ATTACHMENT 8

Ecology and Bushfire RFI Response Letter

9 June 2025
File Ref: S523094_RFIR_v1.0
Contact: Jess Gaukrodger

Natasha Sidabutar
A/ Coordinator Development Assessment (North)
For the Chief Executive Officer
Council of the City of Gold Coast

Attention: Assessment Manager

RESPONSE TO INFORMATION REQUEST – 202 BAILEYS MOUNTAIN ROAD, UPPER COOMERA (COM/2024/317) – LOT 58 SP191940, LOT 57 SP214370, LOT 183 RP156422

I refer to the above City of Gold Coast Council (CGCC) issued Information Request letter regarding the proposed Development Application for 202 Baileys Mountain Road, Upper Coomera (Lot 58 SP191940, Lot 57 SP214370, Lot 183 RP156422) (herein referred to as the 'subject site'), dated 24th of December 2025. Specifically, this response letter relates to Item 9, 10, 20, 21, 23 and 24.

S5 Environmental's response on behalf of the proponent are as follows:

Public Landscape Works

Item 9. Bushfire management plan

Response – The Bushfire Management Zone (BMZ) has been amended to occur outside of the 5m recreation link. It is noted that the recreation link consists of a 2.5m wide concrete path and landscaping. Accordingly, the determination of hazardous vegetation in the Bushfire Management Plan (BMP) has not changed and the BAL lines remain the same. The BMP has also been updated to remove the rock mulch only requirement, refer to *6.0 Bushfire Management Plan* of S523094_BHAMP_v1.5 within Appendix A.

Item 10. Recreation linkage

Response – On average the corridor is between 44m and 88m in width, due to the natural meander of the waterway (Yuan Creek). Accordingly, a uniform 30m width from the outer bank of a waterway along the length of the subject site has not been achieved, but if averaged out, the corridor width is considerable. In comparison to approved sites to the west, the subject site's width of rehabilitation off the waterway is considerably greater. Therefore, S5 Environmental believe the site complies with PO5 of the Environmental Significance Overlay Code, as the MLES minor waterway will be protected from proposed works and will continue to allow for

unimpeded fauna movement throughout the 85m wide rehabilitated corridor, whilst ensuring bank stability and water quality within the minor waterway (implemented via rehabilitation techniques).

Environmental Assessment

Item 20. Fauna Management Plan

Response – S5 Environmental have prepared a Fauna Management Plan (FMP) (S523094_FMP_001-013(A)) which includes a Nest Box Management Plan (NBMP) in accordance with PO21 and PO22 of the Environmental Significance Overlay Code. Please refer to Appendix B for the FMP.

Item 21. Vegetation Management Plan

Council requested trees 88, 89, 92, 113, 115, 116, 147, 149, 152, 153 and 158 be retained.

Response – S5 Environmental have prepared a Vegetation Management Plan (VMP) (S523094_VMP_001-008(G)) in accordance with PO11, PO18 and PO20 of the Environmental significance overlay code. Additionally, the VMP addresses items 1a-c and e of the RFI. Item 1d) has been addressed Basic Rehabilitation Management Plan (S523094_BRMP_001-008(B)) submitted as part of this application. Please refer to Appendix C for the amended VMP. All trees requested to be retained have now been retained.

22. Amended Plans:

Response – The proposed sewer line has been relocated to avoid the recreational linkage and conservation park proposed on site and requires no additional removal of vegetation to facilitate the connection. The sewer line now runs out to BMR and not through the recreation link/waterway. Refer to Appendix D which provides Cozens Regan's Erosion and Sediment Control Preliminary Issue, which displays the amended sewer line.

Bushfire Assessment

Item 23. Address bushfire risk and management strategies in areas to be dedicated to Council as Open Space

Response – The BMZ has been amended to more 5m north, to exclude the recreation link. The determination of hazardous vegetation in the BMP has not changed and the BAL lines remain the same. Due to this, there would be no bushfire maintenance requirements for the rehabilitated area which is to be dedicated to Council as Open Space, as the BMZ does not entire into the rehabilitated area and is separated by the 5m wide recreation link. Refer to *6.0 Bushfire Management Plan* of S523094_BHAMP_v1.5 within Appendix A, for a detailed description of the BMZ requirements and S523094_BRMP_001-007(B) for requirements within the rehabilitation areas.

Item 24. Relocation of the proposed bio-basin

Response – The BHAMP has been amended (refer to Appendix A) to support planting within the bio-basin, which is in accordance with A03.2 of the Bushfire Hazard overlay code. The location of the bio-basin within the subject site avoids all matters of environmental significance, utilises natural fire breaks (5m recreational link divides the hazardous vegetation from the south) and only requires the removal of exotic species within this location. Planting must ensure an appropriate spacing between plants, guaranteeing horizontal and vertical separation between vegetation to ensure landscaping does not exacerbate a bushfire event. It is not recommended that canopy species are planted within the bio-basin, but low flammability species that are appropriately spaced to ensure vertical and horizontal separation may be planted.

Should you wish to discuss the above, please do not hesitate to contact the undersigned on the number or email address below.

Yours sincerely,

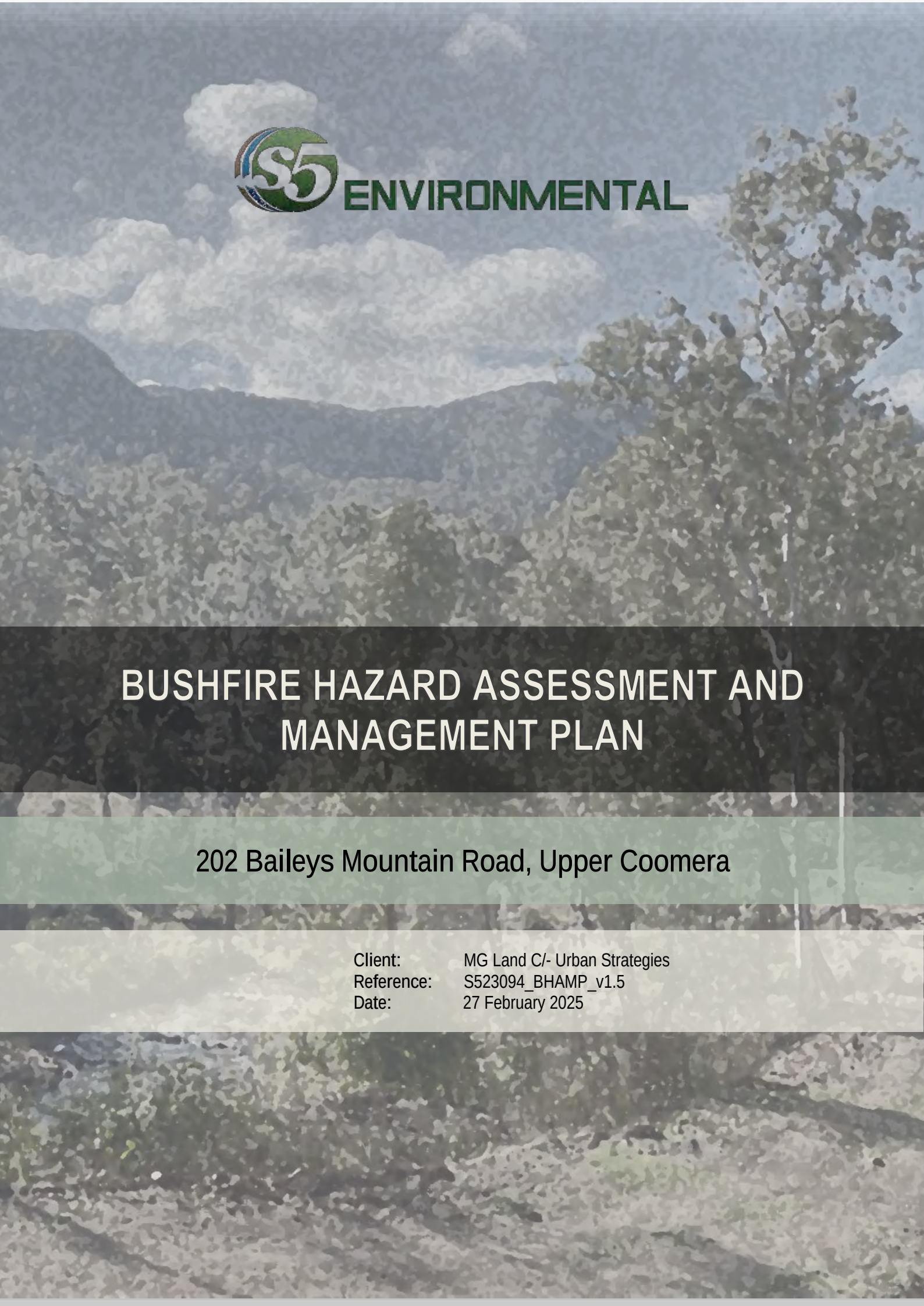
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Enc: Appendix A – Amended BHAMP
Appendix B – FMP
Appendix C – VMP
Appendix D – Cozens Regan Consulting Engineers Erosion and Sediment Control Preliminary Issue

Appendix A

Amended BHAMP



BUSHFIRE HAZARD ASSESSMENT AND MANAGEMENT PLAN

202 Baileys Mountain Road, Upper Coomera

Client:	MG Land C/- Urban Strategies
Reference:	S523094_BHAMP_v1.5
Date:	27 February 2025

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Quality Control

Prepared for	MG Land C/- Urban Strategies
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Date	27 February 2025

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	20 September 2024	CH (Senior Ecologist)	RS (Director)	RS (Director)
1.4	Amendments	10 October 2024	JG (Env. Scientist)	RS (Director)	RS (Director)
1.5	Amendments	27 February 2025	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. Site Plan of Layout
(source: Red Door Architecture, drawing no. 23008, DA-010, rev. C, 21/01/25)

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.

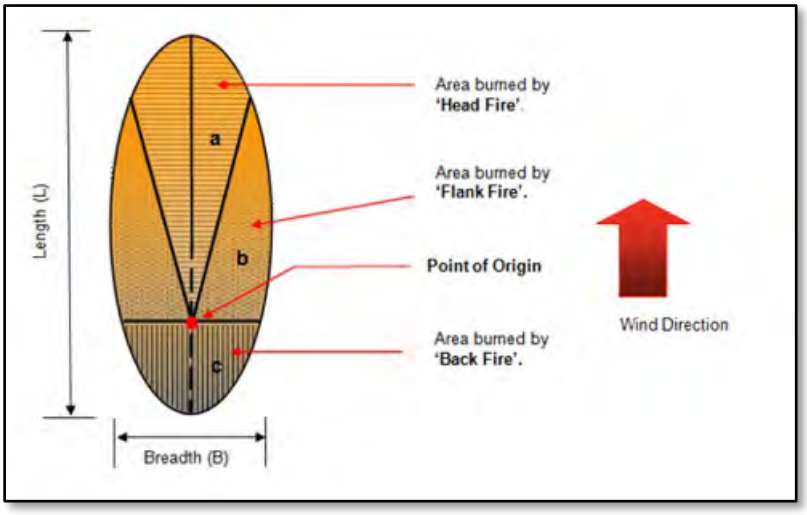


Figure 4 Schematic diagram of simple elliptical fire growth model (Van Wagner 1969) from NSW Rural Fire Surface (2019)

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.

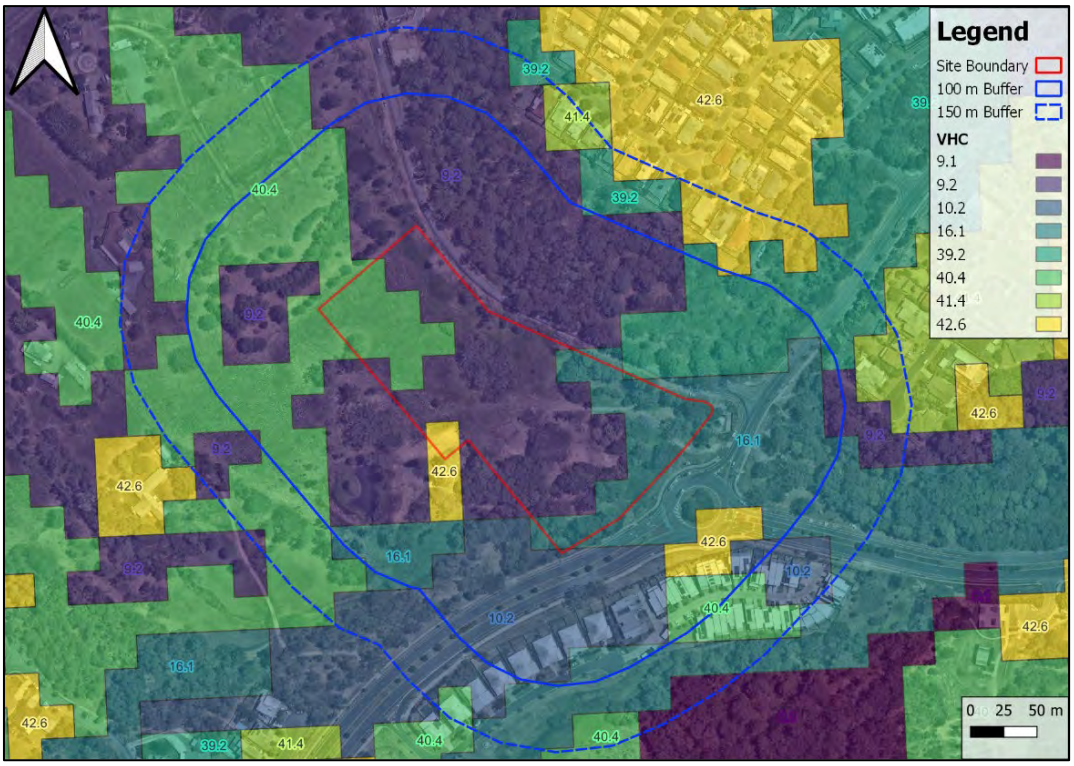


Figure 5. Extract of Vegetation Hazard Classes from Catalyst

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).

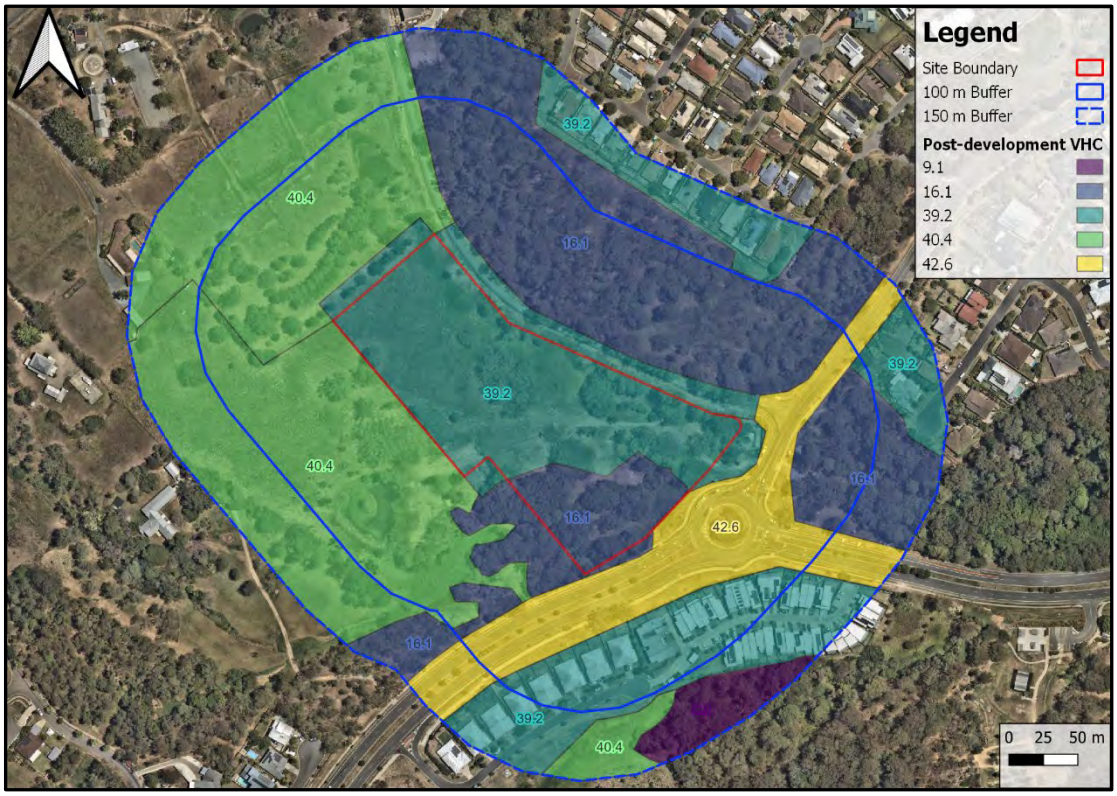


Figure 6. Modified Vegetation Hazard Classes based on Ground-truthed Conditions and Future Land Use.

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.

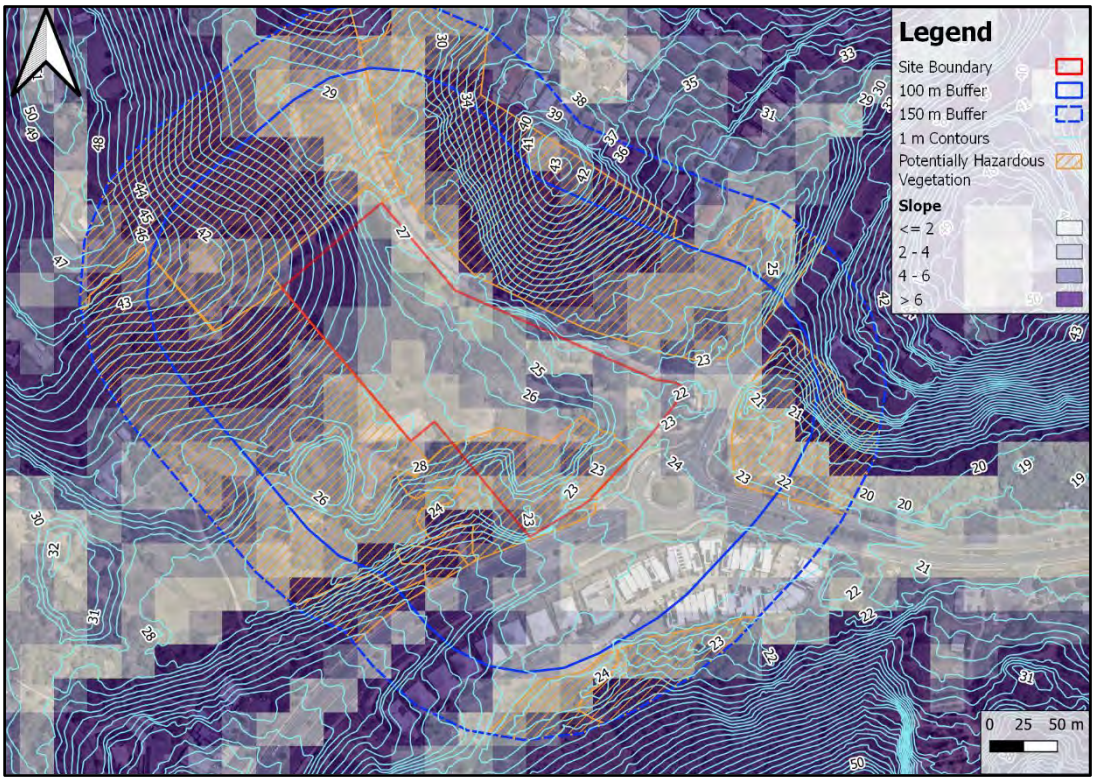


Figure 7. Slope in Proximity to the Proposed Development

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.

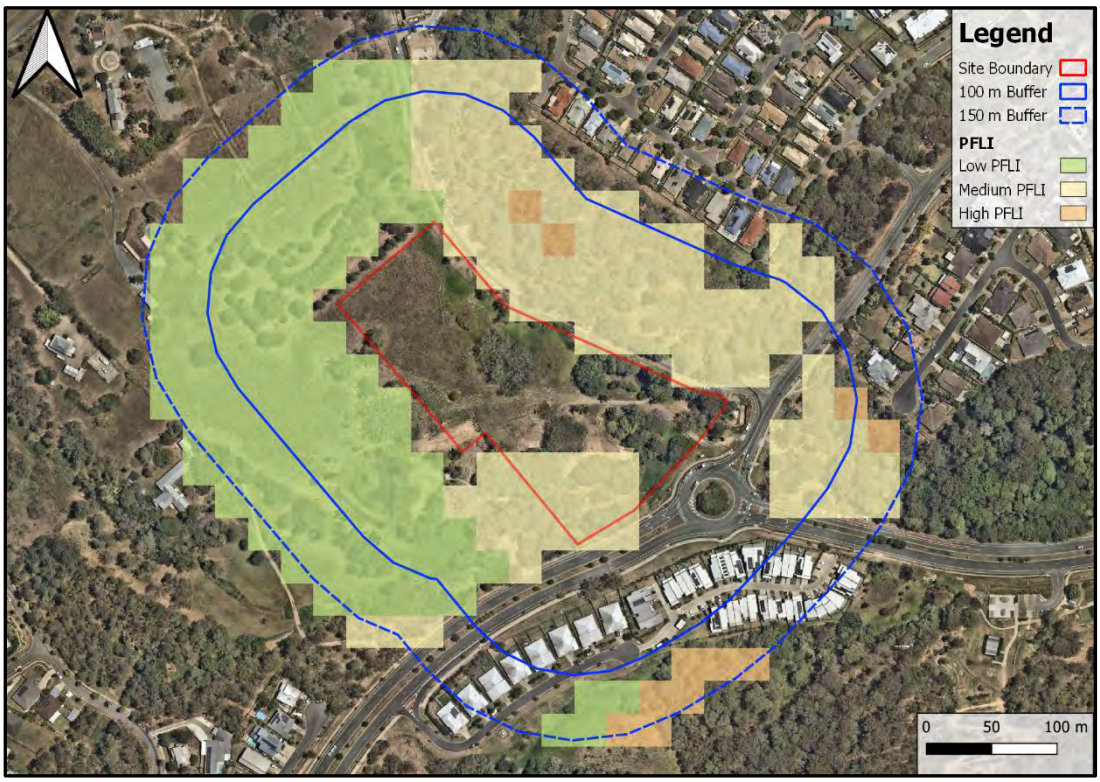


Figure 8. Potential Fire Line Intensity

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.

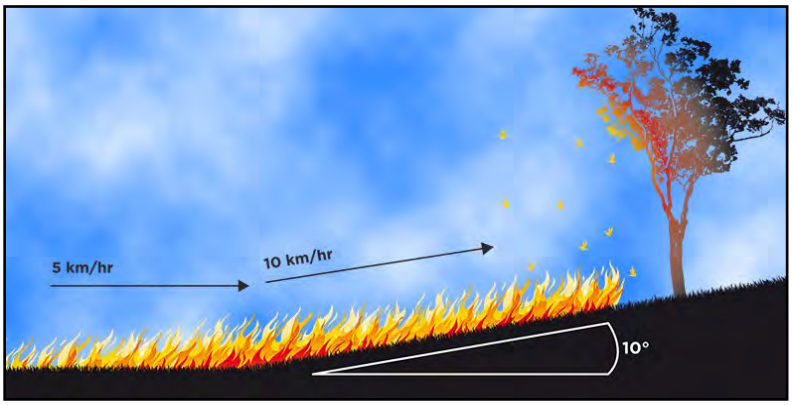


Figure 10. Effects of Topography on Bushfire (source: Country Fire Authority)

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.

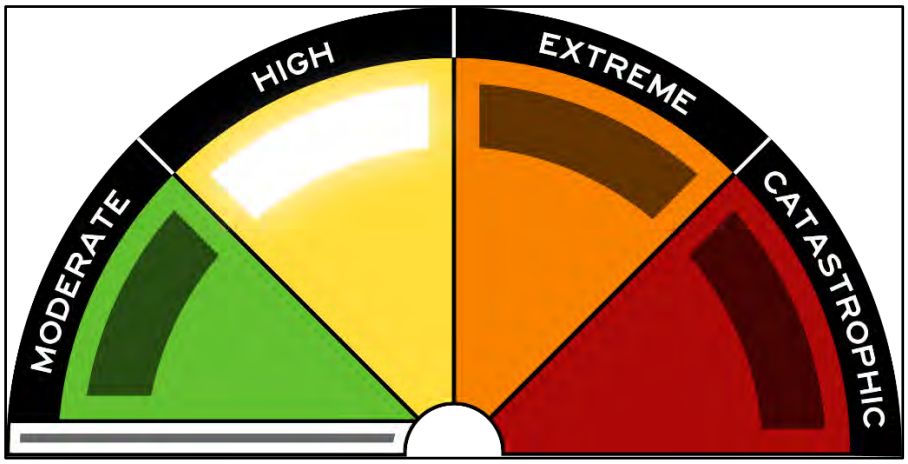


Figure 11. Fire Danger Rating (source: source: QFES [updated: 2023])

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.

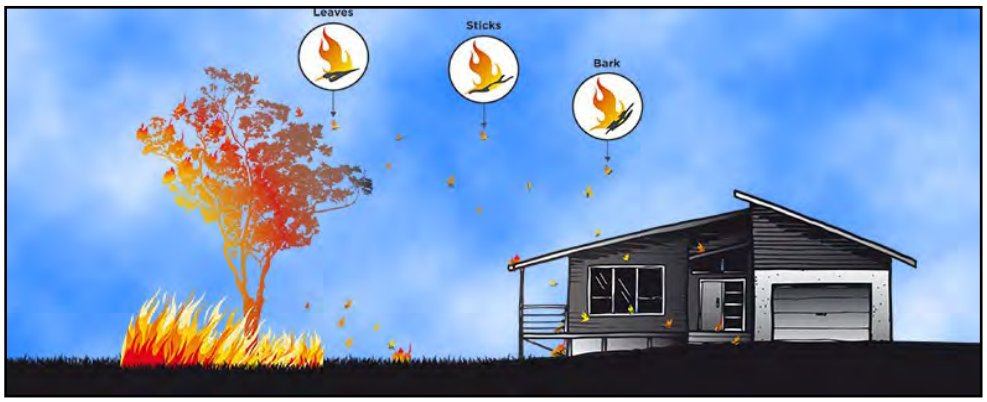


Figure 12. Ember Attack (source: Country Fire Authority)

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 to the north of the southern hazardous vegetation, largely associated with the rehabilitated dedicated park. The BMZ begins north of the recreation link (cement bikeway). The BMZ is to be buffered approx. 21-24 m off the hazardous vegetation to the south, 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 a portion of cleared land on the adjacent property, communal open space and pool area 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; S5 Environmental recommend groundcover planting density be increased in this area so mulch can be replaced with native grasses and sedges. Any grass within the BMZ must not exceed 10 cm in height. Low fuel canopy species can be planted in the BMZ, but there must be vertical and horizontal separation between species. 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. Applying the above recommendations will ensure the BMZ is maintained in a low fuel state. Refer to Figure 14 below.

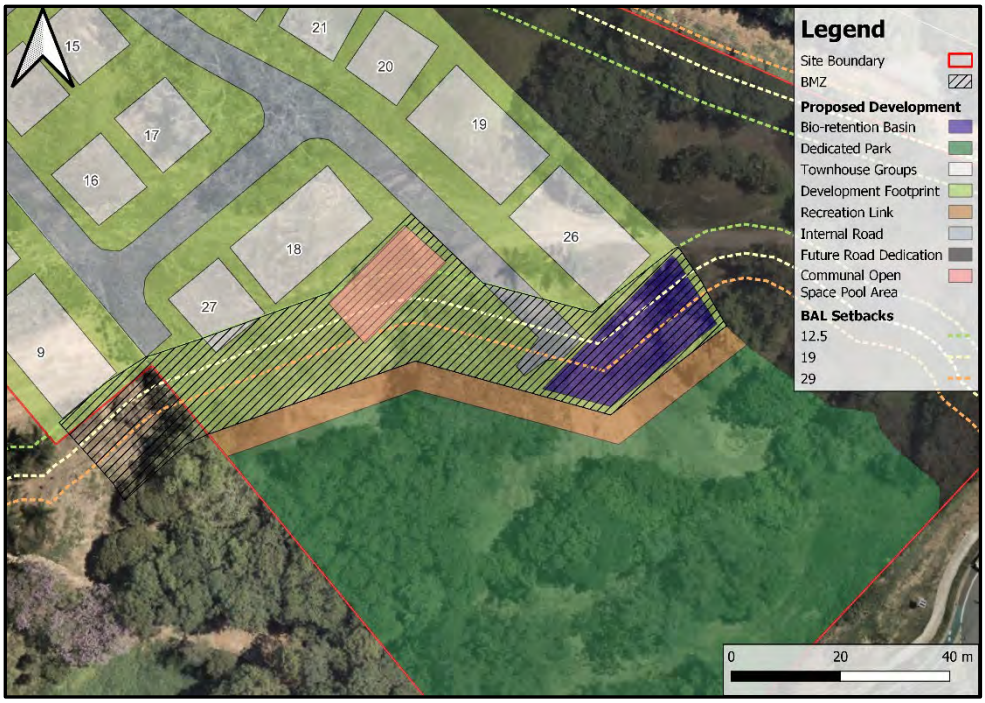


Figure 14. Bushfire Management Zone

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 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.

8.0 REFERENCES

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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.		

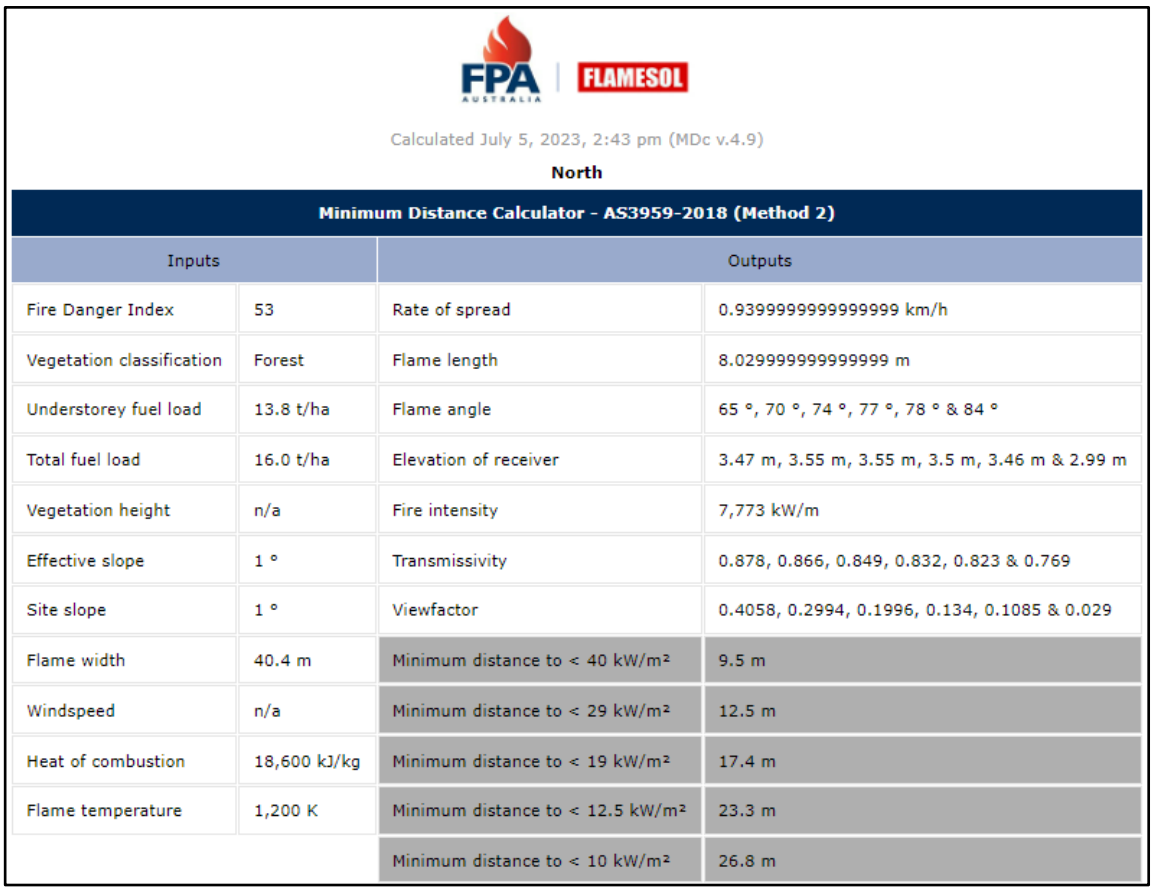
PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	COMMENTS	COUNCIL USE ONLY
Storage of Hazardous Materials			
PO15 Development does not cause: (a) an unacceptable risk to people, property and the environment due to the impact of bushfire on hazardous chemicals; (b) excess danger or difficulty to emergency services 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

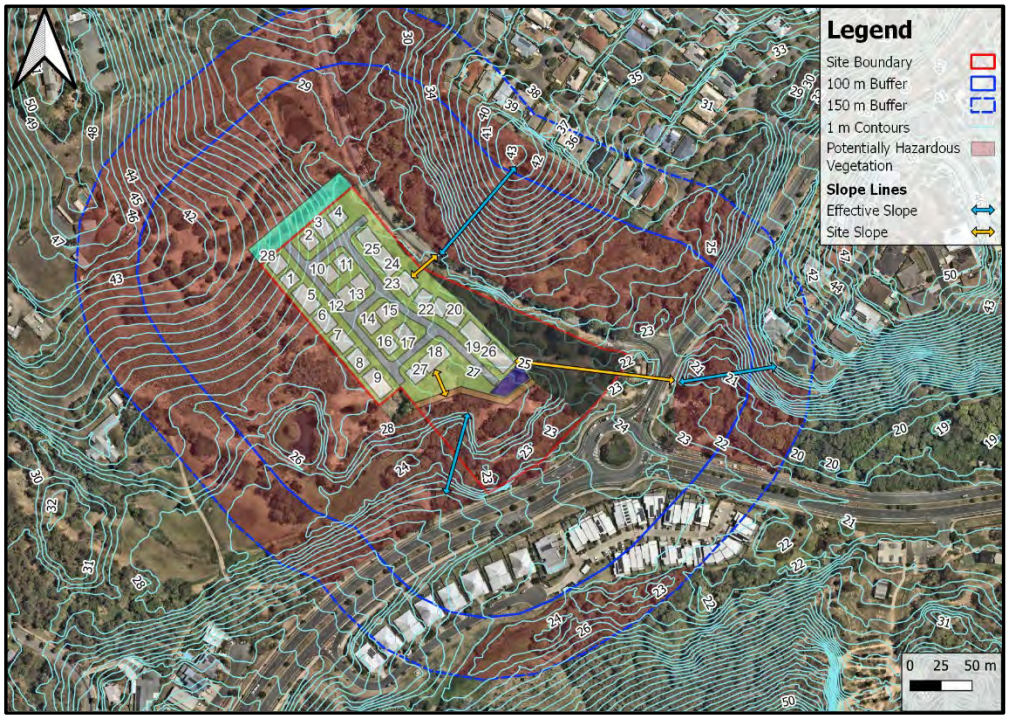
Effective Slope						Site Slope					
Direction	Downslope					Direction	Flat				
Top Elevation	26	m				Top Elevation	26	m			
Bottom Elevation	43	m	Slope %	-18.09%		Bottom Elevation	26	m	Slope %	0.00%	
Distance	94	m	**Slope (°)**	**-10.36**	1	Distance	28	m	**Slope (°)**	**0.00**	1

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



Appendix B

FMP



S5 ENVIRONMENTAL 2/265 Sandgate Road Albion, 4010 Ph 35053053 wwww.s5consulting.com.au ABN 82440704793	Issue	Description	Date	Client	Project Name	Project No.
	A	For Submission	27/02/25	Mg Homes C/- Urban Strategies	202 Baileys Mountain Road, Upper Coomera	S523094
	Drawing Name	**FAUNA MANAGEMENT PLAN**				FMP001



ENVIRONMENTAL
2/265 Sandgate Road Albion, 4010
Ph 35053053
wwww.s5consulting.com.au
ABN 82440704793

Issue	Description	Date	Client	Project Name	Project No.
A	For Submission	27/02/25	Mg Homes C/- Urban Strategies	202 Baileys Mountain Road, Upper Coomera	S523094
Drawing Name	**FAUNA MANAGEMENT PLAN**				FMP002

General Notes

This Fauna Management Plan (FMP) is to be read in conjunction with the Detailed Ecological Assessment (DEA; S523094_DEA_v1.1), Basic Rehabilitation Management Plan (S523094_BRMP_001-007(B)) and Vegetation Management Plan (VMP; S523094_VMP_001-008(A)). This FMP is to be kept on the site for reference during all clearing and operational works for the duration of the construction phase.

This plan details fauna management protocols and the management and mitigation measures to be followed prior to and during clearing of vegetation within 202 Baileys Mountain Road, Upper Coomera. The subject site is located on Lot 58 on SP191940. The abovementioned lot, herein referred to as the 'subject site' comprises an area of approx. 3.08 ha (post-land swap).

Roles and Responsibilities

See Table 1 below for the roles and responsibilities for clearing works associated with the development.

Table 1 Roles and Responsibilities

Roles and Responsibilities		
Roles	Responsibility	Activities
All Personnel	Notifying the fauna spotter catcher should fauna or a potential breeding place be identified during clearing works	• Should fauna, hollows or nests be identified at any time during works, notify the fauna spotter catcher or ecologist on site to ensure that appropriate fauna management measures are implemented.
Site Supervisor	Overseeing construction works	• Ensure processes are in place to include the necessary provisions of the FMP into works/projects; • Ensure that contractual arrangements with the contractors specify the need for adequate training to be provided to all members of the construction/extraction crew involved in the project; • Ensure construction workers are trained in the procedures of the FMP; • Undertake and record corrective actions; and • Report to regulatory authorities if required.
Civil Contractor	Construction	• Implement the requirements from the Construction Environmental Management Plan (CEMP), which is to be submitted to the State Development, Infrastructure, Local Government and Planning (DSDMIP) prior to commencing works; • Understand the requirements within this FMP.

Roles and Responsibilities (cont.)

Roles and Responsibilities		
Roles	Responsibility	Activities
Ecologist/Fauna Spotter Catcher	Preclearance survey	• Undertake a preclearance inspection of trees, wet areas and other vegetation (for fauna, hollows and nests); • Provide a preclearance report based on the site inspection; • Prepare and submit to Department of Science (DES) a Species Management Plan (SMP) should a proposed activity impact on a breeding place/s of protected fauna.
Project Arborist	Supervise all clearing activities and any work within TPZ of retained trees	• Supervise tree pruning; • Supervise all works within the TPZ of retained trees.
Fauna Spotter Catcher	Overseeing clearing activities	• Supervise all clearing activities and is always present on site; • Handle all fauna emergencies while present on site; • Recommend and undertake any fauna management measures required; and • Provide pre and post clearing reports to regulatory authorities.

Development Works

A detailed ecological assessment and tree survey stating tree retention and removal was conducted as part of detailed ecological assessment of the site and includes identification of vegetated areas proposed for removal, guidance on directional clearing and presence of State and Local vegetation mapping, as well as fauna management procedures. S5 Environmental understands that the proposed development requires an inspection of vegetation proposed to be removed prior to clearing for all the approved works. The works associated with the proposed development are detailed and assessed in Table 2 (below) and shown on FMP001.

Table 2 Assessment of Proposed Development Works

Stage	Works	Area	Clearing Direction	Protected Vegetation Mapping
1	Vegetation Clearing for Proposed Development	4 NJKHTs-1 NJKHT within KHA	Clearing must be undertaken in a north to south direction towards the waterway corridor and proposed rehabilitation area., illustrated within FMP002. Further, it is recommended that the understorey is cleared first in communities/patches with higher structural complexity, to ensure animals disturbed in canopy/shrub layer do not retreat into the understorey.	• Category B (remnant) vegetation • Category C (high value regrowth) vegetation • Koala Habitat Areas (core) • Protected Plants

Fauna Management Plan

Objectives

- Protect fauna throughout the development project;
- Implement fauna management measures required; and
- Ensure any fauna emergencies are appropriately handled.

Performance Criteria

- Sensitive clearing techniques are to be employed;
- Relocation of cleared habitat where possible into the proposed rehabilitation area associated with the waterway corridor along the southern boundary of the subject site in areas of retained vegetation;
- Successful relocation into appropriate habitat of any fauna located within the clearing area; and
- No injuries or fatalities to fauna.

Responsibility

Civil contractor, Fauna Spotter Catcher, Ecologist, Project Arborist and Site Supervisor.

Preclearance Tree Survey

- A suitably qualified Fauna Spotter Catcher must undertake a preclearance inspection of trees, wet areas and other vegetation (for fauna, hollows and nests) prior to clearing works commencing;
- A suitably qualified Fauna Spotter Catcher must provide a preclearance report based on the site inspection that identifies any potential impacts to fauna and their habitats resulting from development works and recommends minimisation and mitigation measures for those impacts; and
- Prepare and submit to the Department of the Environment, Tourism, Science and Innovation (DETSI) a Species Management Plan (SMP) which should state the proposed activity impact on a breeding place/s of protected fauna.

Fauna Spotter Catcher

- A qualified Fauna Spotter-Catcher and Koala Spotter in possession of a valid Rehabilitation Permit (issued by DETSI) and with appropriate experience in surveying, monitoring and rescuing fauna species is required to supervise clearing works for the period of vegetation clearing;
- The Spotter-Catcher is to inspect trees to be cleared and/or trees that may have a canopy that overlaps with other vegetation to be cleared for the presence of fauna and significant fauna habitat features (tree hollows, nests, dreys and hollow logs) no more than 48 hours prior to clearing works commencing. It should be noted that all mature koala habitat trees (i.e., *Eucalyptus, Lophostemon, Corymbia, Melaleuca* and *Angophora* spp.) could potentially be used by koalas and as such should be searched extensively before and during clearing procedures; and
- Inspection is to occur at least once each clearing day prior to clearing commencement, and the Fauna Spotter-Catcher is to remain on-site during any clearing works. All trees identified as significant fauna habitat are to be clearly flagged and cleared under the guidance of the Fauna Spotter-Catcher.

Fauna Sensitive General Specifications

- Clearing should occur sequentially as specified in Table 2. The aim of directional clearing of the site is to allow fauna to move safely to habitat adjacent to the development area;
- The Fauna Spotter Catcher/Koala Spotter will follow and direct clearing works at all times to maximise detection of fauna;
- If any animals are identified in trees to be removed during clearing operations, work shall cease immediately on that tree. The Fauna Spotter Catcher must implement any required fauna management measures prior to clearing operations recommencing;
- Where possible, hollow bearing trees and trees containing dreys should be felled as close to sunset as practical to minimize the time nocturnal fauna spend out of shelter;
- Felled hollow bearing limbs, timber stockpiles, debris piles, and habitat areas such as dense sections of undergrowth should be inspected for wildlife by the fauna spotter catcher. Felled trees are to be inspected for fauna and any felled timber left more than 24 hours be re-inspected before moving or mulching; and
- Any catch or release of possums, snakes, koala, or other species should take place in areas in proximity to the site at a safe distance outside of the roadways into the most suitable tree/habitat found as determined by the fauna spotter catcher.

Breeding Places Specifications, Fauna Relocation and Injured Wildlife

- If any injured fauna is identified on the site, the Spotter-Catcher is to be contacted immediately to attend the site and assess the animal. The Spotter-Catcher is to direct a course of action to ensure the animal is taken to a veterinarian or euthanized where required in accordance with the Code of Practice for the Care of Sick, Injured, or Orphaned Protected Animals is Queensland, 2013 (NCA 1992);
- Any injured or orphaned wildlife should be taken to Animal Emergency Centre Gold Coast- 24/7 Emergency Vets – 4/492 Scottsdale Drive, Varsity Lakes, QLD, 4227, Ph. (07) 5593 4544, or RSPCA Ambulance: 1300 ANIMAL (1300 264 625);
- No interference with or relocation of fauna unless undertaken by the fauna spotter catcher; and
- All hollow dependent fauna should be relocated with species specific denning boxes.

Fauna Recorded on Site

An ecological site inspection was completed by S5 Environmental Ecologists on the 6th of April 2024, in which fauna observations and evidence of fauna were recorded. Fauna observed on-site generally consisted of highly mobile avi-fauna considered common across the local area and are typically found in modified, urban environments, however detailed fauna surveys were not conducted. Fauna recorded on the site are shown in Table 3.

Fauna Recorded on Site (cont.)

Table 3 Fauna Recorded on Site

Common name	Species name
BIRDS	
Daleco novaeguineae	Laughing kookaburra
Gymnorhina tibicen	Australian magpie
Rhipidura albiscape	Grey fantail
REPTILE	
Emydura macquarii	Macquarie turtle
MAMMAL	
Macropus parryii	Whiptail wallaby

Listed Fauna Likely to Occur on Site

As part of a Detailed Ecological Assessment, S5 Environmental undertook a likelihood of occurrence assessment for EPBC Act and NC Act listed species, to determine which species are 'likely' to occur within the development area and adjacent areas. This assessment determined that it is possible for the following species to occur within the site, based on habitat features present:

- Koala (*Phascolarctos cinereus*);
- Grey-headed flying-fox (*Pteropus poliocephalus*);
- Glossy-black Cockatoo (*Calyptorhynchus lathami);*
- South-eastern Glossy Black-Cockatoo (*Calyptorhynchus lathami lathami*);
- White-throated needletail (*Hirundapus caudacutus*);
- Black-faced Monarch (*Monarcha melanopsis*);
- Australian Painted-snipe (*Rostratula australis*);
- Rufous Fantail (*Rhipidura rufifrons*);
- Spectacled Monarch (*Symposiachrus trivirgatus*);
- White Bellied Sea-eagle (*Haliaeetus leucogaster)*; and
- Osprey (*Haliaeetus leucogaster).*

Species Conditions and Management Actions

- Refer to Table 4 below for a summary of the recommended Management Actions for listed species 'likely' to occur within the development and adjacent areas;
- Refer to Table 5 below for a summary of the recommended Management Actions for generalist species groups that are common within Upper Coomera;
- Refer to Table 6 below for technical specifications and images; and
- Refer to the scaled drawing on FMP001 for recommended locations of fauna movement solutions.

Table 4 Management Actions for Listed Species Likely to Occur within the Development Area and Adjacent Areas

Common Name	Species name	Typical Habitat	Management Action
Grey-headed Flying-fox	*Pteropus poliocephalus*	The species are canopy-feeding frugivore and nectarivore, which utilise vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands.	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. If a grey-headed flying-fox is located, works should immediately cease and only resumed after the animal has moved on of its own accord.
South-eastern Glossy Black-cockatoo	*Calyptorhynchus lathami lathami*	The glossy black-cockatoo lives in coastal woodlands and drier forest areas, open inland woodlands or timbered watercourses where its main food source, the casuarina (she-oak), is common.	• 8 Nest boxes are to be installed to mitigate potential loss of breeding habitat, as stated in the Nest Box Management Plan below; • 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. If a listed species is located, works should immediately cease and only resume after the animal has moved on of its own accord.
White-bellied Sea-eagle	*Haliaeetus leucogaster*	White-bellied Sea eagles are found in coastal habitats and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands.	
White-throated Needletail	*Hirundapus caudacutus*	White-throated Needletails are aerial feeding birds that utilise non-breeding habitats within Australia, which include large tracts for woodland.	
Australian Painted-snipe	Rostratula australis	The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans.	

Common Name	Species name	Typical Habitat	Management Action
Osprey	*Pandion haliaetus*	The osprey breeds near freshwater lakes and rivers, and sometimes on coastal brackish waters. The Australian Painted-snipe breeds in shallow freshwater or brackish wetlands following flooding.	
Rufous Fantail	*Rhipidura rufifrons*	The Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts.	
Spectacled Monarch	*Symposiachrus trivirgatus*	The Spectacled Monarch moist lowland forests, subtropical or tropical mangrove forests, and subtropical or tropical moist montane forests.	
Black-faced Monarch	*Monarcha melanopsis*	The Black-faced Monarch is found in rainforests, eucalypt woodlands, coastal scrub and damp gullies.	

Table 5 Management Actions for Generalist Species Common within Upper Coomera

Species Group	Species name	Management Action
Amphibians and Fish	Aquatic/Riparian	• A licensed 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.
Reptiles	Terrestrial/Arboreal/ Fossorial/Riparian	• A licensed 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; and • Installation of Fauna Exclusion Fencing.
Small ground dwelling mammals and macropods	Terrestrial/ Fossorial	• A licensed 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; and • Installation of Local Traffic Management (signage) and Fauna Exclusion Fencing.
Arboreal mammals	Arboreal	• A licensed 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; and • Installation of Fauna Exclusion Fencing and potentially Fauna Friendly Fencing.

Koala Values, Habitat and Movement Across the Site

Koala movement before, during and after construction works will be safe and supported throughout the subject site. Safe koala movement during construction will be ensured by using fauna-exclusion fencing and local traffic management. The development footprint does not significantly fragment koala habitat areas within the site, or in the broader landscape and utilises a previously cleared/disturbed area. Approximately 6,200 m² of rehabilitation works are being proposed alongside 18,557 m² of development. The on-ground rehabilitation works will strengthen the existing vegetation within the site and will create a large ecological corridor running along the southern boundary of the site into the western lot, which contains a watercourse (to be strengthened during rehabilitation), which will provide many essential environmental and biological processes and values.

Rehabilitation will strengthen vegetation links to the south-east and south-west of the subject site. Vegetation within the site contained minimal non-juvenile koala habitat trees and was dominated by exotic species. After rehabilitation works, the retained vegetation to the south will provide shelter, foraging and movement opportunities for koalas. Approx. 1 NJKHT is proposed for removal within the mapped koala habitat area (core) (3 NJKHTs are proposed for removal outside KHA). The 6,200 m² of rehabilitated vegetation will provide many foraging, shelter and habitat opportunities for the koala, among other species. Within areas proposed for rehabilitation across the site, koala habitat trees are to be planted where exotic species are proposed for removal. This will strengthen ecological values across the site and provide additional habitat for koalas. Refer to Figure 1 below which displays koala movement opportunities within the subject site and the locality post development and rehabilitation works.

Table 6 Management Actions for the Koala

Activities that may cause injury or death of koalas	Management Action
Vehicle strike	• Fauna Exclusion Fencing is to be installed.
Koalas falling in excavated pits and or trenches for pier construction and becoming trapped or injured.	• Temporary fauna exclusion / dust control fencing is to be installed prior to construction works to prevent animals entering the site. Permanent fauna exclusion fencing to be installed surrounding the development area. Refer to Figures 2 and 3; • Ensure excavated trenches and pits are covered and secured at the end of each day; • Pits and trenches are to be inspected at the start of each day to ensure no trapped animals; and • Contact DETSI licensed koala spotter/catcher in possession of a valid Rehabilitation Permit to rescue koala, construction personnel are not to attempt to handle animal.
Koalas taking refuge in machinery at night and being injured when the machinery starts.	• Temporary fauna exclusion / dust control fencing is to be installed prior to construction works to prevent animals entering the site. Permanent fauna exclusion fencing to be installed between development area and koala habitat to the west of the site. Refer to Figures 2 and 3; • Inspect machinery at the start of each day prior to use. Inspection to be entered into work log; and • If koala encountered contact DETSI licensed koala spotter/catcher in possession of a valid Rehabilitation Permit to move koala. Note: construction personnel are not to handle the animal.
Increased levels of construction related dust on adjacent koala habitat.	• Temporary dust control fencing is to be installed prior to works commencing. • Dust suppression techniques such as regular watering of exposed soil are to be implemented as advised by an Erosion and Sediment Control professional.
Injury or death during clearing and construction activities	• 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. If a koala is located, works should immediately cease and only resume after the animal has moved on of its own accord. • If a koala becomes trapped, injured or deceased as a of from construction activity, the following must occur: • Immediately cease construction activity in the vicinity; • Contact RSPCA Qld on 1300 ANIMAL (ph: 1300 264 625);
	• RSPCA representative or contractors licensed koala spotter/catcher in possession of a valid Rehabilitation Permit to free trapped koala and assess for injuries. If uninjured, allow koala to move on of its own volition. If injured, see below. • RSPCA representative or contractors licensed koala spotter/catcher in possession of a valid Rehabilitation Permit to take injured or deceased animal to nearest wildlife hospital located at Currumbin Wildlife Hospital: - 27 Millers Dr, Currumbin QLD 4223, Ph. 07 5534 0813. • Construction personnel not to handle animal; • Construction activity to only resume after management measures have been carried out as per the above; and • Review all procedures as per the Koala Management Plan to ensure all Management Actions are being implemented.



Figure 1 Koala Movement Opportunities Post Development & Rehabilitation

Table 7 Fauna Furniture & Movement Solutions; Comments, Technical Specifications and Images

Example Design	Specifications and Comments
Fauna Exclusion Fencing	
 Figure 2 Typical fauna exclusion fencing with smooth metal top (BCC, 2023)  Figure 3 Floppy top chain link fencing (BCC, 2023)	• The purpose of fauna exclusion fencing is it excludes wildlife from entering unsafe areas including roads and residential properties where domestic animals such as dogs) may be present. • Panelling sheets are required on the bushland facing side of the fence to prevent fauna from entering development area. Construction techniques previously utilised: • Fauna exclusion fencing should be a minimum of 1.5 metres in height. • Fencing must not have any gaps greater than 50 mm. • Use panelling, smooth metal or Perspex sheets of at least 600 mm in width or floppy top design.

Loss of Habitat Features

To offset the loss of habitat features from the proposed works, nest boxes are required to be installed at a ratio of one box to every one habitat feature removed. CoGC describes common habitat features to including hollow-bearing trees, hollow logs, woody debris, stags, native bee hives, leaflitter, large rocks and boulders and rocky outcrops.

A total of 1 hollow and 7 habitat trees are proposed for removal; therefore 8 nest boxes must be installed to offset the loss of the mentioned habitat feature. It should be noted any native bee nests are to be retained where possible or safely relocated on site. Please refer to FMP009 which identifies the tree number and what habitat feature it contains.

Habitat trees have been identified within Table 8 on FMP009, as requested by CoCG, however are not required to be offset.

Habitat Trees & Features to be Removed

Please refer to the Vegetation Management Plan (S523094_VMP_001-008(A)) for the full tree schedule identifying tree retention and removal.

Table 8 Habitat Trees and Habitat Features within the Site

Codes: FS = Fauna Scratches; SH = Small Hollow; MH = Medium Hollow; LH = Large Hollow; T = Termitaria; BN = Bird Nest; NB = Nest Box, SF = Evidence of Sap Feeding												
No.	STATUS	SCIENTIFIC NAME	COMMON NAME	HABITAT TREES	HABITAT FEATURES	Total DBH [mm]	SPREAD* [m]	HEIGHT* [m]	NATIVE/ EXOTIC	NJKHT	TPZ [mm]	Nest Box required to be Installed
44	Remove	*Ficus obliqua*	Small-leaved Fig	Yes		3000	15	18	Native	No	15000	1
45	Remove	*Ficus rubiginosa*	Port Jackson Fig	Yes		3200	15	19	Native	No	15000	1
46	Remove	*Ficus rubiginosa*	Port Jackson Fig	Yes		2200	12	16	Native	No	15000	1
50	Remove	*Ficus rubiginosa*	Port Jackson Fig	Yes		1089	15	17	Native	No	13068	1
73	Remove	*Lophostemon suavoleans*	Swamp Box	Yes	SH	950	6	15	Native	Yes	11400	2
87	Remove	*Toona ciliata*	Red Cedar	Yes		850	10	18	Native	No	10200	1
91	Remove	*Ficus obliqua*	Small-leaved Fig	Yes		1721	19	12	Native	No	15000	1

Nest Box Management Plan

Assessment of Target Species

Detailed ecological assessment including a tree survey of the site conducted as part of this Nest Box Management Plan (NBMP) includes identification of priority species listed by City of Gold Coast (CoGC), which have the potential to utilise nest boxes. Species not listed as 'priority' have also been given consideration as part of this assessment. Assessment has included presence of the species within a 5 km radius of the site. Searches for species records have been conducted through the WildNet database (WO) and Atlas of Living Australia (ALA). Refer to Table 9 below.

Table 9 Assessment of Target Species

Scientific Name	Common Name	CoGC Priority Species	Source	Nest Box Size Requirement
Petaurus norfolcensis	Squirrel Glider	✓	ALA	Small
Calyptorhynchus lathami lathami	South-eastern Glossy Black-cockatoo	✓	ALA/WO	Large
Chalinolobus gouldii	Gould's wattled bat		ALA	Small
Dacelo novaeguineae	Laughing kookaburra		WO	Medium
Petaurus breviceps	Sugar glider	✓	ALA	Medium
Petaurus norfolcensis	Crimson rosella		ALA/WO	Large
Trichoglossus moluccanus	Rainbow lorikeet	✓	ALA	Small-Medium
Trichosurus vulpecula	Brushtail possum		ALA/WO	Medium

Nest Box Installation

The following items must be considered prior to installation of nest boxes on trees:

- Orientation – heat can impact the success of the nest box. Heat can overcome the nest box occupant and lead to death. Given the locality of the subject site (i.e., SEQ), is it recommended that nest boxes are place on the fauna pole/tree to face a south-west direction, to avoid overheating in the summer months. Further, it is not recommended that nest boxes proposed for bird species are installed to face each other. This can encourage competition and aggression between species.
- Sound – some species can be sensitive to noise. As such, is it not recommended that nest boxes are not installed in trees which are within close proximity to busy roads.
- Proximity to resources – S5 Environmental understand vegetation south-east of the waterway is to be retained. This vegetation Nest Boxes are to be located within this vegetation.
- Nest boxes should be installed in proximity to food resources. The proposed rehabilitation (see rehabilitation management plan, S523094_BRMP_001-007(B)) and retained vegetation (See Detailed Ecological Assessment, S523094_DEA_v1.1) will provide foraging resources for many of the target species.
- Nest boxes are to be installed using the Habisure system, or similar non-invasive technique. Refer to Figure 4.

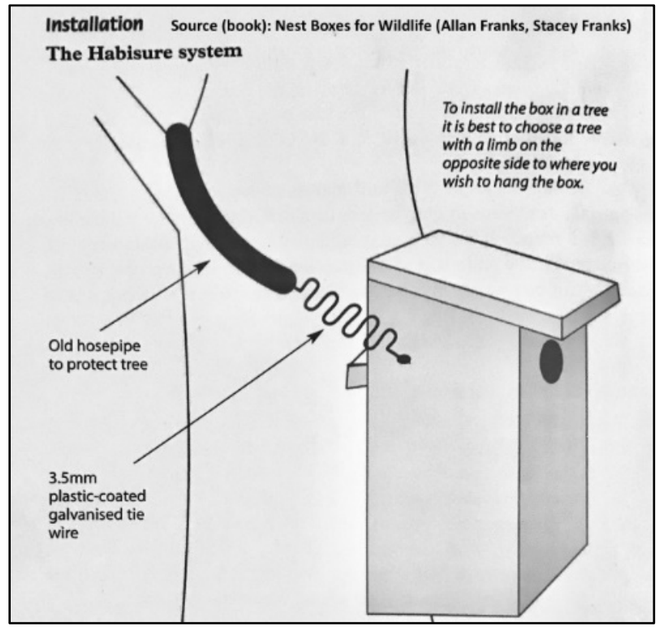


Figure 4 Habisure System Installation (source: Nestbox Tales)

Location of Nest Boxes

The location of nest boxes are to be selected on site. Specifications of trees to be selected include mature native canopy species that are large enough to support nest boxes. Specific tree specifications are required for installation depending on the specific fauna being targeted. Other important factors to consider include how much sound/light pollution is within the area, the height, health and species of a tree and he accessibility for maintenance.

Installation Timeframes

Installation of nest boxes are to be completed within seven days of the commencement of the clearing activities.

Monitoring and Maintenance

Nest boxes are to be monitored and maintained in accordance with Table 10 on FMP011 below.

Table 10 Monitoring and Maintenance Schedule for Nest Boxes

Timing	Task	Remedial Action	Responsibility
Pre-clearing	• Perform a site visit and ensure all nest boxes have been installed as per the NBMP.	• Clearing works to be delayed until nest boxes have been installed as per NBMP.	• Ecologist • Fauna Spotter Catcher • Site Co-ordinator
	• Conduct a pre-clear survey of all vegetation proposed to be removed within 48 hours of proposed clearing	• Ensure all works are completed as per the approved NBMP and VMP.	
During clearing	• Fauna spotter catcher to be on site at all times during the clearing activities	• Ensure all works are completed as per the approved NBMP and VMP.	• Fauna Spotter Catcher • Site Co-ordinator
	• Directional clearing is to be undertaken in a north-west to south-east direction as indicated within the accompanying Fauna Management Plan	• Ensure all works are completed as per the approved NBMP and VMP.	
Month 1	• Monitor for invasion of pest species, such as Indian mynas	• Removal of Indian mynas nest if nest is present	• Fauna Spotter Catcher • Site Co-ordinator
	• Inspect for damaged nest boxes	• Replace or repair damaged nest boxes within 7 days, as per manufacturer guidelines	
	• Maintain furniture within nest box	• Replenish nesting material of un-inhabited nest boxes	
Post Storm/Fire	• Inspect for damaged nest boxes	• Replace or repair damaged nest boxes within 7 days, as per manufacturer guidelines	• Fauna Spotter Catcher • Site Co-ordinator
	• Maintain furniture within nest box.	• Replenish nesting material of un-inhabited nest boxes	
Month 2, Month 3, Month 6	• Monitor for invasion of pest species, such as Indian mynas	• Removal of Indian mynas nest if nest is present	• Fauna Spotter Catcher • Site Co-ordinator
	• Inspect for damaged nest boxes	• Replace or repair damaged nest boxes within 7 days, as per manufacturer guidelines	
	• Inspect mammal and bat nest boxes through hinged lid/opening	• Record findings for progress report	
	• Assess utilization of bird nest boxes from afar (opening lid may cause nesting birds to abandon eggs)	• Record findings for progress report	
	• Maintain furniture within nest box.	• Replenish nesting material of un-inhabited nest boxes	
	• Utilize monitoring information to determine whether location, orientation or any other factors need to be altered.	• Relocation of nest boxes to reduce impacts from environmental factors such as harsh weather or heat	
Post completion of Development	• Community awareness and engagement	• Educational signage to be installed on fence between development and Nest Box Management Area	• Ecologist • Site Co-ordinator
Month 12	• Monitor for invasion of pest species, such as Indian mynas	• Removal of Indian mynas nest if nest is present	• Ecologist • Fauna Spotter Catcher • Site Co-ordinator
	• Inspect for damaged nest boxes	• Replace or repair damaged nest boxes within 7 days, as per manufacturer guidelines	
	• Inspect mammal and bat nest boxes through hinged lid/opening	• Record findings for progress report	
	• Assess utilization of bird nest boxes from afar (opening lid may cause nesting birds to abandon eggs)	• Record findings for progress report	
	• Maintain furniture within the nest box.	• Replenish nesting material of un-inhabited nest boxes	
	• Complete Nest Box Management Plan Certification Meeting.	• Onsite meeting	
	• Review the first 12 months of the monitoring schedule and assess the effectiveness of Nest Box Management Plan and whether any ongoing work/maintenance is required.	• Report progress results to landowner	

Appendix C

VMP



LEGEND / NOTES

- 20 — Tree Numbering
- Tree Protection Zone Retained Tree
- Tree To Be Removed
- Tree To Be Retained (Subject To Arborist Inspection)
- Proposed Earthworks - Cut
- Proposed Earthworks - Fill
- Proposed Stormwater Line
- Proposed Sewer Line
- Proposed Retaining Walls

NOTE:
- SURVEY PLAN

NORTHPOINT.

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ISSUE	DESCRIPTION	DATE
A	FOR ISSUE	14/02/2025
B	RFI AMENDMENTS	09/06/2025

PROJECT NO.
S523094

CLIENT
MG HOMES
C/- URBAN STRATEGIES

PROJECT NAME
PROPOSED RESIDENTIAL DEVELOPMENT

SITE
202 BAILEYS MOUNTAIN ROAD
UPPER COOMERA

DRAWING NAME
VEGETATION MANAGEMENT PLAN

DRAWING NO.
S523094_VMP_001

SCALE	SHEET SIZE	DRAWN	APPROVED
1:1000	A3	SAJ	RS

2/265 Sandgate Road
Albion Qld 4010

ph 3505 3053

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ABN 82 440 704 793

ENVIRONMENTAL

General Notes

This Vegetation Management Plan (VMP) is to be read in conjunction with the Approved Engineering and Landscape Operational Works drawings for the site and is to be kept on the site for reference during all clearing and operational works for the duration of the construction phase.

This VMP details the management and mitigation measures to be followed prior to and during the clearing of vegetation for the development at 202 Baileys Mountain Road, Upper Coomera. The property is further described as Lot 58 on SP191940, herein referred to as the 'subject site' and has a total area of 3.08 ha (post-land swap).

Proposed Development

S5 Environmental understand that the proposed development is for a DA will be for Reconfiguring a Lot, 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 the City of Gold Coast (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 (cement bike path) will separate the rehabilitated dedicated park with the development footprint, which includes the townhouses, internal roads, communal open space pool area and a bio-basin. 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.

Regional Ecosystems

Table 1 Ground-truthed Regional Ecosystems (REs) 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. 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. Refer to the Detailed Ecological Assessment (DEA) prepared by S5 Environmental for full RE descriptions **S523094_DEA_v1.1.**
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)* 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.

Tree Pruning

Where pruning is required on vegetation to be retained, it is to be carried out under the supervision of the Project Arborist (minimum AQF level 5 qualified) and is to comply with Australian Standard AS4373-2007 – Pruning of amenity trees. The natural growth habit of each species should be considered with regard to pruning.

LEGEND / NOTES

NOTE:
- SURVEY PLAN

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CLIENT
MG HOMES
C/- URBAN STRATEGIES

PROJECT NAME
PROPOSED RESIDENTIAL DEVELOPMENT

SITE
202 BAILEYS MOUNTAIN ROAD
UPPER COOMERA

DRAWING NAME
VEGETATION MANAGEMENT PLAN- NOTES SHEET 1 OF 4

DRAWING NO.
S523094_VMP_002

SCALE	SHEET SIZE	DRAWN	APPROVED
N.T.S.	A3	SAJ	RS

2/265 Sandgate Road
Albion Qld 4010

ph 3505 3053

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Figure 1: Ground-truthed Regional Ecosystems within the Site

Erosion Control and Stabilisation Work

Erosion control measures and stabilisation works are to be implemented as required to protect any exposed earth and prevent erosion. Vegetation clearing should proceed just ahead of commencement of construction to minimise the chance for rainfall and other natural processes to cause erosion. Erosion and sediment controls are to be installed and maintained as required to prevent sediment laden runoff entering any nearby drains or waterways. Any exposed areas are to be treated in accordance with an approved Erosion and Sediment Control Plan. Where sediment fencing is required to be installed within the Tree Protection Zone (TPZ) of the retained tree, the location and installation methodology of the fencing must be approved by the Project Arborist.

Stockpiling of Organic Waste / Materials

Organic waste materials and soil from earthworks activities are to be stored within the development footprint away from nearby drains and outside of any TPZ retained vegetation.

Mulching and Re-use of Organic Waste / Materials

Any native vegetation that is cleared should be mulched for subsequent re-use where possible in rehabilitation activities. Stockpiles are to be placed in previously cleared areas, but not placed on slopes greater than 5%, or within the TPZ of retained trees. Any mulch created on site is to undergo the mulch aging process for a minimum of six weeks prior to its reuse, so as to ensure no green material or unwanted seed is spread throughout the site.

Vegetation Management Actions

Objective

Protect native flora and fauna values throughout the development project.

Performance Criteria

- Fauna and vegetation sensitive clearing techniques are to be employed;
- All areas designated for vegetation retention will remain undisturbed, or works within these areas to be supervised by the Project Arborist; and
- No injuries or fatalities to fauna.

Responsibility

Civil contractor, Fauna Spotter Catcher, Project Arborist and Site Supervisor.

Management Actions

- The southern vegetated potion of the site is to be dedicated to CoGC for conservation including a waterway. This is to be handed over from the body corporate to GoGC after the completion of 24 months of maintenance;
- Tree retention is to be in accordance with the cover page of this VMP and the Tree Schedule at the rear of this VMP, which are based off the proposed earthworks;
- Trees outside of the subject site are not to be removed as part of these works;
- All vegetation to be retained is to be clearly identified and adequately protected prior to vegetation clearing commencing using appropriate tree protection fencing (see below) and signage (refer to Figure 2 – below for an example of appropriate signage);
- A pre-start meeting will be conducted with the Ecologist, Fauna Spotter Catcher, and Development Services, prior to site/operational/building work commencing;
- Prior to the pre-start meeting, all vegetation is to be nominated to be cleared or retained, Tree Protection Fencing and appropriate signage erected in accordance with this VMP;
- At least one day (but no longer than 48 hours) prior to vegetation removal, a Fauna Spotter-Catcher will assess the site for the presence of native fauna;
- All contractors are to be advised of TPZs and the applicable restrictions within the TPZ's. Refer to the prohibited activities listed in the TPZs;
- A minimum AQF Level 5 qualified arborist must be present to supervise and direct works where works are within the TPZs of retained trees;
- Vegetation clearance to be limited to areas designated for vegetation removal;
- Erosion and sediment control measures must be installed prior to the pre-start meeting;
- A Fauna Spotter Catcher must be on site throughout all clearing operations;
- Sensitive tree clearing techniques are to be implemented. Directional clearing will occur, generally beginning in disturbed areas, and working towards vegetated refuge areas (starting north to south);

LEGEND / NOTES

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S523094

CLIENT
MG HOMES
C/- URBAN STRATEGIES

PROJECT NAME
PROPOSED RESIDENTIAL DEVELOPMENT

SITE
202 BAILEYS MOUNTAIN ROAD
UPPER COOMERA

DRAWING NAME
VEGETATION MANAGEMENT PLAN- NOTES SHEET 2 OF 4

DRAWING NO.
S523094_VMP_003

SCALE	SHEET SIZE	DRAWN	APPROVED
N.T.S.	A3	SAJ	RS

2/265 Sandgate Road
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- All felled native trees are to be recycled (milled, chipped or mulched) and re-used as mulch for rehabilitation, landscape works and/or erosion control on site, where possible. If cleared vegetation is stockpiled for more than 24 hours, the Fauna Spotter Catcher must inspect the vegetation prior to chipping or removal from the site;
- Any felled non-native vegetation is not to be used in the rehabilitation area (refer to Tree Schedule below for details of non-native trees);
- Stockpiling of felled trees will occur only within the development footprint and outside the TPZs of retained trees. Stockpiling is not permitted within the rehabilitation area, exclusion zones or within the TPZ of retained trees. Erosion and sediment control measures are to be implemented for stockpiles as required; and
- No dogs are allowed on the construction site.

Tree Protection Zones (TPZs)

In accordance with *AS4970-2009 – Protection of Trees on Development Sites*, the following activities are **PROHIBITED** within Tree Protection Zones (TPZs) of trees to be retained unless under Arborist Supervision/Approval:

- Entry of machinery, vehicles or unauthorised personnel, unless authorised by BCC or an Arboricultural Professional for remediation purposes;
- Construction of a site office, shed or temporary building;
- Stockpiling of soil, waste or material of any kind;
- Excavation for silt fencing;
- Parking of vehicles of any kind;
- Lighting of fires and combustion of any material;
- Wash down and cleaning equipment;
- Refuelling;
- Storage or mixing of fuel, chemicals, paints, herbicides or hazardous substances;
- Soil level changes including filling or excavation, trenching, topsoil skimming and/or surface excavation (except where illustrated in this set of plans or for remediation purposes, and, under the supervision of the Project Arborist);
- Attaching of signs or other objects to trees except for Arboricultural or Ecological purposes and only as directed by the Project Arborist / Environmental Professional;
- Pruning or removing of tree branches or foliage except under the direction of the Project Arborist as per the requirements of this VMP; and
- Mechanical damage to the trunk, stem, branches or retained roots of trees.

Tree Protection Fencing

The purpose of Tree Protection Fencing is to clearly delineate the TPZ and to exclude from the TPZ any activities that may impact the long-term viability of the tree. Should any work be required within the TPZ, they must be authorised and supervised by the Project Arborist. Options exist for Tree Protection fencing include:

- 1.8 m Chain Wire Mesh Panels with shade cloth (if required) attached, held in place with concrete feet; or
- 1.7 m steel Star Pickets at approximately 3 m intervals with high visibility barrier mesh (at least 900mm in height) strung between pickets with strainer wire at the top and bottom of the mesh. Mesh is to be fastened to the pickets by suitable fasteners, such as tie wire or zip ties.

Signage

Suitable signage must be attached to the Tree Protection Fencing at suitable intervals. Tree Protection Signage should clearly identify the nature and purpose of the fencing and clearly indicate that all activities are excluded from within the fenced area. Examples of suitable TPZ Exclusion Signage are shown below.



Figure 2: Tree Protective Fencing Signage, Image source: AS 4970-2009

Monitoring

- TPZ fencing is to be inspected regularly to ensure that it remains properly installed;
- A licensed fauna spotter-catcher must be engaged to inspect all vegetation prior to and during vegetation removal;
- Erosion and sediment control fencing is to be inspected regularly; and
- Site supervisor to monitor vegetation clearing and ensure management strategies are adhered to.

Corrective Action

In the event of damage to retained trees, fencing is to be reinstated and Council notified. The level of revegetation is to be negotiated with Council. In the event of a fauna injury, a Spotter Catcher is to coordinate with a local veterinarian surgery or animal hospital to ensure successful rehabilitation of fauna and undertake relevant reporting requirements to DES.

LEGEND / NOTES

NOTE:
- SURVEY PLAN

NORTHPOINT.

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ISSUE	DESCRIPTION	DATE
A	FOR ISSUE	14/02/2025
B	RFI AMENDMENTS	09/06/2025

PROJECT NO.
S523094

CLIENT
MG HOMES
C/- URBAN STRATEGIES

PROJECT NAME
PROPOSED RESIDENTIAL DEVELOPMENT

SITE
202 BAILEYS MOUNTAIN ROAD
UPPER COOMERA

DRAWING NAME
VEGETATION MANAGEMENT PLAN- NOTES SHEET 3 OF 4

DRAWING NO.
S523094_VMP_004

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

Reporting

Any incidents of non-compliance to be recorded. Any incidents of harm to fauna and any accidental damage to vegetation is to be recorded and reported to a Council officer appointed for this purpose.

Fauna Management Actions

Habitat Creation

Any vegetation to be removed which contains hollows or other potential significant habitat value (e.g. logs or termitaria) should be strategically placed within the rehabilitated park area, in accordance with the approved rehabilitation management plan, to improve future terrestrial habitat throughout this area.

Fauna Management

A qualified Fauna Spotter-Catcher in possession of a valid Rehabilitation Permit (issued by DES) and with appropriate experience in surveying, monitoring and rescuing fauna species is required to supervise clearing works for the period of vegetation clearing.

The Spotter-Catcher is to inspect trees to be cleared and/or trees that may have a canopy that overlaps with other vegetation to be cleared for the presence of fauna and significant fauna habitat features (tree hollows, nests, dreys and hollow logs) no more than 48 hours prior to clearing works commencing.

Inspection is to occur at least once each day prior to clearing commencement, and the Fauna Spotter-Catcher is to remain on-site and to direct all clearing works. Works must cease if advised by the Fauna Spotter Catcher and fauna management measures must be implemented prior to works recommencing. Works are only to recommence once the Fauna Spotter has indicated necessary fauna management measures have been implemented. All trees identified as significant fauna habitat are to be clearly flagged and cleared under the guidance of the Fauna Spotter-Catcher.Fire Ant Movement Controls

To prevent the spread of fire ants, the Queensland government has implemented controls that apply to individuals and commercial operators, to restrict the movement of materials that could carry fire ants including soil, turf, potted plants, mulch, baled hay or straw, animal manures, mining or quarry products.

Penalties apply for non-compliance with the movement controls. If unsure of personal obligations under the Biosecurity Act *2014, contact the relevant Queensland State Government Department.*

Restricted Invasive Pest Plants, Weed and Waste Management Actions

Objective

Minimise restricted invasive pest plants and weed dispersal throughout the development.

Performance Criteria

- Control all restricted invasive pest plants;
- Prevent spread of restricted invasive pest plants offsite; and
- Remove rubbish from the site.

Responsibility

Civil contractor and site supervisor.

Management Actions

- Vehicles are to use designated site entry and vehicle access tracks;
- Storage areas are to be bunded to prevent chemical spills (petrol, oil, etc.) from discharging from the site and entering stormwater drains;
- During vegetation clearing, restricted invasive pest plant species are to be removed and must be stockpiled separately and disposed of at an appropriate waste disposal facility;
- Stockpiles of native vegetation are to be inspected for restricted invasive pest plant species prior to exporting off site/mulching;
- Restricted invasive pest plants as defined under the Biosecurity Act 2014, Weeds of National Significance (WoNS), or weeds listed in the Biosecurity Plan for the Brisbane Local Government area, are not to be planted on site; and
- Fire as a management technique for controlling restricted invasive pest plants is not to be administered on the site during development works.
- Refer to civil plans for civil details including and not limited to proposed; sewer line, water line, stormwater line.

Monitoring

- Germination or regrowth of restricted invasive pest plant species are to be monitored; and
- Site supervisor to monitor restricted invasive pest plant control and ensure management strategies are adhered to.

Corrective Action

Undertake a second phase of restricted invasive pest plant control to treat newly germinated or regerminated restricted invasive pest plant species.

Reporting

Any incidents of non-compliance to be recorded in an environmental diary.

Relevant Legislation and Standards to this VMP

- Vegetation Management Act 1999;
- Biosecurity Act 2014;
- Nature Conservation Act 1992;
- Australian Standards 4373-2007 and 4970-2009; and
- Environmental Protection and Biodiversity Conservation Act 1999

LEGEND / NOTES

NOTE:
- SURVEY PLAN

NORTHPOINT.

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ISSUE	DESCRIPTION	DATE
A	FOR ISSUE	14/02/2025
B	RFI AMENDMENTS	09/06/2025

PROJECT NO.
S523094

CLIENT
MG HOMES
C/- URBAN STRATEGIES

PROJECT NAME
PROPOSED RESIDENTIAL DEVELOPMENT

SITE
202 BAILEYS MOUNTAIN ROAD
UPPER COOMERA

DRAWING NAME
VEGETATION MANAGEMENT PLAN- NOTES SHEET 4 OF 4

DRAWING NO.
S523094_VMP_005

SCALE	SHEET SIZE	DRAWN	APPROVED
N.T.S.	A3	SAJ	RS

2/265 Sandgate Road
Albion Qld 4010

ph 3505 3053

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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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ISSUE	DESCRIPTION	DATE
A	FOR ISSUE	14/02/2025
B	RFI AMENDMENTS	09/06/2025

PROJECT NO.
S523094

CLIENT
MG HOMES
C/- URBAN STRATEGIES

PROJECT NAME
PROPOSED RESIDENTIAL DEVELOPMENT

SITE
202 BAILEYS MOUNTAIN ROAD
UPPER COOMERA

DRAWING NAME
VEGETATION MANAGEMENT PLAN - SCHEDULE SHEET 1 OF 3

DRAWING NO.
S523094_VMP_006

SCALE	SHEET SIZE	DRAWN	APPROVED
N.T.S.	A3	SAJ	RS

2/265 Sandgate Road
Albion Qld 4010

ph 3505 3053

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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, Habitat Tree	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[1]	*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		Habitat Tree	10200
88	Retain	*Toona ciliata*	Red Cedar	420						420	8	13	Native			5040
89	Retain	*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		Habitat Tree	15000
92	Retain	*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	Retain	*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	Retain	*Grevillea robusta*	Silky Oak	470						470	7	16	Native			5640
116	Retain	*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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ISSUE	DESCRIPTION	DATE
A	FOR ISSUE	14/02/2025
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PROJECT NO.
S523094

CLIENT
MG HOMES
C/- URBAN STRATEGIES

PROJECT NAME
PROPOSED RESIDENTIAL DEVELOPMENT

SITE
202 BAILEYS MOUNTAIN ROAD
UPPER COOMERA

DRAWING NAME
VEGETATION MANAGEMENT PLAN - SCHEDULE SHEET 2 OF 3

DRAWING NO.
S523094_VMP_007

SCALE	SHEET SIZE	DRAWN	APPROVED
N.T.S.	A3	SAJ	RS

2/265 Sandgate Road
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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	Retain	*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	Retain	*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	Retain	*Melaleuca viminalis*	Weeping Bottlebrush	210	300					367	6	10	Native			4404
153	Retain	*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	Retain	*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

NOTE:
- SURVEY PLAN

NORTHPOINT.

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ISSUE	DESCRIPTION	DATE
A	FOR ISSUE	14/02/2025
B	RFI AMENDMENTS	09/06/2025

PROJECT NO.
S523094

CLIENT
MG HOMES
C/- URBAN STRATEGIES

PROJECT NAME
PROPOSED RESIDENTIAL DEVELOPMENT

SITE
202 BAILEYS MOUNTAIN ROAD
UPPER COOMERA

DRAWING NAME
VEGETATION MANAGEMENT PLAN - SCHEDULE SHEET 3 OF 3

DRAWING NO.
S523094_VMP_008

SCALE	SHEET SIZE	DRAWN	APPROVED
N.T.S.	A3	SAJ	RS

2/265 Sandgate Road
Albion Qld 4010

ph 3505 3053

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ABN 82 440 704 793

ENVIRONMENTAL

Appendix D

Cozens Regan Consulting Engineers Erosion and Sediment Control Preliminary Issue

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.
   FINE CRUSHED ROCK MATERIALS
   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.

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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
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   - 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/m^3
   - 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.

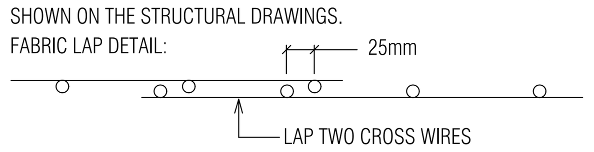
C6 SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN THE POSITIONS SHOWN. THE WRITTEN APPROVAL OF THE ENGINEER SHALL BE OBTAINED FOR ANY OTHER SPLICES. WHERE THE LAP LENGTH IS NOT SHOWN IT SHALL BE SUFFICIENT TO DEVELOP THE FULL STRENGTH OF THE REINFORCMENT.
LAP LENGTHS: (MINIMUM U.N.O.)

BAR SIZE	LAP LENGTH
N10	375
N12	500
N16	600
N20	750

BAR SIZE	LAP LENGTH
N24	900
N28	1050
N32	1200
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 CLEAR 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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'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
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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

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

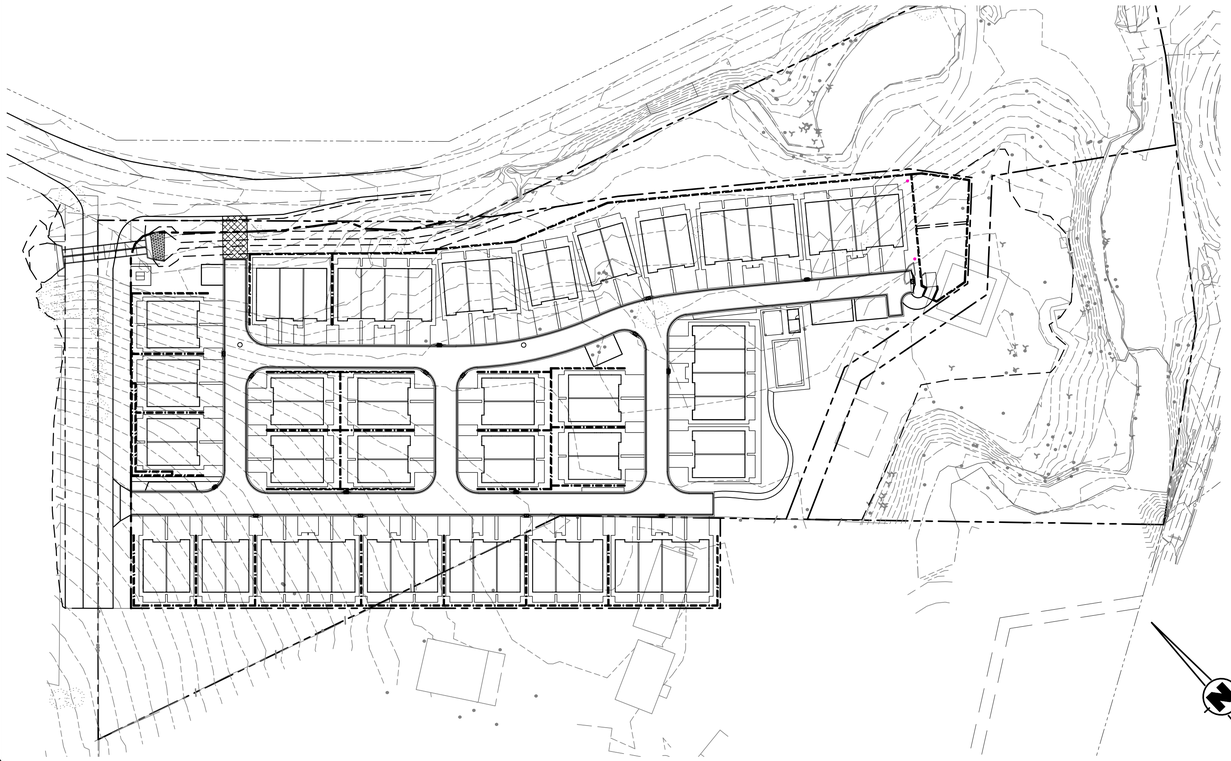
THE SITE IS SITUATED AT 202 BAILEYS MOUNTAIN ROAD, UPPER COOMERA QLD

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

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JOB NO. 230094
DRAWING NO. C02
ISSUE P1P2



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.

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

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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

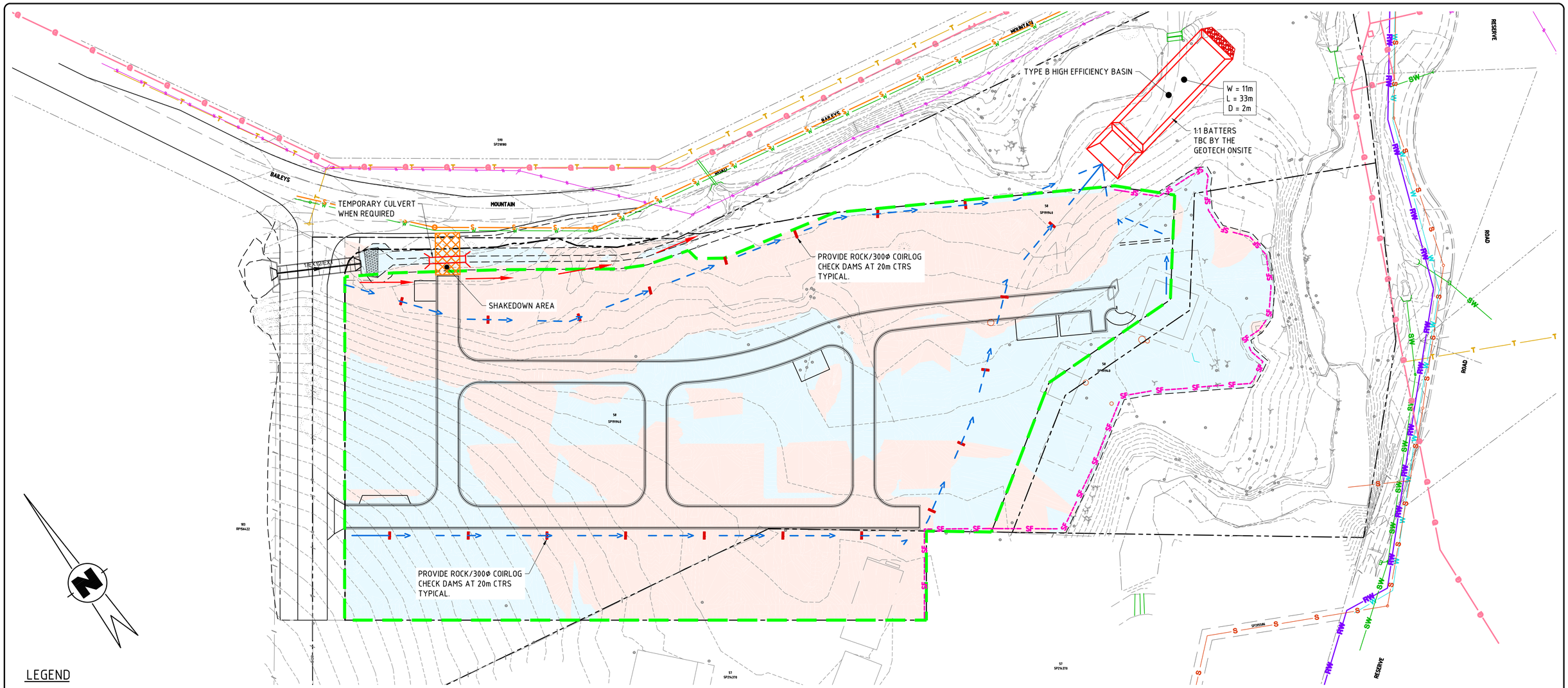
PROJECT: PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA

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

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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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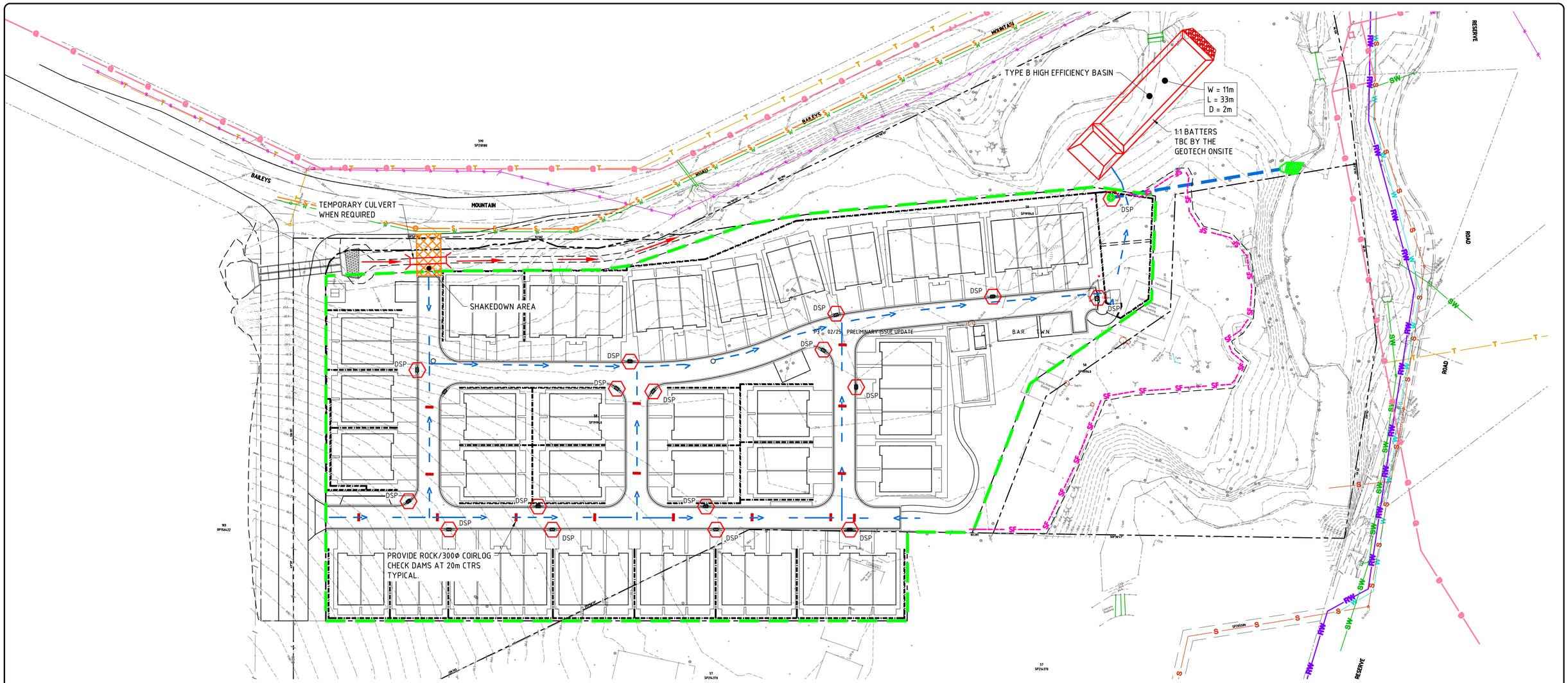
PROJECT: PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA

PHASE 1A & 1B PRELIMINARIES, VEGETATION REMOVAL & EARTHWORKS

JOB NO. 230094

DRAWING NO. C04

ISSUE P1 P2 P3



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.

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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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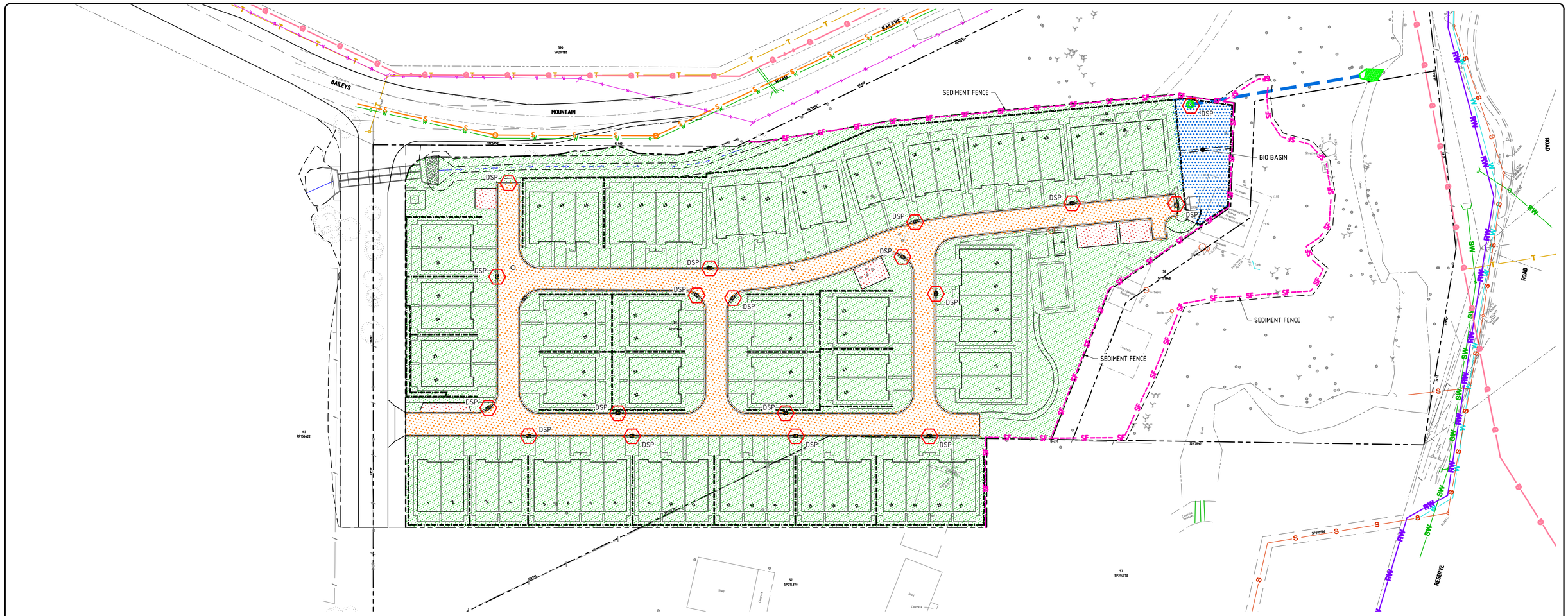
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CHECKED	TWN

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
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:

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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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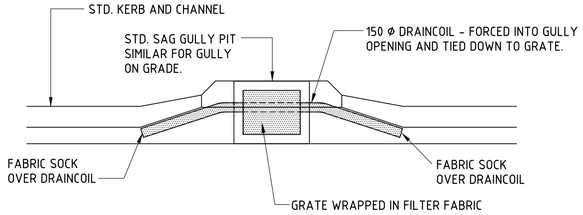
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202 BAILEYS MOUNTAIN RD, UPPER COOMERA

PHASE 3 STABILISATION PLAN

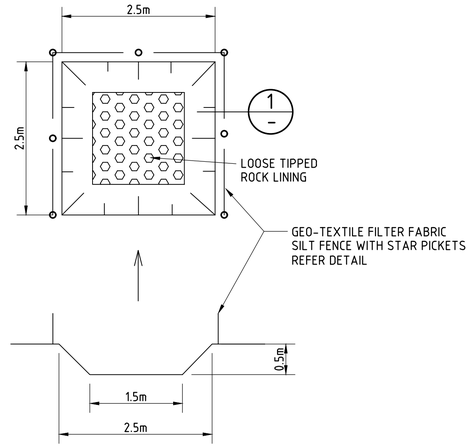
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DRAWING NO. C06
ISSUE P1 P2 P3



SILTATION CONTROL AT GULLY PIT (EXISTING)

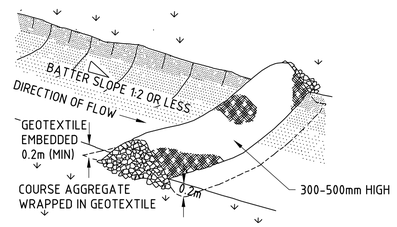
SCALE 1 : 50

TO BE PROVIDED AT EXISTING GULLY PITS EXTERNAL TO SITE WHERE DIRECTED.

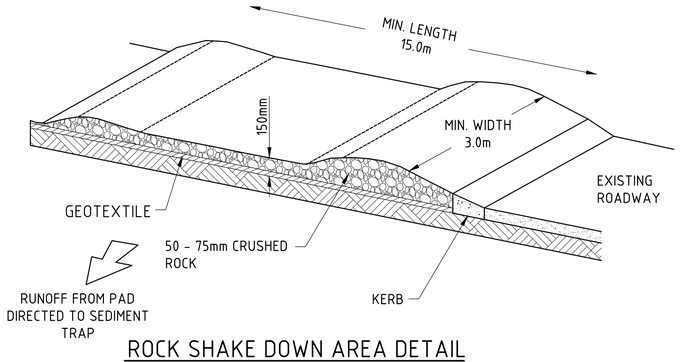


SILTATION TRAP DETAILS

SCALE 1 : 50

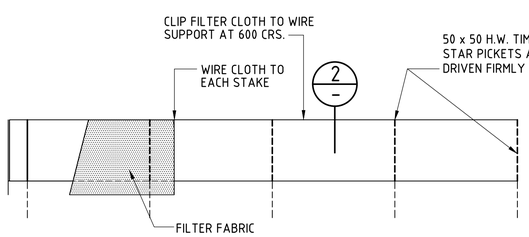


ROCK CHECK DAM



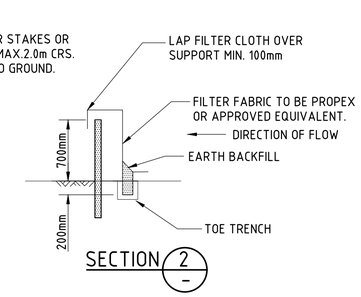
ROCK SHAKE DOWN AREA DETAIL

SCALE N.T.S.

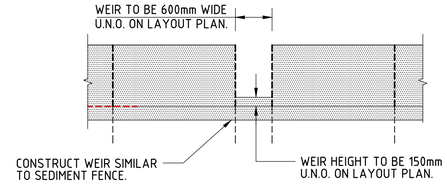


SEDIMENT FENCE DETAILS

SCALE 1 : 50

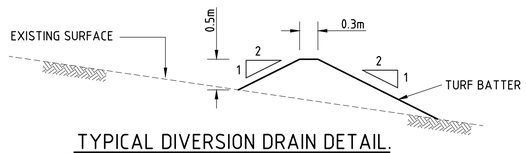


REFER LAYOUT PLAN FOR SURFACE TREATMENT AT WEIR OUTLET.



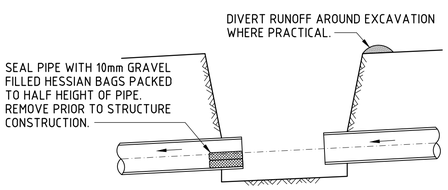
SEDIMENT FENCE WEIR

SCALE 1 : 50



TYPICAL DIVERSION DRAIN DETAIL.

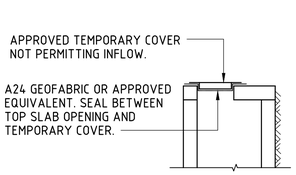
SCALE 1:50



EXCAVATION

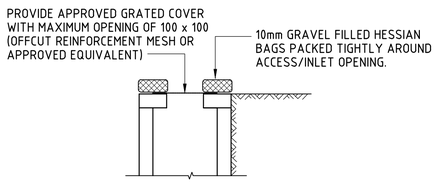
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EXCAVATION AND PIPE INSTALLATION



ACCESS CHAMBER

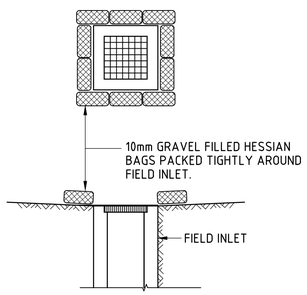
1:50



INLET STRUCTURE

1:50

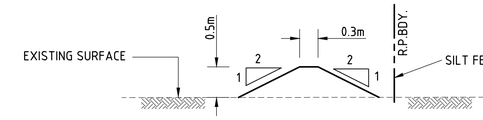
(STRUCTURE COMPLETE UP TO TOP SLAB)



INLET STRUCTURE

1:50

(STRUCTURE COMPLETE)



TYPICAL BUND DETAIL.

SCALE 1:50

STAGE 1

STAGE 2

STAGE 3

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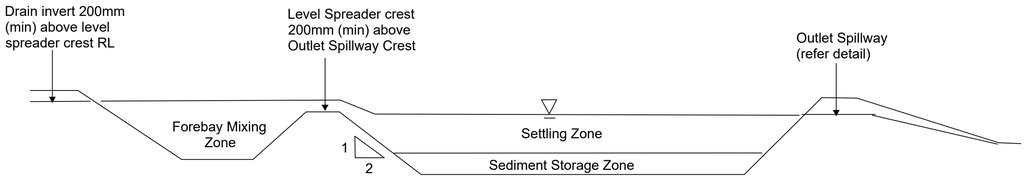
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EROSION & SEDIMENT CONTROL DETAILS

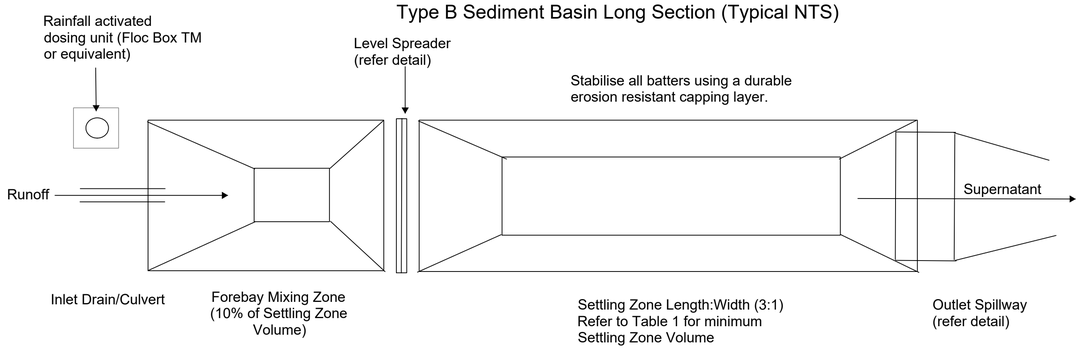
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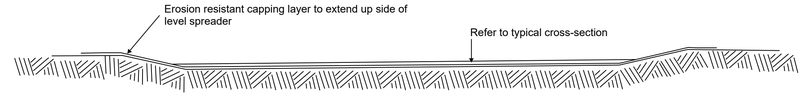
ISSUE P1



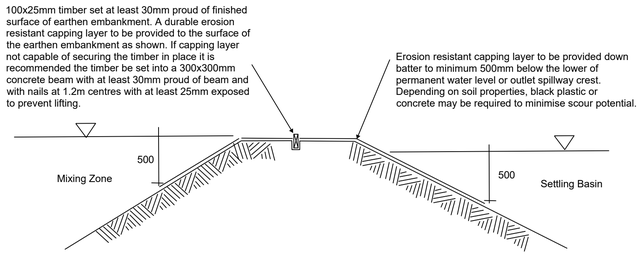
Type B Sediment Basin Long Section (Typical NTS)



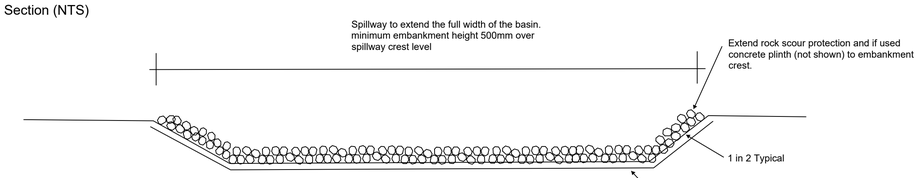
Type B Sediment Basin Plan View (Typical NTS)



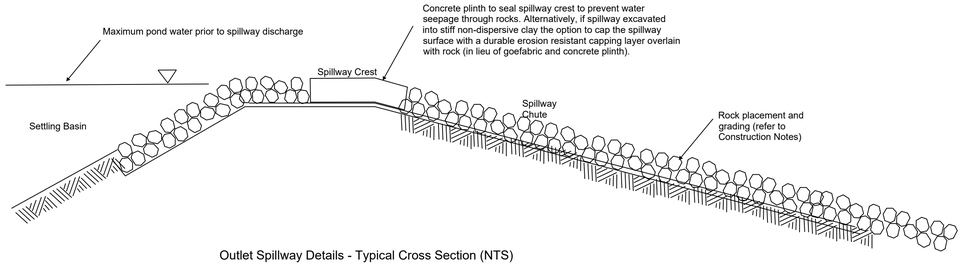
Level Spreader Details - Typical Long Section (NTS)



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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CLIENT MG LAND PTY LTD
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



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Elevations Table

No.	From Depth	To Depth	Colour	Depth Range Volume
1	-4.000	-3.500		$0.01m^3$
2	-3.500	-3.000		$5.25m^3$
3	-3.000	-2.500		$44.85m^3$
4	-2.500	-2.000		$180.10m^3$
5	-2.000	-1.500		$418.08m^3$
6	-1.500	-1.000		$696.06m^3$
7	-1.000	-0.500		$1586.38m^3$
8	-0.500	0.000		$4140.38m^3$
9	0.000	0.500		$3785.15m^3$
10	0.500	1.000		$2461.65m^3$
11	1.000	1.500		$1331.14m^3$
12	1.500	2.000		$676.45m^3$
13	2.000	2.500		$349.04m^3$
14	2.500	3.000		$92.95m^3$
15	3.000	3.500		$0.64m^3$

CUT	FILL
$7,071m^3$	$8,697m^3$

NET = $1,626m^3$ (FILL)

No.	DATE	ISSUE	REVISED	CHECKED
P4	02/25	PRELIMINARY ISSUE UPDATE	B.A.R.	T.W.N.
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.

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SCALE B

DATUM AHD (U.N.O.)

SCALES SHOWN ARE AT A1 SIZE

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PROJECT
PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
OVERALL EARTHWORKS PLAN

JOB NO. 230094
DRAWING NO. C09
ISSUE P1 P2 P3 P4

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)

NOTE: EARTHWORKS CUT/FILL RANGES ARE CALCULATED TO THE (FS -350 TO NS -150) AND ARE TO BE USED AS A GUIDE ONLY.



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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
P4	02/25	PRELIMINARY ISSUE UPDATE	B.A.R.	T.W.N.
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.

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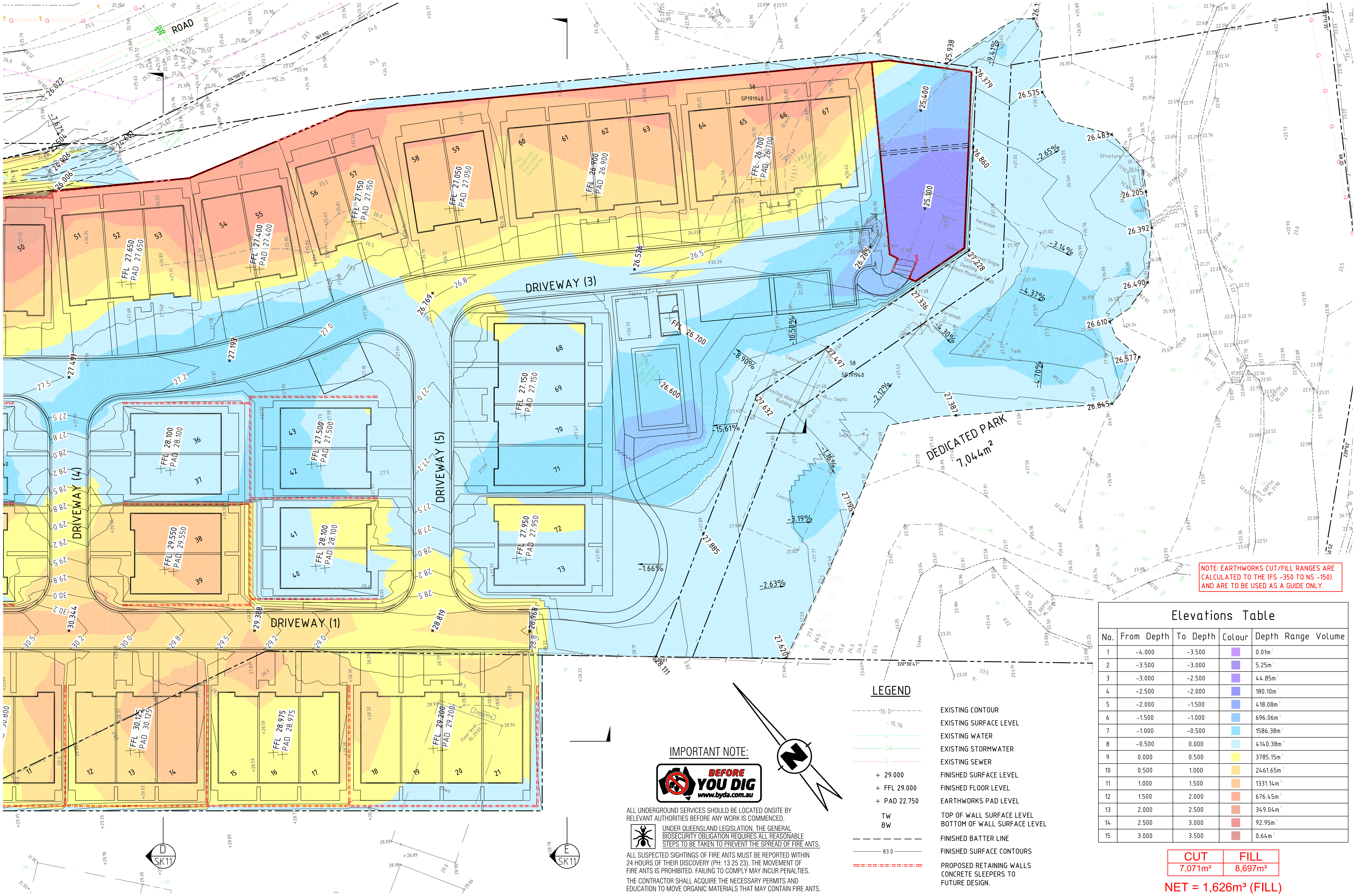
PROJECT: PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA

BULK EARTHWORKS PLAN - 1 OF 2

JOB NO. 230094

DRAWING NO. C10

ISSUE P1 P2 P3 P4



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)

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.

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P4	02/25	PRELIMINARY ISSUE UPDATE	B.A.R.	T.W.N.
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.

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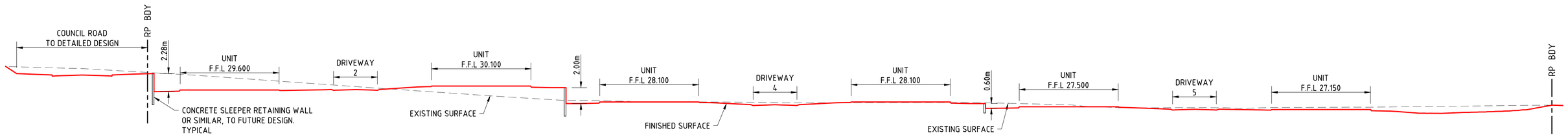
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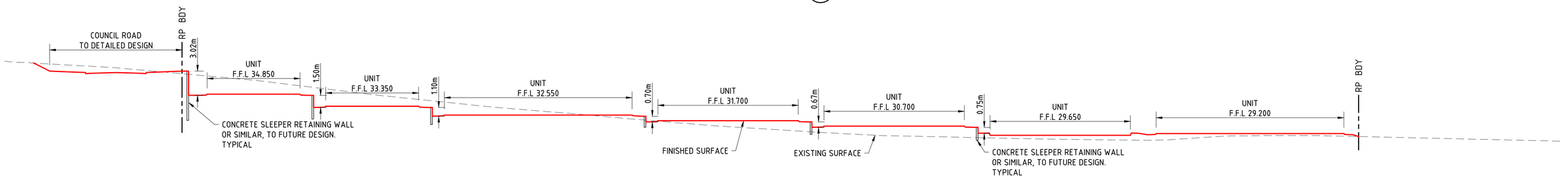
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202 BAILEYS MOUNTAIN RD, UPPER COOMERA
BULK EARTHWORKS PLAN - 2 OF 2

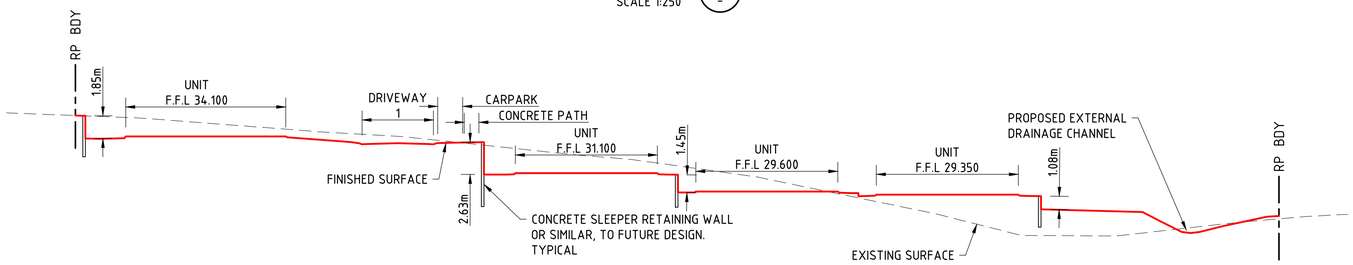
JOB NO. 230094
DRAWING NO. C11
ISSUE P1 P2 P3 P4



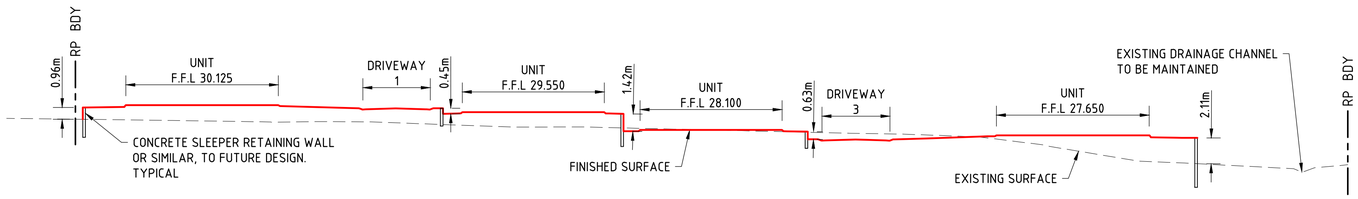
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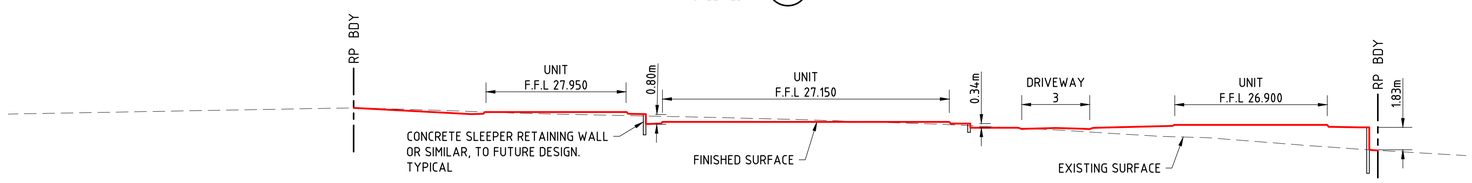
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SECTION C
SCALE 1:250



SECTION D
SCALE 1:250



SECTION E
SCALE 1:250

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P3	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
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PROJECT: PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA

SITE SECTIONS

JOB NO. 230094

DRAWING NO. C12

ISSUE P1P2P3

590
SP218180

57
SP214370

58
SP191940

183
RP156422

BAILEYS MOUNTAIN ROAD

SK01

SK02

A C11

B C11

C C11

D C11

E C11

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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No.	DATE	ISSUE	REVISED	CHECKED
P3	02/25	PRELIMINARY ISSUE UPDATE	B.A.R.	T.W.N.
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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202 BAILEYS MOUNTAIN RD, UPPER COOMERA

CONCEPT OVERALL SITE PLAN

JOB NO. 230094

DRAWING NO. SK00

ISSUE P1P2P3



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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 — 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)

No.	DATE	ISSUE	REVISED	CHECKED
P6	02/25	PRELIMINARY ISSUE UPDATE	B.A.R.	T.W.N.
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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CHECKED	T.W.N.

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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 P6

LAWFUL POINT OF DISCHARGE

750ø RCP CL3
43m @ 2.8%
USIL 23.700
DSIL 22.500

BIO RETENTION BASIN.
REFER SK05 FOR DETAILS.

DEDICATED PARK
7,044m²

DRIVEWAY (1)
DRIVEWAY (3)
DRIVEWAY (4)
DRIVEWAY (5)

D SK11

E SK11

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 / 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)

IMPORTANT NOTE:

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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

DATUM AHD (U.N.O.)

SCALES SHOWN ARE AT A1 SIZE

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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

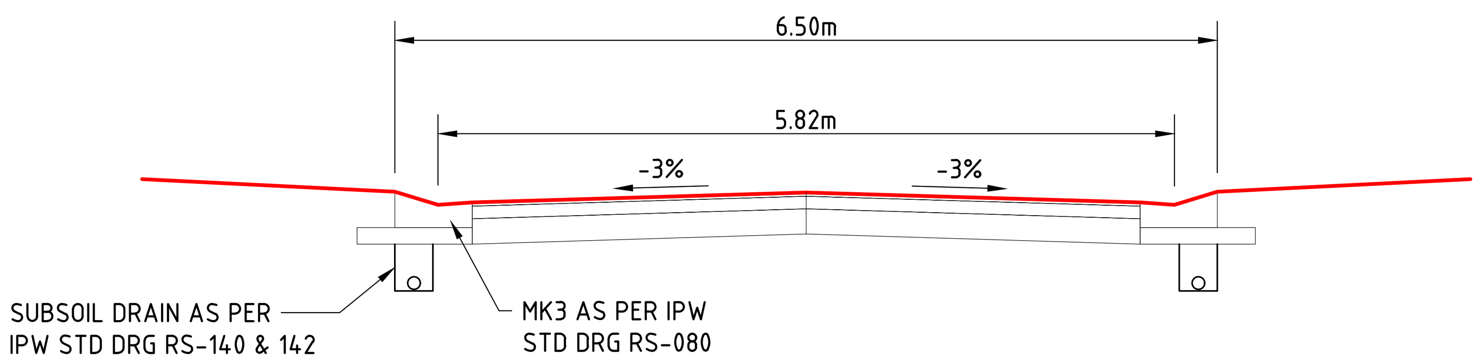
PROJECT PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA

CONCEPT CIVIL WORKS PLAN - 2 OF 2

JOB NO. 230094

DRAWING NO. SK02

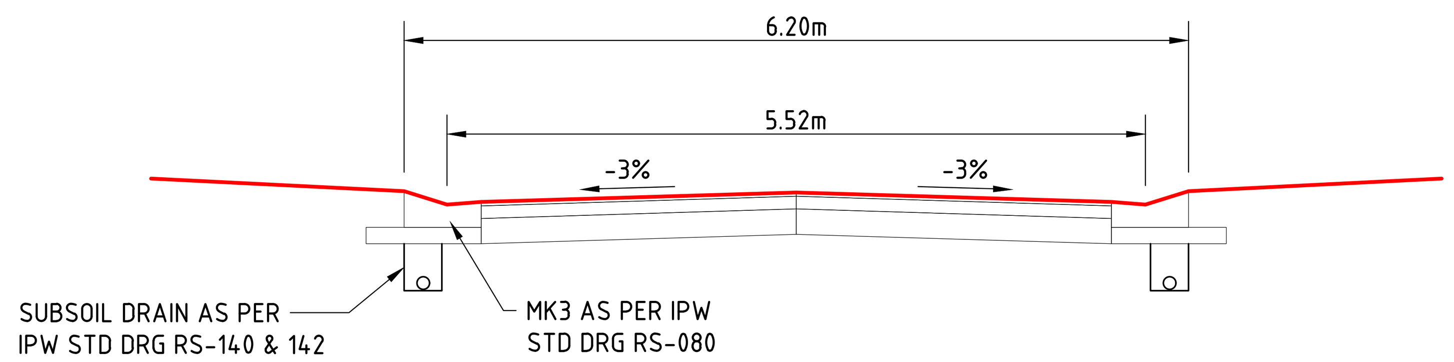
ISSUE P1 P2 P3 P4 P5



TYPICAL DRIVEWAY (1) SECTION

(BETWEEN CH.00 - CH.40)

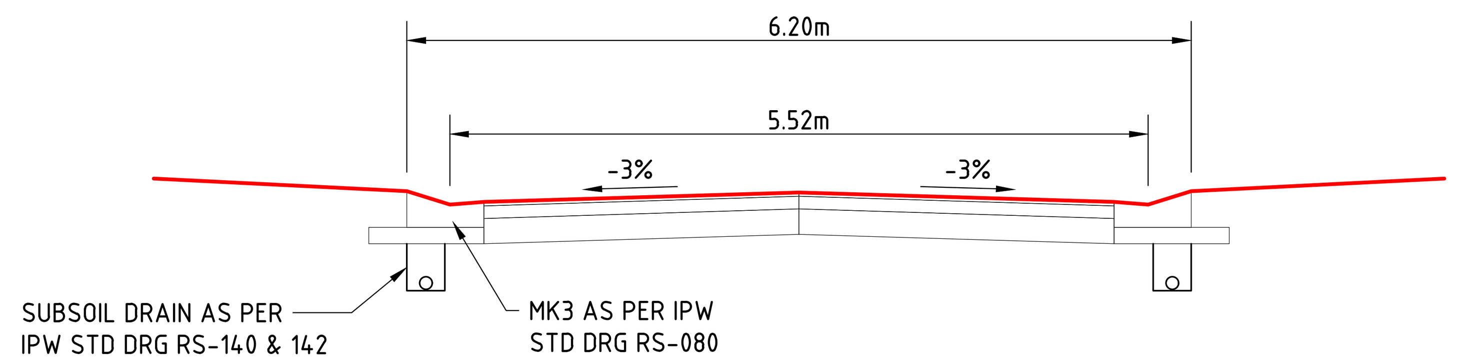
SCALE 1:50



TYPICAL DRIVEWAY (1) SECTION

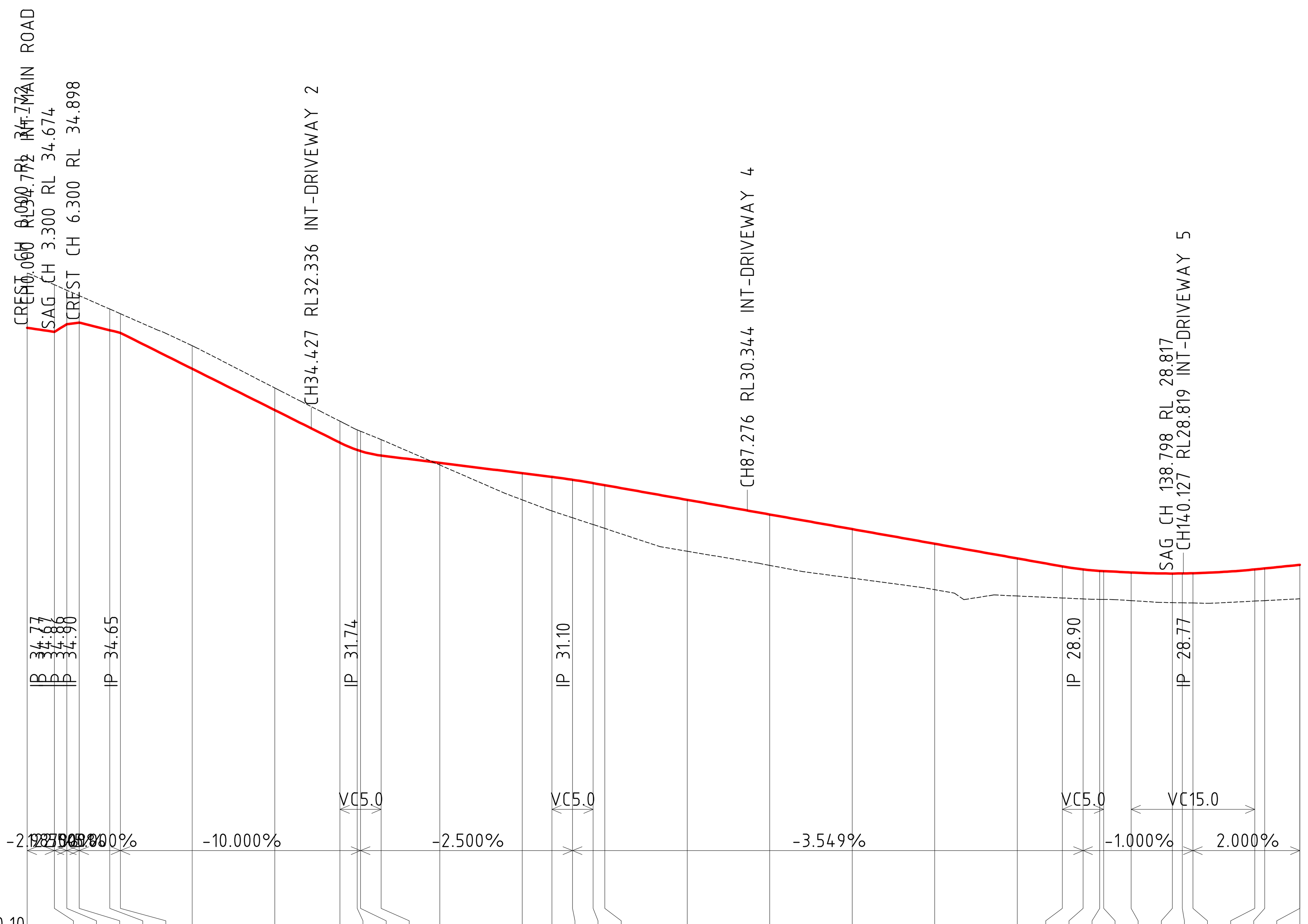
(BETWEEN CH.40 - CH.154)

SCALE 1:50



TYPICAL DRIVEWAY (2) SECTION

SCALE 1:50

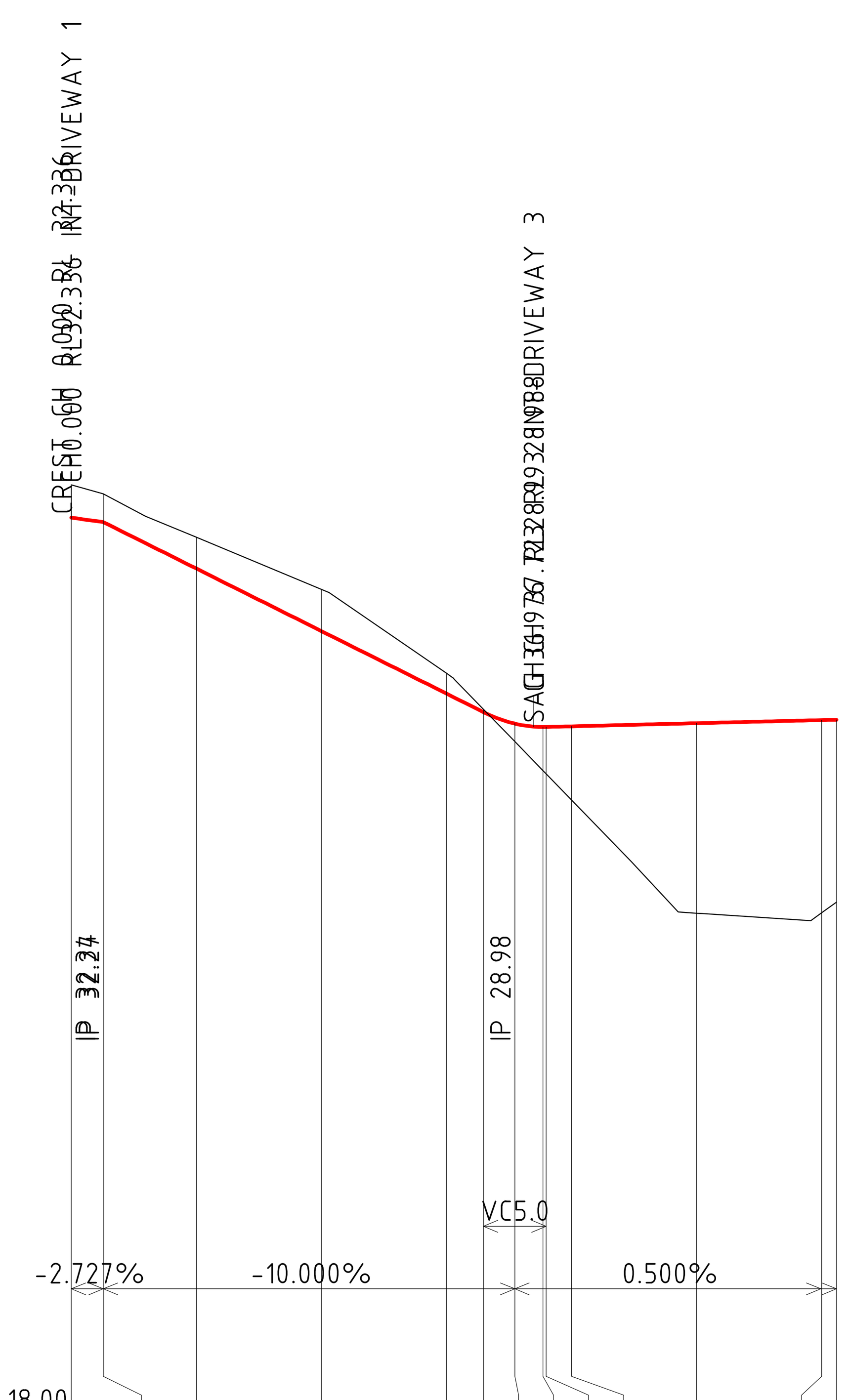


CHAINAGE	EXISTING SURFACE	DESIGN SURFACE	CUT (-) FILL (+)
-0.000	36.10	34.772	-1.324
3.300	35.81	34.674	-1.141
4.800	35.68	34.861	-0.822
6.300	35.55	34.898	-0.653
10.000	35.23	34.713	-0.513
11.300	35.11	34.648	-0.464
20.000	34.34	33.778	-0.560
30.000	33.31	32.778	-0.536
37.904	32.51	31.988	-0.521
40.000	32.30	31.811	-0.487
40.404	32.26	31.785	-0.480
42.904	32.06	31.676	-0.387
50.000	31.45	31.498	+0.051
60.000	30.60	31.248	+0.645
63.595	30.33	31.158	+0.825
66.095	30.17	31.089	+0.921
68.595	30.00	31.007	+1.004
70.000	29.91	30.957	+1.047
80.000	29.36	30.602	+1.246
90.000	29.01	30.248	+1.234
100.000	28.70	29.893	+1.189
110.000	28.42	29.538	+1.113
120.000	28.27	29.183	+0.911
125.476	28.22	28.989	+0.765
127.976	28.20	28.916	+0.714
130.000	28.19	28.880	+0.690
130.476	28.19	28.875	+0.686
133.798	28.16	28.842	+0.682
138.798	28.11	28.817	+0.706
140.000	28.11	28.818	+0.711
141.298	28.10	28.823	+0.721
148.798	28.15	28.917	+0.768
150.000	28.16	28.941	+0.780
154.260	28.20	29.026	+0.822
154.262	28.20		

HORIZ. GEOMETRY: L=30.627 B=139°42'38" ; L=2.612 R=100.000 ; L=116.007 B=139°40'19"

ROAD LONGITUDINAL SECTION DRIVEWAY 1
Scale 1:500 h 1:100 v

DRIVEWAY 1



CHAINAGE	EXISTING SURFACE	DESIGN SURFACE	CUT (-) FILL (+)
-0.000	32.86	32.336	-0.527
2.556	32.72	32.266	-0.451
10.000	32.02	31.522	-0.500
20.000	31.19	30.522	-0.667
30.000	29.85	29.522	-0.326
32.961	29.27	29.226	-0.045
35.461	28.76	29.041	+0.285
37.723	28.29	28.988	+0.699
37.961	28.24	28.988	+0.748
40.000	27.82	28.998	+1.179
50.000	26.01	29.048	+3.039
60.000	26.01	29.098	+3.083
61.188	26.19	29.104	+2.919

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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P2	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P1	09/24	ORIGINAL ISSUE	B.A.R.	T.W.N.

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NOT FOR CONSTRUCTION

SCALE A 0 5 10 15 20 1 : 500 HORIZ.
SCALE B 0 1 2 1 : 50

DATUM AHD (U.N.O.) SCALES SHOWN ARE AT A1 SIZE

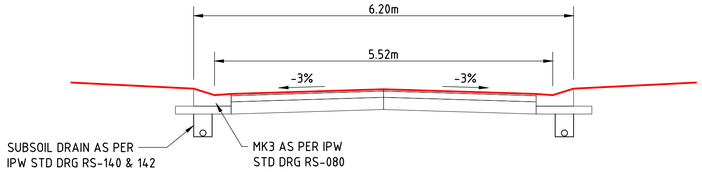
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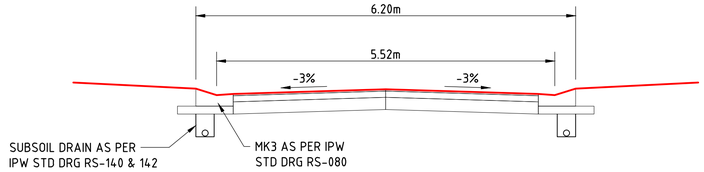
PROJECT PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
CONCEPT DRIVEWAY LONG SECTIONS 1 OF 2

JOB NO. 230094
DRAWING NO. SK03
ISSUE P1 P2



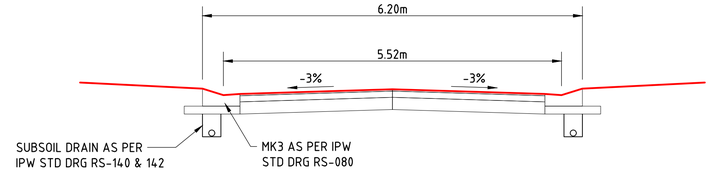
TYPICAL DRIVEWAY (3) SECTION

SCALE 1:50



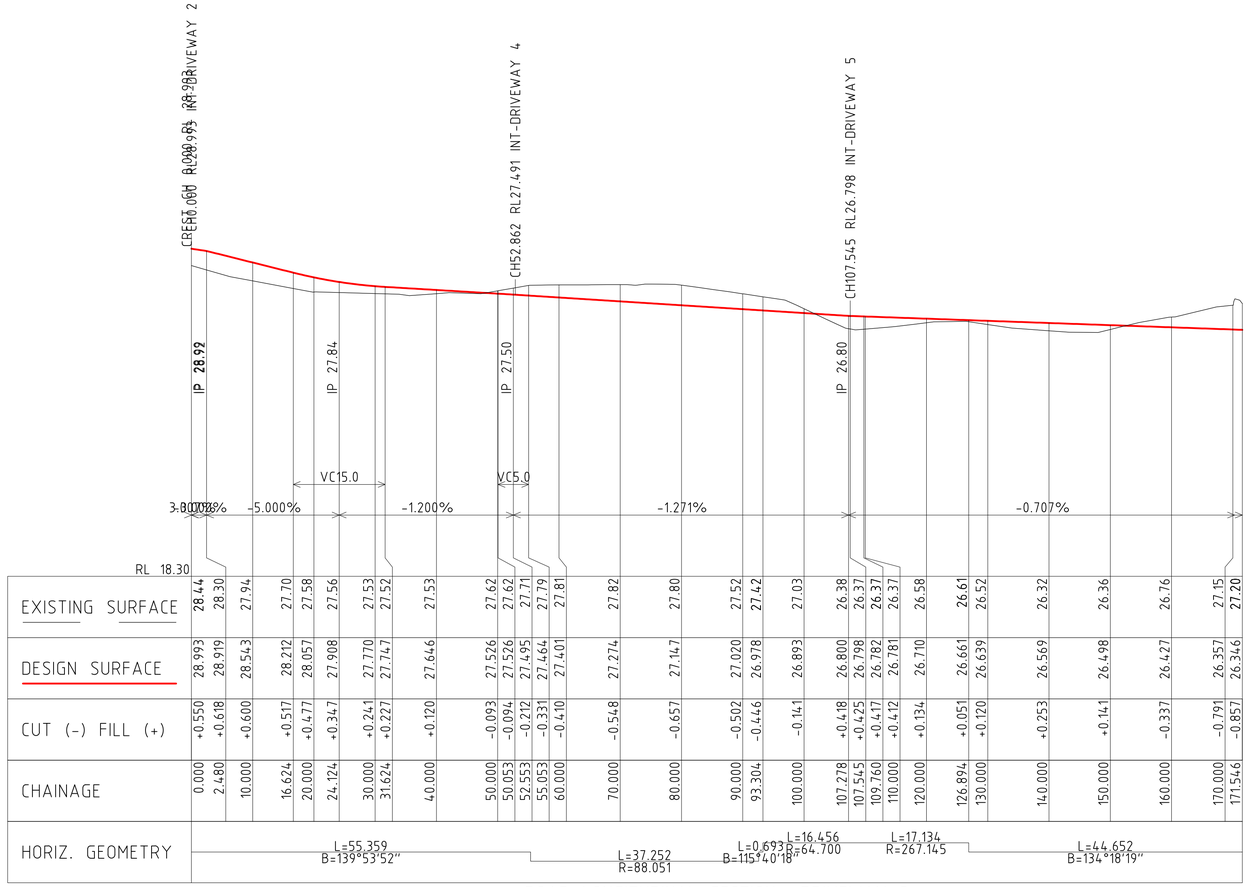
TYPICAL DRIVEWAY (4) SECTION

SCALE 1:50



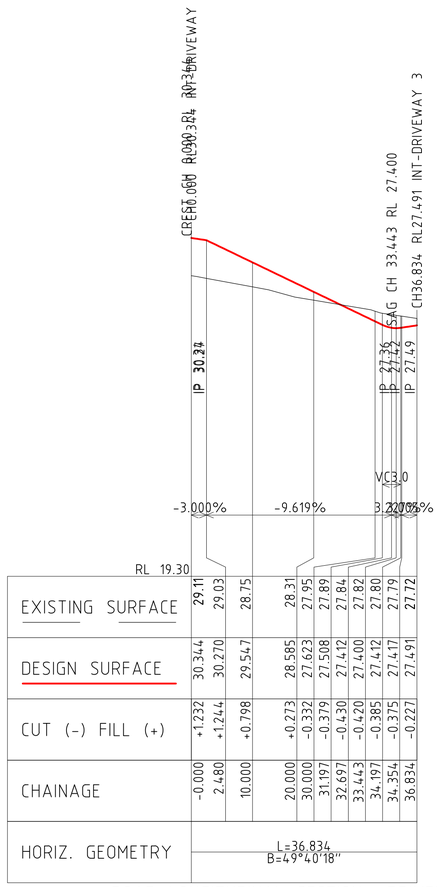
TYPICAL DRIVEWAY (5) SECTION

SCALE 1:50



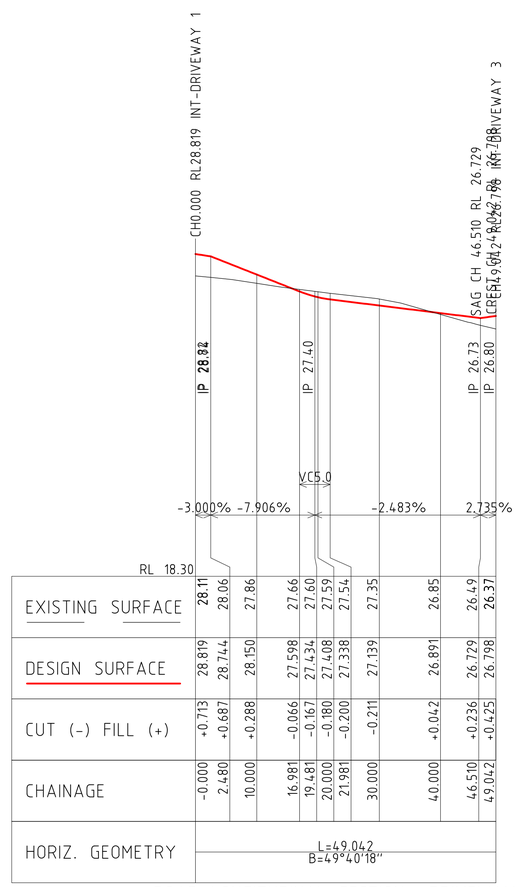
ROAD LONGITUDINAL SECTION DRIVEWAY 3
Scale 1:500 h 1:100 v

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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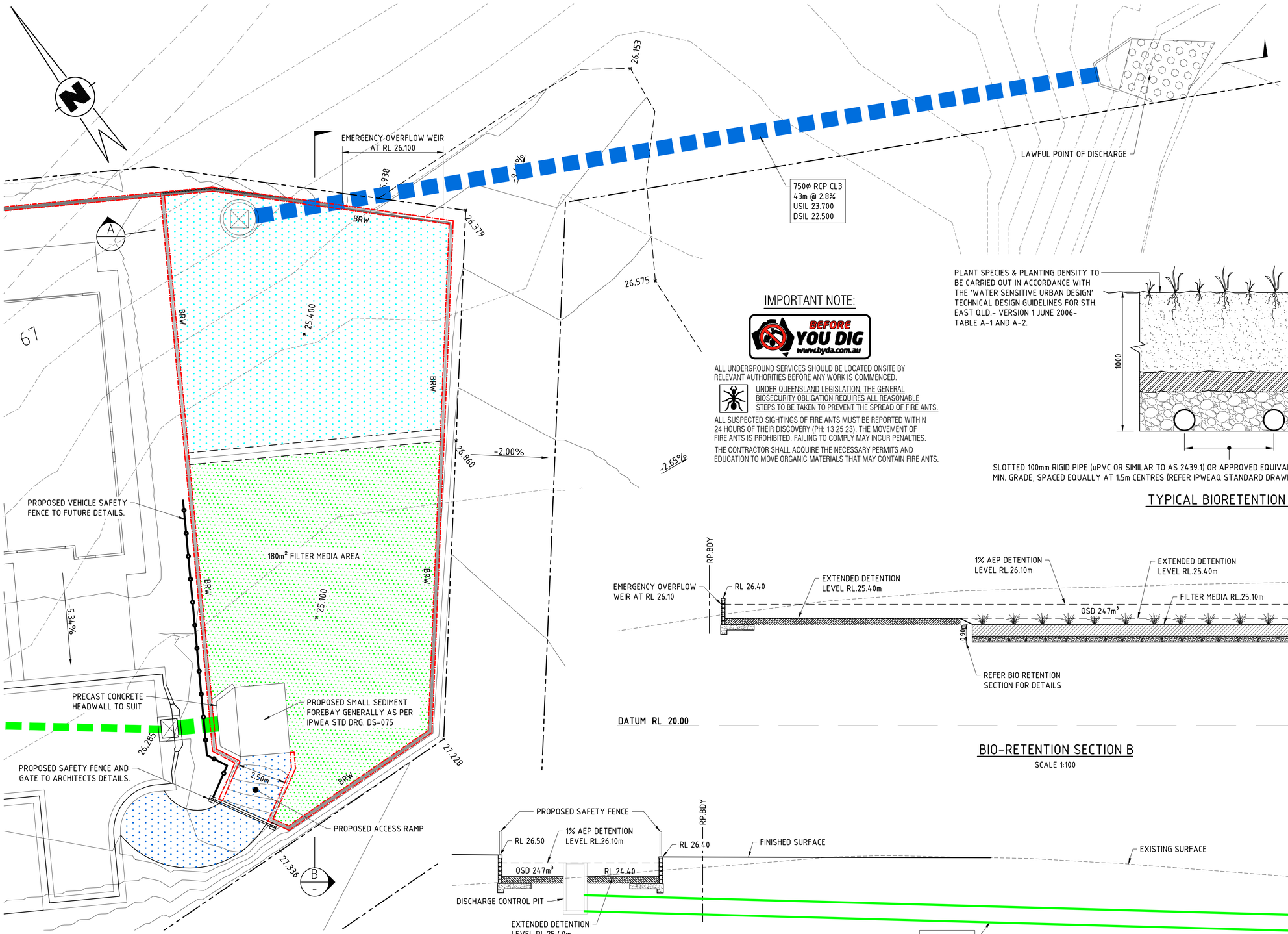
SCALE A 0 5 10 15 20 1 : 500 HORIZ.
SCALE B 0 1 2 1 : 50
DATUM AHD (U.N.O.) SCALES SHOWN ARE AT A1 SIZE

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DRAWN BAR
CHECKED TWN
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CLIENT MG LAND PTY LTD
PROJECT PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
CONCEPT DRIVEWAY LONG SECTIONS 2 OF 2

JOB NO. 230094
DRAWING NO. SK04
ISSUE P1 P2 P3



LEGEND

- PROPOSED BIO-RETENTION BASIN
- PROPOSED ACCESS RAMP
- PROPOSED OVERFLOW ON SITE DETENTION AREA
- BRW — PROPOSED BLOCK RETAINING WALL

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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 B

SCALE 1:100

BIO-RETENTION SECTION A

SCALE 1:100

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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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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 P1 P2 P3

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
- W — COUNCIL WATER MAIN
- PROPOSED PRIVATE SANITARY DRAINGE
- S — PROPOSED COUNCIL SEWER EXTENSION
- S — COUNCIL SEWER MAIN

IMPORTANT NOTE:

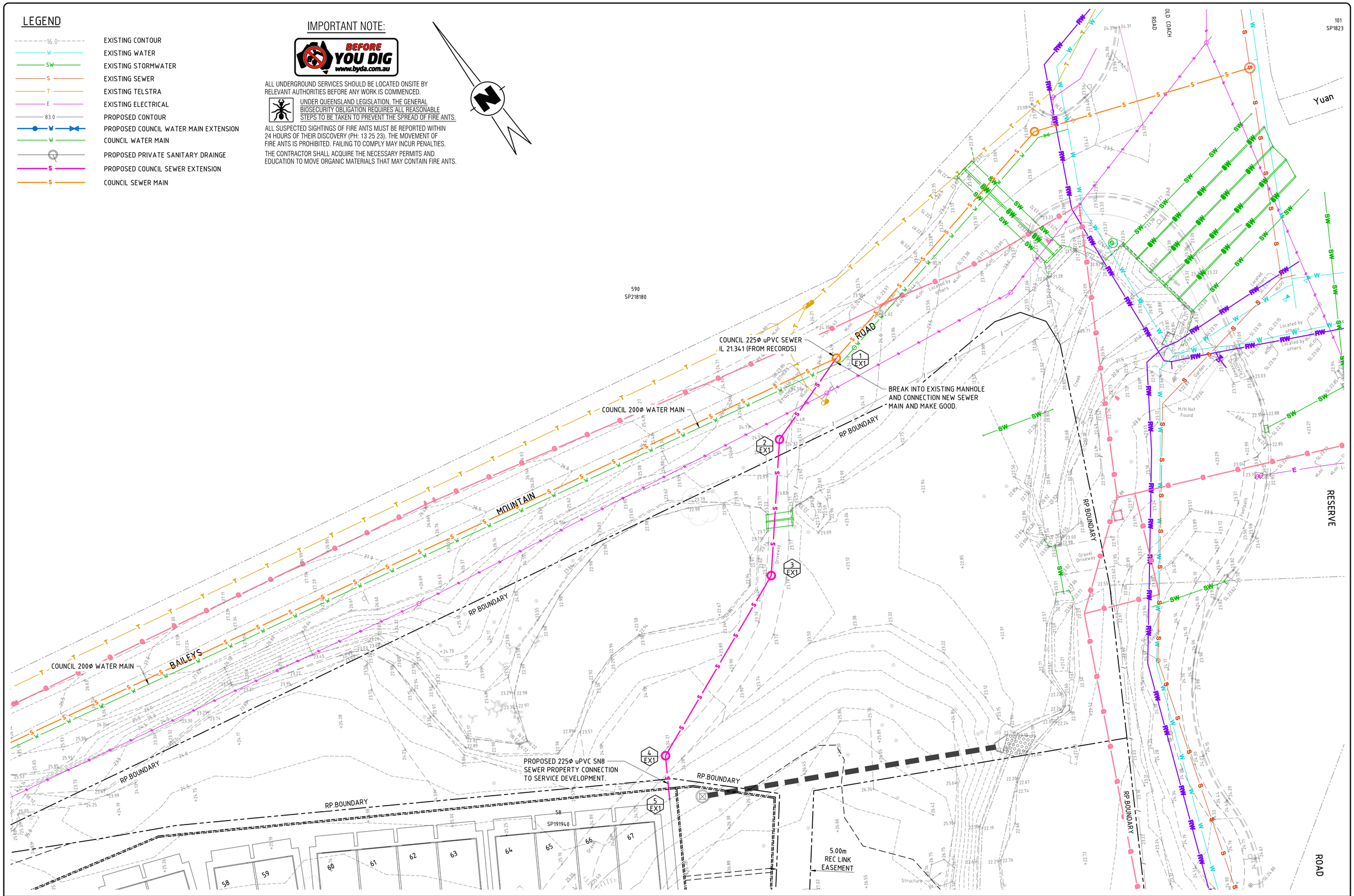
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A	09/24	APPROVAL ISSUE	B.A.R.	T.W.N.

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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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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
CONCEPT WATER AND SEWER PLAN - 1 OF 2

JOB NO. 230094

DRAWING NO. SK10

ISSUE A B C

MOUNTAIN ROAD

COUNCIL 200ø WATER MAIN

RP BOUNDARY

PROPOSED 225ø uP
SEWER PROPERTY C
TO SERVICE DEVELO

PROPOSED 100ø
WATER MAIN

1.50m

PROPOSED 100ø DOMESTIC/FIRE
WATER METER TO DETAILED DESIGN.

DRIVEWAY (1)

DRIVEWAY (2)

DRIVEWAY (3)

DRIVEWAY (4)

DRIVEWAY (5)

PROPOSED STANDARD END LINE HYDRANT
AS PER SEQ STD DRG. SEQ-WAT-1302-1 D

LEGEND

- EXISTING CONTOUR
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING TELSTRA
- EXISTING ELECTRICAL
- PROPOSED CONTOUR
- PROPOSED COUNCIL WATER MAIN EXTENSION
- COUNCIL WATER MAIN
- PROPOSED PRIVATE SANITARY DRAINGE
- PROPOSED COUNCIL SEWER EXTENSION
- COUNCIL SEWER MAIN

No.	DATE	ISSUE	REVISED	CHECKED
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A	09/24	APPROVAL ISSUE	B.A.R.	T.W.N.

IN ASSOCIATION WITH

APPROVAL ISSUE
NOT FOR CONSTRUCTION

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.

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(RPEQ No 15735)

CLIENT MG LAND PTY LTD

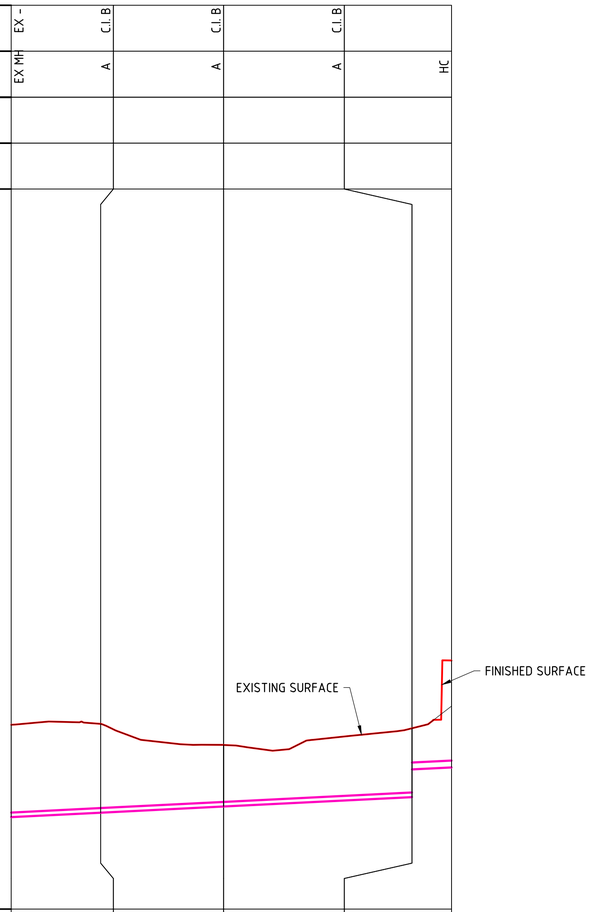
PROJECT
PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
CONCEPT WATER AND SEWER PLAN - 2 OF 2

JOB NO. 230094

DRAWING NO. SK11

ISSUE A B C

Maintenance Hole/Shaft No.	1/EX1	2/EX1	3/EX1	4/EX1	5/EX1
MH / MS Cover Type	EX -	Cl. B	Cl. B	Cl. B	
MH / MS Type	EX MH	A	A	A	HC
Branch Drop Type					
Property Connection Type					



Datum R.L. 18

Property Description					
Pipe Nom. Dia.(DN)Type Class	150ø PVC	150ø PVC	150ø PVC	225ø PVC	
Grade (1 in x) Length	1:100 14.60m	1:100 20.06m	1:100 30.75m	1:100 6.46m	
Embedment Type					
Depth of Invert Below FSL	3.014	2.898	2.011	2.247 1.342	3.488
Invert Level (IL)	21.380	21.526	21.727	22.034 22.939	23.004
Finished Surface Level (FSL)	24.394	24.424	23.737	24.281	26.492
Existing Surface Level (ESL)	24.394	24.424	23.737	24.281	25.004
Structure Setout Easting/Northing	N6917574.047 E528285.262	E528270.725 N6917572.677	E528254.671 N6917560.644	E528224.377 N6917555.350	E528219.866 N6917550.728
Chainage	0.000	14.601	34.666	65.418	71.878

SEWER LINE EX1
SCALES: HORIZONTAL 1:500 VERTICAL 1:100

No.	DATE	ISSUE	REVISED	CHECKED
P1	02/25	ORIGINAL ISSUE	B.A.R.	T.W.N.

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SCALE A 0 5 10 15 20 1 : 500 HORIZ.
SCALE B 0 1 2 3 4 5 1 : 100 VERT.
DATUM AHD (U.N.O.)
SCALES SHOWN ARE AT A1 SIZE

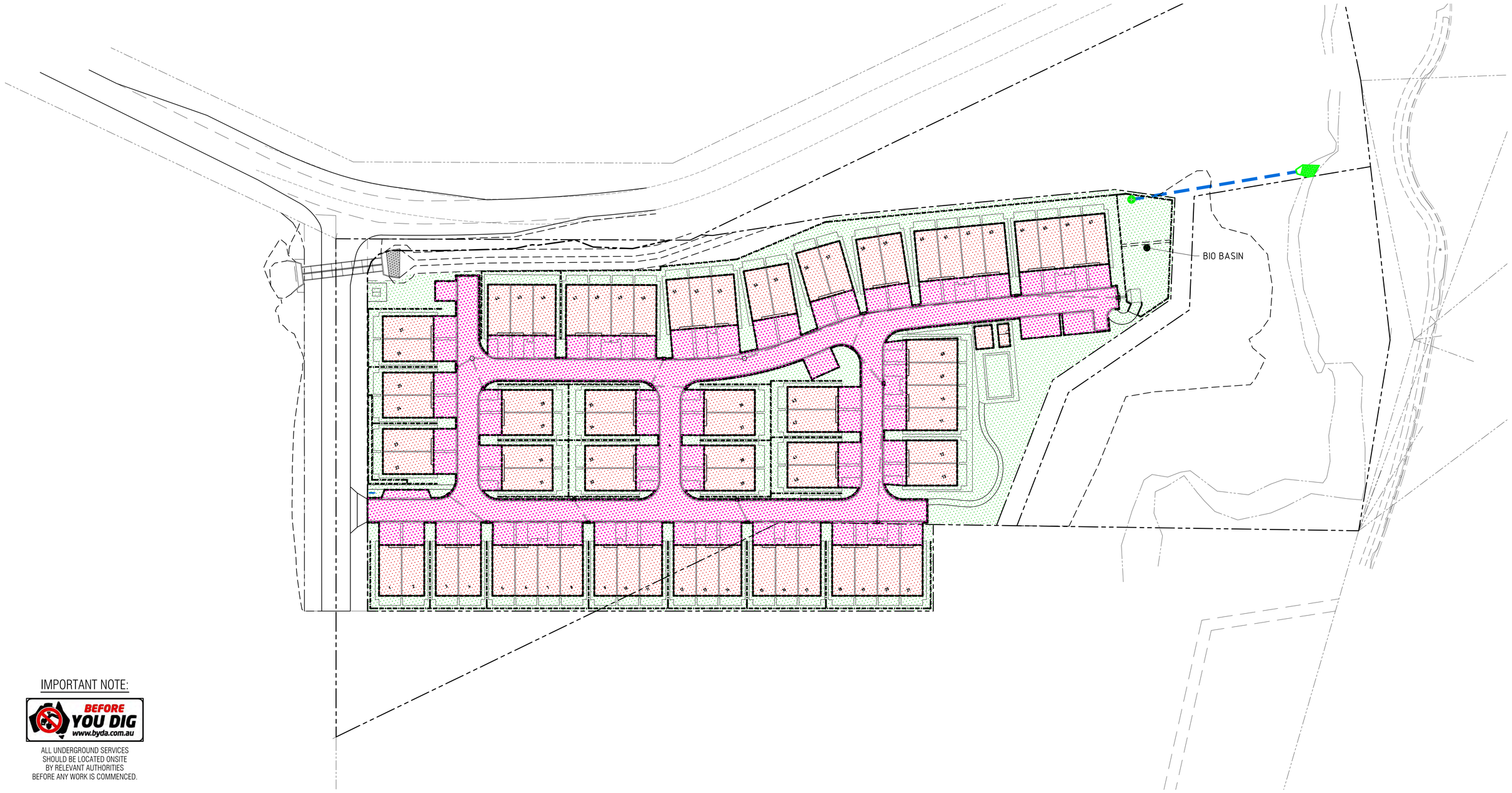
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DRAWN	BAR
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APPROVED FOR AND ON BEHALF OF COZENS REGAN GROUP PTY LTD
(RPEQ No 15735)

CLIENT: MG LAND PTY LTD
PROJECT: PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
CONCEPT EXTERNAL SEWER LONGITUDINAL SECTION

JOB NO. 230094
DRAWING NO. SK12
ISSUE P1



IMPORTANT NOTE:

BEFORE YOU DIG www.byda.com.au

ALL UNDERGROUND SERVICES
SHOULD BE LOCATED ONSITE
BY RELEVANT AUTHORITIES
BEFORE ANY WORK IS COMMENCED.

MUSIC CATCHMENT TABLE

CATCHEMENT	AREA HA	Fi
ROOF	0.5727	100%
ROAD	**0.5608**	**100%**
GROUND	0.4779	30%

No.	DATE	ISSUE	REVISED	CHECKED
P3	02/25	PRELIMINARY ISSUE UPDATE	B.A.R.	T.W.N.
P2	09/24	PRELIMINARY ISSUE - ARCH UPDATE	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 15 20 1:500

SCALE B

DATUM AHD (U.N.O.)

SCALES SHOWN ARE AT A1 SIZE

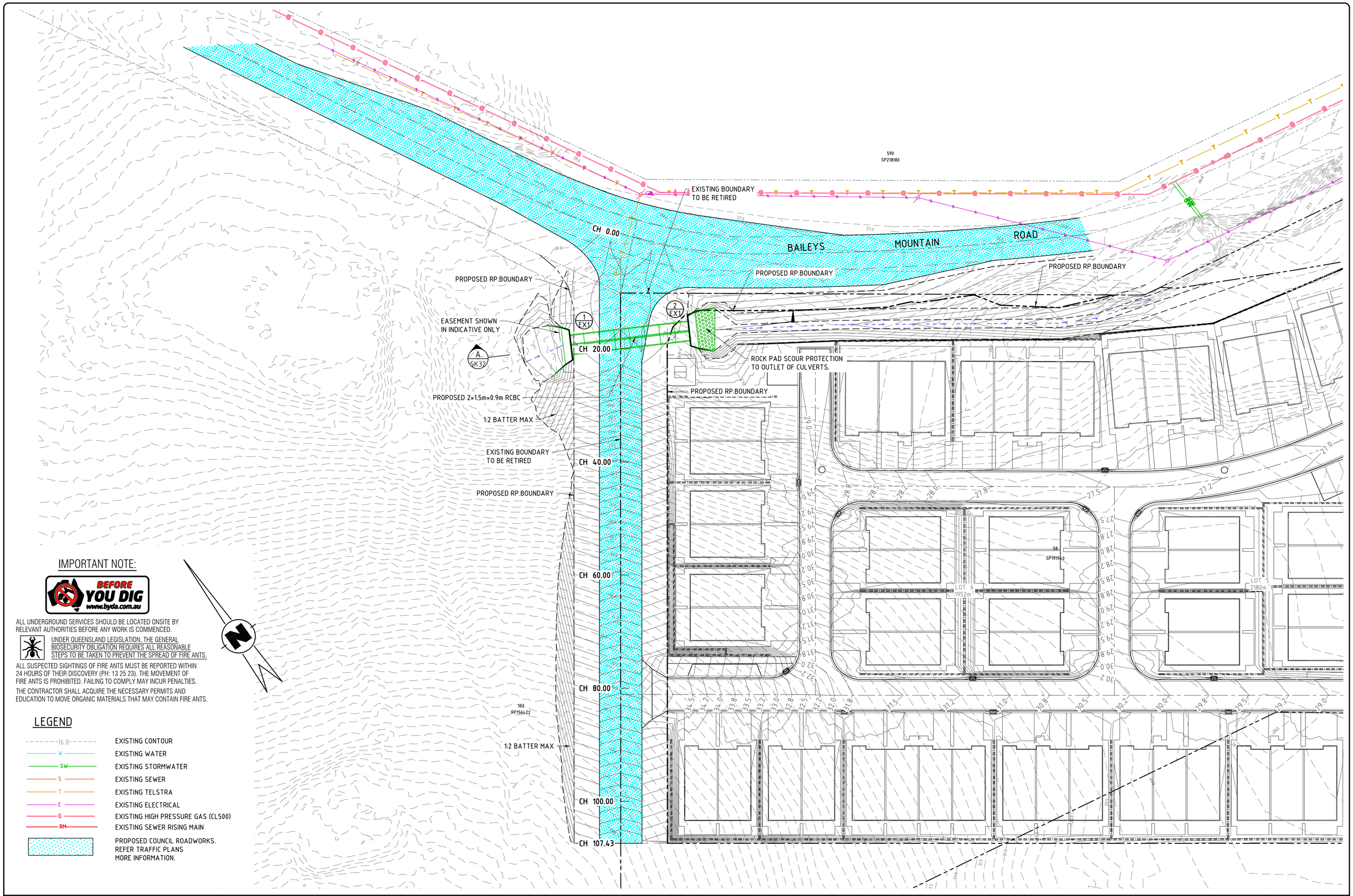
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(RPEQ No 15735)

CLIENT MG LAND PTY LTD

PROJECT PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
CONCEPT MUSIC PLAN

JOB NO. 230094
DRAWING NO. SK20
ISSUE P1 P2 P3



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
- 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 COUNCIL ROADWORKS. REFER TRAFFIC PLANS MORE INFORMATION.

No.	DATE	ISSUE	REVISED	CHECKED
P4	02/25	PRELIMINARY ISSUE UPDATE	B.A.R.	T.W.N.
P3	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P2	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P1	09/24	ORIGINAL ISSUE	B.A.R.	T.W.N.

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SCALE A 0 3 6 9 12 15 1 : 300

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.

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(RPEQ No 15735)

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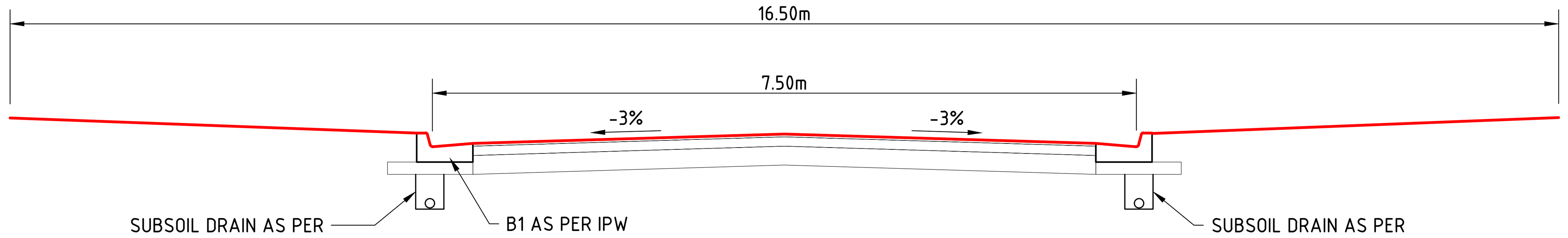
PROJECT: PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA

CONCEPT EXTERNAL ROADWORKS PLAN

JOB NO. 230094

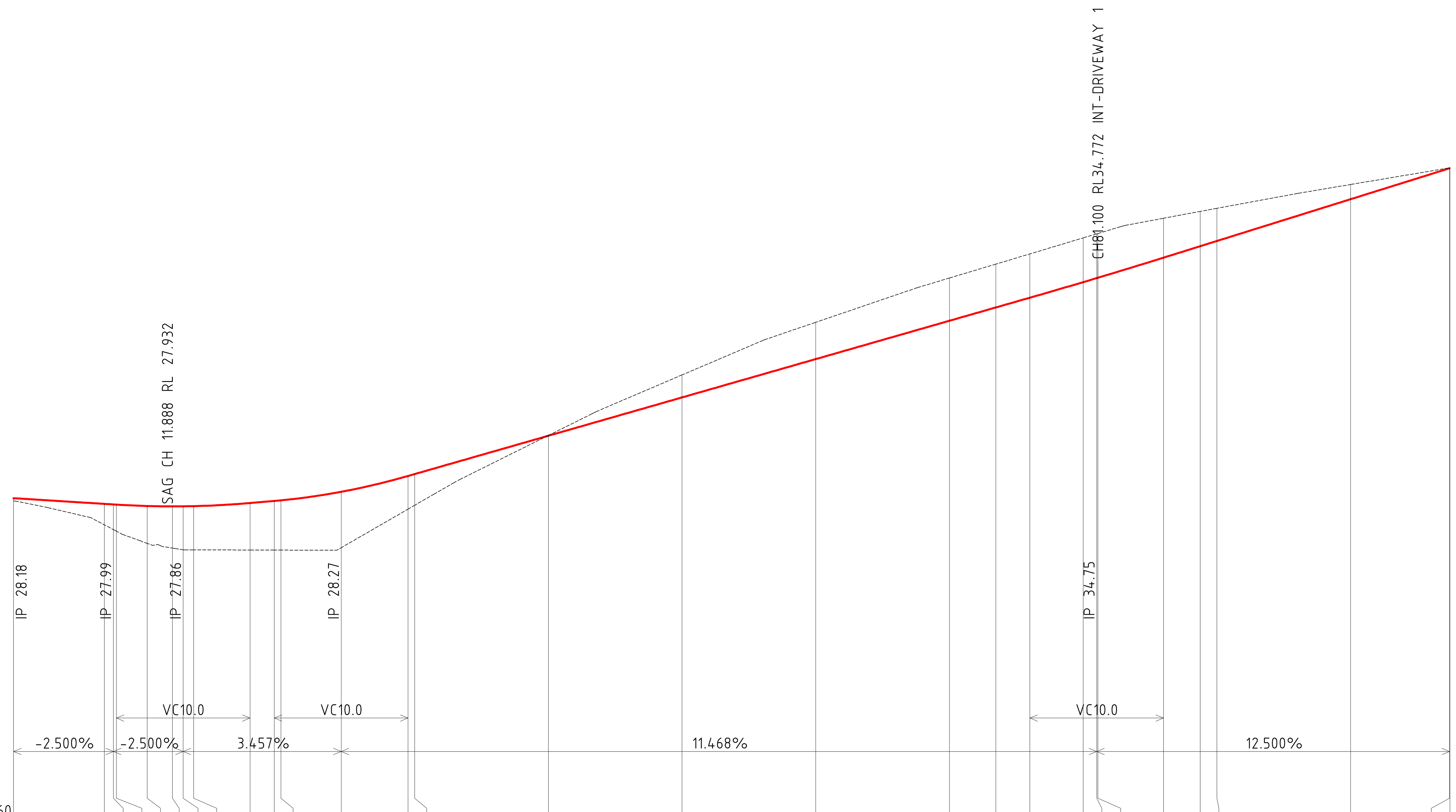
DRAWING NO. SK30

ISSUE P1 P2 P3 P4



TYPICAL ROAD SECTION

SCALE 1:50



CHAINAGE	EXISTING SURFACE	DESIGN SURFACE	CUT (-) FILL (+)
0.000	28.10	28.177	+0.081
6.796	27.38	28.007	+0.627
7.473	27.24	27.990	+0.752
7.691	27.19	27.985	+0.794
10.000	26.83	27.943	+1.116
11.888	26.68	27.932	+1.247
12.691	26.63	27.934	+1.300
13.476	26.63	27.940	+1.309
17.691	26.63	28.033	+1.406
19.508	26.62	28.096	+1.471
20.000	26.62	28.114	+1.490
24.508	26.70	28.369	+1.674
29.508	27.85	28.842	+0.991
30.000	27.96	28.898	+0.934
40.000	30.05	30.045	-0.009
50.000	31.86	31.192	-0.673
60.000	33.44	32.339	-1.101
70.000	34.76	33.486	-1.278
73.468	35.18	33.884	-1.297
76.011	35.49	34.175	-1.311
80.000	35.96	34.641	-1.323
81.011	36.09	34.761	-1.325
81.100	36.10	34.772	-1.324
86.011	36.55	35.374	-1.178
88.748	36.76	35.716	-1.041
90.000	36.85	35.872	-0.978
100.000	37.56	37.122	-0.440
107.403	38.06	38.048	-0.010
107.430	38.06		

HORIZ. GEOMETRY: L=6.796 B=242°24'32" | L=6.680 R=30.000 | L=93.953 B=229°39'02"

ROAD LONGITUDINAL SECTION MAIN ROAD
Scale 1:250 h 1:100 v

No.	DATE	ISSUE	REVISED	CHECKED
P2	10/24	PRELIMINARY ISSUE	B.A.R.	T.W.N.
P1	09/24	ORIGINAL ISSUE	B.A.R.	T.W.N.

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SCALE A 0 5 10 1 : 250
SCALE B 0 1 2 3 4 5 1 : 100 VERT.
DATUM AHD (U.N.O.) SCALES SHOWN ARE AT A1 SIZE

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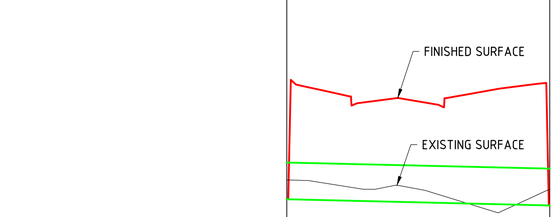
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CLIENT MG LAND PTY LTD

PROJECT PROPOSED TOWNHOUSE DEVELOPMENT
202 BAILEYS MOUNTAIN RD, UPPER COOMERA
CONCEPT EXTERNAL ROADWROKS LONG SECTION

JOB NO. 230094
DRAWING NO. SK31
ISSUE P1 P2

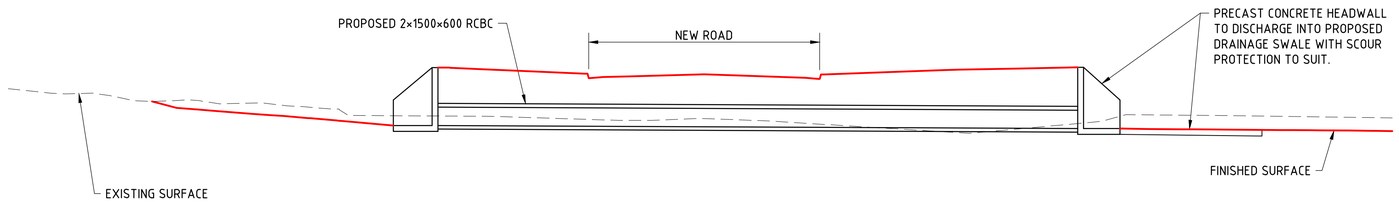
Pit / Line Number	1/EX1	2/EX1
Pit Type	Headwall	Headwall
Grate/Lid	1050-1200	1050-1200
PIT SIZE	1620 3x15	1620 3x15
Flow (L/S)	0.000	
Velocity (m/s)	0.000	
HGL Level	26.900	26.900



Datum R.L. 25

Diameter (mm) Class	Box Culvert 1500x600	
Slope / Grade	0.47% 1:214.56	
Depth to Invert (DTI)	0.000	0.000
Invert Level (IL)	26.400	26.300
Existing Surface Level (ESL)	26.717	26.565
Final Surface Level (FSL)	26.400	26.300
Chainage	0.000 21.456	21.456

EX1
SCALES: HORIZONTAL 1:250 VERTICAL 1:50



SECTION A
SCALE 1:100 SK30

No.	DATE	ISSUE	REVISED	CHECKED
P1	09/24	ORIGINAL ISSUE	B.A.R.	T.W.N.

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SCALE B 0 1 2 1 : 50 VERT.
DATUM AHD (U.N.O.)
SCALES SHOWN ARE AT A1 SIZE

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CONCEPT EXTERNAL STROMWATER LONG SECTION

JOB NO. 230094
DRAWING NO. SK32
ISSUE P1