Section 17 Transport

17.1 Introduction

The proposed Alpha Coal Project (Mine) (the Project) is to be located in the Galilee Basin in central Queensland. The Project will consist of a construction phase, in which the required infrastructure will be built and commissioned over 24 months, as well as an ongoing operational phase of at least 30 years. During these two phases, the Project will increase traffic on the existing road network in the surrounding region.

A Traffic Impact Assessment (Volume 5, Appendix K) 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 provides appropriate mitigation measures for potential impacts identified.

Impacts of the proposed Project on the rail network were the subject of a separate assessment presented in Volume 3, Section 17 and Volume 6, Appendix K. The Project impacts on the ongoing operation of existing regional/state air and seaport facilities are not included in this Environmental Impact Statement (EIS) and are subject to assessment by third-party operators responsible for this infrastructure.

17.1.1 Project-Related Transport Infrastructure

As part of the Project, it is proposed that the existing Hobartville Road within the Mining Lease Application (MLA 70426) area will be closed to public traffic; and relevant bypasses will be constructed to facilitate traffic flow around the Project site. Proposed road closures and bypasses are shown in Figure 17-1 as part of the site layout.

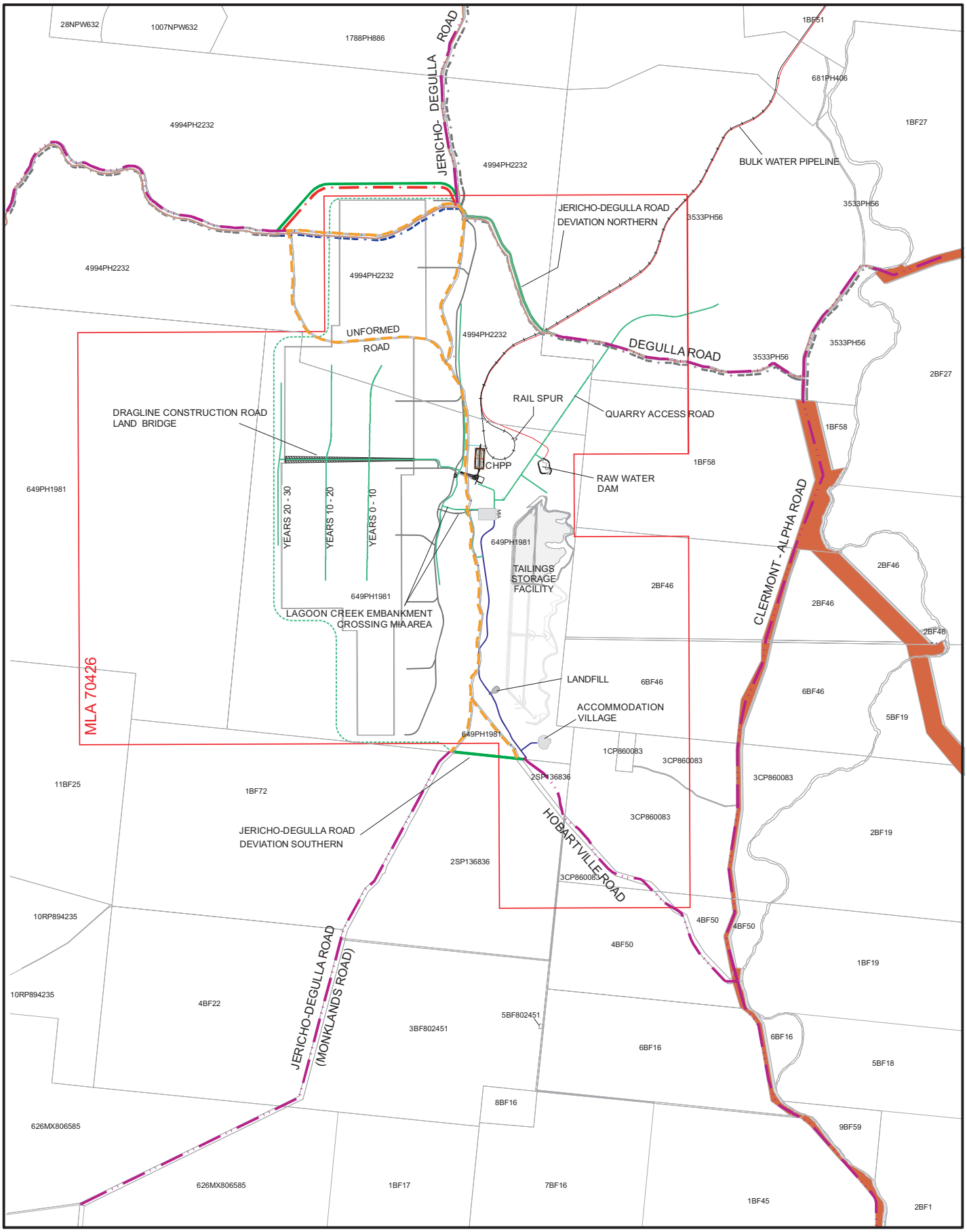
The Proponent is currently operating a Bulk Sample Test Pit (BSTP) program at the proposed site. As part of this testing program, an agreement has been made with the Barcaldine Regional Council (BRC) and DTMR to upgrade and maintain the existing Hobartville Road, Clermont-Alpha Road and Duck Ponds Road.

The following upgrades are covered under the 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 8 m wide gravel formation with bitumen seal of 4 m width. Seven stock grids will be replaced along the road;
- Improvement of the intersection of Clermont-Alpha Road and Hobartville Road; and
- Provision of a 4 m wide passing opportunity and ongoing shoulder maintenance between the above-mentioned 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.



Source: ParsonsBrinkenhoff, Figure No 97000 - 801 02/07/2010

GENERAL LEGEND

MINING LEASE APPLICATION (MLA70426) BOUNDARY

EXISTING

- EXISTING STOCK ROUTE RESERVE
- EXISTING STOCK ROUTE (WITHIN ROAD RESERVE)
- EXISTING ROADS

PROPOSED

- PROPOSED ROAD DEVIATIONS/UPGRADES
- PROPOSED ROAD CLOSURES
- PROPOSED STOCK ROUTE CLOSURE
- PROPOSED TWO-WAY SEALED ROAD
- PROPOSED TWO-WAY UNSEALED ROAD
- PROPOSED SINGLE LANE UNSEALED ROAD
- PROPOSED HAUL ROAD
- PROPOSED STOCK ROUTE

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Datum: GDA94, MGA Zone55

N W E S

HANCOCK PROSPECTING PTY LTD

Alpha Coal Project
Environmental Impact Statement

PROJECT ROAD CLOSURES AND DIVERSIONS

Job Number | 4262 6580
Revision | A
Date | 24-09-2010

Figure: 17-1

File No: 42626580-g-2092.cdr

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 (third party responsibility) and hence is not discussed further.

It is anticipated that the generated traffic from the Project will utilise the following roads:

- Capricorn Highway;
- Gregory Highway;
- Peak Downs Highway;
- Clermont-Alpha Road;
- Degulla Road; and
- Hobartville 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 5, Appendix K.

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 coal mine projects located along the road and the road is frequently used by both Commercial Vehicles (CV) and Over Dimensional (OD) Vehicles.

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, to the north of the Project area. 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 ODs.

17.2.1.3 Capricorn Highway

The Capricorn Highway is the main east-west highway linking Rockhampton to Emerald, and further west to Longreach via Alpha. It is a heavily trafficked CV route, 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.

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 3.5 to 4.5 m. Within this section, the seal widens to two-lane widths to enable two-way traffic for approximately 3 km. 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 m 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 7 km 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 Hobartville Road

Hobartville Road is a formed, unsealed road connecting from the Clermont-Alpha Road to access the privately owned Hobartville Station, with a section length of approximately 18 km. The road then runs north directly through the Project site.

The carriageway was initially a single-lane formed road in a wide reservation; however, recent grading activities have provided a formed roadway wide enough to accommodate two-way traffic in most areas.

17.2.2.2 Degulla Road

Degulla Road is a formed, unsealed east-west road connecting from Hobartville 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.

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 single public transport route operates along the Capricorn Highway and will not be impacted by the Project.

The use of stock routes in rural areas can create safety concerns for freight haulage routes. Existing stock routes currently exist on Clermont-Alpha Road, Hobartville Road and Degulla Road.

17.2.4 Existing Road Accident Data

Road accident data have 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 summaries of accident data at intersections and mid-blocks are displayed together (see Table 17-1).

The following accident data were obtained from DTMR for the period from July 2005 to July 2010.

Table 17-1: Accident 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 Highway	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

The overall pattern of accidents on the road network generally reflects trends associated with a normal rural environment, i.e. single vehicle accidents in midblock locations between residential centres, with higher proportion of intersection accidents in residential areas.

Further analysis of trends across each road section is discussed in Volume 5, Appendix K.

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’ (DTMR, 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 5, Appendix K.

Proposed works on the SCR that have been assessed include minor realignment and shoulder sealing on 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 met with Robb Bauer, Executive Officer at BRC in the Alpha Office on 20 July 2010. Details of the meeting are provided in Volume 5, Appendix K. Major items of interest for the Council include their preference to upgrade Alpha airport for all potential developments in the area rather than having separate airfields for each different one. They also raised concerns regarding dust protection and flooding of unsealed roads.

Telephone conversations were held with the Mackay, Barcaldine and Emerald regional offices to gain DTMR advice on submission requirements and information requests. Due to a lack of available information concerning standards, future traffic growth rates, road maintenance costs and road maintenance costs, this report is based on the information provided by DTMR at the time of assessment.

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 midblocks on the SCR network surrounding the subject site and is for two-way traffic. Such information is not available for Hobartville Road; however, an estimate of volumes for this road 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 operation 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 shows the years that have been assessed.

Table 17-2: Traffic volume assessment years

Assessment Year	Traffic Pattern
2013	Peak traffic volume during construction phase
2017	Peak equipment deliveries during operational phase
2022	10-year post-operation design horizon
2030	Additional assessment year during operation for comparison purposes
2041	Peak resource requirements during operational phase

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 projected future growth rate data was unavailable, 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:

- Hobartville 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 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 2013. During this peak period there is expected to be approximately 1,060 employees working on site, with the majority of the workforce completing 12-hour shifts (7:00 am to 7:00 pm) on a 10-day on, 4-day off roster.

Delivery of materials and equipment and consumables is expected to occur seven days a week over a 10-hour period daily.

All employees, with the exception of those who reside in Alpha, will reside in the construction accommodation village within the MLA 70426, which will be accessed via Hobartville Road.

The Proponent will operate a Fly-In-Fly-Out (FIFO) service to Alpha airport for 80% of the workforce, with transport to the accommodation village in 50+ seater buses. The remaining 20% of the workforce is expected to reside within the region. For those not residing in Alpha, two-thirds will be transported to the accommodation village via a compulsory Bus-In-Bus-Out (BIBO) service from regional centres, and one-third will be permitted to drive light vehicles (Drive-In-Drive-Out [DIDO]).

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

The Proponent has provided data showing the predicted traffic generated as a result of the construction of the Project. The data are based on the current status of the design. 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. Traffic is classified as either Commercial Vehicle (CV), meaning any vehicle over 10 tonne capacity, or Light Vehicle (LV) meaning any vehicle under 10 tonne capacity.

Table 17-3: Generated peak construction traffic volumes 2013

Category		Vehicle Type	Origin	Destination	Estimated Activity / Units	Equivalent Vehicles (single trip) per year
1 Personnel						
1.1	FIFO	Bus	Alpha Airport	Accommodation	1,128 people	884
1.2	DIDO	LV	Alpha Town	Mine Site	15 people	7,020
1.3	BIBO	Bus	Barcaldine Council	Accommodation	53 people	104
1.4	DIDO	LV	Barcaldine Council	Accommodation	27 people	1,404
1.5	BIBO	Bus	Emerald	Accommodation	63 people	208
1.6	DIDO	LV	Emerald	Accommodation	32 people	1,664
1.7	BIBO	Bus	Clermont	Accommodation	63 people	208
1.8	DIDO	LV	Clermont	Accommodation	32 people	1,664
2 Equipment						
2.1	Construction Equipment	Standard Semi	Brisbane	Mine Site	Truck loads	290
2.2	Construction Equipment	Standard Semi	Gladstone	Mine Site	Truck loads	76
2.3	Construction Equipment	Standard Semi	Abbot Point	Mine Site	Truck loads	114
2.4	Construction Equipment	Standard Semi	Mackay	Mine Site	Truck loads	152
2.5	New Equipment for Operations	Standard Semi	Mackay	Mine Site	4,610 tonnes	508
3 Materials						
3.1	Construction Materials	Standard Semi	Brisbane	Mine Site	6,290 tonnes	1,257
3.2	Construction Materials	Standard Semi	Gladstone	Mine Site	1,640 tonnes	328
3.3	Construction Materials	Standard Semi	Abbot Point	Mine Site	2,460 tonnes	492
3.4	Construction Materials	Standard Semi	Mackay	Mine Site	3,280 tonnes	656
3.5	Consumables - Diesel	57kL Tanker	Mackay	Mine Site	9,240 kL	162
3.6	Fuel	57kL Tanker	Mackay	Mine Site	48,123 kL	845
3.7	Lube	20t Capacity	Mackay	Mine Site	664,577 L	34
4 Waste						
4.1	Non Landfill waste	20t Capacity	Mine Site	Emerald	14,400 tonnes	723
4.2	Lube waste	20t Capacity	Mine Site	Emerald	520 tonnes	26
				Total LV Single Trips per Year		**11,752**
				Total CV Single Trips per Year		**7,067**

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 employee transport.

Coal produced by the mine will be transported off-site via rail and hence will not generate any additional traffic on the road network.

Peak personnel numbers occur in 2041 with approximately 2,300 people required. Personnel mode of transport and origin; delivery of materials, equipment and consumables; and waste treatment assumptions are the same as for the construction phase.

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.

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.

Table 17-4: Generated peak operational traffic volumes 2017

Category		Vehicle Type	Origin	Destination	Estimated Annual Tonnage/ Volume or Units	Equivalent Vehicles (single trip) per year
1 Personnel						
1.1	FIFO	Bus	Alpha Airport	Accommodation	1,598 people	1,259
1.2	DIDO	LV	Alpha Town	Mine Site	22 people	10,296
1.3	BIBO	Bus	BRC	Accommodation	123 people	312
1.4	DIDO	LV	BRC	Accommodation	62 people	3,224
1.5	BIBO	Bus	Emerald	Accommodation	105 people	208
1.6	DIDO	LV	Emerald	Accommodation	52 people	2,704
1.7	BIBO	Bus	Clermont	Accommodation	104 people	208
1.8	DIDO	LV	Clermont	Accommodation	52 people	2,704
2 Equipment						
2.1	New mining equipment	Standard Semi	Mackay	Mine Site	12,096 tonnes	1,308
2.2	Replacement equipment	Standard Semi	Mackay	Mine Site	0	0
3 Materials						
3.1	General consumables	CV	Mackay	Mine Site	20,505t	527
3.2	Fuel	57 kL tanker	Mackay	Mine Site	181,857 kL	3,191
3.3	Lube	20t capacity	Mackay	Mine Site	2,622 kL	132

Category		Vehicle Type	Origin	Destination	Estimated Annual Tonnage/ Volume or Units	Equivalent Vehicles (single trip) per year
4 Waste						
4.1	Non Landfill waste	20t Capacity	Mine Site	Emerald	9,155 tonnes	459
4.2	Lube waste	20t Capacity	Mine Site	Emerald	1,980 tonnes	99
Total LV Single Trips per Year						**18,928**
Total CV Single Trips per Year						**7,703**

17.3.5 Distribution of Generated Traffic

For the traffic impact assessment it was assumed that all generated traffic will use the existing road network.

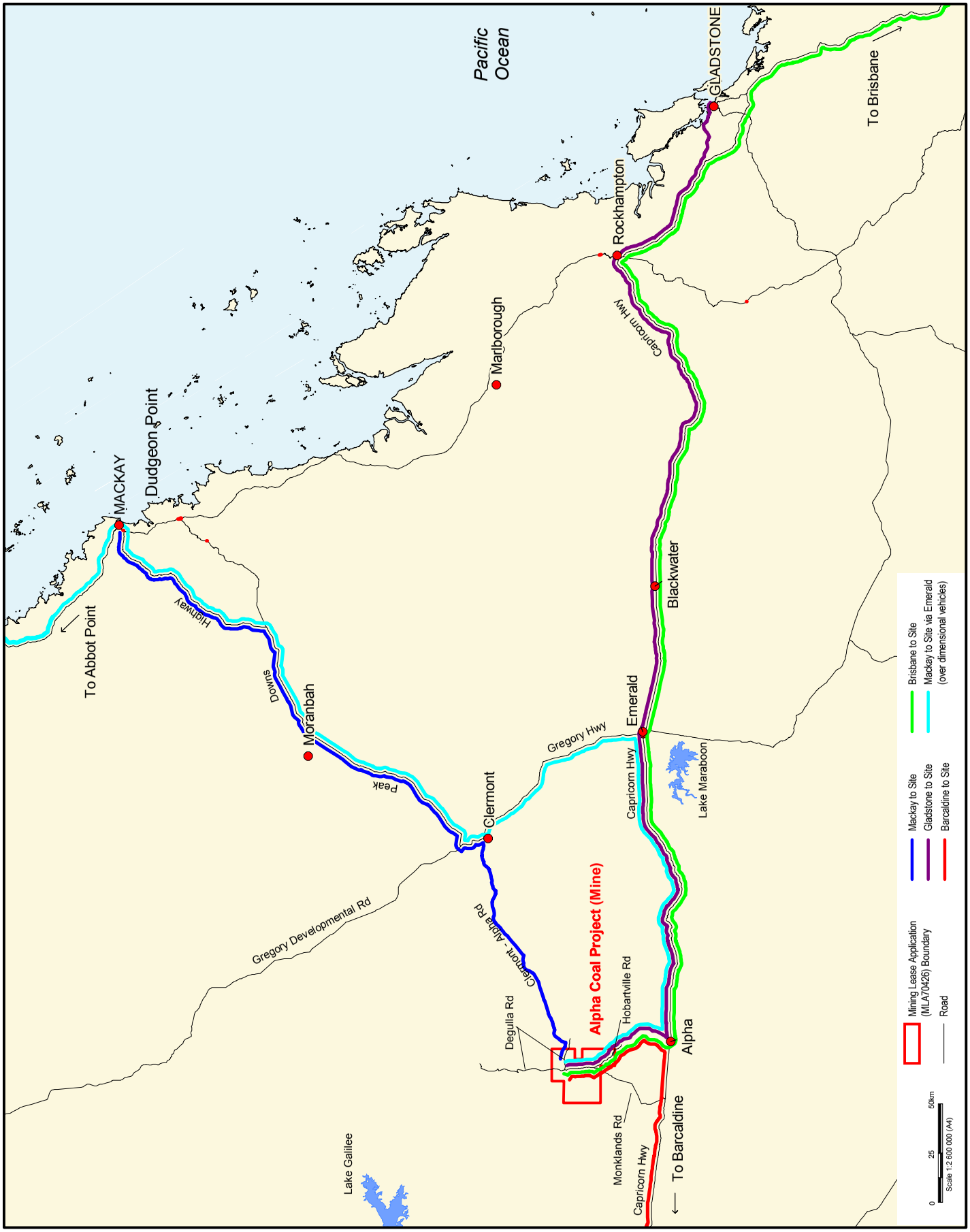
A number of factors will influence the decision of which roads to utilise to access the site. Major considerations include:

- 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 the 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.

Figure 17-2 shows the proposed traffic distribution routes, with detailed descriptions of these routes provided in Volume 5, Appendix K.

Using the route designations shown in Figure 17-2 and previous generated traffic calculations, the generated traffic was assigned to the local road network, and resulting AADT values for the 2017 operational assessment scenario calculated.



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Alpha Coal Project
Environmental Impact Statement

PROPOSED TRAFFIC DISTRIBUTION ROUTES

Job Number	4262 6580
Revision	A
Date	24-09-2010

Figure:17-2

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17.3.6 Total Future Traffic Volumes

The total volume of traffic in the network in future assessment scenarios is determined by adding together the future background traffic volume and the traffic volume generated by the Project for the selected assessment year, 2017 being the overall worst case scenario.

Table 17-5 outlines the total future traffic volumes with and without the Project development for 2017 and the percentage increase caused by the generated traffic after assignment to the designated transport routes.

Table 17-5: Generated peak operational traffic volumes 2017

Road Segment	AADT Volumes				Impact		Impact > 5%
	2009 Existing	2017 Projected Background	2017 Project Generated	2017 Total With Project	% Increase from 2017	% Increase from 2009	
Hobartville Road							
Clermont-Alpha Road to Site	20	26	117	143	450.0%	585.0%	Yes
Clermont-Alpha Road							
Alpha to Hobartville Road	83	106	102	208	96.2%	122.9%	Yes
Hobartville Road to Mistake Creek	16	21	45	66	214.3%	281.3%	Yes
Mistake Creek to Clermont	80	102	45	147	44.1%	56.3%	Yes
Capricorn Highway							
Jericho-Alpha	386	571	18	589	3.2%	4.7%	No
Alpha-Gemfields	537	681	20	701	2.9%	3.7%	No*
Gemfields-Emerald	1,260	1,597	20	1,617	1.3%	1.6%	No
Emerald-Rockhampton	3,026	5,200	0	5,200	0.0%	0.0%	No
Gregory Highway							
Emerald-Capella	2,235	3,303	0	3,303	0.0%	0.0%	No
Capella-Clermont	1,006	1,487	0	1,487	0.0%	0.0%	No
Peak Downs Highway							
Clermont-Peak Downs	597	883	15	898	1.7%	2.5%	No
Peak Downs-Nebo	3,377	7,239	15	7,254	0.2%	0.4%	No
Nebo-Mackay	3,645	7,814	15	7,829	0.2%	0.4%	No

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).

Due to a lack of available data, the pavement assessment is based only on site observations and the limited information available at the time of assessment.

The methodology, scope and assumptions of the assessment are provided in Volume 5, Appendix K.

The initial assessment shows that the roads on which the Project traffic will have an impact on the pavement design life are:

- Clermont-Alpha Road;
- Hobartville Road; and
- Degulla Road.

All roads have been assessed against their existing condition as of July 2010.

As part of the BSTP program that the Proponent is currently undertaking, it is understood a maintenance agreement has been entered into with the BRC for the upgrade and maintenance of Hobartville Road. It is proposed that a similar agreement will be entered into for the construction and operational phases of the Project for Council controlled roads, reflecting the transport usage patterns of the mine for each phase. Such an agreement may include:

- Detailed site inspection prior to works commencing to determine existing conditions;
- Routine site inspections throughout the life of the Project to determine maintenance and rehabilitation requirements;
- Specific structural inspections of cattle grates, culverts and bridges; and
- Inclusion of maintenance and rehabilitation works into mine activities.

Any contribution agreement entered into with DTMR for state controlled roads will be further investigated if additional maintenance information and costs become available; and otherwise, detailed negotiations will be held with the DTMR..

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

In addition, the following intersections were also assessed:

- Intersection of Clermont Alpha Road and Capricorn Highway; and
- Intersection of Capricorn Highway and Gregory Highway.

Based on previous discussions, assessment has taken place for the 2017 operational phase scenario, as this presents the worst case scenario for traffic impacts, and therefore all other scenarios will have no greater impact than the results discussed.

17.5.1 Road Links Assessment

The methodology, scope and assumptions of the assessment are provided in Volume 5, Appendix K.

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 17-6.

Table 17-6: Road Link Assessment – Level of Service

Road Segment	K Factor		Existing (2009)		2017			
					Without Project		With Project	
	Surveyed	Assumed	AADT	LOS	AADT	LOS	AADT	LOS
Hobartville Road								
Clermont Alpha Road to Site	-	0.12	20*	A	26	A	143	A
Clermont-Alpha Road								
Alpha to Hobartville Road	-	0.12	83	A	106	A	208	A
Hobartville Road to Mistake Creek	-	0.12	16	A	21	A	66	A
Mistake Creek to Clermont	-	0.12	80	A	102	A	147	A
Capricorn Highway								
Alpha to Gemfields	.09 to .12	0.11	537	A	681	A	701	A

* No existing AADT on Hobartville Road available, estimated based on site observations

Note: K Factor is the ratio of the AADT volume to the design hourly peak volume. Typical K factors for rural roads range from 0.10 to 0.15.

The analysis shows that the AADT 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.

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 may be relevant in the overall impact and are discussed in Volume 5, Appendix K.

17.5.2 Intersection Assessment

The methodology, scope and assumptions of the assessment are provided in Volume 5, Appendix K.

In accordance with the DTMR guidelines, intersections were assessed based on a measure of Degree of Saturation (DOS). For unsignalised intersections, the guidelines suggest that the minimum required utilisation ratio or DOS is 0.8. Above this value, the intersection is considered to be nearing its practical capacity and upgrade works may be required.

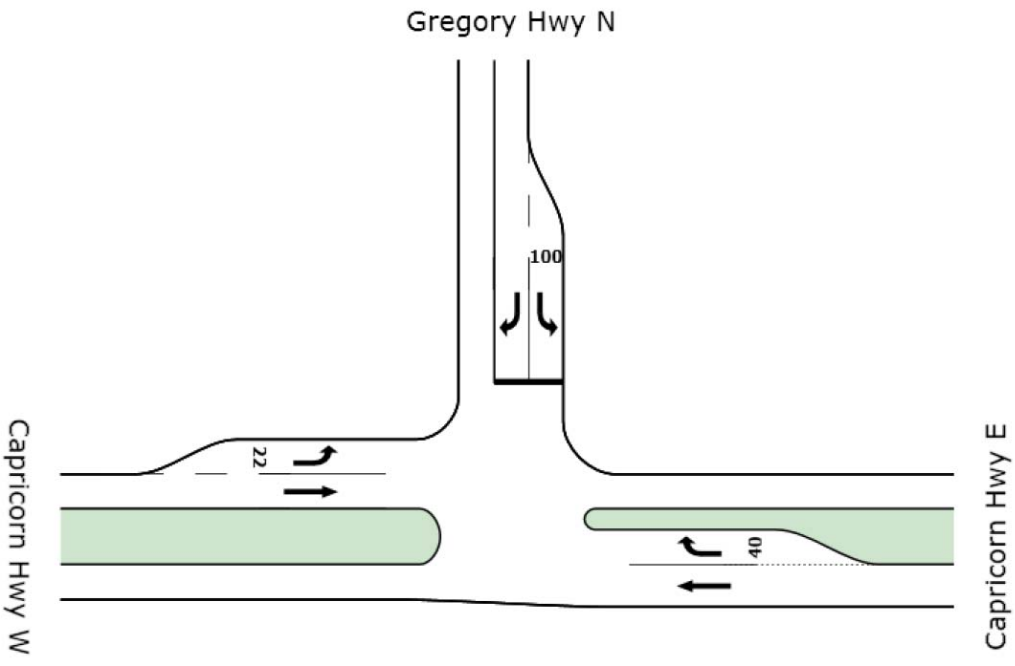
The Signalised and Unsignalised Intersection Design and Research Aid (SIDRA) modelling package was used to analyse both the existing (2009) and future performance of the road network for both the 'without Project' and 'with Project' scenarios for the above intersections. SIDRA is a well recognised software package used for traffic engineering assessment of intersection operational performance.

New intersections will need to be constructed to access the mining lease site from the existing road network from Hobartville and Degulla Roads. These new intersections were not modelled due to the extremely low volume of traffic on these roads and the fact that these intersections will be designed to all required standards and to minimise any impact on the existing road network.

17.5.2.1 Capricorn Highway and Gregory Highway Intersection

The intersection is classified as an unsignalised 'Seagull' intersection with the intersection layout shown in Figure 17-3.

Figure 17-3: Capricorn Highway and Gregory Highway intersection layout



Detailed assessment of this intersection against DTMR's criteria, including traffic volumes, assumptions and SIDRA outputs is provided in Volume 5, Appendix K.

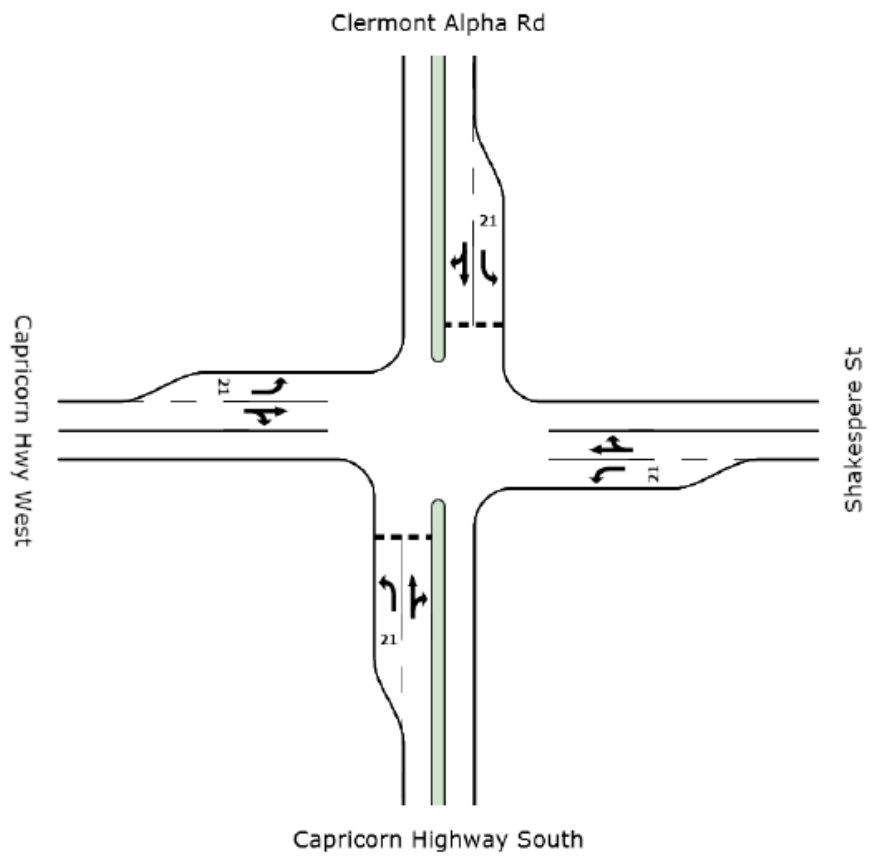
The SIDRA results show that the Project has minimal incremental impact on the intersection performance levels when compared to the 'without Project' scenarios for the assessed years.

Whilst there is little incremental impact, the results show that this intersection is anticipated to operate outside DTMR's standard DOS performance criteria during the Project life period, without influence from the Project. The minimal incremental impacts suggest that the Project will not accelerate the intersection's failure to meet performance criteria, and therefore the Proponent is not liable for any upgrade works required.

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 in Figure 17-4.

Figure 17-4: Capricorn Highway and Gregory Highway intersection layout



Detailed assessment of this intersection against DTMR's criteria, including traffic volumes, assumptions and SIDRA outputs is provided in Volume 5, Appendix K.

The SIDRA results show that the Project has very minimal incremental impact on the intersection performance levels when compared to the 'without Project' scenarios for the assessed years.

The results also show that this intersection is anticipated to operate 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.

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 will be in place to manage or mitigate potential impacts. This should be defined in a detailed transport management plan, which should cover:

- Permit conditions – standard conditions for Queensland apply for over dimensional vehicles and dangerous goods;
- Passing space for large vehicles on narrow roads or unsealed sections;
- Wet weather operations;
- Unfenced stock on roads;
- Designated routes, operating times, curfews, etc.;
- Signage, e.g. for narrow cattle grates or other potential hazards;
- Lighting; and
- Washdown facilities.

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 ongoing 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 those calculated in this report. In planning for when the Project starts, the opportunities and implications arising from the broader regional planning for traffic volumes and impact will be further assessed.

17.6.3 Noise

Noise impacts of transport are addressed in the EIS noise and vibration section and appendix report (Volume 2, Section 15 and Volume 5, Appendix I).

17.6.4 Dust and Flood Control

Dust generation by vehicles on the Project site or travelling/delivering to the site will 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 will be addressed in the transport management plan on an as-needs basis.

It should be noted that flooding is an occasional event and may close sections of roads and lead to damage of roads. The transport management plan will 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 Project site (e.g. to accommodate over dimensional loads – see discussion in Section 17.6.8 below). Appropriate work plans, including relevant environmental management plans, will be addressed in detail in the transport management plan, which will 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 5, Appendix K.

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 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' (Commonwealth of Australia, 2007).

The Transport 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. The plan will also address vehicle and driver licensing, vehicle placarding, handling and storage requirements. Table 17-7 provides an indicative list of dangerous goods and hazardous substances the will be transported for the Project

Table 17-7: Indicative List of Dangerous Goods and Hazardous Substances

Chemical Name/ Shipping Name	DG Class	Raw conc. (wt%)	Storage conc. (wt%)	UN Number	Packaging group	Purpose/ Use
Diesel fuel	3 (Class C1)*	N/A	N/A	1202	III	Fuel for mobile equipment
Lubrication oils (hydraulic oil)	3 (Class C2)**	N/A	N/A	N/A	N/A	Lubricate plant and equipment
Ammonium nitrate/fuel oil	1.1D	N/A	N/A	0082	N/A	Blasting explosive

Chemical Name/ Shipping Name	DG Class	Raw conc. (wt%)	Storage conc. (wt%)	UN Number	Packaging group	Purpose/ Use
(ANFO)						
Caustic soda (sodium hydroxide)	8	50	50	1823	II	Concrete degreasing agent
Flotation agents (MIBC- methyl isobutyl carbinol)	3	99.5	99.5	2053	III	CHPP
Anionic flocculants (acrylamide / acrylate copolymer)	N/A	99.5	10	N/A	N/A	CHPP
Cationic flocculant (polydimethyl diyl ammonia chloride)	N/A	40	40	N/A	N/A	CHPP
Sodium Hypochlorite	8	12	12	1791	II or III	Water Treatment Plant Sewage Treatment Plant
Sodium Hydroxide	8	10	10	1824	II or III	Water Treatment Plant Sewage Treatment Plant
Aluminium Sulphate	N/A	40	40	N/A	N/A	Water Treatment Plant Sewage Treatment Plant
Citric acid	N/A	95	95	N/A	N/A	Water Treatment Plant
Powdered activated carbon	N/A	100	100	N/A	N/A	Water Treatment Plant
Powdered polymer (cationic polyacrylamide	N/A	100	100	N/A	N/A	Water Treatment Plant
Lime (calcium oxide)	8	100	100	1910	III	Water Treatment Plant
Solvents (e.g. acetone)	3	99.5	99.5	1090	II	Workshop degreasing agent
Sulphuric acid	8	15-51%	15-51%	2796	II	Batteries
Paints	3	N/A	N/A	1263	III	Paint

* Class C1—a combustible liquid that has a flashpoint of 150°C or less.
** Class C2—a combustible liquid that has a flashpoint exceeding 150°C.

17.6.8 Over Dimensional Vehicles

The transport operator for the proposed development, DHL, has developed detailed planning for over dimensional (OD) vehicles, including swept path envelopes, route constraints, permit and escort requirements. Approximately 10% of vehicles delivering goods will be in OD in size.

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 OD vehicles.

Site-specific issues may need to be addressed when planning the routes for over dimensional vehicles. These issues are discussed in Volume 5, Appendix K in further detail.

Any issues relating to the movement of OD vehicles will need to be identified and addressed in the transport management plan 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 Hobartville Road and construct bypasses to the north and south of the mining lease area. As these works affect the existing road network and are entirely attributed to the impact of the Project, the Proponent will be responsible for all associated costs.

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

17.7.2 Site Access intersections

In order to access the Project site from the existing road network new intersections will need to be constructed at both the northern and southern entries to the site as part of the proposed bypass layouts. As these works affect the existing road network and are entirely attributed to the impact of the Project, the Proponent will be responsible for all associated costs under the DTMR guidelines.

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 and BIBO system in conjunction with an on-site accommodation village to minimise the impact of employee transport on the road network.

17.7.4 Transport Management Plan

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

17.7.5 Road Maintenance Program

As outlined in Section 17.4 of this report, the Project will have an impact on the pavement design life of Hobartville, Degulla and Clermont-Alpha Roads. In order to mitigate these impacts, the following measures are proposed:

- Continuation of the existing agreement between the Proponent and BRC for the upgrade and ongoing maintenance of Hobartville Road for a 10-year mitigation period; and
- Discussion with DTMR regarding an infrastructure agreement for a proportion of the ongoing maintenance costs of Degulla and Clermont Alpha Roads.

It should be noted that a number of factors as discussed in Volume 5, Appendix K 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 Over Dimensional Vehicles

At the time of the assessment, no specific details were available on the number, size or weight of OD vehicles required for the Project. It is anticipated that a proportion of freight will fall into this category. Mitigation measures proposed to manage these vehicles impacts on the road network include:

- Planning of required freight movements to utilise non OD vehicles where possible;
- Planning freight movements to utilise OD vehicles that do not exceed the existing available envelope dimensions;
- Following required planning, permit applications and escort requirements as specified by DTMR; and
- For any OD vehicle requirements that do not fit the existing envelope dimensions and are not outlined in DTMR's two-year infrastructure plans, 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 Conclusions

17.8.1 Traffic Generation

The Project will be completed in two phases. The construction phase is expected to have a duration of 24 months and will generate up to 32 light vehicle and 31 commercial vehicle single trips per day at its peak in 2013, based on a peak workforce of 1,060 employees.

The operational phase is expected to have a duration of 30 years and will generate up to 46 light vehicle and 30 commercial vehicle single trips per day at its peak in the penultimate year of operation, based on a peak workforce of approximately 2,300 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. Growth rates of between 3% and 5% 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 (Volume 4, Appendix G).

17.8.3 Road Network Performance Impacts

The road network performance impacts caused by the 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 insignificant and do not require mitigation by the Proponent, excluding the proposed works for closures to Hobartville Road and the construction of temporary and permanent site access intersections.

17.8.4 Pavement Impact

The road network performance impacts caused by the Project have been assessed in accordance with the DTMR 'Guidelines for the Assessment of Road Impacts of Developments' (2006).

The assessment shows that the Project will have an impact on the pavement design life and ongoing maintenance of the Clermont-Alpha Road, Hobartville Road and Degulla Road.

Due to the limited information available to complete this initial pavement assessment, further investigation and assessment are required in conjunction with discussions with DTMR and BRC prior to entering any infrastructure contribution agreements.

17.8.5 Required Mitigation Measures

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

- Construction of required bypasses due to the closure of Hobartville Road to the standards required by the Queensland DTMR;
- Construction of temporary and permanent site access intersections to the standards required by the Queensland DTMR;
- Implementation of FIFO and BIBO programs to minimise traffic volumes generated by employees travelling to and from the Project site;
- Development of a Transport Management Plan to manage risks associated with transport for the construction and operational phases of the Project;
- 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, Hobartville Road and Degulla Road; and
- Implementation of planning and permit requirements, including the construction of any capacity upgrades to road infrastructure as required by Over Dimensional (OD) vehicles movements.

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