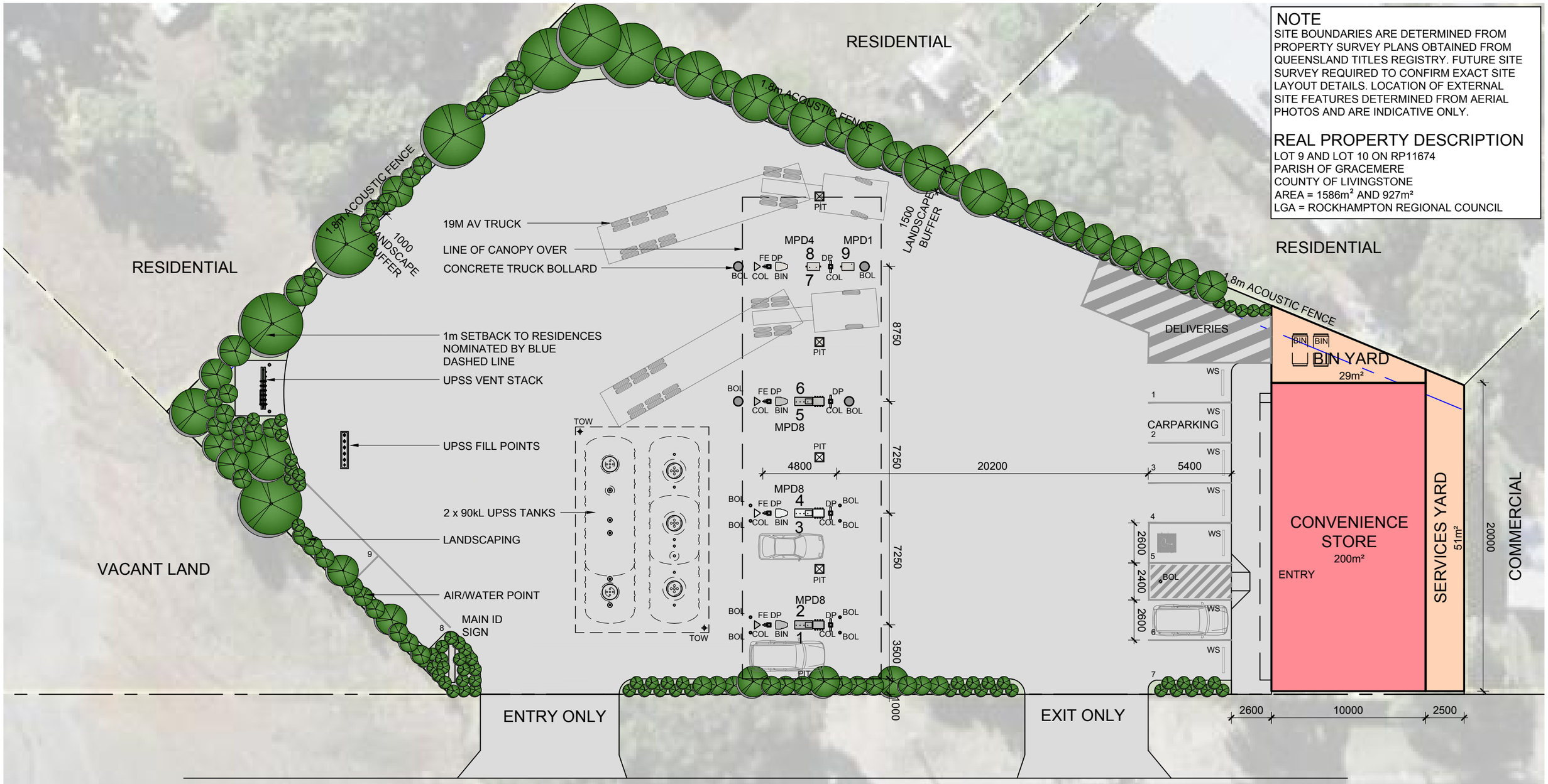

NOTE

SITE BOUNDARIES ARE DETERMINED FROM PROPERTY SURVEY PLANS OBTAINED FROM QUEENSLAND TITLES REGISTRY. FUTURE SITE SURVEY REQUIRED TO CONFIRM EXACT SITE LAYOUT DETAILS. LOCATION OF EXTERNAL SITE FEATURES DETERMINED FROM AERIAL PHOTOS AND ARE INDICATIVE ONLY.

REAL PROPERTY DESCRIPTION

LOT 9 AND LOT 10 ON RP11674
PARISH OF GRACEMERE
COUNTY OF LIVINGSTONE
AREA = 1586m² AND 927m²
LGA = ROCKHAMPTON REGIONAL COUNCIL

SITE INFORMATION

AREAS

BUILDING =	200m²
SERVICE YARD =	80m²
CANOPY AREA =	331m²
LANDSCAPE AREA =	235m²
UNCOVERED PAVEMENT AREA =	1667m²
TOTAL AREA =	2513m²

CARPARKING = 9 SPACES INCLUDING 1 ACCESSIBLE SPACE

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0 2.5 5.0 7.5 10.0 12.5
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AMENDMENTS

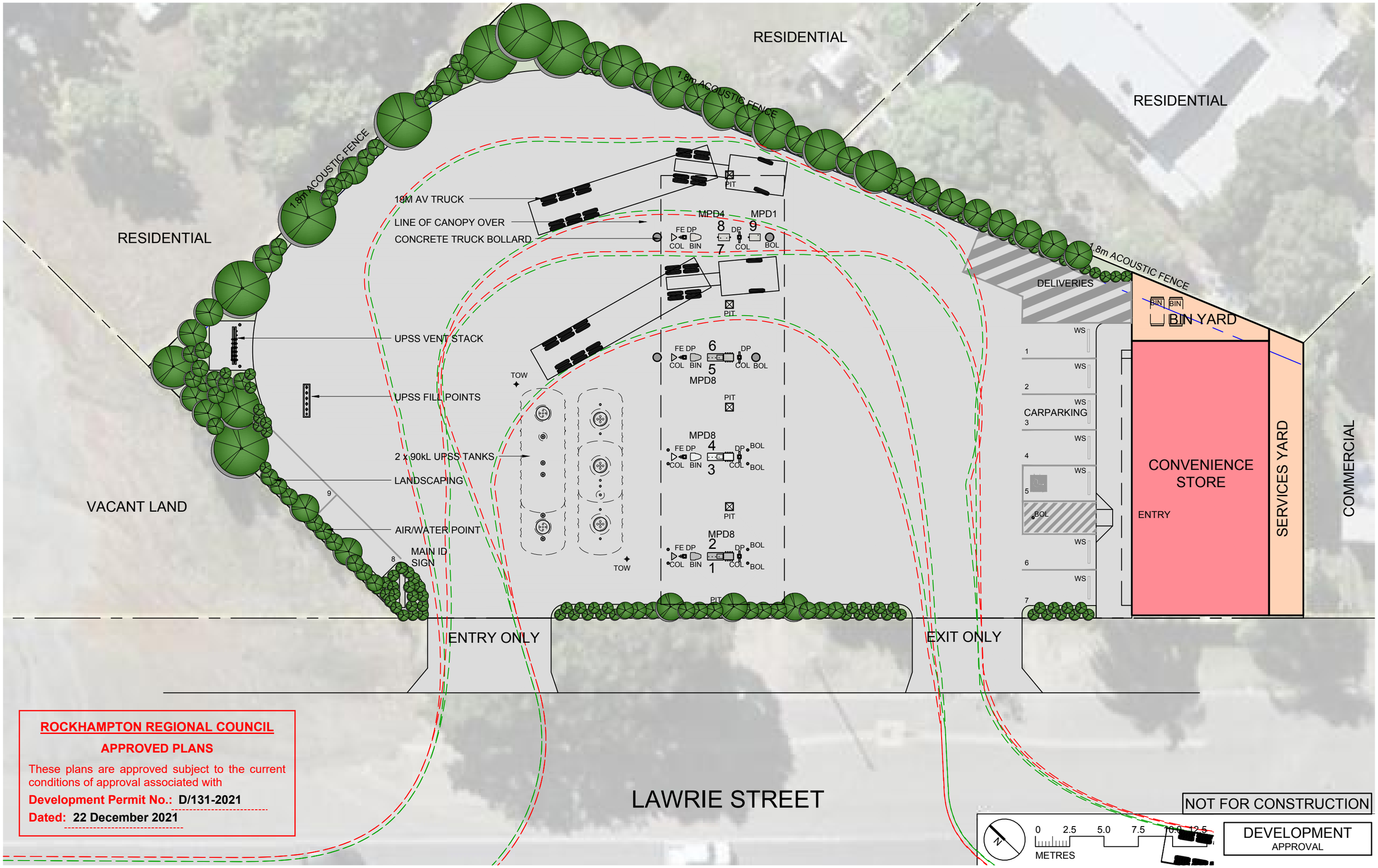
REV	DATE	DESCRIPTION	BY
A	13/09/21	PRELIMINARY ISSUE - FOR REVIEW	MAE
B	21/09/21	PRELIMINARY ISSUE - FOR REVIEW	MAE
C	28/09/21	DEVELOPMENT APPROVAL ISSUE	MAE
D	11/10/21	DEVELOPMENT APPROVAL ISSUE	MAE

CLIENT
GRACEMERE CENTRE PTY LTD (AS TRUSTEE) GRACEMERE CENTRE TRUST

PROJECT
GRACEMERE SERVICE STATION DEVELOPMENT
16-18 LAWRIE STREET
GRACEMERE, QUEENSLAND 4702

TITLE
PROPOSED SITE PLAN

SCALE	DRAWN	DATE
1:250	MAE	06/09/21
SIZE	CHECKED	DATE
A3		
DRAWING NUMBER		REVISION
2021046-DA-A100		D



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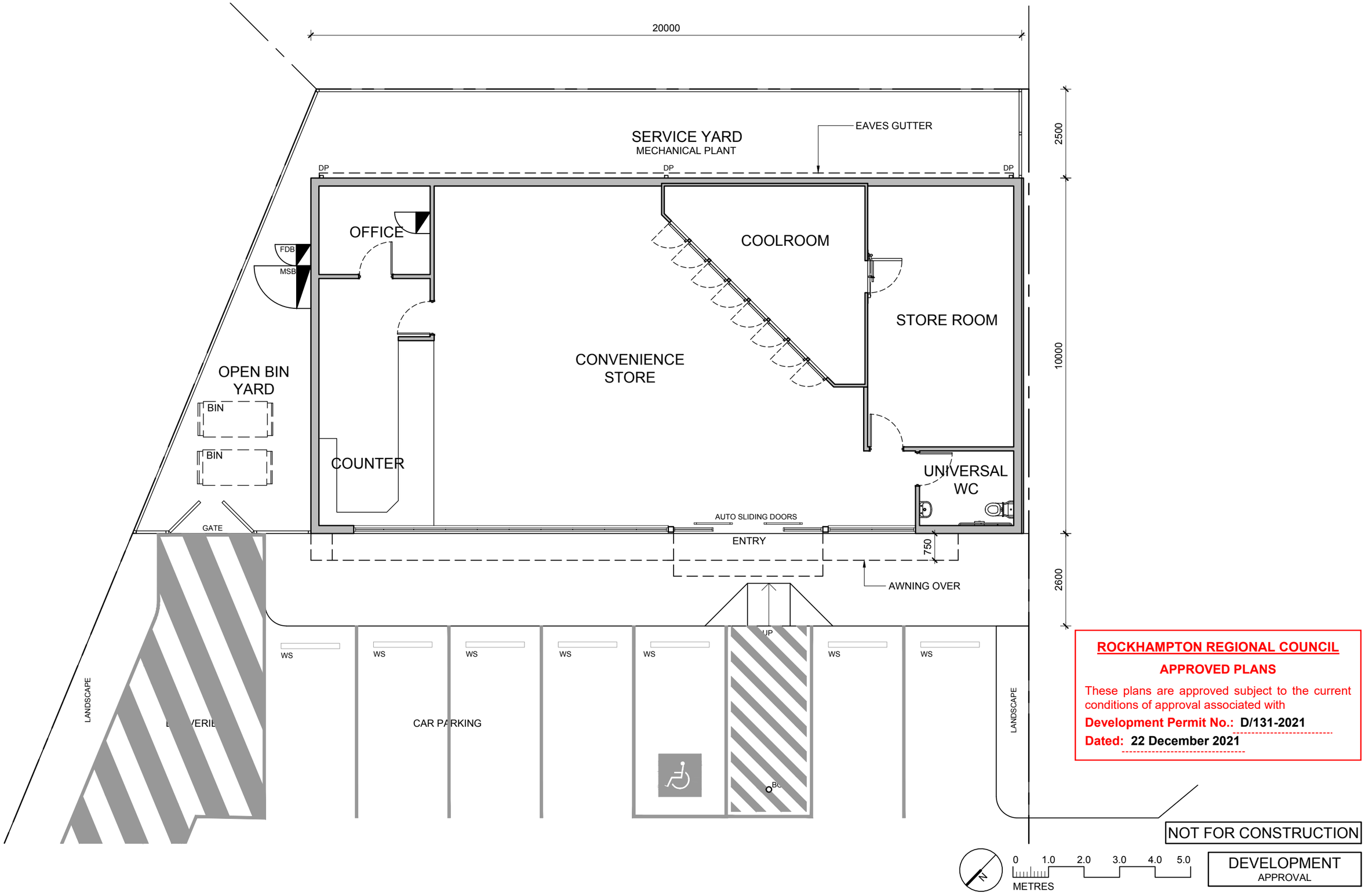
PROJECT
GRACEMERE SERVICE STATION DEVELOPMENT
16-18 LAWRIE STREET
GRACEMERE, QUEENSLAND 4702

TITLE
VEHICLE SITE PLAN - 19m AV TRUCKS

SCALE	DRAWN	DATE
1:250	MAE	06/09/21
SIZE	CHECKED	DATE
A3		
DRAWING NUMBER		REVISION
2021046-DA-A120		B



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A	28/09/21	DEVELOPMENT APPROVAL ISSUE	MAE

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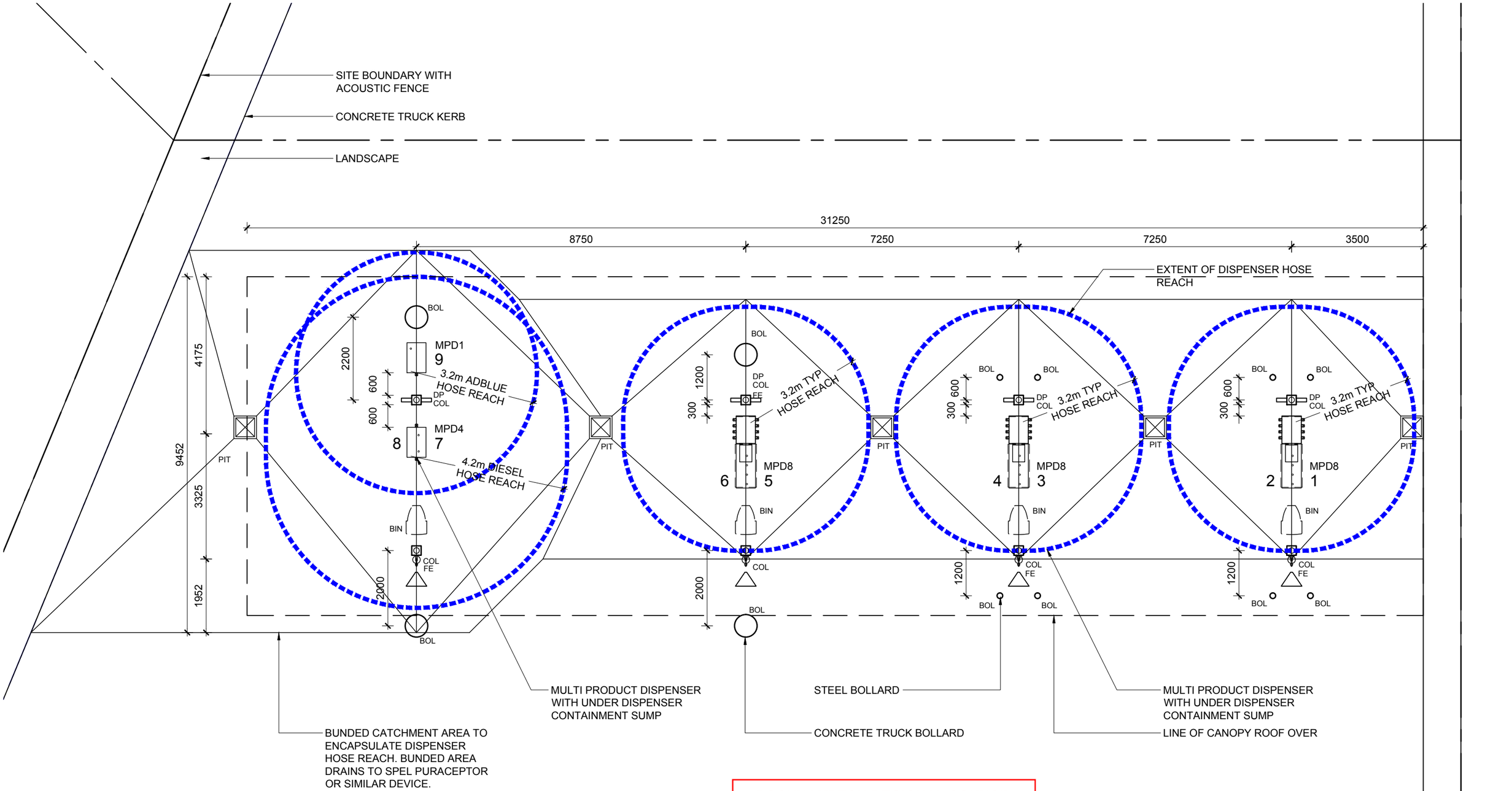
PROJECT
GRACEMERE SERVICE STATION DEVELOPMENT
16-18 LAWRIE STREET
GRACEMERE, QUEENSLAND 4702

TITLE
PROPOSED C-STORE LAYOUT

SCALE	DRAWN	DATE
1:100	MAE	06/09/21
SIZE	CHECKED	DATE
A3		
DRAWING NUMBER		REVISION
2021046-DA-A200		A



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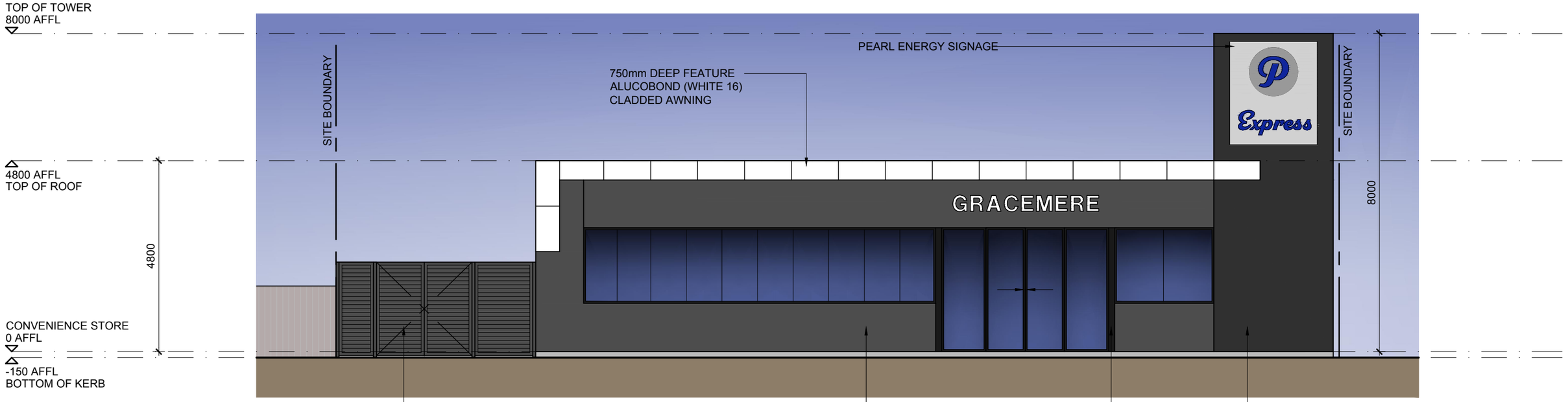
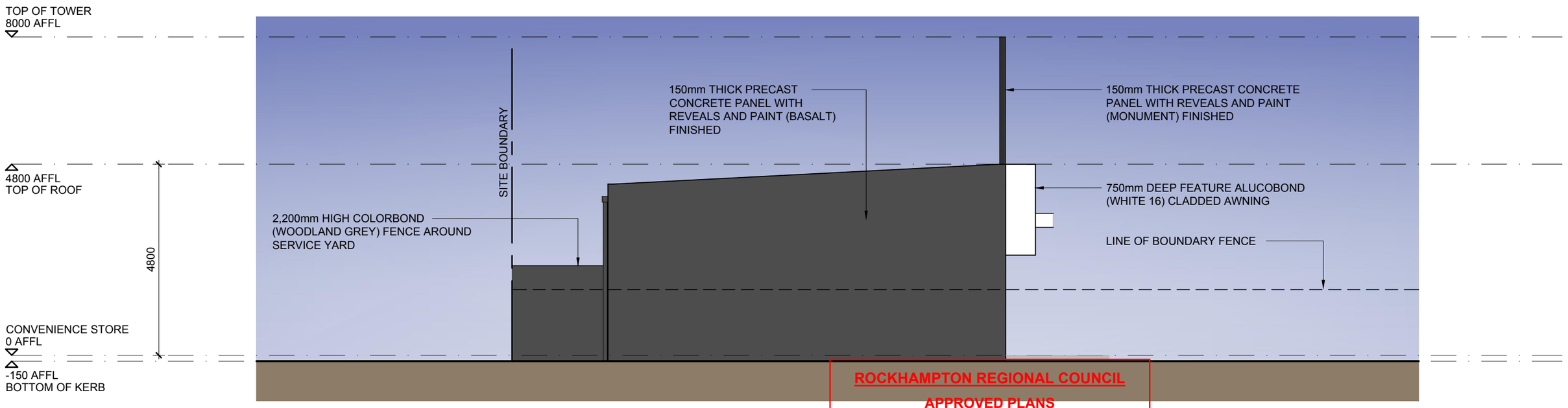
PROJECT
GRACEMERE SERVICE STATION DEVELOPMENT
16-18 LAWRIE STREET
GRACEMERE, QUEENSLAND 4702

TITLE
PROPOSED CANOPY FLOOR PLAN

SCALE	DRAWN	DATE
1:100	MAE	06/09/21
SIZE	CHECKED	DATE
A3		
DRAWING NUMBER		REVISION
2021046-DA-A210		B



1 / A120 NORTH EAST ELEVATION
SCALE 1:100



2 / A120 SOUTH EAST ELEVATION
SCALE 1:100

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STATION DEVELOPMENT
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GRACEMERE, QUEENSLAND 4702

TITLE
PROPOSED BUILDING
ELEVATIONS
SHEET 1 OF 2

SCALE	DRAWN	DATE
1:100	MAE	06/09/21
SIZE	CHECKED	DATE
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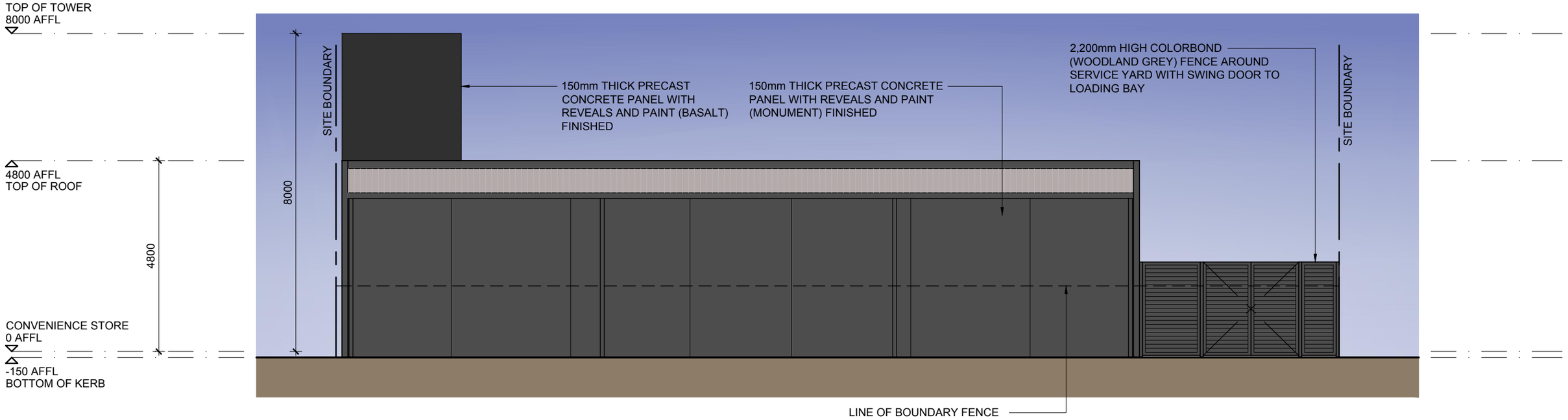
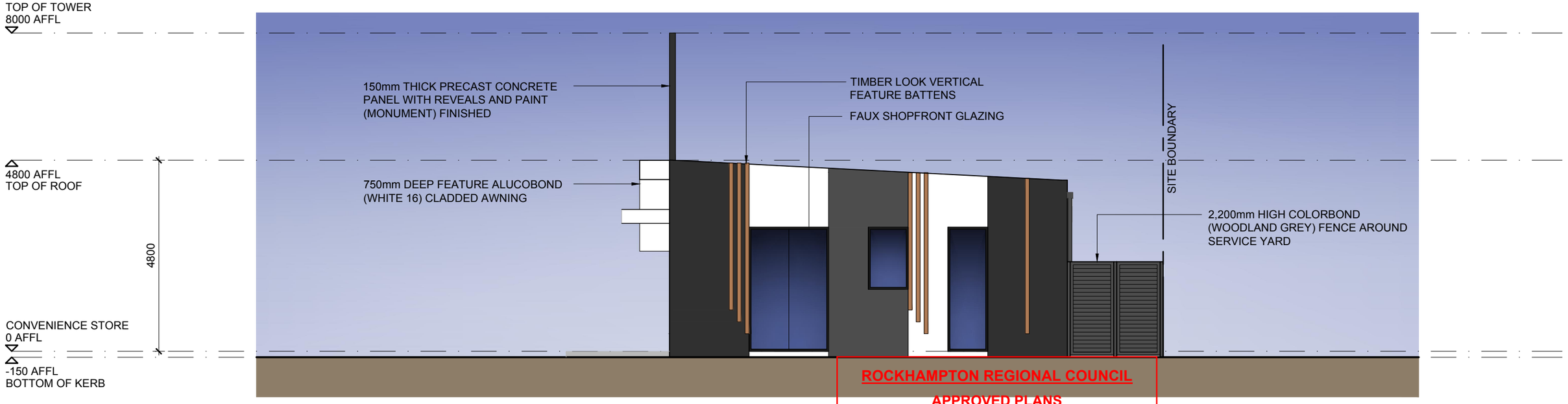
DRAWING NUMBER		REVISION
2021046-DA-A300		B



3 A120 SOUTH WEST ELEVATION
SCALE 1:100



4 A120 NORTH WEST ELEVATION
SCALE 1:100

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GRACEMERE SERVICE STATION DEVELOPMENT
16-18 LAWRIE STREET
GRACEMERE, QUEENSLAND 4702

TITLE
PROPOSED BUILDING ELEVATIONS
SHEET 2 OF 2

SCALE	DRAWN	DATE
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SIZE	CHECKED	DATE
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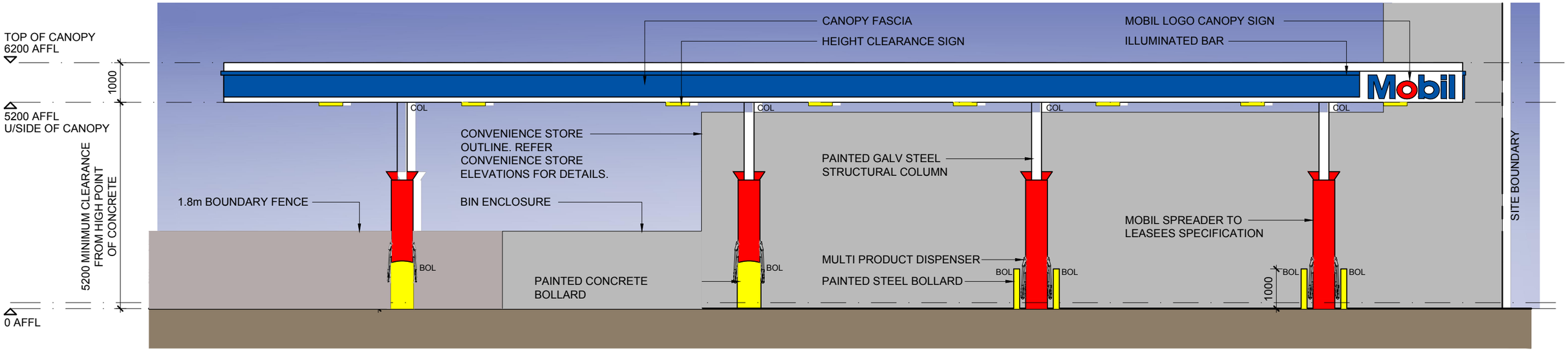
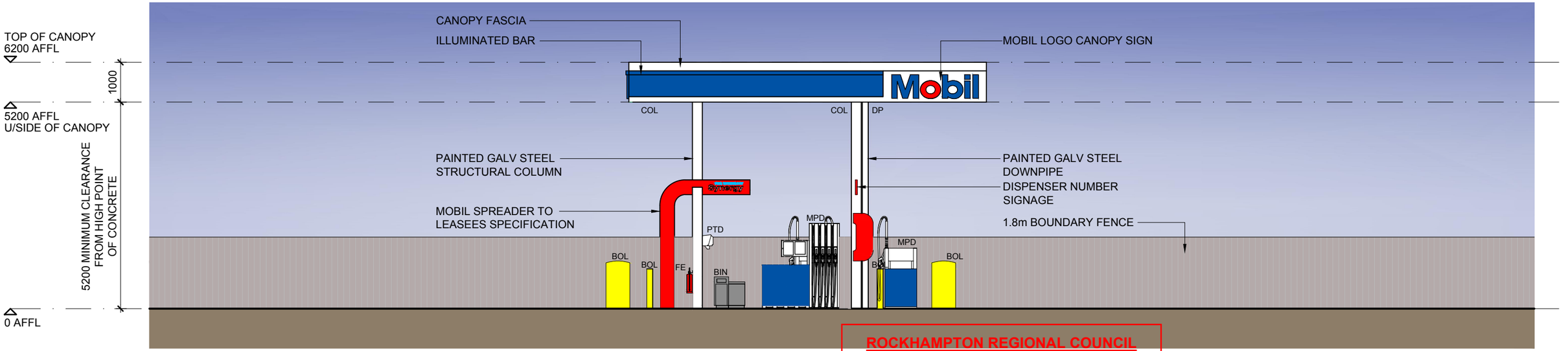
DRAWING NUMBER		REVISION
2021046-DA-A301		A



1 / A120 NORTH WEST ELEVATION
SCALE 1:100



2 / A120 SOUTH WEST ELEVATION - FROM LAWRIE STREET
SCALE 1:100

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GRACEMERE, QUEENSLAND 4702

TITLE
PROPOSED CANOPY ELEVATIONS
SHEET 1 OF 2

SCALE	DRAWN	DATE
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SIZE	CHECKED	DATE
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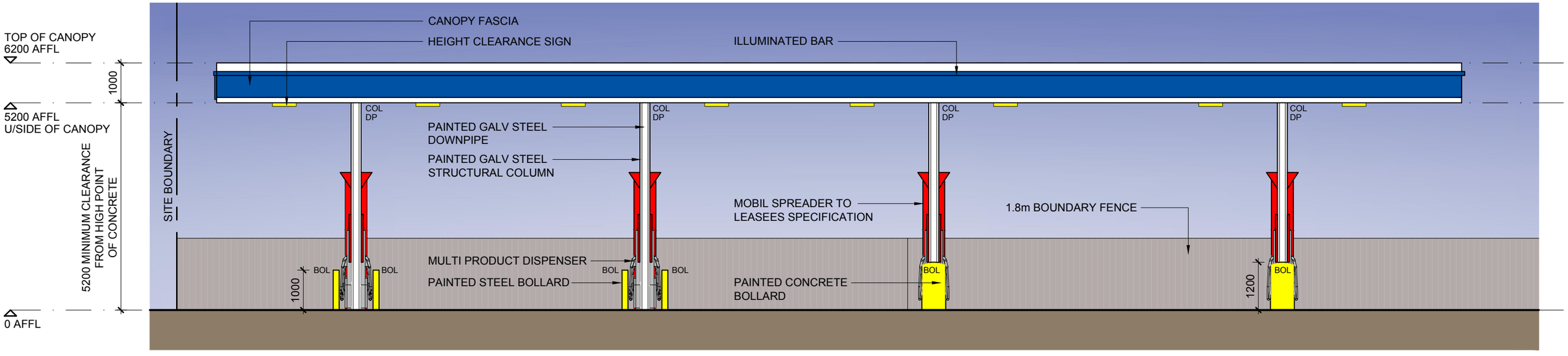
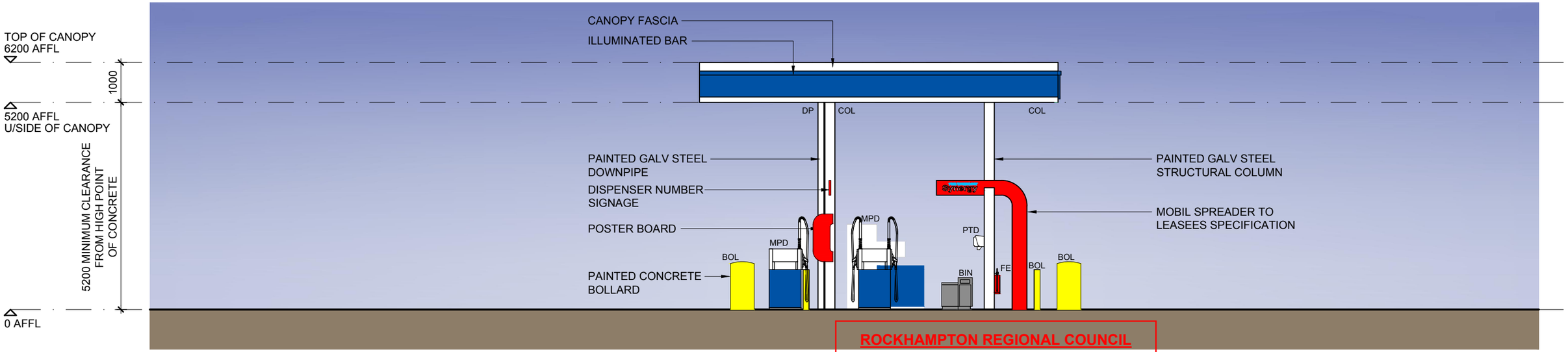
DRAWING NUMBER		REVISION
2021046-DA-A310		B



3 A120 NORTH EAST ELEVATION
SCALE 1:100



4 A120 SOUTH EAST ELEVATION
SCALE 1:100

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16-18 LAWRIE STREET
GRACEMERE, QUEENSLAND 4702

TITLE
PROPOSED CANOPY ELEVATIONS SHEET 2 OF 2

SCALE	DRAWN	DATE
1:100	MAE	06/09/21
SIZE	CHECKED	DATE
A3		
DRAWING NUMBER		REVISION
2021046-DA-A311		B

STANDARD NOTES

1. ALL FUEL SYSTEM WORKS ARE TO BE UNDERTAKEN BY COMPETENT AND ACCREDITED CONTRACTORS.
2. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL OTHER PROJECT DOCUMENTATION.
3. DO NOT SCALE DRAWINGS.
4. UNDERGROUND PETROLEUM STORAGE SYSTEM INSTALLATION IS TO BE DESIGNED IN ACCORDANCE WITH:
   - QUEENSLAND WORK HEALTH AND SAFETY ACT 2011.
   - QUEENSLAND WORK HEALTH AND SAFETY REGULATION 2011.
   - AS/NZS1596:2008 THE STORAGE AND HANDLING OF LP GAS.
   - AS1692-2006 TANKS FOR FLAMMABLE AND COMBUSTIBLE LIQUIDS.
   - AS/NZS1841.5 - PORTABLE FIRE EXTINGUISHERS - SPECIFIC REQUIREMENTS FOR POWDER TYPE EXTINGUISHERS.
   - AS1940-2017 THE STORAGE AND HANDLING OF FLAMMABLE AND COMBUSTIBLE LIQUIDS.
   - AS2444 - PORTABLE FIRE EXTINGUISHERS AND FIRE BLANKETS - SELECTION AND LOCATION.
   - AS/NZS3000 - AUSTRALIAN/NEW ZEALAND WIRING RULES.
   - AS4897-2008 DESIGN INSTALLATION AND OPERATION OF UNDERGROUND PETROLEUM STORAGE SYSTEMS.
   - AS4976-2008 THE REMOVAL AND DISPOSAL OF UNDERGROUND PETROLEUM STORAGE TANKS.
   - AS4977-2008 PETROLEUM PRODUCTS - PIPELINE, ROAD TANKER COMPARTMENT AND UNDERGROUND TANK IDENTIFICATION.
   - AS/NZS60079.10.1-2009 EXPLOSIVE ATMOSPHERES - CLASSIFICATION OF AREAS - EXPLOSIVE GAS ATMOSPHERES (IEC 60079-10-1, Ed.1.0(2008) MOD).
   - AUSTRALIAN CODE FOR THE TRANSPORT OF DANGEROUS GOODS BY ROAD AND RAIL EDITION 7
   - QUEENSLAND TRANSPORT OPERATIONS ROAD USE MANAGEMENT - DANGEROUS GOODS 2008
7. THE UPSS INSTALLATION IS TO BE IN ACCORDANCE WITH CURRENT RELEVANT ACTS AND REGULATIONS, CODES OF PRACTICE, THE LOCAL STATUTORY AUTHORITY BY-LAWS, AND APICSA RP001.
8. THE SITE LAYOUT AS PER ARCHITECTURAL DRAWINGS.
9. CONCRETE PAVEMENTS, SITE DRAINAGE, AND CONTAMINATION CATCHMENT AND TREATMENT TO BE AS PER CIVIL ENGINEERS DRAWINGS.
10. NO BULK STORAGE OF AUTOMOTIVE LIQUID PETROLEUM GAS ON SITE.
11. THE TANK HOLE EXCAVATION IS TO BE IN ACCORDANCE WITH GEOTECHNICAL REPORT, CIVIL ENGINEERS RECOMMENDATIONS, AND WORKPLACE HEALTH AND SAFETY REGULATIONS.
12. THE UNDERGROUND PETROLEUM STORAGE TANKS ARE TO BE SECONDARY CONTAINED FIBREGLASS VESSELS WITH INTERSTITUAL MONITORING MANUFACTURED IN ACCORDANCE WITH AS1692.
13. TANKS ARE TO BE INSTALLED, BACKFILLED, AND BALLASTED IN ACCORDANCE WITH MANUFACTURES INSTALLATION REQUIREMENTS.
14. TANK EXCAVATION OBSERVATION WELLS ARE TO BE INSTALLED AT DIAGONAL OPPOSITE OF THE TANK FARM EXCAVATION TO FACILITATE THE TESTING OF GROUND WATER FOR POTENTIAL SPILLS.
15. GALVANISED STEEL SPILL SAFE FILL BOX WITH INDIVIDUAL CATCHMENT TRAYS DRAIN VALVES FOR EACH FILL POINTS TO BE INSTALLED FOR THE DELIVERY OF FUEL.
16. DISPENSERS ARE TO HAVE THERMOPLASTIC CONTAINMENT UNDER DISPENSER SUMPS FITTED.
17. AUTOMATIC TANK GAUGING, INTERSTITIAL SPACE MONITORING, AND ELECTRONIC LINE LEAK DETECTION IS TO BE INSTALLED.
18. LEAK DETECTION SHALL BE CABABLE OF DETECTING A LEAK OF 0.76 L PER HOUR WITH A PROBABILTY OF DETECTION OF AT LEAST 0.95 AND A PROBABILTY OF FALSE DETECTION OF 0.05 OR LESS.
19. VERIFY THE SETTING AND OPERATION OF ALL FILL LINE OVERFILL PROTECTION VALVES. VALVES TO BE SET AT A MAXIM,UM OF 95% OF ACTUAL TANK CAPACITY.
20. ALL THERMOPLASTIC PIPE WORK SHALL BE LAID WITH A MINIMUM OF 150mm CLEARANCE BETWEEN ADJACENT AND CROSS-OVER PIPING.
21. ALL THERMOPLASTIC PIPE WORK IS TO BE LAID WITH A MINIMUM OF 300mm COVER UNDER CONCRETE PAVEMENTS.
22. ALL PRODUCT DELIVERY PIPE WORK UNDER PRESSURE TO CLASS 'A' SITES SHALL BE THERMOPLASTIC SECONDARY CONTAINED PIPE WORK.
23. PRODUCT DELIVERY, REMOTE FILL, AND VAPOUR RECOVERY STAGE 1 PIPE WORK IS TO BE INSTALLED WITH A RECOMMENDED 1:100 FALL BACK TO THE TANK CONNECTION. LOW POINTS AND AREAS WHERE AIR POCKETS CAN ACCUMULATE WILL NOT BE ACCEPTED.
24. VENT PIPE WORK IS TO BE LAID WITH A MANDATORY 1:100 FALL BACK TOWARDS THE TANK CONNECTION. LOW POINTS AND AREAS WHERE AIR POCKETS CAN ACCUMULATE WILL NOT BE ACCEPTED.
25. ALL THERMOPLASTIC PIPE WORK IS TO BE INSTALLED BY A PIPE MANUFACTURER ACCREDITED INSTALLER.
26. VAPOUR RECOVERY STAGE 1 IS TO BE INSTALLED AND OPERATIONAL TO CAPTURE VAPOUR DISPLACED FROM UNDERGROUND PETROLEUM STORAGE TANKS DURING TANKER FUEL DELIVERY.
27. VENTS ARE TO BE FITTED WITH PRESSURE/VACUUM VENT CAPS.
28. OVERFILL FLOAT VALVES ARE NOT TO BE INSTALLED TO VENTS TO PREVENT FAILURE OF TANKS IN THE EVENT OF FLOAT BECOMING STUCK.
29. UNUSED SOCKETS TO TANKS TO BE SEALED WITH MALLEABLE STEEL PLUGS.
30. ALL METAL FITTINGS UNDER PRESSURE TO BE GALV STEEL ONLY. DO NOT USE MALLEABLE STEEL FITTINGS ON PRESSURE LINES.
31. FILL POINT AND DIP MARKERS ARE TO BE INSTALLED IN ACCORDANCE WITH AS4977.
32. MANDATORY SIGNAGE TO BE INSTALLED TO CANOPY COLUMNS, DISPENSERS, AND EMERGENCY STOPS AS REQUIRED BY AUSTRALIAN STANDARDS AND QUEENSLAND WORK HEALTH AND SAFETY REGULATIONS 2011.
33. ALL METAL OBJECTS WITHIN HAZARD ZONES ON FORECOURT ARE TO BE EARTHED AND STATICALLY BONDED.
34. ALL ELECTRICAL WORK IN AND AROUND THE HAZARDOUS AREAS ON SITE SHALL BE CARRIED OUT AND CERTIFIED BY A SUITABLY QUALIFIED ELECTRICAL CONTRACTOR IN ACCORDANCE WITH LOCAL AUTHORITY, POWER SUPPLY AUTHORITY REQUIREMENTS, AND AUSTRALIAN STANDARDS.

ABBREVIATIONS

ATG	AUTOMATIC TANK GAUGING RISER
BOL	BOLLARD
BRN	INTERSTITIAL SPACE MONITORING RISER
COL	COLUMN
DIP	TANK DIP RISER
DP	DOWNPIPE
ES	EMERGENCY STOP
FDB	FUEL DISTRIBUTION BOARD
FE	FIRE EXTINGUISHER
LP	LIGHT POLE
MW	GROUND WATER MONITORING WELL
MPD	MULTI PRODUCT DISPENSER
MSB	MAIN SWITCHBOARD
TOW	TANK OBSERVATION WELL
TP	THERMOPLASTIC PIPE WORK
VA	DEF VENT
VD	DIESEL VENT
VF	FUEL VENT
VH	HOLDING TANK VENT
VP	SPEL PURACEPTOR VENT PIPE WORK
VR1	VAPOUR RECOVERY STAGE 1

PIPEWORK

FILL
110mm OD SINGLE CONTAINED UNDERGROUND THERMOPLASTIC PIPE WORK.

PRODUCT - PRESSURE SYSTEM
63/75mm OD SECONDARY CONTAINED UNDERGROUND THERMOPLASTIC PIPE WORK.

VAPOUR RECOVERY STAGE 1
90mm OD. SINGLE WALLED THERMOPLASTIC UNDERGROUND PIPE WORK.

FLAMMABLE PRODUCT VENT
63mm OD SINGLE WALLED THERMOPLASTIC UNDERGROUND PIPE WORK.
NOTE: VENT LINE FROM TANK CONNECTED TO VR1 TO BE 90mm OD SINGLE WALLED THERMOPLASTIC UNDERGROUND PIPE WORK.
CONFIRM VENT PIPE WORK SIZE WITH AS1940

COMBUSTIBLE PRODUCT VENT
63mm OD SINGLE WALLED THERMOPLASTIC UNDERGROUND PIPE WORK.
CONFIRM VENT PIPE WORK SIZE WITH AS1940

PRODUCT SCHEDULE

STORAGE NO	LOCATION	TYPE	VOLUME	PRODUCT	GHS CATEGORY	ADG CATEGORY
T1	U/GROUND	FIBREGLASS SECONDARY CONTAINED	30 kL	UNLEADED 91 OCTANE PETROL (ULP91)	FLAMMABLE LIQUIDS CATEGORY2	3 PGII
T2	U/GROUND	FIBREGLASS SECONDARY CONTAINED	30 kL	UNLEADED 91 OCTANE PETROL WITH 10% ETHANOL (E10)	FLAMMABLE LIQUIDS CATEGORY 2	3 PGII
T3	U/GROUND	FIBREGLASS SECONDARY CONTAINED	30 kL	UNLEADED 95 OCTANE PETROL (ULP95)	FLAMMABLE LIQUIDS CATEGORY 2	3 PGII
T4	U/GROUND	FIBREGLASS SECONDARY CONTAINED	70 kL	AUTOMOTIVE DIESEL (DIS)	FLAMMABLE LIQUIDS CATEGORY 4	C1
T5	U/GROUND	FIBREGLASS SECONDARY CONTAINED	20 kL	DIESEL EXHAUST FLUID (DEF)	N/A	N/A
P1	CAGE	EXCHANGE CYLINDERS (4.5 - 9KG)	600 L	LIQUID PETROLEUM GAS (LPG)	FLAMMABLE GAS CATEGORY 1	2.1

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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NOT FOR CONSTRUCTION

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AMENDMENTS

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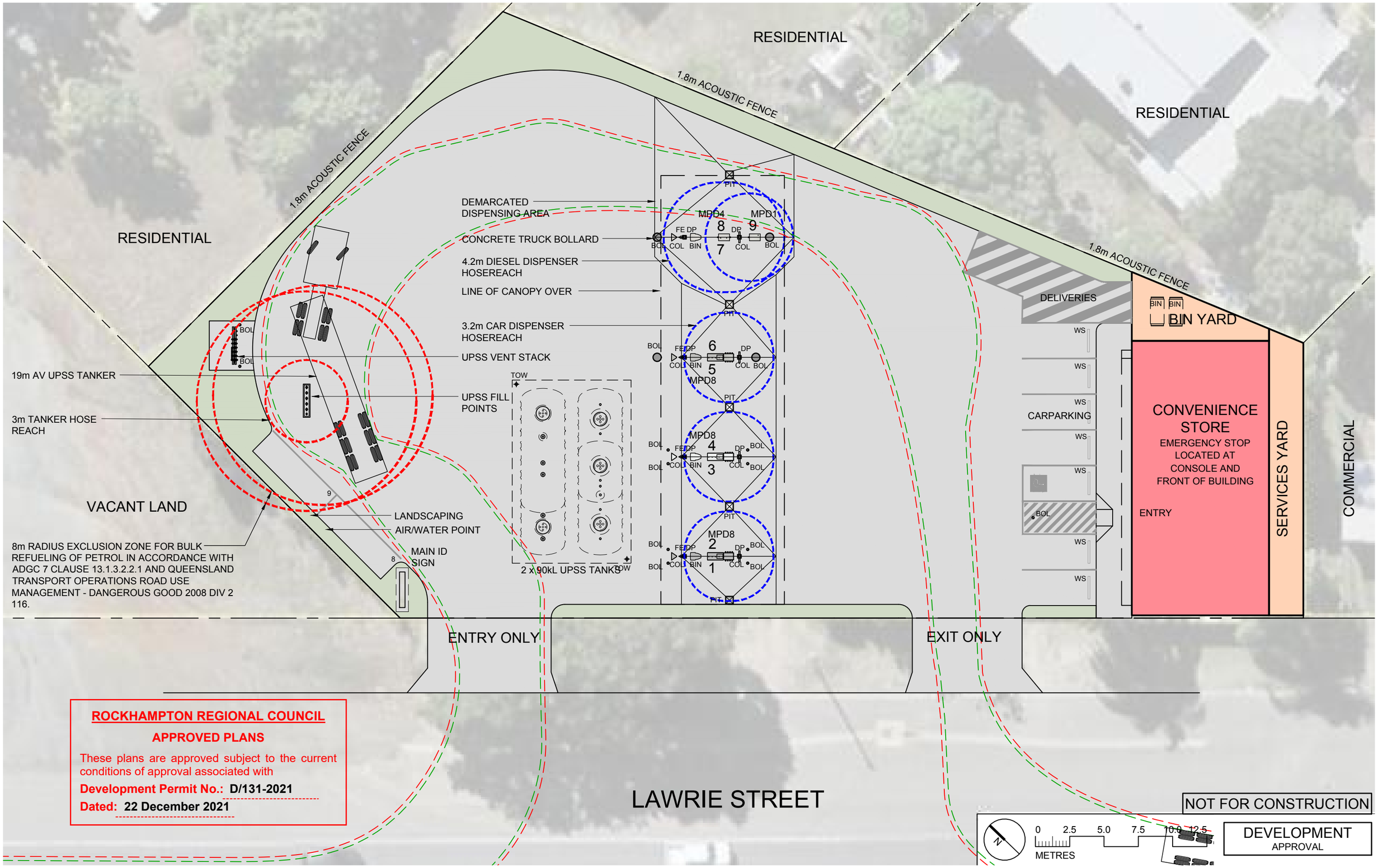
CLIENT
GRACEMERE CENTRE PTY LTD (AS TRUSTEE)
GRACEMERE CENTRE TRUST

PROJECT
GRACEMERE SERVICE STATION DEVELOPMENT
16-18 LAWRIE STREET
GRACEMERE, QUEENSLAND 4702

TITLE
UPSS NOTES, LEGEND, AND SCHEDULES

SCALE	DRAWN	DATE
NTS	MAE	16/09/21
SIZE	CHECKED	DATE
A3		
DRAWING NUMBER		REVISION
2021046-DA-F001		A



ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/131-2021

Dated: 22 December 2021

NOT FOR CONSTRUCTION

METRES 0 2.5 5.0 7.5 10.0 12.5

DEVELOPMENT APPROVAL

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AMENDMENTS

REV	DATE	DESCRIPTION	BY
A	28/09/21	DEVELOPMENT APPROVAL ISSUE	MAE
B	11/11/21	DEVELOPMENT APPROVAL ISSUE	MAE

CLIENT
GRACEMERE CENTRE PTY LTD (AS TRUSTEE) GRACEMERE CENTRE TRUST

PROJECT
GRACEMERE SERVICE STATION DEVELOPMENT
16-18 LAWRIE STREET
GRACEMERE, QUEENSLAND 4702

TITLE
UPSS VEHICLE PATH SITE PLAN - 19m AV TANKER

SCALE	DRAWN	DATE
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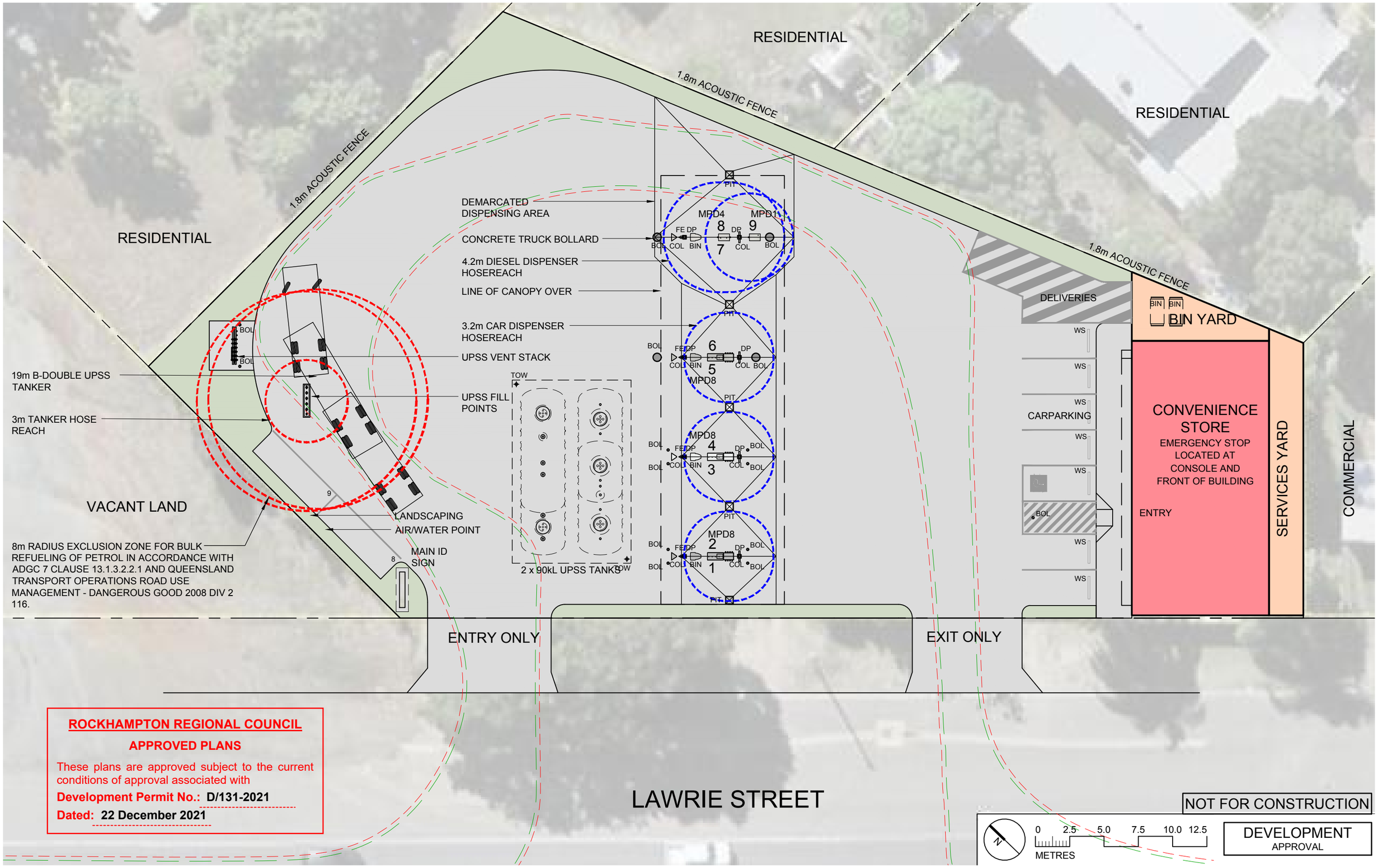
SIZE	CHECKED	DATE
A3		
DRAWING NUMBER		REVISION
2021046-DA-F150		B



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0 2.5 5.0 7.5 10.0 12.5 METRES

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AMENDMENTS

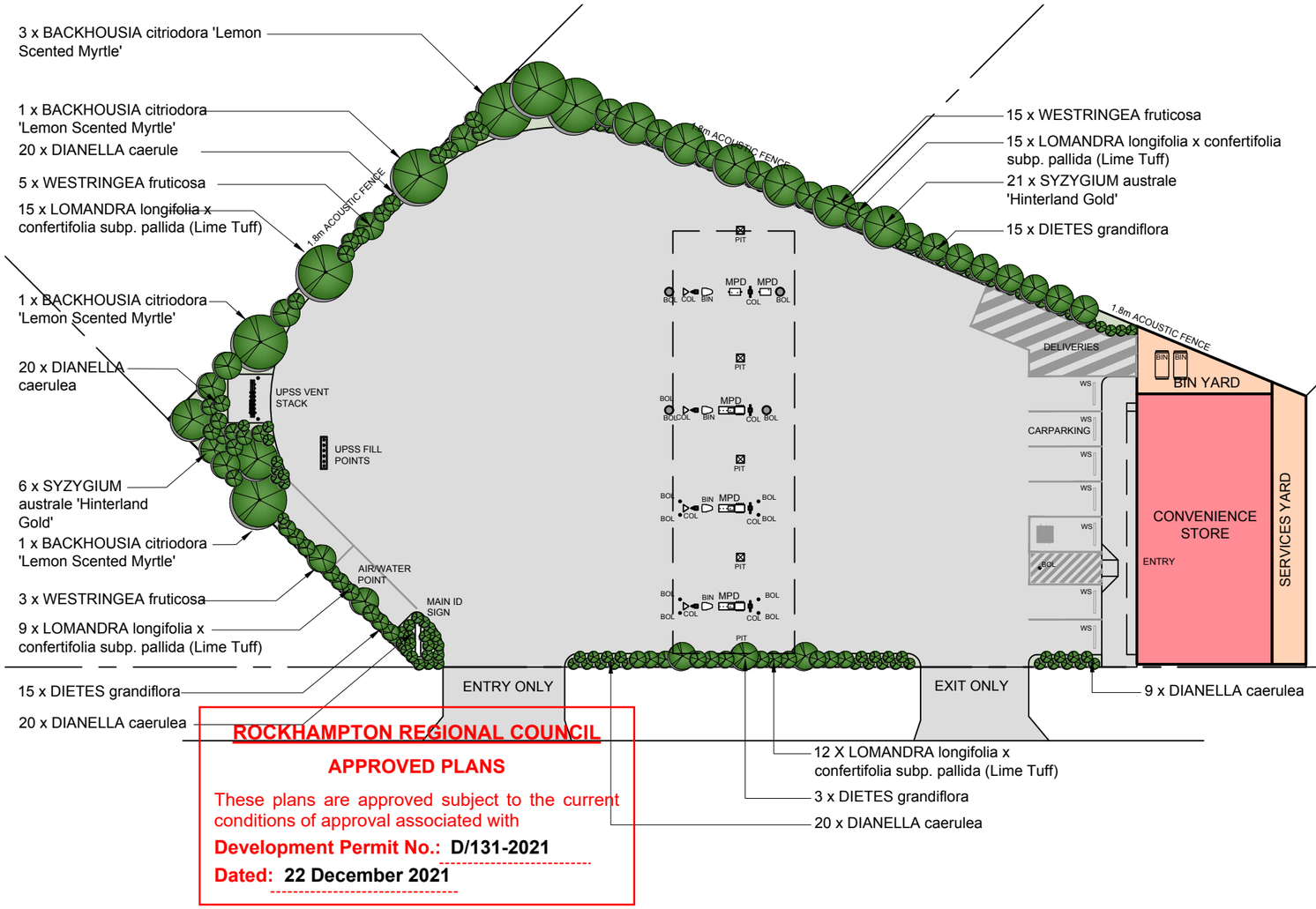
REV	DATE	DESCRIPTION	BY
A	28/09/21	DEVELOPMENT APPROVAL ISSUE	MAE
B	11/11/21	DEVELOPMENT APPROVAL ISSUE	MAE

CLIENT: GRACEMERE CENTRE PTY LTD (AS TRUSTEE) GRACEMERE CENTRE TRUST

PROJECT: GRACEMERE SERVICE STATION DEVELOPMENT
16-18 LAWRIE STREET
GRACEMERE, QUEENSLAND 4702

TITLE: UPSS VEHICLE PATH SITE PLAN - 19m B-DOUBLE TANKER

SCALE	DRAWN	DATE
1:250	MAE	06/09/21
SIZE	CHECKED	DATE
A3		
DRAWING NUMBER		REVISION
2021046-DA-F151		B



ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Development Permit No.: D/131-2021

Dated: 22 December 2021

LANDSCAPE NOTES

FALLS & DRAINAGE
- PROVIDE FALLS TO ALL LANDSCAPE AREAS. FALL TO DRAINS AS INDICATED AND AWAY FROM BUILDING AND NEIGHBOURING PROPERTIES, PONDING IS NOT ACCEPTABLE AND NOTIFY IF ADDITIONAL DRAINAGE MAY BE REQUIRED.
- MIN CROSSFALL TO PLANTING AREAS IS 1:40
- MIN CROSSFALL TO PAVED AREAS TO BE 1:100

GARDEN EDGING
- PROVIDE EDGING CONCRETE EDGING TO ALL LANDSCAPE AREAS AND ADJOINING CARPARK AND TURFED AREAS.

PLANTING BEDS
- REFER TO LANDSCAPE PLANS AND SCHEDULE FOR PLANTING AREAS AND SPECIES.
- CULTIVATE ALL PLANTING BEDS TO MIN 150mm DEEP.
- MULCH AND SOIL TO MEET AS4454 AND AS4419 AND ENSURE SOIL MEDIA IS AMELIORATED TO INCREASE WATER HOLDING CAPACITIES.
- APPLY GYPSUM TO THE SUB GRADE AT A RATE OF 100 GRAMS/m2.
- APPLY BLOOD AND BONE TO THE SUB GRADE AT A RATE OF 100 GRAMS/m2.
- SPREAD A MIN DEPTH OF 350mm OF IMPORTED ORGANIC WEED FREE SOIL MIX TO GARDEN BEDS DIRECTLY AFTER CULTIVATION WORKS.
- CROWN BEDS IN THE CENTRE.
- POSITION PLANTS GENERALLY IN ACCORDANCE WITH THE LANDSCAPE PLAN.
- MULCH GARDEN BEDS TO 100mm USING QUALITY TEA TREE MULCH.
- WATER PLANTING BEDS.
- FERTILISE WITH A LONG TERM SLOW RELEASE FERTILISER.
-

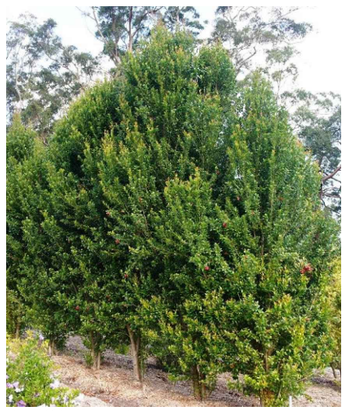
LEVELS
- ALL SUFACES ABUTTING BUILDINGS TO BE A MIN 75mm BELOW WEEPHOLES.

ROCKS/PEBBLES
- ALL GARDEN BEDS AGAINST A BUILDING SHALL BE SEPARATED BY A MIN 150mm STRIP OF PEBBLES.
- ALL PEBBLES AREAS TO HAVE WEED MATTING INSTALLED UNDER. BIORETENTION
- BIORETENTION BASIN TO PLANTED WITH GROUND COVERS AT A DENSITY OF 4/m² AS PER THE WSUD TECHNICAL DESIGN GUIDELINES.
- ANY TREES IN BIORETENTION BASIN TO BE MOUNDED LOCALLY TO 800mm MINIMUM.

SERVICES
- LANDSCAPE CONTRACTOR TO LIAISE WITH SITE PROJECT MANAGER/SUPERVISOR TO DETERMINE LOCATION OF ALL AS CONSTRUCTED SERVICES PRIOR TO COMMENCING WORKS.

ESTABLISHMENT & MAINTENANCE
- 12 WEEK ESTABLISHMENT PERIOD TO ALL TURF AND PLANTING AREAS COMMENCING FROM BUILDERS PRACTICAL COMPLETION DATE.
- REFER TO LOCAL AUTHORITY REQUIREMENTS IN RELATION TO WATER USAGE RESTRICTIONS TO ENSURE WATER REGIME IS NOT IN BREACH.
- WATER TWICE WEEKLY FOR FIRST 3 WEEKS AND ONCE WEEKLY THEREAFTER.


BACKHOUSIA citriodora 'Lemon Scented Myrtle'


SYZYGIUM australe 'Hinterland Gold'


WESTRINGEA fruticosa


LOMANDRA longifolia x confertifolia subp. pallida (Lime Tuff)


DIETES grandiflora


DIANELLA caerulea


DIANELLA revoluta

PLANT NAME	HABIT	HABIT	HEIGHT	WIDTH
BACKHOUSIA citriodora 'Lemon Scented Myrtle'	SCREENING PLANT	NATIVE (LOCAL)	5-10m	3-4m
SYZYGIUM australe 'Hinterland Gold'	SCREENING PLANT	NATIVE	2-4m	1.5-2m
WESTRINGEA fruticosa 'Native Rosemary'	SHRUB	NATIVE	2m	1.5m
LOMANDRA longifolia x confertifolia subp. pallida (Lime Tuff)	CLUMPING AND TUSSOCK PLANT	NATIVE	0.7-0.9m	0.6-0.8m
DIETES grandiflora	CLUMPING AND TUSSOCK PLANT	EXOTIC	0.0-1.5m	00.8-1.5m
DIANELA caerulea	CLUMPING AND TUSSOCK PLANT	NATIVE (LOCAL)	1m	0.5m
DIANELA revoluta	CLUMPING AND TUSSOCK PLANT	NATIVE	0.3m	0.3m

NOT FOR CONSTRUCTION

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AMENDMENTS

REV	DATE	DESCRIPTION	BY
A	08/11/21	DEVELOPMENT APPROVAL ISSUE	MAE
B	09/11/21	DEVELOPMENT APPROVAL ISSUE	MAE

CLIENT
GRACEMERE CENTRE PTY LTD (AS TRUSTEE)
GRACEMERE CENTRE TRUST

PROJECT
GRACEMERE SERVICE STATION DEVELOPMENT
16-18 LAWRIE STREET
GRACEMERE, QUEENSLAND 4702

TITLE
LANDSCAPE SITE PLAN

SCALE	DRAWN	DATE
1:250	MAE	06/09/21
SIZE	CHECKED	DATE
A3		
DRAWING NUMBER		REVISION
2021046-DA-L100		B

RoadPro ACOUSTICS

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/131-2021

Dated: 22 December 2021

Environmental Noise Assessment
Proposed Service Station

16-18 Lawrie Street
Gracemere

Report 1334R1-R0

21 October 2021

Document Control

Report 1334R1-R0

Version History:

Version	Date	Prepared by	Reviewed by	Description / nature of amendments
Draft 1	07-Oct-21	JC	JC	Initial draft
Draft 2	08-Oct-21	JC	JC	Minor amendments
Draft 3	18-Oct-21	JC	JC	Minor amendments
Draft 4	20-Oct-21	JC	JC	Minor amendments
Revision 0	21-Oct-21	JC	JC	Final report

Contact for enquiries

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Table of Contents

1 Introduction

RoadPro Acoustics was engaged by Gracemere Centre Pty Ltd (as trustee) Gracemere Centre Trust to assess potential noise impacts from a proposed service station at a site at 16-18 Lawrie Street, Gracemere (the Site). The Site location is shown in **Figure 1**, and proposed site layout is shown in **Figure 2**. Plans are provided in **Appendix A**.

Figure 1: Site Location – 16-18 Lawrie Street, Gracemere

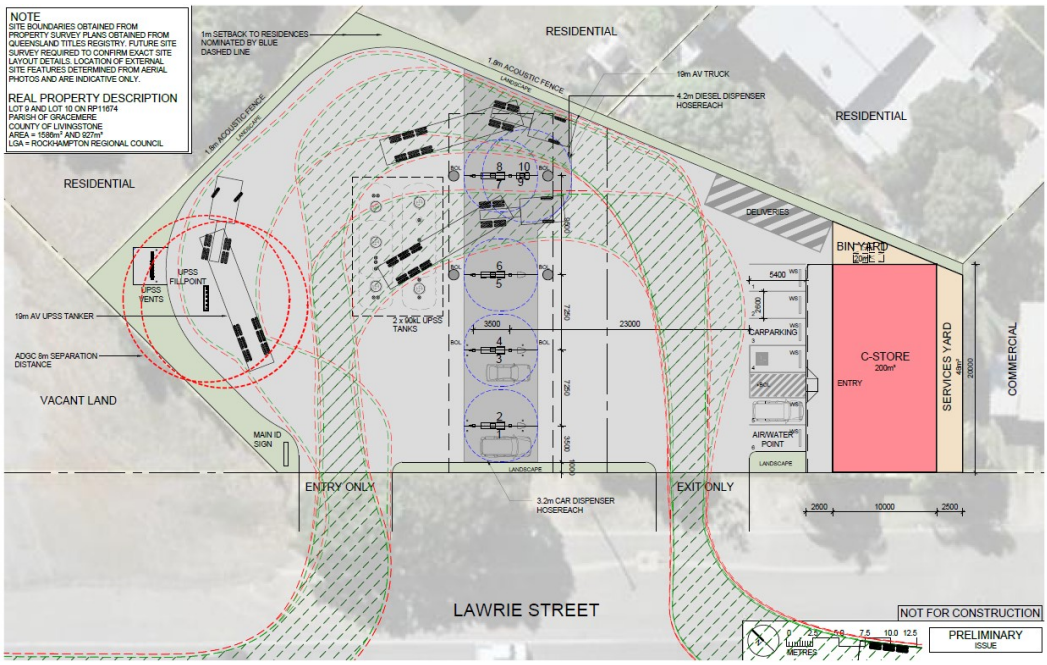


Figure 2: Site layout - 16-18 Lawrie Street, Gracemere

- 10 bowser pumps (5 x dual side),
- Store / fuel shop,
- Bin yard,
- Services yard, and
- 6 x car parking bays.

This noise assessment has been carried out generally in accordance with the following:

- Environmental Protection (Noise) Policy 2019;
- Environmental Protection Act 1997;
- Rockhampton Regional Council Planning Scheme;
- *Noise Measurement Manual*, Queensland Government – Environmental Protection Agency, Version 4, August 2013; and
- Australian Standard *AS1055.1–1997 Acoustics – Description and measurement of environmental noise*.

Information used for this assessment included:

- Development plans prepared by inTOTUM;
- Google Earth imagery;
- Ausmap LIDAR spot heights; and
- Photographs and general information from a site visit and inspection.

2 Acoustic Terminology

The following is a brief explanation of the acoustic terminology used in this report.

2.1 Sound (Noise) Level

Sound or noise consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. The human ear responds to changes in sound pressure over a very wide range. The loudest sound pressure to which the human ear responds is ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols "L" or "L_A" are commonly used to represent Sound Pressure Level.

2.2 "A" Weighted Sound Pressure Level - dB(A)

The overall level of a sound is usually expressed in terms of dB(A), which is measured using a sound level meter with an "A-weighting" filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People's hearing is most sensitive to sounds at mid frequencies (500 Hz to 4000 Hz), and less sensitive at lower and higher frequencies. Thus, the level of a sound in dB(A) is a good measure of the loudness of that sound. Different sources having the same dB(A) level generally sound about equally as loud.

A change of 1 dB(A) or 2 dB(A) in the level of a sound is difficult for most people to detect, whilst a 3 dB(A) to 5 dB(A) change corresponds to small but noticeable change in loudness. A 10 dB(A) change corresponds to an approximate doubling or halving in loudness.

Table 1 below shows examples of typical noise levels.

Table 1: Typical Noise Levels

Sound Pressure Level (dB(A))	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120	Heavy rock concert	Extremely
110	Grinding on steel	noisy
100	Loud car horn at 3 m	Very noisy
90	Construction site with pneumatic hammering	
80	Curbside of busy street	Loud
70	Loud radio or television	
60	Department store	Moderate to
50	General Office	quiet
40	Inside private office	Quiet to very
30	Inside bedroom	quiet
20	Unoccupied recording studio	Almost silent

2.3 Statistical Sound (Noise) Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels L_{AN}, where L_{AN} is the A-weighted sound pressure level exceeded by N% of a given measurement period. For example, the L_{A1} is the noise level exceeded for 1% of the time, L_{A10} the noise exceeded for 10% of the time, and so on.

Of particular relevance are:

L_{A1} The noise level exceeded for 1% of the 15 minute interval.

L_{A10} The noise level exceed for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.

L_{A90} The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level

L_{Aeq} is the A-weighted equivalent continuous sound pressure level (basically the average sound level). It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

When dealing with numerous days of statistical noise data a method is required to determine the noise descriptors that are representative of a monitoring location for a particular time of day. The method of statistical accumulation provides an appropriate method of determining these noise descriptors.

This method accumulates each value for the days of monitoring and produces an estimate of the "repeatable minimum" L_{A90} noise level over the daytime and night-time measurement periods, as required by the Department of Environment and Heritage Protection. In addition, the method produces mean or "average" levels that are representative of the other descriptors that can be expected on a typical day at each particular site.

3 Background Noise

Noise measurements were carried out in John Street from Monday 6th September 2021 to Monday 13th September 2021 at the location shown in **Figure 3**. The location was selected for its accessibility and as being representative of background noise levels for the nearest sensitive receivers.

The measurements were carried out using a Nor139 sound level meter (Serial number 1392783) recording "fast" response "A" frequency weighted sound levels at 15-minute intervals, with the microphone at a height of approximately 1.5 m. The instrument was checked for calibration prior to and post-measurement using a 94 dB acoustic signal at 1000 Hz, and drift in calibration remained within ±0.5 dB.

Weather conditions for the duration of the survey were monitored via the Rockhampton Airport Bureau of Meteorology station and were generally suitable for noise monitoring throughout the measurement period.

Figure 3: Noise Logger Location - 16-18 Lawrie Street, Gracemere

Ambient noise at the Site included road traffic noise, some construction noise, train noise, and natural sounds.

A summary of the logged data is provided in **Table 2**. The full dataset of the measurements and weather is provided as charts in **Appendix B**.

Table 2: Logger noise measurement results, dB(A)

Day	Period,T	$L_{A90,T}$	$L_{Aeq,T}$	$L_{A10,T}$	$L_{A1,T}$
Monday-6-Sep-21	Day	(51.3)	(57.2)	(59.5)	(65.4)
	Eve	43.0	55.5	55.7	63.1
	Night	38.1	55.1	56.3	63.7
Tuesday-7-Sep-21	Day	48.3	57.3	59.0	65.0
	Eve	42.6	56.8	54.5	62.5
	Night	39.7	55.4	57.1	61.8
Wednesday-8-Sep-21	Day	48.4	57.1	59.3	65.3
	Eve	40.9	52.5	54.8	62.1
	Night	40.4	55.4	56.6	62.7
Thursday-9-Sep-21	Day	49.3	56.7	59.0	65.6
	Eve	42.5	56.0	57.9	64.4
	Night	40.6	60.6	57.7	65.7
Friday-10-Sep-21	Day	48.3	58.0	59.5	66.2
	Eve	43.6	53.8	55.7	63.1
	Night	33.1	51.4	52.5	58.2
Saturday-11-Sep-21	Day	47.9	56.2	58.9	65.2
	Eve	41.4	52.4	54.9	61.9
	Night	31.9	51.2	52.4	58.3
Sunday-12-Sep-21	Day	47.1	55.8	58.8	64.9
	Eve	40.3	51.2	54.2	61.8
	Night	34.3	52.1	50.4	57.9
Monday-13-Sep-21	Day	(48.7)	(58.7)	(59.8)	(66.1)
Overall	**Day**	48	57	59	65
	Eve	43	54	55	63
	Night	38	56	56	62

4 Noise Criteria

4.1 Acoustic Quality Objectives - Residences

The *Environmental Protection (Noise) Policy 2019* (EPP(Noise)) is designed to achieve the object of the *Environmental Protection Act 1994*. Relevant extracts are as follows:

The environmental values to be enhanced or protected under this policy are—

(a) the qualities of the acoustic environment that are conducive to protecting the health and biodiversity of ecosystems; and

(b) the qualities of the acoustic environment that are conducive to human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to do any of the following—

(i) sleep;

(ii) study or learn;

(iii) be involved in recreation, including relaxation and conversation; and

(c) the qualities of the acoustic environment that are conducive to protecting the amenity of the community.

Acoustic Qualify Objectives are specified for residences as shown in **Table 3**.

Table 3: *Environmental Protection (Noise) Policy 2019* Acoustic Quality Objectives

Sensitive receptor	**Time of day**	**Acoustic quality objectives (measured at the receptor) dB(A)**			**Environmental value**
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$	
Dwelling (for outdoors)	Daytime and evening	50	55	65	health and wellbeing
Dwelling (for indoors)	Daytime and evening	35	40	45	health and wellbeing
	Nighttime	30	35	40	health and wellbeing, in relation to the ability to sleep
commercial and retail activity (for indoors)	when the activity is open for business	45			health and wellbeing, in relation to the ability to converse

In order to assess internal sound levels, a 7 dB(A) noise reduction (free-field) through partially opened windows as per the Queensland Ecoaccess Guideline *Planning for Noise Control* (2004) is assumed. Where a building façade is expected to be closed, the outside to inside noise reduction is expected to be 20 dB(A)+.

4.2 Background Creep

The EPP(Noise) provides the following regarding *background* creep in **Section 9**. Note that the technical provisions for *background creep* for time-varying (L_{Aeq}) and constant noise (L_{A90}) have been removed from the EPP(Noise) as of 1 September 2019.

(2) To the extent it is reasonable to do so, noise must be dealt with in a way that ensures—

(a)the noise does not have any adverse effect, or potential adverse effect, on an environmental value under this policy; and

(b)background creep in an area or place is prevented or minimised.

The potential for an increase in background noise levels from this proposal is limited to noise from mechanical plant. The criteria specified in the *Environmental Protection Act 1994* is deemed to be appropriate for control of mechanical plant noise by the Queensland Government.

4.3 Sleep Disturbance

The Queensland Ecoaccess Guideline *Planning for Noise Control* (2004), which refers to the WHO guidelines, indicates that unreasonable sleep disturbance impacts due to impulsive noise sources such as engine starts and door slams can occur at levels of 45 to 50 dB(A) within a bedroom depending upon the number of noise events per night. Maximum external noise levels to limit the likelihood of sleep disturbance for a range of noise levels and number of events are shown in **Table 4**.

Table 4: Number of permissible noise events for various external maximum noise levels for partially closed windows (10% probability of awakening) from DEHP *Planning for noise control*

MaxLpA (dBA)[1]	47	52	57	62
Number of events (n)	32	10	3	1

[1] Free-field

When the expected number of maximum noise events during the night-time period exceeds 32, the L_{Amax} criterion should default to the $L_{A1(1\ hour)}$ Acoustic Quality Objective i.e. 40 dB(A) inside, or 47 dB(A) outside (free-field).

4.4 Mechanical Plant Noise

The *Environmental Protection Act 1994* specifies criteria for specific mechanical plant, summarised in **Table 5**.

Table 5: Summary of mechanical plant noise criteria from the Queensland *Environmental Protection Act 1994*

Plant	Time Period Start	Time Period Finish	Criterion
Pumps[1]	7am	7pm	Background + 5 dB(A)
	7pm	10pm	Background + 3 dB(A)
	10pm	7am	Inaudible
Air conditioning equipment	7am	10pm	Background + 5 dB(A)
	10pm	7am	Background + 3 dB(A)
Refrigeration plant[2]	7am	10pm	Background + 5 dB(A)
	10pm	7am	Background + 3 dB(A)

Notes:
[1]A pump means an electrical, mechanical or pneumatic pump; and includes a swimming pool pump and a spa blower. Examples — liquid pump, air pump, heat pump.
[2]Criteria for refrigeration plant applies to an occupier of premises at or for which there is plant or equipment for refrigeration (refrigeration equipment); or an owner of refrigeration equipment that is on or in a vehicle, other than a vehicle used or to be used on a railway. "Vehicle" includes a trailer.

The site-specific criteria for mechanical plant noise considering the measured background noise levels are provided in **Table 6**.

Table 6: Site-specific mechanical plant noise criteria from the Queensland *Environmental Protection Act 1994*

Plant	Time Period Start	Time Period Finish	Criterion
Pumps	7am	6pm	48 + 5 = 53 dB(A)
	6pm	7pm	43 + 5 = 48 dB(A)
	7pm	10pm	43 + 3 = 46 dB(A)
	10pm	7am	38 - 10 = 28 dB(A)
Air conditioning equipment	7am	6pm	48 + 5 = 53 dB(A)
	6pm	10pm	43 + 5 = 48 dB(A)
	10pm	7am	38 + 3 = 41 dB(A)
Refrigeration plant	7am	6pm	48 + 5 = 53 dB(A)
	6pm	10pm	43 + 5 = 48 dB(A)
	10pm	7am	38 + 3 = 41 dB(A)

Notes:
[1]A noise level 10 dB(A) or more below the ambient background noise level is generally adopted for design purposes to represent "inaudibility". Even though a noise level 10 dB(A) below the background noise level may not be imperceptible, the likelihood of disturbance being causes by the source is considered to be negligible.

5 Predicted Noise Emission Levels

5.1 General Methodology

The nearest potentially affected receivers to the Site are residences to the north and east of the Site, as shown in **Figure 4**. The residences at 1 and 3 Arthur Street are 2-storey houses, while the residence at 5 Arthur Street and the commercial premises at 20 Lawrie Street are single-storey structures.

Figure 4: Model scenario

Calculations of environmental noise emissions from the site were carried out using the PEN3D environmental noise software package. Terrain data was derived from LIDAR spot heights at 5 m grid intervals and converted to 0.5 m ground contours.

The nearest potentially most affected receivers to the Site are:

- A single storey residence to the north-east at 5 Arthur Street,
- A double-storey residence to the east at 3 Arthur Street,
- A double-storey residence to the east at 1 Arthur Street,
- A single-storey commercial premise to the south-east at 20 Lawrie Street.

5.2 Vehicles

Vehicle noise for carparking (and refuelling) was modelled using the BayFIU method adapted for Australian conditions[2]. The $L_{Aeq(1\ hour)}$ sound power level for a single vehicle movement is 64 dB, and it was assumed a peak hour would have one vehicle stop and leave per car park. The method incorporates all noise such as door closures and engine starts. The $L_{A10(1\ hour)}$ and $L_{A1(1\ hour)}$ noise levels are approximately 2 dB(A) and 8 dB(A) greater than the $L_{Aeq(1\ hour)}$ respectively.

Vehicles travelling through the Site were modelled as moving point sources, with a peak hour of approximately 5 heavy and 20 light vehicles assumed. Sound power spectra for vehicle types[3] is shown in **Table 7**.

Table 7: Vehicle sound power levels at low speeds, dB

	1/1 Octave Band Centre Frequency (Hz)							
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Light	63	72	73	77	78	78	75	69
Heavy	103	101	99	98	99	96	89	78

The $L_{AMax,adj}$ sound power level for a car door closure or engine start is 95 dB(A), centred at 1000 Hz.

5.3 Pumps

Bowser pumps can have significantly varying noise emissions. Given the criterion for night-time use is “inaudibility”, taken to be 10 dB(A) below the background level, consideration of noise from pumps should be a high priority when procuring this equipment.

5.4 Air Conditioners

Air conditioning plant noise levels will require further assessment during the detailed design stage of the project to ensure the night-time noise criterion is achieved.

5.5 Refrigeration Plant

Fixed refrigeration plant will require further assessment during the detailed design stage of the project to ensure evening and night-time noise criteria are achieved.

Mobile refrigeration plant will possibly be fixed to some trucks that use the service station. However, as the Site does not include any truck parking areas, noise caused by mobile refrigeration plant will be highly transient and isn’t considered to require assessment and attenuation in addition to general truck engine and exhaust noise.

5.6 Loading Bay Noise

Provided loading activities are constrained to daytime and early evening hours, it is considered unlikely that this has potential to cause a nuisance.

5.7 Waste Collection Noise

As with the loading bay, provided this activity is constrained to daytime and early evening, it is considered unlikely that waste collection will cause a nuisance.

---

[2] Laurence Nicol and Paul Johnson, Paper Number 39, Proceedings of ACOUSTICS 2011 (November 2011) “Prediction of parking area noise in Australian conditions”

[3] Emanuel Hammer, Sebastian Egger, Tina Saurer and Erik Bühlmann, 23rd International Congress on Sound and Vibration (July 2016) “Traffic Noise Modelling at Lower Speeds”

5.8 Other Ancillary Noise

Compressed air dispensers are typically fitted with tonal audible alarms. It is recommended that a unit is procured on which the alarm volume can be adjusted, or the alarm can be disabled during the evening and night.

6 Discussion of Results and Attenuation

The most significant noise impacts from the Site are expected to be a result of vehicle noise, particularly L_{AMax} noise levels rather than overall L_{Aeq} noise emissions.

The Acoustic Quality Objectives are expected to be achieved, however the maximum noise levels from light vehicles (door closures and engine starts) will potentially exceed the nominated criterion for sleep disturbance (52 dB(A)) at 1 Arthur Street and 3 Arthur Street by 1-7 dB(A), as shown in **Table 8** and **Table 9**. Subjectively, this would be perceived as "negligible" to "noticeable" relative to the criterion.

Table 8 Predicted L_{AMax} noise levels from Site vehicle movements

Receptor	X Posn	Y Posn	Height	Ground	Noise Level
	(m)	(m)	(m)	(m)	(dB(A))
5 Arthur Street	240262.1	7405680	1.8	30.5	51
3 Arthur Street	240286.1	7405657	4.5	29.8	53
1 Arthur Street	240281.5	7405638	4.5	29.1	59
20 Lawrie Street	240271.5	7405606	1.8	28.3	39

Table 9 Predicted L_{Aeq} noise levels from Site vehicle movements

Receptor	X Posn	Y Posn	Height	Ground	Noise Level
	(m)	(m)	(m)	(m)	(dB(A))
5 Arthur Street	240262.1	7405680	1.8	30.5	40
3 Arthur Street	240286.1	7405657	4.5	29.8	41
1 Arthur Street	240281.5	7405638	4.5	29.1	43
20 Lawrie Street	240271.5	7405606	1.8	28.3	25

These results should, however, be reviewed in the context of the existing noise environment, in which surrounding transportation noise from Lawrie Street, and to a lesser extent the railway, produce L_{A1} noise levels that exceed the Acoustic Quality Objectives throughout all time periods.

Acoustic barriers of the height and extents required for heavy vehicles (4.5m high along the northern and north-eastern boundaries) are not preferable from an aesthetic viewpoint and should be viewed against the likelihood that heavy vehicles will frequent the Site at night time. The following is provided in that regard:

- Of the 10,188 vehicles that use Lawrie Street, 4,668 vehicles move in the direction of travel that will be able to access the development.
- Of those 4,668 vehicles, 3.17% is heavy vehicles.
- The hourly distribution of traffic (**Figure 5** below) shows that evening/night activity is well below 2% of the AADT (4,668).
- The Capricorn Highway and Bruce Highway have designated transport routes that carry freight etc. Lawrie Street is not a freight route or a B-double route and mainly carries heavy vehicles associated with local business operations i.e. expected to be predominately day time operations.

- Conservatively estimating an even temporal distribution of heavy vehicles in the traffic stream, fewer than 3 heavy vehicles would travel along Lawrie Street during the evening/night time, and the number that would utilise the service station would be lower again.

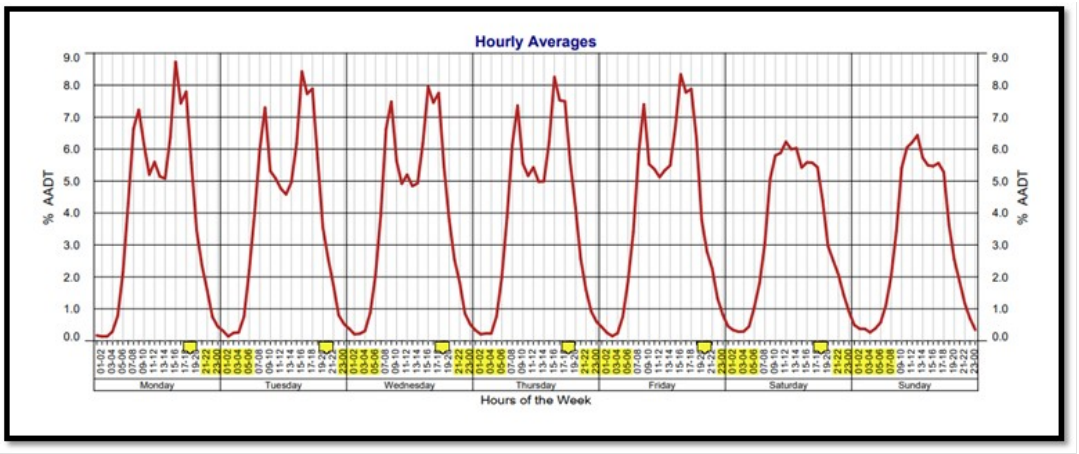


Figure 5 Hourly distribution of traffic on Lawrie Street, Gracemere

Given the low heavy vehicle traffic expected, acoustic barriers designed for heavy vehicle use of the Site are considered to be excessively conservative.

The offsets from the fuel pump and carparking areas combined with the 1.8m acoustic barrier fence along the northern and north-eastern boundaries of the Site are expected to achieve the Acoustic Quality Objectives for noise from the Site during all time periods.

The following is recommended:

- Construct the 1.8m high acoustic barrier as shown in the development plans.
- Make allowance for installation of an increased acoustic barrier height if noise emissions from the Site causes nuisance and it is shown with noise measurements that the Acoustic Quality Objectives are being exceeded.

7 Conclusion and Summary of Recommendations

RoadPro Acoustics was engaged by Gracemere Centre Pty Ltd (as trustee) Gracemere Centre Trust to assess potential noise emissions from a proposed service station at 16-18 Lawrie Street, Gracemere.

It was found that the Site design is expected to achieve the Acoustic Quality Objectives for normal operation during the day, evening and night.

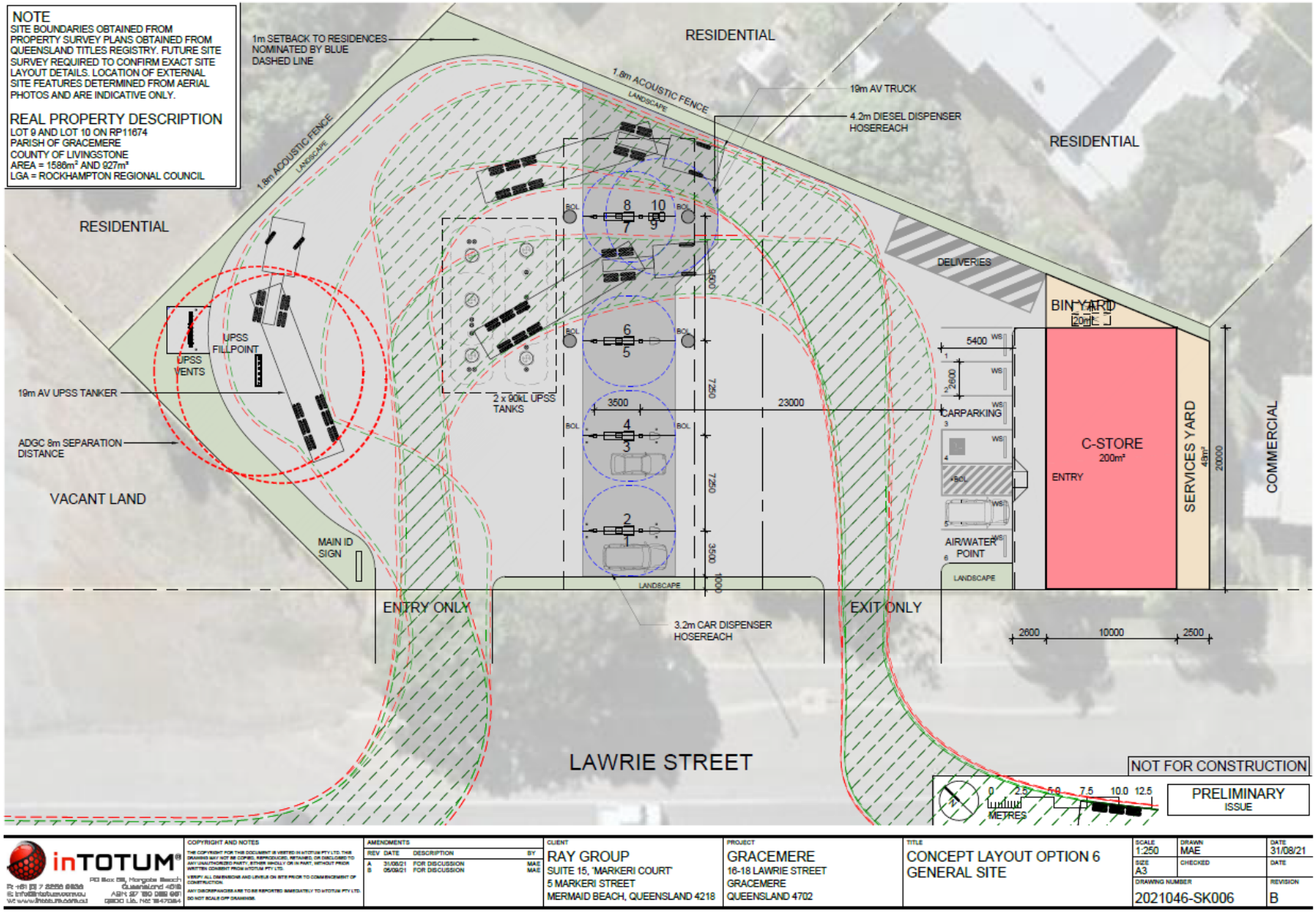
Heavy vehicle usage of the Site is possible but expected to be infrequent. An acoustic barrier along the northern and eastern boundaries of the Site to achieve the nominated criteria with noise from heavy vehicles would be 4.5m high. It is considered that installation of this barrier should only be required if noise from the Site is shown to be causing nuisance and exceeding the nominated criteria.

The 1.8m high acoustic barrier design shown on the plans, assuming negligible HV use of the Site, is considered to be more suitable and is expected to achieve the Acoustic Quality Objectives for day, evening and night time use.

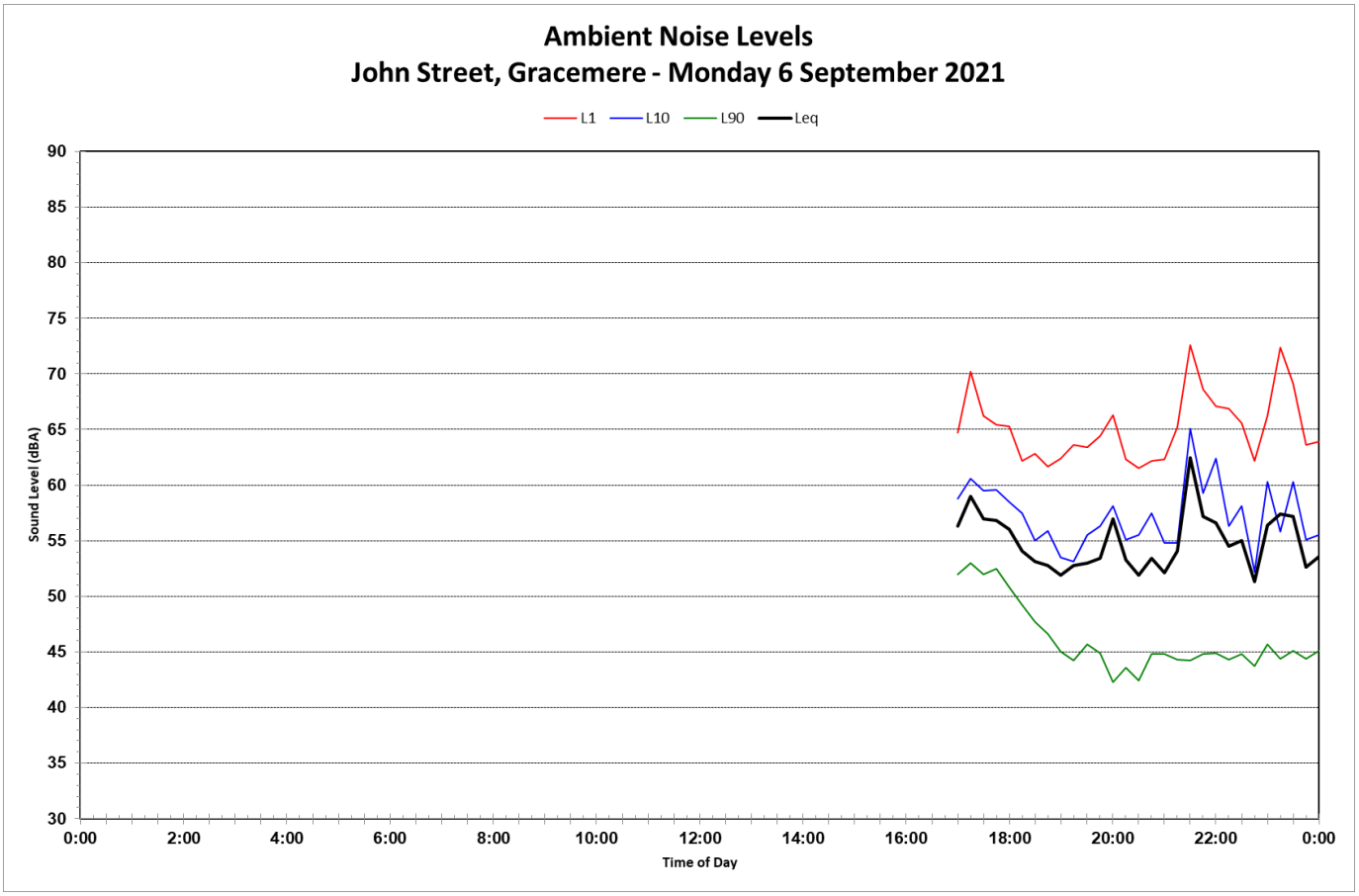
Mechanical plant must be further assessed during the detailed design stage of the project to ensure the noise criteria are achieved.

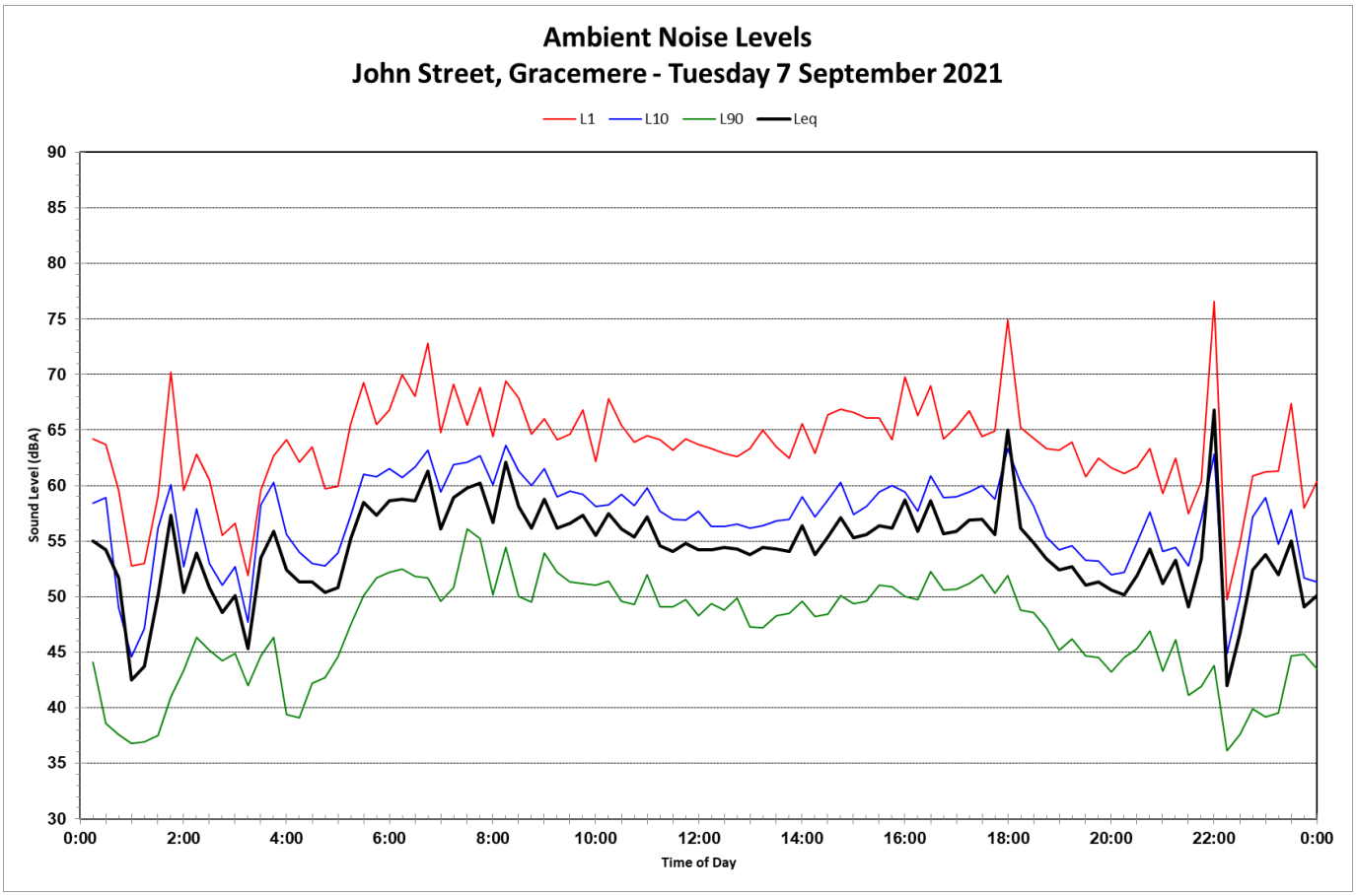
It is the view of RoadPro Acoustics that the Site is suitable for the proposed use, subject to the recommendations made in this report.

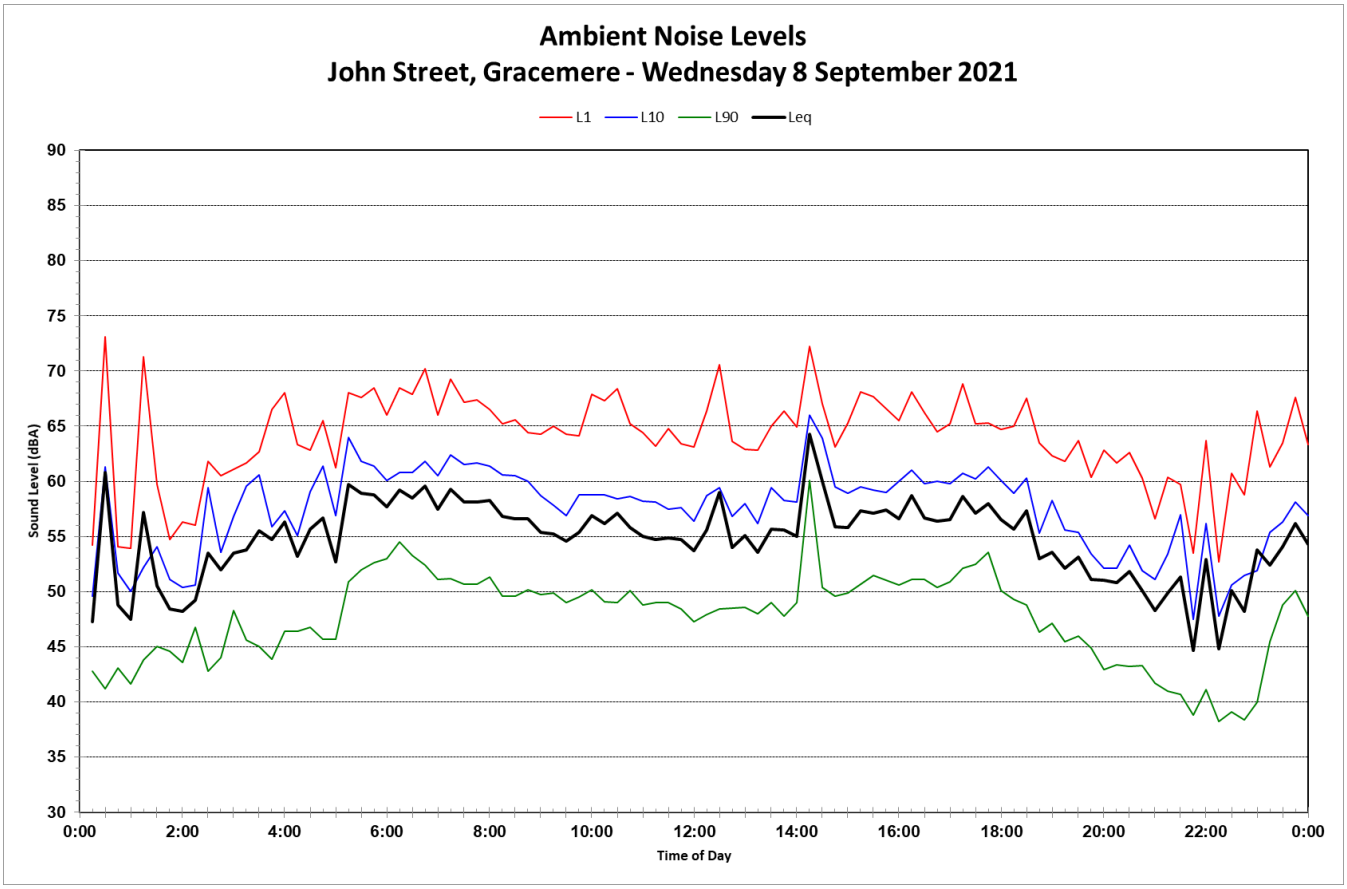
Appendix A – Proposal Plans

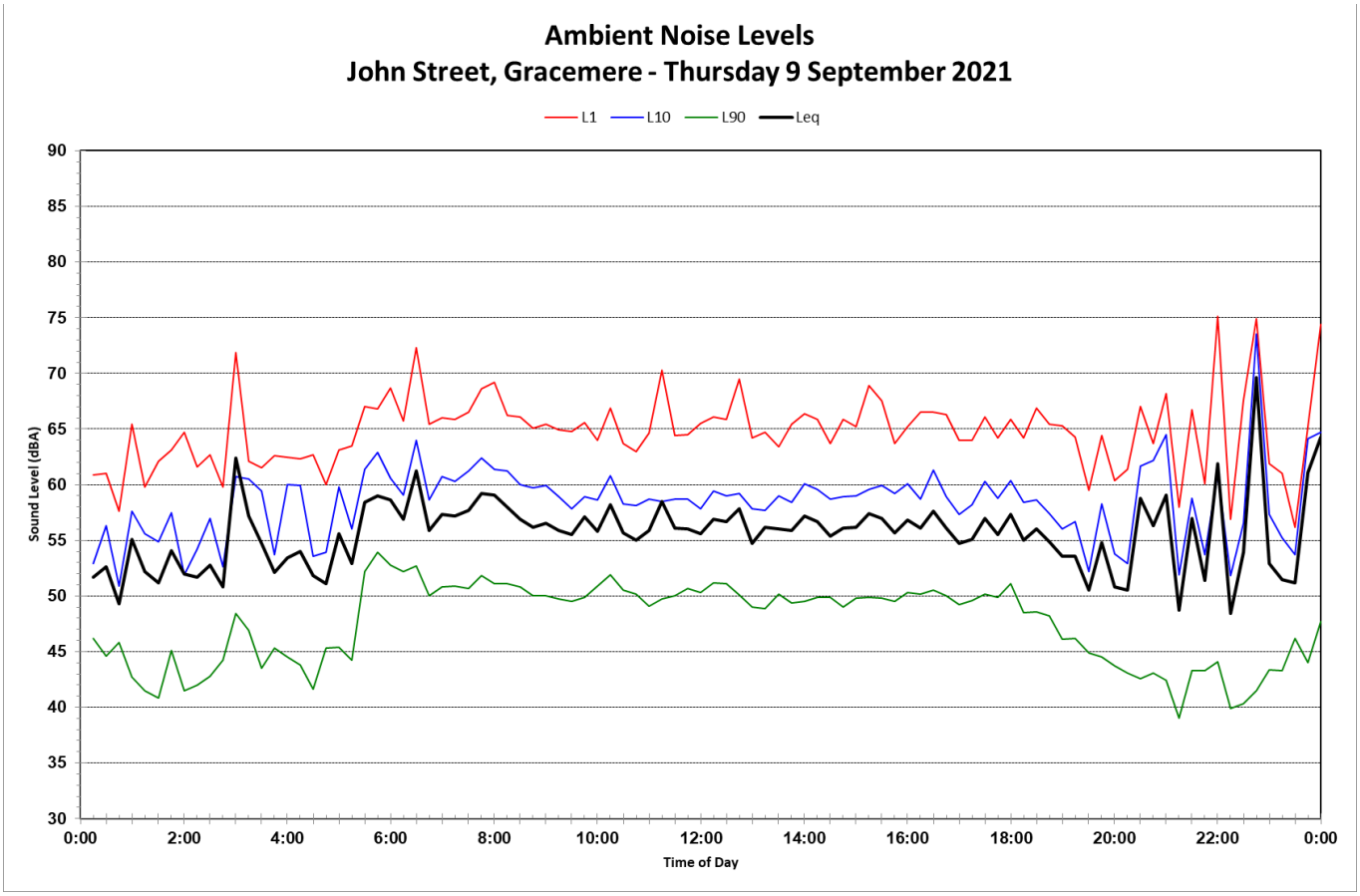


Appendix B – Ambient Noise Charts






Ambient Noise Levels
John Street, Gracemere - Wednesday 8 September 2021
L1
L10
L90
Leq
Sound Level (dBA)
90
85
80
75
70
65
60
55
50
45
40
35
30
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Time of Day


Ambient Noise Levels
John Street, Gracemere - Thursday 9 September 2021
L1
L10
L90
Leq
Sound Level (dBA)
90
85
80
75
70
65
60
55
50
45
40
35
30
0:00
2:00
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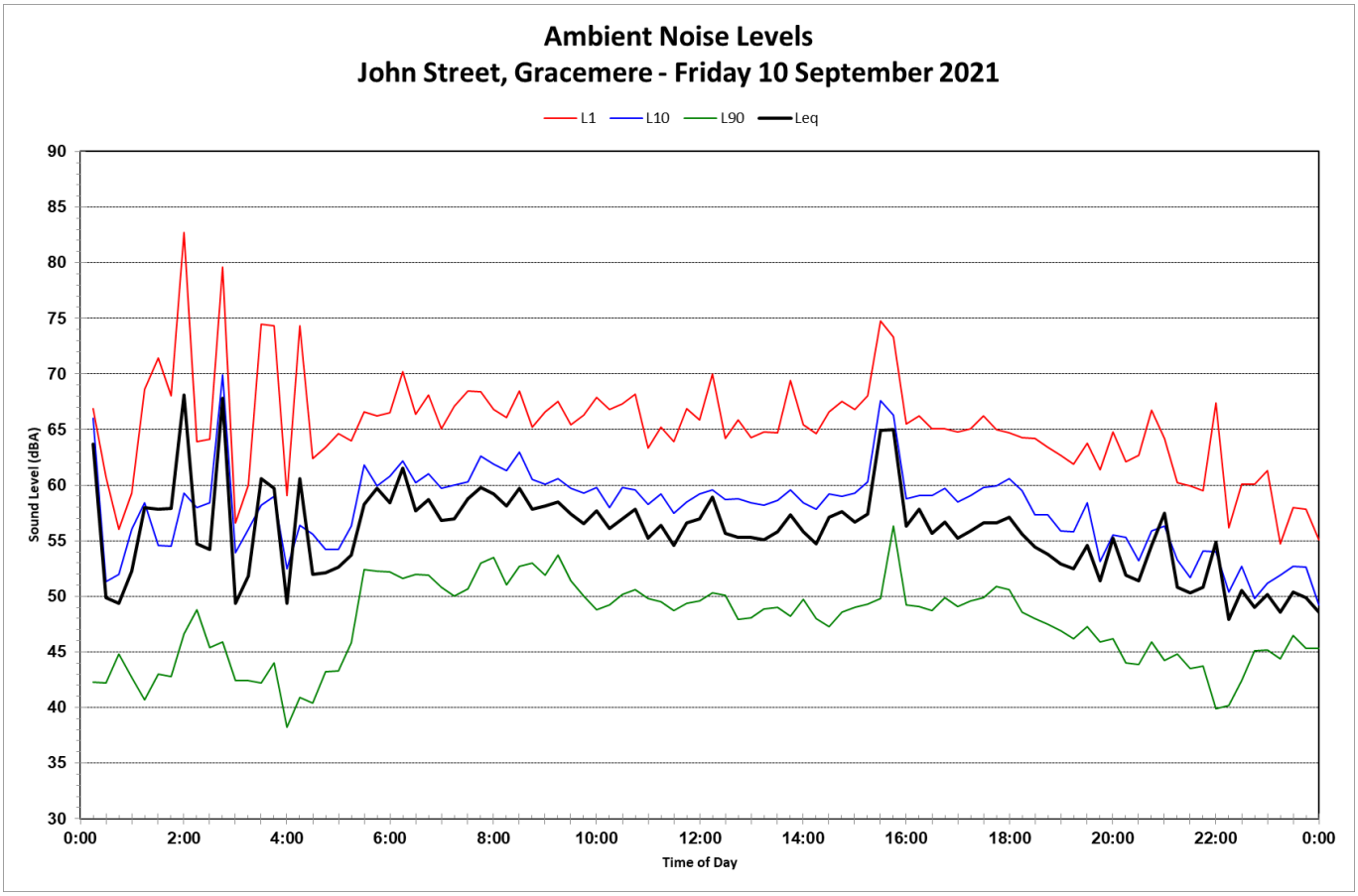
20:00
22:00
0:00
Time of Day


Ambient Noise Levels
John Street, Gracemere - Friday 10 September 2021
L1
L10
L90
Leq
Sound Level (dBA)
90
85
80
75
70
65
60
55
50
45
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0:00
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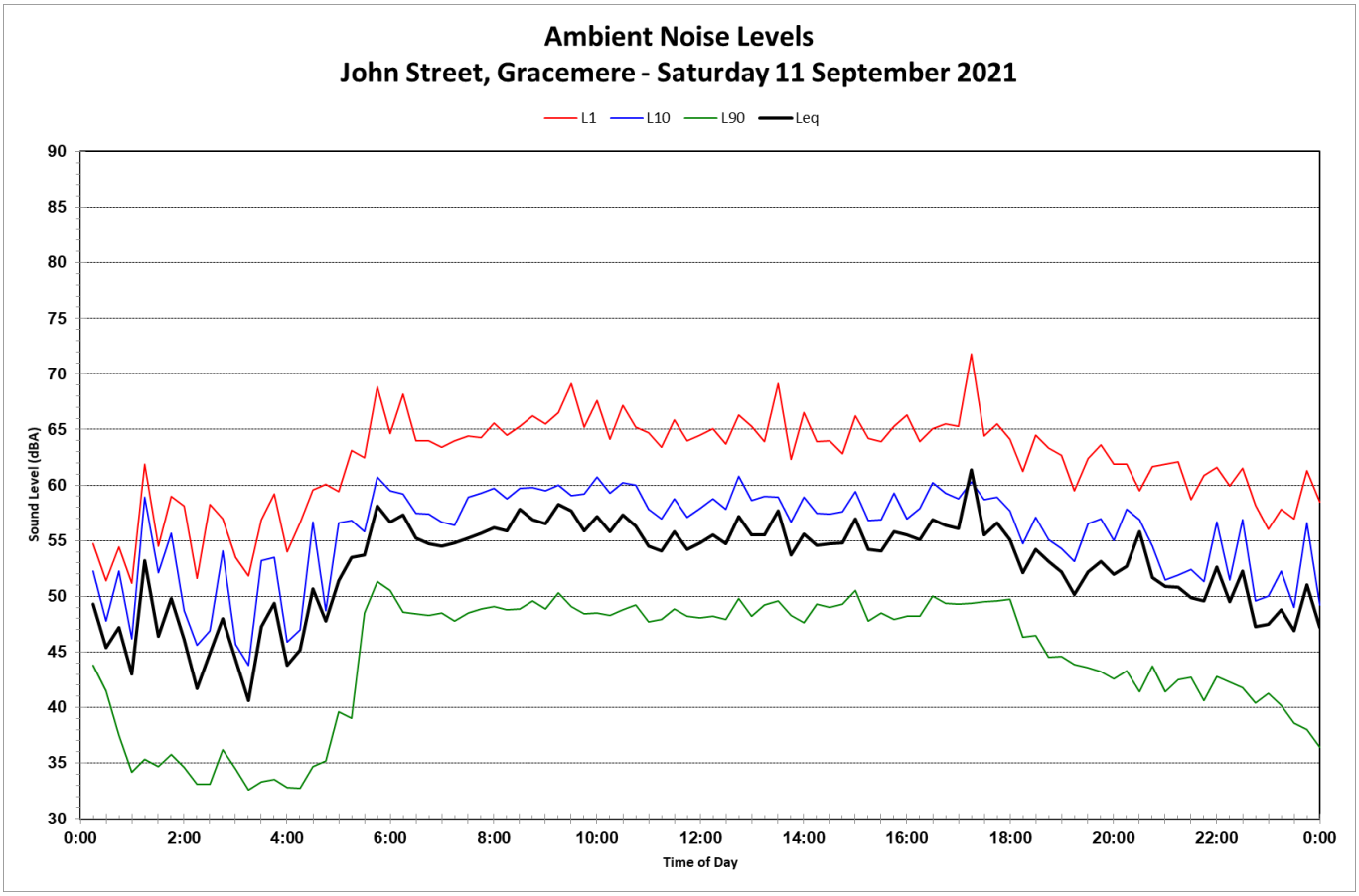
Time of Day


Ambient Noise Levels
John Street, Gracemere - Saturday 11 September 2021
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L10
L90
Leq
Sound Level (dBA)
90
85
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60
55
50
45
40
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30
0:00
2:00
4:00
6:00
8:00
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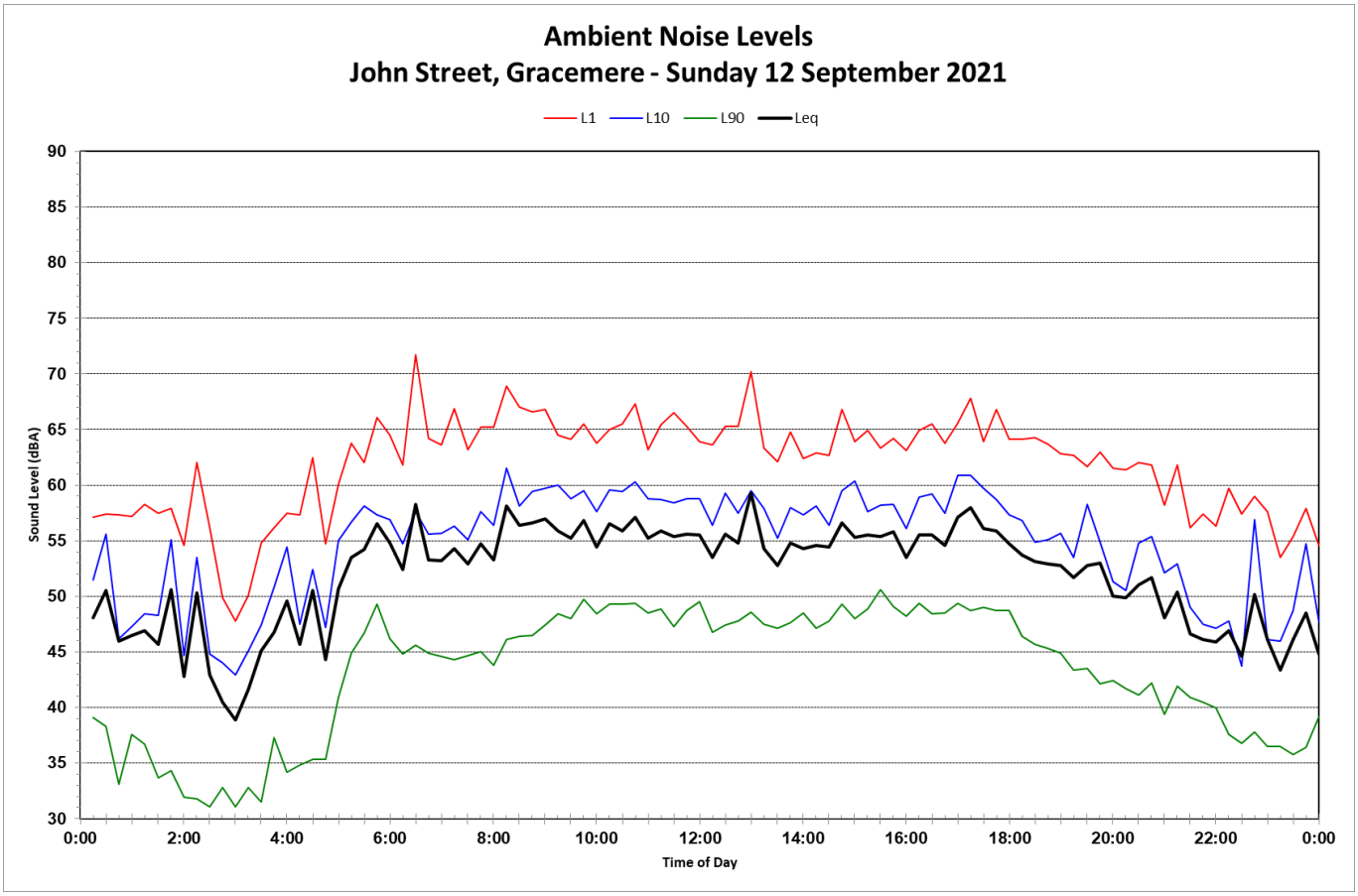
14:00
16:00
18:00
20:00
22:00
0:00
Time of Day


Ambient Noise Levels
John Street, Gracemere - Sunday 12 September 2021
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L10
L90
Leq
Sound Level (dBA)
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85
80
75
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0:00
2:00
4:00
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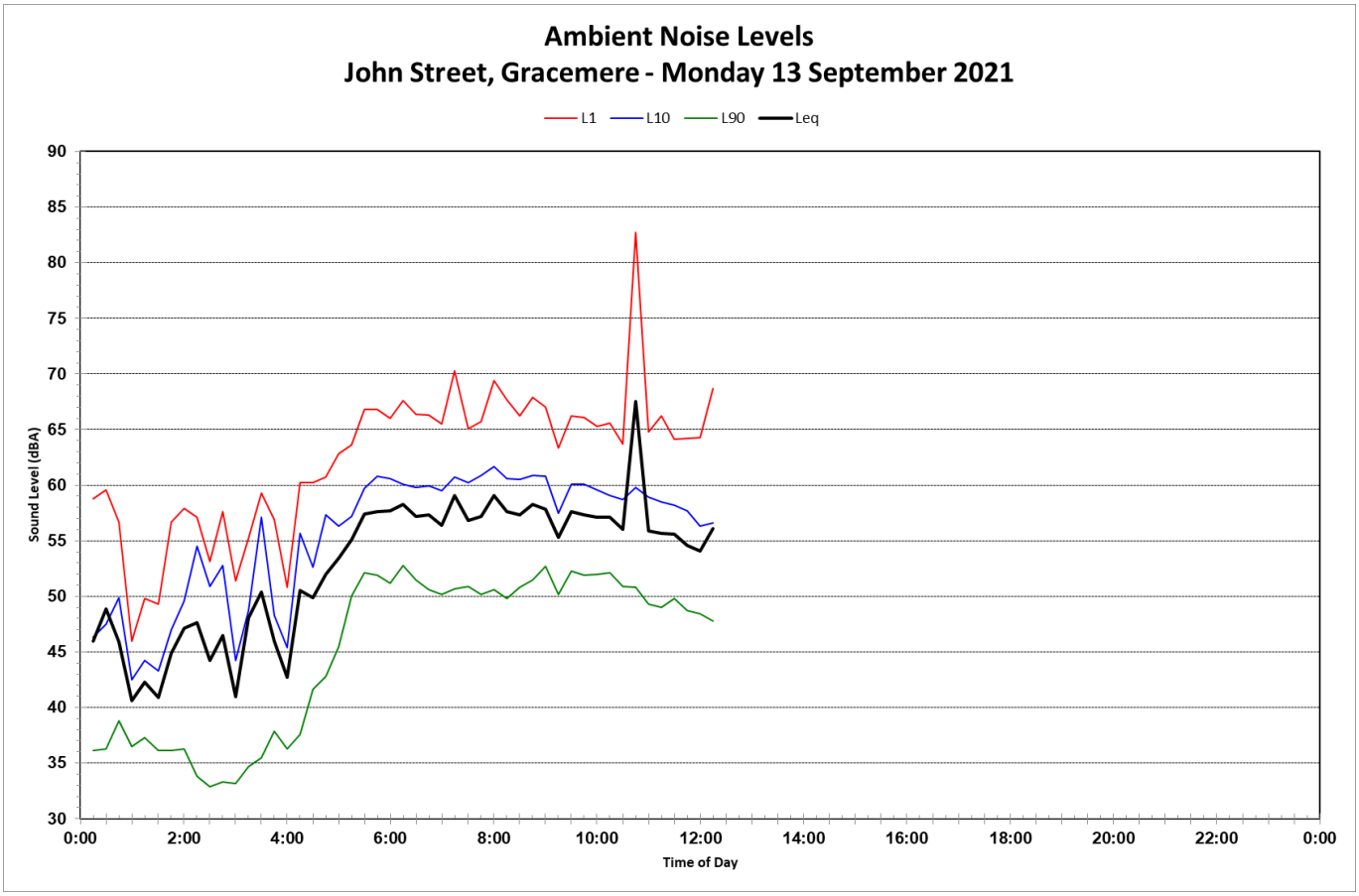
Time of Day


Ambient Noise Levels
John Street, Gracemere - Monday 13 September 2021
L1
L10
L90
Leq
Sound Level (dBA)
90
85
80
75
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65
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55
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45
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35
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0:00
2:00
4:00
6:00
8:00
10:00
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14:00
16:00
18:00
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22:00
0:00
Time of Day

mcmurtrie
CONSULTING ENGINEERS

TRAFFIC IMPACT ASSESSMENT

PROPOSED SERVICE STATION
16 and 18 Lawrie Street, Gracemere
(LOTS 9 and 10 on RP 611674)

Prepared For: Gracemere Centre Pty Ltd

Job No. 0272122
September 2021
Revision B

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/131-2021
Dated: 22 December 2021

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E mail@mcmengineers.com
PO Box 2149
Wandal Q 4700
63 Charles Street
North Rockhampton Q 4701

TRAFFIC IMPACT ASSESSMENT

Rev.	Description	Signature	Date
B	DA Issue	RPEQ 5141	24-09-21
A	Draft	-	20-09-21

CONTENTS

INTRODUCTION

1.1. BACKGROUND

McMurtrie Engineers has been engaged by Gracemere Centre Pty Ltd to prepare a Traffic Impact Assessment for the proposed service station located at 16-18 Lawrie St, Gracemere.

This report forms part of a Development Application to be lodged with the Rockhampton Regional Council. The following issues have been addressed as part of the study:

- Adequacy of the proposed car parking supply;
- The proposed car parking layout and design;
- Site access arrangements;
- Provision for service vehicle access;
- Provision for safe access by cyclists and pedestrians;
- Potential impact upon the local road network.

Lawrie Street is a State-controlled road therefore the Department of Transport and Main Roads (DTMR) will act as a referral agency for the application. Responses to State Codes 1 and 6 are provided in the appendices.

1.2. REFERENCES

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

- Rockhampton Region Planning Scheme;
- Australian / New Zealand Standard, Parking Facilities, Part 1: Off-Street Car parking AS/ NZS 2890.1:2004;
- Australian / New Zealand Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicle Facilities AS/ NZS 2890.2:2018;
- Australian / New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with a Disability AS/ NZS 2890.6:2009;
- Background traffic AADT received from Transport and Main Roads
- Other documents and data as referenced in the report.

SITE ENVIRONS

2.1. SUBJECT SITE

As shown in Figure 2.1, the subject site is located on the eastern side of Lawrie Street, just north of the Lawrie Street / Ranger Street intersection. The site is identified as Lots 9 and 10 on RP611674. As shown as Figure 2.2 the site is located within the District Centre Zone and has an area of approximately 2,500m^2.

Figure 2.1 - Location of Subject Site

[Source: Queensland Globe]

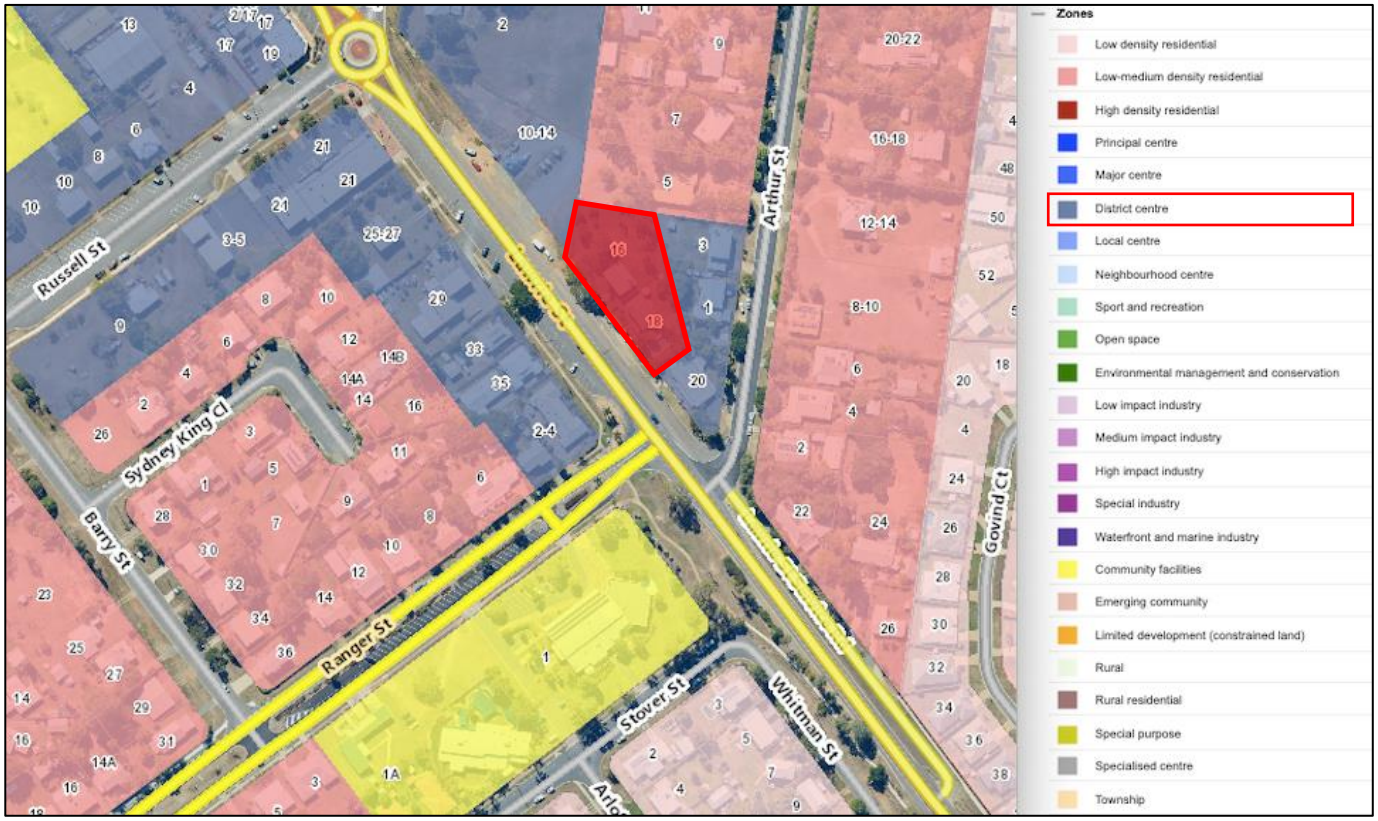


Figure 2.2 - Location of Subject Site

[Source: Rockhampton Region Planning Scheme]

2.2. ADJACENT LAND USE / APPROVALS

The subject site is located within a District Centre zone, with a low – medium and low residential zones just to the north and east of the site. Further to this, there are no known applications in the direct vicinity that would affect the proposal.

2.3. ROAD NETWORK

Lawrie Street

Access to the site is gained directly from Lawrie Street. As shown in Figure 2.3, Lawrie Street is a State-controlled road with a posted speed limit of 60km / hr. Along the frontage of the site Lawrie Street is a two lane road, with a wide sealed shoulder on both sides, and on-street parking provided on the western side opposite the site. An aerial image of the local road network is shown in Figures 2.4 and 2.5.

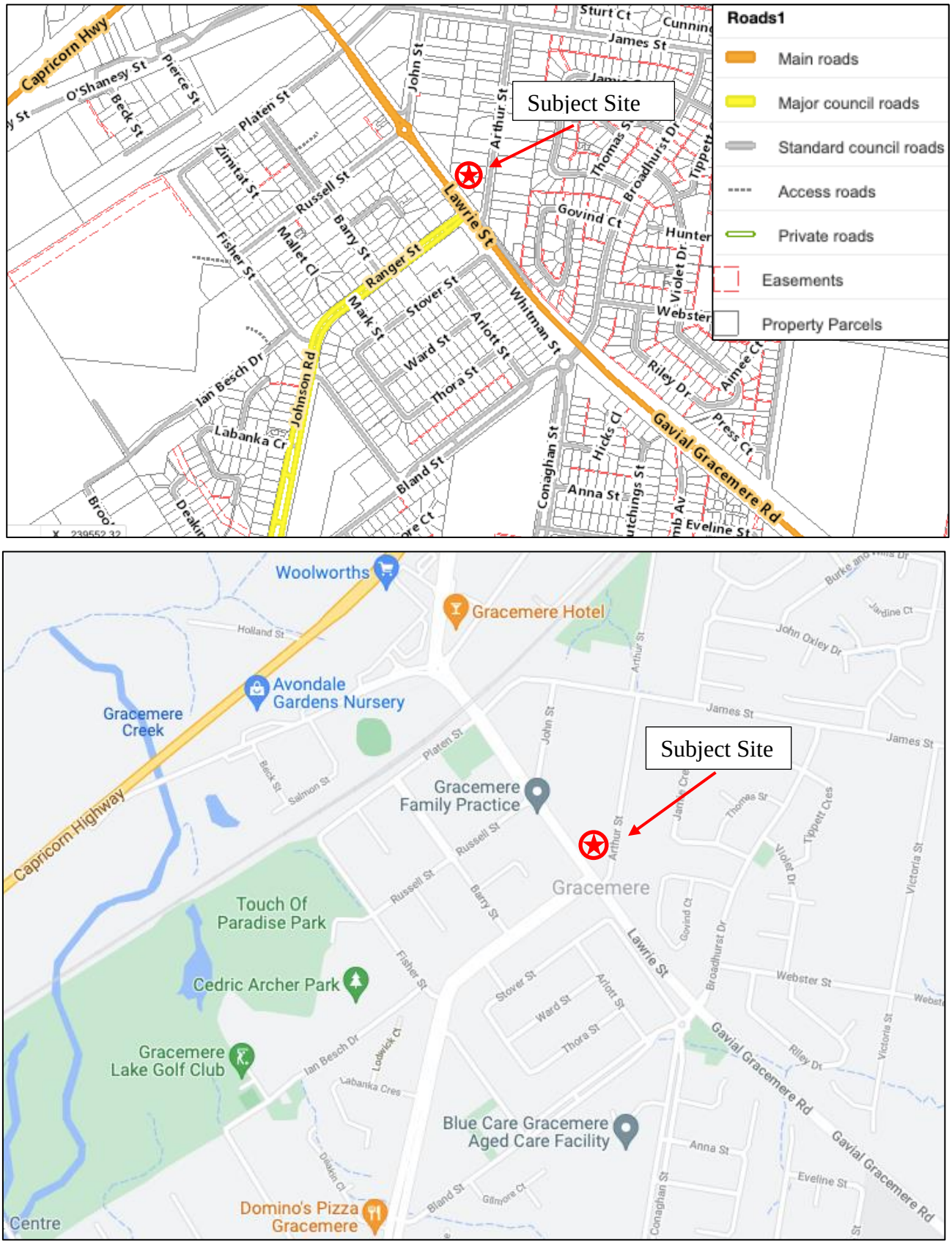


Figure 2.3 – Local Road Network
[Source: Rockhampton Region Planning Scheme & Google Maps]

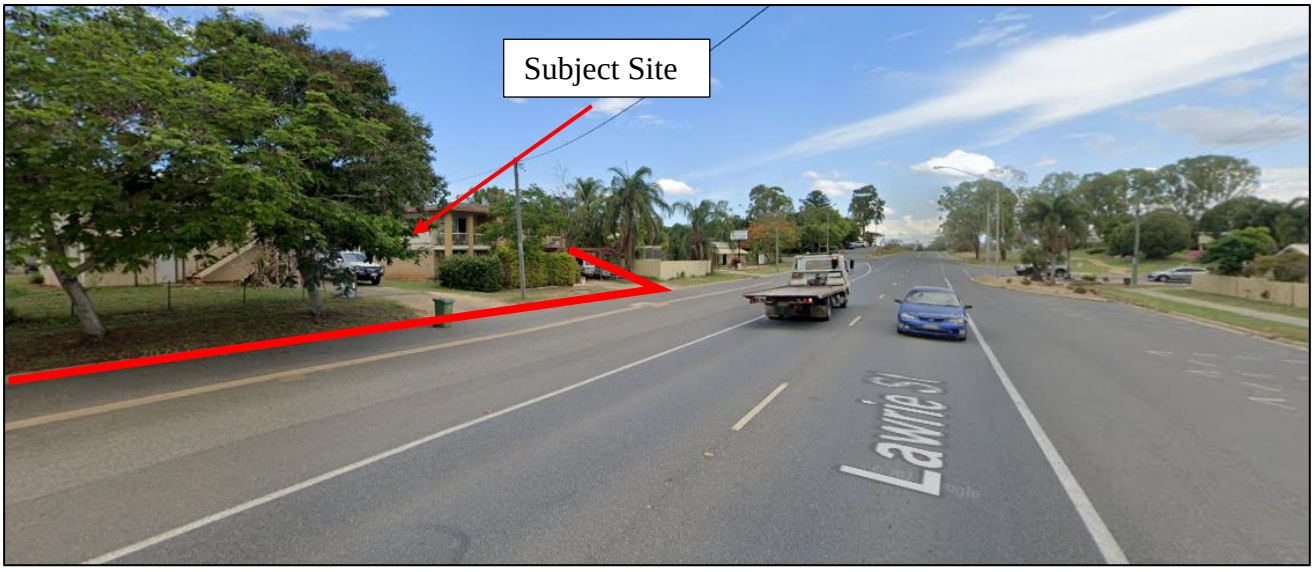


Figure 2.4 – Lawrie Street along the frontage of the site, facing south [Source: Google Street View]

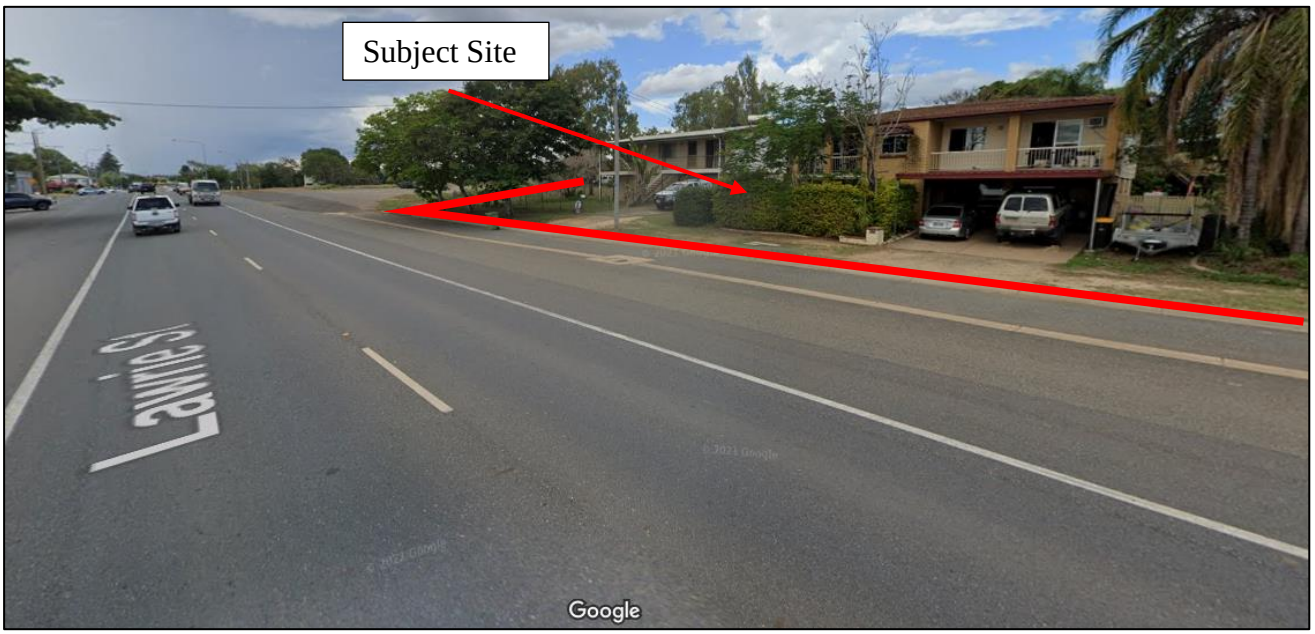


Figure 2.5 – Lawrie Street along the frontage of the site, facing north [Source: Google Street View]

Surveyed Traffic Volumes

Traffic census data have been received from the Department of Transport and Main Roads (DTMR), for year 2020. The census data indicates that Lawrie Street carries in the order of 10,000 vehicles per day (both directions), with up to 10% heavy vehicles travelling northbound and approximately 3% southbound along the site frontage.

Detailed census data is provided as Attachment A.

2.4. INTEGRATED TRANSPORT INFRASTRUCTURE

Public Transport

A review of public transport available in the vicinity of the site is summarised in Table 2.1 and Figure 2.6.

Table 2.1: Public transport infrastructure in the vicinity of the site (Source: Google Maps / Youngs Bus Services)

Service	Route #	Location of Stop	Distance to nearest stop	Frequency on / off peak
Stockland to Gracemere	21	Lawrie Street at Ranger Street & Lawrie Street at Gracemere	Within 300 metres & opposite the site	Generally hourly peak / hourly off peak
Stockland to Mt Morgan	22	Lawrie Street at Ranger Street & Lawrie Street at Gracemere	Within 300 metres & opposite the site	Generally hourly peak / hourly off peak

It is noted that a Greyhound, long distance bus stop also operates in the vicinity of the site, however the stop services buses travelling northbound on Lawrie Street.

Figure 2.6 – Bus routes in the vicinity of the site [Google Maps / Source: Youngs Bus Services]

Pedestrian Infrastructure

The site does not provide pedestrian connectivity along the frontage, however a footpath is provided on the opposite side, servicing the existing bus stop.

Figure 2.7 – Pedestrian Infrastructure on Lawrie Street [Source: Google Street View]

Cyclist Infrastructure

Bicycle lanes are not currently provided along the frontage of the site.

2.5. FUTURE TRANSPORT NETWORK

Lawrie Street along the frontage of the site forms part of the Gavial – Gracemere Road, Lawrie Street Upgrade (LSU) Project. The project will be completed by the Department of Transport and Main Roads (DTMR), with construction estimated to commence in the near future. The project is currently in the detailed design phase, with the concept layout of the planned road upgrade shown in Figure 2.8.

As shown, it is proposed that Lawrie Street will be widened along the eastern side to facilitate turning lanes to nearby intersections and will link to the proposed signals at the Lawrie Street / John Street / Russell Street intersection. It is planned that the existing on-street parking facilities along the western side of Lawrie Street will be retained. The proposal also provides a new southbound bus stop and bicycle facilities on both sides of the road.

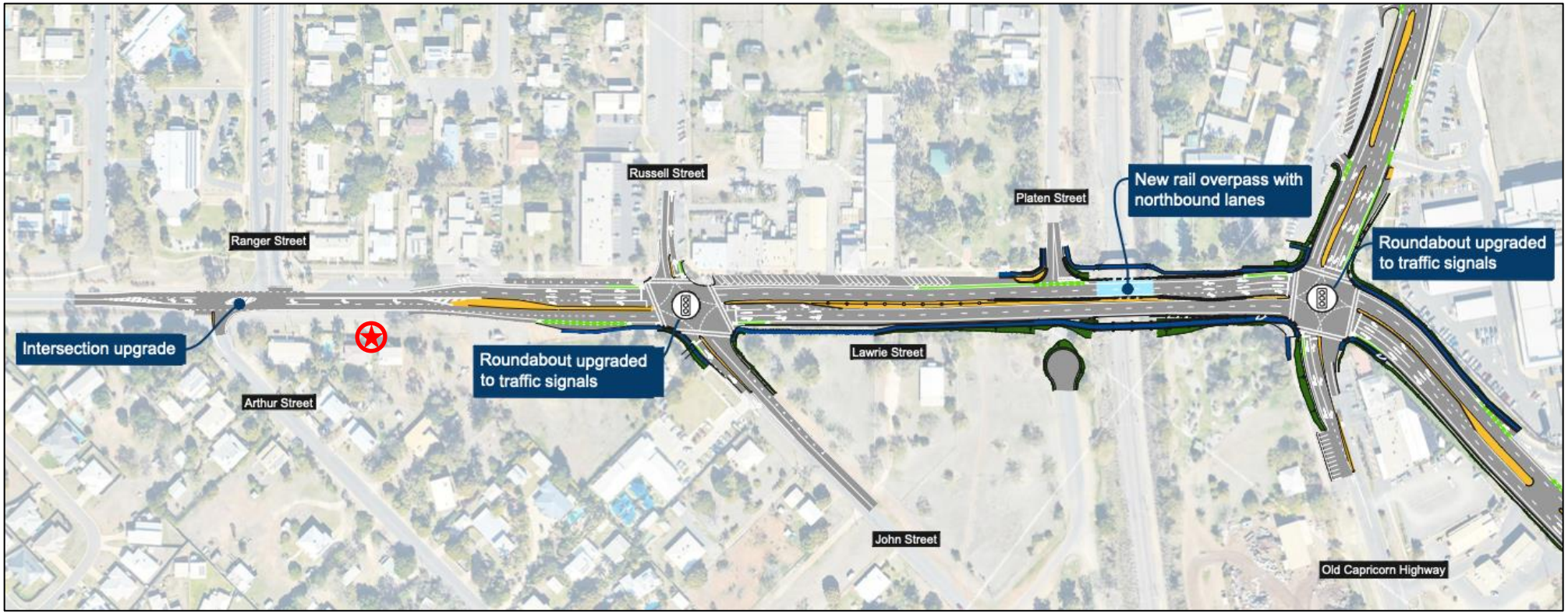


Figure 2.8 – Planned Road Upgrade on Lawrie Street [Source: Department of Transport and Main Roads]

DEVELOPMENT PROPOSAL

3.1. LAND USES

The proposed plan of development is for a service station and an associated convenience shop. It is proposed that the existing dwellings on the property will be removed and a shop constructed at the southern end of the site. The proposed shop will have an area of approximately 200m^2.

Access to the site is proposed from Lawrie Street. It is proposed that access be restricted to left in / left out, with the northern crossover providing for ingress movement and the southern for egress.

A plan of the proposed development is shown in Figure 3.1.

3.2. VEHICLE ACCESS

The proposal provides a dual access arrangement with separate entry and exit crossovers off Lawrie Street. The proposed access crossovers have been designed to discourage right turns to and from the site. It is proposed that directional markings will be provided at each entry, with associated signage erected just inside the boundary.

3.3. CAR PARKING

The proposed development will provide a total of 16 car parking spaces, as follows:

General parking:	8 spaces
Service station:	8 spaces

Given the use of the proposed development, visitors filling up at the station will often make additional purchases from the shop whilst paying for fuel. Therefore such will not occupy the general parking provided throughout the site.

3.4. PEDESTRIAN AND CYCLIST FACILITIES

Given the use of the proposed development, visitors generally arrive to the site via private vehicle.

Figure 3.1 – Proposed Plan of Development

CAR PARKING

4.1. STATUTORY REQUIREMENT

The car parking requirement for different development types are set out in Table 9.3.1.3.1 of the Rockhampton Regional Council Access, Parking and Transport Code. A review of the car parking rates and the use of the proposed development result in the below parking requirement:

Service station	Four (4) spaces per service bay. Spaces for ancillary uses such as shop and food and drink outlet: As required under relevant use listed herein.
Shop	One (1) space per twenty-five (25) square metres of gross floor area; or Where located within the Principal Centre – Core and Quay Street precincts: One (1) space per fifty (50) square metres of gross floor area; or No additional on-site car parking spaces are required if involving the reuse of an existing building(s) or structure(s) on the State Heritage Register.

Based on the above parking rates, the Acceptable Outcome for car parking of the proposed development is as follows:

Table 4.1: Acceptable Outcome for Car Parking (Rockhampton Regional Council)

Description	Use / scale	Statutory Parking Rate	Acceptable Outcome for Car Parking
Service Station	8 x bowsers	4 spaces / service bay	4 spaces
	Shop (200m^2)	1 space / 25m^2 GFA	8 spaces
		TOTAL	**12 spaces**

4.2. ADEQUACY OF PROPOSED PARKING SUPPLY

The proposal provides a total of 16 car parking spaces, of which 8 are provided in the fill area, adjacent to the fuel bowser. Such is considered to be acceptable given that the proposal only provides a single convenience shop with visitors generally visiting the shop before paying for fuel. For larger purchases 8 additional spaces are provided throughout the site.

Based on the above it is considered that the proposed parking supply is satisfactory, and will meet the parking demand generated by the proposed uses.

4.3. CAR PARKING LAYOUT AND DESIGN

Car Parking

The geometric layout of the proposed car parking has been designed to comply with *AS2890.1:2004*, in respect to parking bay dimensions and aisle widths. The proposed car parking provides the following dimensions and characteristics:

Table 4.2: Parking Layout and Geometry

Design Element	Required	Supplied	Compliance
General parking (User Class 2)	2.5m wide x 5.4m long	2.6m wide x 5.4m long	Compliant
Disabled Parking	2.4m wide x 5.4m long, plus shared zone	2.5m wide x 5.4m long	Compliant
Clearance adjacent to vertical obstructions	0.3m (i.e. walls, fences, etc)	Minimum 0.3 metres	Compliant
Aisle Width Circulation width	5.8 metres 5.5 metres	> 5.8 metres > 5.5 metres	Compliant Compliant
Aisle extension	1 metre beyond last parking / 8 metre aisle	N/A	N/A
Grades (driveway)	1:20 maximum for the first 6 metres into the site	1:20 for the first 6 metres	Compliant
Grades (car parking module)	1:20 measured parallel to the angle of the parking space or 1:16 in all other directions	1:20 measured parallel to the angle of the parking space or 1:16 in all other directions	Compliant
Grade (transitions)	Max 1:8 (summit) and 1:6.7 (sag) at 2 metres	N/A	N/A
Height Clearance	Minimum 2.2m clearance to overhead structures and services	N/A	N/A

As demonstrated in Table 4.2, the internal geometric layout is compliant with the requirements of the Australian Standards publication AS2890.1:2004. A dimensioned layout of the proposed car parking arrangements is shown as Figure 4.1. As shown, wheel stops have been provided at the end of parking spaces fronting a footpath for pedestrian protection.

A swept path analysis has been prepared for the proposed parking arrangements using AutoTurn software. As shown in Figures 4.2, the proposed parking arrangements allow satisfactory manoeuvring for the design vehicle (85th percentile vehicle) to negotiate the proposed car parking and exit the site in a forward gear.

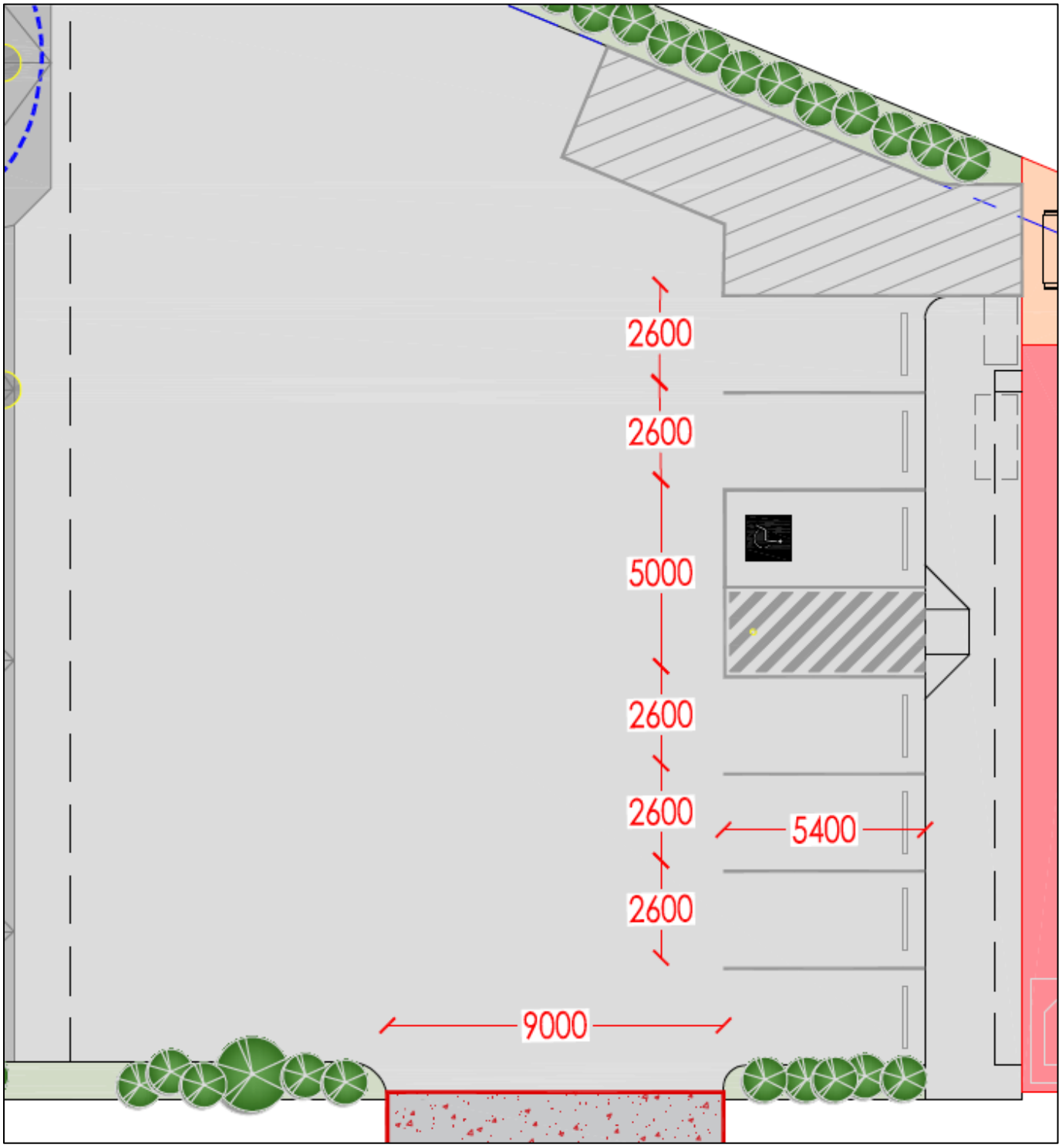


Figure 4.1 – Dimensioned Car Parking Layout

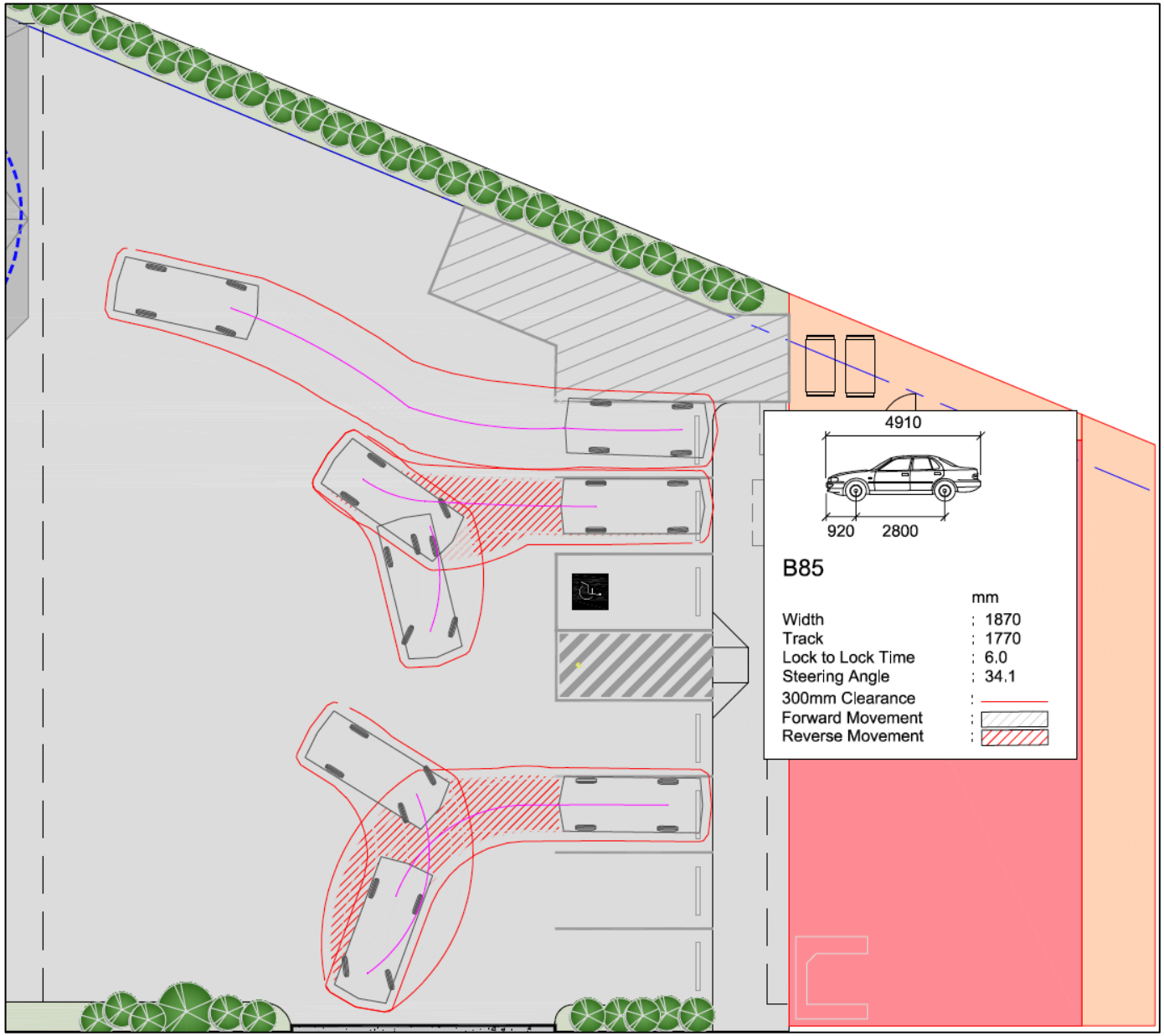


Figure 4.2 – Swept Path of 85th Percentile Vehicles

Provision for queuing

The proposed service station has been designed to facilitate a queue length of three light vehicles at each fill point, and a minimum of two trucks at the heavy vehicle fuelling zone. As shown in Figure 4.3, it is proposed that the heavy vehicle fill area will be at the eastern end of the site, at the furthest point from the entry to not block access to the development during peak operation.

Figure 4.3 – On-Site Queuing

4.4. SUITABILITY OF PROPOSED ACCESS

Access to the site is proposed to be gained via a dual access arrangement, with ingress achieved from the northern crossover and egress from the southern. It is proposed that right turns will be restricted via the design of the crossover splays and a double barrier lane on Lawrie Street, along the frontage of the site. As shown in Figure 4.4, it is proposed that appropriate signage will be installed at each access to discourage unlawful movements to and from the development.

As shown in Figure 4.5, the access points will remain in their proposed locations under the existing and future frontage road alignment. Given the expected timing of the proposed upgrade, the need for the double barrier lane is dependent on the completion of the planned works, where if the upgrade is completed before the establishment of the proposed service station, no additional works are considered to be required to facilitate the proposed development.

A pedestrian sight splay has been indicated on the departure driveway in accordance with AS2890.1:2004. It is proposed that the sight splays will be kept clear of obstructions to visibility, with landscaping limited to 0.5 metres high.

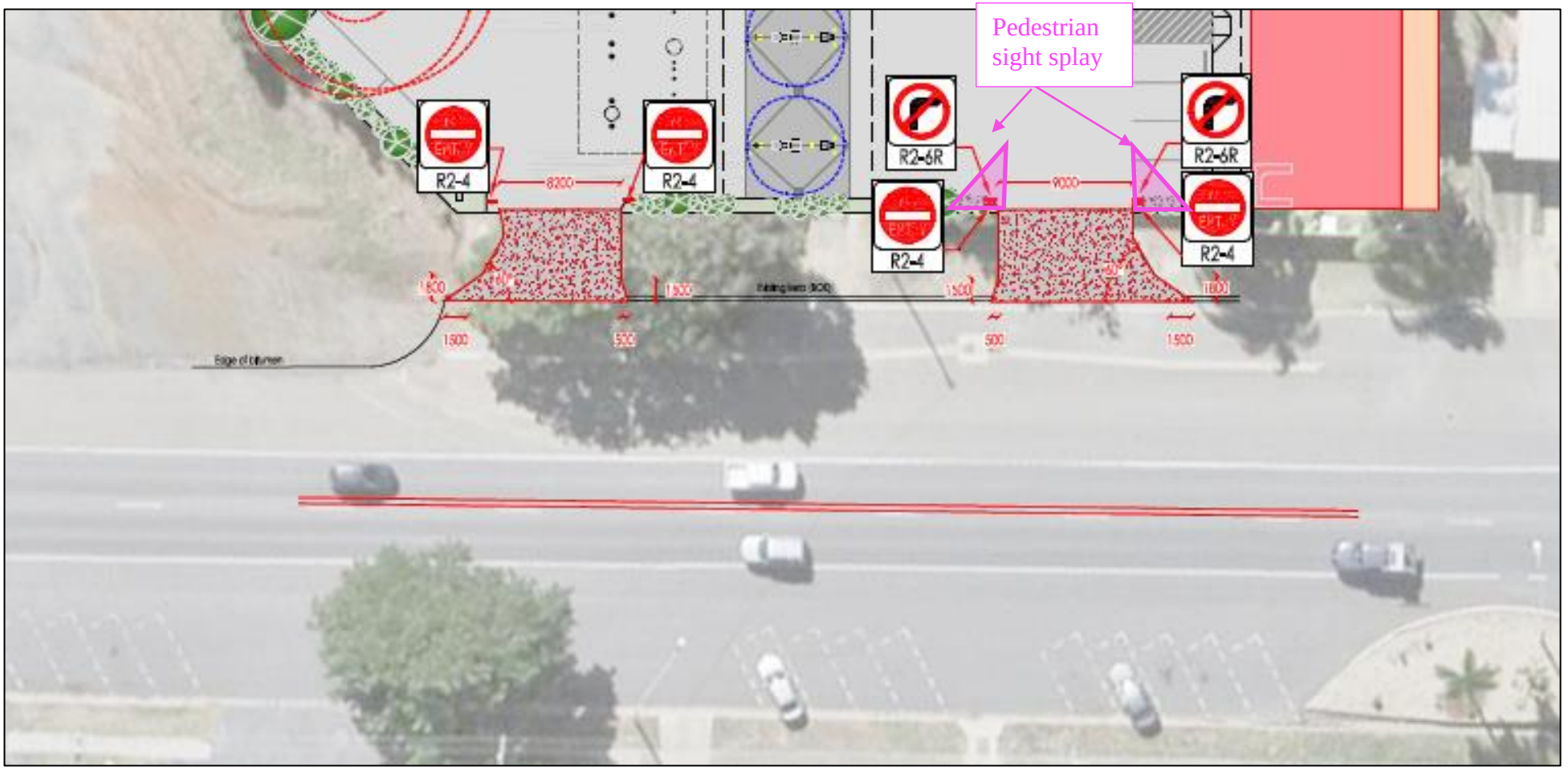


Figure 4.4 – Proposed Access Arrangements (Current alignment of Lawrie Street)

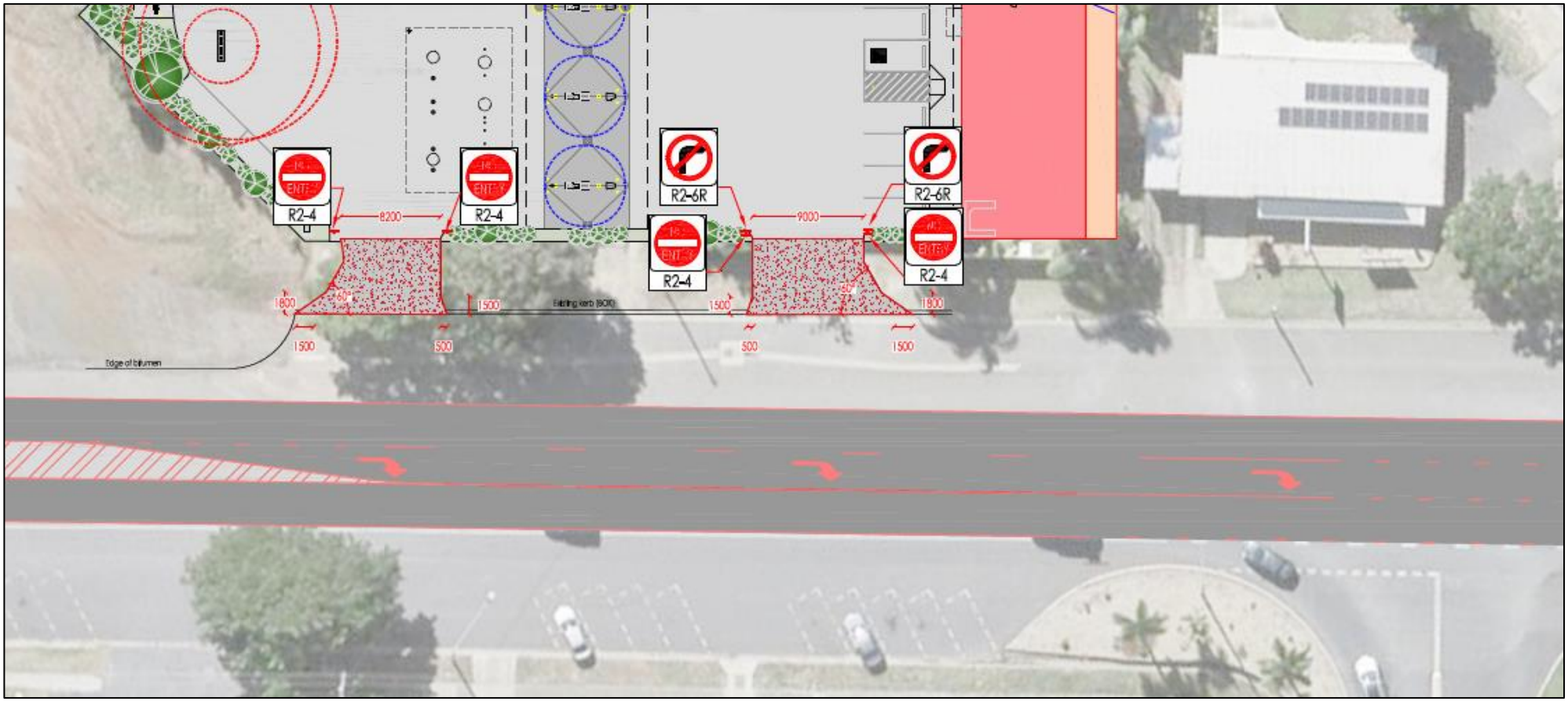


Figure 4.5 – Proposed Access Arrangements (Future alignment of Lawrie Street)

ACCESS AND MOBILITY MANAGEMENT

5.1. PROVISIONS FOR PEDESTRIANS

Given the location and use of the proposal, visitors to the development are expected to arrive via private vehicle. Therefore a dedicated pedestrian path linking to the wider pedestrian network is not considered to be required.

5.2. PROVISION FOR BICYCLES AND END OF TRIP FACILITIES

In accordance with Table SC6.4.7.1 of the Bicycle Network Planning Scheme Policy, the following bicycle parking rates are applicable to the proposed uses.

Use	Required number of employee or resident parking spaces	Class	Required number of visitor or shopper parking spaces	Class
Shop	1 per 300m² GFA	1 or 2	1 per 500m² GFA over 1,000m² GFA	3

Table SC6.4.7.2 — Classification of bicycle facilities

Class	Security level	Description	Duration of parking	Main user type
1	High	Fully enclosed individual locker	All day and night	Bike and ride commuters
2	Medium	Lockable enclose, shelter or compound fitted with class 3 facilities where the cyclist is responsible for locking the bicycle within the communal enclosure	All day	Employees, students, and bike and ride commuters
3	Low	Bicycle rails or racks to which both the bicycle frame and wheels can be locked	Short to medium term	Shoppers, visitors, and employees of workplaces where security supervision of the facility is provided

Based on the above rate, and relatively small scale of development the proposal only yields a requirement for two bicycle parking spaces, with one space reserved for visitors. It is proposed that a single bicycle rail suitable for two bikes will be provided at the front of the convenience store.

LOADING FACILITIES

6.1. SERVICING REQUIREMENTS

The Rockhampton Planning Scheme does not specify on-site loading requirements for a service station. However, based on the scale of the proposed convenience shop, it is expected that such will generally be serviced by smaller service vehicles, typically a Small Rigid Vehicle (SRV), with occasional access gained by a refuse truck. As shown in Figures 6.1 and 6.2, the proposed design allows for an SRV and a standard 10.3 metre long front loading Refuse Collection Vehicle (RCV) to service the development and enter and exit the site in a forward gear. As shown in Figure 6.3 - 6.5, the proposal also allows access by an Articulated Vehicle (AV) which will be used for fuel delivery and will also be serviced by the proposed development.

It is noted that deliveries and waste collection will occur outside peak background commuter periods. Therefore, the site will be generally have low traffic turnover at the time of servicing.

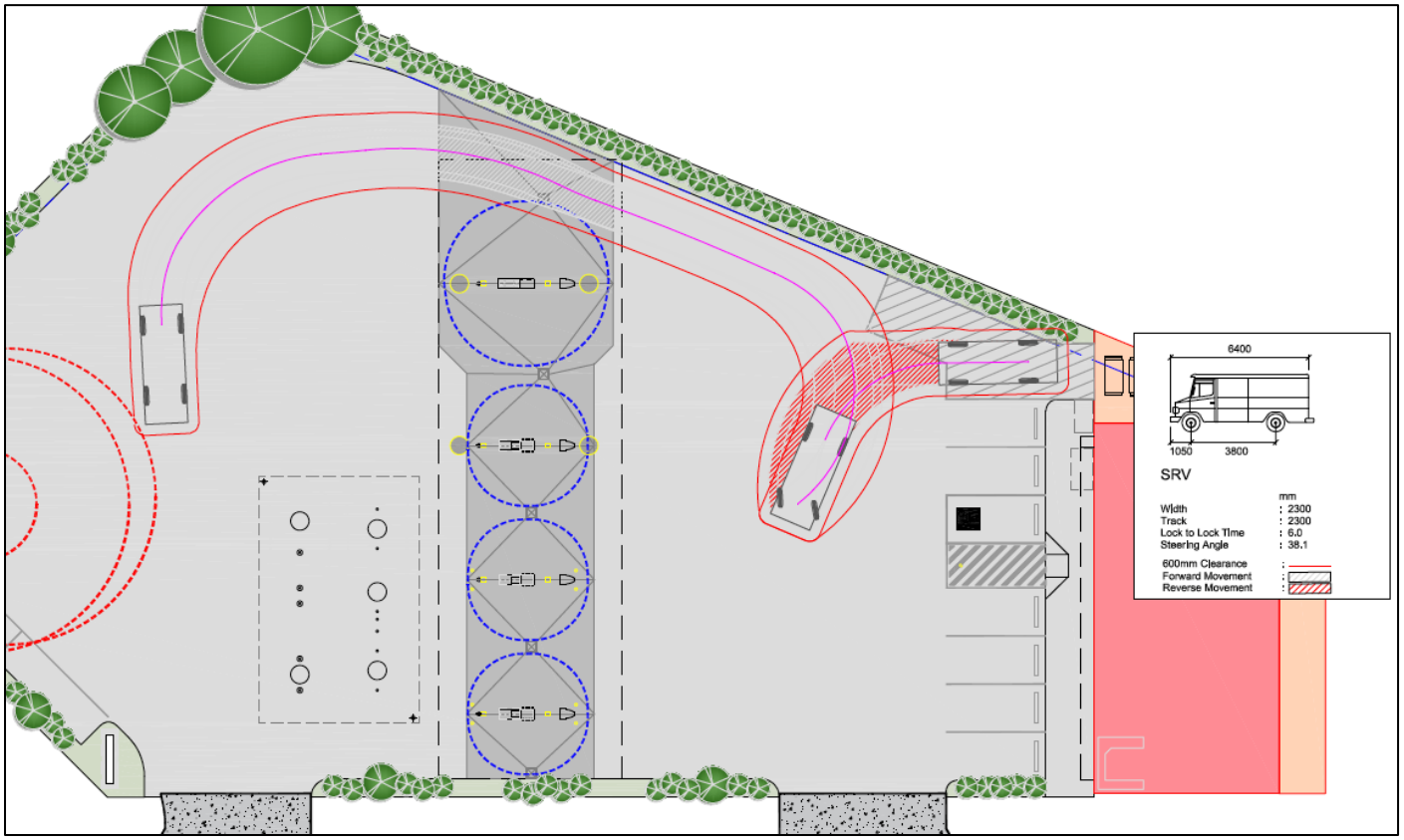


Figure 6.1 – Small Rigid Vehicle (SRV) Manoeuvring

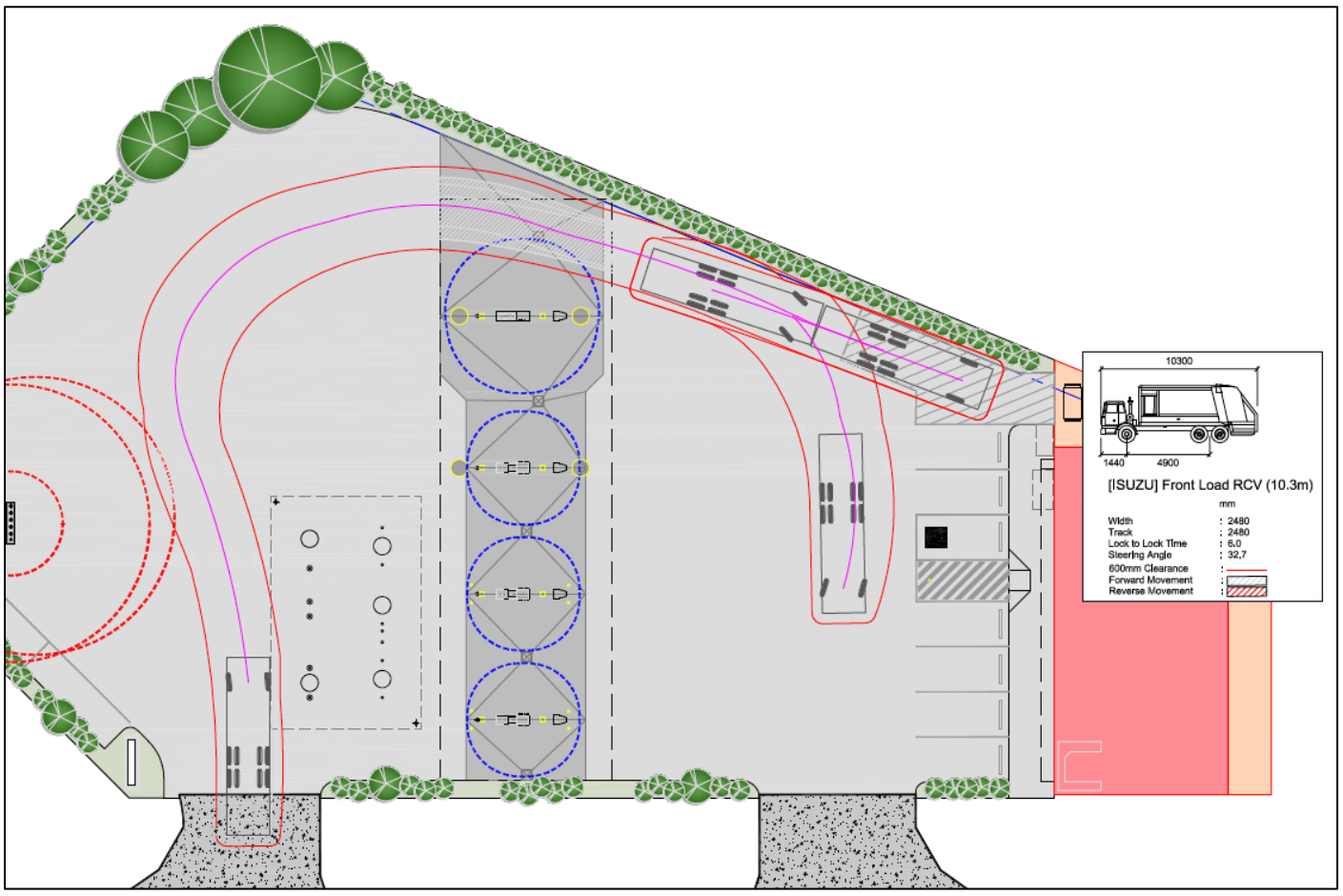


Figure 6.2 – Refuse Collection Vehicle Manoeuvring

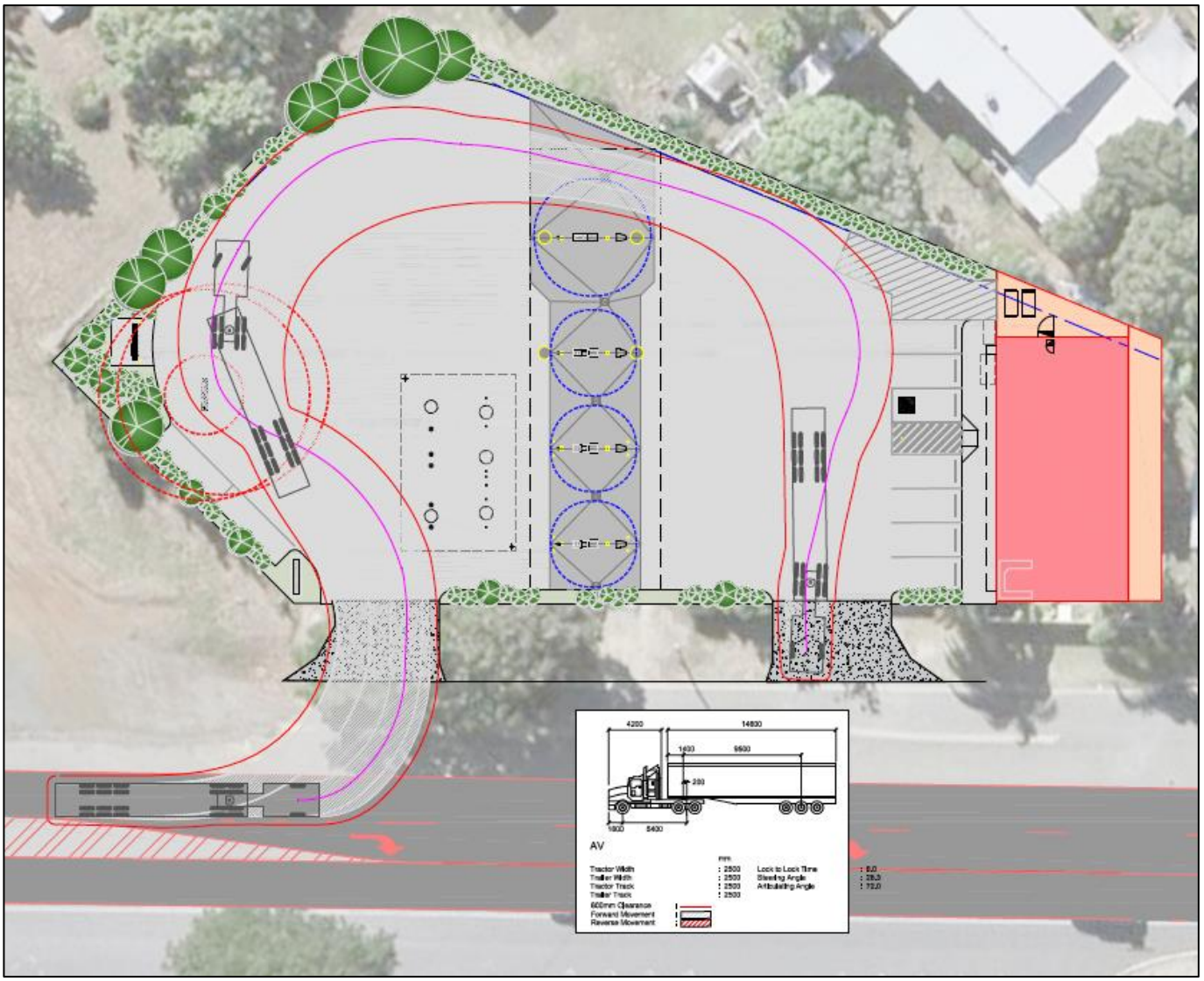


Figure 6.3 – Articulated Vehicle Manoeuvring (Fuel Delivery)

ENTRY PATH

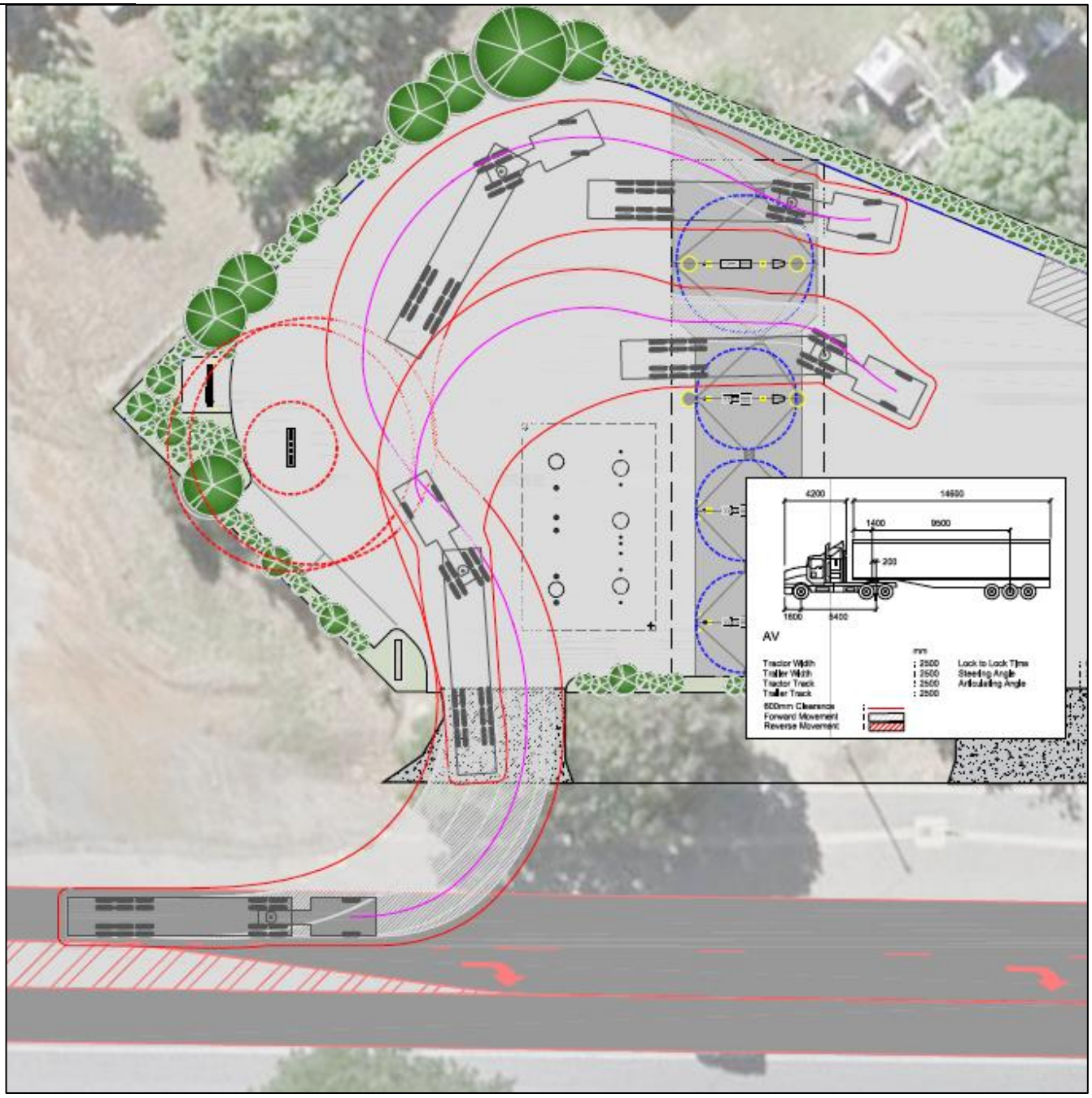


Figure 6.4 – Heavy Vehicle Manoeuvring (Articulated Vehicle (AV)) ENTRY PATH

EXIT PATH

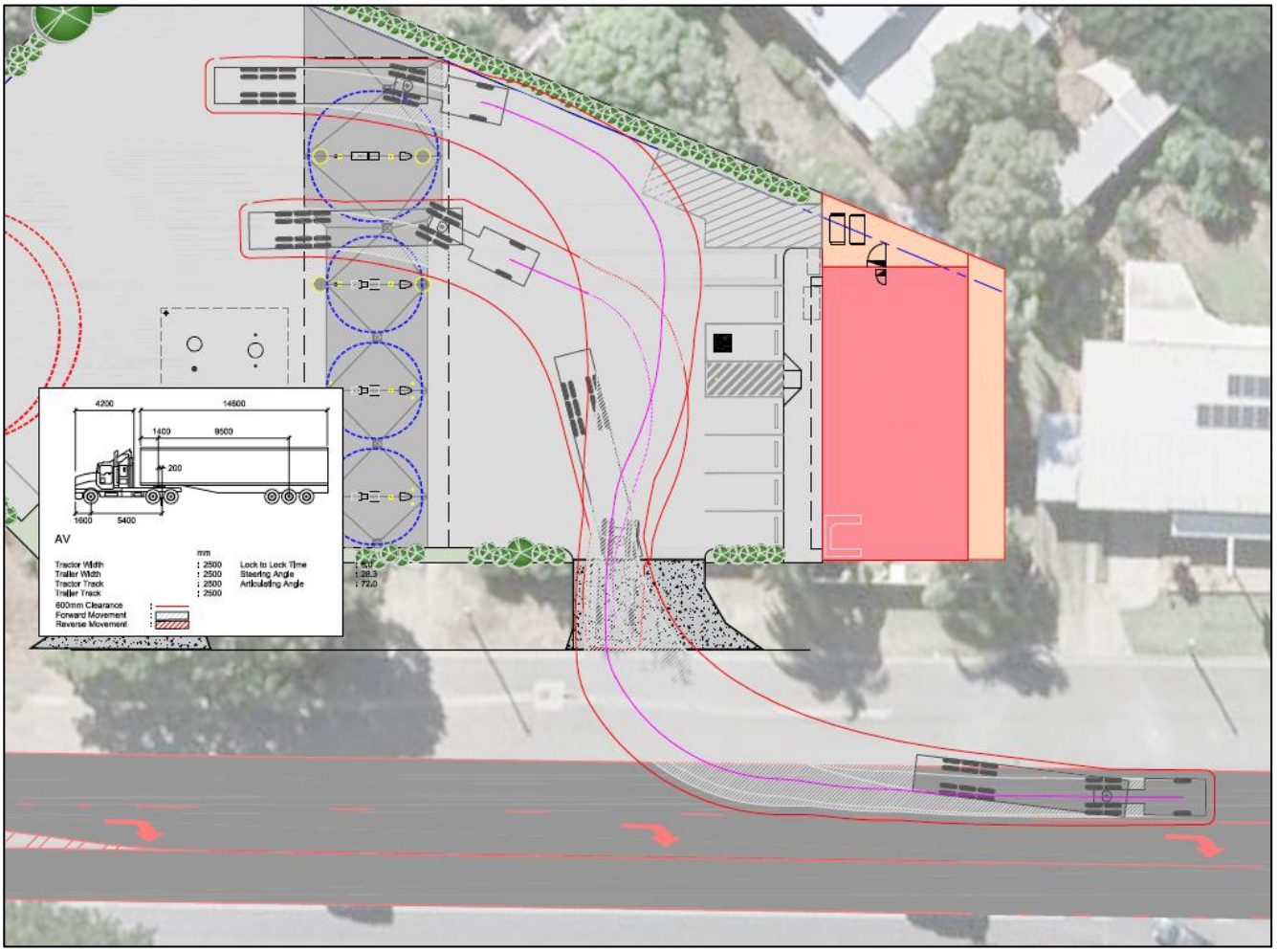


Figure 6.5 – Heavy Vehicle Manoeuvring (Articulated Vehicle (AV)) EXIT PATH

TRAFFIC IMPACT

7.1. TRAFFIC GENERATION

Give n the The traffic generation of service stations varies considerably depending on the location of the site in relation to the surrounding residential and commercial land uses, and passing traffic flow. Typically, a service station located in an urban area will attract in the order of 3% - 5% of vehicles from the passing traffic flow. If the site includes a significant convenience shop, then that use will generate added demand to the fuel outlet, similar to that of a stand alone shop.

The data provided by the Queensland Government via the Open Data Portal, includes traffic generation rates for various development uses studied between 2006 – 2019. The surveys provided in the Open Data Portal includes a study of ten service station, of which five comprise of a floor area of less than 1,000m^2.

The following traffic generation rates are derived from the study of the five service stations with an area of less than 1,000m^2.

Average: 29 trips / 100m^2
85th percentile: 46 trips / 100m^2

Application of the above rates results in the following estimates for the proposal.

Table 7.1 - Estimated Development Traffic Generation

Component	Moring Peak Hour			Afternoon Peak Hour		
	In	Out	Total	In	Out	Total
Service Station (200m^2)	46	46	92	46	46	92

Peak hour distribution- AM: 50/50, PM: 50/50

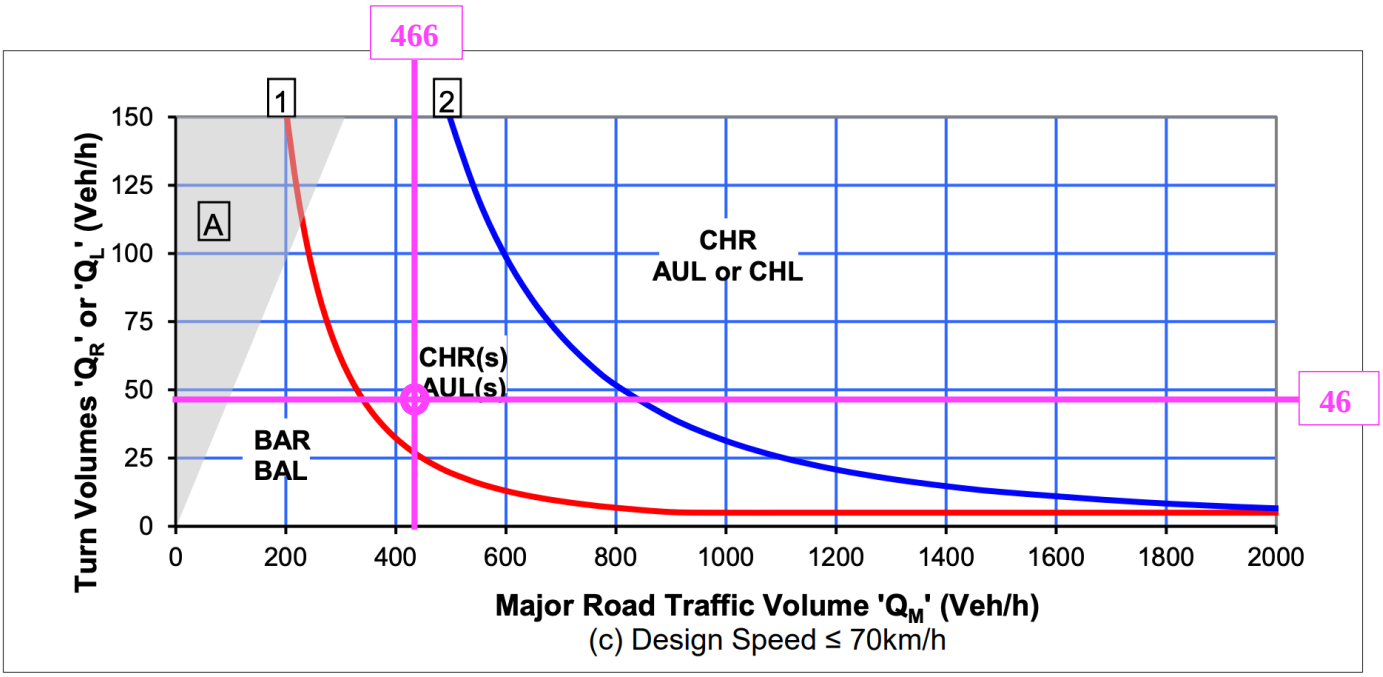
Overall, the vast majority of trips attracted to a development are expected to drop-in from the passing traffic flow and are not added to the network. Generally, only a small percentage of trips will be added to the network and these will be typically associated with employees and deliveries. On this basis, it is estimated that the site will attract up to 90% of the development traffic from the adjacent traffic flow.

On the basis that access to the development will be restricted to left in left out, the resultant impact of the proposal upon the safety and operation of the frontage road network will be negligible.

7.2. TURN WARRANTS ASSESSMENT

A turn warrants analysis has been carried out at the entry crossover from Lawrie Street. The assessment has been based on the traffic census data, and the resultant traffic generation of the proposed development. Given that Lawrie Street would need to be upgraded in the near future, a warrants analysis of future traffic conditions is not considered to be necessary.

As shown in Figure 7.1, in accordance with Austroads part 6, a short left turn treatment (AUL(S)) is warranted. The existing geometry of Lawrie Street provides a wide shoulder which can facilitate traffic decelerating clear of the through lane before turning into the site. It is therefore considered that a formal left turn treatment is not required, therefore no further works are considered to be required to facilitate ingress movement to the site.



Note: the minimum right-turn treatment for multilane roads is a CHR(s).

Source: TMR (2016a).

Figure 7.1 – Turn Warrants Diagram (<70km/hr) at Proposed Entry

CONCLUSIONS AND RECOMMENDATIONS

- The subject site is located on the eastern side of Lawrie Street, just north of the Lawrie Street / Ranger Street intersection. The site is identified as Lots 9 and 10 on RP611674. As shown as Figure 2.2 the site is located within the District Centre Zone and has an area of approximately 2,500m^2.

- Lawrie Street along the frontage of the site forms part of the Gavial – Gracemere Road, Lawrie Street Upgrade (LSU) Project. The project will be completed by the Department of Transport and Main Roads (DTMR), with construction estimated to commence in the near future .

- The proposed plan of development is for a service station and an associated convenience shop. It is proposed that the existing dwellings on the property will be removed and a shop constructed at the southern end of the site. The proposed shop will have an area of approximately 200m^2.

- In accordance with Table 9.3.1.3.1 of the Access, Parking and Transport Code, the proposal yields a requirement for 12 car parking spaces. The proposal provides a total of 16 car parking spaces and therefore satisfies Council's Acceptable Outcome for car parking. The geometric layout of the proposed car parking has been designed to comply with *AS2890.1:2004*, in respect to parking bay dimensions and aisle widths.

- The proposed service station has been designed to facilitate a queue length of three light vehicles at each fill point, and a minimum of two trucks at the heavy vehicle fuelling zone. Such is typically provided for service station of a similar scale and is considered to be satisfactory and will not result in a queuing demand on the frontage road.

- Access to the site is proposed to be gained via a dual access arrangement, with ingress achieved from the northern crossover and egress from the southern. It is proposed that right turns will be restricted via the design of the crossover splays and a double barrier lane on Lawrie Street, along the frontage. It is proposed that appropriate signage will be installed at each access to discourage unlawful movements to and from the development. It is noted that a planned upgrade of Lawrie Street is expected to be completed along the frontage. Such will restrict movement to and from the site to left in / left out without the need for a double barrier lane.

- The Rockhampton Planning Scheme does not specify on-site loading requirements for a service station. However, based on the scale of the proposed convenience shop, it is expected that such will generally be serviced by smaller service vehicles. As demonstrated in Section 6, the proposal has been designed to allow appropriate servicing for the convenience shop and for up to an Articulated Vehicle (AV) to enter and exit the site in a forward gear.

- As discussed in Section 7, given the restricted access, and majority of visitors arriving to the site from the passing traffic flow, the resultant impact of the development upon the safety and operation of the frontage road will be small. The turn warrants analysis of the proposed entry indicates that a short left turn is warranted at the site entry. Such can be facilitated in the shoulder of the existing road, therefore no additional works are considered to be required to facilitate entry movement to the site.

APPENDIXCES

APPENDIX A – TRAFFIC CENSUS DATA

APPENDIX B – RESPONSE TO STATE CODE 1

APPENDIX C – RESPONSE TO STATE CODE 6

APPENDIX A – TRAFFIC CENSUS DATA

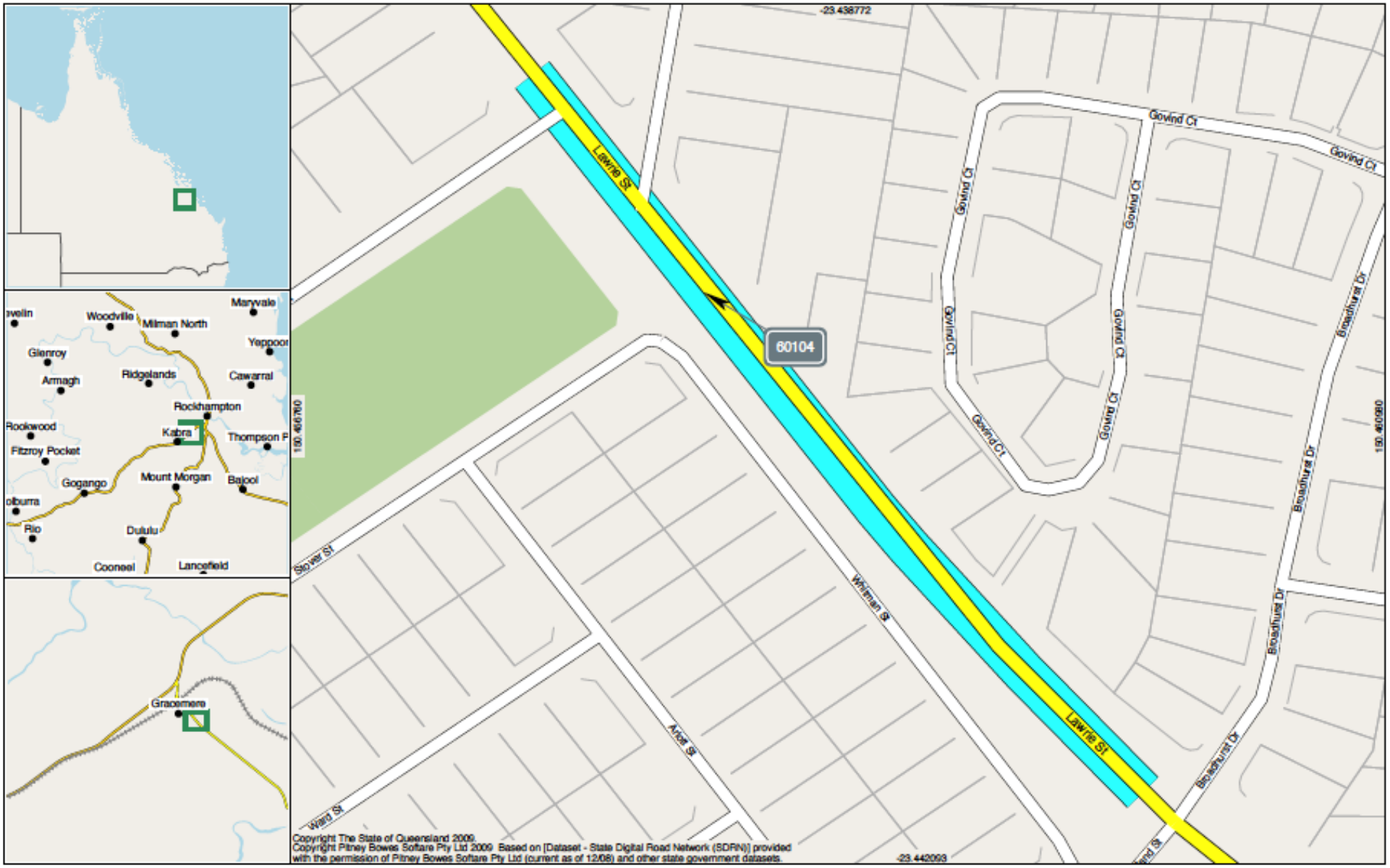
Queensland Government

25-Aug-2020 16:44

Traffic Analysis and Reporting System
AADT Segment Report
Area 404 - Fitzroy District Road Section 450 - GAVIAL - GRACEMERE ROAD
Road Segment from 9.468km to 9.862km Segment Site 60104 Traffic Year 2019 Data Collection Year 2018

TARS

Page 1 of 2 (1 of 7)



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Queensland Government

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Traffic Analysis and Reporting System

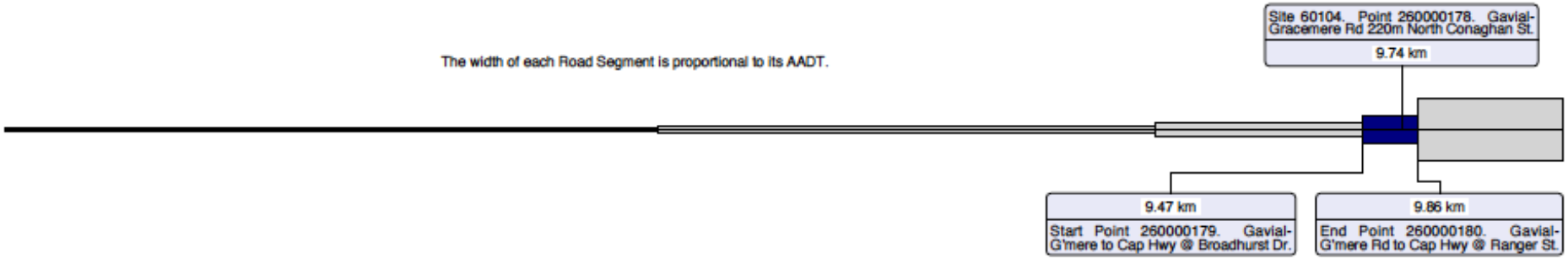
AADT Segment Report

Area 404 - Fitzroy District Road Section 450 - GAVIAL - GRACEMERE ROAD

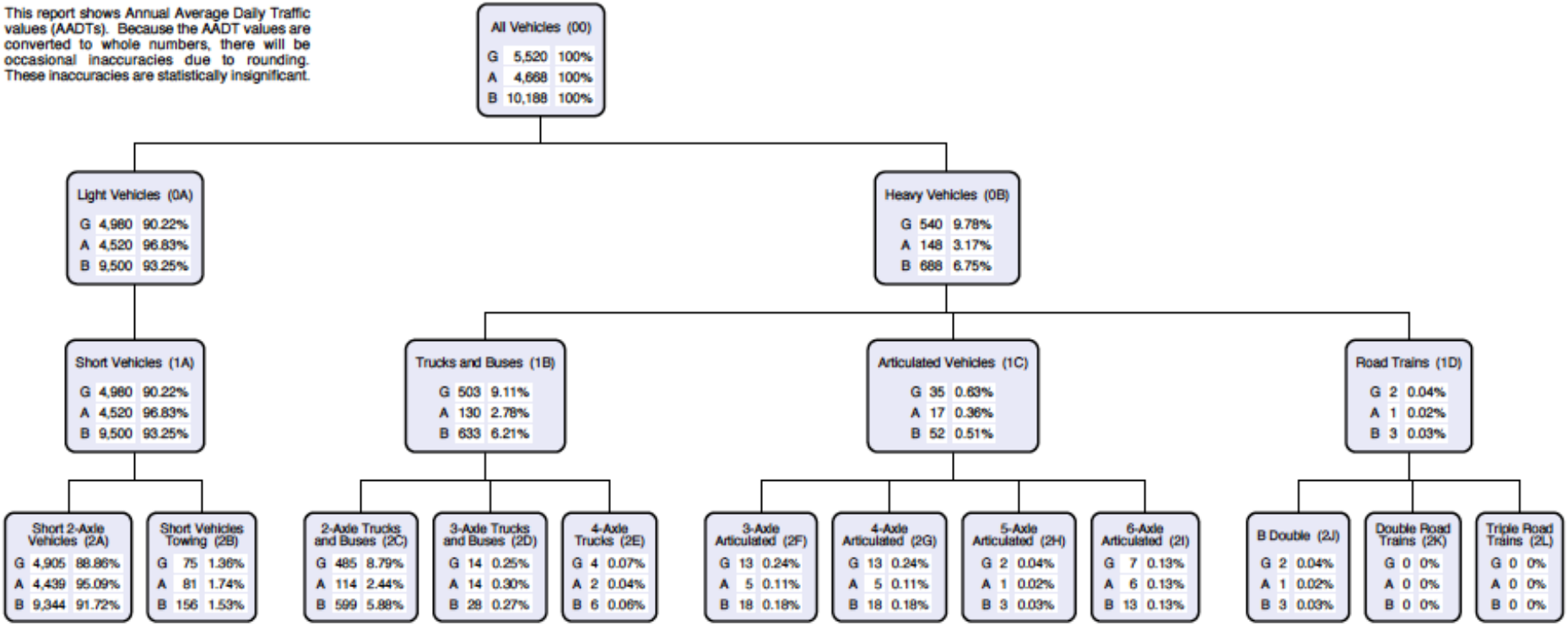
Road Segment from 9.468km to 9.862km Segment Site 60104 Traffic Year 2019 Data Collection Year 2018

TARS

The width of each Road Segment is proportional to its AADT.



This report shows Annual Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.



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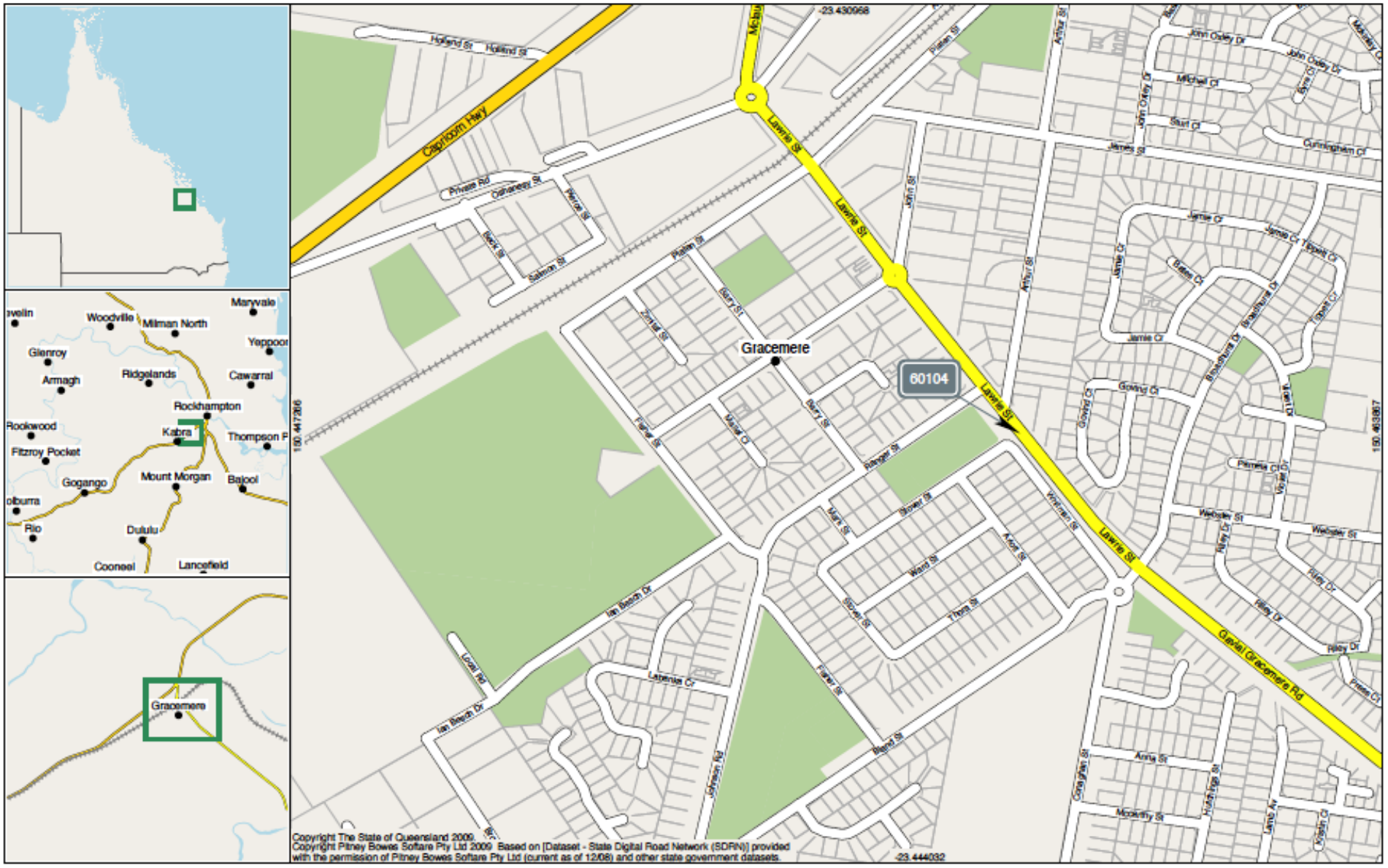
Traffic Analysis and Reporting System

Annual Volume Report

Area 404 - Fitzroy District Road Section 450 - GAVIAL - GRACEMERE ROAD

Site 60104 - Gavial-Gracemere Rd 100m N Conaghan St TDist 9.745km Speed Limit 60

TARS



Queensland Government

Traffic Analysis and Reporting System
Annual Volume Report

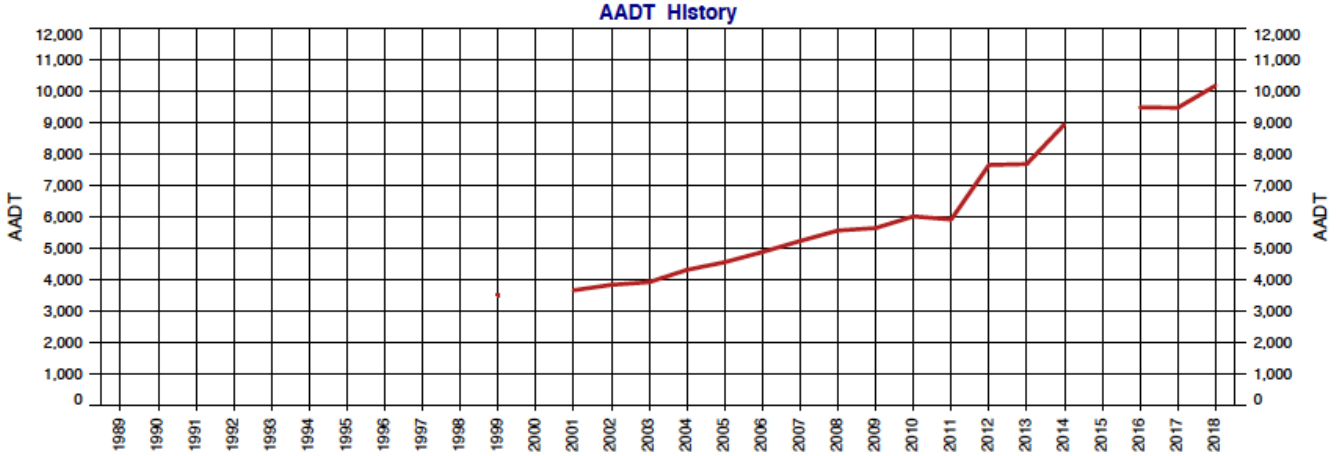
TARS

25-Aug-2020 16:44

Area	404 - Fitzroy District
Road Section	450 - GAVIAL - GRACEMERE ROAD
Site	60104 - Gavial-Gracemere Rd 100m N Conaghan St
Thru Dist	9.745
Type	C - Coverage
Stream	TB - Bi-directional traffic flow

Year	2018	Growth last Year	7.43%
AADT	10,188	Growth last 5 Yrs	4.76%
Avg Week Day	9,372	Growth last 10 Yrs	6.37%
Avg Weekend Day	7,539		

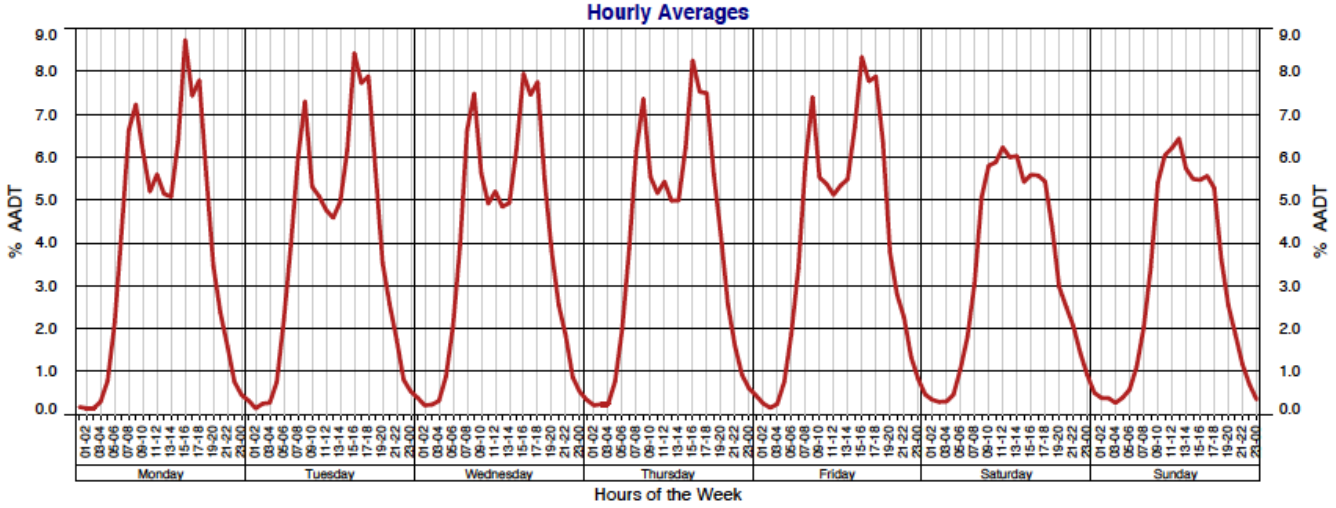
AADT History



Year	AADT	1-Year Growth	5-Year Growth	10-Year Growth
2018	10,188	7.43%	4.76%	6.37%
2017	9,483	-0.12%	4.16%	6.21%
2016	9,494		7.63%	7.18%
2015				
2014	8,954	16.47%	10.72%	8.23%
2013	7,688	0.39%	7.76%	6.91%
2012	7,658	29.36%	9.18%	7.74%
2011	5,920	-1.64%	3.17%	4.65%
2010	6,019	6.59%	5.35%	
2009	5,647	1.42%	5.24%	5.38%
2008	5,568	6.38%	6.96%	
2007	5,234	7.21%	6.83%	
2006	4,882	7.13%	6.33%	
2005	4,557	5.66%		
2004	4,313	9.97%	4.88%	

Year	AADT	1-Year Growth	5-Year Growth	10-Year Growth
2003	3,922	2.24%		
2002	3,836	4.72%		
2001	3,663			
2000				
1999	3,504			
1998				
1997				
1996				
1995				
1994				
1993				
1992				
1991				
1990				
1989				

Hourly Averages



APPENDIX B - RESPONSE TO STATE CODE 1

State code 1: Development in a state-controlled road environment

Table 1.2.1: Development in a state-controlled road environment

Performance outcomes	Acceptable outcomes	Response
Buildings and structures		
PO1 The location of buildings, structures, infrastructure, services and utilities does not create a safety hazard in a state-controlled road, or cause damage to, or obstruct road transport infrastructure.	**AO1.1** Buildings, structures, infrastructure, services and utilities are not located in a state-controlled road. AND	**COMPLIES – Buildings, Structures, Infrastructure, Services and utilities are not located in a State controlled road.**
	AO1.2 Buildings, structures, infrastructure, services and utilities can be maintained without requiring access to a state-controlled road.	**COMPLIES – Buildings, Structures, Infrastructure, Services and utilities can be maintained, without requiring access to the State controlled road.**
PO2 The design and construction of buildings and structures does not create a safety hazard by distracting users of a state-controlled road.	**AO2.1** Facades of buildings and structures facing a state-controlled road are made of non-reflective materials. OR	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
		NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT
	AO2.2 Facades of buildings and structures do not reflect point light sources into the face of oncoming traffic on a state-controlled road. AND	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
	AO2.3 External lighting of buildings and structures is not directed into the face of oncoming traffic on a state-controlled road and does not involve flashing or laser lights. AND	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
	AO2.4 Advertising devices visible from a state-controlled road are located and designed in accordance with the Roadside Advertising Guide, 2nd Edition, Department of Transport and Main Roads, 2017.	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
PO3 Road, pedestrian and bikeway bridges over a state-controlled road are designed and constructed	**AO3.1** Road, pedestrian and bikeway bridges over a state-controlled road include throw protection screens in accordance with section 4.9.3 of the	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**

Performance outcomes	Acceptable outcomes	Response
to prevent projectiles from being thrown onto a state-controlled road.	Design Criteria for Bridges and Other Structures Manual, Department of Transport and Main Roads, 2018.	
Filling, excavation and retaining structures		
PO4 Filling and excavation does not interfere with, or result in damage to, infrastructure or services in a state-controlled road. Note: Information on the location of services and public utility plants in a **state-controlled road** can be obtained from the Dial Before You Dig service. Where development will impact on an existing or future service or public utility plant in a **state-controlled road** such that the service or public utility plant will need to be relocated, the alternative alignment must comply with the standards and design specifications of the relevant service or public utility provider, and any costs of relocation are to be borne by the developer. Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.	No acceptable outcome is prescribed.	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
PO5 Filling, excavation, building foundations and retaining structures do not undermine, or cause subsidence of, a state-controlled road. Note: To demonstrate compliance with this performance outcome, it is recommended an RPEQ certified geotechnical assessment, prepared in accordance with the Road Planning and Design Manual 2nd Edition: Volume 3, Department of Transport and Main Roads, 2016, is provided. Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome and prepare a geotechnical assessment.	No acceptable outcome is prescribed.	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
PO6 Filling, excavation, building foundations and retaining structures do not cause ground water disturbance in a state-controlled road. Note: To demonstrate compliance with this performance outcome, it is recommended an RPEQ certified geotechnical assessment, prepared in accordance with the Road Planning and Design manual 2nd Edition: Volume 3, Department of Transport and Main Roads, 2016, is provided. Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further	No acceptable outcome is prescribed.	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**

Performance outcomes	Acceptable outcomes	Response
guidance on how to comply with this performance outcome and prepare a geotechnical assessment.		
PO7 Excavation, boring, piling, blasting or fill compaction during construction of a development does not result in ground movement or vibration impacts that would cause damage or nuisance to a state-controlled road, road transport infrastructure or road works. Note: To demonstrate compliance with this performance outcome, it is recommended an RPEQ certified geotechnical assessment, prepared in accordance with Road Planning and Design Manual 2nd Edition: Volume 3, Department of Transport and Main Roads, 2016, is provided. Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome and prepare a geotechnical assessment.	No acceptable outcome is prescribed.	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
PO8 Development involving the haulage of fill, extracted material or excavated spoil material exceeding 10,000 tonnes per year does not damage the pavement of a state-controlled road. Note: It is recommended a pavement impact assessment is provided. Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, and the Guide to Traffic Impact Assessment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome and prepare a pavement impact assessment.	**AO8.1** Fill, extracted material and spoil material is not transported to or from the development site on a state-controlled road.	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
PO9 Filling and excavation associated with the construction of vehicular access to a development does not compromise the operation or capacity of existing drainage infrastructure for a state-controlled road. Note: Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.	No acceptable outcome is prescribed.	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**

Performance outcomes	Acceptable outcomes	Response
PO10 Fill material used on a development site does not result in contamination of a state-controlled road. Note: Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.	**AO10.1** Fill material is free of contaminants including acid sulfate content. Note: Soils and rocks should be tested in accordance with AS 1289.0 – Methods of testing soils for engineering purposes and AS 4133.0-2005 – Methods of testing rocks for engineering purposes. AND	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
	AO10.2 Compaction of fill is carried out in accordance with the requirements of AS 1289.0 2000 – Methods of testing soils for engineering purposes.	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
PO11 Filling and excavation does not cause wind-blown dust nuisance in a state-controlled road. Note: Refer to the SDAP Supporting Information: Filling, excavation and retaining structures in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.	**AO11.1** Compaction of fill is carried out in accordance with the requirements of AS 1289.0 2000 – Methods of testing soils for engineering purposes. AND	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
	AO11.2 Dust suppression measures are used during filling and excavation activities such as wind breaks or barriers and dampening of ground surfaces.	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
Stormwater and drainage		
PO12 Development does not result in an actionable nuisance, or worsening of, stormwater, flooding or drainage impacts in a state-controlled road. Note: Refer to the SDAP Supporting Information: Stormwater and drainage in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.	No acceptable outcome is prescribed.	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
PO13 Run-off from the development site is not unlawfully discharged to a state-controlled road. Note: Refer to the SDAP Supporting Information: Stormwater and drainage in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.	**AO13.1** Development does not create any new points of discharge to a state-controlled road. AND	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
	AO13.2 Stormwater run-off is discharged to a lawful point of discharge. Note: Section 3.9 of the Queensland Urban Drainage Manual, Institute of Public Works Engineering Australasia (Queensland Division) Fourth Edition, 2016, provides further information on lawful points of discharge. AND	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
	AO13.3 Development does not worsen the condition of an existing lawful point of discharge to the state-controlled road.	

Performance outcomes	Acceptable outcomes	Response
PO14 Run-off from the development site during construction does not cause siltation of stormwater infrastructure affecting a state-controlled road. Note: Refer to the SDAP Supporting Information: Stormwater and drainage in a state-controlled road environment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.	**AO14.1** Run-off from the development site during construction is not discharged to stormwater infrastructure for a state-controlled road.	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
Vehicular access to a state-controlled road		
PO15 Vehicular access to a state-controlled road that is a limited access road is consistent with government policy for the management of limited access roads. Note: Refer to the SDAP Supporting Information: Vehicular access to a state-controlled road, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.	**AO15.1** Development does not require new or changed access to a limited access road. Note: Limited access roads are declared by the transport chief executive under section 54 of the *Transport Infrastructure Act 1994* and are identified in the DA mapping system. OR	**N/A – Access is gained from a State controlled road**
	AO15.2 A new or changed access to a limited access road is consistent with the limited access policy for the state-controlled road. Note: Limited access policies for limited access roads declared under the *Transport Infrastructure Act 1994* can be obtained by contacting the relevant Department of Transport and Main Roads regional office. AND	**COMPLIES – Access is designed in accordance with the relevant design guidelines**
	AO15.3 Where a new or changed access is for a service centre, access is consistent with the Service centre policy, Department of Transport and Main Roads, 2013 and the Access policy for roadside service centre facilities on limited access roads, Department of Transport and Main Roads, 2013, and the Service centre strategy for the state-controlled road. Note: The Service centre policy, Department of Transport and Main Roads, 2013, Access policy for roadside service centre facilities, Department of Transport and Main Roads, 2013 and the relevant Service centre strategy for a state-controlled road can be accessed by contacting the relevant Department of Transport and Main Roads regional office.	**COMPLIES – Access is designed in accordance with the relevant design guidelines**
PO16 The location and design of vehicular access to a state-controlled road (including access to a limited access road) does not create a safety hazard for users of a state-controlled road or result in a worsening of operating conditions on a state-controlled road.	**AO16.1** Vehicular access is provided from a local road.	**N/A – Access is gained from a State controlled road**
	OR all of the following acceptable outcomes apply:	

Performance outcomes	Acceptable outcomes	Response
Note: Where a new or changed access between the premises and a state-controlled road is proposed, the Department of Transport and Main Roads will need to assess the proposal to determine if the vehicular access for the development is safe. An assessment can be made by Department of Transport and Main Roads as part of the development assessment process and a decision under section 62 of *Transport Infrastructure Act 1994* issued. Refer to the SDAP Supporting Information: Vehicular access to a state-controlled road, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.	**AO16.2** Vehicular access for the development is consistent with the function and design of the state-controlled road. AND	
	AO16.3 Development does not require new or changed access between the premises and the state-controlled road. Note: A decision under section 62 of the *Transport Infrastructure Act 1994* outlines the approved conditions for use of an existing vehicular access to a **state-controlled road**. Current section 62 decisions can be obtained from the relevant Department of Transport and Main Roads regional office. AND	**COMPLIES – Access is designed in accordance with the relevant design guidelines**
	AO16.4 Use of any existing vehicular access to the development is consistent with a decision under section 62 of the *Transport Infrastructure Act 1994*. Note: The development which is the subject of the application must be of an equivalent use and intensity for which the section 62 approval was issued and the section 62 approval must have been granted no more than 5 years prior to the lodgement of the application. AND	**ALTERNATIVE OUTCOME – Existing access points are proposed to be removed to facilitate the proposed development.**
	AO16.5 On-site vehicle circulation is designed to give priority to entering vehicles at all times so vehicles do not queue in a road intersection or on the state-controlled road.	**COMPLIES – The proposal has been designed to give priority to vehicles entering the site.**
Vehicular access to local roads within 100 metres of an intersection with a state-controlled road		
PO17 The location and design of vehicular access to a local road within 100 metres of an intersection with a state-controlled road does not create a safety hazard for users of a state-controlled road. Note: Refer to the SDAP Supporting Information: Vehicular access to a state-controlled road, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.	**AO17.1** Vehicular access is located as far as possible from the state-controlled road intersection. AND	**N/A – Access is gained directly from a State controlled road**
	AO17.2 Vehicular access is in accordance with parts, 3, 4 and 4A of the Road Planning and Design Manual, 2nd Edition: Volume 3, Department of Transport and Main Roads, 2016. AND	**N/A – Access is gained directly from a State controlled road**
	AO17.3 On-site vehicle circulation is designed to give priority to entering vehicles at all times so vehicles do not queue in the intersection or on the state-controlled road.	**N/A – Access is gained directly from a State controlled road**

Performance outcomes	Acceptable outcomes	Response
Public passenger transport infrastructure on state-controlled roads		
PO18 Development does not damage or interfere with public passenger transport infrastructure, public passenger services or pedestrian or cycle access to public passenger transport infrastructure and public passenger services. Note: Refer to the SDAP Supporting Information: Vehicular access to a state-controlled road, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.	**AO18.1** Vehicular access and associated road access works are not located within 5 metres of existing public passenger transport infrastructure. AND	**COMPLIES - The proposed access crossovers maintain appropriate separation from existing public transport infrastructure on Lawrie Street.**
	AO18.2 Development does not necessitate the relocation of existing public passenger transport infrastructure. AND	**COMPLIES – The proposal does not require existing public transport infrastructure to be relocated.**
	AO18.3 On-site vehicle circulation is designed to give priority to entering vehicles at all times so vehicles using a vehicular access do not obstruct public passenger transport infrastructure and public passenger services or obstruct pedestrian or cycle access to public passenger transport infrastructure and public passenger services. AND	**COMPLIES – The proposal has been designed to give priority to vehicles entering the site.**
	AO18.4 The normal operation of public passenger transport infrastructure or public passenger services is not interrupted during construction of the development.	**COMPLIES – The proposal does not impact on the normal operation of existing public transport in the direct vicinity of the site.**
Planned upgrades		
PO19 Development does not impede delivery of planned upgrades of state-controlled roads.	**AO19.1** Development is not located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of a state-controlled road. Note: Land required for the planned upgrade of a state-controlled road is identified in the DA mapping system. OR	**COMPLIES – The proposed works are generally contained on site and will not impact on future upgrade works along the frontage road.**
	AO19.2 Development is sited and designed so that permanent buildings, structures, infrastructure, services or utilities are not located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of a state-controlled road.	**NOT APPLICABLE – The proposal does not infringe into areas required for future upgrade of the frontage road.**

Performance outcomes	Acceptable outcomes	Response
	OR all of the following acceptable outcomes apply: **AO19.3** Structures and infrastructure located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of a state-controlled road are able to be readily relocated or removed without materially affecting the viability or functionality of the development. AND	**NOT APPLICABLE – The proposal does not infringe into areas required for future upgrade of the frontage road.**
	AO19.4 Vehicular access for the development is consistent with the function and design of the planned upgrade of the state-controlled road. AND	**NOT APPLICABLE – The proposal does not infringe into areas required for future upgrade of the frontage road.**
	AO19.5 Development does not involve filling and excavation of, or material changes to, land required for a planned upgrade to a state-controlled road. AND	**NOT APPLICABLE – The proposal does not infringe into areas required for future upgrade of the frontage road.**
	AO19.6 Land is able to be reinstated to the pre-development condition at the completion of the use.	**NOT APPLICABLE – The proposal does not infringe into areas required for future upgrade of the frontage road.**
Network impacts		
PO20 Development does not result in a worsening of operating conditions on the state-controlled road **network.** Note: To demonstrate compliance with this performance outcome, it is recommended that an RPEQ certified traffic impact assessment is provided. Please refer to the Guide to Traffic Impact Assessment, Department of Transport and Main Roads, 2017, for further guidance on how to comply with this performance outcome.	No acceptable outcome is prescribed.	**COMPLIES – Refer to traffic report, the proposal will not result in worsening of operating conditions on the State controlled road.**
PO21 Development does not impose traffic loadings on a state-controlled road which could be accommodated on the local road network.	**AO21.1** The layout and design of the development directs traffic generated by the development to the **local road** network.	**COMPLIES**
PO22 Upgrade works on, or associated with, a **state-controlled road** are built in accordance with Queensland road design standards.	**AO22.1** Upgrade works required as a result of the development are designed and constructed in accordance with the *Road Planning and Design Manual*, 2nd edition, Department of Transport and Main Roads, 2016.	**COMPLIES – Any external works required as a result of the proposed development will be completed in accordance with the relevant design standards.**

Performance outcomes	Acceptable outcomes	Response
	Note: Road works in a state-controlled road require approval under section 33 of the *Transport Infrastructure Act 1994* before the works commence.	

APPENDIX B - RESPONSE TO STATE CODE 6

State code 6: Protection of state transport networks

Table 6.2.2: All development

Performance outcomes	Acceptable outcomes	Response
Network impacts		
PO1 Development does not result in a worsening of the safety of a state-controlled road. Note: To demonstrate compliance with this performance outcome, it is recommended that a Registered Professional Engineer of Queensland (RPEQ) certified road safety audit or road safety assessment (as applicable) is provided. Further information on determining whether a road safety audit or road safety assessment is required is provided in section 9 of the Guide to Traffic Impact Assessment, Department of Transport and Main Roads, 2017.	No acceptable outcome is prescribed.	**COMPLIES – Refer to traffic report, the proposal will not result in worsening of safety conditions on the State controlled road.**
PO2 Development does not result in a worsening of the infrastructure condition of a state-controlled road or road transport infrastructure. Note: To demonstrate compliance with this performance outcome, it is recommended that a RPEQ certified traffic impact assessment and pavement impact assessment are provided. Further information on how to prepare a traffic impact assessment and pavement impact assessment is provided in the Guide to Traffic Impact Assessment, Department of Transport and Main Roads, 2017.	No acceptable outcome is prescribed.	**COMPLIES – Refer to traffic report, the proposal will not result in worsening of infrastructure conditions on the State controlled road.**
PO3 Development does not result in a worsening of operating conditions on a state-controlled road or the surrounding road network. Note: To demonstrate compliance with this performance outcome, it is recommended that an RPEQ certified traffic impact assessment is provided. Further information on how to prepare a traffic impact assessment is provided in the Guide to Traffic Impact Assessment, Department of Transport and Main Roads, 2017.	No acceptable outcome is prescribed.	**COMPLIES – Refer to traffic report, the proposal will not result in worsening of operating conditions on the State controlled road.**

Performance outcomes	Acceptable outcomes	Response
PO4 Development does not impose traffic loadings on a state-controlled road which could be accommodated on the local road network.	AO4.1 The layout and design of the development directs traffic generated by the development to the local road network.	**COMPLIES –**
PO5 Upgrade works on, or associated with, a state-controlled road are built in accordance with relevant design standards.	AO5.1 Upgrade works on a state-controlled road are designed and constructed in accordance with the Road Planning and Design Manual, 2nd edition, Department of Transport and Main Roads, 2016.	**COMPLIES – Any external works required as a result of the proposed development will be completed in accordance with the relevant design standards.**
PO6 Development involving the haulage of fill, extracted material or excavated spoil material exceeding 10,000 tonnes per year does not damage the pavement of a state-controlled road. Note: It is recommended that a transport infrastructure impact assessment and pavement impact assessment are provided. Further information on how to prepare a traffic impact assessment is provided in the Guide to Traffic Impact Assessment, Department of Transport and Main Roads, 2017.	AO6.1 Fill, extracted material and spoil material is not transported to or from the development site on a state-controlled road.	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
PO7 Development does not adversely impact on the safety of a railway crossing. Note: It is recommended that a traffic impact assessment be prepared to demonstrate compliance with this performance outcome. An impact on a level crossing may require an Australian Level Crossing Assessment Model (ALCAM) assessment to be undertaken. Section 2.2 – Railway crossing safety of the Guide to Development in a Transport Environment: Rail, Department of Transport and Main Roads, 2015, provides guidance on how to comply with this performance outcome.	**AO7.1** Development does not require a new railway crossing. OR	**COMPLIES**
	AO7.2 A new railway crossing is grade separated.	**NOT APPLICABLE – The proposal does not require a new railway crossing.**
	OR all of the following acceptable outcomes apply: **AO7.3** Upgrades to a level crossing are designed and constructed in accordance with AS1742.7 – Manual of uniform traffic control devices, Part 7: Railway crossings and applicable rail manager standard drawings. Note: It is recommended a traffic impact assessment be prepared to demonstrate compliance with this acceptable outcome. An impact on a level crossing may require an Australian Level Crossing Assessment Model (ALCAM) assessment to be undertaken. Section 2.2 – Railway crossing safety of the Guide to Development in a Transport Environment: Rail, Department of Transport and Main Roads, 2015, provides guidance on how to comply with this acceptable outcome AND	**NOT APPLICABLE – The proposal does not require a new railway crossing.**

Performance outcomes	Acceptable outcomes	Response
	AO7.4 Access points achieve sufficient clearance from a level crossing in accordance with AS1742.7 – Manual of uniform traffic control devices, Part 7: Railway crossings by providing a minimum clearance of 5 metres from the edge running rail (outer rail) plus the length of the largest vehicle anticipated on-site. Note: Section 2.2 of the Guide to Development in a Transport Environment: Rail, Department of Transport and Main Roads, 2015, provides guidance on how to comply with this acceptable outcome. AND	**NOT APPLICABLE – The proposal does not require a new railway crossing.**
	AO7.5 On-site vehicle circulation is designed to give priority to entering vehicles at all times.	**NOT APPLICABLE – The proposal does not require a new railway crossing.**
PO8 Development does not result in a worsening of the infrastructure condition of a railway or rail transport infrastructure.	No acceptable outcome is prescribed.	**NOT APPLICABLE – The proposal does not require a new railway crossing.**
PO9 Development does not result in a worsening of operating conditions of a railway	No acceptable outcome is prescribed.	**NOT APPLICABLE – The proposal does not require a new railway crossing.**
Stormwater and drainage		
PO10 Development does not result in an actionable nuisance, or worsening of, stormwater, flooding or drainage impacts in a state transport corridor or state transport infrastructure.	No acceptable outcome is prescribed.	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
PO11 Run-off from the development site is not unlawfully discharged to a state transport corridor or state transport infrastructure.	**AO11.1** Development does not create any new points of discharge to a state transport corridor. AND	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
	AO11.2 Stormwater run-off is discharged to a lawful point of discharge. Note: Section 3.49 of the Queensland Urban Drainage Manual, Institute of Public Works Engineering Australasia (Queensland Division) Fourth Edition, 2016, provides further information on lawful points of discharge. AND	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
	AO11.3 Development does not worsen the condition of an existing lawful point of discharge to a state transport corridor.	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**
PO12 Run-off from the development site does not	**AO12.1** Run-off from the development site is not	**NOT APPLICABLE TO TRAFFIC IMPACT ASSESSMENT**

Performance outcomes	Acceptable outcomes	Response
cause siltation of stormwater infrastructure affecting a state transport corridor or state transport infrastructure.	discharged to stormwater infrastructure for a state transport corridor.	
Planned upgrades		
PO13 Development does not impede delivery of planned upgrades of state transport infrastructure.	**AO13.1** Development is not located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of state transport infrastructure. Note: Land required for the planned upgrade of state transport infrastructure is identified in the DA mapping system. OR	**COMPLIES – The proposed works are generally contained on site and will not impact on future upgrade works along the frontage road.**
	AO13.2 Development is sited and designed so that permanent buildings, structures, infrastructure, services or utilities are not located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of state transport infrastructure.	**NOT APPLICABLE – The proposal does not infringe into areas required for future upgrade of the frontage road.**
	OR all of the following acceptable outcomes apply: AO13.3 Structures and infrastructure located on land identified by the Department of Transport and Main Roads as land required for the planned upgrade of state transport infrastructure are able to be readily relocated or removed without materially affecting the viability or functionality of the development. AND	**NOT APPLICABLE – The proposal does not infringe into areas required for future upgrade of the frontage road.**
	AO13.4 Vehicular access for the development is consistent with the function and design of the planned upgrade of state transport infrastructure. AND	**NOT APPLICABLE – The proposal does not infringe into areas required for future upgrade of the frontage road.**
	AO13.5 Development does not involve filling and excavation of, or material changes to, land required for a planned upgrade to a state transport infrastructure. AND	**NOT APPLICABLE – The proposal does not infringe into areas required for future upgrade of the frontage road.**
	AO13.6 Land is able to be reinstated to the predevelopment condition at the completion of the use.	**NOT APPLICABLE – The proposal does not infringe into areas required for future upgrade of the frontage road.**

Table 6.2.3: Public passenger transport infrastructure

Performance outcomes	Acceptable outcomes	Response
Public passenger transport infrastructure		
PO14 Development does not damage or interfere with public passenger transport infrastructure, public passenger services or pedestrian or cycle access to public passenger transport infrastructure and public passenger services.	AO14.1 Vehicular access and associated road access works are not located within 5 metres of public passenger transport infrastructure. AND	**COMPLIES - The proposed access crossovers maintain appropriate separation from existing public transport infrastructure on Lawrie Street.**
	AO14.2 Development does not necessitate the relocation of existing public passenger transport infrastructure. AND	**COMPLIES – The proposal does not require existing public transport infrastructure to be relocated.**
	AO14.3 Development does not obstruct pedestrian or cyclist access to public passenger transport infrastructure or public passenger services. AND	**COMPLIES – The proposal does not obstruct pedestrian or cyclist access to public transport infrastructure.**
	AO14.4 The normal operation of public passenger transport infrastructure or public passenger services is not interrupted during construction of the development.	**COMPLIES – The proposal does not impact on the normal operation of existing public transport in the direct vicinity of the site.**
PO15 Upgraded or new public passenger transport infrastructure is provided to accommodate the demand for public passenger transport generated by the development. Note: To demonstrate compliance with this performance outcome, it is recommended a public transport impact assessment be prepared in accordance with appendix 1 of the State Development Assessment Provisions Supporting Information – Public Passenger Transport Infrastructure, Department of Transport and Main Roads, 2017. New or upgraded public passenger transport infrastructure provided should be in accordance with the Public Transport Infrastructure Manual, Department of Transport and Main Roads, 2015. Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.	No acceptable outcome is prescribed.	**NOT APPLICABLE – The proposal does not propose to upgrade or provide new public transport infrastructure.**
PO16 Development is designed to ensure the	No acceptable outcome is prescribed.	**COMPLIES**

Performance outcomes	Acceptable outcomes	Response
location of public passenger transport infrastructure prioritises and enables efficient public passenger services. Note: Chapters 2 and 5 of the Public Transport Infrastructure Manual, Department of Transport and Main Roads, 2015 provides guidance on how to comply with this performance outcome. Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.		
PO17 Development enables the provision or extension of public passenger services to the development and avoids creating indirect or inefficient routes for public passenger services. Note: Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.	No acceptable outcome is prescribed.	**NOT APPLICABLE**
PO18 New or modified road networks are designed to enable development to be serviced by public passenger services. Note: Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.	AO18.1 Roads catering for buses are arterial or sub-arterial roads, collector or their equivalent. AND	**NOT APPLICABLE – The proposal does not propose to provide a new or improved road network.**
	AO18.2 Roads intended to accommodate buses are designed and constructed in accordance with parts 3, 4-4C and 6 of the Road Planning and Design Manual 2nd edition, Volume 3: Guide to Road Design, Department of Transport and Main Roads, 2016 and Part 13 of the Manual of Uniform Traffic Control Devices, Department of Transport and Main Roads, 2018. Note: Parts 3, 4-4C and 6 of the Road Planning and Design Manual, Volume 3: Guide to Road Design, Department of Transport and Main Roads, 2016, must be read in conjunction with the following standards where specified in the Manual: 1. Supplement to Austroads Guide to Road Design (Parts 3,4-4C and 6), Department of Transport and Main Roads, 2014, and 2. Austroads Guide to Road Design (Parts 3,4-4C and 6). AND	**NOT APPLICABLE – The proposal does not propose to provide a new or improved road network.**

Performance outcomes	Acceptable outcomes	Response
	AO18.3 Traffic calming devices are not installed on roads used for buses. Note: Chapter 2 of the Public Transport Infrastructure Manual, Department of Transport and Main Roads, 2015 provides guidance on how to comply with this acceptable outcome.	**NOT APPLICABLE – The proposal does not propose to provide a new or improved road network.**
PO19 Development provides safe, direct and convenient pedestrian access to existing and future public passenger transport infrastructure. Note: Chapter 3 of the Public Transport Infrastructure Manual, Department of Transport and Main Roads, 2015 provides guidance on how to comply with this performance outcome. In particular, it is recommended that a pedestrian demand analysis be provided to demonstrate compliance with the performance outcome. Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.	No acceptable outcome is prescribed.	**COMPLIES – Appropriate pedestrian facilities can be established along the frontage of the site to link to future pedestrian and public transport facilities along the frontage of the site.**
PO20 On-site vehicular circulation ensures the safety of both public passenger transport services and pedestrians. Note: Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.	AO20.1 The location of on-site pedestrian crossings ensures safe sight distances for pedestrians and public passenger services. AND	**COMPLIES – Appropriate pedestrian safety measures are proposed to be provided at the entry point to the site.**
	AO20.2 On-site circulation is designed and constructed so that public passenger services can enter and leave in a forward gear at all times. AND	**NOT APPLICABLE – The proposal has not been design to facilitate a public passenger services through the site.**
	AO20.3 Development does not result in public passenger services movements through car parking aisles.	**COMPLIES**
PO21 Taxi facilities are provided to accommodate the demand generated by the development. Note: Guidance on how to meet the performance outcome are available in chapter 7 of the Public Transport Infrastructure Manual, Department of Transport and Main Roads, 2015. Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.	No acceptable outcome is prescribed.	**NOT APPLICABLE – Taxi facilities are not proposed to be provided.**

Performance outcomes	Acceptable outcomes	Response
PO22 Taxi facilities are located and designed to provide convenient, safe and equitable access for passengers. Note: Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.	AO22.1 A taxi facility is provided parallel to the kerb and adjacent to the main entrance. AND	**NOT APPLICABLE – Taxi facilities are not proposed to be provided.**
	AO22.2 Taxi facilities are designed in accordance with: 1. AS2890.5–1993 Parking facilities – on-street parking and AS1428.1–2009 Design for access and mobility – general requirements for access – new building work 2. AS1742.11–1999 Parking controls – manual of uniform traffic control devices 3. AS/NZS 2890.6–2009 Parking facilities – offstreet parking for people with disabilities 4. Disability standards for accessible public transport 2002 made under section 31(1) of the *Disability Discrimination Act 1992* 5. AS/NZS 1158.3.1 – Lighting for roads and public spaces, Part 3.1: Pedestrian area (category P) lighting – Performance and design requirements.	**NOT APPLICABLE – Taxi facilities are not proposed to be provided.**
PO23 Educational establishments are designed to ensure the safe and efficient operation of public passenger services and pedestrian access. Note: Refer to the SDAP Supporting Information: Public passenger transport infrastructure, Department of Transport and Main Roads, 2017, for further guidance on how to comply with the performance outcome.	AO23.1 Educational establishments are designed in accordance with the provisions of the Planning for Safe Transport Infrastructure at Schools, Department of Transport and Main Roads, 2011.	**NOT APPLICABLE – Taxi facilities are not proposed to be provided.**

mcmurtrie CONSULTING ENGINEERS
REGIONAL LEADERS | NATIONAL EXPERTISE

DATE 27.09.2021
OUR REF. 027-21-22

REPORT TYPE

STORMWATER MANAGEMENT PLAN

PROJECT

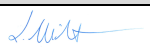
Service Station, 16 and 18 Lawrie Street, Gracemere
Lot 9 and 10 RP611674, Gracemere Queensland

CLIENT

Gracemere Centre Pty Ltd

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/131-2021
Dated: 22 December 2021

DOCUMENT CONTROL

Rev.	Description	Signature	RPEQ No.	Date
A	Issued for Approval		15243	27.09.2021

Contents

1. INTRODUCTION AND APPROACH

1.1. PROJECT OVERVIEW

McMurtrie Consulting Engineers (MCE) have been commissioned by Gracemere Centre Pty Ltd to undertake a site-based Stormwater Management Plan (SMP) for a proposed service station which is to be located on Lot 9 & 10 on RP611674. The aim of this SMP is to demonstrate that the proposed development will comply with Capricorn Municipal Development Guidelines (CMDG), Queensland Urban Drainage Manual (QUDM 2016), Australian Rainfall and Runoff 2016 (ARR'16) and State Planning Policy (SPP 2017).

1.2. METHODOLOGY

The assessment methodology adopted for this SMP is summarised below.

- Broadly identify the contributing catchments to the project.
- Identify Lawful Point of Discharge (LPOD) for the site stormwater runoff
- Identify the critical storm events and duration for this project
- Estimate peak discharge runoff for pre-development and post-development scenarios.
- Identify potential mitigation and management strategies to ensure no worsening to downstream catchments and infrastructure.
- Assess the stormwater quality treatment requirements for the project.

1.3. DATA SOURCES

The background data used to undertake this assessment were collected from the following sources:

- ARR'16 data hub
  - Rainfall data
  - Design storm ensemble temporal patterns
- Rockhampton Regional Council GIS data
- Survey and preliminary site layout from Rockhampton Regional Council
- Pluviograph rainfall data for the 'Rockhampton Aero' station.

2. SITE CHARACTERISTICS

2.1. SITE LOCATION

The proposed site is located on Lot 9 & 10 on RP611674. Site details have been summarised within Table 1 and a QLD Globe extract is presented as Figure 1.

Developer	**Property and Location**	
	Lot and Property Description	**Address**
Gracemere Centre Pty Ltd	Lot 9 & 10 RP611674	16 & 18 Lawrie Street, Gracemere, 4702

Table 1: Site Description

Figure 1: Site Location

The proposed site abuts Lawrie Street on the Southwestern side and shares a common boundary with the adjacent lots on all other sides.

2.2. TOPOGRAPHY

The existing site consists of 2 residential structures, slight impervious area, and grassed lawns. The existing site levels

range from approximately 30.1m AHD in the Northern corner to 27.9m ADH in the Southern corner.

3. HYDROLOGY ASSESSMENT

3.1. LAWFUL POINT OF DISCHARGE

The existing site surface grades the southwestern boundary, The Lawrie Street Road reserve. The existing drainage pit in Lawrie street is the Lawful Point of Discharge (LPOD) for the site.

Post development discharge will be assessed to ensure that there will be no adverse impacts on downstream properties and infrastructure.

3.2. HYDROLOGIC MODELLING

Hydrologic calculations have been undertaken using XPSTORM 2020.1 for pre and post development scenarios. The modelling within XPSTROM environment has been undertaken to estimate the peak discharge for storms up to 1% AEP. Hydrologic modelling has been undertaken using the Laurenson Runoff Routing Method. Laurenson's Method is an industry leading hydrologic routing method that can be used for catchments ranging between 10m^2 up to 20,000km^2. The information required to apply Laurenson's Method include:

- Rainfall Intensity Data (obtained from the Bureau of Meteorology 2016 IFD utility)
- Rainfall Temporal Patterns (obtained from the ARR'16 Data Hub)
- Catchment Area (ha)
- Catchment Slope
- Initial and Continuing Infiltration Data
- Catchment Roughness (Manning's 'n')

Given the relatively limited scope of this hydraulic impact assessment a lumped catchment approach, as defined by ARR'16 and shown in Figure 2 below, was applied to the hydrologic review of the site. The lumped approach is suitable for this site given the relative consistency in land use and the ultimate purpose of the model.

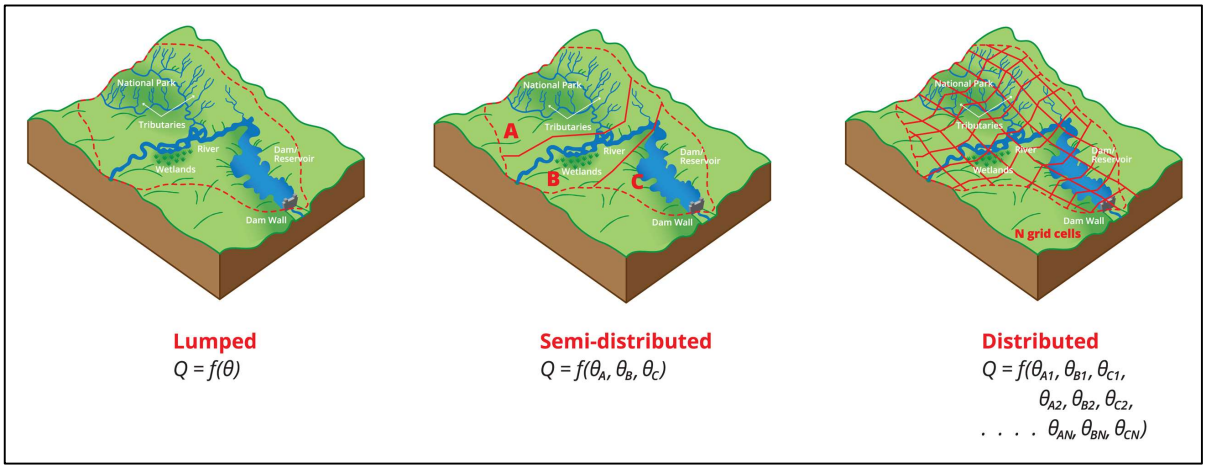


Figure 2: Catchment Analysis Options

Refer Appendix A for Site Layout.

3.2.1 CATCHMENT HYDOLOGY PARAMETERS

Table 2 and 3 summarise the input data for the development site in pre-development and post-development conditions. Table 4 summarises the input data for the external catchment.

Parameter		Existing Site		
		Grass	Impervious pavement	Roof
Area (ha)		0.198	0.018	0.035
Impervious (%)		0.0	100	100
Slope (%)		4	4	27
Laurenson 'n' (storage non-linearity exponent)		-0.285	-0.285	-0.285
Infiltration	Initial Loss (mm/hr)	0.0	0.0	0.0
	Continuing Loss (mm/hr)	2.5	0.0	0
Manning's Roughness (n)		0.025	0.016	0.022

Table 2: Pre-Development Model Parameters (XP Storm)

Parameter		Post-Development		
		Grass	Impervious pavement	Roof
Area (ha)		0.023	0.169	0.059
Impervious (%)		0.0	100	100
Slope (%)		4	4	27
Laurenson 'n' (storage non-linearity exponent)		-0.285	-0.285	-0.285
Infiltration	Initial Loss (mm/hr)	0.0	0.0	0.0
	Continuing Loss (mm/hr)	2.5	0.0	0.0
Manning's Roughness (n)		0.025	0.016	0.022

Table 3: Post-Development Model Parameters – Conveyed by Swale (XP Storm)

Applying no initial losses within the model is consistent with the requirements of both ARR'87 and ARR'16. ARR'16 states that there is no evidence that infiltration losses change with respect to the recurrence interval being modelled and that continuing losses can be applied equally to frequent and rare events.

3.2.2 HYDOLOGY RESULTS

Applying the ARR'16 ensemble temporal patterns to the catchments allowed the identification of the critical duration for the mean minor (0.5EY) and major storm (1% AEP) events. The below figures are screen shots of Box and Whisker plot taken from XPSTORM software. These plots show the comparison of storm ensembles for different durations for minor and major storm events.

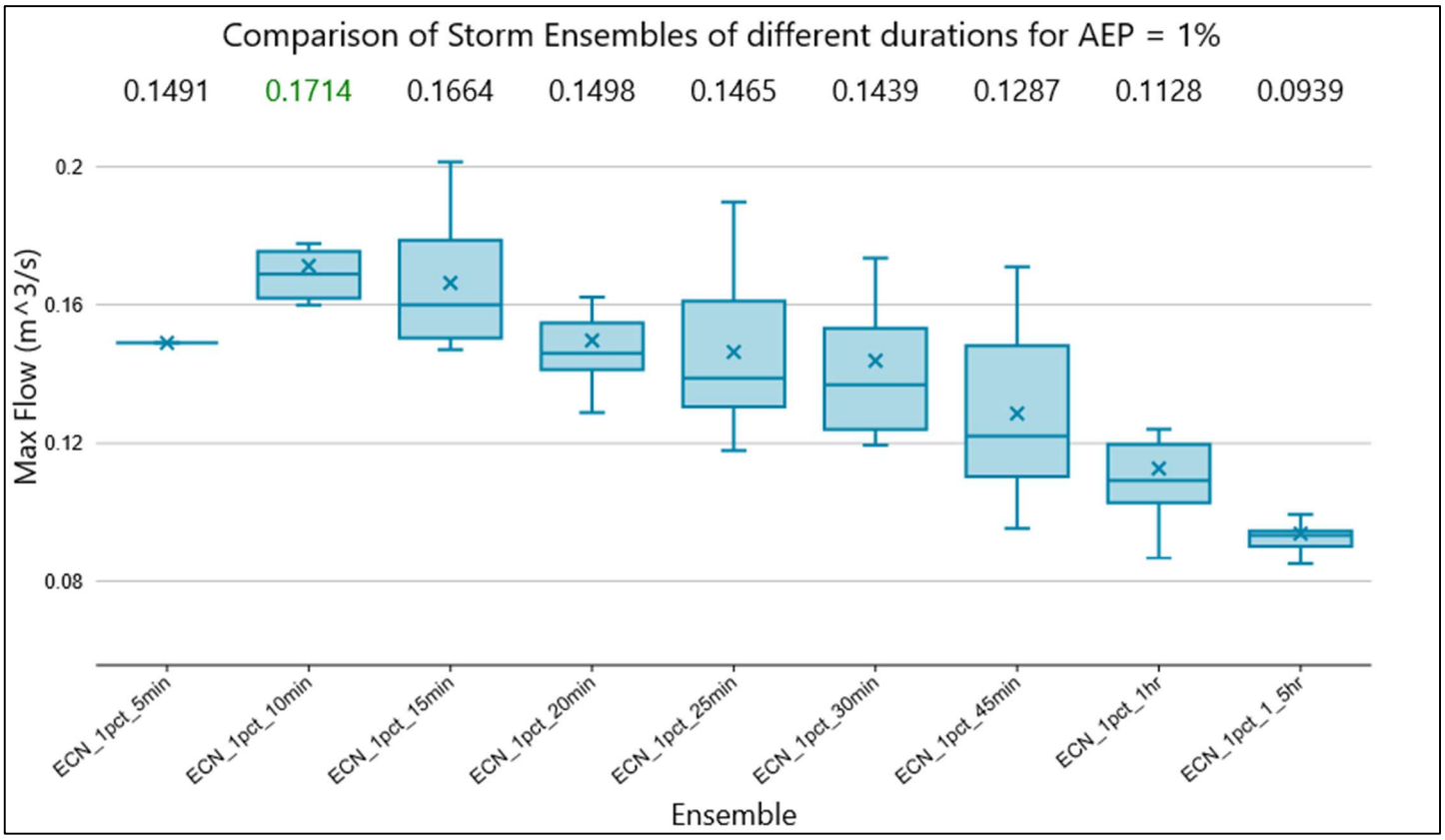


Figure 3: Comparison of Storm Ensembles of different durations for pre-development 1% AEP (XPSTROM Model)

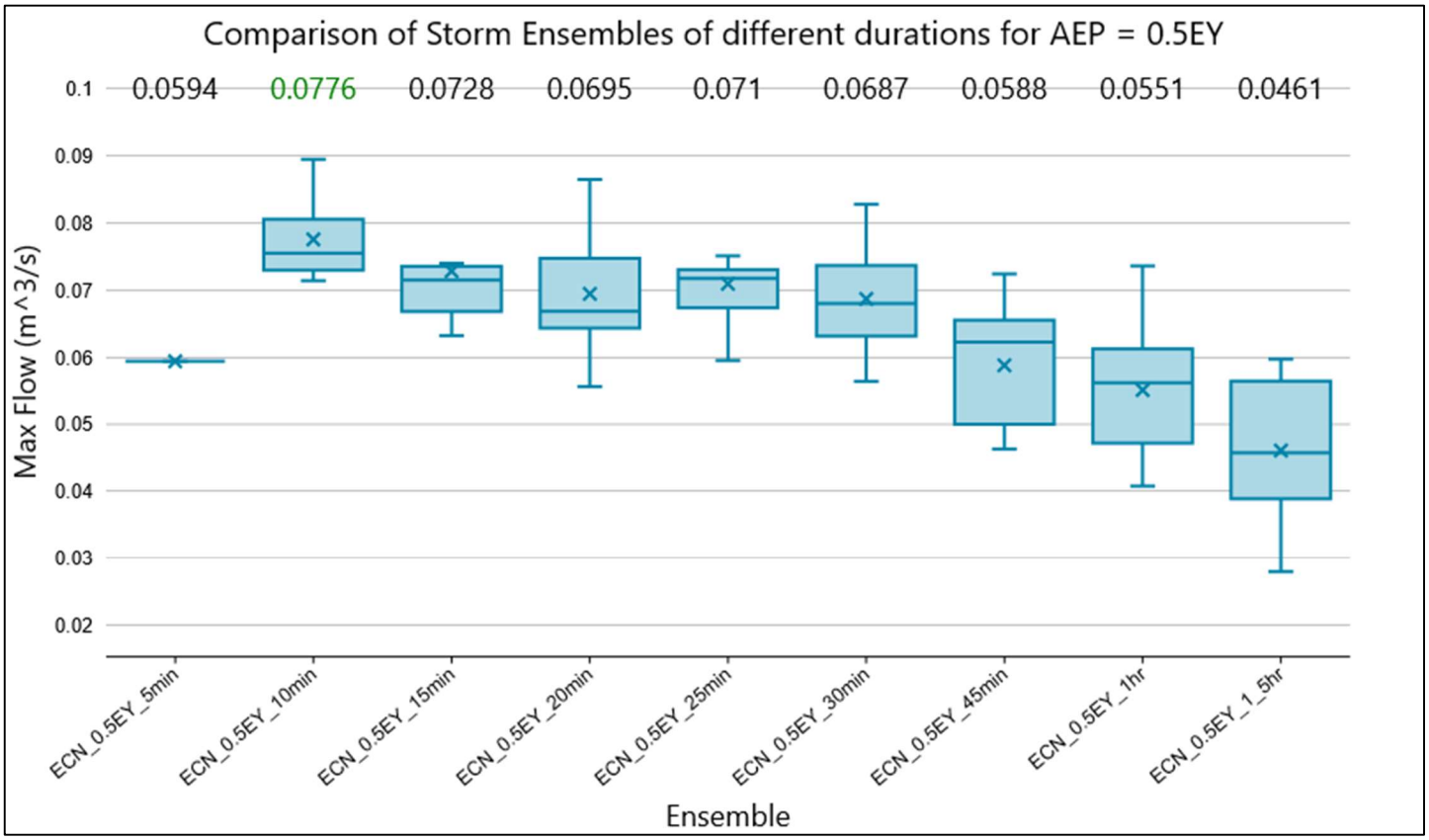


Figure 4: Comparison of Storm Ensembles of different durations for pre-development 0.5EY (XPSTORM Model)

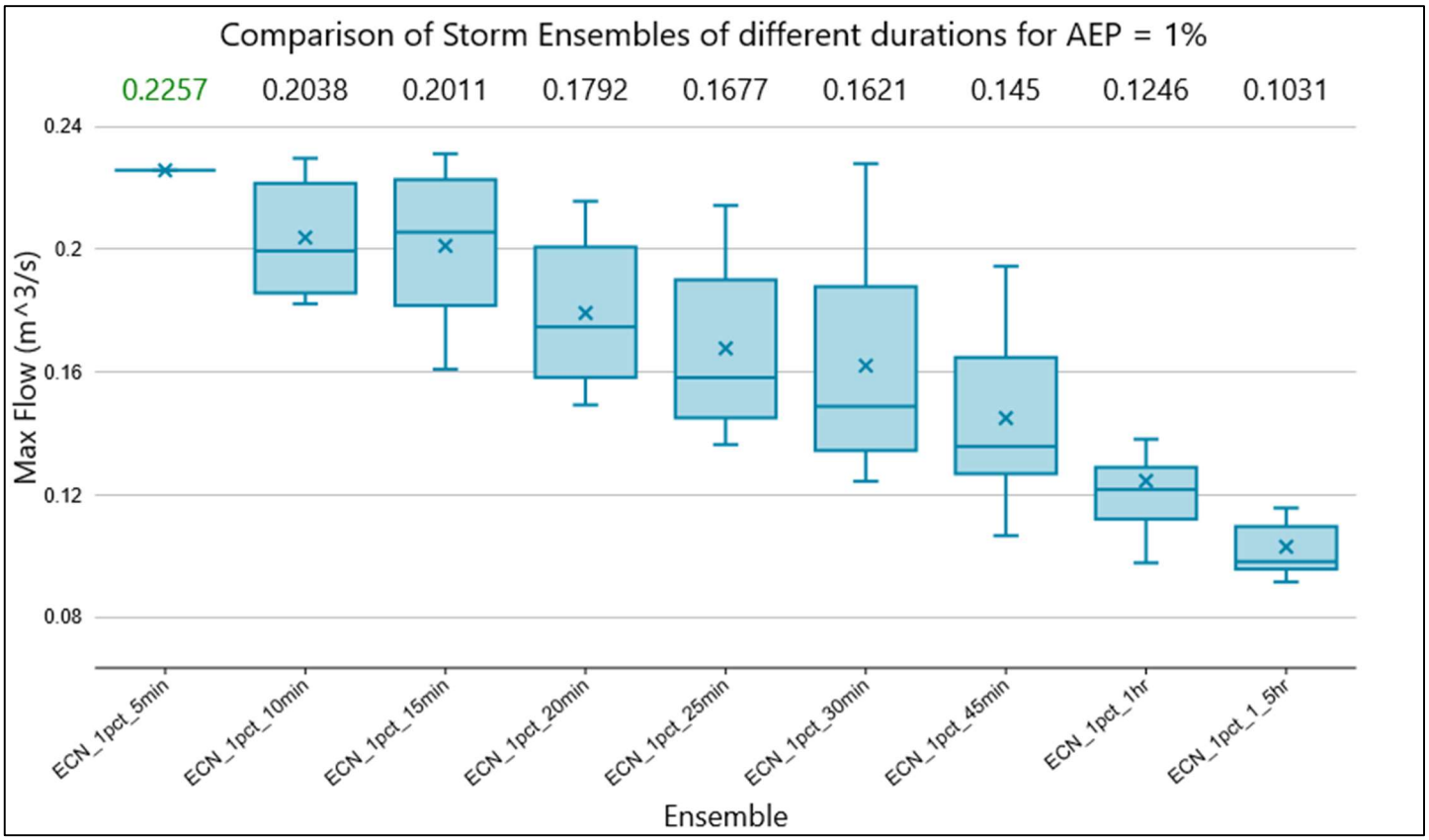


Figure 5: Comparison of Storm Ensembles of different durations for post-development 1% AEP (XPSTORM Model)

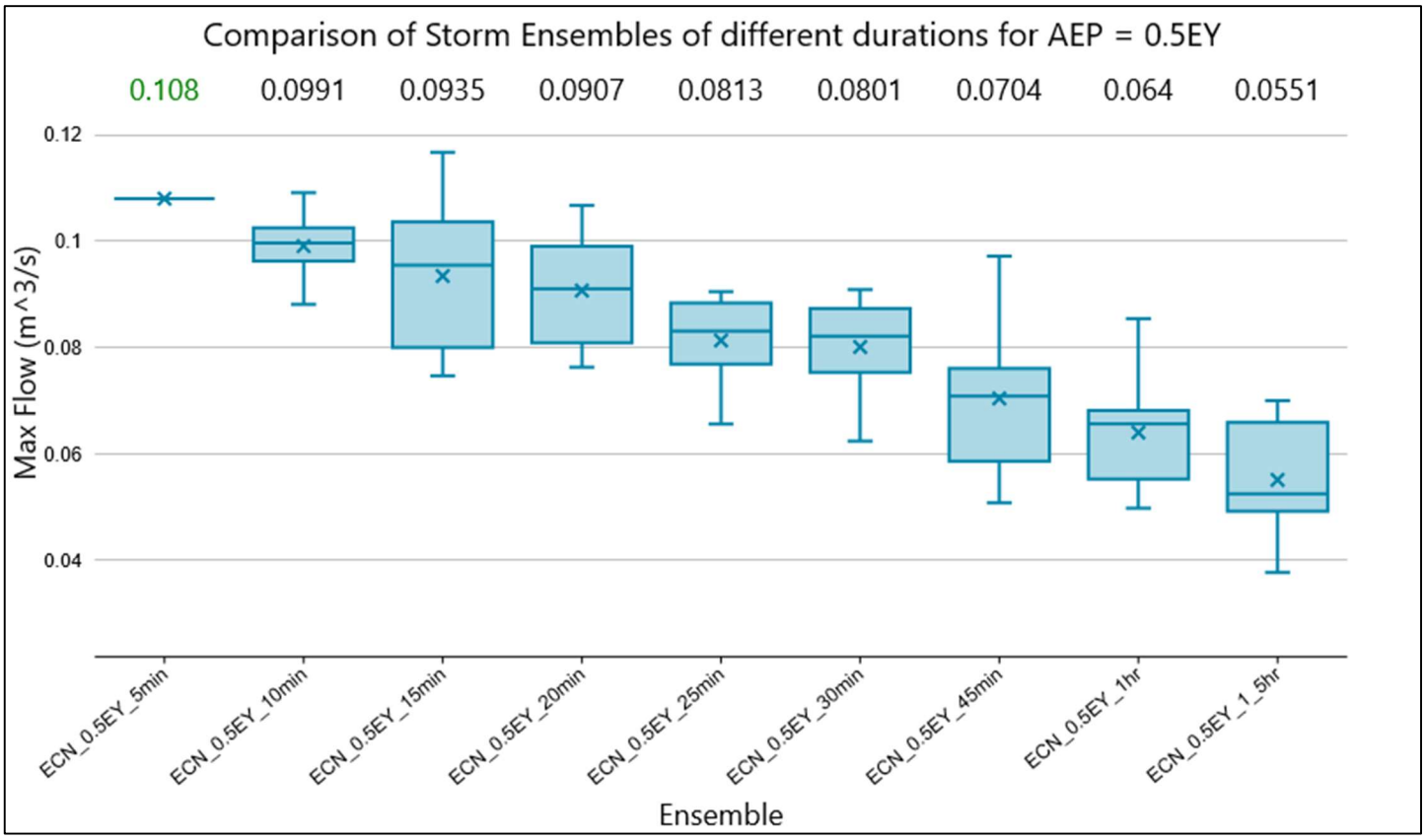


Figure 6: Comparison of Storm Ensembles of different durations for post-development 0.5EY (XPSTORM Model)

The results of each of the ensembles are summarised in Table 4. The same storm events are applied to the hydraulic analysis. There are multiple 'potential' critical post development storms presented, this is because all of these storms have a higher peak discharge than that of the predevelopment case and as such need to be addressed by the proposed the mitigation strategy.

Recurrence interval	Critical Predevelopment storm	Potential critical post development storms
1% AEP (major storm)	1pct_10min_5	1pct_5min_1
		1pct_10min_8
		1pct_15min_2
		1pct_20min_4
0.5EY (minor storm)	0.5EY_10min_5	0.5EY_5min_1
		0.5EY_10min_7
		0.5EY_15min_9
		0.5EY_20min_6
		0.5EY_25min_4
		0.5EY_30min_3

Table 4: Critical Storm Events

4. HYDRAULIC ASSESSMENT

4.1. BACKGROUND

The hydraulic assessment for the site has been carried out using XPSTORM 2020.1. The aim of the hydraulic modelling is to demonstrate that the post-development minor and major storm peak discharge at the LPOD is equal or less than the peak pre-development discharge. This will be achieved by utilizing sag pits to store water within the lot, driveways will act as a weir outlet when water has ponded to a depth of 125mm.

4.2. INTERNAL STORMWATER CONVEYANCE

The site stormwater network consists of one continuous stormwater link, 3 internal stormwater pits to convey site stormwater to the legal point of discharge. The site peak discharge for each site condition is presented below, with critical cases highlighted in yellow. Table 5 demonstrates that the peak discharge for the major and minor events will be lesser in the post development mitigated case than the existing site predevelopment condition.

Storm Event (AEP % and duration)	Pre-Development Peak Flow (m^3/s)	Post-Development Unmitigated Peak Flow (m^3/s)	Post-Development Mitigated Peak Flow(m^3/s)		
			Pipe outlet (200 dia Upvc)	Weir outlet	Total
1pct_5min	0.149	0.226	0.071	0.030	0.101
1pct_10min	0.171	0.204	0.071	0.068	0.139
1pct_15min	0.1664	0.201	0.071	0.064	0.135
1pct_20min	0.1498	0.179	0.071	0.044	0.115
0.5EY_5min	0.0594	0.108	0.069	0.000	0.069
0.5EY_10min	0.0776	0.099	0.069	0.000	0.069
0.5EY_15min	0.0728	0.094	0.069	0.000	0.069
0.5EY_20min	0.0695	0.091	0.068	0.000	0.068
0.5EY_25min	0.071	0.081	0.068	0.000	0.068
0.5EY_30min	0.0687	0.080	0.068	0.000	0.068

Table 5: Peak Discharge Rate at LPOD

The first 2 flow columns presented in data presented in table 5 (Pre-development Peak flow and Post-Development Unmitigated Peak flow) summarise the hydrology data for the earlier presented Box and Whisker charts, The Post-Development Mitigated Peak flow data is derived from the following hydraulic model outputs:

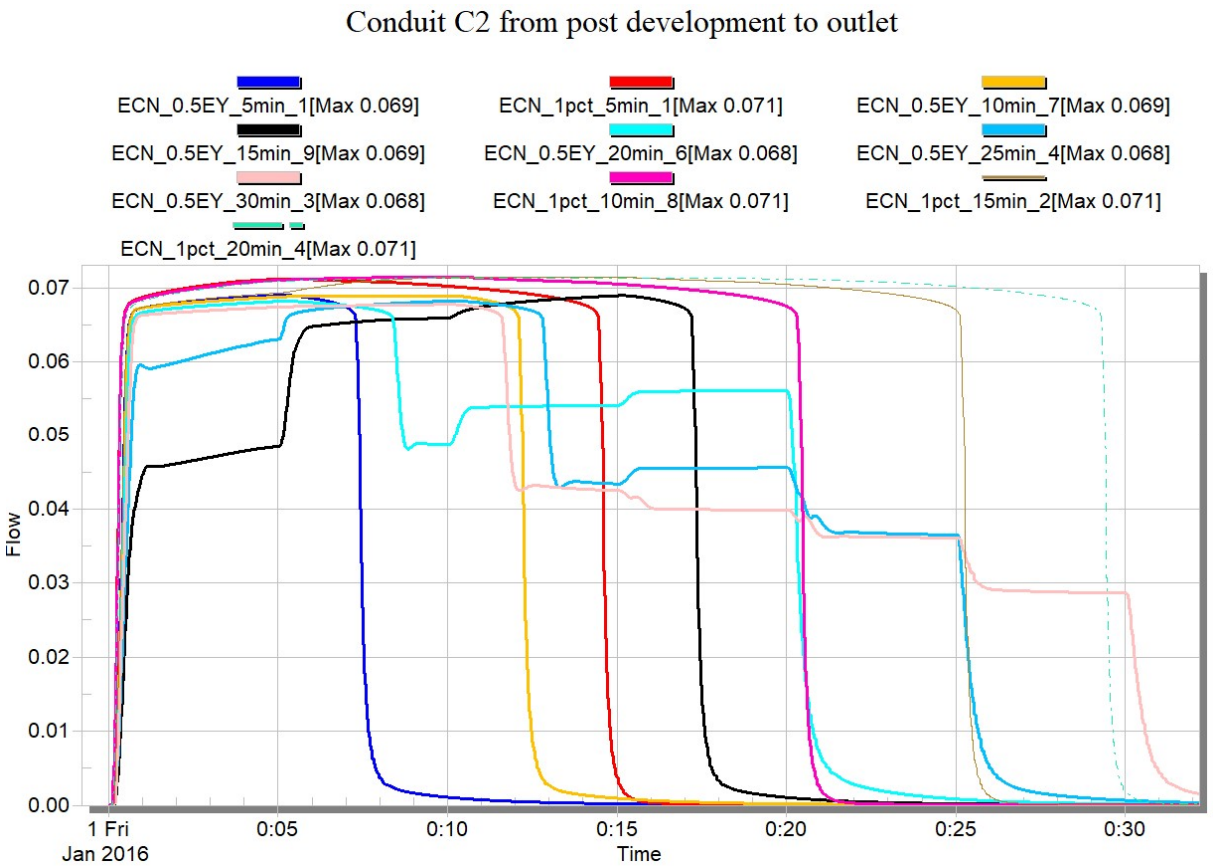


Figure 7: Flow graph of all Potential Critical Post-Development Storms – Outlet through 200 dia Upvc pipe (XPSTORM Model)

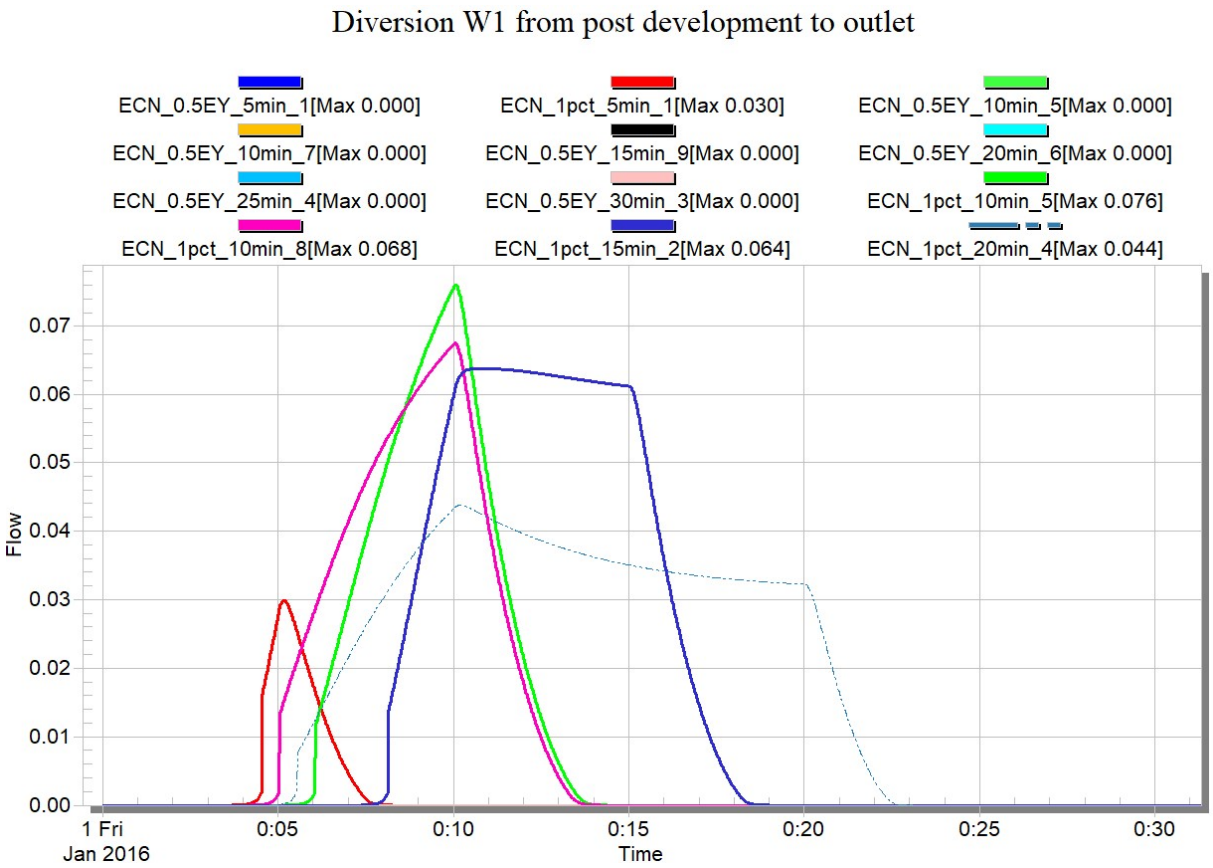


Figure 8: Flow graph of all Potential Critical Post-Development Storms – Outlet over Driveway Weir (XPSTORM Model)

These outcomes have been achieved by modelling the mitigation strategy as a simplified storage area varying linearly from 0.36m^2 (for a 600x600 pit) to 613m2 (the combined storage area of the 2 stormwater pit catchments before overtopping the driveway). The Additional details have been presented below in table 6:

Pit invert level (RL)	**27.24m**
Pit Surface level (RL)	**28.000m**
Weir height (driveways)	**28.125m**
Detention Volume	**38.6m^3**
Outlet Structure	**Low flow pipe 200 dia UPVC @ RL 27.24** **18m Wide weir @ RL 28.125**

Table 6: Storage area model parameters

The heights summarised in table 6 give context to the stage graph for the water levels in the detention model below:

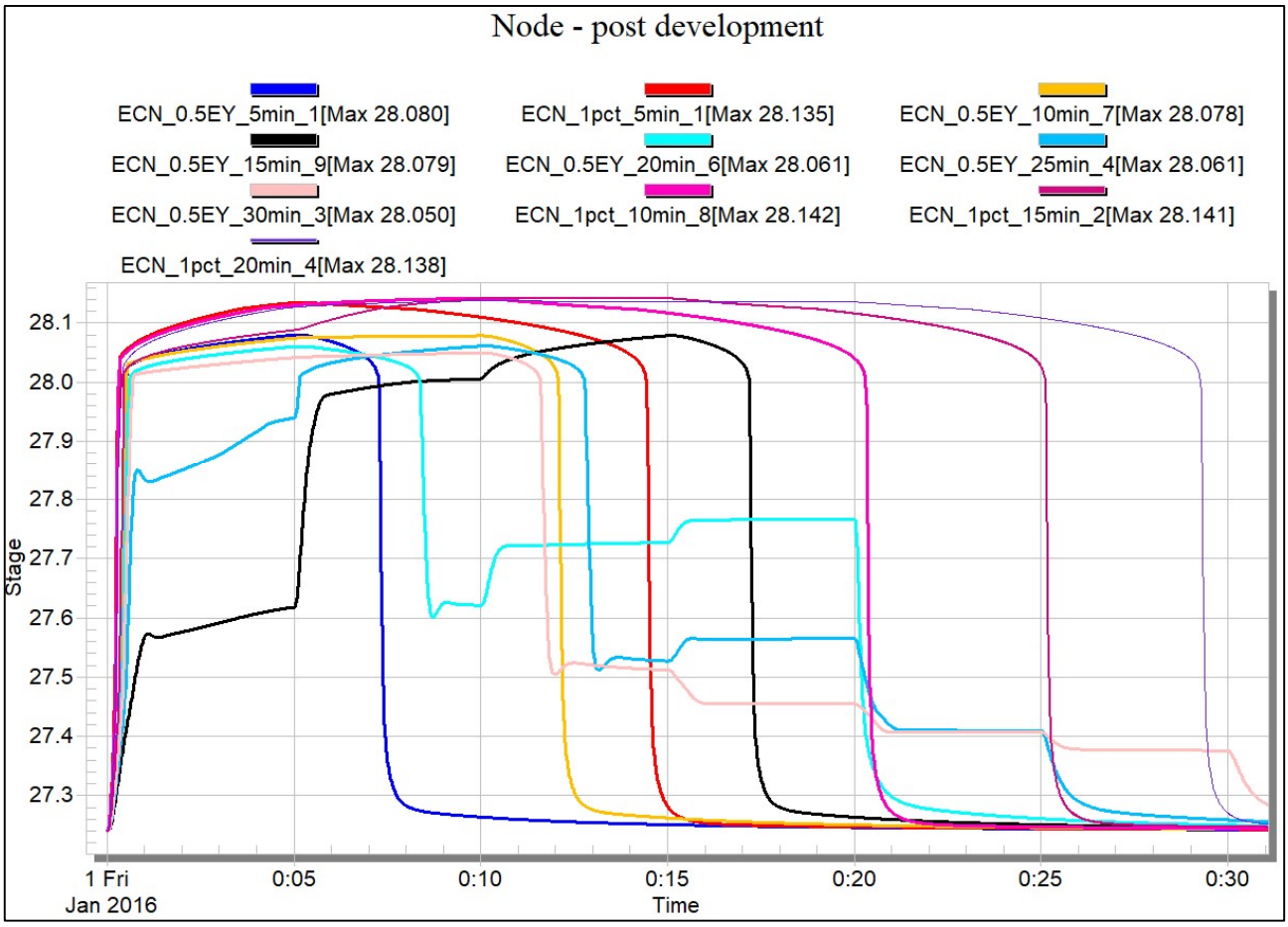


Figure 9: Stage graph for mitigated detention system (XPSTORM Model)

5. QUALITY ASSESSMENT

5.1. BACKGROUND

The development of the land has the potential to increase the pollutant loads within stormwater runoff and downstream watercourses. During construction phase of the development, disturbances to the existing ground have the potential to significantly increase sediment loads entering downstream drainage systems and watercourses. The operational phase of the development will potentially increase the amount of sedimentation and nutrients washing from the site (refer section 5.2 for demonstration of compliance).

The proposed development is the construction of a service station, the premises net size is 2,513m^2 resulting in an impervious area of approximately 90% of the net developable area. The State Planning Policy (July 2017) states that a premises greater than 2500m2 resulting in an area greater than 25% of the net developable area requires assessment against water quality benchmarks, therefore the development must address water quality benchmarks (refer section 5.3 for demonstration of compliance)

The following sections describe construction and operational phase controls and water quality modelling of the proposed treatment train in compliance with Council guidelines.

5.2. CONSTRUCTION PHASE

5.2.1 KEY POLLUTANTS

During the construction phase a number of key pollutants have been identified for this development. Table 5 illustrates the key pollutants that have been identified.

Pollutant	Sources
Litter	Paper, construction packaging, food packaging, cement bags, material off cuts.
Sediment	Exposed soils and stockpiles during earthworks and building works.
Hydrocarbons	Fuel and oil spills, leaks from construction equipment and temporary car park areas.

Table 7: Key Pollutants – Construction Phase

5.2.2 EROSION AND SEDIMENT CONTROLS

Erosion and Sediment Control (ESC) devices employed on the site shall be designed and constructed in accordance with CMDG.
Details of the proposed controls are shown on McMurtrie Consulting Engineers, Sediment and Erosion Control Device Details included as Appendix A.

PRE-CONSTRUCTION

- Stabilised site access/exit on Lawrie Street.
- Sediment fences to be located along the contour lines downstream of disturbed areas.
- Diversion drains to divert clean runoff around the construction site.
- Educate site personnel to the requirements of the Sediment and Erosion Control Plan.

CONSTRUCTION

- Maintain construction access/exit, sediment fencing, catch drains and all other existing controls as required.
- Progressively surface and revegetate finished areas as appropriate.

During construction, all areas of exposed soils allowing dust generation are to be suitably treated. Treatments will include mulching the soil and watering. Road access is to be regularly cleaned to prevent the transmission of soil on vehicle wheels and eliminate any build-up of typical road dirt and tyre dusts from delivery vehicles.
Adequate waste disposal facilities are to be provided and maintained on the site to cater for all waste materials such as litter hydrocarbons, toxic materials, acids or alkaline substances.

5.3. OPERATIONAL PHASE

Refer Appendix B for SMP for Operational phase water quality objectives for performance of proprietary EO45 for subject site.

6. CONCLUSION

The following conclusions are drawn based on the above study of the site;

- Post-development runoff flow will be restricted by a 200 dia outlet to cause ponding up to 125mm above 2 proposed pits before discharging over the driveway accesses.
- Outflow from the site will be discharged into an existing stormwater pit in Lawrie Street, the legal point of discharge.
- A stormwater treatment train has been specified to address the State Planning Policy 2016 water quality objectives by utilising an Enviro OE45.

7. APPENDIX

- Appendix A – Stormwater Management Plan.
- Appendix B – Enviro Australia SMP for operational phase water quality
- Appendix C – Enviro Australia OE45 standard drawings.

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Values

McMurtrie Consulting Engineers *is built on traditional values.*
While we are the largest independent engineering consultancy locally, our ultimate mission is to satisfy our clients' expectations through professional accountability and a job well done.

APPENDIX A

Stormwater Management Plan

LEGEND

- GRASSED AREA
- IMPERVIOUS PAVEMENT AREA
- ROOF AREA

CATCHMENT PROPERTIES				
CATCHMENT	SLOPE (m/m)	MANNINGS ROUGHNESS	PERCENT IMPERVIOUS	AREA (ha)
GRASS	0.04	0.025	0	0.198
IMPERVIOUS PAVEMENT	0.04	0.016	100	0.018
ROOF	0.27	0.022	100	0.035

2.5 0 2.5 5 7.5 10 12.5m

SCALE 1:125 @ A1 SCALE 1:250 @ A3

EXISTING SITE LAYOUT PLAN

SCALE: 1:125(A1) 1:250(A3)

SURVEYOR

ADDRESS:

CO-ORDINATE DATUM

HEIGHT DATUM

DRAWING No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	DFT	DFT CHK	DES	DES CHK
		A	27.09.21	ISSUED FOR APPROVAL	IBB	LNM	IBB	LNM

	BY	DATE
REVIEWED		
RPEQ ENG		

RPEQ No:

CLIENT

SCALE: NTS

PREPARED BY

mcmurtrie CONSULTING ENGINEERS

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Fax: (07) 4921 1790

CLIENT GRACEMERE CENTRE PTY LTD

PROJECT SERVICE STATION, LAWRIE STREET, GRACEMERE

TITLE STORMWATER MANAGEMENT PLAN

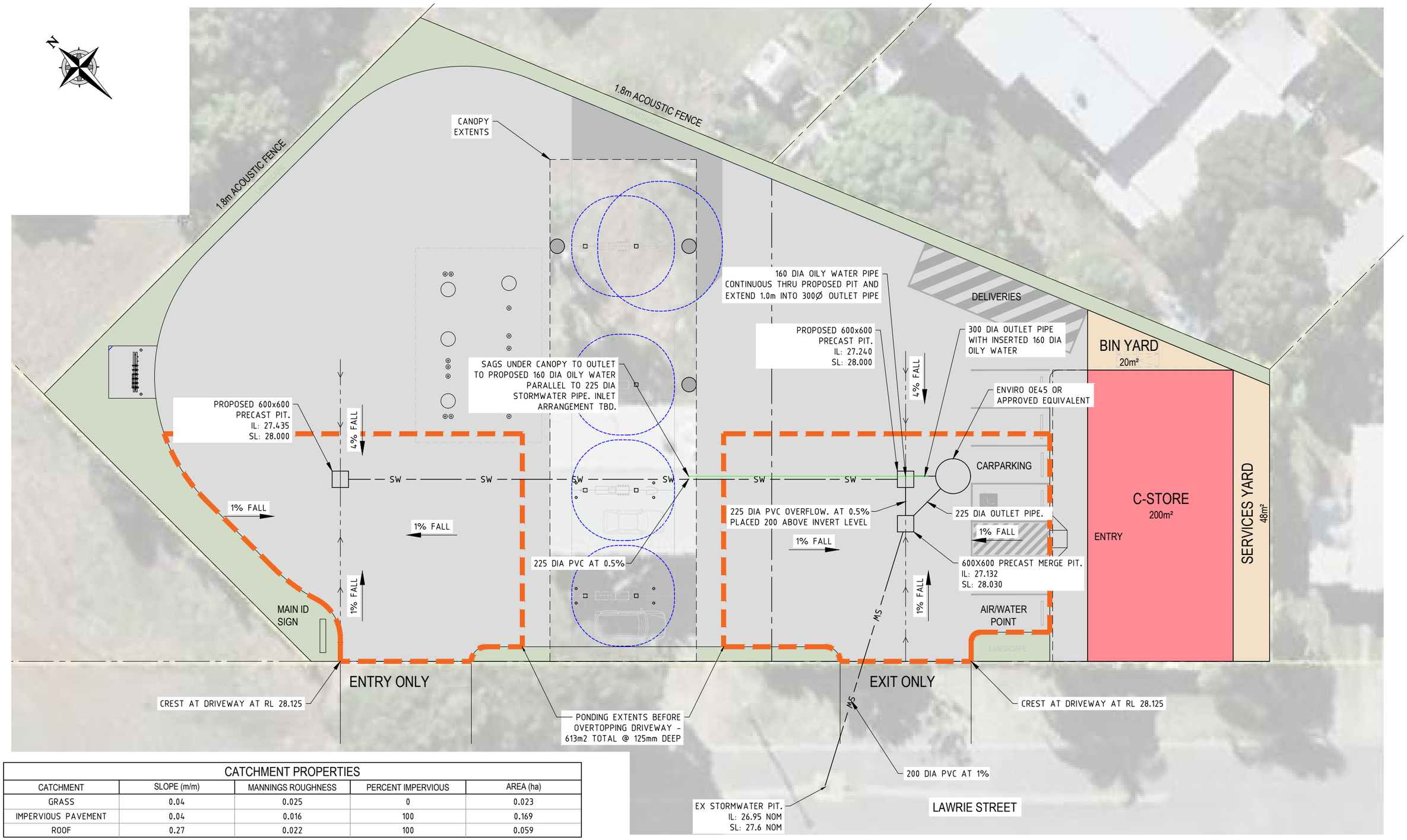
PRE DEVELOPMENT LAYOUT

A1

DRAWING NUMBER 027-21-21-SMP-01

REVISION A

PLOT DATE: 27/09/2021 4:17:33 PM DRAWING LOCATION: S:\PROJECT RECORDS\21-27\027-21-21 SERVICE STATION LAWRIE STREET\DES\DWG\SKETCH\SMP.DWG



CATCHMENT PROPERTIES

CATCHMENT	SLOPE (m/m)	MANNINGS ROUGHNESS	PERCENT IMPERVIOUS	AREA (ha)
GRASS	0.04	0.025	0	0.023
IMPERVIOUS PAVEMENT	0.04	0.016	100	0.169
ROOF	0.27	0.022	100	0.059

2.5 0 2.5 5 7.5 10 12.5m

SCALE 1:125 @ A1 SCALE 1:250 @ A3

PROPOSED SITE LAYOUT PLAN

SCALE: 1:125(A1) 1:250(A3)

REV	DATE	REVISION DESCRIPTION	IBB DFT	LNM DFT CHK	IBB DES	LNM DES CHK
A	27.09.21	ISSUED FOR APPROVAL				

DRAWING No. | REFERENCE DRAWING TITLE

SURVEYOR
ADDRESS:
CO-ORDINATE DATUM
HEIGHT DATUM

	BY	DATE
REVIEWED		
RPEQ ENG		

RPEQ No:

CLIENT

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SCALE: NTS

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CLIENT GRACEMERE CENTRE PTY LTD
PROJECT SERVICE STATION, LAWRIE STREET, GRACEMERE
TITLE STORMWATER MANAGEMENT PLAN
POST DEVELOPMENT LAYOUT

A1 | DRAWING NUMBER 027-21-21-SMP-02 | REVISION A

PLOT DATE: 27/09/2021 14:45:36 PM DRAWING LOCATION: S:\PROJECT RECORDS\21-22\027-21-22 SERVICE STATION LAWRIE STREET\DESIGN\DWG\SKETCH SMP.DWG

APPENDIX B

Enviro Australia SMP for operational phase water quality

Stormwater Quality

The stormwater quality assessment for the development has been based on the requirements listed in the state planning policy – July 2017 under the water quality section.

It is expected that the proposed development will increase the stormwater pollutants that are exported form the subject site. The Enviro OE45 has been proposed to intercept and capture pollutants associated with the proposed development so that potential impacts external to the subject site will be adequately mitigated to achieve the required Water Quality Objectives (WQO's)

The Enviro OE45 is an in-line multi chamber stormwater utility designed to remove the broad spectrum of pollutants transported by run-off water, separate oil from water and provide 10,000L of bulk oil spill containment. The system has been tested to comply with EN858-1 oil/water separation tests.

This section discusses:

- The Water Quality Objectives identified for the catchment.
- The proposed measures to mitigate the increase in pollutant export.
- Modelling of the proposed measures and comparison to the identified WQO's.

Water quality modelling was undertaken with the Model for Urban Stormwater Improvement Conceptualisation (MUSIC), generally in accordance with the Water by Design MUSIC Modelling Guidelines (2010)

Water Quality Objectives

The load reduction WQO's presented in the table below have been extracted from Table B of the Queensland State Planning Policy (SPP) (July 2017).

Pollutant	**Total Suspended Solids (kg/yr)**	**Total Phosphorus (kg/yr)**	**Total Nitrogen (kg/yr)**	**Gross Pollutants (kg/yr)**
Load Reduction Target	85%	60%	45%	90%

MUSIC Modelling Methodology

Water Quality modelling of the proposed development has been undertaken using MUSIC Version 6, developed by eWater CRC. MUSIC enables the user to conceptualise the transfer of pollutants through a stormwater drainage system and it provides an aid in quantifying the effectiveness of the proposed stormwater quality treatment system.

Meteorological data

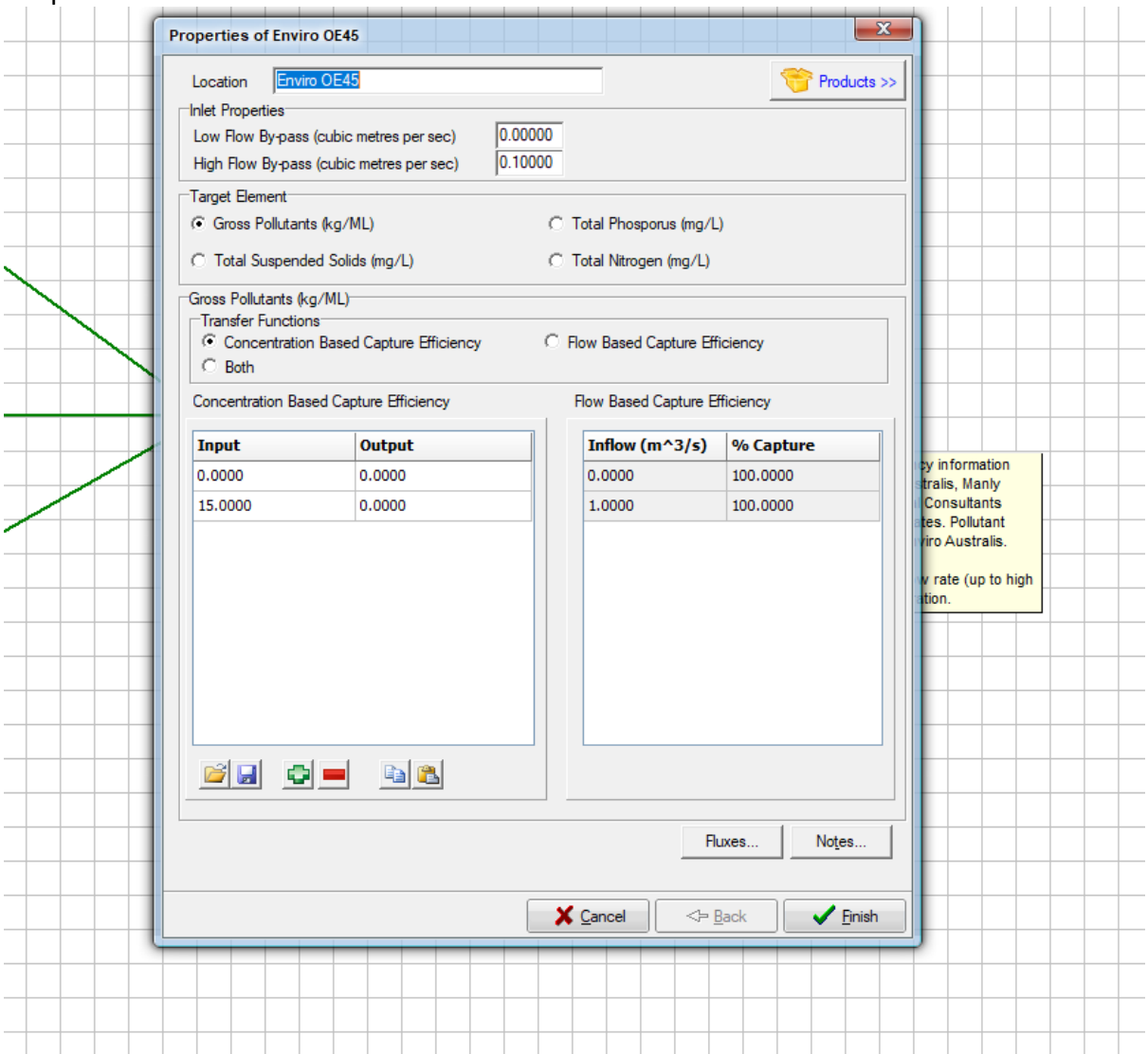
Six-minute pluviographic data was sourced from the Bureau of Meteorology (BOM) for Rockhampton Aero (Station No. 039083).

Source Nodes

Source Node	Area (ha)	Fraction Impervious	Land Use
Grass/Garden	0.023	20	Commercial
Road	0.169	100	Commercial
Roof	0.059	100	Commercial

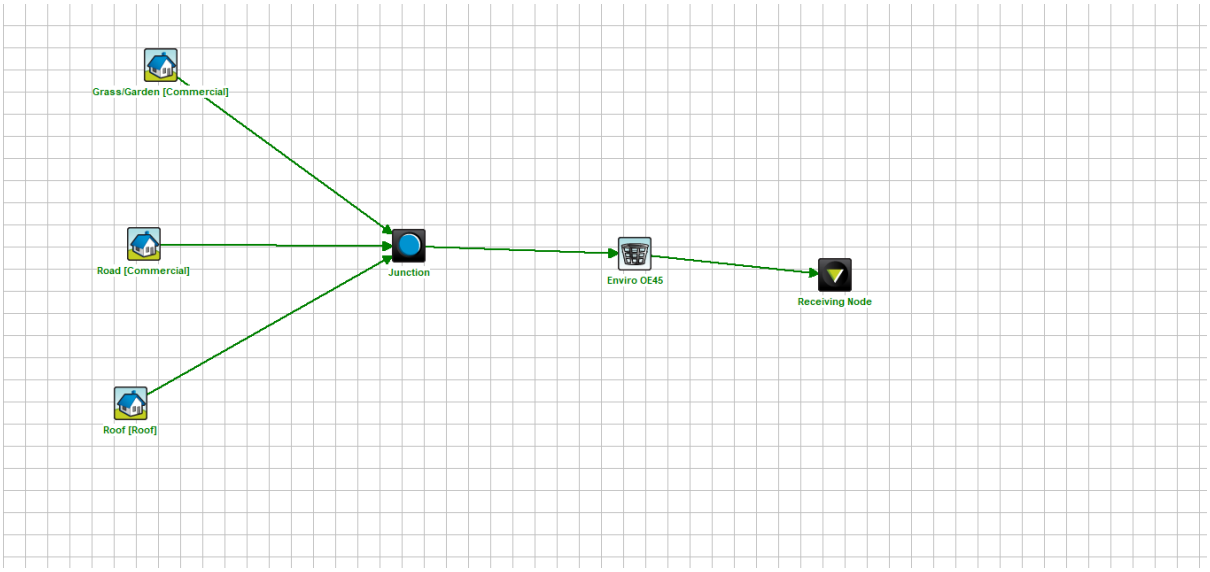
Treatment Nodes

To represent the treatment measures proposed, the Enviro OE45 treatment node was adopted within the MUSIC model.



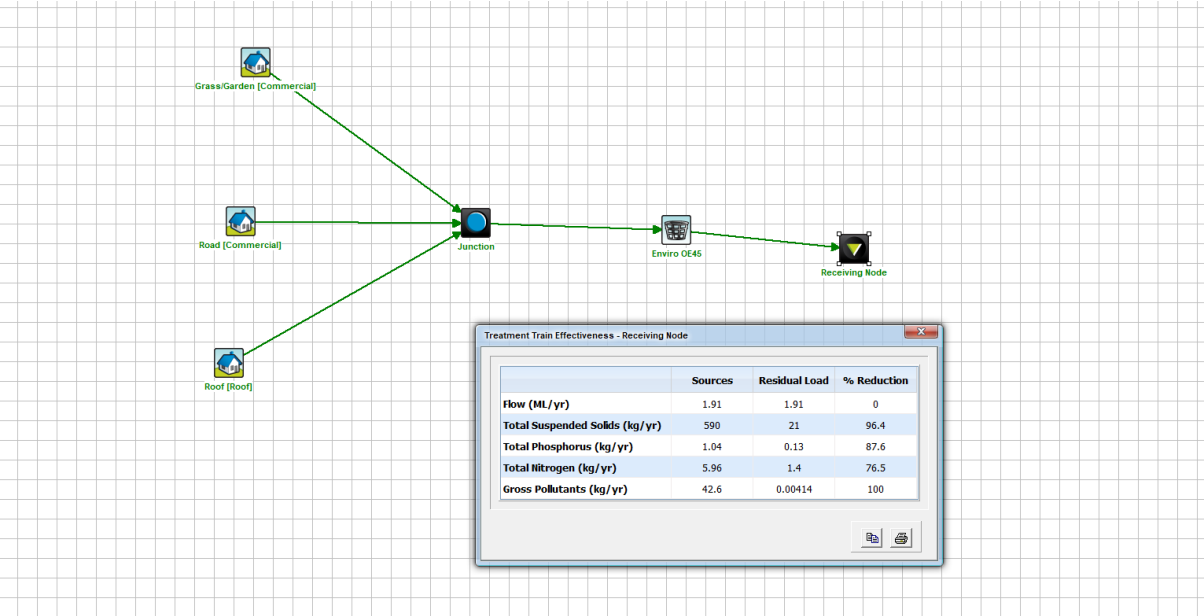
MUSIC Model

The site has been modelled as a commercial use, and the following schematic shows the treatment solution adopted for the site.



MUSIC Model Results

The development has been considered holistically for water quality analysis to ensure the development meets the required water quality objectives. The results from the MUSIC model at the receiving node, including the proposed Enviro OE45, are shown below.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	1.91	1.91	0
Total Suspended Solids (kg/yr)	590	21	96.4
Total Phosphorus (kg/yr)	1.04	0.13	87.6
Total Nitrogen (kg/yr)	5.96	1.4	76.5
Gross Pollutants (kg/yr)	42.6	0.00414	100

The following table compares the MUSIC modelling analysis to the required load reduction targets.

	Totally suspended Solids	Total Phosphorus	Total Nitrogen	Gross Pollutants
Minimum Percentage Reductions (SPP)	85	60	45	90
Achieved Percentage Reductions	96.4	87.6	76.5	100
WQO's Achieved?	Yes	Yes	Yes	Yes

Conclusion

The proposed stormwater treatment model complies with Council's policy of promoting the management of stormwater to mitigate the impacts of urban developments. The WSUD measures and detention system as discussed in this report are to be incorporated in the stormwater design of this development to ensure the council's set objectives are achieved.

APPENDIX C

Enviro Australia OE45 standard drawings

Enviro 'OE45' is a full retention oily water separator compliant with EN 858-1 and includes emergency spill protection to 10,000 litres

Flow rates based at 1% pipe gradient:-
Treated Flow.....66 L/sec

MASS:
(Based on "D" Class Covers)

Total mass for delivery based on minimum invert is 10 **tonnes**

Enviro OE45

General Notes

The Enviro 'OE45' is an Australia Designed and Manufactured Device for the removal of pollutants including oils from run-off water. The Enviro 'OE45' is normally installed in-line within new or existing drainage pipes and can be adapted to be installed in an open channel if required. The device does not require any power, utilising the energy in the water flow to separate and contain pollutants for periodical removal by evacuation equipment. Internal surface can be inspected and washed as required, whilst screens can be removed and also cleaned if and as required.

The Enviro 'OE45' are a unique oil/water Separator as well as a Stormwater Quality Improvement Devices (SQID's) which has undergone extensive performance stress testing by independent authorities. These tests indicate compliance with Environmental Protection Authority (EPA) Legislation and Guidelines which prohibit the discharge of pollutants into stormwater. The aim of the Enviro 'OE45' is to restore water quality to a safe and environmentally sustainable state, which pre-existed urbanisation. The application is aimed at any catchment, where an oil spill risk may exist.

Recommendations made in the Australian Run-Off Quality Guideline 2007 (ARQ) are adhered to. The 'OE' models also comply with EN-858-1, Class 1 oil/water separators.

Specifications: -

1. Design service life 100 years for fixed parts and 25 years for replacement parts
2. Hydraulic Resistance k factor = 0.425
3. Inlet to outlet differential = 25mm
4. Concrete chamber, risers and cover slabs are designed and manufactured in accordance with AS3600-2009 and under Quality Assurance 9001.
5. Covers are designed and tested in accordance with AS3996 – 2006 Access Covers and Grates
6. Internal components are manufactured from high grade, stainless steel to comply with International Corrosion Standards. There is no welding used. This complies with advice from both the American and Australian Institute of Engineers warning that welded stainless steel exposed to bacterial charged water can result in early corrosion and failure
7. 'OE45' performance testing verifies the following pollutant removal rates. The testing was performed across a range of concentrations and flow rates which replicated various run-off water conditions and confirmed: -
   7.1. gross pollutants, reduction exceeds 95%
   7.2. suspended solids, reduction exceeds.....90%
   7.3. total phosphorous, (TP) retention 97%
   7.4. total nitrogen, (TN) retention.....85%
   7.5. total hydrocarbons.....99.95%
   7.6. Oil Containment.....10,000 litres
8. The lower storage chamber has the capacity to hold the annual load discharged from a catchment based on the ARQ Section 3.7 recommended allowance of 1m3/ha/ann.
9. An important feature of the Enviro 'OE45' is that all in flow is treated in accordance with EPA requirements that fuel-dispensing zones cannot discharge oil contaminants particularly as a result of emergency oil spills into environmental flows. Provision has been allowed for the installation of alarms and automatic evacuation systems.
10. Particle size capture is set to retain all particles greater than 500µ and to then retain a majority of particles to less than 100µ.
11. Hydrocarbon retention occurs in a separate chamber which operates as a best practice oil and grease arrestor
12. Re-suspension of hydrocarbons and all retained materials is prevented by including separate chambers for separation from flow and retention.

REV.	DESCRIPTION	DATE	APPROVED
0	Technical Specification Created	08-July-21	LC
REVISIONS			

For further assistance: -
Technical Support Ph: .....+61 8 8564 2347
Email: info@enviroaustralis.com.au

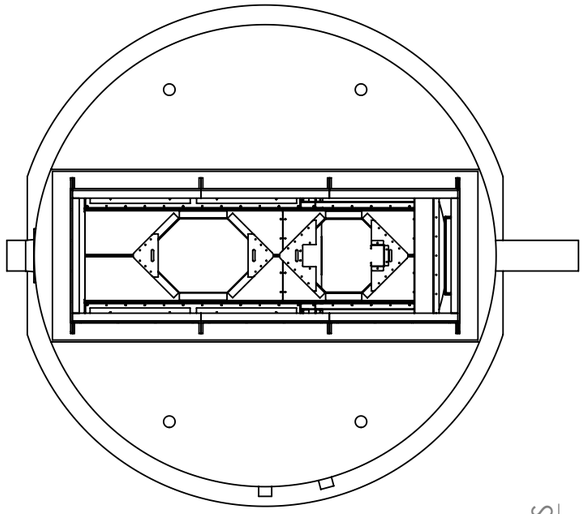
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS	
BENDING RADIUS	K - FACTOR
PREPARED BY	Logesh S
APPROVED BY	L Crasti
DATE	08-Jul-21

MATERIAL: CONCRETE & S/STEEL
WEIGHT:

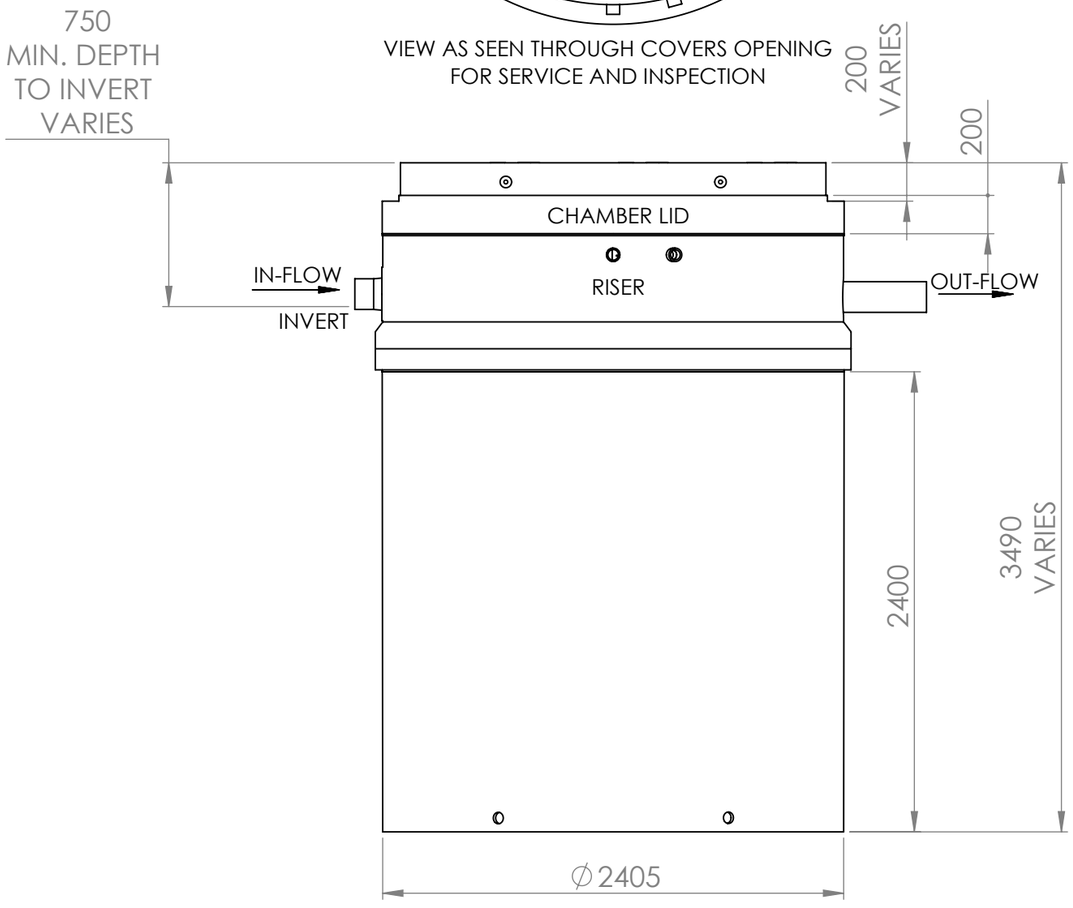
ENVIRO

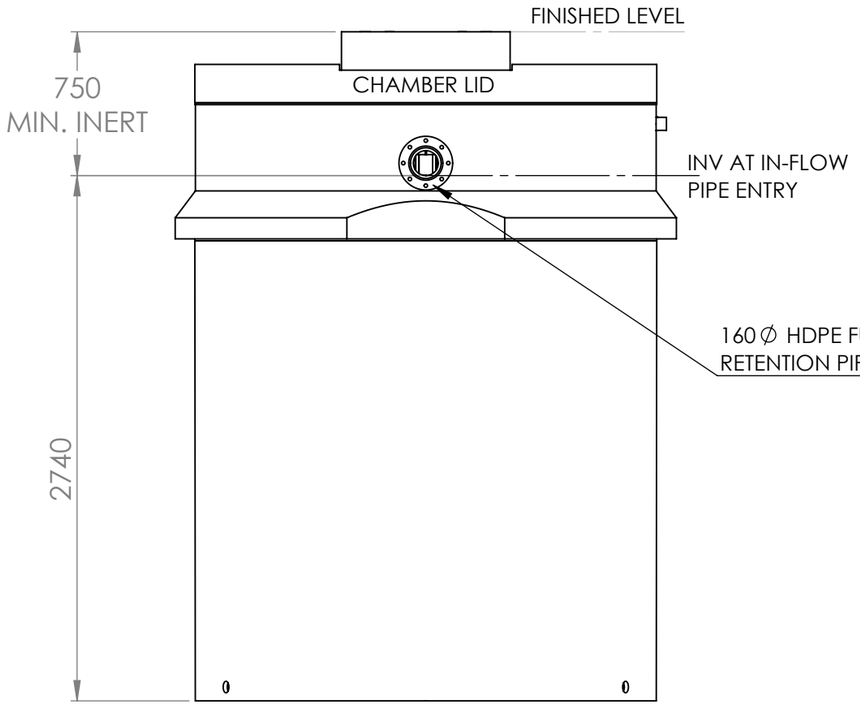
TITLE:
ENVIRO OE45
SPECIFICATIONS AND TECHNICAL DATA

ASSEMBLY: SPECIFICATIONS
A3
REV:
SCALE: NTS
SHEET 1 OF 5



VIEW AS SEEN THROUGH COVERS OPENING
FOR SERVICE AND INSPECTION





General Table		
CLASS	OVERALL HEIGHT	DEPTH TO INVERT
'D' CLASS	3490 mm	750 mm

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS	
BENDING RADIUS	K - FACTOR
PREPARED BY	Logesh S
APPROVED BY	L Crasti
DATE	08-Jul-21

ENVIRO

TITLE:

ENVIRO OE45
GENERAL ARRANGEMENT

MATERIAL: CONCRETE & STEEL

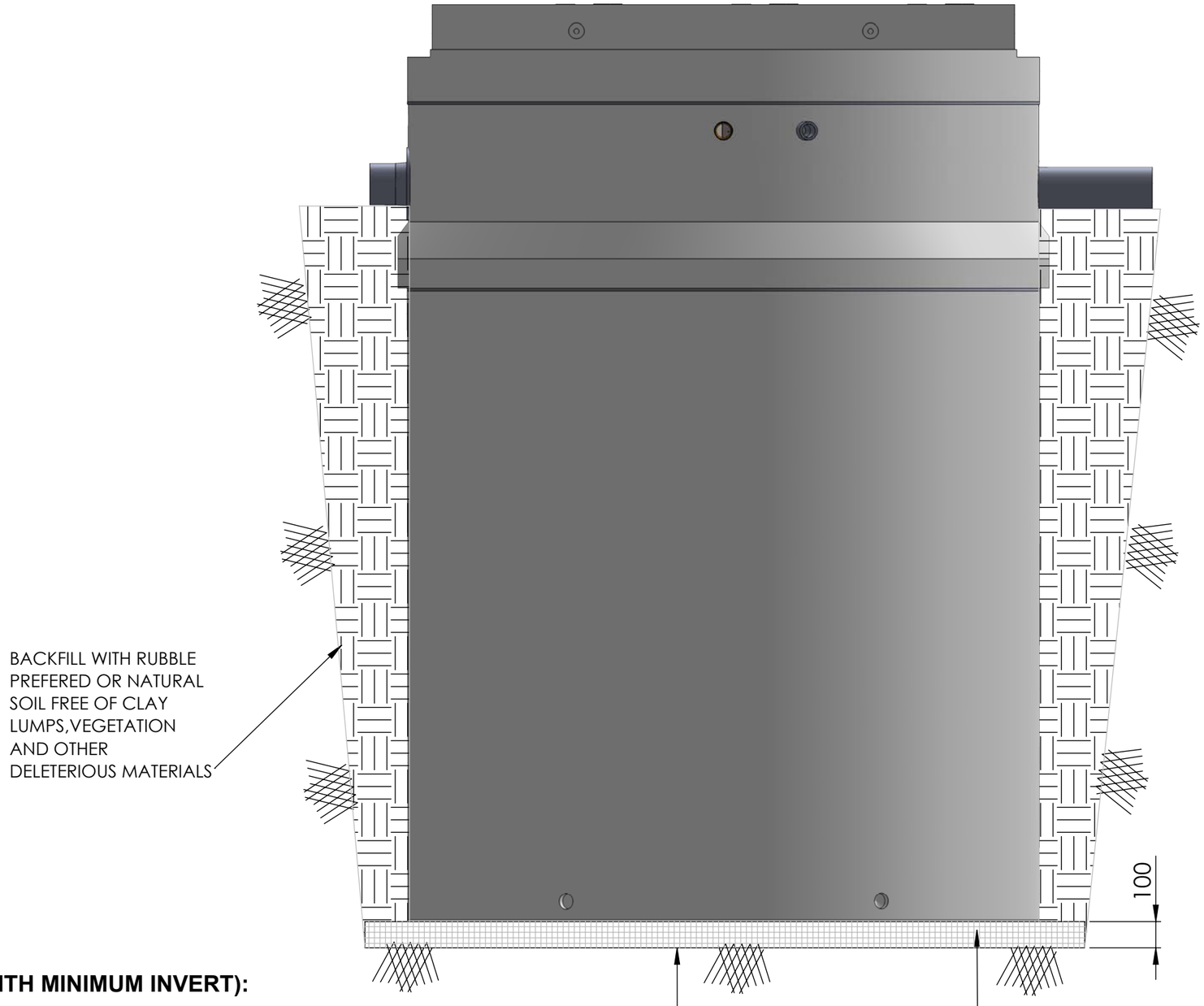
ASSEMBLY: SPECIFICATIONS

A3

REV:

SCALE: NTS

SHEET 2 OF 5



EXCAVATION VOLUME (WITH MINIMUM INVERT):

EXCAVATION VOLUME FROM CHAMBER BASE TO PIPE INVERT - 33.2 m^3

TOTAL EXCAVATION VOLUME - 53 m^3

TOTAL BACKFILL VOULME = 37.5 m^3

*TOTAL EXCAVATION & BACKFILL VOLUME ABOVE INVERT LEVEL CHANGES WITH INVERT HEIGHT.

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS	
BENDING RADIUS	K - FACTOR
PREPARED BY	Logesh S
APPROVED BY	L Crasti
DATE	08-Jul-21

ENVIRO

TITLE: ENVIRO OE45 SITE INSTALLATION

MATERIAL: CONCRETE & STEEL

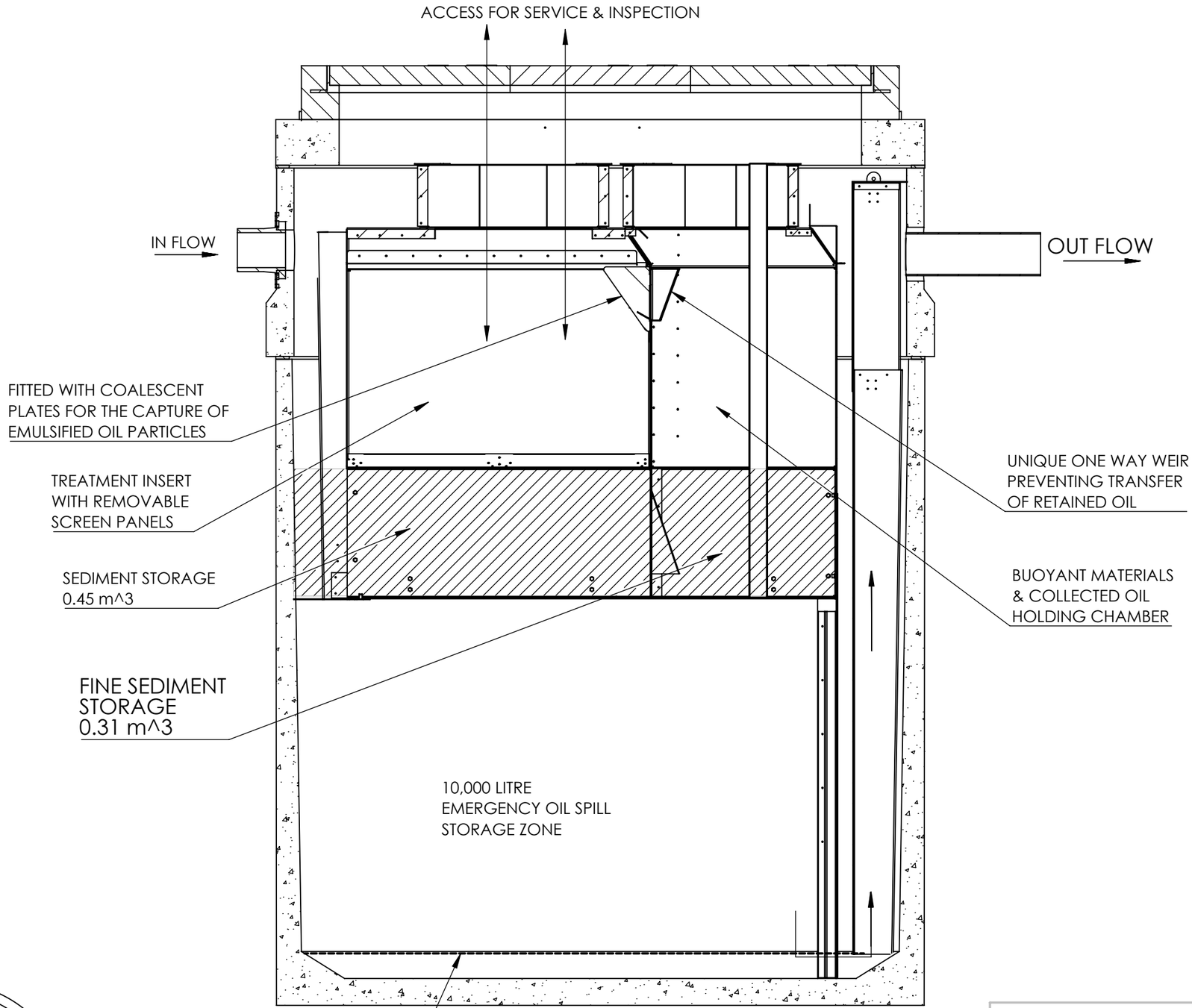
ASSEMBLY: SPECIFICATIONS

A3

REV:

SCALE: NTS

SHEET 3 OF 5



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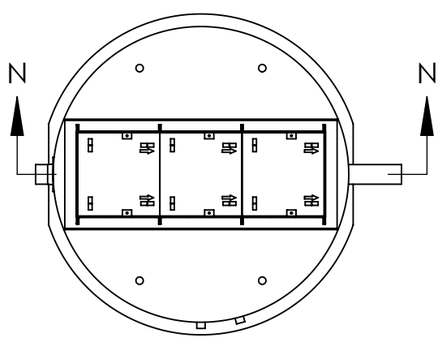


UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS	
BENDING RADIUS	K - FACTOR
PREPARED BY	Logesh S
APPROVED BY	L Crasti
DATE	08-Jul-21

ENVIRO

TITLE:
ENVIRO OE45
GENERAL OPERATION

MATERIAL: CONCRETE & STEEL

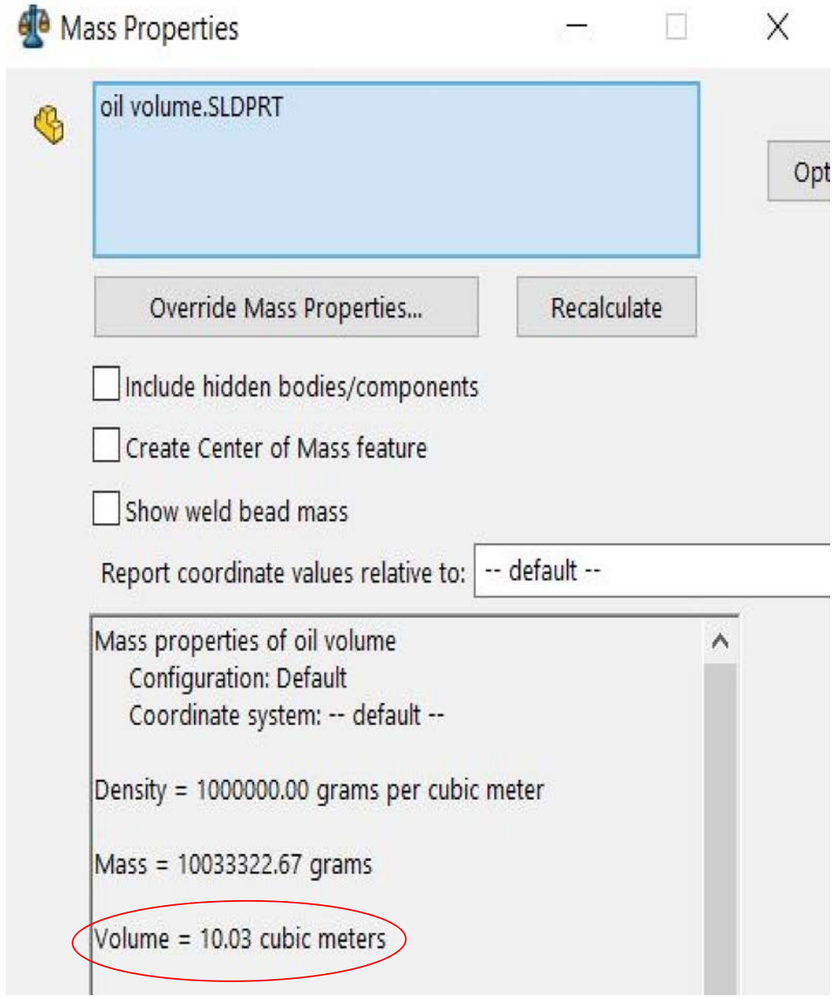
ASSEMBLY: SPECIFICATIONS

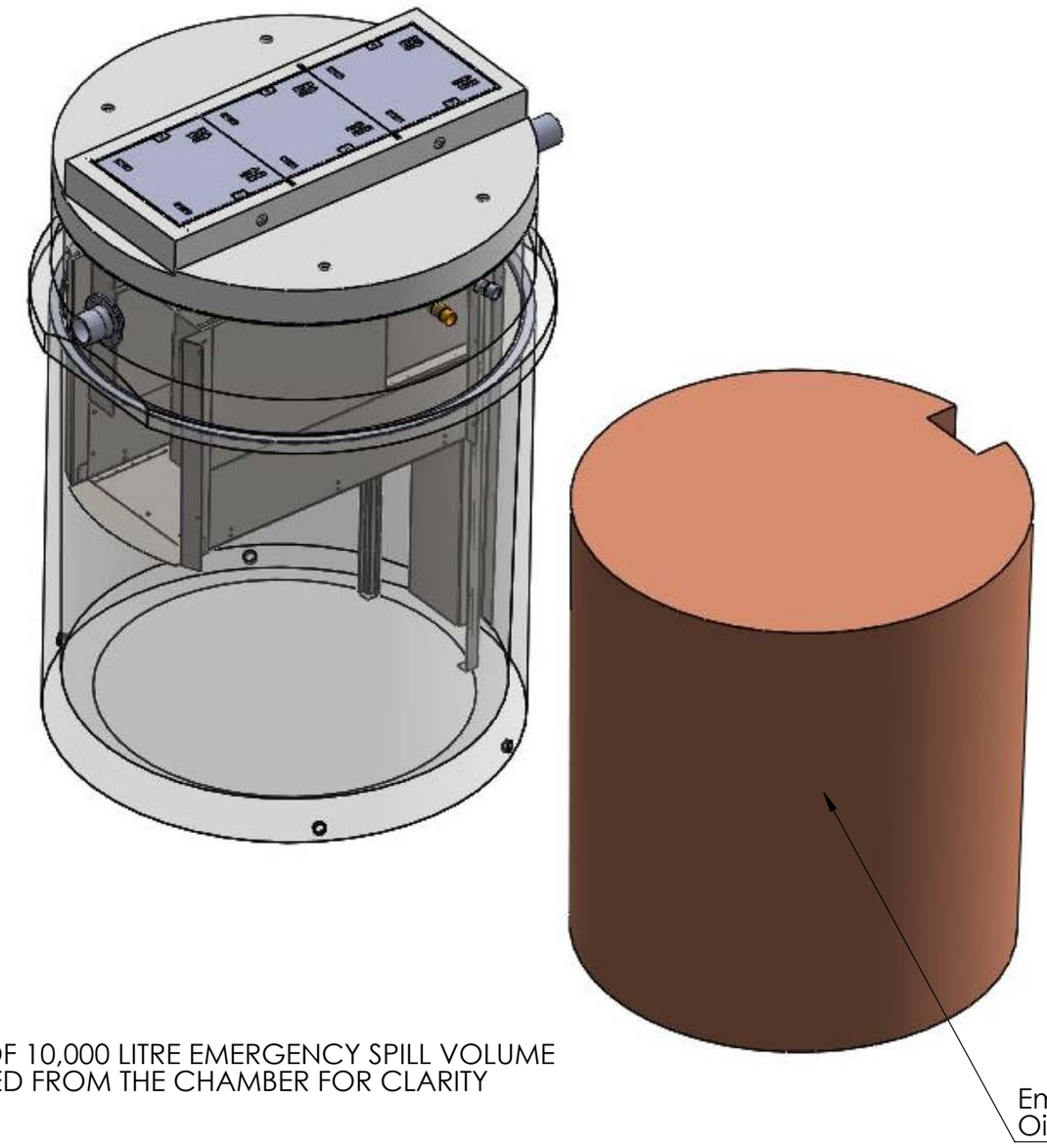
A3

REV:

SCALE: NTS

SHEET 4 OF 5





NOTE:

SHAPE OF 10,000 LITRE EMERGENCY SPILL VOLUME REMOVED FROM THE CHAMBER FOR CLARITY

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS

BENDING RADIUS	K - FACTOR
PREPARED BY	Logesh S
APPROVED BY	L Crasti
DATE	08-Jul-21

ENVIRO

TITLE:
ENVIRO OE45
STORAGE VOLUME

MATERIAL:
CONCRETE & STEEL

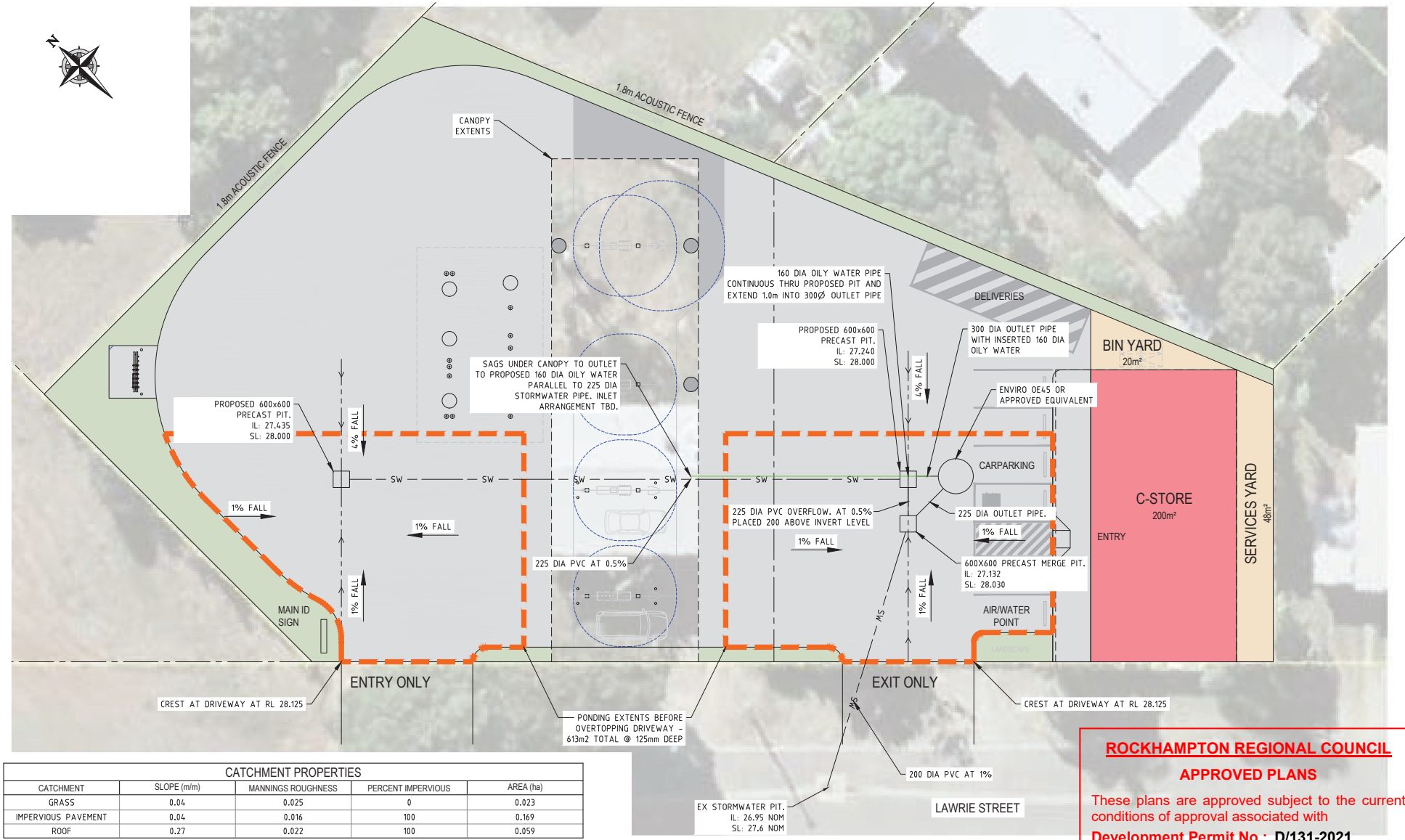
ASSEMBLY:
SPECIFICATIONS

A3

REV:

SCALE: NTS

SHEET 5 OF 5



CATCHMENT PROPERTIES				
CATCHMENT	SLOPE (m/m)	MANNINGS ROUGHNESS	PERCENT IMPERVIOUS	AREA (ha)
GRASS	0.04	0.025	0	0.023
IMPERVIOUS PAVEMENT	0.04	0.016	100	0.169
ROOF	0.27	0.022	100	0.059

2.5 0 2.5 5 7.5 10 12.5m

SCALE 1:125 @ A1 SCALE 1:250 @ A3

PROPOSED SITE LAYOUT PLAN

SCALE: 1:125(A1) 1:250(A3)

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/131-2021

Dated: 22 December 2021

SURVEYOR

ADDRESS:

CO-ORDINATE DATUM

HEIGHT DATUM

DRAWING No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	IBB DFT	LNM DFT CHK	IBB DES	LNM DES CHK
		A	27.09.21	ISSUED FOR APPROVAL				

REVIEWED BY DATE

RPEQ ENG

RPEQ No:

CLIENT

SCALE: NTS

PREPARED BY

mcmurtrie CONSULTING ENGINEERS

Address: 63 Charles Street NORTH ROCKHAMPTON QLD 4701
Postal: PO BOX 2149, WANDAL QLD 4700
E-mail: mail@mcmengineers.com
Phone: (07) 4921 1780
Mobile: 0407 631 066
Fax: (07) 4921 1790

CLIENT GRACEMERE CENTRE PTY LTD

PROJECT SERVICE STATION, LAWRIE STREET, GRACEMERE

TITLE STORMWATER MANAGEMENT PLAN

POST DEVELOPMENT LAYOUT

A1

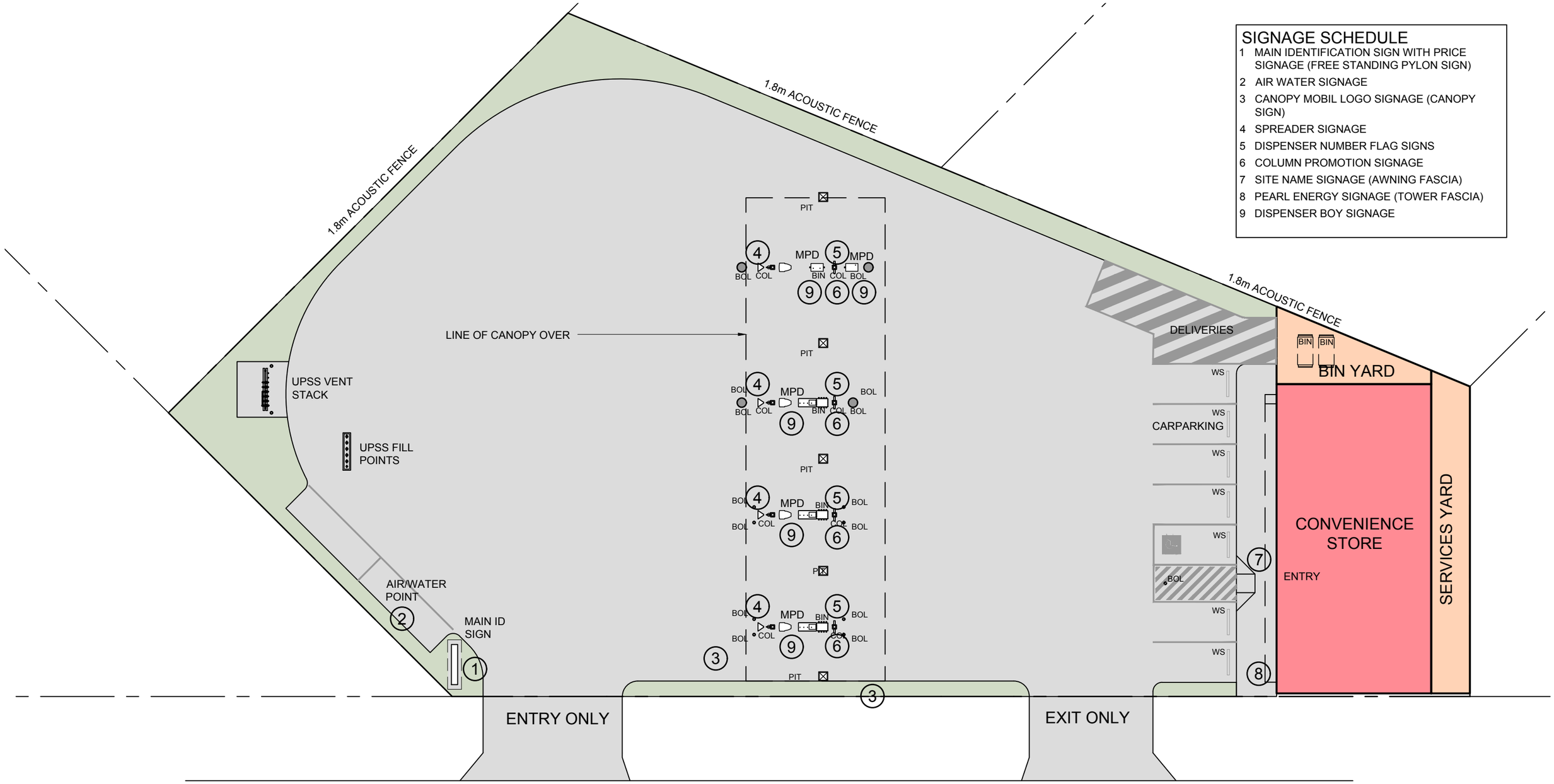
DRAWING NUMBER 027-21-21-SMP-02

REVISION A

PLOT DATE: 27/09/2021 4:45:38 PM DRAWING LOCATION: S:\PROJECTS\DC\2021\27-21-22 SERVICE STATION, LAWRIE STREET\DESIGN\CIVIL\SHEETS\SMP.DWG

SIGNAGE SCHEDULE

1 MAIN IDENTIFICATION SIGN WITH PRICE SIGNAGE (FREE STANDING PYLON SIGN)
2 AIR WATER SIGNAGE
3 CANOPY MOBIL LOGO SIGNAGE (CANOPY SIGN)
4 SPREADER SIGNAGE
5 DISPENSER NUMBER FLAG SIGNS
6 COLUMN PROMOTION SIGNAGE
7 SITE NAME SIGNAGE (AWNING FASCIA)
8 PEARL ENERGY SIGNAGE (TOWER FASCIA)
9 DISPENSER BOY SIGNAGE



ROCKHAMPTON REGIONAL COUNCIL

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LAWRIE STREET

NOT FOR CONSTRUCTION

0 2.5 5.0 7.5 10.0 12.5
METRES

DEVELOPMENT APPROVAL

inTOTUM®
PO Box 83, Margate Beach Queensland 4019
P: +61 (0) 7 3258 9933
E: info@intotum.com.au
W: www.intotum.com.au
ABN: 27 160 029 661
QBCC Lic. No: 1247034

AMENDMENTS

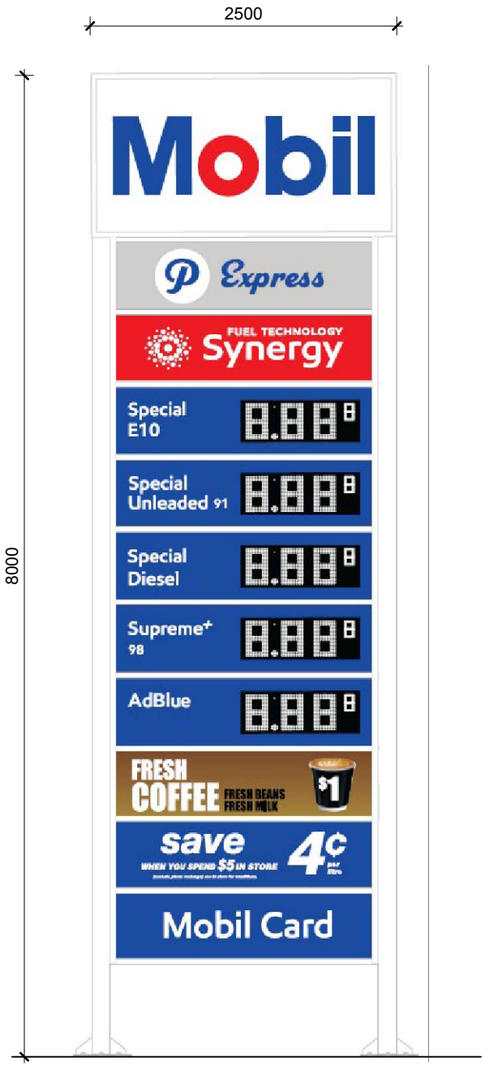
REV	DATE	DESCRIPTION	BY
A	28/09/21	DEVELOPMENT APPROVAL ISSUE	MAE
B	11/11/21	DEVELOPMENT APPROVAL ISSUE	MAE

CLIENT
GRACEMERE CENTRE PTY LTD (AS TRUSTEE) GRACEMERE CENTRE TRUST

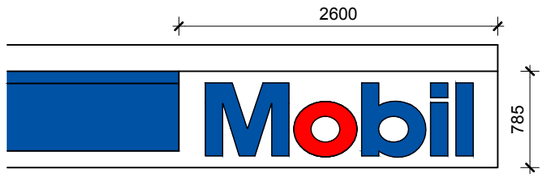
PROJECT
GRACEMERE SERVICE STATION DEVELOPMENT
16-18 LAWRIE STREET
GRACEMERE, QUEENSLAND 4702

TITLE
SIGNAGE SITE PLAN

SCALE	DRAWN	DATE
1:250	MAE	06/09/21
SIZE	CHECKED	DATE
A3		
DRAWING NUMBER		REVISION
2021046-DA-S100		B

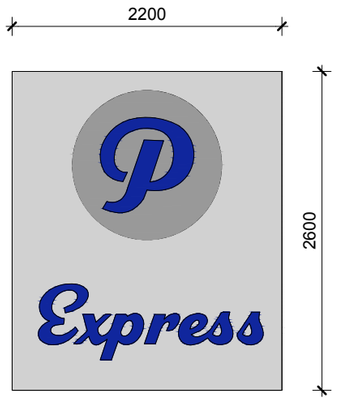


1 - MAIN IDENTIFICATION SIGN WITH PRICE SIGNAGE (FREE STANDING PYLON SIGN)

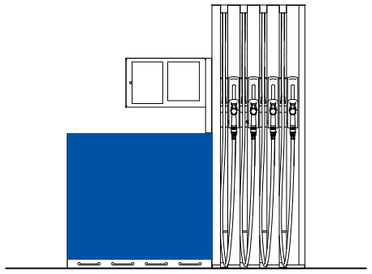


3 - CANOPY MOBIL LOGO SIGNAGE (CANOPY SIGN)

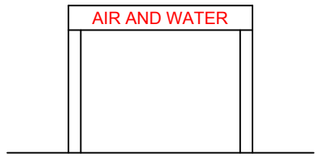
7 - CANOPY MOBIL LOGO SIGNAGE (AWNING SIGN)



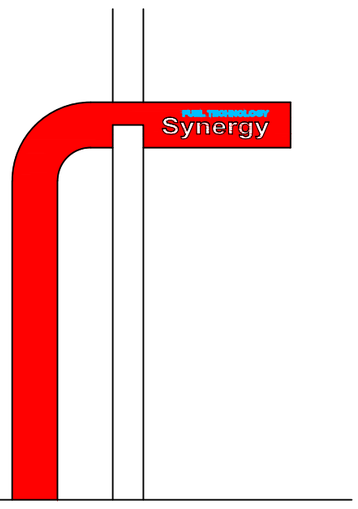
8 - PEARL ENERGY SIGNAGE (TOWER SIGN)



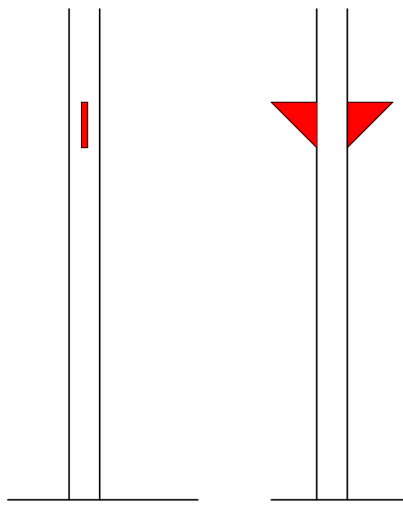
9 - DISPENSER BODY SIGNAGE



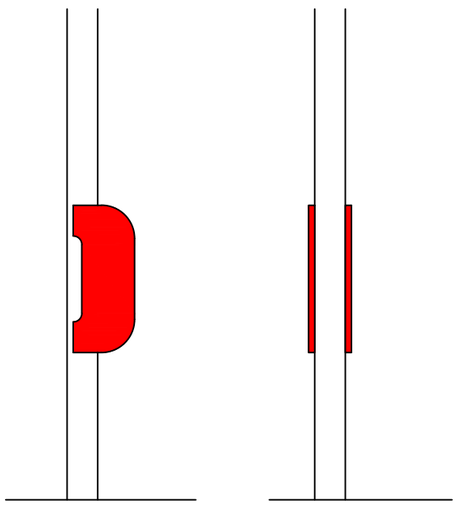
2 - AIR WATER SIGNAGE



4 - SPREADER SIGNAGE



5 - DISPENSER NUMBER FLAG SIGNS



6 - COLUMN PROMOTIONAL SIGNAGE

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Dated: **22 December 2021**

NOT FOR CONSTRUCTION

DEVELOPMENT APPROVAL

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AMENDMENTS

REV	DATE	DESCRIPTION	BY
A	28/09/21	DEVELOPMENT APPROVAL ISSUE	MAE

CLIENT
GRACEMERE CENTRE PTY LTD (AS TRUSTEE) GRACEMERE CENTRE TRUST

PROJECT
GRACEMERE SERVICE STATION DEVELOPMENT
16-18 LAWRIE STREET
GRACEMERE, QUEENSLAND 4702

TITLE
SIGNAGE DETAILS

SCALE	DRAWN	DATE
1:50	MAE	06/09/21
SIZE	CHECKED	DATE
A3		
DRAWING NUMBER		REVISION
2021046-DA-S400		A