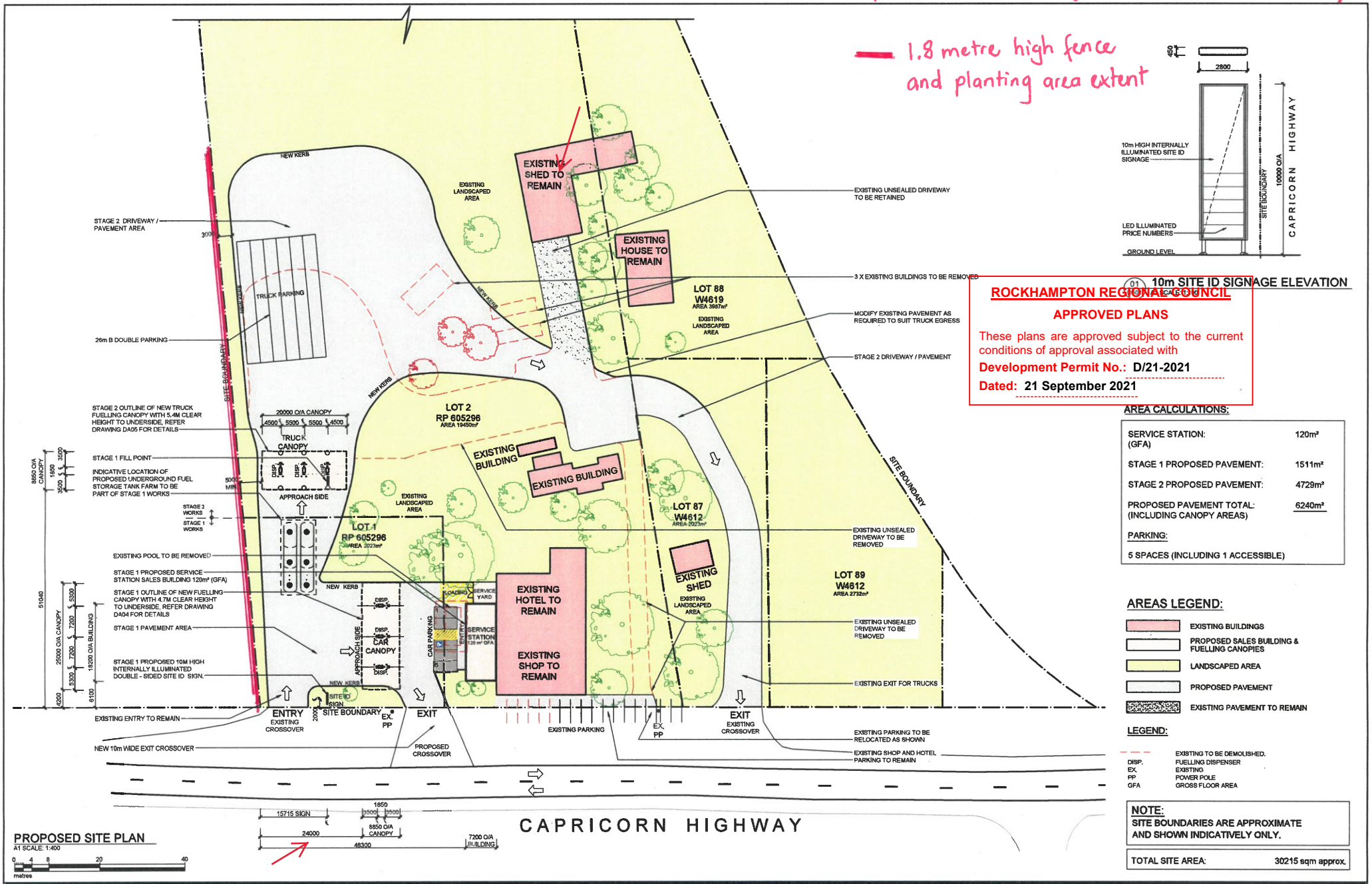
Proposed Site Plan (as amended by Council)

1.8 metre high fence and planting area extent



01 10m SITE ID SIGNAGE ELEVATION
NTS @ A3

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/21-2021

Dated: 21 September 2021

AREA CALCULATIONS:

SERVICE STATION: (GFA)	120m²
STAGE 1 PROPOSED PAVEMENT:	1511m²
STAGE 2 PROPOSED PAVEMENT:	4729m²
PROPOSED PAVEMENT TOTAL: (INCLUDING CANOPY AREAS)	6240m²

PARKING:

5 SPACES (INCLUDING 1 ACCESSIBLE)

AREAS LEGEND:

- EXISTING BUILDINGS
- PROPOSED SALES BUILDING & FUELLING CANOPIES
- LANDSCAPED AREA
- PROPOSED PAVEMENT
- EXISTING PAVEMENT TO REMAIN

LEGEND:

- EXISTING TO BE DEMOLISHED.
- DISP. FUELLING DISPENSER
- EX. EXISTING
- PP POWER POLE
- GFA GROSS FLOOR AREA

NOTE:
SITE BOUNDARIES ARE APPROXIMATE AND SHOWN INDICATIVELY ONLY.

TOTAL SITE AREA: 30215 sqm approx.

PROPOSED SITE PLAN

A1 SCALE: 1:400

0 4 8 20 40 metres

FOR DEVELOPMENT APPROVAL

No.	Date	Amendment	By
D	12.07.2021	REVISED BUILDING & TRUCK CANOPY	PP
C	12.05.2021	CANOPY ELEVATION REVISED / BUILDING REDUCED	PP
B	24.02.2021	AIR CANOPY REVISED	PP
A	04.01.2021	ORIGINAL ISSUE	PP

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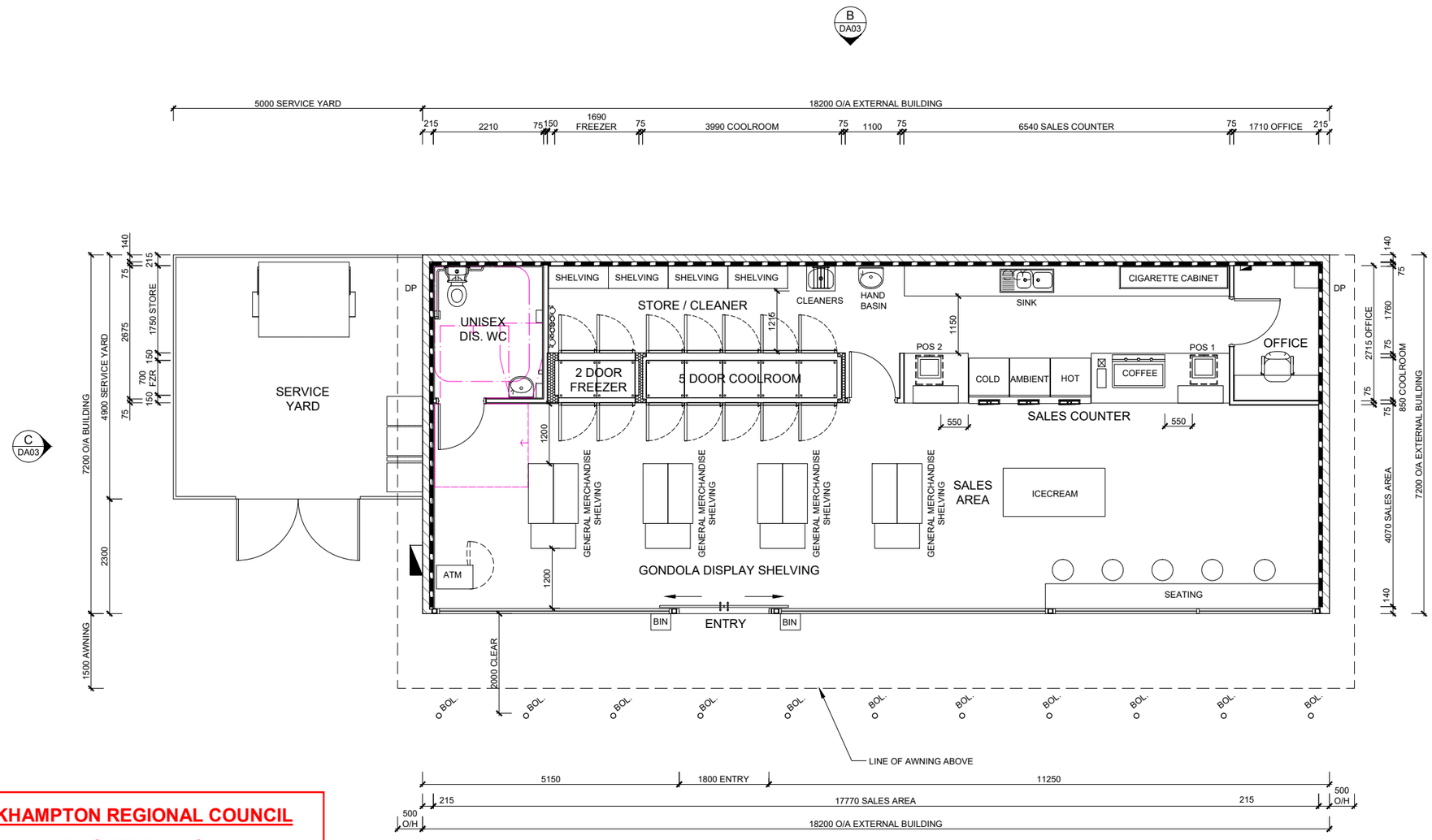
Client: **SINGH BROS**

Project: **SERVICE STATION DEVELOPMENT**
LOT 1 & 2 PLAN 605296, LOTS 87 & 89 PLAN W4612 & LOT 88 W4619
4589 CAPRICORN HIGHWAY WESTWOOD
WESTWOOD, QLD 4702

Drawing Title: **PROPOSED SITE PLAN**

A1 Scale	A3 Scale	Date	Drawn
1:400	HALF A1 SCALE	22.02.2021	PP

Drawing No: **20-041 DA01**
Revision: **D**



ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: **D/21-2021**

Dated: **21 September 2021**

NOTE: BUILDING INTERNAL LAYOUT INDICATIVE ONLY. SUBJECT TO FINAL REVIEW PRIOR TO BUILDING APPLICATION

AREA CALCULATIONS:

BUILDING GFA = 120 m²

PROPOSED FLOOR PLAN

A1 SCALE: 1:50

0 0.5 1.0 2.5 5.0

metres

FOR DEVELOPMENT APPROVAL

No	Date	Amendment	By
C	12.08.2021	REVISED BUILDING	PP
B	13.05.2021	BUILDING REVISED	PP
A	23.02.2021	ORIGINAL ISSUE	PP

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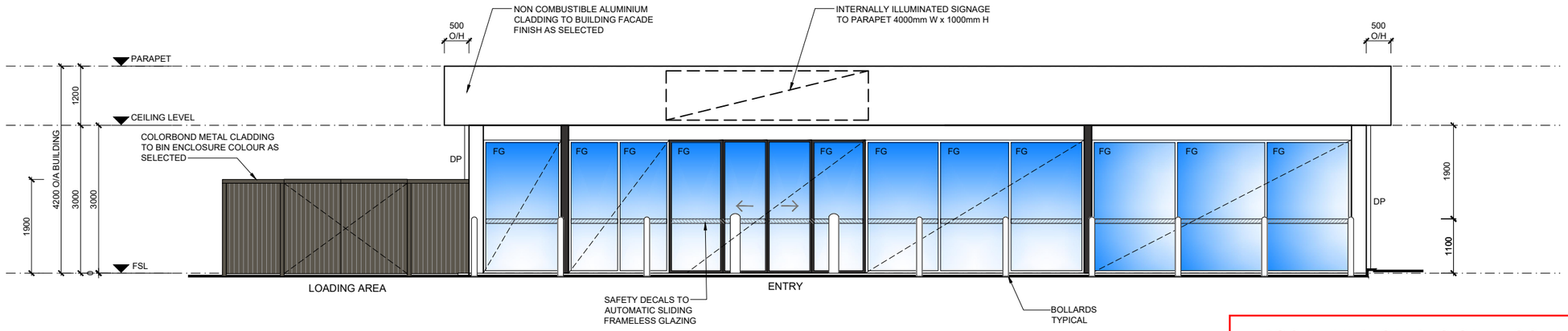
WESTWOOD, QLD 4702

Drawing Title
PROPOSED FLOOR PLAN

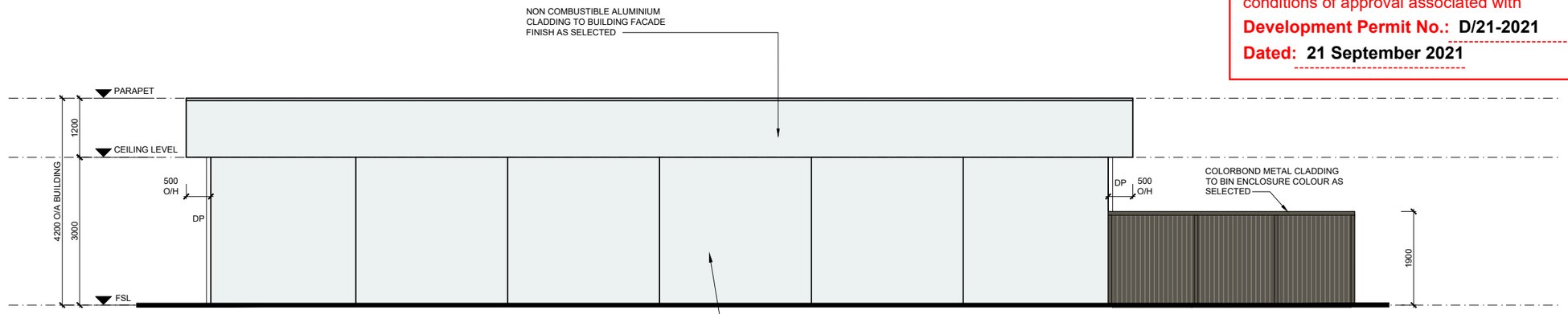
A1 Scale	A3 Scale	Date	Drawn
1:50	HALF A1 SCALE	22.02.2021	PP

Drawing No **20-062-DA02**

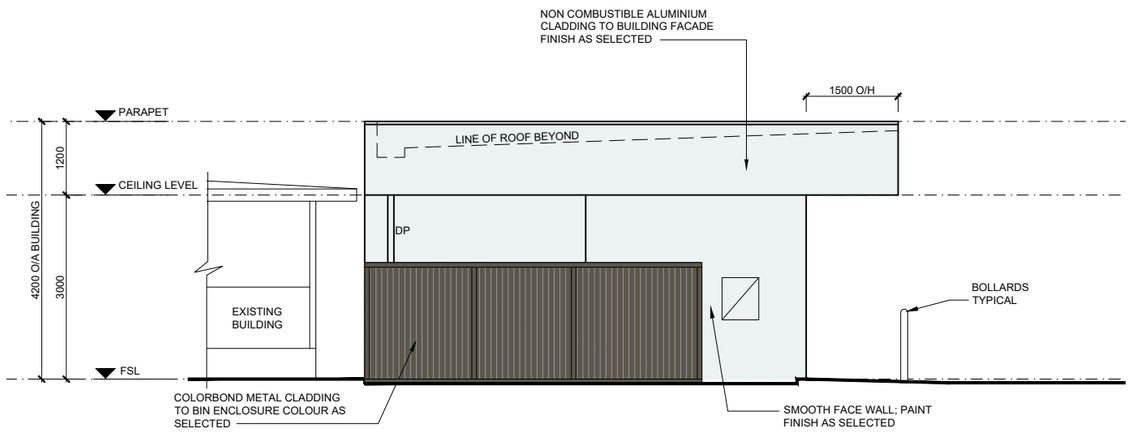
Revision **C**



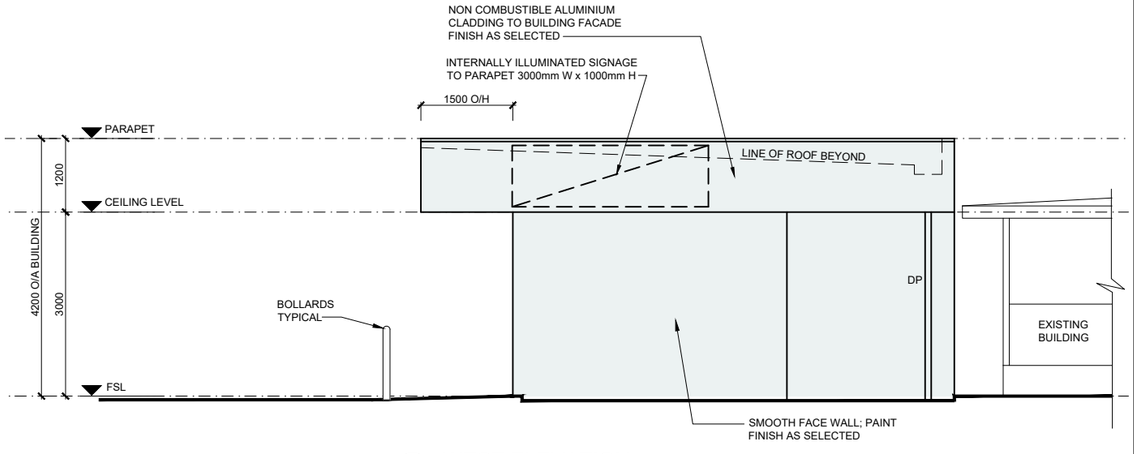
A DA02 NORTH ELEVATION
A1 SCALE: 1:50



B DA02 SOUTH ELEVATION
A1 SCALE: 1:100



C DA02 EAST ELEVATION
A1 SCALE: 1:50



D DA02 WEST ELEVATION
A1 SCALE: 1:50

0 0.5 1.0 2.5 5.0
metres

FOR DEVELOPMENT APPROVAL

No	Date	Amendment	By
C	12.08.2021	REVISED ELEVATIONS	PP
B	13.05.2021	ELEVATIONS REVISED	PP
A	23.02.2021	ORIGINAL ISSUE	PP

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Client
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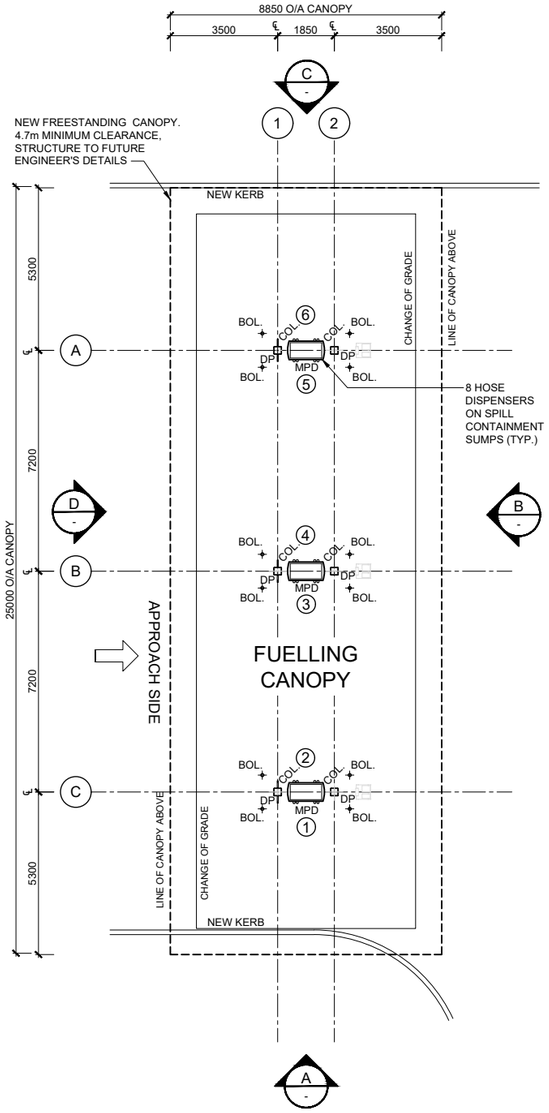
Project
SERVICE STATION DEVELOPMENT
LOT 1 & 2 PLAN 605296, LOTS 87 & 89 PLAN W4612 & LOT 88 W4619
4589 CAPRICORN HIGHWYAY WESTWOOD
WESTWOOD, QLD 4702

Drawing Title
BUILDING ELEVATIONS

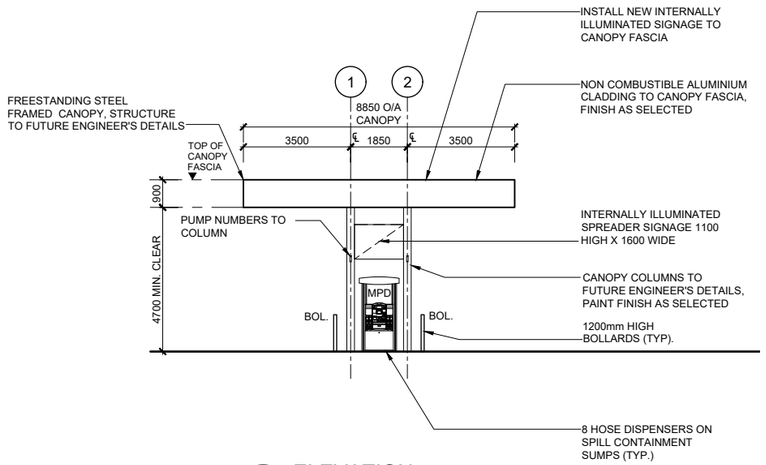
A1 Scale	A3 Scale	Date	Drawn
1:50	HALF A1 SCALE	22.02.2021	PP

Drawing No
20-062-DA03

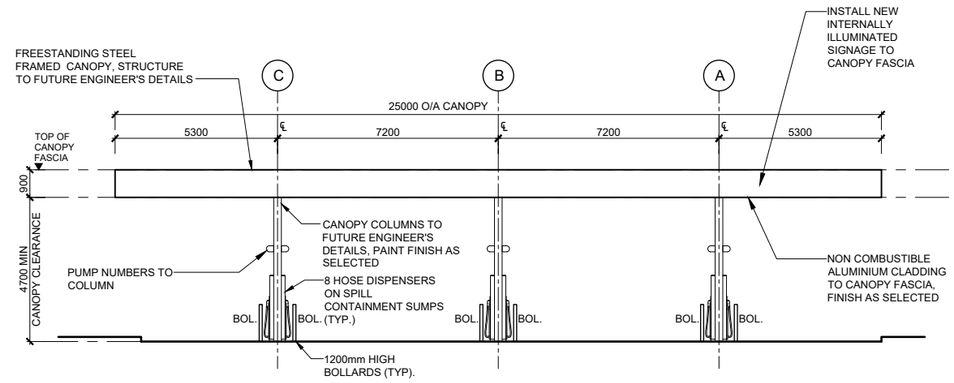
Revision
C



FUEL DISPENSING CANOPY
SCALE 1:100



A ELEVATION
A1 SCALE: 1:100



B ELEVATION
A1 SCALE: 1:100

C ELEVATION
A1 SCALE: 1:100

D ELEVATION
A1 SCALE: 1:100

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/21-2021

Dated: 21 September 2021

0 1 2 5 10
metres

FOR DEVELOPMENT APPROVAL

No	Date	Amendment	By
C	12.08.2021	KERBS REVISED	PP
B	24.02.2021	CANOPY REVISED	PP
A	23.02.2021	ORIGINAL ISSUE	PP

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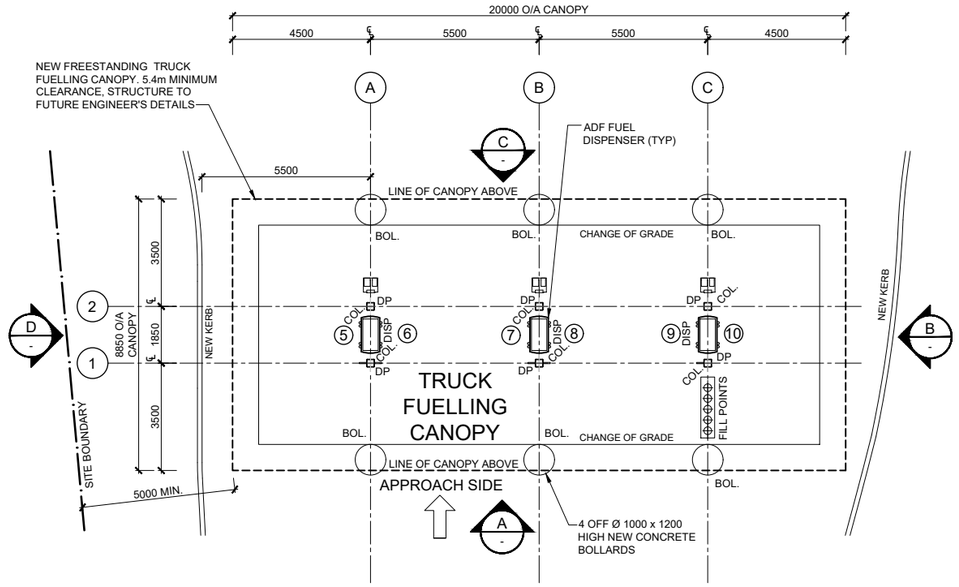
4589 CAPRICORN HIGHWYAY WESTWOOD
WESTWOOD, QLD 4702

Drawing Title
CAR CANOPY PLAN AND ELEVATIONS

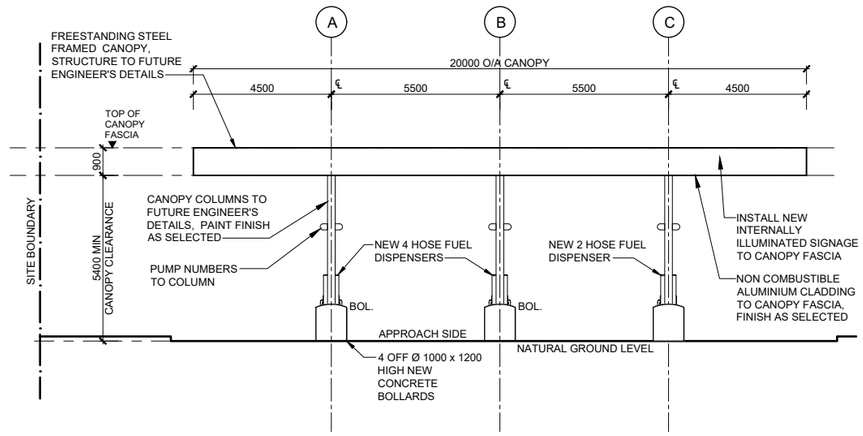
A1 Scale	A3 Scale	Date	Drawn
1:100	HALF A1 SCALE	22.02.2021	PP

Drawing No
20-062-DA04

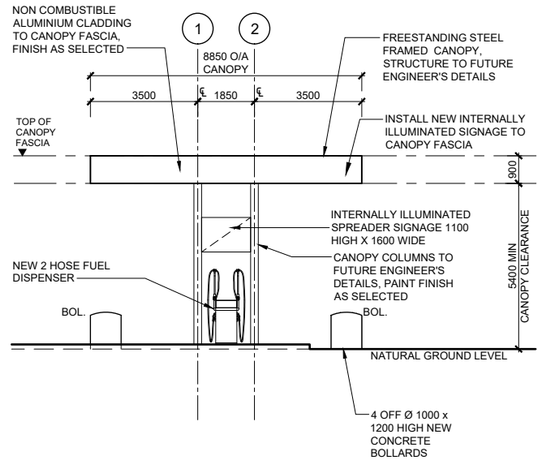
Revision
C



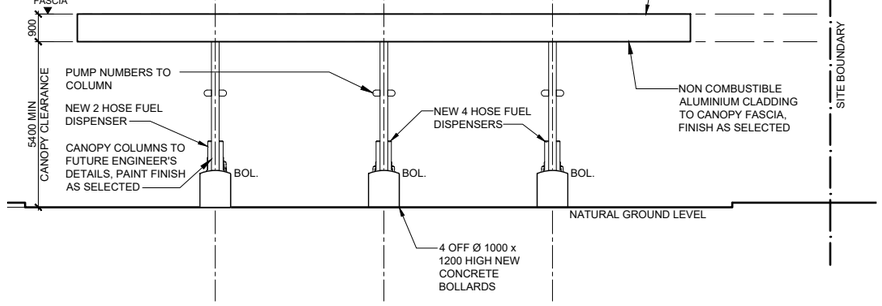
TRUCK FUEL DISPENSING CANOPY
SCALE 1:100



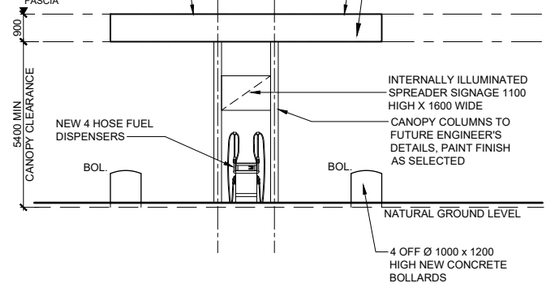
A ELEVATION
A1 SCALE: 1:100



B ELEVATION
A1 SCALE: 1:100



C ELEVATION
A1 SCALE: 1:100



D ELEVATION
A1 SCALE: 1:100

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/21-2021

Dated: 21 September 2021

0 1 2 5 10
metres

FOR DEVELOPMENT APPROVAL

No	Date	Amendment	By
C	12.08.2021	CANOPY REVISED & FILLPOINT RELOCATED	PP
B	13.05.2021	CANOPY REVISED	PP
A	23.02.2021	ORIGINAL ISSUE	PP

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WESTWOOD, QLD 4702

Drawing Title
TRUCK CANOPY PLAN AND ELEVATIONS

A1 Scale	A3 Scale	Date	Drawn
1:100	HALF A1 SCALE	22.02.2021	PP

Drawing No
20-062-DA05

Revision
C

SITE BOUNDARY

EXISTING LANDSCAPED AREA

STAGE 2 WORKS

NEW KERB

EXISTING SHED TO REMAIN

EXISTING HOUSE TO REMAIN

LOT 88 W4619 AREA 3987m²

EXISTING LANDSCAPED AREA

TRUCK PARKING

NEW KERB

NEW KERB

SITE BOUNDARY

NEW KERB

NEW KERB

LOT 2 RP 605296 AREA 19450m²

TRUCK CANOPY

EXISTING BUILDING

EXISTING BUILDING

SITE BOUNDARY

STAGE 1 FILL POINT

FILL POINT

APPROACH SIDE

LOT 87 W4612 AREA 2023m²

LOT 1 RP 605296 AREA 2023m²

EXISTING LANDSCAPED AREA

NEW KERB

LOADING

SERVICE YARD

EXISTING HOTEL TO REMAIN

EXISTING SHED

LOT 89 W4612 AREA 2732m²

EXISTING LANDSCAPED AREA

STAGE 1 WORKS

DISP.

DISP.

CAR CANOPY

DISP.

APPROACH SIDE

CAR PARKING

SERVICE STATION

EXISTING SHOP TO REMAIN

NEW KERB

SITE ID SIGN

EXISTING EXIT FOR TRUCKS

EXISTING ENTRY TO REMAIN

NEW 10m WIDE EXIT CROSSOVER

ENTRY

EXISTING CROSSOVER

EX. PP

EXIT

PROPOSED CROSSOVER

SITE BOUNDARY

EXISTING PARKING

EX. PP

EXIT

EXISTING CROSSOVER

CAPRICORN HIGHWAY

SITE PLAN - STAGING PLAN

A1 SCALE: 1:500

0 5 10 25 50

metres

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/21-2021

Dated: 21 September 2021

AREAS LEGEND:

STAGE 1 WORKS

STAGE 2 WORKS

TOTAL SITE AREA: 30215 sqm approx.

FOR DEVELOPMENT APPROVAL

No	Date	Amendment	By
D	12.08.2021	REVISED BUILDING & CANOPY	PP
C	13.05.2021	TRUCK CANOPY & SALES BUILDING REVISED	PP
B	24.02.2021	CANOPY REVISED	PP
A	24.02.2021	ORIGINAL ISSUE	PP

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Project
SERVICE STATION DEVELOPMENT
LOT 1 & 2 PLAN 605296, LOTS 87 & 89 PLAN W4612 & LOT 88 W4619
4589 CAPRICORN HIGHWYAY WESTWOOD
WESTWOOD, QLD 4702

Drawing Title
SITE PLAN - STAGING PLAN

A1 Scale	A3 Scale	Date	Drawn
1:500 @ A1	HALF A1 SCALE	22.02.2021	PP

Drawing No **20-041 DA06**

Revision **D**

Traffic Impact Assessment Report

Proposed Westwood Service Station
4589 CAPRICORN HIGHWAY WESTWOOD
LOT 1 & 2 PLAN 605296, LOTS 87 & 89 PLAN W4612 & LOT 88 W4619
WESTWOOD, QLD 4702

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/21-2021

Dated: 21 September 2021

Prepared For: Singh Bros Qld Pty Ltd

Job No. 0672021
May 2021
Revision C

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E mail@mcmengineers.com

PO Box 2149
Wandal Q 4700
63 Charles Street
North Rockhampton Q 4701

Traffic Impact Assessment Report

Rev.	Description	Signature	Date
C	Change in GFA		25.05.21
B	Staging Updated		02.03.21
A	Issued for DA review	-	09.02.21

CONTENTS

Traffic Impact Assessment Report

Westwood Service Station, 4589 CAPRICORN HIGHWAY WESTWOOD, LOT 1 & 2 PLAN 605296, LOTS 87 & 89 PLAN W4612 & LOT 88 W4619WESTWOOD, QLD 4702

1.0 INTRODUCTION

1.1. PROJECT BACKGROUND

Singh Bros Qld Pty Ltd are proposing to establish a service station on part of the property at 4589 CAPRICORN HIGHWAY WESTWOOD, LOT 1 & 2 PLAN 605296, LOTS 87 & 89 PLAN W4612 & LOT 88 W4619 WESTWOOD, QLD 4702. The service station is expected to cater for passing traffic on the adjacent section of the Capricorn Highway, and provides refueling and parking facilities for both light and heavy vehicles.

1.2. SCOPE AND STUDY AREA

McMurtrie Consulting Engineers (MCE) have been commissioned by Singh Bros Qld Pty Ltd to undertake a Traffic Impact Assessment (TIA) for the proposed Service Station, located at 4589 CAPRICORN HIGHWAY WESTWOOD, LOT 1 & 2 PLAN 605296, LOTS 87 & 89 PLAN W4612 & LOT 88 W4619, WESTWOOD, QLD 4702.

This Traffic Impact Assessment (TIA) was carried out to determine the level of potential impacts of the Project on the operation of the surrounding road network. The outcomes of the TIA will be used in support of the Development Application which will be assessed by Department of Transport and Main Roads (TMR) and Rockhampton Regional Council (RRC).

The assessment methodology adopted for this TIA is summarised in the key tasks listed below.

- Broadly identify the existing transport infrastructure which is of relevance to the Project.
- Estimate traffic generation associated with the Project and the distribution of this development traffic on the identified road network.
- Assess the potential impact of the Project on the surrounding transport infrastructure.
- Identify potential mitigation and management strategies to be implemented to offset the impact of the proposed Project (if required).

As outlined above, the adopted methodology centers on establishing a background, “without development” traffic scenario for the identified transport routes and comparing this with a scenario including the Project-generated traffic, i.e. the “with development” scenario.

The process allows for the assessment of the traffic impacts of the Project in terms of road safety, access requirements, intersection operations, road link capacity, pavement and other transport infrastructure. Following this, if required, potential mitigation and/or management measures would be formulated to address the potential traffic impacts caused by the proposed Project.

1.2.1 STUDY AREA

As previously identified, the proposed service station is to be located at located at 4589 CAPRICORN HIGHWAY WESTWOOD, LOT 1 & 2 PLAN 605296, LOTS 87 & 89 PLAN W4612 & LOT 88 W4619, WESTWOOD, QLD 4702. The site is located on and adjacent to the existing premises of the Westwood Hotel, as shown in **Figure 1** below. It is proposed that the current Hotel/shop use will continue following establishment of the Service Station. Note that all proposed access points are also currently existing except for the proposed light vehicle egress point from the service station, therefore creating only one new egress to the State Controlled Road Network. Further on in this report the closure of one existing access is proposed thus resulting in the overall maintenance of the number of acceses.

Figure 1 Study Area – 4589 CAPRICORN HIGHWAY WESTWOOD QLD

2.0 EXISTING CONDITIONS

2.1. SURROUNDING ROAD NETWORK DETAILS

2.1.1 ROAD LINKS

Capricorn Highway (Rockhampton-Duaringa) – 16A

The Capricorn Highway links Rockhampton to the western centres of Emerald, Barcaldine and Longreach. In the Westwood area the link is the primary east-west road transport route for both passenger and road freight vehicles within Central Queensland. The highway through Westwood is a Type 1 Roadtrain Route and is typically a two-way, two lane rural standard road with a posted speed limit of 80km/h, generally with direct access to properties fronting the route.

2.2. TRAFFIC VOLUMES

2.2.1 ROAD LINK VOLUMES

The background traffic volumes for the relevant section of the state-controlled road network were established using the available 2019 AADT segment traffic count data provided by TMR (refer **Appendix A**). Using these established traffic volumes for each section of the road links, the development year (2021) daily traffic volumes on the network were established assuming a conservative 1.0% background traffic growth rate on the link (actual average 10 year growth rate was identified to be -0.56%).

A summary of the forecast background traffic volumes for each of the relevant road segments for the opening year (2021) is provided in **Table 1** and refer to **Appendix A** for traffic counts.

Table 1 Forecast Future Background AADT Traffic Volumes

Site ID	AADT Segment		Base Data Year	Base Year (2019) AADT				10 Yr. GR %	Background AADT (2021)			
	Start (km)	End (km)		Gaz	% HV	A-Gaz	% HV		Gaz		A-Gaz	
									Total	HV	Total	HV
Capricorn Highway – 16A												
60040	17.86	51.62	2019	1734	28.14	1686	24.5	2.0	1768	498	1720	422

2.3. NETWORK PERFORMANCE

2.3.1 ROAD LINKS

Based on the daily traffic volumes identified in **Table 1** above, it is anticipated that all relevant sections of the Capricorn Highway can be considered to be currently operating satisfactorily and within capacity, as the existing mid-block traffic volumes identified are considered well within the capacity of a two-way, two lane sealed rural road / highway.

2.4. ROAD SAFETY ISSUES

2.4.1 EXISTING SITE CONDITIONS

A site inspection of the existing traffic conditions on the relevant road network was undertaken by Chris Hewitt (RPEQ/Road Safety Auditor) on Monday 1 February 2021. No existing immediate safety issues were able to be identified. The only issue identified as a risk is the interaction between the proposed site accesses and the existing angled kerbside parking at the front of the hotel however this should be able to be suitably managed with adequate delineation and will be discussed further on in this report.

2.4.2 ROAD CRASH HISTORY REVIEW

A review of the road crash history of the section of the Capricorn Highway through Westwood was undertaken using the road crash data available from the Queensland Globe database, with the assessment completed for the available data range (2002-2018).

The results of this assessment identified 5 crashes in the nominated extents within this timeframe, with the approximate location of the recorded crashes shown in **Figure 2** below, while a summary of the details of the road crash data is provided in **Table 2**.

Figure 2 Road Crash Locations – Bruce Highway / Proposed Site Access Intersection [Source: QLD Globe]

Table 2 Summary of Road Crash History (2002-2018)

Crash Ref. No.	Crash Year	Crash Severity	Crash Type	DCA Description	Crash Description
Bruce Highway					
270592	2003	Hospitalisation	Single	Off carriageway on straight hit object	Off Path-Straight:Right Off Cway Hit Obj
26996	2013	Medical Treatmeant	Multi-Vehicle	Rear-end	Veh's Same Direction: Rear End
186032	2010	Property damage only	Single	Hit animal	Pass & Misc: Hit Animal
283823	2018	Medical Treatment	Multi-Vehicle	Off Path-Straight: Left Off Cway Hit Obj	Off carriageway on straight hit object
175307	2001	Minor Injury	Single Vehicle	Off Path-Curve: Other	Other

The results above indicate that no one traffic movement can be considered a specific safety risk, with only 5 crashes recorded along the section of the Capricorn Highway in the vicinity of the proposed site over the last 16 years (2002-2018) and only one accident recorded in the past 8 years.

3.0 PROPOSED DEVELOPMENT DETAILS

3.1. OPERATIONAL DETAILS

The proposed development is a service station, which will occupy the southern portion of the subject site as shown in the site plan included as **Appendix B** and the extract provided as **Figure 3** below. The balance of the lot is to remain operating as per its existing use under the proposed development.

The development will provide three (3) bowsers for cars (i.e. six (6) refueling positions), and three (3) bowsers for heavy vehicles/trucks (i.e. three (3) refueling positions). Vehicular access is proposed via separate all movement entry/exit access intersections with the Capricorn Highway, while the largest design vehicle anticipated to require access to the site is a Type 1 Road Train combination vehicle for which it is proposed to have a separate site exit at the southern end of the site to allow for separation of larger vehicles.

The proposed service station building has an area of 120m² GFA, with parking bays provided for cars to park in close proximity to the building and further truck parking areas provided to the east of the main service station area.

The traffic elements of the proposed development are discussed further in the following sections.

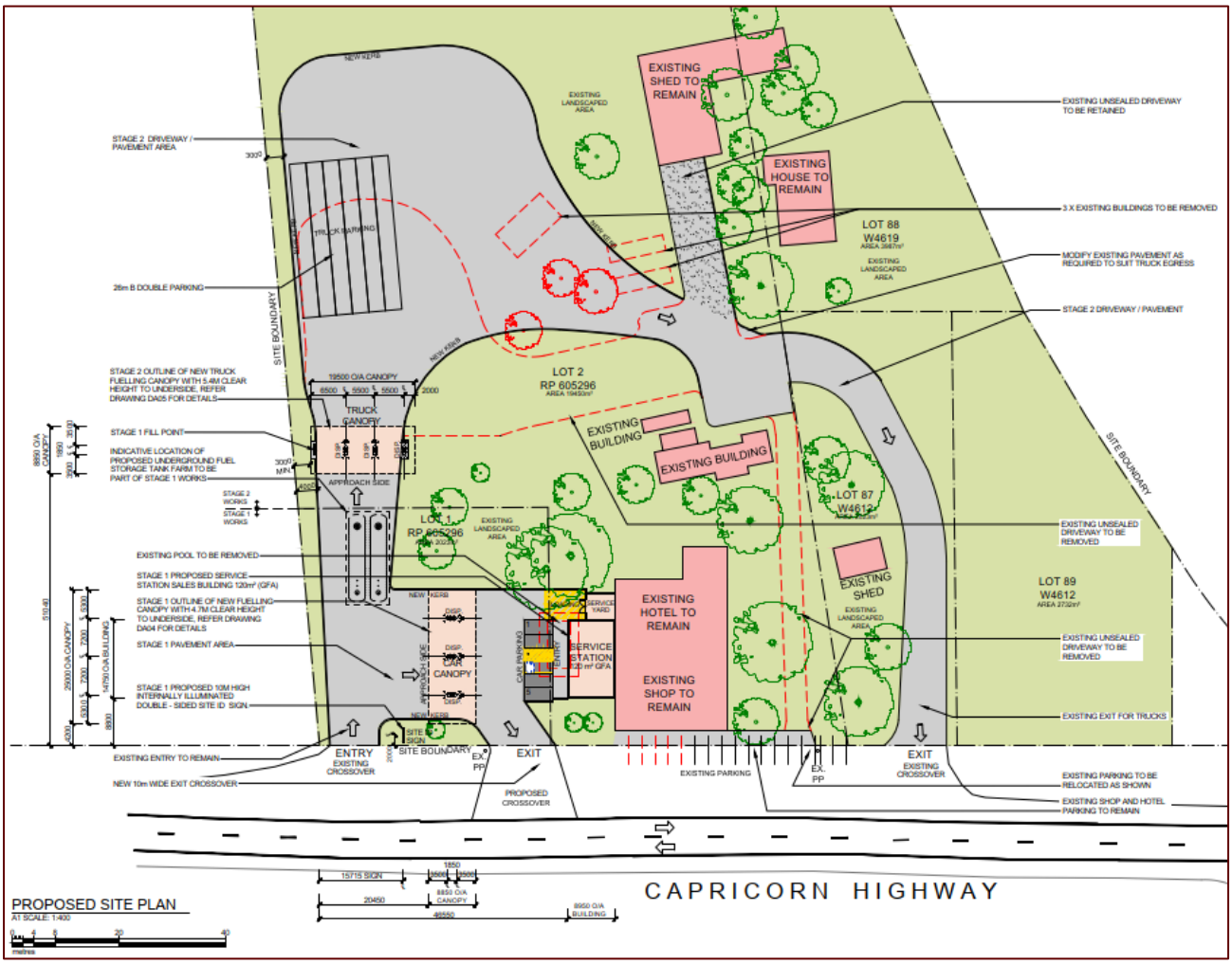


Figure 3 Extract from Site Layout Plan (Dwg. 20-041 – Rev C)

3.2. PROPOSED ACCESS AND PARKING

3.2.1. SITE ACCESS

As previously identified, vehicular access is proposed via separate all movement entry/exit access intersections with the Capricorn Highway, with a separate heavy vehicle site exit at the southern end of the site to allow for separation of larger vehicles.

3.2.2 INTERNAL SITE FACILITIES

In order to assess the adequacy of the internal traffic facilities, reference has been made to the Access, Parking and Transport Code within the Rockhampton Regional Council Planning Scheme, as well as the relevant Australian Standards.

Compliance with the requirements of these documents is discussed in the following sections.

3.2.2.1 CAR PARKING

Table 9.3.1.3.2 of RRC's Access, Parking and Transport Parking Code stipulates a car parking requirement of 1 space per 25m² GFA for the relevant shop area of a service station. Given the proposed service station includes approximately 120m² GFA of shop area, the recommended parking provision for the development is therefore 5 parking spaces (minimum).

All parking spaces proposed for light vehicles (cars) should be generally 5.4m long and 2.6m wide and accessed by a parking aisle exceeding 6.6m width, which meets the requirements stipulated in AS2890.1 for short term, high turnover parking, while the provision of 1 PWD bay for the proposal aligns with the general PWD bay provision rate of between 1-2% of the overall parking bays on site.

3.2.2.2 QUEUING AND VEHICLE CIRCULATION

As shown in Dwg. 20-041 Rev C (refer **Appendix B**) the proposed site layout nominates one-way traffic flow (clockwise) for vehicles through the petrol pump lanes in the vicinity of the service station, with the vehicle access to the pump area located off the main access road. Vehicle swept paths have also been undertaken which confirm the ability of a Type 1 Road Train combination to travel through the site as required, with a copy of the relevant swept paths for the proposal included for reference in **Appendix B.**

3.2.2.3 SERVICE VEHICLE ACCESS, CIRCULATION AND LOADING

RRC's Access, Parking and Transport Parking Code does not stipulate any specific requirement for servicing at service station developments. Notwithstanding this, a service vehicle bay is proposed to the east of the building.

It is also understood that the fuel tanker which is expected to be used for regular refueling of the service station tanks will be a B-Double configuration vehicle.

4.0 DEVELOPMENT TRAFFIC

4.1. TRAFFIC GENERATION

It is envisioned that the site will cater for both east and westbound vehicles.

In order to determine the traffic generation of the proposed service development, reference has been made to the Traffic Generation Data—2006–2017 recently published on the Queensland Government website (https://data.qld.gov.au/dataset/traffic-generation-data-2006-2018) which includes the recorded weekday trip generation rates for 10 separate service stations locations in Queensland.

A summary of the relevant service station data is provided in **Table 4** below, which reveals an average trip generation rate of 29.32 trips / 100m² GFA for service stations which are less than 1,000m² GFA. Applying this rate to the identified service station tenancy area (120m² GFA) would equate to a peak hour trip generation for the proposed development site of 35 trips (entry and exit).

Table 4: Summary of Trip Generation Data (Service Stations)

Year	Land use	Suburb	Variable Units	Variable Value	Start Date	End Date	Weekday Peak Hour Start	Weekday Peak Hour End	Weekday Peak Volume	Average Weekday Peak Hour Trip Generation Rate
2009	Service Station	MORAYFIELD	GLFA	3521	9/05/2009	15/05/2009	13:30:00	14:30:00	584	16.59
2009	Service Station	BURPENGARY EAST	GLFA	3246	9/05/2009	15/05/2009	9:00:00	10:00:00	535	16.48
2009	Service Station	CARSELDINE	GLFA	1772	9/05/2009	15/05/2009	15:00:00	16:00:00	423	23.87
2009	Service Station	STAPYLTON	GLFA	2273	9/05/2009	15/05/2009	12:30:00	13:30:00	577	25.38
2009	Service Station	UPPER COOMERA	GLFA	2396	9/05/2009	15/05/2009	5:30:00	6:30:00	759	31.68
2009	Service Station	COLLEGE VIEW	GLFA	796	9/05/2009	15/05/2009	13:30:00	14:30:00	355	44.60
2011	Service Station	WOODRIDGE	GLFA	332	14/03/2011	20/03/2011	5:30:00	6:30:00	156	46.99
2011	Service Station	SUNNYBANK HILLS	GLFA	542	14/03/2011	20/03/2011	15:00:00	16:00:00	93	17.16
2011	Service Station	MACGREGOR	GLFA	529	23/03/2011	29/03/2011	14:45:00	15:45:00	117	22.12
2011	Service Station	ELANORA	GLFA	793	8/04/2011	14/04/2011	7:45:00	8:45:00	125	15.76
									AVERAGE	29.32

Source: https://data.qld.gov.au/dataset/traffic-generation-data-2006-2018/resource/73079dc1-c34e-44cf-9e9a-8acb13591c1b

It is considered that this calculated rate is more appropriate for the site than the standard trip generation rates recommended in the DTMR's *Road Planning and Design Manual (Chapter 3)* and the RTA *Guide to Traffic Engineering Developments* of 66 trips / 100m² GFA in the peak hour. This is because the adoption of this rate for the development would equate to a peak hour generation of 100 trips for the site, which is considered to be excessive when compared to the peak hourly traffic on the adjacent section of the Capricorn Highway (peak approx. 350 vph). While the main use of the service station is expected to be "drop-in" trips by vehicles passing on the Highway, it is not considered reasonable to assume that 10 - 20% of the passing vehicles would utilise the service station development.

As such the adoption of the calculated rate from the Queensland Government's Traffic Generation Data—2006–2017 of 29.32 trips / 100m² for service stations under 1,000m² GFA is considered acceptable, which equates to a peak hour traffic generation of 35 trips during the AM and PM periods.

4.2. TRAFFIC DISTRIBUTION

Given the proposed development is a service station with no ancillary retail services, it is anticipated that the vast majority of trips generated by the proposed development will be undiverted "drop-in" trips undertaken by vehicles travelling past on the Capricorn Highway.

However, with a view to maintaining a conservative approach, it has been assumed that 20% of trips generated by the service station during the peak hours will be destination (i.e. new) trips, with a summary of the expected distribution of traffic from the development provided in **Table 5** below.

Table 5 Proposed Development Traffic Distribution

AM PEAK	PM PEAK
ARRIVAL / DEPARTURE SPLIT	
• 50% traffic inbound to development; and • 50% traffic outbound from development.	• 50% traffic inbound to development; and • 50% traffic outbound from development.
"NEW" TRIP DISTRIBUTION (20% Overall Trips)	
INBOUND • 100% from Capricorn Highway (50% from East and 50% from West). **OUTBOUND** • 100% to Capricorn Highway (50% to East and 50% to West).	**INBOUND** • 100% from Capricorn Highway (50% from East and 50% from West). **OUTBOUND** • 100% to Capricorn Highway (50% to East and 50% to West).

"DROP-IN" TRIP DISTRIBUTION (80% Overall Trips)	
INBOUND • 100% from Capricorn Highway (50% from East and 50% from West). **OUTBOUND** • 100% to Capricorn Highway (50% to East and 50% to West).	**INBOUND** • 100% from Capricorn Highway (50% from East and 50% from West). **OUTBOUND** • 100% to Capricorn Highway (50% to East and 50% to West).

4.3. DEVELOPMENT TRAFFIC VOLUMES ON THE NETWORK

Based on the information outlined above and the conservative assumptions applied, an estimate of the additional development traffic volumes at the key site access intersection with Capricorn Highway were established, with a summary of the resultant AM and PM peak hour development traffic volumes provided in **Figure 4** to **Figure 9** below, noting that approximately 28% of the development traffic is assumed to be heavy vehicles.

The development year has been assumed as 2021 and the 10 year design horizon as 2031.

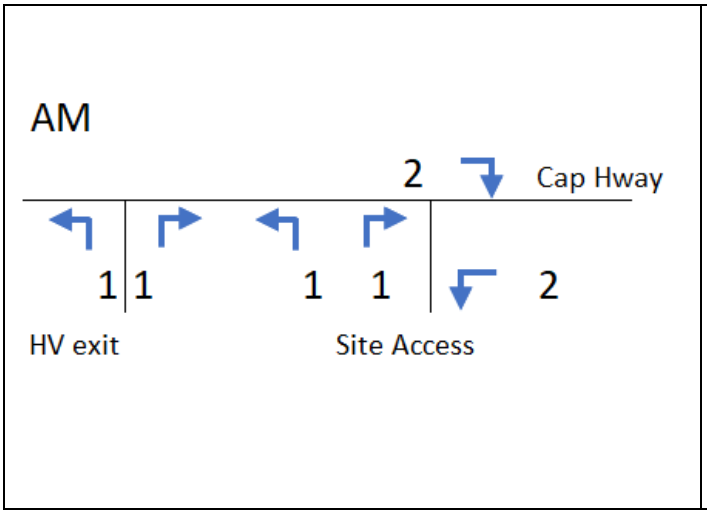


Figure 4 "New Trip" Development Volumes AM Peak

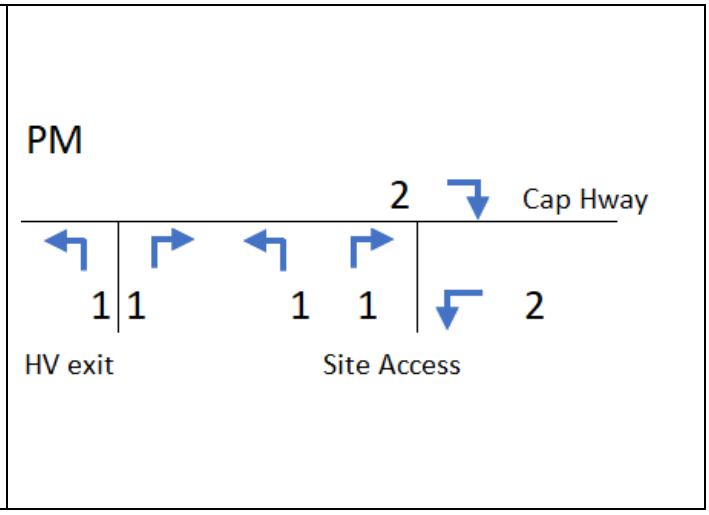


Figure 5 "New Trip" Development Volumes PM Peak

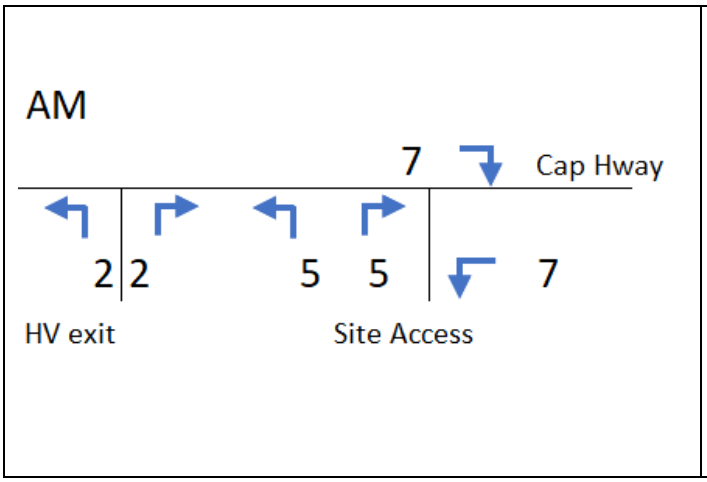


Figure 6 "Drop In" Development Volumes AM Peak

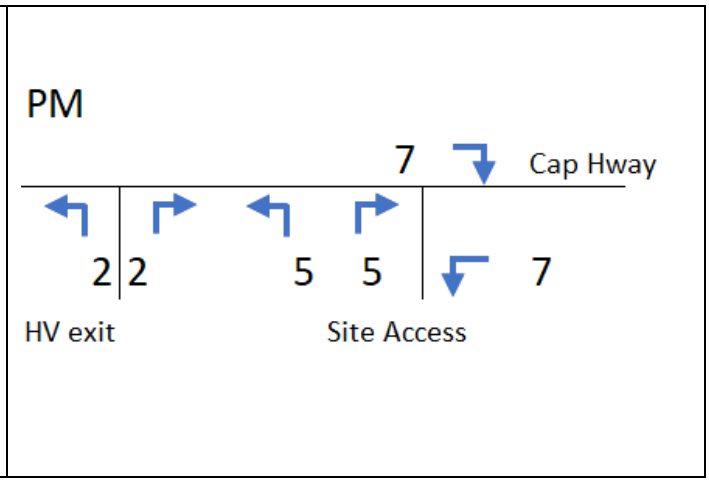


Figure 7 "Drop In" Development Volumes PM Peak

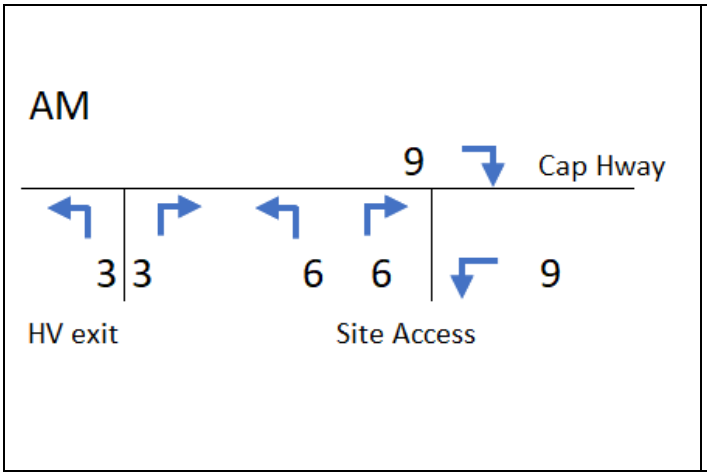


Figure 8 Total Development Traffic Volumes AM Peak

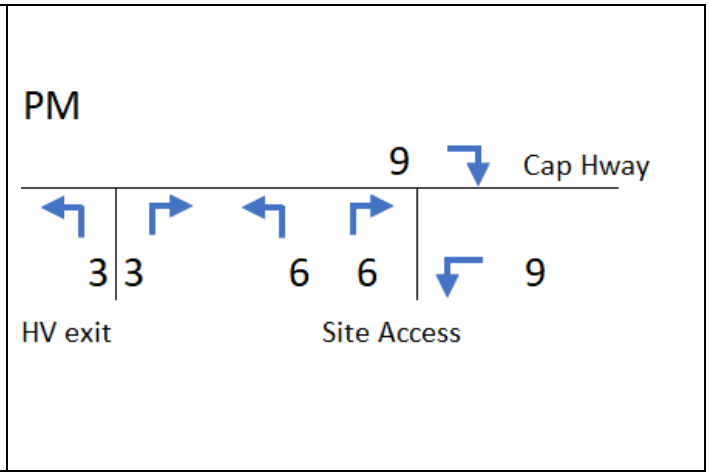


Figure 9 Total Development Traffic Volumes PM Peak

5.0 IMPACT ASSESSMENT AND MITIGATION

Further details of the assessment of the impact of the development on road network is provided in the following sections.

5.1. WITH AND WITHOUT DEVELOPMENT TRAFFIC VOLUMES

5.1.1 ROAD LINK VOLUMES

As previously discussed, given the proposed development is a service station (with no ancillary retail services) it is anticipated that the majority of trips generated by the proposed development will be undiverted drop-in trips.

Whilst the development is predicted to generate in the order of 35 vehicle trips (entry and exit) in the AM and PM peak hours, at least 80% of these trips are expected to be undiverted drop-in trips by vehicles travelling past the site on the Capricorn Highway, which would have been on the road network even in the absence of the proposed development. Accordingly, the impact of the proposed development upon existing road link volumes is anticipated to be negligible.

5.2. ACCESS AND FRONTAGE IMPACT ASSESSMENT AND MITIGATION

The proposed site access ingress and egress will be provided as per **Figures 3.** Sight visibility from all 3 proposed access locations comfortably achieves minimum SISD of 214m for a 90 kph design speed in both directions although some vegetation clearing will be required at Westwood Creek to maintain SISD to the west as per **Figure 10** below.

Figure 10 Proposed Vegetation Clearing

Forecast through road and access volumes are based on **Table 1** and **Figures 8 and 9,** the derived hourly volumes from **Appendix A** and a compound growth rate of 2.0% which are shown in **Figures 11 to 14** below for the opening year of 2021 and a 10 year design horizon of 2031 assuming a 10% peak hour factor.

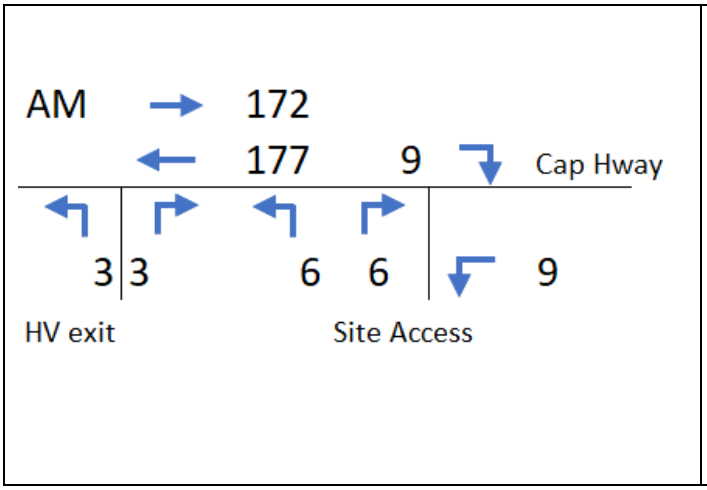


Figure 11 Development Volumes AM Peak 2021

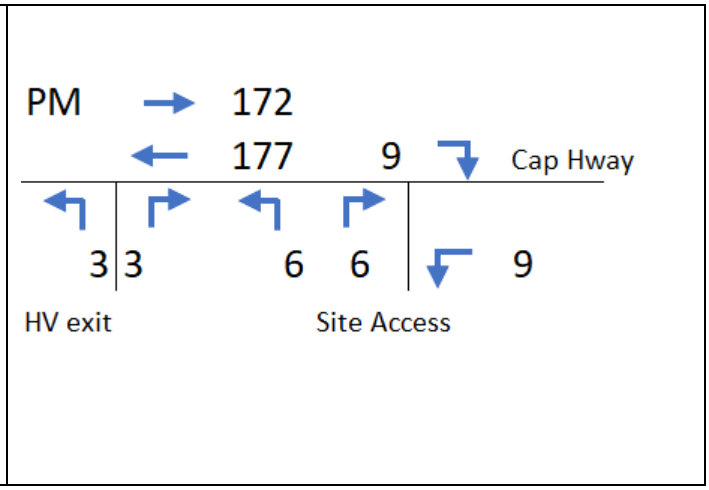


Figure 12 Development Volumes PM Peak 2021

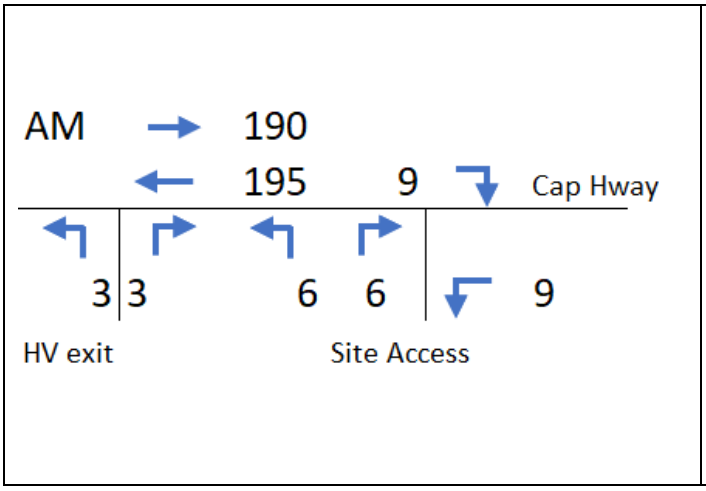


Figure 13 Development Volumes AM Peak 2031

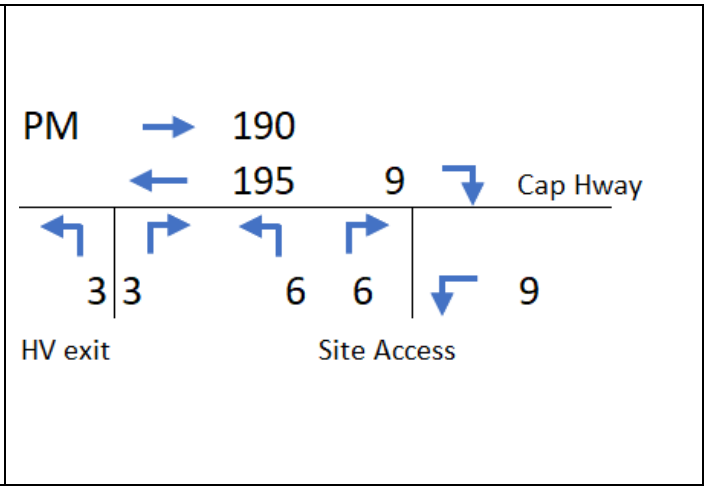


Figure 14 Development Volumes PM Peak 2031

A turn warrants assessment was undertaken for the current site access intersection with the Capricorn Highway based on the forecast 2031 post development traffic volumes from the proposed Westwood Service Station as identified in **Figure 13** and **Figure 14** above. The assessment was completed using Figure 2.26b of Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings, which depicts the turn warrants graph for design speeds between 70km/h and 100km/h.

The resultant graph from the assessment for the post development (2031) traffic conditions (worst case am peak) is provided in **Figure 15** below.

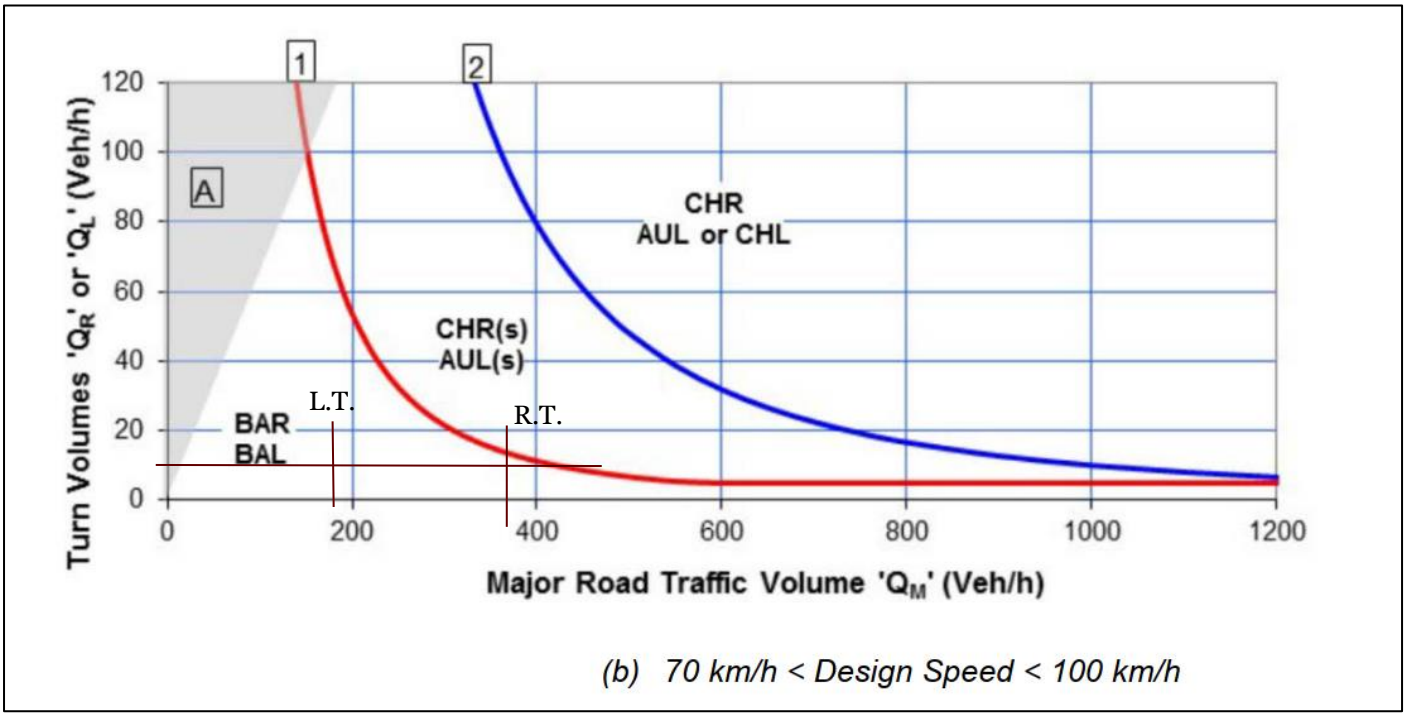


Figure 15 Turn Warrants Graph (70-100km/hr) – Post Development Traffic Volume Scenario (2031)

The results of the turn warrants assessment indicate that the recommended turn treatments at the site access intersection of the Capricorn Highway/site access intersection for the post development traffic volume scenario is a BAR/BAL treatment designed for swept paths for a Type 1 Road Train combination vehicle and a design speed of 90kph similar to **Figure 16**.

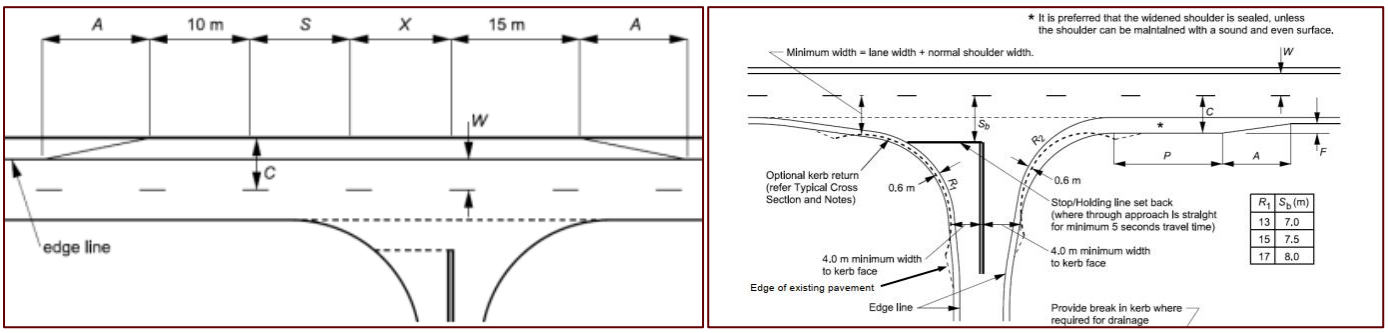


Figure 16 Conceptual BAR/BAL

TMR also requested that some consideration be given to the location of the new service station access in relation to the existing parking for the shop/hotel. The service station exit needs to be squared up and some road reserve parking relocated from in front of the existing shop/hotel. Additional parking can be obtained by removing the existing gravel access adjacent to the existing shop as per **Figure 17**. Further refined design detail can be provided in Operational Works/Sect 33 Approval phases of the project.

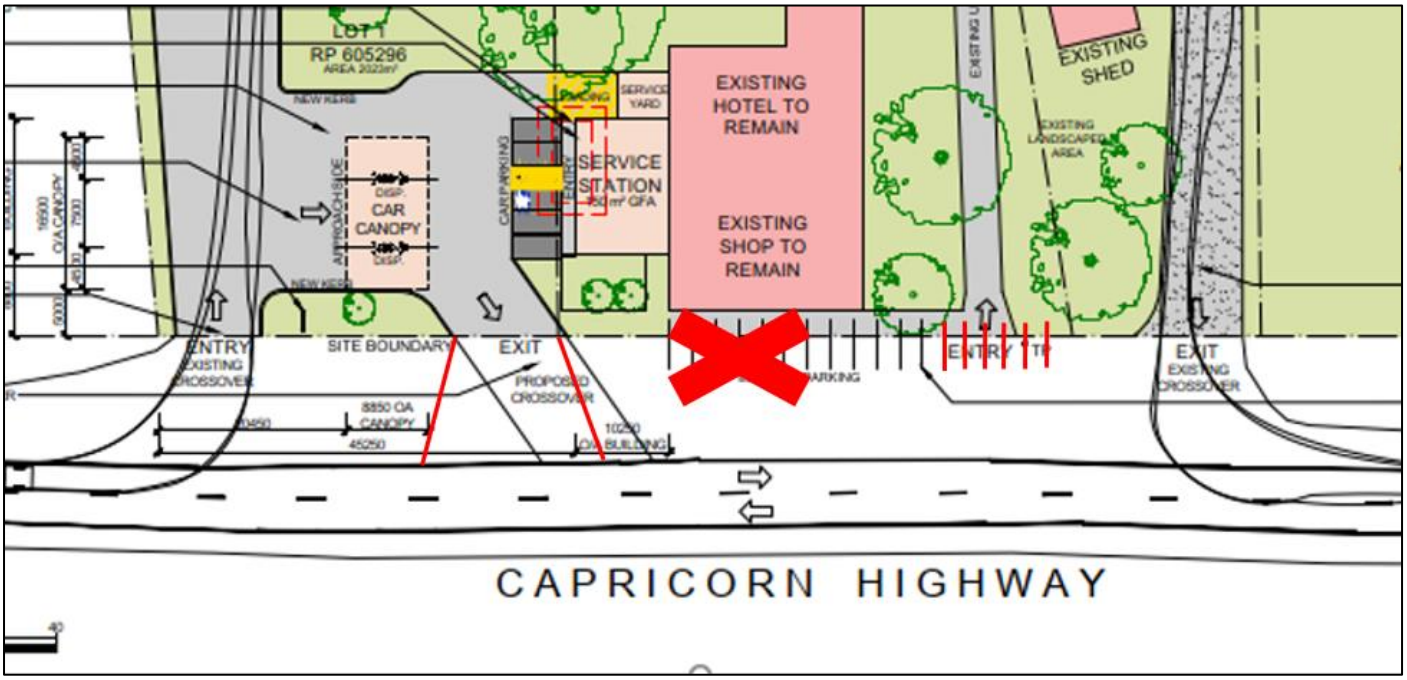


Figure 17 Proposed Exit and Parking Changes

Further to this, TMR has noted that lighting would be required at the proposed site access intersection. As such an assessment of the warrants for road lighting has been undertaken in accordance with Figure 17.1 of TMR's *Road Planning and Design Manual*, adopting estimates of the daily traffic volumes on both the Bruce Highway and the site access road (estimated to be approximately 10% of peak hour volume calculated).

The results of this assessment are shown in **Figure 18** below and identify that based on the estimated traffic flows at the intersection, that Category V5 road lighting is required to be provided at the Capricorn Highway / site access intersection as part of the proposed upgrade works associated with the proposed service station development.

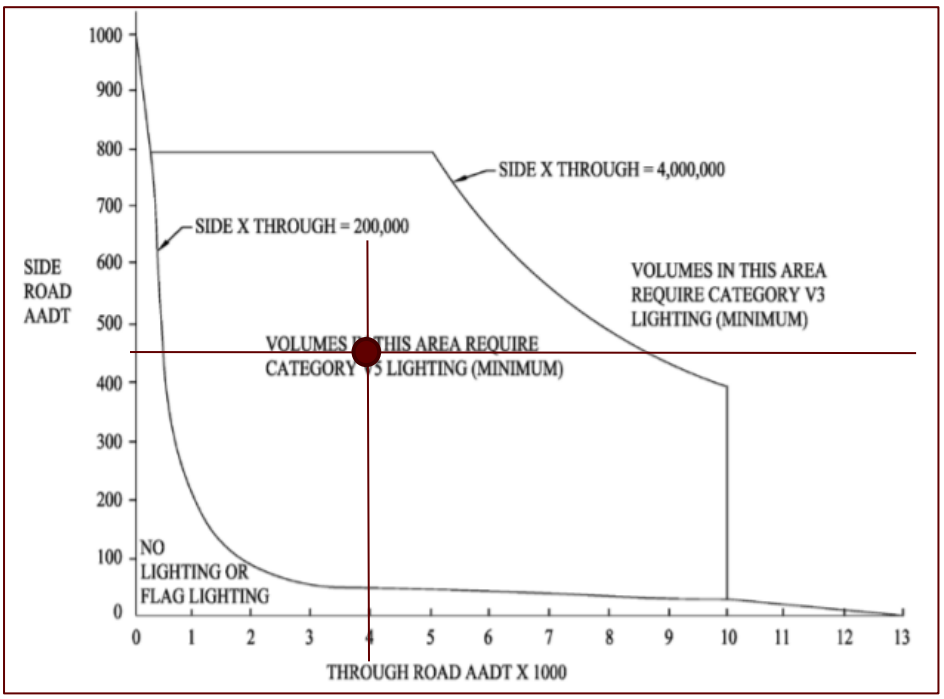


Figure 18 Road Lighting Warrants Assessment – Post Development Traffic Volumes

5.3. PAVEMENT IMPACT ASSESSMENT AND MITIGATION

Given the proposed development is a service station on a major arterial road and is not expected to generate a significant number of new heavy vehicle movements under typical operation, no pavement mitigation works are deemed warranted or required as a result of the proposal.

6.0 PROPOSED STAGING

6.1 STAGING DETAILS AND PROPOSED WORKS

The proposal is to construct the development in 2 distinct stages as per **Figure 19** below.

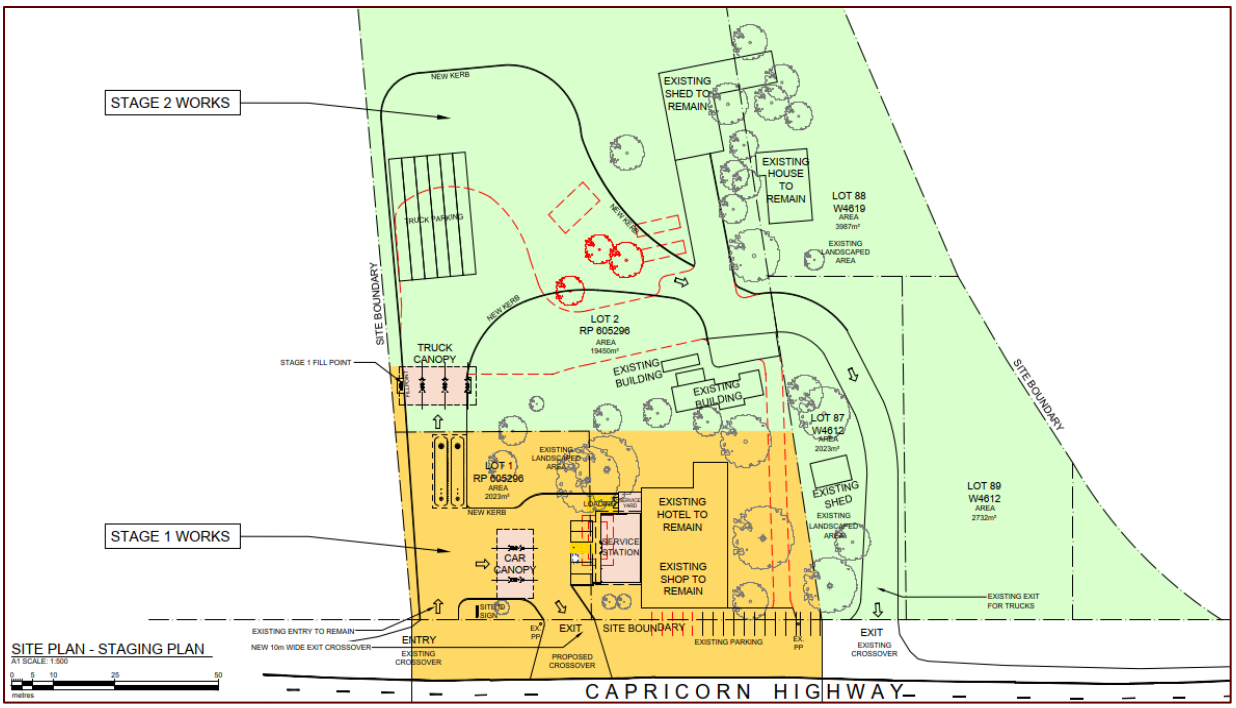


Figure 19 Staging Plan

It is anticipated that this Staging Plan will permit the Stage 1 works including the proposed access with the Capricorn Highway to be constructed initially and the Stage 2 works comprising the truck filling canopy, truck parking facilities and truck exit intersection be provided at a later date.

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 SUMMARY OF IMPACTS AND MITIGATION MEASURES PROPOSED

7.1.1 INTERNAL FACILITIES

The traffic elements of the proposed plan of development have been presented generally in accordance with the requirements of AS2890 and the Access, Parking and Transport Code within the Rockhampton Regional Council Planning Scheme.

The proposed on-site parking provision of **5 spaces**, including 1 PWD bay is considered adequate to cater for the parking demand expected to be generated by the development. Additional heavy vehicle parking is proposed at the rear of the site.

In addition, the proposed shop and petrol tank servicing and refuse collection arrangements for the service station development can be considered adequate, with the swept paths of all nominated service vehicles shown to comfortably be able to enter the site, access the required loading and servicing locations for the development and egress the site in a forward gear.

7.1.2 TRAFFIC IMPACTS

The turn warrants assessment undertaken based on the estimated post development traffic volumes (2031) indicated that the recommended turn treatments for the site access intersection of the Capricorn Highway / site access was a BAL/BAR treatment for a 90kph design speed and a Type 1 Road Train design vehicle including V5 overhead lighting.

7.1.3 RECOMMENDATIONS

In light of the information provided above, it is concluded that conditional to the provision of the identified upgrade works to the Capricorn Highway/site access intersection (including the provision of road lighting) and the rearrangement of the existing road reserve car parking, the proposed development will have a negligible impact on the adjacent road network and can therefore be recommended to be approved from a traffic engineering perspective. In relation to proposed development staging it is anticipated that Stage 1 works including the site access roadworks will be constructed initially and Stage 2 works to provide for trucks and truck egress be constructed at a later date and any development conditions should reflect this Staged approach.

7.2 CERTIFICATION STATEMENT AND AUTHORISATION

A copy of the RPEQ certification and authorisation statement covering this assessment of the proposed Westwood Service Station development located at 4589 Capricorn Highway, Westwood (LOT 1 & 2 PLAN 605296, LOTS 87 & 89 PLAN W4612 & LOT 88 W4619) is included for reference as **Appendix C**.

APPENDIX A

TMR Traffic Data

Traffic Analysis and Reporting System

AADT Segment Analysis Report (Complete)

Road Section 16A - CAPRICORN HIGHWAY (ROCKHAMPTON - DUARINGA)

Traffic Year 2019

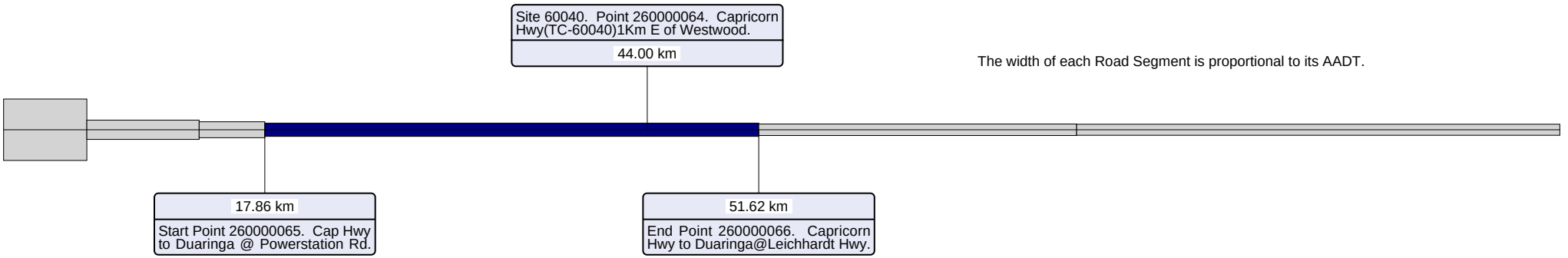
Road Segments Summary - All Vehicles

Region	Segment Start Tdist	Segment End Tdist	Site	Site Tdist	Description	AADT			VKT (Millions)			Data Year	Page
						G	A	B	G	A	B		
404	0.000 km	5.690 km	60039	3.070 km	Capricorn Hwy 1.5Km West Bruce Hwy	8,289	7,503	15,792	17.21501	15.58261	32.79762	2018	2
404	5.690 km	13.367 km	60010	8.690 km	Capricorn Hwy 3km West Gracemere	2,555	2,401	4,956	7.15938	6.72785	13.88723	2019	3
404	13.367 km	17.856 km	61457	14.580 km	Capricorn Hwy WiM Site at Kabra	2,075	2,018	4,093	3.39986	3.30646	6.70632	2019	4
404	17.856 km	51.620 km	60040	44.000 km	Capricorn Hwy 1Km East of Westwood	1,734	1,686	3,420	21.36957	20.77803	42.14760	2019	5
404	51.620 km	73.350 km	60045	64.000 km	Capricorn Hwy at 41 Mile Ck	1,477	1,480	2,957	11.71475	11.73855	23.45330	2019	6
404	73.350 km	106.380 km	150050	92.220 km	Capricorn Hwy 300m East of Int 16A/462	1,378	1,461	2,839	16.61310	17.61374	34.22684	2018	7
								Totals	77.47167	75.74724	153.21891		

Road Segments Summary - Heavy Vehicles only

VKT totals are calculated only if traffic class data is available for all sites.

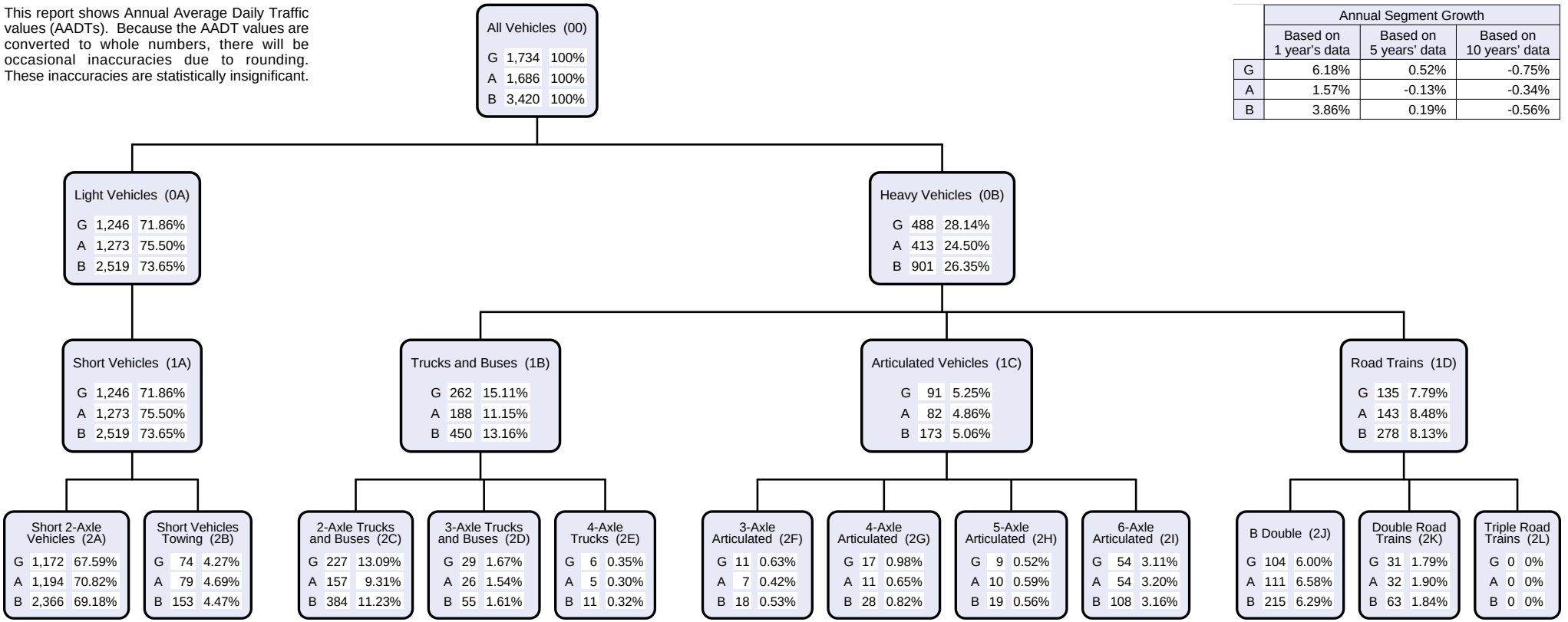
Region	Segment Start Tdist	Segment End Tdist	Site	Site Tdist	Description	HV AADT						HV VKT (Millions)			Data Year	Page
						G		A		B						
						AADT	HV %	AADT	HV %	AADT	HV %	G	A	B		
404	0.000 km	5.690 km	60039	3.070 km	Capricorn Hwy 1.5Km West Bruce Hwy	892	10.76%	1,949	25.98%	2,841	17.99%	1.85255	4.04778	5.90033	2018	2
404	5.690 km	13.367 km	60010	8.690 km	Capricorn Hwy 3km West Gracemere	615	24.07%	675	28.11%	1,290	26.03%	1.72329	1.89142	3.61472	2019	3
404	13.367 km	17.856 km	61457	14.580 km	Capricorn Hwy WiM Site at Kabra	1,071	51.61%	1,647	81.62%	2,718	66.41%	1.75482	2.69858	4.45340	2019	4
404	17.856 km	51.620 km	60040	44.000 km	Capricorn Hwy 1Km East of Westwood	488	28.14%	413	24.50%	901	26.35%	6.01404	5.08975	11.10380	2019	5
404	51.620 km	73.350 km	60045	64.000 km	Capricorn Hwy at 41 Mile Ck	287	19.43%	310	20.95%	597	20.19%	2.27633	2.45875	4.73508	2019	6
404	73.350 km	106.380 km	150050	92.220 km	Capricorn Hwy 300m East of Int 16A/462	417	30.26%	422	28.88%	839	29.55%	5.02733	5.08761	10.11494	2018	7
											Totals	18.64836	21.27390	39.92226		



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.

	Annual Segment Growth		
	Based on 1 year's data	Based on 5 years' data	Based on 10 years' data
G	6.18%	0.52%	-0.75%
A	1.57%	-0.13%	-0.34%
B	3.86%	0.19%	-0.56%



Report Notes for AADT Segment Analysis Report (Complete)

AADT Segment Report

Provides AADT Segment details for a Road Section together with the traffic flow data collected at the related Site. Traffic data is reported by the start and end Through Distance of the AADT Segments on each section of road. The road segments are represented diagrammatically with AADT data including:

AADT	by direction of traffic flow
VKT	Vehicle Kilometres Travelled
%VC	Percentage Vehicle Class as per the Austroads vehicle classification scheme

Annual Average Daily Traffic (AADT)

Annual Average Daily Traffic (AADT) is the number of vehicles passing a point on a road in a 24 hour period, averaged over a calendar year.

AADT Segment

Is a subdivision of a Road Section. The boundaries of an AADT Segment are it's Start Point and End Point (or Start and End Through Distance (TDist)) within the Road Section. These distances are measured in kilometres from the begining of the Road Section in Gazettal Direction. AADT Segments are determined by the traffic volume, collected at a count Site, located within the limits of each AADT Segment.

Annual Segment Growth (when displayed)

A percentage that represents the increase or decrease in AADT for the AADT Segment,using an exponential fit, calculated over a 1, 5 or 10 year period.

Area

For administration purposes the Department of Transport and Main Roads has divided Queensland into 12 Districts. The Area field in TSDM reports displays the District Name and Number.

District Name	District
Central West District	401
Darling Downs District	402
Far North District	403
Fitzroy District	404
Mackay/Whitsunday District	405
Metropolitian District	406
North Coast District	407
North West District	409
Northern District	408
South Coast District	410
South West District	411
Wide Bay/Burnett District	412

Data Year

The most recent year the traffic data was collected for this AADT Segment.

Gazettal Direction

The Gazettal Direction is the direction of the traffic flow. It can be easily recognised by referring to the name of the road eg. Road Section: 10A Brisbane - Gympie denotes that the gazettal direction is from Brisbane to Gympie.

G	Traffic flowing in Gazettal Direction
A	Traffic flowing against Gazettal Direction
B	The combined traffic flow in both Directions

Road Section

Is the Gazetted road from which the traffic data is collected. Each Road Section is given a code, allocated sequentially in Gazettal Direction. Larger roads are broken down into sections and identified by an ID code with a suffix for easier data collection and reporting (eg. 10A, 10B, 10C). Road Sections are then broken into AADT Segments which are determined by traffic volume.

Site

The physical location of a traffic counting device. Sites are located at a specified Through Distance along a Road Section.

Site TDist

The Through Distance in gazettal direction from the start of the Road Section at which the site is located.

Site Description

The description of the physical location of the traffic counting device.

Start and End Point

The unique identifier for the Through Distance along a Road Section.

Through Distance

The distance, in kilometres, from the beginning of the Road Section in Gazettal Direction.

Traffic Class

Is the 12 Austroads vehicle categories or classes into which vehicles are placed or binned. Traffic classes are formed in a hierarchical format.

Volume or All Vehicles

00 = 0A + 0B

Light Vehicles

0A = 1A
1A = 2A + 2B

Heavy Vehicles

0B = 1B + 1C + 1D
1B = 2C + 2D + 2E
1C = 2F + 2G + 2H + 2I
1D = 2J + 2K + 2L

The following classes are the categories for which data can be captured:

Volume

00 All vehicles.

2-Bin

0A Light vehicles
0B Heavy vehicles

4-Bin

1A Short vehicles
1B Truck or bus
1C Articulated vehicles
1D Road train

12-Bin

2A Short 2 axle vehicles
2B Short vehicles towing
2C 2 axle truck or bus
2D 3 axle truck or bus
2E 4 axle truck
2F 3 axle articulated vehicle
2G 4 axle articulated vehicle
2H 5 axle articulated vehicle
2I 6 axle articulated vehicle
2J B double
2K Double road train
2L Triple road train

Vehicle Kilometres Travelled (VKT)

Daily VKT is a measure of the traffic demand. It is calculated by the length of an AADT Segment in kilometres multiplied by its AADT. The yearly VKT is the daily VKT multiplied by 365 days.

AADT Segment Summary - All Vehicles

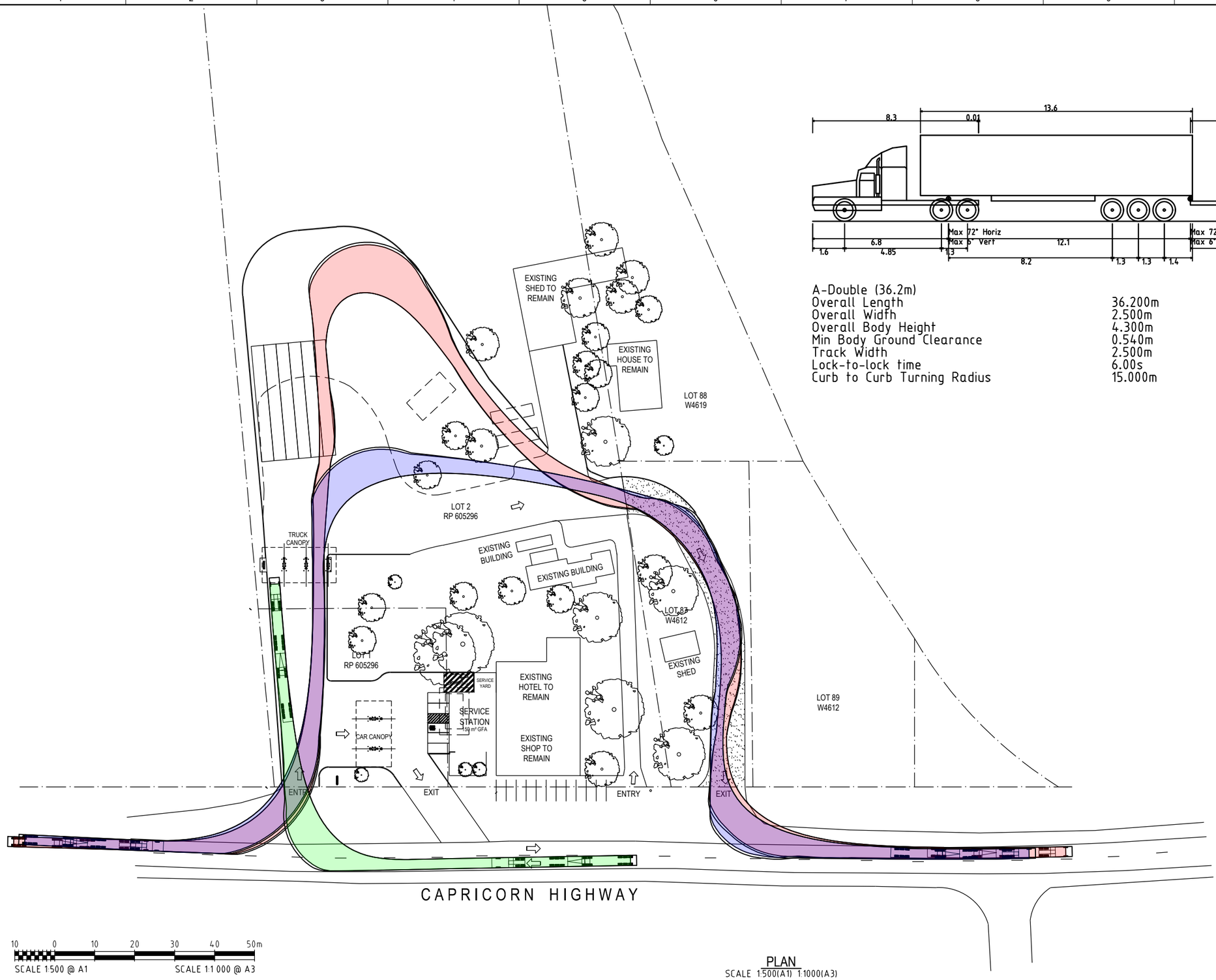
The Total VKT can be used to gauge the demand on an entire Road Section.

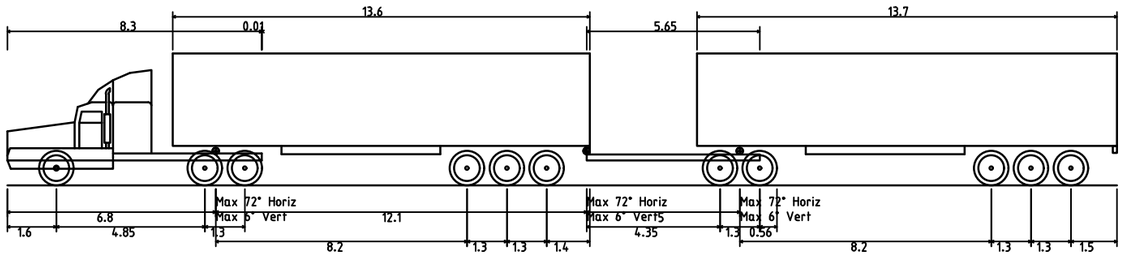
AADT Segment Summary - Heavy Vehicles only

A blank field indicates that vehicle classification data was not collected for this AADT Segment.

APPENDIX B

Site Layout Plan and Swept Paths





A-Double (36.2m)

Overall Length	36.200m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	15.000m

10 0 10 20 30 40 50m

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

PLAN
SCALE 1:500(A1) 1:1000(A3)

INFORMATION ONLY

SURVEYOR										
N/A										
ADDRESS:										
CO-ORDINATE DATUM										
HEIGHT DATUM										
	DRAWING No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	DFT	DFT CHK	DES	DES CHK
			A	05.02.2021	SUBMITTED FOR INFORMATION	BD	CH		

	BY	DATE
REVIEWED		
RPEQ ENG		
RPEQ No:		

CLIENT

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SCALE: AS SHOWN

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mcmurtrie CONSULTING ENGINEERS
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E-mail: mail@mcmengineers.com
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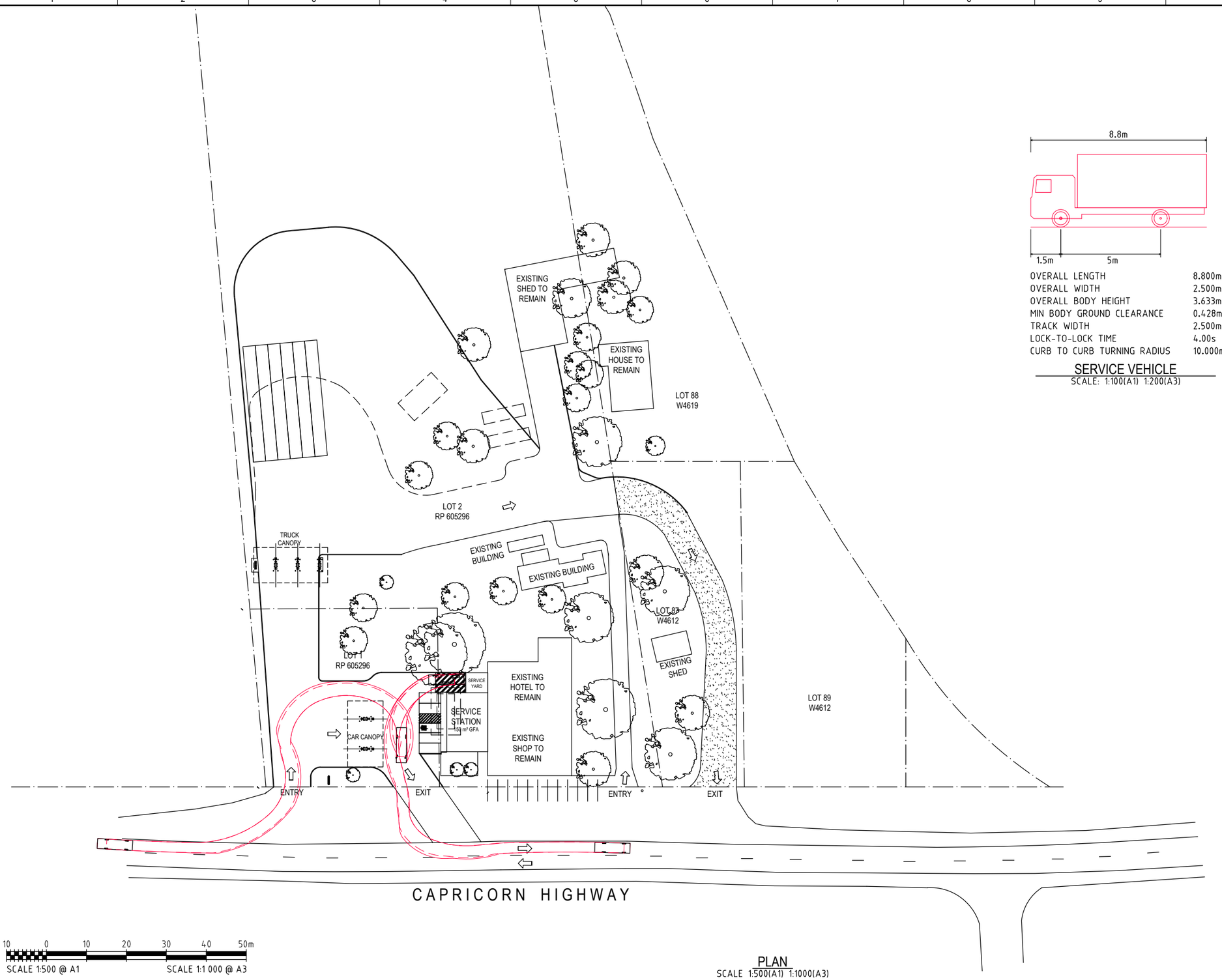
Mobile: 0407 631 066
Fax: (07) 4921 1790

CLIENT
PROJECT WESTWOOD SERVICE STATION
TITLE SWEPT PATH ANALYSIS PLAN
TYPE 1 ROAD TRAIN
SHEET 1 OF 3

A1 | DRAWING NUMBER 0672021-SK-0001 | REVISION A

PLOT DATE: 5/05/2021 6:58:09 PM DRAWING LOCATION: E:\MCE\ 231_TURNPATH CHECKS\WESTWOOD\0672021 -WESTWOOD SERVICE STATION SWEPT PATHS (MCM PLAN).DWG



10 0 10 20 30 40 50m

SCALE 1:500 @ A1 SCALE 1:1 000 @ A3

PLAN

SCALE 1:500(A1) 1:1000(A3)

OVERALL LENGTH	8.800m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	3.633m
MIN BODY GROUND CLEARANCE	0.428m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	10.000m

SERVICE VEHICLE

SCALE: 1:100(A1) 1:200(A3)

INFORMATION ONLY

SURVEYOR

N/A

ADDRESS:

CO-ORDINATE DATUM

HEIGHT DATUM

DRAWING No.	REFERENCE DRAWING TITLE

REV	DATE	REVISION DESCRIPTION	BD DFT	CH DFT CHK	DES	DES CHK
A	05.02.2021	SUBMITTED FOR INFORMATION				

	BY	DATE
REVIEWED		
RPEQ ENG		

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Fax: (07) 4921 1790
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CLIENT BAINSCO PTY LTD

PROJECT WESTWOOD SERVICE STATION

TITLE SWEPT PATH ANALYSIS PLAN
SERVICE VEHICLE
SHEET 2 OF 3

A1

DRAWING NUMBER 0672021-SK-0001

REVISION A

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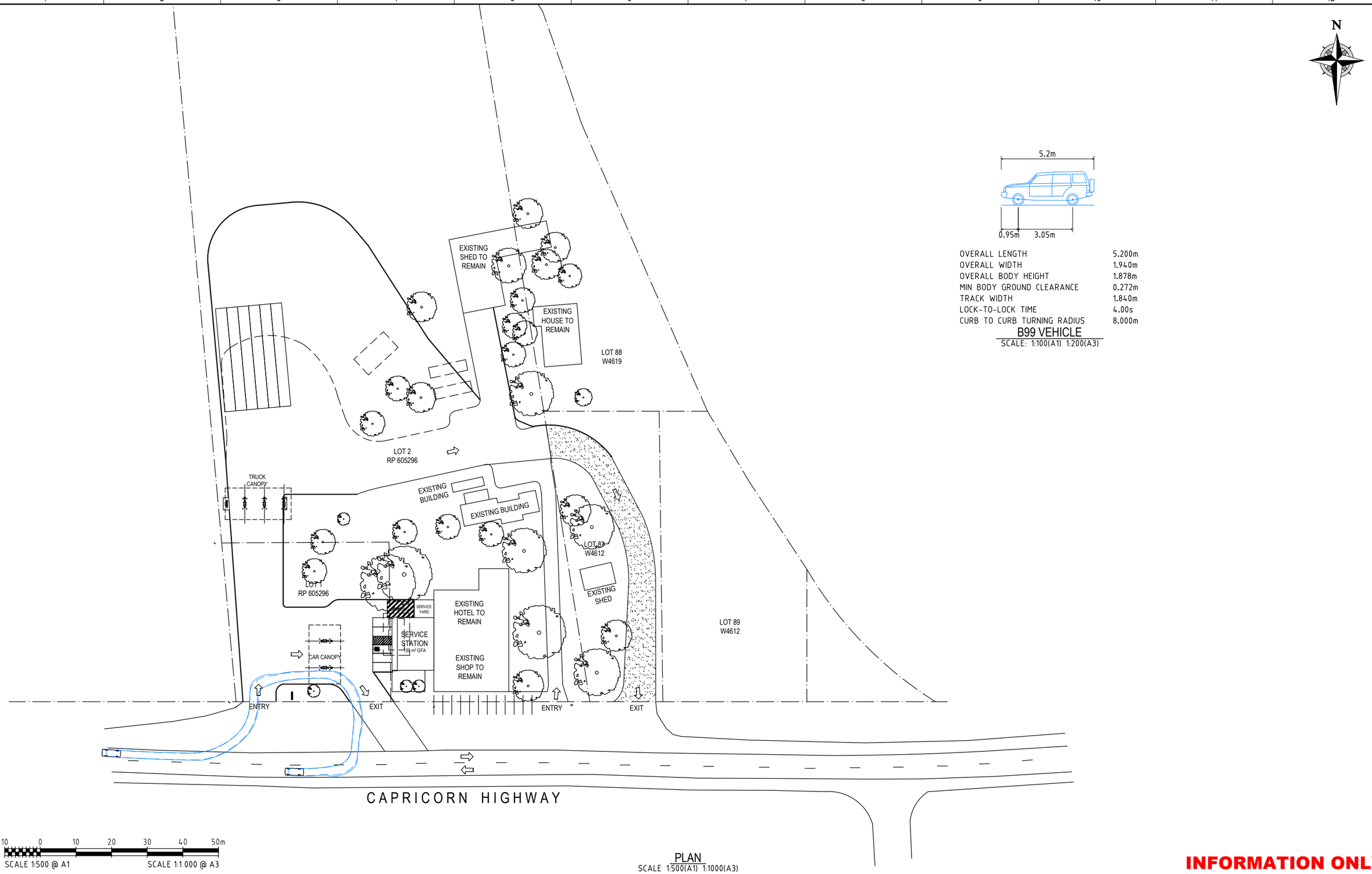

10 0 10 20 30 40 50m

SCALE 1:500 @ A1 SCALE 1:1 000 @ A3

PLAN

SCALE 1:500(A1) 1:1000(A3)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.878m
MIN BODY GROUND CLEARANCE	0.272m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	8.000m

B99 VEHICLE

SCALE: 1:100(A1) 1:200(A3)

INFORMATION ONLY

SURVEYOR
N/A
ADDRESS:
CO-ORDINATE DATUM
HEIGHT DATUM

DRAWING No.	REFERENCE DRAWING TITLE

REV	DATE	REVISION DESCRIPTION	BD DFT	CH DFT CHK	DES	DES CHK
A	05.02.2021	SUBMITTED FOR INFORMATION				

	BY	DATE
REVIEWED		
RPEQ ENG		

RPEQ No:

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E-mail: mail@mcmengineers.com

CLIENT BAINSCO PTY LTD
PROJECT WESTWOOD SERVICE STATION
TITLE SWEPT PATH ANALYSIS PLAN
B99 VEHICLE
SHEET 3 OF 3

A1

DRAWING NUMBER 0672021-SK-0001

REVISION A

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APPENDIX C

RPEQ Certification

Certification of Traffic Impact Assessment Report

Registered Professional Engineer Queensland

for

Project Title:	Westwood Service Station

As a professional engineer registered by the Board of Professional Engineers of Queensland pursuant to the *Professional Engineers Act 2002* as competent in my areas of nominated expertise, I understand and recognise:

- the significant role of engineering as a profession, and that
- the community has a legitimate expectation that my certification affixed to this engineering work can be trusted, and that
- I am responsible for ensuring its preparation has satisfied all necessary standards, conduct and contemporary practice.

As the responsible RPEQ, I certify:

i) I am satisfied that all submitted components comprising this traffic impact assessment, listed in the following table, have been completed in accordance with the *Guide to Traffic Impact Assessment* published by the Queensland Department of Transport and Main Roads and using sound engineering principles, and

ii) where specialised areas of work have not been under my direct supervision, I have reviewed the outcomes of the work and consider the work and its outcomes as suitable for the purposes of this traffic impact assessment, and that

iii) the outcomes of this traffic impact assessment are a true reflection of results of assessment, and that

iv) I believe the strategies recommended for mitigating impacts by this traffic impact assessment,

v) embrace contemporary practice initiatives and will deliver the desired outcomes.

Name:	Chris Hewitt	**RPEQ No:**	5141
RPEQ Competencies:	Civil		
Signature:		**Date:**	February 2021
Postal Address:	PO Box 2149 Wandal QLD 4700		
Email:	chris@mcmengineers.com		

Traffic impact assessment components to which this certification applies	✓
1. Introduction	
Background	✓
Scope and study area	✓
Pre-lodgement meeting notes	✓
2. Existing Conditions	
Land use and zoning	✓
Adjacent land uses / approvals	✓
Surrounding road network details	✓
Traffic volumes	✓
Intersection and network performance	N/A
Road safety issues	✓
Site access	✓
Public transport (if applicable)	N/A
Active transport (if applicable)	N/A
Parking (if applicable)	N/A
Pavement (if applicable)	N/A
Transport infrastructure (if applicable)	N/A
3. Proposed Development Details	
Development site plan	✓
Operational details (including year of opening of each stage and any relevant catchment / market analysis)	✓
Proposed access and parking	✓
4. Development Traffic	
Traffic generation (by development stage if relevant and considering light and heavy vehicle trips)	✓
Trip distribution	✓
Development traffic volumes on the network	✓
5. Impact Assessment and Mitigation	
With and without development traffic volumes	✓
Construction traffic impact assessment and mitigation (if applicable)	N/A
Road safety impact assessment and mitigation	✓
Access and frontage impact assessment and mitigation	✓
Intersection delay impact assessment and mitigation	N/A
Road link capacity assessment and mitigation	✓
Pavement impact assessment and mitigation	✓
Transport infrastructure impact assessment and mitigation	N/A
Other impacts assessment relevant to the specific development type / location (if applicable)	N/A
6. Conclusions and Recommendations	
Summary of impacts and mitigation measures proposed	✓
Certification statement and authorisation	✓

QUOTATION

DATE 19.05.21

OUR REF. 067-20-21

REPORT TYPE

Stormwater Management plan

PROJECT

Westwood Service Station

CLIENT

Singh Bros Qld Pty Ltd

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/21-2021

Dated: 21 September 2021

mcmurtrie CONSULTING ENGINEERS

DOCUMENT CONTROL

Revision History			
Revision No	**Date**	**Checked By**	**Issued By**
A	19.05.2021	MM	CWH

The information contained within this report is provided in good faith in the belief that no information, opinions or recommendations made are misleading. All comments and opinions given in this report are based on information supplied by the client, their agent and third parties.

CONTENTS

1 INTRODUCTION AND APPROACH

1.1 PROJECT OVERVIEW

McMurtrie Consulting Engineers (MCE) have been commissioned by Singh Bros Qld Pty Ltd to undertake a site-based Stormwater Management Plan (SMP) for a proposed service station located at located at lot 1 Coverley street, Westwood – described as lot 1 and 2 on RP605296, lot 88 on W4619 and lots 87 and 89 on W4612.

The aim of this SWMP 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'19) and State Planning Policy (SPP 2017).

1.2 METHODOLOGY

The assessment methodology adopted for this SWMP 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 event and duration for this project
- Estimate peak discharge runoff for pre-development and post-development scenarios.
- Identify potential mitigation and management strategies to be implemented during the construction and operational phases 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
- Queensland globe satellite imagery of existing site condition
- Geoscience Australia ELVIS - Elevation Foundation Spatial Data
- Preliminary overall layout plans
- Pluviograph rainfall data for the 'Rockhampton Aero' station (BOM)

2 SITE CHARACTERISTICS

2.1 SITE LOCATION

The proposed project site is located at lot 1 Coverley street, Westwood – described as lot 1 and 2 on RP605296, lot 88 on W4619 and lots 87 and 89 on W4612. Site details have been summarised within Table 1 and a Queensland Globe Extract is presented as Figure 1.

Table 1: Site Description

Developer	Property and Location	
	Lot and Property Description	**Address**
REO Heavy Equipment Repairs	lot 1 and 2 on RP605296, lot 88 on W4619 and lots 87 and 89 on W4612	Lot 1 Coverley street, Westwood

Figure 1: Site Location ***[source: QLD Globe]***

The site is bounded by the Capricorn highway to the West, Coverley street to the east, Residential lots to the north, and a drainage course to the south. Refer Appendix A for proposed lot layout.

2.2 TOPOGRAPHY

The development site currently consists of vacant land, gravel roads and existing structures. The existing site is approximately 16 ha in land area. The existing site drains in two separate locations, Lots 1 and 2 on RP605296 and 87 W4612 drain east to west at 1% into Capricorn highway road reserve whereas Lot 88 on W4619 and lot 89 W4612 drains north to south into the existing drainage easement. The variation to the proposed site is constrained within the western half, in order to avoid burdening the mitigation infrastructure MCE propose excluding the unchanged portion of the site from assessment and providing a bund to keep the runoff separate.

3 HYDROLOGY ASSESSMENT

3.1 LAWFUL POINT OF DISCHARGE

The stormwater strategy contained within this report will discharge stormwater the existing drainage easement. This flow is not anticipated to cause an actionable nuisance to downstream properties.

3.2 HYDRAULIC 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'19 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'19 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. There is also no historical data available to allow for a comparison or calibration for this location.

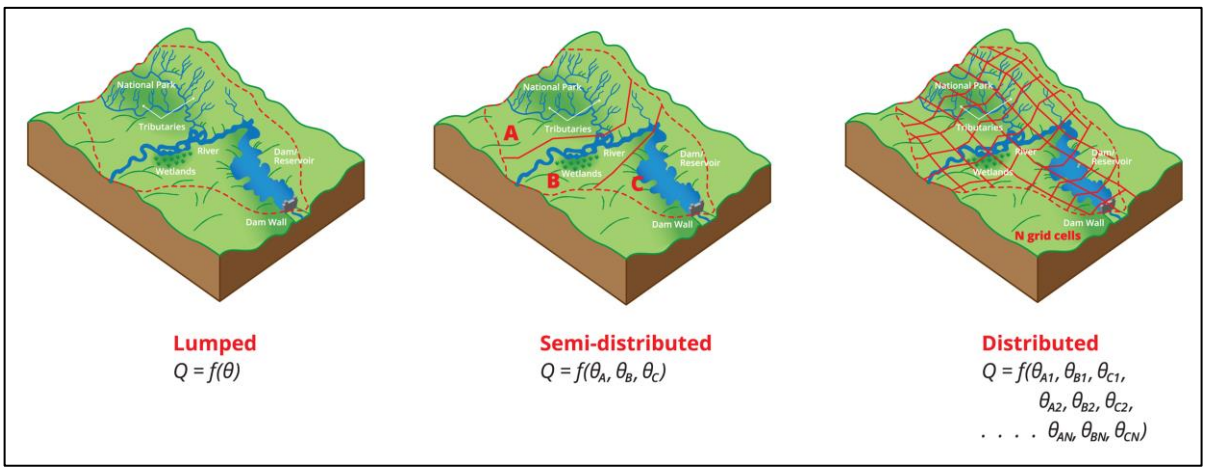

Figure 2: Catchment Analysis Options

3.2.1 CATCHMENT HYDROLOGY PARAMETERS

Below tables summarise the catchment properties of pre-development and post-development scenarios excluding the unchanged areas which are to be separate from development extents.

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

Parameter		Land Description			
		Grass	Unsealed Hardstand		Roof Area
		Pervious	Pervious	Impervious	Impervious
Area (ha)		0.966	0.264	0.265	0.142
Impervious (%)		0	0	100	100
Slope (%)		1	1	1	33
Laurenson 'n' (storage non-linearity exponent)		-0.285	-0.285	-0.285	-0.285
Infiltration	Initial Loss (mm/hr)	0	0	0	0
	Continuing Loss (mm/hr)	1.9	1.9	0	0
Manning's Roughness (n)		0.030	0.023	0.023	0.022

Table 3: Post-Development Model Parameters (XP Storm)

Parameter		Land Description				
		Grass	Unsealed Hardstand		Sealed road	Roof Area
		Pervious	Pervious	Impervious	Impervious	Impervious
Area (ha)		0.708	0.022	0.023	0.741	0.141
Impervious (%)		0	0	100	100	100
Slope (%)		15	1.1	15	1.1	1.1
Laurenson 'n' (storage non-linearity exponent)		-0.285	-0.285	-0.285	-0.285	-0.285
Infiltration	Initial Loss (mm/hr)	0	0	0	0	0
	Continuing Loss (mm/hr)	1.9	1.9	0	0	0
Manning's Roughness (n)		0.030	0.023	0.023	0.015	0.022

Applying no initial losses within the model is consistent with the requirements of both ARR'87 and ARR'19. ARR'19 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 HYDROLOGY RESULTS

Applying the ARR'19 ensemble temporal patterns to the pre and post developed catchments allowed the identification of the critical duration for the mean minor and major storm event. Below figures are the Box and Whisker plot taken from XPSTORM software. This plot shows the comparison of storm ensembles for different durations for minor and major storm events.

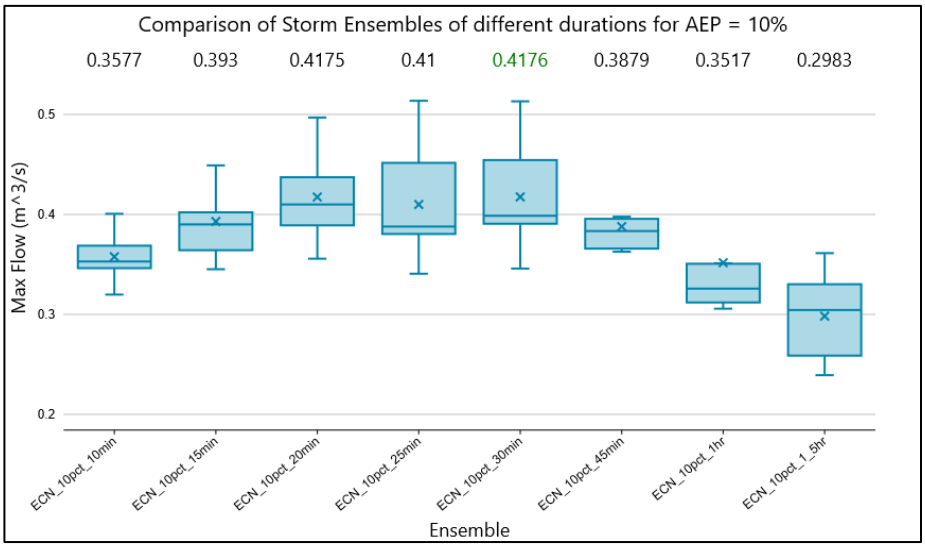

Figure 3: Comparison of Storm Ensembles of different durations for Pre-Development minor event (10% AEP) (XP Storm Model)

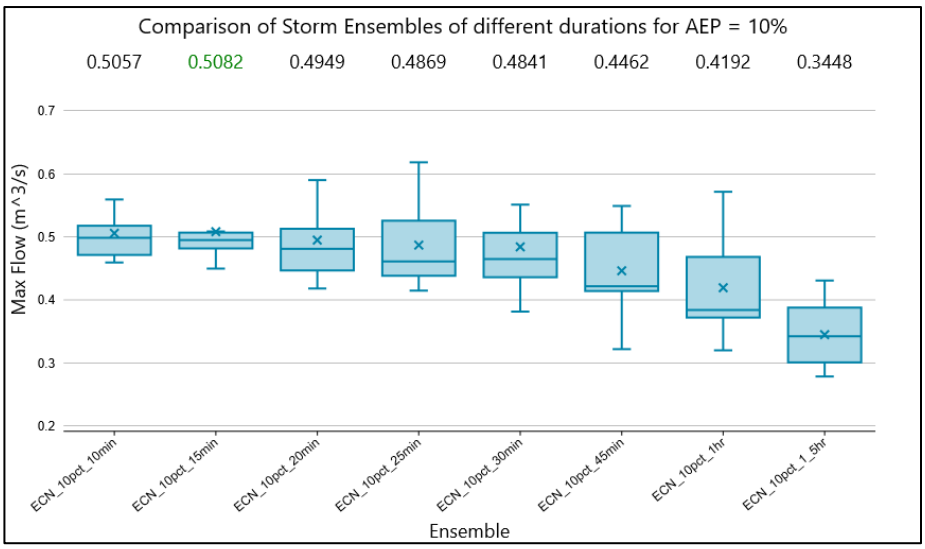

Figure 4: Comparison of Storm Ensembles of different durations for Post-Development minor event (10% AEP) (XP Storm Model)

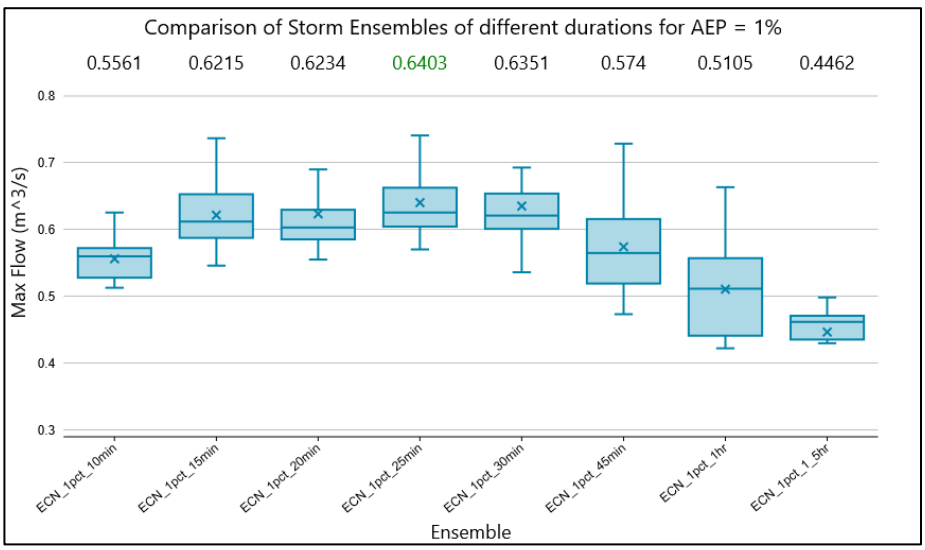

Figure 5: Comparison of Storm Ensembles of different durations for Pre-Development major event (1% AEP) (XP Storm Model)

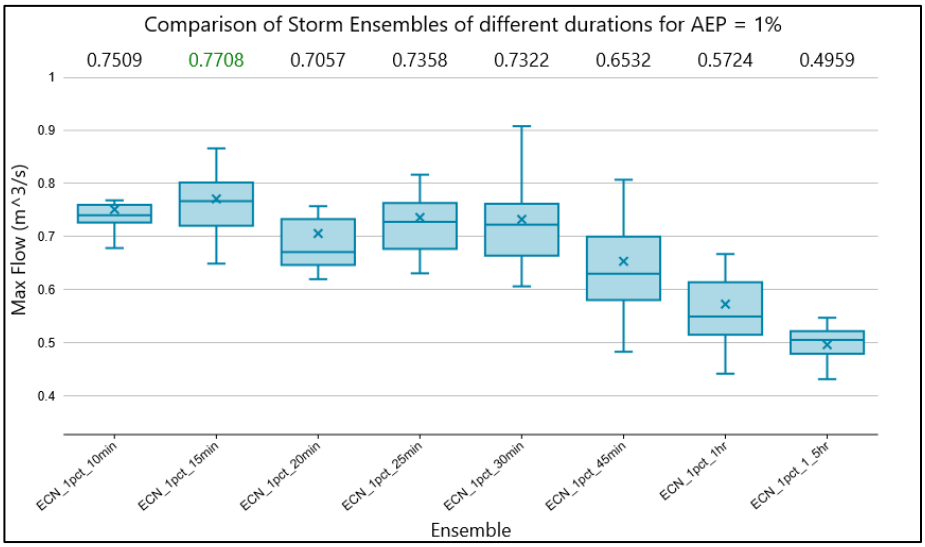

Figure 8: Comparison of Storm Ensembles of different durations for Post-Development major event (1% AEP) (XP Storm Model)

The results of each of the ensembles are summarised in Table 6. The same storm events are applied to the hydraulic analysis.

Table 4: Critical Storm Events

Annual Exceedance Probability (AEP)	Pre-Developed Site Critical Storm Event	Post-Developed Site Critical Storm Event
10% AEP (Minor Event)	10pct_30min_9	10pct_15min_1
1% AEP (Major Event)	1pct_25min_5	1pct_25min_8

4 HYDRAULIC ASSESMENT

4.1 BACKGROUND

The hydraulic assessment for the site has been carried out using XPSTORM 2020.1. The main 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 peak pre-development discharge. This aim will be achieved by detaining the site runoff via an open detention basin within the development site.

4.2 DETENTION

It is proposed to provide a 313m^3 open detention basin with 1m in depth at the southern boundary abutting the drainage easement, to ensure there will be no adverse impacts on downstream properties and infrastructure. Post-development flows from the commercial development will be directed. At this stage of the development no routing has been modelled, this is conservative as this infrastructure will provide additional detention.
Table 7 summarises the peak discharge at the LPOD for different scenarios.

Table 7: Peak Discharge at LPOD

Storm Event (AEP)	Pre-Development (m^3/s)	Post-Development without Detention (m^3/s)	Post-Development with Detention (m^3/s)		
			Pipe Outlet	Weir Outlet	Total
10% AEP (Minor Event)	0.438	0.518	0.351	0	0.351
1% AEP (Major Event)	0.642	0.754	0.477	0.049	0.526

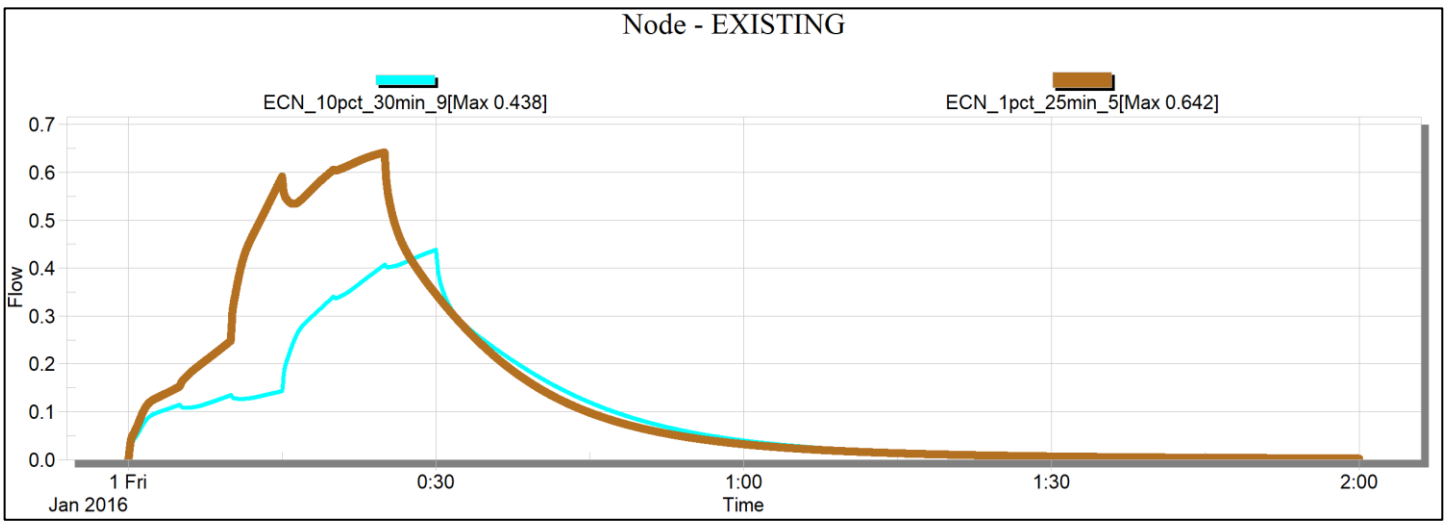

Figure 11: Pre-Development Peak Discharge at LPOD

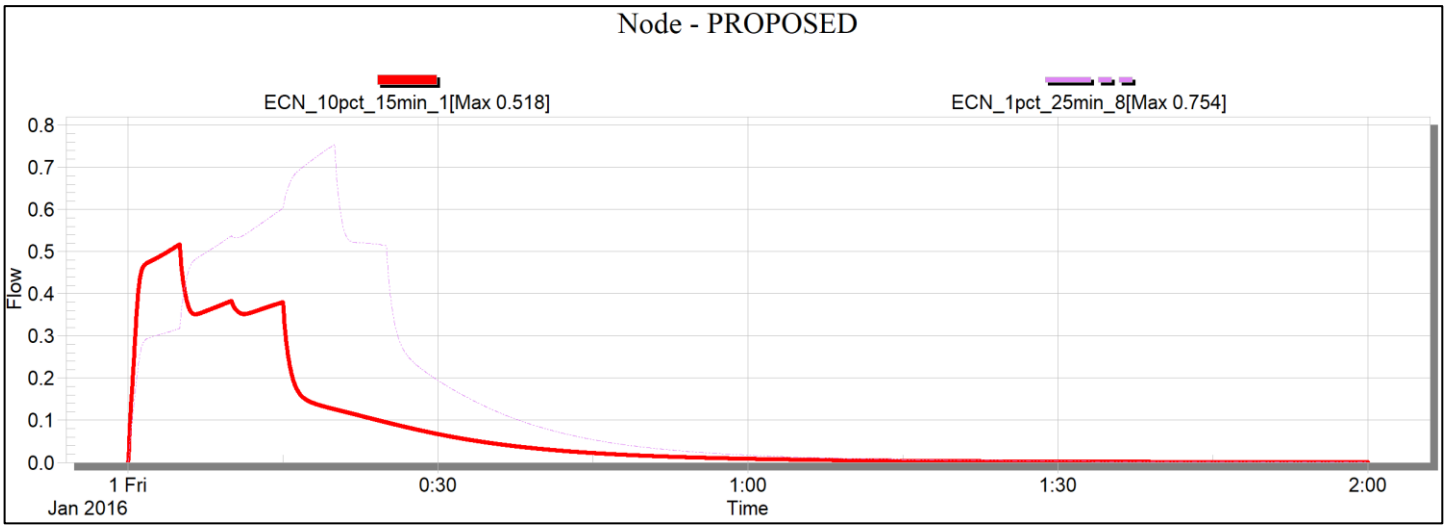

Figure 12: Post-Development Peak Discharge at LPOD (unmitigated

Table 8 summarises the detention basin parameters to achieve the target mitigated pre-development flow rates.

Table 8: Detention Basin Parameters

Total Effective Detention Volume	**313m³**
Basin invert level (stage 0 in model)	**154.1 AHD**
Extended Detention Depth over Bio-Filter (Not included in effective detention volume)	**0.3m**
Peak Water Level in 1% AEP	**154.994m AHD**
Peak Water Depth at 1% AEP	**0.894m**
Primary Discharge Structure	**450mm dia RCP**
Primary discharge Invert Level	**154.1 AHD**
Secondary Discharge Structure	**1m Weir**
Secondary Discharge Invert Level	**154.9m**

Figure 13 and 14 shows the hydraulic behaviour of the proposed 450 dia out pipe, proposed overflow weir and basin stage in post-development conditions. The post-development peak discharge rate is less than the pre-development runoff and will not adversely impact on downstream properties or structures.

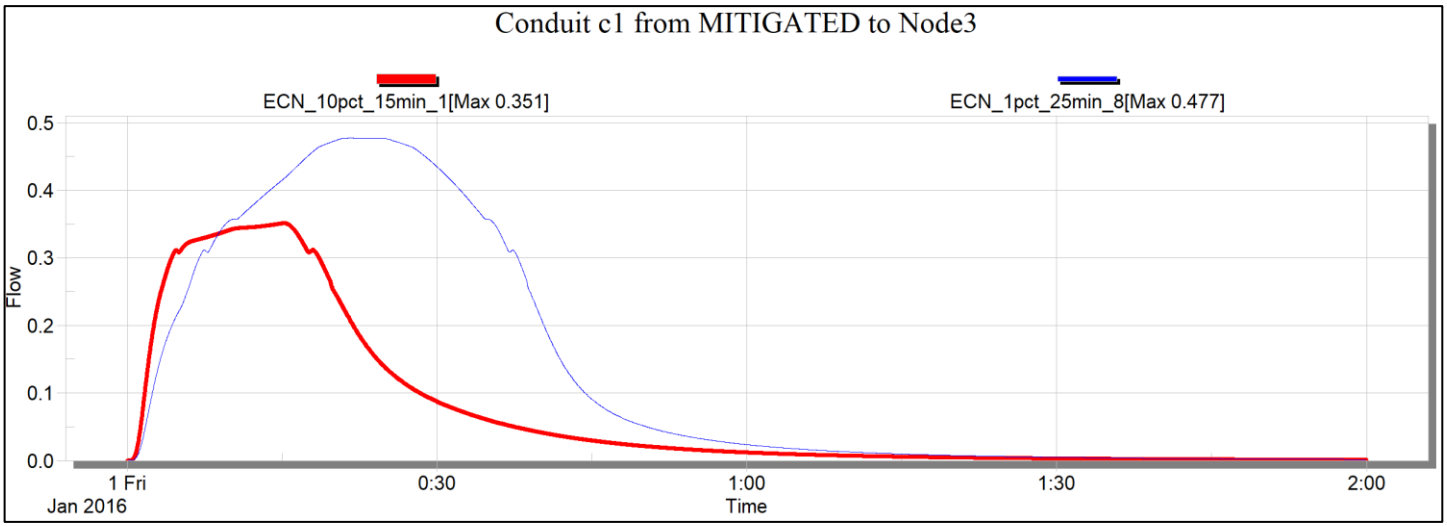

Figure 13: Post Development discharge through 450mm dia outlet

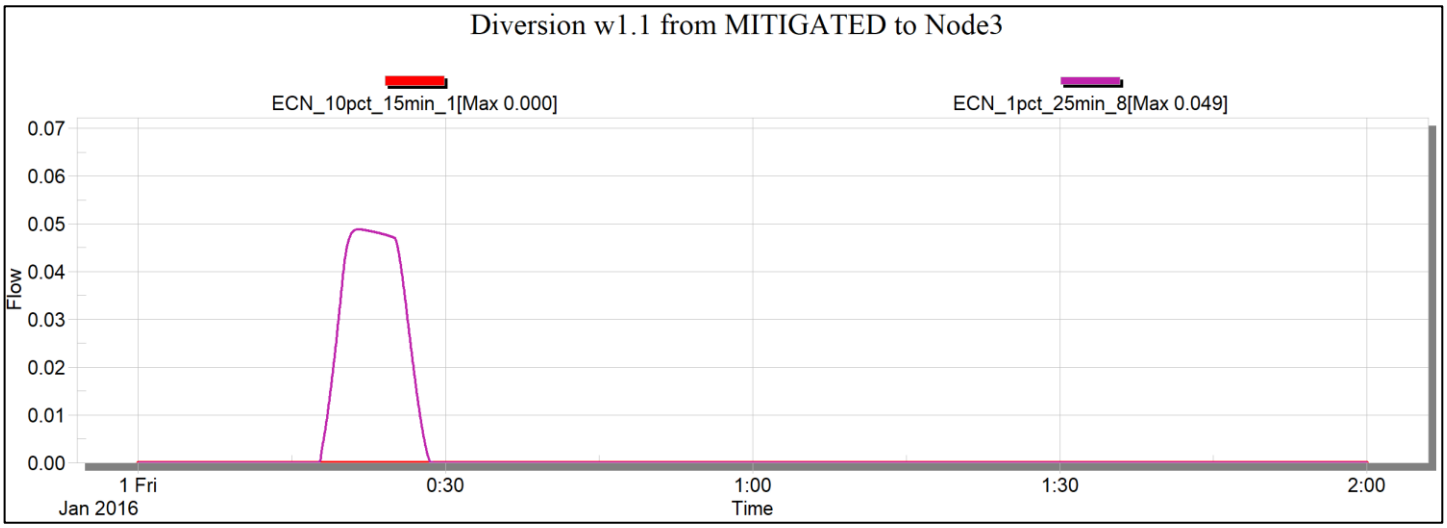

Figure 14: Post Development discharge over 1m wide overflow weir

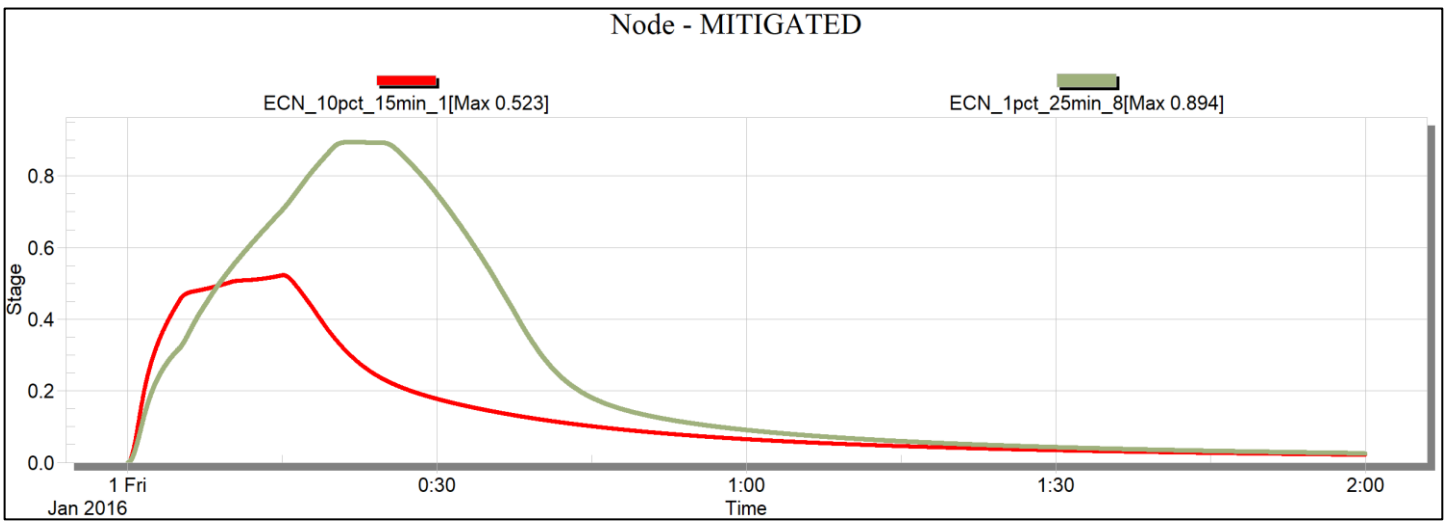

Figure 15: Post Development depth in proposed detention basin

5 QUALITY ASSESSMENT

5.1 BACKGROUND

During the construction phase of the development, disturbances to the existing ground have the potential to significantly increase sediment loads entering downstream drainage systems and watercourses.

There are two categories of pollutants generated during operational phase of the development: Those associated with SPP (suspended solids, phosphorus, nitrogen and gross pollutants), and those associated with service station operation.

In accordance with the State Planning Policy (SPP) (DILGP, July 2017), the site is situated within Western Queensland climatic region. As Westwood is less than 25,000 persons, the SPP Water Quality Objectives (WQO) do not apply and site specific operational treatment is not required.

All pollutants associated with the operation of the proposed service station will be addressed by grading a sag between all fuel bowsers and providing a proprietary underground treatment system. This system will be specified in detailed design for the operational works.

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 10 illustrates the key pollutants that have been identified.

Table 10: Key Pollutants – Construction Phase

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.

5.2.2 SEDIMENT AND EROSION CONTROLS

Sediment and erosion control devices (S&EC) employed on the site shall be designed and constructed in accordance with IECA Australasia Best Practice Erosion & Sediment Control Guidelines (2008).

PRE-CONSTRUCTION

- Stabilised site access/exit on Wade 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.

Appendix A – Concept Stormwater Layout

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OUR AFFILIATIONS

ENGINEERS AUSTRALIA

AS/NZS ISO 9001:2008 Quality Management System Certified
Registration Number 225

Local Buy
Register of Pre-Qualified Suppliers (RPQS)
Engineering Consultancy Services
Contract: BUS 226-0212

LEGEND

- GRASS AREA INCLUDED IN STORMWATER MANAGEMENT PLAN
- GRAVEL AREA
- ROOF AREA INCLUDED IN STORMWATER MANAGEMENT PLAN
- GRASS AREA EXCLUDED FROM STORMWATER MANAGEMENT PLAN
- ROOF AREA EXCLUDED FROM STORMWATER MANAGEMENT PLAN

N

10 0 10 20 30 40 50m

SCALE 1:500 @ A1 SCALE 1:1 000 @ A3

PREDEVELOPMENT LAYOUT PLAN

SCALE 1:500(A1) 1:1000(A3)

INFORMATION ONLY

SURVEYOR
N/A
ADDRESS:
CO-ORDINATE DATUM
HEIGHT DATUM

DRAWING No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	DFT	DFT CHK	DES	DES CHK
		A	19/05/2021	SUBMITTED FOR INFORMATION	IBB	IBB	IBB	CH

	BY	DATE
REVIEWED		
RPEQ ENG		

RPEQ No:

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SCALE: AS SHOWN

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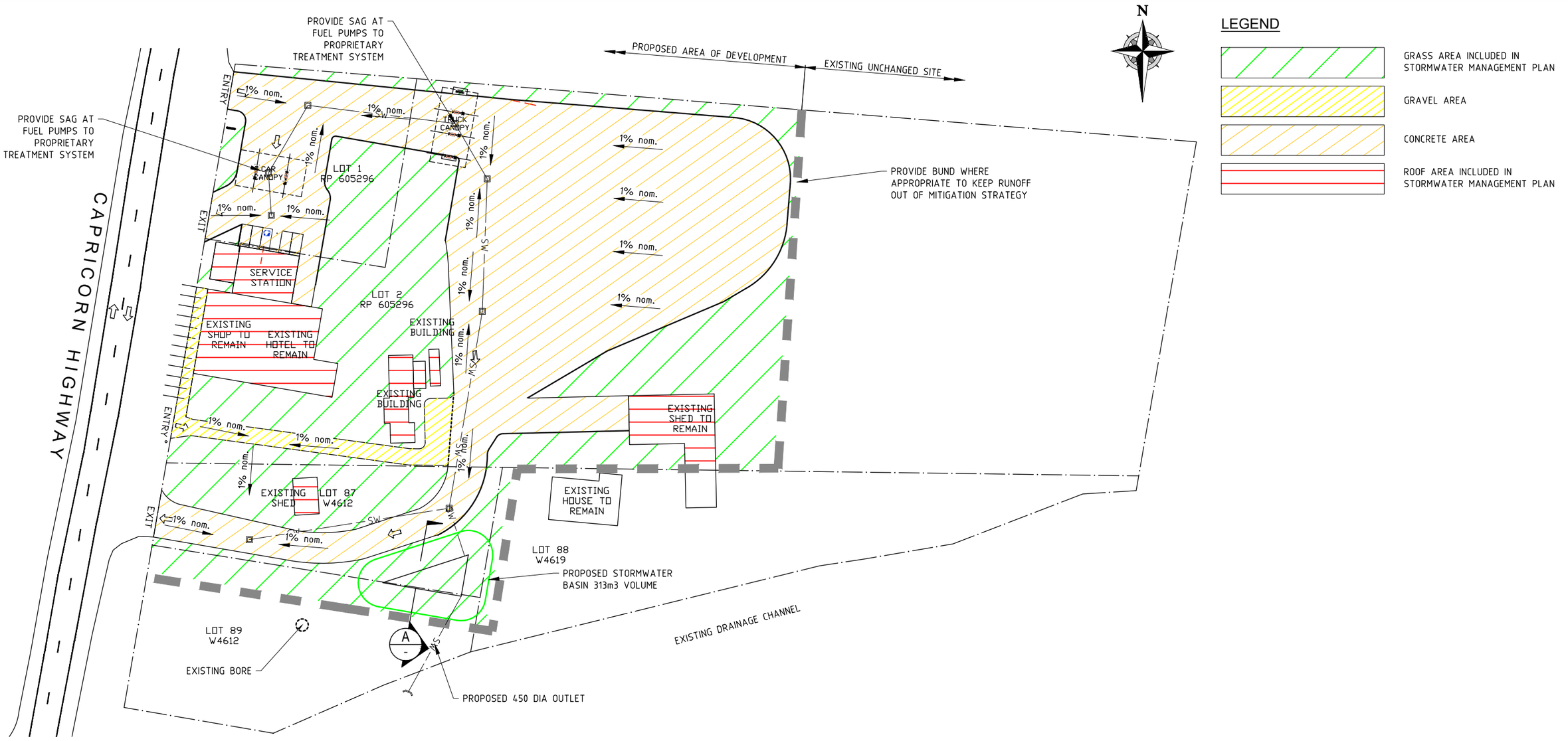
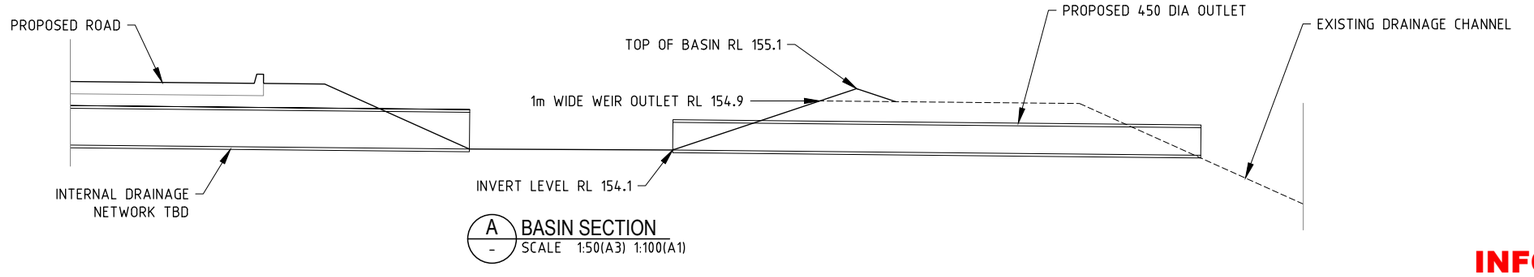
CLIENT BAINSCO PTY LTD
PROJECT WESTWOOD SERVICE STATION
TITLE PREDEVELOPMENT CATCHMENT LAYOUT

A1 | DRAWING NUMBER 0672021-SMP-001 | REVISION A

PLOT DATE: 18/05/2021 6:04:56 PM DRAWING LOCATION: S:\PROJECT RECORDS\20\21067-20-21 - WESTWOOD SERVICE STATION\DESIGN\DWGS\STORMWATER LAYOUT.DWG



POSTDEVELOPMENT LAYOUT PLAN
SCALE 1:500(A1) 1:1000(A3)



A - BASIN SECTION
SCALE 1:50(A3) 1:100(A1)

1 0 1 2 3 4 5m
SCALE 1:50 @ A1 SCALE 1:100 @ A3

10 0 10 20 30 40 50m
SCALE 1:500 @ A1 SCALE 1:1 000 @ A3

INFORMATION ONLY

REV	DATE	REVISION DESCRIPTION	DFT	DFT CHK	DES	DES CHK
A	19/05/2021	SUBMITTED FOR INFORMATION	IBB	IBB	IBB	CH

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	BY	DATE
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RPEQ ENG		

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CLIENT BAINSCO PTY LTD
PROJECT WESTWOOD SERVICE STATION
TITLE POSTDEVELOPMENT CATCHMENT LAYOUT

A1 | DRAWING NUMBER 0672021-SMP-002 | REVISION A

DRAWING LOCATION: S:\PROJECT RECORDS\20-21\067-20-21 - WESTWOOD SERVICE STATION\DESIGN\DWGS\STORMWATER LAYOUT.DWG
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