J.C. Engineers Pty. Ltd.
Suite 1208
Level 2, Building A
1 Lawson St
Southport QLD 4215

CONCEPT STORMWATER MANAGEMENT PLAN

56 SHIRLEY LANE
BYRON BAY NSW 2481

PREPARED FOR
SHAJI KARIMADATH

MAY 2024
JASMIN TRGO
RPEQ 19378

JCE Developments

Vignesh Hurkadli Satishbabu
Civil Engineer
BEng (Civil), Master of Advanced Civil Engineering.

Jasmin Trgo
Senior Civil Engineer
RPEQ, BEng (Civil), NER

J.C. Engineers Pty. Ltd. Project No. **C123b**
If you have any queries regarding this report, please contact Jasmin Trgo.

Revision	Date	Description	Author	Rev.	App.
A	27 May 2024	DRAFT FOR COMMENTS	VS	JT	JT
B	29 May 2024	FINAL	VS	JT	JT

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1. Introduction

This report has been developed regarding catchment analysis along with stormwater management to examine the stormwater issues that occur on 56 Shirley Lane, Byron Bay NSW 2481.

The purpose of this report is to address the assessment and management of stormwater quantity to ensure that the proposed development complies all necessary state with and local government policies.

This report intends to assess the likely impact of the proposed development in relation to stormwater quantity, and the adequacy of the existing stormwater infrastructure. Included in this report is the summary of the hydraulic quantity analysis, and hydraulic design to manage the stormwater area on the property at on 56 Shirley Lane, Byron Bay NSW 2481.

(J.C Engineers have been engaged to complete a Stormwater Quantity Analysis and Design).

1.1. Governing standards and relevant documents

The following Australian standards and documentation have been employed throughout the stormwater engineering design process:

- Section 3.4 of Byron Shire Council's Comprehensive Guidelines for Stormwater Management Section B3.2.3 of Chapter B3 of Byron Development Control Plan 2014.
- Australian Standard 3500.3 – 1998 "National Plumbing and Drainage''.
- Australian Rainfall and Runoff 2019 (ARR2019).
- BRANZ plumbing and Drainage Guide.
- Intensity Frequency Distribution Data - BOM.
- Byron Shire Council - Comprehensive Guidelines for Stormwater Management.
- Byron Development Control Plan 2014.
- Architectural Plans by ArchDraft dated 28 March 2024.
- Site Plan by ArchDraft dated 28 March 2024.

2. Site characteristics

2.1. Location

The proposed development is situated in 56 Shirley Lane, Byron Bay NSW 2481. The property is located within the Byron Shire Council Area and is located to the south of the Shirley Lane as indicated within Figure 1. The approximate area of the existing allotment contained in this report is approx. 920.66m^2.

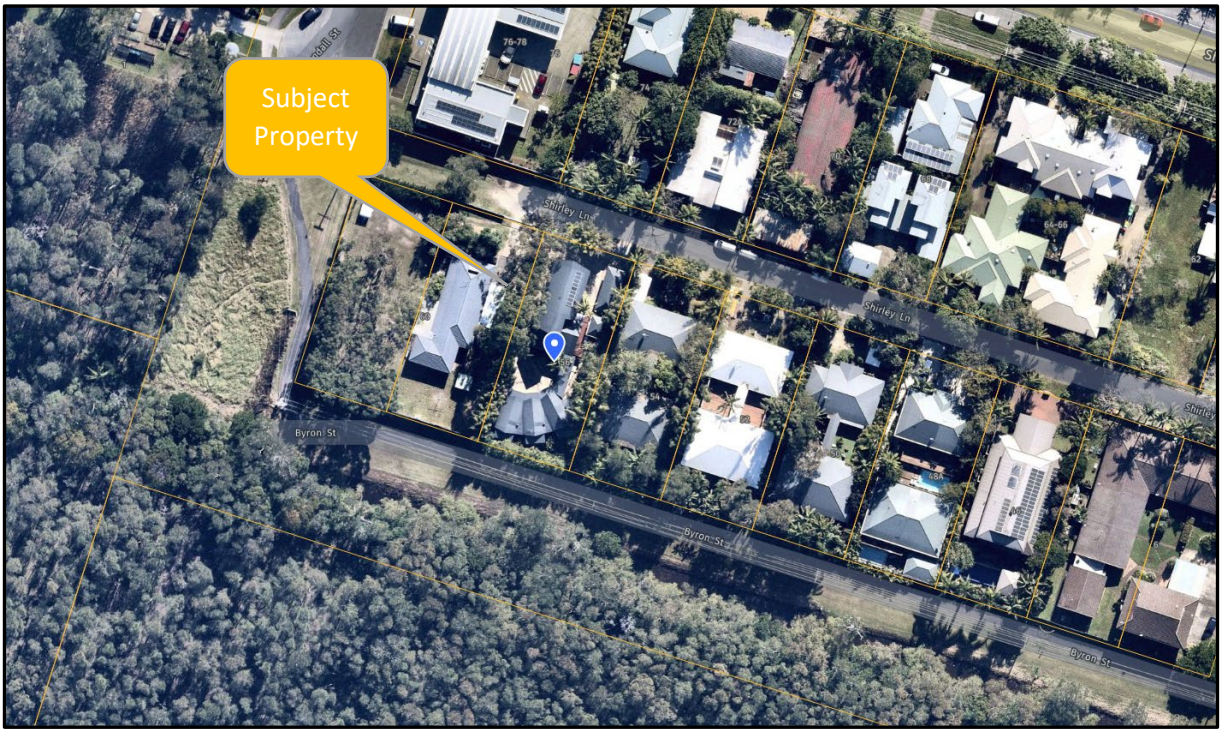


Figure 1: Locality Plan (Retrieved from NearMaps on 17 July 2023)

2.2. Existing development overview

The detailed elevation data obtained for the project site indicates the nearby area slopes towards the southern part of the property.

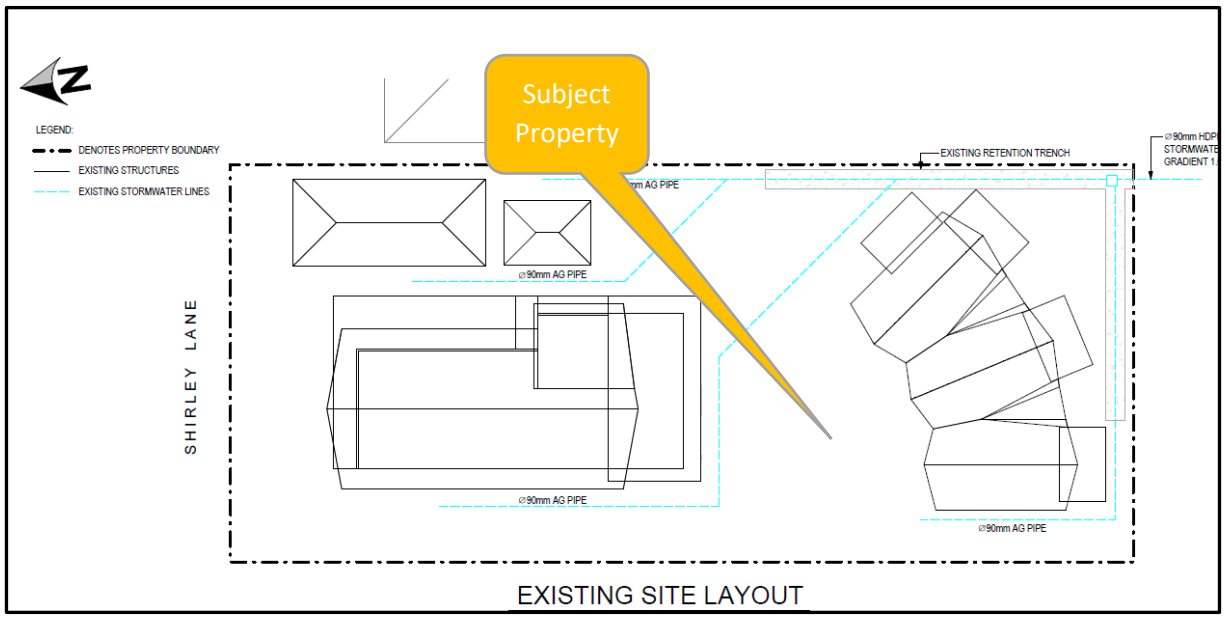


Figure 2: Existing site layout

3. Stormwater quantity

3.1. Catchment analysis

The stormwater quantity analysis of the existing and developed site conditions has been undertaken with reference to the requirements and procedure outlined by:

- Section 3.4 of Byron Shire Council's Comprehensive Guidelines for Stormwater Management Section B3.2.3 of Chapter B3 of Byron Development Control Plan 2014.
- Australian Rainfall and Runoff 2019 (ARR2019).
- Healthy Waterways Water Sensitive Urban Design Guidelines.

3.2. Stormwater drainage methodology

Calculations have been undertaken to determine the pervious and impervious peak run-off rates with the Best Management Practices (BMPs) incorporated into the site layout for stormwater quantity control.

3.2.1. Site constraints

Constraints identified for the site regarding stormwater management include:

- Development will result in an impact on the quantity of the stormwater runoff generated within the site.
- Development will result in increased impervious area, and subsequently an increase in peak discharges (gross). Since all new impervious catchments are proposed to be managed independently from the overall catchment, the net result of the stormwater discharge for the development will be **less than the existing state**.

3.2.2. Design response

The design response for the stormwater management constraints have been identified as the following:

- Collect and convey site generated runoff to the lawful point of discharge and ensure that no adverse impacts occur to neighbouring properties.
- Stormwater quantity mitigation to ensure the development does not cause an actionable nuisance on any adjacent properties.
- The design does not adversely affect upstream drainage and does not worsen the downstream condition.
- The design has adequate capacity to safely manage the peak discharge of the additional flow produced as a result of the proposed development.
- The downstream receiving drainage system has adequate capacity to safely convey the peak discharge of the additional flow resulting from the proposed development.

This Stormwater Management Plan (SWMP) has been developed to demonstrate the design response is consistent with Byron Shire Council Planning Scheme and relevant industry standards.

3.2.3. Data

Data used in the preparation of this report and information about the site was gathered from the following sources:

- Proposed Site Layout,
- Rainfall and Meteorological Data by the Australian Bureau of Meteorology,
- Contour data retrieved from Elvis (Elevation and Depth-Foundation Spatial Data).

3.3. Lawful point of discharge

The peak flow rate for the site has been obtained using the Rational Method in accordance with ARR (Australian Rainfall and Runoff), and Byron Shire Council's Comprehensive guidelines for Stormwater Management.

A Lawful Point of Discharge Test (LPD Test) to ensure the stormwater is discharged from the site lawfully and at a lawful location in addition to needing to meet other statutory requirements such as the SPP and Planning Act.

The test is in sequential order. If a condition can be met, then subsequent items need not be tested. This should be read in full but is summarised here to provide context for this site. It can be summarised as:

Test 1 - Will the proposed development alter the site's stormwater discharge characteristics in a manner that may substantially damage a third-party property? (if yes, go to Test 2, if not then LPD is satisfied).

Test 2 - Is the location of the discharge from the development site under the lawful control of the local government or other statutory authority from whom permission to discharge has been received?

Test 3 - An authority to discharge over affected properties will be necessary.

The site slopes fall naturally towards the south of the property. Thereby, use of the proposed infrastructure to accommodate the external stormwater runoff in design storm events is feasible.

3.3.1. Peak flow calculations

In order to find the peak flow rate for the design storm events of the existing development, the Rational Method was employed as outlined in the Byron Shire Council.

a) The 10-year discharge coefficient (C_{10}) for the impervious catchments and for overland catchments, fraction impervious is done for existing development scenarios, assuming low cover bushland and low soil permeability (conservative) are given in Table 1 below
b) ARI 10 years (**AEP 10%**) has been considered for both impervious catchments (roof and driveway) and pervious catchments.
c) IFD Design Rainfall Depth from the Australian Bureau of Meteorology shows Rainfall Intensity (Iy) for the development is approximately **60.8mm/hr**, with a 1-hour duration (AEP= 10%) to identify the appropriate coefficient of discharge. However, for the purposes of design, a Rainfall Intensity of **282.00mm/hr** at 5-minute duration has been adopted for roof catchments and driveway (1% AEP), and a Rainfall Intensity of **182.00mm/hr** at a 15-minute duration has been adopted for pervious catchments (1% AEP).

Table 1: Summary Table – Stormwater Calculations.

Pre-Development Scenario				
	Area Description	**10-year discharge coefficient (C_{10}) (Impervious Catchments)**	**10-year discharge coefficient (C_{10}) (Overland Catchments)**	**Time of concentration (T_c) In min**
Existing Lot	Pervious Area – 556.00m^2	-	0.70	15 Minutes
	Roof Impervious Area – 364.66m^2	0.90	-	5 Minutes
Proposed development	Pervious Area – 393.18m^2	-	0.70	15 Minutes
	Roof Impervious Area – 527.48m^2	0.90	-	5 Minutes

d) Ta table 3 below states ARI's requires to be 100-year event, and this site has been designed for 100 years.
e) The IFD table reference from the Bureau of Meteorology is enclosed in Appendix C.
f) The time of concentration for each catchment was calculated from adding the sheet flow time.

Following the Rational Method in the Byron Shire Council:

$$Q = \frac{CyIyAy}{360}$$

The flow rate of the total stormwater runoff generated from the existing and proposed development catchments is **Q_{100} = 52.99L/s** and **Q_{100} = 59.82L/s** respectively considering the location of the property in an urban area.

Calculations for these figures have been presented in the Appendix A.

A study of Pre-Development and Post-Development has been undertaken. The peak flow discharged from the proposed development for all typical storm events have been presented in Table 2.

Table 2: Pre and Post Development Peak Flows

EY	AEP (%)	AEP (1 in x)	ARI years	F_y	Pre-Dev't Discharge		Post-Dev't Q		Q Change
					m^3/s	L/s	m^3/s	L/s	%
1	63.21	1.58	1	0.80	0.0142	14.21	0.0159	15.89	11.84
0.5	39.35	2.54	2	0.85	0.0188	18.75	0.0210	20.96	11.75
0.2	18.13	5.52	5	0.95	0.0255	25.54	0.0286	28.62	12.05
0.11	10	10	9.49	1.00	0.0307	30.66	0.0344	34.38	12.13
0.05	5	20	19.5	1.05	0.0365	36.50	0.0410	40.97	12.26
0.02	2	50	50	1.15	0.0461	46.12	0.0519	51.94	12.62
0.01	1	100	100	1.20	0.0530	52.99	0.0598	59.82	12.88
Q100 (pervious)+Q100 (impervious)				1.20	0.0530	52.99	0.0598	59.82	12.88

Table 3: Recommended design average recurrence interval

Table 7.3.2 – Recommended design average recurrence intervals (ARI) and annual exceedence probabilities (AEP) for the combined minor/major system

Development category [1]	ARI (yrs)	AEP
Reference flood for setting floor levels in hospitals, emergency services, flood evacuation buildings and Civil Defence HQ	500	0.2%
Reference flood for setting floor levels of emergency shelters, police facilities, museums, libraries, storage facilities for valuable records or item of historical or cultural significance, and housing for aged and those with impaired mobility; and the setting design levels for water and wastewater centres [2] and critical utility services infrastructure [2]	200	0.5%
Reference flood for setting habitable floor levels in residential buildings and floor levels in commercial/industrial buildings adjacent floodplains or overland flow paths [3]	100	1%
Design storm for overland flow paths	50 or 100	2 or 1%

4. Sub-Catchment Stormwater Infrastructure

An analysis of catchment has been done to propose adequate stormwater infrastructure in and around the proposed developments. This has been done in relation to the existing development and associated new infrastructure.

For the calculation of adequate stormwater drainage infrastructure, the following is analysed:

- Stormwater accumulating on the roof of the proposed development will run through gravel drain and directly into the proposed gravel-filled infiltration/retention trench(22 m^3) as shown in Appendix D.

4.1. Dimensions Of Stormwater Infiltration/Retention System

For the analysis of this impervious catchment considering roof, the flow rate of the total stormwater runoff generated from the proposed development is: Q_{100} = 40.39L/s, based on the dimensions of the catchment. Therefore, Q_{100} = 40.39L/s = 0.040m^3/s

For 5 min time of concentration, Q_{100} = 0.040x300 = 12m^3.

To counter 12$m^3$of runoff discharge, an infiltration gravel-filled system with a minimum capacity of 24m^3 (34.30m^2 × 0.70 m) is proposed as about 50% of the infiltration volume is used by gravel.

4.1.1. Gravel filled stormwater system.

There are diverse types of stormwater infiltration gravel – filled on grab can be proposed based on the soil layers. Proposed Gravel-filled infiltration as shown Figure 3 below. Gravel-filled Infiltration is proposed to be scoria or crushed rock wrapped in geotextile so that the rockwork is covered.

Figure 3: Underground Stormwater infiltration system.

4.1.2. Soil Saturated Hydraulic Conductivity

Field hydraulic conductivity test are essential to confirm the assumptions of soil hydraulic conductivity adopted during the concept design stage. As per the Engineers Australia (2006), saturated hydraulic conductivities for various types of soil are shown in table 4.

Table 4: Hydraulic Conductivity for various Soil types (Retrieved from Engineers Australia 2006)

Soil Type	Saturated Hydraulic Conductivity	
	mm/hr	m/s
Sand	> 180	$> 5 \times 10^{-5}$
Sandy Clay	36 – 180	$1 \times 10^{-5} – 5 \times 10^{-5}$
Medium Clay	3.6 to 36	$1 \times 10^{-6} – 1 \times 10^{-5}$
Heavy Clay	0.036 to 3.6	$1 \times 10^{-8} – 1 \times 10^{-6}$

4.1.3. Emptying time of the infiltration/retention system

Emptying time is defined as the time taken to completely empty a storage associated with an infiltration system following the cessation of rainfall. This is an important design consideration as the computation procedures previously described assume that the storage is empty prior to the commencement of the design storm event. Continuous simulation modelling for a range of catchments is required to provide reliable emptying time criteria. Considering the ARI for 100 years then infiltration should empty in maximum 3.5 days as per Engineers Australia (2006). Emptying time is computed simply as the ratio of the volume of water in temporary storage (dimension of storage × porosity) to the infiltration rate (hydraulic conductivity × infiltration area). As per site location, Gravel - Filled infiltration area of 34.30 m^2 (assuming medium clay and hydraulic conductivity as 12mm/hr for 1m^2 area – Table 3). Emptying time for 24.01 m^3 is around approximately 32 hours.

5. Conclusion and recommendations

This report discusses the stormwater analysis for the existing development at the property 56 Shirley Lane, Byron Bay NSW 2481. The analysis has been conducted in accordance with Byron Shire Council, and other industry regulations. The following points summarise the findings for the existing infrastructure:

- The total stormwater run-off flow generated from the existing development is Q_{100} = 59.82L/s.
- The stormwater runoff from the roof of the proposed development will run through the gravel drain and into the infiltration/retention basin of 24.01m^3 capacity.
- The proposed stormwater network consists of sufficient capacity to convey external catchment flows hence 'no worsening' of existing downstream council infrastructure.

Appendix A – Stormwater Calculations – Existing Development

Pre-Development Hydrology (Rational Method)

Job No.	:	C123
Project Name	:	Stormwater Quantity Analysis
Location	:	56 Shirley Lane Byron Bay NSW 2481
Council	:	Byron Shire Council
Date	:	24 May, 2024

1. Existing Catchment Parameters

The time of concentration (t_c) was determined as per AS3500.3 Section 5.4.4

Catchment Classification: Urban (limits Cy to 1 for Urban catchments as per QUDM 4.5)

	Subcatchments				Overall Catchment	
Pre-Development Catchment	Pervious(Lots Area)	Impervious - Roof	Impervious - Driveway		Impervious	Pervious
Area (sqm)	556.00	364.66	0.00		364.66	556.00
Area (ha)	0.0556	0.0365	0.0000		0.0365	0.0556
Time of concentration, t_c (min)	15	5	5		15	5
Fraction impervious, f_i	0.00	1.00	1.00		-	
$^1I_{10}$			60.8			
C_{10}		0.90	0.90		0.78	
$C_{10\ (when\ fi = 0)}$	0.70					

Land Classification (if fi = 0): Light Cover Bushland - Low

2. Pre-Development Discharge Calculations

Total Area 920.66

Catchment runoff rates were derived using the Rational Method in accordance with QUDM Section 4.3.

$$Q_y = \frac{C_y \cdot {}^{t}I_y \cdot A}{360}$$

Using the data above, pre-developed discharge rates were summarised in the table below.

ROOF AND IMPERVIOUS CATCHMENTS: Q100

Tc = 5.00 mins

EY	AEP (%)	AEP (1 in x)	ARI	F_y	C_y	$^{t}I_y$	Pre-Dev't Discharge	
						mm/hr	m^3/s	L/s
1	63.21	1.58	1	0.80	0.6233737	110.40	0.0070	6.97
0.5	39.35	2.54	2	0.85	0.6623345	136.80	0.0092	9.18
0.2	18.13	5.52	5	0.95	0.7402562	168.00	0.0126	12.60
0.11	10	10	9.49	1.00	0.7792171	192.00	0.0152	15.15
0.05	5	20	19.5	1.05	0.8181779	218.40	0.0181	18.10
0.02	2	50	50	1.15	0.8960996	254.40	0.0231	23.09
0.01	1	100	100	1.20	0.9350605	282.00	0.0267	26.71

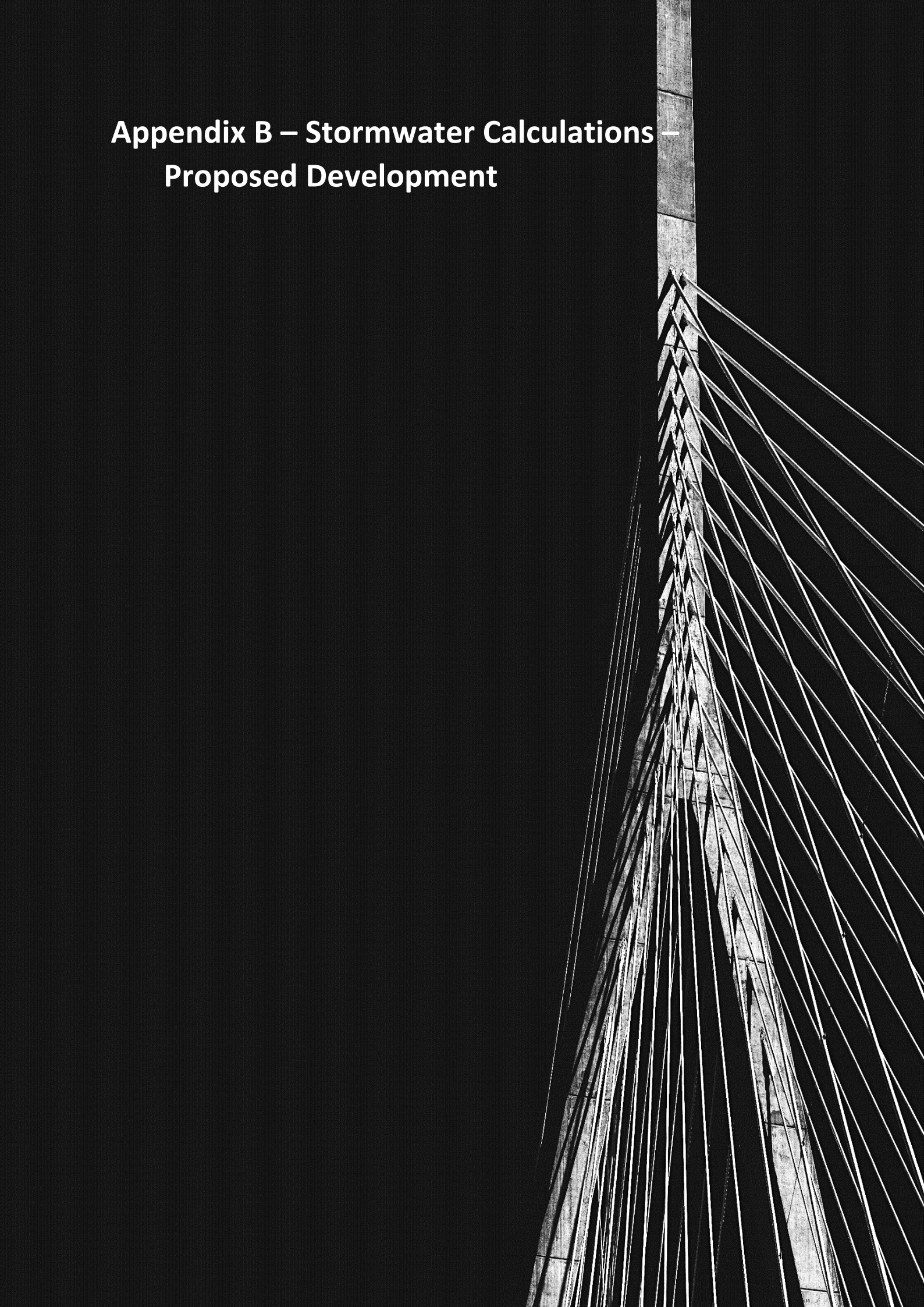
PERVIOUS CATCHMENTS: Q100

Tc = 15.00 mins

EY	AEP (%)	AEP (1 in x)	ARI	F_y	C_y	$^{t}I_y$	Pre-Dev't Discharge	
						mm/hr	m^3/s	L/s
1	63.21	1.58	1	0.80	0.6233737	75.20	0.0072	7.24
0.5	39.35	2.54	2	0.85	0.6623345	93.60	0.0096	9.57
0.2	18.13	5.52	5	0.95	0.7402562	113.20	0.0129	12.94
0.11	10	10	9.49	1.00	0.7792171	128.80	0.0155	15.50
0.05	5	20	19.5	1.05	0.8181779	145.60	0.0184	18.40
0.02	2	50	50	1.15	0.8960996	166.40	0.0230	23.03
0.01	1	100	100	1.20	0.9350605	182.00	0.0263	26.28

Q10	30.66
Q20	36.50
Q100	52.99
Combined	52.99

Appendix B – Stormwater Calculations – Proposed Development



Post-Development Hydrology (Rational Method)

Job No.	:	C123
Project Name	:	Stormwater Quantity Analysis
Location	:	56 Shirley Lane Byron Bay NSW 2481
Council	:	Byron Shire Council
Date	:	24 May, 2024

1. Existing Catchment Parameters

The time of concentration (t_c) was determined as per AS3500.3 Section 5.4.4

Catchment Classification: Urban (limits Cy to 1 for Urban catchments as per QUDM 4.5)

	Subcatchments				Overall Catchment	
Pre-Development Catchment	Pervious(Lots Area)	Impervious - Roof	Impervious - Driveway		Impervious Catchments	Pervious catchment
Area (sqm)	393.18	527.48	0.00		527.48	393.18
Area (ha)	0.0393	0.0527	0.0000		0.0527	0.0393
Time of concentration, t_c (min)	15	5	5		15	5
Fraction impervious, f_i	0.00	1.00	1.00		-	
$^1I_{10}$	60.8					
C_{10}		0.90	0.90		0.81	
Land Classification Light Cover Bushland - Low — $C_{10\ (\text{when } fi=0)}$	0.70	N/A	N/A			
					Total area (sq m)	920.66

2. Pre-Development Discharge Calculations

Catchment runoff rates were derived using the Rational Method in accordance with QUDM Section 4.3.

$$Q_y = \frac{C_y \cdot {}^tI_y \cdot A}{360}$$

Using the data above, pre-developed discharge rates were summarised in the table below.

ROOF AND IMPERVIOUS CATCHMENTS: Q100

Tc = 5.00 mins

EY	AEP (%)	AEP (1 in x)	ARI	F_y	C_y	^tI_y	Post-Dev't Discharge	
						mm/hr	m^3/s	L/s
1	63.21	1.58	1	0.80	0.651670	110.40	0.0105	10.54
0.5	39.35	2.54	2	0.85	0.692399	136.80	0.0139	13.88
0.2	18.13	5.52	5	0.95	0.773858	168.00	0.0190	19.05
0.11	10	10	9.49	1.00	0.814587	192.00	0.0229	22.92
0.05	5	20	19.5	1.05	0.855317	218.40	0.0274	27.37
0.02	2	50	50	1.15	0.936775	254.40	0.0349	34.92
0.01	1	100	100	1.20	0.977505	282.00	0.0404	40.39

PERVIOUS CATCHMENTS: Q100

Tc = 15.00 mins

EY	AEP (%)	AEP (1 in x)	ARI	F_y	C_y	^tI_y	Post-Dev't Discharge	
						mm/hr	m^3/s	L/s
1	63.21	1.58	1	0.80	0.651670	75.20	0.0054	5.35
0.5	39.35	2.54	2	0.85	0.692399	93.60	0.0071	7.08
0.2	18.13	5.52	5	0.95	0.773858	113.20	0.0096	9.57
0.11	10	10	9.49	1.00	0.814587	128.80	0.0115	11.46
0.05	5	20	19.5	1.05	0.855317	145.60	0.0136	13.60
0.02	2	50	50	1.15	0.936775	166.40	0.0170	17.02
0.01	1	100	100	1.20	0.977505	182.00	0.0194	19.43

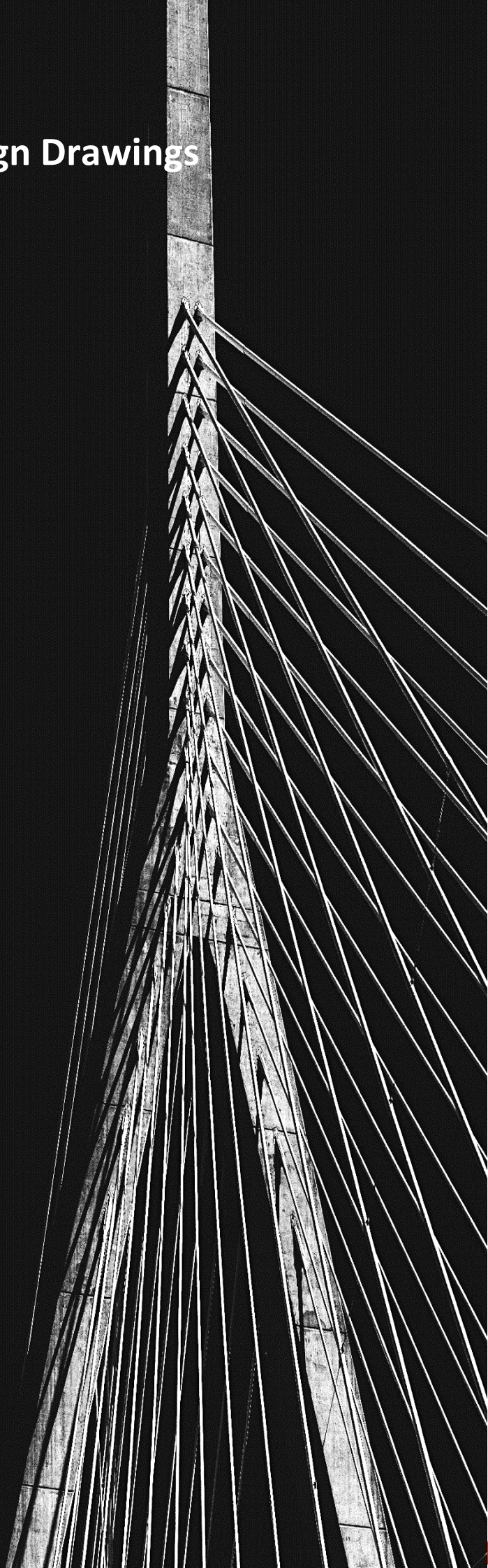
Q10	34.38
Q20	40.97
Q100	59.82
Combined	59.82

Appendix C – IFD Tables

IFD Design Rainfall Depth (mm)
Issued: 9-Aug-23
Location Label:
Requested coordinate: Latitude -28.64052 Longitude 153.60357
Nearest grid cell: Latitude 28.6375 (S) Longitude 153.6125 (E)

		Annual Exceedance Probability (AEP)								
Duration	Duration in min	63.20%	50.00%	20.00%	10.00%	5.00%	2.00%	1.00%	39.35%	18.13%
1 min	1	2.58	2.89	3.82	4.45	5.05	5.82	6.41	3.22	3.94
2 min	2	4.35	4.86	6.51	7.65	8.8	10.4	11.8	5.45	6.72
3 min	3	6.11	6.83	9.13	10.7	12.3	14.5	16.2	7.65	9.42
4 min	4	7.73	8.64	11.5	13.5	15.4	18.1	20.1	9.66	11.87
5 min	5	9.2	10.3	13.7	16	18.2	21.2	23.5	11.51	14.13
10 min	10	14.9	16.6	22	25.5	28.9	33.1	36.3	18.52	22.65
15 min	15	18.8	21	27.8	32.2	36.4	41.6	45.5	23.41	28.62
20 min	20	21.8	24.4	32.2	37.3	42.2	48.4	52.9	27.17	33.15
25 min	25	24.2	27.1	35.8	41.5	47	54	59.3	30.19	36.87
30 min	30	26.3	29.4	38.9	45.2	51.2	59	64.9	32.77	40.08
45 min	45	31	34.7	46.2	53.9	61.4	71.4	79	38.78	47.64
1 hour	60	34.6	38.8	51.9	60.8	69.6	81.5	90.7	43.45	53.56
1.5 hour	90	40.2	45.2	61	72	83	98.1	110	50.81	63.06
2 hour	120	44.7	50.4	68.5	81.3	94.2	112	126	56.83	70.89
3 hour	180	52.1	58.9	81	96.8	113	135	153	66.75	83.95
4.5 hour	270	61	69.3	96.4	116	136	164	186	78.92	100.07
6 hour	360	68.5	78.1	110	132	155	187	213	89.42	114.11
9 hour	540	81.1	92.9	131	159	188	226	256	106.43	136.24
12 hour	720	91.6	105	150	182	214	257	291	120.98	155.98
18 hour	1080	109	125	179	217	255	305	344	144.17	186.11
		1yr	***1.44yr***	***4.48yr***	***10yr***	***20yr***	***50yr***	***100yr***	***2yr***	***5yr***
						ARI				

Appendix D – Stormwater Design Drawings



J.C. Engineers Pty. Ltd.
ABN: 32 616 356 908

Website: www.jcengineers.com.au
Email: info@jcengineers.com.au

JCE Developments

Project

PROPOSED STORMWATER MANAGEMENT PLAN

56 SHIRLEY LANE, BYRON BAY NSW 2481

JOB NO.	CLIENT	PROJECT DESIGNER
C123b	SHAJI KARIMADATH	J.C. ENGINEERS

DRAWING LIST			
SHEET	NAME	ISSUE DATE	REV
C001	TITLE SHEET	29/05/2024	B
C002	EXISTING SITE LAYOUT	29/05/2024	B
C003	PROPOSED SITE LAYOUT	29/05/2024	B
C004	CATCHMENT AREAS	29/05/2024	B
C005	STORMWATER MANAGEMENT DESIGN	29/05/2024	B
C006	ELEVATIONS	29/05/2024	B
C007	TYPICAL DETAILS	29/05/2024	B

SITE LOCALITY
N.T.S.

REFERENCES:
- BYRON SHIRE COUNCIL'S COMPREHENSIVE GUIDELINES FOR STORMWATER MANAGEMENT.
- BYRON SHIRE PLAN MAPPING.
- BYRON SHIRE COUNCIL ENGINEERING SPECIFICATION.
- INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA (IPWEA) STANDARD DRAWINGS.
- DIAL BEFORE YOU DIG (DBYD) INFORMATION.

BEFORE YOU DIG www.byda.com.au

Sheet	Drawing No.	REV
TITLE SHEET	C001	B

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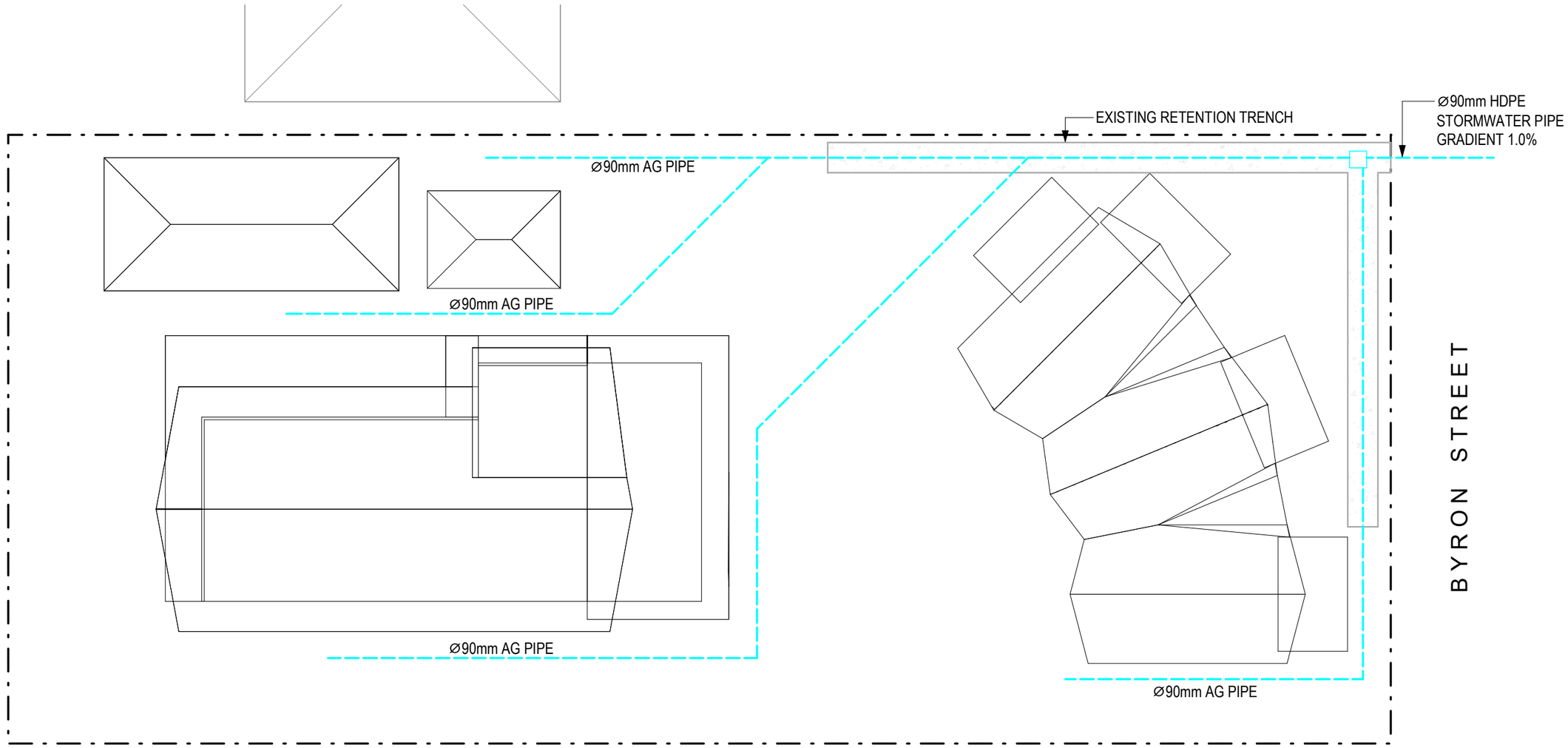

EXISTING SITE LAYOUT

SCALE 1 : 150

LEGEND:

- DENOTES PROPERTY BOUNDARY
- EXISTING STRUCTURES
- EXISTING STORMWATER LINES

REV	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED
B	FINAL	29/05/2024	CM	JT	JT
A	DRAFT	24/05/2024	CM	JT	JT

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www.jcengineers.com.au
info@jcengineers.com.au
ABN: 32 616 356 908

JCE Developments

Project Details: PROPOSED STORMWATER MANAGEMENT PLAN

Drawn: CM

Designed: KR

ENGINEERING CERTIFICATION

Eng. Area	Name	Signature	No.	Date
CIVIL	JASMIN TRGO		19378	29/05/2024

Project Address: 56 SHIRLEY LANE, BYRON BAY NSW 2481

Client: SHAJI KARIMADATH

Job No.: C123b

Sheet: EXISTING SITE LAYOUT

Drawing No.: C123b - C002

REV: B

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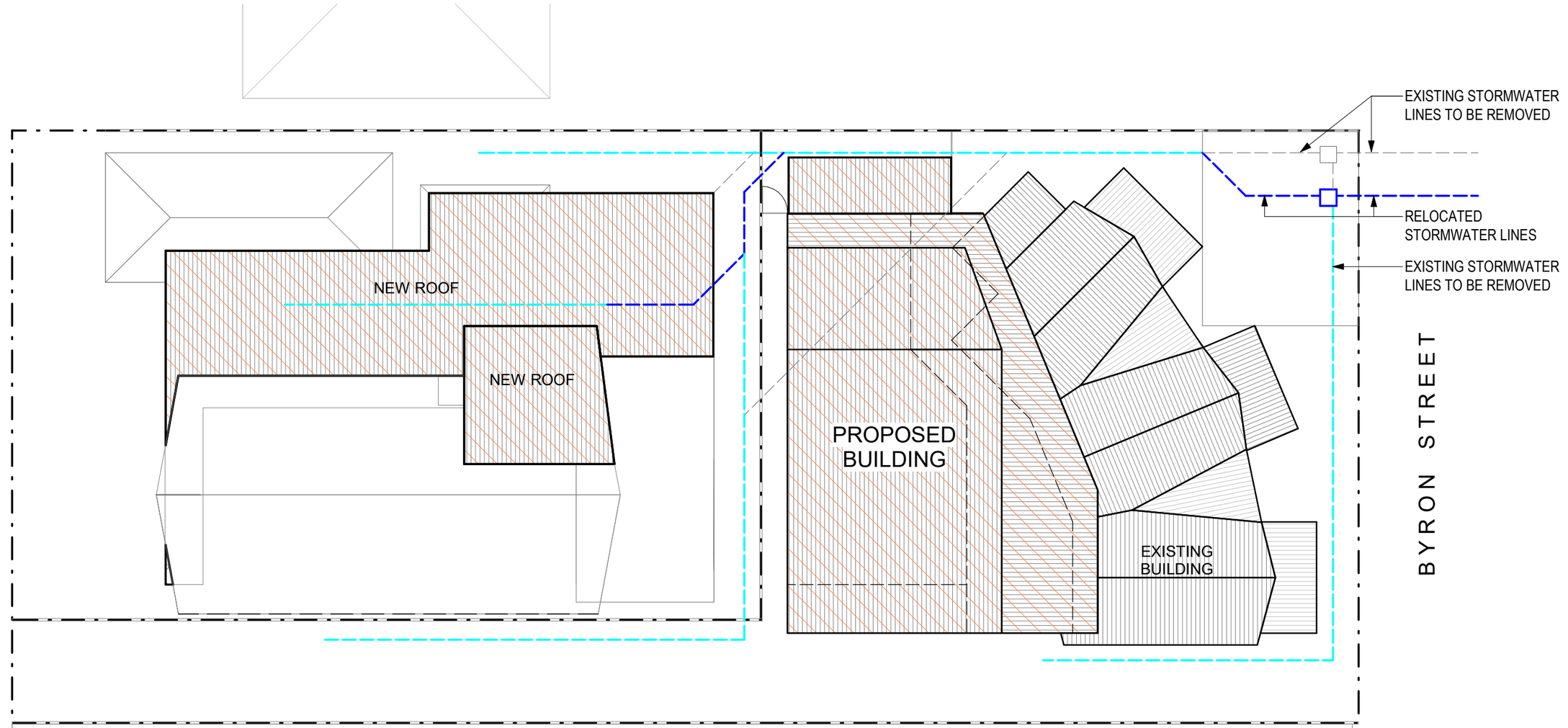

PROPOSED SITE LAYOUT

SCALE 1 : 150

LEGEND:

- DENOTES PROPERTY BOUNDARY
- EXISTING STRUCTURES
- EXISTING STORMWATER LINES
- EXISTING STORMWATER LINES TO BE REMOVED
- RELOCATED STORMWATER LINES
- PROPOSED STRUCTURES

REV	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED
B	FINAL	29/05/2024	CM	JT	JT
A	DRAFT	24/05/2024	CM	JT	JT

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Designed: KR

ENGINEERING CERTIFICATION

Eng. Area	Name	Signature	No.	Date
CIVIL	JASMIN TRGO		19378	29/05/2024

Project Address: 56 SHIRLEY LANE, BYRON BAY NSW 2481

Client: SHAJI KARIMADATH

Job No.: C123b

Sheet: PROPOSED SITE LAYOUT

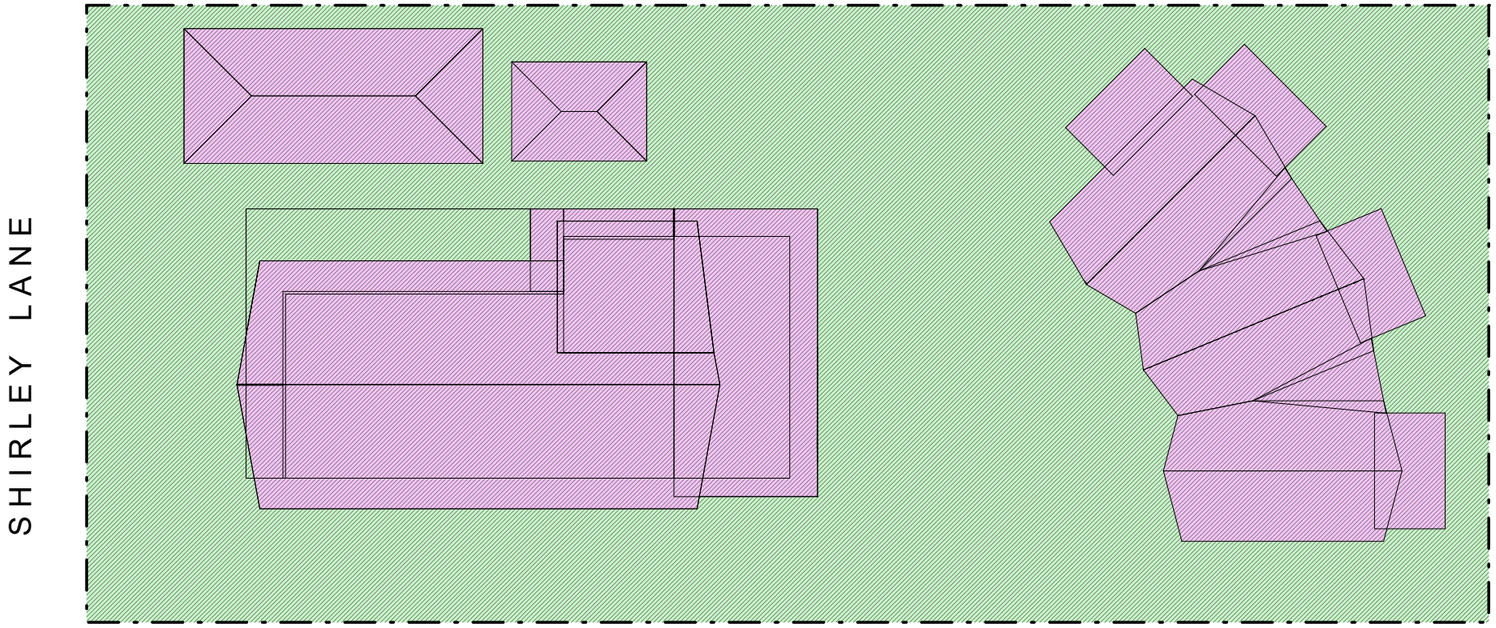
Drawing No.: C123b - C003

REV: B

29/05/2024 12:39:16 PM

IMPERVIOUS AREA - ROOF = 364.66m²

PERVIOUS AREA = 556.00m²

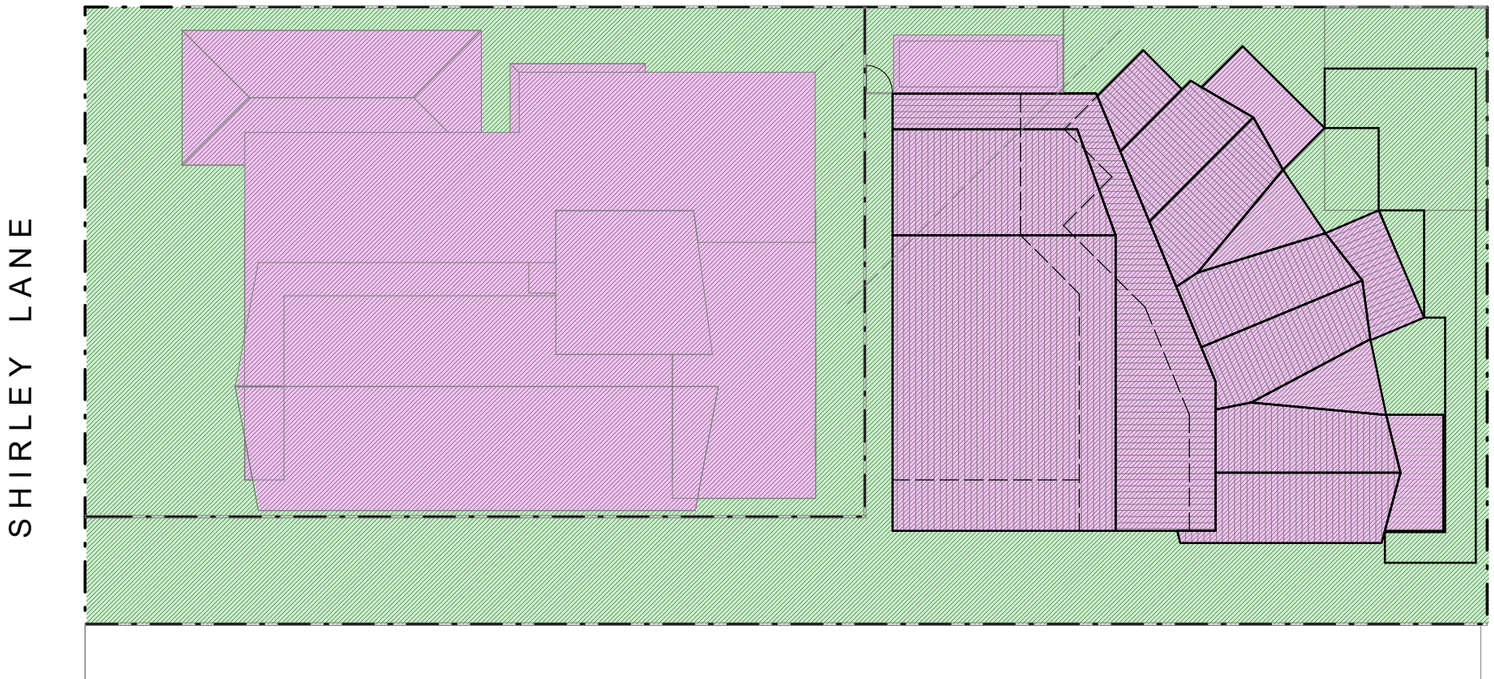


PRE-DEVELOPMENT CATCHMENT AREA

SCALE 1 : 200

IMPERVIOUS AREA - ROOF = 527.48m²

PERVIOUS AREA = 393.18m²



POST DEVELOPMENT CATCHMENT AREA

SCALE 1 : 200

REV	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED
B	FINAL	29/05/2024	CM	JT	JT
A	DRAFT	24/05/2024	CM	JT	JT

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ENGINEERING CERTIFICATION

Eng. Area	Name	Signature	No.	Date
CIVIL	JASMIN TRGO		19378	29/05/2024

Project Address: 56 SHIRLEY LANE, BYRON BAY NSW 2481

Client: SHAJI KARIMADATH

Job No.: C123b

Sheet: CATCHMENT AREAS

Drawing No.: C123b - C004

REV: B

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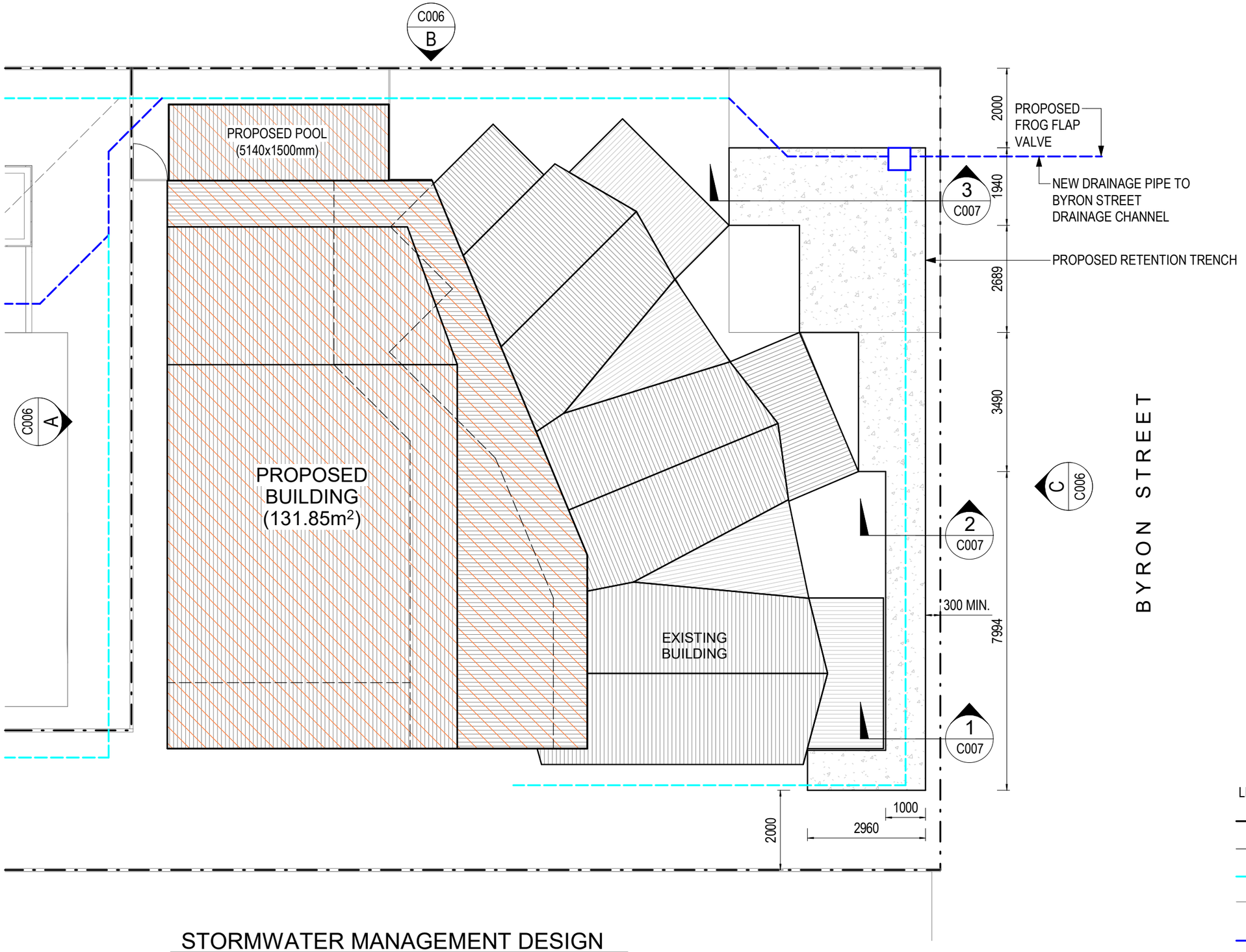

LEGEND:

- DENOTES PROPERTY BOUNDARY
- EXISTING STRUCTURES
- EXISTING STORMWATER LINES
- EXISTING STORMWATER LINES TO BE REMOVED
- RELOCATED STORMWATER LINES
- PROPOSED STRUCTURES
- PROPOSED RETENTION TRENCH

STORMWATER MANAGEMENT DESIGN

SCALE 1 : 100

REV	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED
B	FINAL	29/05/2024	CM	JT	JT
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Project Details: PROPOSED STORMWATER MANAGEMENT PLAN

Drawn: CM
Designed: KR

ENGINEERING CERTIFICATION

Eng. Area	Name	Signature	No.	Date
CIVIL	JASMIN TRGO		19378	29/05/2024

Project Address: 56 SHIRLEY LANE, BYRON BAY NSW 2481

Client: SHAJI KARIMADATH

Job No.: C123b

Sheet: STORMWATER MANAGEMENT DESIGN

Drawing No.: C123b - C005

REV: B

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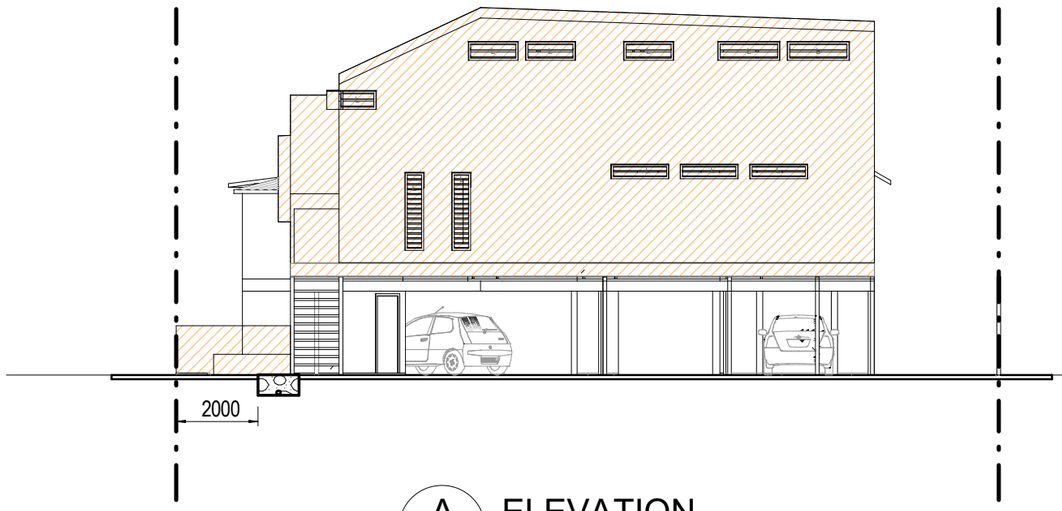
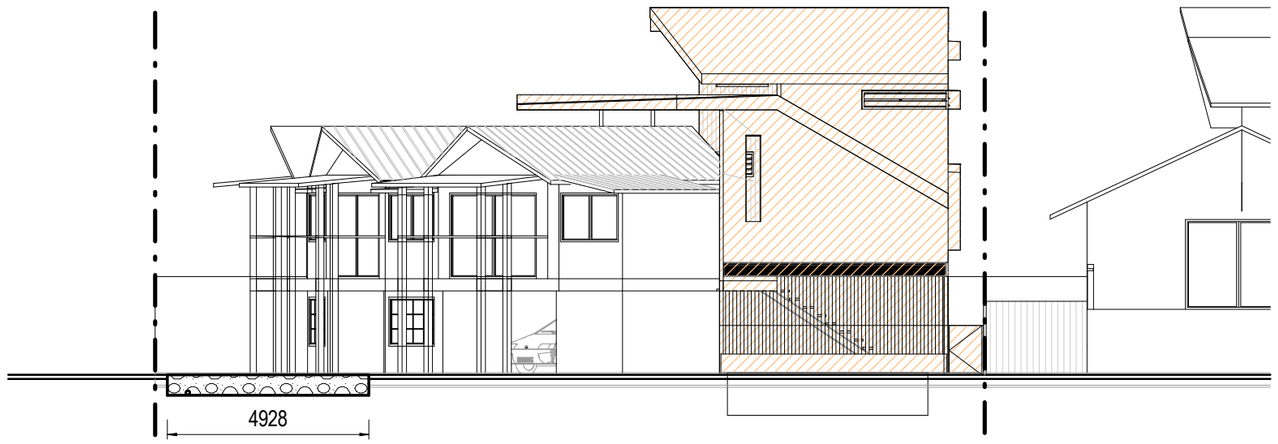


A C005 ELEVATION
SCALE 1 : 150



B C005 ELEVATION
SCALE 1 : 150

C C005 ELEVATION
SCALE 1 : 150

REV	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED
B	FINAL	29/05/2024	CM	JT	JT
A	DRAFT	24/05/2024	CM	JT	JT

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JCE Developments

Project Details: PROPOSED STORMWATER MANAGEMENT PLAN

Drawn: CM
Designed: KR

ENGINEERING CERTIFICATION

Eng. Area	Name	Signature	No.	Date
CIVIL	JASMIN TRGO		19378	29/05/2024

Project Address: 56 SHIRLEY LANE, BYRON BAY NSW 2481

Client: SHAJI KARIMADATH
Job No.: C123b
Sheet: ELEVATIONS
Drawing No.: C123b - C006
REV: B

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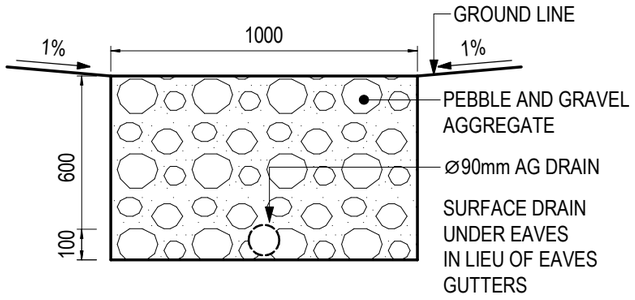
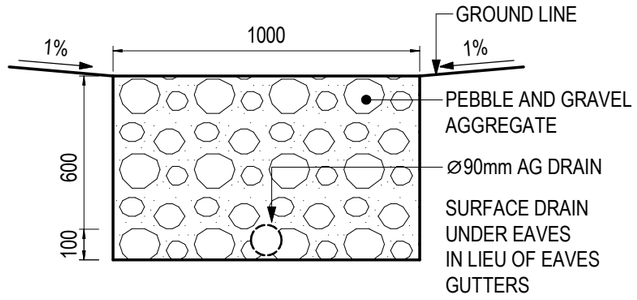
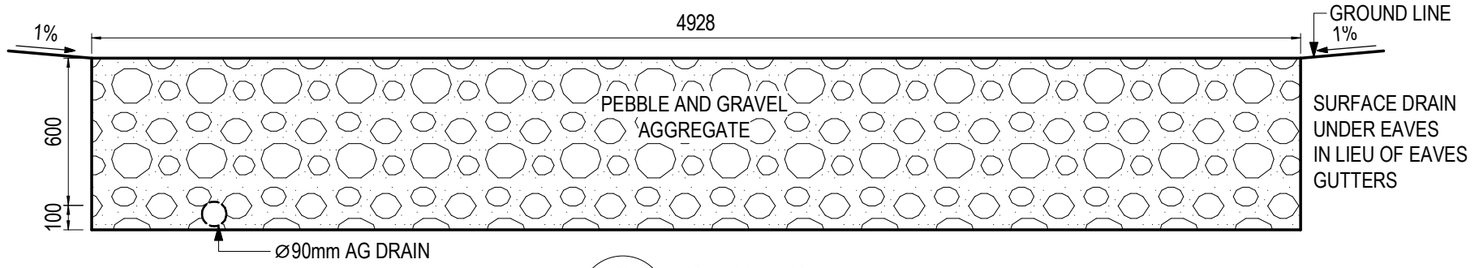


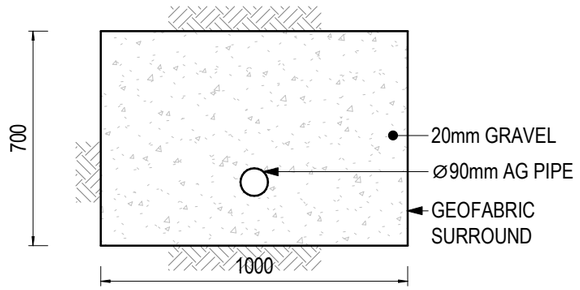
1 C005 SECTION
SCALE 1 : 20



2 C005 SECTION
SCALE 1 : 20



3 C005 SECTION
SCALE 1 : 25



TYPICAL TRENCH DETAIL
SCALE 1 : 20

FROG FLAP VALVE

REV	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED
B	FINAL	29/05/2024	CM	JT	JT
A	DRAFT	24/05/2024	CM	JT	JT

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info@jcengineers.com.au
ABN: 32 616 356 908
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Project Details: PROPOSED STORMWATER MANAGEMENT PLAN

Drawn: CM
Designed: KR

ENGINEERING CERTIFICATION

Eng. Area	Name	Signature	No.	Date
CIVIL	JASMIN TRGO		19378	29/05/2024

Project Address: 56 SHIRLEY LANE, BYRON BAY NSW 2481

Client: SHAJI KARIMADATH
Job No.: C123b
Sheet: TYPICAL DETAILS
Drawing No.: C123b - C007
REV: B

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