

17 | Transport



Section 17 Traffic Impact Assessment

17.1 Introduction

Hancock Galilee Pty Ltd (HGPL), the Proponent, is investigating the opportunity to develop the Kevin's Corner Coal Project (The Project).

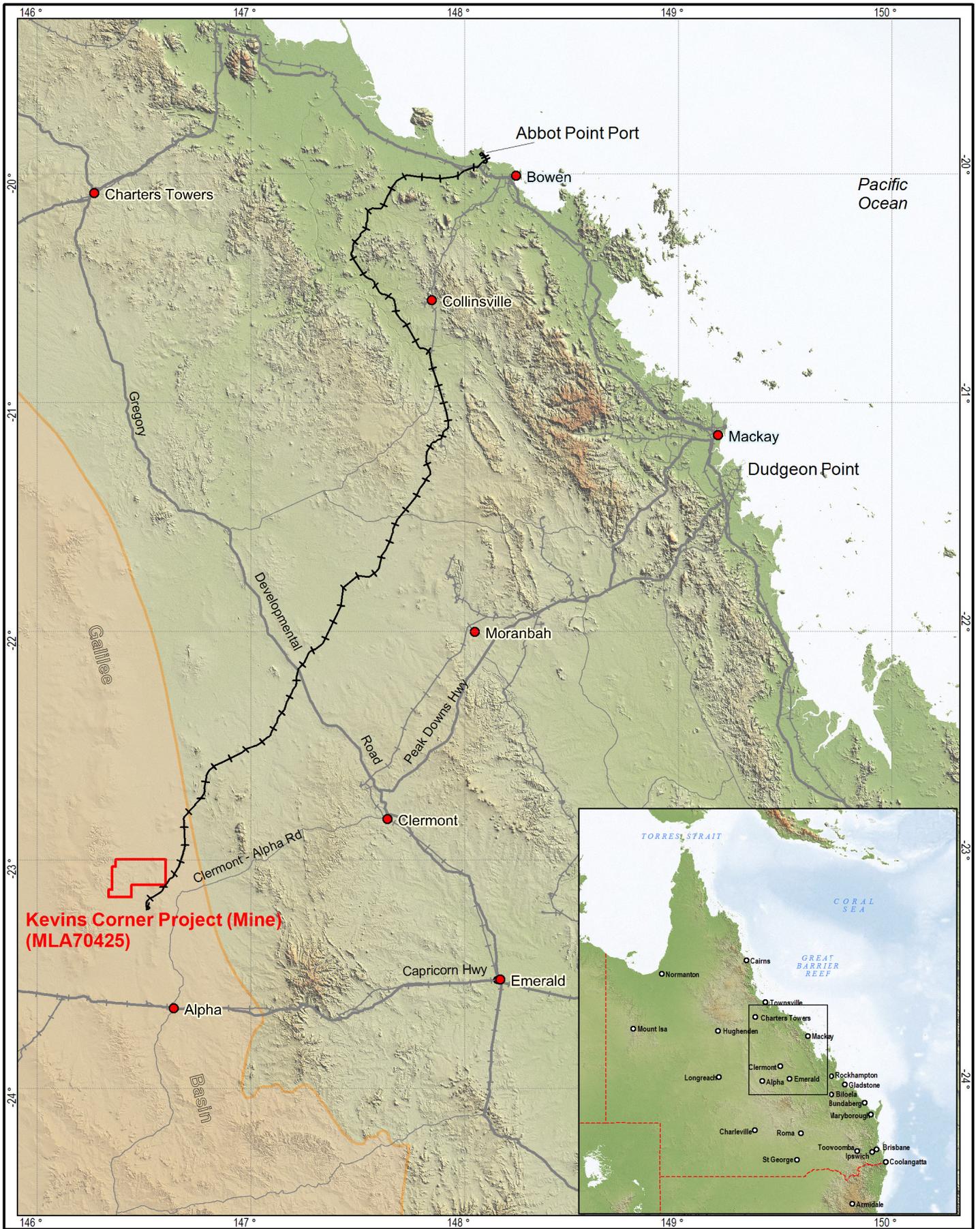
URS has been engaged by HGPL to prepare an Environmental Impact Statement (EIS) for the proposed Project planned for the Galilee Basin region of Queensland, approximately 70 km north of the township of Alpha by road from the Capricorn Highway.

This traffic component to the EIS is to be prepared and referred to the Queensland Government required under the *State Development and Public Works Organisation Act 1971* (SDPWO Act) and also under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This study assesses both the construction and ongoing operational phases of the development and has been prepared to evaluate the traffic impacts of the proposed Project on the existing road network, in accordance with the Queensland Government Department of Transport and Main Roads (DTMR) *Guidelines for Assessment of Road Impacts of Developments* (2006). This assessment focuses on the preferred routes to the Project site and provides appropriate mitigation measures for potential impacts identified.

As part of this report, a site inspection was undertaken of the existing road network and data has been sourced from the Queensland DTMR. Information regarding the Project has been sourced from HGPL.

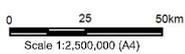
Figure 17-1 illustrates the location of the Project.



**Kevins Corner Project (Mine)
(MLA70425)**

 Mining Lease Application (MLA70425) Boundary
 Proposed Alpha Project Rail Line

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 HANCOCK GALILEE PTY LTD
**Kevins' Corner Project
Environmental Impact Statement**

**KEVINS CORNER
REGIONAL LOCATION**

Job Number | 4262 6660
 Revision | B
 Date | 12-09-2011

Figure: 17-1

File No: 42626660-g-1090.wor

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17.1.1 Project-related Transport Infrastructure

As part of the Project, it is proposed that the existing Jericho-Degulla Road within the mining lease area be closed to public traffic and relevant bypasses will be constructed to facilitate traffic flow around the active areas of the Project site, linking Degulla Road to Cudmore National Park.

The Proponent is currently operating a bulk sample test pit program (BSTP) at the proposed Project site as part of another coal mine application (Alpha Coal Mine). As part of this testing program, an agreement has been made with the Barcardine Regional Council (BRC) and DTMR to upgrade and maintain the existing Hobartville Road, Clermont-Alpha Road and Duck Ponds Road.

The following upgrades are covered under the BSTP agreement.

- Upgrade to Hobartville Road along a length of 28 km from the BSTP entrance to the intersection with the Clermont-Alpha Road, including an eight metre wide gravel formation with bitumen seal of four metre width. Seven stock grids will be replaced along the road.
 - It should be noted that no vehicles for the Kevin's Corner Project are proposed to use any section of Hobartville Road.
- Improvement of the intersection of Clermont-Alpha Road and Hobartville Road.
- Provision of a four metre wide passing opportunity and ongoing shoulder maintenance between the Clermont-Alpha Road / Hobartville Road intersection and the township of Alpha.

All external road upgrades and construction will be completed to required standards and design guidelines as stipulated by the DTMR.

The agreement covers both capital and maintenance works and as of 24 August 2010, designs were complete and cost estimates from both a private company and BRC were being reviewed for implementation of the works. A site visit in early March 2011 revealed that re-construction work of the carriageway along Hobartville Road and sections of Clermont-Alpha was in progress.

Duck Ponds Road is a Central Highlands Regional Council (CHRC) controlled road located east of Emerald. An agreement has been made with CHRC to make good this road following the completion of the BSTP haulage. However, this road is not included as part of this report and hence is not discussed further.

It is anticipated that the generated traffic from the Kevin's Corner Project will utilise the following roads in the vicinity:

- Capricorn Highway;
- Gregory Highway;
- Peak Downs Highway;
- Clermont-Alpha Road; and
- Degulla Road.



17.2 Existing Conditions

17.2.1 Regional Road Network

The roads described below are part of the State Controlled Road (SCR) network and are managed by the DTMR. This section summarises the main characteristics of each road with detailed descriptions provided in Volume 2, Appendix R.

17.2.1.1 Peak Downs Highway (70)

The Peak Downs Highway (70) is an interstate highway that links Mackay on the central east coast of Queensland to Clermont in a south-westerly direction. It is a two lane, two-way sealed road with a 100 km/hr speed limit, which is reduced to 80 km/hr or 60 km/hr where the road passes through communities.

A number of localised upgrades of the road have occurred due to recent coal mine projects and the road is frequently used by both Commercial Vehicles (CV) and Over Dimensional Vehicles (ODV).

The Peak Downs Highway is suitable for use as a transport route for the Kevin's Corner Project should this traffic utilise Mackay.

17.2.1.2 Gregory Highway (A7)

The Gregory Highway (A7) runs in a north-south direction through central eastern Queensland, connecting Springsure in the south to Clermont, further north. The section of the highway included in this assessment is a two lane, two-way sealed road with a 100 km/hr speed limit, which is reduced to 80 km/hr or 60 km/hr where the road passes through communities. The highway is frequently used by both CVs and ODVs.

The Gregory Highway is suitable for use as a haulage route for the Kevin's Corner Project.

17.2.1.3 Capricorn Highway

This is the main east-west highway linking Rockhampton to Emerald, and further west to Barcaldine via Alpha. It is a heavily trafficked CV route (particularly east of Emerald), with a speed limit of 100 km/h. The Capricorn Highway is mainly one lane in each direction with sealed shoulders in some areas and overtaking lanes at various locations. Generally, the road surface is adequate and there are no obvious issues for CV access.

The Capricorn Highway is suitable for use as a haulage route for the Kevin's Corner Project.

17.2.1.4 Clermont - Alpha Road

The Clermont-Alpha Road provides a north-south route connecting the Capricorn Highway at Alpha in the south to the Gregory Highway at Clermont further north. For a 37 km section extending to the north of the Capricorn Highway, the road is a single carriageway, single-lane sealed road with a varying seal width of approximately three and a half to four and a half metres. Within this section, the seal widens to two lane widths to enable two-way traffic for approximately three kilometres. There are no line markings on the seal.

Approximately 37 km north of the intersection with the Capricorn Highway the carriageway cross section changes to a formed, unsealed road approximately 8 to 10 metres in width, providing two lanes to accommodate two-way traffic; however, there is no delineation of lanes. The road returns to a

two-way two lane sealed carriageway for approximately seven kilometres on the approach into Clermont from the west.

17.2.2 Local Road Network

The Project site is surrounded by a network of local roads, which are primarily unsealed local access roads. Local road conditions are managed by the BRC. In general, all local roads are within rural private property areas and do not have speed limit signs, unless otherwise specified.

17.2.2.1 Jericho – Degulla Road

Jericho-Degulla Road is a formed, unsealed north-south road connecting Hobartville Road/ Degulla Road to the south with Cudmore Reserve to the north.

The carriageway is a two-way formed road in a wide reservation with less formed shoulders and in other areas the road is a single track with less formed shoulders to enable two-way traffic to pass. The surface condition is poor-average, with potholes. The road surface is open to erosion, dust and flooding issues.

17.2.2.2 Degulla Road

Degulla Road is a formed, unsealed east-west road connecting Hobartville Road/Jericho-Degulla Road in the west to Clermont-Alpha Road in the east with a section length of approximately 16 km. The carriageway is a single lane formed road in a wide reservation with less formed shoulders to enable two-way traffic to pass. It should be noted that a section of this road will be closed as part of the proposed Alpha Coal Project.

17.2.3 Public Transport and Freight Routes

There are currently a number of existing designated routes in the study area, utilised by public transport, school buses, haulage and stock.

School bus routes currently exist along the Capricorn, Gregory and Peak Downs Highways. Typical school bus route operation times vary within the ranges of 7.00 am to 8.30 am and 2.30 pm to 4.30 pm, depending on the proximity and starting time of local schools.

A number of long-distance regional bus services operate throughout rural Queensland and five of these routes operate along the same State Controlled Roads as the proposed haulage routes. These public transport services occur at a low frequency and are generally at or below one service per day (with the exception of the Mt Isa – Brisbane Greyhound service). It is therefore considered that any interaction between construction and operational vehicles will be minimal and these public transport services will not be significantly impacted based on the proposed vehicle movements generated by the Project.

The use of stock routes in rural areas can create safety concerns for freight haulage routes. Existing stock routes surrounding the Project site currently exist on Clermont-Alpha Road, Hobartville Road and Degulla Road. The location and impact of stock routes on vehicles generated by the Project should be investigated as part of the further tasks undertaken in the Road-Use Management Plan.

17.2.4 Existing Road Crash Data

Road crash data has been analysed along the routes proposed to be utilised by the traffic movements of the Project for which DTMR was able to provide statistics. For the purposes of this study, the summary of crash data at intersections and mid-blocks are displayed together (see Table 17-1)

The following crash data was obtained from DTMR from July 2005 to July 2010.

Table 17-1 Crash data summary

Road Section	Fatality	Other Injury	Property Damage	Total
	No. (% of Total)	No. (% of Total)	No. (% of Total)	
Capricorn Highway				
16A Rockhampton – Duaringa	6 (18%)	17 (52%)	10 (30%)	33
16B Duaringa – Emerald	1 (1%)	75 (52%)	68 (47%)	144
16C Emerald - Alpha	1 (2%)	30 (61%)	18 (37%)	49
16D Alpha - Barcaldine	0 (0%)	6 (55%)	5 (45%)	11
Total Capricorn Hwy	8 (3%)	128 (54%)	101 (43%)	237
Gregory Highway				
27B Emerald - Clermont	4 (4%)	46 (48%)	46 (48%)	96
Total Gregory Highway	4 (4%)	46 (48%)	46 (48%)	96
Clermont – Alpha Road				
Clermont - Alpha Road	0 (0%)	5 (56%)	4 (44%)	9
Total Clermont - Alpha Road	0 (0%)	5 (56%)	4 (44%)	9

17.2.5 Scheduled Road Improvement Projects

The DTMR outlines proposed road improvement projects in the publication *Roads Implementation Program 2009-2010 to 2013-2014* (2008). This document has been reviewed to identify any road improvement projects scheduled to occur on the roads proposed to be used for the Project. Details of the proposed works are given in Volume 2, Appendix R.

Proposed works on the SCR which have been assessed include minor realignment and shoulder sealing along the Capricorn Highway between Emerald and Barcaldine and ongoing regrading works on the Clermont-Alpha Road.

There are indicative funds proposed for the construction of a bridge and approaches over Native Companion Creek on the Clermont-Alpha Road; however, the timing and scope of these works are yet to be confirmed.

17.2.6 Consultation Summary

A representative from the traffic assessment team consulted with BRC and DTMR throughout the development of the TIA. Details of this consultation are provided in Volume 2, Appendix R.

17.3 Traffic Volumes

This section provides existing traffic volumes and forecasts of future traffic volumes during the construction and operational phases of the Project.

17.3.1 Existing Traffic Volumes

Annual Average Daily Traffic (AADT) is a simple measure of transport demand obtained by counting the number of axles passing a given point on the road. AADT was obtained from DTMR for mid-blocks on the SCR network surrounding the subject site and is for two-way traffic. Such information is not available for Degulla Road or Jericho–Degulla Road; however, an estimate of volumes for these roads was undertaken based on on-site observations.

17.3.2 Traffic Volume Assessment Scenarios

For the traffic volume assessment scenarios the Proponent estimated the expected road network traffic volumes generated from both the construction and operational phases of the Project. These estimations included an outline of the anticipated traffic volumes associated with employees and construction vehicles. As the traffic volumes and patterns vary over the construction and operating phases of the Project, including variations over the life of the mine, different scenarios have been assessed to identify the worst case scenario for traffic impacts. Table 17-2 highlights the years that have been assessed.

Table 17-2 Traffic volume assessment years

Assessment Year	Traffic Pattern
2014	Peak traffic volume during construction phase
2017	Peak traffic volume during operational phase
2022	10 year post operation design horizon
2030	Additional assessment year during operation for comparison purposes
2041	Additional assessment year during operation for comparison purposes

17.3.3 Historical Traffic Growth and Future background Volumes

In order to determine the future background traffic volumes (expected volumes across the road network without the proposed Project), the existing traffic volumes are projected forward using historical growth rates. As DTMR were not able to provide a projected future growth rate, an estimate of background traffic growth rates has been made based on ranges of past historical growth rates, relevant available data and an understanding of rural road networks. The following annual rates have been adopted in this assessment to project the background traffic in the future assessment years;

- Degulla Road: 3%;
- Clermont-Alpha Road: 3%;
- Capricorn Highway (Alpha to Emerald): 3%;
- Gregory Highway: 5% (2010-2020) and 3% (2021-2042); and
- Peak Downs Highway: 10% (2010-2020) and 5% (2021-2042).



17.3.4 Traffic Generation of Project

17.3.4.1 Construction Phase

The initial construction phase of the Project is anticipated to occur over a 24 month period to first coal production, with the peak traffic generation occurring in 2014. During this peak period there is expected to be approximately 1,600 employees working on-site, with the majority of the workforce completing 12 hour shifts.

Delivery of materials and equipment and consumable is expected to occur seven days a week over a 10-hour period daily with lower volumes of traffic movements on the weekend.

All employees, with the exception of those who reside in Alpha, will reside in the accommodation facilities within the mining lease, which will be accessed via Degulla Road.

The Proponent will operate a Fly-In-Fly-Out (FIFO) service to a newly constructed airfield on-site for 95% of the workforce. The remaining 5% of the workforce is expected to reside within the local region and utilise a Drive-In-Drive-Out program – 2% from Alpha and 1% each from Clermont, Emerald and Barcaldine. Personnel from Alpha will be permitted by agreement with the Mine Management to Drive-in Drive-out (DIDO) on a daily basis; however, the remaining DIDO personnel from Clermont, Emerald and Barcaldine must reside at the accommodation facilities and be able to drive to/from home only at the beginning and conclusion of their roster.

The movement of employees from the accommodation facilities to the mine site has not been included in this assessment as this occurs within the mining lease area.

The Proponent has provided data (predominantly based on Alpha Project figures due to the similarity of infrastructure) showing the predicted traffic generated as a result of the construction of the Project. The data is based on the current status of the design being similar in scale to the Alpha Coal Project. Traffic volumes are preliminary estimates at this stage.

A summary of the traffic volumes generated by construction activity as outlined in the provided data is shown in Table 17.3. Vehicles have been classified according to the AustRoads *Vehicle Classification System* (AustRoads, 1988), which defines 12 classes to distinguish between the lengths (and size) of short, medium, long, medium combination and long combination vehicles. For the purposes of this assessment, Light Vehicles (LV) represent classes 1 to 3, Commercial Vehicles (CV) represent classes 4 to 10, and Over-Dimensional Vehicles(ODVs) represent classes 11, 12 and above.

Table 17-3 generated peak construction traffic volumes, 2014 – Project only

Category		Vehicle Type (AustRoads Vehicle Class)	Origin	Destination	Network Vehicles (single trip) per year	AADT
Personnel						
1.1	FIFO	Internal Transport	KC Airport	Accommodation	0	0
1.2	DIDO	LV (Class 1)	Alpha Town	Project Site	11315	62
1.4	DIDO	LV (Class 1)	Barcaldine Council	Accommodation	832	5
1.6	DIDO	LV (Class 1)	Emerald	Accommodation	832	5
1.8	DIDO	LV (Class 1)	Clermont	Accommodation	832	5
Equipment						
2.1	Construction	Standard Semi (CV) (Class 8)	Brisbane	Project Site	898	5
2.2			Mackay	Project Site	898	5
2.3			Rockhampton	Project Site	449	2
2.4	Construction	Over- Dimensional (ODV)	Brisbane	Project Site	792	4
2.5			Mackay	Project Site	792	4
2.6			Rockhampton	Project Site	396	2
Material						
3.1	Construction materials	Standard Semi (Class 8) or 57 kL tanker (Class 10)	Brisbane	Project Site	1415	8
3.2			Mackay	Project Site	1887	10
3.3			Gladstone	Project Site	944	5
3.4			Newcastle	Project Site	157	1
3.5			Wollongong	Project Site	157	1
3.6			Adelaide	Project Site	157	1
Waste						
4.1	Non-landfill waste	20 t capacity (Class 4 or 5)	Project Site	Emerald	936	5
		Total LV single trips per year			13,811	76
		Total CV single trips per year			7,897	43
		Total ODV single trips per year			1,979	11

17.3.4.2 Operational Phase

The generated traffic from the Project during its operational phase is primarily attributed to delivery of consumables and replacement equipment, the removal of waste and limited employee transport.

Coal produced by the mine will be transported off site via the proposed rail line to connect with the planned rail line to Alpha-Abbott Point running to the east of the Project site and hence will not generate any traffic or have an impact on the road network.

It is envisaged that operation personnel staff will peak during year 2019 with 1,367 operation personnel on-site at one time, with final equipment being mobilised and most areas of the operation being mined concurrently. However, in 2017, construction personnel of 450 will still be present on-site,



together with operation personnel of 1,300 totalling 1,750 personnel on-site. For a worst case scenario, 2017 total personnel values are to represent the peak operational year for this assessment.

Personnel mode of transport and origin, delivery of materials, equipment and consumables and waste treatment assumptions are the same as per the construction phase. However, from the collation of this data, it is apparent that within the 10-year design horizon required by the DTMR guidelines, the worst case scenario for traffic impact occurs in 2017 and hence this year has been used for further analysis to assess the worst case impacts on the road network.

The Proponent has provided data showing the predicted traffic generated as a result of the operational phase of the Project. Traffic volumes are preliminary estimates at this stage.

A summary of the traffic volumes generated by operational activity as outlined in the provided data is shown in Table 17-4.

Table17-4 Generated peak operational traffic volumes, 2017 – Project only

Category		Vehicle Type (AustRoads Vehicle Class)	Origin	Destination	Network Vehicles (single trip) per year	AADT
Personnel						
1.1	FIFO	Internal transport	KC Airport	Accommodation	0	0
1.2	DIDO	LV (Class 1)	Alpha Town	Project Site	12,522	69
1.4	DIDO	LV(Class 1)	Barcaldine Council	Accommodation	892	5
1.6	DIDO	LV (Class 1)	Emerald	Accommodation	892	5
1.8	DIDO	LV (Class 1)	Clermont	Accommodation	892	5
Equipment						
2.1	New Mining Equipment	Standard Semi (CV) (Class 8)	Brisbane	Project Site	898	5
			Mackay	Project Site	898	5
			Rockhampton	Project Site	449	2
2.2	Replacement equipment (NB: Generated vehicles are for 2017)	Standard Semi (Class 8)	Brisbane	Project Site	654	4
			Mackay	Project Site	654	4
			Rockhampton	Project Site	327	2
			Brisbane	Project Site	0	0
			Mackay	Project Site	0	0
			Rockhampton	Project Site	0	0
Material						
3.1	Construction materials	Standard Semi (Class 8) or 57 kL tanker (Class 10)	Brisbane	Project Site	1444	8
3.2			Mackay	Project Site	1925	11
3.3			Gladstone	Project Site	963	5
3.4			Newcastle	Project Site	160	1
3.5			Wollongong	Project Site	160	1
3.6			Adelaide	Project Site	160	1
Waste						
4.1	Non-landfill waste	20 t capacity (Class 4 or 5)	Project Site	Emerald	698	4
		Total LV single trips per year			15,199	83
		Total CV single trips per year			7,145	39
		Total ODV single trips per year			0	0

17.3.5 Distribution of Generated Traffic

For impact assessment, it is assumed that all generated traffic will use the existing road network. A number of factors will influence the decision of which roads to utilise to access the site. Major considerations include:

- Road assessment, monitoring, maintenance and upgrade requirements;
- Travel time;
- Road safety; and
- Council and DTMR approval requirements.

It is assumed that all materials and equipment will be delivered to site via major highways to the local area. Within the local area, routes will be based on the most direct link available as travel time is often the predominant factor driving transportation of bulk cargo.

Diagrams highlighting the generated trip distribution during construction phase and operational phase are shown on Figure 17-2 and 17-3, respectively. A detailed account of the routes is provided in Volume 2, Appendix R.

Using the route designations from previous generated traffic calculations, the generated traffic was assigned to the local road network and resulting daily single movement values for the 2014 (construction) and 2017 (operational) assessment scenarios.

Figure 17-2 2014 peak construction year traffic distribution (daily single movements)

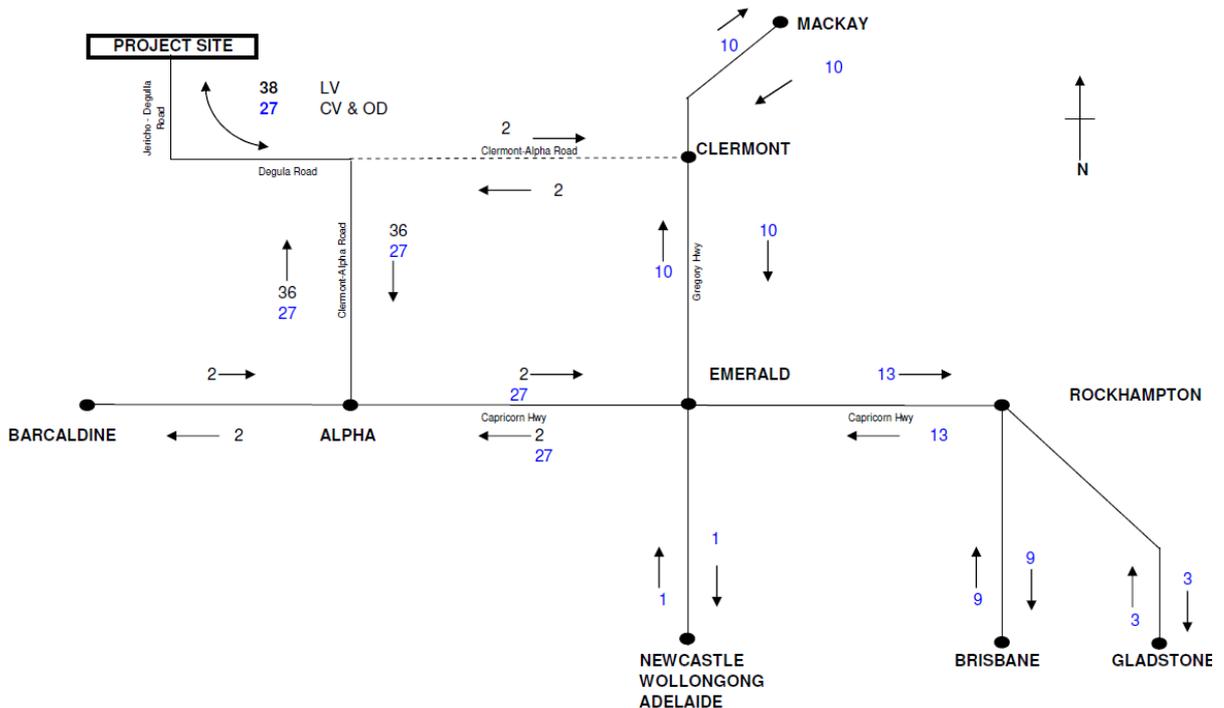
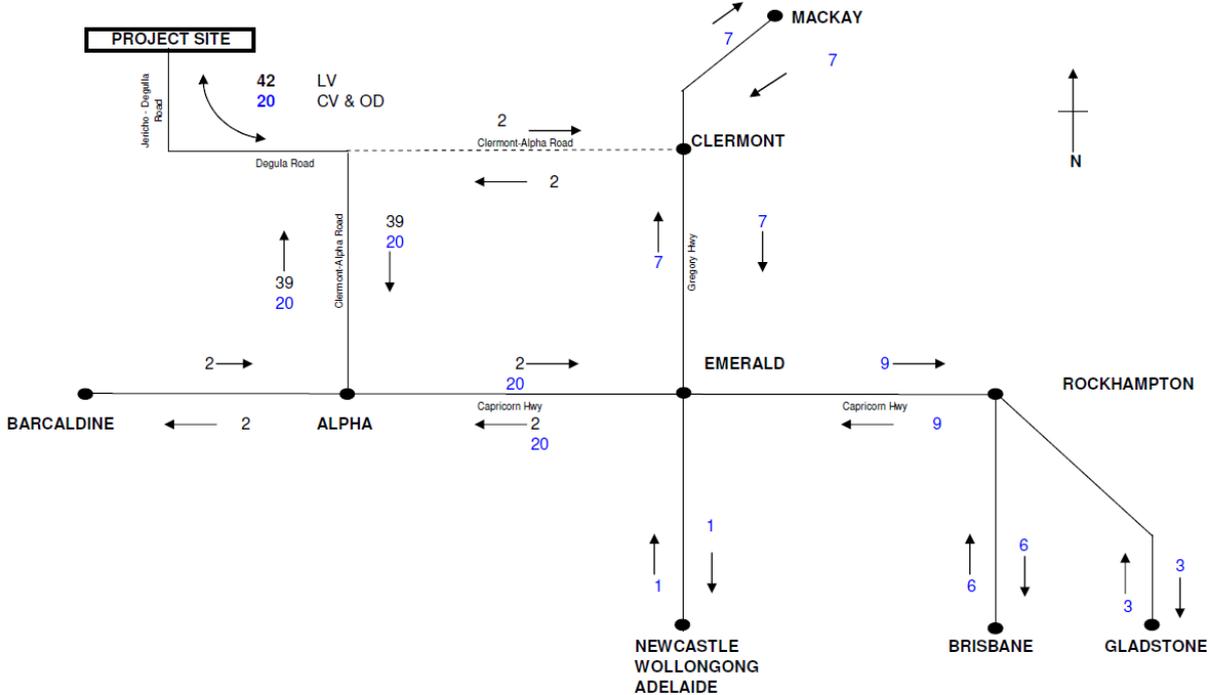


Figure 17-3 2017 peak operational year traffic distribution (daily single movements)



17.3.6 Total Future Traffic Volumes

The total volume of traffic in the network in future assessment scenarios is determined by adding the future background traffic volume and the traffic volume generated by the Project together for the two selected assessment years (2014 and 2017).

Figure 17-4 outlines the total future traffic volumes with and without the Project development for 2014 (construction phase) and the percentage increase caused by the generated traffic after assignment to the designated transport routes. Figure 17-5 outlines this same information but with reference to the 2017 assessment year (operational phase).

Figure 17-4 Peak projected traffic volumes construction phase – Annual Average Daily Traffic (AADT) volumes and impact

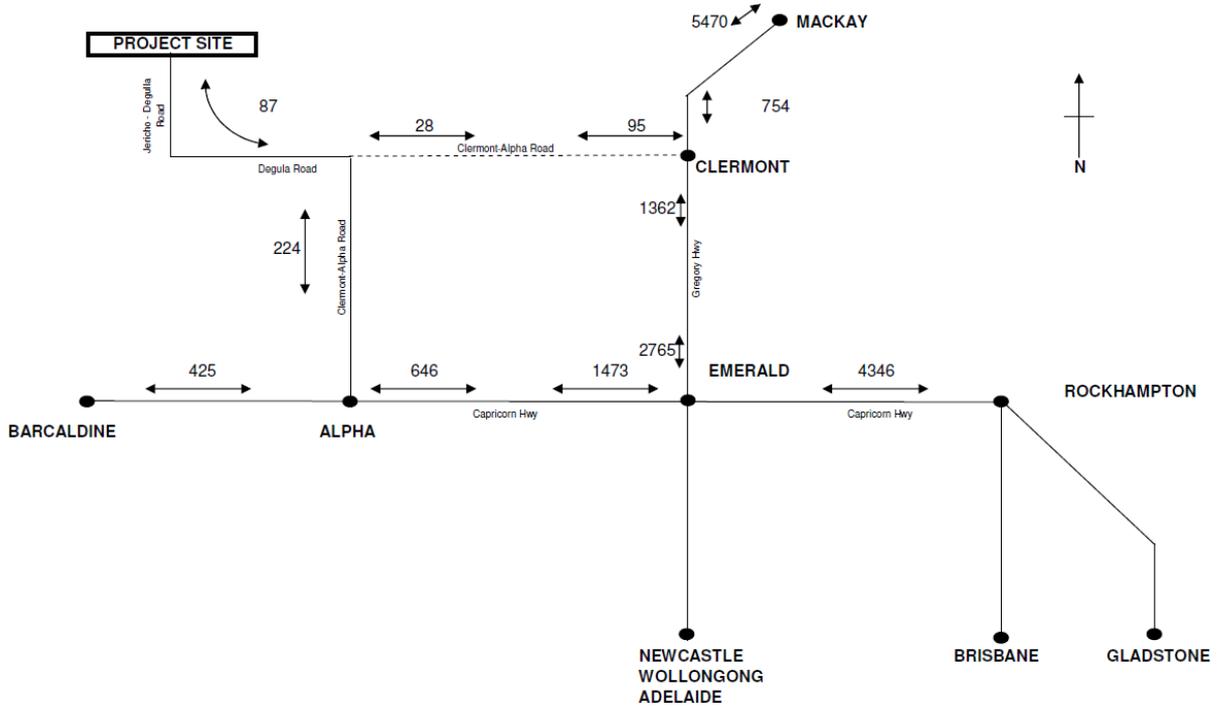
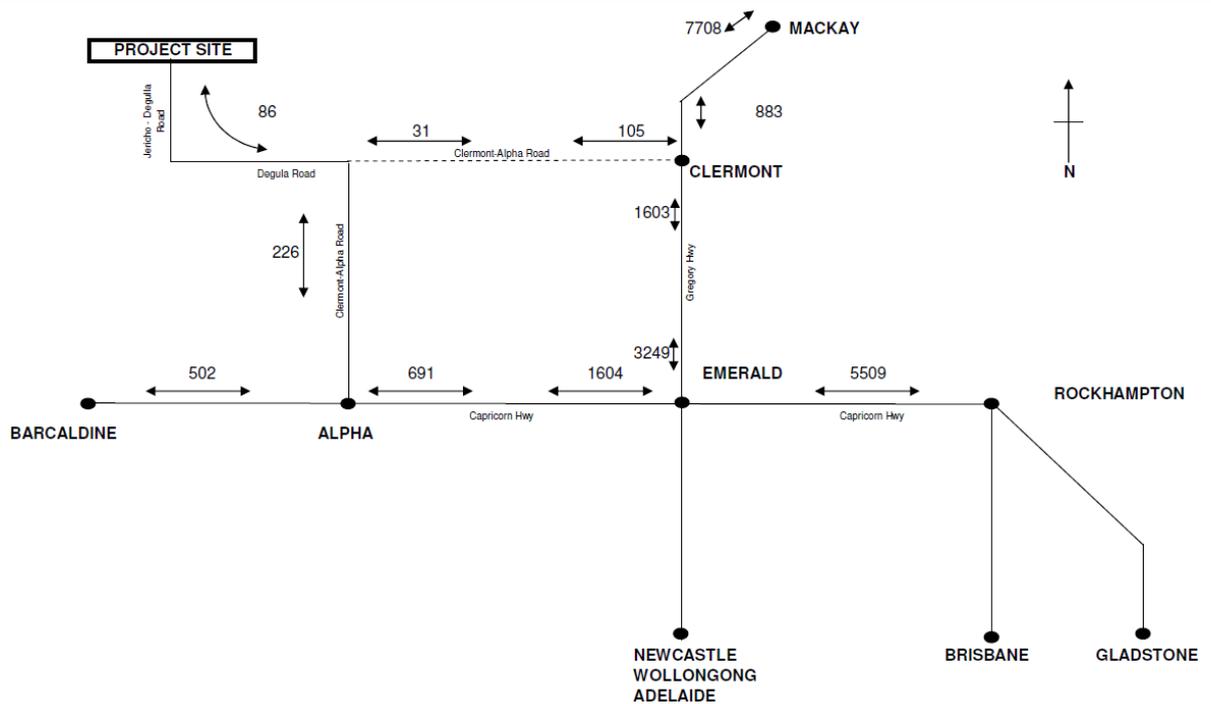


Figure 17-5 Peak projected traffic volumes operation phase – Annual Average Daily Traffic (AADT) volumes and impact



17.4 Pavement Impact Assessment

An initial assessment was conducted to identify any impacts that the Project will have on the pavement design life of affected roads, in accordance with DTMR's *Guidelines for the Assessment of Road Impacts of Developments* (2006).

All roads have been assessed against their existing condition as of March 2011.

Further details of the pavement impact assessment can be found in Volume 2, Appendix R.

The following is a summary of the recommended works for the roads affected by the Project development based on the pavement impact assessment:

- Clermont-Alpha Road between Alpha and Hobartville Road;
 - No works recommended as a result of the Kevin's Corner Project due to these works being conducted as part of the Alpha Coal Project;
 - Clermont-Alpha Road between Hobartville Road and Degulla Road;
 - Upgrade of road segment to a consistent two-lane all-weather surface (to be completed in conjunction with the Alpha Coal Project).
- Clermont-Alpha Road between Degulla Road and Clermont; and
 - No works recommended as a result of the Project.
- Jericho-Degulla Road and Degulla Road
 - Upgrade to an all weather surface between Clermont-Alpha Road and the Project site;
 - Upgrade of intersection of Clermont-Alpha Road and Degulla Road;

Further investigation is recommended for the following segments:

- The Clermont-Alpha Road between Hobartville Road and Alpha is subject to flooding. This is an existing condition that the Proponent should investigate prior to committing all commercial vehicles to use this road segment.
- The existing condition of the Clermont-Alpha Road between Clermont and Degulla Road should be investigated by the DTMR. It is recommended this is not the responsibility of the Proponent given the insignificant light vehicle increase due to the Project.

17.5 Road Network Performance

This road network has been assessed from a traffic performance perspective at both midblock (road links) and intersection locations according to the requirements in DTMR's *Guidelines for the Assessment of Road Impacts of Developments* (2006).

According to the Guidelines, the following roads were required to be assessed due to an increase in traffic volumes of greater than 5% due to the Project when compared to existing volumes:

- Clermont-Alpha Road;
- Degulla Road; and
- Capricorn Highway between Alpha and Gemfields.



In addition, the following intersection was also assessed:

- Intersection of Clermont Alpha Road and Capricorn Highway

Based on previous discussions, assessment has taken place for the 2014 and 2017 assessment scenarios, as this presents the worst case scenario for traffic impacts during the construction and operational phases respectively.

It should be noted that only road-based transport is considered for OD vehicles as part of the Kevin's Corner EIS – refer to the Alpha Rail EIS for all rail associated transport.

17.5.1 Road Links Assessment

The methodology, scope and assumptions of the assessment are provided in Volume 2, Appendix R.

In accordance with the DTMR guidelines, road links were assessed based on a measure of Level of Service (LOS). The guidelines require that a minimum standard of LOS C is maintained, but LOS D may be acceptable under certain conditions. In general, remedial measures are sought to maintain existing LOS on rural roads.

A summary of the results of the assessment are shown in Table 17-5 (construction phase) and Table 17-6 (operational phase).

Table 17-5 Road link assessment (Level of Service) – 2014, construction phase

Road Section	K Factor	2009 AADT (LOS)	2014 AADT – Without Project (LOS)	2014 AADT – With Project (LOS)
Degulla Road				
Clermont- Alpha Road to Site	0.12	20* (A)	22 (A)	87 (A)
Clermont-Alpha Road				
Alpha-Degulla Road	0.12	83 (A)	99 (A)	224 (A)
Degulla Road -Mistake Creek	0.12	16 (A)	24 (A)	28 (A)
Mistake Creek-Clermont	0.12	80 (A)	91 (A)	95 (A)
Capricorn Highway				
Alpha-Gemfields	0.11	537 (A)	587 (A)	646 (A)

* No existing AADT on Jericho-Degulla Road and Degulla Road available, estimated based on-site observations

Table 17-6 Road link assessment (Level of Service) – 2017, operational phase

Road Section	K Factor	2009 AADT (LOS)	2017 AADT – Without Project (LOS)	2017 AADT – With Project (LOS)
Degulla Road				
Clermont- Alpha Road to Site	0.12	20* (A)	25 (A)	86 (A)
Clermont-Alpha Road				
Alpha- Degulla Road	0.12	83 (A)	109 (A)	226 (A)
Degulla Road -Mistake Creek	0.12	16 (A)	26 (A)	31 (A)
Mistake Creek-Clermont	0.12	80 (A)	100 (A)	105 (A)
Capricorn Highway				
Alpha-Gemfields	0.11	537 (A)	547 (A)	691 (A)

* No existing AADT on Jericho-Degulla Road and Degulla Road available, estimated based on-site observations

The analysis shows that the additional average daily traffic generated by the Project using peak transport estimates is minimal in comparison to the capacity of the road network. Therefore the Project will not have a significant impact on the road link performance based on a LOS measurement during both the construction and operational phases.

Whilst from a road network performance perspective, there are no significant impacts created by the Project, additional considerations such as safety, pavement design life and road use management (particularly from CVs and ODVs) may be relevant in the overall impact and are discussed in Volume 2, Appendix R.

17.5.2 Intersection Assessment

The DTMR guidelines (2006) state that intersections should be assessed against the performance criteria of Degree of Saturation (DOS). For unsignalised intersections, the key indicator of DOS is the utilisation ratio of individual turning movements within the intersection. Utilisation ratio is expressed as demand volume/capacity ratio for entering movements.

The DTMR guidelines suggest that the minimum required utilisation ratio or DOS for unsignalised intersections is 0.8. Above this value, the intersection is considered to be nearing its practical capacity and upgrade works may be required. At near capacity users are likely to encounter increased delays and queues.

The computer program Signalised & Unsignalised Intersection Design and Research Aid (SIDRA) Intersection 5.0 is a commonly used intersection analysis software package, which uses traffic volumes, intersection geometry and intersection control (e.g. signals, roundabouts, etc.) to determine intersection operational performance. It has been developed to assist traffic engineers in determining the performance of intersections based on algorithms and technical analysis techniques. SIDRA has the ability to analyse both signalised and unsignalised intersections.

The SIDRA modelling package was used to analyse the existing (2009) and future performance of the road network for both the future year and assessment year scenarios for the following intersections:



17.5.2.1 Clermont Alpha Road and Capricorn Highway in Alpha (Unsignalised Four-way Intersection)

A new intersection will need to be constructed to access the Project site from Jericho - Degulla Road. This new intersection has not been modelled due to the extremely low volume of traffic on these roads and the fact the intersection will be designed to all required standards and to minimise any impact on the existing road network.

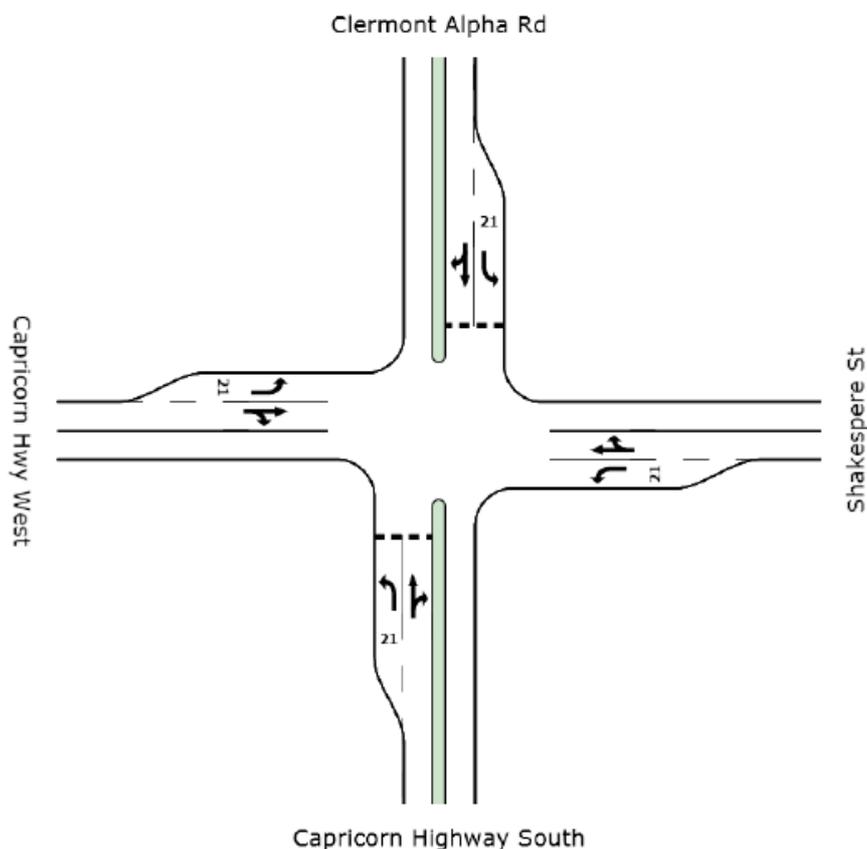
The DOS for each approach of the intersections has been used as a guide to determine the baseline characteristics of the existing performance of the intersections. This information can then be used as a comparison with the anticipated construction vehicle movements to determine the traffic impact of the development.

It should be noted that the worst case results for DOS may come from different movements or movements in which traffic volumes have not been increased by the Project in the same model. This is due to the interaction between traffic volumes, movement priorities and geometric layouts of each intersection.

17.5.2.2 Capricorn Highway and Clermont-Alpha Road Intersection

The intersection is classified as an unsignalised four way, give way intersection, with the layout as shown on Figure 17-6.

Figure 17-6 Capricorn Highway and Clermont Alpha Road intersection layout



The analysis shows that the additional peak hourly traffic generated by the Project using peak transport estimates does not produce any significant incremental impacts on the performance of the nominated intersections and anticipated to operate outside well within DTMR's standard DOS performance criteria of a DOS of 0.8 during the assessed Project life period. Therefore no upgrade works are required from a performance perspective.

It should be noted that the CV and ODV content included in the construction traffic summarised as part of this analysis has been based on Alpha Project (Mine) construction traffic generations estimations. As Kevin's Corner is partly underground, it is envisaged that less equipment requiring oversized transporters will be required. Therefore, with the high proportion of ODVs included, this analysis is considered a robust scenario.

Further investigation in the Road-Use Management Plan needs to be undertaken (i.e. refinement of traffic volumes) to determine whether any minor, temporary intersection upgrades are required.

Whilst from a intersection performance perspective, there are no significant incremental impacts created by the Project, additional considerations such as safety and road use management may be relevant in the overall impact of the Project.

A detailed assessment of this intersection against DTMR's criteria including traffic volumes, assumptions and SIDRA outputs is provided in Volume 2, Appendix R.

17.6 Road Use Considerations

A number of transport management issues need to be considered as part of the planning and implementation phases of the Project.

17.6.1 Road Use Management

Transport to and from the Project site has the potential to impact on the community and appropriate road use management should be in place to manage or mitigate potential impacts. This should be defined in a detailed Road-Use Management Plan (RUMP), which should cover:

- Permit conditions – standard conditions for Qld apply for over dimensional vehicles and dangerous goods;
- Detailed safe driver behaviour and fatigue management protocols;
- Passing space for large vehicles on narrow roads or unsealed sections;
- Wet weather operations;
- Unfenced stock on roads;
- Designated routes, operating times, curfews, etc.;
- Protocols for potential coal product spills;
- Signage, e.g. for narrow cattle grates or other potential hazards;
- Lighting; and
- Washdown facilities.

A proposed draft structure of the RUMP document can be found in Volume 2, Appendix R.



17.6.2 Planning

Background traffic volumes on the roads in the vicinity of the Project site and the broader access routes have been historically growing, due to on-going development across the region. Long term planning for this additional development (such as town projects and growth) is only just being considered by Council and as yet there are no definite plans. Therefore future background traffic volumes may vary from that calculated in this report. In planning for when the Project precedes, the opportunities and implications arising from the broader regional planning for traffic volumes and impact should be further assessed.

17.6.3 Noise

Noise impacts of transport are not covered in this report as there is a separate noise study that considers all noise issues associated with the Project.

17.6.4 Dust and Flood Control

Dust generation by vehicles on the Project site or travelling/delivering to the site should be mitigated to the extent feasible as it impacts on nearby homesteads and has the potential to cause a safety issue for sight distances due to obscuration, particularly on unsealed roads. These mitigation measures should be addressed in the RUMP on an as-needs basis. It should be noted that all frequently used public roads are anticipated to be sealed as part of this Project due to dust control, durability and safety (in conjunction with the Alpha Coal Mine Project).

It should be noted that flooding is an occasional event and may close sections of roads and lead to damage of roads. The RUMP should include a risk assessment and appropriate management measures to deal with the consequences of a flooding event.

17.6.5 Roadworks in Road Reserve

It is possible that there will be requirements for works in road reserves along the access routes to the development site (e.g. to accommodate over dimensional loads). Appropriate work plans, including relevant environmental management plans, should be addressed in detail in the transport management plan, which should cover the relevant permits required for such works and management of associated issues.

17.6.6 On-Site Parking, Circulation and Vehicle Separation

Access to the Project site will be required from existing roads and it is assumed that some form of control / security gating will be installed at the entrance to the site. The configuration of the access must take into account the volume and swept path of vehicles that access and egress the site – particularly with regards to the large proportion of commercial vehicles.

Details of internal transport infrastructure design considerations such as vehicle mix and need for separation, swept path turning movements, internal circulation and parking requirements are discussed in Volume 2, Appendix R.

17.6.7 Transportation of Dangerous Goods and Hazardous Materials

The DTMR is the relevant approval and management body for the transportation of dangerous goods and hazardous materials throughout Queensland and requires certain permits and conditions to be met for the transportation of these goods on the SCR network.

The legislative provisions for the transport of dangerous goods by road in Queensland is detailed in the *Transport Operations (Road Use Management) Act 1995* and the *Transport Operations (Road Use Management-Dangerous Goods) Regulation 2008*.

Particular vehicle and driver licenses, placards, safety equipment, documentation and incident response plans are required for the transportation of dangerous goods and must be approved prior to transportation under The Australian Dangerous Goods Code 7th edition (National Transport Commission [NTC], 2007).

The Proponent will further detail dangerous goods transportation requirements under the RUMP.

17.6.8 Over Dimensional Vehicles

The transport operator for the proposed development, DHL, has developed detailed planning for ODVs, including swept path envelopes, route constraints, permit and escort requirements.

Logistics plans will need to be submitted for individual components (i.e. each separate vehicle) as well as the entire program of planned movements for any ODVs.

Site specific issues may need to be addressed when planning the routes for over-dimension vehicles. These issues are discussed in Volume 2, Appendix R in further detail.

Any issues relating to the movement of ODVs will need to be identified and addressed in the RUMP for each route and delivery.

17.7 Impact Mitigation

The proposed mitigation measures for impacts on the existing road network created by the Project are outlined below.

17.7.1 Public Road Closures and Associated Bypass Works

As part of the site layout, the Proponent is proposing to close a section of Jericho-Degulla Road and construct bypasses to the north and east of the mining lease area. These works will therefore affect the existing road network and the Proponent will need to investigate its extent of responsibility for the associated costs.

All external road upgrades and construction will be completed to required standards and design guidelines as stipulated by the DTMR.

The timing of these works will be incorporated into the construction period and hence agreements between parties should occur prior to construction commencing.

17.7.2 Site Access Intersections

In order to access the Project site from the existing road network a new intersection will need to be constructed at the southern entry to the site along the existing Jericho-Degulla Road alignment as part of the new bypass arrangements. It should be noted that for the purposes of this assessment the



southern boundary of the Kevin's Corner site (i.e. southern access point) intersects Jericho-Degulla Road. However, upon completion of both the Kevin's Corner and Alpha Coal Projects the access from the public road network to both sites will be via Degulla Road due to the closure of sections of the public road network and the construction of bypasses. As such these works at the site access will affect the existing road network and are entirely attributed to the impact of the Project and the Proponent will be responsible for all associated costs.

Whilst the permanent site access intersections will be integrated with the public road works, temporary site access intersections may need to be constructed during the construction period.

17.7.3 Employee Transport Systems

The Proponent is proposing to use both a FIFO (95%) from a proposed on-site airfield facility and DIDO (5%) system in conjunction with an on-site accommodation village to minimise the impact of employee transport on the road network due to the reduced number of vehicles generated by Project.

17.7.4 Road-Use Management Plan

The Proponent will create a RUMP in order to manage the risks and impacts of any transport related issues.

A proposed draft structure of the RUMP document can be found in Volume 2, Appendix R.

17.7.5 Road Maintenance Program

The Project will have an impact on the pavement design life of Jericho-Degulla, Degulla and Clermont-Alpha Roads. In order to mitigate these impacts, the following measures are proposed:

- An agreement between the Proponent and BRC for the upgrade and ongoing maintenance of a section of Degulla Road for a 10 year mitigation period, in conjunction with other Proponents;
- Discussion with BRC regarding the road upgrade works required for traffic impact sections of Degulla Road (between Clermont-Alpha Road and the Alpha Coal Project access point) as recommended by the pavement impact assessment in Section 17.4; and
- Discussion with DTMR and BRC regarding an infrastructure agreement for a proportion of the ongoing maintenance costs of Degulla Road and Clermont-Alpha Road.

It should be noted that a number of factors (discussed in Volume 2, Appendix R) will influence the size of the contribution to be provided by the Proponent.

The road maintenance program may differ between the construction and operational phases of the Project to reflect the shorter time and more intense activity of construction versus the sustained use of the road network over the operational phase.

17.7.6 The Transportation of Dangerous Goods and Dangerous Materials

The DTMR is the relevant approval and management body for the transportation of dangerous goods and hazardous materials throughout Queensland and requires certain permits and conditions to be met for the transportation of these goods on the SCR network.

The legislative provisions for the transport of dangerous goods by road in Queensland are detailed in the *Transport Operations (Road Use Management) Act 1995* and the *Transport Operations (Road Use Management-Dangerous Goods) Regulation 2008*.

Particular vehicle and driver licenses, placards, safety equipment, documentation and incident response plans are required for the transportation of dangerous goods and must be approved prior to transportation under The Australian Dangerous Goods Code 7th edition (NTC, 2007).

The current Australian Dangerous Goods (ADG) Code (7th Edition) (NTC, 2007) for road and rail is implemented by State and Territory legislation. It lists all provisions applicable to the transport of dangerous goods including:

- Classification;
- Packaging and performance testing;
- Use of bulk containers, freight containers and unit loads;
- Marking and placarding;
- Vehicle requirements;
- Segregation and stowage;
- Transfer of bulk dangerous goods;
- Documentation;
- Safety equipment, procedures during transport;
- Emergencies; and
- A dangerous goods list with United Nations (UN) dangerous goods identification numbers.

The classification of goods as dangerous is specified in the Code and this document outlines which goods must be included under the permits and condition requirements. Goods may be classified due to properties such as:

- Combustion;
- Toxicity;
- Corrosiveness;
- Ability to cause harm to the environment;
- Displacement of oxygen;
- Temperature or pressure hazards; and
- Adverse reactions with other materials.



It is likely that the Proponent will be required to transport dangerous goods and hazardous materials to and from the Project site. Details of exact materials have not been confirmed at this stage; however, general mine related materials may include but are not limited to:

- Fuel;
- Explosives; and
- Hazardous waste materials.

The Road-Use Management Plan will describe the types of dangerous goods to be transported (by classification), their use and purpose, and an estimate of the quantities of dangerous goods to be transported. In addition, management and mitigation measures will be outlined and protocols will be defined should a coal (or other) product spill occur. Other items such as vehicle and driver licensing, vehicle placarding, handling and storage requirements will also be addressed. An indicative list of dangerous goods and hazardous substances is located in Volume 2, Appendix R.

17.7.7 Over Dimensional Vehicles

It is anticipated that a proportion of freight will fall into this category and mitigation measures proposed to manage over-dimensional vehicle impacts on the road network include:

- Planning of required freight movements to utilise non-ODVs where possible;
- Planning freight movements to utilise ODVs that do not exceed the existing available envelope dimensions;
- Following required planning, permit applications and escort requirements as specified by DTMR; and
- For any ODV requirements that do not fit the existing envelope dimensions and are not outlined in DTMR's two year infrastructure plans (or be addressed prior to the construction of this Project as part of other mining sites in the area), all required upgrade works may be the responsibility of the Proponent. For those upgrades that are already proposed in DTMR's two year infrastructure plan a "bring it forward" contribution may be applicable.

Implementation of these mitigation measures will be refined as the details of specific freight requirements of the Project are finalised.

17.8 Conclusion

17.8.1 Traffic Generation

The Project will be completed in two phases. The initial construction phase is expected to have duration from 2012, peaking at 2014 and winding off until 2018. During the construction, the operation of the site will ramp-up overlapping with construction until the construction demobilises. The peak construction traffic generation will be in 2014 and with some operational staff mobilising, the site will generate up to 76 light vehicles, 43 commercial vehicle and 11 (robust value) over-dimensional return trips, based on a peak workforce of 1,556 employees.

The operational phase mobilises in 2014 and the site traffic is expected to peak in year 2017, generating up to 83 light vehicle and 39 commercial vehicle return trips per day, based on an on-site workforce of 1715 employees.

17.8.2 Background Traffic

The existing road network surrounding the Project site consisting of Clermont-Alpha Road, Capricorn Highway and Gregory Highway is expected to experience general traffic growth over the life of the Project. 3% to 5% growth rates have been used in this assessment to simulate this background traffic impact on the existing road network. These growth rates account for general growth and small developments in the region, but do not include any significant impacts by other potential large developments that may occur during the mine life period. These impacts will be included in the cumulative impact assessment.

17.8.3 Road Network Performance Impacts

The road network performance impacts caused by the Kevin's Corner Coal Mine Project have been assessed in accordance with the DTMR *Guidelines for the Assessment of Road Impacts of Developments* (2006). From this assessment, it is considered that the impact of the Project on the performance of both road links and intersections are not significant and most do not require mitigation by the Proponent. It is acknowledged that proposed works for closures to Jericho-Degulla Road and the construction of temporary and permanent site access intersections will be required as part of this Project.

17.8.4 Pavement Impact

The road network performance impacts caused by the Kevin's Corner Coal Mine Project have been assessed in accordance with the DTMR *Guidelines for the Assessment of Road Impacts of Developments* (2006). From this assessment, it is considered that the impact of the Project on the performance of both road links and intersections are not significant and most do not require mitigation by the Proponent. It is acknowledged that proposed works for closures to Jericho-Degulla Road and the construction of temporary and permanent site access intersections will be required as part of this Project.

17.8.5 Required Mitigation Measures

Following the road network performance, pavement design life and general safety assessment, the following mitigation measures are recommended for the Proponent's consideration in ongoing development of the Project:

- Construction of required bypass road due to the closure of a section of Jericho-Degulla Road to the standards required by the Queensland DTMR;
- Road upgrade works to Degulla Road as recommended by the pavement impact assessment in conjunction with the neighbouring Alpha Project's Northern access.
- Construction of temporary and permanent site access intersections to the standards required by the Queensland DTMR along Jericho-Degulla Road Diversion;
- Implementation of FIFO minimise traffic volumes generated by employees travelling to and from the Project site;
- Development of a Road-Use Management Plan to manage risks associated with transport for the construction and operational phases of the Project, including use of on-site aerodrome;



- Development of a road maintenance program in conjunction with DTMR and BRC considering a number of influential factors on pavement design life for Clermont-Alpha Road, Degulla Road, Jericho-Degulla Road; and
- Implementation of planning and permit requirements, including the construction of any capacity upgrades to road infrastructure as required by Over Dimensional vehicles movements.

It should be noted that these recommended mitigation measures may change due to the influence of the cumulative impacts of other proposed developments in the surrounding region.