HANCOCK PROSPECTING PTY LTD

Alpha Coal Project Supplementary Environmental Impact Statement

U | Coal Mine – Traffic Impact Assessment

Traffic Impact Assessment -Alpha Coal Project (Mine)

Supplementary Environmental Impact Assessment

30 MARCH 2010

Prepared for

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Introduction

1.1 Project Background

Hancock Prospecting Pty Ltd (HPPL) (the Proponent) is proposing to develop the Alpha Coal Project (Mine) (the Project), a 30 Mtpa open cut thermal coal mine to target the C and D Seams in the Upper Permian coal measures of the Galilee Basin, Queensland, Australia. The coal mine will be supported by privately owned and operated rail and port infrastructure facilities. At the Project site the coal will be mined, washed and conveyed to a train load-out facility where it will be transported approximately 495 kilometres (km) to the east coast of Australia to the port facility of Abbot Point for export.

An Environmental Impact Statement (EIS) for the Alpha Coal Project was prepared (dated September 2010) was made available for public comment and review from 5 November 2010 to 20 December 2010. A supplementary EIS (SEIS) report was required to be prepared in response to the submissions made by Individuals, Advisory Agencies and Organisations, in addition to amendments made to the Project Description since the release of the EIS.

URS Australia Pty Ltd (URS) was engaged by HPPL to prepare a Traffic Impact Assessment (TIA) for the coal mine component of the Project as part of the initial EIS. This study assessed both the construction and ongoing operational phases of the development. An update to the TIA was required as part of the SEIS in response to changes to the Project Description to enable the traffic impacts of the proposed Project on the existing road network to be evaluated in accordance with the Queensland Government Department of Transport and Main Roads (DTMR) 'Guidelines for Assessment of Road Impacts of Developments' (2006). This updated 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 DTMR. Information regarding the Project has been sourced from the Proponent.

1.2 Government Guidelines

The DTMR has published the 'Guidelines for Assessment of Road Impacts of Developments' (2006), which is a document used to provide industry and developers with advice on information that DTMR may require to assist the approval processes of government and reduce project delay.

Whilst not mandatory, these Guidelines provide a basis for the assessment of impacts and have been used where relevant to assist in the production of this report.

1.3 Report Scope

This report evaluates the traffic impacts of the proposed Project on the existing road network and recommends appropriate mitigation measures for any critical impacts identified. The following tasks have been completed as part of this assessment:

- Site inspection of the road network between Mackay and the Project site, between Gladstone and the Project site, as well as the local road network surrounding the Project site;
- Review of existing traffic volume data provided by DTMR for the roads identified as part of potential transport routes for the development;
- Report on historic crash statistics on the relevant road network;
- Collation of projected traffic generation data provided by HPPL and assignment of this traffic data to potential transport routes;
- Estimation of future background traffic growth on the relevant road network without influence from the Project;

1 Introduction

- Estimation of future traffic demand on the relevant road network including both background traffic and generated traffic from the Project;
- Assessment of the future road network performance and pavement design life for scenarios with and without the Project to evaluate impacts of the Project; and
- Identification of possible mitigation measures to address critical impacts on the road network and pavement due to the increase traffic demand of the Project.

Impacts of the proposed Project on the rail network are the subject of a separate assessment presented in Volume 2, Appendix AB of the SEIS. The Project impacts on the ongoing operation of existing regional/State air and sea port facilities are not included in this SEIS and are subject to assessment by third party operators responsible for this infrastructure.

2

Proposed Project Profile

This section outlines the information reviewed and assumptions made in the preparation of the TIA. Information has been provided by HPPL, DTMR and other sources and relates to the construction/commissioning (hereafter referred to as ‘construction’) and operational phases of the Project.

2.1 Project Details

2.1.1 Location and General Details

The Alpha Coal Project (Mine) is a new open cut thermal coal mine. The Project is located within Mining Lease Application (MLA) 70426. The open cut coal mine is proposed to produce 30 million tonnes per annum (Mtpa) of thermal coal for the export market. The expected life of mine (LOM) is 30 years with sufficient Joint Ore Reserves Committee (JORC) compliant resources to potentially extend the Project life beyond 30 years.

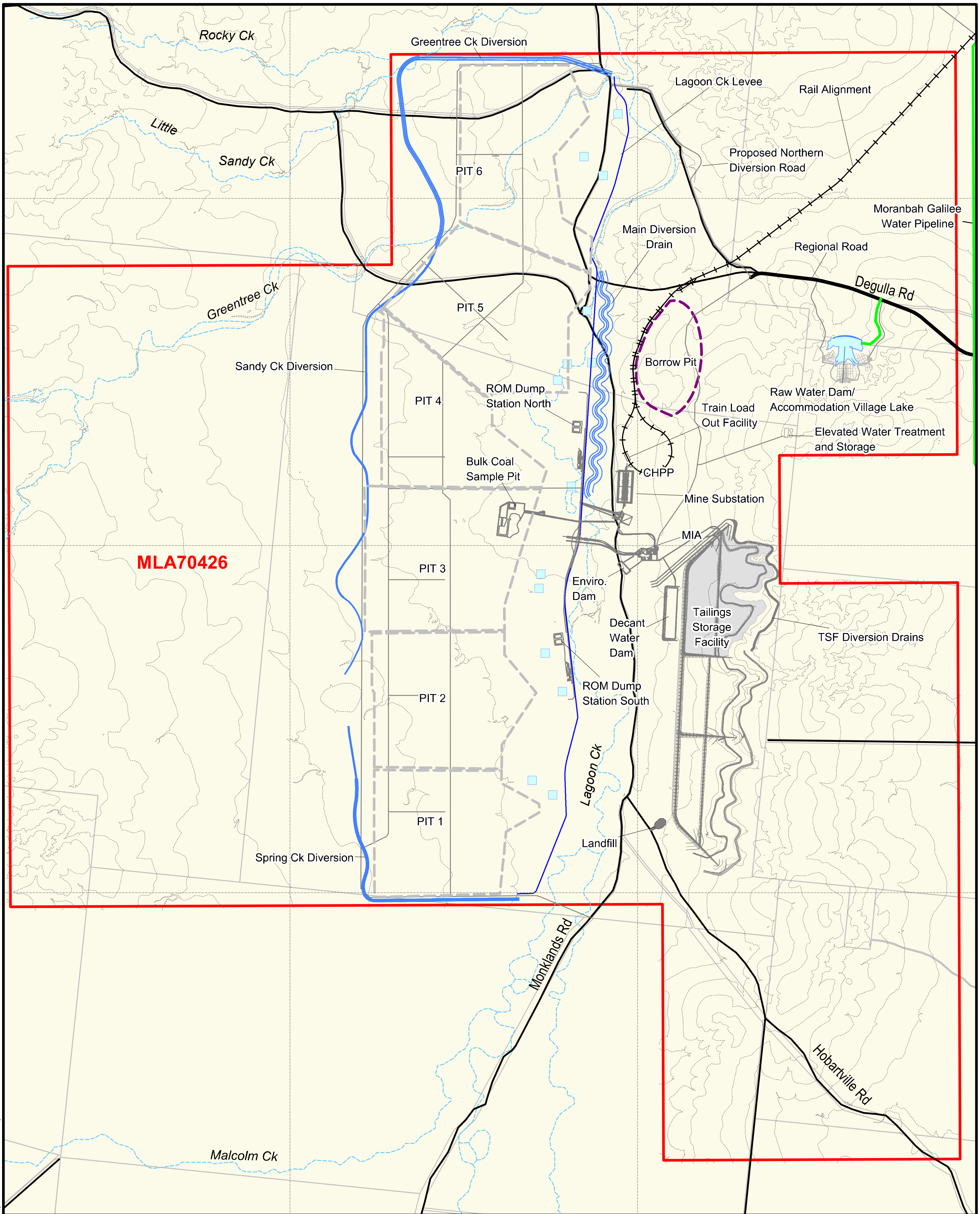
The Project consists of six open cut pits (approximately 24 km in total length) in a north to south direction along the centre of MLA 70426. The overburden will be removed by truck and shovel, excavators, dragline operations and two In-Pit Crushing and Conveying (IPCC) systems. The overburden will be initially stockpiled in out-of-pit spoil dumps and then used to backfill the open cut pits. The coal will be mined and transported by truck and shovel operations.. Raw coal will be processed at two run-of-mine (ROM) facilities where it will be reduced in size for further processing at the Coal Handling and Preparation Plant (CHPP).

Processed coal will then be transported by rail to the Abbot Point Coal Terminal for export.

The Project site infrastructure will include:

- Main workshop, warehouse, administration buildings, training and emergency services building, tyre bay, light vehicle workshop, and bucket repair shop;
- Coal Handling and Preparation Plant (CHPP):
- Train Load Out (TLO) facility and rail loop;
- Raw water dams and environment dams;
- Accommodation village;
- Mine access road;
- Light Industrial Area (LIA)
- Landfill;
- Quarry/borrow pits;
- Fuel and oil, explosives storage facilities;
- Tailings Storage Facility;
- Fire Management System;
- Security;
- Creek diversions, drainage channels and levee bunds;
- Water and wastewater systems;
- Water treatment plant and sewerage treatment plant;
- Electrical systems; and
- Communications systems.

A location map of the mining lease area, including the surrounding regional road network is provided in Figure 2-1.



N W E S

0 2 4Km

Scale 1:150,000 (A4)
Datum: GDA94, MGA Zone55

Contour (10m interval)	Mining Lease Application (MLA70426) Boundary
Water Pipeline	Water Dam
Pit Outline	Borrow Pit

Source: See Copyright Details below and for full disclosure Please Refer to the SEIS *Volume 2, Appendix B*

Client	Project	Title
HANCOCK PROSPECTING PTY LTD	ALPHA COAL PROJECT SUPPLEMENTARY ENVIRONMENTAL IMPACT STATEMENT TRAFFIC IMPACT ASSESSMENT	**ALPHA COAL PROJECT (MINE) PROJECT LAYOUT**
URS	Drawn: LL / Approved: PC / Date: 10-03-2011	Figure: **2-1** / Rev:A
	Job No: **4262 6680** / File No: 42626680-g-2041.wor	A4

2.1.2 Transport Infrastructure

As part of the Project, it is proposed that the existing Hobartville Road within the mining lease area 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 2-2 as part of the site layout.

The Proponent is currently operating a bulk sample test pit program (BSTP) at the proposed Project 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.

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

Hobartville Road

The following upgrades are covered under the agreement:

- Upgrade along a length of 28 km from the BSTP entrance to the intersection with the Clermont-Alpha Road;
- Add approximately 150 mm of gravel formation for a width of approximately eight metres;
- Replace seven stock grids along the length of the road;
- Seal the gravel formation with a one coat bitumen seal of four metre width along the length of the road; and
- Divert the road around the existing Hobartville Homestead to limit noise and dust issues.

The agreement for Hobartville Road covers both capital and maintenance works. At 24 August 2010 designs were complete and cost estimates from both a private company and BRC were being reviewed for implementation of the works.

It should be noted that Hobartville Road is not being used by vehicles generated by the Project during the construction or operational phases. As such, this road is not discussed in detail any further in this report.

Clermont-Alpha Road

The following upgrades are covered under the agreement:

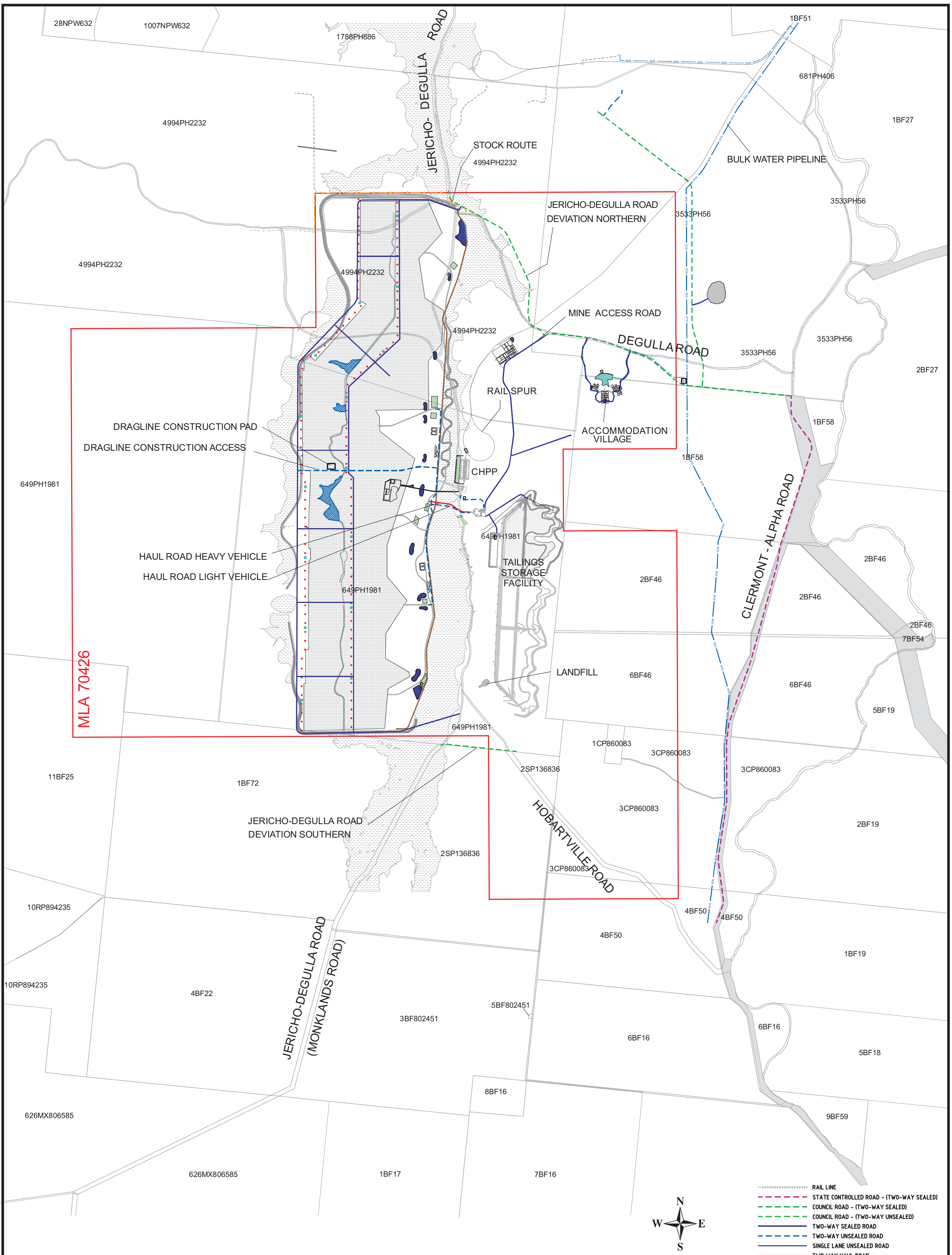
- Improve intersection of Clermont-Alpha Road and Hobartville Road;
- Provide a four metre wide passing opportunity between the above mentioned intersection and the township of Alpha; and
- Ongoing shoulder maintenance of the road between Alpha and Hobartville Road for the duration of the haulage period.

The agreement for Clermont-Alpha Road covers both capital and maintenance works. At 24 August 2010 designs were complete and cost estimates from both a private company and BRC were being reviewed for implementation of the works. All upgrades have been designed and costed to DTMR standards. Ongoing maintenance works will be provided by BRC.

2 Proposed Project Profile

Duck Ponds Road

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.



Source: ParsonsBrinkenhoff, Drg No HC-PBA-67000-DRG-2000 Rev B 18-03-2011

Client	Project	Title
HANCOCK PROSPECTING PTY LTD	ALPHA COAL PROJECT SUPPLEMENTARY ENVIRONMENTAL IMPACT STATEMENT TRAFFIC IMPACT ASSESSMENT	ALPHA COAL PROJECT (MINE) PROJECT ROAD AND RAIL INFRASTRUCTURE
URS	Drawn: LL / Approved: PC / Date: 07-04-2011	Figure: 2-2 / Rev. A
	Job No.: 4262 6680 / File No. 42626680-g-2042.cdr	A4

2.1.3 Timelines

The Project will occur in two phases, construction and operation. The construction phase is expected to occur over 24 months. The operational phase of the Project is expected to extend for 30 years after the completion of construction and commissioning of the first stage of the CHPP. Note that construction of the CHPP continues in the early stages of operation to build up to 30 Mtpa.

This study assesses both the construction and operation phases of the Project.

2.1.4 Employment and Hours of Operation

It is expected that the construction phase of the Project will, at its peak, consist of a workforce of approximately 1,535 employees during month 16 (Source: Parsons Brinckerhoff, 15 July 2010). Hours of operation for the construction phase will be during daylight hours, seven days a week with potential night works as required for specialist activities.

The operational phase of the Project is expected to remain constant over the life of the Project with a peak number of workers on site at a particular time of approximately 770 per shift.

Peak employee figures are used in this report to provide a conservative assessment of impacts.

2.1.5 Origin of Inputs and Destination of Outputs

The origin of inputs for both the construction and operational phases of the Project is important in assessing the impacts of transport on the road network. The origins nominated for relevant components of the Project at the time of the assessment are identified in Table 2-1.

2 Proposed Project Profile

Table 2-1 Origin of Project Inputs

Input	Origin	Remarks
Employees	• 90% National • 1% Alpha • 4% Barcaldine Council Area • 2.5% Emerald • 2.5% Clermont	• National employees will Fly-In-Fly-Out to Alpha Airport • Remainder of employees to be sourced within region
Construction Equipment	• 40% Brisbane • 60% Mackay • Townsville (if available – assumed 10% of Brisbane movements)*	• 40% of total cargo to be containerised from Brisbane (with possibility of some shipments via Townsville) • 60% of total cargo to be break bulk from Mackay
General Construction Materials	• 46% Brisbane • 24% Mackay • 18% Abbot Point • 12% Gladstone	• Origin of general construction materials assumed to be split between these four port regions
Diesel and Lube	• Mackay	•
Mining Equipment	• Mackay	•
Consumables (Operations)	• Mackay	•

- * The Port of Townsville is being considered as a secondary port to receive containerised shipments of construction equipment wherever possible and as such may potentially reduce the number of containers through Brisbane. However, it is acknowledged that there are limitations at the Port of Townsville due to the few scheduled services and limited available portside space. In order to produce a 'worst-case' scenario, this traffic assessment will still assume both of the following:
  - 40% of the total cargo will still originate in Brisbane (on the assumption that the Port of Townsville cannot be utilised); and
  - The Port of Townsville, if available, will receive 10% of containerised cargo where available (i.e 4% of total cargo) given the ports size and annual container throughput when compared to the Port of Brisbane.

Processed coal will be transported by rail to the Abbot Point Coal Terminal for export and was therefore not included in the traffic impact assessment on the road network.

The other major output of the Project will be waste materials. During early works only, solid waste will be delivered to the BRC landfill on Landsborough Highway. The number of vehicles generated to transport this waste material to the BRC landfill will be insignificant and temporary (i.e less than six total trips per day) and as such impact to the Landsborough Highway created by waste delivery vehicles during these early works has not been considered in this TIA. From construction phase, solid waste will be disposed to an on-site landfill. For the purposes of the TIA, during all phases of the Project, sewage sludge has been assumed to be transported to an existing BRC sewage treatment works at Emerald. Hazardous materials and recovered materials will be transported to Emerald for treatment.

Existing Conditions

3.1 Existing Road Network

An outline of relevant information on road conditions in the vicinity of the Project site investigation area is presented in this section.

URS is aware that route survey reports have been provided to the Proponent for transporting oversized cargo to the local area by transport logistics company DHL. These reports have been reviewed by URS, with roads outlined by the report included in this investigation; however no comment is made on the accuracy of the DHL reports.

URS undertook two site visits to the regional and local areas surrounding the Project site on 20-21 July 2010 (dry conditions) and 1-2 March 2011 (wet conditions).

An overview of the State Controlled Roads and Local Government Roads can be found in Figure 3-1.

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Scale: 1:4 500 000 (A4)

Datum: GDA94, MGA Zone55

Mining Lease Application (MLA70426) Boundary

State Controlled Roads

Local Government Roads

Major Road Network

Source: See Copyright Details below and for full disclosure Please Refer to the SEIS ***Volume 2, Appendix B***

Client	Project	Title
HANCOCK PROSPECTING PTY LTD	ALPHA COAL PROJECT SUPPLEMENTARY ENVIRONMENTAL IMPACT STATEMENT TRAFFIC IMPACT ASSESSMENT	**STATE AND LOCAL GOVERNMENT ROAD ASSETS**
URS	Drawn: LL / Approved: PC / Date: 10-03-2011	Figure: **3-1** / Rev:A
	Job No: **4262 6680** / File No: 42626680-g-2024.wor	A4

3 Existing Conditions

3.1.1 Regional Road Network

The central region of Queensland is serviced by a network of highways that provide connections to Rockhampton to the east, Mackay and Townsville to the north-east, Brisbane to the south-east, New South Wales to the south and Mt Isa to the west. A map of the regional road network has been provided previously in Figure 2-1 and Figure 3-1 defines the respective road authorities.

Advice from BRC and DTMR recommends that the most appropriate and efficient route from potential ports to the local project area for haulage routes follow the Interstate Route 70 from the north eastern ports (Peak Downs Highway and Gregory Highway) to Clermont then the A7 (Gregory Highway) to Emerald. An alternate route from Clermont to the Project site is to follow the Clermont-Alpha Road to Degulla Road. From the east, the preferred route to Emerald is along the A4 (Capricorn Highway). From the southeast, the preferred route from Brisbane to site is via the Warrego, Carnarvon, Dawson and Gregory Highways to Emerald.. Once at Emerald, these routes follow the A4 (Capricorn Highway) to Alpha.

These regional roads are managed by DTMR. A description of the relevant regional roads is provided below.

Peak Downs Highway (70)

The Peak Downs Highway (70) is an interstate highway which 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 kilometre per hour (km/hr) speed limit which is reduced to 80 km/hr or 60 km/hr where the road passes through communities.

The Highway is maintained and managed by DTMR and currently provides access from Mackay to a growing number of coal mine sites located in the region. A number of localised upgrades of the road have occurred due to these coal mine projects and the road is frequently used by both Commercial Vehicles (CV) and Over Dimensioned Vehicles (OD).

The current condition of the Highway varies due to the localised upgrades at mine site access points. In these areas, the highway is in good-excellent condition, with sealed shoulders, line markings and additional lanes provided to separate turning movements and street lighting provided at intersections. Grade separations have been provided over mining infrastructure and rail lines.

In areas between mine sites, the road is generally in poor-good condition with unsealed shoulders and visible patching and rutting on the road surface; however line marking is present (although only a centreline is provided in the narrower sections).

There are a number of floodways along the length of Peak Downs Highway, which are clearly marked and have depth indicators provided.

Intermittent, single direction overtaking lanes are provided for approximately 100 km outside of Mackay.

Approximately 75 km from Mackay the Highway crosses the Eton Range, which results in a 12% grade with a number of curves on this grade for a length of 3 km. The speed limit here is reduced to 60 km/hr and safety run-out bays are provided for CV.

3 Existing Conditions

On approach to Mackay the Highway passes through the townships of Eton and Walkerston with reduced speed limits, shopping districts on the side of the highway, 40 km school zones and increased pedestrian and cyclist activities. A school bus route operates along this road.

The Peak Downs Highway is suitable for use as a haulage route for the Alpha Coal Project (Mine) site.

Figure 3-1a shows the typical cross section of the Peak Downs Highway.

Figure 3-1a Peak Downs Highway - Typical Cross Section

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. Extending from the Gregory Highway (north of Clermont) is the Gregory Developmental Road, connecting to Einasliegh. Gregory Highway 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 maintained and managed by DTMR and is frequently used by both CV and OD.

The current condition of the Highway is generally good, with varied width of sealed shoulders from 0-1.5 m, line markings and wide road reservations. Some visible patching and rutting on the road surface reduces the road condition to poor in a number of sites.

There are a number of floodways along the length of Highway, which are clearly marked and have depth indicators provided.

The Highway provides access to private properties on either side of the road reservation, as well as access to the local road network through unsignalised minor intersections. There are rail crossings as well as a signed stock crossing between Emerald and Clermont.

3 Existing Conditions

The road passes through a number of communities, notably Clermont, Capella and Emerald. Speed limits are reduced to 60 km/hr in these areas due to the residential, commercial and increased pedestrian activities. A school bus route operates along this road.

The Gregory Highway connects to the Capricorn Highway at Emerald with a seagull-type intersection.

The Gregory Highway is suitable for use as a haulage route for the Alpha Mine site. Figure 3-2 shows the typical cross section of the Gregory Highway.

Figure 3-2 Gregory Highway - Typical Cross Section

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, 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.

A school bus route operates along this road.

The Capricorn Highway is suitable for use as a haulage route for the Alpha Mine site. Figure 3-3 shows the typical cross section of the Capricorn Highway.

3 Existing Conditions

Figure 3-3 Capricorn Highway - Typical Cross Section

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.

The road is a single carriageway, single lane road with a varying seal width of approximately 3.5 to 4.5 metres for 37 km north of the intersection with the Capricorn Highway. The seal is in average condition with some potholes and rutting evident. Unformed grassed shoulders extend from the edge of the seal to create a wide road reservation. There is insufficient width on the seal for two vehicles to pass in opposing directions and the grassed shoulders need to be used in this instance. For approximately 3 km the seal widens to two lane widths to enable two-way traffic. There are no line markings on the seal.

Approximately 37 km north of the intersection with the Capricorn Highway the carriageway becomes a formed, unsealed road approximately 8-10 m in width, providing two lanes to accommodate two-way traffic; however there is no delineation of lanes. This unsealed carriageway was in good condition at the time of the site inspection, however would be subject to rutting, corrugations and potholes without proper maintenance regimes. The unsealed carriageway cross-section is inconsistent across its length, with intermittent narrowings and some small sealed sections primarily across floodways and creeks.

The road returns to a two-way, two lane sealed carriageway for approximately 7 km on the approach into Clermont from the west.

3 Existing Conditions

The surrounding land is primarily privately owned open bushland, utilised for grazing and other farming activities. Although a majority of the land is fenced, there are sections which are open to stock, horses and also native wildlife.

A number of floodways and cattle grids exist along the route as well as a low lying lagoon area to the west, approximately 42 km north of Alpha.

This road is suitable for light vehicles or commercial vehicles requiring access to the local area; however would require additional safety measures such as signage and road management plans for use as a thoroughfare by a large volume of commercial vehicles on a regular basis. Cattle grids, old bridges and low capacity culverts would restrict the size and weight of over dimensional vehicles able to access the area.

Note that upgrades are proposed to this road as part of the BSTP program; however, the road will be assessed in its current condition.

Figure 3-4 to Figure 3-7 show typical cross sections of Clermont-Alpha Road.

Figure 3-4 Clermont-Alpha Road - Single Lane Section North of Alpha

3 Existing Conditions

Figure 3-5 Clermont-Alpha Road - Typical Unsealed Cross-Section

Figure 3-6 Clermont-Alpha Road - Narrow And Sealed Floodway Crossing

3 Existing Conditions

Figure 3-7 Clermont-Alpha Road - Sealed Section West of Clermont

Flinders Highway (A6) – Townsville to Charters Towers

The Flinders Highway is the main east-west highway linking Townsville and Charters Towers and continues further west to its terminus at Cloncurry. The section between Townsville and Charters Towers has one lane in each direction with sealed shoulders (although sometimes narrow) along most of its length and centre and edge linemarking is provided. There are no apparent issues for CV access.

Flinders Highway forms part of the National Road Network

Gregory Developmental Road (A7) – Charters Towers to Clermont

The Gregory Development Road is a north-south route linking Conjuboy in the north with Clermont to the south. The section between Charters Towers and Clermont forms part of the A7 road link and provides an alternate, inland route to the A1 in central Queensland. One lane is provided in each direction, centre and edge linemarking is provided and it is sealed between Charters Towers and Clermont. There are no apparent issues for the use of this road by CVs.

This section of the Gregory Development Road between Charters Towers and Clermont is classified as a State Strategic Road.

3 Existing Conditions

Dawson Highway (A7) – Rolleston to Springsure

The Dawson Highway is an east-west link connecting Springsure in the west with Gladstone in the east and is an alternate route to the Capricorn Highway. The section between Rolleston and Springsure connects the Gregory Highway and Carnarvon Highway which further connects into the Warrego Highway with a direct link to southeast Queensland. It has one lane in each direction with centre linemarking, however sealed shoulders and edge linemarking is not provided continuously for the full length of this section (particularly the southern half). This section of the Dawson Highway is considered suitable for access by CVs.

The section of Dawson Highway between Rolleston and Springsure is classified as a State Strategic Road.

Carnarvon Highway (A55) – Rolleston to Roma

The Carnarvon Highway is a north-south route linking Rolleston in the north with Mungindi in the south at the Queensland/New South Wales border. The section between Rolleston and Roma is a sealed road and has one lane in each direction. Centre and edge linemarking is provided along the majority of this section however there are some lengths where linemarking is limited to centre linemarking. Shoulder condition adjacent to the carriageway varies from non-existent to unsealed to narrow sealed. Carnarvon Highway is suitable for use by CVs.

The section of Carnarvon Highway between Rolleston and Roma is classified as a State Strategic Road.

Warrego Highway (A2) – Metropolitan Brisbane to Roma

The Warrego Highway is an east-west route linking Brisbane and southeast Queensland in the east with Charleville to the west. The road configuration varies along the section between metropolitan Brisbane and Roma due to the different land uses along this section of road (i.e rural in the west through to urban in the east). The rural sections of this length of Warrego Highway have one lane in each direction with varied shoulder construction from non-existent to unsealed to sealed. In urbanised areas, particularly between Toowoomba and its eastern terminus as the Ipswich Motorway in metropolitan Brisbane, two lanes are provided in both directions and are separated by a median and sealed shoulders.

Immediately east of the Toowoomba township the Highway crosses the Toowoomba Range, which results in a 10% grade with a number of curves on this grade for a length of 4 km. The speed limit here is reduced and safety run-out bays are provided for CV.

The section of Warrego Highway between metropolitan Brisbane and Roma is suitable for use by CV (although care is to be taken when crossing the Toowoomba Range) and is part of the National Road Network.

3.1.2 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.

3 Existing Conditions

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.

The carriageway is a single lane formed road in a wide reservation with less formed shoulders to enable two-way traffic to pass. The surface condition is poor-average, with potholes, rutting and corrugations evident. The road surface is open to erosion, dust and flooding issues. The road reservation is approximately 10 m wide with very little vegetation.

The surrounding land is primarily privately owned open bushland, utilised for grazing and other farming activities. A majority of the land is unfenced open to stock and also native wildlife.

A number of floodways and cattle grids exist along the route with widths varying from 3.6 to 4 m.

This road is suitable for light vehicles or commercial vehicles requiring access to the local area; however would require additional safety measures such as signage and road management plans for use as a thoroughfare by a large volume of commercial vehicles on a regular basis. Cattle grids, old bridges and low capacity culverts would restrict the size and weight of over dimensional vehicles able to access the area.

Figure 3-8 shows the typical cross section of Degulla Road.

Figure 3-8 Degulla Road - Typical Cross Section

3.2 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 7.00am to 8.30am and 2.30pm to 4.30pm, depending on the proximity and starting time of local schools. School bus route operators and local school principals should be contacted as part of any road use management plan to determine any curfews or additional mitigation requirements such as improving safety to school children alighting and disembarking the bus and for the interaction of haulage vehicles and school bus operations. The existing BSTP operations have implemented such measures during haulage.

A number of long-distance regional bus services operate throughout rural Queensland and eight of these routes operate along the same State Controlled Roads as identified in section 3.1.1. 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 have no be significantly impacted based on the proposed vehicle movements generated by the Project. Table 3-1 provides a summary of these public transport services.

Table 3-1 Summary of Existing Public Transport Services

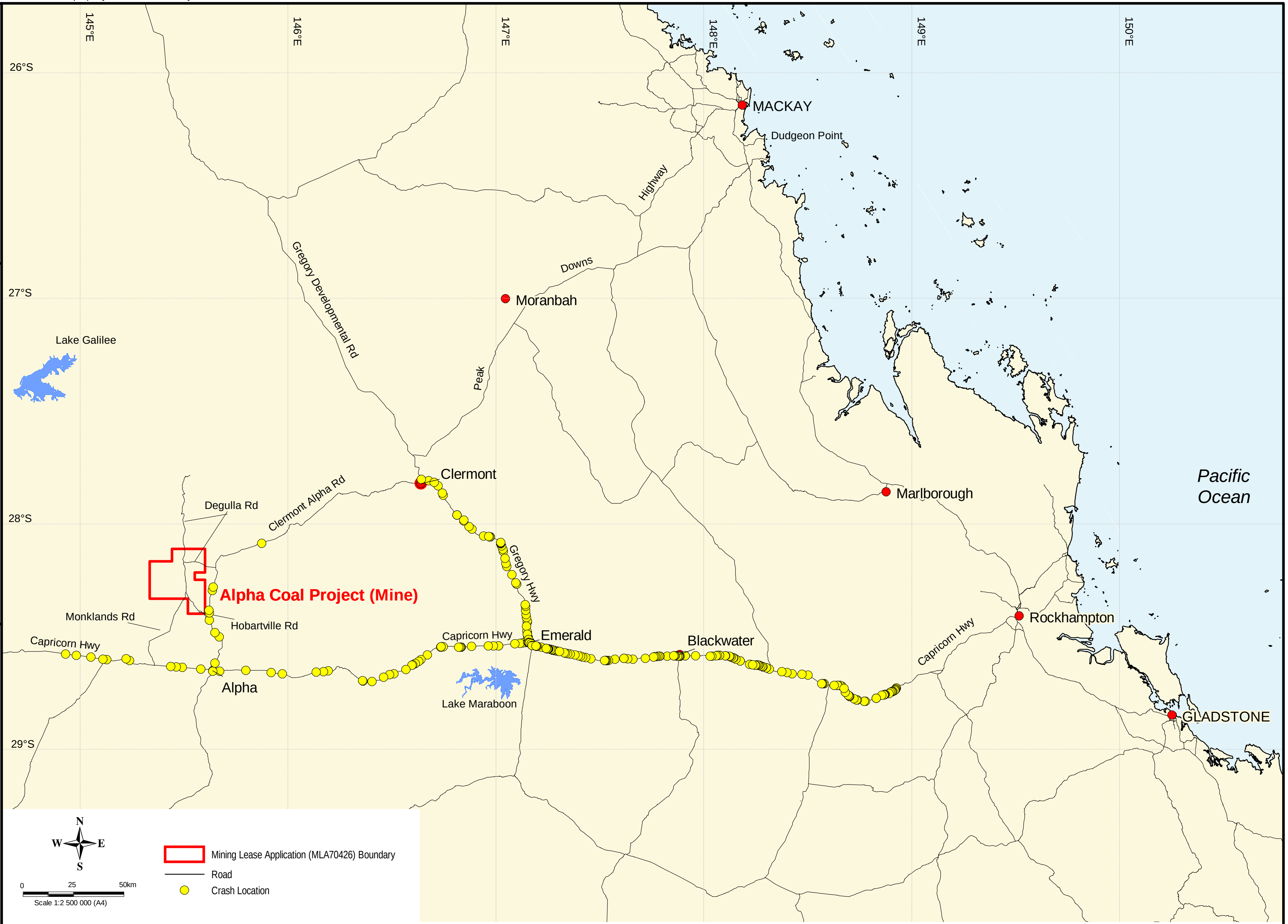
Route (bus operator)		Direction	Direction	Section of Route Overlapping Proposed Vehicles Routes of Project
		Northbound or Westbound	Southbound or Eastbound	
Mt Isa – Brisbane (Greyhound)	Between Mt Isa and Brisbane	1 daily service	1 daily service	Roma to Brisbane
	Between Charleville and Brisbane	1 daily service	1 daily service	
	Between Chinchilla and Brisbane	1 Friday service only	-	
	Between Dalby and Brisbane	1 daily service except Friday	1 daily service	
Mt Isa – Townsville (Greyhound)		4 weekly services – Tues, Thurs, Fri and Sat	4 weekly services – Tues, Thurs, Fri and Sat	Charters Towers – Townsville
Emerald – Mackay (Paradise Coaches)		1 daily service	1 daily service	Full distance of route
Longreach – Emerald (Paradise Coaches)		2 weekly services – Tues and Sat	2 weekly services – Wed and Sun	Barcaldine – Emerald
Cunnamulla – Toowoomba (Greyhound)		3 weekly services – Sun, Wed and Fri	3 weekly services – Mon, Thurs and Sat	Dalby – Toowoomba
Toowoomba – Rockhampton (Greyhound)		3 weekly services – Mon, Wed and Fri	3 weekly services – Tues, Thurs and Sun	Toowoomba – Miles
Charters Towers – Townsville (Douglas Coaches)		1 daily service weekdays only	1 daily service weekdays only	Full distance of route

The use of stock routes in rural areas can create safety concerns for freight haulage routes. Road use management plans should consider the interaction between stock and freight routes and implement any risk management procedures as necessary such as increased signage and communications with land owners on locations of stock. Stock routes currently exist on Clermont-Alpha Road, Hobartville Road and Degulla Road.

3.3 Existing Road Accident Data

Road accident 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 accident data at intersections and midblocks are displayed together.

The following accident data was obtained from DTMR from July 2005 to July 2010 and detailed locations of the crashes are shown in Figure 3-9.



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URS

Client: HANCOCK PROSPECTING PTY LTD

Project: ALPHA COAL PROJECT SUPPLEMENTARY ENVIRONMENTAL IMPACT STATEMENT TRAFFIC IMPACT ASSESSMENT

Drawn: VH | Approved: PC | Date: 07-04-2011

Job No: 4262 6680 | File No: 42626680-g-2043.wor

Title: ALPHA COAL PROJECT (MINE) LOCATION OF CRASHES

Figure: 3-9 | Rev: A | A4

3 Existing Conditions

Further analysis of trends across each road section is discussed in Table 3-2 below.

Table 3-2 Accident Data - Overall 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

Capricorn Highway (Rockhampton to Duaringa)

This section of road shows general trends consistent with rural highways. 53% of incidents were single vehicle accidents and 78% of the accidents occurred at midblock locations. There were no evident trends as to weekday or weekend incidents; however 19% occurred between the hours of 6pm and 6am. 16% of incidents involved a commercial vehicle.

Capricorn Highway (Duaringa to Emerald)

This section of road shows general trends consistent with rural highways. The most common types of accident are rear end in the same lane and single vehicles running off the carriageway. 78% of the accidents occurred at midblock locations and 29% of all accidents occurred between the hours of 6pm and 6am. 19% of incidents involved a commercial vehicle.

Capricorn Highway (Emerald to Alpha)

This section of road shows general trends consistent with rural highways. The most common types of accident were single vehicles running off the carriageway (55%). 80% of the accidents occurred at midblock locations and 20% of all accidents occurred between the hours of 6pm and 6am. 24% of incidents involved a commercial vehicle. This section of road showed a bias towards accidents occurring on a Friday at twice the rate of any other day of the week.

Capricorn Highway (Alpha to Barcaldine)

This section of road shows general trends consistent with rural highways. Almost all accidents were single vehicle accidents, with the most common type classified as running off the carriageway (55%). 75% of the accidents occurred at midblock locations and 27% of all accidents occurred between the hours of 6pm and 6am. 18% of incidents involved a commercial vehicle.

Gregory Highway (Emerald to Clermont)

This section of road shows general trends consistent with rural highways which run through rural residential areas. There was an approximately even spread of accidents between midblock and intersection locations, reflecting the major rural towns located on the Gregory Highway. The most common type of accident is classified as an intersection accident with vehicles from adjacent right-right approaches. There was no significant trend between single or multiple vehicle accidents. 25% of all accidents occurred between the hours of 6pm and 6am and 12% of incidents involved a commercial vehicle.

Clermont-Alpha Road

The low accident numbers on the Clermont-Alpha Road reflects the overall low traffic volumes which utilise this road. From the data available, it is evident that Wednesday has a significantly higher proportion of accidents than any other day of the week. The majority of accidents occur during daylight hours and the most common type of accident is classified as a single vehicle out of control on the carriageway. These trends are reflective of the low usage of this road and the surrounding land use patterns.

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.

It should be noted that the *Galilee Basin Economic and Social Impact Study Report – Transport* (Economic Associates, 2010) has identified that a time-series analysis of major highway sections in the Galilee Basin (including the highways surrounding this Project) has determined that there is no correlation between the recent increase in mining activity and any upward trends in the number of road crashes.

3.4 Scheduled Road Improvement Projects

The DTMR outlines proposed road improvement projects in the publication *'Roads Implementation Program 2009-2010 to 2013-2014'.* This document has been reviewed to identify any road improvement projects scheduled to occur on the roads proposed to be used for the Project. A summary of proposed works is provided in Table 3-3. Note that the proposed works may not occur over the entire length of road and may be limited to specific locations. Works outlined for 2009-2010 may have already occurred at the time of writing this report.

Table 3-3 Scheduled Road Improvement Projects

Road	Proposed Works	Indicative Timing
Capricorn Highway		
Alpha - Barcaldine	• Realignment	2009-2010
Emerald - Alpha	• Seal shoulders	2009-2011
Duaringa – Emerald	• Construct auxiliary lane – Comet River Road • Miscellaneous works • Improve drainage • Seal shoulders • Rehabilitate and widen	2009-2011 2009-2010 2011-Future 2011-Future 2009-2014

Road	Proposed Works	Indicative Timing
Rockhampton - Duaringa	• Construct auxiliary lane • Construct overtaking lane	2009-2010 2010-2014
Clermont-Alpha Road		
Native Companion Creek	• Construction of bridge and approaches	2011-2014
Selected sections	• Minor regrade	2009-2014
Peak Downs Highway		
Clermont - Nebo	• Intersection improvements • Driver fatigue management improvements • Miscellaneous works • Reconstruction of pavement • Rehabilitate and widen • Construct additional lanes • Widen pavement • Creek bridges – concept planning	2009-2011 2009-2011 2009-2010 2009-2014 2011-Future 2009-2010 2009-2014 2009-2011
Nebo – Mackay	• Eton Range minor realignment • Construct overtaking lanes • Upgrade Sandy Creek bridge • Replace guardrail • Intersection improvements • Widen pavement • Walkerston and Eton Range concept planning	2010-2011 2009-Future 2011-2014 2009-2010 2009-2010 Future 2009-2011
Gregory Highway		
Emerald - Clermont	• Install traffic signals – Emerald	2009-2014

Upgrades proposed to surrounding roads as part of the BSTP program are outlined in Section 2.1.2 of this report.

3.5 Consultation Summary

A representative from URS met with Rob Bauer, Executive Officer at BRC in the Alpha Office on 20 July 2010. The following items were discussed.

- BRC preference is to upgrade Alpha Airport for all potential developments in the area rather than having separate airfields for each different one. The airport is having a safety inspection on 16 August 2010. There should be enough room to extend it and provide better facilities.
- BRC would like to extend Eureka Rd towards the Project site to shuttle people straight to and from the airport. This would be out of the floodplain and a better alignment, but there are no plans or road reservations at the moment and planning permits may not suit the timing of the development.
- A number of old bridges on Clermont-Alpha Road may not suit OD vehicles.
- Unsealed roads have a number of issues for use by CV, primarily dust production and flooding.
- BRC's preference is for the Proponent to seal Degulla Road.
- Unfenced stock on Hobartville Road could create safety issues for transport.
- There are no planned road upgrades in Alpha and town planning is at the stage of determining where they can expand the town. There are a number of potential land development sites, but no decisions have been made.

Telephone conversations were held with the Mackay, Barcaldine and Emerald regional offices to gain DTMR advice on submission requirements and information requests.

4

Traffic Volumes

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

4.1 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 (refer Table 4-1) for midblocks on the arterial roads surrounding the subject site and is for two-way traffic. Such information is not available for Degulla Road; however an estimate of volumes for this road has been undertaken based on on-site observations.

The larger links between major centres are broken down into road segments by DTMR for analysis purposes. The highest volumes along these segments have been used.

Signalised intersection plans for the Capricorn Highway/Gregory Highway intersection, were provided by DTMR and were incorporated into the traffic impact assessment.

Table 4-1 2010 Annual Average Daily Traffic Volumes (AADT)

Road	Link	AADT (Total Vehicles)	% Commercial Vehicles
Degulla Rd		20*	30*
Clermont Alpha Rd	Alpha-Hobartville	88	25
	Hobartville-Mistake Ck	21	14
	Mistake Ck-Clermont	81	14
Capricorn Hwy	Jericho-Alpha	350	24
	Alpha-Gemfields	524	23
	Gemfields-Emerald	1263	23
	Emerald-Rockhampton	3374	23
Gregory Hwy	Emerald-Capella	2288	19
	Capella-Clermont	1119	32
Peak Downs Hwy	Clermont-Peak Downs	612	20
	Peak Downs-Nebo	3435	14
	Nebo-Mackay	3893	15

*Volume data not available, figure based on site observations

4.2 Traffic Volume Assessment Scenarios

The Proponent has supplied information to URS regarding the expected road network traffic volumes generated from the construction and operation of the Project. Information supplied 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 4-2 shows the years that have been assessed.

Table 4-2 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	Additional assessment year during operation for comparison purposes

All roads have been assessed against their existing condition as of the site inspections undertaken and the 2010 AADT data supplied by DTMR.

4.3 Historic Traffic Growth and Future Background Volumes

In order to determine the future background traffic volumes (expected volumes across the road network without the Project), the existing traffic volumes are projected forward using historical growth rates. Historical growth rate figures have been provided by DTMR; however these rates vary significantly across the assessment area and many gaps in the data are evident.

Data was unavailable concerning estimates on predicted future growth rates in the region.

Therefore, an estimate of background traffic growth rates has been made based on relevant available data and an understanding of rural road networks.

The available historic growth rates and the adopted growth rates for analysis purposes are provided in Table 4-3.

4 Traffic Volumes

Table 4-3 Historical Traffic Annual Growth Rates and Projected Background Traffic Volumes

Road	Link	Historic Annual Growth Rate Range (%)	Adopted Annual Growth Rate 2010-2020	Adopted Annual Growth Rate 2021-2042	Background Traffic Volumes					
					2010	2013	2017	2022	2030	2041
Degulla Rd			3%	3%	20	22	25	29	37	51
Clermont Alpha Rd	Alpha-Hobartville		3%	3%	88	97	109	126	159	221
	Hobartville-Mistake Ck		3%	3%	21	23	26	30	38	53
	Mistake Ck-Clermont		3%	3%	81	89	100	116	147	203
Capricorn Hwy	Jericho-Alpha	1.5 to 6.5	5%	3%	350	406	493	605	767	1061
	Alpha-Gemfields	-4 to 9.5	3%	3%	524	573	645	748	947	1311
	Gemfields-Emerald	-4 to 9.5	3%	3%	1263	1381	1554	1801	2282	3158
	Emerald-Rockhampton	4 to 12	7%	5%	3374	4134	5418	7318	10812	18491
Gregory Hwy	Emerald-Capella	-11 to 8	5%	3%	2288	2649	3220	3954	5009	6934
	Capella-Clermont	-11 to 8	5%	3%	1119	1296	1575	1934	2450	3391
Peak Downs Hwy	Clermont-Peak Downs		5%	3%	612	709	862	1058	1340	1855
	Peak Downs-Nebo	3 to 17	10%	5%	3435	4571	6694	9823	14513	24822
	Nebo-Mackay	3 to 17	10%	5%	3893	5182	7587	11133	16448	28132

4.4 Traffic Generation of Project

4.4.1 Construction Phase

Approach and Assumptions

The Proponent has provided data 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. Traffic volumes are preliminary estimates at this stage. The data provided has originated from a number of different technical analyses and hence has had to be consolidated and summarised to provide equivalent yearly traffic volumes. The data which has been incorporated into this assessment is outlined below.

Personnel numbers, mode of transport and origin data has been provided by Parsons Brinckerhoff (PB) and is based on the majority (80%) of the construction workforce utilising a Fly-In-Fly-Out (FIFO) method of transport. A minority of the workforce will drive to and from the site each day from Alpha, with the remainder either driving or using a bus program to locate to the mine site accommodation facilities from the surrounding areas for their nominated roster period.

Daily shift periods are expected to be 12 hours in length and occur 7.00am to 7.00pm with daily Alpha personnel traffic arriving and departing in the 1hr period either side of the shift. Buses from Alpha airport and the surrounding regional centres will arrive according to flight times or as scheduled to meet shift times; however it has been assumed they will occur during peak hours for a conservative impact assessment.

It has been assumed that employees driving to and from Alpha, as well as those from nearby regional centres driving to the accommodation facilities will be in single occupancy vehicles. This assumption will produce the worst case scenario for traffic assessment.

Peak personnel numbers occur in 2013 with a total of 1,535 people required.

No allowance has been made for transport movements from the accommodation facilities to the work area as all of these movements will occur within the mining lease and will not affect the external road network.

Delivery of materials, equipment and consumables is assumed to occur 7 days a week, over a 10 hour period, therefore the number of deliveries occurring during each of the peak hour periods is 10% of the daily total (i.e. total deliveries per day divided by 10 hours equals 10% per hour). Initial advice given by the Proponent estimates that approximately 7% of all vehicle movements generated by the Project during the construction phase will involve over-dimensional vehicles.

Waste is assumed to be disposed to the on-site landfill wherever possible; however some waste (hazardous and recoverable) will need to be removed from site to Emerald for treatment. During all phases of the Project, sewage sludge will be transported to an existing BRC sewage treatment works at Emerald. During early works only, solid waste will be delivered to the BRC landfill on Landsborough Highway. During all project phases, hazardous and recovered materials will be transported.

4 Traffic Volumes

A summary of the traffic volumes generated by construction activity as outlined in the provided data is shown in Table 4-4. Vehicles have been classified according to the AustRoads *Vehicle Classification System* 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 (OD) Vehicles represent classes 11, 12 and above.

It should be noted that these are average daily volumes that have been calculated using the total estimated number of traffic movements during the peak of construction, extrapolated to a yearly value. For the purposes of this analysis, peak is anticipated in 2013.

Impacts of specific scheduling of activities have not been considered and will vary depending on the length of time required to complete each task. For this assessment all activities are assumed to occur concurrently and over the whole construction period.

Table 4-4 Generated Peak Construction Traffic, 2013

Category		Vehicle Type (AustRoads Vehicle Class)	Origin	Destination	Estimated Tonnes/ Volume or Units	Equivalent Vehicles (single trip) per year
1. Personnel						
1.1	FIFO	Bus (Class 3 or 4)	Alpha Airport	Accommodation	1,382 people	2,912
1.2	DIDO	LV (Class 1)	Alpha Town	Project Site	9 people	4,212
1.3	BIBO	Bus (Class 3 or 4)	Barcaldine Council	Accommodation	29 people	104
1.4	DIDO	LV (Class 1)	Barcaldine Council	Accommodation	15 people	780
1.5	BIBO	Bus (Class 3 or 4)	Emerald	Accommodation	35 people	104
1.6	DIDO	LV (Class 1)	Emerald	Accommodation	18 people	936
1.7	BIBO	Bus (Class 3 or 4)	Clermont	Accommodation	35 people	104
1.8	DIDO	LV (Class 1)	Clermont	Accommodation	18 people	936
2. Equipment						
2.1	Accommodation Buildings	Standard Semi (Class 8)	Brisbane	Project Site	Truck loads	1,380
2.2	Catering Equipment	Over-Dimensional	Mackay	Project SIte	Truck loads	391
2.3	Construction Equipment	Standard Semi (Class 8)	Brisbane	Project Site	Truck loads	115

4 Traffic Volumes

Category		Vehicle Type (AustRoads Vehicle Class)	Origin	Destination	Estimated Tonnes/ Volume or Units	Equivalent Vehicles (single trip) per year
2.4	Construction Equipment	Over-Dimensional	Mackay	Project Site	Truck loads	23
2.5	Equipment Packages	Standard Semi (Class 8)	Brisbane	Project Site	Truck loads	300
2.6	Equipment Packages	Over-Dimensional	Mackay	Project Site	Truck loads	1,525
2.7	Overland Conveyors	Over-Dimensional	Mackay	Project Site	Truck loads	700
3. Materials						
3.1	Construction materials	Standard Semi (Class 8)	Brisbane	Project Site	6,290 tonnes	1,257
3.2	Construction materials	Standard Semi (Class 8)	Gladstone	Project Site	1,640 tonnes	328
3.3	Construction materials	Standard Semi (Class 8)	Abbot Point	Project Site	2,460 tonnes	492
3.4	Construction materials	Standard Semi (Class 8)	Mackay	Project Site	3,280 tonnes	656
3.5	Consumables - Diesel	57kL tanker (Class 10)	Mackay	Project Site	9,240 kL	162
3.6	Fuel	57kL tanker (Class 10)	Mackay	Project Site	48,123 kL	845
3.7	Lubricant	20 t capacity (Class 4 or 5)	Mackay	Project Site	664,577 L	34
4. Waste						
4.1	Non-landfill waste	20 t capacity (Class 4 or 5)	Project Site	Emerald	14,400 tonnes	723
4.2	Lubricant waste	20 t capacity (Class 4 or 5)	Project Site	Emerald	520 tonnes	26
		Total LV single trips per year				6,864
		Total CV single trips per year				9,542
		Total OD single trips per year				2,639

4.4.2 Operational Phase

Approach and Assumptions

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. The data provided has originated from a number of different technical analyses and hence has had to be consolidated and summarised to provide equivalent yearly traffic volumes. The data which has been incorporated into this assessment is outlined below.

Personnel numbers, mode of transport and origin, delivery of materials, equipment and consumables and waste treatment assumptions are the same as per the construction phase.

Peak personnel numbers will remain constant through the operational phase with a total of 770 people required per shift.

A summary of the traffic volumes generated by operational activity as outlined in the provided data is shown in Table 4-5. Vehicles have been classified according to the AustRoads *Vehicle Classification System* 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 (OD) Vehicles represent classes 11, 12 and above.

It should be noted that these are average daily volumes that have been calculated using the total estimated number of traffic movements during the peak of operation, extrapolated to a yearly value. For the purposes of this analysis, peak operational activity is anticipated in 2041. However, as noted in Section 4.2 a number of operational years have been assessed.

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.

Impacts of specific scheduling of activities have not been considered and will vary depending on the length of time required to complete each task. For this assessment all activities are assumed to occur concurrently and over the whole operational period.

4 Traffic Volumes

Table 4-5 Generated Peak Operational Traffic, 2017

Category	Item	Vehicle Type (AustRoads Vehicle Class)	Origin	Destination	Annual Estimate	Annual Vehicles (single trips)
1. Personnel						
1.1	FIFO	Bus (Class 3 or 4)	Alpha Airport	Accommodation	693 people	1,456
1.2	DIDO	LV (Class 1)	Alpha Town	Project Site	5 people	2,340
1.3	BIBO	Bus (Class 3 or 4)	Barcaldine Council	Accommodation	15 people	104
1.4	DIDO	LV (Class 1)	Barcaldine Council	Accommodation	8 people	416
1.5	BIBO	Bus (Class 3 or 4)	Emerald	Accommodation	18 people	104
1.5	DIDO	LV (Class 1)	Emerald	Accommodation	9 people	488
1.7	BIBO	Bus (Class 3 or 4)	Clermont	Accommodation	18 people	104
1.7	DIDO	LV (Class 1)	Clermont	Accommodation	9 people	468
2. Equipment						
2.1	New mining equipment	Standard Semi (Class 8)	Mackay	Project Site	12,096 tonnes	1,308
2.2	Replacement equipment (NB: generated vehicles are for 2017)	Standard Semi (Class 8)	Mackay	Project Site	0	0

4 Traffic Volumes

Category	Item	Vehicle Type (AustRoads Vehicle Class)	Origin	Destination	Annual Estimate	Annual Vehicles (single trips)
3. Materials						
3.1	General consumables	CV (Class 3, 4 or 5)	Mackay	Project Site	20,505 tonnes	527
3.2	Fuel	57kL Tanker (Class 10)	Mackay	Project Site	181,857 kL	3,191
3.3	Lube	20t Capacity (Class 4 or 5)	Mackay	Project Site	2,622 kL	132
4. Waste						
4.1	Non landfill waste	20t Capacity (Class 4 or 5)	Project Site	Emerald	9,155t	459
4.2	Lube Waste	20t Capacity (Class 4 or 5)	Project Site	Emerald	1,980t	99
		Total LV Single Trips per Year				3,732
		Total CV Single Trips per Year				7,484

4.5 Distribution of Project 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 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.

Figure 4-1 shows the proposed traffic distribution routes.

Mackay and Abbot Point to Site

All vehicles from Mackay and Abbot Point will follow the Peak Downs Highway to Clermont, then the Gregory Highway to Emerald. From Emerald they will continue west along the Capricorn Highway to Clermont-Alpha Road. Following the Clermont Alpha Road, they will then turn left onto Degulla Road to access the site.

Brisbane to Site

From Brisbane, all traffic will follow the Warrego Highway to Roma where it will turn north into the Carnarvon Highway and continue to Rolleston. At Rolleston, traffic will follow the Dawson Highway into the Gregory Highway until Emerald. At Emerald, traffic will turn left and follow the Capricorn Highway to Alpha and access the site via Clermont-Alpha Road and Degulla Road.

Townsville Site

From Townsville, all traffic will follow the Flinders Highway to Charters Towers where it will turn south and follow the Gregory Developmental Road to Clermont and continue south on the Gregory Highway until Emerald. At Emerald, traffic will turn right and follow the Capricorn Highway to Alpha and access the site via Clermont-Alpha Road and Degulla Road.

Gladstone and Rockhampton to Site

From Gladstone, traffic will follow the Bruce Highway to Rockhampton. At Rockhampton, traffic will follow the Capricorn Highway west to Alpha. Following the Clermont-Alpha Road north from Alpha, they will then turn left onto Degulla Road to access the site.

Regional Centres to Site

It is anticipated that personnel from the regional centres will follow one of the routes outlined above. Those personnel residing to the west of the project site are anticipated to filter to the Capricorn Highway and then follow the highway east towards Alpha. From Alpha they will access the site via Clermont-Alpha and Degulla Roads.

4 Traffic Volumes

The only permitted exception is for personnel residing in Clermont who are able to utilise the Clermont-Alpha Road to access the site via Degulla Road rather then travelling the longer distance via Emerald and Alpha. However the use of this section of Clermont-Alpha Road (between Degulla Road and Clermont) is restricted to light vehicles only – all HVs and ODs must access the site via Emerald.

Traffic Assignment

From the above route designation and previous generated traffic calculations, Table 4-7 and Table 4-7 show the appropriate traffic assignment and resulting AADT values for the 2013 construction and 2017 operational assessment scenarios respectively.

URS

Client: HANCOCK PROSPECTING PTY LTD

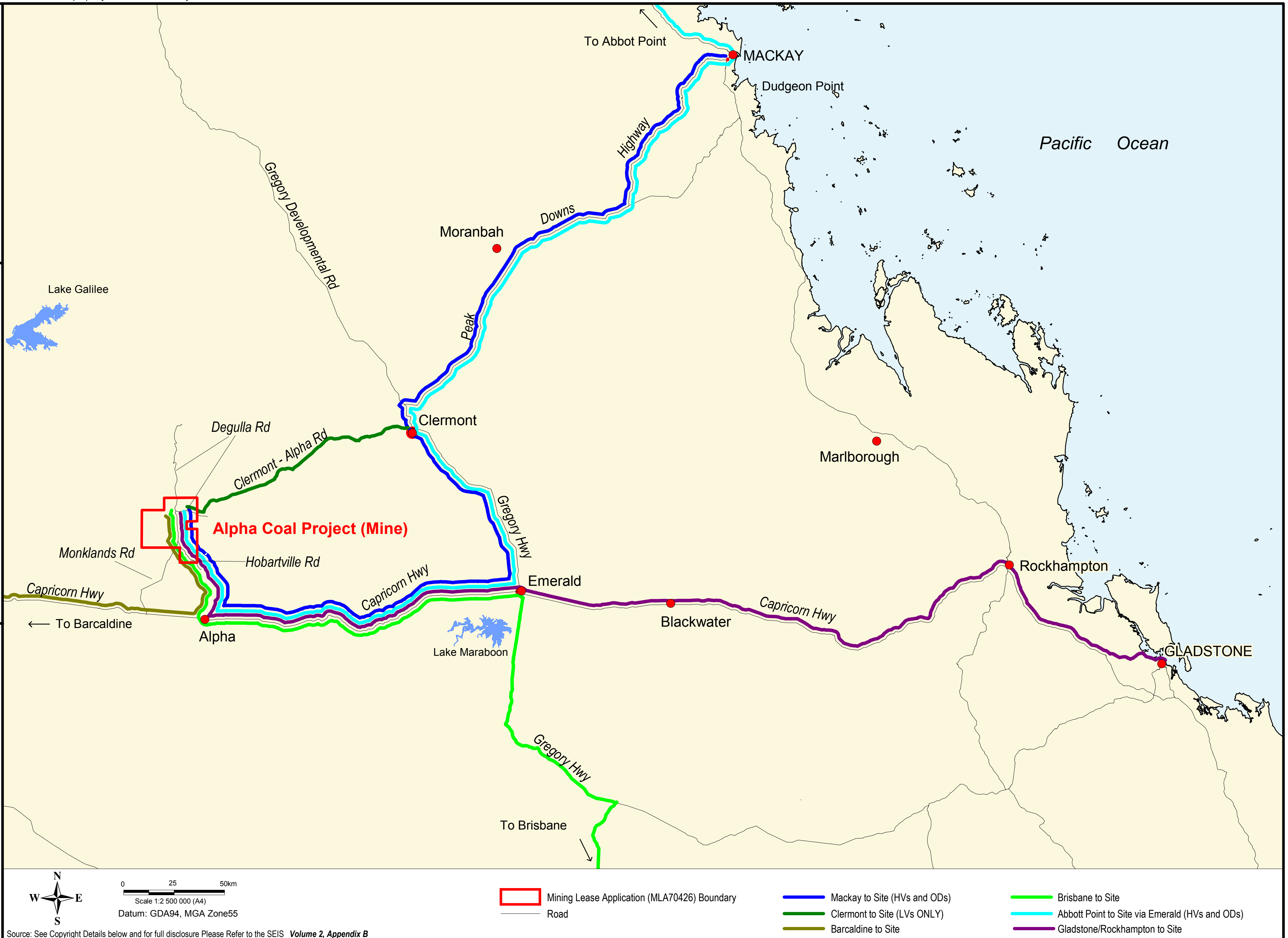
Project: ALPHA COAL PROJECT SUPPLEMENTARY ENVIRONMENTAL IMPACT STATEMENT TRAFFIC IMPACT ASSESSMENT

Drawn: LL | Approved: PC | Date: 30-03-2011

Job No: 4262 6680 | File No: 42626680-g-2037.wor

Title: **ALPHA COAL PROJECT (MINE) TRAFFIC DISTRIBUTION ROUTES**

Figure: 4-1 | Rev: A | A4



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4 Traffic Volumes

Table 4-6 Construction traffic assignment and Average Annual Daily Traffic (AADT), 2013

Road Segment	Annual Trips					AADT
	CV Single	CV Return	LV Single	LV Return	Total Return	
Clermont-Alpha Road (Alpha - Degulla Rd)	12,181	24,362	5,928	11,856	36,218	100
Clermont-Alpha Road (Degulla Rd - Clermont)	0	0	936	1,872	1,872	6
Degulla Rd	12,181	24,362	6,864	13,728	38,090	105
Capricorn Hwy (Alpha to Emerald)	9,165	18,330	936	1,872	20,202	56
Capricorn Hwy (Emerald - Rockhampton)	328	656	0	0	656	2
Gregory Hwy (Emerald - Clermont)	5,112	10,224	0	0	10,224	29
Gregory Hwy etc. (Emerald – Brisbane)	3,052	6,104	0	0	6,104	17
Peak Downs Hwy (Clermont - Mackay)	4,828	9,656	0	0	9,656	27
Gregory Developmental Road (North of Clermont)	180	360	0	0	360	1
Capricorn Hwy (West of Alpha)	104	208	936	1,872	2,080	6

Table 4-7 Operational traffic assignment and Average Annual Daily Traffic (AADT), 2017

Road Segment	Annual Trips					AADT
	CV Single	CV Return	LV Single	LV Return	Total Return	
Clermont-Alpha Road (Alpha - Degulla Rd)	7,484	14,968	3,224	6,448	21,416	59
Clermont-Alpha Road (Degulla Rd - Clermont)	0	0	468	936	936	3
Degulla Rd	7,484	14,968	3,692	7,384	22,352	62
Capricorn Hwy (Alpha to Emerald)	5,924	11,848	468	936	12,784	36
Capricorn Hwy (Emerald - Rockhampton)	0	0	0	0	0	0
Gregory Hwy (Emerald - Clermont)	5,262	10,524	0	0	10,524	29
Gregory Hwy etc. (Emerald – Brisbane)	0	0	0	0	0	0
Peak Downs Hwy (Clermont - Mackay)	5,158	10,316	0	0	10,316	29
Gregory Developmental Road (North of Clermont)	0	0	0	0	0	0
Capricorn Hwy (West of Alpha)	104	208	468	936	1,144	4

4.6 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 selected assessment year.

As noted previously, the worst case scenarios within the 10 year design horizon occur at 2013 during the construction period and 2017 for the operational period. Both years have been assessed given the different vehicle routes and volumes required between the construction and operational phases.

Table 4-9 outlines the total future traffic volumes with and without the Project development for 2013 (construction phase) and the percentage increase caused by the generated traffic after assignment to the designated transport routes. The generated traffic is also compared to both the background 2013 and existing 2010 traffic volumes as a percentage. Table 4-9 covers these same comparisons for the future traffic volumes with and without the Project for 2017 (operational phase).

4 Traffic Volumes

Table 4-8 Future Traffic Volumes, 2013 (Construction Phase)

Road Segment	AADT Volumes				Impact		Impact > 5%
	2010 Existing	2013 Projected Background	2013 Project Generated	2013 Total With Project	% Increase from 2013	% Increase from 2010	
Degulla Road							
Clermont-Alpha Road to Site	20	22	105	127	477.3%	525.0%	Yes
Clermont-Alpha Road							
Alpha to Hobartville	88	97	100	197	103.1%	113.6%	Yes
Hobartville to Mistake Creek	21	23	6	29	26.1%	28.6%	Yes
Mistake Creek to Clermont	81	89	6	95	6.7%	7.4%	Yes
Capricorn Highway							
Jericho-Alpha	350	406	6	412	1.5%	1.7%	No
Alpha-Gemfields	524	573	56	629	9.8%	10.7%	Yes
Gemfields-Emerald	1263	1381	56	1437	4.1%	4.4%	No
Emerald-Rockhampton	3374	4134	2	4136	0.0%	0.0%	No
Gregory Highway							
Emerald-Capella	2288	2649	29	2678	1.1%	1.3%	No
Capella-Clermont	1119	1296	29	1325	2.2%	2.6%	No
Peak Downs Highway							
Clermont-Peak Downs	612	709	27	736	3.8%	4.4%	No
Peak Downs-Nebo	3435	4571	27	4598	0.6%	0.8%	No
Nebo-Mackay	3893	5182	27	5209	0.5%	0.7%	No

4 Traffic Volumes

Table 4-9 Future Traffic Volumes, 2017 (Operational Phase)

Road Segment	AADT Volumes				Impact		Impact > 5%
	2010 Existing	2017 Projected Background	2017 Project Generated	2017 Total With Project	% Increase from 2017	% Increase from 2010	
Degulla Road							
Clermont-Alpha Road to Site	20	25	62	87	248.0%	310.0%	Yes
Clermont-Alpha Road							
Alpha to Hobartville	88	109	59	168	51.4%	67.0%	Yes
Hobartville to Mistake Creek	21	26	3	29	11.5%	14.3%	Yes
Mistake Creek to Clermont	81	100	3	103	3.0%	3.7%	No*
Capricorn Highway							
Jericho-Alpha	350	493	4	497	0.8%	1.1%	No
Alpha-Gemfields	524	645	36	681	5.6%	6.9%	Yes
Gemfields-Emerald	1263	1554	36	1590	2.3%	2.9%	No
Emerald-Rockhampton	3374	5418	0	5418	0%	0%	No
Gregory Highway							
Emerald-Capella	2288	3220	29	3249	0.9%	1.3%	No
Capella-Clermont	1119	1575	29	1604	1.8%	2.6%	No
Peak Downs Highway							
Clermont-Peak Downs	612	862	29	891	3.4%	4.7%	No
Peak Downs-Nebo	3435	6694	29	6723	0.4%	0.8%	No
Nebo-Mackay	3893	7587	29	7616	0.4%	0.7%	No

* Although impact is not greater than 5% for 2017, it is above the 5% threshold in 2013.

Pavement Impact Assessment

An initial assessment has been conducted to identify impacts that the Project will have on the pavement design life of affected roads. This section details this assessment and its findings.

5.1 Assessment Methodology, Scope and Assumptions

The DTMR ‘Guidelines for the Assessment of Road Impacts of Development’ (GARID) specifies that a pavement impact assessment should be completed when evaluating the full impact a development may have on the surrounding state controlled road (SCR) network. As per the GARID, the Central West Region DTMR office was contacted for guidance regarding the appropriate scope of the pavement assessment. We were advised that a normal assessment is required and to include bridges and major culverts.

Information provided for the DTMR roads includes:

- Pavement design life;
- Pavement age and width data;
- Maintenance costs;
- Proposed upgrades (referred to the Queensland Transport and Roads Investment Program (QTRIP)); and
- 2010 and 2011 AADT volumes.

Barcaldine Regional Council were contacted regarding Degulla Road and they. advised that this road is not a high priority for Council. Degulla Road is classified as a category 2 road and is naturally formed earth with gravel overlay in sections of approximately 50mm depth. Maintenance budget for Degulla Road is $30 000.

A site inspection assessing the pavement condition was undertaken between the 1st and 3rd of March, 2011.

The underlying purpose of the pavement assessment is to assist DTMR to maintain the SCR network in a safe and functional condition and determine if the impact of the development requires the Proponent to contribute towards any unplanned upgrades or maintenance or to accelerate the progress of any DTMR planned future works.

Only pavement impacts directly attributable to the Project are required to be assessed in this process. All roads have been assessed against their existing condition as of March 2011.

5.2 Project Profile and Future Traffic Volumes

Refer to Sections 2 and 4 of this report for details of traffic volumes and the Project profile used in this assessment.

The GARID provides a set of “Underlying Principles” which includes at Principle 3 a comment that an increase in traffic on SCRs of less than 5% is deemed insignificant unless the increase actually provides a significant impact on an aspect of road performance.

Sections of SCR’s with a traffic affect of more than 5% are the Clermont-Alpha Road from the mine to Clermont and the Clermont-Alpha Road from Alpha to the mine. These are considered further in the discussion below.

Degulla Road is not considered SCR as It is maintained by Barcaldine Regional Council. However, due to the increase in traffic volume and distribution this has been included in the analysis.

5.3 Impact Assessment and Estimated Contribution Requirements

5.3.1 Clermont-Alpha Road (180km)

A section of the Clermont-Alpha Road, directly to the west of Clermont is sealed two lanes, with the following 180km to Alpha varying from single lane sealed to gravel pavements with some bridges and some concrete floodways.

The existing condition of this road, as provided by DTMR, shows that the pavement is an average of 14 years old, with a maximum of 29 years and a minimum of less than 1 year old. The design life for pavement in the Central West Region is 10 years for both rehabilitation and construction works. The width is reported to be an average of 8.2m, with a maximum of 11.6m and minimum of 3.7m.

There are few planned and future upgrades for the Clermont-Alpha Road. The Roads Alliance 'Addendum to the Queensland Transport and Roads Investment Program 2010-2011 to 2013-2014' (Transport and Main Roads, November 2010) includes the following upgrades:

- Project Number 16/552/13; Sections 79.00 to 83.00km; Indicative total cost $497 000; full Queensland Government contribution; approved for the 2011-2012 financial year; to undertake minor regrade.
- Project Number 16/552/14; Sections 75.00 to 79.00km; Indicative total cost $526 000; full Queensland Government contribution; indicated to be in the 2012-2013 financial year; to undertake minor regrade.
- Project Number 16/552/16; Sections 35.00 to 38.00km; Indicative total cost $604 000; full Queensland Government contribution; indicated to be in the 2013-2014 financial year; to undertake minor regrade.
- Project Number 16/552/17; the Belyando River; indicative total cost of $10 200 000; full Queensland Government contribution; $772 000 approved for the period to June 2012, remainder to be confirmed; to undertake a replacement of the bridge/s.

Maintenance for the Clermont-Alpha Road is undertaken by maintenance providers under a Road Maintenance Performance Contract to the Queensland DTMR. Maintenance costs are $2,116.72/km per annum.

Between Clermont and Degulla Road (120km)

The existing condition of the Clermont-Alpha Road between Clermont and Degulla Road is highly variable:

- The pavement ages range from 1 year to >45 years old;
- Pavement widths vary from one trafficable lane to three trafficable lanes; and
- Pavement surfaces are asphalt, concrete, formed gravel, and natural surfaces (light gravel or sand).

Upon receiving advice from the site inspections, the Proponent has confirmed that no commercial vehicles will use the Clermont-Alpha Road between Clermont and Degulla Road. A marginal increase in light vehicles is expected, this is not considered significant.

5 Pavement Impact Assessment

Table 5-1 Clermont-Alpha Road between Clermont and Degulla Road - AADT and Commercial Vehicle Distribution

	Base Data		Mine Activity		Total Vehicles		
Year	AADT	% CVs	AADT	% CVs	AADT	No. CVs	% CVs
2010	81	14%			81	11	14%
2013	89	14%	6	0%	95	12	13%
2017+	100	14%	3	0%	103	14	14%

[1] Construction traffic due to mining activities only

[2] Traffic due to mining activities only. Considered consistent after 2017

Sections of the **Clermont-Alpha Road that are sealed** (approximately 21km) are generally in very good condition with pavement ages between 2 and 10 years. Given the marginal contribution of vehicles to this road segment it is recommended that only routine maintenance will be required.

There are a number of sealed areas that require attention as they present a risk to existing users and as such are not the responsibility of the Proponent. These include:

- The causeway over Back Creek can flow very fast when the water is over 200mm deep. This causes a safety concern for existing road users, one local saying that she's seen vehicles being moved in the direction of flow at about 200mm depth. This causeway should be raised to provide safe access.
- The causeway over an un-signed creek approximately 25km west of Clermont has a significant hole on the south side. This is a significant safety concern given that it is very difficult to see if there is rain over the causeway. This should be repaired as soon as possible.
- All culverts should be cleared of silt for them to be effective. The culverts were found to be in good condition, though most were filled with a significant amount of silt.

Sections of the **Clermont-Alpha Road that are formed gravel** (approximately 30km) are in variable condition. These sections are between 3 and 10 years old, with a design life of 10 years. These sections showed some signs of pot holing, though likely due to the recent wet season prior to the site inspection. These sections should be maintained to extend their remaining life. If pot holes are filled, the marginal increase in light vehicles is unlikely to significantly affect these sections of the road.

Given the marginal contribution of vehicles to this road segment it is recommended that only routine maintenance will be required.

Sections of the **Clermont-Alpha Road that are natural surface** (approximately 69km) are also in variable condition. The age of the natural surface road is reported to be between 20 and 45 years. The condition of the naturally surfaced road is dependent upon the natural base:

- Approximately 8km is light gravel / sand over hard pack / rock – generally in good condition;
- Approximately 41km is light gravel over a sandy base – in poor condition during dry conditions and deteriorating to very poor during and after wet conditions; and
- Approximately 20km is sand over a sandy base – in acceptable condition during dry conditions and deteriorating to very poor during and after wet conditions.

5 Pavement Impact Assessment

During the site inspection along the Clermont-Alpha Road rain swept through the area. The site vehicle was following an unloaded road train and it was noted that the condition of the road became extremely slippery. The road train also became bogged approximately 90km west of Clermont. Due to the marginal increase (2%) in light vehicles generated by the Project using this road segment, no work or maintenance is recommended to be the responsibility of the Proponent.

Plate 5-1 Clermont-Alpha Road between Clermont and Degulla Road (site photos)

The fast-flowing Back Creek after approx. 30mm rain

Unknown causeway with significant hole requiring immediate attention.

Gravel section in good condition

Gravel section requiring maintenance

5 Pavement Impact Assessment

Light gravel over sandy base after rain and one light vehicle

Light gravel over sandy base after rain and one road train

Light gravel over sandy base after rain and one road train

Bridge over Native Companion Creek should be completed to replace existing bridge

One lane bridge over Native Companion Creek requiring replacement (commenced as per previous photo)

5 Pavement Impact Assessment

Between Degulla Road and Hobartville Road (30km)

The existing condition of the Clermont-Alpha Road between Degulla Road and Hobartville Road is generally reasonable. Approximately 13km is gravel, 2.5km is sealed, and the remainder is natural surface. There are isolated locations of softness around the culverts and low spots, but otherwise the road is in good condition.

The sealed sections are predominantly 1.5 lanes wide. This is sufficient for the existing traffic conditions as there are significant hard shoulders through this section. The age of the pavement is mostly 3 to 5 years old, though the natural surface is at least 20 years old.

There is a culvert crossing approximately 15km north of Hobartville Road which is showing signs of degradation, see Plate 5-2 below. This point is likely to degrade swiftly, potentially creating a significant hole in the carriageway. It should be repaired immediately, though is not the responsibility of the Proponent. Other culvert crossings and floodways along this section are in good condition.

Table 5-2 Clermont-Alpha Road between Hobartville Road and Degulla Road - AADT and Commercial Vehicle Distribution

	Base Data		Mine Activity		Total Vehicles		
Year	AADT	% CVs	AADT	% CVs	AADT	No. CVs	% CVs
2010	88	25%			88	22	25%
2013	97	25%	100	67%	197	91	46%
2017+	109	25%	59	70%	168	69	41%

[1] Construction traffic due to mining activities only

[2] Traffic due to mining activities only. Considered consistent after 2017

Given the increase in traffic, particularly commercial vehicles, it is recommended that this road segment be upgraded to a 2 lane all-weather surface.

Plate 5-2 Clermont-Alpha Road between Degulla Road and Hobartville Road (site photos)

Single Lane section of Clermont-Alpha Road between Degulla Road and Hobartville Road

Floodway approx. 15km north of Hobartville Road requiring maintenance

Between Hobartville Road and Alpha

The Clermont-Alpha Road between Alpha and Hobartville Road is predominantly sealed. The condition of this road is very good. There is an approximately 4m section of surface degradation about 11km north of Alpha which will require maintenance within the 2011 dry season to ensure it does not degrade further through future wet season. This is an existing condition that should be maintained by the DTMR.

Table 5-3 Clermont-Alpha Road between Hobartville Road and Alpha - AADT and Commercial Vehicle Distribution

	Base Data		Mine Activity		Total Vehicles		
Year	AADT	% CVs	AADT	% CVs	AADT	No. CVs	% CVs
2010	88	25%			88	22	25%
2013	97	25%	100	67%	197	91	46%
2017+	109	25%	59	70%	168	69	41%

[1] Construction traffic due to mining activities only

[2] Traffic due to mining activities only. Considered consistent after 2017

This short north-south section of the Clermont-Alpha Road will take the majority of the mine traffic and all of the commercial vehicles related to the mine. Throughout the construction period there is an expected increase of 21% commercial vehicles, while the operations only increase the commercial vehicles by 16%. Light vehicles increase by 45% and 22% for construction and operations respectively.

Given the existing good condition of the road, it is recommended that no additional works are required for the implementation of the Project. Anecdotal evidence suggests that this road segment regularly floods during the wet season. This should be investigated by the DTMR for potential upgrade. It is recommended that any upgrade of this road segment be attributable to the Project, if undertaken during the life of the Project, as it will facilitate unimpeded access to the Project site.

5.3.2 Degulla Road

Degulla Road is also a Barcaldine Regional Council Road. It is classified as a category 2 road as it is a thoroughfare between Alpha and Degulla. The maintenance budget for the 2010 / 2011 financial year is in the order of $30 000.

Currently there is little traffic on this road, though traffic counts were not provided by Barcaldine Regional Council. An estimate of 20 vehicles per day has been assumed for this road on the basis of traffic noted during the site inspection. A robust commercial vehicle contribution of 30% has been assumed.

5 Pavement Impact Assessment

Table 5-4 Degulla Road - AADT and Commercial Vehicle Distribution

	Base Data		Mine Activity		Total Vehicles		
Year	AADT	% CVs	AADT	% CVs	AADT	No. CVs	% CVs
2010	20	30%			20	6	30%
2013	22	30%	105[1]	64%	127	41	58%
2017+	25	30%	62[2]	67%	87	30	56%

[1] Construction traffic due to mining activities only

[2] Traffic due to mining activities only. Considered consistent after 2017

It can be seen from the table above that there is a significant increase in the number of vehicles using Degulla Road both during construction and operation of the mine – particularly commercial vehicles.

It is recommended that Degulla Road be upgraded to an all weather surface between the Clermont-Alpha Road and the Project site. This should be under similar agreements as those implemented for Hobartville Road for the BSTP program.

It should be noted that BRC preference is also for the Proponent to seal the section of Degulla Road from Clermont-Alpha Road to the Project site.

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 Hobartville Road. It is recommended that a similar agreement be entered into for the construction and operational phases of the Project for BRC-controlled roads for Degulla Road reflecting the transport usage patterns of the mine for each phase.

Figure 5-1 Indicative Road Condition for Degulla Road

5.4 Recommended Works

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

- Clermont-Alpha Road between Alpha and Hobartville Road
  - No works recommended as a result of the Project.
- Clermont-Alpha Road between Hobartville Road and Degulla Road
  - Upgrade of road segment to a consistent two-lane all-weather surface.
- Clermont-Alpha Road between Degulla Road and Clermont
  - No works recommended as a result of the Project.
- 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

5.5 Further Investigation and Current Agreements

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.

Road Network Performance

This section analyses the road network from a traffic performance perspective at both midblock (road links) and intersection locations.

6.1 Network Assessment Requirements

DTMR's 'Guidelines for the Assessment of Road Impacts of Developments' states that;

'…traffic operation impacts need to be considered for any State Controlled Roads where the construction or operational traffic generated by a proposed development equals or exceeds 5% of the existing AADT on the road section, intersection movements or turning movements.'

Based on the figures previously shown in Tables 4-6, 4-7 and 4-9 the following justification for selecting the scope of assessment is as follows:

Roads and Intersections Included in Assessment

- Degulla Road – not a state controlled road, however included in assessment based on increased AADT volumes.
- Clermont-Alpha Road – over the 5% criteria threshold.
- Capricorn Highway (Alpha to Gemfields section) – over the 5% criteria threshold.
- Intersection of Clermont-Alpha Road and Capricorn Highway – over the 5% criteria threshold.
- Intersection of Capricorn Highway and Gregory Highway – over the 5% threshold.

Roads and Intersections Not Included in Assessment

- Capricorn Highway excluding Alpha to Gemfields section – below the 5% criteria threshold.
- Peak Downs Highway – below the 5% criteria threshold.
- Gregory Highway – below the 5% criteria threshold.

Based on previous discussions, assessment has taken place for the 2013 construction phase and 2017 operational phase scenarios, as these present the worst cases for traffic impacts and therefore all other scenarios will have no greater impact than the results discussed.

6.2 Road Links Assessment

6.2.1 Analysis Method and Required Performance Criteria

In accordance with the DTMR guidelines, road links were assessed based on a measure of Level Of Service (LOS).

LOS is an index of the operational performance of traffic on a given traffic lane, carriageway, road or intersection, based on service measures such as speed, travel time, delay and degree of saturation during a given flow period.

In general there are six levels of service, designated from A to F, with LOS A representing free flowing traffic with no delays and LOS F being congested with no flow and major delays. A LOS up to LOS C is generally considered acceptable in road design.

The DTMR 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.

6 Road Network Performance

The assessment of LOS for the road network in question has been completed using the methodology detailed in the AustRoads ‘Guide to Traffic Engineering Practice Part 2 – Roadway Capacity’.

6.2.2 Assumptions and Analysis

Whilst the methodology used is suitable for the Capricorn Highway and results in no impact on LOS for the 2013 and 2017 ‘With Project’ scenarios, there is little information available to provide standard guidelines for the assessment on narrow or unpaved rural roads such as Degulla Road and Clermont-Alpha Road.

Therefore, the following methodology has been adapted from the guidelines for use in assessing these two roads.

For a standard two lane, two-way rural road, the appropriate threshold for LOS A is 2,000 AADT on level terrain. Using a factor of 0.5 to account for unpaved roads and an additional 0.5 factor for single lane roads, the resulting threshold for LOS A would be 500 AADT. Additionally, if the terrain is classified as ‘rolling’ the resulting threshold for LOS A would be 225 AADT. The maximum AADT value on these unpaved or narrow rural roads in the assessment is 200 and hence all can be classified as having a LOS A.

Table 6-1 and Table 6-2 summarise the assessment of the road links during the 2013 and 2017 assessment years respectively.

6.2.3 Summary of Road Link Impact Assessment

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.

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 of the Project and are discussed in Section 7.

Table 6-1 Road link assessment - Level of Service (LOS) during Construction Phase (2013)

Road Segment	K Factor		Existing 2010		Projected 2013			
					Without Project		With Project	
	Surveyed	Assumed	AADT	LOS	AADT	LOS	AADT	LOS
Degulla Road								
Clermont Alpha Road to Site	-	0.12	20*	A	22	A	127	A
Clermont-Alpha Road								
Alpha to Hobartville	-	0.12	88	A	97	A	197	A
Hobartville to Mistake Creek	-	0.12	21	A	23	A	29	A
Mistake Creek to Clermont	-	0.12	81	A	89	A	95	A
Capricorn Highway								
Alpha to Gemfields	.09 to .12	0.11	524	A	573	A	629	A

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.

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

Table 6-2 Road link assessment - Level of Service (LOS) during Operational Phase (2017)

Road Segment	K Factor		Existing 2010		Projected 2017			
					Without Project		With Project	
	Surveyed	Assumed	AADT	LOS	AADT	LOS	AADT	LOS
Degulla Road								
Clermont Alpha Road to Site	-	0.12	20*	A	25	A	87	A
Clermont-Alpha Road								
Alpha to Hobartville	-	0.12	88	A	109	A	168	A
Hobartville to Mistake Creek	-	0.12	21	A	26	A	29	A
Mistake Creek to Clermont	-	0.12	81	A	100	A	103	A
Capricorn Highway								
Alpha to Gemfields	.09 to .12	0.11	524	A	645	A	681	A

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.

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

6.3 Intersection Assessment

6.3.1 Analysis Method and Required Performance Criteria

The DTMR guidelines 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.

6 Road Network Performance

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 both the existing (2009) and future performance of the road network for both the 'without project' and 'with project' scenarios for the following intersections:

- Capricorn Highway and Gregory Highway Intersection in Emerald (Unsignalised T-Intersection); and
- Clermont Alpha Road and Capricorn Highway in Alpha (Unsignalised 4 way Intersection).

A new intersection will need to be constructed to access the mining lease site from the existing road network from Degulla Road. This new intersection has not been modelled due to the extremely low volume of traffic on this road and the fact that it 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.

6.3.2 Capricorn Highway and Gregory Highway Intersection - Emerald

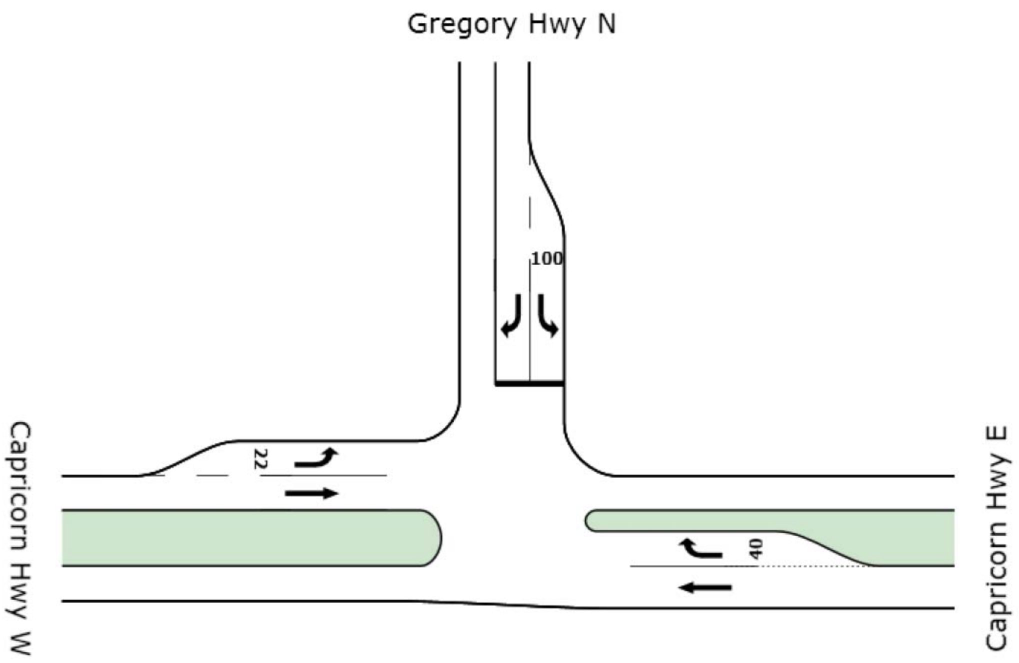
Intersection Geometry and Control

To assist in modelling this intersection, DTMR provided intersection layout plans, which show the geometric layout of the intersection. Geometry for the intersection was also sourced from publicly availably aerial photographs.

The intersection is classified as an unsignalised 'Seagull' intersection, where right turning traffic is provided with a median gap in which to pause whilst negotiating a gap to enter the main traffic stream. Traffic entering the Capricorn Highway from the Gregory Highway is controlled by a stop sign. This layout changes the priority of the right turning movements when compared to a regular T intersection, as the right turns from the Gregory Highway are given priority over the right turns from the Capricorn Highway.

SIDRA output showing the layout of this intersection is provided in Figure 6-1.

Figure 6-1 Capricorn Highway and Gregory Highway Intersection Layout



Traffic Volumes

Existing turning movement volume data was provided by DTMR for this intersection over the period 7.30am to 6.00pm on Wednesday 6 August 2009. From this data it was determined that for the overall volume of traffic entering the intersection, the relevant AM and PM peak hours were between 7.45am to 8.45am and 4.15pm to 5.15pm. The percentage of CV's for each leg was also provided.

These peak hours and peak hour volumes have been used in the analysis for the existing performance levels.

It was considered appropriate to assess both the 2013 and 2017 scenarios as the traffic patterns differ between the construction and operational phases. These two scenarios represent the worst case for both phases.

For the 2013 and 2017 'without project' scenario, the existing 2009 turning movement volumes were extrapolated using the proposed growth rates as discussed previously. CV percentages remain the same as the existing conditions.

The 2013 and 2017 'with project' scenario then add the additional traffic generated by the Project to the relevant movements, based on the traffic distribution outlined in Section 4.5 and the following assumptions:

- Employee bus schedules are not known at this stage of the Project and hence for worst case scenario analysis, it is assumed that all buses will complete a one way trip in each peak hour;
- All CV deliveries are expected to occur over a 10 hour period each day and therefore, 10% of the total daily volume of CV trips will occur in any one hour period, including each peak hour period;

6 Road Network Performance

- All DIDO trips between Clermont, Emerald and Barcaldine and the mine Accommodation facilities will occur during the peak hour; and
- For the worst case scenario analysis, all BIBO and DIDO trips will occur towards the mine site in the AM peak and away from the mine site in the PM peak period – two-way trips for CV and OD vehicles will occur during both peak periods.

The movements which additional traffic is added are the North-West and West-North turning movements, and the East-West and West-East through movements.

Table 6-3 and Table 6-4 summarise the outcome of this analysis based on the worst performing movement, with full reports available in Appendix A to this report.

Table 6-3 Capricorn Highway and Gregory Highway Intersection Assessment - SIDRA Summary AM

	2009	2013 - Construction			2017 - Operation		
	Existing	Without Project	With Project	Incremental Impact	Without Project	With Project	Incremental Impact
Critical Movement	East to North	East to North (Right Turn)			East to North (Right Turn)		
DOS	0.53	0.72	0.77	0.05	0.99	1.00	0.01
Average Delay (sec)	13	18	20	2	28	29	1
Queue Length (m)	37	68	78	10	114	114	0

Table 6-4 Capricorn Highway and Gregory Highway Intersection Assessment - SIDRA Summary PM

	2009	2013 - Construction			2017 - Operation		
	Existing	Without Project	With Project	Incremental Impact	Without Project	With Project	Incremental Impact
Critical Movement	East to North	East to North (Right Turn)			North to East (Left Turn)		
DOS	0.57	0.78	0.85	0.07	1.01	1.02	0.01
Average Delay (sec)	14	19	24	5	64	66	2
Queue Length (m)	42	82	104	22	261	263	2

These results show that for each assessment year, the Project has a minor incremental impact on the intersection performance levels when compared to the 'without project' scenarios for the same year. In the analysis for the 2013 PM peak hour, the results do show that the intersection will operate outside DTMR's standard DOS performance criteria of 0.8 once construction traffic generated from the Project is considered in the analysis. However, the impact from construction traffic is temporary in nature, and the intersection is anticipated to operate above 0.8 during the Project life, without influence from the Project, shortly after 2013. It should be further noted that the impact of the Project in the 2017 analysis is minimal with a DOS incremental impact of 0.01. As such, the reduced performance of this intersection is mainly due to the background growth applied to the existing traffic. It is therefore concluded that this intersection will fail regardless of the influence of this Project and therefore upgrade works and improvements should be the responsibility of DTMR.

In addition, this analysis is a single intersection analysis and does not take into account the network effects on traffic distribution. For example, if this intersection reaches capacity and users experience delays they are highly likely to use alternate routes such as the Anakie or Dundas Street intersections.

6.3.3 Capricorn Highway and Clermont-Alpha Road Intersection, Alpha

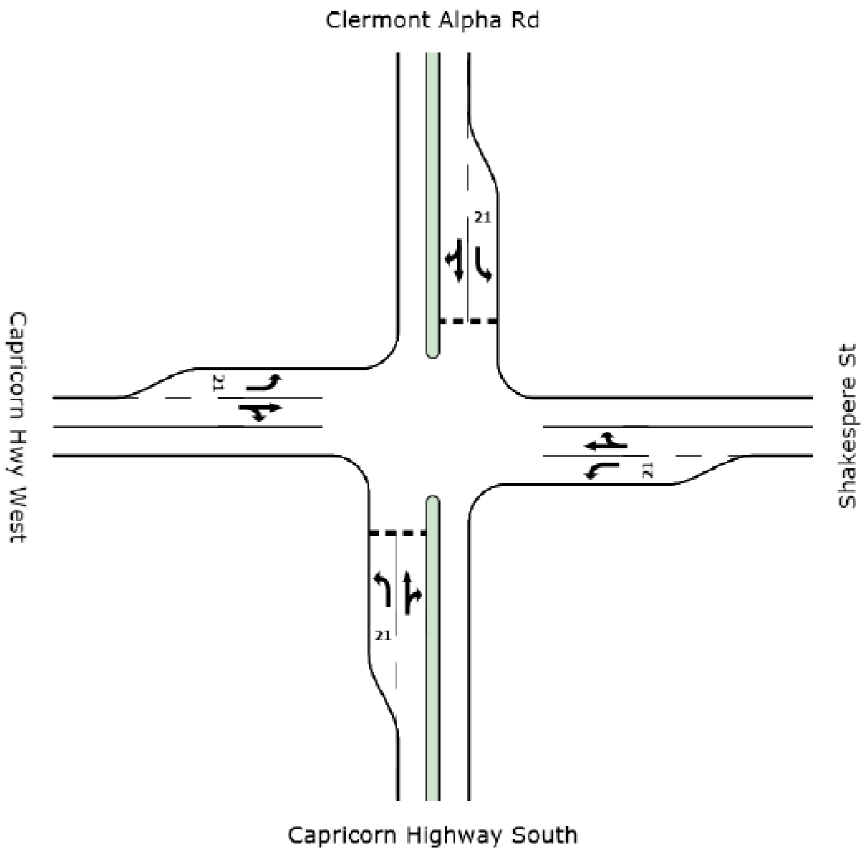
Intersection Geometry and Control

To assist in modelling this intersection DTMR provided intersection layout plans, which show the geometric layout of the intersection. Geometry for the intersection was also sourced from publicly availably aerial photographs.

The intersection is classified as an unsignalised 4-way, give way intersection, with the major road running in an east-west direction. Traffic entering the main road from the northern and southern legs are controlled by give-way signs.

SIDRA output showing the layout of this intersection is provided in Figure 6-2.

Figure 6-2 Capricorn Highway and Clermont-Alpha Road Intersection Layout

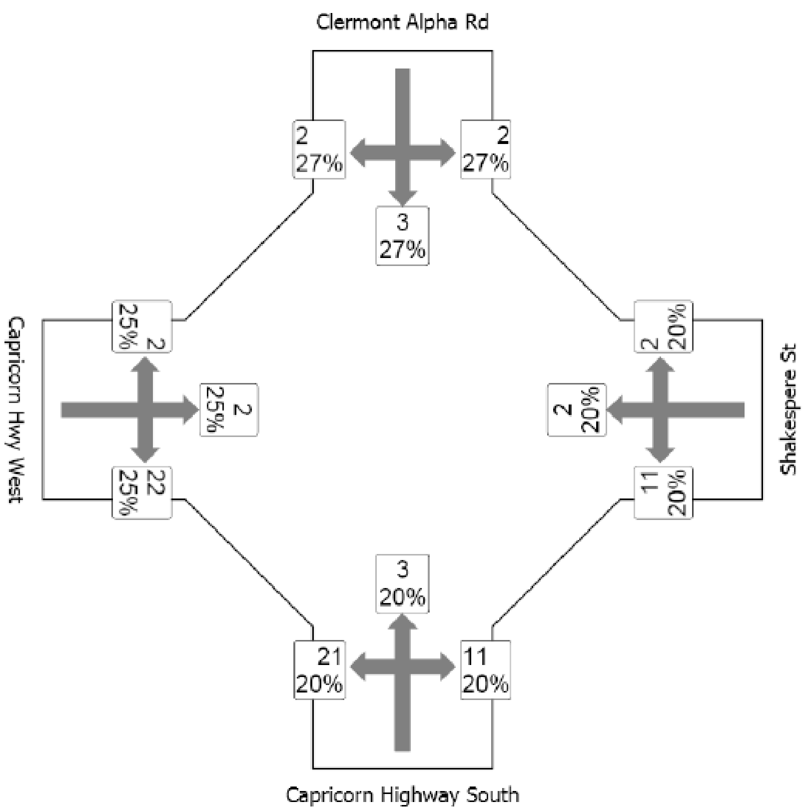


Traffic Volumes

Existing turning movement volume data was not available for this intersection. 2009 midblock AADT data was used to determine the volume of traffic entering the intersection at each leg and the percentage of commercial vehicles, although no data was available for the western leg. AADT data was converted to Design Hourly Volumes (DHV) using a K factor of 0.12, which is consistent with rural roads. This means that approximately 12% of AADT volumes are expected to occur within the peak hours.

From on-site observations, it was determined that the major movement is the south-east turn following the Capricorn Highway. Utilising on-site observations, knowledge of the surrounding land use and usage patterns of each road, the AADT data was split into turning movements. Figure 6-3 shows the estimated turning movements used for this assessment showing total vehicles and the percentage of commercial vehicles.

Figure 6-3 Capricorn Highway and Clermont-Alpha Road Intersection - Estimated Turning Movement Volumes



It was considered appropriate to assess both the 2013 and 2017 scenarios as the traffic patterns differ and between the construction and operational phases. These two scenarios represent the worst case for both phases.

For the 2013 and 2017 'without project' scenario, the existing 2009 turning movement volumes were extrapolated using the proposed growth rates as discussed previously. CV percentages remain the same as the existing conditions.

6 Road Network Performance

The 2013 and 2017 'with project' scenarios then add the additional traffic generated by the Project to the relevant movements, based on the traffic distribution outlined in Section 4.5 and the following assumptions.

- All light vehicle movements from Alpha to the Project site will occur outside of peak hours and are not included in this assessment. This is due to the shift hours of 7am to 7pm, with light vehicles expected to commute in the half hours before and after shift times.
- Employee bus schedules are not known at this stage of the Project and hence for worst case scenario analysis, it is assumed that all buses will complete a one way trip in each peak hour.
- All CV deliveries are expected to occur over a 10 hour period each day and therefore, 10% of the total daily volume of CV trips will occur in any one hour period, including each peak hour period.
- All DIDO trips between Clermont, Emerald and Barcaldine and the mine Accommodation facilities will occur during the peak hour; and
- For the worst case scenario analysis, all BIBO and DIDO trips will occur towards the mine site in the AM peak and away from the mine site in the PM peak period – return trips for CV and OD trips will occur during both peak periods.

The movements to which additional traffic are added are the North-West turning movement, the North-South through movement and the North-East turning movement.

Table 6-5 and Table 6-6 summarise the outcome of this analysis based on the worst performing movement, with full reports available in Appendix A.

Table 6-5 Capricorn Highway and Clermont-Alpha Road Intersection Assessment - SIDRA Summary AM

	2009	2013 - Construction			2017 - Operation		
	Existing	Without Project	With Project	Incremental Impact	Without Project	With Project	Incremental Impact
Critical Movement	South-West	South to East (Right Turn)			South to East (Right Turn)		
DOS	0.03	0.02	0.10	0.08	0.03	0.06	0.03
Average Delay (sec)	9	10	11	1	10	10	0
Queue Length (m)	< 1 car	< 1 car	<1 car	0	< 1 car	< 1 car	0

Table 6-6 Capricorn Highway and Clermont-Alpha Road Intersection Assessment - SIDRA Summary PM

	2009	2013 - Construction			2017 - Operation		
	Existing	Without Project	With Project	Incremental Impact	Without Project	With Project	Incremental Impact
Critical Movement	South- West	North to West (Right Turn)			North to West (Right Turn)		
DOS	0.03	0.01	0.18	0.17	0.01	0.10	0.09
Average Delay (sec)	9	10	12	2	10	12	2
Queue Length (m)	< 1 car	< 1 car	10	Approx 4	< 1 car	< 1 car	0

These results show that for each assessment year, the Project has minimal incremental impact on the intersection performance levels when compared to the 'without project' scenarios for the same year given the significant capacity available.

6 Road Network Performance

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.

6.3.4 Additional Intersections – Clermont

In addition to the intersections analysed above, the main intersection utilised by the northern transport route through Clermont include a single lane roundabout with additional turning lanes connecting the Peak Downs Highway and Gregory Highway. This intersection has not been analysed using SIDRA as it does not fall within the 5% threshold criteria required by DTMR.

The T intersection connecting Clermont-Alpha Road to the Clermont Connection Road within Clermont itself is considered to be negligibly impacted by the Project. The generated daily peak hour traffic utilising this intersection is no more than 18 LVs during the 2013 peak hours (representing the personnel movements between Clermont and the site). This volume of traffic is considered negligible when compared to the overall capacity of the intersection, as shown in the analysis of the Clermont-Alpha Road and Capricorn Highway intersection, which has a higher utilisation rate and more generated traffic impacts.

6.3.5 Summary of Intersection Impact Assessment

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.

The Capricorn Highway and Gregory Highway intersection is anticipated to operate slightly above DTMR's standard DOS performance criteria during the construction period, however this is expected to be only temporary in nature. Furthermore, the intersection will exceed the DTMR performance criteria without influence from the Project and will operate with a DOS above 0.8 between shortly after 2013. 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. It is therefore concluded that this intersection will fail regardless of the influence of this Project and therefore upgrade works and improvements should be the responsibility of DTMR.

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 and are discussed in Section 7.

7 Road Use Considerations

This section summarises a number of transport management issues that need to be considered as planning and implementation of the project proceeds.

7.1 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, 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.

A draft structure of the Road-Use Management Plan is provided in section 8.1.4.

7.2 Planning

Extraction of coal in the Galilee Basin by this and other new mines will generate additional regional development, to support the mining activities. Planning for long-term traffic growth in the vicinity of the Project site and the broader access routes has been taken into account in the traffic analysis as described in Volume 2, Section 4.3 and more broadly in other sections of the EIS.

7.3 Noise

Traffic generates noise and therefore additional traffic generated by the proposed mine development will create additional traffic noise both at the Project site and along the roads used to travel to the site. The impacts of traffic-generated noise are assessed within Volume 2, Section 15 and Volume 5, Appendix I of the EIS and Volume 2, Appendix R of the SEIS.

7.4 Dust

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. Air quality impacts, included dust, are assessed within Volume 2, Section 13 and Volume 5, Appendix H of the EIS and in Volume 2, Appendix P of the SEIS. Appropriate mitigation measures form part of the Environmental Management Plan (EM Plan) as outlined in Volume 2, Appendix V of the SEIS.

7.5 Flood Control

The impacts of road infrastructure within the mining lease area on surface water flow regimes are covered in Volume 2, Section 11 and Volume 5, Appendix F2 of the EIS. It should be noted that flooding is an occasional event and may close sections of roads and lead to damage of roads. The EM Plan should include a risk assessment and appropriate management measures to deal with the consequences of a flooding event.

7.6 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 – see discussion in Section 7.7 below). Appropriate work plans which should cover the relevant permits required for such works and management of associated issues such as land disturbance, drainage impacts and impact on structures will be prepared for such works and presented in the EM Plan.

7.7 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.

The internal road layout within the site should take into consideration that a large number of commercial vehicle and bus movements will occur within the site. A continuous circulating internal road layout could be employed in order to reduce the likelihood of commercial vehicles being required to perform reversing or turning movements. Continuous circulation may include providing a one-way direction at all times or allowing ample space for large vehicles to safely perform a u-turn movement (without the need to do three-point turns).

Commercial vehicles will generally be performing through movements within the site whereby they will be delivering or picking up certain materials and continuing on to their destination. Buses and cars, on the other hand, will mainly be used for personal travel and will be situated at the site for extended durations. The mix of vehicles increases the safety risk of circulating traffic within the site and it is therefore suggested that commercial vehicle through movements be separated from bus and car movements to reduce the possibility for vehicle interactions. Once buses and cars have parked within the site, they will generate pedestrians. The safety and circulation of pedestrians within the development must also be taken into consideration and, where possible, conflict points should be avoided or appropriately managed (i.e. adequate visibility at pedestrian crossing locations).

Carparking within the site should be designed to provide adequate parking for cars and (if required) buses and commercial vehicles. A Project strategy will be aimed at reducing personal vehicles access to the site through FIFO and BIBO options.

Articulated trucks and buses (not including road trains) have a swept path with a 26m radius and this should be considered when designing 90 degree parking bays. This need for safe turning areas can be minimised by using 45 degree angle parking bays for large vehicles.

It is assumed that parking provision will be required for only a small proportion of commercial vehicles, as the majority will be completing round trips, with loading and unloading occurring on site before moving to their next location. Commercial vehicles should be accommodated within an off-site depot outside working hours and for maintenance purposes. This will ensure space on site is used efficiently.

Similarly, bus parking needs can be minimised by providing a circulation route within the site to drop off and pick up employees. Buses can then be stored at a dedicated facility until required. These needs may be filled through the use of a subcontract whereby buses can be provided as needed and then used for other purposes when not required. The provision of a number of bus stops within the site will also minimise pedestrian movements required to increase safety.

Provision will also be needed for some visitor car parking near the main site office.

A general guide for car parking space is 25m^2 per car which allows safe circulation space. Commercial vehicle and bus parking area can vary according to configurations, but as a guide should be in the order of 170 – 250 m^2 per vehicle.

The design of car parking facilities should consider the Australian Standards for Parking Facilities:

- AS 2890.1:2004 Parking facilities Part 1: Off-street car parking; and
- AS 2890.2:2002 Parking facilities Part 2: Off-street commercial vehicle facilities.

7.8 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’.

The current Australian Dangerous Goods (ADG) Code (7th Edition) 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.

7 Road Use Considerations

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. The plan will also address vehicle and driver licensing, vehicle placarding, handling and storage requirements. Table 7-1 provides an indicative list of dangerous goods and hazardous substances the will be transported for the Project.

Table 7-1 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 (ANFO)	1.1D	N/A	N/A	0082	N/A	Blasting explosive
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	N/A	40	40	N/A	N/A	CHPP

Chemical Name/ Shipping Name	DG Class	Raw conc. (wt%)	Storage conc. (wt%)	UN Number	Packaging group	Purpose/ Use
flocculant (polydimethyl diyl ammonia chloride)						
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.

7.9 Over Dimensional Vehicles

The transport operator for the proposed development, DHL, has developed detailed planning for over dimensional (OD) vehicles, addressing the following:

- Swept path envelope for OD vehicles (DHL Drawing Numbers AU-TR-D-01 to AU-TR-D-05 - Turning Radius Structural Steel, representing different module types); and
- Specific constraints along the access routes to the mine site.

OD vehicles require State Government permits to operate and there are specific regulations for pilots, escorts and police escorts, as follows:

- Vehicles less than 3.5 m wide - does not require escort;
- Vehicles 3.5 m to 4.5 m wide - one pilot vehicle;
- Vehicles 4.5 m to 5.5 m wide - one escort and one pilot vehicle (Depending on the route these vehicles may require Police involvement, which is decided by the Police when a permit is submitted as part of the approval process); and
- Vehicles greater than 5.5 m wide - two escorts and two pilot vehicles plus mandatory Police escort(s).

7 Road Use Considerations

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

Permit applications must include, but are not limited to individual axle loads, gross mass and vehicle configuration. For over dimension loads, route selection, potential traffic conflicts and proposed traffic management must also be provided in order to be assessed.

Typically site-specific issues that may need to be addressed when planning the routes for over-dimension vehicles include:

- Some overhead transmission lines may require lifting. A site investigation should be conducted along the proposed over-dimension route to determine whether low lying transmission lines pose a hazard;
- Some traffic signals may need to be laid down in order to allow for adequate movement of over-dimension vehicles;
- Rail crossings can have width issues for over-dimension vehicles;
- Bridges and culverts can have width or load constraints;
- Cattle grates can also have width and load constraints;
- Formed roads and verges at intersection can be insufficient for the swept path of the OD vehicles;
- Overhead or roadside objects (e.g. trees, fences, signs, etc) may sit within the swept path and overall horizontal and vertical vehicle envelope and would need to be removed, pruned or laid down; and
- Town or road movement curfews may also apply that restrict oversize movements.

These issues need to be identified and addressed in the Road-Use Management Plan.

Conceptual swept paths for the various OD vehicles (depending on delivery) are provided in Appendix B.

Impact Mitigation

This section outlines the recommended mitigation measures for impacts on the existing road network created by the Project.

8.1 Recommended Mitigation Measures and Works Required

8.1.1 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.

These road closures and bypasses will be required to be designed and constructed to the Queensland Government Main Roads 'Road planning and Design' manual.

It is possible that the Proponent may enter into an agreement with the BRC regarding the delivery of these works, or may engage consultants and contractors directly to facilitate appropriate timing of the works.

Regardless of the delivery method, communication and consultation with all relevant stakeholders is essential to ensure these works meet required standards and are consistent with both State and Council planning.

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

8.1.2 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 new bypass arrangements. 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.

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.

These intersections will be required to be designed and constructed to the Queensland Government Main Roads 'Road Planning and Design' manual.

8.1.3 Employee Transport Systems

As discussed previously in this report, 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. By utilising these systems, the number of light vehicles and therefore a large volume of potential generated traffic is reduced. The Proponent will implement these systems as part of its Road-Use Management Plan and Health and Safety plans to minimise transport impacts on the road network and enhance personal safety.

Although this assessment focuses on road-based transport impacts, it should be noted that the commencement of FIFO services will require certification from CASA where aircraft proposed to transport workers are more than 30 seats.

8.1.4 Road-Use Management Plan

As discussed in Section 7 of this report, it is recommended that the Proponent creates a Road-Use Management Plan in order to manage the risks and impacts of any transport related issues. At this stage of the Project, the full details of the Road-Use Management Plan are unknown, and will evolve as the mine design and operation details are finalised. However, a draft outline of the components to the Road-Use Management Plan will include:

- Summary of the project traffic generation;
- Summary of this TIA findings;
- Outline management and mitigation measures;
  - A strategy to manage road usage by construction vehicles
  - Confirm escort arrangement requirements
  - Outline permit condition requirements for OD vehicles
  - Define measures for vehicle movements (particularly ODs during and following wet weather periods)
  - Vehicle interaction with public transport and school bus routes
  - Detail how the use of defined transport routes will be ensured throughout the project
  - Provide any hours of operation restrictions and/or roads to be avoided by construction and operational vehicles
  - Mitigation measures for local towns – particularly within Alpha (due to increased activity from site workers using town facilities)
  - Determine how livestock will be managed on local roads where cattle grids are removed and there is no existing fencing (eg. Hobartville Road) and how livestock deliveries will be maintained
  - Detail transportation methods of hazardous and dangerous goods
- Detail safe driver behaviour and fatigue management protocols;
- Detail road maintenance and/or road upgrade requirements;
  - To cater for extra traffic generated by project in construction and operational phases of project
  - Conduct a detailed baseline assessment prior to construction activities commencing
  - Define an inspection program
  - Detail any contributions plan required from relevant stakeholders
- Liaise with relevant stakeholders; and
  - DTMR
  - Local Councils
  - Queensland Police (in particular for escort arrangement protocols)
  - School Bus Operators
- Define community engagement strategies.

8.1.5 Road Maintenance Program

As outlined in Section 5 of this report, the Project will have an impact on the pavement design life of Degulla and Clermont-Alpha Roads. In order to mitigate these impacts, the following measures are recommended:

- Discussion with BRC regarding the road upgrade works required for Degulla Road (between Clermont-Alpha Road and the northern mine access point) as recommended by the pavement impact assessment in section 5; 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 will influence the size of the contribution to be provided by the Proponent. Factors may include; contributions required by other developments in the area, and the incremental requirements over the existing DTMR and Council maintenance schedules.

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.

8.1.6 Capacity Upgrades for Over Dimensional Vehicles

At the time of the assessment, no specific details were available on the number, size or weight of Over Dimensional (OD) vehicles required for the Project; however indicative swept paths for some OD vehicles is attached in Appendix B to this document. It is anticipated that a proportion of freight will fall into this category. Mitigation measures recommended 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 which 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 2 year infrastructure plans, all required upgrade works may be the responsibility of the Proponent. For those upgrades which are already proposed in DTMR's 2 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.

Conclusions

The proposed Alpha Coal Mine Project will generate additional traffic volumes on the existing road network in the region around Alpha, Emerald and Clermont in central Queensland. The impact of this additional traffic volume on the performance of the road network, the pavement design life and other safety concerns has been assessed by this TIA.

9.1 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 62 light vehicle, 51 commercial vehicle and 9 over-dimensional single trips per day at its peak in 2013, based on a peak workforce of 1,535 employees.

The operational phase is expected to have a duration of 30 years and will generate up to 33 light vehicle and 34 commercial vehicle single trips per day at its peak, based on a peak shift workforce of 770 employees.

9.2 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 which may occur during the mine life period. These impacts will be included in the cumulative impact assessment.

9.3 Road Network Performance Impacts

The road network performance impacts caused by the Alpha Coal Mine Project have been assessed in accordance with the DTMR *'Guidelines for the Assessment of Road Impacts of* Developments'. 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 Hobartville Road and the construction of temporary and permanent site access intersections on Degulla Road will be required as part of this Project.

In the analysis for the 2013 PM peak hour for the Capricorn Highway / Gregory Highway intersection, the results show that the intersection will operate outside DTMR's standard DOS performance criteria of 0.8 once construction traffic generated from the Project is considered in the analysis. However, the impact from construction traffic is temporary in nature, and the intersection is anticipated to operate above 0.8 during the Project life, without influence from the Project, shortly after 2013. As such, the reduced performance of this intersection is mainly due to the background growth applied to the existing traffic. It is therefore concluded that this intersection will fail regardless of the influence of this Project and therefore upgrade works and improvements should be the responsibility of DTMR.

9.4 Pavement 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'.

The assessment shows that the project will have an impact on the pavement design life and/or ongoing maintenance of the Clermont-Alpha Road and Degulla Road as per the recommendations from the pavement impact assessment in section 5.

9.5 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 bypasses due to the closure of Hobartville Road to the standards required by the Queensland DTMR;
- Road upgrade works to Clermont-Alpha Road (between Hobartville Road and Degulla Road) and Degulla Road (between Clermont-Alpha Road and the Project site) as recommended by the pavement impact assessment
- 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 Road-Use 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 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 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.

10

Glossary

Commercial Vehicles – a vehicle above 10 tonne gross vehicle mass.

Delay – the additional travel time experienced by a vehicle at an intersection.

Degree of Saturation (DOS) – the ratio of arrival (demand) flow rate to capacity during a given flow period.

Intersection - a place at which two roads meet or cross.

Level of Service (LOS) – an index of the operational performance of traffic on a given traffic lane, carriageway, road or intersection, based on service measures such as speed, travel time, delay and degree of saturation during a given flow period.

Midblock - the section of a road between intersections.

Seagull Intersection - a T-intersection where the right turn out of the side road gives way to oncoming traffic from the right and is provided with an acceleration lane in the median to merge into the traffic stream approaching from the left.

T-Intersection – an intersection where two roads meet (whether or not at right angles) and one of the roads ends.

11 References

Australian Standard AS 2890.1, (2004). Parking facilities Part 1: Off-street car parking

Australian Standard AS 2890.2 (2002). Parking facilities Part 2: Off-street commercial vehicle facilities

Austroads, (1988). Guide to Traffic Engineering Practice Part 2 – Roadway Capacity

Commonwealth of Australia, National Transport Commission (2007). Australian Code for the Transportation of Dangerous Goods by Road and Rail (ADG), 7th Edition

The State of Queensland (Department of Main Roads), (2006), *Guidelines for Assessment of Road Impacts of Development*

The State of Queensland (Department of Main Roads), (2008), *Road Implementation Plan 2008-2009 to 2012-2013*

Transport Operations (Road Use Management) Act 1995. Commonwealth Government

Transport Operations (Road Use Management – Dangerous Goods) Regulation 2008. Commonwealth Government

Limitations

URS Australia Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of Hancock Prospecting Pty Ltd and only those third parties who have been authorised in writing by URS to rely on the report. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in the Proposal dated May 2010.

The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

This report was prepared between July 2010 and March 2011 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

Appendix A SIDRA Output Reports

MOVEMENT SUMMARY

Site: Capricorn Hwy/Gregory Hwy Existing AM

Capricorn Hwy/Gregory Hwy Existing
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Capricorn Hwy E											
11	T	246	8.5	0.133	0.0	NA[9]	NA[9]	NA[9]	0.00	0.00	60.0
12	R	448	8.5	0.528	13.4	LOS B	4.9	36.7	0.65	0.99	44.0
Approach		695	8.5	0.528	8.7	LOS B	4.9	36.7	0.42	0.64	48.6
North: Gregory Hwy N											
1	L	348	6.3	0.433	14.5	LOS B	3.2	23.6	0.54	1.01	44.1
3	R	60	11.1	0.094	17.2	LOS C	0.5	3.7	0.50	0.90	45.4
Approach		408	7.0	0.433	14.9	LOS C	3.2	23.6	0.54	0.99	44.3
West: Capricorn Hwy W											
4	L	124	9.8	0.072	8.5	LOS A	0.0	0.0	0.00	0.67	49.0
5	T	276	9.8	0.150	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		400	9.8	0.150	2.6	LOS A	0.0	0.0	0.00	0.21	56.1
All Vehicles		1503	8.4	0.528	8.8	NA	4.9	36.7	0.34	0.62	49.1

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.

Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).

Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

Processed: Wednesday, 25 August 2010 3:50:52 p.m.
SIDRA INTERSECTION 5.0.2.1437

Project: O:\Workgroups\ICE\transport planning\jobs\Alpha Hancock Coal Mine TIA\Reporting\Updated Report - Incorporates Submission Responses (March 2011)\Final Report - 16 March 2011\Alpha Coal Mine - Rev 2.sip
8000947, URS AUSTRALIA, FLOATING

MOVEMENT SUMMARY

Site: Capricorn Hwy/Gregory Hwy Existing PM

Capricorn Hwy/Gregory Hwy Existing
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Capricorn Hwy E											
11	T	236	8.5	0.128	0.0	NA[9]	NA[9]	NA[9]	0.00	0.00	60.0
12	R	477	8.5	0.565	13.9	LOS B	5.6	42.0	0.67	1.03	43.6
Approach		713	8.5	0.565	9.3	LOS B	5.6	42.0	0.45	0.69	47.9
North: Gregory Hwy N											
1	L	441	6.3	0.559	15.9	LOS C	5.3	38.8	0.62	1.09	43.0
3	R	56	11.1	0.090	17.4	LOS C	0.5	3.5	0.51	0.91	45.2
Approach		497	6.8	0.559	16.1	LOS C	5.3	38.8	0.61	1.07	43.2
West: Capricorn Hwy W											
4	L	113	9.8	0.065	8.5	LOS A	0.0	0.0	0.00	0.67	49.0
5	T	298	9.8	0.163	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		411	9.8	0.162	2.3	LOS A	0.0	0.0	0.00	0.18	56.5
All Vehicles		1620	8.3	0.565	9.6	NA	5.6	42.0	0.38	0.68	48.2

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

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MOVEMENT SUMMARY

Site: Capricorn Hwy/Gregory Hwy
2013 Without Project AM

Capricorn Hwy/Gregory Hwy 2013 Without Project
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Capricorn Hwy E											
11	T	300	8.5	0.162	0.0	NA[9]	NA[9]	NA[9]	0.00	0.00	60.0
12	R	545	8.5	0.723	17.7	LOS C	9.0	67.8	0.78	1.24	40.5
Approach		845	8.5	0.723	11.4	LOS C	9.0	67.8	0.50	0.80	45.8
North: Gregory Hwy N											
1	L	424	6.3	0.579	16.9	LOS C	5.4	39.8	0.66	1.15	42.3
3	R	74	11.1	0.131	18.3	LOS C	0.7	5.1	0.56	0.94	44.3
Approach		498	7.0	0.579	17.1	LOS C	5.4	39.8	0.64	1.12	42.5
West: Capricorn Hwy W											
4	L	152	9.8	0.087	8.5	LOS A	0.0	0.0	0.00	0.67	49.0
5	T	336	9.8	0.183	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		487	9.8	0.183	2.6	LOS A	0.0	0.0	0.00	0.21	56.1
All Vehicles		1831	8.4	0.723	10.6	NA	9.0	67.8	0.41	0.73	47.1

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

Processed: Wednesday, 25 August 2010 3:50:52 p.m.
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MOVEMENT SUMMARY

Site: Capricorn Hwy/Gregory Hwy 2013 With Project AM

Capricorn Hwy/Gregory Hwy 2013 With Project
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Capricorn Hwy E											
11	T	326	10.3	0.179	0.0	NA[9]	NA[9]	NA[9]	0.00	0.00	60.0
12	R	545	8.5	0.771	19.9	LOS C	10.3	77.1	0.81	1.34	38.9
Approach		872	9.2	0.771	12.5	LOS C	10.3	77.1	0.51	0.84	44.8
North: Gregory Hwy N											
1	L	424	6.3	0.596	17.4	LOS C	5.6	41.4	0.67	1.16	41.9
3	R	85	23.5	0.190	21.0	LOS C	1.0	8.2	0.61	0.99	42.4
Approach		509	9.2	0.596	18.0	LOS C	5.6	41.4	0.66	1.13	42.0
West: Capricorn Hwy W											
4	L	162	15.7	0.097	8.6	LOS A	0.0	0.0	0.00	0.66	49.0
5	T	342	11.5	0.189	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		504	12.9	0.189	2.8	LOS A	0.0	0.0	0.00	0.21	55.9
All Vehicles		1885	10.2	0.771	11.4	NA	10.3	77.1	0.41	0.75	46.5

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

Processed: Friday, 18 March 2011 4:18:52 p.m.
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SIDRA INTERSECTION

MOVEMENT SUMMARY

Capricorn Hwy/Gregory Hwy 2013 Without Project PM
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Capricorn Hwy E											
11	T	287	8.5	0.156	0.0	NA[9]	NA[9]	NA[9]	0.00	0.00	60.0
12	R	580	8.5	0.776	19.4	LOS C	10.9	82.2	0.81	1.35	39.3
Approach		867	8.5	0.776	12.9	LOS C	10.9	82.2	0.54	0.90	44.4
North: Gregory Hwy N											
1	L	537	6.3	0.752	20.4	LOS C	9.9	73.1	0.77	1.32	39.8
3	R	68	11.1	0.125	18.6	LOS C	0.6	4.9	0.57	0.95	44.0
Approach		605	6.8	0.752	20.2	LOS C	9.9	73.1	0.75	1.28	40.2
West: Capricorn Hwy W											
4	L	138	9.8	0.079	8.5	LOS A	0.0	0.0	0.00	0.67	49.0
5	T	362	9.8	0.198	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		500	9.8	0.198	2.3	LOS A	0.0	0.0	0.00	0.18	56.5
All Vehicles		1973	8.3	0.776	12.5	NA	10.9	82.2	0.47	0.84	45.4

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

MOVEMENT SUMMARY

Capricorn Hwy/Gregory Hwy 2013 With Project PM
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Capricorn Hwy E											
11	T	294	10.5	0.161	0.0	NA[9]	NA[9]	NA[9]	0.00	0.00	60.0
12	R	580	8.5	0.848	24.1	LOS C	13.8	103.4	0.87	1.57	36.2
Approach		874	9.2	0.848	16.0	LOS C	13.8	103.4	0.58	1.04	41.8
North: Gregory Hwy N											
1	L	537	6.3	0.795	22.5	LOS C	11.2	82.4	0.81	1.41	38.3
3	R	79	23.0	0.189	21.8	LOS C	1.0	8.0	0.63	1.00	41.7
Approach		616	8.4	0.795	22.4	LOS C	11.2	82.4	0.79	1.36	38.7
West: Capricorn Hwy W											
4	L	149	16.9	0.090	8.7	LOS A	0.0	0.0	0.00	0.66	49.0
5	T	388	11.1	0.214	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		538	12.7	0.214	2.4	LOS A	0.0	0.0	0.00	0.18	56.5
All Vehicles		2027	9.9	0.848	14.3	NA	13.8	103.4	0.49	0.91	43.8

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

Processed: Friday, 18 March 2011 4:20:51 p.m.
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MOVEMENT SUMMARY

Site: Capricorn Hwy/Gregory Hwy
2017 Without Project AM

Capricorn Hwy/Gregory Hwy 2017 Without Project AM
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Capricorn Hwy E											
11	T	378	8.5	0.205	0.0	NA[9]	NA[9]	NA[9]	0.00	0.00	60.0
12	R	650	8.5	0.999[3]	27.8	LOS D	15.1	113.7	1.00	1.48	34.1
Approach		1027	8.5	1.000	17.6	LOS D	15.1	113.7	0.63	0.94	40.5
North: Gregory Hwy N											
1	L	516	6.3	0.794	23.0	LOS C	10.7	79.0	0.81	1.41	38.0
3	R	89	11.1	0.186	20.0	LOS C	0.9	7.2	0.62	1.00	42.7
Approach		605	7.0	0.793	22.5	LOS C	10.7	79.0	0.78	1.35	38.6
West: Capricorn Hwy W											
4	L	184	9.8	0.106	8.5	LOS A	0.0	0.0	0.00	0.67	49.0
5	T	408	9.8	0.223	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		593	9.8	0.223	2.6	LOS A	0.0	0.0	0.00	0.21	56.1
All Vehicles		2225	8.4	0.999	15.0	NA	15.1	113.7	0.50	0.86	43.1

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.

Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).

Approach LOS values are based on the worst delay for any vehicle movement.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.
9 Continuous movement

Processed: Wednesday, 25 August 2010 3:50:52 p.m.
SIDRA INTERSECTION 5.0.2.1437

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MOVEMENT SUMMARY

Site: Capricorn Hwy/Gregory Hwy
2017 With Project AM

Capricorn Hwy/Gregory Hwy With Project AM
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Capricorn Hwy E											
11	T	405	8.6	0.220	0.0	NA[9]	NA[9]	NA[9]	0.00	0.00	60.0
12	R	634	8.5	1.000[3]	28.7	LOS D	15.1	113.7	1.00	1.50	33.6
Approach		1039	8.5	1.000	17.5	LOS D	15.1	113.7	0.61	0.92	40.6
North: Gregory Hwy N											
1	L	516	6.3	0.800	23.4	LOS C	10.9	80.5	0.81	1.43	37.8
3	R	95	16.0	0.216	21.2	LOS C	1.1	8.8	0.64	1.00	41.9
Approach		611	7.8	0.799	23.0	LOS C	10.9	80.5	0.79	1.36	38.3
West: Capricorn Hwy W											
4	L	188	11.8	0.110	8.5	LOS A	0.0	0.0	0.00	0.67	49.0
5	T	409	10.0	0.224	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		598	10.6	0.224	2.7	LOS A	0.0	0.0	0.00	0.21	56.0
All Vehicles		2247	8.9	1.000	15.1	NA	15.1	113.7	0.50	0.85	43.1

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.
9 Continuous movement

Processed: Friday, 18 March 2011 4:22:23 p.m.
SIDRA INTERSECTION 5.0.2.1437

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MOVEMENT SUMMARY

Site: Capricorn Hwy/Gregory Hwy
2017 Without Project PM

Capricorn Hwy/Gregory Hwy Without Project PM

Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Capricorn Hwy E											
11	T	412	8.5	0.225	0.0	NA[9]	NA[9]	NA[9]	0.00	0.00	60.0
12	R	642	8.5	1.000[3]	28.2	LOS D	15.1	113.7	1.00	1.49	33.8
Approach		1054	8.5	1.000	17.2	LOS D	15.1	113.7	0.61	0.91	40.8
North: Gregory Hwy N											
1	L	637	6.3	1.013	63.5	LOS F	35.4	261.1	1.00	2.71	22.4
3	R	98	11.1	0.213	20.5	LOS C	1.1	8.3	0.63	1.00	42.2
Approach		736	6.8	1.014	57.7	LOS F	35.4	261.1	0.95	2.48	23.6
West: Capricorn Hwy W											
4	L	167	9.8	0.096	8.5	LOS A	0.0	0.0	0.00	0.67	49.0
5	T	441	9.8	0.241	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		608	9.8	0.241	2.3	LOS A	0.0	0.0	0.00	0.18	56.5
All Vehicles		2398	8.3	1.013	25.9	NA	35.4	261.1	0.56	1.21	35.5

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.
9 Continuous movement

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MOVEMENT SUMMARY

Site: Capricorn Hwy/Gregory Hwy
2017 With Project PM

Capricorn Hwy/Gregory Hwy With Project PM

Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Capricorn Hwy E											
11	T	436	8.8	0.239	0.0	NA[9]	NA[9]	NA[9]	0.00	0.00	59.9
12	R	619	8.5	0.999[3]	29.5	LOS D	15.1	113.7	1.00	1.52	33.2
Approach		1055	8.6	1.000	17.3	LOS D	15.1	113.7	0.59	0.89	40.7
North: Gregory Hwy N											
1	L	625	6.3	1.017	66.3	LOS F	35.6	262.4	1.00	2.76	21.7
3	R	115	15.4	0.276	22.7	LOS C	1.5	12.0	0.67	1.03	40.5
Approach		740	7.4	1.018	59.6	LOS F	35.6	262.4	0.95	2.49	23.2
West: Capricorn Hwy W											
4	L	173	12.6	0.101	8.5	LOS A	0.0	0.0	0.00	0.67	49.0
5	T	453	9.8	0.247	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		625	10.6	0.247	2.4	LOS A	0.0	0.0	0.00	0.18	56.5
All Vehicles		2420	8.7	1.018	26.4	NA	35.6	262.4	0.55	1.20	35.3

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.
9 Continuous movement

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Capricorn Hwy/Clermont Alpha Rd Existing

Capricorn Hwy/Clermont Alpha Road Existing
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Capricorn Highway South											
1	L	21	20.0	0.031	8.8	LOS A	0.1	0.7	0.05	0.64	48.7
2	T	3	20.0	0.018	8.0	LOS A	0.1	0.7	0.17	0.51	49.3
3	R	11	20.0	0.018	9.3	LOS A	0.1	0.7	0.17	0.63	48.2
Approach		35	20.0	0.031	8.9	LOS A	0.1	0.7	0.10	0.63	48.6
East: Shakespere St											
4	L	11	20.0	0.006	8.8	LOS A	0.0	0.0	0.00	0.66	49.0
5	T	2	20.0	0.003	0.0	LOS A	0.0	0.1	0.04	0.00	59.1
6	R	2	20.0	0.003	8.8	LOS A	0.0	0.1	0.04	0.82	48.8
Approach		15	20.0	0.006	7.5	LOS A	0.0	0.1	0.01	0.59	50.2
North: Clermont Alpha Rd											
7	L	2	27.0	0.003	9.0	LOS A	0.0	0.1	0.03	0.65	48.8
8	T	3	27.0	0.007	8.3	LOS A	0.0	0.3	0.19	0.52	49.2
9	R	2	27.0	0.007	9.7	LOS A	0.0	0.3	0.19	0.65	48.2
Approach		7	27.0	0.007	8.9	LOS A	0.0	0.3	0.14	0.59	48.8
West: Capricorn Hwy West											
10	L	2	25.0	0.001	8.9	LOS A	0.0	0.0	0.00	0.66	49.0
11	T	2	25.0	0.020	0.1	LOS A	0.1	0.9	0.07	0.00	58.2
12	R	22	25.0	0.020	9.0	LOS A	0.1	0.9	0.07	0.66	48.6
Approach		26	25.0	0.020	8.3	LOS A	0.1	0.9	0.06	0.61	49.3
All Vehicles		83	22.2	0.031	8.5	NA	0.1	0.9	0.08	0.61	49.1

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

Processed: Wednesday, 25 August 2010 3:50:52 p.m.
SIDRA INTERSECTION 5.0.2.1437

Project: O:\Workgroups\ICE\transport planning\jobs\Alpha Hancock Coal Mine TIA\Reporting\Updated Report - Incorporates Submission Responses (March 2011)\Final Report - 16 March 2011\Alpha Coal Mine - Rev 2.sip
8000947, URS AUSTRALIA, FLOATING

MOVEMENT SUMMARY

Site: Capricorn Hwy/Clermont Alpha Rd 2013 Without Project

Capricorn Hwy/Clermont Alpha Road 2013 Without Project
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Capricorn Highway South											
1	L	27	20.0	0.041	8.8	LOS A	0.1	1.0	0.06	0.64	48.7
2	T	4	20.0	0.024	8.1	LOS A	0.1	1.0	0.20	0.52	49.1
3	R	14	20.0	0.024	9.5	LOS A	0.1	1.0	0.20	0.63	48.1
Approach		45	20.0	0.041	9.0	LOS A	0.1	1.0	0.12	0.62	48.5
East: Shakespere St											
4	L	14	20.0	0.008	8.8	LOS A	0.0	0.0	0.00	0.66	49.0
5	T	3	20.0	0.004	0.0	LOS A	0.0	0.2	0.05	0.00	58.9
6	R	3	20.0	0.004	8.9	LOS A	0.0	0.2	0.05	0.81	48.8
Approach		20	20.0	0.008	7.4	LOS A	0.0	0.2	0.01	0.58	50.3
North: Clermont Alpha Rd											
7	L	3	27.0	0.005	9.0	LOS A	0.0	0.1	0.04	0.64	48.8
8	T	4	27.0	0.010	8.5	LOS A	0.1	0.4	0.22	0.52	49.1
9	R	3	27.0	0.010	9.9	LOS A	0.1	0.4	0.22	0.65	48.1
Approach		11	27.0	0.010	9.1	LOS A	0.1	0.4	0.17	0.60	48.7
West: Capricorn Hwy West											
10	L	3	25.0	0.002	8.9	LOS A	0.0	0.0	0.00	0.66	49.0
11	T	3	25.0	0.025	0.1	LOS A	0.1	1.1	0.08	0.00	57.8
12	R	27	25.0	0.025	9.1	LOS A	0.1	1.1	0.08	0.66	48.6
Approach		34	25.0	0.025	8.2	LOS A	0.1	1.1	0.08	0.60	49.3
All Vehicles		109	22.2	0.041	8.5	NA	0.1	1.1	0.09	0.61	49.1

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: Capricorn Hwy/Clermont Alpha Rd 2013 With Project AM

Capricorn Hwy/Clermont Alpha Road 2013 With Project AM
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Capricorn Highway South											
1	L	27	20.0	0.041	8.8	LOS A	0.1	1.0	0.06	0.64	48.7
2	T	41	56.4	0.099	10.8	LOS B	0.5	5.2	0.35	0.60	47.8
3	R	14	20.0	0.099	11.1	LOS B	0.5	5.2	0.35	0.66	46.8
Approach		82	38.2	0.099	10.2	LOS B	0.5	5.2	0.25	0.62	47.9
East: Shakespere St											
4	L	14	20.0	0.008	8.8	LOS A	0.0	0.0	0.00	0.66	49.0
5	T	3	20.0	0.005	0.4	LOS A	0.0	0.2	0.19	0.00	55.8
6	R	3	20.0	0.005	9.2	LOS A	0.0	0.2	0.19	0.74	48.5
Approach		20	20.0	0.008	7.5	LOS A	0.0	0.2	0.06	0.57	49.8
North: Clermont Alpha Rd											
7	L	3	27.0	0.005	9.2	LOS A	0.0	0.1	0.13	0.61	48.4
8	T	20	84.6	0.050	11.9	LOS B	0.3	3.0	0.35	0.58	47.5
9	R	3	27.0	0.050	11.6	LOS B	0.3	3.0	0.35	0.71	46.5
Approach		26	70.8	0.050	11.5	LOS B	0.3	3.0	0.32	0.60	47.5
West: Capricorn Hwy West											
10	L	49	61.7	0.038	10.0	LOS A	0.0	0.0	0.00	0.66	49.0
11	T	3	25.0	0.025	0.1	LOS A	0.1	1.1	0.08	0.00	57.8
12	R	27	25.0	0.025	9.1	LOS A	0.1	1.1	0.08	0.66	48.6
Approach		80	47.7	0.038	9.3	LOS A	0.1	1.1	0.03	0.63	49.1
All Vehicles		208	44.2	0.099	9.7	NA	0.5	5.2	0.16	0.62	48.5

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: Capricorn Hwy/Clermont Alpha Rd 2013 With Project PM

Capricorn Hwy/Clermont Alpha Road 2013 With Project PM
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Capricorn Highway South											
1	L	27	20.0	0.041	8.8	LOS A	0.1	1.0	0.06	0.64	48.7
2	T	20	83.2	0.061	10.7	LOS B	0.3	3.3	0.26	0.54	48.7
3	R	14	20.0	0.061	10.2	LOS B	0.3	3.3	0.26	0.67	47.5
Approach		61	40.7	0.061	9.8	LOS B	0.3	3.3	0.17	0.61	48.4
East: Shakespere St											
4	L	14	20.0	0.008	8.8	LOS A	0.0	0.0	0.00	0.66	49.0
5	T	3	20.0	0.004	0.0	LOS A	0.0	0.2	0.05	0.00	58.9
6	R	3	20.0	0.004	8.9	LOS A	0.0	0.2	0.05	0.81	48.8
Approach		20	20.0	0.008	7.4	LOS A	0.0	0.2	0.01	0.58	50.3
North: Clermont Alpha Rd											
7	L	3	27.0	0.005	9.0	LOS A	0.0	0.1	0.04	0.64	48.8
8	T	41	48.7	0.175	10.5	LOS B	1.0	10.0	0.31	0.54	47.8
9	R	49	61.7	0.175	12.3	LOS B	1.0	10.0	0.31	0.70	46.7
Approach		94	54.8	0.176	11.4	LOS B	1.0	10.0	0.30	0.63	47.3
West: Capricorn Hwy West											
10	L	3	25.0	0.002	8.9	LOS A	0.0	0.0	0.00	0.66	49.0
11	T	3	25.0	0.025	0.1	LOS A	0.1	1.1	0.08	0.00	57.8
12	R	27	25.0	0.025	9.1	LOS A	0.1	1.1	0.08	0.66	48.6
Approach		34	25.0	0.025	8.2	LOS A	0.1	1.1	0.08	0.60	49.3
All Vehicles		208	42.5	0.176	10.0	NA	1.0	10.0	0.20	0.61	48.2

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

Processed: Friday, 18 March 2011 4:27:28 p.m.
SIDRA INTERSECTION 5.0.2.1437

Project: O:\Workgroups\ICE\transport planning\jobs\Alpha Hancock Coal Mine TIA\Reporting\Updated Report - Incorporates Submission Responses (March 2011)\Final Report - 16 March 2011\Alpha Coal Mine - Rev 2.sip
8000947, URS AUSTRALIA, FLOATING

MOVEMENT SUMMARY

Site: Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Capricorn Hwy/Clermont Alpha Road 2017 Without Project
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Capricorn Highway South											
1	L	34	20.0	0.050	8.8	LOS A	0.1	1.2	0.07	0.63	48.7
2	T	5	20.0	0.029	8.3	LOS A	0.1	1.2	0.22	0.52	49.0
3	R	16	20.0	0.029	9.6	LOS A	0.1	1.2	0.22	0.63	48.0
Approach		55	20.0	0.050	9.0	LOS A	0.1	1.2	0.13	0.62	48.5
East: Shakespere St											
4	L	16	20.0	0.010	8.8	LOS A	0.0	0.0	0.00	0.66	49.0
5	T	3	20.0	0.004	0.0	LOS A	0.0	0.2	0.05	0.00	58.9
6	R	3	20.0	0.004	8.9	LOS A	0.0	0.2	0.05	0.81	48.8
Approach		22	20.0	0.010	7.5	LOS A	0.0	0.2	0.01	0.59	50.1
North: Clermont Alpha Rd											
7	L	3	27.0	0.005	9.0	LOS A	0.0	0.1	0.04	0.64	48.8
8	T	5	27.0	0.012	8.6	LOS A	0.1	0.5	0.24	0.53	49.0
9	R	3	27.0	0.012	10.0	LOS A	0.1	0.5	0.24	0.65	48.0
Approach		12	27.0	0.012	9.1	LOS A	0.1	0.5	0.19	0.59	48.6
West: Capricorn Hwy West											
10	L	3	25.0	0.002	8.9	LOS A	0.0	0.0	0.00	0.66	49.0
11	T	3	25.0	0.031	0.1	LOS A	0.2	1.3	0.09	0.00	57.7
12	R	34	25.0	0.031	9.1	LOS A	0.2	1.3	0.09	0.65	48.5
Approach		40	25.0	0.031	8.4	LOS A	0.2	1.3	0.08	0.60	49.2
All Vehicles		128	22.2	0.050	8.6	NA	0.2	1.3	0.10	0.61	49.0

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Capricorn Hwy/Clermont Alpha Road 2017 With Project AM
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Capricorn Highway South											
1	L	34	20.0	0.050	8.8	LOS A	0.1	1.2	0.07	0.63	48.7
2	T	22	38.1	0.058	9.3	LOS A	0.3	2.6	0.28	0.56	48.7
3	R	16	20.0	0.057	10.1	LOS B	0.3	2.6	0.28	0.65	47.7
Approach		72	25.6	0.057	9.2	LOS B	0.3	2.6	0.18	0.61	48.5
East: Shakespere St											
4	L	16	20.0	0.010	8.8	LOS A	0.0	0.0	0.00	0.66	49.0
5	T	3	20.0	0.004	0.2	LOS A	0.0	0.2	0.14	0.00	56.9
6	R	3	20.0	0.004	9.0	LOS A	0.0	0.2	0.14	0.76	48.6
Approach		22	20.0	0.010	7.6	LOS A	0.0	0.2	0.04	0.58	49.9
North: Clermont Alpha Rd											
7	L	3	27.0	0.005	9.1	LOS A	0.0	0.1	0.10	0.62	48.5
8	T	11	63.5	0.025	10.5	LOS B	0.1	1.3	0.31	0.55	48.3
9	R	3	27.0	0.025	10.8	LOS B	0.1	1.3	0.31	0.68	47.2
Approach		17	49.8	0.025	10.3	LOS B	0.1	1.3	0.27	0.59	48.1
West: Capricorn Hwy West											
10	L	27	61.5	0.021	10.0	LOS A	0.0	0.0	0.00	0.66	49.0
11	T	3	25.0	0.031	0.1	LOS A	0.2	1.3	0.09	0.00	57.7
12	R	34	25.0	0.031	9.1	LOS A	0.2	1.3	0.09	0.65	48.5
Approach		64	40.6	0.031	9.0	LOS A	0.2	1.3	0.05	0.62	49.1
All Vehicles		175	32.7	0.057	9.1	NA	0.3	2.6	0.12	0.61	48.8

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

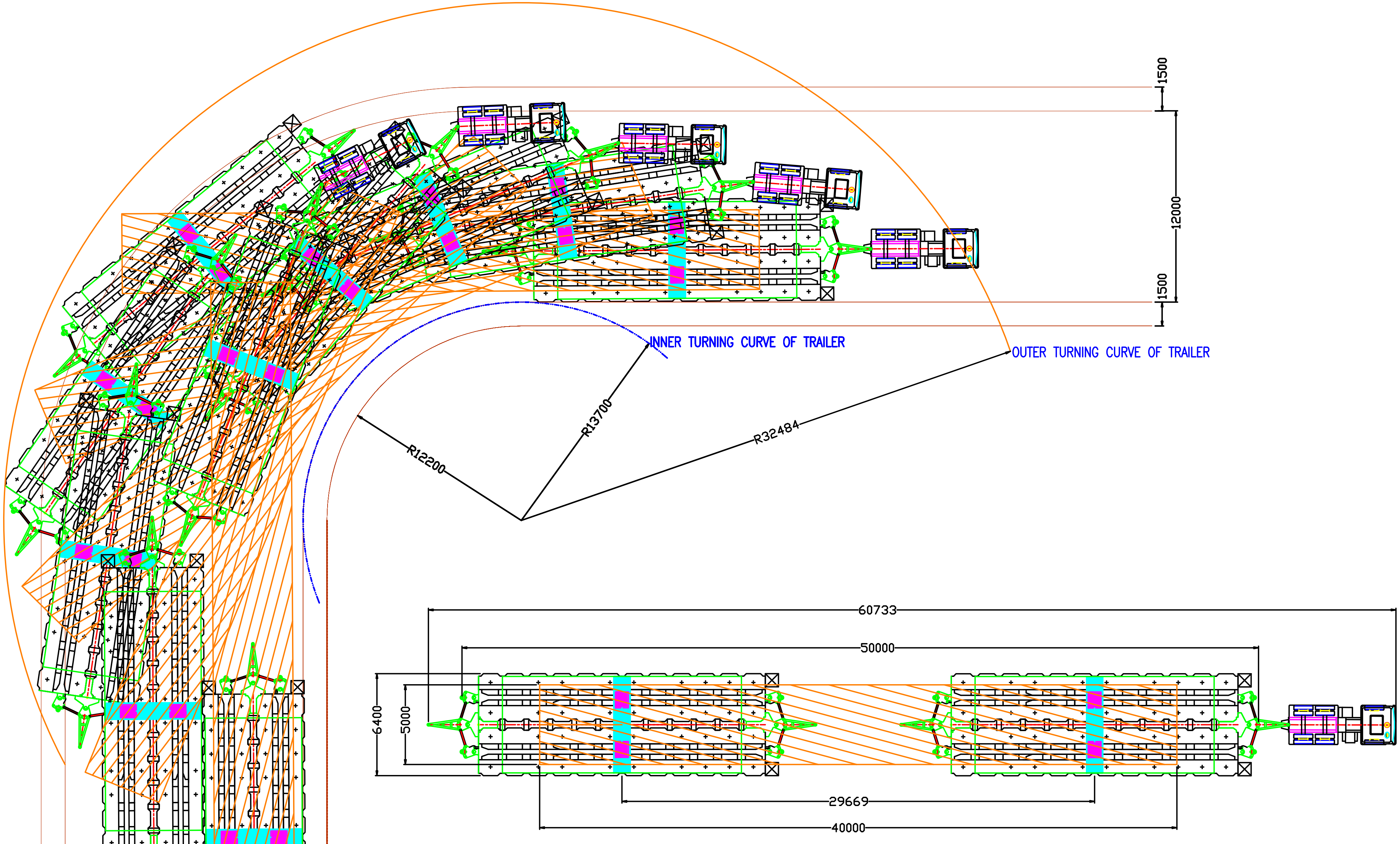
Capricorn Hwy/Clermont Alpha Road 2017 With Project PM
Stop (Two-Way)

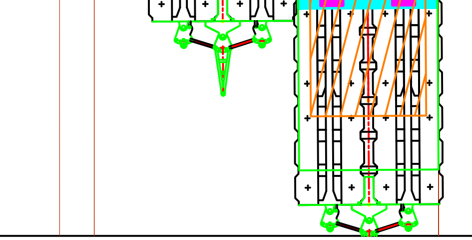
Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Capricorn Highway South											
1	L	34	20.0	0.050	8.8	LOS A	0.1	1.2	0.07	0.63	48.7
2	T	11	60.0	0.042	9.8	LOS A	0.2	1.9	0.26	0.53	48.8
3	R	16	20.0	0.042	10.0	LOS A	0.2	1.9	0.26	0.65	47.7
Approach		60	27.0	0.050	9.3	LOS A	0.2	1.9	0.15	0.62	48.4
East: Shakespere St											
4	L	16	20.0	0.010	8.8	LOS A	0.0	0.0	0.00	0.66	49.0
5	T	3	20.0	0.004	0.0	LOS A	0.0	0.2	0.05	0.00	58.9
6	R	3	20.0	0.004	8.9	LOS A	0.0	0.2	0.05	0.81	48.8
Approach		22	20.0	0.010	7.5	LOS A	0.0	0.2	0.01	0.59	50.1
North: Clermont Alpha Rd											
7	L	3	27.0	0.005	9.0	LOS A	0.0	0.1	0.04	0.64	48.8
8	T	22	42.9	0.094	10.1	LOS B	0.5	5.0	0.30	0.54	48.0
9	R	27	61.5	0.094	12.0	LOS B	0.5	5.0	0.30	0.68	46.9
Approach		53	51.6	0.095	11.0	LOS B	0.5	5.0	0.29	0.62	47.5
West: Capricorn Hwy West											
10	L	3	25.0	0.002	8.9	LOS A	0.0	0.0	0.00	0.66	49.0
11	T	3	25.0	0.031	0.1	LOS A	0.2	1.3	0.09	0.00	57.7
12	R	34	25.0	0.031	9.1	LOS A	0.2	1.3	0.09	0.65	48.5
Approach		40	25.0	0.031	8.4	LOS A	0.2	1.3	0.08	0.60	49.2
All Vehicles		175	33.1	0.095	9.4	NA	0.5	5.0	0.16	0.61	48.5

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

Appendix B Over Dimensional Vehicle Swept Paths (provided by DHL)

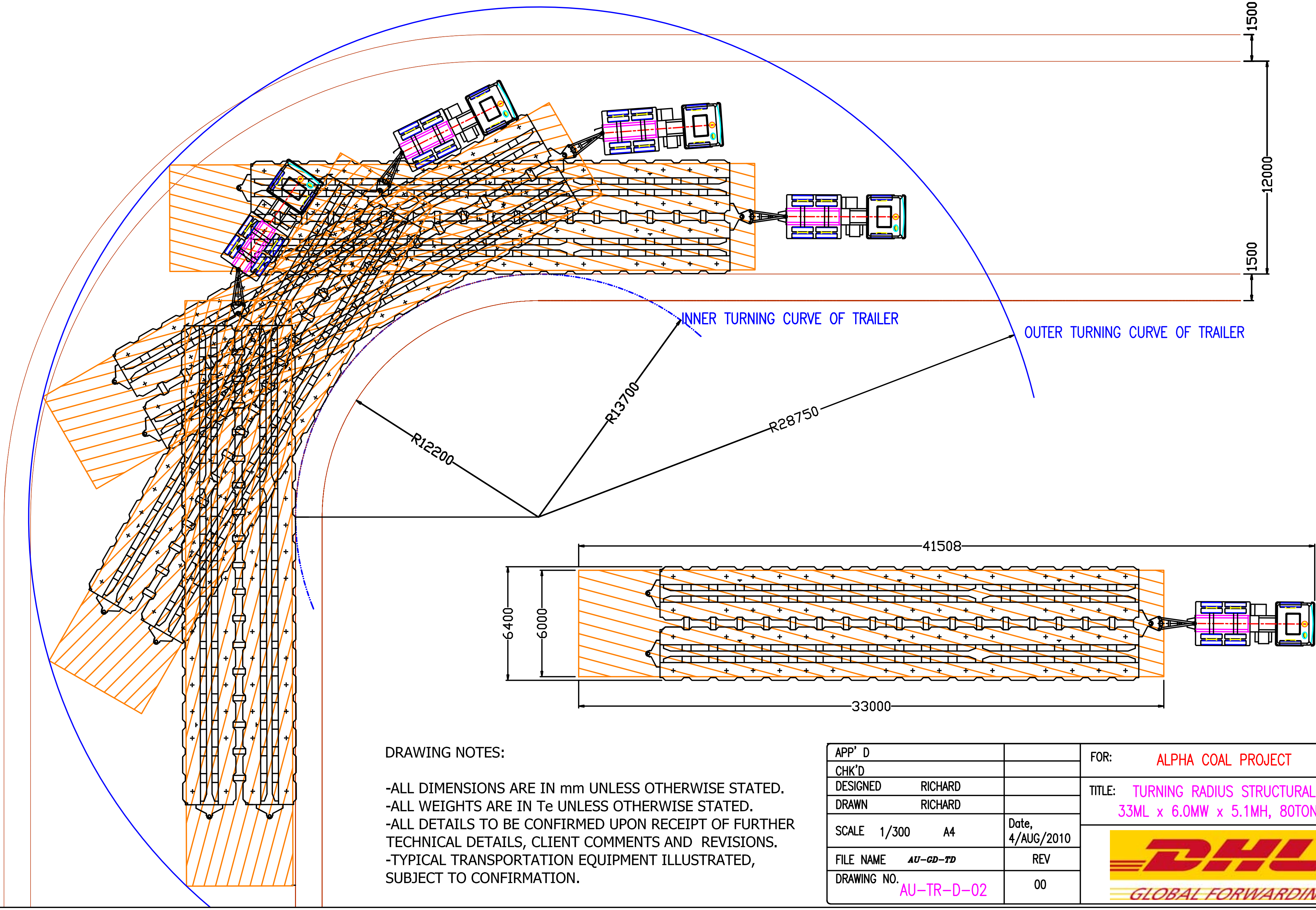




DRAWING NOTES:

-ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
-ALL WEIGHTS ARE IN Te UNLESS OTHERWISE STATED.
-ALL DETAILS TO BE CONFIRMED UPON RECEIPT OF FURTHER TECHNICAL DETAILS, CLIENT COMMENTS AND REVISIONS.
-TYPICAL TRANSPORTATION EQUIPMENT ILLUSTRATED, SUBJECT TO CONFIRMATION.

APP' D		FOR: ALPHA COAL PROJECT
CHK'D		
DESIGNED RICHARD		TITLE: TURNING RADIUS STRUCTURAL STEEL 40ML x 5.0MW x 5.1MH, 80TONNES
DRAWN RICHARD		
SCALE 1/300 A4	Date, 4/AUG/2010	DHL GLOBAL FORWARDING
FILE NAME AU-GD-TD	REV	
DRAWING NO. AU-TR-D-01	00	



DRAWING NOTES:

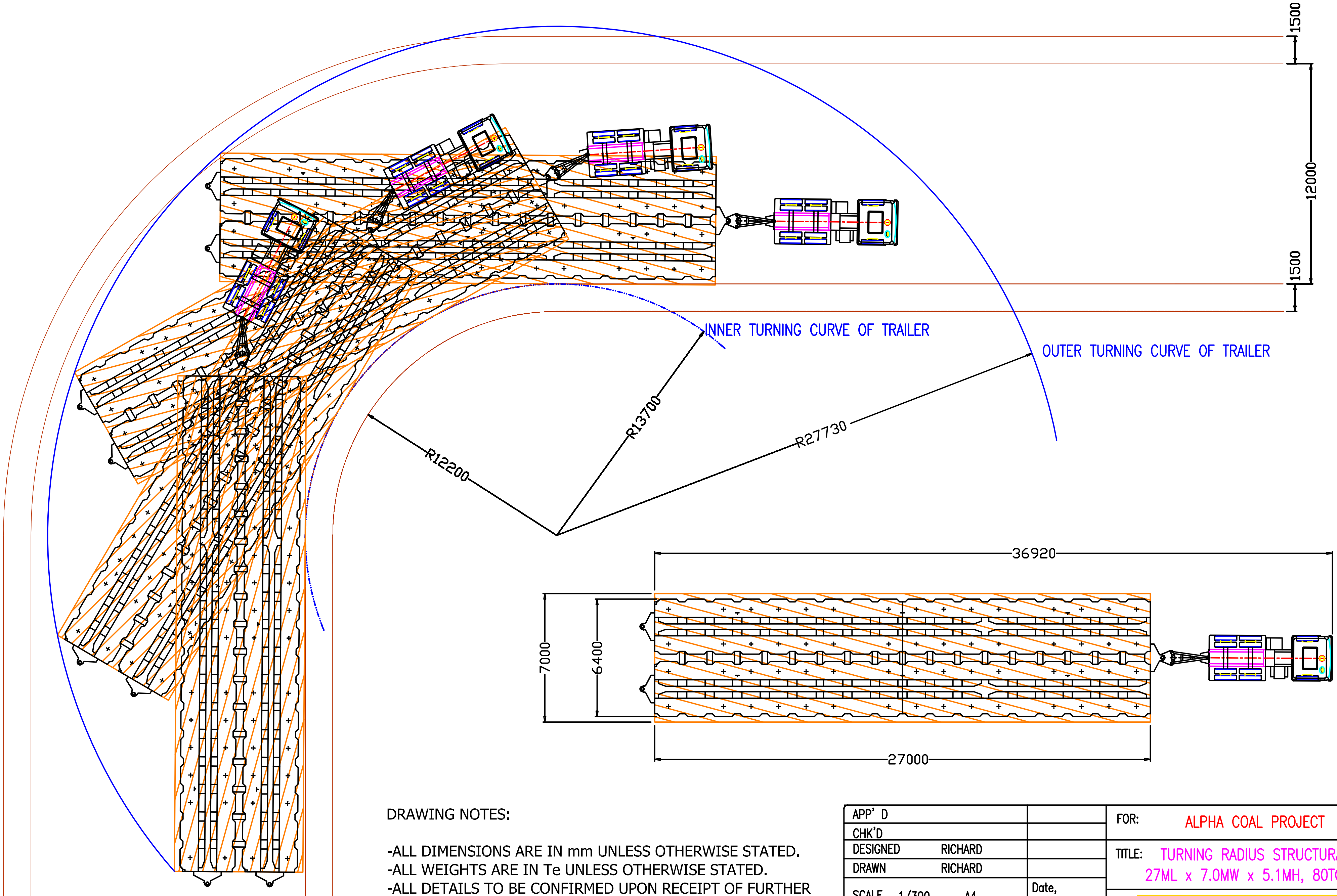
-ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
-ALL WEIGHTS ARE IN Te UNLESS OTHERWISE STATED.
-ALL DETAILS TO BE CONFIRMED UPON RECEIPT OF FURTHER TECHNICAL DETAILS, CLIENT COMMENTS AND REVISIONS.
-TYPICAL TRANSPORTATION EQUIPMENT ILLUSTRATED, SUBJECT TO CONFIRMATION.

APP' D		
CHK'D		
DESIGNED	RICHARD	
DRAWN	RICHARD	
SCALE 1/300	A4	Date, 4/AUG/2010
FILE NAME	AU-GD-TD	REV
DRAWING NO.	AU-TR-D-02	00

FOR: ALPHA COAL PROJECT

TITLE: TURNING RADIUS STRUCTURAL STEEL 33ML x 6.0MW x 5.1MH, 80TONNES

DHL GLOBAL FORWARDING



DRAWING NOTES:

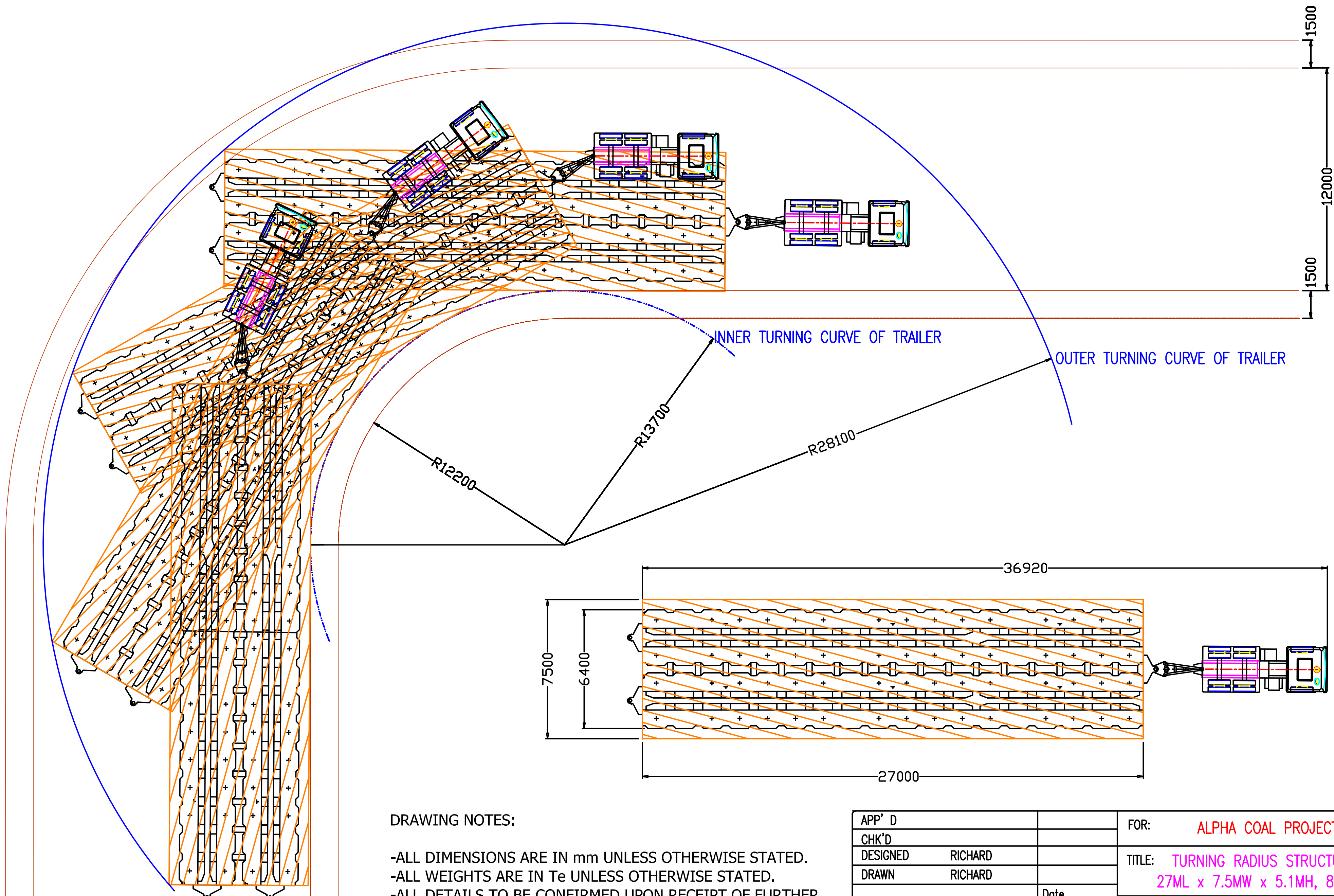
-ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
-ALL WEIGHTS ARE IN Te UNLESS OTHERWISE STATED.
-ALL DETAILS TO BE CONFIRMED UPON RECEIPT OF FURTHER TECHNICAL DETAILS, CLIENT COMMENTS AND REVISIONS.
-TYPICAL TRANSPORTATION EQUIPMENT ILLUSTRATED, SUBJECT TO CONFIRMATION.

APP' D		
CHK'D		
DESIGNED	RICHARD	
DRAWN	RICHARD	
SCALE 1/300	A4	Date, 4/AUG/2010
FILE NAME	AU-GD-TD	REV
DRAWING NO.	AU-TR-D-03	00

FOR: ALPHA COAL PROJECT

TITLE: TURNING RADIUS STRUCTURAL STEEL
27ML x 7.0MW x 5.1MH, 80TONNES

DHL GLOBAL FORWARDING



DRAWING NOTES:

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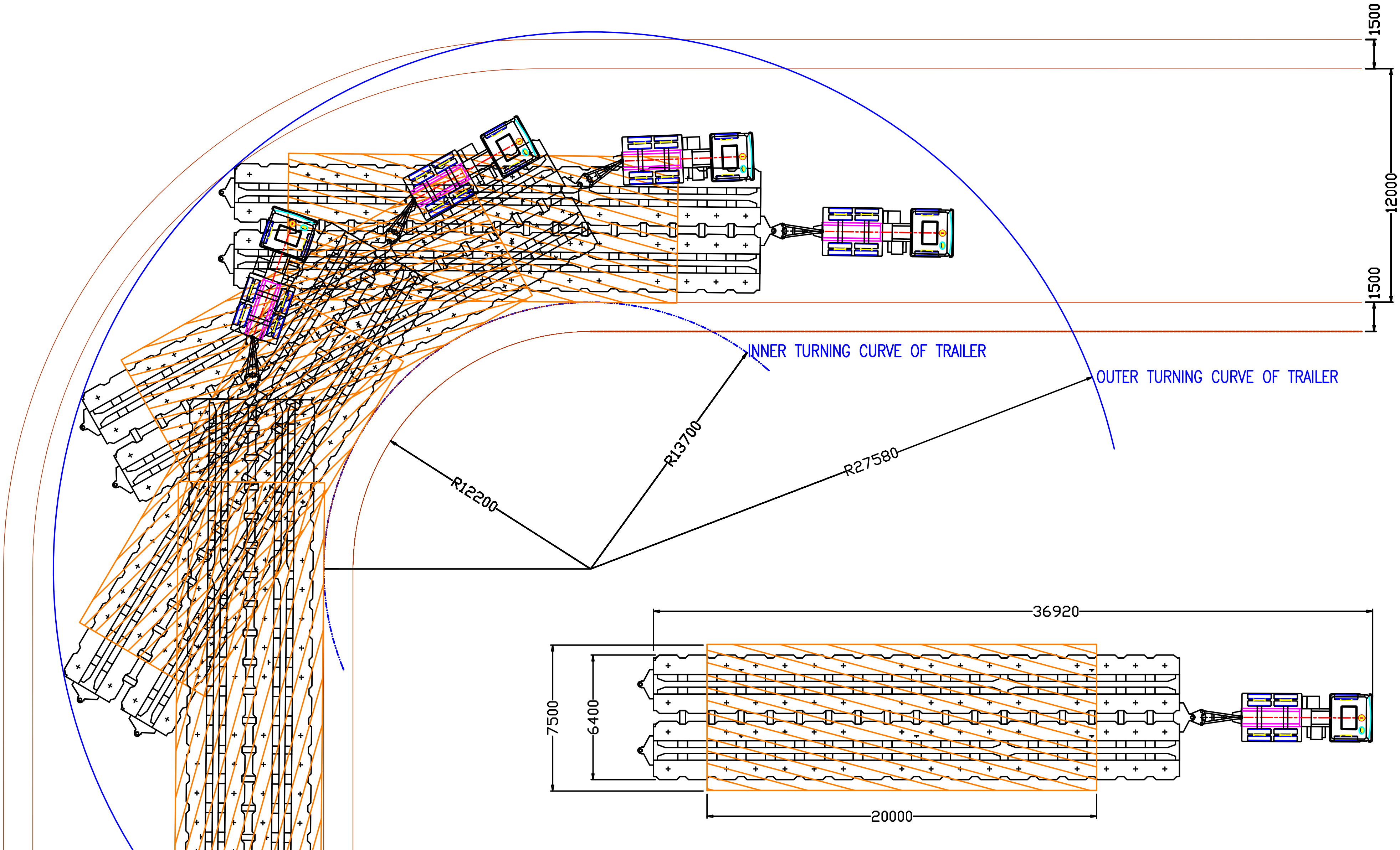
-ALL WEIGHTS ARE IN Te UNLESS OTHERWISE STATED.
-ALL DETAILS TO BE CONFIRMED UPON RECEIPT OF FURTHER TECHNICAL DETAILS, CLIENT COMMENTS AND REVISIONS.
-TYPICAL TRANSPORTATION EQUIPMENT ILLUSTRATED, SUBJECT TO CONFIRMATION.

APP' D		
CHK'D		
DESIGNED	RICHARD	
DRAWN	RICHARD	
SCALE 1/300	A4	Date, 4/AUG/2010
FILE NAME	AU-GD-TD	REV
DRAWING NO.	AU-TR-D-04	00

FOR: ALPHA COAL PROJECT

TITLE: TURNING RADIUS STRUCTURAL STEEL 27ML x 7.5MW x 5.1MH, 80TONNES

DHL GLOBAL FORWARDING



DRAWING NOTES:

-ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
-ALL WEIGHTS ARE IN Te UNLESS OTHERWISE STATED.
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-TYPICAL TRANSPORTATION EQUIPMENT ILLUSTRATED, SUBJECT TO CONFIRMATION.

APP' D			FOR: ALPHA COAL PROJECT
CHK'D			
DESIGNED	RICHARD		TITLE: TURNING RADIUS STRUCTURAL STEEL 27ML x 7.5MW x 5.1MH, 80TONNES
DRAWN	RICHARD		
SCALE	1/300 A4	Date, 4/AUG/2010	DHL GLOBAL FORWARDING
FILE NAME	AU-GD-TD	REV	
DRAWING NO.	AU-TR-D-05	00	

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