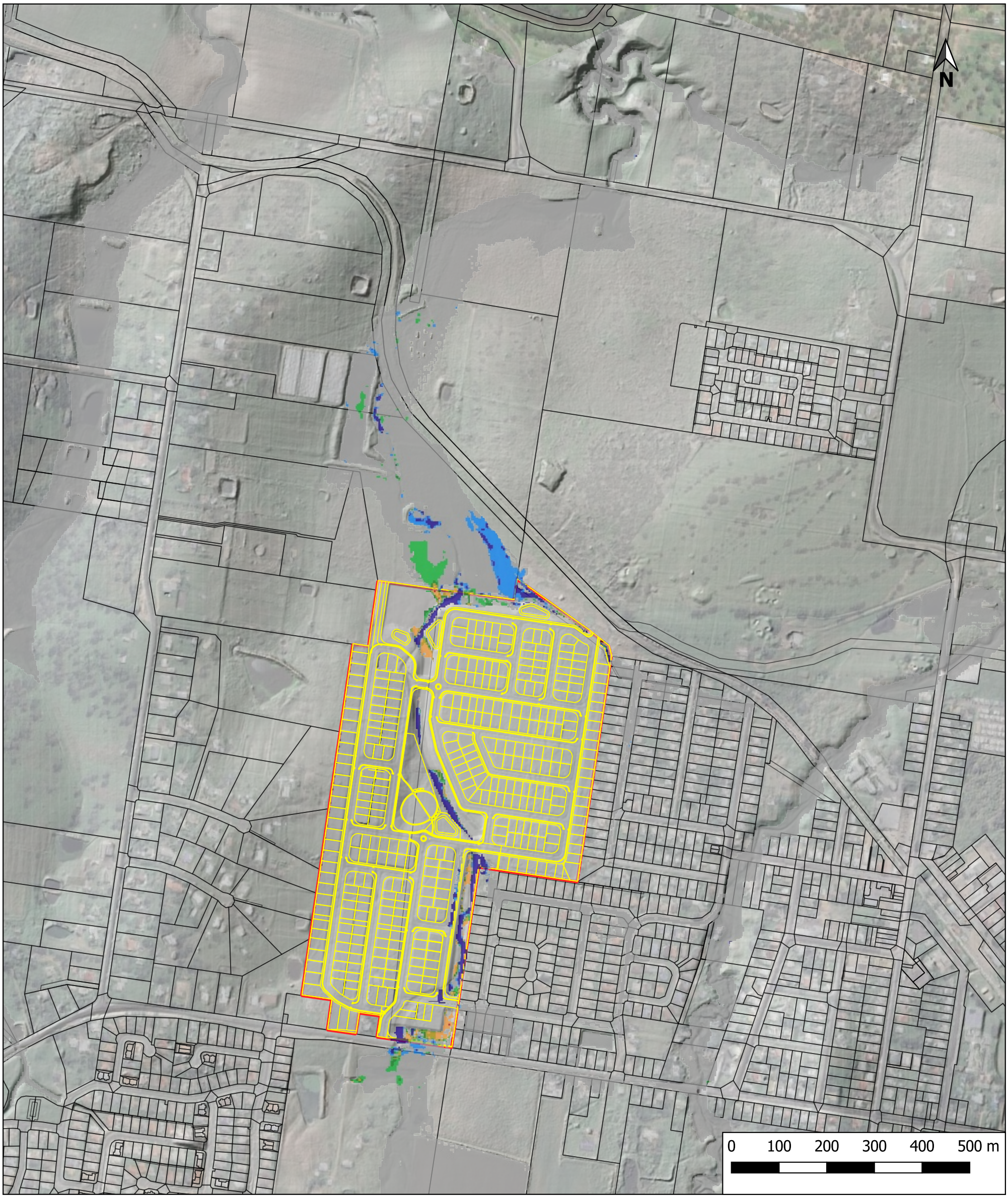

2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

2% AEP Flood Velocity Afflux

Project: BE230128	Date: 18/04/2024
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Proposed Development
- Cadastral
- Site Boundary

Flood Velocity Afflux (m/s)

- <-0.2
- -0.2 - -0.1
- -0.1 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- > 1

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N

0 100 200 300 400 500 m

2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

5% AEP Flood Velocity Afflux

Project: BE230128	Date: 18/04/2024
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Proposed Development
- Cadastral
- Site Boundary

Flood Velocity Afflux (m/s)

- <-0.2
- -0.2 - -0.1
- -0.1 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- > 1

BURCHILLS ENGINEERING SOLUTIONS

FOR

Europagroup

N

0 100 200 300 400 500 m

2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

10% AEP Flood Velocity Afflux

Project: BE230128	Date: 18/04/2024
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Proposed Development
- Cadastral
- Site Boundary

Flood Velocity Afflux (m/s)

- <-0.2
- -0.2 - -0.1
- -0.1 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- > 1

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N

0 100 200 300 400 500 m

2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

18% AEP Flood Velocity Afflux

Project: BE230128	Date: 18/04/2024
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Proposed Development
- Cadastral
- Site Boundary

Flood Velocity Afflux (m/s)

- <-0.2
- -0.2 - -0.1
- -0.1 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- > 1

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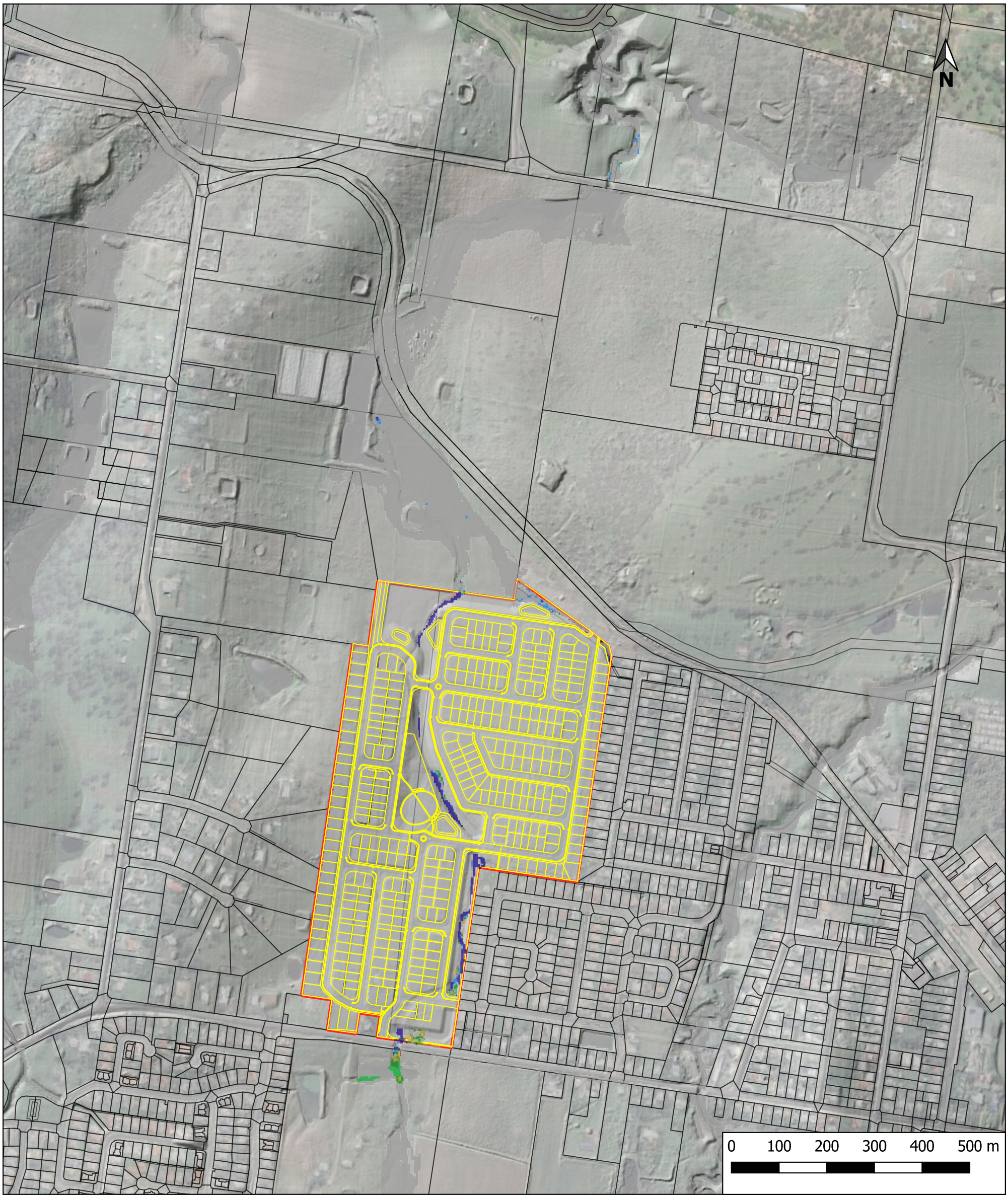

2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

39% AEP Flood Velocity Afflux

Project: BE230128	Date: 18/04/2024
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Proposed Development
- Cadastral
- Site Boundary

Flood Velocity Afflux (m/s)

- <-0.2
- -0.2 - -0.1
- -0.1 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- > 1

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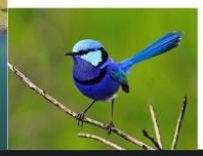

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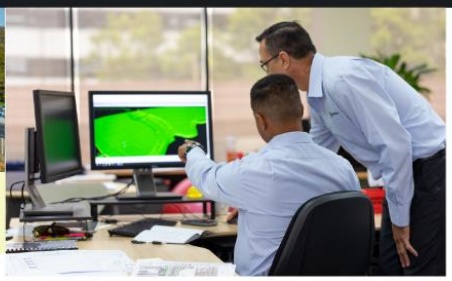

2983 Forest Hill Fernvale Road, Lowood

Traffic Impact Assessment Report

Client: Lowood One Pty Ltd
Project No: BE230128
Document No: BE230128-RP-TIA-04

April 2024

Document Control Record

Prepared by:	Adele Packer
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Date:	24/04/2024

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Signed:	
Date:	24/04/2024

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Table of Contents

Tables

Figures

Appendices

1. Introduction

1.1 Project Overview

Lowood One Pty Ltd have engaged Burchills Engineering Solutions to prepare a Traffic Impact Assessment (TIA) to be submitted to Somerset Regional Council (the 'Council' or 'SRC'). The Application sought is a Preliminary Approval for a Variation Request pursuant to section 50 of the Planning Act 2016 to allow for future staged development of a 358 lot subdivision, including 19 duplex allotments.

The properties included in this Development Application include:

- Lot 56 Forest Hill Fernvale Road, Lowood (Lot 56 on SP 197415); and
- Lot 57 Forest Hill Fernvale Road, Lowood (Lot 57 on SP 197415).

The purpose of this report is to investigate the potential traffic impacts associated with the proposed development, with reference to the latest development approval for the overall development area.

1.2 References

In the course of preparing this report, reference has been made to the following:

- Somerset Regional Council Planning Scheme
- Department of Transport and Main Roads (TMR) Guide to Traffic Impact Assessments, December 2018
- Roads and Maritime Services (RMS) Technical Direction Guide to Traffic Generating Developments, August 2013;
- Queensland Streets, Design Guidelines for Subdivisional Street Works; and
- Other documents as specified.

1.3 Report constraints

Burchills Engineering Solutions has carried out this traffic report that complies with industry standard traffic engineering practices and standards applicable during the assessment in April 2024. The report was based on the available project information and conditions at the time of the assessment. However, Burchills Engineering Solutions cannot be held responsible for any changes to the project planning or road conditions that occur after the report's completion, which may affect the accuracy of the assessment's findings.

2. Existing Conditions

2.1 Land Uses

The proposed development is situated at 2983 Forest Hill Fernvale Road, Lowood, formally described as Lot 56 & 57 on SP197415. The surrounding land uses are predominantly residential and rural. The site is located within Somerset Regional Council (SRC) local government area and is currently zoned as 'Emerging Community'. The subject site and its surrounding environs is shown in Figure 2.1.

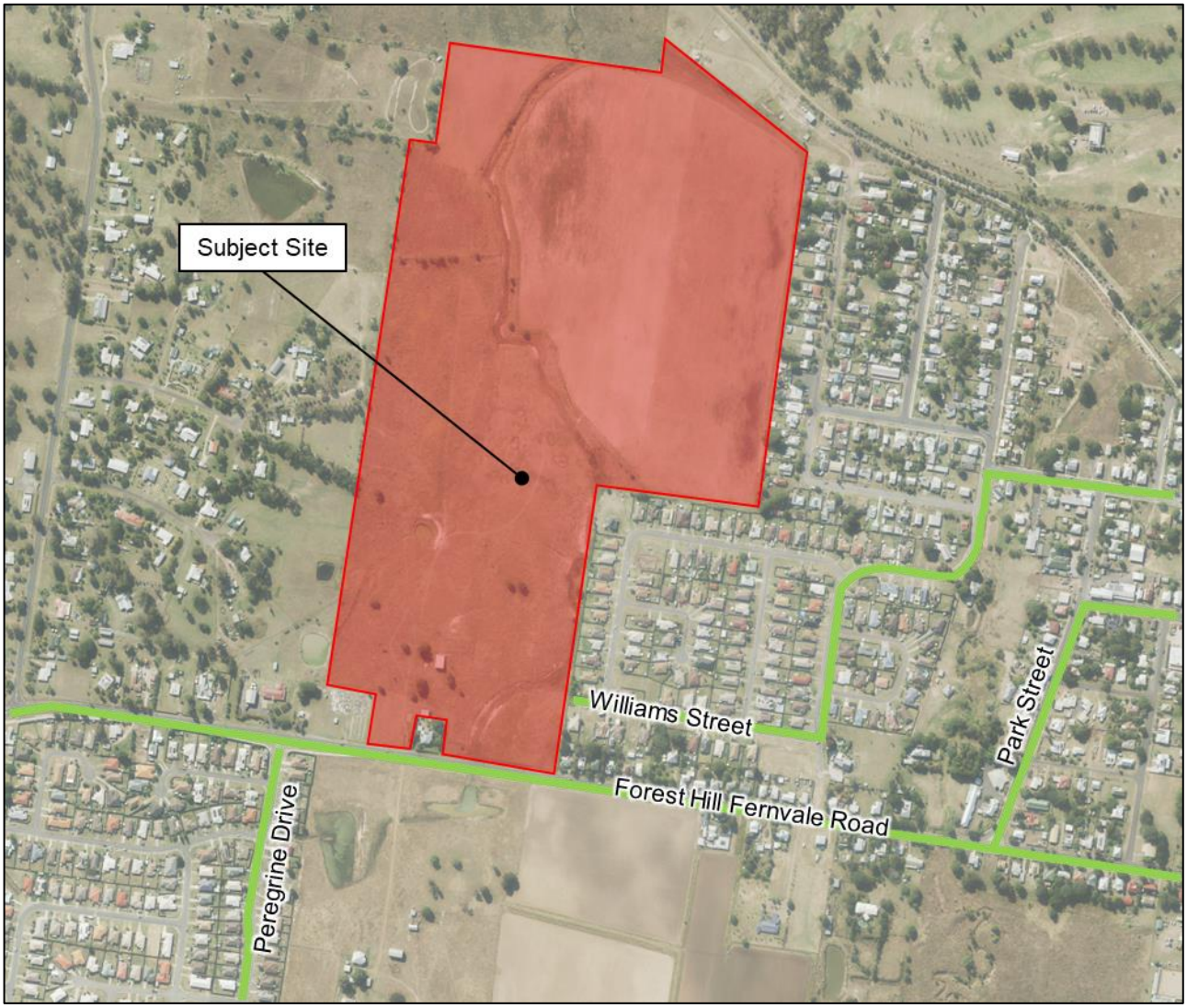


Figure 2.1 Subject Site

The site is currently vacant land.

2.2 Local Road Network

A summary of key roads in the vicinity of the site is provided below.

2.2.1 Forest Hill Fernvale Road

Forest Hill Fernvale Road is an arterial road under the jurisdiction of the Department of Transport and Main Roads (DTMR). It is configured as a two-way, two-lane sealed 6.5m wide carriageway.

Forest Hill Fernvale Road is shown in Figure 2.2 below.

Figure 2.2 Forest Hill Fernvale Road Facing East (left) and West (right)

2.2.2 Williams Street

Williams Street is a local road under the jurisdiction of Somerset Regional Council. It is configured as a two-way, two-lane sealed 8m wide carriageway.

Williams Street is shown in Figure 2.3 below.

Figure 2.3 Williams Street Facing East (left) and West (right)

2.2.3 Park Street

Park Street is a sub-arterial road under the jurisdiction of DTMR. It is configured as a two-way, two-lane sealed 13m wide carriageway.

Park Street is shown in Figure 2.3 below.

Figure 2.4 Park Street Facing North (left) and South (right)

2.3 Public Transport Facilities

There is a bus stop pair in Lowood town centre, approximately 1.5km walking distance from the subject site. The location of the bus stops is shown in Figure 2.5 below.

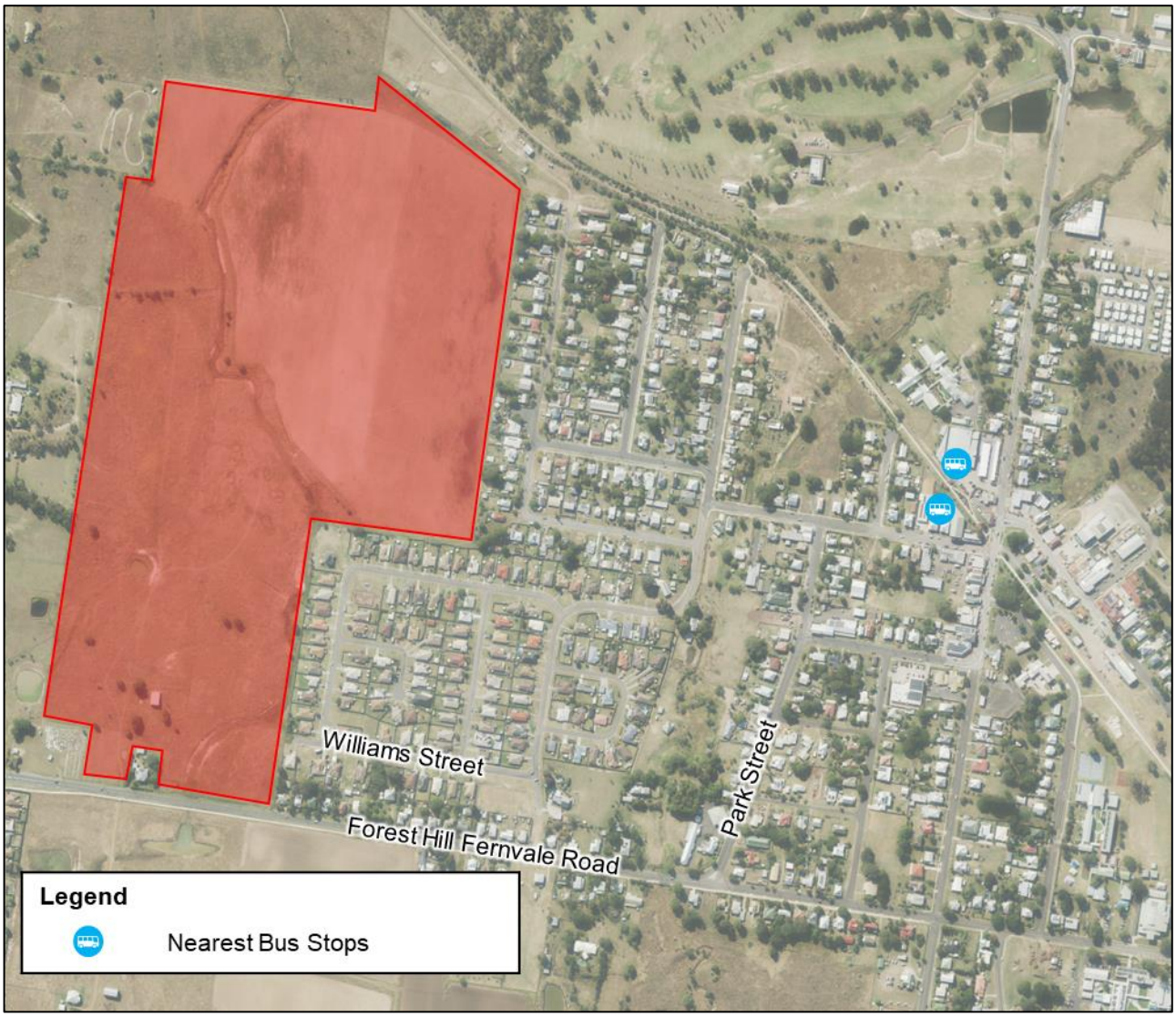


Figure 2.5 Existing Public Transport Connections

The bus stops are serviced by Route 529 which provides connections between Toogoolawah and Ipswich three (3) times per day.

2.4 Active Transport Facilities

A shared path is available on the southern side of Forest Hill Fernvale Road that provides a connection between the residential dwellings to the west of the site and the Lowood town centre.

3. Proposed Development

3.1 Development Yield

The proposed overall masterplan development comprises a low-density residential subdivision that includes 358 lots (including 19 duplex lots) for a total of 377 dwellings.

A layout of the proposed ultimate masterplan development plan is shown in Figure 3.1 below and can be found at Appendix A.

Figure 3.1 Proposed Development Layout

3.2 Vehicle Access

Vehicle access to the development is proposed via a new access intersection on Forest Hill Fernvale Road. A secondary access is proposed via a connection to Williams Street to the east of the site. A detailed review of the site accesses is included in Section 8.2.

4. Traffic Assumptions and Characteristics

4.1 Study Intersections

The traffic impacts of the proposed development on the surrounding road network have been assessed in accordance with DTMR's Guide to Traffic Impact Assessments (GTIA). The location of the study intersection is shown in Figure 4.1.

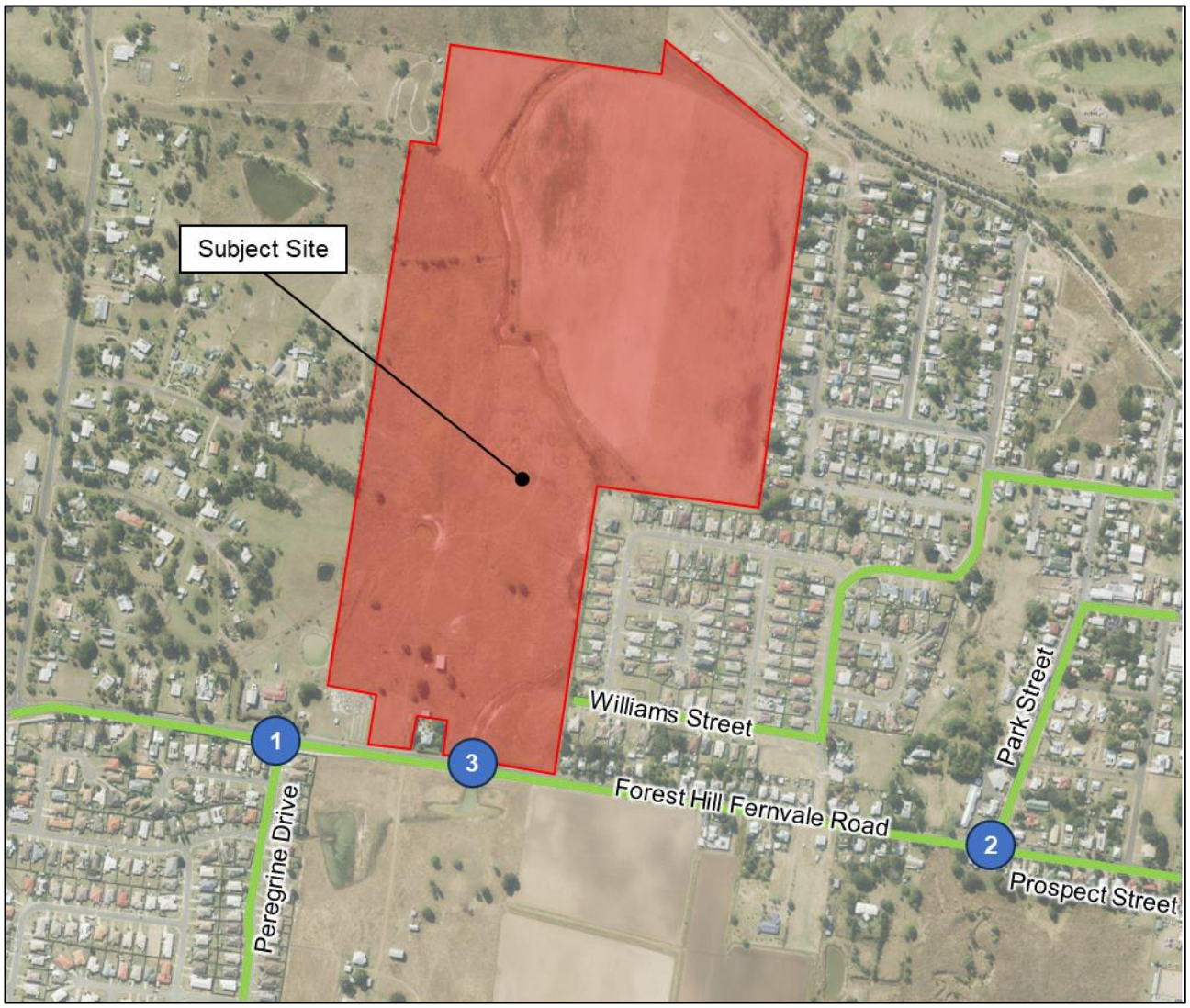


Figure 4.1 Study Intersections

4.2 Background Traffic Volumes

To understand the existing traffic conditions, traffic surveys were undertaken by Austraffic during the AM and PM peak periods on 7th September 2023 for the Peregrine Drive / Forest Hill Fernvale Road intersection and the Park Street / Prospect Street intersection.

The surveyed and adopted peak periods have been summarised in Table 4.1 and a copy of the traffic survey data is enclosed in Appendix B.

Table 4.1 Adopted Peak Periods

Intersection ID	Surveyed Peak Periods	
	AM	PM
Peregrine Drive / Forest Hill Fernvale Road	8:00AM – 9:00AM	3:00PM – 4:00PM
Park Street / Prospect Street	8:00AM – 9:00AM	3:00PM – 4:00PM
Adopted Hourly Peak Periods	8:00AM – 9:00AM	3:00PM – 4:00PM

4.3 Traffic Growth

Burchills reviewed TMR's annual segment reports for the Forest Hill Fernvale Road State-controlled road to provide an indication of traffic growth along the study network within the last 10 years. The subject site is located within close proximity to a TMR count site (32101). The AADT data demonstrates minimal traffic growth over the previous 10 years; however 1.27% growth has been recorded in the previous year (2018-2019). This growth rate has been adopted for a conservative approach and applied to Park Street, Prospect Street and Forest Hill Fernvale Road.

No growth has been applied to the residential catchment on Peregrine Drive, as it is assumed to be a closed catchment and fully developed.

4.4 Traffic Generation

In order to determine the traffic likely to be generated by the development, reference has been made to the RTA Guide to Traffic Generating Developments (GTGD) October 2002.

Table 4.2 summarises the trip generation rates, and trip generation adopted for the traffic assessment.

Table 4.2 Development Traffic Generation

Land Use	Yield	Trip Generation Rates		Trip Generation		Source
		AM Peak	PM Peak	AM Peak	PM Peak	
Low density residential	377 dwellings	0.85 trips per dwelling	0.85 trips per dwelling	321 vph	321 vph	GTGD
TOTAL		**-**	**-**	**321 vph**	**321 vph**	**-**

4.5 Traffic Distribution

The surrounding road network and attractors have been analysed to determine the external distributions for the development traffic, as well as precedent from the traffic survey data obtained.

The distribution of development trips on the network has been determined from the distribution of trips from the Peregrine Drive residential catchment to the west of the subject site (i.e. based on the traffic survey data from 7th September, 2023). It is assumed that 25% of trips to / from the east will occur via the local road network i.e. via Williams Street.

Further details regarding the adopted traffic distributions are provided at Appendix D.

5. Traffic Assessment Criteria

5.1 Assessment Scenarios

In accordance with TMR's GTIA, the impact assessment year for the development impacts on the external road network should be the year of opening.

A year of opening of 2025 has been assumed. Table 5.1 summarises the impact assessment scenarios.

Table 5.1 Impact Assessment Scenarios

Impact Assessment Scenario	Study Intersections
2025 BG	• Peregrine Drive / Forest Hill Fernvale Road • Park Street / Prospect Street • Forest Hill Fernvale Road / site access
2025 BG + DEV	• Peregrine Drive / Forest Hill Fernvale Road • Park Street / Prospect Street • Forest Hill Fernvale Road / site access
2035 BG	• Forest Hill Fernvale Road / site access
2035 BG + DEV	• Forest Hill Fernvale Road / site access

5.2 Assessment Criteria

The performance of the intersections has been analysed by using SIDRA Intersection 9 software. SIDRA is an industry recognised analysis tool that estimates the capacity and performance of intersections based on input parameters, including geometry and traffic volumes, and provides estimates of an intersection's Degree of Saturation (DOS), queues and delays.

5.2.1 Intersection Delay

The TMR GTIA recognises the intersection delay as a greater indicator of intersection performance in comparison to the previous TMR GARID's focus on the degree of saturation (DOS) criteria. The TMR GTIA appreciates that in urban networks, the DOS of an intersection may not be the most accurate representation of the intersection's operation as it is expected that existing intersections are approaching capacity with the growth of our cities.

Furthermore, for priority-controlled intersections and roundabouts, where the average peak hour delay for any movement exceeds 42 seconds, as outlined in the GTIA, the intersection should be upgraded for safety purposes. At an individual intersection level, where this threshold has been exceeded, Burchills Engineer has made further comments.

5.2.2 Intersection Degree of Saturation (DoS)

While the movement delay is considered to provide a better indication of intersection performance and safety for priority-controlled intersections and roundabouts, the DOS should still be considered when assessing the performance of the intersection.

Table 5.2 provides the DOS thresholds adopted for the assessment.

Table 5.2 Adopted Intersection Performance Thresholds – Degree of Saturation

Intersection Treatment	DOS Threshold
Signalised Intersections	Less than or equal to 0.90
Roundabouts	Less than or equal to 0.85
Priority Controlled Intersections	Less than or equal to 0.80

Source: TMR Guidelines for Road Impacts Development

6. SIDRA Assessment

6.1 Peregrine Drive / Forest Hill Fernvale Road

The existing intersection is currently a priority-controlled T-intersection arrangement. The aerial and SIDRA-assessed layout is illustrated in Figure 6.1.

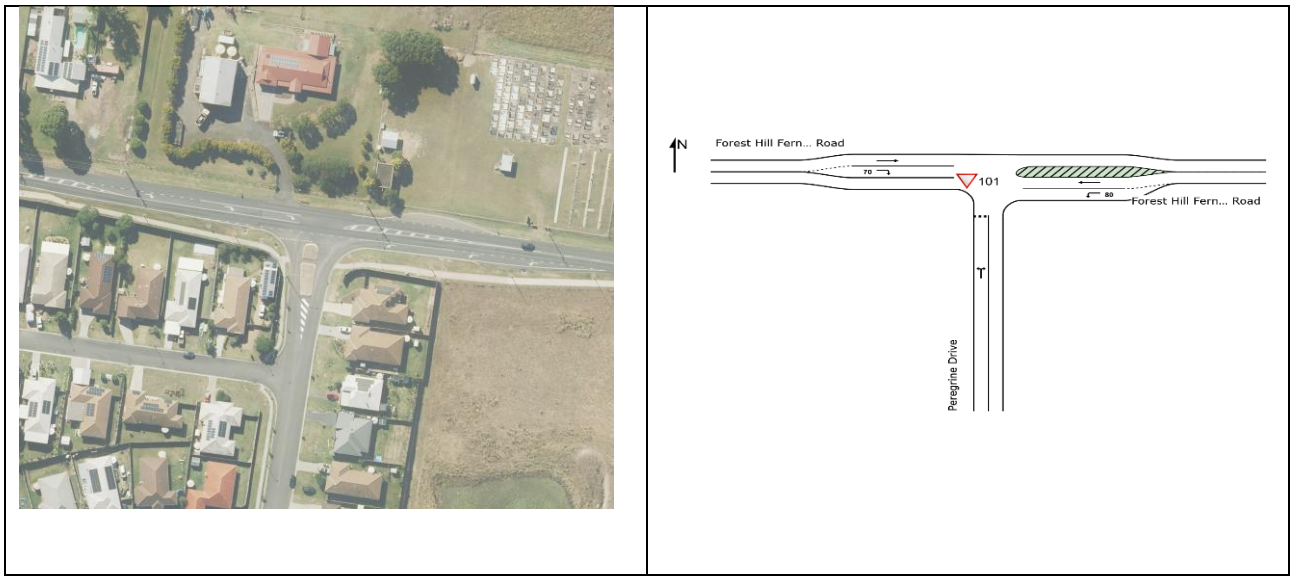


Figure 6.1 Aerial and SIDRA Layout – Peregrine Drive / Forest Hill Fernvale Road

The result of the SIDRA assessment is summarised in Figure 6.1. The SIDRA layouts and detailed results are included in Appendix C.

Table 6.1 SIDRA Results – Peregrine Drive / Forest Hill Fernvale Road

Scenarios	AM Peak Period			PM Peak Period		
	DOS	Critical Mvmt Delay (s)	95th %ile Queue (m)	DOS	Critical Mvmt Delay (s)	95th %ile Queue (m)
2025 BG	0.19	12	4	0.19	12	3
2025 BG + DEV	0.20	12	5	0.20	12	3

As shown in Table 6.1, the T-intersection of Peregrine Drive / Forest Hill Fernvale Road performs within the acceptable thresholds (DOS <0.80 and delay <42 seconds) in all scenarios.

As such, the intersection is anticipated to operate satisfactorily following the year of opening for the development.

6.2 Park Street / Prospect Street

The existing intersection is currently a priority-controlled T-intersection arrangement. The aerial and SIDRA-assessed layout is illustrated in Figure 6.2.

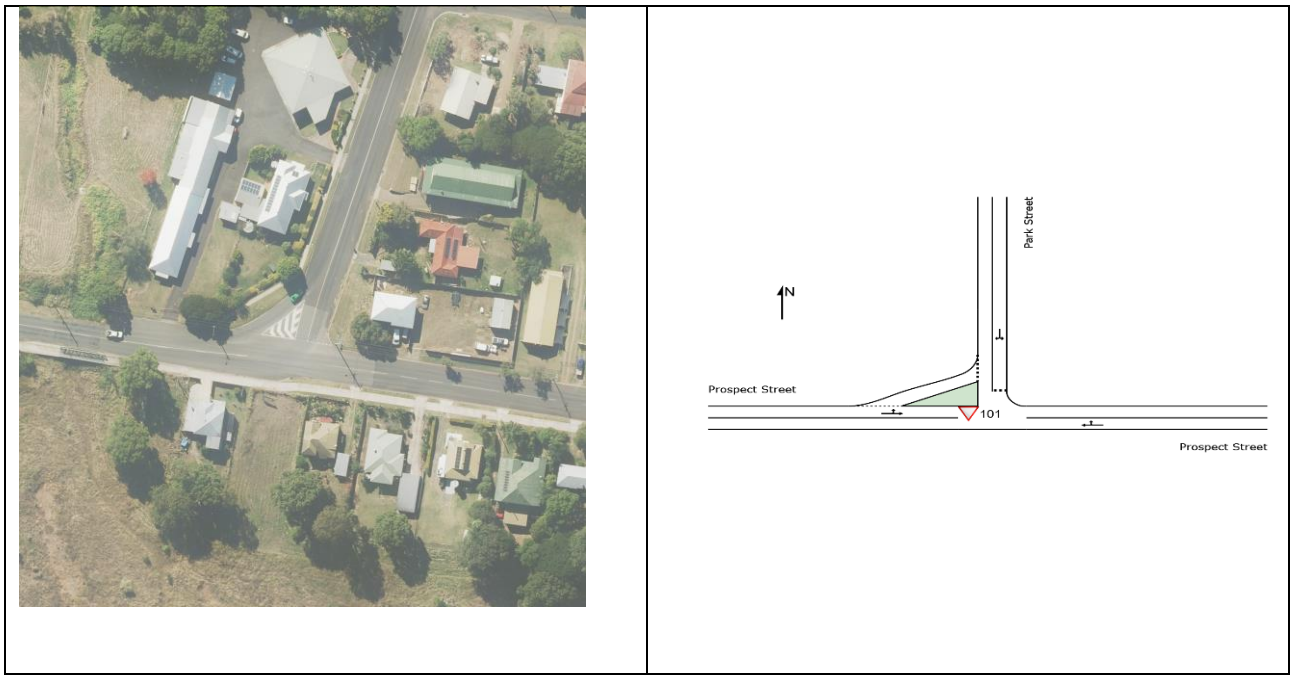


Figure 6.2 Aerial and SIDRA Layout – Park Street / Prospect Street

The result of the SIDRA assessment is summarised in Table 6.2. The SIDRA layouts and detailed results are included in Appendix D.

Table 6.2 SIDRA Results – Park Street / Prospect Street

Scenarios	AM Peak Period			PM Peak Period		
	DOS	Critical Mvmt Delay (s)	95th %ile Queue (m)	DOS	Critical Mvmt Delay (s)	95th %ile Queue (m)
2025 BG	0.26	8	9	0.26	8	7
2025 BG + DEV	0.34	9	13	0.37	9	13

As shown in Table 6.2, the T-intersection of Park Street / Prospect Street performs within the acceptable thresholds (DOS <0.80 and delay <42 seconds) in all scenarios.

As such, the intersection is anticipated to operate satisfactorily following the year of opening for the development.

6.3 Forest Hill Fernvale Road / Site Access

The proposed intersection is currently a priority-controlled T-intersection arrangement. The concept layout and SIDRA-assessed layout is illustrated in Figure 6.3.

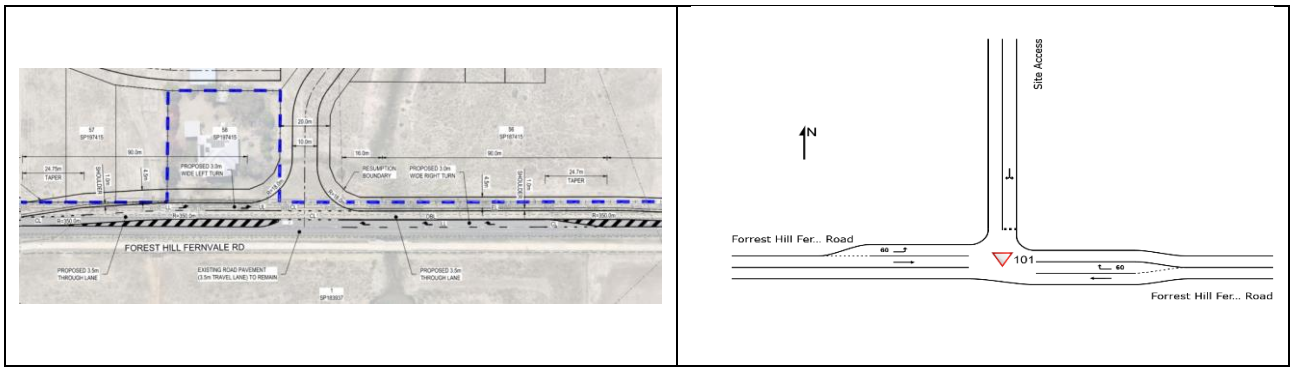


Figure 6.3 Concept Layout and SIDRA Layout – Forest Hill Fernvale Road / Site Access

The result of the SIDRA assessment is summarised in Table 6.3. The SIDRA layouts and detailed results are included in Appendix C.

Table 6.3 SIDRA Results – Forest Hill Fernvale Road / Site Access

Scenarios	AM Peak Period			PM Peak Period		
	DOS	Critical Mvmt Delay (s)	95th %ile Queue (m)	DOS	Critical Mvmt Delay (s)	95th %ile Queue (m)
2025 BG + DEV	0.26	10	8	0.22	10	5
2035 BG + DEV	0.29	10	9	0.25	11	5

As shown in Table 6.3, the T-intersection of Forest Hill Fernvale Road / Site Access performs within the acceptable thresholds (DOS <0.80 and delay <42 seconds) in all scenarios.

As such, the intersection is anticipated to operate satisfactorily following the year of opening and the 10-year design horizon for the development.

6.4 Network Delay Impact

In accordance with the GTIA requirements for no net worsening to baseline road network operations, this assessment has investigated the delay impact of the development traffic on the network. The assessment has reviewed whether the increase in average delay at the study intersections exceeds 5%. The average delay has been calculated as per the guidance in the GTIA illustrated in Figure 6.4, taking the aggregate average delay across the intersections for both the baseline scenario (2025 BG) and the with development scenario (2025 BG + DEV).

$$ID = \sum_{i=1}^{n} WD - \sum_{i=1}^{n} BC$$

where:

ID	is aggregate intersection-delay impact vehicle-minutes.
WD	is 'with development' intersection vehicle-minutes for design peak periods. This is calculated by multiplying the 'with development' average delay by movement to the base case volume on each movement, thus not counting the impact as delays to development traffic, only to pre-existing traffic that is affected by these additional delays.
BC	is base case intersection vehicle-minutes for design peak periods
n	is the number of intersections in the impact assessment area
i	is each intersection within the impact assessment area.

Source: TMR GTIA

Figure 6.4 Network Delay Impact

The results of the network impact assessment are summarized in Table 6.4.

Table 6.4 Intersection Delay Impact – Forest Hill Fernvale Road

Assessment Scenario	Aggregate Delay (veh-min)	
	AM Peak	PM Peak
BG Volumes	1331	1390
2025 BG	54.62	59.96
2025 BG + DEV	59.48	67.17
Difference (Development Impact)	4.86	7.21
Development Delay Impact (%)	8.90%	12.0%
Average Delay Impact (%)	10.5%	

As shown in Table 6.4, the network average delay impact is 10%, which exceeds the 5% threshold. However, mitigation measures are not warranted on the State-controlled road network on the basis of the following:

- The overall Degree of Saturation (DOS) and delays for each of the analysed intersections fall well within acceptable limits (i.e. DOS <0.80 and delays <42s) for both pre- and post-development scenarios, which indicates that neither of the intersections are approaching their capacities;

- Whilst the increase in traffic resulting from the development does increase movement delays by about 2 seconds at most, delays at each intersection still remain under 10 seconds in the post development scenario; and
- It is anticipated that the provision of the additional intersection on Forest Hill Fernvale Road will reduce right turn volumes and delays (westbound) at the Park Street / Prospect Street intersection, as residents within the existing Williams Street catchment and surrounds will utilize the internal road network to travel to / from the west, rather than passing through the Park Street / Prospect Street intersection.

On the basis of the above the impacts generated by the development on the external road network are considered to be satisfactory from a traffic engineering perspective.

7. Car Parking Assessment

7.1 Car Parking Requirements

The SRC Transport, Access and Parking Code specifies a parking rate of 2 spaces per dwelling for dwelling houses. This is a total parking requirement of 754 car parking spaces across the site.

7.2 Car Parking Provision

It is anticipated that each dwelling will contain a double garage for a total of 754 car parking spaces across the site.

7.3 Suitability of Car Parking

The car parking provision satisfies the minimum requirements of the Transport, Access and Parking Code and is expected to meet the parking demands generated by the development.

8. Design Review

8.1 Overview

Burchills Engineering Solutions has undertaken a detailed review of the proposed site layout to ensure compliance with relevant standards and guidelines, including:

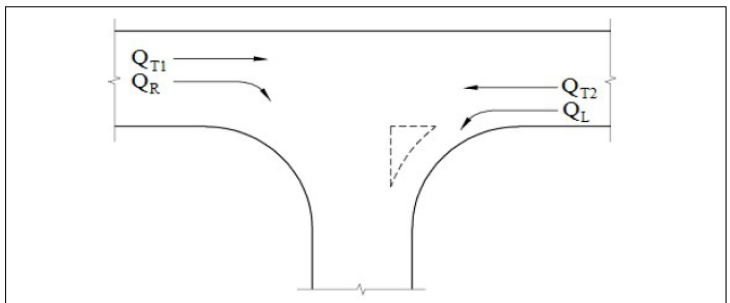
- Somerset Regional Council Planning Scheme;
- Austroads Guide to Road Design Part 4a (AGRD);
- Institute of Public Works Engineering Australasia (IPWEA) Street Design Manual (version 21 August 2020)
- Australian/New Zealand Standard AS2890.1:2004 Parking Facilities

8.2 Access Assessment

8.2.1 Turn Warrants Assessment

A turn warrant assessment has been undertaken in accordance with Department of Transport and Main Roads (DTMR) Road Planning and Design Manual Edition 2: Volume 3 Supplement to Austroads Guide to Road Design Part 4A: Unsignalised Intersections August 2014. A summary of the traffic movement parameters considered is shown in Figure 8.1 below.

Figure 4A-2 - Calculation of the major road traffic volume parameter 'Q_M'



Road Type	Turn Type	Splitter Island	Q_M (veh/h)
2 Lane 2 Way	Right	No	= Q_{T1} + Q_{T2} + Q_L
		Yes	= Q_{T1} + Q_{T2}
	Left	Yes/No	= Q_{T2}
4 Lane 2 Way	Right	No	= 50% x Q_{T1} + Q_{T2} + Q_L
		Yes	= 50% x Q_{T1} + Q_{T2}
	Left	Yes/No	= 50% x Q_{T2}

Figure 8.1 Turn Warrants Qm Traffic Flow Calculation

The adopted volumes for the 10-year design horizon scenario for the site access intersection turn warrant assessment are shown in Table 8.1 with the turn warrant diagram shown in Figure 8.2.

Table 8.1 Site Access Trips Peak Hours

Traffic Volume	AM peak hour	PM peak hour
Q_{T1} (westbound)	254	443
Q_{T2} (eastbound)	433	279

Q_L	33	33
Q_R	48	144
Q_M Left	433	279
Q_M Right	720	755

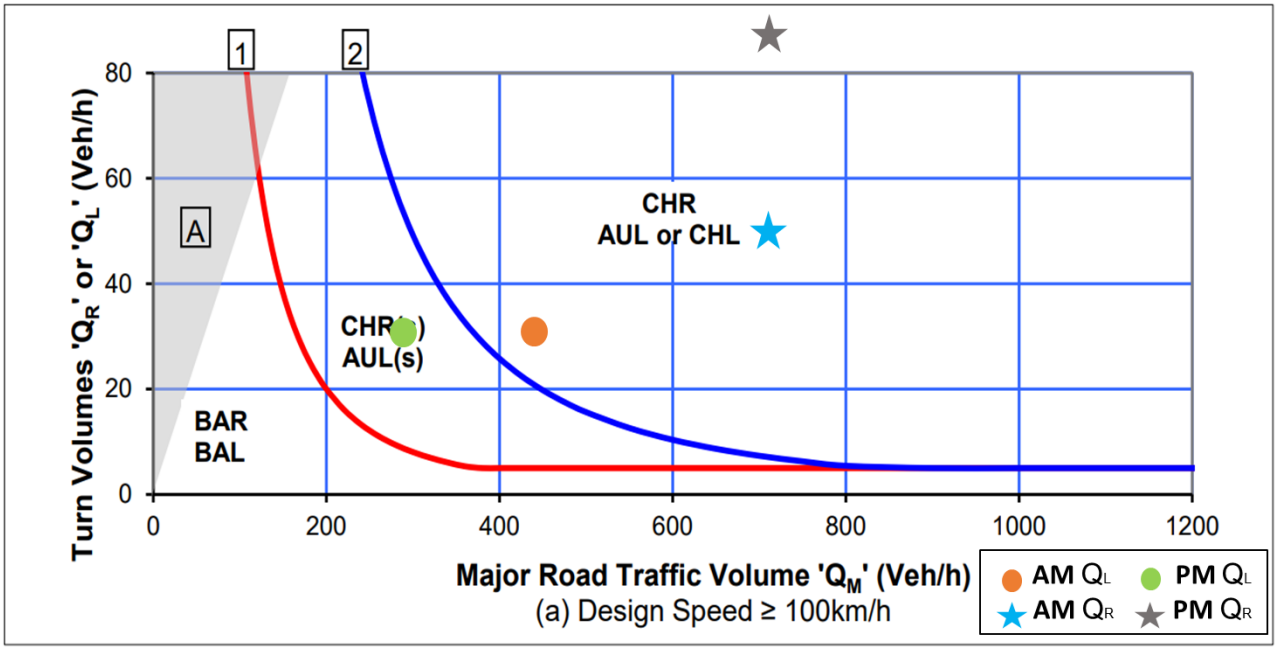


Figure 8.2 Turn Warrant Assessment (10-Year Design Horizon)

The assessment above indicates that the site access intersection will require the provision of a Channelised Right-turn (CHR) and an Auxiliary Left Turn (AUL) treatment in the 10-year design horizon scenario.

The site access intersection has been designed based on the above requirements and in accordance with Austroads Guide to Road Design Part 4a.

A concept layout of the intersection is shown in Figure 8.3 below.

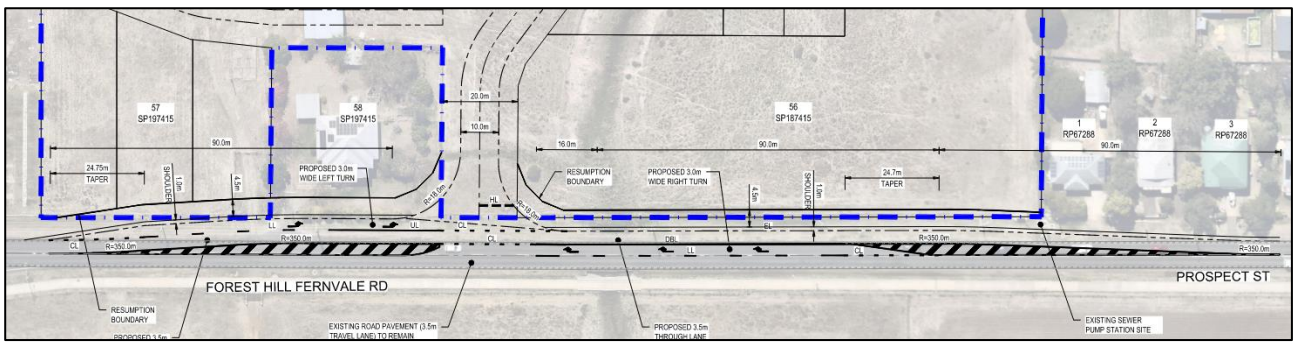


Figure 8.3 Site Access Intersection Concept Layout

8.2.2 Sight Distance

The safe intersection sight distance (SISD) at the proposed site access intersection on Forest Hill Fernvale Road has been assessed in accordance with Austroads Guide to Road Design, Part 4a, as shown in Table 8.2 and Figure 8.4 below.

Table 8.2 SISD Assessment at Site Access Intersection

Direction	Design Speed	SISD Requirement	Available	Compliance
Looking east	90km/h*	214m	>700m	Yes
Looking west	90km/h	214m	>450m	Yes

*Note: the speed limit changes to 60km/h immediately to the east of the subject site; however the sight distance has been assessed at 90km/h for a conservative approach.

Figure 8.4 Sight Lines from Site Access Location Looking East (left) and West (right)

As shown above, the site benefits from ample sight lines in both directions. The SISD at the proposed site access intersection complies with the requirements of AGRD Part 4a.

8.2.3 Safety Assessment on Forest Hill Fernvale Road

The crash data on the road network surrounding the subject site (i.e. between the study intersections on Forest Hill Fernvale Road) has been investigated over the past 5-year period (2017 to 2022). The crash data is summarized in Table 8.3 below.

Table 8.3 Crash Data on Forest Hill Fernvale Road (2017-2022)

Crash ID	Date	Conditions	Severity	DCA Code	Description
151779	November 2019	Daylight, clear	Hospitalisation	705	Off path straight: out of control off carriageway

As shown above, only one incident has been recorded in the previous 5 year period. Additionally, it was a single vehicle incident.

The crash data on Forest Hill Fernvale Road does not identify any recurring trends.

8.3 Internal Road Network

8.3.1 Road Widths and Hierarchy

As the internal road network will be managed by SRC, the internal road widths have been assessed against the SRC Standard Drawings.

The road characteristics and design requirements are outlined in Table 8.4 below.

Table 8.4 Road Width Assessment

Road Hierarchy Classification	Road Reserve Requirement	Road Reserve Provision	Carriageway Width Requirement	Carriageway Provision	Compliance
Access Street (40km/h)	Min. 16m	Min. 20m	Min. 8m	Min. 8m	Yes
Collector (60km/h)	Min. 20m	Min. 20m	Min. 10m	Min. 10m	Yes

On the basis of the above, the proposed internal road hierarchy is considered to be satisfactory from a traffic engineering perspective.

8.3.2 Road Capacities

The road capacities of the internal road network have been assessed according the proposed road hierarchy and SRC's Planning Scheme Policy 6.5.8 – Roadwork Design Standards.

Table 8.5 Road Capacity Assessment

Road Hierarchy Classification	Capacity	Max. No. of Lots Served	Compliance
Access Street (40km/h)	75 dwellings	~72 dwellings	Yes
Collector Street (60km/h)	300 dwellings	283 dwellings*	Yes

**Note: it has been assumed that 25% of dwellings will enter and exit the development via Williams Street, i.e. the local road network.*

As shown above, the proposed road hierarchy has sufficient capacity to cater for the expected traffic demands within the development.

8.3.3 Intersection Spacing

The recommended internal intersection spacing has been assessed based on the IPWEA Street Design Manual requirements, as indicated in Table 8.6.

Table 8.6 Intersection Spacing Assessment

Road	Minimum Requirements	Minimum Identified	Compliance
Local access roads	40m	60m	Yes

The assessment indicates that intersection spacing proposed for the internal local access roads meet the minimum requirements for IPWEA Street Design Manual.

8.3.4 Active Transport Provisions

Pedestrian footpaths are proposed throughout the development. The footpaths are a minimum of 1.5m wide in accordance with Somerset Regional Council's Standard Drawing SRC-ROAD-019.

8.4 Servicing

8.4.1 Service Vehicle Requirements

The SRC Planning Scheme does not specify service vehicle requirements for dwelling houses. However, it is assumed that access will be required for side-lift Waste Collection Vehicles (WCV) as well as moving trucks (8.8m long medium rigid vehicle, MRV).

8.4.2 Waste Collection

Waste will be collected kerbside via Council's waste collection service. Wheelie bins are proposed to store the waste for each dwelling.

8.4.3 Swept Path – 9.9m WCV

A swept path assessment has been undertaken for the proposed WCV, as shown in the swept paths in Appendix E. The swept path assessment indicates that the WCV can enter and exit the site in a forward gear.

9. Conclusions

Burchills Engineering Solutions has been engaged by Lowood One Pty Ltd to provide a Traffic Impact Assessment (TIA) for the proposed residential development at 2893 Forest Hill Fernvale Road, Lowood.

The following key points summarise the findings from the traffic impact assessment undertaken herein:

- The proposed development is comprised of 358 residential lots (including 19 duplex lots) for a total of 377 low density residential dwellings;
- Access to the development is proposed via a new access intersection on Forest Hill Fernvale Road, which includes an auxiliary left turn lane and channelised right turn lane in accordance with Austroads Guide to Road Design Part 4a;
- Pedestrian paths are provided throughout the development;
- Each dwelling will benefit from a double garage, satisfying the minimum requirements of the SRC Transport, Access and Parking Code;
- The internal road network complies with the road design requirements outlined within the Somerset Regional Council Planning Scheme and the IPWEA Street Design Manual;
- The site is anticipated to generate in the order of 321 vehicle movements during both the AM and PM peak periods;
- The operation of the Forest Hill Fernvale Road / site access intersection has been assessed using SIDRA intersection 9.1. The results indicate that the site access intersection will operate within acceptable performance thresholds in the post-development scenario for the year of opening (2025) and 10-year design horizon (2035);
- The adjacent State-controlled intersections (Peregrine Drive / Forest Hill Fernvale Road, Park Road / Prospect Street) operate within acceptable performance thresholds in the post-development scenario for the year of opening (2025);
- A delay assessment was undertaken of the adjacent State-controlled intersections. Whilst the 5% threshold was exceeded, overall delay impacts to the State-controlled road network are expected to be low and do not warrant mitigation measures;
- Swept path analysis indicates that a side lift WCV can traverse the internal road network to collect waste, entering and exiting the site in a forward gear.

Appendix A – Site Layout

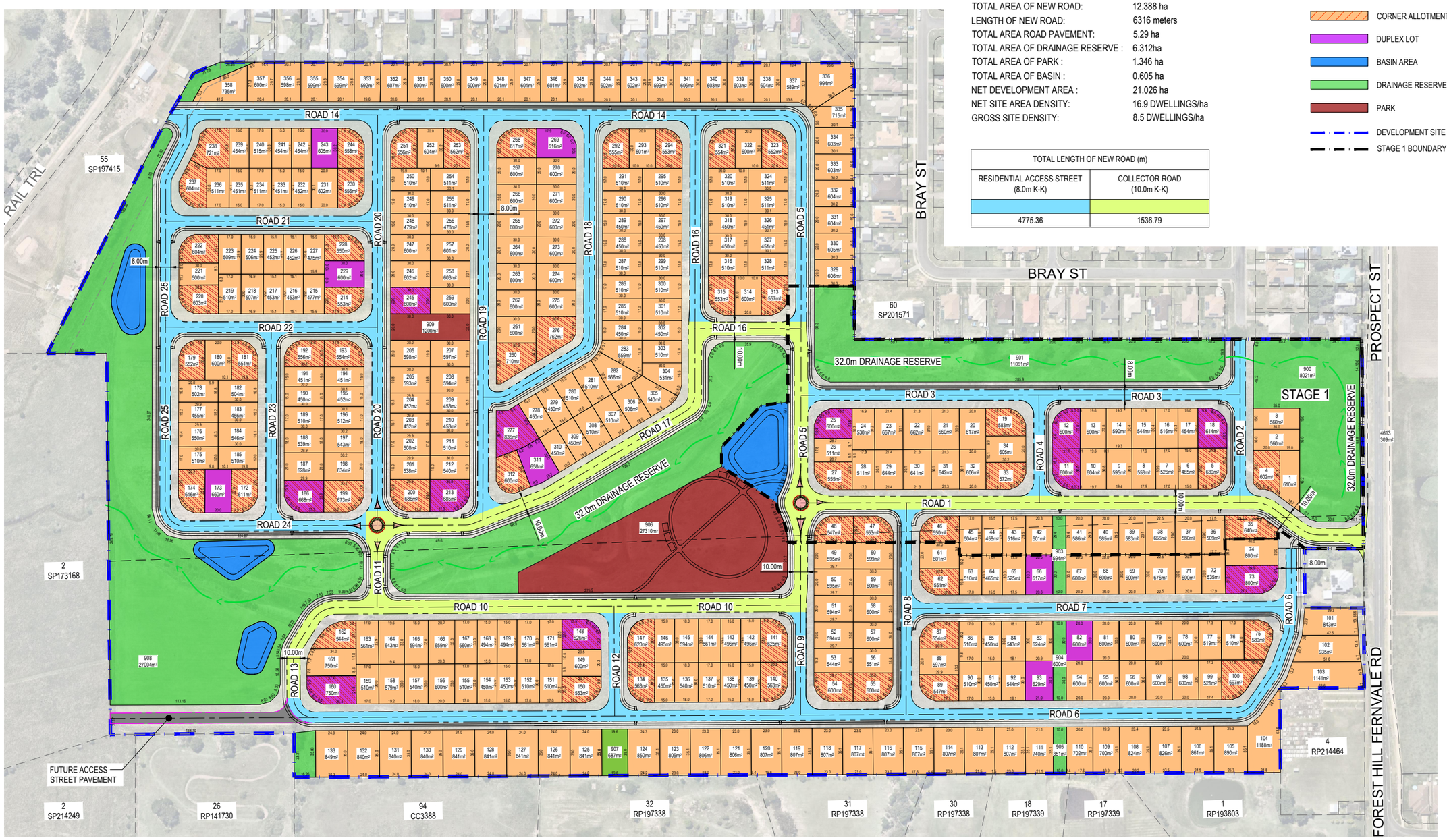
DEVELOPMENT SUMMARY

TOTAL RESIDENTIAL LOTS:	358
TOTAL DWELLINGS:	377
TOTAL SITE AREA:	41.677 ha
TOTAL AREA OF NEW ROAD:	12.388 ha
LENGTH OF NEW ROAD:	6316 meters
TOTAL AREA ROAD PAVEMENT:	5.29 ha
TOTAL AREA OF DRAINAGE RESERVE :	6.312ha
TOTAL AREA OF PARK :	1.346 ha
TOTAL AREA OF BASIN :	0.605 ha
NET DEVELOPMENT AREA :	21.026 ha
NET SITE AREA DENSITY:	16.9 DWELLINGS/ha
GROSS SITE DENSITY:	8.5 DWELLINGS/ha

TOTAL LENGTH OF NEW ROAD (m)	
RESIDENTIAL ACCESS STREET (8.0m K-K)	COLLECTOR ROAD (10.0m K-K)
4775.36	1536.79

LEGEND

- TYPICAL ALLOTMENTS
- CORNER ALLOTMENTS
- DUPLEX LOT
- BASIN AREA
- DRAINAGE RESERVE
- PARK
- DEVELOPMENT SITE BOUNDARY
- STAGE 1 BOUNDARY



Prepared for : LOWOOD ONE PTY LTD

Designer : QT
Checked : JC
Date : 27.03.24

MASTER PLAN
2983 FOREST HILL FERNVALE RD,
LOWOOD QLD 4311

SCALE 15 0 15 30 45 60 75 (metres)
1 : 1500 (FULL SIZE)

BE230128-00-SK001-B

BURCHILLS ENGINEERING SOLUTIONS
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Phone: +61 7 5509 6400
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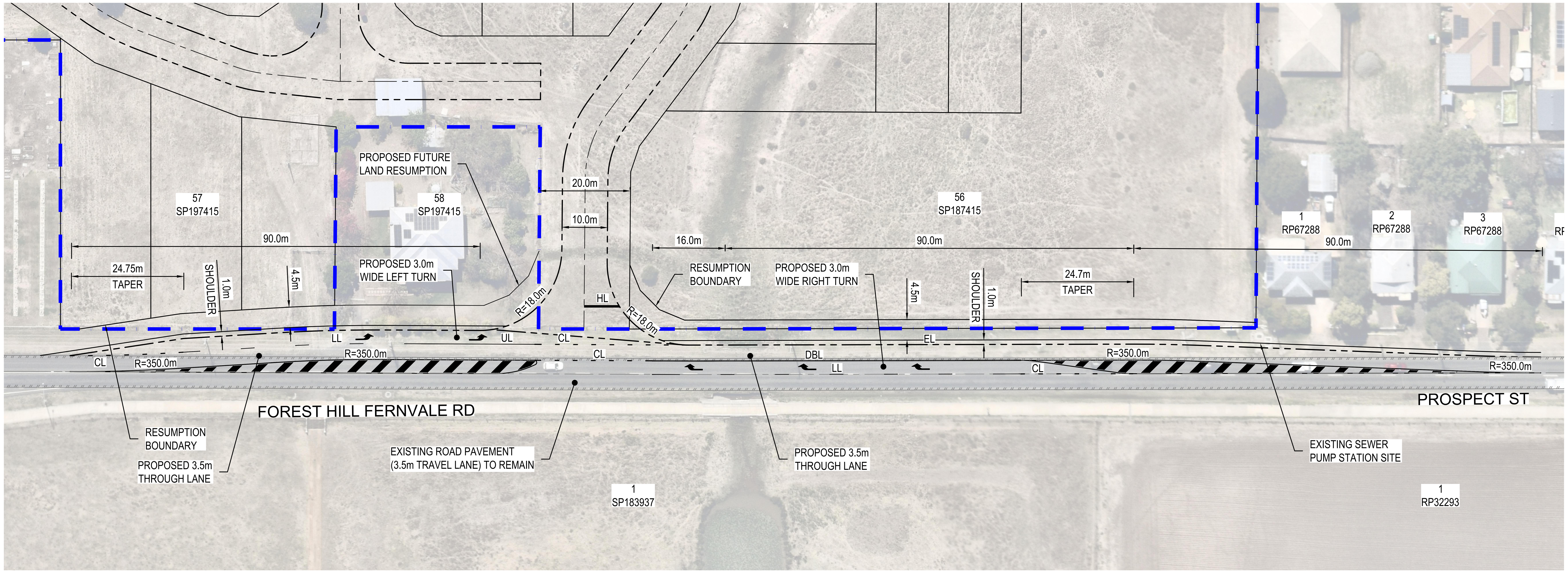
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365



INTERSECTION FUNCTIONAL PLAN

SCALE 1 : 500 (FULL SIZE) (metres)

LEGEND

- DEVELOPMENT SITE BOUNDARY
- PROPOSED LOT BOUNDARY
- PROPOSED ROAD CONTROL LINE
- EXISTING Ø150 WATER MAIN
- EXISTING SEWER RISING MAIN
- EXISTING SEWER MAIN
- EXISTING COMMS
- EXISTING OVERHEAD ELECTRIC
- EXISTING FLOWPATH / WATERWAY

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCIL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	10.04.24

DISCLAIMER

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NOTE

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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT: CONCEPT ENGINEERING DRAWINGS

DRAWING TITLE: INTERSECTION FUNCTIONAL PLAN

DEVEL. APPLIC. No. : -	DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL	
DESIGNER : TG	
DRAFTSPERSON : CD	
CHECKED : FRASER LUCAS	

APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365

RPEQ No. :

SCALE : AS NOTED	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE230128-00	DRAWING No. : SK320	VERSION: B

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PLOTTED: 25.04.2024 at 15:48

Appendix B – Traffic Survey

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 1 **Weather:** Fine

Location: Forest Hill Fernvale Road/Peregrine Drive, Lowood

Day/Date: Thursday, 7 September 2023

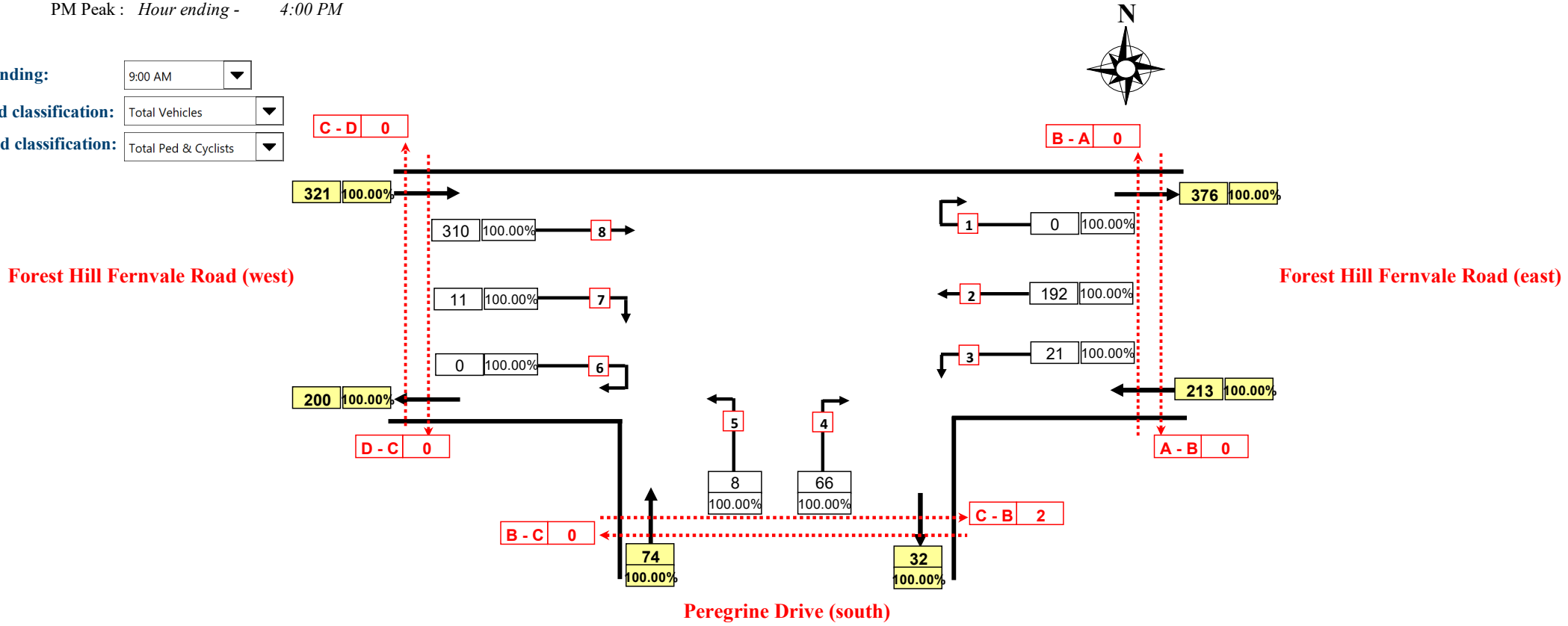
Summary: AM Peak : *Hour ending - 9:00 AM*

PM Peak : *Hour ending - 4:00 PM*

Hour Ending: 9:00 AM

On-road classification: Total Vehicles

Off-road classification: Total Ped & Cyclists



Note: 3.28% = proportion of selected vehicle classification as a percentage of total vehicles

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 1 **Weather:** Fine

Location: Forest Hill Fernvale Road/Peregrine Drive, Lowood

Day/Date: Thursday, 7 September 2023

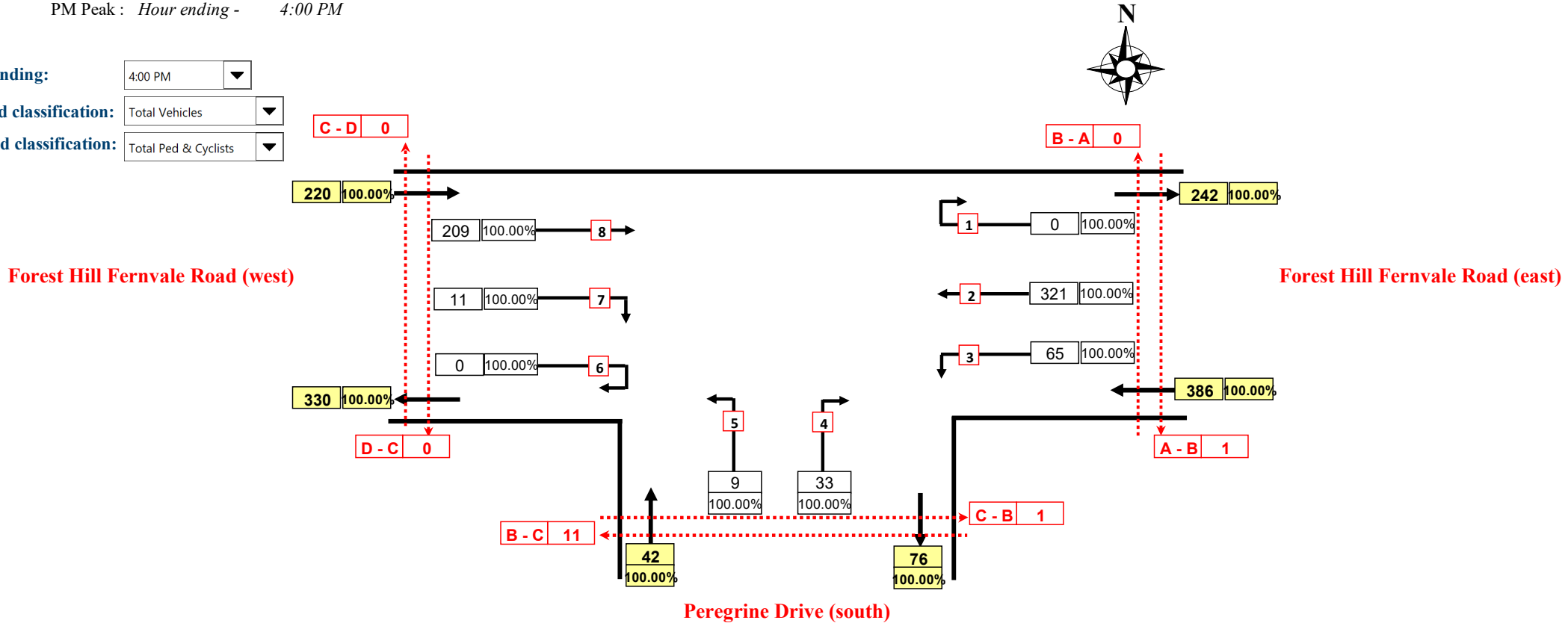
Summary: AM Peak : *Hour ending - 9:00 AM*

PM Peak : *Hour ending - 4:00 PM*

Hour Ending: 4:00 PM

On-road classification: Total Vehicles

Off-road classification: Total Ped & Cyclists



Note: 3.28% = proportion of selected vehicle classification as a percentage of total vehicles

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 2 **Weather:** Fine

Location: Prospect Street/Park Street, Lowood

Day/Date: Thursday, 7 September 2023

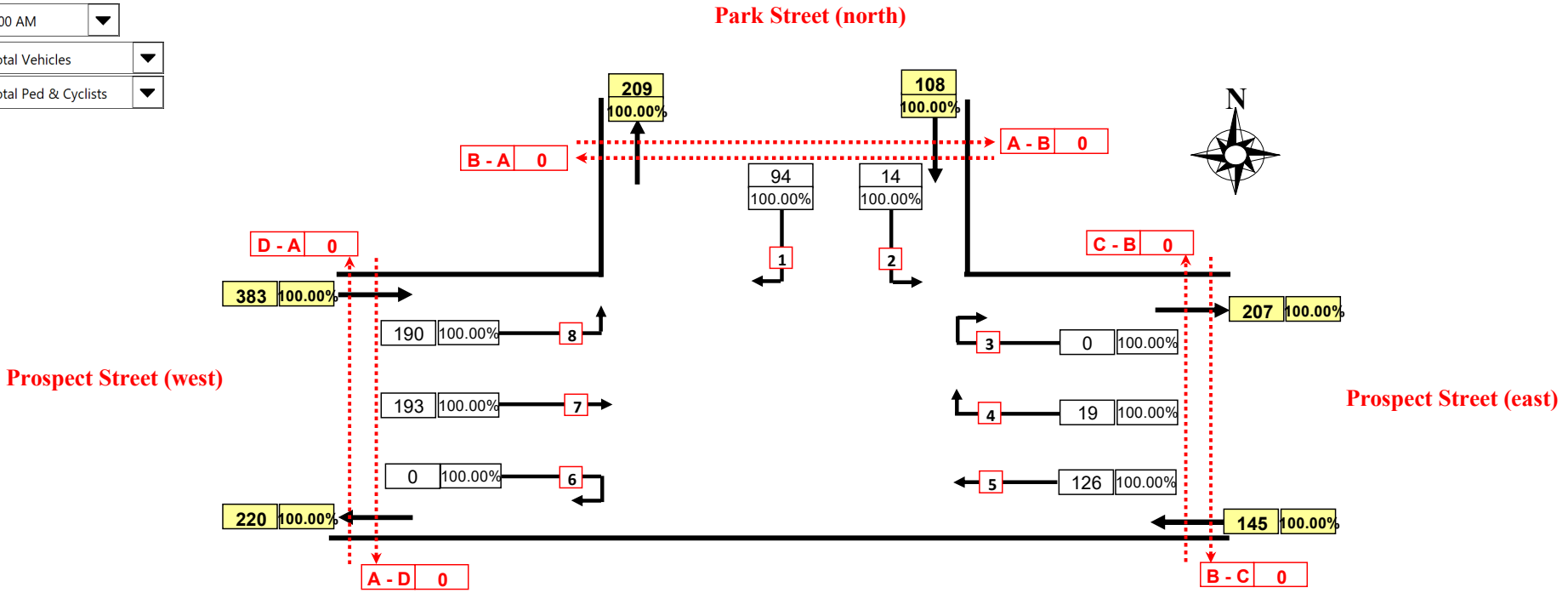
Summary: AM Peak : *Hour ending - 9:00 AM*

PM Peak : *Hour ending - 4:00 PM*

Hour Ending: 9:00 AM

On-road classification: Total Vehicles

Off-road classification: Total Ped & Cyclists



Note: 3.28% = proportion of selected vehicle classification as a percentage of total vehicles

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 2 **Weather:** Fine

Location: Prospect Street/Park Street, Lowood

Day/Date: Thursday, 7 September 2023

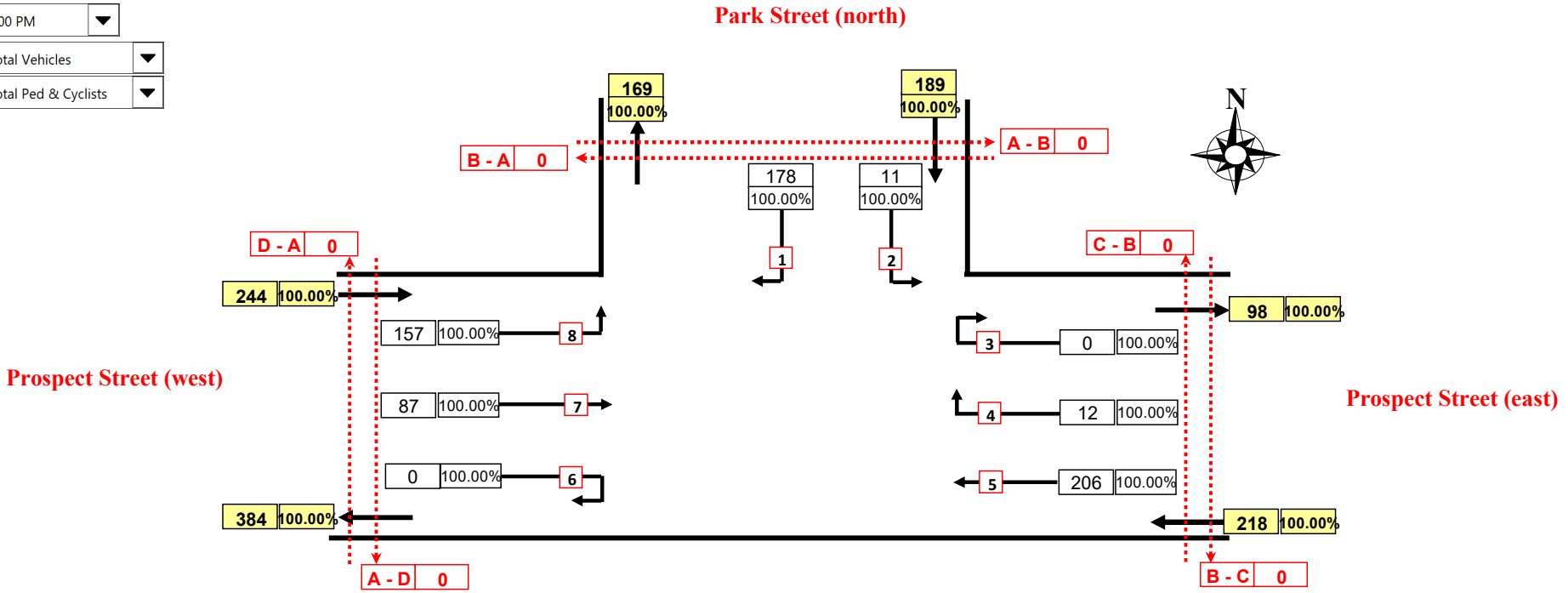
Summary: AM Peak : *Hour ending - 9:00 AM*

PM Peak : *Hour ending - 4:00 PM*

Hour Ending: 4:00 PM

On-road classification: Total Vehicles

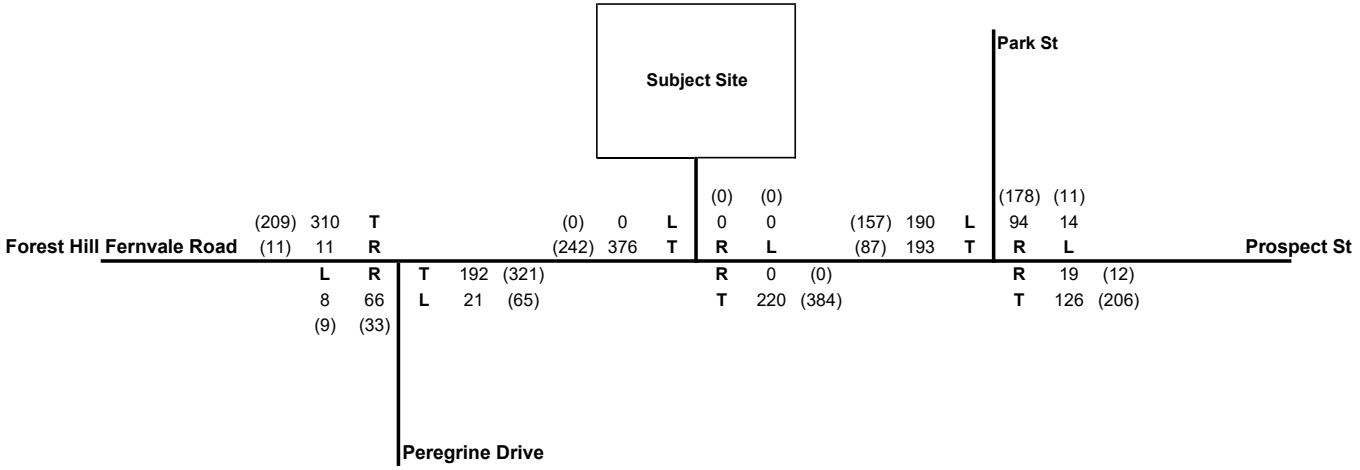
Off-road classification: Total Ped & Cyclists



Note: 3.28% = proportion of selected vehicle classification as a percentage of total vehicles

Appendix C – Traffic Flow Diagrams

AM Peak 8:00AM - 9:00AM
(PM Peak) 3:00PM - 4:00PM

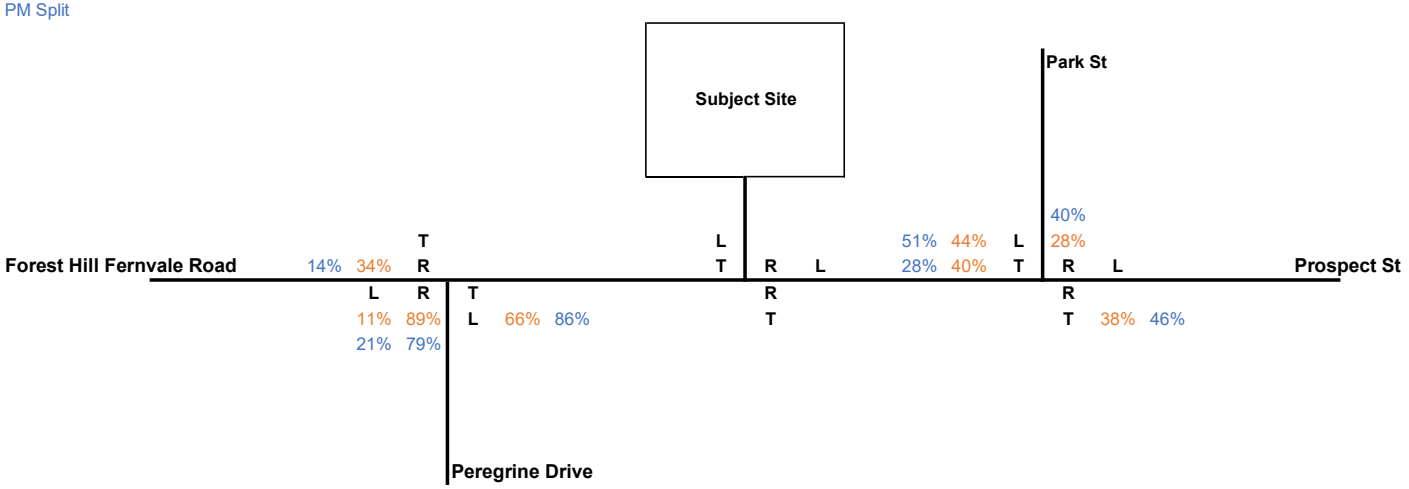


BE230128_2983 Forest Hill Fernvale Road

2023 Background Traffic Volumes

BURCHILLS
ENGINEERING SOLUTIONS

AM Peak 8:00AM - 9:00AM
(PM Peak) 3:00PM - 4:00PM
AM Split
PM Split



BE230128_2983 Forest Hill Fernvale Road

2023 Existing In / Out Splits

BURCHILLS ENGINEERING SOLUTIONS

BE230128_2983 Forest Hill Fernvale Road

Development Trips

BURCHILLS ENGINEERING SOLUTIONS

Growth factor (Forest Hill Fernvale Road): 1.03
Assessment year: 2025
AM Peak
(PM Peak)

BE230128_2983 Forest Hill Fernvale Road

2025 Background Traffic Volumes

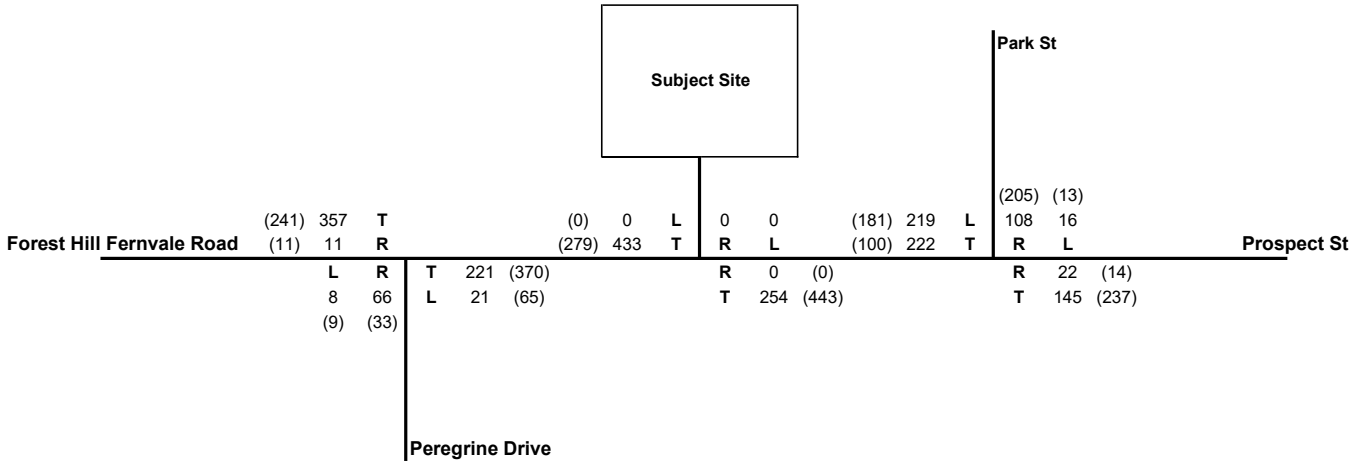
BURCHILLS ENGINEERING SOLUTIONS

Assessment year: 2025
AM Peak
(PM Peak)

BE230128_2983 Forest Hill Fernvale Road

2025 Background + Development Traffic

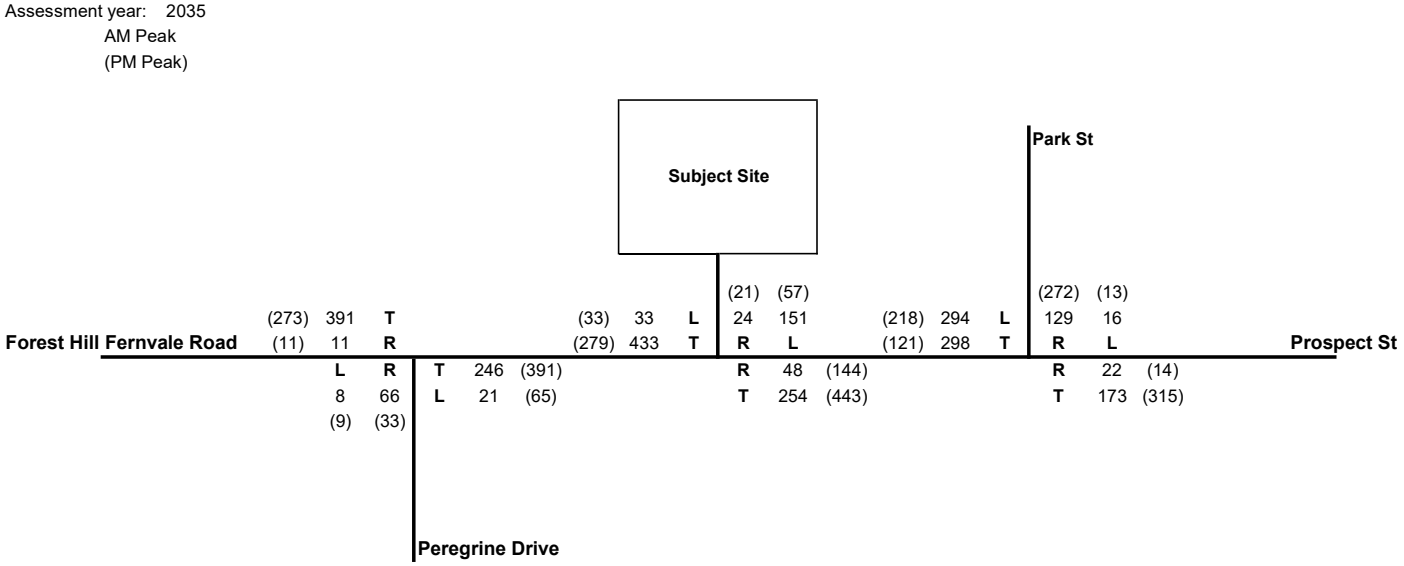
Growth factor (Forest Hill Fernvale Road): 1.15
Assessment year: 2035
AM Peak
(PM Peak)



BE230128_2983 Forest Hill Fernvale Road

2035 Background Traffic Volumes

BURCHILLS
ENGINEERING SOLUTIONS



BE230128_2983 Forest Hill Fernvale Road

2035 Background + Development Traffic

BURCHILLS ENGINEERING SOLUTIONS

Appendix D – SIDRA Outputs

USER REPORT FOR SITE

Project: Forest Hill Fernvale Road_Intersection Models

Output produced by SIDRA INTERSECTION Version: 9.1.4.221 **Template: Movement Summary**

Site: 101 [BG2025 Peregrine Drive / Forest Hill Fernvale Road - AM Peak (Site Folder: BG2025)]

Peregrine Drive / Forest Hill Fernvale Road
BG2025
AM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Peregrine Drive															
1	L2	All MCs	8	5.0	8	5.0	0.164	6.6	LOS A	0.6	4.4	0.60	0.80	0.60	48.5
3	R2	All MCs	69	5.0	69	5.0	0.164	12.2	LOS B	0.6	4.4	0.60	0.80	0.60	48.5
Approach			78	5.0	78	5.0	0.164	11.6	LOS B	0.6	4.4	0.60	0.80	0.60	48.5
East: Forest Hill Fernvale Road															
4	L2	All MCs	22	5.0	22	5.0	0.012	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.7
5	T1	All MCs	218	5.0	218	5.0	0.115	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			240	5.0	240	5.0	0.115	0.5	NA	0.0	0.0	0.00	0.05	0.00	59.2
West: Forest Hill Fernvale Road															
11	T1	All MCs	352	5.0	352	5.0	0.186	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12	R2	All MCs	12	5.0	12	5.0	0.011	6.5	LOS A	0.0	0.3	0.33	0.57	0.33	51.5
Approach			363	5.0	363	5.0	0.186	0.3	NA	0.0	0.3	0.01	0.02	0.01	59.6
All Vehicles			681	5.0	681	5.0	0.186	1.7	NA	0.6	4.4	0.07	0.12	0.07	57.9

Site: 101 [BG2025 Peregrine Drive / Forest Hill Fernvale Road - PM Peak (Site Folder: BG2025)]

Peregrine Drive / Forest Hill Fernvale Road
BG2025
PM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Peregrine Drive															
1	L2	All MCs	9	5.0	9	5.0	0.096	7.4	LOS A	0.3	2.5	0.59	0.80	0.59	48.5
3	R2	All MCs	35	5.0	35	5.0	0.096	12.8	LOS B	0.3	2.5	0.59	0.80	0.59	48.5
Approach			44	5.0	44	5.0	0.096	11.7	LOS B	0.3	2.5	0.59	0.80	0.59	48.5
East: Forest Hill Fernvale Road															
4	L2	All MCs	68	5.0	68	5.0	0.038	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.7
5	T1	All MCs	363	5.0	363	5.0	0.192	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			432	5.0	432	5.0	0.192	0.9	NA	0.0	0.0	0.00	0.09	0.00	58.6
West: Forest Hill Fernvale Road															
11	T1	All MCs	237	5.0	237	5.0	0.125	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12	R2	All MCs	12	5.0	12	5.0	0.013	7.6	LOS A	0.0	0.4	0.46	0.63	0.46	50.9
Approach			248	5.0	248	5.0	0.125	0.4	NA	0.0	0.4	0.02	0.03	0.02	59.4
All Vehicles			724	5.0	724	5.0	0.192	1.4	NA	0.3	2.5	0.04	0.11	0.04	58.2

Site: 101 [BG2025_Park Street / Prospect Street - AM Peak (Site Folder: BG2025)]

Park Street / Prospect Street
BG2025
AM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Prospect Street															
5	T1	All MCs	143	5.0	143	5.0	0.091	0.2	LOS A	0.2	1.1	0.10	0.12	0.10	58.9
6	R2	All MCs	21	5.0	21	5.0	0.091	6.3	LOS A	0.2	1.1	0.10	0.12	0.10	55.9
Approach			164	5.0	164	5.0	0.091	0.9	NA	0.2	1.1	0.10	0.12	0.10	58.5
North: Park Street															
7	L2	All MCs	16	5.0	16	5.0	0.151	6.4	LOS A	0.5	3.8	0.45	0.71	0.45	51.0
9	R2	All MCs	106	5.0	106	5.0	0.151	8.1	LOS A	0.5	3.8	0.45	0.71	0.45	50.7
Approach			122	5.0	122	5.0	0.151	7.9	LOS A	0.5	3.8	0.45	0.71	0.45	50.7
West: Prospect Street															
10	L2	All MCs	215	5.0	215	5.0	0.256	5.7	LOS A	1.2	8.7	0.08	0.27	0.08	54.9
11	T1	All MCs	219	5.0	219	5.0	0.256	0.0	LOS A	1.2	8.7	0.08	0.27	0.08	57.1
Approach			434	5.0	434	5.0	0.256	2.9	NA	1.2	8.7	0.08	0.27	0.08	56.0
All Vehicles			720	5.0	720	5.0	0.256	3.3	NA	1.2	8.7	0.15	0.31	0.15	55.6

Site: 101 [BG2025_Park Street / Prospect Street - PM Peak (Site Folder: BG2025)]

Park Street / Prospect Street
BG2025
PM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Prospect Street															
5	T1	All MCs	234	5.0	234	5.0	0.133	0.0	LOS A	0.1	0.7	0.03	0.04	0.03	59.6
6	R2	All MCs	14	5.0	14	5.0	0.133	5.7	LOS A	0.1	0.7	0.03	0.04	0.03	56.5
Approach			247	5.0	247	5.0	0.133	0.3	NA	0.1	0.7	0.03	0.04	0.03	59.4
North: Park Street															
7	L2	All MCs	13	5.0	13	5.0	0.256	6.0	LOS A	1.0	6.9	0.45	0.70	0.45	51.0
9	R2	All MCs	202	5.0	202	5.0	0.256	7.9	LOS A	1.0	6.9	0.45	0.70	0.45	50.7
Approach			215	5.0	215	5.0	0.256	7.8	LOS A	1.0	6.9	0.45	0.70	0.45	50.8
West: Prospect Street															
10	L2	All MCs	178	5.0	178	5.0	0.167	5.7	LOS A	0.8	5.6	0.07	0.35	0.07	54.3
11	T1	All MCs	99	5.0	99	5.0	0.167	0.0	LOS A	0.8	5.6	0.07	0.35	0.07	56.4
Approach			277	5.0	277	5.0	0.167	3.7	NA	0.8	5.6	0.07	0.35	0.07	55.0
All Vehicles			739	5.0	739	5.0	0.256	3.8	NA	1.0	6.9	0.17	0.35	0.17	55.0

USER REPORT FOR SITE

Project: Forest Hill Fernvale Road_Intersection Models

Output produced by SIDRA INTERSECTION Version: 9.1.4.221 **Template: Movement Summary**

Site: 101 [DEV2025_Park Street / Prospect Street - PM Peak (Site Folder: DEV2025)]

Park Street / Prospect Street
DEV2025
PM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Prospect Street															
5	T1	All MCs	304	5.0	304	5.0	0.169	0.0	LOS A	0.1	0.7	0.02	0.03	0.02	59.7
6	R2	All MCs	13	5.0	13	5.0	0.169	5.7	LOS A	0.1	0.7	0.02	0.03	0.02	56.6
Approach			317	5.0	317	5.0	0.169	0.2	NA	0.1	0.7	0.02	0.03	0.02	59.6
North: Park Street															
7	L2	All MCs	12	5.0	12	5.0	0.369	6.6	LOS A	1.7	12.6	0.55	0.81	0.68	49.9
9	R2	All MCs	262	5.0	262	5.0	0.369	9.5	LOS A	1.7	12.6	0.55	0.81	0.68	49.6
Approach			274	5.0	274	5.0	0.369	9.4	LOS A	1.7	12.6	0.55	0.81	0.68	49.7
West: Prospect Street															
10	L2	All MCs	208	5.0	208	5.0	0.195	5.7	LOS A	0.9	6.8	0.06	0.35	0.06	54.3
11	T1	All MCs	116	5.0	116	5.0	0.195	0.0	LOS A	0.9	6.8	0.06	0.35	0.06	56.4
Approach			324	5.0	324	5.0	0.195	3.7	NA	0.9	6.8	0.06	0.35	0.06	55.1
All Vehicles			915	5.0	915	5.0	0.369	4.2	NA	1.7	12.6	0.19	0.38	0.23	54.7

Site: 101 [DEV2025 Peregrine Drive / Forest Hill Fernvale Road - AM Peak (Site Folder: DEV2025)]

Peregrine Drive / Forest Hill Fernvale Road
DEV2025
AM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Peregrine Drive															
1	L2	All MCs	8	5.0	8	5.0	0.173	6.7	LOS A	0.6	4.6	0.61	0.82	0.61	48.1
3	R2	All MCs	69	5.0	69	5.0	0.173	12.9	LOS B	0.6	4.6	0.61	0.82	0.61	48.1
Approach			78	5.0	78	5.0	0.173	12.2	LOS B	0.6	4.6	0.61	0.82	0.61	48.1
East: Forest Hill Fernvale Road															
4	L2	All MCs	22	5.0	22	5.0	0.012	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.7
5	T1	All MCs	233	5.0	233	5.0	0.123	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			255	5.0	255	5.0	0.123	0.5	NA	0.0	0.0	0.00	0.05	0.00	59.2
West: Forest Hill Fernvale Road															
11	T1	All MCs	369	5.0	369	5.0	0.196	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12	R2	All MCs	12	5.0	12	5.0	0.011	6.6	LOS A	0.0	0.3	0.35	0.58	0.35	51.5
Approach			381	5.0	381	5.0	0.196	0.2	NA	0.0	0.3	0.01	0.02	0.01	59.6
All Vehicles			714	5.0	714	5.0	0.196	1.6	NA	0.6	4.6	0.07	0.12	0.07	58.0

Site: 101 [DEV2025 Peregrine Drive / Forest Hill Fernvale Road - PM Peak (Site Folder: DEV2025)]

Peregrine Drive / Forest Hill Fernvale Road
DEV2025
PM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Peregrine Drive															
1	L2	All MCs	9	5.0	9	5.0	0.100	7.5	LOS A	0.4	2.6	0.60	0.81	0.60	48.2
3	R2	All MCs	35	5.0	35	5.0	0.100	13.4	LOS B	0.4	2.6	0.60	0.81	0.60	48.2
Approach			44	5.0	44	5.0	0.100	12.1	LOS B	0.4	2.6	0.60	0.81	0.60	48.2
East: Forest Hill Fernvale Road															
4	L2	All MCs	68	5.0	68	5.0	0.038	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.7
5	T1	All MCs	368	5.0	368	5.0	0.195	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			437	5.0	437	5.0	0.195	0.9	NA	0.0	0.0	0.00	0.09	0.00	58.6
West: Forest Hill Fernvale Road															
11	T1	All MCs	260	5.0	260	5.0	0.138	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12	R2	All MCs	12	5.0	12	5.0	0.013	7.6	LOS A	0.0	0.4	0.46	0.63	0.46	50.9
Approach			272	5.0	272	5.0	0.138	0.4	NA	0.0	0.4	0.02	0.03	0.02	59.5
All Vehicles			753	5.0	753	5.0	0.195	1.4	NA	0.4	2.6	0.04	0.11	0.04	58.2

Site: 101 [DEV2025_Park Street / Prospect Street - AM Peak (Site Folder: DEV2025)]

Park Street / Prospect Street
DEV2025
AM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Prospect Street															
5	T1	All MCs	165	5.0	165	5.0	0.103	0.2	LOS A	0.2	1.2	0.10	0.12	0.10	59.0
6	R2	All MCs	20	5.0	20	5.0	0.103	6.6	LOS A	0.2	1.2	0.10	0.12	0.10	56.0
Approach			185	5.0	185	5.0	0.103	0.9	NA	0.2	1.2	0.10	0.12	0.10	58.6
North: Park Street															
7	L2	All MCs	15	5.0	15	5.0	0.201	6.8	LOS A	0.7	5.0	0.53	0.78	0.53	50.2
9	R2	All MCs	123	5.0	123	5.0	0.201	9.2	LOS A	0.7	5.0	0.53	0.78	0.53	49.9
Approach			138	5.0	138	5.0	0.201	9.0	LOS A	0.7	5.0	0.53	0.78	0.53	50.0
West: Prospect Street															
10	L2	All MCs	283	5.0	283	5.0	0.337	5.7	LOS A	1.7	12.5	0.09	0.27	0.09	54.9
11	T1	All MCs	288	5.0	288	5.0	0.337	0.0	LOS A	1.7	12.5	0.09	0.27	0.09	57.0
Approach			572	5.0	572	5.0	0.337	2.9	NA	1.7	12.5	0.09	0.27	0.09	56.0
All Vehicles			895	5.0	895	5.0	0.337	3.4	NA	1.7	12.5	0.16	0.32	0.16	55.5

Site: 101 [Forrest Hill Fernvale Road and Site Access with Dev 2025 AM - Import (Site Folder: DEV2025)]

Forrest Hill Fernvale Road and Site Access 2025
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Forrest Hill Fernvale Road															
5	T1	All MCs	238	5.0	238	5.0	0.126	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	All MCs	51	5.0	51	5.0	0.059	7.8	LOS A	0.2	1.6	0.48	0.69	0.48	50.7
Approach			288	5.0	288	5.0	0.126	1.4	NA	0.2	1.6	0.08	0.12	0.08	58.1
North: Site Access															
7	L2	All MCs	159	5.0	159	5.0	0.263	8.2	LOS A	1.1	7.7	0.54	0.76	0.57	50.0
9	R2	All MCs	25	5.0	25	5.0	0.263	15.8	LOS C	1.1	7.7	0.54	0.76	0.57	49.9
Approach			184	5.0	184	5.0	0.263	9.3	LOS A	1.1	7.7	0.54	0.76	0.57	50.0
West: Forrest Hill Fernvale Road															
10	L2	All MCs	35	5.0	35	5.0	0.019	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.7
11	T1	All MCs	406	5.0	406	5.0	0.215	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			441	5.0	441	5.0	0.215	0.5	NA	0.0	0.0	0.00	0.05	0.00	59.2
All Vehicles			914	5.0	914	5.0	0.263	2.5	NA	1.1	7.7	0.14	0.21	0.14	56.8

Site: 101 [Forrest Hill Fernvale Road and Site Access with Dev 2025 PM - Import (Site Folder: DEV2025)]

Forrest Hill Fernvale Road and Site Access 2025
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Forrest Hill Fernvale Road															
5	T1	All MCs	415	5.0	415	5.0	0.220	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	All MCs	152	5.0	152	5.0	0.148	7.0	LOS A	0.6	4.5	0.41	0.65	0.41	51.3
Approach			566	5.0	566	5.0	0.220	1.9	NA	0.6	4.5	0.11	0.18	0.11	57.3
North: Site Access															
7	L2	All MCs	60	5.0	60	5.0	0.137	6.9	LOS A	0.5	3.6	0.52	0.69	0.52	49.7
9	R2	All MCs	22	5.0	22	5.0	0.137	17.9	LOS C	0.5	3.6	0.52	0.69	0.52	49.5
Approach			82	5.0	82	5.0	0.137	9.8	LOS A	0.5	3.6	0.52	0.69	0.52	49.6
West: Forrest Hill Fernvale Road															
10	L2	All MCs	35	5.0	35	5.0	0.019	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.7
11	T1	All MCs	261	5.0	261	5.0	0.138	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			296	5.0	296	5.0	0.138	0.7	NA	0.0	0.0	0.00	0.07	0.00	59.0
All Vehicles			944	5.0	944	5.0	0.220	2.2	NA	0.6	4.5	0.11	0.19	0.11	57.0

Site: 101 [Forrest Hill Fernvale Road and Site Access with Dev 2035 AM - Import (Site Folder: DEV2035)]

Forrest Hill Fernvale Road and Site Access 2025
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Forrest Hill Fernvale Road															
5	T1	All MCs	267	5.0	267	5.0	0.142	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	All MCs	51	5.0	51	5.0	0.064	8.2	LOS A	0.2	1.7	0.50	0.72	0.50	50.5
Approach			318	5.0	318	5.0	0.142	1.3	NA	0.2	1.7	0.08	0.11	0.08	58.2
North: Site Access															
7	L2	All MCs	159	5.0	159	5.0	0.288	8.9	LOS A	1.2	8.8	0.58	0.81	0.65	49.4
9	R2	All MCs	25	5.0	25	5.0	0.288	18.3	LOS C	1.2	8.8	0.58	0.81	0.65	49.3
Approach			184	5.0	184	5.0	0.288	10.2	LOS B	1.2	8.8	0.58	0.81	0.65	49.4
West: Forrest Hill Fernvale Road															
10	L2	All MCs	35	5.0	35	5.0	0.019	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.7
11	T1	All MCs	456	5.0	456	5.0	0.241	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			491	5.0	491	5.0	0.241	0.5	NA	0.0	0.0	0.00	0.04	0.00	59.3
All Vehicles			993	5.0	993	5.0	0.288	2.5	NA	1.2	8.8	0.13	0.21	0.15	56.8

Site: 101 [Forrest Hill Fernvale Road and Site Access with Dev 2035 PM - Import (Site Folder: DEV2035)]

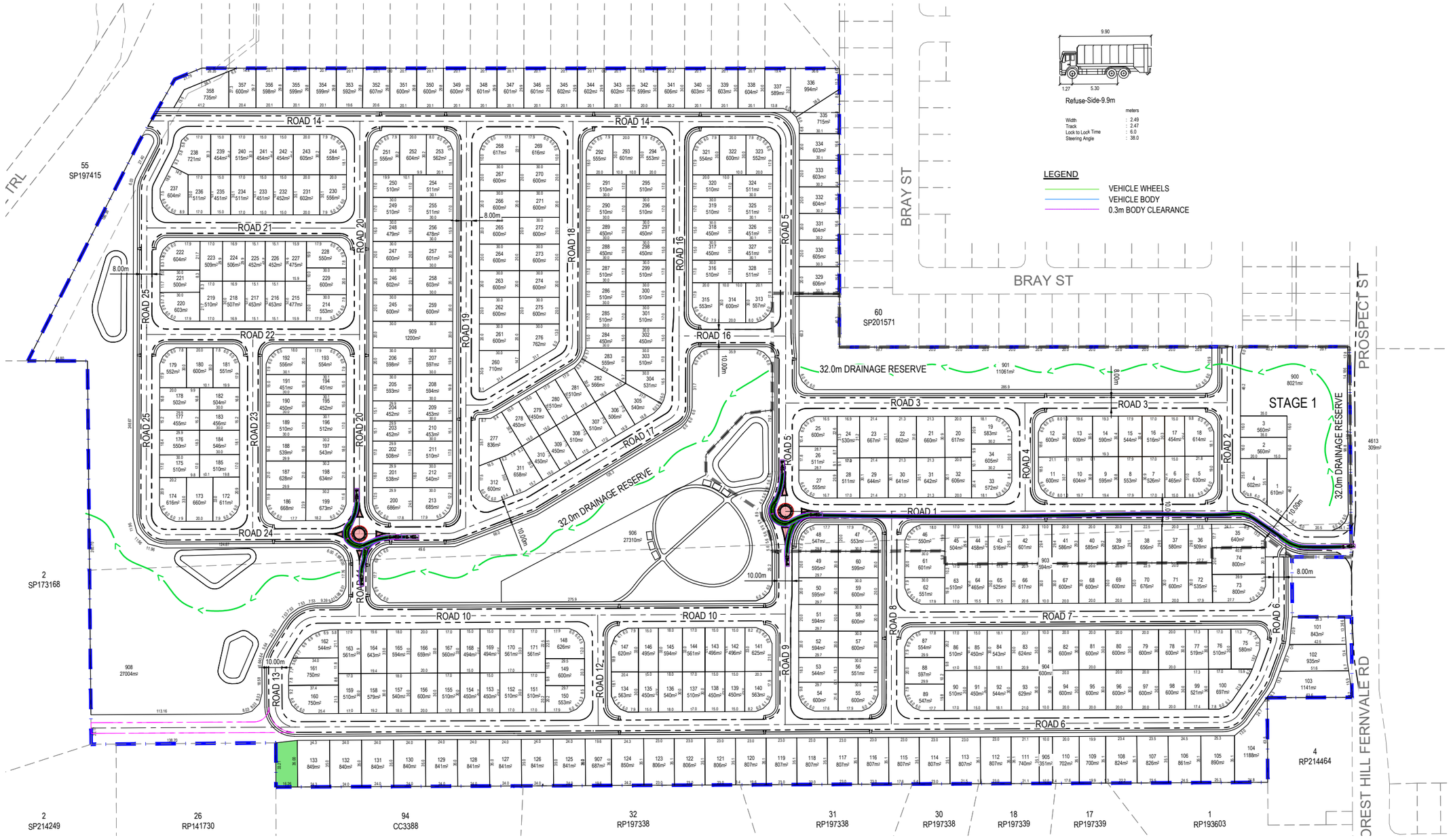
Forrest Hill Fernvale Road and Site Access 2025
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Forrest Hill Fernvale Road															
5	T1	All MCs	466	5.0	466	5.0	0.247	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	All MCs	152	5.0	152	5.0	0.154	7.2	LOS A	0.6	4.6	0.44	0.67	0.44	51.2
Approach			618	5.0	618	5.0	0.247	1.8	NA	0.6	4.6	0.11	0.16	0.11	57.5
North: Site Access															
7	L2	All MCs	60	5.0	60	5.0	0.153	7.1	LOS A	0.5	3.9	0.56	0.72	0.56	49.0
9	R2	All MCs	22	5.0	22	5.0	0.153	20.7	LOS C	0.5	3.9	0.56	0.72	0.56	48.9
Approach			82	5.0	82	5.0	0.153	10.8	LOS B	0.5	3.9	0.56	0.72	0.56	49.0
West: Forrest Hill Fernvale Road															
10	L2	All MCs	35	5.0	35	5.0	0.019	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	52.7
11	T1	All MCs	294	5.0	294	5.0	0.156	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			328	5.0	328	5.0	0.156	0.6	NA	0.0	0.0	0.00	0.06	0.00	59.1
All Vehicles			1028	5.0	1028	5.0	0.247	2.2	NA	0.6	4.6	0.11	0.18	0.11	57.2

Organisation: BURCHILLS ENGINEERING SOLUTIONS | Licence: NETWORK / 1PC | Created: Wednesday, 24 April 2024 12:23:48 PM
Project: \\BES-SVR01\Projects\2023\BE230128_2983 Forest Hill Fernvale Rd, Lowood\!Traffic\SIDRA\Forest Hill Fernvale Road_Intersection Models.sip9

Appendix E – Swept Paths



Prepared for : LOWOOD ONE PTY LTD

Designer : ADELE PACKER
Checked : ANGELA WOOD
Date : 24-04-2024

WCV SWEPT PATHS
2983 FOREST HILL FERNVALE RD LOWOOD

SCALE 15 0 15 30 45 60 75 (metres)
1 : 1500 (FULL SIZE)

BE230128-SK002

BURCHILLS ENGINEERING SOLUTIONS
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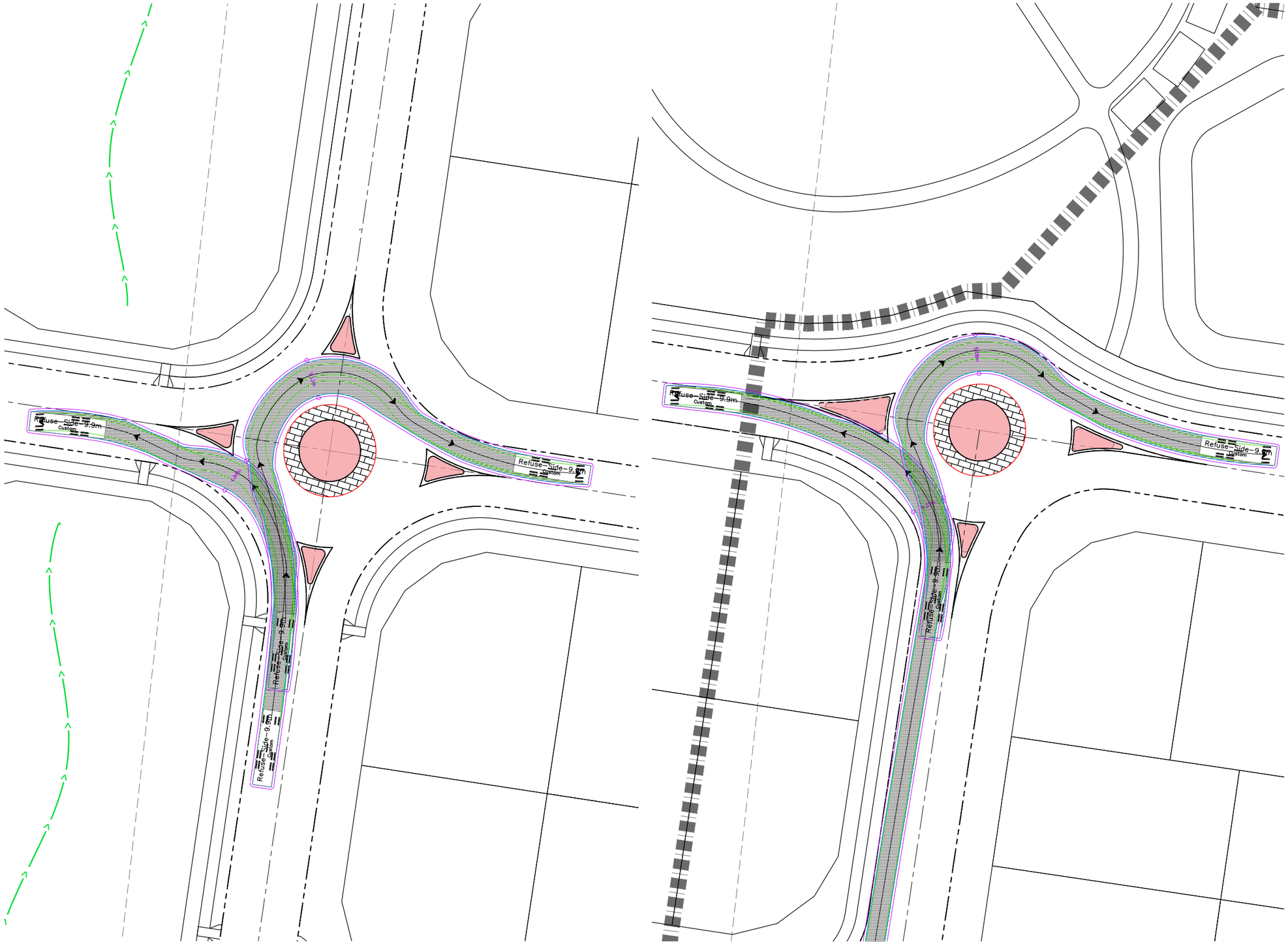

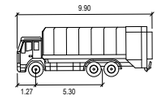

Refuse-Side-9.9m

	meters
Width	: 2.49
Track	: 2.47
Lock to Lock Time	: 6.0
Steering Angle	: 38.0

LEGEND

- VEHICLE WHEELS
- VEHICLE BODY
- 0.3m BODY CLEARANCE

Prepared for : LOWOOD ONE PTY LTD

Designer : ADELE PACKER
Checked : ANGELA WOOD
Date : 24-04-2024

WCV SWEPT PATHS - INTERNAL INTERSECTIONS
2983 FOREST HILL FERNVALE ROAD LOWOOD

SCALE 5 0 5 10 (metres)
1 : 250 (FULL SIZE)

BE230128-SK003

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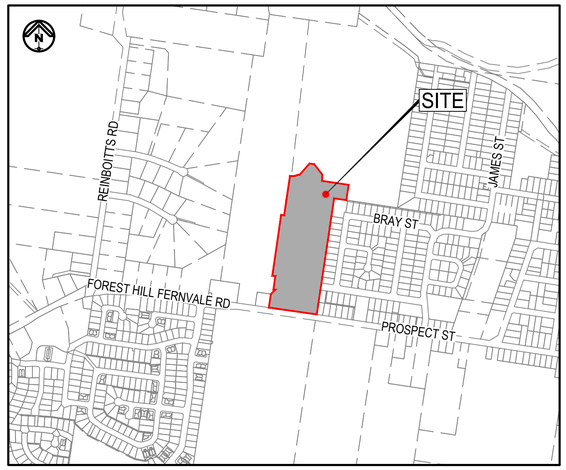
PROPOSED RESIDENTIAL DEVELOPMENT
AT 2983 FOREST HILL FERNVALE RD, LOWOOD
QUEENSLAND 4311

EARTHWORKS OPW - STAGE 1

CONTRACT BE230128-01A

GENERAL NOTES:

1. CONTRACT DOCUMENTATION
   ALL DRAWINGS UNDER THIS CONTRACT ARE TO BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATION.
2. SURVEY INFORMATION
   CONTROL SURVEY INFORMATION WILL BE ESTABLISHED ON SITE BY THE PRINCIPAL'S SURVEYOR. SETOUT INFORMATION SHALL NOT BE OBTAINED BY SCALING FROM THESE DRAWINGS.
3. DATUM
   ALL LEVELS SHOWN ON DRAWINGS ARE A.H.D. (DERIVED).
4. EXISTING SURVEY CONTROL STATIONS
   THE CONTRACTOR IS TO ENSURE THAT SURVEY CONTROL STATIONS ARE NOT DAMAGED OR DISTURBED IN ANY WAY BY CONSTRUCTION ACTIVITIES.
5. EXISTING SERVICES
   EXISTING SERVICES LOCATIONS WHERE SHOWN ON THE DRAWINGS ARE INDICATIVE ONLY. THE CONTRACTOR SHALL CONTACT THE RELEVANT AUTHORITIES AND UNDERTAKE A DIAL-BEFORE-YOU-DIG SEARCH TO ASCERTAIN THE EXACT LOCATION OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO EXISTING SERVICES.
6. SITE ACCESS
   THE CONTRACTOR SHALL GAIN ACCESS TO THE SITE AT LOCATIONS APPROVED BY THE SUPERINTENDENT. FREEDOM OF ACCESS TO OTHER WORK AREAS ON THE SITE SHALL BE MAINTAINED AT ALL TIMES.
7. PROVISION FOR TRAFFIC
   PROVISION FOR TRAFFIC ON LOCAL ROADS IS TO BE IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND LOCAL AUTHORITY REQUIREMENTS.
8. WORK BOUNDARIES
   THE CONTRACTOR IS TO RESTRICT ACTIVITIES TO THOSE AREAS DESIGNATED AS WORK AREAS UNDER THIS CONTRACT. AT NO TIME SHALL THE CONTRACTOR ENTER ADJOINING PROPERTIES OR CONTRACT WORK AREAS ON THE SITE WITHOUT WRITTEN AUTHORISATION FROM THE SUPERINTENDENT.
9. TOPSOIL STRIPPING
   ALL TOPSOIL STRIPPED FROM WORK AREAS SHALL BE STOCKPILED FOR LATER RE-SPREADING TO ALL FOOTPATHS, BATTERS AND ALLOTMENTS.
10. EARTHWORKS (GENERAL)
    ALL FILL MATERIAL PLACED SHALL BE COMPACTED AND TRIMMED TO FINAL EARTHWORKS LEVELS AND PROFILES SHOWN ON THE CONTRACT DRAWINGS AND TESTED IN ACCORDANCE WITH THE PROJECT SPECIFICATION.
    ALL COMPACTION TESTING UNDER THIS CONTRACT IS TO BE CARRIED OUT TO AS3798 LEVEL 1 STANDARD BY A NATA-ACCREDITED TESTING AUTHORITY. CERTIFICATION FOR ALL EARTHWORKS CONSTRUCTION AND TESTING IS TO BE PROVIDED BY A REGISTERED PROFESSIONAL ENGINEER QUEENSLAND (RPEQ) ENGAGED BY THE CONTRACTOR.
11. COMPACTION STANDARDS
    ALL FILL MATERIAL PLACED UNDER THIS CONTRACT SHALL BE COMPACTED IN ACCORDANCE WITH THE PROJECT SPECIFICATION AND CURRENT COUNCIL STANDARDS.
12. TESTING
    ALL TESTING SHALL BE CARRIED OUT BY AN APPROVED N.A.T.A. TESTING AUTHORITY IN ACCORDANCE WITH THE PROJECT SPECIFICATION AND COUNCIL STANDARDS.
13. "AS CONSTRUCTED" SURVEY
    "AS CONSTRUCTED" SURVEY SHALL BE CARRIED OUT BY THE PRINCIPAL'S SURVEYOR AS WORK PROCEEDS.
14. MAINTENANCE OF SITE CONDITION
    AT THE COMPLETION OF WORKS THE SITE IS TO BE LEFT IN A CLEAN AND TIDY CONDITION TO THE SATISFACTION OF THE SUPERINTENDENT AND RELEVANT COUNCIL REPRESENTATIVE.
15. REFERENCED DOCUMENTS
    ALL DRAWINGS TO BE READ IN CONJUNCTION WITH:
    - VEGETATION MANAGEMENT AND TREE CLEARING REQUIREMENTS



LOCALITY PLAN
N.T.S.

DRAWING INDEX	
DWG No.	DESCRIPTION
C000	COVER SHEET
C200	BULK EARTHWORKS LAYOUT PLAN
C210	EARTHWORKS SECTIONS
C220	EARTHWORKS NOTES AND DETAILS
C250	EROSION & SEDIMENT CONTROL PLAN - EARTHWORKS PHASE
C251	EROSION & SEDIMENT CONTROL BASIN NOTES AND DETAILS
C252	EROSION & SEDIMENT CONTROL TYPICAL NOTES AND DETAILS
C900	HAZARD RISK REGISTER - DESIGN RISKS

PREPARED FOR
LOWOOD ONE PTY LTD

PREPARED BY

BURCHILLS
ENGINEERING SOLUTIONS

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ABN 76 166 942 365

NOTE:
DESIGNS HAVE BEEN UNDERTAKEN USING SURVEY DATA PROVIDED BY ONE SURVEYORS DATED 6 NOVEMBER 2023

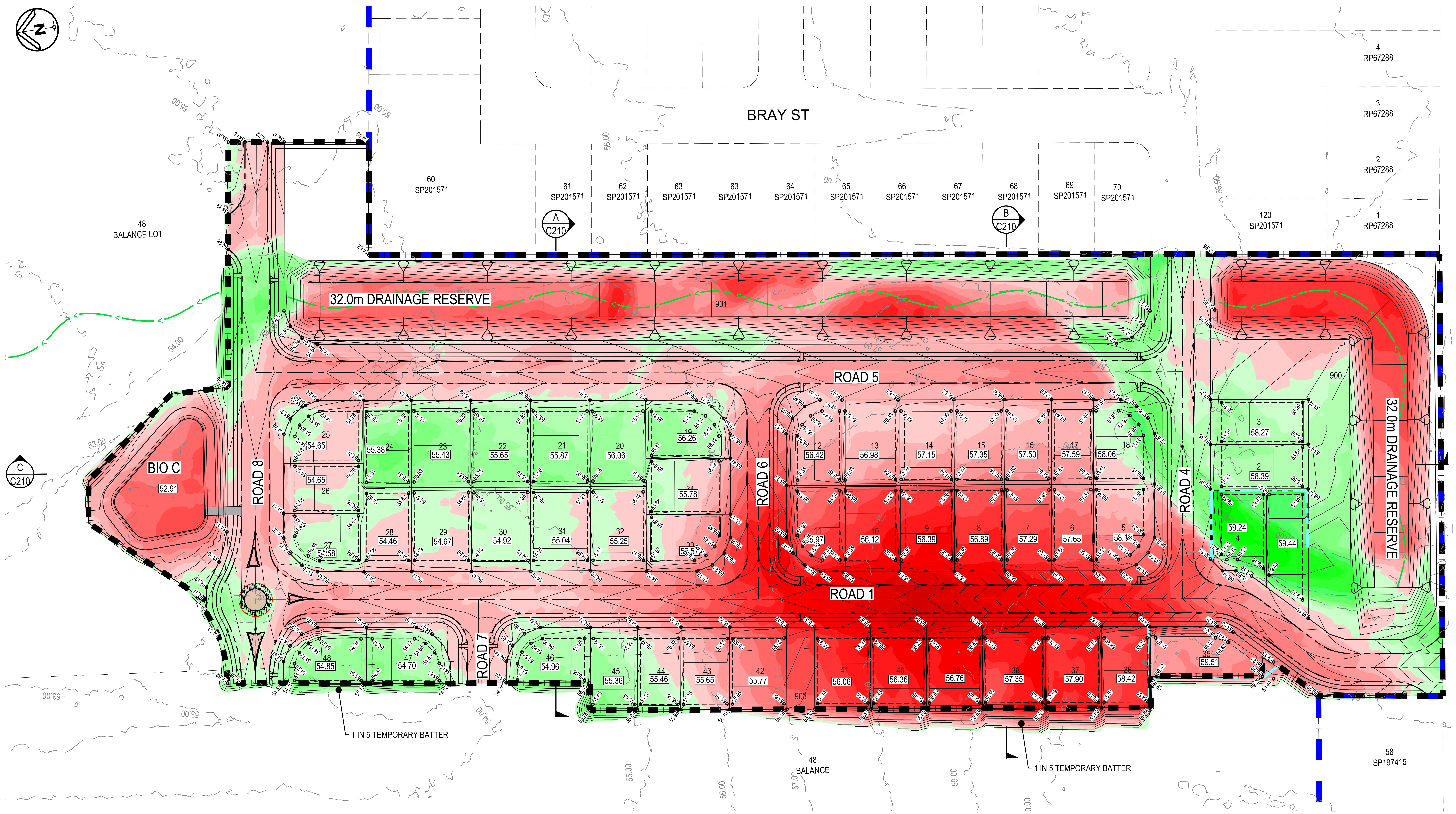
DATE : 24-04-24

PROJECT No.:	DRAWING No. :	VERSION:
BE230128-01A	C000	B

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR LOWOOD ONE PTY LTD



BULK EARTHWORKS LAYOUT PLAN

SCALE 1 : 750 (FULL SIZE) (metres)

EARTHWORKS LEGEND

Cut	Fill
-4.5 TO -4.0 m	0.0 TO 0.5 m
-4.0 TO -3.5 m	0.5 TO 1.0 m
-3.5 TO -3.0 m	1.0 TO 1.5 m
-3.0 TO -2.5 m	1.5 TO 2.0 m
-2.5 TO -2.0 m	2.0 TO 2.5 m
-2.0 TO -1.5 m	2.5 TO 3.0 m
-1.5 TO -1.0 m	3.0 TO 3.5 m
-1.0 TO -0.5 m	3.5 TO 4.0 m
-0.5 TO 0.0 m	4.0 TO 4.5 m

BULK EARTHWORKS SUMMARY

STRUCTURAL FILLING

AREA	NETT SOLID FILL
OVERALL FILLING (ALLOTMENTS, BATTERS)	10,360 cu.m.
TOTAL FILL REQUIRED	10,360 cu.m.

EXCAVATION

AREA	NETT CUT
OVERALL EXCAVATION	43,131 cu.m.
TOTAL CUT	43,131 cu.m.

i.e. 43,131cu.m - 10,360 cu.m. = 32,771 cu.m. TO BE EXPORTED OUT SIDE
INCLUDING 200mm TOPSOIL STRIP
INCLUDING 200mm TOPSOIL RESPREAD TO LOTS, VERGES, DRAINAGE RESERVE AND OPEN SPACE AREAS
INCLUDING 300mm ROAD BOXING DEPTHS

LEGEND

- EXISTING CONTOUR LIDAR
- EXISTING EDGE OF KERB
- DEVELOPMENT SITE BOUNDARY
- PROPOSED ROAD CONTROL LINE
- PROPOSED KERB
- DESIGN SURFACE CONTOUR
- PROPOSED RETAINING WALL
- PROPOSED BATTER

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCIL RFI UPDATES	24-04-24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08-12-23

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NOTE
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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

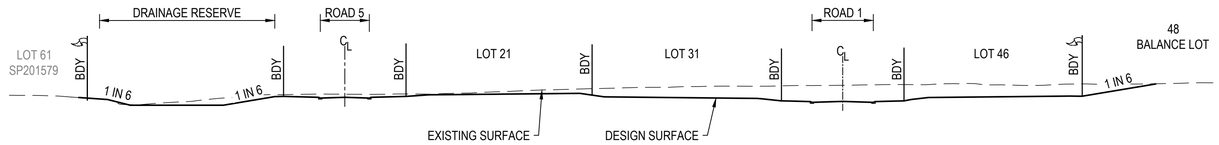
PROJECT:
EARTHWORKS OPW - STAGE 1

DRAWING TITLE:
BULK EARTHWORKS LAYOUT PLAN

DEVEL. APPLIC. No. : -	DATE : 24-04-24
PROJECT LEADER : JONATHAN CUELL	
DESIGNER : TG	
DRAFTSPERSON : CD	
CHECKED : FRASER LUCAS	

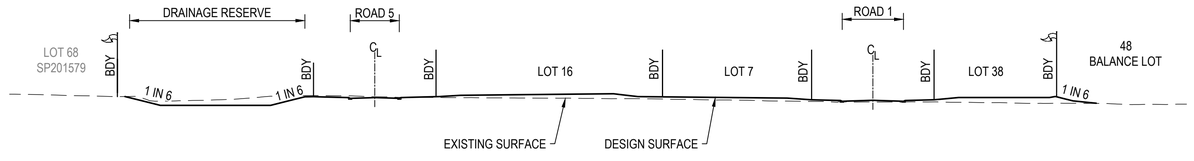
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. : 21773

SCALE : AS NOTED	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE230128-01A	DRAWING No. : C200	VERSION: B



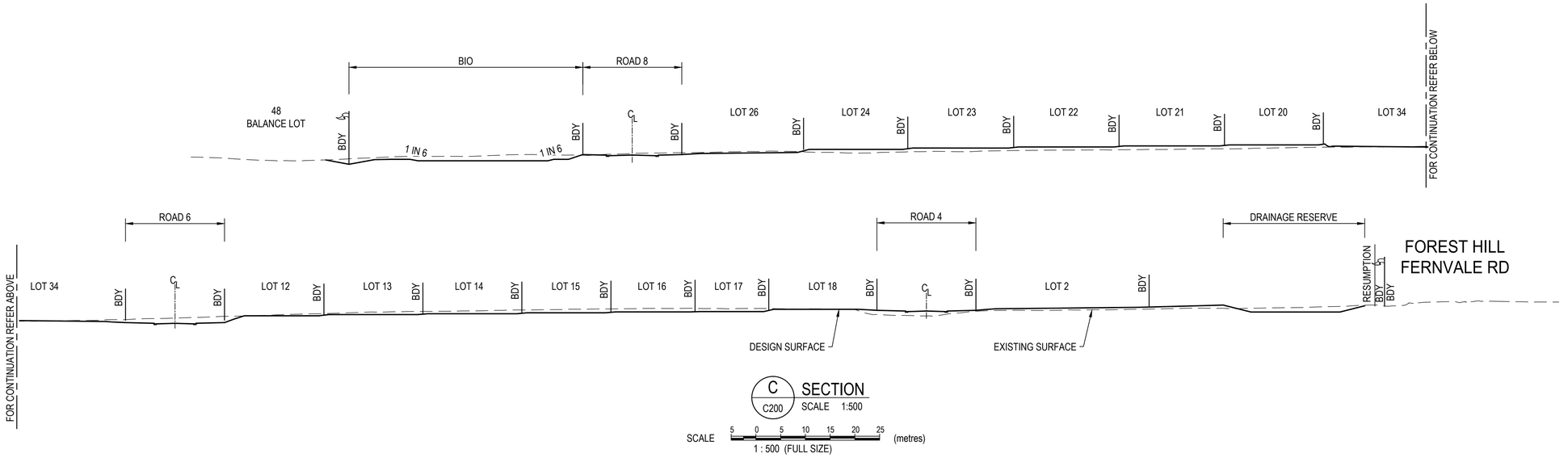
A SECTION
C200 SCALE 1:500

SCALE 5 0 5 10 15 20 25 (metres)
1 : 500 (FULL SIZE)



B SECTION
C200 SCALE 1:500

SCALE 5 0 5 10 15 20 25 (metres)
1 : 500 (FULL SIZE)



C SECTION
C200 SCALE 1:500

SCALE 5 0 5 10 15 20 25 (metres)
1 : 500 (FULL SIZE)

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL
FERNVALE RD, LOWOOD
QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCIL RFI UPDATES	24-04-24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08-12-23

BURCHILLS ENGINEERING SOLUTIONS
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Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
EARTHWORKS OPW - STAGE 1

DRAWING TITLE :
EARTHWORKS SECTIONS

DEVEL. APPLIC. No. :	-
DATE :	24-04-24
PROJECT LEADER :	JONATHAN CUELL
DESIGNER :	TG
DRAFTSPERSON :	CD
CHECKED :	FRASER LUCAS

APPROVED FOR AND ON BEHALF OF
BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. : 21773

SCALE : AS NOTED	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE230128-01A	DRAWING No. : C210	VERSION: B

PLOTTED: 25.04.2024 at 16:11
FILENAME: C:\Users\TJ.Ngoc.Nguyen\OT Vietnam Ltd Co\BCH23 - Documents\BCH23000 BE230128 2983 Forest Hill Fernvale Rd\03 Civil\01 DA\Rev A\02 Acad\03 Stage 1 OPW Earthworks\C210.dwg

GENERAL EARTHWORKS NOTES:

1. ALL EARTHWORKS CONSTRUCTION UNDER THIS CONTRACT IS TO BE PERFORMED STRICTLY IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT PREPARED BY THE PRINCIPAL'S GEOTECHNICAL CONSULTANT.
2. ALL COMPACTION TESTING UNDER THIS CONTRACT IS TO BE CARRIED OUT TO AS3798 LEVEL 1 STANDARD BY A NATA-ACCREDITED TESTING AUTHORITY. CERTIFICATION FOR ALL EARTHWORKS CONSTRUCTION AND TESTING IS TO BE PROVIDED BY A REGISTERED PROFESSIONAL ENGINEER QUEENSLAND (RPEQ) ENGAGED BY THE CONTRACTOR.
3. ALL DESIGN LEVELS SHOWN ON THE CONTRACT DRAWINGS ARE FINISHED SURFACE LEVELS FOLLOWING TOPSOIL REPLACEMENT.
4. ALL STRUCTURAL FILL MATERIAL PLACED SHALL BE COMPACTED TO THE FOLLOWING MINIMUM DENSITY IN ACCORDANCE WITH THE SPECIFICATION AND THE GEOTECHNICAL REPORT:
   a) 95% DENSITY RATIO FOR GENERAL STRUCTURAL FILL (COHESIVE MATERIAL)
   b) 98% DENSITY RATIO FOR THE TOP 300mm DEPTH BELOW PAVEMENT SUBGRADE LEVEL (COHESIVE MATERIAL)
5. ALL EARTHWORKS BATTERS STEEPER THAN 1 IN 4 ARE TO BE LANDSCAPED IN ACCORDANCE WITH LANDSCAPE ARCHITECTS PLANS.
6. EXISTING DAMS ARE TO BE DE-WATERED AND CLEANED-OUT. ALL UNSUITABLE OR SATURATED MATERIAL IS TO BE REMOVED AND REPLACED WITH SELECTED ON-SITE STRUCTURAL FILL MATERIAL AND COMPACTED AS SPECIFIED. FILLING OF DAMS IS TO BE COMPLETED UNDER LEVEL 1 BY GEOTECHNICAL ENGINEER.
7. PROVIDE CONDITION SURVEY OF ADJACENT RESIDENTIAL BUILDINGS FOR ALL PROPERTIES LOCATED WITHIN NOMINAL 100m OF EARTHWORKS OPERATIONS. CONDITION SURVEY TO BE UNDERTAKEN BY QUALIFIED PERSONNEL WITH BUILDING EXPERIENCE.

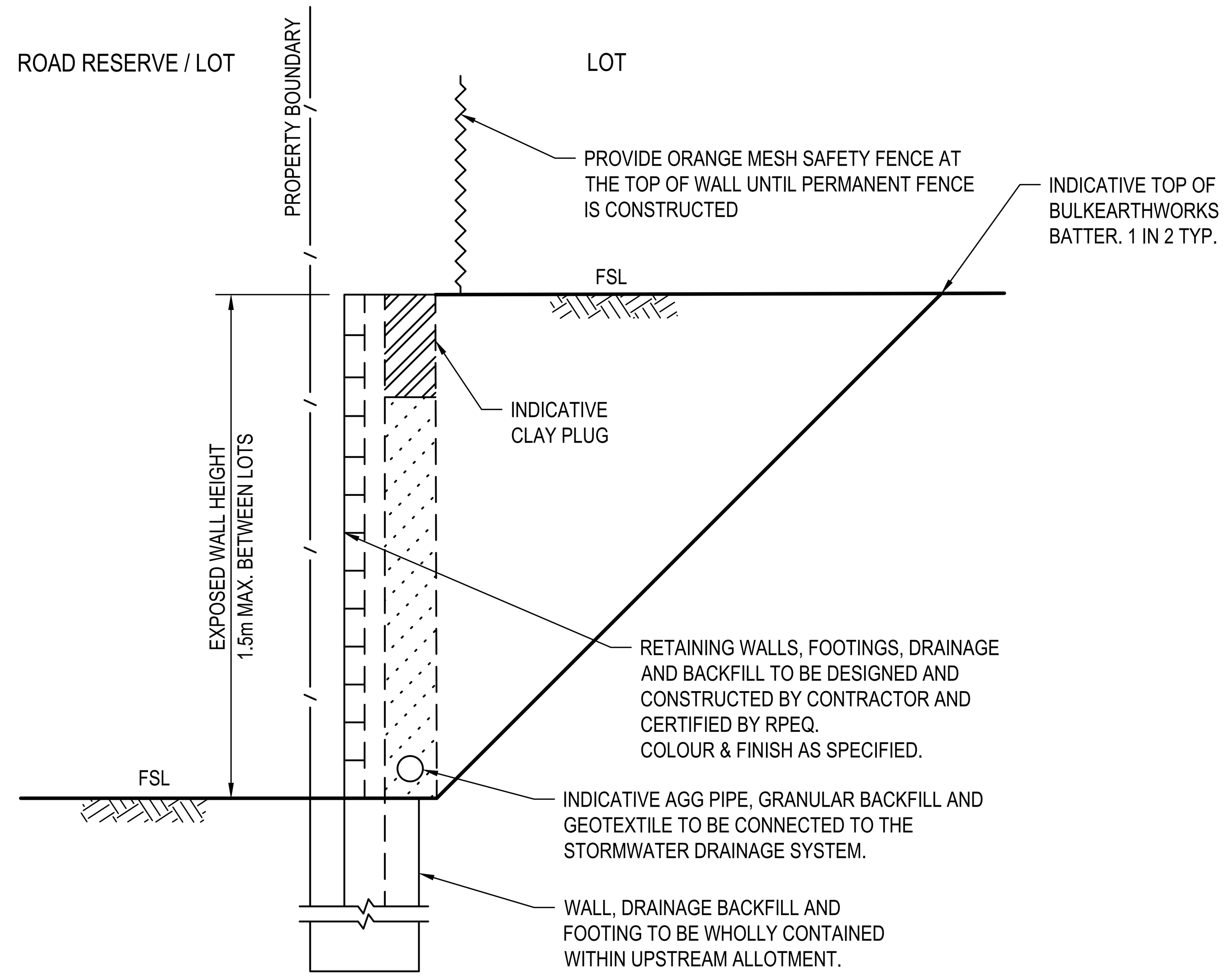
TYPICAL EARTHWORKS SEQUENCE NOTES:

1. CONSTRUCT DIVERSION DRAINS AS DIRECTED TO DIVERT SITE RUNOFF AWAY FROM CONSTRUCTION AREAS. ESTABLISH DE-WATERING CONTROLS TO ENSURE THAT THE CONSTRUCTION AREAS REMAIN FREE OF SURFACE WATER AND PONDING.
2. FOLLOWING COMPLETION OF CLEARING OPERATIONS AND REMOVAL OF RESIDUAL VEGETATION AND DEBRIS, STRIP TOPSOIL TO A NOMINAL 150mm DEPTH AND PLACE IN TEMPORARY STOCKPILES IN LOCATIONS APPROVED BY THE SUPERINTENDENT.
3. PROOF-ROLL AND COMPACT THE PROPOSED FILL AREAS FOLLOWING TOPSOIL STRIPPING, TO THE SATISFACTION OF THE SUPERINTENDENT.
4. ANY STRIPPED AREAS WHICH DEMONSTRATE EXCESSIVE MOVEMENT OR DO NOT IMPROVE SUFFICIENTLY UNDER PROOF-ROLLING ARE TO BE REMOVED, REPLACED WITH APPROVED SITE MATERIAL AND COMPACTED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT.
5. ANY UNSUITABLE MATERIAL ENCOUNTERED, INCLUDING SILTY MATERIAL AND UN-CONTROLLED FILL IS TO BE EXCAVATED TO THE EXTENTS AND DEPTHS NOMINATED BY THE PRINCIPAL'S GEOTECHNICAL CONSULTANT, REMOVED TO NON-STRUCTURAL FILL AREAS OR TAKEN OFF-SITE AS DIRECTED AND REPLACED WITH APPROVED, COMPACTED FILL MATERIAL.
6. PLACE STRUCTURAL FILL MATERIAL FROM SITE EXCAVATIONS TO NOMINATED SITE FILL AREAS, INCLUDING BENCHING AND COMPACTION IN ACCORDANCE WITH THE GEOTECHNICAL REPORT AND TRIMMING AND FINAL PROFILING OF BATTERS.
7. PROVIDE GRASSING TO TOPSOILED AREAS AS DIRECTED.

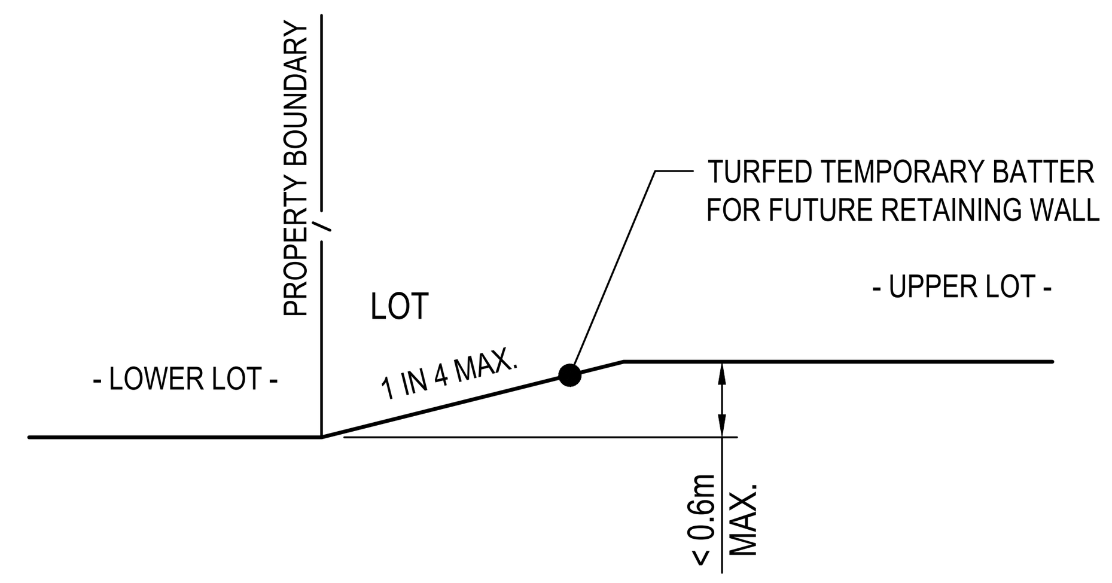
RETAINING WALL NOTES:

1. RETAINING WALLS, FOOTINGS, DRAINAGE, BACKFILL AND CONNECTION OF AGGREGATE DRAINS TO STORMWATER DRAINAGE SYSTEM TO BE DESIGNED AND CONSTRUCTED BY THE CONTRACTOR AND CERTIFIED BY AN SUITABLY QUALIFIED RPEQ
2. THESE DRAWINGS IDENTIFY SURFACE PROFILES, RETAINING WALL LOCATIONS, AND SETOUT INFORMATION ONLY. REFER TO CONTRACTOR SUPPLIED DRAWINGS FOR RPEQ STRUCTURAL DETAILS, WALL MATERIALS AND COMPACTION SPECIFICATIONS AND CONSTRUCTIBILITY INFORMATION.
3. RETAINING WALL DESIGN ENGINEER TO PROVIDE RPEQ FORM 15 STRUCTURAL CERTIFICATE INCLUDING GEOTECHNICAL GLOBAL STABILITY CERTIFICATION BY GEOTECHNICAL ENGINEER. WALL DESIGN TO ASSUME SURCHARGE LOADING BEHIND WALL. DESIGN TO BE IN ACCORDANCE WITH AS4678 INCLUDING ALL REQUIRED DESIGN LOAD CASES AND COMBINATIONS.
4. RETAINING WALLS TO BE DESIGNED TO CONSIDER ALL LOADS INCLUDING CONSTRUCTION LOADS AND OPERATIONAL LOADS.
5. ANY GEOTECHINCAL INFORMATION PROVIDED BY THE PRINCIPAL OR THE SUPERINTENDENT SHALL BE FOR INFORMATION PURPOSES ONLY. THE CONTRACTOR AND THE RETAINING WALL DESIGN ENGINEER SHOULD SATISFY THEMSELVES OF THE DESIGN SOIL PARAMETERS AND UNDERTAKE AND ADDITIONAL GEOTECHNICAL INVESTIGATION DEEMED NECESSARY BY THE DESIGN ENGINEER.
6. THE CONTRACTOR SHALL ENSURE THAT ANY CONFLICT BETWEEN THESE PROJECT DRAWINGS AND THE RETAINING WALL DRAWINGS PREPARED BY THE RETAINING WALL DESIGN ENGINEER IS RESOLVED WITH THE SUPERINTENDENT PRIOR TO CONSTRUCTION COMMENCING.
7. A COPY OF THE RETAINING WALL DESIGN DRAWINGS, INCLUDING CONNECTION OF AGGREGATE DRAINS TO THE STORMWATER DRAINAGE SYSTEM, DESIGN PARAMETERS AND CERTIFICATION BE PROVIDED TO THE SUPERINTENDENT AT THE PRE-START MEETING PRIOR TO CONSTRUCTION COMMENCING.
8. ANY RETAINING WALL AND BATTER EXCEEDING THE HEIGHT OF 1.5m, THE CONTRACTOR SHALL UNDERTAKE A THIRD PARTY RPEQ REVIEW OF THE PROPOSED DESIGN.

NOTE:
RETAINING WALL DESIGN, CONSTRUCTION, SUPERVISION AND CERTIFICATION TO BE PROVIDED BY SPECIALIST SUB-CONTRACTOR.

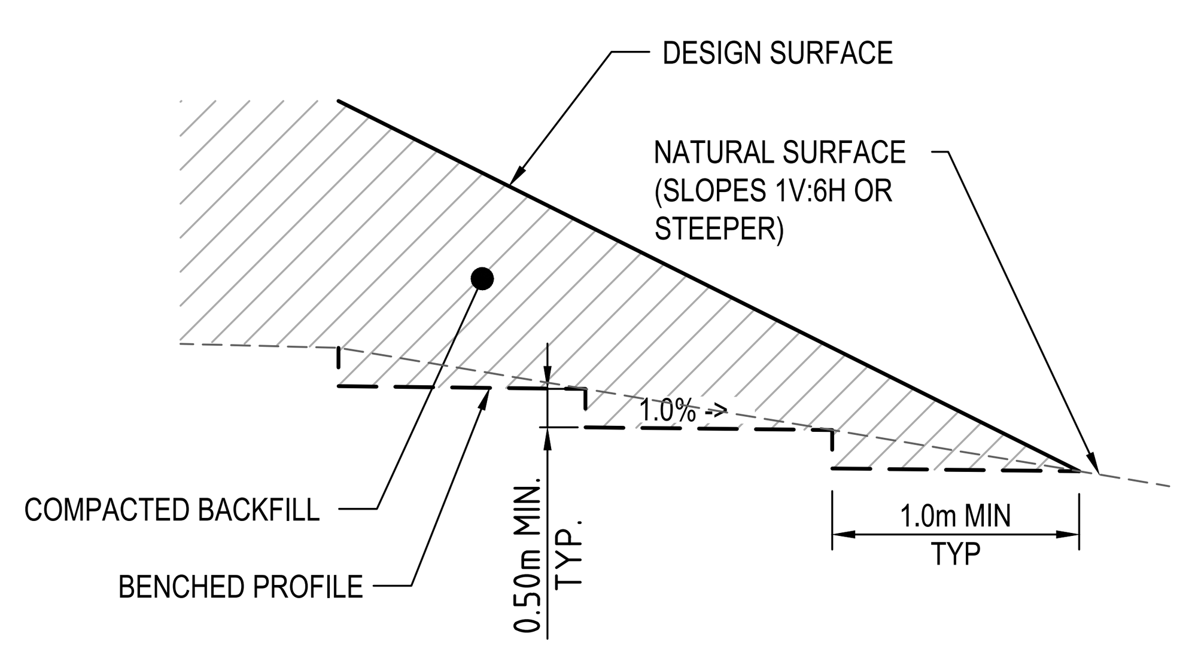


SLEEPER RETAINING WALL CONFIGURATION BETWEEN LOTS (1.5m MAX.)

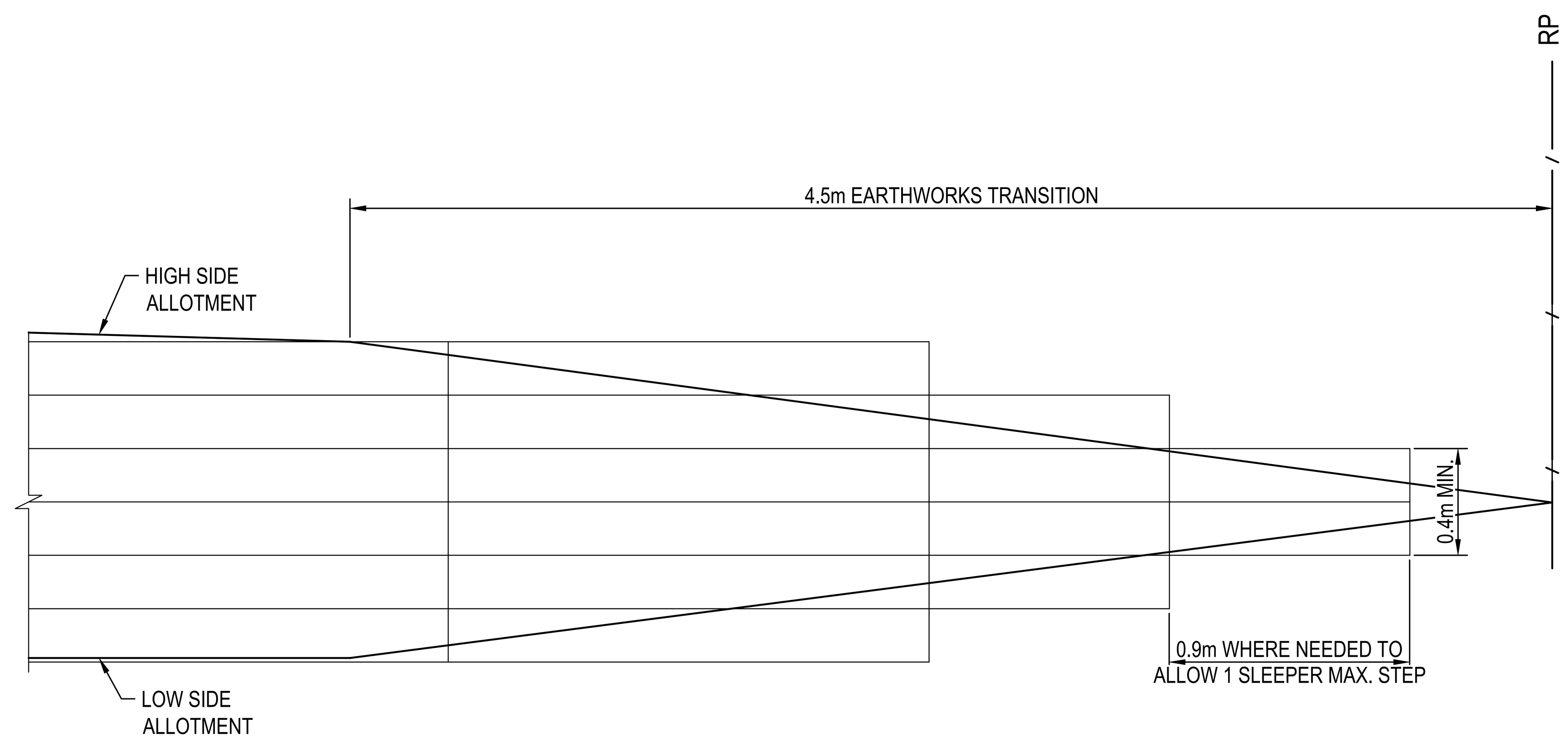


TEMPORARY BATTER DETAIL

NOTE:
FINAL BENCHED PROFILE TO BE VERIFIED BY CERTIFYING GEOTECHNICAL ENGINEER.



TYPICAL FILL ON SLOPES BENCHING DETAIL



TYPICAL SIDE BOUNDARY WALL RETURN DETAIL

SCALE 0.2 0 0.2 0.4 0.6 0.8 1.0 (metres)
1 : 20 (FULL SIZE)

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCIL RFI UPDATES	24-04-24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08-12-23

BURCHILLS ENGINEERING SOLUTIONS
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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
EARTHWORKS OPW - STAGE 1

DRAWING TITLE :
EARTHWORKS NOTES AND DETAILS

DEVEL. APPLIC. No. : - DATE : 24-04-24
PROJECT LEADER : JONATHAN CUELL
DESIGNER : TG
DRAFTSPERSON : CD
CHECKED : FRASER LUCAS

APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. : 21773

SCALE : AS NOTED | DATUM : AHD | FULL SIZE : A1
PROJECT No.: BE230128-01A | DRAWING No. : C220 | VERSION: B

FILENAME: C:\Users\Tu Ngoc Nguyen\QT Vietnam Ltd Co\BCH23 - Documents\BCH23007 BE230128 2983 Forest Hill Fernvale Rd\03. Civil\01. DA\Rev A\02. Acad\03. Stage 1 OPW Earthworks\C220.dwg
PLOTTED: 25.04.2024 at 16:11

CHANNEL WORKS TO BE CONSTRUCTED IN INITIAL PHASE OF BULK EARTHWORKS AND STABILISED AS SOON AS PRACTICAL. CHANNEL TO THEN BE USED TO CATER FOR CLEAN WATER FROM EXTERNAL CATCHMENT

CHANNEL WORKS TO BE CONSTRUCTED IN INITIAL PHASE OF BULK EARTHWORKS AND STABILISED AS SOON AS PRACTICAL. CHANNEL TO THEN BE USED TO CATER FOR CLEAN WATER FROM EXTERNAL CATCHMENT

BRAY ST

PROSPECT ST

RD

STAGE 1

ROAD 1
ROAD 4
ROAD 5
ROAD 6
ROAD 7
ROAD 8

60 SP201571
61 SP201571
62 SP201571
63 SP201571
63 SP201571
64 SP201571
65 SP201571
66 SP201571
67 SP201571
68 SP201571
69 SP201571
70 SP201571
120 SP201571
4 RP67288
3 RP67288
2 RP67288
1 RP67288
48 BALANCE LOT
901
900
903
48 BALANCE
58 SP197415

TEMPORARY SEDIMENT BASIN CONSTRUCTED AS PART OF BULK EARTHWORKS

STABILISED CONSTRUCTION ACCESS. REFER IECA STD. DRG. EXIT-01

NOTE:
ACCESS TO LOTS FOR CONSTRUCTION OF SERVICE CONNECTIONS ONLY. ANY DISTURBED AREAS WITHIN LOTS TO BE REHABILITATED IMMEDIATELY FOLLOWING COMPLETION OF WORKS.

NOTE:
FOR SEDIMENT AND EROSION CONTROL NOTES AND TYPICAL DETAILS REFER TO BE230128-01A-C251.

NOTE:
ALL DESIGN/SETOUT INFORMATION SHOWN ON THIS DRAWING IS AVAILABLE IN DIGITAL FORMAT FROM THE OFFICE OF THE SUPERINTENDENT UPON REQUEST BY THE CONTRACTOR.

SEDIMENT AND EROSION CONTROL CERTIFICATION

I ..... HEREBY CERTIFY THAT THE SEDIMENT AND EROSION CONTROL MEASURES AND DEVICES SHOWN ON THIS DRAWING HAVE BEEN DESIGNED IN ACCORDANCE WITH THE 'BEST PRACTICE EROSION AND SEDIMENT CONTROL' (IECA AUSTRALASIA, NOVEMBER 2008).

SIGNED ..... RPEQ No. ..... DATED .....

WARNING: UNDERGROUND SERVICES:
UNDERGROUND SERVICES EXIST IN THIS VICINITY. THE CONTRACTOR IS TO CONTACT THE RELEVANT AUTHORITIES TO CONFIRM EXACT LOCATION OF SERVICES ON SITE PRIOR TO ANY EXCAVATION OR CONSTRUCTION COMMENCING.

EROSION & SEDIMENT CONTROL PLAN - EARTHWORKS PHASE

SCALE 10 0 5 10 15 20 25 30 35 (metres)
1 : 750 (FULL SIZE)

LEGEND

- EXISTING CONTOUR LIDAR
- EXISTING EDGE OF KERB
- DEVELOPMENT SITE BOUNDARY
- PROPOSED ROAD CONTROL LINE
- PROPOSED KERB
- DESIGN SURFACE CONTOUR
- PROPOSED RETAINING WALL
- PROPOSED SEDIMENT FENCE
- CHECK FLOW DAM
- PROPOSED BATTER
- DIRTY WATER DIVERSION
- CLEAN WATER DIVERSION DRAIN
- SEDIMENT BASIN
- DEVELOPMENT SITE AREA

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCIL RFI UPDATES	24-04-24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08-12-23

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Phone: +61 7 5509 6400
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Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
EARTHWORKS OPW - STAGE 1

DRAWING TITLE :
EROSION & SEDIMENT CONTROL PLAN - EARTHWORKS PHASE

DEVEL. APPLIC. No. : -	DATE : 24-04-24
PROJECT LEADER : JONATHAN CUELL	
DESIGNER : TG	
DRAFTSPERSON : CD	
CHECKED : FRASER LUCAS	

APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. : 21773

SCALE : AS NOTED	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE230128-01A	DRAWING No. : C250	VERSION: B

FILENAME: C:\Users\Tu.Ngoc.Nguyen\OT Vietnam Ltd Co\BCH23 - Documents\BCH23007 BE230128 2983 Forest Hill Fernvale Rd\03_Civil\01_DWGs_ACAD_Aus\03_Stage 1 OPW Earthworks\C250.dwg
PLOTTED: 25 Jul 2024 at 16:12

PHASE 1 - SITE ESTABLISHMENT

1. ESTABLISH STABILISED ACCESS POINT, SITE OFFICES, AND PARKING AREAS (LOCATION TO BE CONFIRMED ON SITE).
2. DESIGNATE AND CORDON OFF ANY EXCLUSION AREAS (ANY AREAS OF THE SITE THAT ARE NOT TO BE ACCESSED).
3. INSTALL DUST FENCES ALONG ALL BOUNDARIES WITH EXISTING RESIDENTIAL DEVELOPMENT.
4. INSTALL SEDIMENT FENCES DOWNSLOPE FROM ALL DISTURBED AREAS AS INDICATED ON THE DRAWINGS (AS A MINIMUM).
5. INSTALL CLEAN WATER DIVERSION DRAINS WITH APPROPRIATE EROSION RESISTANT MATERIALS AND ROCK CHECK DAMS IN THE LOCATIONS INDICATED ON THE DRAWINGS.
6. CONSTRUCT TYPE B SEDIMENT BASINS PRIOR TO CARRYING OUT BROAD SCALE CLEARING IN THE SAME CATCHMENT.
7. INSTALL ALL DIRTY WATER DIVERSIONS AND TEMPORARY SEDIMENT TRAPS ENSURING DE-WATERING FACILITIES ARE AVAILABLE WHEN REQUIRED.
8. COMMENCE CLEARING WORK STARTING AT THE TOP OF EACH CATCHMENT. IDEALLY CLEARING SHOULD BE CARRIED OUT PROGRESSIVELY WITH THE BULK EARTHWORKS TO LIMIT EROSION.
9. PROGRESSIVELY STRIP, STOCKPILE, AND SEED TOPSOIL WITH A FAST GROWING PASTURE MIX. ALL TOPSOILS MUST BE CARED FOR DURING CONSTRUCTION TO ENSURE SUCCESSFUL REVEGETATION.
10. COMMENCE BULK EARTHWORKS, ENSURING A MINIMAL AMOUNT OF AREA IS DISTURBED AT ANY ONE TIME.

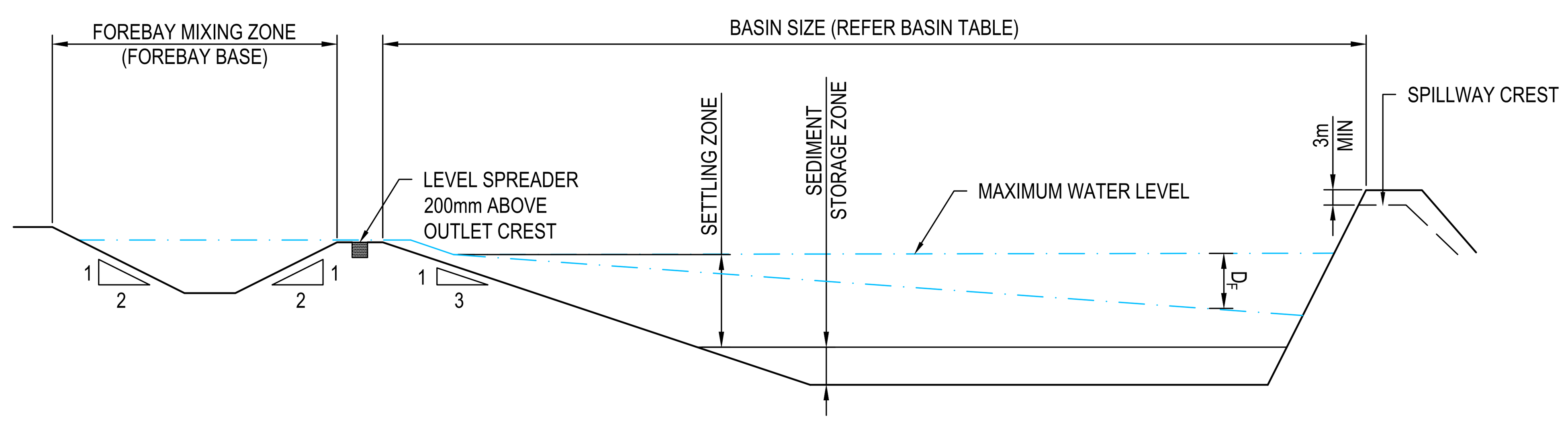
PHASE 2 - CLEARING AND BULK EARTHWORKS

11. RESPREAD TOPSOIL OVER COMPLETED EARTHWORKS AND SOW WITH SUITABLE VEGETATIVE COVER AS SOON AS PRACTICABLE.
12. ONCE ALL EXPOSED AREAS HAVE BEEN STABILISED WITH TOPSOIL AND AT LEAST 80% VEGETATIVE COVER, ALL TEMPORARY SEDIMENT CONTROLS INCLUDING SEDIMENT BASINS MAY BE REMOVED AND THE BULK EARTHWORKS IN THOSE AREAS COMPLETED AND REVEGETATED.
13. REMOVE ALL TEMPORARY CLEAN WATER DIVERSION DRAINS AND REVEGETATE.
14. REMOVE SITE OFFICES AND DUST FENCING AND REVEGETATE ANY OTHER DISTURBED AREAS.
15. ENSURE ALL EXTERNAL ROADS HAVE BEEN SWEPT CLEAN AND ARE FREE OF ANY SEDIMENT.

SEDIMENT AND EROSION CONTROL CERTIFICATION

I, TOBY BENNETT HEREBY CERTIFY THAT THE SEDIMENT AND EROSION CONTROL MEASURES AND DEVICES SHOWN ON THIS DRAWING HAVE BEEN DESIGNED IN ACCORDANCE WITH THE 'BEST PRACTICE EROSION AND SEDIMENT CONTROL' (IECA AUSTRALASIA, NOVEMBER 2008).

SIGNED .... RPEQ No. 21912 DATED 05-09-2023



SEDIMENT BASIN TYPE B TYPICAL SECTION
N.T.S.

TEMPORARY SEDIMENT BASIN CALCULATIONS

BASIN ID	BASIN TYPE	CATCH AREA (ha)	BATTER 1 in X	L:W RATIO	D_S (m)	C_1	TIME CONC. (mins)	i_1 (mm/hr)	0.5Q1 (m^3/s)	LAB SETTLE RATE (m/hr)	FLOC SETTLE DEPTH (m)	MINIMUM A_S (m^2)	ACTUAL V_S (m^3)	MIN. SEDIMENT STORAGE DEPTH (m)	MIN. SEDIMENT STORAGE VOLUM (m^3)	APPROX. REQ SED STORAGE DEPTH (m)	APPROX. LENGTH AT SPILLWAY (m)	APPROX. WIDTH AT SPILLWAY (m)	APPROX. DEPTH AT SPILLWAY (m)	TOTAL VOLUM AT SPILLWAY
1	B	7.336	4	3	0.6	0.37	37	29	0.109	0.40	0.60	1309	785	0.2	236	0.2	69.9	23.3	0.8	1020.7

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL
FERNVALE RD, LOWOOD
QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCIL RFI UPDATES	24-04-24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08-12-23

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
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Phone: +61 7 5509 6400
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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
EARTHWORKS OPW - STAGE 1

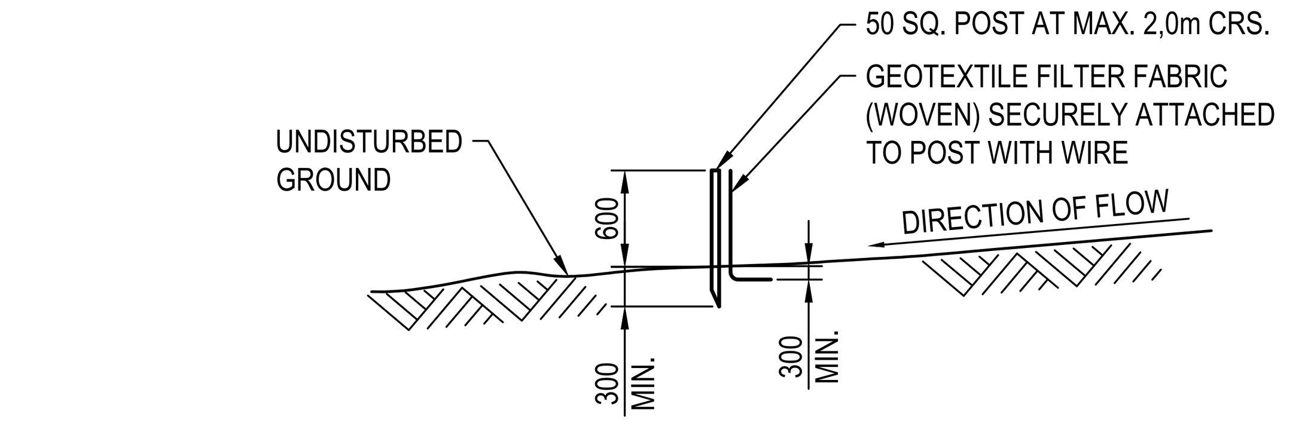
DRAWING TITLE :
EROSION & SEDIMENT CONTROL BASIN NOTES AND DETAILS

DEVEL. APPLIC. No. : - DATE : 24-04-24
PROJECT LEADER : JONATHAN CUELL
DESIGNER : TG
DRAFTSPERSON : CD
CHECKED : FRASER LUCAS
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. : 21773
SCALE : AS NOTED | DATUM : AHD | FULL SIZE : A1
PROJECT No.: BE230128-01A | DRAWING No. : C251 | VERSION: B

FILENAME: C:\Users\Tu Ngoc Nguyen\QT Vietnam Ltd Co\BCH23 - Documents\BCH23007 BE230128 2983 Forest Hill Fernvale Rd\03. Civil\01. DA\Rev A\02. Acad\03. Stage 1 OPW Earthworks\C251.dwg
PLOTTED: 25.04.2024 at 16:12

EROSION AND SEDIMENT CONTROL NOTES

1. THIS DRAWING HAS BEEN PREPARED AS A GUIDE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MANAGE SITE SEDIMENT AND EROSION CONTROL MEASURES AND DURING THE CONSTRUCTION PERIOD INSTALL ADDITIONAL MEASURES WHERE SCOUR OR SEDIMENT TRANSPORT IS LIKELY TO OCCUR.
2. DELAY CLEARING, GRUBBING AND TOPSOIL STRIPPING UNTIL NECESSARY.
3. COMMENCE WORK ON SITE ONLY AFTER SEDIMENT AND EROSION CONTROL MEASURES ARE IN PLACE.
4. MANAGE SITE ENTRY/EXIT POINTS TO ENSURE SEDIMENT IS NOT TRACKED OFF SITE.
5. SHAKEDOWN AREA: PROVIDES FOR CONSTRUCTION, SERVICE AND STAFF VEHICLES ENTERING PUBLIC ROADS. CONTRACTOR SHALL LOCATE TO SUIT SITE ACTIVITIES. CONSTRUCTED AS 250mm THICK LAYER OF COARSE (150mm -200mm) RIVER GRAVEL OVER A SINGLE LAYER OF HIGH STRENGTH GEOTEXTILE (15m x 5m).
6. THE CONTRACTOR SHALL INSTALL EITHER STORMWATER INLET SEDIMENT TRAPS OR EXCAVATED INLET ARRANGEMENT AT ALL STORMWATER STRUCTURES DURING THE CONSTRUCTION.
7. FILTER ROLLS SHALL BE INSTALLED AT GULLY PITS IMMEDIATELY AFTER GULLY PIT CONSTRUCTION AND LEFT IN PLACE DURING THE MAINTENANCE PERIOD. OPERATION OF ROLLS DURING PERIODS OF HEAVY RAIN TO BE MONITORED TO PREVENT FLOODING AND EROSION DAMAGE ELSEWHERE.
8. ARRANGE FOR EROSION CONTROL MEASURES TO BE INSTALLED AS CLOSE AS POSSIBLE TO THE SOURCE OF EROSION.
9. ENSURE STOCKPILED TOPSOIL AND EARTHWORKS ARE NOT ERODED BY WIND AND STORMWATER RUN-OFF AND ARE PROVIDED WITH A SEDIMENT FENCE AROUND THE LOW SIDE.
10. SEDIMENT FENCES HAVE BEEN ESTABLISHED UNDER BULK EARTHWORKS CONTRACT. ERECT SEDIMENT FENCES IF REQUIRED, GENERALLY ALONG THE LOW SIDE OF THE CONSTRUCTION SITE AND ALONG A LINE OF CONSTANT LEVEL. AS AN ALTERNATIVE TO BURYING THE SEDIMENT FENCE LOWER EDGE, THE CONTRACTOR MAY ELECT TO PLACE 200mm OF THE FABRIC ON THE GROUND UP-SLOPE OF THE FENCE AND COVER WITH 100mm MIN LAYER OF AGGREGATE.
11. TO PREVENT EROSION, TOPSOIL AND SEED IMMEDIATELY AFTER COMPLETION OF BULK EARTHWORKS TO FINISHED PROFILES.
12. PROVIDE TURF STRIP ADJACENT TO KERB FOR FULL LENGTH OF NEW ROAD AND TURF STRIP PLACED AT 90° TO KERB EVERY 10m FOR FULL WIDTH OF VERGE.
13. PRIOR TO COMPLETION OF CONSTRUCTION OF PAVEMENT AND SEALING, PLACE SANDBAGS AT 45° TO ARREST SCOUR AGAINST KERB AND CHANNEL AS FOLLOWS:
    ROAD GRADE 0.5% - 5% - 25M MAX CRS.
    5% - 10% - 10m MAX CRS.
    10% - 15% - 15m MAX CRS.
    15% - 20% - 5m MAX CRS.
14. SWEEP EXTERNAL ROADS WHERE SEDIMENT HAS BEEN DROPPED FROM CONSTRUCTION VEHICLES. DO NOT WASH SEDIMENT INTO THE STORMWATER SYSTEM.
15. ALL SEDIMENT AND EROSION CONTROL STRUCTURES, TRENCHES ETC. SHALL BE REGULARLY MAINTAINED AND INSPECTED FOR EFFECTIVENESS.
16. THE USE OF POTABLE WATER IS NOT PERMITTED IN SITE EARTHWORKS OPERATIONS, ROAD AND PAVEMENT CONSTRUCTION OR DUST SUPPRESSION. RECYCLED WATER IS REQUIRED TO BE USED AND IS TO BE IN ACCORDANCE WITH L.C.C GUIDELINES.

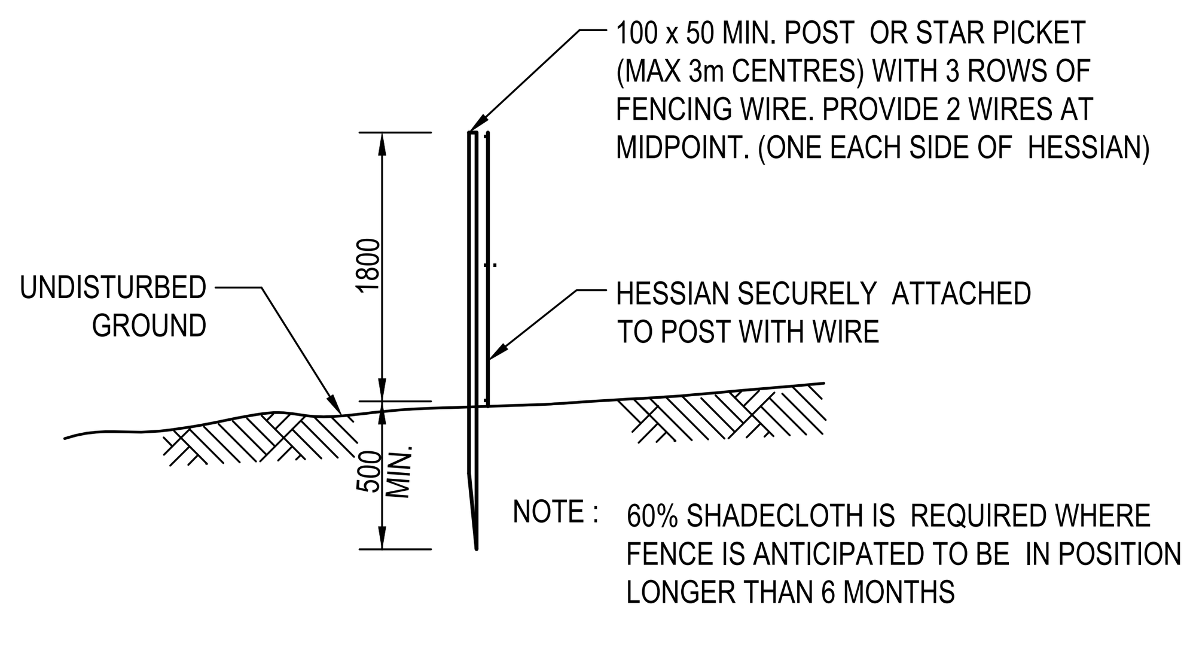


SEDIMENT FENCE

N.T.S.

NOTE: SEDIMENT FENCE TO HAVE TURNOUTS AT 50m MAX INTERVALS.

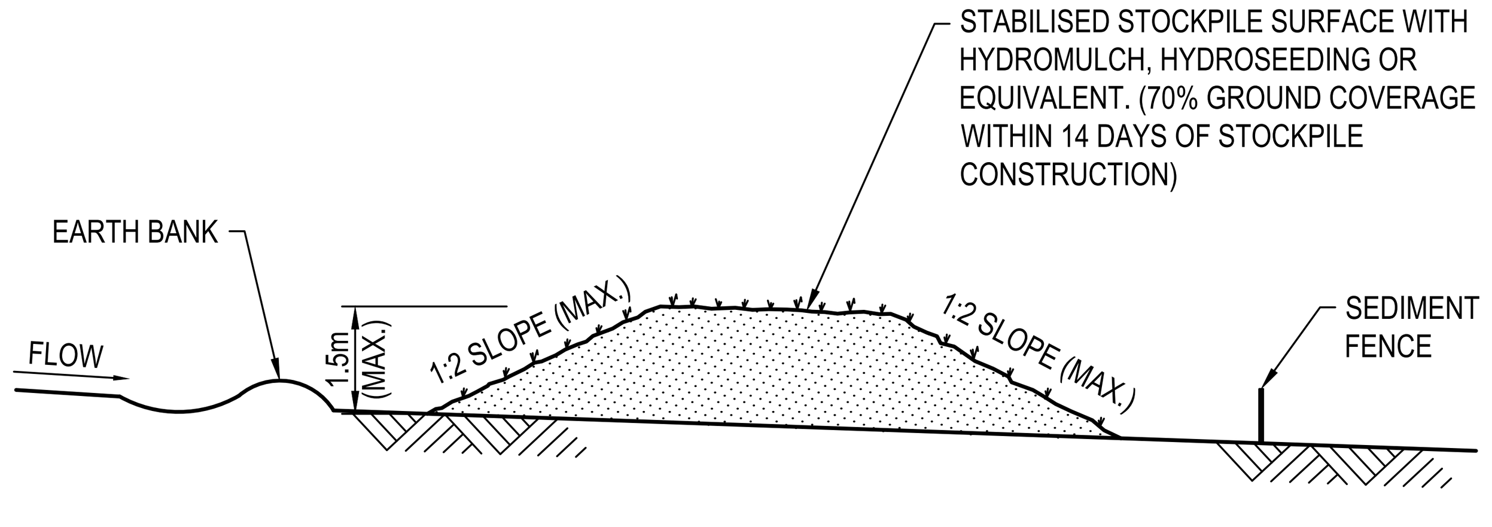
NOTE:
REFER TO IPWEAQ STANDARD DRAWINGS D-0040 AND D-0041 FOR ALL ADDITIONAL SEDIMENT CONTROL DETAILS.



DUST CONTROL FENCE

N.T.S.

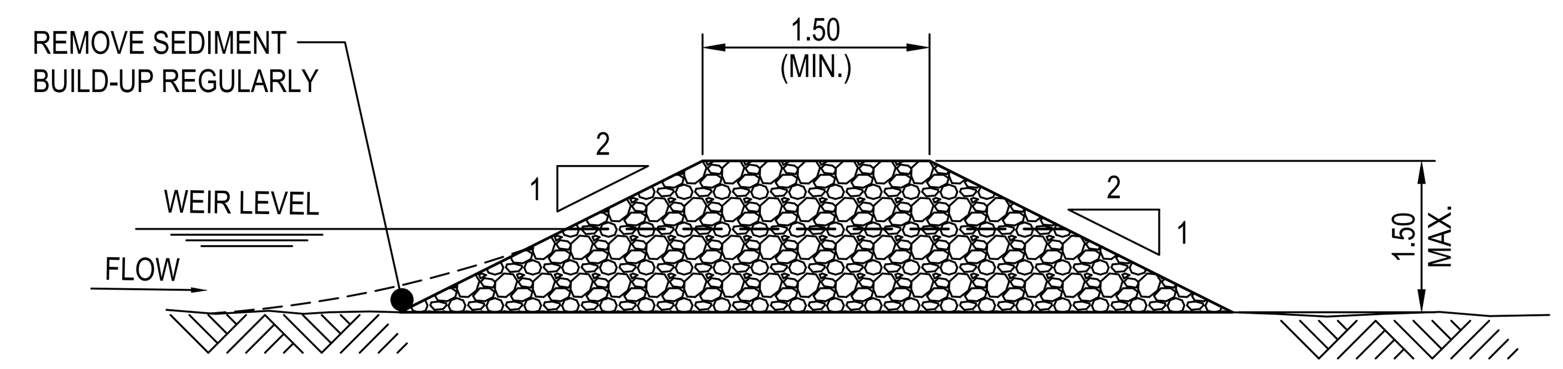
NOTE:
DUST CONTROL FENCE TO BE PLACED AS DIRECTED ON-SITE BY SUPERINTENDENT.



TYPICAL STOCKPILE CONFIGURATION

N.T.S.

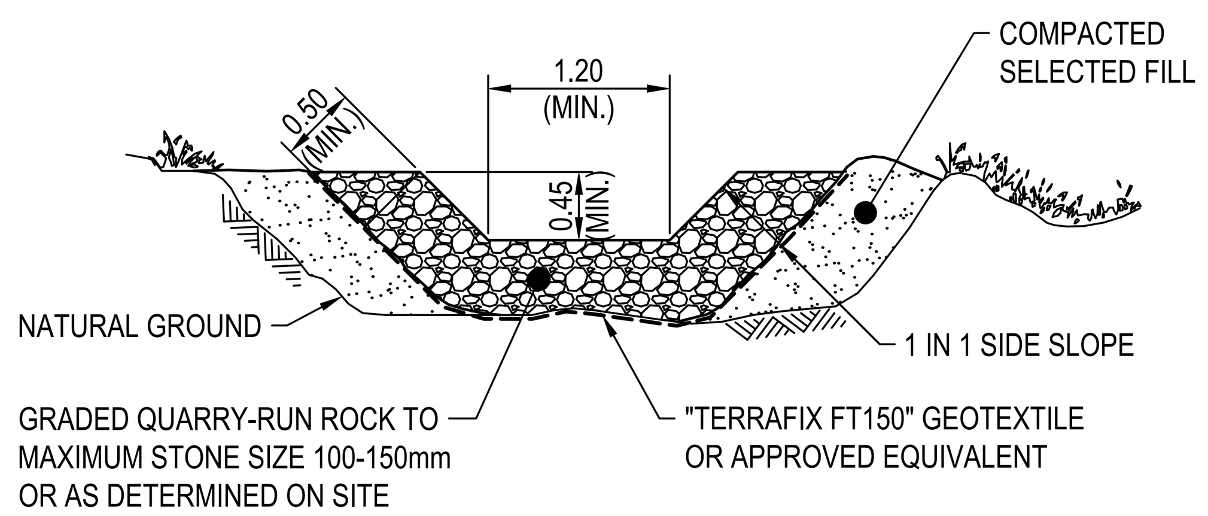
NOTE:
1. LOCATE STOCKPILES AT TOP OF CATCHMENT ON FLAT GROUND AND NOT WITHIN 5m OF CONCENTRATED FLOW PATHS.
2. STOCKPILES SHOULD HAVE EARTHBANKS UPSLOPE FOR DIVERSION OF UPSTREAM WATER AROUND STOCKPILE AND SEDIMENT FENCES PLACED 1-2m DOWNSLOPE.



ROCK CHECK DAM TYPICAL DETAIL

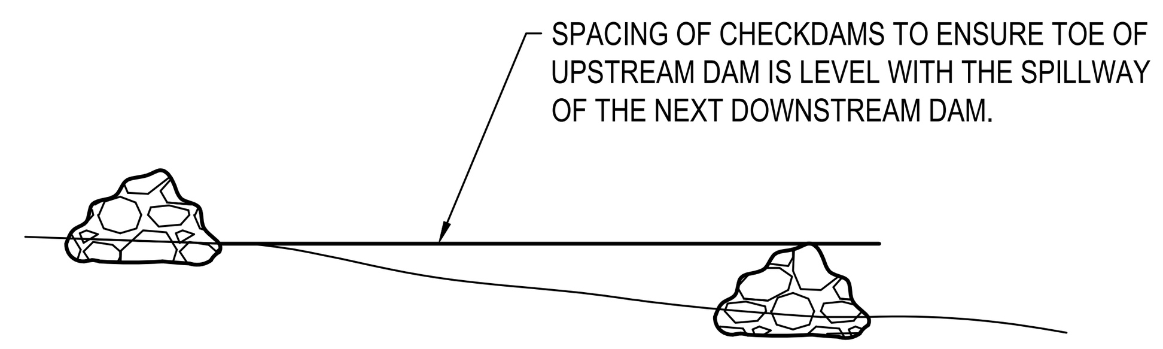
SCALE 1.0 0 1.0 2.0 (metres)

1 : 50 (FULL SIZE)



ROCK CHECK DAM TYPICAL CROSS SECTION

N.T.S.



ROCK CHECK DAM TYPICAL LONGITUDINAL SECTION

N.T.S.

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I .... HEREBY CERTIFY THAT THE SEDIMENT AND EROSION CONTROL MEASURES AND DEVICES SHOWN ON THIS DRAWING HAVE BEEN DESIGNED IN ACCORDANCE WITH THE 'BEST PRACTICE EROSION AND SEDIMENT CONTROL' (IECA AUSTRALASIA, NOVEMBER 2008).

SIGNED .... RPEQ No. .... DATED ....

NOTE:
REFER TO IPWEAQ STANDARD DRAWINGS D-0040 AND D-0041 FOR ALL ADDITIONAL SEDIMENT CONTROL DETAILS.

PLOTTED: 25.04.2024 at 16:12

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCIL RFI UPDATES	24-04-24
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NOTE
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Figured dimensions take precedence over scale. Do not scale reduced size drawings.
Verify dimensions prior to commencing any on-site or off-site works or fabrication.

BURCHILLS ENGINEERING SOLUTIONS
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Phone: +61 7 5509 6400
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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
EARTHWORKS OPW - STAGE 1

DRAWING TITLE :
EROSION & SEDIMENT CONTROL TYPICAL NOTES AND DETAILS

DEVEL. APPLIC. No. : - DATE : 24-04-24

PROJECT LEADER : JONATHAN CUELL

DESIGNER : TG

DRAFTSPERSON : CD

CHECKED : FRASER LUCAS

APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365

RPEQ No. : 21773

SCALE : AS NOTED	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE230128-01A	DRAWING No. : C252	VERSION: B

QMS RISK & OPPORTUNITIES REGISTER
SAFETY IN DESIGN – NORMAL DESIGN RISKS - CIVIL

Design Element	Associated risks & opportunities	Raw risk assessment		Raw risk rating	Treatment Measures to avoid, minimize or treat the risk.	Responsibility	Residual risk rating
		Likelihood	Consequence				
CONSTRUCTION PHASE							
SITE ACCESS	Unsafe site access and egress point, restricted access, flooding, unauthorised access from persons or animals	L	M	L-M	Prepare site specific Construction Traffic Management Plan and Workplace Health and Safety Management Plan	Principal Contractor	L
CLEARING & DEMOLITION	Removal of existing structures, decommision of services, vegetation clearing and fauna management	M	H	M-H	Contractor to obtain Demolition Permit, arrange all service disconnections with asset ownerand carry out vegetation works in accordance with Vegetation and Fauna Management Plan	Principal Contractor	L
EXISTING SERVICES	Distrub or damage existing services and infrastructure, overhead powerlines, work adjacent to existing services, existing service relocations	M	H	M-H	Client to commission detailed site survey and service potholing at critical locations. Contractor to undertake Dial Before You Dig and service verification with service authoritiy providers and undertake additional potholing prior to construction	Client and Principal Contractor	L-M
EXCAVATION & TRENCHING	Unstable existing slopes and landslip, steep cut profiles, deep trench excavations, working at heights, intercept water table, dispersive soils, acid sulphate soils	M	H	M-H	Client to commission a geotechnical investigation and contractors to undertake own investigations. Temporary and final earthworks profiles confirmed by client's geotechnical consultant. Tempory earthworks profile to be confirmed by Contractor's geotechnical consultant. Contractor to provide temporary benching, fencing, stabilisation and shoring.	Client and Principal Contractor	L
MATERIALS HANDLING	Manual handling, handling and disposal of sharps, repeative work processeds, hazardous substances	H	M	M-H	Contractor or provide a site specific Workplace Health and Safety Management Plan including Material Safety Data Sheets	Principal Contractor	L
PLANT & EQUIPMENT	Operation of plant and machinery, site access by visitors, material deliveries and waste removal	M	H	M-H	Contractor or provide a site specific Workplace Health and Safety Management Plan including register of operator machinery tickets. Contractor to maintain a site visitor register and provide site specific induction to all visitors	Principal Contractor	L
OPERATIONAL PHASE							
ROADS & PATHWAYS	General road safety, flood free access, pedestrian and cyclist injuries, inadequate signage	L	H	M	Design, approvals and construction undertaken in accordance with Australian, State Government and Local Authority standards, codes, guidelines and best practice	Asset Owner	L
STORWATER / FLOODING	Hazard from storm and flood water depths and velocities, ponding and access to inlets, outlets and basins	M	H	M-H	Design, approvals and construction undertaken in accordance with Australian, State Government and Local Authority standards, codes, guidelines and best practice	Asset Owner	L
WATER & SEWER	Blockages, contamination, interuption to service, access to fittings, confined space access	L	M	L-M	Design, approvals and construction undertaken in accordance with Australian, State Government and Local Authority standards, codes, guidelines and best practice	Asset Owner	L
WALLS & FENCING	Risk of falls, unauthoried access from persons and animals, structural failure	M	M	M	Design, approvals and construction undertaken in accordance with Australian, State Government and Local Authority standards, codes, guidelines and best practice	Asset Owner	L
MAINTENANCE PHASE							
ROADS & PATHWAYS	All as for construction and operation phases					Asset Owner	
STORWATER / FLOODING	All as for construction and operation phases					Asset Owner	
WATER & SEWER	All as for construction and operation phases					Asset Owner	
WALLS & FENCING	All as for construction and operation phases					Asset Owner	
REFURBISHMENT PHASE							
ROADS & PATHWAYS	All as for construction and operation phases					Asset Owner	
STORWATER / FLOODING	All as for construction and operation phases					Asset Owner	
WATER & SEWER	All as for construction and operation phases					Asset Owner	
WALLS & FENCING	All as for construction and operation phases					Asset Owner	
DEMOLITION PHASE							
ROADS & PATHWAYS	All as for construction and operation phases					Asset Owner	
STORWATER / FLOODING	All as for construction and operation phases					Asset Owner	
WATER & SEWER	All as for construction and operation phases					Asset Owner	
WALLS & FENCING	All as for construction and operation phases					Asset Owner	

PRELIMINARY
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PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
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NOTE
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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
EARTHWORKS OPW - STAGE 1

DRAWING TITLE :
HAZARD RISK REGISTER - DESIGN RISKS

DEVEL. APPLIC. No. : -
DATE : 24-04-24
PROJECT LEADER : JONATHAN CUELL
DESIGNER : TG
DRAFTSPERSON : CD
CHECKED : FRASER LUCAS

APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. : 21773

SCALE : AS NOTED
DATUM : AHD
FULL SIZE : A1
PROJECT No.: BE230128-01A
DRAWING No. : C900
VERSION: B

FILENAME: C:\Users\Tu Ngoc Nguyen\QT Vietnam Ltd Co\BCH23 - Documents\BCH23007 BE230128 2983 Forest Hill Fernvale Rd\03. Civil\01. DA\Rev A\02. Acad\03. Stage 1 OPW Earthworks\C900.dwg

PLOTTED: 25.04.2024 at 16:12

Our Ref: BE230128-MEM-HIA-Stg1-02.docx
Enquiries: Melissa Blum

TECHNICAL MEMORANDUM

Date	26/04/2024
To	Lowood One Pty Ltd
From	Melissa Blum
Project	BE230128 – 2983 Forest Hill Fernvale Road, Lowood
Subject	Conceptual Stormwater Management Plan – Stage 1

1. BACKGROUND

Lowood One Pty Ltd have engaged Burchills Engineering Solutions to prepare a Conceptual Stormwater Management Plan (CSMP) to accompany a Development Application to be submitted to Somerset Regional Council (the 'Council' or 'SRC'). The Application sought is a Reconfiguring a Lot Approval for Stage 1 of the development which includes 48 lots, including 4 duplex allotments.

The properties included in this Development Application include:

- Lot 56 Forest Hill Fernvale Road, Lowood (Lot 56 on SP 197415); and
- Lot 57 Forest Hill Fernvale Road, Lowood (Lot 57 on SP 197415).

This report has been prepared to address the requirements of the Somerset Region Planning Scheme, Version 4.2 (2016).

This report should be read in conjunction with the Hydraulic Impact Assessment (BE230128-TM-HIA-Stg1-02.pdf) and the Master Stormwater Management Plan (MSMP) (BE230128-RP-MSMP - 02.pdf).

1.1 Information Request Response

This CSMP revision has been prepared to address Somerset Regional Council Information Request dated 23 February 2024. The relevant items and associated responses have been included in the following table.

Table 1.1 Information Request Response

Item No.	Item	Response
17	Attachment B- Stormwater Civil Hydraulic Engineering Report section 5.1 refers to package BE230128-01A for detailed erosion and sediment control design drawings. Please provide Package BE230128-01A for assessment?	Drawing Package BE230128-01A has been included in Appendix E.
18	Attachment B – Stormwater Civil Hydraulic Engineering Report – Appendix C – Burchills Civil Engineering Drawings differ from the submitted Attachment G – Operational Works Plans. Please clarify the differences and reason for these differences?	Plans have been updated to ensure consistency.
19	Attachment B – Stormwater Civil Hydraulic Engineering Report – Appendix C – Burchills Civil Engineering Drawings – SK201 - Earthwork Sections – the lots shown on sections A and B do not correspond to the lots at section locations shown, please clarify?	Plans have been updated to ensure consistency.
20	Attachment B – Stormwater Civil Hydraulic Engineering Report – Appendix C – Burchills Civil Engineering Drawings – SK301 – Typical Road Cross Sections – do not provide a typical section for Road 4. Please provide section for Road 4.	Section for Road 4 has been included
21	Attachment B – Stormwater Civil Hydraulic Engineering Report – Appendix C – Burchills Civil Engineering Drawings do not provide any detailed erosion and sediment control plans for Stage 1. Please provide detailed erosion and sediment control plans for Stage 1.	Drawing and sediment control plan for Stage 1 has been included in Appendix E.
22	Attachment B – Stormwater Civil Hydraulic Engineering Report does not provide any stormwater sizing calculation for the stormwater network. Please provide calculations.	The stormwater calculations will be completed at OPW.
23	Attachment B – Stormwater Civil Hydraulic Engineering Report – Burchills Stage 1 Civil Engineering Report Appendix B – Civil Drawings show stage 1 operational works drawings which differ from the plans submitted in Appendix G and also differ from the Burchill Civil Engineering Drawings contain in Appendix C of Attachment B. Please clarify why so many differing Operational Works drawing exist and which set is to be assessed?	Plans have been updated.
24	Attachment B – Stormwater Civil Hydraulic Engineering Report – Burchills Stage 1 Civil Engineering Report Appendix B – Civil Drawings C220 detail sleeper retaining wall but no sleeper wall are shown to be provided on the layout drawings or typical sections. Please clarify the provision of this detail and the location of any retaining wall to be provided?	Plans have been updated.

Item No.	Item	Response
25	Attachment B – Stormwater Civil Hydraulic Engineering Report contains Burchills Stage 1 Civil Engineering Report December 2023 and Burchills Civil Engineering Report December 2023. Please clarify which is provided for assessment.	Plans have been updated.
26	It is noted that the waterway through the site is 'low' (green) waterway on the Queensland waterways for waterway barrier works mapping. Please clarify that the operational works design has considered requirements for waterway barrier works, including all proposed structures and culverts.	The OPW design has considered the requirements for waterway barrier works, including: • Culverts within the waterway have a minimum culver aperture width of 1.2m and will be placed within the low flow channel. • Culverts will be installed at or below bed level, • Culvert cells will be aligned parallel to the direction of water flow to minimise turbulence.

2. SITE DETAILS

The subject site is located at 2983 Forest Hill Fernvale Road, Lowood, QLD and can be formally described as Lot 56 and 57 SP 197415 with a total area of 41.68ha. Refer to Figure 2.1 for the site locality.

Figure 2.1 Site Locality (QLD Globe, 2023)

2.1 Proposed Development

The proposed Stage 1 development includes 48 lots, including 4 duplex allotments, as shown in Figure 2.2. These lots will be filled above the Design Flood Level (1% AEP plus 300mm freeboard).

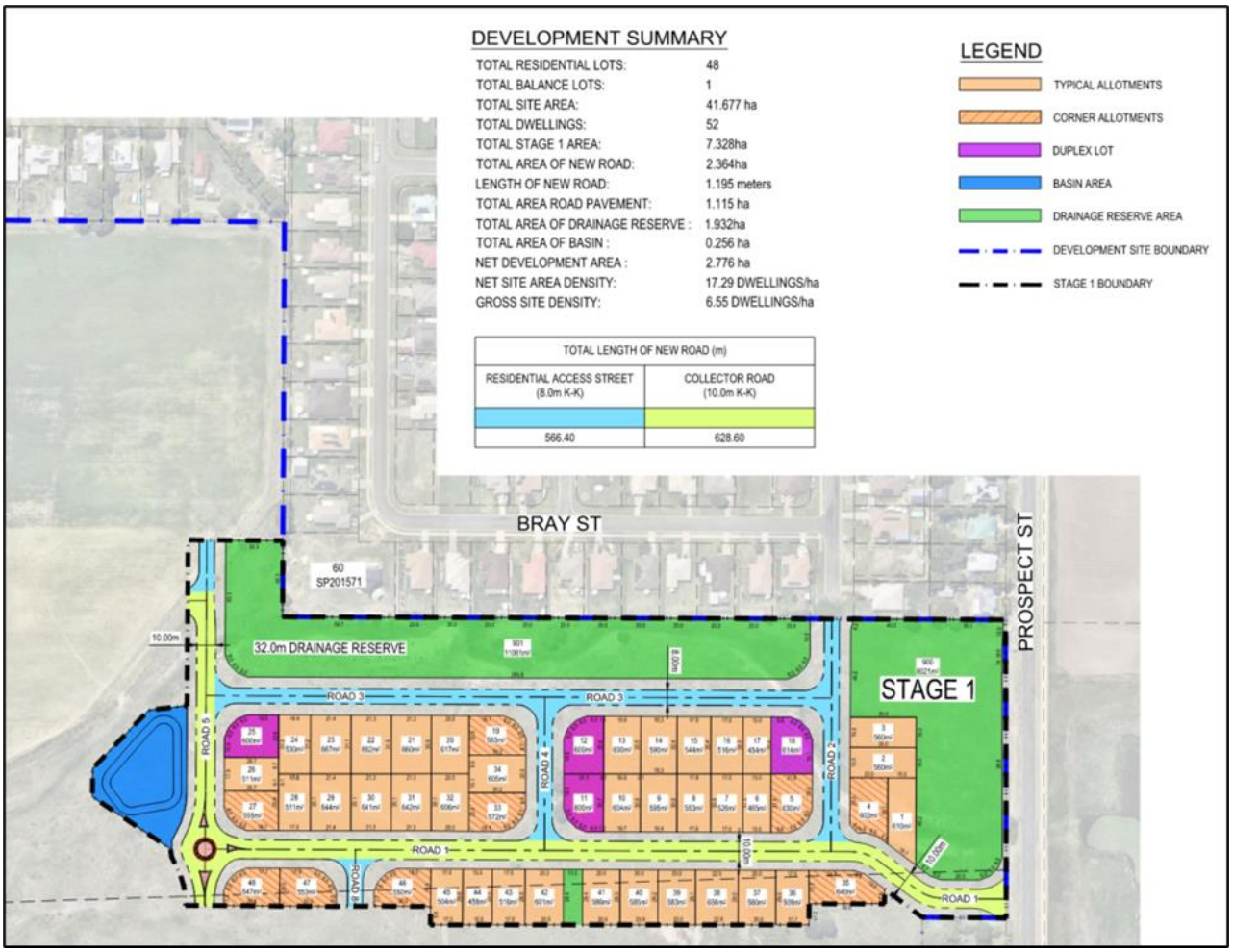


Figure 2.2 Proposed Stage 1 Development (Burchills, 2024)

4. STORMWATER QUALITY MANAGEMENT PLAN

4.1 Water Quality Objective (WQO)

In accordance with the Somerset Region Planning Scheme (Version 4.2) and the SEQ Water 'Water Quality Management in Drinking Water Catchments Development Guidelines' (2017), the total effect of permanent water quality control measures are to achieve reductions in the mean annual load generated by the development site at a minimum of:

- 85% for Total Suspended solids (TSS);
- 65% for Total Phosphorus (TP);
- 45% for Total Nitrogen (TN);
- 95% for Gross Pollutants (>5mm); and

This will ensure the environmental values of the downstream receiving waters are maintained and have been chosen as the WQO for the development.

4.2 Treatment Train

4.2.1 Overall

To ensure the above WQO's can be met at each of the site's LPDs, a treatment train was proposed for the developed site and modelled using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software.

It is proposed to use bioretention basins.

4.2.2 Bioretention Basin

The parameters of the proposed bioretention basins are presented in Table 4.1. The location of the proposed treatment train elements are shown in Figure 4.1.

Table 4.1 Proposed Bio-retention Basin Parameters

Basin ID	Parameter	Modelled Value
Stage 1	Filter area	900m^{2*}
	Extended detention depth	0.3m
	Filter media depth	0.4m
	Transition Layer	0.10m
	Drainage Layer	0.2m

* Bioretention Basin for Stage 1 is greater than 800m^2 and needs to split into two cells, TBC at detailed design phase.

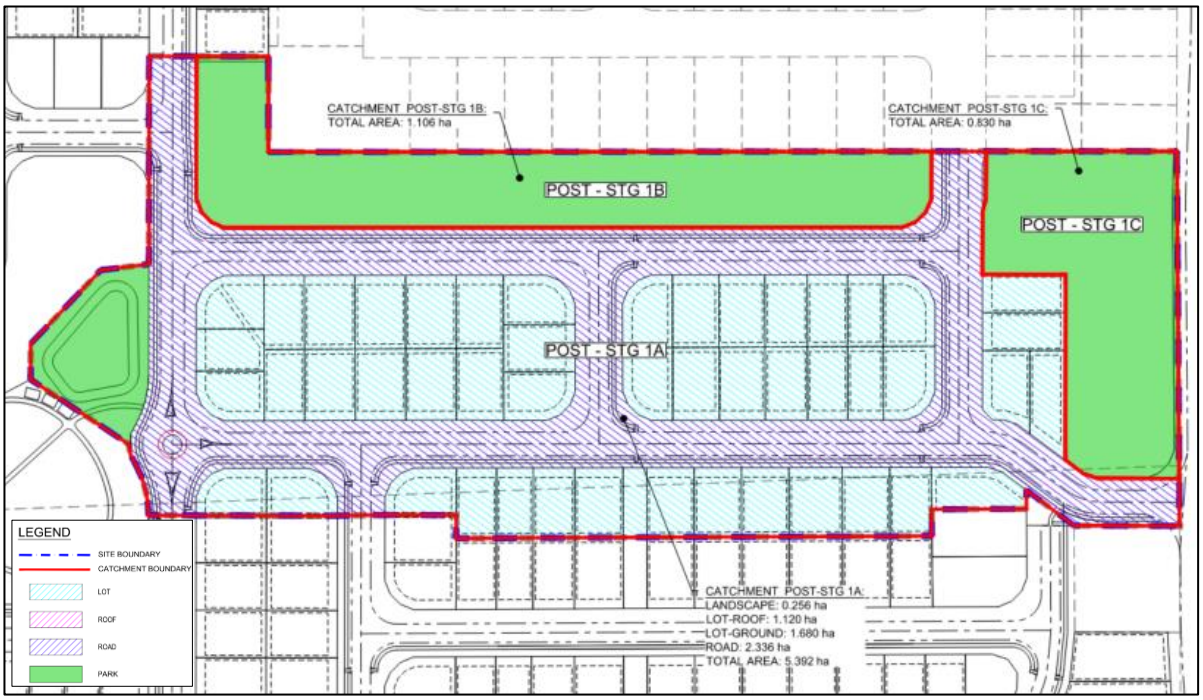


Figure 4.1 Stage 1 MUSIC Catchment Plan

Typical sections of a bioretention basin have been included in Figure 4.2 and Figure 4.3. The bioretention systems will be designed in accordance with the Water by Design Technical Guidelines (Water by Design, 2014) during the detailed design phase of the development.

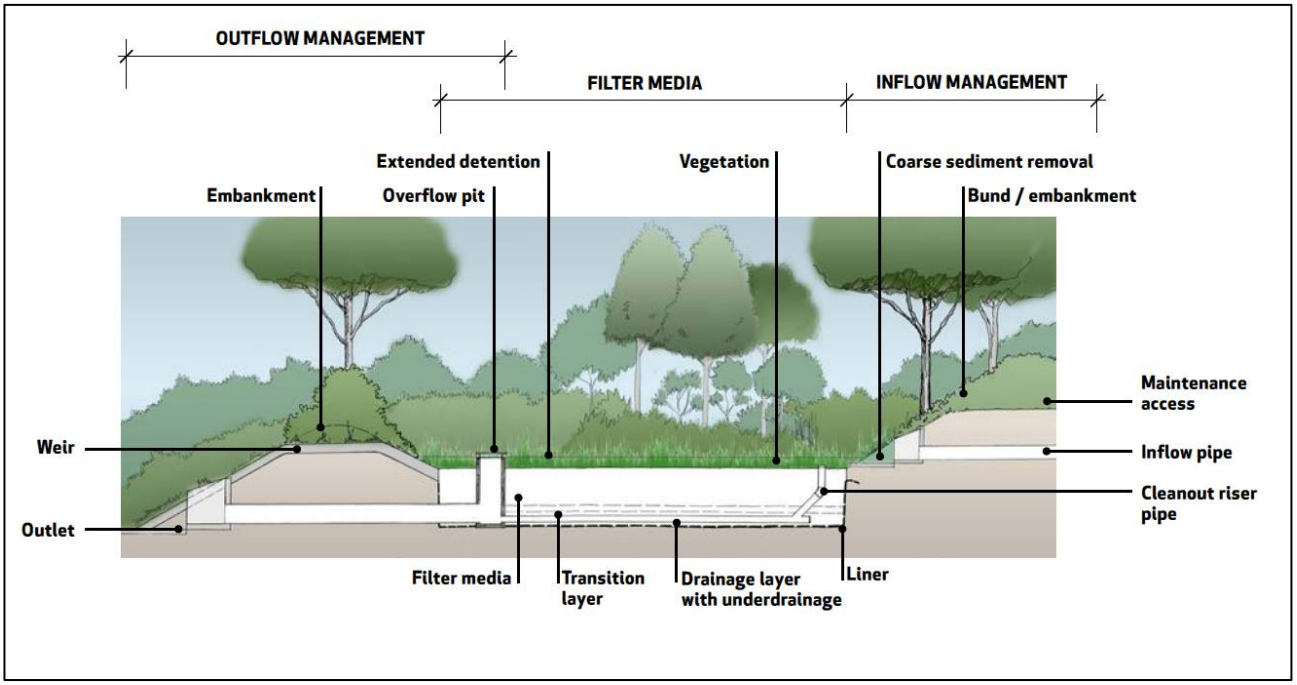


Figure 4.2 Typical Bioretention Basin (Water By Design, 2014)

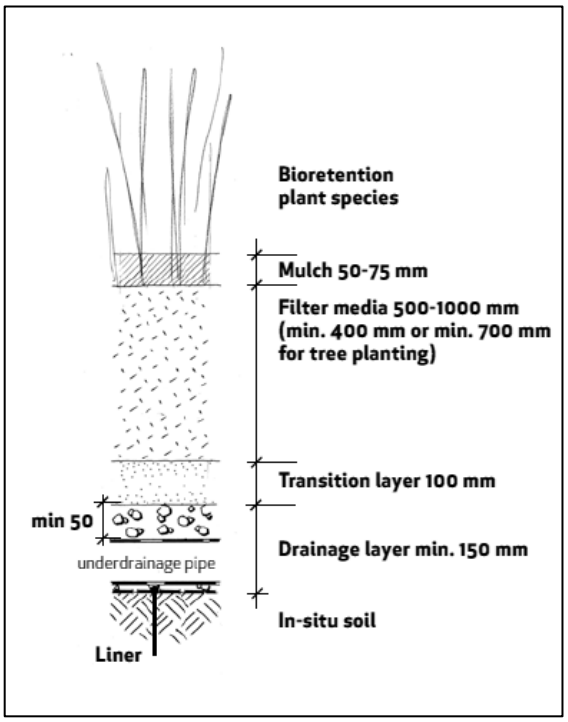


Figure 4.3 Typical Bioretention Drainage Profile (Water By Design, 2014)

4.3 MUSIC Results – Stage 1

Results of the MUSIC modelling for the treatment train effectiveness for the Stage 1 are summarised in Table 4.2. The results indicate the WQO are achieved for the rainfall data set simulated.

Table 4.2 Stage 1 Treatment Train Effectiveness

Pollutant	Inflows (kg/yr)	Outflows (kg/yr)	Reduction Achieved (%)	Water Quality Objective (%)
TSS	9,480	685	92.8	80
TP	17.1	2.42	85.8	60
TN	75.8	32.5	57.2	45
GP	921	0	100	90

NOTE: All simulations have been run with pollutant export estimation set to ‘stochastic generation’.

A screen capture of the MUSIC model and treatment train effectiveness results is presented in Figure 4.4.

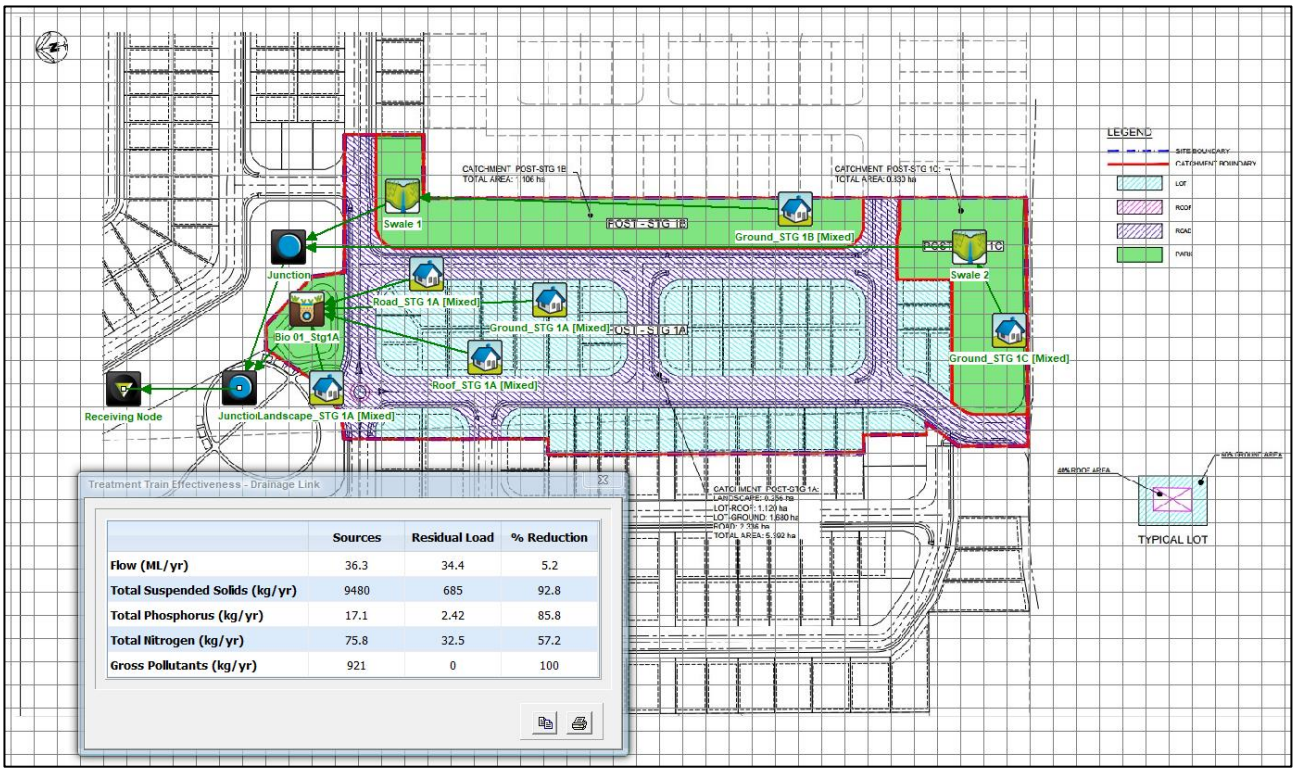


Figure 4.4 Stage 1 Treatment Train Layout & MUSIC Results

5. EROSION AND SEDIMENT CONTROL PLAN

5.1 Best Management Practices

Stormwater runoff quality during the construction phase of this development shall be managed in accordance with Best Practice Erosion and Sediment Control (IECA, 2008), which is the current recognised construction industry best management practice (BMP) for erosion and sediment control.

Erosion and Sediment Control (ESC) plans are required to be implemented during the construction phase to minimise environmental harm to on-site stormwater treatment devices and downstream receiving waters.

Detailed Erosion and Sediment Control design drawings have been prepared submitted as part of the Bulk Earthworks Operational Works Application submitted concurrently with this ROL Application. Please refer to Drawing Package No. BE230128-01A prepared by Burchills Engineering Solutions for further detail (Appendix E).

5.2 Erosion Hazard Assessment

As part of the IECA guidelines, an erosion hazard assessment is completed to identify low-risk and high-risk short-term land disturbances within a given region (IECA, 2008). This Erosion Hazard Assessment estimates a TASK number which triggers if a site should be treated as high or low risk in regard to erosion control measures. A trigger value for high-risk site of 200 has been adopted in this CSMP as recommended by IECA. Table 5.1 below show the values used for the estimation of the TASK number.

Table 5.1 Erosion Hazard Assessment

Catchment ID	Area (m^2)	Duration of Disturbance (months)	Slope Factor	K Factor	TASK Number
Stage 1	7300	6	0.21	0.440	4047.1

From Table 5.1 the results show that the internal catchment requires high-risk ESC treatment. Given the development proposal is at a conceptual phase, further details of the erosion and sediment control systems and procedures will be provided at the detailed design stage.

5.3 Erosion Control Standard

The best practice erosion control measures for high-risk development as detailed in Best Practice Erosion and Sediment Control (IECA, 2008) include the following:

- All reasonable and practical steps to be taken to apply best practice erosion control measures to completed earthworks, or otherwise stabilise such works, prior to anticipated rainfall - including existing unstable, undisturbed, soil surfaces under the management or control of the building/construction works;
- Land clearing limited to maximum 4 weeks work;
- Disturbed soil surfaces stabilised with minimum 75% cover within 10 days of completion of works within any area of a work site;
- Staged construction and stabilisation of earth batters; and
- Soil stockpiles and unfinished earthworks are suitably stabilised (covered) if disturbance is expected to be suspended for a period exceeding 10 days.

5.4 Sediment Loss Estimate

As the site has been classified as high-risk, a sediment loss estimate has been included to indicate the recommended sediment control techniques.

The potential volume of sediment loss from the subject site has been estimated using the Revised Universal Soil Loss Equation (RUSLE).

RUSLE calculates annual soil loss rates based on:

$$A = R. K. LS. C .P$$

Where:

A = annual soil loss due to erosion (t/ha/yr)

R = rainfall erosivity factor

K = soil erodibility factor

LS = topographic factor derived from slope length and slope gradient

C = cover and management factor

P = erosion control practice factor

Table 5.2 Potential Sediment Loss (RUSLE)

Catch. ID	Area (ha)	Soil Type*	Slope length (m)	Slope Grade (%)	Intensity $^{6}I_{2}$ (mm/hr)	R	K	LS	C	P	A (t/ha/yr)	Yeild (m^3/yr)
Stage 1	7.3	Sandy Clay	100	1.00	9.4	1987	0.025	0.24	1	1.3	15.5	87.0

*Note soil testing will need to be carried out to confirm soil type.

5.5 Sediment Control Standard

Table B1 of the guidelines (IECA, 2018) provides a method for determining the sediment control standard for construction activities based on the estimated soil loss rate. Based on the estimated soil loss rates and the size of the contributing catchment, Type 3 sediment controls are required for this site as a minimum. A list of Type 3 and supplementary sediment control techniques is provided in Table 5.3 based on Table 4.5.3 and Table 4.5.4 of the guidelines (IECA, 2008). These control techniques provide a guide that is recommended to be used to minimise the downstream effect of sediments.

Table 5.3 Sediment Control techniques

Techniques	Type 3	Supplementary
Sheet flow treatment	• Buffer Zone • Fabric Drop Inlet Protection • Filter Fence • Straw Bale Barrier • Sediment Fence	• Grass Filter Strips • Fibre Rolls

Techniques	Type 3	Supplementary
Concentrated flow treatment	• Coarse Sediment Trap	• Straw Bale Barrier • Kerb Inlet Sediment Traps (on-grade and sag inlet traps, including Gully Bags)
De-watering sediment control	• Sediment Fence	• Grass Filter bed
Instream sediment control	• Modular Sediment Barrier	• Straw Bale Barrier (short-term device only)
Other		• Construction exits (Rock Pads, Wash Bays)

6. CONCLUSION

This CSMP for Stage 1 has been prepared for Lowood One Pty Ltd to accompany the Development Application to allow for the development of 48 lots, including 4 duplex allotments on 2983 Forest Hill Fernvale Road, Lowood.

The CSMP has referenced relevant guidelines relating to stormwater management to form the conceptual basis of the stormwater plan. The following conclusions have been made as result of the study.

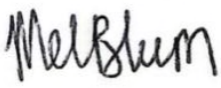
Stormwater Quality

The stormwater quality on-site is proposed to be managed through a bioretention basin, with a total filter area of 900m^2. This basin achieves the Water Quality Objectives, in line with the Somerset Region Planning Scheme (Version 4.2) and the SEQ Water 'Water Quality Management in Drinking Water Catchments Development Guidelines' (2017).

Construction Management for Erosion and Sediment

Detailed Erosion and Sediment Control design drawings have been prepared submitted as part of the Bulk Earthworks Operational Works Application submitted concurrently with this ROL Application. Please refer to Drawing Package No. BE230128-01A prepared by Burchills Engineering Solutions for further detail.

Yours sincerely,



Melissa Blum
Senior Water Engineer

Samuel Huddy
Senior Water Engineer
RPEQ - 29555

Appendix A – Proposed Plans of Development

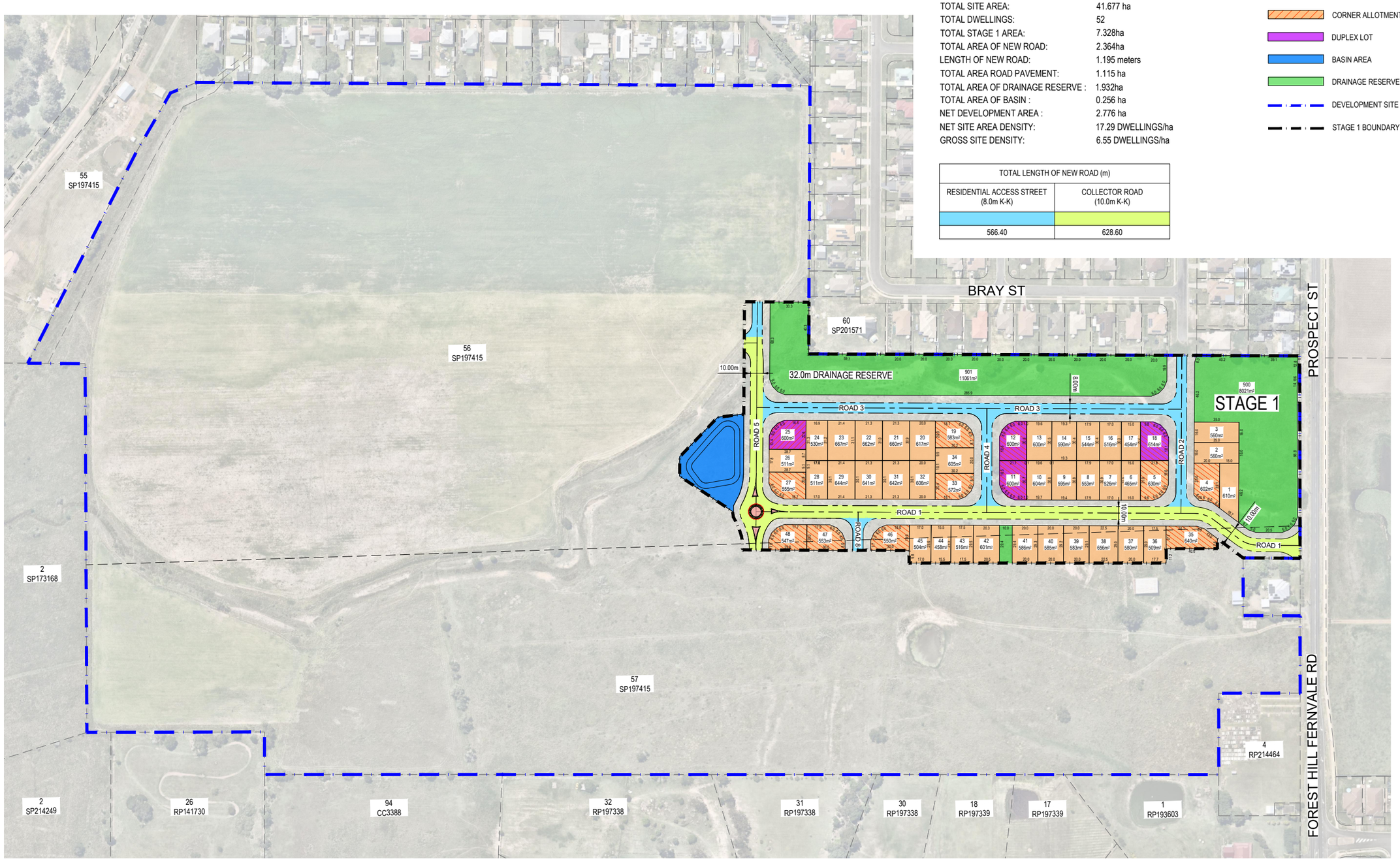
DEVELOPMENT SUMMARY

TOTAL RESIDENTIAL LOTS:	48
TOTAL BALANCE LOTS:	1
TOTAL SITE AREA:	41.677 ha
TOTAL DWELLINGS:	52
TOTAL STAGE 1 AREA:	7.328ha
TOTAL AREA OF NEW ROAD:	2.364ha
LENGTH OF NEW ROAD:	1.195 meters
TOTAL AREA ROAD PAVEMENT:	1.115 ha
TOTAL AREA OF DRAINAGE RESERVE :	1.932ha
TOTAL AREA OF BASIN :	0.256 ha
NET DEVELOPMENT AREA :	2.776 ha
NET SITE AREA DENSITY:	17.29 DWELLINGS/ha
GROSS SITE DENSITY:	6.55 DWELLINGS/ha

TOTAL LENGTH OF NEW ROAD (m)	
RESIDENTIAL ACCESS STREET (8.0m K-K)	COLLECTOR ROAD (10.0m K-K)
566.40	628.60

LEGEND

- TYPICAL ALLOTMENTS
- CORNER ALLOTMENTS
- DUPLEX LOT
- BASIN AREA
- DRAINAGE RESERVE AREA
- DEVELOPMENT SITE BOUNDARY
- STAGE 1 BOUNDARY



Prepared for : LOWOOD ONE PTY LTD

Designer : TG
Checked : CD
Date : 24.03.24

STAGE 1 - SUBDIVISION LAYOUT
CONCEPT CIVIL DRAWINGS

SCALE 15 0 15 30 45 60 75 (metres)
1 : 1500 (FULL SIZE)

BE230128-01-SK010-B

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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

Appendix B – MUSIC Input Parameters

Rainfall and Evapotranspiration Parameters

MUSIC modelling was based on 6-minute interval data obtained from the Bureau of Meteorology (BOM) for rainfall station 40584 HINZE, as summarised in Table D.6-1.

Table D.6-1 Meteorological and Rainfall Runoff Data Reporting Table

Input	Data Used in Modelling
Rainfall station	Wivenhoe
Time step	6 minute
Modelling period	1-01-1976 to 31-12-1985 (10 years)
Mean annual rainfall (mm)	1371
Evapotranspiration	1445
Rainfall runoff parameters	Residential
Pollutant export parameters	Residential

Catchment Parameters

Based on the proposed land uses within the development, the subject site has been modelled as tbc in Table D.6-2. The site has been divided into roof and ground level source nodes as per the architectural drawings included in Appendix A.

Table D.6-2 Land Use Parameters

Stage	Area (ha)	Land use	Total Impervious (%)
Post-STG-1A Landscape	0.223	Park	10
Post-STG-1A Lot-Roof	1.125	Roof	100
Post-STG-1A Lot-Ground	1.688	Ground	60
Post-STG-1A Road	2.336	Road	90
Post-STG-1B Landscape	1.106	Park	10
Post-STG-1B Landscape	0.830	Park	10

The MUSIC catchment plan with full breakdown of roof and ground areas is presented in Appendix E. The pollutant loads and runoff parameters for each source node have been based on the data from the Water by Design MUSIC Modelling Guidelines (Water By Design, 2010), as summarised in Table D.6-3 and Table D.6-4.

Table D.6-3 Rainfall Runoff Parameters Urban

Parameter	All Nodes
Landuse	Residential
Rainfall threshold (mm)	1
Soil storage capacity (mm)	500
Initial storage (% capacity)	10
Field capacity (mm)	200
Infiltration capacity coefficient a	211
Infiltration capacity exponent b	5
Initial depth (mm)	50
Daily recharge rate (%)	28
Daily baseflow rate (%)	27
Daily deep seepage rate (%)	0

Table D.6-4 Pollutant Load Parameters

Urban Residential	Total Suspended Solids (log mg/L)		Total Phosphorous (log mg/L)		Total Nitrogen (log mg/L)	
	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Storm Flow Concentration	1.30(1) 2.43(2) 2.18(3)	0.39	-0.89(1) -0.30(2) -0.47(3)	0.31	0.26	0.23
Base Flow Concentration	0(1) 1(2,3)	0(1) 0.34(2,3)	0(1) -0.97(2,3)	0(1) 0.31	0(1) 0.20(2,3)	0(1) 0.20(2,3)

NOTE: (1) Values applied to “Roof” areas
(2) Values applied to “Road” areas
(3) Values applied to “Ground” areas

Treatment Node Parameters

The following sections describe the modelling parameters applied to MUSIC for each of the treatment nodes included as part of the water quality assessment.

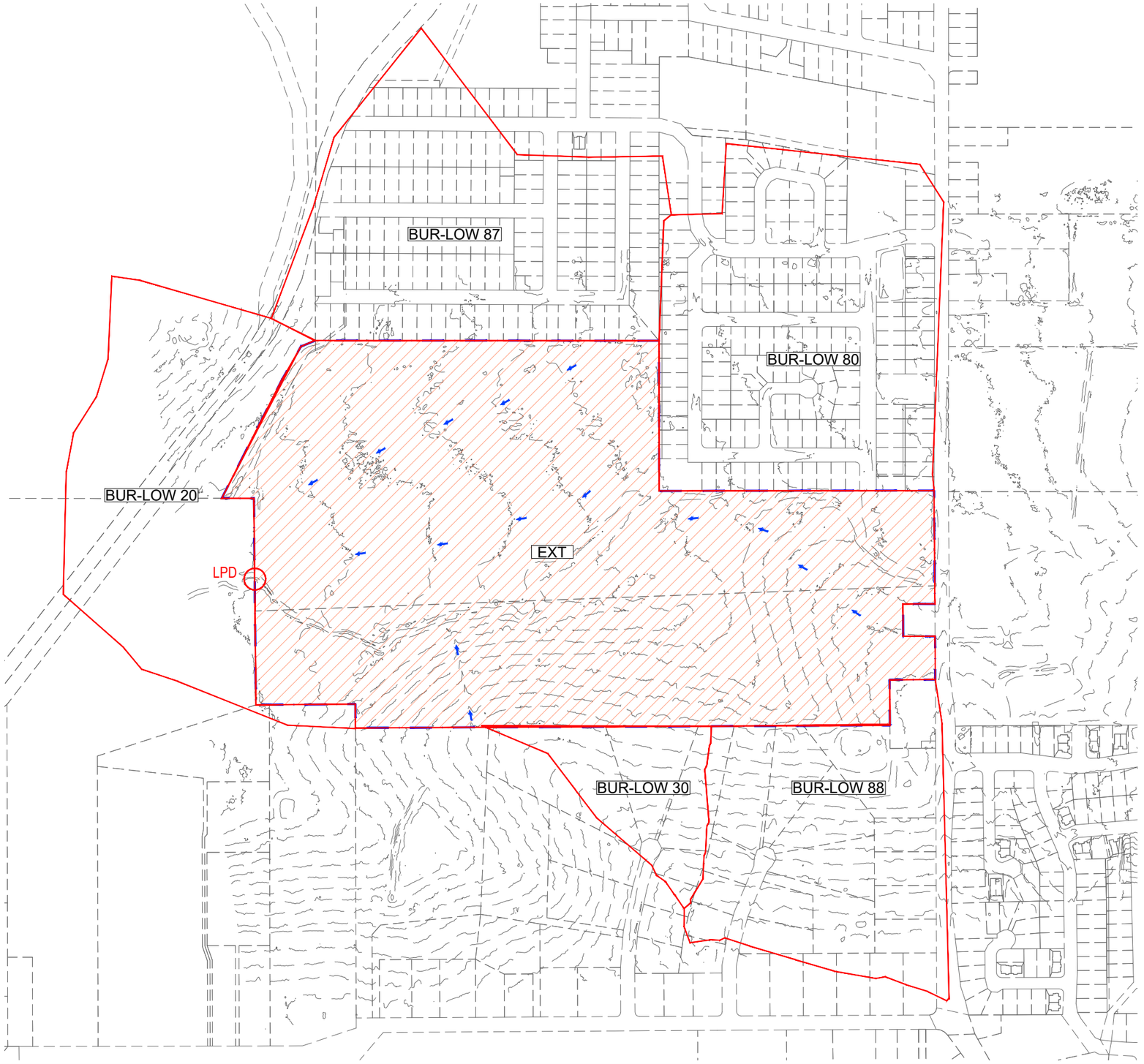
Bioretention System

The input parameters for the bioretention system are summarised in Table D.6-5.a

Table D.6-5 Bioretention Parameters

ID	C
Surface area (m2)	900
Has the filter area been calculated appropriately? (Y / N / N/A)	Y
Extended detention depth (m)	0.3
Filter area (m^2)	900
Unlined filter media perimeter (m)	139
Saturated hydraulic conductivity (mm/hour)	200
Filter depth (m)	0.4
TN content of filter media (mg/kg)	400
Orthophosphate content of filter media (mg/kg)	30
Is the base lined? (Y/N)	Yes
Effectiveness of plant TN removal (effective/ineffective/unvegetated)	Effective
Overflow weir width (m)	95
Exfiltration rate (mm/hr)	0
If an exfiltration rate has been used, have node water balance losses been used in calculation of treatment train effectiveness? (Y / N / N/A)	N/A
If exfiltration rate has been used, is the exfiltration rate justified? (Y / N / N/A)	N/A
Underdrain present? (Y/N)	Yes
Submerged zone with carbon present?	No
Depth of submerged zone (m)	N/A
Confirmation that K and C* remain default? (Y/N)	Yes

Appendix C – Burchills Stormwater Drawings



LEGEND

- SITE BOUNDARY
- EXISTING SURFACE CONTOURS
- CATCHMENT BOUNDARY
- FLOW DIRECTION
- LPD — LEGAL POINT DISCHARGE
- RURAL

CATCHMENT TABLE

CATCHMENT	AREA (ha)
EXT	41.688
BUR-LOW 20	13.538
BUR-LOW 87	15.468
BUR-LOW 80	17.331
BUR-LOW 88	11.829
BUR-LOW 30	3.729

Prepared for : LOWOOD ONE PTY LTD

PRE-DEVELOPMENT CATCHMENT PLAN - STG 01
2983 FOREST HILL FERNVALE RD LOWOOD

SCALE 50 0 50 100 150 (metres)
1 : 3000 (FULL SIZE)

BE230128-C904-A

Designer : MN
Checked : TN
Date : 18.04.24

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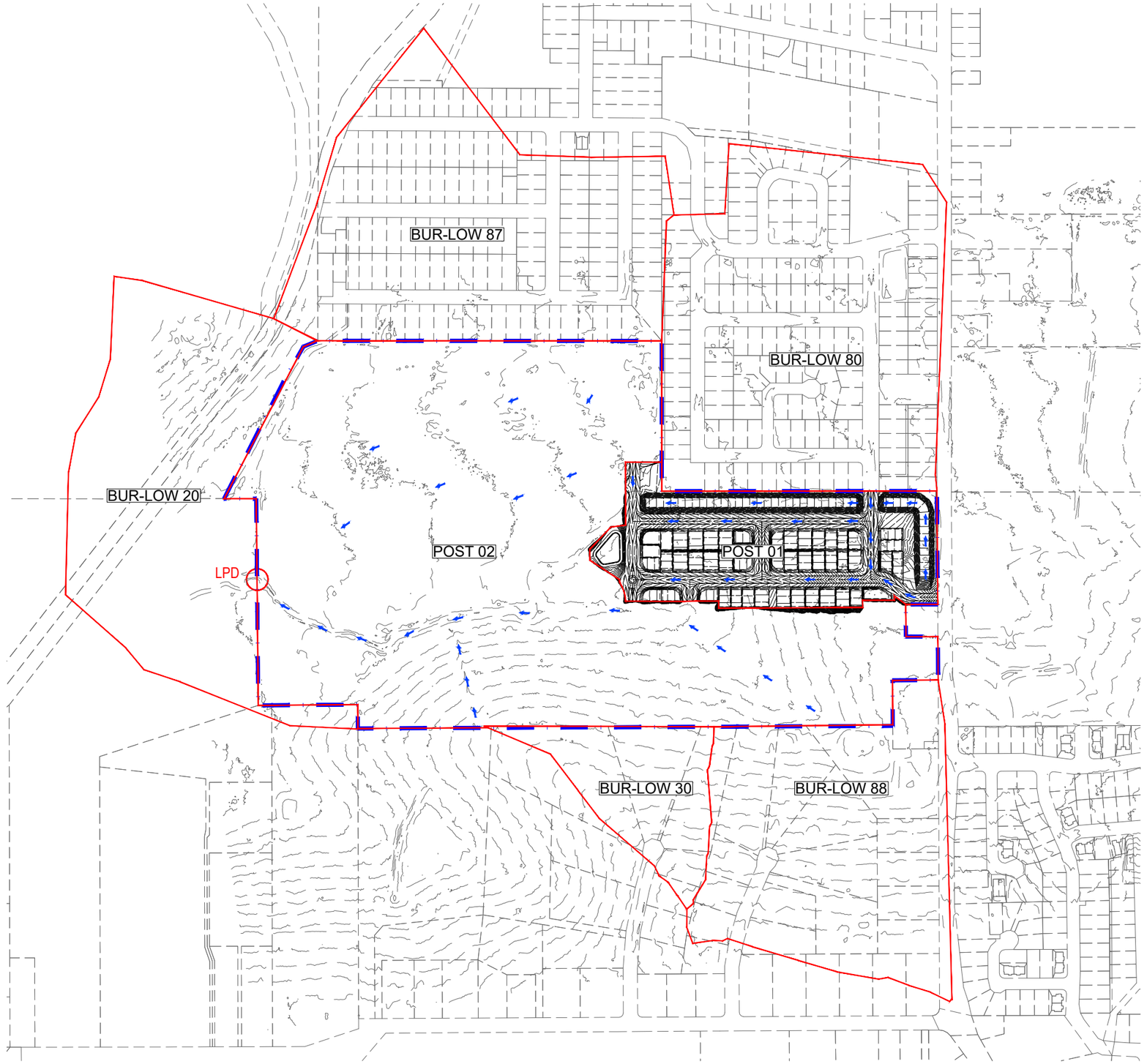
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365



LEGEND

- SITE BOUNDARY
- DESIGN SURFACE CONTOURS
- EXISTING SURFACE CONTOURS
- CATCHMENT BOUNDARY
- FLOW DIRECTION
- LPD — LEGAL POINT DISCHARGE

CATCHMENT TABLE

CATCHMENT	AREA (ha)
POST 01	7.336
POST 02	34.341
BUR-LOW 20	13.538
BUR-LOW 87	15.468
BUR-LOW 80	17.331
BUR-LOW 88	11.829
BUR-LOW 30	3.729

Prepared for : LOWOOD ONE PTY LTD

POST-DEVELOPMENT CATCHMENT PLAN - STG 01
2983 FOREST HILL FERNVALE RD LOWOOD

SCALE 50 0 50 100 150 (metres)
1 : 3000 (FULL SIZE)

BE230128-C905-A

Designer : MN
Checked : TN
Date : 18.04.24

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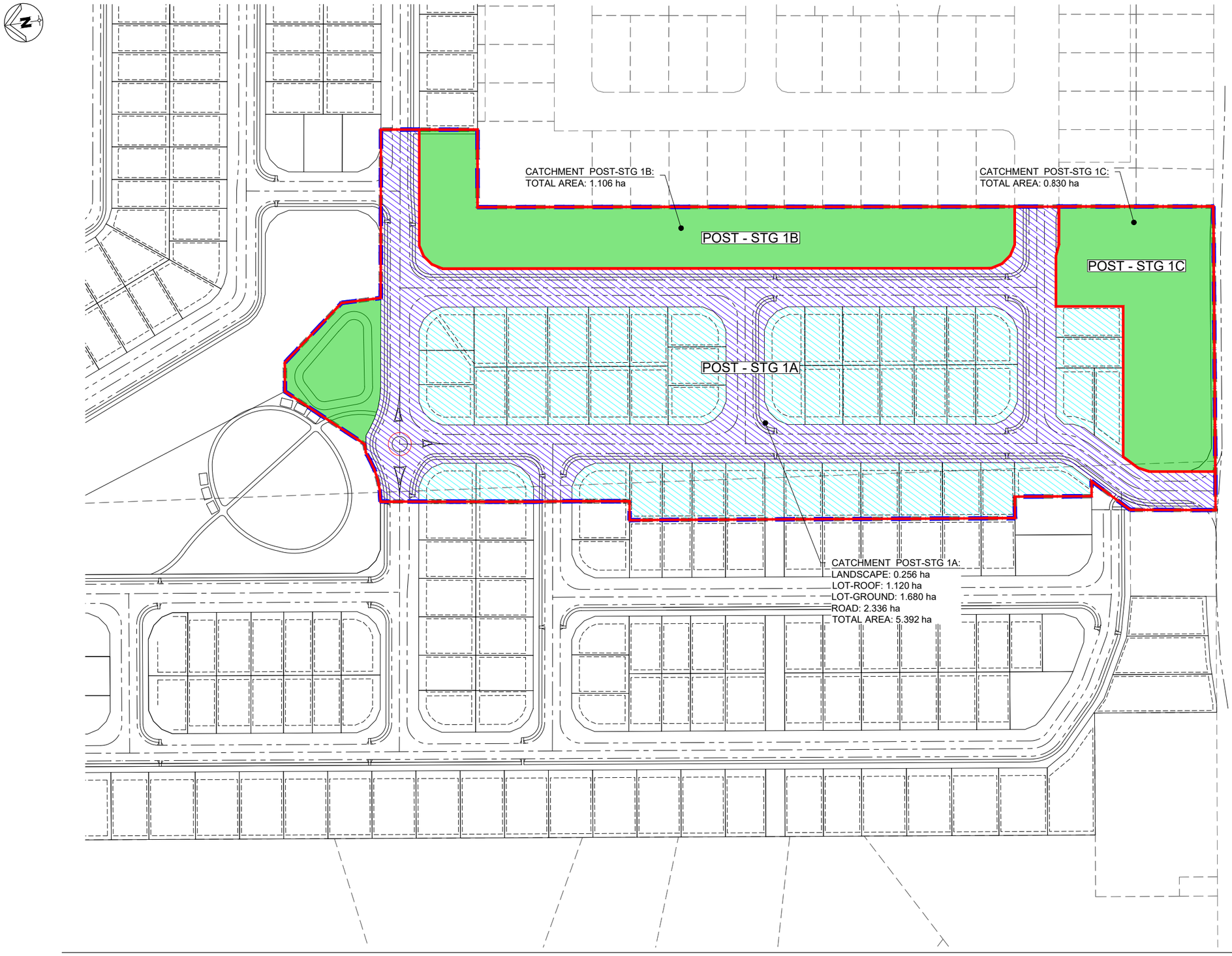
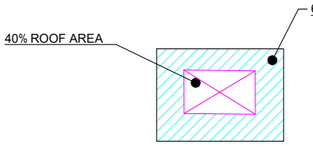


LEGEND

- SITE BOUNDARY
- CATCHMENT BOUNDARY
- LOT
- ROOF
- ROAD
- PARK



TYPICAL LOT

Prepared for : LOWOOD ONE PTY LTD

MUSIC-DEVELOPMENT CATCHMENT PLAN - STG 01
2983 FOREST HILL FERNVALE RD LOWOOD

SCALE 15 0 15 30 45 60 75 (metres)
1 : 1500 (FULL SIZE)

BE230128-C906-A

Designer : MN
Checked : TN
Date : 18.04.24

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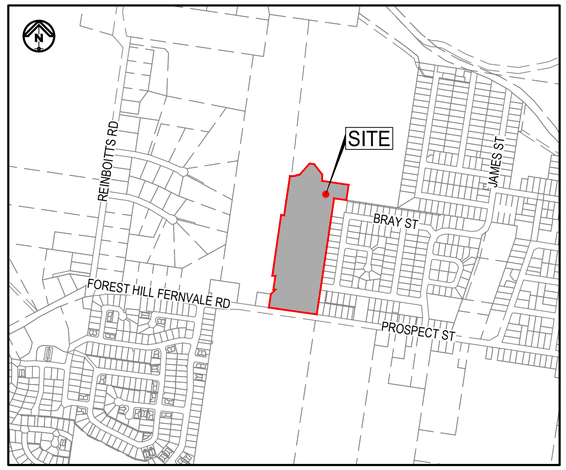
Appendix D – Burchills Civil Engineering Drawings - Concept Civil Engineering Stage 1

PROPOSED LAND SUBDIVISION
AT 2983 FOREST HILL FERNVALE RD, LOWOOD
QUEENSLAND 4311

CONCEPT CIVIL ENGINEERING STAGE 1

CONTRACT BE230128-01



LOCALITY PLAN

N.T.S.

DRAWING INDEX	
DWG No.	DESCRIPTION
SK000	COVER SHEET
SK200	BULK EARTHWORKS LAYOUT PLAN
SK201	EARTHWORKS SECTIONS
SK300	ROADWORKS AND DRAINAGE LAYOUT PLAN
SK301	TYPICAL ROAD CROSS SECTIONS
SK310	ROAD 1 LONGITUDINAL SECTIONS
SK311	ROADS 4 & 5 LONGITUDINAL SECTIONS
SK312	ROADS 6 & 7 LONGITUDINAL SECTIONS
SK313	ROAD 8 LONGITUDINAL SECTIONS
SK320	BIO-RETENTION BASIN DETAIL PLAN
SK321	BIO-RETENTION BASIN DETAILS
SK350	INTERSECTION FUNCTION LAYOUT PLAN
SK500	CONCEPT WATER AND SEWER LAYOUT PLAN

PREPARED FOR
LOWOOD ONE PTY LTD

PREPARED BY

BURCHILLS
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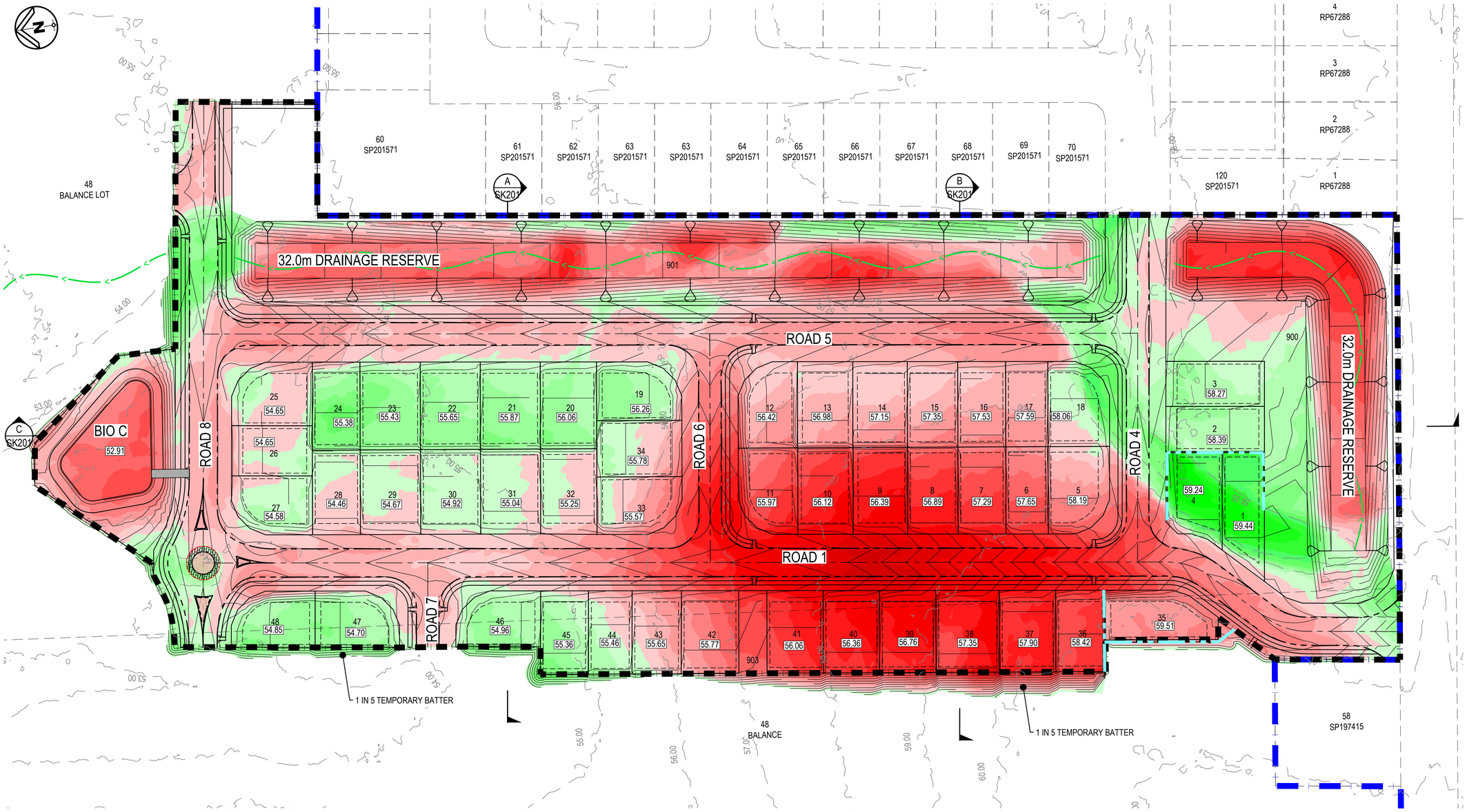
NOTE:

DESIGNS HAVE BEEN UNDERTAKEN USING SURVEY DATA
PROVIDED BY ONE SURVEYORS DATED 6 NOVEMBER 2023

DATE : 24.04.24

PROJECT No.:	DRAWING No. :	VERSION:
BE230128-01	SK000	B



BULK EARTHWORKS LAYOUT PLAN

SCALE 10 0 5 10 15 20 25 30 35 (metres)
1 : 750 (FULL SIZE)

EARTHWORKS LEGEND

-4.5 TO -4.0 m		0.0 TO 0.5 m	
-4.0 TO -3.5 m		0.5 TO 1.0 m	
-3.5 TO -3.0 m		1.0 TO 1.5 m	
-3.0 TO -2.5 m		1.5 TO 2.0 m	
-2.5 TO -2.0 m		2.0 TO 2.5 m	
-2.0 TO -1.5 m		2.5 TO 3.0 m	
-1.5 TO -1.0 m		3.0 TO 3.5 m	
-1.0 TO -0.5 m		3.5 TO 4.0 m	
-0.5 TO 0.0 m		4.0 TO 4.5 m	

BULK EARTHWORKS SUMMARY

STRUCTURAL FILLING

AREA	NETT SOLID FILL
OVERALL FILLING	
(ALLOTMENTS, BATTERS)	10,360 cu.m.
TOTAL FILL REQUIRED	10,360 cu.m.

EXCAVATION

AREA	NETT CUT
OVERALL EXCAVATION	43,131 cu.m.
TOTAL CUT	43,131 cu.m.

i.e. 43,131cu.m - 10,360 cu.m. = 32,771 cu.m. TO BE EXPORTED OUT SIDE
INCLUDING 200mm TOPSOIL STRIP
INCLUDING 200mm TOPSOIL RESPREAD TO LOTS, VERGES, DRAINAGE RESERVE AND OPEN SPACE AREAS
INCLUDING 300mm ROAD BOXING DEPTHS

LEGEND

- 90.0 EXISTING CONTOUR LIDAR
- EXISTING EDGE OF KERB
- DEVELOPMENT SITE BOUNDARY
- PROPOSED ROAD CONTROL LINE
- PROPOSED KERB
- 90.0 DESIGN SURFACE CONTOUR
- PROPOSED RETAINING WALL

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCIL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

NOTE
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Figured dimensions take precedence over scale. Do not scale reduced size drawings.
Verify dimensions prior to commencing any on-site or off-site works or fabrication.

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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
BULK EARTHWORKS LAYOUT PLAN

DEVEL. APPLIC. No. : -	DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL	
DESIGNER : TG	
DRAFTSPERSON : CD	
CHECKED : FRASER LUCAS	

APPROVED FOR AND ON BEHALF OF
BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. :

SCALE : AS NOTED	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE230128-01	DRAWING No. : SK200	VERSION: B

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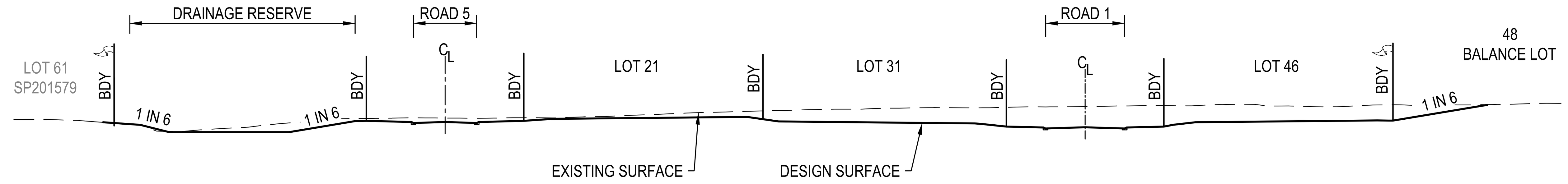

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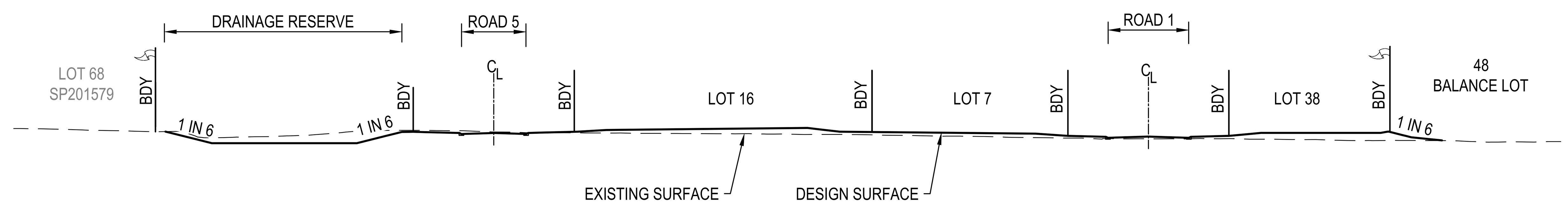

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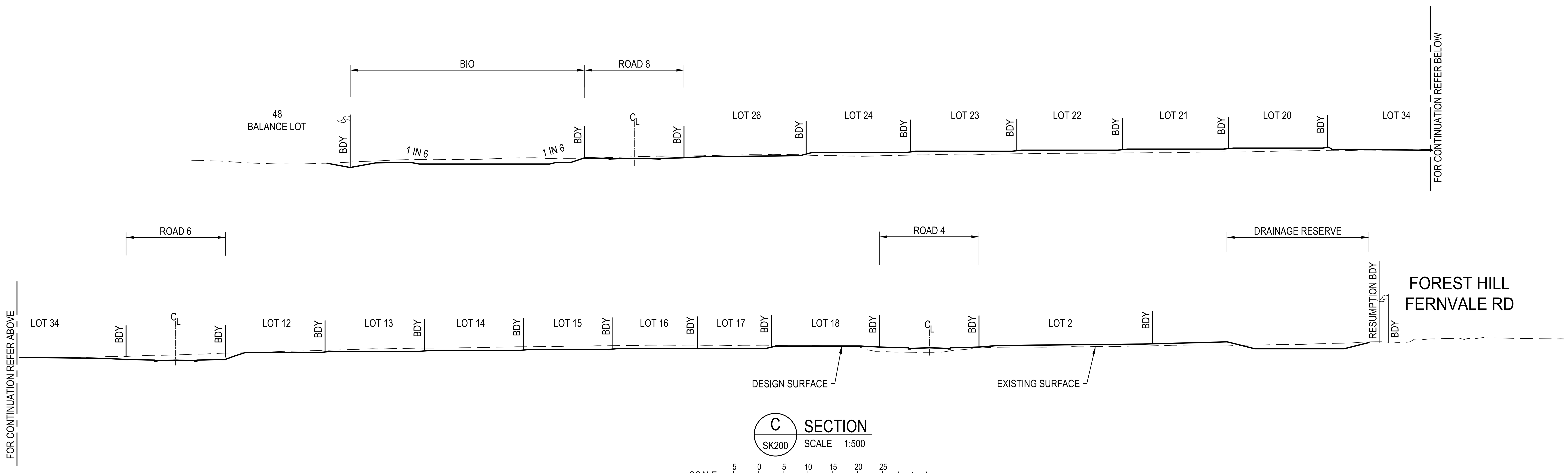
1 : 500 (FULL SIZE)



C SK200 SECTION SCALE 1:500

SCALE 5 0 5 10 15 20 25 (metres)
1 : 500 (FULL SIZE)

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

FILENAME: C:\Users\To Ngoc Nguyen\QT Vietnam Ltd Co\BCH23 - Documents\BCH23007 BE230128 2983 Forest Hill Fernvale Rd\03 Civil\01 DA\Rev A\02 Acad\02 Stage 1 DA\SK201.dwg

PLOTTED: 25.04.2024 at 16:29

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

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Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
EARTHWORKS SECTIONS

DEVEL. APPLIC. No. : -	DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL	
DESIGNER : TG	
DRAFTSPERSON : CD	
CHECKED : FRASER LUCAS	

APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365

RPEQ No. :

SCALE : AS NOTED	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE230128-01	DRAWING No. : SK201	VERSION: B

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

BRAY ST

PROSPECT ST

32.0m DRAINAGE RESERVE

ROAD 1

ROAD 4

ROAD 5

ROAD 6

ROAD 7

ROAD 8

BIO C

CULVERT GROUP 1
7 x 2100x600 RCBCs

CULVERT GROUP 2
7 x 2100x600 RCBCs

PROPOSED LOW-FLOW CHANNEL. REFER TYPICAL DETAIL

PROPOSED EXTENSION OF EXISTING CULVERTS

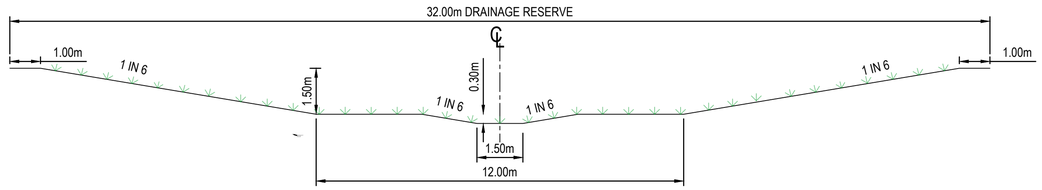
STUB FOR FUTURE CONNECTION

48
BALANCE

58
SP197415

ROADWORKS AND DRAINAGE LAYOUT PLAN

SCALE 10 0 5 10 15 20 25 30 35 (metres)
1 : 750 (FULL SIZE)



CHANNEL TYPICAL SECTION

SCALE 1 0 1 2 3 4 5 (metres)
1 : 100 (FULL SIZE)

LEGEND

- DEVELOPMENT SITE BOUNDARY
- EXISTING CONTOUR LIDAR (90.0)
- EXISTING STORMWATER (SW)
- EXISTING EASEMENT
- DESIGN SURFACE CONTOUR (90.0)
- DESIGNPROPOSED LOT BOUNDARY
- PROPOSED LOW-FLOW CHANNEL
- PROPOSED ROAD CENTRELINE
- PROPOSED HEADWALL
- PROPOSED STORMWATER PIPE (SW)
- PROPOSED STORMWATER MANHOLE
- PROPOSED BATTER
- DRAINAGE RESERVE
- PROPOSED FOOTPATH
- PROPOSED ASPHALT PAVETMENT

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
ROADWORKS AND DRAINAGE LAYOUT PLAN

DEVEL. APPLIC. No. :	-
DATE :	24.04.24
PROJECT LEADER :	JONATHAN CUELL
DESIGNER :	TG
DRAFTSPERSON :	CD
CHECKED :	FRASER LUCAS

APPROVED FOR AND ON BEHALF OF
BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365

RPEQ No. :

SCALE : AS NOTED	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE230128-01	DRAWING No. : SK300	VERSION: B

FILENAME: C:\Users\Tu Nguyen\OneDrive - Burchills Engineering Solutions\Documents\BE\2023\BE230128 Forest Hill Fernvale Rd\05 Civil\01 DA\Rev A\00_Acad\02_Sheet 1\DWG\SK300.dwg
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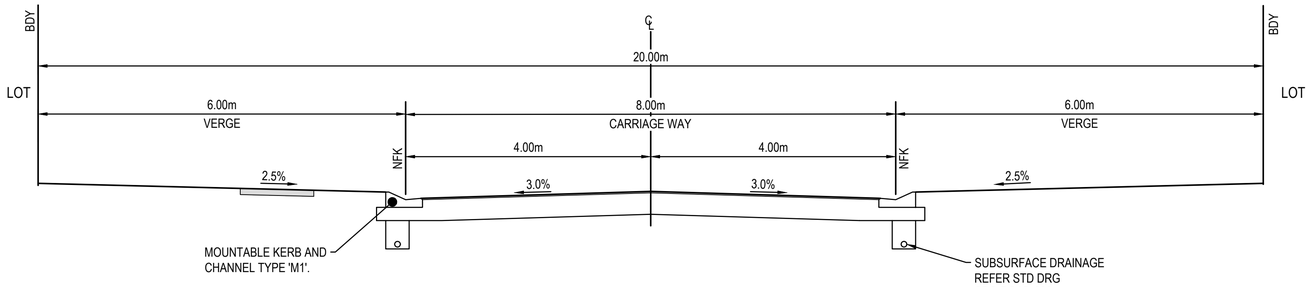
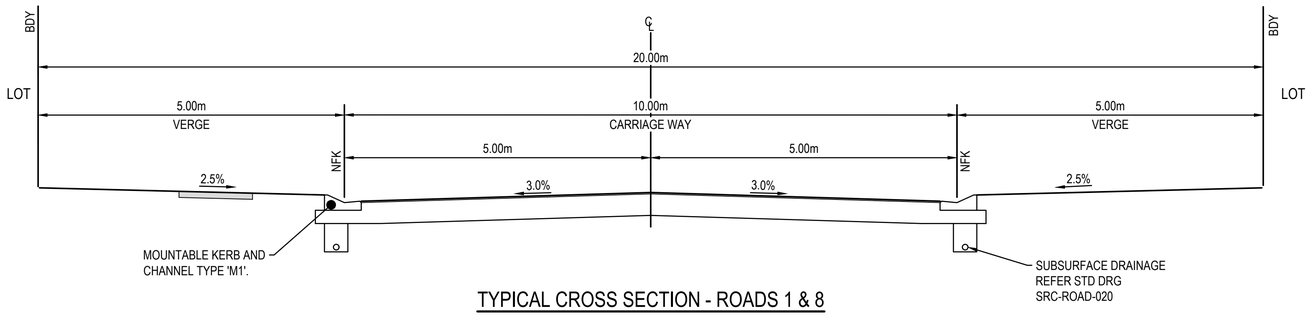


TYPICAL CROSS SECTION - ROADS 5, 6 & 7

SCALE 1.0 0 1.0 2.0 (metres)

1 : 50 (FULL SIZE)



TYPICAL CROSS SECTION - ROADS 1 & 8

SCALE 1.0 0 1.0 2.0 (metres)

1 : 50 (FULL SIZE)

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL
FERNVALE RD, LOWOOD
QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
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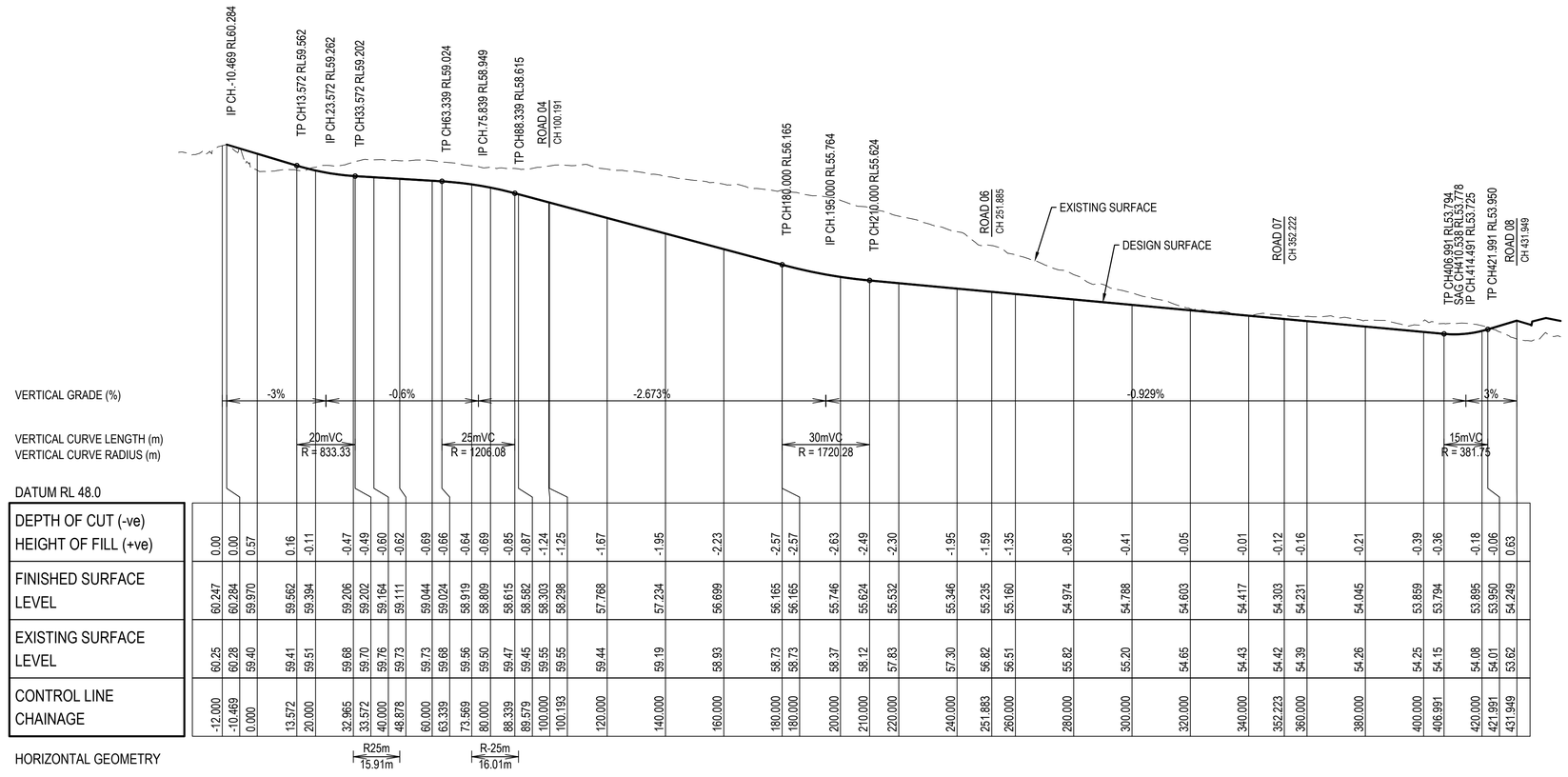
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
TYPICAL ROAD
CROSS SECTIONS

DEVEL. APPLIC. No. : -	DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL	
DESIGNER : TG	
DRAFTSPERSON : CD	
CHECKED : FRASER LUCAS	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	
RPEQ No. :	
SCALE : AS NOTED	DATUM : AHD / FULL SIZE : A1
PROJECT No.: BE230128-01	DRAWING No. : SK301 / VERSION: B



CONTROL LINE CHAINAGE	DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve)	FINISHED SURFACE LEVEL	EXISTING SURFACE LEVEL
-12.000	0.00	60.247	60.25
-10.469	0.00	60.284	60.28
0.000	0.57	59.970	59.40
13.572	0.16	59.562	59.41
20.000	-0.11	59.394	59.51
32.965	-0.47	59.206	59.68
33.572	-0.49	59.202	59.70
40.000	-0.60	59.164	59.76
48.878	-0.62	59.111	59.73
60.000	-0.69	59.044	59.73
63.339	-0.66	59.024	59.68
73.569	-0.64	58.919	59.56
80.000	-0.69	58.809	59.50
88.339	-0.85	58.615	59.47
89.579	-0.87	58.582	59.45
100.000	-1.24	58.303	59.55
100.193	-1.25	58.298	59.55
120.000	-1.67	57.768	59.44
140.000	-1.95	57.234	59.19
160.000	-2.23	56.699	58.93
180.000	-2.57	56.165	58.73
180.000	-2.57	56.165	58.73
200.000	-2.63	55.746	58.37
210.000	-2.49	55.624	58.12
220.000	-2.30	55.532	57.83
240.000	-1.95	55.346	57.30
251.883	-1.59	55.235	56.82
260.000	-1.35	55.160	56.51
280.000	-0.85	54.974	55.82
300.000	-0.41	54.788	55.20
320.000	-0.05	54.603	54.65
340.000	-0.01	54.417	54.43
352.223	-0.12	54.303	54.42
360.000	-0.16	54.231	54.39
380.000	-0.21	54.045	54.26
400.000	-0.39	53.859	54.25
406.991	-0.36	53.794	54.15
420.000	-0.18	53.895	54.08
421.991	-0.06	53.950	54.01
431.949	0.63	54.249	53.62

ROAD 1 LONGITUDINAL SECTION

VERTICAL SCALE 1 0 1 2 3 4 5 1:100 (metres)

HORIZONTAL SCALE 10 0 10 20 30 40 50 1:1000 (metres)
(FULL SIZE)

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

BURCHILLS ENGINEERING SOLUTIONS
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Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:

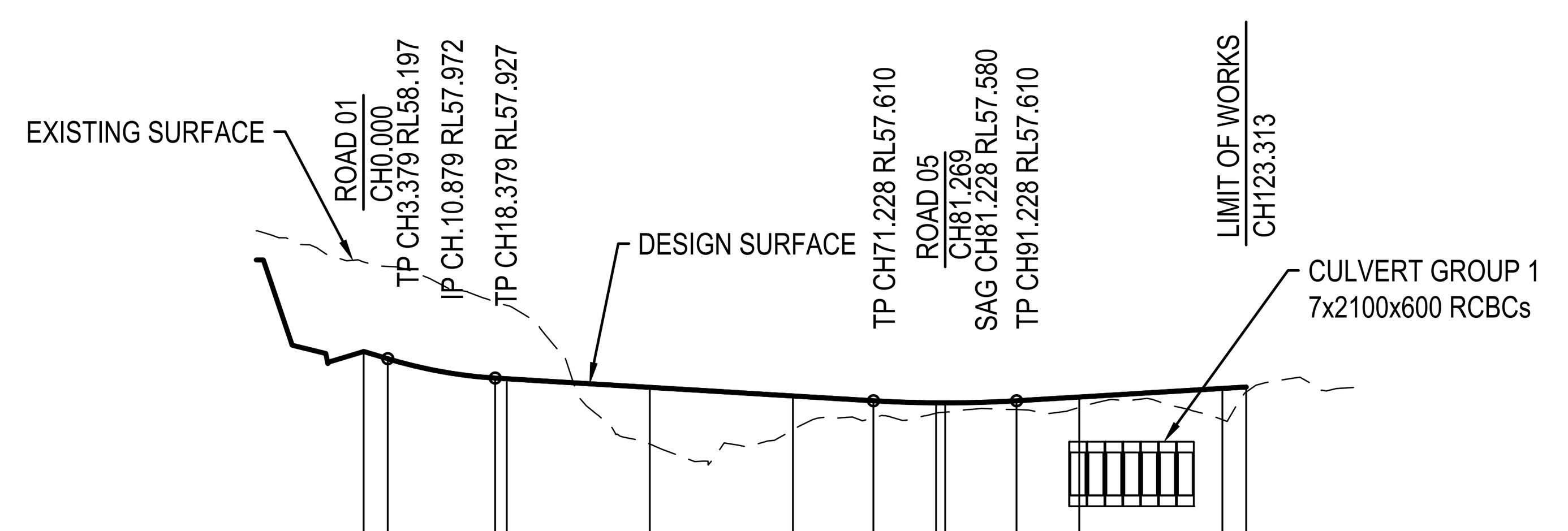
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :

ROAD 1 LONGITUDINAL SECTIONS

DEVEL. APPLIC. No. : -	DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL	
DESIGNER : TG	
DRAFTSPERSON : CD	
CHECKED : FRASER LUCAS	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	
RPEQ No. :	
SCALE : AS NOTED	DATUM : AHD / FULL SIZE : A1
PROJECT No.: BE230128-01	DRAWING No. : SK310 / VERSION: B

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER



VERTICAL GRADE (%): -3% | -0.6% | 0.6%

VERTICAL CURVE LENGTH (m) / VERTICAL CURVE RADIUS (m): 15mVC R = 625 | 20mVC R = 1666.67

DATUM RL 51.0

DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve)	-1.25	-1.29	-1.06	-1.03	0.79	0.47	0.24	0.14	0.13	0.12	0.15	0.44	0.07
FINISHED SURFACE LEVEL	58.299	58.197	57.927	57.918	57.798	57.678	57.610	57.581	57.580	57.610	57.663	57.783	57.803
EXISTING SURFACE LEVEL	59.55	59.49	58.99	58.94	57.01	57.21	57.37	57.44	57.45	57.49	57.52	57.35	57.73
CONTROL LINE CHAINAGE	0.000	3.379	18.379	20.000	40.000	60.000	71.228	80.000	81.269	91.228	100.000	120.000	123.313

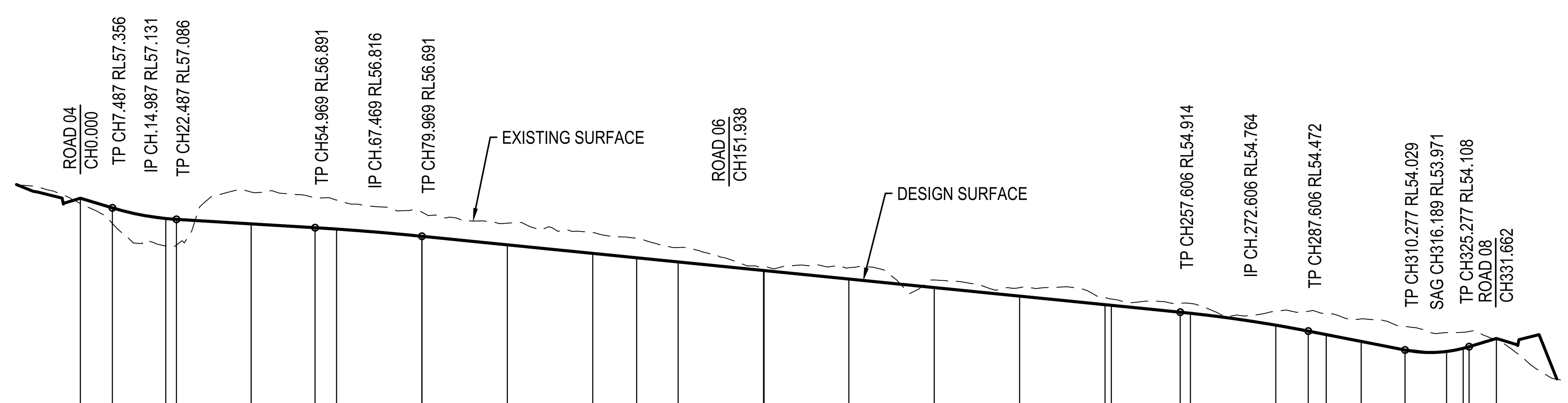
HORIZONTAL GEOMETRY

ROAD 4 LONGITUDINAL SECTION

VERTICAL SCALE 1 0 1 2 3 4 5 1:100 (metres)

HORIZONTAL SCALE 10 0 10 20 30 40 50 1:1000 (metres)

(FULL SIZE)



VERTICAL GRADE (%): -3% | -0.6% | -1% | -1.952% | 3%

VERTICAL CURVE LENGTH (m) / VERTICAL CURVE RADIUS (m): 15mVC R = 625 | 25mVC R = 6250.2 | 30mVC R = 3152.13 | 15mVC R = 302.92

DATUM RL 48.0

DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve)	0.13	0.37	0.64	0.60	-0.74	-0.71	-0.68	-0.56	-0.56	-0.51	-0.49	-0.45	-0.34	-0.08	-0.08	-0.26	-0.18	-0.20	-0.16
FINISHED SURFACE LEVEL	57.580	57.356	57.106	57.086	56.981	56.891	56.859	56.691	56.690	56.490	56.290	56.188	56.090	55.890	55.889	55.690	55.490	55.290	55.090
EXISTING SURFACE LEVEL	57.45	56.99	56.46	56.49	57.72	57.60	57.54	57.25	57.25	57.00	56.78	56.64	56.43	55.97	55.97	55.95	55.67	55.49	55.25
CONTROL LINE CHAINAGE	0.000	7.487	20.000	22.487	40.000	54.969	60.000	79.969	80.000	100.000	120.000	130.281	140.000	160.000	160.139	180.000	200.000	220.000	240.000

DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve)	-0.15	-0.21	-0.23	-0.32	-0.46	-0.49	-0.53	-0.55	-0.44	-0.38	-0.35	0.02
FINISHED SURFACE LEVEL	55.076	54.914	54.890	54.611	54.472	54.389	54.230	54.029	53.995	54.070	54.108	54.299
EXISTING SURFACE LEVEL	55.22	55.12	55.12	54.94	54.94	54.88	54.76	54.58	54.44	54.45	54.46	54.28
CONTROL LINE CHAINAGE	241.488	257.606	260.000	280.000	287.606	291.815	300.000	310.277	320.000	323.904	325.277	331.662

HORIZONTAL GEOMETRY

ROAD 5 LONGITUDINAL SECTION

VERTICAL SCALE 1 0 1 2 3 4 5 1:100 (metres)

HORIZONTAL SCALE 10 0 10 20 30 40 50 1:1000 (metres)

(FULL SIZE)

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

NOTE
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Figured dimensions take precedence over scale. Do not scale reduced size drawings.
Verify dimensions prior to commencing any on-site or off-site works or fabrication.

BURCHILLS ENGINEERING SOLUTIONS
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Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
ROADS 4 & 5 LONGITUDINAL SECTIONS

DEVEL. APPLIC. No. : - | DATE : 24.04.24

PROJECT LEADER : JONATHAN CUELL

DESIGNER : TG

DRAFTSPERSON : CD

CHECKED : FRASER LUCAS

APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365

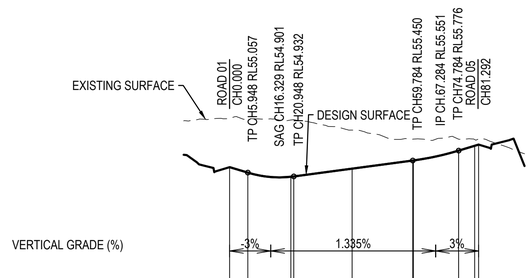
RPEQ No. :

SCALE : AS NOTED | DATUM : AHD | FULL SIZE : A1

PROJECT No.: BE230128-01 | DRAWING No. : SK311 | VERSION: B

PLOTTED: 25.04.2024 at 16:29

FILENAME: C:\Users\To Ngoc Nguyen\QT Vietnam Ltd Co\BCH23 - Documents\BCH23007 BE230128 2983 Forest Hill Fernvale Rd\03. Civil\01. DA\Rev A\02. Acad\02. Stage 1.DA\SK310.dwg



VERTICAL GRADE (%)		-3%		1.385%				3%						
VERTICAL CURVE LENGTH (m)		15mVC						15mVC						
VERTICAL CURVE RADIUS (m)		R = 346.02						R = 900.88						
DATUM RL 49.0														
DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve)	-1.59	-1.75	-1.85	-1.85	-1.26	-0.70	-0.70	-0.37	-0.20	-0.18				
FINISHED SURFACE LEVEL	55.235	55.057	54.921	54.932	55.186	55.450	55.453	55.776	55.932	55.971				
EXISTING SURFACE LEVEL	56.82	56.81	56.77	56.79	56.44	56.15	56.15	56.15	56.14	56.15				
CONTROL LINE CHAINAGE	0.000	5.948	20.000	20.948	40.000	59.784	60.000	74.784	80.000	81.292				

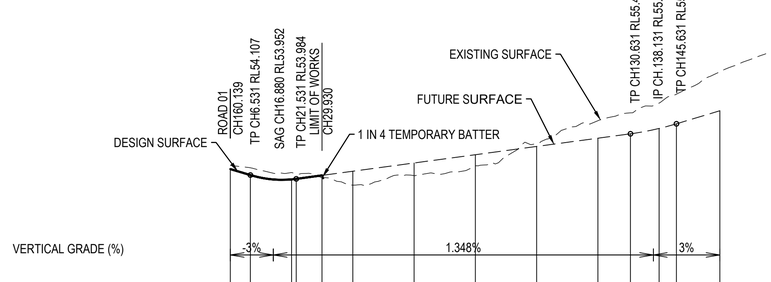
HORIZONTAL GEOMETRY

ROAD 6 LONGITUDINAL SECTION

VERTICAL SCALE 1 0 1 2 3 4 5 1:100 (metres)

HORIZONTAL SCALE 10 0 10 20 30 40 50 1:1000 (metres)

(FULL SIZE)



VERTICAL GRADE (%)		-3%			1.348%							3%		
VERTICAL CURVE LENGTH (m)		15mVC										15mVC		
VERTICAL CURVE RADIUS (m)		R = 344.96										R = 908.14		
DATUM RL 48.0														
DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve)	-0.12	-0.24	-0.22	-0.17	0.09	0.45	0.41	0.37	-0.10	-0.57	-0.68	-0.83	-0.97	-1.27
FINISHED SURFACE LEVEL	54.303	54.107	53.966	53.984	54.097	54.233	54.502	54.772	55.042	55.311	55.455	55.629	55.781	56.207
EXISTING SURFACE LEVEL	54.42	54.34	54.19	54.15	54.01	53.78	54.09	54.40	55.14	55.88	56.14	56.46	56.75	57.48
CONTROL LINE CHAINAGE	0.000	6.531	20.000	21.531	29.930	40.000	60.000	80.000	100.000	120.000	130.631	140.000	145.631	159.830

HORIZONTAL GEOMETRY

HORIZONTAL GEOMETRY

ROAD 7 LONGITUDINAL SECTION

VERTICAL SCALE 1 0 1 2 3 4 5 1:100 (metres)

HORIZONTAL SCALE 10 0 10 20 30 40 50 1:1000 (metres)

(FULL SIZE)

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

BURCHILLS ENGINEERING SOLUTIONS
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Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

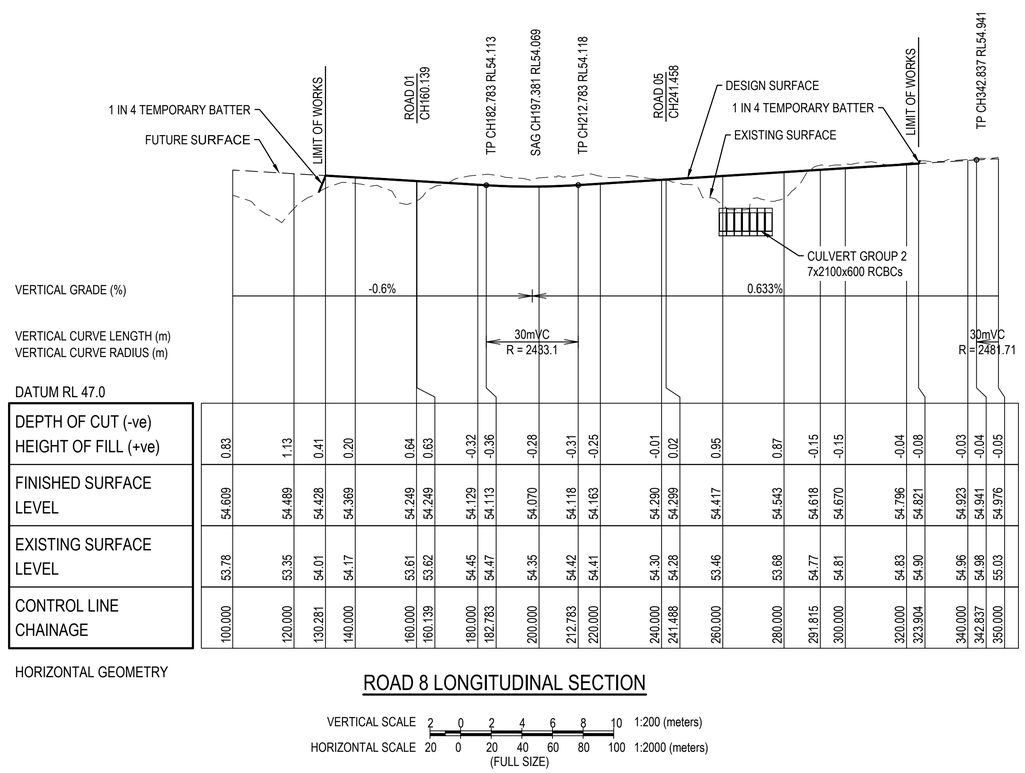
PROJECT:

CONCEPT CIVIL ENGINEERING

DRAWING TITLE :

ROADS 6 & 7 LONGITUDINAL SECTIONS

DEVEL. APPLIC. No. : -	DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL	
DESIGNER : TG	
DRAFTSPERSON : CD	
CHECKED : FRASER LUCAS	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	
RPEQ No. :	
SCALE : AS NOTED	DATUM : AHD / FULL SIZE : A1
PROJECT No.: BE230128-01	DRAWING No. : SK312 / VERSION: B



DATUM RL 47.0

DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve)	0.83	1.13	0.41	0.20	0.64	0.63	-0.32	-0.36	-0.28	-0.31	-0.25
FINISHED SURFACE LEVEL	54.609	54.489	54.428	54.369	54.249	54.249	54.129	54.113	54.070	54.118	54.163
EXISTING SURFACE LEVEL	53.78	53.35	54.01	54.17	53.61	53.62	54.45	54.47	54.35	54.42	54.41
CONTROL LINE CHAINAGE	100.000	120.000	130.281	140.000	160.000	160.139	180.000	182.783	200.000	212.783	220.000

DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve)	-0.01	0.02	0.95	0.87	-0.15	-0.15	-0.04	-0.08	-0.03	-0.04	-0.05
FINISHED SURFACE LEVEL	54.290	54.299	54.417	54.543	54.618	54.670	54.796	54.821	54.923	54.941	54.976
EXISTING SURFACE LEVEL	54.30	54.28	53.46	53.68	54.77	54.81	54.83	54.90	54.96	54.98	55.03
CONTROL LINE CHAINAGE	240.000	241.488	260.000	280.000	291.815	300.000	320.000	323.904	340.000	342.837	350.000

HORIZONTAL GEOMETRY

ROAD 8 LONGITUDINAL SECTION

VERTICAL SCALE 2 0 2 4 6 8 10 1:200 (meters)
HORIZONTAL SCALE 20 0 20 40 60 80 100 1:2000 (meters)
(FULL SIZE)

PLOTTED: 25.04.2024 at 16:29
FILENAME: C:\Users\Tu Ngoc Nguyen\QT Vietnam Ltd Co\BCH23 - Documents\BCH23007 BE230128 2983 Forest Hill Fernvale Rd\03. Civil\01. DA\Rev A\02. Acad\02. Stage 1 DA\SK310.dwg

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL
FERNVALE RD,
LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

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BURCHILLS
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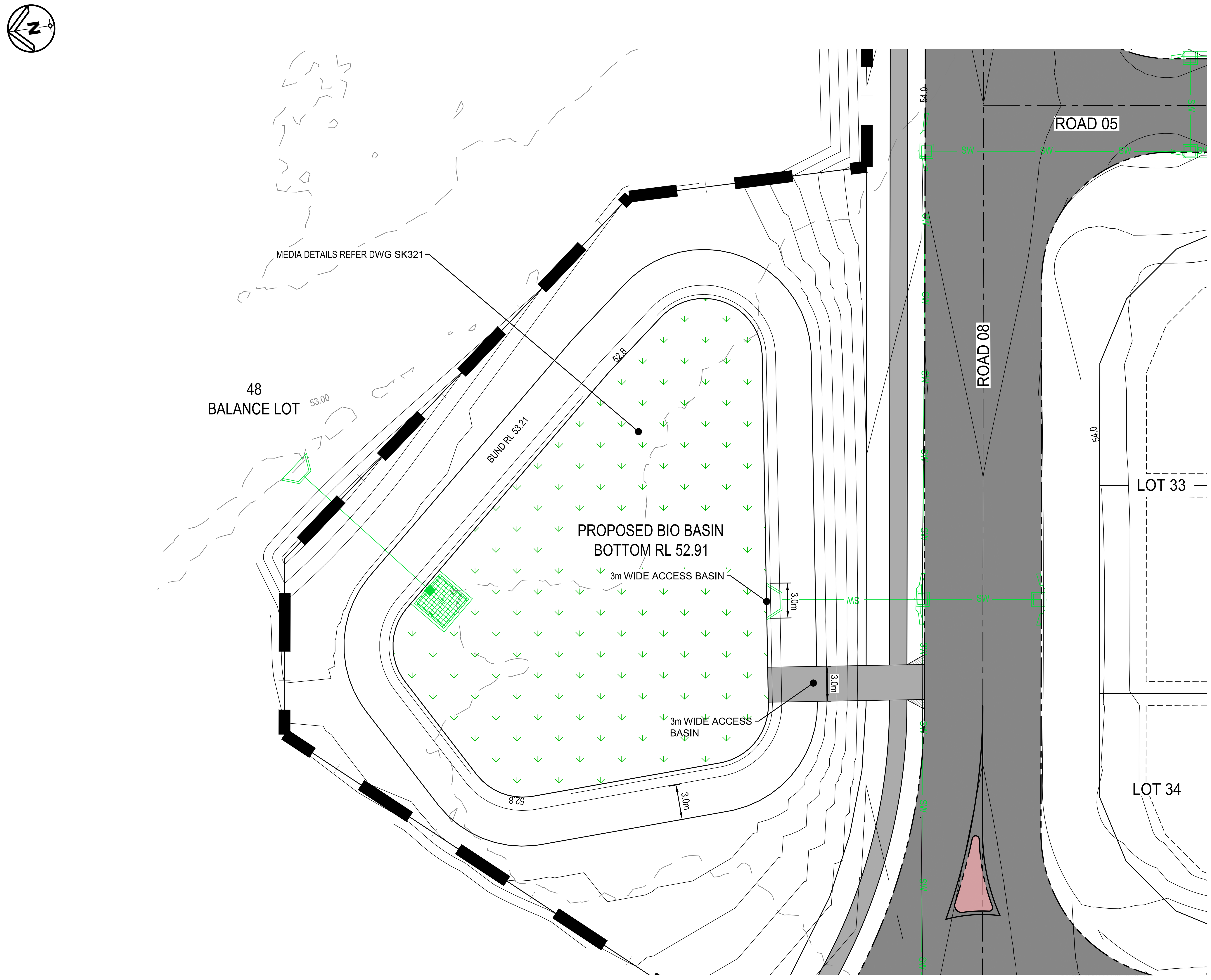
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
ROAD 8 LONGITUDINAL SECTIONS

DEVEL. APPLIC. No. : -
DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL
DESIGNER : TG
DRAFTSPERSON : CD
CHECKED : FRASER LUCAS
APPROVED FOR AND ON BEHALF OF
BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. :
SCALE : AS NOTED
DATUM : AHD
FULL SIZE : A1
PROJECT No.: BE230128-01
DRAWING No. : SK313
VERSION: B



BIO-RETENTION BASIN DETAIL PLAN

SCALE 1 : 200 (FULL SIZE) (metres)

LEGEND

- DEVELOPMENT SITE BOUNDARY
- EXISTING CONTOUR LIDAR
- EXISTING STORMWATER
- EXISTING EASEMENT
- DESIGN SURFACE CONTOUR
- DESIGNPROPOSED LOT BOUNDARY
- PROPOSED LOW-FLOW CHANNEL
- PROPOSED ROAD CENTRELINE
- PROPOSED HEADWALL
- PROPOSED STORMWATER PIPE
- PROPOSED FOOTPATH
- PROPOSED ASPHALT PAVEMENT

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

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Phone: +61 7 5509 6400
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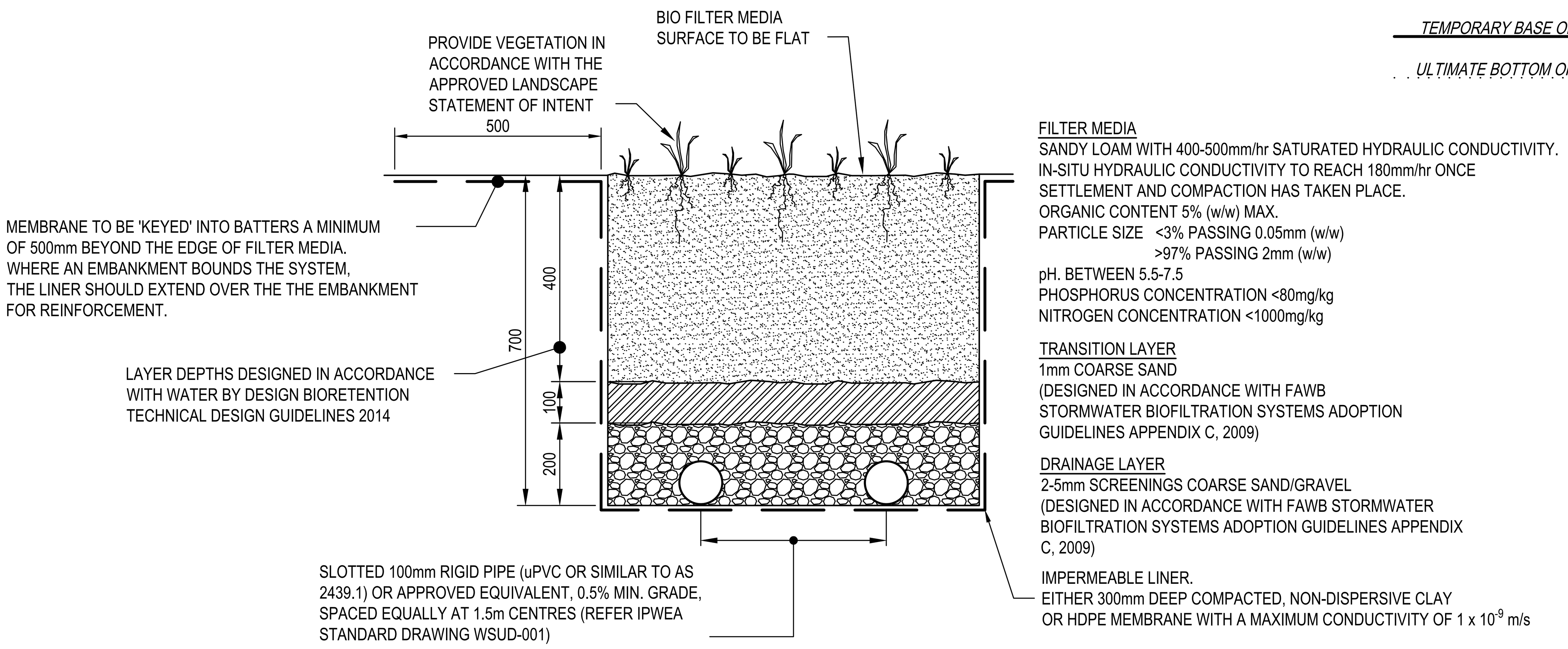
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
CONCEPT CIVIL ENGINEERING

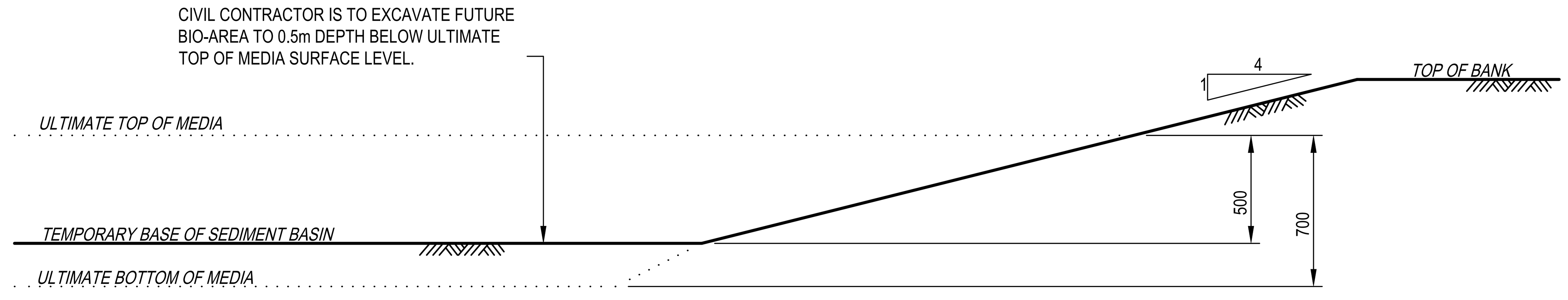
DRAWING TITLE :
BIO-RETENTION BASIN DETAIL PLAN

DEVEL. APPLIC. No. : - | DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL
DESIGNER : TG
DRAFTSPERSON : CD
CHECKED : FRASER LUCAS
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. :
SCALE : AS NOTED | DATUM : AHD | FULL SIZE : A1
PROJECT No.: BE230128-01 | DRAWING No. : SK320 | VERSION: B



TYPICAL BIO-RETENTION MEDIA CROSS SECTION

SCALE 0.1 0 0.1 0.2 0.3 0.4 0.5 (metres)
1 : 10 (FULL SIZE)



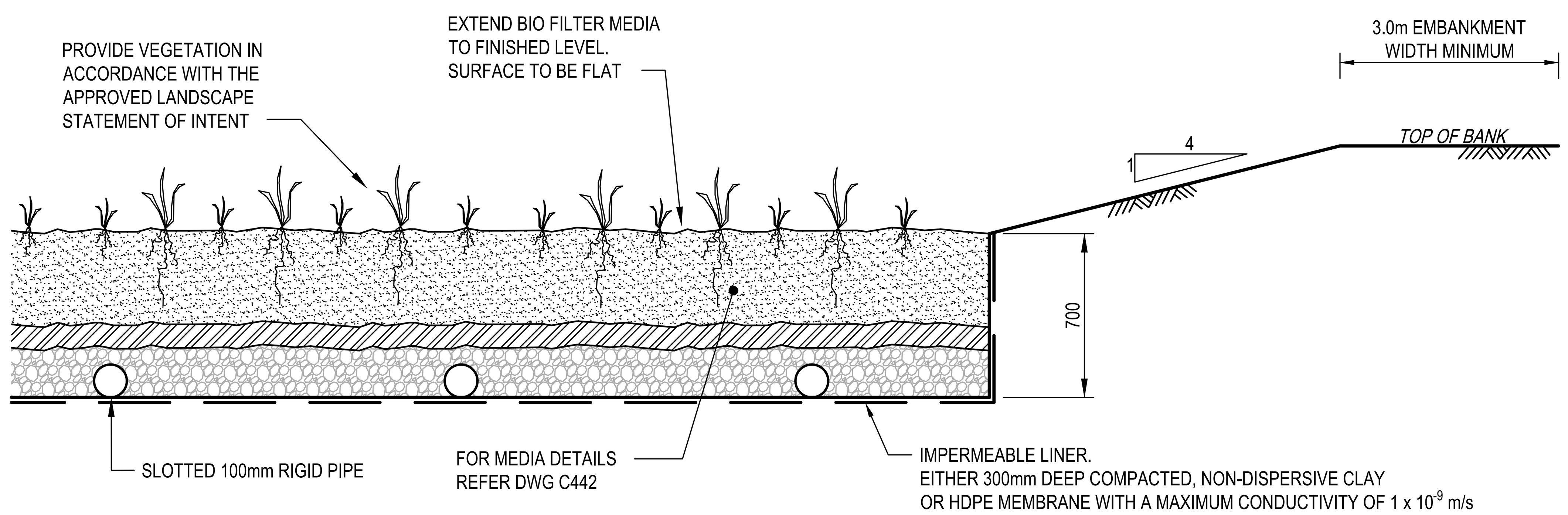
CONSTRUCTION PHASE 1 - CIVIL CONSTRUCTION PHASE

(TEMPORARY SEDIMENT CONTROL BASIN)

SCALE 0.2 0 0.2 0.4 0.6 0.8 1.0 (metres)
1 : 20 (FULL SIZE)

PHASE 1 NOTES -
CIVIL CONSTRUCTION PHASE

- EXCAVATE BASIN TO NOMINAL 500mm DEPTH BELOW ULTIMATE TOP OF MEDIA LEVEL.
- SHAPE TEMPORARY SEDIMENT BASIN TO GENERAL EXTENTS OF ULTIMATE BASIN AND TO BASE LEVEL AS SHOWN ADJACENT AND ENSURE MINIMUM TOTAL SETTLING AND STORAGE VOLUME.
- CONTRACTOR TO MAINTAIN SEDIMENT BASIN AND PUMP-OUT AFTER RAINFALL EVENTS, INCLUDING MANUAL FLOCCULATION.



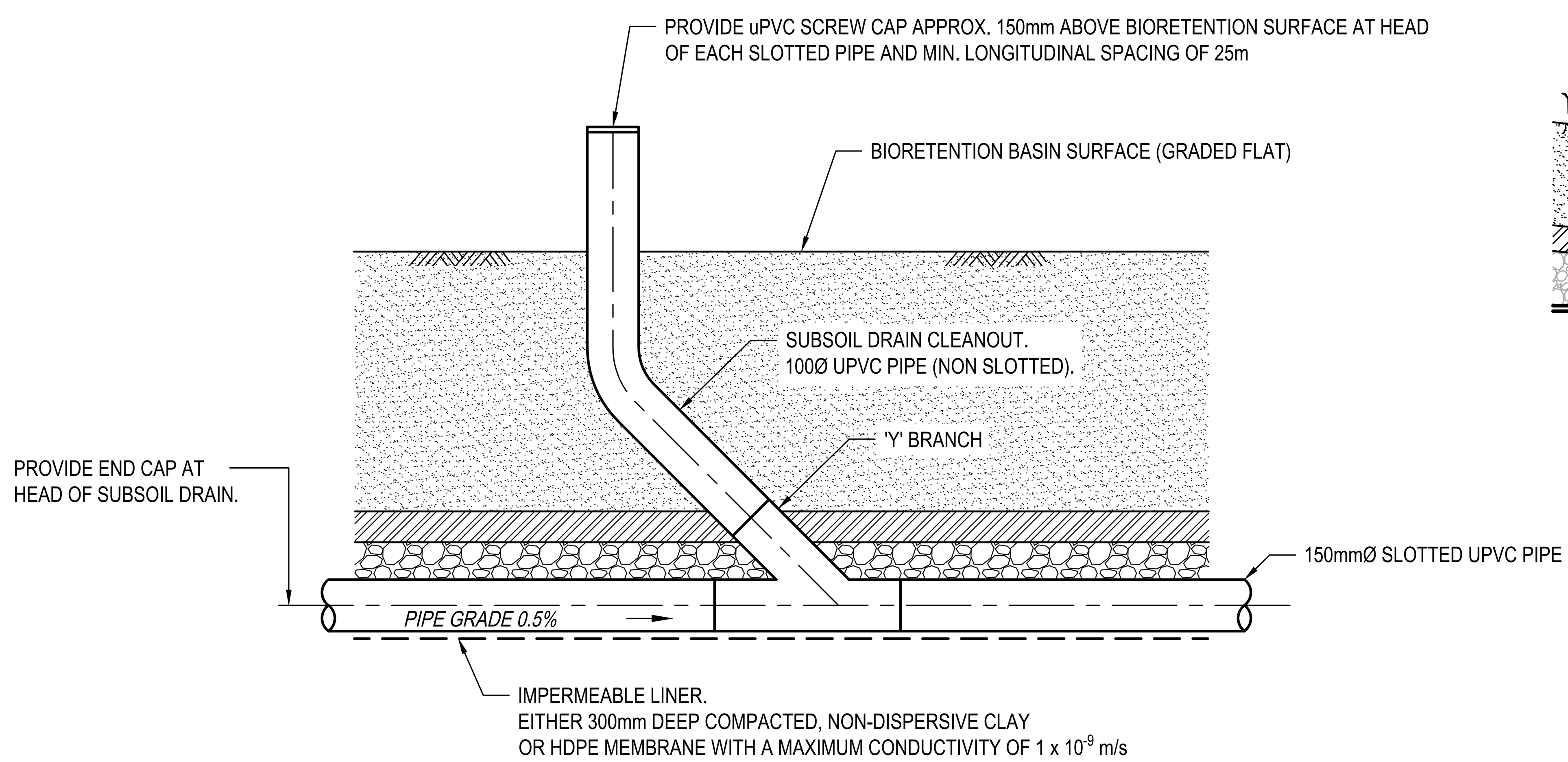
CONSTRUCTION PHASE 2 - OPERATIONAL PHASE

(ULTIMATE BIO-RETENTION BASIN)

SCALE 0.2 0 0.2 0.4 0.6 0.8 1.0 (metres)
1 : 20 (FULL SIZE)

PHASE 2 NOTES -
OPERATIONAL PHASE

- UPON COMPLETION OF 80-90% OF BUILDING WORKS IN THE CONTRIBUTING CATCHMENT AREA, REMOVE THE PROTECTIVE LAYERS (TURFING, TOPSOIL AND GEOTEXTILE).
- EXTEND BIO FILTER MEDIA TO ULTIMATE SURFACE LEVEL.
- ESTABLISH VEGETATION IN THE BIO-RETENTION BASIN IN ACCORDANCE WITH LANDSCAPE ARCHITECTS SPECIFICATION.



TYPICAL BIO-RETENTION BASIN SUBSOIL DRAIN CLEANOUT

NTS

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
BIO-RETENTION BASIN DETAILS

DEVEL. APPLIC. No. : - DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL
DESIGNER : TG
DRAFTSPERSON : CD
CHECKED : FRASER LUCAS
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. :

SCALE : AS NOTED	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE230128-01	DRAWING No. : SK321	VERSION: B

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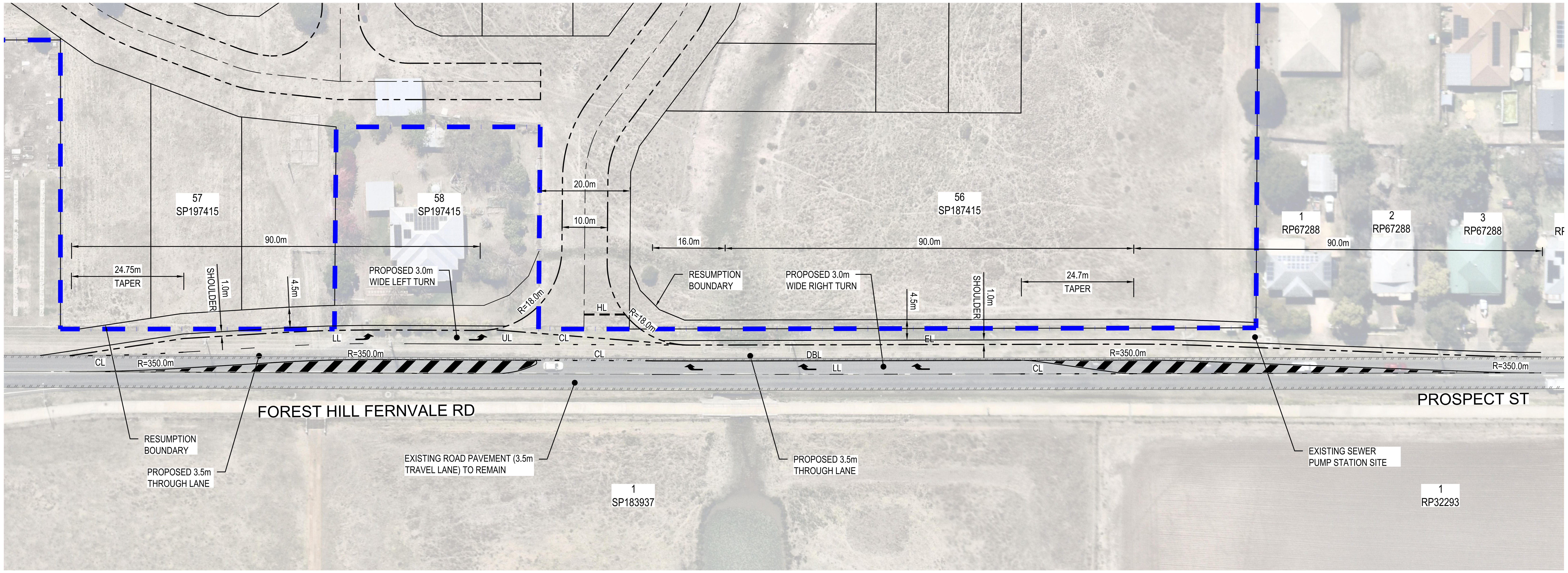

INTERSECTION FUNCTION LAYOUT PLAN

SCALE 5 0 5 10 15 20 25 (metres)
1 : 500 (FULL SIZE)

LEGEND

- DEVELOPMENT SITE BOUNDARY
- PROPOSED LOT BOUNDARY
- PROPOSED ROAD CONTROL LINE
- W — EXISTING Ø150 WATER MAIN
- RM — EXISTING SEWER RISING MAIN
- S — EXISTING SEWER MAIN
- C — EXISTING COMMS
- OH — EXISTING OVERHEAD ELECTRIC
- > — EXISTING FLOWPATH / WATERWAY

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

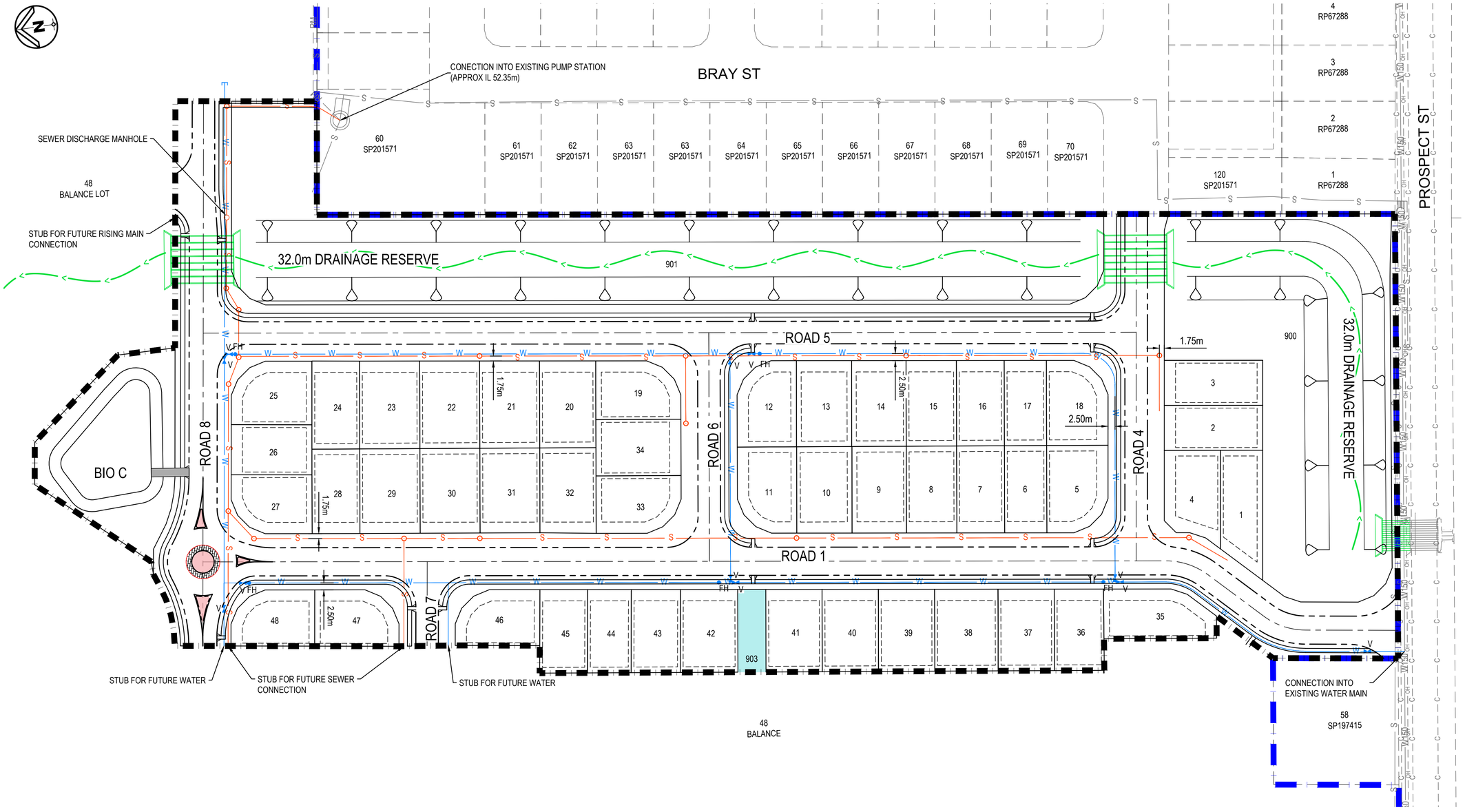
PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
INTERSECTION FUNCTION LAYOUT PLAN

DEVEL. APPLIC. No. : - DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL
DESIGNER : TG
DRAFTSPERSON : CD
CHECKED : FRASER LUCAS
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. :
SCALE : AS NOTED | DATUM : AHD | FULL SIZE : A1
PROJECT No.: BE230128-01 | DRAWING No. : SK350 | VERSION: B

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PLOTTED: 25.04.2024 at 16:30



CONCEPT WATER AND SEWER LAYOUT PLAN

SCALE 10 0 5 10 15 20 25 30 35 (metres)
1 : 750 (FULL SIZE)

LEGEND

- STAGE BOUNDARY
- W — EXISTING Ø150 WATER MAIN
- RM — EXISTING SEWER RISING MAIN
- S — EXISTING SEWER MAIN
- W — PROPOSED WATER MAIN
- FH V — PROPOSED HYDRANT / VALVE
- S — PROPOSED SEWER MAIN
- RM — PROPOSED SEWER RISING MAIN
- PROPOSED PUMP STATION

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
CONCEPT WATER AND SEWER LAYOUT PLAN

DEVEL. APPLIC. No. : -	DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL	
DESIGNER : TG	
DRAFTSPERSON : CD	
CHECKED : FRASER LUCAS	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	
RPEQ No. :	
SCALE : AS NOTED	DATUM : AHD / FULL SIZE : A1
PROJECT No.: BE230128-01	DRAWING No. : SK500 / VERSION: B

Appendix E – Burchills Civil Engineering Drawings – Earthworks OPW – Stage 1

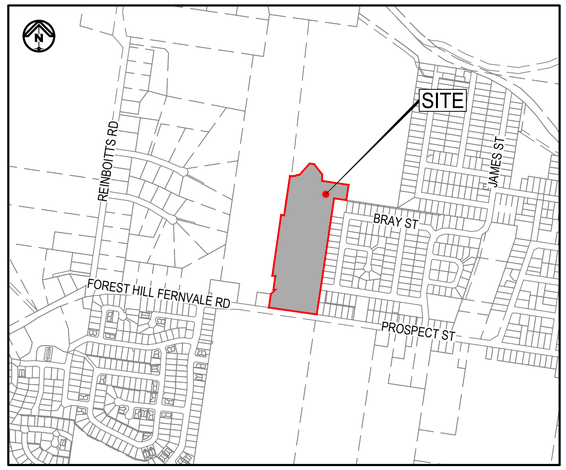
PROPOSED RESIDENTIAL DEVELOPMENT
AT 2983 FOREST HILL FERNVALE RD, LOWOOD
QUEENSLAND 4311

EARTHWORKS OPW - STAGE 1

CONTRACT BE230128-01A

GENERAL NOTES:

1. CONTRACT DOCUMENTATION
   ALL DRAWINGS UNDER THIS CONTRACT ARE TO BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATION.
2. SURVEY INFORMATION
   CONTROL SURVEY INFORMATION WILL BE ESTABLISHED ON SITE BY THE PRINCIPAL'S SURVEYOR. SETOUT INFORMATION SHALL NOT BE OBTAINED BY SCALING FROM THESE DRAWINGS.
3. DATUM
   ALL LEVELS SHOWN ON DRAWINGS ARE A.H.D. (DERIVED).
4. EXISTING SURVEY CONTROL STATIONS
   THE CONTRACTOR IS TO ENSURE THAT SURVEY CONTROL STATIONS ARE NOT DAMAGED OR DISTURBED IN ANY WAY BY CONSTRUCTION ACTIVITIES.
5. EXISTING SERVICES
   EXISTING SERVICES LOCATIONS WHERE SHOWN ON THE DRAWINGS ARE INDICATIVE ONLY. THE CONTRACTOR SHALL CONTACT THE RELEVANT AUTHORITIES AND UNDERTAKE A DIAL-BEFORE-YOU-DIG SEARCH TO ASCERTAIN THE EXACT LOCATION OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK AND SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO EXISTING SERVICES.
6. SITE ACCESS
   THE CONTRACTOR SHALL GAIN ACCESS TO THE SITE AT LOCATIONS APPROVED BY THE SUPERINTENDENT. FREEDOM OF ACCESS TO OTHER WORK AREAS ON THE SITE SHALL BE MAINTAINED AT ALL TIMES.
7. PROVISION FOR TRAFFIC
   PROVISION FOR TRAFFIC ON LOCAL ROADS IS TO BE IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND LOCAL AUTHORITY REQUIREMENTS.
8. WORK BOUNDARIES
   THE CONTRACTOR IS TO RESTRICT ACTIVITIES TO THOSE AREAS DESIGNATED AS WORK AREAS UNDER THIS CONTRACT. AT NO TIME SHALL THE CONTRACTOR ENTER ADJOINING PROPERTIES OR CONTRACT WORK AREAS ON THE SITE WITHOUT WRITTEN AUTHORISATION FROM THE SUPERINTENDENT.
9. TOPSOIL STRIPPING
   ALL TOPSOIL STRIPPED FROM WORK AREAS SHALL BE STOCKPILED FOR LATER RE-SPREADING TO ALL FOOTPATHS, BATTERS AND ALLOTMENTS.
10. EARTHWORKS (GENERAL)
    ALL FILL MATERIAL PLACED SHALL BE COMPACTED AND TRIMMED TO FINAL EARTHWORKS LEVELS AND PROFILES SHOWN ON THE CONTRACT DRAWINGS AND TESTED IN ACCORDANCE WITH THE PROJECT SPECIFICATION.
    ALL COMPACTION TESTING UNDER THIS CONTRACT IS TO BE CARRIED OUT TO AS3798 LEVEL 1 STANDARD BY A NATA-ACCREDITED TESTING AUTHORITY. CERTIFICATION FOR ALL EARTHWORKS CONSTRUCTION AND TESTING IS TO BE PROVIDED BY A REGISTERED PROFESSIONAL ENGINEER QUEENSLAND (RPEQ) ENGAGED BY THE CONTRACTOR.
11. COMPACTION STANDARDS
    ALL FILL MATERIAL PLACED UNDER THIS CONTRACT SHALL BE COMPACTED IN ACCORDANCE WITH THE PROJECT SPECIFICATION AND CURRENT COUNCIL STANDARDS.
12. TESTING
    ALL TESTING SHALL BE CARRIED OUT BY AN APPROVED N.A.T.A. TESTING AUTHORITY IN ACCORDANCE WITH THE PROJECT SPECIFICATION AND COUNCIL STANDARDS.
13. "AS CONSTRUCTED" SURVEY
    "AS CONSTRUCTED" SURVEY SHALL BE CARRIED OUT BY THE PRINCIPAL'S SURVEYOR AS WORK PROCEEDS.
14. MAINTENANCE OF SITE CONDITION
    AT THE COMPLETION OF WORKS THE SITE IS TO BE LEFT IN A CLEAN AND TIDY CONDITION TO THE SATISFACTION OF THE SUPERINTENDENT AND RELEVANT COUNCIL REPRESENTATIVE.
15. REFERENCED DOCUMENTS
    ALL DRAWINGS TO BE READ IN CONJUNCTION WITH:
    - VEGETATION MANAGEMENT AND TREE CLEARING REQUIREMENTS



LOCALITY PLAN
N.T.S.

DRAWING INDEX	
DWG No.	DESCRIPTION
C000	COVER SHEET
C200	BULK EARTHWORKS LAYOUT PLAN
C210	EARTHWORKS SECTIONS
C220	EARTHWORKS NOTES AND DETAILS
C250	EROSION & SEDIMENT CONTROL PLAN - EARTHWORKS PHASE
C251	EROSION & SEDIMENT CONTROL BASIN NOTES AND DETAILS
C252	EROSION & SEDIMENT CONTROL TYPICAL NOTES AND DETAILS
C900	HAZARD RISK REGISTER - DESIGN RISKS

PREPARED FOR
LOWOOD ONE PTY LTD

PREPARED BY

BURCHILLS ENGINEERING SOLUTIONS

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IPSWICH | MORETON BAY
PHONE: +61 7 5509 6400
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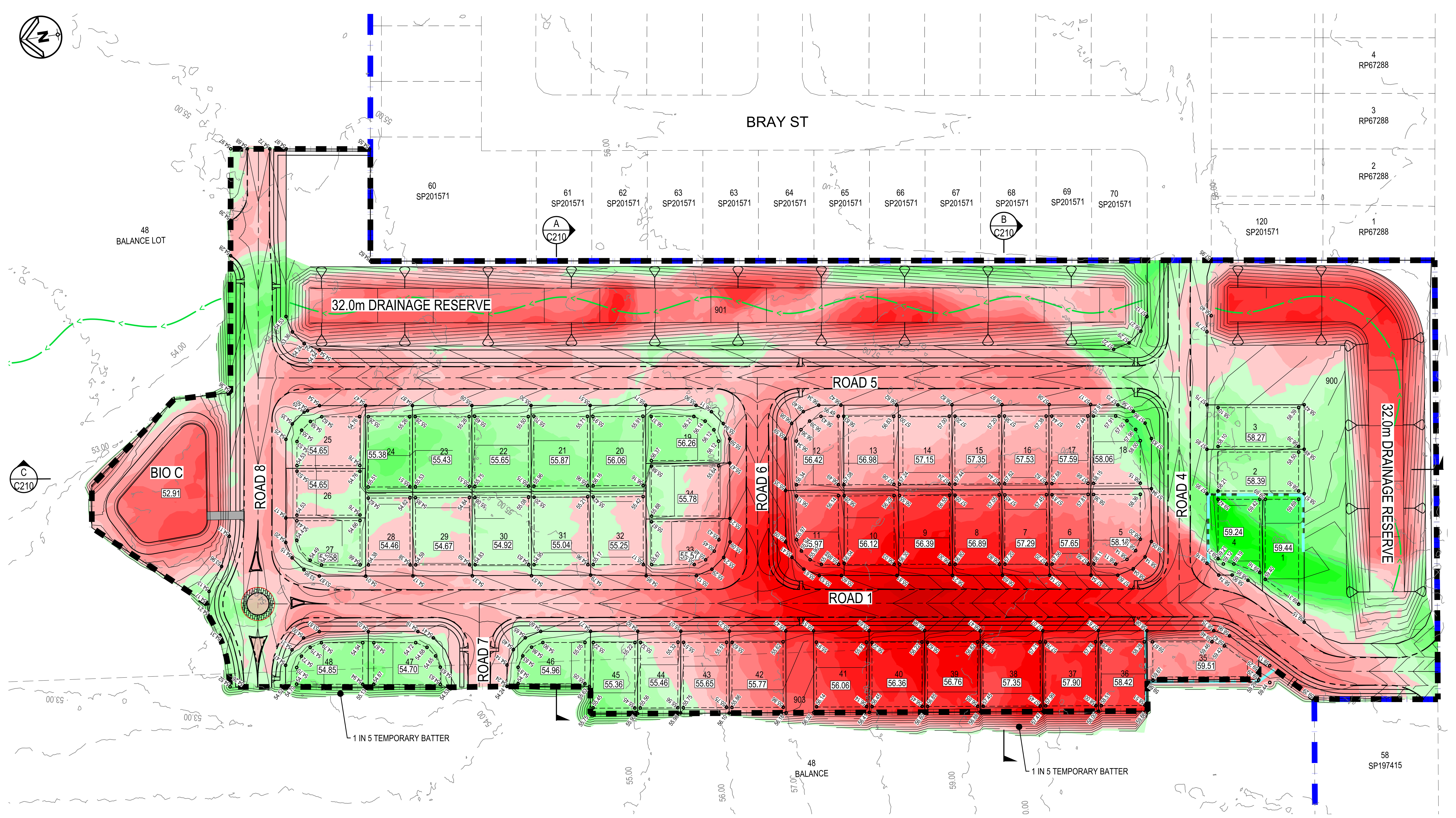
EMAIL: ADMIN@BURCHILLS.COM.AU
COOTE BURCHILLS ENGINEERING PTY LTD
ABN 76 166 942 365

NOTE:
DESIGNS HAVE BEEN UNDERTAKEN USING SURVEY DATA PROVIDED BY ONE SURVEYORS DATED 6 NOVEMBER 2023

DATE : 24-04-24

PROJECT No.:	DRAWING No. :	VERSION:
BE230128-01A	C000	B



BULK EARTHWORKS LAYOUT PLAN

SCALE 1 : 750 (FULL SIZE) (metres)

EARTHWORKS LEGEND

Cut depth	Fill depth
-4.5 TO -4.0 m	0.0 TO 0.5 m
-4.0 TO -3.5 m	0.5 TO 1.0 m
-3.5 TO -3.0 m	1.0 TO 1.5 m
-3.0 TO -2.5 m	1.5 TO 2.0 m
-2.5 TO -2.0 m	2.0 TO 2.5 m
-2.0 TO -1.5 m	2.5 TO 3.0 m
-1.5 TO -1.0 m	3.0 TO 3.5 m
-1.0 TO -0.5 m	3.5 TO 4.0 m
-0.5 TO 0.0 m	4.0 TO 4.5 m

BULK EARTHWORKS SUMMARY

STRUCTURAL FILLING

AREA	NETT SOLID FILL
OVERALL FILLING (ALLOTMENTS, BATTERS)	10,360 cu.m.
TOTAL FILL REQUIRED	10,360 cu.m.

EXCAVATION

AREA	NETT CUT
OVERALL EXCAVATION	43,131 cu.m.
TOTAL CUT	43,131 cu.m.

i.e. 43,131cu.m - 10,360 cu.m. = 32,771 cu.m. TO BE EXPORTED OUT SIDE
INCLUDING 200mm TOPSOIL STRIP
INCLUDING 200mm TOPSOIL RESPREAD TO LOTS, VERGES, DRAINAGE RESERVE AND OPEN SPACE AREAS
INCLUDING 300mm ROAD BOXING DEPTHS

LEGEND

- 90.0 — EXISTING CONTOUR LIDAR
- EXISTING EDGE OF KERB
- DEVELOPMENT SITE BOUNDARY
- PROPOSED ROAD CONTROL LINE
- PROPOSED KERB
- 90.0 — DESIGN SURFACE CONTOUR
- PROPOSED RETAINING WALL
- PROPOSED BATTER

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD,
LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCIL RFI UPDATES	24-04-24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08-12-23

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Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

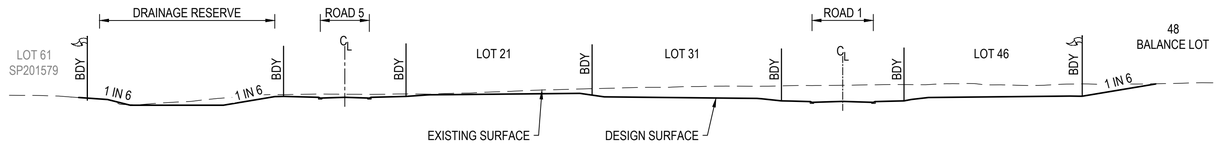
PROJECT:
EARTHWORKS OPW - STAGE 1

DRAWING TITLE :
BULK EARTHWORKS LAYOUT PLAN

DEVEL. APPLIC. No. : -	DATE : 24-04-24
PROJECT LEADER : JONATHAN CUELL	
DESIGNER : TG	
DRAFTSPERSON : CD	
CHECKED : FRASER LUCAS	

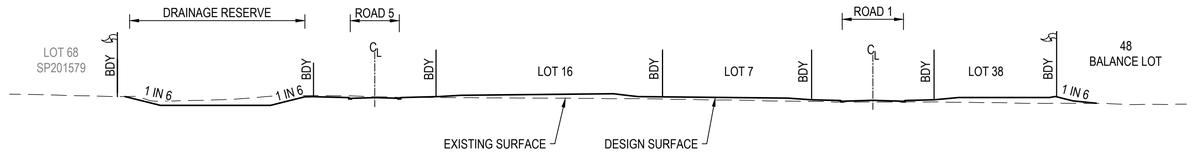
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. :

SCALE : AS NOTED	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE230128-01A	DRAWING No. : C200	VERSION: B



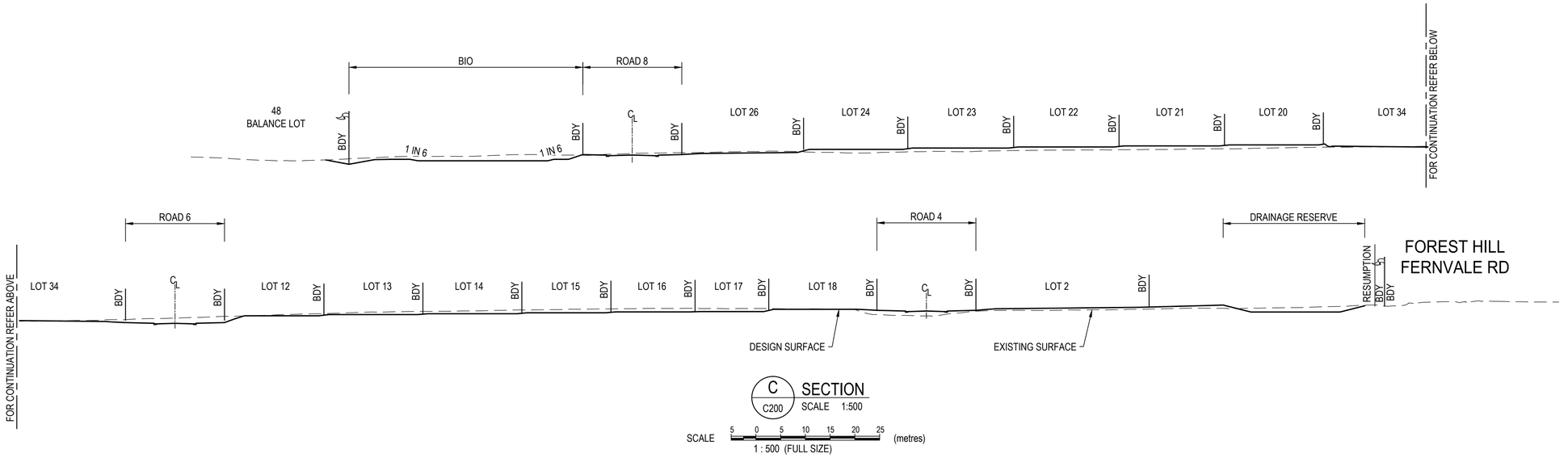
A SECTION
C200 SCALE 1:500

SCALE 5 0 5 10 15 20 25 (metres)
1 : 500 (FULL SIZE)



B SECTION
C200 SCALE 1:500

SCALE 5 0 5 10 15 20 25 (metres)
1 : 500 (FULL SIZE)



C SECTION
C200 SCALE 1:500

SCALE 5 0 5 10 15 20 25 (metres)
1 : 500 (FULL SIZE)

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL
FERNVALE RD, LOWOOD
QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCIL RFI UPDATES	24-04-24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08-12-23

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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
EARTHWORKS OPW - STAGE 1

DRAWING TITLE :
EARTHWORKS
SECTIONS

DEVEL. APPLIC. No. :	-
DATE :	24-04-24
PROJECT LEADER :	JONATHAN CUELL
DESIGNER :	TG
DRAFTSPERSON :	CD
CHECKED :	FRASER LUCAS

APPROVED FOR AND ON BEHALF OF
BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365

RPEQ No. :

SCALE : AS NOTED	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE230128-01A	DRAWING No. : C210	VERSION: B

GENERAL EARTHWORKS NOTES:

1. ALL EARTHWORKS CONSTRUCTION UNDER THIS CONTRACT IS TO BE PERFORMED STRICTLY IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT PREPARED BY THE PRINCIPAL'S GEOTECHNICAL CONSULTANT.
2. ALL COMPACTION TESTING UNDER THIS CONTRACT IS TO BE CARRIED OUT TO AS3798 LEVEL 1 STANDARD BY A NATA-ACCREDITED TESTING AUTHORITY. CERTIFICATION FOR ALL EARTHWORKS CONSTRUCTION AND TESTING IS TO BE PROVIDED BY A REGISTERED PROFESSIONAL ENGINEER QUEENSLAND (RPEQ) ENGAGED BY THE CONTRACTOR.
3. ALL DESIGN LEVELS SHOWN ON THE CONTRACT DRAWINGS ARE FINISHED SURFACE LEVELS FOLLOWING TOPSOIL REPLACEMENT.
4. ALL STRUCTURAL FILL MATERIAL PLACED SHALL BE COMPACTED TO THE FOLLOWING MINIMUM DENSITY IN ACCORDANCE WITH THE SPECIFICATION AND THE GEOTECHNICAL REPORT:
   a) 95% DENSITY RATIO FOR GENERAL STRUCTURAL FILL (COHESIVE MATERIAL)
   b) 98% DENSITY RATIO FOR THE TOP 300mm DEPTH BELOW PAVEMENT SUBGRADE LEVEL (COHESIVE MATERIAL)
5. ALL EARTHWORKS BATTERS STEEPER THAN 1 IN 4 ARE TO BE LANDSCAPED IN ACCORDANCE WITH LANDSCAPE ARCHITECTS PLANS.
6. EXISTING DAMS ARE TO BE DE-WATERED AND CLEANED-OUT. ALL UNSUITABLE OR SATURATED MATERIAL IS TO BE REMOVED AND REPLACED WITH SELECTED ON-SITE STRUCTURAL FILL MATERIAL AND COMPACTED AS SPECIFIED. FILLING OF DAMS IS TO BE COMPLETED UNDER LEVEL 1 BY GEOTECHNICAL ENGINEER.
7. PROVIDE CONDITION SURVEY OF ADJACENT RESIDENTIAL BUILDINGS FOR ALL PROPERTIES LOCATED WITHIN NOMINAL 100m OF EARTHWORKS OPERATIONS. CONDITION SURVEY TO BE UNDERTAKEN BY QUALIFIED PERSONNEL WITH BUILDING EXPERIENCE.

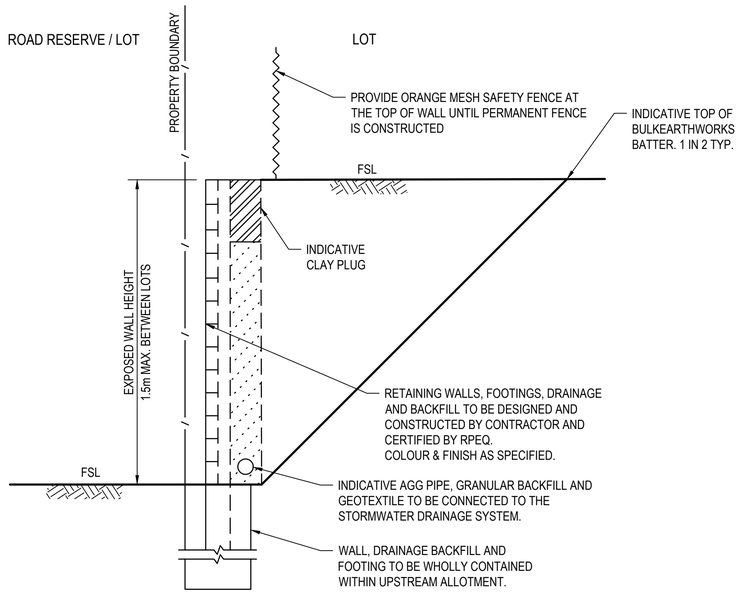
TYPICAL EARTHWORKS SEQUENCE NOTES:

1. CONSTRUCT DIVERSION DRAINS AS DIRECTED TO DIVERT SITE RUNOFF AWAY FROM CONSTRUCTION AREAS. ESTABLISH DE-WATERING CONTROLS TO ENSURE THAT THE CONSTRUCTION AREAS REMAIN FREE OF SURFACE WATER AND PONDING.
2. FOLLOWING COMPLETION OF CLEARING OPERATIONS AND REMOVAL OF RESIDUAL VEGETATION AND DEBRIS, STRIP TOPSOIL TO A NOMINAL 150mm DEPTH AND PLACE IN TEMPORARY STOCKPILES IN LOCATIONS APPROVED BY THE SUPERINTENDENT.
3. PROOF-ROLL AND COMPACT THE PROPOSED FILL AREAS FOLLOWING TOPSOIL STRIPPING, TO THE SATISFACTION OF THE SUPERINTENDENT.
4. ANY STRIPPED AREAS WHICH DEMONSTRATE EXCESSIVE MOVEMENT OR DO NOT IMPROVE SUFFICIENTLY UNDER PROOF-ROLLING ARE TO BE REMOVED, REPLACED WITH APPROVED SITE MATERIAL AND COMPACTED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT.
5. ANY UNSUITABLE MATERIAL ENCOUNTERED, INCLUDING SILTY MATERIAL AND UN-CONTROLLED FILL IS TO BE EXCAVATED TO THE EXTENTS AND DEPTHS NOMINATED BY THE PRINCIPAL'S GEOTECHNICAL CONSULTANT, REMOVED TO NON-STRUCTURAL FILL AREAS OR TAKEN OFF-SITE AS DIRECTED AND REPLACED WITH APPROVED, COMPACTED FILL MATERIAL.
6. PLACE STRUCTURAL FILL MATERIAL FROM SITE EXCAVATIONS TO NOMINATED SITE FILL AREAS, INCLUDING BENCHING AND COMPACTION IN ACCORDANCE WITH THE GEOTECHNICAL REPORT AND TRIMMING AND FINAL PROFILING OF BATTERS.
7. PROVIDE GRASSING TO TOPSOILED AREAS AS DIRECTED.

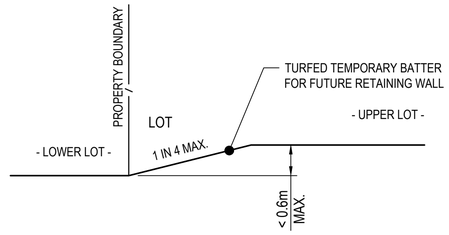
RETAINING WALL NOTES:

1. RETAINING WALLS, FOOTINGS, DRAINAGE, BACKFILL AND CONNECTION OF AGGREGATE DRAINS TO STORMWATER DRAINAGE SYSTEM TO BE DESIGNED AND CONSTRUCTED BY THE CONTRACTOR AND CERTIFIED BY AN SUITABLY QUALIFIED RPEQ
2. THESE DRAWINGS IDENTIFY SURFACE PROFILES, RETAINING WALL LOCATIONS, AND SETOUT INFORMATION ONLY. REFER TO CONTRACTOR SUPPLIED DRAWINGS FOR RPEQ STRUCTURAL DETAILS, WALL MATERIALS AND COMPACTION SPECIFICATIONS AND CONSTRUCTIBILITY INFORMATION.
3. RETAINING WALL DESIGN ENGINEER TO PROVIDE RPEQ FORM 15 STRUCTURAL CERTIFICATE INCLUDING GEOTECHNICAL GLOBAL STABILITY CERTIFICATION BY GEOTECHNICAL ENGINEER. WALL DESIGN TO ASSUME SURCHARGE LOADING BEHIND WALL. DESIGN TO BE IN ACCORDANCE WITH AS4678 INCLUDING ALL REQUIRED DESIGN LOAD CASES AND COMBINATIONS.
4. RETAINING WALLS TO BE DESIGNED TO CONSIDER ALL LOADS INCLUDING CONSTRUCTION LOADS AND OPERATIONAL LOADS.
5. ANY GEOTECHINCAL INFORMATION PROVIDED BY THE PRINCIPAL OR THE SUPERINTENDENT SHALL BE FOR INFORMATION PURPOSES ONLY. THE CONTRACTOR AND THE RETAINING WALL DESIGN ENGINEER SHOULD SATISFY THEMSELVES OF THE DESIGN SOIL PARAMETERS AND UNDERTAKE AND ADDITIONAL GEOTECHNICAL INVESTIGATION DEEMED NECESSARY BY THE DESIGN ENGINEER.
6. THE CONTRACTOR SHALL ENSURE THAT ANY CONFLICT BETWEEN THESE PROJECT DRAWINGS AND THE RETAINING WALL DRAWINGS PREPARED BY THE RETAINING WALL DESIGN ENGINEER IS RESOLVED WITH THE SUPERINTENDENT PRIOR TO CONSTRUCTION COMMENCING.
7. A COPY OF THE RETAINING WALL DESIGN DRAWINGS, INCLUDING CONNECTION OF AGGREGATE DRAINS TO THE STORMWATER DRAINAGE SYSTEM, DESIGN PARAMETERS AND CERTIFICATION BE PROVIDED TO THE SUPERINTENDENT AT THE PRE-START MEETING PRIOR TO CONSTRUCTION COMMENCING.
8. ANY RETAINING WALL AND BATTER EXCEEDING THE HEIGHT OF 1.5m, THE CONTRACTOR SHALL UNDERTAKE A THIRD PARTY RPEQ REVIEW OF THE PROPOSED DESIGN.

NOTE:
RETAINING WALL DESIGN, CONSTRUCTION, SUPERVISION AND CERTIFICATION TO BE PROVIDED BY SPECIALIST SUB-CONTRACTOR.

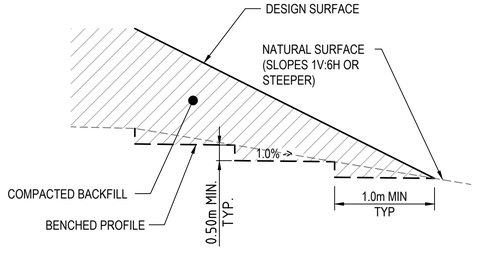


SLEEPER RETAINING WALL CONFIGURATION BETWEEN LOTS (1.5m MAX.)

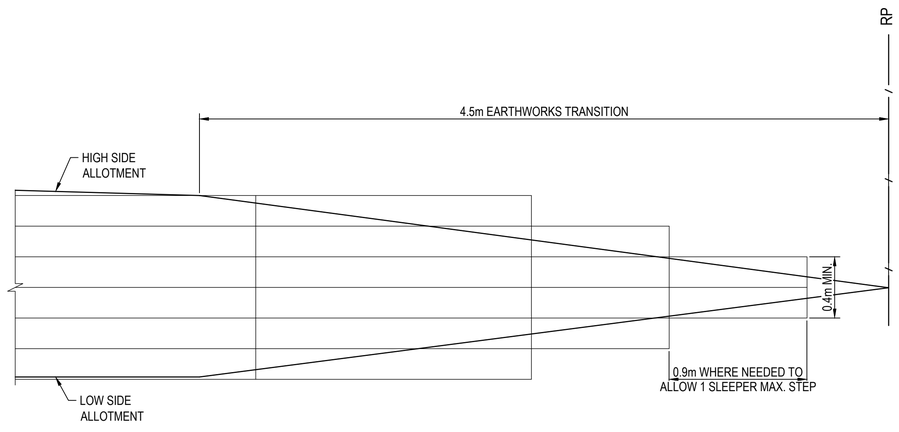


TEMPORARY BATTER DETAIL

NOTE:
FINAL BENCHED PROFILE TO BE VERIFIED BY CERTIFYING GEOTECHNICAL ENGINEER.



TYPICAL FILL ON SLOPES BENCHING DETAIL



TYPICAL SIDE BOUNDARY WALL RETURN DETAIL

SCALE 0.2 0 0.2 0.4 0.6 0.8 1.0 (metres)
1 : 20 (FULL SIZE)

PRELIMINARY
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PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCIL RFI UPDATES	24-04-24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08-12-23

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
EARTHWORKS OPW - STAGE 1

DRAWING TITLE :
EARTHWORKS NOTES AND DETAILS

DEVEL. APPLIC. No. :	-
DATE :	24-04-24
PROJECT LEADER :	JONATHAN CUELL
DESIGNER :	TG
DRAFTSPERSON :	CD
CHECKED :	FRASER LUCAS

APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365

RPEQ No. :

SCALE : AS NOTED	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE230128-01A	DRAWING No. : C220	VERSION: B

CHANNEL WORKS TO BE CONSTRUCTED IN INITIAL PHASE OF BULK EARTHWORKS AND STABILISED AS SOON AS PRACTICAL. CHANNEL TO THEN BE USED TO CATER FOR CLEAN WATER FROM EXTERNAL CATCHMENT

CHANNEL WORKS TO BE CONSTRUCTED IN INITIAL PHASE OF BULK EARTHWORKS AND STABILISED AS SOON AS PRACTICAL. CHANNEL TO THEN BE USED TO CATER FOR CLEAN WATER FROM EXTERNAL CATCHMENT

BRAY ST

PROSPECT ST

RD

STAGE 1

ROAD 1
ROAD 4
ROAD 5
ROAD 6
ROAD 7
ROAD 8

60 SP201571
61 SP201571
62 SP201571
63 SP201571
63 SP201571
64 SP201571
65 SP201571
66 SP201571
67 SP201571
68 SP201571
69 SP201571
70 SP201571
120 SP201571
4 RP67288
3 RP67288
2 RP67288
1 RP67288
48 BALANCE LOT
901
900
903
48 BALANCE
58 SP197415

TEMPORARY SEDIMENT BASIN CONSTRUCTED AS PART OF BULK EARTHWORKS

STABILISED CONSTRUCTION ACCESS. REFER IECA STD. DRG. EXIT-01

NOTE:
ACCESS TO LOTS FOR CONSTRUCTION OF SERVICE CONNECTIONS ONLY. ANY DISTURBED AREAS WITHIN LOTS TO BE REHABILITATED IMMEDIATELY FOLLOWING COMPLETION OF WORKS.

NOTE:
FOR SEDIMENT AND EROSION CONTROL NOTES AND TYPICAL DETAILS REFER TO BE230128-01A-C251.

NOTE:
ALL DESIGN/SETOUT INFORMATION SHOWN ON THIS DRAWING IS AVAILABLE IN DIGITAL FORMAT FROM THE OFFICE OF THE SUPERINTENDENT UPON REQUEST BY THE CONTRACTOR.

SEDIMENT AND EROSION CONTROL CERTIFICATION

I ..... HEREBY CERTIFY THAT THE SEDIMENT AND EROSION CONTROL MEASURES AND DEVICES SHOWN ON THIS DRAWING HAVE BEEN DESIGNED IN ACCORDANCE WITH THE 'BEST PRACTICE EROSION AND SEDIMENT CONTROL' (IECA AUSTRALASIA, NOVEMBER 2008).

SIGNED ..... RPEQ No. ..... DATED .....

WARNING: UNDERGROUND SERVICES:
UNDERGROUND SERVICES EXIST IN THIS VICINITY. THE CONTRACTOR IS TO CONTACT THE RELEVANT AUTHORITIES TO CONFIRM EXACT LOCATION OF SERVICES ON SITE PRIOR TO ANY EXCAVATION OR CONSTRUCTION COMMENCING.

EROSION & SEDIMENT CONTROL PLAN - EARTHWORKS PHASE

SCALE 10 0 5 10 15 20 25 30 35 (metres)
1 : 750 (FULL SIZE)

LEGEND

- EXISTING CONTOUR LIDAR
- EXISTING EDGE OF KERB
- DEVELOPMENT SITE BOUNDARY
- PROPOSED ROAD CONTROL LINE
- PROPOSED KERB
- DESIGN SURFACE CONTOUR
- PROPOSED RETAINING WALL
- PROPOSED SEDIMENT FENCE
- CHECK FLOW DAM
- PROPOSED BATTER
- DIRTY WATER DIVERSION
- CLEAN WATER DIVERSION DRAIN
- SEDIMENT BASIN
- DEVELOPMENT SITE AREA

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
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A	PRELIMINARY CIVIL ENGINEERING DESIGN	08-12-23

NOTE
This is an uncontrolled document issued for information purposes only, unless the checked sections are signed or completed.
Figured dimensions take precedence over scale. Do not scale reduced size drawings.
Verify dimensions prior to commencing any on-site or off-site works or fabrication.

BURCHILLS ENGINEERING SOLUTIONS
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Ipswich I Moreton Bay
Phone: +61 7 5509 6400
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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
EARTHWORKS OPW - STAGE 1

DRAWING TITLE :
EROSION & SEDIMENT CONTROL PLAN - EARTHWORKS PHASE

DEVEL. APPLIC. No. :	-
DATE :	24-04-24
PROJECT LEADER :	JONATHAN CUELL
DESIGNER :	TG
DRAFTSPERSON :	CD
CHECKED :	FRASER LUCAS

APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365

RPEQ No. :

SCALE : AS NOTED	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE230128-01A	DRAWING No. : C250	VERSION: B

FILENAME: C:\Users\Tu.Nguyen\OT Vietnam Ltd Co\BCH23 - Documents\BE\2023\BE230128 2983 Forest Hill Fernvale Rd\03_Civil\01_DWGs_ACAD_Acad\03_Stage 1 OPW Earthworks\C250.dwg
PLOTTED: 25 Jul 2024 at 16:12

PHASE 1 - SITE ESTABLISHMENT

1. ESTABLISH STABILISED ACCESS POINT, SITE OFFICES, AND PARKING AREAS (LOCATION TO BE CONFIRMED ON SITE).
2. DESIGNATE AND CORDON OFF ANY EXCLUSION AREAS (ANY AREAS OF THE SITE THAT ARE NOT TO BE ACCESSED).
3. INSTALL DUST FENCES ALONG ALL BOUNDARIES WITH EXISTING RESIDENTIAL DEVELOPMENT.
4. INSTALL SEDIMENT FENCES DOWNSLOPE FROM ALL DISTURBED AREAS AS INDICATED ON THE DRAWINGS (AS A MINIMUM).
5. INSTALL CLEAN WATER DIVERSION DRAINS WITH APPROPRIATE EROSION RESISTANT MATERIALS AND ROCK CHECK DAMS IN THE LOCATIONS INDICATED ON THE DRAWINGS.
6. CONSTRUCT TYPE B SEDIMENT BASINS PRIOR TO CARRYING OUT BROAD SCALE CLEARING IN THE SAME CATCHMENT.
7. INSTALL ALL DIRTY WATER DIVERSIONS AND TEMPORARY SEDIMENT TRAPS ENSURING DE-WATERING FACILITIES ARE AVAILABLE WHEN REQUIRED.
8. COMMENCE CLEARING WORK STARTING AT THE TOP OF EACH CATCHMENT. IDEALLY CLEARING SHOULD BE CARRIED OUT PROGRESSIVELY WITH THE BULK EARTHWORKS TO LIMIT EROSION.
9. PROGRESSIVELY STRIP, STOCKPILE, AND SEED TOPSOIL WITH A FAST GROWING PASTURE MIX. ALL TOPSOILS MUST BE CARED FOR DURING CONSTRUCTION TO ENSURE SUCCESSFUL REVEGETATION.
10. COMMENCE BULK EARTHWORKS, ENSURING A MINIMAL AMOUNT OF AREA IS DISTURBED AT ANY ONE TIME.

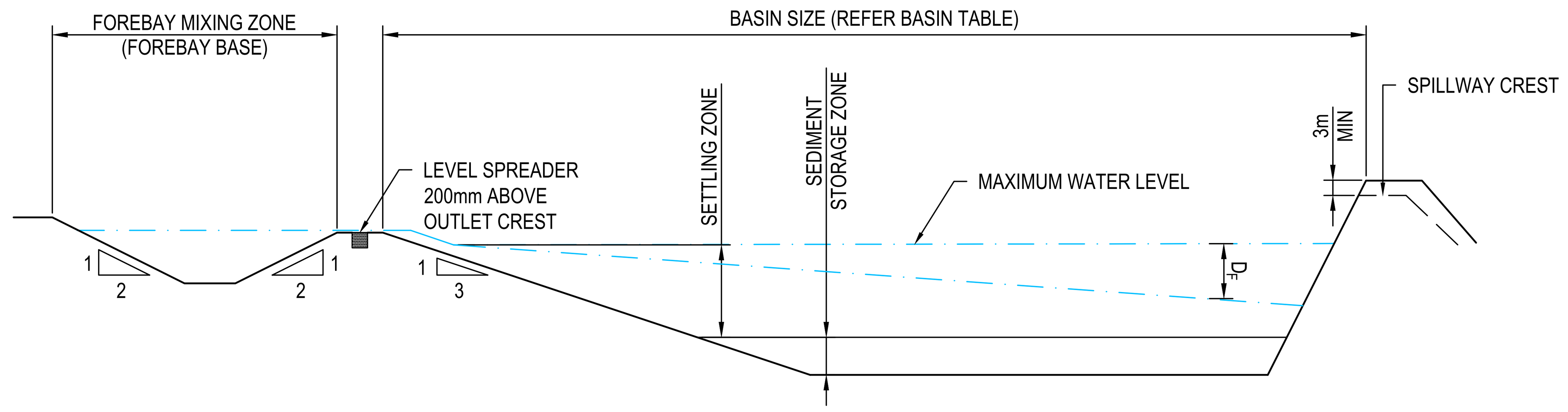
PHASE 2 - CLEARING AND BULK EARTHWORKS

11. RESPREAD TOPSOIL OVER COMPLETED EARTHWORKS AND SOW WITH SUITABLE VEGETATIVE COVER AS SOON AS PRACTICABLE.
12. ONCE ALL EXPOSED AREAS HAVE BEEN STABILISED WITH TOPSOIL AND AT LEAST 80% VEGETATIVE COVER, ALL TEMPORARY SEDIMENT CONTROLS INCLUDING SEDIMENT BASINS MAY BE REMOVED AND THE BULK EARTHWORKS IN THOSE AREAS COMPLETED AND REVEGETATED.
13. REMOVE ALL TEMPORARY CLEAN WATER DIVERSION DRAINS AND REVEGETATE.
14. REMOVE SITE OFFICES AND DUST FENCING AND REVEGETATE ANY OTHER DISTURBED AREAS.
15. ENSURE ALL EXTERNAL ROADS HAVE BEEN SWEPT CLEAN AND ARE FREE OF ANY SEDIMENT.

SEDIMENT AND EROSION CONTROL CERTIFICATION

I, TOBY BENNETT HEREBY CERTIFY THAT THE SEDIMENT AND EROSION CONTROL MEASURES AND DEVICES SHOWN ON THIS DRAWING HAVE BEEN DESIGNED IN ACCORDANCE WITH THE 'BEST PRACTICE EROSION AND SEDIMENT CONTROL' (IECA AUSTRALASIA, NOVEMBER 2008).

SIGNED .... RPEQ No. 21912 DATED 05-09-2023



SEDIMENT BASIN TYPE B TYPICAL SECTION
N.T.S.

TEMPORARY SEDIMENT BASIN CALCULATIONS																			
BASIN ID	BASIN TYPE	CATCH AREA (ha)	BATTER 1 in X	L:W RATIO	D_S (m)	C_1	TIME CONC. (mins)	i_1 (mm/hr)	0.5Q1 (m^3/s)	LAB SETTLE RATE (m/hr)	FLOC SETTLE DEPTH (m)	MINIMUM A_S (m^2)	ACTUAL V_S (m^3)	MIN. SEDIMENT STORAGE DEPTH (m)	MIN. SEDIMENT STORAGE VOLUM (m^3)	APPROX. REQ SED STORAGE DEPTH (m)	APPROX. LENGTH AT SPILLWAY (m)	APPROX. WIDTH AT SPILLWAY (m)	APPROX. DEPTH AT SPILLWAY (m)	TOTAL VOLUM AT SPILLWAY
1	B	7.336	4	3	0.6	0.37	37	29	0.109	0.40	0.60	1309	785	0.2	236	0.2	69.9	23.3	0.8	1020.7

PRELIMINARY
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PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCIL RFI UPDATES	24-04-24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08-12-23

BURCHILLS ENGINEERING SOLUTIONS
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Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
EARTHWORKS OPW - STAGE 1

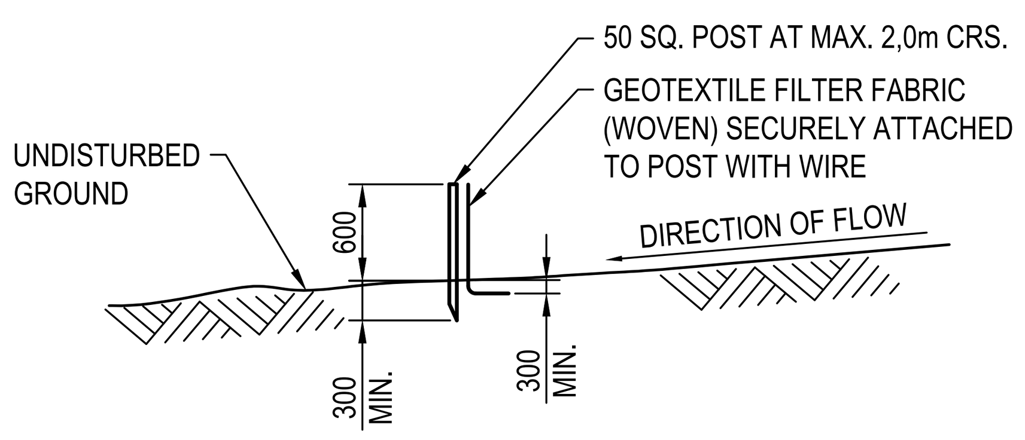
DRAWING TITLE :
EROSION & SEDIMENT CONTROL BASIN NOTES AND DETAILS

DEVEL. APPLIC. No. : - | DATE : 24-04-24
PROJECT LEADER : JONATHAN CUELL
DESIGNER : TG
DRAFTSPERSON : CD
CHECKED : FRASER LUCAS
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. :
SCALE : AS NOTED | DATUM : AHD | FULL SIZE : A1
PROJECT No.: BE230128-01A | DRAWING No. : C251 | VERSION: B

PLOTTED: 25.04.2024 at 16:12

EROSION AND SEDIMENT CONTROL NOTES

1. THIS DRAWING HAS BEEN PREPARED AS A GUIDE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MANAGE SITE SEDIMENT AND EROSION CONTROL MEASURES AND DURING THE CONSTRUCTION PERIOD INSTALL ADDITIONAL MEASURES WHERE SCOUR OR SEDIMENT TRANSPORT IS LIKELY TO OCCUR.
2. DELAY CLEARING, GRUBBING AND TOPSOIL STRIPPING UNTIL NECESSARY.
3. COMMENCE WORK ON SITE ONLY AFTER SEDIMENT AND EROSION CONTROL MEASURES ARE IN PLACE.
4. MANAGE SITE ENTRY/EXIT POINTS TO ENSURE SEDIMENT IS NOT TRACKED OFF SITE.
5. SHAKEDOWN AREA: PROVIDES FOR CONSTRUCTION, SERVICE AND STAFF VEHICLES ENTERING PUBLIC ROADS. CONTRACTOR SHALL LOCATE TO SUIT SITE ACTIVITIES. CONSTRUCTED AS 250mm THICK LAYER OF COARSE (150mm -200mm) RIVER GRAVEL OVER A SINGLE LAYER OF HIGH STRENGTH GEOTEXTILE (15m x 5m).
6. THE CONTRACTOR SHALL INSTALL EITHER STORMWATER INLET SEDIMENT TRAPS OR EXCAVATED INLET ARRANGEMENT AT ALL STORMWATER STRUCTURES DURING THE CONSTRUCTION.
7. FILTER ROLLS SHALL BE INSTALLED AT GULLY PITS IMMEDIATELY AFTER GULLY PIT CONSTRUCTION AND LEFT IN PLACE DURING THE MAINTENANCE PERIOD. OPERATION OF ROLLS DURING PERIODS OF HEAVY RAIN TO BE MONITORED TO PREVENT FLOODING AND EROSION DAMAGE ELSEWHERE.
8. ARRANGE FOR EROSION CONTROL MEASURES TO BE INSTALLED AS CLOSE AS POSSIBLE TO THE SOURCE OF EROSION.
9. ENSURE STOCKPILED TOPSOIL AND EARTHWORKS ARE NOT ERODED BY WIND AND STORMWATER RUN-OFF AND ARE PROVIDED WITH A SEDIMENT FENCE AROUND THE LOW SIDE.
10. SEDIMENT FENCES HAVE BEEN ESTABLISHED UNDER BULK EARTHWORKS CONTRACT. ERECT SEDIMENT FENCES IF REQUIRED, GENERALLY ALONG THE LOW SIDE OF THE CONSTRUCTION SITE AND ALONG A LINE OF CONSTANT LEVEL. AS AN ALTERNATIVE TO BURYING THE SEDIMENT FENCE LOWER EDGE, THE CONTRACTOR MAY ELECT TO PLACE 200mm OF THE FABRIC ON THE GROUND UP-SLOPE OF THE FENCE AND COVER WITH 100mm MIN LAYER OF AGGREGATE.
11. TO PREVENT EROSION, TOPSOIL AND SEED IMMEDIATELY AFTER COMPLETION OF BULK EARTHWORKS TO FINISHED PROFILES.
12. PROVIDE TURF STRIP ADJACENT TO KERB FOR FULL LENGTH OF NEW ROAD AND TURF STRIP PLACED AT 90° TO KERB EVERY 10m FOR FULL WIDTH OF VERGE.
13. PRIOR TO COMPLETION OF CONSTRUCTION OF PAVEMENT AND SEALING, PLACE SANDBAGS AT 45° TO ARREST SCOUR AGAINST KERB AND CHANNEL AS FOLLOWS:
    ROAD GRADE 0.5% - 5% - 25m MAX CRS.
    5% - 10% - 10m MAX CRS.
    10% - 15% - 15m MAX CRS.
    15% - 20% - 5m MAX CRS.
14. SWEEP EXTERNAL ROADS WHERE SEDIMENT HAS BEEN DROPPED FROM CONSTRUCTION VEHICLES. DO NOT WASH SEDIMENT INTO THE STORMWATER SYSTEM.
15. ALL SEDIMENT AND EROSION CONTROL STRUCTURES, TRENCHES ETC. SHALL BE REGULARLY MAINTAINED AND INSPECTED FOR EFFECTIVENESS.
16. THE USE OF POTABLE WATER IS NOT PERMITTED IN SITE EARTHWORKS OPERATIONS, ROAD AND PAVEMENT CONSTRUCTION OR DUST SUPPRESSION. RECYCLED WATER IS REQUIRED TO BE USED AND IS TO BE IN ACCORDANCE WITH L.C.C GUIDELINES.

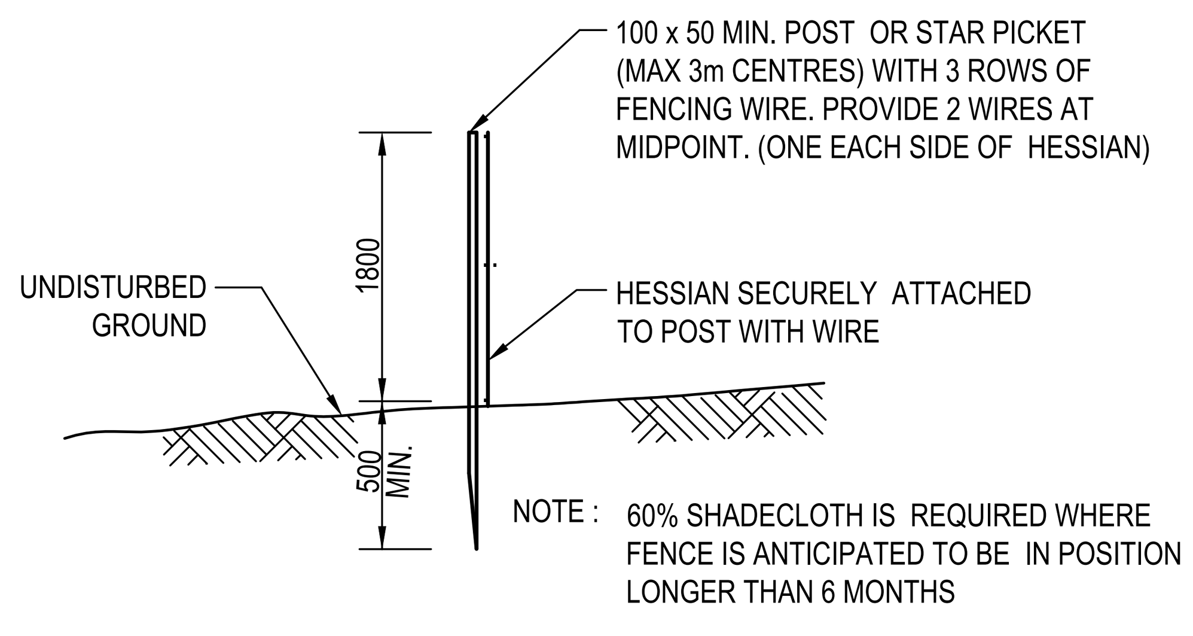


SEDIMENT FENCE

N.T.S.

NOTE: SEDIMENT FENCE TO HAVE TURNOUTS AT 50m MAX INTERVALS.

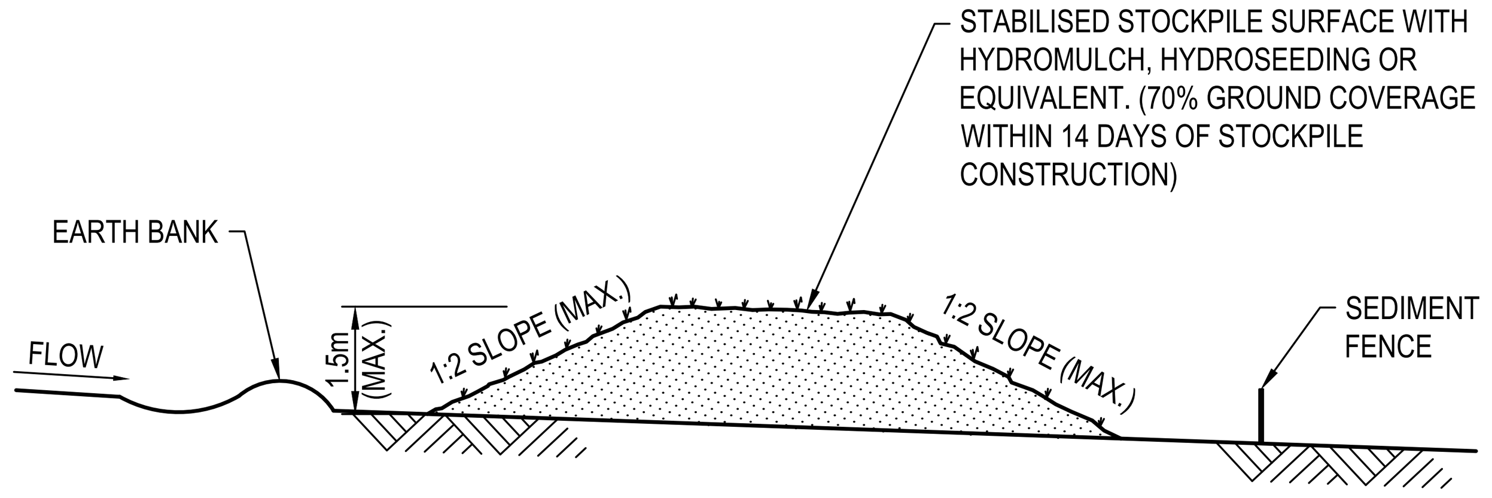
NOTE:
REFER TO IPWEAQ STANDARD DRAWINGS D-0040 AND D-0041 FOR ALL ADDITIONAL SEDIMENT CONTROL DETAILS.



DUST CONTROL FENCE

N.T.S.

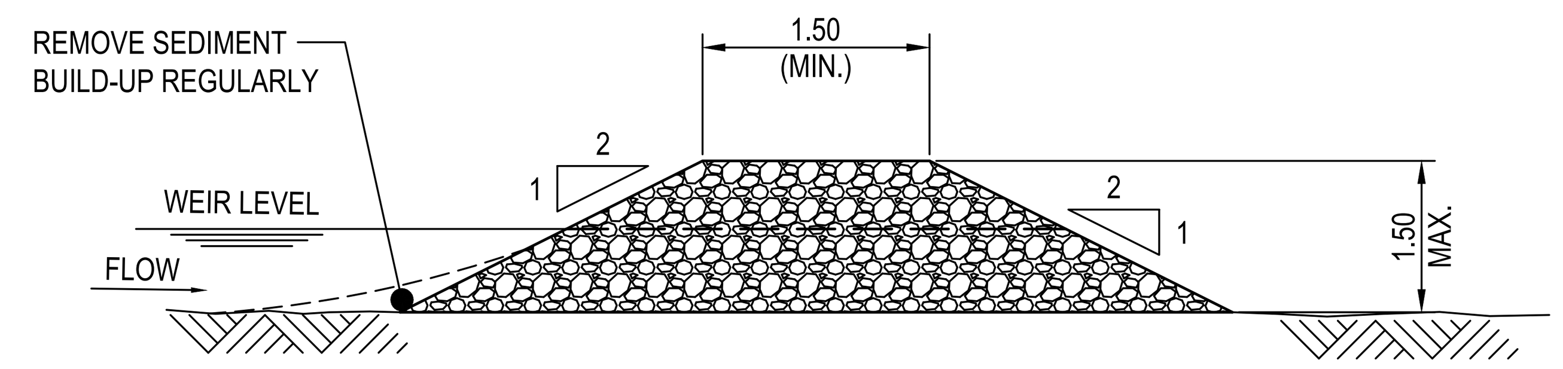
NOTE:
DUST CONTROL FENCE TO BE PLACED AS DIRECTED ON-SITE BY SUPERINTENDENT.



TYPICAL STOCKPILE CONFIGURATION

N.T.S.

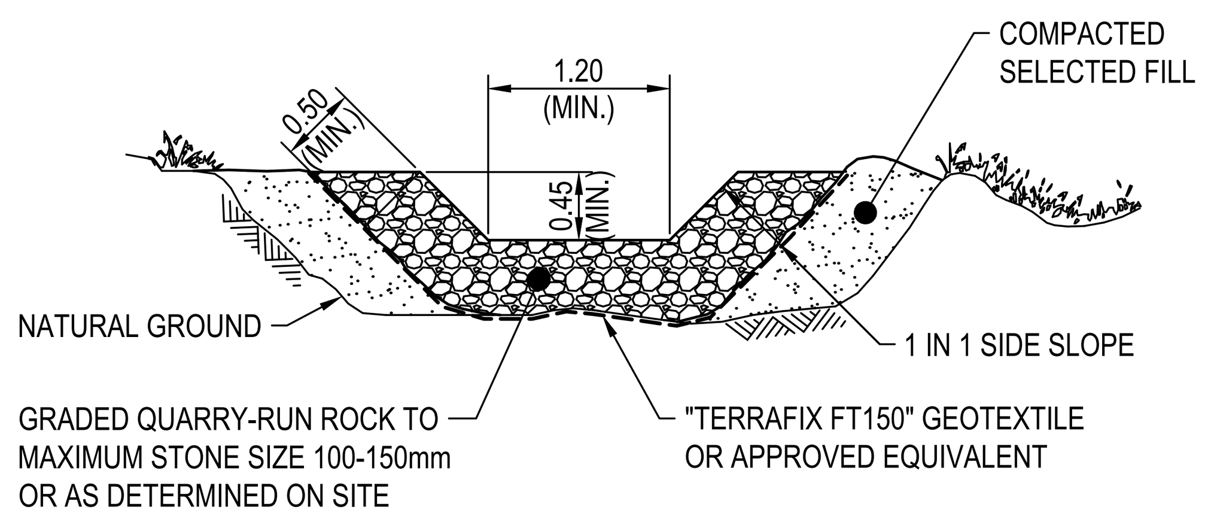
NOTE:
1. LOCATE STOCKPILES AT TOP OF CATCHMENT ON FLAT GROUND AND NOT WITHIN 5m OF CONCENTRATED FLOW PATHS.
2. STOCKPILES SHOULD HAVE EARTHBANKS UPSLOPE FOR DIVERSION OF UPSTREAM WATER AROUND STOCKPILE AND SEDIMENT FENCES PLACED 1-2m DOWNSLOPE.



ROCK CHECK DAM TYPICAL DETAIL

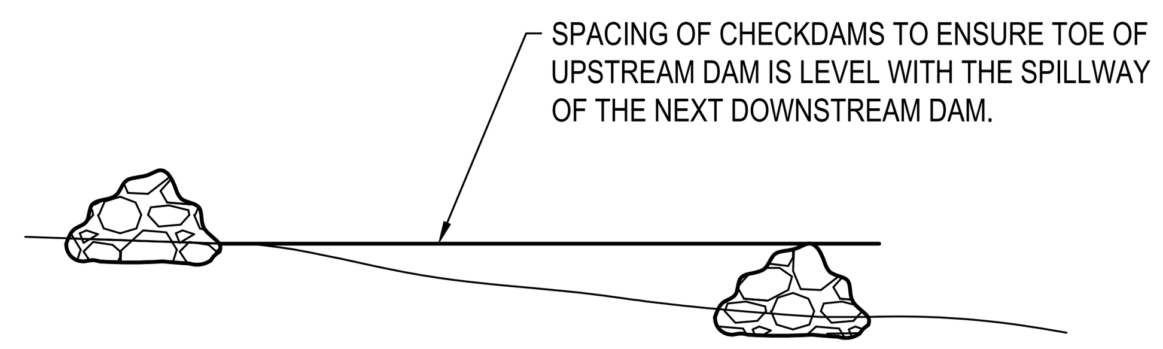
SCALE 1.0 0 1.0 2.0 (metres)

1 : 50 (FULL SIZE)



ROCK CHECK DAM TYPICAL CROSS SECTION

N.T.S.



ROCK CHECK DAM TYPICAL LONGITUDINAL SECTION

N.T.S.

SEDIMENT AND EROSION CONTROL CERTIFICATION

I .... HEREBY CERTIFY THAT THE SEDIMENT AND EROSION CONTROL MEASURES AND DEVICES SHOWN ON THIS DRAWING HAVE BEEN DESIGNED IN ACCORDANCE WITH THE 'BEST PRACTICE EROSION AND SEDIMENT CONTROL' (IECA AUSTRALASIA, NOVEMBER 2008).

SIGNED .... RPEQ No. .... DATED ....

NOTE:
REFER TO IPWEAQ STANDARD DRAWINGS D-0040 AND D-0041 FOR ALL ADDITIONAL SEDIMENT CONTROL DETAILS.

PRELIMINARY
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PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCIL RFI UPDATES	24-04-24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08-12-23

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
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Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
EARTHWORKS OPW - STAGE 1

DRAWING TITLE :
EROSION & SEDIMENT CONTROL TYPICAL NOTES AND DETAILS

DEVEL. APPLIC. No. : - | DATE : 24-04-24

PROJECT LEADER : JONATHAN CUELL

DESIGNER : TG

DRAFTSPERSON : CD

CHECKED : FRASER LUCAS

APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365

RPEQ No. :

SCALE : AS NOTED | DATUM : AHD | FULL SIZE : A1

PROJECT No.: BE230128-01A | DRAWING No. : C252 | VERSION: B

QMS RISK & OPPORTUNITIES REGISTER
SAFETY IN DESIGN – NORMAL DESIGN RISKS - CIVIL

Design Element	Associated risks & opportunities	Raw risk assessment		Raw risk rating	Treatment Measures to avoid, minimize or treat the risk.	Responsibility	Residual risk rating
		Likelihood	Consequence				
CONSTRUCTION PHASE							
SITE ACCESS	Unsafe site access and egress point, restricted access, flooding, unauthorised access from persons or animals	L	M	L-M	Prepare site specific Construction Traffic Management Plan and Workplace Health and Safety Management Plan	Principal Contractor	L
CLEARING & DEMOLITION	Removal of existing structures, decommision of services, vegetation clearing and fauna management	M	H	M-H	Contractor to obtain Demolition Permit, arrange all service disconnections with asset ownerand carry out vegetation works in accordance with Vegetation and Fauna Management Plan	Principal Contractor	L
EXISTING SERVICES	Distrub or damage existing services and infrastructure, overhead powerlines, work adjacent to existing services, existing service relocations	M	H	M-H	Client to commission detailed site survey and service potholing at critical locations. Contractor to undertake Dial Before You Dig and service verification with service authoritiy providers and undertake additional potholing prior to construction	Client and Principal Contractor	L-M
EXCAVATION & TRENCHING	Unstable existing slopes and landslip, steep cut profiles, deep trench excavations, working at heights, intercept water table, dispersive soils, acid sulphate soils	M	H	M-H	Client to commission a geotechnical investigation and contractors to undertake own investigations. Temporary and final earthworks profiles confirmed by client's geotechnical consultant. Tempory earthworks profile to be confirmed by Contractor's geotechnical consultant. Contractor to provide temporary benching, fencing, stabilisation and shoring.	Client and Principal Contractor	L
MATERIALS HANDLING	Manual handling, handling and disposal of sharps, repeative work processeds, hazardous substances	H	M	M-H	Contractor or provide a site specific Workplace Health and Safety Management Plan including Material Safety Data Sheets	Principal Contractor	L
PLANT & EQUIPMENT	Operation of plant and machinery, site access by visitors, material deliveries and waste removal	M	H	M-H	Contractor or provide a site specific Workplace Health and Safety Management Plan including register of operator machinery tickets. Contractor to maintain a site visitor register and provide site specific induction to all visitors	Principal Contractor	L
OPERATIONAL PHASE							
ROADS & PATHWAYS	General road safety, flood free access, pedestrian and cyclist injuries, inadequate signage	L	H	M	Design, approvals and construction undertaken in accordance with Australian, State Government and Local Authority standards, codes, guidelines and best practice	Asset Owner	L
STORWATER / FLOODING	Hazard from storm and flood water depths and velocities, ponding and access to inlets, outlets and basins	M	H	M-H	Design, approvals and construction undertaken in accordance with Australian, State Government and Local Authority standards, codes, guidelines and best practice	Asset Owner	L
WATER & SEWER	Blockages, contamination, interuption to service, access to fittings, confined space access	L	M	L-M	Design, approvals and construction undertaken in accordance with Australian, State Government and Local Authority standards, codes, guidelines and best practice	Asset Owner	L
WALLS & FENCING	Risk of falls, unauthoried access from persons and animals, structural failure	M	M	M	Design, approvals and construction undertaken in accordance with Australian, State Government and Local Authority standards, codes, guidelines and best practice	Asset Owner	L
MAINTENANCE PHASE							
ROADS & PATHWAYS	All as for construction and operation phases					Asset Owner	
STORWATER / FLOODING	All as for construction and operation phases					Asset Owner	
WATER & SEWER	All as for construction and operation phases					Asset Owner	
WALLS & FENCING	All as for construction and operation phases					Asset Owner	
REFURBISHMENT PHASE							
ROADS & PATHWAYS	All as for construction and operation phases					Asset Owner	
STORWATER / FLOODING	All as for construction and operation phases					Asset Owner	
WATER & SEWER	All as for construction and operation phases					Asset Owner	
WALLS & FENCING	All as for construction and operation phases					Asset Owner	
DEMOLITION PHASE							
ROADS & PATHWAYS	All as for construction and operation phases					Asset Owner	
STORWATER / FLOODING	All as for construction and operation phases					Asset Owner	
WATER & SEWER	All as for construction and operation phases					Asset Owner	
WALLS & FENCING	All as for construction and operation phases					Asset Owner	

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL
FERNVALE RD, LOWOOD
QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCIL RFI UPDATES	24-04-24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08-12-23

BURCHILLS ENGINEERING SOLUTIONS
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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
EARTHWORKS OPW - STAGE 1

DRAWING TITLE :
HAZARD RISK REGISTER - DESIGN RISKS

DEVEL. APPLIC. No. : -	DATE : 24-04-24
PROJECT LEADER : JONATHAN CUELL	
DESIGNER : TG	
DRAFTSPERSON : CD	
CHECKED : FRASER LUCAS	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	
RPEQ No. :	
SCALE : AS NOTED	DATUM : AHD / FULL SIZE : A1
PROJECT No.: BE230128-01A	DRAWING No. : C900 / VERSION: B

Our Ref: BE230128-TM-HIA-Stg1-02.docx
Enquiries: Melissa Blum

TECHNICAL MEMORANDUM

Date	26/04/2024
To	Lowood One Pty Ltd
From	Melissa Blum
Project	BE230128 – 2983 Forest Hill Fernvale Road, Lowood
Subject	Hydraulic Impact Assessment – Stage 1

1. BACKGROUND

Lowood One Pty Ltd have engaged Burchills Engineering Solutions to prepare a Hydraulic Impact Assessment (HIA) to accompany a Development Application to be submitted to Somerset Regional Council (the 'Council' or 'SRC'). The Application sought is a Reconfiguring a Lot Approval for Stage 1 of the development which includes 48 lots, including 4 duplex allotments.

The properties included in this Development Application include:

- Lot 56 Forest Hill Fernvale Road, Lowood (Lot 56 on SP 197415); and
- Lot 57 Forest Hill Fernvale Road, Lowood (Lot 57 on SP 197415).

This report has been prepared to address the requirements of the Somerset Region Planning Scheme, Version 4.2 (2016), specifically the Flood Hazard Overlay Code. It should be read in conjunction with the Conceptual Stormwater Management Plan (CSMP) for Stage 1 (BE230128-MEM-CSMP-Stg1-02.pdf) and HIA contained within the Master Stormwater Management Plan (MSMP) for the Masterplan (BE230128-RP-MSPM-02.pdf).

2. SITE DETAILS

The subject site is located at 2983 Forest Hill Fernvale Road, Lowood, QLD and can be formally described as Lot 56 and 57 SP 197415 with a total area of 41.68ha. Refer to Figure 2.1 for the site locality.

Figure 2.1 Site Locality (QLD Globe, 2023)

2.1 Proposed Development

The proposed Stage 1 development includes 48 lots, including 4 duplex allotments, as shown in Figure 2.2. These lots will be filled above the Design Flood Level (1% AEP plus 300mm freeboard). The proposed Regional Detention Basin associated with the masterplan development is not proposed in Stage 1 works and the impact this has on flooding is outlined in Section 4 of this Memorandum.

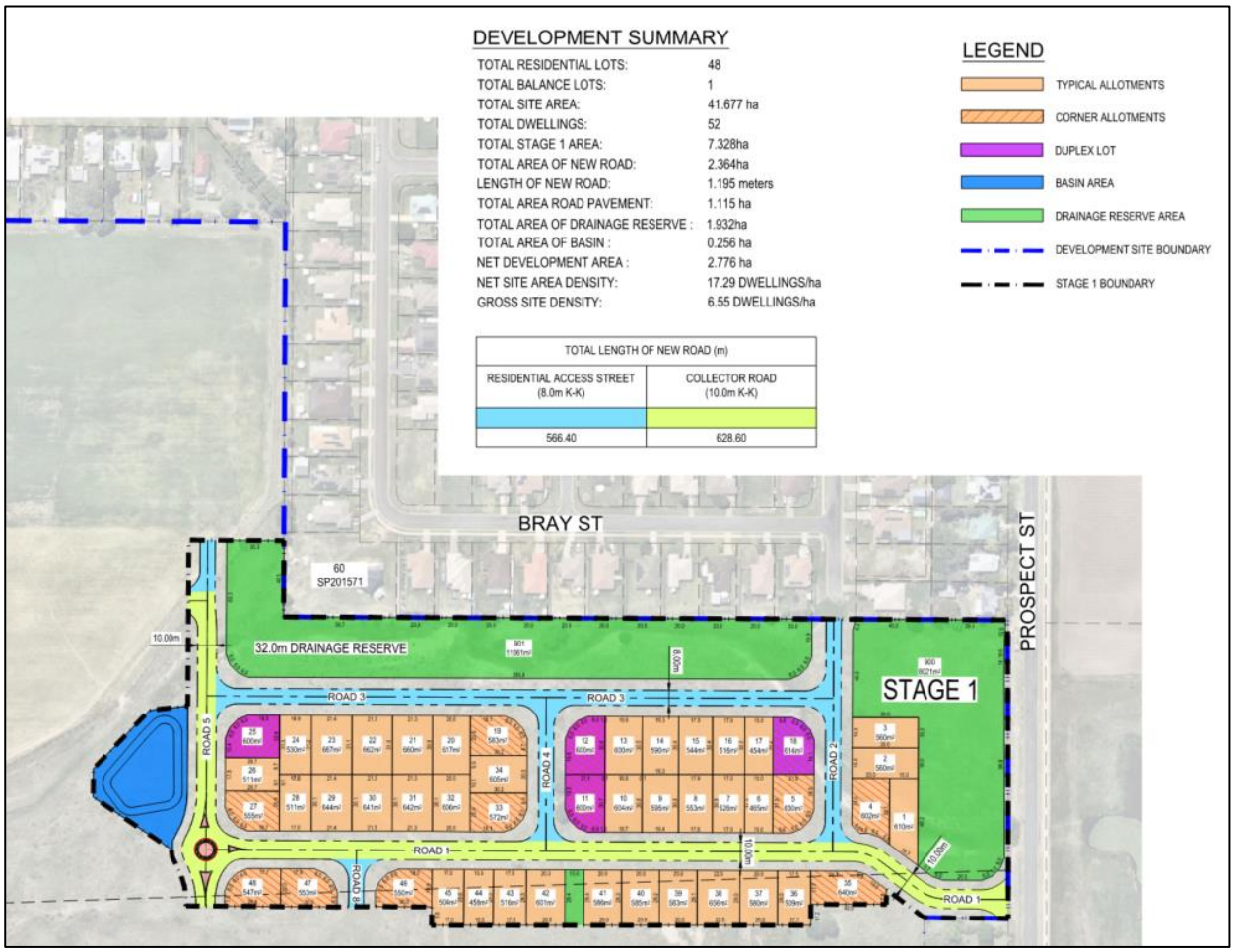


Figure 2.2 Proposed Stage 1 Development (Burchills, 2024)

3. HYDRAULIC MODEL

Burchills have utilised Councils Lowood Flood Study (Water Technology, 2019) TUFLOW model for this assessment. The Lowood model represents the Lowood local catchment, draining into the Brisbane River to the north. the model does not include Brisbane River flooding. The model covers an area of 17km^2 and uses a 3m grid resolution. The resolution of the model is considered fit-for-purpose for the hydraulic impact assessment (HIA).

The model used for this assessment was developed as part of the Masterplan assessment, full details of the model changes and validation are presented in the Masterplan HIA report (BE230128-RP-HIA-Masterplan-02.docx). The following sections relate to changes to the Masterplan Model.

3.1 Post-Development Scenario Representation

The post-development topography was represented in the model through the design DEM, as indicated within Appendix B, and included the fill pads, basins and channel.

In addition to this, a bund has been included along the northern boundary, with 3 x 2.1m x 0.6m culverts controlling the outflow from the Site.

3.1.1 Post-Development Hydrology

The hydrology for the post-development scenario was also updated to reflect the impervious area changes associated with Stage 1 only. This was achieved by using an XP-SWMM model to represent the Site, using eight sub catchments. The catchment parameters for the modified catchments are presented in Table 3.1.

Table 3.1 Catchment Modification & Representation

Catchments	Area	Fraction Imp. (%)
P04	1.1	5
P05	0.8	5
P06	13.5	75

4. RESULTS

4.1 Pre-Development Flood Behaviour

The area of Stage 1 begins to get inundated from the 0.5EY, with ponding to the east of the channel, close to Forest Hill Fernvale Road. In the 0.2EY event, there is an addition of a breakout flow to the west of the channel, near the northern boundary of the Stage. These two areas of inundation get deeper and cover a larger extent with the larger events.

Generally in the existing Scenario flood waters are contained to existing waterways and there is only minor flood within the floodplain of depth less than 300mm.

4.2 Post-Development Flood Behaviour

In the post-developed scenario the flood is conveyed through the primary site drainage channel to the undeveloped portion of the site where it joins on to the existing waterway before reaching the LPD. It is important to note that the proposed regional detention basin associated with the masterplan development is not proposed during Stage 1 works. Flood waters are contained within the Stage 1 channel and the development lots achieve the required freeboard.

Flood depth within the channel is generally less than 1.5m in depth for the 1% AEP event. In more frequent events such as the 0.5EY, the flood depth in the channel ranges from 0.2-0.5m.

Flood velocity in the channel is relatively slow, peaking at approximately 1.5m/s in the 2% and 1% AEP events. The flow velocities within the channel are in accordance with QUDM (2017), Section 9.5.3 – 'Recommended maximum average velocities'.

Flow hazard within the channel is greater than 0.6m^2/s and is not safe for pedestrian access.

Peak water surface level, depth, velocity, hazard and afflux plots for the modelled events have been included in Appendix D of this report.

4.3 Flood Impacts

Flood afflux occurs due to a lack of stormwater controls at the development, with the proposed Regional Detention Basin not coming online until future stages of the development. It is important to note that once the development is realised in its entirety, flood impacts are reduced.

The proposed development results in an increase in flood level downstream of the development. Flood afflux is at its highest in the 1% AEP flood event, with flood level generally increasing by 10-30mm downstream and peak afflux of up to 50mm occurring in an existing downstream dam. More frequent flood events such as the 39% AEP event result in an improvement in flood impact downstream of the development.

An assessment of Stage 1's impact of flood velocity was also completed, with flood velocity change limited to a few select areas in the downstream floodplain. The small increase in flood velocity (less than 0.2m/s) is not likely to give rise to additional scour potential and is considered acceptable.

It is important to note that no flood afflux occurs on any existing structures / dwellings and is wholly contained to land uses associated with agricultural purposes.

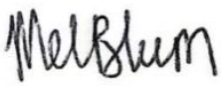
5. CONCLUSION

This HIA for Stage 1 has been prepared for Lowood One Pty Ltd to accompany the Development Application to allow for the development of 48 lots, including 4 duplex allotments on 2983 Forest Hill Fernvale Road, Lowood.

This HIA builds on the assessment and findings from the Masterplan assessment (BE23128-RP-MSMP-02) and assess the proposed Stage 1 development in isolation from the controls proposed by the Masterplan development. The results of the assessment indicate that flood waters can be appropriately conveyed through the development in accordance with the relevant guidelines.

The findings of the HIA indicate that changes to flood levels downstream occur, with impacts occurring on undeveloped agricultural land only and no significant impacts on any existing structures / dwellings. The proposed development will not cause additional scour potential downstream.

Yours sincerely,



Melissa Blum
Senior Water Engineer

Samuel Huddy
Senior Water Engineer
RPEQ - 29555

Appendix A – Proposed Plans of Development

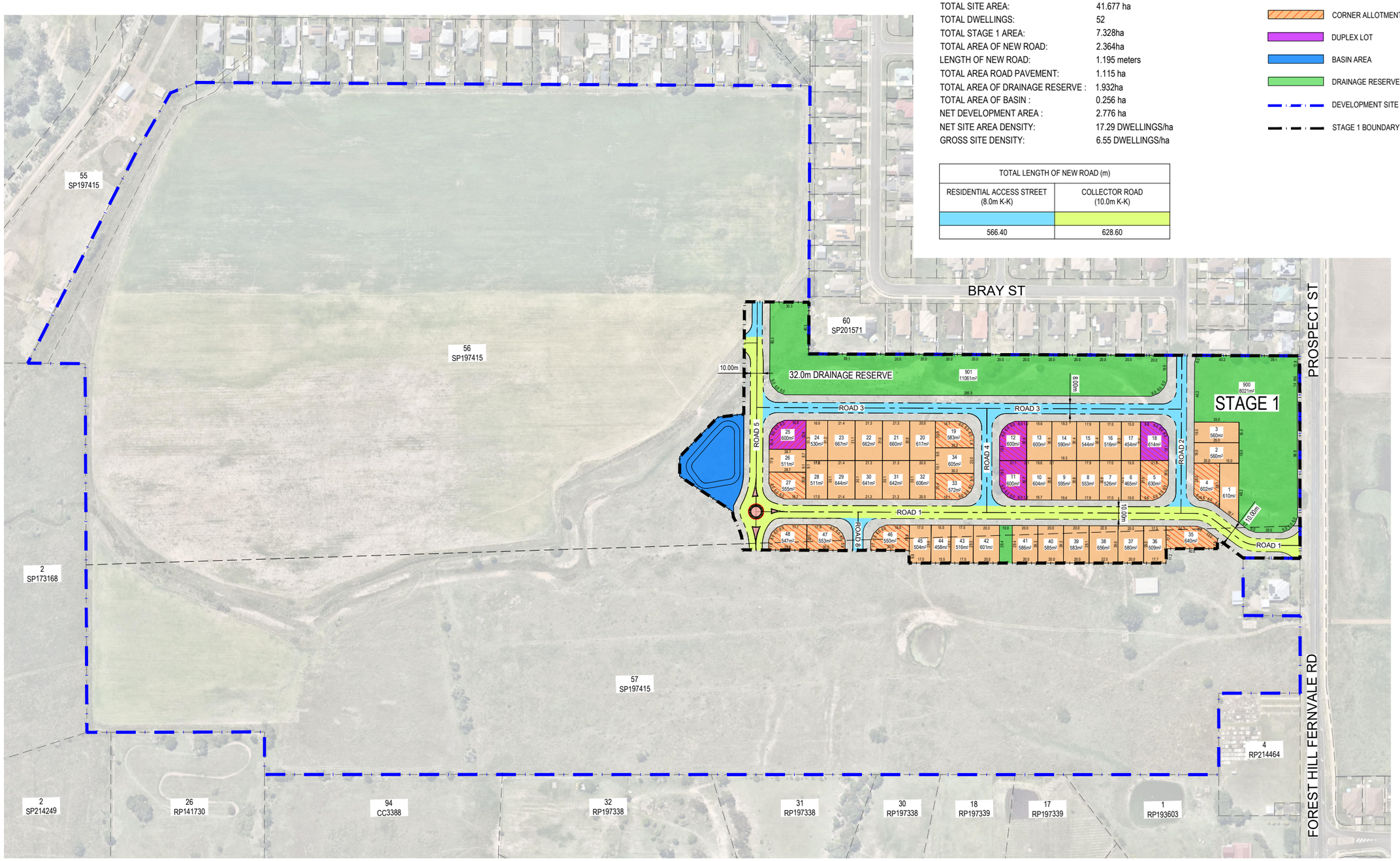
DEVELOPMENT SUMMARY

TOTAL RESIDENTIAL LOTS:	48
TOTAL BALANCE LOTS:	1
TOTAL SITE AREA:	41.677 ha
TOTAL DWELLINGS:	52
TOTAL STAGE 1 AREA:	7.328ha
TOTAL AREA OF NEW ROAD:	2.364ha
LENGTH OF NEW ROAD:	1.195 meters
TOTAL AREA ROAD PAVEMENT:	1.115 ha
TOTAL AREA OF DRAINAGE RESERVE :	1.932ha
TOTAL AREA OF BASIN :	0.256 ha
NET DEVELOPMENT AREA :	2.776 ha
NET SITE AREA DENSITY:	17.29 DWELLINGS/ha
GROSS SITE DENSITY:	6.55 DWELLINGS/ha

TOTAL LENGTH OF NEW ROAD (m)	
RESIDENTIAL ACCESS STREET (8.0m K-K)	COLLECTOR ROAD (10.0m K-K)
566.40	628.60

LEGEND

- TYPICAL ALLOTMENTS
- CORNER ALLOTMENTS
- DUPLEX LOT
- BASIN AREA
- DRAINAGE RESERVE AREA
- DEVELOPMENT SITE BOUNDARY
- STAGE 1 BOUNDARY



Prepared for : LOWOOD ONE PTY LTD

Designer : TG
Checked : CD
Date : 24.03.24

STAGE 1 - SUBDIVISION LAYOUT
CONCEPT CIVIL DRAWINGS

SCALE 15 0 15 30 45 60 75 (metres)
1 : 1500 (FULL SIZE)

BE230128-01-SK010-B

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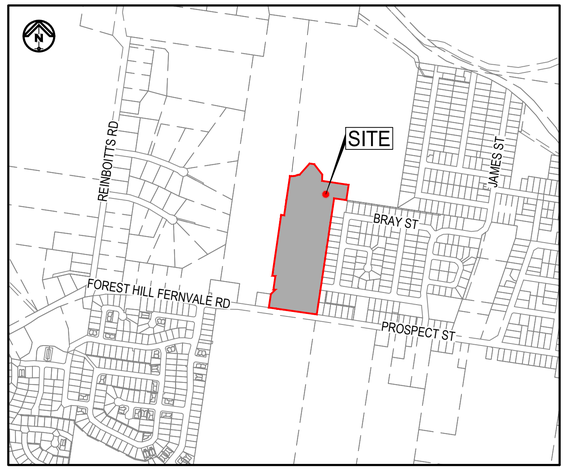
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

Appendix B – Burchills Civil Engineering Drawings

PROPOSED LAND SUBDIVISION
AT 2983 FOREST HILL FERNVALE RD, LOWOOD
QUEENSLAND 4311

CONCEPT CIVIL ENGINEERING STAGE 1

CONTRACT BE230128-01



LOCALITY PLAN

N.T.S.

DRAWING INDEX	
DWG No.	DESCRIPTION
SK000	COVER SHEET
SK200	BULK EARTHWORKS LAYOUT PLAN
SK201	EARTHWORKS SECTIONS
SK300	ROADWORKS AND DRAINAGE LAYOUT PLAN
SK301	TYPICAL ROAD CROSS SECTIONS
SK310	ROAD 1 LONGITUDINAL SECTIONS
SK311	ROADS 4 & 5 LONGITUDINAL SECTIONS
SK312	ROADS 6 & 7 LONGITUDINAL SECTIONS
SK313	ROAD 8 LONGITUDINAL SECTIONS
SK320	BIO-RETENTION BASIN DETAIL PLAN
SK321	BIO-RETENTION BASIN DETAILS
SK350	INTERSECTION FUNCTION LAYOUT PLAN
SK500	CONCEPT WATER AND SEWER LAYOUT PLAN

PREPARED FOR
LOWOOD ONE PTY LTD

PREPARED BY

BURCHILLS
ENGINEERING SOLUTIONS

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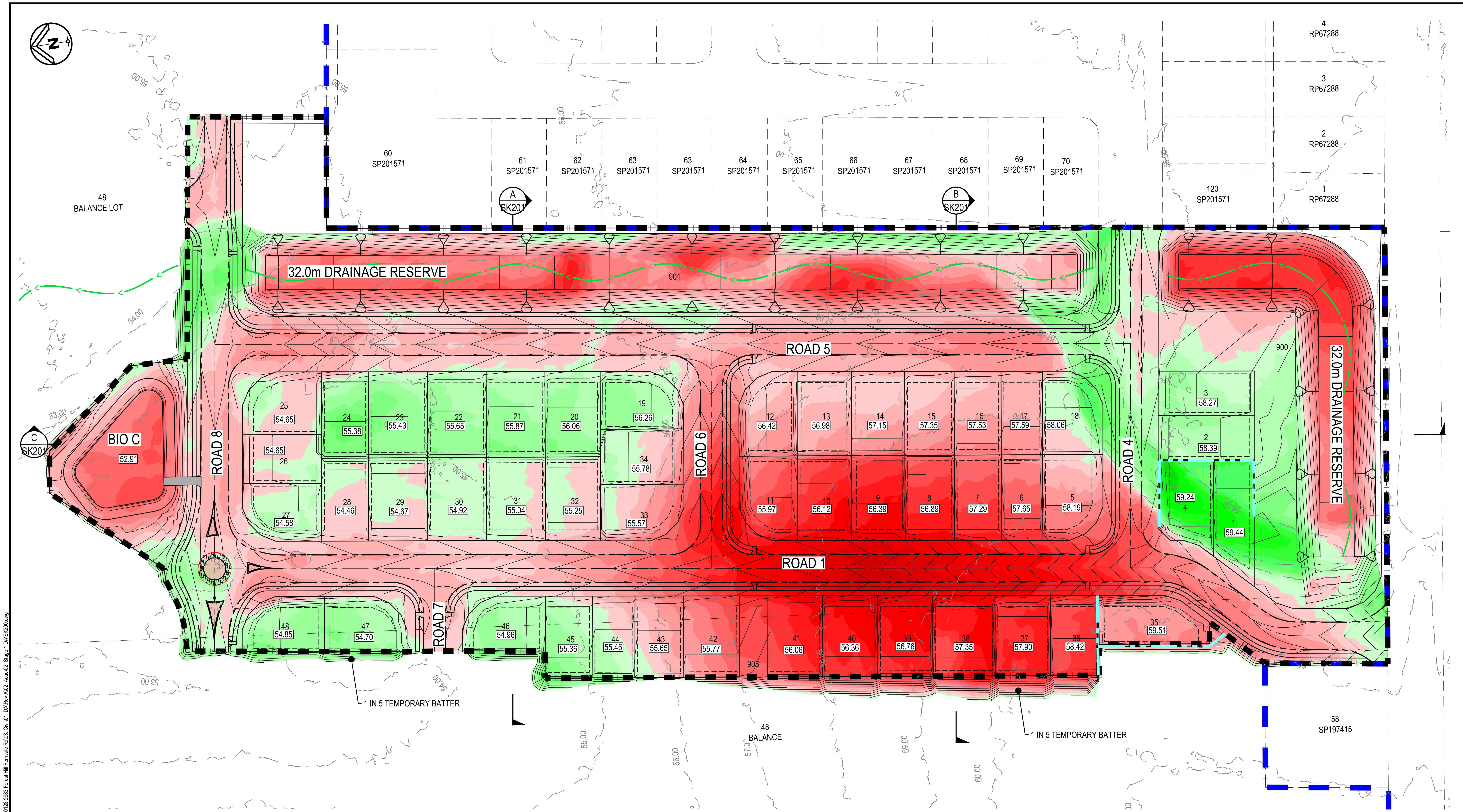
ABN 76 166 942 365

NOTE:

DESIGNS HAVE BEEN UNDERTAKEN USING SURVEY DATA
PROVIDED BY ONE SURVEYORS DATED 6 NOVEMBER 2023

DATE : 24.04.24

PROJECT No.:	DRAWING No. :	VERSION:
BE230128-01	SK000	B



BULK EARTHWORKS LAYOUT PLAN

SCALE 1 : 750 (FULL SIZE) (metres)

EARTHWORKS LEGEND

Cut	Fill
-4.5 TO -4.0 m	0.0 TO 0.5 m
-4.0 TO -3.5 m	0.5 TO 1.0 m
-3.5 TO -3.0 m	1.0 TO 1.5 m
-3.0 TO -2.5 m	1.5 TO 2.0 m
-2.5 TO -2.0 m	2.0 TO 2.5 m
-2.0 TO -1.5 m	2.5 TO 3.0 m
-1.5 TO -1.0 m	3.0 TO 3.5 m
-1.0 TO -0.5 m	3.5 TO 4.0 m
-0.5 TO 0.0 m	4.0 TO 4.5 m

BULK EARTHWORKS SUMMARY

STRUCTURAL FILLING	
AREA	NETT SOLID FILL
OVERALL FILLING (ALLOTMENTS, BATTERS)	10,360 cu.m.
TOTAL FILL REQUIRED	10,360 cu.m.
EXCAVATION	
AREA	NETT CUT
OVERALL EXCAVATION	43,131 cu.m.
TOTAL CUT	43,131 cu.m.

i.e. 43,131cu.m - 10,360 cu.m. = 32,771 cu.m. TO BE EXPORTED OUT SIDE
INCLUDING 200mm TOPSOIL STRIP
INCLUDING 200mm TOPSOIL RESPREAD TO LOTS, VERGES, DRAINAGE RESERVE AND OPEN SPACE AREAS
INCLUDING 300mm ROAD BOXING DEPTHS

LEGEND

- 90.0 — EXISTING CONTOUR LIDAR
- EXISTING EDGE OF KERB
- DEVELOPMENT SITE BOUNDARY
- PROPOSED ROAD CONTROL LINE
- PROPOSED KERB
- 90.0 — DESIGN SURFACE CONTOUR
- PROPOSED RETAINING WALL

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
BULK EARTHWORKS LAYOUT PLAN

DEVEL. APPLIC. No. : -	DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL	
DESIGNER : TG	
DRAFTSPERSON : CD	
CHECKED : FRASER LUCAS	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	RPEQ No. :
SCALE : AS NOTED	DATUM : AHD / FULL SIZE : A1
PROJECT No.: BE230128-01	DRAWING No. : SK200 / VERSION: B

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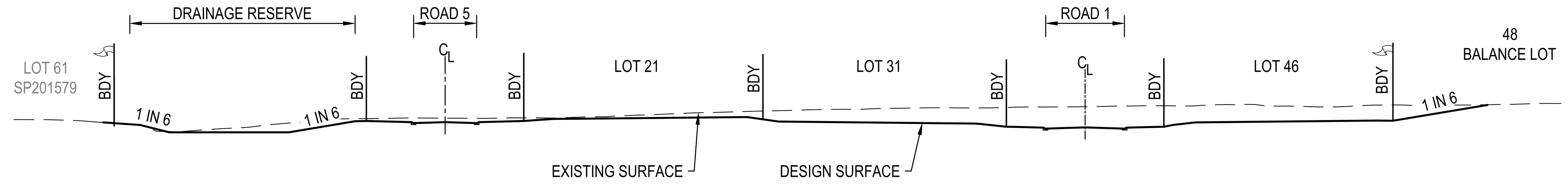
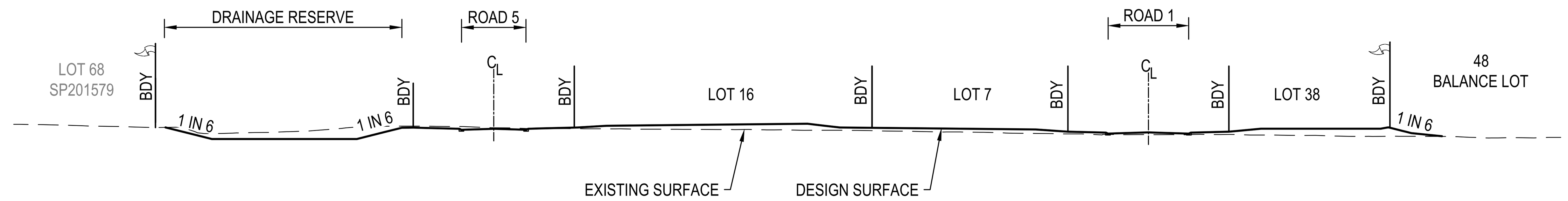


A SK200 SECTION SCALE 1:500

SCALE 5 0 5 10 15 20 25 (metres)
1 : 500 (FULL SIZE)



B SK200 SECTION SCALE 1:500

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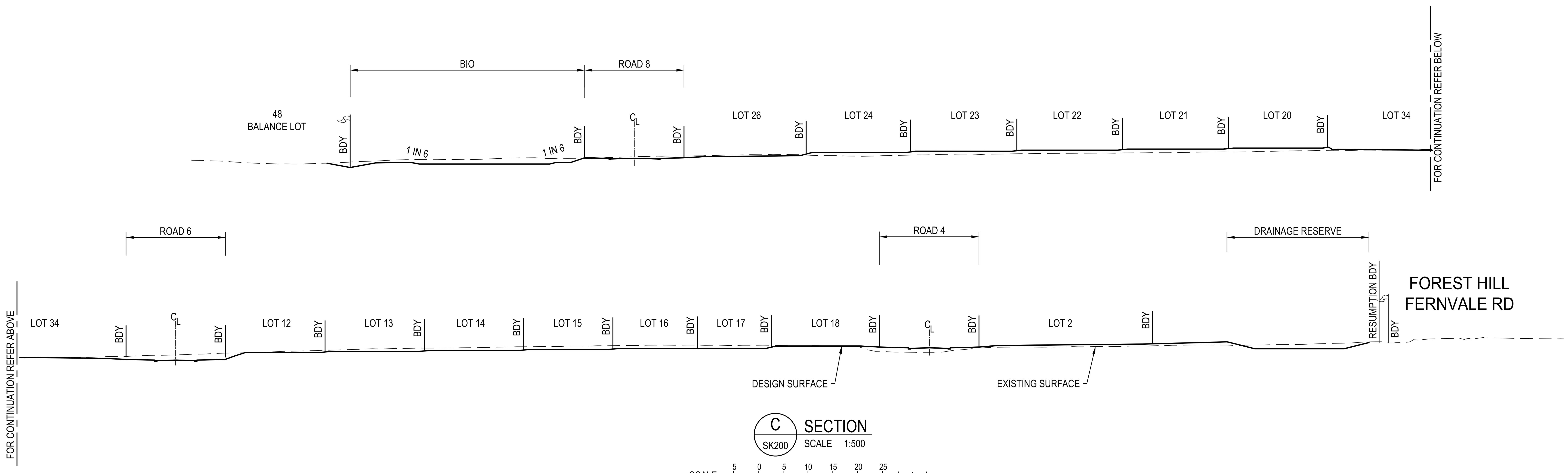

C SK200 SECTION SCALE 1:500

SCALE 5 0 5 10 15 20 25 (metres)
1 : 500 (FULL SIZE)

FILENAME: C:\Users\To Ngoc Nguyen\QT Vietnam Ltd Co\BCH23 - Documents\BCH23007 BE230128 2983 Forest Hill Fernvale Rd\03_Civil\01_DA\Rev A\02_Acad\02_Stage 1 DA\SK201.dwg

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PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

NOTE
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BURCHILLS ENGINEERING SOLUTIONS
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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
EARTHWORKS SECTIONS

DEVEL. APPLIC. No. : - DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL
DESIGNER : TG
DRAFTSPERSON : CD
CHECKED : FRASER LUCAS
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. :
SCALE : AS NOTED | DATUM : AHD | FULL SIZE : A1
PROJECT No.: BE230128-01 | DRAWING No. : SK201 | VERSION: B

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

BRAY ST

PROSPECT ST

32.0m DRAINAGE RESERVE

CULVERT GROUP 2
7 x 2100x600 RCBCs

CULVERT GROUP 1
7 x 2100x600 RCBCs

PROPOSED LOW-FLOW CHANNEL. REFER TYPICAL DETAIL

ROAD 1

ROAD 4

ROAD 5

ROAD 6

ROAD 7

ROAD 8

BIO C

PROPOSED EXTENSION OF EXISTING CULVERTS

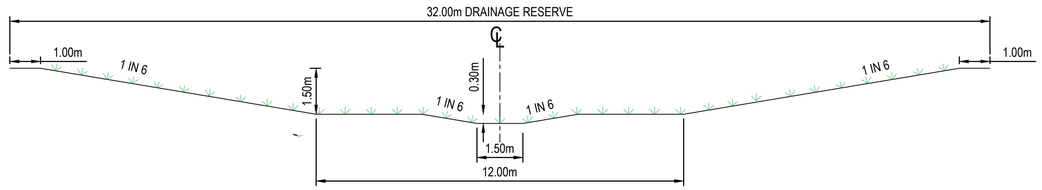
STUB FOR FUTURE CONNECTION

48
BALANCE

58
SP197415

ROADWORKS AND DRAINAGE LAYOUT PLAN

SCALE 10 0 5 10 15 20 25 30 35 (metres)
1 : 750 (FULL SIZE)



CHANNEL TYPICAL SECTION

SCALE 1 0 1 2 3 4 5 (metres)
1 : 100 (FULL SIZE)

LEGEND

- DEVELOPMENT SITE BOUNDARY
- EXISTING CONTOUR LIDAR (90.0)
- EXISTING STORMWATER (SW)
- EXISTING EASEMENT
- DESIGN SURFACE CONTOUR (90.0)
- DESIGNPROPOSED LOT BOUNDARY
- PROPOSED LOW-FLOW CHANNEL
- PROPOSED ROAD CENTRELINE
- PROPOSED HEADWALL
- PROPOSED STORMWATER PIPE (SW)
- PROPOSED STORMWATER MANHOLE
- PROPOSED BATTER
- DRAINAGE RESERVE
- PROPOSED FOOTPATH
- PROPOSED ASPHALT PAVETMENT

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

BURCHILLS ENGINEERING SOLUTIONS
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Coote Burchills Engineering Pty Ltd
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PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
ROADWORKS AND DRAINAGE LAYOUT PLAN

DEVEL. APPLIC. No. :	-
DATE :	24.04.24
PROJECT LEADER :	JONATHAN CUELL
DESIGNER :	TG
DRAFTSPERSON :	CD
CHECKED :	FRASER LUCAS

APPROVED FOR AND ON BEHALF OF
BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365

RPEQ No. :

SCALE : AS NOTED	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE230128-01	DRAWING No. : SK300	VERSION: B

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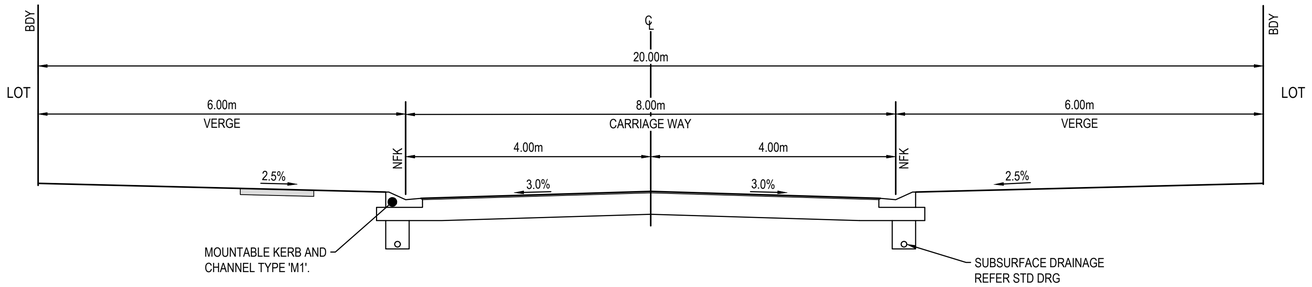
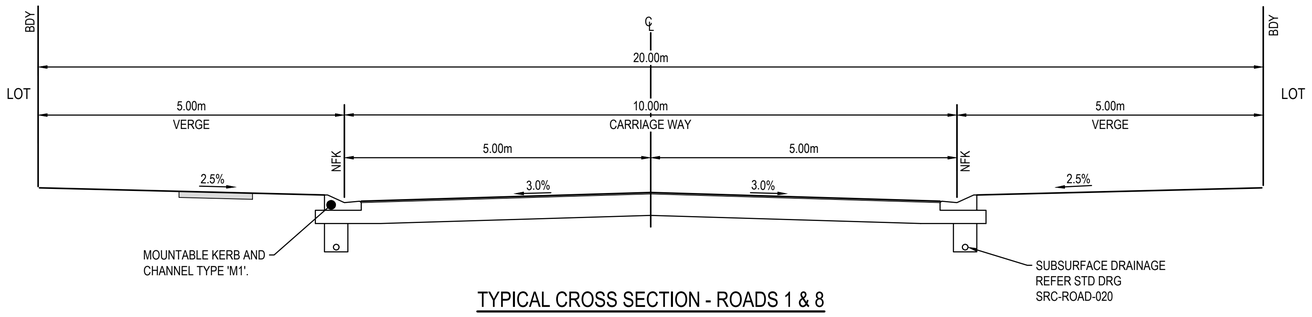


TYPICAL CROSS SECTION - ROADS 5, 6 & 7

SCALE 1.0 0 1.0 2.0 (metres)

1 : 50 (FULL SIZE)



TYPICAL CROSS SECTION - ROADS 1 & 8

SCALE 1.0 0 1.0 2.0 (metres)

1 : 50 (FULL SIZE)

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL
FERNVALE RD, LOWOOD
QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

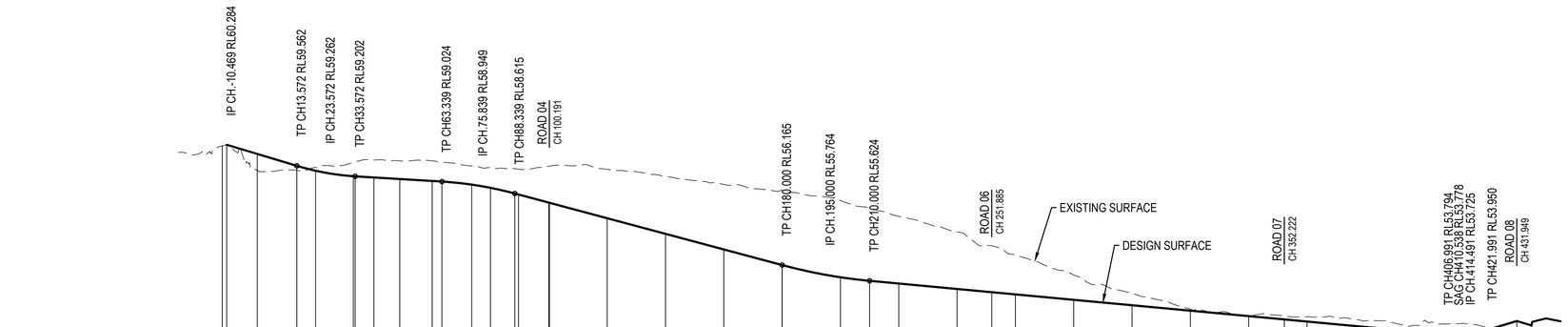
PROJECT:

CONCEPT CIVIL ENGINEERING

DRAWING TITLE :

TYPICAL ROAD
CROSS SECTIONS

DEVEL. APPLIC. No. : -	DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL	
DESIGNER : TG	
DRAFTSPERSON : CD	
CHECKED : FRASER LUCAS	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	
RPEQ No. :	
SCALE : AS NOTED	DATUM : AHD / FULL SIZE : A1
PROJECT No.: BE230128-01	DRAWING No. : SK301 / VERSION: B



FILENAME: C:\Users\Tu Ngoc Nguyen\QT Vietnam Ltd Co\BCH23 - Documents\BCH23007 BE230128 2983 Forest Hill Fernvale Rd\03. Civil\01. DA\Rev A\02. Acad\02. Stage 1 DA\SK310.dwg

PLOTTED: 25.04.2024 at 16:29

DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve)	0.00	0.00	0.57	0.16	-0.11	-0.47	-0.49	-0.60	-0.62	-0.69	-0.66	-0.64	-0.69	-0.85	-0.87	-1.24	-1.25	-1.67	-1.95	-2.23
FINISHED SURFACE LEVEL	60.247	60.284	59.970	59.562	59.394	59.206	59.202	59.164	59.111	59.044	59.024	58.919	58.809	58.615	58.582	58.303	58.298	57.768	57.234	56.699
EXISTING SURFACE LEVEL	60.25	60.28	59.40	59.41	59.51	59.68	59.70	59.76	59.73	59.73	59.68	59.56	59.50	59.47	59.45	59.55	59.55	59.44	59.19	58.93
CONTROL LINE CHAINAGE	-12.000	-10.469	0.000	13.572	20.000	32.965	33.572	40.000	48.878	60.000	63.339	73.569	80.000	88.339	89.579	100.000	100.193	120.000	140.000	160.000

DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve)	-2.57	-2.57	-2.63	-2.49	-2.30	-1.95	-1.59	-1.35	-0.85	-0.41	-0.05	-0.01	-0.12	-0.16	-0.21	-0.39	-0.36	-0.18	-0.06	0.63
FINISHED SURFACE LEVEL	56.165	56.165	55.746	55.624	55.532	55.346	55.235	55.160	54.974	54.788	54.603	54.417	54.303	54.231	54.045	53.859	53.794	53.895	53.950	54.249
EXISTING SURFACE LEVEL	58.73	58.73	58.37	58.12	57.83	57.30	56.82	56.51	55.82	55.20	54.65	54.43	54.42	54.39	54.26	54.25	54.15	54.08	54.01	53.62
CONTROL LINE CHAINAGE	180.000	180.000	200.000	210.000	220.000	240.000	251.883	260.000	280.000	300.000	320.000	340.000	352.223	360.000	380.000	400.000	406.991	420.000	421.991	431.949

HORIZONTAL GEOMETRY

R25m
15.91m

R-25m
16.01m

ROAD 1 LONGITUDINAL SECTION

VERTICAL SCALE 1 0 1 2 3 4 5 1:100 (metres)
HORIZONTAL SCALE 10 0 10 20 30 40 50 1:1000 (metres)
(FULL SIZE)

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL
FERNVALE RD,
LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

BURCHILLS
ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
ROAD 1 LONGITUDINAL SECTIONS

DEVEL. APPLIC. No. : -
DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL
DESIGNER : TG
DRAFTSPERSON : CD
CHECKED : FRASER LUCAS
APPROVED FOR AND ON BEHALF OF
BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. :
SCALE : AS NOTED
DATUM : AHD
FULL SIZE : A1
PROJECT No.: BE230128-01
DRAWING No. : SK310
VERSION: B

DATUM RL 51.0

DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve)	-1.25	-1.29	-1.06	-1.03	0.79	0.47	0.24	0.14	0.13	0.12	0.15	0.44	0.07	
FINISHED SURFACE LEVEL	58.299	58.197	57.927	57.918	57.798	57.678	57.610	57.581	57.580	57.610	57.663	57.783	57.803	
EXISTING SURFACE LEVEL	59.55	59.49	58.99	58.94	57.01	57.21	57.37	57.44	57.45	57.49	57.52	57.35	57.73	
CONTROL LINE CHAINAGE	0.000	3.379	18.379	20.000	40.000	60.000	71.228	80.000	81.269	91.228	100.000	120.000	123.313	

HORIZONTAL GEOMETRY

ROAD 4 LONGITUDINAL SECTION

VERTICAL SCALE 1 0 1 2 3 4 5 1:100 (metres)
HORIZONTAL SCALE 10 0 10 20 30 40 50 1:1000 (metres)
(FULL SIZE)

DATUM RL 48.0

DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve)	0.13	0.37	0.64	0.60	-0.74	-0.71	-0.68	-0.56	-0.56	-0.51	-0.49	-0.45	-0.34	-0.08	-0.08
FINISHED SURFACE LEVEL	57.580	57.356	57.106	57.086	56.981	56.891	56.859	56.691	56.690	56.490	56.290	56.188	56.090	55.890	55.889
EXISTING SURFACE LEVEL	57.45	56.99	56.46	56.49	57.72	57.60	57.54	57.25	57.25	57.00	56.78	56.64	56.43	55.97	55.97
CONTROL LINE CHAINAGE	0.000	7.487	20.000	22.487	40.000	54.969	60.000	79.969	80.000	100.000	120.000	130.281	140.000	160.000	160.139

DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve)	-0.26	-0.18	-0.20	-0.16	-0.15	-0.21	-0.23	-0.32	-0.46	-0.49	-0.53	-0.55	-0.44	-0.38	-0.35	0.02
FINISHED SURFACE LEVEL	55.690	55.490	55.290	55.090	55.076	54.914	54.890	54.611	54.472	54.389	54.230	54.029	53.995	54.070	54.108	54.299
EXISTING SURFACE LEVEL	55.95	55.67	55.49	55.25	55.22	55.12	55.12	54.94	54.94	54.88	54.76	54.58	54.44	54.45	54.46	54.28
CONTROL LINE CHAINAGE	180.000	200.000	220.000	240.000	241.488	257.606	260.000	280.000	287.606	291.815	300.000	310.277	320.000	323.904	325.277	331.662

HORIZONTAL GEOMETRY

ROAD 5 LONGITUDINAL SECTION

VERTICAL SCALE 1 0 1 2 3 4 5 1:100 (metres)
HORIZONTAL SCALE 10 0 10 20 30 40 50 1:1000 (metres)
(FULL SIZE)

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL
FERNVALE RD,
LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

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BURCHILLS
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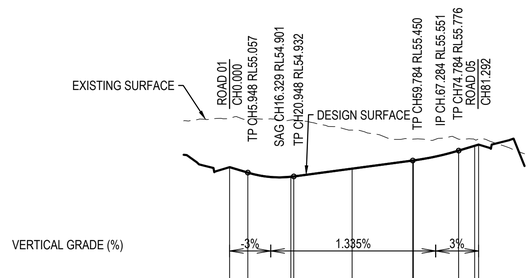
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
ROADS 4 & 5 LONGITUDINAL SECTIONS

DEVEL. APPLIC. No. : -
DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL
DESIGNER : TG
DRAFTSPERSON : CD
CHECKED : FRASER LUCAS
APPROVED FOR AND ON BEHALF OF
BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. :
SCALE : AS NOTED
DATUM : AHD
FULL SIZE : A1
PROJECT No.: BE230128-01
DRAWING No. : SK311
VERSION: B

PLOTTED: 25.04.2024 at 16:29
FILENAME: C:\Users\Tu Ngoc Nguyen\QT Vietnam Ltd Co\BCH23 - Documents\BCH23007 BE230128 2983 Forest Hill Fernvale Rd\03. Civil\01. DA\Rev A\02. Acad\02. Stage 1 DA\SK310.dwg



VERTICAL GRADE (%)		-3%		1.385%				3%						
VERTICAL CURVE LENGTH (m)		15mVC						15mVC						
VERTICAL CURVE RADIUS (m)		R = 346.02						R = 900.88						
DATUM RL 49.0														
DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve)	-1.59	-1.75	-1.85	-1.85	-1.26	-0.70	-0.70	-0.37	-0.20	-0.18				
FINISHED SURFACE LEVEL	55.235	55.057	54.921	54.932	55.186	55.450	55.453	55.776	55.932	55.971				
EXISTING SURFACE LEVEL	56.82	56.81	56.77	56.79	56.44	56.15	56.15	56.15	56.14	56.15				
CONTROL LINE CHAINAGE	0.000	5.948	20.000	20.948	40.000	59.784	60.000	74.784	80.000	81.292				

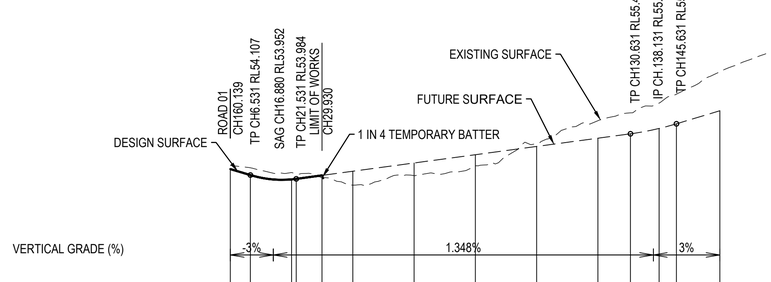
HORIZONTAL GEOMETRY

ROAD 6 LONGITUDINAL SECTION

VERTICAL SCALE 1 0 1 2 3 4 5 1:100 (metres)

HORIZONTAL SCALE 10 0 10 20 30 40 50 1:1000 (metres)

(FULL SIZE)



VERTICAL GRADE (%)		-3%			1.348%							3%		
VERTICAL CURVE LENGTH (m)		15mVC										15mVC		
VERTICAL CURVE RADIUS (m)		R = 344.96										R = 908.14		
DATUM RL 48.0														
DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve)	-0.12	-0.24	-0.22	-0.17	0.09	0.45	0.41	0.37	-0.10	-0.57	-0.68	-0.83	-0.97	-1.27
FINISHED SURFACE LEVEL	54.303	54.107	53.966	53.984	54.097	54.233	54.502	54.772	55.042	55.311	55.455	55.629	55.781	56.207
EXISTING SURFACE LEVEL	54.42	54.34	54.19	54.15	54.01	53.78	54.09	54.40	55.14	55.88	56.14	56.46	56.75	57.48
CONTROL LINE CHAINAGE	0.000	6.531	20.000	21.531	29.930	40.000	60.000	80.000	100.000	120.000	130.631	140.000	145.631	159.830

HORIZONTAL GEOMETRY

HORIZONTAL GEOMETRY

ROAD 7 LONGITUDINAL SECTION

VERTICAL SCALE 1 0 1 2 3 4 5 1:100 (metres)

HORIZONTAL SCALE 10 0 10 20 30 40 50 1:1000 (metres)

(FULL SIZE)

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

BURCHILLS ENGINEERING SOLUTIONS
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Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

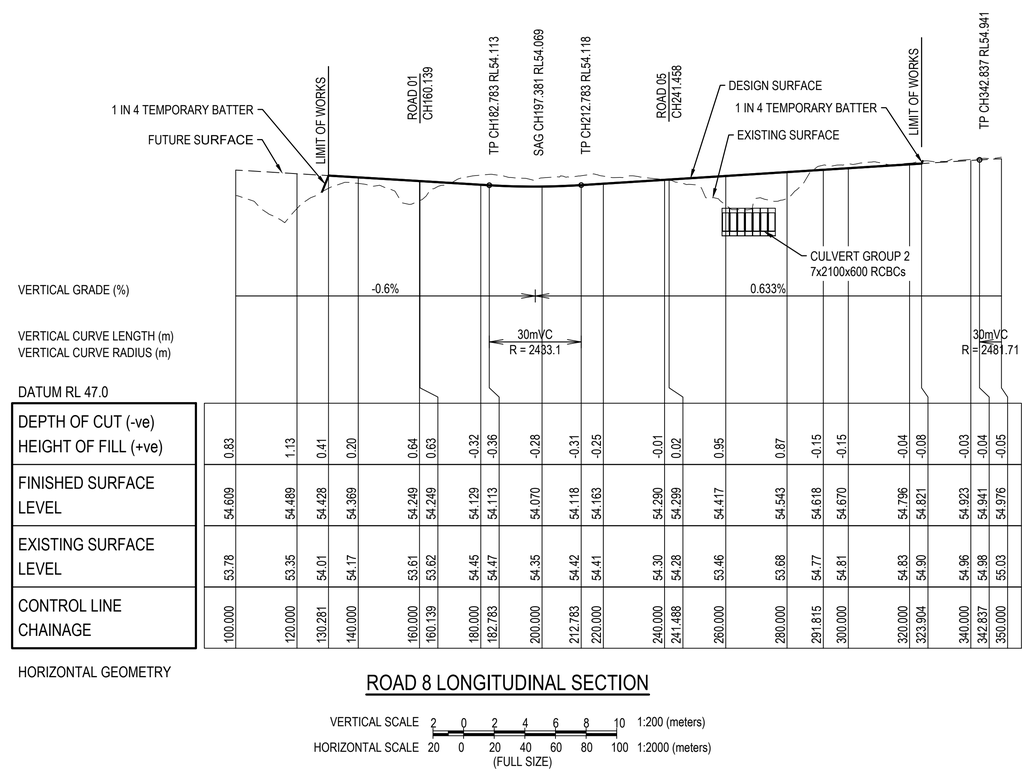
PROJECT:

CONCEPT CIVIL ENGINEERING

DRAWING TITLE :

ROADS 6 & 7 LONGITUDINAL SECTIONS

DEVEL. APPLIC. No. : -	DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL	
DESIGNER : TG	
DRAFTSPERSON : CD	
CHECKED : FRASER LUCAS	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	
RPEQ No. :	
SCALE : AS NOTED	DATUM : AHD / FULL SIZE : A1
PROJECT No.: BE230128-01	DRAWING No. : SK312 / VERSION: B



DEPTH OF CUT (-ve) HEIGHT OF FILL (+ve)	0.83	1.13	0.41	0.20	0.64	0.63	-0.32	-0.36	-0.28	-0.31	-0.25	-0.01	0.02	0.95	0.87	-0.15	-0.15	-0.04	-0.08	-0.03	-0.04	-0.05
FINISHED SURFACE LEVEL	54.609	54.489	54.428	54.369	54.249	54.249	54.129	54.113	54.070	54.118	54.163	54.290	54.299	54.417	54.543	54.618	54.670	54.796	54.821	54.923	54.941	54.976
EXISTING SURFACE LEVEL	53.78	53.35	54.01	54.17	53.61	53.62	54.45	54.47	54.35	54.42	54.41	54.30	54.28	53.46	53.68	54.77	54.81	54.83	54.90	54.96	54.98	55.03
CONTROL LINE CHAINAGE	100.000	120.000	130.281	140.000	160.000	160.139	180.000	182.783	200.000	212.783	220.000	240.000	241.488	260.000	280.000	291.815	300.000	320.000	323.904	340.000	342.837	350.000

HORIZONTAL GEOMETRY

ROAD 8 LONGITUDINAL SECTION

VERTICAL SCALE 2 0 2 4 6 8 10 1:200 (meters)
HORIZONTAL SCALE 20 0 20 40 60 80 100 1:2000 (meters)
(FULL SIZE)

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL
FERNVALE RD,
LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

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BURCHILLS
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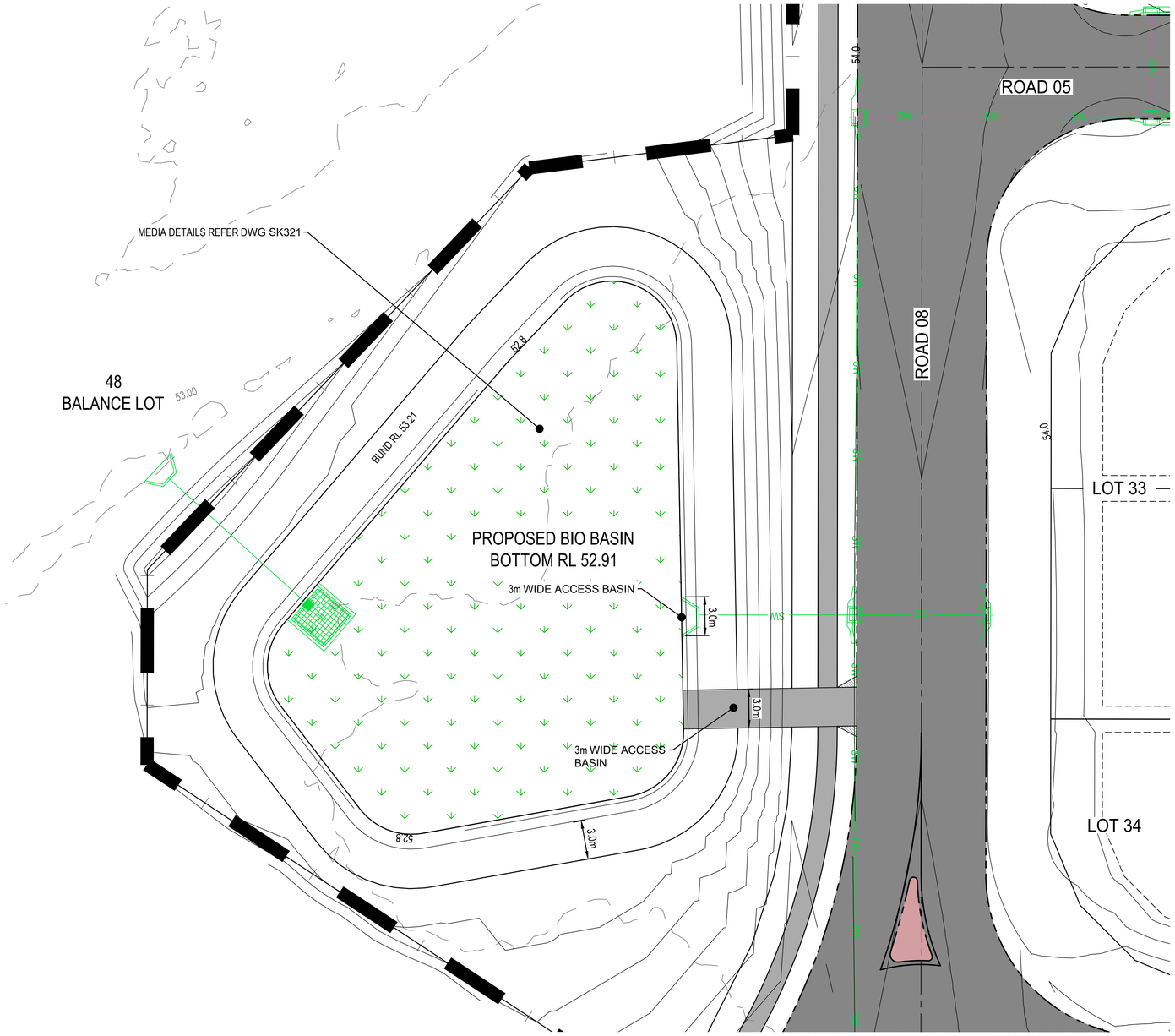
Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
ROAD 8 LONGITUDINAL SECTIONS

DEVEL. APPLIC. No. : - DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL
DESIGNER : TG
DRAFTSPERSON : CD
CHECKED : FRASER LUCAS
APPROVED FOR AND ON BEHALF OF
BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. :
SCALE : AS NOTED DATUM : AHD FULL SIZE : A1
PROJECT No.: BE230128-01 DRAWING No. : SK313 VERSION: B

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER



BIO-RETENTION BASIN DETAIL PLAN

SCALE 2 0 2 4 6 8 10 (metres)

1 : 200 (FULL SIZE)

LEGEND

- DEVELOPMENT SITE BOUNDARY
- 90.0 — EXISTING CONTOUR LIDAR
- SW — EXISTING STORMWATER
- EXISTING EASEMENT
- 90.0 — DESIGN SURFACE CONTOUR
- DESIGNPROPOSED LOT BOUNDARY
- PROPOSED LOW-FLOW CHANNEL
- PROPOSED ROAD CENTRELINE
- PROPOSED HEADWALL
- SW — PROPOSED STORMWATER PIPE
- PROPOSED FOOTPATH
- PROPOSED ASPHALT PAVETMENT

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL
FERNVALE RD, LOWOOD
QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

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BURCHILLS ENGINEERING SOLUTIONS
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Phone: +61 7 5509 6400
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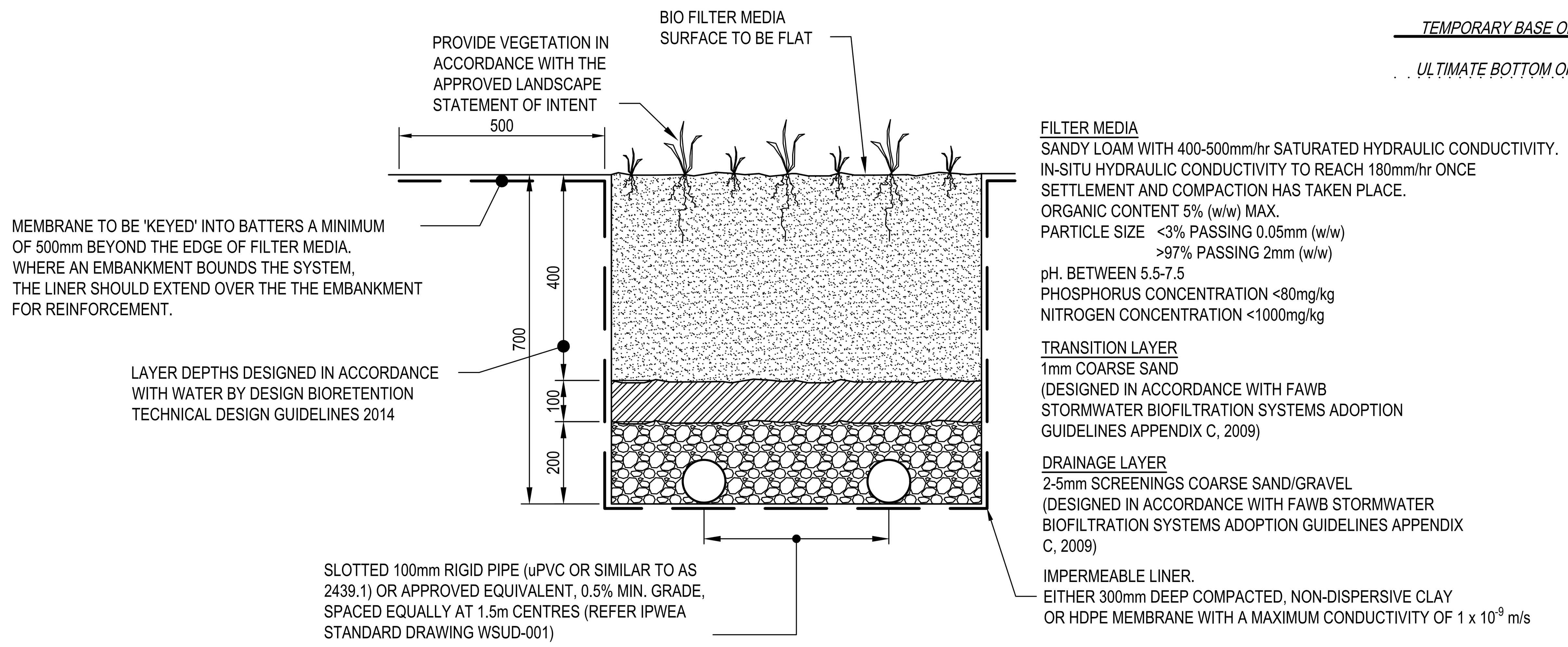
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
CONCEPT CIVIL ENGINEERING

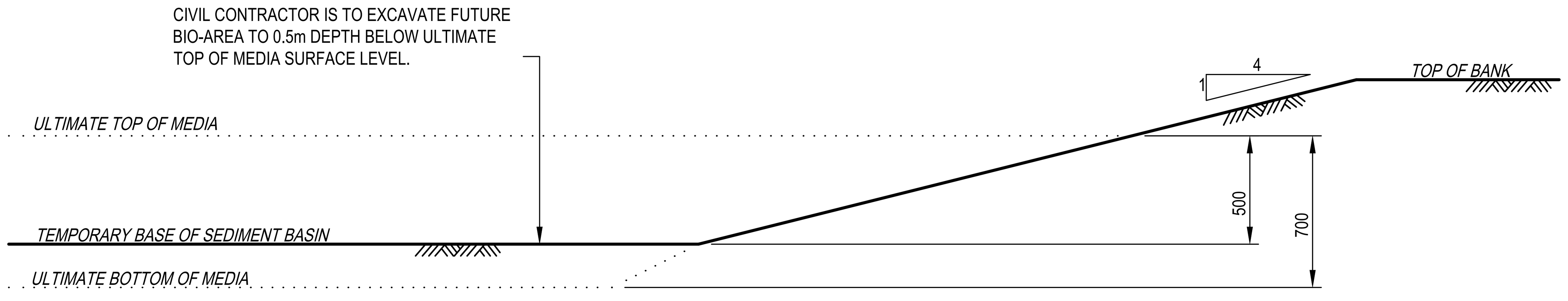
DRAWING TITLE :
BIO-RETENTION BASIN
DETAIL PLAN

DEVEL. APPLIC. No. : -		DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL		
DESIGNER : TG		
DRAFTSPERSON : CD		
CHECKED : FRASER LUCAS		
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365 RPEQ No. :		
SCALE : AS NOTED	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE230128-01	DRAWING No. : SK320	VERSION: B



TYPICAL BIO-RETENTION MEDIA CROSS SECTION

SCALE 0.1 0 0.1 0.2 0.3 0.4 0.5 (metres)
1 : 10 (FULL SIZE)



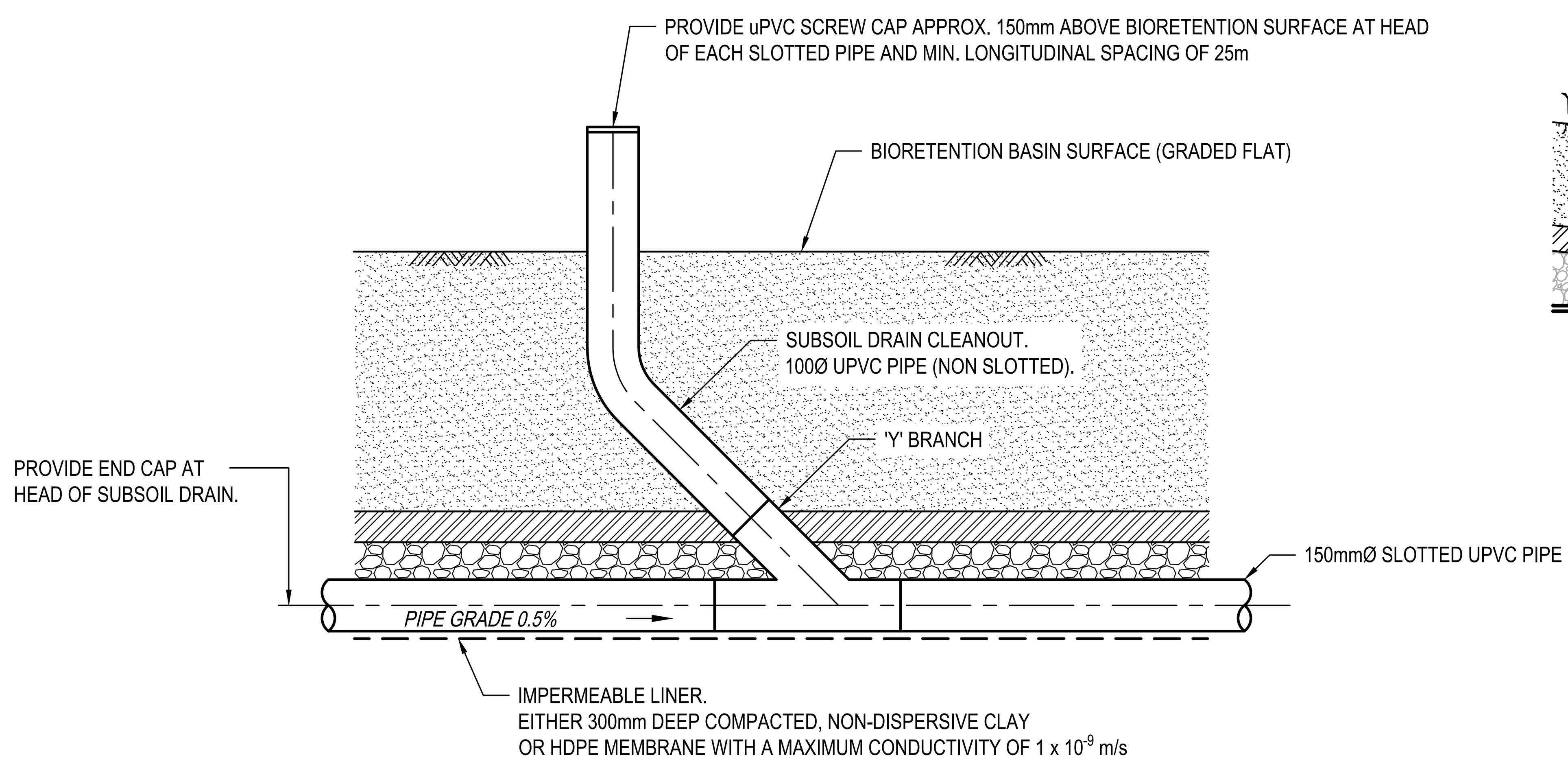
CONSTRUCTION PHASE 1 - CIVIL CONSTRUCTION PHASE

(TEMPORARY SEDIMENT CONTROL BASIN)

SCALE 0.2 0 0.2 0.4 0.6 0.8 1.0 (metres)
1 : 20 (FULL SIZE)

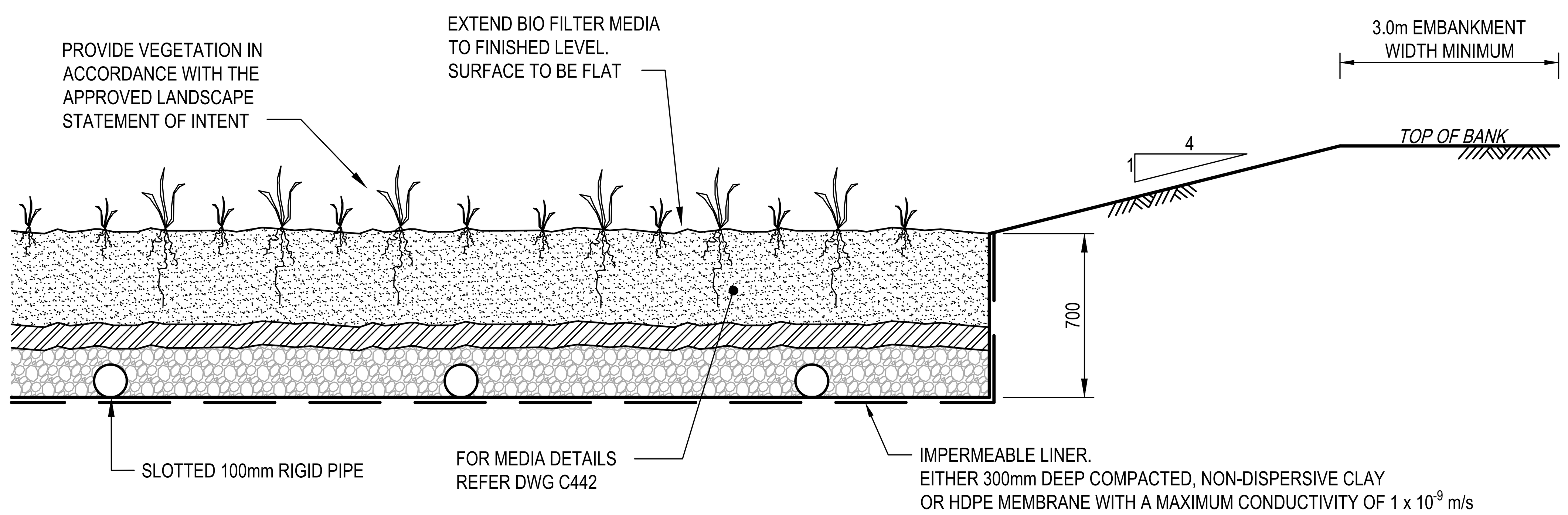
PHASE 1 NOTES - CIVIL CONSTRUCTION PHASE

- EXCAVATE BASIN TO NOMINAL 500mm DEPTH BELOW ULTIMATE TOP OF MEDIA LEVEL.
- SHAPE TEMPORARY SEDIMENT BASIN TO GENERAL EXTENTS OF ULTIMATE BASIN AND TO BASE LEVEL AS SHOWN ADJACENT AND ENSURE MINIMUM TOTAL SETTLING AND STORAGE VOLUME.
- CONTRACTOR TO MAINTAIN SEDIMENT BASIN AND PUMP-OUT AFTER RAINFALL EVENTS, INCLUDING MANUAL FLOCCULATION.



TYPICAL BIO-RETENTION BASIN SUBSOIL DRAIN CLEANOUT

NTS



CONSTRUCTION PHASE 2 - OPERATIONAL PHASE

(ULTIMATE BIO-RETENTION BASIN)

SCALE 0.2 0 0.2 0.4 0.6 0.8 1.0 (metres)
1 : 20 (FULL SIZE)

PHASE 2 NOTES - OPERATIONAL PHASE

- UPON COMPLETION OF 80-90% OF BUILDING WORKS IN THE CONTRIBUTING CATCHMENT AREA, REMOVE THE PROTECTIVE LAYERS (TURFING, TOPSOIL AND GEOTEXTILE).
- EXTEND BIO FILTER MEDIA TO ULTIMATE SURFACE LEVEL.
- ESTABLISH VEGETATION IN THE BIO-RETENTION BASIN IN ACCORDANCE WITH LANDSCAPE ARCHITECTS SPECIFICATION.

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

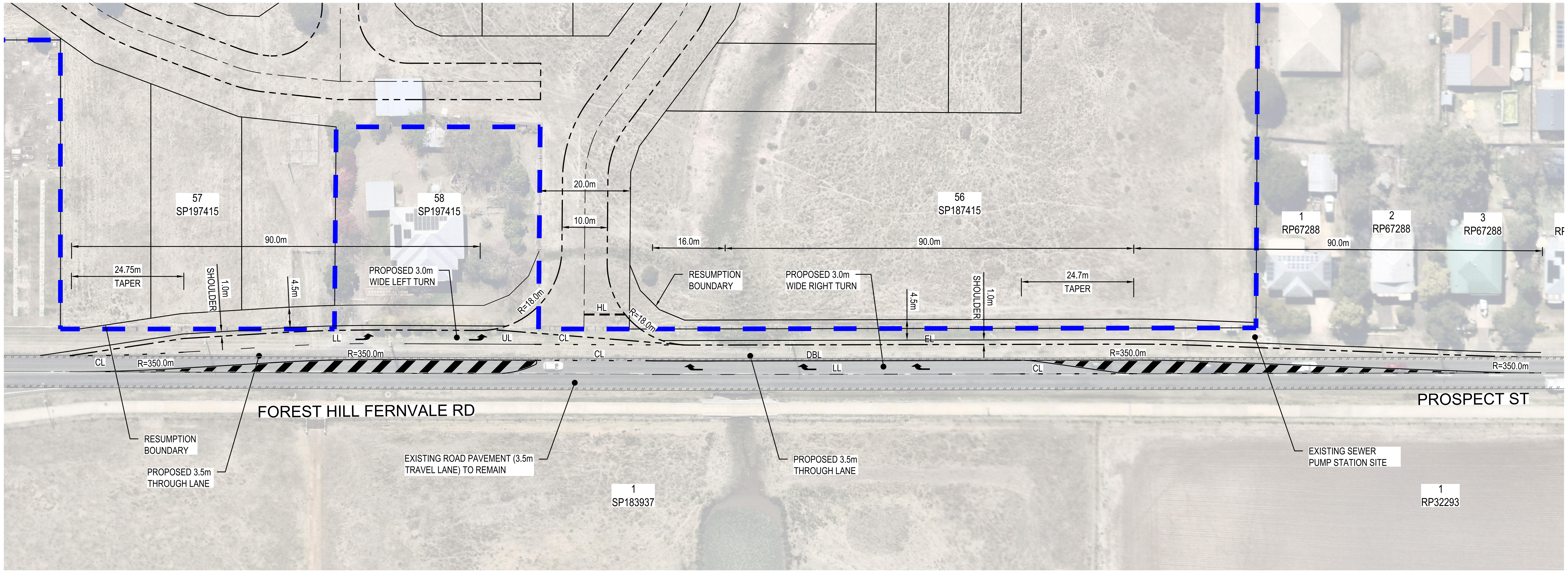
VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
BIO-RETENTION BASIN DETAILS

DEVEL. APPLIC. No. : - DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL
DESIGNER : TG
DRAFTSPERSON : CD
CHECKED : FRASER LUCAS
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. :
SCALE : AS NOTED DATUM : AHD FULL SIZE : A1
PROJECT No.: BE230128-01 DRAWING No. : SK321 VERSION: B



INTERSECTION FUNCTION LAYOUT PLAN

SCALE 5 0 5 10 15 20 25 (metres)
1 : 500 (FULL SIZE)

LEGEND

- DEVELOPMENT SITE BOUNDARY
- PROPOSED LOT BOUNDARY
- PROPOSED ROAD CONTROL LINE
- W — EXISTING Ø150 WATER MAIN
- RM — EXISTING SEWER RISING MAIN
- S — EXISTING SEWER MAIN
- C — EXISTING COMMS
- OH — EXISTING OVERHEAD ELECTRIC
- > — EXISTING FLOWPATH / WATERWAY

FILENAME: C:\Users\Tu Ngoc Nguyen\QT Vietnam Ltd Co\BCH23 - Documents\BCH23007 BE230128 2983 Forest Hill Fernvale Rd\03. Civil\01. DA\Rev A\02. Acad\02. Stage 1 DA\SK350.dwg

PLOTTED: 25.04.2024 at 16:30

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR
LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

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Verify dimensions prior to commencing any on-site or off-site works or fabrication.

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
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Phone: +61 7 5509 6400
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Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

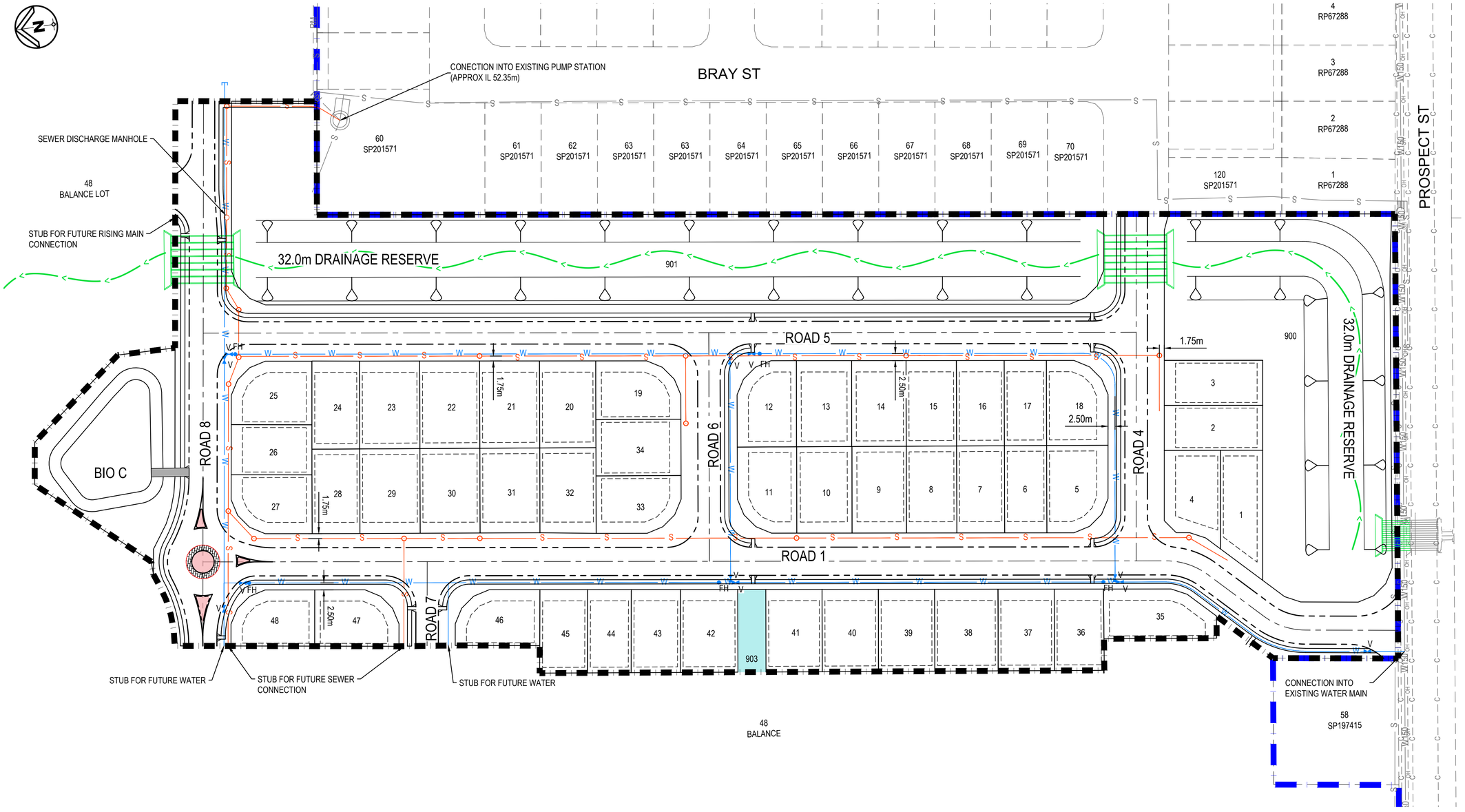
PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
INTERSECTION FUNCTION LAYOUT PLAN

DEVEL. APPLIC. No. : - DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL
DESIGNER : TG
DRAFTSPERSON : CD
CHECKED : FRASER LUCAS
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ No. :

SCALE : AS NOTED | DATUM : AHD | FULL SIZE : A1
PROJECT No.: BE230128-01 | DRAWING No. : SK350 | VERSION: B

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER



CONCEPT WATER AND SEWER LAYOUT PLAN

SCALE 10 0 5 10 15 20 25 30 35 (metres)
1 : 750 (FULL SIZE)

LEGEND

- STAGE BOUNDARY
- W — EXISTING Ø150 WATER MAIN
- RM — EXISTING SEWER RISING MAIN
- S — EXISTING SEWER MAIN
- W — PROPOSED WATER MAIN
- FH V — PROPOSED HYDRANT / VALVE
- S — PROPOSED SEWER MAIN
- RM — PROPOSED SEWER RISING MAIN
- PROPOSED PUMP STATION

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

PROPOSED LAND DEVELOPMENT

2983 FOREST HILL FERNVALE RD, LOWOOD QLD 4311

FOR LOWOOD ONE PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
B	COUNCILL RFI UPDATES	24.04.24
A	PRELIMINARY CIVIL ENGINEERING DESIGN	08.12.23

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

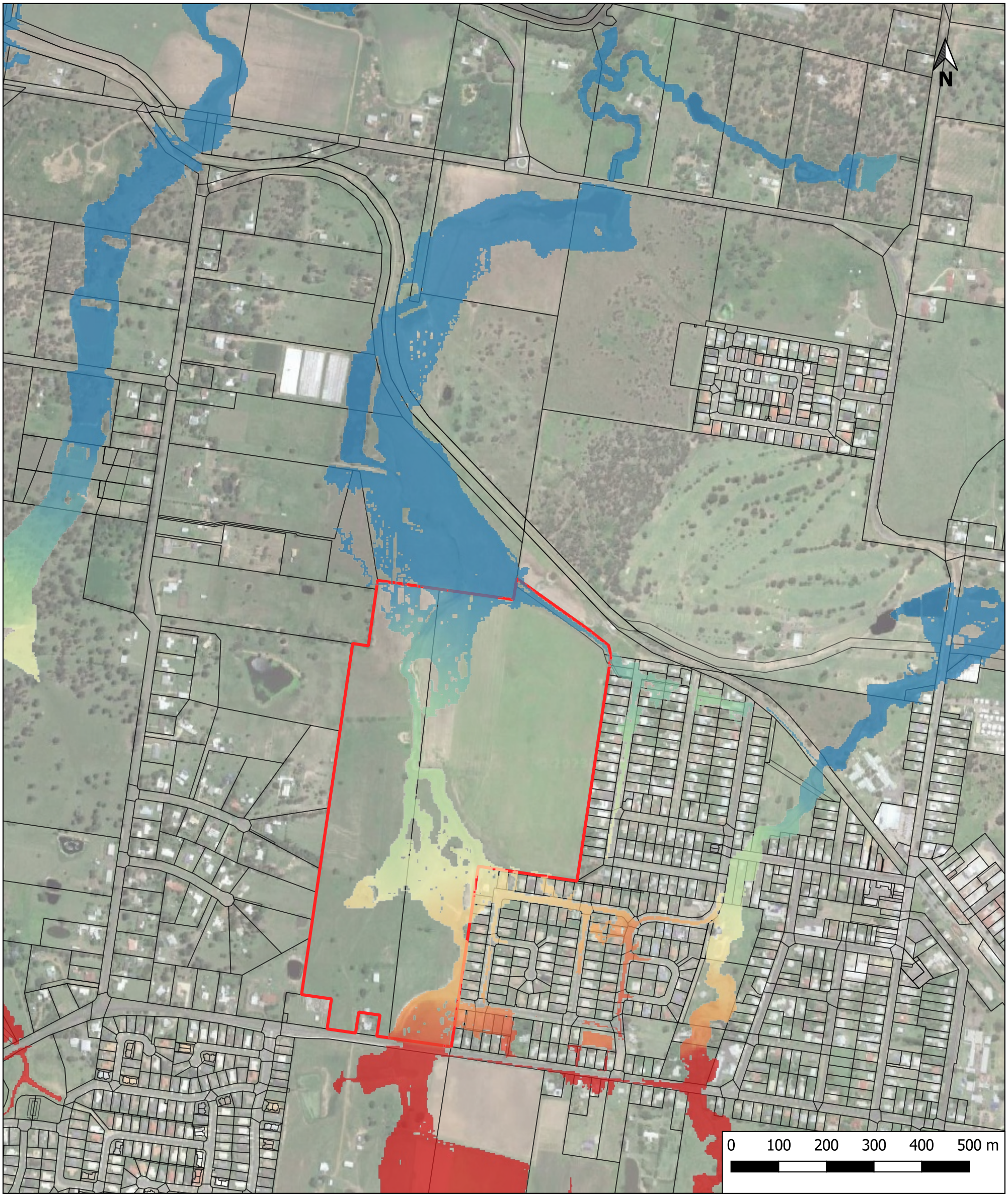
PROJECT:
CONCEPT CIVIL ENGINEERING

DRAWING TITLE :
CONCEPT WATER AND SEWER LAYOUT PLAN

DEVEL. APPLIC. No. : -	DATE : 24.04.24
PROJECT LEADER : JONATHAN CUELL	
DESIGNER : TG	
DRAFTSPERSON : CD	
CHECKED : FRASER LUCAS	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	
RPEQ No. :	
SCALE : AS NOTED	DATUM : AHD / FULL SIZE : A1
PROJECT No.: BE230128-01	DRAWING No. : SK500 / VERSION: B

PLOTTED: 25.04.2024 at 16:30
FILENAME: C:\Users\Tu.Nguyen\OT Vietnam Ltd Co\BCH23 - Documents\BCH23000 BE230128 2983 Forest Hill Fernvale Rd\03 Civil\01 DWRev A\02 Acad\SK500.dwg

Appendix C – Flood Modelling Results



2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

1% AEP Peak Flood Level

PRE DEVELOPMENT

Project: BE230128	Date: 28/11/2023
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Cadastral
- Site Boundary

Flood Level (mAHD)

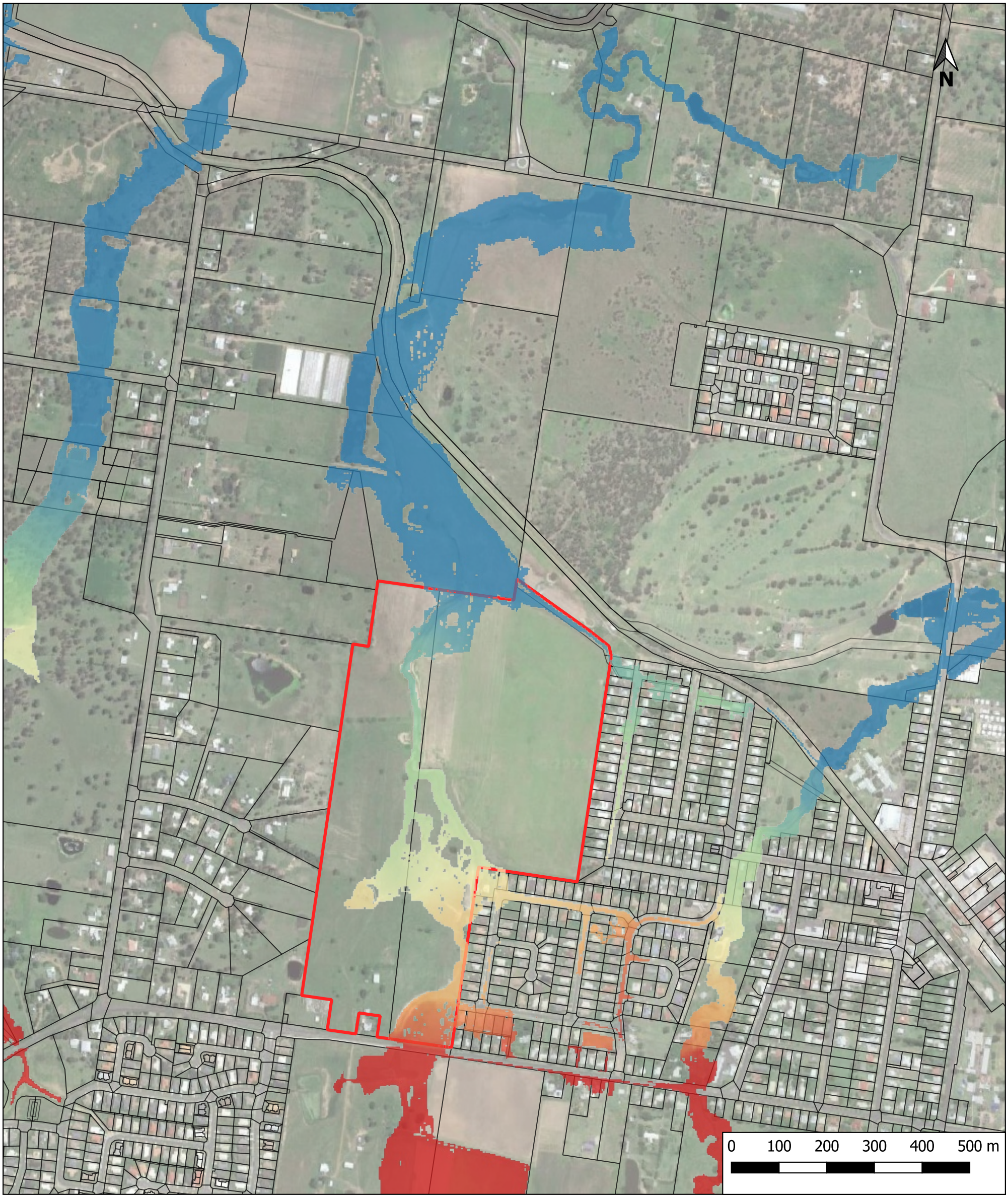
60

50

BURCHILLS ENGINEERING SOLUTIONS

FOR

Europagroup



2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

2% AEP Peak Flood Level

PRE DEVELOPMENT

Project: BE230128	Date: 28/11/2023
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Cadastral
- Site Boundary

Flood Level (mAHD)

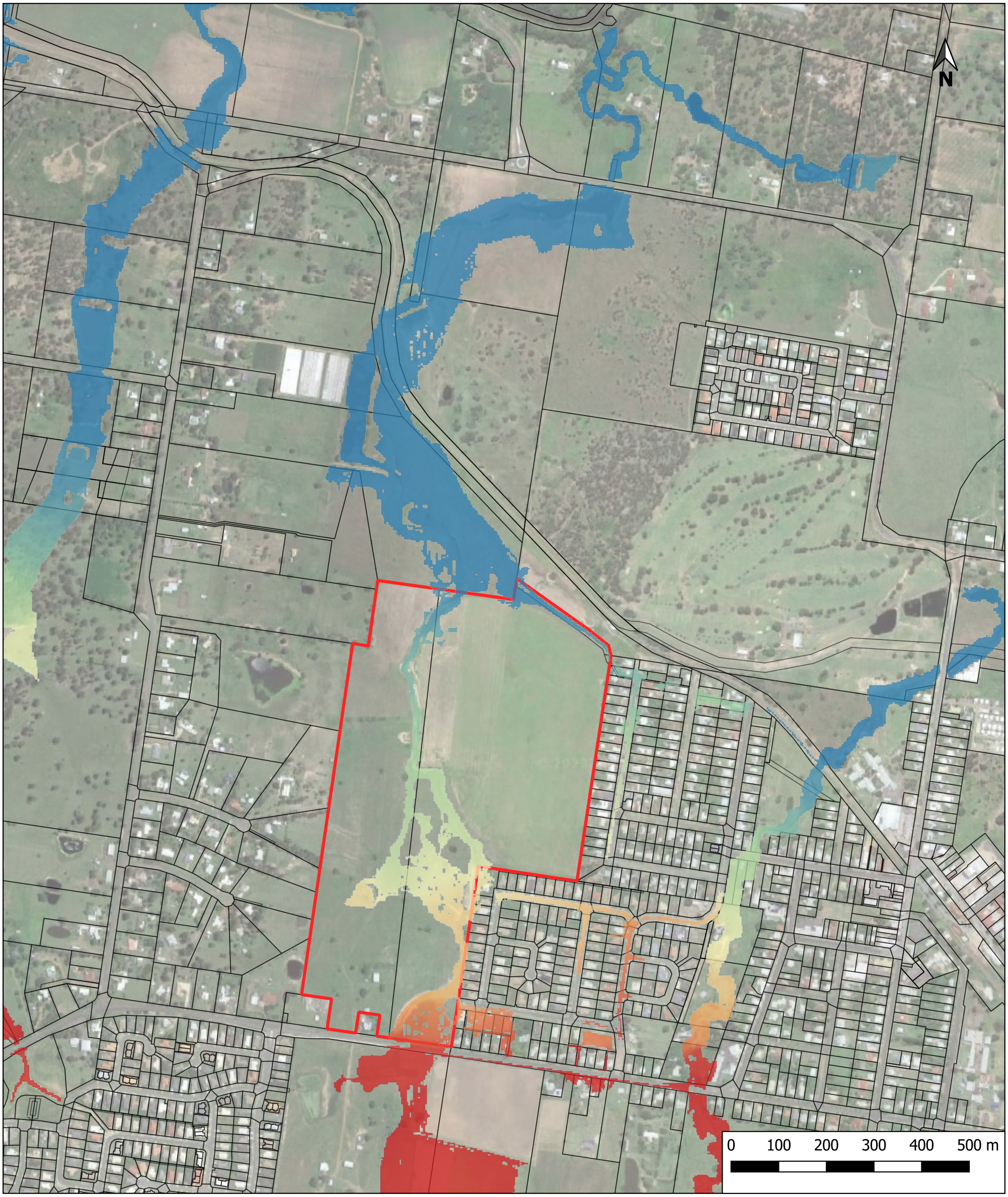
60

50

BURCHILLS ENGINEERING SOLUTIONS

FOR

Europagroup



2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

5% AEP Peak Flood Level

PRE DEVELOPMENT

Project: BE230128	Date: 28/11/2023
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

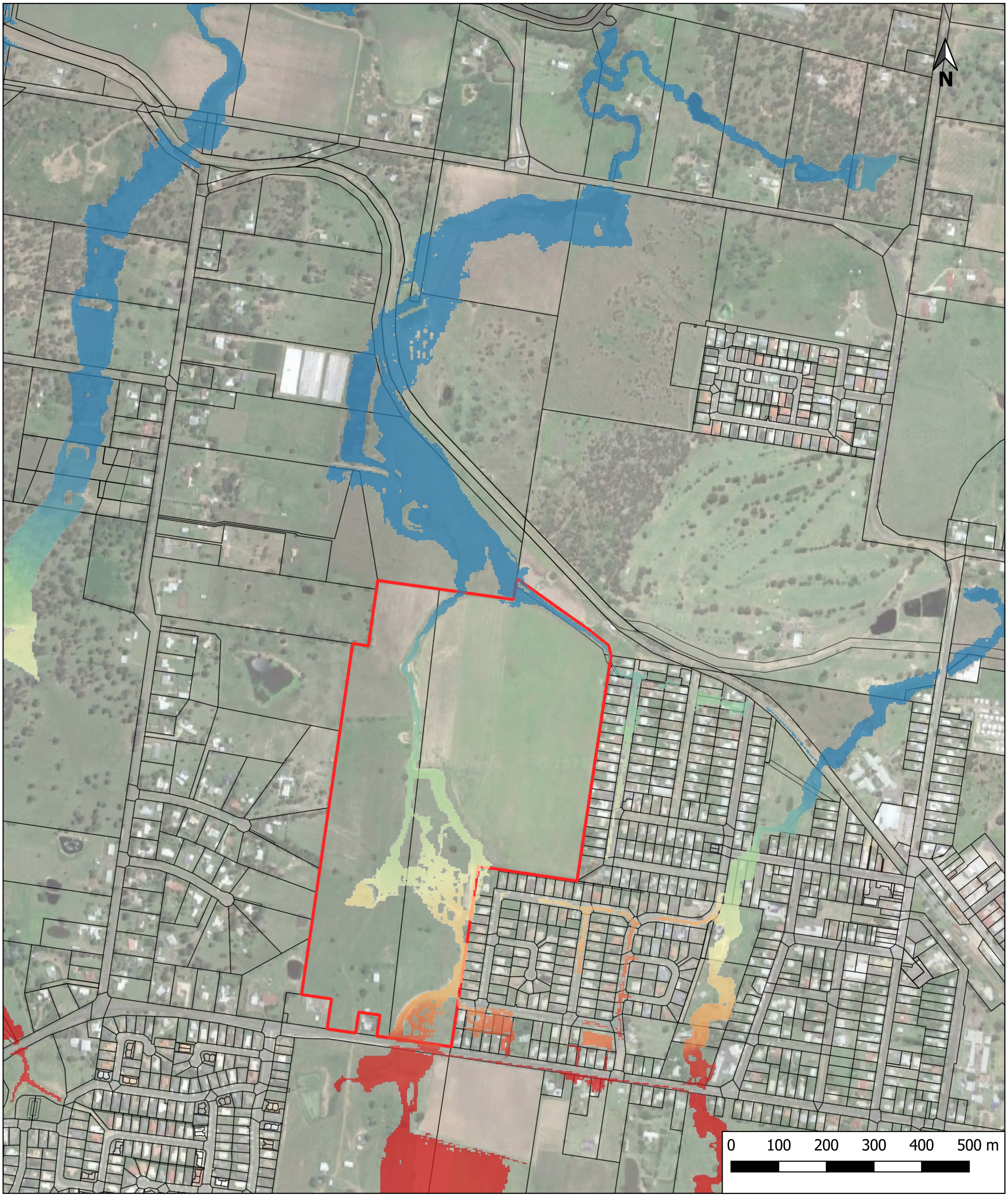
Legend

- Cadastral
- Site Boundary
- Flood Level (mAHD): 60 – 50

BURCHILLS ENGINEERING SOLUTIONS

FOR

Europagroup



2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

10% AEP Peak Flood Level

PRE DEVELOPMENT

Project: BE230128	Date: 28/11/2023
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

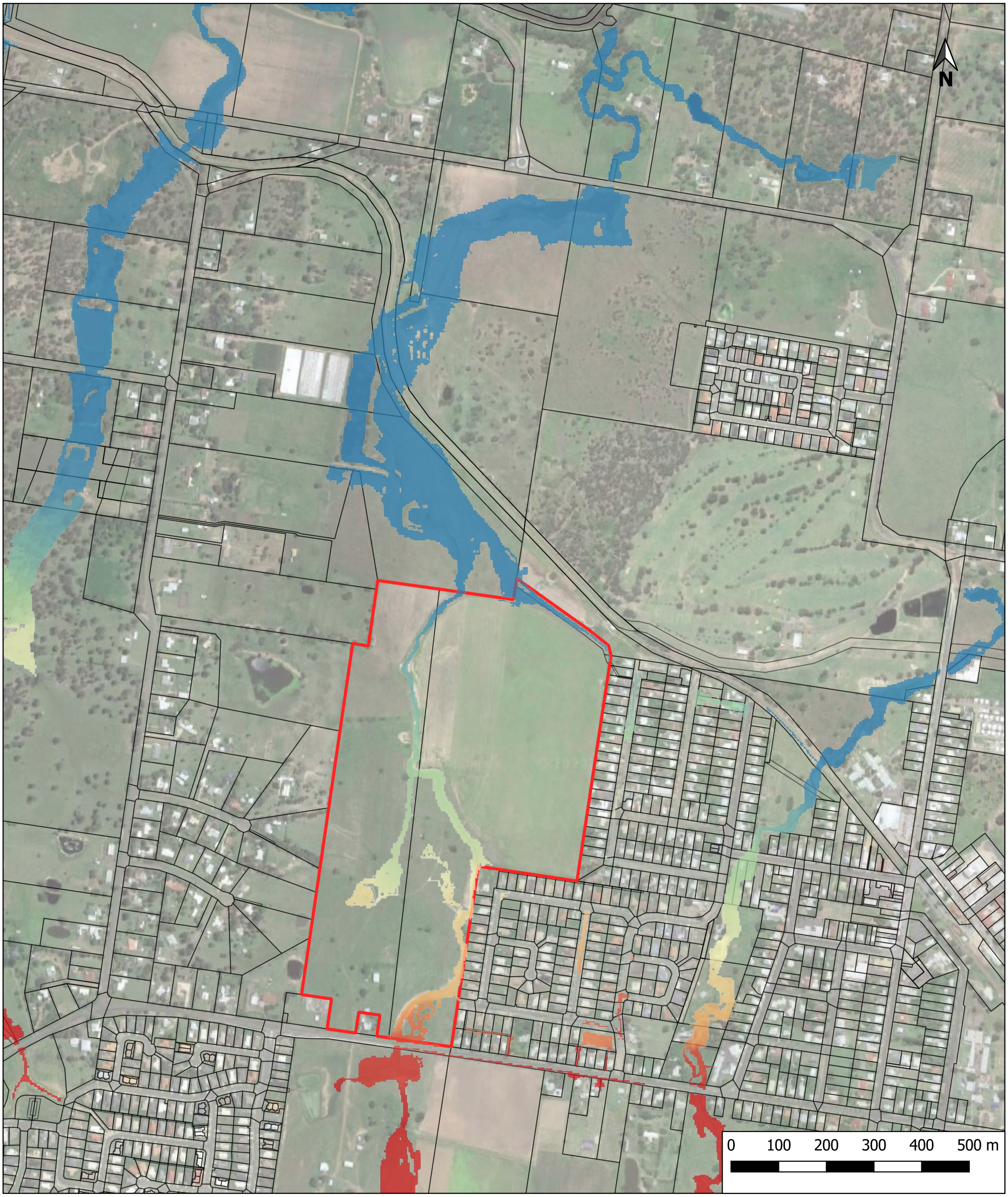
Legend

- Cadastral
- Site Boundary
- Flood Level (mAHD): 60 – 50

BURCHILLS ENGINEERING SOLUTIONS

FOR

Europagroup



2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

18% AEP Peak Flood Level

PRE DEVELOPMENT

Project: BE230128	Date: 28/11/2023
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Cadastral
- Site Boundary
- Flood Level (mAHD): 60 – 50

BURCHILLS ENGINEERING SOLUTIONS

FOR

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2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

39% AEP Peak Flood Level

PRE DEVELOPMENT

Project: BE230128	Date: 28/11/2023
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

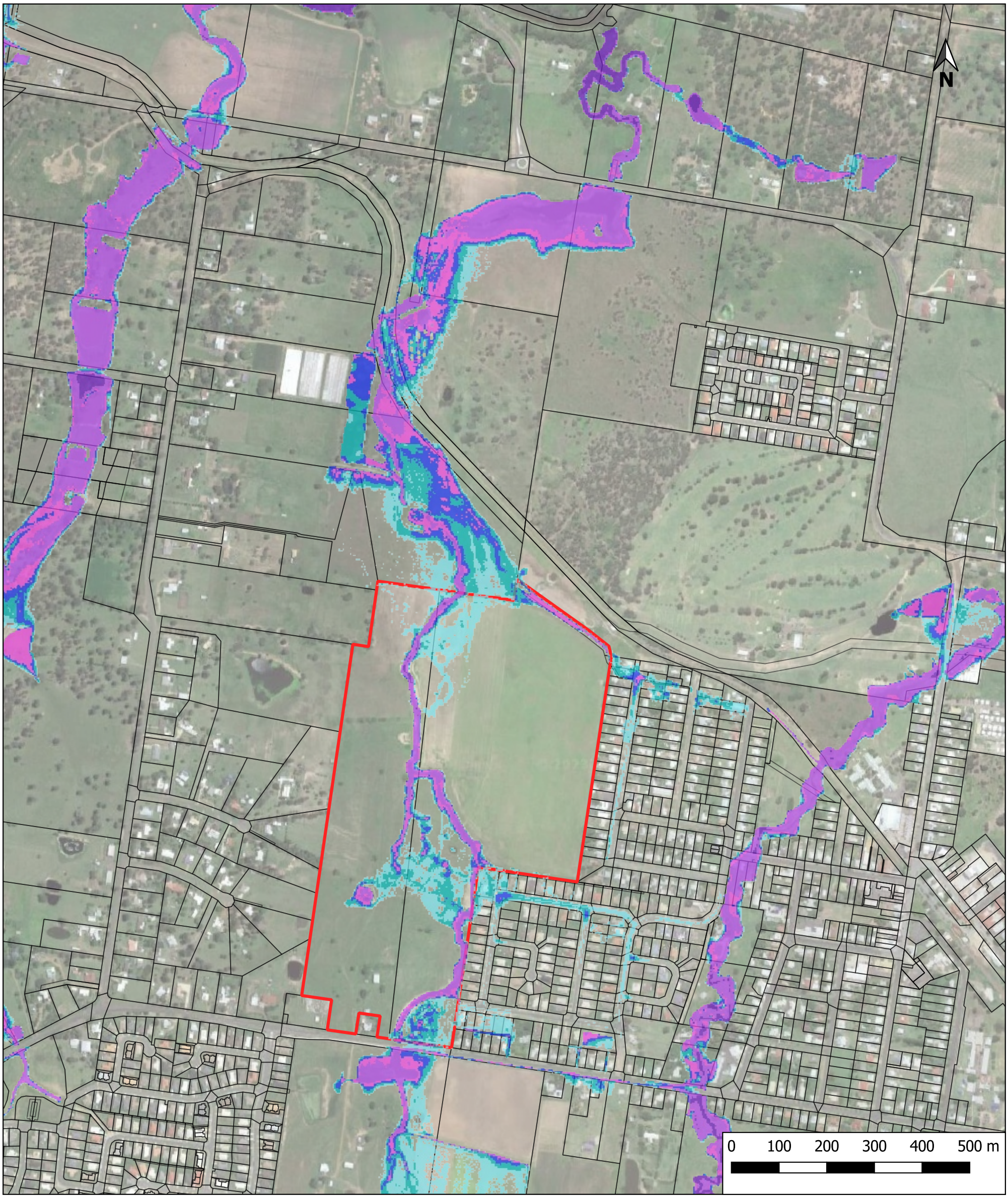
Legend

- Cadastral
- Site Boundary
- Flood Level (mAHD): 60 – 50

BURCHILLS ENGINEERING SOLUTIONS

FOR

Europagroup



2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

1% AEP Peak Flood Depth

PRE DEVELOPMENT

Project: BE230128	Date: 28/11/2023
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Cadastral
- Site Boundary

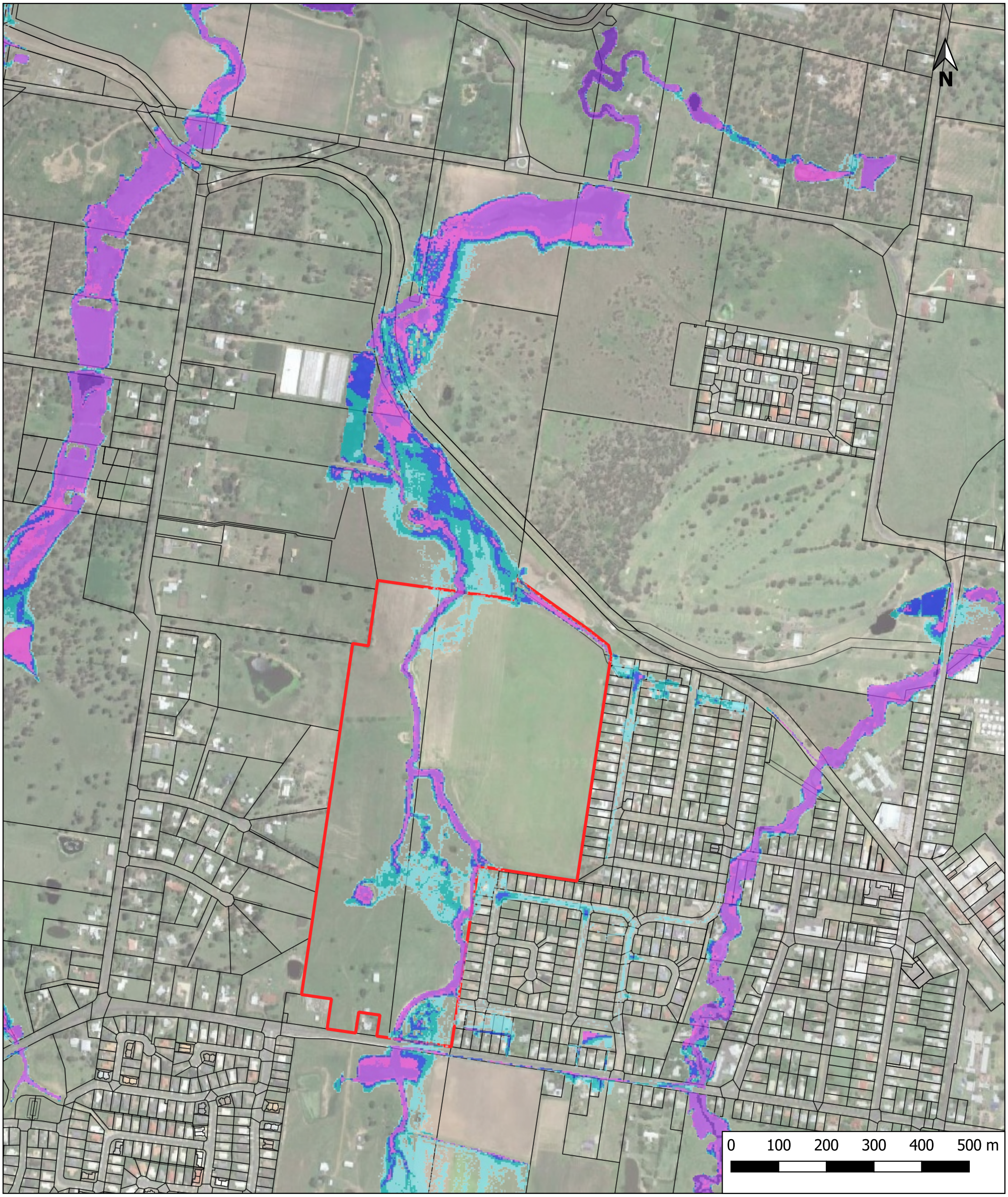
Flood Depth (m)

- <= 0.02
- 0.02 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.50
- > 1.50

BURCHILLS ENGINEERING SOLUTIONS

FOR

Europagroup



2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

2% AEP Peak Flood Depth

PRE DEVELOPMENT

Project: BE230128	Date: 28/11/2023
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Cadastral
- Site Boundary

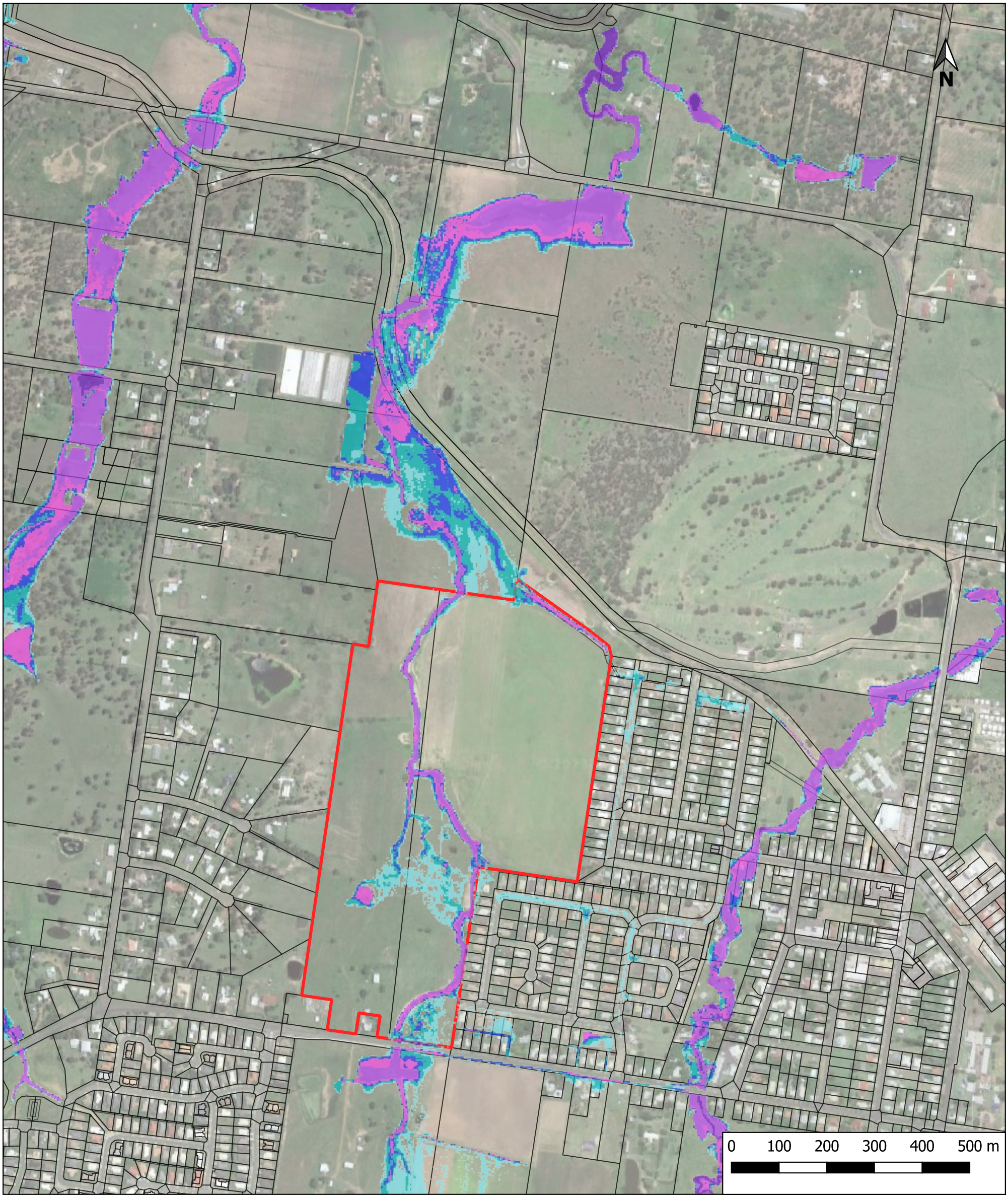
Flood Depth (m)

- <= 0.02
- 0.02 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.50
- > 1.50

BURCHILLS ENGINEERING SOLUTIONS

FOR

Europagroup



2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

5% AEP Peak Flood Depth

PRE DEVELOPMENT

Project: BE230128	Date: 28/11/2023
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Cadastral
- Site Boundary

Flood Depth (m)

- <= 0.02
- 0.02 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.50
- > 1.50

BURCHILLS ENGINEERING SOLUTIONS

FOR

Europagroup

N

0 100 200 300 400 500 m

2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

10% AEP Peak Flood Depth

PRE DEVELOPMENT

Project: BE230128	Date: 28/11/2023
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Cadastral
- Site Boundary

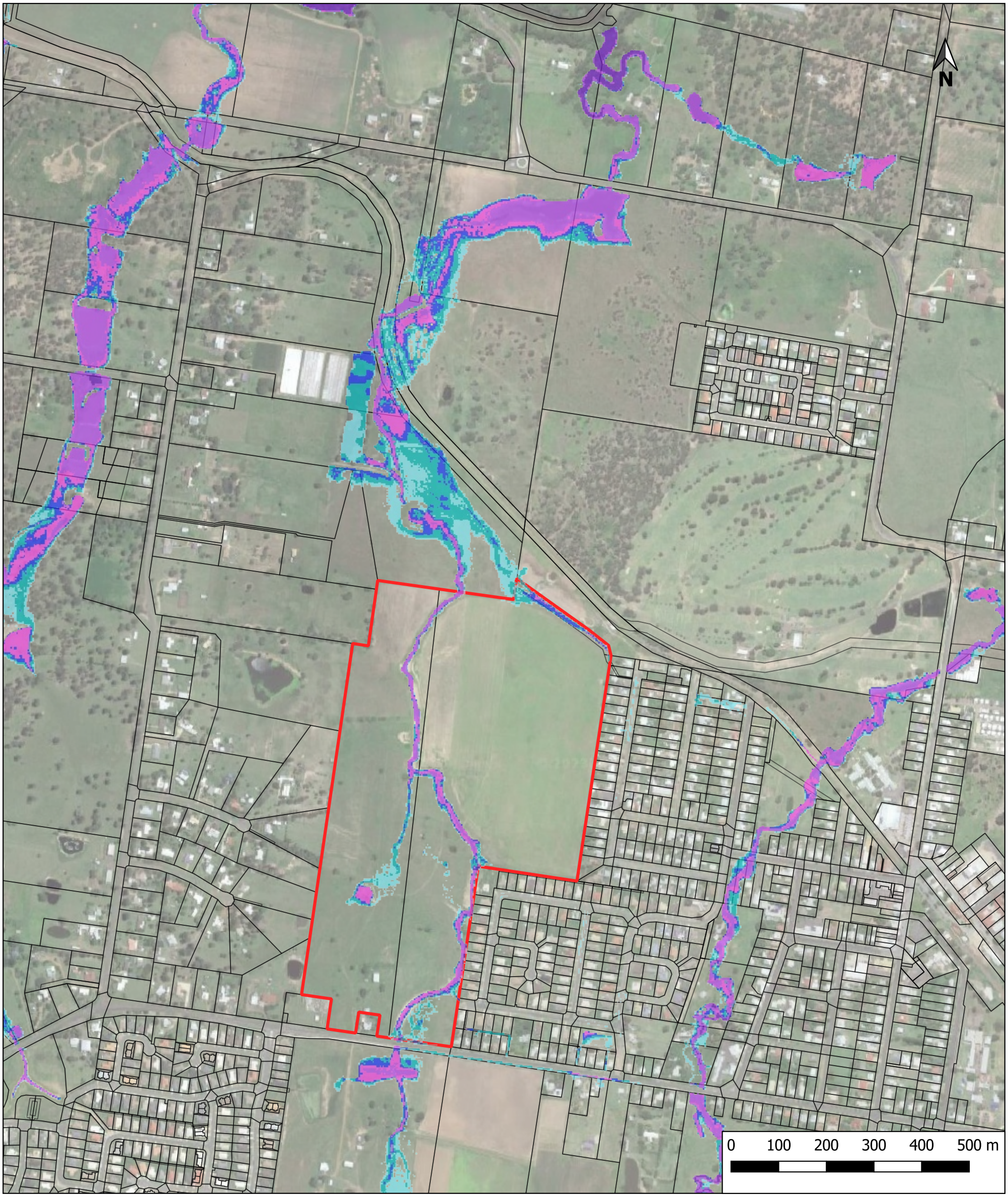
Flood Depth (m)

- <= 0.02
- 0.02 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.50
- > 1.50

BURCHILLS ENGINEERING SOLUTIONS

FOR

Europagroup



2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

18% AEP Peak Flood Depth

PRE DEVELOPMENT

Project: BE230128	Date: 28/11/2023
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Cadastral
- Site Boundary

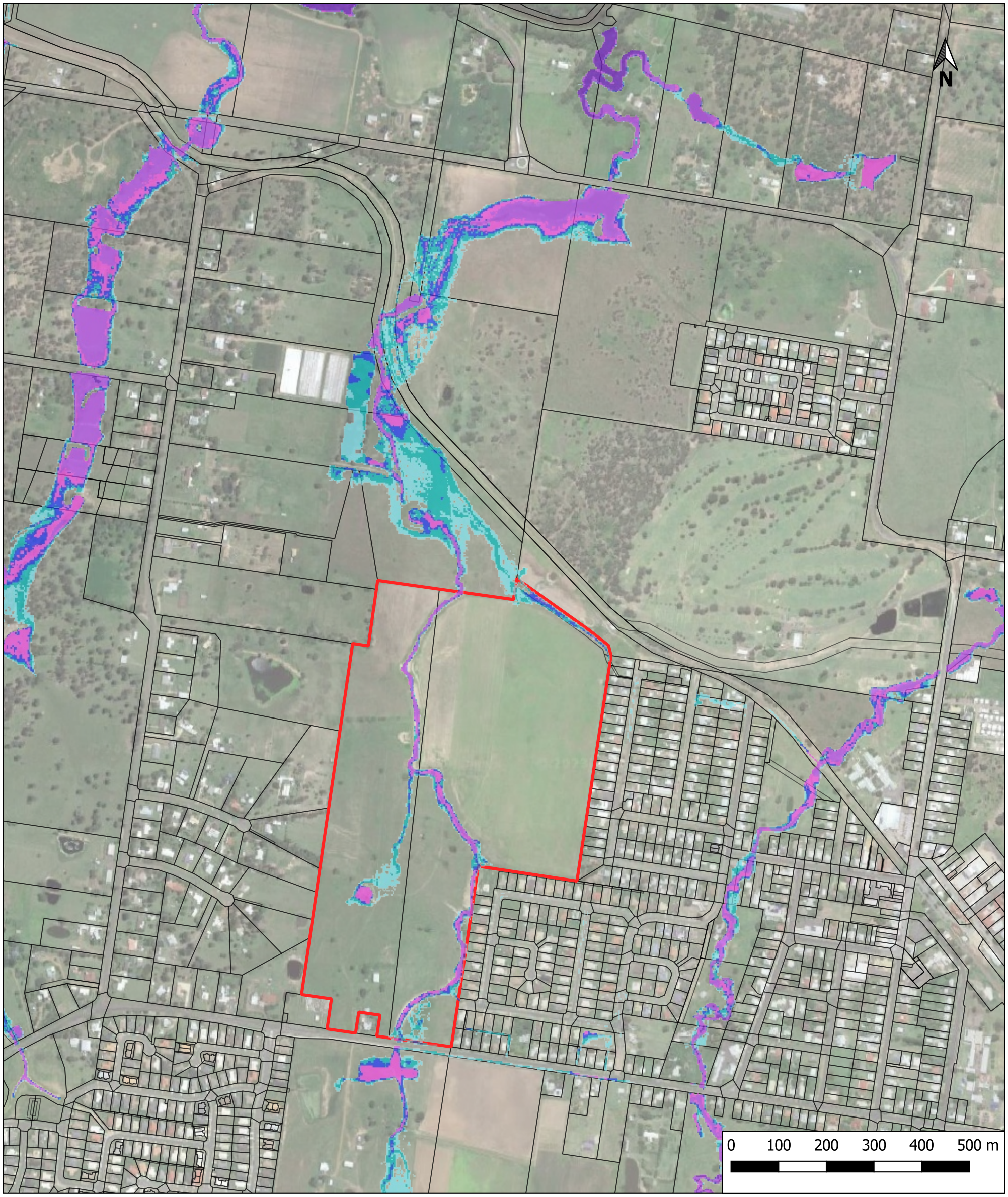
Flood Depth (m)

- <= 0.02
- 0.02 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.50
- > 1.50

BURCHILLS ENGINEERING SOLUTIONS

FOR

Europagroup



2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

39% AEP Peak Flood Depth

PRE DEVELOPMENT

Project: BE230128	Date: 28/11/2023
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Cadastral
- Site Boundary

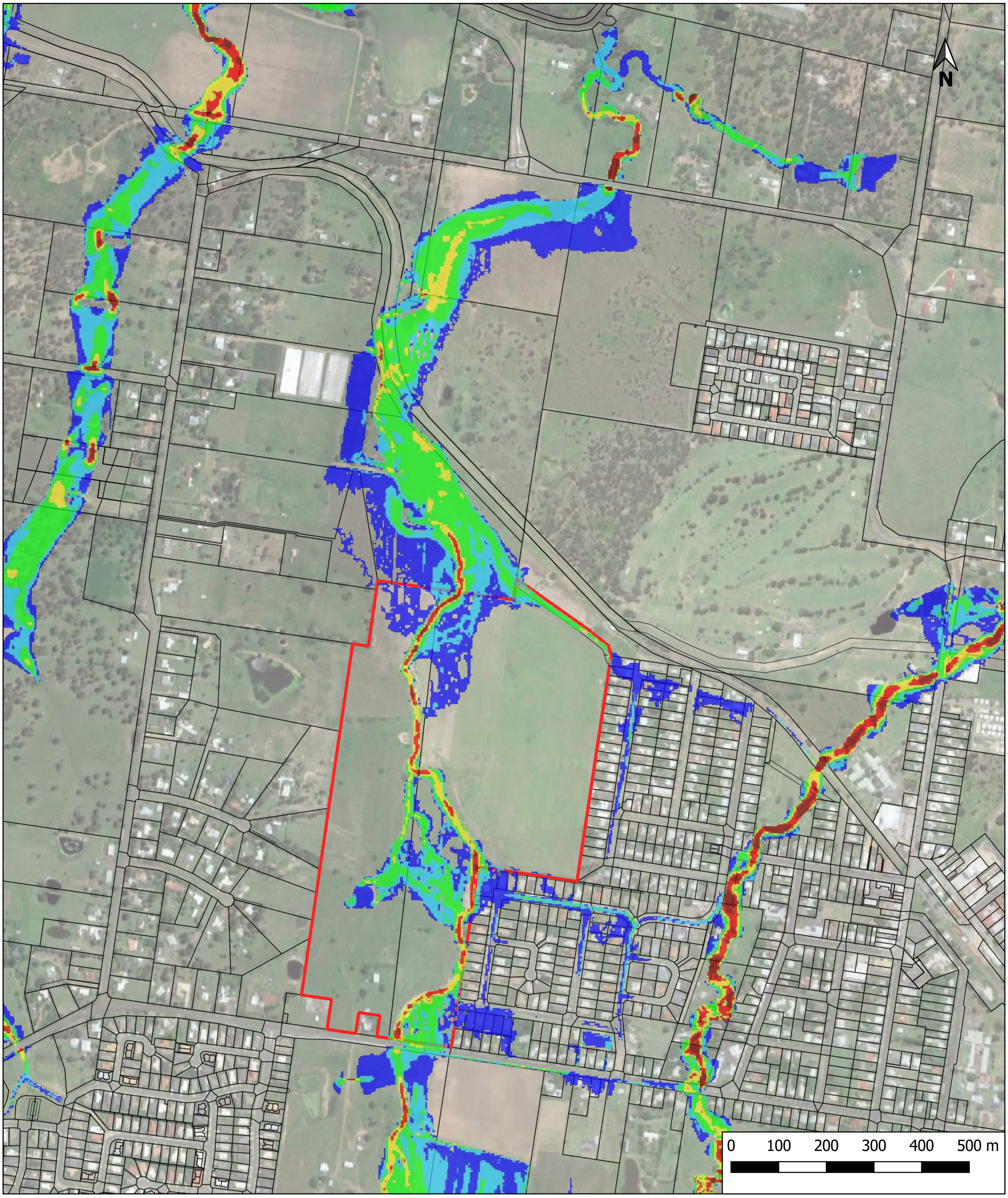
Flood Depth (m)

- <= 0.02
- 0.02 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.50
- > 1.50

BURCHILLS ENGINEERING SOLUTIONS

FOR

Europagroup



2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

1% AEP Peak Flood Velocity

PRE DEVELOPMENT

Project: BE230128	Date: 28/11/2023
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Cadastral
- Site Boundary

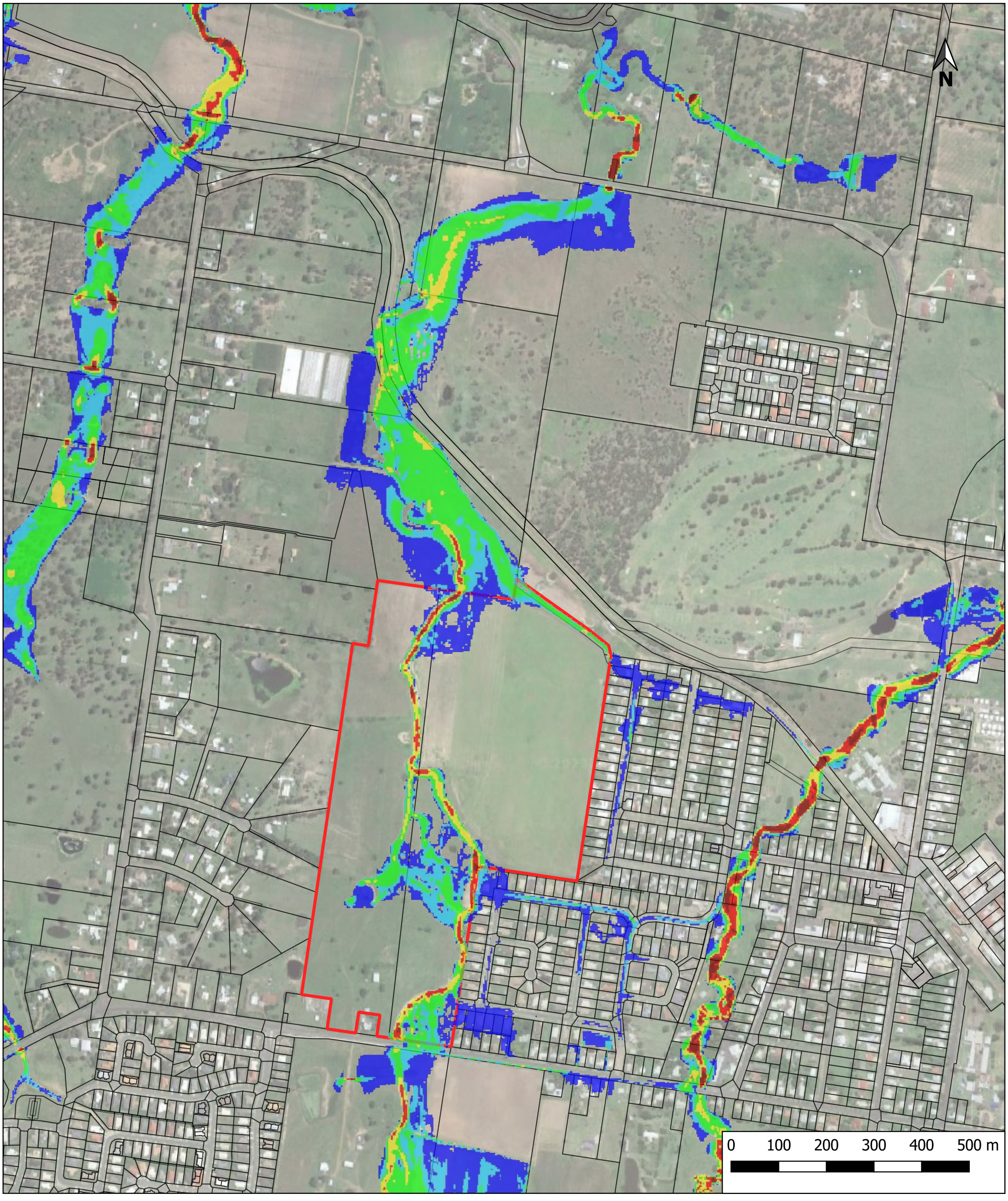
Flood Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- above 2

BURCHILLS ENGINEERING SOLUTIONS

FOR

Europagroup



2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

2% AEP Peak Flood Velocity

PRE DEVELOPMENT

Project: BE230128	Date: 28/11/2023
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Cadastral
- Site Boundary

Flood Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- above 2

BURCHILLS ENGINEERING SOLUTIONS

FOR

Europagroup

N

0 100 200 300 400 500 m

2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

5% AEP Peak Flood Velocity

PRE DEVELOPMENT

Project: BE230128	Date: 28/11/2023
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Cadastral
- Site Boundary

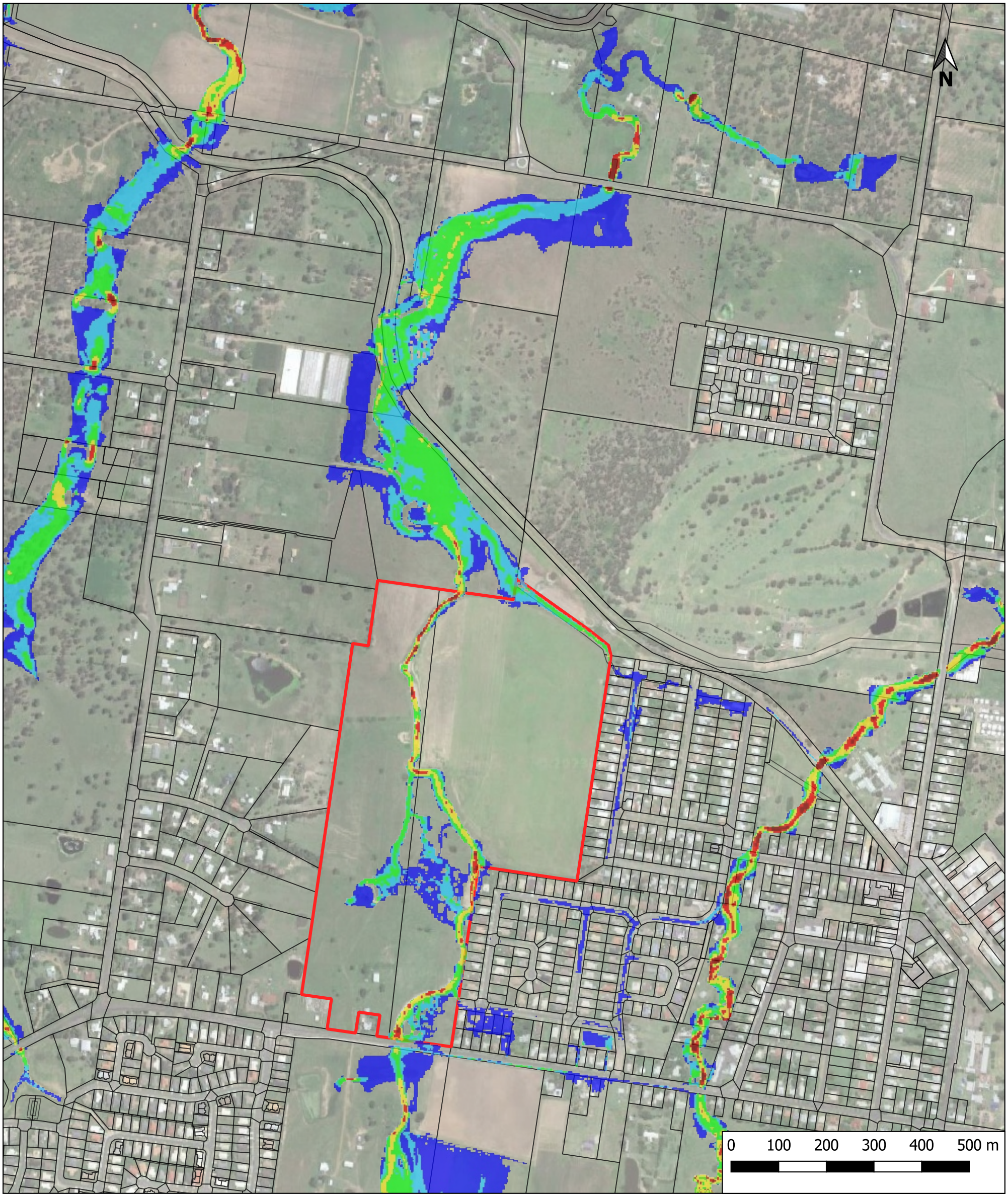
Flood Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- above 2

BURCHILLS ENGINEERING SOLUTIONS

FOR

Europagroup



2983 Forest Hill Fernvale Road, Lowood Masterplan Layout Review and Development

10% AEP Peak Flood Velocity

PRE DEVELOPMENT

Project: BE230128	Date: 28/11/2023
Scale: 1:7,500 at A3	Projection: GDA94/MGA zone 56
Data Sources:	

Legend

- Cadastral
- Site Boundary

Flood Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- above 2

BURCHILLS ENGINEERING SOLUTIONS

FOR

Europagroup