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Proposed Townhouse Development
202 Baileys Mountain Road
Upper Coomera

ACOUSTIC REPORT






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1. Introduction

This report is in response to a request by MG Homes Pty Ltd for an environmental noise assessment of a proposed townhouse development to be located at 202 Baileys Mountain Road, Upper Coomera. To facilitate the assessment, unattended noise monitoring was conducted to establish traffic noise levels in the vicinity of the site and to establish the criteria for onsite activities. Based on the outcomes of the assessment recommendations for acoustic treatments are specified.

2. Site Description

2.1 Site Location

The site is described by the following:

202 Baileys Mountain Road, Upper Coomera
Lot 58 on SP191940

Refer to Figure 1 for site location.

Figure 1: Site Location (Not to Scale)



A comprehensive site survey was conducted on the 2nd May 2024 and identified the following:

a) A single storey residential dwelling currently occupies the site and will be demolished to make way for the proposed development.
b) Purlingbrook Street separates the site from single storey residential properties to the north.
c) Baileys Mountain Road and Old Coach Road separate the site from single storey residential properties to the east.
d) Reserve Road separates the site from single and two storey residential properties to the south.
e) Courtney Drive bounds the site from single and two storey residential properties to the west.
f) The site is zoned Emerging Community.
g) Baileys Mountain Road separates the site from single and two storey residential properties to the east.

2.2 Proposal

The proposal is to reconfigure a lot with a material change of the site use as a townhouse development as follows:

- Total site area of 3.087Ha.
- Construction of 73 dwellings
- Site access is via new internal road of Baileys Mountain Road

Refer to the Appendices for development plans.

2.3 Acoustic Environment

The surrounding area is primarily affected by road traffic noise from Baileys Mountain Road.

3. Equipment

The following equipment was used to record noise levels:

- Rion NL42 Environmental Noise Monitors
- BSWA Technology Co. Ltd Sound Calibrator

The Rion NL42 Environmental Noise Monitor holds current NATA Laboratory Certification and was field calibrated before and after the monitoring period, with no significant drift from the reference signal recorded.

4. Receiver and Noise Monitoring

4.1 Receiver Locations

The nearest noise sensitive receiver locations were identified as follows;

1. Single storey residential dwellings are located to the north of the site boundary at 2-24 Purlingbrook Street.
2. Single storey and two storey residential dwellings are located to the east of the site boundary at 2-19 Tian Crescent.
3. A single storey residential dwelling is located to the south of the site boundary at 288 Reserve Road.
4. Single storey and two storey residential dwellings are located to the west of the site boundary at 14 and 17 Courtney Drive.

These locations were chosen as being representative of the nearest sensitive receivers to the proposed development. Refer to Figure 2 for receiver locations.

Figure 2: Receivers and Noise Monitoring Locations



4.2 Unattended Noise Monitoring

A Rion NL42 environmental noise monitor was placed in the front yard of 5 Purlingbrook Street to measure environmental noise levels. The monitor was located in a free field position with the microphone approximately 1.4 metres above ground surface level. The noise monitor was set to record noise levels between the 24th April and 1st May 2024.

A second Rion NL42 noise monitor was placed in the front yard of 10 Wright Court to measure road traffic noise levels. The monitor was located in a free field position with the microphone approximately 1.4 metres above ground surface level. The noise monitor was set to record noise levels between the 22nd January and 29th January 2024.

The noise monitors were set to record noise levels in "A" Weighting, Fast response using 15 minute statistical intervals. Road traffic noise monitoring was conducted in accordance with Australian Standard *AS2702:1984 'Acoustics - Methods for the measurement of road traffic noise'*. Ambient noise monitoring was conducted generally in accordance with Australian Standard *AS1055:2018 'Acoustics – Description and measurement of environmental noise'*.

5. Measured Noise Levels

The following tables present the measured road traffic and ambient noise levels from the unattended noise surveys. Any periods of inclement weather or extraneous noise were omitted from the measured data prior to determining the results.

5.1 Meteorological Conditions

Meteorological observations during the unattended noise monitoring survey were obtained from the Bureau of Meteorology website (http://www.bom.gov.au/climate/data), shown in Table 1 below.

Table 1: Meteorological Conditions – Gold Coast

Day	Date	Rainfall (mm)	Wind			
			9am		3pm	
			Speed (km/h)	Direction	Speed (km/h)	Direction
Monday	22/01/24	0	13	NNW	39	SSE
Tuesday	23/01/24	0	24	SSE	24	SSE
Wednesday	24/01/24	0	28	SE	20	ESE
Thursday	25/01/24	0	11	NE	28	NE
Friday	26/01/24	0	13	NNW	19	NNE
Saturday	27/01/24	0.2	15	NW	19	NNE
Sunday	28/01/24	*18.8	7	WSW	19	SE
Monday	29/01/24	*7.2	11	SE	20	ESE
Wednesday	24/04/24	4.0	24	E	15	SE
Thursday	25/04/24	0	43	SE	31	SE
Friday	26/04/24	0	46	SSE	22	SSE
Saturday	27/04/24	0	43	SE	24	SSE
Sunday	28/04/24	0	48	SE	26	SE
Monday	29/04/24	0.8	31	SE	24	SE
Tuesday	30/04/24	0	32	ESE	17	ESE
Wednesday	01/05/24	*0	19	SSW	20	SSW

*Inclement weather recorded on 28th and 29th January and 1st of May was found to have affected the measured noise levels, therefore the data for these time periods were not utilised.

5.2 Road Traffic Noise Levels

The road traffic noise levels measured at the monitoring location are as follows:

Table 2: Measured road traffic noise levels - all time periods

Day	Date	L10 (18h)	L90 (8h)	L90 (18h)	Leq (1h) Day	Leq (1h) Night
Wednesday	22/01/24	57	38	48	62	48
Thursday	23/01/24	56	37	47	60	59
Friday	24/01/24	55	39	46	60	58
Saturday	25/01/24	53	33	41	67	54
Sunday	26/01/24	54	30	42	57	55
Monday	27/01/24	54	41	44	58	51
Tuesday	28/01/24	x	x	x	57	65
Wednesday	29/04/24	x	x	x	58	55
Overall value		55	36	45	60	56

Refer to the appendix for graphical representation.

5.3 Ambient Noise Levels

The ambient noise levels measured at the monitoring location are as follows:

Table 3: Measured ambient noise levels - all time periods

Day	Date	L90 dB(A)		
		Day	Evening	Night
Wednesday	24/04/24	48	48	38
Thursday	25/04/24	45	45	43
Friday	26/04/24	49	45	39
Saturday	27/04/24	47	43	39
Sunday	28/04/24	47	45	38
Monday	29/04/24	51	48	37
Tuesday	30/04/24	52	46	37
Wednesday	01/05/24	x	x	x
Overall value		48	46	39

Refer to the appendix for graphical representation.

6. Noise Criteria

6.1 Environmental Noise Criteria

The noise criteria as applied by City of Gold Coast Council are as follows:

6.1.1 Acoustic Quality Objectives

Table 6 presents the acoustic quality objectives at noise sensitive receptors as detailed in Schedule 1 of the Environmental Protection (Noise) Policy 2008.

Table 4: Acoustic Quality Objectives at Noise Sensitive Properties

Sensitive Receptor	Time of Day	Acoustic Quality Objectives, dBA		
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$
Dwelling (Outdoors)	Day and Evening (7am – 10pm)	50	55	65
Dwelling (Indoors)	Day and Evening (7am – 10pm)	35	40	45
	Night (10pm – 7am)	30	35	40

6.1.2 Background Creep

The Background Creep criteria are as follows;

Time-varying noise:

$$L_{Aeq,adj,T,} \leq \text{Ambient } L_{A90,T} + 5\text{dB(A)}$$

Steady-state noise:

$$L_{A90,T} \leq \text{Ambient } L_{A90,T}$$

The time period (T) is a time interval of at least 15 minutes, or if the noise continues for less than 15 minutes, the duration of the noise source.

Based on the results of ambient noise monitoring as presented in Table 3, the project specific background creep noise limits are shown in Table 7.

Table 5: Background creep – noise limits

Time Period	Noise Level Limits SPL dB(A)	
	Measured $L_{A90,T}$	Criteria $L_{Aeq,T}$
Day (7am – 6pm)	48	55
Evening (6pm – 10pm)	46	51
Night (10pm – 7am)	39	44

6.2 Queensland Development Code MP4.4

To determine the minimum design requirements for any new buildings located within a transport corridor, the Queensland Development Code Part 4.4 may be applied if no alternative solutions are provided. In accordance with MP4.4, the noise categories are stated in Table 6.

Table 6: Queensland Development Code Part 4.4 Criteria

Queensland Development Code MP 4.4	
Category	$L_{10(18h)}$ dBA
4	≥ 73
3	68-72
2	63-67
1	58-62
0	≤ 57

The building treatment for any future development onsite shall be determined at Building Approval stage, in general accordance with the Queensland Development Code. Alternative solutions may be provided on request.

7. Road Traffic Noise Assessment

Road traffic noise associated with Baileys Mountain Road for a ten-year planning horizon was assessed at the development to determine compliance with the Queensland Development Code Part 4.4 (refer to Section 6).

7.1 Traffic Volumes

Traffic volumes for the surrounding road network were sourced from the traffic engineer for the development. The traffic data includes percentage of heavy vehicles and growth rates as nominated below, used to calculate future volumes.

Table 7: Traffic Volumes

Location	2024 Predicted AADT	2034 Predicted AADT	Percentage of Heavy Vehicles	Annual Growth Rate
Reserve Road Northbound	7,815	12,669	4%	0.4%
Reserve Road Southbound	6,650	10,780	2%	0.4%

7.2 Road Traffic Noise Verification

To ensure the CoRTN noise model is accurate, a verification model of the predicted $L_{A10(18hr)}$ was created and compared to the measured noise level. The CoRTN method allows a 2dB(A) variation from the predicted and measured level, if the variation exceeds 2dB(A) a correction to the predicted level is required.

Table 8: Comparison of Measured and Predicted Noise Levels

Location	Measured $L_{A10(18hr)}$ dB(A)	Predicted $L_{A10(18hr)}$ dB(A)	Correction
Reserve Road	55.4	55	0

7.3 Predicted Road Traffic Noise Levels - 2034

Road traffic noise modelling for the proposed development was based on the following information:

- Site layout, provided by Red Door Architecture, Project No. 230008, drawing DA-010 dated 23/09/24.
- Reserve Road speed limit of 60km/h.
- Receiver heights were based on 1.5m above finished floor level.
- -0.7 (Free field) and -1.7dB(A) (Façade) corrections for Queensland Conditions.

Table 9 presents the predicted road traffic noise impacts for the townhouses.

Table 9: Predicted Road Traffic Noise Impacts – Baileys Mountain Road

Façade location		Predicted Road Traffic Noise 2034	
Unit	Level	$L_{A10(18hr)}$ dBA	QDC Noise Category
1-20	Ground/First Floor	≤ 57	0
21	Ground	≤ 57	0
21	First	58.3	1
22-66	Ground/First Floor	≤ 57	0
67	Ground	57.5	1

Façade location		Predicted Road Traffic Noise 2034	
Unit	Level	$L_{A10(18hr)}$ dBA	QDC Noise Category
67	First	59.6	1
68-70	Ground	57.1	1
68-70	First	57.5	1
71-73	Ground	58	1
71-73	First	58.5	1

Refer to the appendices for room numbering and Section 9 for recommendations.

8. Environmental Assessment

8.1 Offsite Activities

Noise associated with offsite sources was assessed based on previous measurements of similar activities. The calculations assume that the nominated activities are located at a representative distance within the site to each sensitive location onsite. Any relevant shielding or building transmission loss is taken into account for these activities.

8.1.1 Acoustic Quality Objectives

The average maximum noise source levels and predicted levels at the receiver locations are shown in Table 10 as follows. Note: L_{A10} and L_{A1} results are not shown in cases where the total duration of the events is less than the minimum time required e.g. $L_{A10(1hr)}$ requires noise events to occur for at least 360 seconds of an hour long period. L_{Aeq} results are not shown where the calculated total is less than 0dBA.

Table 10: Acoustic Quality Objective Noise Levels, 1 hour

Receiver	Receivers 1. 2-24 Purlingbrook Street (N) 2. 2-19 Tian Crescent (E) 3. 288 Reserve Road (S) 4. 14 & 17 Courtney Drive (W) Description	Source Leq@1 m dB(A)	Correction dB(A)*	Corrected Leq@1 m dB(A)	No. of events per 1hr Day	No. of events per 1hr Eve	No. of events per 1hr Night	Duration per event	Distance (m)	Barrier (height (m)) No	Barrier screening dB	Building Screening dB	Topo screening dB	Dist atten. @-6dB/dd	LAeq adj.,1hr ext. dB(A) Day	LAeq adj.,1hr int. dB(A) Day	LAeq adj.,1hr ext. dB(A) Eve	LAeq adj.,1hr int. dB(A) Eve	LAeq adj.,1hr ext. dB(A) Night	LAeq adj.,1hr int. dB(A) Night	LA10 adj.,1hr ext. dB(A) Day	LA10 adj.,1hr int. dB(A) Day	LA10 adj.,1hr ext. dB(A) Eve	LA10 adj.,1hr int. dB(A) Eve	LA10 adj.,1hr ext. dB(A) Night	LA10 adj.,1hr int. dB(A) Night	LA1 adj.,1hr ext. dB(A) Day	LA1 adj.,1hr int. dB(A) Day	LA1 adj.,1hr ext. dB(A) Eve	LA1 adj.,1hr int. dB(A) Eve	LA1 adj.,1hr ext. dB(A) Night	Amenity LAeq Compliance Day / eve	Day / eve indoor	Night indoor	LA10 Compliance Day / eve	Day / eve indoor	Night indoor	LA1 Compliance Day / eve	Day / eve indoor	Night indoor
	Criteria																																50	35	30	55	40	35	65	45	40
	Car passby	69		69	71	48	32	15	143					-44	20	10	18	8	16	6	23	13	23	13	23	13	25	15	25	15	25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1	Car door closure	75	2	77	71	48	32	2	140					-43	20	10	18	8	16	6							26	16	26	16	26	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start	74	2	76	71	48	32	2	140					-43	19	9	17	7	15	5							25	15	25	15	25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Total														25	15	23	13	21	11	23	13	23	13	23	13	30	20	30	20	30	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	Criteria																															50	35	30	55	40	35	65	45	40
	Car passby	69		69	71	48	32	15	139					-43	21	11	19	9	17	7	24	14	24	14	24	14	26	16	26	16	26	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Car door closure	75	2	77	71	48	32	2	142					-43	19	9	17	7	15	5							25	15	25	15	25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start	74	2	76	71	48	32	2	142					-43	18	8	16	6	14	4							24	14	24	14	24	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Total														24	14	23	13	21	11	24	14	24	14	24	14	30	20	30	20	30	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	Criteria																															50	35	30	55	40	35	65	45	40
	Car passby	69		69	71	48	32	15	205					-47	17	7	15	5	13	3	20	10	20	10	20	10	22	12	22	12	22	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	Car door closure	75	2	77	71	48	32	2	197					-46	17	7	15	5	13	3							23	13	23	13	23	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start	74	2	76	71	48	32	2	197					-46	16	6	14	4	12	2							22	12	22	12	22	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Total														22	12	20	10	19	9	20	10	20	10	20	10	27	17	27	17	27	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	Criteria																															50	35	30	55	40	35	65	45	40
	Car passby	69		69	71	48	32	15	170					-45	19	9	17	7	15	5	22	12	22	12	22	12	24	14	24	14	24	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	Car door closure	75	2	77	71	48	32	2	162					-44	18	8	16	6	14	4							24	14	24	14	24	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Car start	74	2	76	71	48	32	2	162					-44	17	7	15	5	13	3							23	13	23	13	23	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Total														23	13	21	11	20	10	22	12	22	12	22	12	28	18	28	18	28	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

*Correction due to tonality and impulsiveness as per AS1055:2018.

Compliance is predicted with the Acoustic Quality Objectives on the condition the recommendations presented in Section 9 are implemented.

8.1.2 Background Creep

The noise source levels and predicted levels at the receiver locations are shown as follows;

Table 11: Background Creep Noise Levels, 15min

Receiver	Receivers 1. 2-24 Purlingbrook Street (N) 2. 2-19 Tian Crescent (E) 3. 288 Reserve Road (S) 4. 14 & 17 Courtney Drive (W) Description	Source Leq@1m dB(A)	Correction dB(A)*	Corrected Leq@1m dB(A)	LAeq adj,T ext. dB(A) Day	LAeq adj,T ext. dB(A) Eve	LAeq adj,T ext. dB(A) Night	LAeq 15 min Compliance Day	Eve	Night
	Criteria							55	51	44
	Car passby	69		69	22	18	16	Yes	Yes	Yes
1	Car door closure	75	2	77	23	18	16	Yes	Yes	Yes
	Car start	74	2	76	22	17	15	Yes	Yes	Yes
	Total				27	23	21	**Yes**	**Yes**	**Yes**
	Criteria							55	51	44
	Car passby	69		69	23	19	17	Yes	Yes	Yes
2	Car door closure	75	2	77	22	17	15	Yes	Yes	Yes
	Car start	74	2	76	21	16	14	Yes	Yes	Yes
	Total				27	23	21	**Yes**	**Yes**	**Yes**
	Criteria							55	51	44
	Car passby	69		69	19	15	13	Yes	Yes	Yes
3	Car door closure	75	2	77	20	15	13	Yes	Yes	Yes
	Car start	74	2	76	19	14	12	Yes	Yes	Yes
	Total				24	20	19	**Yes**	**Yes**	**Yes**
	Criteria							55	51	44
	Car passby	69		69	21	17	15	Yes	Yes	Yes
4	Car door closure	75	2	77	21	16	14	Yes	Yes	Yes
	Car start	74	2	76	20	15	13	Yes	Yes	Yes
	Total				26	21	20	**Yes**	**Yes**	**Yes**

*Correction due to tonality and impulsiveness as per AS1055:2018.

Compliance is predicted with the Background Creep criteria on the condition the recommendations presented in Section 9 are implemented.

9. Recommendations

9.1 Road Traffic Noise

All building treatments for residential units shall be determined at the Building Approval stage in accordance with the assessment requirements of the Queensland Development Code Part MP4.4. For reference, preliminary noise categories are nominated in Table 12.

9.1.1 Glazing

Calculations were conducted in accordance with Queensland Development Code Part MP4.4 with the resulting treatment recommendations presented in Table 12.

Table 12: QDC Noise Category & Glazing Treatments

Building	Level	Room	QDC Category	QDC Rw Ratings				QDC Glazing	
				Wall	Roof	Glazing	Entry door	Glazing	Acoustic seals
1-20	Ground /First Floor	All Rooms	0	-	-	-	-	standard	no
21	Ground	All Rooms	0	-	-	-	-	standard	no
21	First	All Rooms	1	35	35	27	-	4mm float	yes
22-66	Ground /First Floor	All Rooms	0	35	35	27	-	4mm float	yes
67	Ground	All Rooms	1	35	-	27	28	4mm float	yes
67	First	All Rooms	1	35	35	27	-	4mm float	yes
68-70	Ground	All Rooms	1	35	-	27	28	4mm float	yes
68-70	First	All Rooms	1	35	35	27	-	4mm float	yes
71-73	Ground	All Rooms	1	35	-	27	28	4mm float	yes
71-73	First	All Rooms	1	35	35	27	-	4mm float	yes

Any locations not identified in Table 12 would require 4mm float for windows (minimum R_w 22) and 4mm float for sliding and entry doors (minimum R_w 23)

9.1.2 Wall construction

The wall construction recommendations from QDC MP4.4 are included in the table below. Note that these are not the only allowable methods of construction for the development, and alternative constructions to achieve the required Rw ratings may also be provided. QDC Noise Categories are nominated in Table 12.

Table 13: QDC typical wall construction

QDC Noise Category	Wall Rw	Minimum Wall Treatments
1	35	Single leaf of clay brick masonry at least 110mm thick with: (i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and (ii) One layer of plasterboard at least 10mm thick fixed to outside face of studs OR Minimum 6mm thick fibre cement sheeting or weatherboards or plank cladding externally, minimum 90mm deep timber stud or 92mm metal stud, standard plasterboard at least 13mm thick internally.

QDC Noise Category	Wall Rw	Minimum Wall Treatments
0	N/A	Standard Construction

Note that the construction system listed in the table is not the only possible type of construction. Other similar systems achieving at least the minimum ratings nominated in Table 12 would also be suitable.

More detailed information for external wall systems may be provided on request.

9.1.3 Roofing construction

The roof construction recommendations from QDC MP4.4 are included in the table below. Note that these are not the only allowable methods of construction for the development, and alternative constructions to achieve the required Rw ratings may also be provided. QDC Noise Categories are nominated in Table 12

Table 14: QDC typical roof construction

QDC Noise Category	Roof Rw	Minimum Roof Treatments
1	35	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling cavity.
0	n/a	Standard Construction

Note that the construction system listed in the table is not the only possible type of construction. Other similar systems achieving at least the minimum ratings nominated in Table 12 would also be suitable.

More detailed information for external wall systems may be provided on request.

9.1.4 Entry Doors

The entry door construction recommendations from QDC MP4.4 are included in the table below. Note that these are not the only allowable methods of construction for the development, and alternative constructions to achieve the required Rw ratings may also be provided. QDC Noise Categories are nominated in Table 12.

Table 15: QDC typical entry door construction

QDC Noise Category	Entry Door R_w	Minimum Entry Door Treatments
1	28	Fixed so as to overlap the frame or rebate of the frame, constructed of – (i) wood, particleboard or blockboard not less than 33mm thick; or (ii) compressed fibre reinforced sheeting not less than 9mm thick; or (iii) other suitable material with a mass per unit area not less than 24.4kg/m^2; or (iv) solid core timber door not less than 35mm thick fitted with full perimeter *acoustically rated seals*.
0	N/A	Standard Construction

9.1.5 Alternative ventilation

To achieve the required internal noise levels for the development, we recommend all locations listed in Table 12 requiring acoustic seals have the provision for an alternative ventilation system (in accordance with National Construction Code 2022 requirements and AS1668.2) similar to air-conditioning or mechanical ventilation to allow doors and windows to be closed.

9.2 Onsite Activities

General compliance is predicted for noise impacts at the sensitive receiver locations on the condition that waste collection is to be conducted in accordance with the surrounding residential properties.

9.3 Onsite mechanical plant

No information regarding mechanical services was available at the time of the assessment. We recommend that any new mechanical plant is designed to comply with the criteria stated in Section 6.1 with an assessment undertaken by qualified acoustic consultant to be conducted prior to installation.

10. Conclusion

An environmental noise assessment was conducted for the proposed residential townhouse development located at 202 Baileys Mountain Road, Upper Coomera. On the condition the recommendations detailed in Section 9 are implemented, compliance is predicted with SDAP assessment criteria.

If you should have any queries, please do not hesitate to contact us.

Report Prepared By



Greg Pearce B.Eng (Mech)
Director

acousticworks)))

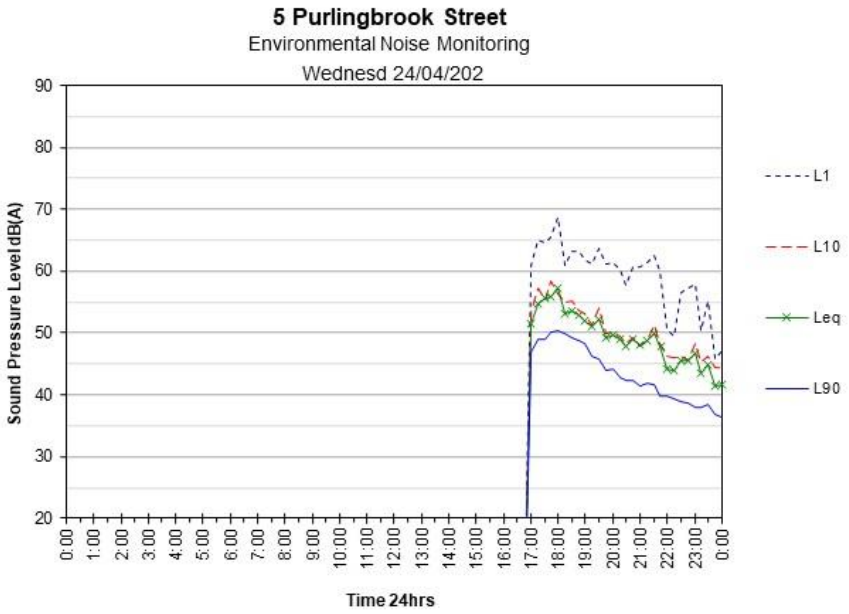
11. Appendices

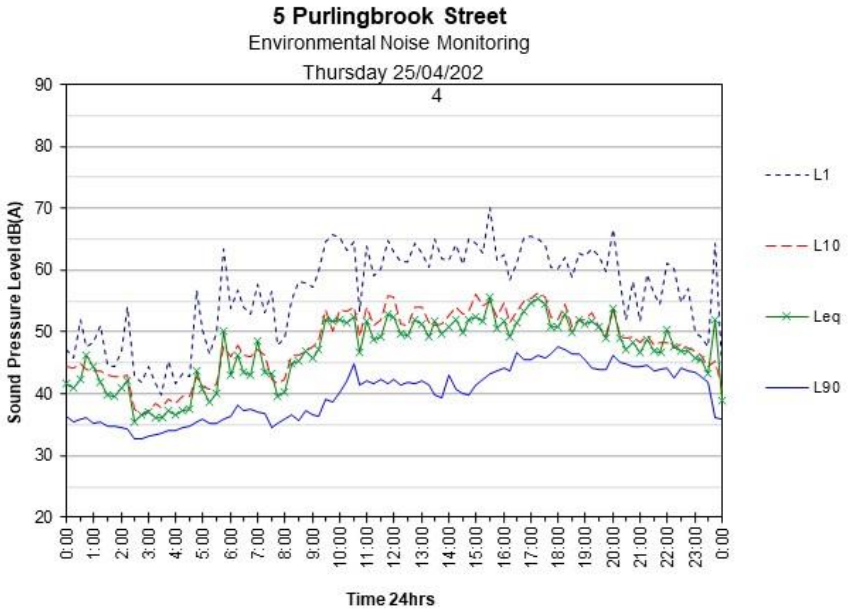
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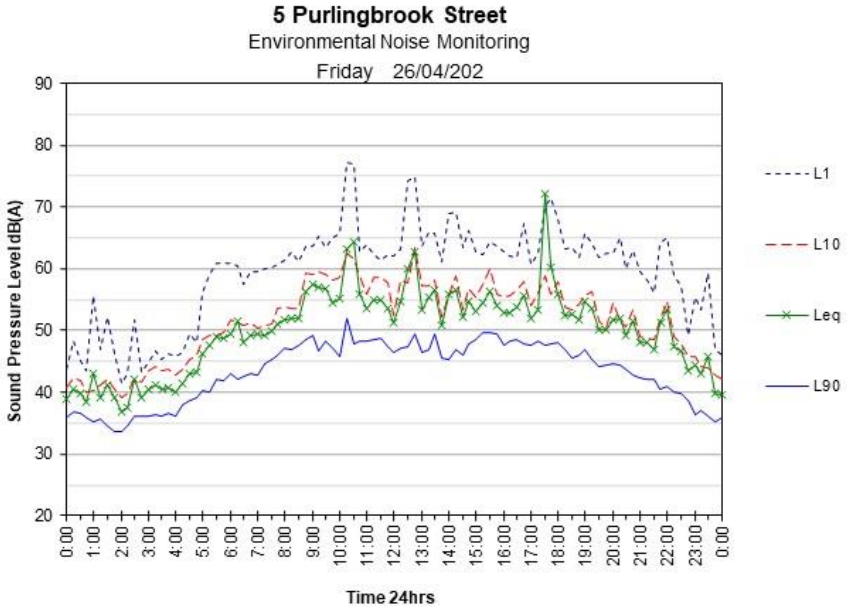


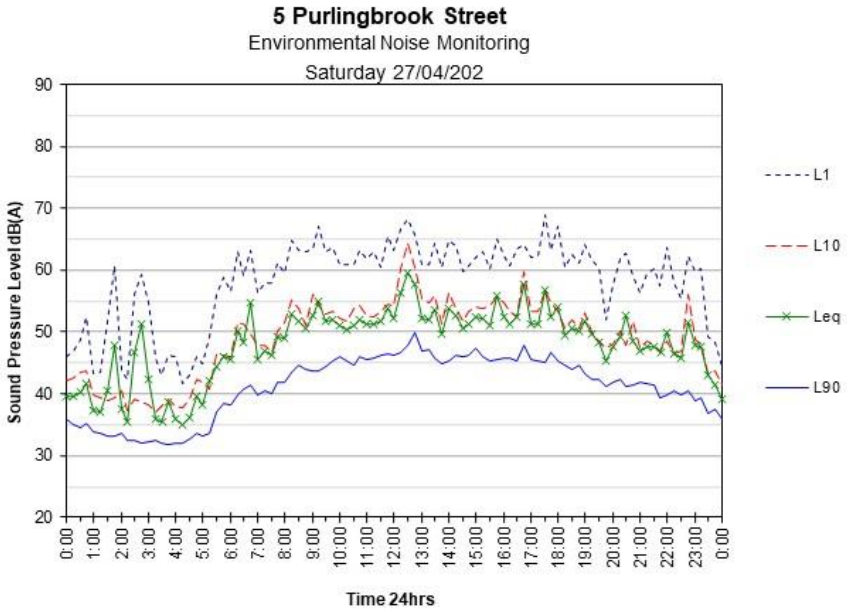
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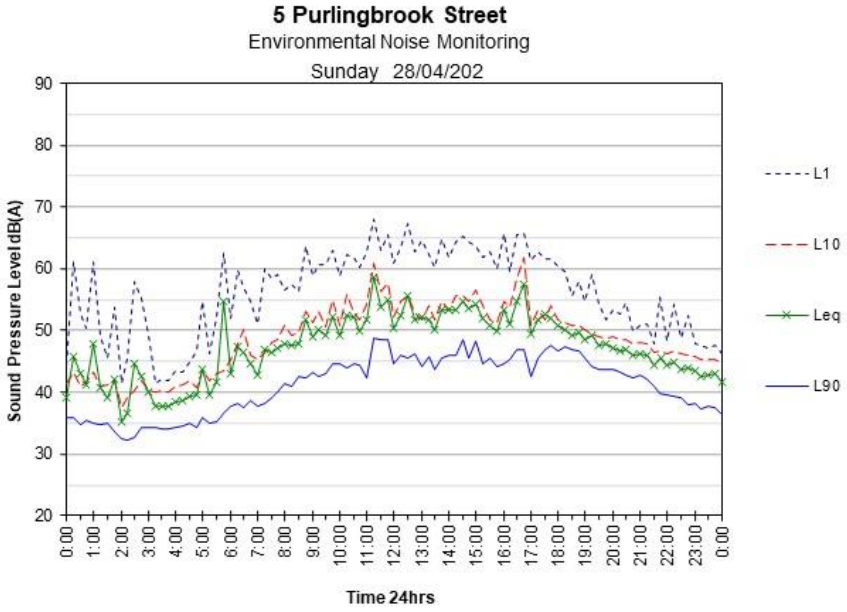
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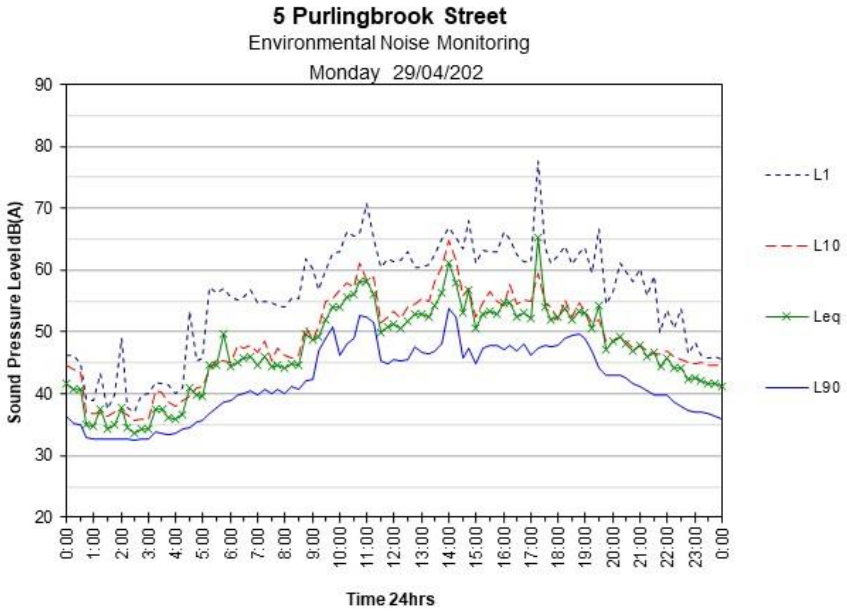


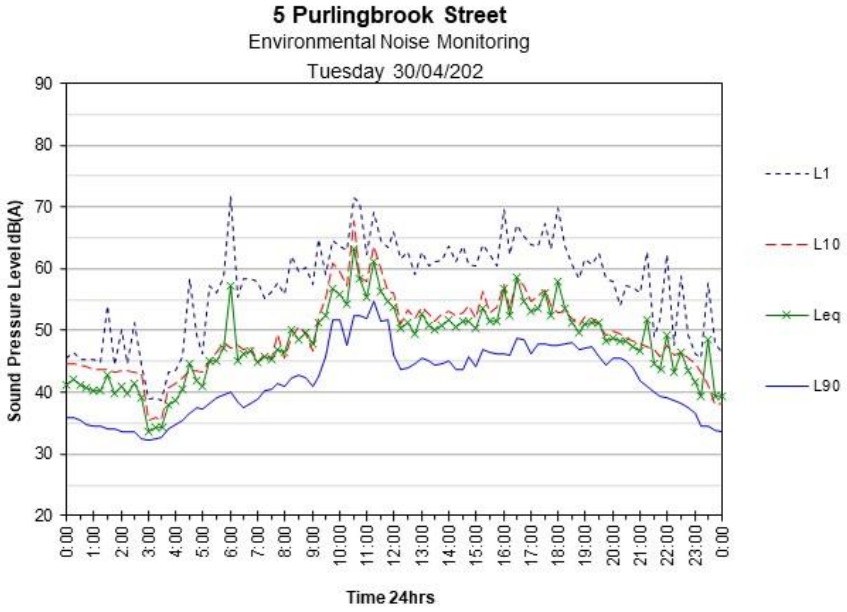


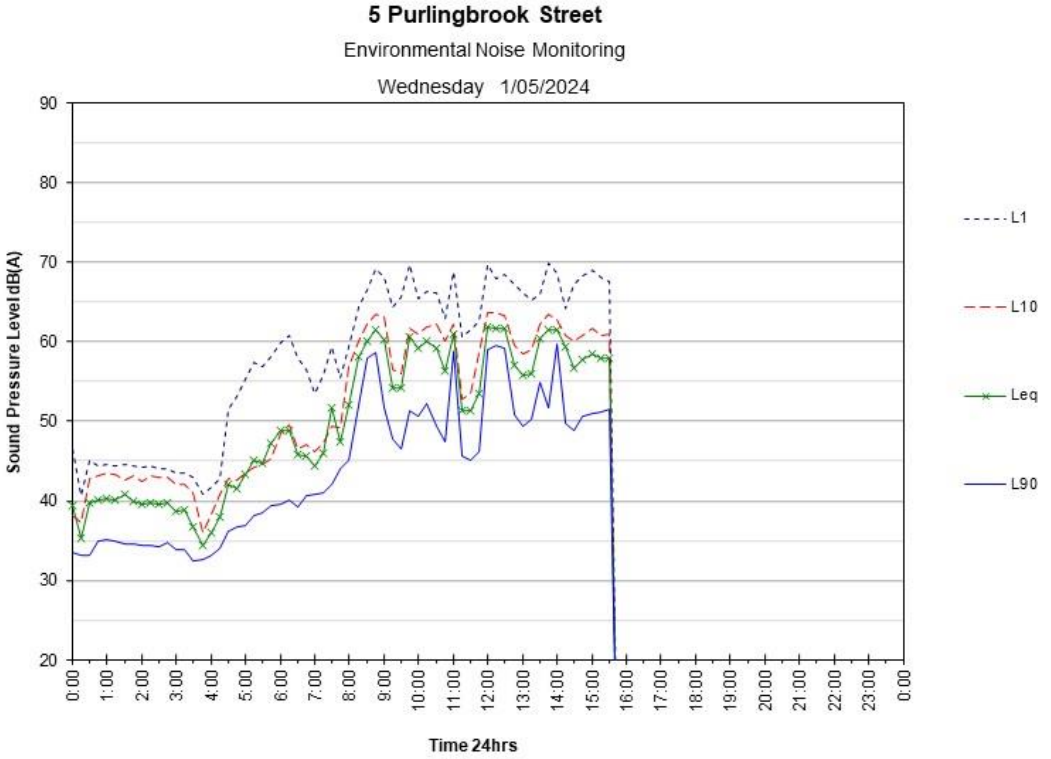

5 Purlingbrook Street
Environmental Noise Monitoring
Friday 26/04/202
Sound Pressure Level dB(A)
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5 Purlingbrook Street
Environmental Noise Monitoring
Saturday 27/04/202
Sound Pressure Level dB(A)
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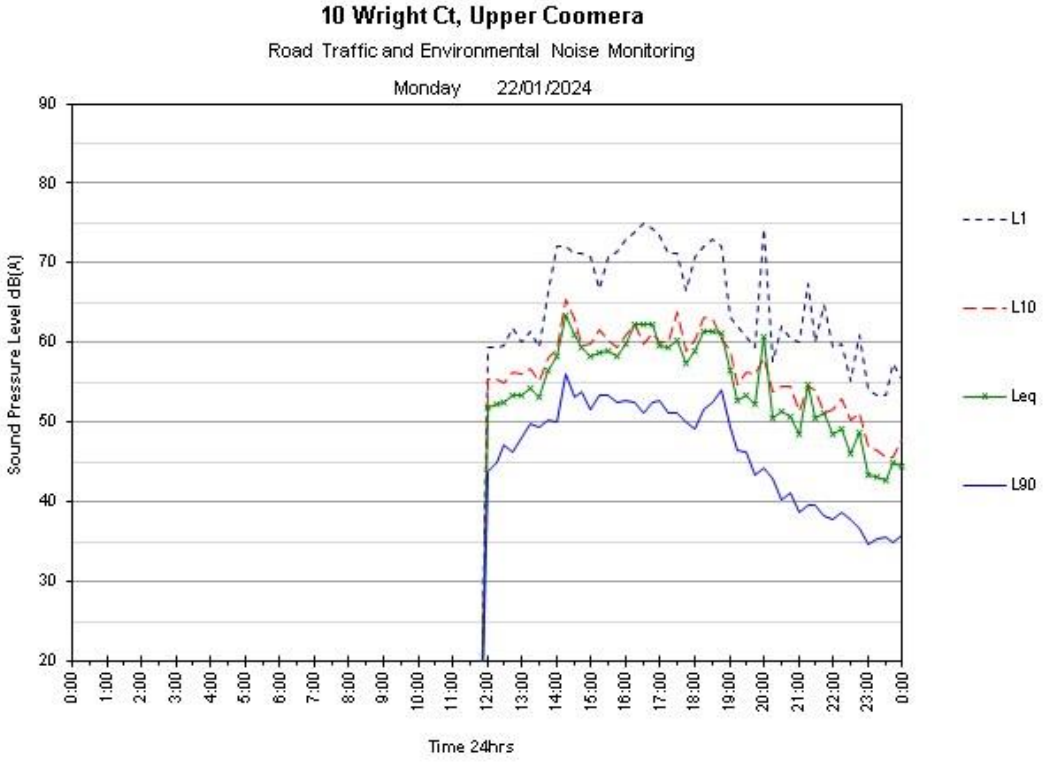

5 Purlingbrook Street
Environmental Noise Monitoring
Sunday 28/04/202
Sound Pressure Level dB(A)
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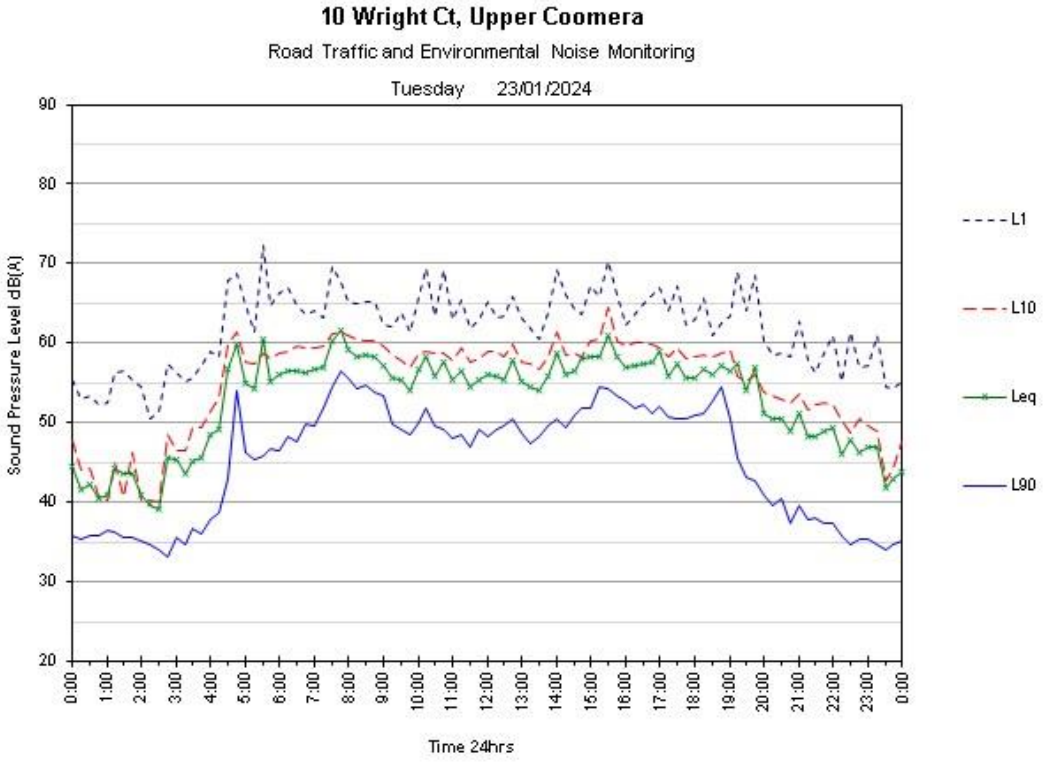

5 Purlingbrook Street
Environmental Noise Monitoring
Monday 29/04/202
Sound Pressure Level dB(A)
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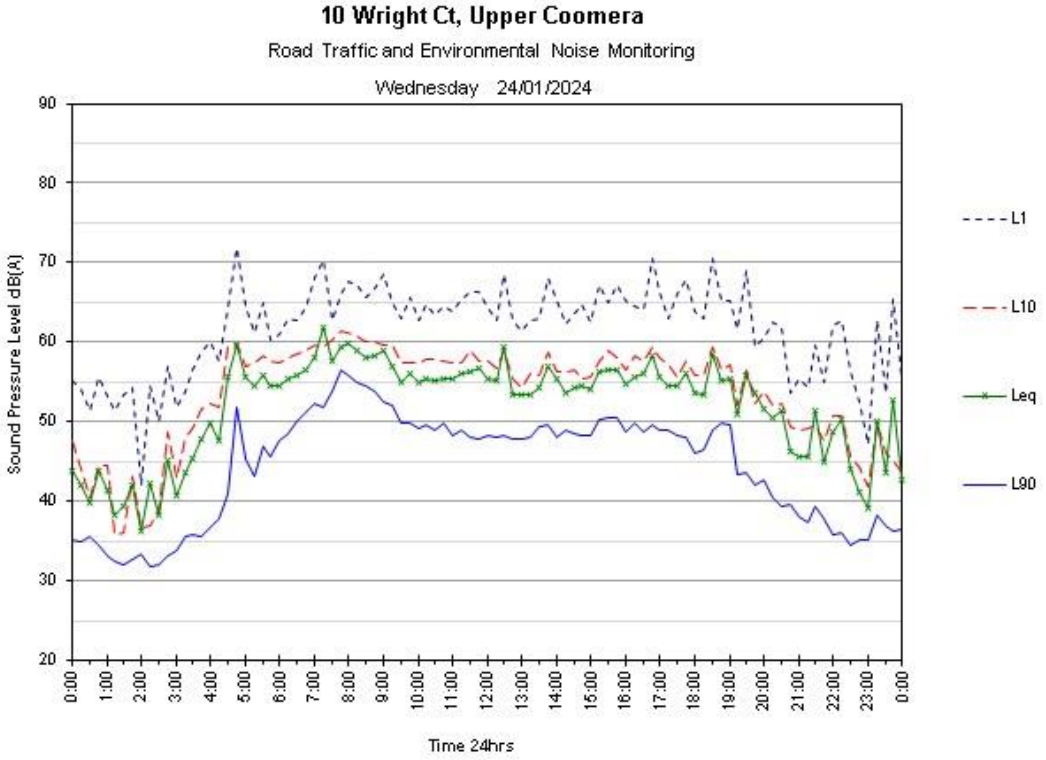

5 Purlingbrook Street
Environmental Noise Monitoring
Tuesday 30/04/202
Sound Pressure Level dB(A)
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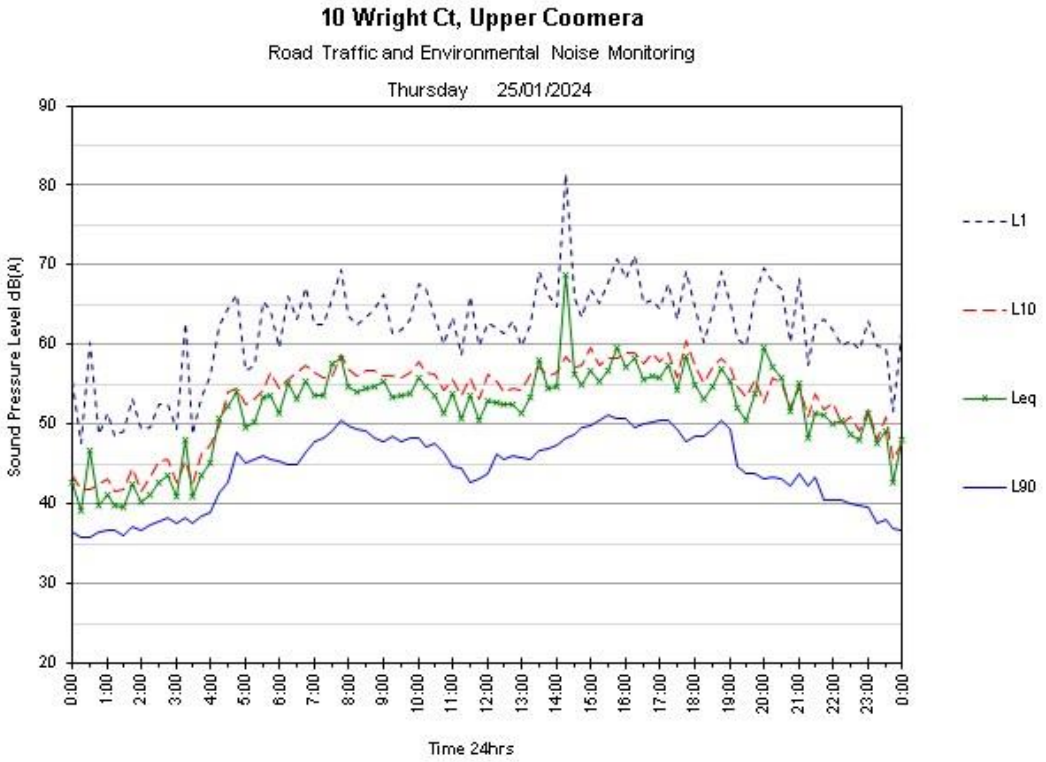

5 Purlingbrook Street
Environmental Noise Monitoring
Wednesday 1/05/2024
Sound Pressure Level dB(A)
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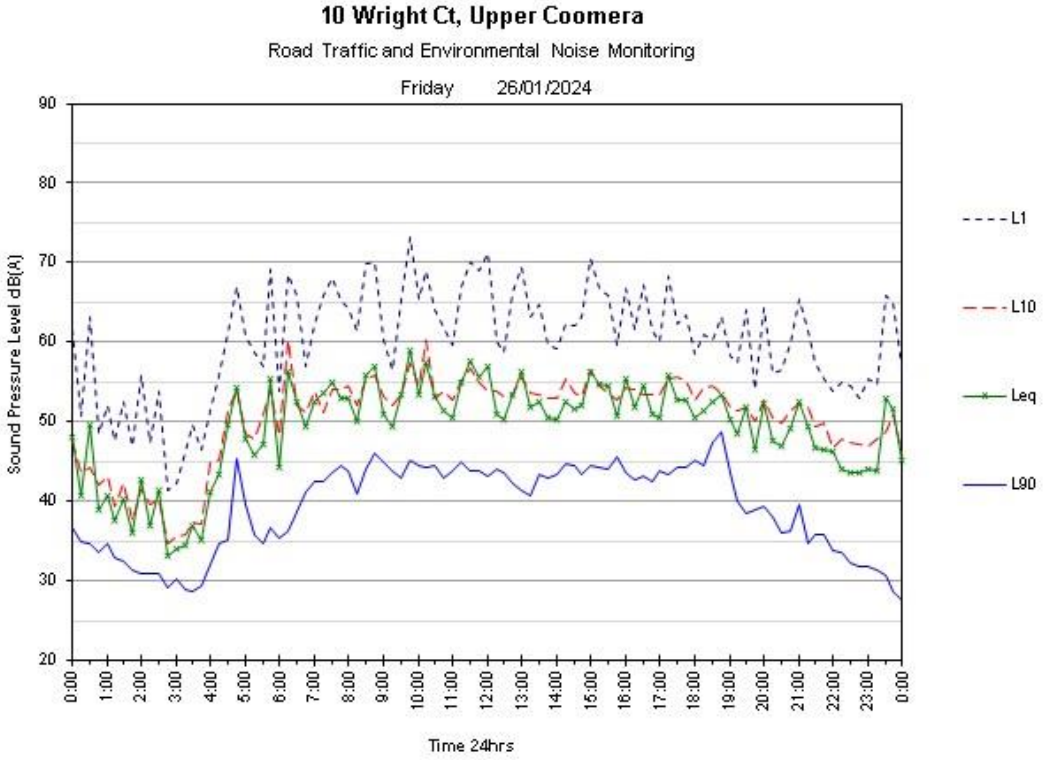
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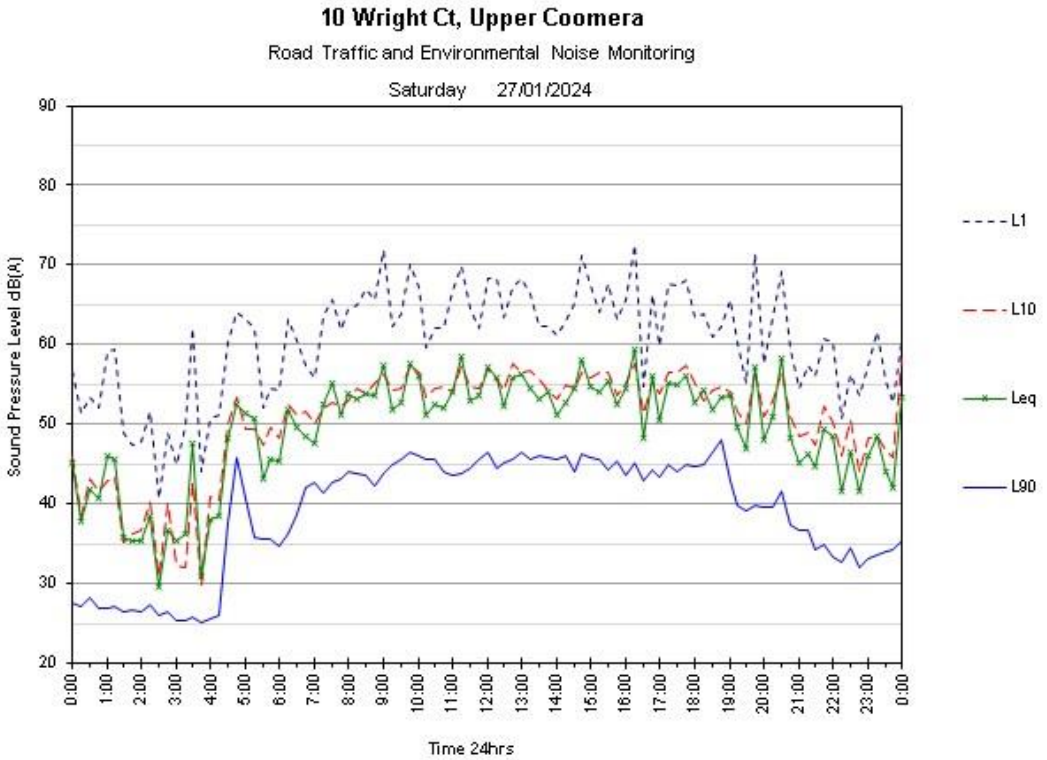


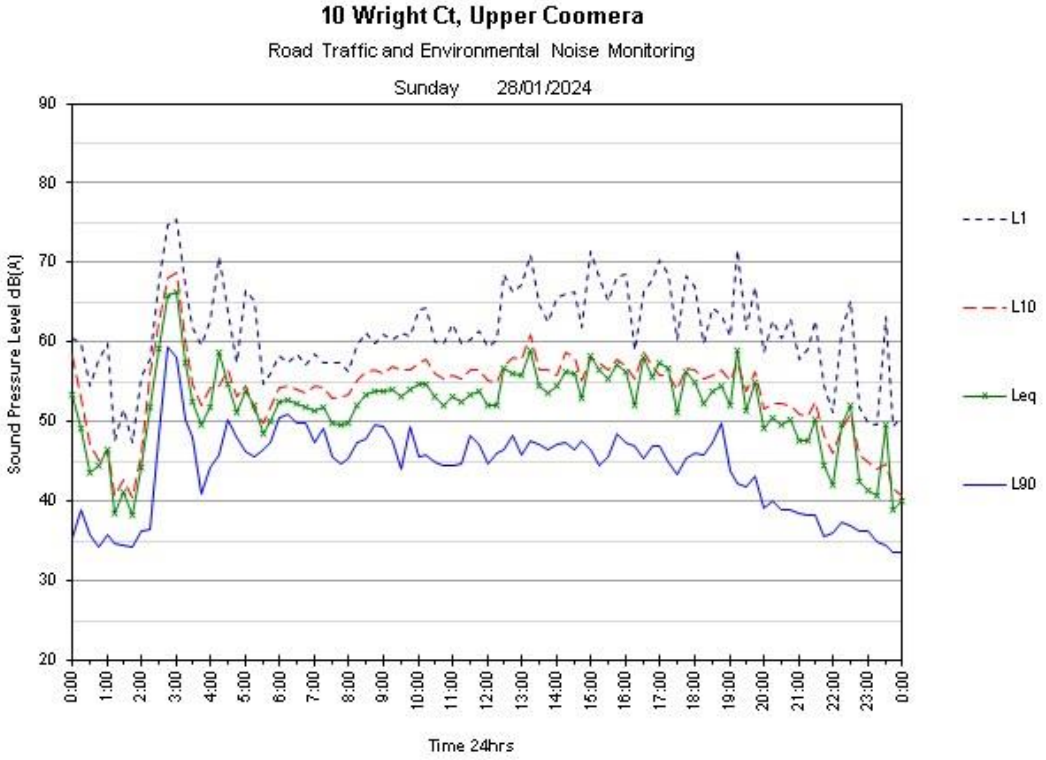


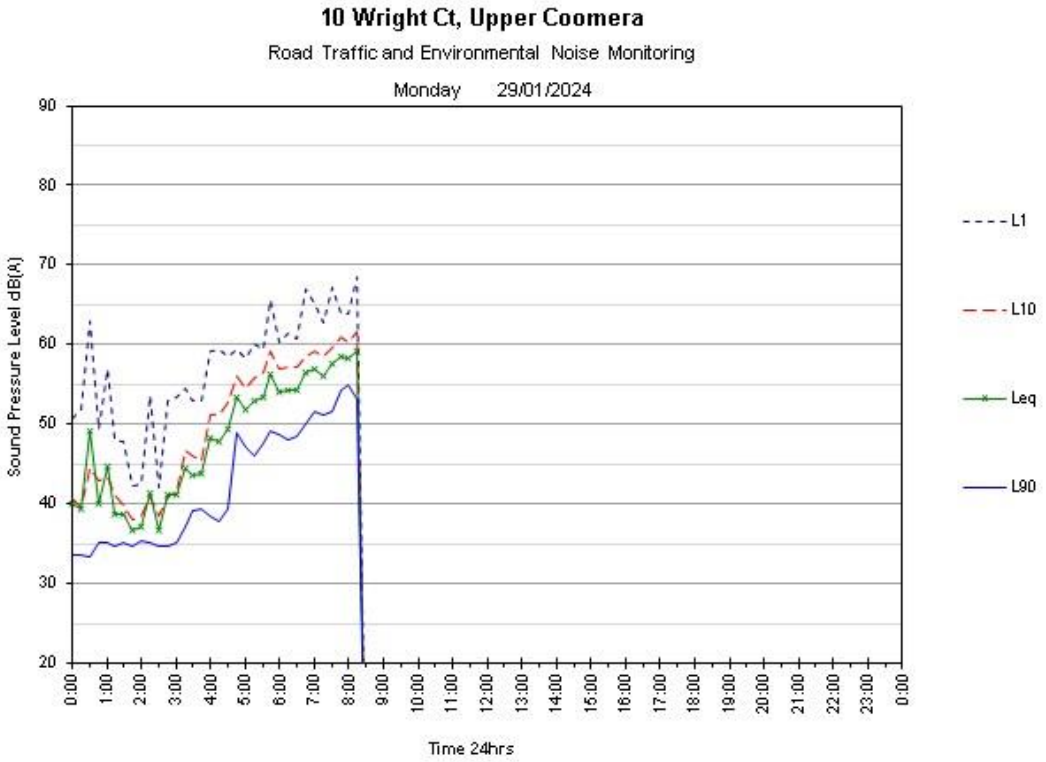

10 Wright Ct, Upper Coomera
Road Traffic and Environmental Noise Monitoring
Wednesday 24/01/2024
Sound Pressure Level dB(A)
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Time 24hrs
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10 Wright Ct, Upper Coomera
Road Traffic and Environmental Noise Monitoring
Thursday 25/01/2024
Sound Pressure Level dB(A)
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10 Wright Ct, Upper Coomera
Road Traffic and Environmental Noise Monitoring
Friday 26/01/2024
Sound Pressure Level dB(A)
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10 Wright Ct, Upper Coomera
Road Traffic and Environmental Noise Monitoring
Saturday 27/01/2024
Sound Pressure Level dB(A)
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10 Wright Ct, Upper Coomera
Road Traffic and Environmental Noise Monitoring
Sunday 28/01/2024
Sound Pressure Level dB(A)
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10 Wright Ct, Upper Coomera
Road Traffic and Environmental Noise Monitoring
Monday 29/01/2024
Sound Pressure Level dB(A)
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S5 ENVIRONMENTAL
2/265 Sandgate Road Albion, 4010
Ph 07 3505 3053
www.s5consulting.com.au
ABN 74 600 187 844

Issue	Description	Date	Client	Project Name	Project No.
B	Layout Amendment	20/09/2024	MG Land C/- Urban Strategies	202 Baileys Mountain Road, Upper Coomera	S523094
Drawing Name	BASIC REHABILITATION MANAGEMENT PLAN				BRMP001

General Notes

Address: 202 Baileys Mountain Road, Upper Coomera (Lot 58 on SP191940).

S5 Environmental have prepared this Basic Rehabilitation Management Plan (BRMP) on behalf of their client MG Land, to assist with a Development Application for a Reconfiguring a Lot (Boundary Realignment 2 into 2), Material Change of Use (Multiple Dwelling – Townhouses) and Operational Works (Changes to Ground Level and Vegetation Clearing) at 202 Baileys Mountain Road, Upper Coomera. The development will include a land-swap with the western adjacent property. The northern extent of the site is proposed as a road reserve, with an eastern portion of the site proposed as a road/land dedication to City of Gold Coast Council (CoGC). The development proposed a 5 m recreation link pathway, which will separate the development footprint in the northern extent of the site, and the Dedicated Park in the south. The development footprint will include the proposed townhouses, internal roads and a bio-basin. The rehabilitation of the Dedicated Park is the focus of this BRMP.

Site Description

The site is located within the CoGC Local Government Area and zoned as Rural residential under the CoGC's *City Plan 2024*. The subject site is located within the suburb of Upper Coomera. CoGC zoning in the locality predominantly includes Rural residential and Medium density residential.

The subject site is a historically disturbed and sparsely vegetated lot containing a dwelling on the south-western extent, accessed via an unsealed driveway in the west and an additional crossover in the north-west of the site. Yaun Creek waterway is situated south of the existing residence, and flows west to east through the subject site before flowing under Old Coach Road. Baileys Mountain Road runs along the subject site's northern boundary. Old Coach Road and Reserve Road border the eastern extent of the site.

Vegetation subject to this BRMP has been mapped by the State as mixed polygon of Regional Ecosystem (RE) 12.3.11 and 12.11.24. Site inspection and ground-truthing determined that a mixed polygon of RE 12.3.11 and RE 12.3.1a more accurately characterised the vegetation observed. Refer to the Detailed Ecological Assessment (**S523094_DEA_v1.1**) and Vegetation Retention Plan (**S523094_VRP_001-004(D)**) for further information regarding the ecological state of the subject site, as well as the proposed development plans. Tree Protection Zones (TPZ) are additionally illustrated within the VRP in accordance with AS4970.

During S5 Environmental's site visit a number of declared weed species were identified. These species are detailed below in **Table 2**. Rehabilitation works are proposed in the south-eastern extent of the subject site. This area has been divided into two distinct Rehabilitation Management Units (RMUs) based on proximity to Yuan Creek.

Objectives

- To remove exotic species;
- To improve the ecological integrity, functionality and value of the area;
- To provide habitat for native fauna; and
- Revegetate the Dedicated Park and waterway within the south-eastern extent of the site with a variety of native groundcover and shrub species that are locally appropriate considering the ground-truthed RE 12.3.1a and 12.3.11.

Rehabilitation Strategy.

The following Rehabilitation Management Units (RMUs) have been prescribed in order to achieve these outcomes.

Rehabilitation Management Unit 1 – 3,512 m²

Rehabilitation Management Unit 1 (RMU 1) represents a riparian corridor of approximately 20-30 metres surrounding Yuan Creek. This area is within the waterway corridor and presents as a distinct channel that may become periodically inundated and pool in areas during heavy rainfall. RE 12.3.1a was assessed to be the most suitable RE based on review of current and preclear RE mapping along Yuan Creek, ground-truthing during the site inspection, and periodic inundation. On-ground species composition included a number of mature Moreton Bay fig trees (*Ficus macrophylla)* as well as native vines, including; barbed wire vine (*Smilax australis*) and snake vine (*Stephania japonica)*. Rehabilitation of RMU 1 aims to remove over 90% of exotic species and undertake infill planting of the riparian corridor after weed removal, with appropriate native shrub and ground-cover species. Due to the established nature of native canopy in this area, it is unlikely that canopy planting would be required and/or successful in the current state. Weed removal in this area should particularly aim to remove; cocos palms (*Syagrus romanzoffiana),* camphor laurel (*Cinnamomum camphora*) as well as invasive species of grass. Stumps of removed canopy and subcanopy species are to be left in situ to assist with erosion control.

The goal of RMU 1 is to enhance ecological function of the site and promote natural regeneration. Rehabilitation will improve connectivity to the east and west and provide opportunities for the movement of terrestrial and aquatic fauna. Rehabilitation will include the planting of 1 m dense buffer riparian species (e.g. *Lomandra* spp.) along the banks existing waterway channel. Riparian species have been identified in **Table 1**.

Planting specifications -

- Shrubs to be planted at 1 plant per 3 m² and ground covers to be planted at 1 plant per m². Riparian species are to be planted at 2 plants per m²;
- Rehabilitation planting to consider on ground conditions (i.e. target areas) where weeds have been removed for dense infill planting and reduce densities of planting where native ground, shrub and canopy level strata are well established; and
- Due to the proposed rehabilitation being within a CoGC waterway corridor, rehabilitated banks are to be stabilised with jute matting pinned securely to the ground.

Rehabilitation Management Unit 2 – 2,688 m²

Rehabilitation Management Unit 2 (RMU 2) represents areas outside of the riparian corridor, and includes tops of the banks extending north towards the development area as well as south towards Reserve Road. RE 12.3.11 was found to be the most suitable RE based on pre-clear vegetation mapping and on-ground species composition. These areas are unlikely to be periodically inundated due to the increase in elevation, with species aligning with RE12.3.11 better suited for the higher banks. RMU2 includes planted areas of vegetation associated with gardens around the dwelling as well as areas historically maintained as turf. It has a higher level of non-native flora compared with RMU1 and in areas, is highly disturbed. Rehabilitation of RMU 2 aims to remove over 90% of exotic species and rehabilitate the area with a mixture of native groundcover, shrub and canopy species aligned with RE 12.3.11 in order to enhance ecological function.

Planting specifications -

- Canopy to be planted at 1 plant per 10 planted at 1 plant per 3 m², shrubs to be planted at 1 plant per 3 m² and ground covers to be planted at 1 plant per m²; and

- Rehabilitation planting to consider on ground conditions (i.e. target areas) where weeds have been removed for dense infill planting and reduce densities of planting where native ground, shrub and canopy level strata are well established.

Revegetation Specifications

Contractor

The contractor appointed for rehabilitation works must be experienced in bush regeneration techniques and retention of naturally regenerating vegetation. Any herbicide application is to be completed by a licenced ACDC contractor.

Site Preparation and Weeding

All rubbish, paths and existing structure are to be removed from the rehabilitation areas. It is noted that building waste was present within the riparian corridor of Yuan creek (i.e. bricks, waste, concrete). This building waste should be removed wherever possible, however heavy machinery is not to be used within close proximity to the creek and ecological impacts to native vegetation should be minimised.

The following steps are recommended for weed treatment:

1. Identify existing State and Council restricted invasive pest plant species occurring within the Rehabilitation Area.
2. Physical weed removal, followed by stem inject, cut and paint, or foliar spray all remaining weedy vegetation in accordance with specific control techniques, outlined in the ***Declared Weed and Waste Management Actions*** Section;
3. Manual removal should only be used on species resistant to herbicide treatment, as applicable. Herbicides are to be registered for use within proximity to a waterway/aquatic area and must be used in accordance with the registered label, relevant legislation or applicable APVMA approved off-label permit;
4. Initial weeding will take into account all weeds identified within the rehabilitation area, with a primary treatment followed by a secondary treatment to account for regermination and reshooting; and
5. All understorey and ground-layer weed species are to be treated concurrently, unless there is a high risk of erosion, in which case, a staged approach to reduce soil exposure should be employed i.e. mosaic spraying or spraying of rings for tube stock.

Maintenance Trail and Access

Given the width of the rehabilitation, a maintenance trail must be established so that access to both RMUs can be achieved and managed. Maintenance trails should be sited by the Rehabilitation contractor, preferably utilising trails within the vegetation. Maintenance trail width should be minimised where possible to allow revegetation. Maintenance Trails should be clearly marked and maintained. Indicative trail locations are shown above in **BRMP001.**

Mulching

1. Forest aged mulch (free of deleterious/extraneous material) is to be installed, to an initial depth of 100mm to 150mm across the RMU 2. Blanket mulching is not appropriate within RMU 1 due to the likelihood of inundation; and
2. Jute matting should be installed where weed management and planting is occurring on steep banks of RMU 1. Jute matting is to be secured with pins at regular intervals (approx. 2/m^2 to ensure they are retained in place in the event of minor flooding

Exposed Soil and Slope Stabilisation

1. Exposed soil in the Rehabilitation Area will be revegetated with planting of native species;
2. Stumps of removed exotic canopy species are to remain in-situ to aid soil stabilisation; and
3. The installation of jute mat or equivalent and/or sediment fencing is to be used in accordance with direction from an erosion and sediment control certified person (CPESC), to ensure no sediment enters Yuan Creek.

Planting

1. Tube stock sized plants should be used and should be at least 20 cm in height (dependent on the species), displaying healthy signs of growth. They should be adequately 'sun hardened', free from damage, pests and disease and be of local provenance;
2. All plants should be watered in pots before planting;
3. Plant species are to be selected in accordance with the planting palettes provided and placed as site conditions allow. Set out of plants and species is to be in accordance with the planting areas and densities as shown in this Rehabilitation Plan;
4. Plant placement of each species is to be generally randomised in keeping with a natural ecosystem and distributed to achieve the set densities prescribed; and
5. Riparian species are to be planted within RMU 1 in line with planting palette (see **Table 1**)
6. Tree guards are to be installed where predation is evident during the establishment and maintenance period.

Fauna-exclusion Fencing

1. Fauna exclusion fencing must be erected along the northern and southern boundaries of the dedicated park. The purpose of which is to prevent the movement of wildlife into the proposed development as well as onto Reserve Road. (see **BRMP001** above). Specifications for the fauna-exclusion fence are as follow:
   - Fence must be at least 1.5m in height;
   - No gaps greater than 50mm; and
   - Use panelling, smooth metal or Perspex sheets of at least 600mm at the top.
2. The northern and southern fauna-exclusion fences are to include a self-closing access gate to allow future access to the Dedicated Park for maintenance. Refer to **BRMP001** for indicative location.

Fauna-friendly Fencing

1. Where fencing is installed adjacent the eastern and western boundary of the dedicated park (refer **BRMP001**) the following is permitted as fauna-friendly fencing:

   Wooden Pole Fence:
   - Gap between ground and first rail is minimum 40cm;
   - Gap between every other rail is 30cm minimum; and
   - Fence is no greater than 1.2m in height.

   Boxwire Fence:
   - Squares no less than 15cm is used provided a 30cm gap between ground level and the mesh is provided; and
   - Fence is no greater than 1.2m in height.

   Strand Fence:

- Gap between ground and first strand is minimum 40cm;
- Gap between every other strand is 30cm minimum; and
- Fence is no greater than 1.2m in height.

2. Fencing shown as "Potential fauna-fencing" on Sheet **BRMP001** is not required to be erected, however, should fencing be erected in these locations, it must be fauna-friendly fencing per the above specification unless agreed in writing with an Ecologist from CoCG.

Fertilising

1. An organic fertiliser suitable for use on Australian native vegetation, in pellet form, will be applied at time of planting. The fertiliser will be placed adjacent and not in contact with the root ball at 2 – 4 cm below the soil surface and under the mulch.

Watering

1. Plants should be watered before planting;
2. All plants are then to be watered in at time of planting (approximately 5 – 10 L per plant);
3. Watering requirements will be influenced by site and climatic conditions and should be carried out as often as required to ensure establishment and active growth. Under extremely dry conditions, follow-up watering can be generally carried out as follows:
   - Three times a week for the first month after planting;
   - Twice a week or as needed 4-8 weeks after planting; and
   - As required according to climatic conditions thereafter for the duration of the maintenance period;
4. Watering schedule may vary according to rainfall. If soil is moist, watering will not be necessary; and

Maintenance and Monitoring

1. A 24-month maintenance period will commence from the date of practical implementation of all works;
2. The rehabilitation area will be periodically assessed to replace dead plants and control weeds. Assessments will be undertaken as per the Monitoring and Maintenance Schedule. Weed removal, monitoring and maintenance will be ongoing as required;
3. Dead plants shall be replaced with suitable replacement species;
4. Weak or leaning plants should be staked, the stakes are to be removed once the plants become strong and established; and
5. By the end of the maintenance period, rehabilitation is to have achieved the prescribed species densities, with a minimum 90% mortality of weed species.

Note: - Monitoring and maintenance frequency will be increased on a reactive basis (where necessary) to ensure that rehabilitation works achieve compliance with the 'Rehabilitation Targets' (below) throughout the duration of the 24-month maintenance period.

Rehabilitation Targets

1. Any rubbish/debris is to be removed before rehabilitation commences;
2. A survival rate of 90% of native vegetation planting at end of maintenance period must be achieved; and
3. A removal rate of 90% of weed species cover/abundance at the end of the maintenance period must be achieved.

Planting Palettes

Table 1. Planting palette for RMU1 based on the RE Technical Descriptions for RE 12.3.1a

Scientific Name	Common Name	%	Target Plant Density*
Canopy			
Lophostemon confertus	Brush box	20	1 plant per 10 m^2
Ficus coronata	Sandpaper Fig	20	
Melaleuca salicina	Willow Bottlebrush	20	
Acacia disparrima subsp. disparrima	Southern Salwood	20	
Eucalyptus grandis	Flooded Gum	20	
Shrubs			
Backhousia myrtifolia	Cinnamon Myrtle	15	1 plant per 3 m^2
Cryptocarya laevigata	Glossy Laurel	15	
Phyllanthus microcladu	Brush Sauropus	10	
Breynia oblongifolia	Coffee bush	10	
Alphitonia excelsa	Red Ash	15	
Tristaniopsis laurina	Water Gum	10	
Cryptocarya triplinervis	Three Veined Laurel	10	
Polyscias elegans	Celery Wood	10	
Jacksonia scoparia	Dogwood	5	
Westringia eremicola	Slender westringia	5	
Dodonaea triquetra	Common hop bush	5	
Groundcover **			
Lomandra longifolia (riparian species)	Spiny-head mat-rush (riparian species)	5	1 plant per m^2 OR 2 plants per m^2 for riparian species planted in 1 m creek bank buffer
Dianella caerulea	Blue flax-lily	5	
Christella dentata	Soft Fern (riparian species)	5	
Lomandra hystrix	Green Mat-rush (riparian species)	15	
Juncus usitatus	Common rush (riparian species)	5	
Imperata cylindrica	Cogon grass	5	
Adiantum formosum	Giant Maidenhair	15	
Adiantum hispidulum	Rough Maidenhair	10	
Ottochloa gracillima	Graceful grass	20	
Tripladenia cunninghamii	Bush Lily	15	
Note: *Canopy species are not to be planted under existing canopy trees*			

*The target density required following planting (includes existing vegetation)

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Issue	Description	Date	Client	Project Name	Project No.
B	Layout Amendment	20/09/2024	MG Land C/- Urban Strategies	202 Baileys Mountain Road, Upper Coomera	S523094
Drawing Name	BASIC REHABILITATION MANAGEMENT PLAN				BRMP004

Planting Palettes Cont.

Table 2. Planting palette for RMU2 based on the RE Technical Descriptions for RE 12.3.11

Scientific Name	Common Name	%	Target Plant Density*
Canopy			
Eucalyptus tereticornis	QLD blue gum	40	1 plant per 10m^2
Eucalyptus siderophloia	Northern grey ironbark	20	
Melaleuca quinquenervia	Broad leaved paperbark	10	
Corymbia intermedia	Pink bloodwood	20	
Lophostemon suaveolens	Swamp box	10	
Shrubs			
Leptospermum polygalifolium	Yellow tea-tree	15	1 plant per 3m^2
Lophostemon suaveolens	Swamp box	15	
Acacia disparrima	Hickory wattle	15	
Acacia leiocalyx	Black wattle	15	
Alphitonia excelsa	Soap tree	15	
Acacia concurrens	Black wattle	10	
Melaleuca quinquenervia	Broad leaved paperbark	15	
Groundcover			
Lomandra longifolia	Spiny-head mat-rush	10	1 plant per m^2
Lobelia purpurascens	White root	5	
Cymbopogon refractus	Barbed wire grass	10	
Entolasia stricta	Wiry panic grass	10	
Dianella caerulea	Flax lily	5	
Imperata cylindrica	Cogon grass	10	
Goodenia rotundifolia	Star goodenia	5	
Gahnia aspera	Red fruited saw sedge	5	
Ottochloa gracillima	Graceful grass	20	
Themeda triandra	Kangaroo grass	10	
Pteridium Esculentum	Bracken fern	10	
Note: *Canopy species are not to be planted under existing canopy trees*			

*The target density required following planting (includes existing vegetation)

Fire Ants and Restricted Species

Upon review of the fire ant biosecurity map, the locality of Upper Coomera is within fire ant biosecurity Zone 2; covering suburbs yet to receive fire ant eradication treatment. Restrictions to fire ant carrier movements apply (National Red Imported Fire Ant Eradication Program 2016) including the movement of soil, mulch, manure, baled hay, straw, potted plants, turf, and compost.

If any fire ants or restricted species are located within the subject site, a report to the Department of Agriculture and Fisheries must be made within 24 hours of suspected sighting. Refer to the Queensland Government's Fire ant biosecurity zone map at https://www.fireants.org.au/ for further information.

Declared Plant, Weed and Waste Management Actions

S5 Environmental's Ecologists identified two State and/or Locally Declared Pest Plant/ Weed species within the subject site during the site inspection. The below information is to inform rehabilitation works in the prevention of future weed invasions.

Objectives

Prevent any weed presence from negatively impacting plant growth or survival by undertaking weeding for 24 months, with aims to remove at least 90% of exotic species at the end of the maintenance period.

Performance Criteria

1. Control any declared plants;
2. Prevent spread of declared plants offsite; and
3. Remove rubbish from the site.

Responsibility

1. Rehabilitation Contractor and Site Supervisor.

General Management Actions

1. It is recommended that a thorough weed treatment is undertaken prior to planting to promote stock survival and diminish plant competition with exotic species;
2. Vehicles are not to enter the rehabilitation area at any time. Unless under the supervision and direction of the Project Arborist;
3. Storage areas are to be bunded to prevent chemical spills (petrol, oil, etc.) from discharging from the site and entering stormwater drains;
4. During works, declared and invasive plant species (if applicable) are to be removed as per the State and Council Declared Pest Plant/Weed Treatment and Control Table. Declared and invasive plants must be stockpiled separately and disposed of at an appropriate waste disposal facility;
5. Stockpiles of vegetation are to be inspected for declared plant species prior to exporting offsite/mulching;
6. Declared plants as defined by the Biosecurity Act 2014 are not to be planted on-site; and
7. Fire as a management technique for controlling declared plants is not to be administered on the site.

Note: Herbicides must be applied by appropriately qualified/supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance.

Monitoring

1. Germination or regrowth of declared plant species and environmental weeds; and
2. Site Supervisor to monitor declared plant and environmental weed control and ensure management strategies are adhered to.

Corrective Action

1. Undertake successive phases of declared plant and environmental weed control to treat newly germinated or remaining declared plants and environmental weeds.

Reporting

1. Any incidents of non-compliance to be recorded in an Environmental Diary.

It should be noted that weed control works are NOT limited to the specified declared weeds within **Table 2** below but apply to all environmental weeds located within the rehabilitation area.

The following declared weeds were identified within the Rehabilitation Area and must be controlled accordingly.

Table 3. State and Locally Declared Pest Plant/ Weed

DECLARED PEST TREATMENT AND CONTROL	
Trees	
African tulip tree (*Spathodea campanulata*) State Category 3	▪ Cut, scrape and paint with glyphosate no more than 15 cm from the ground and apply herbicide immediately to all cut/scraped surfaces; or • Stem inject with glyphosate. Drill around the base of the trunk at 7.5 cm intervals on a 45° angle and immediately inject herbicide.
Shrub	
Lantana (*Lantana camara*) State Category 3	▪ Cut, scrape and paint with glyphosate no more than 15 cm from the ground and apply herbicide immediately to all cut/scraped surfaces; ▪ Foliar spray with glyphosate to wet all foliage but not cause runoff; ▪ or all pieces to prevent re-shooting.

Monitoring and Maintenance Schedule

Monitoring and Maintenance Schedule			
Timing	**Task**	**Remedial Action**	**Responsibility**
Pre-planting	• At least 1 round of initial weed pre-treatment/management; • Confirm that appropriate pest plant control has been completed as guided by the State and Council Restricted Invasive Pest Plant Table.	• Ensure initial weed treatment rounds are completed as per the approved RMP; • Evaluate success of initial weed treatment; • Instigate an additional round of treatment if success rate is low.	Restoration Ecologist and Rehabilitation Contractor
	• Apply mulch as specified in approved RMP.	• Reapply mulch where required.	
	• Acquire fertilizer and sun-hardened seedlings.	• Delay planting until all materials are available.	
	• Install exclusion signing and/or fencing to prevent disturbance from vehicles, livestock and/or otherwise.	• Delay planting until all materials are available.	
During Planting	• Any necessary follow-up weed control.	• Ensure all works are completed as per the approved RMP.	Restoration Ecologist and Rehabilitation Contractor
	• Initial planting and watering and installation of tree guards.	• Ensure all works are completed as per the approved RMP.	
3 Month Establishment Period	• Water newly installed seedlings three times a week or as needed for the remainder of the first month after planting.	• Replace damaged seedlings and stake weak or leaning plants.	Rehabilitation Contractor
	• Water newly installed seedlings TWICE EACH WEEK during Month 2 after planting or as required.	• Additional watering may be required during dry periods.	
	• Check exclusion signage is still in place and performing its role.	• Reinstate or upgrade exclusion signage if required.	
	• Check for disturbances from pests (e.g., hares, foxes, etc.) or vandals.	• Replace damaged seedlings if browsing is observed	
	• Check for signs of soil erosion and instability.	• Implement erosion and sediment control i.e., jute matting and sediment fencing in areas suffering erosion.	
Month 1-6 (On Maintenance) At Least Monthly (or as conditions dictate)	• Monitor rehabilitation progress and seedling health.	• Replace damaged seedlings and stake weak or leaning plants. Water as required.	Rehabilitation Contractor
	• Check for disturbances from pests (e.g., rabbits, foxes, etc.) or vandals.	• Replace damaged seedlings.	
	• Check for signs of soil erosion and instability.	• Implement additional erosion and sediment control i.e., jute matting and sediment fencing in areas suffering erosion.	
	• Monitor restricted environmental weeds and weeds.	• Treat environmental weeds to prevent their spread.	
Month 6 – 11 (On Maintenance) At Least Monthly (or as conditions dictate)	• Check for erosion and sediment run-off.	• Implement additional erosion and sedimentation control i.e., jute matting, or jute netting and mulch.	Rehabilitation Contractor (weed monitoring & control)
	• Monitor restricted invasive plants and environmental weeds.	• Treat restricted environmental weeds and spray/remove to prevent their spread.	
	• Monitor and record rehabilitation progress and seedling health.	• Additional watering when rainfall is low; & • Replace damaged seedlings and replenish mulch where required.	
Months 12 -24	• Check for erosion and sediment run-off.	• Implement additional erosion and sedimentation control i.e., jute matting, or jute netting and mulch.	Rehabilitation Contractor (weed monitoring & control)
	• Monitor for environmental weeds, record progress and ongoing issues	• Treat restricted environmental weeds and spray/remove to prevent their spread.	
	• Monitor and record rehabilitation progress and seedling health (min. of 80% of specimens are to be in good health)	• Additional watering when rainfall is low; & • Replace damaged seedlings and replenish mulch where required.	
	• Review the first 12 months of the monitoring schedule and assess effectiveness of Rehabilitation Plan.	• Report rehabilitation progress results to landowner	
	• First year report to be submitted to Council (Refer below)		Ecologist
Month 13 – 23	• Check for erosion and sediment run-off.	• Implement additional erosion and sedimentation control i.e., jute matting, or jute netting and mulch.	Rehabilitation Contractor (weed

Monitoring and Maintenance Schedule			
Timing	**Task**	**Remedial Action**	**Responsibility**
At least every second month (or as conditions dictate)	• Monitor for restricted invasive pest plants and other weeds, record progress and ongoing issues;	• Treat restricted environmental weeds and spray/remove to prevent their spread.	monitoring & control)
	• Monitor and record rehabilitation progress and seedling health. • Additional watering when rainfall is low	• Replace damaged or dead seedlings and replenish mulch where require.	
Month 24	• Check for erosion and sediment run-off.	• Implement additional erosion and sedimentation control i.e., jute matting, or jute netting and mulch.	Rehabilitation Contractor (weed monitoring & control)
	• Monitor for restricted invasive pest plant species and other weeds, record progress and ongoing issues	• Treat environmental weeds and spray/remove to prevent their spread.	
	• Monitor and record rehabilitation progress and seedling health	• Additional watering when rainfall is low; and • Replace damaged or dead seedlings and replenish mulch where required.	
	• Review months 12-24 of the monitoring schedule and assess effectiveness of Rehabilitation Plan.	• Report rehabilitation progress results to landowner	
	• Second year report to be submitted to Council		Ecologist

Table Notes: -

- **Timing column**: the terminology 'or as conditions dictate' is taken only to mean an increased frequency will be implemented on a reactive basis (where necessary) to ensure that rehabilitation works achieve compliance with the 'Rehabilitation Targets') throughout the duration of the 24-month maintenance period.
- **Task column**: during monitoring events, the threshold to trigger remedial action will be any observed conditions that do not meet the performance targets specified in 'Rehabilitation Targets' (refer to Sheet **BRMP003**), or anywhere else in this plan.
- **Remedial Action column**: Specified remedial actions (as well as any other necessary actions) will be undertaken to restore conditions throughout the rehabilitation areas to achieve the performance targets specified in 'Rehabilitation Targets' (refer to Sheet BRMP003), or anywhere else in this plan.
- **Monitoring and Maintenance Reports -** Report to include monitoring and maintenance inspection logs from the rehabilitation contractor for each monitoring/maintenance event outlining specific details of the date of event, monitoring findings and (where necessary) remedial actions for each event.

Ongoing Requirements

At the completion of 24 months maintenance, ownership of the Dedicated Park will be transferred from Body Corporate to CoGC. It should be noted that the following are not permitted within the Dedicated Park:

- No part of any building or structure (including but not limited to swimming pools, tennis courts, retaining walls, tanks);
- No landscaping;
- No on-site stormwater drainage;
- No on-site wastewater treatment;
- No areas of disturbance (including excavation and filling); and
- No on-site parking.

Access

All future access to the Dedicated Park will be achieved via a gate in the fauna-exclusion fencing, adjacent the recreation link pathway. Removal and disposal of weed materials shall be offsite via an appropriate disposal mechanism, e.g., Green Bin, Council Waste Transfer Station or similar.

Ongoing Maintenance and Monitoring

It is the ongoing responsibility of CoGC to keep the Dedicated Park free of weeds, rubbish, and deleterious material. As such, it is the ongoing responsibility of the City of Moreton Bay to keep the RMUs free of weeds, rubbish and deleterious material.

Replanting/Revegetation

If native vegetation within the rehabilitation area is damaged, appears dying or is dead, the Body Corporate must look to replace these dead or damaged plants in accordance with the Planting Palette of this BRMP during the 2-year maintenance period.

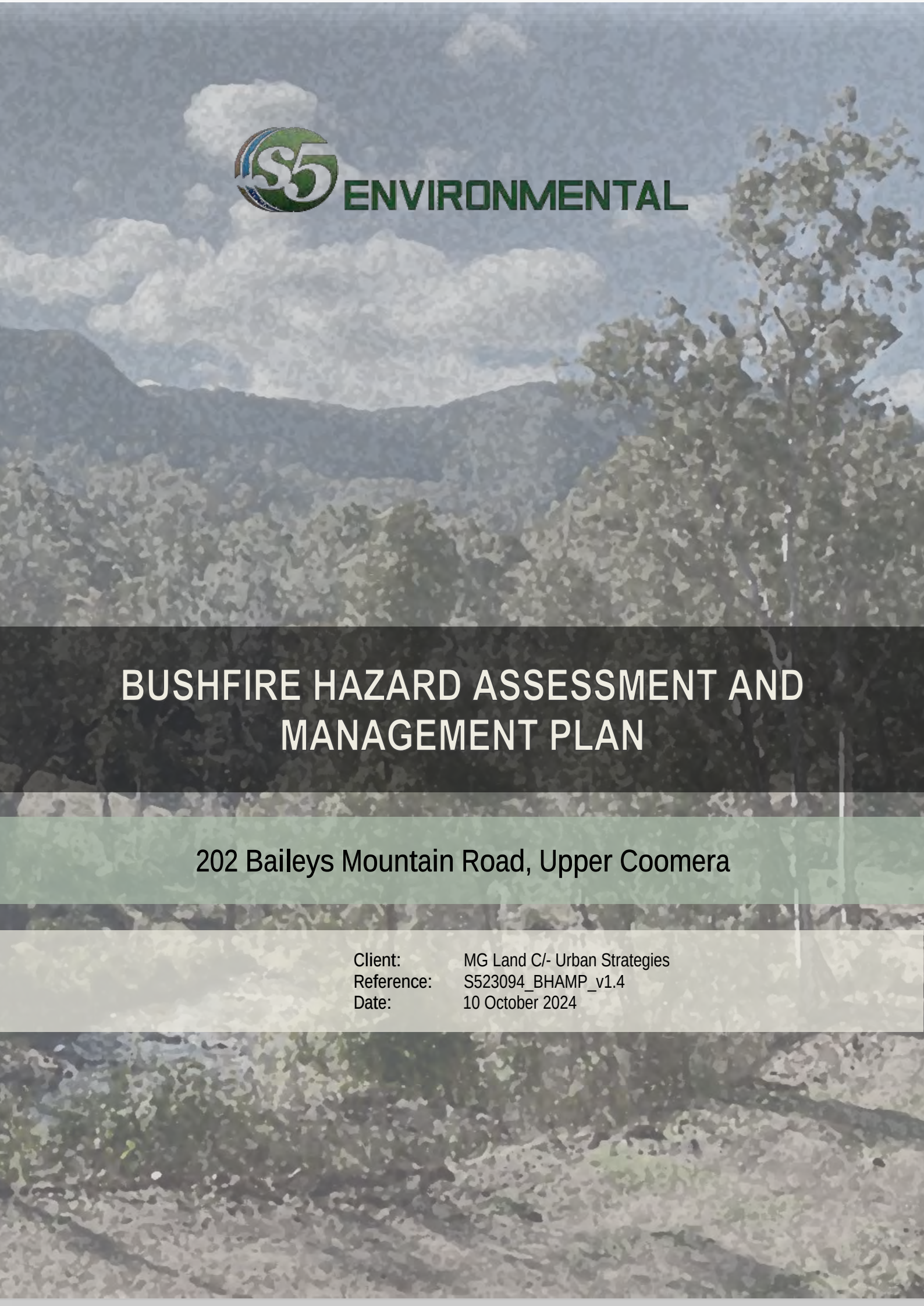
Each plant must be watered prior to planting and the addition of a suitable native fertiliser and water crystals are to be used. Initial watering after planting should be daily for at least the first week, and then at reduced intervals depending on climatic conditions at the time.

Fire Ants

The Department of Agriculture and Fisheries' Fire Ant Biosecurity Map outlines suburbs and localities which are in Biosecurity Zones for Red Imported Fire Ants. Your property is located within the Queensland Governments Biosecurity Zone 2 for fire ants. Should you suspect fire ants are present within your Lot or the Dedicated Park, you must notify the Government's National Fire Ant Eradication Program.

For more information on Fire ants or to report suspected sightings at the following web address:

https://www.fireants.org.au/look



BUSHFIRE HAZARD ASSESSMENT AND MANAGEMENT PLAN

202 Baileys Mountain Road, Upper Coomera

Client:	MG Land C/- Urban Strategies
Reference:	S523094_BHAMP_v1.4
Date:	10 October 2024

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Quality Control

Prepared for	MG Land C/- Urban Strategies
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Date	10 October 2024

Version Control

Version	Description	Date	Author	Reviewer	Approver
1.0	For Review	20 April 2024	SV (Env. Scientist)	CH (Ecologist)	RS (Director)
1.1	Draft	15 May	CH (Senior Ecologist)	SL (Principal Ecologist)	RS (Director)
1.2	Amended Layout	17 June 2024	CH (Senior Ecologist)	SL (Principal Ecologist)	RS (Director)
1.3	Amended Layout	10 October 2024	CH (Senior Ecologist)	RS (Director)	RS (Director)
1.4	Amendedments	10 October 2024	JG (Env. Scientist)	RS (Director)	RS (Director)

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Disclaimer

S5 Consulting Pty Ltd trading as S5 Environmental has developed this Bushfire Hazard and Bushfire Attack Level Assessment, taking into consideration the Australian Standard (AS3959-2018) - Construction of Buildings in Bushfire-prone Areas, the State Planning Policy and relevant local authority policies and guidelines. However, there can be no guarantee that following the recommendations made in this assessment can guarantee safety of property and human life.

Fire is an element of nature, and as such fire events (small or large) can have disastrous outcomes even with the best planning in place. The authors of this report and S5 Consulting Pty Ltd accept no responsibility for any harm to property or human life caused by fire or any other cause to persons utilising property or structures.

Abbreviations

AHD	Australian Height Datum
AS 3959-2018	*Australian Standard 3959-2018 Construction of Buildings in Bushfire-prone Areas*
BAL	Bushfire Attack Level
BCA	Building Code of Australia
BMP	Bushfire Management Plan
BRC	Bushfire Resilient Communities (The State of Queensland 2017)
CFA	Country Fire Authority
CoGC	City of the Gold Coast
DES	Department of Environment and Science
DNRME	Department of Natural Resources, Mines and Energy
DoR	Department of Resources
FFDI	Forest Fire Danger Index
ha	Hectares
NCC	National Construction Code
RE	Regional Ecosystem
SEQ	South East Queensland
SPP	*State Planning Policy, 2017*
VHC	Vegetation Hazard Class

1.0 INTRODUCTION

S5 Environmental was commissioned by Urban Strategies, on behalf of their client MG Land, to undertake a Bushfire Hazard Assessment and Management Plan (BHAMP) as supporting documentation for a Development Application for a Reconfiguring a Lot (Boundary Realignment 2 into 2), Material Change of Use (Multiple Dwelling – Townhouses) and Operational Works (Changes to Ground Level and Vegetation Clearing) at 202 Baileys Mountain Road, Upper Coomera, further described as Lot 13 on RP835832. Refer to Table 1.

The aim of this BHAMP is to undertake a site-specific bushfire hazard assessment, determine any set back required between the proposed development and hazardous vegetation and prepare a Bushfire Management Plan to ensure the proposed development is not exposed to an unacceptable bushfire risk and can comply with the relevant legislative bushfire requirements.

Table 1. Site Description

Address	202 Baileys Mountain Road, Upper Coomera	RPD	Lot 58 on SP191940
LGA	City of Gold Coast (CoGC)	Site Area	3.08 ha (post-boundary realignment)
Zone	Rural residential	Tenure	Freehold
Current State	Lot 58 on SP191940, herein referred to as the 'subject site', is a modified lot containing a dwelling on the south-western extent, accessed via an unsealed driveway. Yaun Creek waterway is situated south of the existing residence in the south-eastern extent of the lot. The subject site and southern and north-western adjacent lots are zoned as Rural residential, with Medium density residential lots to the north-west. Refer to Figure 1, below.		
Proposed Development	S5 Environmental understand that the proposed development is for DA will be for Reconfiguring a Lot (Boundary Realignment 2 into 2), Material Change of Use (Multiple Dwelling – Townhouses) and Operational Works (Changes to Ground Level and Vegetation Clearing), for a 73 townhouse development. The development will include a boundary realignment with the western adjacent property. The northern extent of the site is proposed as a road reserve, with an eastern portion of the site proposed as a future road/land dedication to CoGC. The southern extent of the site is proposed as a dedicated park, which will undergo rehabilitation. Refer to S523094_BRMP_001-005(B) for the Basic Rehabilitation Management Plan (BRMP). A 5 m recreation link pathway will separate the rehabilitated dedicated park with the development footprint, which includes the townhouses, internal roads, and a		

	bio-basin. Refer to Figure 2, for the proposed development site boundary post-boundary realignment.
Potentially Hazardous Vegetation	Post development, potentially hazardous vegetation is situated to the south-west of the subject site. This vegetation has been mapped as category B under the Vegetation Management Act, with a Regional Ecosystem (RE) of 12.3.11, 12.11.24 and 12.11.27. These REs are described as follows: RE 12.3.11: *Eucalyptus tereticornis* ± *Eucalyptus siderophloia*, *Corymbia intermedia* open forest on alluvial plains usually near coast; RE 12.11.24: *Eucalyptus tindaliae*, *E. carnea*, *Corymbia intermedia* ± *E. siderophloia* or *E. crebra*, *Corymbia citriodora* subsp. *variegata* woodland on metamorphics ± interbedded volcanics; and RE 12.11.27: *Eucalyptus racemosa* subsp. *racemosa* and/or *E. seeana* and *Corymbia intermedia* woodland on metamorphics ± interbedded volcanics.



Figure 1. Site Aerial (source: Nearmap, date: 13/11/23)



Figure 2. Extract of Site Layout (source: Red Door Architecture, drawing no. 23008, DA-010, rev. 22, Review Issue dated: 28/08/24)

2.0 STATUTORY REQUIREMENTS

2.1 Development Applications in Bushfire Prone Areas

Bushfire Prone Areas are identified at both the State and Local Government Level. The State Planning Policy (SPP) Bushfire Prone Area map was developed by CSIRO to map areas with Very High, High and Medium Potential Bushfire Intensity. The SPP also maps a 100 m Potential Impact Buffer. It is understood that the CoGC *Planning Scheme 2022* has appropriately integrated all aspects of the SPP, including the Safety and Resilience to Hazards (Natural Hazards, Risk and Resilience – Bushfire) State Interest. As such, only the CoGC planning scheme mapping and overlay code apply to a proposed development within this local government area. The CoGC Bushfire hazard overlay map was consulted to determine the preliminary bushfire hazard ratings of the site and locality (within 150 m of the proposed development), refer to Figure 3 below.

The CoGC Bushfire hazard overlay has mapped a patch of native vegetation as Medium potential bushfire intensity, whilst the balance of the subject site has been mapped as Potential impact buffer. Numerous patches of native vegetation throughout the assessment area have similarly been mapped as Medium Potential Bushfire Intensity, with much of the remaining assessment area being mapped as Potential impact buffer. A patch of native vegetation to the south of the subject site has been mapped as Very High Potential Bushfire Intensity.

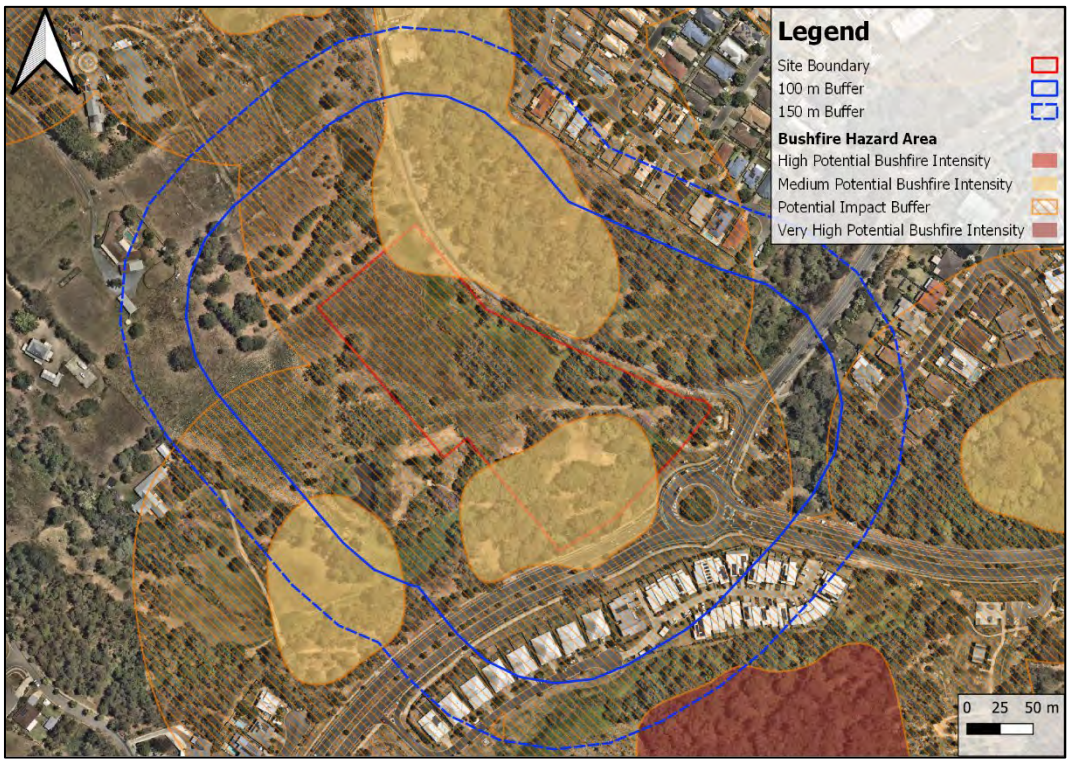


Figure 3 CoGC Bushfire Hazard Mapping within and in Proximity to the Site

3.0 METHODOLOGY

3.1 Bushfire Hazard Assessment

The SPP Potential Bushfire Intensity classifications are based on the *New Methodology for State-wide Mapping of Bushfire Prone Areas in Queensland* (Leonard *et al.* 2014). This State-wide mapping methodology was developed to identify Bushfire Prone Areas in support of bushfire hazard provisions of Queensland's State Planning Policy. The new methodology scales bushfire hazard based on the Potential Fire-line Intensity (PFLI) of a severe bushfire and can be used to predict the radiation profile of areas located adjacent to potentially hazardous vegetation and an associated Potential Impact Buffer.

Accordingly, the classification of an area's PFLI is calculated as a combination of the following three metrics, using the below equation (Leonard *et al.* 2014):

- Total fuel load (W);
- The McArthur Forest Fire Danger Index (FFDI), and
- Maximum Landscape Slope (θ in ^{o}).

$$FI = 0.62\, W^2\, FFDI \exp(0.069\, \theta)$$

For the purposes of the bushfire hazard assessment, S5 Environmental have utilised data from the Queensland Fire and Emergency Services (QFES) published to the Queensland Government's Queensland Spatial Catalogue (QSpatial) for fuel load and FFDI. PFLI is delineated into a number of hazard categories shown in Table 2, and each patch of hazardous vegetation can be classed as Very High, High, Medium, Grassland or low hazard according to the PFLI determined for that specific patch. Any patch of hazardous vegetation classed as Very High, High, or Medium is buffered by 100m called the Potential Impact Buffer.

The Potential Impact Buffer is also considered a Bushfire Prone Area, along with hazardous vegetation with a PFLI of very high, high, or medium. Any development within a bushfire prone area requires further assessment of radiant heat exposure, assessment against the relevant local planning scheme bushfire code and/or an assessment against the SPP assessment benchmarks for Natural hazards, risk, and resilience relevant to bushfire and the development of a site-specific bushfire management plan to ensure that the proposed development is exposed to an acceptable or tolerable bushfire risk.

Table 2 Potential Bushfire Intensity Classification

Potential Bushfire Intensity Class	Potential Fire-line Intensity (PFLI)
Very high	>40,000kW/m
High	20,000 – 40,000kW/m
Medium	4,000 – 20,000kW/m
Low	<4,000kW/m

3.2 Modification of Potential Intensity of Small Patches and Corridors

Using the Bushfire Resilient Communities (BRC) methodology in Section 4.2.6 (The State of Queensland 2019b), small patches of hazardous vegetation and narrow corridors were removed from the map of hazardous vegetation within 150 m of the proposed development. This is as small, isolated and/or narrow patches of hazardous vegetation are not large enough to support a fully developed fire. As stated in the BRC methodology (The State of Queensland 2019b), small, isolated, or narrow patches are unlikely to reach a potential fire-line intensity greater than 4,000 kW/m and as such, are considered to be low hazard and not classed as a Bushfire Prone Area. The *SPP Technical Reference Guide - Bushfire Resilient Communities* (2019) summarises research by Leonard and Opie (2017) outlines four steps to filter out small patches and narrow corridors of continuous fuel (see Table 3, below).

Table 3 Steps to Downgrade Bushfire Intensity

Step	Description
1	Remove small, isolated patches of continuous fuel (< 1ha) surrounded completely by either discontinuous fuel or no fuel. These patches must be further than 100 m from other continuous fuel patches greater than 2 ha in area.
2	Downgrade intensity of small patches (0.5 to 3 ha) of continuous vegetation surrounded completely by either discontinuous or no fuel, which is more than 100 m from other continuous fuel patches greater than 2 ha in area.
3	Remove narrow corridors of continuous fuel (50 m, or less in width). The process erodes, then dilates by 25 m in width all continuous fuel patches in relation to discontinuous areas.
4	Remove small fragments (< 0.5 ha) of shrub-dominated or hazardous tree vegetation.

3.3 Radiant Heat Exposure Assessment

Radiant heat exposure for the proposed development was calculated using a Method 2 from the AS3959-2018. This Method 2 calculates the Bushfire Attack Level (BAL) for a proposed development by determining the minimum distance between hazardous vegetation and the development to achieve each BAL level. As BAL directly correlates to radiant heat exposure, this calculation reflects the level of bushfire risk for a proposed development (see Table 4).

Table 4 BAL and Radiant Heat Exposure

BAL Score	Radiant Heat Exposure
Low	-
12.5	12.5 kW/m^2
19	19 kW/m^2

BAL Score	Radiant Heat Exposure
29	29 kW/m^2
40	40 kW/m^2
Flame zone (FZ)	> 40 kW/m^2

To determine the radiant heat exposure for the proposed development, the online Flamesol Minimum Distance Calculator (FPA 2017) was used to determine the required setbacks to hazardous vegetation to achieve an acceptable radiant heat exposure for the proposed development.

Currently, S5 Environmental understand there is one set of inputs for a Method 2 calculation in accordance with AS3959-2018 or Bushfire Resilient Communities (BRC) accepted by the CoGC. Inputs to the BAL/radiant heat exposure assessment include the sets of parameters as summarised in Table 5.

Table 5 Parameter inputs for Method 2 from AS3959-2018

Parameter	AS method 2
Surface fuel load (t/ha)	Surface fuel load for identified VHC (surface + near surface)
Overall fuel load (t/ha)	Total fuel load for identified VHC
Flame temperature	1200K
FDI/FFDI	From Catalyst/QSpatial
Standard inputs	Bushfire Resilient Communities (QG 2019)
Effective slope	Measured as the slope under the hazardous vegetation.
Site slope	Measured as the slope between the hazardous vegetation and the site.
Flame Width	Flame width is assumed to be 100 m (AS 3959-2018) unless a short-fire run.

3.4 Short Fire Run

Small or narrow patches of hazardous vegetation are unlikely to support a fully developed bushfire due to their limited size (see Figure 4 for a schematic representation of how fire moves across a landscape, demonstrating this). As such, the flame width and height in these small patches will not reach the standard inputs for the Method 2 from AS3959-2018 as these standard inputs are based on a fully developed bushfire. In these cases, a short fire run calculation can be used. The short fire run methodology can only be applied when there is a maximum fire run of 150m as measured on the effective slope. In these cases where a short fire run can be justified, and thus a reduced flame width and height for a Method 2 calculation, the method from the *Short Fire Run: Methodology for Assessing Bush Fire Risk for Low Risk Vegetation* (NSW Rural Fire Service, 2019) is adopted.

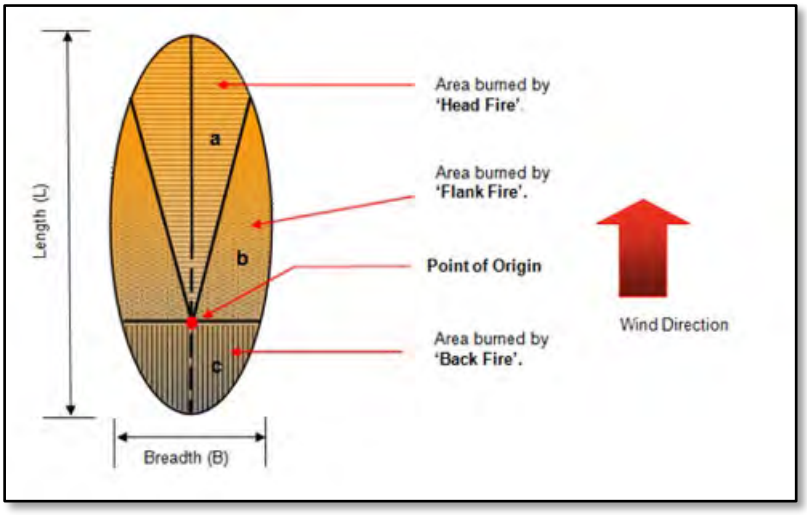


Figure 4 Schematic diagram of simple elliptical fire growth model (Van Wagner 1969) from NSW Rural Fire Surface (2019)

4.0 BUSHFIRE HAZARD ASSESSMENT

4.1 Potential Fire-line Intensity Assessment

In accordance with *A New Methodology for State-wide mapping of bushfire prone areas in Queensland* (Leonard *et al.* 2014), fuel loads derived from ground-truthed Vegetation Hazard Classes (VHCs), effective slope and FFDI were used to calculate the PFLI of hazardous vegetation within 150 m of the proposed development and hazardous into the relevant PFLI category. The following sections discuss how these parameters were determined to calculate PFLI for hazardous vegetation in proximity to the proposed development.

4.1.1 Vegetation Hazard Class Mapping

In accordance with the *New Methodology for State-wide Mapping of Bushfire Prone Areas in Queensland* (Leonard *et al.* 2014), potential fuel loads are assigned to vegetation categories (Vegetation Hazard Classes – VHC) formed by amalgamating land use and vegetation types with a moderately consistent fuel load and structure.

The potential fuel load assigned to each VHC is generally representative of the higher fuel load expected for the typical vegetation types, landscape, and site conditions within each VHC and approximates the ***80th percentile (%) fuel load of the "long unburnt condition"*** for the class (generally greater than 10 years without burning).

Using QFES Catalyst Mapping, numerous VHCs were mapped within and adjacent to the subject site. An extract of the Catalyst Mapping is shown below in Figure 5.

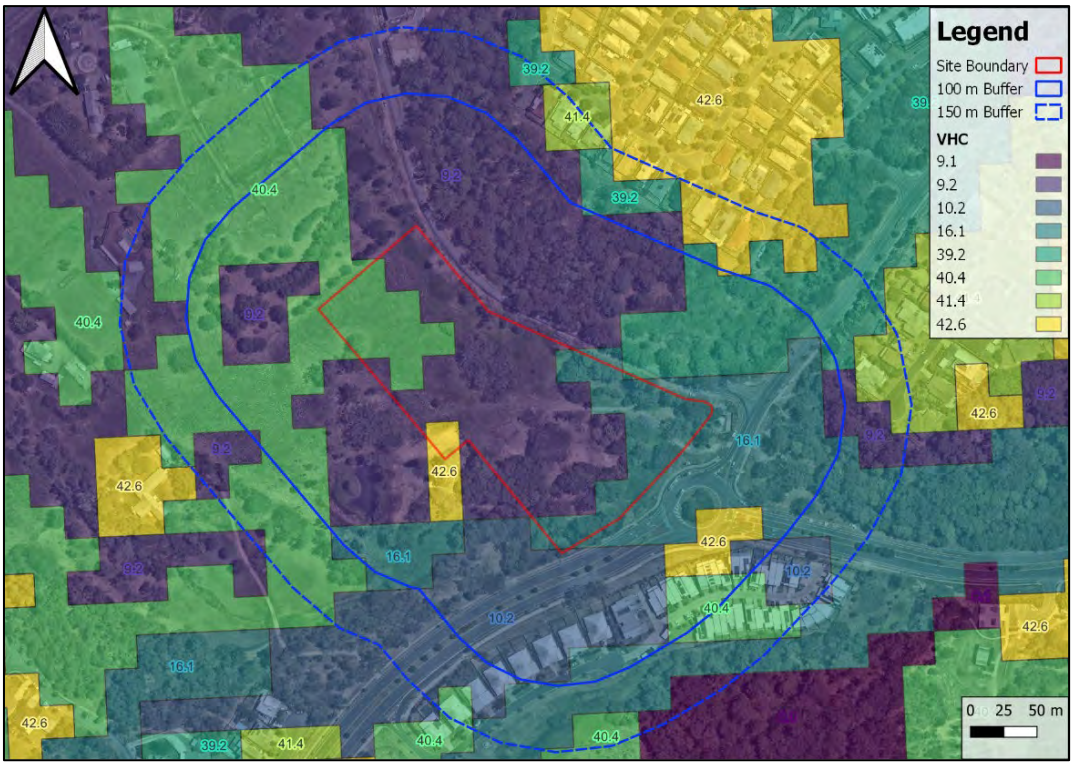


Figure 5. Extract of Vegetation Hazard Classes from Catalyst

4.1.2 Vegetation Hazard Class Verification

To ground-truth the State Government VHCs mapped within and adjacent to the subject site, S5 Environmental's Ecologists conducted a site visit on the 6th of June 2023 and subsequently undertook a Reliability Assessment in accordance with BRC comparing available bushfire and vegetation mapping with on-ground conditions. The reliability assessment incorporated a comprehensive review of available aerial mapping of the site, including a 150 m buffered area, external to the proposed development.

Post development, the northern extent of the subject site will be developed for residential purposes and as such, the VHC within this area has been modified to VHC 39.2 '*Low to moderate tree cover in built-up areas.* This area also includes the bio-retention basin to the south of the dwellings. The road dedication, along the south-eastern boundary, has been conservatively modified to VHC 39.2 to represent the current state of the vegetation, however it is understood the area will eventually be cleared by Council for road widening activities. The south-western extent of the VHC 39.2 mapped area associated with the development extents into the adjacent with the site, as there is an agreement with the adjacent land owner that a patch to the south of the built area is to be maintained in a low fuel state as a Bushfire Management Zone. Vegetation within the southern extent of the site will undergo repatriation and has been ground-truthed as a mixed polygon of RE 12.3.1a and 12.3.11. As a conservative measure, this area has been mapped as the higher associated VHC of 16.1 '*Eucalyptus dominated forest on drainage lines and alluvial plains*'.

Outside the subject site, the native vegetation to the north and east has been mapped as VHC 16.1, reflecting the existing VHC mapping and ground-truthed conditions. A patch of VHC 9.1 '*Moist to dry eucalypt open forest on coastal lowlands and ranges'* has been mapped to the south of Reserve Road, reflecting the State VHC and Regional Ecosystem mapping.

Medium density housing to the north, east and south of the subject site has been mapped as VHC 39.2, to reflect the landscape state of the vegetation, with semi-rural lots to the north-west amended to VHC 40.4, to reflect the fairly continuous nature of low vegetation throughout these areas. The Reserve Road and Old Coach Road corridors to the south and east of the subject site have been modified to VHC 42.6, reflecting the limited extent of vegetation within the road corridor. Patches of VHC 40.4 were identified and modified to reflect ground-truthed conditions to the south and west of the subject site.

The VHC mapping has, therefore, been modified to reflect the on-ground conditions more accurately, and to reflect the post-development state of the subject site and locality (see Figure 6). As spatially indicated in Figure 6, the modified VHCs have been restricted to a 150 m buffer from the subject site, as the more distant areas are not relevant for the purposes of this Bushfire Hazard Assessment. Refer to Plate 1 to Plate 6 below.



Plate 1 View of dense vegetation mapped as VHC 16.1 along the southern boundary (proposed rehabilitation).



Plate 2 Alternative view of native vegetation mapped as VHC 16.1.

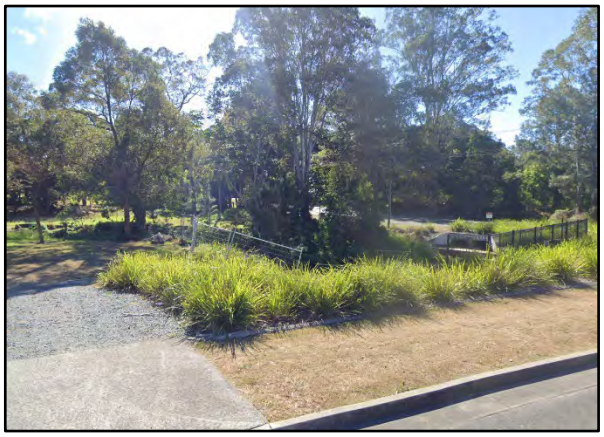


Plate 3 View of future road dedication area (VHC 39.2) (source: Google Maps 2021).



Plate 4 View of development area (VHC 39.2) (source: Google Maps 2021).



Plate 5 View of eastern vegetation across Baileys Mountain Road (VHC 16.1) (source: Google Maps 2021).



Plate 6 View of vegetation to the south of Reserve Road(VHC 9.1) (source: Google Maps 2021).

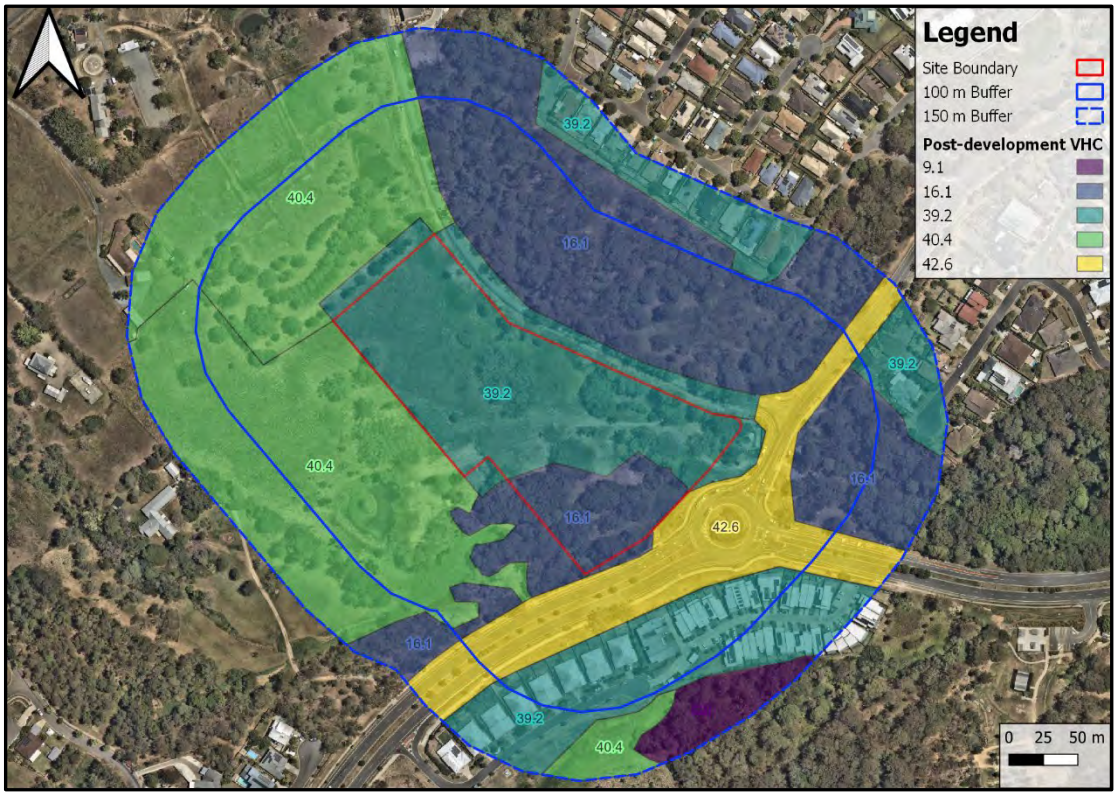


Figure 6. Modified Vegetation Hazard Classes based on Ground-truthed Conditions and Future Land Use.

4.1.3 Fuel Loads

Table 6 below, summarises the associated fuel-loads of the final VHCs in relation to the proposed development.

Table 6 Summary of VHCs and their Associated Fuel Continuity and Loads

VHC	VHC Description	Fuel Continuity	Potential Fuel Load * (t/ha)
			Total
9.1	Moist to dry eucalypt open forest on coastal lowlands and ranges	Continuous	24.2
16.1	Eucalyptus dominated forest on drainage lines and alluvial plains	Continuous	16.0
39.2	Low to moderate tree cover in built-up areas	Discontinuous	8
40.4	Continuous low grass or tree cover	Continuous	5
42.6	Nil to very low vegetation cover	Discontinuous	2

*CSIRO A Methodology for State-wide Mapping of Annual Fuel Load and Bushfire Hazard in Queensland. Glenn Newnham, Kimberley Opie, Justin Leonard CSIRO Land and Water, 2017.

4.1.4 Modification of Potential Intensity of Small Patches and Corridors

S5 Environmental have investigated the application of the processing stages and have identified that steps 1 to 4 do not apply to the proposed development as there are no small patches or corridors within 150 m of the proposed development.

4.1.5 Slope Assessment

The slope of vegetated land over which a bushfire passes has a strong influence on both the intensity and rate of spread of the bushfire. From a bushfire hazard assessment perspective, the relevant slopes to consider are the slopes beneath areas of potentially hazardous vegetation, defined as "effective slope" in AS 3959-2018, that would be retained within or adjacent to the proposed development site. Also relevant, is whether the vegetated land is situated upslope or downslope of the proposed development. As fire travels faster upslope, there is a significant reduction in risk and fire-line intensity for sites that sit below the vegetation. Hazardous vegetation to the west and south is approximately level to the proposed development, whilst hazardous vegetation to the east is located slightly upslope. Refer to Figure 7.

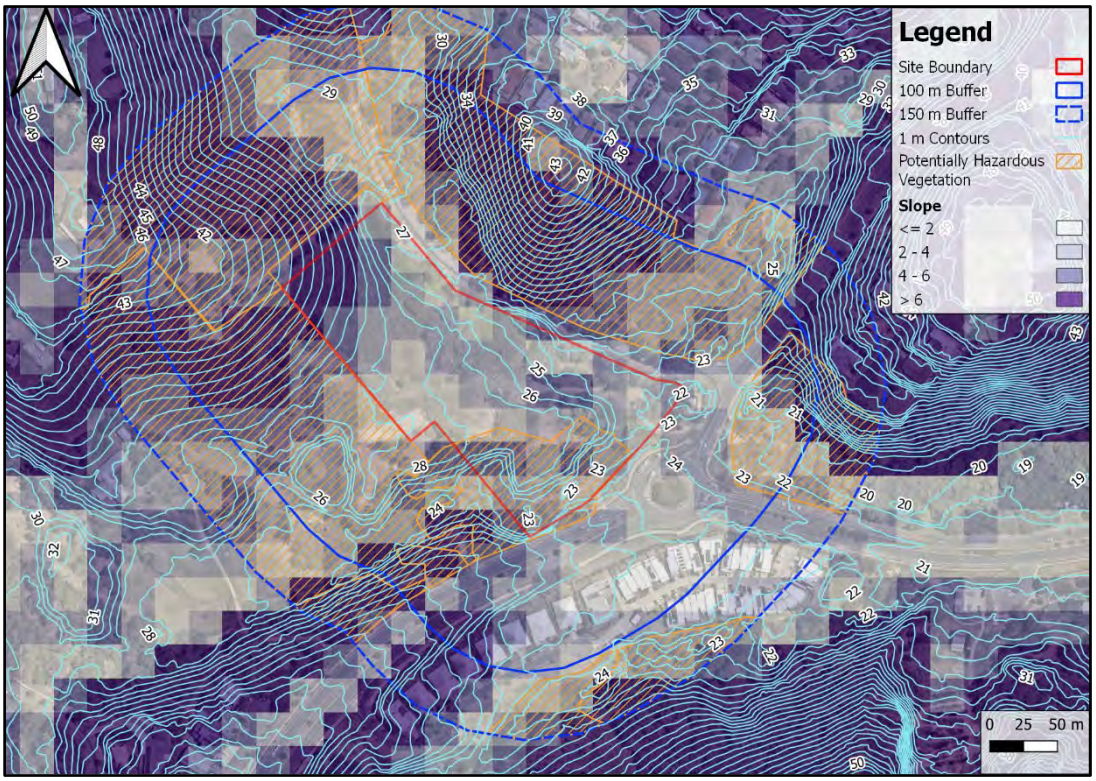


Figure 7. Slope in Proximity to the Proposed Development

4.1.6 Forest Fire Danger Index

In accordance with the Australian Standard (AS) 3959-2018, *Construction of Buildings in Bushfire Prone Areas*, the Fire Danger Index (FDI) indicates the chance of a fire starting, its intensity, rate of spread and the difficultly of its suppressions, according to several combinations of relative humidity, air temperature, wind speed as well as long- and short-term drought effects. The QFES Catalyst Mapping indicates that the site-specific Forest Fire Danger Index (FFDI) for the subject site is 53.

4.1.7 Final PFLI

A final PFLI for patches of hazardous vegetation (determined in Section 4.1) has been calculated using the PFLI equation in Section 3.1. Based on this PFLI calculation, the potentially hazardous vegetation associated with VHC 16.1 within the southern extent of the subject site, as well as that located to the north-east and east of the site, was mapped to contain areas of Medium and High PFLI (i.e., 4,000 to 40,000 kW/m^2). The potentially hazardous vegetation to the south of the subject site, mapped as VHC 9.1, was mapped to contain areas of Medium and High (i.e., 4,000 to 40,000 kW/m^2). The balance of the assessment area, including areas mapped as VHC 40.4 has been mapped to contain Low PFLI (i.e. > 4,000 kW/m^2), and is therefore non-hazardous. Refer to Figure 8.

4.2 Hazardous Vegetation

Vegetation mapped as VHC 16.1 within the southern extent of the subject site, as well as that to the north-east and east of the subject site was determined to be the only hazardous vegetation. Vegetation mapped as VHC 9.1 to the south of the subject site was greater than 100 m from the development, and therefore was not considered hazardous to the proposed townhouse development. As vegetation mapped as VHC 16.1 is within 100 m of the development area, the proposed townhouse development is therefore within a Bushfire Prone Area. As such, a Bushfire Attack Level (BAL) assessment has been conducted to determine the radiant heat flux the townhouse development may be exposed to, and what BAL score and subsequent building requirements the development will have to adhere to.

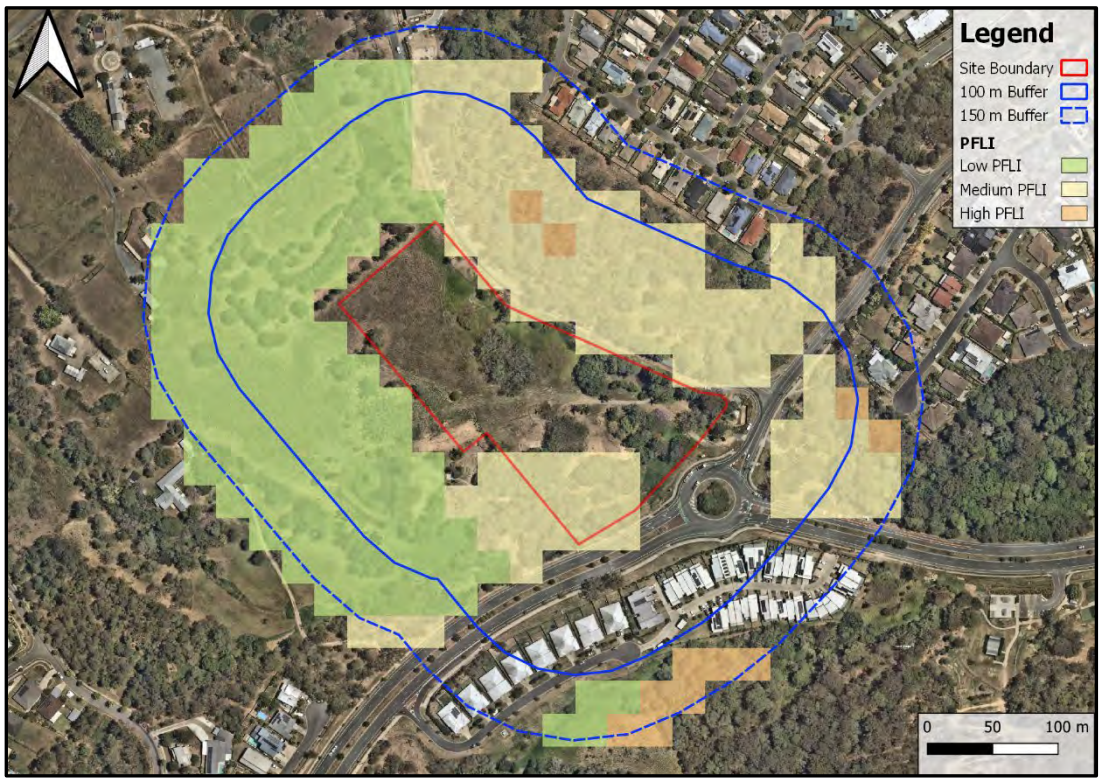


Figure 8. Potential Fire Line Intensity

5.0 BUSHFIRE ATTACK LEVEL ASSESSMENT

This Bushfire Attack Level assessment has focused on the potential impact of a fire event in hazardous vegetation located within 100 m of the subject site. Hazardous vegetation in relation to the proposed development was determined to be the vegetation to the north, east and south of the proposed development (refer to **Figure 8**). A Method 2 assessment in accordance with AS3959-2018 utilising the Flamesol Minimum Distance Calculator was undertaken to determine the required setbacks from hazardous (see **Table 7**). Refer to **Appendix B** for inputs and outputs from the Flamesol Minimum Distance Calculator.

Table 7. Summary of Setbacks and BAL Scores for the Proposed Development

Radiant Heat Exposure (kW/m^2)	BAL	Setbacks Required from Hazardous Vegetation		
		North	East	South
-	LOW	100 m	100 m	100 m
12.5	12.5	23.3 m	27.9 m	22.1 m
19	19	17.4 m	19.5 m	16.8 m
29	29	12.5 m	13.2 m	12.3 m
40	40	9.5 m	9.7 m	9.4 m
> 40	FZ	< 9.5 m	< 9.7 m	< 9.4 m

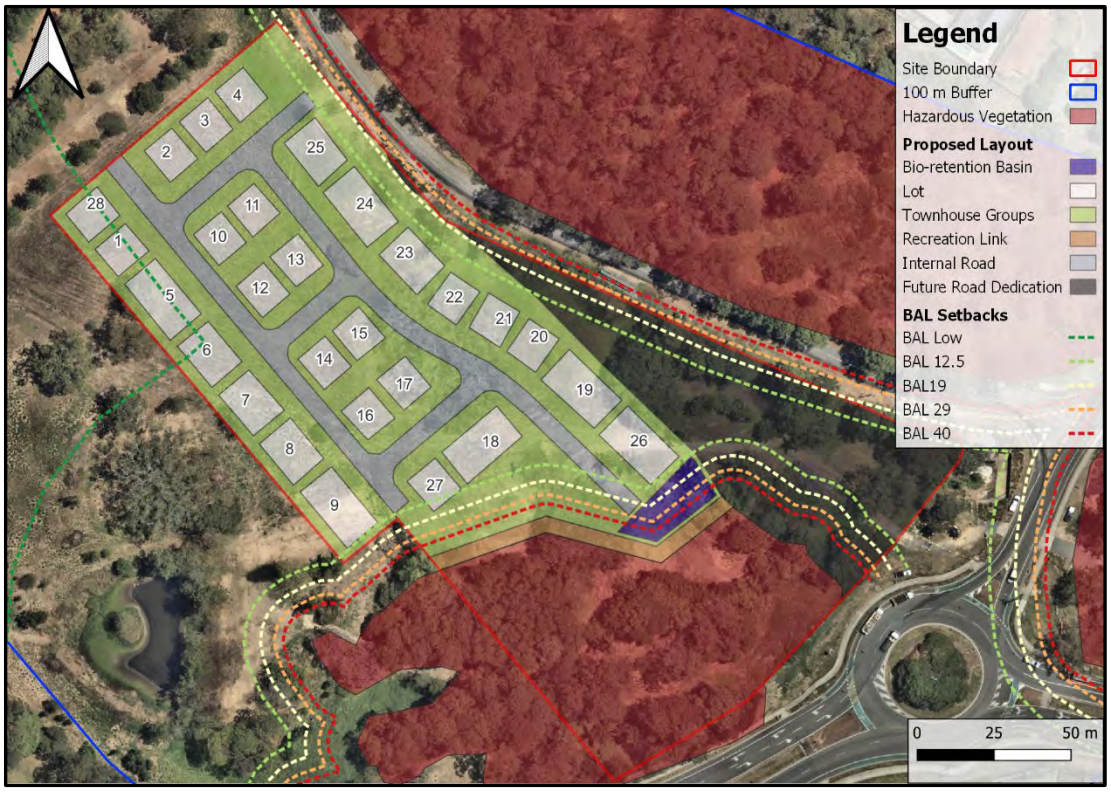


Figure 9. BAL Setbacks

Each townhouse grouping was numbered so as to differentiate them and identify their applicable BAL scores (refer to Figure 9). Based on the results of the radiant heat exposure assessment, townhouse groupings 1-8, 10-17 and 20-25 will achieve a BAL score of 12.5. The remaining townhouse groupings, 9, 18 and 19 achieve a BAL score of 19 with the southern edge of group 9 and the south-western corners of group 18 and 19 just inside the BAL 19 contour. Refer to Table 8, below. Accordingly, a Bushfire Management Plan has been prepared and presented in Section 6.0.

Table 8. BAL Requirement for Proposed Lots

Townhouse Groupings	Applicable BAL Score
1-26 and 28	BAL 12.5
27	BAL 19

6.0 BUSHFIRE MANAGEMENT PLAN

This Bushfire Management Plan (BMP) identifies management measures that must be implemented to ensure that the risk of bushfire attack is reduced to an acceptable level. It is first important to understand the processes that influence bushfire behaviour (Section 6.1), and the sources of damage that threaten people, infrastructure, and property (Section 6.2).

6.1 Bushfire Behaviour

Understanding bushfire behaviour is imperative when planning new development. There are three main factors which influence fire behaviour as follows:

1) Topography

Slope influences the speed and intensity of a fire. Fire is known to burn faster uphill as flames and radiant heat preheat the vegetation ahead of the fire, drying it out and making it increasingly flammable. As a rule of thumb, for every 10 degrees slope, fire doubles in speed. Refer to Figure 10, below.

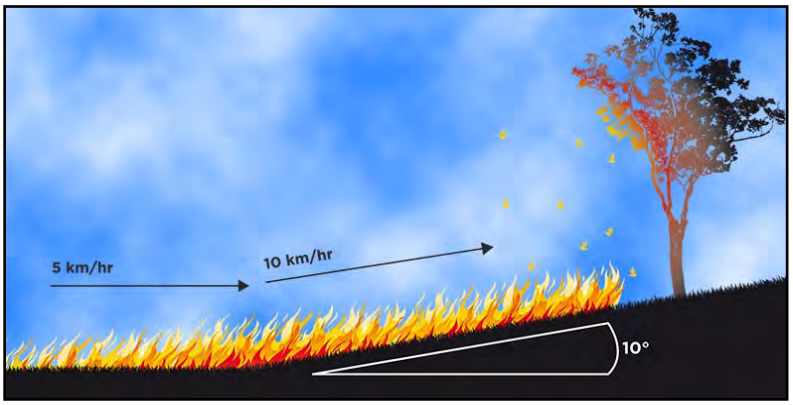


Figure 10. Effects of Topography on Bushfire (source: Country Fire Authority)

2) Weather Conditions

Bushfire weather conditions are fundamentally defined by temperature, humidity, wind, atmospheric conditions, and past rainfall. For example, summer weather conditions increase the flammability of vegetation. Wind influences the speed and direction in which fire travels, fire intensity and possibility of spot fires from burning debris. A measure of weather conditions is the Forest Fire Danger Index (FFDI) and Grassland Fire Danger Index (GFDI). These measures are useful in determining the fire danger rating (refer to Fire Danger Rating in Figure 11).

3) Vegetation

Vegetation is the source of fuel for a bushfire. The amount of fuel surrounding a building can directly impact a buildings survival. Vegetation management, landscaping for bushfire and breaking the continuity of vegetation can limit the spread of fire.

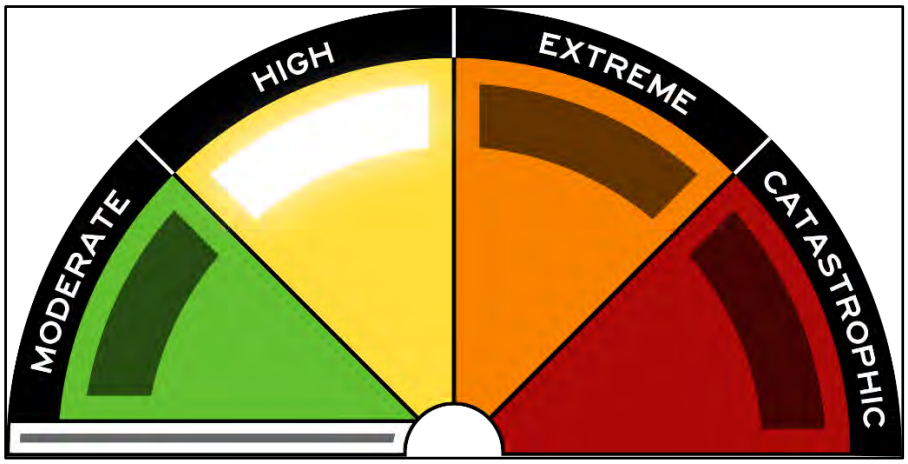


Figure 11. Fire Danger Rating (source: source: QFES [updated: 2023])

6.2 Bushfire Damage Sources

The Country Fire Authority (2009) states, "*Bushfires can vary in intensity and scale across the landscape*". As the past bushfire events throughout Australia have illustrated, bushfires can be devastating and lead to long-running fires which are difficult to suppress. Building survival is influenced by many interacting factors. The four main ways buildings are destroyed during a bushfire include:

- Ember attack;
- Radiant heat;
- Direct flame contact; and
- Fire-driven wind.

Ember Attack

Research indicates that the most common way buildings catch on fire is through ember attack (80% of house loss). Ember attack occurs when small burning twigs, bark, leaf are carried by wind and land in and around a building. Embers can ignite flammable plants, leaf litter, fences, outdoor furniture, and sheds (refer to Figure 12, below). Ember attack is addressed within the AS 3959-2018 through Construction Standard requirements.

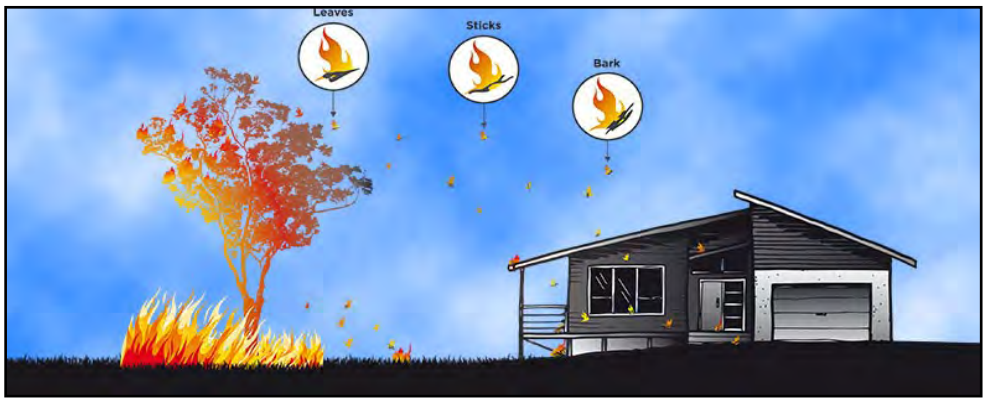


Figure 12. Ember Attack (source: Country Fire Authority)

Radiant Heat

Radiant heat is the heat created from burning fuel during a bushfire. Radiant heat can ignite surfaces without direct flame contact or ember attack, dry out vegetation ahead of the bushfire, crack glass (allowing embers to enter a building) and distort and melt materials (refer to Figure 13, below). The most common cause of loss of human life is via radiant heat (CFA, 2018).



Figure 13. Radiant Heat (source: Country Fire Authority)

Direct Flame Contact

Direct flame contact occurs when a fire front reaches a building, this is referred to as the 'Flame Zone'. Approximately 20% of house loss occurs when houses/buildings are directly adjacent to bushland.

Fire-driven Wind

Fire-driven wind can carry embers, cause trees to fall onto buildings, can break windows and destroy structures. The closer a building is to a fire front, the more severe the impact of fire-driven wind.

6.3 Management and Mitigation Measures – Permanent Buildings

Management and mitigation measures are generally outlined in relevant planning instruments at both the State and Local Government level.

Mitigation measures emphasize resilience to bushfire and are categorised into the following groups for the permanent structures within the site.

- Layout design;
- Building and construction requirements;
- Firefighting infrastructure;
- Bushfire emergency plan; and
- Vegetation management and landscaping

Layout Design

Access and Egress

The proposed townhouse development will gain access via a crossover which ill adjoin a new road adjacent the northern boundary. S5 Environmental recommend constructing the internal road to meet the requirements as outlined within AO6.1 of the CoGC Bushfire hazard overlay code and within SC6.11 City Plan policy – Land development guidelines, Section 2 – Transport network standards. This will ensure that the internal road will be appropriately constructed to carry emergency fire-fighting appliances and provide emergency evacuation during a bushfire event.

Siting of Development

The proposed townhouse development is situated within 100 m of potentially hazardous vegetation to the south-west. As mentioned above, townhouse groups 1-8, 10-17 and 20-25 will achieve a BAL score of 12.5, whilst townhouse groups 9, 18 and 19 are located just inside the BAL 19 zone contour. These BAL scores have been modelled utilising the Flamesol BAL Minimum Distance Calculator (refer to Appendix B). The siting of the development is considered to ensure the proposed development is exposed to an acceptable level of bushfire risk.

Building and Construction Requirements

In accordance with the BCA, the AS 3959-2018 requirements for construction of buildings applies to any new Class 1, 2, 3 or 10a Building (when ancillary to a Class 1, 2, or 3 Building). Therefore, any future habitable Class 1, 2 and/or 3 buildings and their ancillary Class 10a building/s within the development must adhere to the relevant BAL construction Standards based on their location. Refer to Table 8.

Fencing erected within 20 m of any building within the development will be constructed out of non-combustible or fire-retardant materials. Additionally, fencing will be designed to facilitate the safe movement of fauna and will provide access to the site for fire-fighting purposes.

Early Warning Systems

Smoke alarms should be installed in accordance with the Building Code of Australia and the AS 3786-1993 - *Smoke Alarms*. The Queensland Fire and Emergency Services recommends photoelectric smoke alarms (not ionization alarms). Photoelectric smoke alarms are generally more effective than ionization types as they detect visible particles of combustion.

Firefighting Infrastructure

The site is expected to be connected to a reticulated water supply network. It is expected that the reticulated water supply network within the area complies with the provisions outlined in the SEQ Water Supply, Sewage Design and Construction Code.

Bushfire Emergency

In the event of a Bushfire Emergency, the local QFES should be contacted immediately. The Pimpama Fire and Rescue Station is located on the neighbouring Lot, to the south-east of the subject site, approximately 190m away (by road). The contact details for the Pimpama Fire and Rescue Station are:

- Address: 1 Cox Road, Pimpama 4209
- Phone: (07) 5549 8500

Please note that in fire emergencies the triple zero (000) emergency telephone number should be used.

S5 Environmental further recommend new occupants are provided with a copy of the most up to date Bushfire Management Plan, complete with the Queensland Fire and Emergency Services cover sheet for their information.

Bushfire Management Zone

A Bushfire Management Zone (BMZ) is proposed adjacent the southern hazardous vegetation, largely associated with the rehabilitated dedicated park. The BMZ is to be buffered 21.1 m off the hazardous vegetation, and will ensure that Townhouse Groups 9, 18 and 26 can achieve a BAL 12.5 score, with Townhouse Group 27 also achieving a BAL 19 score. The BMZ will include the 5 m wide recreation link, a portion of cleared land on the adjacent property, open areas within the proposed development and the bio-basin. No trees are proposed to be retained within the BMZ.

Planting within the bio-basin must consist of low-flammability species, such as mat-rushes (*Lomandra* spp.), and must be regularly monitored for accumulation of leaf matter and woody debris. Organic mulch is not to be used within the BMZ, with rock mulch to be used as an alternative if required. Any grass within the BMZ must not exceed 10 cm in height. The BMZ partially falls within the realigned Lot 57 SP214370. We understand the future intent of this area to be a continuation of the LGIP recreational link and a proposed stormwater basin. This will ensure the BMZ is maintained in a low fuel state. Refer to Figure 14 below.

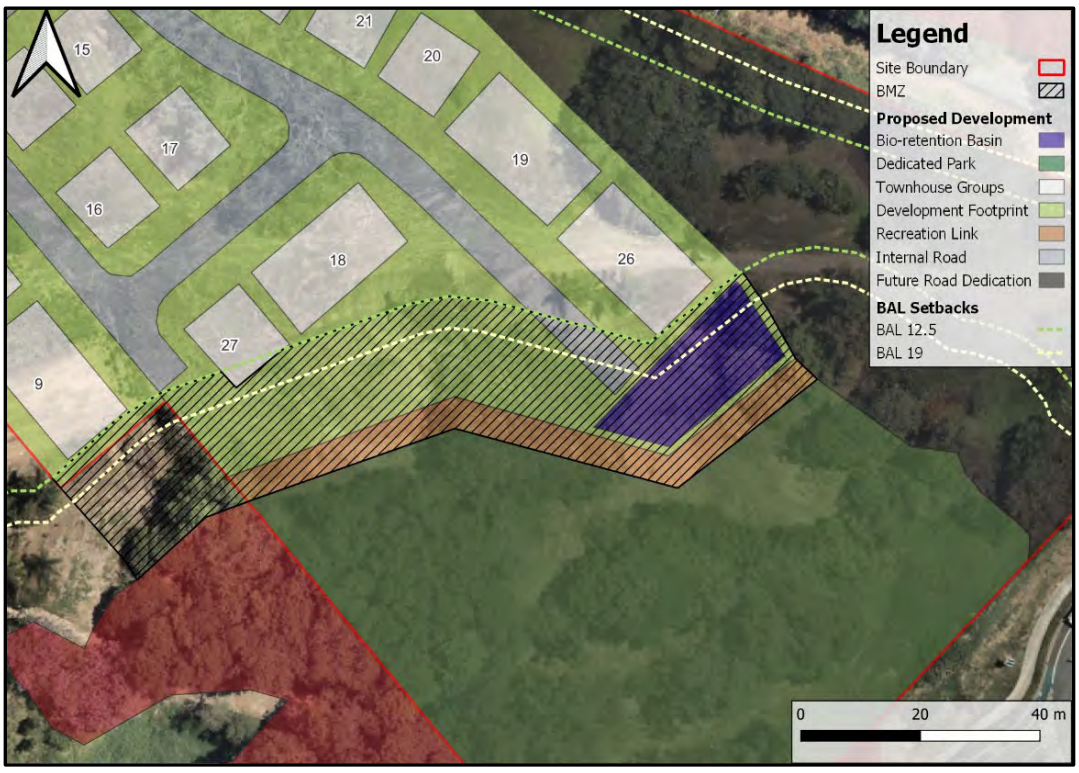


Figure 14. Bushfire Management Zone

Landscaping

Throughout the entity of the development, S5 Environmental recommend that Townhouse owners and Body Corporate adhere to the following advice (outlined in the SPP Technical Reference Guide – Bushfire Resilient Communities) on low flammability landscaping.

Landscaping plays an important role in increasing a buildings' ability to endure bushfire attack. Landscaping for bushfire reduces the risk of ember attack which is the most common cause of building loss during bushfire. This includes utilisation of low flammability treatments such as rock mulches, concrete retaining blocks, and appropriate plantings.

Appropriate plant attributes to consider implementing in landscape design to reduce bushfire risk include:

- High leaf moisture content;
- Lower volatile oil content;
- Higher leaf mineral content;
- Broad-leaved species;
- Resilience to pruning;
- Low ignition likelihood;
- A low volume of persistent dead leaves/branches;
- Smooth or tightly held bark; and
- Leaves and twigs that do not regularly fall.

Management of landscaped areas should ensure that there is no accumulation of litter and woody debris on garden beds and should ensure that there is horizontal and vertical separation of plants. Any grass within the proposed lots should never exceed 10 cm in height. Irrigation of garden and greenery areas could be considered to ensure a well-watered, low flammability landscape.

The Victorian Country Fire Authority (CFA) have produced an online Plant Selection Key which facilitates landscape designers and property owners to select fire wise garden plants. The CFA have also produced the publication 'Landscaping for Bushfire: Garden Design and Plant Selection' (CFA, 2011). The publication outlines planning, designing, choosing suitable plants, maintaining gardens and provides a Plant Selection Key, and can be obtained from their website.

In addition, trees should not overhang the roofline of the building, touch walls or other elements of a building and plants greater than 10 centimetres in height at maturity must not be placed directly in front of a window or other glass feature.

7.0 CONCLUSION

This Bushfire Hazard Assessment concluded that the proposed development is within 100m of potentially hazardous vegetation to the south-west. The AS 3959-2018 Bushfire Attack Level assessment for the proposed multiple dwelling development determined Townhouse Groups 1-26 and 28 will achieve a BAL score of 12.5, with Townhouse Group 27 achieving a BAL score of 19. Accordingly, all buildings exposed to BAL 12.5 or greater will have to adhere to the relevant construction requirements set out in AS 3959-2018.

S5 Environmental have prepared a site-specific Bushfire Management Plan has to support the proposed residential subdivision, which recommends key mitigation measures to be implemented to ensure the risk to people, infrastructure and property is acceptable and minimised.

Overall, the proposed development complies with the relevant CoGC bushfire related assessment benchmarks, refer to Appendix A.

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APPENDIX A

Bushfire Hazard Overlay Code Response

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
Bushfire Hazard			
PO1 In a bushfire hazard area, the fire mitigation methods used at the site are adequate for the bushfire hazard of the individual site, having regard to: (a) vegetation type; (b) slope; (c) aspect; (d) bushfire history; (e) conservation values of the site; (f) ecological restoration, including forest succession; (g) ongoing maintenance; (h) climate change; and (i) on site and off-site1 fire hazard implications. Note: This includes potential hazard from land up to 10kms away from the site. For example, how might large tracts of forest away from the site impact on the bushland that surrounds the site.	AO1 A written assessment by a suitably qualified and experienced bushfire management consultant confirms that the site is not in a bushfire hazard area. OR The development complies with an approved Bushfire management plan prepared in accordance with SC6.3 City Plan policy – Bushfire management plans. OR The development complies with an existing approved Bushfire management plan as referenced within the approved reconfiguration of a lot. Note: Prior to: (a) plan sealing for a Reconfiguration of a lot; or (b) the issue of a Building final or Certificate of classification for Building work; or (c) the commencement of use where building work is not proposed. Whichever comes first, the applicant must submit to Council, certification from an appropriately qualified and experienced person that the development has been completed in accordance with, and complies with the approved Bushfire management plan and that all risk treatments are functioning in accordance with the approved plan.	Complies S5 Environmental have prepared a Bushfire Management Plan in accordance with SC6.3 City Plan Policy. S5 Environmental are of the understanding the proposed development will comply with the recommendations as outlined within this Bushfire Management Plan.	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
Land Use			
PO2 In a bushfire hazard area, development: (a) does not result in a high concentration of people living, working, or congregating in a bushfire hazard area; (b) does not result in the bulk manufacture or storage of hazardous materials; and (c) 'essential' community infrastructure is able to function effectively during and immediately after a bushfire event.	AO2 The following land uses are not located in a bushfire hazard area: (a) Child care centre; (b) Community care centre; (c) Community use; (d) Development involving the manufacture or storage of hazardous material in bulk; (e) Educational establishment; (f) Hospital; (g) Residential care facility; (h) Retirement facility; (i) Rooming accommodation; (j) Sport and recreation uses; (k) Tourist attraction; (l) Tourist park; and (m) Utility installation (waste management facilities). AND In a bushfire hazard area permitted essential community infrastructure is designed to function effectively during and immediately after bushfire events, as demonstrated in a Bushfire management plan. Note: A Bushfire management plan prepared by a suitably qualified person and in accordance with SC6.3 City Plan policy – Bushfire management plans is Council's preferred method for addressing this acceptable outcome.	Not Applicable S5 Environmental understand the proposed land use will be for a townhouse development.	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
Development design and lot layout			
PO3 In a bushfire hazard area, developments, including lot layout are designed to avoid bushfire hazard and provide safe sites for people, property and buildings. Editor's note – The development should be located: (a) away from the most likely direction of a fire front (refer Figure 8.2.3-1: Preferred house site location in bushfire hazard areas); and (b) so that elements of the development least susceptible to fire are sited closest to the bushfire hazard.	AO3 Development, Lots and/or building envelopes are not located within bushfire hazard areas. OR The development is located in accordance with the approved Bushfire management plan as referenced within the approved reconfiguration of a lot. OR The development is designed to adequately demonstrate that the risk to life and property is minimised to achieve acceptable levels and ensure ongoing site management.	Complies S5 Environmental are of the opinion that the development has been adequately designed to minimize bushfire risk with BAL 19 being the maximum BAL rating achieved by the townhouse development.	
	AO3.2 The development design incorporates bushfire radiation zone/s that: (a) use existing or natural fire breaks & minimise the need to clear native vegetation; (b) do not impact matters of environmental significance; (c) are located entirely within the boundaries of the private property of the development site; and (d) incorporates landscaping species that are less likely to exacerbate a bushfire event.	Complies The development proposed rehabilitation of areas identified as matters of environmental significance (i.e., areas associated with Yaun Creek), while also achieving a suitable setback. The townhouse group 27 within proximity of the rehabilitation area to the south, is able to achieve a BAL 19 based on the proposed layout. A BMZ is proposed to ensure townhouse group 27 can achieve a BAL 19, and groups 9, 18 and 26 can achieve a BAL 12.5.	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
		The maintained BMZ will include the 5 m wide recreation link, a portion of cleared land on the adjacent property, open areas within the proposed development and partial areas of the bio-basin. No trees are proposed to be retained within the BMZ. S5 Environmental have additionally recommended the implementation of low flammability landscaping throughout the development to minimize overall bushfire risk of the proposed development. This is outlined within the BMZ and Landscaping section of the Bushfire Management Plan. The BMZ partially falls within the realigned Lot 57 SP214370. We understand the future intent of this area to be a continuation of the LGIP recreational link and a proposed stormwater basin. This will ensure the BMZ is maintained in a low fuel state.	
PO4 In a bushfire hazard area, when designing for bushfire hazard mitigation the lot layout must avoid impacts on matters of environmental significance.	AO4 Development design, Lot size, and layout avoids impact on matters of environmental significance and minimises impacts such as fragmentation, habitat loss and edge effects for any matters of environmental significance.	Not Applicable Outside the scope of this report.	
PO5 Development uses fencing that:	AO5 Fences are constructed:	Complies	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
(a) does not contribute to the spread of bushfire; (b) facilitates the safe movement of fauna; and (c) provides access for fire-fighting purposes.	(a) using non-combustible or fire retardant materials within 20m of any building used for accommodation; (b) that do not impede the safe movement of fauna (where applicable); and (c) has gates that can be freely accessed for fire-fighting purposes (if applicable).	(a) S5 Environmental have recommended that fences constructed within the proposed development be constructed out of non-combustible material; (b) The development proposes appropriate fencing. If fencing is to be installed on the east and western boundary of the rehabilitation area, fencing to be fauna friendly fencing; and (c) As per the BRMP, the rehabilitation area fencing is to install a self-closing access gate, which can be utilised for firefighting (if needed).	
Vehicular Access			
PO6 In a bushfire hazard area, vehicular access (including internal roads) is designed to mitigate against bushfire hazard by ensuring adequate access for: (a) fire-fighting and other emergency vehicles, and (b) the evacuation of residents and emergency personnel, during a bushfire event.	AO6.1 The development design incorporates a perimeter road that: (a) is located between the boundary of the lots and/or buildings and the adjacent natural area and/or bushfire hazard area; (b) has a minimum cleared width of 20m; (c) has a constructed minimum road width of 6m; (d) has a maximum gradient of 12.5%; (e) is constructed to an all-weather standard; and (f) is constructed to ensure all culverts and bridges have a minimum load bearing of 15 tonnes (if applicable). (refer Figure 8.2.3-2b).	Performance Solution It is acknowledged that the development does not propose a perimeter road. A BMZ is proposed between the townhouses and the hazardous vegetation (rehabilitation area to be dedicated to CoGC as a park). The BMZ incorporates a recreation link and other maintained areas and will function as a sufficient low flammability setback. The development can comply with cleared heights, road widths, gradient and standard requirements. No culverts are proposed as part of the development.	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
	AO6.2 The road design is capable of providing access for fire-fighting and other emergency vehicles, in accordance with SC6.11 City Plan policy – Land development guidelines, Section 2 – Transport network standards.	Complies S5 Environmental have recommended that the proposed road will be constructed to the construction standards in accordance with SC6.11 and hence will provide access for firefighting and other emergency vehicles.	
	AO6.3 The road design does not include dead end roads (refer Figure 8.2.3-2a).	Performance Solution The proposed layout includes 3 dead end road designs. These areas are in proximity to 'T' or 'Y' style intersection, which will allow for which will allow for additional turning space, if required. S5 Environmental are of the opinion that the dead end will not increase the bushfire risk for the proposed development.	
Clearing			
PO7 In a bushfire hazard area, the development layout is designed to avoid the requirement to clear vegetation to achieve risk reduction.	AO7 The Bushfire management plan details the required extent of vegetation clearing and landscaping and where required modify development design and/or lot layout to minimise clearing of vegetation. Note: For guidance on how to prepare a Bushfire management plan refer to SC6.3 City Plan Policy – Bushfire management plans.	Complies S5 Environmental understands the development does not propose to clear additional vegetation to reduce its overall level of bushfire risk.	
Open space management plan			

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
PO8 For areas to be dedicated to Council as open space, management strategies to mitigate bushfire risk must be identified.	AO8 The Bushfire management plan contains a separate section detailing management strategies for areas to be dedicated to Council that can be included within the Open space management plan. Note: For guidance on how to prepare a Bushfire management plan refer to SC6.3 City Plan Policy – Bushfire management plans.	Not Applicable The proposed development does not included areas of open space to be dedicated to council.	
Fire trails			
PO9 In a bushfire hazard area, fire trails must be provided to: (a) enable access for fire fighters, residents and equipment; (b) contribute to (where required) bushfire radiation zone(s); (c) mitigate against bushfire hazard; and (d) allow access for hazard reduction management programs. Note: fire trails should be located, constructed and maintained with due regard for landscape and ecological values and should not result in soil disturbance or erosion.	AO9.1 Fire trails are located on public land (including public open space areas) to facilitate access for fire brigades. OR Fire trails located on private property are located as close as possible to the property boundaries and the adjoining bushfire hazard area, and an access easement is granted in favour of City of Gold Coast and Queensland Fire and Emergency Services. Note: Design and construction of all fire trails located on land to be dedicated to the City as Conservation Estate are in accordance with SC6.3 City Plan policy – Bushfire management plans, Section 3.5(f). For other fire trails, AO9.2 – AO9.6 apply.	Performance Solution No fire trial is proposed as part of the development, however a BMZ is proposed adjacent the hazardous area. Once the road dedication has been dedicated to Council, the recreation link will directly adjoin the site boundary and road corridor area. The recreation link will be 5 m in width, with adjacent maintained area of approx. 1.5 m, totaling at minimum approx. 6.5 m of available area accessible from a public road corridor for firefighting purposes. No culverts are proposed within the site. The BMZ can comply with vertical clearance, crossfall, width and maximum gradient.	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
	AO9.2 The fire trail has: (a) a minimum cleared width of 6m; (b) a minimum of 4.8m vertical clearance; (c) across fall of no greater than 10 degrees; (d) a minimum formed width of 4m; (e) a maximum gradient of 12.5%, with adequate drainage to prevent soil erosion and minimise ongoing trail maintenance; and (f) culverts and/or bridges with a minimum load bearing of 8 tonnes (if applicable).	Currently the BMZ and recreation link do not continue to the west, however, adjacent development is expected which will provide continued access and separation adjacent potentially hazardous vegetation. The BMZ and recreation link within the site is approx. 112 m and provides turning opportunities given the adjacent open space within the site.	
	AO9.3 Vehicular links are provided along the fire trail either to existing fire trails or roads, and these links are designed having regard to the topography of the site, fire fighter safety and the need to regularly access water supplies. Note: where possible, these links should be at intervals of approximately 200m		
	AO9.4 The fire trail has vehicular access at each end, and links either to existing fire trails or public roads.		
	AO9.5 The fire trail provides turning areas for fire-fighting appliances. The turning bay can be either: (a) a turning circle;		

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
	(b) a 'T' shaped turning bay; or (c) a 'Y' shaped turning bay.		
	AO9.6 The fire trail provides areas for vehicles to pass or turn at intervals of not more than 200m and with a maximum grade of 5% (1 in 20).		
Areas with water reticulation			
PO10 In a bushfire hazard area, the development maintains the safety of people and property by ensuring that the water supply is reliable and has sufficient flow and pressure requirements for fire-fighting purposes at all times.	AO10.1 The development is proposed in a bushfire hazard area, and reticulated water is supplied in accordance with SC6.11 City Plan policy – Land development guidelines, Section 6 – Water supply and sewerage reticulation standards.	Complies S5 Environmental understand the proposed development will be connected to a reticulated water source which meets the flow and pressure requirements as outlined within AO10.2.	
	AO10.2 Development involving new or existing buildings with a gross floor area of greater than 50m2, each lot has a reliable reticulated water supply that has sufficient flow and pressure characteristics for fire-fighting purposes at all times. It must have a minimum pressure and flow of 10 litres a second at 200 kPa.		
Areas with no water reticulation (private water supply)			
PO11	AO11.1	Not Applicable	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
In a bushfire hazard area, the development maintains the safety of people and property by ensuring that an adequate water supply for fire-fighting purposes is provided.	For development with a combined GFA less than 500m2 where one or more buildings are proposed, dedicated fire-fighting water storage is provided to protect each individual building. Each dedicated fire-fighting water storage must have a volume of water not less than 10,000 litres for each building, be provided within 10m of each building and be: (a) a separate tank that is either below ground level or of non-flammable construction; or (b) a reserve section in the bottom part of the main water supply tank that is either below ground level or of non - flammable construction. Note: dedicated fire-fighting water storage is in addition to water supply for household use and does not include swimming pools, creeks and dams.	The proposed development will be connected to a reticulated water supply.	
	AO11.2 For development that proposes one or more buildings with a combined GFA greater than 500m2 there is no acceptable outcome provided.		
PO12 In a bushfire hazard area, all fire-fighting water storage tanks, including domestic water supply tanks, are fitted with the standard rural fire brigade fittings.	AO12 The outlet pipe is 50mm in diameter, fitted with a 50mm male camlock (standard rural fire brigade fitting) and an isolating valve.	Not Applicable S5 Environmental understand the proposed development will be connected to a reticulated water supply.	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
PO13 In a bushfire hazard area, water storage provided for fire-fighting purposes is safely located and accessible at all times.	AO13.1 The water supply outlet is located at least 9m from any potential fire hazards, such as venting gas bottles and combustible structures.	Not Applicable S5 Environmental understand the proposed development will be connected to a reticulated water supply.	
	AO13.2 A safe and accessible hard stand area capable of accommodating a fire fighting vehicle is provided not more than 3m from the water supply outlet.		
PO14 Development in a bushfire hazard area must provide adequate fire-fighting water storage. This infrastructure must be provided on public land so as to be readily accessible to fire brigades for hazard reduction and fire-fighting purposes.	AO14.1 Where public water supplies (e.g. fire hydrants or public water storage) do not exist, water supply tanks are provided for fire-fighting purposes on public land within the development. The water tanks must: (a) Be installed on land dedicated to Council; (b) hold a volume of at least 22,500 litres per every 20 dwellings; (c) be of concrete construction; and (d) have an outlet pipe of 50mm in diameter, fitted with a 50mm male camlock (standard rural fire brigade fitting) and an isolating valve.	Not Applicable S5 Environmental understand the proposed development will be connected to a reticulated water supply.	
	AO14.2 Development on public land provides a safe and accessible hardstand area capable of accommodating a fire fighting vehicle not more than 3m from the water supply outlet.		

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
Storage of Hazardous Materials			
PO15 Development does not cause: (a) an unacceptable risk to people, property and the environment due to the impact of bushfire on hazardous chemicals; (b) excess danger or difficulty to emergency services for emergency response or evacuation.	AO15 Development involving the storage, handling or manufacture of hazardous chemicals is not located within a Bushfire hazard area.	Not Applicable S5 Environmental understand the proposed use is for a townhouse development, which will not involve the storage, handling, or manufacture of hazardous chemicals.	
Advice to new residents			
PO16 In a bushfire hazard area, new residents/occupants of a development in a bushfire hazard area are informed about: (a) the potential bushfire hazard on their site; (b) their responsibility for fire management; (c) the measures required for ongoing fire hazard mitigation; and (d) emergency procedures during a bushfire or on bad fire weather days. Editor's note - Further information on bushfire preparation can be found at www.ruralfire.qld.gov.au	AO16 A copy of the Bushfire management plan, complete with the Queensland Fire and Emergency Services cover sheet and any other addendums is provided to each resident/occupant for their information. Note: the QFES cover sheet is attached to the approved Bushfire management plan and a notification will be placed on the property's rates notice.	Complies S5 Environmental have outlined within the Bushfire Management Plan that new residents are to be provided with a copy of this bushfire management plan with the Queensland Fire and Emergency Services cover sheet.	

APPENDIX B

Flamesol Inputs and Outputs

Summary of Input Parameters for Hazardous Vegetation to the North

Parameter	Input	Note
FFDI	53	Source: QFES Catalyst Mapping
Surface Fuel Load	13.8 t/ha	Surface fuel load for VHC 16.1 (surface + near surface)
Overall Fuel Load	16.0 t/ha	Total fuel load for VHC 16.1
Effective Slope	1 ^{o}	The slope under the hazardous vegetation slopes downslope towards the development. A minimum Effective Slope of 1 ^{o} was utilised.
Site Slope	1 ^{o}	Hazardous vegetation to the north-east is sited at the same level as the proposed development. A minimum Site Slope of 1 ^{o} was utilised.
Flame Temperature	1,200 K	Standard input, in accordance with the AS3959-2018.
Flame Width	100 m	Flame width is assumed to be 100 m (AS 3959-2018)

Calculated July 5, 2023, 2:43 pm (MDc v.4.9)

North

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	53	Rate of spread	0.9399999999999999 km/h
Vegetation classification	Forest	Flame length	8.029999999999999 m
Understorey fuel load	13.8 t/ha	Flame angle	65 °, 70 °, 74 °, 77 °, 78 ° & 84 °
Total fuel load	16.0 t/ha	Elevation of receiver	3.47 m, 3.55 m, 3.55 m, 3.5 m, 3.46 m & 2.99 m
Vegetation height	n/a	Fire intensity	7,773 kW/m
Effective slope	1 °	Transmissivity	0.878, 0.866, 0.849, 0.832, 0.823 & 0.769
Site slope	1 °	Viewfactor	0.4058, 0.2994, 0.1996, 0.134, 0.1085 & 0.029
Flame width	40.4 m	Minimum distance to < 40 kW/m²	9.5 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	12.5 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	17.4 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	23.3 m
		Minimum distance to < 10 kW/m²	26.8 m

Flamesol Calculator Outputs for Required Setbacks for Hazardous Vegetation to the North

Summary of Input Parameters for Hazardous Vegetation to the East

Parameter	Input	Note
FFDI	53	Source: QFES Catalyst Mapping
Surface Fuel Load	13.8 t/ha	Surface fuel load for VHC 16.1 (surface + near surface)
Overall Fuel Load	16.0 t/ha	Total fuel load for VHC 16.1
Effective Slope	1 ^{0}	The slope under the hazardous vegetation slopes downslope towards the development. A minimum Effective Slope of 1 ^{0} was utilised.
Site Slope	1 ^{0}	The land between the hazardous vegetation and development area slopes slightly upwards. A minimum Effective Slope of 1 ^{0} was utilised.
Flame Temperature	1,200 K	Standard input, in accordance with the AS3959-2018.
Flame Width	100 m	Flame width is assumed to be 100 m (AS 3959-2018)

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Calculated April 18, 2024, 8:42 pm (MDc v.4.9)

East

Minimum Distance Calculator - AS3959-2018 (Method 2)

Inputs		Outputs	
Fire Danger Index	53	Rate of spread	0.9399999999999999 km/h
Vegetation classification	Forest	Flame length	8.029999999999999 m
Understorey fuel load	13.8 t/ha	Flame angle	67 °, 73 °, 78 °, 82 °, 83 ° & 86 °
Total fuel load	16 t/ha	Elevation of receiver	3.52 m, 3.6 m, 3.58 m, 3.49 m, 3.4 m & 2.54 m
Vegetation height	n/a	Fire intensity	7,773 kW/m
Effective slope	1 °	Transmissivity	0.877, 0.863, 0.842, 0.82, 0.8070000000000001 & 0.745
Site slope	1 °	Viewfactor	0.4063, 0.2987, 0.2012, 0.1362, 0.1105 & 0.03
Flame width	100 m	Minimum distance to < 40 kW/m²	9.699999999999999 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	13.2 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	19.5 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	27.9 m
		Minimum distance to < 10 kW/m²	33.4 m

Flamesol Calculator Outputs for Required Setbacks for Hazardous Vegetation to the East

Summary of Input Parameters for Hazardous Vegetation to the South

Parameter	Input	Note
FFDI	53	Source: QFES Catalyst Mapping
Surface Fuel Load	13.8 t/ha	Surface fuel load for VHC 16.1 (surface + near surface)
Overall Fuel Load	16.0 t/ha	Total fuel load for VHC 16.1
Effective Slope	1 ^{0}	The slope under the hazardous vegetation slopes downslope towards the development. A minimum Effective Slope of 1 ^{0} was utilised.
Site Slope	1 ^{0}	Hazardous vegetation to the south is sited at the same level as the proposed development. A minimum Site Slope of 1 ^{0} was utilised.
Flame Temperature	1,200 K	Standard input, in accordance with the AS3959-2018.
Flame Width	100 m	Flame width is assumed to be 100 m (AS 3959-2018)

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Calculated July 5, 2023, 2:45 pm (MDc v.4.9)

South

Minimum Distance Calculator - AS3959-2018 (Method 2)

Inputs		Outputs	
Fire Danger Index	53	Rate of spread	0.9399999999999999 km/h
Vegetation classification	Forest	Flame length	8.029999999999999 m
Understorey fuel load	13.8 t/ha	Flame angle	64 °, 68 °, 72 °, 75 °, 77 ° & 83 °
Total fuel load	16.0 t/ha	Elevation of receiver	3.44 m, 3.5 m, 3.52 m, 3.49 m, 3.47 m & 3.05 m
Vegetation height	n/a	Fire intensity	7,773 kW/m
Effective slope	1 °	Transmissivity	0.878, 0.867, 0.851, 0.836, 0.827 & 0.774
Site slope	1 °	Viewfactor	0.4051, 0.2967, 0.1981, 0.1337, 0.1079 & 0.0288
Flame width	34 m	Minimum distance to < 40 kW/m²	9.4 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	12.3 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	16.8 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	22.1 m
		Minimum distance to < 10 kW/m²	25.3 m

Flamesol Calculator Outputs for Required Setbacks for Hazardous Vegetation to the South

APPENDIX C

Slope Lines and Calculations

Project: 202 Baileys Mountain Road, Upper Coomera
Number: S523094

ENVIRONMENTAL

BUSHFIRE SLOPE CALCULATOR

North-east

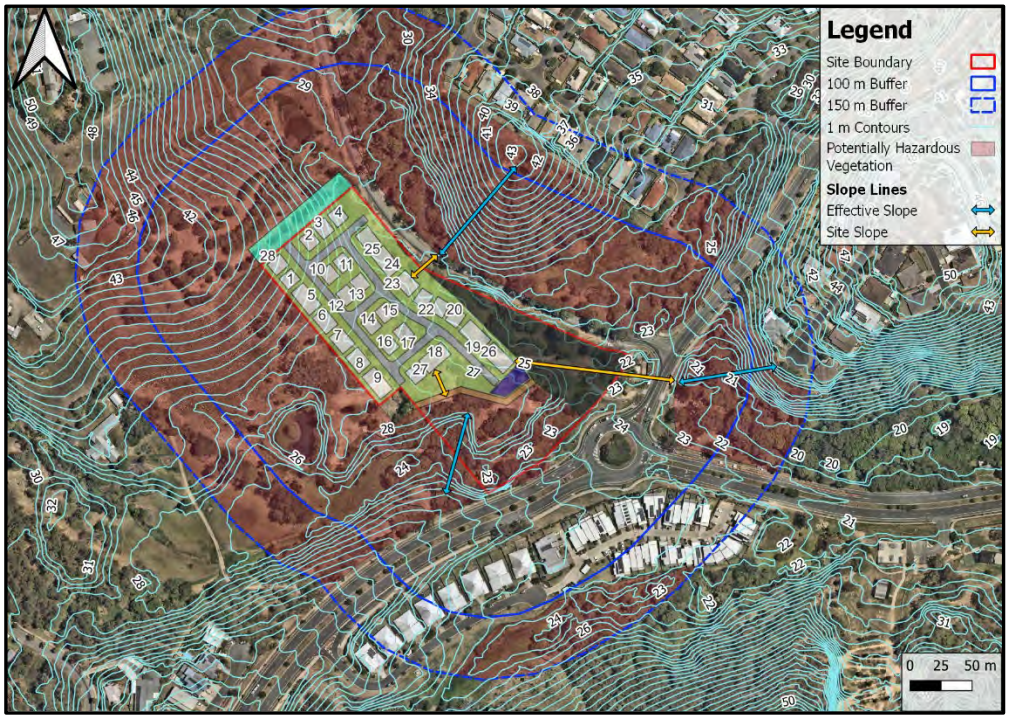
Effective Slope						Site Slope					
Direction	Downslope					Direction	Flat				
Top Elevation	26	m				Top Elevation	26	m			
Bottom Elevation	43	m	Slope %	-18.09%		Bottom Elevation	26	m	Slope %	0.00%	
Distance	94	m	**Slope (°)**	**-10.36**	1	Distance	28	m	**Slope (°)**	**0.00**	1

East

Effective Slope						Site Slope					
Direction	Downslope					Direction	Upslope				
Top Elevation	22	m				Top Elevation	25	m			
Bottom Elevation	33	m	Slope %	-13.75%		Bottom Elevation	23	m	Slope %	1.43%	
Distance	80	m	**Slope (°)**	**-7.88**	1	Distance	140	m	**Slope (°)**	**0.82**	1

South

Effective Slope						Site Slope					
Direction	Upslope					Direction	Flat				
Top Elevation	27	m				Top Elevation	27	m			
Bottom Elevation	29	m	Slope %	-2.94%		Bottom Elevation	27	m	Slope %	0.00%	
Distance	68	m	**Slope (°)**	**-1.69**	1	Distance	1	m	**Slope (°)**	**0.00**	1



LANDSCAPE SPECIFICATION NOTES

1. SURFACE LEVELS AND FALLS: Grade all surface finishes evenly away from buildings for a minimum of 1000mm. Set down planting and turfing areas minimum 200mm below finished floor level.
2. PLANTING AND TURFING AREA PREPARATION: Weed growth on sub-grade to receive an application of Glyphosate herbicide (or equivalent frog friendly product) prior to works commencing. Trim sub-grade to desired level, cultivate 150mm deep place 100 g/m2 of Blood and Bone and 100 g/m2 of Gypsum.
3. TURFING AREAS: Prepare as noted, place 100mm of imported topsoil (to AS4419) and lay min 25mm thick A-grade Green Couch. All turf grass and topsoil to be certified weed free.
4. DEEP PLANTING AREAS: Prepare as noted, place 300mm deep of imported topsoil (to AS4419) and place 100mm deep of max 25mm grade hoop pine mulch.
5. TOPSOIL: Topsoil quality and sample testing to comply with AS4419 Soils for Landscaping and Garden Use. All imported topsoil shall be free from weeds, sticks, rocks over 25mm dia, plastic, contaminants, construction rubbish and other deleterious materials.
6. GRAVEL MULCH DWELLINGS: Gravel mulch shall be 20mm grade smooth washed river gravel, place 100mm deep on A12 bidum fabric.
7. GRAVEL MULCH SWALE: Future specification by Hydraulic consultant.
8. KERB CHANNEL AND KERB RAMPS: Refer to Engineer's drawings for locations of all kerb ramps.
9. ROAD SURFACE TREATMENTS: Refer to Engineer's drawings for surface treatments
10. MOWING EDGE TO REAR OF LOTS: Paver edge, charcoal finish.
11. MOWING EDGES TO STREET FRONTAGES: Paver edge, charcoal finish.
12. MOWING EDGES TO PUBLIC INTERFACE: Timber edge.
13. FENCING: Refer to Architects details.
14. RETAINING WALLS: Refer to Engineer's drawings.
15. PEDESTRIAN PAVEMENTS: Refer Engineer's drawings for all pedestrian pavements. .
16. VEHICULAR PAVEMENTS: Refer Engineer's drawings for all vehicular pavements.
17. LIGHTING AND ELECTRICAL: TBC.
18. TREE INSTALLATION: New trees are to be located clear of underground services - 1.5m clearance between tree trunk and civil sevice (water/sewerage). For all adjustments to tree locations to suit site conditions, seek Superintendent approval prior to commencement of work.
19. ENTRY STATEMENT: Laser cut screen located within private property. Supplied by builder.
20. BIN TO DWELLINGS: Permeable batten screen. Supplied by builder.
21. BIN WASHDOWN: 600mm wide turf strip to back of kerb per lot.



Rectification works if required to streetscape

Temporary construction access point in alignment with driveway 2.

Barrier rail to top of culvert.

Overland flow channel. Refer Civil drawings.
Unallocated visitor parking.
PMT. Fenced and gated as per CoGC requirements.

Street trees to LCC requirements.

Mailbox bank with temporary parking. 1200mm wide pedestrian path.

Primary entry / exit point with new crossover. Refer Civil drawings.

Entry signage supplied by builder with inground uplighting, within private property.

Basin outlet. Refer Civil drawings.

Retaining wall setback from property boundary. Screen planting in front of wall within private property.

30m setback from top of bank.

5m wide recreation link with 2.5m wide shared path with turf strip either side.

Bio retention basin within private property.

Bio retention maintenance access with gate.

Bin collection point.

Approximate top of bank.

Feature trees within common areas.

Communal open space including pool and shelter.

Shade trees at 8m centres along shared path.

Existing vegetation to be retained and protected.

Screen planting to rear property boundary.

Portion of land to be cleared on adjoining property. Turf finish.

Bin collection point.

NOTE:
Limited vegetation proposed within 18500mm wide Bushfire Buffer. Refer to Bushfire Consultants report.

SCHEMATIC DESIGN - MASTER PLAN

202 BAILEYS MOUNTAIN ROAD, UPPER COOMERA

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SCALE : 1:500 @ A1; 1:1000 @ A3

SCHEMATIC DESIGN - DWELLING BLOCK TYPES

202 BAILEYS MOUNTAIN ROAD, UPPER COOMERA

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SCALE : 1:500 @ A1; 1:1000 @ A3

5.5m wide overland flow channel.

Temporary construction access.

Feature tree.

Unallocated visitor parking.

PMT. Screened enclosure to all sides with gate to front.

Open space with bench seat on concrete pad. Plant screening to perimeter.



CUL-DE-SAC

SCALE: 1:200 @ A1, 1:400 @ A3

Internal driveway.

600mm wide turf strip to back of kerb

Underground services. Refer Civil drawings.

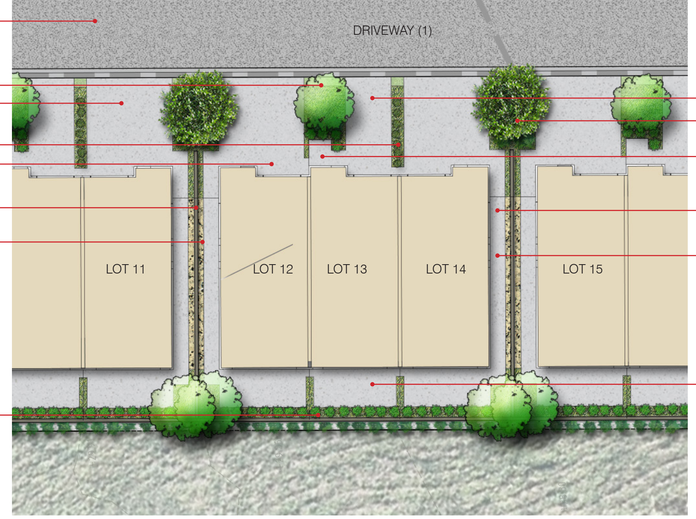
Screen fencing and gate access

Double width concrete driveway to end units

Screen fencing and gate access

Gravel to strip between pavement and fence/retaining wall

Deep planting to rear yard including shade trees, shrubs and groundcovers



Single driveway to central units

Feature tree, shrubs and groundcovers to corner dwellings.

Screened bin area to central units located at front.

Paved area surrounding dwelling

Services located to side of end dwellings including clothes line, air conditioner, bin storage and hot water. Refer Architects drawings.

Central dwelling accessed by lockable gate used only by BC for maintenance access. Services located to rear of central dwelling including clothes line, air conditioner and hot water. Refer Architects drawings.

TYPICAL TRIPLEX

SCALE: 1:200 @ A1, 1:400 @ A3

NOTE:
Driveway widths to dwellings. Refer Civil Engineers drawings.

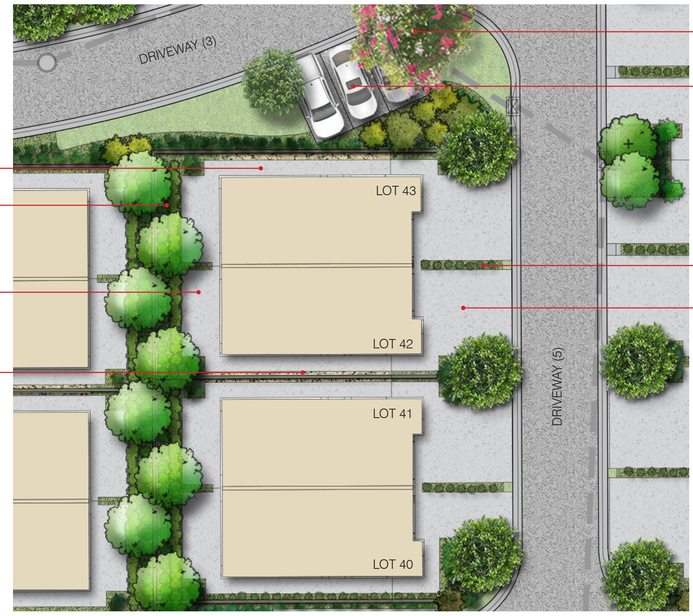
NOTE:
For all fencing. Refer Architects drawings.

Paved area surrounding dwelling

Deep planting to rear yard including shade trees, shrubs and groundcovers

Paved entertaining area in rear yard.

Gravel mulch to side of dwelling along fence line.



Feature trees (Poinciana) in common areas where suitable.

Unallocated visitor parking.

Narrow planting strip between driveways.

Double driveway to each duplex unit.

TYPICAL DUPLEX

SCALE: 1:200 @ A1, 1:400 @ A3

Paved entertaining area in rear yard.

Gravel mulch to side of dwelling along fence line.

Screened bin area to central units located at front.

Double width concrete driveway to end units

600mm wide turf strip to back of kerb



Overland flow channel. Refer Civil drawings.

Deep planting to rear yard including shade trees, shrubs and groundcovers.

Central dwelling accessed by lockable gate used only by BC for maintenance access. Services located to rear of central dwelling including clothes line, air conditioner and hot water. Refer Architects drawings.

Screen fencing and gate access

Single driveway to central units

Trees to be clear of services. If required use of root barrier recommended.

Services located to side of dwelling including clothes line, bin storage and hot water. Refer Architects drawings.

TYPICAL QUADPLEX

SCALE: 1:200 @ A1, 1:400 @ A3

SCHEMATIC DESIGN - TYPICAL LOT PLANS

202 BAILEYS MOUNTAIN ROAD, UPPER COOMERA

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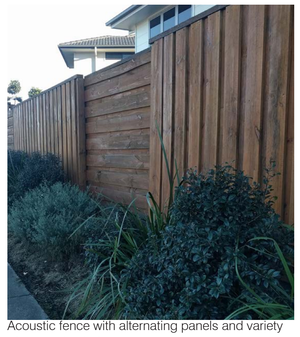
SCALE : 1:500 @ A1; 1:1000 @ A3



1200mm high black flat top aluminium pool type fence with timber posts to top of retaining walls at frontage of lots.



Side utility areas to end units.



Acoustic fence with alternating panels and variety of vegetation in front.



Low height split face, charcoal block wall at frontage to adjust levels between dwellings.



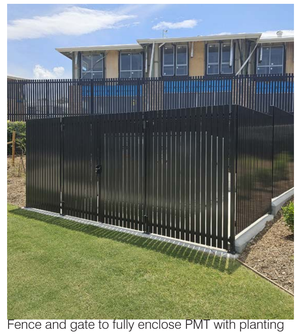
Mail bank with vehicle pull in bay and pedestrian path access.



Services located in rear yard for central units.



Concrete bin pad for dwellings on road stubs.



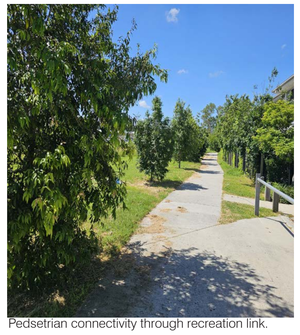
Fence and gate to fully enclose PMT with planting to sides and rear and turf to front.



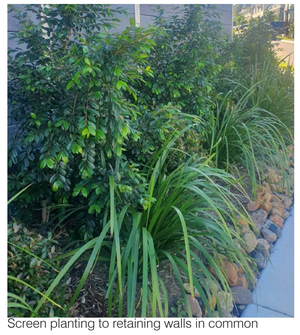
Feature trees providing seasonal colour and points of interest.



Unallocated visitor parking with wheelstops. Planting adjacent to deter parking on grass.



Pedsetrian connectivity through recreation link.



Screen planting to retaining walls in common areas and streetscape.

INDICATIVE IMAGERY

TREES



ELAEOCARPUS reticulatus - Blueberry Ash



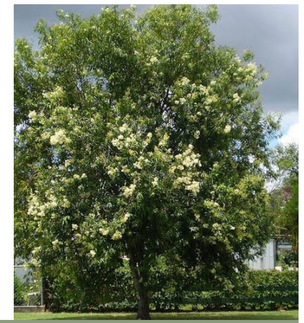
MAGNOLIA species - Magnolia



TABEBUIA palmeri - Pink Trumpet Tree



TRISTANIOPSIS laurina 'Luscious' - Water Gum



WATERHOUSIA floribunda - Weeping Lilly Pilly

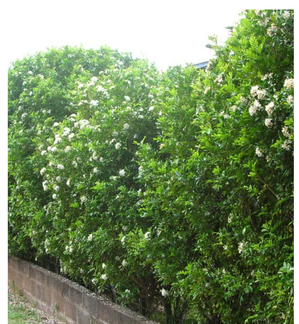
SHRUBS



ACMENA smithii 'Allyn Magic' - Small Lilly Pilly



MICHELIA figo - Port Wine Magnolia



MURRAYA paniculata - Mock Orange



SYZYGIUM australe 'Superior' - Lilly pilly



SYZYGIUM australe 'Resilience' - Lilly pilly

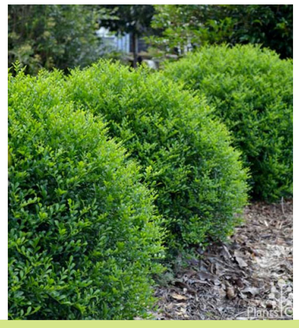
GROUNDCOVERS



LIRIOPE muscari 'Evergreen Giant'



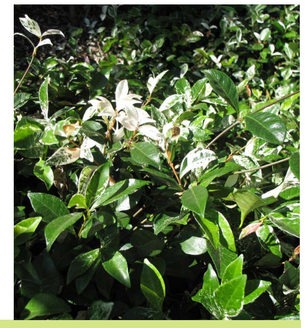
LOMANDRA Lime Tuff - Mat Rush



MURRAYA paniculata 'Min a Min' PBR



OPHIOPOGON intermedius 'Stripey White'



TRACHELOSPERMUM jasminoides - Tricolor

PLANT PALETTE - LOTS + COMMON AREAS

SPECIES	COMMON NAME
TREES	
ELAEOCARPUS reticulatus	Blueberry Ash
MAGNOLIA grandiflora 'Little Gem'	Little Gem Magnolia
MAGNOLIA grandiflora 'Teddy Bear'	Teddy Bear Magnolia
TABEBUIA palmeri	Pink Trumpet Tree
TRISTANIOPSIS laurina 'Luscious'	Water Gum
WATERHOUSIA floribunda	Weeping Lilly Pilly
SHRUBS	
ACMENA smithii 'Allyn Magic'	Small Lilly Pilly
MICHELIA figo	Port Wine Magnolia
MURRAYA paniculata	Mock Orange
SYZYGIUM australe 'Superior'	'Superior' Lily Pilly
SYZYGIUM australe 'Resilience'	'Resilience' Lilly Pilly
GROUNDCOVERS	
LIRIOPE 'Evergreen Giant'	Evergreen Giant
LOMANDRA 'Lime Tuff'	Mat Rush
MURRAYA paniculata 'Min a Min' PBR	Dwarf Orange Jessamine
OPHIOPOGON intermedius	Stripey White
TRACHELOSPERMUM jasminoides 'Tricolor'	Variegated Star Jasmine

SCHEMATIC DESIGN - TYPICAL PLANT PALETTE & SITE IMAGERY

202 BAILEYS MOUNTAIN ROAD, UPPER COOMERA

DUNN + MORAN LANDSCAPE ARCHITECTS

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SCALE : 1:500 @ A1; 1:1000 @ A3

ENTRY AREA TYPICAL IMAGERY



Typical entry signage in planted bed (private property) surrounded by trees, shrubs and groundcovers. Hard mowing edge within boundary


Vehicle crossover between street and internal driveways.


Communal mailbox with temporary car park



ENTRY SCALE: 1:300 @ A1, 1:600 @ A3

BIO BASIN SEDGES AND TUFTER PLANTS





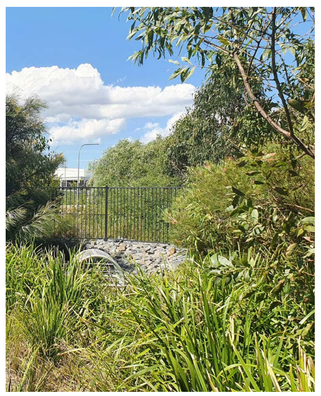


PLANT PALETTE - BIO BASIN

SPECIES	COMMON NAME
TREES	
LOPHOSTEMON confertus	Brush Box
MELALEUCA quiquenervia	Broad-leaved Paperbark
SHRUBS	
BANKSIA robur	Swamp Banksia
CALLISTEMON viminalis 'Captain Cook'	Bottlebrush (cultivar)
DORYANTHES palmeri	Giant Spear Lily
GROUNDCOVERS	
LOMANDRA hystrix	Mat Rush
MYOPORUM ellipticum	Coastal Boobialla
SEDGES/TUFTED PLANTS	
CAREX appressa	The Tall Sedge
FICINIA nodossa	The Knotted Club-rush
GAHNIA clarkei	Saw Sedge
JUNCUS usitatus	Common Rush
LOMANDRA hystrix	Mat Rush

BIO BASIN TYPICAL IMAGERY





BIO-BASIN SCALE: 1:300 @ A1, 1:600 @ A3

SCHEMATIC DESIGN - BASIN & RECREATION LINK

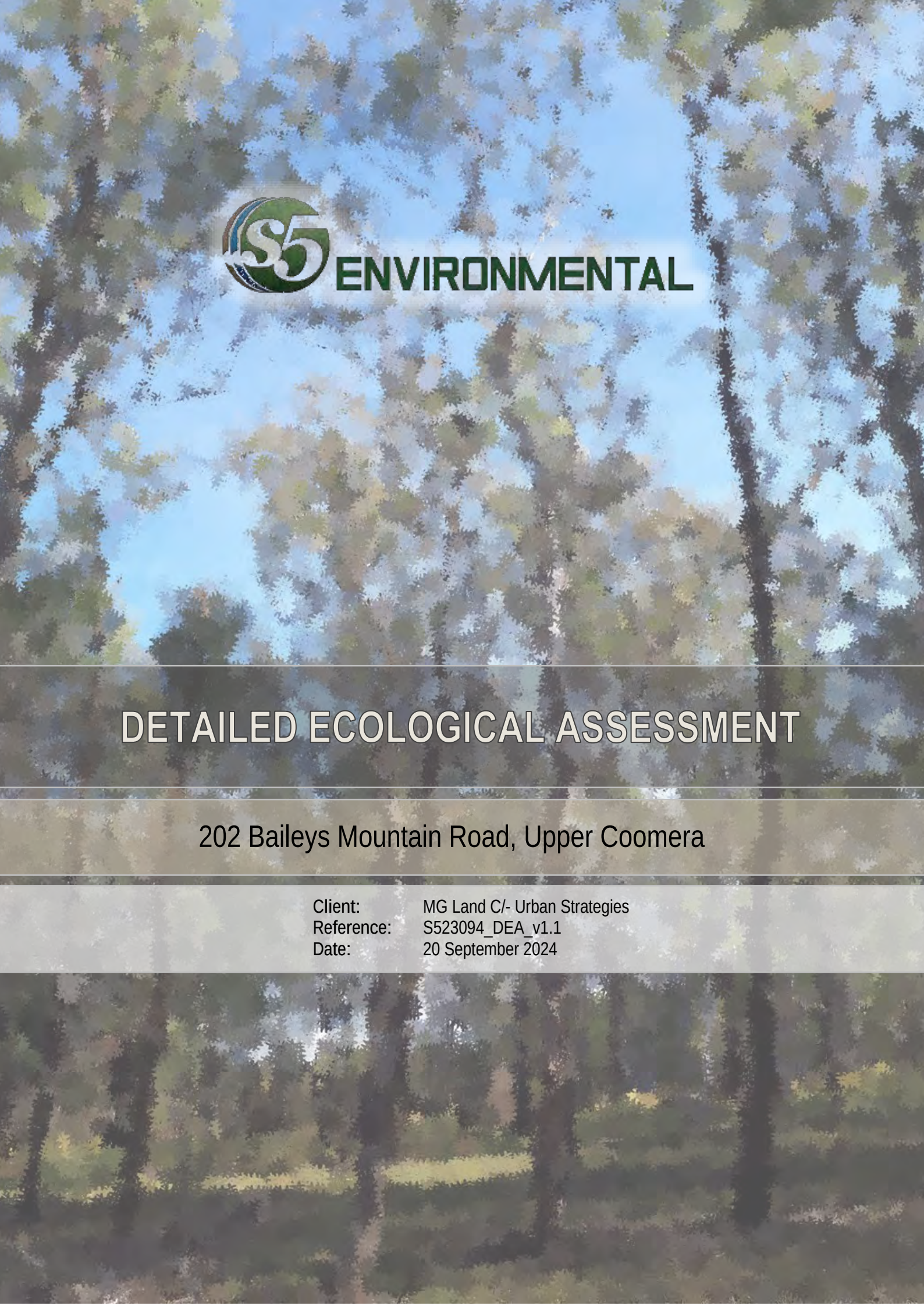
202 BAILEYS MOUNTAIN ROAD, UPPER COOMERA

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DETAILED ECOLOGICAL ASSESSMENT

202 Baileys Mountain Road, Upper Coomera

Client:	MG Land C/- Urban Strategies
Reference:	S523094_DEA_v1.1
Date:	20 September 2024

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Quality Control

Prepared for	MG Land C/- Urban Strategies
Prepared by	S5 Consulting Pty Ltd (ACN 600 187 844) 2/265 Sandgate Road, Albion T 07 3505 3053 www.s5consulting.com.au
Date	20 September 2024

Version Control

Version	Description	Date	Author	Reviewer	Approver
1.0	For Submission	10 June 2024	CH (Senior Ecologist)	SL (Principal Ecologist)	RS (Director)
1.1	Updated Layout	20 September 2024	CH (Senior Ecologist)	RS (Director)	RS (Director)

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ABBREVIATIONS

ALA	Atlas of Living Australia
CoGC	City of Gold Coast
CE	Critically Endangered
Cwlth	Commonwealth
DBH	Diameter at Breast Height
DES	Department of Environment and Science (Qld)
DNRME	Department of Natural Resources, Mines and Energy (Qld)
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DSDMIP	Department of State Development, Manufacturing, Infrastructure and Planning (Qld)
E	Endangered
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EVNT	Endangered, Vulnerable and Near Threatened
KHA	Koala Habitat Area
km	Kilometre
M	Migratory
m	Meter
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
MLES	Matters of Local Environmental Significance
NC Act	*Nature Conservation Act 1992* (Qld)
NT	Near Threatened
RE	Regional Ecosystem
PR	*Planning Regulation 2017*
QH	Queensland Herbarium
QLD	Queensland
SARA	State Assessment and Referral Agency (Qld)
SPP	State Planning Policy
WO	Wildlife Online
V	Vulnerable
VM Act	*Vegetation Management Act 1999* (Qld)

1.0 INTRODUCTION

S5 Environmental was commissioned by Urban Strategies, on behalf of their client MG Land, to undertake a Detailed Ecological Assessment to support a Development Application for a Reconfiguring a Lot (Boundary Realignment 2 into 2), Material Change of Use (Multiple Dwelling – Townhouses) and Operational Works (Changes to Ground Level and Vegetation Clearing) at 202 Baileys Mountain Road, Upper Coomera, further described as Lot 58 on SP191940. Refer to Figure 2.

This report investigates the ecological values, features and functionality of the site in the context of the local and regional area and applicable ecological constraints. Further, this report investigates the presence and/or absence of *Nature Conservation Act 1992* (NC Act) and *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) listed species and matters, and ecological corridor connectivity across the site and regional surrounds.

Table 1 Site Description

Street Address	202 Baileys Mountain Road, Upper Coomera	Lot on Plan	Lot 58 on SP191940
LGA	City of Gold Coast (CoGC)	Area	3.08 ha (post-land swap)
Coordinates	-27.8663, 153.2860	Tenure	Freehold
Current State	Lot 58 on SP191940, herein referred to as the 'subject site', is historically disturbed containing a dwelling on the south-western extent, accessed via an unsealed driveway. Yaun Creek waterway is situated south of the existing residence in the south-eastern extent of the lot. The subject site and southern and north-western adjacent lots are zoned as Rural residential, with Medium density residential lots to the north-west. Refer to Figure 1, below.		
Proposed Development	S5 Environmental understand that the proposed development is for a DA will be for Reconfiguring a Lot (Boundary Realignment 2 into 2), Material Change of Use (Multiple Dwelling – Townhouses) and Operational Works (Changes to Ground Level and Vegetation Clearing) for a 73-townhouse development. The development will include a land-swap with the western adjacent property. The northern extent of the site is proposed as a road reserve, with an eastern portion of the site proposed as a future road/land dedication to CoGC. The southern extent of the site is proposed as a dedicated park, which will undergo rehabilitation. Refer to S523094_BRMP_001-007(B) for the Basic Rehabilitation Management Plan (BRMP). A 5 m recreation link pathway will separate the rehabilitated dedicated park with the development footprint, which includes the townhouses, internal roads and a bio-basin. Refer to Figure 2, for the proposed development site boundary post-land swap.		



Figure 1 Site Aerial (source: Nearmap, date: 13/11/2023)

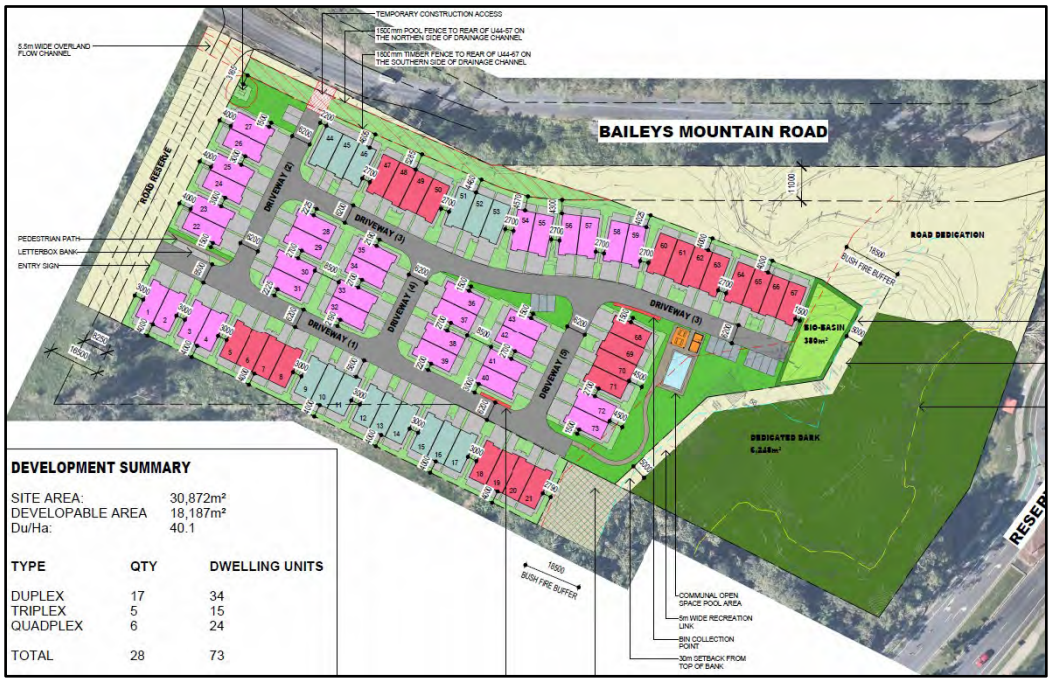


Figure 2 Extract of Site Layout (source: Red Door Architecture, drawing no. 23008, rev. 22, 28/08//2024)

2.0 METHODOLOGY

The intent of this report is to provide an informed assessment of the ecological values that are present and/or likely to be present on the site. This report also provides an assessment of the site's habitat and biodiversity values and ecological functionality. In the preparation of this assessment, the following steps were undertaken:

1. Legislation and planning review;
2. Desktop assessment;
3. Field survey;
4. Impact assessment and development analysis; and
5. Conclusions and recommendations.

2.1 Desktop Assessment

Desktop searches were reviewed prior to the field assessment to inform a targeted search for threatened species and ecological communities that could potentially occur on the site. Desktop searches covered the following databases and mapping sources:

- Databases (Search of 1 km radius; Appendix A):
  - Department of Climate Change, Energy the Environment and Water (2024), *EPBC Act Protected Matters Search Tool*;
  - Queensland Government (2023), *Wildnet Online Extract*, *Nature Conservation Act 1992*;
- State Mapping (Appendix B):
  - Queensland Government (2024), *Fire ant biosecurity zone mapping* – Version 1;
  - Queensland Government (2024), *Request a vegetation map or property report*;
  - Department of State Development, Manufacturing, Infrastructure and Planning (2023), Online mapping system which incorporates the State Planning Policy (SPP) *Interactive Mapping System* (IMS), and the *Development Assessment Mapping System* (DAMS); and,
- Local Government Area Mapping:
  - City of Gold Coast, *City Plan Version 11 (2024) – Zones and Overlay Online Mapping.*
  - *City of Gold Coast Development Application Tracking (DAT)*

The likelihood of each EPBC Act and NC Act listed species occurring on site was assessed using the results of the desktop assessment and these species were targeted in fieldwork.

In addition, aerial photography was utilised to discern potential wildlife movement corridors and regional ecological function of the locality. The online resource 'Atlas of Living Australia' (ALA, 2024) was also utilised to gather information on potential flora and fauna at the site.

2.2 Field Assessment

A detailed site inspection of the development site was conducted by S5 Environmental Ecologists on the 6th April 2024. Weather was overcast, with a minimum temperature of 19.8°C and a minimum temperature of 15.2 °C, and a maximum temperature of 20.7 °C, as recorded at Upper Coomera (Gold Coast Seaway, Station No. 040764). A total of 0.2mm of rainfall was recorded on the day prior to the site visit, and 0.6mm on the day of the site visit, as recorded at Coomera Foxwell Road (Station No. 040516).

For the ecological assessment, the 'random meander' technique (Cropper, 1993) was used to traverse the site. A measured walkover of the site was achieved with focus on the area within and adjacent to the proposed development footprint. Flora and fauna species were recorded as they were encountered. Vegetation communities were inspected in order to assess their structure, dominance, associations and function. The structure, health and integrity of the ecosystems within the site were also assessed and documented.

Areas, or niches, displaying habitat value were closely examined. This included habitat trees and areas of woody debris that may shelter reptiles. Signs of faunal activity, including tree scratches, nests, dreys, scats, tracks, dens and diggings were also searched for and recorded. These traces were interpreted using Triggs (2008). The ecological intactness of land neighbouring the site was broadly investigated as part of the assessment.

Site habitats were assessed to determine their value for native fauna species, including significant and threatened species. Particular attention was given to habitat features including:

- The presence of hollows, fissures and tubes in mature trees suitable as nesting/roosting sites, as well as arboreal and ground-based nests, dreys, or burrows;
- The presence of significant habitat trees;
- The presence of arboreal fauna, scratch markings, orts and scats;
- The presence of characteristic feeding signs, for example, diggings (terrestrial mammals), and sap feeding scars on eucalypts (Gliders);
- The presence/abundance of dense vegetation, logs, leaf litter and fallen timber; (small bush birds and reptiles);
- Floristic diversity, including diversity and abundance of fruiting and flowering species; and
- Vegetation connectivity.

A nocturnal fauna assessment has not been performed as part of this assessment.

2.3 Survey Limitations

It should be noted that the survey undertaken as part of this Detailed Ecological Assessment only represents a 'snapshot' in time and therefore, may not provide a true indication of vegetation species presence within the subject site. The ability to accurately identify plants to species level can be significantly affected by numerous factors including the timing of a survey (the season), prevailing climatic conditions and the presence of reproductive material (flowers, fruit and seed capsules). Whilst every effort has been made to detect and accurately identify these species, this survey should not be regarded as conclusive evidence that certain species including listed and protected plants do not occur within the subject site and surrounds.

2.4 Likelihood of Occurrence and Impact Assessment

Results obtained from the desktop and field assessment inform the assessment of the likelihood that the proposed development will have a significant (residual) impact on any MNES, MSES or MLES. Species records, state and local mapping and habitat on site are considered to determine the likelihood of MNES, MSES and MLES occurring within the subject site. Table 2 outlines the definitions of each described likelihood of occurrence. Impacts to any matters (national, state and/or local) that are likely or have been confirmed on site are assessed in the context of the proposed works and inform recommendations.

Table 2 Likelihood of Occurrence Definitions

Likelihood	Definition
Confirmed	• Identified by S5 Environmental Ecologist during site inspection.
Likely	• Suitable habitat present; and • Occurrence records in vicinity since 2000 (WO, ALA).
Possible	• Suitable/marginal habitat present and no occurrence records since 2000; or • Occurrence records in vicinity since 2000 and no suitable/marginal habitat present.
Unlikely	• Unsuitable habitat on site and no sightings since 2000.

3.0 RELEVANT LEGISLATION

A review was conducted on the regulatory framework applicable to the project. The following sections discuss the findings of this review.

3.1 Federal Legislative Overview

3.1.1 *Environment Protection and Biodiversity Conservation Act 1999*

The EPBC Act provides a legislative framework to protect and manage nationally and internationally significant matters. The EBPC Act defines these as Matters of National Environmental Significance (MNES).

Under the EPBC Act, a 'self-assessment' is required to ascertain whether an action requires a referral to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for a significant impact to a MNES. The EPBC Act Policy Statement 1.1, the 'Significant Impact Guidelines' lists assessment criteria for each MNES to assist in determining whether an action is likely to have a significant impact on a MNES.

It should be noted that the "up-listing" of the koala to Endangered in 2022, means that clearing of native vegetation will likely be required to be referred to DCCEEW to determine if it would be deemed a Controlled Action. That is, to determine if it will have a significant impact on a matter of National Environmental Significance, in this case, the koala.

3.2 State Legislative Overview

3.2.1 *Planning Regulation 2017*

3.2.1.1 Koala Habitat

State Koala Habitat Mapping maps the following areas: Koala Priority Areas (KPA), Core Koala Habitat Areas (KHA), Locally Refined Koala Habitat Areas (LRKHA), Koala Habitat Restoration Areas (KHRA) and Identified Koala Broad-Hectare Area (IKBHA).

Unless the proposed development is listed as exempted development in Schedule 24 of the Planning Regulation, the following applies. When the proposed development site is:

- Inside a KPA and contains Koala Habitat (KHA and/or LRKHA):
  - and interference with Koala Habitat is proposed, the development is prohibited;
  - and interference with Koala Habitat is not proposed, the assessment benchmarks under Schedule 11, Part 2, Section 4 of the Planning Regulation apply;
- Inside a KPA and no Koala Habitat on the premises, no assessment under the Planning Regulation 2017 in relation to Koala Habitat is required;
- Outside a KPA and contains Koala Habitat (KHA and/or LRKHA):
  - and interference with Koala Habitat is proposed, referral to SARA and assessment against SDAP Code 25 is required;
  - and interference with Koala Habitat is not proposed, no assessment under the Planning Regulation 2017 in relation to Koala Habitat is required;

- Inside an IKBHA and the proposed development is assessable development, the assessment benchmarks under Schedule 11, Part 3, Section 6 apply.

3.2.1.2 Native (Regulated) Vegetation

The *Vegetation Management Act 1999* (VM Act) and the *Vegetation Management Framework Amendment Act 2013* provides a legislative framework that aims to regulate the clearing of vegetation in a way that protects regulated vegetation (defined on a regulated vegetation Map), ensures clearing does not cause land degradation, prevents the loss of biodiversity, maintains ecological processes, manages the environmental effects of clearing, reduces greenhouse gas emissions and allows for sustainable land use. Provided an accepted development vegetation clearing code applies to the proposed vegetation clearing and the clearing complies with that code, the works are accepted development under the Planning Regulation.

Categories of regulated vegetation include:

- Category A (Vegetation offsets/compliance notices/VDecs);
- Category B (Remnant Vegetation);
- Category C (High-value Regrowth);
- Category R (Reef Regrowth Watercourse Vegetation); and
- Category X (Exempt Clearing Work on Freehold, Indigenous and Leasehold land).

Remnant Vegetation and High Value Regrowth are assessed using the Regional Ecosystem (RE) framework and REs are described in the Regional Ecosystem Description Database (REDD).

The VM Act also protects areas known as essential habitat. essential habitat is habitat in which NC Act listed fauna species are known to occur and is identified on a Vegetation Management Supporting Map.

3.2.2 *Nature Conservation Act 1992*

The *Nature Conservation Act 1992 (*NC Act) is the legislative foundation for the creation and management of protected areas in Queensland, namely national parks, conservation parks, resources reserves, nature refuges, coordinated conservation areas, wilderness areas, world heritage management areas and international agreement areas. Further, the NC Act also ensures that native fauna and native flora are protected outside of protected areas.

3.2.2.1 Breeding Places

All breeding places for native fauna are protected under the NC Act. Where interference with breeding places for protected fauna are/is proposed, DES require a Species Management Programme (SMP) to be submitted and approved to manage potential impacts to protected fauna prior to works being undertaken. There are two types of SMPs; namely High Risk and low risk SMPs.

A High Risk SMP is required if tampering with a breeding place is proposed for fauna that are:

- prescribed as Extinct in the Wild, Endangered, Vulnerable, Near Threatened, or Special Least Concern fauna under the *Nature Conservation (Wildlife) Regulation 2006* (NC Reg), and/or
- prescribed as Least Concern fauna under the NC Reg and are colonial breeders.

A low risk SMP is required if tampering with a breeding place is proposed for all other native fauna prescribed as least concern under the NC Reg. Breeding places may be identified during pre-clearance surveys and/or during clearing activities. Regardless of the timing of breeding place detection/identification, the above requirements apply. It should be noted that it is also an industry standard for clearing to be undertaken under the supervision of, and after an initial site assessment, by a fauna spotter.

3.2.2.2 Protected Animals

The *Nature Conservation (Animals) Regulation 2020* is subordinate legislation under the NC Act that prescribes the protection status of wildlife in Queensland. Protected animals are any fauna listed as Endangered, Vulnerable, Near Threatened, Special Least Concern, and Least Concern species.

3.2.2.3 Protected Plants

The *Nature Conservation (Plants) Regulation 2020* regulates activities that propose to interfere with protected plants in Queensland. A flora survey trigger map identifies areas of High Risk where Endangered, Vulnerable or Near Threatened native plants are present or are likely to be present. Vegetation clearing proposed within a mapped high-risk area requires a flora survey to be undertaken by a Suitably Qualified Person in accordance with the flora survey guidelines. If no threatened or Near Threatened plants listed under the NC Plants Regulation are identified during the flora survey, a clearing permit is not required following submission of the flora survey report and exempt clearing notification to the Department of Environment and Science. However, if threatened and Near Threatened plants are identified during the flora survey and no exemptions apply to the proposed works, a protected plant clearing permit is required. It is important to note that if protected plant/s are identified during clearing works, works must cease and advice sought regarding obtaining a protected plant clearing permit immediately.

3.2.3 *Biosecurity Act 2014*

The *Biosecurity Act 2014* is intended to control the spread of pest species, both plant and animal. Under the Biosecurity Act, pests are declared as follows:

- Prohibited Matter - a disease, exotic fish, insect pest, pest animal or a weed that is not found in Queensland. If it were to enter Queensland it would seriously impact our health, way of life, the economy, and the environment. If you find prohibited matter, you must report it to Biosecurity Queensland within 24 hours; and
- Restricted Matter - can be an animal disease, noxious fish, insects, pest animal or weed that is found in Queensland. Specific actions are required to be taken that limit the impact of this matter by reducing, controlling or containing it.

Should any Prohibited or Restricted weeds, or pests, be identified on site, they must be addressed in accordance with the above requirements of the *Biosecurity Act 2014*.

There is also a General Biosecurity Obligation (GBO) under the Biosecurity Act to ensure works do not spread a pest, disease or contaminant issue and to:

- take all reasonable and practical steps to prevent or minimise each biosecurity risk;
- minimise the likelihood of the risk causing a biosecurity event and limit the consequences of such an event; and

- prevent or minimise the adverse effects the risk could have and refrain from doing anything that might make harmful effects worse.

In addition, the Department of Agriculture and Fisheries' Fire Ant Biosecurity Map outlines suburbs and localities which are in Biosecurity Zones for Red Imported Fire Ants.

3.2.4 *Fisheries Act 1994*

The purpose of the *Fisheries Act 1994* is to provide a legislative framework for the conservation and enhancement of the community's fisheries resources and fish habitats in a way that seeks to apply and balance the principles of ecologically sustainable development and promote ecologically sustainable development.

3.2.4.1 Waterways

Fish passage is a matter of state environmental significance (MSES) under the *Environmental Offsets Act 2014* and is protected under the Fisheries Act. This MSES is protected through the mapping of the State's waterways in the *Queensland waterways for waterway barrier works spatial data layer*. Each waterway is assigned a fish attribute (FP) number that ranges from 1 to 5; waterways with a 1 and 2 FP numbers support fish that are stronger swimmers and stream orders 3, 4 and 6 support fish with weaker swimming abilities and as such, different solutions for fish passage are required. Each mapped waterway is considered to be fish habitat and as such, are protected and managed in a way that protects fish habitat values and passage.

Attributes of a waterway, as defined under the Fisheries Act are:

- Defined bed and banks;
- An extended, if non-permanent, period of flow;
- Flow adequacy; and
- Fish habitat at or upstream of site.

Fisheries Queensland's *Accepted development requirements for operational work* that is constructing or raising waterway barrier works specify the requirements for works within a waterway to be considered accepted development and not require a development application. Should works not comply with these requirements, a development application is required for operational works.

On ground attributes of a mapped waterway may not meet the above attributes for a waterway. In this case, consultation with the Department of Fisheries and Forestry, otherwise compliance with the relevant requirements for the mapped waterway is needed, i.e., either the accepted development requirements or a development application. See Figure 3 below for the decision-making process according to the FP attribute and development work type.

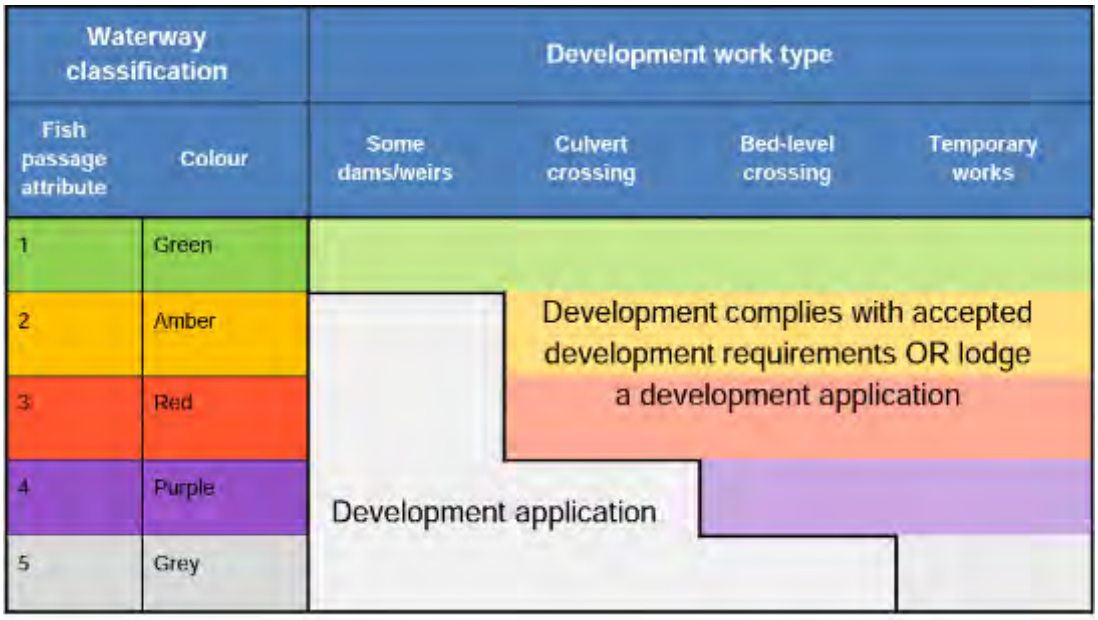


Figure 3 Decision making process for determining whether a development application is required (source: Queensland waterways for waterway barrier works spatial data layer: Guide to determining waterways, Version 2.0)

3.2.5 State Planning Policies

The SPP ensures the State's interests in planning are protected through Local Government Planning Schemes. The SPP is used by Local Governments to be integrated into local Planning Schemes. S5 Environmental understands that the SPP ecologically related State Interests have been fully incorporated into the CoGC City Plan 2022 and as such, do not require assessment for the proposed development.

3.3 Local Legislative Overview

As the proposed development is considered assessable development, S5 Environmental understands that assessment against the relevant ecological codes of the City of Gold Coast Planning Scheme is required.

3.3.1 Environmental Significance Overlays

Within the Environmental Significance Overlays, disturbance to regulated and general priority vegetation is minimised by avoiding significant adverse impacts, mitigating significant adverse impacts where these cannot be avoided and offsetting any significant residual impacts. Ecologically relevant overlay codes applicable to the proposed development include:

- Matters of Local Environmental Significance (MLES): Wetlands & Waterways Overlay (minor & buffer); and
- Matters of State Environmental Significance (MSES): Koala Priority Areas.

3.3.2 Matters of Local Environmental Significance - Wetlands and Waterways

The purpose of the Environmental Significance Overlay Code is to identify and protect matters of environmental significance and ensure that development is consistent with, and contributes to, the achievement of the objectives of the Our Natural City Strategy. Further, the aims of the Wetlands and Waterways Overlay Code is as follows:

- Degraded matters of environmental significance are protected and rehabilitated;
- Wetlands, waterways and their associated buffers are protected and enhanced;
- Buffers are provided between matters of environmental significance and any proposed development, to manage impacts;
- Appropriate tenure and management arrangements are provided to protect matters of environmental significance and their associated buffers;
- Where offsets are required, these are consistent with the Environmental Offsets Act 2014;
- Management strategies and appropriate clearing practices are implemented to ensure any fauna impacted by development activities are managed and protected during works.

3.3.3 Matters of State Environmental Significance - Koala Habitat Areas

The purpose of the Environmental Significance Overlay Code is to identify and protect matters of environmental significance and ensure that development is consistent with, and contributes to, the achievement of the objectives of the Our Natural City Strategy. Further, the aims of the Koala habitat Areas Overlay Code are as follows:

- Degraded matters of environmental significance are protected and rehabilitated;
- Where offsets are required, these are consistent with the Environmental Offsets Act 2014; and
- Management strategies and appropriate clearing practices are implemented to ensure any fauna impacted by development activities are managed and protected during works.

4.0 DESKTOP ASSESSMENT RESULTS

Results of the desktop assessment are provided in Appendix A and Appendix B and have been summarised in the relevant sections below.

4.1 Vegetation Communities

4.1.1 Threatened Ecological Communities

The PMST report indicated that four Threatened Ecological Communities (TECs) may occur within the area (refer to Appendix A). The listed TECs included:

- Coastal swamp oak (*Casuarina glauca*) forest of New South Wales and Southeast Queensland (SEQ) ecological community;
- Coastal swamp sclerophyll forest of New South Wales and Southeast Queensland;
- Lowland rainforest of subtropical Australia; and
- Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and SEQ bioregions.

4.1.2 Regulated Vegetation

Current regulated vegetation mapping indicates that the site contains 0.28 ha of Category B vegetation, 0.06 ha of Category C vegetation and the balance of the site is mapped as Category X vegetation. Refer to Figure 4.

4.1.3 Regional Ecosystems

The subject site is mapped as contain the following REs:

- RE 12.3.11: *Eucalyptus tereticornis* +/- *Eucalyptus siderophloia, Corymbia intermedia* open forest on alluvial plains usually near coast, Of concern (550 m^2); and
- RE 12.11.24: *Eucalyptus carnea* or *E. tindaliae, Corymbia intermedia* +/- *E. siderophloia* or *E. crebra* woodland on metamorphics +/- interbedded volcanics, Least concern (1,266 m^2).

Refer to Figure 5.

4.1.4 Essential Habitat

Current mapping indicates that the site does not contain Essential Habitat mapping. Refer to Appendix B.

4.1.5 Koala Habitat (Planning Regulation)

Current State Koala mapping shows core Koala Habitat Areas (KHA) along the northern boundary and in the southern corner of the site. The subject site does not contain Koala Priority Area (KPA), Identified Koala Broad Hectare Area (IKBHA) or locally refined Koala Habitat Areas (LRKHA). Refer to Figure 6.

4.1.6 Environmental Significance Overlay

Under the CoGC City Plan Version 11, the subject site is mapped within the Environmental Significance Overlay as containing the following Matter of State Environmental Significance (MSES):

- Priority species (refer to Figure 6);
  - State significant species; and
  - Koala habitat areas;
- Vegetation management – regulated vegetation (refer Figure 7).

In addition, the subject site is mapped to contain the following Matters of Local Environmental Significance (MLES):

- Priority species – local significant species (refer to Figure 6); and
- Vegetation management - medium priority and regulated vegetation (refer Figure 7);

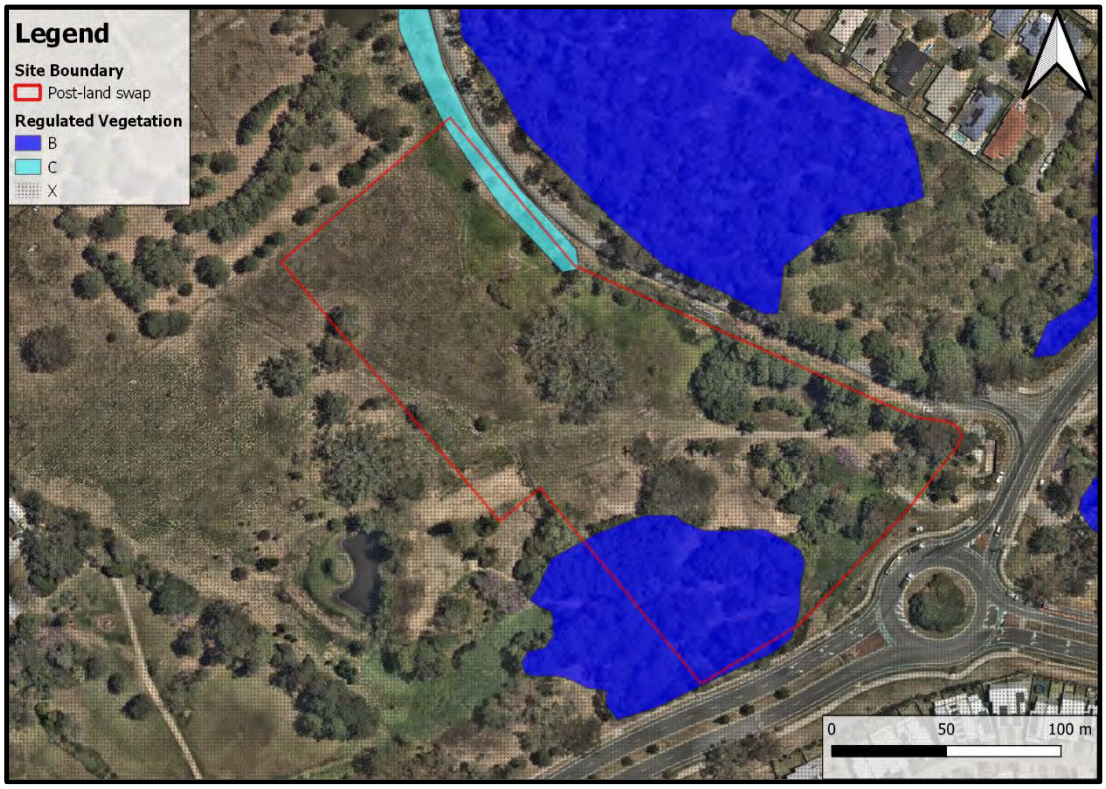


Figure 4 Regulated Vegetation (source: QSpatial, 2023)

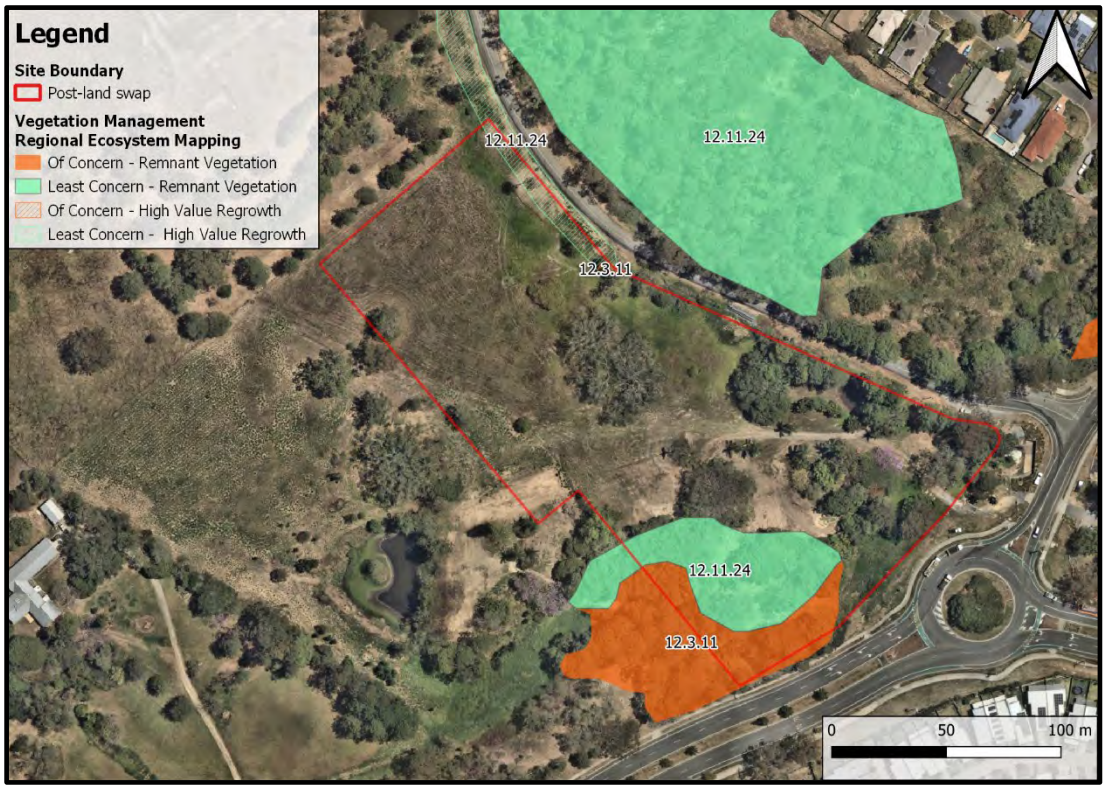


Figure 5 Regional Ecosystem (source: QSpatial, 2023)



Figure 6 Koala Mapping (source: QSpatial 2023)



Figure 7 CoGC Significant Species Mapping (source: CoGC Open Data Portal, 2024)



Figure 8 CoGC Vegetation Management (source: CoGC Open Data Portal, 2024)

4.2 Aquatic Values

4.2.1 Waterway Barrier Works Spatial Overlay

Under the State's Waterway barrier works spatial overlay, the site has been mapped to contain a FP1 (low) waterway in the north, and a FP2 (moderate) waterway in the southeastern and northeastern extents. These mapped waterways represent an unnamed tributary, which empties into Yaun Creek. Refer to Figure 9 below.

4.2.2 Waterway Corridors and Wetlands

Under the CoGC City Plan Version 11, the subject site is mapped within the Environmental Significance Overlay as containing the following Matter of State Environmental Significance (MSES):

- Wetlands and waterways; and
- Wetlands and waterways buffer area

Refer to Figure 10.



Figure 9 Waterway Barrier Works Overlay (source: QSpatial, 2023)

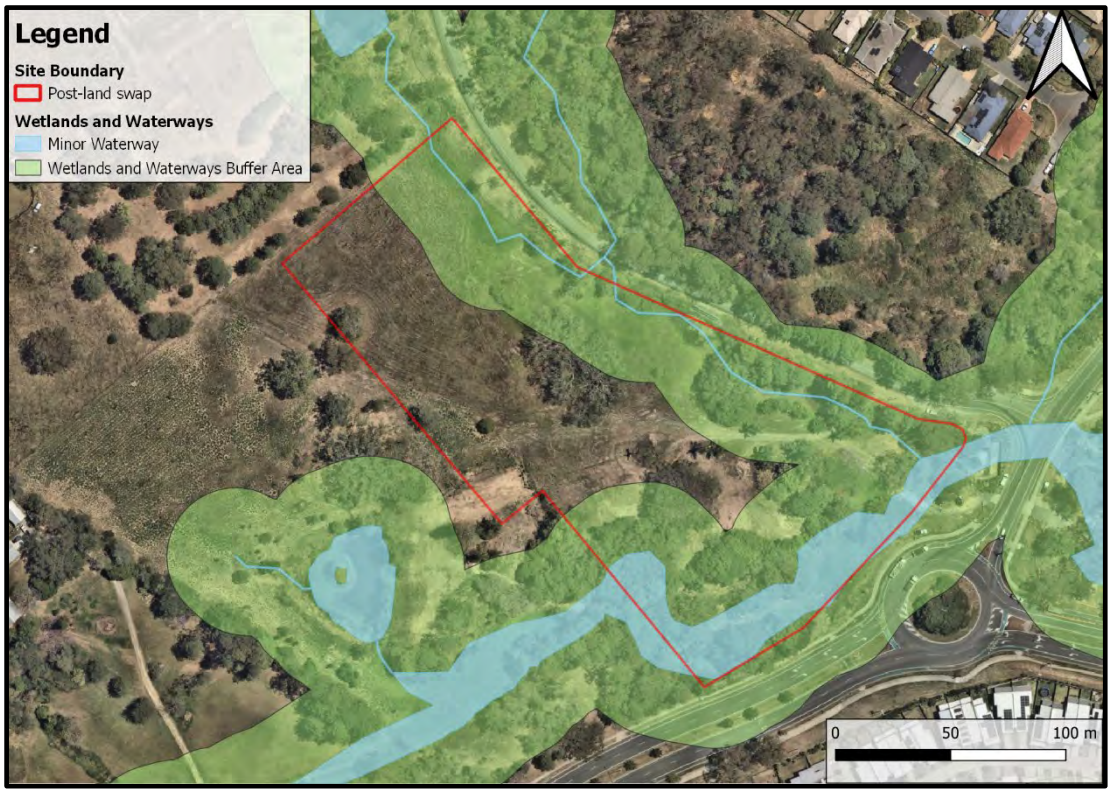


Figure 10 CoGC Wetlands and Waterway Mapping (source: CoGC Open Data Portal, 2024)

4.3 EPBC and NC Act Listed Species

Results from the PMST and WildNet database searches are provided in Appendix A and summarised below.

4.3.1 Flora

The PMST and WildNet database searches returned nine flora species protected under the EPBC Act and/or NC Act with the potential to occur and/or their habitat known or likely to occur within the area.

The subject site contains High Risk Areas for Protected Plants under the NC Act. Refer to Figure 11.

4.3.2 Fauna

The PMST identified 36 fauna species protected under the EPBC Act and/ or NC Act listed threatened or migratory fauna species as known or likely to occur within a 1 km radius of the site. Refer to Appendix A.



Figure 11 Protected Flora Trigger Mapping (source: QSpatial, 2023)

4.4 Pest Species

The PMST and WildNet database searches have identified several pest flora and fauna species as being known or likely to occur within 1 km of the site. Refer to Appendix A.

Upon review of the fire ant biosecurity map, the locality of Upper Coomera sits inside Biosecurity Zone 2. Refer to Appendix B.

5.0 FIELD SURVEY RESULTS

5.1 Vegetation Communities

5.1.1 Threatened Ecological Communities

Of the four TECs identified in the PMST results and listed above in Section 4.1.1, none were observed on or immediately adjacent to the subject site.

5.1.2 Regional Ecosystems

The field assessment identified one mixed polygon RE and an area of non-remnant vegetation within the subject site. The ground-truthed vegetation is shown spatially in Figure 12 below, with representative photos shown in Plates 1 to 6. Refer to Table 3.

Table 3 Ground-truthed Regional Ecosystems within the Site

Description
Remnant RE 12.3.1a and 12.3.11
The vegetation in the southern extent, adjacent Yaun Creek has been mapped by the State as a mix of RE 12.3.11 and 12.11.24. Refer to Section 4.1.3 for RE descriptions of REs 12.3.11 and 12.11.24. This mapping was ground-truthed as incorrect., with a mixed polygon of 12.3.11 and 12.3.1a more accurately describing the vegetation observed. RE 12.3.1a is described as: 'Complex notophyll vine forest. Typical canopy species include *Castanospermum australe, Elaeocarpus grandis, Grevillea robusta, Cryptocarya obovata, Beilschmiedia obtusifolia, Dysoxylum mollissimum* subsp*. molle, Pseudoweinmannia lachnocarpa, Argyrodendron trifoliolatum, Planchonella australis, Ficus watkinsiana, F. macrophylla forma macrophylla, Aphananthe philippinensis, Toona ciliata* and *Syzygium francisii.* Emergent *Eucalyptus grandis* or *Lophostemon confertus* may occur.' This mixed polygon RE assessment is consistent with pre-clear mapping approx. 200 m downstream of the creek. The vegetation within this patch was ground-truthed as remnant due to a canopy cover of approximately 60% consisting of native species, as well as an average height of approximately 18 m. Species along the creek line were observed to more so align with the RE 12.3.1a description. It was noted that this area likely was periodically inundated with water from Yaun Creek. Numerous fig species, such as Moreton Bay fig (*Ficus macrophylla*) and weeping fig (*Ficus benjamania),*and other native species including red cedar (*Toona ciliata)* and silky oak (*Grevilia robusta)* where identified within the creek line. Fig trees within the mixed polygon RE frequently measured approximately 3000 mm DBH and were occasionally strangling other canopy species. The midstorey and understorey along the creek were moderately disturbed, with a few native species such as cheese tree (*Glochidion ferdinandi*), green kamala (*Mallotus philippensis)* flame tree (*Brachychiton acerifolius*), and tuckeroo (*Cupaniopsis anacardioides*), with one macadamia nut (*Macadamia integrifolia*)

Description
located on the creek line (Tree 120). Weed species such as camphor laurel (*Cinnamomum camphora*) and umbrella tree (*Schefflera actinophylla*) were abundant throughout the entire site. Native vine species observed included barbed wire vine (*Smilax australis*) and tape vine (*Stephania japonica).* Several palm species were observed surrounding the waterways, mostly consisting of invasive cocos palm (*Syagrus romanzoffiana*), with the native Bangalow palm (*Archontophoenix cunninghamiana*) and occasional cabbage tree palm (*Livistona australis*) also observed. Aquatic weed species such as blue water lily (*Nymphaea caerulea*) were identified within the waterway. Species identified in the western portion of the remnant vegetation patch aligned with RE 12.3.11, and included various eucalyptus species, such as forest red gum (*E. tereticornis)*, grey ironbark (*E. siderophloia)*, brush box (*L. confertus*), pink bloodwood (*C. intermedia)*, swamp box (*L. suaveolens*). This area was higher in elevation, and likely did not experience periodic inundation from Yaun Creek. A second macadamia nut (Tree 92) was located on the edge of this RE community, however was assessed as planted given the proximity to the existing dwelling. The understorey and midstorey within the western portion of remnant vegetation exhibited weed incursion and edge effects, with notable infestation of giant devil's fig (*Solanum chrysotrichum*), mock orange (*Murraya paniculata)*, Brazilian cherry (*Eugenia uniflora*) and easter cassia (*Senna pendula* var. *glabrata).* Native mat-rush (*Lomandra* sp.) and blady grass (*Imperata cylindrica)* were noted as native groundcover, as well as recruitment of canopy species within this remnant extent.
Non-remnant
The balance of the site was ground-truthed as non-remnant vegetation. Various figs and exotic fruit trees such as mango tree (*Mangifera indica)*, lychee tree (*Litchi chinensis)* and guava *(Psidium guajava)* were also identified within the non-remnant area. Scattered native eucalypts and black wattle (*Acacia leiocalyx)* featured throughout the non-remnant area, along with slash pine (*Pinus elliotii*) and camphor laurel identified as the dominant tree species. Weed incursion, historical clearing and edge effects were evident throughout the non-remnant area. Giant devil's fig (refer to Plate 6) was the dominant midstorey exotic species, with various grasses and Singapore daisy *(Sphagneticola trilobata*) comprising the understorey.



Figure 12 Ground-truthed Regional Ecosystems within the Site



Plate 1 View of macadamia nut (*Macadamia integrifolia*) within remnant area.



Plate 2 View of large fig tree next to creek in remnant vegetation.



Plate 3 View of waterway surrounded by palm species in remnant RE 12.3.1a/12.3.11.



Plate 4 View of mat-rushes in remnant area.



Plate 5 View of flame tree (foreground) and gum trees (background) in remnant area.



Plate 6 View of weed incursion in remnant area.



Plate 7 View of non-remnant area.



Plate 8 View of mature fig within non-remnant area.

5.3 Aquatic Values

5.3.1 Waterway

The waterway within the remnant area, Yaun Creek, appeared to be fairly opaque and was stained with natural tannins (refer to Plate 9). However, some runoff from the adjacent road was noted as forming a thin layer on the surface of the water (refer to Plate 12). Water level appeared low, yet flowing in some areas, while pooling naturally in others, and supported fauna such as the Macquarie turtle (*Emydura macquarii*) (refer to Plate 16). In addition, the presence of this waterway provided a water source for riparian vegetation including cabbage tree palms (*Livistona australis*), creek sandpaper fig (*Ficus coronata*), and swamp box (*Lophostemon suaveolens)* trees.

The northern mapped waterway entered the site via a small culvert under Baileys Mountain Road. Minimal water was observed within the mapped FP1 waterway, which served more so as a drainage feature. The water from this drainage feature was observed as pooling within a modified waterbody. Passage is limited downstream due to restrictive culverts which seems to only allow for passage during higher flow periods. A culvert was located downstream, with low water level indicating that fish passage was not possible at the time (refer to Plate 13). Overland flow was apparent at times of high rainfall (refer to Plate 14) connecting the modified waterbody with Yaun Creek in the most-eastern extent of the site, before flowing under Old Coach Road.

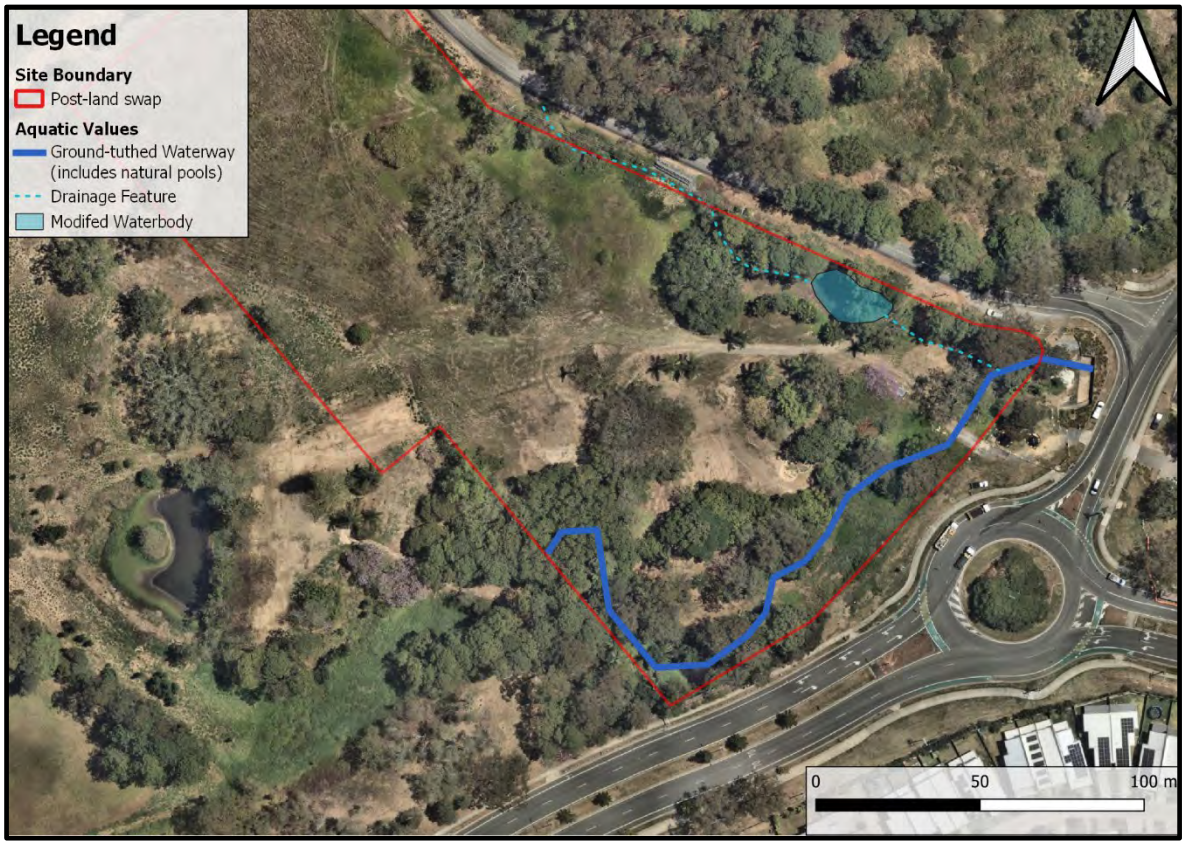


Figure 13 Ground-truthed Aquatic Values within the Site



Plate 9 View of water opacity within Yaun Creek.



Plate 10 View of debris in Yaun Creek



Plate 11 View of narrow section of Yaun Creek.



Plate 12 View of potential run-off on Yaun Creek (natural pool section).



Plate 13 View of downstream culvert from modified waterbody.



Plate 14 View of overland flow path downstream from modified waterbody.



Plate 15 View of water clarity within modified waterbody.

5.4 EPBC and NC Act Listed Species

5.4.1 Flora

Two macadamia nut trees (*Macadamia integrifolia),* a protected plant listed as Vulnerable under EPBC and NC Act were identified during the field survey. One was assessed as likely planted, given the proximity to the dwelling and is therefore not protected under the NC Act as it is considered not 'in the wild' (Tree 92). Tree 120 was located within the waterway corridor and is considered 'in the wild' and is protected under the NC Act. Both individuals are protected under the EPBC Act.

A list of all native flora species identified during the field survey is provided in Appendix D.

5.4.2 Fauna

A list of all fauna species observed during the field survey is provided in Appendix E.

5.5 Pest Species

5.5.1 Flora

Two pest flora species recognised by the State and/or CoGC as a restricted invasive weed were identified within the subject site, namely lantana (*Lantana camara)* and African tulip tree (*Spathodea campanulata*) (Category 3 under the Biosecurity Act). A list of all non-restricted pe st flora species identified during the field survey is provided in Appendix D.

5.5.2 Fauna

No pest fauna species or evidence of pest fauna species were recorded on site during the field survey.

6.0 ECOLOGICAL FUNCTION

Vegetation and ecological features within a site may serve to function on several levels. For instance, vegetation may offer local foraging resources to various fauna within the immediate vicinity of a site, whilst offering movement and regional foraging resources to more mobile and potentially migratory species. As such, when determining the ecological integrity and functionality of a site, it is prudent to analyse the site on a local, sub-regional and regional scale. This may also act to gauge a site's value to known populations of listed fauna species which may occur within the locale.

6.1 Biodiversity Corridors and Connectivity

The subject site is mapped partially within a Terrestrial State-wide Biodiversity Corridor, and is associated with the various patches of Category B and Category C mapped vegetation. When compared with terrestrial corridors to the north and south, this terrestrial corridor appears to have undergone significant development and urbanization, providing tenuous connectivity throughout the broader landscape between areas such as Mount Tambourine National Park in the west and Coomera Island in the east. Yaun Creek flows east, meeting with the Coomera River approx. 4 km downstream, which is mapped as a Riparian State-wide Corridor.

Within the locality, fauna movement is possible to areas located to the north and west. These areas remain fairly vegetated, with large rural style lot noted from review of aerial imagery. Fencing existed along the site boundary, however it was observed on site during the inspection that large macropods were able to navigate through the locality. Within the subject site, fencing was lacking, meaning minimal barriers for fauna. Given the open areas and potential exposure to threats such as predatory species (i.e. bird of prey) within the northern portion of the site, it is expected that fauna may prefer to utilise the protection afforded by the ground-truthed remnant vegetation as well as the scattered native/fruit trees located within the southern non-remnant area.

The Yaun Creek headwaters are located within the Rural residential zoned lots to the west and flows through the southern extent of the site and an underpass via Old Coach Road. Areas to the east are highly developed, with Yaun Creek providing a vegetated riparian corridor between subdivisions to the north and south. Yaun Creek was noted as flowing through the Old Coach Road culvert at the time of inspection. It is expected that terrestrial, and depending on water levels and flow, also aquatic fauna can utilise the vegetated waterway corridor to move through the broader landscape.

The modified waterbody located along the north-eastern boundary was noted as stagnant, and likely only provides connectivity to Yaun creek and areas downstream during high rainfall events.

6.2 Summary of Local Site Habitat Values

The subject site had varying habitat value, with moderate ecological value in the southern extent of the subject site surrounding the remnant vegetation, and lower ecological value assessed within the non-remnant areas, associated with the lack of native vegetation. Remnant vegetation areas included the waterway and denser native vegetation than non-remnant areas, providing valuable habitat for fauna such as mammals, birds, and reptiles.

The non-remnant area was observed to have lower habitat value, with a sparser canopy, and large areas of exotic ground cover due to historical clearing. Non-remnant areas provided habitat for larger mammals including macropod species, and likely reptiles. This area was noted as supporting a small mob (approx. six individuals) of whiptail wallabies (*Macropus parryi*), which were observed travelling through the subject site. The area was also noted as providing habitat for various native bird species (refer to Plate 18).

The vegetation to the south provided evidence of glider habitat in the form of an observed deceased specimen. Exact species was not able to be determined, however likely a squirrel glider (*Petaurus breviceps*) (refer to Plate 19).

Both the remnant and non-remnant areas likely support several common urban generalists, including brushtail possums (*Trichosurus vulpecula)* and ringtail possums (*Pseudocheirus peregrinus*). Scattered canopy trees may provide nesting habitat for possums, as well as common urban bird species. Fig, eucalyptus trees and various exotic fruit species located within both remnant and non-remnant areas likely provide seasonal foraging to frugivore and nectarivore species. Fauna scratches were noted as being present in several locations. Open grass also provides foraging resources for common birds such as the Australian magpie (*Gymnorhina tibicen*).

Arboreal habitat features in the form of hollows were noted within non-remnant areas and opportunistically reported during the tree survey. Refer to the Vegetation Retention Plan for location (S523094_VRP_001-004(C)). Hollows were limited within the remnant area, and given the density of the vegetation may have gone undetected during the survey. Given the majority of the site has been historically modified, there was little evidence to suggest recent utilisation of the site by koala.

A mapped waterway exists to the south of the subject site. A turtle was observed within the waterway, and nests observed within the bank (assessed as likely not active during the time of inspection) which may have been utilised by species including the spotted and striated pardalote, rainbow bee eater or water dragon. Refer to Plate 16 and Plate 17.



Plate 16 View of Macquarie turtle in the waterway in Yaun Creek.



Plate 17 View of nests in creek banks.



Plate 18 View of grey fantail perched in giant devil's fig in non-remnant area.



Plate 19 View of deceased glider.

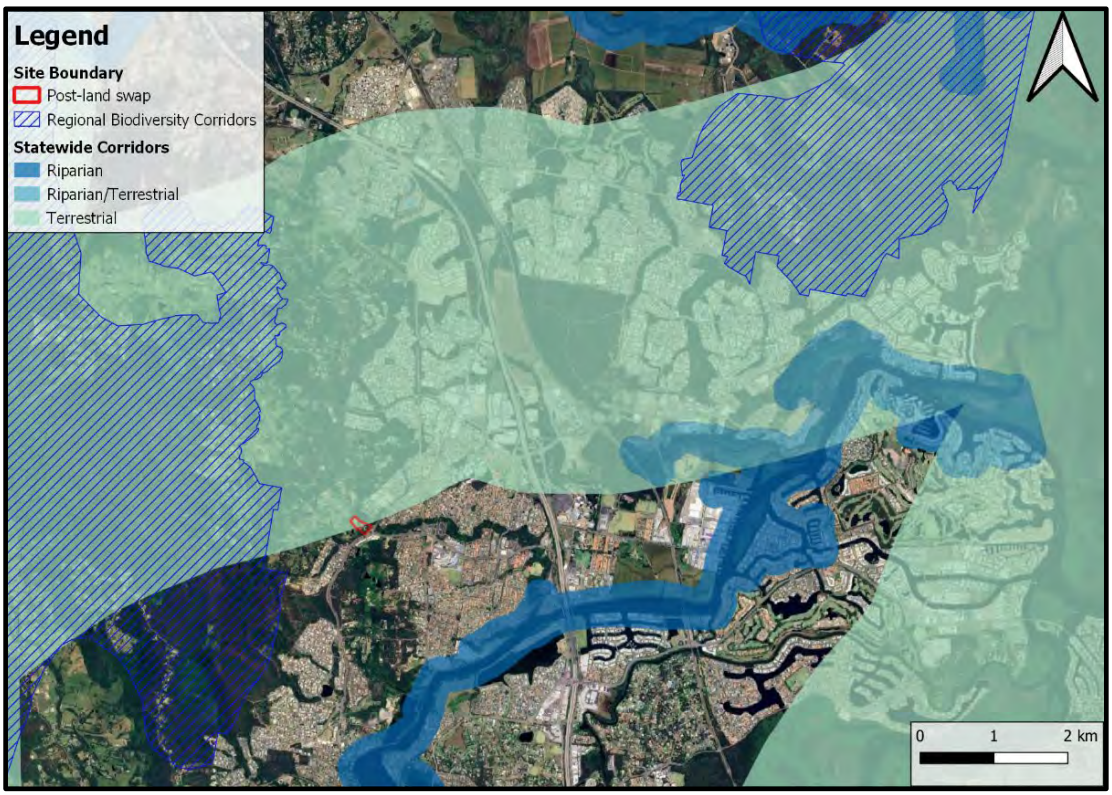


Figure 14 Biodiversity Connectivity in Relation to the Subject Site (source: QSpatial, 2023)

7.0 LIKELIHOOD OF OCCURENCE ASSESSMENT

7.1 EPBC and NC Act Flora Listed Species

The likelihood of EPBC Act and NC Act listed species within the site and in proximity to the subject site is shown in Table 4.

Likely or confirmed flora species within the proximity of the development area;

- Native guava; and
- Macadamia nut.

7.2 EPBC and NC Act Fauna Listed Species

Table 5 summarises listed fauna species and their likely occurrence within the subject site and adjacent areas, in the context of the site location and available habitat.

One EPBC and/or NC Act listed fauna species was confirmed or are considered to be likely to occur within the development area, namely the white-throated needle-tail.

The following EPBC or NC listed fauna species were confirmed or are considered to be likely to occur within proximity of the development area:

- South-eastern glossy-black cockatoo;
- White-bellied sea-eagle;
- White-throated needle-tail;
- Black-faced monarch;
- Osprey;
- Australian painted snipe;
- Rufous fantail;
- Spectacled monarch;
- Koala; and
- Grey-headed flying-fox.

Table 4 Likelihood of Occurrence for Listed Flora Species

Scientific Name	Common Name	EPBC Status	NC Status	Typical Habitat	Likelihood of Occurrence Within Development Area	Likelihood of Occurrence In Proximity to Development Area
Arthraxon hispidus	Hairy-joint grass	V	V	Found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps.	Possible	Possible
Baloghia marmorata	Jointed baloghia	V	V	Found in subtropical rainforest/notophyll vine forest and wet sclerophyll forest (brush box woodland) with rainforest understorey between 150 and 550 m above sea level. Recorded at sites between Mt Tamborine and Mt Pinbarren.	Unlikely	Unlikely
Bosistoa transversa	Three-leaved bosistoa	V	C	Grows in wet sclerophyll forest, dry sclerophyll forest and rain forest up to 300 m above sea level.	Unlikely	Possible
Corchorus cunninghamii	Native jute	E	E	The native jute is found in a mosaic of wet sclerophyll and subtropical rainforest as well as grassy open forest. This species is generally located at low to mid elevations (110–430 m). In general, the soils are shallow, stony and well drained and common canopy species occurring alongside this species include grey gum (*Eucalyptus propinqua*), Brush box (*Lophostemon confertus*) and grey Ironbark *(Eucalyptus siderophloia*).	Unlikely	Possible
Endiandra floydii	Floyd's walnut	E	E	Subtropical (including littoral) rainforest or wet sclerophyll forest, often with brush box in the canopy and occasionally with hoop pine (*Araucaria cunninghamii*) emergent.	Unlikely	Possible
Macadamia integrifolia	Macadamia nut	V	V	Often grows in remnant rainforest, including complex mixed notophyll forest and extremely tall, closed forest, and prefers partially open areas such as rainforest edges.	Unlikely	**Confirmed**

Scientific Name	Common Name	EPBC Status	NC Status	Typical Habitat	Likelihood of Occurrence Within Development Area	Likelihood of Occurrence In Proximity to Development Area
Planchonella eerwah	Black plum	E	E	Occurs in subtropical rainforest, dry rainforest and hoop pine vine scrub on rocky slopes and drainage lines on a variety of soils.	Unlikely	Possible
Randia moorei	Spiney gardenia	E	E	Grows in subtropical, riverine, littoral and dry stunted rainforests up to 360m above sea level.	Unlikely	Possible
Rhodamnia rubescens	Scrub turpentine	CE	CR	Populations and individuals of *R. rubescens* are often found in wet sclerophyll associations in rainforest transition zones and creek-side riparian vegetation.	Unlikely	Possible
Rhodomyrtus psidioides	Native guava	CE	CR	Rainforest and rainforest margins with tall eucalyptus forests	Unlikely	Likely
Samadera bidwillii	Quassia	V	V	Quassia commonly occurs in lowland rainforest or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland. Quassia is commonly found in areas adjacent to both temporary and permanent watercourses.	Possible	Possible
Sophora fraseri	Brush sophora	V	V	Grows in moist habitats, often in hilly terrain at altitudes from 60–660 m on shallow soils along rainforest margins in eucalypt forests or in large canopy gaps in closed forest communities). This species occurs within the Northern Rivers (NSW), Condamine, Burnett Mary and South East Queensland Natural Resource Management Regions.	Unlikely	Possible
Zieria collina	Hill zieria	V	V	Forms thickets in light rainforest, and often a dominant shrub in regrowth. Altitude of 550m above sea level.	Unlikely	Possible

Table 5 Likelihood of Occurrence for Listed Fauna Species

Scientific Name	Common Name	EPBC Status	NCA Status	Typical Habitat	Likelihood of Occurrence Within Development Area	Likelihood of Occurrence Outside Development Area
BIRDS						
Actitis hypoleucos	Common sandpiper	M	SL	Coastal or inland wetlands, both saline and freshwater.	Possible	Possible
Anthochaera phrygia	Regent honeyeater	CE, M	CR	Uncommon nomad in woodlands and open forest in South-East Queensland. Regent Honeyeaters mostly occur in dry Box-Ironbark eucalypt woodland and dry sclerophyll forest associations in areas of low to moderate relief, wherein they prefer moister, more fertile sites available, for example along creek flats, or in broad river valleys and foothills.	Possible	Possible
Apus pacificus	Fork-tailed swift	M, Ma	SL	The fork-tailed swift is almost exclusively aerial, flying from less then 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh.	Possible	Possible
Botaurus poiciloptilus	Australasian bittern	E	E	The Australasian bittern favours permanent or seasonal freshwater wetlands with tall, dense vegetation.	Possible	Possible
Calyptorhynchus lathami lathami	South-eastern glossy black cockatoo	V	V	Open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly black she-oak (*Allocasuarina littoralis*), forest she-oak (*A. torulosa*) or drooping she-oak (*A. verticillata*).	Possible	Likely

Scientific Name	Common Name	EPBC Status	NCA Status	Typical Habitat	Likelihood of Occurrence Within Development Area	Likelihood of Occurrence Outside Development Area
Calidris ferruginea	Curlew sandpiper	CE, M	CR	Curlew sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms.	Possible	Possible
Charadrius leschenaultii	Greater sand plover	V, M	V	Coastal, intertidal mudflats of sheltered bays and estuaries.	Possible	Possible
Cuculus optatus	Oriental cuckoo	M	SL	Mainly inhabits forests, occurring in coniferous, deciduous, and mixed forest.	Possible	Possible
Erythrotriorchis radiatus	Red goshawk	V	E	A rare bird of prey that prefers forest and woodlands with a mosaic of vegetation types, including, eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest and rainforest margins, all within close proximity to permanent water.	Unlikely	Unlikely
Falco hypoleucos	Grey falcon	V	V	Falco hypoleucos is usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. It has a sparse distribution and is absent from Cape York Peninsula, south of the Great Dividing Range in Queensland and New South Wales, south of the Great Dividing Range in Victoria, and south of 26oS in Western Australia.	Unlikely	Unlikely
Gallinago hardwickii	Latham's snipe	M, Ma	SL	Common migrant from Japan and Kuril to eastern and Tasmanian swamps and wet grasslands.	Possible	Likely
Haliaeetus leucogaster	White-bellied sea-eagle	M	SL	Common resident or nomad along coast and on rivers, lakes and dams.	Possible	Likely

Scientific Name	Common Name	EPBC Status	NCA Status	Typical Habitat	Likelihood of Occurrence Within Development Area	Likelihood of Occurrence Outside Development Area
Hirundapus caudacutus	White-throated needletail	V, M	SL	Almost exclusively aerial but known to roost among dense foliage of forest and woodland area. Common migrant Oct-Apr, mainly in eastern Australia and Tasmania.	Likely (aerial feeding)	Likely (aerial feeding)
Lathamus discolor	Swift parrot	CE	E	Breeding in Tasmania from Sep-Feb; winter nomadic visitor to sclerophyll forests and woodlands in south-east Queensland to South Australia.	Unlikely	Possible
Limosa lapponica baueri	Bar-tailed godwit	V, M	E	The bar-tailed godwit (western Alaskan) occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats.	Possible	Possible
Monarcha melanopsis	Black-faced monarch	M	SL	Rainforest, sclerophyll forest and woodland in dense gullies in eastern, coastal Australia.	Possible	Likely
Myiagra cyanoleuca	Satin flycatcher	M	SL	Uncommon migrant along eastern Australia. Found in thick gullies.	Unlikely	Possible
Numenius madagascariensis	Eastern curlew	CE, M	E	The eastern curlew is the largest shorebird in Australia, it generally occupies sheltered coasts, in particular coastal lakes, inlets, bays and estuaries with large intertidal mudflats or sandflats where it feeds on crabs and molluscs. Common migrant along tidal mudflats, san spits, mangroves, ocean beaches.	Possible	Possible
Pachyptila turtur subantarctica	Fairy prion (southern)	V	-	Known to breed on Macquarie Island and have a circumpolar distribution during non-breeding period which may include the southern Queensland coastline. Seabird which frequents the open sea and rarely occurs in sheltered coastal waters.	Unlikely	Unlikely

Scientific Name	Common Name	EPBC Status	NCA Status	Typical Habitat	Likelihood of Occurrence Within Development Area	Likelihood of Occurrence Outside Development Area
Pandion haliaetus	Osprey	M, Mar	SL	Found in all states and territories. The range is a narrow strip at the coast and offshore islands, although it is occasionally found at open river systems and beyond tidal plains. Visits to inland regions from the north during the wet season may occur in years of heavier rainfall.	Possible	Likely
Rhipidura rufifrons	Rufous fantail	M	SL	Common migrant or resident in rainforest and forests along eastern portion of Australia.	Possible	Likely
Rostratula australis	Australian painted snipe	E	E	The Australian painted snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains.	Possible	Likely
Symposiachrus trivirgatus	Spectacled monarch	M, Mar	SL	Lower storey of rainforest and damp thick forests particularly gullies.	Possible	Likely
Tringa nebularia	Common greenshank	M	SL	The common greenshank does not breed in Australia; however, the species occurs in all types of wetlands and has the widest distribution of any shorebird in Australia.	Possible	Possible
Turnix melanogaster	Black-breasted button-quail	V	V	Restricted to rainforests and forests, mostly in areas with 770-1200 mm rainfall per annum. They prefer drier low closed forests, particularly semi-evergreen vine thicket, low microphyll vine forest, araucarian microphyll vine forest and araucarian notophyll vine forest. They may also be found in low, dense acacia thickets and, in littoral area, in vegetation behind sand dunes	Unlikely	Possible
AMPHIBIANS						

Scientific Name	Common Name	EPBC Status	NCA Status	Typical Habitat	Likelihood of Occurrence Within Development Area	Likelihood of Occurrence Outside Development Area
Adelotus brevis	Tusked frog	-	V	Inhabits wet eucalypt forest, rainforest and sometimes dry eucalypt forest, where it can be found in close proximity to suitable breeding habitat such as ponds and slow-moving sections of streams	Possible	Possible
Mixophyes fleayi	Fleay's frog	E	E	Found in wet forests over a restricted range from the Conondale Range south-east Queensland, south to Trynney Creek in the Richmond Range in NSW. Found in leaf litter and along watercourses in rainforest and adjoining wet sclerophylly forests.	Possible	Possible
MAMMALS						
Chalinolobus dwyeri	Large-eared pied bat	V	V	The large-eared pied bat commonly occupies sandstone cliffs and fertile woodland valley habitat areas that are in close proximity to each other. Rainforest and moist eucalypt forests at high elevation are also important habitat.	Possible	Possible
Dasyurus maculatus maculatus (SE mainland population)	Spotted-tail quoll (southern subspecies)	E	E	While the spotted-tail quoll is likely extinct around Brisbane, it can occupy a range of habitats, with preference for mature wet forest with minimal disturbance, eucalypt forest and rainforest. Probably extinct around Brisbane area.	Unlikely	Unlikely
Ornithorhynchus anatinus	Platypus	-	SL	Platypus are found in eastern Australia from the steamy tropics of far north Queensland to the freezing snows of Tasmania. In Queensland, platypus live in rivers east of the Great Dividing Range, and are also found in some western-flowing streams	Unlikely	Possible

Scientific Name	Common Name	EPBC Status	NCA Status	Typical Habitat	Likelihood of Occurrence Within Development Area	Likelihood of Occurrence Outside Development Area
Petauroides volans	Greater glider	V	V	Largely restricted to eucalypt forests and woodlands, with a preference for forests with a diversity of eucalypt species. This species shelters in large tree hollows during the day.	Possible	Possible
Petaurus australis australis	Yellow-bellied glider (southern subspecies)	V	V	The species lives in coastal and open foothill forest and woodland, and in wet eucalypt forests. In eastern Australia it lives only in tall, mature eucalypt forests in regions of high rainfall, with temperate to subtropical climates.	Possible	Possible
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)	Koala	E	E	Koala habitat includes Eucalypt (Eucalyptus, Corymbia, Angophora, and Melaleuca) forests in eastern QLD, NSW and VIC.	Possible	Possible
Potorous tridactylus tridactylus	Long-nosed potoroo	V	V	The Long-nosed potoroo has been found in a range of habitats, including wet eucalypt forests to coastal heaths and scrubs, they tend to prefer dense vegetation for shelter and the presence of an abundant supply of fungi for food.	Unlikely	Possible
Pteropus poliocephalus	Grey-headed flying-fox	V	C	Flying fox foraging sites typically include rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. Roosting sites are generally located near water, such as lakes, rivers or the coast, and the roosting vegetation varies and can include rainforest patches, stands of Melaleuca, mangroves, or riparian vegetation.	Possible	Likely

8.0 CONSTRAINTS APPLICABLE TO THE PROPOSED DEVELOPMENT

The results of the legislative review, desktop assessment and field survey confirmed that the constraints relevant to the proposed development are as shown in Table 6.

Table 6 Ecologically Relevant Constraints Applicable to the Proposed Development

Legislation/Policy	Matters	Assessment	Relevance to the Proposed Development
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Matters of National Environmental Significance (MNES)	The proposed development is unlikely to significantly impact TECs and Wetlands of International Importance. A likelihood of occurrence assessment has been undertaken is provided in Section 7.0, with one migratory EPBC listed fauna species identified as 'likely' to occur within the development area, and one listed plant species (Tree 120) located within the rehabilitation area. A second macadamias tree (Tree 92) is located adjacent the existing dwelling and is proposed to be removed. As the tree has been assessed as 'planted' the removal is not expected to significantly impact the species. Current advice from DCCEEW is that the removal of more than 10 non-juvenile koala habitat trees may require referral to DCCEEW for their consideration. As the development proposes to remove approx. 1 NJKHT (Tree 73) referral is not required. Refer to the Vegetation Retention Plan (S523094_VRP_001-004(D)). The development proposed to remove a number of figs trees, which are known foraging resources for the grey-headed flying-fox. However, as these foraging resources are not known at 'winter foraging habitat'	Not Applicable

Legislation/Policy	Matters	Assessment	Relevance to the Proposed Development
		which is known as 'habitat critical to the survival of the species'. As such, it has been determined that the development is unlikely to cause a significant impact to the species. Mitigation measures are proposed to ensure no significant residual impact. Refer to Section 9.1.	
Planning Regulation 2017 (Planning Regulation)	Koala Habitat	There is KHA mapped within the subject site (see Figure 6). Mapped KHA vegetation along the northern boundary of the site has been cleared by Council (refer to Figure 1), and the development proposing to retain the southern mapped KHA patch. As development proposed to interfere with less than 500 m^2 of mapped koala habitat, the development is considered exempted development.	Not Applicable
	Native (Regulated) Vegetation	Clearing of the Category C vegetation in the north of the site has been recently undertaken by Council, with all mapped Category B vegetation to be retained and rehabilitated within the dedicated park. Clearing of vegetation within Category X mapped areas if considered exempt clearing work.	Not Applicable
Nature Conservation Act 1992 (NC Act)	Breeding Places	A fauna spotter catcher must inspect the site prior to clearing to ensure no active breeding places will be tampered with. If active breeding places are proposed	Applicable

Legislation/Policy	Matters	Assessment	Relevance to the Proposed Development
		to be tampered with, a Species Management Program is required to be submitted to DESI.	
	Protected Animals	No listed fauna species were observed during the field assessment. A licenced Fauna Spotter Catcher to undertake a pre-clearance survey no more than 48 hours prior to the commencement of clearing works and to be always present during clearing works	Applicable
	Protected Plants	Clearing within the northern patch of Trigger Area mapping has been previously undertaken by Council. No clearing is proposed by the development within the southern patch of Trigger Area mapping, where a protected plant has been located. If protected plants are identified during clearing works, works must cease, and advice sought regarding obtaining a protected plant clearing permit immediately.	Applicable
Biosecurity Act 2014 (Biosecurity Act)	Prohibited and Restricted Matters	Restricted plant matters (category 3) were identified within the subject site during the field survey. Category 3 restricted matters must not be distributed. Development must manage the biosecurity risk posed by these and other pest animals in accordance with GBO.	Applicable
Fisheries Act 1994 (Fisheries Act)	Waterways	S5 Environmental understand that the development does not propose any waterway barrier works. The rehabilitation of Yaun Creek is proposed. The ground-truthed drainage lines and modified waterbodies are	Not Applicable

Legislation/Policy	Matters	Assessment	Relevance to the Proposed Development
		located within the future road dedication. Council will be responsible for any works associated with these features following the road dedication.	
State Planning Policy (SPP)	Biodiversity	The SPP for biodiversity interests have been incorporated into the CoGC planning scheme.	Not Applicable
City of Gold Coast *City Plan Version 9*	Environmental Significance	The development proposes to rehabilitate the waterway buffer area associated with Yaun Creek in the south, which is also mapped as State and Local significant species habitat and MLES and MSES Vegetation management. The proposed development also encroaches into the Waterway corridors overlay mapping and buffer area mapping associated with the mapped waterway along the north-eastern boundary (see Figure 10) and as such triggers assessment against the code. Refer to Appendix C.	Applicable

9.0 POTENTIAL IMPACTS AND MITIGATION MEASURES

9.1 Impacts and Mitigation Measures for EPBC and NC Act Species

Table 7 below outlines potential indirect impacts, recommendations, and mitigation measures for potential direct impacts to the white-throated needle-tail, which was assessed as 'likely' within the development area. Eleven species have been identified as 'confirmed' or 'likely' to occur within proximity to the development. Refer to Table 7 below for potential indirect and direct impacts, recommendations, and mitigation measures for these species.

Table 7 Potential Impacts to EPBC and NC Act Listed Species

Impact Assessment	Recommendations and Mitigation Measures
MACADAMIA NUT	
The greatest threat to the macadamia nut is land clearing for urban and agricultural development. Other threats include weed invasion, wind, wildfire and inappropriate fire regimes (DoE, 2022). Further threats facing wild macadamia populations is genetic dilution and hybridisation with commercial varieties (O'Connor *et al.* 2015).	The development will remove one planted macadamia nut, and by doing so will reduce the opportunities for genetic hybridisation within the site. The development utilises historically disturbed and cleared land, and will rehabilitate the southern extent of the site, where a wild macadamia was located. It is recommended that contractors employed for the development are familiar with the species. If a protected plant is identified within the clearing area, work must cease and advice regarding a protected plant clearing permit must be sought. Weed species should be managed in accordance with GBO.
NATIVE GUAVA	
The most notable threat to the species is infection and mortality from myrtle rust (*Austropuccinia psidii*). Other threats to the species include land clearing, fragmentation of populations and weed invasion (Threatened Species Scientific Committee, 2020).	There are confirmed records of the species approx. 200 m downstream of the site. The development is not expected to increase likelihood of myrtle rust infection, however tubestock should be sourced from a nursery that implements Best Management Practice programs and follows a Biosecurity Plan.
WHITE-THROATED NEEDLE-TAIL	

Impact Assessment	Recommendations and Mitigation Measures
As the species is considered migratory and breeding activities take place in Asia (DAWE, 2019), non-breeding habitats are important for the species in Australia. Non-breeding habitats can include large tracts for woodland, where aerial foraging takes place, and in hollows which the species is known to utilise for roosting behaviours (DoE, 2015). Removal of hollows may potentially interfere with roosting behaviours.	It has been determined that the species may utilise the airspace within the development area for foraging purposes. Further, the development proposes to remove one hollow-bearing tree (Tree 73). It is recommended that the proposed development install three nest boxes within the rehabilitation area to mitigate the loss of potential roosting behaviours. Refer to S523094_BRMP_001-007(B). A licenced Fauna Spotter Catcher to undertake a pre-clearance survey no more than 48 hours prior to the commencement of clearing works and to be present at all times during clearing works.
SOUTH-EASTERN GLOSSY BLACK-COCKATOO	
The species is uncommon although widespread due to foraging behaviour. The main threats to the south-eastern glossy black-cockatoo are; reduction of suitable habitat through clearing for development, decline of hollow bearing trees due to land management activities and a decline in extent and productivity of sheoak foraging habitat due to feral herbivores and frequent fire.	Although there are multiple recordings of the south-eastern glossy black-cockatoo within proximity to the site, no appropriate feed trees were noted as being present on site, such as black she-oak (*Allocasuarina littoralis*) or forest sheoak (*A. torulosa*) (OEH, 2023). As mentioned above, one hollow bearing tree (Tree 73) is proposed to be removed. It is recommended that the proposed development install three nest boxes within the rehabilitation area to mitigate the loss of potential roosting behaviours. Installation and monitoring is to be detailed within a Nest Box Management Plan.
WHITE-BELLIED SEA-EAGLE	
The white-bellied sea-eagle is sensitive to disturbance during breeding season (April to October) and disturbances may impact breeding success (DAWE, 2019). Breeding pairs usually return to the same breeding territory each year, and often reuse the nest. Removal of eucalyptus trees may	A licenced Fauna Spotter Catcher to undertake a pre-clearance survey no more than 48 hours prior to the commencement of clearing works and to be present at all times during clearing works. Should a white-bellied sea-eagle nest be identified on site or within 100m of the site during breeding season, works must not commence/recommence until any chicks have fledged.

Impact Assessment	Recommendations and Mitigation Measures
interfere with potential future breeding habitats.	
OSPREY	
Currently, the main threat to the species is degradation or alteration of habitat for urban or tourism development. The removal of vegetation may degrade of alter habitat. Indirect impacts include reduction in quality of foraging grounds caused by discharge or runoff (DoE, 2022).	The proposed development is utilising a largely modified area for the development footprint, as such direct impacts to the species will be minimal. Further, the development proposes rehabilitation of Yaun Creek within the site. Refer to S523094_BRMP_001-007(B). It is recommended that best practice stormwater management is implemented to ensure that runoff/discharge does not leech into the tributaries of the nearby Coomera River, a likely foraging ground for the species. See Stormwater, Pollutants and Erosion in Table 7, below.
AUSTRALIAN PAINTED SNIPE	
Wetland drainage and the diversion of water for agriculture and reservoirs is the biggest threat to the species. Invasive weeds and predation by introduced predators are also potential threats (Northern Territory Government,	Potential habitat for the species has been identified within the southern extent of the site, associated with Yaun Creek. Three sightings have been recorded within 5 km of the site, however the locations of the species have been obscured due to the listing status of the species (critically endangered). The development does not propose interference with the potential habitat, and further proposed to rehabilitation via weed removal and infill planting. Refer to S523094_BRMP_001-007(B).
BLACK-FACED MONARCH	
Vegetation clearing within the development footprint does not involve the removal of any potential, black-faced monarch habitat, or possibly interference with breeding behaviours of the species, however rehabilitation and the removal of exotic shrubs within the rehabilitation area may reduce potential habitat for this species.	It is recommended that clearing be undertaken outside breeding season/s and a suitably qualified fauna spotter catcher targeting the pre-clear survey to detect the presence of the black-faced monarch and their breeding places.

Impact Assessment	Recommendations and Mitigation Measures
Breeding period for the species is between October to March, with the egg laying period mostly from November to mid-January (DoE, 2015), and may also utilise low shrubs in which to build their nest (DAWE, 2015).	
RUFOUS FANTAIL	
The proposed development largely retains the vegetation throughout the southern extent of the site which may be inhabited by the rufous fantail. Construction noise (as vibration and sound) has the potential to impact feeding or breeding behaviour. The breeding period for the species is between September to February, with 81% of eggs laid in November to December (DES, 2015).	A licenced Fauna Spotter Catcher to undertake a pre-clearance survey no more than 48 hours prior to the commencement of clearing works and to be present at all times during clearing works. Noise levels should be limited to acceptable levels during construction, especially during the breeding period of November to December.
SPECTACLED MONARCH	
The proposed development does not involve the removal of any potential spectacled monarch habitat, or possible interference with breeding behaviours of the species, however rehabilitation and the removal of exotic shrubs within the rehabilitation area may interfere. The species builds small nests on vine and tree forks, often near water, and breeds between September to February (Birdlife, 2020).	It is recommended that clearing be undertaken outside breeding season/s and a suitably qualified fauna spotter catcher targeting the pre-clear survey to detect the presence of the spectacled monarch and their breeding places.
KOALA	
The removal of koala habitat trees within the site may result in the loss of shelter for koalas moving through the landscape.	The development proposes to remove one koala habitat tree. Rehabilitation within the south of the site will improve habitat

Impact Assessment	Recommendations and Mitigation Measures
	quality of the potential fauna movement corridor, for koalas moving through the area. A licenced Fauna Spotter Catcher to undertake a pre-clearance survey no more than 48 hours prior to the commencement of clearing works and to be present at all times during clearing works.
The increase of sound from the proposed development and construction may disturb the species. Individuals found in urban environments are twice as likely to respond to human disturbance, making them hypersensitive, and desire to avoid human disturbances can lead to the animal expending unnecessary energy and increase stress (Kinsella et al, 2015).	It is recommended that the proposed development strengthen the resilience and sound buffering of the rehabilitation area by planting canopy and shrub species along the edge of Yaun Creek where vegetation is currently lacking. A Rehabilitation Plan has been complied to outline restoration efforts. Refer to S523094_BRMP_001-007(B). During the construction period, noise levels should be limited to acceptable levels. The use of temporary noise barrier fencing is recommended during koala breeding times to ensure impacts to breeding are minimised.
GREY-HEADED FLYING-FOX	
Loss of foraging habitat is considered the primary threat to the species. Further threats to the species include camp disturbances (DAWE, 2021).	The development is unlikely to cause disturbances to any known flying fox camp. The development proposes to remove two native Myrtaceae species, and retained significant potential feed trees, such as Tree 146 (1,800 mm DBH mango tree). Further, the proposed development will rehabilitate the Yaun Creek area to mitigate any potential for loss of foraging resources. A licenced Fauna Spotter Catcher is to undertake a pre-clearance survey at least 48 hours prior to the commencement of clearing works and to be present at all times during clearing works.

9.2 Impacts and Mitigation Measures for Ecological Values

Table below outlines potential impacts, recommendations, and mitigation measures for ecological values within the site.

Table 8 Potential Impacts, Recommendations and Mitigation Measures

POTENTIAL IMPACTS	RECOMMENDATIONS AND MITIGATION MEASURES
FLORA, FAUNA, HABITAT VALUE AND FUNCTIONALITY	
The removal of vegetation and development within the site will reduce foraging (seasonal and yearly) and habitat resources for local and migratory fauna species.	• Loss of habitat mitigated by the rehabilitation in the northern retained vegetation associated with Yaun Creek. Refer to S523094_BRMP_001-007(B); • Any fauna habitat features cleared within the proposed development footprint must be relocated into the retained area; • Any fencing installed along the northern and southern boundaries of the rehabilitation area must be fauna exclusion fencing, with fauna escape poles installed; • If fencing is proposed to be stalled along eastern and western extents of the rehabilitation area, fencing must be fauna-friendly to ensure movement is possible along the Yaun Creek corridor; • Fauna awareness signage and speed reduction infrastructure (e.g. speed bumps) are recommended to be installed to facilitate safe fauna movement within the site; and • Outdoor and security lighting should be wildlife friendly e.g. directional lighting focused toward the centre of the development; the use of shields or fittings can minimise light spill into adjacent vegetation and direct light to where it is needed; lighting could be placed lower, to minimise ecological impacts.
Fauna injuries and fatalities have the potential to occur during vegetation clearing works on the site.	Vegetation will require removal as part of the development. For the removal of vegetation within the Development Footprint, the following fauna management measures will be undertaken:

POTENTIAL IMPACTS	RECOMMENDATIONS AND MITIGATION MEASURES
	• A Queensland Government qualified Fauna Spotter/Catcher must be commissioned to undertake fauna spotter/catching works during any clearing works; • Any recovered fauna may be re-located into the vegetation associated with surrounding bushland areas; • The Fauna Spotter Catcher must direct clearing works at all times and works cease/pause at the fauna spotter's request; and • Any injured fauna resulting from clearing works are to be handled only by the qualified Fauna Spotter/Catcher and taken to a veterinary clinic or registered wildlife carer.
The removal of large habitat trees will likely reduce the presence and availability of hollows and associated nesting opportunities for bird, marsupial and reptile species.	Nest boxes are recommended to be installed to mitigate loss or current and future habitat, with installation to be detailed within a Nest Box Management Plan.
Increased risk of fauna injury and fatalities associated with domestic animals.	Domestic animals should be always excluded from the site during construction.
INVASIVE AND EXOTIC FLORA	
Disturbance associated with earthworks may act as a dispersal mechanism to encourage weed dispersal to adjacent sites which may further encourage existing exotic species to proliferate.	There was significant evidence of weed incursion across the subject site, hence it is recommended that any weeds that are identified within the development footprint be removed as part of the development, and appropriate weed control measures undertaken during construction to avoid further spread of invasive plants. Further, rehabilitation is to be undertaken as per the BRMP. Refer to S523094_BRMP_001-007(B).
STORMWATER, POLLUTANTS AND EROSION	
Unmanaged site stormwater runoff during construction may carry sediment and pollutants into the local stormwater networks, which may bring	• It is recommended that appropriate sediment and erosion controls are in place prior to and during construction works;

POTENTIAL IMPACTS	RECOMMENDATIONS AND MITIGATION MEASURES
about deterioration in water quality. This may, in turn, adversely affect the health of flora and habitat value to local fauna.	• Runoff from the site during the construction phase of the development should be managed. During the construction phase, this will entail the development of and adherence to erosion control procedures which will locate and describe measures to ensure that sediments do not leave the site and degrade the receiving environment; • Any fill introduced to the site should be certified as clean and free from contaminants; and • It is recommended that all measures outlined in the Stormwater Management Plan are incorporated.

10.0 RECOMMENDATIONS

Accordingly, the following recommendations are proposed to manage and/or mitigate potential impacts associated with the proposed development include the following:

- Development of a detailed Vegetation Management Plan that demonstrates the management measures to be in place to protect vegetation identified for retention and fauna during construction and operational works;
- Fencing is to be installed as per recommendations in Table 8;
- Steps to minimize erosion and scouring, such as utilising jute netting, should be implemented whilst revegetation is established, and have been detailed in the Basic Rehabilitation Management Plan (BRMP);
- Implementation of the BRMP which aims to rehabilitate Yaun Creek. This will detail weed management and infill planting of native ground, shrub and canopy strata;
- Speed control infrastructure and fauna awareness signage is to be installed throughout the development;
- Hollows lost are to be mitigated through a Nest Box Management Plan, to ensure no impact to hollow reliant threatened species such as the south-eastern glossy black-cockatoo and white-throated needle-tail; and
- To ensure aquatic values are maintained and enhanced, any earthworks occurring within proximity to the mapped waterway should implement mitigation measures to ensure sediment, pollutants and stormwater runoff which will not impact aquatic values downstream in Yaun Creek and ultimately the Coomera River.

General recommendations for the proposed development include:

- A licenced Fauna Spotter Catcher to undertake a pre-clearance survey no more than 48 hours prior to the commencement of clearing works and to be always present during clearing works;
- If breeding places are detected at any time during site works, works must cease and an SMP prepared and submitted to the State;
- Restrictions to fire ant carrier movements apply (*National Red Imported Fire Ant Eradication Program 2016*) including the movement of soil, mulch, manure, baled hay, straw, potted plants, turf, and compost; and
- Ensure works do not spread a pest, disease, or contaminant issue in accordance with the GBO.

11.0 CONCLUSION

This Ecological Assessment determined the subject to have varying ecological value, with the proposed multiple dwelling development maximizing use of lower ecological value areas with high ecological values retained surrounding and in association with the waterway.

Given the current ecological state of the proposed development area, it is S5 Environmental's opinion that, with the implementation of the above recommendations, the proposed townhouse development is unlikely to have significant residual impact on ecological values within the site and local area.

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APPENDIX A
Database Searches

Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Queensland status: All
Records: Confirmed
Date: Since 1980
Latitude: -27.8663
Longitude: 153.2860
Distance: 1
Email: chloe@s5consulting.com.au
Date submitted: Monday 08 Apr 2024 18:33:41
Date extracted: Monday 08 Apr 2024 18:40:03

The number of records retrieved = 67

Disclaimer
Information presented on this product is distributed by the Queensland Government as an information source only. While every care is taken to ensure the accuracy of this data, the State of Queensland makes no statements, representations or warranties about the accuracy, reliability, completeness or suitability of any information contained in this product.
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Information about your Species lists request is logged for quality assurance, user support and product enhancement purposes only.
The information provided should be appropriately acknowledged as being derived from WildNet database when it is used. As the WildNet Program is still in a process of collating and vetting data, it is possible the information given is not complete. Go to the WildNet database webpage (https://www.qld.gov.au/environment/plants-animals/species-information/wildnet) to find out more about WildNet and where to access other WildNet information products approved for publication. Feedback about WildNet species lists should be emailed to wildlife.online@des.qld.gov.au.

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Hylidae	*Litoria fallax*	eastern sedgefrog		C		1
animals	amphibians	Limnodynastidae	*Platyplectrum ornatum*	ornate burrowing frog		C		9
animals	birds	Acanthizidae	*Sericornis magnirostra*	large-billed scrubwren		C		1
animals	birds	Alcedinidae	*Dacelo novaeguineae*	laughing kookaburra		C		1
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		1
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		1
animals	birds	Anseranatidae	*Anseranas semipalmata*	magpie goose		C		1
animals	birds	Ardeidae	*Bubulcus ibis*	cattle egret		C		1
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		1
animals	birds	Artamidae	*Gymnorhina tibicen*	Australian magpie		C		1
animals	birds	Artamidae	*Strepera graculina graculina*	pied currawong (eastern Australia)		C		1
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		1
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		1
animals	birds	Charadriidae	*Vanellus miles novaehollandiae*	masked lapwing (southern subspecies)		C		1
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		1
animals	birds	Columbidae	*Geopelia placida*	peaceful dove		C		1
animals	birds	Columbidae	*Phaps chalcoptera*	common bronzewing		C		1
animals	birds	Columbidae	*Spilopelia chinensis*	spotted dove	Y			1
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		1
animals	birds	Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo		C		1
animals	birds	Dicruridae	*Dicrurus bracteatus bracteatus*	spangled drongo (eastern Australia)		C		1
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		1
animals	birds	Hirundinidae	*Petrochelidon ariel*	fairy martin		C		1
animals	birds	Maluridae	*Malurus lamberti*	variegated fairy-wren		C		1
animals	birds	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren		C		1
animals	birds	Meliphagidae	*Manorina melanocephala*	noisy miner		C		1
animals	birds	Meliphagidae	*Meliphaga lewinii*	Lewin's honeyeater		C		1
animals	birds	Meliphagidae	*Myzomela sanguinolenta*	scarlet honeyeater		C		1
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		1
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		1
animals	birds	Meliphagidae	*Plectorhyncha lanceolata*	striped honeyeater		C		1
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		1
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		1
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		1
animals	birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird		C		1
animals	birds	Pachycephalidae	*Pachycephala pectoralis youngi*	golden whistler (south-eastern Australia)		C		1
animals	birds	Pardalotidae	*Pardalotus punctatus*	spotted pardalote		C		1
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		1
animals	birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican		C		1
animals	birds	Psittaculidae	*Parvipsitta pusilla*	little lorikeet		C		1
animals	birds	Psittaculidae	*Platycercus adscitus palliceps*	pale-headed rosella (southern form)		C		1
animals	birds	Psittaculidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet		C		1
animals	birds	Psittaculidae	*Trichoglossus moluccanus*	rainbow lorikeet		C		1
animals	birds	Psophodidae	*Psophodes olivaceus*	eastern whipbird		C		1
animals	birds	Rallidae	*Porphyrio melanotus*	purple swamphen		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		1
animals	birds	Rhipiduridae	*Rhipidura leucophrys leucophrys*	willie wagtail (southern)		C		1
animals	birds	Threskiornithidae	*Threskiornis molucca*	Australian white ibis		C		1
animals	birds	Zosteropidae	*Zosterops lateralis cornwalli*	silvereye (eastern)		C		1
animals	mammals	Leporidae	*Lepus europaeus*	European brown hare	Y			1
animals	mammals	Macropodidae	*Macropus giganteus*	eastern grey kangaroo		C		1
animals	mammals	Macropodidae	*Wallabia bicolor*	swamp wallaby		C		1
animals	mammals	Miniopteridae	*Miniopterus australis*	little bent-wing bat		C		1
animals	mammals	Ornithorhynchidae	*Ornithorhynchus anatinus*	platypus		SL		1
animals	mammals	Peramelidae	*Isoodon macrourus*	northern brown bandicoot		C		1
animals	mammals	Phalangeridae	*Trichosurus vulpecula*	common brushtail possum		C		1
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		E	E	1
plants	land plants	Apocynaceae	*Parsonsia straminea*	monkey rope		C		1/1
plants	land plants	Asteraceae	*Chrysanthemoides monilifera subsp. rotundata*	bitou bush	Y			1/1
plants	land plants	Lauraceae	*Endiandra muelleri subsp. bracteata*			C		1/1
plants	land plants	Leguminosae	*Mimosa pudica var. hispida*		Y			1/1
plants	land plants	Malvaceae	*Modiola caroliniana*	red-flowered mallow	Y			1/1
plants	land plants	Myrsinaceae	*Ardisia crenata*		Y			1/1
plants	land plants	Myrtaceae	*Eugenia uniflora*	Brazilian cherry tree	Y			1/1
plants	land plants	Passifloraceae	*Passiflora edulis*		Y			1/1
plants	land plants	Passifloraceae	*Passiflora suberosa subsp. litoralis*		Y			1/1
plants	land plants	Phyllanthaceae	*Glochidion sumatranum*	umbrella cheese tree		C		1/1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.*
The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.*
The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).
This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 08-Apr-2024

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	67
Listed Migratory Species:	18

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	26
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	4
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Moreton bay	Within 10km of Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community may occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community may occur within area	In feature area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area	In feature area
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia			
Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Botaurus poiciloptilus			
Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot [59714]	Critically Endangered	Species or species habitat may occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat known to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat may occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In feature area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area	In feature area
FROG			

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Litoria olongburensis](#) Wallum Sedge Frog [1821]	Vulnerable	Species or species habitat may occur within area	In feature area
[Mixophyes fleayi](#) Fleay's Frog [25960]	Endangered	Species or species habitat likely to occur within area	In feature area
INSECT			
[Argynnis hyperbius inconstans](#) Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
[Chalinolobus dwyeri](#) Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat likely to occur within area	In feature area
[Dasyurus maculatus maculatus (SE mainland population)](#) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area	In feature area
[Macroderma gigas](#) Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In feature area
[Petauroides volans](#) Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area	In feature area
[Petaurus australis australis](#) Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Petrogale penicillata](#) Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area	In feature area
[Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)](#) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
[Potorous tridactylus tridactylus](#) Long-nosed Potoroo (northern) [66645]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Pteropus poliocephalus](#) Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
PLANT			
[Acronychia littoralis](#) Scented Acronychia [8582]	Endangered	Species or species habitat may occur within area	In buffer area only
[Arthraxon hispidus](#) Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Baloghia marmorata](#) Marbled Balogia, Jointed Baloghia [8463]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Bosistoa transversa](#) Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Coleus habrophyllus listed as Plectranthus habrophyllus](#) [91378]	Endangered	Species or species habitat may occur within area	In buffer area only
[Coleus nitidus listed as Plectranthus nitidus](#) Nightcap Plectranthus, Silver Plectranthus [91380]	Endangered	Species or species habitat may occur within area	In feature area
[Corchorus cunninghamii](#) Native Jute [14659]	Endangered	Species or species habitat likely to occur within area	In feature area
[Cryptocarya foetida](#) Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat may occur within area	In feature area
[Cryptostylis hunteriana](#) Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area	In feature area
[Cupaniopsis shirleyana](#) Wedge-leaf Tuckeroo [3205]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Endiandra floydii Floyd's Walnut, Crystal Creek Walnut [52955]	Endangered	Species or species habitat known to occur within area	In feature area
Leichhardtia longiloba listed as Marsdenia longiloba Clear Milkvine [91911]	Vulnerable	Species or species habitat may occur within area	In feature area
Lepidium peregrinum Wandering Pepper-cress [14035]	Endangered	Species or species habitat may occur within area	In buffer area only
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat may occur within area	In feature area
Notelaea lloydii Lloyd's Olive [15002]	Vulnerable	Species or species habitat may occur within area	In feature area
Owenia cepiodora Onionwood, Bog Onion, Onion Cedar [11344]	Vulnerable	Species or species habitat may occur within area	In feature area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area	In feature area
Planchonella eerwah Shiny-leaved Condoo, Black Plum, Wild Apple [17340]	Endangered	Species or species habitat likely to occur within area	In feature area
Randia moorei Spiny Gardenia [10577]	Endangered	Species or species habitat likely to occur within area	In feature area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Samadera bidwillii Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Sophora fraseri [8836]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Syzygium hodgkinsoniae Smooth-bark Rose Apple, Red Lilly Pilly [3539]	Vulnerable	Species or species habitat may occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In feature area
Vincetoxicum woollsii listed as Tylophora woollsii [40080]	Endangered	Species or species habitat may occur within area	In feature area
Zieria collina [2178]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
REPTILE			
Coeranoscincus reticulatus Three-toed Snake-tooth Skink [59628]	Vulnerable	Species or species habitat may occur within area	In feature area
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
[Cuculus optatus](#) Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area	In feature area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat likely to occur within area	In feature area
[Symposiachrus trivirgatus as Monarcha trivirgatus](#) Spectacled Monarch [83946]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris melanotos](#)			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
[Charadrius leschenaultii](#)			
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Gallinago hardwickii](#)			
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Limosa lapponica](#)			
Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
[Numenius madagascariensis](#)			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Pandion haliaetus](#)			
Osprey [952]		Species or species habitat likely to occur within area	In buffer area only
[Tringa nebularia](#)			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
[Actitis hypoleucos](#)			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
[Anseranas semipalmata](#)			
Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
[Bubulcus ibis as Ardea ibis](#) Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Lathamus discolor](#) Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Pachyptila turtur](#) Fairy Prion [1066]		Species or species habitat likely to occur within area	In buffer area only
[Pandion haliaetus](#) Osprey [952]		Species or species habitat likely to occur within area	In buffer area only
[Pterodroma cervicalis](#) White-necked Petrel [59642]		Species or species habitat may occur within area	In feature area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Sterna striata			
White-fronted Tern [799]		Migration route may occur within area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus			
Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area	In feature area
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Jacobs Well Airport	2004/1361	Controlled Action	Completed	In buffer area only
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Residential subdivision, Reserve Road	2004/1333	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Kerkins Levee Rehabilitation Project, Phases 2-8	2004/1435	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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APPENDIX B
State Mapping

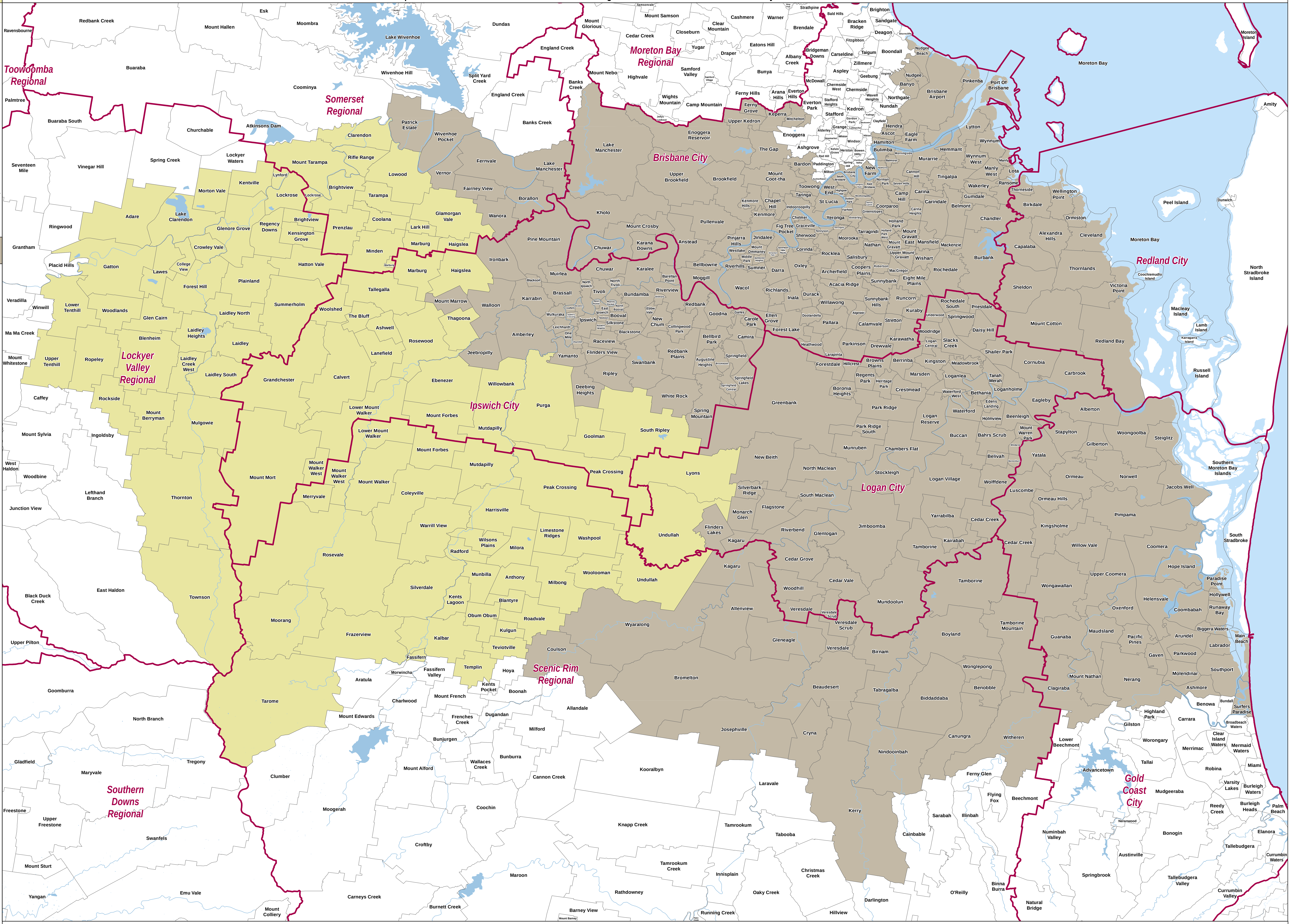
National Red Imported Fire Ant Eradication Program: Fire ant biosecurity zones

Fire ant biosecurity zone 1

Adare
Anthony
Ashwell
Blantyre
Blenheim
Brightview
Calvert
Clarendon
Coleyville
College View
Coolana
Crowley Vale
Ebenezer
Fassifern
Forest Hill
Frazerview
Gatton
Glamorgan Vale
Glen Cairn
Glenore Grove
Goolman
Grandchester
Haigslea
Harrisville
Hatton Vale
Kalbar
Kensington Grove
Kents Lagoon
Kentville
Kulgun
Laidley
Laidley Creek West
Laidley Heights
Laidley North
Laidley South
Lake Clarendon
Lanefield
Lark Hill
Lawes
Limestone Ridges
Lockrose
Lower Mount Walker
Lower Tenthill
Lowood
Lynford
Lyons
Marburg
Merryvale
Milbong
Milora
Minden
Moorang
Morton Vale
Mount Berryman
Mount Forbes
Mount Mort
Mount Tarampa
Mount Walker
Mount Walker West
Mulgowie
Munbilla
Mutdapilly
Obum Obum
Peak Crossing
Plainland
Prenzlau
Purga
Radford
Regency Downs
Rifle Range
Roadvale
Rockside
Ropeley
Rosevale
Rosewood
Silverdale
South Ripley
Summerholm
Tallegalla
Tarampa
Tarome
Templin
Teviotville
Thagoona
The Bluff
Thornton
Townson
Undullah
Upper Tenthill
Warrill View
Washpool
Willowbank
Wilsons Plains
Woodlands
Woolooman
Woolshed

Fire ant biosecurity zone 2

Acacia Ridge
Alberton
Alexandra Hills
Algester
Allenview
Amberley
Annerley
Anstead
Archerfield
Arundel
Ascot
Ashmore
Augustine Heights
Bahrs Scrub
Balmoral
Bannockburn
Banyo
Bardon
Barellan Point
Basin Pocket
Beaudesert
Beenleigh
Belivah
Bellbird Park
Bellbowrie
Belmont
Benobble
Berrinba
Bethania
Biddaddaba
Biggera Waters
Birkdale
Birnam
Blacksoil
Blackstone
Booval
Borallon
Boronia Heights
Boyland
Brassall
Brisbane Airport
Brisbane City
Bromelton
Brookfield
Brookwater
Browns Plains
Buccan
Bulimba
Bundamba
Burbank
Calamvale
Camira
Camp Hill
Cannon Hill
Canungra
Capalaba
Carbrook
Carina
Carina Heights
Carindale
Carole Park
Cedar Creek
Cedar Grove
Cedar Vale
Chambers Flat
Chandler
Chapel Hill
Chelmer
Churchill
Chuwar
Clagiraba
Cleveland
Coalfalls
Collingwood Park
Coombabah
Coomera
Coopers Plains
Coorparoo
Corinda
Cornubia
Coulson
Crestmead
Cryna
Daisy Hill
Darra
Deebing Heights
Dinmore
Doolandella
Drewvale
Durack
Dutton Park
Eagle Farm
Eagleby
East Brisbane
East Ipswich
Eastern Heights
Ebbw Vale
Edens Landing
Eight Mile Plains
Ellen Grove
Enoggera Reservoir
Fairfield
Fairney View
Fernvale
Ferny Grove
Fig Tree Pocket
Flagstone
Flinders Lakes
Flinders View
Forest Lake
Forestdale
Gailes
Gaven
Gaythorne
Gilberton
Gleneagle
Glenlogan
Goodna
Graceville
Greenbank
Greenslopes
Guanaba
Gumdale
Hamilton
Hawthorne
Heathwood
Helensvale
Hemmant
Hendra
Heritage Park
Highgate Hill
Hillcrest
Holland Park
Holland Park West
Hollywell
Holmview
Hope Island
Inala
Indooroopilly
Ipswich
Ironbark
Jacobs Well
Jamboree Heights
Jeebropilly
Jimboomba
Jindalee
Josephville
Kagaru
Kairabah
Kangaroo Point
Karalee
Karana Downs
Karawatha
Karrabin
Kenmore
Kenmore Hills
Keperra
Kerry
Kholo
Kingsholme
Kingston
Kuraby
Labrador
Lake Manchester
Larapinta
Leichhardt
Logan Central
Logan Reserve
Logan Village
Loganholme
Loganlea
Lota
Luscombe
Lytton
Macgregor
Mackenzie
Main Beach
Manly
Manly West
Mansfield
Marsden
Maudsland
Meadowbrook
Middle Park
Mitchelton
Moggill
Molendinar
Monarch Glen
Moores Pocket
Moorooka
Morningside
Mount Coot-Tha
Mount Cotton
Mount Crosby
Mount Gravatt
Mount Gravatt East
Mount Marrow
Mount Nathan
Mount Ommaney
Mount Warren Park
Muirlea
Mundoolun
Munruben
Murarrie
Nathan
Nerang
New Beith
New Chum
New Farm
Newtown
Nindooinbah
Norman Park
North Booval
North Ipswich
North Maclean
North Tivoli
Norwell
Nudgee
Nudgee Beach
One Mile
Ormeau
Ormeau Hills
Ormiston
Oxenford
Oxley
Pacific Pines
Pallara
Paradise Point
Park Ridge
Park Ridge South
Parkinson
Parkwood
Patrick Estate
Pimpama
Pine Mountain
Pinjarra Hills
Pinkenba
Port Of Brisbane
Priestdale
Pullenvale
Raceview
Ransome
Redbank
Redbank Plains
Redland Bay
Regents Park
Richlands
Ripley
Riverbend
Riverhills
Riverview
Robertson
Rochedale
Rochedale South
Rocklea
Runaway Bay
Runcorn
Sadliers Crossing
Salisbury
Seven Hills
Seventeen Mile Rocks
Shailer Park
Sheldon
Sherwood
Silkstone
Silverbark Ridge
Sinnamon Park
Slacks Creek
South Brisbane
South Maclean
Southport
Spring Mountain
Springfield
Springfield Central
Springfield Lakes
Springwood
St Lucia
Stapylton
Steiglitz
Stockleigh
Stones Corner
Stretton
Sumner
Sunnybank
Sunnybank Hills
Surfers Paradise
Swanbank
Tabragalba
Tamborine
Tamborine Mountain
Tanah Merah
Taringa
Tarragindi
Tennyson
The Gap
Thorneside
Thornlands
Tingalpa
Tivoli
Toowong
Underwood
Upper Brookfield
Upper Coomera
Upper Kedron
Upper Mount Gravatt
Veresdale
Veresdale Scrub
Vernor
Victoria Point
Wacol
Wakerley
Walloon
Wanora
Waterford
Waterford West
Wellington Point
West End
West Ipswich
Westlake
White Rock
Willawong
Willow Vale
Windaroo
Wishart
Witheren
Wivenhoe Pocket
Wolffdene
Wongawallan
Wonglepong
Woodend
Woodhill
Woodridge
Woolloongabba
Woongoolba
Wulkuraka
Wyaralong
Wynnum
Wynnum West
Yamanto
Yarrabilba
Yatala
Yeerongpilly
Yeronga



Fire ant biosecurity zone map
as at 8 July 2021, 12.00 am

- 🟨 Fire ant biosecurity zone 1
- 🟫 Fire ant biosecurity zone 2
- ☐ Local Government Areas
- ☐ Suburb

Contact the Department of Agriculture and Fisheries for more information or request a biosecurity instrument permit at www.daf.qld.gov.au/fireants or call 13 25 23

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State Planning Policy

Making or amending a local planning instrument and designating land for community infrastructure

Date: 10/06/2024

Queensland Government

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0 70 140 210 280

Metres

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Legend

Cadastre (5k)

Cadastre (5k)

MSES - Wildlife habitat (sea turtle nesting areas)

MSES - Wildlife habitat (sea turtle nesting areas)

MSES - Regulated vegetation (intersecting a watercourse)

MSES - Regulated vegetation (intersecting a watercourse)

MSES - High ecological value waters (watercourse)

MSES - High ecological value waters (watercourse)

MSES - Wildlife habitat (endangered or vulnerable)


MSES - Wildlife habitat (endangered or vulnerable)

MSES - Wildlife habitat (special least concern animal)


MSES - Wildlife habitat (special least concern animal)

MSES - Wildlife habitat (koala habitat areas - core)


MSES - Wildlife habitat (koala habitat areas - core)

MSES - Wildlife habitat (koala habitat areas - locally refined)


MSES - Wildlife habitat (koala habitat areas - locally refined)

MSES - Strategic environmental areas (designated precinct)


MSES - Strategic environmental areas (designated precinct)

MSES - High ecological significance wetlands

MSES - High ecological significance wetlands

MSES - High ecological value waters (wetland)


MSES - High ecological value waters (wetland)

MSES - Legally secured offset area (offset register)


MSES - Legally secured offset area (offset register)

MSES - Legally secured offset area (regulated vegetation offsets)


MSES - Legally secured offset area (regulated vegetation offsets)

MSES - Protected areas (estate)


MSES - Protected areas (estate)

MSES - Protected areas (special wildlife reserve)


MSES - Protected areas (special wildlife reserve)

MSES - Protected areas (nature refuge)


MSES - Protected areas (nature refuge)

MSES - Marine park (highly protected areas)


MSES - Marine park (highly protected areas)

MSES - Declared fish habitat area


MSES - Declared fish habitat area

MSES - Regulated vegetation (category B)


MSES - Regulated vegetation (category B)

MSES - Regulated vegetation (category C)


MSES - Regulated vegetation (category C)

MSES - Regulated vegetation (category R)


MSES - Regulated vegetation (category R)

MSES - Regulated vegetation (essential habitat)


MSES - Regulated vegetation (essential habitat)

MSES - Regulated vegetation (wetland)


MSES - Regulated vegetation (wetland)

Date: 10/06/2024

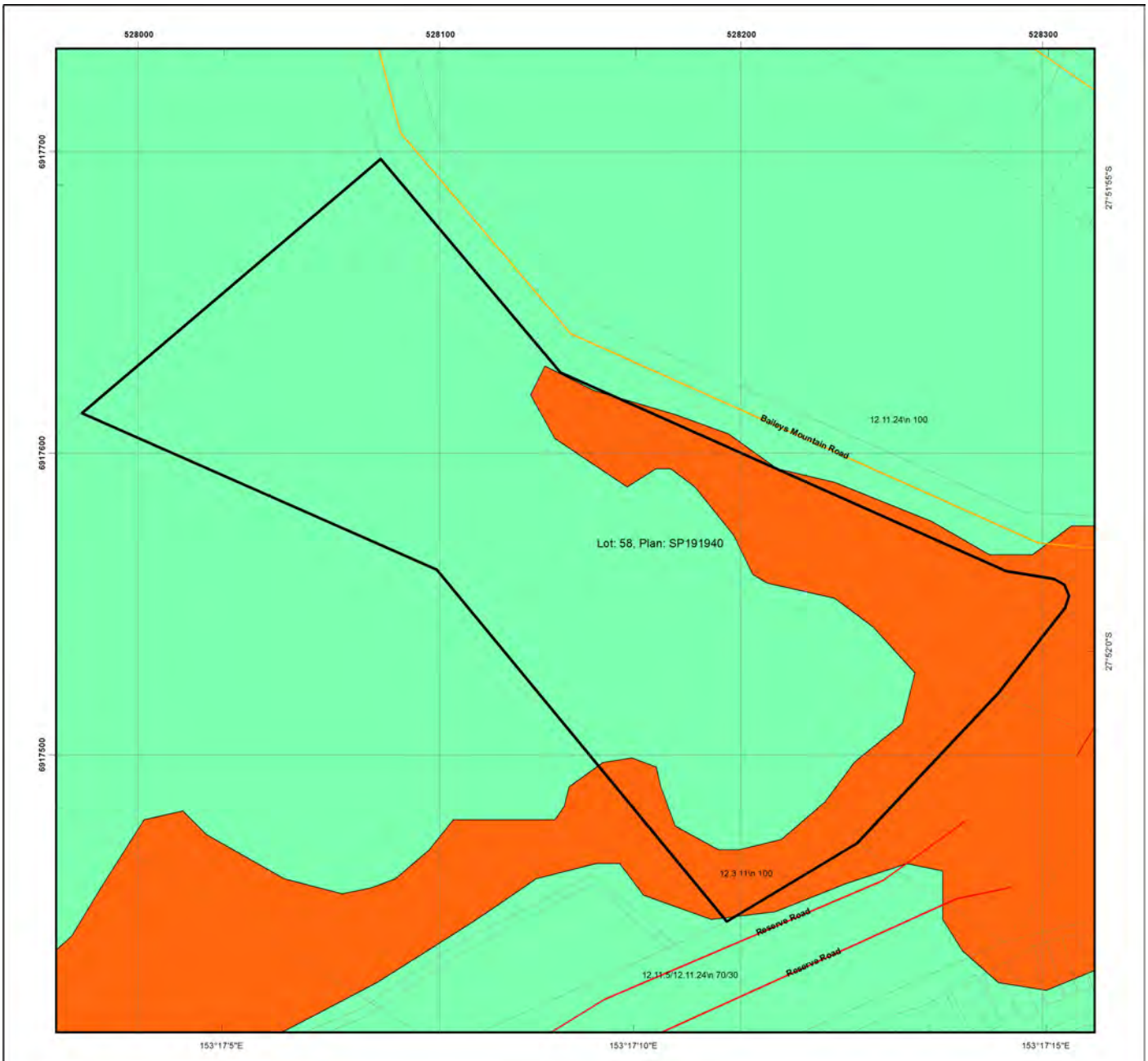
State Planning Policy

Making or amending a local planning instrument and designating land for community infrastructure

Queensland Government

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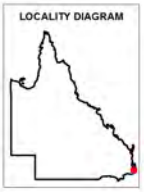
Vegetation Management Pre-clear Regional Ecosystem Map

Legend

- Selected Lot and Plan
- Pre-clearing area containing Endangered RE
- Pre-clearing area containing Of Concern RE
- Pre-clearing area that is a Least Concern RE
- Water
- Highway
- Connector
- Street/Local Road
- Other land parcel boundaries

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LOCALITY DIAGRAM



N

0 10 20 30 40 50 m

This product is projected into:
GDA 1994 MGA Zone 56

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Vegetation management report

For Lot: 58 Plan: SP191940

02/06/2023

Queensland Government

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Recent changes

Updated mapping

Updated vegetation mapping was released on 8 September 2022 and includes the most recent Queensland Herbarium scientific updates to the Regulated Vegetation Management Map, regional ecosystems, wetland, high-value regrowth and essential habitat mapping.

The Department of Environment and Science have also updated their protected plant and koala protection mapping to align with the Queensland Herbarium scientific updates.

Overview

Based on the lot on plan details you have supplied, this report provides the following detailed information:

Property details - information about the specified Lot on Plan, lot size, local government area, bioregion(s), subregion(s) and catchment(s);

Vegetation management framework - an explanation of the application of the framework and contact details for the Department of Resources who administer the framework;

Vegetation management framework details for the specified Lot on Plan including:

- the vegetation management categories on the property;
- the vegetation management regional ecosystems on the property;
- vegetation management watercourses or drainage features on the property;
- vegetation management wetlands on the property;
- vegetation management essential habitat on the property;
- whether any area management plans are associated with the property;
- whether the property is coastal or non-coastal; and
- whether the property is mapped as Agricultural Land Class A or B;

Protected plant framework - an explanation of the application of the framework and contact details for the Department of Environment and Science who administer the framework, including:

- high risk areas on the protected plant flora survey trigger map for the property;

Koala protection framework - an explanation of the application of the framework and contact details for the Department of Environment and Science who administer the framework; and

Koala protection framework details for the specified Lot on Plan including:

- the koala district the property is located in;
- koala priority areas on the property;
- core and locally refined koala habitat areas on the property;
- whether the lot is located in an identified koala broad-hectare area; and
- koala habitat regional ecosystems on the property for core koala habitat areas.

This information will assist you to determine your options for managing vegetation under:

- the vegetation management framework, which may include:

- exempt clearing work;
- accepted development vegetation clearing code;
- an area management plan;
- a development approval;

- the protected plant framework, which may include:

- the need to undertake a flora survey;
- exempt clearing;
- a protected plant clearing permit;

- the koala protection framework, which may include:

- exempted development;
- a development approval;
- the need to undertake clearing sequentially and in the presence of a koala spotter.

Other laws

The clearing of native vegetation is regulated by both Queensland and Australian legislation, and some local governments also regulate native vegetation clearing. You may need to obtain an approval or permit under another Act, such as the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Section 8 of this guide provides contact details of other agencies you should confirm requirements with, before commencing vegetation clearing.

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1. Property details

1.1 Tenure and title area

All of the lot, plan, tenure and title area information associated with property Lot: 58 Plan: SP191940, are listed in Table 1.

Table 1: Lot, plan, tenure and title area information for the property

Lot	Plan	Tenure	Property title area (sq metres)
58	SP191940	Freehold	30,870

The tenure of the land may affect whether clearing is considered exempt clearing work or may be carried out under an accepted development vegetation clearing code.

Does this property have a freehold tenure and is in the Wet Tropics of Queensland World Heritage Area?

No, this property is not located in the Wet Tropics of Queensland World Heritage Area.

1.2 Property location

Table 2 provides a summary of the locations for property Lot: 58 Plan: SP191940, in relation to natural and administrative boundaries.

Table 2: Property location details

Local Government(s)
Gold Coast City

Bioregion(s)	Subregion(s)
Southeast Queensland	Burringbar - Conondale Ranges

Catchment(s)
South Coast

2. Vegetation management framework (administered by the Department of Resources)

The *Vegetation Management Act 1999* (VMA), the Vegetation Management Regulation 2012, the *Planning Act 2016* and the Planning Regulation 2017, in conjunction with associated policies and codes, form the Vegetation Management Framework.

The VMA does not apply to all land tenures or vegetation types. State forests, national parks, forest reserves and some tenures under the *Forestry Act 1959* and *Nature Conservation Act 1992* are not regulated by the VMA. Managing or clearing vegetation on these tenures may require approvals under these laws.

The following native vegetation is not regulated under the VMA but may require permit(s) under other laws:

- grass or non-woody herbage;
- a plant within a grassland regional ecosystem prescribed under Schedule 5 of the Vegetation Management Regulation 2012; and
- a mangrove.

2.1 Exempt clearing work

Exempt clearing work is an activity for which you do not need to notify the Department of Resources or obtain an approval under the vegetation management framework. Exempt clearing work was previously known as exemptions.

In areas that are mapped as Category X (white in colour) on the regulated vegetation management map (see section 4.1), and where the land tenure is freehold, indigenous land and leasehold land for agriculture and grazing purposes, the clearing of vegetation is considered exempt clearing work and does not require notification or development approval under the vegetation management framework. For all other land tenures, contact the Department of Resources before commencing clearing to ensure that the proposed activity is exempt clearing work.

A range of routine property management activities are considered exempt clearing work. A list of exempt clearing work is available at
https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/exemptions.

Exempt clearing work may be affected if the proposed clearing area is subject to development approval conditions, a covenant, an environmental offset, an exchange area, a restoration notice, or an area mapped as Category A. Exempt clearing work may require approval under other Commonwealth, State or Local Government laws, or local government planning schemes. Contact the Department of Resources prior to clearing in any of these areas.

2.2 Accepted development vegetation clearing codes

Some clearing activities can be undertaken under an accepted development vegetation clearing code. The codes can be downloaded at
https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/codes

If you intend to clear vegetation under an accepted development vegetation clearing code, you must notify the Department of Resources before commencing. The information in this report will assist you to complete the online notification form.

You can complete the online form at
https://apps.dnrm.qld.gov.au/vegetation/

2.3 Area management plans

Area Management Plans (AMP) provide an alternative approval system for vegetation clearing under the vegetation management framework. They list the purposes and clearing conditions that have been approved for the areas covered by the plan. It is not necessary to use an AMP, even when an AMP applies to your property.

On 8 March 2020, AMPs ended for fodder harvesting, managing thickened vegetation and managing encroachment. New notifications cannot be made for these AMPs. You will need to consider options for fodder harvesting, managing thickened vegetation or encroachment under a relevant accepted development vegetation clearing code or apply for a development approval.

New notifications can be made for all other AMPs. These will continue to apply until their nominated end date.

If an Area Management Plan applies to your property for which you can make a new notification, it will be listed in Section 3.6 of this report. Before clearing under one of these AMPs, you must first notify the Department of Resources and then follow the conditions and requirements listed in the AMP.
https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/area-management-plans

2.4 Development approvals

If under the vegetation management framework your proposed clearing is not exempt clearing work, or is not permitted under an accepted development vegetation clearing code, or an AMP, you may be able to apply for a development approval. Information on how to apply for a development approval is available at
https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/development

2.5. Contact information for the Department of Resources

For further information on the vegetation management framework:
Phone 135VEG (135 834)
Email vegetation@resources.qld.gov.au
Visit https://www.resources.qld.gov.au/?contact=vegetation to submit an online enquiry.

3. Vegetation management framework for Lot: 58 Plan: SP191940

3.1 Vegetation categories

The vegetation categories on your property are shown on the regulated vegetation management map in section 4.1 of this report. A summary of vegetation categories on the subject lot are listed in Table 3. Descriptions for these categories are shown in Table 4.

Table 3: Vegetation categories for subject property. Total area: 3.09ha

Vegetation category	Area (ha)
Category B	0.4
Category C	< 0.1
Category X	2.6

Table 4: Description of vegetation categories

Category	Colour on Map	Description	Requirements / options under the vegetation management framework
A	red	Compliance areas, environmental offset areas and voluntary declaration areas	Special conditions apply to Category A areas. Before clearing, contact the Department of Resources to confirm any requirements in a Category A area.
B	dark blue	Remnant vegetation areas	Exempt clearing work, or notification and compliance with accepted development vegetation clearing codes, area management plans or development approval.
C	light blue	High-value regrowth areas	Exempt clearing work, or notification and compliance with managing Category C regrowth vegetation accepted development vegetation clearing code.
R	yellow	Regrowth within 50m of a watercourse or drainage feature in the Great Barrier Reef catchment areas	Exempt clearing work, or notification and compliance with managing Category R regrowth accepted development vegetation clearing code or area management plans.
X	white	Clearing on freehold land, indigenous land and leasehold land for agriculture and grazing purposes is considered exempt clearing work under the vegetation management framework. Contact the Department of Resources to clarify whether a development approval is required for other State land tenures.	No permit or notification required on freehold land, indigenous land and leasehold land for agriculture and grazing. A development approval may be required for some State land tenures.

Property Map of Assessable Vegetation (PMAV)

There is no Property Map of Assessable Vegetation (PMAV) present on this property.

3.2 Regional ecosystems

The endangered, of concern and least concern regional ecosystems on your property are shown on the vegetation management supporting map in section 4.2 and are listed in Table 5.

A description of regional ecosystems can be accessed online at
https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions/

Table 5: Regional ecosystems present on subject property

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
12.11.24	Least concern	B	0.28	Eucalyptus carnea or E. tindaliae, Corymbia intermedia +/- E. siderophloia or E. crebra woodland on metamorphics +/- interbedded volcanics	Sparse
12.11.24	Least concern	C	0.06	Eucalyptus carnea or E. tindaliae, Corymbia intermedia +/- E. siderophloia or E. crebra woodland on metamorphics +/- interbedded volcanics	Sparse
12.3.11	Of concern	B	0.15	Eucalyptus tereticornis +/- Eucalyptus siderophloia, Corymbia intermedia open forest on alluvial plains usually near coast	Mid-dense
12.3.11	Of concern	C	less than 0.01	Eucalyptus tereticornis +/- Eucalyptus siderophloia, Corymbia intermedia open forest on alluvial plains usually near coast	Mid-dense
non-rem	None	X	2.60	None	None

Please note:

1. All area and area derived figures included in this table have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.
2. If Table 5 contains a Category 'plant', please be aware that this refers to 'plantations' such as forestry, and these areas are considered non-remnant under the VMA.

The VMA status of the regional ecosystem (whether it is endangered, of concern or least concern) also determines if any of the following are applicable:

- exempt clearing work;
- accepted development vegetation clearing codes;
- performance outcomes in State Code 16 of the State Development Assessment Provisions (SDAP).

3.3 Watercourses

Vegetation management watercourses and drainage features for this property are shown on the vegetation management supporting map in section 4.2.

3.4 Wetlands

There are no vegetation management wetlands present on this property.

3.5 Essential habitat

Under the VMA, essential habitat for protected wildlife is native wildlife prescribed under the *Nature Conservation Act 1992* (NCA) as critically endangered, endangered, vulnerable or near-threatened wildlife.

Essential habitat for protected wildlife includes suitable habitat on the lot, or where a species has been known to occur up to 1.1 kilometres from a lot on which there is assessable vegetation. These important habitat areas are protected under the VMA.

Any essential habitat on this property will be shown as blue hatching on the vegetation supporting map in section 4.2.

If essential habitat is identified on the lot, information about the protected wildlife species is provided in Table 6 below. The numeric labels on the vegetation management supporting map can be cross referenced with Table 6 to outline the essential habitat factors for that particular species. There may be essential habitat for more than one species on each lot, and areas of Category A, Category B and Category C can be mapped as Essential Habitat.

Essential habitat is compiled from a combination of species habitat models and buffered species records. Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated. Essential habitat, for protected wildlife, means an area of vegetation shown on the Regulated Vegetation Management Map -

1) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database. Essential habitat factors are comprised of - regional ecosystem (mandatory for most species), vegetation community, altitude, soils, position in landscape; or

2) in which the protected wildlife, at any stage of its life cycle, is located.

If there is no essential habitat mapping shown on the vegetation management supporting map for this lot, and there is no table in the sections below, it confirms that there is no essential habitat on the lot.

Category A and/or Category B and/or Category C

Table 6: Essential habitat in Category A and/or Category B and/or Category C

Label	Scientific Name	Common Name	NCA Status	Vegetation Community	Altitude	Soils	Position in Landscape
860	Phascolarctos cinereus	koala	E	Open forests and woodlands containing Eucalyptus, Corymbia, Lophostemon or Melaleuca trees having a trunk of a diameter of more than 10cm at 1.3m above the ground. Tree species used for food and habitat varies across the state and can include: Corymbia citriodora, Corymbia henryi, Corymbia intermedia, Eucalyptus acmenoides, Eucalyptus bancroftii, Eucalyptus biturbinata, Eucalyptus blakelyi, Eucalyptus brownii, Eucalyptus camaldulensis, Eucalyptus carnea, Eucalyptus chloroclada, Eucalyptus coolabah, Eucalyptus crebra, Eucalyptus dealbata, Eucalyptus drepanophylla, Eucalyptus dunnii, Eucalyptus eugenioides, Eucalyptus exserta, Eucalyptus fibrosa, Eucalyptus grandis, Eucalyptus helidonica, Eucalyptus latisinensis, Eucalyptus longirostrata, Eucalyptus major, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus microcarpa, Eucalyptus microcorys, Eucalyptus microtheca, Eucalyptus moluccana, Eucalyptus montivaga, Eucalyptus orgadophila, Eucalyptus papuana, Eucalyptus pilularis, Eucalyptus platyphylla, Eucalyptus populnea, Eucalyptus portuensis, Eucalyptus propinqua, Eucalyptus racemosa, Eucalyptus resinifera, Eucalyptus robusta, Eucalyptus saligna, Eucalyptus seeana, Eucalyptus siderophloia, Eucalyptus sideroxylon, Eucalyptus tereticornis, Eucalyptus thozetiana, Eucalyptus tindaliae, Eucalyptus umbra, Lophostemon confertus, Melaleuca leucadendra, Melaleuca quinquenervia.	Sea level to 1000m.	None	Riparian areas, plains and hill/escarpment slopes.

Label	Regional Ecosystem (mandatory unless otherwise specified)
860	4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6, 4.3.8, 4.3.10, 4.3.11, 4.5.3, 4.5.5, 4.5.6, 4.5.8, 4.5.9, 4.7.1, 4.7.7, 4.7.8, 4.9.6, 4.9.10, 4.9.12, 4.9.17, 6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5, 6.3.7, 6.3.8, 6.3.9, 6.3.11, 6.3.12, 6.3.17, 6.3.18, 6.3.22, 6.3.24, 6.3.25, 6.4.1, 6.4.2, 6.4.3, 6.4.4, 6.5.1, 6.5.2, 6.5.3, 6.5.5, 6.5.6, 6.5.7, 6.5.8, 6.5.9, 6.5.10, 6.5.11, 6.5.13, 6.5.14, 6.5.15, 6.5.16, 6.5.17, 6.5.18, 6.5.19, 6.6.2, 6.7.1, 6.7.2, 6.7.5, 6.7.6, 6.7.7, 6.7.9, 6.7.11, 6.7.12, 6.7.13, 6.7.14, 6.7.17, 6.9.3, 7.2.3, 7.2.4, 7.2.7, 7.2.11, 7.3.7, 7.3.8, 7.3.9, 7.3.12, 7.3.13, 7.3.14, 7.3.16, 7.3.19, 7.3.20, 7.3.21, 7.3.25, 7.3.26, 7.3.39, 7.3.40, 7.3.42, 7.3.43, 7.3.44, 7.3.45, 7.3.47, 7.3.48, 7.3.50, 7.5.1, 7.5.2, 7.5.3, 7.5.4, 7.8.7, 7.8.8, 7.8.10, 7.8.15, 7.8.16, 7.8.17, 7.8.18, 7.8.19, 7.11.5, 7.11.6, 7.11.13, 7.11.14, 7.11.16, 7.11.18, 7.11.19, 7.11.20, 7.11.21, 7.11.31, 7.11.32, 7.11.33, 7.11.34, 7.11.35, 7.11.37, 7.11.41, 7.11.42, 7.11.43, 7.11.44, 7.11.45, 7.11.46, 7.11.47, 7.11.48, 7.11.49, 7.11.50, 7.11.51, 7.12.4, 7.12.5, 7.12.17, 7.12.21, 7.12.22, 7.12.23, 7.12.24, 7.12.25, 7.12.26, 7.12.27, 7.12.28, 7.12.29, 7.12.30, 7.12.33, 7.12.34, 7.12.35, 7.12.51, 7.12.52, 7.12.53, 7.12.54, 7.12.55, 7.12.56, 7.12.57, 7.12.58, 7.12.59, 7.12.60, 7.12.61, 7.12.62, 7.12.63, 7.12.65, 7.12.66, 7.12.69, 8.1.5, 8.2.3, 8.2.6, 8.2.7, 8.2.8, 8.2.11, 8.2.12, 8.2.13, 8.2.14, 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6, 8.3.8, 8.3.10, 8.3.11, 8.3.13, 8.5.1, 8.5.2, 8.5.3, 8.5.5, 8.5.6, 8.5.7, 8.9.1, 8.10.1, 8.11.1, 8.11.3, 8.11.4, 8.11.5, 8.11.6, 8.11.8, 8.11.10, 8.11.12, 8.12.4, 8.12.5, 8.12.6, 8.12.7, 8.12.8, 8.12.9, 8.12.12, 8.12.14, 8.12.20, 8.12.22, 8.12.23, 8.12.25, 8.12.26, 8.12.27, 8.12.29, 8.12.31, 8.12.32, 9.3.1, 9.3.2, 9.3.3, 9.3.4, 9.3.5, 9.3.6, 9.3.7, 9.3.8, 9.3.10, 9.3.11, 9.3.13, 9.3.14, 9.3.15, 9.3.16, 9.3.17, 9.3.19, 9.3.20, 9.3.21, 9.3.22, 9.3.27, 9.4.1, 9.4.2, 9.5.1, 9.5.3, 9.5.4, 9.5.5, 9.5.6, 9.5.7, 9.5.8, 9.5.9, 9.5.10, 9.5.11, 9.5.12, 9.5.15, 9.5.16, 9.5.17, 9.7.1, 9.7.2, 9.7.3, 9.7.4, 9.7.5, 9.7.6, 9.8.1, 9.8.2, 9.8.3, 9.8.4, 9.8.5, 9.8.9, 9.8.10, 9.8.11, 9.8.13, 9.10.1, 9.10.3, 9.10.4, 9.10.5, 9.10.7, 9.10.8, 9.11.1, 9.11.2, 9.11.3, 9.11.4, 9.11.5, 9.11.7, 9.11.10, 9.11.12, 9.11.13, 9.11.14, 9.11.15, 9.11.16, 9.11.17, 9.11.18, 9.11.19, 9.11.21, 9.11.22, 9.11.23, 9.11.24, 9.11.25, 9.11.26, 9.11.28, 9.11.29, 9.11.30, 9.11.31, 9.11.32, 9.12.1, 9.12.2, 9.12.3, 9.12.4, 9.12.5, 9.12.6, 9.12.7, 9.12.10, 9.12.11, 9.12.12, 9.12.13, 9.12.14, 9.12.15, 9.12.16, 9.12.17, 9.12.18, 9.12.19, 9.12.20, 9.12.21, 9.12.22, 9.12.23, 9.12.24, 9.12.25, 9.12.26, 9.12.27, 9.12.28, 9.12.29, 9.12.30, 9.12.31, 9.12.32, 9.12.33, 9.12.35, 9.12.36, 9.12.37, 9.12.38, 9.12.39, 9.12.44, 10.3.2, 10.3.3, 10.3.5, 10.3.6, 10.3.9, 10.3.10, 10.3.11, 10.3.12, 10.3.13, 10.3.14, 10.3.15, 10.3.17, 10.3.20, 10.3.27, 10.3.28, 10.4.3, 10.4.9, 10.5.1, 10.5.2, 10.5.4, 10.5.5, 10.5.7, 10.5.8, 10.5.9, 10.5.10, 10.5.11, 10.5.12, 10.7.1, 10.7.2, 10.7.3, 10.7.4, 10.7.5, 10.7.9, 10.7.10, 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11.11.13, 11.11.14, 11.11.15, 11.11.16, 11.11.17, 11.11.19, 11.11.20, 11.12.1, 11.12.2, 11.12.3, 11.12.5, 11.12.6, 11.12.7, 11.12.8, 11.12.9, 11.12.10, 11.12.13, 11.12.14, 11.12.15, 11.12.16, 11.12.17, 11.12.19, 11.12.20, 12.2.5, 12.2.6, 12.2.7, 12.2.8, 12.2.10, 12.3.2, 12.3.3, 12.3.4, 12.3.5, 12.3.6, 12.3.7, 12.3.9, 12.3.10, 12.3.11, 12.3.14, 12.3.18, 12.3.19, 12.3.20, 12.5.1, 12.5.2, 12.5.3, 12.5.4, 12.5.6, 12.5.7, 12.5.10, 12.5.12, 12.8.1, 12.8.8, 12.8.9, 12.8.11, 12.8.12, 12.8.14, 12.8.16, 12.8.17, 12.8.20, 12.8.24, 12.8.25, 12.9-10.1, 12.9-10.2, 12.9-10.3, 12.9-10.4, 12.9-10.5, 12.9-10.7, 12.9-10.8, 12.9-10.11, 12.9-10.12, 12.9-10.14, 12.9-10.17, 12.9-10.18, 12.9-10.19, 12.9-10.21, 12.9-10.25, 12.9-10.26, 12.9-10.27, 12.9-10.28, 12.9-10.29, 12.11.2, 12.11.3, 12.11.5, 12.11.6, 12.11.7, 12.11.8, 12.11.9, 12.11.14, 12.11.15, 12.11.16, 12.11.17, 12.11.18, 12.11.22, 12.11.23, 12.11.24, 12.11.25, 12.11.26, 12.11.27, 12.11.28, 12.12.2, 12.12.3, 12.12.4, 12.12.5, 12.12.6, 12.12.7, 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3.6 Area Management Plan(s)

Nil

3.7 Coastal or non-coastal

For the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP), this property is regarded as*

Coastal

*See also Map 4.3

3.8 Agricultural Land Class A or B

The following can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code:

Does this lot contain land that is mapped as Agricultural Land Class A or B in the State Planning Interactive Mapping System?

No Class A

No Class B

Note - This confirms Agricultural Land Classes as per the State Planning Interactive Mapping System only. This response does not include Agricultural Land Classes identified under local government planning schemes. For further information, check the Planning Scheme for your local government area.

See Map 4.4 to identify the location and extent of Class A and/or Class B Agricultural land on Lot: 58 Plan: SP191940.

4. Vegetation management framework maps

Vegetation management maps included in this report may also be requested individually at:
https://www.resources.qld.gov.au/qld/environment/land/vegetation/vegetation-map-request-form

Regulated vegetation management map

The regulated vegetation management map shows vegetation categories needed to determine clearing requirements. These maps are updated monthly to show new property maps of assessable vegetation (PMAV).

Vegetation management supporting map

The vegetation management supporting map provides information on regional ecosystems, wetlands, watercourses and essential habitat.

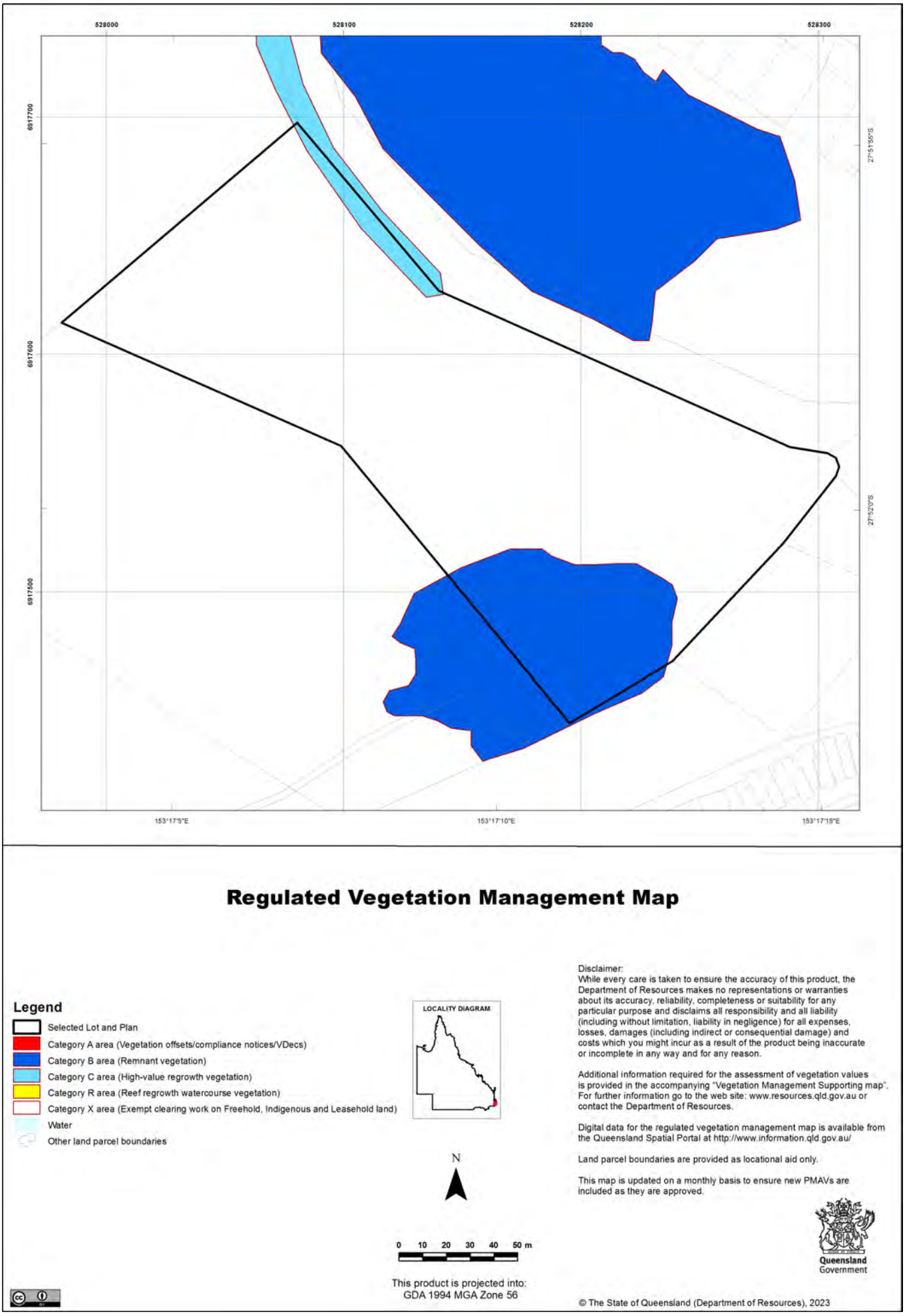
Coastal/non-coastal map

The coastal/non-coastal map confirms whether the lot, or which parts of the lot, are considered coastal or non-coastal for the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP).

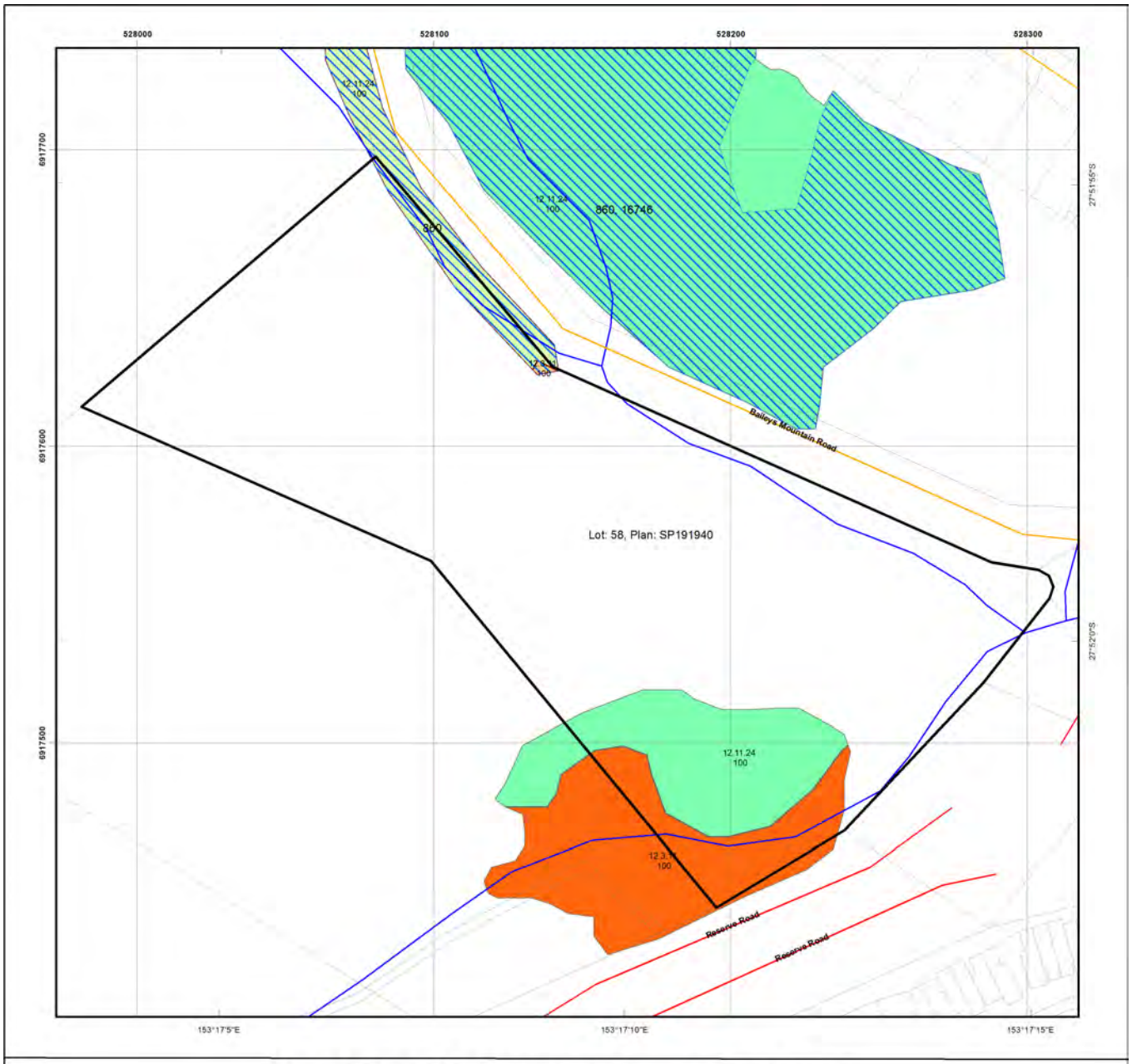
Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture

The Agricultural Land Class map confirms the location and extent of land mapped as Agricultural Land Classes A or B as identified on the State Planning Interactive Mapping System. Please note that this map does not include areas identified as Agricultural Land Class A or B in local government planning schemes. This map can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code.

4.1 Regulated vegetation management map



4.2 Vegetation management supporting map



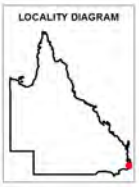
Vegetation Management Supporting Map

Legend

- Selected Lot and Plan
- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category C or R area containing endangered regional ecosystems
- Category C or R area containing of concern regional ecosystems
- Category C or R area that is a least concern regional ecosystem
- Category X area
- Water
- Wetland on the vegetation management wetlands map
- Essential habitat on the essential habitat map
- Essential habitat species record
- Watercourses and drainage features on the vegetation management watercourse and drainage features map (Stream order shown as black number against stream where available)
- Highway
- Connector
- Street/Local Road
- National Parks, State Forest and other reserves
- Other land parcel boundaries

Queensland Government

LOCALITY DIAGRAM



N

0 10 20 30 40 50 m

This product is projected into: GDA 1994 MGA Zone 56

Labels for Essential Habitat are centred on the area of enquiry.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/- 100 metres.

Disclaimer:
While every care is taken to ensure the accuracy of this product, the Department of Resources makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

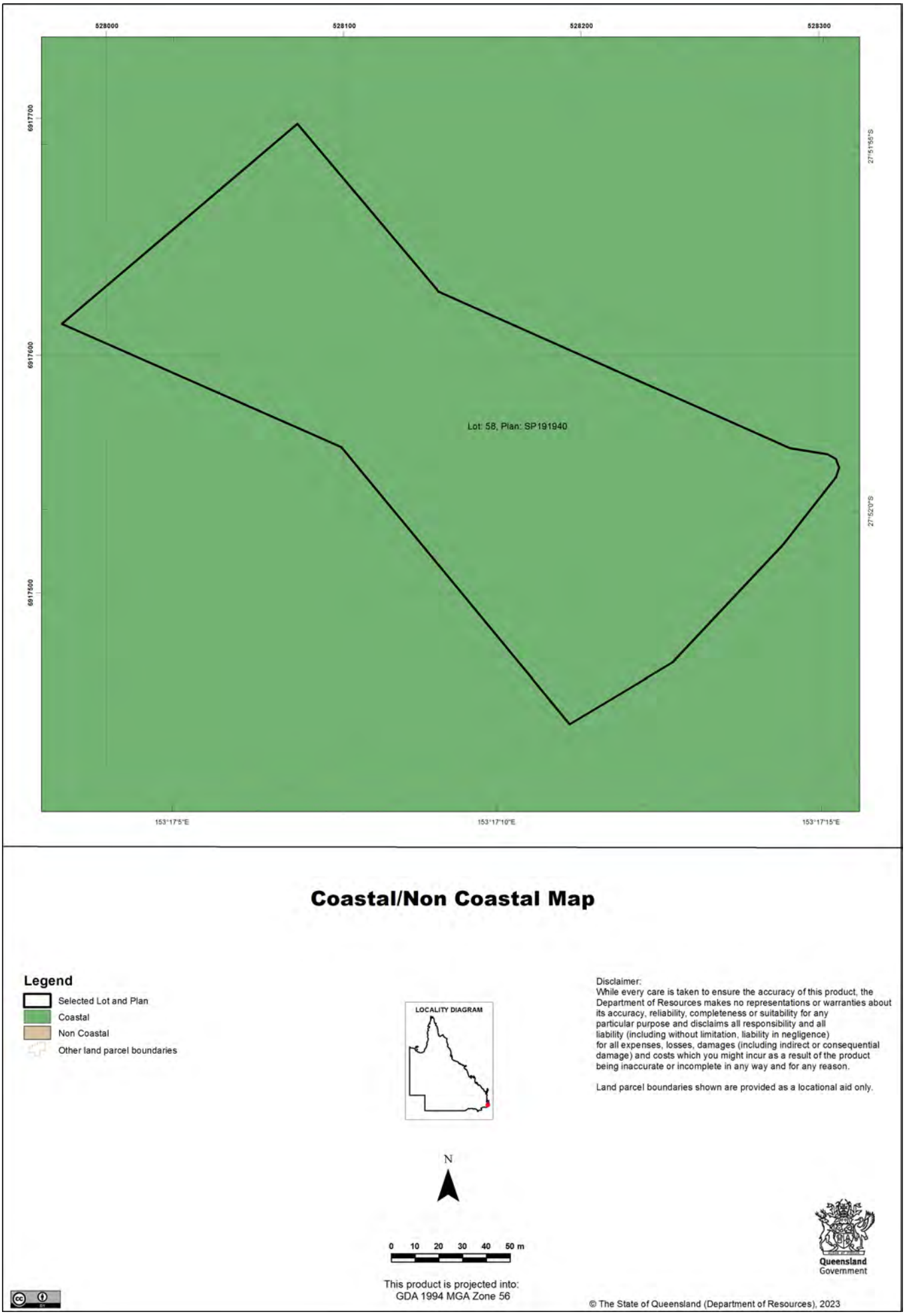
Additional information may be required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.resources.qld.gov.au or contact the Department of Resources.

Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at http://www.information.qld.gov.au/

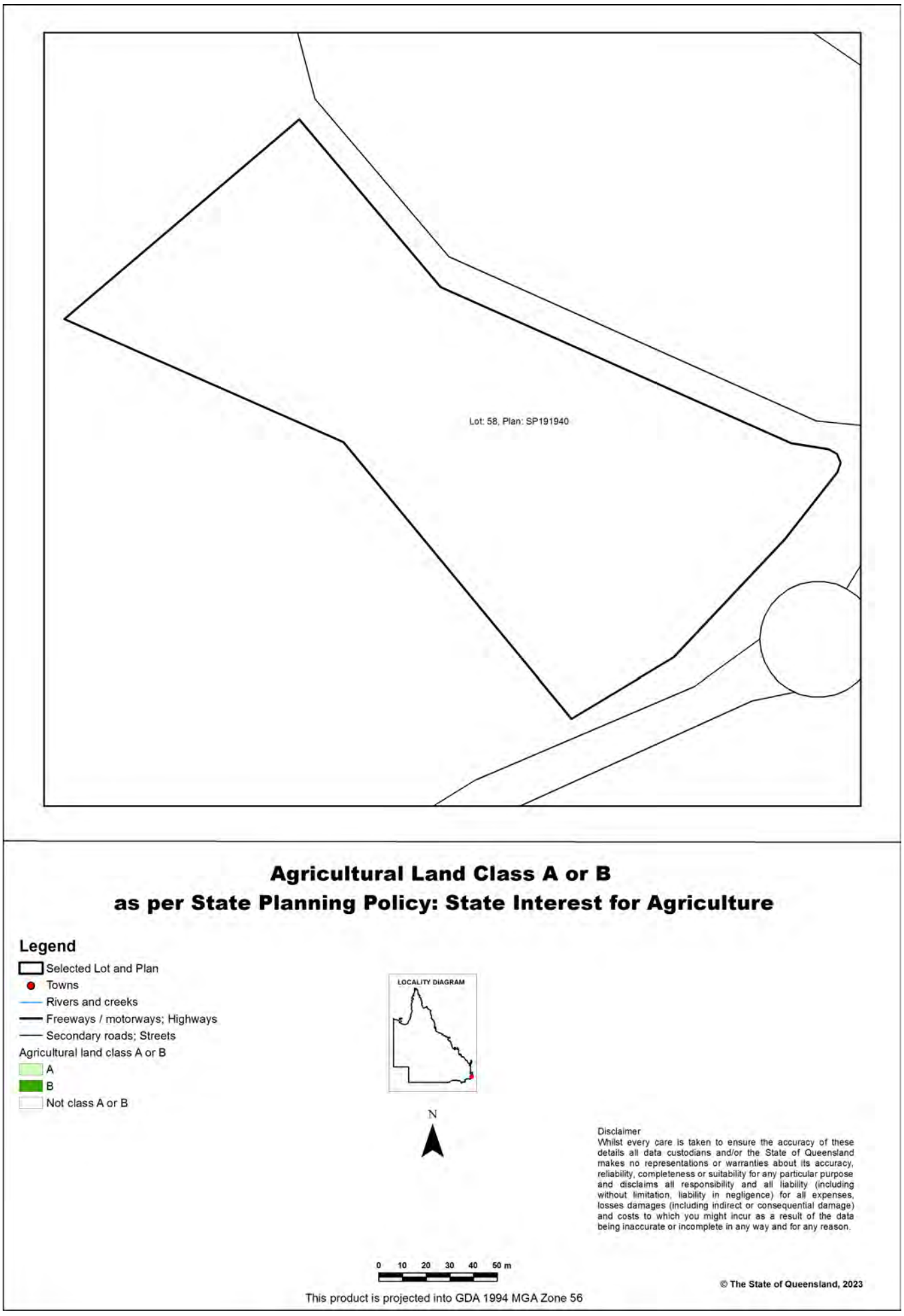
Land parcel boundaries are provided as locational aid only.

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4.3 Coastal/non-coastal map



4.4 Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture



5. Protected plants framework (administered by the Department of Environment and Science (DES))

In Queensland, all plants that are native to Australia are protected plants under the *Nature Conservation Act 1992* (NCA). The NCA regulates the clearing of protected plants 'in the wild' (see Operational policy: When a protected plant in Queensland is considered to be 'in the wild') that are listed as critically endangered, endangered, vulnerable or near threatened under the Act.

Please note that the protected plant clearing framework applies irrespective of the classification of the vegetation under the *Vegetation Management Act 1999* and any approval or exemptions given under another Act, for example, the *Vegetation Management Act 1999* or *Planning Regulation 2017*.

5.1 Clearing in high risk areas on the flora survey trigger map

The flora survey trigger map identifies high-risk areas for threatened and near threatened plants. These are areas where threatened or near threatened plants are known to exist or are likely to exist based on the habitat present. The flora survey trigger map for this property is provided in section 5.5.

If you are proposing to clear an area shown as high risk on the flora survey trigger map, a flora survey of the clearing impact area must be undertaken by a suitably qualified person in accordance with the Flora survey guidelines. The main objective of a flora survey is to locate any threatened or near threatened plants that may be present in the clearing impact area.

If the flora survey identifies that threatened or near threatened plants are not present within the clearing impact area or clearing within 100m of a threatened or near threatened plant can be avoided, the clearing activity is exempt from a permit. An exempt clearing notification form must be submitted to the Department of Environment and Science, with a copy of the flora survey report, at least one week prior to clearing.

If the flora survey identifies that threatened or near threatened plants are present in, or within 100m of, the area to be cleared, a clearing permit is required before any clearing is undertaken. The flora survey report, as well as an impact management report, must be submitted with the clearing permit application form.

5.2 Clearing outside high risk areas on the flora survey trigger map

In an area other than a high risk area, a clearing permit is only required where a person is, or becomes aware that threatened or near threatened plants are present in, or within 100m of, the area to be cleared. You must keep a copy of the flora survey trigger map for the area subject to clearing for five years from the day the clearing starts. If you do not clear within the 12 month period that the flora survey trigger map was printed, you need to print and check a new flora survey trigger map.

5.3 Exemptions

Many activities are 'exempt' under the protected plant clearing framework, which means that clearing of native plants that are in the wild can be undertaken for these activities with no need for a flora survey or a protected plant clearing permit. The Information sheet - General exemptions for the take of protected plants provides some of these exemptions.

Some exemptions under the NCA are the same as exempt clearing work (formerly known as exemptions) under the *Vegetation Management Act 1999* (i.e. listed in Schedule 21 of the Planning Regulations 2017) while some are different.

5.4 Contact information for DES

For further information on the protected plants framework:
Phone 1300 130 372 (and select option four)
Email palm@des.qld.gov.au
Visit https://www.qld.gov.au/environment/plants-animals/plants/protected-plants

5.5 Protected plants flora survey trigger map

This map included may also be requested individually at: https://apps.des.qld.gov.au/map-request/flora-survey-trigger/.

Updates to the data informing the flora survey trigger map

The flora survey trigger map will be reviewed, and updated if necessary, at least every 12 months to ensure the map reflects the most up-to-date and accurate data available.

Species information

Please note that flora survey trigger maps do not identify species associated with 'high risk areas'. While some species information may be publicly available, for example via the Queensland Spatial Catalogue, the Department of Environment and Science does not provide species information on request. Regardless of whether species information is available for a particular high risk area, clearing plants in a high risk area may require a flora survey and/or clearing permit. Please see the Department of Environment and Science webpage on the clearing of protected plants for more information.



Protected Plants Flora Survey Trigger Map

Legend

- Selected Lot and Plan
- High risk area
- Other land parcel boundaries.
- Freeways / motorways / highways
- Secondary roads / streets

LOCALITY DIAGRAM



N

0 10 20 30 40 50 m

This product is projected into:
GDA 1994 MGA Zone 56

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

Land parcel boundaries are provided as locational aid only.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at palm@des.qld.gov.au

Disclaimer:
While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.

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6. Koala protection framework (administered by the Department of Environment and Science (DES))

The koala (*Phascolarctos cinereus*) is listed in Queensland as endangered by the Queensland Government under *Nature Conservation Act 1992* and by the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999*.

The Queensland Government's koala protection framework is comprised of the *Nature Conservation Act 1992*, the Nature Conservation (Animals) Regulation 2020, the Nature Conservation (Koala) Conservation Plan 2017, the *Planning Act 2016* and the Planning Regulation 2017.

6.1 Koala mapping

6.1.1 Koala districts

The parts of Queensland where koalas are known to occur has been divided into three koala districts - koala district A, koala district B and koala district C. Each koala district is made up of areas with comparable koala populations (e.g. density, extent and significance of threatening processes affecting the population) which require similar management regimes.

Section 7.1 identifies which koala district your property is located in.

6.1.2 Koala habitat areas

Koala habitat areas are areas of vegetation that have been determined to contain koala habitat that is essential for the conservation of a viable koala population in the wild based on the combination of habitat suitability and biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water). In order to protect this important koala habitat, clearing controls have been introduced into the Planning Regulation 2017 for development in koala habitat areas.

Please note that koala habitat areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley, Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

There are two different categories of koala habitat area (core koala habitat area and locally refined koala habitat), which have been determined using two different methodologies. These methodologies are described in the document Spatial modelling in South East Queensland.

Section 7.2 shows any koala habitat area that exists on your property.

Under the Nature Conservation (Koala) Conservation Plan 2017, an owner of land (or a person acting on the owner's behalf with written consent) can request to make, amend or revoke a koala habitat area determination if they believe, on reasonable grounds, that the existing determination for all or part of their property is incorrect.

More information on requests to make, amend or revoke a koala habitat area determination can be found in the document Guideline - Requests to make, amend or revoke a koala habitat area determination.

The koala habitat area map will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

Changes to the koala habitat area map which occur between annual updates because of a request to make, amend or revoke a koala habitat area determination can be viewed on the register of approved requests to make, amend or revoke a koala habitat area available at: https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/koalamaps. The register includes the lot on plan for the change, the date the decision was made and the map issued to the landholder that shows areas determined to be koala habitat areas.

6.1.3 Koala priority areas

Koala priority areas are large, connected areas that have been determined to have the highest likelihood of achieving conservation outcomes for koalas based on the combination of habitat suitability, biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water) and a koala conservation cost benefit analysis.

Conservation efforts will be prioritised in these areas to ensure the conservation of viable koala populations in the wild including a focus on management (e.g. habitat protection, habitat restoration and threat mitigation) and monitoring. This includes a prohibition on clearing in koala habitat areas that are in koala priority areas under the Planning Regulation 2017 (subject to some exemptions).

Please note that koala priority areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley,

Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

Section 7.2 identifies if your property is in a koala priority area.

6.1.4 Identified koala broad-hectare areas

There are seven identified koala broad-hectare areas in SEQ. These are areas of koala habitat that are located in areas committed to meet development targets in the SEQ Regional Plan to accommodate SEQ's growing population including bring-forward Greenfield sites under the Queensland Housing Affordability Strategy and declared master planned areas under the repealed *Sustainable Planning Act 2009* and the repealed *Integrated Planning Act 1997*.

Specific assessment benchmarks apply to development applications for development proposed in identified koala broad-hectare areas to ensure koala conservation measures are incorporated into the proposed development.

Section 7.2 identifies if your property is in an identified koala broad-hectare area.

6.2 Koala habitat planning controls

On 7 February 2020, the Queensland Government introduced new planning controls to the Planning Regulation 2017 to strengthen the protection of koala habitat in South East Queensland (i.e. koala district A).

More information on these planning controls can be found here:
https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy.

As a high-level summary, the koala habitat planning controls make:

- development that involves interfering with koala habitat (defined below) in an area that is both a koala priority area and a koala habitat area, prohibited development (i.e. development for which a development application cannot be made);
- development that involves interfering with koala habitat (defined below) in an area that is a koala habitat area but is not a koala priority area, assessable development (i.e. development for which development approval is required); and
- development that is for extractive industries where the development involves interfering with koala habitat (defined below) in an area that is both a koala habitat area and a key resource area, assessable development (i.e. development for which development approval is required).

Interfering with koala habitat means:

1) Removing, cutting down, ringbarking, pushing over, poisoning or destroying in anyway, including by burning, flooding or draining native vegetation in a koala habitat area; but
2) Does not include destroying standing vegetation by stock or lopping a tree.

However, these planning controls do not apply if the development is exempted development as defined in Schedule 24 of the Planning Regulation 2017. More information on exempted development can be found here:
https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy.

There are also assessment benchmarks that apply to development applications for:

- building works, operational works, material change of use or reconfiguration of a lot where:
  - the local government planning scheme makes the development assessable;
  - the premises includes an area that is both a koala priority area and a koala habitat area; and
  - the development does not involve interfering with koala habitat (defined above); and

- development in identified koala broad-hectare areas.

The Guideline - Assessment Benchmarks in relation to Koala Habitat in South East Queensland assessment benchmarks outlines these assessment benchmarks, the intent of these assessment benchmarks and advice on how proposed development may meet these assessment benchmarks.

6.3 Koala Conservation Plan clearing requirements

Section 10 and 11 of the Nature Conservation (Koala) Conservation Plan 2017 prescribes requirements that must be met when clearing koala habitat in koala district A and koala district B.

These clearing requirements are independent to the koala habitat planning controls introduced into the Planning Regulation 2017, which means they must be complied with irrespective of any approvals or exemptions offered under other legislation.

Unlike the clearing controls prescribed in the Planning Regulation 2017 that are to protect koala habitat, the clearing requirements prescribed in the Nature Conservation (Koala) Conservation Plan 2017 are in place to prevent the injury or death of koalas when koala habitat is being cleared.

6.4 Contact information for DES

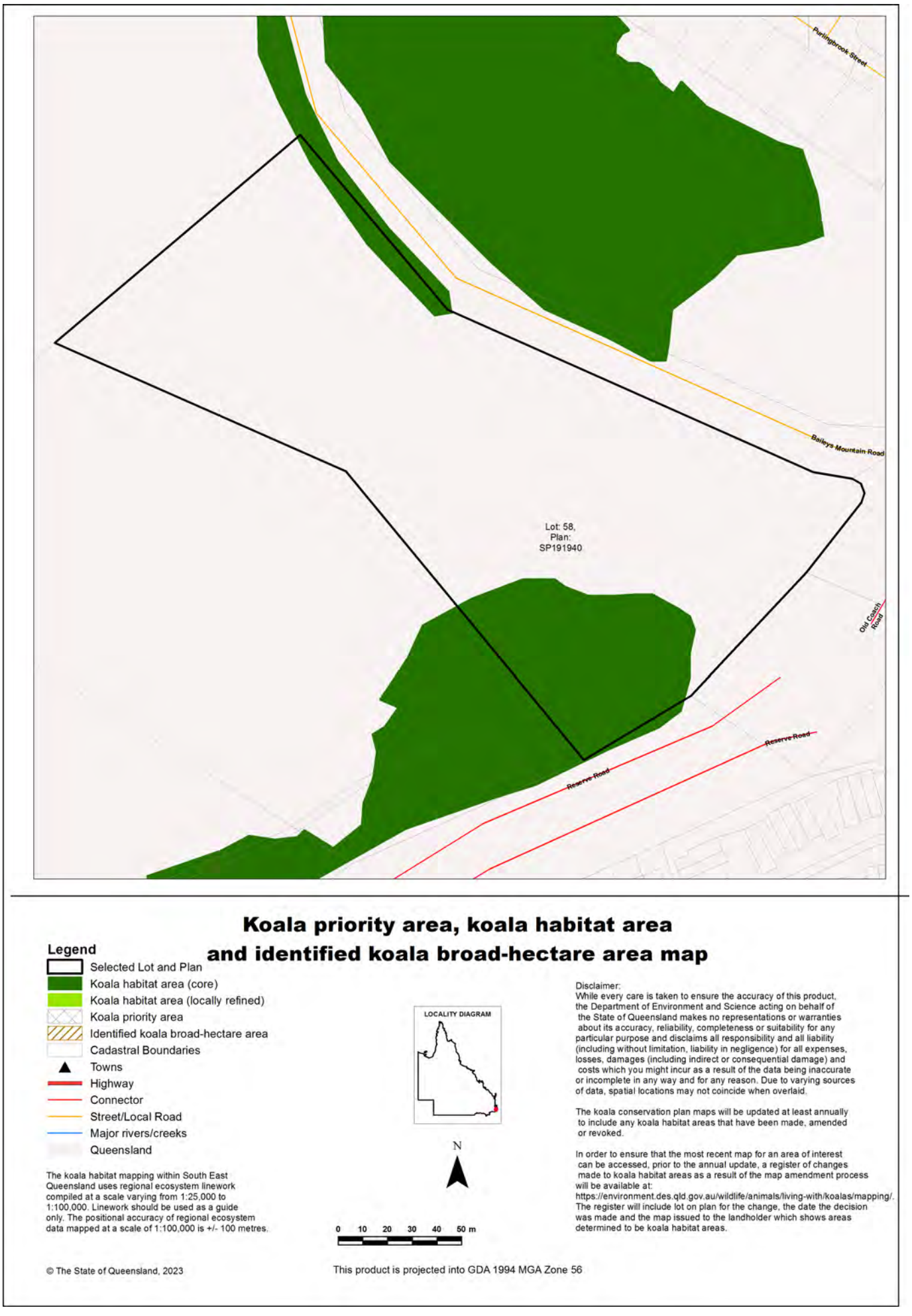
For further information on the koala protection framework:
Phone 13 QGOV (13 74 68)
Email koala.assessment@des.qld.gov.au
Visit https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping

7. Koala protection framework details for Lot: 58 Plan: SP191940

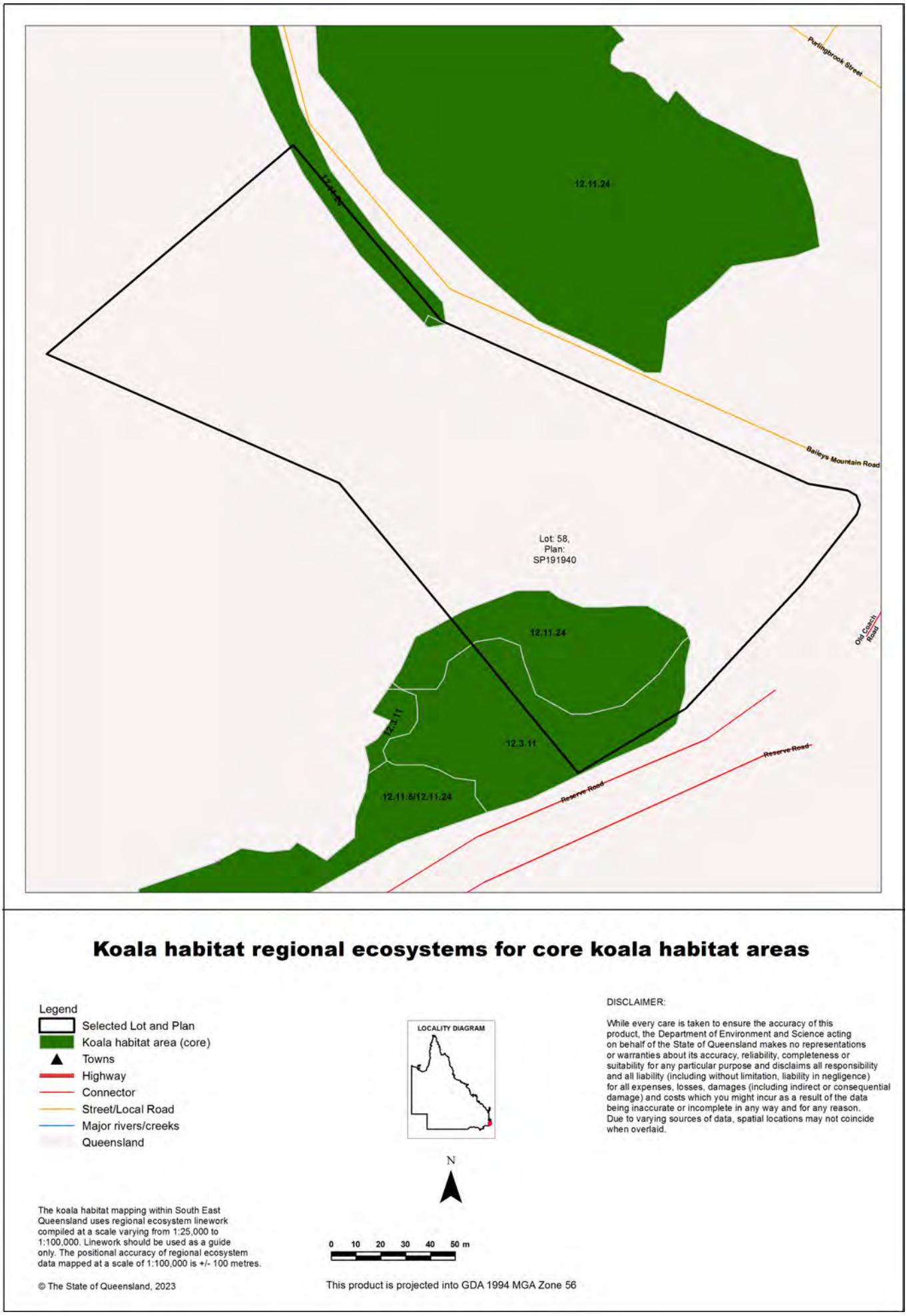
7.1 Koala districts

Koala District A

7.2 Koala priority area, koala habitat area and identified koala broad-hectare area map



7.3 Koala habitat regional ecosystems for core koala habitat areas



8. Other relevant legislation contacts list

Activity	Legislation	Agency	Contact details
• Interference with overland flow • Earthworks, significant disturbance	*Water Act 2000* *Soil Conservation Act 1986*	Department of Regional Development, Manufacturing and Water (Queensland Government) Department of Resources (Queensland Government)	Ph: 13 QGOV (13 74 68) www.rdmw.qld.gov.au www.resources.qld.gov.au
• Indigenous Cultural Heritage	*Aboriginal Cultural Heritage Act 2003* *Torres Strait Islander Cultural Heritage Act 2003*	Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships	Ph: 13 QGOV (13 74 68) www.datsip.qld.gov.au
• Mining and environmentally relevant activities • Infrastructure development (coastal) • Heritage issues	*Environmental Protection Act 1994* *Coastal Protection and Management Act 1995* *Queensland Heritage Act 1992*	Department of Environment and Science (Queensland Government)	Ph: 13 QGOV (13 74 68) www.des.qld.gov.au
• Protected plants and protected areas	*Nature Conservation Act 1992*	Department of Environment and Science (Queensland Government)	Ph: 1300 130 372 (option 4) palm@des.qld.gov.au www.des.qld.gov.au
• Koala mapping and regulations	*Nature Conservation Act 1992*	Department of Environment and Science (Queensland Government)	Ph: 13 QGOV (13 74 68) Koala.assessment@des.qld.gov.au
• Interference with fish passage in a watercourse, mangroves • Forestry activities on State land tenures	*Fisheries Act 1994* *Forestry Act 1959*	Department of Agriculture and Fisheries (Queensland Government)	Ph: 13 QGOV (13 74 68) www.daf.qld.gov.au
• Matters of National Environmental Significance including listed threatened species and ecological communities	*Environment Protection and Biodiversity Conservation Act 1999*	Department of Agriculture, Water and the Environment (Australian Government)	Ph: 1800 803 772 www.environment.gov.au
• Development and planning processes	*Planning Act 2016* *State Development and Public Works Organisation Act 1971*	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) www.dsdmip.qld.gov.au
• Local government requirements	*Local Government Act 2009* *Planning Act 2016*	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) Your relevant local government office
• Harvesting timber in the Wet Tropics of Qld World Heritage area	*Wet Tropics World Heritage Protection and Management Act 1993*	Wet Tropics Management Authority	Ph: (07) 4241 0500 www.wettropics.gov.au

APPENDIX C
Response to the Environmental Areas Overlay Code

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
Section B- Table 8.2.6-2: Environmental significance overlay code – for assessable development			
Ecological site assessment			
PO1 All matters of environmental significance on and adjacent to the development site are identified and protected. Note - An Ecological Site Assessment prepared in accordance with SC6.7 City Plan policy – Ecological site assessments, is Council's preferred method for addressing this performance outcome.	AO1 Proposed works do not impact on: • areas identified on Environmental significance – vegetation management overlay map; • buffers to wetlands and waterways being: • 100m from the mapped boundary of a State significant aquatic area, as identified on Environmental significance – wetlands and waterways overlay map; • 100m from the outer landward boundary of a State significant wetland, as identified on Environmental significance – wetlands and waterways overlay map; • 100m from the outer landward boundary of a Local significant wetland, as identified on Environmental significance – wetlands and waterways overlay map; • 60m from the outer bank of a Major Waterway identified on Environmental significance – wetlands and waterways overlay map; or • 30m from the outer bank of a Waterway identified on Environmental significance – wetlands and waterways overlay map; and • individual trees within areas mapped on the Environmental significance – priority species overlay map.	An ecological assessment has been completed and the results have been discussed within this report. Matters of environmental significance have been identified on and adjacent to the development site. The development does not impact on Vegetation management mapping. A waterway buffer is mapped within the north-eastern extent of the site, however this was ground-truthed as inaccurate. Over 6,00 m^2 of vegetation associated with Yaun creek will be rehabilitated. It is acknowledged that the development proposes to rehabilitate a distance of between 26-56 m from the undulating waterway, with areas not meeting the required 30 m. Given other areas exceed the 30 m, the level of rehabilitation is deemed appropriate. Further, development (townhouses) are not proposed within 30 m of the creek. All native vegetation within the Priority species overlay map is proposed to be retained.	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
Wetland and waterway			
PO5 Buffers are provided to wetlands and waterways identified on the Environmental significance – wetlands and waterways overlay map to ensure the: protection of matters of environmental significance mapped onsite or identified through an ecological site assessment; unimpeded movement of fauna along the waterway; water quality is maintained; bank stability; and protection of property and infrastructure. Note: The buffer width for wetlands is measured from the outer, landward boundary of the mapped wetland, as shown on Environmental significance – wetlands and waterways overlay map. Note: Recommendations provided in an ecological site assessment (prepared in accordance with SC6.7 City Plan policy – Ecological site assessments) is Council's preferred method for determining alternative buffer widths.	AO5.1 Buffers at least 100m wide are provided between the development and the mapped boundary of a State significant aquatic area, as identified on Environmental significance – wetlands and waterways overlay map.	Refer to Figure 13 for ground-truthed aquatic values within the site. In areas where the drainage feature was ground-truthed, it was located within the future road dedication to Council, and was noted as functioning as an overland drainage feature, pooling in a modified waterbody. These areas are in a future road corridor, and as such rehabilitation is not proposed. A 26-56 m rehabilitation buffer is proposed for Yaun Creek located in the south of the site. Development is not proposed within 30 m of the waterway.	
	AO5.2 Buffers at least 100m wide are provided between the development and the outer landward boundary of a State significant wetland, as identified on Environmental significance – wetlands and waterways overlay map.		
	AO5.3 Buffers at least 100m wide are provided between the development and the outer landward boundary of a Local significant wetland as identified on the Environmental significance – wetlands and waterways overlay map.		

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
Note Artificial waterways are to be addressed through the Coastal erosion hazard overlay code and map. Where a waterbody contains both natural and artificial banks, the natural banks are to be assessed in accordance with this performance outcome.	AO5.4 Buffers at least 60m wide are provided between the development and the outer bank of a Major Waterway as identified on the Environmental significance – wetlands and waterways overlay map.		
	AO5.5 Buffers at least 30m wide are provided between the development and the outer bank of a waterway as identified on the Environmental significance – wetlands and waterways overlay map.		
PO13 Assessable koala feed and shelter trees are protected in situ when they are located: in koala habitat areas as identified on the Environmental significance – priority species overlay map; and within biodiversity areas as identified on the Environmental significance – biodiversity areas overlay map.	AO13 Development does not impact on assessable koala feed and shelter trees.	The proposed development layout avoids and minimises impacts to vegetation. The development propose to remove one koala feed tree. In addition, the rehabilitation of the waterway corridor will include koala feed and shelter trees to mitigate any loss of these resulting from the proposed works.	
PO14 Assessable koala feed and shelter trees are protected when they are: in koala habitat areas as identified on the Environmental significance – priority species overlay map; and	AO14 Development avoids impacts on assessable koala feed and shelter trees. Any damage is minimised to the greatest extent possible.	The proposed development layout avoids and minimises impacts to vegetation. In addition, the rehabilitation of the waterway corridor will include koala feed and shelter trees to mitigate any loss of these resulting from the proposed works.	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
outside biodiversity areas as identified on the Environmental significance – biodiversity areas overlay map.			
PO15 Site design provides safe koala movement opportunities by incorporating measures to maintain connectivity between areas of koala habitat on and adjacent to the site. Note : DEHP's Koala-Sensitive Design Guideline should be consulted for suitable measures to provide for safe koala movement.	AO15 No acceptable outcome provided.	Vegetation surrounding the development site shows a potential koala movement corridor running south along the waterway corridor. The proposed retention of the waterway and subsequent rehabilitation will protect and enhance this koala movement corridor in perpetuity.	
PO16 During the clearing and construction phases, measures are incorporated to protect koalas from death or injury.	AO16 Threats to koalas as a result of clearing and construction activities are mitigated by: • ensuring no tree in which a koala is present or a tree with a crown overlapping a tree containing a koala is cleared; • undertaking clearing of vegetation in stages, and ensuring: • no more than 1 ha is cleared per day for sites less than 6 ha in size; • no more than 2 ha is cleared per day for sites greater than 6 ha in size; • that between each stage there is at least 12 hours where no clearing occurs; • koala habitat is always linked to allow koalas to move out of the site; • use of qualified koala spotters; • prohibition of domestic dogs and security dogs on site; and • use of koala safety fencing.	The development can comply. Refer to Section 9.2.	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
PO17 State significant species, and their habitat, are protected in situ when it is: identified on the Environmental significance – priority species overlay map, or through an ecological site assessment; and within biodiversity areas as identified on the Environmental significance – biodiversity areas overlay map.	AO17 Development does not impact on State significant species, and their habitat.	The proposed development layout avoids and minimises impacts to vegetation. In addition, the rehabilitation of the waterway corridor will include native vegetation to mitigate any loss of these resulting from the proposed works.	
PO18 Development protects state significant species, and their habitat or is designed to minimise and mitigate impacts on habitat values when it is: identified on the Environmental significance – priority species overlay map; and outside of biodiversity areas as identified on the Environmental significance – biodiversity areas overlay map.	AO18.1 Development avoids impacts on state significant species, and their habitat.	The proposed development layout avoids and minimises impacts to vegetation. In addition, the rehabilitation of the waterway corridor will include native vegetation to mitigate any loss of these resulting from the proposed works.	
	AO18.2 Where development impacts on state significant species and their habitat, the following occurs: flora species are propagated and used in rehabilitation and landscaping onsite; and fauna species are safely relocated by a qualified fauna spotter catcher.		
PO19 Local significant species, and their habitat, are protected in situ when it is: identified on the Environmental significance – priority species overlay map, or through an ecological site assessment; and	AO19 Development does not impact on local significant species, and their habitat.	The proposed development layout avoids and minimises impacts to vegetation. In addition, the rehabilitation of the waterway corridor will include native vegetation to mitigate any loss of these resulting from the proposed works.	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
within biodiversity areas as identified on the Environmental significance – biodiversity areas overlay map.			
PO20 Development protects local significant species, and their habitat or is designed to minimise and mitigate impacts on habitat values when it is: identified on the Environmental significance – priority species overlay map; and outside of biodiversity areas as identified on the Environmental significance – biodiversity areas overlay map.	AO20.1 Development avoids impacts on local significant species, and their habitat.	The proposed development layout avoids and minimises impacts to vegetation. In addition, the rehabilitation of the waterway corridor will include native vegetation to mitigate any loss of these resulting from the proposed works.	
	AO20.2 Where development impacts on local significant species and their habitat, the following occurs: flora species are propagated and used in rehabilitation and landscaping onsite; and fauna species are safely relocated by a qualified fauna spotter catcher.		
Fauna management			
PO21 Development design and location provides for the safe movement of native fauna through the site.	AO21 Where infrastructure crosses native fauna movement paths, the design of new development incorporates fauna friendly movement solutions. Note: Fauna friendly movement solutions developed in accordance with the Queensland Government Fauna Sensitive Road Design Manual Volume 2: Preferred Practices; and the QLD Government Koala-Sensitive Design Guidelines is Council's preferred method for addressing this outcome.	Vegetation surrounding the development site shows a potential fauna movement corridor running a north to south direction. The proposed retention of the waterway and subsequent rehabilitation will protect and enhance this fauna movement corridor in perpetuity.	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
PO22 Where fauna habitat is proposed to be damaged, management strategies must be implemented to ensure: • the native fauna is safely relocated to an area of similar habitat; • the sequence of habitat disturbance ensures that fauna is not isolated from adjoining areas of habitat; • fauna relocation occurs immediately prior to habitat disturbance; • accredited and experienced spotter catchers, licensed by the Queensland Parks and Wildlife Service, are to be present on the site to direct and undertake the removal and relocation of fauna; and • where possible, damaged habitat and nesting sites are rehabilitated outside of development areas. Note: A Fauna Management Plan prepared by a suitably qualified person and in accordance with SC6.8 City Plan policy – Environmental management	AO22 No acceptable outcome provided.	See Section 9.2 for management strategies including recommendation for engagement with spotter/catcher.	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
plans is Council's preferred method for addressing this outcome.			
PO25 A Covenant Management Plan is prepared for areas to be protected under a statutory covenant. The management plan must include the following details: • rehabilitation area and strategy of works; • weed eradication and control requirements; • how the covenant area will be maintained and managed in perpetuity; • feral and domestic animal exclusion requirements; and • required maintenance access. Note: A Covenant Management Plan is prepared by a suitably qualified person and in accordance with SC6.8 City Plan policy – Environmental management plans is Council's preferred method for addressing this performance outcome.	AO25 No acceptable outcome provided.	A Covenant Management Plan has not been developed as no areas are proposed to be protected under a statutory covenant, however, a Basic Rehabilitation Management Plan has been provided. Refer to S523094_BRMP_001-007(B).	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
PO26 Disturbed, cleared or modified areas are rehabilitated where they form part of: • an ecological corridor; or • matters of environmental significance and associated buffers; or • areas identified within an Ecological Site Assessment as requiring rehabilitation. Note: A Rehabilitation Management Plan prepared in accordance with the South East Queensland Ecological Restoration Framework and SC6.8 City Plan policy – Environmental management plans is Council's preferred method for addressing this outcome.	AO26 No acceptable outcome provided.	Refer to Basic Rehabilitation Management Plan (S523094_BRMP_001-007(B)).	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
9.4.14-2: Vegetation management code – for assessable development			
Vegetation Management Plan			
PO1 Damage to assessable vegetation does not occur where the vegetation: provides habitats for threatened flora and fauna; is of historical, cultural or visual significance; provides erosion prevention and slope stabilisation; is necessary to maintain the character of the local area; or assists in the conservation of the city's biodiversity. Note: A Vegetation Management Plan, prepared in accordance with SC6.8 City Plan policy – Environmental management plans is the Council's preferred method of addressing this performance outcome.	AO1 A Vegetation Management Plan, prepared by a suitably qualified person, is submitted as part of an Operational Work (Vegetation Clearing) application to show compliance with the Performance outcome. This plan includes, but is not limited to: the location of the existing or approved dwellings, building or structures; the location of waterways, ridge tops and steep slopes (greater than 25%) on and adjacent to the site; the location of the assessable vegetation to which the damage is proposed, and reasonable particulars of its vegetation type, including species, height and girth and whether it is: habitat for threatened flora and fauna; of historical, cultural, character or visual significance; essential for erosion prevention and slope stabilisation, including within waterway buffers; significant to the conservation of the city's biodiversity; vegetation that contributes to waterway and wetland health. a statement of the reasons for the damage and any relevant factors associated with the purpose of the proposed damage; particulars of how vegetation to be retained will be protected during works in accordance with AS 4970–2009 Protection of trees on development sites; particulars of how the vegetation is to be damaged and, if relevant, how the damaged material is to be removed or disposed of; a plan indicating the location, size and species of replacement vegetation to compensate for the loss of damaged vegetation; and a staging plan for clearing greater than 4ha of vegetation.	A future Vegetation Management Plan is to be developed for the site. This plan will detail how vegetation clearing is to be undertaken to ensure fauna are safe during the development works.	

APPENDIX D
Flora Species List

Scientific Name	Common Name
Acacia leiocalyx	Early Flowering Wattle
Brachychiton acerifolius	Flame Tree
*Cedrela odorata**	Cedarwood
*Celtis sinensis**	Chinese Celtis
*Cinnamomum camphora**	Camphor Laurel
Corymbia intermedia	Pink Bloodwood
*Corymbia torelliana **	Cadaghi
Cupaniopsis anacardioides	Tuckeroo
*Delonix regia**	Poinciana
Eucalyptus crebra	Narrow-leaved Ironbark
Eucalyptus major	Grey Gum
Eucalyptus microcorys	Tallowwood
Eucalyptus seeana	Narrow-leaved Red Gum
Eucalyptus siderophloia	Grey Ironbark
Eucalyptus tereticornis	Forest Red Gum
Ficus benjamania	Weeping Fig
Ficus coronata	Creek Sandpaper Fig
Ficus macrophylla	Moreton Bay Fig
Ficus obliqua	Small-leaved Fig
Ficus rubiginosa	Port Jackson Fig
*Ficus sp.**	Fig Tree
Glochidion ferdinandi	Cheese Tree
Grevillea robusta	Silky Oak
*Jacaranda mimosifolia**	Jacaranda
Jagera psudechus	Foam Bark Tree
*Litchi chinensis**	Lychee Tree
Livistona australis	Cabbage Palm
Lophostemon confertus	Brush Box
Lophostemon suavoleans	Swamp Box
Macadamia integrifolia	Macadamia

Scientific Name	Common Name
Mallotus paniculata	Green Kamala
*Mangifera indica**	Mango Tree
Melaleuca viminalis	Weeping Bottlebrush
Nymphaea caerulea	Blue water lily
*Pandanus sp.**	Pandanus Palm
*Pinus elliottii**	Slash Pine
Podocarpus elatus	Brown Pine
*Psidium guajava **	Guava
*Schefflera actinophylla**	Umbrella Tree
*Schinus terebinthifolia **	Broad-leaved Pepper Tree
Solanum chrysotrichum	Giant devil's fig
*Spathodea campanulate**	African Tulip Tree
Sphagneticola trilobata	Singapore daisy
Syzygium sp	Lilly-pilly
Toona ciliata	Red cedar

* denotes an exotic species or species endemic to QLD but outside its native range and/or is likely planted

APPENDIX E
Fauna Species List

Scientific Name	Common Name
Daleco novaeguineae	Laughing kookaburra
Emydura macquarii	Macquarie turtle
Gymnorhina tibicen	Australian magpie
Macropus parryii	Whiptail wallaby
Rhipidura albiscape	Grey fantail

CIVIL ENGINEERING REPORT

Proposed Residential Townhouse Development
MG Land Pty Ltd
202 Baileys Mountain Road, Upper Coomera
Lot 58 on SP191940

Prepared for:

MG Land Pty Ltd

Approved by:

Mr Tristan Nelson
Director
Cozens Regan Group Pty Ltd
RPEQ: 15735

Date:
October 2024

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1.0 INTRODUCTION

Cozens Regan Group Pty Ltd has been commissioned by MG Land Pty Ltd to prepare an Engineering Report for the Proposed Residential Townhouse Development at 202 Baileys Mountain Road, Upper Coomera.

This Civil Engineering Report is required to support a proposed Material Change of use application to Gold Coast City Council.

This Civil Engineering Report summarises our various preliminary investigations and designs into the existing services. The Report addresses the existing engineering constraints and proposes solutions which are tailored to enable practical and cost effective development of the project.

2.0 THE SITE

2.1 SITE LOCATION

The subject site is described as Lot 58 on SP191940 located at 202 Baileys Mountain Road, Upper Coomera. The site is bound by Baileys Mountain Road to the East, Reserve Road to the South and vacant land to the West and North.

The subject site and approximate area of works is shown in Figure 1 below.



Figure 1 – Aerial Photograph (Qld Globe)

2.2 SITE DESCRIPTION

The site is currently vacant but historically a house existed and the remnants of some ancillary features still remain. The site is mostly cleared with a number of existing trees, the ground has good grass coverage throughout.

The site generally falls from the north west to the south east. The levels of the site range from RL 36.80 in the north west corner down to R.L 20.80 in the south east corner.

The total site area is equal to 3,087 ha. A contour and detail survey has been produced for the site and is contained within Appendix B

2.3 DESCRIPTION OF DEVELOPMENT

The proposed development incorporates the construction of a Residential Townhouse Development. The development will require the construction of buildings, access driveways, parking areas, stormwater, sewer, water supply and landscaping.

Refer the Architectural Site Plan contained within Appendix A for more information in regards to the proposed development.

3.0 EARTHWORKS

The bulk earthworks proposed for the development will involve cut to fill and is focused around providing acceptable vehicular/pedestrian access to all buildings along with providing building platforms with freeboard above the 1% AEP overland flow paths.

The earthworks propose to alter the existing overland flow path traversing the site from North to South. The existing overland flow path traversing the site from West to East is to remain undisturbed.

Due to earthworks proposed within the waterway/overland flow path a hydraulic impact assessment was necessary to demonstrate nil adverse impacts which has been prepared by Alan & Dennis. Please refer this report for further information.

Bulk Earthworks volumes have been preliminarily assessed and are estimated to be in the order of 7,800m^3 Cut, 8,700m^3 Fill with a net import quantity of 900m^3. Note these figures are an indicative estimate only and do not include any bulking factors or spoil generated by services and detailed excavation etc.

Refer Earthworks plan 230094/C09 – C11 contained in Appendix C for more information.

Retaining walls are proposed around the perimeter of the site and internally between buildings where difference in levels require. Retaining walls are all proposed as single concrete tier walls.

All earthworks will be done to Level 1 Geotechnical Supervision.

4.0 EROSION AND SEDIMENT CONTROL

The site is subject to compliance with the requirements of the Gold Coast City Councils' Land Development Guidelines.

Conceptual Erosion and Sediment Control requirements are outlined within the Site Based Stormwater Management Plan prepared by Cozens Regan Group Pty Ltd., including all the requirements for maintenance of the structures during the construction phase and required methods of reporting.

The Local Authority By-Law and Statutory Authority provisions related to Workplace Health & Safety, Dust and Smoke Nuisance, Environment and Occupational Noise Suppression will be rigidly enforced as part of the general site works contractual arrangements.

5.0 FLOODING

The site has been reviewed against City of Gold Coast online flood mapping and has been determined to be free of regional flooding or inundation. There are however two overland flow paths which traverse the site and collect runoff from significant upstream catchments. This is discussed in more detail within the Hydraulic Impact Assessment prepared by Allan & Dennis.

6.0 ROADWORKS AND ACCESS

It is proposed to construct a new Council Collector Road along the Northern Boundary of the site with a new intersection to Baileys Mountain Road.

Vehicular access to the site will be provided by a new vehicular crossover from the new Council road in the north west corner of the site.

The proposed external roadworks upgrades discussed above have been assessed in more detail within the Traffic Report prepared by TTM, refer this report for more information.

7.0 SEWERAGE RETICULATION

The site is not currently serviced by Councils sewer reticulation network.

The nearest Council sewer is a 300mm Trunk Sewer located within near verge of Reserve Road adjacent the southern boundary.

The development is proposed to be serviced by extending Councils sewer reticulation from Reserve Road into the site and across the existing waterway which traverses the site. In order to maximise the depth of cover across the waterway it is proposed to extend a 225mm sewer across the waterway and transition to a 150mm sewer across the proposed park and up to the development site. A 150mm dia property connection is proposed to be installed to service the development.

It is understood that a Sewer Network Capacity Assessment is being undertaken by others and was not available for review at the time of writing.

Civil Sketch Drawings 230094/SK10 – 11 outlines the concept sewerage reticulation and connection point for the proposed development.

Design and construction of the sewer connection shall be in accordance with the requirements of SEQ Water Supply and Sewer and Code and subject to approval.

Design and construction of the private sanitary drain shall be in accordance with the requirements of Plumbing and Drainage Code AS3500 and subject to Council Plumbing and Drainage approval.

8.0 WATER RETICULATION

The development site is not currently serviced by a metred connection to Councils Water reticulation network.

The nearest Council watermain is a DN300mm watermain located within the near verge of Reserve Road adjacent the sites southern boundary.

It is proposed to extend a new DN100mm watermain along the verge of Baileys Mountain Road and up the full extent of the new Council road traversing the northern boundary of the development.

A DN100mm metered connection is proposed from the new watermain at the site's entry point to service the developments domestic and fire servicing requirements.

The proposed 100mm combined water meter will be required to be installed in an above ground arrangement at the site's boundary. The final location and size of the meter is to be confirmed during detailed design.

It is understood that a Water Network Capacity Assessment is being undertaken by others and was not available for review at the time of writing.

It is intended that a flow and pressure test will be conducted on the existing water reticulation network during detailed design to confirm that sufficient firefighting supply is available.

Civil Sketch Drawings 230094/SK10 – 11 outlines the concept water supply reticulation and connection point for the proposed development.

Design and construction of the water connection shall be in accordance with the requirements of SEQ Water Supply and Sewer and Code and subject to approval.

Design and construction of the private water supply shall be in accordance with the requirements of Plumbing and Drainage Code AS3500 and subject to Council Plumbing and Drainage approval.

9.0 OTHER SERVICES

Electrical and Telecommunications overhead and underground services are understood to be located within Baileys Mountain Road and Reserve Road. It is recommended the capacity and availability of these services be confirmed during detailed design.

10.0 CONCLUSION

This civil engineering report has shown that the proposed development for this site can be serviced and constructed using suitable engineering solutions to council's requirements. All preliminary comments and assumptions are subject to confirmation by detail design.

APPENDIX A

ARCHITECTURAL SITE PLAN

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LEGEND

- BUSHFIRE BUFFER
- RETAINING WALL
- TEMPORARY CONSTRUCTION ACCESS
- BIN COLLECTION POINT
- POOL SHELTER

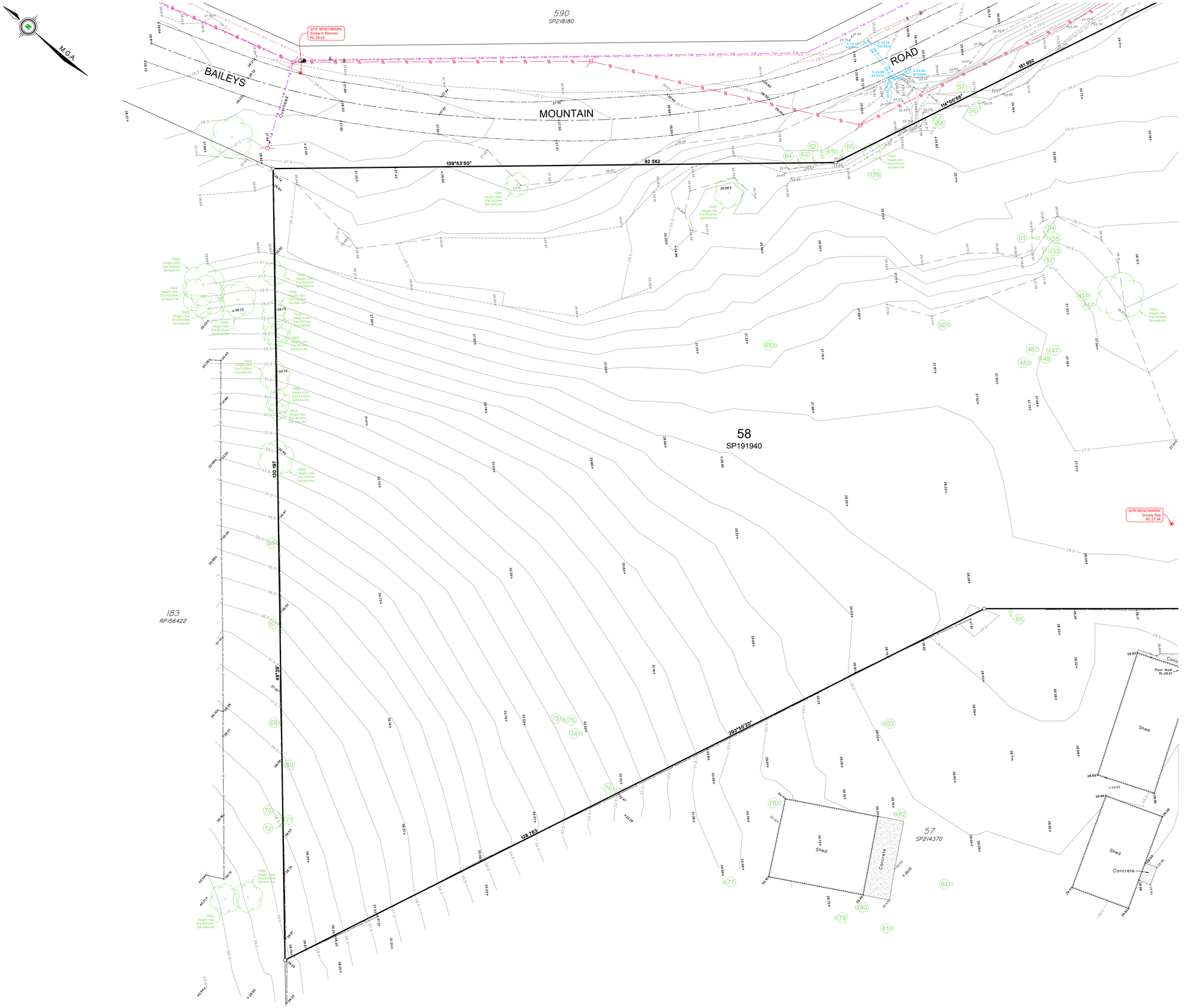
RED DOOR ARCHITECTURE

REVISION	B	18.10.24	DA ISSUE

WWW.RDARCH.COM.AU | 230008 | SCALE 1 : 1000 | 18.10.24 | 202 BAILEYS MOUNTAIN RD, UPPER COOMERA | MG LAND | DA-0-010 | SITE PLAN OF LAYOUT

APPENDIX B

DETAIL SURVEY PLAN



Client

MG Homes

Project

Detail Survey of 202 Baileys Mountain Road, Upper Coomera

Described as Lot 58 on SP191940

Scale: 1:300 at A1

Datum: AHD vide PSM 9055 — Locality: Upper Coomera

RL: 7.251m — LGA: Gold Coast City

Contour Int: 0.5m — Cadfile: MGH-323.DET.01

Issue	Description	Drw	Date	Appd
A	INITIAL ISSUE	SSD	26.06.23	MP

Notes

The title boundaries shown hereon were not marked at the time of survey and have been compiled from previous survey.
Services shown hereon have been located where possible by field survey. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.

LEGEND

BB	Bottom of bank	
BW	Bottom of wall	
BX	Building	
CG	Change of grade	
CL	Centreline of road	
EBT	Edge of bitumen	
ECO	Edge of concrete	
ELP	Light Pole	
EMH	Electricity Pit	
EP	Electricty Pole	
ERD	Edge of gravel road	
EW	Edge of water	
FHP	Fire Hydrant Pillar	
FNX	Fence	
GB	Garden	
GMK	Gas Marker	
GTS	Gully pit	
HWL	Headwall	
KCL	Kerb lip	
KIN	Kerb invert	
KTB	Kerb top back	
MHO	⌀$1mm	
MHS	$×	
PDV	Patio or Deck	
RWP	Recycled Water Pipe	
SGN	Traffic sign	
SHD	Shed	
SMH	Sewer Manhole	
TB	Top of Bank	
TEP	Telstra Pit	
TRE	Tree	
TW	Top of wall	

Tree Legend
for further information on tagged trees and TPZs see repot by S5 Consulting

Tree Height=5m Dia=300mm Spread=10m — Un-tagged Tree

Tagged Tree

Service Location Legend
eLoc × - Position Via Electronic Locator

UNDERGROUND SERVICES - ALPHA CLASSIFICATION AS PER AUSTRALIAN STANDARD AS5488.

Sewer main	S-O
Stormwater drainage	SW-O
Water main	W-O
Telstra service	T-O
NBN service	NBN-O
Gas supply	G-O
Electricity supply	E-O

0 — 9 — 18 m

SCALE 1:300 (A1)

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Sheet No.	Surveyed By:	Date Surveyed:
1 of 3	SAB	19.06.23

Dwg. No. **MGH-323.DET.01** — Issue **A**



Client

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Project

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GTS	Gully pit	
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KIN	Kerb invert	
KTB	Kerb top back	
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MHS	$×	
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Tree Legend
for further information on tagged trees and TPZs see repot by S5 Consulting

Tree Height:5m Dia:300mm Spread:10m — Un-tagged Tree

Tagged Tree

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NBN service	NBN-O
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Electricity supply	E-O

0 — 9 — 18 m

SCALE 1:300 (A1)

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Tree Height-5m Dia-300mm Spread-10m — Un-tagged Tree

Tagged Tree

Service Location Legend
eLocX - Position Via Electronic Locator

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SCALE 1:300 (A1)

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Dwg. No.	Issue
MGH-323.DET.01	A

APPENDIX C

CONCEPT ENGINEERING PLANS

GENERAL NOTES

1. FILLING TO ALLOTMENTS TO HAVE MINIMUM FALL 0.70% TO ROAD ALIGNMENT, OR TO PIPED DRAINAGE SYSTEM AT REAR .
2. ALL EXPOSED CLAY AND BARE SOIL ARE TO BE TOPSOILED AND GRASSED AS SPECIFIED, WITH MINIMUM SOIL DEPTH OF 100mm. A CATCH DRAIN IS TO BE CUT TO PROTECT SUCH GRASSED AREAS FROM SCOUR DURING INITIAL GROWTH.
3. SERVICE CONDUITS FOR WATER, ENERGEX , GAS AND TELSTRA/OPTUS ARE TO BE INSTALLED AS DIRECTED, AND IN ACCORDANCE WITH THE LOCAL GOVERMENTS STANDARD DRAWING AND STANDARD SPECIFICATION.
6. CONSTRUCTION SETOUT TO BE BASED ON CONTROL DATA AND COMPUTER DESIGN DISKS TO BE PROVIDED BY THE PRINCIPALS SURVEYOR.

EXISTING SERVICES AND FEATURES

1. THE CONTRACTOR SHALL ALLOW FOR THE CAPPING OFF, EXCAVATION AND REMOVAL (IF REQUIRED) OF ALL EXISTING SERVICES IN AREAS AFFECTED BY WORKS WITHIN THE CONTRACT AREA OR AS SHOWN ON THE DRAWINGS UNLESS DIRECTED OTHERWISE BY THE SUPERINTENDENT.
2. THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES SERVICES TO ALL BUILDINGS NOT AFFECTED BY THE WORKS ARE NOT DISRUPTED.
3. PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL GAIN APPROVAL OF HIS PROGRAM FOR THE RELOCATION/CONSTRCUTION OF TEMPORARY SERVICES.
4. CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN SUPPLY TO EXISTING BUILDINGS REMAINING IN OPERATION DURING THE WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED, THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.
5. INTERRUPTION TO SUPPLY OF EXISTING SERVICES SHALL BE DONE SO AS NOT TO CAUSE ANY INCONVENIENCE TO THE PRINCIPAL. CONTRACTOR TO GAIN APPROVAL FROM THE SUPERINTENDENT FOR TIME OF INTERRUPTION.
6. EXISTING SERVICES, BUILDINGS, EXTERNAL STRUCTURES AND TREES SHOWN ON THESE DRAWINGS ARE EXISTING FEATURES PRIOR TO ANY DEMOLITION WORKS.
7. EXISTING SERVICES UNLESS SHOWN ON THE SURVEY PLAN HAVE BEEN PLOTTED FROM SERVICES SEARCH PLANS AND AS SUCH THEIR ACCURACY CANNOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE A 'DIAL BEFORE YOU DIG' SEARCH AND TO ESTABLISH THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT. CLEARANCE SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY.
8. ALL BRANCH GAS AND WATER SERVICES UNDER DRIVEWAYS AND BRICK PAVING SHALL BE LOCATED IN Ø80 uPVC SEWER GRADE CONDUITS EXTENDING A MINIMUM OF 500mm BEYOND EDGE OF PAVING.

ENVIRONMENTAL SITE MANAGEMENT

1. VEGETATION PROTECTION
   A) TREES LOCATED ALONG THE FOOTPATH SHOULD BE, WHERE POSSIBLE TRANSPLANTED PRIOR TO CONSTRUCTION, OR REPLACED IF DESTROYED.
   B) WHEN WORKING WITHIN 4.00m OF TREES, RUBBER OR HARDWOOD GIRDLES SHOULD BE CONSTRUCTED WITH 1.8m BATTENS CLOSELY SPACED AND ARRANGED VERTICALLY FROM GROUND LEVEL. GIRDLES MUST BE STRAPPED TO TREES PRIOR TO CONSTRUCTION AND REMAIN UNTIL COMPLETION.
   C) WHERE POSSIBLE TREE ROOTS SHOULD BE TUNNELED UNDER, RATHER THAN SEVERED. IF TREE ROOTS ARE SEVERED THE DAMAGED AREA SHOULD BE TREATED WITH A SUITABLE FUNGICIDE. CONTACT ARBORIST FOR ADVICE. PH 3403 2958
   D) ANY TREE LOPPING REQUIRED SHOULD BE UNDERTAKEN BY COUNCIL'S METROPOLITAN TREE SERVICE. PH 3403 2955
2. SOIL
   A) TOPSOIL AND SUBSOIL SHOULD BE STOCKPILED SEPARATELY.
   B) CARE SHOULD BE TAKEN TO PREVENT SEDIMENT FROM ENTERING THE STORMWATER SYSTEM. THIS MAY INVOLVE PLACING APPROPRIATE SEDIMENT CONTROLS AROUND STOCKPILES.
3. REHABILITATION
   A) PRE DISTURBANCE SOIL PROFILES AND COMPACTION LEVELS ARE TO BE REINSTATED.
   B) PRE DISTURBANCE VEGETATION PATTERNS SHOULD BE RESTORED. FOR FURTHER INFORMATION CONTACT COUNCIL ECOLOGICAL ASSESSMENT OFFICER PH. 34038888

EARTHWORKS

1. THE CONTRACTOR IS TO STRIP THE CONSTRUCTION AREA OF ALL GRASS, SHRUBS, RUBBISH, AND DELETERIOUS MATERIAL AS NOMINATED BY THE ENGINEER AND DISPOSE OF THIS UNSUITABLE MATERIAL OFF SITE.
2. LOCATION AND DEPTH OF EXISTING UNDERGROUND SERVICES IS TO BE VERIFIED ON SITE PRIOR TO COMMENCING EXCAVATION.
3. STRIP APPROXIMATELY 100mm TOPSOIL TO EXTENT OF EARTHWORKS AND STOCKPILE ONSITE FOR RE-USE AS DIRECTED.
4. BULK EARTHWORKS IS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL STANDARDS AND THE REQUIREMENTS OF AS3798. GEOTECHNICAL SUPERVISION OF EARTHWORKS IS TO BE CARRIED OUT IN ACCORDANCE WITH THE LEVEL 1 REQUIREMENTS OF AS3798 BY A N.A.T.A. REGISTERED GEOTECHNICAL TESTING AUTHORITY AT THE CONTRACTORS COST. THE CONTRACTOR SHALL PROVIDE DETAILS OF ALL TESTING TO THE ENGINEER PROGRESSIVELY THROUGH THE WORKS AND NOTIFY THE ENGINEER OF ANY NON-CONFORMANCES. ALL NON CONFORMING WORK IS TO BE RECTIFIED. THE INSPECTION AND TESTING AUTHORITY IS TO PROVIDE A COMPLIANCE CERTIFICATE AND REPORT BY AN RPEQ. INCLUDING THE INSPECTIONS, SAMPLING AND TESTING CARRIED OUT DURING THE EARTHWORKS.
5. PRIOR TO FILL OPERATIONS AND IN THE PRESENCE OF THE CONTRACTOR'S GEOTECHNICAL ENGINEER, PROOF ROLL THE FILL AREA SUBGRADE. REMOVE SOFT AND OR COMPRESSIBLE ZONES AND REPLACE WITH SELECT SITE MATERIAL COMPACTED TO A DENSITY CONSISTENT WITH THAT NOTED FOR THE PROPOSED FILLING.
6. PROOF ROLLING NOMINATED SHALL BE CARRIED OUT USING A SINGLE AXLE HIGHWAY TRUCK WITH A REAR AXLE LOAD NOT LESS THAN 10 TONNES TYRES INFLATED TO 550kPa OR APPROVED EQUIVALENT. EQUIPMENT, LABOUR AND LOADING REQUIRED FOR PROOF ROLLING IS TO BE PROVIDED BY THE CONTRACTOR.
7. THE MAJORITY OF MATERIAL WON FROM PROPOSED EXCAVATIONS SHOULD BE SUITABLE FOR USE AS FILL MATERIAL. SUITABLE MATERIALS FOR FILLING SHOULD GENERALLY HAVE A MAXIMUM PARTICLE SIZE NOT EXCEEDING 150mm. OVERSIZE MATERIAL IS TO BE EITHER CRUSHED TO A PARTICLE SIZE =/< 150mm FOR REUSE AS FILL MATERIAL OR BE DISPOSED OF OFF SITE.
8. ALL FILL UNDER FOOTINGS AND SLABS SHALL BE COMPACTED IN LAYERS NOT GREATER THAN 150mm TO 100% STANDARD COMPACTION FOR COHESIVE MATERIALS OR A DENSITY INDEX OF NOT LESS THAN 70% FOR NON COHESIVE MATERIALS. TESTS SHALL BE CONDUCTED ON FILL AS REQUIRED BY QUALIFIED SOIL TEST CONSULTANT TO CONFIRM COMPACTION.
9. FOLLOWING COMPLETION OF BULK EARTHWORKS OPERATIONS THE CONTRACTOR IS TO NOTIFY THE SUPERINTENDENT. THE FINISHED SURFACE IS TO BE PROOF ROLLED IN THE PRESENCE OF THE CONTRACTOR'S GEOTECHNICAL ENGINEER PRIOR TO TOPSOILING/BUILDING.
10. IT IS THE CONTRACTORS RESPONSIBILITY TO PROTECT THE SITE AND SURROUNDING AREAS FROM DAMAGE RESULTING FROM STORMWATER RUNOFF. TEMPORARY DIVERSION DRAINS AND OR OTHER DRAINAGE CONTROL DEVICES ARE TO BE IMPLEMENTED BY THE CONTRACTOR DURING CONSTRUCTION TO MINIMIZE THE EFFECTS OF WEATHER.
11. CONTRACTOR TO MAKE UP ANY DEFICIENCIES IN EARTHWORKS WITH APPROVED IMPORTED FILL MATERIAL.
12. IMPORTED FILL MATERIAL IF ORDERED, SHALL BE LOW PLASTICITY GRANULAR FILL HAVING THE FOLLOWING CHARACTERISTICS:
    MINIMUM CBR 15 %, PLASTICITY INDEX <15%, % PASSING 0.0075mm SIEVE <25%
13. EXCESS SPOIL MATERIAL GENERATED DURING CONSTRUCTION IS TO BE DISPOSED OF OFF SITE.
14. ALL FILL MATERIAL PLACED ON THE SITE COMPRISING ONLY NATURAL EARTH AND ROCK IS TO BE FREE OF CONTAMINANTS (AS DEFINED BY SECTION 11 OF THE ENVIROMENTAL PROTECTION ACT (EPA) 1994), NOXIOUS, HAZARDOUS, DELETERIOUS AND ORGANIC MATERIALS. SUITABLE FILL MATERIAL IS DEEMED TO COMPLY WITH THE REQUIREMENTS OF CLAUSE 4.3, AS3798, GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS.
15. THE MOVEMENT OF MATERIAL TO AND FROM THE SITE IS TO BE IN ACCORDANCE WITH RELEVANT EPA POLICIES, IN PARTICULAR THOSE ADDRESSING PRESENCE AND TREATMENT OF FIRE ANTS.

SUBSOIL DRAINAGE NOTES

1. GENERAL: PROVIDE SUBSOIL DRAINS TO INTERCEPT GROUND WATER SEEPAGE AND PREVENT WATER BUILD-UP BEHIND WALLS AND UNDER FLOORS AND PAVEMENT. CONNECT SUBSOIL TO SURFACE DRAINS OR TO THE STORMWATER DRAINAGE SYSTEM AS APPLICABLE.
2. PIPE DEPTH: PROVIDE THE FOLLOWING MINIMUM CLEAR DEPTH, MEASURED TO THE CROWN OF THE PIPE, WHERE THE PIPE PASSES BELOW THE FOLLOWING ELEMENTS:
   - 100mm BELOW FORMATION LEVEL OF THE PAVEMENT, KERB OR CHANNEL
   - 100mm BELOW THE AVERAGE GRADIENT OF THE BOTTOM OF FOOTINGS
3. JOINTING: AT JUNCTIONS OF SUBSOIL PIPES PROVIDE TEES, COUPLINGS OR ADAPTORS TO AS2439.1
4. TRENCH WIDTH MINIMUM 300mm
5. PIPE UNDERLAY GENERAL: GRADE THE TRENCH FLOOR EVENLY TO THE GRADIENT OF THE PIPELINE. IF THE TRENCH FLOOR IS ROCK, CORRECT ANY IRREGULARITIES WITH COMPACTED BEDDING MATERIAL. BED PIPING ON CONTINUOUS UNDERLAY OF BEDDING MATERIAL, AT LEAST 75mm THICK AFTER COMPACTION. LAY THE PIPE WITH ONE LINE OF PERFORATIONS AT THE BOTTOM.
6. PIPE UNDERLAY CHASES: IF NECESSARY TO PREVENT PROJECTIONS SUCH AS SOCKETS AND FLANGES FROM BEARING ON THE TRENCH BOTTOM OR UNDERLAY.
7. PIPE SURROUNDS GENERAL: PLACE THE MATERIAL IN THE PIPE SURROUND IN LAYERS SMALLER THAN OR EQUAL TO 200mm LOOSE THICKNESS, AND COMPACT WITHOUT DAMAGING OR DISPLACING PIPING.
8. PIPE SURROUNDS DEPTH OF OVERLAY TO THE UNDERSIDE OF THE BASE OF OVERLYING STRUCTURES SUCH AS PAVEMENTS, SLABS AND CHANNELS TO WITHIN 150mm OF THE FINISHED SURFACE OF UNPAVED OR LANDSCAPED AREAS.
9. FILTER SOCKS: PROVIDE POLYESTER PERMEABLE SOCKS CAPABLE OF RETAINING PARTICLES OF 0.25mm SIZES. SECURELY FIT OR JOIN THE SOCK AT EACH JOINT.

FLEXIBLE PAVEMENT NOTES

BASE, SUB BASE AND SELECT MATERIAL

1. GENERAL:
   PAVEMENT "BASE" (IE THE HIGHEST COURSE OF THE PAVEMENT BELOW THE SURFACING) SHALL BE CONSTRUCTED OF FINE CRUSHED ROCK (EXCEPT CONCRETE PAVEMENT. WHERE THE CONCRETE IS THE BASE)
   PAVEMENT "SUB-BASE" (IE THE IMMEDIATE OR LOWER COURSE OF THE PAVEMENT BELOW THE BASE) SHALL BE CONSTRUCTED OF CRUSHED ROCK OR NATURAL GRAVELS.
   PAVEMENT"SELECT MATERIAL LAYER" (IE THE LOWER COURSE OF THE PAVEMENT BELOW THE SUB-BASE). SHALL BE CONSTRUCTED OF CRUSHED ROCK, NATURAL GRAVELS OR SUITABLE SOILS. THE SUBGRADE SURFACE SHALL BE THE SURFACE THAT UNDERLIES EITHER:
   - THE SELECT MATERIAL LAYER WHEN SELECT MATERIAL LAYER IS PRESENT OR
   - THE SUB-BASE WHEN SELECT MATERIAL LAYER IS ABSENT FROM THE PAVEMENT CONSTRUCTION, OR
   - THE BASE WHEN BOTH SELECT MATERIAL LAYER AND SUB-BASE ARE ABSENT FROM THE PAVEMENT CONSTRUCTION.
2. MATERIALS:
   PRIOR TO THE DELIVERY OF ANY MATERIAL TO THE SITE, THE SOURCE OF ALL MATERIALS AND CERTIFICATES THAT THE MATERIAL SATISFIES THE SPECIFIED REQUIREMENTS SHALL BE PROVIDED FOR APPROVAL. ADDITIONALLY FOR EACH MATERIAL SOURCE, COMPLIANCE WITH THE APPROVED QUALITY ASSURANCE PROGRAM FOR INDIVIDUAL MATERIALS SHALL BE PROVIDED TO THE SUPERINTENDENT AS REQUIRED IN THE QUALITY SYSTEM REQUIREMENTS. TESTING OF PAVEMENT MATERIALS WILL NORMALLY BE PERFORMED ON SAMPLES TAKEN AT THE SOURCE PRIOR TO DELIVERY TO THE SITE AND IN THEIR FINAL CONDITIONS AFTER PLACEMENT AND COMPACTION IN THE PAVEMENT. FINAL ACCEPTANCE WILL BE CONDITIONAL ON NO SIGNIFICANT CHANGE IN PROPERTIES DUE TO SEGREGATION OR CONTAMINATION DURING SUBSEQUENT PAVEMENT WORKS.
   <u>FINE CRUSHED ROCK MATERIALS</u>
   FINE CRUSHED ROCK SHALL CONFORM TO THE REQUIREMENTS OF TYPE 2.1 MATERIAL AS SPECIFIED IN TMR SPECIFICATION MRTS05 AND SHALL BE HARD, DURABLE STONE FREE OF CLAY LUMPS, ORGANIC MATTER AND OBJECTIONABLE QUANTITIES OF DELETERIOUS SUBSTANCES. THE MATERIAL MAY BE CRUSHER RUN OR SCREENED AND RECOMBINED. ALL THE MATERIAL REQUIREMENTS APPLY BOTH PRIOR TO AND AFTER PLACEMENT IN THE PAVEMENT.
   SUB-BASE MATERIALS
   SUB-BASE MATERIALS SHALL BE CRUSHED ROCK SUB-BASE OR SUITABLE NATURAL GRAVELS AND CONFORM TO THE REQUIREMENTS OF TYPE 2.3 AS PER TMR SPECIFICATION MRTS05. STONE SHALL BE HARD, DURABLE AND THE MATERIALS SHALL BE FREE OF CLAY LUMPS, ORGANIC MATTER AND OBJECTIONABLE QUANTITIES OF DELETERIOUS SUBSTANCES. ALL THE MATERIAL REQUIREMENTS APPLY BOTH PRIOR TO AND AFTER PLACEMENT IN THE PAVEMENT.

ASPHALTIC CONCRETE SURFACING NOTES

1. ASPHALT (HOT MIXED) TO AS2150
2. BITUMEN EMULSION TO AS1160
3. BASECOURSE SURFACE TO BE FIRM, FREE OF SURFACE WATER, OILS, GREASE, RETARDERS, LOOSE MATERIAL AND DUST. APPLY TACK COAT IMMEDIATELY BEFORE PLACING ASPHALT.
4. TACK COAT: BITUMINOUS EMULSION SPRAY TO THE RECOMMENDATION OF AS2150
5. ASPHALT: MIXING LAYING AND COMPACTION TO THE RECOMMENDATION OF AS2150
   TACK COAT: BITUMINOUS EMULSION SPRAY TO THE RECOMMENDATION OF AS2150
6. MIXES:
   - AC10 - 10mm NOMINAL MAXIMUM AGGREGATE SIZE
   - AC7 - 7mm NOMINAL MAXIMUM AGGREGATE SIZE
   - AC5 - 5mm NOMINAL MAXIMUM AGGREGATE SIZE
7. BITUMEN BINDER CLASS 170
8. SURFACE FINISH: DENSE, SMOOTH, FREE OF ROLLER MARKS AND LOOSE MATERIAL.
   COMPACTION: WHILST THE MIX TEMPERATURE IS ABOVE 140°C. SITE DENSITY (MINIMUM):95% OF THE 50 BELOW MARSHALL DENSITY OF THE LABORATORY COMPACTED MIX.
9. JOINTS:
   - THE NUMBER OF JOINTS, BOTH LONGITUDINAL AND TRAVERSE, SHALL BE KEPT TO A MINIMUM.
   - THE DENSITY AND SURFACE FINISH AT JOINTS SHALL BE SIMILAR TO THOSE OF THE REMAINDER OF THE LAYER.
   - FORM JOINTS AND STAGGER 300mm MINIMUM IN SUCCESSIVE LAYERS
10. FINISHED PAVEMENT PROPERTIES:
    FINISHED SURFACES SHALL BE SMOOTH, DENSE AND TRUE TO SHAPE AND SHALL NOT VARY MORE THAN 10mm FROM SPECIFIED PLAN LEVEL AT ANY POINT AND SHALL NOT DEVIATE FROM THE BOTTOM OF A 3mm STRAIGHT EDGE LAID IN ANY DIRECTION BY MORE THAN 5mm.
11. REFER PAVEMENT PLAN FOR ADDITIONAL NOTES WHERE REQUIRED.

FLEXIBLE PAVEMENT NOTES cont'd

RIGID CONCRETE PAVEMENT NOTES

GENERAL:

1. CARRY OUT ALL CONCRETE WORK IN ACCORDANCE WITH AS3600 AND THE SPECIFICATION. KEEP A COPY OF THESE DOCUMENTS ON SITE.
2. VERIFY ALL SETTING OUT DIMENSIONS WITH THE ARCHITECT AND OR THE SURVEYOR.
3. DO NOT OBTAIN DIMENSIONS BY SCALING THE DRAWINGS.
4. IN CASE OF DOUBT - ASK.

CONCRETE:

1. PLACE CONCRETE OF THE FOLLOWING CHARACTERISTIC COMPRESSIVE STRENGTH F'C AS DEFINED IN AS3600 OR RTA FROM 609. ADD WATER REDUCING ADMIXTURE EQUAL TO WRDA.

	AS3600 F'C MPA AT 28 DAYS	SPECIFIED SLUMP (mm)	NOMINAL AGG. SIZE (mm)
ALL KERBS, PITS ETC	25	80	20
VEHICULAR PAVING	REFER TO CONCRETE PAVEMENT NOTES BELOW		

2. USE TYPE GP CEMENT IN ACCORDANCE WITH AS36972
3. ALL CONCRETE SHALL BE SUBJECT TO PROJECT CONTROL SAMPLE AND TESTING TO AS3600.
4. CONSOLIDATE BY VIBRATION. CURE SURFACES BY COVERING WITH PLASTIC AND KEEPING MOIST FOR MIN. 7 DAYS.

RIGID CONCRETE PAVEMENT NOTES

REINFORCEMENT:

1. FIX REINFORCEMENT AS SHOWN ON DRAWINGS. THE TYPE AND GRADE IS INDICATED BY A SYMBOL AS SHOWN BELOW.
   - N. HOT ROLLED DEFORMED BAR. GRADE 500
   - R. PLAIN ROUND BAR. GRADE 250
   -SL OR RL. HARD DRAWN WIRE FABRIC SQUARE OR RECTANGULAR.
2. PROVIDE BAR SUPPORTS OR SPACERS TO GIVE THE FOLLOWING CONCRETE COVER TO ALL REINFORCEMENT UNLESS NOTED OTHERWISE.
   - FOOTINGS: 75 BOTTOM, 65 TOP AND SIDE 40
   - SLABS: 40 WHEN EXPOSED TO WEATHER
   - DRAINAGE STRUCTURES: 30 WHEN CAST IN FORMS BUT LATER EXPOSED TO WEATHER OR GROUND. 65 WHEN CAST DIRECTLY IN CONTACT WITH GROUND.
3. FOR ALL PITS LOCATED IN CONCRETE PROVIDE 2N16 TRIMMER BARS AROUND 1200mm LONG AROUND ALL CORNERS OF PITS UNLESS SHOWN OTHERWISE.

REINFORCEMENT:

1. FIX REINFORCEMENT AS SHOWN ON DRAWINGS. THE TYPE AND GRADE IS INDICATED BY A SYMBOL AS SHOWN BELOW.
   - N. HOT ROLLED DEFORMED BAR. GRADE 500
   - R. PLAIN ROUND BAR. GRADE 250
   -SL OR RL. HARD DRAWN WIRE FABRIC SQUARE OR RECTANGULAR.
2. PROVIDE BAR SUPPORTS OR SPACERS TO GIVE THE FOLLOWING CONCRETE COVER TO ALL REINFORCEMENT UNLESS NOTED OTHERWISE.
   - FOOTINGS: 75 BOTTOM, 65 TOP AND SIDE 40
   - SLABS: 40 WHEN EXPOSED TO WEATHER
   - DRAINAGE STRUCTURES: 30 WHEN CAST IN FORMS BUT LATER EXPOSED TO WEATHER OR GROUND. 65 WHEN CAST DIRECTLY IN CONTACT WITH GROUND.
3. FOR ALL PITS LOCATED IN CONCRETE PROVIDE 2N16 TRIMMER BARS AROUND 1200mm LONG AROUND ALL CORNERS OF PITS UNLESS SHOWN OTHERWISE.

CONCRETE VEHICULAR PAVEMENT NOTES:

1. CONCRETE MIX PARAMTERTERS:
   - MAXIMUM AGGREGATE SIZE = 20mm
   -FLEXURAL STRENGTH AT 28 DAYS = 3.5 MPa (F'c=32MPa)
   - FLEXURAL STRENGTH AT 90 DAYS = 3.85 MPa
   - MAXIMUM WATER / CEMENT RATIO = 0.45
   - MAXIMUM SHRINKAGE LIMIT = 600 MICROSTRAINS (AS1012.13) AFTER 8 WEEKS OF DRYING.
   - MINIMUM CEMENT CONTENT = 300kg/m³
   - CEMENT TO BE TYPE GP (NORMAL CEMENT) TO AS3972
   - SLUMP = 50mm
2. SAWN JOINTS ARE TO BE CUT BETWEEN 2-4 HOURS AFTER CONCRETE POUR USING SOFT SAW CUT TO AVOID DAMAGING THE SURFACE DURING SAWCUT.
3. THE BUILDER SHALL PROVIDE CONSTANT SUPERVISION OF CONCRETE POURS EXECUTED BY SUB-CONTRACTORS TO ENSURE:
   - REINFORCEMENT DISPLACED OFF CHAIRS ARE REPLACED PRIOR TO CONCRETE PLACEMENT.
   -NO SITE WATER IS ADDED TO CONCRETE OR CONCRETE IN WAITING TRUCKS. (REQUIRED SLUMP FOR PLACEMENT SHALL BE ACHIEVED USING SUPER PLASTICISER)
   - ALL CONCRETE IS FULLY COMPACTED USING A POKER VIBRATOR.
   - NO POURS ARE EXECUTED WHEN WHEN THE AMBIENT TEMPERATURE EQUALS OR EXCEEDS 35° C.
4. CURING: THE FINISHED CONCRETE SHALL BE CURED FOR A MINIMUM OF SEVEN DAYS USING AT LEAST ONE OF THE FOLLOWING METHODS:
   -PONDING OR CONTINUOUS SPRINKLING OF WATER.
   - THE USE OF AN ABSORBENT COVER KEPT CONSTANTLY WET. (WHEN THE AMBIENT TEMPERATURE EXCEEDS 32°C CURING MAY ONLY BE ACHIEVED USING ABOVE 2 METHODS.
   - THE USE OF AN IMPERMEABLE SHEET MEMBRANE OVER A MOISTENED SURFACE. (THE MEMBRANE SHALL BE FIXED AND LAPPED SO THAT NO AIR CIRCULATION CAN OCCUR AT THE CONCRETE SURFACE.)
   - THE USE OF A CURING COMPOUND COMPLYING WITH AS3799, APPLIED UNIFORMLY IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS, AND WHEN DRY THE COAT SHOULD BE CONTINUOUS, FLEXIBLE AND WITHOUT VISIBLE BREAKS OR PIN HOLES FOR SEVEN DAYS.
5. BROOM CONCRETE FINISH UNLESS SPECIFIED OTHERWISE TO ARCHITECTS REQUIREMENTS.

CONCRETE

C1 ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS.3600, CURRENT EDITION WITH AMENDMENTS.

C2 CONCRETE QUALITY (UNLESS SHOWN OTHERWISE):
CEMENT SHALL BE TYPE 'A' NORMAL PORTLAND CEMENT.
SIZE OF COARSE AGGREGATE SHALL BE 20 mm. U.N.O.
CONCRETE SHALL HAVE THE FOLLOWING SLUMP DURING PLACING:
- BEAMS, SLABS AND FOOTINGS _ _ _ _ _ _ _ 80 mm.
- COLUMNS AND WALLS _ _ _ _ _ _ _ _ _ _ _ 80 mm.

ADMIXTURES SHALL NOT BE USED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER.

ELEMENT	CONCRETE STRENGTH	SPECIAL REQUIREMENTS
FOOTINGS	N25 U.N.O.	
SLAB ON GROUND	N32 U.N.O.	

STRENGTH SHALL BE VERIFIED BY PROJECT CONTROL TESTING IN ACCORDANCE WITH AS. 3600 AND AS. 1379.

C3 CLEAR CONCRETE COVER TO REINFORCEMENT INCLUDING TIES AND STIRRUPS, UNLESS SHOWN OTHERWISE, SHALL BE:

ELEMENT	FORMED & SHELTERED	FORMED & EXPOSED	NO FORMWORK
SLABS	30mm	45mm	40mm
FOOTINGS	50mm	50mm	50mm

COVER TO REINFORCEMENT SHALL BE OBTAINED BY THE USE OF CONCRETE OR PLASTIC BAR CHAIRS FOR BOTTOM REINFORCEMENT AND PLASTIC TIPPED WIRE BAR CHAIRS FOR TOP REINFORCEMENT. ALL CHAIRS SHALL BE SPACED AT MAXIMUM 800mm CENTRES EACH WAY. U.N.O. ALL BAR CHAIRS SHALL BE PLASTIC IN ALL EXTERNAL SLABS. ALL BAR CHAIRS DIRECTLY PLACED ON SUBGRADE SHALL BE SUPPORTED BY METAL PANS.

C4 REINFORCEMENT QUALITY AND NOTATION:

SYMBOL	BAR SHAPE	STRENGTH GRADE (MPa)	DUCTILITY CLASS	TO COMPLY WITH AUST. STANDARD
S	STRUCTURAL GRADE DEFORMED RIB BAR	250	NORMAL	AS. 1302
N	HOT ROLLED DEFORMED RIB BAR	500	NORMAL	AS. 4671
R	PLAIN ROUND BAR	250	NORMAL	AS. 4671
RL	RECTANGULAR MESH OF DEFORMED RIB BAR	500	LOW	AS. 4671
SL	SQUARE MESH OF DEFORMED RIB BAR	500	LOW	AS. 4671
L-TM	TRENCH MESH	500	LOW	AS. 4671
W	COLD DRAWN WIRE	500	LOW	AS. 4671

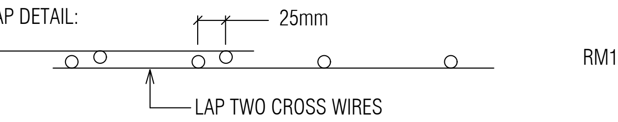
C5 REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND IS NOT NECESSARILY SHOWN IN TRUE PROJECTION.

C6 SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN THE POSITIONS SHOWN. THE WRITTEN APPROVAL OF THE ENGINEER SHALL BE OBTAINED FOR ANY OTHER SPLICES. WHERE THE LAP LENGTH IS NOT SHOWN IT SHALL BE SUFFICIENT TO DEVELOP THE FULL STRENGTH OF THE REINFORCMENT.
LAP LENGTHS: (MINIMUM U.N.O.)

BAR SIZE	LAP LENGTH	BAR SIZE	LAP LENGTH
N10	375	N24	900
N12	500	N28	1050
N16	600	N32	1200
N20	750	N36	1350

C7 WELDING OF THE REINFORCEMENT WILL NOT BE PERMITTED UNLESS SHOWN ON THE STRUCTURAL DRAWINGS.

C8 FABRIC LAP DETAIL:



C9 SLAB REINFORCEMENT SHALL EXTEND AT LEAST 65mm ONTO MASONRY SUPPORT WALLS UNLESS SHOWN OTHERWISE.

C10 CONCRETE SIZES SHOWN ARE MINIMUM AND NO REDUCTIONS BY DUCTS, PIPES, ETC., SHALL BE MADE WITHOUT THE APPROVAL OF THE SUPERVISING OFFICER. SIZES DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.

C11 TRIM ALL PENETRATION GREATER THAN 300 mm WITH 2/N12 BARS EACH SIDE TOP AND BOTTOM EXTENDING 600 PAST OPENINGS AND DISPLACE REINFORCEMENT EITHER SIDE.

C12 PIPES OR CONDUITS SHALL NOT BE PLACED WITHIN THE CONCRETE COVER TO REINFORCEMENT WITHOUT THE APPROVAL OF THE ENGINEER. PIPES OR CONDUITS CAST WITHIN THE SLAB SHALL BE PLACED IN MIDDLE THIRD OF SLAB. PIPES/CONDUITS SHALL NOT BE BUNDLED.

C13 NO HOLES OR CHASES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.

C14 CONSTRUCTION JOINTS, WHERE NOT SHOWN, SHALL BE LOCATED TO THE APPROVAL OF THE ENGINEER.

C15 ALL CONCRETE SHALL BE COMPACTED USING HIGH FREQUENCY VIBRATORS.

C16 ALL SLABS SHALL BE PLACED AT THE SAME TIME AS BEAMS OF WHICH THEY FORM PART.

C17 CURINGS OF ALL CONCRETE SURFACES SHALL COMMENCE IMMEDIATELY AFTER SURFACES ARE FINISHED AND SHALL CONTINUE FOR A MINIMUM OF 7 DAYS.
CURING METHODS SHALL BE EITHER CHEMICAL,WATER SATURATED CONCRETE SEALED IN <u>CLEAR</u> PLASTIC OR FLOODING.

C18 SLABS WITH SPECIFIED ROUGH FINISH ARE TO BE KEPT FREE OF BLEED WATER AND FLOATED TO PREVENT THE FORMATION OF PLASTIC SHRINKAGE CRACKS.

C19 AN ALIPHATIC ALCOHOL EVAPORATION RETARDANT SHALL BE USED ON ALL SLABS IMMEDIATELY AFTER FIRST SCREED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS. AN ALIPAHTIC ALCOHOL SHALL BE USED TO AID THE FINISHING OF THE CONCRETE SURFACE, WATER SHALL NOT BE USED. THIS IS AN ADDITIONAL REQUIREMENT TO CURING.

C20 SLAB, BEAM AND COLUMN FORMWORK FINISH SHALL BE MINIMUM CLASS 2. PATCH AS REQUIRED TO SUIT ARCHITECTURAL FINISHES.

C21 ALL DRILL & EPOXY REBARS SHALL BE APPROVED BY INSPECTING ENGINEER U.N.O. EPOXY SHALL BE RAMSET "CHEMSET REO 502" EPOXY SERIES OR HILTI "HIT - RE 500 INJECTION ADHESIVE" OR APPROVED EQUIVALENT.

C22 SITE BENDING OF REINFORCEMENT BARS SHALL BE DONE WITHOUT HEATING USING A RE-BENDING TOOL. THE BARS SHALL BE RE-BENT AGAINST A FLAT SURFACE OR A PIN WITH A DIAMETER NOT LESS THAN THE MINIMUM PIN SIZE PRESCRIBED IN AS. 3600.

CONCRETE cont'd

C23 ALL REINFORCEMENT INCLUDING STARTER BARS, ANCHOR BOLTS AND OTHER CONCRETE INSERTS SHALL BE WELL SECURED IN POSITION AND INSPECTED BY THE STRUCTURAL ENGINEER PRIOR TO CONCRETE PLACING.

C24 HOLD DOWN BOLTS SHALL BE HOT DIP GALVANISED UNO.

C25 FORM CONSTRUCTION JOINTS WHERE ONLY APPROVED BY SUPERINTENDENT. TO ACHIEVE ADEQUATE BOND ENSURE ENTIRE SURFACE IS CLEAN AND ROUGHENED TO A FULL AMPLITUDE OF NOT LESS THAN 5mm WITH COARSE AGGREGATE EXPOSED. PRIME EXISTING CONCRETE WITH MASTER BUILDERS "CONCRESIVE 2525" IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION AND PLACE ADJACENT FRESH CONCRETE WITHIN 30 MINUTES OF PRIMING. DAMPEN EXISTING CONCRETE PRIOR TO PLACING ADJACENT FRESH CONCRETE. COAT EXISTING CONCRETE WITH NEAT CEMENT SLURRY PRIOR TO PLACING ADJACENT FRESH CONCRETE.

C26 WHERE SLAB OR BEAM DEPTH EXCEEDS 350mm AND DOCUMENTED REINF. SPACING EXCEEDED FALL PROTECTION REQUIREMENTS, SAFTEY MESH SHALL BE OVERLAID AS FALL PROTECTION IN ACCORDANCE WITH WORK PLACE HEALTH & SAFTEY REGULATIONS.

C27 SAFTEY MESH NOT SHOWN ON DRAWINGS.
THE BUILDER SHALL PROVIDE SAFTY MESH TO OCCUPATIONAL HEALTH AND SAFTEY REQUIREMENTS AND ALLOW FOR ALL COSTS IN THE CONTRACT SUM.

REINFORCED MASONRY

RM1 ALL CONCRETE MASONRY UNITS SHALL CONFORM TO THE REQUIREMENTS OF AS.4455. STANDARD BLOCKS SHALL NOT BE USED. ALL BLOCKS SHALL HAVE THICKENED INTERIOR WEBS TO ALLOW CORES TO LINE UP, AND SHALL HAVE TOP GROOVES FOR REINFORCEMENT.

RM2 ALL MORTAR SHALL CONFORM TO THE REQUIREMENTS OF AS.3700.

RM3 THE DESIGN STRENGTH OF THE CONCRETE MASONRY SHALL BE:

ELEMENT	GRADE	MORTAR MIX-CEMENT:LIME:SAND
GENERAL	GRADE 12	1 : 1 : 6
RETAINING WALLS	GRADE 12	1 : 0.1 : 3

RM4 WORKMANSHIP INVOLVED IN PLACING CONCRETE MASONRY UNITS SHALL COMPLY WITH AS.3700 AND THE UNITS SHALL HAVE FULLY BEDDED FACE SHELLS AND CROSS WALLS.

RM5 CLEAN OUT HOLES SHALL BE PROVIDED AT THE BASE OF ALL CONCRETE FILLED CORES TO EACH POUR LIFT. CLEAN OUT ALL CORES AT THE END OF EACH DAY'S LAYING. POUR LIFTS SHALL NOT EXCEED THE FOLLOWING :
290 BLOCKS - 3000 MAXIMUM POUR LIFT.
190 BLOCKS - 2800 MAXIMUM POUR LIFT.
140 BLOCKS - 2400 MAXIMUM POUR LIFT.

RM6 ALL MORTAR DROPPINGS SHALL BE CLEANED FROM CORES AND REMOVED FROM BOTTOM OF CAVITY THROUGH CLEAN OUT HOLES BEFORE CONCRETE FILLING.

RM7 CONCRETE QUALITY OF CONCRETE USED TO FILL CORES SHALL HAVE (UNLESS SHOWN OTHERWISE):
CHARACTERISTIC CONCRETE STRENGTH AT 28 DAYS OF 20 MPa.
A SLUMP OF 230mm WHEN BEING POURED.
MAXIMUM COARSE AGGREGATE SIZE OF 10mm.

RM8 THE CONCRETE FILLING SHALL BE THOROUGHLY COMPACTED.

RM9 MORTAR ADMIXTURES SHALL NOT BE USED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER.

RM10 REINFORCING SHALL HAVE 12mm CLEAR COVER FROM INSIDE FACE OF BLOCKS.

RM11 ' H ' BLOCKS SHALL BE USED FOR ALL FULLY CONCRETE FILLED WALLS U.N.O.

RM12 ALL CONCRETE FILLED MASONRY SHALL BE THOROUGHLY SATURATED INTERNALLY IMMEDIATELY PRIOR TO POUR.

RM13 ALL MASONRY BLOCK RETAINING WALLS SHALL CONTAIN AN APPROVED EXTERNAL WATERPROOF MEMBRANE TO THE RETAINING FACE IN ACCORDANCE WITH ARCHITECTS AND MANUFACTURER'S SPECIFICATIONS. U.N.O.

RM14 ALL CANTILEVERED MASONRY BLOCK RETAINING WALLS SHALL BE ADEQUATELY PROPPED FOR A MINIMUM OF 28 DAYS FROM TIME OF CORE FILLING. IN ADDITION, RETAINING WALLS SUPPORTED BY A SLAB OVER SHALL BE ADEQUATELY PROPPED PRIOR TO BACKFILLING AND REMAIN PROPPED UNTIL 14 DAYS AFTER SLAB OVER IS POURED.

RM15 ALL FREE STANDING MASONRY BLOCK WALLS SHALL BE ADEQUATELY PROPPED WITH PUSH/PULL PROPS UNTIL SUPPORTING STRUCTURE IS COMPLETED.

RM16 BLOCK CONTROL JOINTS SHALL BE PROVIDED IN ALL WALLS AT 6.0m MAX. CRS. U.N.O. JOINTS SHALL BE FREE OF MORTAR AND SEALED WITH APPROVED SEALANT.

RM17 ALL SILLS AND TOP COURSE OF WALLS SHALL BE CONSTRUCTED WITH KNOCKOUT BLOCKS TO PROVIDE A CONTINUOS BOND BEAM. HORIZONTAL REINFORCEMENT TO ALL SILLS SHALL EXTEND A MINIMUM OF 600 PAST OPENINGS.

RM18 NO CHASES/ PENETRATIONS SHALL BE CUT INTO LOAD BEARING MASONRY WITHOUT THE APPROVAL OF THE ENGINEER.

IMPORTANT NOTE:

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ALL UNDERGROUND SERVICES
SHOULD BE LOCATED ONSITE
BY RELEVANT AUTHORITIES
BEFORE ANY WORK IS COMMENCED.

'WORK AS EXECUTED' REPORTING REQUIREMENTS

WORK AS EXECUTED INFORMATION MUST BE PROVIDED BY THE CONTRACTOR AS A PART OF THIS WORK, UNLESS NOTED OTHERWISE.

CONCRETE TESTING

CT1 REQUIREMENT:
- PRODUCTION ASSESSMENT - TESTING CARRIED OUT BY THE BATCHING PLANT.
- PROJECT ASSESSMENT - TESTING OF SAMPLES TAKEN ON SITE AT DISCHARGE POINT.

CT2 PROVIDE EVIDENCE OF PRODUCTION ASSESSMENT TO AS. 1379 PRIOR TO POURING.

CT3 CONCRETE SHRINKAGE AND CONCRETE FOR SLABS (UP TO 110mm THICK) ON GROUND, TO BE VERIFIED BY PRODUCTION ASSESSMENT.

CT4 CARRY OUT PROJECT ASSESSMENT FOR REMAINDER OF CONCRETE AS FOLLOWS:
- i) SUPPLY OF CONCRETE SHALL BE FROM A CONCRETE BATCHING PLANT THAT CARRIES OUT PRODUCTION ASSESSMENT, FOR THE GRADES OF CONCRETE SPECIFIED FOR THIS PROJECT.
- ii) CONCRETE SHALL BE SUPPLIED AND TESTED IN ACCORDANCE WITH AS. 1379 AND AS.1012.
- iii) THE ORGANISATION(S) RESPONSIBLE FOR SAMPLING AND TESTING OF CONCRETE TO HAVE RELEVANT 'NATA' LABORATORY REGISTRATION, BE INDEPENDENT, AND USE TRAINED, COMPETENT PERSONNEL FOR THE TAKING OF SAMPLES AND SPECIMENS AND THE PREPARATION OF MATERIALS AND WORK FOR TESTING.
- iv) SLUMP AT TIME OF POURING TO BE WITHIN THE PERMISSIBLE TOLERANCE IN AS. 1379 FOR NOMINAL SLUMP SPECIFIED.
- v) AT LEAST 1 SAMPLE FOR EVERY 50m3 SHALL BE TAKEN AT THE SITE, BUT NOT LEAST THAN 3 SAMPLES SHALL BE TAKEN PER POUR. FIRST AND LAST BATCH PER DAY TO BE SAMPLED, THE OTHER TAKEN PROGRESSIVELY DURING THE POUR, RECORDING LOCATION IN POUR WHERE SAMPLE WAS TAKEN.
- vi) IT IS PERMISSIBLE TO REDUCE THE NUMBER OF SAMPLES TO 2 FOR POURS LESS THAN 30m3, AND 1 FOR POURS LESS THAN 10m3.
- vii) A SAMPLE CONSISTS OF AT LEAST 3 CYLINDERS. ONE CYLINDER SHALL BE TESTED AT 7 DAYS. TWO CYLINDERS SHALL BE TESTED AT 28 DAYS. 7 AND 28 DAY TEST RESULTS TO BE SENT IMMEDIATELY TO STRUCTURAL ENGINEER.
- viii) AS. 1379 CLAUSE B2 SHALL NOT APPLY UNLESS THE SAMPLE CONSISTS OF 6 CYLINDERS MINIMUM AT EACH TEST AGE.
- iv) IF MORE THAN ONE STRENGTH GRADE IS BEING USED IN A POUR, EACH STRENGTH GRADE SHALL BE CONSIDERED A SEPERATE POUR FOR THE PURPOSES OF TESTING.

CONSTRUCTION INSPECTION REQUIREMENTS

IF CERTIFICATION OF THE WORKS IS REQUIRED TO BE PROVIDED BY COZENS REGAN GROUP THE FOLLOWING INSPECTIONS (TO BE UNDERTAKEN BY COZENS REGAN GROUP DURING CONSTRUCTION) ARE MANDATORY.

NOTE: ALL INSPECTIONS REQUIRE 24 HOURS MINIMUM NOTICE.

EARTHWORKS:-

1. SUBGRADE PROOF ROLL. MIN. 10 TONNE WATER TRUCK REQUIRED.
2. RETAINING WALL PRE-POUR INSPECTION FOR REINFORCED CONCRETE WALLS.
3. RETAINING WALL PRE-PLACEMENT OF ROCKS OR FOOTING FOR GRAVITY WALLS.

ROADWORKS:-

4. PRE-EXCAVATION INSPECTION (IF ORDERED).
5. SUBGRADE PROOF ROLL (BOTTOM OF BOX). MIN. 10 TONNE WATER TRUCK REQUIRED.
6. PRE KERB VISUAL INSPECTION
7. RECTIFIED SUBGRADE PROOF ROLL (IF ORDERED). MIN. 10 TONNE WATER TRUCK REQUIRED.
8. PRE-SEAL INSPECTION/PROOF ROLL. MIN. 10 TONNE WATER TRUCK REQUIRED.
9. REINFORCEMENT INSPECTION (CONCRETE PAVEMENT ONLY).
10. FINAL PRACTICAL COMPLETION INSPECTION.

STORMWATER:-

11. PRE-EXCAVATION INSPECTION (IF ORDERED).
12. PRE-BACKFILL PIPE INSPECTION.
13. STRUCTURE/PIT INSPECTION (PRIOR TO FINISH SURFACE APPLICATION).
14. FINAL PRACTICAL COMPLETION INSPECTION.

WATER SUPPLY & SEWER:-

15. PRE-EXCAVATION INSPECTION (IF ORDERED).
16. PRE-BACKFILL INSPECTION.
17. STRUCTURE/PIT INSPECTION (PRIOR TO FINISH SURFACE APPLICATION).
18. FINAL PRACTICAL COMPLETION INSPECTION.

IMPORTANT

No.	DATE	ISSUE	REVISED	CHECKED
P1	03/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.

IN ASSOCIATION WITH

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE A

SCALE B

DATUM AHD (U.N.O.)

SCALES SHOWN ARE AT A1 SIZE

COZENS REGAN GROUP
CONSULTING ENGINEERS • CIVIL • STRUCTURAL

SUITE 7 ADVANCE BUSINESS CENTRE
39 LAWRENCE DRIVE NERANG
PO BOX 2711 NERANG QLD 4211
P: (07) 5578 4100
F: (07) 5578 4092
E: mail@cozreg.com.au
W: www.cozreg.com.au

CONSULT AUSTRALIA Member Firm

DESIGNED TWN
DRAWN BAR
CHECKED TWN
APPROVED FOR AND ON BEHALF OF COZENS REGAN GROUP PTY LTD
(RPEQ No 15735)

CLIENT
MG LAND PTY LTD

PROJECT
PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
NOTES SHEET

JOB NO.
230094

DRAWING NO.
C01

ISSUE
P1





IMPORTANT NOTE:

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ALL UNDERGROUND SERVICES SHOULD BE LOCATED ONSITE BY RELEVANT AUTHORITIES BEFORE ANY WORK IS COMMENCED.

Elevations Table

No.	From Depth	To Depth	Colour	Depth Range Volume
1	-4.000	-3.500		0.01m³
2	-3.500	-3.000		5.25m³
3	-3.000	-2.500		44.85m³
4	-2.500	-2.000		180.10m³
5	-2.000	-1.500		418.08m³
6	-1.500	-1.000		696.06m³
7	-1.000	-0.500		1586.38m³
8	-0.500	0.000		4140.38m³
9	0.000	0.500		3785.15m³
10	0.500	1.000		2461.65m³
11	1.000	1.500		1331.14m³
12	1.500	2.000		676.45m³
13	2.000	2.500		349.04m³
14	2.500	3.000		92.95m³
15	3.000	3.500		0.64m³

CUT	FILL
7,071m³	8,697m³

NET = 1,626m³ (FILL)

No.	DATE	ISSUE	REVISED	CHECKED
P3	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P2	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P1	04/24	ORIGINAL ISSUE	B.A.R.	T.W.N.

IN ASSOCIATION WITH

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE A 0 5 10 15 20 1:500

SCALE B

DATUM AHD (U.N.O.)

SCALES SHOWN ARE AT A1 SIZE

COZENS REGAN GROUP
CONSULTING ENGINEERS • CIVIL • STRUCTURAL
SUITE 7 ADVANCE BUSINESS CENTRE
39 LAWRENCE DRIVE NERANG
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CONSULT AUSTRALIA Member Firm

DESIGNED TWN
DRAWN BAR
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APPROVED FOR AND ON BEHALF OF COZENS REGAN GROUP PTY LTD (RPEQ No 15735)

CLIENT MG LAND PTY LTD

PROJECT PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA

OVERALL EARTHWORKS PLAN

JOB NO. 230094

DRAWING NO. C09

ISSUE P1 P2 P3

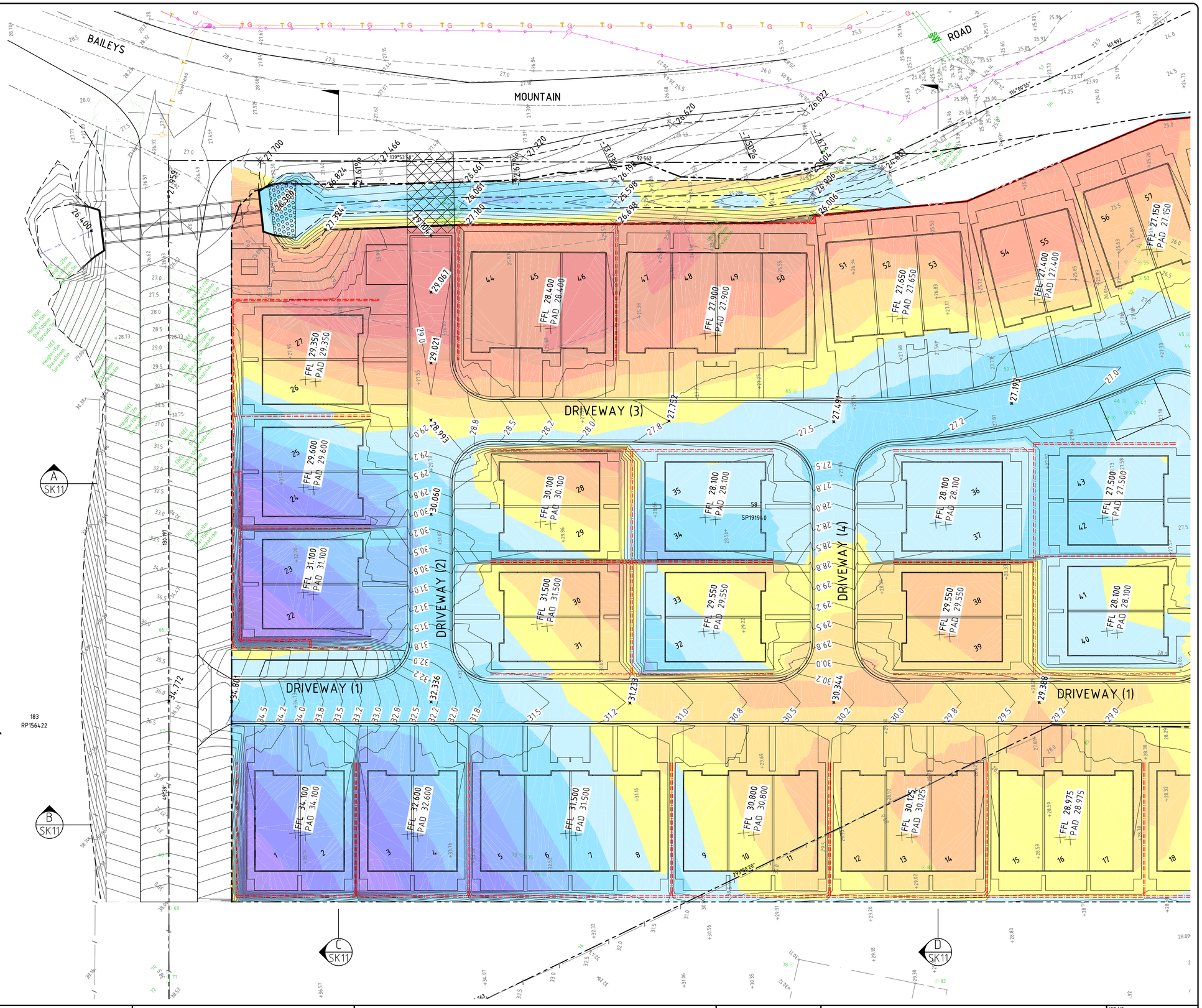
Elevations Table

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1	-4.000	-3.500		0.01m³
2	-3.500	-3.000		5.25m³
3	-3.000	-2.500		44.85m³
4	-2.500	-2.000		180.10m³
5	-2.000	-1.500		418.08m³
6	-1.500	-1.000		696.06m³
7	-1.000	-0.500		1586.38m³
8	-0.500	0.000		4140.38m³
9	0.000	0.500		3785.15m³
10	0.500	1.000		2461.65m³
11	1.000	1.500		1331.14m³
12	1.500	2.000		676.45m³
13	2.000	2.500		349.04m³
14	2.500	3.000		92.95m³
15	3.000	3.500		0.64m³

CUT	FILL
7,071m³	8,697m³

NET = 1,626m³ (FILL)

NOTE: EARTHWORKS CUT/FILL RANGES ARE CALCULATED TO THE (FS -350 TO NS -150) AND ARE TO BE USED AS A GUIDE ONLY.



IMPORTANT NOTE:

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LEGEND

16.0	EXISTING CONTOUR
+ 15.76	EXISTING SURFACE LEVEL
W	EXISTING WATER
SW	EXISTING STORMWATER
S	EXISTING SEWER
+ 29.000	FINISHED SURFACE LEVEL
+ FFL 29.000	FINISHED FLOOR LEVEL
+ PAD 22.750	EARTHWORKS PAD LEVEL
TW BW	TOP OF WALL SURFACE LEVEL BOTTOM OF WALL SURFACE LEVEL
	FINISHED BATTER LINE
83.0	FINISHED SURFACE CONTOURS
	PROPOSED RETAINING WALLS CONCRETE SLEEPERS TO FUTURE DESIGN.

No.	DATE	ISSUE	REVISED	CHECKED
P3	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P2	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P1	02/24	ORIGINAL ISSUE	B.A.R.	T.W.N.

IN ASSOCIATION WITH

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SCALE A 0 5 10 1 : 250

SCALE B

DATUM AHD (U.N.O.)

SCALES SHOWN ARE AT A1 SIZE

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DESIGNED	T.W.N.
DRAWN	B.A.R.
CHECKED	T.W.N.
APPROVED FOR AND ON BEHALF OF COZENS REGAN GROUP PTY LTD (RPEQ No 15735)	

CLIENT: MG LAND PTY LTD


PROJECT: PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA

BULK EARTHWORKS PLAN - 1 OF 2

JOB NO. 230094

DRAWING NO. C10

ISSUE P1 P2 P3



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LEGEND

- - - 16.0 - - -	EXISTING CONTOUR
+ 15.76	EXISTING SURFACE LEVEL
— W —	EXISTING WATER
— SW —	EXISTING STORMWATER
— S —	EXISTING SEWER
+ 29.000	FINISHED SURFACE LEVEL
+ FFL 29.000	FINISHED FLOOR LEVEL
+ PAD 22.750	EARTHWORKS PAD LEVEL
TW BW	TOP OF WALL SURFACE LEVEL BOTTOM OF WALL SURFACE LEVEL
— — — —	FINISHED BATTER LINE
— 83.0 —	FINISHED SURFACE CONTOURS
==========	PROPOSED RETAINING WALLS CONCRETE SLEEPERS TO FUTURE DESIGN.

NOTE: EARTHWORKS CUT/FILL RANGES ARE CALCULATED TO THE (FS -350 TO NS -150) AND ARE TO BE USED AS A GUIDE ONLY.

Elevations Table

No.	From Depth	To Depth	Colour	Depth Range Volume
1	-4.000	-3.500	🟪	0.01m³
2	-3.500	-3.000	🟪	5.25m³
3	-3.000	-2.500	🟪	44.85m³
4	-2.500	-2.000	🟪	180.10m³
5	-2.000	-1.500	🟦	418.08m³
6	-1.500	-1.000	🟦	696.06m³
7	-1.000	-0.500	🟦	1586.38m³
8	-0.500	0.000	🟦	4140.38m³
9	0.000	0.500	🟨	3785.15m³
10	0.500	1.000	🟧	2461.65m³
11	1.000	1.500	🟧	1331.14m³
12	1.500	2.000	🟧	676.45m³
13	2.000	2.500	🟥	349.04m³
14	2.500	3.000	🟥	92.95m³
15	3.000	3.500	🟥	0.64m³

CUT	FILL
7,071m³	8,697m³

NET = 1,626m³ (FILL)

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P1	04/24	ORIGINAL ISSUE	B.A.R.	T.W.N.

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SCALE A 0 5 10 1 : 250

SCALE B

DATUM AHD (U.N.O.)

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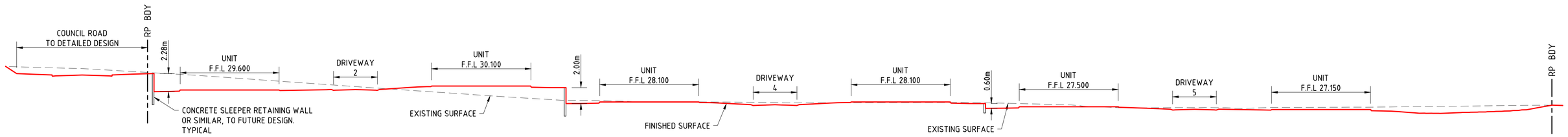
CLIENT
MG LAND PTY LTD

PROJECT
PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
BULK EARTHWORKS PLAN - 2 OF 2

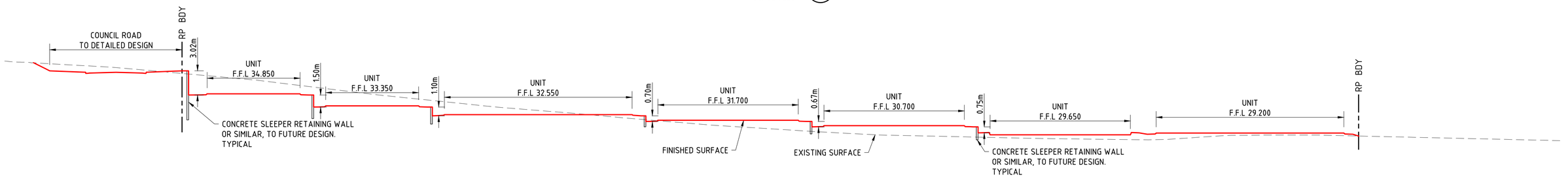
JOB NO. 230094

DRAWING NO. C11

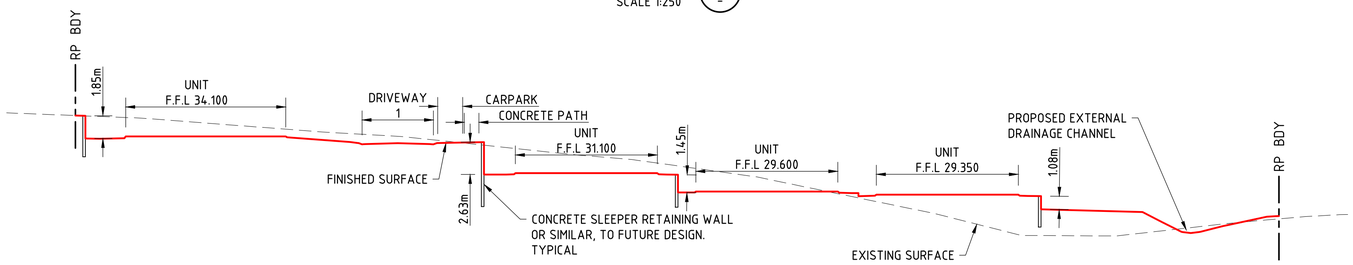
ISSUE P1 P2 P3



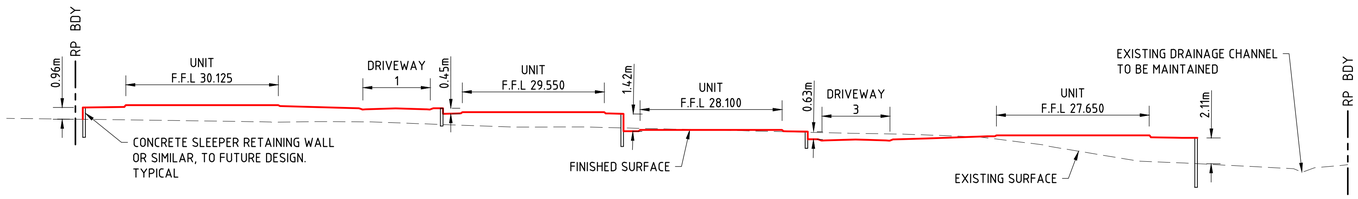
SECTION A
SCALE 1:250



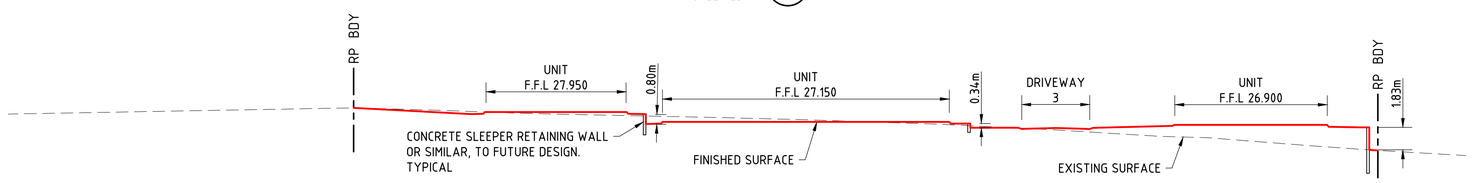
SECTION B
SCALE 1:250



SECTION C
SCALE 1:250



SECTION D
SCALE 1:250



SECTION E
SCALE 1:250

No.	DATE	ISSUE	REVISED	CHECKED
P3	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
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SCALE B

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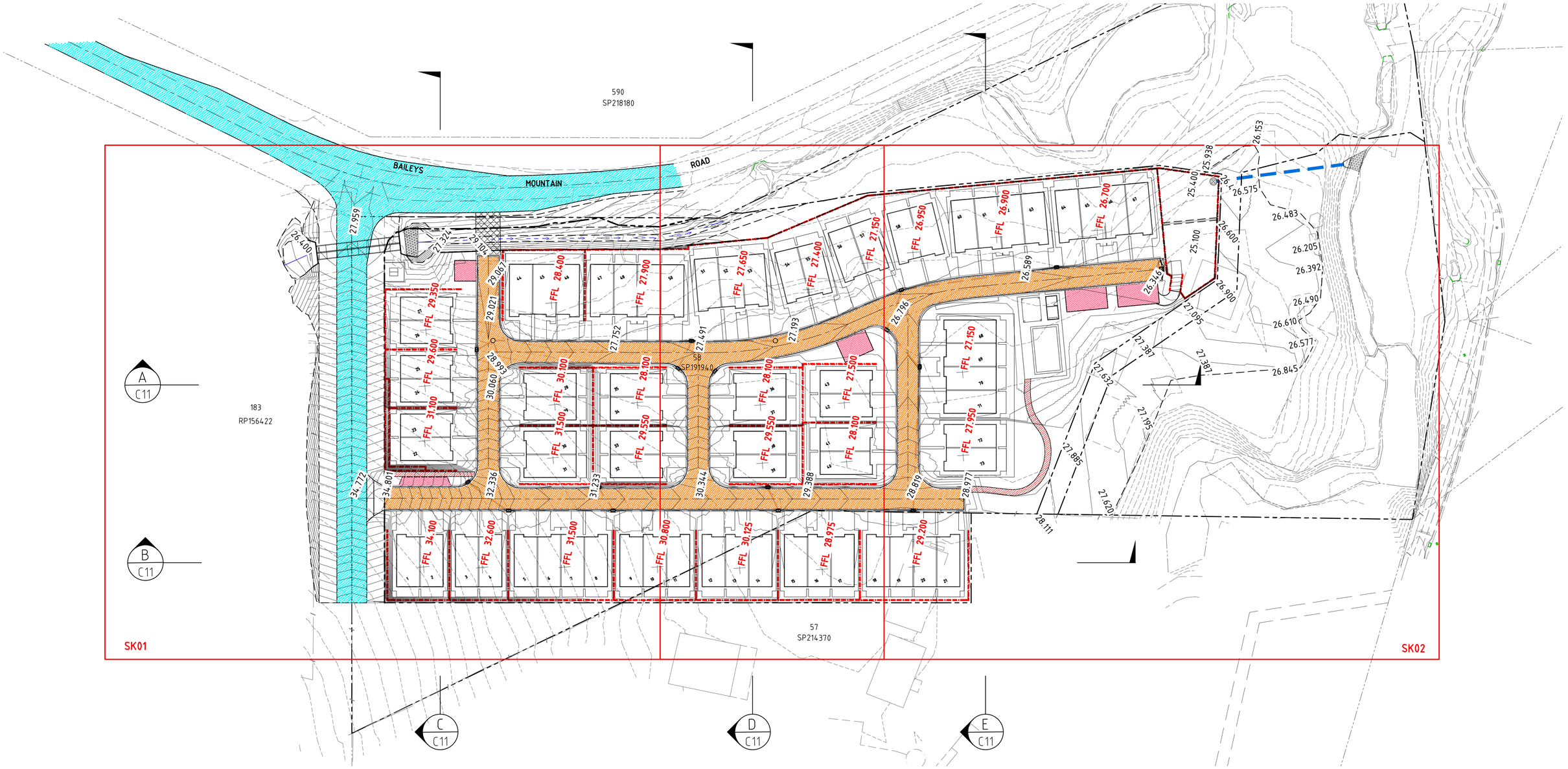
PROJECT: PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA

SITE SECTIONS

JOB NO. 230094

DRAWING NO. C12

ISSUE P1P2P3



LEGEND

16.0	EXISTING CONTOUR
W	EXISTING WATER
SW	EXISTING STORMWATER
S	EXISTING SEWER
T	EXISTING TELSTRA
G	EXISTING HIGH PRESSURE GAS (CL500)
E	EXISTING ELECTRICAL
RM	EXISTING COUNCIL SEWER RISING MAIN
83.0	PROPOSED CONTOUR
	PROPOSED PRIVATE STORMWATER RETICULATION
	PROPOSED COUNCIL STORMWATER RETICULATION
	PROPOSED WATER RETICULATION
	PROPOSED SEWERAGE RETICULATION
+ 23.400	FINISHED SURFACE LEVEL
+ FFL 23.200	FINISHED FLOOR LEVEL
+ PAD 22.750	EARTHWORKS PAD LEVEL
	PROPOSED CONCRETE SLEEPER RETAINING WALL OR SIMILAR TO FUTURE DESIGN
BRW	PROPOSED BLOCK RETAINING WALL
TW BW	TOP OF WALL LEVEL BOTTOM OF WALL LEVEL
	DENOTES DIVERSION DRAIN
	PROPOSED INTERNAL PRIVATE ROADS/DRIVEWAYS
	PROPOSED CAR PARKING BAYS
	PROPOSED CONCRETE FOOTPATH
	PROPOSED EXTERNAL ROADWORKS

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P2	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P1	05/24	ORIGINAL ISSUE	B.A.R.	T.W.N.

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SCALE A 0 5 10 15 20 1:500

SCALE B

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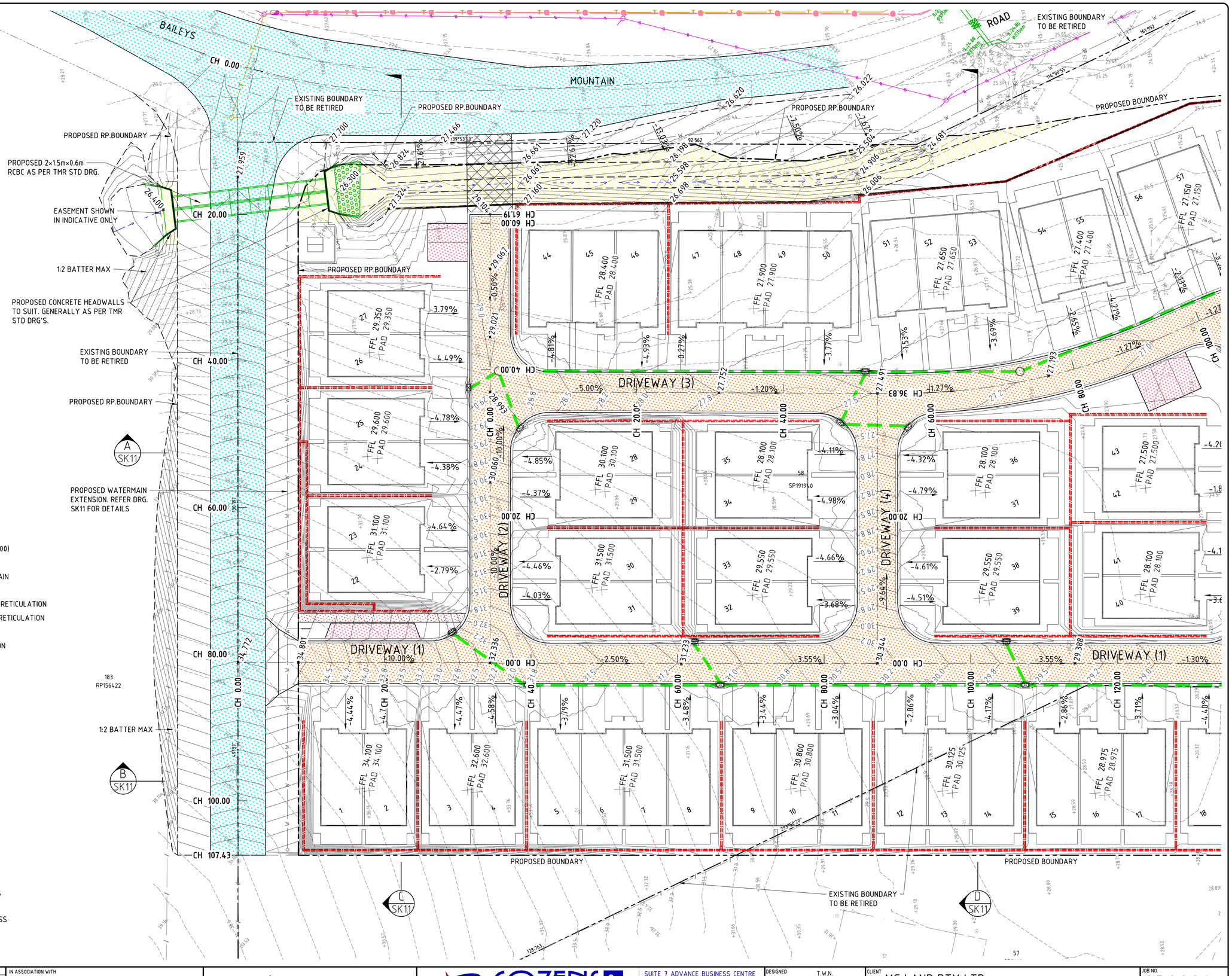
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CLIENT MG LAND PTY LTD

PROJECT PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA

CONCEPT OVERALL SITE PLAN

JOB NO. 230094
DRAWING NO. SK00
ISSUE P1P2



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LEGEND

- 16.0 — EXISTING CONTOUR
- W — EXISTING WATER
- SW — EXISTING STORMWATER
- S — EXISTING SEWER
- T — EXISTING TELSTRA
- G — EXISTING HIGH PRESSURE GAS (CL500)
- E — EXISTING ELECTRICAL
- RM — EXISTING COUNCIL SEWER RISING MAIN
- 83.0 — PROPOSED CONTOUR
- PROPOSED PRIVATE STORMWATER RETICULATION
- PROPOSED COUNCIL STORMWATER RETICULATION
- PROPOSED WATER RETICULATION
- PROPOSED SEWERAGE RETICULATION
- + 23.400 — FINISHED SURFACE LEVEL
- + FFL 23.200 — FINISHED FLOOR LEVEL
- + PAD 22.750 — EARTHWORKS PAD LEVEL
- PROPOSED CONCRETE SLEEPER RETAINING WALL OR SIMILAR TO FUTURE DESIGN
- BRW — PROPOSED BLOCK RETAINING WALL
- TW / BW — TOP OF WALL LEVEL / BOTTOM OF WALL LEVEL
- DENOTES DIVERSION DRAIN
- PROPOSED INTERNAL PRIVATE ROADS/DRIVEWAYS
- PROPOSED CAR PARKING BAYS
- PROPOSED CONCRETE FOOTPATH
- PROPOSED EXTERNAL ROADWORKS
- PROPOSED TEMPORARY SITE ACCESS
- PROPOSED DRAINAGE EASEMENT (INDICATIVE ONLY)

No.	DATE	ISSUE	REVISED	CHECKED
P5	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P4	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P3	05/24	PRELIMINARY ISSUE - 1:2 BATTER ADDED	B.A.R.	T.W.N.
P2	05/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P1	05/24	ORIGINAL ISSUE	B.A.R.	T.W.N.

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SCALE A 0 5 10 1 : 250

SCALE B

DATUM AHD (U.N.O.)

SCALES SHOWN ARE AT A1 SIZE

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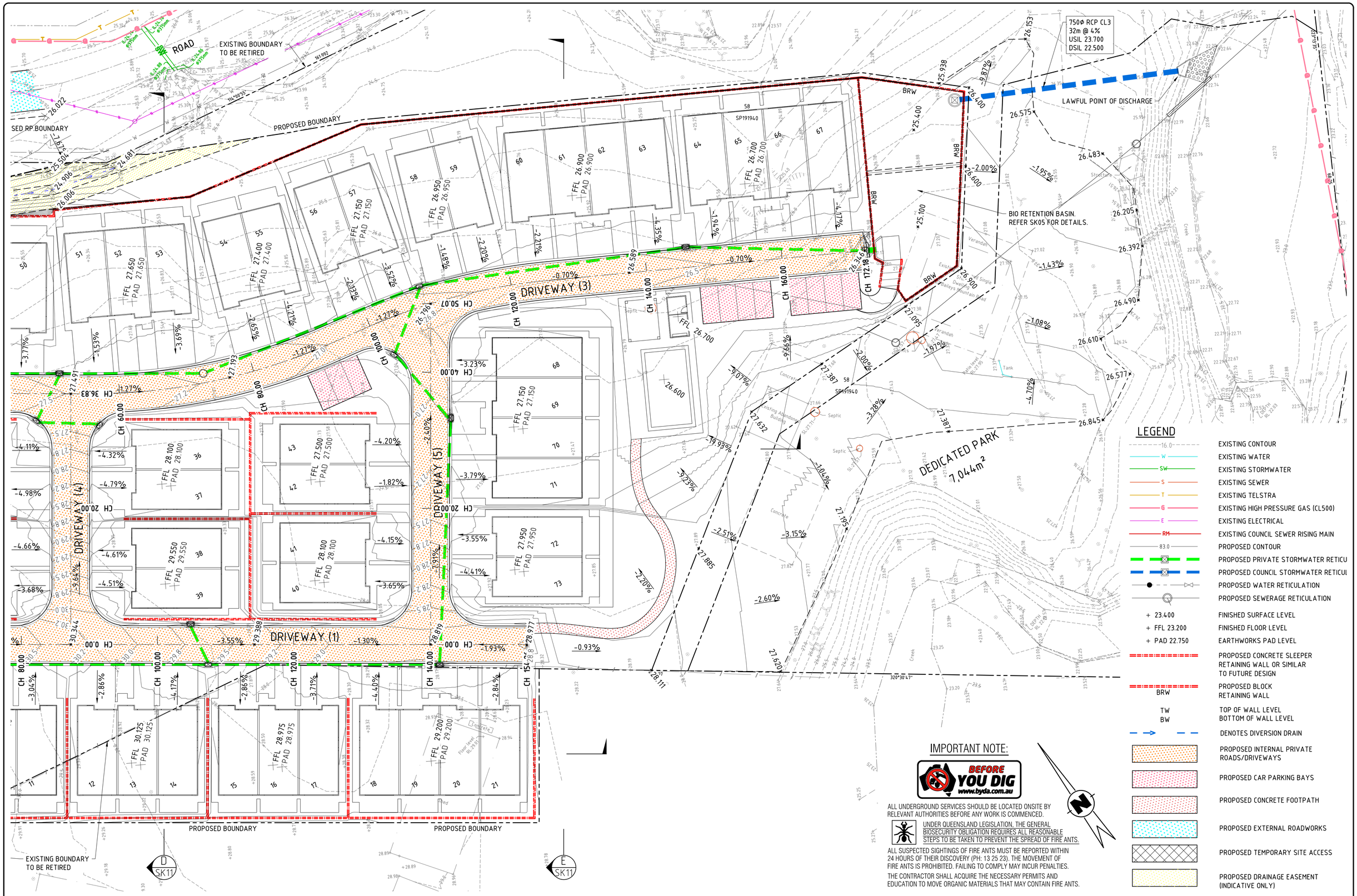
CLIENT: MG LAND PTY LTD

PROJECT: PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
CONCEPT CIVIL WORKS PLAN - 1 OF 2

JOB NO. 230094

DRAWING NO. SK01

ISSUE P1 P2 P3 P4 P5



LEGEND

- EXISTING CONTOUR
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING TELSTRA
- EXISTING HIGH PRESSURE GAS (CL500)
- EXISTING ELECTRICAL
- EXISTING COUNCIL SEWER RISING MAIN
- PROPOSED CONTOUR
- PROPOSED PRIVATE STORMWATER RETICU
- PROPOSED COUNCIL STORMWATER RETICUI
- PROPOSED WATER RETICULATION
- PROPOSED SEWERAGE RETICULATION
- + 23.400 FINISHED SURFACE LEVEL
- + FFL 23.200 FINISHED FLOOR LEVEL
- + PAD 22.750 EARTHWORKS PAD LEVEL
- PROPOSED CONCRETE SLEEPER RETAINING WALL OR SIMILAR TO FUTURE DESIGN
- BRW PROPOSED BLOCK RETAINING WALL
- TW TOP OF WALL LEVEL
  BW BOTTOM OF WALL LEVEL
- DENOTES DIVERSION DRAIN
- PROPOSED INTERNAL PRIVATE ROADS/DRIVEWAYS
- PROPOSED CAR PARKING BAYS
- PROPOSED CONCRETE FOOTPATH
- PROPOSED EXTERNAL ROADWORKS
- PROPOSED TEMPORARY SITE ACCESS
- PROPOSED DRAINAGE EASEMENT (INDICATIVE ONLY)

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P1	05/24	ORIGINAL ISSUE	B.A.R.	T.W.N.

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SCALE A 0 5 10 1 : 250

SCALE B

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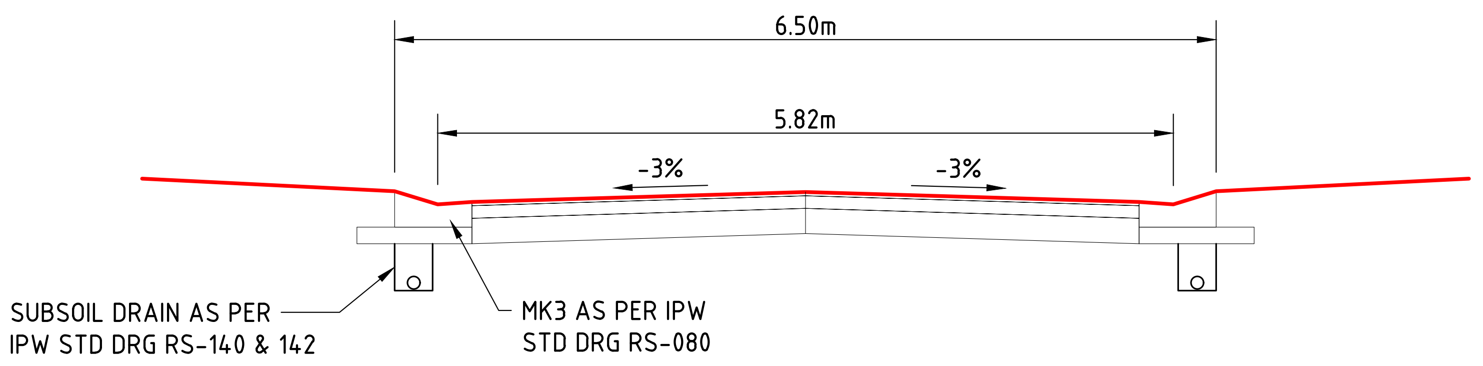
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CLIENT MG LAND PTY LTD

PROJECT
PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
CONCEPT CIVIL WORKS PLAN – 2 OF 2

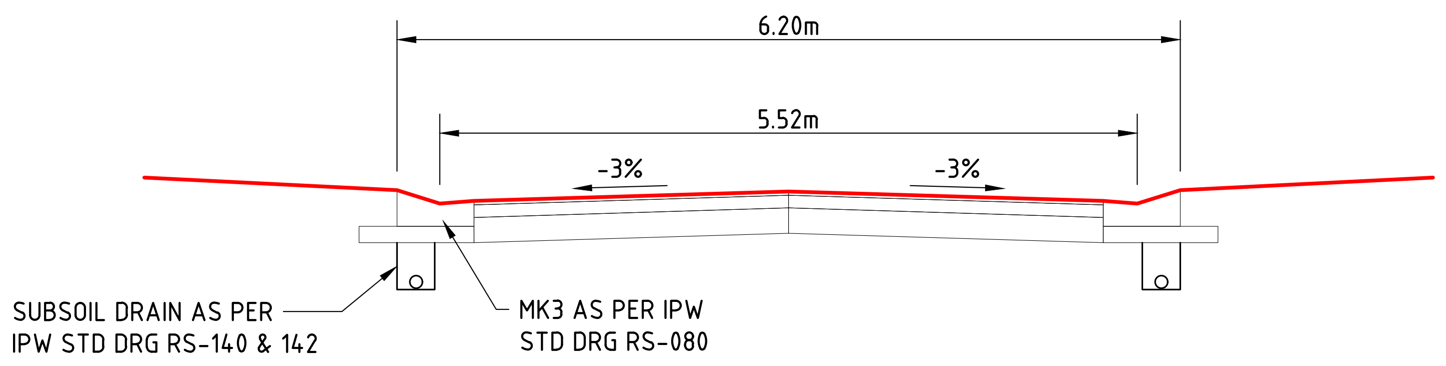
JOB NO. 230094
DRAWING NO. SK02
ISSUE P1 P2 P3 P4



TYPICAL DRIVEWAY (1) SECTION

(BETWEEN CH.00 - CH.40)

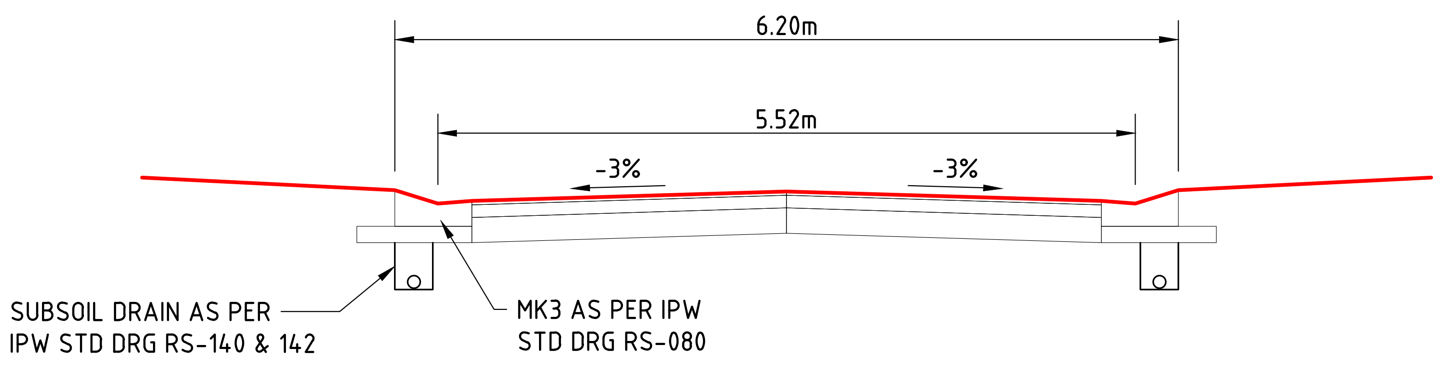
SCALE 1:50



TYPICAL DRIVEWAY (1) SECTION

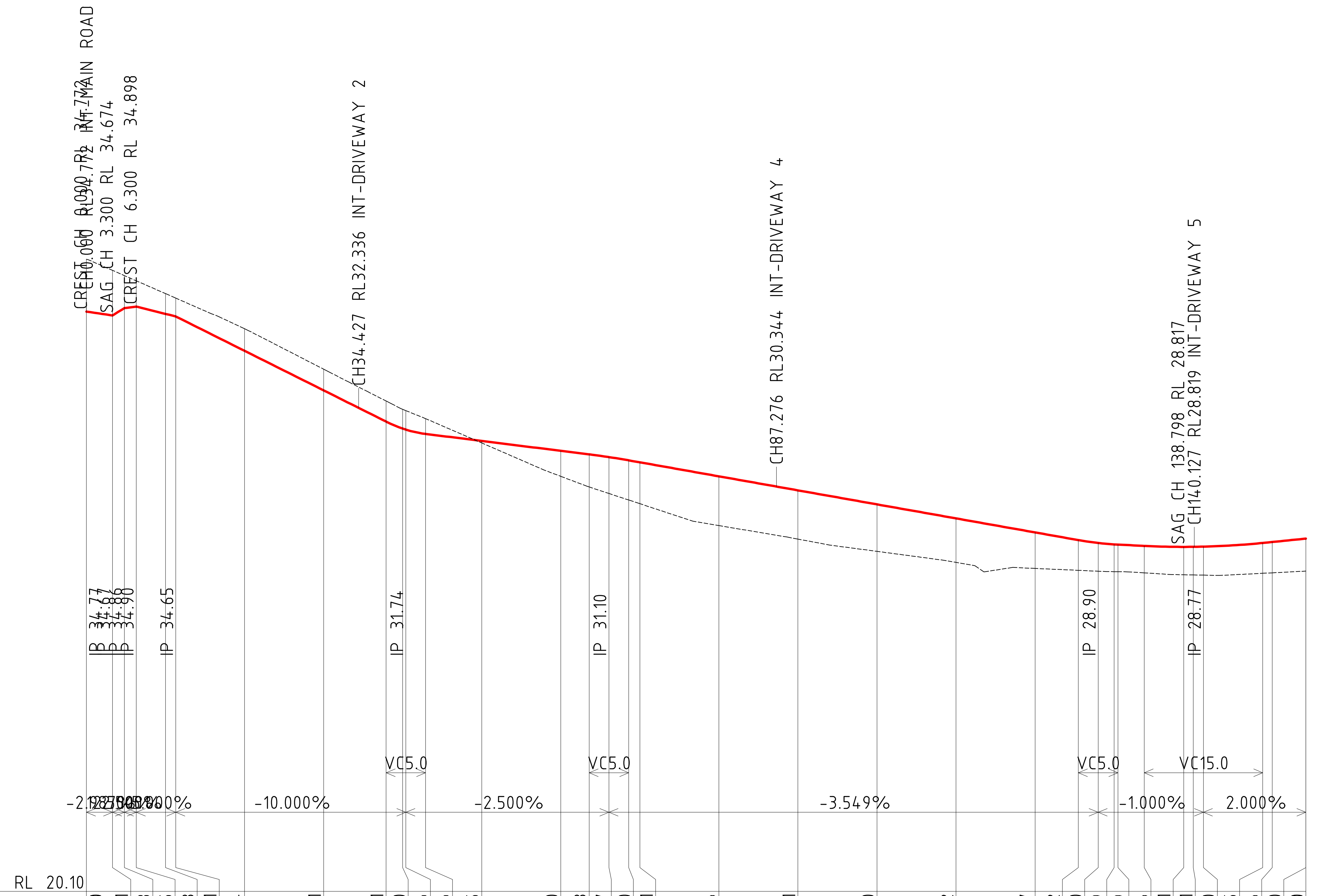
(BETWEEN CH.40 - CH.154)

SCALE 1:50



TYPICAL DRIVEWAY (2) SECTION

SCALE 1:50



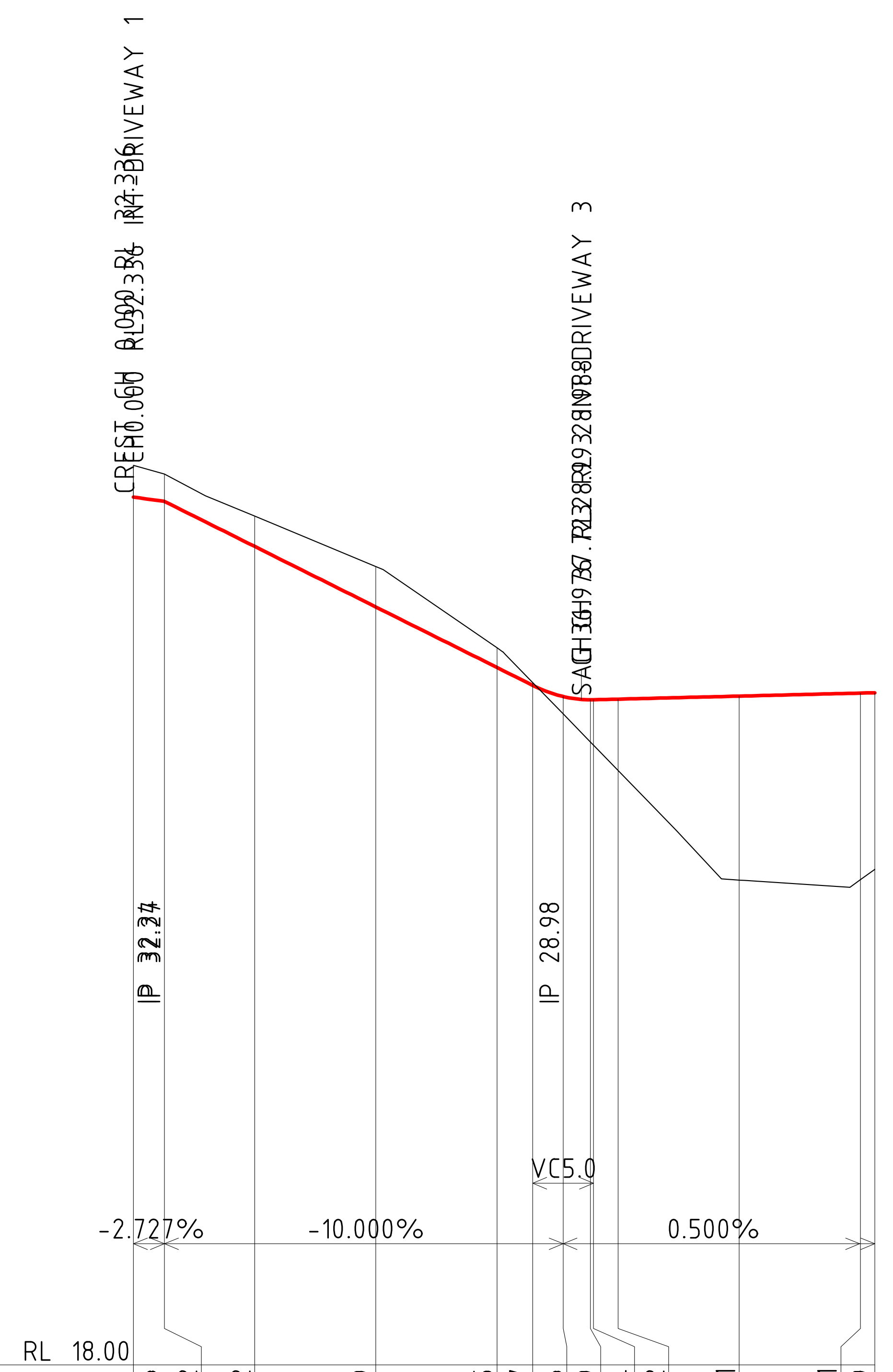
EXISTING SURFACE	36.10	35.81	35.68	35.55	35.23	35.11	34.34	33.31	32.51	32.30	32.26	32.06	31.45	30.60	30.33	30.17	30.00	29.91
DESIGN SURFACE	34.772	34.674	34.861	34.898	34.713	34.648	33.778	32.778	31.988	31.811	31.785	31.676	31.498	31.248	31.158	31.089	31.007	30.957
CUT (-) FILL (+)	-1.324	-1.141	-0.822	-0.653	-0.513	-0.464	-0.560	-0.536	-0.521	-0.487	-0.480	-0.387	+0.051	+0.645	+0.825	+0.921	+1.004	+1.047
CHAINAGE	-0.000	3.300	4.800	6.300	10.000	11.300	20.000	30.000	37.904	40.000	40.404	42.904	50.000	60.000	63.595	66.095	68.595	70.000

EXISTING SURFACE	29.36	29.01	28.70	28.42	28.27	28.22	28.20	28.19	28.19	28.16	28.11	28.11	28.10	28.15	28.16	28.20	28.20
DESIGN SURFACE	30.602	30.248	29.893	29.538	29.183	28.989	28.916	28.880	28.875	28.842	28.817	28.818	28.823	28.917	28.941	29.026	
CUT (-) FILL (+)	+1.246	+1.234	+1.189	+1.113	+0.911	+0.765	+0.714	+0.690	+0.686	+0.682	+0.706	+0.711	+0.721	+0.768	+0.780	+0.822	
CHAINAGE	80.000	90.000	100.000	110.000	120.000	125.476	127.976	130.000	130.476	133.798	138.798	140.000	141.298	148.798	150.000	154.260	154.262

HORIZ. GEOMETRY
L=30.627
B=139°42'38"
L=2.612
R=100.000
L=2.336
B=141°12'28"
L=2.680
R=100.000
L=116.007
B=139°40'19"

ROAD LONGITUDINAL SECTION DRIVEWAY 1
Scale 1:500 h 1:100 v

DRIVEWAY 1



EXISTING SURFACE	32.86	32.72	32.02	31.19	29.85	29.27	28.76	28.29	28.24	27.82	26.01	26.01	26.19
DESIGN SURFACE	32.336	32.266	31.522	30.522	29.522	29.226	29.041	28.988	28.988	28.998	29.048	29.098	29.104
CUT (-) FILL (+)	-0.527	-0.451	-0.500	-0.667	-0.326	-0.045	+0.285	+0.699	+0.748	+1.179	+3.039	+3.083	+2.919
CHAINAGE	-0.000	2.556	10.000	20.000	30.000	32.961	35.461	37.723	37.961	40.000	50.000	60.000	61.188

HORIZ. GEOMETRY
L=61.188
B=49°39'02"

ROAD LONGITUDINAL SECTION DRIVEWAY 2
Scale 1:500 h 1:100 v

DRIVEWAY 2

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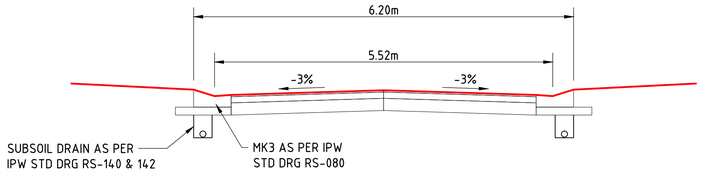
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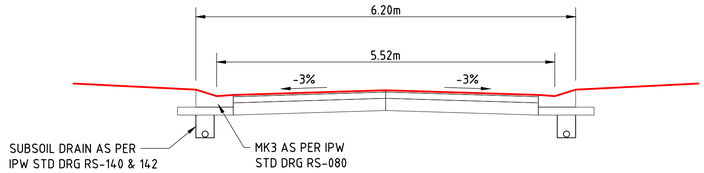
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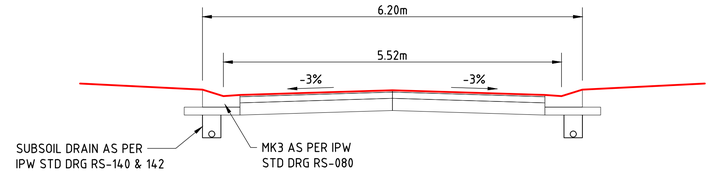
TYPICAL DRIVEWAY (3) SECTION

SCALE 1:50



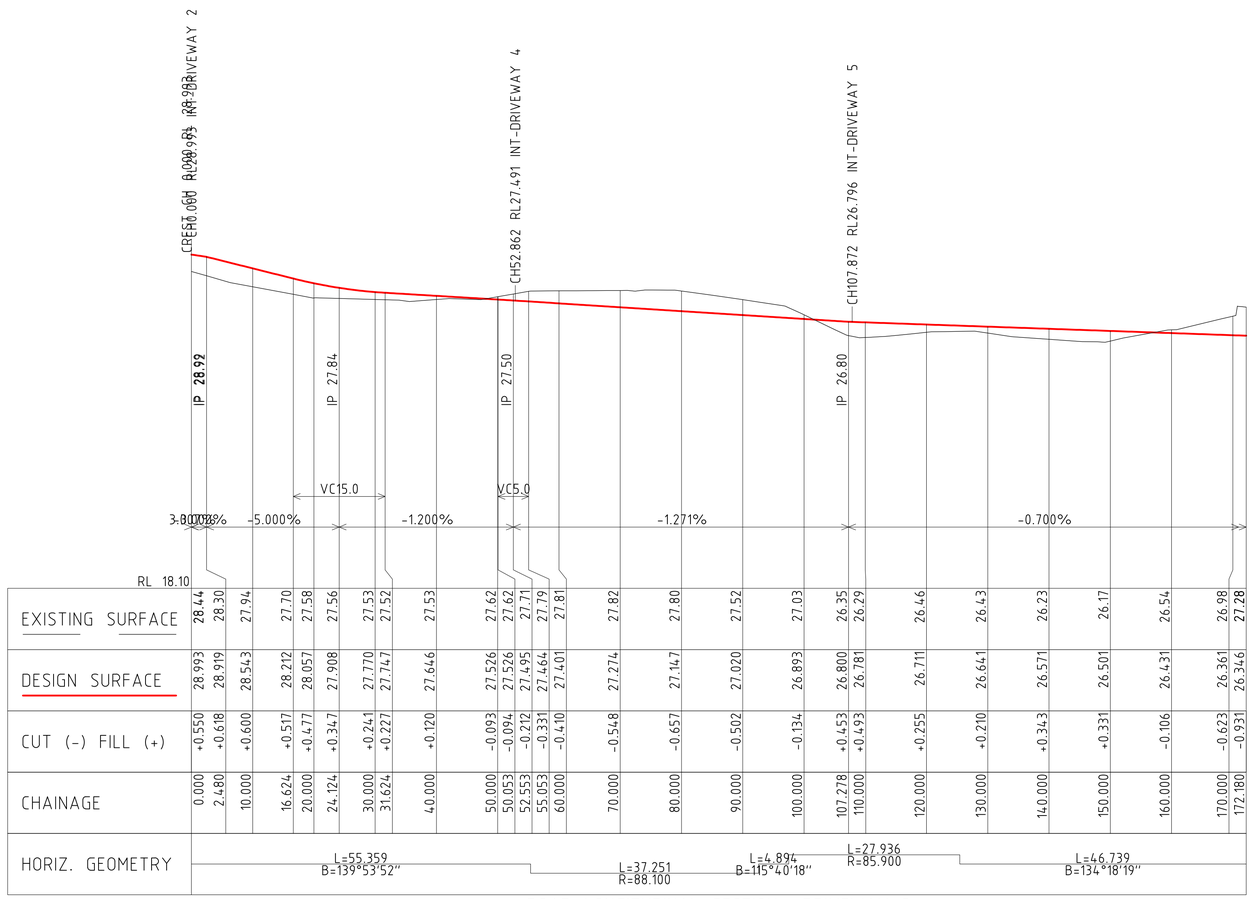
TYPICAL DRIVEWAY (4) SECTION

SCALE 1:50



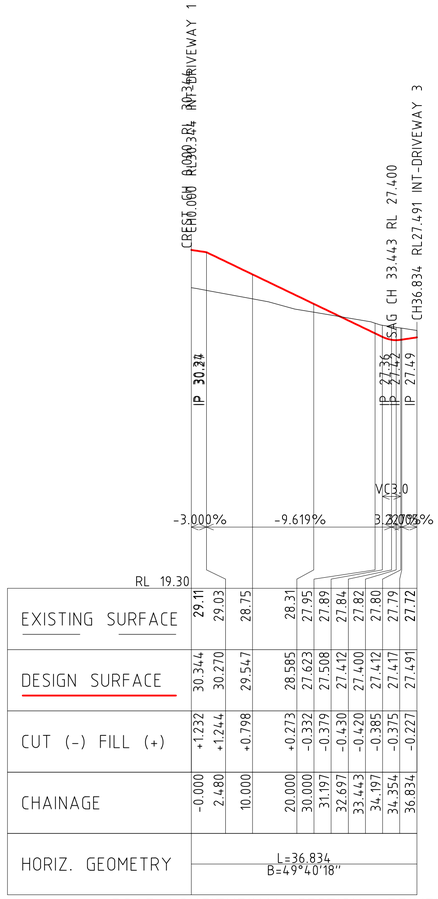
TYPICAL DRIVEWAY (5) SECTION

SCALE 1:50



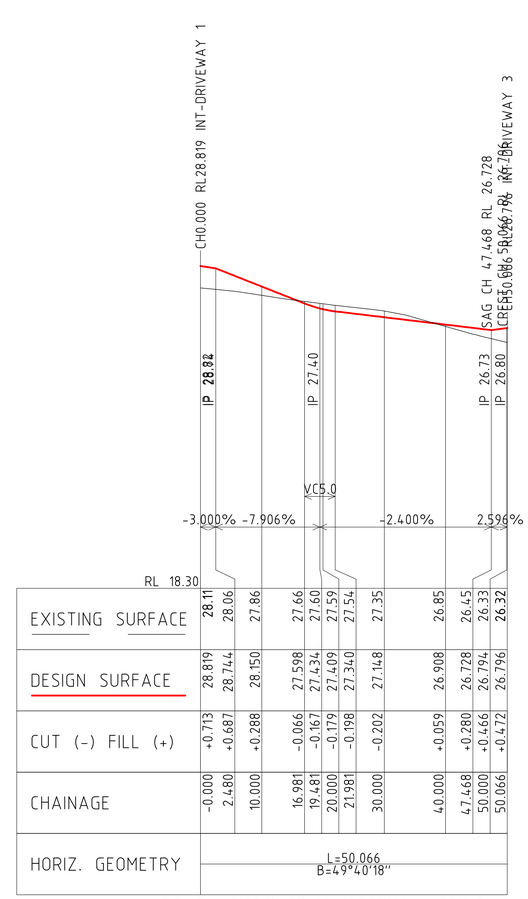
ROAD LONGITUDINAL SECTION DRIVEWAY 3
Scale 1:500 h 1:100 v

DRIVEWAY 3



ROAD LONGITUDINAL SECTION DRIVEWAY 4
Scale 1:500 h 1:100 v

DRIVEWAY 4



ROAD LONGITUDINAL SECTION DRIVEWAY 5
Scale 1:500 h 1:100 v

DRIVEWAY 5

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LEGEND

- 16.0 — EXISTING CONTOUR
- W — EXISTING WATER
- SW — EXISTING STORMWATER
- S — EXISTING SEWER
- T — EXISTING TELSTRA
- E — EXISTING ELECTRICAL
- 83.0 — PROPOSED CONTOUR
- W — PROPOSED COUNCIL WATER MAIN EXTENSION
- PROPOSED PRIVATE SANITARY DRAINAGE
- PROPOSED COUNCIL SEWER EXTENSION

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ALL SUSPECTED SIGHTINGS OF FIRE ANTS MUST BE REPORTED WITHIN 24 HOURS OF THEIR DISCOVERY (PH: 13 25 23). THE MOVEMENT OF FIRE ANTS IS PROHIBITED. FAILING TO COMPLY MAY INCUR PENALTIES.

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590
SP218180

MOUNTAIN ROAD

BAILEYS MOUNTAIN ROAD

RESERVE

PROPOSED 100Ø WATER MAIN

PROPOSED 100Ø WATER MAIN

RP BOUNDARY

RP BOUNDARY

RP BOUNDARY

RP BOUNDARY

RP BOUNDARY

1.50m

1.50m

1.50m

CONNECTION TO EXISTING MAIN TO BE MADE UNDER G.C. WATER SUPERVISION. TO FUTURE CONNECTION DETAILS.

PROPOSED INLINE SLUICE VALVE AS PER SEQ STD DRG. SEQ-WAT-1303-1 D

EXISTING COUNCIL 200Ø WATER MAIN

BREAK INTO EXISTING MANHOLE AND CONNECTION NEW SEWER MAIN AND MAKE GOOD.

EXISTING COUNCIL 300Ø uPVC SEWER IL 21.31 (FROM RECORDS)

PROPOSED DN225 SEWER @ 1:250

CONCRETE ENCASEMENT UNDER WATERWAY TO FUTURE DESIGN.

5.00m REC LINK EASEMENT

PROPOSED DN150 SEWER @ 1:100

PROPOSED 150Ø uPVC SN8 SEWER PROPERTY CONNECTION TO SERVICE DEVELOPMENT. IL

58
SP191940

DRIVEWAY (3)

PARK

ROAD

ROAD

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202 BAILEYS MOUNTAIN RD, UPPER COOMERA
CONCEPT WATER AND SEWER PLAN – 1 OF 2

JOB NO. 230094

DRAWING NO. SK10

ISSUE A | B

MOUNTAIN

ROAD

PROPOSED 100Ø WATER MAIN

RP BOUNDARY

DRIVEWAY (1)

DRIVEWAY (2)

DRIVEWAY (3)

DRIVEWAY (4)

DRIVEWAY (5)

PROPOSED 100Ø DOMESTIC/FIRE WATER METER TO DETAILED DESIGN.

PROPOSED STANDARD END LINE HYDRANT AS PER SEQ STD DRG. SEQ-WAT-1302-1 D

PROPOSED 150Ø SEWER PROPER TO SERVICE DE IL

LEGEND

- EXISTING CONTOUR
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING TELSTRA
- EXISTING ELECTRICAL
- PROPOSED CONTOUR
- PROPOSED COUNCIL WATER MAIN EXTENSION
- PROPOSED PRIVATE SANITARY DRAINGE
- PROPOSED COUNCIL SEWER EXTENSION

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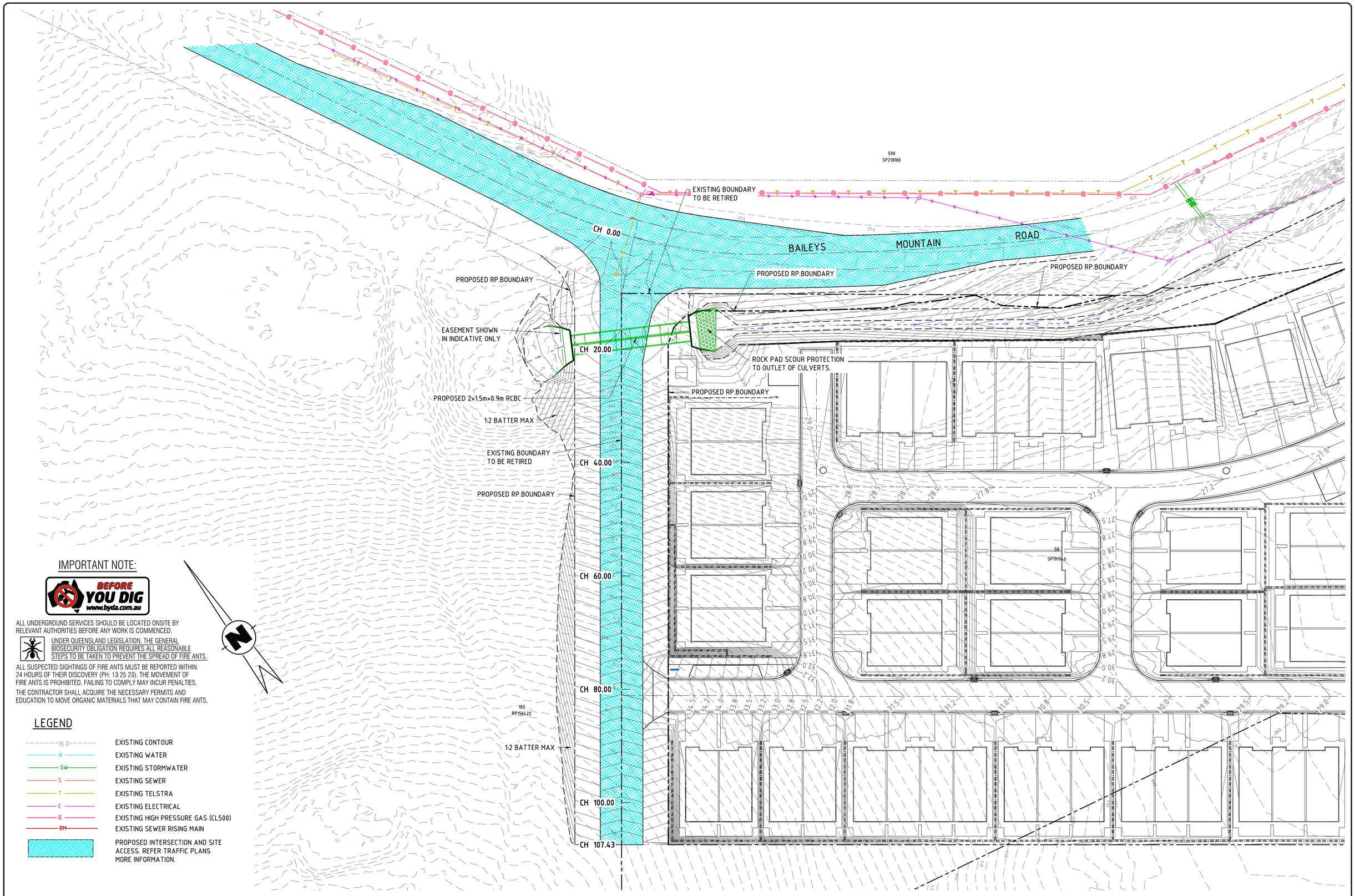
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CONCEPT WATER AND SEWER PLAN - 2 OF 2

JOB NO. 230094

DRAWING NO. SK11

ISSUE A|B



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LEGEND

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- W — EXISTING WATER
- SW — EXISTING STORMWATER
- S — EXISTING SEWER
- T — EXISTING TELSTRA
- E — EXISTING ELECTRICAL
- G — EXISTING HIGH PRESSURE GAS (CL500)
- RM — EXISTING SEWER RISING MAIN
- PROPOSED INTERSECTION AND SITE ACCESS. REFER TRAFFIC PLANS MORE INFORMATION.

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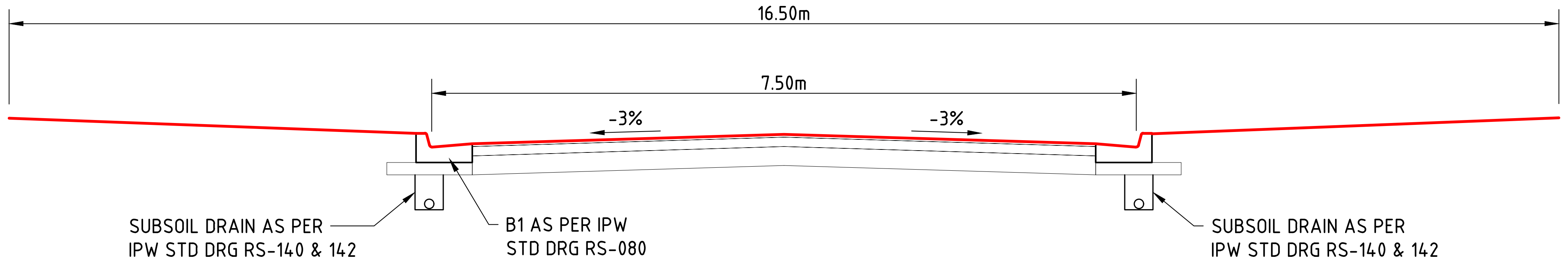
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CONCEPT EXTERNAL ROADWORKS PLAN

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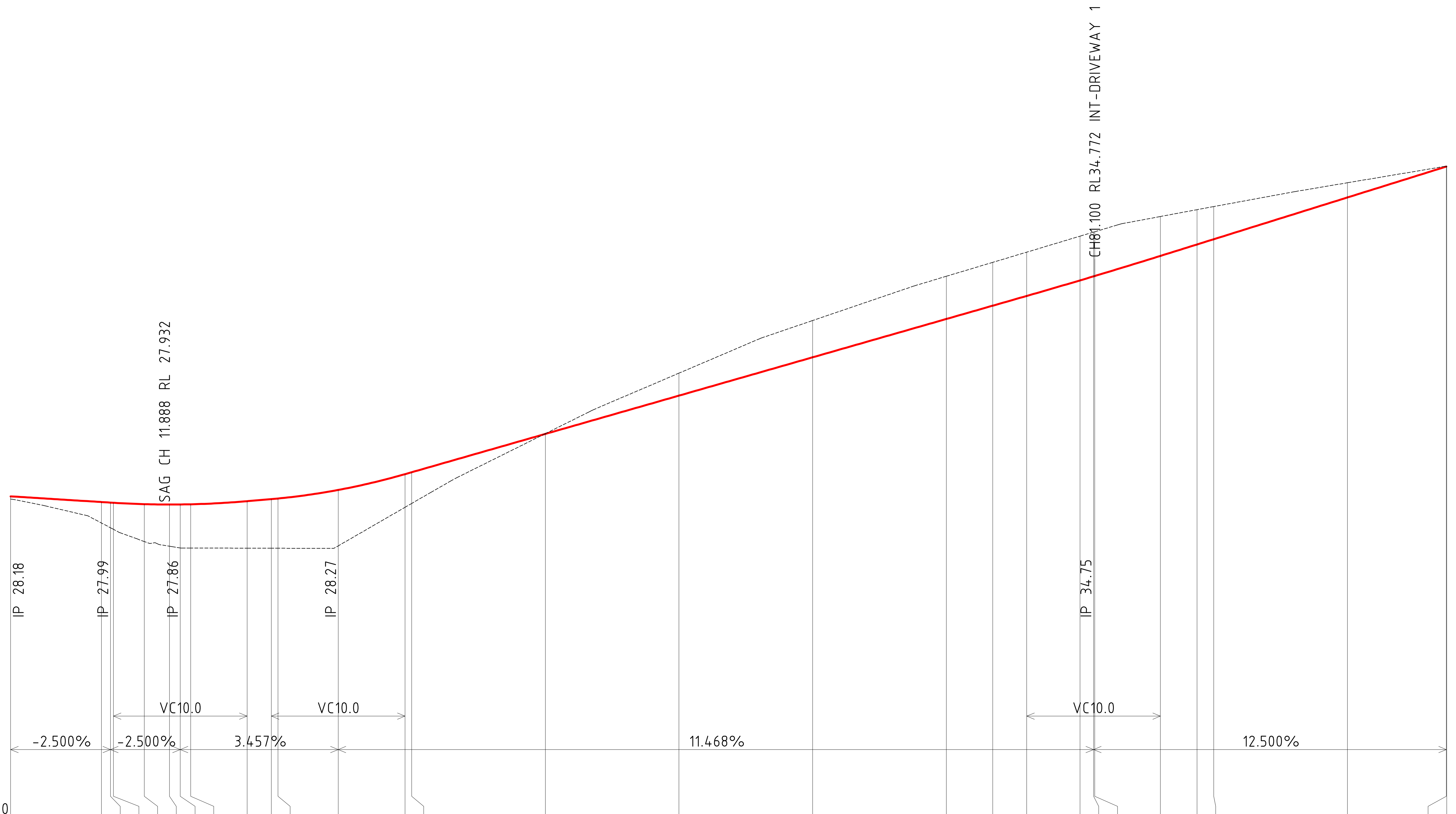
DRAWING NO. SK30

ISSUE P1 P2 P3



TYPICAL ROAD SECTION

SCALE 1:50



EXISTING SURFACE	28.10	27.38	27.24	27.19	26.83	26.68	26.63	26.63	26.63	26.62	26.62	26.70	27.85	27.96	30.05
DESIGN SURFACE	28.177	28.007	27.990	27.985	27.943	27.932	27.934	27.940	28.033	28.096	28.114	28.369	28.842	28.898	30.045
CUT (-) FILL (+)	+0.081	+0.627	+0.752	+0.794	+1.116	+1.247	+1.300	+1.309	+1.406	+1.471	+1.490	+1.674	+0.991	+0.934	-0.009
CHAINAGE	0.000	6.796	7.473	7.691	10.000	11.888	12.691	13.476	17.691	19.508	20.000	24.508	29.508	30.000	40.000
HORIZ. GEOMETRY	L=6.796 B=242°24'32"		L=6.680 R=30.000												

EXISTING SURFACE	31.86	33.44	34.76	35.18	35.49	35.96	36.09	36.10	36.55	36.76	36.85	37.56	38.06	38.06
DESIGN SURFACE	31.192	32.339	33.486	33.884	34.175	34.641	34.761	34.772	35.374	35.716	35.872	37.122	38.048	
CUT (-) FILL (+)	-0.673	-1.101	-1.278	-1.297	-1.311	-1.323	-1.325	-1.324	-1.178	-1.041	-0.978	-0.440	-0.010	
CHAINAGE	50.000	60.000	70.000	73.468	76.011	80.000	81.011	81.100	86.011	88.748	90.000	100.000	107.403	107.430
HORIZ. GEOMETRY		L=93.953 B=229°39'02"												

ROAD LONGITUDINAL SECTION MAIN ROAD
Scale 1:250 h 1:100 v

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APPENDIX D

City of Gold Coast GIS Mapping





ALLAN & DENNIS

202 BAILEYS MOUNTAIN ROAD

HYDRAULIC ASSESSMENT

OCTOBER 2024

J23037/R1V1

PREPARED FOR
MG LAND

DOCUMENT INFORMATION

Prepared for:
MG Homes

Job reference:
J23037

Report reference:
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Rick Dennis
Principal Engineer

APPROVED

Laurence Allan
Principal Engineer

REVISION HISTORY

Version	Date	Revision	Prepared	Approved
1	17 October 2024	DA Submission	R. Dennis	L. Allan

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NOMENCLATURE

A&D	Allan & Dennis Pty Ltd
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
ALS	Aerial Laser Survey
ARI	Average Recurrence Interval
ARR	Australia Runoff and Rainfall
BoM	Bureau of Meteorology
CGL	Change to ground level and creation of new waterways code
Council	City of Gold Coast
DA	Development Application
HA	Hydraulic Assessment
IL	Invert Level
IR	Information Request
SGS	Sub-Grid Sampling
SMP	Stormwater Management Plan

In-line with the recent implementation of ARR (Ball, et al., 2019) design storm events are described in terms of AEP, the probability of a storm event magnitude exceeded in any given year as a percentage. This terminology was implemented to replace the ARI, of which is commonly misinterpreted, for example, that a 10 year ARI will occur exactly every ten years. The event equivalency is presented below:

AEP (%)	ARI (year)	Shorthand
63	1 in 1	Q1
50	1 in 1.44	Q2
20	1 in 4.48	Q5
10	1 in 9.49	Q10
5	1 in 20	Q20
2	1 in 50	Q50
1	1 in 100	Q100

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Nomenclature ii
1 Introduction 4
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2.3 Results 7
3 Conclusion & Qualifications 8
4 References 9

FIGURES

Figure 1 Site Location & Hydrologic Model Layout
Figure 2 Hydraulic Model Layout - Existing
Figure 3 Hydraulic Model Roughness - Existing
Figure 4 Hydraulic Model Layout - Developed
Figure 5 Hydraulic Model Roughness - Developed
Figure 6 Model Topography Difference- Developed

REFERENCE DRAWINGS

APPENDICES

Appendix A Hydrologic Box Plots
Appendix B Existing Flood Maps
Appendix C Developed Flood Maps

1 INTRODUCTION

This HA has been prepared by A&D to support the DA of Lot 57 on SP214370 and Lot 58 on SP191940 (the site). This report details the assessment of the existing and proposed site conditions, in order to provide flood predictions to address relevant outcomes of the CGL code.

The existing site is traversed by Yuan Creek and several northern tributaries prior to discharging through the Old Coach Road culverts. The project works propose to formalise the meandering tributary along the Baileys Mountain Road frontage to provide access and suitable development, as per the received design (attached in reference drawings). Yuan Creek and other tributaries will remain as per existing.

2 FLOOD ASSESSMENT

A new flood model was established, in accordance with current best-practice, as detailed herein

2.1 HYDROLOGY

The hydrologic (rainfall-runoff) modelling was undertaken using WBNM with Storm injector (v1.3.8). Sub-catchments were delineated from Council's stormwater network database, ALS (conducted 2014) and ground survey (attached in reference drawings), as illustrated on Figure 1 and summarised in Table 2-1.

TABLE 2-1 SUB-CATCHMENT PROPERTIES

ID	Area (ha)	Impervious (%)	ID	Area (ha)	Impervious (%)
C01	74.22	0.0	C09	11.63	15.8
C02	56.83	0.0	C10	6.64	0.0
C03	10.43	0.0	C11	6.09	0.0
C04	30.97	0.0	C12	15.33	0.0
C05	17.23	0.0	C13	4.57	11.5
C06	6.76	0.0	C14	13.86	46.1
C07	16.28	19.5	C15	3.54	0.0
C08	21.96	44.6	**Total**	**296.36**	**7.3**

The adopted impervious values were based on 2023 aerial imagery and equivalent fraction impervious estimates (IPWEAQ, 2017). Current best practices were adopted to estimate design storm runoff, including the following model parameters:

- 1.3 catchment lag factor;
- BoM 2016 design rainfall depths; and
- ARR (Ball, et al., 2019) temporal patterns and burst losses (initial loss – median pre-burst).

All design storms, 63%-1% AEP, 30-540 minute durations and temporal ensembles were simulated. Critical design flows at the site are presented Table 2-2 respectively total catchment runoff at the site (C15). Box plots are included in Appendix A.

TABLE 2-2 CRITICAL DESIGN FLOWS AT SITE (C20)

AEP (%)	Median Pattern Peak Flow (m^3/s)	Critical Duration (min)
63	13.5	270
50	16.0	180
20	30.0	180
10	33.7	120
5	41.2	120
2	46.9	90
1	55.7	120

2.2 HYDRAULIC

The hydraulic modelling was undertaken using Tuflow HPC SGS (2023-03-AC), as summarised below.

2.2.1 EXISTING SCENARIO

- Model extent illustrated in Figure 2, with boundaries set a suitable distance away from the site to eliminate undue boundary effects;
- Topography is based on ALS data (conducted 2014) and site ground survey with a 2 m model grid. Break lines and grid modifications were applied to critical areas for accuracy, consistency and stability;
- Manning's 'n' roughness, as illustrated in Figure 3:
    - Road 0.03 (0.05 m) to 0.013 (0.5 m) (variable depth);
    - Maintained 0.1 (0.05 m) to 0.02 (0.2 m) (variable depth);
    - Vegetated 0.08 (1 m) to 0.12 (3 m) (variable depth);
    - Standing water 0.025; and
    - Lots 0.1.
- Normal depth height-discharge tailwater boundary;
- Local inflows applied as grid areas. Proportionate flow split applied to sub-catchments C05 and C14 for further definition within the hydraulic model;
- Initial dam water levels set to lowest outlet elevations;
- Map cut-off depth of 0.01 m; and
- Structure properties based on Council's open database and site survey, with engineering assumptions applied to missing information. Table 2-3 presents key structure information.

TABLE 2-3 KEY STRUCTURE PROPERTIES

Structure	Arrangement (m)	Upstream IL (mAHD)	Downstream IL (mAHD)	Source
Baileys Mountain Road 1	2/0.375	24.74	24.66	Ground Survey
Baileys Mountain Road 2	2/1.5x0.75	21.77	21.6	Ground Survey
Lot 58 on SP191940 Driveway	2/0.9x0.9	22.23	22.2	Ground Survey
Lot 57 on SP214370 Driveway	1/0.75 1/0.9 1/1.05	23.44 23.45 23.46	23.32 23.32 23.34	Ground Survey
Old Coach Rd Yuan Creek	3/2.7x1.8* 2/2.7x2.0*	20.78	20.50	Ground Survey
Development Entrance^	2/1.5x0.6	26.4	26.3	Design

* For consistancy, modelled as 5/2.7x1.88
^ Developed scenario only

2.2.2 DEVELOPED SCENARIO

- As per base scenario incorporating received design surface and formalised channel (maintained grass), as illustrated Figure 4 and 5 respectively. Model topography difference illustrated in Figure 6;
- Proposed site road crossing, as per Table 2-3. This arrangement is in accordance to culvert waterway barrier works work type 1.3 (DAF, 2018); and
- Existing site inflows assumed (refer to SMP demonstrating no increase in site runoff).

2.3 RESULTS

In accordance to best practice, all design storms, critical durations and temporal ensembles were simulated for both existing and developed scenarios. Raw results are processed such that the peak flood surface is the critical duration, median temporal pattern result. Applicable results are discussed below.

2.3.1 EXISTING SCENARIO

Appendix B presents the existing scenario flood maps. Relevant hydraulic controls include the upstream site (Lot 183 on RP156422) dam spillway, and the Baileys Mountain / Old Coach Road crossings. These controls confirm an appropriate model extent.

The northern Baileys Mountain Road culverts are overtopped during the 63% AEP event, noting the conservative initial dam water levels. Old Coach Road is overtopped during events greater than the 50% AEP event.

Flow velocities up to 1.9 m/s are noted through the first site section of the Baileys Mountain Road frontage tributary for the 1% AEP event.

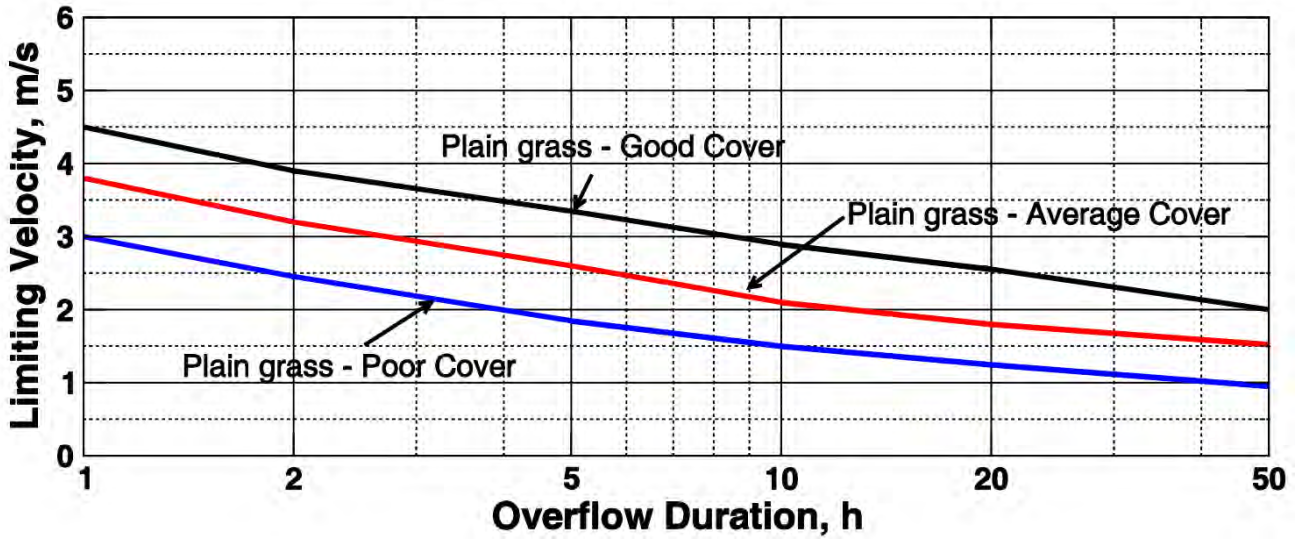
2.3.2 DEVELOPED SCENARIO

The developed scenario flood depth, level difference, velocity and velocity difference maps are presented in Appendix C. These indicate design storms traverse the site within the formalised channel providing safe development. Initial 1D analysis of the channel indicated a 0.5 m freeboard to the top of bank during the 1% AEP event and 0.3 m freeboard for high roughness vegetation sensitivity.

Flood level difference maps illustrate the formalisation of the Baileys Mountain Road frontage flow path results are within tolerable afflux limits for affected open space, designated drainage areas, road reserve / corridor (CGC, 2019). There are general flood level reductions external to the site with relatively minor changes over the site interfaces at extremely low depths (<0.1 m) as a result of consolidating inundation to within the formalised channel. However, the development does not affect the safety or use of any land external to the site. Furthermore, the development will not impact the proposed Baileys Mountain Road upgrade design.

The 1% AEP flow velocity within the formalised channel section is up to 2.5 m/s for the critical 90-minute design storm. Design storm analysis indicates this is within the limiting velocity curve for even poor grass cover, as per Chart 2-1. However, inspections should be conducted during the vegetation establishment phase to ensure scour issues are resolved.

CHART 2-1 LIMITING VELOCITY DURATION FOR GRASS (HEWLETT, BOORMAN, & BRAMLEY, 1987)



3 CONCLUSION & QUALIFICATIONS

This HA has been prepared to support the proposed DA and ensure the proposed formalised channel is sufficient to safely convey design storm flows through the site. A new hydraulic model was established to accurately assess the site and proposed works in accordance to current best-practice. Model results indicate the proposed development:

- Does not cause ponding on the site or nearby land;
- Does not increase flooding which adversely affects the safety or use of any land upstream and downstream; or
- Does not adversely affect the flow of water in any overland flow path external to the site.

Furthermore, the proposed site road crossing arrangement culvert waterway barrier works work type 1.3 (DAF, 2018).

This report was prepared by A&D, specifically catered for the particular project requirements, and may not be applicable beyond this scope. For this reason, any other third parties are not authorised to utilise this report without further input and advice from A&D.

The report is based on the following information provided by others:

- ALS elevation data;
- Site ground survey (Focus Survey);
- Development design (Cozens Regan Group); and
- Stormwater network database (Council).

The accuracy of the report is dependent upon the accuracy of this information.

Whilst this report assesses catchment hydraulic performance, using industry standard theoretical modelling techniques and engineering practices, actual future observed catchment flows, levels and extent of inundation may vary from those predicted herein.

4 REFERENCES

Ball, J., Babister, M., Nathan, R., Weeks, W., Weinmann, E., Retallick, M., & Testoni, I. (Eds.). (2019). *Australian Rainfall and Runoff: A Guide to Flood Estimation.* Commonwealth of Australia (Geoscience Australia).

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IPWEAQ. (2017). *Queensland Urban Drainage Manual Fourth Edition.* Institute of Public Works Engineering Australasia, Queensland Division.

FIGURES

FIGURE 1 SITE LOCATION & HYDROLOGIC MODEL LAYOUT
FIGURE 2 HYDRAULIC MODEL LAYOUT - EXISTING
FIGURE 3 HYDRAULIC MODEL ROUGHNESS - EXISTING
FIGURE 4 HYDRAULIC MODEL LAYOUT - DEVELOPED
FIGURE 5 HYDRAULIC MODEL ROUGHNESS - DEVELOPED
FIGURE 6 MODEL TOPOGRAPHY DIFFERENCE- DEVELOPED

526000E 527000E 528000E 529000E

6918000N 6917000N 6916000N

C11
6.1 ha

C12
15.3 ha

C05
17.2 ha

C04
31 ha

C10
6.6 ha

C13
4.6 ha

C14
13.9 ha

C06
6.8 ha

C15
3.5 ha

C09
11.6 ha

C03
10.4 ha

C02
56.8 ha

C08
22 ha

C07
16.3 ha

C01
74.2 ha

Bailey's Mountain Road
Jenkins Court
Annabelle Crescent
Nicola Way
Old Coach Road
Gannon Way
Duce Court Reserve
Ruffles Road
WILLOW VALE
Courtney Drive
C-J Edward Park
Yaun Creek
Reserve Road
Goldcrest Drive Park
Gordon Drive
UPPER COOMERA
Upper Coomera State College
Serin Street
Bluetail Crescent
Serin Street Park
Filbert Street Reserve
Hotham Creek
WONGAWALLAN
Temporarily Closed Road
Brygon Creek
Brygon Creek Drive Reserve
Brygon Creek Drive

LEGEND

Site
Cadastre
Sub-catchment

Elevation (mAHD)
80
20

Elevation Contour
50 m
10 m

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DATE
15 October 2024

SIZE
A3

REFERENCE
J23037

SCALE
1:10000

0 200 400 600 800 1,000 m

FIGURE 1

SITE LOCATION & HYDROLOGIC MODEL LAYOUT

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

C:\Work\AD\J23037\QGIS\DOP\Figure1.qgs 2024-10-15T21:29:06.912

527500E
527750E
528000E
528250E
528500E
6918000N
6917750N
6917500N
6917250N

C12T
C10L
C13L
C14B
C15L
C09L
C05A
C04L
C06L
C03L
C02T
1/0.45 RCP
1/1.8 RCP
2/0.375 RCP
2/0.9x0.9 RCBC
5/2.7x1.88 RCBC
3/0.75x0.3 RCBC
1/0.9 RCP
3/2.4x1.5 RCBC
3/1.8 RCP
1/0.9 RCP

Jenkins Court
Tilbury Rise
Mount Street
Erskine Street
Mortimore Place
Gloucester Place
Kiamba Street
Elabana Court
Kondalilla Drive
Old Coach Road
Denise Drive
Wendy Court
Baileys Mountain Road
Courtney Drive
Yaun Creek
Reserve Road
Tian Crescent
Gordon Drive
Wright Court
CJ Edward Park

LEGEND

- Site
- Cadastre

Model Features

- Extent
- Culvert
- Inflow
- Boundary

Model Topography (m)

40
20

Contour

- 5 m
- 1 m

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SIZE A3
REFERENCE J23037
SCALE 1:3750

0 90 180 270 360 450 m

FIGURE 2

MODEL TOPOGRAPHY - EXISTING (E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\DOP\Prizren.qgs 2024-10-15T21:30:38.749

527500E
527750E
528000E
528250E
528500E
6918000N
6917750N
6917500N
6917250N

Jenkins Court
Erskine Street
Tilbury Rise
Mount Street
Mortimore Place
Gloucester Place
Kiamba Street
Elabana Court
Kondalilla Drive
Old Coach Road
Wendy Court
Denise Drive
Baileys Mountain Road
Courtney Drive
C J Edward Park
Yaun Creek
Reserve Road
Richardson Crescent
Tian Crescent
Gordon Drive
Wright Court

LEGEND

Site
Cadastre

Model Features
Extent

Roughness Class
Vegetation
Maintained
Road
Water
Lots

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SIZE
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REFERENCE
J23037

SCALE
1:3750

0 90 180 270 360 450 m

FIGURE 3
MODEL ROUGHNESS - EXISTING (E06)
202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

C:\Work\AD\J23037\GIS\D06\Prizen.aprx 2024-10-15T21:30:31.572

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

C10L
C13L
C14B
C15L
C09L
C J Edward Park

2/1.5x0.6 RCBC
2/0.375 RCP
2/0.9x0.9 RCBC
2/1.5x0.75 RCBC
1/0.65 RCP
5/2.7x1.88 RCBC
1/1.2 RCP
1/0.9 RCP
1/0.75 RCP

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
Reserve Road

40
35
30
25

N

LEGEND

- Site
- Cadastre
- Culvert
- Inflow

Model Topograph (m)

40
20

Contour

- 5 m
- 1 m

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15 October 2024

SIZE
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REFERENCE
J23037

SCALE
1:1200

0 20 40 60 80 100 m

FIGURE 4

MODEL TOPOGRAPHY - DEVELOPED (D08)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

D:\Work\AD\J23037\QGIS\D08\Frizzen.qgs 2024-10-15T21:30:35.017

528000E

528250E

6917500N

Purlingbrook Street

Kondalilla Drive

Baileys Mountain Road

Old Coach Road

CJ Edward Park

Yaun Creek

Reserve Road

N

LEGEND

Site

Cadastre

Model Features

Extent

Roughness Class

Vegetation

Maintained

Road

Water

Lots

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SCALE
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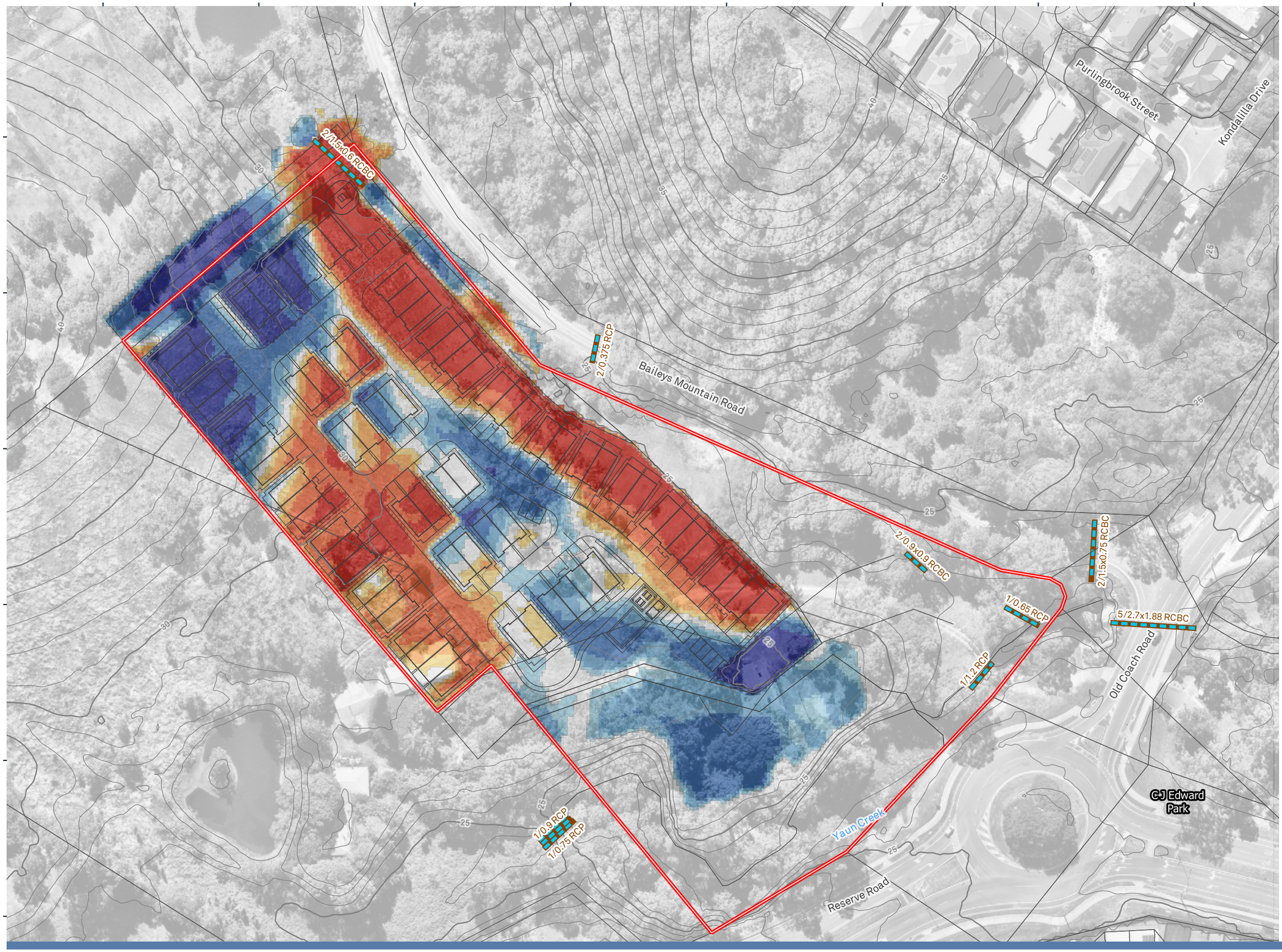
0 20 40 60 80 100 m

FIGURE 5

MODEL ROUGHNESS - DEVELOPED (D08)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE 6

MODEL TOPOGRAPHY DIFFERENCE - DEVELOPED (D08-E04)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

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LEGEND

- BUSHFIRE BUFFER
- RETAINING WALL
- TEMPORARY CONSTRUCTION ACCESS
- BIN COLLECTION POINT
- POOL SHELTER

REDDOOR ARCHITECTURE

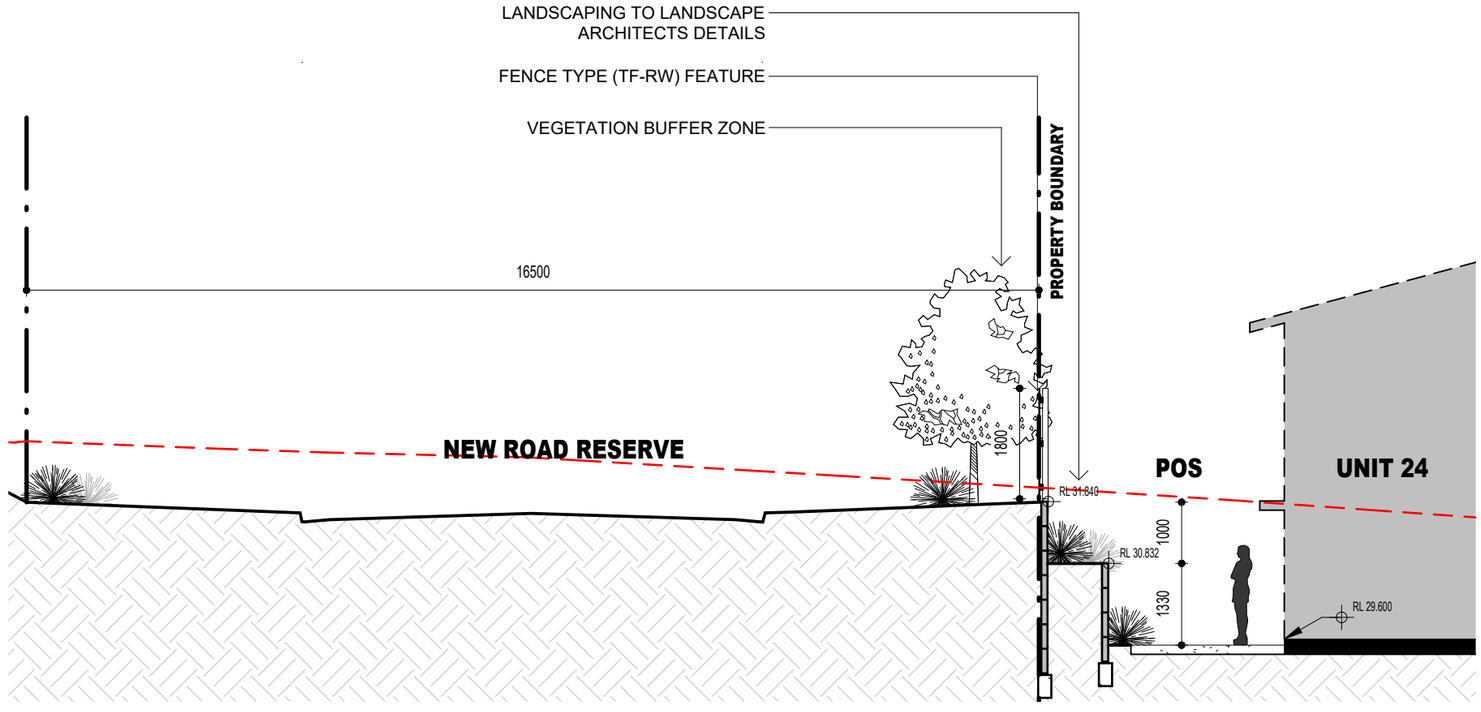
REVISION			
A	16.10.24	DA ISSUE	

WWW.RDARCH.COM.AU	230008	SCALE 1 : 1000	16.10.24	202 BAILEYS MOUNTAIN RD, UPPER COOMERA	MG LAND	DA-0-010	SITE PLAN OF LAYOUT

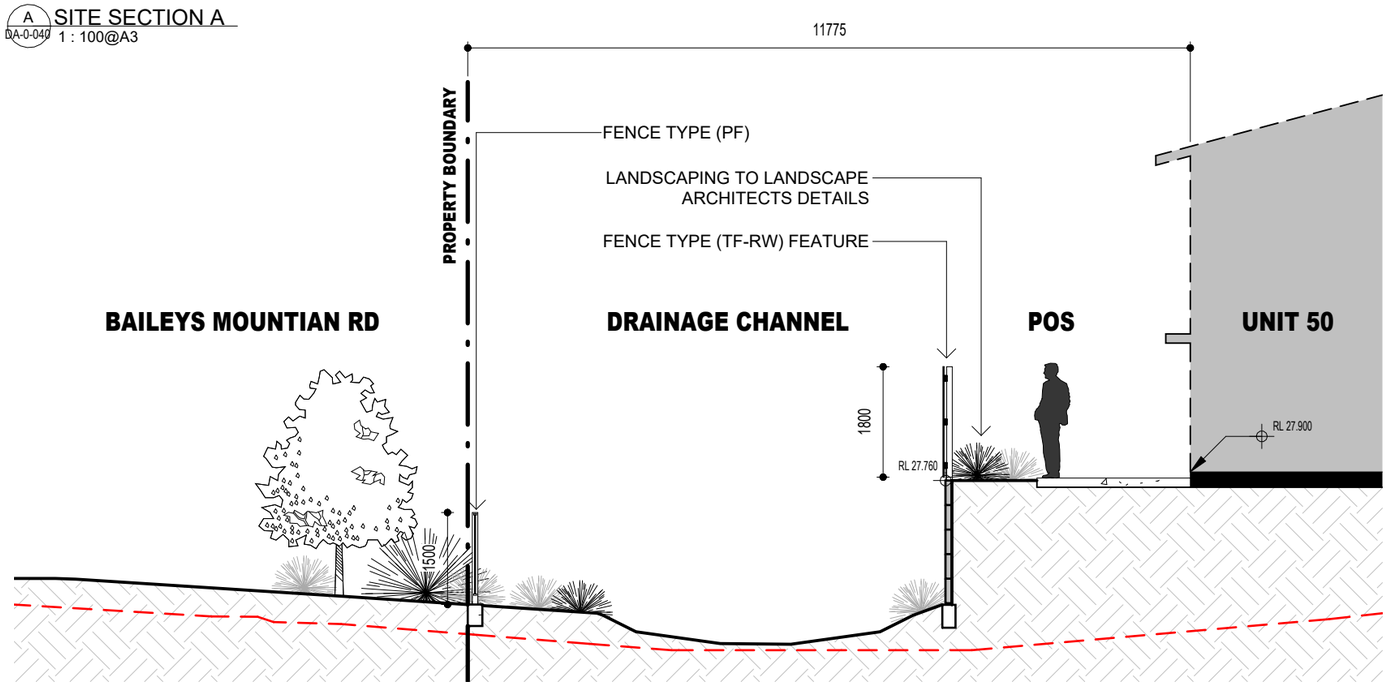
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LEGEND

NATURAL GROUND LINE



A SITE SECTION A (DA-0-040)
1 : 100@A3



B SITE SECTION B (DA-0-040)
1 : 100@A3

REDDOOR ARCHITECTURE

REVISION A 16.10.24 DA ISSUE

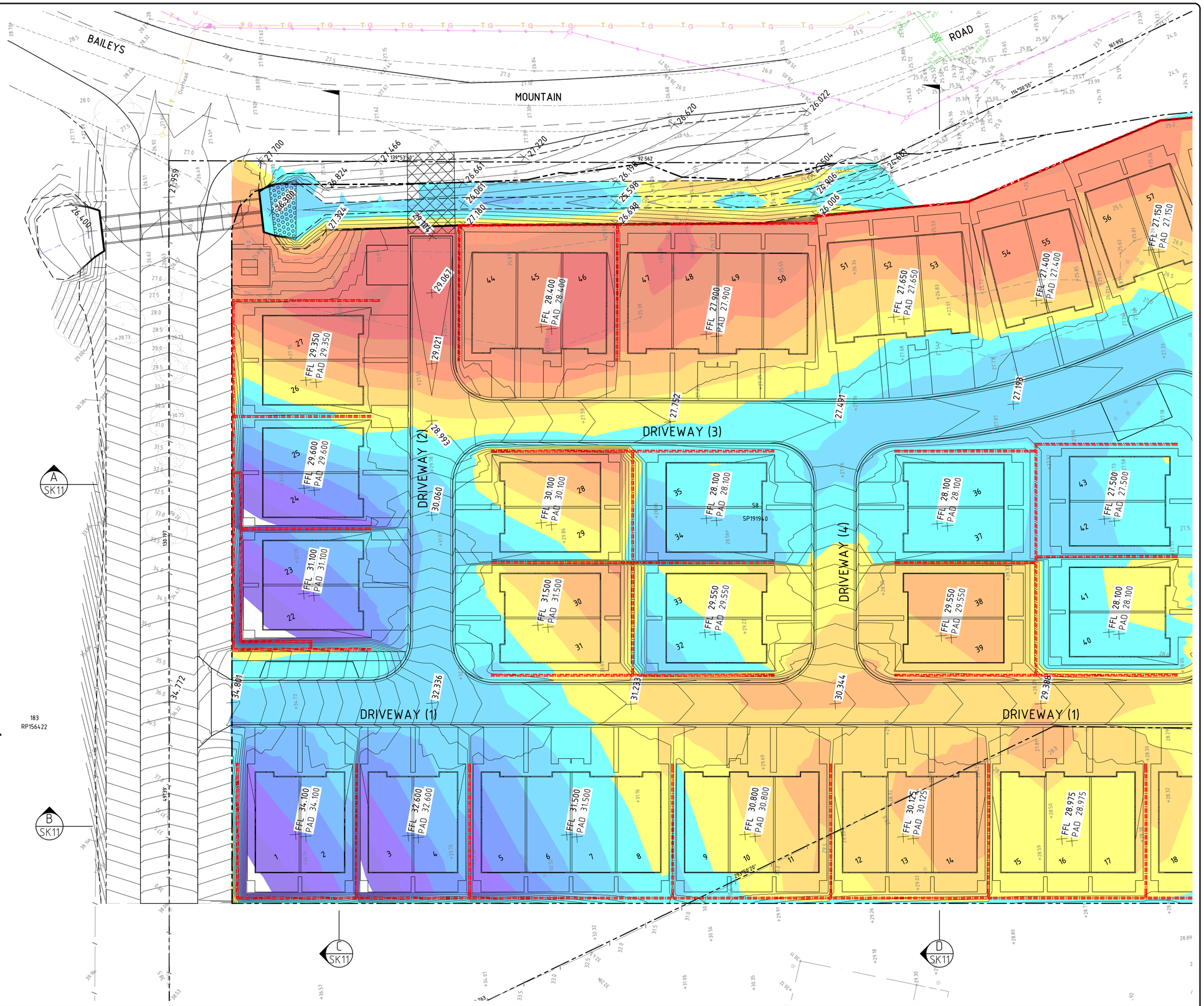
Elevations Table

No.	From Depth	To Depth	Colour	Depth Range Volume
1	-3.000	-2.500		47.70m³
2	-2.500	-2.000		217.33m³
3	-2.000	-1.500		431.19m³
4	-1.500	-1.000		726.99m³
5	-1.000	-0.500		1893.89m³
6	-0.500	0.000		4534.71m³
7	0.000	0.500		3785.99m³
8	0.500	1.000		2461.95m³
9	1.000	1.500		1331.13m³
10	1.500	2.000		676.45m³
11	2.000	2.500		349.04m³
12	2.500	3.000		92.95m³
13	3.000	3.500		0.64m³

CUT	FILL
7,857m³	8,698m³

NET = 841m³ (FILL)

NOTE: EARTHWORKS CUT/FILL RANGERS ARE CALCULATED TO THE FINISHED SURFACE AND ARE TO BE USED AS A GUIDE ONLY.



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THE CONTRACTOR SHALL ACQUIRE THE NECESSARY PERMITS AND EDUCATION TO MOVE ORGANIC MATERIALS THAT MAY CONTAIN FIRE ANTS.

LEGEND

16.0	EXISTING CONTOUR
+ 15.76	EXISTING SURFACE LEVEL
W	EXISTING WATER
SW	EXISTING STORMWATER
S	EXISTING SEWER
+ 29.000	FINISHED SURFACE LEVEL
+ FFL 29.000	FINISHED FLOOR LEVEL
+ PAD 22.750	EARTHWORKS PAD LEVEL
TW BW	TOP OF WALL SURFACE LEVEL BOTTOM OF WALL SURFACE LEVEL
	FINISHED BATTER LINE
83.0	FINISHED SURFACE CONTOURS
	PROPOSED RETAINING WALLS CONCRETE SLEEPERS TO FUTURE DESIGN.

No.	DATE	ISSUE	REVISED	CHECKED
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P1	02/24	ORIGINAL ISSUE	B.A.R.	T.W.N.

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SCALE B

DATUM AHD (U.N.O.)

SCALES SHOWN ARE AT A1 SIZE

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CONSULTING ENGINEERS • CIVIL • STRUCTURAL
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39 LAWRENCE DRIVE NERANG
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F: (07) 5578 4092
E: mail@cozreg.com.au
W: www.cozreg.com.au
CONSULT AUSTRALIA Member Firm

DESIGNED T.W.N.
DRAWN B.A.R.
CHECKED T.W.N.

APPROVED FOR AND ON BEHALF OF COZENS REGAN GROUP PTY LTD
(RPEQ No 15735)

CLIENT MG LAND PTY LTD

PROJECT PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
BULK EARTHWORKS PLAN - 1 OF 2

JOB NO. 230094
DRAWING NO. C10
ISSUE P1P2

ROAD
DRIVEWAY (3)
DRIVEWAY (4)
DRIVEWAY (5)
DRIVEWAY (1)
DEDICATED PARK
7,044m²
SP191940
Septic
Concrete
Existing Abandoned Building
Existing Dwelling
Baileys Mountain Road
Verandah
Tank
Floor level RL 29.80
Creek
DEPTH RL 21.98
D SK11
E SK11

NOTE: EARTHWORKS CUT/FILL RANGERS ARE CALCULATED TO THE FINISHED SURFACE AND ARE TO BE USED AS A GUIDE ONLY.

Elevations Table

No.	From Depth	To Depth	Colour	Depth Range Volume
1	-3.000	-2.500		47.70m³
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6	-0.500	0.000		4534.71m³
7	0.000	0.500		3785.99m³
8	0.500	1.000		2461.95m³
9	1.000	1.500		1331.13m³
10	1.500	2.000		676.45m³
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13	3.000	3.500		0.64m³

CUT	FILL
7,857m³	8,698m³

NET = 841m³ (FILL)

IMPORTANT NOTE:

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UNDER QUEENSLAND LEGISLATION, THE GENERAL BIOSECURITY OBLIGATION REQUIRES ALL REASONABLE STEPS TO BE TAKEN TO PREVENT THE SPREAD OF FIRE ANTS.

ALL SUSPECTED SIGHTINGS OF FIRE ANTS MUST BE REPORTED WITHIN 24 HOURS OF THEIR DISCOVERY (PH: 13 25 23). THE MOVEMENT OF FIRE ANTS IS PROHIBITED. FAILING TO COMPLY MAY INCUR PENALTIES.

THE CONTRACTOR SHALL ACQUIRE THE NECESSARY PERMITS AND EDUCATION TO MOVE ORGANIC MATERIALS THAT MAY CONTAIN FIRE ANTS.

LEGEND

16.0	EXISTING CONTOUR
+ 15.76	EXISTING SURFACE LEVEL
W	EXISTING WATER
SW	EXISTING STORMWATER
S	EXISTING SEWER
+ 29.000	FINISHED SURFACE LEVEL
+ FFL 29.000	FINISHED FLOOR LEVEL
+ PAD 22.750	EARTHWORKS PAD LEVEL
TW BW	TOP OF WALL SURFACE LEVEL BOTTOM OF WALL SURFACE LEVEL
	FINISHED BATTER LINE
83.0	FINISHED SURFACE CONTOURS
	PROPOSED RETAINING WALLS CONCRETE SLEEPERS TO FUTURE DESIGN.

No.	DATE	ISSUE	REVISED	CHECKED
P2	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P1	04/24	ORIGINAL ISSUE	B.A.R.	T.W.N.

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SCALE A 0 5 10 1 : 250

SCALE B

DATUM AHD (U.N.O.)

SCALES SHOWN ARE AT A1 SIZE

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CONSULT AUSTRALIA Member Firm

DESIGNED T.W.N.
DRAWN B.A.R.
CHECKED T.W.N.
APPROVED FOR AND ON BEHALF OF COZENS REGAN GROUP PTY LTD (RPEQ No 15735)

CLIENT MG LAND PTY LTD

PROJECT PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
BULK EARTHWORKS PLAN - 2 OF 2

JOB NO. 230094
DRAWING NO. C11
ISSUE P1P2

LANDSCAPE SPECIFICATION NOTES

1. SURFACE LEVELS AND FALLS: Grade all surface finishes evenly away from buildings for a minimum of 1000mm. Set down planting and turfing areas minimum 200mm below finished floor level.
2. PLANTING AND TURFING AREA PREPARATION: Weed growth on sub-grade to receive an application of Glyphosate herbicide (or equivalent frog friendly product) prior to works commencing. Trim sub-grade to desired level, cultivate 150mm deep place 100 g/m2 of Blood and Bone and 100 g/m2 of Gypsum.
3. TURFING AREAS: Prepare as noted, place 100mm of imported topsoil (to AS4419) and lay min 25mm thick A-grade Green Couch. All turf grass and topsoil to be certified weed free.
4. DEEP PLANTING AREAS: Prepare as noted, place 300mm deep of imported topsoil (to AS4419) and place 100mm deep of max 25mm grade hoop pine mulch.
5. TOPSOIL: Topsoil quality and sample testing to comply with AS4419 Soils for Landscaping and Garden Use. All imported topsoil shall be free from weeds, sticks, rocks over 25mm dia, plastic, contaminants, construction rubbish and other deleterious materials.
6. GRAVEL MULCH DWELLINGS: Gravel mulch shall be 20mm grade smooth washed river gravel, place 100mm deep on A12 bidum fabric.
7. GRAVEL MULCH SWALE: Future specification by Hydraulic consultant.
8. KERB CHANNEL AND KERB RAMPS: Refer to Engineer's drawings for locations of all kerb ramps.
9. ROAD SURFACE TREATMENTS: Refer to Engineer's drawings for surface treatments
10. MOWING EDGE TO REAR OF LOTS: Paver edge, charcoal finish.
11. MOWING EDGES TO STREET FRONTAGES: Paver edge, charcoal finish.
12. MOWING EDGES TO PUBLIC INTERFACE: Timber edge.
13. FENCING: Refer to Architects details.
14. RETAINING WALLS: Refer to Engineer's drawings.
15. PEDESTRIAN PAVEMENTS: Refer Engineer's drawings for all pedestrian pavements. .
16. VEHICULAR PAVEMENTS: Refer Engineer's drawings for all vehicular pavements.
17. LIGHTING AND ELECTRICAL: TBC.
18. TREE INSTALLATION: New trees are to be located clear of underground services - 1.5m clearance between tree trunk and civil sevice (water/sewerage). For all adjustments to tree locations to suit site conditions, seek Superintendent approval prior to commencement of work.
19. ENTRY STATEMENT: Laser cut screen located within private property. Supplied by builder.
20. BIN TO DWELLINGS: Permeable batten screen. Supplied by builder.
21. BIN WASHDOWN: 600mm wide turf strip to back of kerb per lot.



Rectification works if required to streetscape

Temporary construction access point in alignment with driveway 2.

Barrier rail to top of culvert.

Overland flow channel. Refer Civil drawings.
Unallocated visitor parking.
PMT. Fenced and gated as per CoGC requirements.

Street trees to LCC requirements.

Mailbox bank with temporary parking. 1200mm wide pedestrian path.

Primary entry / exit point with new crossover. Refer Civil drawings.

Entry signage supplied by builder with inground uplighting, within private property.

Basin outlet. Refer Civil drawings.

Retaining wall setback from property boundary. Screen planting in front of wall within private property.

30m setback from top of bank.

5m wide recreation link with 2.5m wide shared path with turf strip either side.

Bio retention basin within private property.

Bio retention maintenance access with gate.

Bin collection point.

Approximate top of bank.

Feature trees within common areas.

Communal open space including pool and shelter.

Shade trees at 8m centres along shared path.

Exiisting vegetation to be retained and protected.

Screen planting to rear property boundary.

Portion of land to be cleared on adjoining property (shown hatched). Turf finish.

Bin collection point.

NOTE:
Limited vegetation proposed within 18500mm wide Bushfire Buffer. Refer to Bushfire Consultants report.

SCHEMATIC DESIGN - MASTER PLAN

202 BAILEYS MOUNTAIN ROAD, UPPER COOMERA

DUNN + MORAN LANDSCAPE ARCHITECTS

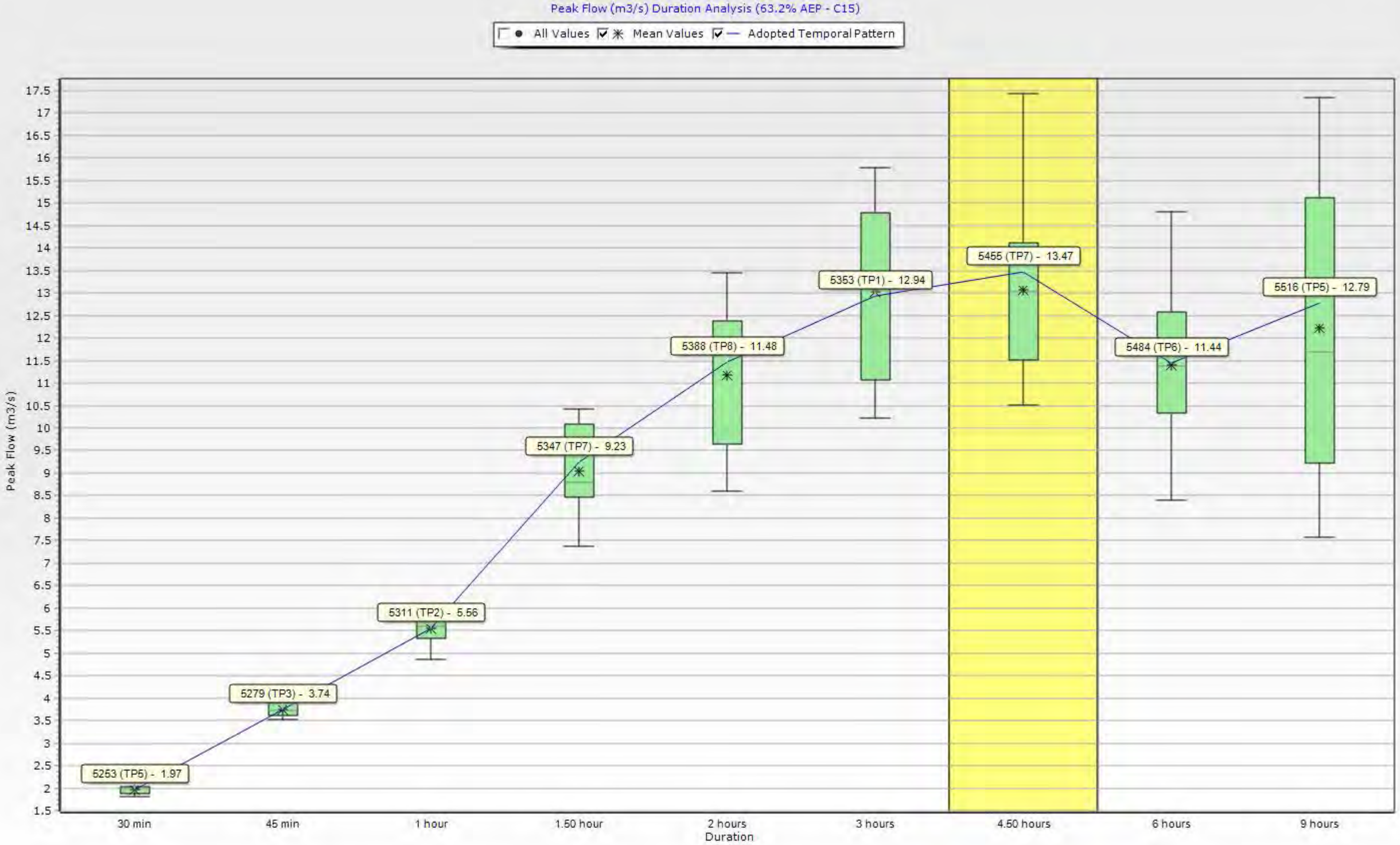
23048000 SD-01
2024-10-17 DRAFT FOR REVIEW

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0 5 10 20 40 50
SCALE : 1:500 @ A1; 1:1000 @ A3

APPENDIX A

HYDROLOGIC BOX PLOTS


Peak Flow (m3/s) Duration Analysis (63.2% AEP - C15)
All Values
Mean Values
Adopted Temporal Pattern
Peak Flow (m3/s)
17.5
17
16.5
16
15.5
15
14.5
14
13.5
13
12.5
12
11.5
11
10.5
10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
5253 (TP5) - 1.97
5279 (TP3) - 3.74
5311 (TP2) - 5.56
5347 (TP7) - 9.23
5388 (TP8) - 11.48
5353 (TP1) - 12.94
5455 (TP7) - 13.47
5484 (TP6) - 11.44
5516 (TP5) - 12.79
30 min
45 min
1 hour
1.50 hour
2 hours
3 hours
4.50 hours
6 hours
9 hours
Duration

Peak Flow (m3/s) Duration Analysis (50% AEP - C15)

All Values | Mean Values | Adopted Temporal Pattern

Peak Flow (m3/s)

Duration

30 min | 45 min | 1 hour | 1.50 hour | 2 hours | 3 hours | 4.50 hours | 6 hours | 9 hours

5253 (TP5) - 3.28

5283 (TP7) - 6.10

5314 (TP5) - 8.33

5347 (TP7) - 12.20

5388 (TP8) - 14.19

5420 (TP6) - 15.98

5455 (TP7) - 15.95

5484 (TP6) - 13.69

5516 (TP5) - 15.29

Peak Flow (m3/s) Duration Analysis (20% AEP - C15)

All Values | Mean Values | Adopted Temporal Pattern

Peak Flow (m3/s)

5256 (TP8) - 13.04

5283 (TP7) - 17.76

5314 (TP5) - 20.91

5347 (TP7) - 23.66

5386 (TP6) - 24.14

5419 (TP5) - 29.97

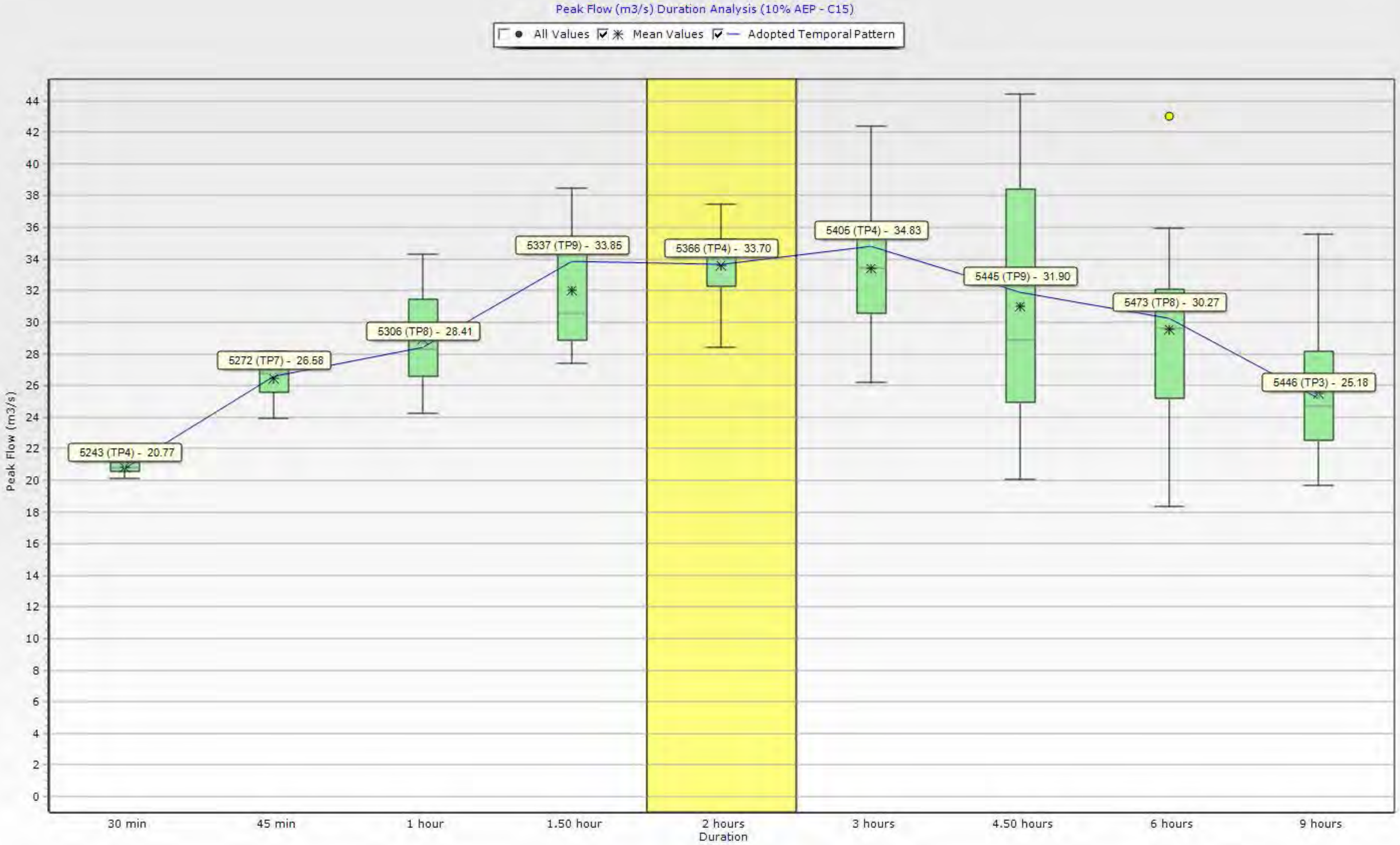
5459 (TP9) - 24.96

5484 (TP6) - 21.43

5516 (TP5) - 23.93

30 min | 45 min | 1 hour | 1.50 hour | 2 hours | 3 hours | 4.50 hours | 6 hours | 9 hours

Duration


Peak Flow (m3/s) Duration Analysis (10% AEP - C15)
All Values
Mean Values
Adopted Temporal Pattern
Peak Flow (m3/s)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
5243 (TP4) - 20.77
5272 (TP7) - 26.58
5306 (TP8) - 28.41
5337 (TP9) - 33.85
5366 (TP4) - 33.70
5405 (TP4) - 34.83
5445 (TP9) - 31.90
5473 (TP8) - 30.27
5446 (TP3) - 25.18
30 min
45 min
1 hour
1.50 hour
2 hours
3 hours
4.50 hours
6 hours
9 hours
Duration

Peak Flow (m3/s) Duration Analysis (5% AEP - C15)

All Values | Mean Values | Adopted Temporal Pattern

Peak Flow (m3/s)

54 52 50 48 46 44 42 40 38 36 34 32 30 28 26 24 22 20 18 16 14 12 10 8 6 4 2 0

5242 (TP3) - 28.87
5272 (TP7) - 35.06
5305 (TP7) - 38.88
5333 (TP6) - 39.53
5373 (TP8) - 41.22
5406 (TP4) - 42.16
5445 (TP9) - 38.97
5473 (TP8) - 36.84
5508 (TP9) - 32.02

30 min | 45 min | 1 hour | 1.50 hour | 2 hours | 3 hours | 4.50 hours | 6 hours | 9 hours

Duration

Peak Flow (m3/s) Duration Analysis (2% AEP - C15)

All Values | Mean Values | Adopted Temporal Pattern

Peak Flow (m3/s)

5240 (TP10) - 34.28

5211 (TP6) - 42.73

5212 (TP3) - 46.04

5324 (TP5) - 46.93

5357 (TP6) - 47.81

5399 (TP8) - 43.09

5429 (TP7) - 41.27

5462 (TP9) - 46.49

5427 (TP2) - 43.51

30 min | 45 min | 1 hour | 1.50 hour | 2 hours | 3 hours | 4.50 hours | 6 hours | 9 hours

Duration

Peak Flow (m3/s) Duration Analysis (1% AEP - C15)

All Values | Mean Values | Adopted Temporal Pattern

Peak Flow (m3/s)

95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0

5211 (TP6) - 48.93
5212 (TP3) - 52.41
5324 (TP5) - 52.97
5357 (TP6) - 55.67
5399 (TP8) - 50.49
5429 (TP7) - 48.03
5462 (TP9) - 54.62
5427 (TP2) - 50.91
5240 (TP10) - 38.82

30 min | 45 min | 1 hour | 1.50 hour | 2 hours | 3 hours | 4.50 hours | 6 hours | 9 hours

Duration

APPENDIX B

EXISTING FLOOD MAPS

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
CJ Edward Park
Yaun Creek
Reserve Road

28.75
28.5
28
27.75
27
26.25
26
25.75
25.5
27.5
27.25
27
26.75
26.5
26.5
26.25
26
26
25
24.75
24
25
23.5
23
22.75
23
23.25
22.75
23
22.5
23.5
24
25.25
23.75

LEGEND

- Site
- Cadastre
- Culvert

Flood Depth (m)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (mAHD)

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ALLAN & DENNIS

DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE B1.1

63% AEP FLOOD DEPTH MAP - EXISTING (E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\D06Prizren.qgs 2024-10-15T21:29:42.569

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Reserve Road
Yaun Creek
CJ Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Flood Depth (m)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

- Flood Level Contour (mAHD)

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DATE
15 October 2024

SIZE
A3

REFERENCE
J23037

SCALE
1:1200

0 20 40 60 80 100 m

FIGURE B1.2

50% AEP FLOOD DEPTH MAP - EXISTING (E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\D06\Frizzen.qgs 2024-10-15T21:29:44.582

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Reserve Road
Yaun Creek
CJ Edward Park

N

LEGEND

- Site
- Cadastre
- Culvert

Flood Depth (m)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0
- Flood Level Contour (mAHD)

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SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE B1.3

20% AEP FLOOD DEPTH MAP - EXISTING (E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

J:\Work\AD\J23037\GIS\DOB\Prizren.aprx 2024-10-15T21:29:46.620

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
Reserve Road
C-J Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Flood Depth (m)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (mAHD)

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REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE B1.4

10% AEP FLOOD DEPTH MAP - EXISTING (E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

C:\Work\AD\J23037\QGIS\D06\Frizen.qgs 2024-10-15T21:29:48.620

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Yaun Creek
Reserve Road
C-J Edward Park

N

LEGEND

- Site
- Cadastre
- Culvert

Flood Depth (m)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (mAHD)

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SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE B1.5

5% AEP FLOOD DEPTH MAP - EXISTING (E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

C:\Work\AD\J23037\QGIS\D06\Frizen.qgs 2024-10-15T21:29:50.629

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
Reserve Road
CJ Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Flood Depth (m)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (mAHD)

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SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE B1.6

2% AEP FLOOD DEPTH MAP - EXISTING (E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\DDBPrizeran.qgs 2024-10-15T21:29:52.616

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
Reserve Road
CJ Edward Park

N

LEGEND

Site
Cadastre
Culvert

Flood Depth (m)

0.01 - 0.1
0.1 - 0.3
0.3 - 0.6
0.6 - 1.2
1.2 - 2.0
Above 2.0

Flood Level Contour (mAHD)

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DATE
15 October 2024

SIZE
A3

REFERENCE
J23037

SCALE
1:1200

0 20 40 60 80 100 m

FIGURE B1.7

1% AEP FLOOD DEPTH MAP - EXISTING (E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\DDBPrizren.qgs 2024-10-15T21:29:54.651

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Reserve Road
CJ Edward Park
Yaun Creek

LEGEND

- Site
- Cadastre
- Culvert

Flood Velocity (m/s)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (mAHD)

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SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE B2.1

63% AEP FLOOD VELOCITY MAP - EXISTING (E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\D06Prizren.qgs 2024-10-15T21:29:56.704

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Reserve Road
Yaun Creek
CJ Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Flood Velocity (m/s)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0
- Flood Level Contour (mAHD)

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SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE B2.2

50% AEP FLOOD VELOCITY MAP - EXISTING (E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

C:\Work\AD_J23037\GIS_DIB\Prizren.qgs 2024-10-15T21:29:58.872

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Reserve Road
Yaun Creek
CJ Edward Park

N

LEGEND

- Site
- Cadastre
- Culvert

Flood Velocity (m/s)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (mAHD)

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REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE B2.3

20% AEP FLOOD VELOCITY MAP - EXISTING (E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
Reserve Road
CJ Edward Park

N

LEGEND

- Site
- Cadastre
- Culvert

Flood Velocity (m/s)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (mAHD)

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ALLAN & DENNIS

DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE B2.4

10% AEP FLOOD VELOCITY MAP - EXISTING (E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

J:\WorkAD\J23037\GIS\DOB\Prizren.aprx 2024-10-15T21:30:03.028

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Yaun Creek
CJ Edward Park
Reserve Road

LEGEND

- Site
- Cadastre
- Culvert

Flood Velocity (m/s)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (mAHD)

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Aerial Imagery Copyright Nearmap, 2024.

ALLAN & DENNIS

DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE B2.5

5% AEP FLOOD VELOCITY MAP - EXISTING (E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

C:\Work\AD_J23037\GIS_D08\Picture.qgs 2024-10-15T21:30:05.283

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
CJ Edward Park
Yaun Creek
Reserve Road

N

LEGEND

Site
Cadastre
Culvert

Flood Velocity (m/s)

0.01 - 0.1
0.1 - 0.3
0.3 - 0.6
0.6 - 1.2
1.2 - 2.0
Above 2.0

Flood Level Contour (mAHD)

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DATE
15 October 2024

SIZE
A3

REFERENCE
J23037

SCALE
1:1200

0 20 40 60 80 100 m

FIGURE B2.6

2% AEP FLOOD VELOCITY MAP - EXISTING (E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

D:\Work\AD\J23037\QGIS\D08Printmaps 2024-10-15T21:30:07.771

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
CJ Edward Park
Reserve Road

N

LEGEND

Site
Cadastre
Culvert

Flood Velocity (m/s)

0.01 - 0.1
0.1 - 0.3
0.3 - 0.6
0.6 - 1.2
1.2 - 2.0
Above 2.0

Flood Level Contour (mAHD)

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DATE 15 October 2024
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REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE B2.7

1% AEP FLOOD VELOCITY MAP - EXISTING (E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

O:\Work\AD\J23037\GIS\SD\B\Prizmen.qgs 2024-10-15T21:30:10.178

APPENDIX C

DEVELOPED FLOOD MAPS

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
CJ Edward Park
Yaun Creek
Reserve Road

28.75
28.5
28
27.5
27.25
27
26.75
26.5
26.25
26
25.5
25
24.75
24
23.5
23.25
23
22.75
22.5
22

N

LEGEND

- Site
- Cadastre
- Culvert

Flood Depth (m)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C1.1

63% AEP FLOOD DEPTH MAP - DEVELOPED (D08)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

C:\Work\AD\J23037\GIS\D08Pr\rien.qgs 2024-10-15T21:29:10.128

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Reserve Road
CJ Edward Park
Yaun Creek

LEGEND

- Site
- Cadastre
- Culvert

Flood Depth (m)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C1.2
50% AEP FLOOD DEPTH MAP - DEVELOPED (D08)
202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

C:\Work\AD\J23037\GIS\D08\Prizren.qgs 2024-10-15T21:29:12.506

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Reserve Road
Vaun Creek
C-J Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Flood Depth (m)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C1.3

20% AEP FLOOD DEPTH MAP - DEVELOPED (D08)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

J:\J23037\GIS\D08\Prizren.aprx 2024-10-15T21:29:14.737

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Reserve Road
Yaun Creek
C-J Edward Park

N

LEGEND

- Site
- Cadastre
- Culvert

Flood Depth (m)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (m)

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DATE
15 October 2024

SIZE
A3

REFERENCE
J23037

SCALE
1:1200

0 20 40 60 80 100 m

FIGURE C1.4

10% AEP FLOOD DEPTH MAP - DEVELOPED (D08)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

C:\Work\AD\J23037\QGIS\D08\Frizen.qgs 2024-10-15T21:29:16.967

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Yaun Creek
Reserve Road
C-J Edward Park

N

LEGEND

- Site
- Cadastre
- Culvert

Flood Depth (m)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (m)

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DATE
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SIZE
A3

REFERENCE
J23037

SCALE
1:1200

0 20 40 60 80 100 m

FIGURE C1.5

5% AEP FLOOD DEPTH MAP - DEVELOPED (D08)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

C:\Work\AD\J23037\QGIS\D08\Prizen.qgs 2024-10-15T21:29:19.245

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Reserve Road
Yaun Creek
CJ Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Flood Depth (m)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0
- Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C1.6

2% AEP FLOOD DEPTH MAP - DEVELOPED (D08)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\D08Frozen.qgs 2024-10-15T21:29:21.532

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
Reserve Road
CJ Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Flood Depth (m)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C1.7

1% AEP FLOOD DEPTH MAP - DEVELOPED (D08)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

D:\Work\AD\J23037\QGIS\D08Printing.qgs 2024-10-15T21:29:24.173

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
Reserve Road
CJ Edward Park

28.75
28.5
28
27.5
27.25
27
26.75
26.5
26.25
26
25
24.75
24
23.75
25.25
23.5
23
22.75
22.5

N

LEGEND

- Site
- Cadastre
- Culvert

Flood Level Difference (m)

- < -0.10
- < -0.05
- < -0.02
- < -0.01
- ± 0.01
- > 0.01
- > 0.02
- > 0.05
- > 0.10
- Was wet now dry
- Was dry now wet
- Flood Level Contour (m)

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SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C2.1

63% AEP FLOOD LEVEL DIFFERENCE MAP - DEVELOPED (D08-E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD_J23037\QGIS\D08Pricren.qgs 2024-10-15T21:30:12.687

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Reserve Road
Yaun Creek
CJ Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Flood Level Difference (m)

- < -0.10
- < -0.05
- < -0.02
- < -0.01
- ± 0.01
- > 0.01
- > 0.02
- > 0.05
- > 0.10
- Was wet now dry
- Was dry now wet
- Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C2.2

50% AEP FLOOD LEVEL DIFFERENCE MAP - DEVELOPED (D08-E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\D08Prizren.qgs 2024-10-15T21:30:15.421

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
Reserve Road
CJ Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Flood Level Difference (m)

- < -0.10
- < -0.05
- < -0.02
- < -0.01
- ± 0.01
- > 0.01
- > 0.02
- > 0.05
- > 0.10
- Was wet now dry
- Was dry now wet
- Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C2.3

20% AEP FLOOD LEVEL DIFFERENCE MAP - DEVELOPED (D08-E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

C:\Work\AD\J23037\GIS\D08F11zen.aprx 2024-10-15T21:30:17.884

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
Reserve Road
CJ Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Flood Level Difference (m)

- < -0.10
- < -0.05
- < -0.02
- < -0.01
- ± 0.01
- > 0.01
- > 0.02
- > 0.05
- > 0.10
- Was wet now dry
- Was dry now wet
- Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C2.4

10% AEP FLOOD LEVEL DIFFERENCE MAP - DEVELOPED (D08-E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

C:\Work\AD_J23037\GIS\D08\Picture1.qgs 2024-10-15T21:30:20.298

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Yaun Creek
Reserve Road
CJ Edward Park

N

LEGEND

- Site
- Cadastre
- Culvert

Flood Level Difference (m)

- < -0.10
- < -0.05
- < -0.02
- < -0.01
- ± 0.01
- > 0.01
- > 0.02
- > 0.05
- > 0.10
- Was wet now dry
- Was dry now wet
- Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C2.5

5% AEP FLOOD LEVEL DIFFERENCE MAP - DEVELOPED (D08-E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

J:\Work\AD_J23037\GIS\D08\Prizen.qgs 2024-10-15T21:30:22.718

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
Reserve Road
CJ Edward Park

N

LEGEND

- Site
- Cadastre
- Culvert

Flood Level Difference (m)

- < -0.10
- < -0.05
- < -0.02
- < -0.01
- ± 0.01
- > 0.01
- > 0.02
- > 0.05
- > 0.10
- Was wet now dry
- Was dry now wet
- Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C2.6

2% AEP FLOOD LEVEL DIFFERENCE MAP - DEVELOPED (D08-E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\D08Prizren.qgs 2024-10-15T21:30:25.119

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Reserve Road
Yaun Creek
CJ Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Flood Level Difference (m)

- < -0.10
- < -0.05
- < -0.02
- < -0.01
- ± 0.01
- > 0.01
- > 0.02
- > 0.05
- > 0.10
- Was wet now dry
- Was dry now wet
- Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C2.7

1% AEP FLOOD LEVEL DIFFERENCE MAP - DEVELOPED (D08-E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\D08Printrain.qgs 2024-10-15T21:30:27.584

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Reserve Road
Yaun Creek
CJ Edward Park

28.75
28.5
28
27
27.75
27.5
27.25
27
26.75
26.5
26.5
26.25
26
26
25
24.75
24
25
23.5
23
22.75
23
23.25
22.5
23.5
24
25.25
23.75

LEGEND

- Site
- Cadastre
- Culvert

Flood Velocity (m/s)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (m)

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DATE
15 October 2024

SIZE
A3

REFERENCE
J23037

SCALE
1:1200

0 20 40 60 80 100 m

FIGURE C3.1

63% AEP FLOOD VELOCITY MAP - DEVELOPED (D08)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\D08\Frizzen.qgs 2024-10-15T21:29:26.411

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Reserve Road
Yaun Creek
CJ Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Flood Velocity (m/s)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0
- Flood Level Contour (m)

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DATE 15 October 2024
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SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C3.2

50% AEP FLOOD VELOCITY MAP - DEVELOPED (D08)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

C:\Work\AD_J23037\GIS\D08Prizren.qgs 2024-10-15T21:29:28.625

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Reserve Road
Yaun Creek
C-J Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Flood Velocity (m/s)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0
- Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C3.3

20% AEP FLOOD VELOCITY MAP - DEVELOPED (D08)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

C:\Work\AD\J23037\QGIS\D08\Prizren.qgs 2024-10-15T21:29:30.837

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
Reserve Road
CJ Edward Park

N

LEGEND

- Site
- Cadastre
- Culvert

Flood Velocity (m/s)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C3.4

10% AEP FLOOD VELOCITY MAP - DEVELOPED (D08)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

C:\Work\AD\J23037\GIS\D08\Prizren.aprx 2024-10-15T21:29:33.251

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Yaun Creek
Reserve Road
CJ Edward Park

N

LEGEND

Site
Cadastre
Culvert

Flood Velocity (m/s)

0.01 - 0.1
0.1 - 0.3
0.3 - 0.6
0.6 - 1.2
1.2 - 2.0
Above 2.0

Flood Level Contour (m)

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DATE
15 October 2024

SIZE
A3

REFERENCE
J23037

SCALE
1:1200

0 20 40 60 80 100 m

FIGURE C3.5

5% AEP FLOOD VELOCITY MAP - DEVELOPED (D08)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

C:\Work\AD\J23037\GIS\D08\Prizren.aprx 2024-10-15T21:28:35.6110

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
CJ Edward Park
Yaun Creek
Reserve Road

LEGEND

- Site
- Cadastre
- Culvert

Flood Velocity (m/s)

- 0.01 - 0.1
- 0.1 - 0.3
- 0.3 - 0.6
- 0.6 - 1.2
- 1.2 - 2.0
- Above 2.0

Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C3.6

2% AEP FLOOD VELOCITY MAP - DEVELOPED (D08)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\D08Prizren.qgs 2024-10-15T21:29:37.875

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
Reserve Road
CJ Edward Park

N

LEGEND

Site
Cadastre
Culvert

Flood Velocity (m/s)

0.01 - 0.1
0.1 - 0.3
0.3 - 0.6
0.6 - 1.2
1.2 - 2.0
Above 2.0

Flood Level Contour (m)

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DATE
15 October 2024

SIZE
A3

REFERENCE
J23037

SCALE
1:1200

0 20 40 60 80 100 m

FIGURE C3.7

1% AEP FLOOD VELOCITY MAP - DEVELOPED (D08)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\D08Printrenags 2024-10-15T21:29:40.525

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
Reserve Road
CJ Edward Park

28.75
28.5
28
27
27.75
27.5
27.25
27
26.75
26.5
26.5
26.25
26
26
25
24.75
24
25
23.5
23
23
22.75
23.25
22.75
23
22.5
23.5
24
25.25
23.75

LEGEND

- Site
- Cadastre
- Culvert

Velocity Difference (m/s)

- < -1.0
- < -0.75
- < -0.50
- < -0.25
- ± 0.25
- > 0.25
- > 0.50
- > 0.75
- > 1.0
- Was wet now dry
- Was dry now wet
- Flood Level Contour (m)

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REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C4.1

63% AEP FLOOD VELOCITY DIFFERENCE MAP - DEVELOPED (D08-E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\D08Prizren.qgs 2024-10-15T21:30:43.823

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
Reserve Road
CJ Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Velocity Difference (m/s)

- < -1.0
- < -0.75
- < -0.50
- < -0.25
- ± 0.25
- > 0.25
- > 0.50
- > 0.75
- > 1.0
- Was wet now dry
- Was dry now wet
- Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C4.2

50% AEP FLOOD VELOCITY DIFFERENCE MAP - DEVELOPED (D08-E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\D08Prizren.qgs 2024-10-15T21:30:46.256

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
Reserve Road
C-J Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Velocity Difference (m/s)

- < -1.0
- < -0.75
- < -0.50
- < -0.25
- ± 0.25
- > 0.25
- > 0.50
- > 0.75
- > 1.0
- Was wet now dry
- Was dry now wet
- Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C4.3

20% AEP FLOOD VELOCITY DIFFERENCE MAP - DEVELOPED (D08-E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

J:\J23037\GIS\D08\Prizren.aprx 2024-10-15T21:30:48.608

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Reserve Road
Yaun Creek
CJ Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Velocity Difference (m/s)

- < -1.0
- < -0.75
- < -0.50
- < -0.25
- ± 0.25
- > 0.25
- > 0.50
- > 0.75
- > 1.0
- Was wet now dry
- Was dry now wet
- Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C4.4

10% AEP FLOOD VELOCITY DIFFERENCE MAP - DEVELOPED (D08-E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

J:\Work\AD_J23037\GIS\QGIS\D08\Picture1.qgs 2024-10-15T21:30:50.990

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Yaun Creek
Reserve Road
CJ Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Velocity Difference (m/s)

- < -1.0
- < -0.75
- < -0.50
- < -0.25
- ± 0.25
- > 0.25
- > 0.50
- > 0.75
- > 1.0
- Was wet now dry
- Was dry now wet
- Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C4.5

5% AEP FLOOD VELOCITY DIFFERENCE MAP - DEVELOPED (D08-E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD_J23037\GIS_D08Prizren.qgs 2024-10-16T21:30:53.354

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Yaun Creek
Reserve Road
CJ Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Velocity Difference (m/s)

- < -1.0
- < -0.75
- < -0.50
- < -0.25
- ± 0.25
- > 0.25
- > 0.50
- > 0.75
- > 1.0
- Was wet now dry
- Was dry now wet
- Flood Level Contour (m)

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DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C4.6

2% AEP FLOOD VELOCITY DIFFERENCE MAP - DEVELOPED (D08-E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\D08Prizren.qgs 2024-10-15T21:30:55.729

528000E
528100E
528200E
528300E
6917700N
6917600N
6917500N

Purlingbrook Street
Kondalilla Drive
Baileys Mountain Road
Old Coach Road
Reserve Road
Yaun Creek
CJ Edward Park

LEGEND

- Site
- Cadastre
- Culvert

Velocity Difference (m/s)

- < -1.0
- < -0.75
- < -0.50
- < -0.25
- ± 0.25
- > 0.25
- > 0.50
- > 0.75
- > 1.0
- Was wet now dry
- Was dry now wet
- Flood Level Contour (m)

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ALLAN & DENNIS

DATE 15 October 2024
SIZE A3
REFERENCE J23037
SCALE 1:1200

0 20 40 60 80 100 m

FIGURE C4.7

1% AEP FLOOD VELOCITY DIFFERENCE MAP - DEVELOPED (D08-E06)

202 Baileys Mountain Road, Upper Coomera
Hydraulic Impact Assessment
MG Homes

Q:\Work\AD\J23037\QGIS\D08Printrain.qgs 2024-10-15T21:30:58.188

SITE BASED STORMWATER MANAGEMENT PLAN

Proposed Residential Townhouse Development
MG Land Pty Ltd
202 Baileys Mountain Road, Upper Coomera
Lot 58 on SP191940

Prepared for:

MG Land Pty Ltd

Approved by:

Mr Tristan Nelson
Director
Cozens Regan Group Pty Ltd
RPEQ: 15735

Date:
October 2024

DOCUMENT CONTROL RECORD

Report Details

Client: MG Land Pty Ltd
Document Name: Site Based Stormwater Management Plan
Site Address: 202 Baileys Mountain Road, Upper Coomera
Lot 58 on SP191940
Job Number: 230094
File Name: 230094_SWMP_REPORT_A.docx

Issue	Rev	Approved	Date	Distributed to:	Qty.
DA Lodgement	A		18/10/2024	MG LAND PTY LTD	1

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EXECUTIVE SUMMARY

This report examines and evaluates options for Stormwater Management during the construction and operational phase for the Proposed Residential Townhouse Development at 202 Baileys Mountain Road, Upper Coomera.

The strategies proposed in this report will provide short and long term community benefits with an Environmentally Sensitive Design emphasis.

The Water Sensitive Urban Design objectives are met by:

Erosion and Sediment Control

Provision of sediment fencing, sediment basin and drainage structure protection during construction.

Stormwater Quality

Stormwater produced by the development is proposed to be treated by a bioretention basin.

Stormwater Quantity

The lawful point of Discharge is to be maintained post development.

Peak stormwater flows are proposed to be mitigated with the provision of On Site Detention provided in the bioretention basin to ensure that no increase in flows post development occurs.

1.0 INTRODUCTION

1.1 GENERAL INTRODUCTION

Cozens Regan Group Pty Ltd has been commissioned by MG Land Pty Ltd to prepare a Site Based Stormwater Management Plan for the Proposed Residential Townhouse Development at 202 Baileys Mountain Road, Upper Coomera.

This Site Based Stormwater Management Plan is required to support a proposed Material Change of Use application to Gold Coast City Council.

The proposed area of works is shown on the architectural site plan contained in Appendix A.

1.2 SCOPE OF PLAN

In accordance Councils' City Plan and the Land Development Guidelines - Water Sensitive Urban Design, the matters which have been addressed within the scope of this report and the area to which they apply are described below.

- Erosion and Sediment Control
- Stormwater Quality
- Stormwater Quantity

1.3 SITE LOCATION

The subject site is described as Lot 58 on SP191940 located at 202 Baileys Mountain Road, Upper Coomera. The site is bound by Baileys Mountain Road to the East, Reserve Road to the South and vacant land to the West and North.

The subject site and approximate area of works is shown in Figure 1 below.



Figure 1 – Aerial Photograph (Qld Globe)

1.4 SITE DESCRIPTION

The site is currently vacant but historically a house existed, and the remnants of some ancillary features still remain. The site is mostly cleared with a number of existing trees, the ground has good grass coverage throughout.

The site generally falls from the north west to the south east. The levels of the site range from RL 36.80 in the north west corner down to R.L 20.80 in the south east corner.

The total site area is equal to 3,087 ha. A contour and detail survey has been produced for the site and is contained within Appendix B

1.5 DESCRIPTION OF DEVELOPMENT

The proposed development incorporates the construction of a Residential Townhouse Development. The development will require the construction of buildings, access driveways, parking areas, stormwater, sewer, water supply and landscaping.

Refer the Architectural Site Plan contained within Appendix A for more information in regards to the proposed development.

2.0 SEDIMENT AND EROSION CONTROL

2.1 OBJECTIVES

The objectives of this erosion and sediment control plan are:

a) To conceptually address the issue of erosion and sediment control for the construction of the proposed Residential Townhouse Development on the site.
b) To demonstrate that the water quality of the receiving waters is not worsened by the site development.
c) Minimise sediment transport in surface water runoff during the construction and operational stages.
d) Provide a monitoring and maintenance programme for implementation during the construction phase.

2.2 POTENTIAL SEDIMENT GENERATION

The development will result in one catchment from which sediment can be generated. The area to be disturbed is approximately 2.0 ha which is the proposed earthworks area. While the potential exists for sediment to be generated during the construction phase, the potential sediment volume is dependent upon rainfall, site topography, the material type exposed, flow characteristics, and the construction practices and programme.

Control of the construction impacts is the primary objective for sediment and erosion control practices.

The management of erosion and sediment control for the development has been undertaken in accordance with Gold Coast City Council Planning Scheme – Land Development Guidelines and the referenced Best Management Practices for Sediment and Erosion Control.

Based on the expected potential for sediment generated, the provision of a high efficiency sediment basin has been proposed along with a series of stabilised drains, sediment fence traps and stormwater pit protection measures. These provisions are considered adequate to control the mobilisation of sediment.

The installation of pollution control devices in the operational phase will decrease further the potential sediment loading; however the effect of these is ignored.

2.3 CONSTRUCTION PHASE CONTROL MEASURES

The works proposed to control erosion are:

a) Erect sediment and dust fences at the lower perimeter of the site. Sediment fences to be included on site safety fence, including hessian or approved dust control cloth.
b) Construct sediment basins in specified areas.
c) Remove from the site any material which is not required for rehabilitation of disturbed areas.
d) Preparation of roadways, building pads and removal of surplus material off site.
e) Stabilise flow paths along proposed roadways
f) Exposed soils and stockpiles are to be watered, as required, to minimise soil losses as a result of wind.
g) Place geo-textile field gully inlet filters and drainage structure protection around entry points to the drainage system until the pavement is complete or until grass is established.
h) Finalised earthworks to be top soiled and seeded/hydro-mulched or landscaped as directed.

i) Construct buildings.
j) Geo-textile filters to be replaced with mesh filters until landscaping is complete and stabilised.
k) Maintain all sediment devices and other interim controls regularly. Including the removal of accumulated sediment.
l) Remove sediment fences and inlet filters including accumulated sediment after the establishment of the landscaping and grass cover.

2.4 MAINTENANCE

The installation of erosion and sediment control devices requires maintenance of these devices to ensure their effectiveness in the control of potential environmental impact. Summary of the maintenance requirements for this project are detailed below.

The Contractor is responsible for the installation and maintenance of the sediment and erosion control measures during the construction phase and the defects liability period (normally six months).

Maintenance responsibilities for the establishment of vegetation, that is the requirement to irrigate the plants and grass used to generate ground cover lies with the Contractor initially but ultimately reverts to the owner once the defects liability period has expired.

Maintenance will require:

a) Inspection of silt fences and drainage paths during construction and after any rainfall event.
b) Clean out sediment build-up following each event that causes deposits.
c) Clean up soil and sediment deposits promptly as they occur.
d) Provide inlet protection where soil disturbance is to occur.

2.5 RESPONSES TO COMPLAINTS

Complaints during this type of construction usually relate to noise and dust. Generally the complaint is made known to the Contractor, the Principal, the Superintendent and/or the Council.

The Contractor shall keep a record of all complaints identifying the nature of the complaint and any remedial action taken to address such complaint. The Contractor shall act as soon as possible to remedy the problem, if the complaint is considered valid and reasonable. A complaints record shall be made available by the contractor for regular inspection by the Superintendent. For the purpose of direction by others, the Contractor's details are to be supplied to Council prior to commencement of the works.

Complaints relating to dust shall require the Contractor to immediately water the exposed earth surfaces and any soil stockpile areas as well as haul roads to control dust. Such watering shall occur immediately after the complaint is registered with the Contractor. Watering should continue periodically until conditions suit, or the works are completed to a state that prevents dust transport.

2.6 MONITORING

The installation of the erosion and sediment control measures as detailed in this report and attached figures will ameliorate potential impact to water quality in the receiving waters. A monitoring program is proposed to ensure that the control measures achieve the desired goals. It is considered appropriate that only a visual monitoring program be required. Following rainfall events and prior to discharge water quality monitoring will be conducted on the any stored water to check suspended solids.

3.0 STORMWATER QUALITY ASSESSSMENT

3.1 WATER QUALITY TREATMENT TARGETS

The Gold Coast City Council City Plan – Land Development Guidelines - Water Sensitive Urban Design sets the requirements for stormwater quality management for the site which also reference the Queensland State Planning policy.

The Objective for stormwater treatment consist of pollution reduction targets as follows.

Table 3.1: Pollutant Reduction Targets

Pollutant	**Reduction Target**
Total Suspended Solids (TSS)	80%
Total Phosporus (TP)	60%
Total Nitrogen (TN)	45%
Gross Pollutants	90%

As the development is for a residential development a bioretention solution meeting the above targets is proposed.

3.2 BIORETENTION SIZING & SPECIFICATION

As discussed in section 3.1 in order to meet the pollutant reduction targets a bioretention basin is proposed. To confirm the proposed size of the bioretention basin to meet the targets, water quality modelling with the software package MUSIC has been undertaken. The Music model has been calibrated in accordance with the Gold Coast City Council MUSIC modelling guidelines.

The catchment breakdown for the site has been determined as follows.

Table 3.2: Pollutant Reduction Targets

Catchment	**Area Type**	**Area**	**Impervious Fraction**
TOWNHOUSE DEVELOPMENT SITE	**Roofs**	0.5768	100%
	Roads & Driveways	0.5609	100%
	Ground	0.5925	30%

Bioretention Basin

Filter Media Area = 180m^2
Filter Media Depth = 600mm
Extended Detention Depth = 0.30m
Extended Detention Area = 180 m^2

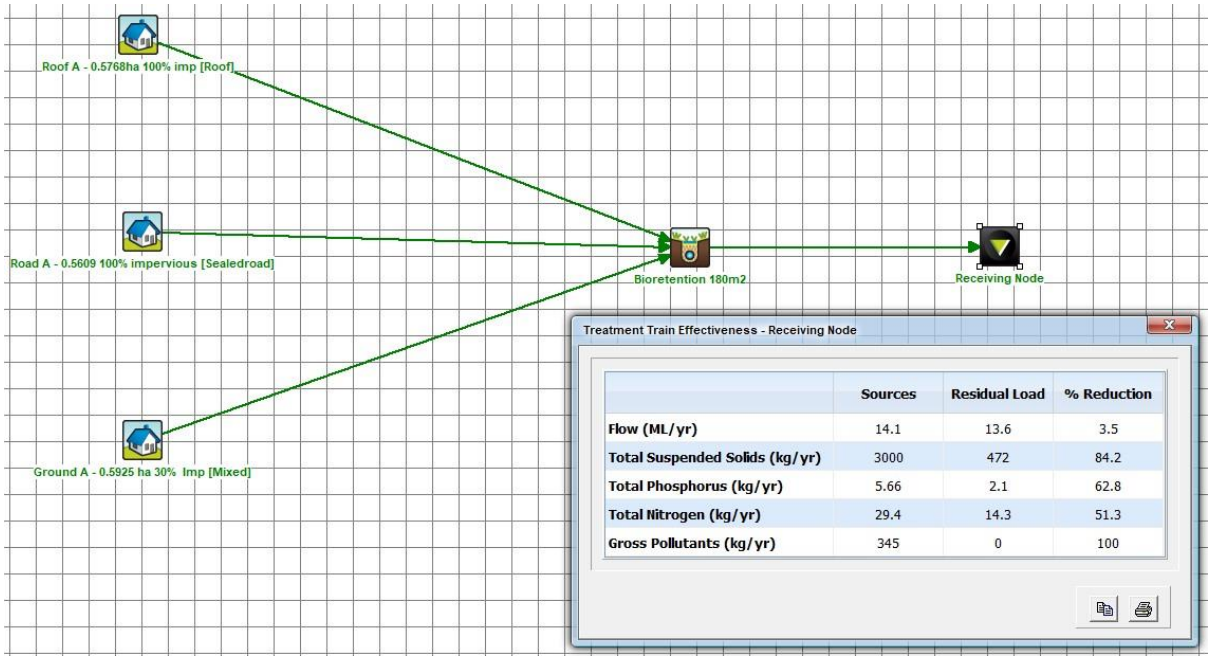


Figure 3.2: MUSIC Model output

As demonstrated above the proposed music model confirms the pollutant reduction achieved is 84.2% for TSS, 62.8% for TP, 51.3% for TN and 100% for GP.

The proposed bioretention basins therefore provide sufficient treatment in accordance the Council requirements. Refer to 230094/SK05_Bioretention Basin Plan & Details for the location and layout of the treatment system and 230094/SK00-SK02 for the Civil stormwater drainage system.

3.3 MONITORING

The objective is to provide a stormwater drainage system that reduces the impact the development may pose to the local environment. Management practices to assist in the reduction of the reliance on the primary treatment structures will be implemented.

Provision of long term water quality monitoring for this development is considered impractical and is not supported.

The Contractor/Builder is responsible for the installation and maintenance of the primary control measures, being the bioretention basin during the construction phase and the defects liability period.

Maintenance responsibilities for the operating life of the project revert to the Owner/ business operators once the defects liability period has expired.

Maintenance will require as a minimum:

- Regular inspections after rainfall events.
- Cleaning/replacement of the treatment devices in accordance with the Water by Design Technical Guidelines.
- Removal of accumulated gross pollutants.

Failure to maintain the proposed stormwater treatment devices and infrastructure will lead to poor site amenity, increased potential for erosion, scouring, increased discharges of stormwater pollutants, and higher potential for adverse stormwater impacts to be imposed on adjacent and downstream properties and waterways.

4.0 STORMWATER QUANTITY

4.1 LAWFUL POINT OF DISCHARGE

In accordance with Section 3 of the Queensland Urban Drainage Manual all development must address the 3 Point Lawful Point of Discharge Test.

The criteria for determining the lawful point of discharge are:
(i) Will the proposed development alter the site's stormwater discharge characteristics in a manner that may substantially damage a third party property?

It is the objectives of this stormwater quantity assessment to ensure that 'no worsening' occurs and therefore the answer to this test is no and thus no further steps are required to obtain tenure for a lawful point discharge (assuming any previous circumstances and changes were lawful).

The development site is proposed to discharge into the existing waterway traversing the site via a piped drainage system. This existing waterway is considered the sites lawful points of discharge.

The subject development does not propose to alter the drainage characteristics of the site and thus the tenure for lawful point of discharge is not required.

4.2 OBJECTIVES

In accordance with the requirements of Gold Coast City Council – City Plan Version 6 the development is to ensure the following design objectives are met for stormwater quantity over the site.

All runoff from developed catchments is managed to ensure that property and infrastructure upstream or downstream is protected from impacts of flooding and meets with the following:

1) development does not adversely impact on land, drainage system or watercourse;
2) the flood behaviour of the whole catchment must not change as a result of the development; and
3) at the boundary of the development site or at nominated locations downstream of the development the following is achieved:
    (a) no increase in peak flood flow rate for all events up to and including the 1% AEP (i.e. 100 year ARI) event;
    (b) no increased in peak flood velocities;
    (c) no increase in flood level for all events up to and including the 1% AEP (i.e. 100 year ARI) event;
    (d) no material change in rate of flood rise; and
    (e) stormwater outfall or discharge is located to avoid conflict with existing usage of downstream land or impact on existing waterway or drainage.

4.3 EXTERNAL CATCHMENTS

The site is affected by external catchments which discharge through the site. These catchments have been further assessed within the Hydraulic Impact Assessment prepared by Alan & Dennis..

4.4 DETERMINATION OF AN INCREASE IN PEAK STORMWATER DISCHARGE

In accordance with QUDM the rational method was adopted to calculate the peak stormwater discharges for the site to compare both the pre-developed and developed scenario.

Parameters adopted for use in the rational method calculation are in accordance with the Queensland Urban Drainage Manual and are highlighted below.

TABLE 4.4.1: RATIONAL METHOD PEAK FLOWS

Catchment	Area (ha)	Tc (exist)	Tc (Dev)	ARI	% AEP/EY	Existing			Post development		
						C	I (mm/hr)	Q (m^3/s)	C	I (mm/hr)	Q (m^3/s)
Proposed Townhouse Site	1.73	14	11	1	1 EY	0.56	80.1	0.216	0.67	89	0.285
				2	0.5EY	0.6	100	0.288	0.71	111	0.379
				5	0.2EY	0.67	124	0.399	0.8	138	0.531
				10	10%	0.70	143	0.481	0.84	158	0.638
				20	5%	0.74	163	0.580	0.88	181	0.765
				50	2%	0.81	189	0.736	0.97	209	0.974
				100	1 %	0.84	208	0.840	1.00	231	1.110

The peak stormwater discharge comparison was assessed for all AEP's 1EY, 0.5EY, 0.2EY, 10%, 5%, 2% up to the 1% AEP event.

Refer to Appendix D for more detailed peak stormwater discharge calculations.

The results from these calculations show that the development will result in an increase in peak stormwater flows in the unmitigated state due to an increase in the amount of impervious area and a decrease in the time of concentration and therefore mitigation is required.

4.5 ON SITE DETENTION/RETENTION

Hydrologic Routing Analysis

In order to meet the Gold Coast City Council and QUDM requirements of a 'no-worsening' affect to downstream stormwater infrastructure, the peak stormwater flows for the developed scenario are required to be reduced to that equal to or less than pre-developed conditions. This reduction in peak stormwater discharge is proposed to be met by providing an on-site stormwater detention system.

In accordance with QUDM and as requested by Gold Coast City Council, the hydraulic modelling was assessed within computer routing software (Drains) to assess the pre-development and post development cases to determine the volume of On Site Detention required to maintain pre-developed flows.

A breakdown of the pre, post and mitigated flows and proposed detention are shown in the following table.

TABLE 4.5 – DRAINS PEAK DISCHARGE CALCULATIONS

Catchment	ARI	AEP/EY	Pre-developed Flow Rates (m^3/s)	Post-developed Flow Rates un-mitigated (m^3/s)	Post-developed Flow Rates mitigated (m^3/s)
Proposed Townhouse Site	1	1 EY	0.216	0.277	0.214
	2	0.5 EY	0.288	0.370	0.287
	5	0.2 EY	0.400	0.513	0.395
	10	10% AEP	0.487	0.627	0.481
	20	5% AEP	0.583	0.750	0.577
	50	2% AEP	0.738	0.927	0.737
	100	1% AEP	0.883	1.04	0.881

TABLE 4.6 – ON SITE DETENTION CALCULATIONS

Catchment	ARI	AEP	ON SITE DETENTION (m^3)
Proposed Townhouse Site	100	1%	247

This On Site Detention Storage is proposed to be provided within the proposed bioretention basin above the extended detention depth.

An orifice plate or weir arrangement will be required to be installed within the discharge control pit in order to restrict flows to that equal or less than existing.

The abovementioned stormwater detention requirements if installed correctly will sufficiently attenuate stormwater flows to that of predevelopment rate and will mitigate any potential adverse effects on downstream/neighbouring infrastructure or property in accordance with the objectives of this section.

Refer to Appendix E for peak stormwater Calculations & Drains Model Results.

Refer to 230176/SK01-SK02_Concept Civil Works Plans and 230176/SK05 _Concept Bio Basin Plan & Details for more information relating to the detention location and outlet configuration.

5.0 QUALIFICATIONS

This site based stormwater management plan for 202 Baileys Mountain Road, Upper Coomera has been prepared specifically for this development as requested by MG Land Pty Ltd. Our analysis and approach is limited to the scope stated at the beginning of the report. As such third parties are not authorised to utilise this report without the written approval and advice form Cozens Regan Group Pty Ltd.

Cozens Regan Group Pty Ltd relied on the following supplied information in preparation of this report:

- Building and site layout supplied by Red Door Architecture.
- Detailed Survey supplied by Focus on Surveying
- Rainfall data provided by the Bureau of Meteorology

The accuracy of this report is dependent on the accuracy of the information supplied.

While Cozens Regan Group Pty Ltd has taken every precaution to ensure the accuracy of the assessment it should be noted that the design is based on predicted rainfall data only and as such future observed flows may vary from that predicted.

REFERENCES

- Gold Coast City Council City Plan – Land Development Guidelines - Water Sensitive Urban Design (WSUD)
- Water by Design - Music Modelling Guidelines 2006
- State Planning Policy 2017 – Health Waters
- Queensland Urban Drainage Manual 2016(Natural Resources and Water)
- Urban Stormwater – Queensland best practice environmental guidelines January 2009 (Environmental Protection Agency)
- Queensland Water Quality Guidelines Version 3 September 2009 (Department of Environment and Resource Management)
- Urban Stormwater Quality Planning Guidelines (Department of Environment and Resource Management 2010);

Appendix A

Proposed Site Plan

COPYRIGHT RED DOOR ARCHITECTURE ALL RIGHTS RESERVED. THIS DRAWING AND RELEVANT AUSTRALIAN STANDARDS. OR IN WHOLE WITHOUT WRITTEN PERMISSION OF RED DOOR ARCHITECTURE.



LEGEND

- BUSHFIRE BUFFER
- RETAINING WALL
- TEMPORARY CONSTRUCTION ACCESS
- BIN COLLECTION POINT
- POOL SHELTER

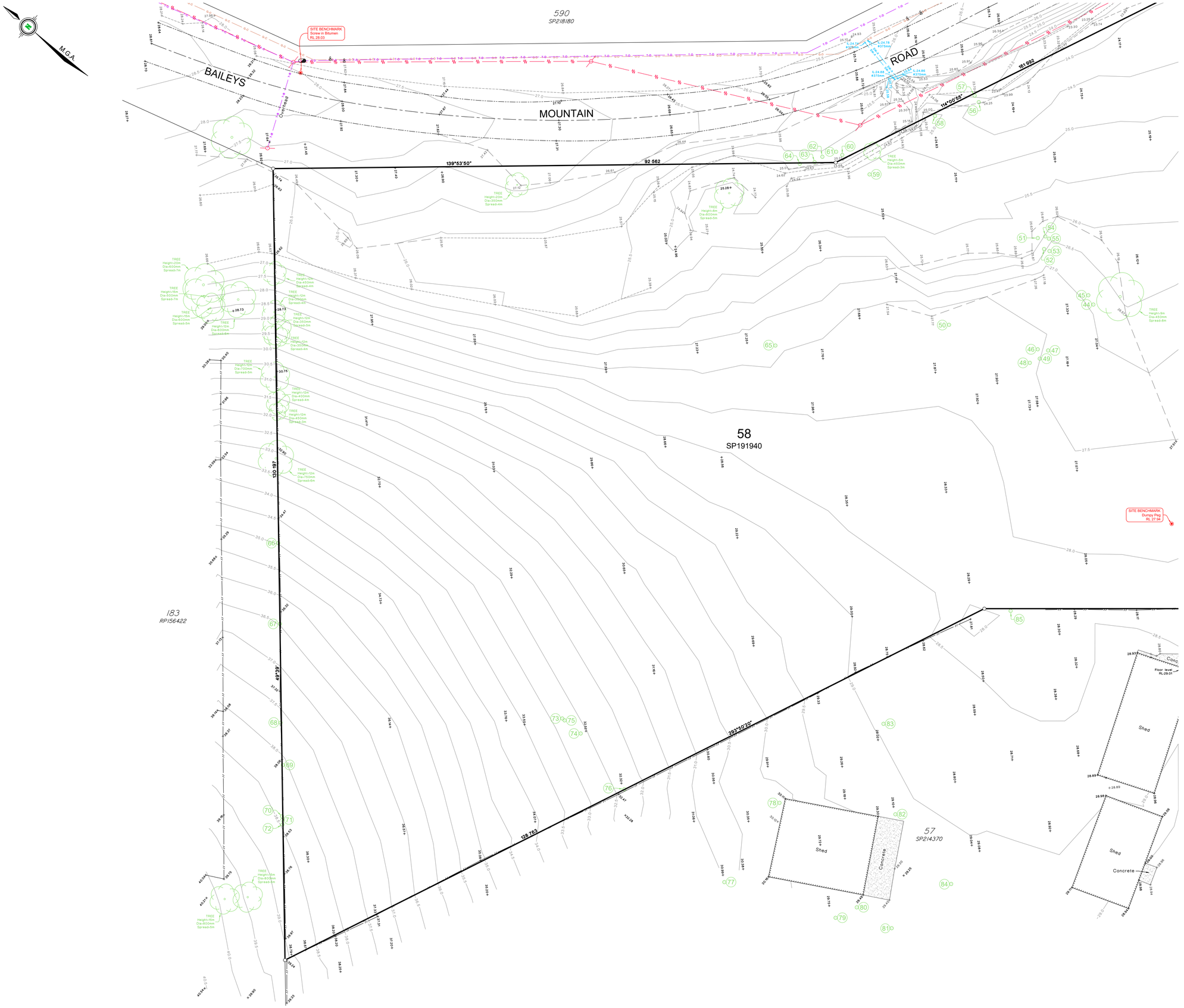
RED DOOR ARCHITECTURE

REVISION	B	18.10.24	DA ISSUE

WWW.RDARCH.COM.AU | 230008 | SCALE 1 : 1000 | 18.10.24 | 202 BAILEYS MOUNTAIN RD, UPPER COOMERA | MG LAND | DA-0-010 | SITE PLAN OF LAYOUT

Appendix B

DETAIL SURVEY



Client

MG Homes

Project

Detail Survey of 202 Baileys Mountain Road, Upper Coomera

Described as Lot 58 on SP191940

Scale: 1:300 at A1

Datum: AHD vide PSM 9055 — Locality: Upper Coomera

RL: 7.251m — LGA: Gold Coast City

Contour Int: 0.5m — Cadfile: MGH-323.DET.01

Issue	Description	Drw	Date	Appd
A	INITIAL ISSUE	SSD	26.06.23	MP

Notes

The title boundaries shown hereon were not marked at the time of survey and have been compiled from previous survey.
Services shown hereon have been located where possible by field survey. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.

LEGEND

BB	Bottom of bank	
BW	Bottom of wall	
BX	Building	
CG	Change of grade	
CL	Centreline of road	
EBT	Edge of bitumen	
ECO	Edge of concrete	
ELP	Light Pole	
EMH	Electricity Pit	
EP	Electricty Pole	
ERD	Edge of gravel road	
EW	Edge of water	
FHP	Fire Hydrant Pillar	
FNX	Fence	
GB	Garden	
GMK	Gas Marker	
GTS	Gully pit	
HWL	Headwall	
KCL	Kerb lip	
KIN	Kerb invert	
KTB	Kerb top back	
MHO	⌀$1mm	
MHS	$×	
PDV	Patio or Deck	
RWP	Recycled Water Pipe	
SGN	Traffic sign	
SHD	Shed	
SMH	Sewer Manhole	
TB	Top of Bank	
TEP	Telstra Pit	
TRE	Tree	
TW	Top of wall	

Tree Legend
for further information on tagged trees and TPZs see repot by S5 Consulting

Tree Height=5m Dia=300mm Spread=10m — Un-tagged Tree

Tagged Tree

Service Location Legend
eLoc × - Position Via Electronic Locator

UNDERGROUND SERVICES - ALPHA CLASSIFICATION AS PER AUSTRALIAN STANDARD AS5488.

Sewer main	S-O
Stormwater drainage	SW-O
Water main	W-O
Telstra service	T-O
NBN service	NBN-O
Gas supply	G-O
Electricity supply	E-O

0 — 9 — 18 m

SCALE 1:300 (A1)

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Sheet No.	Surveyed By:	Date Surveyed:
1 of 3	SAB	19.06.23

Dwg. No. **MGH-323.DET.01** — Issue **A**



Client

MG Homes

Project

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RWP	Recycled Water Pipe	
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for further information on tagged trees and TPZs see repot by S5 Consulting

Tree Height:5m Dia:300mm Spread:10m — Un-tagged Tree

Tagged Tree

Service Location Legend
eLoc - Position Via Electronic Locator

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NBN service	NBN-O
Gas supply	G-O
Electricity supply	E-O

0 — 9 — 18 m

SCALE 1:300 (A1)

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Sheet No.	Surveyed By:	Date Surveyed:
2 of 3	SAB	19.06.23

Dwg. No.	Issue
MGH-323.DET.01	A



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RWP	Recycled Water Pipe	
SGN	Traffic sign	
SHD	Shed	
SMH	Sewer Manhole	
TB	Top of Bank	
TEP	Telstra Pit	
TRE	Tree	
TW	Top of wall	

Tree Legend
for further information on tagged trees and TPZs see repot by SS Consulting

Tree Height-5m Dia-300mm Spread-10m — Un-tagged Tree

Tagged Tree

Service Location Legend
eLocX - Position Via Electronic Locator

UNDERGROUND SERVICES - ALPHA CLASSIFICATION AS PER AUSTRALIAN STANDARD AS5488.

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Telstra service	T-O
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0 — 9 — 18 m

SCALE 1:300 (A1)

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Sheet No.	Surveyed By:	Date Surveyed:
3 of 3	SAB	19.06.23

Dwg. No.	Issue
MGH-323.DET.01	A

Appendix C

Concept Engineering Plans

TOWNHOUSE RESIDENTIAL DEVELOPMENT

AT - 202 BAILEYS MOUNTAIN RD, UPPER COOMERA

FOR - MG LAND PTY LTD

EROSION AND SEDIMENT CONTROL

PRELIMINARY ISSUE

JOB NUMBER 230094

DRAWING SCHEDULE

C02 EROSION & SEDIMENT CONTROL COVER SHEET AND SITE NOTES
C03 EROSION & SEDIMENT CONTROL SITE CATCHMENTS
C04 PHASE 1 BULK EARTHWORKS PLAN
C05 PHASE 2 ROADWORKS & DRAINAGE PLAN
C06 PHASE 3 STABILISATION PHASE PLAN
C07 EROSION AND SEDIMENT CONTROL DETAILS
C08 TYPE B DEEMED TO COMPLY SEDIMENT BASIN DETAILS

E&SC PLAN OBJECTIVE

DESIGN AND CERTIFICATION OF THE EROSION AND SEDIMENT CONTROLS REQUIRED TO COMPLY WITH THE STATE, LOCAL GOVERNMENT AND BEST PRACTICE EROSION AND SEDIMENT CONTROLS FOR ALL THE PHASES OF CONSTRUCTION DURING THE CIVIL WORKS.

APPLICABLE GUIDELINES

STATE PLANNING POLICY 2017
BEST PRACTICE EROSION AND SEDIMENT CONTROL (IECA, 2008)
APPENDIX B – SEDIMENT BASIN DESIGN (IECA 2018)

SITE LOCATION & DESCRIPTION

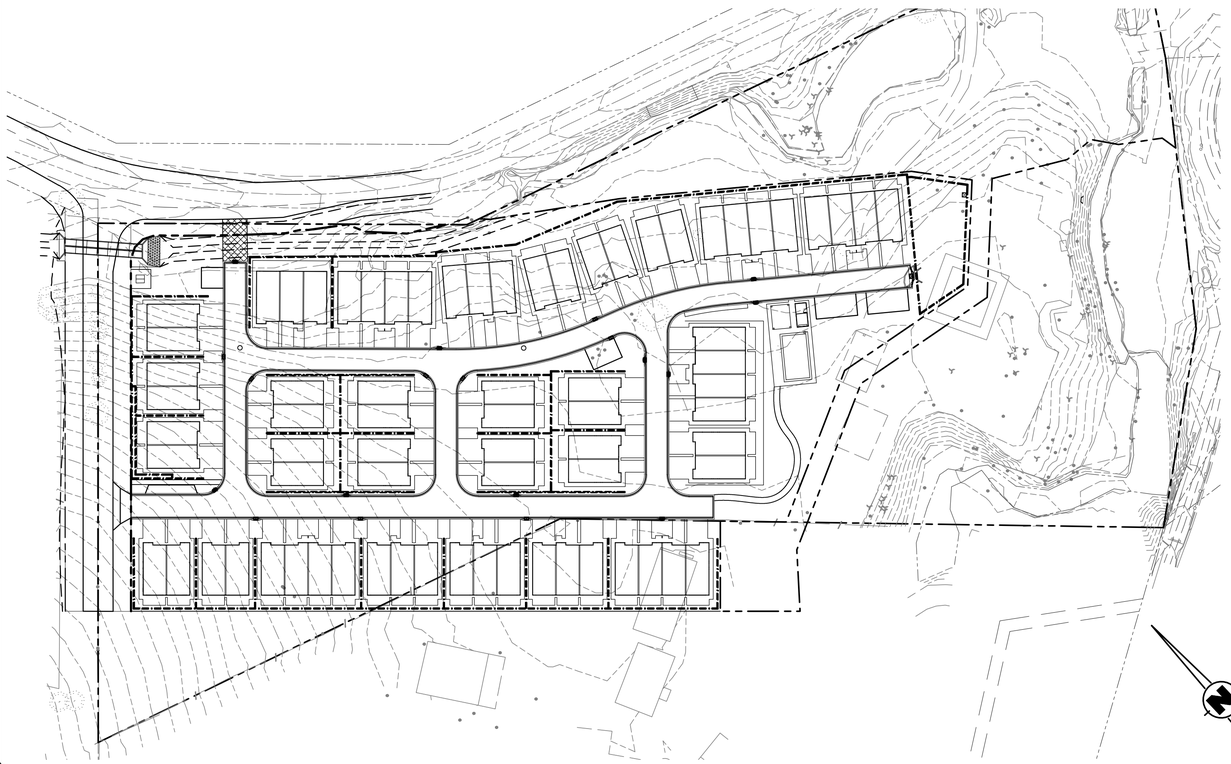
THE SITE IS SITUATED AT 202 BAILEYS MOUNTAIN ROAD, UPPER COOMERA QLD

SITE SOILS

THE PROFILE OF SOILS ON SITE GENERALLY CONSITS OF 0–400mm OF SILT, UNDELAIRD BY 400–1600mm CLAY FOUNDED ON ROCK. PLEASE REFER TO AW GEOTECHNICS REPORT DATED 27/03/2023

MAINTENANCE SCHEDULE

Control	IECA Standard Drawing Reference	IECA Construction Phase Maintenance Frequency	Responsible
Erosion control blankets	ECB-01	Fortnightly or after runoff producing events	Contractor
Light mulching	M-01	Fortnightly or after run off producing events	Contractor
Site entry and exit point	Exit-02	Prior to forecast rain, daily during extended periods of rainfall, after runoff producing rainfall or otherwise fortnightly	Contractor
Fibre rolls	FR-01	Prior to forecast rain, daily during extended periods of rainfall, after runoff producing rainfall or otherwise weekly	Contractor
Sediment fence	SF-02	Weekly and after significant rain, make necessary repairs immediately	Contractor
Kerb sediment inlet traps	ESC-03	Prior to forecast rain, daily during extended periods of rainfall, after runoff producing rainfall or otherwise weekly	Contractor
Grated stormwater inlet sediment trap	ESC-02	Prior to forecast rain, daily during extended periods of rainfall, after runoff producing rainfall or otherwise weekly	Contractor
Sediment basin	Sediment basin design factsheet page 22	Prior to forecast rain, daily during extended periods of rainfall, after runoff producing rainfall or otherwise weekly	
Diversion Drains & Channels	CD-02, DC-01	Weekly and after runoff producing rain fall	Contractor
Check Dams	RCD-01	Weekly and after runoff producing rain fall	Contractor





LOCALITY PLAN

COZENS REGAN GROUP
CONSULTING ENGINEERS • CIVIL • STRUCTURAL

SUITE 7 ADVANCE BUSINESS CENTRE
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CONSULT AUSTRALIA
Member Firm

JOB NO. 230094
DRAWING NO. C02
ISSUE P1



IMPORTANT NOTE:

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ALL UNDERGROUND SERVICES SHOULD BE LOCATED ONSITE BY RELEVANT AUTHORITIES BEFORE ANY WORK IS COMMENCED.

UNDER QUEENSLAND LEGISLATION, THE GENERAL BIOSECURITY OBLIGATION REQUIRES ALL REASONABLE STEPS TO BE TAKEN TO PREVENT THE SPREAD OF FIRE ANTS.

ALL SUSPECTED SIGHTINGS OF FIRE ANTS MUST BE REPORTED WITHIN 24 HOURS OF THEIR DISCOVERY (PH: 13 25 23). THE MOVEMENT OF FIRE ANTS IS PROHIBITED. FAILING TO COMPLY MAY INCUR PENALTIES.

THE CONTRACTOR SHALL ACQUIRE THE NECESSARY PERMITS AND EDUCATION TO MOVE ORGANIC MATERIALS THAT MAY CONTAIN FIRE ANTS.

N

LEGEND

PROPOSED CATCHMENT AREAS

No.	DATE	ISSUE	REVISED	CHECKED
P2	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P1	03/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.

IN ASSOCIATION WITH

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE A 0 5 10 15 20 1:500

SCALE B

DATUM AHD (U.N.O.)

SCALES SHOWN ARE AT A1 SIZE

COZENS REGAN GROUP
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W: www.cozreg.com.au

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DESIGNED TWN
DRAWN B.A.R.
CHECKED TWN

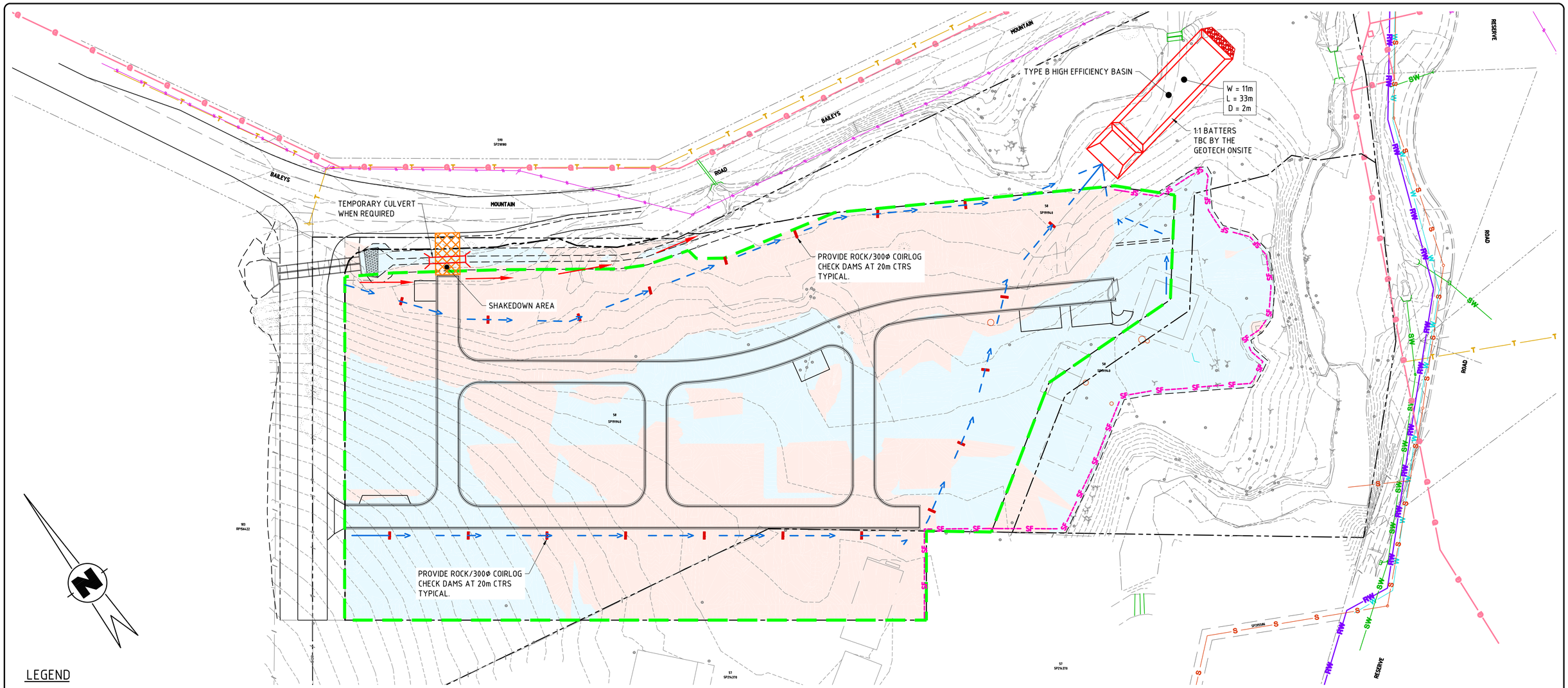
APPROVED FOR AND ON BEHALF OF COZENS REGAN GROUP PTY LTD
(RPEQ No 15735)

CLIENT MG LAND PTY LTD

PROJECT PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA

EROSION & SEDIMENT CONTROL SITE CATCHMENTS

JOB NO. 230094
DRAWING NO. C03
ISSUE P1P2



LEGEND

- SF — DENOTES SILTATION FENCE AS PER IECA STD DRG. SF.01 & 02
- SHAKE DOWN AREA AS PER IECA STD DRG. EXIT - 01
- DWD - DIVERSION DRAIN FLOW PATH WITH A14 GEOTEXTILE LINER/OR VITAL BOND MATT HR @ 20 DILUTION AND COIRLOG CHECK DAMS
- CLEAN WATER DIVERSION CHANNEL. GEOTEXTILE LINED AND ROCK CHECK DAMS AT 25m SPACING.
- HIGH EFFICIENCY 'TYPE B' SEDIMENT BASIN INSTALLED & MAINTAINED GENERALLY AS PER 'TYPE B DEEMED TO COMPLY' PROPOSED IN APPENDIX A OF WATER BY DESIGN DOCUMENT TITLED SEDIMENT MANAGEMENT ON CONSTRUCTION SITES AND AS SHOWN ON DRG C06.
- BASIN CATCHMENT AREA
- SPILLWAY AS PER IECA STD ES-1
- AREA OF FILL
- AREA OF CUT

POLYMER SPRAY APPLICATION RATE: 100L OF POLYMER 1000L OF WATER = 10% POLYMER/WATER SOLUTION.

LOCATION OF ALL SEDIMENT BASIN TO BE CONFIRMED ON SITE WITH RPEQ/CPESC

IMPORTANT NOTE:

BEFORE YOU DIG www.byda.com.au

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UNDER QUEENSLAND LEGISLATION, THE GENERAL BIOSECURITY OBLIGATION REQUIRES ALL REASONABLE STEPS TO BE TAKEN TO PREVENT THE SPREAD OF FIRE ANTS.

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THE CONTRACTOR SHALL ACQUIRE THE NECESSARY PERMITS AND EDUCATION TO MOVE ORGANIC MATERIALS THAT MAY CONTAIN FIRE ANTS.

HIGH EFFICIENCY BASIN No.1 PARAMETER (DEEMED TO COMPLY)

	BASIN
CATCHMENT SIZE	1.70 HA
SETTLING VOLUME ($330m^3$/HA)	$561m^3$
SETTLING DEPTH TO SPILLWAY CREST (1-2m)	2.0m
SEDIMENT STORAGE (30% OF SETTLING VOLUME)	$163m^3$
SPILLWAY WIDTH	11; 1:1 BATTERS 0.5m FREE BOARD
FOREBAY SIZE (10% SETTLING)	$56m^3$

CHECK DAMS SPACING

DRAIN SLOPE %	CHECK DAM HEIGHT (mm)	CHECK DAM MIN SPACING (m)
1%	500	50
2%	500	25
3%	500	17
4%	500	13
5%	500	10
6%	500	8
7%	500	7
8%	500	6
9%	500	6
10%	500	5

EROSION AND SEDIMENT CONTROL SEQUENCING NOTES

PHASE 1A: INSTALLATION OF PRIMARY AND PERIMETER SEDIMENT CONTROLS

- CONSTRUCT SITE ENTRY AND EXIT POINT
- ERECT VEGETATION PROTECTION FENCING AND SURVEY CLEARING LIMITS.
- CARRY OF VEGETATION REMOVAL OF THE SEDIMENT BASIN AND DIVERSION/CATCH DRAINS AREAS ONLY.
- CONSTRUCT SEDIMENT BASINS AS DETAILED. VOLUME OF THE SEDIMENT BASINS TO BE CONFIRMED TO RPEQ/CPESC VIA SURVEY PICK UP.
- CONSTRUCT SILT FENCES
- CONSTRUCT DIVERSION DRAINS AS DETAILED. DRAINS TO BE ADJUSTED TO NEW LEVELS AS THE SITE CHANGES THROUGHOUT THE PHASE.

PHASE 1B: VEGETATION REMOVAL AND EARTHWORKS

- COMPLETE THE REMAINING VEGETATION REMOVAL AND GRUBBING FOR THE SITE.
- STRIP AND STOCKPILE TOPSOIL ENSURING UPSTREAM DIVERSION BUNDS AND DOWNSTREAM SILT FENCES AROUND THE STOCKPILE AREAS ARE IN PLACE.
- CARRY OUT BULK EARTHWORKS IN ACCORDANCE WITH PROJECT DRAWINGS.
- ONCE EARTHWORKS HAVE BEEN COMPLETED ALL DISTURBED ARE TO STABILISED WITH HEAVY POLYMER SPRAY. INSPECT THE SPRAY EVERY 6 WEEK AND TOUCH UP ANY AREAS THAT SHOW DETERIORATION.

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SCALE A 0 5 10 15 20 1 : 500

SCALE B

DATUM AHD (U.N.O.) SCALES SHOWN ARE AT A1 SIZE

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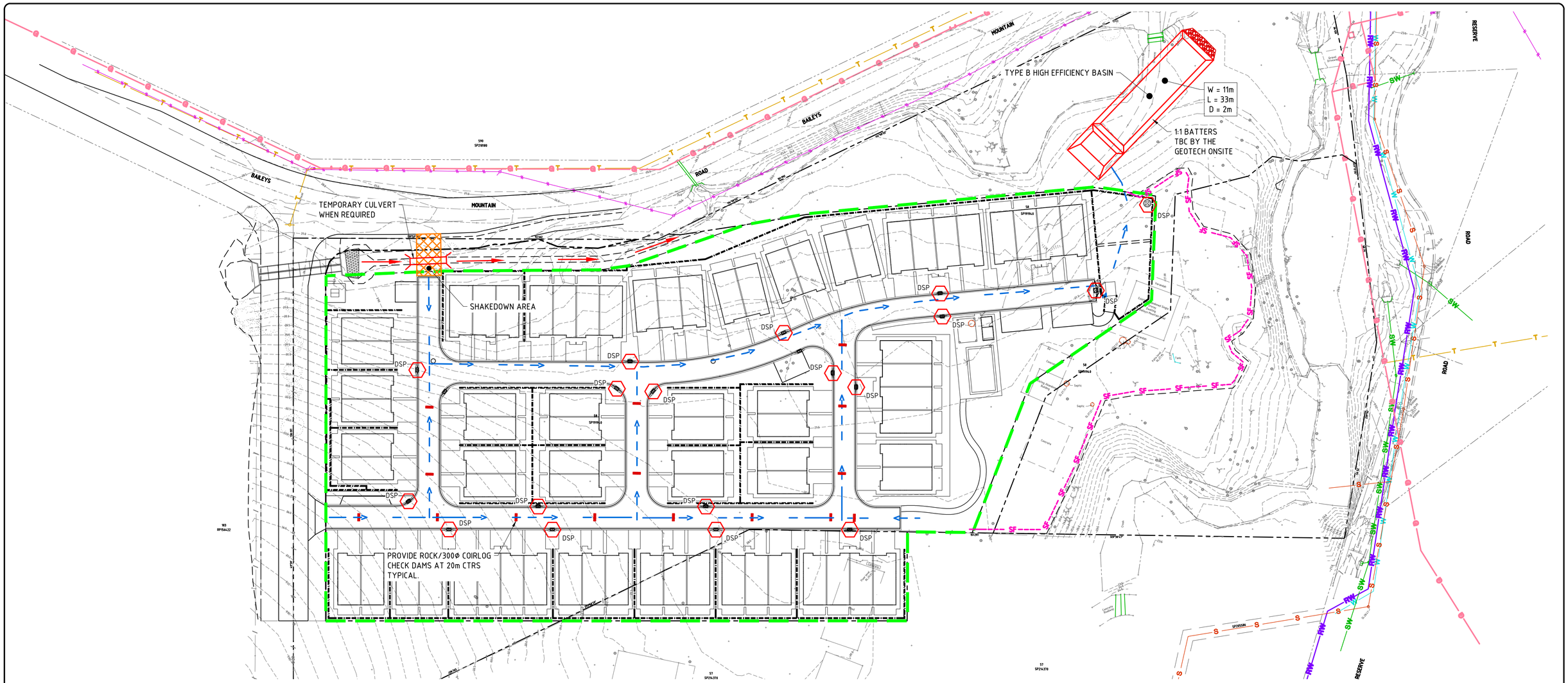
APPROVED FOR AND ON BEHALF OF COZENS REGAN GROUP PTY LTD (RPEQ No 15735)

CLIENT: MG LAND PTY LTD

PROJECT: PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA

PHASE 1A & 1B PRELIMINARIES, VEGETATION REMOVAL & EARTHWORKS

JOB NO. 230094
DRAWING NO. C04
ISSUE P1P2



LEGEND

- SF — DENOTES SILTATION FENCE AS PER IECA STD DRG. SF.01 & 02
- SHAKE DOWN AREA AS PER IECA STD DRG. EXIT - 01
- DWD - DIVERSION DRAIN FLOW PATH WITH A14 GEOTEXTILE LINER/OR VITAL BOND MATT HR @ 20 DILUTION AND COIRLOG CHECK DAMS
- CLEAN WATER DIVERSION CHANNEL. GEOTEXTILE LINED AND ROCK CHECK DAMS AT 25m SPACING.
- HIGH EFFICIENCY 'TYPE B' SEDIMENT BASIN INSTALLED & MAINTAINED GENERALLY AS PER 'TYPE B DEEMED TO COMPLY' PROPOSED IN APPENDIX A OF WATER BY DESIGN DOCUMENT TITLED SEDIMENT MANAGEMENT ON CONSTRUCTION SITES AND AS SHOWN ON DRG C06.
- BASIN CATCHMENT AREA
- SPILLWAY AS PER IECA STD ES-1

IMPORTANT NOTE:

BEFORE YOU DIG www.byda.com.au

ALL UNDERGROUND SERVICES SHOULD BE LOCATED ONSITE BY RELEVANT AUTHORITIES BEFORE ANY WORK IS COMMENCED.

UNDER QUEENSLAND LEGISLATION, THE GENERAL BIOSECURITY OBLIGATION REQUIRES ALL REASONABLE STEPS TO BE TAKEN TO PREVENT THE SPREAD OF FIRE ANTS.

ALL SUSPECTED SIGHTINGS OF FIRE ANTS MUST BE REPORTED WITHIN 24 HOURS OF THEIR DISCOVERY (PH: 13 25 23). THE MOVEMENT OF FIRE ANTS IS PROHIBITED. FAILING TO COMPLY MAY INCUR PENALTIES.

THE CONTRACTOR SHALL ACQUIRE THE NECESSARY PERMITS AND EDUCATION TO MOVE ORGANIC MATERIALS THAT MAY CONTAIN FIRE ANTS.

EROSION AND SEDIMENT CONTROL SEQUENCING NOTES

PHASE 2 - BALANCE OF BULK EARTHWORKS, ROADWORKS AND UNDERGROUND SERVICES INSTALLATION

- MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES (I.E. SILT FENCES, CHECK DAMS, CLEAN WATER DIVERSION DRAIN) DURING THE CONSTRUCTION OF THE UNDERGROUND SERVICES AND ROADWAY.
- ONCE THE CONSTRUCTION OF THE UNDERGROUND SERVICES AND ROADWAY HAS BEEN COMPLETED ALL DISTURBED AREA ARE TO BE STABILISED VIA HEAVY POLYMER SPRAY AND WITHIN 6 WEEK TIMEFRAME.
- CONNECT ANY SEALED PAVEMENTS TO THE STORMWATER SYSTEM AND INSTALL KERB INLET PROTECTIONS ONCE ALL GULLY PITS ARE CONSTRUCTED AND BASE COURSE HAS BEEN LAID.
- HES BASINS TO REMAIN UNTIL 70% OF THE SITE HAS BEEN STABILSED.

POLYMER SPRAY APPLICATION RATE:
100L OF POLYMER 1000L OF WATER =
10% POLYMER/WATER SOLUTION.

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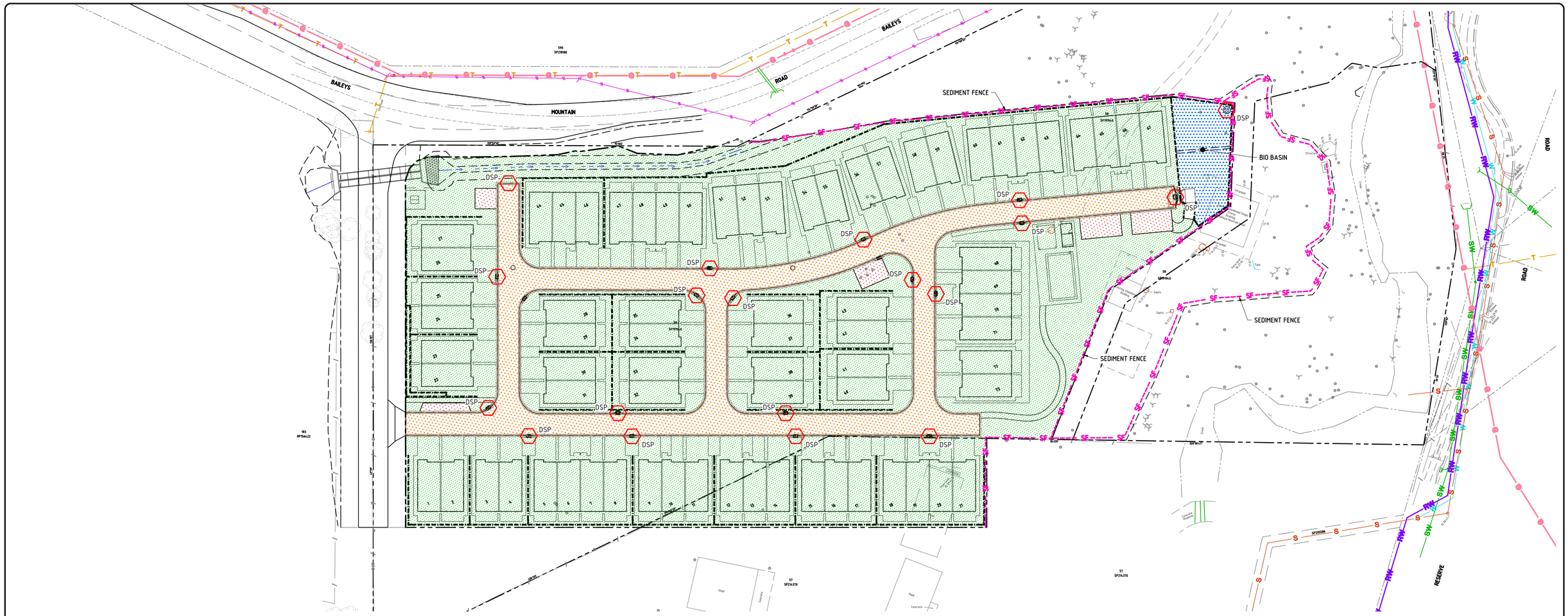
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(RPEQ No 15735)

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PROJECT: PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
PHASE 2 ROADWORKS AND SERVICES

JOB NO. 230094
DRAWING NO. C05
ISSUE P1P2



LEGEND

- POLYMER SPRAY
- DSP — DENOTES DRAINAGE STRUCTURE PROTECTION
- PROPOSED AC PAVEMENT
- PROPOSED CONCRETE PAVEMENTS
- SF — DENOTES SILTATION FENCE AS PER IECA STD DRG. SF.01 & 02
- PROPOSED BIO RETENTION BASIN

IMPORTANT NOTE:

BEFORE YOU DIG www.byda.com.au

ALL UNDERGROUND SERVICES SHOULD BE LOCATED ONSITE BY RELEVANT AUTHORITIES BEFORE ANY WORK IS COMMENCED.

UNDER QUEENSLAND LEGISLATION, THE GENERAL BIOSECURITY OBLIGATION REQUIRES ALL REASONABLE STEPS TO BE TAKEN TO PREVENT THE SPREAD OF FIRE ANTS.

ALL SUSPECTED SIGHTINGS OF FIRE ANTS MUST BE REPORTED WITHIN 24 HOURS OF THEIR DISCOVERY (PH: 13 25 23). THE MOVEMENT OF FIRE ANTS IS PROHIBITED. FAILING TO COMPLY MAY INCUR PENALTIES.

THE CONTRACTOR SHALL ACQUIRE THE NECESSARY PERMITS AND EDUCATION TO MOVE ORGANIC MATERIALS THAT MAY CONTAIN FIRE ANTS.

POLYMER SPRAY APPLICATION RATE:
100L OF POLYMER 1000L OF WATER =
10% POLYMER/WATER SOLUTION.

EROSION AND SEDIMENT CONTROL SEQUENCING NOTES

PHASE 3: STABILIZATION AND MAINTENANCE

- MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES UNTIL ALL DISTURBED AREAS HAVE BEEN STABILISED.
- REMOVE SEDIMENT BASIN:
- INSTALL DOWNSTREAM OF THE BASIN ANY SHORT TERM CONTROL MEASURES REQUIRED TO DECOMMISSION THE BASIN WITHOUT CAUSING ANY EROSION, SEDIMENT OR ENVIRONMENTAL HARM.
- REMOVE AND DISPOSE OF PONDED WATER AND STORED SEDIMENT WITHOUT CAUSING ANY EROSION, SEDIMENT OR ENVIRONMENTAL HARM.
- REMOVE SITE ENTRY AND EXIT POINT.
- ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES TO BE ERECTED AND MAINTAINED AS DIRECTED BY RPEQ/CPESC.
- DISTURBED AREAS TO BE PERIODICALLY STABILISED WITH HEAVY POLYMER SPRAY PRIOR TO RAIN EVENTS AT THE DIRECTION OF THE RPEQ/CPESC. THE CONTRACTOR MUST INFORM THE RPEQ/CPESC OF UPCOMING SIGNIFICANT RAIN EVENTS ASAP SO THE RPEQ/CPESC CAN ASSIST IN PREPARING THE SITE FOR SUCH EVENTS.

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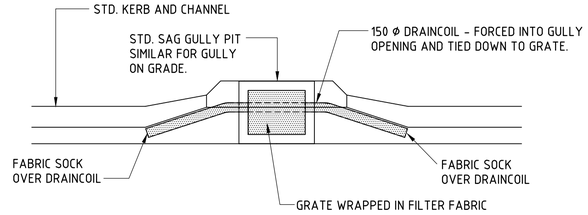
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PHASE 3 STABILISATION PLAN

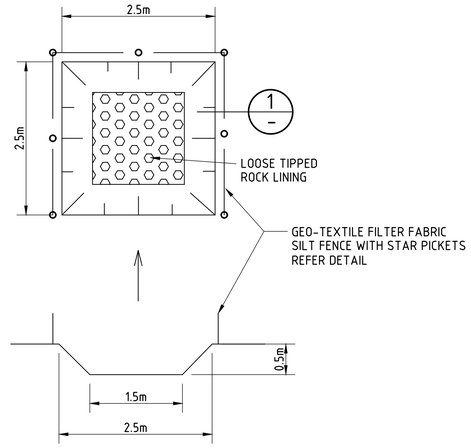
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ISSUE P1P2



SILTATION CONTROL AT GULLY PIT (EXISTING)

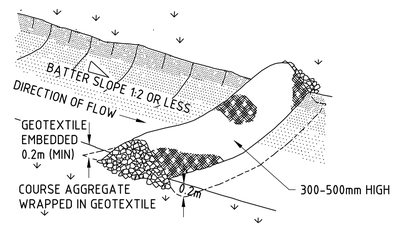
SCALE 1 : 50

TO BE PROVIDED AT EXISTING GULLY PITS EXTERNAL TO SITE WHERE DIRECTED.

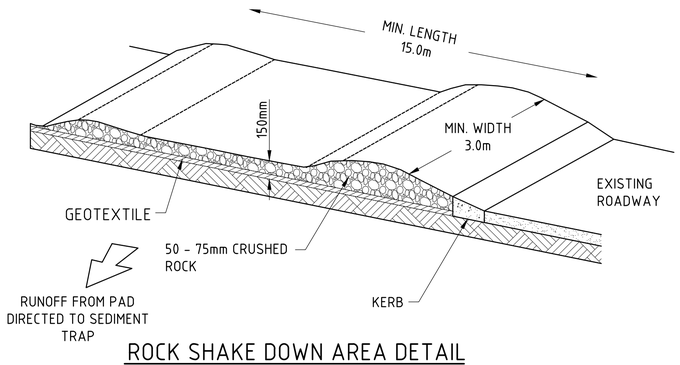


SILTATION TRAP DETAILS

SCALE 1 : 50



ROCK CHECK DAM

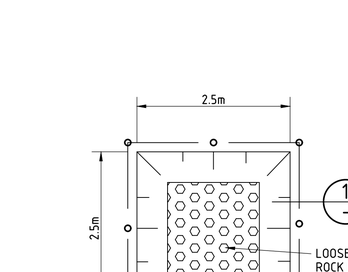


ROCK SHAKE DOWN AREA DETAIL

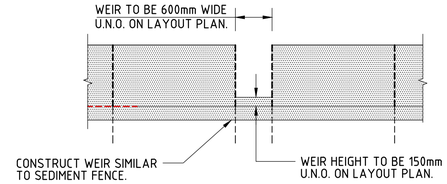
SCALE N.T.S.

SEDIMENT FENCE DETAILS

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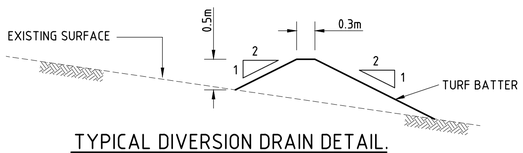


REFER LAYOUT PLAN FOR SURFACE TREATMENT AT WEIR OUTLET.



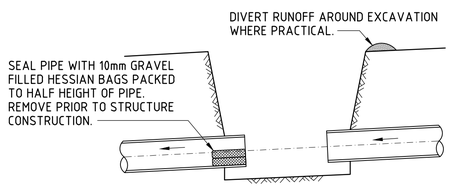
SEDIMENT FENCE WEIR

SCALE 1 : 50



TYPICAL DIVERSION DRAIN DETAIL.

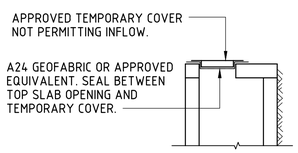
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EXCAVATION

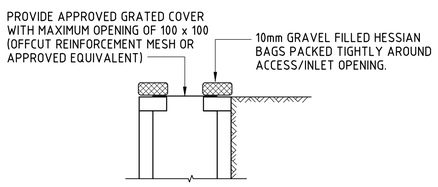
1:100

EXCAVATION AND PIPE INSTALLATION



ACCESS CHAMBER

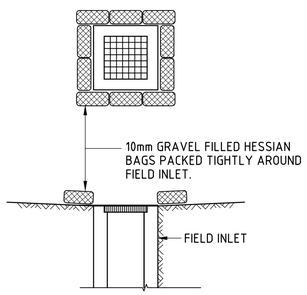
1:50



INLET STRUCTURE

1:50

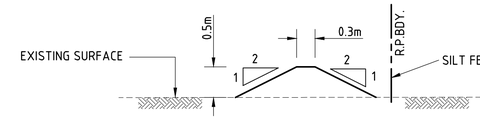
(STRUCTURE COMPLETE UP TO TOP SLAB)



INLET STRUCTURE

1:50

(STRUCTURE COMPLETE)



TYPICAL BUND DETAIL.

SCALE 1:50

STAGE 1

STAGE 2

STAGE 3

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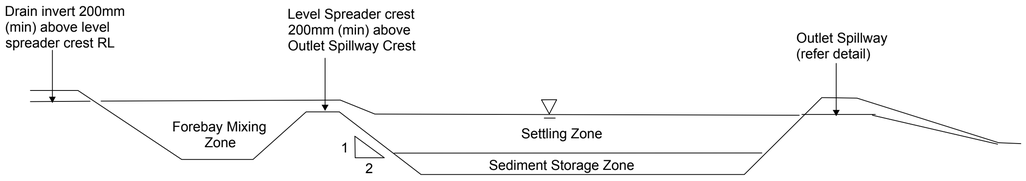
PROJECT PROPOSED TOWNHOUSE DEVELOPMENT
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EROSION & SEDIMENT CONTROL DETAILS

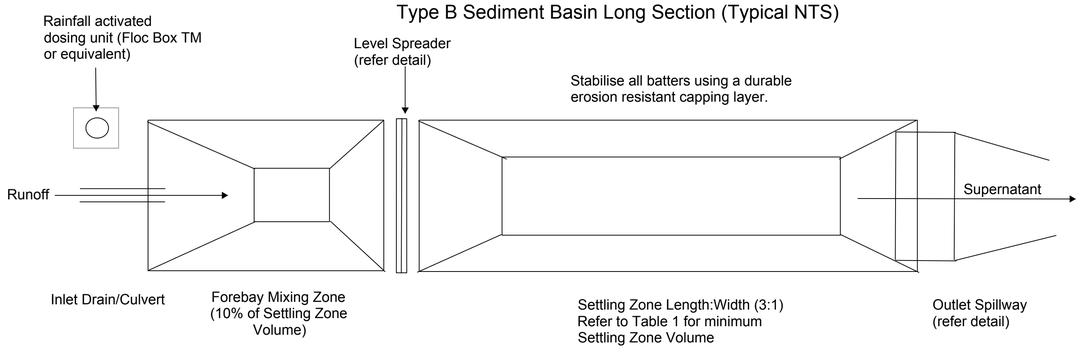
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DRAWING NO. C07

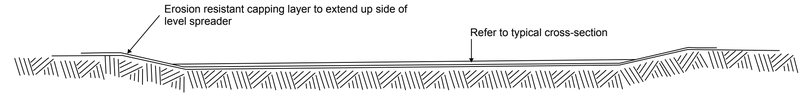
ISSUE P1



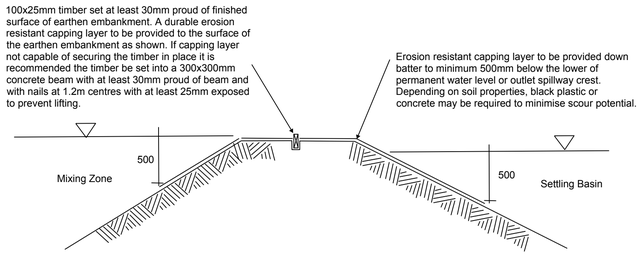
Type B Sediment Basin Long Section (Typical NTS)



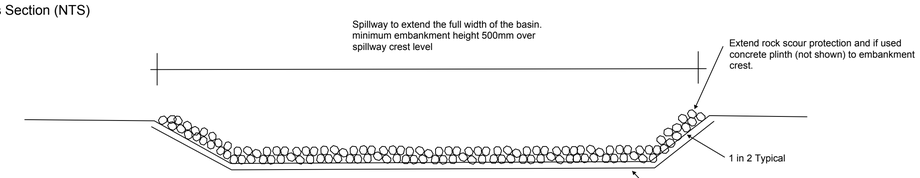
Type B Sediment Basin Plan View (Typical NTS)



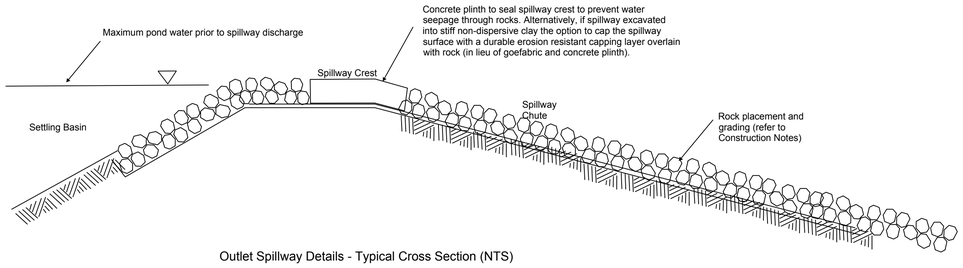
Level Spreader Details - Typical Long Section (NTS)



Level Spreader Details - Typical Cross Section (NTS)



Outlet Spillway Details - Typical Long Section (NTS)



Outlet Spillway Details - Typical Cross Section (NTS)

Basin Perspective (looking downstream)

Basin Perspective (looking upstream)

Notes:

Auto Doser
1. Installed to manufacturers specification.
2. Doser and supply of flocculant to be provided on level pad within 10m of dosing point.
3. All-weather access track to be provided to doser.

Basin construction:

Materials-

5. Earth Fill: clean soil with Emerson Class 2(1), 3, 4 or 5 and free of roots, woody vegetation, rocks and other unsuitable material. Soil with Emerson Class 4 and 5 may not be suitable depending on particle size distribution and degree of dispersion. Class 2(1) should only be used upon recommendation from geotechnical specialist.
6. Spillway rock: hard, angular, durable, weather resistant and evenly graded rock with 50% by weight larger than the specified nominal (d50) rock size. Large rock should dominate, with sufficient small rock to fill the voids between larger rock. the diameter of the largest rock should be no larger than 1.5 times the nominal rock size. The specific gravity should be at least 2.5.
7. Durable erosion resistant capping to manufacturers specifications. if Geotextile fabric used it is to be heavy duty, needle-punched, non-woven cloth, minimum 'bidim' A24 or equivalent.

Construction-

8. Notwithstanding any description contained with approved plans or specifications, the Contractor shall be responsible for satisfying themselves as to the nature and extent of the specified works and the physical and legal conditions under which the works will be carried out. This shall include means of access, extent of clearing, nature of the materials to be excavated, type and size of mechanical plant required, location and suitability of water supply for construction and testing purposes, and any other likely matters affecting the construction of the works.
9. Refer to approved plans for location, dimensions, and construction details. If there are questions or problems with the location, dimensions, or method of installation, contact the engineer or responsible on-site officer for assistance.
10. Before starting any clearing or construction, ensure all the necessary materials and components are on the site to avoid delays in completing the sediment basin once works begin.
11. Install requires short term sediment control measures downstream of the proposed earthworks to control sediment runoff during construction of the basin.
12. The area to be covered by the embankment, borrow pits and incidental works, together with an area extending beyond the limits of each for a distance not exceeding five (5) metres all around must be cleared of all trees, scrub, stumps, roots, dead timber and rubbish and disposed of in a suitable manner. Delay clearing the main basin area until the embankment is complete.
13. Ensure all holes made by grubbing within the embankment footprint are filled with sound material, adequately compacted, and finished flush with the natural surface.

Cut-off Trench-

14. Before construction of the cut-off trench or any ancillary works within the embankment footprint, all grass growth and topsoil must be removed from the area to be occupied by the embankment and must be deposited clear of this area and reserved for topdressing the completed embankment.
15. Excavate a cut-off trench along the centre line of the earth fill embankment. Cut the trench to stable soil material, but in no case make it less than 600mm deep. the cut-off trench must extend into both abutments to at least the elevation of the outlet spillway crest. Make the minimum bottom width wide enough to permit operation of the excavation and compaction equipment, but in no case less than 600mm. Make the side slopes of the trench no steeper than 1:1 (H:V).
16. Ensure all water, loose soil, and rock are removed from the trench before backfilling commences. The cut-off trench must be backfilled with select earth-fill of the type specified for the embankment, and this soil must have a moisture content and degree of compaction the same as specified for the core zone.
17. Material excavated from the cut-off trench may be used in the construction of the embankment provided it is suitable and it is placed in the correct zone according to its classification.

Embankment-

18. Scarify areas on which fill is to be placed before placing the fill.
19. Ensure al fill material used to form the embankment meets the specifications certified by a soil scientist of geotechnical specialist.
20. The fill material must contain sufficient moisture so it can be formed by hand into a ball without crumbling. If water can be squeezed out of the ball, it is too wet for proper compaction. Place fill material in 150 to 200mm continuous layers over the entire length of the fill area and then compact before placement of further fill.
21. Unless specified on the approved plans, compact the soil at about 1% to 2% wet optimum and to 95% modified or 100% standard compaction.embankment to an elevation 10% higher than the design height to allow for settling
22. Where both dispersive and non-dispersive classified earth-fill materials are available, non-dispersive earth-fill must be used in the core zone. the remaining classified earth-fill materials must only be used as directed by the site superintendent.
23. Where specified, construct the embankment to an elevation 10% higher than the design height to allow for settling; otherwise finished dimensions of the embankment after application of the durable erosion resistant capping layer must conform to the drawing with a tolerance of 75mm from specified dimensions.
24. Ensure debris and other unsuitable building waste is not placed within the earth embankment.
25. After completion of the embankment all loose uncompacted earth-fill material on the upstream and downstream batter must be removed prior to applying the durable erosion resistant capping layer.
26. Apply durable erosion resistant capping layer to all exposed earth as directed within the approved plans.

Spillway construction-

27. The spillway must be excavated as shown on the plans, and the excavated material if classified as suitable, must be used in the embankment, and if not suitable it must be disposed of into spoil heaps.
28. Ensure excavated dimensions allow adequate boxing-out such that the specified elevations, grades, chute width, and entrance and exit slopes for the emergency spillway will be achieved after placement of the rock or other scour protection measures as specified in the plans.
29. Place specified scour protection measures on the emergency spillway. Ensure the finished grade blends with the surrounding area to allow a smooth flow transition from spillway to downstream channel.
30. If a synthetic filter fabric underlay is specified, place the fabric directly on the prepared foundation. if more than 1 sheet of filter fabric is required, overlap the edges by at least 300mm and place anchor pins at minimum 1m spacing along the overlap. bury the upstream end of the filter fabric a minimum 300mm below ground and where necessary, bury the lower end of the fabric or overlap a minimum 300mm over the next downstream section as required. Ensure the filter fabric extends at least 1000mm upstream of the spillway crest.
31. Take care not to damage the fabric during or after placement. If damage occurs, remove the rock and repair the sheet by adding another layer of fabric with a minimum overlap of 300mm around the damaged area.3If extensive damage is suspected, remove and replace the entire sheet.
32. where large rock is used, or machine placement is difficult, a minimum 100mm layer of fine gravel, aggregate, or sand may be needed to protect the fabric.
33. Placement of rock should follow immediately after placement of the filter fabric. Place rock so that it forms a dense, well graded mass of rock with a minimum of voids. the desired distribution of rock throughout the mass may be obtained by selective loading at the quarry and controlled dumping during final placement.
34. The finished slope should be free of pockets of small rock or clusters of large rocks. Hand placing may be necessary to achieve the proper distribution of rock sizes to produce a relatively smooth, uniform surface. the finished grade of the rock should blend with the surrounding are. No overfall or protrusion of rock should be apparent.
35. Ensure that the final arrangement of the spillway crest will not promote excessive flow through the rock such that the water can be retained within the settling basin at the elevation no less than 50mm above of below the nominated spillway crest elevation.

Establishing the settling pond-

36. The area to be covered by the stored water outside of the limits of the borrow pits must be cleared of rubbish. Trees must be cut down stump high and removed from the immediate vicinity of the work.
37. Establish all required inflow chutes and inlet baffles, if specified, to enable water to discharge into the basin in a manner that will not cause soil erosion or the re-suspension of settled sediment.
38. Install a sediment storage level marker post with a cross member set just below the top of the sediment storage zone (as specified on the approved plans). Use at least a 75mm wide post firmly set into the basin floor.
39. If specified, install internal settling pond baffles. Ensure the crest of these baffles is set level with, or just below, the elevation of the emergency spillway.
40. Install all appropriate measures to minimise safety risk to on-site personnel and the public caused by the presence of the settling pond. Avoid steep, smooth internal slopes. Appropriately fence the settling pond and post warning signs if unsupervised public access is likely or there is considered to be an unacceptable risk to the public.

Table 1 - Settling Zone Volume

Standard Type B High Efficiency Sediment Basin for Small Catchments (<2ha)

No.	DATE	ISSUE	REVISED	CHECKED
P1	03/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.

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SCALE A 0 1 2 3 4 5 1 : 100

SCALE B

DATUM AHD (U.N.O.)

SCALES SHOWN ARE AT A1 SIZE

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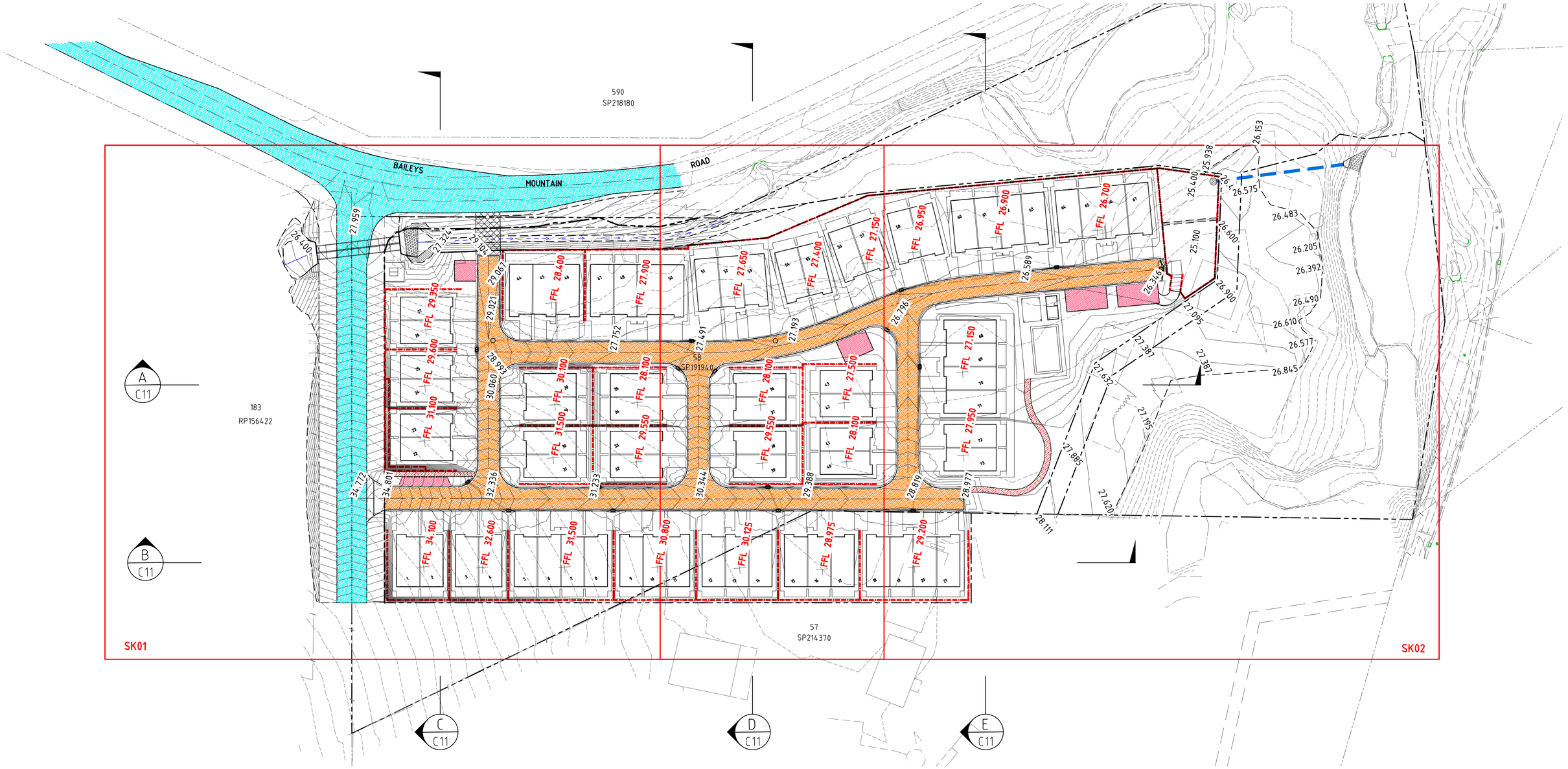
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PROJECT PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA

TYPE 'B' DEEMED TO COMPLY SEDIMENT BASIN DETAILS

JOB NO. 230094
DRAWING NO. C08
ISSUE P1



LEGEND

16.0	EXISTING CONTOUR
W	EXISTING WATER
SW	EXISTING STORMWATER
S	EXISTING SEWER
T	EXISTING TELSTRA
G	EXISTING HIGH PRESSURE GAS (CL500)
E	EXISTING ELECTRICAL
RM	EXISTING COUNCIL SEWER RISING MAIN
83.0	PROPOSED CONTOUR
	PROPOSED PRIVATE STORMWATER RETICULATION
	PROPOSED COUNCIL STORMWATER RETICULATION
	PROPOSED WATER RETICULATION
	PROPOSED SEWERAGE RETICULATION
+ 23.400	FINISHED SURFACE LEVEL
+ FFL 23.200	FINISHED FLOOR LEVEL
+ PAD 22.750	EARTHWORKS PAD LEVEL
	PROPOSED CONCRETE SLEEPER RETAINING WALL OR SIMILAR TO FUTURE DESIGN
BRW	PROPOSED BLOCK RETAINING WALL
TW BW	TOP OF WALL LEVEL BOTTOM OF WALL LEVEL
	DENOTES DIVERSION DRAIN
	PROPOSED INTERNAL PRIVATE ROADS/DRIVEWAYS
	PROPOSED CAR PARKING BAYS
	PROPOSED CONCRETE FOOTPATH
	PROPOSED EXTERNAL ROADWORKS

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P1	05/24	ORIGINAL ISSUE	B.A.R.	T.W.N.

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SCALE A 0 5 10 15 20 1:500

SCALE B

DATUM AHD (U.N.O.)

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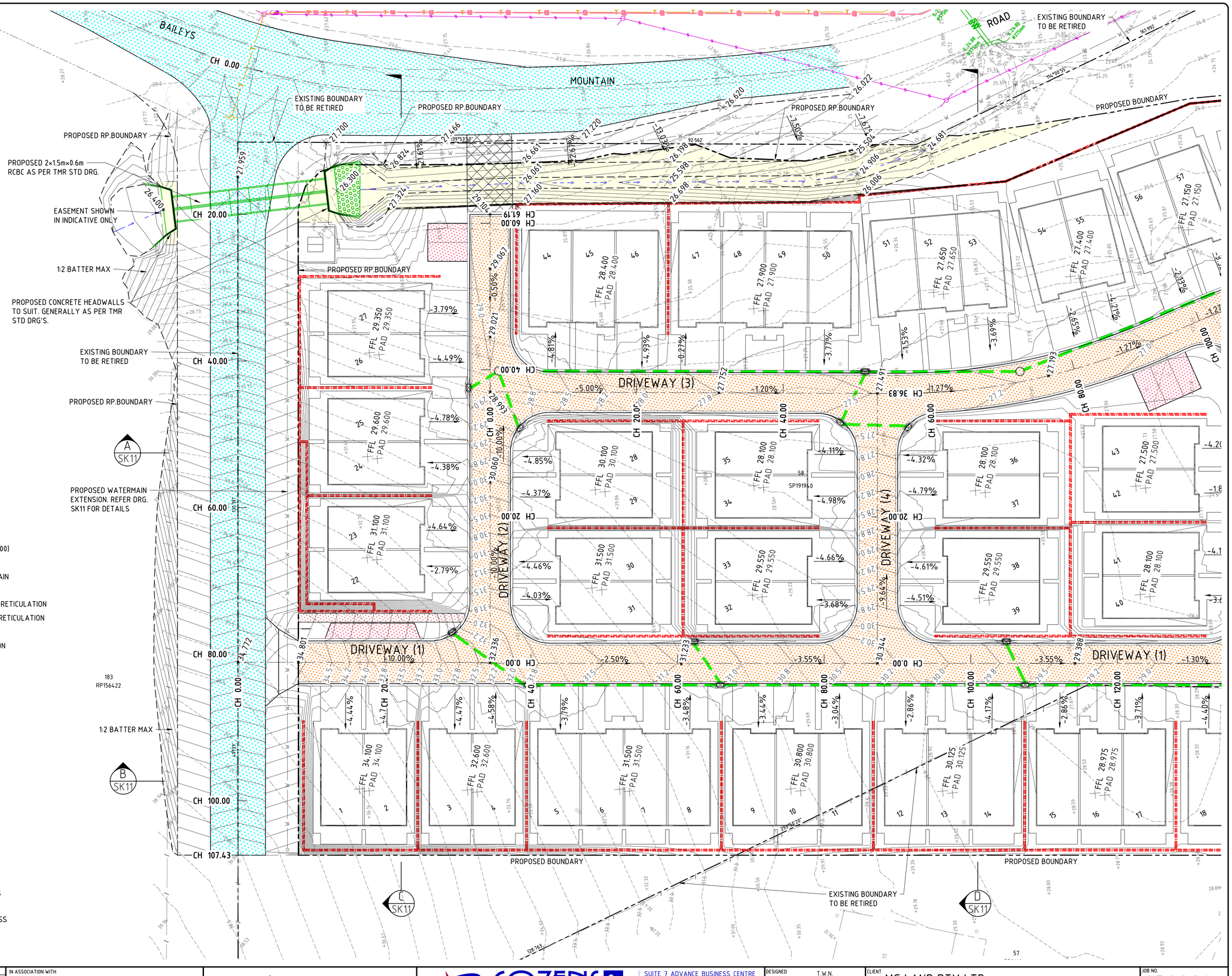
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202 BAILEYS MOUNTAIN RD, UPPER COOMERA

CONCEPT OVERALL SITE PLAN

JOB NO. 230094
DRAWING NO. SK00
ISSUE P1P2



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ALL SUSPECTED SIGHTINGS OF FIRE ANTS MUST BE REPORTED WITHIN 24 HOURS OF THEIR DISCOVERY (PH: 13 25 23). THE MOVEMENT OF FIRE ANTS IS PROHIBITED. FAILING TO COMPLY MAY INCUR PENALTIES.

THE CONTRACTOR SHALL ACQUIRE THE NECESSARY PERMITS AND EDUCATION TO MOVE ORGANIC MATERIALS THAT MAY CONTAIN FIRE ANTS.

LEGEND

- 16.0 — EXISTING CONTOUR
- W — EXISTING WATER
- SW — EXISTING STORMWATER
- S — EXISTING SEWER
- T — EXISTING TELSTRA
- G — EXISTING HIGH PRESSURE GAS (CL500)
- E — EXISTING ELECTRICAL
- RM — EXISTING COUNCIL SEWER RISING MAIN
- 83.0 — PROPOSED CONTOUR
- PROPOSED PRIVATE STORMWATER RETICULATION
- PROPOSED COUNCIL STORMWATER RETICULATION
- PROPOSED WATER RETICULATION
- PROPOSED SEWERAGE RETICULATION
- + 23.400 — FINISHED SURFACE LEVEL
- + FFL 23.200 — FINISHED FLOOR LEVEL
- + PAD 22.750 — EARTHWORKS PAD LEVEL
- PROPOSED CONCRETE SLEEPER RETAINING WALL OR SIMILAR TO FUTURE DESIGN
- BRW — PROPOSED BLOCK RETAINING WALL
- TW / BW — TOP OF WALL LEVEL / BOTTOM OF WALL LEVEL
- DENOTES DIVERSION DRAIN
- PROPOSED INTERNAL PRIVATE ROADS/DRIVEWAYS
- PROPOSED CAR PARKING BAYS
- PROPOSED CONCRETE FOOTPATH
- PROPOSED EXTERNAL ROADWORKS
- PROPOSED TEMPORARY SITE ACCESS
- PROPOSED DRAINAGE EASEMENT (INDICATIVE ONLY)

No.	DATE	ISSUE	REVISED	CHECKED
P5	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P4	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P3	05/24	PRELIMINARY ISSUE - 1:2 BATTER ADDED	B.A.R.	T.W.N.
P2	05/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P1	05/24	ORIGINAL ISSUE	B.A.R.	T.W.N.

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SCALE A 0 5 10 1 : 250

SCALE B

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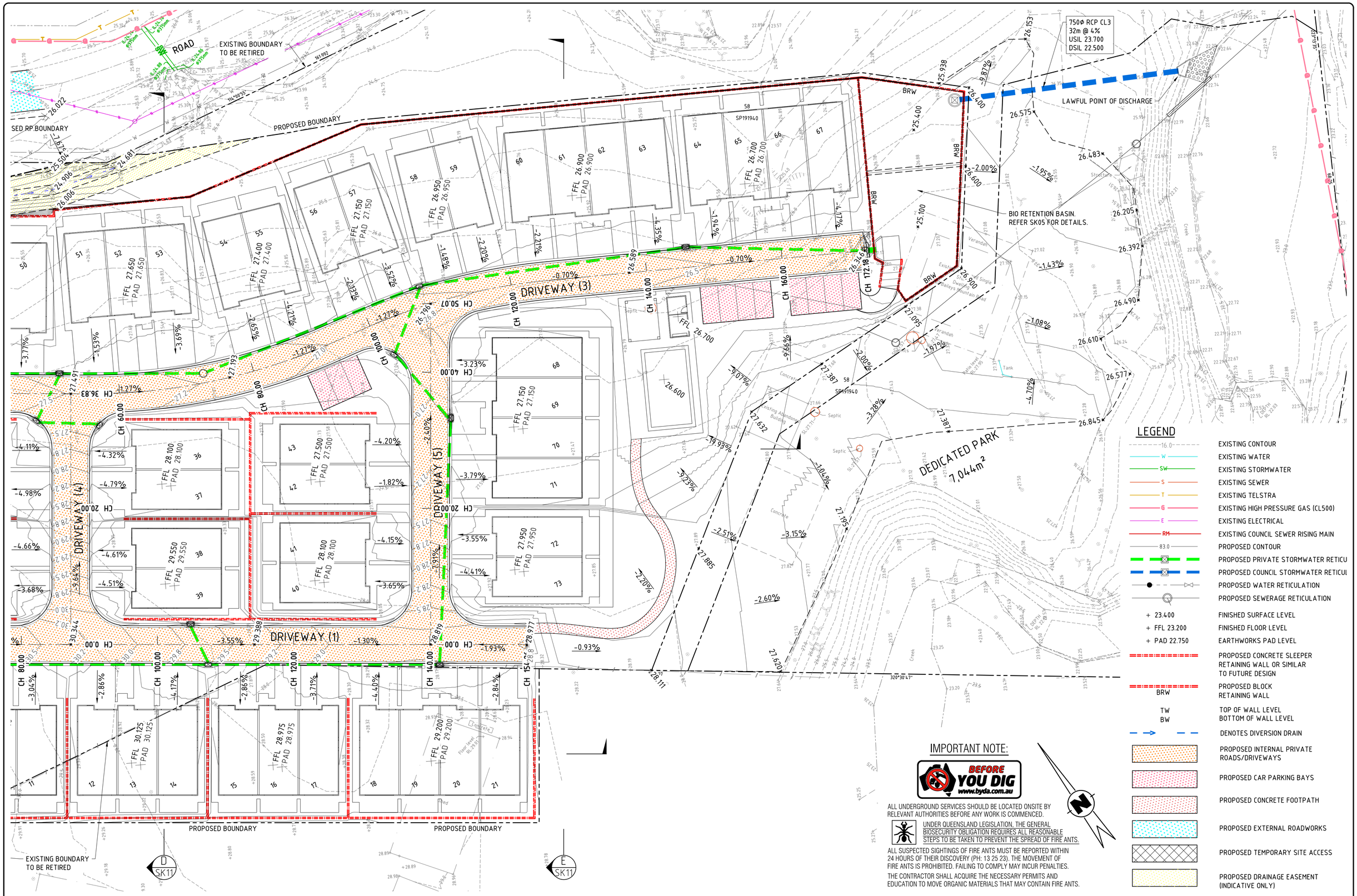
CLIENT: MG LAND PTY LTD

PROJECT: PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
CONCEPT CIVIL WORKS PLAN - 1 OF 2

JOB NO. 230094

DRAWING NO. SK01

ISSUE P1 P2 P3 P4 P5



LEGEND

- EXISTING CONTOUR
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING TELSTRA
- EXISTING HIGH PRESSURE GAS (CL500)
- EXISTING ELECTRICAL
- EXISTING COUNCIL SEWER RISING MAIN
- PROPOSED CONTOUR
- PROPOSED PRIVATE STORMWATER RETICU
- PROPOSED COUNCIL STORMWATER RETICUI
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- BRW PROPOSED BLOCK RETAINING WALL
- TW TOP OF WALL LEVEL
  BW BOTTOM OF WALL LEVEL
- DENOTES DIVERSION DRAIN
- PROPOSED INTERNAL PRIVATE ROADS/DRIVEWAYS
- PROPOSED CAR PARKING BAYS
- PROPOSED CONCRETE FOOTPATH
- PROPOSED EXTERNAL ROADWORKS
- PROPOSED TEMPORARY SITE ACCESS
- PROPOSED DRAINAGE EASEMENT (INDICATIVE ONLY)

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P2	05/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P1	05/24	ORIGINAL ISSUE	B.A.R.	T.W.N.

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SCALE A 0 5 10 1 : 250

SCALE B

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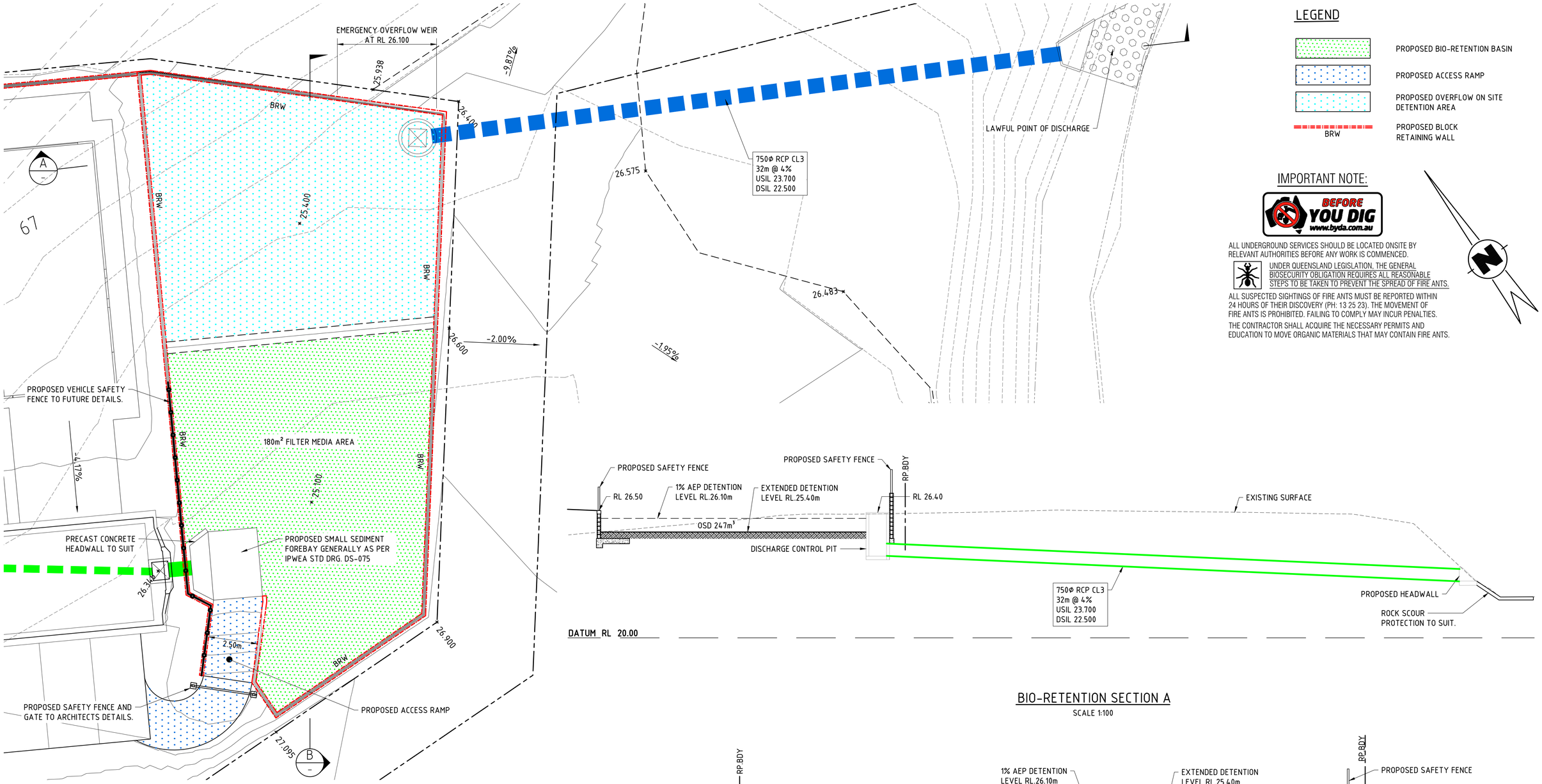
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CHECKED	T.W.N.

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PROJECT
PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
CONCEPT CIVIL WORKS PLAN – 2 OF 2

JOB NO. 230094
DRAWING NO. SK02
ISSUE P1 P2 P3 P4



LEGEND

- PROPOSED BIO-RETENTION BASIN
- PROPOSED ACCESS RAMP
- PROPOSED OVERFLOW ON SITE DETENTION AREA
- BRW — PROPOSED BLOCK RETAINING WALL

IMPORTANT NOTE:

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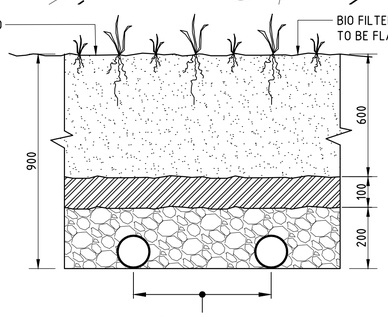
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PLANT SPECIES & PLANTING DENSITY TO BE CARRIED OUT IN ACCORDANCE WITH THE 'WATER SENSITIVE URBAN DESIGN' TECHNICAL DESIGN GUIDELINES FOR STH. EAST QLD.- VERSION 1 JUNE 2006- TABLE A-1 AND A-2.



FILTER MEDIA
"SOUTHERN PACIFIC SANDS PTY LTD - BIORET PLUS" OR APPROVED EQUIVALENT SANDY LOAM WITH 400-500mm/hr SATURATED HYDRAULIC CONDUCTIVITY.
IN-SITU HYDRAULIC CONDUCTIVITY TO REACH 180mm/hr ONCE SETTLEMENT AND COMPACTION HAS TAKEN PLACE.
ORGANIC CONTENT 4.4% DRY WEIGHT
PARTICLE SIZE <3% PASSING 0.05mm (w/w)
>97% PASSING 2mm (w/w)
pH. BETWEEN 5.5-7.5
PHOSPHORUS CONCENTRATION <100mg/kg

TRANSITION LAYER
1mm COARSE SAND
(DESIGNED IAW WSUD TDG SECTION 5.3.4.3)

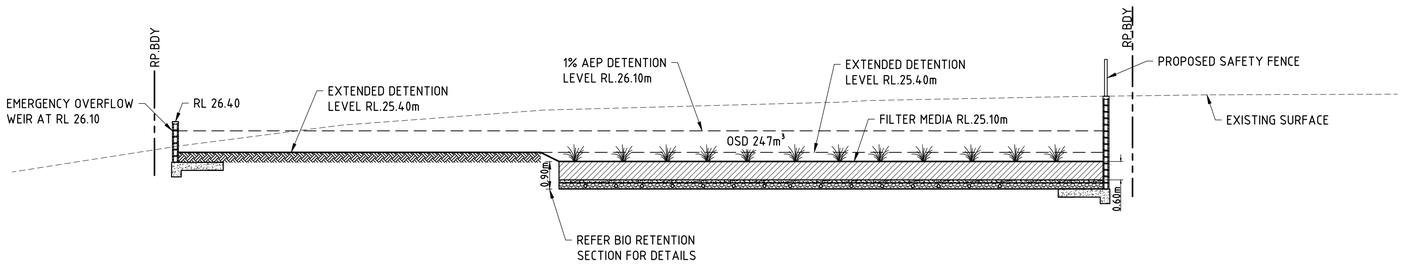
DRAINAGE LAYER
2-5mm SCREENINGS COARSE SAND/GRAVEL
(DESIGNED IAW WSUD TDG SECTION 5.3.4.2)

SLOTTED 100mm RIGID PIPE (uPVC OR SIMILAR TO AS 2439.1) OR APPROVED EQUIVALENT, 0.5% MIN. GRADE, SPACED EQUALLY AT 1.5m CENTRES (REFER IPWEAQ STANDARD DRAWING WSUD-001)

TYPICAL BIORETENTION SECTION

BIO-RETENTION SECTION A

SCALE 1:100



BIO-RETENTION SECTION B

SCALE 1:100

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SCALE B

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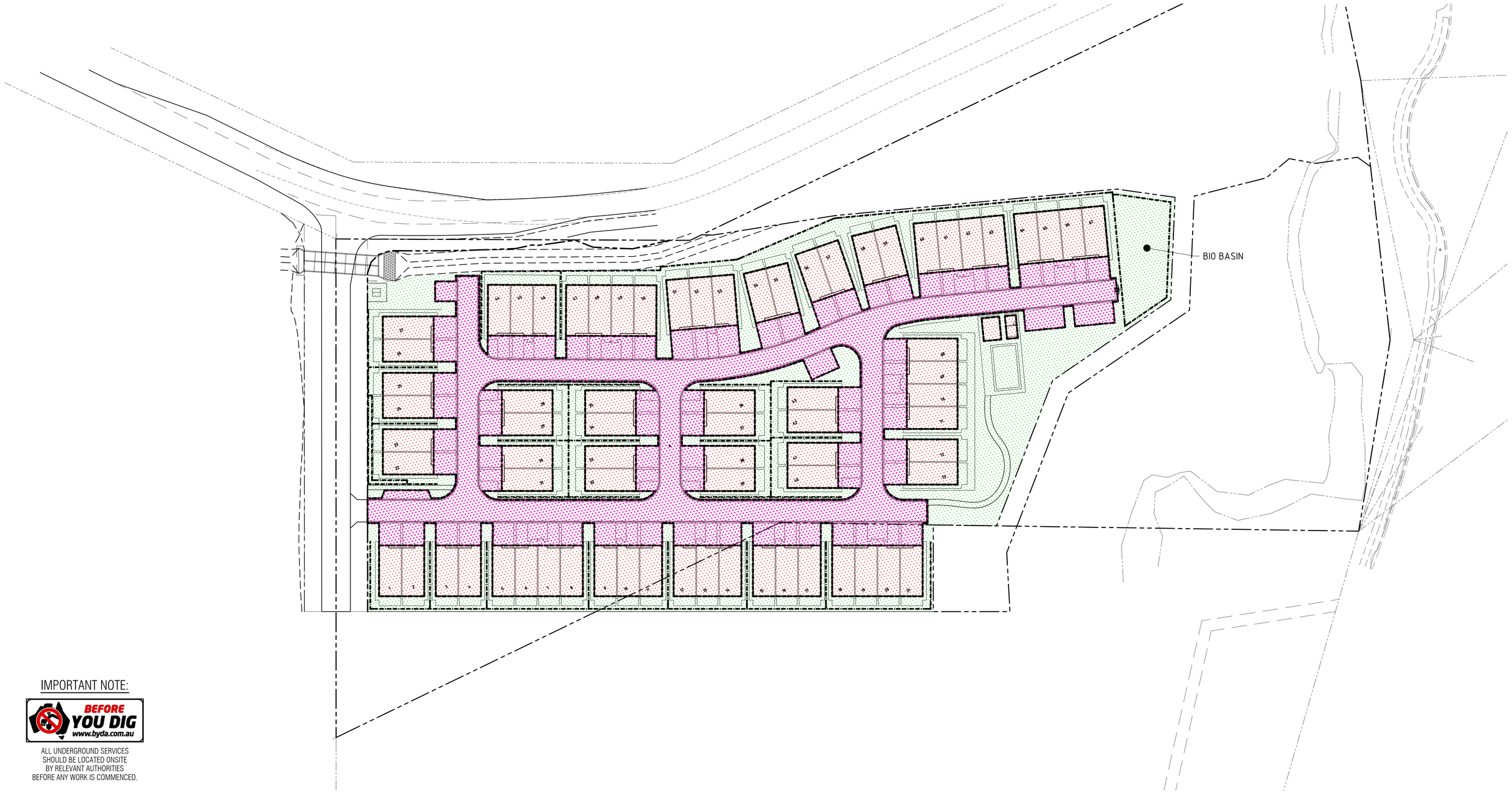
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DRAWN	BAR
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(RPEQ No 15735)

CLIENT: MG LAND PTY LTD

PROJECT: PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
CONCEPT BIO BASIN PLAN AND DETAILS

JOB NO. 230094
DRAWING NO. SK05
ISSUE P1P2



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MUSIC CATCHMENT TABLE

CATCHEMENT	AREA HA	Fi
ROOF	0.5768	100%
ROAD	**0.5609**	**100%**
GROUND	0.5925	30%

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202 BAILEYS MOUNTAIN RD, UPPER COOMERA

CONCEPT MUSIC PLAN

JOB NO. 230094
DRAWING NO. SK20
ISSUE P1P2

Appendix D

RATIONAL METHOD CALCULATIONS

Cozens Regan Williams Prove

Project Number: 230094
Description: Stormwater Quantity Assesment
Designed: TWN 11/10/2024 **CATCHMENT:** A
Location: 202 BAILEYS MOUNTAIN ROAD

PRE-DEVELOPMENT tc	Major	
Standard Inlet time:	N/A	min
Friends Eqn:		
High point RL	37.2	m AHD
Low point RL	34.8	m AHD
Flow length:	20.0	m
Site slope	12.0	%
Hortons 'n'	0.045	
Overland flow travel time	**7.94**	**min**
Channel Flow 1		
High point RL	34.8	m AHD
Low point RL	24.8	m AHD
Flow length	125.0	m
Slope	0.08	m
Hydaulic Radius	0.025	A/WP
n	0.03	
V	**0.81**	
Channel Travel Time	**2.58**	**min**
Channel Flow 2		
High point RL	24.8	m AHD
Low point RL	20.8	m AHD
Flow length	241.0	m
Slope	0.02	m
Hydaulic Radius	0.24	A/WP
n	0.045	
V	**1.11**	
Channel Travel Time	**3.62**	**min**
Calculated tc	**14.15**	**min**
Adopted tc	**14.0**	**min**

MAX 20 min. Refer QUDM 4.06.1

POST DEVELOPMENT tc.	Major		
Standard Inlet time:	5.0	min	
Kerb and channel flow			
High point RL	33.4	m AHD	
Low point RL	26.2	m AHD	
Flow length	230.0	m	
Slope	3.1	%	
Kerb travel time	**3.25**	**min**	**QUDM Eqn 4.06**
Pipe flow			
High point RL	23.7	m AHD	
Low point RL	22.5	m AHD	
Flow length	32.0	m	
Slope	0.0375	m	
Pipe Size	750	mm	
n	0.013		
Q	**2.22**	m3/s	**FROM FLOW CHART**
Pipe travel time	**0.106**	**min**	**QUDM Fig 4.10**
Channel Flow			
High point RL	22.2	m AHD	
Low point RL	20.8	m AHD	
Flow length	82.0	m	
Slope	0.02	m	
Hydaulic Radius	0.045	A/WP	
n	0.03		
V	**0.55**		
Channel Travel Time	**2.48**	**min**	**Refer QUDM 4.06.10**
Calculated tc	**10.84**	**min**	
Adopted tc	**11.0**	**min**	

MAX 20 min. Refer QUDM 4.06.1

CALCULATION OF INITIAL RUNOFF - QUDM Section 4.00

	PRE-DEV'T	POST-DEV'T	
Catchment area (ha)	**1.730**	**1.730**	
Impervious area (ha)	**0.040**	**1.320**	**Ha**
Fraction impervious	0.02	0.76	
Intensity - 1 hr, 10 yr (mm/hr)	**64.9**		**IFD: Coomera**
t_c existing (min.)	14.00		
t_c post-developed (min.)	11.00		

ESTIMATION OF PEAK FLOWS

ARI	Existing				Post development				Difference in runoff	
	C	I (mm/hr)	Q (m^3/min)	**Q (m^3/s)**	C	I (mm/hr)	Q (m^3/min)	**Q (m^3/s)**	Increase (L/s)	Increase %
1EY	0.56	80.1	12.93	0.216	0.67	89	17.10	0.285	69	32.2%
0.5EY	0.6	100	17.30	0.288	0.71	111	22.72	0.379	90	31.4%
0.2EY	0.67	124	23.95	0.399	0.8	138	31.83	0.531	131	32.9%
10%	**0.70**	143	**28.86**	**0.481**	**0.84**	158	38.27	**0.638**	**157**	**32.6%**
5%	**0.74**	163	**34.78**	**0.580**	**0.88**	181	45.93	**0.765**	**186**	**32.1%**
2%	0.81	189	44.14	0.736	0.97	209	58.45	0.974	239	32.4%
1%	**0.84**	**208.00**	**50.38**	**0.840**	**1.00**	**231.00**	66.61	**1.110**	**270**	**32.2%**

APPROX. PEAK FLOWS LESS THAN Q1

ARI	% of Q1	Existing (L/s)	Post dev't (L/s)	% inc
1 mth	25%	53.9	71.2	32.2%
2 mth	40%	86.2	114.0	32.2%
3 mth	**50%**	107.8	**142.5**	**32.2%**
4 mth	60%	129.3	171.0	32.2%
6 mth	75%	161.7	213.7	32.2%
9 mth	90%	194.0	256.5	32.2%
12 mths (Q1)	100%	215.6	284.9	32.2%

SUMMARY

			CHECKED	COMMENT
Item	**Existing**	**Proposed**		
Area Ha	**1.730**	**1.730**		
Imperv A	0.040	1.320		
Fi %	0.0%	0.8%		
tc mins	14.00	11.00		
10yr 1hr I	64.9	64.9		
C10	**0.70**	**0.84**		
C100	0.84	1.00		
Q10 m^3/s	0.481	0.638		
Q20 m^3/s	0.580	0.765		
Q50 m^3/s	0.736	0.974		
Q100 m^3/s	0.840	1.110		
Initial Vs	**Ave (m^3)**	**Max Est Vs (m^3)**		
Q10	95.7	137.9		
Q20	113.2	163.5		
Q50	145.5	209.9		
Q100	164.9	238.0		

CHECKED:

INITIAL DETENTION SIZING

Written by OC 17/07/2009
Updated by TWN Jan 2013

Based on QUDM 5.05 'Flood-Routing for Small Basins - Initial Sizing'

Flood Event	Discharge Coeff. of Runoff		Rainfall Intensity		Qi (m3/s)	Qo (m3/s) (allowable outlet flow)	Vi Approx. Inflow Volume (m^3) 4 * Qi * tc/ 3 Vi =	Ratio r = (Qi-Qo)/Qi	INITIAL ESTIMATED Vs					
	Existing Cy	Post-D'ment Cy	Existing I mm/hr	Post-D'ment I mm/hr					Culp (1948) Vs=r{(1+2r)/3}Vi Vs m^3/s	Boyd (1989) Vs=r*Vi Vs m^3/s	Carroll (1990) Vs={r(3+5r)/8}Vi Vs m^3/s	Basha (1994) Vs={r(2+r)/3}Vi Vs m^3/s	Average Vs	Maximum Estimated Vs
1	0.56	0.67	80	89	0.285	0.216	251	0.24	30.3	61.1	32.2	45.7	42.3	61.1
2	0.6	0.71	100	111	0.379	0.288	333	0.24	39.2	79.5	41.7	59.4	54.9	79.5
5	0.67	0.80	124	138	0.531	0.399	467	0.25	57.6	115.5	61.2	86.6	80.2	115.5
10	**0.7**	**0.84**	**143**	**158**	**0.638**	**0.481**	561	**0.25**	**68.6**	**137.9**	**72.9**	**103.3**	**95.7**	**137.9**
20	**0.74**	**0.88**	**163**	**181**	**0.765**	**0.580**	674	**0.24**	**81.0**	**163.5**	**86.1**	**122.2**	**113.2**	**163.5**
50	0.81	0.97	189	209	0.974	0.736	857	0.24	104.2	209.9	110.8	157.1	145.5	209.9
100	**0.84**	**1.00**	**208**	**231**	**1.110**	**0.840**	977	**0.24**	**118.0**	**238.0**	**125.5**	**178.0**	**164.9**	**238.0**

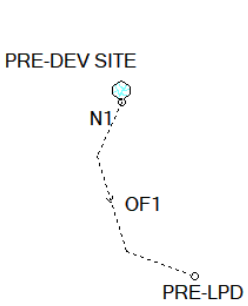
Initial Sizing: QUDM (5.05.1)

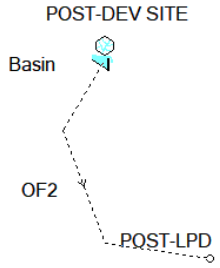
Note: Initial sizing in above table does not allow for any run-off routing or relationship between catchment size and time of concentration

Appendix E

DRAINS MODEL RESULTS

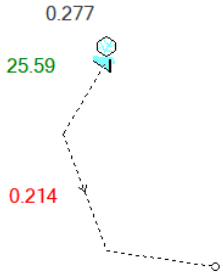
Drains Model Setup





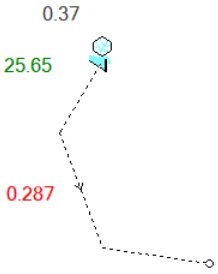
Results for median storm in critical 1EY ensembles using Lite hydraulic model.





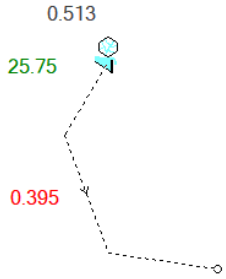
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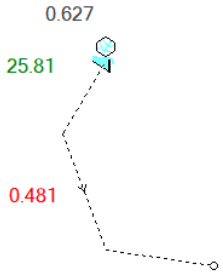
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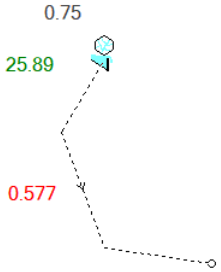
Results for median storm in critical 10% AEP ensembles using Lite hydraulic model.





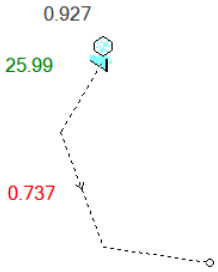
Results for median storm in critical 5% AEP ensembles using Lite hydraulic model.





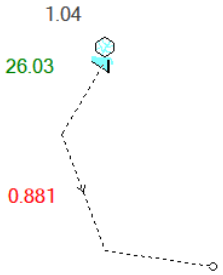
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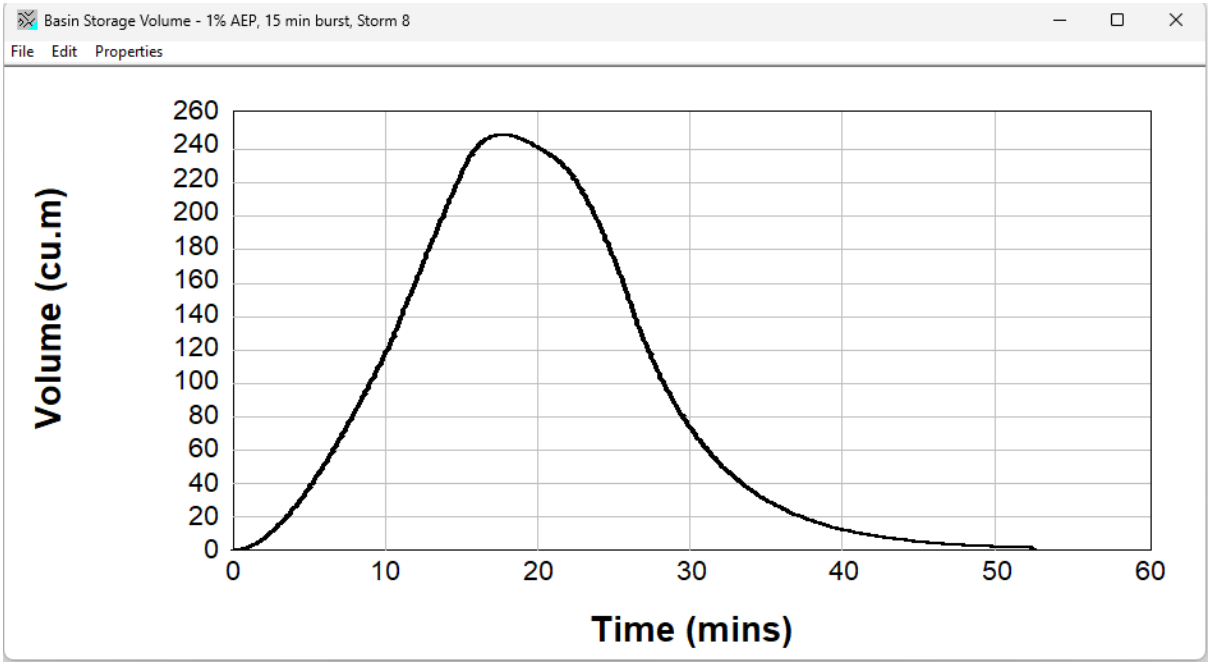




Results for median storm in critical 1% AEP ensembles
using Lite hydraulic model.







Transport
Engineering Report

202 Baileys Mountain Road, Upper Coomera

Reconfiguration of Lot (ROL) and Material Change of Use (MCU) - Multi-Unit Development

On behalf of MG Land



About TTM now Colliers

For 40 years, we've been at the centre of the Australian development and infrastructure industry. Our unique combination of acoustics, data, traffic and waste services is fundamental to the success of any architectural or development project.

We have over 60 staff, with an unrivalled depth of experience. Our industry knowledge, technical expertise and commercial insight allow us to deliver an exceptional and reliable service.

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Revision Record

No.	Author	Reviewed/Approved		Description	Date
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3.					
4.					

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1. Introduction

1.1. Purpose

TTM Consulting (now a Colliers company) has been engaged by MG Land to prepare a traffic engineering report investigating a proposed Reconfiguration of a Lot (RoL) and Material Change of Use (MCU) for a multiple unit dwelling development. It is understood that a Development Application (DA) will be lodged with City of Gold Coast Council ('Council').

1.2. Scope

The scope of the transport aspects investigated includes:

- Reviewing the prevailing traffic and transport conditions surrounding the site.
- Identifying parking supply required to cater for development demands.
- Assessing the parking layout to provide efficient and safe internal circulation and manoeuvring.
- Assessing the access configuration to provide efficient and safe manoeuvring between the site and the public road network for cars, service vehicles, cyclists and pedestrians.
- Identifying the service vehicle needs for the site
- Assessing the internal service vehicle layouts to provide efficiency and safety for on-site service vehicle operation

The development plans have been assessed against the following guidelines and planning documents:

- City of Gold Coast City Plan, specifically:
  - Gold Coast City Plan Version 11
  - Gold Coast City Plan Development Codes, Part 9.4.13 Transport Code
  - Gold Coast City Plan Development Codes, Part 9.4.2 Driveways and Vehicle Crossings Code
  - Schedule 6.11 City Plan policy – Land Development Guidelines
- Australian Standards for Parking Facilities, specifically:
  - Part 1: Off-streetcar parking (AS2890.1:2004)
  - Part 2: Off-street commercial vehicle facilities (AS2890.2:2018)
  - Part 3: Bicycle parking (AS2890.3:2015)
  - Part 6: Off-street parking for people with disabilities (AS2890.6:2009).

1.3. Pre-lodgement Discussions

A Pre-lodgement meeting took place on 30/03/2023 with the Council. During this meeting, it was communicated that Council desired the local road network access to be relocated as far north as possible on Baileys Mountain Road from the Old Coach Road / Reserve Road intersection. TTM notes the current site plans no longer indicate an access location for the site directly from Baileys Mountain Road, except for temporary construction access. TTM also acknowledges that the Council requested further justifications for the internal road hierarchy, local road access intersection location and traffic distribution.

The proposed new local road will facilitate access through appropriate design arrangements and sightlines. Further, TTM notes Council will impose a trunk condition for a road dedication for future upgrades to Baileys Mountain Road for future construction (not part of this development).

2. Site Location

The subject site is located at 202 Baileys Mountain Road, Upper Coomera near the intersection of Old Coach Road as shown in Figure 2.1. The subject site has road frontages to Baileys Mountain Road to the east and Old Coach Road and Reserve Road to the south. The real property description is Lot 58 on SP 191940.



Figure 2.1: Site Location (Surrounding Context)

The subject site is currently vacant land. The key site characteristics from a planning perspective include:

- 30,929m² site area
- Emerging Community, Upper Coomera zoning

3. The Proposed Development

3.1. Development Profile

The development proposal is a Reconfiguration of Lot (RoL) application for a '2 into 2' boundary realignment and a Material Change of Use (MCU).

As part of the RoL, a new local road is to be constructed through the western side of the site. The new local road will form part of a wider local road network structure plan for the immediate area with a connection to Baileys Mountain Road.

For the MCU component, a multi-unit residential development is proposed, with the overall yield is summarised in Table 3.1.

Table 3.1: Proposed Land Uses

Land Use	Qty
Multiple Dwellings:	
• Duplex units	34 dwellings
• Triplex Units	15 dwellings
• Quadplex Unit	24 dwellings
Total	**73 Dwellings**

Further, as part of the proposed development plans, land is to be dedicated for a recreation link and conservation land along Yuan Creek. A copy of the development plans, prepared by Red Door Architecture, is included in Appendix A.

3.2. Parking

The development plan includes the following parking supply:

- 140 resident spaces including 70 garage and 70 tandem driveway spaces.
- 16 visitor spaces (including 1 PWD space), which are dispersed across the site.

3.3. Access

Road Access

A new local road and intersection to Baileys Mountain Road is proposed. A summary of the new local road design includes the following characteristics:

- Land dedication for future upgrade to Baileys Mountain Road
- Residential Collector Street classification
- New intersection to Baileys Mountain Road
- Proposed left- and right-turn lanes

Site Access

The proposed development plan includes the following access arrangements:

- General Wide crossover as per IPWEA RS-51 parameters, 6.2m wide access via the New Road on the west side of the northern subject site frontage. This access will accommodate all vehicles with all movements permitted.
- Pedestrian access to the new Road frontage via footpath linkages. Shared footpaths are proposed internally.

3.4. Servicing

The development plan allows occasional access for vehicles up to the size of a Medium Rigid Vehicle (MRV), and regular access to Refuse Collection Vehicles (RCV),

4. Site Travel Environment

4.1. Public Transport Facilities and Services

4.1.1. Bus Services

Bus stops are located on Reserve Road, 500m to the west of the Old Coach Road intersection, which provides services connecting to the Coomera and Ormeau Rail Stations. The bus stops are serviced by TransLink's 724 bus route, which has an hourly frequency.

4.2. Active Transport Facilities

4.2.1. Bicycles

Dedicated on-street cycle lanes are located along Old Coach Road and Reserve Road which is accessible from the subject site.

4.3. The Road Network

4.3.1. Road Hierarchy

The hierarchy and characteristics of roads in the immediate vicinity of the site are shown in Table 4.1.

Table 4.1: Surrounding Road Hierarchy

Road	Speed Limit	Road Configuration			Classification
		Reserve Width	Carriageway Width	Lane Configuration	
Baileys Mountain Road	60 km/h	31 - 33m	22m	2 traffic lanes	Neighborhood Road
Old Coach Road	60 km/h	20m	10m	2 traffic lanes plus informal kerbside parking.	Sub Arterial
Reserve Road	60 km/h	20m	12.5m	2 traffic lanes plus informal kerbside parking.	Sub Arterial

The intersection of Baileys Mountain Road and Old Coach Road is a priority-controlled roundabout.

4.4. Transport Planning

TTM have discussed the planning of the future road network in the vicinity of the subject site with council. Per the pre-lodgement advice, it is understood that council has plans to upgrade and signalise the intersection of Baileys Mountain Road and Old Coach Road / Reserve Road. It is understood the extent of the upgrade extends beyond the subject site to the west.

A concept plan of the planned upgrades, drafted by Burchills Engineering Solutions Drawing Number 27144-P304 Revision A, is provided in Appendix B. As such, TTM notes a road dedication will be imposed as part of an approval condition for trunk land only. No construction requirement will be imposed as part of the approval condition.

Further, it is understood a new road hierarchy overlay has been introduced to the Gold Coast *CityPlan*, identifying land required for future road widening. The overlay includes the proposed land dedication for the Baileys Mountain Road and Old Coach Road intersection upgrade, which is illustrated in Figure 4.1 and also shows the land dedication over the subject site.

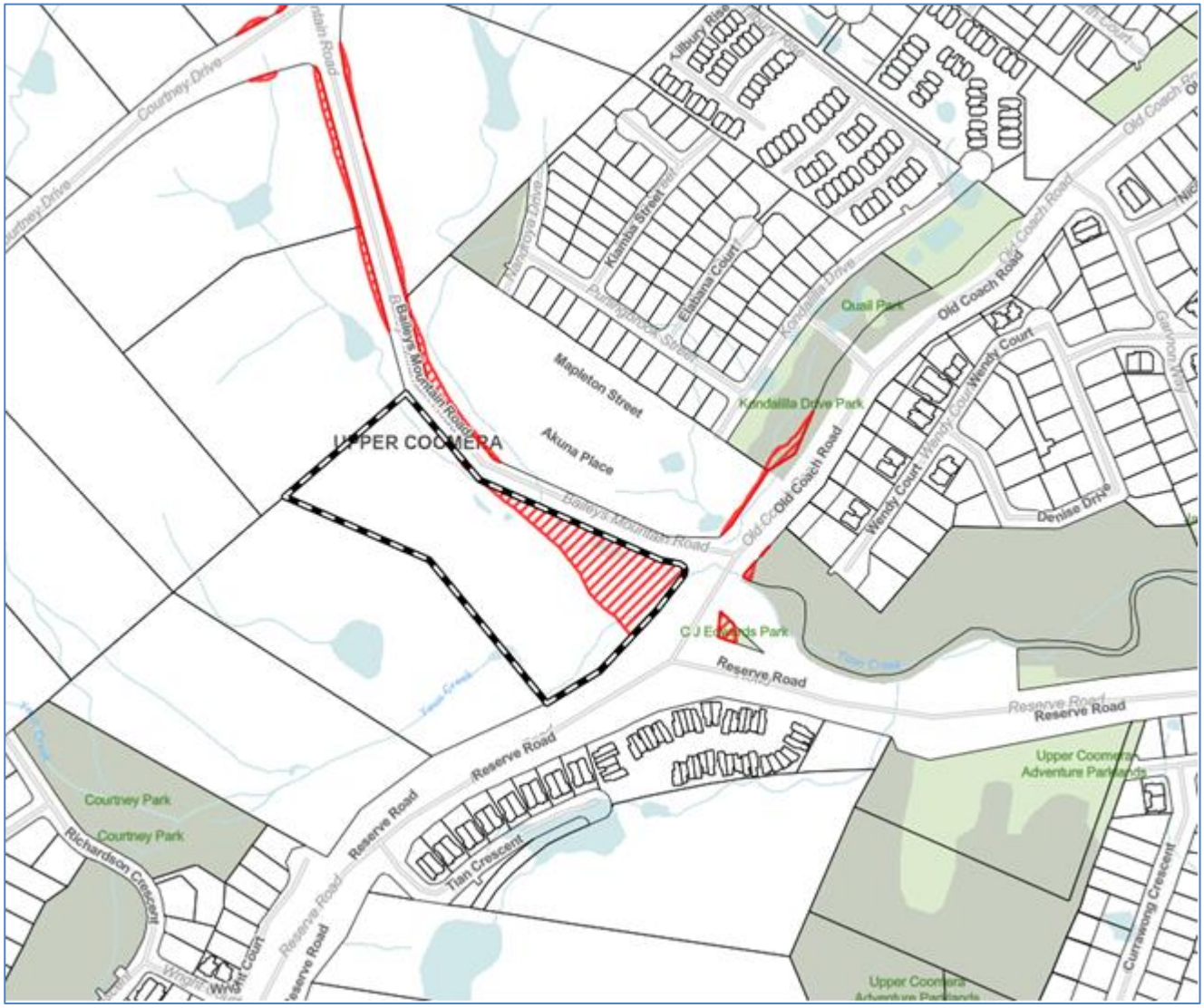


Figure 4.1: Future Road Dedication

5. Access Arrangements

As part of the development application, a '2 into 2' lot boundary realignment is proposed. The boundary realignment is in conjunction with the neighbouring properties to provide a cohesive and logical road structure plan, including access to the subject site. Figure 4.1 illustrates the boundary realignment, noting the realignment also facilitates a land swap to provide more regular shaped allotments.

Further information regarding the road classification, design characteristics and arrangements are provided in the following sections.

5.1. Road Access

As part of the RoL realignment access to the subject is achieved via a new local road and intersection connecting to Baileys Mountain Road. A summary regarding the road design, layout and classification is provided as follows:

Road Design

- Residential Collector Street
- 16.5m Road Reserve, with the following arrangement:
  - 4.5m wide Verge
  - 7.5m wide carriageway
  - 4.5m verge
- Sightlines achieved in both directions for both ingress and egress

Intersection Design

It is recognized that the proposed development, along with the broader surrounding catchment, will lead to an increase in right- and left-turn movements into the subject site (and adjacent sites) from Baileys Mountain Road. Given the road conditions and layout, the introduction of turn lane treatments may be warranted.

It is recommended that basic left- and right-turn lanes at the local road intersection with Baileys Mountain Road would accommodate the traffic demand from the proposed development and future catchment growth. A conceptual design for the intersection, featuring basic left- and right-turn treatments, is included in Appendix B and has been designed in compliance with Council standard drawings and Austroads guidelines. Swept path analysis on the conceptual plans illustrate that vehicles can safely enter and exit the new local road without any conflicts — further details are available in the attached Site Plans in Appendix C.

The extent of road / pavement outlined in the attached concept plans can effectively be provided within the current road carriageway and align with proposed road upgrades under Council's LGIP for Baileys Mountain Road.

It is recommended that a turn treatment warrant assessment can be conducted according to the Guide to Traffic Management Part 6 to confirm the adequacy of the proposed site access arrangements – this will require up-to-date (recent) traffic data.

In general, the proposed New Road (i.e. the new local road) subject site access arrangements and design are generally consistent with the provisions of the Council's Transport Code and Standard Drawings and are considered acceptable.

5.2. Site Access - MCU

Access to the proposed development / subject site is via the proposed 'New Road', i.e. the new local road. A review of the proposed site access driveway design against Council planning requirements is outlined in Table 5.1.

Table 5.1: Driveway Requirements – Site Access

Design Aspect	AS2890 / Council Requirements	Proposed Provision	Compliance
Crossover Location	6m from the intersection	69m	Compliant
Sight Distance - 50kph	Desirable – 69m Minimum - 45m	69m to the north* 69m to the south*	Performance Outcome Performance Outcome
Design Type	General Wide crossover IPWEA RS-51 3.0m - 9.0m wide	General Wide 6.2m crossover	Compliant
Grade	1 in 20 for the first 6m	1 in 20 for the first 6m	Compliant
Minimum Queuing Provisions	6 m (1 vehicle length)	24 m (4 vehicle lengths)	Compliant

Sight Lines

The sight lines at the concept are assumed to be provided at compliant minimum requirements as the new road and intersection are yet to be constructed. A desktop review indicates the minimum AS 2890.1:2004 sight lines can be achieved once the new local road and intersection is fully constructed.

6. Parking Arrangements

6.1. Parking Supply

6.1.1. Car parking

Council parking requirements for this type of development are identified in Table 6.1. The development is zoned as medium-density residential. Parking is based on Table 9.4.13-3 of the City Plan.

Table 6.1: Parking Supply Requirement

Land Use	Council Requirement	Extent	Requirement	Provision
Multiple Dwelling				
• Resident	1.5 per 3-bedroom unit	73 dwellings	110	202
• Visitor	2 plus 2 spaces per 10 dwellings		10	13
Total			120	215

The development provides a total of 215 car parking spaces. This includes:

- 73 dedicated residential spaces provided as enclosed garages
- 129 tandem resident spaces
- 13 communal visitor spaces located across the site

The visitor spaces are spread uniformly throughout the development, noting they have been dispersed within what would be practical and feasible.

The above parking supply is to include PWD parking in communal parking areas (not including reserved residential spaces). The general Council requirement is a minimum of 1 PWD space per 100 standard spaces. As such, one PWD (Class 5) parking space is required. The development proposes 1 PWD parking space which meets this requirement.

6.2. Parking Layout

Table 6.2 overleaf identifies the characteristics of the proposed parking layouts with respect to the TAPS PSP design provisions.

Table 6.2: Parking Design Requirements

Design Aspect	AS2890 / Council Requirements	Proposed Provision	Compliance
Parking space length: – Residential single garage – Residential uncovered space – Visitor bay – PWD Bay and Shared zone	 5.4m 5.4m 5.4m 5.4m	 6.0m 5.8m 5.4m 5.4m	 Compliant Compliant Compliant Compliant
Parking space width: – Residential single garage – Residential uncovered space – Visitor Parking Bay – PWD bay and shared space	 3m 2.4m 2.6m 2.4m	 3.3m 2.6m 2.6m 2.4m	 Compliant Compliant Compliant Compliant
Duplex Driveway Width	Min 3.0m	Min 3.0m	Compliant
Garage Door Opening	Single min 2.4m	Single min 2.4m	Compliant
Aisle Width: – Parking Aisle	 5.8m	 6.5m / 6.2m	 Compliant
Maximum Gradient: – Parking bay – Parking Aisle	 1:20 (5.0%) 1:16 (6.25%)	 1:20 (5.0%) 1:16 (6.25%)	 Compliant Compliant

The proposed car park layout complies with the GCC Planning Scheme and is therefore considered fit-for-purpose.

7. Service Vehicle Arrangements

To assess the service vehicle requirements for the site, TTM has referred to Council's requirements for service vehicles. Other service vehicle provisions are generally in accordance with AS2890.2:2018.

7.1. Council Requirements

Table 9.4.13-9 of Planning Scheme requires the following minimum class of service vehicle:

- Occasional access for a medium rigid vehicle (MRV)
- Regular access for a refuse collection vehicle (RCV)

7.2. Proposed Service Vehicle Arrangements and Their Adequacy

The development layout allows for individual bin collection, therefore a 9.8m side-lift RCV is the largest design service vehicle anticipated to require access to the proposed development and so has been adopted as the design service vehicle. Refuse collection is to be conducted 'kerbside' for all the residential units. Refuse collection points are provided for the units where a refuse truck cannot service the area. Refer to architectural plans for further details.

TTM has conducted swept paths that show the internal road network will be able to provide adequate access for the proposed largest design vehicle (Appendix C). All service vehicles will enter and exit the development in a forward gear. These swept paths show that an RCV can safely enter, service all townhouses, not unreasonably obstruct moving vehicles, and exit the development. Further, as the RCV design vehicle tested is larger than an MRV design vehicle for deliveries, these outcomes are equal or better than the RCV design service vehicle.

8. Development Transport Assessment

The existing site is a greenfield area and therefore has no current traffic generation.

To estimate the traffic generated by the development, TTM has referred to RTA's *'Guide to Traffic Generating Developments (GTGD)'*. The GTGD specifies that townhouses in medium-density developments have a weekday peak-hour traffic generation of 0.65 vehicles per hour (vph) dwelling. A summary of the expected traffic generation of the site is given in Table 8.1.

Table 8.1: Development Peak Hour Traffic Generation

Site Use	Extent	Traffic Generation Rate	Peak Hour Traffic Generation
Multi-unit Dwellings	73 dwellings	0.65 vph / dwelling	48 vph

As noted in Table 8.1, the development generates 48 vph in the peak hour. For a residential development, a 75% / 25% distribution factor has been adopted for the AM peak. A 39% / 61% distribution has been adopted for the PM peak. Application of these factors indicates the following traffic volume splits:

- AM – 36 vph Outbound (75%) and 12 vph Inbound (25%); and
- PM – 19 vph Outbound (39%) and 29 vph Inbound (61%).

A preliminary assessment of the site access capacity / performance in consideration of the access was undertaken, using the overall projected traffic generation and standard industry in / out splits. This preliminary assessment identified that the access would operate well within capacity, with queuing typically less than one (1) vehicle and average delays of approximately 1 to 2 seconds.

The level of traffic generation is considered small and within the range of typical fluctuation in traffic volumes on the road network. The local road network can accommodate the expected traffic volumes with little or no delay to the network. On this basis, the development is not expected to impact adversely on the safety or operation of the surrounding road system.

9. Active Transport Facilities

9.1. Public Transport

The proposed development does not require the provision of any additional public transport facilities. TTM considers the reasonable level of access to public transportation provisions in the vicinity of the site will satisfy the site's requirements for such facilities. The existing bus stop located on Reserve Road provides a regular link to Helensvale and Coomera Rail Station with bus stops are within a 500m (2 minute) walking distance.

9.2. Pedestrian Access

Access for pedestrians is to be designed per Council's Standard Drawing for the new local road. This includes a new pedestrian footpath on the new local road. Internally, the development proposal includes shared pathways. Additionally, there is a proposed 5.0m recreational footpath on the eastern side of the main parcel of land, facilitating access to the new dedicated park.

9.3. Cyclist Requirements

The site has access to the Reserve Road on-street bikeway which is expected to be sufficient to cater for the needs of the development.

In accordance with Council's Transport Code, Table 9.4.12-10- Bicycle Parking Rates for multiple dwellings:

- 1 lockable covered, bicycle parking space per unit (in either the garage or separate on-site facility); and
- 1 visitor bicycle parking space per 3 units.

Therefore 180 bicycle parking spaces are required as follows:

- 73 space per residential units for tenants; and
- 24 spaces for visitors.

All resident bicycles will be stored within each dwelling. Visitor bicycle parking is to be provided throughout the development generally in accordance with the above recommendations. The spaces are spread uniformly throughout the development, noting they have been dispersed within what would be practical and feasible. This is considered to be a detailed design issue, which it is anticipated could reasonably be addressed by way of a suitable condition within an approval.

10. Summary and Conclusions

10.1. Proposed Development

The development comprises of 73 townhouse units, including open communal spaces, pedestrian footpaths, and visitor car parking. Site access is achieved via a new local road which connects to Baileys Mountain Road.

10.2. Parking Arrangements

The parking supply for the proposed development is generally consistent with Council's accepted parking requirements. The garages, driveway, and visitor car parking spaces, as a minimum, are to comply with the Australian Standard requirements.

Overall, TTM considers the proposed car parking arrangements for this development are satisfactory.

10.3. Access Arrangements

The proposed external road network and intersection design is provided to appropriately cater for the expected traffic volumes. The proposed road will provide a cohesive and logical internal road hierarchy and is provided in accordance with the design standards outlined in Council's Planning Scheme.

10.4. Service Vehicle Arrangements

The proposed service vehicle provisions generally comply with the relevant guidelines. Refuse collection for the residential dwellings is per Council's Solid Waste Management Code.

The proposed development scheme provides the following servicing arrangements:

- Refuse collection to be conducted via the kerbside for the majority of the residential units. Refuse collection points are provided for the units where a refuse truck cannot service the area. Refer to architectural plans for further details.
- General deliveries / furniture deliveries to be conducted via the kerbside; and
- All service vehicles can enter and exit the development in a forward gear.

10.5. Traffic Impact Assessment

Assessment of the proposed development indicates that the development will not have a significant impact on the capacity / operation of the future road network. As such, no further mitigating road works are considered to be required.

10.6. Active Transport Facilities

The existing broader public transport infrastructure and proposed site provisions for pedestrian / bicycle facilities is considered adequate for the proposed development.

10.7. Conclusion

Based on the assessment contained within this report, TTM see no traffic engineering reason why the relevant approvals should not be granted.

Appendix A Development Plans

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202 BAILEYS MOUNTAIN ROAD, UPPER COOMERA

SITE & PROPERTY SETBACKS

DRIVEWAY LENGTH: 5.5m (typical)
SIDE SETBACKS: 1.35m (typical)
REAR SETBACKS: 4.0m (typical)
dimensions are typical unless noted otherwise

GEORGE ALEXANDER WAY: 5.9m (min.)
PROPOSED ROAD DEDICATION: 5.9m (min.)

INTERNAL ROADWAYS: 6.2m
PATHWAYS: 1.2m

DEVELOPMENT SUMMARY

REAL PROPERTY DESCRIPTION		
202 BAILEYS MOUNTAIN RD, UPPER COOMERA, 4209		
ON RP LOT 58 ON SP191940		
TOTAL SITE AREA	30,872m²	
DEVELOPMENT AREA	18,187m²	
SITE COVER	5,520m²	(30.3%) OF DEVELOP. AREA
TOTAL PRIVATE OPEN SPACE	3,157m²	
COMMON SPACE / PUBLIC OPEN SPACE	1,130m²	(6%) OF DEVELOP. AREA

BUILDING CLUSTER TYPES

BUILDING TYPE	CLUSTER	UNITS	BUILDING DESCRIPTION
DUPLEX	17	34	2 STOREY - 3 BEDROOM + MPR - 1 CAR
TRIPLEX	5	15	2 STOREY - 3 BEDROOM + MPR - 1 CAR
QUADPLEX	6	24	2 STOREY - 3 BEDROOM + MPR - 1 CAR
TOTAL	28	73	

GFA SUMMARY

BUILDING TYPE	TOTAL GFA	CLUSTERS	OVERALL GFA
DUPLEX	251m²	17	4,267m²
TRIPLEX	378m²	5	1,890m²
QUADPLEX	504m²	6	3,024m²
TOTAL		28	9,181m²

SITE COVER

BUILDING TYPE	SITE COVER (m²)	CLUSTERS	OVERALL SITE COVER (m²)
DUPLEX	151m²	17	2,567m²
TRIPLEX	277m²	5	1,135m²
QUADPLEX	303m²	6	8,484m²
TOTAL		28	5,520m²

DA DRAWING CONTENT

Sheet Number	Sheet Name
DA-0-000	TITLE SHEET
DA-0-010	SITE PLAN OF LAYOUT
DA-0-020	CARPARKING PLAN
DA-0-030	STAGING PLAN
DA-0-035	PRIVATE OPEN SPACE AREA PLAN
DA-0-036	COMMUNAL OPEN SPACE
DA-0-037	BUILDING FACADE TYPES
DA-0-040	FENCING PLAN
DA-0-041	FENCE TYPE DETAILS
DA-0-050	SITE SECTIONS
DA-0-051	SITE SECTIONS
DA-0-052	SITE SECTIONS
DA-0-053	SITE SECTIONS
DA-0-060	STREETSCAPES
DA-0-061	STREETSCAPES
DA-0-062	STREETSCAPES

REDDOOR ARCHITECTURE

REVISION A 16.10.24 DA ISSUE

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LEGEND

- BUSHFIRE BUFFER
- RETAINING WALL
- TEMPORARY CONSTRUCTION ACCESS
- BIN COLLECTION POINT
- POOL SHELTER

REDDOOR ARCHITECTURE

REVISION A 16.10.24 DA ISSUE

WWW.RDARCH.COM.AU | 230008 | SCALE 1 : 1000 | 16.10.24 | 202 BAILEYS MOUNTAIN RD, UPPER COOMERA | MG LAND | DA-0-010 | SITE PLAN OF LAYOUT

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PARKING LEGEND

G RESIDENT (GARAGE)

R RESIDENT (DRIVEWAY)
5.5m x 2.4m

V VISITOR (STREET PARKING)
5.4m x 2.6m

V VISITOR (EXCLUSIVE USE)
5.4m x 2.6m

NOTE:
VISITOR (EXCLUSIVE USE)
MEANS ADDITIONAL VISITOR PARKING THAT CAN ONLY BE USED BY VISITORS TO THE UNIT ASSOCIATED WITH THAT PARKING SPACE. NOT MARKED OR SIGNED AS VISITOR PARKING

VISITOR (STREET PARKING)
MEANS PARKING FOR VISITORS TO ANY UNIT IN THE DEVELOPMENT

CAR PARKS REQUIRED

RESIDENT = 2/ DWELLING UNIT = (146)
VISITOR = VISITOR 2+ 1/ 10 DWELLING UNITS = (9)

TOTAL CAR PARKS

RESIDENT GARAGED = (73)
RESIDENT DRIVEWAY = (73)

TOTAL RESIDENT = (146)

VISITOR (STREET PARKING)= (13)
VISITOR (EXCLUSIVE USE)= (49)

TOTAL CAR PARKS = (208)

REDDOOR ARCHITECTURE

REVISION			
	A	16.10.24	DA ISSUE

WWW.RDARCH.COM.AU | 230008 | SCALE 1 : 1000 | 16.10.24 | 202 BAILEYS MOUNTAIN RD, UPPER COOMERA | MG LAND | DA-0-020 | CARPARKING PLAN

Appendix B Concept Intersection Plans

LEGEND

- PROPOSED KERB
- PROPOSED LINEMARKING
- EXISTING BOUNDARY

PRELIMINARY
ADVICE ONLY
13 May 2024

REFER (RIGHT) FOR CONTINUATION

PROPOSED RESIDENTIAL COLLECTOR DRIVEWAY

ROAD SHOULDER

LEFT TURN (AUL)

BAILEYS MOUNTAIN RD

20.00 TAPER

202 BAILEYS MOUNTAIN ROAD
UPPER COOMERA

REFER (LEFT) FOR CONTINUATION

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	13-05-24	ORIGINAL ISSUE	AA	JK	JK

SCALE 0 5 10 15 20 25m
SCALE 1:500 AT ORIGINAL SIZE

NORTH

CLIENT REDDOOR ARCHITECTURE

TTM CONSULTING PTY LTD
ABN 65 010 868 621
LEVEL 8, 369 Ann Street, BRISBANE QLD 4000
P.O. BOX 12015, BRISBANE QLD 4003
T: (07) 3327 9500 F: (07) 3327 9501
E: ttmbris@ttmgroup.com.au W: www.ttmgroup.com.au

PROJECT
202 BAILEYS MOUNTAIN ROAD - UPPER COOMERA

DRAWING TITLE
INTERSECTION DESIGN
PROPOSED LEFT TURN (BAL) AND (AUL)
RIGHT TURN (BAR)

PROJECT NUMBER	23BRT0507
ORIGINAL SIZE	A3
DRAWING NUMBER	23BRT0507-04
REVISION	A
DATE	13 May 2024
SHEET	1 OF 1



REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	13-05-24	ORIGINAL ISSUE	AA	JK	JK

SCALE 0 5 10 15 20 25m
SCALE 1:500 AT ORIGINAL SIZE

NORTH

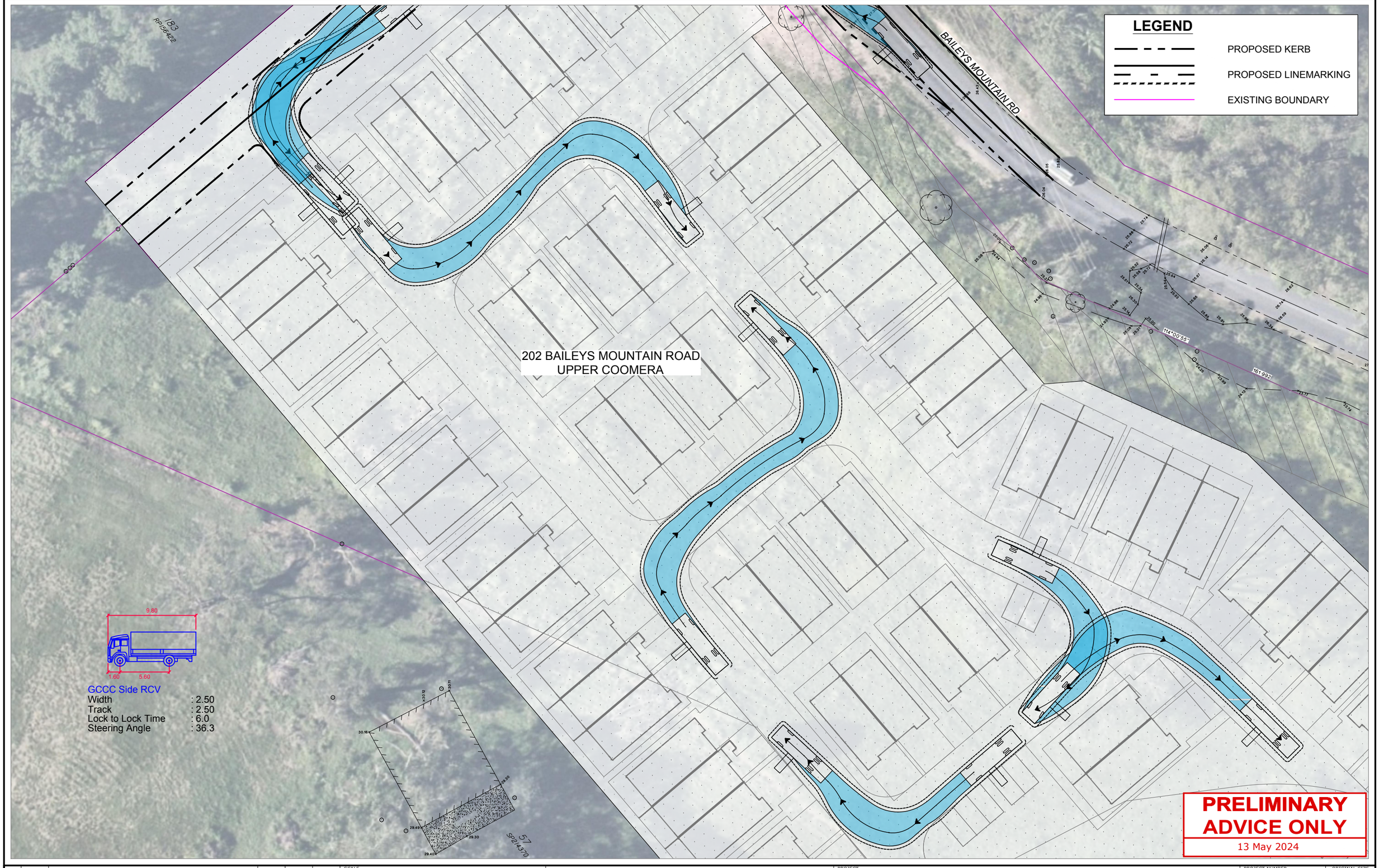
CLIENT
REDDOOR ARCHITECTURE

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PROJECT
202 BAILEYS MOUNTAIN ROAD - UPPER COOMERA

DRAWING TITLE
INTERSECTION DESIGN
9.80m - GCCC Side RCV COLLECTOR - INTERSECTION

PROJECT NUMBER	ORIGINAL SIZE
23BRT0507	A3
DRAWING NUMBER	REVISION
23BRT0507-05	A
DATE	SHEET
13 May 2024	1 OF 1



PRELIMINARY
ADVICE ONLY
13 May 2024

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	13-05-24	ORIGINAL ISSUE	AA	JK	JK

SCALE 0 5 10 15 20 25m
SCALE 1:500 AT ORIGINAL SIZE

NORTH

CLIENT
REDDOOR ARCHITECTURE

TTM CONSULTING PTY LTD
ABN 65 010 868 621
LEVEL 8, 369 Ann Street, BRISBANE QLD 4000
P.O. BOX 12015, BRISBANE QLD 4003
T: (07) 3327 9500 F: (07) 3327 9501
E: ttmbris@ttmgroup.com.au W: www.ttmgroup.com.au

PROJECT
202 BAILEYS MOUNTAIN ROAD - UPPER COOMERA

DRAWING TITLE
INTERSECTION DESIGN
9.80m - GCCC Side RCV COLLECTOR - INTERNAL

PROJECT NUMBER	ORIGINAL SIZE
23BRT0507	A3
DRAWING NUMBER	REVISION
23BRT0507-06	A
DATE	SHEET
24 Oct 2023	1 OF 1

Appendix C Swept Paths

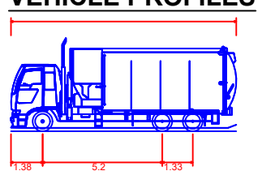


REFUSE VEHICLE CLOCKWISE



REFUSE VEHICLE ANTICLOCKWISE

VEHICLE PROFILES



GCC Side Loader	
Overall Length	9.800m
Overall Width	2.472m
Overall Body Height	4.050m
Min Body Ground Clearance	0.150m
Track Width	2.472m
Lock-to-lock time	6.00s
Wall to Wall Turning Radius	11.500m
Clearance Envelope	0.500m

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	28-06-24	ORIGINAL ISSUE	JK	JK	

SCALE 0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

NORTH

CLIENT: MG LANDS PTY LTD

TTM CONSULTING PTY LTD
ABN 65 010 868 621
LEVEL 8, 369 Ann Street, BRISBANE QLD 4000
P.O. BOX 12015, BRISBANE QLD 4003
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E: ttmbris@ttmgroup.com.au W: www.ttmgroup.com.au

PROJECT: **LOT 35 BAILEYS MOUNTAIN ROAD, UPPER COOMERA**

DRAWING TITLE: **Swept Path Analysis**
Refuse Collection Vehicle - 9.8m Side Loader

PROJECT NUMBER	23BRT0507
ORIGINAL SIZE	A3
DRAWING NUMBER	23BRT0507-01
REVISION	A
DATE	14 Oct 2024
SHEET	1 OF 1



LEGEND / NOTES

- 20 — Tree Numbering
- Tree Protection Zone Retained Tree
- Tree To Be Removed
- Tree To Be Retained (Subject To Arborist Inspection)
- Stag - Existing Tree
- GPS Located Tree
- Surveyed Trees - Exotic Species

NOTE:
- SURVEY PLAN

NORTHPOINT.

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D	ARCHITECTURAL LAYOUT AMENDED	23/09/2024
E	ARCHITECTURAL LAYOUT AMENDED	21/10/2024

PROJECT NO.
S523094

CLIENT
MG HOMES
C/- URBAN STRATEGIES

PROJECT NAME
PROPOSED RESIDENTIAL DEVELOPMENT

SITE
202 BAILEYS MOUNTAIN ROAD
UPPER COOMERA

DRAWING NAME
VEGETATION RETENTION PLAN

DRAWING NO.
S523094_VRP_001

SCALE	SHEET SIZE	DRAWN	APPROVED
1:1000	A3	SAJ	RS

2/265 Sandgate Road
Albion Qld 4010

ph 3505 3053

www.s5consulting.com.au
ABN 82 440 704 793

ENVIRONMENTAL

VEGETATION MANAGEMENT SCHEDULE

Site Address: 202 Baileys Mountain Road, Upper Coomera

Codes: FS = Fauna Scratches; SH = Small Hollow; MH = Medium Hollow; LH = Large Hollow; T = Termitaria; BN = Bird Nest

No.	STATUS	SCIENTIFIC NAME	COMMON NAME	DBH 1 [mm]	DBH 2 [mm]	DBH 3 [mm]	DBH 4 [mm]	DBH 5 [mm]	DBH 6 [mm]	Total DBH [mm]	SPREAD* [m]	HEIGHT* [m]	NATIVE/ EXOTIC	HABITAT	NOTES	TPZ [mm]
1	Retain	*Ficus rubiginosa*	Port Jackson Fig	800						800	7	13	Native			9600
2	Retain	*Eucalyptus microcorys*	Tallowwood	335						335	5	9	Native			4020
3	Retain	*Eucalyptus microcorys*	Tallowwood	190						190	4	7	Native			2280
4	Retain	*Eucalyptus siderophloia*	Grey Ironbark	1000						1000	10	16	Native	MH		12000
5	Remove	*Cinnamomum camphora*	Camphor Laurel	270	210	410	90	350		645	10	12	Exotic			7740
6	Remove	*Corymbia torelliana*	Cadaghi	455						455	9	12	Non-Endemic			5460
7	Remove	*Schefflera actinophylla*	Umbrella Tree	480						480	8	10	Non-Endemic			5760
8	Retain	*Melaleuca viminalis*	Weeping Bottlebrush	240						240	3	7	Native			2880
9	Retain	*Eucalyptus tereticornis*	Forest Red Gum	1300						1300	12	25	Native	FS		15000
10	Retain	*Eucalyptus tereticornis*	Forest Red Gum	530						530	6	23	Native			6360
11	Remove	*Pinus elliottii*	Slash Pine	410						410	4	18	Exotic			4920
12	Remove	*Pinus elliottii*	Slash Pine	370						370	5	18	Exotic			4440
13	Remove	*Pinus elliottii*	Slash Pine	500						500	5	18	Exotic			6000
14	Remove	*Pinus elliottii*	Slash Pine	575						575	8	19	Exotic			6900
15	Remove	*Pinus elliottii*	Slash Pine	560						560	6	18	Exotic			6720
16	Retain	*Pandanus* sp.	Pandanus Palm	210	210	200	190			406	6	5	Native			4872
17	Retain	*Ficus benjamina*	Weeping Fig	330	260					421	7	12	Native			5052
18	Remove	*Pinus elliottii*	Slash Pine	700						700	6	18	Exotic			8400
19	Remove	*Pinus elliottii*	Slash Pine	280						280	5	19	Exotic			3360
20	Remove	*Pinus elliottii*	Slash Pine	570	170	310				671	6	18	Exotic			8052
21	Retain	*Corymbia intermedia*	Pink Bloodwood	215						215	3	10	Native			2580
22	Remove	*Pinus elliottii*	Slash Pine	470						470	6	18	Exotic			5640
23	Remove	*Pinus elliottii*	Slash Pine	500						700	9	20	Exotic			8400
24	Remove	*Cinnamomum camphora*	Camphor Laurel	190	210					284	8	8	Exotic			3408
25	Remove	*Pinus elliottii*	Slash Pine	650						650	9	20	Exotic		monkey rope vine	7800
26	Remove	*Pinus elliottii*	Slash Pine	400						400	5	17	Exotic			4800
27	Remove	*Pinus elliottii*	Slash Pine	620						620	5	18	Exotic			7440
28	Retain	*Lophostemon confertus*	Brush Box	400						400	7	15	Native			4800
29	Remove	*Pinus elliottii*	Slash Pine	495						495	6	18	Exotic			5940
30	Remove	*Pinus elliottii*	Slash Pine	380						380	5	16	Exotic			4560
31	Remove	*Cinnamomum camphora*	Camphor Laurel	220						220	7	10	Exotic			2640
32	Retain		Dead tree	400	100					413	4	12	NA		monkey rope vine	0
33	Remove	*Cinnamomum camphora*	Camphor Laurel	170	180					248	3	10	Exotic			2976
34	Retain	*Lophostemon confertus*	Brush Box	500						500	7	18	Native			6000
35	Retain	*Lophostemon confertus*	Brush Box	260						260	4	9	Native			3120
36	Remove	*Celtis sinensis*	Chinese Celtis	250						250	4	10	Exotic		monkey rope vine	3000
37	Remove	*Celtis sinensis*	Chinese Celtis	310						310	5	10	Exotic		monkey rope vine	3720
38	Remove	*Schinus terebinthifolia*	Broad-leaved Pepper Tree	260						260	8	5	Exotic		monkey rope vine	3120
39	Remove	*Cinnamomum camphora*	Camphor Laurel	570						570	9	17	Exotic			6840
40	Remove	*Celtis sinensis*	Chinese Celtis	190						190	7	7	Exotic			2280
41	Remove	*Cinnamomum camphora*	Camphor Laurel	320	390	420	450			796	10	15	Exotic			9552
42	Retain[1]	*Ficus rubiginosa*	Port Jackson Fig	2000						2000	15	18	Native			15000
43	Retain	*Acacia leiocalyx*	Early Black Wattle	210						210	8	9	Native			2520
44	Remove	*Ficus obliqua*	Small-leaved Fig	3000						3000	15	18	Native		multiple DBHs	15000
45	Remove	*Ficus rubiginosa*	Port Jackson Fig	3200						3200	15	19	Native			15000
46	Remove	*Ficus rubiginosa*	Port Jackson Fig	2200						2200	12	16	Native			15000
47	Remove	*Cinnamomum camphora*	Camphor Laurel	235	240	250				419	6	14	Exotic			5028
48	Remove	*Grevillea robusta*	Silky Oak	310						310	3	18	Native			3720
49	Remove	*Cinnamomum camphora*	Camphor Laurel	260						260	7	12	Exotic			3120
50	Remove	*Ficus rubiginosa*	Port Jackson Fig	430	1000					1089	15	17	Native			13068
51	Remove	*Cupaniopsis anacardioides*	Tuckeroo	200						200	4	8	Native			2400
52	Remove	*Acacia leiocalyx*	Early Black Wattle	340						340	4	12	Native			4080
53	Remove	*Cinnamomum camphora*	Camphor Laurel	120	180	395	140			472	10	10	Exotic			5664
54	Remove	*Cinnamomum camphora*	Camphor Laurel	215	230					315	8	9	Exotic			3780
55	Remove	*Cinnamomum camphora*	Camphor Laurel	190	230					299	8	9	Exotic			3588
56	Retain	*Glochidion ferdinandi*	Cheese Tree	130	100	120				204	4	8	Native			2448
57	Remove	*Cinnamomum camphora*	Camphor Laurel	240						240	5	8	Exotic			2880
58	Retain	*Acacia leiocalyx*	Early Black Wattle	220						220	3	10	Native		monkey rope vine	2640
59	Retain[1]	*Corymbia intermedia*	Pink Bloodwood	610						610	7	16	Native	LH	monkey rope vine	7320
60	Retain	*Acacia leiocalyx*	Early Black Wattle	230						230	3	8	Native			2760
61	Retain	*Acacia leiocalyx*	Early Black Wattle	245						245	3	10	Native			2940
62	Remove	*Acacia leiocalyx*	Early Black Wattle	230						230	2	13	Native		monkey rope vine	2760
63	Remove	*Cinnamomum camphora*	Camphor Laurel	170	50					178	2	10	Exotic			2136
64	Remove	*Cinnamomum camphora*	Camphor Laurel	165	150	135				261	3	8	Exotic			3132
65	Remove	*Psidium guajava*	Guava	125	230	210	220	250	200	514	7	7	Exotic			6168

LEGEND / NOTES

NOTE:
- SURVEY PLAN

NORTHPOINT.

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A	FOR ISSUE	16/10/2023
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C	CIVILS LAYOUT AMENDED	28/05/2024
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E	ARCHITECTURAL LAYOUT AMENDED	21/10/2024

PROJECT NO.
S523094

CLIENT
MG HOMES
C/- URBAN STRATEGIES

PROJECT NAME
PROPOSED RESIDENTIAL DEVELOPMENT

SITE
202 BAILEYS MOUNTAIN ROAD
UPPER COOMERA

DRAWING NAME
VEGETATION RETENTION PLAN
SCHEDULE SHEET 1 OF 3

DRAWING NO.
S523094_VRP_002

SCALE	SHEET SIZE	DRAWN	APPROVED
N.T.S.	A3	SAJ	RS

2/265 Sandgate Road
Albion Qld 4010

ph 3505 3053

www.s5consulting.com.au
ABN 82 440 704 793

ENVIRONMENTAL

VEGETATION MANAGEMENT SCHEDULE

Site Address: 202 Baileys Mountain Road, Upper Coomera

Codes: FS = Fauna Scratches; SH = Small Hollow; MH = Medium Hollow; LH = Large Hollow; T = Termitaria; BN = Bird Nest

No.	STATUS	SCIENTIFIC NAME	COMMON NAME	DBH 1 [mm]	DBH 2 [mm]	DBH 3 [mm]	DBH 4 [mm]	DBH 5 [mm]	DBH 6 [mm]	Total DBH [mm]	SPREAD* [m]	HEIGHT* [m]	NATIVE/ EXOTIC	HABITAT	NOTES	TPZ [mm]
66	Retain	*Acacia leiocalyx*	Early Black Wattle	235	110	50				265	5	8	Native		slash pines to north east along boundary not surveyed due to tree felling	3180
67	Remove	*Pinus elliottii*	Slash Pine	345						345	2	9	Exotic			4140
68	Remove	*Pinus elliottii*	Slash Pine	350						350	2	9	Exotic			4200
69	Remove	*Pinus elliottii*	Slash Pine	310						310	2	9	Exotic			3720
70	Remove	*Pinus elliottii*	Slash Pine	200						200	3	9	Exotic			2400
71	Remove	*Pinus elliottii*	Slash Pine	380						380	3	9	Exotic			4560
72	Remove	*Pinus elliottii*	Slash Pine	300						300	3	9	Exotic			3600
73	Remove	*Lophostemon suavoleans*	Swamp Box	950						950	6	15	Native	SH	Has strangler fig	11400
74	Remove	*Cinnamomum camphora*	Camphor Laurel	125	145	190	265	210	210	481	7	8	Exotic			5772
75	Remove	*Ficus obliqua*	Small-leaved Fig	300						300	8	10	Native		Strangling Lophostemon suaveolens	3600
76	Retain	*Eucalyptus seeana*	Narrow-leaved Red Gum	1050						1050	11	16	Native	LH, MH, T, FS		12600
77	Retain	*Corymbia intermedia*	Pink Bloodwood	1200						1200	8	17	Native	LH, MH	Property next door to the south-west	14400
78	Retain	*Grevillea robusta*	Silky Oak	300						300	4	13	Native		Property next door to the south-west	3600
79	Retain	*Ficus macrophylla*	Moreton Bay Fig	3100						3100	15	16	Native		Property next door to the south-west	15000
80	Retain	*Ficus coronata*	Creek Sandpaper Fig	210	140	160				299	4	8	Native		Property next door to the south-west	3588
81	Retain	*Ficus rubiginosa*	Port Jackson Fig	4200						4200	12	15	Native	LH, MH	Property next door to the south-west	15000
82	Retain	*Grevillea robusta*	Silky Oak	300						300	3	12	Native		Property next door to the south-west	3600
83	Remove	*Grevillea robusta*	Silky Oak	610						610	5	13	Native	T	Property next door to the south-west	7320
84	Retain	*Ficus obliqua*	Small-leaved Fig	1000						1000	12	16	Native		Property next door to the south-west	12000
85	Remove	*Cinnamomum camphora*	Camphor Laurel	250	120	190				337	5	7	Exotic			4044
86	Remove	*Ficus sp.*	Fig Tree	550						550	8	7	Exotic			6600
87	Remove	*Toona ciliata*	Red Cedar	850						850	10	18	Native			10200
88	Remove	*Toona ciliata*	Red Cedar	420						420	8	13	Native			5040
89	Remove	*Grevillea robusta*	Silky Oak	540						540	6	17	Native			6480
90	Remove	*Delonix regia*	Poinciana	310	370	300	380			684	12	7	Exotic			8208
91	Remove	*Ficus obliqua*	Small-leaved Fig	1400	1000					1721	19	12	Native			15000
92	Remove	*Macadamia integrifolia*	Macadamia	550	100	210	250			648	7	12	Native			7776
93	Retain	*Ficus macrophylla*	Moreton Bay Fig	430	2000	2800	450	400		3520	22	16	Native		down slope towards creek	15000
94	Retain	*Ficus macrophylla*	Moreton Bay Fig	240	380	2000	230	200		2073	15	15	Native		down slope towards creek	15000
95	Retain	*Grevillea robusta*	Silky Oak	520						520	6	17	Native			6240
96	Remove	*Cinnamomum camphora*	Camphor Laurel	380						380	7	19	Exotic			4560
97	Retain	*Jagera psudechus*	Foam Bark Tree	140	360					387	6	17	Native			4644
98	Retain	*Jagera psudechus*	Foam Bark Tree	350						350	6	16	Native			4200
99	Retain	*Ficus sp.*	Fig Tree	160						160	3	11	Native			1920
100	Remove	*Pinus elliottii*	Slash Pine	230						230	2	10	Exotic			2760
101	Retain	*Eucalyptus microcorys*	Tallowwood	390						390	7	17	Native			4680
102	Retain	*Acacia leiocalyx*	Early Black Wattle	285						285	2	11	Native		monkey rope vine	3420
103	Retain		Dead tree	295						295	1	10	NA			0
104	Retain	*Eucalyptus crebra*	Narrow-leaved Ironbark	420						420	7	16	Native			5040
105	Retain	*Lophostemon confertus*	Brush Box	190						190	2	11	Native			2280
106	Retain	*Lophostemon confertus*	Brush Box	230						230	5	11	Native			2760
107	Remove	*Schefflera actinophylla*	Umbrella Tree	200	80					216	3	9	Non-Endemic			2592
108	Retain	*Eucalyptus crebra*	Narrow-leaved Ironbark	230						230	5	14	Native			2760
109	Retain	*Eucalyptus major*	Grey Gum	710						710	9	19	Native	FS		8520
110	Retain	*Corymbia intermedia*	Pink Bloodwood	215						215	2	12	Native			2580
111	Retain	*Corymbia intermedia*	Pink Bloodwood	400						400	3	15	Native			4800
112	Retain	*Corymbia intermedia*	Pink Bloodwood	285						285	5	11	Native		monkey rope vine	3420
113	Remove	*Eucalyptus crebra*	Narrow-leaved Ironbark	580						580	7	18	Native			6960
114	Remove	*Litchi chinensis*	Lychee Tree	110	170	180	150	60		316	6	7	Exotic			3792
115	Remove	*Grevillea robusta*	Silky Oak	470						470	7	16	Native			5640
116	Remove	*Grevillea robusta*	Silky Oak	490						490	5	16	Native			5880
117	Remove	*Cinnamomum camphora*	Camphor Laurel	400						400	8	11	Exotic			4800
118	Retain	*Eucalyptus crebra*	Narrow-leaved Ironbark	325						325	5	16	Native			3900
119	Remove	*Pinus elliottii*	Slash Pine	360						360	4	10	Exotic			4320
120	Retain	*Macadamia integrifolia*	Macadamia	160	150					220	3	6	Native			2640
121	Retain	*Eucalyptus microcorys*	Tallowwood	490						490	12	19	Native		monkey rope vine	5880
122	Retain	*Eucalyptus microcorys*	Tallowwood	515						515	10	19	Native			6180
123	Remove	*Cinnamomum camphora*	Camphor Laurel	180	100	170				268	7	8	Exotic		other side of the creek near reserve road	3216
124	Retain	*Acacia leiocalyx*	Early Black Wattle	170						170	4	12	Native		other side of the creek near reserve road	2040
125	Retain	*Corymbia intermedia*	Pink Bloodwood	600						600	7	18	Native		other side of the creek near reserve road	7200

LEGEND / NOTES

NOTE:
- SURVEY PLAN

NORTHPOINT.

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A	FOR ISSUE	16/10/2023
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D	ARCHITECTURAL LAYOUT AMENDED	23/09/2024
E	ARCHITECTURAL LAYOUT AMENDED	21/10/2024

PROJECT NO.
S523094

CLIENT
MG HOMES
C/- URBAN STRATEGIES

PROJECT NAME
PROPOSED RESIDENTIAL DEVELOPMENT

SITE
202 BAILEYS MOUNTAIN ROAD
UPPER COOMERA

DRAWING NAME
VEGETATION RETENTION PLAN
SCHEDULE SHEET 2 OF 3

DRAWING NO.
S523094_VRP_003

SCALE	SHEET SIZE	DRAWN	APPROVED
N.T.S.	A3	SAJ	RS

2/265 Sandgate Road
Albion Qld 4010

ph 3505 3053

www.s5consulting.com.au
ABN 82 440 704 793

ENVIRONMENTAL

VEGETATION MANAGEMENT SCHEDULE

Site Address: 202 Baileys Mountain Road, Upper Coomera

Codes: FS = Fauna Scratches; SH = Small Hollow; MH = Medium Hollow; LH = Large Hollow; T = Termitaria; BN = Bird Nest

No.	STATUS	SCIENTIFIC NAME	COMMON NAME	DBH 1 [mm]	DBH 2 [mm]	DBH 3 [mm]	DBH 4 [mm]	DBH 5 [mm]	DBH 6 [mm]	Total DBH [mm]	SPREAD* [m]	HEIGHT* [m]	NATIVE/ EXOTIC	HABITAT	NOTES	TPZ [mm]
126	Retain	*Eucalyptus microcorys*	Tallowwood	530						530	12	16	Native		other side of the creek near reserve road	6360
127	Retain	*Lophostemon confertus*	Brush Box	280						280	5	15	Native		other side of the creek near reserve road	3360
128	Retain	*Corymbia intermedia*	Pink Bloodwood	400	80					408	7	18	Native		other side of the creek near reserve road	4896
129	Retain	*Eucalyptus crebra*	Narrow-leaved Ironbark	150	420					446	8	19	Native		other side of the creek near reserve road	5352
130	Remove	*Spathodea campanulata*	African Tulip Tree	275						275	4	9	Exotic			3300
131	Retain	*Eucalyptus crebra*	Narrow-leaved Ironbark	580						580	9	18	Native		monkey rope vine	6960
132	Retain	*Eucalyptus crebra*	Narrow-leaved Ironbark	410						410	8	18	Native		monkey rope vine	4920
133	Retain	*Syzygium* sp.	Lilly-pilly	310	180					359	6	9	Native			4308
134	Retain	*Eucalyptus major*	Grey Gum	220						220	2	14	Native			2640
135	Remove	*Jacaranda mimosifolia*	Jacaranda	225	240	320				459	8	11	Exotic			5508
136	Remove	*Schefflera actinophylla*	Umbrella Tree	230	160	150	180	300		473	7	9	Non-Endemic			5676
137	Retain	*Acacia leiocalyx*	Early Black Wattle	290						290	4	14	Native			3480
138	Retain	*Lophostemon confertus*	Brush Box	590						590	9	16	Native			7080
139	Retain	*Eucalyptus tereticornis*	Forest Red Gum	590						590	8	21	Native			7080
140	Remove	*Cinnamomum camphora*	Camphor Laurel	260	370	250				517	9	11	Exotic			6204
141	Retain	*Eucalyptus tereticornis*	Forest Red Gum	490						490	7	20	Native			5880
142	Retain	*Eucalyptus crebra*	Narrow-leaved Ironbark	465						465	9	20	Native			5580
143	Remove	*Schefflera actinophylla*	Umbrella Tree	130	170	190	250	190		425	5	8	Non-Endemic			5100
144	Remove	*Mangifera indica*	Mango Tree	300						300	7	10	Exotic			3600
145	Remove	*Schefflera actinophylla*	Umbrella Tree	550						550	6	7	Non-Endemic		multiple DBHs	6600
146	Remove	*Mangifera indica*	Mango Tree	1800						1800	11	13	Exotic			15000
147	Remove	*Ficus macrophylla*	Moreton Bay Fig	330	350	320	110			589	12	15	Native			7068
148	Remove	*Cinnamomum camphora*	Camphor Laurel	350	460					579	10	15	Exotic			6948
149	Remove	*Ficus macrophylla*	Moreton Bay Fig	370						370	5	11	Native			4440
150	Remove	*Cinnamomum camphora*	Camphor Laurel	130	130	160	160	160		333	6	12	Exotic			3996
151	Remove	*Spathodea campanulata*	African Tulip Tree	575						575	6	9	Exotic			6900
152	Remove	*Melaleuca viminalis*	Weeping Bottlebrush	210	300					367	6	10	Native			4404
153	Remove	*Podocarpus elatus*	Brown Pine	580						580	10	10	Native			6960
154	Remove	*Schefflera actinophylla*	Umbrella Tree	550						550	6	8	Non-Endemic		multiple DBHs	6600
155	Retain	*Corymbia intermedia*	Pink Bloodwood	750						750	12	18	Native			9000
156	Remove	*Schefflera actinophylla*	Umbrella Tree	240	150	150				321	6	8	Non-Endemic			3852
157	Remove	*Delonix regia*	Poinciana	160	200	200	130			350	10	9	Exotic			4200
158	Remove	*Toona ciliata*	Red Cedar	720						720	9	13	Native			8640
159	Remove	*Schefflera actinophylla*	Umbrella Tree	240	230	160	150	210	80	458	7	10	Non-Endemic			5496
160	Retain	*Grevillea robusta*	Silky Oak	440						440	5	15	Native			5280
161	Retain	*Podocarpus elatus*	Brown Pine	250						250	2	7	Native			3000
162	Retain	*Livistona australis*	Cabbage Palm	220						220	4	10	Native			2640
163	Remove	*Pinus elliottii*	Slash Pine	440						440	6	16	Exotic			5280
164	Remove	*Jacaranda mimosifolia*	Jacaranda	350	330	340				590	10	11	Exotic			7080
165	Retain	*Ficus macrophylla*	Moreton Bay Fig	150	220	300	360	340	330	718	12	13	Native			8616
166	Retain	*Brachychiton acerifolius*	Flame Tree	460						460	6	18	Native			5520
167	Retain	*Grevillea robusta*	Silky Oak	330						330	6	17	Native			3960
168	Remove	*Pinus elliottii*	Slash Pine	345						345	5	15	Exotic			4140
169	Remove	*Cinnamomum camphora*	Camphor Laurel	250	250	340	210	200		570	8	10	Exotic			6840
170	Remove	*Cinnamomum camphora*	Camphor Laurel	275	250	120				391	6	12	Exotic			4692
171	Retain	*Mallotus paniculata*	Green Kamala	330						330	3	7	Native			3960
172	Retain	*Mallotus paniculata*	Green Kamala	300						300	3	8	Native			3600
173	Retain	*Mallotus paniculata*	Green Kamala	360						360	3	8	Native			4320
174	Retain	*Eucalyptus microcorys*	Tallowwood	530						530	10	18	Native			6360
175	Retain	*Eucalyptus tereticornis*	Forest Red Gum	530						530	11	20	Native	FS		6360
176	Remove	*Cinnamomum camphora*	Camphor Laurel	160	180					241	5	9	Exotic			2892
177	Remove	*Cinnamomum camphora*	Camphor Laurel	140	160	70				224	4	9	Exotic			2688
178	Remove	*Cinnamomum camphora*	Camphor Laurel	420						420	12	17	Exotic			5040
179	Remove	*Cinnamomum camphora*	Camphor Laurel	290						290	9	15	Exotic			3480
180	Retain	*Eucalyptus tereticornis*	Forest Red Gum	420						420	10	19	Native			5040
181	Remove	*Cinnamomum camphora*	Camphor Laurel	460	270					534	12	17	Exotic			6408
182	Remove	*Cinnamomum camphora*	Camphor Laurel	550						550	10	16	Exotic			6600

*Attributes are estimates only

† Retain subject to arborist inspection

LEGEND / NOTES

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SCHEDULE SHEET 3 OF 3

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S523094_VRP_004

SCALE	SHEET SIZE	DRAWN	APPROVED
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