTLET CONFIGURATION, BIO-RETENTION AREA, VOLUMES, ETC.)



Scale

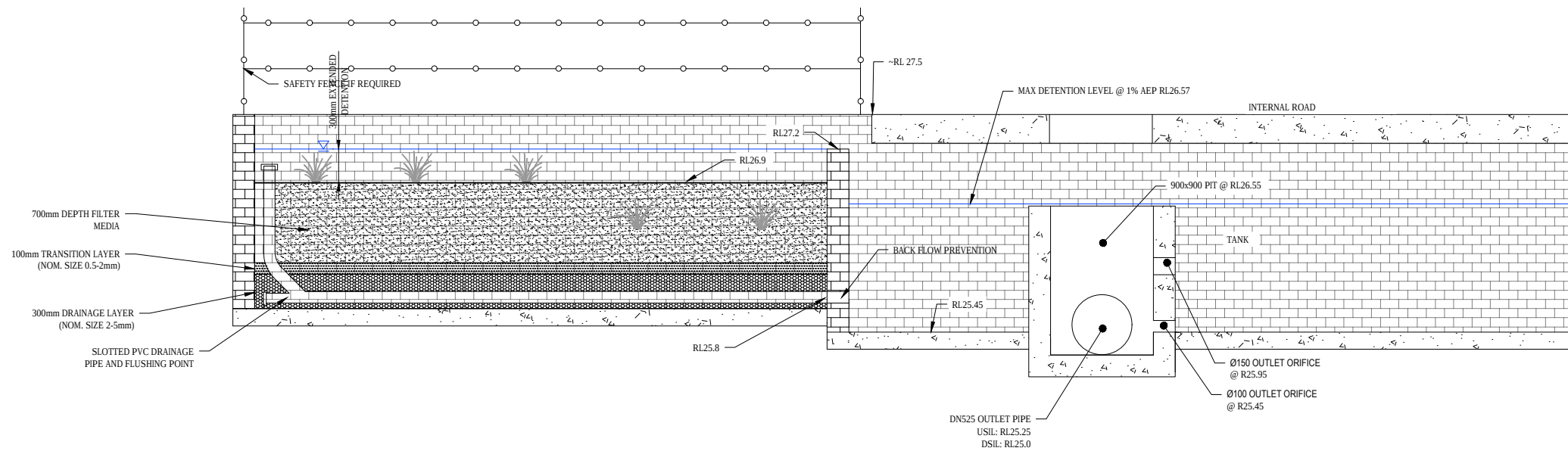
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Client

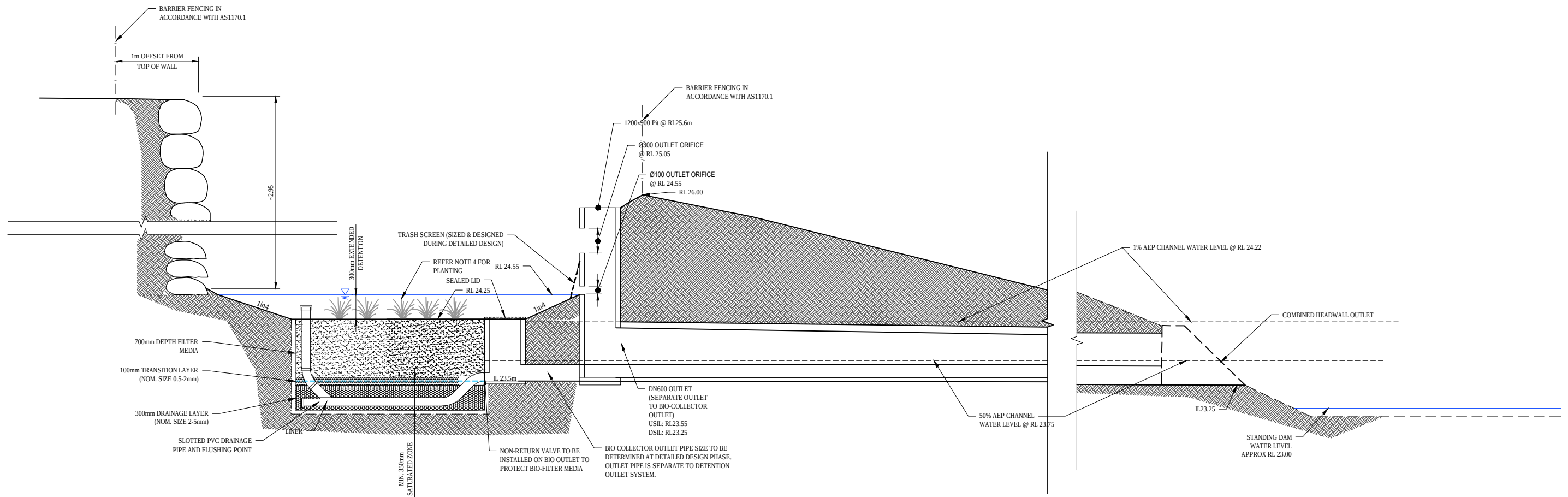
SANDSON PTY LTD

Project	202 BAILEYS MOUNTAIN ROAD, UPPER COOMERA
Title	POST DEVELOPED STORMWATER CATCHMENT PLAN



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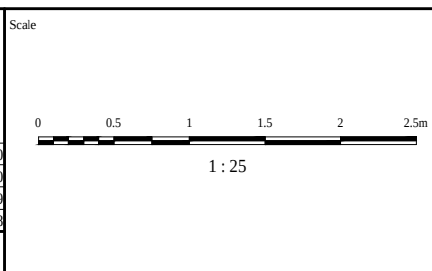
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DA-00-305



BIORETENTION / DETENTION BASIN DETAIL
1 : 25

1
DA-00-305

Issue	Description	By	Clk	RPEQ	Date
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03	AMENDED LAYOUT	AS	DC		06.02.20
02	ORIGINAL ISSUE	AS	DC		01.07.19
01	ORIGINAL ISSUE	NF	AS		26.07.18



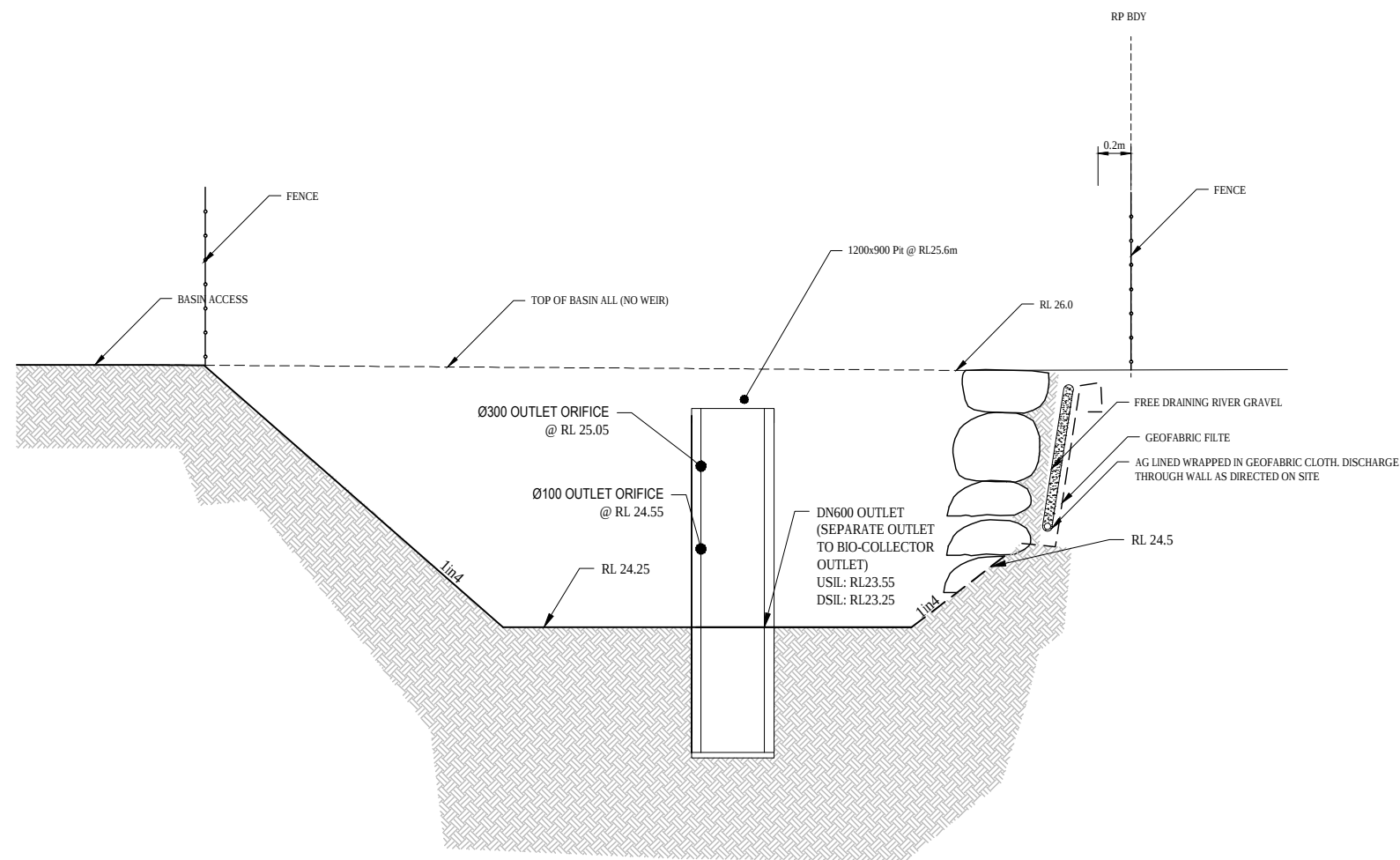
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Architect	BDA ARCHITECTURE
Filename	Da00381-10022603-gcd-BasinDetails.dwg

Client	SANDSON PTY LTD
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Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION
Approved	R.P.E.Q No :
Scales	1:25
Original Size	A1
Height Datum	AHD
Grid	© Copyright reserved

Project	202 BAILEYS MOUNTAIN ROAD, UPPER COOMERA
Title	BIORETENTION / DETENTION BASIN DETAILS - SHEET 1 OF 2

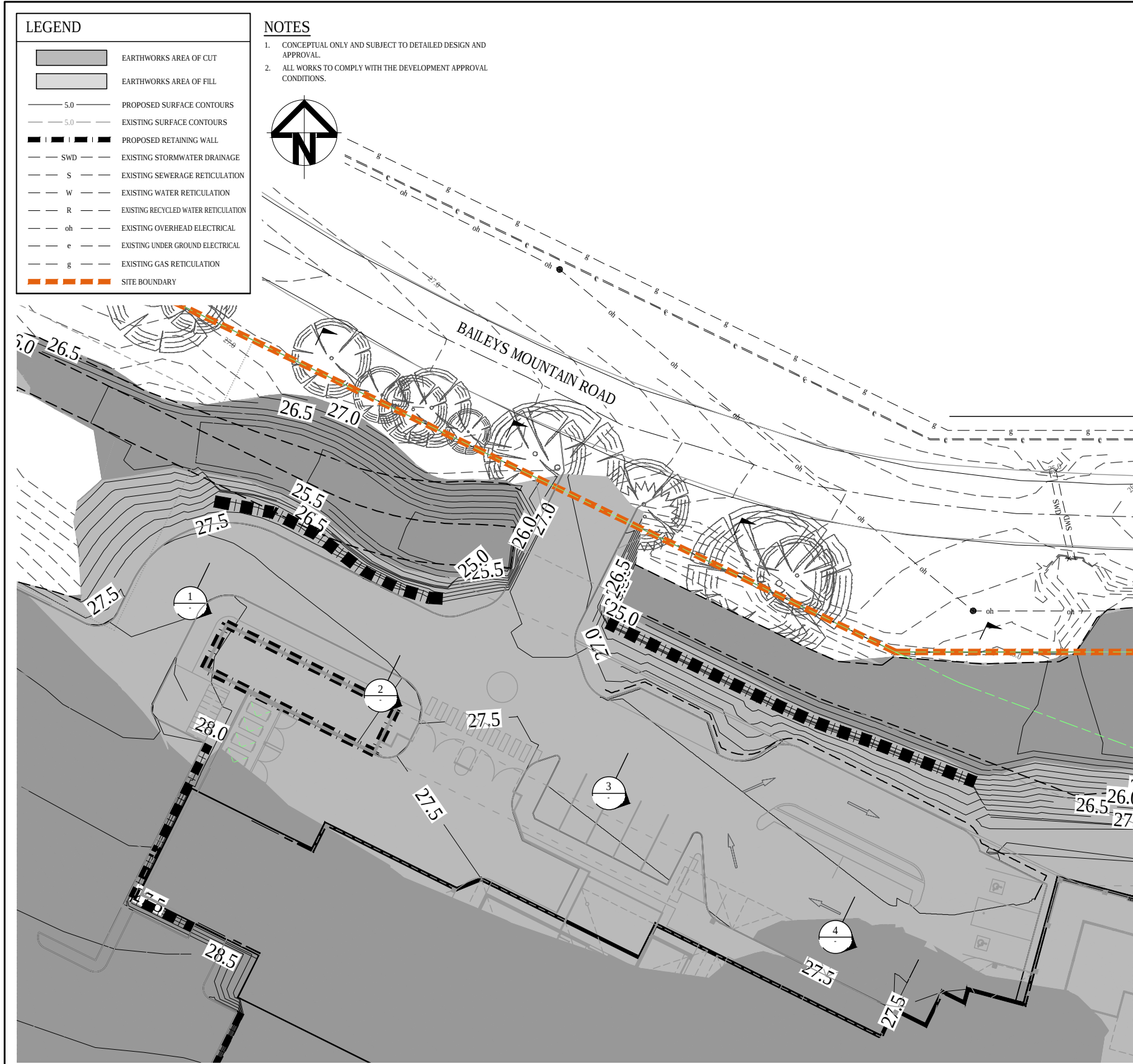
 ARCADIS		
Arcadis Australia Pacific Pty Limited P O Box, 1653 Southport QLD 4215 ABN 76 104 485 289 Tel No: +61 7 5532 3933 Fax No: +61 7 5591 4778 www.arcadis.com		
Drawing No.	Project No.	Issue
DA-00-381 —	10022603 —	04



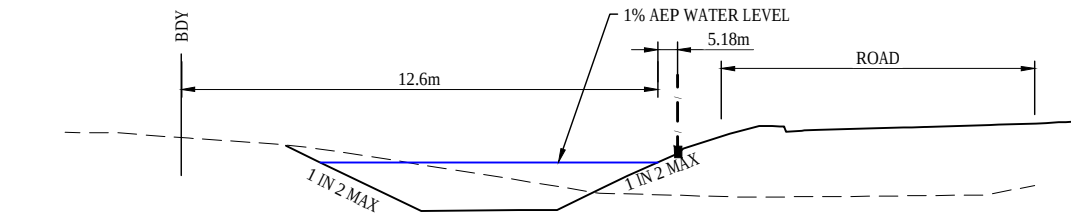
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DA-00-305

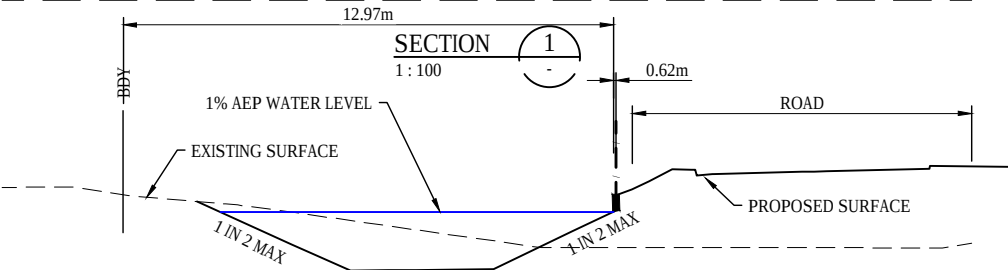
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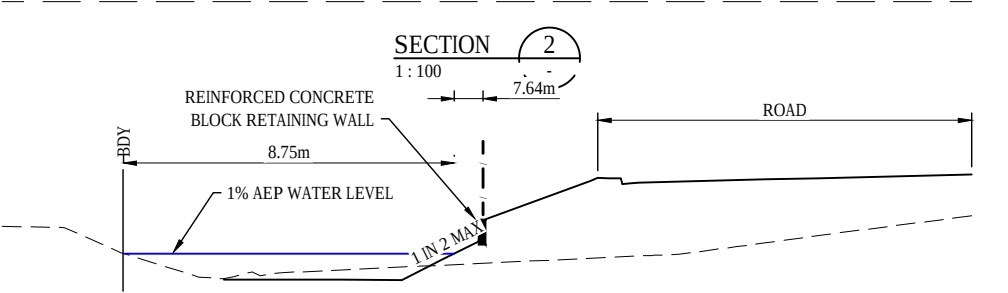
LAYOUT PLAN
SCALE 1:200



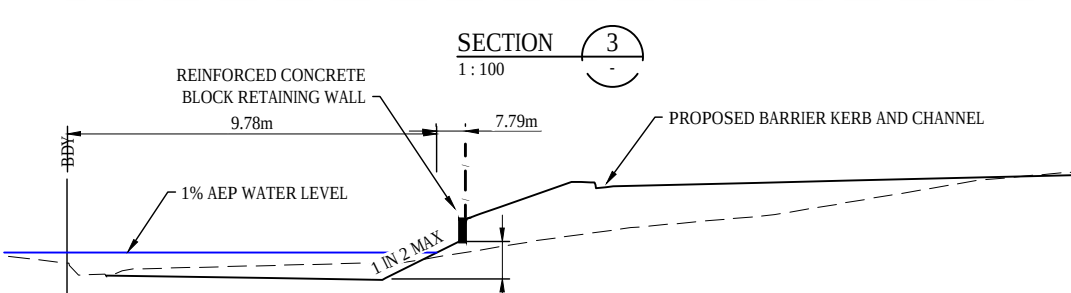
DATUM RL.22.000



DATUM RL.22.000



DATUM RL.22.000



DATUM RL.22.000



Issue	Description	By	Ckd	RPEQ	Date
03	SECTIONS AMENDED	OC	AS		17.03.20
02	SECTIONS AMENDED	NF	AS		01.07.19
01	ORIGINAL ISSUE	NF	AS		25.06.19

Scale
0 1 2 4 6 8 10m
1 : 100
0 5 10 15 20m
1 : 200

Surveyor	SCHLENCKER SURVYING
Architect	BDA ARCHITECTURE
Filename	SK005-10022603-gcd Conveyance Channel.dwg

Client	SANDSON PTY LTD
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Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION
Approved	R.P.E.Q No :
Scales	1 : 100 1 : 200
Original Size	A1
Height Datum	AHD
Grid	© Copyright reserved

Project	202 BAILEYS MOUNTAIN ROAD, UPPER COOMERA
Title	PRELIMINARY EARTHWORKS CONVEYANCE CHANNEL LAYOUT PLAN



ARCADIS

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Drawing No.

SK005

Project No.

10022603

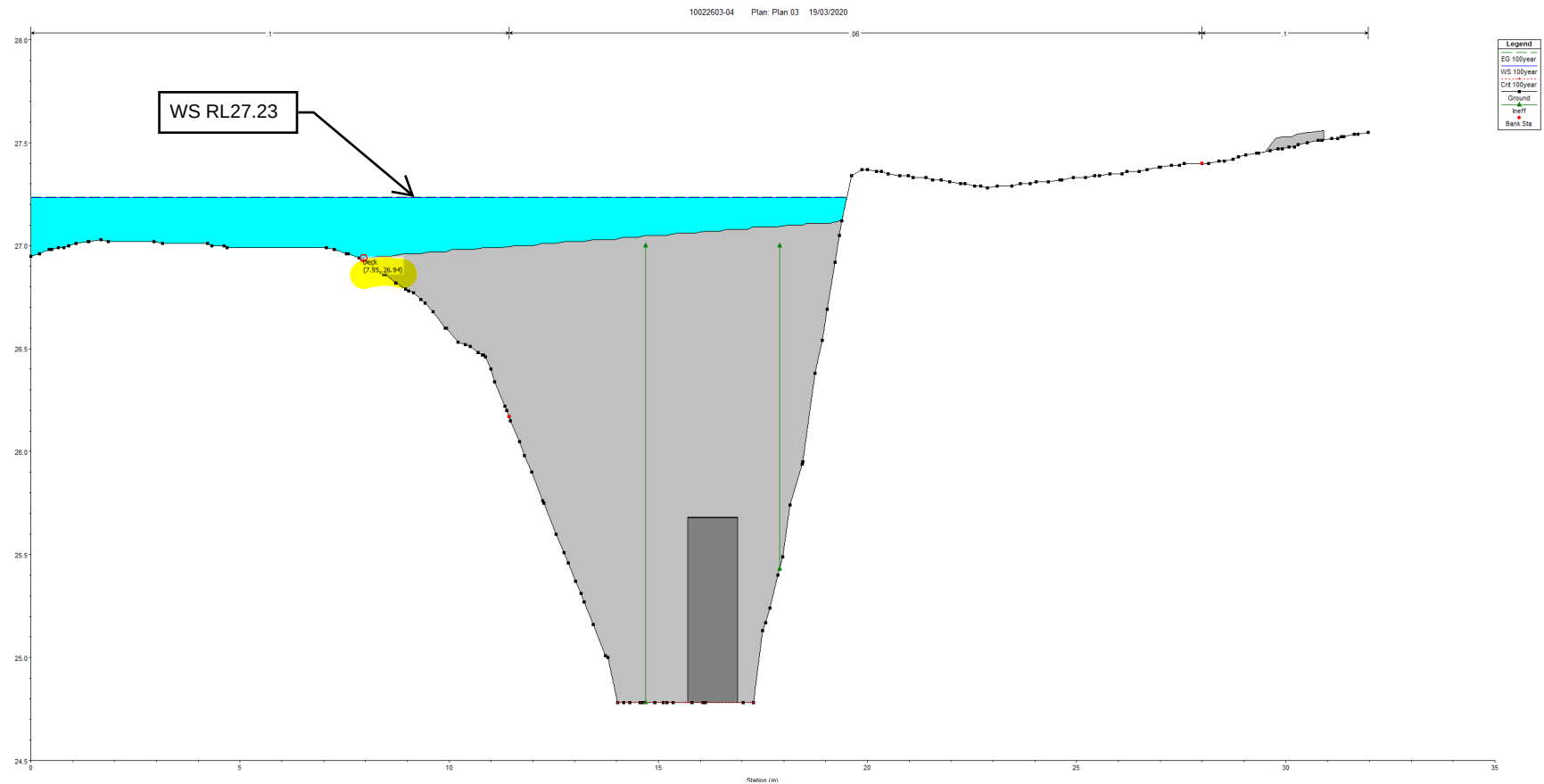
Issue

03

Attachment Two – 100% Blockage Event Cross Section

TABLE OF UPSTREAM DATA FOR DRIVEWAY CROSSING DURING 100% BLOCKAGE EVENT

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
42	252.18	100year	2.78	24.78	27.23	25.27	27.24	0.000058	0.17	19.16	19.51	0.04



UPSTREAM CROSS SECTION OF DRIVEWAY CROSSING DURING 100% BLOCKAGE EVENT