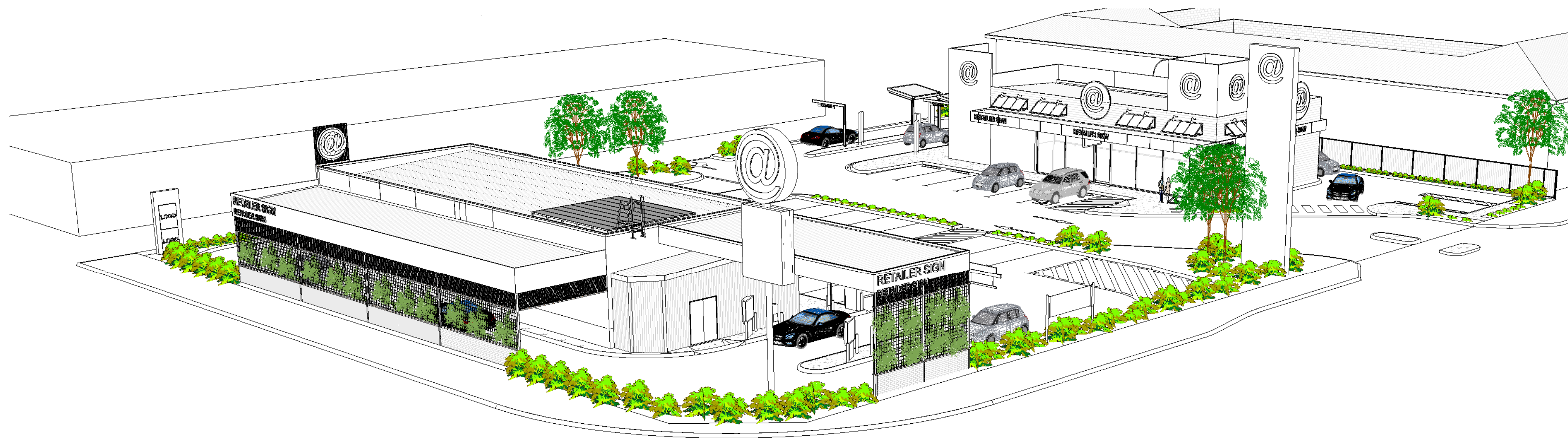


ARCHITECTURAL DRAWINGS

PROPOSED MIXED USE DEVELOPMENT

87 FITZROY ST, ROCKHAMPTON



3D PERSPECTIVES FOR ILLUSTRATION ONLY

ARCHITECTURAL DA DRAWINGS

DRG No.	DRAWING TITLE
DA00	COVER PAGE
DA01	EXISTING SITE PLAN
DA02	PROP. SITE PLAN
DA03	BUILDING ELEVATIONS & PERSPECTIVES
DA04	BUILDING ELEVATIONS & PERSPECTIVES
DA05	BUILDING ELEVATIONS & PERSPECTIVES
DA06	BUILDING PERSPECTIVES
DA07	TENANCY 1 - SEATING AREA PLAN
DA08	TENANCY 2 - SEATING AREA PLAN

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Project Description

PROP. MIXED USE DEVELOPMENT

87 FITZROY ST, ROCKHAMPTON

Scale @A1

Drawn NR

Date JAN 2022

Approved By GN

Drawing Title

COVER PAGE

Job Number - Drawing Number

21185

DA00

Revision C



PROPERTY DESCRIPTION

LOT 1 & 2 on RP604178
LOT 2 on RP848798
LOT 2 on RP603146
LOT 34 on SP107136

COUNCIL: ROCKHAMPTON

DEVELOPMENT ASSESSMENT

TOTAL SITE AREA - 3,417m2

ROCKHAMPTON REGIONAL COUNCIL

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B	17.05.2022	NR	RESPONSE TO I.P.	
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P1	18.02.2022	NR	PRELIMINARY ISSUE	

Project Description	
PROPOSED MIXED USE DEVELOPMENT 87 FITZROY ST, ROCKHAMPTON	
Scale	1:200 A1 / 1:400 A3
Drawn	NR
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Issued	

Drawing Title	
EXISTING SITE PLAN	
Drawing Number	21185-DA01
Revision	B



PROPERTY DESCRIPTION

LOT 1 & 2 on RP604178
LOT 2 on RP848798
LOT 2 on RP603146
LOT 34 on SP107136



COUNCIL: ROCKHAMPTON

DEVELOPMENT ASSESSMENT

TOTAL SITE AREA - 3,417m²

LANDSCAPE AREA - 370m²

BLDG. SITE COVER - 24.2%
(INCLUDES ALL ROOFED AREAS)

IMPERVIOUS AREA

- EXISTING APPROX. - 1084m²
- PROPOSED - 3047m²

BUILDING AREAS

- T1 - FOOD & DRINK - 247m²
EXCLUDES ALFRESCO - 36m²
- T2 - FOOD & DRINK - 255m²

TOTAL GFA - 502m²

EXTERNAL AREAS

- T1 ALFRESCO - 40m²
- T1 REFUSE ENCLOSURE - 22m²
- T2 REFUSE ENCLOSURE - 13m²

TOTAL EXTERNAL AREAS - 75m²

CAR PARKING

- REQUIRED - 12
- PROVIDED - 23

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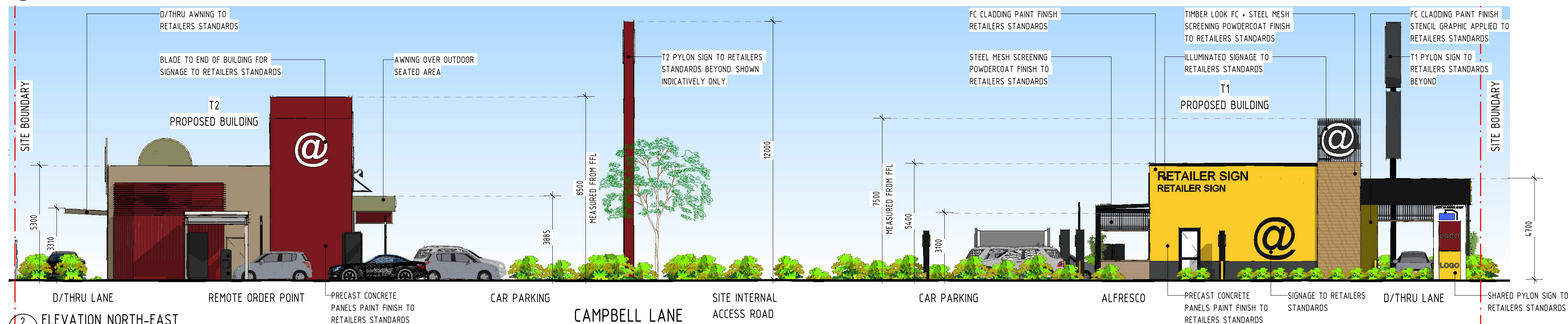
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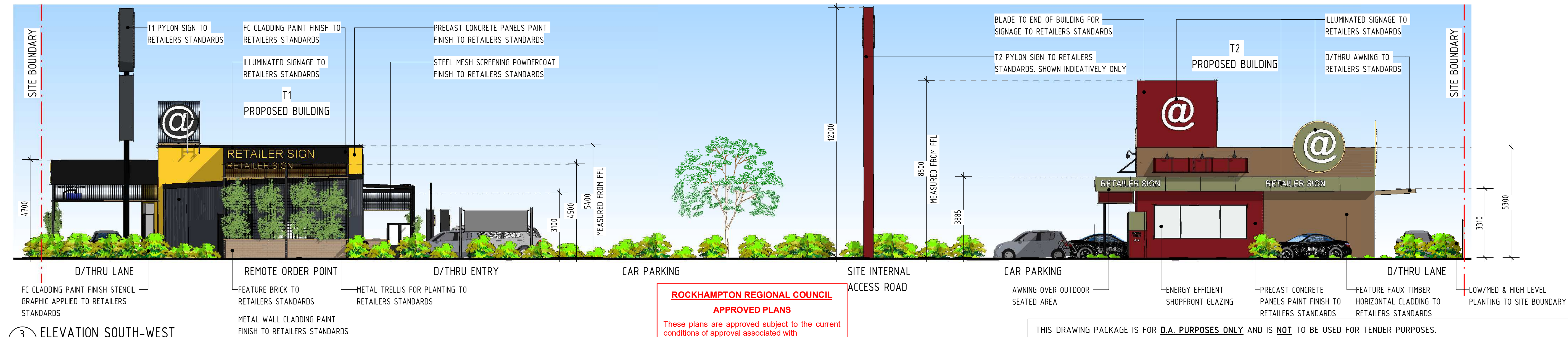


1 SITE PERSPECTIVE



2 ELEVATION NORTH-EAST

1 : 100



3 ELEVATION SOUTH-WEST

1 : 100

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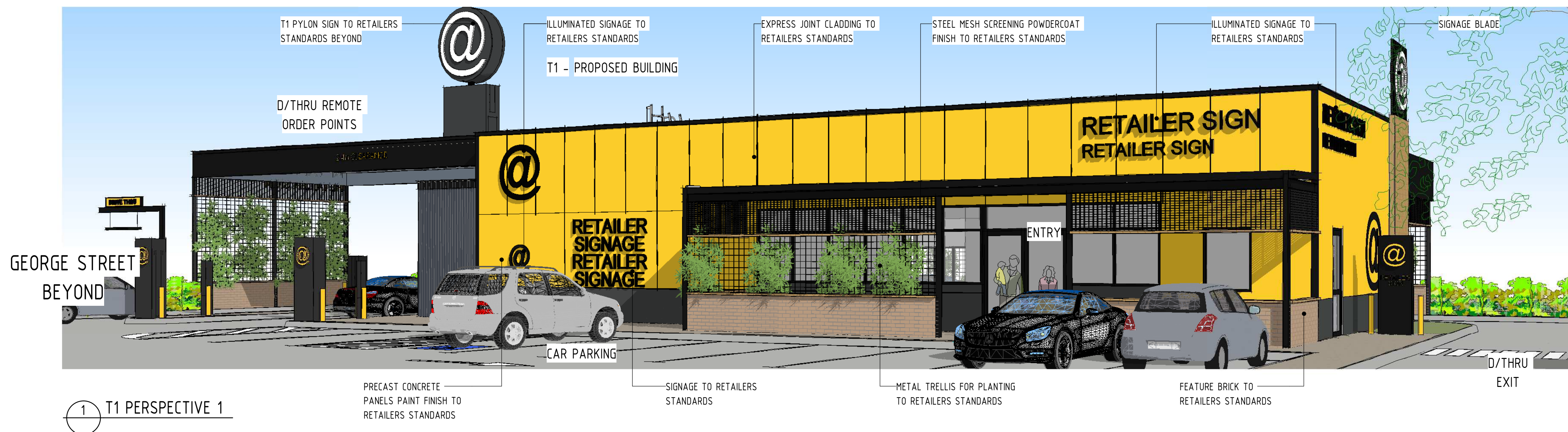
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87 FITZROY ST, ROCKHAMPTON	
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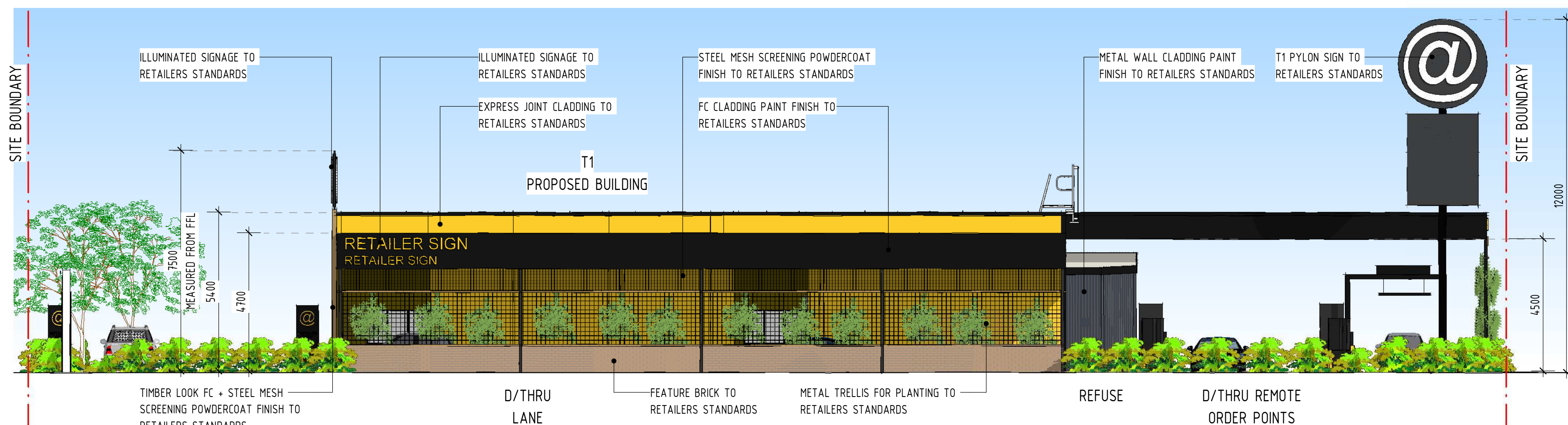
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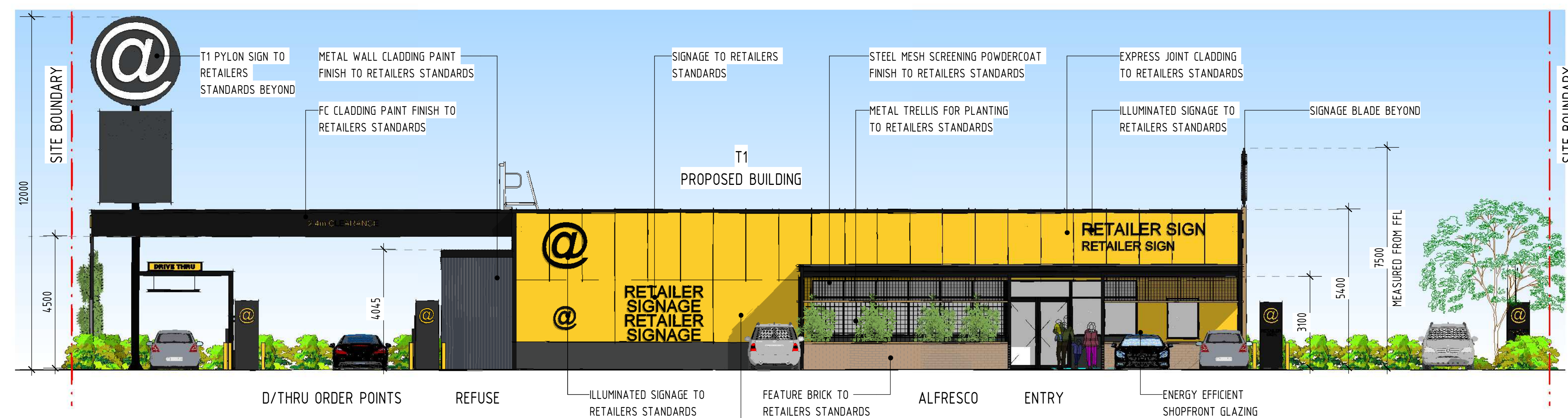
1 T1 PERSPECTIVE 1



2 ELEVATION NORTH-WEST - T1



3 T1 D/THRU TRELLIS PERSPECTIVE



4 ELEVATION SOUTH-EAST - T1



5 T1 ALFRESCO/ENTRY PERSPECTIVE

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87 FITZROY ST, ROCKHAMPTON	
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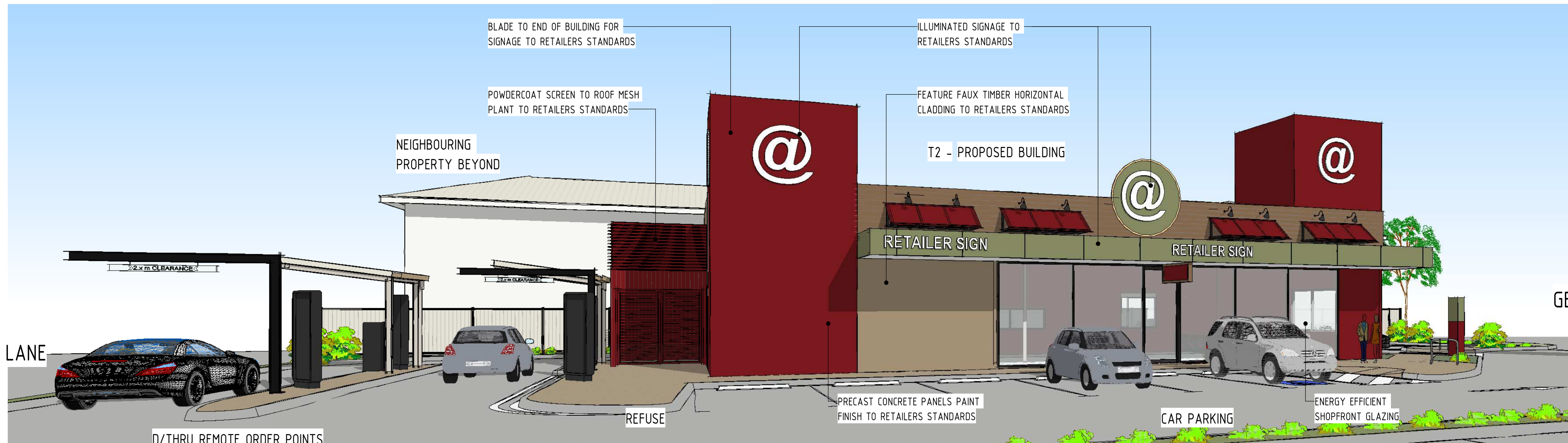
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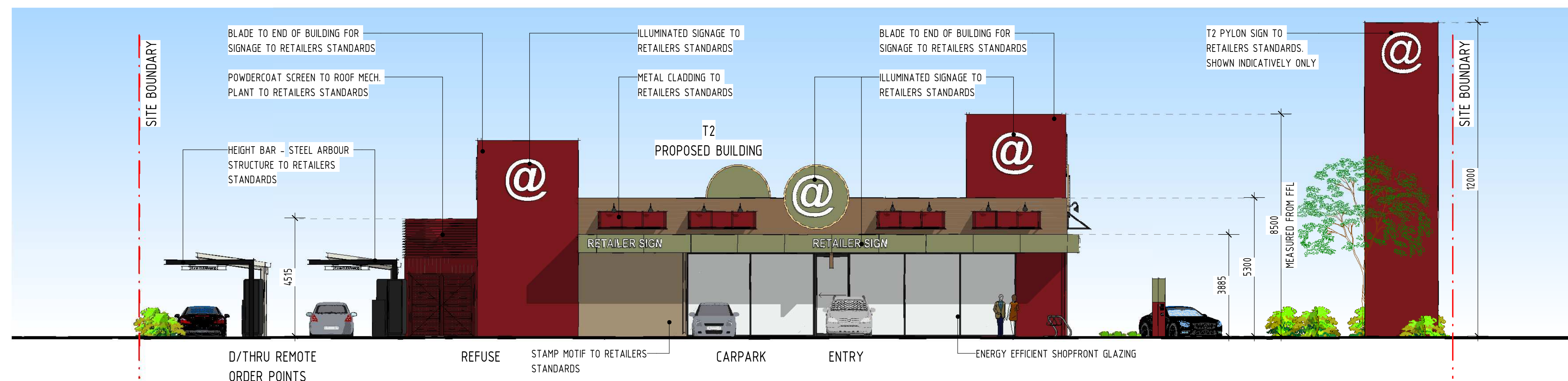
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CAMPBELL LANE

GEORGE STREET
BEYOND

1 T2 PERSPECTIVE 1

2 ELEVATION NORTH-WEST - T2
1 : 1003 ELEVATION SOUTH-EAST - T2
1 : 100

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87 FITZROY ST, ROCKHAMPTON	
Scale @A1 1 : 100	Date JAN 2022
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21185	DA05
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1 SITE PERSPECTIVE 1



2 SITE PERSPECTIVE 2



3 SITE PERSPECTIVE 3

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21185 DA06		C

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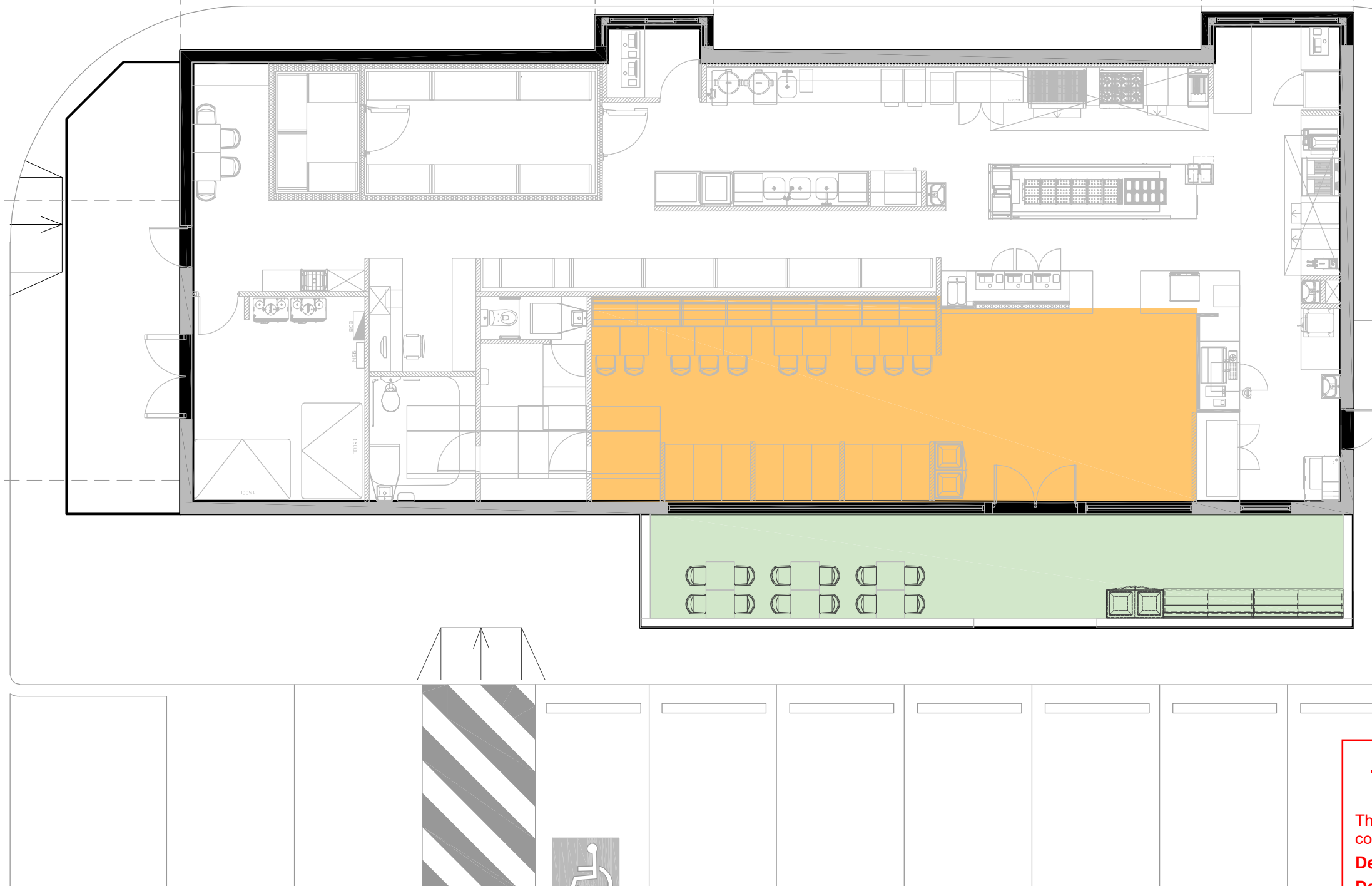
LOT 1 & 2 on RP604178
LOT 2 on RP848798
LOT 2 on RP603146
LOT 34 on SP107136



COUNCIL: ROCKHAMPTON

BUILDING AREAS

INTERNAL DINING	- 53.9m ²
EXTERNAL DINING	- 32.25m ²
TOTAL	- 86.15m ²



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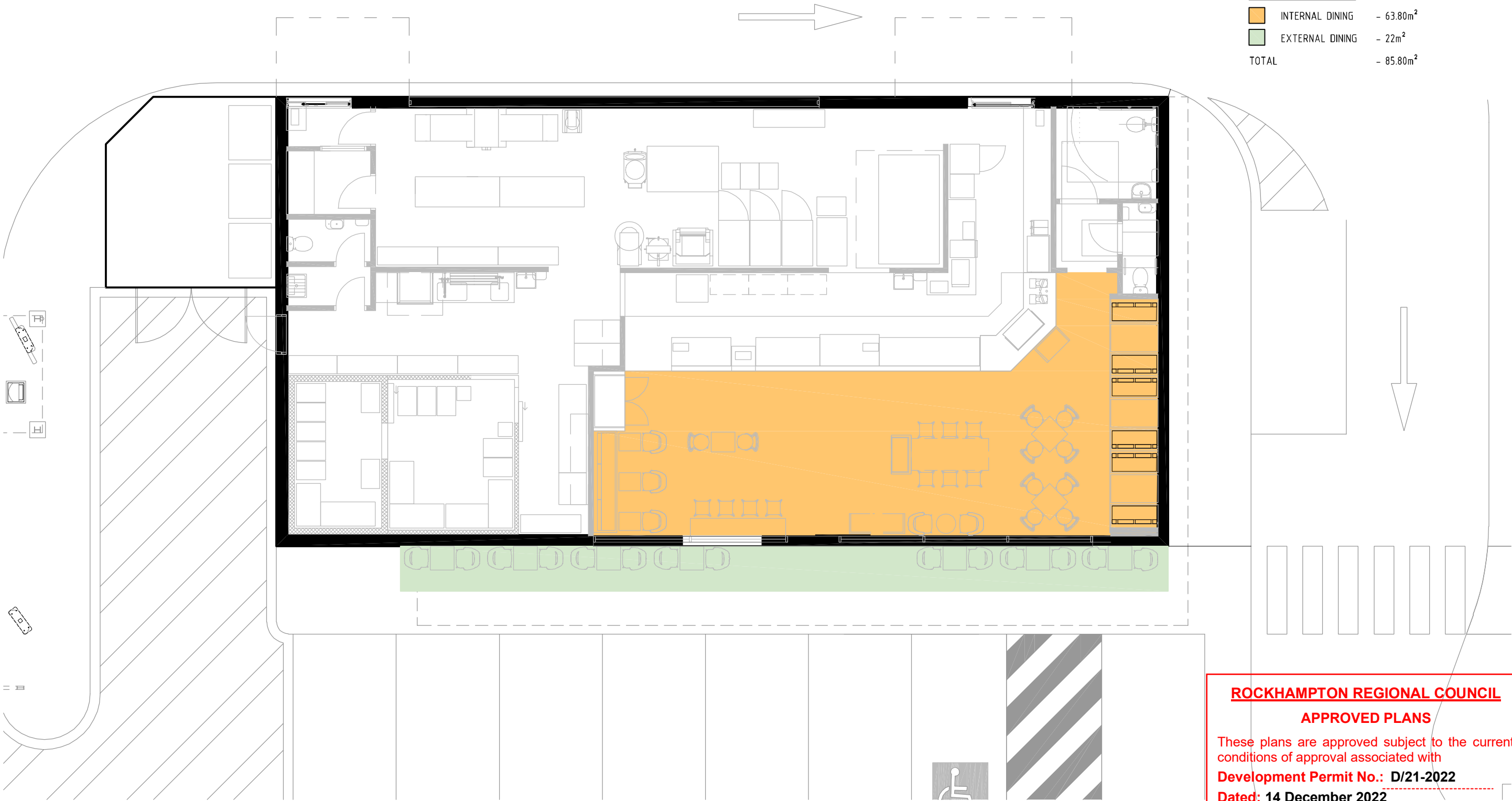
LOT 1 & 2 on RP604178
LOT 2 on RP848798
LOT 2 on RP603146
LOT 34 on SP107136



COUNCIL: ROCKHAMPTON

BUILDING AREAS

<div></div>	INTERNAL DINING	- 63.80m ²
<div></div>	EXTERNAL DINING	- 22m ²
TOTAL		- 85.80m ²



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OFFICE 2 LEVEL 1, 488 LUTWICHE ROAD, LUTWICHE QLD 4030 E: info@vervebd.com.au P: 07 3857 0942

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Project Description
PROPOSED MIXED USE DEVELOPMENT
87 FITZROY ST. ROCKHAMPTON

Scale
1:200 @ A1 / 1:400 @ A3

Approved

Issued

Drawing Title
TENANCY 2 -
SEATING AREA PLAN

Drawing Number

21185-DA08

Revision

A



Premise

ZOOM PROPERTY GROUP

87-93 Fitzroy Street, Rockhampton

SITE BASED STORMWATER MANAGEMENT PLAN

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Rev: C

1 June 2022

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DOCUMENT AUTHORISATION					
Revision	Revision Date	Report Details			
A	01/03/22	Site Based Stormwater Management Plan			
B	27/04/22	Response to Information Request			
C	01/06/22	Updated Site Layout			
Prepared By	Initial	Reviewed By	Initial	Authorised By	Signature
Lewis Hamilton	LH	Chris Shields	CS	Jeremy Cox	

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APPENDIX C CALCULATIONS
APPENDIX D HEC-RAS MODEL RESULTS

1. INTRODUCTION

Premise Australia Pty Ltd (here within referred to as "Premise") has been commissioned by Zoom Property Group to prepare a Site Based Stormwater Management Plan in support of a development application to configure five (5) lots into one (1) mixed use development consisting of two fast food restaurants. The site is located on the corner of Fitzroy Street and George Street, and is comprised of the following lots:

- Lots 1 & 2 on RP604178;
- Lot 2 on RP848798;
- Lot 2 on RP603146; and
- Lot 34 on SP107136

The applicant intends to develop the subject site and reconfiguration of the lot to use it for commercial purposes. A left in/left out entry and exit is proposed on George Street and an exit on Campbell Lane with an access road along with parking to be constructed with associated infrastructure to service the proposed commercial restaurants.

The purpose of this report is to provide a management strategy for stormwater quantity and quality to address the requirements of the site in order to comply with Rockhampton Regional Council Stormwater Quality Guidelines, QUDM, the SPP, and any other relevant planning and design guidelines.

Refer to **Figure 1** below for a Road Map Image of the site and its locality.



Figure 1: Aerial Imagery of the site (Source: Nearmap)

2. DATA

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

- Aerial LiDAR data by Department of Natural Resources and Mines;
- Proposed Site Layout provided by Verve Building Design Co;
- Detailed Survey data prepared by Capricon Survey Group Co;
- Rainfall and Meteorological Data by the Australian Bureau of Meteorology; and
- Aerial Imagery by Nearmap (Accessed February 2022)

3. SITE CHARACTERISTICS

3.1 Site area and location

The subject site has a total area of 3,422 m² and is located approximately 950m south-west of the Fitzroy River that divides the city of Rockhampton. The proposed development site is situated on the corner of main roads Fitzroy Street and George Street with Campbell Lane located on the eastern side of the site.

3.2 Existing Drainage and Topography

The site currently contains a single defunct restaurant (Lot 2 on RP848798 and Lot 2 on RP603146), a workshop (Lot 34 on SP107136) and open space (Lots 1-2 on RP604178). The surrounding developed areas to the north-east and south-east contain commercial use allotments.

There is currently no underground stormwater infrastructure in George Street or Campbell Lane adjacent to the site, and runoff is discharged as overland sheet flow or concentrated discharge via kerb adaptors.

Runoff from the open space and workshop lot drains to Campbell Lane to the east as overland sheet flow. Road flow from Campbell Lane is conveyed to Denham Street before eventually discharging to a natural overland flow path adjacent to Gladstone Road.

Runoff from the majority of defunct restaurant lots drain to the George Street road frontage to the south-west as kerb and channel flow. A minor portion roof the roof area and internal driveway hardstand drains to Fitzroy Street via kerb adaptors and driveway invert, which is conveyed to George Street and is considered as a single catchment. Runoff then is also conveyed to Denham Street and follows the same path as the remainder of the site. Refer to **Figure 2** for the existing drainage regime.



Figure 2: Existing Drainage Regime

Three critical locations have been identified (A, B & C) to complete an analysis of pre and post-development discharge characteristics and are shown in **Figure 2**.

The gradient across the site is relatively consistent with an approximate slope of 1%-2.5%. Elevations range from 9.6 mAHD (south-eastern corner of the site) to 10.7 mAHD (north-western corner of the site).

3.3 Proposed Development

The proposed development consists of two (2) takeaway food outlets, located on the northern and southern portions of the site, linked with a hardstand car parking area. Refer to the development layout in **Appendix A** for further details.

3.4 Proposed Drainage

Surface and roofwater runoff from the north-western portion of the site will be discharged to George Street, while the remainder of the site will discharge to Campbell Lane as sheet flow. As the nearest underground stormwater infrastructure is further than 100m from the site, and the catchment is relatively flat, it is not possible to construct underground stormwater infrastructure to service the site. The development will be graded such that the site is free draining. The proposed drainage layout can be seen on Premise civil drawings in **Appendix A**.

3.5 Flooding summary

Rockhampton Regional Council's Planning Scheme does not identify the site as being within a Flood Hazard Area, and does not represent a Flood Hazard resulting from a regional flood or local flooding from a local overland flow catchment.

It is not considered that any further assessment of flooding conditions is necessary to facilitate the development.

4. STORMWATER QUANTITY MANAGEMENT

4.1 Lawful Point of Discharge

In accordance with Queensland Urban Drainage Manual (QUDM 2017) section 3.9, lawful discharge of stormwater is required. A Lawful Point of Discharge Test (LPD Test) is outlined in Section 3.9.1 to ensure the stormwater is discharged from the site lawfully and at a lawful location in addition to needing to meet other statutory requirements such as the SPP and Planning Act.

The test in Section 3.9.1 of QUDM is in sequential order. If a condition can be met, then subsequent items need not be tested. This should be read in full but is summarised here to provide context for this site. It can be summarised as:

- Test 1:* Will the proposed development alter the site's stormwater discharge characteristics in a manner that may substantially damage a third-party property? (if yes go to Test 2, if not then LPD is satisfied)
- Test 2:* Is the location of the discharge from the development site under the lawful control of the local government or other statutory authority from whom permission to discharge has been received?
- Test 3:* An authority to discharge over affected properties will be necessary.

The lawful points of discharge have been identified as the George Street and Campbell Lane road frontages for the north-western and remainder of the site respectively, in accordance with section 7.13.14 of QUDM. This is considered appropriate as runoff from the site is already conveyed within the road and kerb and channel under existing conditions.

4.1.1 INTERNAL STORMWATER CONVEYANCE

Stormwater runoff from the site will be conveyed to George Street and Campbell Lane as surface runoff in vegetated swales which form part of the stormwater quality treatment train, and within the inverted crown internal access roads. Grading of the site will be undertaken to allow free draining outfall from the site.

The existing grated drain at the George Street access will be reinstated to allow minor runoff to be discharged via kerb adaptors and reduce surface runoff over the pedestrian pathway for safety. Capacity checks of the proposed swales and access roads have been undertaken using Manning's equation for open channel flow and can be seen in **Appendix C**.

4.2 Stormwater Runoff

Peak discharges from the catchment were calculated using the Rational Method. The Rational Method calculations were undertaken in accordance with the Queensland Urban Drainage Manual (QUDM 2017) assuming that the proposed works are undertaken as planned for a range of storm events.

Peak discharge calculations were undertaken for the identified discharge points A, B and C, consistent with the topography discussed in **Section 3.2**.

The catchment delineation can be seen in **Appendix B**. A fraction impervious of 0.20 was adopted for the open space area within the site and determined through aerial imagery for catchments external to the site. A summary of the assumptions for the rational method calculation are shown in the following tables, with the full calculations shown in **Appendix C**.

Table 1: Pre-Development Catchment Details

Catchment	Catchment Area (ha)	Fraction Impervious (%)	Runoff Coefficient	Pervious Manning's Roughness (n)	Impervious Manning's Roughness (n)
1	0.100	90	0.88	0.03	0.02
2	0.051	90	0.88	0.03	0.02
3	0.225	90	0.88	0.03	0.02
4	0.205	90	0.88	0.03	0.02
5	0.242	20	0.66	0.03	0.02
6	0.182	90	0.88	0.03	0.02
7	0.848	80	0.86	0.03	0.02

4.3 Hydrology

The XP-RAFTS runoff routing model was used to assess pre and post-development peak discharges at the relevant discharge locations. XP-RAFTS uses "the Laurenson non-linear runoff routing procedure to develop a stormwater runoff hydrograph from either an actual event (a recorded rainfall time series) or a design storm utilising Intensity-Frequency-Duration data together with dimensionless storm temporal patterns, as well as standard AR&R 2019 data and methods.

The Laurenson runoff routing procedure used in XPRAFTS has the following advantages:

- It offers a model to simulate both rural and urban catchments.
- It allows for non-linear response from catchments over a large range of event magnitudes.
- It considers time-area and sub-catchment shape.
- It offers an efficient mathematical procedure for developing both rural, urban and mixed runoff hydrographs at any sub-catchment outlet." (XPRAFTS V2009, XPSolutions)

The contributing catchments were modelled as sub-catchments in XPRAFTS. Catchment and link characteristics were entered into the model for the sub-catchments within the study area. The catchment storage/lag coefficient Bx was set to 1. Initial and continuing losses stated on the ARR data hub for the site were stated as 35mm and 1.7mm respectively. Pre-burst rainfall was included in the hydrologic model using the median pre-burst depth of 10.8mm. Discharges from the XPRAFTS model were compared to the rational method for the existing catchment to check for gross errors in the modelling.

The full ensemble of storms was modelled consistent with current AR&R 2019 methodologies and the mean temporal pattern/maximum duration were selected as the "critical" storm to be used for design. A comparison of the XP-RAFTS model and Rational Method peak discharges is shown in Appendix C for pre-development peak discharges at Point C. This comparison shows that the XPRAFTS model is adequately validated.

4.4 Pre-Development Peak Discharges

Table 2 shows the peak discharges for under pre-developed conditions for the catchment.

Table 2: Peak Stormwater Discharges – Pre-Development XP-RAFTS

Annual Exceedance Probability (AEP)	Peak Discharge (m ³ /s)			Critical Duration (min)	Temporal Pattern
	Point A	Point B	Point C		
63.2%	0.043	0.066	0.399	10	7
50%	0.048	0.074	0.444	10	2
20%	0.065	0.1	0.591	10	7
10%	0.07	0.117	0.702	10	3
5%	0.088	0.135	0.807	10	7
2%	0.105	0.167	0.948	30	7
1%	0.118	0.198	1.07	30	8

4.5 Post-Development Peak Discharges

In the post-development scenario, it is proposed that the site will maintain discharge to George Street and Campbell Lane as described in **Section 3.4**. From the preliminary site layout plan it has been determined that the open space area within the site will increase from 20% impervious to 80% within Catchment 5. The remaining catchments are unchanged from the pre-development scenario. Post-development catchment characteristics are shown in **Table 3**.

Table 3: Post-Development Catchment Details

Catchment	Catchment Area (ha)	Fraction Impervious (%)	Runoff Coefficient	Pervious Manning's Roughness (n)	Impervious Manning's Roughness (n)
1	0.100	90	0.88	0.03	0.02
2	0.051	90	0.88	0.03	0.02
3	0.225	90	0.88	0.03	0.02
4	0.205	90	0.88	0.03	0.02
5	0.242	80	0.86	0.03	0.02
6	0.182	90	0.88	0.03	0.02
7	0.848	80	0.86	0.03	0.02

The XP-RAFTS model for the post-development catchments is the same as the pre-development model aside from the increase in impervious fraction for Catchment 5.

Table 4 shows the peak discharges for under post-developed conditions for the catchment.

Table 4: Peak Stormwater Discharges – Post-Development XP-RAFTS

Annual Exceedance Probability (AEP)	Peak Discharge m ³ /s		
	Point A	Point B	Point C
63.2%	0.043	0.115	0.442
50%	0.048	0.128	0.492
20%	0.065	0.167	0.655
10%	0.07	0.2	0.777
5%	0.088	0.234	0.893
2%	0.105	0.19	1.051
1%	0.118	0.228	1.182

4.6 Discussion of Expected Peak Discharges

Peak discharges for pre and post-development have been assessed for Points B and C and a comparison is shown below. Point A has been omitted from the comparison as Catchment 1 remained unchanged in the post-development scenario.

Table 5: Point B Peak Discharge Summary

Annual Exceedance Probability (AEP)	Peak Discharge (m ³ /s)		Impact	
	Pre	Post	(m ³ /s)	%
63.2%	0.066	0.115	0.049	74%
50%	0.074	0.128	0.054	73%
20%	0.1	0.167	0.067	67%
10%	0.117	0.2	0.083	71%
5%	0.135	0.234	0.099	73%
2%	0.167	0.19	0.023	14%
1%	0.198	0.228	0.03	15%

Table 6: Point C Peak Discharge Summary

Annual Exceedance Probability (AEP)	Peak Discharge (m ³ /s)		Impact	
	Pre	Post	(m ³ /s)	%
63.2%	0.399	0.442	0.043	11%
50%	0.444	0.492	0.048	11%
20%	0.591	0.655	0.064	11%
10%	0.702	0.777	0.075	11%
5%	0.807	0.893	0.086	11%
2%	0.948	1.051	0.103	11%
1%	1.07	1.182	0.112	10%

It can be seen from the tables above that the proposed development results in a 15% increase at point B, and an increase of 10% at Point C for the 1% AEP storm event. It is considered that the increase in peak discharges is minor, despite the proportional increase, noting the discharge rises less than 0.1m³/s for all events.

4.7 Downstream System Capacity

Noting the increase in peak discharge from the site as a result of the development, it is not considered practical to install on-site detention due to the physical limitations of the site and absence of underground stormwater infrastructure in the vicinity. An analysis of the Campbell Lane and Denham Street road corridors conveying runoff from the catchment has been undertaken to assess the capacity of the system and determine the impact of the development. Road profile have been determined from a combination of detailed survey and LiDAR data. George Street has been omitted from the analysis as the Catchments discharging to Point A are unchanged in the post-development scenario.

Analysis was undertaken using a 1D HEC-RAS model with flow data obtained from the XP-RAPTS model discussed in **Section 4.3**, for the 20% AEP (minor) and 1% AEP (major) storm events. Tabulated results are presented below, while graphical outputs are included in **Appendix D**.

Table 7: 20% AEP Peak Discharge – Campbell Lane (Point B)

Scenario	Peak Discharge (m ³ /s)	Max. Depth (m)	Max. Velocity (m/s)	Depth-Velocity Product (m ² /s)
Pre-Development	0.1	0.07	0.61	0.04
Post-Development	0.167	0.09	0.71	0.06
Impact	0.067	0.02	0.1	0.02

Table 8: 1% AEP Peak Discharge – Campbell Lane (Point B)

Scenario	Peak Discharge (m ³ /s)	Max. Depth (m)	Max. Velocity (m/s)	Depth-Velocity Product (m ² /s)
Pre-Development	0.198	0.10	0.74	0.074
Post-Development	0.228	0.11	0.77	0.077
Impact	0.03	0.01	0.03	0.00

Table 9: 20% AEP Peak Discharge – Denham Street (Point C)

Scenario	Peak Discharge (m ³ /s)	Max. Depth (m)	Max. Velocity (m/s)	Depth-Velocity Product (m ² /s)
Pre-Development	0.591	0.23	0.26	0.06
Post-Development	0.655	0.24	0.28	0.07
Impact	0.064	0.01	0.02	0.01

Table 10: 1% AEP Peak Discharge – Denham Street (Point C)

Scenario	Peak Discharge (m³/s)	Max. Depth (m)	Max. Velocity (m/s)	Depth-Velocity Product (m²/s)
Pre-Development	1.07	0.28	0.36	0.10
Post-Development	1.182	0.3	0.37	0.11
Impact	0.112	0.02	0.01	0.01

It can be seen from the results of the analysis that the impact on flow depth, velocity and depth-velocity product are very minor as a result of the development. The post-development flow characteristics are within the road flow limits, capacity and traffic and pedestrian safety criteria outlined in Section 7.4 of QUDM. This demonstrates the capacity of the road to convey runoff from the site and mitigation is not required. It is not anticipated that the development will cause actionable nuisance on downstream or adjacent landowners.

5. STORMWATER QUALITY

As the proposed development is a material change of use that involves a premises greater than 2,500m² in size and will result in an impervious area greater than 25% of the net developable area, the management of stormwater quality is required to comply with the Queensland Government's State Planning Policy (SPP) (Queensland Government 2017), and in particular the outcomes of the SPP code: Water Quality (Appendix 2).

5.1 Water Quality Design Objectives

Performance Outcome PO1 in the SPP Code: Water Quality states that the development should be 'planned and designed considering the land use constraints of the site for achieving stormwater design objectives. Acceptable Outcome AO1.1 from the same appendix states the site stormwater quality management plan that is prepared needs to be "consistent with any local area stormwater management planning" and provide for "achievable stormwater quality treatment measures meeting design objectives or current best practice environmental management". Table B contained within the SPP Code specifies the following minimum pollutant reductions in mean annual load from unmitigated development within Central Queensland (South):

Table 11: Water Quality Design Objectives

Pollutant	Load Reduction Target (%)
Total Suspended Solid (TSS)	85
Total Phosphorus (TP)	60
Total Nitrogen (TN)	45
Gross Pollutants (GP)	90

5.2 Construction phase

During the construction phase various pollutants are generated which can find their way into the stormwater runoff. These pollutants can affect the quality of the stormwater runoff and hence pollute both the site and the downstream receiving environment. **Table 12** below outlines the major sources of pollutants.

Table 12: Typical Construction Phase Pollutants

Construction Phase Pollutants
Litter from construction packaging, paper, food packaging, off cuts, etc.
Sediment from erosion of exposed soils and stockpiles.
Hydrocarbons - from fuel and oil spills, leaks from construction equipment.
Toxic Materials - cement slurry, solvents, cleaning agents, wash waters.
pH altering substances - cement slurry, wash waters.

Erosion and sediment control measures used during the construction phase of the development will be designed and installed in accordance with International Erosion Control Association (Australasia) - "Best Practice Erosion & Sediment Control – for building and construction sites" November 2008 and Rockhampton Regional Council's requirements for Erosion and Sediment Control.

5.3 Temporary Sediment Basins

Temporary sediment basins are recommended for construction in the location of the outlet to Campbell lane, to cater for runoff from disturbed areas during construction. It is recommended that High Efficiency Sediment (HES) basins are sized based on the maximum disturbed area within each basin's catchment at any one time during construction. Alternative treatment methods can be utilised at the Operational Works Phase, provided that the State Planning Policy 2017 objectives are met.

The State Planning Policy 2017 (SPP) introduces a new stormwater management design objective for sediment control on construction sites. The design objective by the SPP states that all exposed areas greater than 2500 m² must be provided with sediment controls which are designed, implemented and maintained to a standard which would achieve at least 80% of the average annual runoff volume of the contributing catchment treated (i.e. 80% hydrologic effectiveness) to 50mg/L Total Suspended Solids (TSS) or less, and pH in the range (6.5–8.5).

5.4 Stormwater Quality Modelling

Stormwater Pollutant modelling for the development has been generated using the modelling program 'Model for Urban Stormwater Improvement Conceptualisation' (MUSIC), version 6.3.0, adhering to the Water by Design MUSIC modelling guidelines Version 1.0, 2010 (WBDMG). A split catchment approach has been adopted for the following typical site areas:

- Roof Catchment;
- Ground; and
- Road Catchment

Values for typical Impervious Fractions used in Split-catchments have been adopted from Table 3.6 in the Water by Design MUSIC Modelling Guidelines Version 1.0, 2010. Details of Catchment parameters are listed in **Table 13**.

Table 13: MUSIC Model Catchment Parameters

Catchment ID	Node Type	Total Area (ha)	Fraction Impervious (%)
A1	Roof	0.028	100
A2	Road	0.022	100
B1	Roof	0.044	100
B2	Road	0.057	100
B3	Ground	0.002	15
C1	Road	0.072	100
C2	Ground	0.004	15
D1	Road	0.043	100
D2	Road	0.013	100
D3	Road	0.024	100

Detailed catchment delineation for stormwater quality treatment is shown in **Appendix B**. Further assumptions associated with the model involve:

- Six-minute pluviographic data and monthly evapotranspiration data sourced from Bureau of Meteorology for use in the MUSIC model;
- The pollutant export parameters for split-catchment residential land use has been adopted from WBDMG Table 3.9;
- Default routing (No flow routing or translation between nodes);
- No seepage/exfiltration (0 mm/hr); and
- All other parameters used within the modelling were based on Water by Design MUSIC Modelling Guidelines Version 1.0, 2010.

The MUSIC model setup can be seen in **Figure 3** below.

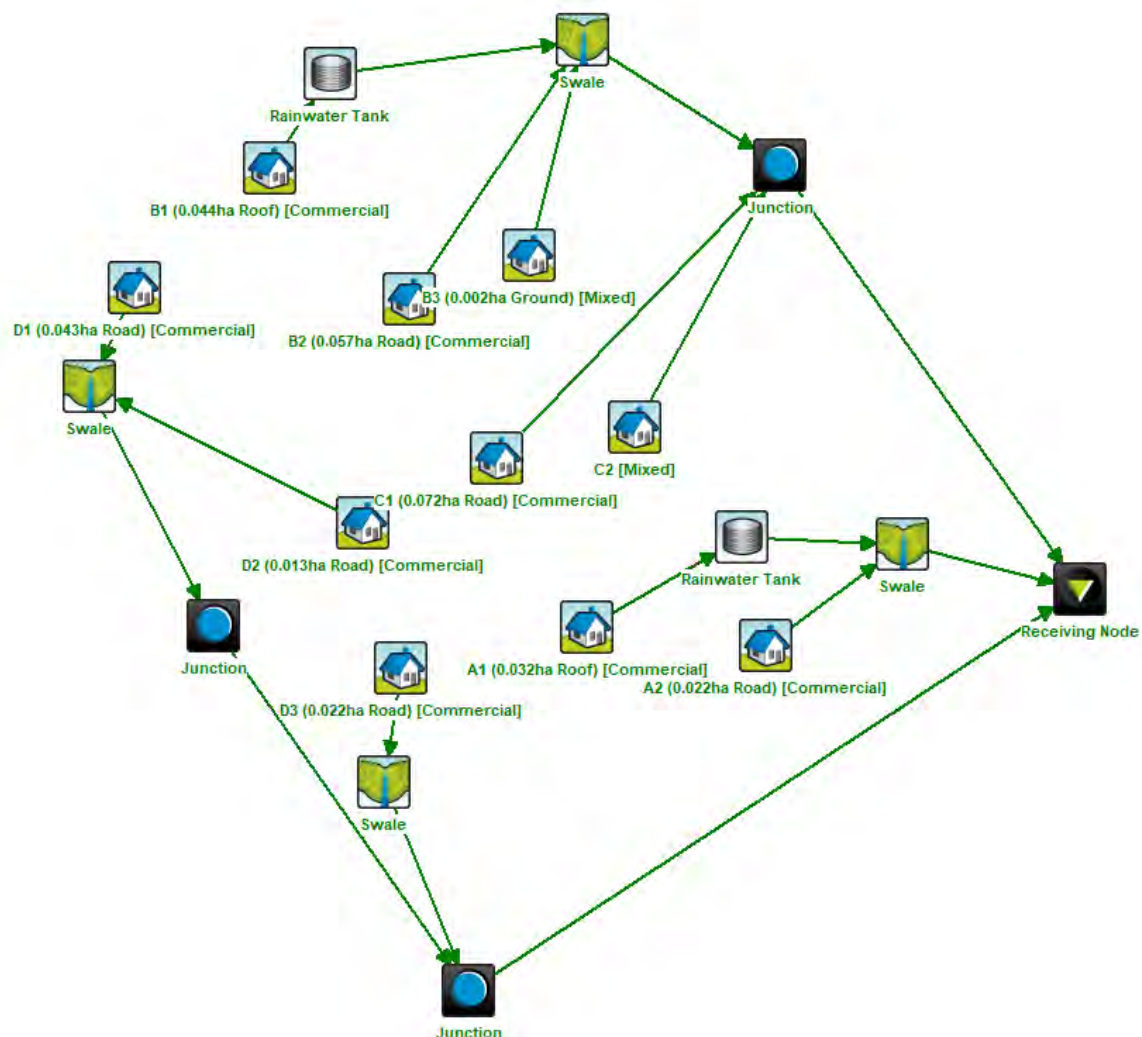


Figure 3: MUSIC Model Schematic (Source: eWater MUSIC)

5.5 Stormwater Quality Improvement Devices (SQIDs)

The requisite parameters of the nominal Stormwater Quality Improvement Devices (SQIDs) needed for site-based management of the stormwater quality have been determined based on the catchment parameters outlined in **Section 5.4**. It is proposed to implement three (3) vegetated swales and two (2) 10kL rainwater tanks to treat runoff.

The parameters for the treatment system are provided in the table below. The swales will be located along the boundaries of the site and modelled with an average vegetation height of 500mm. Supplementary planting should be undertaken in addition to stabilisation through turf or grass cover. The concept stormwater layout plan shows the location and details of the swales and can be found in **Appendix A**. A 10kL rainwater tank will be provided to each building within the site for rainwater harvesting and reuse.

Table 14: Treatment Device parameters – Vegetated Swales

Swale ID	Length (m)	Bed Slope (%)	Bottom Width (m)	Top Width (m)	Depth (m)
Swale B	10	1.5	0	1.5	0.25
Swale D1	35	1.5	0	1.0	0.15
Swale D2	20	1.5	0	3.5	0.44

Table 15: Treatment Device parameters – Rainwater Tanks

Device	Volume (kL)	Depth Above Overflow (m)	Initial Volume (m ³)	Overflow Pipe Diameter (mm)
Rainwater Tank (each)	10	0.2	5	50

5.6 Results

Table 16 outlines the effectiveness of the MUSIC Model Treatment Train in achieving the set Stormwater Management Design Objectives (SMDO's) for pollutant reduction for the proposed development.

Table 16: Treatment Train Effectiveness at Receiving Node

Pollutant	Unmitigated Load (kg/yr)	Mitigated Load (kg/yr)	Reduction (%)	Pollutant Reduction Target (%)	Reduction Target Achieved (Y/N)
Suspended Solids (TSS)	656	336	48.7	85	N
Total Phosphorus (TP)	1.2	0.722	39.8	60	N
Total Nitrogen (TN)	6.87	5.54	19.4	45	N
Gross Pollutants > 5mm	52.9	16.5	68.8	90	N

While the table above shows that the SMDO's are not met for the entire development, there is a significant reduction in TSS, TP and Gross Pollutants. The minor decrease in Total Nitrogen is due to the limited efficiency of vegetated swales in reduction of TN. While the SMDO's are not met for the development, it is considered the most practical stormwater quality management approach for the site considering the physical constraints and absence of underground stormwater infrastructure.

6. CONCLUSION

This Site Based Stormwater Management Report details the proposed stormwater design and infrastructure for the project in accordance with the Queensland Urban Drainage Manual, Australian Rainfall & Runoff 2016, Rockhampton Regional Council Guidelines and the State Planning Policy's Stormwater Management Design Objectives (SMDO's).

The Rockhampton Regional Council Planning Scheme (Ver. 2.2) indicates that the site is unaffected by flooding in the 1% AEP event. Hydrologic and 1D hydraulic modelling was undertaken to demonstrate increases in peak discharge to the downstream drainage system do not have an impact on properties downstream and the existing Campbell Lane and Denham Road corridors have sufficient capacity to convey runoff from the site.

The Stormwater Quality Improvement Devices (SQID) proposed for the development consists of three (3) vegetated swales. The modelling of the proposed quality management system did not achieve the SPP's Pollutant Load SMDO's for the site. However, by implementing the SQIDs into the proposed development, stormwater runoff from the site will be treated to the in the most practical manner that is physically possible for the site considering the constraints.

7. QUALIFICATIONS

Our analysis and overall approach have been specifically catered for the requirements of Zoom Property Group and may not be applicable beyond this scope. For this reason, any other third parties are not authorised to utilise this report without further input and advice from Premise.

Premise has relied on the following information as outlined in **Section 2** of this Report.

While Premise's report accurately assesses peak flows from design storms in accordance with current industry standards and guidelines, the sites future observed flows may vary from that predicted. For these reasons appropriate freeboards should be adopted.

8. RPEQ CERTIFICATION

As Registered Professional Engineer of Queensland (RPEQ) for this project, on behalf of Premise Australia Pty Ltd, I certify that the modelling undertaken as part of this assessment has been undertaken in accordance with current engineering best practice as recommended in the QUDM, ARR16 and Rockhampton Regional Council Guidelines.

Name: Jeremy Cox

RPEQ No: 14732

Date: 1st June 2022

Signature: _____

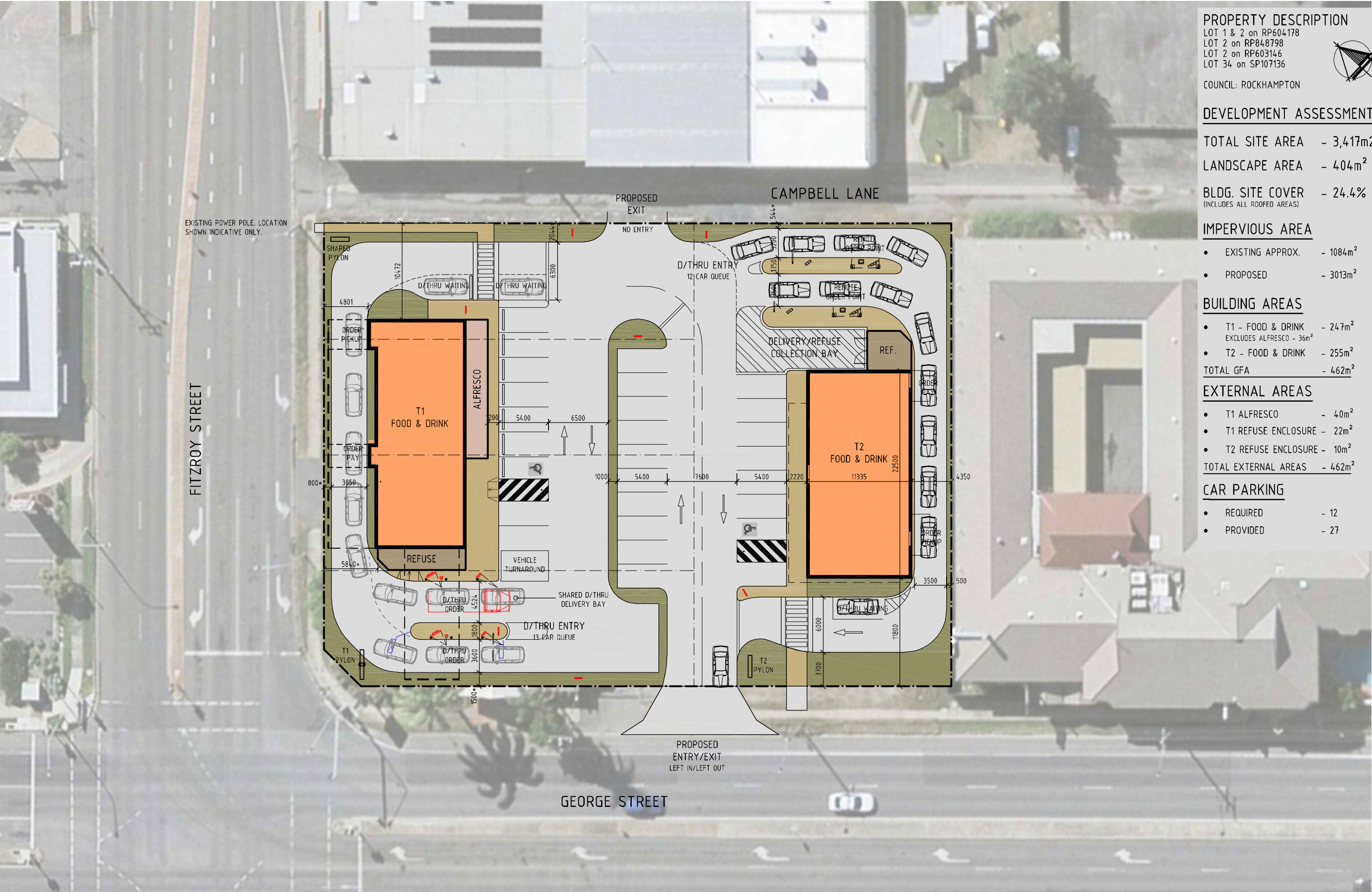
9. REFERENCES

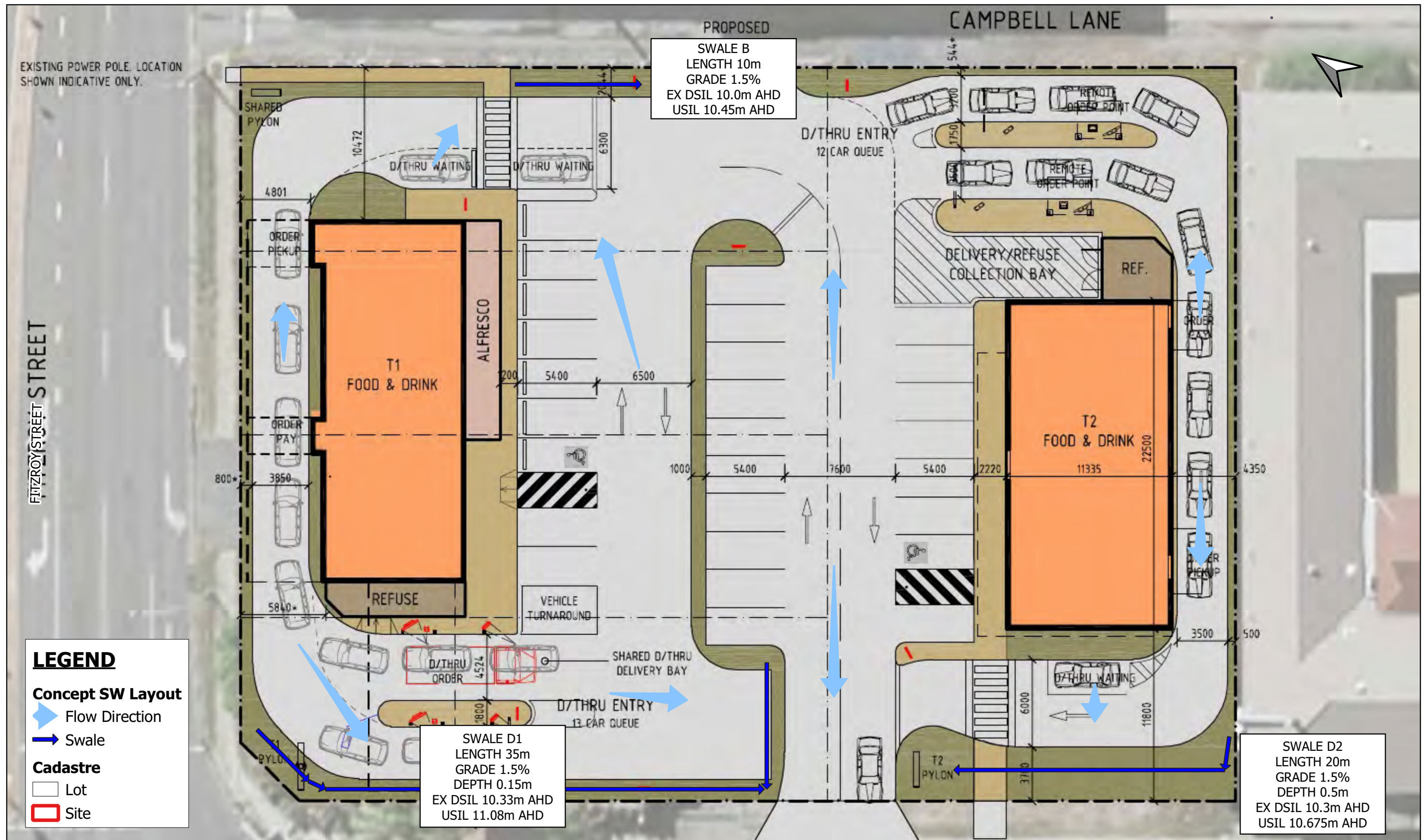
1. Institute of Public Works Engineering Australasia (QLD Division), et al, 2016. *Queensland Urban Drainage Manual (QUDM), Fourth Edition*. Brisbane.
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3. Water by Design, 2010. *MUSIC Modelling Guidelines*, SEQ Healthy Water Ways Partnership, Brisbane
4. Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, *Australian Rainfall and Runoff: A Guide to Flood Estimation*, Commonwealth of Australia (Geoscience Australia), 2016, Canberra.
5. Bureau of Meteorology, 2016 *IFDs – Rainfall Data*. Available at: <http://www.bom.gov.au/water/designRainfalls/revised-efd/?year=2016>
6. Department of Infrastructure, Local Government and Planning, July 2017. *State Planning Policy (SSP)*, Brisbane.



APPENDIX A

PROPOSED LOT LAYOUT AND CONCEPT LAYOUT

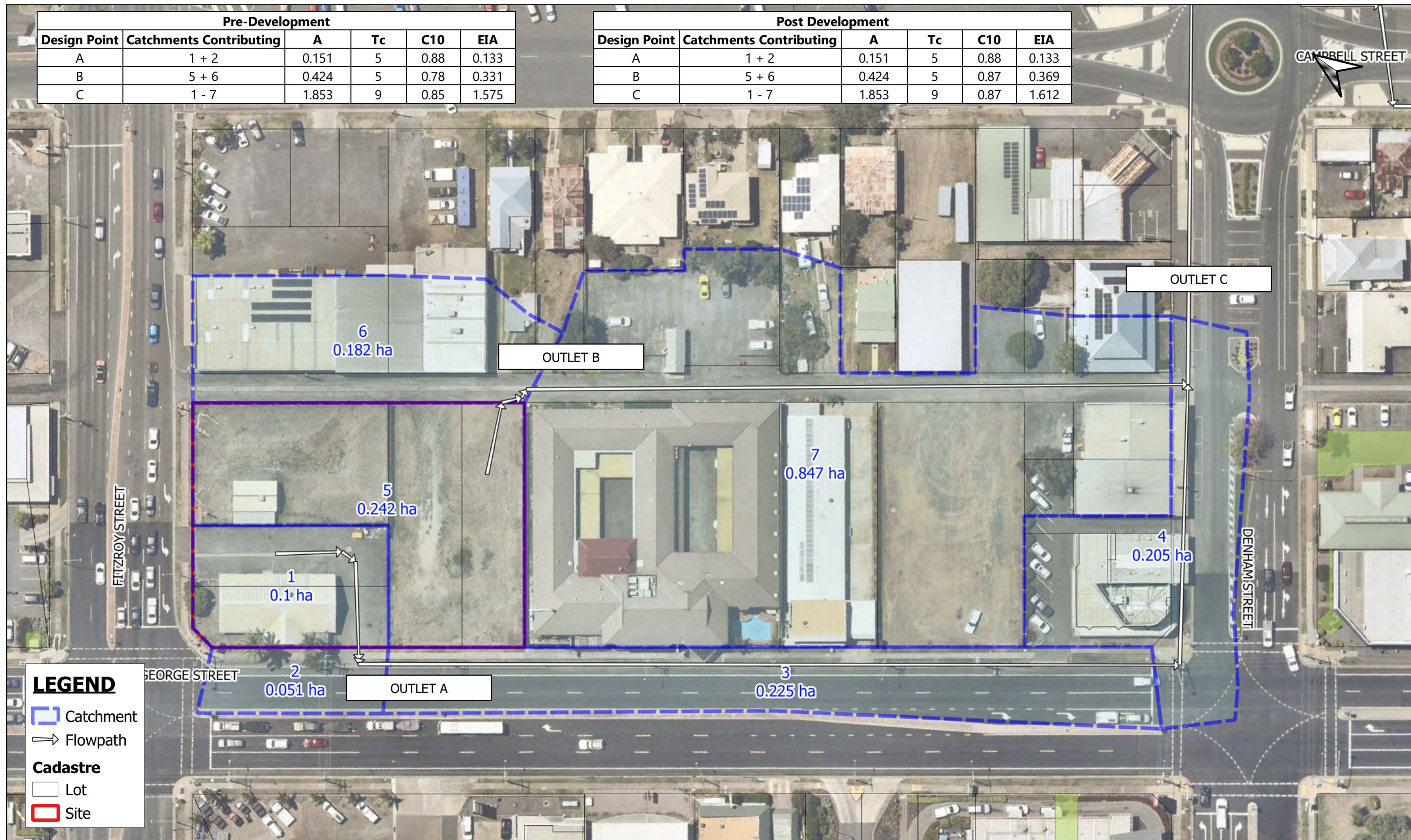






APPENDIX B

CATCHMENTS





APPENDIX C

CALCULATIONS

RATIONAL METHOD SUMMARY



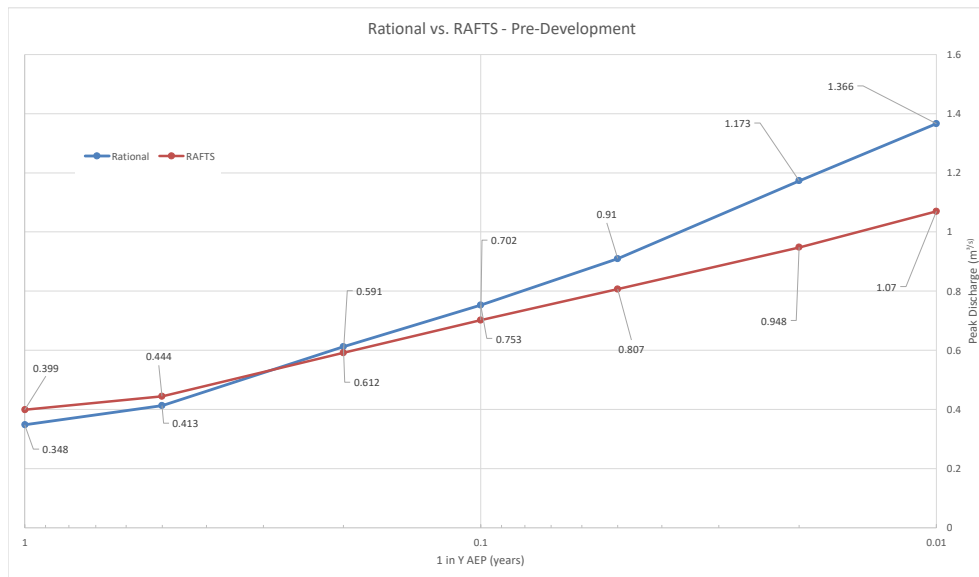
Pre-Development Scenario			
Catchment	A	B	C
Area (ha)	0.15	0.42	1.85

Post-Development Scenario			
Catchment	A	B	C
Area (ha)	0.15	0.42	1.85

Job Number	MIS-1019
Date	44617
Designer	LH
Reviewer	JC

Pre Development Flows																								
Catchment Name	Area (ha)	t _c (min)	I ₁₀₀ (mm/hr)	C ₁₀₀	1% AEP (m ³ /s)	I ₅₀ (mm/hr)	C ₅₀	2% AEP (m ³ /s)	I ₃₀ (mm/hr)	C ₃₀	5% AEP (m ³ /s)	I ₁₀ (mm/hr)	C ₁₀	10% AEP (m ³ /s)	I ₅ (mm/hr)	C ₅	18% AEP (m ³ /s)	I ₂ (mm/hr)	C ₂	39% AEP (m ³ /s)	I ₁ (mm/hr)	C ₁	63% AEP (m ³ /s)	Q3month (m ³ /s)
A	0.15	5	300	1.00	0.13	268	1.00	0.11	229	0.92	0.09	200	0.88	0.07	170	0.84	0.06	128	0.75	0.04	115	0.70	0.03	0.02
B	0.42	5	300	0.94	0.33	268	0.90	0.28	229	0.82	0.22	200	0.78	0.18	170	0.74	0.15	128	0.66	0.10	115	0.62	0.08	0.04
C	1.85	9	260	1.00	1.34	233	0.98	1.17	198	0.89	0.91	172	0.85	0.75	147	0.81	0.61	111	0.72	0.41	99	0.68	0.35	0.17

Post Development Flows																								
Catchment Name	Area (ha)	t _c (min)	I ₁₀₀ (mm/hr)	C ₁₀₀	1% AEP (m ³ /s)	I ₅₀ (mm/hr)	C ₅₀	2% AEP (m ³ /s)	I ₂₀ (mm/hr)	C ₂₀	5% AEP (m ³ /s)	I ₁₀ (mm/hr)	C ₁₀	10% AEP (m ³ /s)	I ₅ (mm/hr)	C ₅	18% AEP (m ³ /s)	I ₂ (mm/hr)	C ₂	39% AEP (m ³ /s)	I ₁ (mm/hr)	C ₁	63% AEP (m ³ /s)	Q3month (m ³ /s)
A	0.15	5	300	1.00	0.13	246	1.00	0.10	207	0.92	0.08	177	0.88	0.07	155	0.84	0.05	118	0.75	0.04	91	0.70	0.03	0.01
B	0.42	5	300	1.00	0.35	246	1.00	0.29	207	0.91	0.22	177	0.87	0.18	155	0.83	0.15	118	0.74	0.10	91	0.70	0.07	0.04
C	1.85	9	260	1.00	1.34	246	1.00	1.27	207	0.91	0.97	177	0.87	0.79	155	0.83	0.66	118	0.74	0.45	91	0.70	0.33	0.16

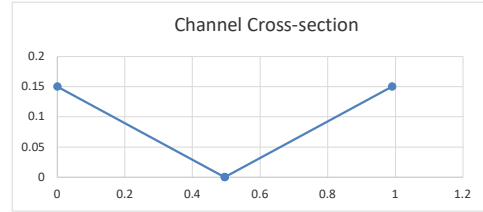


Swale A

AEP	Area	Intensity	Fy	C	Q
63.2	0.105	115	0.8	0.696	0.023
50	0.105	128	0.85	0.7395	0.028
20	0.105	170	0.95	0.8265	0.041
10	0.105	200	1	0.87	0.051
5	0.105	229	1.05	0.9135	0.061
2	0.105	268	1.15	1	0.078
1	0.105	300	1.2	1	0.088

Mannings Channel Capacity - Swale A

Channel Depth	0.25 m
Base Width	0 m
Batter 1 1 in :	3
Batter 2 1 in :	3
Top of Channel (width)	1.5 m
Slope	1.50%
Mannings 'n'	0.04
Area	0.188 m ²
Wetted Perimeter	1.581 m
Hydraulic Radius	0.118585 m
Calculated V	0.738524 m/s
Calculated Q	0.138473 m ³ /s

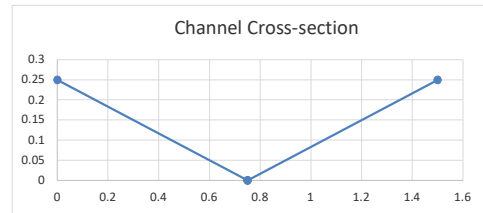


Swale B

AEP	Area	Intensity	Fy	C	Q
63.2	0.052	115	0.8	0.696	0.012
50	0.052	128	0.85	0.7395	0.014
20	0.052	170	0.95	0.8265	0.020
10	0.052	200	1	0.87	0.025
5	0.052	229	1.05	0.9135	0.030
2	0.052	268	1.15	1	0.039
1	0.052	300	1.2	1	0.043

Mannings Channel Capacity - Swale B

Channel Depth	0.25 m
Base Width	0 m
Batter 1 1 in :	3
Batter 2 1 in :	3
Top of Channel (width)	1.5 m
Slope	1.50%
Mannings 'n'	0.04
Area	0.188 m ²
Wetted Perimeter	1.581 m
Hydraulic Radius	0.118585 m
Calculated V	0.738524 m/s
Calculated Q	0.138473 m ³ /s

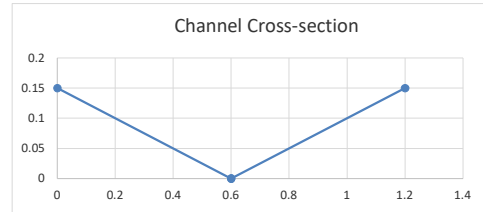


Swale D1

AEP	Area	Intensity	Fy	C	Q
63.2	0.053	115	0.8	0.696	0.012
50	0.053	128	0.85	0.7395	0.014
20	0.053	170	0.95	0.8265	0.021
10	0.053	200	1	0.87	0.026
5	0.053	229	1.05	0.9135	0.031
2	0.053	268	1.15	1	0.039
1	0.053	300	1.2	1	0.044

Mannings Channel Capacity - Swale D1

Channel Depth	0.15 m
Base Width	0 m
Batter 1 1 in :	4
Batter 2 1 in :	4
Top of Channel (width)	1.2 m
Slope	1.50%
Mannings 'n'	0.04
Area	0.090 m ²
Wetted Perimeter	1.237 m
Hydraulic Radius	0.072761 m
Calculated V	0.533176 m/s
Calculated Q	0.047986 m ³ /s

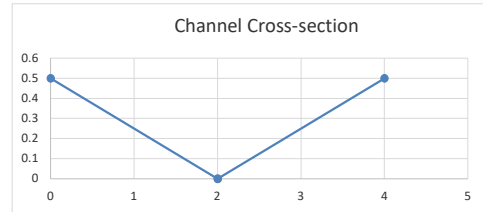


Swale D2

AEP	Area	Intensity	Fy	C	Q
63.2	0.021	115	0.8	0.696	0.005
50	0.021	128	0.85	0.7395	0.006
20	0.021	170	0.95	0.8265	0.008
10	0.021	200	1	0.87	0.010
5	0.021	229	1.05	0.9135	0.012
2	0.021	268	1.15	1	0.016
1	0.021	300	1.2	1	0.018

Mannings Channel Capacity - Swale D2

Channel Depth	0.5 m
Base Width	0 m
Batter 1 1 in :	4
Batter 2 1 in :	4
Top of Channel (width)	4.0 m
Slope	1.50%
Mannings 'n'	0.04
Area	1.000 m ²
Wetted Perimeter	4.123 m
Hydraulic Radius	0.242536 m
Calculated V	1.19023 m/s
Calculated Q	1.19023 m ³ /s





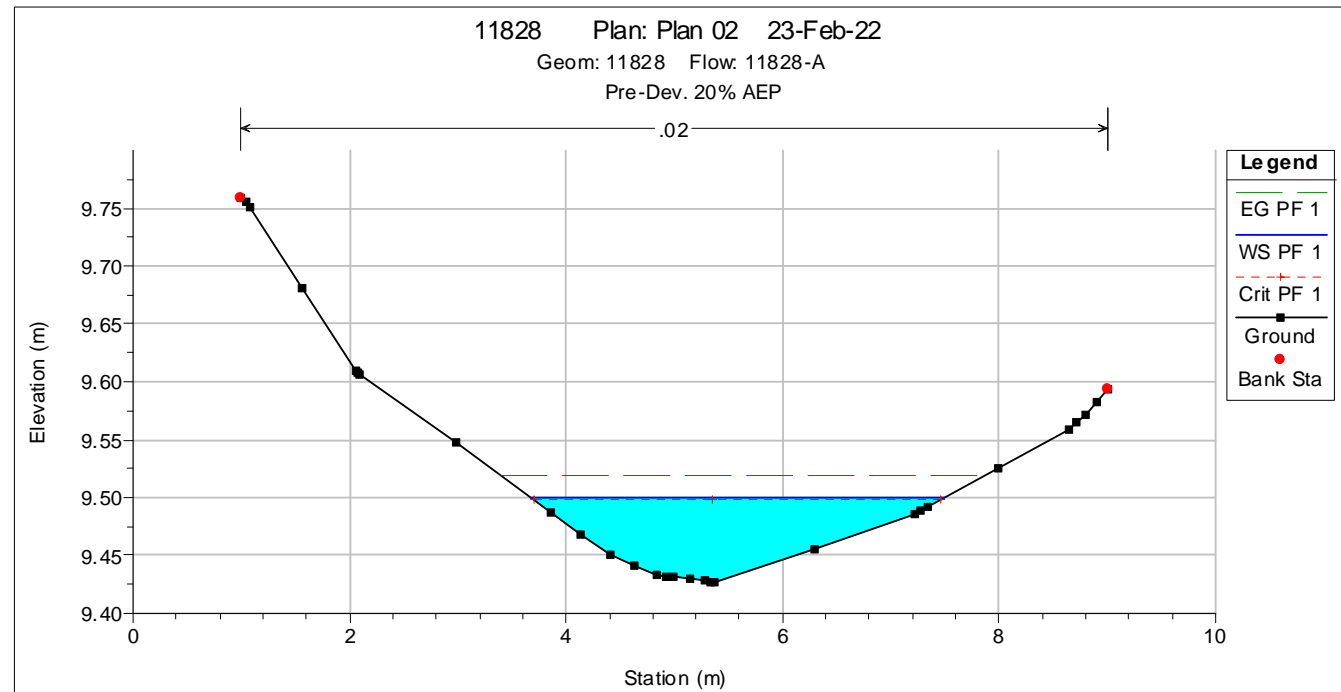
APPENDIX D

HEC-RAS MODEL RESULTS

Road Flow: Campbell Lane - Point B

20% AEP Pre-Development

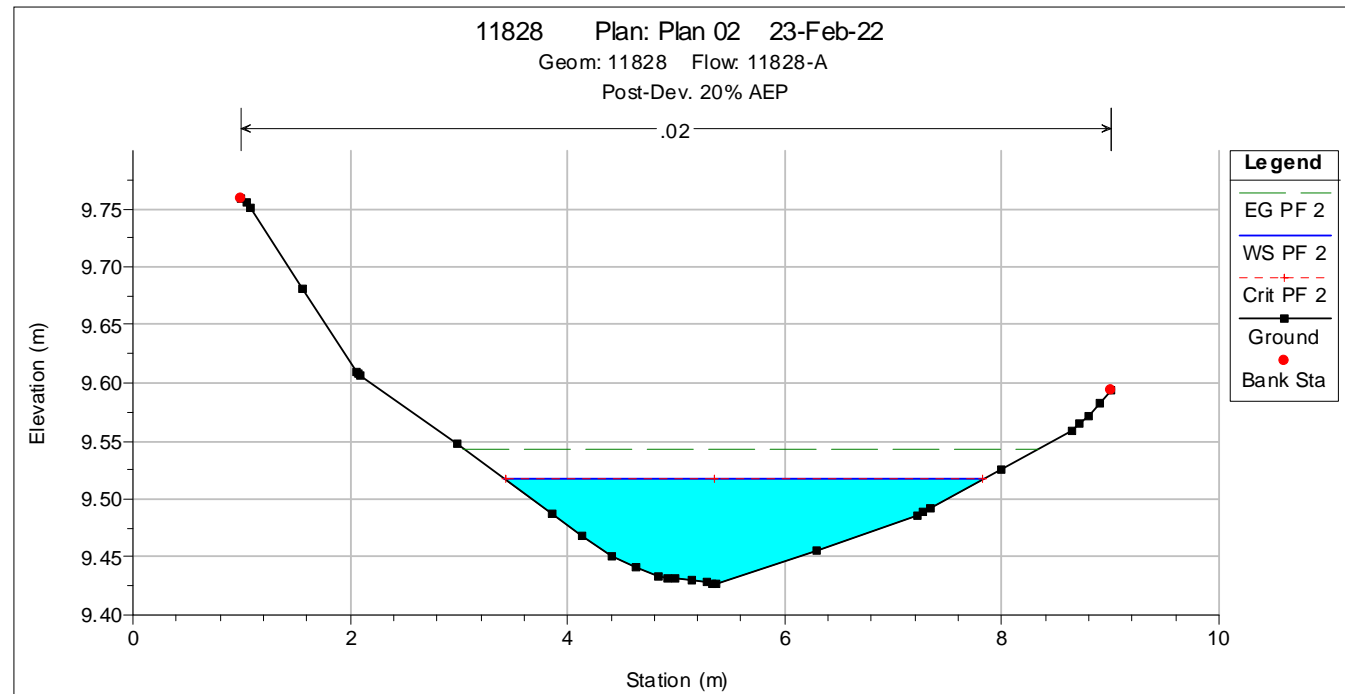
E.G. Elev (m)	9.52
Vel Head (m)	0.02
W.S. Elev (m)	9.5
Crit W.S. (m)	9.5
E.G. Slope (m/m)	0.01
Q Total (m3/s)	0.1
Top Width (m)	3.82
Vel Total (m/s)	0.61
Max Chl Dpth (m)	0.07
Element	Channel
Wt. n-Val.	0.02
Flow Area (m2)	0.16
Area (m2)	0.16
Flow (m3/s)	0.1
Top Width (m)	3.82
Avg. Vel. (m/s)	0.61
Hydr. Depth (m)	0.04



Road Flow: Campbell Lane - Point B

20% AEP Post-Development

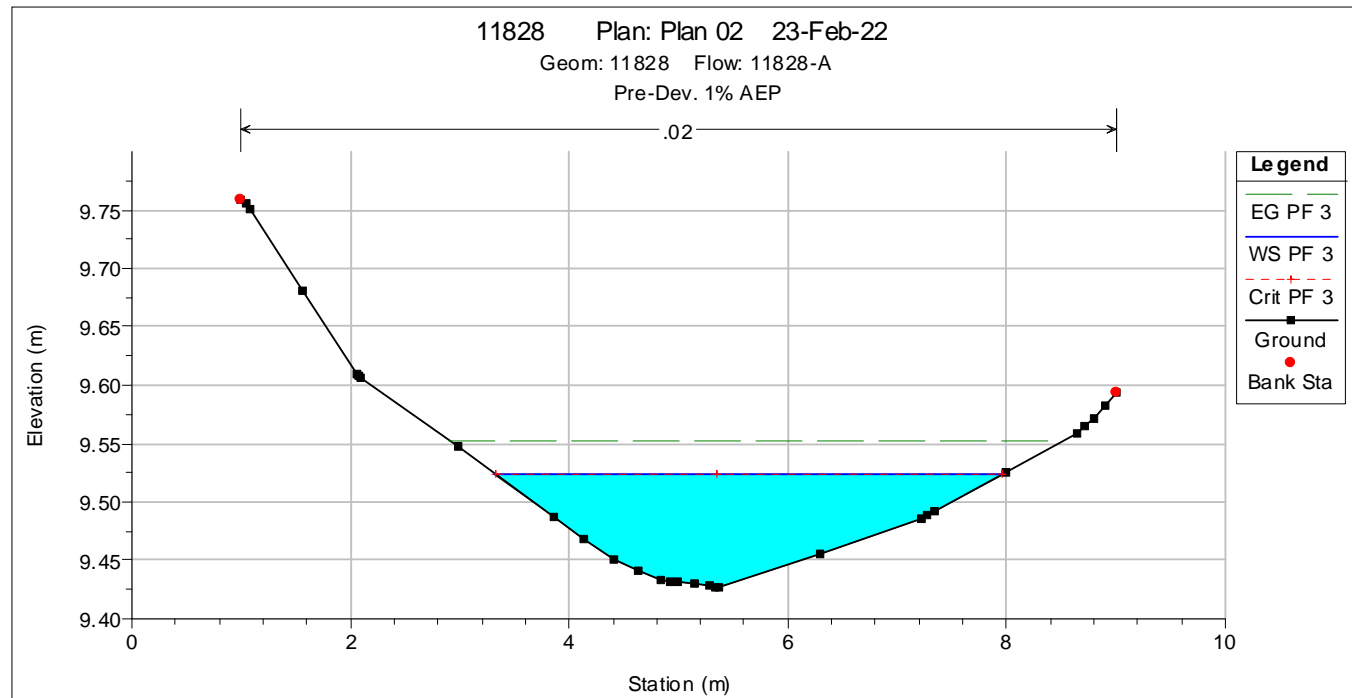
E.G. Elev (m)	9.54
Vel Head (m)	0.03
W.S. Elev (m)	9.52
Crit W.S. (m)	9.52
E.G. Slope (m/m)	0.01
Q Total (m3/s)	0.17
Top Width (m)	4.43
Vel Total (m/s)	0.71
Max Chl Dpth (m)	0.09
Element	Channel
Wt. n-Val.	0.02
Flow Area (m2)	0.24
Area (m2)	0.24
Flow (m3/s)	0.17
Top Width (m)	4.43
Avg. Vel. (m/s)	0.71
Hydr. Depth (m)	0.05



Road Flow: Campbell Lane - Point B

1% AEP Pre-Development

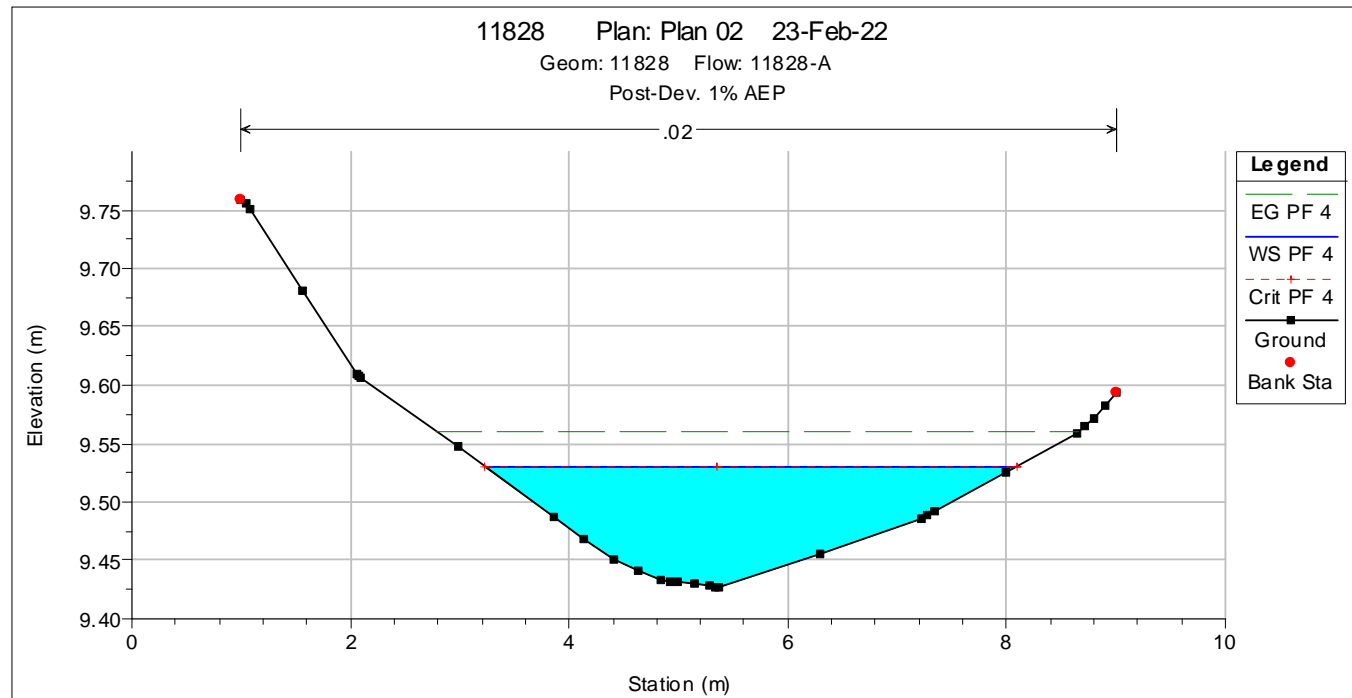
E.G. Elev (m)	9.55
Vel Head (m)	0.03
W.S. Elev (m)	9.52
Crit W.S. (m)	9.52
E.G. Slope (m/m)	0.01
Q Total (m3/s)	0.2
Top Width (m)	4.66
Vel Total (m/s)	0.74
Max Chl Dpth (m)	0.1
Element	Channel
Wt. n-Val.	0.02
Flow Area (m2)	0.27
Area (m2)	0.27
Flow (m3/s)	0.2
Top Width (m)	4.66
Avg. Vel. (m/s)	0.74
Hydr. Depth (m)	0.06



Road Flow: Campbell Lane - Point B

1% AEP Post-Development

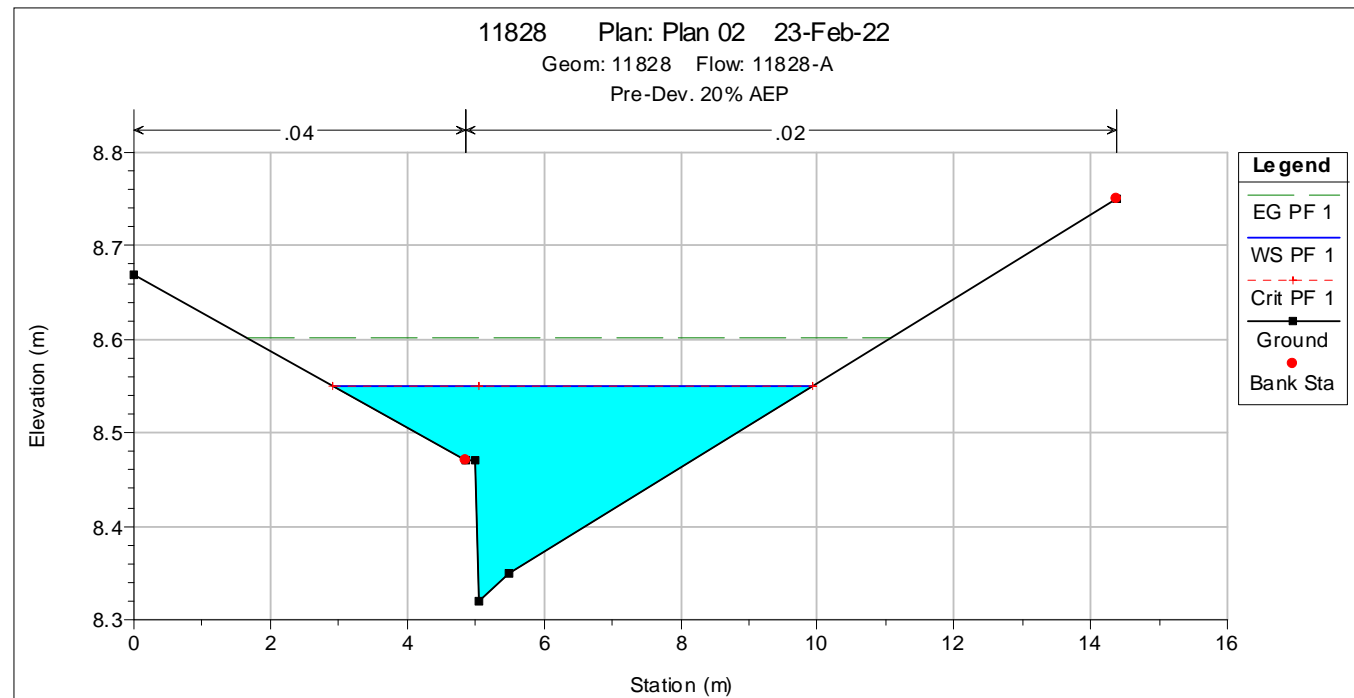
E.G. Elev (m)	9.56
Vel Head (m)	0.03
W.S. Elev (m)	9.53
Crit W.S. (m)	9.53
E.G. Slope (m/m)	0.0099
Q Total (m3/s)	0.23
Top Width (m)	4.87
Vel Total (m/s)	0.77
Max Chl Dpth (m)	0.1
Element	Channel
Wt. n-Val.	0.02
Flow Area (m2)	0.3
Area (m2)	0.3
Flow (m3/s)	0.23
Top Width (m)	4.87
Avg. Vel. (m/s)	0.77
Hydr. Depth (m)	0.06

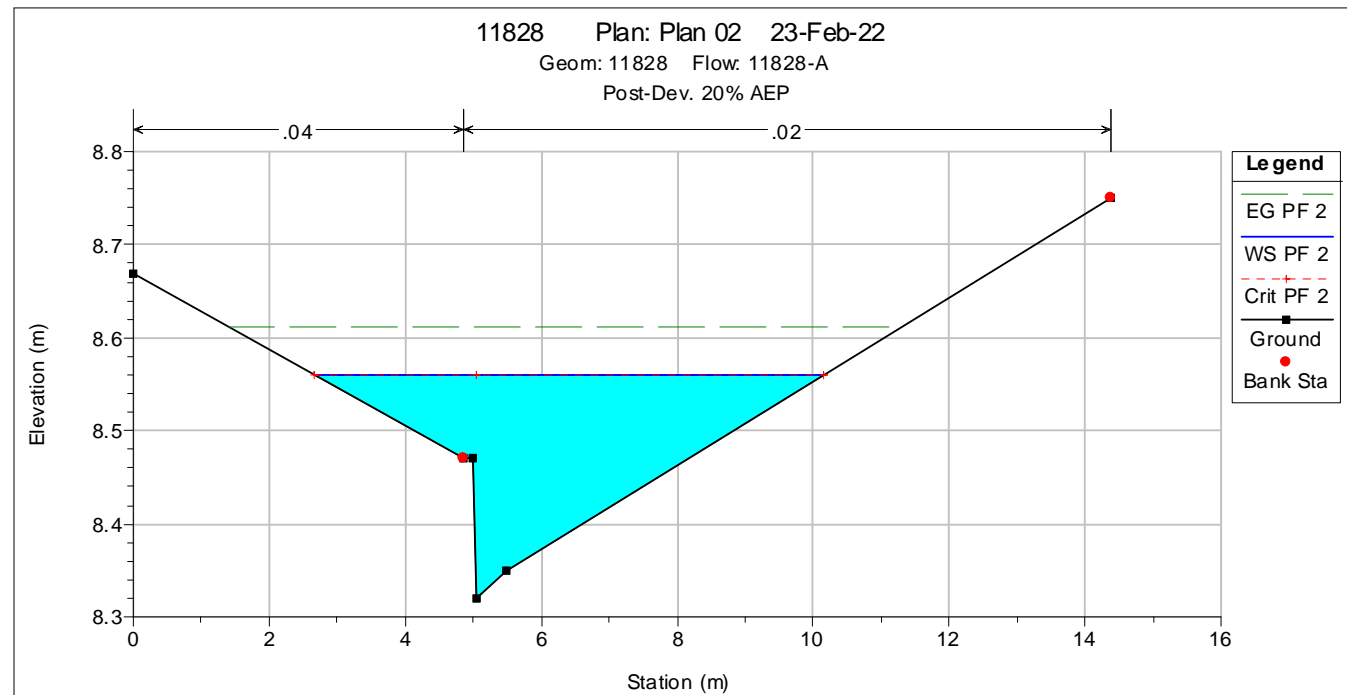


Road Flow: Denham Street - Point C

20% AEP Pre-Development

E.G. Elev (m)	8.5
Vel Head (m)	0.05
W.S. Elev (m)	8.45
Crit W.S. (m)	8.45
E.G. Slope (m/m)	0.00807
Q Total (m3/s)	0.59
Top Width (m)	7.04
Vel Total (m/s)	0.92
Max Chl Dpth (m)	0.23
Element	Left OB
Wt. n-Val.	0.04
Flow Area (m2)	0.08
Area (m2)	0.08
Flow (m3/s)	0.02
Top Width (m)	1.95
Avg. Vel. (m/s)	0.26
Hydr. Depth (m)	0.04
Element	Channel
Wt. n-Val.	0.02
Flow Area (m2)	0.56
Area (m2)	0.56
Flow (m3/s)	0.57
Top Width (m)	5.09
Avg. Vel. (m/s)	1.02
Hydr. Depth (m)	0.11

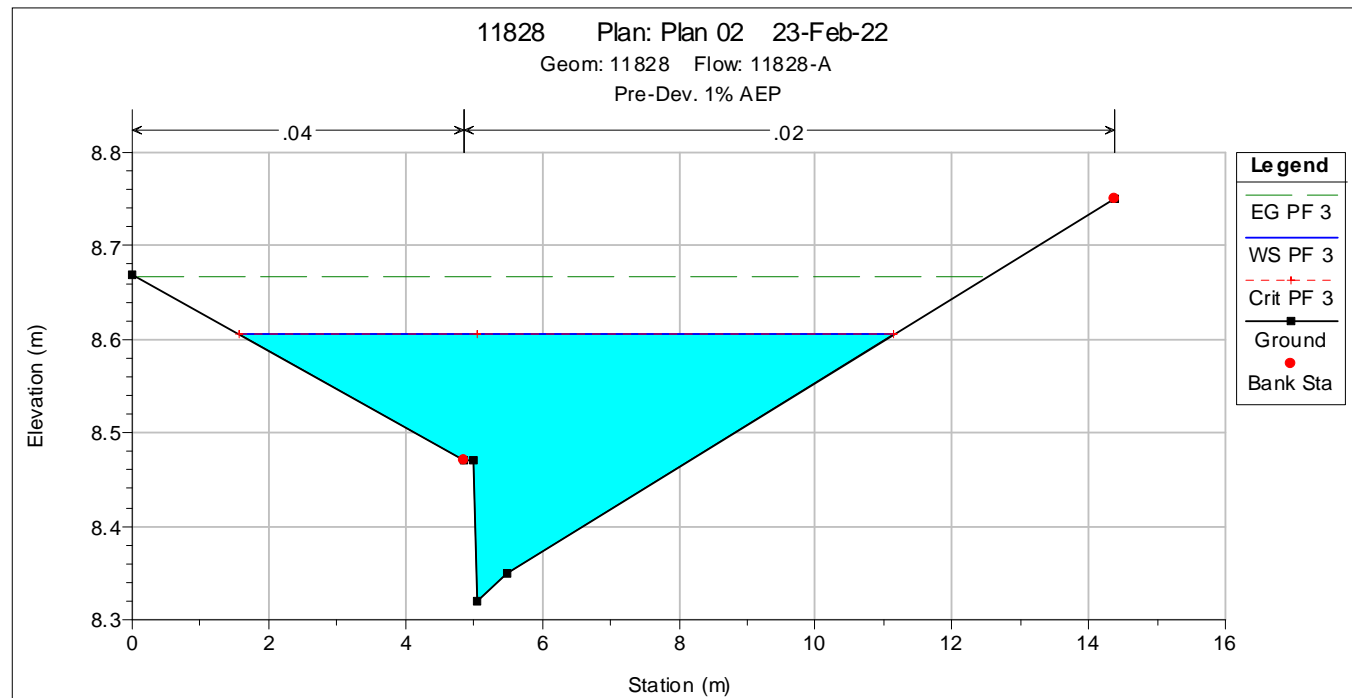




Road Flow: Denham Street - Point C

1% AEP Pre-Development

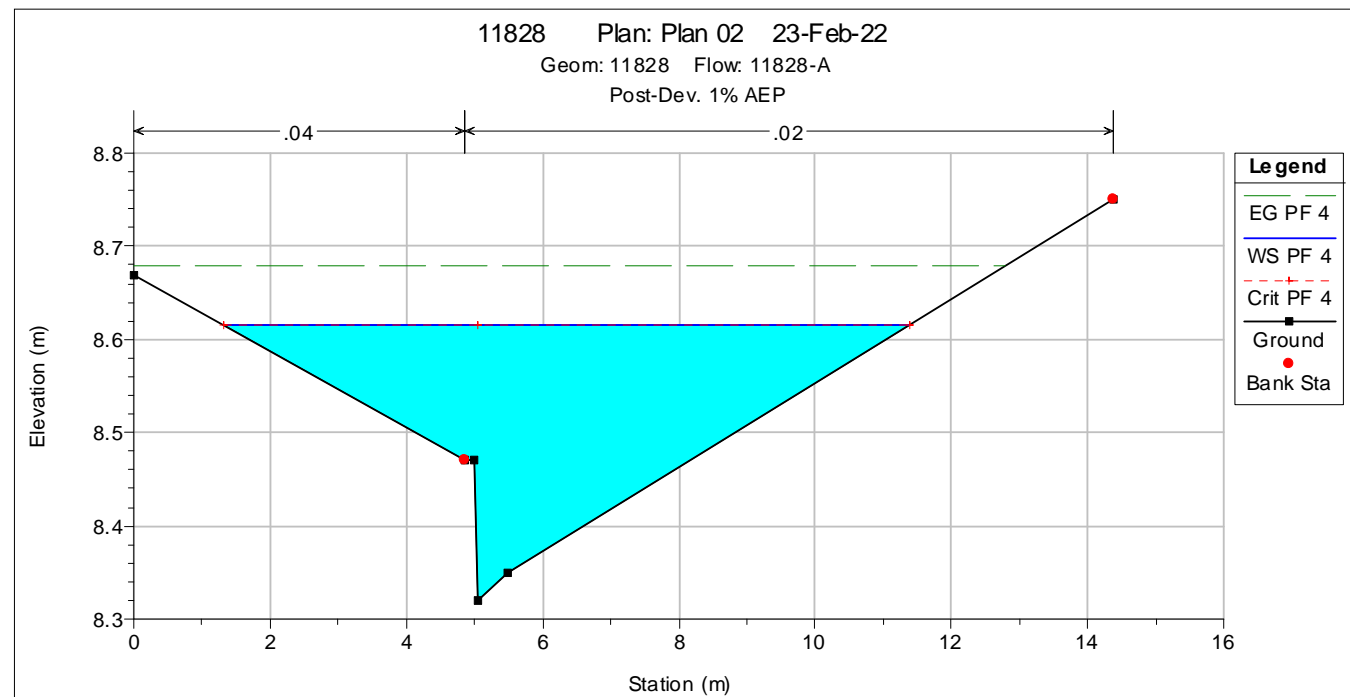
E.G. Elev (m)	8.57
Vel Head (m)	0.06
W.S. Elev (m)	8.51
Crit W.S. (m)	8.51
E.G. Slope (m/m)	0.0074
Q Total (m3/s)	1.07
Top Width (m)	9.58
Vel Total (m/s)	0.98
Max Chl Dpth (m)	0.28
Element	Left OB
Wt. n-Val.	0.04
Flow Area (m2)	0.22
Area (m2)	0.22
Flow (m3/s)	0.08
Top Width (m)	3.27
Avg. Vel. (m/s)	0.36
Hydr. Depth (m)	0.07
Element	Channel
Wt. n-Val.	0.02
Flow Area (m2)	0.87
Area (m2)	0.87
Flow (m3/s)	0.99
Top Width (m)	6.3
Avg. Vel. (m/s)	1.14
Hydr. Depth (m)	0.14



Road Flow: Denham Street - Point C

1% AEP Post-Development

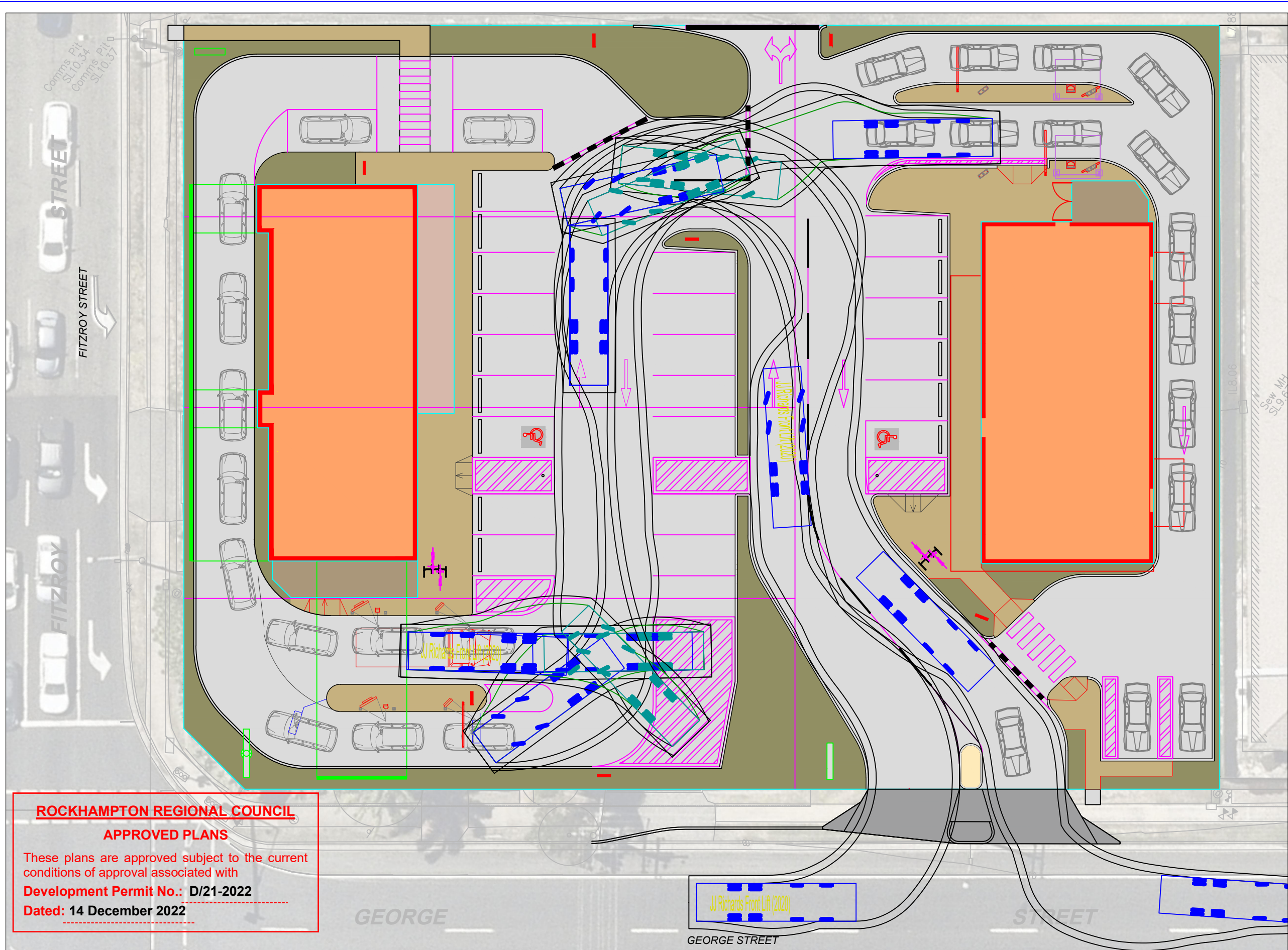
E.G. Elev (m)	8.58
Vel Head (m)	0.06
W.S. Elev (m)	8.52
Crit W.S. (m)	8.52
E.G. Slope (m/m)	0.00723
Q Total (m3/s)	1.18
Top Width (m)	10.08
Vel Total (m/s)	0.99
Max Chl Dpth (m)	0.3
Element	Left OB
Wt. n-Val.	0.04
Flow Area (m2)	0.26
Area (m2)	0.26
Flow (m3/s)	0.1
Top Width (m)	3.54
Avg. Vel. (m/s)	0.37
Hydr. Depth (m)	0.07
Element	Channel
Wt. n-Val.	0.02
Flow Area (m2)	0.94
Area (m2)	0.94
Flow (m3/s)	1.09
Top Width (m)	6.55
Avg. Vel. (m/s)	1.15
Hydr. Depth (m)	0.14

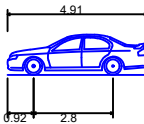




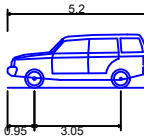
Premise

premise.com.au

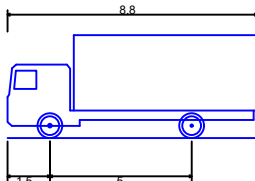




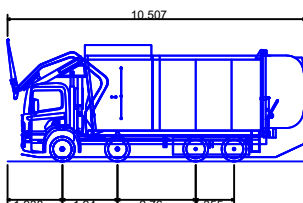
B85 Vehicle (Realistic min radius) (2004)
Overall Length 4.910m
Overall Width 1.870m
Overall Body Height 1.421m
Min Body Ground Clearance 0.159m
Track Width 1.770m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 5.750m



B99 Vehicle (Realistic min radius) (2004)
Overall Length 5.200m
Overall Width 1.940m
Overall Body Height 1.878m
Min Body Ground Clearance 0.272m
Track Width 1.840m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 6.250m




MRV - Medium Rigid Vehicle
Overall Length 8.800m
Overall Width 2.500m
Overall Body Height 3.633m
Min Body Ground Clearance 0.428m
Track Width 2.500m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 10.000m

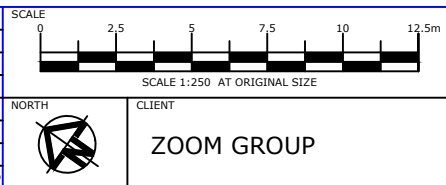


JJ Richards Front Lift (2020)
Overall Length 10.507m
Overall Width 2.490m
Overall Body Height 4.300m
Min Body Ground Clearance 0.150m
Track Width 2.490m
Lock-to-lock time 5.00s
Curb to Curb Turning Radius 10.800m

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/21-2022
Dated: 14 December 2022

DIRECTOR

DAVID GRUMMITT **RPEQ 19356**
APPROVED 15 Oct 2022

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
B	15-10-22	AMENDED SITE ACCESS ARRANGEMENT	DG	DG	DG
A	03-08-22	ORIGINAL ISSUE	DG	DG	DG

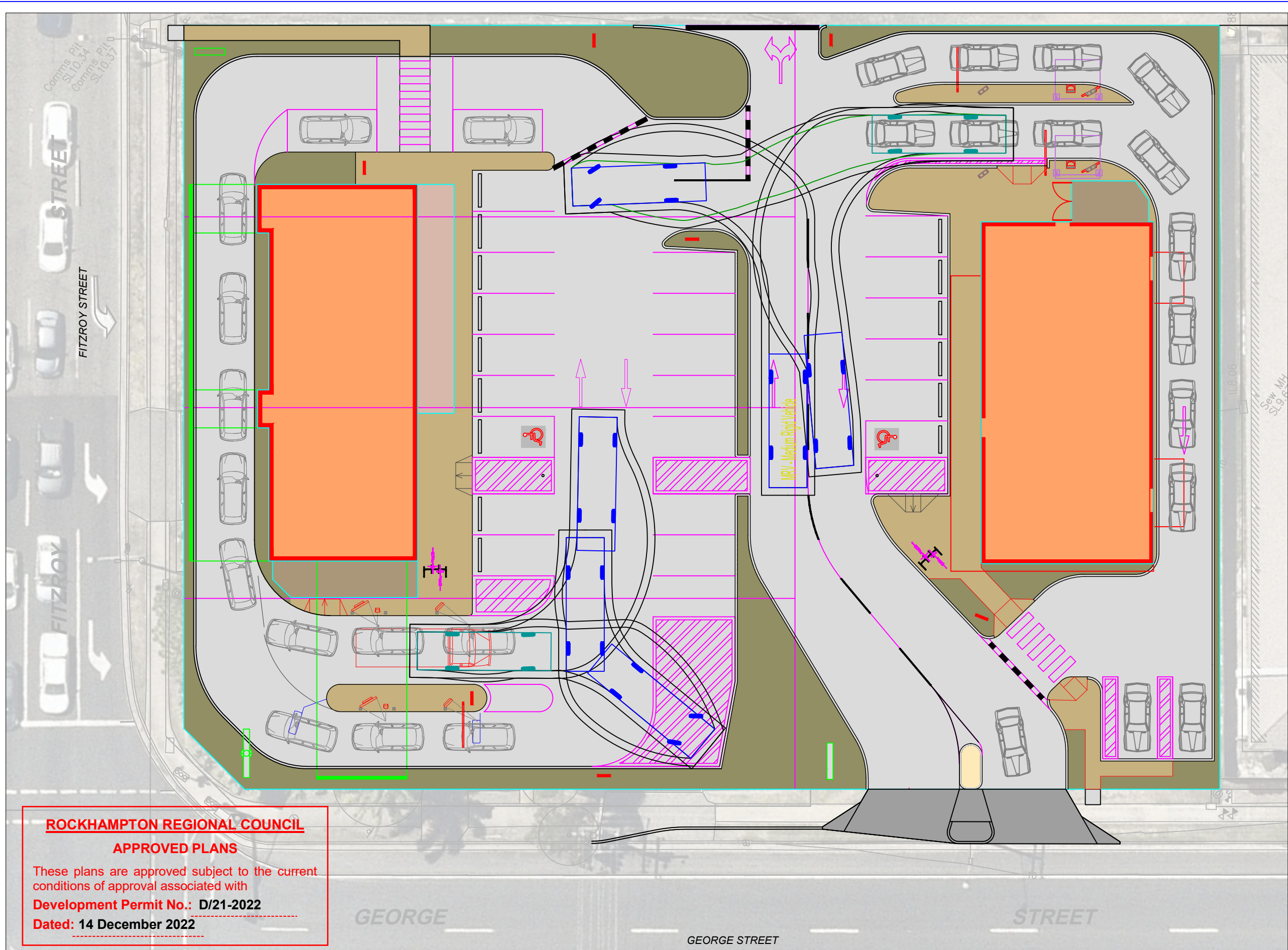


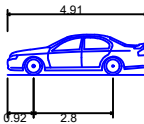
ttm
TTM CONSULTING PTY LTD
ABN 65 010 868 621
LEVEL 8, 369 Ann Street, BRISBANE, QLD, 4000
P.O. BOX 12015, BRISBANE, QLD, 4003
T: (07) 3327 9500 F: (07) 3327 9501
E: ttmbri@ttmgroup.com.au W: www.ttmgroup.com.au

PROJECT **87 FITZROY STREET, ROCKHAMPTON**

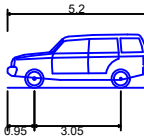
DRAWING TITLE **VEHICLE SWEEP PATH ANALYSIS
REFUSE COLLECTION VEHICLE (FRONT-LOADING)**

PROJECT NUMBER 21BRT0461	ORIGINAL SIZE A3
DRAWING NUMBER 21BRT0461-10	REVISION B
DATE 15 Oct 2022	SHEET 1 OF 5

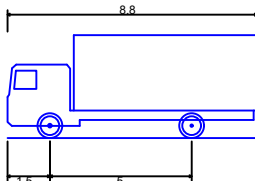




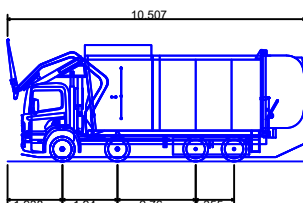
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Track Width 1.770m
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B99 Vehicle (Realistic min radius) (2004)
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Overall Width 1.940m
Overall Body Height 1.878m
Min Body Ground Clearance 0.272m
Track Width 1.840m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 6.250m



MRV - Medium Rigid Vehicle
Overall Length 8.800m
Overall Width 2.500m
Overall Body Height 3.633m
Min Body Ground Clearance 0.428m
Track Width 2.500m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 10.000m




JJ Richards Front Lift (2020)
Overall Length 10.507m
Overall Width 2.490m
Overall Body Height 4.300m
Min Body Ground Clearance 0.150m
Track Width 2.490m
Lock-to-lock time 5.00s
Curb to Curb Turning Radius 10.800m


ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/21-2022
Dated: 14 December 2022

**DIRECTOR**
DAVID GRUMMITT **RPEQ 19356**
APPROVED 15 Oct 2022


REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
B	15-10-22	AMENDED SITE ACCESS ARRANGEMENT	DG	DG	DG
A	03-08-22	ORIGINAL ISSUE	DG	DG	DG



SCALE 1:250 AT ORIGINAL SIZE



NORTH



CLIENT
ZOOM GROUP

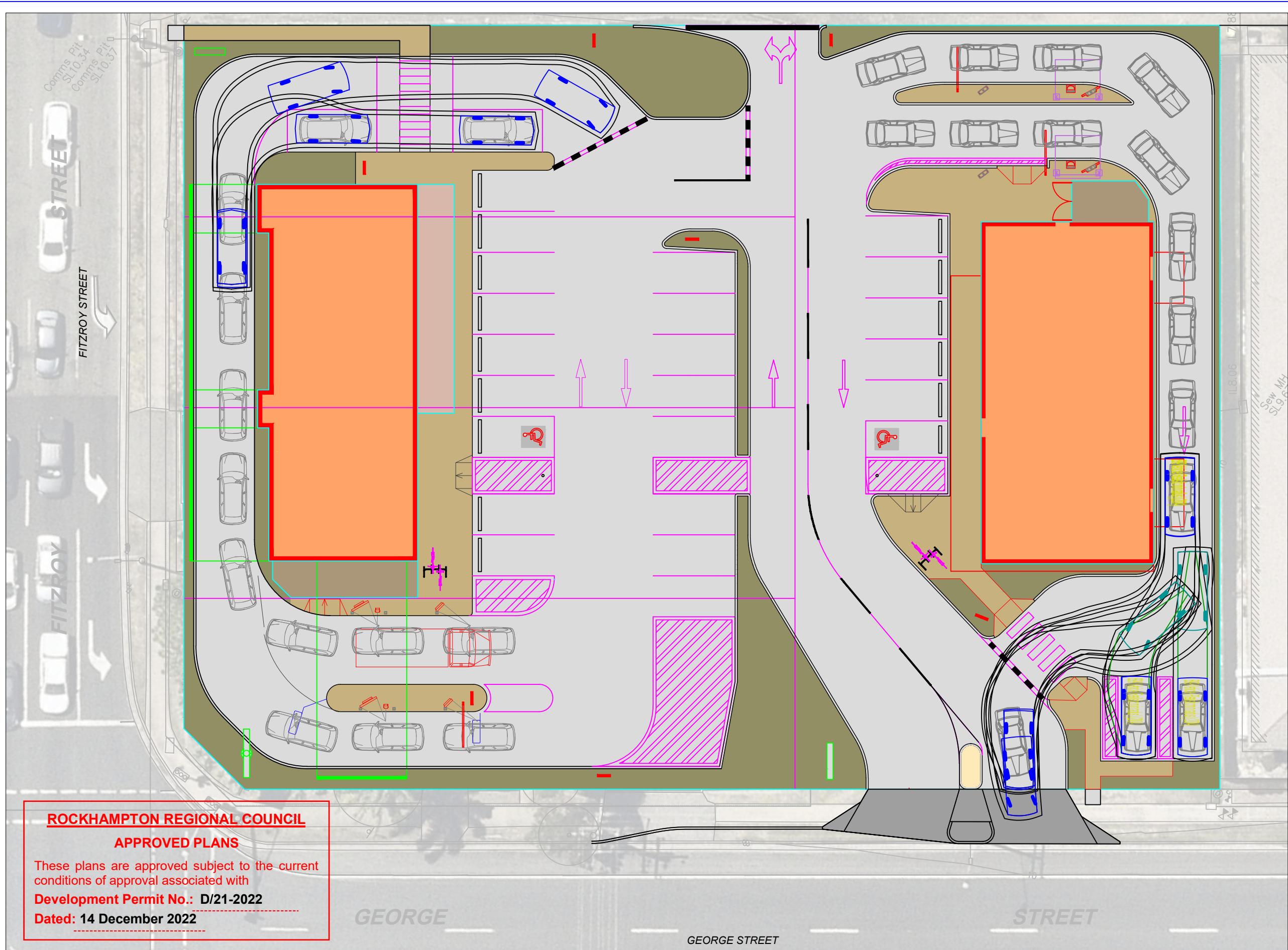


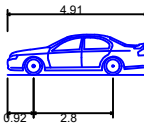
TTM CONSULTING PTY LTD
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E: ttmbri@ttmgroup.com.au W: www.ttmgroup.com.au

PROJECT
87 FITZROY STREET, ROCKHAMPTON

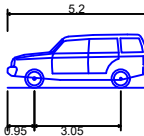
DRAWING TITLE
**VEHICLE SWEEP PATH ANALYSIS
MEDIUM RIGID VEHICLE (DELIVERIES)**

PROJECT NUMBER 21BRT0461	ORIGINAL SIZE A3
DRAWING NUMBER 21BRT0461-10	REVISION B
DATE 15 Oct 2022	SHEET 2 OF 5

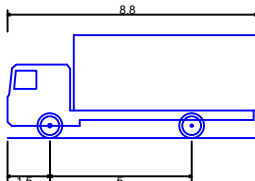




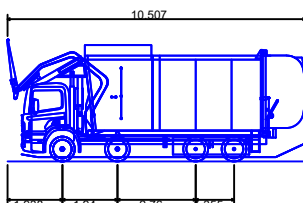
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Overall Width 1.870m
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Min Body Ground Clearance 0.159m
Track Width 1.770m
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B99 Vehicle (Realistic min radius) (2004)
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MRV - Medium Rigid Vehicle
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Overall Body Height 3.633m
Min Body Ground Clearance 0.428m
Track Width 2.500m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 10.000m




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Overall Width 2.490m
Overall Body Height 4.300m
Min Body Ground Clearance 0.150m
Track Width 2.490m
Lock-to-lock time 5.00s
Curb to Curb Turning Radius 10.800m




DIRECTOR
DAVID GRUMMITT RPEQ 19356
APPROVED 15 Oct 2022


REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
B	15-10-22	AMENDED SITE ACCESS ARRANGEMENT	DG	DG	DG
A	03-08-22	ORIGINAL ISSUE	DG	DG	DG



SCALE 1:250 AT ORIGINAL SIZE



NORTH



CLIENT
ZOOM GROUP

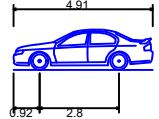
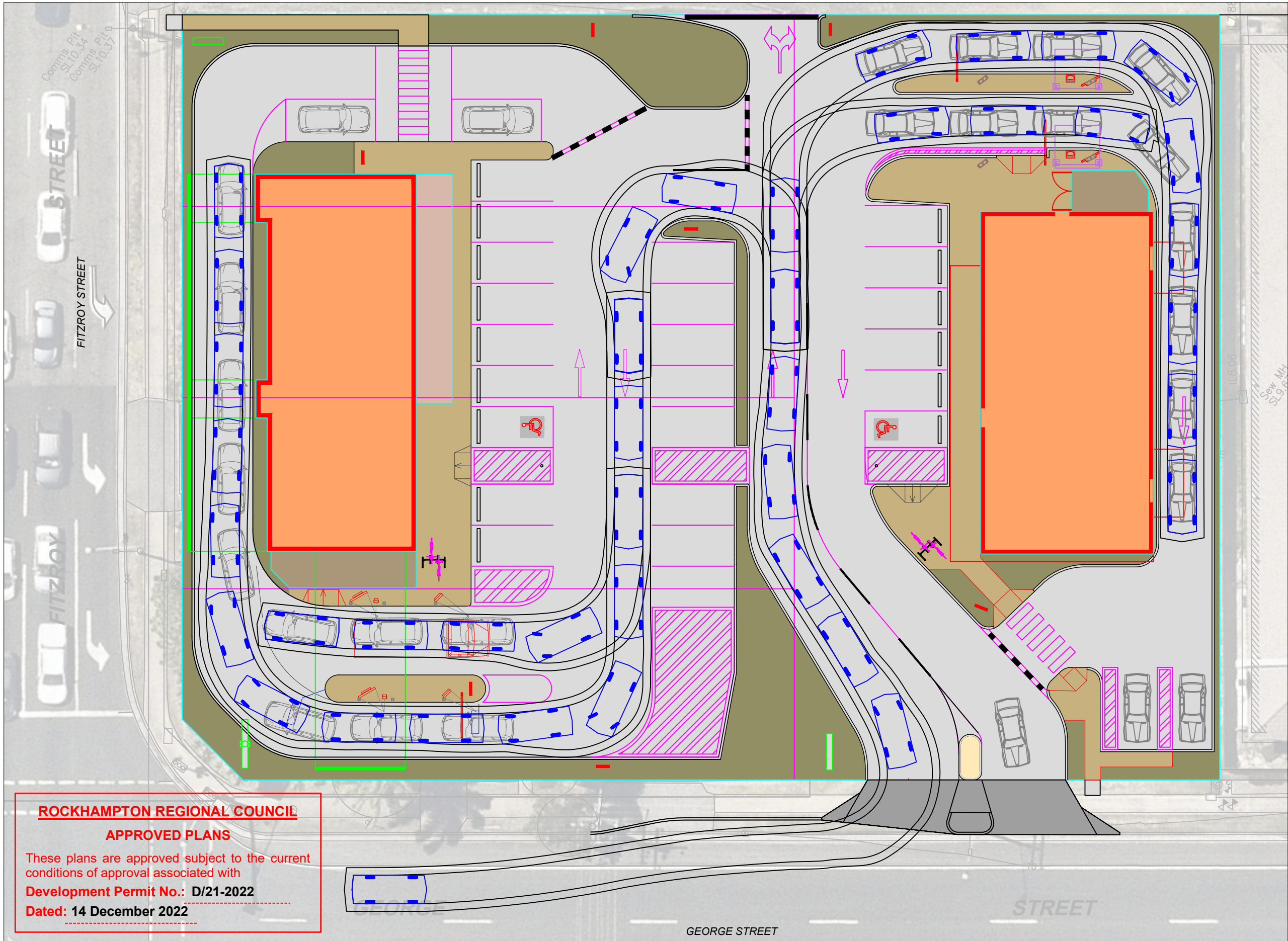


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ABN 65 010 868 621
LEVEL 8, 369 Ann Street, BRISBANE, QLD, 4000
P.O. BOX 12015, BRISBANE, QLD, 4003
T: (07) 3327 9500 F: (07) 3327 9501
E: ttmbri@ttmgroup.com.au W: www.ttmgroup.com.au

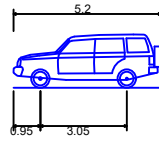
PROJECT
87 FITZROY STREET, ROCKHAMPTON

DRAWING TITLE
VEHICLE SWEEP PATH ANALYSIS
B99 PASSING B85 VEHICLE (DRIVE THROUGH WAITING)

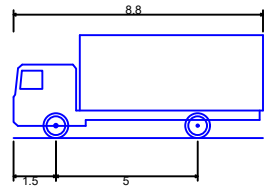
PROJECT NUMBER	21BRT0461	ORIGINAL SIZE	A3
DRAWING NUMBER	21BRT0461-10	REVISION	B
DATE	15 Oct 2022	SHEET	3 OF 5



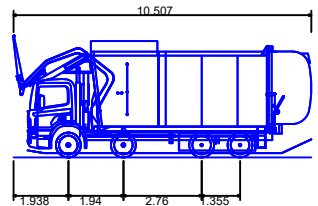
B85 Vehicle (Realistic min radius) (2004)
Overall Length 4.910m
Overall Width 1.870m
Overall Body Height 1.421m
Min Body Ground Clearance 0.159m
Track Width 1.770m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 5.750m



B99 Vehicle (Realistic min radius) (2004)
Overall Length 5.200m
Overall Width 1.940m
Overall Body Height 1.878m
Min Body Ground Clearance 0.272m
Track Width 1.840m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 6.250m



MRV - Medium Rigid Vehicle
Overall Length 8.800m
Overall Width 2.500m
Overall Body Height 3.633m
Min Body Ground Clearance 0.428m
Track Width 2.500m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 10.000m



JJ Richards Front Lift (2020)
Overall Length 10.507m
Overall Width 2.490m
Overall Body Height 4.300m
Min Body Ground Clearance 0.150m
Track Width 2.490m
Lock-to-lock time 5.00s
Curb to Curb Turning Radius 10.800m

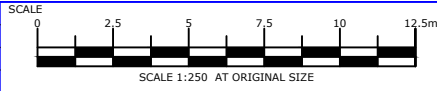
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/21-2022
Dated: 14 December 2022


DAVID GRUMMITT
RPEQ 19356
APPROVED 15 Oct 2022

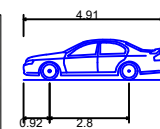
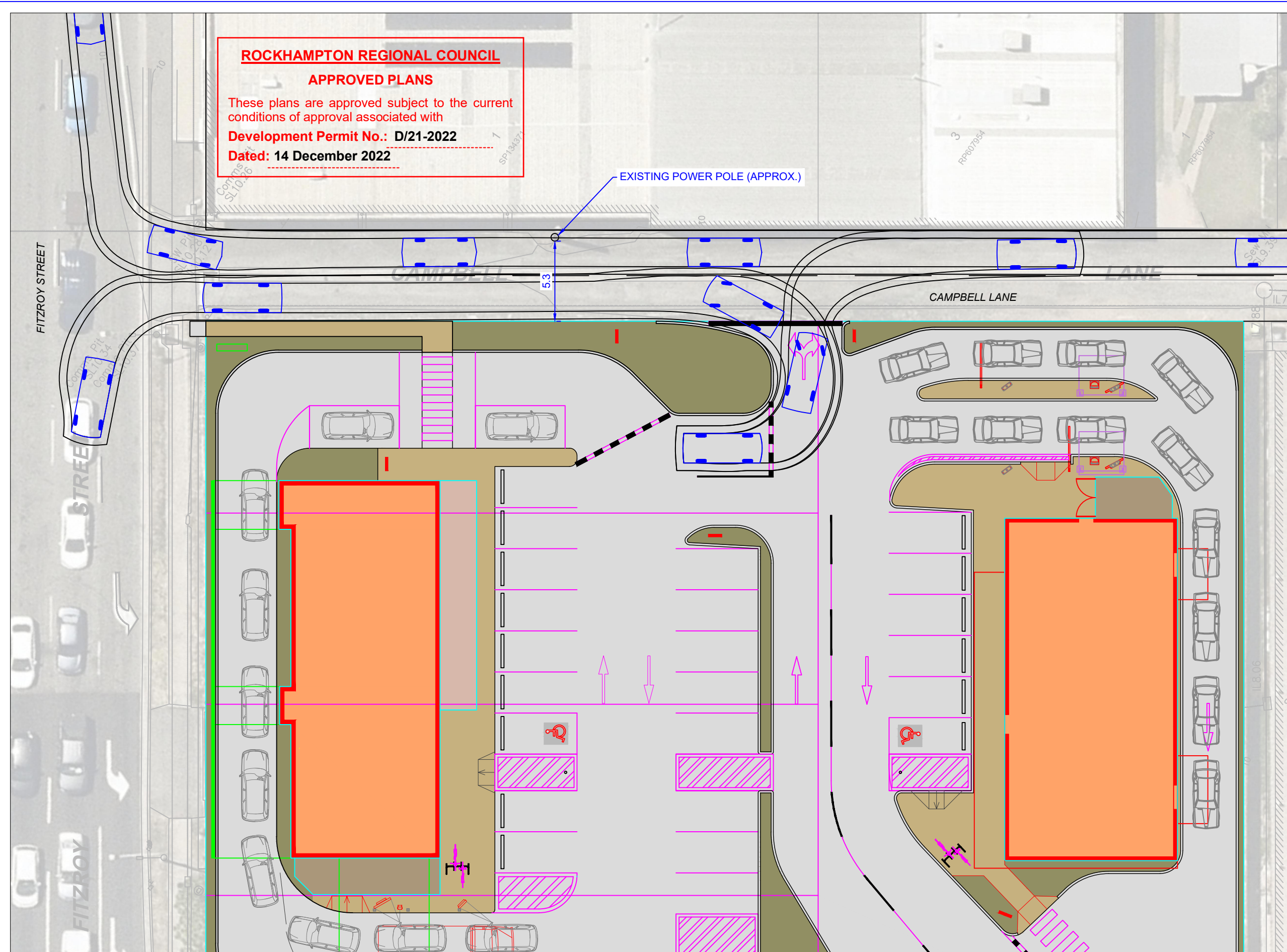
REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
B	15-10-22	AMENDED SITE ACCESS ARRANGEMENT	DG	DG	DG
A	03-08-22	ORIGINAL ISSUE	DG	DG	DG



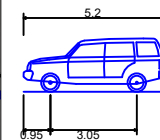
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PROJECT	87 FITZROY STREET, ROCKHAMPTON
DRAWING TITLE	VEHICLE SWEEP PATH ANALYSIS DRIVE THROUGH QUEUING CAPACITY (B85 VEHICLE)

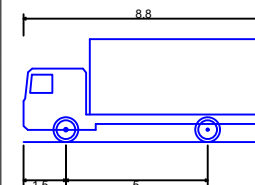
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DRAWING NUMBER	21BRT0461-10	REVISION	B
DATE	15 Oct 2022	SHEET	4 OF 5



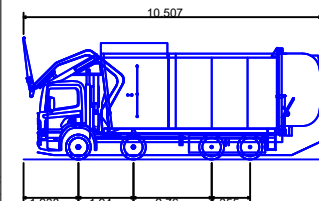
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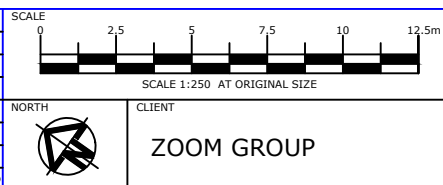
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Lock-to-lock time 5.00s
Curb to Curb Turning Radius 10.800m

DIRECTOR
DAVID GRUMMITT RPEQ 19356
APPROVED 15 Oct 2022

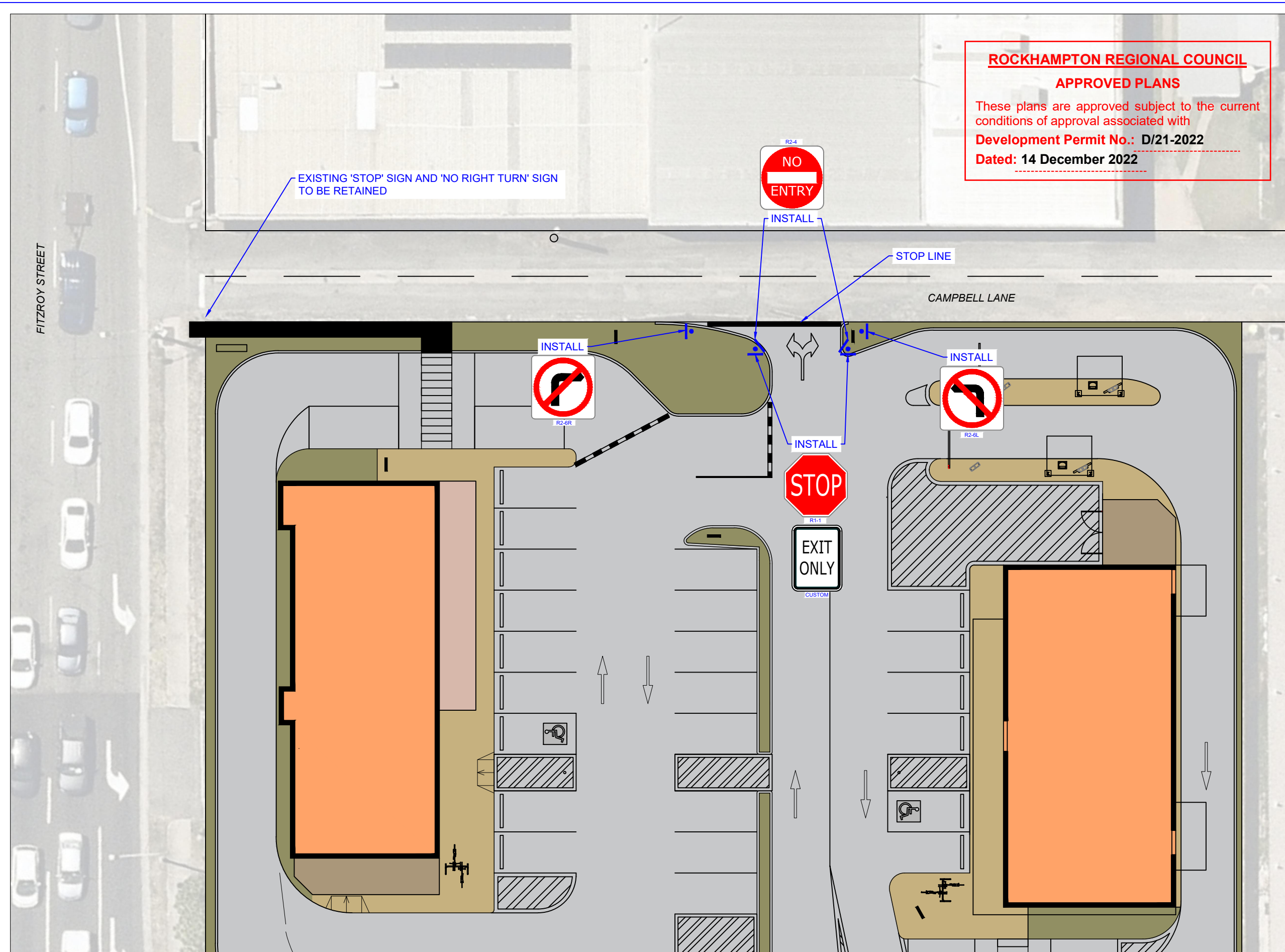
REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
B	15-10-22	AMENDED SITE ACCESS ARRANGEMENT	DG	DG	DG
A	03-08-22	ORIGINAL ISSUE	DG	DG	DG



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PROJECT
87 FITZROY STREET, ROCKHAMPTON
DRAWING TITLE
VEHICLE SWEEP PATH ANALYSIS
CAMPBELL LANE SITE EGRESS (B99 VEHICLE)

PROJECT NUMBER	21BRT0461	ORIGINAL SIZE	A3
DRAWING NUMBER	21BRT0461-10	REVISION	B
DATE	15 Oct 2022	SHEET	5 OF 5



ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
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Dated: 14 December 2022

Note: Only the directional signage shown in this plan is approved. The plan should be updated at Operational Works stage to align with the other approved plans (e.g. site plan)

David Grummitt DIRECTOR
 DAVID GRUMMITT RPEQ 19356
 APPROVED 3 Aug 2022

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	03-08-22	ORIGINAL ISSUE	DG	DG	DG

SCALE 0 2.5 5 7.5 10 12.5m
 SCALE 1:250 AT ORIGINAL SIZE

NORTH

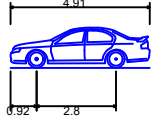
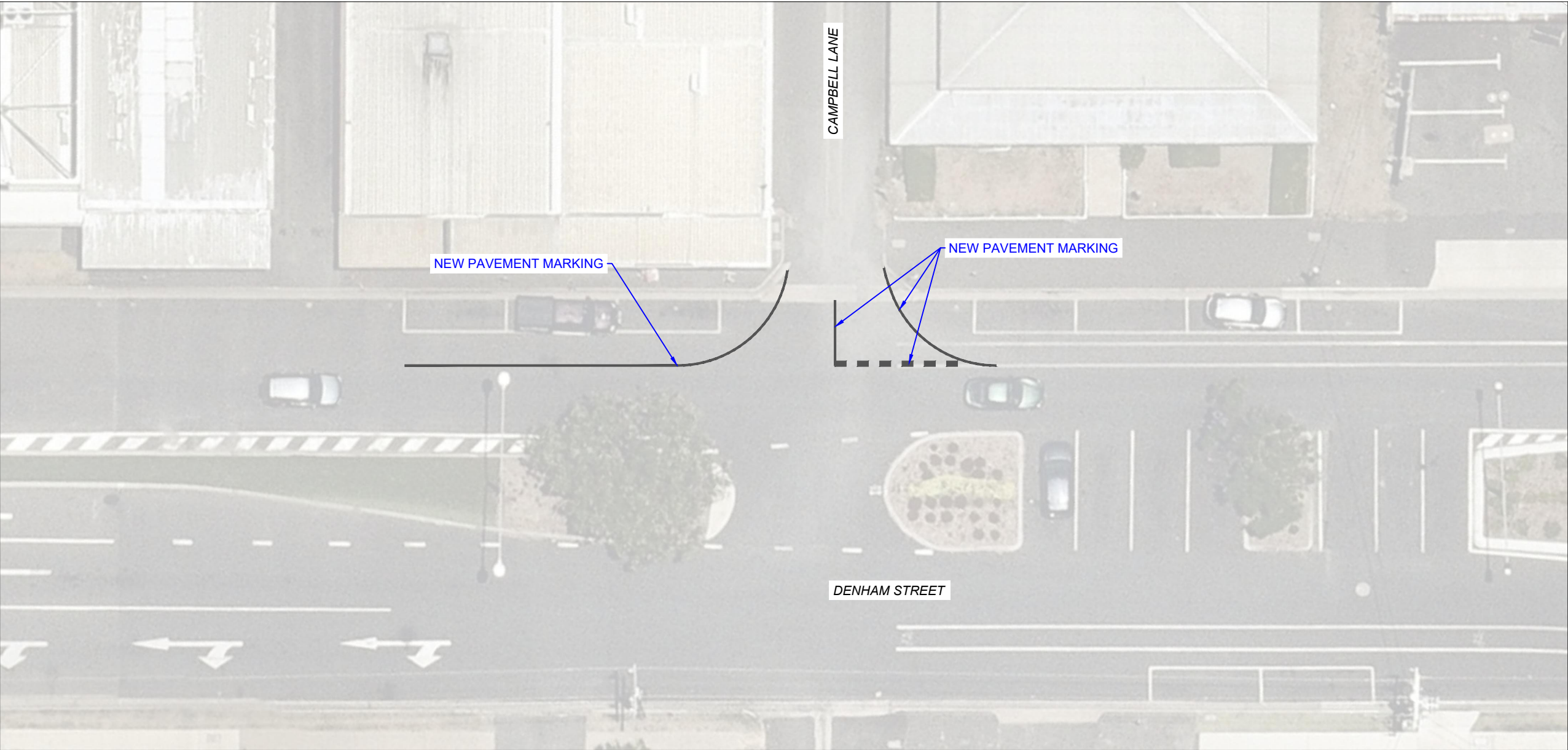
CLIENT
ZOOM GROUP

ttm TTM CONSULTING PTY LTD
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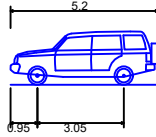
PROJECT
87 FITZROY STREET, ROCKHAMPTON

DRAWING TITLE
**CAMPBELL LANE SITE EGRESS ARRANGEMENT
 PRELIMINARY SIGNAGE & PAVEMENT MARKING PLAN**

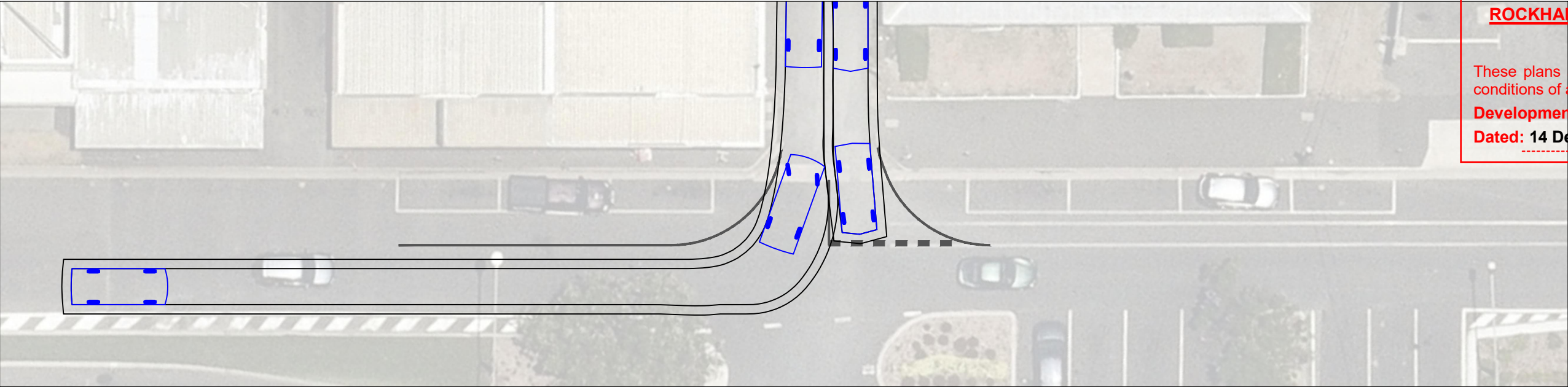
PROJECT NUMBER 21BRT0461	ORIGINAL SIZE A3
DRAWING NUMBER 21BRT0461-11	REVISION A
DATE 3 Aug 2022	SHEET 1 OF 1



B85 Vehicle (Realistic min radius) (2004)
Overall Length 4.910m
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ROCKHAMPTON REGIONAL COUNCIL

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Dated: 14 December 2022

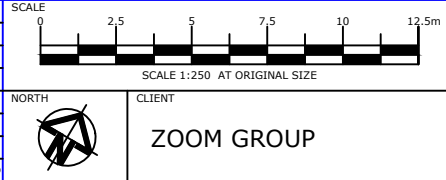
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DAVID GRUMMITT
APPROVED 8 Aug 2022

DIRECTOR

RPEQ 19356

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
B	08-08-22	GENERAL AMENDMENTS	DG	DG	DG
A	03-08-22	ORIGINAL ISSUE	DG	DG	DG



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PROJECT	PROJECT NUMBER	ORIGINAL SIZE
87 FITZROY STREET, ROCKHAMPTON	21BRT0461	A3
DRAWING TITLE	DRAWING NUMBER	REVISION
DENHAM STREET / CAMPBELL LANE INTERSECTION PROPOSED UPGRADE CONCEPT PLAN	21BRT0461-12	B
DATE	SHEET	
8 Aug 2022	1 OF 1	

PROPOSED FAST FOOD DEVELOPMENT
125 GEORGE ST & 87-93 FITZROY
ST, ROCKHAMPTON CITY
LANDSCAPE CONCEPT PLAN

- 1 PROPOSED STREET TREE**
Street tree in accordance with Council's Street Tree Planting Guidelines;
Refer Proposed Planting Schedule
(ie: *Xanthostemon chrysanthus*)
- 2 MEDIUM SHADE/ SCREEN TREE**
Medium sized trees that assist in the landscape presentation to the streetscape; provides shade, visual and climatic amenity, as well as primary screening to neighbouring property;
Refer Proposed Planting Schedule
(ie: *Elaeocarpus eumundii*, *Harpullia pendula*)
- 3 COLUMNAR PALMS**
Vertical columnar palms to provide visual and climatic amenity; and softens building presentation to the adjacent streetscape;
Refer Proposed Planting Schedule
(ie: *Ptychosperma elegans*)
- 4 SCREEN PLANTING**
Dense planting to boundaries so as to provide visual amenity and privacy screening to neighbouring properties;
Refer Proposed Planting Schedule
- 5 SHRUBS AND GROUNDCOVERS**
Mass planting to assist in building presentation to the streetscape and to provide visual amenity;
Refer Proposed Planting Schedule

- LEGEND
- PROPOSED SCREEN FENCE
1800mm high timber screen fence
 - PROPOSED GARDEN EDGE
To future detail

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Dated: 14 December 2022

B	18/10/22	UPDATED ARCHITECTURAL DWGS
A	17/05/22	FOR SUBMISSION TO RRC
ISSUE	DATE	REASON
1:300@A3		
JOB NUMBER	SHEET NO.	ISSUE
22.107	1	B
		DRAWN BY
		AG/ PD

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CODE	SPECIES	COMMON NAME	SIZE**	SPACING(m)	HEIGHT(m)	WIDTH(m)
1 PROPOSED STREET TREE						
1.1	<i>Xanthostemon chrysanthus</i>	Golden Penda	45L	as shown	10	6
2 PROPOSED MEDIUM SHADE/ SCREEN TREES						
2.1	<i>Elaeocarpus eumundii</i>	Smooth Leaved Quandong	100L	as shown	8	4
2.2	<i>Harpullia pendula</i>	Tulipwood	100L	as shown	10	6
3 PROPOSED COLUMNAR PALM						
3.1	<i>Ptychosperma elegans</i>	Solitaire Palm	100L	as shown	12	6

**PLANT CONTAINER SIZE:

100L	100 Litre container stock min	Min. height at time of planting: 2.4m
45L	45 Litre container stock min	Min. height at time of planting: 1.9-2.3m

The spacing of plants shown on plan have been derived as a compromise between growth rate, anticipated size, and the ability to provide a good vegetative cover within a reasonable space of time.

B	18/10/22	UPDATED ARCHITECTURAL DWGS
A	17/05/22	FOR SUBMISSION TO RRC
ISSUE	DATE	REASON

JOB NUMBER	SHEET NO.	ISSUE	DRAWN BY
22.107	2	B	AG/ PD

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PROPOSED FAST FOOD DEVELOPMENT
125 GEORGE ST & 87-93 FITZROY
ST, ROCKHAMPTON CITY
PROPOSED PLANTING
SCHEDULE



CODE	SPECIES	COMMON NAME	SIZE**	SPACING(m)	HEIGHT(m)	WIDTH(m)
4	PROPOSED SCREEN PLANTING					
4.1	<i>Syzygium australe</i> Aussie Boomer	Lillypilly	300mm	1.2	1.5	1.5
4.2	<i>Syzygium australe</i> Aussie Southern	Lillypilly	300mm	1.5	5	2
5	PROPOSED SHRUBS AND GROUNDCOVERS					
5.1	<i>Allamanda cathartica</i> Sunee	Dwarf Yellow Allamanda	200mm	0.8	1	1.2
5.2	<i>Callistemon</i> Little John	Dwarf Bottlebrush	200mm	0.8	1	0.9
5.3	<i>Carissa grandiflora</i> Desert Star	Desert Star	200mm	0.7	1	1
5.4	<i>Ixora chinensis</i> Coral Fire	Ixora	200mm	0.8	1	1
5.5	<i>Ixora chinensis</i> Orange Dwarf Maui	Ixora Dwarf	200mm	0.8	1	1
5.6	<i>Russelia equisetiformis</i> Tangerine Falls	Tangerine Falls	200mm	0.7	1	1
5.7	<i>Westringia</i> Flat n Fruity	Prostrate Native Rosemary	200mm	1	0.3	2
5.8	<i>Westringia</i> Zena	Dwarf Rosemary	200mm	0.9	1	1
5.9	<i>Xanthostemon chrysanthus</i> Little Goldie	Dwarf Golden Penda	200mm	0.7	1	0.8

**PLANT CONTAINER SIZE:

300mm	300mm dia minimum pot size
200mm	200mm dia minimum pot size

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ISSUE	DATE	REASON

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22.107	3	B	AG/ PD

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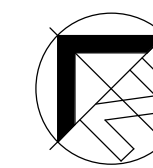
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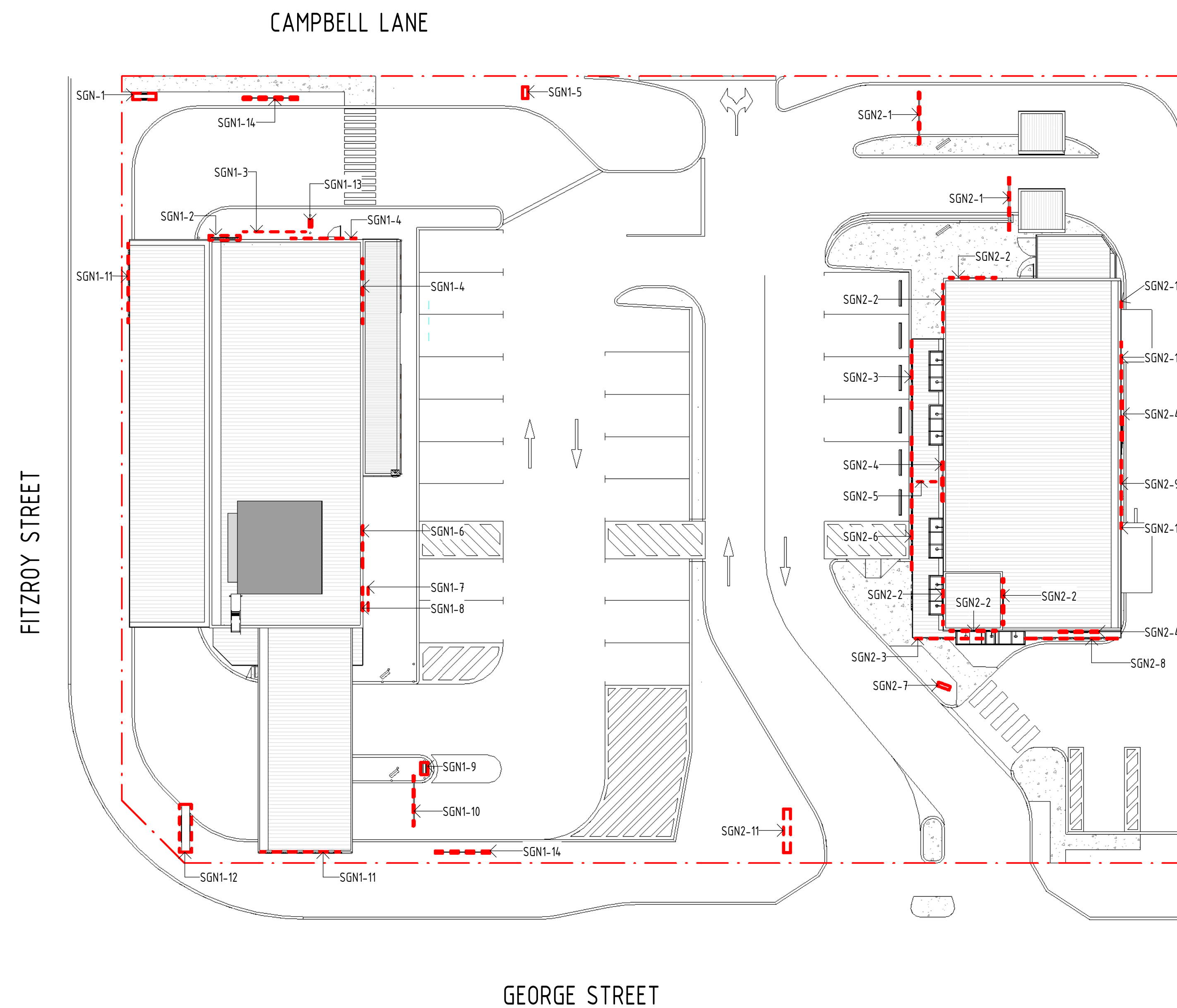
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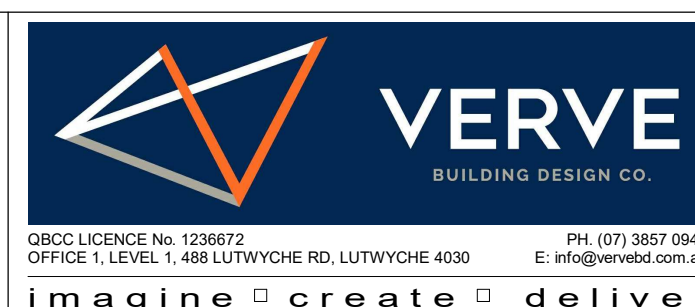
Development Permit No.: D/21-2022

Dated: 14 December 2022

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CONSULTING ENGINEER



- ☐ commercial / industrial / retail
- ☐ fast food restaurant design
- ☐ travel centre / service stations
- ☐ project concept to completion

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Revision and approvals

Rev	Date	Drn	Description	Appr
P1	11.03.2022	NR	PRELIMINARY ISSUE	
A	17.05.2022	NR	DA ISSUE	
B	07.07.2022	NR	REVISED DA ISSUE	
C	13.10.2022		REVISED DA ISSUE	

Project Description

PROP. MIXED USE DEVELOPMENT

87 FITZROY ST, ROCKHAMPTON

Scale @A1

1: 200

Drawn

NR

Date

MAR 2022

Approved By

GN

Drawing Title

SIGNAGE PLAN

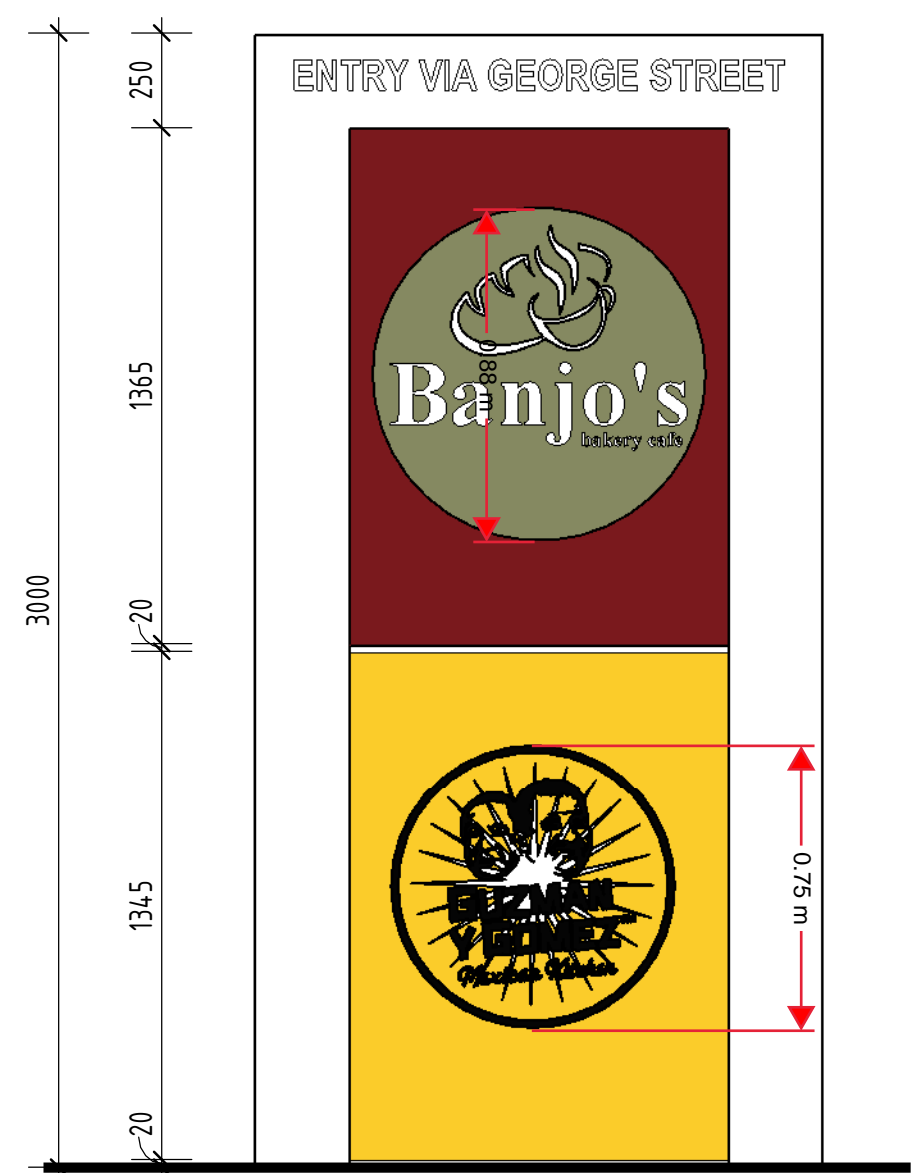
Job Number - Drawing Number

21185

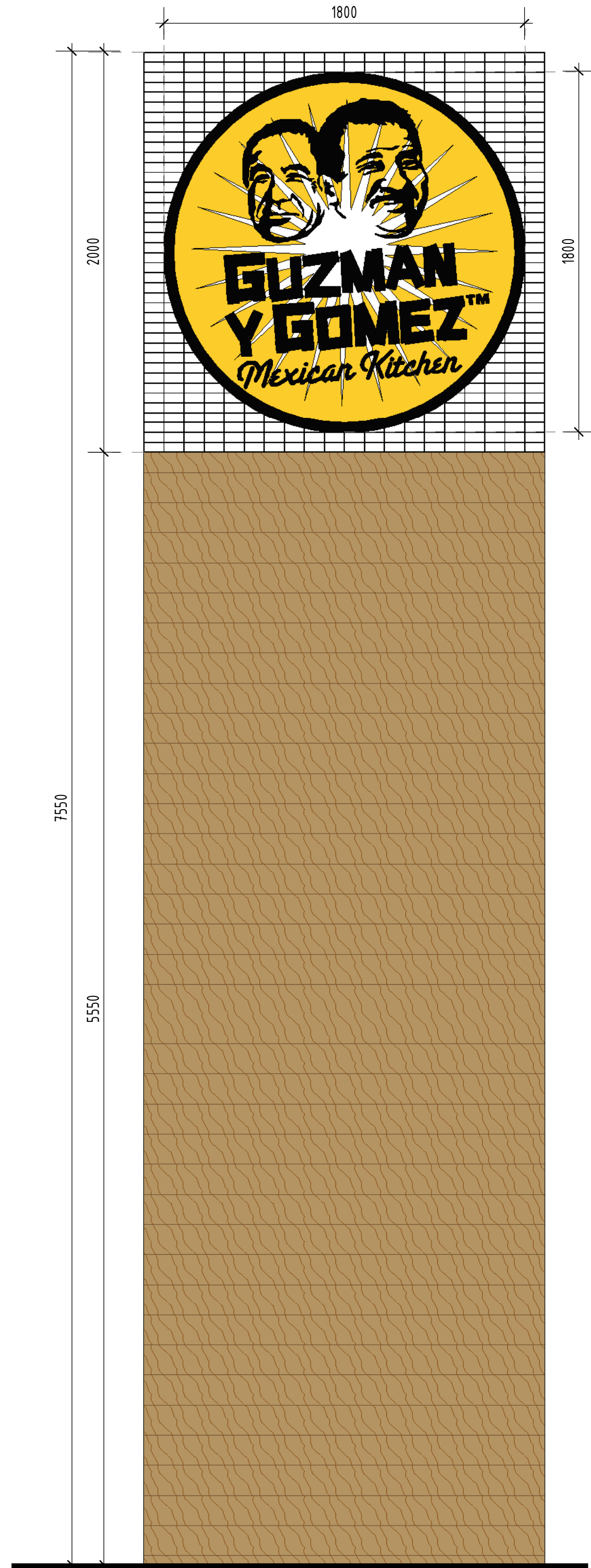
2010

Revision

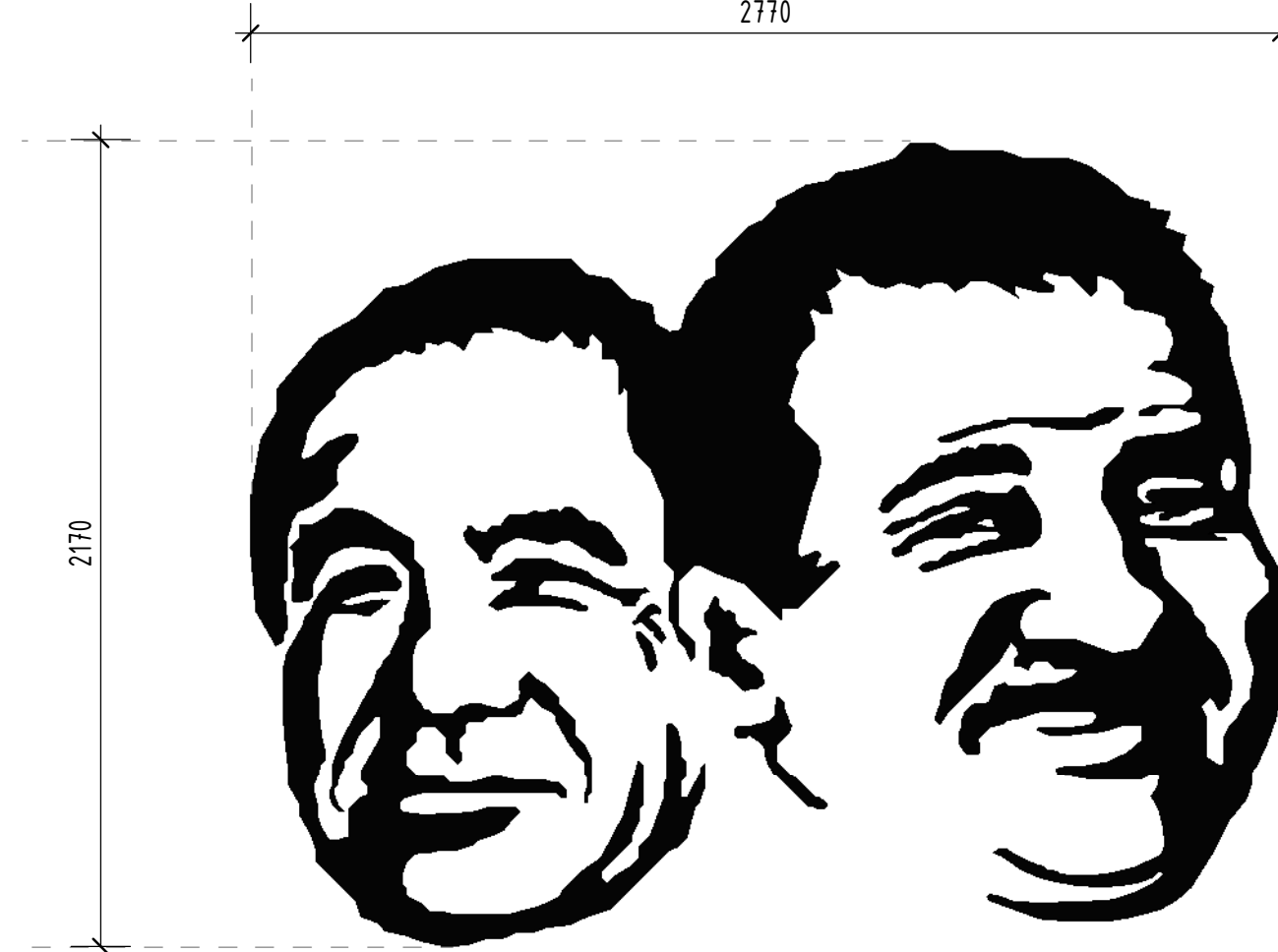
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1 SGN-1 - ILLUMINATED SHARED PYLON
1 : 20



2 SGN1-2 - T1 ILLUMINATED SIGNAGE
1 : 20



3 SGN1-3 - T1 NON-ILLUMINATED SIGNAGE
1 : 20



4 SGN1-4 - T1 ILLUMINATED SIGNAGE
1 : 20
2 OFF

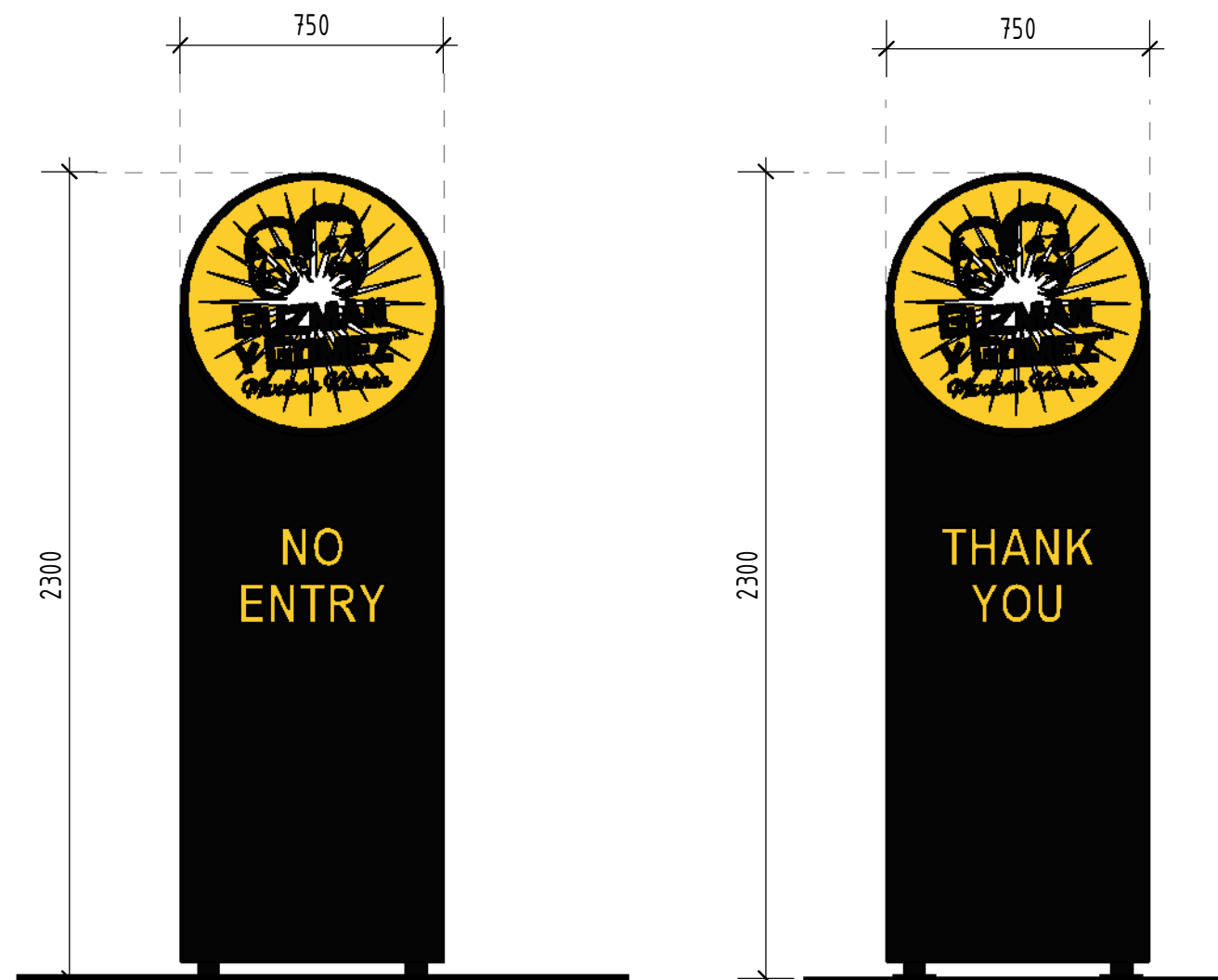
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/21-2022

Dated: 14 December 2022



7 SGN1-5 - T1 ILLUMINATED DIRECTIONAL SIGNAGE
1 : 20



6 SGN1-6 - T1 NON-ILLUMINATED SIGNAGE
1 : 20

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- ☐ commercial / industrial / retail
- ☐ fast food restaurant design
- ☐ travel centre / service stations
- ☐ project concept to completion

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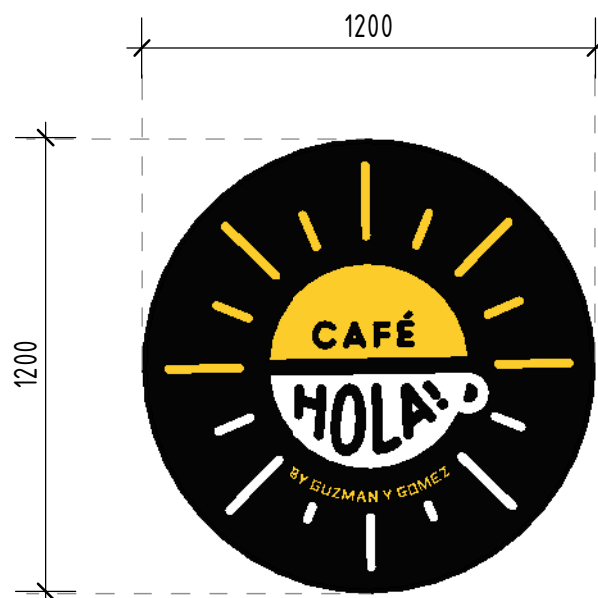
Revision and approvals				
Rev	Date	Drn	Description	Appr
P1	11.03.2022	NR	PRELIMINARY ISSUE	
A	17.05.2022	NR	DA ISSUE	
B	18.05.2022	NR	REVISED DA ISSUE	

Project Description	
PROP. MIXED USE DEVELOPMENT	
87 FITZROY ST, ROCKHAMPTON	
Scale @A1 1 : 20	Date MAR 2022
Drawn NR	Approved By GN

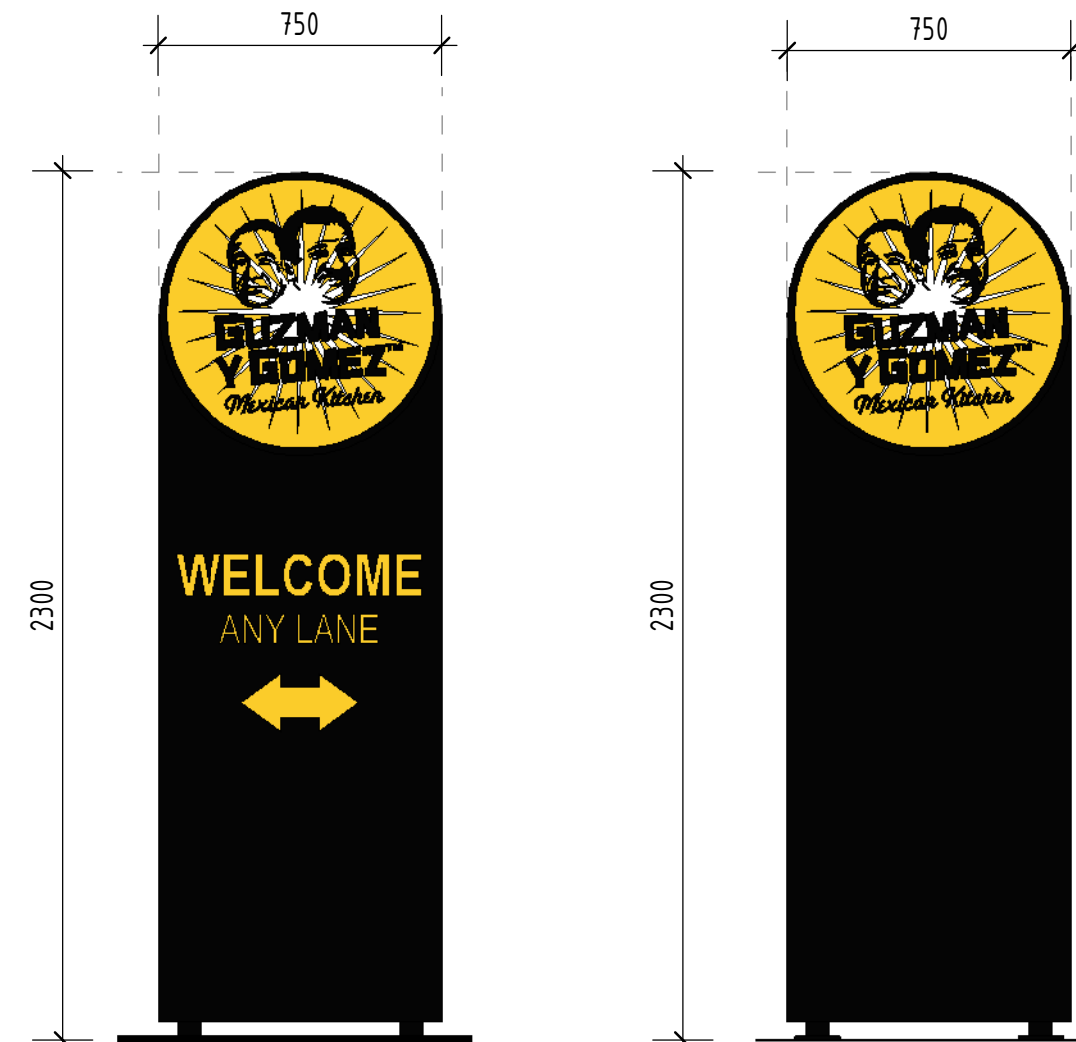
Drawing Title	
EXTERNAL SIGNAGE DETAILS - T1	
Job Number - Drawing Number 21185	Revision B
2011	



1 SGN1-7 - T1 ILLUMINATED SIGNAGE
1 : 20



2 SGN1-8 - T1 ILLUMINATED SIGNAGE
1 : 20



3 SGN1-9 - T1 ILLUMINATED DIRECTIONAL SIGNAGE
1 : 20

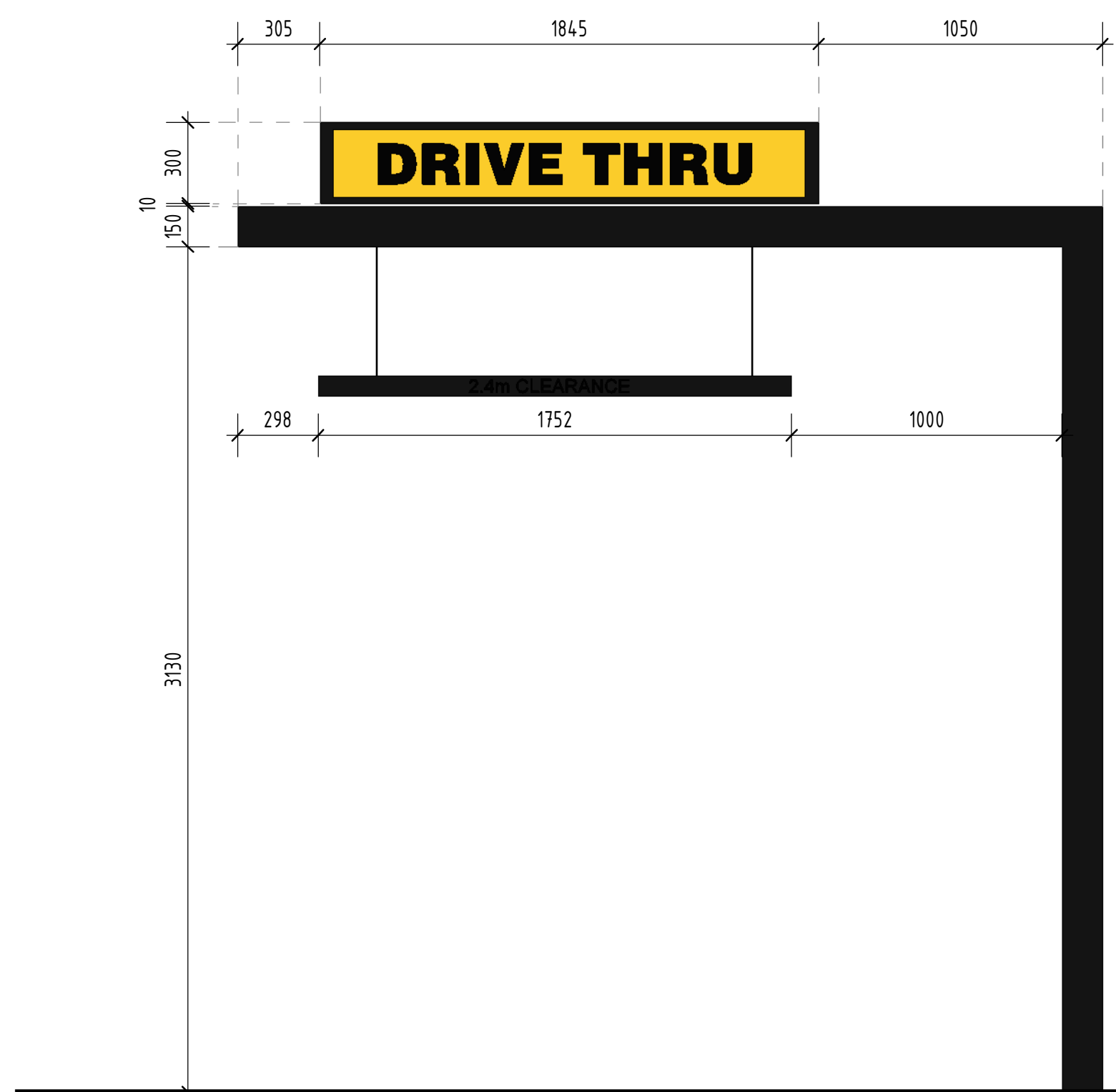
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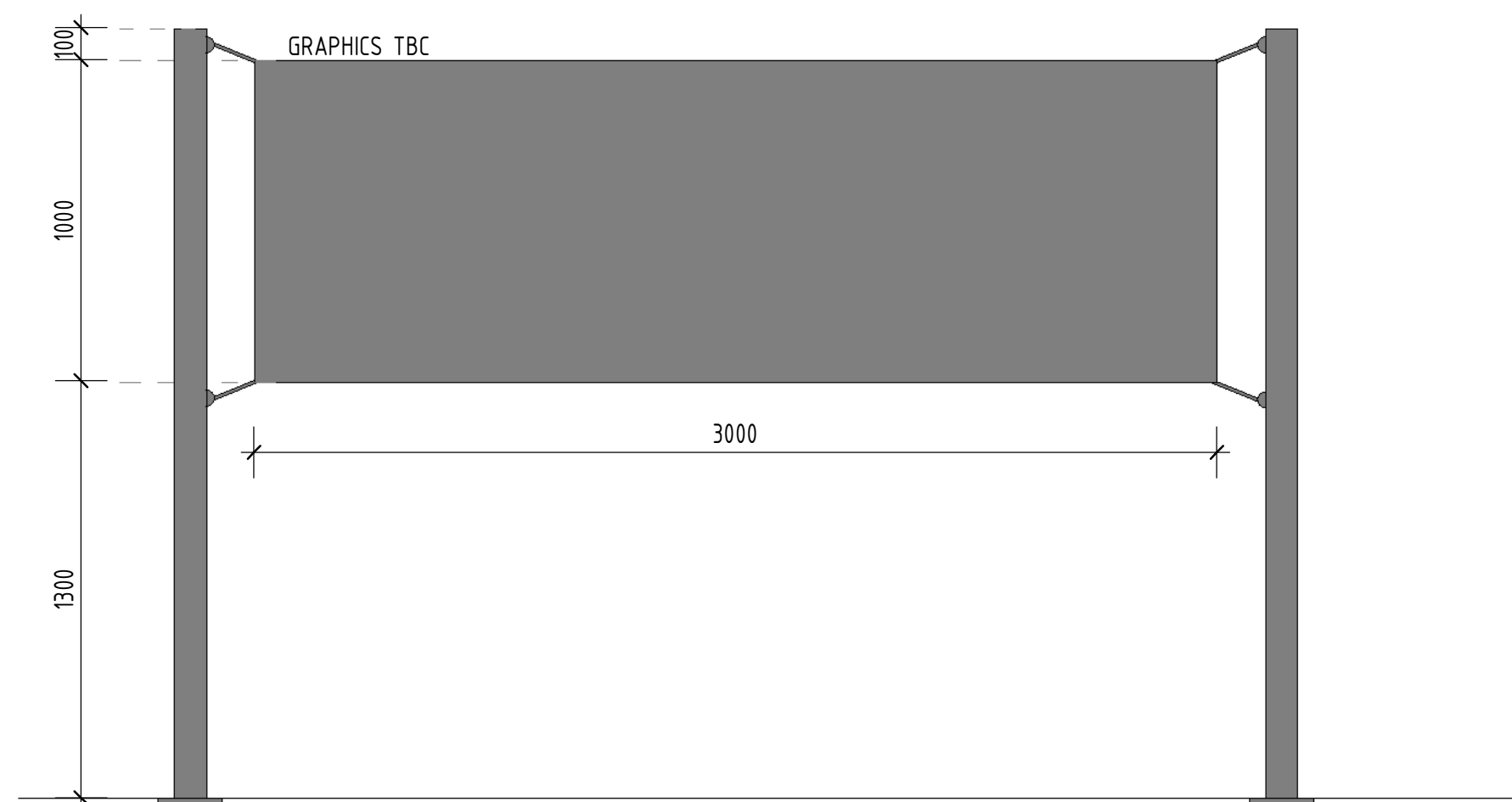
Dated: 14 December 2022



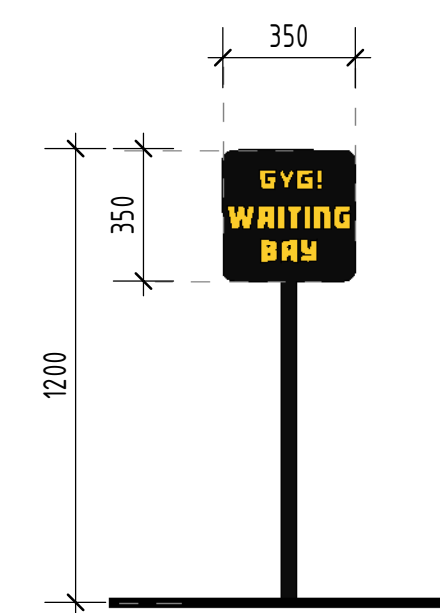
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1 : 20



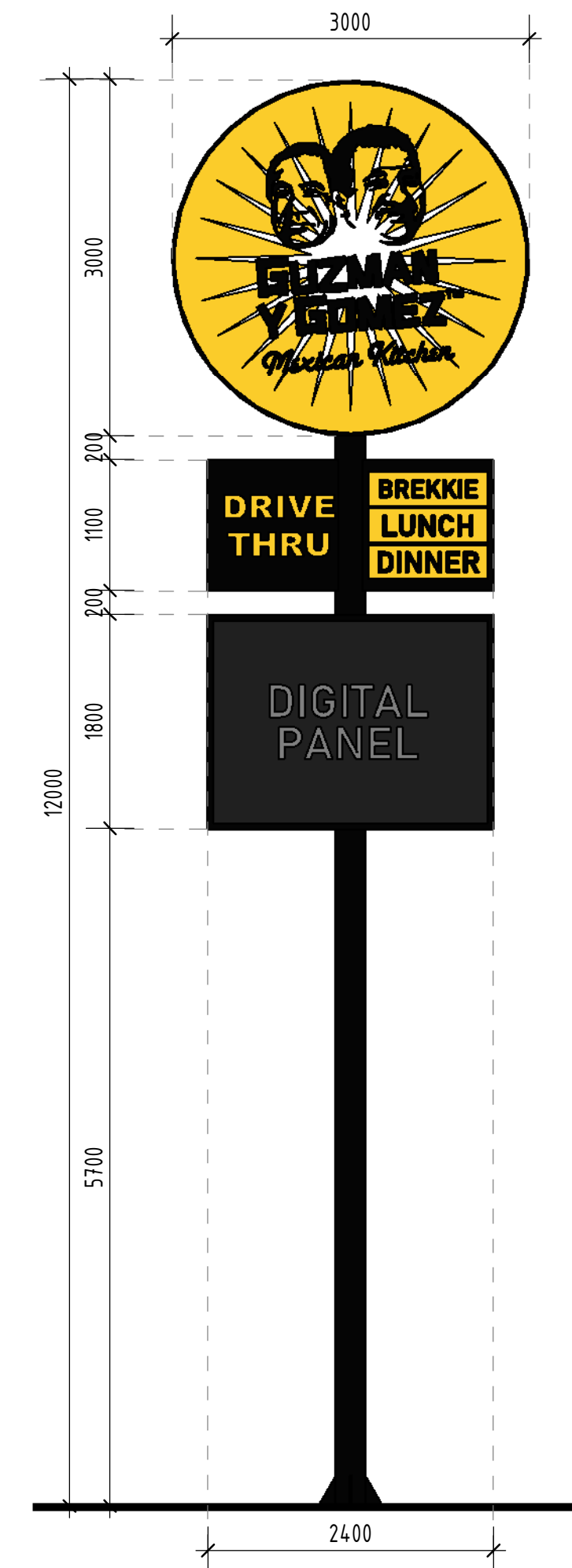
5 SGN1-11 - T1 ILLUMINATED SIGNAGE
1 : 20
2 OFF



9 SGN1-14 - T1 GRAPHIC SIGNAGE
1 : 20
2 OFF



8 SGN1-13 - T1 ILLUMINATED DIRECTIONAL SIGNAGE
1 : 20



6 SGN1-12 - T1 ILLUMINATED PYLON SIGN
1 : 50

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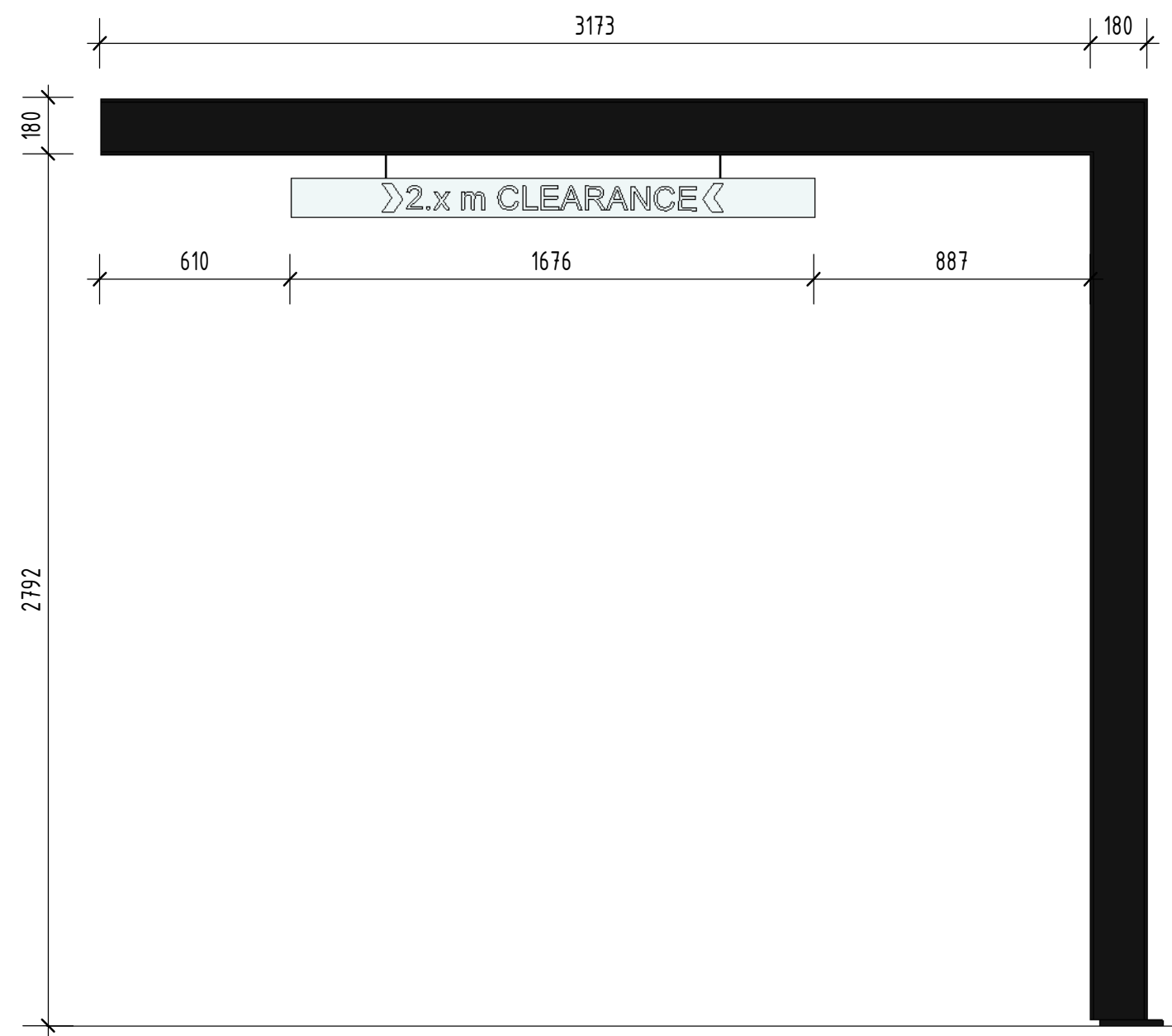
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Project Description	
PROP. MIXED USE DEVELOPMENT	
87 FITZROY ST, ROCKHAMPTON	
Scale @A1 As indicated	Date MAR 2022
Drawn NR	Approved By GN

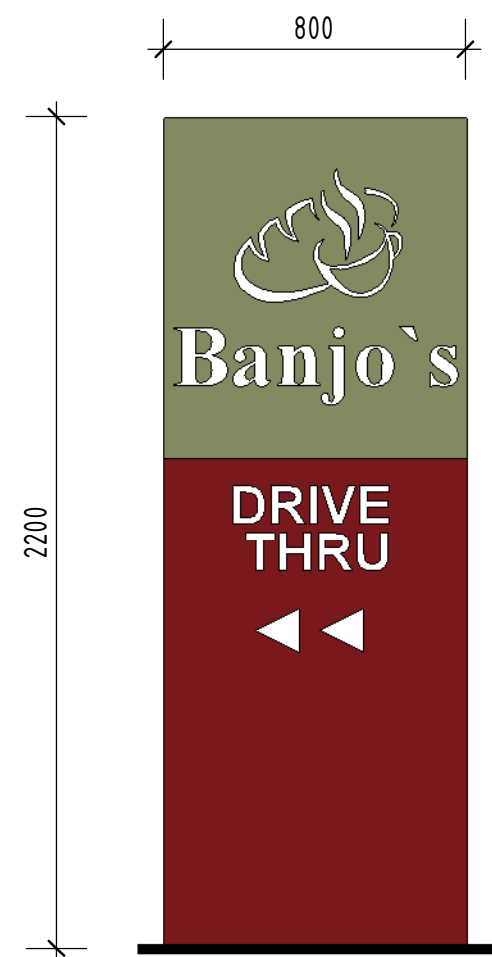
Drawing Title	
EXTERNAL SIGNAGE DETAILS - T1	
Job Number - Drawing Number 21185	Revision 2012
B	



1 SGN2-1 - T2 NON-ILLUMINATED SIGNAGE
1 : 20



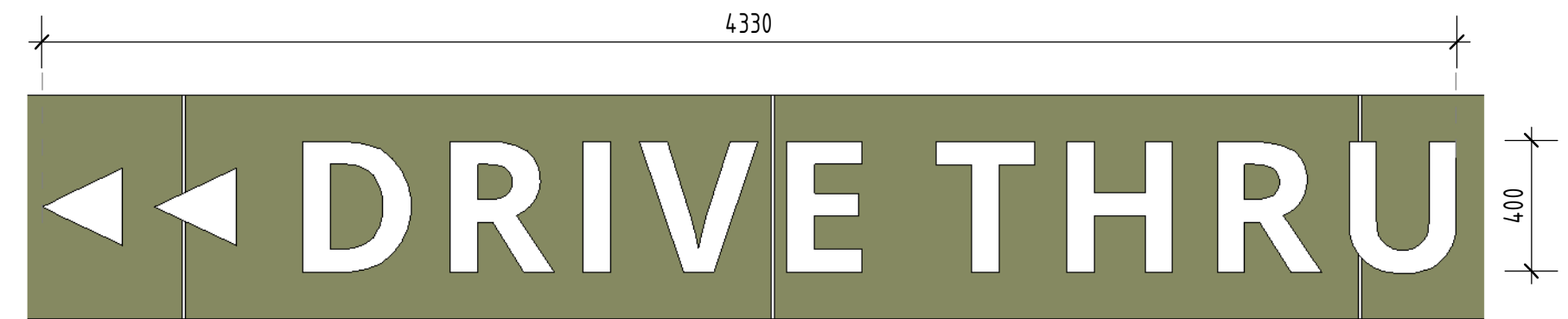
5 SGN2-5 - T2 NON-ILLUMINATED SIGNAGE
1 : 20



7 SGN2-7 - T2 ILLUMINATED DIRECTIONAL SIGNAGE
1 : 20



2 SGN2-2 - T2 ILLUMINATED SIGNAGE
1 : 20
5 OFF



3 SGN2-3 - T2 ILLUMINATED SIGNAGE
1 : 20
2 OFF



4 SGN2-4 - T2 ILLUMINATED SIGNAGE
1 : 20
3 OFF



6 SGN2-6 - T2 ILLUMINATED SIGNAGE
1 : 20

DA ISSUE

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Project Description	
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87 FITZROY ST, ROCKHAMPTON	
Scale @A1 1 : 20	Date MAR 2022
Drawn NR	Approved By GN

Drawing Title	
EXTERANL SIGNAGE DETAILS - T2	
Job Number - Drawing Number 21185	Revision A



1 SGN2-8 - T2 ILLUMINATED SIGNAGE
1 : 20



2 SGN2-9 - T2 ILLUMINATED SIGNAGE
1 : 20



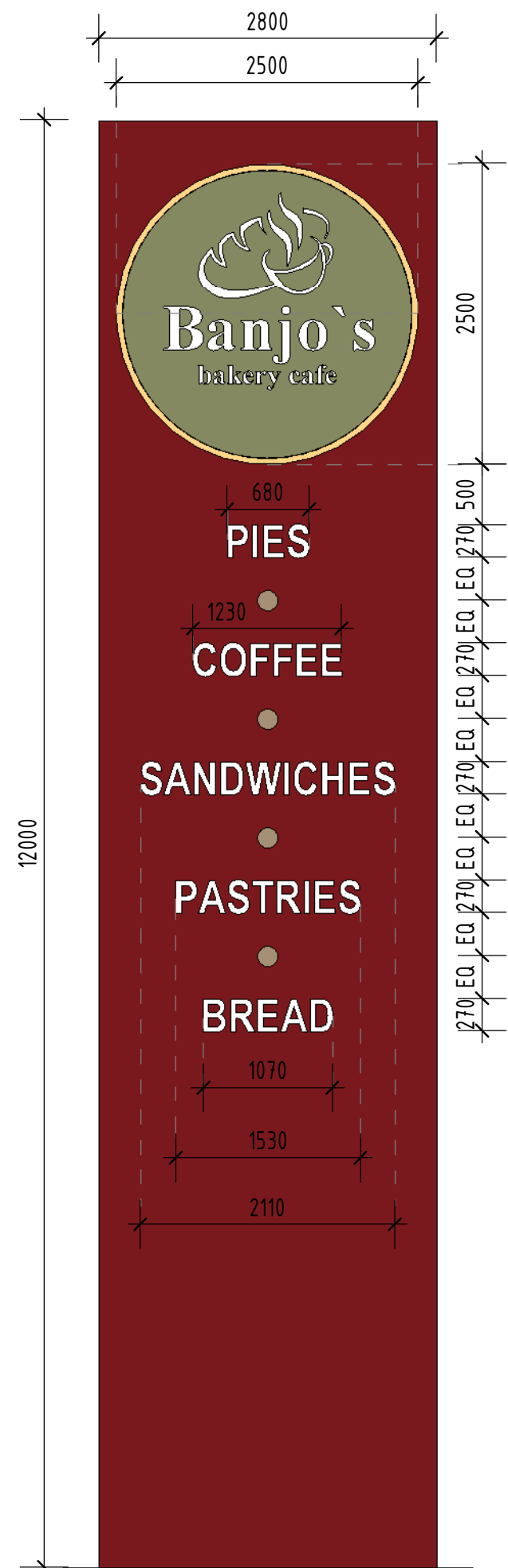
3 SGN2-10 - T2 ILLUMINATED SIGNAGE
1 : 20



5 SGN2-11 - T2 ILLUMINATED SIGNAGE
1 : 20



6 SGN2-12 - T2 ILLUMINATED SIGNAGE
1 : 20



4 SGN2-13 - T2 ILLUMINATED PYLON SIGN
1 : 50

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87 FITZROY ST, ROCKHAMPTON
Scale @A1
As indicated
Drawn NR

Date
MAR 2022
Approved By
GN

Drawing Title
**EXTERNAL SIGNAGE DETAILS
- T2**
Job Number - Drawing Number
21185 2014
Revision
A