PROPOSED FUEL FILLING STATION DEVELOPMENT AT 12 QUEEN ELIZABETH DRIVE & 36 BROWN STREET, **ROCKHAMPTON, QLD**

IPUI	
TP02	EXIS
TP03	PRO
TP04	PRO
TP05	PRO
TP06	SIGN



ARCHITECTURAL DRAWING LIST:

TITLE PAGE AND SITE LOCALITY PLAN STING CONDITIONS & DEMOLITION PLAN OPOSED SITE PLAN OPOSED FLOOR PLAN OPOSED ELEVATIONS NAGE DETAILS

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with **Development Permit No.:** D/55-2020 Dated: 16 October 2020



CLIENT

RCI GROUP

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20143	TP01	P3	01 of 06

PROJECT ADDRESS 12 QUEEN ELIZABETH DRIVE & **36 BROWN STREET** BERSERKER QLD DRAWING TITLE TITLE PAGE AND SITE LOCALITY PLAN

PROJECT PROPOSED FUEL FILLING STATION DEVELOPMENT

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REV	AMENDMENT DETAILS	BY	DATE
P1	PRELIMINARY ISSUE	JS	29-04-20
P2	PLAN UPDATED TO SUIT TP03 REV. P4	JS	06-05-20
P3	CANOPY LINK ADDED	JS	03-09-20



ALL STATISTICS	A CONTRACTOR OF	12h
CHEDULE:		
SITE AREA -	1,844m²	Contraction of the local division of the loc
APING -	291m² (15.78%)	A COMPANY
<u>CY AREAS:</u> IOP -	200m²	
ACES	9 cars	A STATE

ROCKHAMPTON REGIONAL COUNCIL APPROVED PLANS

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P8	CANOPY LINK ADDED	JS	03-09-20
P7	CANOPY RELOCATED 500mm TO NORTH. LOADING BAY WIDENED	JS	12-08-20
P6	EGRESS CROSSOVER TO QUEEN ELIZABETH DRV. MODIFIED. HI FLOW DISPENSER REMOVED	JS	30-07-20
P5	INGRESS CROSSOVER FROM QUEEN ELIZABETH DRV. MODIFIED. LANDSCAPING AREA REVISED	JS	07-05-20
P4	CANOPY ANGLE REVISED. SHOPFRONT BOLLARD REMOVED	JS	06-05-20
P3	PRELIMINARY ISSUE	JS	29-04-20
P2	PRELIMINARY ISSUE	JS	20-04-20
P1	PRELIMINARY ISSUE	JS	17-04-20
REV	AMENDMENT DETAILS	BY	DATE



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PROJECT PROPOSED FUEL FILLING STATION DEVELOPMENT

PROJECT ADDRESS 12 QUEEN ELIZABETH DRIVE & 36 BROWN STREET BERSERKER QLD 4701 DRAWING TITLE

PROPOSED SITE PLAN

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P3	CANOPY LINK ADDED	JS	03-09-20
P2	SHOPFRONT BOLLARD REMOVED	JS	06-05-20
P1	PRELIMINARY ISSUE	JS	29-04-20
REV	AMENDMENT DETAILS	BY	DATE



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PROJECT PROPOSED FUEL FILLING

STATION DEVELOPMENT

PROJECT ADDRESS 12 QUEEN ELIZABETH DRIVE & **36 BROWN STREET** BERSERKER QLD 4701 DRAWING TITLE

PROPOSED FLOOR PLAN

RCI GROUP

DATE	SCALE @ A1	NORTH		
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PROJECT No.	DRAWING No.	REVISION No.	SHEET	
20143	TP04	P3	04 of 06	



1:100 @ A1 SIZE & 1:200@A3





Έ	RNA	AL COLOUR SCHEDULE
	AC-1	CANOPY FASCIA ALUMINIUM COMPOSITE PANEL COLOUR 'BLUE'
	AC-2	CANOPY FASCIA AND STEEL COLUMNS ALUMINIUM COMPOSITE PANEL COLOUR 'WHITE'
	AC-4	STORE FEATURE AWNING ALUMINIUM COMPOSITE PANEL COLOUR 'WHITE'
	AC-5	SIGNAGE ALUMINIUM COMPOSITE PANEL COLOUR 'RED'
	P1	PRECAST EXTERNAL WALLS PAINT DULUX - WHITE
	P2	PRECAST PANEL PAINT DULUX - MONUMENT
	P3	PRECAST PANEL PAINT DULUX - BASALT
	P4	DOOR & WINDOW POWDERCOATED NIGHT SKY
	P5	VERTICAL COLORBOND FENCE 'WOODLAND GREY'
	P6	STORE FASCIA PRECAST PANEL COLOUR 'WOODLAND GREY'
	GL1	CLEAR GLAZING TO CODE, NCC & RELEVANT STANDARDS

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REV	AMENDMENT DETAILS	BY	DATE
P1	PRELIMINARY ISSUE	JS	29-04-20
P2	CANOPY HEIGHT, SHOPFRONT BOLLARD & SIGNAGE REVISED	JS	06-05-20
P3	CANOPY LINK ADDED	JS	03-09-20



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PROPOSED FUEL FILLING STATION DEVELOPMENT

PROJECT ADDRESS 12 QUEEN ELIZABETH DRIVE & **36 BROWN STREET**

BERSERKER QLD 4701 DRAWING TITLE

PROPOSED ELEVATIONS

CLIENT RCI GROUP

DATE	SCALE @ A1	NORTH	
APR.'20	1:100		
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PROJECT No.	DRAWING No.	REVISION No.	SHEET
20143	TP05	P3	05of 06



1:100 @ A1 SIZE & 1:200@A3



Traffic Impact Assessment Report

Proposed Queens Elizabeth Drive Service Station 12 Queen Elizabeth Drive & 36 Brown Street (Lot 1 SP15745), Rockhampton, QLD

> ROCKHAMPTON REGIONAL COUNCIL APPROVED PLANS These plans are approved subject to the current

conditions of approval associated with Development Permit No.: D/55-2020 Dated: 16 October 2020

Prepared For: RCI Group

Job No. 075-19-20 May 2020 Revision A

> ABN 69 958 286 371 P (07) 4921 1780 F (07) 4921 1790 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
А	FOR INFORMATION	adf:#	14.05.20
		-	

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CONTENTS

INTRODUCTION	1
1.1. PROJECT BACKGROUND	1
1.2. SCOPE AND STUDY AREA	1
1.2.1 STUDY AREA	1
EXISTING CONDITIONS	2
2.1. SURROUNDING ROAD NETWORK DETAILS	2
1.3.1 ROAD LINKS	2
2.2. TRAFFIC VOLUMES	3
1.4.1 ROAD LINK VOLUMES	3
2.3. NETWORK PERFORMANCE	4
1.5.1 ROAD LINKS	4
2.4. ROAD SAFETY ISSUE	4
1.6.1 EXISTING SITE CONDITIONS	4
1.6.2 ROAD CRASH HISTORY REVIEW	4
2.5. SITE ACCESS	6
PROPOSED DEVELOPMENT DETAILS	6
3.1. OPERATIONAL DETAILS	6
3.2. PROPOSED ACCESS AND PARKING	7
3.2.1. SITE ACCESS	7
1.8.2 INTERNAL SITE FACILITIES	7
DEVELOPMENT TRAFFIC	8
4.1. TRAFFIC GENERATION	8
4.2. TRAFFIC DISTRIBUTION	9
4.3. DEVELOPMENT TRAFFIC VOLUMES ON THE NETWORK	9
IMPACT ASSESSMENT AND MITIGATION	10
5.1. WITH AND WITHOUT DEVELOPMENT TRAFFIC VOLUMES	
1.8.3 ROAD LINK VOLUMES	
5.2. ACCESS AND FRONTAGE IMPACT ASSESSMENT AND MITIGATION	11
5.3. PAVEMENT IMPACT ASSESSMENT AND MITIGATION	13
CONCLUSIONS AND RECOMMENDATIONS	13

6.1. SUMMARY OF IMPACTS AND MITIGATION MEASURES PROPOSED	13
1.8.4 INTERNAL FACILITIES	13
1.8.5 TRAFFIC IMPACTS	14
1.8.6 RECOMMENDATIONS	14
6.2. CERTIFICATION STATEMENT AND AUTHORISATION	14
APPENDIX A	А
APPENDIX B	В
APPENDIX C	C
APPENDIX D	D

Traffic Impact Assessment Report

Queen Elizabeth Dr Service Station, 12 Queen Elizabeth Drive & 36 Brown Street (Lot 1 SP15745), Rockhampton

INTRODUCTION

1.1. PROJECT BACKGROUND

RCI Group are proposing to establish a service station on the properties at 12 Queen Elizabeth Drive & 36 Brown Street (Lot 1 SP15745) in Rockhampton, Queensland. The service station is expected to cater for southbound passing traffic on the adjacent section of Queen Elizabeth Drive with a side entrance on Brown St and provides refuelling, parking facilities for predominantly light vehicles and a dog wash.

1.2. SCOPE AND STUDY AREA

McMurtrie Consulting Engineers (MCE) have been commissioned by RCI Group to undertake a Traffic Impact Assessment (TIA) for the proposed Service Station, located at 12 Queen Elizabeth Drive & 36 Brown Street (Lot 1 SP15745) in Rockhampton, Queensland.

This Traffic Impact Assessment (TIA) was carried out to determine the level of potential impacts of the operational phases 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 centres 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 proposed to be 12 Queen Elizabeth Drive & 36 Brown Street, Rockhampton, on the land parcel formally described as Lot 1 SP15745, as shown in **Figure 1** below.



Figure 1 Study Area 12 Queen Elizabeth Drive & 36 Brown Street

[Source: Qld Globe]

EXISTING CONDITIONS

2.1. SURROUNDING ROAD NETWORK DETAILS

1.3.1 ROAD LINKS

Queen Elizabeth Drive & Brown Street

Queen Elizabeth Drive links Musgrave Street to Toft Street which then transitions into the Fitzroy Bridge. In the Rockhampton area, Queen Elizabeth Drive is part of the alternative north-south route to cross the city, avoiding the Bruce Highway for passenger, commercial and some road freight vehicles. The section of Queen Elizabeth Dr, between Brown Street and Bridge St is typically a two-way, four lane separated urban standard road with a posted speed limit of 60km/h, permitting left in/left out site access from Queen Elizabeth Drive for all vehicles (including Tanker) and left/right turn in and out from Brown Street for passenger and commercial vehicles only. Site access from Queen Elizabeth Drive for the proposed development will be from the southbound or A-gazettal direction as indicated in **Figure 2** below.



Figure 2 Site location frontage along Queen Elizabeth Drive, Rockhampton

2.2. TRAFFIC VOLUMES

1.4.1 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**). From the TMR data, the background growth rates are negative in this vicinity for 1-year, 5-year and 10-year periods, therefore we have conservatively assumed a 1% growth rate on the link. Using these established traffic volumes for each section of the road links, the development year (2020) daily traffic volumes on the network were established (actual average 10-year growth rate was identified to be -3.32%).

A summary of the forecast background traffic volumes for each of the relevant road segments for the base year (2019) is provided in **Table 1** and refer to **Appendix A** for peak hourly counts.

Site ID	AA Segr	AADT Segment		Base Year (2019) AADT		10 Yr.	Background AADT (2020)								
	Start	End	Data Vear	Con	% HV	A-G-97	9/ HN7	GR	Gaz		A-Gaz				
	(km) (km)		I cui	Gaz	%ΠV	A-Gaz	70 H V	%	Total	HV	Total	HV			
Bridge St	Bridge St – High St (Road Section 196)														
60017	1.58	3.23	2019	9,451	9.06	7426	10.05	1	9546	865	7500	754			

Table 1 Forecast Future Background AADT Traffic Volumes

075-19-20

2.3. NETWORK PERFORMANCE

1.5.1 ROAD LINKS

Based on the daily traffic volumes identified in **Table 1** above, it is anticipated that the relevant section of Queen Elizabeth Drive can be considered to be currently operating satisfactorily and within capacity, as the existing midblock traffic volumes identified are considered well within the capacity of a two-way, four lane sealed separated urban road.

2.4. ROAD SAFETY ISSUE

1.6.1 EXISTING SITE CONDITIONS

A site inspection of the existing traffic conditions on the relevant road network was undertaken by Chris Hewitt on Wednesday 6 May 2020. No safety issues were able to be identified and any new access will be left in/left out. Under the 4-lane separated layout there is not likely to be any significant safety issues as the proposed development access points closely approximate the existing access points for the current use which is a caravan repair and sales centre.

1.6.2 ROAD CRASH HISTORY REVIEW

A review of the road crash history of the section of Queen Elizabeth Drive considering the intersections either side of the proposed access point was undertaken using the road crash data available from the Queensland Globe database, with the assessment completed for the available data range (2001-2018).

The results of this assessment identified 79 crashes in the nominated extents within this timeframe, with the approximate location of the recorded crashes shown in **Figure 3**, while a summary of the details of the road crash data is provided in **Table 2**.



Figure 3 Road Crash Locations – Queen Elizabeth Drive / Proposed Site Access Intersection [Source: QLD Globe]

075-19-20

Table 2: Summary of Road Crash History (2001-2018)

Crash Ref. No.	Crash Year	Crash Severity	Crash Type	DCA Description	Crash Description
36479	2002	Property damage only	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
222974	2010	Property damage only	Multi-Vehicle	Veh'S Same Direction: Left Rear	Rear-end
156574	2007	Property damage only	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
					Off carriageway on straight
156778	2007	Property damage only	Single Vehicle	Off Path-Straight: Left Off Cway Hit Obj	hit object
218068	2010	Property damage only	Multi-Vehicle	Veh'S Same Direction: Right Rear	Rear-end
199841	2009	Property damage only	Single Vehicle	Off Path-Straight: Mounts Traffic Island	Off carriageway on straight hit object
179097	2008	Property damage only	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
51007	2003	Property damage only	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
62655	2003	Property damage only	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
88959	2004	Property damage only	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
202887	2009	Property damage only	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
127497	2006	Property damage only	Multi-Vehicle	Veh'S Same Direction: Right Rear	Rear-end
56344	2003	Property damage only	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
119239	2006	Property damage only	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
64539	2003	Property damage only	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
168848	2008	Property damage only	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
182157	2009	Property damage only	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
119547	2006	Property damage only	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
131929	2006	Property damage only	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
177188	2008	Property damage only	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
181649	2008	Property damage only	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
50148	2003	Property damage only	Multi-Vehicle	Veh'S Same Direction: Lane Side Swipe	Lane changes
					Intersection from adjacent
217748	2010	Property damage only	Multi-Vehicle	Veh'S Adjacent Approach: Thru-Thru	approaches
14257	2001	Property damage only	Multi-Vehicle	Veh'S Manoeuvring: Reversing	Hit parked vehicle
41015	2002	Property damage only	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
111441	2005	Property damage only	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
148897	2007	Property damage only	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
113699	2006	Property damage only	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
60171	2003	Property damage only	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
80989	2004	Property damage only	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
41659	2002	Property damage only	Single Vehicle	Veh'S Adjacent Approach: Other	Intersection from adjacent approaches
197452	2009	Property damage only	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
121858	2006	Property damage only	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
201860	2009	Property damage only	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
221734	2010	Property damage only	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
157518	2007	Property damage only	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
135532	2006	Property damage only	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
158044	2007	Property damage only	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
184342	2009	Minor injury	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
232198	2011	Minor injury	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
71936	2004	Minor injury	Multi-Vehicle	Veh'S Same Direction: Right Rear	Rear-end
79723	2004	Minor injury	Multi-Vehicle	Veh'S Same Direction: Right Rear	Rear-end
128891	2006	Minor injury	Single Vehicle	Off Path-Straight: Other	Other
207048	2010	Minor injury	Multi-Vehicle	Veh'S Adjacent Approach: Thru-Thru	Intersection from adjacent approaches
192931	2009	Minor injury	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
183261	2009	Minor injury	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
41139	2002	Minor injury	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
249590	2012	Minor injury	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
37696	2002	Minor injury	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
115111	2006	Minor injury	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
215464	2010	Minor injury	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
265734	2013	Minor injury	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end

075-19-20

111439	2005	Minor injury	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
235722	2011	Minor injury	Multi-Vehicle	Veh'S Same Direction: Left Rear	Rear-end
168207	2008	Medical treatment	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
					Intersection from adjacent
14138	2001	Medical treatment	Multi-Vehicle	Veh'S Adjacent Approach: Thru-Thru	approaches
96125	2005	Medical treatment	Multi-Vehicle	Veh'S Same Direction: Right Rear	Rear-end
108067	2005	Medical treatment	Single Vehicle	Off Path-Straight:Out Of Control On Cway	Out of control on straight
281536	2015	Medical treatment	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
159909	2008	Medical treatment	Single Vehicle	Off Path-Straight: Mounts Traffic Island	Off carriageway on straight hit object
64540	2003	Medical treatment	Single Vehicle	Veh'S On Path: Accident Or Broken Down	Hit parked vehicle
215011	2000	Medical treatment	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
133197	2006	Medical treatment	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
136699	2007	Medical treatment	Multi-Vehicle	Veh'S Same Direction: Rear End	Rear-end
220781	2010	Medical treatment	Multi-Vehicle	Veh'S Same Direction: Right Rear	Rear-end
76471	2004	Medical treatment	Hit pedestrian	Ped'N: Far Side Vehicle Hit From Left	Pedestrian
					Off carriageway on straight
90216	2005	Hospitalisation	Single Vehicle	Off Path-Straight: Mounts Traffic Island	hit object
81072	2004	Hospitalisation	Hit pedestrian	Ped'N: Far Side Vehicle Hit From Left	Pedestrian
207170	2010	Hospitalisation	Multi-Vehicle	Veh'S Same Direction: Right Rear	Rear-end
143236	2007	Hospitalisation	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
				Veh'S Manoeuvring: Entering From	
86548	2004	Hospitalisation	Multi-Vehicle	Footway	Vehicle leaving driveway
117920	2006	Hospitalisation	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
273410	2014	Hospitalisation	Multi-Vehicle	Veh'S Same Direction: Right Rear	Rear-end
163345	2008	Hospitalisation	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
				Veh'S Manoeuvring: Entering From	
291647	2016	Hospitalisation	Single Vehicle	Footway	Vehicle leaving driveway
					Off carriageway on straight
125471	2006	Hospitalisation	Single Vehicle	Off Path-Straight: Left Off Cway Hit Obj	hit object
274425	2014	Hospitalisation	Multi-Vehicle	Veh'S Opposite Approach: Thru-Right	Opposing vehicles turning
54331	2003	Hospitalisation	Hit pedestrian	Ped'N: Far Side Vehicle Hit From Left	Pedestrian
259242	2013	Fatal	Single Vehicle	Off Path-Straight: Left Off Cway Hit Obj	Ott carriageway on straight hit object

The results above indicate that the majority of the crashes/incidents occur at the intersection of Queen Elizabeth Drive, Toft Street and Bridge Street. Disregarding the incidents which occurred at the signalized intersections, there have been seven crashes recorded in the southbound lane of the Queen Elizabeth Drive in the vicinity of the proposed site over the 16 years of data available (2002-2018) with no incidents recorded in the previous five years.

2.5. SITE ACCESS

As previously identified, access to the site will be via left in/left to the Queen Elizabeth St southbound lanes and left/right in and out from Brown Street.

The access intersection will need to cater for vehicles up to a 15.4 m tanker.

PROPOSED DEVELOPMENT DETAILS

3.1. OPERATIONAL DETAILS

The proposed development is a service station, which will occupy majority of the subject site as shown in the site plan included as **Appendix B** and the extract provided as



Figure 4 below.

The development will provide four (4) bowsers for cars (i.e. eight (8) refuelling positions), one being a high flow fill dispenser. Vehicular access is proposed via a left in/left out access from Queen Elizabeth Drive and left/right in and out from Brown Street, while the largest design vehicle anticipated to require access to the site is a 15.4m tanker, only accessible from Queen Elizabeth Drive.

The proposed service station building has an area of 200m² GFA, with parking bays provided for cars parking in close proximity to the building.

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



Figure 4 Extract from Site Layout Plan (Dwg. 20143 – TP03 Rev P5)

[Source: RCI Group]

3.2. PROPOSED ACCESS AND PARKING

3.2.1. SITE ACCESS

As previously identified, vehicular access to the service station development is proposed to be provided via a left in/left out access from Queen Elizabeth Drive catering for vehicles in the Southbound lanes and a left/right in and out access from Brown Street.

1.8.2 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.

1.8.2.1 CAR PARKING

Table 9.3.1.3.2 of RRC's Access, Parking and Mobility 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 200m² GFA of shop area, the recommended parking provision for the development is therefore 8 parking spaces (minimum).

As shown in the site plan Dwg. 20143 – TP03 Rev P5 (included within **Appendix B**), a total of 9 parking spaces are proposed on site, including 1 PWD Bay for Persons with Disabilities.

075-19-20

All parking spaces proposed for light vehicles (cars) are generally 5.4m long and 2.6m wide and are 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.

1.8.2.2 QUEUING AND VEHICLE CIRCULATION

As shown in Dwg. 20143 – TP03 Rev P5 (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 accessible from either Queen Elizabeth Drive or Brown Street. Vehicle swept paths have also been undertaken which confirm the ability of a 15.4m Tanker to travel through the site as required, with a copy of the relevant swept paths for the proposal included for reference in **Appendix C**.

1.8.2.3 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.

Finally, it is also understood that the fuel tanker which expected to be used for regular refuelling of the service station tanks will be a 15.4m Tanker configuration vehicle. The swept path for the proposed refuelling activities on site are shown on Dwg. 20143 – TP03 (refer **Appendix B**), which clearly indicates that the 15.4m tanker can access the proposed fuel fill points within the truck stop area.

DEVELOPMENT TRAFFIC

4.1. TRAFFIC GENERATION

As mentioned previously it is envisioned that the site will cater for south bound traffic only as there is no direct access to or from the site from the north bound lanes due to the concrete median.

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 (<u>https://data.qld.gov.au/dataset/traffic-generation-data-2006-2018</u>) 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 3**, 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 (200m² GFA) would equate to a peak hour trip generation for the proposed development site of 59 trips (entry and exit).

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

Table 3: Summary of Trip Generation Data (Service Stations)

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 132 trips for the site, which is considered to be excessive given the saturation of service stations for southbound traffic through Rockhampton. With 3 service stations accessible to

075-19-20

Southbound traffic from Parkhurst and 2 additional service stations within a 500m radius to proposed site, it is not considered reasonable that an additional service station at the proposed site will generate 132 trips during the peak periods. Also, given the relatively limited facilities at the proposed site (8 vehicle refuelling positions) it is not anticipated that the site can cater for such high volumes of attendance.

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 59 trips during the AM and PM periods.

It should be noted that the current site usage as a caravan dealership is assumed to generate 5-10 vehicles/ peak hour. The proposed development would be contributing an additional 45-50 trips during the AM and PM peak periods.

4.2. TRAFFIC DISTRIBUTION

Given the proposed development is a service station with no fast food or 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 Queen Elizabeth Drive or Brown Street. We have assumed that the split of vehicles entering/exiting the proposed site will be a 50% split.

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 4** below.

Table 4 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 Tr	ips)
 INBOUND 50% from Queen Elizabeth Drive (North) 50% from Brown Street (East/West) 	 INBOUND 50% from Queen Elizabeth Drive (North) 50% from Brown Street (East/West)
 OUTBOUND 90% to Queen Elizabeth Drive (South) 10% to Brown Street (East/West) 	 OUTBOUND 90% to Queen Elizabeth Drive (South) 10% to Brown Street (East/West)
"DROP-IN" TRIP DISTRIBUTION (80% Overal	ll Trips)
 INBOUND 50% from Queen Elizabeth Drive (North) 50% from Brown Street (East/West) 	 INBOUND 50% from Queen Elizabeth Drive (North) 50% from Brown Street (East/West)
 90% to Queen Elizabeth Drive (South) 10% to Brown Street (East/West) 	 90% to Queen Elizabeth Drive (South) 10% to Brown Street (East/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 on Queen Elizabeth Drive were established, with a summary of the resultant peak hour development traffic volumes provided in **Figure 5** to **Figure 7**. From the development traffic accessing the site off Brown St, it has been assumed that approximately 80% of traffic with enter from the west and the remaining 20% from the east.

The development year has been assumed as 2020 thus resulting in a 10-year design period of 2030.



IMPACT ASSESSMENT AND MITIGATION

Based on the information provided above, it was determined that the critical elements of the surrounding road network in terms of the potential impact of the proposed service station development was Queen Elizabeth Drive and Brown Street access intersection.

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

1.8.3 ROAD LINK VOLUMES

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

075-19-20

Whilst the development is predicted to generate in the order of 59 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 Queen Elizabeth Drive, 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 2 and 4** with the ingress access point on Queen Elizabeth Drive located approximately 20m downstream of the Brown street turnoff and the Brown Street ingress located approximately 40m downstream of the Brown St turnoff. The egress access point on Queen Elizabeth Drive located approximately 40m downstream of the Brown street turnoff and the Brown Street egress located approximately 40m downstream of the Brown street turnoff and the Brown Street egress located approximately 40m downstream of the Brown street turnoff and the Brown Street egress located approximately 40m downstream of the Brown street turnoff and the Brown Street egress located approximately 40m downstream of the Brown St turnoff. Due to the configuration of the Brown Street left turn, constrained by the centre island, all heavy vehicles will enter and exit the site from the accesses fronting Queen Elizabeth Drive. It is anticipated that light vehicles will manoeuvre the site from either of the access points.

Access visibility from egress point on Queen Elizabeth Drive will be able to sight a vehicle entering Queen Elizabeth St from Edwin St comfortable achieving SISD of 141m for a 70 km/h design speed and egress From Brown St can see to the Brown and Musgrave St intersection achieving a SSID greater than 114m for a 60km.h design speed. The section of the Queen Elizabeth Drive experiences sufficient gaps in the traffic due to the traffic lights at intersection of Musgrave St and Charles St to allow a vehicle to safely exit the site. **Figure 8 and 9** show the degree of access visibility afforded at the proposed egress points.



Figure 8 Sight Distance from proposed Queen Elizabeth Drive egress point



Figure 9 Sight Distance from proposed Brown St egress point

Forecast through road and access volumes based on **Table 1** and **Figure 5** to **Figure 7**, the detailed hourly volumes from **Appendix A** and a compound growth rate of 1 % are shown in **Figures 10 and 11** below for the opening year of 2020 and the 10-year design horizon of 2030. It has been assumed 50% of traffic will utilize the outside lane of the 2 southbound lanes on Queen Elizabeth Drive.



075-19-20

A turn warrants assessment was undertaken for the current site access intersection with Queen Elizabeth Drive based on the forecast 2030 post development traffic volumes from the proposed service station as identified in **Figure 11** above. The assessment was completed using Figure 2.25C of Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings, which depicts the turn warrants graph for design speeds less than 70km/h.

The resultant graph from the assessment for the post development (2030) traffic conditions (worst case am peak) is provided in **Figure 12** below.



Figure 12 Turn Warrants Graph (70-100km/hr) – Post Development Traffic Volume Scenario (2030)

The results of the turn warrants assessment indicate that the recommended turn treatments at the site access intersection of Queen Elizabeth Drive/site access intersection for the post development traffic volume scenario was a BAL treatment. As such, there are no proposed changes to Queen Elizabeth Drive at the proposed development intersection.

There are no traffic counts available for Brown Street, however Brown St is a local access Road and road is not expected to exceed 20 vehicles/ peak hour. The Brown Street and Queen Elizabeth Drive intersection is an existing CHL and the low through volumes would not trigger the Brown St site access turn to be upgraded from the existing BAR and BAL turns. The lane width at the BAR turn location is approximately 6.0m which with appropriate parking restrictions will allow for a vehicle to pass another vehicle propped to turn right into the site.

5.3. PAVEMENT IMPACT ASSESSMENT AND MITIGATION

Given the proposed development is a service station on a main road and is not expected to generate any new heavy vehicle movements under typical operation, no pavement mitigation works are deemed warranted or required as a result of the proposal. Some minor heavy vehicle movements will occur during construction however the construction period will only be short and any increase in associated ESA's will be insignificant for the construction year.

CONCLUSIONS AND RECOMMENDATIONS

6.1. SUMMARY OF IMPACTS AND MITIGATION MEASURES PROPOSED

1.8.4 INTERNAL FACILITIES

The traffic elements of the proposed plan of development have been designed 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 **<u>9</u>** spaces (including 1 PWD bay meets Council's requirements (**<u>9</u>** spaces) and as such is considered adequate to cater for the parking demand expected to be generated by the development.

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

075-19-20

be able to enter the site, access the required loading and servicing locations for the development and egress the site in a forwards gear.

1.8.5 TRAFFIC IMPACTS

The turn warrants assessment undertaken based on the estimated post development traffic volumes (2030) indicated that the recommended turn treatments for the site access intersection of the Queen Elizabeth Drive/ site access was a BAL treatment. No upgrade works are necessary for this treatment.

1.8.6 RECOMMENDATIONS

In light of the information provided above, it is concluded that conditional to the provision of the identified upgrade works to the Queen Elizabeth Drive/site access to 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.

6.2. CERTIFICATION STATEMENT AND AUTHORISATION

A copy of the RPEQ certification and authorisation statement covering this assessment of the proposed Queen Elizabeth Drive Service Station development located at 12 Queen Elizabeth Drive (Lot 1 SP15745) is included for reference as **Appendix D**.

APPENDIX A

TMR Traffic Data



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Traffic Analysis and Reporting System **AADT Segment Analysis Report (Complete)** Road Section 196 - ROCKHAMPTON - YEPPOON ROAD Traffic Year 2019

Page 2 of 14 (2 of 15)

Road Segments Summary - All Vehicles

	Segment	Segment					AADT		۱ ۱	VKT (Million	is)	Data	
Region	Start Tdist	End Tdist	Site	Site Tdist	Description	G	A	В	G	A	В	Year	Page
404	0.000 km	0.554 km	60124	0.340 km	R'ton-Yeppoon Rd 60m N Kent St	6,682	9,443	16,125	1.35117	1.90947	3.26064	2019	2
404	0.554 km	1.580 km	60018	1.000 km	R'ton-Yeppoon Rd N East St on Bridge	16,129	20,739	36,868	6.04015	7.76655	13.80670	2019	3
404	1.580 km	3.226 km	61076	2.700 km	R'ton-Yeppoon Rd S of Elphinstone St	9,451	7,426	16,877	5.67807	4.46147	10.13953	2019	4
404	3.226 km	4.030 km	60102	3.506 km	R'ton-Yeppoon Rd Sth Moores Ck	8,082	6,207	14,289	2.37174	1.82151	4.19325	2019	5
404	4.030 km	30.357 km	60007	14.800 km	R'ton-Yeppoon Rd East of Ironpot Ck	5,585	5,564	11,149	53.66825	53.46645	107.13470	2019	6
404	30.357 km	35.600 km	61607	35.410 km	R'ton-Yeppoon Rd 320m E Tabone St RBT	4,846	5,907	10,753	9.27377	11.30420	20.57796	2018	7
								Totals	78.38314	80.72964	159.11278		

Road Segments Summary - Heavy Vehicles only VKT totals are calculated only if traffic class data is available for all sites.

						HV AADT										
	Segment	Segment				G		G A		В		HV	VKT (Mill	lions) Data		1
Region	Start Tdist	End Tdist	Site	Site Tdist	Description	AADT	HV %	AADT	HV %	AADT	HV %	G	Α	В	Year	Page
404	0.000 km	0.554 km	60124	0.340 km	R'ton-Yeppoon Rd 60m N Kent St	780	11.67%	1,097	11.62%	1,877	11.64%	0.15772	0.22182	0.37955	2019	2
404	0.554 km	1.580 km	60018	1.000 km	R'ton-Yeppoon Rd N East St on Bridge	970	6.01%	2,069	9.98%	3,039	8.24%	0.36326	0.77482	1.13808	2019	3
404	1.580 km	3.226 km	61076	2.700 km	R'ton-Yeppoon Rd S of Elphinstone St	856	9.06%	746	10.05%	1,602	9.49%	0.51428	0.44819	0.96247	2019	4
404	3.226 km	4.030 km	60102	3.506 km	R'ton-Yeppoon Rd Sth Moores Ck	558	6.90%	158	2.55%	716	5.01%	0.16375	0.04637	0.21012	2019	5
404	4.030 km	30.357 km	60007	14.800 km	R'ton-Yeppoon Rd East of Ironpot Ck	608	10.89%	786	14.13%	1,394	12.50%	5.84249	7.55295	13.39544	2019	6
404	30.357 km	35.600 km	61607	35.410 km	R'ton-Yeppoon Rd 320m E Tabone St RBT	257	5.30%	311	5.26%	568	5.28%	0.49182	0.59516	1.08698	2018	7
											Totals	7.53331	9.63931	17.17263		





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Traffic Analysis and Reporting System AADT Segment Analysis Report (Complete) Area 404 - Fitzroy District Traffic Year 2019 - Data Collection Year 2019

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Page 4 of 14 (4 of 15)









Traffic Analysis and Reporting System AADT Segment Analysis Report (Complete) Area 404 - Fitzroy District Road Section 196 - ROCKHAMPTON - YEPPOON ROAD Traffic Year 2019 - Data Collection Year 2019

TARS

Page 7 of 14 (7 of 15)





22-Apr-2020 13:53

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Page 8 of 14 (8 of 15)





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Page 9 of 14 (9 of 15)





22-Apr-2020 13:53

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Page 10 of 14 (10 of 15)

TARS





22-Apr-2020 13:53

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Page 11 of 14 (11 of 15)








Traffic Analysis and Reporting System AADT Segment Analysis Report (Complete) Area 404 - Fitzroy District Traffic Year 2019 - Data Collection Year 2018

Page 14 of 14 (14 of 15)



TARS



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 %VC Vehicle Kilometres Travelled
 - 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.

- Traffic flowing in Gazettal Direction Traffic flowing against Gazettal Direction G
- R
- 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** $\begin{array}{l} 0B &= 1B + 1C + 1D \\ 1B &= 2C + 2D + 2E \\ 1C &= 2F + 2G + 2H + 2I \end{array}$ 1D = 2J + 2K + 2L

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

Volume

00 All vehicles.

2-Bin

- Light vehicles 0A Heavy vehicles 0B
- 4-Bin

Short vehicles 1A

- 1B Truck or bus
- 1C Articulated vehicles
- 1Ď Road train

12-Bin

- Short 2 axle vehicles 2A
- Short vehicles towing 2B 2C 2 axle truck or bus
- 2D 3 axle truck or bus
- 2E 2E 2F 4 axle truck
- 3 axle articulated vehicle
- 4 axle articulated vehicle 5 axle articulated vehicle 2G
- 2H 21 6 axle articulated vehicle
- 2.1 B double
- 2K Double road train
- 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.

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APPENDIX B

Site Layout Plan



		12
CHEDULE:		
SITE AREA -	1,844m²	Concession of the local division of the loca
APING -	291m² (15.78%)	STREET.
Y AREAS: IOP -	200m²	
ACES	9 cars	1 AL
E AREA AND DIM	IENSIONS ARE	

ROCKHAMPTON REGIONAL COUNCIL APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with **Development Permit No.:** D/55-2020 Dated: 16 October 2020

P5	INGRESS CROSSOVER FROM QUEEN ELIZABETH DRV. MODIFIED. LANDSCAPING AREA REVISED	JS	07-05-20
P4	CANOPY ANGLE REVISED. SHOPFRONT BOLLARD REMOVED	JS	06-05-20
P3	PRELIMINARY ISSUE	JS	29-04-20
P2	PRELIMINARY ISSUE	JS	20-04-20
P1	PRELIMINARY ISSUE	JS	17-04-20
REV	AMENDMENT DETAILS	BY	DATE



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PROJECT PROPOSED FUEL FILLING STATION DEVELOPMENT

PROJECT ADDRESS 12 QUEEN ELIZABETH DRIVE & 36 BROWN STREET BERSERKER QLD 4701 DRAWING TITLE

PROPOSED SITE PLAN

CLIENT RCI GROUP

DATE	SCALE @ A1	NORTH	
APR.'20	1:200		
DRAWN	CHECKED		\rightarrow
JS	AB		
ISSUE PRELIMIN	IARY		ſ
PROJECT No.	DRAWING No.	REVISION No.	SHEET
20143	TP03	P5	03of 06

APPENDIX C

Swept Path Analysis



10	11	12	1
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Dated:	16 October 2020		
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APPENDIX D

RPEQ Certification

Certification of Traffic Impact Assessment Report

Registered Professional Engineer Queensland

for

Project Title: Queen Elizabeth Drive 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:	adf:#	Date:	14/05/20
Postal Address:	PO Box 2149 Wandal QLD 4700		
Email:	chris@mcmengineers.com		

053-19-20

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	\checkmark			
Access and frontage impact assessment and mitigation	~			
Intersection delay impact assessment and mitigation	N/A			
Road link capacity assessment and mitigation	\checkmark			
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	~			





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STATION DEVELOPMENT PROJECT ADDRESS 12 QUEEN ELIZABETH DRIVE & 36 BROWN STREET BERSERKER

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P1 PRELIMINARY ISSUE JS 29-04-20 BY DATE REV



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P2	CANOPY LINK ADDED	JS	03-09-20
P1	PRELIMINARY ISSUE	JS	12-08-20
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PROPOSED FUEL FILLING STATION DEVELOPMENT

PROJECT ADDRESS

12 QUEEN ELIZABETH DRIVE & 36 BROWN STREET BERSERKER QLD 4701 DRAWING TITLE

PROPOSED SWEEP PATHS -SERVICES & DELIVERY TRUCKS

CLIENT RCI GROUP

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INTERNALLY ILLUMINATED CANOPY SIGN

INTERNALLY ILLUMINATED SIGN

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ROCKHAMPTON REGIONAL COUNCIL				
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P3	CANOPY LINK ADDED	JS	03-09	-20
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PROJECT PROPOSED FUEL FILLING STATION DEVELOPMENT

PROJECT ADDRESS 12 QUEEN ELIZABETH DRIVE & **36 BROWN STREET** BERSERKER QLD 4701 DRAWING TITLE

SIGNAGE DETAILS

CLIENT RCI GROUP

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1:50 @ A1 SIZE & 1:100@A3

STORMWATER CATCHMENT AREA PLAN

DENOTES STORMWATER CATCHMENT AREA BOUNDARY (IMPERVIOUS)
 DENOTES STORMWATER CATCHMENT AREA BOUNDARY (PERVIOUS)

TOTAL SITE AREA

ROOF AREA

PAVEMENT AREA

= 1,845 m²

- = 489 m² = 1,062 m²
- LANDSCAPE AREA

= 294 m²

DENOTES EXISTING SURVEY CONTOUR DENOTES NEW SURFACE LEVEL CONTOUR

ROCKHAMPTON REGIONAL COUNCIL APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with **Development Permit No.: D/55-2020 Dated: 16 October 2020**

DA APPROVAL ONLY NOT TO BE USED FOR CONSTRUCTION PURPOSES 14.08.20 ISSUED FOR DA APPROVAL В 15.05.20 ISSUED FOR DA APPROVAL Α DATE AMENDMENT DESCRIPTION REVISION COPYRIGHT ECLIPSE Consulting Engineers Pty Ltd is the owner of the copyright subsisting in these drawings, plans, designs and specifications. They must not be used, reproduced or copied in whole or in part without prior written consent of ECLIPSE Consulting Engineers Pty Ltd IPSE | CONSULTING ENGINEERS ECL ECLIPSE Consulting Engineers Pty Ltd 304/12 Century Circuit Phone : (02) 9894 8500 Fax : (02) 8850 0212 Norwest Central BAULKHAM HILLS NSW 2153 info@eclipseconsulting.com.au www.eclipseconsulting.com.au PROPOSED SERVICE STATION 12 Queen Elizabeth Dr, Rockhampton For RCI Group STORMWATER CATCHMENT AREA PLAN

DESIGN SWH	DRAWN GOH	DATE MAY 2020	PROJECT No. 10061
CHECKED	APPROVED	SCALE 1:100	DRG No. CO3 - B

STORMWATER DRAINAGE STRATEGY

- ALL GUTTERS & DOWNPIPES ARE DESIGNED TO ACCEPT A 1:20 YEAR ARI STORM EVENT
- BOX GUTTERS & DOWNPIPES ARE DESIGNED TO ACCEPT A 1:100 YEAR ARI STORM EVENT
- ALL PITS & PIPES ARE DESIGNED TO ACCEPT A 1:20 YEAR ARI STORM EVENT
- 1:20 YR, 5 MIN = 230 mm/hr
- 1:100 YR, 5 MIN = 301 mm/hr
- ALL STORMWATER PIPES MUST HAVE A MIN 1.0% FALL U.N.O.
- ALL STORMWATER RUNOFF IS DIRECTED TO A SQID PRIOR TO EXITING THE SITE • STORMWATER QUALITY MEASURES HAVE BEEN IMPLEMENTED TO MEET LOCAL COUNCIL REQUIREMENTS OF REDUCING POST - DEVELOPMENT RUNOFF POLLUTION LOADS BY PRE-DETERMINED AMOUNTS (REFER TREATMENT EFFECTIVENESS SUMMARY)
- SQID'S USED ON THIS SITE INCLUDE: OCEAN PROTECT OCEAN GUARDS TO SIP
- OCEAN PROTECT STOMFILTERS

WATER QUALITY DESIGN SUMMARY A MUSIC MODEL HAS BEEN PREPARED TO DETERMINE EFFECTIVENESS OF WATER QUALITY TREATMENT DEVICES.

TREATMENT EFFECTIVENESS							
	SOURCES	RESIDUAL LOAD	% REDUCTION	% TARGET			
FLOW (ML/yr)	1.16	1.07	7.8	-			
TOTAL SUSPENDED SOLIDS (kg/yr)	187	27.0	85.2	80			
TOTAL PHOSPHORUS (kg/yr)	0.523	0.200	61.8	60			
TOTAL NITROGEN (kg/yr)	3.7	1.95	47.2	45			
GROSS POLLUTANTS (kg/yr)	27	0	100	90			

STORMWATER DRAINAGE PLAN

ALL DRAINAGE LINES SHALL BE UPVC (CLASS SH) STORMWATER DRAINAGE PIPE, UNO. ALL DRAINAGE LINES SHALL BE LAID @ 1% FALL MIN, UNO. FIRST FLUSH RAINWATER DEVICES TO BE FITTED TO DRAINAGE LINES TO BUILDER'S DETAIL MINIMUM EFFECTIVE EAVES GUTTER SLOPE = 1:500 THE FOLLOWING SYMBOLS & ABBREVIATIONS HAVE BEEN USED:

- DP1 = Ø150 DOWN PIPE
- DP2 = Ø100 DOWN PIPE
- BG1 = BOX GUTTER REFER TO DETAIL BG2 = BOX GUTTER - REFER TO DETAIL
- SIP = SURFACE INLET PIT (NO LINTEL)
- X 100.00 DENOTES PROPOSED FINISHED SURFACE LEVEL

OG DENOTES STORMWATER PIT TO BE FITTED WITH OCEAN PROTECT OCEAN GUARDS REFER TO TYPICAL DETAIL

ROCKHAMPTON REGIONAL COUNCIL APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with **Development Permit No.: D/55-2020** Dated: 16 October 2020

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CHECKED	APPROVED	SCALE 1:100	DRG No. C04 - B

EXTERNAL PAVEMENT PLAN

1:100

C.J.

DENOTES 150 THICK SLAB WITH SL82 MESH TOP THROUGHOUT CONCRETE STRENGTH = 32 MPa

DENOTES 200 THICK SLAB WITH SL82 MESH TOP & BOTTOM THROUGHOUT CONCRETE STRENGTH = 32 MPa

2-N12 (75 SPACING 1200 LONG) TRIMMERS TOP SHALL BE LOCATED 50 FROM ALL RE-ENTRANT CORNERS, TYPICAL U.N.O.

REINFORCEMENT COVER TO GROUND FLOOR SLAB SHALL BE AS FOLLOWS: 40mm - TO UNPROTECTED GROUND 40mm - EXTERNAL EXPOSURE

30mm - TO A MEMBRANE IN CONTACT WITH GROUND 30mm - INTERNAL EXPOSURE

DENOTES CONSTRUCTION JOINT

_ . _ . <mark>S.J.</mark> _ _ _ DENOTES SAW CUT JOINT

ROCKHAMPTON REGIONAL COUNCIL APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with **Development Permit No.:** D/55-2020 Dated: 16 October 2020

1:100

C05 - B

NEW KERB & GUTTER IN - ACCORDANCE WITH LOCAL COUNCIL STANDARD SPECIFICATION & DETAIL

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NEW DRIVEWAY LAYBACK IN - ACCORDANCE WITH LOCAL COUNCIL STANDARD SPECIFICATION & DETAIL

1:20

C06 - B

BOX GUTTER, RAINWATER HEAD & SUMP SIZING SCHEDULE							
NODE	BOX GUTTER SIZE	RAINWATER HEAD SIZE	SUMP SIZE	loc (mm)	DOWNF		
BG2	600 W x 150 D	N/A	600 W x 100 D	20mm	100		

INITIAL PREPARATION

Verify all dimensions on site prior to commencement, locate all underground services and ensure no damage occurs to them throughout the contract. Comply with the requirements of the Council site guidelines in reference to erosion and sediment control regulations and other environmental controls to contain all within confines of the site. Spray with approved herbicide weed killer to all proposed lawn and garden areas to manufactures directions. Spray all weeds before commencement of any site works are carried and throughout the contract so as to suppress any weeds that may arise. Source all plants before start of job so the time factor to purchase from species list, will be true to plant schedule. The trees and shrubs recommended may sometimes be difficult to source due to times of year, weather, disease etc, this being the case, please inform early so arrangements to substitute can be made. Excess soils and contaminated soil are to removed within the guidelines of the council requirements to approved sites.

SOIL PREPARATION

Cultivate to the minimum depth of 200mm in all garden areas and 100mm depth in all lawn areas; add a clay breaker to all garden areas, before the addition of garden soil is added. In all areas where fill is required, gain required levels using a premium soil mix. Where excavation is required as with clay excavate as required to allow for addition of 200-400mm depth of premium garden soil to garden areas and 100-300mm depth of topsoil to lawn areas. Undertake all required action to ensure that no root balls of proposed plants sit in clay wells and that all garden and lawn areas drain satisfactorily. It is the contractor's responsibility to ensure the end result of the project is that all lawn and garden areas drain sufficiently (both surface and subsurface), are at required finished levels and have sufficient soil depths to enable lawn and plants to thrive and grow. Soil levels are to allow for the addition of turf and mulches to specified requirements. **GARDEN EDGING**

EDGING: Timber edging shall be located to all planter bed edges where meeting new or existing turfed areas. Use 38x150mm treated pine edging with 50x50 pegs at 1200 centres finished 30mm below top of edging. Concrete internal edging to Engineers detail. PLANTING

Purchase plants from an approved nursery that supplies plants that are true to type and species, healthy and able to store at nursery to maintain vigor before planting. Plant within 24hrs of plants being delivered. Set out plants as indicated on plan. Plant holes shall be dug approximately twice the width and 100mm deeper than the plant root balls that they are to receive. Add fertilizer, followed by 100mm of garden soil shall be placed into the base of hole and lightly consolidated. Remove plant from container install and backfill with garden soil and firmed into place. Base of stem shall finish flush with finished soil level. Thoroughly water all plants on first planting to soak soil of plant and surrounding soil so as to allow roots to adjust, do not allow drying out. Water regular over the first 3-4 weeks.

FERTILISING

Use slow release fertilizers such as osmocote and or agriform tablets on all plants. MULCHING

Install 100mm minimum of Forest mulch as a mulch over all gardens. Shaded areas mulch with 10-25mm pebble mulch with weedmat under.

RETAINING WALLS

Erection of masonry block retaining walls treated timber retaining walls to be as per retaining wall specification guidelines . All retaining walls and footings to remain within the confines of boundary. TURF

Prepare for, level and lay cultivated Buffalo turf to all areas nominated on the plan as being lawn. To be layed within 24 hrs of delivery on site, making sure all areas are level for drainage, garden edging and paths COMPLETION

Prior to practical completion removal from site all unwanted debris occurring from work. Satisfy council that all landscaping work has been undertaken in strict accordance with council's landscape codes and guide lines. At the completion of landscape works and prior to the issue of the Certificate of Practical Completion Carry out the following during the maintenance period(determined by Builder). These works shall include but not limited to watering, weeding, fertilizing, pest and disease control, returfing, staking and tying, replanting, cultivation, pruning, aerating, renovation, top dressing and the like.

EXISTING TREES

The existing trees to be retained on site are to be protected by surrounding with a 1.8m high chainmesh fence 3.00m from the base of the tree. This fence is to be erected prior to works commencing on site and is to be retained until all building works are completed The enclosed area is to remain free of materials, machinery, vehicles or site sheds. With this preparation is to protect the existing tree and its critical roots from mechanical damage, compaction or any other adverse impacts resulting from construction activity and allowing the trees to grow the optimum growth once all works have been finalized.

ROCKHAMPTON REGIONAL COUNCIL APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with **Development Permit No.: D/55-2020 Dated: 16 October 2020**

Environmental Noise Assessment Proposed Service Station

12 Queen Elizabeth Drive & 36 Brown Street

Berserker

Report 1316R1-R0 29 May 2020

Traffic Engineering and Road Safety Specialists

www.roadpro.net.au

Document Control Report 1316R1-R0

Version History:

Version	ersion Date Prep		Reviewed by	Description / nature of amendment		
Draft 1	15-May-20	JC	JC	Initial draft		
Revision 0	29-May-20	JC	JC	Final report		

Contact for enquiries

Please direct any queries regarding the preparation of this document to:

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Table of Contents

1	Introduction1				
2	Ac	oustic Terminology3			
	2.1	Sound (Noise) Level			
	2.2	"A" Weighted Sound Pressure Level - dB(A)3			
	2.3	Statistical Sound (Noise) Levels4			
3	Ва	ckground Noise5			
4	No	ise Criteria7			
	4.1	Acoustic Quality Objectives - Residences7			
	4.2	Background Creep8			
	4.3	Sleep Disturbance8			
	4.4	Mechanical Plant Noise9			
5	Pre	edicted Noise Emission Levels10			
	5.1	General Methodology10			
	5.2	Vehicles			
	5.1	Pumps11			
	5.2	Air Conditioners11			
	5.3	Refrigeration Plant11			
	5.4	Loading Bay Noise11			
	5.5	Waste Collection Noise11			
	5.6	Other Ancillary Noise11			
6	Dis	scussion of Results and Attenuation11			
	6.1	Vehicle Movements11			
	6.2	Mechanical Plant12			
7	Co	nclusion and Summary of Recommendations12			
Ар	pendix	A – Proposal PlansA-1			
Ар	oendix	B – Noise ChartsB-1			

1 Introduction

RoadPro Acoustics was engaged by RCI Group to assess potential noise impacts from a proposed service station at a site at 12 Queen Elizabeth Drive & 36 Brown Street, Berserker (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 "A" – 12 Queen Elizabeth Drive & 36 Brown Street, Berserker

Figure 2: Site layout - 12 Queen Elizabeth Drive & 36 Brown Street, Berserker

The proposal involves the establishment of a service station catering for predominately light vehicles.

8 bowsers (at 4 fuel stations) will be available.

An air and water station will be provided, and the fuel shop will retail typical convenience items.

It is proposed that the Site will be accessed and egressed from both Queen Elizabeth Drive and Brown Street.

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

- Environmental Protection (Noise) Policy 2019;
- Environmental Protection Act 1997;
- *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 trg;
- 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 "LA" 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.

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 silen	

Table 1: Typical Noise Levels

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, LA10 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 at the site from Thursday 23rd April 2020 to Tuesday 28th April 2020 at the location shown in **Figure 3** and **Figure 4**. The location was selected as being representative of background noise levels for the nearest sensitive receivers.

The measurements were carried out using a Norsonic 139 (Serial number 1392811) recording "fast" response "A" frequency weighted sound levels at 15minute intervals, with the microphone at a height of approximately 1.3 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 for the Rockhampton Airport Bureau of Meteorology station and were generally suitable for noise monitoring throughout the measurement period.

Figure 3: Noise Logger Location - 12 Queen Elizabeth Drive & 36 Brown Street, Berserker

Figure 4: Noise Logger

Ambient noise at the Site was dominated road by traffic noise on Queen Elizabeth Drive.

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**.

Day	Period,T	L _{A90,T}	L _{Aeq,T}	L _{A10,T}	L _{A1,T}
	Day	42.2	51.9	54.1	58.9
Thursday-23-Apr-20	Evening	33.5	45.9	48.8	53.6
	Night	29.8	47.0	43.6	51.2
	Day	43.2	52.8	53.1	59.3
Friday-24-Apr-20	Evening	33.9	46.2	48.5	55.3
	Night	28.3	43.9	42.4	49.3
	Day	38.6	50.0	50.6	56.2
Saturday-25-Apr-20	Evening	32.2	46.3	48.5	55.2
	Night	28.2	68.5	43.1	50.4
	Day	39.8	50.8	51.5	57.3
Sunday-26-Apr-20	Evening	32.1	47.0	47.9	54.2
	Night	28.9	45.9	42.5	50.4
	Day	44.2	54.1	54.3	59.9
Monday-27-Apr-20	Evening	32.8	48.1	49.4	56.0
	Night	28.3	47.4	44.5	53.7
Tuesday-28-Apr-20	Day	44.7	51.7	53.6	59.0
	Day	43	52	53	59
Overall RBL and	Evening	33	47	49	55
averages	Night	28	62	43	50

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

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.

Sensitive	Time of day	Acoustic q	uality object	Environmental value	
receptor	-	(measured	at the recept		
		L _{Aeq,adj,1hr}	LA10,adj,1hr	LA1,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

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

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 appropriate 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 levelsfor partially closed windows (10% probability of awakening) from DEHP Planning for noisecontrol

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 $L_{A1(1 \text{ hour})}$ Acoustic Quality Objective i.e. 40 dB(A) inside, or 47 dB(A) outside (free-field).

The number of night-time noise events is expected to be approximately 10, requiring the external noise criterion of 52 dB(A) to be achieved.

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
	7am	7pm	Background + 5 dB(A)
Pumps ¹	7pm	10pm	Background + 3 dB(A)
	 10pm		Inaudible
Air conditioning	7am	10pm	Background + 5 dB(A)
equipment	 10pm		Background + 3 dB(A)
	7am	10pm	Background + 5 dB(A)
Refrigeration plant ²	10pm	7am	Background + 3 dB(A)

Notes:

¹A 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.

²Criteria 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
	Environmenta	I Protection A	ct 1994					

Plant	Time Period Start	Time Period Finish	Criterion	
	7am	6pm	43 + 5 = 48 dB(A)	
_	6pm	7pm	33 + 5 = 38 dB(A)	
Pumps	7pm	10pm	33 + 3 = 36 dB(A)	
	10pm	7am	28 - 10 = 18 dB(A)	
	7am	6pm	43 + 5 = 48 dB(A)	
Air conditioning	6pm	10pm	33 + 5 = 38 dB(A)	
equipment	10pm	7am	28 + 3 = 31 dB(A)	
	7am	6pm	43 + 5 = 48 dB(A)	
Refrigeration plant	6pm	10pm	33 + 5 = 38 dB(A)	
-	10pm	7am	28 + 3 = 31 dB(A)	

Notes:

¹A 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 receiver is a double-storey residence adjacent to the south-east corner of the Site at 40 Brown Street.

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 0.25 m ground contours. The model layout and potentially most affected sensitive receiver is shown in **Figure 5**.

Figure 5: Model scenario

5.2 Vehicles

Vehicle noise for carparking (and refuelling) was modelled using the BayFIU method adapted for Australian conditions². 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.

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

Vehicles travelling through the Site were modelled as moving point sources, with a peak hour of approximately 20 light vehicles assumed. It is not expected that heavy vehicles will frequent the Site. Sound power spectra for the vehicles³ is shown in **Table 7**.

1/1 Octave Band Centre Frequency (Hz)								
	63	125	250	500	1000	2000	4000	8000
Light	63	72	73	77	78	78	75	69

Table 7:	Vehicle sound power levels at low speeds, dB
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5.1 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.

5.2 Air Conditioners

Air conditioning plant noise levels have been calculated based on a generic commercial AC condenser unit sound power level of 75 dB(A), with the plant in the bin refuse area. The resultant predicted noise level is 41 dB(A) at the adjoining sensitive receiver.

5.3 Refrigeration Plant

External fixed refrigeration plant has also been modelled as being within the refuse bin area.

A generic sound power level of 80 dB(A) was assumed, with resultant noise levels calculated to be 46 dB(A).

5.4 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.

5.5 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.

5.6 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

6.1 Vehicle Movements

The most significant noise impacts from the Site are expected to be a result of car door closures and engine starts during the night.

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"

The maximum noise levels at the adjoining residence are predicted to exceed the nominated criterion for sleep disturbance of 52 dB(A). An acoustic barrier fence 2.1m high is proposed for the eastern boundary of the Site which will be sufficient to protect ground floor rooms. However, upper floor rooms will remain exposed to the fuel service area.

A 5.5m high acoustic barrier would be required to achieve the sleep disturbance criterion, which is not considered to be consistent with maintaining visual amenity for the neighbouring property.

Given the majority of the customer base for the service station is expected to be in light vehicles, and night-time traffic will be relatively low, it is considered that there is a relatively low risk of disturbance at the residence from night-time activities at the Site. This is consistent with a similar site at If this does occur, an increased acoustic barrier height can be considered.

6.2 Mechanical Plant

With the acoustic barrier in place to protect the amenity of the residence from carpark noise, noise from mechanical plant is still expected to exceed the night-time noise criterion due to the low background noise levels.

It is recommended that mechanical plant is located on the western side of the fuel shop building with appropriate visual screening to Queen Elizabeth Drive.

7 Conclusion and Summary of Recommendations

RoadPro Acoustics was engaged by RCI Group to assess potential noise emissions from a proposed service station at 12 Queen Elizabeth Drive & 36 Brown Street, Berserker.

The night-time sleep disturbance criterion is expected to be exceeded. However, due to the volume and type of traffic expected at the Site, it is considered that the risk of disturbance is low.

It is recommended that mechanical plant is located on the western side of the fuel shop.

Considerations for equipment procurement should include:

- Noise levels of bowser pumps, and
- Options for adjusting or disabling alarms on compressed air dispensers.

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 – Noise Charts









