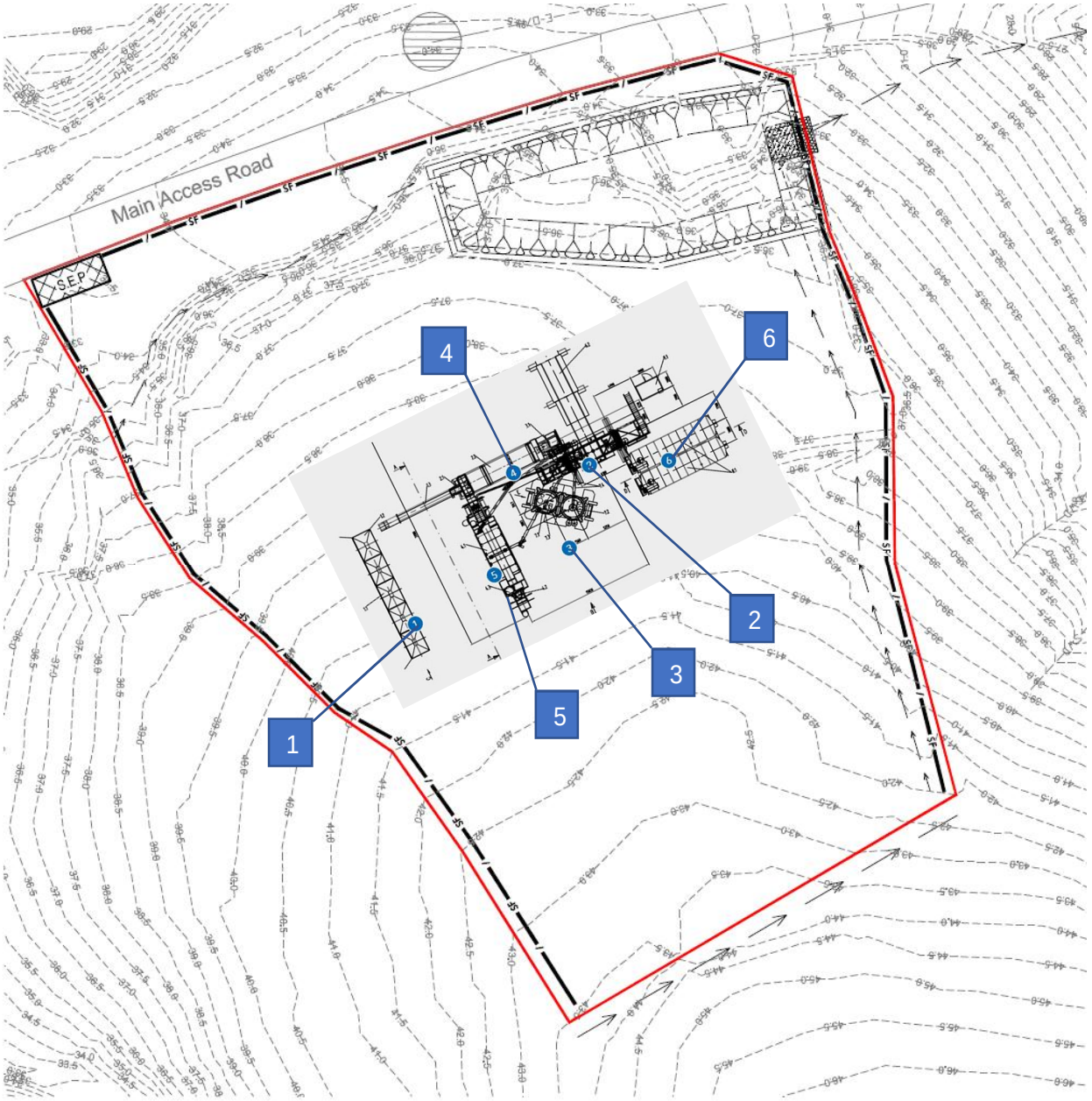
POINT No.	DESCRIPTION
1	COLD FEED SYSTEM
2	MIXING TOWER
3	FILLER SILO
4	DRYER DRUM WITH BURNER
5	DUST COLLECTION SYSTEM
6	BITUMEN TANKS



ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/83-2019

Dated: 9 April 2020

PRELIMINARY

REV	DESCRIPTION	APPD	DATE
A	FOR COMMENTS		14.08.19

DESIGNED W REID
DRAWN -
CHECKED K MACREADY
APPROVED -

CLIENT
COLAS QUEENSLAND PTY. LTD.

RPEQ No. -
DATE AUGUST 2019

EngineersPlus
ENGINEERS PLUS PTY LTD
www.engineersplus.com.au

PROJECT
MIDGEE QUARRY ASPHALT PLANT
59793 BRUCE HIGHWAY
MIDGEE QLD 4702
INDICATIVE SITE LAYOUT PLAN

ENGINEERS PLUS REFERENCE No. 18581

A3	DRAWING No. 18581 - 01	REVISION A

LEGEND

- EXISTING PROPERTY BOUNDARY
- EXISTING UNDERGROUND ELECTRICITY (EUG)
- EXISTING STORMWATER DRAINAGE (SW)
- EXISTING ROAD CENTRELINE
- EXISTING BUILDING
- EXISTING FENCE
- EXISTING TOP OF BANK
- EXISTING TOE OF BANK
- EXISTING EDGE OF BITUMEN
- EXISTING EDGE OF GRAVEL FORMATION
- EXISTING LAKE
- CONTOURS EXISTING SURFACE (0.5m INTERVALS) (24.0)

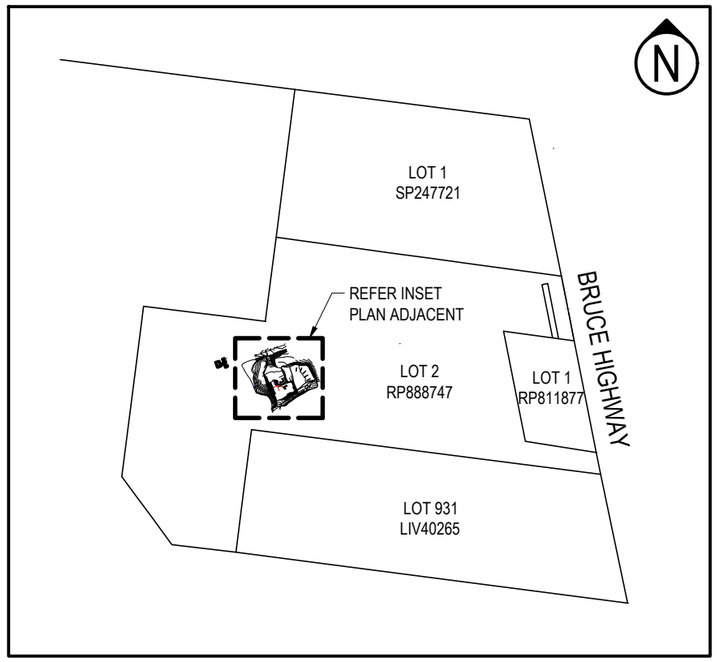
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/83-2019

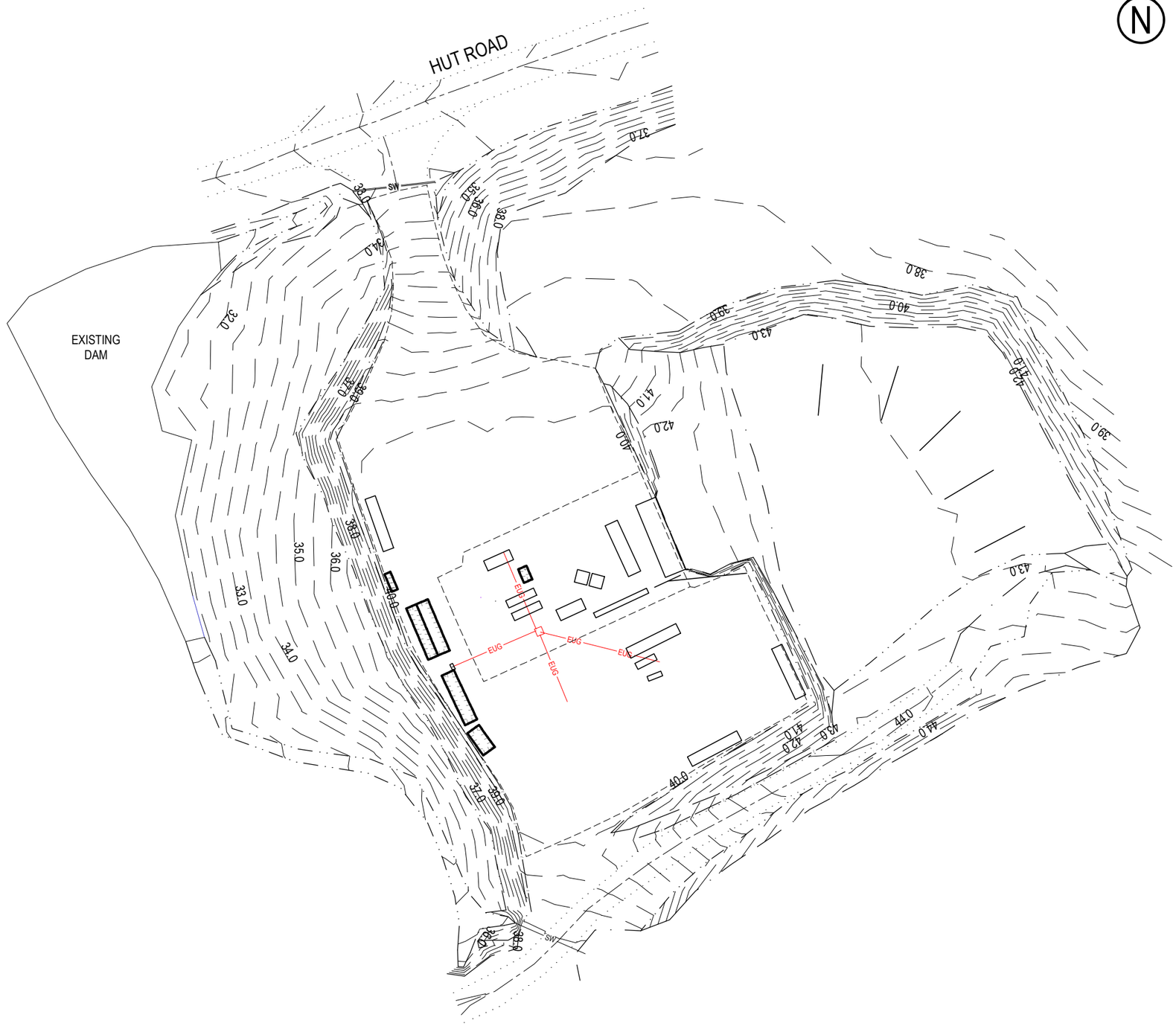
Dated: 9 April 2020



KEY PLAN

SCALE - 1:20,000

0 200 400 600m 1:20,000 (A3)



INSET PLAN

SCALE - 1:1,000

0 10 20 30m 1:1000 (A3)

PRELIMINARY

REV	DESCRIPTION	APPD	DATE
A	PRELIMINARY (FOR COMMENTS)		12.12.19

DESIGNED	W REID
DRAWN	-
CHECKED	K MACREADY
APPROVED	-

CLIENT: COLAS QUEENSLAND PTY. LTD.

RPEQ No. -

DATE DECEMBER 2019

EngineersPlus

ENGINEERS PLUS PTY LTD
www.engineersplus.com.au

PROJECT
MIDGEE QUARRY ASPHALT PLANT
59793 BRUCE HIGHWAY
MIDGEE QLD 4702 (LOT 2 ON RP888747)
SITE LAYOUT PLAN

ENGINEERS PLUS REFERENCE No. 18581

A3	DRAWING No.	REVISION
	18581 - 02	A

LEGEND

- SITE BOUNDARY
- RET. — PROPOSED RETENTION BASIN
- PROPOSED FLOW DIRECTION
- GRASSED SWALE
- ROCK LINED SWALE
- 31 — EXISTING SURFACE CONTOURS
- STORMWATER CATCHMENT BOUNDARY
- 200mm HIGH BUND

STORMWATER CATCHMENT TABLE	
STORMWATER CATCHMENT I.D.	AREA (ha)
A	0.853
B	0.515
BSN	0191
INTERNAL TOTAL	1.559
EXT A	0.285

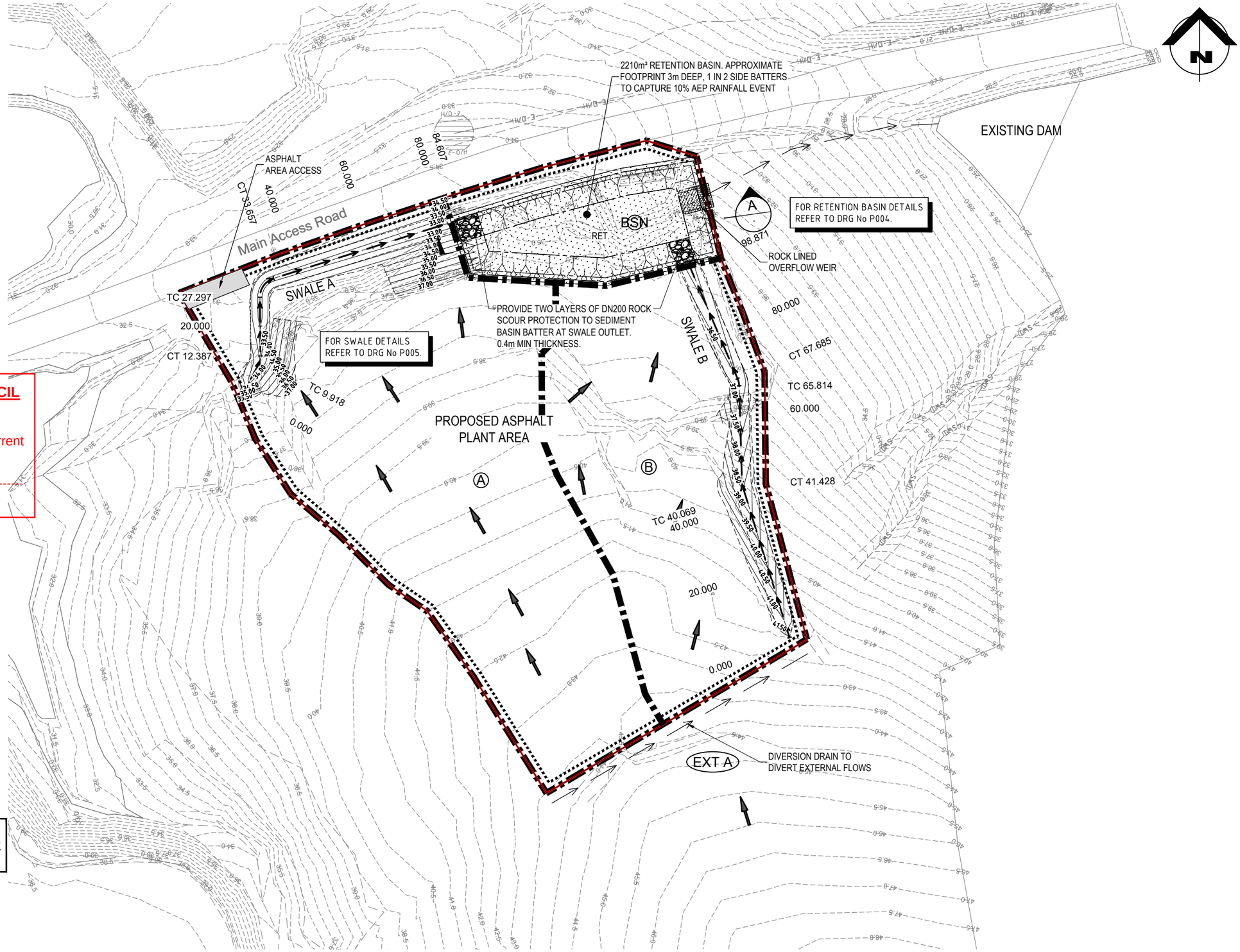
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/83-2019

Dated: 9 April 2020



CONTRACTOR TO DETERMINE AND LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS

REPORT ISSUE

NOT FOR CONSTRUCTION

ISSUE No.	DATE	AMENDMENT
C	18-02-20	ISSUED FOR COUNCIL RFI
B	07-03-19	ISSUED FOR REPORT
A	21-02-19	ISSUED FOR REPORT

KNOBEL ENGINEERS
Suite 4 - 155 Varsity Parade, Varsity Lakes Q 4227
PO Box 41, Varsity Lakes Q 4227
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E: eng@knobelengineers.com.au
GOLD COAST | BRISBANE | BALLINA | ROCKHAMPTON

CLIENT: COLAS QUEENSLAND PTY LTD

PROJECT: MIDGEE QUARRY ASPHALT PLANT
59793 BRUCE HIGHWAY
MIDGEE QLD 4702

DESIGN	DRAWN	APPROVED
HH	HH	

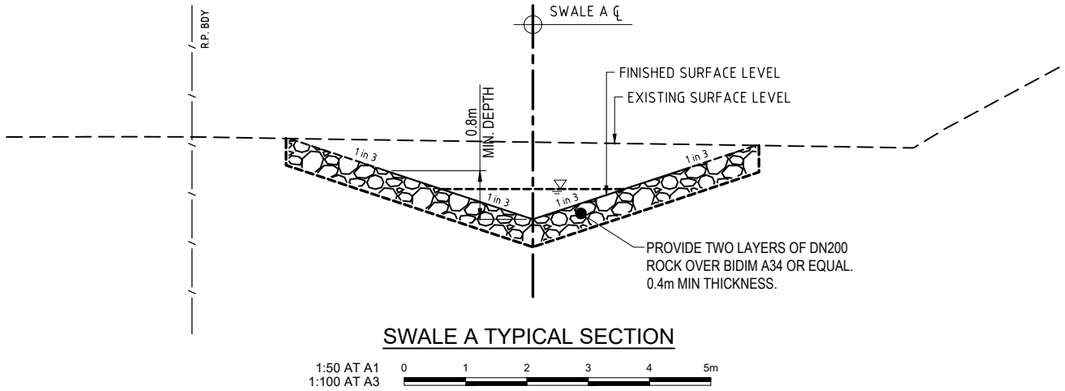
TITLE: STORMWATER MANAGEMENT PLAN

SCALE: 1:500 AT A1, 1:1000 AT A3 (0 10 20 30 40 50m)

PROJECT NO. K4717

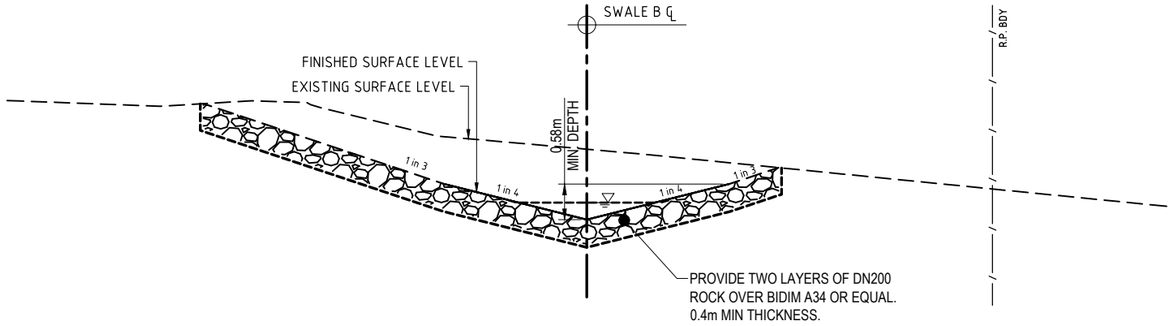
DWG NO. P002

ISSUE C



SWALE A TYPICAL SECTION

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



SWALE B TYPICAL SECTION

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

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

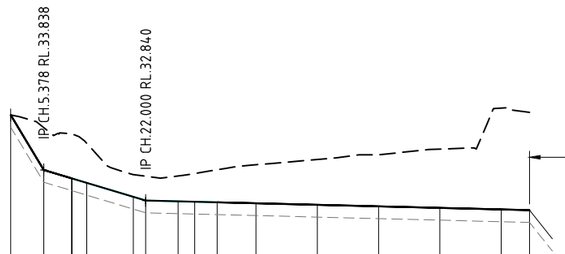
Development Permit No.: D/83-2019

Dated: 9 April 2020

SWALE CAPACITY TABLE					
STORMWATER CATCHMENT I.D.	AREA (ha)	CATCHMENT SLOPE (%)	Q_{100} 20_{min} STORM PEAK DISCHARGE (m^3/s)	SWALE MANNINGS (N)	PEAK FLOW DEPTH (m)
A	0.853	5.4%	0.61	0.033	0.50
B	0.515	5.4%	0.38	0.033	0.28

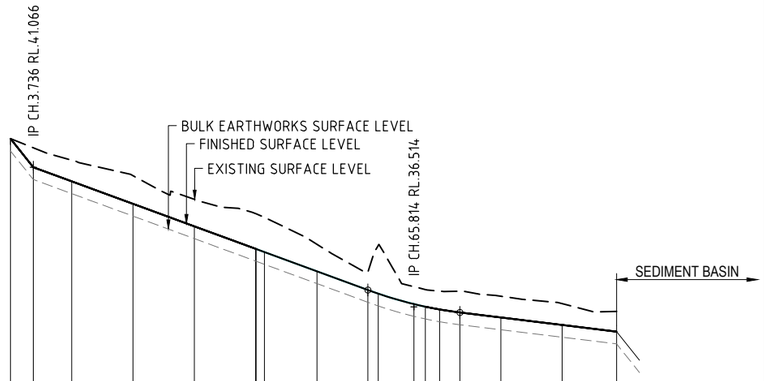
CONTRACTOR TO DETERMINE AND LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS

REPORT ISSUE
NOT FOR CONSTRUCTION



Vertical Curve Length (m)																									
Vertical Curve Radius (m)																									
Vertical Geometry Grade (%)		-33.333%		-6%										-0.5%											
Vertical Grade Length (m)		5.378m		16.622m										62.607m											
Horiz Curve Data				R-5m				R5m																	
DATUM R.L.23.000																									
EXISTING SURFACE LEVELS	35.630	35.217	35.014	35.012	34.709	33.687	33.634	33.639	33.719	33.843	34.008	34.178	34.334	34.518	35.856	35.715									
CUT / FILL DEPTH	0.000	-1.380	-1.449	-1.452	-1.292	-0.727	-0.794	-0.825	-0.919	-1.061	-1.257	-1.478	-1.683	-1.917	-3.305	-3.188									
DESIGN SURFACE LEVELS	35.630	33.838	33.565	33.560	33.417	32.960	32.840	32.814	32.800	32.782	32.750	32.700	32.650	32.600	32.550	32.527									
SWALE CONTROL LINE CHAINAGES	0.000	5.378	9.918	10.000	12.387	20.000	22.000	27.297	30.000	33.657	40.000	50.000	60.000	70.000	80.000	84.607									

SWALE A LONGITUDINAL SECTION



Vertical Curve Length (m)																									
Vertical Curve Radius (m)																									
Vertical Geometry Grade (%)		-25%				-7.333%														-2.439%					
Vertical Grade Length (m)		3.736m				62.078m														33.058m					
Horiz Curve Data						R5m														R-5m					
DATUM R.L.26.000																									
EXISTING SURFACE LEVELS	42.000	41.700	41.303	40.791	40.023	39.556	39.551	39.434	38.554	37.656	38.515	37.174	37.079	37.026	37.022	36.861	36.619	36.367							
CUT / FILL DEPTH	0.000	-0.634	-0.696	-0.918	-0.883	-1.149	-1.149	-1.132	-0.880	-0.592	-1.570	-0.568	-0.559	-0.597	-0.692	-0.693	-0.695	-0.660							
DESIGN SURFACE LEVELS	42.000	41.066	40.607	39.873	39.140	38.407	38.402	38.302	37.673	37.064	36.945	36.605	36.520	36.430	36.331	36.168	35.924	35.707							
SWALE CONTROL LINE CHAINAGES	0.000	3.736	10.000	20.000	30.000	40.000	40.069	41.428	50.000	58.314	60.000	65.814	67.685	70.000	73.314	80.000	90.000	98.871							

SWALE B LONGITUDINAL SECTION

ISSUE No.	DATE	AMENDMENT
A	18-02-20	ISSUED FOR REPORT

KNOBEL ENGINEERS
Suite 4 - 155 Varsity Parade, Varsity Lakes Q 4227
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GOLD COAST | BRISBANE | BALLINA | ROCKHAMPTON

CLIENT: COLAS QUEENSLAND PTY LTD

PROJECT: MIDGEE QUARRY ASPHALT PLANT
59793 BRUCE HIGHWAY
MIDGEE QLD 4702

DESIGN	DRAWN	APPROVED
HH	HH	

TITLE: SWALE LONGITUDINAL AND CROSS SECTIONS

SCALE 1:500 AT A1 (1:1000 AT A3) 0 10 20 30 40 50m HOR
1:100 AT A1 (1:200 AT A3) 0 2 4 6 8 10m VERT

PROJECT NO. K4717

DWG NO. P005

ISSUE A

COLAS Queensland Pty Ltd
Stormwater Management Plan
Midgee Asphalt Manufacturing Plant

STEER
ENVIRONMENTAL CONSULTING

COLAS Queensland Pty Ltd – Stormwater Management Plan (SWMP) – Asphalt Manufacturing Plant – 59793 Bruce Highway, Midgee 4702

Applicant Name: COLAS Queensland Pty Ltd
AR #:
Project #:
EA Application #:
Existing EA Permit #:

Report Prepared by: STEER Environmental Consulting

April 2019

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/83-2019
Dated: 9 April 2020

Document Status

Report Type: Stormwater Management Plan (SWMP)

Project: Asphalt Manufacturing Plant Environmentally Relevant Activity, 59793 Bruce Highway, Midgee 4702

Client: COLAS Queensland Pty Ltd

Document Version	Date	Author	Checked	Approved
Final	**30.04.2019**	**Glenn Druery**	**Phil Steer**	**Phil Steer**
Signed				

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Table of Contents

1 List of Figures

2 Abbreviations

- DA - Development Approval
- DES - Department of Environment and Science
- DSDMIP - Department of State Development, Manufacturing, Infrastructure and Planning
- EA - Environmental Authority
- EP Act - *Environmental Protection Act 1994*
- ERA - Environmentally Relevant Activity
- KECSWMP - Knobel Engineers Conceptual Stormwater Management Plan
- Knobel - Knobel Engineers
- Planning Act - *Planning Act 2016*
- QUDM - Queensland Urban Drainage Manual
- RPEQ - Registered Professional Engineer of Queensland
- RRC - Rockhampton Regional Council
- RRPS - Rockhampton Region Planning Scheme 2015
- SWMP - Stormwater Management Plan
- STEER EC - STEER Environmental Consulting

3 Executive Summary

COLAS Queensland Pty Ltd intends to establish an asphalt manufacturing plant at 59793 Bruce Highway, Midgee 4702. The activity is described as an environmentally relevant activity (ERA) under the provisions of the *Environmental Protection Act 1994* (EP Act), and requires an environmental authority (EA) from the Department of Environment and Science (DES) to operate. The proposed activity is assessable development under the provisions of the *Planning Act 2016* and requires a development approval (DA) from local government (Rockhampton Regional Council (RRC)) and the State (Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP)) to operate. Both the DA and the EA will require that the activity is operated in such a manner so that stormwater that falls on disturbed areas of the asphalt manufacturing activity is appropriately managed to prevent impact on land and waters in the receiving environment. Appropriate engineered stormwater management controls must be in place for activities that require approval for assessable development.

STEER Environmental Consulting (STEER EC) has been commissioned by COLAS Queensland Pty Ltd to prepare a "Stormwater Management Plan" (SWMP) for the proposed asphalt manufacturing activity. The SWMP discusses the proposed site for the asphalt manufacturing activity, the surrounding area, and the receiving environment in terms of potential impact from the activity. The subject land is also the licensed location for an extractive and screening ERA. STEER EC has worked cooperatively with Knobel Engineers (Knobel) to develop this SWMP for the asphalt manufacturing activity. The SWMP details the engineered design of the operational area, and the stormwater management infrastructure that will be implemented to mitigate potential impact on the receiving environment from stormwater that has been in contact with the footprint of the site. Other mitigation measures include diverting stormwater around the footprint of the asphalt manufacturing plant.

4 Background

4.1 Proponent

COLAS Queensland Pty Ltd is part of the COLAS Group, a leader in the construction and maintenance of transport infrastructure across Australia. The COLAS Group is involved in every aspect of construction and maintenance for roads and other types of transport infrastructure including air, rail and marine transport, as well as projects involving urban development and recreational facilities. The main operational branch of the COLAS Group is focused on the core business of constructing and maintaining roads, but also undertakes specialised activities in related sectors including railways, sales of refined products, road safety and signalling, and pipelines. COLAS Queensland Pty Ltd is based at Dundowran near Hervey Bay, and is part of the decentralised network of local companies under the COLAS Group. COLAS Queensland Pty Ltd is focused purely on road construction and maintenance, and already operates bitumen spray crews around central Queensland from its base in Gracemere. COLAS Queensland Pty Ltd has identified an opportunity to manufacture asphalt to supply the local market in central Queensland.

4.2 Site Location and Surrounding Area

The subject land is located at 59793 Bruce Highway, Midgee 4702 in the RRC local government area (Figure 1). The real property description for the subject land is Lot 2 on Plan RP888747. The site is located on the western side of the Bruce Highway approximately 14 km south of Rockhampton. There is presently no asphalt manufacturing plant on site, however the intention is the utilise one of the cleared areas on the subject land to construct an asphalt manufacturing plant. The presence of the hard rock quarry on the subject land has been a major factor in the decision to establish the proposed asphalt manufacturing plant on site. Material won from the existing hard rock quarry will be crushed on site under an existing environmental authority (EA) and used in the asphalt manufacturing plant as feedstock for manufacturing asphalt. The land parcel is zoned as rural in the Rockhampton Region Planning Scheme 2015 (RRPS), however Hopeman Pty Ltd operates the hard rock quarry under a development approval (DA) administered by Rockhampton Regional Council (RRC) and an EA administered by the Department of Environment and Science (DES). The land parcel covers a surface area of approximately 85 ha, and large areas of the surface of the subject land have been developed for the purpose of conducting the existing extraction and screening activities (Figure 2).

The surrounding area is rural, and is zoned as such in the RRPS. Between the subject land and the Bruce Highway is nestled an 8 ha parcel of land on which the Kangaroo Country Caravan Park is situated. The caravan park occupies the southern portion of the lot. Both land parcels to the north and south are undeveloped, and owned by the Hopkins family, who also own and operate the extractive and screening environmentally relevant activities (ERAs) on the subject land. The land parcel to the west is freehold, undeveloped and used for grazing cattle.

Figure 1. Location of the subject land at 59793 Bruce Highway, Midgee in relation to Rockhampton and surrounding population centres.

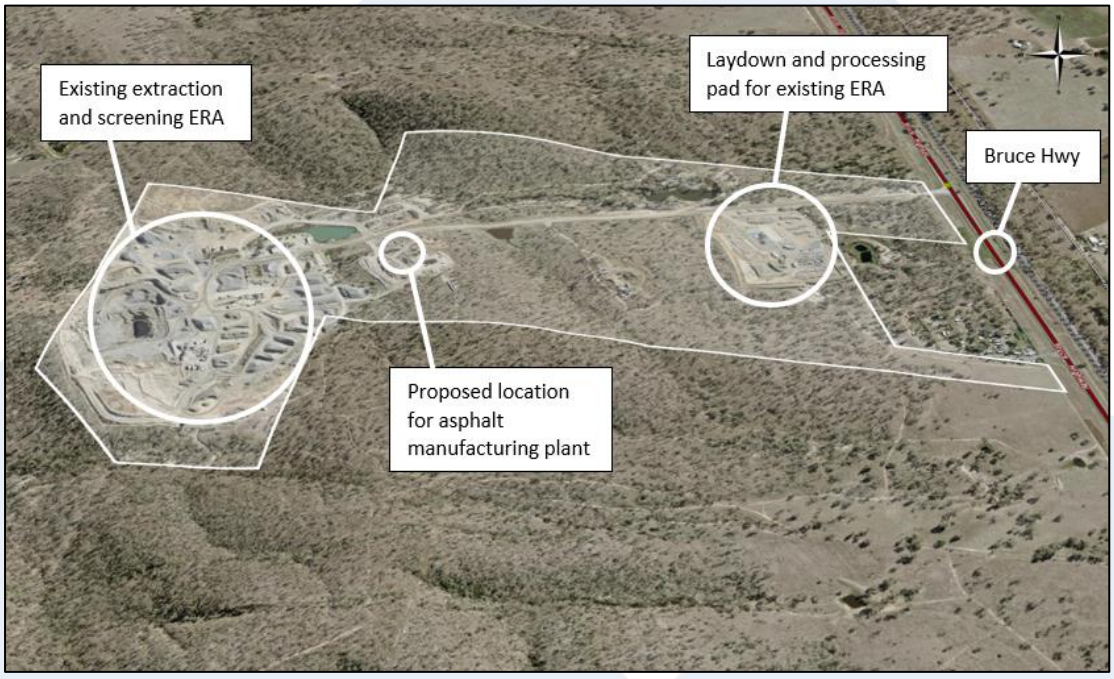

Figure 2. Lot 2 on Plan RP888747 at 59793 Bruce Highway, Midgee showing the proposed location for the asphalt manufacturing plant to the east of the main area of extraction licensed under the Hopeman Pty Ltd environmental authority.

Figure 3. Subject land shown in darker yellow/green, surrounded entirely by rural zone land (lighter yellow/green). Source: RRPS mapping.

4.3 Site History

The subject land is the location of a large hard rock quarry owned and operated by Hopeman Pty Ltd. The quarry has been operated continually for many decades at the location, and the footprint of that activity occupies a significant area of the subject land. Hopeman Pty Ltd operates the extractive and screening ERA under the provisions of an EA issued by DES. Quarrying involves making hard rock accessible by blasting as necessary, before won material is processed into a range of products including road base, aggregates, crusher dust, filter rock and railway ballast. This is achieved through the use of crushing and screening plant permanently positioned on the subject land (Figure 4). Hopeman Pty Ltd are also involved in civil construction projects and have used cleared areas on the subject land for storage of various materials such as used railway sleepers, and redundant or decommissioned plant. The proposed location for the asphalt manufacturing plant was cleared many years ago and has been used as a laydown area for storing material from a range of projects.

Figure 4. Processing plant in use at the extractive and screening ERA on the subject land.

4.4 Regional Context

The subject land is located in the Fitzroy River Catchment, which makes up part of the Brigalow Belt Bioregion of central Queensland. The land is separated from the Fitzroy River floodplain by the Bruce Highway and northern rail line. Vegetation in the surrounding area consists predominantly of open woodland to the north, west and south which is mapped primarily as non-remnant vegetation.

4.5 Climate

The climate for the region is classified as warm and temperate. The average rainfall is 773 mm with the majority falling between October and March (Figure 5). Average temperature ranges from 26.7 ^{o}C in January to 15.8 ^{o}C in July (Figure 5).

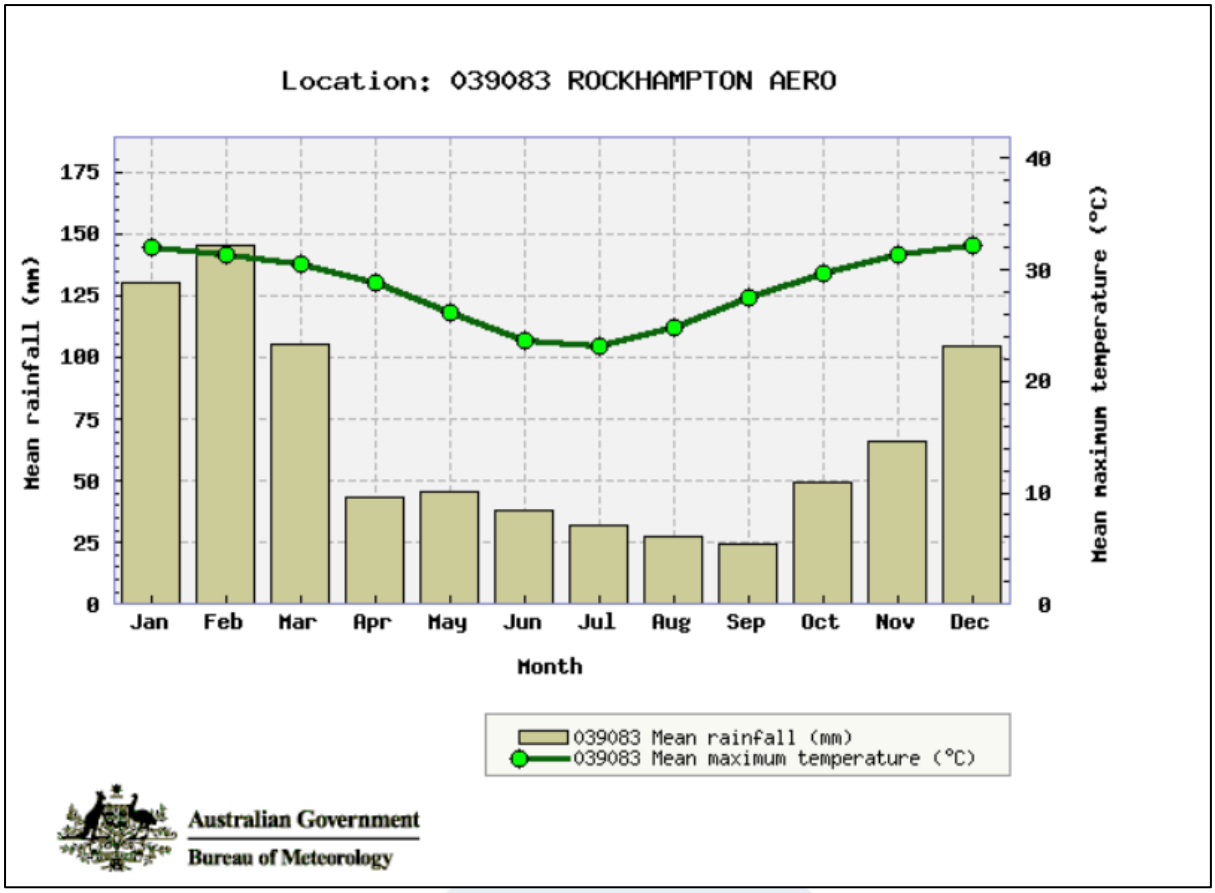

Figure 5. Mean monthly rainfall and maximum temperature for Rockhampton Aero, located at the Bureau of Meteorology at the Rockhhampton Airport.

5 Stormwater Management Plan

5.1 Stormwater Management Plan Context

In the absence of appropriate built controls, stormwater that falls or flows onto the footprint of the asphalt manufacturing plant facility during rainfall events is likely to liberate sediment, which is a prescribed water contaminant in the *Environmental Protection Act 1994*. Sediment-laden stormwater released from the asphalt manufacturing plant has the potential to impact on waters in the receiving environment, potentially resulting in environmental harm. This Stormwater Management Plan (SWMP) describes the management approach and mitigation measures to manage and capture surface stormwater generated on the site during rainfall events. The document describes mitigation measures that will be employed during both the construction and operational phases of the activity. The SWMP has been designed to minimise sediment mobilisation and erosion on the site, and any potential release of sediment from the site.

The SWMP has been developed in consultation with Knobel Engineers (Knobel), Registered Professional Engineers of Queensland (RPEQ). Knobel has undertaken the necessary calculations in accordance with DES guidelines, which will see stormwater runoff for all rainfall events up to and including a 1 in 5 year 24-hour duration rainfall event captured and retained onsite. The detailed calculations based on site hydrology and hydraulics can be viewed in the Knobel Engineers Conceptual Stormwater Management Plan (KECSWMP) which contributes to this SWMP as Appendix A.

5.2 Receiving Environment

A constructed dam is located downstream of the surface area of the proposed asphalt manufacturing plant footprint. This is a legacy farm dam used to water stock for many years prior to the operation of the existing quarry on the subject land. Stormwater that falls on the catchment of the proposed asphalt manufacturing plant and on the small catchment above the proposed site footprint reports to this dam. The dam then overtops and discharges through a culvert beneath the main access road which runs east-west through site and to the existing hard rock quarry, to the unmapped drainage line on the subject land (Figure 6).

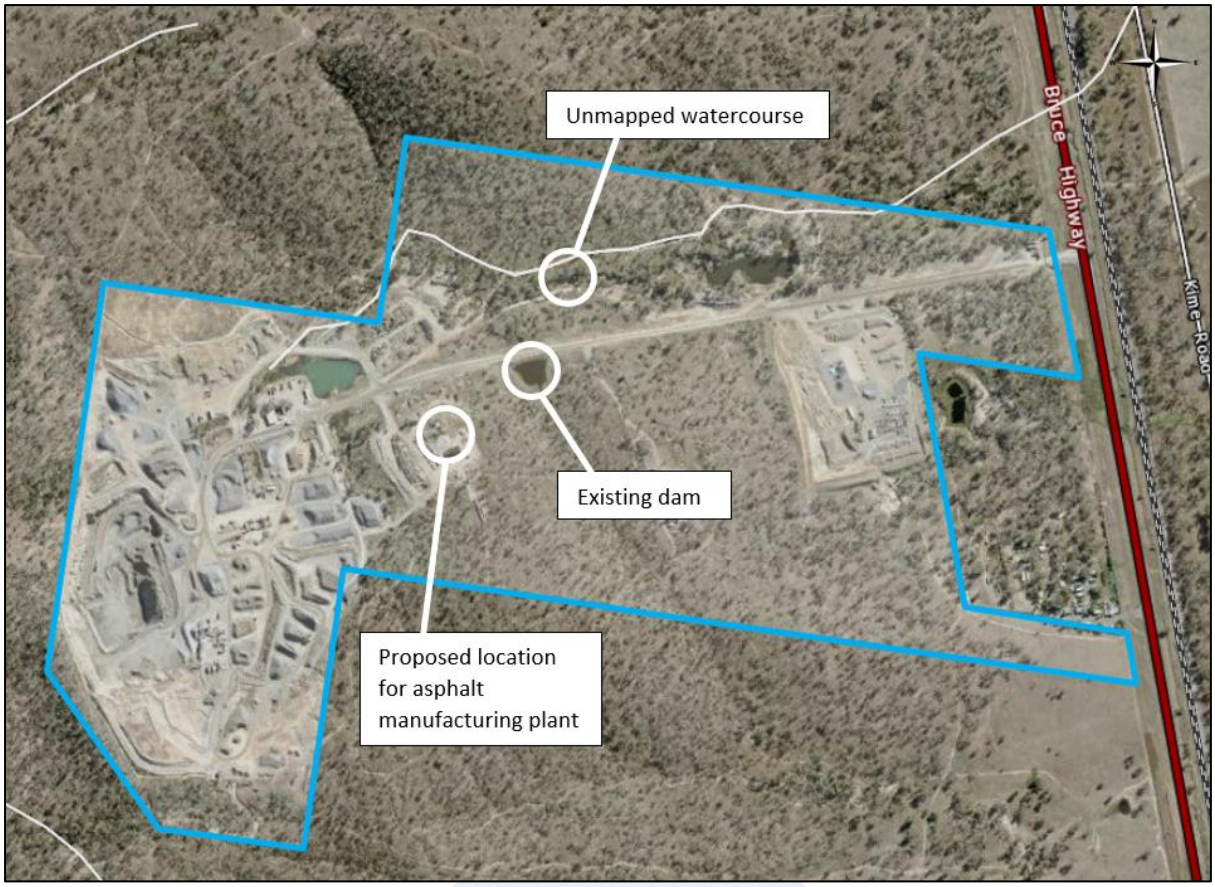

Figure 6. Location of unmapped watercourse (grey line approximately marking location) that stormwater from the dam reports to. Source: Queensland Globe.

5.3 General SMWP Design Principles

The SWMP has been designed predominantly as a 'catchment perimeter control' plan. The proposed site for the asphalt manufacturing plant is located on a sloping section of land, positioned to one side of a slight ridge on an elevated portion of Lot 2 Plan RP888747. The surface contours shown in the KECSWMP demonstrate that the site area commences approximately 10 m upgradient of, and south of the main access road for the existing extractive and screening ERA on the subject land at approximately 43 m AHD. The site slopes north toward the main access road, and the proposed footprint for the asphalt manufacturing plant extends to immediately upgradient of this road, terminating at an elevation of approximately 34 m. The site therefore has an approximate fall of 9 m from the southern upslope boundary to the northern boundary adjacent to the main access road. The natural topography of the site generally directs stormwater from the southernmost portion, down the natural slope toward the northeast. The surface area of the site proposed for the asphalt manufacturing plant is 1.559 ha (Refer to Knobel *Stormwater Catchment Plan*, Ref K4717/P001/A contained within Appendix A). The proposed location for the asphalt manufacturing plant only has a small catchment of 0.285 ha, located directly upgradient to the south (Plan Ref K4717/P001/A contained within Appendix A).

The SWMP has been designed to work in unison with the natural topography and hydraulic characteristics of stormwater flows across the proposed site for the asphalt manufacturing plant. The site was carefully selected with the intention of ensuring that stormwater management strategies can be engineer-designed to use the natural slope of the site to the system's advantage, allowing for implementation of minimal standard stormwater management controls to guide stormwater flows from the single small catchment area into the proposed retention basin (Refer to Knobel *Stormwater Management Plan*, Ref K4717/P002/B contained within Appendix A). Stormwater will be captured and allowed to settle within the retention basin, thus retaining sediment liberated in stormwater flows on the licensed place. Only during extreme rainfall events will stormwater be discharged from the retention basin into the receiving environment.

The SWMP is comprised of the following stormwater management infrastructure which will be discussed in detail in sections below:

- Sediment fencing
- Earthen perimeter bund
- Diversion drains
- Vegetated swales
- Rock-lined swales
- Stabilised entry/exit point
- Retention basin with rock-lined overflow weir

5.3.1 Construction phase

Stormwater management for the proposed asphalt manufacturing activity will be separated into two distinct phases as follows:

1. The construction phase, and
2. The operational phase.

This section describes how stormwater will be managed through the construction phase.

The construction of the asphalt manufacturing plant will require sufficient time to build necessary infrastructure such as office buildings, ablution blocks, material stockpiling areas, and siting the asphalt manufacturing plant where it will be eventually operated. This phase will also involve preparing the hardstand area, which will involve laying down asphalt or bitumen in some trafficable areas.

Additionally, the construction phase will involve building the stormwater management infrastructure in accordance with the RPEQ-designed plans in the KECSWMP. Once the site is set out, a sediment fence will be installed along the western, northern and eastern boundaries of the proposed asphalt manufacturing plant area in accordance with the Knobel *Sediment and Erosion Control Plan and Details*, Ref: K4717/P003/B in Appendix A.

Once the asphalt manufacturing plant and the permanent stormwater management infrastructure has been constructed, the sediment fence will be permanently removed for the operational phase of the activity.

5.3.2 Exclusion of external stormwater flows

Overland flow of stormwater from upgradient of the proposed development site can impact unnecessarily on the internal stormwater management system which is only engineered to manage water that falls directly on the disturbed area of the activity. Wherever possible, stormwater flowing from catchment located upgradient of the proposed development site should be diverted around the site. Equally as important as implementing appropriate internal stormwater and sediment and erosion control measures is establishing effective ways of preventing clean stormwater from entering the footprint of the proposed site. Stormwater that falls upgradient of the proposed development site is considered uncontaminated water, however once it enters the site and comes in contact with disturbed areas it must be managed as potentially contaminated stormwater. Therefore, ingress of stormwater that originates upgradient of the site can significantly increase the volume of water that must be managed through stormwater management and holding infrastructure. The upgradient catchment is poorly grassed, and has large areas of naturally bare ground which invariably results in the liberation of sediment from this area during significant rain events. However, since this is the natural undisturbed ground surface, this water is considered uncontaminated stormwater for the purpose of this SWMP.

The upgradient overland flow can only originate from within the small catchment above the proposed site for the asphalt manufacturing plant. The site for the asphalt manufacturing plant was specifically chosen because of its location having only minimal catchment above the proposed area for the plant. The external catchment of 0.285 ha located upgradient of the proposed asphalt manufacturing plant area is labelled 'EXT A' in the Knobel *Stormwater Catchment Plan*, Ref: K4717/P001/A contained within Appendix A. Rain falling on areas to the west and east of the proposed area for the asphalt manufacturing plant will flow away from the site due to the natural gradient of the land.

A diversion drain and vegetated swale will be constructed at the interface between the upgradient external catchment (EXT A) to prevent, or at least minimise to the greatest extend possible, stormwater from entering the site of the asphalt manufacturing plant.

The small catchment size upgradient of the proposed asphalt manufacturing plant, and the control measures in place to divert water away from the disturbed area of the plant will ensure that the internal stormwater management system will not be challenged with additional potentially contaminated stormwater.

Additional built infrastructure to ensure potentially contaminated stormwater generated from rainfall directly onto the distrubed area of the asphalt manufacturing plant site will be retained on this area by installing a 200 mm high earthen perimeter bund (Knobel *Stormwater Management Plan*, Ref:K4717/P002/B ontained within Appendix A). This bund will prevent sheet flow over the disturbed area from escaping site, and instead will ensure this water reports directly to the rock-lined swales located along the northern and eastern boundaries of the asphalt manufacturing plant area.

5.3.3 Control of surface water flows within the footprint of the activity

Stormwater flows generated from rain falling directly on the disturbed area of the proposed asphalt manufacturing plant must be managed in a manner that minimises the potential for erosion and sediment liberation within the site. This will be achieved by installing rock-lined swales that will act to significantly slow the velocity of flowing stormwater on site. These structures function as a primary treatment system by removing gross pollutants such as plastic and other rubbish that may be accidentally liberated in stormwater during significant rain events. The rock-lined swales will reduce the likelihood of stormwater scouring the ground on the disturbed area of the proposed activity, liberating sediment in the process and prematurely filling the retention basin. There will be two rock-lined swales constructed within the footprint of the proposed asphalt manufacturing plant area. One will be located close to the northern boundary of the site, running parallel with the main access road and will direct water in an easterly direction to the retention basin in the northeast corner. The second rock-lined swale will be constructed along the eastern boundary of the site, and will channel water northward, also into the retention basin. The location of the proposed rock-lined swales can be seen in the Knobel *Stormwater Management Plan*, Ref: K4717/P002/B and the Knobel *Sediment and Erosion Control Plan and Details*, Ref: K4717/P003/B, both presented in Appendix A.

5.3.4 Retention basin design capacity

The footprint of the asphalt manufacturing plant has only a single catchment (Catchment A in Knobel *Stormwater Catchment Plan*, Ref: K4717/P001/A in Appendix A). Initially, rainwater will travel as sheet flow across the surface of the asphalt manufacturing plant, before concentrating in the two rock-lined swales along the northern and eastern boundaries of the site and flowing into the single retention basin. The intention of the engineer-designed retention basin will be to capture and hold stormwater runoff from all rainfall events up to and including a 1 in 5 year 24-hour duration rainfall event. The retention basin will be constructed in the northeast corner of the disturbed area of the asphalt manufacturing plant, which is downgradient of both the northern and eastern rock-lined swales, which will channel stormwater that falls on site into the basin. The retention basin will be constructed with a 1 in 2 batter around its perimeter, and each stormwater delivery point where stormwater will enter the basin at the termination of the two rock-lined swales will have rock armouring to minimise the risk of erosion. Design of the retention basin will provide a sediment settling zone, which will allow a minimum settling volume of 2210 m^3.

The retention basin will have a reinforced spillway built into the eastern end, which will allow settled stormwater to discharge once the basin is at capacity. The spillway will be 0.5 m lower than the top of the bank, and will be 5 m wide once constructed (Knobel *Permanent Sediment and Erosion Control Details*, Ref: K4717/P004/B). Immediately downgradient of the spillway will be rock armouring to ensure discharges from the retention basin do not result in erosion of the grass-lined swale between the retention basin and the dam to the east.

5.3.5 Discharge of stormwater

Captured and settled stormwater will be discharged into the receiving environment via the constructed weir at the eastern end of the retention basin. Settled stormwater will discharge across the reinforced spillway, and flow over the rock armouring before entering the existing dam to the east

(Figure 6). After filling the dam, water will discharge in a northerly direction, under the road through a culvert and enter the existing unmapped watercourse that flows west to east on the subject land. The unmapped watercourse ultimately discharges toward Serpentine Creek, which is situated approximately mid-estuary on the southern bank of the Fitzroy River.

5.4 SWMP Maintenance

Routine maintenance of the key infrastructure of the stormwater management system is vital to the ongoing effectiveness of the SWMP. Routine maintenance will entail the following:

- Regular inspections of the integrity of the sediment fence during the construction phase.
- Regular inspections of permanent stormwater management infrastructure once constructed to ensure continued integrity of the following:
    - perimeter bund,
    - grassed swales/drains outside of the footprint of the plant,
    - rock-lined swales within the footprint of the plant,
    - water storage infrastructure (retention basins).
- Regular maintenance/servicing of rock-lined and grassed swales, the retention basin and the reinforced spillway to remove any accumulated debris. Unattended accumulation of debris may significantly compromise the effectiveness of stormwater management system infrastructure.
- Regular inspection and servicing of swales, retention basins and weirs to remove any accumulated sediment/silt. This material should be removed and stockpiled for future rehabilitation works or other alternate purposes.
- Inspection of stormwater management system infrastructure following significant rainfall events to confirm the integrity of all infrastructure and identify any areas where repairs may be necessary.
- Repair of any damage to stormwater management infrastructure.
- Continual on-site use of water captured within the retention basin to maintain maximum freeboard and potential capacity of infrastructure. Removing water from the retention basin will also simplify the process of intermittently removing accumulated sediment from the basin.

5.5 Use of Captured Water

To maintain the maximum available freeboard, and therefore maintain the maximum potential holding capacity of the stormwater management infrastructure, water captured within retention basin will be removed regularly. While water should be removed regularly to maximise freeboard at all times, special attention should be made to maximising freeboard immediately prior to the recognised wetter months of the year, being October to March (Figure 5). Water removed from the retention basin will be used on-site to control dust potentially generated at the asphalt manufacturing plant or on the main access road shared by the asphalt plant and the existing hard rock quarry. Water from the retention basin will not be used in a manner that is likely to result in this water escaping to the receiving environment.

6 Implementation of SWMP

The SWMP is being implemented into a site that has previously been cleared and used as a laydown area, however has not been developed for any particular use. Therefore, there is no existing stormwater management infrastructure at the proposed location for the asphalt manufacturing plant.

The SWMP will be implemented from scratch, beginning with establishment of the construction phase infrastructure and the western diversion drain/grassed swale that will separate the small external catchment (EXT A) from the footprint of the asphalt manufacturing plant. The difference between this and a greenfield site is that the site proposed for the asphalt manufacturing plant has already been cleared and compacted over time from use as a laydown area by the land owners. Therefore, no extensive clearing of vegetation is necessary. Commencement of the minor reshaping that will be necessary to install the infrastructure described in the SWMP will occur during the drier months of the year so as to minimise the potential for significant rain events to liberate sediment during the construction phase. The retention basin will be constructed first to ensure that in the event of significant rain, sediment liberated in stormwater that traverses the disturbed area of the site will be captured. Construction of all stormwater management infrastructure will be completed prior to the establishment of the asphalt manufacturing plant infrastructure.

7 Appendices

Appendix A – Knobel Engineers - Conceptual Stormwater Management Plan

CONCEPTUAL STORMWATER MANAGEMENT PLAN

PROPOSED ASPHALT MANUFACTURING PLANT

59793 Bruce Highway

MIDGEE

7 March 2019

File No: K4717-0002

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KNOBEL ENGINEERS

DOCUMENT CONTROL SHEET

Title:	Conceptual Stormwater Management Plan
Document No:	K4717-0002
Original Date of Issue:	7 March 2019
Project Manager:	Aaron Pianta
Author:	Andrew Pilkington
Client:	Colas Queensland Pty Ltd
Client Contact:	Phil Steer – Steer Environmental Consulting
Client Reference:	59793 Bruce Highway, Midgee
Synopsis:	This Conceptual Stormwater Management Plan describes the existing site characteristics, proposed development of the site and corresponding stormwater quantity and quality management controls to be implemented during both the construction and operational phases of the development.

Reviewed by RPEQ	Reg. No.	Signed	Date
Aaron Pianta	10423		7 March 2019

Revision/Checking History

Revision No	Date	Checked By	Issued By
Original	7 March 2019	Aaron Pianta	Andrew Pilkington

Distribution

Recipient	No of Copies	Method
Phil Steer – Steer Environmental Consulting	1	PDF

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Appendix B Knobel Engineers, *Stormwater Management Plan* (Ref: K4717/P002/B)
Appendix C Knobel Engineers, *Sediment and Erosion Control Plan and Details* (Ref: K4717/P003/B)
Appendix D Knobel Engineers, *Permanent Sediment Basin Plan and Details* (Ref: K4717/P004/B

1.0 INTRODUCTION

1.1 Background

Knobel Engineers has been commissioned by Colas Queensland Pty Ltd to prepare a Conceptual Stormwater Management Plan (CSWMP) for the Proposed Asphalt Manufacturing Plant at 59793 Bruce Highway, Midgee.

The subject site will make up a portion of the subject lot which is described in Table 1 and has a total area of 85.15 ha. The subject site has a total area of 1.559 ha.

Table 1: Site Description

Developer	Lot and Property Description	Street Address
Colas Queensland Pty Ltd	Lot 2 RP888747	59793 Bruce Highway, Midgee

In preparing the CSWMP Knobel Engineers has considered the applicable requirements for the management of the stormwater quantity and quality measures appropriate for the subject site and proposed development.

1.2 Scope

This CSWMP details the conceptual planning, layout and design of the stormwater management infrastructure for both the construction and operational phases of this development.

This CSWMP aims to:

- Establish the required performance criteria for the proposed stormwater quality management systems;
- Provide a conceptual design of stormwater infrastructure including stormwater quality management controls where required;
- Provide guidelines for stormwater quality during construction and operational phase;
- Ensure stormwater runoff is conveyed through the site to a lawful point of discharge in accordance with Queensland Urban Drainage Manual (QUDM) and Capricorn Municipal Development Guidelines (CMDG); and
- Provide reporting and monitoring mechanisms whereby the performance of this system can be measured enabling identification of corrective actions/alterations required to ensure the above mentioned objectives are maintained.

This CSWMP has been prepared in accordance with the IEAust, (National Committee on Water Engineering), *Australian Runoff Quality (Draft), CMDG* and QUDM.

2.0 DESCRIPTION OF SUBJECT SITE

2.1 Location

The subject site is located on 59793 Bruce Highway, Midgee indicated in Figure 1.

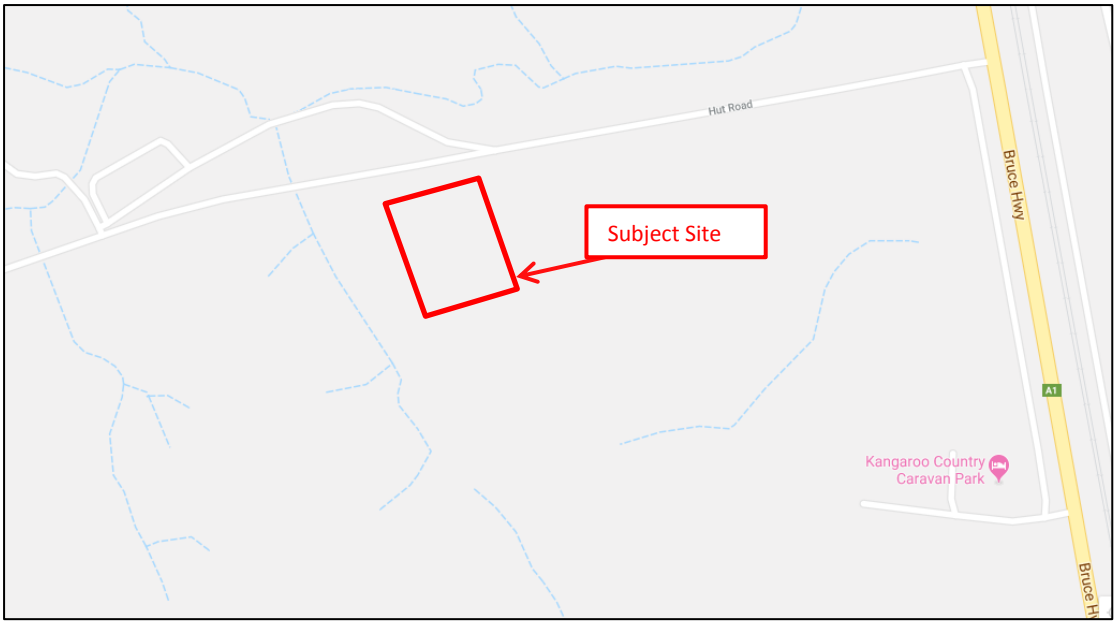


Figure 1: ***Subject Site - Locality Plan (modified from maps.google.com.au)***

2.1.1 Site Topography

The site grades west with the highest point located on the south western boundary of the site at 44.5m AHD and the lowest point located in the north eastern corner at 33m AHD.

2.1.2 Vegetation and Land Use

The subject site currently consists of a cleared section of land to the east of an existing licensed hard rock quarry. The subject site is proposed to be used for the manufacturing of asphalt and will utilise material won from the quarry for use as feedstock for manufacturing asphalt. The subject site is completely independent of the quarrying activity. An aerial photograph is illustrated in Figure 2.

Figure 2: ***Aerial Photograph (modified from google maps.google.com.au)***

2.1.3 Proposed Development

The site is to be utilised as a Proposed Asphalt Manufacturing Plant.

3.0 SITE HYDROLOGY AND HYDRAULICS

3.1 Background

In order to estimate the contributing peak discharge for a range of ARI events the Rational Method has been applied to define flow rates at and through the subject site. In accordance with Department of Environment and Science (DES) Guidelines, stormwater runoff for all rainfall events up to a 1 in 5 year 24 hour duration rainfall event should be captured and held onsite. The following sections define the parameters of the sites hydraulics and provide sizing volumes for the proposed retention basin. The Rational Method (Section 4.03 of the Queensland Urban Drainage Manual - QUDM 2008) is flexible in its data requirements and is able to produce satisfactory estimates of peak site discharges based on the following data input:

- specific intensity frequency duration (IFD) data;
- length/type of flowpath;
- contributing catchment areas; and
- coefficient of discharge.

3.2 Development Flows

3.2.1 Catchment Definition and Existing Point of Discharge

The subject site will contain a single catchment, Catchment A. Catchment A discharges stormwater to the north and north eastern boundary of the site; this will represent the Lawful Point of Discharge (LPOD) for Catchment A.

The Catchment is shown on Knobel Engineers, *Stormwater Catchment Plan* (Ref: K4717/P001/A) included as Appendix A.

3.2.2 Coefficient of Runoff

The coefficient of runoff (C year) was determined based on fraction impervious (f_i) method as specified in QUDM.

The site is assumed to be made up of 50% impervious area with the remainder gravel/roadbase. For this reason Catchment A will be 75% impervious, this equates to a fraction impervious of 0.75. Using a one hour, ten year rainfall intensity ($^1I_{10}$) of 64 mm/hr, a C_{10} value of 0.85 has been adopted for the Catchment A.

With reference to QUDM Table 4.5.2, applying the frequency factors for the standard storms of 2, 5, 10 and 100 years results in the following pre development coefficients of runoff as shown in Table 2.

Table 2: Development Coefficient of Runoff

Catchment ID	C_2	C_5	C_{10}	C_{100}
Catchment A	0.72	0.81	0.85	1.00

3.2.3 Time of Concentration

The time of concentration has been calculated in accordance with QUDM section 4.6.6 – Overland Flow. Friend's Equation ($t = (107n\ L^{0.333})/S^{0.2}$) has been used to calculate the initial travel time as sheet flow with the remaining distance calculated as concentrated flow. From review of the site, Catchment A stormwater will sheet flow across the site before concentrating in constructed swales on the north and east boundaries. Swales will direct flows towards the north eastern boundary. Refer to Table 3 for the calculated time of concentration.

Table 3: Calculated Time of Concentration

Catchment	Catchment Area (ha)	Catchment Properties	Time of concentration		
			Overland flow Friend's Equation	Concentrated flow QUDM Figure 4.09	Total t_c
A	1.559	Bare soil surface	Horton's (n) = 0275 L = 91 m Slope = 5.40 % t = 9.4 min	Length of flow = 135m Fall of channel = 7 Δ = 2 t = 2 min	12 min

3.2.4 Design Flow Rates

Design storm flow rates have been calculated for standard storms with an ARI of 2, 5, 10 and 100 years using design rainfall intensities from The Bureau of Meteorology, *Australian Rainfall and Runoff 2016*. The Rational Method ($Q = 2.78 \times 10^{-3}$ CIA) has been used to calculate the required design flow rates for the subject site.

The calculated peak flows for this subject site are presented in Table 4.

Table 4: Development Catchment Flow Rates

Annual Exceedance Probability	AEP	39% (1 in 2 yr)	18% (1 in 5 yr)	10% (1 in 10 yr)	1% (1 in 100 yr)
Coefficient of Runoff	C	0.72	0.81	0.85	1.00
Area of Catchment (ha)	A	1.559	1.559	1.559	1.559
Average Rainfall Intensity (mm/h)	I	110	134	153	231
Peak Flow Rate (m3/s)	**Q**	**0.344**	**0.468**	**0.565**	**0.999**

3.3 Downstream Flow Characteristics

An investigation of the downstream flow characteristics was undertaken to determine if stormwater flows from the site resulting from storm events in excess of the 1 in 5 yr 24 hour ARI (18% AEP) do not interact with the water quality test points for the existing extraction and screening ERA on the site.

The outcome of this investigation determined that flows from the site will not enter this area and instead follow an existing flow path directing flows east towards an existing dam. See Knobel Engineers, *Stormwater Management Plan* (Ref: K4717/P002/B) included as Appendix B for further details.

3.4 External Catchments

3.4.1 Catchment Definition and Existing Point of Discharge

The site has a single external catchment (EXT A) which discharges flows across the southern boundary of the site and moves in a north west direction. EXT A has an area of approximately 2,851 m^2. The external catchment consists of poor grassed areas and select trees. The Catchment is shown on Knobel Engineers, *Stormwater Catchment Plan* (Ref: K4717/P001/A).

3.4.2 Coefficient of Runoff

The coefficient of runoff (C year) was determined based on fraction impervious (f_i) method as specified in QUDM. A fraction impervious of 0.00 has been adopted for the external catchment. Using a one hour, ten year rainfall intensity ($^1I_{10}$) of 64 mm/hr a C_{10} value of 0.70 has been adopted for the external catchment.

With reference to QUDM Table 4.5.2, applying the frequency factors for the standard storms of 2, 5, 10 and 100 years results in the following pre development coefficients of runoff as shown in Table 5.

Table 5: Development Coefficient of Runoff

Catchment ID	C_2	C_5	C_{10}	C_{100}
External Catchment A	0.60	0.67	0.70	0.84

3.4.3 Time of Concentration

The time of concentration has been calculated in accordance with QUDM section 4.6.6 – Overland Flow. Friend's Equation ($t = (107n\ L^{0.333})/S^{0.2}$) has been used to calculate the initial travel time as sheet flow with the remaining distance calculated as concentrated flow. From review of the site, EXT A stormwater will sheet flow before concentrating in natural channels and will flow across the southern boundary of the site. It is proposed to redirect flows to the east around the subject site through the use of a diversion drain and a bund along the southern boundary. Refer to Table 6 for the calculated time of concentration.

Table 6: Calculated Time of Concentration

Catchment	Catchment Area (ha)	Catchment Properties	Time of concentration		
			Overland flow Friend's Equation	Concentrated flow QUDM Figure 4.09	Total t_c
A	2.851	Poorly Grassed Surface	Horton's (n) = 035 L = 71 m Slope = 6.8 % t = 10.6 min	Length of flow = 46m Fall of channel = 3 Δ = 3 t = 3 min	14 min

3.4.4 Design Flow Rates

Design storm flow rates have been calculated for standard storms with an ARI of 2, 5, 10 and 100 years using design rainfall intensities from The Bureau of Meteorology, *Australian Rainfall and Runoff 2016*. The Rational Method ($Q = 2.78 \times 10^{-3}$ CIA) has been used to calculate the required design flow rates for the subject site.

The calculated peak flows for this subject site are presented in Table 7.

Table 7: External Catchment Flow Rates

Annual Exceedance Probability	AEP	39% (1 in 2 yr)	18% (1 in 5 yr)	10% (1 in 10 yr)	1% (1 in 100 yr)
Coefficient of Runoff	C	0.60	0.67	0.70	0.84
Area of Catchment (ha)	A	0.285	0.285	0.285	0.285
Average Rainfall Intensity (mm/h)	I	103	126	144	217
Peak Flow Rate (m3/s)	**Q**	**0.049**	**0.066**	**0.080**	**0.144**

4.0 WATER QUALITY ASSESSMENT

4.1 Background

Disturbance to the existing ground has the potential to significantly increase sediment loads entering downstream drainage systems and watercourses. The following section outlines proposed sediment and erosion controls to be implemented during the construction and operational phase of the development.

4.2 Key Pollutants

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

Table 8 illustrates the key pollutants that have been identified.

Table 8: 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.
Toxic Materials	Cement slurry, asphalt primer, solvents, cleaning agents, and wash waters
Acids or Alkaline substances	Acid sulphate soil, cement slurry and wash waters.

4.3 Sediment and Erosion Controls

4.3.1 Context

Stormwater that falls or flows onto the proposed plant area during rainfall events is likely to release sediment in disturbed areas. Sediment laden stormwater that is released from the site has the potential to cause unreasonable harm to waterways. This section outlines methods to manage and capture surface stormwater generated on the site during rainfall events and is designed to minimise sediment erosion mobilisation and erosion on the site, and any potential release of sediment from the site.

4.3.2 General Design Principles

Sediment and Erosion Controls have been designed predominantly as a 'catchment perimeter control' plan. The proposed plant area is structured around the existing areas. The topography of the site has been designed to direct stormwater through a retention basin before discharging stormwater via an overflow weir to the overland flow path to the east of the site. Rock swales have been proposed around the perimeter of the operational area and will capture runoff, remove sediment and discharge flows to the retention basin. See Knobel Engineers, *Stormwater Management Plan* (Ref: K4717/P002/B) for further details.

4.3.3 Control of Surface Water Flows

Stormwater flows on the site must be managed in a manner that minimises potential erosion within the site and to minimise potential release of any contaminated surface flows from the site through the use of rock swales and a retention basin.

4.3.4 Retention Basin

The retention basin will be designed to completely retain a Q_5 24 hour rainfall event. This will ensure any contaminants from the site can be removed prior to leaving the site. The basin will utilise a single overflow spillway, with the invert of the weir at the Q_5 water level of RL 33.0 m, this will allow rainfall events above the 5 year ARI to be discharged from the site and maintain the existing flow regime that was evident in the pre development scenario. For further details see Knobel Engineers, *Permanent Sediment Basin Plan and Details* (Ref: K4717/P004/B) included as Appendix D. Stormwater from the basin will be utilised onsite for dust suppression and other activities during the asphalt manufacturing process.

5 Year 24hr Rainfall Intensity

= 6.95 mm/h

= 0.00695 m/h

24h Rainfall Depth

= 0.00695 x 24

= 0.1668m

Catchment Areas

1.559ha

24hr Rainfall Volume

C5 = 0.81

a) = 0.81 x 15586 x 0.1668

= 2106 m^3

4.3.5 Swales

The rock swales will serve two functions, firstly will look to convey runoff from portions of the operational area to the retention basin and secondly to treat stormwater runoff by removing gross pollutants from runoff. To ensure stormwater from site is utilizing the existing point of discharge for all storm events up to and including the 1% AEP (100 yr ARI), sizing for swales is provided below for the Q_{100} event.

Peak Flow rate for Swale Calculations

Assume TC = 20min $^{20}I_5$ = 106 mm/h

= (0.81 x 106 x 1.559) / 360

= 0.372 m^3/s

Assume flow is split between inflow locations with 70% of flow directed to the northern swale and the remainder is collected by the eastern swale.

North Swale:

a) Q_{100} = 0.372m^3/s x 0.70

= 0.260m^3/s

4.4 Operational Phase Maintenance Requirements

The proposed stormwater management devices will require maintenance and monitoring to ensure that they function as designed. The following section provides an outline of the necessary maintenance tasks for the proposed devices.

4.4.1 Retention Basin Maintenance

The retention basin will need to be monitored to ensure the basin is working as intended. Sediments accumulated at the inlets to the basin need to be monitored. Should excessive sediment build-up it will impact flow path and may result in flows not reaching the basin. The proposed Stormwater Quality Improvement Devices (SQIDs) will require regular maintenance and monitoring to ensure that they function as designed.

Maintenance is primarily concerned with:

- Maintenance of flow to and through the retention basin;
- Maintaining structure and lining of retention basin;
- Preventing undesired overgrowth vegetation from taking over the retention basin;
- Removal of accumulated sediments;
- Litter and debris removal; and
- Ensure weir functionality is maintained through removal of debris and sediment deposits.

4.4.2 Rock Swale Maintenance

The rock swales will need to be monitored ensure build-up of sediments does not occur.

Maintenance is primarily concerned with:

- Maintenance of flow through the swale;
- Preventing undesired overgrowth vegetation from taking over the swale;
- Removal of accumulated sediments; and
- Litter and debris removal.

5.0 CONCLUSIONS

Knobel Engineers has been commissioned by Colas Queensland Pty Ltd to prepare a Conceptual Stormwater Management Plan (CSWMP) for a proposed Asphalt Manufacturing Plant at 59793 Bruce Highway, Midgee.

This CSWMP details the conceptual planning, layout and design of the stormwater management infrastructure for both the construction and operational phases of this development.

A sediment and erosion control plan is provided for the construction and operational phase of the development and shall be implemented by the contractor and developer. A 1590 m^2 retention basin with a storage volume of 2210m^3 storage is proposed for the operational phase of the development to treat stormwater runoff up to and including the 24 hour 5% AEP (1 in 5 yr) storm event. Rock swales have been provided to collect flows from site and direct to the retention basin and ensure flows up to and including the 1% AEP (100 yr ARI) storm event are discharge through the LPOD for the site.

APPENDIX

A

Knobel Engineers

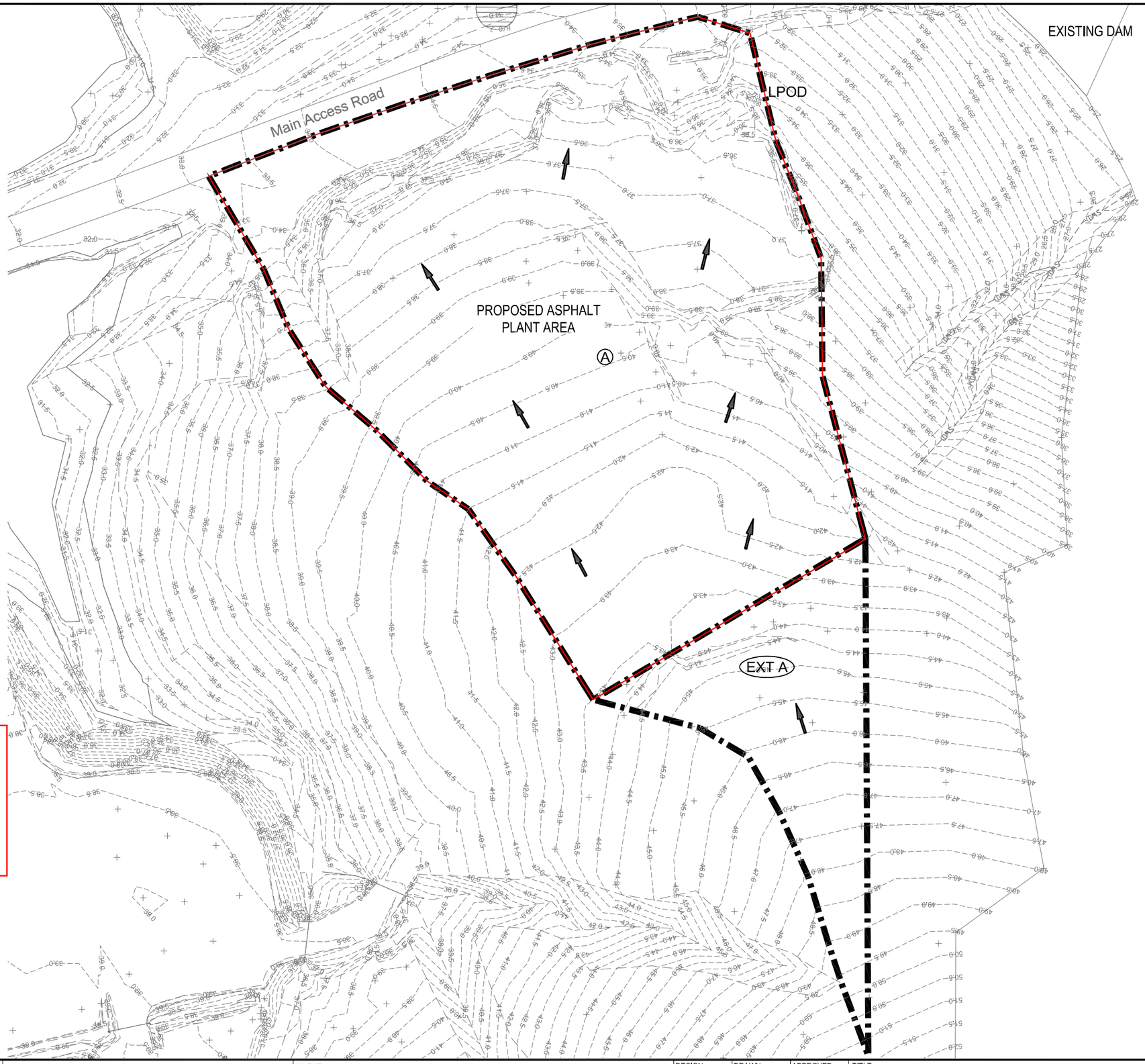
Stormwater Catchment Plan

(Ref: K4717/P001/A)

LEGEND

- SITE BOUNDARY
- STORMWATER CATCHMENT BOUNDARY
- 31 — EXISTING SURFACE CONTOURS
- (A) — STORMWATER CATCHMENT I.D.
- LPOD — LAWFUL POINT OF DISCHARGE
- FLOW DIRECTION

STORMWATER CATCHMENT TABLE	
STORMWATER CATCHMENT I.D.	AREA (ha)
A	1.559
EXT A	0.285



ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/83-2019

Dated: 9 April 2020

CONTRACTOR TO DETERMINE AND LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS

REPORT ISSUE
NOT FOR CONSTRUCTION

ISSUE No.	DATE	AMENDMENT
A	21-02-19	ISSUED FOR REPORT

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CLIENT: COLAS QUEENSLAND PTY LTD

PROJECT: MIDGEE QUARRY ASPHALT PLANT
59793 BRUCE HIGHWAY
MIDGEE QLD 4702

DESIGN	DRAWN	APPROVED
AJP	EG	

TITLE: STORMWATER CATCHMENT PLAN

SCALE: 1:500 AT A1, 1:1000 AT A3 (0 10 20 30 40 50m)

PROJECT NO.: K4717

DWG NO.: P001

ISSUE: A

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APPENDIX

B

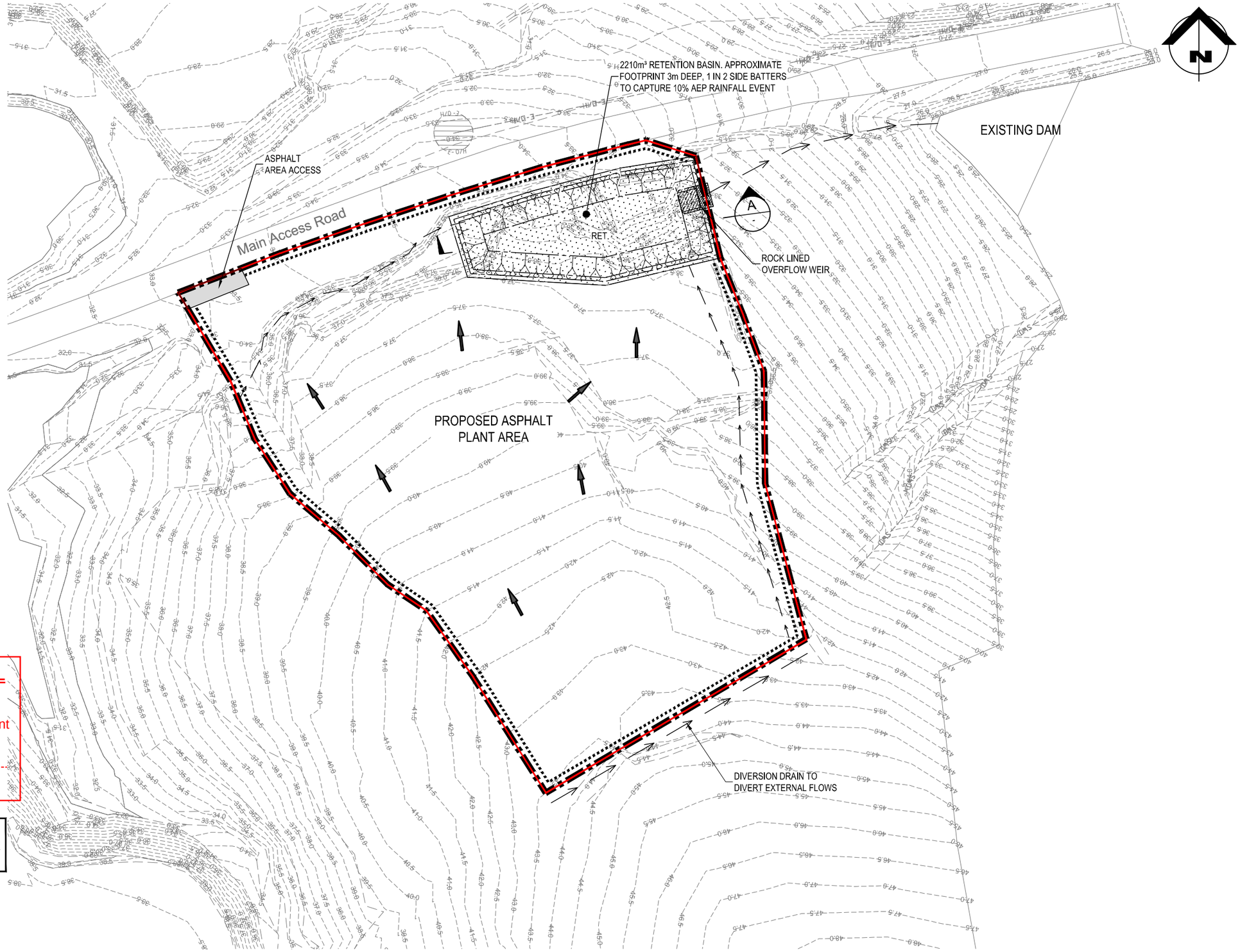
Knobel Engineers

Stormwater Management Plan

(Ref: K4717/P002/B)

LEGEND

- SITE BOUNDARY
- RET. — PROPOSED RETENTION BASIN
- PROPOSED FLOW DIRECTION
- GRASSED SWALE
- ROCK LINED SWALE
- 31 — EXISTING SURFACE CONTOURS
- STORMWATER CATCHMENT BOUNDARY
- 200mm HIGH BUND



ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/83-2019

Dated: 9 April 2020

CONTRACTOR TO DETERMINE AND LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS

REPORT ISSUE

NOT FOR CONSTRUCTION

B	07-03-19	ISSUED FOR REPORT
A	21-02-19	ISSUED FOR REPORT
ISSUE	DATE	AMENDMENT

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CLIENT: COLAS QUEENSLAND PTY LTD

PROJECT: MIDGEE QUARRY ASPHALT PLANT
59793 BRUCE HIGHWAY
MIDGEE QLD 4702

DESIGN	DRAWN	APPROVED
AJP	EG	

TITLE: STORMWATER MANAGEMENT PLAN

SCALE: 1:500 AT A1, 1:1000 AT A3 (0 10 20 30 40 50m)

PROJECT NO. K4717

DWG NO. P002

ISSUE B

APPENDIX

C

Knobel Engineers

Sediment and Erosion Control Plan and Details

(Ref: K4717/P003/B)

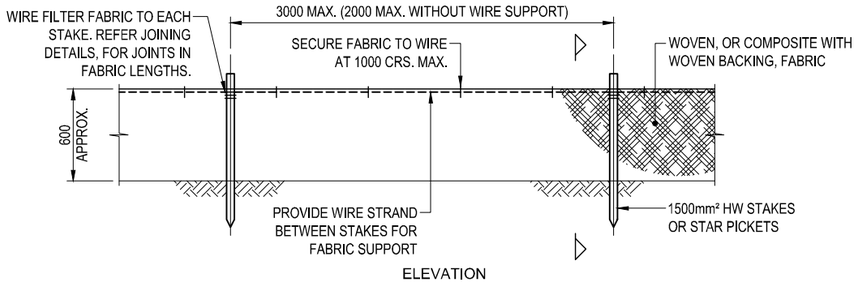
LEGEND

SF — SEDIMENT FENCE

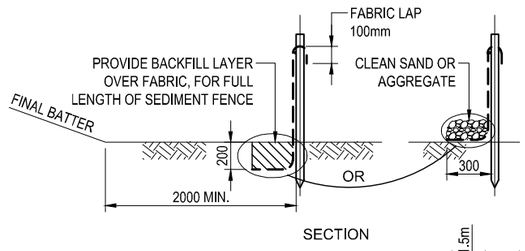
S.E.P. — STABILISED ENTRY/EXIT POINT

EXISTING SURFACE CONTOURS

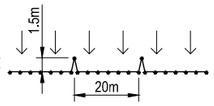
31



ELEVATION



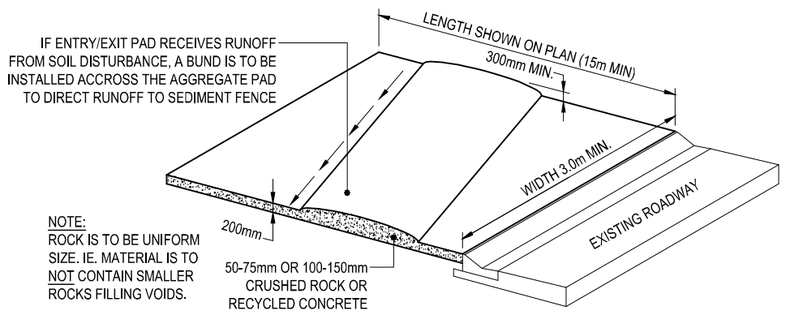
SECTION



NOTE: INSTALL 1.5m (MIN.) DEEP 'RETURNS' AT 20m SPACING (MAX.) ON UPSLOPE SIDE OF FENCELINE (5-10m MAX SPACING IF FENCE ALIGNED AT ANGLE TO CONTOUR). EG:

SEDIMENT FENCE DETAILS

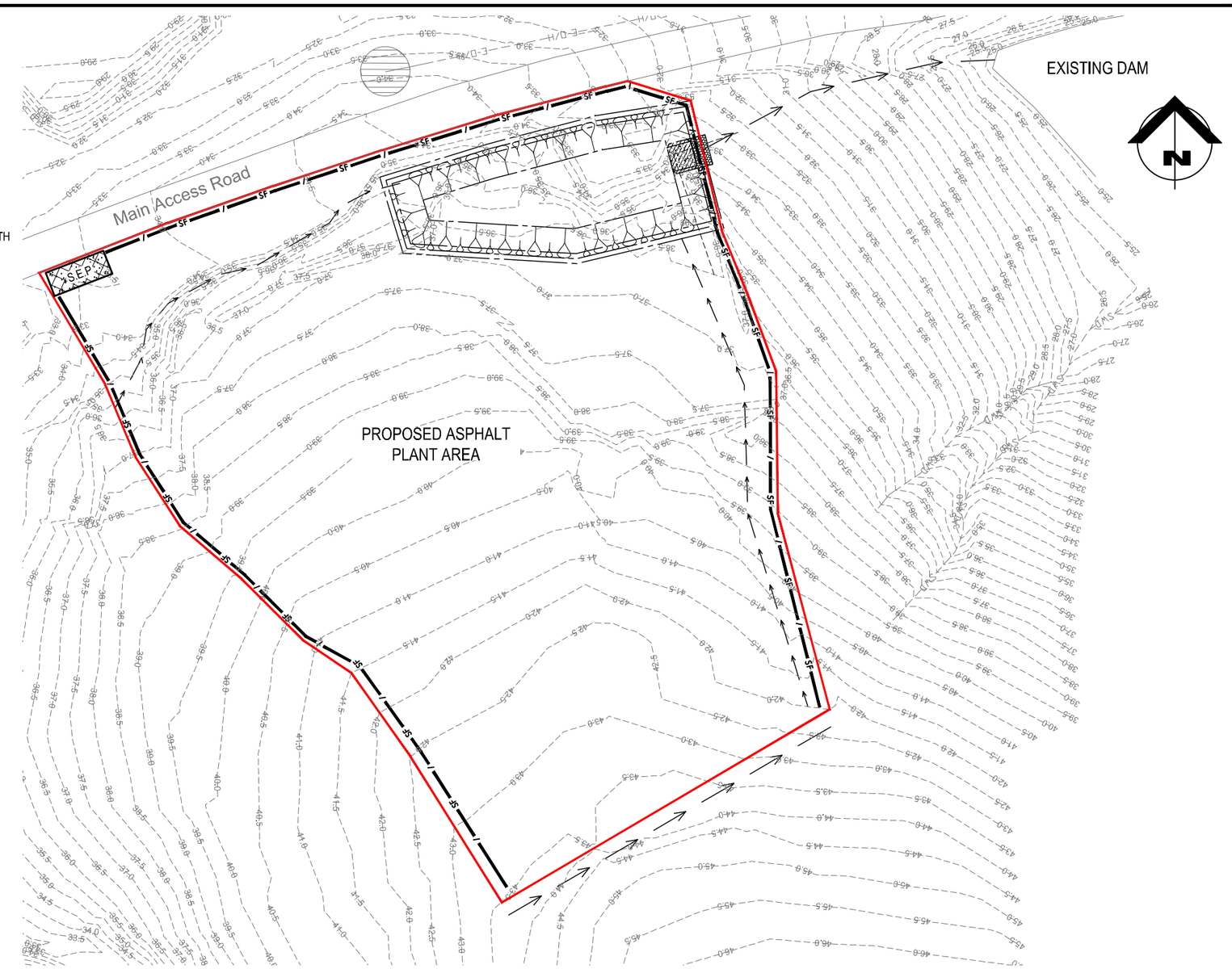
N.T.S. — SF — DENOTES SEDIMENT FENCE. REFER PLAN FOR LOCATION AND EXTENTS.

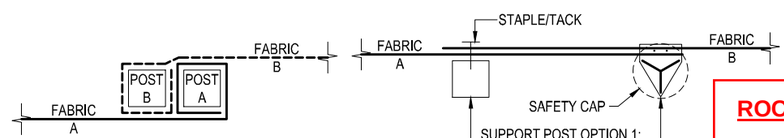


STABILISED ENTRY/EXIT POINT

N.T.S. OR APPROVED EQUIVALENT

S.E.P. — DENOTES STABILISED ENTRY/EXIT POINT, REFER PLAN FOR LOCATIONS.





SEDIMENT FENCE FABRIC JOINING DETAILS

N.T.S.

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CLIENT	DESIGN	DRAWN	APPROVED
COLAS QUEENSLAND PTY LTD	AJP	MGD/DKC	

PROJECT
MIDGEE QUARRY ASPHALT PLANT
59793 BRUCE HIGHWAY
MIDGEE QLD 4702

TITLE
SEDIMENT AND EROSION CONTROL PLAN AND DETAILS

SCALE 1:500 AT A1, 1:1000 AT A3 — 0 10 20 30 40 50m

PROJECT NO. K4717
DWG NO. P003
ISSUE B

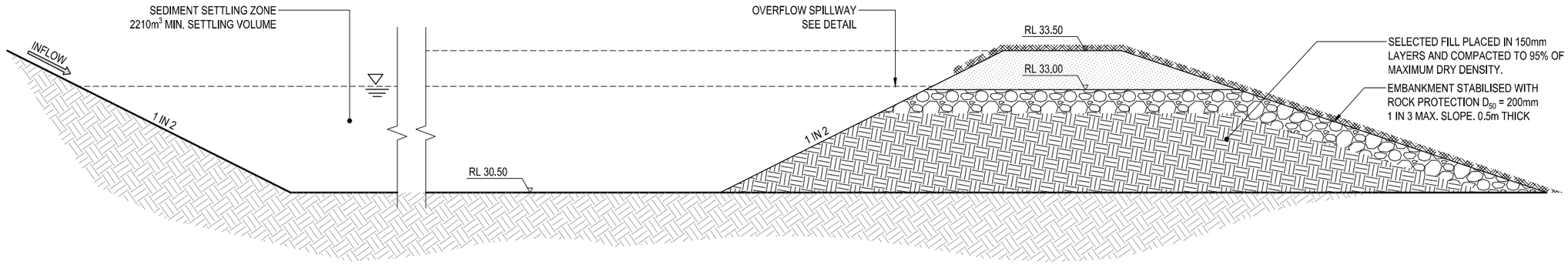
APPENDIX

D

Knobel Engineers

Permanent Sediment and Erosion Control Details

(Ref: K4717/P004/B)



SECTION A
RETENTION BASIN OUTLET DETAIL
N.T.S

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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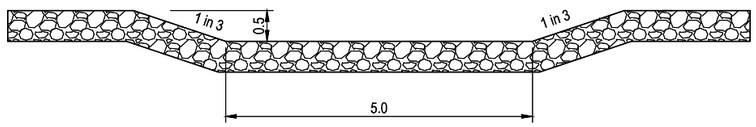
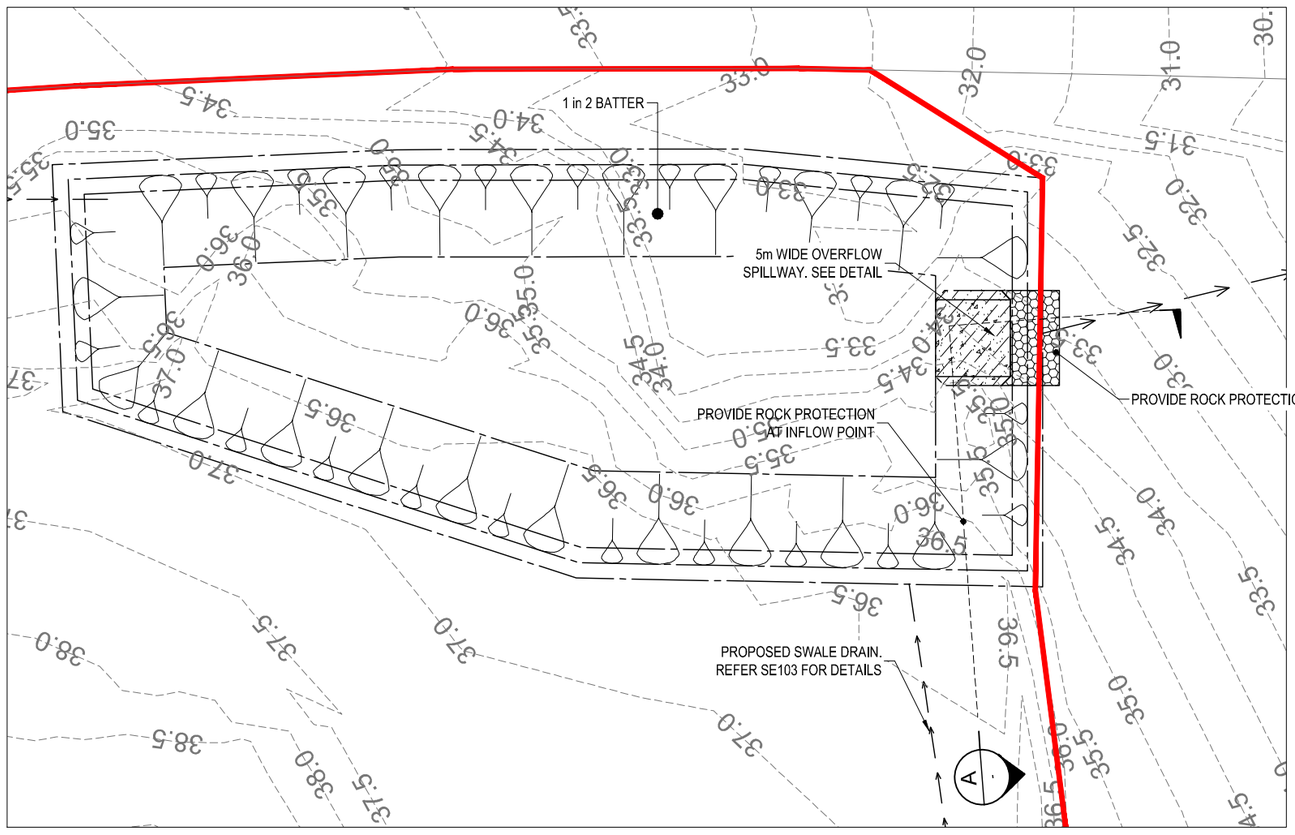
Development Permit No.: D/83-2019

Dated: 9 April 2020



SPILLWAY DETAIL
SCALE 1:50 AT A1



INSET A
SCALE 1:200 AT A1

CONTRACTOR TO DETERMINE AND LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS

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CLIENT: COLAS QUEENSLAND PTY LTD

PROJECT: MIDGEE QUARRY ASPHALT PLANT
59793 BRUCE HIGHWAY
MIDGEE QLD 4702

DESIGN	DRAWN	APPROVED
AJP	MGD/DKC	

TITLE: SEDIMENT AND EROSION CONTROL DETAILS

SCALE: 1:200 AT A1, 1:400 AT A3 (0, 5, 10, 15, 20m)

PROJECT NO. K4717

DWG NO. P004

ISSUE B

ACCESS TRAFFIC
CONSULTING

COLAS Asphalt Manufacturing Plant
59793 Bruce Highway, Midgee

Traffic Impact Assessment

May 2019

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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

Development Permit No.: D/83-2019

Dated: 9 April 2020

Quality Information

Document	Traffic Impact Assessment
Client	COLAS Queensland Pty Ltd
Reference	ENG0118-001
Date	27 May 2019
Prepared By	Andrew Barrie

Revision History

Rev	Revision Date	Details	Authorised	
			Name / Position	Signature
0	03/05/2019	Draft for Client Comment	Andrew Barrie Principal Traffic Engineer RPEQ 12801	Original Signed
A	27/05/2019	Final	Andrew Barrie Principal Traffic Engineer RPEQ 12801	

Table of Contents

1.0 Introduction

1.1 Project Background

COLAS Queensland Pty Ltd (COLAS) propose to establish an asphalt manufacturing plant within the existing quarry site located at 59793 Bruce Highway or Lot 2 RP888747 in Midgee, approximately 9.5km south of Rockhampton. The proposed operation of the plant is understood to be regarded as High Impact Industry as defined by the Rockhampton Regional Council Planning Scheme.

1.2 Scope and Study Area

Access Traffic Consulting (ATC) have been commissioned by COLAS to undertake a Traffic Impact Assessment (TIA) for the proposed asphalt manufacturing plant (the Project) located south of Rockhampton on 59793 Bruce Highway.

This Traffic Impact Assessment (TIA) was carried out to determine the level of potential impacts of both the construction and operational phases of the Project on the operation of the surrounding road network. The TIA will form part of the development application to Rockhampton Regional Council (RRC) and the expected referral agency of Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP).

1.2.1 Study Area

As identified above, the proposed asphalt manufacturing plant is proposed to be located at 59793 Bruce Highway, Midgee, and is formally described as Lot 2 RP888747 as shown in **Figure 1** below.

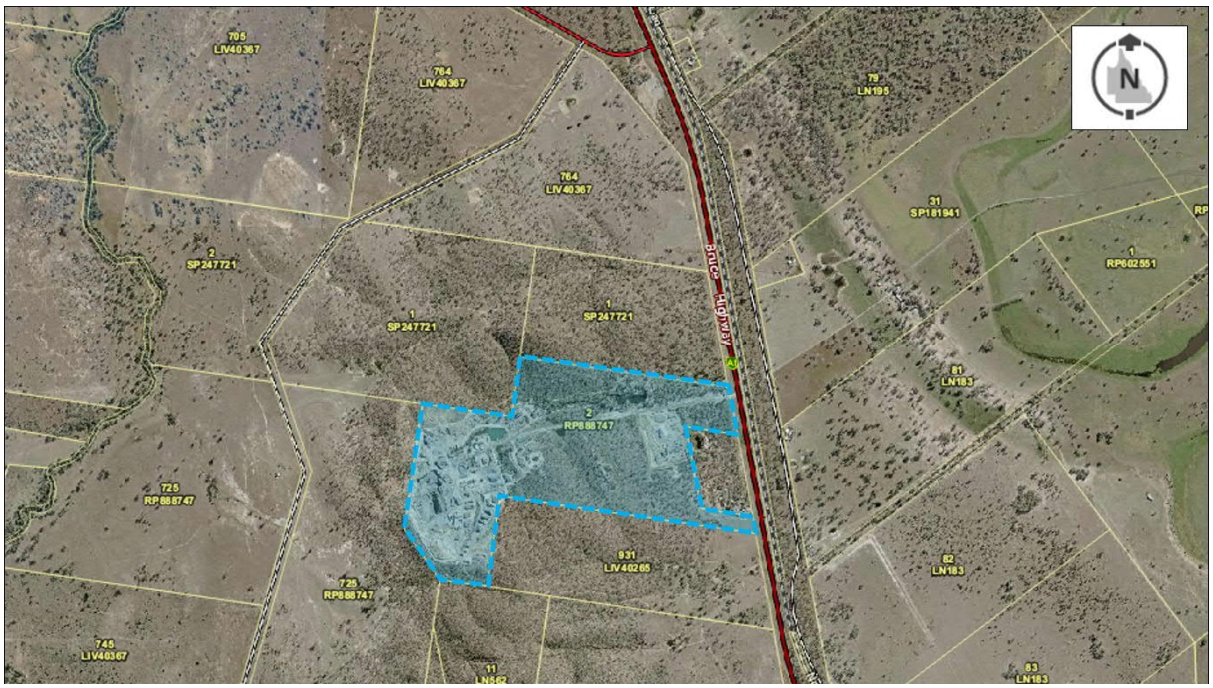

Figure 1 Study Area – 59793 Bruce Highway, Midgee Qld **[Source: Qld Globe]**

1.3 Pre-Lodgement Meeting Minutes

As part of the initial development application a pre-lodgement meeting was held with representatives of RRC on 24 October 2018, with minutes of this meeting have been included for reference as **Appendix A.** During this meeting the proposal was noted that a Material Change of Use application, triggering impact assessment is required, and that due to the proximity of the site to the state controlled road network (Bruce Highway) that referral to the DSDMIP will also be required.

This TIA has therefore been prepared to provide the necessary information to support the development application for the Project, in particular the potential impacts to the adjacent state controlled road network.

2.0 Existing Conditions

2.1 Land Use, Zoning and Approvals

Currently the subject site is being utilised for a quarry operation (Hopkins Brothers Quarry), with the land parcel forming the development (Lot 2 RP88874) currently identified as a rural land zoning under Rockhampton Regional Council's Planning Scheme (2015), as shown in **Figure 2** below. An expanded zoning map over the study area is provided for reference in **Appendix B**.

Figure 2 Land Use Zoning – 59793 Bruce Highway, Midgee Qld **[Source: RRC Online Mapping]**

Based on information provided, an approval was recently obtained to increase the operations of the Hopkins Brothers Quarry up to 1,000,000 tonnes per year, noting the supporting TIA for the approval and the subsequent approval conditions reference a requirement for the upgrade of the left turn treatment at the Bruce Highway / Midgee Quarry Access intersection to provide a AUL(s) treatment once the site output exceeded 700,000 tonnes per year. A copy of the previous TIA supporting the expansion of the quarry is provided in **Appendix C**, while the relevant approval conditions are included for reference in **Appendix D.**

2.2 Adjacent Land Use / Approvals

As shown in **Figure 2** above, all adjacent land parcels are also currently zoned as "rural" under GRC's Planning Scheme (2015). The subject site is bounded by rural properties to the north, west and south, with sections of its eastern boundary fronting the Bruce Highway. The remaining sections of the sites eastern boundary adjoins Lot 1 RP811877, which is zoned as rural under Council's Planning Scheme and currently contains a caravan park in its southern section.

No active or planned development approvals which could influence this TIA are understood to be currently held over the adjacent properties.

2.3 Surrounding Road Network Details

2.3.1 Project Transport Routes

This section describes the road transport networks expected to be utilised by the Project and is based on information regarding the operation of the proposed asphalt manufacturing plant provided by the applicant (COLAS).

- Staff are expected to commute to/from Rockhampton to the site daily

- For the incoming material deliveries to the plant, 40% are anticipated to travel from Brisbane, while the remaining 60% are expected to travel from Rockhampton.
- The initial delivery locations for the asphalt material from site are expected to be the major road projects in the area, namely the Rockhampton Northern Access Upgrade project on the Bruce Highway on the northern side of Rockhampton, and the Capricorn Highway Duplication project on the Capricorn Highway just west of Rockhampton.

Based on this information, the Project is anticipated to utilise the following road sections in the transport of materials to site and the delivery of the resultant asphalt product from the plant, as shown diagrammatically in **Figure 3**:

- Bruce Highway (Benaraby to Rockhampton) (10E) – Ch. 45.420 km to 107.400 km.
- Bruce Highway (Benaraby to Rockhampton) (10E) – Ch. 107.400 km to 121.051 km.
- Bruce Highway (Rockhampton to St Lawrence) (10F) – Ch. 0.000 km to 13.180 km
- Capricorn Highway (Rockhampton to Duaringa) (16A) – Ch. 0.000 km to 5.960 km.

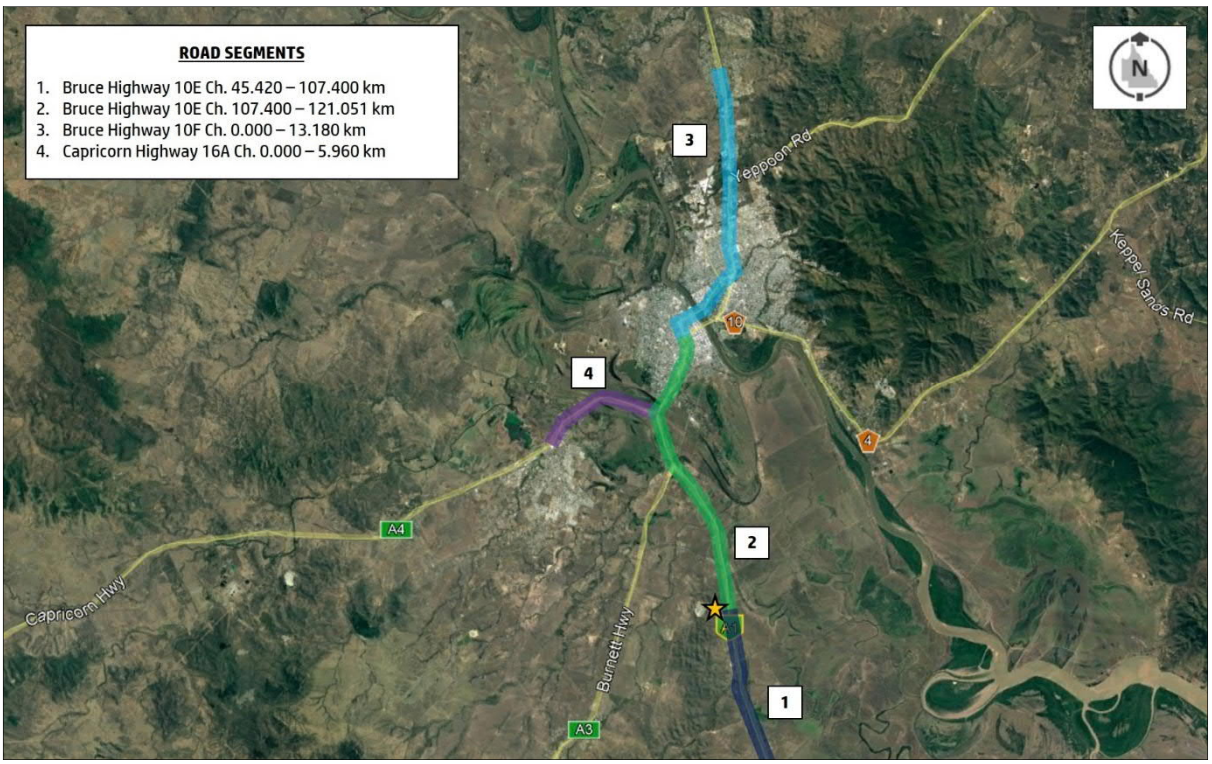

Figure 3 Expected Project Transport Routes **[Source: Google Earth]**

Based on the information provided above, the following elements of the road network were identified as relevant to the Traffic Impact Assessment for the Project.

2.3.2 Road Links

2.3.2.1 Bruce Highway (10E)

The Bruce Highway is part of the National Highway Network and joins Brisbane in the south to Cairns in the north. Travelling approximately 1,700 km this road is the primary road transport route for both passenger and road freight vehicles along the east coast of Queensland. Based on the expected traffic volumes from the Project the sections of the Bruce Highway (10E) relevant to the Project are the road segment directly to the south of the site (Ch. 45.420 km to 107.400 km) and the segments from the access to the end of 10E in Rockhampton (Ch. 107.400km to 121.051 km).

In general, the Highway is a two-way, two lane road approved for B-Double use (refer **Appendix E**), with a posted speed limit of 100 km/h in the rural areas, with the sections on the approach to and within Rockhampton incorporating four lane sections and reduced posted speed limits of 60-80 60km/h. Furthermore, the daily traffic volumes (2018) in the rural sections of 10E range between 5,700 – 9,200 vpd (18-27% HVs) increasing up to 21,000 vpd (13-18% HVs) in the urban sections.

2.3.2.2 Bruce Highway (10F)

The section of the Bruce Highway (10F) relevant to the Project is the length between the intersection with the end of 10E at the George Street / Fitzroy Street intersection (Ch. 0.000 km) to the northern extent of the Rockhampton Northern Access Upgrade (RNAU) project, approximately located at the intersection with Terra Nova Drive to the north of Rockhampton (Ch. 13.180 km).

Through Rockhampton the Highway is generally a two-way, four lane median divided road approved for B-Double use (refer **Appendix E**), with a posted speed limits varying between 60-70km/h, with traffic volumes between 14,500 – 33,000 vpd (10-17% HVs). The section of the Highway north of Yeppoon Road is currently a two lane carriageway, but is currently being upgraded to four lanes as part of the RNAU project. Posted speeds in this section currently range from 70km/h in the southern section, up to 80km/h at Terranova Drive with daily traffic volumes in the order of 13,000 vpd (11.5% HVs).

2.3.2.3 Capricorn Highway (16A)

The Capricorn Highway links the city of Rockhampton with western Queensland, including the Central Highlands. Travelling approximately 575km, this link is the primary east-west road transport route for both passenger and road freight vehicles within Central Queensland.

The section of the Capricorn Highway relevant to the Project is the length between its intersection with the Bruce Highway and its intersection with McLaughlin Street at Gracemere, which is currently in the process of being upgraded to a four lane carriageway as part of the Capricorn Highway Duplication project. This section of the link is typically a two-way, two lane road with a posted speed limit of 100-110km/h, except on the approach to Gracemere and the Bruce Highway were speeds are reduced to 80km/h. This section of the Capricorn Highway is also a designated B-Double route (refer **Appendix E**) and caters for daily traffic volumes in the order of 15,800 (18% HVs).

2.3.3 Intersections

2.3.3.1 Bruce Highway / Midgee Quarry Access (TMR Ch. 107.400km)

The intersection of Bruce Highway / Midgee Quarry Access is located at TMR chainage 107.400 km (10E) and currently operates a three-way priority controlled (Give Way) intersection, with priority given to the Bruce Highway approaches. One lane in each direction of travel is provided on each of the approaches to the intersection, with a Basic Left (BAL) treatment and Channelised Right Turn (CHR) treatment provided for turning movements into the access from the southern and northern Bruce Highway approaches respectively, as shown in **Figure 4** below. Further to this, the geometry of the intersection is currently sized to safely accommodate the required transport vehicles entering and exiting the site, understood to consist of truck and dog trailer combinations, semi-trailers and B-Doubles.

Figure 4 Bruce Highway / Midgee Quarry Access Intersection – Existing Configuration

2.4 Traffic Volumes

2.4.1 Road Link Volumes

The background traffic volumes for the road sections relevant to the Project were typically established using the available 2018 AADT segment traffic count data provided by TMR, which is included for reference in **Appendix F**. A summary of the forecast background traffic volumes for each of the relevant road segments at the adopted Project design horizons is provided in **Table 1**.

Table 1 Forecast Future Background Road Link (AADT) Traffic Volumes

Site ID	AADT Segment		Base Data Year	Base Year (2018) AADT				10 Yr. GR %	Background AADT (2019)			
	Start (km)	End (km)		Gaz	% HV	A-Gaz	% HV		Gaz (Total)	Gaz (HV)	A-Gaz (Total)	A-Gaz (HV)
Bruce Highway (Benaraby to Rockhampton) – 10E												
60023	45.420	85.308	2018	2,841	21.68%	2,842	23.82%	0.16%	2,846	617	2,847	678
61551	85.308	107.400*	2018	3,478	28.32%	3,524	26.14%	2.33%	3,559	1,008	3,606	943
	107.400*	108.938	2018	3,478	28.32%	3,524	26.14%	2.33%	3,559	1,008	3,606	943
60130	108.938	114.388	2018	3,062	24.95%	3,067	27.06%	1.67%	3,113	777	3,118	844
60024	114.388	116.961	2018	4,798	15.46%	4,412	21.01%	0.94%	4,843	749	4,453	936
60868	116.961	119.737	2018	10,103	20.54%	10,110	16.89%	0.00%#	10,103	2,075	10,110	1,708
61086	119.737	121.051	2018	10,566	11.62%	10,346	14.46%	0.00%#	10,566	1,228	10,346	1,496
Bruce Highway (Rockhampton to St Lawrence) – 10F												
60027	0.000	1.409	2018	7,468	17.02%	6,966	18.40%	0.00%#	7,468	1,271	6,966	1,282
60017	1.409	4.340	2018	17,400	11.02%	15,358	8.71%	0.00%#	17,400	1,917	15,358	1,338
61005	4.340	5.517	2018	13,633	9.34%	11,593	12.17%	0.75%	13,735	1,283	11,680	1,421
60822	5.517	8.550	2018	9,092	11.67%	8,512	13.83%	1.63%	9,240	1,078	8,651	1,196
60926	8.550	13.180	2018	6,366	13.70%	6,384	9.21%	2.32%	6,514	892	6,532	602
Capricorn Highway (Rockhampton to Duaringa) – 16A												
60039	0.000	5.960	2018	8,289	10.76%	7,503	25.98%	0.00%#	8,289	892	7,503	1,949

Negative Historical Growth Rate has been revised to 0.0% for purpose of analysis

*TMR Chainage for Bruce Highway / Midgee Quarry Access intersection.

2.4.2 Intersection Volumes

The peak hour traffic volumes at the Bruce Highway / Midgee Quarry Access intersection are based on the 12-hour counts (6am to 6pm) undertaken by DTMR on Wednesday 24 January 2015, with a copy of the raw data for these counts is provided for reference in **Appendix G.**

The 2015 volumes were then amended to estimate the current (2019) traffic conditions at the intersection using the following assumptions:

- The relevant road segment growth rate (approx. 2.33% p.a.) was applied to the recorded (2015) through movements in both directions on the Bruce Highway to establish 2019 volumes.
- The turning volumes into and out of the Midgee Quarry Access were adjusted to account for the heavy vehicle volumes required to transport the recently approved 1,000,000 tonnes per year output from the quarry site. Based on an assumed daily tonnage requirement of 3,472 tonnes and an average payload of the truck and dog combination of 32 tonnes (from the previous TIA from the site) this would equate to approximately 9 trucks per hour. This volume was then conservatively assumed to be travelling both inbound and outbound from the site in both directions of travel.

Further details of the calculations undertaken to estimate the current 2019 peak hour traffic volumes at the Bruce Highway / Midgee Quarry Access intersection are included for reference in **Appendix H**, with the resultant 2019 AM and PM peak forecasts shown in **Figure 5** and **Figure 6** respectively.

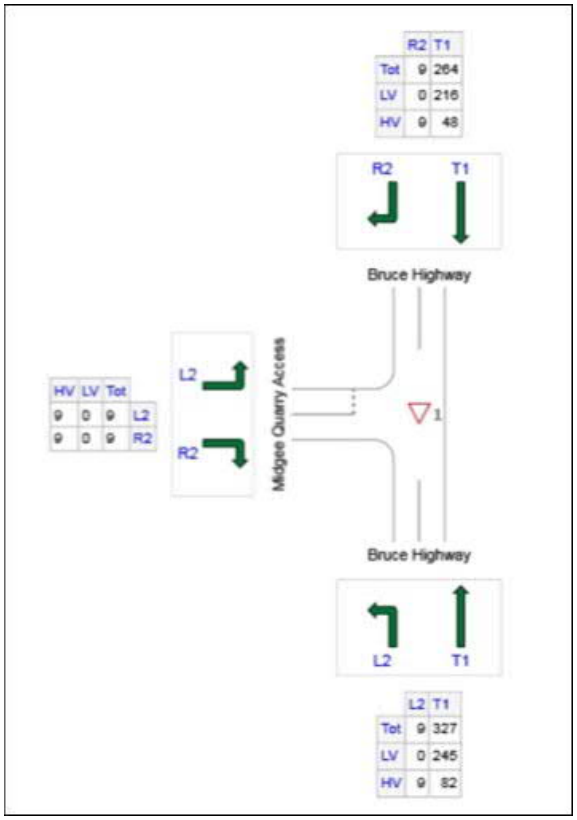

Figure 5 2019 AM Peak Hour Traffic Volumes Bruce Highway / Midgee Quarry Access

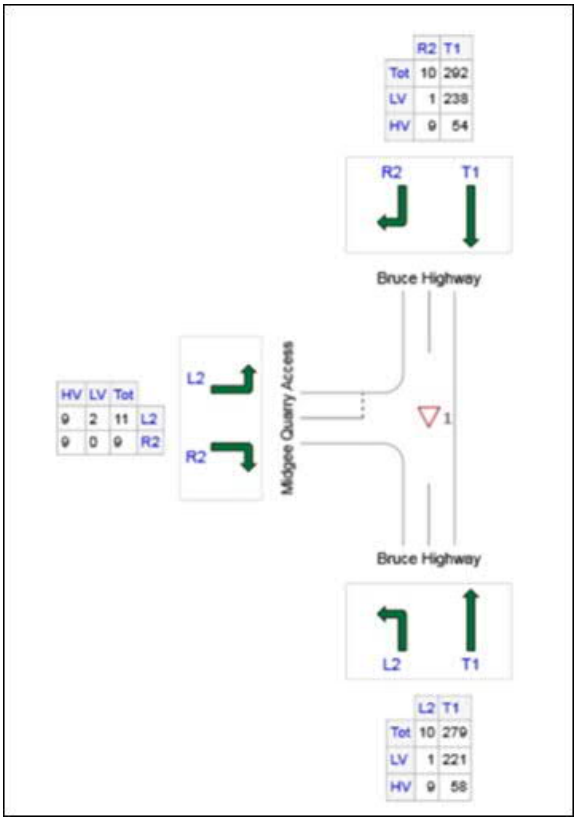

Figure 6 2019 PM Peak Hour Traffic Volumes Bruce Highway / Midgee Quarry Access

2.5 Existing Site Access

As previously identified the existing access to the Project site (Lot 2 RP88874) currently acts as the main access to the Hopkins Brothers Quarry (otherwise known as Midgee Quarry) operations on site, with the access road forming the minor road leg of the priority controlled Bruce Highway / Midgee Quarry Access intersection as previously detailed in **Section 2.3.3.1** above.

As previously identified, the access intersection currently provides CHR / BAL turn treatments. It is noted however that as part of the approval conditions for the operation of the existing quarry up to 1,000,000 tonnes per year, upgrade works are required to provide an AUL(s) left turn treatment on the southern approach to the intersection once the site output from the quarry exceeds 700,000 tonnes per year.

2.6 Intersection and Network Performance

2.6.1 Road Links

Based on the daily traffic volumes identified for each section of the road network relevant to the project (refer **Table 2**), it is anticipated that all sections can be considered to be operating satisfactorily and within capacity, with all mid-block traffic volumes identified considered within the capacity of the relevant two-lane rural highway or multi-lane urban sections of the road network through Rockhampton.

2.6.2 Intersections

The background traffic volumes at the relevant site access intersection with the Bruce Highway identified in **Figure 5** and **Figure 6** above were utilised to undertake preliminary intersection analysis (using SIDRA software) to establish the operational performance of the access under the estimated current (2019) traffic conditions. A summary of the results is provided in **Table 2** below, with further detailed results included for reference as **Appendix I**.

Table 2 Existing Conditions SIDRA Results – Bruce Highway / Midgee Quarry Access (Existing Configuration)

Analysis Scenario	Intersection Degree of Saturation	Level of Service**	Intersection Average Delay (sec)	Maximum 95% Back of Queue Length (m)
Bruce Highway / Midgee Quarry Access				
2019 AM Peak	0.212	LOS B	0.7	2.8
2019 PM Peak	0.178	LOS B	0.7	2.6

** LOS value identified is for worst movement at the intersection, not the overall intersection.

The results above indicate that the existing configuration of the Bruce Highway / Midgee Quarry Access intersection is expected to operate satisfactorily under current (2019) traffic conditions. This is indicated by all values for DOS, LOS, average delay and vehicle queueing being well within acceptable limits of operation for priority-controlled intersection.

2.7 Road Safety Issues

2.7.1 Existing Site Conditions

A site inspection of the existing traffic conditions at the proposed site access location and the adjacent road network was undertaken, by Andrew Barrie (RPEQ / TMR Senior Road Safety Auditor). As part of this inspection the following road safety considerations were identified, including:

1) Existing Left Turn Treatment at Bruce Highway / Midgee Quarry Access Intersection

The current configuration of the Bruce Highway / Midgee Quarry Access intersection provides the minimum basic left (BAL) turn treatment for movements into the site from the southern Bruce Highway approach. Based on the relatively high opposing northbound through movement volumes within the traffic lane, and the increase in left turn movements at the intersection as part of the approved expansion of the current operations on site and the proposed development there is potential for a minor increase in accidents/vehicles conflicts for vehicles undertaking a left turn into the site.

Whilst the potential for such accidents is considered relatively unlikely, further consideration is recommended to determine the appropriate turn treatment at the intersection to safely accommodate the current and future left turn entry movements into the site.

Further assessment of these identified road safety items, including the completion of a road safety assessment of the existing and "in construction" traffic volumes, can be seen within **Section 5.6** of this report.

2.7.2 Road Crash History Review

A review of the road crash history in the vicinity of the relevant Bruce Highway / Midgee Quarry Access intersection was undertaken for the length spanning 500m either side of the access location. This review was completed using the road crash data available from the Queensland Globe database, with the period assessed between 2001-2018. The results of this assessment identified 5 crashes within the nominated extents as shown in **Figure 7**, with a summary of the road crash data provided in **Table 3**.

Figure 7 Road Crash Locations – Bruce Highway / Midgee Quarry Access Intersection

Table 3 Summary of Road Crash History – Bruce Highway / Midgee Quarry Access Intersection (2001-2018)

Crash Reference Number	Crash Year	Crash Severity	Crash Type	DCA Description	Crash Description
Bruce Highway / Midgee Quarry Access (Approx. TMR Chainage 106.900km to 107.900km)					
18037	2001	Property damage	Single Vehicle	Off Path - Straight: Out of Control On C'way	Out of control on straight
74286	2004	Property damage	Multi-Vehicle	Veh's Overtaking: Overtake-Right Turn	Overtaking same direction
146781	2007	Property damage	Other	Pass & Misc: Hit Animal	Hit animal
175841	2008	Property damage	Single Vehicle	Off Path - Straight: Right Off C'way Hit Obj	Off carriageway on straight hit object
269221	2014	Medical treatment	Multi-Vehicle	Veh's Same Direction: Rear End	Rear-end

As shown above, while there were 5 crashes recorded in the vicinity of the intersection overall, only 1 has been recorded in the last 5 years. Further to this, it is noted that only 2 could be directly attributed to the operation of the access intersection, with the other three recorded accidents single vehicle crashes.

As such it can be determined that there is no specific element of the current road environment at the access intersection that can be deemed a contributing factor to road crashes or the decrease in overall safety of the road network.

2.8 Pavement Loadings

In addition to the current traffic volumes, estimates were generated for the forecast background pavement loadings for each of the identified road segments. Traffic loads on the pavement are defined in terms of ESA for granular pavements and Standard Axle Repetitions (SAR) for other pavement types. For this assessment, it was assumed that all relevant road segments will be granular pavements. The ESA for the background traffic heavy vehicle component was calculated based on the provided heavy vehicle percentages for the relevant road sections. The following assumptions were applied to this calculation.

- The existing percentage of heavy vehicles will be maintained for future years.
- Equivalent Standard Axles per Heavy Vehicle (ESAs/HV) were adopted as follows (based on advice previously received from TMR):
  - 2.9 ESAs/HV for the Bruce Highway.
  - 3.2 ESAs/HV for all other roads (i.e. Capricorn Highway).

A summary of the forecast background ESAs for each of the relevant road segments at the adopted design horizons is provided in **Table 4** below.

Table 4 Forecast Future Background Pavement Loadings (ESAs)

Segment ID	AADT Segment		Base Data Year	Base Year HV % & Volume		10 Yr GR %	2019 HV Volumes		ESAs / HV	No. Days	Background ESAs	
	Start (km)	End (km)		Gaz	A-Gaz		Gaz	A-Gaz			Gaz	A-Gaz
Bruce Highway (Benaraby to Rockhampton) – 10E												
60023	45.420	85.308	2018	21.68% 616	23.82% 677	0.16	617	678	2.9	365	653,004	717,713
61551	85.308	107.400*	2018	28.32% 985	26.14% 921	2.33	1,008	943	2.9	365	1,066,883	997,781
	107.400*	108.938	2018	28.32% 985	26.14% 921	2.33	1,008	943	2.9	365	1,066,883	997,781
60130	108.938	114.388	2018	24.95% 764	27.06% 830	1.67	777	844	2.9	365	822,166	893,152
60024	114.388	116.961	2018	15.46% 742	21.01% 927	0.94	749	936	2.9	365	792,545	990,412
60868	116.961	119.737	2018	20.54% 2,075	16.89% 1,708	0.00#	2,075	1,708	2.9	365	2,196,553	1,807,472
61086	119.737	121.051	2018	11.62% 1,228	14.46% 1,496	0.00#	1,228	1,496	2.9	365	1,299,594	1,583,549
Bruce Highway (Rockhampton to St Lawrence) – 10F												
60027	0.000	1.409	2018	17.02% 1,271	18.40% 1,282	0.00#	1,271	1,282	2.9	365	1,345,410	1,356,726
60017	1.409	4.340	2018	11.02% 1,917	8.71% 1,338	0.00#	1,917	1,338	2.9	365	2,029,653	1,415,936
61005	4.340	5.517	2018	9.34% 1,273	12.17% 1,411	0.75	1,283	1,421	2.9	365	1,357,920	1,504,604

Segment ID	AADT Segment		Base Data Year	Base Year HV % & Volume		10 Yr GR %	2019 HV Volumes		ESAs / HV	No. Days	Background ESAs	
	Start (km)	End (km)		Gaz	A-Gaz		Gaz	A-Gaz			Gaz	A-Gaz
60822	5.517	8.550	2018	11.67%	13.83%	1.63	1,078	1,196	2.9	365	1,141,414	1,266,387
				1,061	1,177							
60926	8.550	13.180	2018	13.70%	9.21%	2.32	892	602	2.9	365	944,580	636,801
				872	588							
Capricorn Highway (Rockhampton to Duaringa) – 16A												
60039	0.000	5.960	2018	10.76%	25.98%	0.00[#]	892	1,949	3.2	365	1,041,735	2,276,758
				892	1,949							

[#] Negative Historical Growth Rate has been revised to 0.0% for purpose of analysis

[*] TMR Chainage (10E) for Bruce Highway / Midgee intersection.

3.0 Proposed Development Details

3.1 Development Site Plan

Figure 8 below indicates the proposed location of the asphalt manufacturing plant within the site and its interaction with the adjacent site elements for the existing quarry operations, including the current extraction and laydown areas.

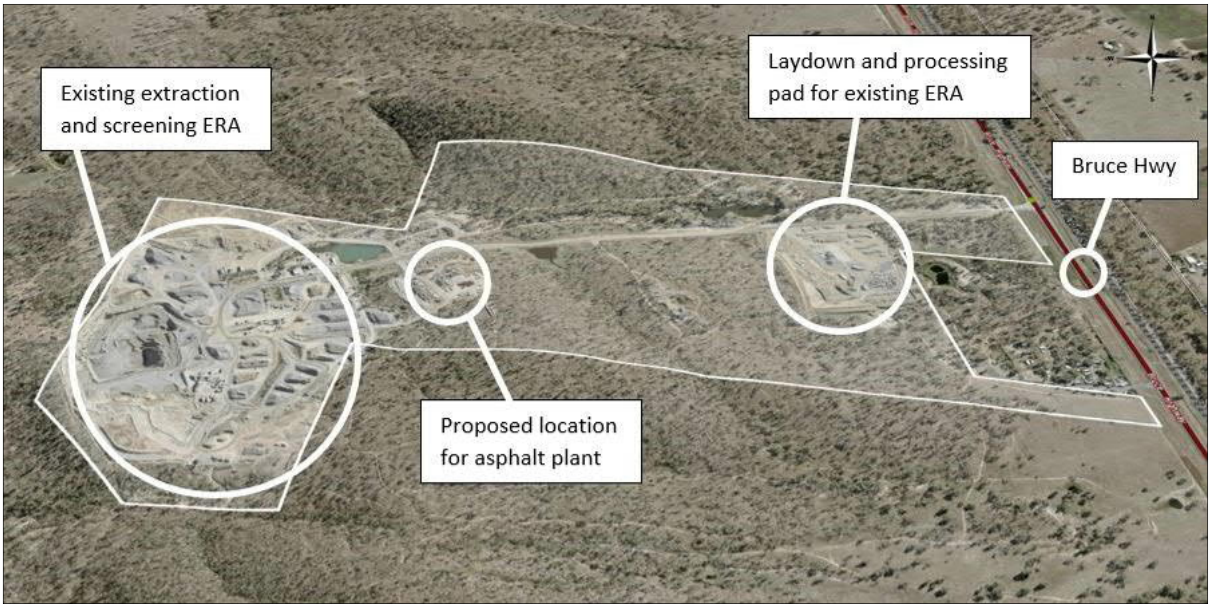

Figure 8 Proposed Plan of Development – COLAS Midgee Asphalt Manufacturing Plant

A shown above, the asphalt plant is proposed to be located adjacent to the quarry material extraction area, which is logical based on the intended use of the on-site gravel/aggregate materials in the asphalt manufactured. Further to this, the indicative site layout provided also identifies the intended use of the existing internal access road and access intersection on the Bruce Highway as part of the operation of the proposed asphalt manufacturing plant.

3.2 Operational Details

Based on information provided by COLAS it is understood that the proposed asphalt manufacturing plant is anticipated to commence late 2019 (pending approvals). The proposed hours of operation are expected to be 12 hours per day (6am to 6pm), 7 day per week.

Further to this, it is anticipated that the plant will operate for 48 weeks per year, equating to approximately 336 days of operation per year.

3.3 Proposed Access and Parking

3.3.1 Site Access

As identified above, it is proposed that the existing Bruce Highway / Midgee Quarry Access intersection be utilised as the sole access point to the proposed Midgee asphalt manufacturing plant located at 59793 Bruce Highway, Midgee. .

Further assessment regarding the required configuration of this access intersection is provided in **Section 5.2** below, however notwithstanding this, based on the current provision of adequate sight distances in both directions to/from the existing access point, the proposed use of the access location for the proposed asphalt plant is considered acceptable.

3.3.2 Internal Site Facilities

Further to this, it is noted that the indicative plan of development provided to date does not specifically detail the configuration of the proposed internal access or parking facility arrangements as part of the proposed asphalt manufacturing plant.

Notwithstanding this, it is expected that the design of internal access roads and parking facilities will be carried out in accordance with the requirements of all relevant standards, guidelines and policies. It is also noted that due to the abundance of suitable vacant land on site and the identified separation from the proposed asphalt plant to the main access intersection (with Bruce Highway) it is not anticipated the operation of the facility will lead to any overspill of vehicles or parking onto the surrounding road network.

4.0 Development Traffic

Based on discussions with the applicant (COLAS) it was determined that the peak period of traffic generation for the Project site would be during the operational phase of the asphalt plant, which would include traffic movements associated with staff travel, material transport to site and asphalt product transport movements from the plant.

Further details of the expected generation and distribution of traffic during the peak operational phase of the Project are provided below.

4.1 Operational Phase

COLAS provided the following information regarding the operational phase of the proposed Midgee asphalt manufacturing plant:

- It is expected that site operations will commence in 2019 (pending approvals).
- Plant workforce is expected to comprise of approximately 3 personnel.
- Staff are expected to commute to/from Rockhampton to the site daily, with vehicle movements expected to be limited inbound movements in the AM and outbound movements in the PM.
- Staff are expected to commute using private vehicles, and it has conservatively been assumed that each staff member will travel separately, i.e. 3 inbound movements in AM and 3 outbound movements in PM.
- The plant is expected to source the required gravel/aggregate material internally from the existing quarry operations on site.
- Incoming material deliveries to the site will be limited to a maximum of 10 vehicles per day, with an average of 6 HVs per day, which include a 50%/50% mix of semi-trailer and B-Double vehicle configurations.
- For the incoming material deliveries to the plant, 40% are anticipated to travel from Brisbane, while the remaining 60% are expected to travel from Rockhampton.
- Outgoing material from the plant is expected to be limited to a maximum of 30 semi-trailers per day.
- The overall annual tonnage for asphalt transport from the site is to be limited to a maximum of 100,000 tonnes per year.
- Based on an assumed semi-trailer payload of 26.5 tonnes, this equates to approximately 3,774 trucks per year.
- The initial delivery locations for the asphalt material from site are expected to be the major road projects in the area, namely the Rockhampton Northern Access Upgrade project on the Bruce Highway on the northern side of Rockhampton, and the Capricorn Highway Duplication project on the Capricorn Highway just west of Rockhampton.

4.1.1 Summary of Development Traffic Movements

From the anticipated vehicle numbers for each of the main vehicle movement generating activities identified above, the maximum number of daily traffic movements or trips on each of the relevant road links associated with the operation of the proposed COLAS asphalt manufacturing plant was estimated to be approximately:

- 3 light vehicle and 36 heavy vehicle round trips per day on the Bruce Highway north of the site.
- 4 heavy vehicle round trips on the Bruce Highway south of the site.
- 30 heavy vehicle round trips per day on the Capricorn Highway.

A summary of the maximum daily and peak hour traffic movements on the relevant road sections expected to be generated by the proposed operation of the asphalt manufacturing plant is provided in **Table 5**.

Table 5 Development Traffic Volume Summary

Traffic Movements	Maximum Project Volumes		
	Daily	AM Peak	PM Peak
Inbound			
Material delivery vehicles from Brisbane	4	1	1
Material delivery vehicles from Rockhampton	6	1	1
Staff (light vehicles) from Rockhampton	3	3	0
Asphalt product delivery vehicles from Bruce Hwy North	30#	3#	3#
Asphalt product delivery vehicles from Cap Hwy West	30#	3#	3#
Outbound			
Material delivery vehicles to Brisbane	4	1	1
Material delivery vehicles to Rockhampton	6	1	1
Staff (light vehicles) to Rockhampton	3	0	3
Asphalt product delivery vehicles to Bruce Hwy North	30#	3#	3#
Asphalt product delivery vehicles to Cap Hwy West	30#	3#	3#

Maximum asphalt product delivery movements to/from each delivery location are based on 100% of daily plant output and values above are not expected to occur concurrently.

4.2 Development Traffic Volumes on the Network

Based on the proposed traffic generation and distribution for the proposed COLAS asphalt manufacturing plant identified above, the expected development traffic volumes on the road network were established. In addition to the development volumes on the road links, the anticipated Project traffic volumes at the key Bruce Highway / Midgee Quarry Access intersection during the AM and PM peak periods were noted to be of particular relevance to the assessment. A summary of the expected maximum peak hour forecast development traffic volumes at the main access intersection are shown in **Figure 9** and **Figure 10** below.

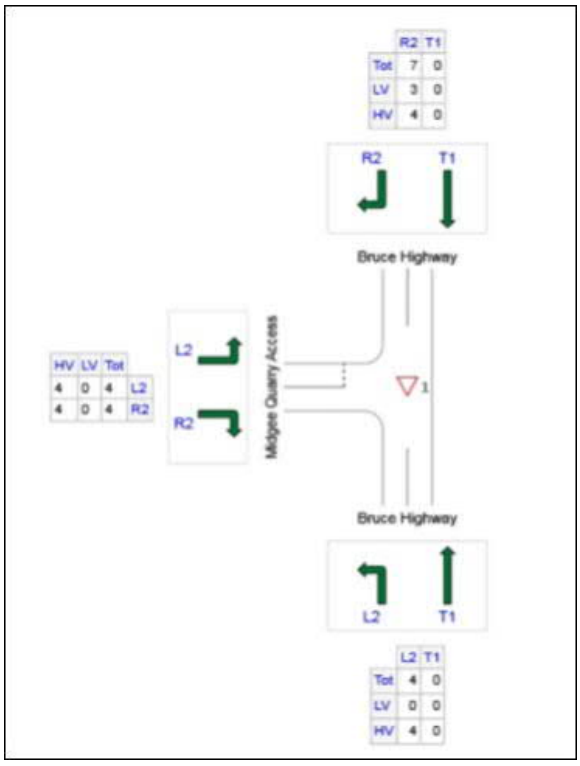

Figure 9 AM Peak Development Traffic Volumes Bruce Highway / Midgee Quarry Access

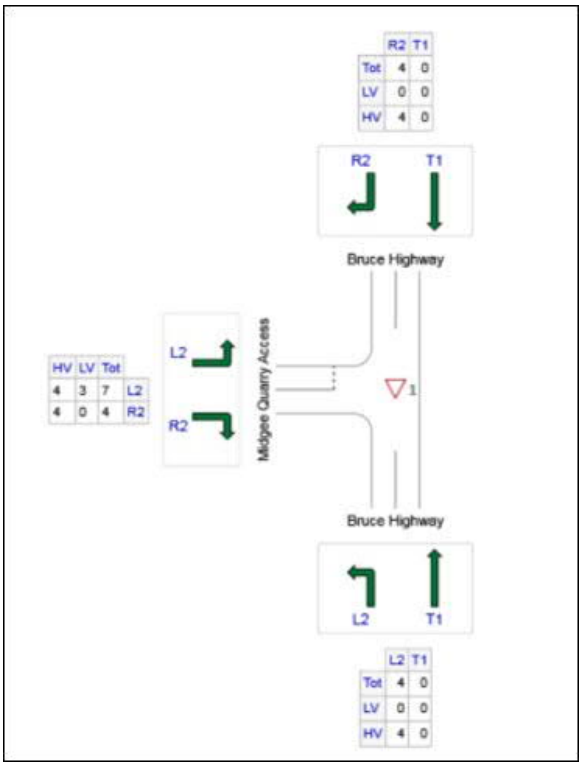

Figure 10 PM Peak Development Traffic Volumes Bruce Highway / Midgee Quarry Access

5.0 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 COLAS asphalt manufacturing plant were the identified road links forming the proposed transport routes for the site and the key Bruce Highway / Midgee Quarry Access intersection. Further assessment of the impact of the development on these elements is provided in the following sections.

5.1 With and Without Traffic Development Traffic Volumes

5.1.1 Road Link Volumes

A summary of the assessment of the percentage increase in daily traffic volumes on the road network as a result of the operational phase of the proposed COLAS asphalt manufacturing plant is shown in **Table 6**. It is noted that this assessment has conservatively been undertaken assuming the maximum development traffic volumes and under 2019 traffic conditions, the period in which the identified development traffic volumes are anticipated to have the greatest impact on the adjacent road network.

Table 6 Daily Traffic Volume Comparison

Site ID	AADT Segment		Background AADT (2019)		Maximum Daily Development Traffic Volumes		% Increase	
	Start (km)	End (km)	Gaz	A-Gaz	Gaz	A-Gaz	Gaz	A-Gaz
Bruce Highway (Benaraby to Rockhampton) – 10E								
60023	45.420	85.308	2,846	2,847	4	4	0.14%	0.14%
61551	85.308	107.400*	3,559	3,606	4	4	0.11%	0.11%
	107.400*	108.938	3,559	3,606	39	39	1.10%	1.08%
60130	108.938	114.388	3,113	3,118	39	39	1.25%	1.25%
60024	114.388	116.961	4,843	4,453	39	39	0.81%	0.88%
60868	116.961	119.737	10,103	10,110	39	39	0.39%	0.39%
61086	119.737	121.051	10,566	10,346	39	39	0.37%	0.38%
Bruce Highway (Rockhampton to St Lawrence) – 10F								
60027	0.000	1.409	7,468	6,966	39	39	0.52%	0.56%
60017	1.409	4.340	17,400	15,358	39	39	0.22%	0.25%
61005	4.340	5.517	13,735	11,680	30	30	0.22%	0.26%
60822	5.517	8.550	9,240	8,651	30	30	0.32%	0.35%
60926	8.550	13.180	6,514	6,532	30	30	0.46%	0.46%
Capricorn Highway (Rockhampton to Duaringa) – 16A								
60039	0.000	5.960	8,289	7,503	30	30	0.36%	0.40%

*TMR Chainage for Bruce Highway / Midgee Quarry Access intersection.

As can be seen by the results in **Table 6**, the addition of the expected traffic volumes from the operation of the proposed COLAS asphalt manufacturing plant is shown to have a minimal impact on the identified sections of the state-controlled road network, with the increase in traffic volumes shown to be considerably less than 5%. As such, it is anticipated that there will be adequate "capacity" in the state-controlled road network to cater for the additional trips generated by the proposed development.

5.1.2 Intersection Volumes

Forecast "pre development" traffic volumes at the Bruce Highway / Midgee Quarry Access intersection were established for the identified 10 year design horizon (2029) for the Project (based on the expected commencement of site operations in 2019) by applying the previously identified growth rates for the adjacent section of the Bruce Highway to the 2019 through movement volumes on each Bruce Highway approach established in Section 2.4.2 above.

The corresponding "post development" traffic volumes were then established by adding the peak hour development traffic volumes identified in **Figure 11** and **Figure 12** to the calculated 2029 pre development volumes. Further details on how these volumes were established is provided for reference in **Appendix J**, with a summary of the forecast 2029 post development traffic volumes at the Bruce Highway / Midgee Quarry Access intersection shown in **Figure 13** to **Figure 14**.

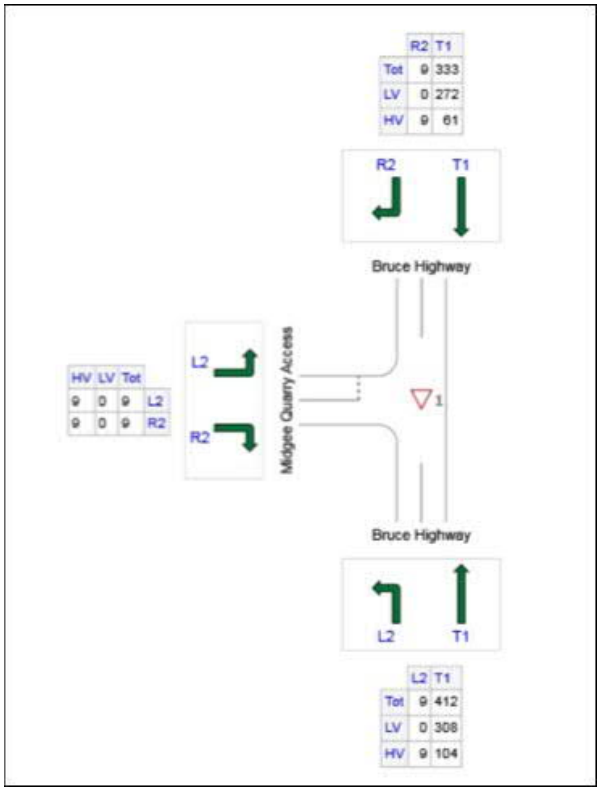

Figure 11 2029 AM Peak "Pre Development" Volumes Bruce Highway / Midgee Quarry Access

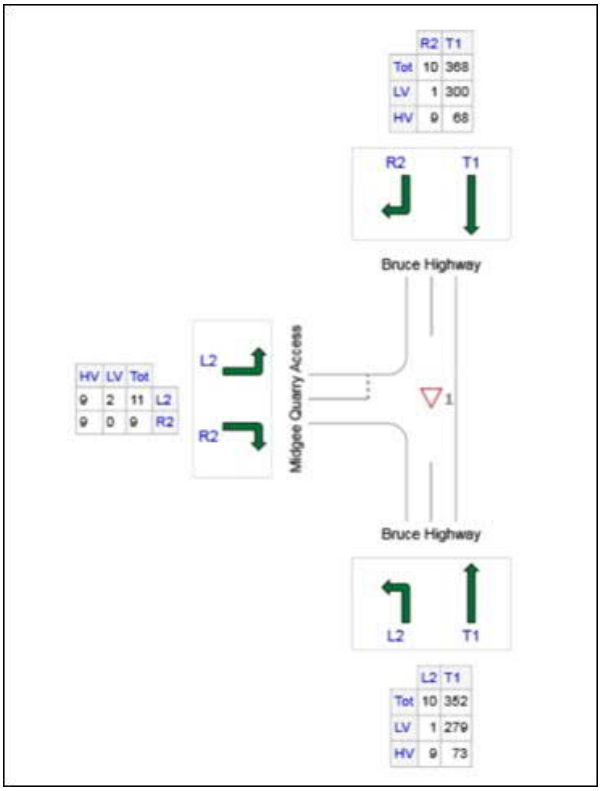

Figure 12 2029 PM Peak "Pre Development" Volumes Bruce Highway / Midgee Quarry Access

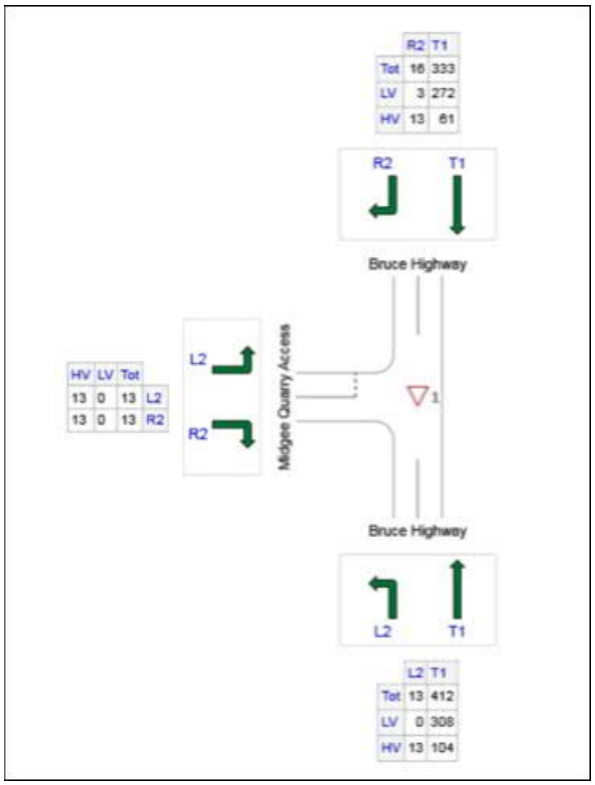

Figure 13 2029 AM Peak "Post Development" Volumes Bruce Highway / Midgee Quarry Access

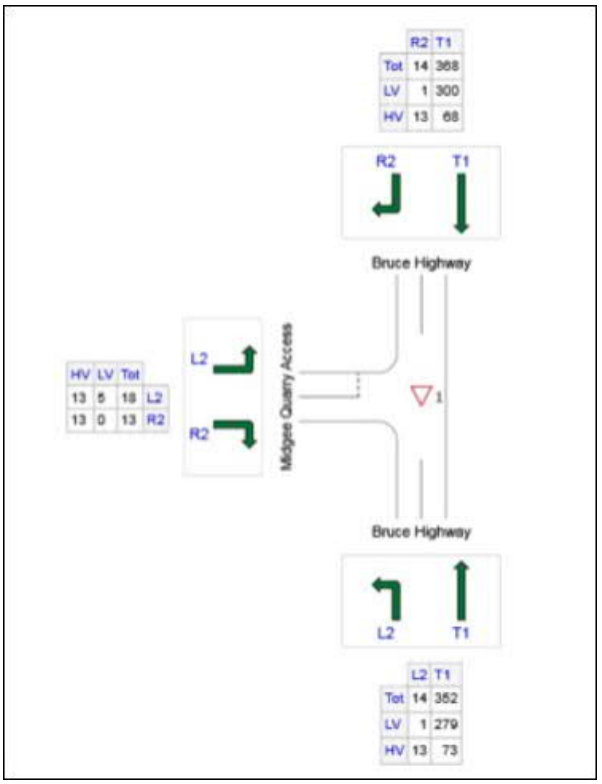

Figure 14 2029 PM Peak "Post Development" Volumes Bruce Highway / Midgee Quarry Access

5.2 Access and Frontage Impact Assessment and Mitigation

A turn warrants assessment was undertaken for the Bruce Highway / Midgee Quarry intersection based on the forecast 2029 post development traffic volumes identified in **Figure 13** and **Figure 14** above. The assessment was completed using Figure 2.26a of Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings, which depicts the turn warrants graph for design speeds greater than 100km/h. The resultant graph from the assessment is provided in **Figure 15** below, while further details of the turn warrants assessment calculations are provided for reference in **Appendix K**.

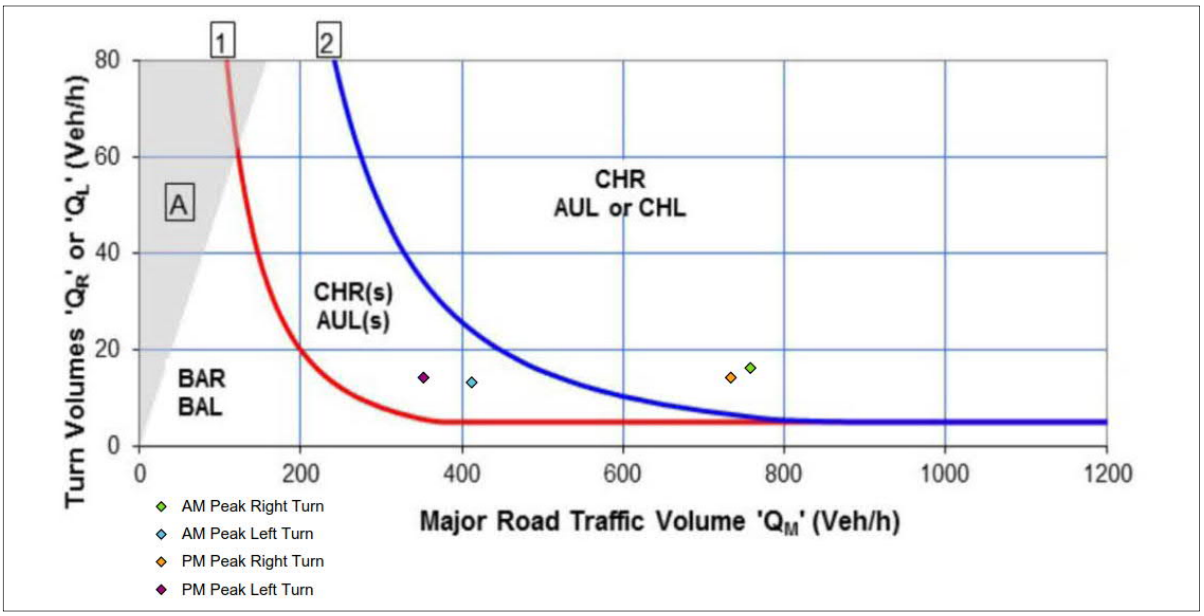

Figure 15 Turn Warrants Graph (>100km/hr) – Post Development Traffic Volume Scenario (2029)

The results of the turn warrants assessment indicate that the recommended turn treatments at the Bruce Highway / Midgee Quarry Access intersection for the post development traffic volume scenario of the proposed COLAS asphalt manufacturing plant were CHR and AUL(s) treatments.

As previously identified, the existing configuration of this intersection currently provides a CHR type turn treatment for right turn movements and a BAL type treatment for left turning vehicles. As such to mitigate the impacts to the intersection as a result of the proposed asphalt plant, it is recommended that upgrade works be undertaken on the southern Bruce Highway approach to provide an AUL(s) left turn treatment at the intersection in accordance with Figure 8.3 of Austroads' Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (2017), as indicatively shown in **Figure 16** below.

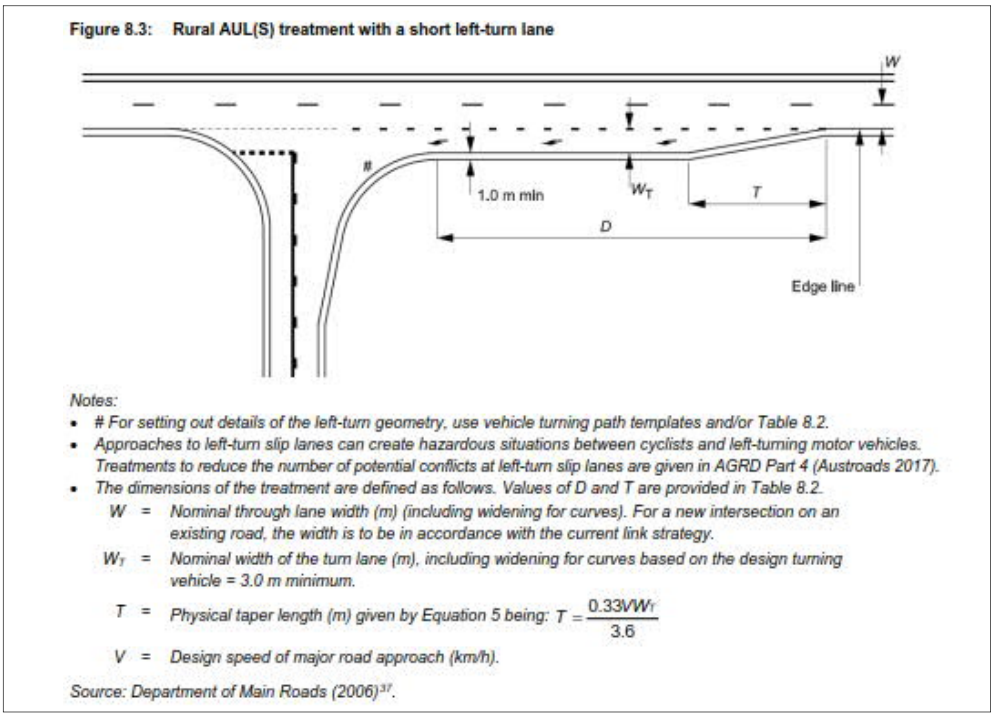

Figure 16 Figure 8.3 Austroads GTRD Part 4A – Rural AUL(s) Treatment

5.3 Intersection Delay Impact Assessment and Mitigation

Preliminary SIDRA analysis was also undertaken to establish the operational performance of the proposed upgraded configuration of the Bruce Highway / Midgee Quarry Access intersection during the AM and PM peak periods for both the pre and post development traffic conditions. This assessment was done for the identified 10-year design horizon (2019) for the Project, with a summary of the results of this analysis provided in **Table 7**, with detailed SIDRA output summaries included for reference in **Appendix L.**

Table 7 SIDRA Results – Bruce Highway / Midgee Quarry Access Intersections (Proposed Configuration)

Analysis Scenario	Intersection Degree of Saturation	Level of Service**	Intersection Average Delay (sec)	Maximum 95% Back of Queue Length (m)
Bruce Highway / Midgee Quarry Access Intersection				
2029 AM Peak Pre Development	0.256	D	0.9	5.0
2029 PM Peak Pre Development	0.220	C	0.9	4.3
2029 AM Peak Post Development	0.256	D	1.3	7.6
2029 PM Peak Post Development	0.220	C	1.3	6.4

** LOS value identified is for worst movement at the intersection, not the overall intersection.

The results above indicate that the proposed upgraded configuration of the Bruce Highway / Midgee Quarry Access intersection (incorporating CHR / AUL(s) treatments) is expected to operate satisfactorily during all identified development scenarios. This is indicated by all values for DOS, LOS, average delay and vehicle queue length being well within acceptable limits of operation for a priority-controlled intersection.

As such the impact of the proposed COLAS asphalt manufacturing plant on the operation of the adjacent Bruce Highway / Midgee Quarry Access intersection can be considered minor, with only negligible increases in average delay (0.4 secs) at the intersection calculated. Therefore the proposed upgraded configuration of the intersection can be considered appropriate to cater for the additional traffic volumes generated by the Project.

5.4 Road Link Capacity Assessment and Mitigation

As previously note, the proposed facility is only anticipated to generate a relatively small number of daily traffic movements on the relevant sections of the surrounding road network, with a maximum of:

- 3 light vehicle and 36 heavy vehicle (39 combined) round trips per day on the Bruce Highway north of the site.
- 4 heavy vehicle round trips on the Bruce Highway south of the site.
- 30 heavy vehicle round trips per day on the Capricorn Highway.

Based on these minor increases in traffic volumes it can be seen that the proposed COLAS asphalt manufacturing plant is anticipated to have minimal impact on the operation of the adjacent road links, with adequate capacity expected to be available to cater for the additional traffic volumes generated by the plant.

5.5 Pavement Impact Assessment and Mitigation

The assessment of potential pavement impacts of the Project involved a comparison of the pavement loading ESAs associated with the background traffic volumes on the identified road links to the ESAs estimated to be generated by the heavy vehicles associated with the operation of the proposed asphalt manufacturing plant.

As stated previously, transportation of materials to the site are anticipated to be carried out by a combination of semi-trailer and B-Double vehicle configurations, while the delivery of the asphalt product is proposed to be transported using semi-trailers. The expected transport routes for the material delivery movements to site and the outgoing asphalt product movements associated with the operation of the plant have been previously defined in **Section 2.3.1** above.

Table 8 below identifies the assumed heavy vehicle classes expected to be utilised as part of transport operations for the Project, with the average loaded and unloaded ESAs/HV values for each configuration also provided as specified in the pavement data provided by TMR and established in the first principles calculations included for reference as **Appendix M**.

Table 8 Assumed Vehicle Class and ESA/HV Values

Vehicle Class	Vehicle Configuration	Loaded ESAs/HV	Unloaded ESAs/HV
6 Axle Semi		5.54	1.68
B-Double		6.91	1.69

A summary of the comparison of the background and development pavement loadings is provided in **Table 9** below, with further details of the high level calculations undertaken included in **Appendix N**. It is noted that for the purpose of this assessment it has been assumed that for the material delivery movements to

site all vehicles will arrive to the Project site fully loaded and then travel back on the same route unloaded, while the outgoing asphalt product delivery vehicles are assumed to depart the site fully loaded and return to the plant site unloaded via the same transport route.

Table 9 Pavement Loading Comparison

Segment ID	AADT Segment		Background ESA (2019)		Project-Generated ESA		% Increase (2019 Volumes)	
	Start (km)	End (km)	Gaz	A-Gaz	Gaz	A-Gaz	Gaz	A-Gaz
Bruce Highway (Benaraby to Rockhampton) – 10E								
60023	45.420	85.308	653,004	717,713	4,528	419	0.69%	0.06%
61551	85.308	107.400*	1,066,883	997,781	4,528	419	0.42%	0.04%
	107.400*	108.938	1,066,883	997,781	19,235	8,717	1.80%	0.87%
60130	108.938	114.388	822,166	893,152	19,235	8,717	2.34%	0.98%
60024	114.388	116.961	792,545	990,412	19,235	8,717	2.43%	0.88%
60868	116.961	119.737	2,196,553	1,807,472	9,932	7,754	0.45%	0.43%
61086	119.737	121.051	1,299,594	1,583,549	9,932	7,754	0.76%	0.49%
Bruce Highway (Rockhampton to St Lawrence) – 10F								
60027	0.000	1.409	1,345,410	1,356,726	9,932	7,754	0.74%	0.57%
60017	1.409	4.340	2,029,653	1,415,936	9,932	7,754	0.49%	0.55%
61005	4.340	5.517	1,357,920	1,504,604	9,303	962	0.69%	0.06%
60822	5.517	8.550	1,141,414	1,266,387	9,303	962	0.82%	0.08%
60926	8.550	13.180	944,580	636,801	9,303	962	0.98%	0.15%
Capricorn Highway (Rockhampton to Duaringa) – 16A								
60039	0.000	5.960	1,041,735	2,276,758	9,303	962	0.89%	0.04%

The results in the tables above indicate that the additional heavy vehicle movements associated with the proposed operation of the COLAS asphalt manufacturing plant are expected to lead to negligible increases in pavement loadings on all identified sections of the Bruce Highway (10E), Bruce Highway (10F) and the Capricorn Highway (16A). This is highlighted by all calculated values of pavement loading increase being well below the recommended 5% impact trigger. As such no mitigation measures or contributions are deemed anticipated to be required as part of the operation of the proposed asphalt plant.

5.6 Safety Impact Assessment and Mitigation

Based on the road environments (<8,000 vpd) of the relevant sections of the surrounding road network, it was determined that the completion of a lower order road safety assessment would be sufficient to establish the existing and post development road safety risks relevant to the proposed Midgee asphalt manufacturing plant development.

To establish the level of risk regarding the road safety considerations identified in **Section 2.7.1** above, a safety risk score matrix as shown in **Figure 17** was utilised, with the results of the road safety risk assessment summarised in **Table 10**.

Figure 9.3.2(a) – Safety risk score matrix

Potential likelihood	Potential consequence: Property only (1)	Minor injury (2)	Medical treatment (3)	Hospitalisation (4)	Fatality (5)
Almost certain (5)	M	M	H	H	H
Likely (4)	M	M	M	H	H
Moderate (3)	L	M	M	M	H
Unlikely (2)	L	L	M	M	M
Rare (1)	L	L	L	M	M

L: Low risk
M: Medium risk
H: High risk

Figure 17 Adopted Risk Score Matrix **[Source: TMR GTIA]**

Table 10 Road Safety Assessment – COLAS Asphalt Manufacturing Plant

	Existing / Pre-Development			Post Development				In Construction & Mitigation		
Risk Item	**Likelihood**	**Consequence**	**Risk Score**	**Likelihood**	**Consequence**	**Risk Score**	**Mitigation Measure**	**Likelihood**	**Consequence**	**Risk Score**
Current provision of BAL turn treatment on southern Bruce Highway approach has potential to lead to increase in accidents / vehicle conflicts between northbound through movements and left turning vehicles.	2	3-4	**M**	3	3-4	**M**	Upgrade of proposed site access intersection to include an AUL(s) turn treatment (based on turn warrants assessment undertaken) is expected to mitigate potential minimal increase in crash likelihood as a result of minor increase in left turning entry movements into the site during the operation of the proposed asphalt plant.	1	3-4	**M**

6.0 Conclusions and Recommendations

6.1 Summary of Impacts and Mitigation Measures Proposed

6.1.1 Traffic Impacts

The critical elements of the surrounding road network in terms of the potential impact of the proposed COLAS asphalt manufacturing plant were identified to be the road links forming the proposed transport routes for the site and the key Bruce Highway / Midgee Quarry Access intersection.

Based on the assessment undertaken it was identified that the proposed facility is only anticipated to generate a relatively small number of daily traffic movements on the relevant sections of the surrounding road network, with a maximum of 39 vehicle round trips (including 36 heavy vehicle) per day on the Bruce Highway north of the site, 4 heavy vehicle round trips on the Bruce Highway south of the plant and up to 30 heavy vehicle round trips per day on the Capricorn Highway. Based on these minor increases in traffic volumes it was determined that the proposed COLAS asphalt manufacturing plant was anticipated to have minimal impact on the operation of the adjacent road links, with adequate capacity available to cater for the additional traffic volumes generated by the plant.

A turn warrants assessment was also undertaken for the forecast post development traffic volumes at the Bruce Highway / Midgee Quarry intersection, the results of which indicated that the recommended turn treatments at intersection were CHR and AUL(s) treatments. As such based on the current intersection configuration (CHR / BAL), it is recommended that upgrade works are provided on the southern Bruce Highway approach to the intersection to provide an AUL(s) left turn treatment in accordance with Figure 8.3 of Austroads' Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (2017).

Detailed intersection analysis was also completed to establish the operational performance of the proposed upgraded configuration of the Bruce Highway / Midgee Quarry Access intersection during the AM and PM peak periods for both the pre and post development traffic conditions. The results of this analysis indicated that the proposed upgraded configuration (incorporating CHR / AUL(s) treatments) was expected to operate satisfactorily for all identified post development scenarios. As such the proposed upgraded configuration of the intersection can be considered appropriate to cater for the additional traffic volumes generated by the proposed COLAS asphalt manufacturing plant and the impact of the proposed facility on the operation of the Bruce Highway / Midgee Quarry Access intersection can be considered minor.

6.1.2 Pavement Impacts

In addition to the traffic assessments completed, a preliminary desktop pavement impact assessment of the relevant road network was also undertaken for the proposed operation of the COLAS asphalt manufacturing plant.

This assessment identified that the additional heavy vehicle movements associated with operation of the plant are expected to lead to negligible increases in pavement loadings on all identified sections of the Bruce Highway (10E), Bruce Highway (10F) and the Capricorn Highway (16A). This is highlighted by all calculated values of pavement loading increase being well below the recommended 5% impact trigger. As such no pavement mitigation measures or contributions are deemed anticipated to be required as part of the operation of the proposed asphalt plant.

6.1.3 Recommendations

In light of the information provided above, it is noted that conditional to the provision of the identified upgrade works (AULs type turn treatment) at the Bruce Highway / Midgee Quarry Access, the traffic and pavement impacts of the proposed COLAS asphalt manufacturing plant can be considered minor and appropriately mitigated. As such, it is recommended that the Project is suitable to be approved from a traffic engineering viewpoint.

6.2 Certification Statement and Authorisation

A copy of the RPEQ certification and authorisation statement covering this assessment of the proposed COLAS asphalt manufacturing plant at 59793 Bruce Highway (Lot 2 RP88874) is included for reference as **Appendix O.**

Appendix A – RRC Pre-lodgement Meeting Minutes

PRELODGEMENT MEETING

MINUTES OF MEETING

MEETING DETAILS

Date of Meeting: Wednesday 24th October – 2:00pm, Reception Meeting Room, Walter Reid

Council Attendees:	**Applicant Attendees:**
▪ Thomas Gardiner – Senior Planning Officer, Development Assessment ▪ Jonathon Trevett-Lyall – Planning Officer ▪ Stacey Joyner – Supervisor, Environmental Health ▪ Les Payne – Environmental Health Officer ▪ Rod Lindsay – Infrastructure Planning Engineer ▪ Rick Palmer - Senior Executive Industry Engagement ▪ Kathy McDonald – Development Support Officer	▪ Ward Veitch (Urban Planet, Town Planning Consultant) ▪ Jason Taituma (Colas QLD) ▪ Glenn Druery (Steer Environmental) ▪ Phil Steer (Steer Environmental)

PROPOSAL:

Address: 59793 Bruce Highway, Midgee

Real Property Description: Lot 2 on RP888747

Details of Proposal: COLAS Queensland Pty Ltd intends to operate an Asphalt Manufacturing Plant at 793 Bruce Highway, Midgee 4702 (real property description Lot 2 RP888747). There is presently no asphalt plant on site; however COLAS Queensland Pty Ltd intends to install a plant that will produce greater than 1000 tonnes of asphalt in a year, triggering Environmentally Relevant Activity 6 (Asphalt Manufacturing) under the *Environmental Protection Regulation 2008*.

Issues identified by the Applicant for discussion:

- Planning matters relating to the current use of the site and the integration of the proposed use (requirements of the Rockeplan)
- ERA provisions and requirements
- Reporting considerations of the development application

Supporting information/documentation provided by Applicant:

- Plan - 1-4-201999A Model 1
- Plan - 1-4-201999A Model 1a
- Proposal letter

MINUTES

PLANNING ASSESSMENT:

Defined Use: High Impact Industry (Asphalt Manufacturing) and ERA 6 (Asphalt Manufacturing)

Planning Area/Zone: Rural Zone

Type of Application Required: Material Change of Use

Level of Assessment: Impact Assessable

DEVELOPMENT ASSESSMENT:

- The subject site is located in a Rural Zone under the *Rockhampton Region Planning Scheme 2015* (the planning scheme).
- The proposal will be defined as a "High Impact Industry" under the planning scheme. A Material Change of Use (MCU) application will be required to be lodged to Council which will trigger impact-assessment
- The application fees payable is the Base fee = $3,458.00 + Site Area over 1001 m2 (POA)
- The MCU application must address the entire planning scheme, including the Strategic Framework as it is not directly consistent with the intent of the zone.
- The application must demonstrate that the proposal will minimise impacts on the surrounding area. In particular, the adjoining Caravan Park, as well as Good Quality Agricultural Land to the west of the site (refer to Overlay mapping).
- The application must outline any management and mitigation measures taken to reduce emissions relating to noise, light, dust and odour and ensuring that the amenity of the surrounding rural area (particularly the adjoining Caravan Park) is not compromised as a result of the Plant.
- Referral to the Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) is required as the premises are in proximity to a state-controlled road (Bruce Highway). It is also recommended to get advice from State regarding a referral for vegetation clearing.
- Public notification will be required for fifteen (15) business days in accordance with the Development Assessment Rules.
- A final decision will be made at a full Council meeting (via P+R Committee).
- It was noted that this proposal is separate to the existing development on the subject site (Midgee Quarry).
- DA Application Form 1 can be found here (please refer to form for Section on ERA's as discussed in the meeting): https://planning.dsdmip.qld.gov.au/planning/resources?query=da-form-1

DEVELOPMENT ENGINEERING UNIT:

- It is recommended that the applicant review the triggers in the State Planning Policy with respect to the requirements for an assessment against the Water Quality provisions. Without a detailed site plan showing the full extents of the development and the amount of impervious area, Council is unable to determine whether this assessment will be required. If triggered, the assessment will need to be submitted with the Material Change of Use application.
- The MCU application should provide details of water and sewerage provisions for the site.
- The MCU application should include a preliminary stormwater management plan (SMP).

As a minimum, the SMP should show how upstream flows are conveyed through / around the site, as well as how the additional runoff from the site is conveyed to a lawful point of discharge as per the requirements of the Queensland Urban Drainage Manual.

- Depending on the amount of earthworks required (if any), an Operational Works application for Site Works may be triggered.
- Any application for Operational Works will need to address Erosion and Sediment Control for the site.

Infrastructure Charges (not including actual charges)

- Infrastructure charges - $17.50 per m2 of GFA

The Adopted Infrastructure Charges are available to view on Council's Website. These are located in the Fees and Charges Section. Please see the link below.

http://www.rockhamptonregion.qld.gov.au/Planning-and-Building/Infrastructure-Charges

PUBLIC AND ENVIRONMENTAL HEALTH:

- An Environmental Authority Application is required at the same time as the development application. You must complete the application form and submit it with the supporting information and the $**1845.30** application fee.
- The application form can be found here: https://www.rockhamptonregion.qld.gov.au/files/assets/public/cis/forms/environmental-authority-site-specific-application-form.pdf

The supporting documentation should include:

- Site plans, showing the location of the plant on the property and the layout of the plant itself.
- Details of emissions including sources, size of the emissions, mitigation measure in place. Emissions include but not limited to:
  - Dust (eg. stockpiles, dust extractions devices used in the manufacturing process)
  - Noise (vehicles movement, processing noise)
  - Odour (processing odour)
  - Light (security or work lights)
  - Chemical emissions form the manufacturing process
- Details of how and where environmental hazardous liquids are stored
- Details of any regulated waste storage areas
- Details of silo's if being used and measures put into place to prevent overfilling.
- Location of any onsite workshops (if applicable)
- Details of storm water management. Stormwater must be prevented from entering the contaminated areas, and stormwater generated from the contaminated areas must be captured.
- Operating Hours
- It is recommended to incorporated the above information into a Site-Based Management Plan to be submitted as part of the application.
- Also if the plant design has been used elsewhere in Qld it would be beneficial to advise where and provide visual representations (eg, photos).

OUTCOME SUMMARY:
The proposal for a High Impact Industry (Asphalt Manufacturing Plant) and ERA 6 (Asphalt Manufacturing) is not consistent with the intent of the Rural Zone. A Material Change of Use application, triggering impact-assessment is required. While the proposal is not consistent with the intent of the zone, if sufficient supporting evidence is provided to demonstrate that there will be negligible impact on the surrounding rural area (particularly the adjoining Caravan Park), then an application may be supported subject to conditions. All of the abovementioned information must be submitted as part of a properly-made development application.

ADVISORY NOTE:
These notes have been provided as informal and non binding comments and are intended for use as a guide only in providing feedback on the proposal presented to the Unit. These discussions do not bind or fetter the Council in any way in exercising its statutory responsibilities in assessing any development application which might be made to the Council.
Link to DA Forms https://planning.dilgp.qld.gov.au/planning/resources Link to Planning Schemes http://www.rockhamptonregion.qld.gov.au/Planning-and-Building/Planning-Schemes-and-Studies Link to Development Assessment Fees http://www.rockhamptonregion.qld.gov.au/About-Council/Finance-Rates-and-Budget/Fees-and-Charges Development Incentives http://www.rockhamptonregion.qld.gov.au/Planning-and-Building/Development-Incentives

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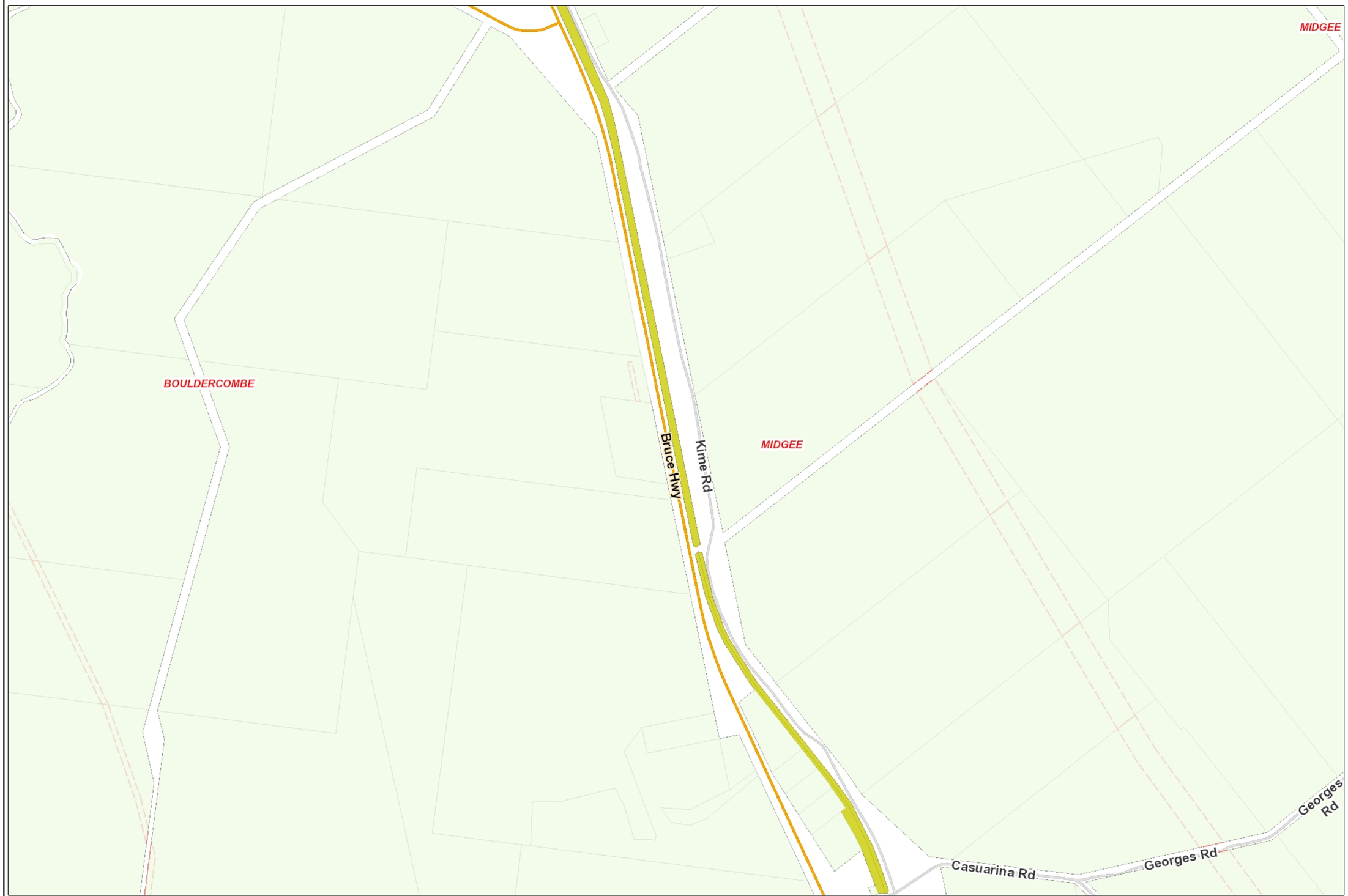
Appendix B – Site Zoning Mapping

RRC Planning Scheme Zoning Mapping

A3 Page scale at 1: 16,650.00

Printed from RRPS on: 24/04/19



Legend

- Sub-Precincts
- Precincts
- Priority Development Area
- Strategic Port Land

Zones

- Low density residential
- Low-Medium density residential
- High density residential
- Principal centre
- Major centre
- District centre
- Local centre
- Neighbourhood centre
- Sport and recreation
- Open space
- Environmental management and conservation
- Low impact industry
- Medium impact industry
- High impact industry
- Special industry
- Waterfront and marine industry
- Community facilities
- Emerging community
- Limited development (constrained land)
- Rural
- Rural residential
- Special purpose
- Specialised centre
- Township

- Easements
- Property Parcels (Main)

Rockhampton Regional Council

Appendix C – Previous Hopkins Brothers Quarry TIA

TECHNICAL MEMORANDUM

TO:	Aaron Pianta Knobel Consulting
FROM:	Chris Hewitt McMurtrie Consulting Engineers
DATE:	16 June 2017
PROJECT NO:	123-16-17
RE:	Hopkins Brothers Quarry Site ay 59793 Bruce Highway Midgee

Dear Aaron,

Background

McMurtrie Consulting has been engaged to provide advice in relation to possible increase in cartage volumes from the Hopkins Brothers Quarry Site located at 59793 Bruce Highway, Midgee. The site is located as per Figure 1 below.

Figure 1 – Site Location

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

The existing operation has a DTMR approval to permit 200,000 Tpa to be carted from site. The existing speed limit on the Bruce Highway adjacent to the site is 100 kph and therefore the design speed has been assumed as 110 kph.

The existing site access intersection with the Bruce Highway has been previously constructed to a high standard in both width and intersection form – and is a type BAL/CHR intersection. Intersection visibility at the site access is excellent in both directions and comfortably exceeds minimum SISD to the North and the South. The intersection has been designed as a BAL/CHR for 100kph with a storage length of one design vehicle i.e. 19m as shown in Figure 2 with lengths in accordance with Figure 13.60 of DTMR Road and Planning Design Manual (RPDM).

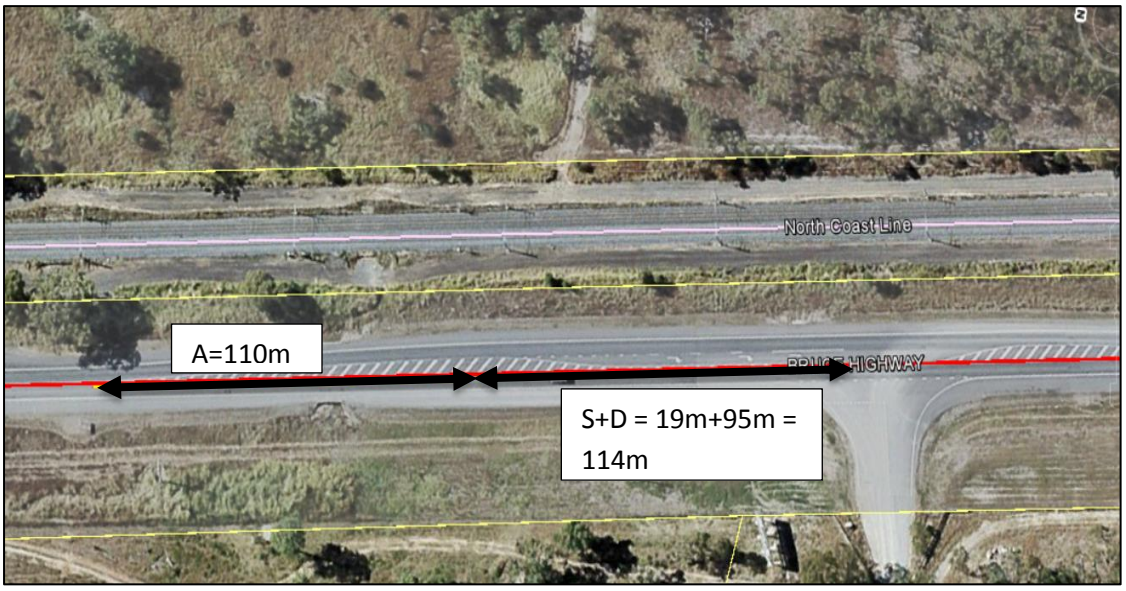


Figure 2 – Existing Intersection Layout

The operation employees 10 staff who arrive at site each day between 5 and 6am. All haulage vehicles are stored onsite so first haulage out from site does not commence until 6am. The site generally operates for 6 days per week for the entire year. Any increase in tonnages supplied from site does not necessarily increase staff numbers.

Under the current operational approval material is generally carted from site in truck and dog combinations at 32 Tonnes per load. Over a 10 hour day this equates to a volume of 2 heavy vehicle movements into site and 2 heavy vehicle movements away from site per hour. The directional split of material exiting the site is approximately 50% to the North and 50% to the South given the sites location on the Bruce Highway. The customer base is predominantly DTMR and local governments as high standard pavement gravels are supplied from the site.

Traffic Assessment

The peak hour for staff arrival and also the Bruce Highway peak hour will be assessed in order to justify any increase in production tonnages based on the existing intersection form and construction.

Attachment 1 shows the 2016 AADT figures for the Bruce Highway at the site entrance. A 10 year design horizon (11 years beyond the supplied traffic figures date) will be assumed and DTMR have advised previously that an accepted linear growth rate of 2.8% applies to this section of the Bruce Highway.

For staff movements the critical movements are right in at 5 - 6am and the corresponding left out at the end of the day.

Figure 3 has been derived from the AADT volumes with a 2.8% linear growth rate applied and the likely staff movements for the 5 – 6am site commencement assuming all enter from the North.

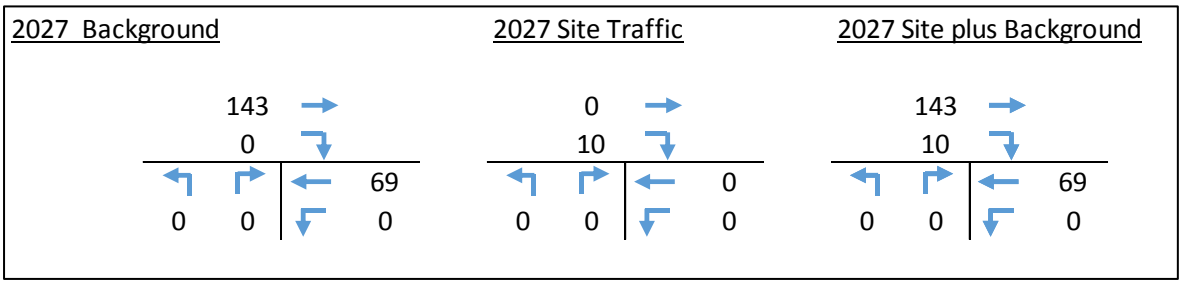


Figure 3 – AM Site Peak for staff arrivals

Based on Figure 4A-1 of the DTMR RPDM the required right turn treatment is a BAR as shown in Figure 4.

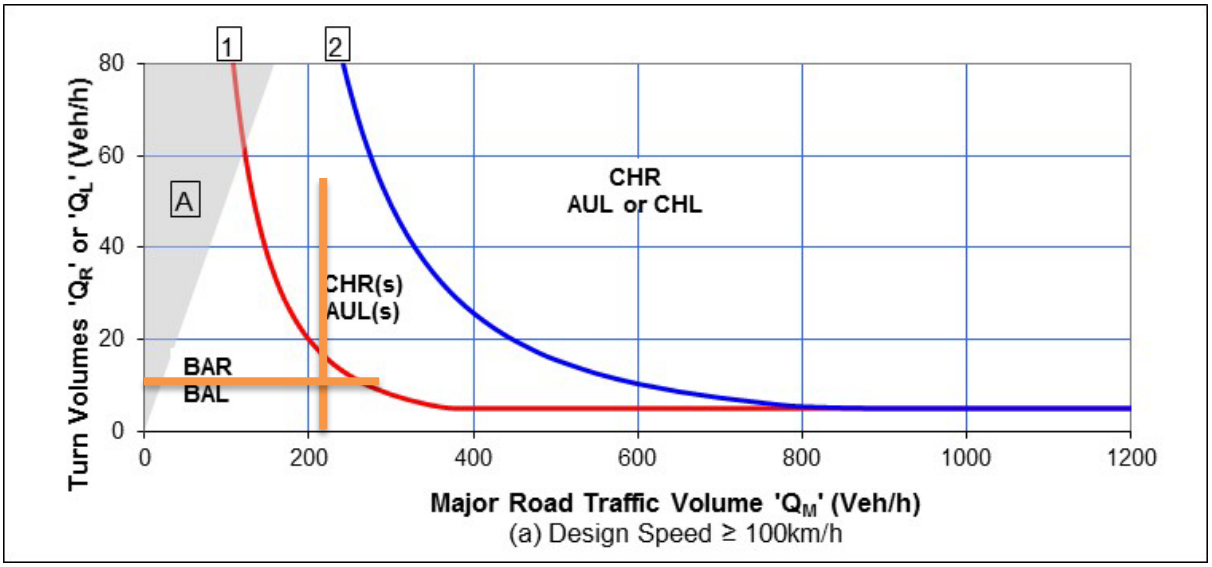


Figure 4 – Turn Warrants Assessment for staff arrivals

In terms of a sensitivity analysis it can be seen from Figure 4 that the current intersection can comfortably handle well in excess of 50 vph turning right (5 times the current staff volume) even as a CHR(s) although line marked as a CHR. Although currently there is no proposal to increase staff numbers the existing intersection is more than capable of catering for any increase in staff numbers.

For material haulage, the Bruce Highway peak will be examined and in order to be conservative it has been assumed all inwards volumes are right turns and a further allowance of 1 vph has been made for all hours during the day to cover other deliveries such as fuel and other service vehicles.

Figure 5 has been derived from the AADT volumes with a 2.8% linear growth rate applied and the Bruce Highway average weekday peak hour of 3 to 4pm.

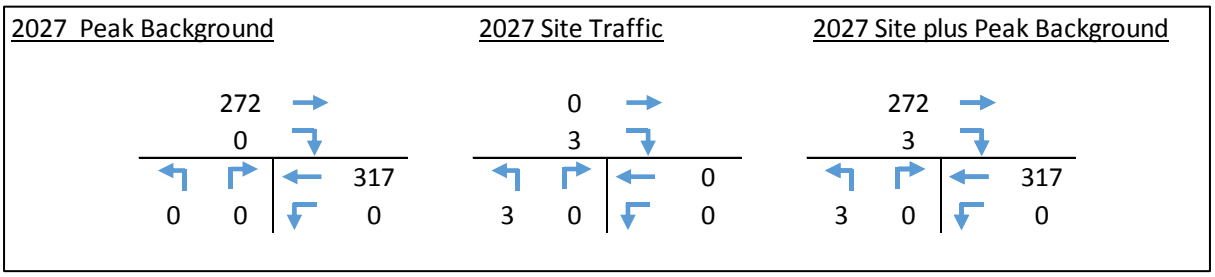


Figure 5 – Bruce Highway Peak

Based on Figure 4A-1 of the DTMR Road and planning Design Manual the required right turn treatment is a BAR as shown in Figure 6.

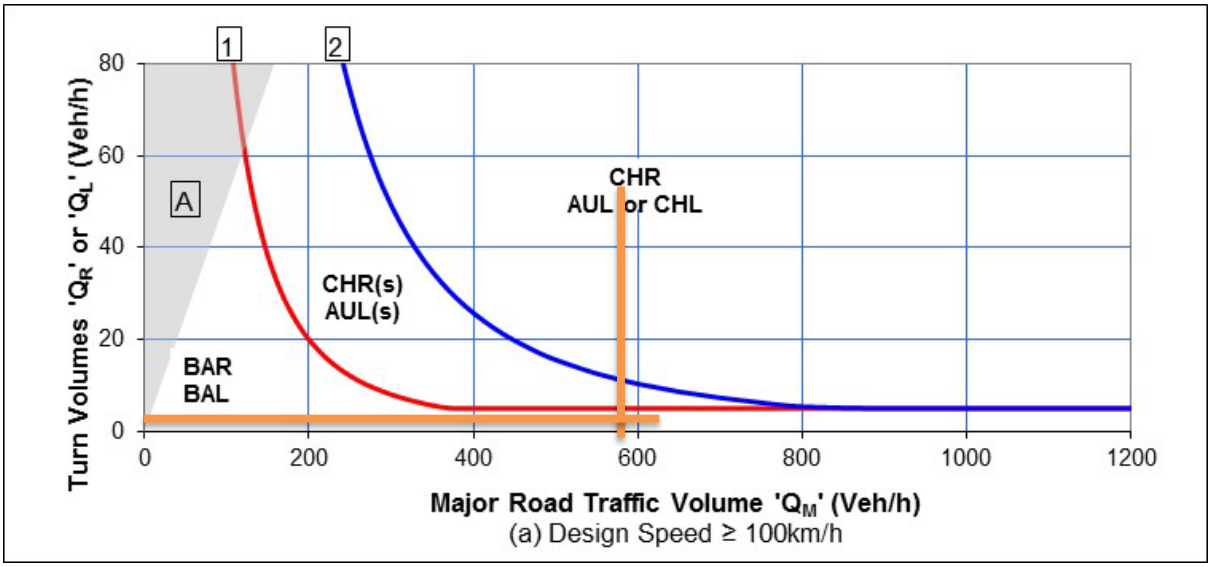


Figure 6 – Turn Warrants Assessment for staff arrivals

As a sensitivity analysis it can be seen from Figure 6 that the current intersection can accommodate up to 12 vph turning right (4 times the current volume), even as a CHR(s) with storage length for one design vehicle, although line marked as a CHR. It is therefore evident that there is excess capacity available in the existing right turn lane to turn in excess of 12 vph in the peak hour. 12vph (assuming 1 vph as a service vehicle) equates to an annual tonnage extracted of 1,098,000 Tpa.

Based on Figure 5 the current BAL can accommodate up to 7 vph without any upgrading (assuming the 1 service vph enters from the North). Without any further intersection upgrading the access could cater for a total extraction volume of 698,880 Tpa if all vehicles turned in from the right.

Bearing in mind that this analysis is conservative and not all the entering traffic will be turning from the right with the previously mentioned directional split of 50% to the North and 50% to the South. However it would seem reasonable to assume that any gravel supply contracts would be for supply to either the North or South that the site access in its current form would be limited by the lowest peak hour turn volume from either direction which would be the left turn. As such the current access form could provide for a total extraction volume of 698,880 Tpa.

If and when quantities exceed this amount the applicant should consider the construction a short left turn lane AUL(s) of 85m length including taper.

This will permit further production increases that should be assessed at a later date.

Yours sincerely

Chris Hewitt
Senior Civil Engineer
RPEQ NO. 5141

ATTACHMENT 1

DTMR Traffic Count Data

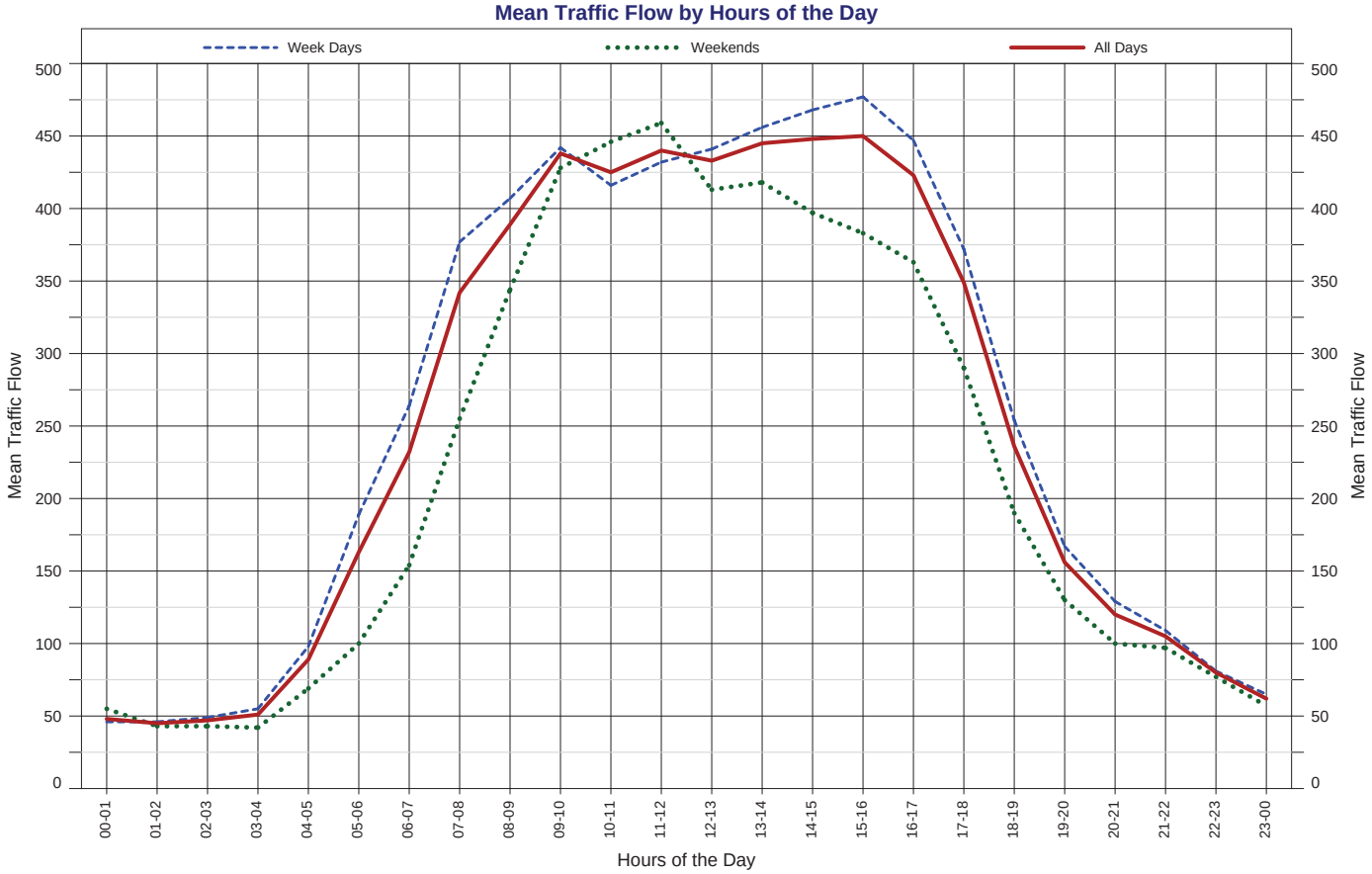
Traffic Analysis and Reporting System
Weekly Volume Report
Weeks 2016-W01 - 2016-W52 (52 weeks)

Area	404 - Fitzroy District
Road Section	10E - BRUCE HIGHWAY (BENARABY - ROCKHAMPTON)
Site	61551 - Bruce Hwy Mikros WiM Site (Bobs Ck)
Thru Dist	100.438
Type	C - Coverage
Stream	TB - Bi-directional traffic flow
Traffic Class	00 - All Vehicles
Weeks	2016-W01 - 2016-W52 (52 weeks)
Date Range	Monday 04-Jan-2016 - Sunday 01-Jan-2017

Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	52	52	52	52	52	52	52
Days Included	3	3	3	3	3	2	3
Calendar Events	5	2	0	0	1	1	3

Mean Traffic Flow by Hours of the Day



Hour	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Average Week Day		Average Weekend Day		Average Day	
00-01	31	0.6%	42	0.7%	49	0.8%	55	0.9%	53	0.7%	71	1.2%	38	0.8%	46	0.7%	55	1.0%	48	0.8%
01-02	26	0.5%	36	0.6%	54	0.9%	55	0.9%	61	0.8%	63	1.1%	23	0.5%	46	0.7%	43	0.8%	45	0.7%
02-03	27	0.5%	41	0.7%	52	0.9%	62	1.0%	64	0.9%	59	1.0%	26	0.5%	49	0.8%	43	0.8%	47	0.8%
03-04	39	0.7%	54	0.9%	60	1.0%	55	0.9%	68	0.9%	53	0.9%	31	0.6%	55	0.9%	42	0.8%	51	0.8%
04-05	69	1.2%	97	1.6%	98	1.6%	103	1.6%	121	1.7%	89	1.5%	48	1.0%	98	1.6%	69	1.3%	89	1.5%
05-06	129	2.3%	197	3.3%	199	3.3%	214	3.3%	204	2.8%	126	2.1%	74	1.6%	189	3.0%	100	1.9%	163	2.7%
06-07	181	3.2%	279	4.6%	287	4.7%	299	4.6%	272	3.7%	205	3.5%	103	2.2%	264	4.2%	154	2.9%	232	3.9%
07-08	242	4.3%	405	6.7%	410	6.7%	413	6.4%	413	5.7%	324	5.5%	186	3.9%	377	6.0%	255	4.8%	342	5.7%
08-09	323	5.7%	414	6.9%	415	6.8%	442	6.9%	439	6.0%	427	7.2%	261	5.5%	407	6.5%	344	6.4%	389	6.5%
09-10	373	6.6%	442	7.3%	453	7.4%	440	6.8%	500	6.9%	505	8.5%	350	7.3%	442	7.0%	428	8.0%	438	7.3%
10-11	415	7.4%	372	6.2%	404	6.6%	422	6.6%	468	6.4%	509	8.6%	382	8.0%	416	6.6%	446	8.3%	425	7.1%
11-12	465	8.3%	383	6.4%	384	6.3%	425	6.6%	503	6.9%	500	8.4%	417	8.7%	432	6.9%	459	8.6%	440	7.3%
12-13	472	8.4%	419	7.0%	401	6.6%	451	7.0%	463	6.4%	440	7.4%	385	8.1%	441	7.0%	413	7.7%	433	7.2%
13-14	490	8.7%	396	6.6%	426	7.0%	433	6.7%	537	7.4%	424	7.2%	411	8.6%	456	7.3%	418	7.8%	445	7.4%
14-15	459	8.2%	430	7.1%	440	7.2%	477	7.4%	534	7.4%	410	6.9%	384	8.0%	468	7.4%	397	7.4%	448	7.4%
15-16	485	8.6%	451	7.5%	423	7.0%	452	7.0%	575	7.9%	382	6.5%	384	8.0%	477	7.6%	383	7.2%	450	7.5%
16-17	384	6.8%	431	7.2%	413	6.8%	452	7.0%	553	7.6%	377	6.4%	349	7.3%	447	7.1%	363	6.8%	423	7.0%
17-18	324	5.8%	358	5.9%	348	5.7%	370	5.8%	461	6.3%	281	4.7%	299	6.3%	372	5.9%	290	5.4%	349	5.8%
18-19	234	4.2%	235	3.9%	226	3.7%	255	4.0%	319	4.4%	198	3.3%	182	3.8%	254	4.0%	190	3.5%	236	3.9%
19-20	156	2.8%	147	2.4%	161	2.6%	159	2.5%	211	2.9%	114	1.9%	145	3.0%	167	2.7%	130	2.4%	156	2.6%
20-21	104	1.8%	127	2.1%	134	2.2%	131	2.0%	147	2.0%	99	1.7%	101	2.1%	129	2.1%	100	1.9%	120	2.0%
21-22	85	1.5%	111	1.8%	102	1.7%	119	1.9%	128	1.8%	107	1.8%	86	1.8%	109	1.7%	97	1.8%	105	1.7%
22-23	69	1.2%	94	1.6%	80	1.3%	77	1.2%	85	1.2%	84	1.4%	69	1.4%	81	1.3%	77	1.4%	80	1.3%
23-24	42	0.7%	63	1.0%	65	1.1%	70	1.1%	83	1.1%	74	1.2%	40	0.8%	65	1.0%	57	1.1%	62	1.0%

Peaks	Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count	
AM	12:00	466	09:30	457	09:45	459	09:45	460	11:45	503	11:15	524	11:45	420	09:45	443	11:30	463	12:00	437
PM	14:00	490	15:45	463	15:30	442	15:15	485	16:15	586	14:15	442	14:15	413	16:00	477	14:15	427	16:00	449

12-Hour	4,666	83.0%	4,736	78.6%	4,743	78.0%	5,032	78.2%	5,765	79.4%	4,777	80.7%	3,990	83.6%	4,989	79.4%	4,386	81.9%	4,818	80.1%
16-Hour	5,192	92.3%	5,400	89.6%	5,427	89.2%	5,740	89.3%	6,523	89.8%	5,302	89.5%	4,425	92.7%	5,658	90.0%	4,867	90.9%	5,431	90.3%
18-Hour	5,303	94.3%	5,557	92.2%	5,572	91.6%	5,887	91.5%	6,691	92.1%	5,460	92.2%	4,534	95.0%	5,804	92.3%	5,001	93.4%	5,573	92.6%
24-Hour	5,624	100.0%	6,024	100.0%	6,084	100.0%	6,431	100.0%	7,262	100.0%	5,921	100.0%	4,774	100.0%	6,287	100.0%	5,353	100.0%	6,016	100.0%

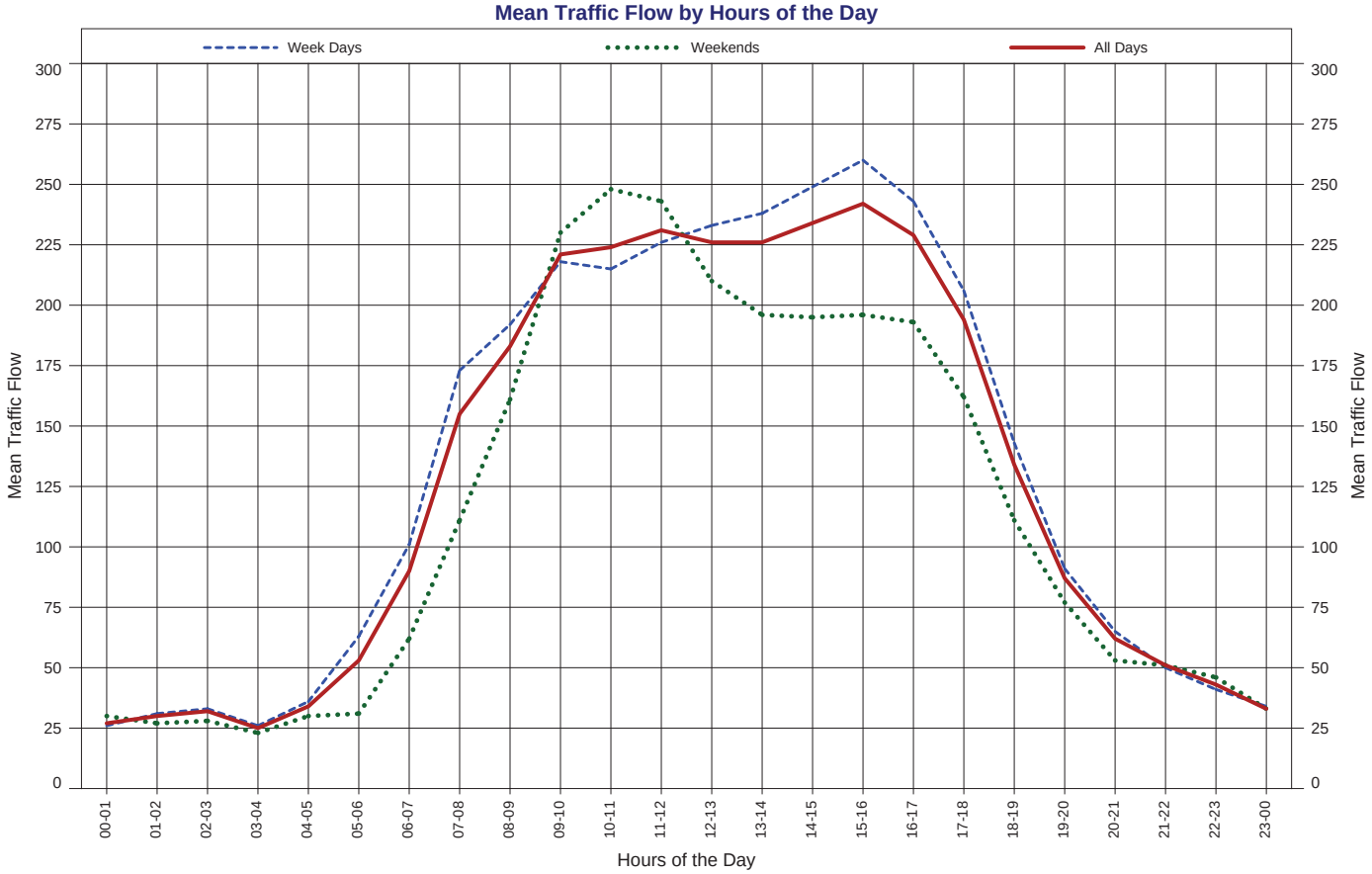
Avg Week Day		89.5%		95.8%		96.8%		102.3%		115.5%						100.0%		85.1%		95.7%
Avg Weekend Day												110.6%		89.2%		117.4%		100.0%		112.4%
Avg Day		93.5%		100.1%		101.1%		106.9%		120.7%		98.4%		79.4%		104.5%		89.0%		100.0%

Area	404 - Fitzroy District
Road Section	10E - BRUCE HIGHWAY (BENARABY - ROCKHAMPTON)
Site	61551 - Bruce Hwy Mikros WiM Site (Bobs Ck)
Thru Dist	100.438
Type	C - Coverage
Stream	TG - Thru traffic -in gazettal dirn
Traffic Class	00 - All Vehicles
Weeks	2016-W01 - 2016-W52 (52 weeks)
Date Range	Monday 04-Jan-2016 - Sunday 01-Jan-2017

Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	52	52	52	52	52	52	52
Days Included	3	3	3	3	3	2	3
Calendar Events	5	2	0	0	1	1	3

Mean Traffic Flow by Hours of the Day



Hour	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Average Week Day		Average Weekend Day		Average Day	
00-01	16	0.5%	29	0.9%	28	0.9%	28	0.9%	30	0.9%	39	1.3%	21	0.8%	26	0.8%	30	1.1%	27	0.9%
01-02	14	0.5%	23	0.7%	37	1.2%	39	1.2%	40	1.1%	42	1.4%	12	0.5%	31	1.0%	27	1.0%	30	1.0%
02-03	14	0.5%	28	0.9%	39	1.3%	43	1.4%	42	1.2%	39	1.3%	17	0.7%	33	1.0%	28	1.0%	32	1.0%
03-04	15	0.5%	22	0.7%	33	1.1%	24	0.8%	36	1.0%	30	1.0%	16	0.6%	26	0.8%	23	0.8%	25	0.8%
04-05	20	0.7%	30	1.0%	41	1.3%	44	1.4%	43	1.2%	40	1.3%	19	0.8%	36	1.1%	30	1.1%	34	1.1%
05-06	44	1.4%	65	2.1%	69	2.2%	69	2.2%	66	1.9%	42	1.4%	19	0.8%	63	2.0%	31	1.1%	53	1.7%
06-07	68	2.2%	105	3.4%	117	3.8%	116	3.7%	98	2.8%	80	2.7%	43	1.7%	101	3.2%	62	2.3%	90	2.9%
07-08	106	3.5%	192	6.2%	192	6.2%	188	5.9%	187	5.3%	158	5.3%	64	2.6%	173	5.4%	111	4.0%	155	5.1%
08-09	137	4.5%	210	6.7%	210	6.8%	194	6.1%	207	5.9%	209	7.0%	113	4.6%	192	6.0%	161	5.9%	183	6.0%
09-10	179	5.8%	224	7.2%	221	7.1%	222	7.0%	242	6.9%	277	9.2%	183	7.4%	218	6.8%	230	8.4%	221	7.2%
10-11	207	6.8%	197	6.3%	207	6.7%	228	7.2%	236	6.7%	277	9.2%	219	8.8%	215	6.7%	248	9.0%	224	7.3%
11-12	255	8.3%	212	6.8%	207	6.7%	210	6.6%	248	7.1%	254	8.5%	231	9.3%	226	7.1%	243	8.8%	231	7.5%
12-13	274	8.9%	215	6.9%	203	6.6%	228	7.2%	243	6.9%	221	7.4%	198	8.0%	233	7.3%	210	7.6%	226	7.4%
13-14	278	9.1%	211	6.8%	217	7.0%	215	6.8%	267	7.6%	192	6.4%	199	8.0%	238	7.5%	196	7.1%	226	7.4%
14-15	275	9.0%	228	7.3%	235	7.6%	245	7.7%	264	7.5%	199	6.6%	191	7.7%	249	7.8%	195	7.1%	234	7.6%
15-16	297	9.7%	248	8.0%	230	7.4%	250	7.9%	277	7.9%	194	6.5%	197	7.9%	260	8.1%	196	7.1%	242	7.9%
16-17	232	7.6%	255	8.2%	223	7.2%	238	7.5%	268	7.6%	190	6.3%	196	7.9%	243	7.6%	193	7.0%	229	7.5%
17-18	196	6.4%	214	6.9%	192	6.2%	205	6.5%	224	6.4%	152	5.1%	172	6.9%	206	6.5%	162	5.9%	194	6.3%
18-19	152	5.0%	131	4.2%	134	4.3%	128	4.0%	172	4.9%	107	3.6%	115	4.6%	143	4.5%	111	4.0%	134	4.4%
19-20	100	3.3%	82	2.6%	80	2.6%	81	2.6%	112	3.2%	62	2.1%	92	3.7%	91	2.8%	77	2.8%	87	2.8%
20-21	63	2.1%	64	2.1%	62	2.0%	60	1.9%	77	2.2%	49	1.6%	56	2.3%	65	2.0%	53	1.9%	62	2.0%
21-22	54	1.8%	51	1.6%	46	1.5%	48	1.5%	53	1.5%	56	1.9%	46	1.9%	50	1.6%	51	1.9%	51	1.7%
22-23	43	1.4%	47	1.5%	45	1.5%	32	1.0%	40	1.1%	48	1.6%	43	1.7%	41	1.3%	46	1.7%	43	1.4%
23-24	26	0.8%	31	1.0%	29	0.9%	38	1.2%	45	1.3%	45	1.5%	20	0.8%	34	1.1%	33	1.2%	33	1.1%

Peaks	Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count	
AM	12:00	255	09:30	234	10:15	222	10:30	245	11:15	250	10:45	283	12:00	231	11:45	229	11:15	249	11:45	232
PM	15:45	297	15:45	256	15:30	247	15:15	254	14:30	280	13:00	223	13:45	205	15:45	263	13:00	209	15:45	242

12-Hour	2,588	84.4%	2,537	81.5%	2,471	79.8%	2,551	80.4%	2,835	80.6%	2,430	80.9%	2,078	83.7%	2,596	81.3%	2,256	82.1%	2,499	81.5%
16-Hour	2,873	93.7%	2,839	91.2%	2,776	89.6%	2,856	90.0%	3,175	90.3%	2,677	89.2%	2,315	93.3%	2,903	90.9%	2,499	91.0%	2,789	91.0%
18-Hour	2,942	96.0%	2,917	93.7%	2,850	92.0%	2,926	92.2%	3,260	92.7%	2,770	92.3%	2,378	95.8%	2,978	93.3%	2,578	93.8%	2,865	93.4%
24-Hour	3,065	100.0%	3,114	100.0%	3,097	100.0%	3,173	100.0%	3,517	100.0%	3,002	100.0%	2,482	100.0%	3,193	100.0%	2,747	100.0%	3,066	100.0%

Avg Week Day		96.0%		97.5%		97.0%		99.4%		110.1%						100.0%		86.0%		96.0%
Avg Weekend Day												109.3%		90.4%		116.2%		100.0%		111.6%
Avg Day		100.0%		101.6%		101.0%		103.5%		114.7%		97.9%		81.0%		104.1%		89.6%		100.0%

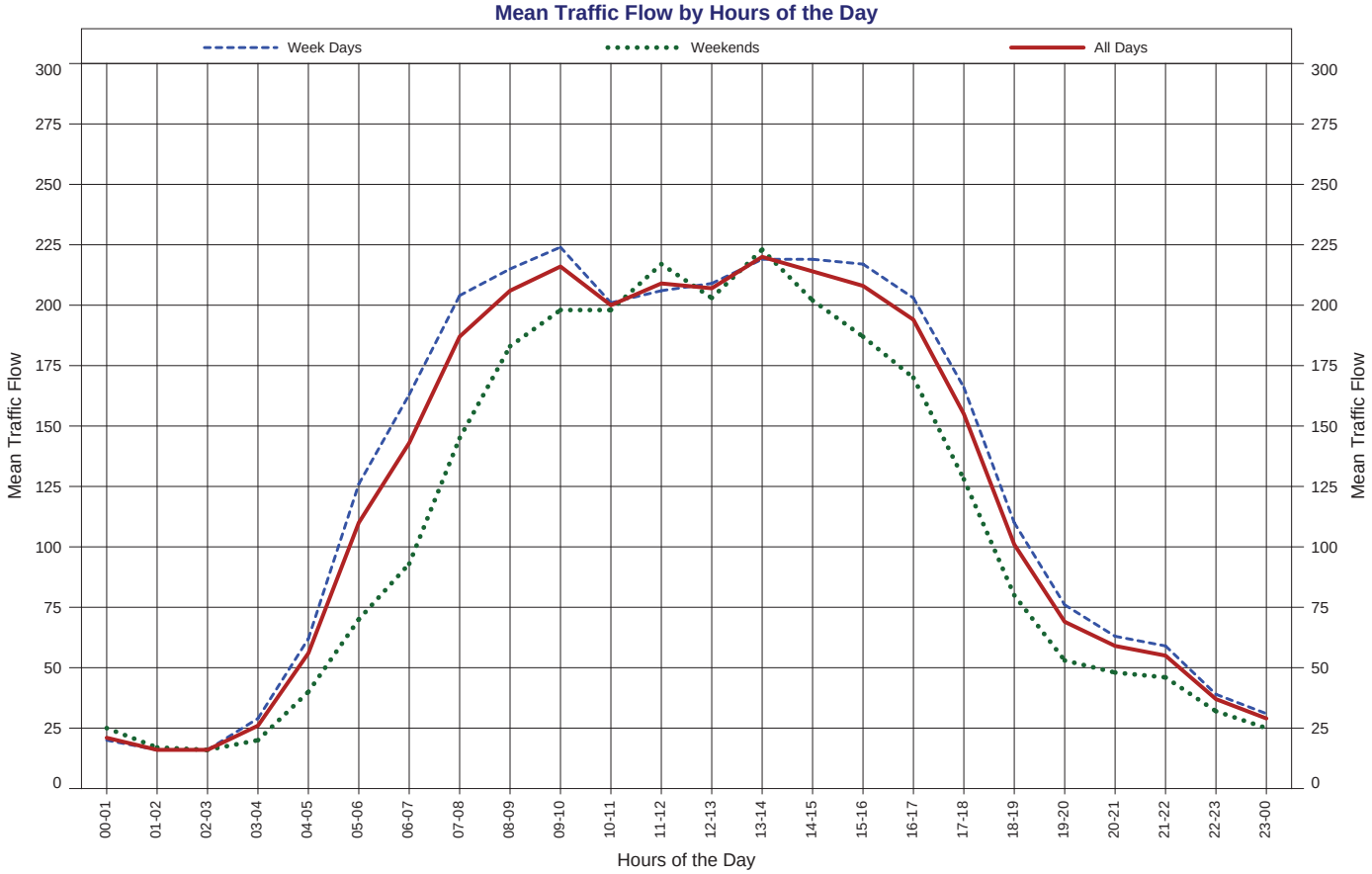
Traffic Analysis and Reporting System
Weekly Volume Report
Weeks 2016-W01 - 2016-W52 (52 weeks)

Area	404 - Fitzroy District
Road Section	10E - BRUCE HIGHWAY (BENARABY - ROCKHAMPTON)
Site	61551 - Bruce Hwy Mikros WiM Site (Bobs Ck)
Thru Dist	100.438
Type	C - Coverage
Stream	TA - Thru traffic -against gazettal
Traffic Class	00 - All Vehicles
Weeks	2016-W01 - 2016-W52 (52 weeks)
Date Range	Monday 04-Jan-2016 - Sunday 01-Jan-2017

Data Profile

	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	Sundays
Days in Date Range	52	52	52	52	52	52	52
Days Included	3	3	3	3	3	2	3
Calendar Events	5	2	0	0	1	1	3

Mean Traffic Flow by Hours of the Day



Hour	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Average Week Day		Average Weekend Day		Average Day	
00-01	15	0.6%	14	0.5%	21	0.7%	27	0.8%	24	0.6%	32	1.1%	17	0.7%	20	0.6%	25	1.0%	21	0.7%
01-02	13	0.5%	13	0.4%	17	0.6%	16	0.5%	20	0.5%	22	0.8%	11	0.5%	16	0.5%	17	0.6%	16	0.5%
02-03	13	0.5%	13	0.4%	14	0.5%	19	0.6%	22	0.6%	21	0.7%	10	0.4%	16	0.5%	16	0.6%	16	0.5%
03-04	24	0.9%	32	1.1%	27	0.9%	31	1.0%	32	0.9%	24	0.8%	15	0.7%	29	0.9%	20	0.8%	26	0.9%
04-05	49	1.9%	67	2.3%	58	1.9%	59	1.8%	78	2.1%	50	1.7%	29	1.3%	62	2.0%	40	1.5%	56	1.9%
05-06	85	3.3%	132	4.5%	130	4.4%	145	4.4%	138	3.7%	84	2.9%	55	2.4%	126	4.1%	70	2.7%	110	3.7%
06-07	114	4.4%	173	5.9%	170	5.7%	184	5.6%	175	4.7%	125	4.3%	60	2.6%	163	5.3%	93	3.6%	143	4.8%
07-08	136	5.3%	213	7.3%	218	7.3%	226	6.9%	226	6.0%	167	5.7%	123	5.4%	204	6.6%	145	5.5%	187	6.3%
08-09	186	7.3%	204	7.0%	205	6.9%	248	7.6%	232	6.2%	218	7.5%	148	6.4%	215	7.0%	183	7.0%	206	7.0%
09-10	194	7.6%	218	7.5%	232	7.8%	218	6.7%	258	6.9%	228	7.8%	167	7.3%	224	7.2%	198	7.6%	216	7.3%
10-11	208	8.1%	175	6.0%	197	6.6%	194	6.0%	232	6.2%	232	7.9%	163	7.1%	201	6.5%	198	7.6%	200	6.8%
11-12	210	8.2%	171	5.9%	176	5.9%	216	6.6%	255	6.8%	247	8.4%	186	8.1%	206	6.7%	217	8.3%	209	7.1%
12-13	198	7.7%	204	7.0%	197	6.6%	223	6.8%	221	5.9%	219	7.5%	187	8.1%	209	6.8%	203	7.8%	207	7.0%
13-14	212	8.3%	184	6.3%	210	7.0%	217	6.7%	270	7.2%	233	8.0%	212	9.2%	219	7.1%	223	8.5%	220	7.4%
14-15	185	7.2%	201	6.9%	205	6.9%	232	7.1%	270	7.2%	211	7.2%	193	8.4%	219	7.1%	202	7.7%	214	7.2%
15-16	188	7.3%	203	7.0%	193	6.5%	202	6.2%	298	8.0%	188	6.4%	186	8.1%	217	7.0%	187	7.1%	208	7.0%
16-17	152	5.9%	176	6.1%	190	6.4%	214	6.6%	285	7.6%	187	6.4%	153	6.7%	203	6.6%	170	6.5%	194	6.6%
17-18	128	5.0%	144	5.0%	156	5.2%	165	5.1%	237	6.3%	129	4.4%	127	5.5%	166	5.4%	128	4.9%	155	5.2%
18-19	82	3.2%	104	3.6%	92	3.1%	126	3.9%	147	3.9%	91	3.1%	68	3.0%	110	3.6%	80	3.1%	101	3.4%
19-20	57	2.2%	65	2.2%	82	2.7%	78	2.4%	99	2.6%	52	1.8%	53	2.3%	76	2.5%	53	2.0%	69	2.3%
20-21	41	1.6%	63	2.2%	71	2.4%	71	2.2%	70	1.9%	50	1.7%	45	2.0%	63	2.0%	48	1.8%	59	2.0%
21-22	32	1.2%	60	2.1%	56	1.9%	71	2.2%	75	2.0%	51	1.7%	40	1.7%	59	1.9%	46	1.8%	55	1.9%
22-23	26	1.0%	47	1.6%	35	1.2%	44	1.4%	45	1.2%	36	1.2%	27	1.2%	39	1.3%	32	1.2%	37	1.3%
23-24	16	0.6%	32	1.1%	35	1.2%	33	1.0%	38	1.0%	29	1.0%	20	0.9%	31	1.0%	25	1.0%	29	1.0%

Peaks	Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count		Hour End & Count	
AM	11:30	210	09:30	223	09:45	244	09:15	253	09:30	258	11:30	249	11:45	190	09:30	232	11:45	216	09:30	221
PM	14:00	212	15:30	208	13:30	216	14:30	232	16:45	318	14:15	240	14:15	216	13:30	219	14:15	228	14:15	220

12-Hour	2,079	81.1%	2,197	75.6%	2,271	76.0%	2,481	76.1%	2,931	78.2%	2,350	80.3%	1,913	83.4%	2,393	77.4%	2,134	81.5%	2,317	78.4%
16-Hour	2,323	90.6%	2,558	88.0%	2,650	88.7%	2,885	88.5%	3,350	89.4%	2,628	89.8%	2,111	92.0%	2,754	89.0%	2,374	90.6%	2,643	89.5%
18-Hour	2,365	92.2%	2,637	90.7%	2,720	91.1%	2,962	90.9%	3,433	91.6%	2,693	92.0%	2,158	94.0%	2,824	91.3%	2,431	92.8%	2,709	91.7%
24-Hour	2,564	100.0%	2,908	100.0%	2,987	100.0%	3,259	100.0%	3,747	100.0%	2,926	100.0%	2,295	100.0%	3,093	100.0%	2,619	100.0%	2,954	100.0%

Avg Week Day		82.9%		94.0%		96.6%		105.4%		121.1%						100.0%		84.7%		95.5%
Avg Weekend Day												111.7%		87.6%		118.1%		100.0%		112.8%
Avg Day		86.8%		98.4%		101.1%		110.3%		126.8%		99.1%		77.7%		104.7%		88.7%		100.0%

Appendix D – Hopkins Brothers Quarry Conditions of Approval

Queensland Government

Department of
State Development, Manufacturing, Infrastructure and Planning

Our reference: SDA-0917-041388
Your reference: D/79-2017

9 October 2018

The Chief Executive Officer
Rockhampton Regional Council
PO Box 1860
Rockhampton QLD 4700
enquiries@rrc.qld.gov.au

Attention: Mr. Thomas Gardiner

Dear Mr. Gardiner

SARA concurrence agency response— 59793 Bruce Highway, Midgee
(Given under section 285 of the *Sustainable Planning Act 2009*)

The referral agency material for the development application described below was received by the Department of State Development, Manufacturing, Infrastructure and Planning (the department) under section 272 of the *Sustainable Planning Act 2009* on 6 September 2017.

Referral triggers

The development application was referred to the department under the following provisions of the Sustainable Planning Regulation 2009:

Referral trigger	Schedule 7, Table 3, Item 1—State-controlled road
	Schedule 7, Table 3, Item 2—State transport infrastructure
	Schedule 7, Table 3, Item 10—Clearing vegetation

Response

Date of response:	9 October 2018
Response details:	Concurrence agency response – with conditions
Development details:	Development permit for a material change of use for an extractive industry, medium impact industry and a warehouse
Conditions:	The conditions set out in Attachment 1 must be attached to any development approval.

Location details

Street address:	59793 Bruce Highway, Midgee QLD 4702

Development Assessment Advisory Team
Level 13, 1 William Street
Brisbane QLD 4000
PO Box 15009, City East QLD 4002

Real property description:	Lot 2 on RP888747
Local government area:	Rockhampton Regional Council

Applicant details

Applicant name:	Hopeman Pty Ltd C/- Gideon Town Planning
Applicant contact details:	PO Box 450 Rockhampton QLD 4700 gg@gideontownplanning.com.au

A copy of this response has been sent to the applicant for their information.

For further information, please contact Duncan Livingstone Principal Planning Officer, on 07 3452 7180 or via email at DAAT@dsdmip.qld.gov.au who will be pleased to assist.

Yours sincerely

Steve Conner
Executive Director – Planning Group

cc: Hopeman Pty Ltd, gg@gideontownplanning.com.au

enc: Attachment 1—Concurrence agency conditions
Attachment 2 – Advice to the applicant
Attachment 3—Reasons for concurrence agency response
Attachment 4—Approved plan and specifications

Our reference: SDA-0917-041388
Your reference: D/79-2017

Attachment 1—Concurrence agency conditions

No.	Conditions	Condition timing
Material change of use		
State-controlled road and State transport infrastructure—Pursuant to section 255D of the *Sustainable Planning Act 2009*, the chief executive administering the Act nominates the Director-General of the Department of Transport and Main Roads to be the assessing authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following conditions:		
1.	(a) The road access location is to be located at the existing access to the state-controlled road (Bruce Highway) at Latitude: -23.48816; Longitude: 150.54108; Datum: GDA94 (b) Road access works comprising a short Auxiliary Left turn (AUL(S)) must be provided at the road access location (c) The road access works must be designed and constructed in accordance with the following: • Road Planning and Design Manual, prepared by Department of Transport and Main Roads (2nd edition); and • Manual of Uniform Traffic Control Devices (Queensland), prepared by Department of Transport and Main Roads.	(a) At all times (b) and (c) Prior to when the quantity of hauled material leaving the site via the Bruce Highway exceeds 700,000 tonnes in any twelve-month period
2.	(a) Stormwater management of the development must ensure no worsening or actionable nuisance to the state-controlled road. (b) Any works on the land must not: (i) create any new discharge points for stormwater runoff onto the state-controlled road; (ii) interfere with and/or cause damage to the existing stormwater drainage on the state-controlled road; (iii) surcharge any existing culvert or drain on the state-controlled road; (iv) reduce the quality of stormwater discharge onto the state-controlled road. (c) RPEQ certification with supporting documentation must be provided to the Manager of Planning Projects & Corridor Management at CorridorManagement@tmr.qld.gov.au within the Department of Transport and Main Roads, confirming that the development has been constructed in accordance with part (a) and (b) of this condition.	(a) and (b) At all times (c) Prior to the commencement of use
3.	(a) Pay a monetary contribution to the Fitzroy District / Central Queensland Region of the Department of Transport and Main Roads towards protecting or maintaining the safety or efficiency of the Bruce Highway in accordance with section 666(2) of the *Sustainable Planning Act 2009* to be used for any pavement damage as a result of the development. The amount of contribution:	(a) Within 30 days of the end of June each year until the transportation of material hauled from the site by road

<table>
<tr><th>No.</th><th>Conditions</th><th>Condition timing</th></tr>
<tr><td></td><td>
i. Must be calculated at twelve monthly intervals commencing on the first day that material hauled under this approval is transported from the site by road as detailed in Table 1 below; and
ii. Is to be indexed based on the Road and Bridge Construction Index, Queensland – Class 3101, published quarterly by the Australian Bureau of Statistics (ABS Cat No. 6427, Series ID A2333727L) to the date of payment.

<u>Table 1:</u>
<table>
<tr><th>Material Hauled – tonnes/year</th><th>Contribution – cents/tonne</th></tr>
<tr><td>1 - 360,000</td><td>Nil</td></tr>
<tr><td>360,001 – 400,000</td><td>0.80</td></tr>
<tr><td>400,001 - 410,000</td><td>1.37</td></tr>
<tr><td>410,001 - 420,000</td><td>1.90</td></tr>
<tr><td>420,001 - 430,000</td><td>2.55</td></tr>
<tr><td>430,001 - 440,000</td><td>3.93</td></tr>
<tr><td>440,001 - 450,000</td><td>5.16</td></tr>
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<tr><td>950,001 – 1,000,000</td><td>13.64</td></tr>
</table>
</td><td>under this approval ceases</td></tr>
</table>

No.	Conditions	Condition timing
	(b) Maintain records which document the quantity of material hauled on the state-controlled road network and submit these records to the Department of Transport and Main Roads via email to FitzroyDistrict@tmr.qld.gov.au at the time of payment referenced in part (a) of this condition.	(b) As indicated
Clearing native vegetation—Pursuant to section 255D of the *Sustainable Planning Act 2009*, the chief executive administering the Act nominates the Director-General of the Department of Natural Resources, Mines and Energy to be the assessing authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following conditions:		
4.	The clearing of vegetation under this development approval is limited to the area identified as: (a) Area A (Parts A^1 - A^2) as shown on the attached Technical Agency Response Plan – TARP SDA-0917-041388, Sheet 1 of 1, dated 30 August 2018 (b) Derived reference points for GPS coordinates listed in attachment to Technical Agency Response Plan – TARP SDA-0917-041388, dated 30 August 2018.	At all times

Our reference: SDA-0917-041388
Your reference: D/79-2017

Attachment 2— Advice to the applicant

General advice	
1.	Under sections 62 and 33 of the *Transport Infrastructure Act 1994*, written approval is required from the Department of Transport and Main Roads to carry out road works that are road access works (including driveways) on a state-controlled road. Please contact the Department of Transport and Main Roads (Fitzroy District / Central Queensland Region) on (07) 4931 1500 or at FitzroyDistrict@tmr.qld.gov.au to make an application for road works approval. This approval must be obtained prior to commencing any works on the state-controlled road reserve. The approval process may require the approval of engineering designs of the proposed works, certified by a Registered Professional Engineer of Queensland (RPEQ).

Our reference: SDA-0917-041388
Your reference: D/79-2017

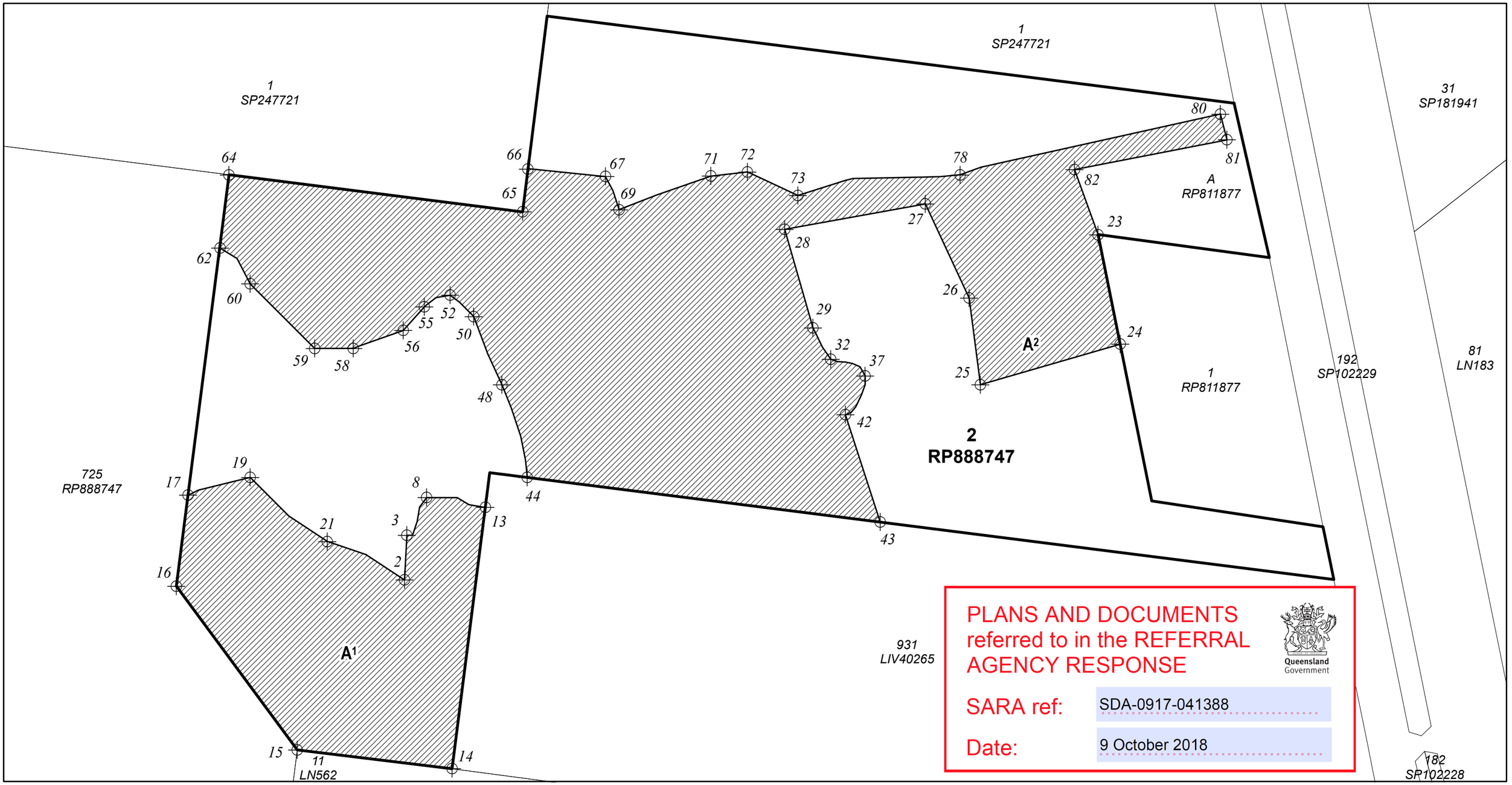
Attachment 3—Reasons for concurrence agency response

Reasons for the department's response:

- To ensure the road access location to the state-controlled road from the site does not compromise the safety and efficiency of the state-controlled road.
- To ensure the design of any road access maintains the safety and efficiency of the state-controlled road.
- To offset the impacts of the development on the safety and efficiency of the state-controlled road.
- To ensure that the impacts of stormwater events associated with development are minimised and managed to avoid creating any adverse impacts on the state-transport corridor.
- To ensure the clearing works are carried out in the location and to the extent specified on the approved plan.

Our reference: SDA-0917-041388
Your reference: D/79-2017

Attachment 4—Approved plan and specifications



PLANS AND DOCUMENTS referred to in the REFERRAL AGENCY RESPONSE

Queensland Government

SARA ref: SDA-0917-041388

Date: 9 October 2018

1:5000 @ A3 size

0 100 200 300 400 500 m

Projection: UTM (MGA Zone 56) Datum: GDA94

Note: Derived Reference Points are provided to assist in the location of area boundaries. Responsibility for locating these boundaries lies solely with the landholder and delegated contractor(s).

The property boundaries shown on this plan are APPROXIMATE ONLY. They are NOT an accurate representation of the legal boundaries.

Note: This plan must be read in conjunction with the Decision Notice SDA-0917-041388

LEGEND

8 Derived Reference Points for GPS (see attachment)

Subject Lot(s)

Area A

Note: This is a colour plan and should only be reproduced in colour.

Technical Agency Response Plan

Plan of Area A (Parts A¹ - A²) in Lot 2 on RP888747

eLVAS Case ID: 2017/004780

N

Version: 1

Queensland Government

CENTRE: MACKAY **LOCALITY OF MIDGEE**	**REGION: CENTRAL** **LOCAL GOVT: ROCKHAMPTON**
Map Reference: 9051	Compiled from: DCDB, PVMP & Assessment Notes
File Reference:	Prepared by: MAT Date: 30 August 2018

TARP
SDA-0917-041388
Sheet 1 of 1

Attachment to Plan: SDA-0917-041388
Derived Reference Points for GPS

Datum: GDA 1994, Projection: Transverse Mercator MGA Zone 56

Notes: Derived Reference Points are provided to assist in the location of area boundaries only.
Responsibility for locating these boundaries lies solely with the landholder and delegated contractor(s).
Coordinates start at a point indicated on the accompanying plan and proceed in a clockwise direction.

Parcel	ID	Easting	Northing
A1	1	247649	7399715
A1	2	247701	7399680
A1	3	247704	7399741
A1	4	247712	7399741
A1	5	247713	7399746
A1	6	247718	7399760
A1	7	247721	7399779
A1	8	247731	7399792
A1	9	247742	7399792
A1	10	247743	7399792
A1	11	247772	7399792
A1	12	247788	7399782
A1	13	247810	7399778
A1	14	247765	7399426
A1	15	247556	7399451
A1	16	247393	7399672
A1	17	247409	7399794
A1	18	247423	7399801
A1	19	247493	7399819
A1	20	247545	7399767
A1	21	247597	7399732
A1	22	247649	7399715
A2	23	248637	7400146
A2	24	248667	7399998
A2	25	248479	7399944
A2	26	248463	7400060
A2	27	248404	7400188
A2	28	248214	7400153
A2	29	248252	7400020
A2	30	248257	7400010
A2	31	248265	7399994
A2	32	248276	7399978
A2	33	248285	7399975
A2	34	248296	7399974
A2	35	248306	7399972
A2	36	248316	7399968
A2	37	248323	7399956
A2	38	248323	7399944
A2	39	248318	7399930
A2	40	248310	7399914
A2	41	248304	7399907
A2	42	248296	7399903
A2	43	248343	7399758
A2	44	247867	7399819
A2	45	247864	7399842
A2	46	247858	7399874
A2	47	247845	7399912
A2	48	247832	7399944
A2	49	247813	7399985
A2	50	247794	7400036
A2	51	247775	7400055
A2	52	247762	7400065
A2	53	247743	7400062
A2	54	247730	7400050
A2	55	247727	7400049
A2	56	247699	7400017
A2	57	247641	7399996
A2	58	247631	7399993
A2	59	247579	7399993
A2	60	247493	7400079

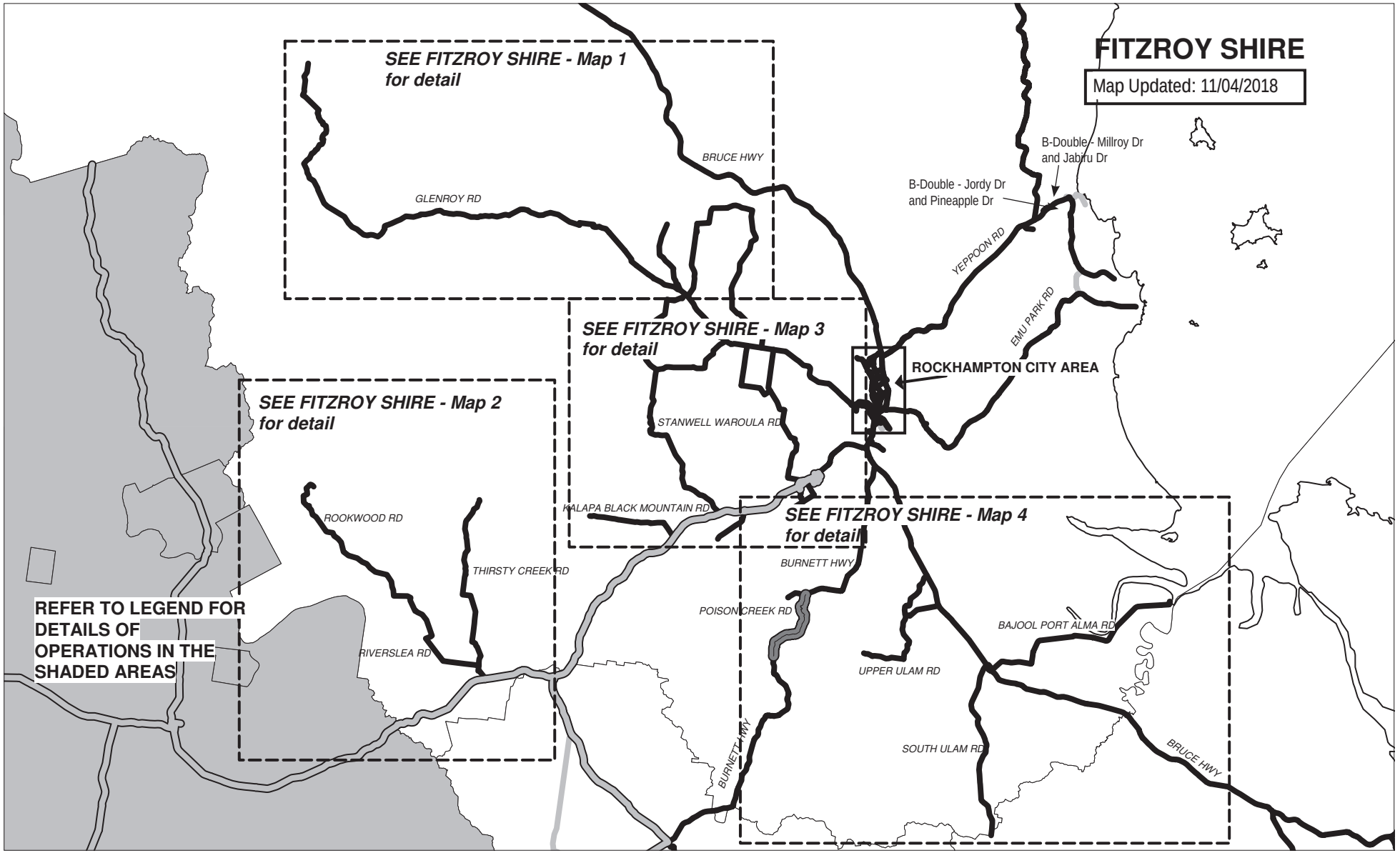
Parcel	ID	Easting	Northing
A2	61	247475	7400114
A2	62	247452	7400128
A2	63	247451	7400128
A2	64	247464	7400227
A2	65	247860	7400177
A2	66	247868	7400235
A2	67	247972	7400224
A2	68	247982	7400206
A2	69	247991	7400180
A2	70	248042	7400200
A2	71	248114	7400225
A2	72	248164	7400231
A2	73	248232	7400199
A2	74	248296	7400220
A2	75	248306	7400222
A2	76	248401	7400224
A2	77	248425	7400224
A2	78	248451	7400227
A2	79	248479	7400237
A2	80	248802	7400309
A2	81	248811	7400274
A2	82	248605	7400234
A2	83	248637	7400146

Parcel	ID	Easting	Northing

Appendix E – TMR MCV Mapping

MULTI-COMBINATION ROUTES IN QUEENSLAND

Queensland Government



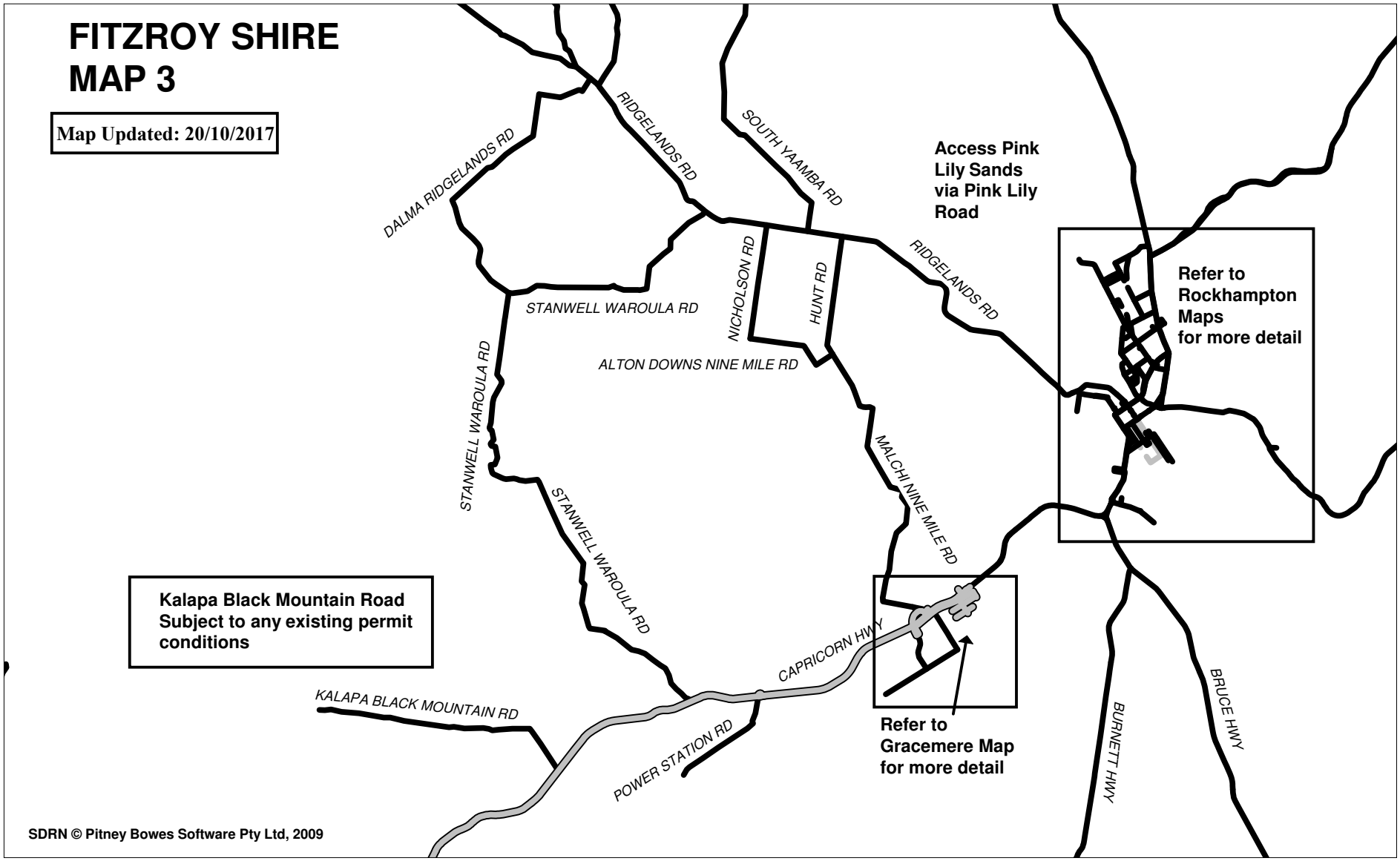
B-DOUBLES	ROAD TRAINS	NO ROAD TRAINS or B-DOUBLES
23 metre routes	Type 1 routes	
23 & 25 metre routes	Type 1 & 2 routes	

REFER TO LEGEND FOR DETAILS OF OPERATIONS IN THE SHADED AREAS
Note: 23 & 25 metre B-doubles can access Type 1 & 2 road train routes

Queensland Government

FITZROY SHIRE MAP 3

Map Updated: 20/10/2017



B-DOUBLES	ROAD TRAINS	NO ROAD TRAINS or B-DOUBLES
23 metre routes	Type 1 routes	
23 & 25 metre routes	Type 1 & 2 routes	

REFER TO LEGEND FOR DETAILS OF OPERATIONS IN THE SHADED AREAS
Note: 23 & 25 metre B-doubles can access Type 1 & 2 road train routes

Appendix F – TMR Traffic Data (AADT)

Traffic Analysis and Reporting System

AADT Segment Analysis Report (Complete)

Road Section 10E - BRUCE HIGHWAY (BENARABY - ROCKHAMPTON)

Traffic Year 2018

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	11.445 km	60127	10.400 km	Bruce Hwy 40m N Ginger Beer Ck(Calliope)	2,681	2,776	5,457	11.19968	11.59653	22.79621	2018	2
404	11.445 km	45.420 km	60006	18.105 km	Bruce Hwy 100m S of Calliope River	2,483	2,373	4,856	30.79137	29.42728	60.21865	2018	3
404	45.420 km	85.308 km	60023	53.490 km	Bruce Hwy 100m Sth Hut Ck (Ambrose)	2,841	2,842	5,683	41.36246	41.37702	82.73948	2018	4
404	85.308 km	108.938 km	61551	100.438 km	Bruce Hwy Mikros WiM Site 400m N Bobs Ck	3,478	3,524	7,002	29.99758	30.39432	60.39190	2018	5
404	108.938 km	114.388 km	60130	111.494 km	Bruce Hwy 100m Nth Gavial Ck	3,062	3,067	6,129	6.09108	6.10103	12.19211	2018	6
404	114.388 km	116.961 km	60024	114.500 km	Bruce Hwy 30m North Scrubby Ck	4,798	4,412	9,210	4.50602	4.14351	8.64953	2018	7
404	116.961 km	119.737 km	60868	118.341 km	Bruce Hwy100m N Owald St(Lower Dawson R)	10,103	10,110	20,213	10.23676	10.24386	20.48062	2018	8
404	119.737 km	121.051 km	61086	120.225 km	Bruce Hwy(Gladstone Rd) @ Derby St	10,566	10,346	20,912	5.06756	4.96205	10.02960	2018	9
								Totals	139.25251	138.24559	277.49810		

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	11.445 km	60127	10.400 km	Bruce Hwy 40m N Ginger Beer Ck(Calliope)	650	24.24%	774	27.88%	1,424	26.09%	2.71533	3.23333	5.94865	2018	2
404	11.445 km	45.420 km	60006	18.105 km	Bruce Hwy 100m S of Calliope River	655	26.38%	587	24.74%	1,242	25.58%	8.12257	7.27931	15.40189	2018	3
404	45.420 km	85.308 km	60023	53.490 km	Bruce Hwy 100m Sth Hut Ck (Ambrose)	616	21.68%	677	23.82%	1,293	22.75%	8.96842	9.85652	18.82494	2018	4
404	85.308 km	108.938 km	61551	100.438 km	Bruce Hwy Mikros WiM Site 400m N Bobs Ck	985	28.32%	921	26.14%	1,906	27.22%	8.49558	7.94358	16.43915	2018	5
404	108.938 km	114.388 km	60130	111.494 km	Bruce Hwy 100m Nth Gavial Ck	764	24.95%	830	27.06%	1,594	26.01%	1.51979	1.65108	3.17086	2018	6
404	114.388 km	116.961 km	60024	114.500 km	Bruce Hwy 30m North Scrubby Ck	742	15.46%	927	21.01%	1,669	18.12%	0.69685	0.87059	1.56743	2018	7
404	116.961 km	119.737 km	60868	118.341 km	Bruce Hwy100m N Owald St(Lower Dawson R)	2,075	20.54%	1,708	16.89%	3,783	18.72%	2.10247	1.73061	3.83309	2018	8
404	119.737 km	121.051 km	61086	120.225 km	Bruce Hwy(Gladstone Rd) @ Derby St	1,228	11.62%	1,496	14.46%	2,724	13.03%	0.58896	0.71750	1.30646	2018	9
											Totals	33.20996	33.28252	66.49248		

Site 60023. Point 260000046. Hut Ck (Nth Ambrose)on Bruce Hwy.
53.49 km

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

45.42 km
Start Point 260000015. Bruce Hwy to R'ton @ G'stone-Mt.Larcom Rd.

85.31 km
End Point 260000047. Bruce Hwy to Marmor @ Bajool-Port Alma.

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	4.14%	0.34%	0.14%
A	-3.99%	-0.70%	0.20%
B	-0.09%	-0.20%	0.16%

All Vehicles (00)

G	2,841	100%
A	2,842	100%
B	5,683	100%

Light Vehicles (0A)

G	2,225	78.32%
A	2,166	76.21%
B	4,391	77.27%

Heavy Vehicles (0B)

G	616	21.68%
A	677	23.82%
B	1,293	22.75%

Short Vehicles (1A)

G	2,225	78.32%
A	2,166	76.21%
B	4,391	77.27%

Trucks and Buses (1B)

G	184	6.48%
A	198	6.97%
B	382	6.72%

Articulated Vehicles (1C)

G	188	6.62%
A	207	7.28%
B	395	6.95%

Road Trains (1D)

G	244	8.59%
A	272	9.57%
B	516	9.08%

Short 2-Axle Vehicles (2A)

G	1,986	69.90%
A	1,976	69.53%
B	3,962	69.72%

Short Vehicles Towing (2B)

G	239	8.41%
A	190	6.69%
B	429	7.55%

2-Axle Trucks and Buses (2C)

G	138	4.86%
A	152	5.35%
B	290	5.10%

3-Axle Trucks and Buses (2D)

G	36	1.27%
A	37	1.30%
B	73	1.28%

4-Axle Trucks (2E)

G	10	0.35%
A	9	0.32%
B	19	0.33%

3-Axle Articulated (2F)

G	11	0.39%
A	12	0.42%
B	23	0.40%

4-Axle Articulated (2G)

G	24	0.84%
A	22	0.77%
B	46	0.81%

5-Axle Articulated (2H)

G	29	1.02%
A	30	1.06%
B	59	1.04%

6-Axle Articulated (2I)

G	124	4.36%
A	143	5.03%
B	267	4.70%

B Double (2J)

G	241	8.48%
A	269	9.47%
B	510	8.97%

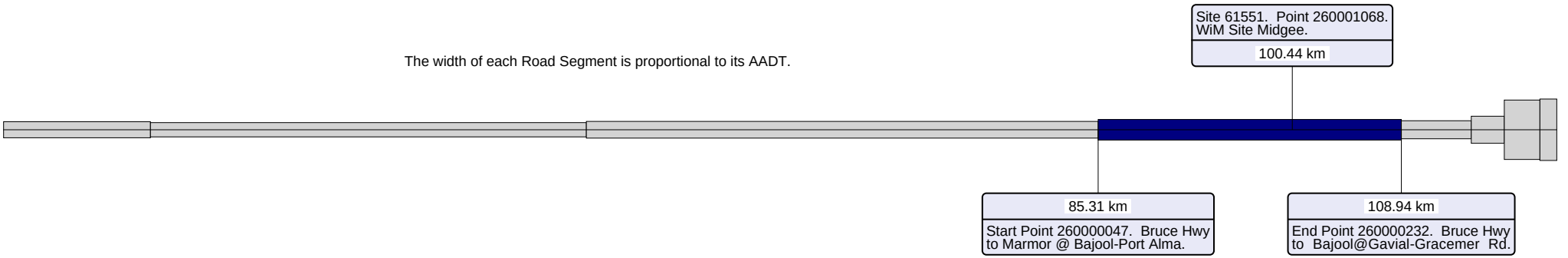
Double Road Trains (2K)

G	3	0.11%
A	3	0.11%
B	6	0.11%

Triple Road Trains (2L)

G	0	0%
A	0	0%
B	0	0%

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	13.66%	2.59%	2.26%
A	10.99%	3.59%	2.41%
B	12.30%	3.08%	2.33%

All Vehicles (00)

G	3,478	100%
A	3,524	100%
B	7,002	100%

Light Vehicles (0A)

G	2,493	71.68%
A	2,602	73.84%
B	5,095	72.76%

Heavy Vehicles (0B)

G	985	28.32%
A	921	26.14%
B	1,906	27.22%

Short Vehicles (1A)

G	2,493	71.68%
A	2,602	73.84%
B	5,095	72.76%

Trucks and Buses (1B)

G	396	11.39%
A	326	9.25%
B	722	10.31%

Articulated Vehicles (1C)

G	256	7.36%
A	256	7.26%
B	512	7.31%

Road Trains (1D)

G	333	9.57%
A	339	9.62%
B	672	9.60%

Short 2-Axle Vehicles (2A)

G	2,326	66.88%
A	2,435	69.10%
B	4,761	67.99%

Short Vehicles Towing (2B)

G	167	4.80%
A	167	4.74%
B	334	4.77%

2-Axle Trucks and Buses (2C)

G	296	8.51%
A	226	6.41%
B	522	7.46%

3-Axle Trucks and Buses (2D)

G	88	2.53%
A	86	2.44%
B	174	2.49%

4-Axle Trucks (2E)

G	12	0.35%
A	14	0.40%
B	26	0.37%

3-Axle Articulated (2F)

G	15	0.43%
A	12	0.34%
B	27	0.39%

4-Axle Articulated (2G)

G	30	0.86%
A	24	0.68%
B	54	0.77%

5-Axle Articulated (2H)

G	34	0.98%
A	35	0.99%
B	69	0.99%

6-Axle Articulated (2I)

G	177	5.09%
A	185	5.25%
B	362	5.17%

B Double (2J)

G	330	9.49%
A	335	9.51%
B	665	9.50%

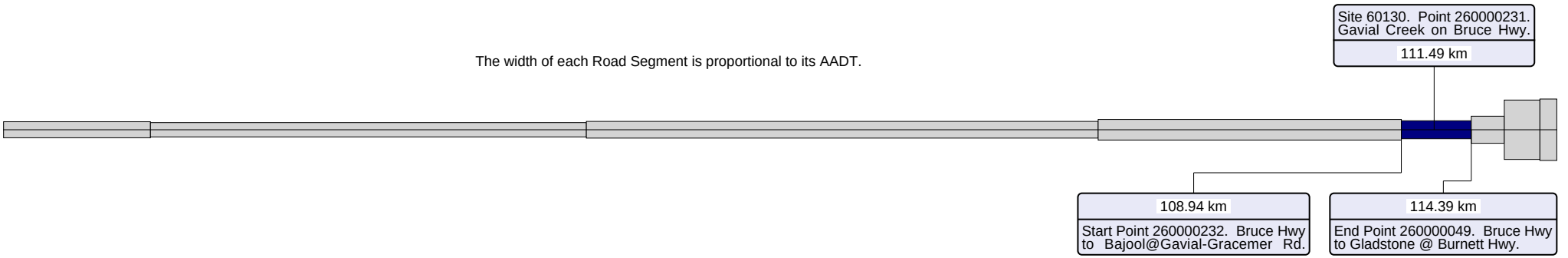
Double Road Trains (2K)

G	3	0.09%
A	4	0.11%
B	7	0.10%

Triple Road Trains (2L)

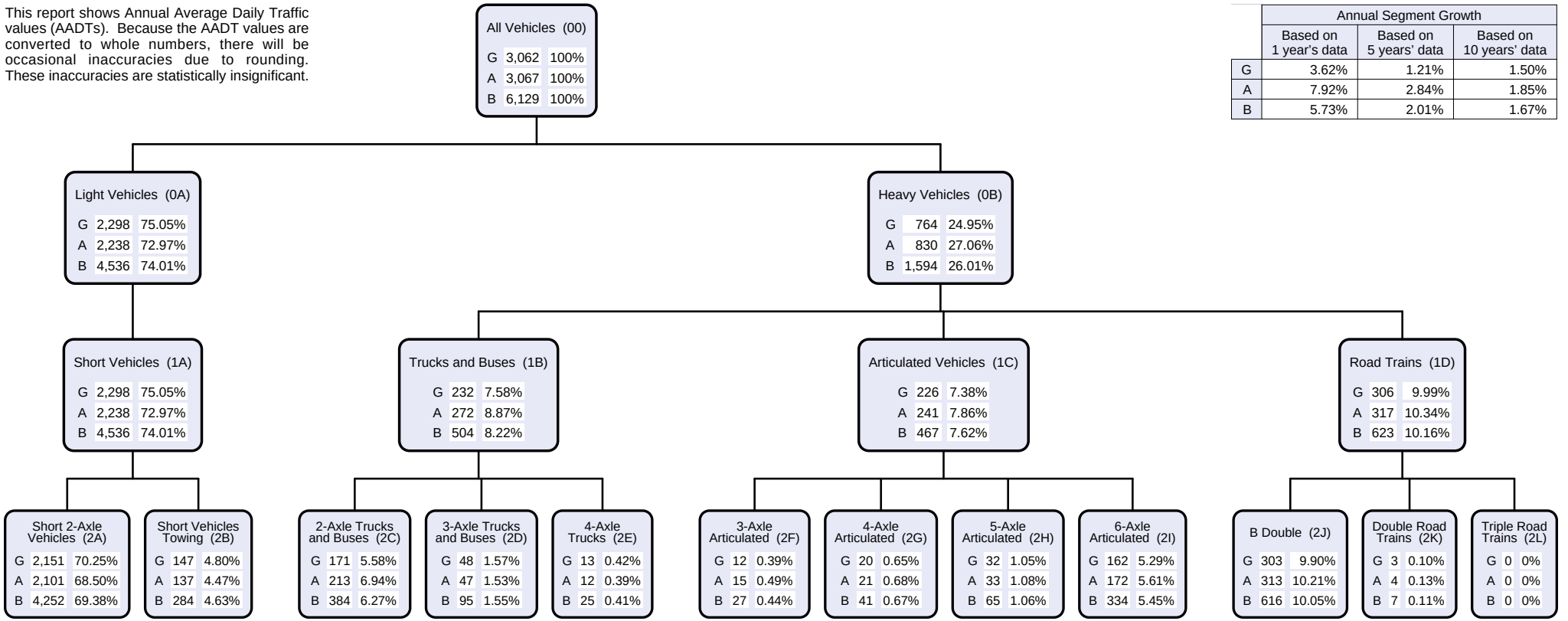
G	0	0%
A	0	0%
B	0	0%

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

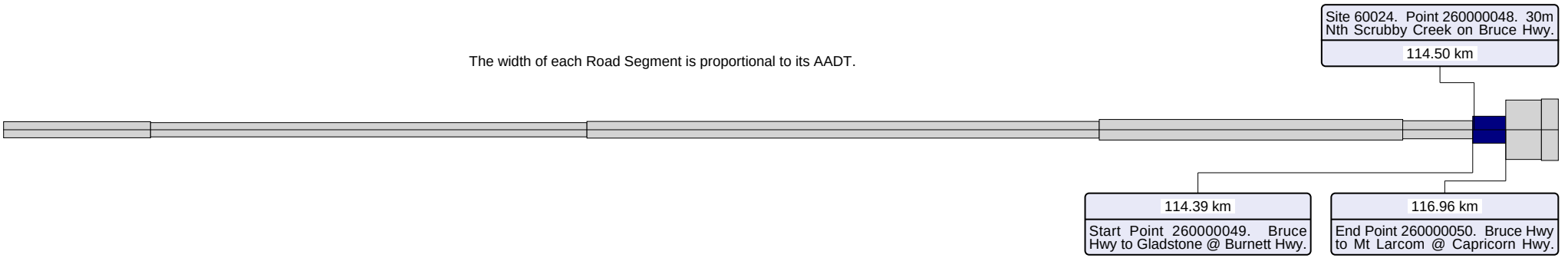


This report shows Annual Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.

	Annual Segment Growth		
	Based on 1 year's data	Based on 5 years' data	Based on 10 years' data
G	3.62%	1.21%	1.50%
A	7.92%	2.84%	1.85%
B	5.73%	2.01%	1.67%

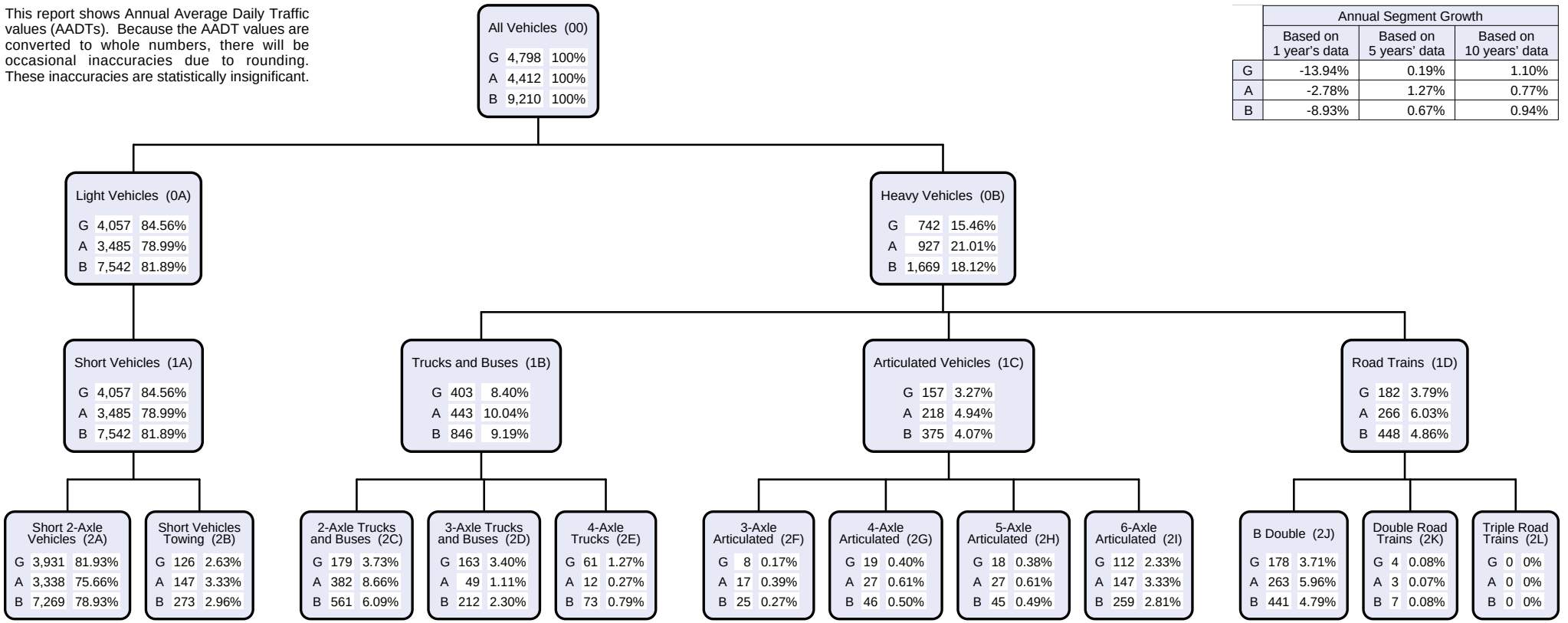


The width of each Road Segment is proportional to its AADT.

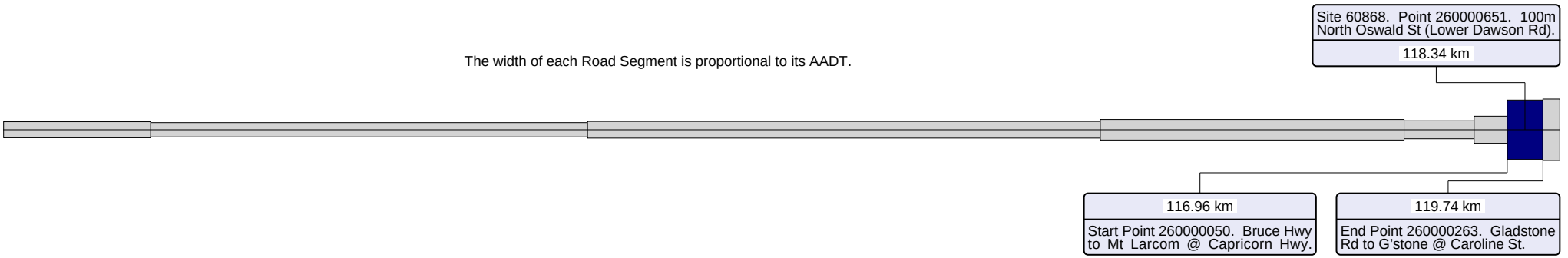


This report shows Annual Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.

	Annual Segment Growth		
	Based on 1 year's data	Based on 5 years' data	Based on 10 years' data
G	-13.94%	0.19%	1.10%
A	-2.78%	1.27%	0.77%
B	-8.93%	0.67%	0.94%

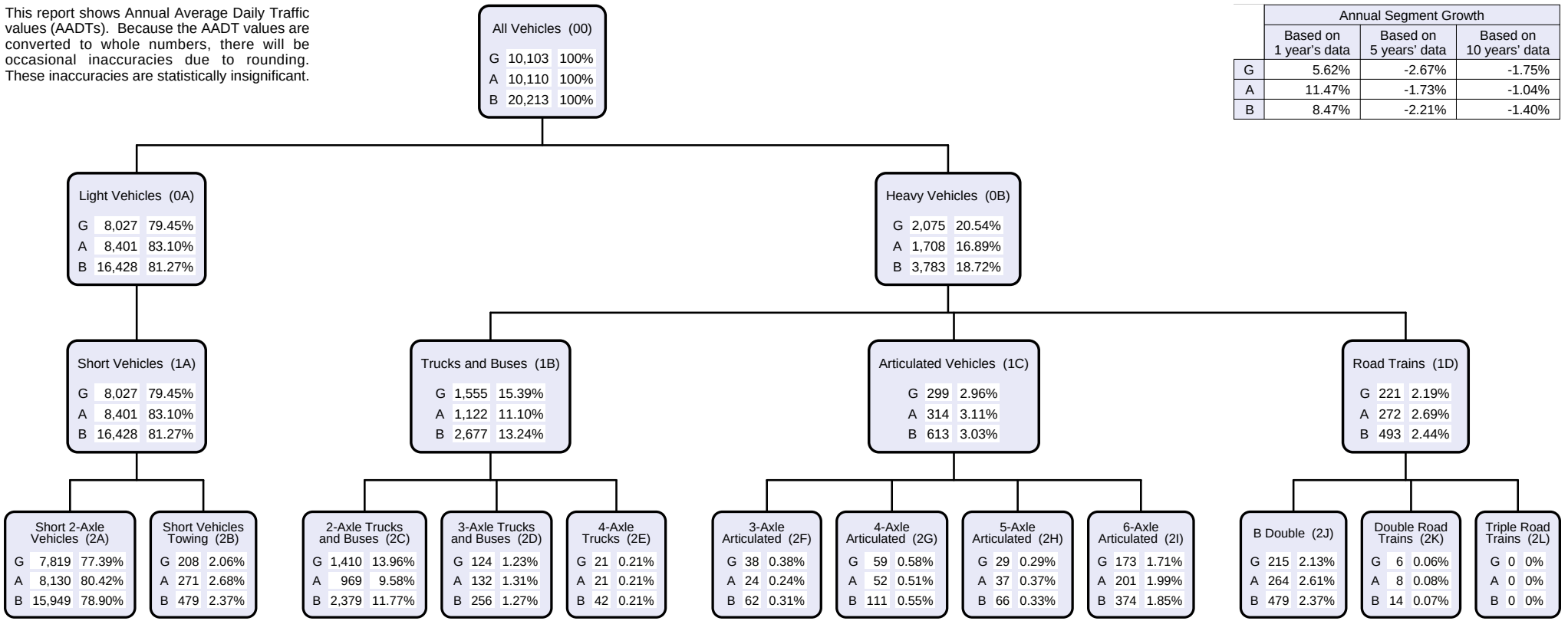


The width of each Road Segment is proportional to its AADT.

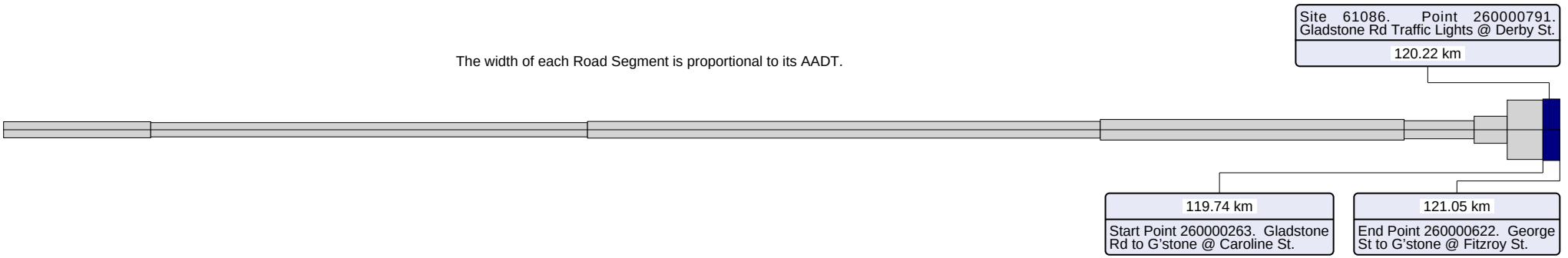


This report shows Annual Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.

	Annual Segment Growth		
	Based on 1 year's data	Based on 5 years' data	Based on 10 years' data
G	5.62%	-2.67%	-1.75%
A	11.47%	-1.73%	-1.04%
B	8.47%	-2.21%	-1.40%

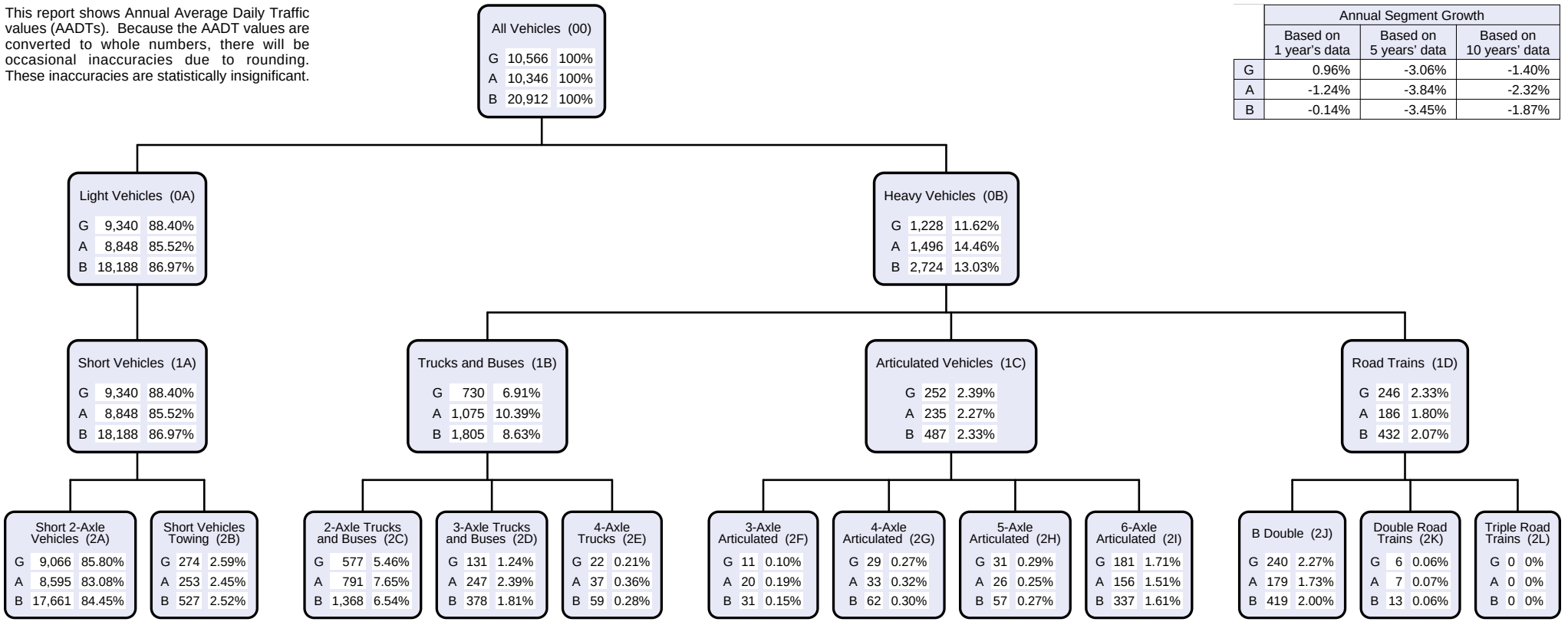


The width of each Road Segment is proportional to its AADT.



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	0.96%	-3.06%	-1.40%
A	-1.24%	-3.84%	-2.32%
B	-0.14%	-3.45%	-1.87%



Traffic Analysis and Reporting System
AADT Segment Analysis Report (Complete)
Road Section 10F - BRUCE HIGHWAY (ROCKHAMPTON-ST LAWRENCE)
Traffic Year 2018

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	1.409 km	60027	0.100 km	Bruce Hwy 100m Sth of Archer St(Lights)	7,468	6,966	14,434	3.84068	3.58251	7.42319	2018	2
404	1.409 km	4.340 km	60017	2.770 km	Bruce Hwy 100m Sth Knight St	17,400	15,358	32,758	18.61478	16.43022	35.04500	2018	3
404	4.340 km	5.517 km	61005	4.750 km	Bruce Hwy at Boland St	13,633	11,593	25,226	5.85680	4.98041	10.83722	2018	4
404	5.517 km	8.550 km	60822	7.736 km	Bruce Hwy 800m Sth Rton-Yeppoon Rd	9,092	8,512	17,604	10.06525	9.42317	19.48842	2018	5
404	8.550 km	13.180 km	60926	10.410 km	Bruce Hwy 200m Sth Mason Ave (Parkhurst)	6,366	6,384	12,750	10.75822	10.78864	21.54686	2018	6
404	13.180 km	19.833 km	60823	13.330 km	Bruce Hwy 150m North Terra Nova Dr	3,630	3,828	7,458	8.81489	9.29570	18.11060	2018	7
404	19.833 km	24.908 km	60160	24.380 km	Bruce Hwy 450m N of 14 Mile Ck Rd	2,122	2,143	4,265	3.93074	3.96964	7.90038	2018	8
404	24.908 km	142.630 km	60003	75.230 km	Bruce Hwy 40m Sth MountainCk(Kunwarara)	1,280	1,245	2,525	54.99972	53.49582	108.49554	2018	9
404	142.630 km	149.400 km	61814	144.300 km	1km south of Montrose Creek on Bruce Hwy	1,251	1,268	2,519	3.09128	3.13329	6.22457	2018	10
405	149.400 km	177.923 km	80022	169.588 km	South of Waverley Creek	1,179	1,343	2,522	12.27445	13.98183	26.25628	2017	11
								Totals	132.24682	129.08123	261.32805		

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	1.409 km	60027	0.100 km	Bruce Hwy 100m Sth of Archer St(Lights)	1,271	17.02%	1,282	18.40%	2,553	17.69%	0.65366	0.65931	1.31297	2018	2
404	1.409 km	4.340 km	60017	2.770 km	Bruce Hwy 100m Sth Knight St	1,917	11.02%	1,337	8.71%	3,254	9.93%	2.05084	1.43034	3.48118	2018	3
404	4.340 km	5.517 km	61005	4.750 km	Bruce Hwy at Boland St	1,273	9.34%	1,411	12.17%	2,684	10.64%	0.54689	0.60617	1.15306	2018	4
404	5.517 km	8.550 km	60822	7.736 km	Bruce Hwy 800m Sth Rton-Yeppoon Rd	1,061	11.67%	1,177	13.83%	2,238	12.71%	1.17457	1.30299	2.47757	2018	5
404	8.550 km	13.180 km	60926	10.410 km	Bruce Hwy 200m Sth Mason Ave (Parkhurst)	872	13.70%	588	9.21%	1,460	11.45%	1.47364	0.99369	2.46733	2018	6
404	13.180 km	19.833 km	60823	13.330 km	Bruce Hwy 150m North Terra Nova Dr	686	18.90%	695	18.16%	1,381	18.52%	1.66584	1.68770	3.35354	2018	7
404	19.833 km	24.908 km	60160	24.380 km	Bruce Hwy 450m N of 14 Mile Ck Rd	530	24.98%	452	21.09%	982	23.02%	0.98176	0.83727	1.81903	2018	8
404	24.908 km	142.630 km	60003	75.230 km	Bruce Hwy 40m Sth MountainCk(Kunwarara)	193	15.08%	254	20.40%	447	17.70%	8.29293	10.91401	19.20693	2018	9
404	142.630 km	149.400 km	61814	144.300 km	1km south of Montrose Creek on Bruce Hwy	375	29.98%	404	31.86%	779	30.92%	0.92664	0.99830	1.92495	2018	10
405	149.400 km	177.923 km	80022	169.588 km	South of Waverley Creek	282	23.92%	313	23.31%	595	23.59%	2.93587	3.25861	6.19448	2017	11
											Totals	20.70264	22.68841	43.39104		

Site 60027. Point 260000051. Bruce Hwy @ Archer St Lights.

0.10 km

0.00 km

Start Point 260000036. George St to Albert St @ Fitzroy St.

1.41 km

End Point 260000727. Albert St to Base Hospital @ Bolsover St.

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	-7.34%	-5.82%	-3.42%
A	-9.54%	-2.82%	-5.08%
B	-8.42%	-4.46%	-4.33%

All Vehicles (00)

G	7,468	100%
A	6,966	100%
B	14,434	100%

Light Vehicles (0A)

G	6,195	82.95%
A	5,686	81.63%
B	11,881	82.31%

Heavy Vehicles (0B)

G	1,271	17.02%
A	1,282	18.40%
B	2,553	17.69%

Short Vehicles (1A)

G	6,195	82.95%
A	5,686	81.63%
B	11,881	82.31%

Trucks and Buses (1B)

G	877	11.74%
A	947	13.59%
B	1,824	12.64%

Articulated Vehicles (1C)

G	210	2.81%
A	195	2.80%
B	405	2.81%

Road Trains (1D)

G	184	2.46%
A	140	2.01%
B	324	2.24%

Short 2-Axle Vehicles (2A)

G	6,045	80.95%
A	5,561	79.83%
B	11,606	80.41%

Short Vehicles Towing (2B)

G	150	2.01%
A	125	1.79%
B	275	1.91%

2-Axle Trucks and Buses (2C)

G	778	10.42%
A	803	11.53%
B	1,581	10.95%

3-Axle Trucks and Buses (2D)

G	82	1.10%
A	116	1.67%
B	198	1.37%

4-Axle Trucks (2E)

G	17	0.23%
A	28	0.40%
B	45	0.31%

3-Axle Articulated (2F)

G	21	0.28%
A	19	0.27%
B	40	0.28%

4-Axle Articulated (2G)

G	35	0.47%
A	31	0.45%
B	66	0.46%

5-Axle Articulated (2H)

G	26	0.35%
A	24	0.34%
B	50	0.35%

6-Axle Articulated (2I)

G	128	1.71%
A	121	1.74%
B	249	1.73%

B Double (2J)

G	178	2.38%
A	134	1.92%
B	312	2.16%

Double Road Trains (2K)

G	6	0.08%
A	6	0.09%
B	12	0.08%

Triple Road Trains (2L)

G	0	0%
A	0	0%
B	0	0%

Site 60017. Point 260000035. Bruce Hwy 100m Sth Knight St.
2.77 km

1.41 km
Start Point 260000727. Albert St to Base Hospital @ Bolsover St.

4.34 km
End Point 260000037. Moores Creek Rd to city @ Yaamba Rd.

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	5.31%	2.00%	1.12%
A	-7.09%	-3.29%	-1.32%
B	-0.89%	-0.65%	-0.08%

All Vehicles (00)

G	17,400	100%
A	15,358	100%
B	32,758	100%

Light Vehicles (0A)

G	15,483	88.98%
A	14,022	91.30%
B	29,505	90.07%

Heavy Vehicles (0B)

G	1,917	11.02%
A	1,337	8.71%
B	3,254	9.93%

Short Vehicles (1A)

G	15,483	88.98%
A	14,022	91.30%
B	29,505	90.07%

Trucks and Buses (1B)

G	1,494	8.59%
A	934	6.08%
B	2,428	7.41%

Articulated Vehicles (1C)

G	244	1.40%
A	220	1.43%
B	464	1.42%

Road Trains (1D)

G	179	1.03%
A	183	1.19%
B	362	1.11%

Short 2-Axle Vehicles (2A)

G	15,215	87.44%
A	13,762	89.61%
B	28,977	88.46%

Short Vehicles Towing (2B)

G	268	1.54%
A	260	1.69%
B	528	1.61%

2-Axle Trucks and Buses (2C)

G	1,362	7.83%
A	828	5.39%
B	2,190	6.69%

3-Axle Trucks and Buses (2D)

G	111	0.64%
A	89	0.58%
B	200	0.61%

4-Axle Trucks (2E)

G	21	0.12%
A	17	0.11%
B	38	0.12%

3-Axle Articulated (2F)

G	28	0.16%
A	20	0.13%
B	48	0.15%

4-Axle Articulated (2G)

G	47	0.27%
A	35	0.23%
B	82	0.25%

5-Axle Articulated (2H)

G	28	0.16%
A	28	0.18%
B	56	0.17%

6-Axle Articulated (2I)

G	141	0.81%
A	137	0.89%
B	278	0.85%

B Double (2J)

G	172	0.99%
A	177	1.15%
B	349	1.07%

Double Road Trains (2K)

G	7	0.04%
A	6	0.04%
B	13	0.04%

Triple Road Trains (2L)

G	0	0%
A	0	0%
B	0	0%

Site 61005. Point 260000731. Bruce Hwy Boland St Ped Crossing.

4.75 km

4.34 km

Start Point 260000037. Moores Creek Rd to city @ Yaamba Rd.

5.52 km

End Point 260000422. Yaamba Rd to city @ Richardson Rd.

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	-0.25%	2.59%	1.39%
A	4.63%	-1.73%	0.05%
B	1.94%	0.48%	0.75%

All Vehicles (00)

G	13,633	100%
A	11,593	100%
B	25,226	100%

Light Vehicles (0A)

G	12,359	90.66%
A	10,182	87.83%
B	22,541	89.36%

Heavy Vehicles (0B)

G	1,273	9.34%
A	1,411	12.17%
B	2,684	10.64%

Short Vehicles (1A)

G	12,359	90.66%
A	10,182	87.83%
B	22,541	89.36%

Trucks and Buses (1B)

G	886	6.50%
A	1,068	9.21%
B	1,954	7.75%

Articulated Vehicles (1C)

G	201	1.47%
A	201	1.73%
B	402	1.59%

Road Trains (1D)

G	186	1.36%
A	142	1.22%
B	328	1.30%

Short 2-Axle Vehicles (2A)

G	12,107	88.81%
A	9,949	85.82%
B	22,056	87.43%

Short Vehicles Towing (2B)

G	252	1.85%
A	233	2.01%
B	485	1.92%

2-Axle Trucks and Buses (2C)

G	796	5.84%
A	992	8.56%
B	1,788	7.09%

3-Axle Trucks and Buses (2D)

G	78	0.57%
A	63	0.54%
B	141	0.56%

4-Axle Trucks (2E)

G	12	0.09%
A	13	0.11%
B	25	0.10%

3-Axle Articulated (2F)

G	16	0.12%
A	26	0.22%
B	42	0.17%

4-Axle Articulated (2G)

G	31	0.23%
A	41	0.35%
B	72	0.29%

5-Axle Articulated (2H)

G	29	0.21%
A	24	0.21%
B	53	0.21%

6-Axle Articulated (2I)

G	125	0.92%
A	110	0.95%
B	235	0.93%

B Double (2J)

G	183	1.34%
A	140	1.21%
B	323	1.28%

Double Road Trains (2K)

G	3	0.02%
A	2	0.02%
B	5	0.02%

Triple Road Trains (2L)

G	0	0%
A	0	0%
B	0	0%

Site 60822. Point 260000618. Bruce Hwy Sth Yeppoon Rd Int.
7.74 km

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

5.52 km
Start Point 260000422. Yaamba Rd to city @ Richardson Rd.

8.55 km
End Point 260000303. Yaamba Rd/Bruce Hwy to City @ Yeppoon Rd.

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	11.14%	3.11%	2.41%
A	3.87%	0.29%	0.85%
B	7.50%	1.70%	1.63%

All Vehicles (00)

G	9,092	100%
A	8,512	100%
B	17,604	100%

Light Vehicles (0A)

G	8,031	88.33%
A	7,334	86.16%
B	15,365	87.28%

Heavy Vehicles (0B)

G	1,061	11.67%
A	1,177	13.83%
B	2,238	12.71%

Short Vehicles (1A)

G	8,031	88.33%
A	7,334	86.16%
B	15,365	87.28%

Trucks and Buses (1B)

G	699	7.69%
A	842	9.89%
B	1,541	8.75%

Articulated Vehicles (1C)

G	195	2.14%
A	188	2.21%
B	383	2.18%

Road Trains (1D)

G	167	1.84%
A	147	1.73%
B	314	1.78%

Short 2-Axle Vehicles (2A)

G	7,812	85.92%
A	7,130	83.76%
B	14,942	84.88%

Short Vehicles Towing (2B)

G	219	2.41%
A	204	2.40%
B	423	2.40%

2-Axle Trucks and Buses (2C)

G	617	6.79%
A	770	9.05%
B	1,387	7.88%

3-Axle Trucks and Buses (2D)

G	67	0.74%
A	57	0.67%
B	124	0.70%

4-Axle Trucks (2E)

G	15	0.16%
A	15	0.18%
B	30	0.17%

3-Axle Articulated (2F)

G	18	0.20%
A	24	0.28%
B	42	0.24%

4-Axle Articulated (2G)

G	35	0.38%
A	39	0.46%
B	74	0.42%

5-Axle Articulated (2H)

G	25	0.27%
A	21	0.25%
B	46	0.26%

6-Axle Articulated (2I)

G	117	1.29%
A	104	1.22%
B	221	1.26%

B Double (2J)

G	163	1.79%
A	144	1.69%
B	307	1.74%

Double Road Trains (2K)

G	4	0.04%
A	3	0.04%
B	7	0.04%

Triple Road Trains (2L)

G	0	0%
A	0	0%
B	0	0%

Site 60926. Point 260000686. Bruce Hwy 200m Sth Mason Ave (Parkhurst).
10.41 km

8.55 km
Start Point 260000303. Yaamba Rd/Bruce Hwy to City @ Yeppoon Rd.

13.18 km
End Point 260000531. Bruce Hwy to R'ton CBD @ Terra Nova Dr.

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	-1.10%	1.04%	2.41%
A	14.41%	1.22%	2.24%
B	6.10%	1.12%	2.32%

All Vehicles (00)

G	6,366	100%
A	6,384	100%
B	12,750	100%

Light Vehicles (0A)

G	5,495	86.32%
A	5,796	90.79%
B	11,291	88.56%

Heavy Vehicles (0B)

G	872	13.70%
A	588	9.21%
B	1,460	11.45%

Short Vehicles (1A)

G	5,495	86.32%
A	5,796	90.79%
B	11,291	88.56%

Trucks and Buses (1B)

G	565	8.88%
A	306	4.79%
B	871	6.83%

Articulated Vehicles (1C)

G	142	2.23%
A	127	1.99%
B	269	2.11%

Road Trains (1D)

G	165	2.59%
A	155	2.43%
B	320	2.51%

Short 2-Axle Vehicles (2A)

G	5,340	83.88%
A	5,629	88.17%
B	10,969	86.03%

Short Vehicles Towing (2B)

G	155	2.43%
A	167	2.62%
B	322	2.53%

2-Axle Trucks and Buses (2C)

G	514	8.07%
A	254	3.98%
B	768	6.02%

3-Axle Trucks and Buses (2D)

G	43	0.68%
A	45	0.70%
B	88	0.69%

4-Axle Trucks (2E)

G	8	0.13%
A	7	0.11%
B	15	0.12%

3-Axle Articulated (2F)

G	13	0.20%
A	6	0.09%
B	19	0.15%

4-Axle Articulated (2G)

G	22	0.35%
A	15	0.23%
B	37	0.29%

5-Axle Articulated (2H)

G	22	0.35%
A	20	0.31%
B	42	0.33%

6-Axle Articulated (2I)

G	85	1.34%
A	86	1.35%
B	171	1.34%

B Double (2J)

G	164	2.58%
A	154	2.41%
B	318	2.49%

Double Road Trains (2K)

G	1	0.02%
A	1	0.02%
B	2	0.02%

Triple Road Trains (2L)

G	0	0%
A	0	0%
B	0	0%

Traffic Analysis and Reporting System

AADT Segment Analysis Report (Complete)

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

Traffic Year 2018

Road Segments Summary - All Vehicles

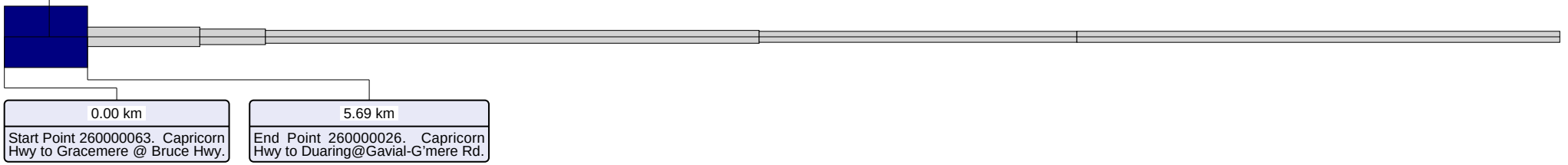
Region	Segment Start Tdist	Segment End Tdist	Site	Site Tdist	Description	AADT			VKT (Millions)			Data Year	Page
						G	A	B	G	A	B		
404	0.000 km	5.690 km	60039	3.070 km	Capricorn Hwy 1.5Km West Bruce Hwy	8,289	7,503	15,792	17.21501	15.58261	32.79762	2018	2
404	5.690 km	13.367 km	60010	8.690 km	Capricorn Hwy 3km West Gracemere	2,583	2,421	5,004	7.23784	6.78390	14.02173	2018	3
404	13.367 km	17.856 km	61457	14.580 km	Capricorn Hwy WiM Site at Kabra	2,120	1,882	4,002	3.47359	3.08363	6.55722	2018	4
404	17.856 km	51.620 km	60040	44.000 km	Capricorn Hwy 1Km East of Westwood	1,633	1,660	3,293	20.12486	20.45761	40.58247	2018	5
404	51.620 km	73.350 km	60045	64.000 km	Capricorn Hwy at 41 Mile Ck	1,346	1,464	2,810	10.67573	11.61164	22.28737	2018	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	75.34013	75.13312	150.47325		

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	642	24.85%	899	37.13%	1,541	30.80%	1.79895	2.51909	4.31804	2018	3
404	13.367 km	17.856 km	61457	14.580 km	Capricorn Hwy WiM Site at Kabra	557	26.27%	463	24.60%	1,020	25.49%	0.91264	0.75862	1.67125	2018	4
404	17.856 km	51.620 km	60040	44.000 km	Capricorn Hwy 1Km East of Westwood	450	27.56%	452	27.23%	902	27.39%	5.54574	5.57038	11.11612	2018	5
404	51.620 km	73.350 km	60045	64.000 km	Capricorn Hwy at 41 Mile Ck	409	30.39%	423	28.89%	832	29.61%	3.24396	3.35500	6.59897	2018	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	18.38117	21.33849	39.71966		

Site 60039. Point 260000062. Cap Hwy(TC-60039)3Km West of Bruce Hwy.
3.07 km



0.00 km
Start Point 260000063. Capricorn Hwy to Gracemere @ Bruce Hwy.

5.69 km
End Point 260000026. Capricorn Hwy to Duaring@Gavial-G'mere Rd.

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	-8.45%	-1.07%	0.35%
A	-16.15%	-2.33%	-0.42%
B	-12.28%	-1.70%	-0.03%

All Vehicles (00)

G	8,289	100%
A	7,503	100%
B	15,792	100%

Light Vehicles (0A)

G	7,394	89.20%
A	5,554	74.02%
B	12,948	81.99%

Heavy Vehicles (0B)

G	892	10.76%
A	1,949	25.98%
B	2,841	17.99%

Short Vehicles (1A)

G	7,394	89.20%
A	5,554	74.02%
B	12,948	81.99%

Trucks and Buses (1B)

G	619	7.47%
A	1,644	21.91%
B	2,263	14.33%

Articulated Vehicles (1C)

G	139	1.68%
A	183	2.44%
B	322	2.04%

Road Trains (1D)

G	134	1.62%
A	122	1.63%
B	256	1.62%

Short 2-Axle Vehicles (2A)

G	7,241	87.36%
A	5,466	72.85%
B	12,707	80.46%

Short Vehicles Towing (2B)

G	153	1.85%
A	88	1.17%
B	241	1.53%

2-Axle Trucks and Buses (2C)

G	530	6.39%
A	1,561	20.81%
B	2,091	13.24%

3-Axle Trucks and Buses (2D)

G	77	0.93%
A	71	0.95%
B	148	0.94%

4-Axle Trucks (2E)

G	12	0.14%
A	12	0.16%
B	24	0.15%

3-Axle Articulated (2F)

G	12	0.14%
A	38	0.51%
B	50	0.32%

4-Axle Articulated (2G)

G	17	0.21%
A	41	0.55%
B	58	0.37%

5-Axle Articulated (2H)

G	13	0.16%
A	12	0.16%
B	25	0.16%

6-Axle Articulated (2I)

G	97	1.17%
A	92	1.23%
B	189	1.20%

B Double (2J)

G	128	1.54%
A	117	1.56%
B	245	1.55%

Double Road Trains (2K)

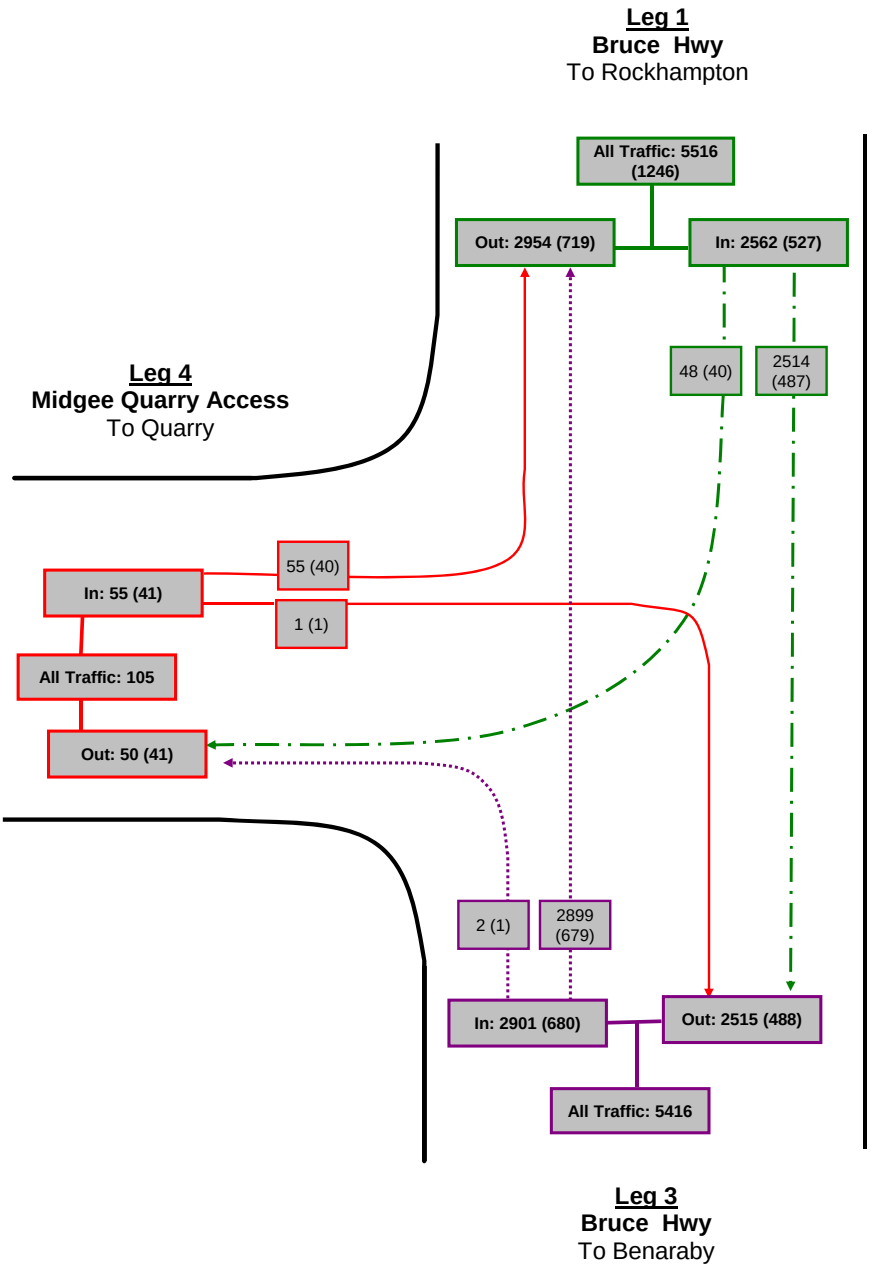
G	6	0.07%
A	5	0.07%
B	11	0.07%

Triple Road Trains (2L)

G	0	0%
A	0	0%
B	0	0%

Appendix G – TMR Intersection Count Bruce Highway / Midgee Quarry Access

LOCATION: Int Bruce Hwy & Midgee Quarry Access
ROAD No: 10E (Int.15269 @ 107.400km)
DATE: Wed, 22/07/15
TIME: 06:00 - 18:00



DATA Collection Date : 22/07/2017
Compiled Edited: Ken Ah Quee
05/12/2018

Count Tally Sheet With Totals and Peak Flows.

QUEENSLAND GOVERNMENT

LOCATION: Int Bruce Hwy & Midgee Quarry Access
ROAD No: 10E (Int.15269 @ 107.400km)
DATE: Wed, 22/07/15
TIME: 06:00 - 18:00

	Leg 1						Leg 3						Leg 4					
	Thru		Right		U-turn	Leg	Left		Thru		U-turn	Leg	Left		Right		U-turn	Leg
Time	*Light*	*Heavy*	*Light*	*Heavy*	*All*	Total	*Light*	*Heavy*	*Light*	*Heavy*	*All*	Total	*Light*	*Heavy*	*Light*	*Heavy*	*All*	Total
6:00 - 6:15	18	7	1	0		**1**	0	0	20	5		**25**	1	0	0	0		**0**
6:15 - 6:30	28	11	0	0		**39**	0	0	37	12		**49**	0	0	0	0		**0**
6:30 - 6:45	23	12	1	0		**36**	0	0	38	9		**47**	0	0	0	0		**0**
6:45 - 7:00	21	10	1	0		**32**	0	0	50	12		**62**	0	0	0	0		**0**
7:00 - 7:15	31	9	0	0		**40**	0	0	41	17		**58**	0	0	0	0		**0**
7:15 - 7:30	36	16	0	0		**52**	0	0	52	12		**64**	0	0	0	0		**0**
7:30 - 7:45	33	15	0	0		**48**	0	0	44	13		**57**	0	0	0	0		**0**
7:45 - 8:00	40	11	1	0		**52**	0	0	40	17		**57**	0	0	0	0		**0**
8:00 - 8:15	38	9	0	0		**47**	0	0	60	14		**74**	0	0	0	0		**0**
8:15 - 8:30	45	12	0	2		**59**	0	0	61	28		**89**	0	0	0	0		**0**
8:30 - 8:45	46	8	0	1		**55**	0	0	63	21		**84**	0	0	0	0		**0**
8:45 - 9:00	37	4	0	1		**42**	0	0	45	11		**56**	0	2	0	0		**2**
9:00 - 9:15	52	17	0	0		**69**	0	0	71	16		**87**	0	0	0	0		**0**
9:15 - 9:30	45	6	0	3		**54**	0	0	60	20		**80**	0	0	0	0		**0**
9:30 - 9:45	53	12	0	0		**65**	0	0	48	24		**72**	0	3	0	0		**3**
9:45 - 10:00	47	9	0	1		**57**	0	0	44	15		**59**	0	0	0	0		**0**
10:00 - 10:15	46	8	0	3		**57**	0	0	70	9		**79**	0	0	0	0		**0**
10:15 - 10:30	39	9	0	1		**49**	0	0	42	14		**56**	0	4	0	0		**4**
10:30 - 10:45	55	16	1	1		**73**	0	0	39	6		**45**	0	1	0	0		**1**
10:45 - 11:00	44	10	0	0		**54**	0	0	44	16		**60**	0	1	0	0		**1**
11:00 - 11:15	45	11	0	1		**57**	0	0	58	13		**71**	0	2	0	0		**2**
11:15 - 11:30	53	10	0	0		**63**	0	0	46	9		**55**	0	1	0	0		**1**
11:30 - 11:45	39	3	1	3		**46**	0	0	45	21		**66**	0	1	0	0		**1**
11:45 - 12:00	44	14	0	1		**59**	0	0	35	13		**48**	0	3	0	0		**3**

Count Tally Sheet With Totals and Peak Flows.

QUEENSLAND GOVERNMENT

LOCATION: Int Bruce Hwy & Midgee Quarry Access
ROAD No: 10E (Int.15269 @ 107.400km)
DATE: Wed, 22/07/15
TIME: 06:00 - 18:00

	Leg 1						Leg 3						Leg 4					
	Thru		Right		U-turn	Leg	Left		Thru		U-turn	Leg	Left		Right		U-turn	Leg
Time	*Light*	*Heavy*	*Light*	*Heavy*	*All*	Total	*Light*	*Heavy*	*Light*	*Heavy*	*All*	Total	*Light*	*Heavy*	*Light*	*Heavy*	*All*	Total
12:00 - 12:15	53	12	0	1		**66**	0	0	39	13		**52**	0	0	0	0		**0**
12:15 - 12:30	39	2	0	3		**44**	0	0	41	16		**57**	0	1	0	0		**1**
12:30 - 12:45	37	11	0	1		**49**	0	0	38	13		**51**	0	2	0	1		**3**
12:45 - 13:00	41	9	0	0		**50**	0	0	38	17		**55**	0	1	0	0		**1**
13:00 - 13:15	35	8	0	1		**44**	0	0	50	23		**73**	0	0	0	0		**0**
13:15 - 13:30	42	12	1	3		**58**	0	0	46	21		**67**	0	1	0	0		**1**
13:30 - 13:45	38	13	0	2		**53**	0	0	48	18		**66**	0	3	0	0		**3**
13:45 - 14:00	49	12	0	1		**62**	0	0	46	15		**61**	1	1	0	0		**2**
14:00 - 14:15	43	10	0	2		**55**	0	0	59	11		**70**	0	3	0	0		**3**
14:15 - 14:30	50	9	0	1		**60**	0	0	59	17		**76**	0	1	0	0		**1**
14:30 - 14:45	49	8	0	1		**58**	0	1	40	11		**52**	0	1	0	0		**1**
14:45 - 15:00	53	6	0	3		**62**	0	0	42	11		**53**	1	2	0	0		**3**
15:00 - 15:15	41	11	0	1		**53**	0	0	58	15		**73**	0	1	0	0		**1**
15:15 - 15:30	58	18	0	1		**77**	0	0	41	9		**50**	0	3	0	0		**3**
15:30 - 15:45	65	14	1	0		**80**	1	0	61	18		**80**	1	0	0	0		**1**
15:45 - 16:00	46	11	0	0		**57**	0	0	45	10		**55**	0	1	0	0		**1**
16:00 - 16:15	51	5	0	0		**56**	0	0	48	15		**63**	3	0	0	0		**3**
16:15 - 16:30	39	6	0	1		**46**	0	0	41	16		**57**	1	0	0	0		**1**
16:30 - 16:45	47	12	0	0		**59**	0	0	42	14		**56**	3	0	0	0		**3**
16:45 - 17:00	40	11	0	0		**51**	0	0	59	5		**64**	2	0	0	0		**2**
17:00 - 17:15	44	12	0	0		**56**	0	0	41	13		**54**	2	1	0	0		**3**
17:15 - 17:30	44	14	0	0		**58**	0	0	35	15		**50**	0	0	0	0		**0**
17:30 - 17:45	31	8	0	0		**39**	0	0	23	6		**29**	0	0	0	0		**0**
17:45 - 18:00	34	4	0	0		**38**	0	0	27	10		**37**	0	0	0	0		**0**
Total:	2027	487	8	40	0	**2562**	1	1	2220	679	0	**2901**	15	40	0	1	0	**55**
Peak Count:	220	54	3	8	0	272	1	1	240	80	0	316	0	8	0	1	0	9
Peak Hour:	15:15 to 16:15	15:00 to 16:00	06:00 to 07:00	11:30 to 12:30	06:00 to 07:00	14:45 to 15:45	14:45 to 15:45	13:45 to 14:45	08:15 to 09:15	07:45 to 08:45	06:00 to 07:00	08:15 to 09:15	#N/A	10:15 to 11:15	06:00 to 07:00	11:45 to 12:45	06:00 to 07:00	13:15 to 14:15

Appendix H – Background Traffic Calculations

ENG0118-001 | COLAS Asphalt Plant Midgee

Bruce Highway / Midgee Quarry Access Intersection

Background Traffic Volumes - Adjusted for Approved 1M tonne p.a. use of Existing Quarry

AM PEAK

GR %	2.33%	2.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.33%	2.33%
Year	(North) Bruce Highway				(West) Midgee Quarry Access				(South) Bruce Highway			
	Thru		Right		Left		Right		Left		Thru	
	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
2015	197	44	0	9	0	9	0	9	0	9	223	75
2016	202	45	0	9	0	9	0	9	0	9	228	77
2017	206	46	0	9	0	9	0	9	0	9	234	79
2018	211	47	0	9	0	9	0	9	0	9	239	80
2019	216	48	0	9	0	9	0	9	0	9	245	82
2020	221	49	0	9	0	9	0	9	0	9	250	84
2021	226	51	0	9	0	9	0	9	0	9	256	86
2022	231	52	0	9	0	9	0	9	0	9	262	88
2023	237	53	0	9	0	9	0	9	0	9	268	90
2024	242	54	0	9	0	9	0	9	0	9	274	92
2025	248	55	0	9	0	9	0	9	0	9	281	94
2026	254	57	0	9	0	9	0	9	0	9	287	97
2027	260	58	0	9	0	9	0	9	0	9	294	99
2028	266	59	0	9	0	9	0	9	0	9	301	101
2029	272	61	0	9	0	9	0	9	0	9	308	104

Existing Quarry Approval

Annual Tonnage	=	1,000,000
Days of Operation	=	288
Average Daily Tonnage	=	3,472
Avg T&D Payload	=	32
No. Trucks per Day	=	109
Hours per day	=	12
Trucks per Hour	=	9

PM PEAK

GR %	2.33%	2.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.33%	2.33%
Year	(North) Bruce Highway				(West) Midgee Quarry Access				(South) Bruce Highway			
	Thru		Right		Left		Right		Left		Thru	
	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
2015	217	49	1	9	2	9	0	9	1	9	202	53
2016	222	50	1	9	2	9	0	9	1	9	207	54
2017	227	51	1	9	2	9	0	9	1	9	212	55
2018	233	53	1	9	2	9	0	9	1	9	216	57
2019	238	54	1	9	2	9	0	9	1	9	221	58
2020	243	55	1	9	2	9	0	9	1	9	227	59
2021	249	56	1	9	2	9	0	9	1	9	232	61
2022	255	58	1	9	2	9	0	9	1	9	237	62
2023	261	59	1	9	2	9	0	9	1	9	243	64
2024	267	60	1	9	2	9	0	9	1	9	249	65
2025	273	62	1	9	2	9	0	9	1	9	254	67
2026	280	63	1	9	2	9	0	9	1	9	260	68
2027	286	65	1	9	2	9	0	9	1	9	266	70
2028	293	66	1	9	2	9	0	9	1	9	273	72
2029	300	68	1	9	2	9	0	9	1	9	279	73

Appendix I – SIDRA Results | Existing (2019) Conditions

MOVEMENT SUMMARY

Site: 1 [EXIST 2019 AM PEAK]

Bruce Highway / Midgee Quarry Access
Existing Intersection Configuration CHR / BAL
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bruce Highway											
1	L2	9	100.0	0.212	6.1	LOS A	0.0	0.0	0.00	0.03	55.7
2	T1	344	25.1	0.212	0.0	LOS A	0.0	0.0	0.00	0.03	59.8
Approach		354	27.1	0.212	0.3	NA	0.0	0.0	0.00	0.03	59.6
North: Bruce Highway											
8	T1	278	18.2	0.158	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	9	100.0	0.014	9.5	LOS A	0.1	0.8	0.53	0.63	49.6
Approach		287	20.9	0.158	0.3	NA	0.1	0.8	0.02	0.02	59.6
West: Midgee Quarry Access											
10	L2	9	100.0	0.063	9.5	LOS A	0.2	2.8	0.64	0.78	45.2
12	R2	9	100.0	0.063	22.8	LOS B	0.2	2.8	0.64	0.78	45.5
Approach		19	100.0	0.063	16.1	LOS B	0.2	2.8	0.64	0.78	45.3
All Vehicles		660	26.5	0.212	0.7	NA	0.2	2.8	0.03	0.05	59.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [EXIST 2019 PM PEAK]

Bruce Highway / Midgee Quarry Access
Existing Intersection Configuration CHR / BAL
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bruce Highway											
1	L2	11	90.0	0.178	6.6	LOS A	0.0	0.0	0.00	0.02	54.1
2	T1	294	20.8	0.178	0.0	LOS A	0.0	0.0	0.00	0.02	59.9
Approach		304	23.2	0.178	0.2	NA	0.0	0.0	0.00	0.02	59.7
North: Bruce Highway											
8	T1	307	18.5	0.175	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	11	90.0	0.014	9.1	LOS A	0.1	0.7	0.48	0.59	48.8
Approach		318	20.9	0.175	0.3	NA	0.1	0.7	0.02	0.02	59.5
West: Midgee Quarry Access											
10	L2	12	81.8	0.059	8.7	LOS A	0.2	2.6	0.59	0.79	45.3
12	R2	9	100.0	0.059	21.2	LOS B	0.2	2.6	0.59	0.79	46.7
Approach		21	90.0	0.059	14.3	LOS A	0.2	2.6	0.59	0.79	45.9
All Vehicles		643	24.2	0.178	0.7	NA	0.2	2.6	0.03	0.04	59.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix J – Traffic Volume Calculations

ENG0118-001 | COLAS Asphalt Plant Midgee

Bruce Highway / Midgee Quarry Access Intersection - Count Data (TMR) Wednesday 22/07/2015

Development Traffic Volumes - Proposed COLAS Asphalt Manufacturing Plant

AM PEAK

Year	(North) Bruce Highway				(West) Midgee Quarry Access				(South) Bruce Highway			
	Thru		Right		Left		Right		Left		Thru	
	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
2019	0	0	3	4	0	4	0	4	0	4	0	0
2020	0	0	3	4	0	4	0	4	0	4	0	0
2021	0	0	3	4	0	4	0	4	0	4	0	0
2022	0	0	3	4	0	4	0	4	0	4	0	0
2023	0	0	3	4	0	4	0	4	0	4	0	0
2024	0	0	3	4	0	4	0	4	0	4	0	0
2025	0	0	3	4	0	4	0	4	0	4	0	0
2026	0	0	3	4	0	4	0	4	0	4	0	0
2027	0	0	3	4	0	4	0	4	0	4	0	0
2028	0	0	3	4	0	4	0	4	0	4	0	0
2029	0	0	3	4	0	4	0	4	0	4	0	0

Proposed Asphalt Manufacturing Plant

Staff	=	3
No. Staff LV Movements	=	3
Max Asphalt Trucks per Day	=	30
Hours per day	=	12
Trucks Movements per Hour	=	3
Max Delivery Trucks from Brisbane	=	4
Max Delivery Trucks from Rockhampton	=	6
Hours per day	=	12
Max Delivery Truck from B'bane per Hour	=	1
Max Delivery Truck from R'ton per Hour	=	1

PM PEAK

Year	(North) Bruce Highway				(West) Midgee Quarry Access				(South) Bruce Highway			
	Thru		Right		Left		Right		Left		Thru	
	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
2019	0	0	0	4	3	4	0	4	0	4	0	0
2020	0	0	0	4	3	4	0	4	0	4	0	0
2021	0	0	0	4	3	4	0	4	0	4	0	0
2022	0	0	0	4	3	4	0	4	0	4	0	0
2023	0	0	0	4	3	4	0	4	0	4	0	0
2024	0	0	0	4	3	4	0	4	0	4	0	0
2025	0	0	0	4	3	4	0	4	0	4	0	0
2026	0	0	0	4	3	4	0	4	0	4	0	0
2027	0	0	0	4	3	4	0	4	0	4	0	0
2028	0	0	0	4	3	4	0	4	0	4	0	0
2029	0	0	0	4	3	4	0	4	0	4	0	0

ENG0118-001 | COLAS Asphalt Plant Midgee

Bruce Highway / Midgee Quarry Access Intersection - Count Data (TMR) Wednesday 22/07/2015

Post Development Traffic Volumes

AM PEAK

Year	(North) Bruce Highway				(West) Midgee Quarry Access				(South) Bruce Highway			
	Thru		Right		Left		Right		Left		Thru	
	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
2019	216	48	3	13	0	13	0	13	0	13	245	82
2020	221	49	3	13	0	13	0	13	0	13	250	84
2021	226	51	3	13	0	13	0	13	0	13	256	86
2022	231	52	3	13	0	13	0	13	0	13	262	88
2023	237	53	3	13	0	13	0	13	0	13	268	90
2024	242	54	3	13	0	13	0	13	0	13	274	92
2025	248	55	3	13	0	13	0	13	0	13	281	94
2026	254	57	3	13	0	13	0	13	0	13	287	97
2027	260	58	3	13	0	13	0	13	0	13	294	99
2028	266	59	3	13	0	13	0	13	0	13	301	101
2029	272	61	3	13	0	13	0	13	0	13	308	104

PM PEAK

Year	(North) Bruce Highway				(West) Midgee Quarry Access				(South) Bruce Highway			
	Thru		Right		Left		Right		Left		Thru	
	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
2019	238	54	1	13	5	13	0	13	1	13	221	58
2020	243	55	1	13	5	13	0	13	1	13	227	59
2021	249	56	1	13	5	13	0	13	1	13	232	61
2022	255	58	1	13	5	13	0	13	1	13	237	62
2023	261	59	1	13	5	13	0	13	1	13	243	64
2024	267	60	1	13	5	13	0	13	1	13	249	65
2025	273	62	1	13	5	13	0	13	1	13	254	67
2026	280	63	1	13	5	13	0	13	1	13	260	68
2027	286	65	1	13	5	13	0	13	1	13	266	70
2028	293	66	1	13	5	13	0	13	1	13	273	72
2029	300	68	1	13	5	13	0	13	1	13	279	73

ENG0118-001 | COLAS Asphalt Plant Midgee

Project Traffic Impact % Calculations (2019)

Road ID	Road Description	AADT Segment		Base Data Year	Base Year AADT			Base Year HV%		Base Year HV		10 Yr GR%	2019 AADT			2019 HV		Dev Traffic (Daily)			Dev Traffic % Impact		
		Start (km)	End (km)		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Gaz	A-Gaz		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Gaz	A-Gaz	Bi-Dir	Gaz %	A-Gaz %	Bi-Dir %
10E	Bruce Highway (Benaraby to Rockhampton)	45.420	85.308	2018	2,841	2,842	5,683	21.68%	23.82%	616	677	0.16%	2,846	2,847	5,692	617	678	4	4	8	0.14%	0.14%	0.14%
		85.308	107.400	2018	3,478	3,524	7,002	28.32%	26.14%	985	921	2.33%	3,559	3,606	7,165	1,008	943	4	4	8	0.11%	0.11%	0.11%
		107.400	108.938	2018	3,478	3,524	7,002	28.32%	26.14%	985	921	2.33%	3,559	3,606	7,165	1,008	943	39	39	78	1.10%	1.08%	1.09%
		108.938	114.388	2018	3,062	3,067	6,129	24.95%	27.06%	764	830	1.67%	3,113	3,118	6,231	777	844	39	39	78	1.25%	1.25%	1.25%
		114.388	116.961	2018	4,798	4,412	9,210	15.46%	21.01%	742	927	0.94%	4,843	4,453	9,297	749	936	39	39	78	0.81%	0.88%	0.84%
		116.961	119.737	2018	10,103	10,110	20,213	20.54%	16.89%	2,075	1,708	0.00%	10,103	10,110	20,213	2,075	1,708	39	39	78	0.39%	0.39%	0.39%
		119.737	121.051	2018	10,566	10,346	20,912	11.62%	14.46%	1,228	1,496	0.00%	10,566	10,346	20,912	1,228	1,496	39	39	78	0.37%	0.38%	0.37%
10F	Bruce Highway (Rockhampton to St Lawrence)	0.000	1.409	2018	7,468	6,966	14,434	17.02%	18.40%	1,271	1,282	0.00%	7,468	6,966	14,434	1,271	1,282	39	39	78	0.52%	0.56%	0.54%
		1.409	4.340	2018	17,400	15,358	32,758	11.02%	8.71%	1,917	1,338	0.00%	17,400	15,358	32,758	1,917	1,338	39	39	78	0.22%	0.25%	0.24%
		4.340	5.517	2018	13,633	11,593	25,226	9.34%	12.17%	1,273	1,411	0.75%	13,735	11,680	25,415	1,283	1,421	30	30	60	0.22%	0.26%	0.24%
		5.517	8.550	2018	9,092	8,512	17,604	11.67%	13.83%	1,061	1,177	1.63%	9,240	8,651	17,891	1,078	1,196	30	30	60	0.32%	0.35%	0.34%
		8.550	13.180	2018	6,366	6,384	12,750	13.70%	9.21%	872	588	2.32%	6,514	6,532	13,046	892	602	30	30	60	0.46%	0.46%	0.46%
16A	Capricorn Highway (Rockhampton - Duaringa)	0.000	5.960	2018	8,289	7,503	15,792	10.76%	25.98%	892	1,949	0.00%	8,289	7,503	15,792	892	1,949	30	30	60	0.36%	0.40%	0.38%

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Project Pavement Impact % Calculations (2019)

SITE MATERIAL DELIVERIES

Max Trucks per Day	=	10
From Rockhampton %	=	60%
From Rockhampton Vol	=	6
From Brisbane %	=	40%
From Brisbane Vol	=	4

ASPHALT DELIVERY

Max. Vehicles per day	=	30

STAFF MOVEMENTS

Inbound trips in AM	=	3
Outbound trips in PM	=	3

Appendix K – Turn Warrants Assessment

Turn Warrant Assessment

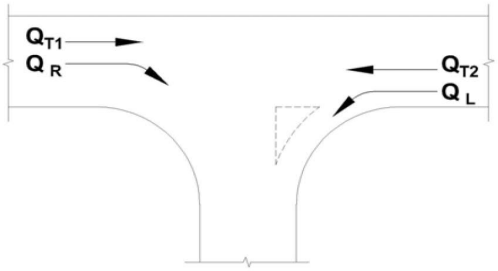
Intersection:	**Bruce Highway / Midgee Quarry Access**
Year / Peak:	**2029 AM & PM**
Scenario:	**Post Development**

Assessment based on Austroads Guide to Road Design, Part 4b. This warrant assessment applies only to turning movements from the major road only.

	AM Peak	*PM Peak*
Q_{T1} =	333	368
Q_R =	16	14

Splitter Island? No

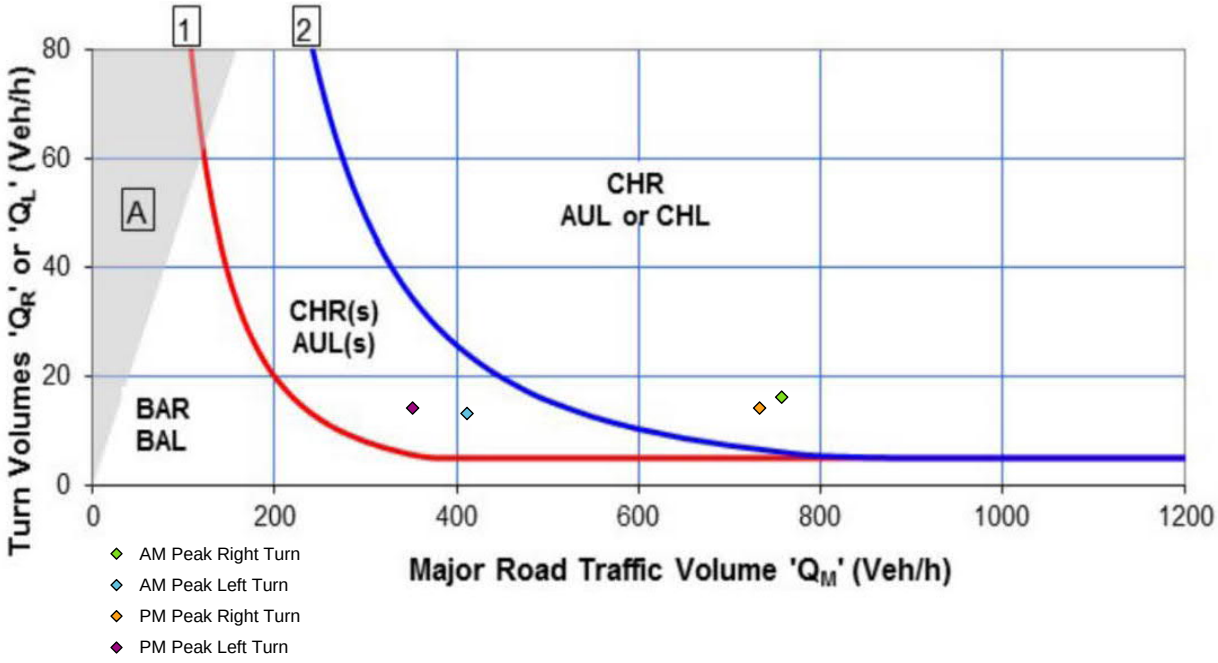
Design speed (km/h) 110



Midgee Quarry Access

	AM Peak	*PM Peak*
Q_{T2} =	412	352
Q_L =	13	14

Graph	Q_M	Q_R/Q_L
AM Peak		
Right	758	16
Left	412	13
PM Peak		
Right	734	14
Left	352	14



Recommended treatments:

Right Turn	CHR
Left Turn	AUL(s)

Legend

BAR	Basic Right Turn	BAL	Basic Left Turn
CHR(S)	Channelised Right Turn (short)	AUL(S)	Auxiliary Left Turn (short)
CHR	Channelised Right Turn	AUL	Auxiliary Left Turn
		CHL	Channelised Left Turn

Comments:

Volumes adopted are conservative as they utilise an assumed maximum vehicle movements from both the existing quarry and proposed asphalt plant in both directions concurrently, when the movements from each use (i.e. quarry and asphalt plant) would only occur in one direction at a time, and not necessarily in the same direction. The use of the maximum volumes from each use on all movement is conservative, but will indicate the turn treatment required to cater for the worst case operation of the site in both directions.

Prepared by:	A.Barrie
Reviewed by:	A.Barrie
Date:	22/04/2019

Appendix L – SIDRA Results | Pre & Post Development

MOVEMENT SUMMARY

Site: 1 [PRE 2029 AM PEAK]

Bruce Highway / Midgee Quarry Access
Proposed Intersection Configuration CHR / AULs
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bruce Highway											
1	L2	9	100.0	0.009	6.1	LOS A	0.0	0.0	0.00	0.57	51.6
2	T1	434	25.2	0.256	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		443	26.8	0.256	0.2	NA	0.0	0.0	0.00	0.01	59.7
North: Bruce Highway											
8	T1	351	18.3	0.199	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	9	100.0	0.023	12.5	LOS A	0.1	1.1	0.58	0.72	47.6
Approach		360	20.5	0.199	0.4	NA	0.1	1.1	0.02	0.02	59.6
West: Midgee Quarry Access											
10	L2	9	100.0	0.122	12.6	LOS A	0.4	5.0	0.80	0.91	39.4
12	R2	9	100.0	0.122	43.5	LOS D	0.4	5.0	0.80	0.91	39.7
Approach		19	100.0	0.122	28.1	LOS B	0.4	5.0	0.80	0.91	39.6
All Vehicles		822	25.7	0.256	0.9	NA	0.4	5.0	0.03	0.04	59.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [PRE 2029 PM PEAK]

Bruce Highway / Midgee Quarry Access
Proposed Intersection Configuration CHR / AULs
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bruce Highway											
1	L2	11	90.0	0.009	6.6	LOS A	0.0	0.0	0.00	0.56	50.0
2	T1	371	20.7	0.213	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		381	22.7	0.213	0.2	NA	0.0	0.0	0.00	0.02	59.6
North: Bruce Highway											
8	T1	387	18.5	0.220	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
9	R2	11	90.0	0.021	11.0	LOS A	0.1	0.9	0.53	0.67	47.5
Approach		398	20.4	0.220	0.3	NA	0.1	0.9	0.01	0.02	59.5
West: Midgee Quarry Access											
10	L2	12	81.8	0.109	10.7	LOS A	0.4	4.3	0.73	0.87	40.8
12	R2	9	100.0	0.109	38.7	LOS C	0.4	4.3	0.73	0.87	42.0
Approach		21	90.0	0.109	23.2	LOS B	0.4	4.3	0.73	0.87	41.4
All Vehicles		800	23.3	0.220	0.9	NA	0.4	4.3	0.03	0.04	58.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [POST 2029 AM PEAK]

Bruce Highway / Midgee Quarry Access
Proposed Intersection Configuration CHR / AULs
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bruce Highway											
1	L2	14	100.0	0.012	6.1	LOS A	0.0	0.0	0.00	0.57	51.6
2	T1	434	25.2	0.256	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		447	27.5	0.256	0.2	NA	0.0	0.0	0.00	0.02	59.6
North: Bruce Highway											
8	T1	351	18.3	0.199	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	17	81.2	0.037	12.1	LOS A	0.1	1.6	0.57	0.73	47.1
Approach		367	21.2	0.199	0.6	NA	0.1	1.6	0.03	0.03	59.2
West: Midgee Quarry Access											
10	L2	14	100.0	0.181	12.9	LOS A	0.6	7.6	0.81	0.92	38.9
12	R2	14	100.0	0.181	45.7	LOS D	0.6	7.6	0.81	0.92	39.2
Approach		27	100.0	0.181	29.3	LOS C	0.6	7.6	0.81	0.92	39.0
All Vehicles		842	27.1	0.256	1.3	NA	0.6	7.6	0.04	0.05	58.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [POST 2029 PM PEAK]

Bruce Highway / Midgee Quarry Access
Proposed Intersection Configuration CHR / AULs
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bruce Highway											
1	L2	15	92.9	0.013	6.6	LOS A	0.0	0.0	0.00	0.56	49.9
2	T1	371	20.7	0.213	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		385	23.5	0.213	0.3	NA	0.0	0.0	0.00	0.02	59.5
North: Bruce Highway											
8	T1	387	18.5	0.220	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
9	R2	15	92.9	0.030	11.3	LOS A	0.1	1.4	0.54	0.69	47.3
Approach		402	21.2	0.220	0.4	NA	0.1	1.4	0.02	0.03	59.4
West: Midgee Quarry Access											
10	L2	19	72.2	0.162	10.3	LOS A	0.5	6.4	0.73	0.87	41.2
12	R2	14	100.0	0.162	40.4	LOS C	0.5	6.4	0.73	0.87	42.2
Approach		33	83.9	0.162	22.9	LOS B	0.5	6.4	0.73	0.87	41.6
All Vehicles		820	24.8	0.220	1.3	NA	0.5	6.4	0.04	0.06	58.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix M – Vehicle Loading Calculations

ENG0118-001 | COLAS Asphalt Plant Midgee

Project Pavement Impact % Calculations (2019)

SITE MATERIAL DELIVERIES (INBOUND)

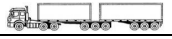
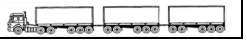
Avg Trucks per Day	=	6						
Days per Week	=	7						
Weeks per Year	=	48						
Site Material Deliveries	=	2,016	trucks					
	=	4,032	trips (in and out combined)					
Semi Trailers	=	50%						
	=	1,008	semi trailers movements					
	=	2,016	semi trailer trips (in and out combined)					
B-Doubles	=	50%						
	=	1,008	B-doubles trailers movements					
	=	2,016	B-doubles trailer trips (in and out combined)					
From Rockhampton	=	60%						
Semi Trailers	=	605	semi trailers movements					
	=	1,210	semi trailer trips (in and out combined)					
B-Doubles	=	605	B-doubles trailers movements					
	=	1,210	B-doubles trailer trips (in and out combined)					
ESAs (Semi)								
Avg Loaded	=	4.93	ESAs/HV	5.61	SAR_5/HV	14.63	SAR_{12}/HV	
Avg Unloaded	=	0.51	ESAs/HV	0.41	SAR_5/HV	0.11	SAR_{12}/HV	
ESAs Loaded	=	2,982	ESAs	3,393	SAR_5	8,848	SAR_{12}	
ESAs Unloaded	=	308	ESAs	248	SAR_5	67	SAR_{12}	
ESAs (B-Double)								
Avg Loaded	=	6.30	ESAs/HV	7.09	SAR_5/HV	17.17	SAR_{12}/HV	
Avg Unloaded	=	0.53	ESAs/HV	0.42	SAR_5/HV	0.11	SAR_{12}/HV	
ESAs Loaded	=	3,810	ESAs	4,288	SAR_5	10,384	SAR_{12}	
ESAs Unloaded	=	321	ESAs	254	SAR_5	67	SAR_{12}	
From Brisbane	=	40%						
Semi Trailers	=	403	semi trailers movements					
	=	806	semi trailer trips (in and out combined)					
B-Doubles	=	403	B-doubles trailers movements					
	=	806	B-doubles trailer trips (in and out combined)					
ESAs (Semi)								
Avg Loaded	=	4.93	ESAs/HV	5.61	SAR_5/HV	14.63	SAR_{12}/HV	
Avg Unloaded	=	0.51	ESAs/HV	0.41	SAR_5/HV	0.11	SAR_{12}/HV	
ESAs Loaded	=	1,988	ESAs	2,262	SAR_5	5,899	SAR_{12}	
ESAs Unloaded	=	206	ESAs	165	SAR_5	44	SAR_{12}	
ESAs (B-Double)								
Avg Loaded	=	6.30	ESAs/HV	7.09	SAR_5/HV	17.17	SAR_{12}/HV	
Avg Unloaded	=	0.53	ESAs/HV	0.42	SAR_5/HV	0.11	SAR_{12}/HV	
ESAs Loaded	=	2,540	ESAs	2,859	SAR_5	6,923	SAR_{12}	
ESAs Unloaded	=	214	ESAs	169	SAR_5	44	SAR_{12}	

ASPHALT DELIVERY

Total tonnage per year	=	100,000						
Payload - 6 Axle Articulated Vehicle	=	26.5						
Total number asphalt delivery truck movements	=	3774						
	=	3,774	trucks					
	=	7,548	trips (in and out combined)					
Semi Trailers	=	100%						
	=	3,774	semi trailers movements					
	=	7,548	semi trailer trips (in and out combined)					
B-Doubles	=	0%						
	=	0	B-doubles trailers movements					
	=	0	B-doubles trailer trips (in and out combined)					
	=	100%						
Semi Trailers	=	3,774	semi trailers movements					
	=	7,548	semi trailer trips (in and out combined)					
B-Doubles	=	0	B-doubles trailers movements					
	=	0	B-doubles trailer trips (in and out combined)					
ESAs (Semi)								
Avg Loaded	=	4.93	ESAs/HV	5.61	SAR_5/HV	14.63	SAR_{12}/HV	
Avg Unloaded	=	0.51	ESAs/HV	0.41	SAR_5/HV	0.11	SAR_{12}/HV	
ESAs Loaded	=	18,606	ESAs	21,172	SAR_5	55,214	SAR_{12}	
ESAs Unloaded	=	1,925	ESAs	1,547	SAR_5	415	SAR_{12}	
ESAs (B-Double)								
Avg Loaded	=	6.300	ESAs/HV	7.09	SAR_5/HV	17.17	SAR_{12}/HV	
Avg Unloaded	=	0.53	ESAs/HV	0.42	SAR_5/HV	0.11	SAR_{12}/HV	
ESAs Loaded	=	0	ESAs	0	SAR_5	0	SAR_{12}	
ESAs Unloaded	=	0	ESAs	0	SAR_5	0	SAR_{12}	

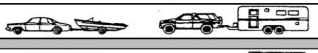
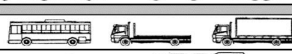
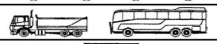
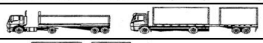
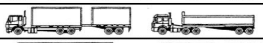
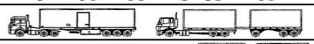
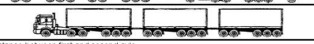
Proposed Number HVs	=	100,000.0	
Payload - 6 Axle Articulated Vehicle	=	26.50	
% To Capricorn Highway	=	50%	
ESAs Loaded	=	9,303	ESAs
ESAs Unloaded	=	962	ESAs
% To Bruce Highway North	=	50%	
ESAs Loaded	=	9,303	ESAs
ESAs Unloaded	=	962	ESAs

SAR by Austroads HV class

Class	Typical description	Dominant vehicle in each class
Medium (5.5m to 14.5m)		
3	Two axle truck	
4	Three axle truck	
5	Four axle truck	
Long (11.5m to 19.0m)		
6	Three axle articulated	
7	Four axle articulated	
8	Five axle articulated	
9	Six axle articulated (semi trailer)	
Medium combination (17.5m to 36.5m)		
10	B Double	
11	Double road train	
Large combination (over 33.0m)		
12	Triple road train	

Austroads vehicle class	3	4	5	6	7	8	9	10	11	12
Legal Loading (t)	15	22.5	27.5	24	31.5	39	42.5	62.5	79	115.5
Base Load per SAR4	13.6	19.2	23	21.8	27.4	33	37.7	56.2	70	102.3
Unloaded Axle Group Load (t)	8.5	9.5	12.5	12.5	13.5	14.5	16	22.5	27.5	39
Unloaded SAR4	0.54	0.5	0.46	0.6	0.56	0.52	0.51	0.53	0.55	0.58
Unloaded SAR5	0.43	0.41	0.37	0.46	0.44	0.41	0.41	0.42	0.43	0.44
Unloaded SAR12	0.11	0.11	0.09	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Loaded Axle Group Load (t)	15	22.5	27.5	24	31.5	39	42.5	62.5	79	115.5
Loaded SAR4	2.98	3.57	4.09	4.43	5.02	5.61	4.93	6.3	8.34	11.75
Loaded SAR5	3.29	4.14	4.89	4.88	5.73	6.58	5.61	7.09	9.53	13.45
Loaded SAR12	6.6	12.08	17.07	9.65	15.13	20.61	14.63	17.17	25.71	36.79
Payload (t)	6.5	13	15	11.5	18	24.5	26.5	40	51.5	76.5

AUSTROADS Vehicle Classification System

Level 1 Length (indicative) Type	Level 2 Axles and Axle Groups Axles	Groups	Level 3 Vehicle Type Typical Description	AUSTROADS Classification Class	Parameters	Typical Configuration
			LIGHT VEHICLES			
Short up to 5.5m		1 or 2	**Short** Sedan, Wagon, 4WD, Utility, Light Van, Bicycle, Motorcycle, etc	1	d(1) ≤ 3.2m and axles = 2	
Medium 5.5m to 14.5m	3, 4 or 5	3	**Short - Towing** Trailer, Caravan, Boat, etc	2	groups = 3 d(1) ≥ 2.1m, d(1) ≤ 3.2m, d(2) ≥ 2.1m and axles = 3, 4 or 5	
			HEAVY VEHICLES			
	2	2	**Two Axle Truck or Bus**	3	d(1) > 3.2m and axles = 2	
	3	2	**Three Axle Truck or Bus**	4	axles = 3 and groups = 2	
	> 3	2	**Four Axle Truck**	5	axles > 3 and groups = 2	
Long 11.5m to 19.0m	3	3	**Three Axle Articulated** Three axle articulated vehicle, or Rigid vehicle and trailer	6	d(1) > 3.2m, axles = 5 and groups = 3	
	4	> 2	**Four Axle Articulated** Four axle articulated vehicle, or Rigid vehicle and trailer	7	d(2) < 2.1m or d(1) < 2.1m or d(1) > 3.2m axles = 4 and groups > 2	
	5	> 2	**Five Axle Articulated** Five axle articulated vehicle, or Rigid vehicle and trailer	8	d(2) < 2.1m or d(1) < 2.1m or d(1) > 3.2m axles = 5 and groups > 2	
	≥ 6	> 2	**Six Axle Articulated** Six axle articulated vehicle, or Rigid vehicle and trailer	9	axles = 6 and groups > 2 or axles > 6 and groups = 3	
Medium Combination 17.5m to 36.5m	> 6	4	**B Double** B Double, or Heavy truck and trailer	10	groups = 4 and axles > 6	
	> 6	5 or 6	**Double Road Train** Double road train, or Medium articulated vehicle and one dog trailer (M.A.D.)	11	groups = 5 or 6 and axles > 6	
Large Combination Over 33.0m	> 6	> 6	**Triple Road Train** Triple road train, or Heavy truck and three trailers	12	groups > 6 and axles > 6	

Definitions: Group: Axle group, where adjacent axles are less than 2.1m apart
Groups: Number of axle groups
Axles: Number of axles (maximum axle spacing of 10.0m)

d(1): Distance between first and second axle
d(2): Distance between second and third axle

Semi-Trailer O OO OOO

	Axles / Tyres	Single / Single	Tandem / Dual	Tri / Dual					Totals	
	Legal Loading (t)	6	16.5	20.00					42.50	tonne
	Base Load / ESA	5.4	13.8	18.5						
Unloaded	Axle Group Load (t)	4.5	5	6.5					16	tonne
	ESA's	0.482	0.017	0.015					0.51	ESA
Loaded	Axle Group Load (t)	6.00	16.50	20.00					42.50	tonne
	ESA's [1]	1.524	2.044	1.366					4.93	ESA
	Payload =	26.5	tonne				ESA/t Payload =		0.0194	unloaded
	Max Legal Payload =	26.5	tonne [2]				ESA/t Payload =		0.1862	loaded

B-Double O OO OOO OOO

	Axles / Tyres	Single / Single	Tandem / Dual	Tri / Dual	Tri / Dual				Totals	
	Legal Loading (t)	6	16.5	20.00	20.00				62.50	tonne
	Base Load / ESA	5.4	13.8	18.5	18.5					
Unloaded	Axle Group Load (t)	4.5	5	6.5	6.5				22.5	tonne
	ESA's	0.482	0.017	0.015	0.015				0.53	ESA
Loaded	Axle Group Load (t)	6.00	16.50	20.00	20.00				62.50	tonne
	ESA's [1]	1.524	2.044	1.366	1.366				6.30	ESA
	Payload =	40.0	tonne				ESA/t Payload =		0.0132	unloaded
	Max Legal Payload =	40.0	tonne [2]				ESA/t Payload =		0.1575	loaded

Semi-Trailer O OO OOO

	Axles / Tyres	Single / Single	Tandem / Dual	Tri / Dual					Totals	
	Legal Loading (t)	6	16.5	20.00					42.50	tonne
	Base Load / ESA	5.4	13.8	18.5						
Unloaded	Axle Group Load (t)	4.5	5	6.5					16	tonne
	SAR_5	0.402	0.006	0.005					0.41	SAR_5
Loaded	Axle Group Load (t)	6.00	16.50	20.00					42.50	tonne
	SAR_5 [1]	1.694	2.444	1.477					5.61	SAR_5
	Payload =	26.5	tonne				SAR_5/t Payload =		0.0156	unloaded
	Max Legal Payload =	26.5	tonne [2]				SAR_5/t Payload =		0.2118	loaded

B-Double O OO OOO OOO

	Axles / Tyres	Single / Single	Tandem / Dual	Tri / Dual	Tri / Dual				Totals	
	Legal Loading (t)	6	16.5	20.00	20.00				62.50	tonne
	Base Load / ESA	5.4	13.8	18.5	18.5					
Unloaded	Axle Group Load (t)	4.5	5	6.5	6.5				22.5	tonne
	SAR_5	0.402	0.006	0.005	0.005				0.42	SAR_5
Loaded	Axle Group Load (t)	6.00	16.50	20.00	20.00				62.50	tonne
	SAR_5 [1]	1.694	2.444	1.477	1.477				7.09	SAR5
	Payload =	40.0	tonne				SAR_5/t Payload =		0.0105	unloaded
	Max Legal Payload =	40.0	tonne [2]				SAR_5/t Payload =		0.1773	loaded

Semi-Trailer O OO OOO

	Axles / Tyres	Single / Single	Tandem / Dual	Tri / Dual					Totals	
	Legal Loading (t)	6	16.5	20.00					42.50	tonne
	Base Load / ESA	5.4	13.8	18.5						
Unloaded	Axle Group Load (t)	4.5	5	6.5					16	tonne
	SAR_{12}	0.112	0.000	0.000					0.11	SAR_{12}
Loaded	Axle Group Load (t)	6.00	16.50	20.00					42.50	tonne
	SAR_{12} [1]	3.541	8.536	2.549					14.63	SAR_{12}
	Payload =	26.5	tonne				SAR_{12}/t Payload =		0.0042	unloaded
	Max Legal Payload =	26.5	tonne [2]				SAR_{12}/t Payload =		0.5519	loaded

B-Double O OO OOO OOO

	Axles / Tyres	Single / Single	Tandem / Dual	Tri / Dual	Tri / Dual				Totals	
	Legal Loading (t)	6	16.5	20.00	20.00				62.50	tonne
	Base Load / ESA	5.4	13.8	18.5	18.5					
Unloaded	Axle Group Load (t)	4.5	5	6.5	6.5				22.5	tonne
	SAR_{12}	0.112	0.000	0.000	0.000				0.11	SAR_5
Loaded	Axle Group Load (t)	6.00	16.50	20.00	20.00				62.50	tonne
	SAR_{12} [1]	3.541	8.536	2.549	2.549				17.17	SAR_{12}
	Payload =	40.0	tonne				SAR_{12}/t Payload =		0.0028	unloaded
	Max Legal Payload =	40.0	tonne [2]				SAR_{12}/t Payload =		0.4293	loaded

Appendix N – Pavement Impact Calculations

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Project Pavement Impact % Calculations (2019)

Road ID	Road Description	AADT Segment		Base Data Year	Base Year AADT			Base Year HV%		Base Year HV		10 Yr GR%	2019 AADT			2019 HV		ESAs/HV	Operation Period	Background ESAs		Development ESAs		ESA Increase %	
		Start (km)	End (km)		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Gaz	A-Gaz		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz			Gaz	A-Gaz	Gaz Total	A-Gaz Total	Gaz %	A-Gaz %
10E	Bruce Highway (Benaraby to Rockhampton)	45.420	85.308	2018	2,841	2,842	5,683	21.68%	23.82%	616	677	0.16%	2,846	2,847	5,692	617	678	2.9	365	653,004	717,713	4,528	419	0.69%	0.06%
		85.308	107.400	2018	3,478	3,524	7,002	28.32%	26.14%	985	921	2.33%	3,559	3,606	7,165	1,008	943	2.9	365	1,066,883	997,781	4,528	419	0.42%	0.04%
		107.400	108.938	2018	3,478	3,524	7,002	28.32%	26.14%	985	921	2.33%	3,559	3,606	7,165	1,008	943	2.9	365	1,066,883	997,781	19,235	8,717	1.80%	0.87%
		108.938	114.388	2018	3,062	3,067	6,129	24.95%	27.06%	764	830	1.67%	3,113	3,118	6,231	777	844	2.9	365	822,166	893,152	19,235	8,717	2.34%	0.98%
		114.388	116.961	2018	4,798	4,412	9,210	15.46%	21.01%	742	927	0.94%	4,843	4,453	9,297	749	936	2.9	365	792,545	990,412	19,235	8,717	2.43%	0.88%
		116.961	119.737	2018	10,103	10,110	20,213	20.54%	16.89%	2,075	1,708	0.00%	10,103	10,110	20,213	2,075	1,708	2.9	365	2,196,553	1,807,472	9,932	7,754	0.45%	0.43%
		119.737	121.051	2018	10,566	10,346	20,912	11.62%	14.46%	1,228	1,496	0.00%	10,566	10,346	20,912	1,228	1,496	2.9	365	1,299,594	1,583,549	9,932	7,754	0.76%	0.49%
10F	Bruce Highway (Rockhampton to St Lawrence)	0.000	1.409	2018	7,468	6,966	14,434	17.02%	18.40%	1,271	1,282	0.00%	7,468	6,966	14,434	1,271	1,282	2.9	365	1,345,410	1,356,726	9,932	7,754	0.74%	0.57%
		1.409	4.340	2018	17,400	15,358	32,758	11.02%	8.71%	1,917	1,338	0.00%	17,400	15,358	32,758	1,917	1,338	2.9	365	2,029,653	1,415,936	9,932	7,754	0.49%	0.55%
		4.340	5.517	2018	13,633	11,593	25,226	9.34%	12.17%	1,273	1,411	0.75%	13,735	11,680	25,415	1,283	1,421	2.9	365	1,357,920	1,504,604	9,303	962	0.69%	0.06%
		5.517	8.550	2018	9,092	8,512	17,604	11.67%	13.83%	1,061	1,177	1.63%	9,240	8,651	17,891	1,078	1,196	2.9	365	1,141,414	1,266,387	9,303	962	0.82%	0.08%
		8.550	13.180	2018	6,366	6,384	12,750	13.70%	9.21%	872	588	2.32%	6,514	6,532	13,046	892	602	2.9	365	944,580	636,801	9,303	962	0.98%	0.15%
16A	Capricorn Highway (Rockhampton - Duaringa)	0.000	5.960	2018	8,289	7,503	15,792	10.76%	25.98%	892	1,949	0.00%	8,289	7,503	15,792	892	1,949	3.2	365	1,041,735	2,276,758	9,303	962	0.89%	0.04%

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Project Pavement Impact % Calculations (2019)

SITE MATERIAL DELIVERIES (INBOUND)

Avg Trucks per Day = 6
Days per Week = 7
Weeks per Year = 48

Site Material Deliveries = 2,016 trucks
= 4,032 trips (in and out combined)

Semi Trailers = 50%
= 1,008 semi trailers movements
= 2,016 semi trailer trips (in and out combined)

B-Doubles = 50%
= 1,008 B-doubles trailers movements
= 2,016 B-doubles trailer trips (in and out combined)

From Rockhampton = 60%

Semi Trailers = 605 semi trailers movements
= 1,210 semi trailer trips (in and out combined)

B-Doubles = 605 B-doubles trailers movements
= 1,210 B-doubles trailer trips (in and out combined)

ESAs (Semi)

Avg Loaded	=	4.93	ESAs/HV	5.61	SAR_5/HV	14.63	SAR_{12}/HV
Avg Unloaded	=	0.51	ESAs/HV	0.41	SAR_5/HV	0.11	SAR_{12}/HV
ESAs Loaded	=	2,982	ESAs	3,393	SAR_5	8,848	SAR_{12}
ESAs Unloaded	=	308	ESAs	248	SAR_5	67	SAR_{12}

ESAs (B-Double)

Avg Loaded	=	6.30	ESAs/HV	7.09	SAR_5/HV	17.17	SAR_{12}/HV
Avg Unloaded	=	0.53	ESAs/HV	0.42	SAR_5/HV	0.11	SAR_{12}/HV
ESAs Loaded	=	3,810	ESAs	4,288	SAR_5	10,384	SAR_{12}
ESAs Unloaded	=	321	ESAs	254	SAR_5	67	SAR_{12}

From Brisbane = 40%

Semi Trailers = 403 semi trailers movements
= 806 semi trailer trips (in and out combined)

B-Doubles = 403 B-doubles trailers movements
= 806 B-doubles trailer trips (in and out combined)

ESAs (Semi)

Avg Loaded	=	4.93	ESAs/HV	5.61	SAR_5/HV	14.63	SAR_{12}/HV
Avg Unloaded	=	0.51	ESAs/HV	0.41	SAR_5/HV	0.11	SAR_{12}/HV
ESAs Loaded	=	1,988	ESAs	2,262	SAR_5	5,899	SAR_{12}
ESAs Unloaded	=	206	ESAs	165	SAR_5	44	SAR_{12}

ESAs (B-Double)

Avg Loaded	=	6.30	ESAs/HV	7.09	SAR_5/HV	17.17	SAR_{12}/HV
Avg Unloaded	=	0.53	ESAs/HV	0.42	SAR_5/HV	0.11	SAR_{12}/HV
ESAs Loaded	=	2,540	ESAs	2,859	SAR_5	6,923	SAR_{12}
ESAs Unloaded	=	214	ESAs	169	SAR_5	44	SAR_{12}

ASPHALT DELIVERY

Total tonnage per year = 100,000
Payload - 6 Axle Articulated Vehicle = 26.5
Total number asphalt delivery truck movements = 3774

= 3,774 trucks
= 7,548 trips (in and out combined)

Semi Trailers = 100%
= 3,774 semi trailers movements
= 7,548 semi trailer trips (in and out combined)

B-Doubles = 0%
= 0 B-doubles trailers movements
= 0 B-doubles trailer trips (in and out combined)

= 100%

Semi Trailers = 3,774 semi trailers movements
= 7,548 semi trailer trips (in and out combined)

B-Doubles = 0 B-doubles trailers movements
= 0 B-doubles trailer trips (in and out combined)

ESAs (Semi)

Avg Loaded	=	4.93	ESAs/HV	5.61	SAR_5/HV	14.63	SAR_{12}/HV
Avg Unloaded	=	0.51	ESAs/HV	0.41	SAR_5/HV	0.11	SAR_{12}/HV
ESAs Loaded	=	18,606	ESAs	21,172	SAR_5	55,214	SAR_{12}
ESAs Unloaded	=	1,925	ESAs	1,547	SAR_5	415	SAR_{12}

ESAs (B-Double)

Avg Loaded	=	6.300	ESAs/HV	7.09	SAR_5/HV	17.17	SAR_{12}/HV
Avg Unloaded	=	0.53	ESAs/HV	0.42	SAR_5/HV	0.11	SAR_{12}/HV
ESAs Loaded	=	0	ESAs	0	SAR_5	0	SAR_{12}
ESAs Unloaded	=	0	ESAs	0	SAR_5	0	SAR_{12}

Proposed Number HVs = 100,000.0
Payload - 6 Axle Articulated Vehicle = 26.50

% To Capricorn Highway = 50%
ESAs Loaded = 9,303 ESAs
ESAs Unloaded = 962 ESAs

% To Bruce Highway North = 50%
ESAs Loaded = 9,303 ESAs
ESAs Unloaded = 962 ESAs

Appendix O – TIA RPEQ Certification and Authorisation

Certification of Traffic Impact Assessment Report

Registered Professional Engineer Queensland

for

Project Title:	COLAS Asphalt Manufacturing Plant TIA

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:	Andrew Barrie	**RPEQ No:**	12801
RPEQ Competencies:	Civil		
Signature:		**Date:**	27 May 2019
Postal Address:	PO Box 9864, Frenchville QLD 4701		
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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	✓
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)	✓
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	✓
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	✓